

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 IPR2024- 01483

**DECLARATION OF IAN TINKLER, IENG MIED
IN SUPPORT OF PETITION FOR *INTER PARTES* REVIEW OF
U.S. PATENT 11,576,524**

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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. 11,576,524 (the 524 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 524 patent and the prior art, at the time of the earliest priority date claimed in the 524 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 Hatfield 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. Obviousness

22. I have been informed and understand that a patent claim can be considered to have been obvious to a person of ordinary skill in the art (“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.

23. 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.

24. 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.

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

26. 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

27. I understand that certain issues relating to the validity of the 524 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 “POSITA” that someone would have had at the time the alleged invention as claimed was made. I provide an overview of the 524 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.

28. 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.

29. 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, timeframe, which I have been informed is the earliest possible priority date of the 524 Patent.

III. Overview of U.S. Patent No. 11,576,524

A. Patent Disclosure

30. U.S. Patent No. 11,576,524 (the ‘524 Patent) describes and claims a device and system for brewing infused beverages. 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 524 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 524 Patent is to describe devices that may be used for making coffee.

31. With respect to the claims of the 524 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 at a conduit joint 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 (e.g., ground coffee) to create a solution (e.g., espresso coffee) that is discharged into a receptacle (250). The system is illustrated in FIG. 2, below:

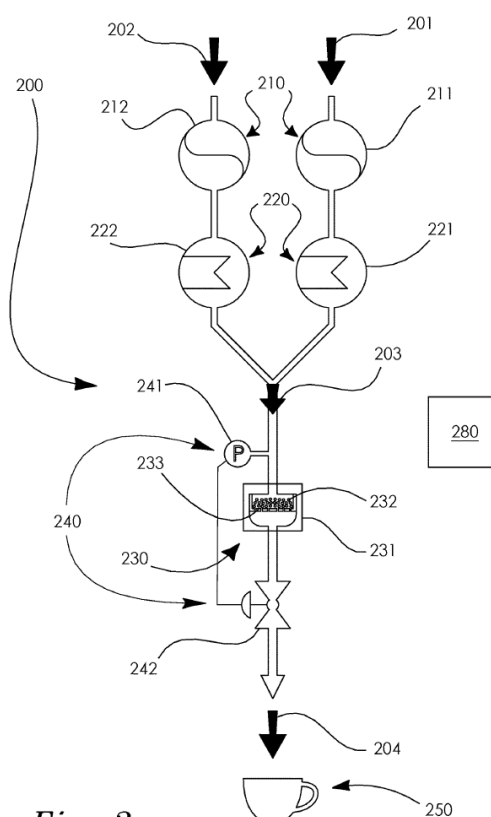


Fig. 2

32. The 524 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.

33. The '524 Patent appears to state three goals:

- a. "Therefore, a beverage brewing system that affords precise, accurate and dynamic temperature control would enable optimization of beverage flavor and is needed."
- b. "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."
- c. "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."

34. Of the three goals listed above, it appears that the claims of the 524 Patent are most closely related to the first goal, i.e., precise, accurate and dynamic temperature control.

B. The Claims of the '524 Patent

35. The following claims of the '524 Patent are being challenged in the Petition that I am supporting, and are analyzed in this Declaration:

Claim 1

1. An infused beverage brewing assembly comprising: a solvent flow management system with a first solvent pump fluidly coupled to a first solvent conduit and operably configured to receive a solvent and induce the flow of the solvent therethrough and a second solvent pump fluidly coupled to a second solvent conduit and operably configured to receive another solvent, separate from the solvent operably configured to be received within the first solvent pump, and induce the flow of the another solvent therethrough; a solvent temperature modulation system with at least one thermal modulator in fluid communication with the first solvent conduit, the first and second solvent conduits directly and fluidly coupled together to form a conduit joint downstream of the thermal modulator to form a resulting solvent conduit with a resulting solvent disposed therein at a resulting temperature and the at least one thermal modulator operably configured to thermally modulate the solvent disposed in the first solvent conduit to a raised temperature higher and different than the resulting temperature; and a brewing chamber in fluid communication with the resulting solvent conduit and for housing a solute disposed to receive the resulting solvent to produce an infused beverage; an outlet for discharging the infused beverage; and an electronic controller communicatively coupled to the first and second solvent pumps and the at least one thermal modulator, and operably configured to modulate the flow of the solvent through the first solvent pump and the at least one thermal modulator and the another solvent through the second solvent pump.

Claim 2

2. The infused beverage brewing assembly according to claim 1, further comprising: at least one solvent flow meter communicatively coupled to the first and second solvent pumps.

Claim 3

3. The infused beverage brewing assembly according to claim 2, wherein: the electronic controller is communicatively coupled to the at least one solvent flow meter and operably configured to receive an electronic signal from the at least one solvent flow meter indicative of a flow rate and to modulate the flow of the solvent through at least one of the first solvent pump and the another solvent through the second solvent pump based on the flow rate ascertainable from the at least one solvent flow meter.

Claim 4

4. The infused beverage brewing assembly according to claim 3, wherein: the electronic controller is operably configured to dynamically modulate the flow of the solvent through at least one of the first solvent pump and the another solvent through the second solvent pump based on the flow rate ascertainable from the at least one solvent flow meter.

Claim 5

5. The infused beverage brewing assembly according to claim 1, wherein the solvent temperature modulation system further comprises: a thermal modulator in fluid communication with the first solvent conduit and a thermal modulator in fluid communication with the second solvent conduit, each of the thermal modulators operably configured to thermally modulate the solvent and the another solvent disposed within the first and second solvent conduits, respectively, to a raised temperature higher and different than a temperature of the solvent and the another solvent upstream of the thermal modulators.

Claim 6

6. The infused beverage brewing assembly according to claim 5, wherein: the electronic controller is communicatively coupled to the thermal modulator in fluid communication with the first solvent conduit and the thermal modulator in fluid communication with the second solvent conduit and the electronic controller is operably configured to dynamically modulate the temperature of the solvent in the first solvent conduit and the another solvent in the second solvent conduit.

Claim 7

7. The infused beverage brewing assembly according to claim 6, further comprising: at least one solvent flow meter communicatively coupled to the first and second solvent pumps.

Claim 8

8. The infused beverage brewing assembly according to claim 7, wherein: the electronic controller is communicatively coupled to the at least one solvent flow meter and operably configured to receive an electronic signal from the at least one solvent flow meter indicative of a flow rate and to modulate the flow of the solvent through at least one of the first solvent pump and the another solvent through the second solvent pump based on the flow rate ascertainable from the at least one solvent flow meter.

Claim 9

9. The infused beverage brewing assembly according to claim 8, further comprising: a temperature measuring device communicatively coupled to the electronic controller and fluidly coupled to the resulting solvent conduit, the electronic controller operably configured to dynamically thermally modulate, through at least one of the thermal modulators, at least one of the solvent and the another solvent disposed within the first and second solvent conduits, respectively.

Claim 10

10. The infused beverage brewing assembly according to claim 1, further comprising: a temperature measuring device communicatively coupled to the electronic controller and fluidly coupled to the resulting solvent conduit, the electronic controller operably configured to dynamically thermally modulate, through the at least one thermal modulator, the solvent disposed within the first solvent conduit.

