

UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE PATENT TRIAL AND APPEAL BOARD

Decent Espresso International Ltd.,
Petitioner,

v.

Duvall Espresso IP Enforcement, LLC,
Patent Owner

Case IPR2025-00747

**DECLARATION OF IAN TINKLER, IENG MIED
IN SUPPORT OF PETITION FOR *INTER PARTES* REVIEW OF
U.S. PATENT 11,957,271**

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Declaration of Ian Tinkler Regarding U.S. Pat. No. 11,957,271

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I, Ian Tinkler, declare as follows:

I. Overview

A. Charge

1. I have been retained by Decent Espresso International Ltd. (“Decent” or “Petitioner”) to provide my opinions concerning the validity of the claims in U.S. Patent No. 11,957,271 (the 271 patent). It is my understanding that I am to consider the issue of validity and provide testimony from the perspective of a person having ordinary skill in the art (“POSA”) in the field(s) relevant to the 271 patent and the prior art, at the time of the earliest priority date claimed in the 271 patent, i.e., August 2012.

2. I am being compensated for my time in connection to this matter. My compensation is not in any way contingent upon the opinions that I express or the outcome of this proceeding or any related litigation. I have no financial or personal interest in the outcome of this proceeding or any related litigation.

3. I am over 18 years of age. I have personal knowledge of the facts stated in this Declaration and could testify competently to them if asked to do so.

4. All of the opinions contained in this Declaration are based on the documents I reviewed and my knowledge and professional judgment.

5. In preparing to offer these opinions, I reviewed the documents listed in the References section at the end of this Declaration.

B. Qualifications

6. In formulating my opinions, I have relied on my knowledge, training, and experience in the relevant field, which I will summarize briefly. A more detailed summary of my background, education, experience, and publications is set forth in my curriculum vitae (CV), which is attached to the end of this Declaration as Appendix A.

7. In 1978, I earned the Ordinary National Certificate in Electronics Engineering from North Hert's College of Further Education (Stevenage College) in Stevenage, England. In 1981, I earned the Higher National Diploma in Mechanical Engineering, HND (which is equivalent to a four-year degree) from Hertfordshire University (Hatfield Polytechnic) in Hatfield, England. In 1998, I earned a Master of Business Administration from Rockford University (Rockford College) in Rockford, Illinois.

8. I have been an Incorporated Engineer (IEng) and a Member of the Institute of Engineering Designers (MIED) for over 40 years.

9. Since completing my education, I have worked for several companies as an engineer for over 45 years. I have listed the last 20 years of experience in my CV.

10. Notably, from 2005 through 2015, I worked for Keurig Green Mountain designing numerous coffee machines, systems, devices, and related

technologies and supervising other employees in the design of such machines, systems, devices, and related technologies. I hired and managed numerous persons who would have been POSAs in the years between 2005 and 2015 and became familiar with their abilities and knowledge levels.

11. During my time working for Keurig Green Mountain, I worked directly with several companies to make coffee machines and systems, including Breville, Cuisinart, Starbucks, Lavazza, Mr. Coffee, and GE. I visited their factories and laboratories in several countries and worked to integrate Keurig technology into many of their coffee machines. During the years between 2005 and 2015, I became familiar with the abilities and knowledge levels of many POSAs working at such companies to design coffee machines and systems.

12. My titles at Keurig included Vice President of Brewer Engineering and Vice President of Research and Development. As Vice President of Brewer Engineering, I led mechanical, electronics, and software teams designing and developing complex technology systems that resulted in the production of over 60 different coffee brewers. As Vice President of Research and Development, I explored, developed, and tested new technologies for use in the next generation of Keurig systems, led internal development teams tasked with the introduction of new product types, and teamed with domestic and international consultants on industrial design and system products.

13. I am the inventor of over 30 U.S. and international patents, including patents relating to coffee brewing systems, vaporizing systems, and power electronics.

II. Legal Principles and Understandings

A. Relevant Law

14. I am not a lawyer, and I will not provide any legal opinions. While I am not a lawyer, I have been advised certain legal standards are to be applied by technical experts in forming opinions regarding the meaning and validity of patent claims.

1. Claim Construction

15. I have been informed that claim construction is a matter of law and that the final claim construction will ultimately be determined by the Patent Trial and Appeal Board. For the purposes of my analysis in this proceeding and with respect to the prior art, I have been informed that IPRs are currently reviewed under “the Phillips standard.”

16. I have been informed that under the Phillips standard, claim terms are given their plain and ordinary meaning as understood by a person of ordinary skill in the art at the time of the invention in light of the claim language and the patent specification.

17. I have been informed that embodiments described in the specification

are encompassed by the claim terms.

18. I have been informed that the patentee can serve as their own lexicographer. As such, if a claim term is provided with a specific definition in the specification, I should interpret that claim term in light of the particular definition provided by the patentee.

19. I understand that the patent prosecution file history may also be considered when interpreting the meaning of the claims of a patent. The file history can contain evidence of how the U.S. Patent and Trademark Office (“PTO”) and the applicant understood the patent and the meaning of the terms of the patent.

20. I understand that the claim language, specification, and prosecution history are referred to as “intrinsic evidence.”

21. I understand that evidence from an expert in the field may also be relevant in the determination of how a person of ordinary skill in the art would understand the claims. I understand that this evidence, which is referred to as “extrinsic evidence,” must be considered in the context of the intrinsic evidence and cannot be used to change the meaning of a claim term to be inconsistent with the intrinsic evidence.

2. Anticipation

22. For purposes of my analysis, I have been instructed by counsel on the law regarding anticipation and obviousness. I understand that a claim is invalid

and unpatentable if it is anticipated or obvious. My opinions relate to both anticipation and obviousness as detailed in this declaration.

23. I understand that anticipation of a claim requires that every element of a claim is expressly or inherently disclosed in a single prior art reference. I understand that an anticipating reference need not use the exact terms of the claims, but must describe the patented subject matter with sufficient clarity and detail to establish that the claimed subject matter existed in the prior art and that such existence would be recognized by a POSA in the field of the purported invention. I further understand that a disclosure is “inherent” if the missing element is necessarily present in view of the explicit disclosure. I also understand that an anticipating reference must enable one of ordinary skill in the art to reduce the purported invention to practice without undue experimentation.

3. Obviousness

24. I have been informed and understand that a patent claim can be considered to have been obvious to a POSA at the time the application was filed. I understand that this means that, even if all of the requirements of a claim are not found in a single prior art reference, the claim is not patentable if the differences between the subject matter in the prior art and the subject matter in the claim would have been obvious to a person of ordinary skill in the art at the time the application was filed.

25. I have been informed that a patent claim is invalid if it would have been obvious to a person of ordinary skill in the art. In analyzing the obviousness of a claim, I understand the following factors may be taken into account:

- a. the scope and content of the prior art;
- b. the differences between the prior art and the claims;
- c. the level of ordinary skill in the art at the time the application was filed; and
- d. any so called “secondary considerations” of non-obviousness if they are present.

I am not aware of any evidence of secondary considerations of non-obviousness relevant to patent that I was asked to consider. I reserve the right to supplement this Declaration if the Patent Owner introduces evidence of secondary considerations of non-obviousness.

26. I have been informed and understand that the teachings of two or more references may be combined in the same way as disclosed in the claims, if such a combination would have been obvious to one having ordinary skill in the art. In determining whether a combination based on either a single reference or multiple references would have been obvious, it is appropriate to consider, among other factors:

- whether the teachings of the prior art references disclose known concepts

combined in familiar ways, which, when combined, would yield predictable results;

- whether a person of ordinary skill in the art could implement a predictable variation, and would see the benefit of doing so;
- whether the claimed elements represent one of a limited number of known design choices, and would have a reasonable expectation of success by those skilled in the art;
- whether a person of ordinary skill would have recognized a reason to combine known elements in the manner described in the claim;
- whether there is some teaching or suggestion in the prior art to make the modification or combination of elements claimed in the patent; and
- whether the claim applies a known technique that had been used to improve a similar device or method in a similar way.

27. I understand that one of ordinary skill in the art has ordinary creativity and is not an automaton.

28. I understand that in considering obviousness, it is important not to determine obviousness using the benefit of hindsight derived from the patent being considered.

B. Level of Ordinary Skill in the Art

29. I understand that certain issues relating to the validity of the 271

Patent must be judged from the perspective of a person of ordinary skill in the relevant art, as I discuss below. I have been asked to define the level of a “person of ordinary skill in the art” or “POSA” that someone would have had at the time the alleged invention as claimed was made. I provide an overview of the 271 Patent in this Declaration. In deciding the level of ordinary skill, I have considered the following factors, which I have been informed are relevant to the determination of the level of ordinary skill in the art:

- the levels of education and experience of persons working in the field;
- the types of problems encountered in the art;
- the prior art solutions to these problems;
- the rapidity with which innovations are made; and
- the sophistication of the technology.

30. In my opinion, a person having ordinary skill in the art (“POSA”) at the time of the alleged invention would have had at least the following (or equivalents): a B.S. degree in mechanical engineering with at least five years of experience in product design; or an M.S. degree in mechanical engineering with at least two years of experience in product design.

31. My opinion below explains how a POSA would have understood the technology described in the references I have identified in this declaration as of the August 16, 2012 or the August 16, 2013, timeframe, which I have been informed is

the earliest possible priority date of the 271 Patent.

III. Overview of U.S. Patent No. 11,957,271

A. Patent Disclosure

32. U.S. Patent No. 11,957,271 (the 271 Patent) describes and claims methods of generating a desired temperature of an infused beverage within a brewing assembly. Various types of beverages, including teas, coffees, and others, may be infused by passing a solvent (such as heated water) over a solute (such as tea or coffee). While I haven't found the word coffee in the 271 Patent, the technology and terminology used in the patent (e.g., pressure, flow, temperature, steam for frothing, etc.), the accusations of infringement against Decent's espresso machines, and FIG. 4 (which appears similar to a group head on an espresso machine) all lead me to understand that at least one of the objects of the 271 Patent is to describe methods that may be used for making coffee.

33. With respect to the claims of the 271 Patent, the specification describes a system in which two solvents (201, 202) are pumped through two conduits by two pumps (211, 212) through at least one thermal modulator (221, 222). The conduits are joined to form a resulting conduit (203) for mixing the solvents. The mixed solvents are pumped into a brewing chamber (230) where they encounter a solute (ground coffee) to create a solution (espresso coffee) that is

discharged into a receptacle (250). The system is illustrated in FIG. 2, below:

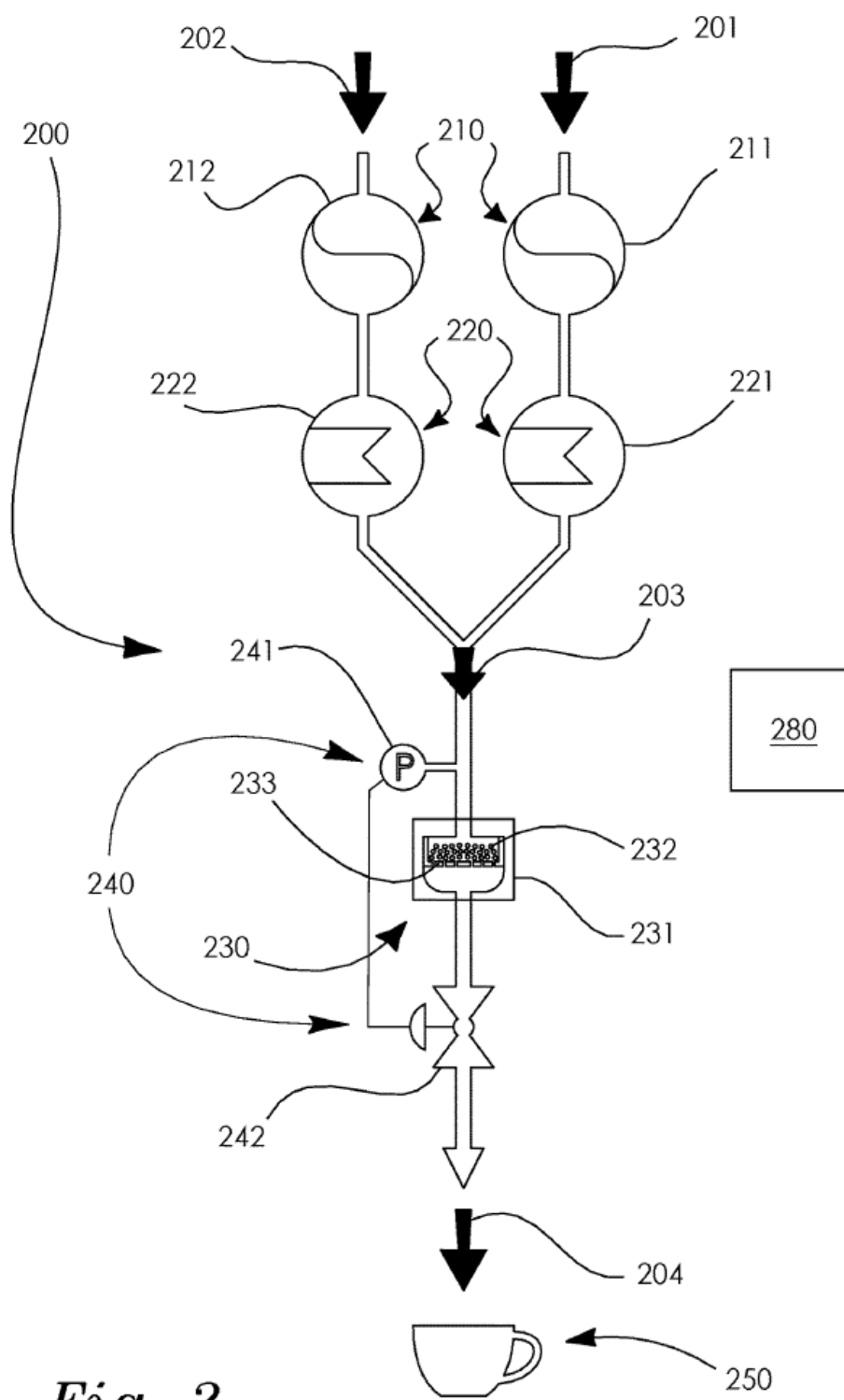


Fig. 2

34. The 271 Patent refers to using an electronic controller (280) to modify one or more of flow rate, temperature, and pressure, by receiving data from flow meters, pressure sensors, and/or temperature measuring devices, then using that data to control/modulate one or more of the pumps and/or thermal modulators to affect temperature, flow, and/or pressure.

