

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

COLLEGE PRODUCTS, INC.
Petitioner,

v.

INTIRION CORPORATION
Patent Owner

Case PGR2024- 00003
Patent No. 11,674,745

PETITION FOR POST GRANT REVIEW

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EXHIBIT LIST

Exhibit No.	Description
1001	U.S. Patent No. 11,674,745
1002	Expert Declaration
1003	Prosecution File History, U.S. Patent No. 11,674,745
1004	Original Intirion Complaint Filed on June 8, 2022.
1005-1007	RESERVED
1008	U.S. Application No. 14/262,290 (“the ’290 Application”), published as U.S. Publication 2014/0251982.
1009	Exemplary embodiment Claim chart 1 sent by Intirion related to U.S. Patent No. 11,274,876
1010	RESERVED
1011	U.S. Application No. 12/317,632 (“the ’632 Application”) published as U.S. Publication U.S. Pub. 2009/0188911 (“Emma”)
1012	“ISDU: Integrated Smoke detector Unit for Commercial Microwave Ovens”, Cory Lloyd <i>et. al</i> , Northeastern University (2007). (“ISDU”)
1013	RESERVED
1014	U.S. Patent No. 4,496,817 to Smith (“Smith”)
1015	U.S. Patent No. 8,446,048 to Butt (“Butt”)
1016	Redline Comparison between 290 and Emma
1017-1019	RESERVED
1020	U.S. Application No. 13/094,747 (“the ’747 Application”) published as U.S. Publication U.S. Pub. 2012/0276763A1 (“Quezada”)

Exhibit No.	Description
1021	Scheduling Order for <i>Intirion Corporation v. College Products, Inc.</i> , 5:23-cv-04023-KEM, Dkt. 75.
1022	Amended Complaint filed by Initiron Corporation, 5:23-cv-04023-KEM, Dkt. 62.
1023	Supplemental Expert Declaration related to the 11,674,745 Petition

College Products, Inc. (“College Products” or “Petitioner”) respectfully requests, pursuant to 35 U.S.C. §321 and 37 C.F.R. §42.200, Post Grant Review of claims 1, 12-15, 19-20, 22-26 (“Challenged Claims”) of U.S. Patent No. 11,674,745 (“the ’745 Patent”) as being invalid under 35 U.S.C. §§102/103 and claims 1-28 (“Indefinite Claims”) of the ’745 Patent as being invalid under 35 U.S.C. §112.

I. MANDATORY NOTICES (37 C.F.R. §42.8)

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

College Products is the real party-in-interest for this proceeding.

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

Petitioner is aware of the following judicial or administrative matters that would affect, or be affected by, a decision pending in this proceeding:

- *Intirion Corporation v. College Products, Inc.*, 5:23-cv-04023-KEM (N.D. Iowa) (“Iowa Transfer Case”).
- IPR2023-01041
- IPR2023-01042
- IPR2023-01043

The afore-mentioned proceedings involve six related U.S. patents: U.S. Patent 9,791,206; U.S. Patent 10,495,374; U.S. Patent 9,657,974; U.S. Patent 11,674,745; U.S. Patent 11,674,746; and U.S. Patent 11,274,876.

In the Iowa transfer case, the Court entered a Scheduling Order, but only up

to a claim construction hearing. Ex.1021. The Court will not set a trial date until after the claim construction hearing.

Concurrently with this Petition, Petitioner is filing a petition for PGR for U.S. Patent 11,674,746 (PGR2023-_____), which is related to the '745 Patent. For efficiency, Petitioner requests these two related PGR petitions be consolidated into one proceeding.¹

C. Lead and Backup Counsel (37 C.F.R. §42.8(b)(3))

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¹ A single expert declaration is provided for these two petitions because of the substantial overlap.

<u>Backup Counsel</u>	Alexander S. Perry (Reg. No. 68,030) BLANK ROME LLP 1825 Eye Street NW Washington D.C. 20006 Tel.:(202) 420-3115 / Fax:(202) 420-2201 alex.perry@blankrome.com
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D. Service Information (37 C.F.R. §42.8(b)(4))

Please direct all correspondence to lead counsel and backup counsel at the addresses shown above. Petitioner consents to electronic service by e-mail, provided that all counsel for Petitioner are copied at the foregoing email addresses.

E. Payment of Fees (37 C.F.R. §42.203)

The undersigned authorizes the Commissioner to charge the fee specified by 37 C.F.R. §42.15(b) to Blank Rome LLP Deposit Account No. 23-2185, referencing attorney docket number 163456-00106. In addition, the undersigned representative authorizes the Commissioner to charge any additional fees which may be required, or credit any overpayment, to that deposit account.

II. COMPLIANCE WITH REQUIREMENTS FOR POST GRANT PETITION PURSUANT TO 37 C.F.R. §42.204(a)

On June 28, 2023, Patent Owner served Petitioner with a First Amended Complaint for Patent Infringement in the Iowa Transfer Case, adding infringement of the '745 Patent as a new count. *See* Exhibit 1022. As such, this Petition is being filed within nine months of the grant of the patent.

Petitioner certifies that the '745 Patent is available for *Post Grant* review; and

(2) Petitioner is not barred or estopped from requesting *Post Grant* review of any of the challenged claims on the grounds identified herein.

Concurrently, Petitioner is filing a Power of Attorney pursuant to 37 C.F.R. §42.10(b). Proof of Service of this petition pursuant to §§42.6(e) and 42.205(a) is provided in the attached certificate of service.

III. SUMMARY OF THE ARGUMENT

The '745 Patent generally teaches a combined microwave-refrigerator appliance, where power is cut to the refrigerator during microwave use, and the microwave includes a smoke sensor and/or USB ports for charging low power devices.

The most critical prior art reference to the '745 Patent is one of its parent applications, U.S. Patent Application No. 12/317,632, which was published as U.S. Publication No. US20090188911A1 ("Emma"). The application that issued as the '745 Patent U.S. Patent Application No. 17/667,161 (the "745 Patent Application") was a continuation in part to Emma (through other intermediate applications). The Examiner did not consider Emma during prosecution, perhaps because he did not appreciate that Emma is prior art even though it is the parent. Emma discloses all the features of the microwave-refrigerator appliance recited in most of the Challenged Claims, except for a smoke sensor or a USB port.

Smoke sensors were used in microwaves decades before the '745 Patent's

priority date. Multiple prior art references discussed herein that were not considered by the Examiner disclose smoke sensors in microwaves, including re-enabling the microwave after a smoke sensor shutdown. Those references include ISDU: Integrated Smoke detector Unit for Commercial Microwave Ovens, Cory Lloyd *et. al*, Northeastern University (“ISDU”) published on April 17, 2007, and U.S. Patent No. 4,496,817 (“Smith”) which issued on January 29, 1985. Had the Examiner considered Emma as prior art and considered microwave smoke sensing references like ISDU and Smith, the Challenged Claims would not have been allowed. As discussed below, claims 1, 13, 15, 20, 22 and 24-25 of the ’745 Patent are unpatentable in view of Emma (disclosing a microwave-refrigerator appliance), combined with ISDU, Smith, or Butt, (disclosing a resettable smoke sensor shutdown of microwaves).

Further, Emma teaches using auxiliary charging ports on a microwave to charge small devices, like cell phones. At the time of the invention, USB ports had been standardized world-wide as a means for charging electronic devices, including as taught by U.S Publication U.S. Pub. 2012/0276763A1 (“Quezada”). As discussed below, claims 12, 14, 19, 23, and 26 are unpatentable in view of Emma (disclosing a microwave-refrigerator appliance with auxiliary charging ports), combined with the knowledge of a POSITA, or Quezada, which teaches USB ports for charging.

As a final matter, Petitioner notes that Patent Owner did not disclose to the Examiner the references discussed herein or related lawsuits and IPR proceedings, even though it had a duty to do so. During prosecution of the '745 Patent, Patent Owner sued Petitioner based on four patents related to the '745 Patent. Petitioner counterclaimed, alleging the patents were invalid over, *inter alia*, Emma and ISDU. Petitioner also filed three IPR proceedings against the related patents, alleging the claims were anticipated or obvious in view of Emma, ISDU, Smith, and/or Butt. Though the '745 Patent was pending at the time of this activity, none of the inventors, Patent Owner, or counsel disclosed the litigation, IPR proceedings, or prior art disclosed therein to the Examiner.

IV. U.S. PATENT NO. 11,674,745

The technology of the '745 patent relates, generally to a microwave oven and refrigerator combination that includes a smoke sensor and, in certain dependent claims, a USB port. Ex. 1023 ¶[11].

A. **Effective Filing Date is No Earlier than April 25, 2014**

The '745 Patent, entitled “Multiple Linked Appliance with Auxiliary Outlet,” was filed as application no. 17/667,161 on February 8, 2022. Ex. 1001 at (21), (22), (54). The '745 Patent claims priority as a continuation-in-part (“CIP”) to U.S. Application No. 14/262,290 (“the '290 Application”), which was filed on April 25, 2014, and published as U.S. Pub. 2014/0251982. *Id.* at (63); Ex. 1008. The '290

Application claims priority as a CIP to U.S. Application No. 12/317,632 (“the ’632 Application”), which was filed on December 23, 2008, and published as U.S. Pub. 2009/0188911 (“Emma”). Ex. 1008 at (63); Ex. 1011 at (10), (21), (22). As explained below, none of the Challenged Claims are entitled to claim priority to the Emma filing date.

As shown in Section VI.C.1 below, each of the Challenged Claims contain at least the following basic elements: Microwave Oven, Control Circuit, and Smoke Sensor, configured to (i) supply a Shutdown Function to the microwave oven based on the Smoke Sensor and (ii) provide a Reset Enable Function so that the microwave oven may be turned back on.² As shown in the attached redline comparison of Emma and the ’290 Application, a smoke sensor was first mentioned in the ’290 Application. *See* Ex. 1016, Ex. 1011 ¶[0055]. As that element and others were not disclosed in Emma, the Challenged Claims cannot claim priority to Emma. The earliest possible priority date for the Challenged Claims is the filing date of the ’290 Application, or April 25, 2014.

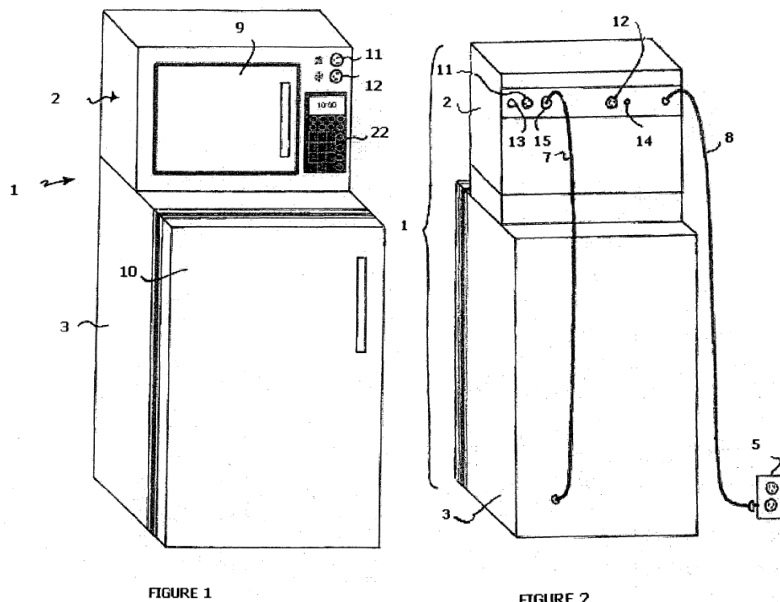
For purposes of this petition, Petitioner assumes that April 25, 2014 is the earliest priority date of the ’745 Patent. However, Petitioner is not conceding the

² Capitalized terms refer to elements of the Challenged Claims as shown in the Listing of Challenged Claims, attached as Petition Appendix A.

Challenged Claims are entitled to that priority date. Petitioner reserves the right to contest in the parallel litigation proceedings that the Challenged Claims are not enabled by the '290 Application.

B. Specification

The following discussion of the '745 Patent specification includes a discussion of its CIP parent Emma because of the substantial overlap, as would be expected. The '745 Patent is directed to a microwave oven and refrigerator combination that includes a smoke sensor and/or a USB port. As discussed below in Section VI.B.2.b, Emma, prior art to the '745 Patent, discloses a microwave oven and refrigerator combination, as shown in Figures 1 and 2 below, with auxiliary ports 11 and 12 and an electrical control scheme to prevent the combination from overloading. Ex. 1011 at Figs. 1-2; Ex. 1002 ¶[64]; Ex. 1023 ¶[19].



The auxiliary ports 11 and 12 “permit convenient access for plugging in low power device[sic] for example, rechargeable devices, such as cellular phones...” Ex. 1001 at 3:64-67. Emma generally describes a system where power to the refrigerator and auxiliary ports is cut off when the microwave is turned on. When the microwave is turned off, power is restored to those components. Emma states: “a combination microwave and refrigerator System is constructed having a single plug input supply. Ex. 1011 at Abstract. “The microwave oven is adapted to provide power to a refrigerator, and to auxiliary receptacles ... a microprocessor controller adapted to monitor operation of the refrigerator compressor and controls the power to the microwave magnetron and other components.” *Id.*, ¶[0008]. Moreover, as part of the device’s electrical control scheme, power to both the refrigerator and the auxiliary power receptacles are disabled when the microwave demands cooking power. Emma states: “When power to the microwave is demanded, the compressor is disabled for a preset minimum period. When microwave demand ceases, refrigerator power is restored...The control model is adapted to disable the power to the auxiliary receptacles, if the microwave is in operation.” *Id.*, ¶[0011-12]; Ex. 1002 ¶[65]; Ex. 1023 ¶[19].

Emma Figure 4 (below) shows a control circuit with the microwave controller 4 electrically controlling relays 19 and 20 for cycling power to refrigerator receptacle

15 and the auxiliary ports 11 and 12:

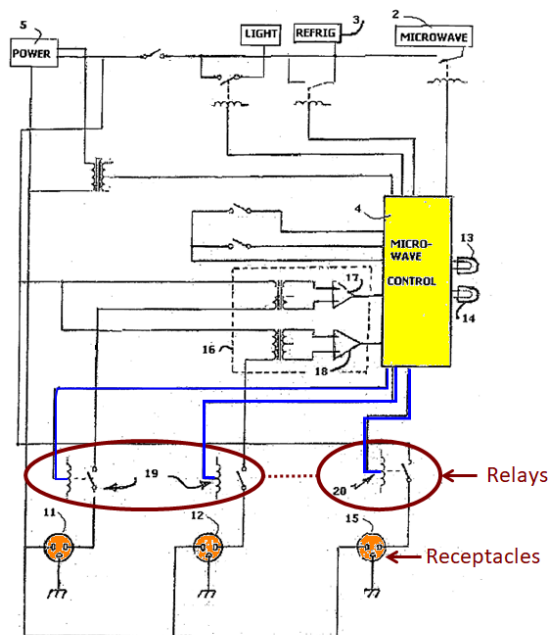


FIGURE 4

Id. at Fig. 4 (annotated); Ex. 1002 ¶[66].

The '745 Patent includes the same microwave-refrigerator combination as Emma but adds a smoke sensor that can send a signal to shut down the microwave oven if smoke is detected and where the microwave is enabled to receive cooking power following the shutdown. Ex. 1001. “[A] safety sensor... such as a smoke or gas sensor may be provided in the microwave oven 2. The smoke sensor 226 operates . . . to turn off the microwave oven upon sensing smoke or polluted air indicative of a potentially dangerous condition...” *Id.* at 14:12-18. “The alcohol/[smoke] sensor 226 may be reset automatically responsive to the alcohol sensor 226 no longer detecting gas indicative of the dangerous condition.

Alternatively, or in addition, the alcohol sensor 226 may be reset upon a sensor sensing opening of the door 9 of the microwave oven 2.” *Id.* at 15:23-28; Ex. 1002 ¶[67]; Ex. 1023 ¶[71, 72].

The ’745 Patent also adds USB port(s) as an alternative for the auxiliary ports 11 and 12 disclosed in Emma. “As shown in FIGS. 15, 16 and 27, the exemplary front control panel 22 of the microwave oven 2 may include Universal Serial Bus (USB) ports 232, 234 for connection, communication, and power supply between the front control panel 22 and electronic devices such as a personal computer, cell phone, Smart Phone, Ipod®, Ipad®, or other suitable device to allow communication and/or charging of the electronic device plugged into the USB ports.” Ex. 1001 at 20:8-15, Ex. 1023 ¶[25-28].

C. The Claims

The ’745 Patent has 28 claims, with claims 1, 15, and 24 being independent (the “Independent Claims”). Ex. 1001 at claims 1-28. All Independent Claims are part of the Challenged Claims and the Indefinite Claims. The Independent Claims, as well as the rest of the Challenged claims, can be found in the listing of the claims attached as Petition Appendix A in which Petitioner provides descriptors for the claim elements, which are used throughout this petition. Furthermore, as discussed below each of Independent claims 1, 15 and 24 are indefinite as to their scope, *see infra* at §VI.E, and none of the dependent claims 2-14, 16-23 and 25-28 remedy the

deficiencies of the Independent claims. Accordingly, each or the Indefinite Claims are also invalid with the Independent Claims.

V. **CHALLENGE AND RELIEF REQUESTED**

A. **Challenged Claims, Specific Art, and Statutory Grounds**

Petitioner requests institution of trial and cancellation of the Challenged Claims of the '745 Patent. The specific grounds for each Challenged Claim are summarized as follows:

Ground 1: Claims 1, 13, 15, 20, 22, and 24-25 are obvious under 35 U.S.C. §103 in view of Emma combined with ISDU;

Ground 2: Claims 1, 13, 15, 20, 22, and 24-25 are obvious under 35 U.S.C. §103 in view of Emma combined with Smith;

Grounds 3 and 4: Claims 1, 13, 15, 20, 22, and 24-25 are obvious under 35 U.S.C. §103 in view of Emma combined with Butt and/or alternatively obvious under 35 U.S.C. §103 in view of Emma combined with Butt and Smith;

Grounds 5 and 6: Claims 12, 14, 19, 23, and 26 are obvious under 35 U.S.C. §103 in view of Emma combined with either ISDU or Smith, and further combined with the knowledge of a POSITA.

Grounds 7 and 8: Claims 12, 14, 19, 23, and 26 are obvious under 35 U.S.C. §103 in view of Emma combined with either ISDU or Smith, and further combined with Quezada.

Grounds 9: Claims 1-28 are invalid under 35 U.S.C. §112(b) as being indefinite.

B. Claim Construction

Petitioner does not believe any claim term requires a construction to find the Challenged Claims invalid for the reasons provided in this Petition.³ Ex. 10023 ¶[47]. However, as explained below, Petitioner applies Patent Owner’s interpretations of one claim term to avoid unnecessary arguments regarding claim construction. The Challenged Claims are invalid even using Patent Owner’s constructions. *Id.*, ¶[49].

1. “Level of smoke”

Claims 1 and 24 recite: “responsive at least in part to a level of smoke sensed by the smoke sensor” Ex. 1001 at claims 1, 24. Claim 15 recites: “responsive at least in part to the smoke sensor sensing an amount of smoke.” Ex. 1001 at claim 15. Based on its contentions in the Iowa Transfer Case on related patents, Patent Owner interprets “level of smoke” and “amount of smoke” as merely detecting smoke. Ex. 1009 at 6. Petitioner applies what it understands Patent Owner contends is the

³ Petitioner reserves all rights to raise claim construction and other arguments, including challenges under 35 U.S.C. §§101 or 112, in district court as relevant to those proceedings. *See, e.g., Target Corp. v. Proxicom Wireless, LLC*, IPR2020-00904, Paper 11 at 11-13 (P.T.A.B. Nov. 10, 2020).

meaning of this term in this Petition and shows below the claims are invalid under Patent Owner's construction. However, Petitioner does not adopt Patent Owner's construction and reserves all rights to contest Patent Owner's construction in the related litigation proceedings, including that this term is indefinite. Ex. 10023 ¶[50].

C. Unpatentability

The Challenged Claims are unpatentable as detailed in Section VI.

D. Supporting Evidence

Petitioner's exhibits are filed herewith. The relevance of the evidence, including identification of specific evidence that support this challenge is found in Sections VI.A-VI.C. Petitioner submits the Original and Supplemental declaration of Mark N. Horenstein (respectively, Ex. 1002 and 1023) in support of this Petition pursuant to 37 C.F.R. §1.68.

VI. THE CHALLENGED CLAIMS ARE UNPATENTABLE

A. The Level of Ordinary Skill in the Art

In this case, a POSITA would have had at least a bachelor's degree in electrical engineering or computer engineering. Ex. 1002 ¶[50]; Ex. 1023 ¶[6]. Alternatively, a POSITA could have had a bachelor's degree in mechanical engineering, industrial engineering, physics, or a related engineering or discipline, plus at least two years of experience working with control circuits, sensors, kitchen appliances, or similar fields. *Id.*

B. The Scope and Content of the Prior Art**1. The Prior Art is Analogous**

A POSITA would understand the field of the invention to be electrical kitchen appliances including refrigeration and cooking appliances, including their control circuits to enable functions such as smoke sensing and power delivery. Ex. 1023 ¶[48]. For example, the '745 Patent describes the field as “improvements to appliances that include compact refrigerator and microwave oven functionality” Ex. 1001 at 1:8-9. Similarly, the Background and Summary sections disclose: “Compact refrigerators and associated appliances may benefit from improvements,” and “In one exemplary arrangement, an appliance apparatus is provided that includes a microwave oven,” respectively. *Id.* at 1:21-22, 1:26-27.