Claim 11

11. The infused beverage brewing assembly according to claim 10, wherein: the electronic controller is operably configured to receive a desired temperature for the resulting temperature in the brewing chamber and a desired flow rate for the resulting solvent in the brewing chamber.

Claim 12

12. The infused beverage brewing assembly according to claim 11, wherein: the electronic controller operably configured to dynamically thermally modulate, through the at least one thermal modulator, the solvent disposed within the first solvent conduit until the resulting temperature in the brewing chamber reaches the desired temperature for the resulting temperature in the brewing chamber.

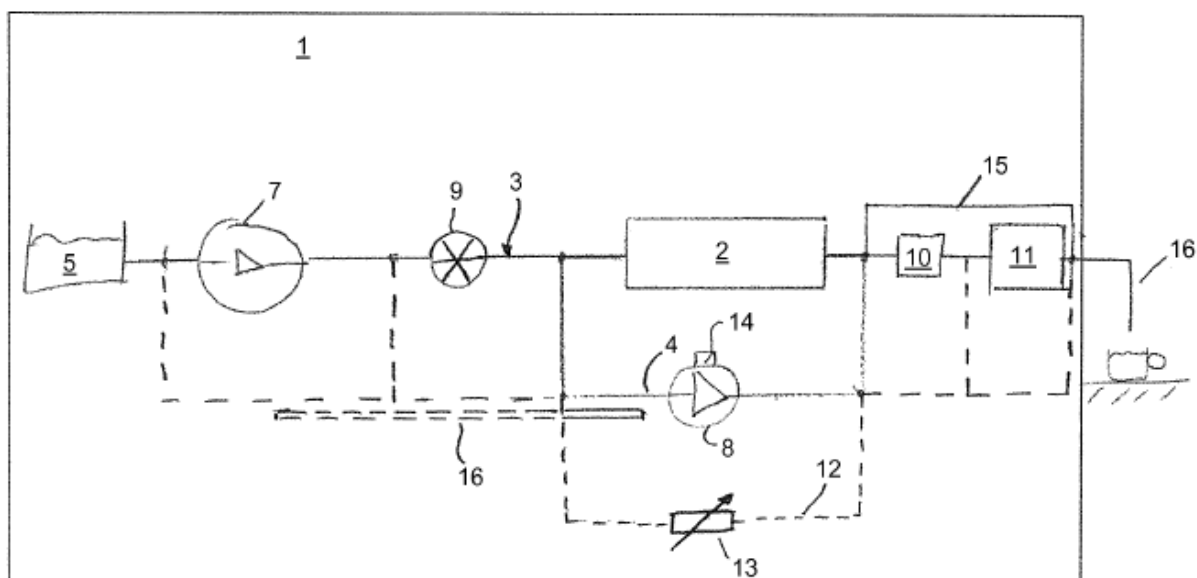
IV. Overview of the Prior Art

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

37. Startz describes “A beverage machine (1), in particular to a coffee machine...” Startz describes a system in which solvent (mixing water and 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 at a conduit

joint (return of bypass flow path between 2 and 10) to form a resulting conduit for mixing the 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:



38. 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.

B. Santi - U.S. Patent Application Publication No. 2014/0053734 (Ex. 1005)

39. Santi describes various embodiments of a system in which solvent (hot and cold water from tank 101) is pumped through two conduits by a pump (200) through at least one heating means (40). The conduits are joined at a conduit joint (21) to form a resulting conduit (between 21 and 15) for mixing the solvents. The mixed solvents are pumped into a brewing chamber (16) where they encounter a solute (e.g., coffee powder) to create a solution (e.g., espresso coffee) that is discharged by dispensing spout (18). One embodiment of the system is illustrated in FIG. 6:

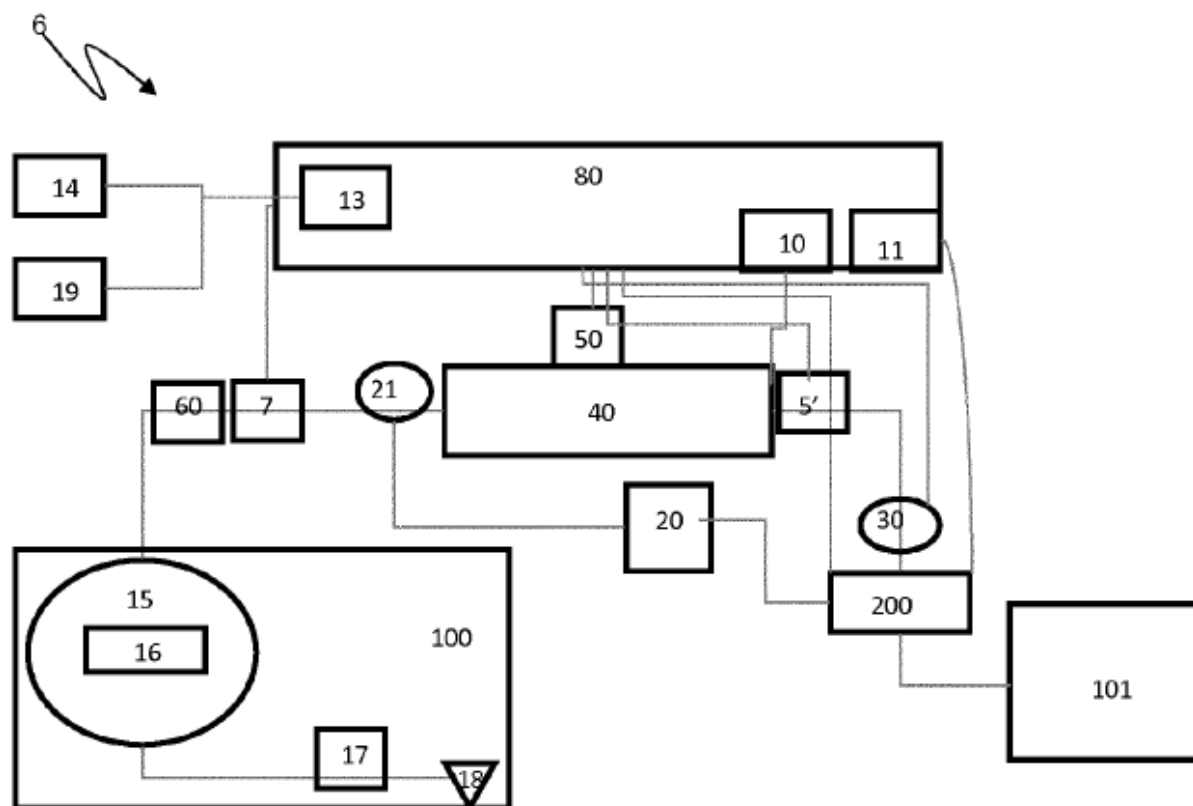


FIG. 6

40. Santi refers to using an electronic control means (80) to modify one or more of flow rate, temperature, and pressure, by receiving data from pressure sensors (e.g., 30), and/or temperature measuring devices (e.g., 5', 50, 60), then using that data to control/modulate one or more of the pumps and/or thermal modulators to affect temperature, flow, and/or pressure.