35. The 271 Patent appears to state several problems and goals:

- a. “[L]ack of independent variable control makes the optimization and modification of infused beverages difficult.”
- b. “There is an apparent need for a brewing system that affords independent modulation of infusion pressure and flow rate...”
- c. “[V]arying exiting flow rate disadvantageously creates inconsistent beverage output, which is costly for many retailers of beverages. The inconsistencies also are problematic for retailers and consumers, alike, as both the taste of the beverage and the amount of the beverage may change at each brewing cycle.”
- d. It is “highly difficult to duplicate the flavor of an extraction even if the same brew formula of infusion pressure and temperature with respect to time are used.”
- e. “Therefore, a beverage brewing system that affords precise,

accurate and dynamic temperature control would enable optimization of beverage flavor and is needed.”

- f. “As previously explained, there is an acute need for a brewing system that affords the brewer independent, dynamic variation of brewing variables of temperature, pressure and flow rate during the production of infused beverages.”
- g. “Furthermore, there is a need for a brewing system that mitigates and/or eliminates the impact of external factors such as solute particle size variations and solute compaction on the beverage flavor.”

36. Of the goals listed above, it appears that the claims of the 271 Patent are most closely related to the one or more of the goals of precise, accurate and dynamic temperature control; independent modulation of flow rate; and consistent exiting flow rate

B. The Claims of the 271 Patent

37. The following claims of the 271 Patent are being challenged in the Petition that I am supporting, and are analyzed in this Declaration:

Claim 1

1. A method of generating a desired temperature of an infused beverage within a brewing assembly comprising the steps of: inducing a flow of a first solvent within a first solvent conduit upstream of a brewing chamber in a brewing assembly, the first solvent at a first temperature; inducing a flow of a second solvent within a second solvent conduit, separate from the first solvent conduit, upstream of the brewing chamber, and thermally modulating the second solvent to a second temperature higher and different than the first temperature; selectively combining the first and second solvents at a resulting solvent conduit upstream of the brewing chamber to form a resulting solvent at a selectively desired temperature lower than the second temperature; receiving the resulting solvent at the brewing chamber housing a solute at the selectively desired temperature to produce an infused beverage; and discharging the infused through an outlet on the beverage assembly.

Claim 2

2. The method according to claim 1, further comprising: thermally modulating the first solvent in the first solvent conduit to the first temperature.

Claim 3

3. The method according to claim 2, further comprising: thermally modulating the first solvent in the first solvent conduit with a first thermal modulator and thermally modulating the second solvent in the second solvent conduit with a second thermal modulator.

Claim 4

4. The method according to claim 3, further comprising: inducing the flow of the first solvent within the first solvent conduit with a first pump and inducing the flow of the second solvent within the second solvent conduit with a second pump.

Claim 5

5. The method according to claim 4, further comprising: electronically controlling the first and second pumps with an electronic controller to selectively modulate the flows of the first and second solvents, respectively, to generate a desired flow rate of the resulting solvent.

Claim 6

6. The method according to claim 5, further comprising: electronically controlling the first and second thermal modulators with the electronic controller to selectively modulate the temperatures of the first and second solvents, respectively, to generate the selectively desired temperature.

Claim 7

7. The method according to claim 1, further comprising: electronically controlling at least one pump with an electronic controller to selectively modulate the flows of the first and second solvents, respectively, to generate a desired flow rate of the resulting solvent.

Claim 8

8. The method according to claim 1, further comprising: electronically controlling a thermal modulator with an electronic controller to selectively modulate the temperature of the second solvent to generate the selectively desired temperature.

Claim 9

9. The method according to claim 8, further comprising: thermally modulating the first solvent in the first solvent conduit to the first temperature with a second thermal modulator; and electronically controlling a second thermal modulator with the electronic controller to selectively modulate the temperature of the first solvent to generate the selectively desired temperature.

Claim 10

10. The method according to claim 9, further comprising: electronically controlling at least one pump with an electronic controller to selectively modulate the flows of the first and second solvents, respectively, to generate a desired flow rate of the resulting solvent.

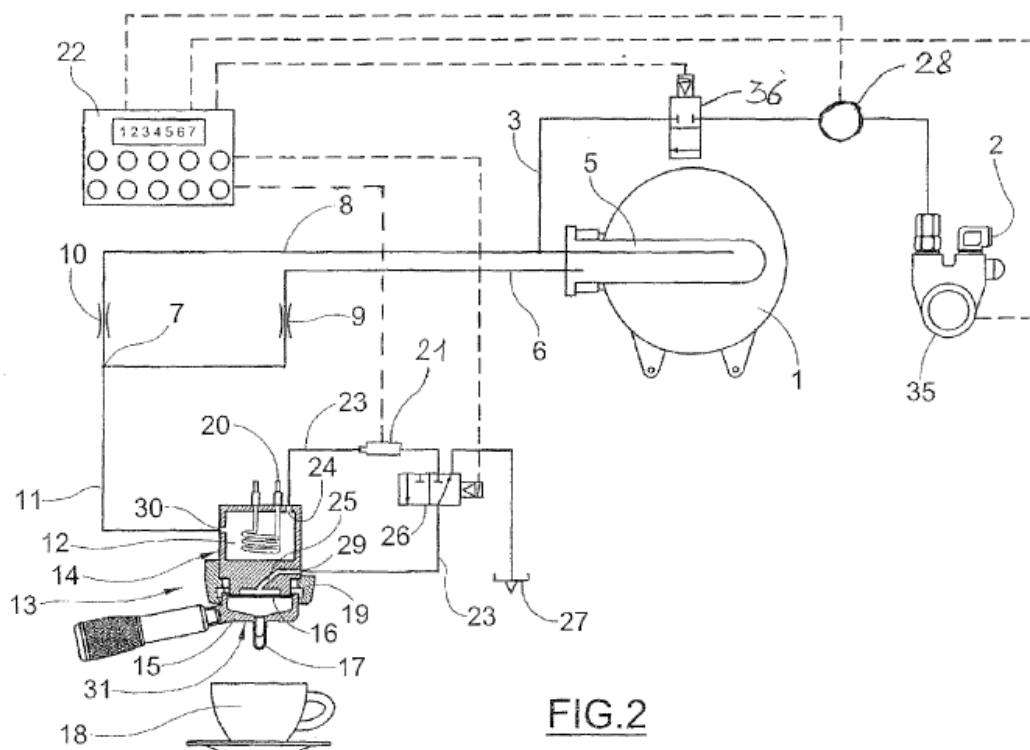
IV. Overview of the Prior Art

38. In the following paragraphs I will provide a brief overview of the key prior art patents and publications. I reserve the right to rely on the entire contents of each publication, even if I do not specifically mention it in the following paragraphs.

A. Coccia - U.S. Patent Application Publication No. 2011/0097454A1 (Ex. 1006)

39. Coccia describes an “infusion” beverage maker for “wetting of the coffee powder” and brewing coffee. Coccia describes a system in which solvent (cold water 2) is pumped by hydraulic pump (4, 35) through two conduits (6, 8) and a heat exchanger (5, 1). The conduits are joined at a conduit joint (7) to form a resulting conduit (11) for mixing hot and cold solvent. The mixed solvent may be further heated by resistance 20 before traveling along conduits (23, 25) and into the

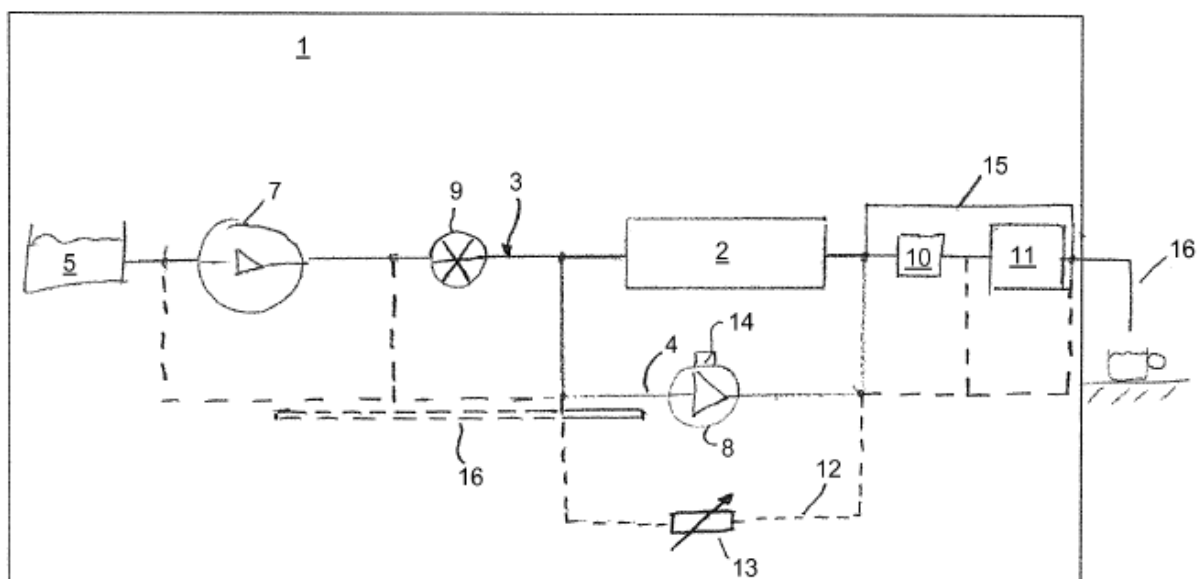
brewing chamber (31, 15, 16) to create an infused beverage (e.g., coffee) that is discharged at an outlet (17). Coccia provides an alternative embodiment in which resistance 20 is not present. Coccia also explains that the electronically controlled heater from publication number WO 91/07898 (by Giuliano) can be used in Coccia's system. Coccia's system is illustrated in FIG. 2:



40. Coccia describes an electronic controller (22) using temperature sensors (not shown), pressure sensors (21), and flow rate measurements (28) to dynamically modulate the temperature of the solvent.

B. Startz - U.S. Patent No. 8,973,487 B2 (Ex. 1003) (and U.S. Patent Application Publication No. 2012/0291634A1 (Ex. 1004))

41. Startz describes “A beverage machine (1), in particular to a coffee machine...” Startz describes a system in which solvent (hot mixing water and cold admixing water) is pumped through two conduits (paths 3, 4) by two pumps (7, 8) through at least one heating device (2, 16). The conduits are joined (return of bypass flow path between 2 and 10) for mixing the hot and cold solvent. The mixed solvent is pumped into a brewing device (11) where the mixed solvent encounters a solute (e.g., ground coffee) to create an infused beverage (e.g., coffee) that is dispensed at dispensing location (6, mislabeled as 16). The system is illustrated in FIG. 1:



42. Startz refers to using a control device (14) to modify one or more of flow rate, temperature, and pressure, by receiving data from a flow meter (9)

and/or temperature sensors (not shown), then using that data to control/modulate one or more of the pumps and/or thermal modulators to affect temperature or flow.

C. Majer - International Publication No. WO2011/151703A2 (Ex. 1008)

43. Majer describes a system in which two solvents (water from water source 3 and milk) are pumped through two conduits (C1, C2) by two pumps (4, 4bis) through at least one heating means (5, 5bis). The solvent (hot water) is pumped into a brewing means (2) where it encounters a solute (e.g., ground coffee) to create a solution (e.g., espresso coffee) that is discharged into a beverage container (7). The system is illustrated in FIG. 1:

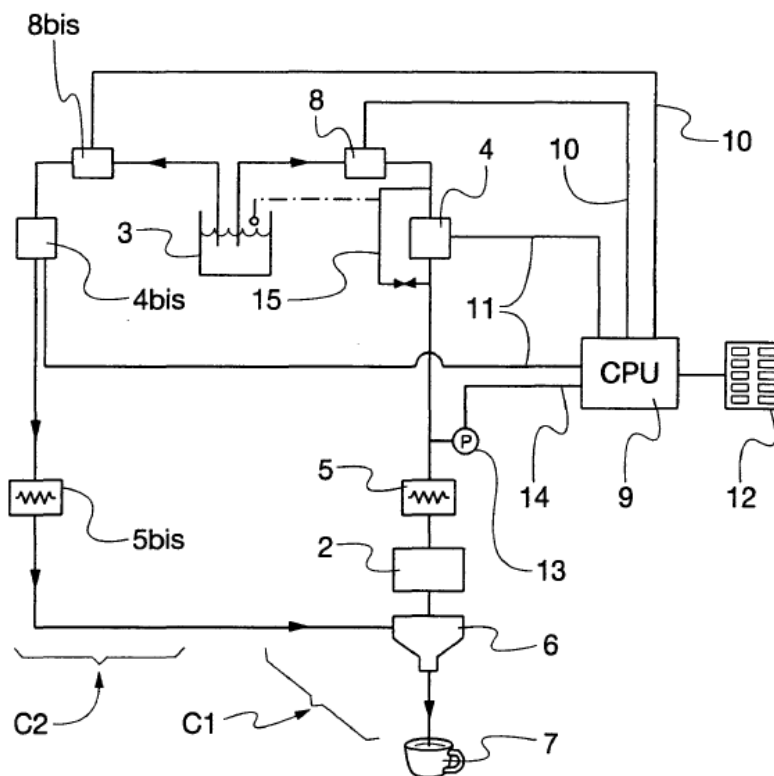
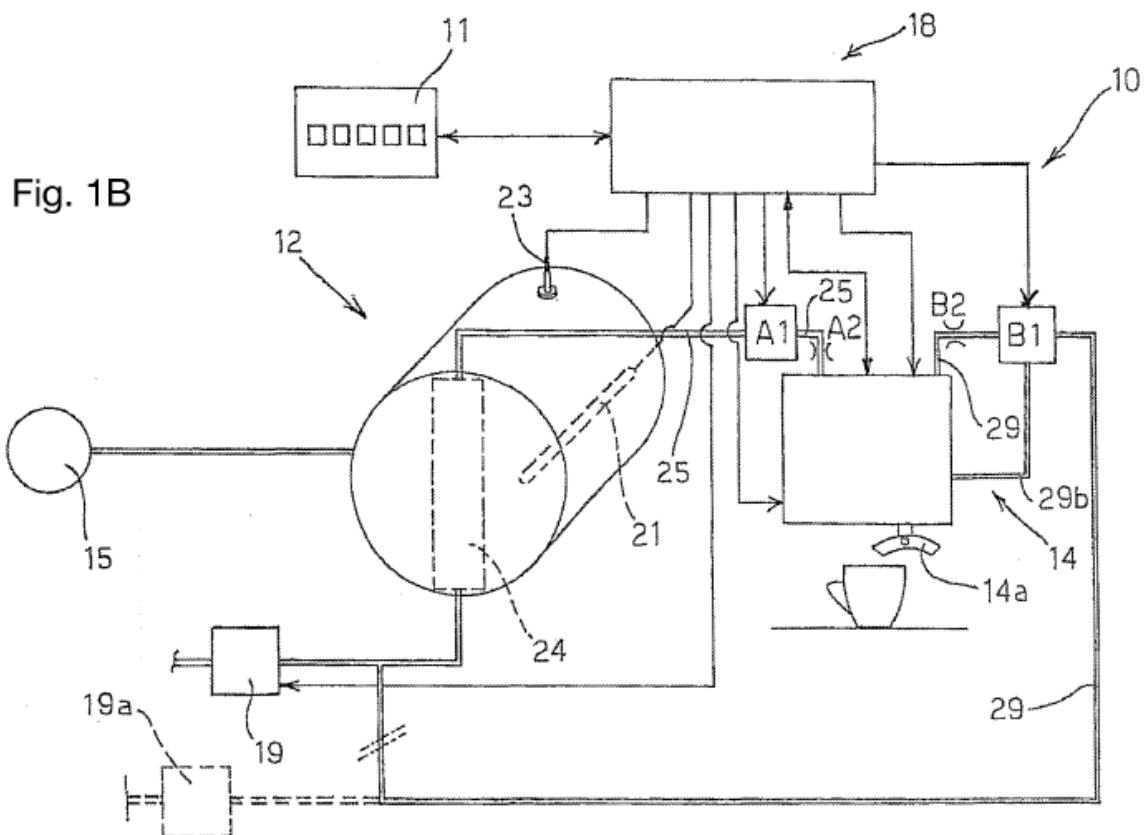


Fig. 1

44. Majer refers to using an electronic controller (CPU 9) to modify one or more of flow rate, temperature, and pressure, by receiving data from flow meters (8, 8bis), pressure meter (13), and/or temperature monitors, then using that data to control/modulate one or more of the pumps and/or heating means to affect temperature, flow, and/or pressure.

D. Porzio - International Publication No. WO2011/158131 (Ex. 1011)

45. Porzio describes a system in which two solvents (water, aromatic liquid) are pumped through two conduits (25, 29) by two pumps (19, 19a) through at least one thermal modulator (heat exchanger 24). The conduits are joined at brew group 14 for mixing the solvents. The mixed solvents are pumped into a brewing chamber (brew group 14) where they encounter a solute (e.g., ground coffee) to create a solution (e.g., espresso coffee) that is discharged into a receptacle (via spout 14a). The system is illustrated in FIG. 1B:



46. Porzio refers to using an electronic controller (control unit 18) to modify one or more of flow rate, temperature, and pressure, by receiving data from temperature measuring devices (23), then using that data to control/modulate one or more of the pumps and/or thermal modulators to affect temperature, flow, and/or pressure.

E. Buttiker - European Patent Publication EP 2 612 577 A1 (Ex. 1009, Ex. 1010 (translation))

47. Buttiker describes a coffee brewing system in which two pumps (31, 32) pump solvent (water from liquid container 10) along two conduits (31a, 31b, 32a, 32b) through two heaters (41, 42) and on to a brewing chamber (60). The two conduits join and the solvent travels through a resulting conduit (54) before being dispensed (outlet unit 70). The system is illustrated in FIG. 1:

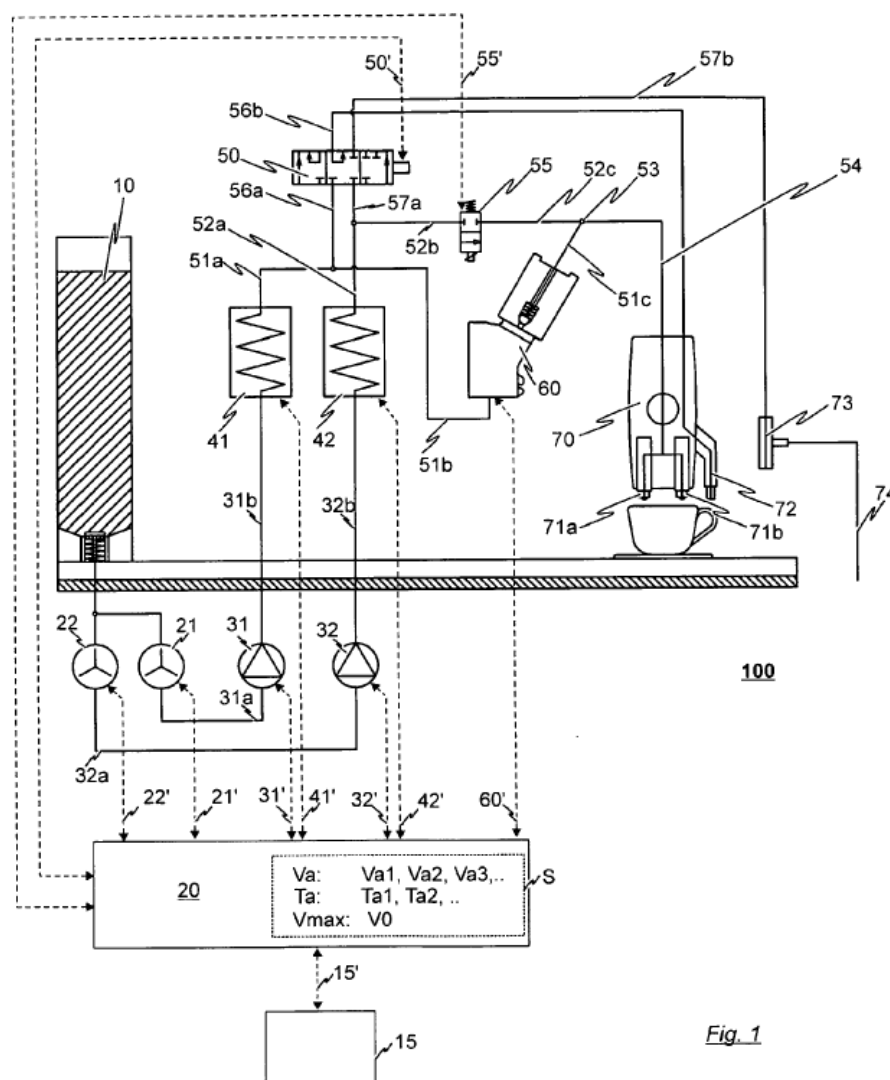


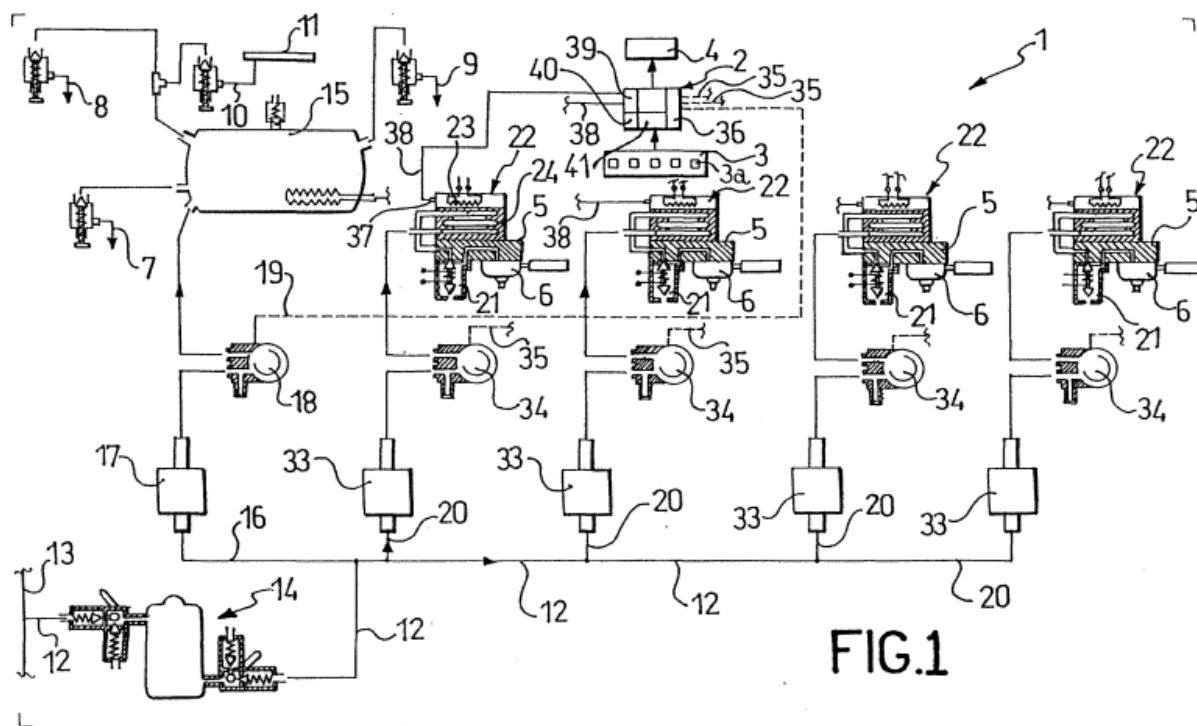
Fig. 1

48. Buttiker describes a controller (20) that controls pumps (31, 32), heaters (41, 42), and valves (50, 55) based on data received from flow meters (21,

22) and temperature sensors (not shown, via 41', 42') to achieve optimal temperatures and flow rates.

F. Giuliano - International Publication No. WO1991/007898A1 (Ex. 1005)

Giuliano describes a professional espresso coffee maker that includes an electronic controller (2) and makes coffee by infusing a “coffee cake” with water in a brewing chamber (5). The machine (1) provides water through conduit (12, 20) to pumps (33), flow meters (34), and heaters (22). The heaters (22) have temperature sensors (37) to provide data to electronic controller (2).



Giuliano teaches that electronic controller (2) has a logic unit (41) for activating resistors (23) in heaters (22) at various stepwise power increments to accurately control the desired temperature of the water being dispensed.

V. Analysis of the Claims of U.S. Patent No. 11,957,271

A. The Motivation to Combine Startz and/or Coccia With Knowledge and/or Other Prior Art

49. As noted above, the 271 Patent appears to state several problems and goals:

- a. “[L]ack of independent variable control makes the optimization and modification of infused beverages difficult.”
- b. “There is an apparent need for a brewing system that affords independent modulation of infusion pressure and flow rate...”
- c. “[V]arying exiting flow rate disadvantageously creates inconsistent beverage output, which is costly for many retailers of beverages. The inconsistencies also are problematic for retailers and consumers, alike, as both the taste of the beverage and the amount of the beverage may change at each brewing cycle.”
- d. It is “highly difficult to duplicate the flavor of an extraction even if the same brew formula of infusion pressure and temperature with respect to time are used.”
- e. “Therefore, a beverage brewing system that affords precise, accurate and dynamic temperature control would enable optimization of beverage flavor and is needed.”

- f. “As previously explained, there is an acute need for a brewing system that affords the brewer independent, dynamic variation of brewing variables of temperature, pressure and flow rate during the production of infused beverages.”
- g. “Furthermore, there is a need for a brewing system that mitigates and/or eliminates the impact of external factors such as solute particle size variations and solute compaction on the beverage flavor.”

50. A POSA seeking to solve one or more of these problems or achieve one or more of these goals would have considered patents, publications, and knowledge related to heated beverage-making, in particular related to brewed beverages that use “solute particles” and “solute compaction.” This would have led a POSA to prior patents and publications related to coffee and/or tea making, and possible to related beverage making, and would have also led the POSA to consider their own knowledge of technologies that existed in the art.

51. Each of the prior patents and publications that I discussed in the preceding section is related to coffee and/or tea making.

52. A POSA seeking a “beverage brewing system that affords precise, accurate and dynamic temperature control” would have considered various control systems for achieving precision, accuracy, and dynamic control. Such control

systems would have included electronic controllers, various sensors, and various types of control mechanisms, such as controllable pumps, controllable heaters, controllable valves, etc. Numerous such controls systems and their components were known to a POSA as of August 2012, as numerous coffee (drip, espresso, etc.) machines were being sold that incorporated various types of control systems. Some of these coffee machines incorporated control systems that allowed higher precision, accuracy, and dynamic control, while other systems incorporated control systems that allowed for lesser precision, accuracy, and dynamic control. As I mentioned above, during my time at Keurig, I and the POSAs working for me designed and assisted with the design of over 60 machines or systems, many of which were publicly known before August 2012.