As shown below, Emma, ISDU, Smith, and Butt are from this exact same field i.e., electrical kitchen appliances, qualifying them as analogous prior art. Ex. 1002, ¶[95]; Ex. 1023 ¶[38]. Moreover, Emma, ISDU, Smith, and Butt are directed to the same type of subject matter as in the '745 Patent. *Id.* These references relate to using logic circuitry in a microwave-refrigerator combination to shut power to the microwave when the refrigerator is in use (e.g., Emma) or relates to smoke or gas sensing in an electrical cooking appliance to shut down the appliance to prevent over cooking and/or prevent a fire from accelerating (e.g., ISDU, Smith, and Butt). *Id.* Finally, Quezada is analogous art because it is reasonably pertinent to the problem

faced by the inventor. Ex. 1023 ¶[38]. The '745 Patent teaches adding USB ports to a microwave having auxiliary electrical outlets to charge small electronic devices. Quezada also addresses charging small electronic devices by integrating USB ports and electrical outlets. *Id.*

2. The Prior Art References

Emma, which the '745 Patent claims priority from, is a critical prior art reference to the Challenged Claims but was not referenced or cited by the Examiner as prior art. Emma is prior art because the Challenged Claims claim new matter not disclosed in Emma. *Supra* at §IV.A. The Examiner may not have appreciated Emma is prior art because it is the parent patent.

Prior art references ISDU, Smith, Butt, and Quezada were not of record in the prosecution of the '745 Patent.

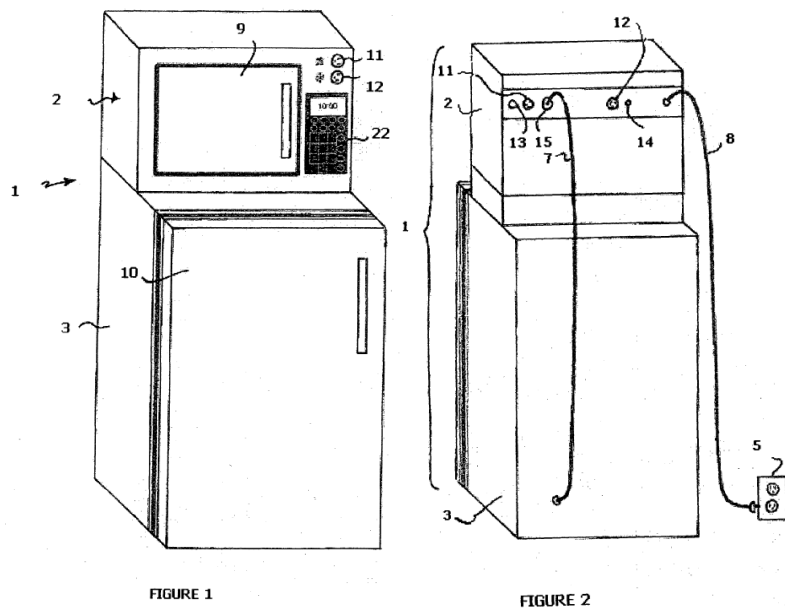
a. *Emma*

U.S. Patent Publication No. 2009/01889117 (“Emma”) (Ex. 1011), entitled “Multiple Linked appliances with Auxiliary Outlet,” published on July 30, 2009. Ex. 1011. Emma is prior art pursuant to at least 35 U.S.C. §102(a)(1). As discussed above, Emma is a parent application to the '745 Patent and is prior art. *Supra* at §IV.A.

Emma is directed to a combination microwave refrigerator in which the refrigerator is plugged into an auxiliary outlet that is controlled by a control circuit

adapted to open and close one or more power relays. Ex. 1011 at Abstract. The control circuit controls relays to supply or withdraw power to the refrigerator and/or other loads while the microwave is actively operating for the purpose of preventing an overload condition on the supply circuit. *See id.*, ¶¶0025-27; Ex. 1002 ¶64].

As shown in Figures 1 and 2 (reproduced below), Emma discloses a microwave oven refrigerator combination in which the refrigerator connects to a receptacle 15 power supply outlet on the microwave oven with both appliances being powered by a single cord 8. Ex. 1011 ¶[0008]; Ex. 1002 ¶[111].



Ex. 1011 at Figs. 1 and 2.

Furthermore, the “microwave oven includes a microprocessor controller adapted to monitor operation of the refrigerator compressor and controls the power

to the microwave magnetron and other components.” *Id.*, ¶[0026]; Ex. 1002 ¶[112].

As shown in the below diagram of the control circuit (Figure 4), Emma discloses a control circuit providing for digitally operating relays 19, 20 for controlling the receptacles 11, 12, and 15; Ex. 1002 ¶[113].

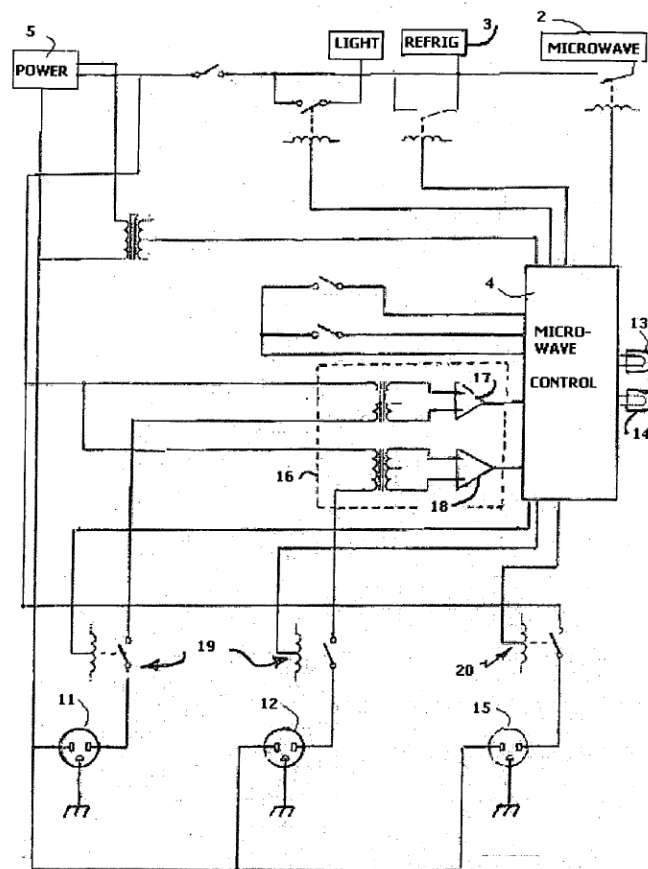


FIGURE 4

Ex. 1011 at Fig. 4.

Emma discloses “[t]he current demands of the microwave 2 are generally the most significant contribution to overload....” *Id.*, ¶[0033]. As shown in Figure 6 (below), to avoid overload conditions, Emma discloses several control methods to

disable and/or limit power to the refrigerator during microwave operation. *Id.*, ¶[0037]; Ex. 1002 ¶¶[114-15].

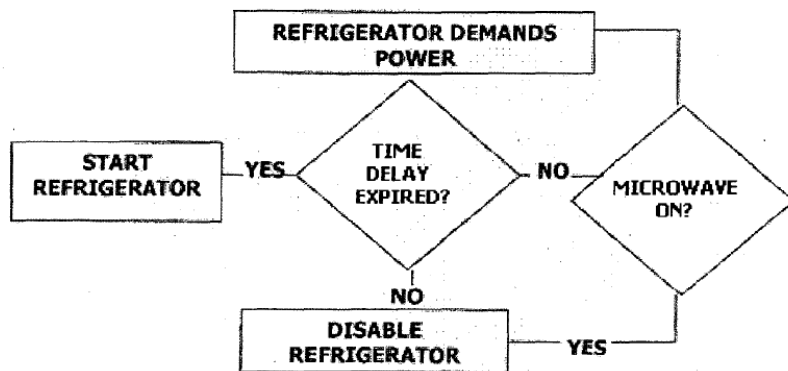


FIGURE 6

Ex. 1011 at Fig. 6.

For example, when the refrigerator demands power, it will first check to see if the microwave is on. *Id.* If it is, it will not start. *Id.* If the microwave oven is not on and the time delay has expired (a method used in Emma to “prevent undesirabl[e] rapid on/off cycles”), the refrigerator may receive power. *Id.*, ¶[0030].

As shown in Figure 1 above, Emma also discloses auxiliary ports 11 and 12 on the microwave panel to “permit convenient access for plugging in low power device[sic] for example, rechargeable devices, such as cellular phones...” Ex. 1011 ¶[0026]. Emma states: “The control model is adapted to disable the power to the auxiliary receptacles, if the microwave is in operation.” *Id.*, ¶¶[0011-12]; Ex. 1002 ¶[65].

b. ***ISDU***

ISDU: Integrated Smoke detector Unit for Commercial Microwave Ovens, Cory Lloyd *et. al*, Northeastern University (“ISDU”) published on April 17, 2007, on “IRis”. Ex. 1012. IRis was a “digital archive,” indexed on Google and readily accessible worldwide, that allowed Northeastern University researchers, starting in 2006, to publish their work to “promote and preserve their intellectual output” and was a precursor to Northeastern University’s more current Digital Repository Service. Ex. 1002 ¶¶[96-98]. Per IRis’s publishing practices, ISDU was published and publicly available in Northeastern University’s digital archive in 2007. *Id.* ISDU is prior art pursuant to at least 35 U.S.C. §102(a)(1). *See Id.*, ¶[98].

ISDU discloses, among other things: that “smoke detection devices be integrated into range ovens and microwaves ... when smoke is detected during microwave operation, the device will temporarily disable microwave operation and let the user know that the food has begun to smoke or even burn.” Ex 1012 at 1. Reproduced below is a diagram of ISDU’s smoke detector circuit interface:

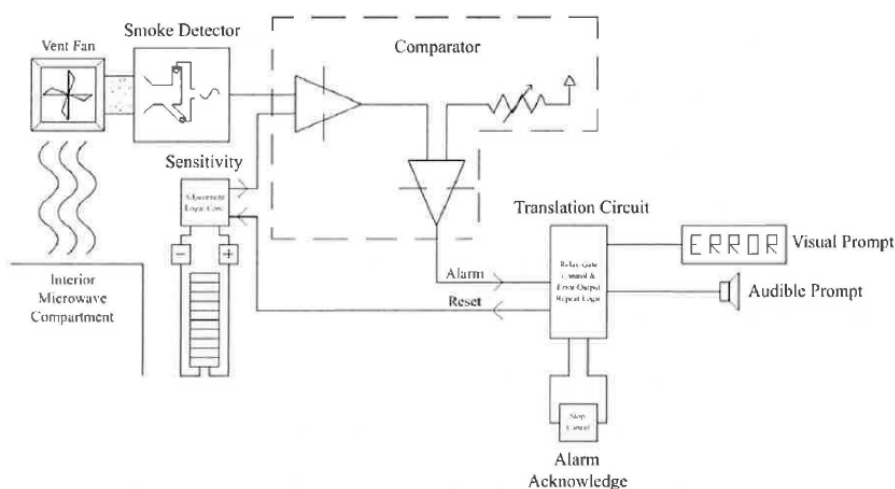


Figure 4

Id. at Fig. 4; Ex. 1002 ¶[99].

The microwave in the above diagram includes a vent fan, where air will flow through to the smoke detector. If the detector reaches its predetermined condition, then a signal is sent to the translation circuit to shut down the microwave oven and emit an audible alarm, a visual prompt and waits for the user’s acknowledgement:

[O]nce smoke is detected, we will send a signal that lets a circuit interrupt the power to the microwave through the use of a ‘soft’ power-off function already in use by the microwave logic. This will stop the

microwave while simultaneously sounding an alarm. After the alert, the user will be able to reset the microwave, change its sensitivity, or stop microwaving.

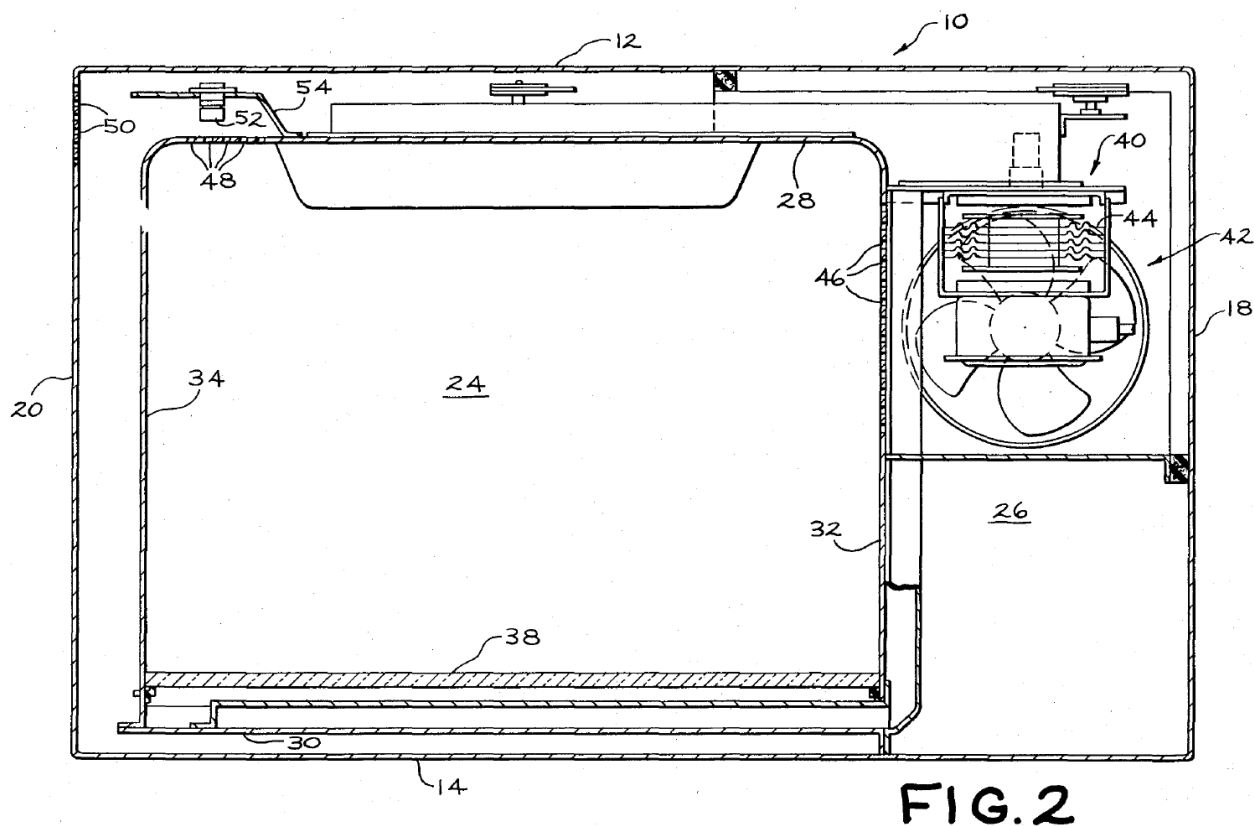
Id. at 6.

“Acknowledgement of the alarm state will reinstate all normal microwave functions and reset the smoke detector circuit for further use.” *Id.* at 8; Ex. 1002 ¶[100].

c. ***Smith***

U.S. Patent No. 4,496,817 (“Smith”) (Ex. 1014), entitled “Automatic Fire Detection for Microwave Oven,” issued January 29, 1985. Ex. 1014. Smith is prior art pursuant to at least 35 U.S.C. §102(a)(1).

Smith discloses “a method and apparatus for anticipating the occurrence of a fire in the cooking cavity of a microwave oven.” *Id.* at 1:55-57. Smith discloses that “before actually reaching the ignition point, the food begins to char, smoke or smolder” resulting in a period of “rapidly increasing gas concentration in the circulating air....” *Id.* at 3:51-56. As shown in Figure 2 (reproduced below), the oven [10] in Smith has “a blower for continuously circulating air and a sensor [52] responsive to the concentration of gases in the circulating air.” *Id.* at Abstract.



Id. at Fig. 2.

Smith further discloses that “upon the detection of a characteristic rate of change indicative of the load being heated closely approaching its combustion point, power to the oven is turned off and indication is provided to the user that a combustion condition in the oven cavity is imminent.” *Id.* at 1:57- 2:4; Ex. 1002 ¶[104].

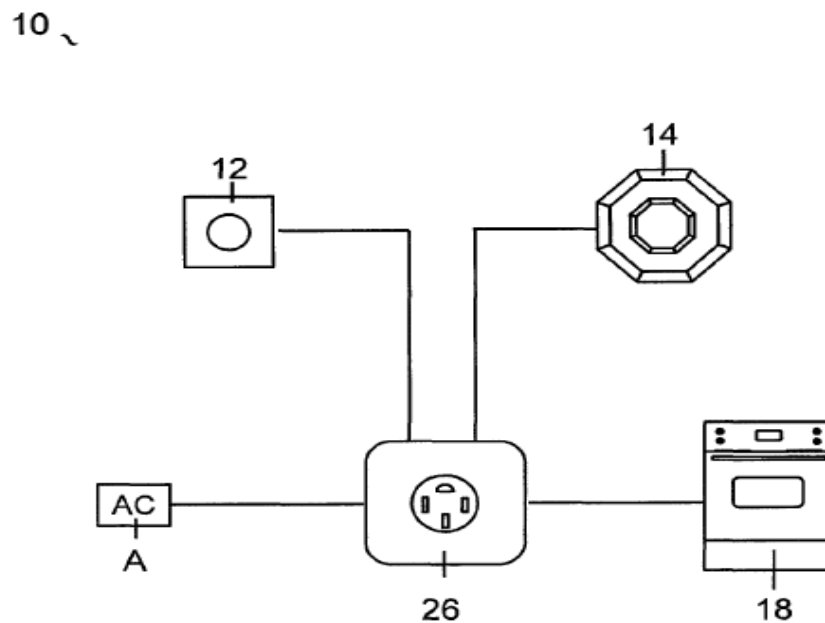
d. *Butt*

U.S. Patent No. 8,446,048 (“Butt”) (Ex. 1015), entitled “Controller for a safety shut-off system,” issued May 21, 2013, based on application no. 12/733,212 filed on 04/29/2010, which was a national stage entry of PCT/CA2008/001462 filed

on August 18, 2008. Ex. 1015. Butt is prior art pursuant to at least 35 U.S.C. §102(a)(1).

Butt discloses a safety shutoff for electrical kitchen appliances. *Id.* at 3:64-66. In particular, “a controller for interrupting a supply of electricity to an appliance upon detection of a trigger, such as Smoke.” *Id.* at 1:16-18. Specifically, “[t]he trigger may be, for example, a signal from a hazard detector such as a smoke detector.” *Id.* at 2:33-34. And the signal can be “transmitted... either wirelessly or using a wired connection.” *Id.* at 2:51-52; Ex. 1002 ¶[106].

Figure 1B



Ex. 1015 at Fig. 1B.

For example, as shown in Figure 1B (reproduced above), Butt discloses the system 10 may include a smoke detector 14 connected to a circuit box 26 housing a controller 20. “If the detector 14 detects the presence of smoke, then ... signal 15 is transmitted and is received by the controller 20. Upon receiving the signal, the controller interrupts the AC power supply to the appliance 18 and consequently shuts the appliance 18 off.” *Id.* at 4:53-58. As a result, “the energy that would otherwise act as an accelerant for the fire is eliminated, and the progress of the fire is slowed.” *Id.* at 4:58-60; Ex. 1002 ¶[107].

Butt discloses a reset button 12 that re-enables the system for further use by checking for a smoke alarm system signal and then closing a relay to reconnect the electrical appliance to AC power. *See* Ex. 1015 at 6:53-7:20; Ex. 1002 ¶[108].

e. ***Quezada***

U.S. Patent Pub. No. 2012/0276763 (“Quezada”) (Ex. 1020), entitled “Wall Mountable Universal Serial Bus and Alternating Current Power Sourcing Receptacle,” published on November 1, 2012. Ex. 1020. Quezada is prior art pursuant to at least 35 U.S.C. §102(a)(1).

Quezada teaches combining a USB port with a standard alternating current (AC) power outlet to conveniently provide a direct current (DC) power source via a USB connector alongside the standard outlet. Ex. 1020; Ex. 1023 ¶[41]. The

embodiment in Quezada Fig. 2 (see below) shows a power sourcing receptacle 100 that includes both a 120-V AC electrical receptacle 102 (red), and a USB receptacle 104 (blue). *Id.*, Ex. 1020 ¶[0023].