**C. Lai - U.S. Patent Application Publication No. 2012/0171332A1
(Ex. 1007)**

41. Lai describes a system in which solvent (water from reservoir 116) is pumped through a conduit by a pump (138) through at least one heater (136). The solvent is pumped into a brewing chamber (filter cup 10, FIG. 1) where they encounter a solute (e.g., coffee beans 18) to create a solution (e.g., coffee) that is discharged into a cup (108). The system is illustrated in FIG. 60:

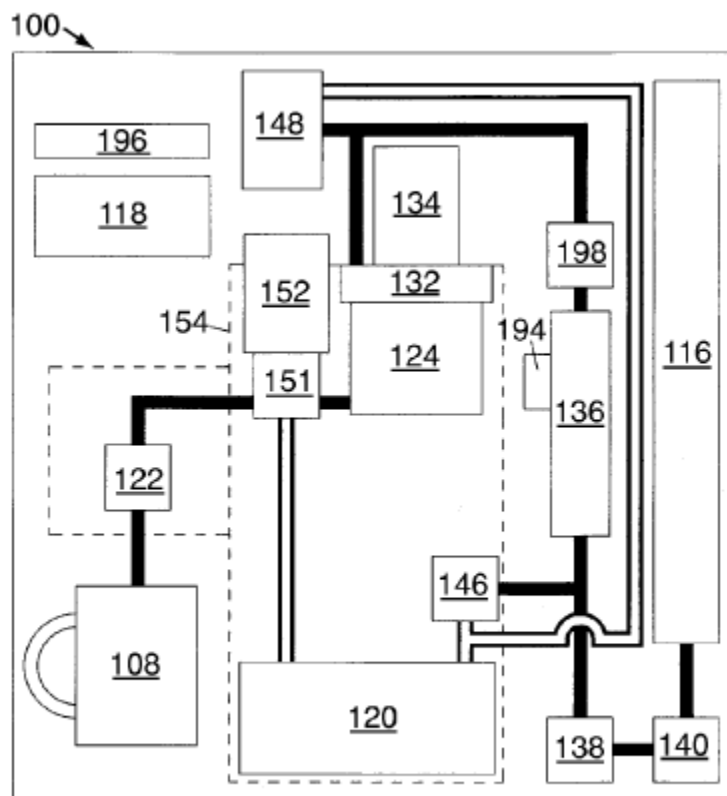


FIG. 60

42. Lai refers to using an electronic controller (control panel 118, PCB 196) to modify one or more of flow rate, temperature, and pressure, by receiving data from flow meters (140) and/or temperature sensors (194, 198), then using that data to control/modulate the pump and/or heater to affect temperature and/or flow.

D. 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:

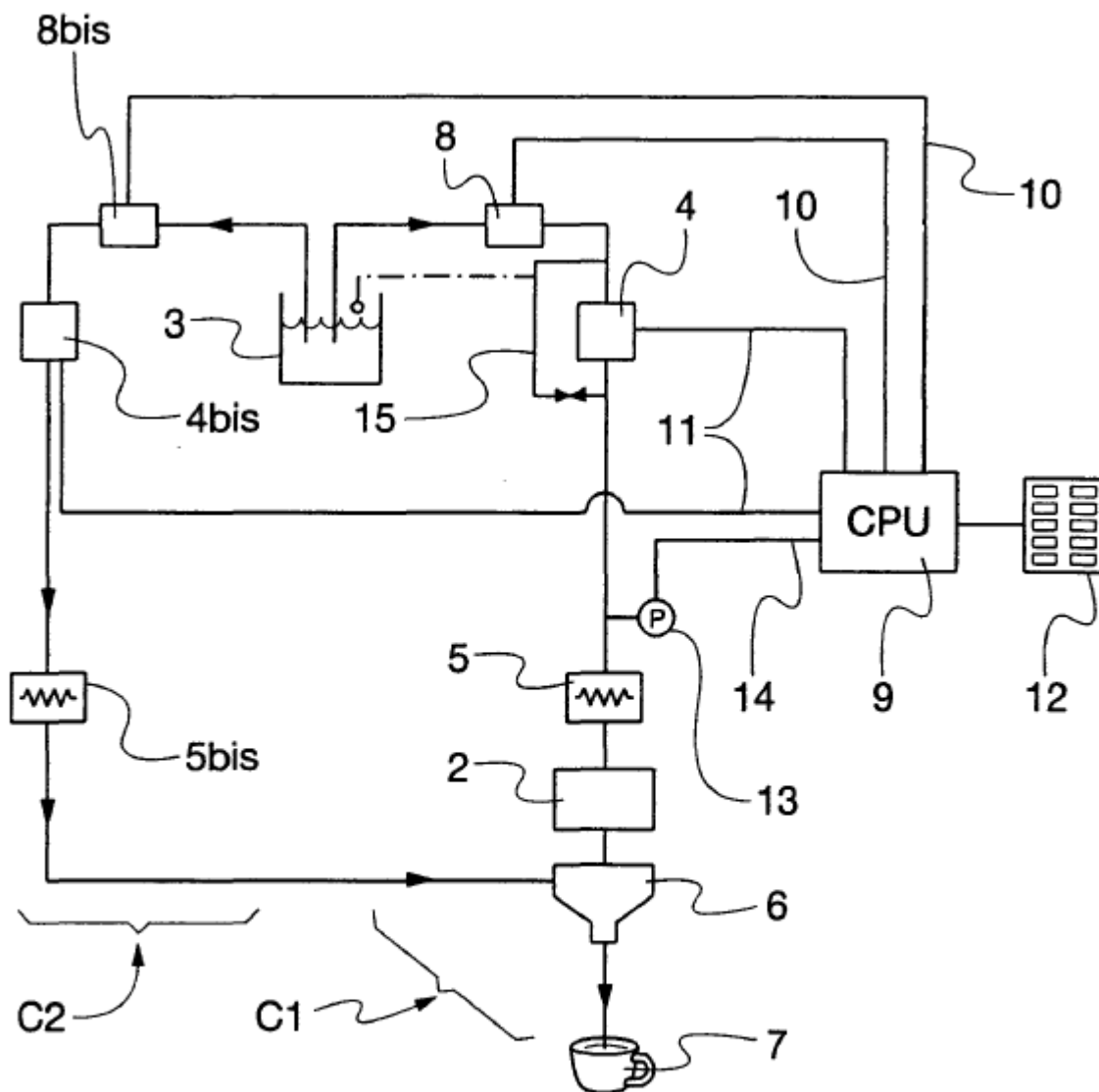


Fig. 1

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.