53. Each of Startz and Coccia discloses much or all of the subject matter claimed by multiple claims of the 271 patent. However, Startz does not explain his controller, sensors, or control mechanisms in depth. Similarly, Coccia does not provide two pumps or two heaters prior to the point at which the first and second solvents are mixed. A POSA attempting to solve the problem of precision, accuracy, and dynamic temperature control address the goals and/or problems identified in the 271 patent with Startz's system would have sought control systems, sensors, and components that enhanced the precision, accuracy, and dynamic temperature control of Startz's system. And a POSA attempting to

address the goals and/or problems identified in the 271 with Coccia's system would have sought systems with two pumps, two heaters prior to the point at which solvents were mixed, as well as electronic control of the various components.

54. The problems identified in the 271 patent, including any of "lack of independent variable control", "independent modulation of infusion pressure and flow rate", "varying exiting flow rate", and/or "difficult [] duplicat[ion of] the flavor of an extraction" would have led a POSA to seek out solutions with multiple pumps, multiple heaters, and precision control that can be achieved with electronic controllers. For example, in many systems, the water supply is at an ambient temperature, whether the water is in a reservoir such as Startz's water tank 5 or piped from an external source such as Coccia's "external source of cold water 2." Ambient water temperature can vary greatly in various environments such as piped water in hot desert regions and cold mountain regions, water in a heated building, or water at an outdoor coffee stand in winter. Even if a machine can precisely heat the solvent in one conduit to a stable, high temperature, in both Coccia's system and Startz's system, that solvent will be mixed with the solvent in a second conduit that is at a potentially widely varying ambient temperature. In such machines, drinks such as espresso coffee are made with a very small volume and flow rate. In such machines, it can be very difficult to control the brewing temperatures when the temperature of the colder conduit could be widely spaced. The variance in

temperature between the hotter and colder conduit (“delta-T”) can vary significantly. For example, where the hotter water is close to boiling (near 100°C) and the colder water is close to freezing (e.g., close to 0°C ambient water temperature in a cold region), the delta-T is much more than in a system where the colder water is at room temperature in a heated room (e.g. near 22°C) or being sourced through pipes in a hot desert region (sometimes near 37°C in cities such as Phoenix, AZ). And in either type of environment, the delta-T is much more significant than if the colder water is heated to a temperature only slightly below the optimal brewing temperature (e.g., heated to between 70°C and 90°C). A POSA would have recognized that where precise temperatures and/or flow rates were desired for brewing coffee, it would be best to mix two similarly heated portions of water, rather than mixing a precisely heated portion of water with a portion that could have a greatly varying temperature. Such a POSA would have recognized the need for two separate pumps, two separate heaters, and electronic control of pumps and/or heaters. Thus, a POSA would have been motivated to combine the disclosures of one or more of Majer, Porzio, Buttiker, and/or Giuliano with the disclosures of Coccia and/or Startz to solve the problems and achieve the goals identified in the 271 patent.

55. Faced with the goals and problems identified in the 271 patent, a POSA would have known that in some instances the goals would better be

accomplished and the problems would better be solved when a machine could be built with two of the same or similar pumps, such as the pumps disclosed in Buttiker, Majer, and Porzio. For example, at times companies have designed and built their own pumps for coffee machines. In such circumstances it would have been less expensive and more reliable to design, test, and build only one type of pump rather than two vastly different pumps. For example, failure mechanisms would only need to be designed out once and a single set of manufacturing equipment (e.g. molds) could be created and used for all pumps, rather than requiring two designs and two sets of manufacturing equipment. These similar or identical pumps would have also proved to be advantageous when the temperatures of heated water in the “cold” conduit were close to the temperatures of water in the “hot” conduit. If such temperatures were close, such that ΔT was low, the hot conduit pump and cold conduit pump could have pumped at similar flow rates, which would have allowed for more precision in temperature and flow rate than would have been permitted by attempting to pump water at a relatively high rate with one pump and a relatively very low rate with the second pump, all while attempting to maintain precise temperatures in machines with very low flow rates. Thus, to achieve the goals stated or solve the problems identified in the 271 patent, a POSA would have been further motivated to combine Startz and/or Coccia with any of Buttiker, Majer, and/or Porzio to use the electronically-controlled, similar

pumps depicted in those references.

56. With regard to Giuliano specifically, Coccia explicitly states, “It will be appreciated that the heat sources may be independent primary heaters, for example of the type disclosed in WO 91/07898.” Ex1006 ¶0088. This is the number of the Giuliano publication at Ex1005. Thus, a POSA would have been motivated by this statement to combine Giuliano with Coccia.

57. Each of the identified prior patents and publications provide at least one type of enhancement in the form of control systems, sensors, and components for enhancing precision, accuracy, and dynamic temperature control. Many of the other coffee machine systems that would be within the knowledge of a POSA (in August 2012) incorporated various enhancements in the form of control systems, sensors, and components for enhancing precision, accuracy, and dynamic temperature control.

58. Thus, a POSA would have had motivation to combine Coccia’s disclosure with one or more of the POSA’s knowledge, Buttiker, Startz, Giuliano, Porzio, and/or Majer. And a POSA would have had motivation to combine Startz’s disclosure with one or more of the POSA’s knowledge, Buttiker, Coccia, Porzio, and/or Majer.

B. Claims 1-10 are Anticipated and/or Obvious

59. It is my opinion that claims 1-4 are anticipated by Startz and/or obvious over Startz in view of one or more of the knowledge of a POSA, Majer, and/or Porzio.

60. It is my opinion that claims 5-6 are obvious over Startz in view of one or more of the knowledge of a POSA, Majer, Porzio, and/or Buttiker.

61. It is my opinion that claims 1 and 7 are anticipated by Coccia and/or obvious over Coccia in view of one or more of the knowledge of a POSA, Majer, and/or Porzio.

62. It is my opinion that claim 8 is obvious over Coccia in view of one or more of the knowledge of a POSA, Majer, Porzio, Giuliano, and/or Buttiker.

63. It is my opinion that claims 9 and 10 are obvious over Coccia in view of one or more of the knowledge of a POSA, Giuliano, Buttiker, Majer, and/or Porzio.

1. Claim 1

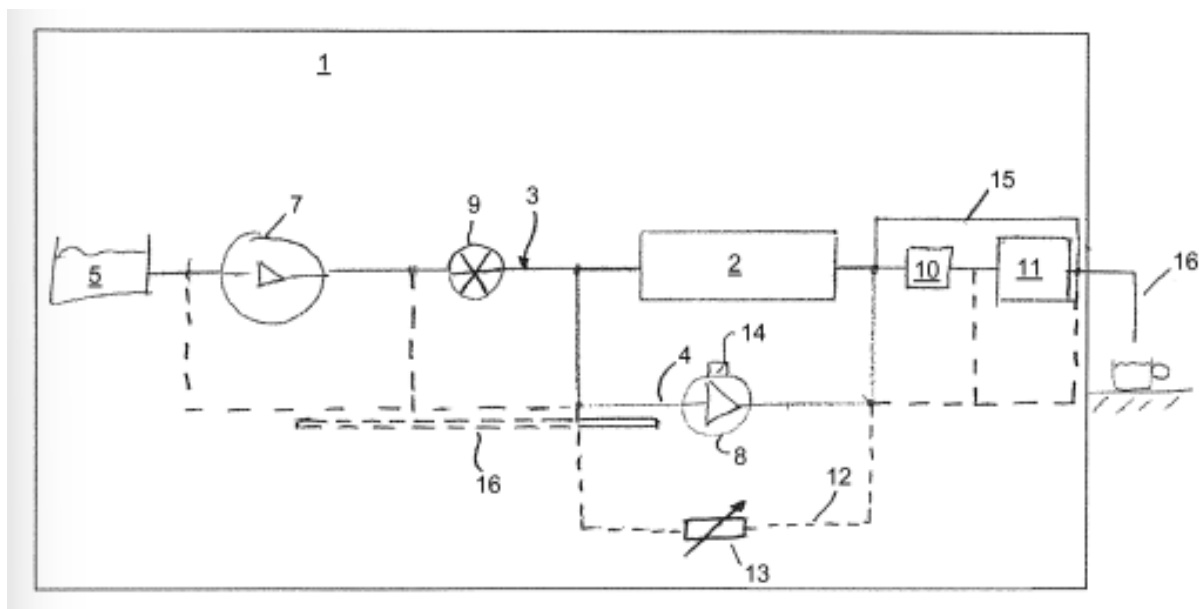
(a) “A method of generating a desired temperature of an infused beverage within a brewing assembly comprising the steps of:”

64. Startz discloses systems and methods for generating a desired temperature of an infused beverage within a brewing assembly. Ex1003, 1:5-16, 1:54-58, 3:9-13, Abstract.

65. Startz discloses, “According to FIG. 1, a beverage machine 1 according to the invention, which can be embodied as a coffee machine,...” Ex1003, 3:9-11. It is well known that coffee is an infused beverage formed by infusing a solute (ground coffee) with a solvent (water). Startz further discloses, “The instant invention ... provides reliable setting of an accurate mixing temperature.” Ex1003, 1:54-59, 2:29-30 (“...individual mixing temperatures can be specifically generated at the dispensing location/mixing area...”), 4:1-3 (“...different mixing temperatures can furthermore be generated specifically...”), 4:18-19 (“If a cool beverage is desired...”).

(b) “inducing a flow of a first solvent within a first solvent conduit upstream of a brewing chamber in a brewing assembly, the first solvent at a first temperature;”

66. As FIG. 1 shows (below), Startz provides a first solvent conduit (bypass flow path 4). A first solvent (water from water tank 5 in conduit 4) is disposed within the first solvent conduit upstream of the brewing chamber (brewing device 11). Bypass flow pump 8 induces a flow of solvent (water) within the first solvent conduit (4) upstream of the brewing chamber (11). The solvent inherently is at a temperature.



67. Startz states, "...a bypass flow pump 8 is now arranged in the bypass flow path 4..." Ex1003, 3:19-21. Startz states, "By means of the active reaction of the bypass flow pump, a defined rate of flow can additionally be established quickly..." Ex1003, 2:28-30. Startz states, "...the bypass flow pump 8 can...convey exactly the quantity or a slightly higher quantity of bypass water,..." Ex1003, 4:14-16. Startz claimed, "a bypass flow path branching from the main flow path upstream of the heating device, and a bypass pump arranged in the bypass flow path..." Ex1003, claim 1.

68. Within the Startz embodiment shown in FIG. 1, the water flows from water tank 5 on the left to dispensing location 6 (misabeled 16) on the right. Thus, a POSA would have understood that the portion of the first solvent conduit (4) where pump 8 induces a flow of first solvent (water) is upstream of a brewing chamber (brewing device 11).

(c) “inducing a flow of a second solvent within a second solvent conduit, separate from the first solvent conduit, upstream of the brewing chamber, and”

69. As FIG. 1 demonstrates (above), Startz provides a pump (main flow pump 7) attached to a second solvent conduit (main flow path 3) that receives a second solvent (water from tank 5 in conduit 3) and induces the flow of the solvent (water) therethrough. The second solvent conduit (3) and first solvent conduit (4) are separate. Pump 7 induces a flow of solvent (water) within the second solvent conduit (3) upstream of the brewing chamber (11).

70. Startz states, “In the main flow path 3, a main flow pump 7 is thereby arranged between the water tank 5 and the heating device 2.” Ex1003, 3:17-19. Startz states, “A defined rate of flow can furthermore be generated via the bypass flow path 4 by means of any embodiments of the bypass flow pump 8, even when a simultaneous main flow is present at the same time in the main flow path 3.” Ex1003, 4:34-38. Startz claimed, “a main flow path having an input end connected to a water supply and an output end connected to a dispensing location, a heating device disposed along the main flow path between the input end and the output end and a main flow pump arranged between the input end and heating device.” Ex1003 claim 1.

71. Within the Startz embodiment shown in FIG. 1, the water flows from water tank 5 on the left to dispensing location 6 (misabeled 16) on the right. Thus,

a POSA would have understood that the portion of the second solvent conduit (3) where pump 7 induces a flow of second solvent (water) is upstream of a brewing chamber (brewing device 11).

72. Alternatively, the application of elements 1(b) and 1(c) to Startz can be reversed such that conduit 4 is the second conduit, pump 8 is the second pump, conduit 3 is the first conduit, and pump 7 is the first pump.

73. If the Board determines that the “second solvent” cannot be water when the “first solvent” is water, it would have been obvious to a POSA that a solvent other than water could be used in one conduit while water could (and in certain devices, would) be used in the other conduit in Startz’s device. Other prior art confirms this.

74. For example, Majer states, “Although it is explicitly mentioned that water is used as the brewing and additional liquid in the first and second circuits C1 and C2, other suitable liquids can be used, such as a liquid ingredient, for example milk, can be dispensed by said second circuit C2.” Ex1008, 16:19-22. Thus, Majer explicitly discloses using a different solvent in a second conduit.

75. And Porzio discloses, “[In] another embodiment it is provided that second conduit 29 is for example connected to...a container of aromatic liquid such as to permit the brew group to be fed with the aromatic liquid. In the rest of the description,...the brew group is fed with water through conduits 25 and 29...”

Ex1011 8:10-20. Porzio explicitly discloses using aromatic liquid in conduit 29 and water in conduit 25.

76. Accordingly, if the “second solvent” cannot be the same as the “first solvent,” a POSA would have known that it would have been obvious to use two different solvents in Startz’s two different conduits.

(d) “thermally modulating the second solvent to a second temperature higher and different than the first temperature;”

77. As FIG. 1 shows, Startz provides a thermal modulator (heating device 2) for heating the second solvent (water in conduit 3) to a second temperature higher than the first temperature.

78. Startz teaches, “...a main flow path 3, which leads through a heating device 2,...In the main flow path 3, a main flow pump 7 is thereby arranged between the water tank and the heating device.” Ex1003, 3:9-19. Startz claims, “a heating device disposed along the main flow path between the input end and the output end...” Ex1003, claim 1. Startz discloses, “[T]he bypass flow pump 8 can,...convey exactly the quantity or a slightly higher quantity of bypass water, which is necessary to obtain the lowest required mixing temperature. If a cool beverage is desired, the bypass flow pump 8 can thus be actuated permanently.” Ex1003, 4:14-19. To lower the mixing temperature, it would be necessary to admix cooler solvent from pump 8 with hotter solvent from flow path 3.