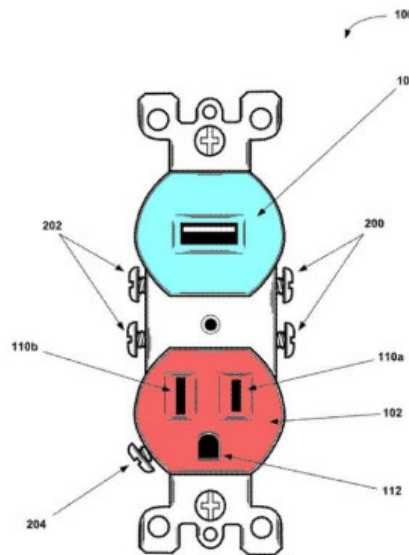


FIG. 2

Ex. 1020, Fig. 2 (annotated).

“The USB receptacle 104 provides 100-150 milliamps (mA) and 5 volts direct current (DC) to devices inserted into USB receptacle 104.” Ex. 1020, ¶[0025]; Ex. 1023, ¶[42]. Thus, the USB receptacle 104 can provide DC power to computer peripherals, digital cameras, printers, personal media players, flash drives, “and other devices capable of accepting power or charge via a USB connector.” *Id.*

Figure 6 from Quezada, replicated below, is a block diagram showing the flow of power to the USB port 104 and AC receptacle 102. Ex.1020, ¶[0039]; Ex. 1023, ¶[43]. The “main power source” supplies power directly to 120-V AC receptacle

102 (red) and directly to USB regulated voltage sourcing unit (“RVSU”) 600 (yellow). *Id.*, Ex. 1020, ¶[0039]-[0040]. The RVSU in turn provides 5-V DC power to the USB receptacle (i.e., “port”, blue) 104.

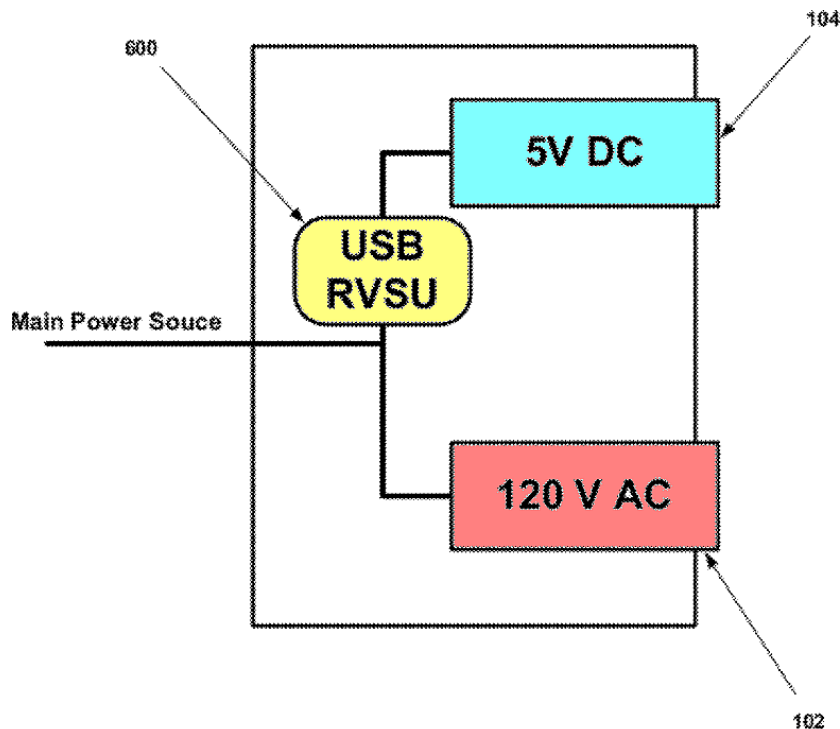


FIG. 6

Ex. 1020, Fig. 6 (annotated).

As shown below in Quezada Fig. 7, the USB RSVU 600 includes a transformer 700 (red) that steps down the incoming source voltage from the 120-V AC main power supply to 5-V AC; rectifier 702 (green) converts the latter voltage from alternating to a “pulsating DC voltage.” Filter 704 (purple) then smooths rectified voltage into a DC voltage. Voltage regulator 706 (blue) then produces and maintains the precisely regulated 5-V DC sent to the USB port. Ex. 1020, Fig. 7,

¶[0041]; Ex. 1023, ¶[44].

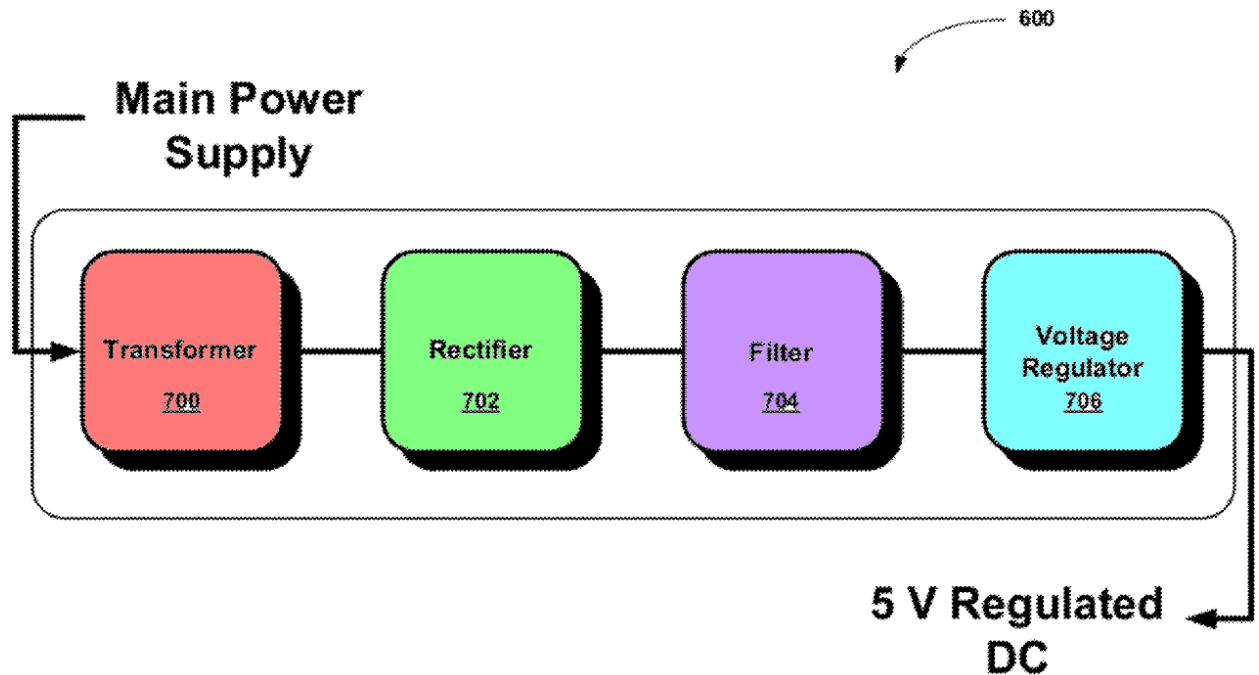


FIG. 7

Ex. 1020, Fig. 7 (annotated).

As such, the USB RVSU 600 provides a 5-volt regulated voltage to USB port 104. *Id.*

C. Differences Between the Claimed Subject Matter and the Prior Art

1. The Prior Art References Teach All Elements of the Challenged Claims.

The teachings of the prior art references are mapped to each element of the Challenged Claims below. Due to the similarity of the claims, the analysis is organized by reference to the basic claim elements common to each of the

Challenged Claims. However, where an element differs from the basic common element, that claim element is specifically analyzed.

a. ***The Independent Claims (Claims 1, 15, and 24) and Claim 25***

i. *Microwave Oven*⁴

(A) Emma

Emma discloses an appliance with a microwave oven that has an interior cooking area: “A system of linked appliances comprising: a microwave oven connected to a source of power.” *See, e.g.*, Ex. 1011 at Claim 1. As shown below in Figure 2, the microwave oven 2 is connected to power source 5 (pink). *Id.*, ¶[0026]; Ex. 1002 ¶¶[138-39, 285]; Ex. 1023 ¶[53].

⁴ Capitalized terms refer to elements of the Independent Claims and dependent claim 25 as shown in the Listing of Challenged Claims, attached as Petition Appendix A.

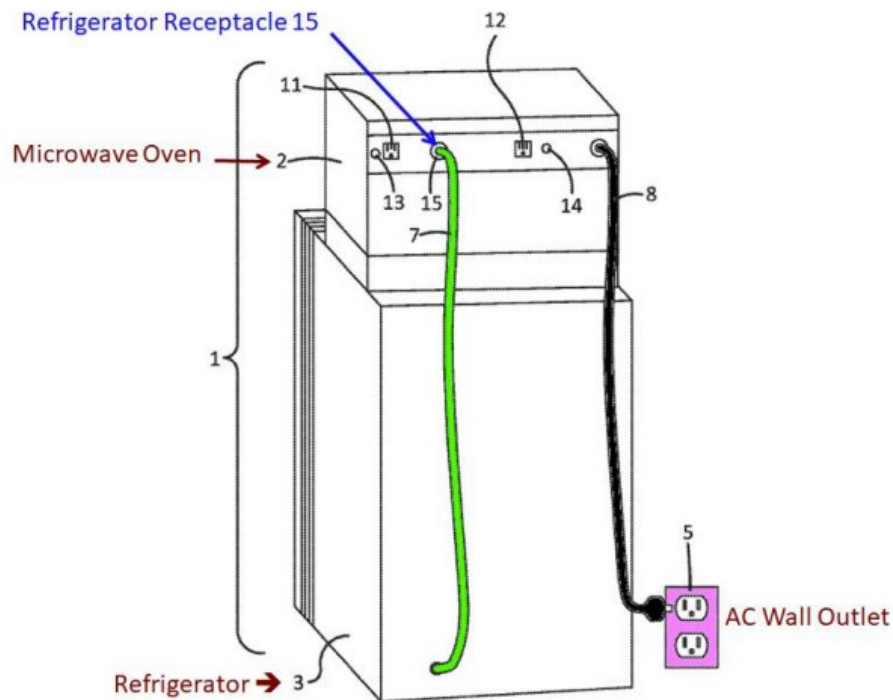


FIGURE 2

Ex. 1002, Fig. 2 (annotated)

The microwave includes an externally accessible electrical connector as refrigerator receptacle 15 at the rear of the microwave which is connectable to a plug via wire 7 (green). Ex. 1011 ¶¶[0026, 0032]; Ex. 1023 ¶[53-54]. The “refrigerator receptacle 15 [is] accessible at the rear of the microwave oven.” *Id.*, ¶[0032].

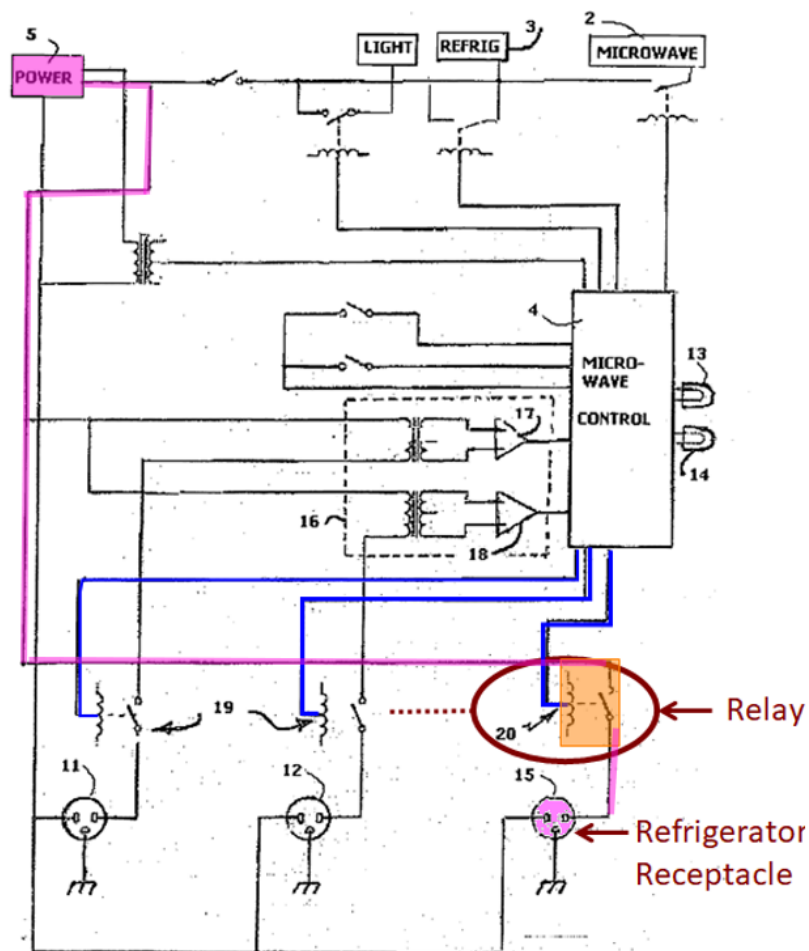
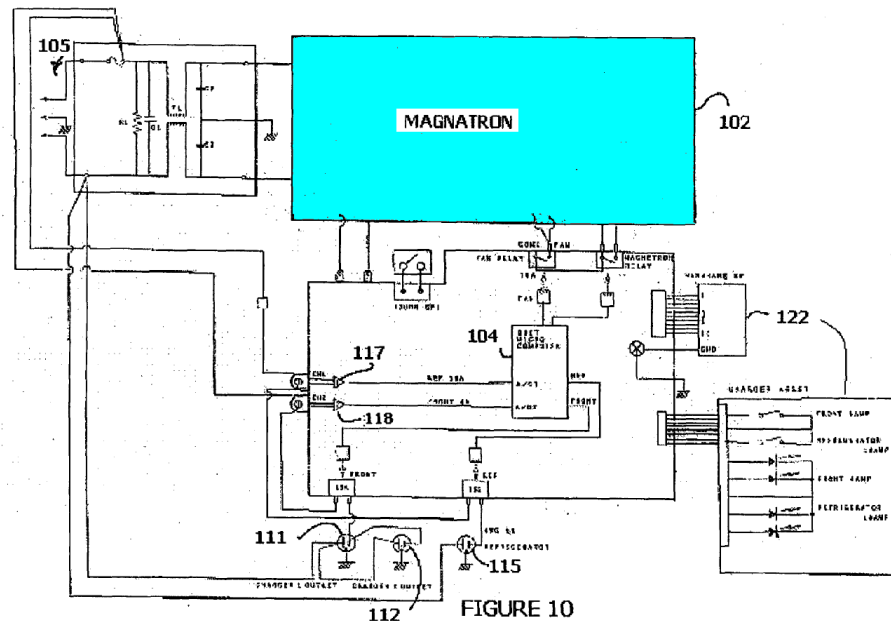


FIGURE 4

Additionally, Emma states as follows: “The appliances (microwave and refrigerator) may be of standard design with features commonly available. The internal components of the appliances are well known and do not need to be described herein.” *Id.* The microwave also includes a magnetron (blue box). Ex. 1011 ¶¶[0008, 0010, 0011], Fig. 10 (annotated).



ii. Refrigerator⁵

(A) Emma

Emma discloses a refrigerator connected to the refrigerator receptacle, where the disclosed receptacle is an externally accessible electrical connector on the microwave oven and is in operative electrical connection with a control circuit (i.e., “at least one electrical power control circuit”). Ex. 1023 ¶[59]. As Emma states: “a microwave oven...having a control processor for controlling the operation of the microwave oven; a first power supply outlet provided on the microwave oven; a refrigerator connected to the source of power by connection to the first power supply

⁵ As shown in Appendix A, this element also applies to dependent claim 25.

outlet....” Ex. 1011 at claim 1. As shown below in Emma Fig 2, the “[r]efrigerator 3 is connected to microwave oven 2 by power cord 7 (green) to refrigerator receptacle 15 (blue arrow), shown at the rear of the microwave 2 in FIG. 2.” *Id.*, ¶[0026]; Ex. 1002 ¶¶[32, 138-39, 285, 287]; Ex. 1023 ¶[59].

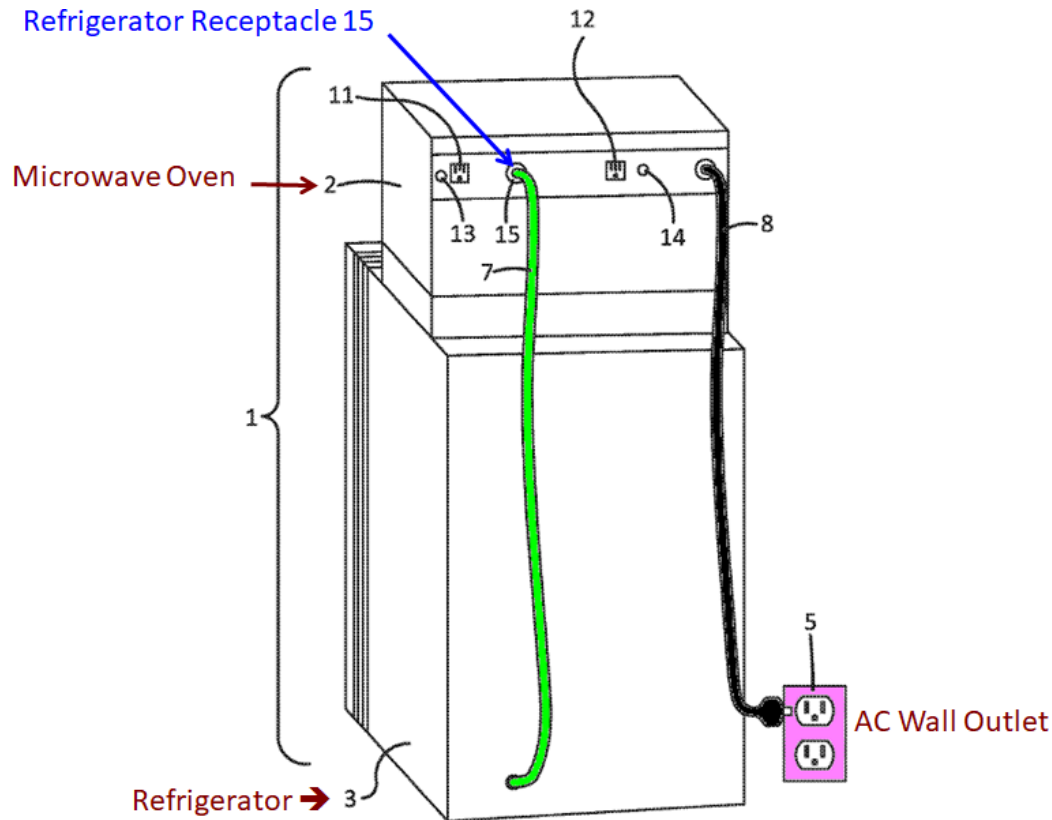
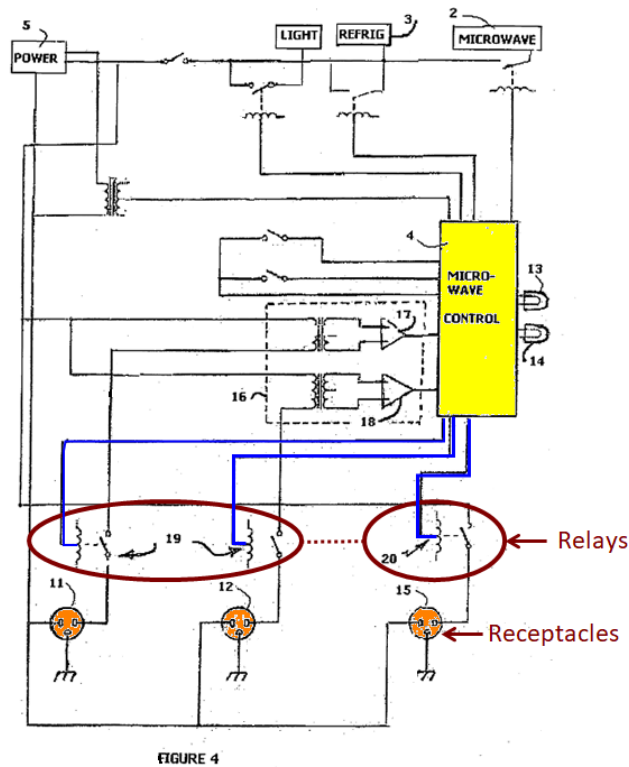


FIGURE 2

Additionally, Fig 4 in Emma, shown below, provides a diagram of Emma’s control circuit. Figure 4 discloses the externally accessible refrigerator receptacle 15 for receiving power cord 7 for connection. Ex. 1023 ¶[60].