E. Upston - U.S. Patent Application Publication No. 2014/0069279A1 (Ex. 1009)

45. Upston describes a system in which solvent (water from reservoir 210) is pumped through a conduit (line 236) by a pump (234) through at least one thermal modulator (boiler 250). The solvent is pumped into a brewing chamber (group head 700) where they encounter a solute (e.g., coffee) to create a solution (e.g., coffee beverage 294) that is discharged into a receptacle. The system is illustrated in FIG. 7:

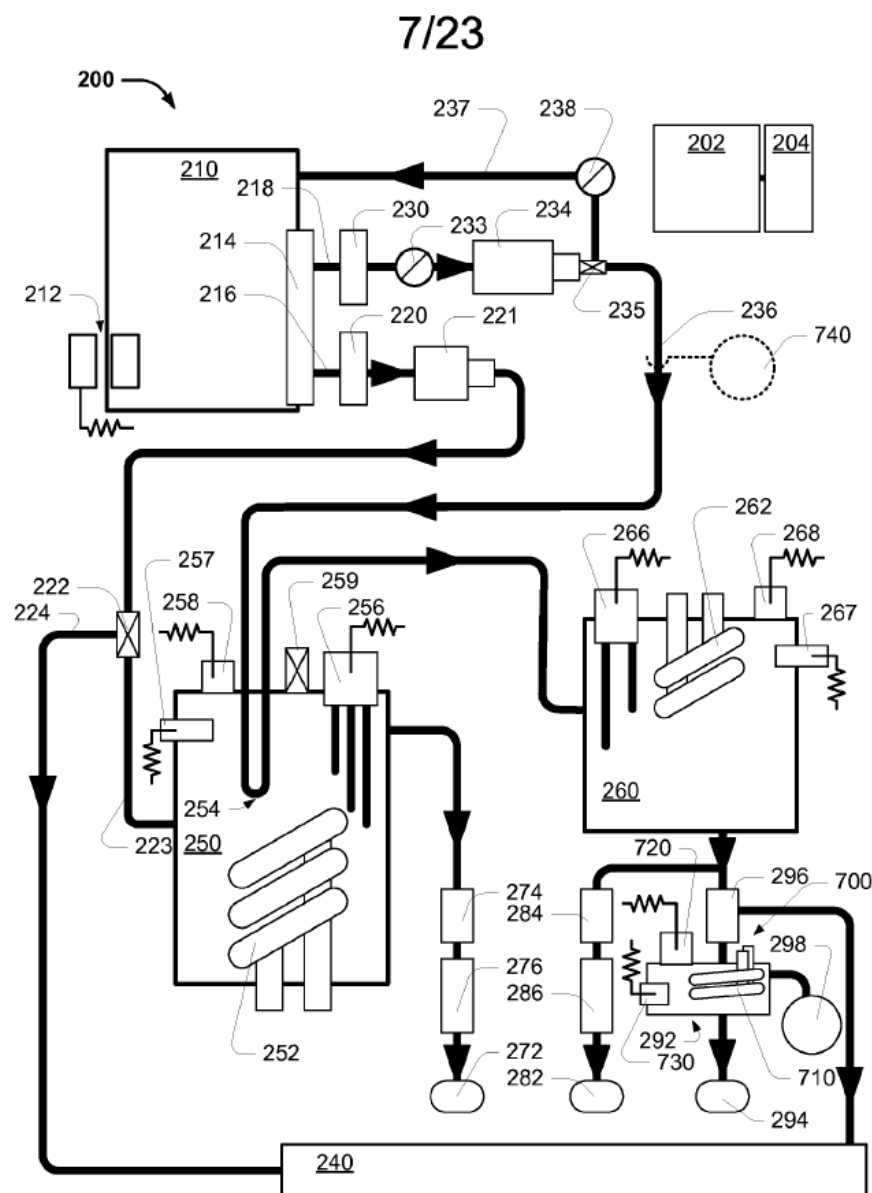


FIG. 7

46. Upston refers to using an electronic controller (processor 202) to modify one or more of flow rate, temperature, and pressure, by receiving data from flow meters (233), pressure sensors (740, 298) and/or temperature measuring devices (thermistors 257, 267, 730), then using that data to control/modulate the

48. 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.

G. Applicant Admitted Prior Art

49. The patent applicant admitted, “Some known devices... enable the user to create and execute brew formulas which modulate ...temperature with respect to time... Temperature control of infusion water is performed by utilizing a proportional mixing valve that is controlled by a controller to mix hot and cold water.” Ex. 1001, 1:65-2:10.

V. Analysis of the Claims of U.S. Patent No. 11,576,524

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

50. As noted above, the 524 Patent appears to state three goals:

- a. “Therefore, a beverage brewing system that affords precise, accurate and dynamic temperature control would enable optimization of beverage flavor and is needed.”
- b. “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.”
- c. “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.”

51. A POSA seeking to solve one or more of these goals / problems would consider patents, publications, and knowledge related to heated beverage-making, in particular related to brewed beverages that use “solute particles” and “solute compaction.” This would lead a POSA to prior patents and publications

related to coffee and/or tea making, and possible to related beverage making, and would also lead the POSA to consider their own knowledge of technologies that existed in the art.

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

53. A POSA seeking a “beverage brewing system that affords precise, accurate and dynamic temperature control” would consider various control systems for achieving precision, accuracy, and dynamic control. Such control systems would include 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, the POSAs working for me assisted with the design of over 60 machines or systems, many of which were publicly known before August 2012.

54. Startz discloses much or all of the subject matter claimed by multiple

claims of the 524 patent. However, Startz does not explain his controller, sensors, or control mechanisms in depth. A POSA attempting to solve the problem of precision, accuracy, and dynamic temperature control with Startz's system would seek control systems, sensors, and components that enhanced the precision, accuracy, and dynamic temperature control of Startz's system.

55. 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.

56. Thus, a POSA would have had motivation to combine Startz's disclosure with one or more of the POSA's knowledge, the applicant admitted prior art (AAPA), Lai, Santi, Porzio, Majer, and/or Upston.

B. Claims 1-5 are Obvious

57. It is my opinion that claims 1-5 are obvious over Startz in view of one or more of the knowledge of a POSA, Lai, Santi, Porzio, and/or Majer.

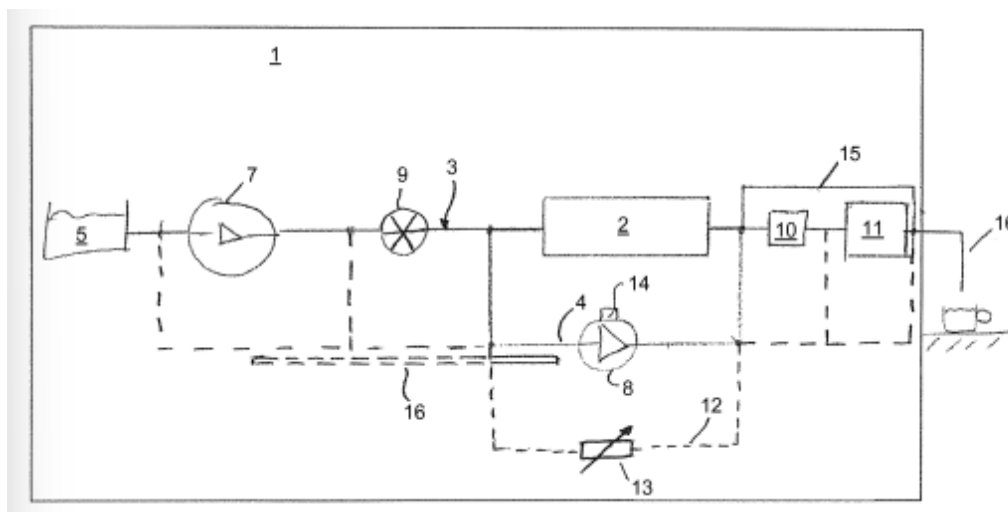
1. Claim 1

(a) “An infused beverage brewing assembly comprising:”

58. Startz discloses an infused beverage brewing assembly. Ex. 1003, 1:5-15, 3:9-13, Abstract. Specifically, Startz discloses, “According to FIG. 1, a beverage machine 1 according to the invention, which can be embodied as a coffee machine, ...” Ex. 1003, 3:9-11. It is well known in the art that coffee is an infused beverage formed by infusing a solute (ground coffee) with a solvent (water or other liquid).