79. Alternatively, if conduit 4 is the second conduit, Startz's further heating device 16 could be the thermal modulator that modulates the second solvent to a higher temperature.

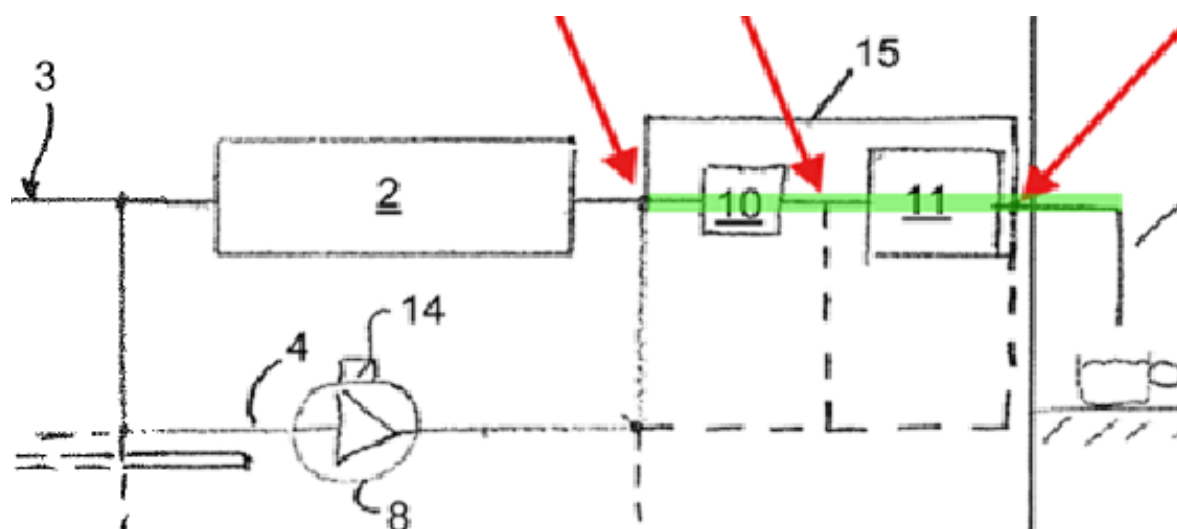
80. Startz discloses that the thermal modulator (2) is operably configured to thermally modulate (heat) the solvent (water) disposed in the second solvent conduit (3) to a raised temperature higher and different than the temperature of the water in the first solvent conduit (4).

81. Startz states, "The heating device 2 can be embodied as a common continuous-flow water heater..." Ex1003, 3:50-52. A POSA would have known that it is inherent that a "heating" device will raise the temperature of water flowing through it. The main flow path 3 leads through the heating device 2; thus, a POSA would have known that the heating device 2 is configured to heat the water in the second conduit. And a POSA would have known that it is inherent that the "raised temperature" exiting the heating device 2 will be higher than the temperature of cold water from path 4.

(e) "selectively combining the first and second solvents at a resulting solvent conduit upstream of the brewing chamber to form a resulting solvent at a selectively desired temperature lower than the second temperature;"

82. As annotated FIG. 1 of Startz shows (below), the first (4) and second (3) solvent conduits are combined together (at a coupling point between 2 and 10,

between 10 and 11, or to the right of 11, see red arrows) downstream of the thermal modulator (2) to form a resulting solvent conduit (green) with a resulting solvent (mixed hot and cold water) disposed therein at a selectively desired temperature (mixing temperature) lower than the temperature of the heated solvent in second solvent conduit (3).



83. Startz teaches, “A return of the bypass flow path 4 into the main flow path 3 thereby preferably takes place either between the heating device 2 and the brewing valve 10 or downstream from the brewing device 11, whereby alternative positions for...a return into the main flow path 3 are illustrated by means of a broken line.” Ex1003, 3:35-41. Startz teaches, “...individual mixing temperatures can be specifically generated at the dispensing location/mixing area by correspondingly changing the capacity of the bypass flow pump.” Ex1003, 2:27-

32. Startz teaches, “By changing the capacity at the bypass flow pump 8 or by pulsing this bypass flow pump 8, different mixing temperatures can furthermore be generated specifically...” Ex1003, 3:67-4:5, Claim 4. Startz further teaches, “[T]he bypass flow pump 8 can...convey exactly the quantity or a slightly higher quantity of bypass water, which is necessary to obtain the lowest required mixing temperature. If a cool beverage is desired, the bypass flow pump 8 can thus be actuated permanently.” Ex1003, 4:14-23.

(f) “receiving the resulting solvent at the brewing chamber housing a solute at the selectively desired temperature to produce an infused beverage; and”

84. Startz discloses a brewing chamber (brewing device 11) that receives the resulting solvent (mixed water) and houses a solute (ground coffee). As noted in the analysis of element (e), the solute is at the selectively desired temperature for producing an infused beverage (coffee).

85. Startz teaches, “In the main flow path 3,...a brewing valve 10 as well as a brewing device 11 are arranged downstream from the heating device 2.” Ex1003, 3:24-27, Claim 2. A POSA would have understood that Startz taught that his invention “can be embodied as a coffee machine” and would have recognized that a “brewing device” in a coffee machine is designed to house ground coffee and receive hot water to produce a coffee beverage. A POSA would have understood that Startz’s “brewing device 11” would have the same properties

as the claimed “brewing chamber.”

(g) “discharging the infused through an outlet on the beverage assembly.”

86. The only prior use of the term “infused” within claim 1 is in the preamble that recites “an infused beverage.” I will therefore interpret “the infused” as a reference back to “an infused beverage.”

87. Startz discloses discharging the infused beverage (coffee) through an outlet (dispensing location 6, mislabeled as 16) on the beverage assembly.

88. Startz teaches “a dispensing location 6 on the output side.” Ex1003, 3:16. Startz references, “a beverage temperature at the dispensing location 6.” Ex1003, 3:55-56. Startz claims “a main flow path having an input end connected to a water supply and an output end connected to a dispensing location...[with] a beverage temperature at the dispensing location...” Ex1003, claim 1.

89. A POSA would have recognized that label 6 is missing from the output side of FIG. 1, and that label 16 must be the mislabeled dispensing location. Ex1003, FIG. 1. A POSA would have recognized the appearance of a crudely drawn mug below label 16 and would have understood that label 16 represented the location where coffee, tea, or other infused beverages would be discharged.

90. Accordingly, Startz anticipates claim 1 or renders claim 1 obvious in view of one or more of the knowledge of a POSA, Porzio, and/or Majer.

2. Claim 2

- (a) “The method according to claim 1, further comprising: thermally modulating the first solvent in the first solvent conduit to the first temperature.”**

91. Startz discloses thermally modulating (heating with further heating device 16) the first solvent (water) in the first solvent conduit (4) to a first temperature.

92. Startz states, “Provision can be made, for example, for a further heating device 16 for heating the bypass flow path 4 at least area by area.” Ex1003, 4:11-13. Startz does not detail heating device 16, but described “a main flow path 3, which through a heating device 2...” Ex1003, 3:11-12. A POSA would have known and understood that the same type of device could (and in certain devices, would) be used for both heating device 2 and heating device 16; it would have been obvious that heating device 16 would heat the water in conduit 4. It is inherent that water passing through an active “heating device” will be at a higher/raised temperature (first temperature) upon exiting the heating device.

93. Thus, Startz discloses thermal modulators for both the first solvent and the second solvent. Moreover, a POSA would have recognized that it would be obvious to include two thermal modulators and that the temperature of the solvent in each conduit would be raised by the respective thermal modulators.

94. Startz anticipates claim 2 and/or renders claim 2 obvious in view of

one or more of the knowledge of a POSA, Porzio, and/or Majer.

3. Claim 3

- (a) “The method according to claim 2, further comprising: thermally modulating the first solvent in the first solvent conduit with a first thermal modulator and thermally modulating the second solvent in the second solvent conduit with a second thermal modulator.”**

95. Startz discloses thermally modulating (heating) the first solvent (water) in the first solvent conduit (4) with a first thermal modulator (16) and thermally modulating (heating) the second solvent (water) in the second solvent conduit (3) with a second thermal modulator (2).

96. Startz states, “The heating device 2 can be embodied as a common continuous-flow water heater...” Ex1003, 3:50-52. A POSA would have known that it is inherent that a “heating” device will raise the temperature of water flowing through it. The main flow path 3 leads through the heating device 2; thus, a POSA would have known that the heating device 2 is configured to heat the water in the second conduit.

97. Regarding the first thermal modulator, Startz states, “Provision can be made, for example, for a further heating device 16 for heating the bypass flow path 4 at least area by area.” Ex1003, 4:11-13. Startz does not detail heating device 16, but described “a main flow path 3, which through a heating device 2...” Ex1003, 3:11-12. A POSA would have known and understood that the same type of device

could be used for both heating device 2 and heating device 16. It is inherent that water passing through an active “heating device” will be at a higher/raised temperature upon exiting the heating device.

98. A POSA would have recognized that it would be obvious to include two thermal modulators that were each in fluid communication with one of the conduits, and that the temperature of the solvent would be raised by the thermal modulators. A device 2 could and would be used to heat to a higher temperature T₂, while device 16 could and would be used to heat to a lower temperature T₁₆, such that the two temperatures of solvent could be combined to reach a combined temperature lower than T₂ and higher than T₁₆.

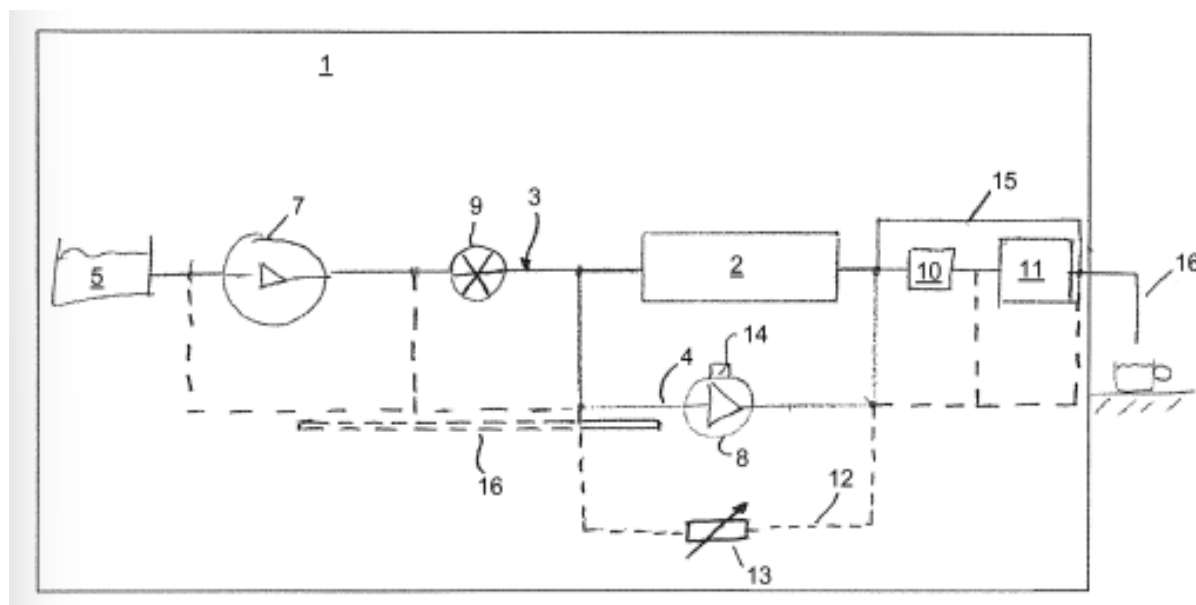
99. Startz anticipates claim 3 and/or renders claim 3 obvious in view of one or more of the knowledge of a POSA, Porzio, and/or Majer.

4. Claim 4

- (a) **“The method according to claim 3, further comprising: inducing the flow of the first solvent within the first solvent conduit with a first pump and inducing the flow of the second solvent within the second solvent conduit with a second pump.”**

100. As FIG. 1 demonstrates, Startz describes inducing the flow of the first solvent (water) within the first solvent conduit (4) with a first pump (8) and inducing the flow of the second solvent (water) within the second solvent conduit

(3) with a second pump (7).



101. Startz states, “In the main flow path 3, a main flow pump 7 is thereby arranged between the water tank 5 and the heating device 2.” Ex1003, 3:17-19; Ex1002-33. Startz states, “A defined rate of flow can furthermore be generated via the bypass flow path 4 by means of any embodiments of the bypass flow pump 8, even when a simultaneous main flow is present at the same time in the main flow path 3.” Ex1003, 4:34-38. Startz claimed, “a main flow path having an input end connected to a water supply and an output end connected to a dispensing location, a heating device disposed along the main flow path between the input end and the output end and a main flow pump arranged between the input end and heating device.” Ex1003 claim 1.

102. Startz states, “...a bypass flow pump 8 is now arranged in the bypass flow path 4...” Ex1003, 3:19-21. Startz states, “By means of the active reaction of

the bypass flow pump, a defined rate of flow can additionally be established quickly...” Ex1003, 2:28-30. Startz states, “...the bypass flow pump 8 can...convey exactly the quantity or a slightly higher quantity of bypass water,...” Ex1003, 4:14-16. Startz claimed, “a bypass flow path branching from the main flow path upstream of the heating device, and a bypass pump arranged in the bypass flow path...” Ex1003, claim 1.

103. Alternatively, the elements can be reversed such that conduit 4 is the second conduit, pump 8 is the second pump, conduit 3 is the first conduit, and pump 7 is the first pump.

104. If the Board determines that the “second solvent” cannot be water when the “first solvent” is water, it would have been obvious to a POSA that a solvent other than water could (and in certain devices, would) be used in one conduit while water could be used in the other conduit in Startz’s device. My analysis of prior art disclosing two different solvents is found above in the analysis of claim 1(c).