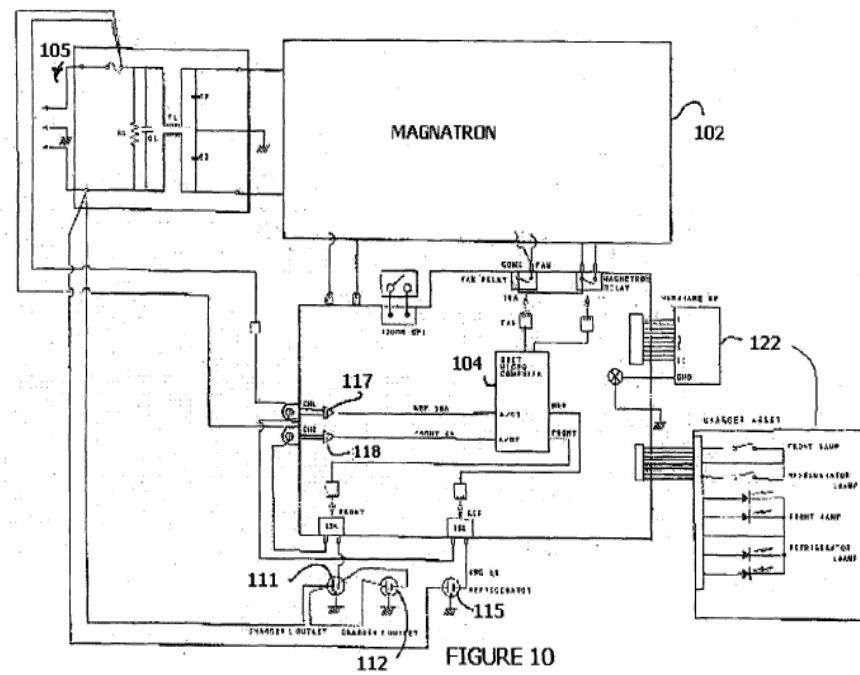
Additionally, when discussing the different components of the refrigerator (i.e., plurality of components), Emma states “[t]he appliances (microwave and refrigerator) may be of standard design with features commonly available. The internal components of the appliances are well known and do not need to be described herein.” Ex. 1011 ¶[0026]. It would have been inherent that a refrigerator of this design would contain a plurality of electrically powered components based on this teaching, for example, at least an electrical compressor and a compressor fan. Ex. 1002 ¶[288]; Ex. 1023 ¶[58]. Emma also discloses an electrical compressor: “When power to the microwave is demanded, the compressor is disabled for a preset

minimum period.” Ex. 1011 ¶[0011]. Emma further discloses a refrigerator temperature sensor that may be used to monitor its status:

Under some circumstances, it may be necessary to give the refrigerator priority to prevent an undesirable drop in temperature. In the latter instance, microcontroller can be coupled to the refrigerator temperature sensor to execute a time sequence during which the microwave will be disabled to allow the refrigerator to return to proper operating temperatures.

Id., ¶[0037]; Ex. 1002 ¶[288]; Ex. 1023 ¶[58].

Emma Figure 10 (reproduced below) is a schematic diagram of a current sensor to monitor the current of the microwave refrigerator combination that shows an electrically powered light emitting diode “LED” labeled “Refrigerator” at control panel 122. Ex. 1011 ¶¶[0035-36]. Emma Figure 11 (reproduced below) is a control panel 122 on the microwave oven to program the microwave oven’s operation. *Id.*; Ex. 1002 ¶[288]; Ex. 1023 ¶[58].



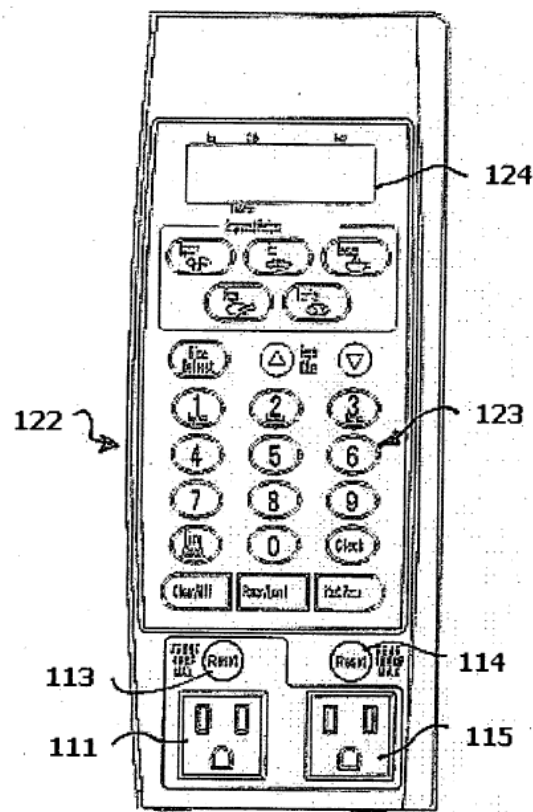


FIGURE 11

Ex. 1011 at Figs. 10-11. The refrigerator may use a LED indicator light to let the user know the status of its operation:

Refrigerator outlet 115 is also shown to be accessible from the front panel [Figure 11 (above)] and is associated with an LED indicator and reset button 114. Similarly LED indicator 114 is controlled to be on during use of the refrigerator and to switch to a flashing mode when the microwave is operating.

Id., ¶[0036].

iii. Control Circuit

(A) Emma

As shown in Figure 2 (reproduced below), Emma discloses a microwave oven refrigerator combination with both appliances being powered only through a single cord 8 being releasably connectable to a power outlet 5: a “single cord 8, provides input power to the system 1 from receptacle 5 through microwave 2.” Ex. 1011 ¶¶[0008,0026]; Ex. 1023 ¶[62].

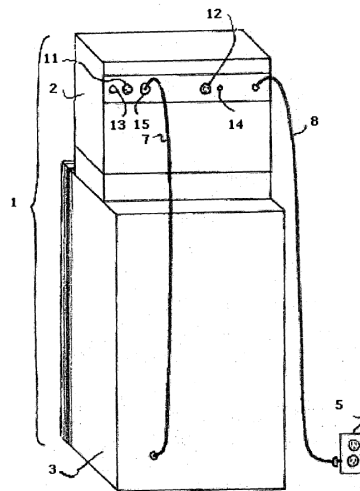


FIGURE 2

Emma further discloses a microprocessor-based control circuit (i.e., “at least one power control circuit”) installed in the microwave oven that is in operative connection with the microwave oven and refrigerator and powered through a single power cord (i.e., “wherein the at least one power control circuit is supplied with electrical power only through the single power cord”). As shown in the control

circuit diagram below (Figure 4), Emma discloses a power control circuit providing for digitally operating relay 19 for controlling the low power auxiliary outlets 11 and 12, and relay 20 for controlling refrigerator outlet receptacle 15. As Fig. 4 shows, the power-control circuit of Emma is in operative electrical connection with the microwave 2 (via microwave control 4) and the refrigerator (via outlet 15). Outlets 11 and 12 provide operative electrical connections to other auxiliary electrical devices. Ex. 1023 ¶[63]. As shown in Emma Fig. 2 above, the microwave is connected to a source of electrical power (AC wall outlet 5) by a single, unpluggable (i.e., “releasably connected”) power cord 8. Ex. 1023 ¶[63].

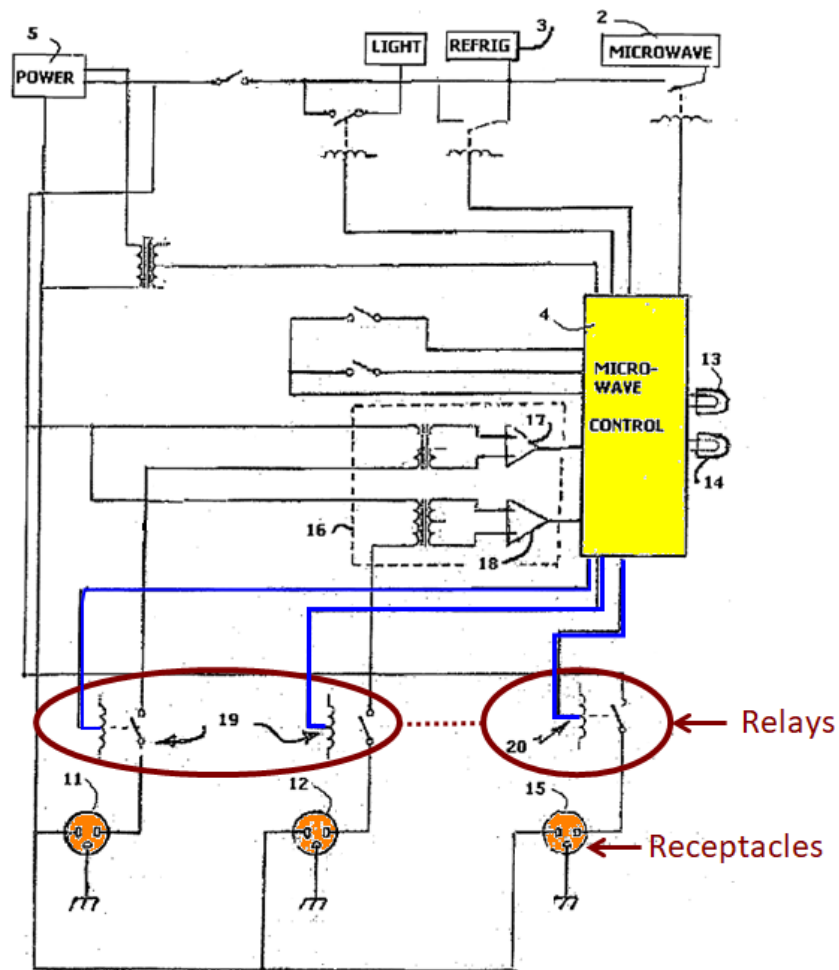


FIGURE 4

Additionally, Figure 3 (reproduced and annotated below) contains a hierarchical block diagram of the system, specifically, the microprocessor and its distribution of power to the device made possible by power from the power supply (i.e., “single power cord”). Ex. 1002 ¶¶[149, 285]; Ex. 1023 ¶[62].

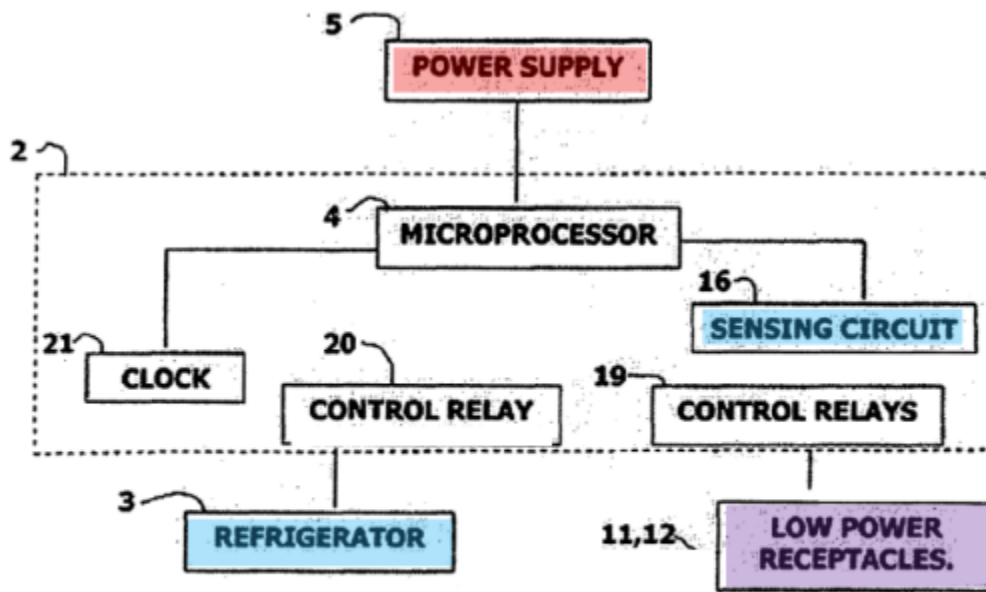


FIGURE 3

iv. Withhold and Deliver Electrical Power

(A) Emma

Emma discloses a microprocessor (“at least one electrical power control circuit”) that is operative to withdraw power to the refrigerator (i.e., at least one electrically powered component of the refrigerator or externally accessible refrigerator electrical outlet connector) when the magnetron draws cooking power, i.e., when the microwave is in use / draws cooking power. Ex. 1023 ¶[192].

For example, Emma discloses a magnetron and that “the power to the auxiliary outlets is disabled by the microwave controller when the microwave magnetron is energized or whenever the current to the auxiliary outlets exceeds a preset value” and the control model is “dependent on the state of operation of the

microwave magnetron.” Ex. 1011 ¶¶[0010-11]; Ex. 1023 ¶[192].

Further Emma recites “wherein the algorithm causes the control processor to disable the refrigerator and the second power supply outlet, when the microwave demands power.” Ex. 1011 at claim 1. Emma further recites: “[r]efrigerator 3 is generally subject to control by the microwave microprocessor controller 4 of the microwave oven 2.” *Id.*, ¶[0026]. “Controller 4 may be programmed to manage the power to the components of the system to avoid overload conditions, while minimizing disruptions in the use of an individual appliance.” *Id.*, ¶[0030]; Ex. 1002 ¶¶[203, 205, 289]; Ex. 1023 ¶[65].

As shown in the below diagram of the control circuit (annotated Figure 4), Emma discloses a control circuit providing for digitally operating relays 19, 20 for controlling the low power auxiliary outlets 11, 12, and refrigerator receptacle 15 for withholding power to the refrigerator / electrical connector. Ex. 1023 ¶[65].

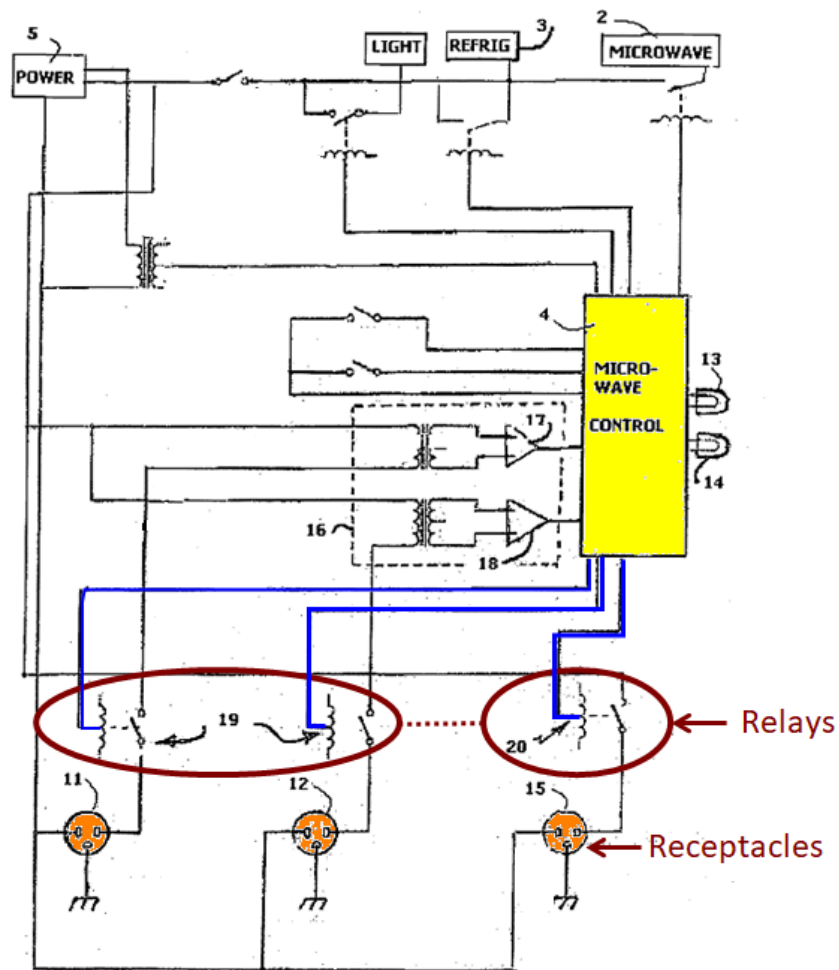


FIGURE 4

For example, as shown in the below Figure 7, when the Microwave demands cooking power it will first disable power to the Refrigerator (yellow), e.g., the refrigerator electrical outlet 15, and the auxiliary outlets (blue) to provide it necessary power. This is because “priority is given to the power demands of the microwave oven.” Ex. 1011 ¶[0038]. “Use of the [auxiliary] receptacles 11, 12, and

[refrigerator receptacle] 15 are, therefore, disabled during microwave operation.”⁶

Id.; Ex. 1002 ¶¶[203, 289]; Ex. 1023 ¶[65].

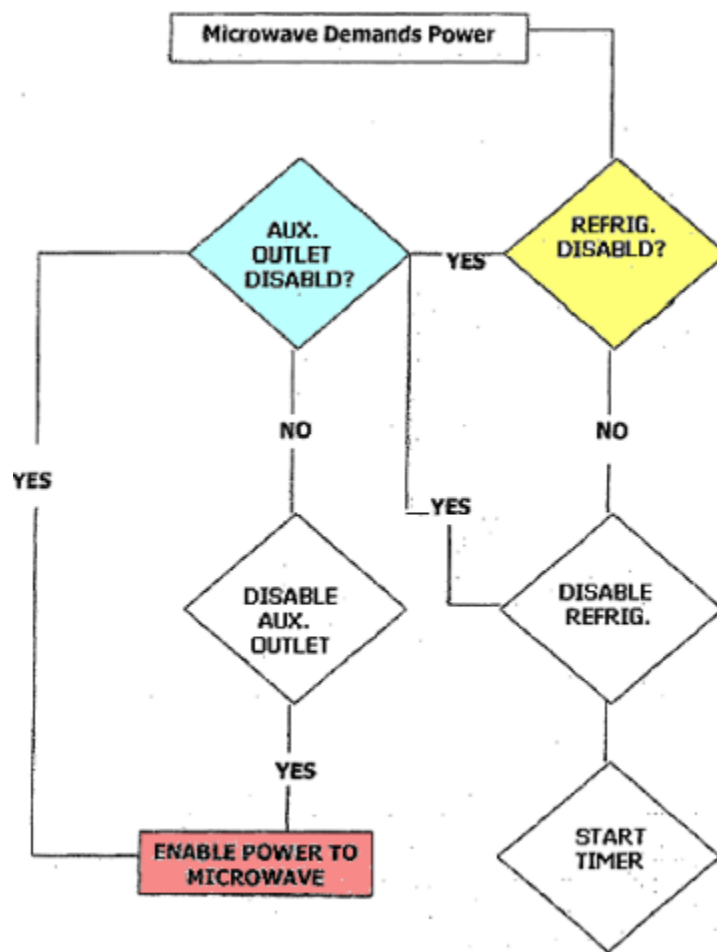


FIGURE 7

As another example, Figure 6 (reproduced and annotated below) is a processor operation model that shows what happens when the refrigerator demands power. If

⁶ For additional reference, see Figure 2 in VI.C.1.a. ii. (A).

the refrigerator demands power (green; e.g., via its thermostat), the logic controller determines whether or not the microwave is on (red). If the microwave is on, the controller disables power to the refrigerator (blue):

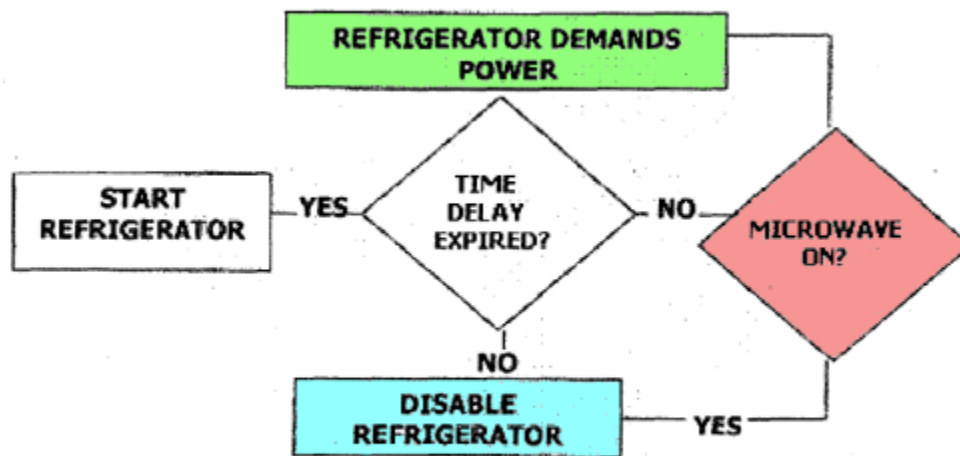


FIGURE 6

Ex. 1011 at Fig. 6; Ex. 1002 ¶¶[206, 289]; Ex. 1023 ¶[65].

As shown above, “[i]f the microwave is on [when the refrigerator demands power], “the recycling of the refrigerator will be delayed. If the microwave was on and subsequently cycled off, the clock 21 must be checked to determine if the restart can occur.” Ex. 1011 ¶[0037].