(b) “a solvent flow management system with a first solvent pump fluidly coupled to a first solvent conduit and operably configured to receive a solvent and induce the flow of the solvent therethrough and”

59. Startz discloses this limitation. As illustrated in FIG. 1 (below), Startz provides a first solvent pump (main flow pump 7) fluidly coupled to a first solvent conduit (main flow path 3) and operably configured to receive a solvent (water from water tank 5) and induce the flow of the solvent (water) therethrough:



60. 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.” Ex. 1003, 3:17-19. 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.” Ex. 1003 claim 1.

(c) **“a second solvent pump fluidly coupled to a second solvent conduit and operably configured to receive another solvent, separate from the solvent operably configured to be received within the first solvent pump, and induce the flow of the another solvent therethrough;”**

61. Startz discloses this limitation. As illustrated in FIG. 1 (above), Startz provides a second solvent pump (bypass flow pump 8) fluidly coupled to a second solvent conduit (bypass flow path 4) and operably configured to receive another solvent (water from water tank 5), separate from the solvent operably configured to be received within the first solvent pump (7), and induce the flow of the another solvent therethrough.

62. Startz states, “According to the invention, a bypass flow pump 8 is now arranged in the bypass flow path 4...” Ex. 1003, 3:19-21. Startz further states, “...the bypass flow pump 8 can, under the pressure conditions at hand, convey exactly the quantity or a slightly higher quantity of bypass water,...” Ex. 1003, 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...” Ex. 1003, claim 1.

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

64. To the extent that the Board determines that the “another solvent” cannot be water if “the solvent” is also water, it would have been obvious to a POSA that two different solvents could be used in Startz’s device.

65. 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.” Ex. 1008, 16:19-22. Thus, Majer explicitly discloses using a different solvent in a second conduit.

66. And Porzio discloses, “According to yet 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... unless indicated otherwise.” Ex. 1011, p. 8:10-20. Thus, Porzio explicitly discloses using aromatic liquid in conduit 29 and water in conduit 25.

67. Accordingly, if the “another solvent” cannot be the same as “the

solvent,” a POSA would have known that it would have been obvious to use two different solvents in the two different conduits of Startz’s device.

(d) “a solvent temperature modulation system with at least one thermal modulator in fluid communication with the first solvent conduit,”

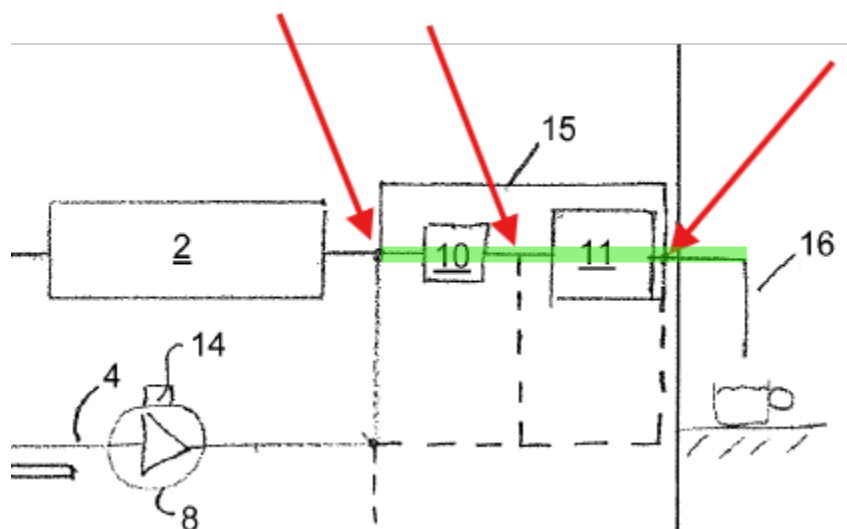
68. Startz discloses this limitation. As illustrated in FIG. 1 (above), Startz provides a solvent temperature modulation system (defined as follows) with at least one thermal modulator (heating device 2) in fluid communication with the first solvent conduit (3).

69. 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.” Ex. 1003, 3:9-19. Startz further demonstrates “fluid communication” by stating, “... the pressure difference upstream of and downstream from the heating device 2 is comparatively low...” Ex. 1003, 4:24-30. Startz claims, “a heating device disposed along the main flow path between the input end and the output end...” Ex. 1003, claim 1.

70. Alternatively, if conduit 4 was the first conduit, Startz’s further heating device 16 could be considered to be the at least one thermal modulator.

- (e) **“the first and second solvent conduits directly and fluidly coupled together to form a conduit joint downstream of the thermal modulator to form a resulting solvent conduit with a resulting solvent disposed therein at a resulting temperature and”**

71. Startz discloses this limitation. As illustrated in the annotated excerpt of FIG. 1 (below), the first (3) and second (4) solvent conduits are directly and fluidly coupled together to form a conduit joint (one of the coupling points between 2 and 10, between 10 and 11, or to the right of 11, as indicated with red arrows) downstream of the thermal modulator (2) to form a resulting solvent conduit (green highlighting) with a resulting solvent (mixed hot and cold water) disposed therein at a resulting temperature (mixing temperature).



72. 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.” Ex. 1003, 3:35-41. Startz further teaches, “... individual mixing temperatures can be specifically generated at the dispensing location/mixing area by correspondingly changing the capacity of the bypass flow pump.” Ex. 1003, 2:27-32. Startz further 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...” Ex. 1003, 3:67-4:5, Claim 4.

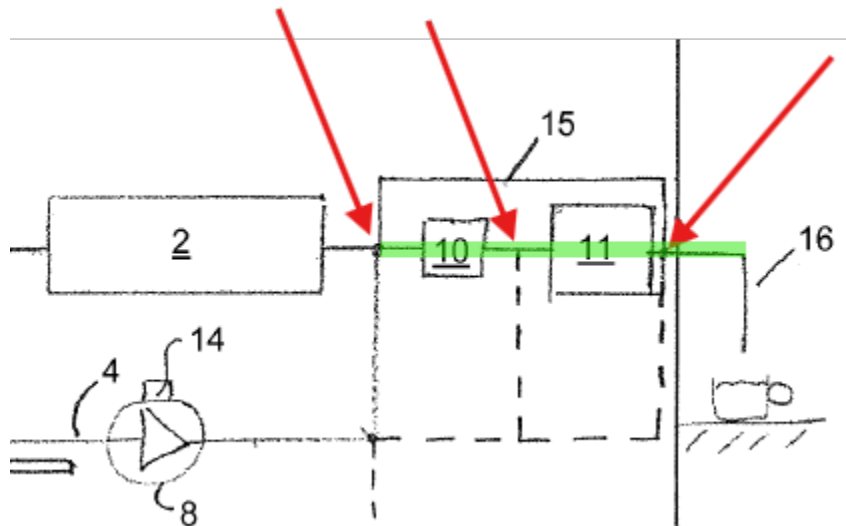
(f) “the at least one thermal modulator operably configured to thermally modulate the solvent disposed in the first solvent conduit to a raised temperature higher and different than the resulting temperature; and”

73. Startz discloses this limitation. Startz discloses that the at least one thermal modulator (2) is operably configured to thermally modulate (i.e., heat) the solvent (water) disposed in the first solvent conduit (3) to a raised temperature higher and different than the resulting temperature (mixing temperature). Startz states, “The heating device 2 can be embodied as a common continuous-flow water heater, for example.” Ex. 1003, 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. As noted above, 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 first 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 “resulting

temperature” that results from mixing the heated water with cold water from bypass flow path 4.