105. Startz anticipates claim 4 and/or renders claim 4 obvious in view of one or more of the knowledge of a POSA, Porzio, and/or Majer.

5. Claim 5

- (a) “The method according to claim 4, further comprising: electronically controlling the first and second pumps with an electronic controller to selectively modulate the flows of the first and second solvents, respectively, to generate a desired flow rate of the resulting solvent.”**

106. Startz does not explicitly disclose all of the limitations of claim 5. As I stated above in my discussion of motivation to combine prior art references, a POSA would have been motivated to combine Startz and Buttiker.

107. Buttiker discloses electronically controlling the first and second pumps (feed pumps 31 and 32) with an electronic controller (control device 20) to selectively modulate the flows of the first and second solvents (water in conduits 31b, 51a, 51b and water in conduits 32b, 52a, 52b), respectively, to generate a desired flow rate (flow per unit of time) of the resulting solvent (mixed water).

108. Buttiker Fig. 1 discloses two conducts (liquid pipes 31b and 32b) that are equipped with two flow meters (21 and 22), two pumps (31 and 32), and two thermal modulators (hot water sources 41 and 42).

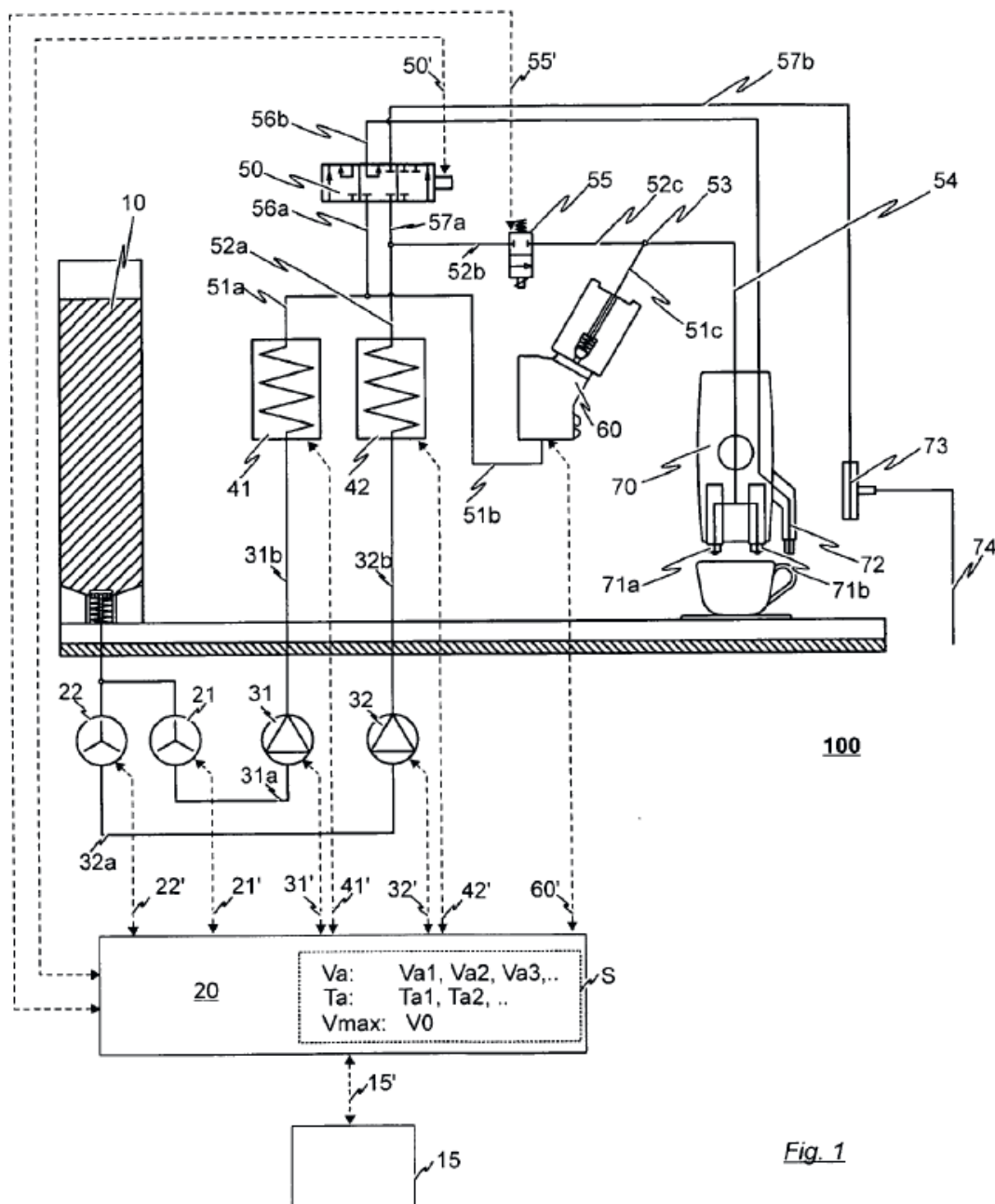


Fig. 1

109. In Buttiker Fig. 1 (above), one portion of heated water is pumped through hot water source 41 into conduit 51a, then conduit 51b, before reaching the brewing chamber (brewing unit 60), and then conduit 51c. Ex1010 ¶0023.

Another portion of heated water is pumped through hot water source 42 into conduit 52a, then conduit 52b, then conduit 52c. Ex1010 ¶0024. Conduits 51c and

52c are joined at mixing node 53 to mix brewed coffee with hot water in conduit 54, before dispensing through beverage outlets 71a and 71b. Ex1010 ¶¶0041-0042, 0026.

110. Buttiker states, “[T]he brewing device is equipped with a control device 20, which can be designed as a microprocessor...” Ex1010 ¶0019. Buttiker teaches, “[F]irst feed pump 31 creates part of a brewing water feed device and is connected to a hot water feed pipe 51a via a liquid pipe 31b and a first hot water source 41...” Ex1010 ¶0018. Buttiker states, “the first feed pump 31 is connected to the control device 20 via a (for example bidirectional) data pipe 31', via which the control device 20 can send suitable control signals to the first feed pump 31 and/or receive them from the first feed pump 31 in order to control the first feed pump 31. In this way, the control device 20 can control the first feed pump 31 depending on measurement signals from the first flow meter 21, so that it is ensured that the control device 20 can precisely control a certain amount of water which is routed in a certain time interval by means of the first feed pump 31 via the liquid pipe 31b...to the mixing node 53.” Ex1010 ¶0023. Buttiker teaches, “the second feed pump 32 is connected to the control device 20 via a (for example bidirectional) data pipe 32', via which the control device 20 can send suitable control signals to the second feed pump 32 and/or receive them from the second feed pump 32 to control the second feed pump 32. In this way, the control device

20 can control the second feed pump 32 in response to measurement signals from the second flow meter 22 so as to ensure that the control device 20 can precisely control a certain amount of water that is routed in a certain time interval by means of the second feed pump 32 via the liquid pipe 32b...to the mixing node 53.”

Ex1010 ¶0024.

111. A POSA would have understood that “amount of water which is routed in a certain time interval” is a “flow rate” because a “rate” is a quantity or amount of one thing measured per unit or something else. Thus, a POSA having knowledge of Buttiker’s description – that control device 20 precisely controls the amount of water routed in a certain time interval to mixing node 53 by pump 31 and also controls the amount of water routed in a certain time interval to mixing node 53 by pump 32 – would have understood that Buttiker was teaching that his device would generate a desired flow rate of the “resulting solvent.” As described in claim 1, the “resulting solvent” is formed by combining the first and second solvents. Ex1001 claim 1.

112. Startz in view of one or more of the knowledge of a POSA, Majer, Porzio, and/or Buttiker renders claim 5 obvious.

6. Claim 6

- (a) “The method according to claim 5, further comprising: electronically controlling the first and second thermal modulators with the electronic controller to selectively modulate the temperatures of the first and second solvents, respectively, to generate the selectively desired temperature.”**

113. Startz does not disclose all the limitations of this claim. As stated above in my analysis of motivation to combine references, a POSA would have been motivated to combine Startz and Buttiker.

114. Buttiker discloses electronically controlling the first and second thermal modulators (hot water sources 41 and 42) with the electronic controller (control device 20) to selectively modulate the temperatures of the first and second solvents (water in liquid pipes 31b and 32b), respectively, to generate the selectively desired temperature (brewing temperature selected by the user).

115. In Buttiker, the claimed second solvent is the water in liquid pipe 32a, 32b, 52a, 52b, 52c, which is pumped by second feed pump 32 and thermally modulated by second hot water source 42 to a temperature “higher than the...hot water from the first hot water source 41 and is, for example, above 90°C and preferably above 95°C.” Ex1010 ¶0024, 0029.

116. Regarding the first solvent, Buttiker states, “the hot water produced by the first hot water source 41, which is routed to the brewing unit 60, has an optimal brewing temperature, for example in the range between 90 and 95°C.” Ex1010

¶0029. Buttiker teaches, “a first hot water source 41...designed as a continuous flow heater...” Ex1010 ¶0018. Buttiker teaches, “[T]he first hot water source 41 is connected to the control device 20 via a (for example bidirectional) data pipe 41', via which the control device 20 can send suitable control signals to the first hot water source 41 and/or receive them from the first hot water source 41 in order to control the first hot water source 41...[A] portion of water, which is delivered to the first hot water source 41 via the liquid pipe 31b by means of the first feed pump 31, is heated in the first hot water source 41 to a temperature predetermined by the control device 20.” Ex1010 ¶0027. Buttiker states, “[T]he second hot water source 42 is connected to the control device 20 via a (for example bidirectional) data pipe 42', via which the control device 20 can send suitable control signals to the second hot water source 42 and/or receive them from the second hot water source 42 in order to control the second hot water source 42...[A] portion of water, which is delivered to the second hot water source 42 via the liquid pipe 32b by means of the second feed pump 32, is heated in the second hot water source 42 to a temperature predetermined by the control device 20.” Ex1010 ¶0028. Buttiker states, “[T]he user can use the user interface 15...to determine... the temperature of a portion of the selected hot beverage...” Ex1010 ¶0032. Buttiker states, “[O]ne or more user-selectable values for a parameter Ta can be stored in the data memory S for each of the hot beverages that can be prepared or selected. The

parameter Ta specifies the temperature of the portion of the selected hot beverage which the brewing device 100 is to prepare and dispense.” Ex1010 ¶0036.

117. Startz in view of one or more of the knowledge of a POSA, Majer, Porzio, and/or Buttiker renders claim 6 obvious.

7. Claim 1

(a) **“A method of generating a desired temperature of an infused beverage within a brewing assembly comprising the steps of:”**

118. Coccia discloses systems and methods for generating a desired temperature of an infused beverage within a brewing assembly. Ex1006-Abstract, ¶0029.

119. Coccia describes, “a coffee machine for producing and dispensing coffee-based beverages.” Ex1006-Abstract. Coccia states, “The water which passes through the layer of coffee has to be heated to a certain temperature and is subject to a certain pressure, the optimum temperature and pressure being selected, among other things, in relation to the starting blend.” Ex1006-¶0003. Coccia confirms, “...‘infusion’ indicates the step of wetting of the coffee powder contained in the filter...” Ex1006-¶0029.

(b) “inducing a flow of a first solvent within a first solvent conduit upstream of a brewing chamber in a brewing assembly, the first solvent at a first temperature;”

120. Coccia discloses inducing a flow of a first solvent (cold water) within a first solvent conduit (cold water duct 8) upstream of a brewing chamber (filter unit 31) in a brewing assembly (dispensing device 13), the first solvent (cold water) at a first temperature.

121. Coccia states, “The water source 2, by means of a duct 3 and a hydraulic pump 4, supplies a heat exchanger 5, also conventional, disposed within the boiler 1. The hydraulic pump 4 is a motor pump actuated by an electronic drive. The output of the heat exchanger 5 supplies heated water via a duct 6 to a mixing point 7 which is also reached by a duct 8 connected to the duct 3 supplying cold water.” Ex1006-¶¶0037-0038. Coccia states, “Flow calibrators, shown by 9 and 10 respectively, are optionally included on the hot water duct 6 and on the cold water duct 8...These flow calibrators make it possible to regulate the quantity of cold with respect to hot water so as to obtain a flow of mixed water in the supply duct 11 at a supply temperature T1.” Ex1006-¶¶0039-0040. Coccia describes, “The embodiment of FIG. 2 differs from the embodiment of FIG. 1 chiefly in that it comprises a hydraulic pump 35 which is not necessarily of variable speed.” Ex1006-¶0069.

(c) “inducing a flow of a second solvent within a second solvent conduit, separate from the first solvent conduit, upstream of the brewing chamber, and”

122. Coccia discloses inducing a flow of a second solvent (heated water) within a second solvent conduit (hot water duct 6), separate from the first solvent conduit (duct 8), upstream of the brewing chamber (31).

123. Coccia states, “The water source 2, by means of a duct 3 and a hydraulic pump 4, supplies a heat exchanger 5, also conventional, disposed within the boiler 1. The hydraulic pump 4 is a motor pump actuated by an electronic drive. The output of the heat exchanger 5 supplies heated water via a duct 6 to a mixing point 7 which is also reached by a duct 8 connected to the duct 3 supplying cold water.” Ex1006-¶¶0037-0038. Coccia states, “Flow calibrators, shown by 9 and 10 respectively, are optionally included on the hot water duct 6 and on the cold water duct 8...These flow calibrators make it possible to regulate the quantity of cold with respect to hot water so as to obtain a flow of mixed water in the supply duct 11 at a supply temperature T1.” Ex1006-¶¶0039-0040. Coccia describes, “The embodiment of FIG. 2 differs from the embodiment of FIG. 1 chiefly in that it comprises a hydraulic pump 35 which is not necessarily of variable speed.” Ex1006-¶0069.