Because priority is given to the power demands of the microwave, Emma further discloses the microprocessor ceases electrical power to the compressor based on those demands: Specifically, “[i]f the refrigerator 3 is under power when the microwave 2 is turned on, the power, to the refrigerator is turned off and clock 21 begins to count for a predetermined period during which the compressor of

refrigerator 3 cannot be restarted.” *Id.*, ¶[0033]. Conversely, Emma discloses the microprocessor may enable power to the compressor and refrigerator when the microwave is not in use. Ex. 1002 ¶[203-06, 289]; Ex. 1023 ¶[65].

v. Smoke Sensor

(A) ISDU

ISDU discloses a smoke sensor positioned in operative connection with the cooking area inside the microwave oven. As shown in annotated FIG 4 (below), the smoke detector (grey) is in operative connection with the microwave cooking area (“interior microwave compartment”; yellow) through a vent fan (blue). Ex. 1002 ¶[289-90] Ex. 1023 ¶[72].

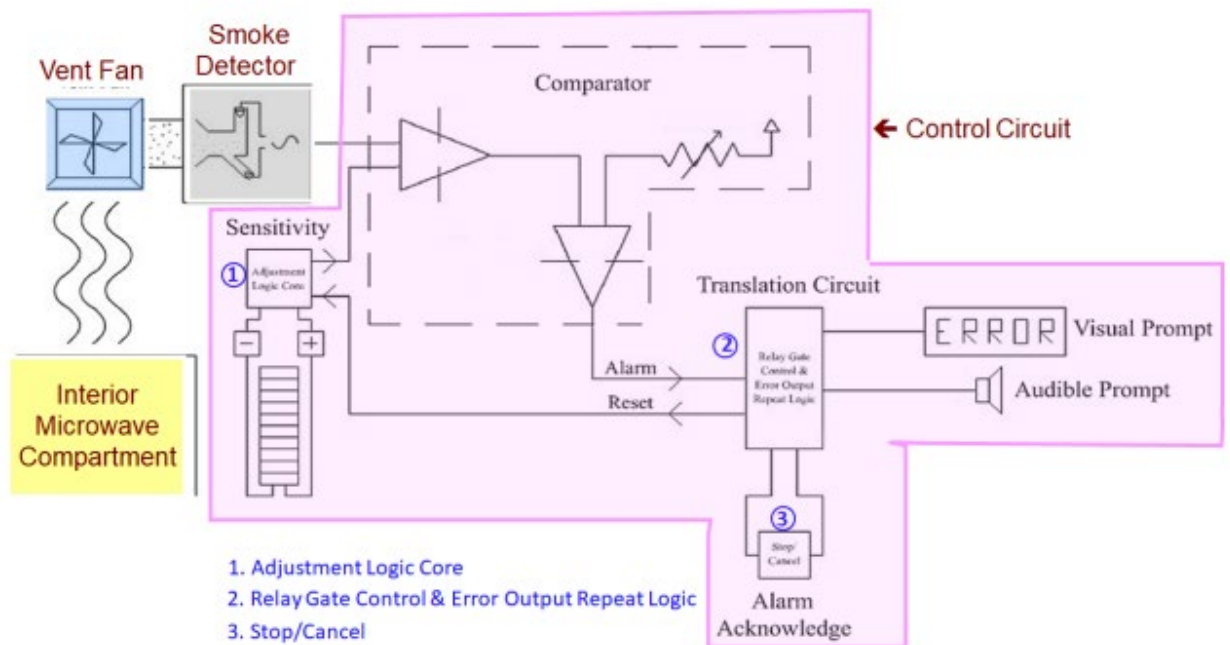


Figure 4

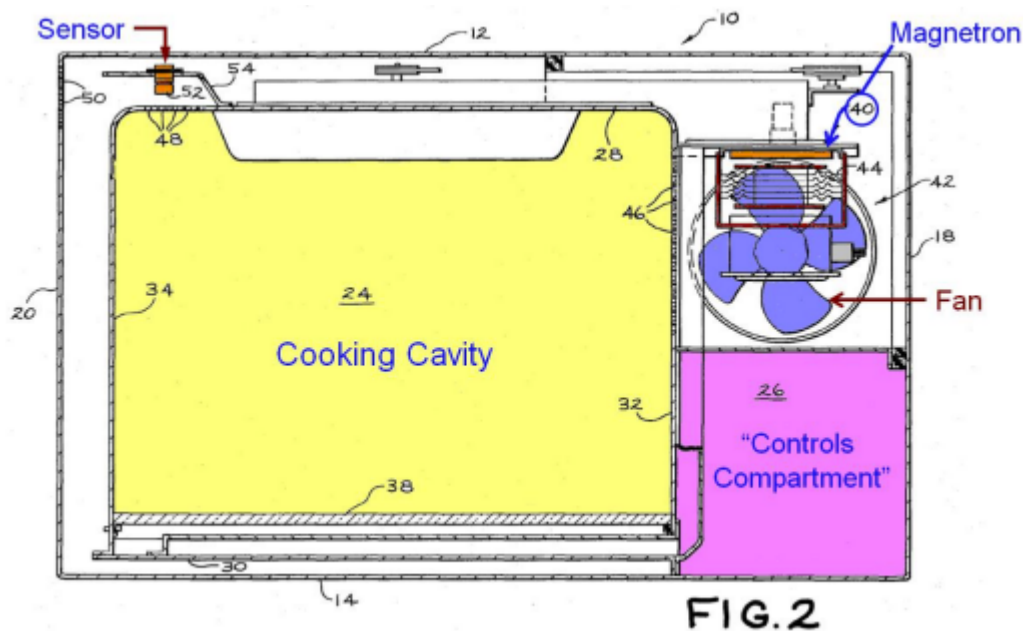
The smoke detection unit is also in operative connection with the circuit (i.e., “at least one power control circuit”). As explained by ISDU, the integrated smoke detection unit interfaces with the microwave logic to control shutting down the microwave and alert the user: “Once smoke is detected, we will send a signal that lets a circuit interrupt the power to the microwave through the use of a ‘soft’ power-off function already in use by the microwave logic. This will stop the microwave while simultaneously sounding an alarm.” Ex. 1012 at 6; Ex. 1002 ¶¶[99-100, 289]; Ex. 1023 ¶[72].

(B) Smith

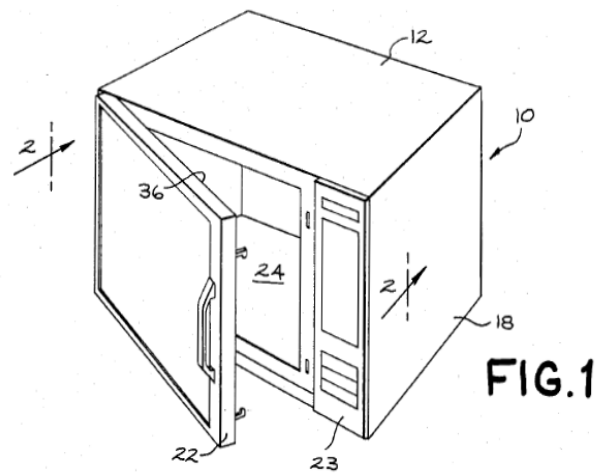
Smith discloses a gas sensor (i.e., “smoke sensor”) positioned in operative connection with a cooking area inside a microwave oven. Smith describes the need to detect smoke and increasing gas concentration prior to combustion: “However, before actually reaching the ignition point, the food begins to char, smoke or smolder, resulting in a second period of relatively rapidly increasing gas concentration in the circulating air, comparable to that rate of increase which characterizes the normal cooking period.” *Id.* at 3:51-54. Referring to Figures 1 and 2 (annotated) below, which are different angles of the microwave oven, Smith discloses a gas sensor 52 (i.e., “smoke sensor”) positioned in operative connection with a cooking area (“cooking cavity”, yellow) inside the microwave oven:

Means for sensing the concentration level of such gases in the air leaving the cavity is provided in the form of a gas sensor 52 disposed in the air flow path between perforations 48 in cavity wall 28 and vent openings 50 in cabinet wall 20. Sensor 52 is supported proximate perforations 48 by mounting bracket 54 which is suitably secured to cavity wall 28. Sensor 52 in the illustrative embodiment of FIG. 2 is a gas sensor readily commercially available from Figaro Engineering, Inc., identifiable as Model TGS No. [816]⁷.

Id. at 3:6-16; Ex. 1002 ¶¶[289-90]; Ex. 1023 ¶[72].



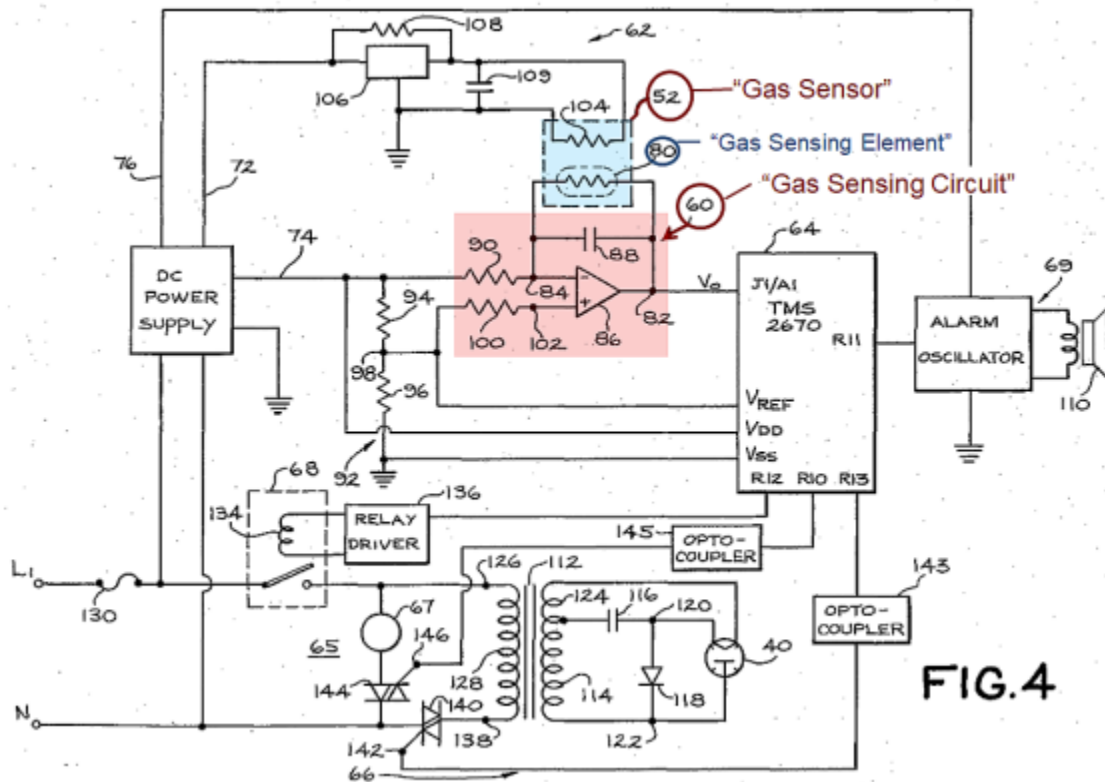
⁷ Ex. 1002 ¶¶[167-169] (discussing typographical error).



The Model TGS No. 816 sensor from Figaro Engineering Inc. is a smoke sensor. Ex. 1002 ¶¶[167-69]; Ex. 1023 ¶[72]. Additionally, referring to FIG. 4 (annotated below), Smith discloses the gas sensor (blue) is in operative connection with the microwave microprocessor (i.e., “control circuit”, yellow):

gas sensor 52 is incorporated in a microprocessor-based control arrangement . . . The circuit of FIG. 4 includes a gas sensing circuit 60 for sensing the concentration level of gases in the circulating air as it exits cooking cavity 24 and generating a voltage signal having a magnitude representative of the sensed gas concentration level.

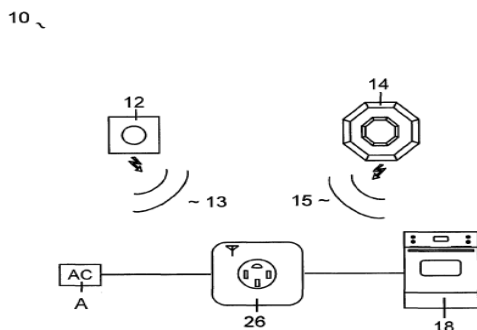
Ex. 1014 at 4:61-5:3; Ex. 1002 ¶¶[170, 289]; Ex. 1023 ¶[72].



(C) Butt

Butt addresses the problem of fires caused by kitchen appliances: “[t]he National Fire Protection Association reports that between the years 1999-2002, for example, there were 114,000 reported home fires associated with cooking alone.” Ex. 1015 at 1:22-25. As shown in Figure 1A (reproduced below), the system taught by Butt controls power to an electrical kitchen appliance 18 coupled to a controller 20, where the Butt system includes a smoke detector 14, panic/reset button 12 (green) and a wireless transmitter. *Id.* at 4:29-34; Ex. 1002 ¶¶[171, 289]; Ex. 1023 ¶[72].

Figure 1A



Id. at Fig. 1A. The system taught by Butt includes a smoke sensor in operative connection with the cooking area of a cooking range. Ex. 1015 at 2:22-25.

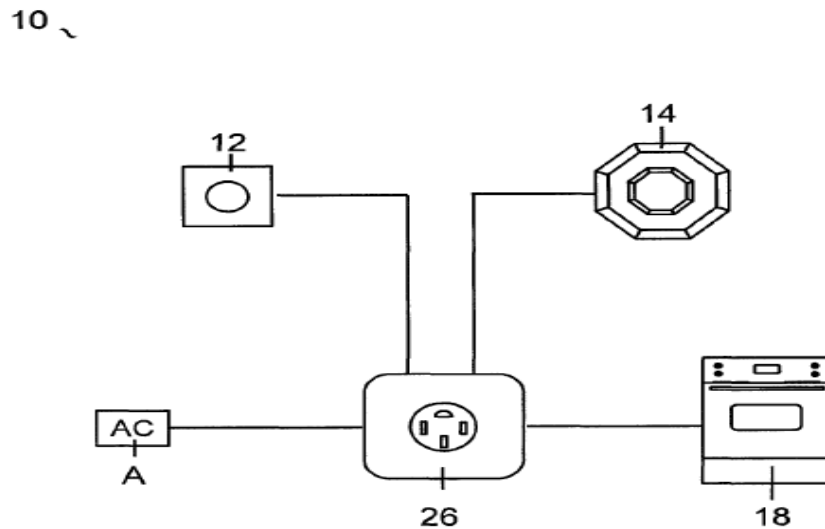
Butt further teaches a smoke detector is in operative connection to the controller (i.e., “at least one power control circuit”). If the detector detects smoke, then a signal is sent to the controller to interrupt power to the kitchen appliance:

If the detector 14 detects the presence of smoke, then in the wireless embodiment illustrated in FIG. 1 an RF signal 15 is transmitted and is received by the controller 20.

Id. at 4:53-63; Ex. 1002 ¶¶[107, 172, 289]; Ex. 1023 ¶[72].

“Further, in the embodiment shown in FIG. 1B [reproduced below], the controller 20, detector 14, and panic/reset button 12 are all wired together.” *Id.* at 5:3-4. “The wiring takes the place of the RF signals 13, 15 illustrated in FIG. 1A.” Ex. 1015 at 5:3-4; Ex. 1002 ¶¶[173, 289]; Ex. 1023 ¶[72].

Figure 1B

vi. Shut-Down Function

(A) ISDU

ISDU discloses that when smoke is detected, the operation of microwave oven ceases, i.e., its magnetron is disable. The user is thus alerted to the smoke:

[W]hen smoke is detected during microwave operation, the device will temporarily disable microwave operation and let the user know that the food has begun to smoke or even burn... The product, Integrated Smoke Detection Unit (ISDU) for commercial microwave ovens, will work in the following way. The presence of particulate during cooking will trigger our device thus sounding an alarm and halting microwave operations.

Ex. 1012 at 1; Ex. 1002 ¶¶[174-75, 289]; Ex. 1023 ¶[76].

The alarm state will consist of a suspension of normal microwave functions *including the cessation of magnetron operation*, a visual alert to be displayed on the integrated microwave LCD, and an audible alert.

Ex. 1012 at 8; Ex. 1023 ¶[76] (emphasis added).

(B) Smith

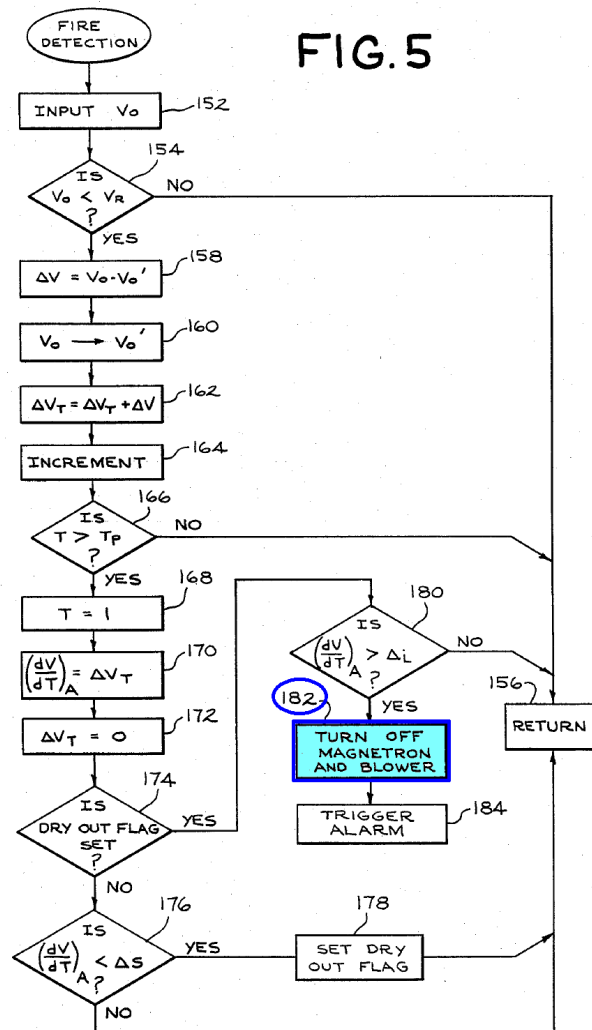
Smith discloses a gas sensor that can cause cooking power, i.e., power to the magnetron, to be stopped when the gas sensor senses at least one change in the amount of smoke sensed by the smoke sensor. As Smith states:

Upon detection of a rate of change greater than reference AL, (Yes to In-quiry 180) a signal is provided at output port R12 causing power control relay 68 to open, thereby deenergizing magnetron 40 and the blower motor 67 (Block 182). ...The deenergizing of both the magnetron and the blower motor using either technique in effect turns off power to the oven. By detecting the occurrence of a rapid increase in the rate of change of concentration level by the hereinbefore described method, magnetron 40 is deenergized 35 prior to the load being heated in the oven reaching its actual combustion temperature, thereby anticipating a potential fire condition and preventing the load from reaching its combustion point.

Ex. 1014 at 9:17-39

Smith Fig. 5 details the control algorithm implemented by the microprocessor following the detection of a fire/smoke in the microwave

oven. Ex. 1002 ¶¶[180-81, 289]; Ex. 1023 ¶¶[74, 78]. The flow chart of Fig. 5 shows the instruction to “turn off magnetron and blower” at block 182 (blue).



Id. at Fig. 5 (annotated).

(C) Butt

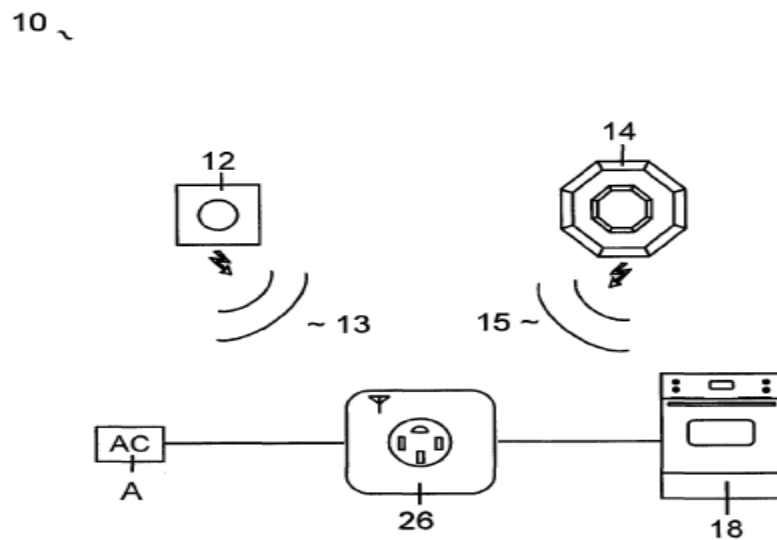
As shown in FIG 1A (reproduced below), Butt teaches that if the detector (i.e., “smoke sensor”) senses smoke and consequently interrupts power to the microwave,

it will be stopping the microwave before the end time of the cooking session set by the user. For example, Butt teaches sending a control signal to a relay to prevent the flow of electricity to the electrical cooking appliance:

If the detector 14 detects the presence of smoke, then in the wireless embodiment illustrated in FIG. 1[A] [shown below] an RF signal 15 is transmitted and is received by the controller 20. Upon receiving the signal, *the controller interrupts the AC power supply to the appliance 18 and consequently shuts the appliance 18 off.*

Id. at 4:53-67 (emphasis added); Ex. 1002 ¶¶[182, 184, 289]; Ex. 1023 ¶[74].