(g) **“a brewing chamber in fluid communication with the resulting solvent conduit and for housing a solute disposed to receive the resulting solvent to produce an infused beverage;”**

74. Startz discloses this limitation. Startz discloses a brewing chamber (brewing device 11) that is in fluid communication (arranged downstream) with the resulting solvent conduit (indicated with green highlighting) and for housing a solute (ground coffee) disposed to receive the resulting solvent (mixed water) to produce an infused beverage (coffee).



75. 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.” Ex. 1003, 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 chamber” in a coffee machine is designed to house ground coffee disposed to receive hot water to produce a coffee beverage.

(h) “an outlet for discharging the infused beverage; and”

76. Startz discloses this limitation. Startz discloses an outlet (dispensing location 6, mislabeled as 16) for discharging the infused beverage (coffee). Startz teaches “a dispensing location 6 on the output side.” Ex. 1003, 3:16. Startz references, “a beverage temperature at the dispensing location 6.” Ex. 1003, 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...” Ex. 1003, claim 1.

77. 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. Ex. 1003, FIG. 1. A POSA would have further 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 from the beverage machine 1.

(i) “an electronic controller communicatively coupled to the first and second solvent pumps and the at least one thermal modulator, and”

78. Startz discloses this limitation. Startz discloses a controller, stating, “Provision can furthermore be made for a control device 14, which controls/regulates the bypass flow pump 8 as a function of a flow volume, a beverage temperature at the dispensing location 6 or a water temperature in the water tank 5.” Ex. 1003, 3:53-56. Startz further states, “The bypass flow pump can be controlled as a function of the chosen product, of the occurring flow or the temperature at the input of the main flow path or at the dispensing location respectively.” Ex. 1003, 2:14-18. Startz further states that both pumps can be controlled, “Generally, the bypass flow pump 8 and/or the main flow pump 7 can be ... a cost-efficient and at the same time an accurately controllable pump.” Ex. 1003, 3:46-50. Startz further teaches, “The mixing portion and thus the admixing quantity of the bypass flow pump 8 can be controlled accurately if the total rate of flow is known, which can be determined via the fluid flow meter 9, for example. By changing the capacity at the bypass flow pump or by pulsing this bypass flow pump 8, different mixing temperatures can furthermore be generated specifically and a sensor element (not illustrated), for example, which is connected downstream, can be regulated through this.” Ex. 1003, 3:63-4:5. Startz claims, “a control device that controls the bypass flow pump as a function of beverage

temperature at the dispensing location and at least one of a flow volume, and a water temperature in the water supply.” Ex. 1003, claim 1.

79. Thus, Startz discloses that both pumps can be controlled, discloses a controller, and discloses numerous types of feedback data, including flow volume, beverage temperature, water tank temperature, chosen product, occurring flow, input temperature, dispensing temperature, total rate of flow, etc.

80. While Startz does not explicitly disclose that controller 14 is electronic, a POSA would have recognized that electronic controllers were widely used in the field. A POSA would also have recognized it would have been appropriate to connect an electronic controller to communicate with multiple pumps and receive the numerous types of feedback data listed by Startz.

81. Finally, a POSA would have recognized that many electronic controllers were connected to communicate with heating devices in beverage machines. For example, Lai teaches, “Importantly, the water temperature is regulated throughout the brewing process for optimum brewing and taste. In connection with this, a water temperature sensor 198 detects a temperature of the water exiting the heater 136 and relays this temperature to the PCB 196 of the control panel 118. The heater power and pump rate may then be adjusted to keep the water temperature within the optimal range. The flow meter 140 also keeps track of the flow rate and relays this information to the PCB 196.” Ex. 1007,

¶0098. Thus, a POSA would have understood that Lai discloses that the heater is also communicatively connected to the electronic controller, along with the pump(s).

82. As a further example, Santi teaches a “device for producing hot beverages” having “at least one brewing chamber”, wherein “said device also comprising control means, operatively connected to said first sensor means and to said second sensor means, for continuous monitoring of said first temperature data and of said first pressure data during the operating phase of said device; said control means being operatively connected to said heating means and to said pumping means for continuous and combined control of said temperature and of said pressure during said operating phase of said device;...” Ex. 1005, ¶¶0026-0031. In describing the “control means”, Santi confirms that the control means is electronic by noting “the first storage means 13 ...operatively connected to the control means, and also comprise selection actuator means 19. The first storage means 13 are produced by means of a non-volatile memory... selection actuator means 19, such as... a touch screen system... Moreover, the different extraction profiles can be modified in the machine through access to programming mode... these selection means comprise second storage means 14 ...second storage means 14 consist of a portable non-volatile memory, such as a memory card (SD, MMC or the like),... a Bluetooth device, a USB key or the like... storage means 14 could

use an extraction profile taken from a web page...” Ex. 1005, ¶¶0084-0086. Santi teaches, “the control means 80 performs continuous and combined control of the temperature and of the pressure during the operating phase...” Ex. 1005, ¶¶0088.

83. Majer teaches a machine used in “the preparation of e.g. a regular coffee, or ‘caffe americano’...” in which, “The dispensing unit comprises also an electrical circuit, preferably including an electronic controller 9 connected to it... The electric circuit is also apt to monitor the hydraulic circuit particularly with respect to the temperature..., the time of operation of pumps 4 and 4bis via lines 11, the flow-rate at the inlet of the pump as read via said flow-meter 8 and 8bis...” Ex. 1008 pages 11:28-12:12. Majer teaches, “Controller unit 9 can operate motor M of pump 4bis to control the amount and the flow rate of water sent to circuit C2...” Ex. 1008 page 11:8-9. Majer teaches, “...pressure sensor 13 can be used to operate pump 4 through controller unit 9 and lines 11 and 14, so as to stop the pump when the desired pressure is reached and to activate again the pump...” Ex. 1008 page 17:29-31.

84. A POSA would have recognized that it would be obvious to combine the machine of Startz with the electronic controller of any of Lai, Santi, and/or Majer, and that such electronic controller would be communicatively coupled to both the thermal modulator and the pumps.

- (j) “operably configured to modulate the flow of the solvent through the first solvent pump and the at least one thermal modulator and the another solvent through the second solvent pump.”**

85. This limitation would have been obvious to a POSA. As noted immediately above, Lai, Santi, and/or Majer renders it obvious that the electronic controller (14) in Startz would have been operably configured to modulate the flow of the solvent (water) through the first solvent pump (7) and the at least one thermal modulator (2) and the another solvent (water) through the second solvent pump (8).

86. Majer explicitly teaches that “Controller unit 9 can operate motor M of pump 4bis” and “...operate pump 4 through controller unit 9 and lines 11 and 14.” Ex. 1008, page 10:8-9, 16:29-31. Thus, both pumps are explicitly controllable through Majer’s electronic controller to modulate flow through each pump.

87. Santi teaches that the “control means” is “operatively connected to said heating means and to said pumping means for continuous and combined control of said temperature and of said pressure during said operating phase of said device;...” Ex. 1005, ¶¶0026-0031.

88. Lai teaches using the electronic “control panel 118” so that, “The heater power and pump rate may then be adjusted to keep the water temperature within the optimal range.” Ex. 1007, ¶0098.