124. If the Board determines that the “second solvent” cannot be water when the “first solvent” is water, it would have been obvious to a POSA that two

different solvents could (and in certain devices, would) be used in Coccia's device. Other prior art confirms this, as stated above in my discussion of Majer and Porzio with respect to claim 1(c).

125. Accordingly, if the "second solvent" cannot be the same as the "first solvent," a POSA would have known that it would have been obvious to use two different solvents in Coccia's two different conduits.

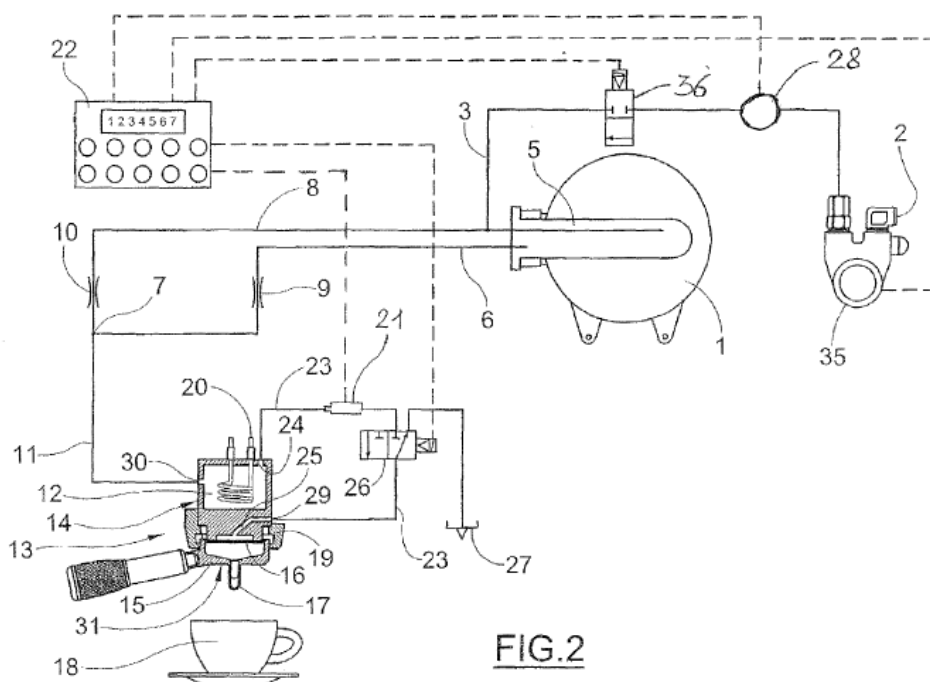
(d) "thermally modulating the second solvent to a second temperature higher and different than the first temperature;"

126. Coccia discloses thermally modulating (heating with heat exchanger 5 in boiler 1) the second solvent (heated water) to a second temperature (hot) higher and different than the first temperature (cold).

127. Coccia states, "The water source 2, by means of a duct 3 and a hydraulic pump 4, supplies a heat exchanger 5, also conventional, disposed within the boiler 1...The output of the heat exchanger 5 supplies heated water via a duct 6 to a mixing point 7 which is also reached by a duct 8 connected to the duct 3 supplying cold water." Ex1006-¶¶0037-0038.

- (e) **“selectively combining the first and second solvents at a resulting solvent conduit upstream of the brewing chamber to form a resulting solvent at a selectively desired temperature lower than the second temperature;”**

128. As displayed in Fig. 2 (below), Coccia discloses selectively combining the first and second solvents (cold water in cold water duct 8 and hot water in hot water duct 6) at a resulting solvent conduit (mixing point 7 and supply duct 11) upstream of the brewing chamber (filter unit 31) to form a resulting solvent (mixed water) at a selectively desired temperature (supply temperature T1) lower than the second temperature (hot water).



129. Coccia states, “The output of the heat exchanger 5 supplies heated water via a duct 6 to a mixing point 7 which is also reached by a duct 8 connected to the duct 3 supplying cold water. Flow calibrators, shown by 9 and 10

respectively, are optionally included on the hot water duct 6 and on the cold water duct 8, upstream of the mixing point 7. These flow calibrators make it possible to regulate the quantity of cold with respect to hot water so as to obtain a flow of mixed water in the supply duct 11 at a supply temperature T1. Downstream of the mixing point 7, the mixed water reaches the dispensing device 13.” Ex1006-¶¶0038-0040. Coccia notes, “The water which passes through the layer of coffee has to be heated to a certain temperature and is subject to a certain pressure, the optimum temperature and pressure being selected...in relation to the starting blend.” Ex1006-¶0003.

130. It is inherent based on physics, and a POSA would have recognized, that Coccia’s supply temperature T1 – which is generated by mixing the hot water from duct 6 and cold water from duct 8 – would be lower than the temperature of the hot water in duct 6.

(f) “receiving the resulting solvent at the brewing chamber housing a solute at the selectively desired temperature to produce an infused beverage; and”

131. Coccia discloses receiving the resulting solvent (water at supply temperature T1) at the brewing chamber (filter unit 31) housing a solute (ground coffee / coffee powder) at the selectively desired temperature (supply temperature T1) to produce an infused beverage (coffee / espresso).

132. Coccia teaches an embodiment in which supply duct 11 supplies the

water to a heating chamber 12 at temperature T1, then the water is further heated in chamber 12 to a dispensing temperature T2. Ex1006-¶0044. However, Coccia also teaches another embodiment in which the water from supply duct 11 at temperature T1 is not heated further in a heating chamber 12. In this embodiment, Coccia teaches, “[I]n one embodiment the dispensing device [13] does not comprise a heating chamber [12] and the supply duct [11] in fluid communication with the dispensing device [13] supplies water under pressure at the dispensing temperature [T2] to the supply unit. Ex1006-¶0079. Coccia teaches, “The dispensing device 13 comprises a supply unit 14 for discharging the water under pressure to a filter unit 31...” Ex1006-¶0041. Thus, in this embodiment, a POSA would have recognized that $T1=T2$, such that the supply temperature T1 is the same as dispensing temperature T2, and that the resulting solvent is received at the brewing chamber (31) at the selectively desired temperature (T1 a.k.a. T2). Coccia teaches, “Espresso coffee is in particular a beverage obtained using a coffee machine which forces hot water to pass through a layer of ground coffee, i.e. coffee powder, contained in an infusion container, generally a metal filter.” Ex1006-¶0003, ¶0019 (“...the coffee contained in the filter...”), ¶0025 (“...the filter unit which contains the ground coffee...”), ¶0026 (“The present invention...comprising a filter unit apt to contain coffee powder and a supply unit apt to introduce water into the filter unit...”).

(g) “discharging the infused through an outlet on the beverage assembly.”

133. The only prior use of the term “infused” within claim 1 is in the preamble that recites “an infused beverage.” I will interpret “the infused” as a reference back to “an infused beverage.”

134. Coccia discloses discharging the infused beverage (coffee / espresso) through an outlet (nozzle 17) on the beverage assembly.

135. Coccia teaches, “The dispensing device 13 comprises...a nozzle 17 for dispensing the coffee under which a collection cup 18 is disposed in operation.”
Ex1006-¶0041.

136. Accordingly, Coccia anticipates claim 1 and/or renders claim 1 obvious in view of one or more of the knowledge of a POSA, Porzio, and/or Majer.

8. Claim 7

- (a) “The method according to claim 1, further comprising: electronically controlling at least one pump with an electronic controller to selectively modulate the flows of the first and second solvents, respectively, to generate a desired flow rate of the resulting solvent.”**

137. Coccia discloses electronically controlling at least one pump (4, 35) with an electronic controller (control unit 22) to selectively modulate the flows of the first and second solvents (cold water and hot water), respectively, to generate a desired flow rate of the resulting solvent (water at supply temperature T1).

138. Coccia discloses, “[A] control unit 22 such as an electronic central processing unit (CPU).” Ex1006-¶0048. Coccia states, “The hydraulic circuit is preferably provided with a flow rate measurement device 28 apt to measure the flow of water passing through it. The device 28 is connected to the control unit 22 to which it sends a signal representative of the measured flow rate of water. For example, the device 28 supplies the control unit 22 with electrical pulses whose number is proportional to the quantity of water passing through it in accordance with a metering constant expressed in cm³/pulse.” Ex1006-¶0054. Coccia states, “In the embodiment of FIG. 1, the device [28] is disposed on the cold water duct 3 downstream of the pump 4. The frequency with which the control unit receives these pulses is directly proportional to the flow rate of water supplied to the hydraulic circuit by the pump 4 and therefore to the dispensing device.” Ex1006-

¶0056. Coccia states, “The pump is, for example, actuated by a variable frequency electronic drive, whose frequency variation corresponds to a variation of the speed of rotation of the pump. In this way it is possible to vary the flow of water supplied by the pump to the duct 3 and therefore the water pressure.” Ex1006-¶0057.

Coccia states, “The pump, or the electronic control unit connected to the pump motor, is connected to the control unit 22 which regulates the speed of rotation of the pump and therefore the pressure of the water supplied to the hydraulic circuit.

A flow of water and a ‘nominal’ pressure of the water supplied to the hydraulic circuit correspond to a speed of rotation of the pump actuated for a given period of

time.” Ex1006-¶¶0058-0059. Coccia states, “The flow of water supplied by the pump as a function of the dispensing pressure detected may be regulated manually

by an operator and/or by means of an automatic regulation in which the signals received by the pressure sensor and the electronic control device of the pump form a feedback loop controlled by the control unit.” Ex1006-¶0060. Coccia states,

“When it detects a flow which does not correspond to the optimum flow value, the control unit adjusts the speed of rotation of the pump until the flow reaches the

optimum value.” Ex1006-¶0062. Coccia states, “The control unit may be

operationally associated with a display and an input device such as a keyboard

which may be operated by an operator in order to control and/or modify the flow of water supplied to the hydraulic circuit and therefore the dispensing pressure.”

Ex1006-¶0064.

139. Accordingly, Coccia anticipates claim 7 and/or renders claim 7 obvious in view of one or more of the knowledge of a POSA, Porzio, and/or Majer.

9. Claim 8

(a) “The method according to claim 1, further comprising: electronically controlling a thermal modulator with an electronic controller to selectively modulate the temperature of the second solvent to generate the selectively desired temperature.”

140. Coccia discloses electronically controlling a thermal modulator (Giuliano’s heater 22) with an electronic controller (Giuliano’s electronic control 2) to selectively modulate the temperature of the second solvent (hot water in duct 6) to generate the selectively desired temperature (supply temperature T1).

141. Coccia teaches that the temperature is modulated by a heat exchanger 5 disposed within a boiler 1. Ex1006-¶0037. As set forth above, in the analysis of claim elements 1(d) and 1(e), Coccia discloses modulating the temperature of the second solvent to generate the selectively desired temperature.

142. In discussing one of the embodiments of the invention, using multiple heat exchangers within a boiler, Coccia states, “It will be appreciated that the heat sources may be independent primary heaters, for example of the type disclosed in WO 91/07898.” Ex1006-¶0088. WO 91/07898 (“Giuliano”) is labeled as Ex1005.

As discussed above in my discussion of motivation to combine, a POSA would have been motivated to combine Coccia and Giuliano, and a POSA would have been motivated to combine Coccia and Giuliano and/or Buttiker.

143. Giuliano states, “Associated with each heater 22 in the machine 1 is a temperature sensor 37, for sensing the water temperature and issuing, over a Lead 38, a signal proportional to the temperature sensed. The electronic apparatus 2 has a storage and comparator unit 39 which is supplied once for all with predetermined temperature increments and continuously with the temperature sensed to stepwise reduce down to zero the electric power dissipated through the resistor 23 on the sensed temperature passing said step values.” Ex1005-6. Giuliano states, “Also provided in the electronic control 2 is an AND-type logic unit 41 for activating the resistor 23 of the heater 22 associated with each dispensing body 5 concurrently with the operation of its respective key 3a in the keyboard 3 to dispense a dose of espresso coffee.” Ex1005-7. Giuliano states, “With the resistor 23 activated, the optimum temperature is attained accurately for the water by the stepwise control of the power supply to the resistor 23 as the sensed temperature approached the desired value. On reaching the optimum temperature, the machine is ready to dispense coffee.” Ex1005-7.

144. Alternatively, Buttiker discloses electronically controlling a thermal modulator (hot water source 42) with an electronic controller (control unit 20) to

selectively modulate the temperature of the second solvent (water in conduit 32b, 52a, 52b, 52c) to generate the selectively desired temperature (temperature Ta).

145. Buttiker states, “[T]he brewing device is equipped with a control device 20, which can be designed as a microprocessor...” Ex1010 ¶0019. Buttiker teaches, “second hot water source 42, which is also designed as a continuous flow heater...” Ex1010 ¶0020. Buttiker states, “the second hot water source 42 is connected to the control device 20 via a (for example bidirectional) data pipe 42', via which the control device 20 can send suitable control signals to the second hot water source 42 and/or receive them from the second hot water source 42 in order to control the second hot water source 42. The control device 20 is set up to control the second hot water source 42 via the data pipe 42' in such a way that in each case a portion of water, which is delivered to the second hot water source 42 via the liquid pipe 32b by means of the second feed pump 32, is heated in the second hot water source 42 to a temperature predetermined by the control device 20.” Ex1010 ¶0028. Buttiker states, “[O]ne or more user-selectable values for a parameter Ta can be stored in the data memory S for each of the hot beverages that can be prepared or selected. The parameter Ta specifies the temperature of the portion of the selected hot beverage which the brewing device 100 is to prepare and dispense.” Ex1010 ¶0036. Buttiker teaches, “The control unit 20 controls the temperature of the portion of hot water from the second hot water source 42

depending on the value selected by the user for the parameter Ta...” Ex1010

¶0042. Buttiker states, “[T]he control device 20 is connected via a data pipe 15' to an operating interface 15...When selecting the hot beverage, the user can use the user interface 15 not only to determine the type of hot beverage selected (e.g., espresso, ristretto, cappuccino, or the like), but also to determine other parameters, such as the amount (or volume) desired by the user and/or the temperature of a portion of the selected hot beverage to be prepared and dispensed by the brewing device 100.” Ex1010 ¶0032.