Figure 1A



Butt further described that it was previously known to have a safety shut-off

system to switch off an electrical appliance upon detecting a signal indicative of a fire: “a detector for detecting a signal indicative of fire, such as smoke; a switch that connects an appliance, such as an electric range, to an AC power supply; and a controller that opens the switch upon receiving a signal from the detector.” Ex 1015 at 1:34-36; Ex. 1002 ¶¶[183, 185, 289] Ex. 1023 ¶[74].

vii. Reset Enable Function

(A) ISDU

ISDU discloses a control circuit operative to enable the microwave, including the magnetron, after ending the cooking session due to the Shut Down Function:

Triggering the smoke detector will output a number of alarm conditions to alert the user. The alarm state will consist of a suspension of normal microwave functions including the cessation of magnetron operation, a visual alert to be displayed on the integrated microwave LCD, and an audible alert . . . ***Acknowledgement of the alarm state will reinstate all normal microwave functions*** and reset the smoke detector circuit for further use.

Ex. 1012 at 8-9 (emphasis added).

As shown above, ISDU discloses the power control circuit enables the microwave oven, including its magnetron, to receive cooking power in a subsequent cooking session to enable further cooking. *Id.*; Ex. 1002 ¶¶[186-87, 283, 289] Ex. 1023 ¶[83].

(B) Butt

Butt teaches that a user may press the panic/reset button to enable the controller to restore power to the appliance: “when the danger posed by the fire has passed, a user can press the panic/reset button 12, which will transmit an RF signal 13 to the controller 20, and the controller 20 will restore the AC power supply to the appliance 18.” Ex. 1015 at 3:63-67; Ex. 1002 ¶¶[192, 289]; Ex. 1023 ¶[80].

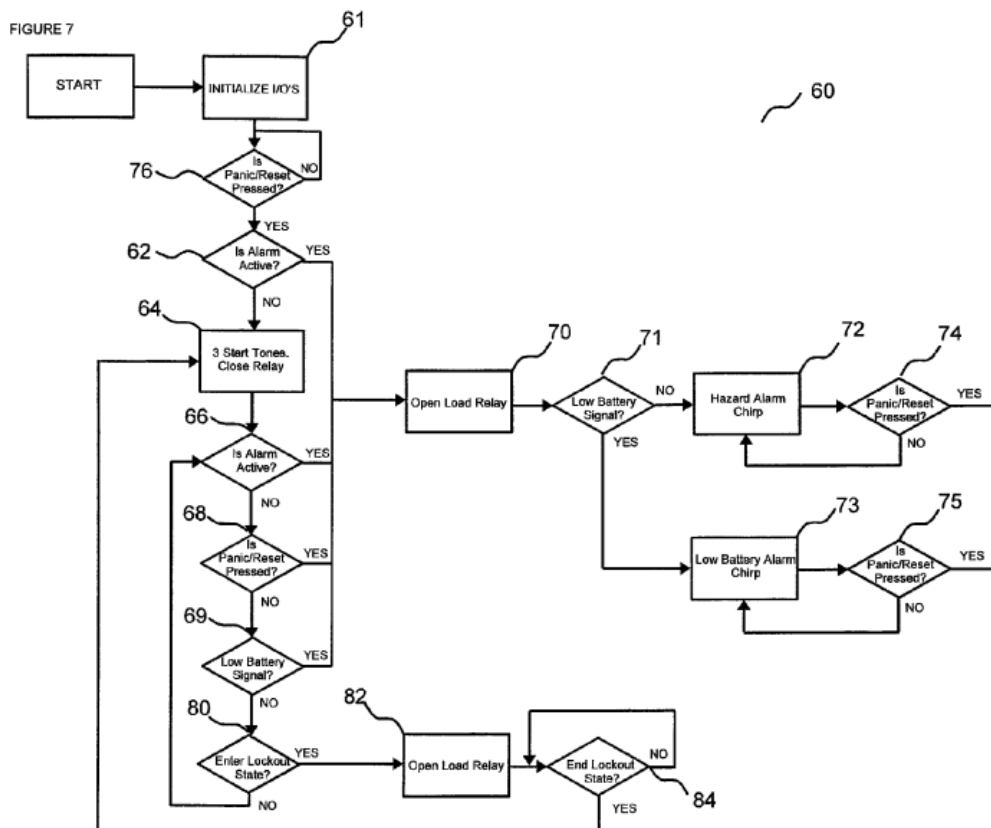
As shown in FIG 7 (reproduced below), when the panic/reset button is pushed, the device is re-enabled:

The relay 44 remains open until the panic/reset button 12 is pressed (block 74), following which the microcontroller 36 closes the relay 44 . . .

Ex. 1015 at 7:15-21; Ex. 1002 ¶¶[195, 289]; Ex. 1023 ¶[80].

Relay 44 operates to remove or provide power to the appliance: “If pursuant to the algorithm implemented in the firmware, power should be restored to the appliance 18, the appropriate signal is sent to relay driver 42, which consequently closes the relay 44 and restores power.” Ex. 1015 at 5:51-54; Ex. 1023 ¶[80]. “When the lockout state is over, the relay 44 is closed and power is restored to the appliance 18 (block 64).” Ex. 1015 at 7:60-62; Ex. 1023 ¶[80].

zr

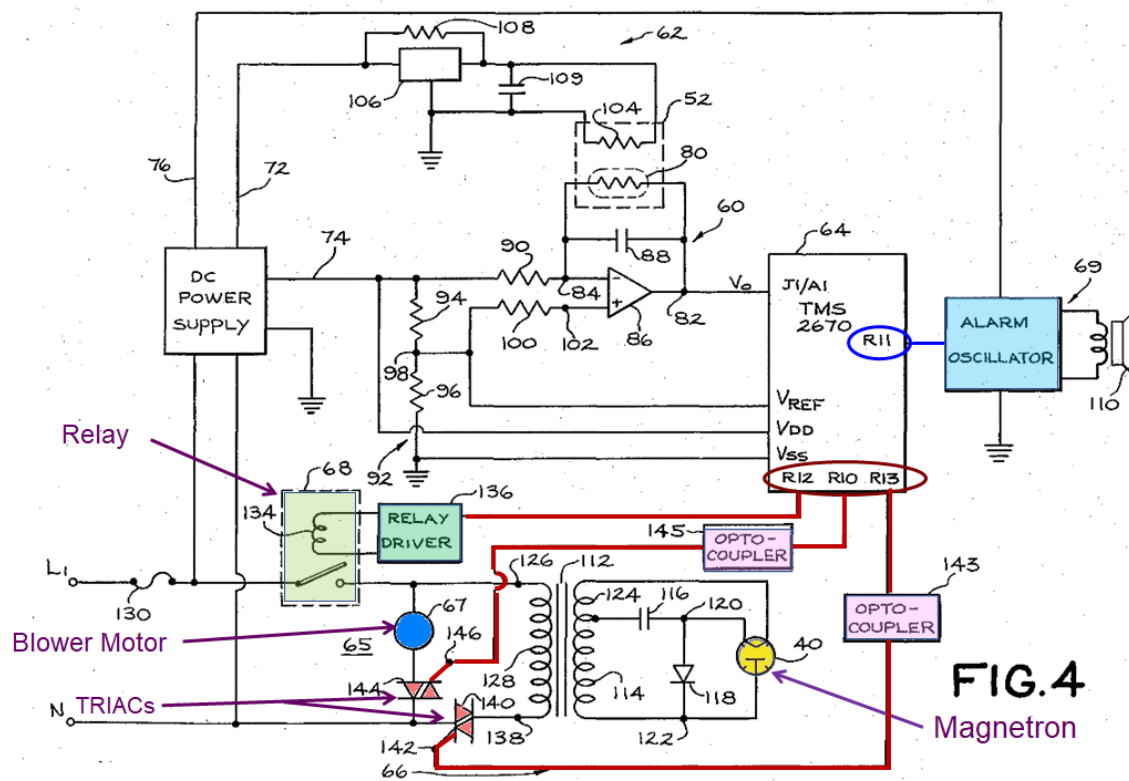


(C) Smith

Smith discloses an electrical circuit (“at least one electrical power control circuit”) as shown in FIG. 4 (annotated below), which is configured to allow the microprocessor 64 to cycle power to the microwave magnetron. For example, this can be done by sending digital signals to a control the position of a relay in line with the magnetron power supply:

Upon detection of a rate of change greater than reference ΔL , (Yes to Inquiry 180) *a signal is provided at output port R12 causing power*

Ex. 1014 at 9:17-28 (emphasis added); Ex. 1002 ¶¶[196-97, 289]; Ex. 1023 ¶[80, 84].



b. *Dependent Claims 12, 14, 19, 23 and 26 (“USB Port”)*

Quezada teaches a power sourcing receptacle that integrates a standard AC

electrical receptacle and a USB port for a direct current (DC) power source. Ex. 1020, (57); Ex. 1023 ¶[88]. As shown below, in Fig. 2, one embodiment in Quezada includes a 120-V AC power sourcing receptacle 100. Ex. 1020 ¶[0023]; Ex. 1023 ¶[88]. The lower half of the receptacle 102 (red), which has the form factor of the well-known “duplex outlet,” provides 120-V AC at 110a and 110b, plus ground at 112. *Id.* The upper half 104 of the receptacle 104 (blue) comprises a standard USB output port well known in the art. *Id.*

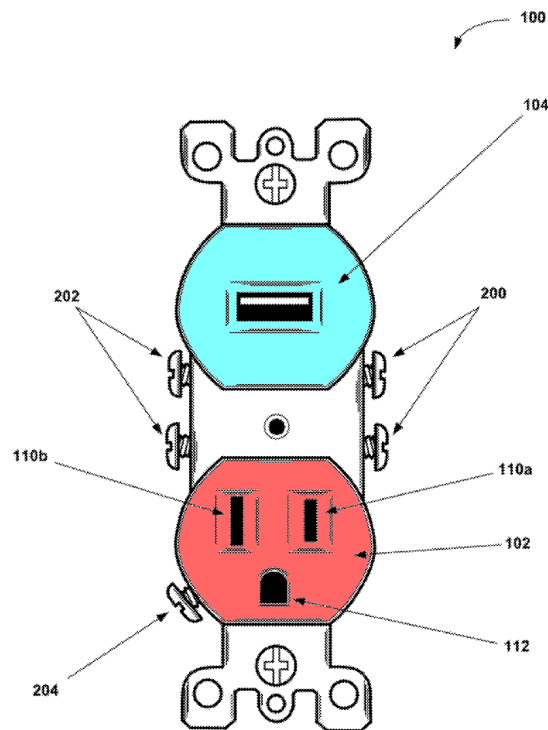


FIG. 2

Ex. 1020, Fig. 2 (annotated).

As Quezada states, “The USB receptacle 104 provides 100-150 milliamps (mA) and 5 volts direct current (DC) to devices inserted into USB receptacle 104.”

Ex. 1020, ¶¶[0025]; Ex. 1023 ¶¶[89]. Thus, the USB receptacle 104 can provide DC power to computer peripherals, digital cameras, printers, personal media players, flash drives, “and other devices capable of accepting power or charge via a USB connector.” *Id.*

Figure 6 below is an annotated block diagram from Quezada showing the flow of power to the USB port 104 (blue) and AC receptacle 102 (red). Ex. 1020, ¶¶[0039]; Ex. 1023 ¶¶[90]. A main power source supplies power directly to AC receptacle 102 and directly to USB regulated voltage sourcing unit (“RVSU”) 600 (yellow). *Id.*, Ex. 1020, ¶¶[0039-40].

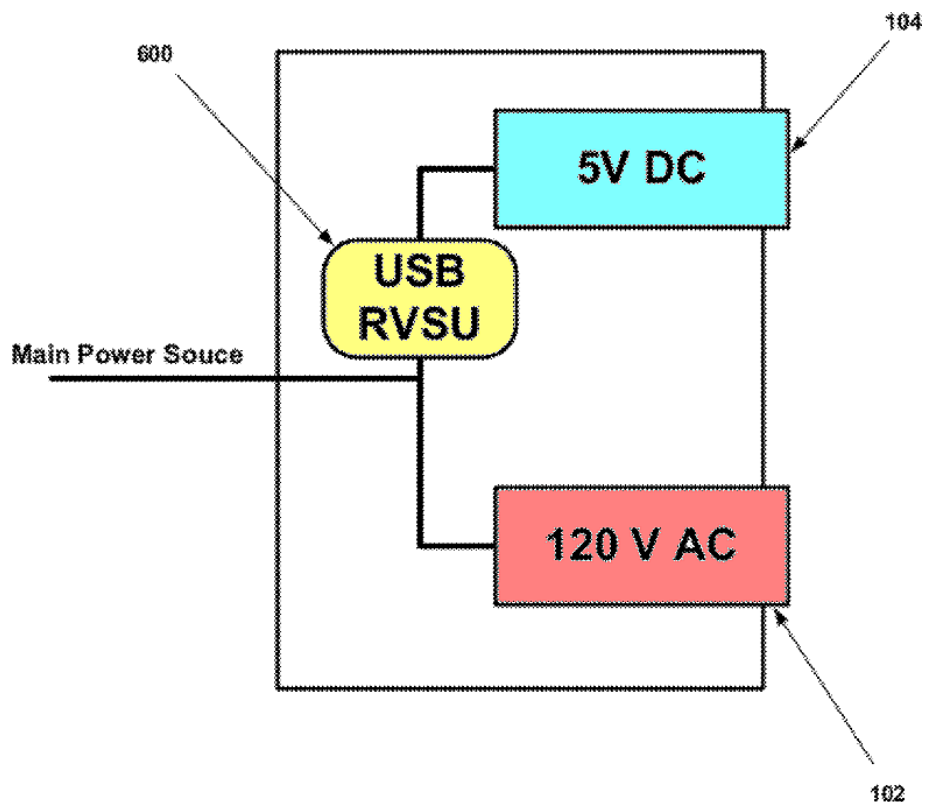


FIG. 6

Ex. 1020, Fig. 6 (annotated).

As shown below in Quezada Fig. 7, reproduced and annotated below, the USB RSVU 600 includes a transformer 700 (red) that steps down the incoming source voltage to a nominal 5 volts AC, a rectifier 702 (green) that converts the AC voltage from alternating to pulsating direct current. Filter 704 (purple) then smooths the pulsating waveform into a steady DC voltage. Ex 1023 ¶[91]. The voltage regulator 706 (blue) maintains the voltage at the desired 5V magnitude. *Id.*; Ex. 1020, Fig. 7, ¶[0041].

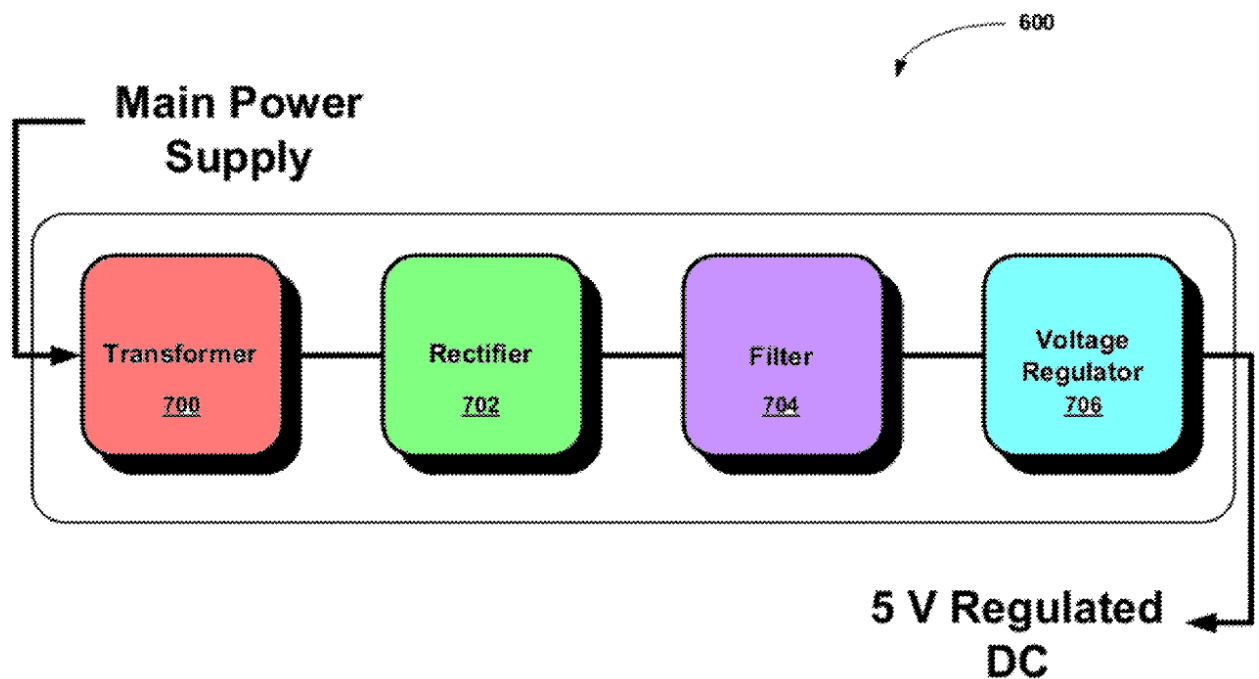


FIG. 7

Ex.1020, Fig. 7 (annotated).

As Quezada teaches, the USB RVSU 600 provides a 5-volt regulated voltage to the USB port 104. *Id.*

c. ***Claims 13 and 20 (“Auxiliary Output Device”)***

(A) Emma

As discussed above at section VI.C.1.a.i(A) Emma discloses a microwave oven that includes at least one auxiliary low power outlet receptacle (i.e., “an auxiliary electrical outlet”) “for plugging in low power device for example, rechargeable devices, such as cellular phones, PDA’s or other electronic devices that do not demand high power.” Ex. 1011 ¶[0027]. The auxiliary electrical outlet is in operative connection with the control circuit, and wherein the microcontroller is operative to cause the auxiliary low power receptacle to be inoperative when the microwave oven / magnetron demands cooking power. Ex. 1011 at ¶¶[0010, 0038]; see supra at VI.C.1.a.iv(A). Emma describes enabling and disabling power to the microwave oven and its first and second power supply outlets based on the control algorithm in the processor:

wherein the control processor is configured to enable or disable power to the microwave oven, ***the first power Supply outlet and the second power Supply outlet***, according to an algorithm in the control processor, and wherein the algorithm causes the control processor to: disable the refrigerator and the second power Supply outlet, when the microwave

demands power; and enable the second power supply outlet when the microwave is off.

Id. at claim 1 (emphasis added); Ex. 1002 ¶[292]; Ex. 1023 ¶[94, 99].

As shown in Emma Figure 4 (annotated below), Emma discloses a control circuit for digitally operating relays 19, 20 for controlling the low power auxiliary outlets 11, 12, and refrigerator receptacle 15:

Microprocessor 4 would control the power to microwave 2 and refrigerator 3 and also low power receptacles 11 and 12 to avoid overload conditions . . . Controller 4 is coupled directly to refrigerator outlet 15 and low power outlets 11 and 12.

Ex. 1011 at ¶[0031]; Ex. 1023 ¶[100].

Additionally, Emma States:

To avoid overload conditions, power to the low power receptacles 11 and 12 and refrigerator receptacle 15 is disabled during microwave operation.

Ex. 1011 at ¶[0033]; Ex. 1023 ¶[101].

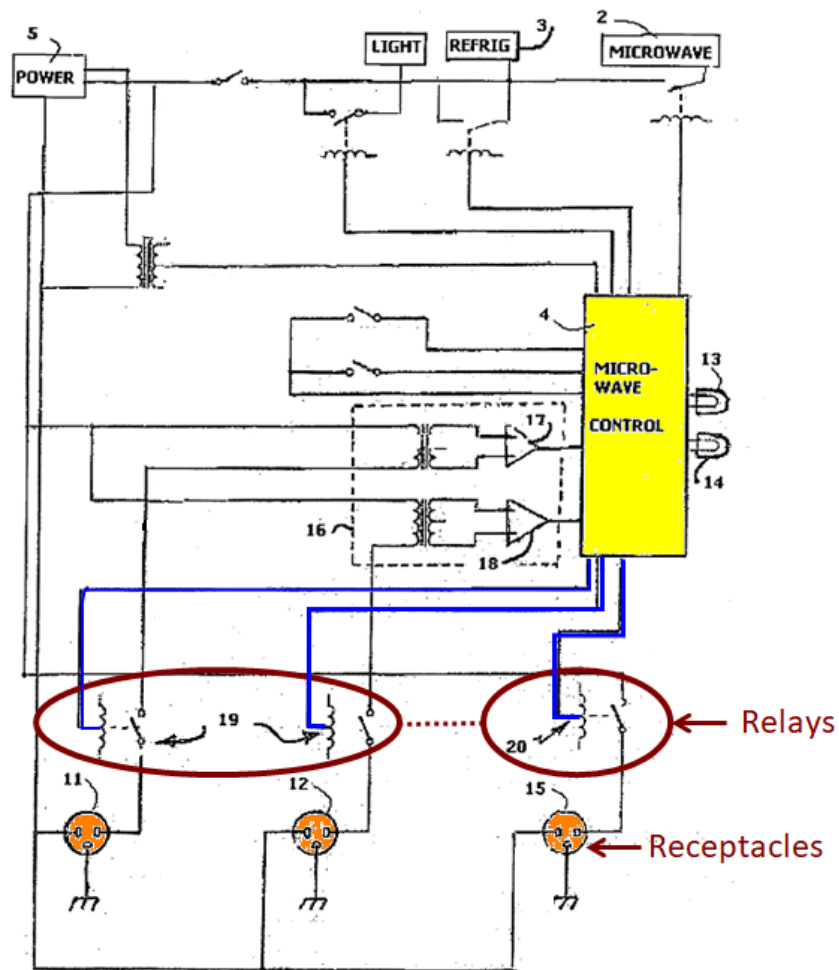


FIGURE 4

Ex. 1011 at Fig. 4 (annotated).