89. A POSA would have recognized that it would be obvious to combine the machine of Startz with the electronic controller of any of Lai, Santi, and/or Majer, and that such electronic controller would be operably configured to modulate solvent flow through the first pump/thermal modulator and through the second pump.

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

2. Claim 2

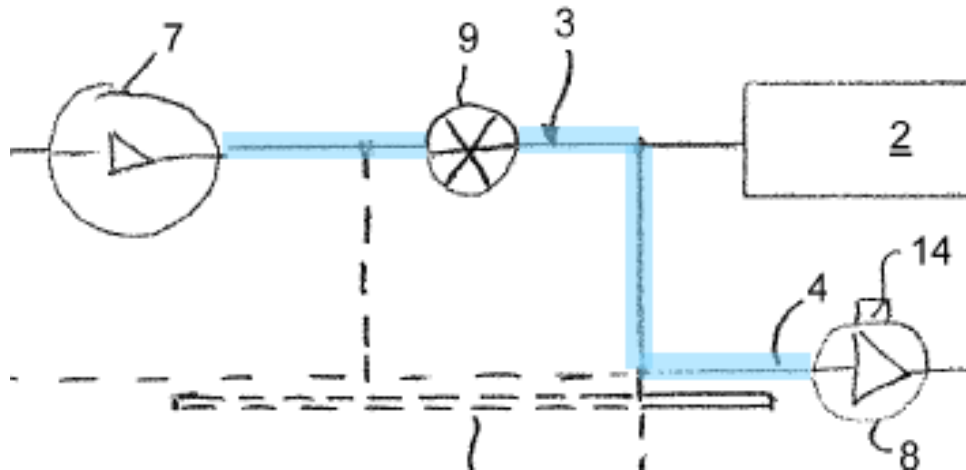
(a) **“The infused beverage brewing assembly according to claim 1, further comprising: at least one solvent flow meter communicatively coupled to the first and second solvent pumps.”**

91. Startz discloses this limitation. Startz discloses a solvent flow meter (fluid flow meter 9) communicatively coupled (as described below) to the first (7) and second (8) solvent pumps.

92. The term “communicatively coupled” is not defined by the Patent Owner, nor does it have any special meaning in the field outside of the Patent Owner’s definition of “coupled.” The term “communicate” has multiple plain and ordinary meanings. Per Merriam-Webster, one definition is “to transmit information, thought, or feeling so that it is satisfactorily received or understood,”

and a second definition is “to open into each other : connect” (with an example usage: “The rooms communicate.”). Ex. 1017, page 2.

93. Startz’s fluid flow meter 9 and the two pumps 7 and 8 meet both definitions of being communicatively coupled. First, when the pumps are inactive, that information is transmitted to the flow meter that will record reduced or stopped flow. And when the pumps are active, that information is transmitted to the flow meter that will record increased or active flow. With respect to the second definition, the flow meter opens into the pumps through main flow path 3 and bypass flow path 4 (illustrated below):



As noted above, in the Claim Construction, the patent applicant stated that the term “coupled” means connected, although not necessarily directly. Here, the flow meter 9 opens into the conduit 3 which opens into the pump 7, so flow meter 9 indirectly opens into pump 7. With respect to the second pump 8, the flow meter opens into conduit 3 that opens into conduit 4 that opens into pump 8, so flow

meter 9 indirectly opens into pump 8. Startz satisfies at least two definitions of “communicatively coupled.”

94. To the extent that the Board determines that “communicatively coupled” requires electronic communication, it would have been obvious to a POSA to provide electronic communication from the flow meter to an electronic controller and from the electronic controller to the pumps. (As noted, the “coupling” need not be direct under the patent applicant’s definition of “coupled.”)

95. Majer teaches, “The hydraulic circuits C1 and C2 preferably comprise at least one type of means apt to detect and control the flow-rate of said primary solvent at the inlet of the pump, such as - for instance - a volumetric flow-control 8 and 8bis, and circuit C1 can be 20 also provided with means to adapt said flow in order to alter it at the outlet level of the preparation chamber.” Ex. 1008 p. 11:17-21. Majer clarifies that the “flow-control” is flow meters and that “adapt[ing] said flow in order to alter it” is performed by pumps: “The electric circuit is also apt to monitor the hydraulic circuit particularly with respect to..., the time of operation of pumps 4 and 4bis via lines 11, the flow-rate at the inlet of the pump as read via said flow-meter 8 and 8bis...” Ex. 1008 pages 11:28-12:12. Majer teaches, “Controller unit 9 can operate motor M of pump 4bis to control the amount and the flow rate of water sent to circuit C2...” Ex. 1008 page 10:8-9. Majer teaches, “Flow rates are detected through flow-rate meters 8 and 8bis (or the pump of fig. 6

for C2) and controller 9 regulates flow rate in C2 according to the detected values in C1 to provide the required amount of water from C2 in the required time.” Ex. 1008 page 12:25-29.

96. Additionally, Lai teaches that the flow meter relays flow information to the controller and that the controller adjusts pump rate to keep temperature within the optimal range: “Importantly, the water temperature is regulated throughout the brewing process for optimum brewing and taste. In connection with this, a water temperature sensor 198 detects a temperature of the water exiting the heater 136 and relays this temperature to the PCB 196 of the control panel 118. The heater power and pump rate may then be adjusted to keep the water temperature within the optimal range. The flow meter 140 also keeps track of the flow rate and relays this information to the PCB 196.” Ex. 1007, ¶0098.

97. A POSA would have recognized that it would be obvious to use the controller to collect flow information and to use that information to control the pumps, thereby communicatively coupling the flow meter and pumps through the controller.

98. Accordingly, Startz in view of one or more of the knowledge of a POSA, Lai, Santi, Porzio, and/or Majer renders claim 2 obvious.

3. Claim 3

- (a) “The infused beverage brewing assembly according to claim 2, wherein: the electronic controller is communicatively coupled to the at least one solvent flow meter and operably configured to receive an electronic signal from the at least one solvent flow meter indicative of a flow rate and”**

99. Startz discloses this limitation. Startz discloses that a controller (control device 14) is communicatively coupled to the at least one solvent flow meter (fluid flow meter 9) and operably configured to receive an electronic signal from the at least one solvent flow meter (9) indicative of a flow rate (total rate of flow).

100. While Startz does not explicitly state that the controller 14 is electronic, Startz states, “Provision can furthermore be made for a control device 14, which controls/regulates the bypass flow pump 8 as a function of a flow volume... The mixing portion and thus the admixing quantity of the bypass flow pump can be controlled accurately if the total rate of flow is known, which can be determined via the fluid flow meter 9...” Ex. 1003, 3:53-67. Based on this, it would have been obvious to a POSA that Startz was describing an electronic controller communicatively coupled to a solvent flow meter and configured to receive an electronic signal from the flow meter indicating the flow rate.

101. To the extent that this element is not obvious over Startz in view of

the knowledge of a POSA, Majer and Lai each disclose the elements of this claim as set forth above, in the analysis of claim 2. Majer states, “The electric circuit is also apt to monitor the hydraulic circuit particularly with respect to... the flow-rate at the inlet of the pump as read via said flow-meter 8 and 8bis...” Ex. 1008 pages 11:28-12:12. Majer teaches, “Flow rates are detected through flow-rate meters 8 and 8bis ... and controller 9 regulates flow rate in C2 according to the detected values in C1...” Ex. 1008 page 12:25-29. Additionally, Lai teaches, “The flow meter 140 also keeps track of the flow rate and relays this information to the PCB 196.” Ex. 1007, ¶0098.