146. Accordingly, Coccia anticipates claim 8 and/or renders claim 8 obvious in view of one or more of the knowledge of a POSA, Giuliano, Buttiker, Majer, and/or Porzio.

10. Claim 9

- (a) **“The method according to claim 8, further comprising: thermally modulating the first solvent in the first solvent conduit to the first temperature with a second thermal modulator; and”**

147. Coccia does not disclose thermally modulating both first and second solvents. As stated above in my discussion of motivation to combine, a POSA would have been motivated to combine Coccia and Buttiker.

148. Buttiker discloses thermally modulating the first solvent (water in liquid pipe 31b) in the first solvent conduit (liquid pipe 31b) to the first

temperature (between 90 and 95°C) with a second thermal modulator (hot water source 41).

149. In Buttiker, the claimed second solvent is the water in liquid pipe 32a, 32b, 52a, 52b, 52c, which is pumped by second feed pump 32 and thermally modulated by second hot water source 42 to a temperature “higher than the...hot water from the first hot water source 41 and is, for example, above 90°C and preferably above 95°C.” Ex1010 ¶0024, 0029.

150. Regarding the first solvent, Buttiker states, “the hot water produced by the first hot water source 41, which is routed to the brewing unit 60, has an optimal brewing temperature, for example in the range between 90 and 95°C.” Ex1010 ¶0029. Buttiker teaches, “a first hot water source 41...designed as a continuous flow heater...” Ex1010 ¶0018. Buttiker teaches, “the control device 20 can precisely control a certain amount of water which is routed in a certain time interval by means of the first feed pump 31 via the liquid pipe 31b to the first hot water source 41 and from the first hot water source 41 via the hot water feed pipes 51a and 51b to the brewing unit 60 and further through the brewing unit 60 and the brewing unit output pipe 51c to the mixing node 53.” Ex1010 ¶0023.

(b) “electronically controlling a second thermal modulator with the electronic controller to selectively modulate the temperature of the first solvent to generate the selectively desired temperature.”

151. Buttiker discloses electronically controlling a second thermal modulator (first hot water source 41) with the electronic controller (control device 20) to selectively modulate the temperature of the first solvent (water in liquid pipe 31b) to generate the selectively desired temperature (brewing temperature selected by user).

152. Buttiker teaches, “[T]he first hot water source 41 is connected to the control device 20 via a (for example bidirectional) data pipe 41', via which the control device 20 can send suitable control signals to the first hot water source 41 and/or receive them from the first hot water source 41 in order to control the first hot water source 41...[A] portion of water, which is delivered to the first hot water source 41 via the liquid pipe 31b by means of the first feed pump 31, is heated in the first hot water source 41 to a temperature predetermined by the control device 20.” Ex1010 ¶0027. Buttiker states, “[T]he user can use the user interface 15...to determine... the temperature of a portion of the selected hot beverage...” Ex1010 ¶0032. Buttiker states, “[O]ne or more user-selectable values for a parameter Ta can be stored in the data memory S for each of the hot beverages that can be prepared or selected. The parameter Ta specifies the temperature of the portion of the selected hot beverage which the brewing device 100 is to prepare and

dispense.” Ex1010 ¶0036.

153. Coccia in view of one or more of the knowledge of a POSA, Majer, Porzio, Buttiker and/or Giuliano renders claim 9 obvious.

11. Claim 10

(a) **“The method according to claim 9, further comprising: electronically controlling at least one pump with an electronic controller to selectively modulate the flows of the first and second solvents, respectively, to generate a desired flow rate of the resulting solvent.”**

154. Buttiker discloses electronically controlling at least one pump (31 and/or 32) with an electronic controller (20) to selectively modulate the flows of the first and second solvents (water in conduits 31b, 51a, 51b and water in conduits 32b, 52a, 52b), respectively, to generate a desired flow rate (flow per unit of time) of the resulting solvent (mixed water).

155. Buttiker teaches, “[F]irst feed pump 31 creates part of a brewing water feed device and is connected to a hot water feed pipe 51a via a liquid pipe 31b and a first hot water source 41...” Ex1010 ¶0018. Buttiker states, “the first feed pump 31 is connected to the control device 20 via a (for example bidirectional) data pipe 31', via which the control device 20 can send suitable control signals to the first feed pump 31 and/or receive them from the first feed pump 31 in order to control the first feed pump 31. In this way, the control device 20 can control the first feed

pump 31 depending on measurement signals from the first flow meter 21, so that it is ensured that the control device 20 can precisely control a certain amount of water which is routed in a certain time interval by means of the first feed pump 31 via the liquid pipe 31b...to the mixing node 53.” Ex1010 ¶0023. Buttiker teaches, “the second feed pump 32 is connected to the control device 20 via a (for example bidirectional) data pipe 32', via which the control device 20 can send suitable control signals to the second feed pump 32 and/or receive them from the second feed pump 32 to control the second feed pump 32. In this way, the control device 20 can control the second feed pump 32 in response to measurement signals from the second flow meter 22 so as to ensure that the control device 20 can precisely control a certain amount of water that is routed in a certain time interval by means of the second feed pump 32 via the liquid pipe 32b...to the mixing node 53.” Ex1010 ¶0024.

156. A POSA would have understood that “amount of water which is routed in a certain time interval” is a “flow rate” because a rate is a quantity or amount of one thing measured per unit or something else. Thus, a POSA having knowledge of Buttiker’s description – that control device 20 precisely controls the amount of water routed in a certain time interval to mixing node 53 by pump 31 and also controls the amount of water routed in a certain time interval to mixing node 53 by pump 32 – would have understood that Buttiker was teaching that his

device would generate a desired flow rate of the “resulting solvent.” As described in claim 1, the “resulting solvent” is formed by combining the first and second solvents. Ex1001 claim 1.

157. Coccia in view of one or more of the knowledge of a POSA, Majer, Porzio, Buttiker and/or Giuliano renders claim 10 obvious.

VI. Conclusion

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

Executed on March 17, 2025, in Wakefield,
Massachusetts,

By: _____



Ian Tinkler, IEng MIED

REFERENCES

Exhibit	Description
1001	U.S. Patent No. 11,957,271
1003	U.S. Patent No. 8,973,487 B2 (collectively with Ex1004, “Startz”)
1004	U.S. Patent Application Publication No. 2012/0291634A1 (collectively with Ex1003, “Startz”)
1005	International Publication No. WO1991/007898A1 (“Giuliano”)
1006	U.S. Patent Application Publication No. 2011/0097454A1 (“Coccia”)
1007	Declaration Certifying Translation of European Patent Publication EP 2 612 577 A1
1008	International Publication No. WO2011/151703A2 (“Majer”)
1009	European Patent Publication EP 2 612 577 A1 (“Buttiker”)
1010	Translation of European Patent Publication EP 2 612 577 A1
1011	International Publication No. WO2011/158131A1 (“Porzio”)
1012	File History for U.S. Patent Application Serial No. 61/742,688
1013	File History for U.S. Patent Application Serial No. 18/109,177
1014	U.S. Patent No. 10,772,456
1015	Patent Owner Infringement Contention Pleading
1016	Patent Owner Claim Chart for 271 Patent

APPENDIX A – C.V.

Ian Tinkler, MBA

Background

- Independent Engineering Consultant providing technical expertise in product design and manufacturing and technical counsel as an expert witness.
- Vice President of Research and Development at Keurig Green Mountain for 10 years, in which he developed and produced over 60 different coffee makers, including espresso machines, which required the introduction of new technologies, components and control systems and worked internationally leading teams in the development of this technology.
- Holds over 30 patents, most of which include coffee brewing systems.
- Familiar and comfortable with the technology described in the patent-in-suit.
- Has previously consulted for other companies regarding espresso machines.
- Former positions include Director of Research & Development for Culligan and Everpure Commercial Water Systems, Director of Engineering for Evac, Chief of Design for Electrodynamics and senior leadership roles for Sundstrand Aerospace, which included work on the B2 Bomber, Boeing 777 and the Space Shuttle.
- Member of the Institute of Engineering Designers.
- HND Mechanical Engineering degree from Hatfield Polytechnic in England where he completed a Graduate Apprenticeship at British Aerospace.
- MBA from Rockford University (Rockford Illinois).

Litigation

- Served as an expert witness for 2 cases for 2 separate former employers, one of which was a patent infringement matter. Deposed in both cases.

IAN TINKLER

Professional Profile

Senior Engineering Executive with a proven track record of innovative product and system design for both consumer product goods and advanced aviation technologies. International manufacturing, program and project leadership with an MBA. Exceptional strategic perspective with a unique ability to combine innovative technology with conventional products. Key player on international sales and marketing teams supporting technical sales in multiple countries. Leader in mergers and acquisition investigations, strategic business planning and developments. Exceptional skills in:

- Engineering and System Design
- Asian Manufacturing
- Business Growth
- Innovative and Creative Solutions
- Team Leadership
- On time Delivery

Professional Experience

Ian Tinkler, LCC, Wakefield, MA

2015 – Present

Consultant

Providing leadership utilizing base of world-wide business contacts & manufacturing experience. Developing high-tech products from conception to market.

Expert Witness

2015 - Present

Providing product development technical counsel to established companies, start-ups, and attorneys.

CannaKorp (startup), Stoneham, MA

2015 – 2018

Chief Technical Officer

2016 – 2018

Designed Wisp vaporizing system and created prototypes utilizing in-house 3D printing techniques and local machine shops. Worked with industrial design house to create look and style of Wisp. Identified components necessary and sourced vendors internationally. Navigated six-month search for Chinese manufacturer able to work with cannabis industry. Hired two Keurig engineers and a Keurig technician to assist in elements of design and manufacture.

Worked with three local labs to create test protocol to determine efficiency of the system. Established relationships with patent attorneys. Developed and patented Wisp and pod design. Worked with UL engineers to become the first UL-certified medical marijuana vaporizing system.

Managed production of Wisp appliance in China and pods in Germany. Managed in-house assembly of internal inserts for pod. Identified seven local vendors to design and manufacture pod-filling equipment. Communicated daily with manufacturer in China, plus video conferences twice a week. Contracted with electronic and software design engineers in China. Traveled to China frequently to lead and support design and production. Built 2,500 units and shipped to U.S. for sale in the growing medical marijuana market place.

Consultant

2015

Established concept and initiated design of Wisp, a medical marijuana vaporizer using pod technology

SmartWheel (startup), Londonderry, NH

2015 – Present

Pro-bono Consultant

Advising and mentoring a young “Dean Kamen” entrepreneur in design and manufacture of high-tech product designed to monitor distracted driving.

Keurig Green Mountain, Burlington, MA

2005 – 2015

A \$5B corporation producing a unique coffee system for the home and away from home market places

Vice President of Research and Development

Explored, developed and tested new technologies for use in the next generation of Keurig systems. Led internal development teams tasked with the introduction of new product types and teamed with domestic and international consultants on industrial design and system products.

Vice President of Brewer Engineering

Working as a key member of the executive management team, defined the technology strategy growing the business from start-up to a \$5B corporation in 10 years.

Led Mechanical, Electronics and Software teams designing and developing complex technology systems, producing over 60 different brewers on schedule with high reliability, resulting in high consumer satisfaction

Established relationships and partnered very closely with Chinese and Malaysian manufactures to produce over 5m brewers.

Culligan International, Northbrook, IL

2002-2004

A \$700M company that design and manufacture of water treatment products for worldwide applications

Director of Research and Development

Led R&D Commercial Engineering team accountable for the design of products. Key member of the commercial business strategy and customer focused teams formed to define the future business models and products; 80 product improvement identified, 70% implemented in 1st year. Teamed with the Directors of Quality and Manufacturing to develop an ISO 9001 New Product Development process and trained over 100 employees on its use

Previous Experience

Envirovac, Rockford, IL

A division of a \$2B European corporation; producing vacuum waste systems for aviation, train, marine and buildings

Director of Growth Strategies: Reporting directly to the president, identified and performed initial due diligence on 20 target companies, identified expansion markets and initiated Joint Venture discussions with a potential Germany partner

Technical Director: Developed and managed schedules and budgets in excess of \$3M for over 15 concurrent projects. Remotely managed engineers working in four countries. Won a \$700K technical aviation sale by developing new patented technology to solve a customer problem. Key member of a strategic team that identified and closed a failing operation returning the train business segment to profitability.

Electrodynamics, Rolling Meadows, IL

Small defense contractor focused on flight data recorders for military aircraft and warhead initiators for missile systems

Chief of Design: Designed warhead initiator for the Javelin and Hellfire missiles. Re-designed and certified the F22 and B2 flight data recorders. Led design reviews with the Department of Defense and prime contractors.

Sundstrand Aerospace, Rockford, IL

Leader in the design and manufacture of electric power generation equipment for commercial and military aircraft

Lead Principal Engineer: Designed and qualified the electronic motor drive packaging for the Global Express Aircraft

Lead Master Engineer: Led the mechanical design team for the 777 Flight critical power electronic supply unit. Lead Mechanical Engineer of the B2 electronics power supply system and Space Shuttle APU Control System.

British Aerospace, Stevenage, UK

Major international defense contractor

Head of Thermal Design Section: Designed thermal and optical tracking systems for missile applications

EDUCATION

Master of Business Administration, MBA

Rockford University (Rockford College), Rockford Illinois

Higher National Diploma in Mechanical Engineering, HND (Equivalent to a 4 year degree)

Hatfield University (Hatfield Polytechnic), Hatfield England

Ordinary National Certificate in Electronics Engineering

North Hert's College of further Education (Stevenage College), Stevenage England

PROFESSIONAL ASSOCIATIONS

Member of the Institute of Engineering Designers, MIED

PATENTS

Over 30 US and International patents with subjects ranging from Power Electronics and Vacuum toilets to Coffee brewing systems and Vaporizing systems