As shown in Figure 7 (reproduced and annotated below), Emma further teaches, that priority is given to the power demands of the microwave oven. Ex. 1002 ¶[294]; Ex. 1023 ¶[102].

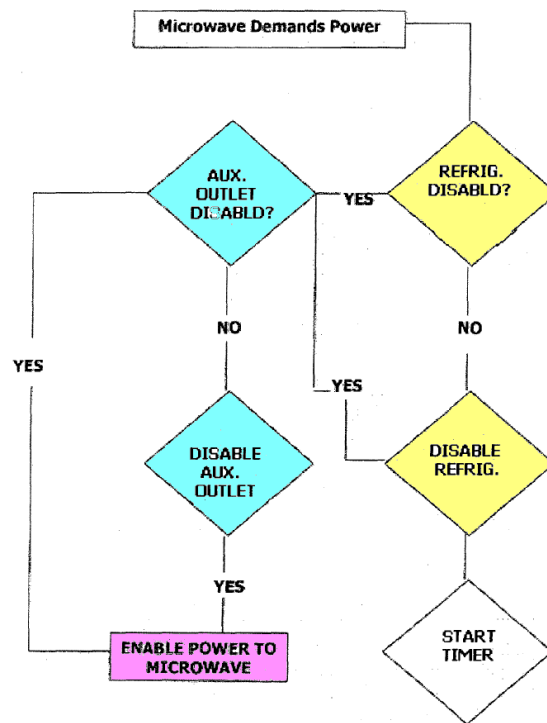
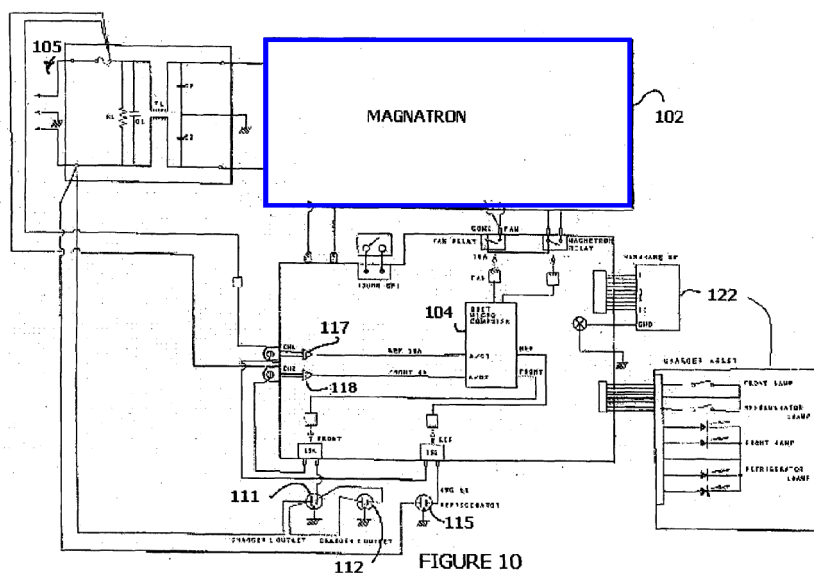


FIGURE 7

Ex. 1011 at Fig. 7 (annotated).

As shown above, “[u]se of the receptacles 11, 12, and 15 are, therefore, disabled during microwave operation. The operational models...may be established by algorithms that are programmed or imbedded in controller 4.” *Id.*, ¶¶[0038]; Ex. 1002 ¶[294]; Ex. 1023 ¶[103].

Further, the Emma microwave also includes a magnetron (blue). Ex. 1011 ¶¶[0008, 0010, 0011], Fig. 10.



Emma states “the power to the auxiliary outlets is disabled by the microwave controller when the microwave *magnetron* is energized or whenever the current to the auxiliary outlets exceeds a preset value.” Ex. 1011 ¶¶[0010]; Ex. 1023 ¶[98].

d. ***Claim 22 (“Sensor”)***

(A) ISDU

ISDU discloses both “ionization and photoelectric smoke detectors.” Ex. 1012 at 9; Ex. 1002 ¶¶295]; Ex. 1023 ¶¶105].

(B) Smith

As discussed above, Smith discloses a microwave oven which includes a smoke /gas sensor. *Supra* at §VI.C.1.a.v. (B). The Smith gas sensor is adapted to detect VOC and is thus, a VOC sensor Ex 1002 ¶[296]; Ex. 1023 ¶[105].

(C) Butt

Butt's exemplary smoke detectors include: "ADEMCO 5806 detector, the SecureLinc (73942) detector, and the Wisdom 433 Mhz Wireless Smoke Detector." Ex. 1015 at 4:49-52. The Ademco 5806 is a photoelectric smoke detector. Ex 1002 ¶[297]; Ex. 1023 ¶[105].

2. Explanation of Asserted Grounds and Rationales Supporting a Conclusion of Obviousness

a. ***Ground 1: Obvious in view of Emma combined with ISDU***

Ground 1 is that all claims 1, 13, 15, 20, 22, and 24-25 are invalid because it would have been obvious to combine the microwave-refrigerator appliance of Emma with the smoke sensor disclosed in ISDU. *Id.*, ¶[106]. There are numerous reasons that why a POSITA would have combined the microwave refrigerator combination of Emma with the smoke sensor ISDU. *Id.* First, all the claimed elements were known in the prior art and a POSITA would have combined the elements as claimed by known methods, with no change in their respective functions. *Id.* This combination would have yielded nothing more than results predictable by one of ordinary skill in the art. *Id.* While Emma fails to recite a smoke sensor, Emma does disclose adding functionality to appliances by cycling power to a refrigerator and auxiliary electrical outlets for the purpose of improving the safety of the Emma appliance (preventing overload conditions). *Id.* Emma's teaching would therefore have motivated a POSITA to look to further microwave functionalities, including

those in ISDU. *Id.*

Both Emma and ISDU disclose shutdown conditions while using electrical cooking appliances that provide added functionality. *Id.*, ¶[107]. Additionally, the ISDU publication explicitly relates to added features of microwave ovens. *Id.*; *supra* at §VI.B.2.b. It would have been obvious to a POSITA to combine the additional microwave oven safety features of ISDU into the Emma microwave/refrigerator combination appliance to provide the added microwave features discussed in ISDU. Ex 1023 ¶[107]. Specifically, it would have been obvious to enable the Emma microwave to shut down upon the detection of smoke and to reenable the Emma microwave for a further cooking session when the smoke had cleared. *Id.* Further, it would have also been obvious to a POSITA to modify ISDU with the features of the microwave/refrigerator combination of Emma for the purpose and convenience of having an “all-in-one appliance” in addition to the safety feature of managing total power draw as taught by Emma. *Id.*

Finally, the claims recite that “the smoke sensor is positioned in operative connection with a cooking area” or “with a cooking area inside the microwave oven.” Petitioner contends ISDU meets this limitation as shown in Section VI.C.1.a.v.(A), because it operates in response to conditions in the microwave. Ex. 1023 ¶[108]. However, to the extent the Board determines there is a positioning requirement and that the smoke sensor in ISDU is not in “operative connection with

the cooking area inside the microwave oven” a POSITA would have found it obvious have done do so. *Id.* Based on the teaching and suggestion provided in ISDU, it would have been obvious to a POSITA to place the smoke sensor within a sufficient position to the cooking area for the sensor to operate with respect to the source of smoke (e.g., initiating at the food being heated). *Id.* This positioning would have been consistent with the express teaching of ISDU that the sensor be integrated with the microwave oven. *Id.* Additionally, ISDU specifically teaches this approach. *Id.* When referring to the prior art, ISDU states: “[w]ith the introduction of a smoke detection circuit *inside* the microwave the consumer will be alerted, by a louder more intense alarm, that they have overcooked their food or that there is another cause of smoke *inside* the microwave.” *Id.*; Ex. 1012 at 4.

Based on ISDU’s teaching and/or the motivation to have the smoke sensor be optimally positioned in a location where it could detect generated smoke close to its source, a POSITA would have placed, or at least tried to place, the smoke detection sensor in operative connection with the cooking area of the microwave oven; otherwise, the sensor would not function as intended. Ex. 1023 ¶[109]. The POSITA would have had a reasonable expectation of success in detecting smoke more quickly compared to attempting to detect smoke using a smoke detector positioned further away from the cooking area. *Id.*

Additionally, it would have been “obvious to try” placing the sensor in

operative connection with the cooking area of the microwave as opposed to outside/around the microwave oven, as there are only a finite number of identified, predictable solutions (i.e., just two feasible locations: inside or outside), with a reasonable expectation for success. *Id.*, ¶[110]. ISDU emphasized that at the time there was a market need to prevent fires but only a finite number of solutions for integrating smoke sensors into microwave ovens. *Id.* Further, it would have been obvious to integrate any smoke sensor inside a microwave oven to create a commercially integrated package for sale and shipping. *Id.* A POSITA would have pursued trying to place the smoke detection sensor inside the microwave oven with a reasonable expectation of success which would have been grounded on the disclosures of the prior art. *Id.*

Should the Board decide that “operative connection” means close proximity, ISDU teaches this as well. *Id.*, ¶[111]. It would have been well understood from the art how a microwave oven and a smoke detection sensor work (the smoke detector should be in proximity to the cooking operation to detect the smoke), and a POSITA would have substituted the placement of the smoke sensor inside as opposed to outside/around the microwave oven and obtained predictable results. *Id.*

To the extent the Board determines that the combination does not expressly recite a “plurality of electrically powered refrigerator components,” It would have been obvious to do so. *Id.*, ¶[112]. First, it would have been obvious to a person of

ordinary skill in the art that in order for the refrigerator discussed in Emma to operate properly, there would have to have been more than one electrically powered refrigerator component (i.e., “a plurality”). *Id.* Emma teaches “The appliances (microwave and refrigerator) maybe of standard design with features commonly available. *Id.* The internal components of the appliances are well known and do not need to be described herein.” Ex. 1011 at ¶[0026]. A POSITA would have understand this to mean that Emma contained at least a plurality of electrically powered refrigerator components or, alternatively, it would have been obvious to include a plurality of electrically powered refrigerator components. *Id.* Some examples of the latter would have included a compressor (explicitly disclosed), an indicator light (expressly disclosed), control circuitry (expressly disclosed), a compressor fan, an internal light, and/or a circulating fan. *Id.*

b. ***Ground 2: Obvious in view of Emma combined with Smith***

Ground 2 is that claims 1, 13, 15, 20-22, and 24-25 are invalid because it would have been obvious to combine the microwave refrigerator combination of Emma with the smoke sensor discussed in Smith. As discussed above, Emma discloses a microwave refrigerator combination. Smith teaches a microwave oven that is designed to shut down the microwave based on a smoke sensor positioned inside the microwave oven and in operative connection with the cooking area

detecting the food being cooked, almost reaching its combustion point. *Supra* at §VI.B.2.c; Ex. 1023 ¶[113].

There are numerous reasons why a POSITA would have combined the microwave refrigerator combination taught in Emma, with the Smoke Sensor operatively placed inside the microwave oven as in Smith. Ex 1023 ¶[115].

First, Emma and Smith each relate to optimizing electric cooking appliances, including specifically microwaves. *Id.*, ¶[116]. Second, all the claimed elements were known in the prior art, and a POSITA would have combined the elements as disclosed by known methods for the purposes of providing Emma's microwave refrigerator combination with Smith's smoke sensor operatively connected with the cooking area. *Id.* Such a combination would have yielded nothing more than predictable results to one of ordinary skill in the art. *Id.* While Emma fails to recite a smoke sensor, Emma does disclose adding functionality to appliances by cycling power to a refrigerator and auxiliary electrical outlets for the purpose of improving the safety of the Emma appliance (preventing overload conditions). *Id.* Emma's teaching would have motivated a POSITA to look to further microwave functionalities, including those in Smith. *Id.*

Any inclusion of Smith's smoke sensor operatively connected with the cooking area with Emma, would result in such elements merely performing the same function as they do separately, i.e., smoke sensing to withdraw electrical power from

an electrical cooking appliance and then enabling resetting of the electrical cooking appliance. *Id.*, ¶[117]. A POSITA would have recognized the results of said combination to be predictable because Emma and Smith function to via digital control power control circuitry in an electrical appliance based on a sensor input. *Id.*

Third, a POSITA would have been motivated to combine Emma and Smith based on the teachings of each reference. *Id.*, ¶[118]. Emma and Smith are both directed towards shutting down a component of the device in response to a sensor output indicative of an unwanted condition. *Id.* Emma teaches withholding power based on the power demands of the microwave oven. *Id.* Smith inherently teaches a power control relay designed to be power cycled by the controller. *Id.* It would have been obvious to a POSITA to modify Emma with Smith to include the smoke sensor in operative connection with the microwave oven following the elimination of the unwanted condition detected. A POSITA would have been able to pursue any of these known potential solutions with a reasonable expectation of success grounded in the disclosures of the prior art. *Id.*

Fourth, it would have also been obvious to a POSITA to modify Smith with the features of the microwave/refrigerator combination of Emma for the purpose and convenience of having an “all-in-one appliance” in addition to the safety feature of managing total power draw as taught by Emma. Ex 1002 ¶[237].

Fifth, a POSITA would also have found the asserted combinations of Emma

and Smith “obvious to try.” Ex. 1023 ¶[119]. As shown in Emma and Smith, at the time of the invention, there was a recognized need in the art to optimize microwave ovens. Ex. 1011 ¶[0007]; Ex. 1014 at 1:6-40. Therefore, it would have been obvious to a POSITA to try this combination. Ex 1023 ¶[119].

Finally, Petitioner contends Smith discloses the Reset Enable Function as shown in Section VI.C.1.a.vii.(C). Should the Board disagree, it would have been obvious to modify Smith and/or the Smith/Emma combination to reset the microwave oven following the smoke sensor no longer sensing smoke. Ex 1023 ¶[113]. First, based on a teaching suggestion or motivation in Smith, a POSITA would modify Smith and/or the Smith/Emma combination to contain the Reset Enable Function. *Id.*

The shutdown function of Smith is configured to be reversible by the control of the Smith and/or the Smith/Emma combination microcontroller through the use of an electronically controlled relay. *Id.*, ¶[114]. Further, Smith teaches that a goal of the Smith smoke sensor is to anticipate fires before they occur. Ex. 1014 at 1:6-9. Resetting the microwave – undamaged upon early detection of a fire in its early stages – would re-enable the microwave for use again in a subsequent cooking session and would prevent replacing a costly appliance or service call when such replacement or service would not be necessary. Ex 1002 ¶[114]. Moreover, a POSITA would have understood that modifying Smith and/or the Smith/Emma

combination to return to a reset state following a shutdown condition and resetting the smoke detection circuitry would yield a reasonable expectation of success and allow for successive detection of smoke events. *Id.* A POSITA would have understood, for example, that a microwave is a commercially sold cooking appliance. *Id.* It would be problematic to offer for sale a microwave oven that had to be serviced or replaced after just one trip of its smoke detection circuit. *Id.*

Lastly, it would have been “obvious to try” to add a Reset Enable Function as discussed previously, because all of the microwave components disclosed in Smith and/or the Smith/Emma combination are non-destructive, as discussed above, and designed to be power cycled. *Id.*, ¶[114]. Thus, there would only be a finite number of potential solutions and conditions for restarting the microwave after the shutdown. A POSITA would have included such a feature with a reasonable expectation of success. *Id.*

c. ***Grounds 3 and 4: Obvious in view of Emma combined with Butt, or alternatively, with Butt and Smith***

Ground 3 is that claims 1, 13, 15, 20-22, and 24-25 are invalid because it would have been obvious to combine the microwave refrigerator combination of Emma with the smoke sensor taught in Butt. There are numerous reasons that a POSITA would make a combination of the microwave refrigerator combination of Emma with the smoke sensor of Butt. *Id.*, ¶[123]. First, all the claimed elements

were known in the prior art and a POSITA would have combined the elements as claimed by known methods, with no change in their respective functions. *Id.* The combination would have yielded nothing more than predictable results to one of ordinary skill in the art. *Id.* While Emma fails to recite a smoke sensor, Emma does disclose adding functionality to appliances by cycling power to a refrigerator and auxiliary electrical outlets for the purpose of improving the safety of the Emma appliance (preventing overload conditions). *Id.* Emma's teaching would motivate a POSITA to look to further microwave functionalities, including those in Butt. *Id.*

Both Emma and Butt disclose shutdown conditions while using electrical cooking appliances that provide added functionality. *Id.*, ¶[124]. Additionally, Butt, explicitly relates to added features of kitchen appliances. *Id.*; *supra* at §VI.C.2.d. It would have been obvious to a POSITA to combine the additional kitchen appliance safety features of Butt into the Emma microwave/refrigerator combination namely to enable the Emma microwave to shut down upon the detection of smoke and reenable the Emma microwave for a further cooking session when the smoke has cleared. Ex 1023 ¶[124]. Further, it would have also been obvious to a POSITA to modify Butt with the features of the microwave/refrigerator combination of Emma for the purpose and convenience of having an "all-in-one appliance" in addition to the safety feature of managing total power draw as taught by Emma. *Id.*

To the extent the Board determines that the combination of Emma and Butt

do not render obvious the afore-mentioned claims, Ground 4 is it would be obvious to a POSITA to combine Emma with Butt and Smith. *Id.*, ¶[125].

First, Emma, Butt and Smith each relate to optimizing electric cooking appliances. *Id.*, ¶[126]. Second, all the claimed elements of the afore-mentioned claims were known in the prior art, and a POSITA would have combined the elements as disclosed by known methods for the purposes of modifying Emma's microwave refrigerator combination to include Smith's smoke sensor to be operatively connected with its cooking area and to include Butt's smoke sensor and reset functionality. *Id.* Such a combination would have yielded nothing more than predictable results to one of ordinary skill in the art. *Id.* Any inclusion of Butt's reset functionality with Smith's smoke sensor operatively connected with the cooking area into Emma, would result in such elements merely performing the same function as they do separately, i.e., smoke sensing to withdraw electrical power from an electrical cooking appliance and then re-enabling the electrical cooking appliance. *Id.* A POSITA would have recognized that the results of said combination were predictable because Emma, Butt and Smith function to digitally control power control circuitry for an electrical appliance based on a sensor input. *Id.*

Third, a POSITA would have been motivated to combine Emma, Butt and Smith based on the teachings of each reference. *Id.*, ¶[127]. Specifically, Emma, Butt and Smith are each directed towards shutting down a component of the device in

response to a sensor output indicative of an unwanted condition. *Id.* Emma teaches withholding of power based on the power demands of the microwave oven. *Id.* Butt discloses shutting down electrical cooking appliances in response to a smoke sensor, and also discloses resetting the electrical power supply to the cooking appliance after a smoke-triggered shutdown condition. *Id.*; *supra* at §VI.C.1.a.v.(C), §VI.C.1.a.vi (C). Similarly, Smith inherently teaches a power control relay for the microwave magnetron designed to be power cycled by the controller. *Supra* at §VI.C.1.a.vi.(B); Ex. 1023 ¶[127]. It would have been obvious to a POSITA to modify Emma with Butt and Smith to include the smoke sensor in operative connection with the microwave oven with the reset functionality disclosed by Butt for the added benefit of re-using the microwave oven. *Id.* A POSITA would have been able to pursue any of these known potential solutions with a reasonable expectation of success grounded in the disclosures of the prior art. *Id.*

Fourth, a POSITA would also have found the asserted combinations of Emma Butt with Smith “obvious to try.” *Id.* ¶[128]. As shown in Emma, Butt and Smith, at the time of the invention, there was a recognized need in the art to optimize microwave ovens. *Id.*; Ex. 1011 ¶[0007]; Ex. 1015 at 1:22-44; Ex. 1014 at 1:6-40. Therefore, it would have been obvious to a POSITA to try this combination. *Id.*

Finally, Petitioner contends Butt discloses “wherein the smoke sensor is positioned in operative connection with a cooking area inside the microwave oven”

because there is no positioning requirement. However, should the Board disagree, it would have been obvious to a person of ordinary skill in the art to modify the Emma/Butt combination to teach a smoke sensor in operative connection with a cooking area inside a kitchen appliance, in this case a microwave oven. Ex 1023 ¶[120]. Butt teaches a user enabled reset device which can be initiated following the smoke detector unit detecting smoke and ceasing the supply of power to the appliance. *Id.*; *supra* at §VI.C.1.a.v.(C), §VI.C.1.a.vi.(C). Butt's reset function reinitializes the system for further use by checking for a smoke alarm system signal and closing a relay to reconnect the electrical appliance to AC power if no such signal is detected. Ex 1023 ¶[120]. There are numerous reasons that a POSITA would make a modification in the Emma/Butt combination to position the smoke detection sensor in operative connection with the inside of the microwave oven. *Id.* First, based on the teaching and suggestion provided in Emma/Butt combination, it would have been obvious to a POSITA to place the smoke sensor to be in operative connection with the cooking area inside the microwave oven because that would place it in closer proximity to the source of smoke (initiating at the food being heated) and the smoke detector must be in operative connection for it to function as a smoke detector. *Id.* This is consistent with the express teaching of Butt that it is integrated with the kitchen appliance. *Id.*

Based on Butt's teaching and/or the motivation to have the smoke sensor be

positioned in a location to detect generated smoke close to its source, a POSITA would have placed, or at least tried to place, the smoke detection sensor in operative connection with the cooking area of any kitchen appliance in this case, a microwave oven. *Id.*, ¶[122]. The POSITA would have had a reasonable expectation of success in detecting smoke more quickly compared to attempting to detect smoke using a smoke detector positioned further away from the cooking area. *Id.*

Lastly, if it is determined that Butt fails to teach the VOC Sensor claim element, it would have been obvious to a POSITA to use either a photoelectric or ionization smoke sensor as the Butt smoke sensor, because photoelectric and ionization smoke sensors are common smoke detector designs that would have been known to a POSITA. *Id.*, ¶[129].

d. ***Grounds 5 and 6: Obvious in View of Emma combined with either ISDU and Smith, and further combined with the Knowledge of a POSITA***

Grounds 5 and 6 are that dependent claims 12, 14, 19, 23, and 26, which claim USB ports with certain functionalities, are invalid because it would have been obvious to combine the microwave refrigerator combination of Emma with the smoke sensors taught in ISDU or Smith, and also substitute one or more of Emma's auxiliary low power receptacles / outlets for a USB port for power delivery to small electronic devices. Ex. 1023 ¶[130].

The bases for combining Emma's microwave refrigerator with the smoke

sensors taught in ISDU or Smith are provided in Sections VI.C.2.a and VI.C.2.b, incorporated herein by reference. It would have been obvious to substitute one or more of the auxiliary low power receptacles / outlets on Emma's microwave with USB ports in light of the knowledge of a POSITA. Ex. 1023 ¶[131]. First, Emma specifically teaches providing low power auxiliary outlets for the purposes of recharging cellular phones and other low power devices; based on this teaching suggestion or motivation in Emma, a POSITA would have known to modify Emma's front panel by adding USB ports or by substituting USB ports for Emma's auxiliary low power receptacles / outlets 11 and 12 on the front panel of the microwave oven. *Id.* Both would serve the purpose of providing a known, low power charging means, for the purpose of providing power to small electronic devices. *Id.* Emma teaches using "low power" auxiliary ports to charge small electronic devices, such as cell phones. *Id.*; Ex. 1011 ¶[0027]. "A maximum current may be set by controller 4 to prevent overload of the outlets 11 and 12." Ex. 1011 ¶[0029]. The POSITA knew at the time that the use of USB ports to deliver power to small devices like cell phones was becoming prolific worldwide in the time frame of the Challenged Claims. Ex. 1023 ¶[131]. Moreover, the POSITA would have known that the use of devices to convert AC to DC for charging small electronic devices such as cell phones and cameras via USB ports was also prolific. *Id.* In fact, in 2009, around the time of Emma and well before the invention date of the Challenged Claims, the

USB Implementers Forum had released the USB Battery Charging Specification 1.1 as an extension of the USB specifications to battery charging over USB to provide additional current in excess of the previously released USB 2.0 specification. *Id.* As early as 2004, well before the April 25 2014, priority date of the Challenged Claims, Apple had already released the fourth generation iPod which provided for the ability to “conveniently charge iPod with either the included FireWire or USB cable.” *Id.* Accordingly, the use of USB ports for charging electronic devices, was normalized and well-known to a POSITA. *Id.*

A POSITA would have understood that modifying Emma’s microwave panel to add a USB port or to substitute a USB port for the auxiliary outlet would have yielded a reasonable expectation of success and would have allowed for the charging of electronic devices, such as cell phones. Ex. 1023 ¶[132]. A POSITA would have understood, for example, that AC/DC conversion and USB ports were commonplace at the time and were rapidly becoming the worldwide standard of the day for charging small electronic devices. *Id.* Thus, it would have been known that such USB ports were being utilized for charging purposes in several different implementations, these would have included in-home computers, vehicles, and wall outlets. *Id.* A POSITA would have recognized that a commercially sold microwave appliance already used as a source for charging small electronic devices through its auxiliary outlets, as taught by Emma, would similarly benefit from being equipped

with USB ports for charging. *Id.* This change would also have been motivated by the standardization of the USB port, its smaller size (compared to conventional AC outlets), and ability to connect electronics directly via the USB cables normally supplied by device manufacturers. Examples include companies making personal media players and cell phones. *Id.*

Further, it would have required no more than a simple substitution of one known element in Emma for another to obtain predictable results. *Id.*, ¶[133]. Emma teaches utilizing the included auxiliary port to charge small electronic devices like cell phones. *Id.* A POSITA would have known to include USB ports or would have substituted one or more of the Emma auxiliary ports with a USB port, especially given the increasing acceptance and standardization of USB ports for use in charging small electronic devices. The results would also have been predictable, i.e., the USB ports would charge small electronic devices just as they did when used in other devices (e.g., in cars, wall outlets adapters, etc.). *Id.*

Lastly, it would have been “obvious to try” to add a USB port to deliver power to small electronic devices as discussed previously, because this type of power charging was common at the time of the invention. *Id.*, ¶[134]. There was a finite number of potential solutions and conditions for charging small electronic devices at the time, and USB ports for charging were standardized under the USB Battery Charging Specification 1.1. *Id.* A POSITA would have included such a feature with

a reasonable expectation of success, as discussed above. *Id.*

e. ***Grounds 7 and 8: Obvious in View of Emma combined with either ISDU or Smith, and further combined with Quezada***

Grounds 7, 8, 9, and 10 are that dependent claims 12, 14, 19, 23, and 26, which claim USB ports having certain functionalities, are invalid because it would have been obvious to a POSITA to combine USB ports, as taught by Quezada, for charging electronic devices with the Emma microwave/refrigerator combination auxiliary low power receptacles / outlets (as modified with the smoke sensors taught in ISDU or Smith, discussed above). Ex. 1023 at ¶[135].

The bases for combining Emma's microwave/refrigerator with the smoke sensors taught in ISDU or Smith are provided in Sections VI.C.2.a and VI.C.2.b, incorporated herein by reference. With respect to USB ports, there are numerous reasons why a POSITA would have combined the USB ports, and accompanying AC/DC power conversion circuitry, taught in Quezada with Emma's microwave auxiliary-port charging feature. Ex. 1023 ¶[136]. First, Emma teaches that a standard household electrical outlet is included in the Emma microwave as a "low power" auxiliary port to charge small electronic devices, such as cellular phones. *See* Section VI.C.1.b.(A).

Quezada teaches incorporating USB ports as an alternative to or in combination with standard AC electrical outlets. Ex. 1023 ¶[137]. Specifically,

Quezada teaches a combined power sourcing receptacle that can include both a standard AC electrical receptacle and a USB port for charging small electronics. *Id.* In Quezada's combined mountable sourcing unit, power is provided to an AC electrical receptacle and also to a USB regulated voltage sourcing unit that converts AC to DC and sends regulated DC voltage to the USB ports. *Id.* Thus, Quezada teaches a system for powering devices through both USB and standard AC electrical ports which is mountable in a small area. *Id.* All of the claimed elements were thus known in the prior art, and a POSITA would easily have combined the elements as disclosed by known methods for the purpose of adding Quezada's USB port charging to Emma's microwave auxiliary port charging. *Id.* Such a combination would have yielded nothing more than predictable results to a POSITA. *Id.* Any addition of Quezada's USB technology to Emma would likewise have resulted in such elements merely performing the same function as they do separately, i.e., charging small electronic devices with DC. *Id.* A POSITA would have recognized that the results of this combination were predictable because Quezada functions in the same way as does Emma, i.e., to deliver power for charging devices. *Id.*

A POSITA would have understood that including Quezada's USB port system in Emma's microwave auxiliary outlet system would have yielded a reasonable expectation of success, including providing for the charging of electronic devices such as cell phones. *Id.*, ¶[138]. A POSITA would have understood, for example,

that Quezada's AC/DC and USB port system could be substituted into any device utilizing a standard electrical outlet, including a microwave oven as taught by Emma. *Id.* Furthermore, Emma provides for the Withhold and Deliver of Electrical Power to Emma's auxiliary outlets via Emma's Control Circuit. A POSITA would have known that replacing the auxiliary (120 VAC) outlet of Emma with the USB port receptacle taught in Quezada, would yield a revised configuration of Emma that functioned in exactly the same way – i.e., when power was withdrawn from the Quezada outlet, its 5-V output would cease and no power would be supplied by the USB port. This familiar result is reached by the simple replacement of Emma's auxiliary outlet with the USB port receptacle of Quezada. So long as a power circuit is connected to the device, such as Emma's power control circuit, Quezada's system will work as intended to supply AC power to an auxiliary port and DC power to a USB port. *Id.* In other words, Quezada's system functions as expected when receiving power regardless of its location, whether it is a wall mounted electrical box or a microwave mounted outlet, as taught by Emma. *Id.* A POSITA would have also understood that a microwave is a commercially sold appliance, and it would be desirable to not only have auxiliary outlets to power small devices as taught by Emma, but also to have USB ports for charging as taught by Quezada, particularly when USB charging had become widespread at the time of the invention. *Id.*

Moreover, all the claimed elements were known in the prior art, and a

POSITA would have combined the elements as disclosed by known methods for the purposes of providing Quezada's USB port charging system to Emma's microwave. *Id.*, ¶[139]. Such a combination would have yielded nothing more than predictable results to one of ordinary skill in the art. *Id.* Any inclusion of Quezada's USB port system into Emma would result in such elements merely performing the same function as they do separately, i.e., converting AC to DC for USB port charging. *Id.* A POSITA would have recognized that the results of said combination were predictable because while Quezada teaches the USB port system in a wall mounted configuration, its location is irrelevant to its electrical function. So long as the system receives power, it will function as intended, i.e., charge small electronic devices. *Id.*

Lastly, a POSITA would have found the asserted combinations "obvious to try." As explained above in Section VI.C.2.g, at the time of the invention USB ports had become prolific for charging small electronic devices. *Id.*, ¶[140]. A POSITA would have known this at the time of the invention and would have tried Quezada's system on Emma's microwave because it is a desirable way to charge small devices, given the smaller size of USB ports and USB cables provided by distributors of small electronic devices. *Id.*

D. Objective Indicia of Nonobviousness do not weigh in favor of Patentability

Petitioner is currently unaware of any objective indicia that could overcome

the strong showing of obviousness set forth above. Should Patent Owner identify any objective indicia, Petitioner requests an opportunity to rebut any such evidence. *Amneal Pharms. v. Supernus Pharms.*, IPR2013-00368, Paper 8, at 12-13 (PTAB Dec. 17, 2013).

E. **All of the Claims are Indefinite**

a. ***Ground 9: Indefinite***

Ground 9 is that claims 1- 28 are invalid as being indefinite. “[A] patent is invalid for indefiniteness if its claims, read in light of the specification delineating the patent, and the prosecution history, fail to inform, with reasonable certainty, those skilled in the art about the scope of the invention.” Nautilus, Inc. v. Biosig Instruments, Inc., 572 U.S. 898, 901 (2014); 35 U.S.C. § 112, ¶2. Independent Claims 1 and 24 recite “a smoke sensor... in operative connection with a cooking area inside the microwave oven...” and Independent Claim 15 recites “a smoke sensor...in operative connection with the cooking area...” Ex. 1001 ’745 patent. Those claims are indefinite because a POSITA cannot determine with reasonable certainty the scope of those claim limitations. Ex. 1023 ¶[140.2].

Specifically, the claim language does not provide any indication of what it means for a smoke sensor to be in “operative connection” with an area. *Id.*, ¶[140.3]. It is unclear whether the connection is such that the smoke sensor somehow operates in the area or the smoke sensor operates based on being connected to the area. *Id.*

While the specification shows circuit diagrams having hardware and logic in operative electrical or operative logical connection, it does not provide any guidance on the meaning of the term “operative connection with the cooking area.” *Id.* Furthermore, while the specification provides certain specific examples of a safety sensor being positioned, e.g., “in the microwave cavity 332 adjacent air exhaust vents 338, 340 of the microwave, which comprises an air passage that connects an area where food is cooked in the microwave oven to the air outside the housing of the microwave oven.” Ex. 1001 at 16:27-30. But the claims are not so limited – a POSITA would have to guess as to what “operative connection” means in the context of the claims as written. Ex. 1023. ¶[140.3].

VII. CONCLUSION

For the foregoing reasons, Petitioner respectfully requests that trial be instituted and that all Challenged Claims of the '745 Patent be cancelled.

Dated: October 9, 2023

Respectfully submitted,

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CERTIFICATE OF WORD COUNT

I hereby certify that the foregoing Petition complies with the type-volume limitation of 37 C.F.R. §42.24(a)(1)(ii) and contains 14,221 words based on the word count indicated by the word processing system used to prepare this Petition, excluding those portions exempted by §42.24(a)(1). I also certify that the foregoing Petition complies with the general format requirements of 37 C.F.R. §42.6(c) and has been prepared using Microsoft® Word in 14-point, Times New Roman font.

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CERTIFICATE OF SERVICE

I hereby certify that on this 9th day of October 2023, a copy of this Petition for Post Grant Review and Petitioner's Exhibits 1000–1023 were served by Federal Express on the following correspondence address of record for patent owner, pursuant to 37 C.F.R. §42.205(a):

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Courtesy copies of these documents were also sent via electronic mail to Patent Owner's litigation counsel listed below:

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Petition Appendix A

Listing of Challenged Claims for U.S. Patent No. 11,674,745

Descriptor	Claim 1	Claim 15 ⁸	Claim 24	Claim 25
	Apparatus comprising an appliance including:	Apparatus comprising: an appliance including	Apparatus comprising:	
“Microwave Oven”	a microwave oven	a microwave oven,... wherein the microwave oven includes an interior cooking area,	a microwave oven, including a magnetron and an externally accessible electrical connector, wherein the electrical connector is connectable to a plug,	
“Refrigerator”	a refrigerator	a refrigerator, wherein the refrigerator is configured to be in operative electrical connection with the at least one electrical power control circuit, wherein the refrigerator includes a plurality of electrically powered refrigerator components,		a refrigerator, wherein the refrigerator includes the plug, wherein the plug is connected to the electrical connector.

⁸ Certain claim elements of this claim have been reordered in this chart to align like claim elements with the same descriptors.

Descriptor	Claim 1	Claim 15 ⁸	Claim 24	Claim 25
“Control Circuit”	at least one power control circuit, wherein the at least one power control circuit is in operative electrical connection with the microwave oven and the refrigerator, a single power cord, wherein the single power cord is configured to be releasably connected to a source of electrical power, wherein the at least one power control circuit is supplied with electrical power only through the single power cord,	at least one electrical power control circuit,... wherein the microwave oven is in operative electrical connection with the at least one electrical power control circuit,	at least one power control circuit, wherein the at least one power control circuit is in operative electrical connection with the microwave oven and the electrical connector, a single power cord, wherein the single power cord is configured to be releasably connected to a source of electrical power, wherein the at least one power control circuit is supplied with electrical power only through the single power cord,	

Descriptor	Claim 1	Claim 15 ⁸	Claim 24	Claim 25
“Withhold and Deliver Electrical Power”	wherein the at least one power control circuit is operative to cause electrical power to be withheld from at least one component of the refrigerator when a magnetron of the microwave oven draws cooking power, and electrical power to be delivered to the refrigerator when the magnetron does not draw cooking power,	wherein the at least one electrical power control circuit is operative to cause electrical power to be unavailable to at least one electrically powered refrigerator component when the magnetron draws cooking power, and electrical power to be available to the at least one electrically powered refrigerator component when the magnetron does not draw cooking power.	wherein the at least one power control circuit is operative to cause electrical power to be withheld from the electrical connector when the magnetron of the microwave oven draws cooking power, and electrical power to be delivered to the electrical connector when the magnetron does not draw cooking power,	
“Smoke Sensor”	wherein the microwave oven includes a smoke sensor, wherein the smoke sensor is positioned in operative connection with a cooking area inside the microwave oven, is in operative connection with the at least one power control circuit,	a smoke sensor, wherein the smoke sensor is positioned in operative connection with the cooking area, wherein the smoke sensor is in operative connection with the at least one electrical power control circuit,	wherein the microwave oven includes a smoke sensor, wherein the smoke sensor is positioned in operative connection with a cooking area inside the microwave oven, is in operative connection with the at least one power control circuit,	
“Shutdown Function”	wherein responsive at least in part to a level of smoke sensed by the	and wherein the at least one electrical power control circuit is	wherein responsive at least in part to a level of smoke sensed by the	

Descriptor	Claim 1	Claim 15 ⁸	Claim 24	Claim 25
	smoke sensor, the at least one power control circuit is operative to cause cooking power to the magnetron to be withdrawn to end a current cooking session prior to a set end time of the current cooking session,	configured to cause cooking power to be withdrawn from a magnetron of the microwave oven prior to a set end time of a current cooking session responsive at least in part to the smoke sensor sensing an amount of smoke,	smoke sensor, the at least one power control circuit is operative to cause cooking power to the magnetron to be withdrawn to end a current cooking session prior to a set end time of the current cooking session,	
“Reset Enable Function”	wherein after the current cooking session has been caused to end prior to the set end time based on the sensed level of smoke, the at least one power control circuit is operative thereafter to enable the magnetron to receive cooking power in a next subsequent cooking session.	wherein the at least one electrical power control circuit is configured such that after ending the current cooking session prior to the set end time due to sensing the amount of smoke, to enable cooking power to again be available to the magnetron in a next subsequent cooking session,	wherein after the current cooking session has been caused to end prior to the set end time based on the sensed level of smoke, the at least one control circuit is operative thereafter to enable the magnetron to receive cooking power in a next subsequent cooking session.	

Descriptor	Claim 12	Claim 14	Claim 19	Claim 23	Claim 26
	The apparatus according to claim 1	The apparatus according to claim 1	The apparatus according to claim 15	The apparatus according to claim 15	The apparatus according to claim 25
“USB Port”	wherein the microwave oven includes a USB port, wherein the USB port is in operative connection with the at least one power control circuit, wherein the USB port is not operative to deliver electrical power from the USB port when the magnetron draws cooking power.	wherein the microwave oven includes a USB port, wherein the USB port is in operative connection with the at least one power control circuit, wherein the USB port is operative to deliver electrical power.	wherein the microwave oven includes a USB port, wherein the USB port is in operative connection with the at least one electrical power control circuit, wherein the USB port is not operative to deliver electrical power from the USB port when the magnetron draws cooking power	wherein the microwave oven includes a USB port, wherein the USB port is in operative connection with the at least one electrical power control circuit, wherein one USB port is operative to deliver electrical power.	wherein the microwave oven further includes at least one USB port, wherein the at least one USB port is in operative connection with the at least one power control circuit.

Descriptor	Claim 13	Claim 20
	The apparatus according to claim 1	The apparatus according to claim 15
“Auxiliary Output Device”	wherein the microwave oven further includes at least one output device including at least one of a USB port, an inductance charging pad, an auxiliary electrical outlet, wherein the at least one output device is in operative connection with the at least one power control circuit, and wherein the at least one power control circuit is operative to cause the at least one output device to be inoperative when the magnetron draws cooking power.	wherein the microwave oven further includes at least one output device including at least one of a USB port, an inductance charging pad, and an auxiliary electrical outlet, wherein the at least one output device is in operative connection with the at least one electrical power control circuit, and wherein the at least one electrical power control circuit is operative to cause the at least one output device to be inoperative when the magnetron draws cooking power.

Descriptor	Claim 22
	The apparatus according to claim 15,
“Sensor”	wherein the smoke sensor includes at least one of a radiation emitter and radiation receiver, a photosensor, a motion sensor, an ionization sensor, and a VOC sensor.