(b) “to modulate the flow of the solvent through at least one of the first solvent pump and the another solvent through the second solvent pump based on the flow rate ascertainable from the at least one solvent flow meter.”

102. Startz discloses this limitation. Startz discloses that the flow of the solvent (mixing portion of water) through at least one of the first solvent pump (7) and the another solvent (admixing quantity of water) through the second solvent pump (8) is modulated (controlled) based on the flow rate (total rate of flow) ascertainable from the at least one solvent flow meter (fluid flow meter 9).

103. Startz states, “Provision can furthermore be made for a control device 14, which controls/regulates the bypass flow pump 8 as a function of a flow volume... The mixing portion and thus the admixing quantity of the bypass flow

pump can be controlled accurately if the total rate of flow is known, which can be determined via the fluid flow meter 9...” Ex. 1003, 3:53-67. Based on this, it would have been obvious to a POSA that Startz was describing an electronic controller modulating flow through at least one pump (note: the claim requires modulation of flow through “at least one of” the two pumps) based on the total flow rate from the flow meter.

104. To the extent that this element is not obvious over Startz in view of the knowledge of a POSA, Majer and Lai each disclose the elements of this claim as set forth above, in the analysis of claim 2.

105. Majer teaches, “Controller unit 9 can operate motor M of pump 4bis to control the amount and the flow rate of water sent to circuit C2...” Ex. 1008 page 10:8-9. Majer teaches, “Flow rates are detected through flow-rate meters 8 and 8bis (or the pump of fig. 6 for C2) and controller 9 regulates flow rate in C2 according to the detected values in C1 to provide the required amount of water from C2 in the required time.” Ex. 1008 page 12:25-29.

106. Additionally, Lai teaches, “Importantly, the water temperature is regulated throughout the brewing process for optimum brewing and taste... The heater power and pump rate may then be adjusted to keep the water temperature within the optimal range. The flow meter 140 also keeps track of the flow rate and relays this information to the PCB 196.” Ex. 1007, ¶0098.

107. A POSA would have recognized that it would be obvious to modulate the flow of the solvent through at least one of the first solvent pump and the another solvent through the second solvent pump based on the flow rate ascertainable from the at least one solvent flow meter.

108. Accordingly, Startz in view of one or more of Lai, Santi, Porzio, and/or Majer renders claim 3 obvious.

4. Claim 4

- (a) **“The infused beverage brewing assembly according to claim 3, wherein: the electronic controller is operably configured to dynamically modulate the flow of the solvent through at least one of the first solvent pump and the another solvent through the second solvent pump based on the flow rate ascertainable from the at least one solvent flow meter.”**

109. The only meaningful difference between this claim 4 and claim 3 is the inclusion of the word “dynamically.” Startz discloses this limitation. Startz discloses that the electronic controller (14) is operably configured to dynamically modulate (keep constant or change during the brewing cycle) the flow of the solvent (mixing portion of water) through at least one of the first solvent pump (7) and the another solvent (admixing portion of water) through the second solvent pump (8) based on the flow rate ascertainable from the at least one solvent flow meter (9).

110. The analysis of claim 3 sets forth all of the elements of this claim except for “dynamically.”

111. Startz teaches, “The mixing portion and thus the admixing quantity of the bypass flow pump 8 can be controlled accurately if the total rate of flow is known, which can be determined via the fluid flow meter 9, for example. 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...” Ex. 1003, 3:63-4:4. Thus, Startz confirms that the flow rate either stays constant or changes during the brewing cycle.

112. To the extent that this element is not obvious over Startz in view of the knowledge of a POSA, Majer and Lai each disclose the elements of this claim as set forth above, in the analysis of claim 3(b). Highlighting that analysis, Majer teaches, “Controller unit 9 can operate motor M of pump 4bis to control the amount and the flow rate of water sent to circuit C2...” Ex. 1008 page 10:8-9. Majer teaches, “...controller 9 regulates flow rate in C2 according to the detected values in C1 to provide the required amount of water from C2 in the required time.” Ex. 1008 page 12:25-29. Majer states, “The flow rate of the first and second circuit C1 and C2... can be constant during the dispensing time or can be varied during the dispensing time...the flow rates fr1 and fr2 can be controlled...” Ex. 1008 page 13:21-26, see also claims 7-10. Lai teaches, “Importantly, the water

temperature is regulated throughout the brewing process for optimum brewing and taste... The heater power and pump rate may then be adjusted to keep the water temperature within the optimal range. The flow meter 140 also keeps track of the flow rate and relays this information to the PCB 196.” Ex. 1007, ¶0098.

113. A POSA would have recognized that it would be obvious to “dynamically” modulate the flow.

114. Accordingly, Startz in view of one or more of Lai, Santi, Porzio, and/or Majer renders claim 4 obvious.

5. Claim 5

- (a) **“The infused beverage brewing assembly according to claim 1, wherein the solvent temperature modulation system further comprises: a thermal modulator in fluid communication with the first solvent conduit and a thermal modulator in fluid communication with the second solvent conduit, each of the thermal modulators operably configured to thermally modulate the solvent and the another [sic] solvent disposed within the first and second solvent conduits, respectively, to a raised temperature higher and different than a temperature of the solvent and the another solvent upstream of the thermal modulators.”**

115. Startz discloses this limitation. Startz discloses a thermal modulator (heating device 2) in fluid communication with the first solvent conduit (3) and a thermal modulator (further heating device 16) in fluid communication with the second solvent conduit (4), each of the thermal modulators (2, 16) operably

configured to thermally modulate the solvent (mixing portion of water) and the another [sic] solvent (admixing portion of water) disposed within the first (3) and second (4) solvent conduits, respectively, to a raised temperature higher and different than a temperature of the solvent (mixing portion of water) and the another solvent (admixing portion of water) upstream (i.e., to the left on FIG. 1) of the thermal modulators (2, 16).

116. Most of the analysis of this element is set forth above in the analysis of claim elements 1(d) and 1(f). The upstream/downstream direction is established by Startz, claiming, “a brewing valve and a brewing device are arranged downstream from the heating device.” Ex. 1003, claim 2. Thus, the left side of FIG. 1 is upstream and the right side of FIG. 1 is downstream. Regarding the second 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.” Ex. 1003, 4:11-13. Startz does not describe a specific type of heating device 16, but described “a main flow path 3, which through a heating device 2...” Ex. 1003, 3:11-12. A POSA would have known and understood that the same type of construction could be used for both heating device 2 and heating device 16, such that it would have been obvious that heating device 16 would be in fluid communication with conduit 4. Further, it is inherent that water passing through an active “heating device” will be at a higher/raised temperature upon exiting the

heating device.

117. 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.

118. Accordingly, Startz in view of one or more of the knowledge of a POSA, Lai, Santi, Porzio, and/or Majer renders claim 5 obvious.

C. Claims 6-10 are Obvious

119. It is my opinion that claims 6-10 are obvious over Startz in view of one or more of the knowledge of a POSA, AAPA, Lai, Santi, Porzio, and/or Majer

1. Claim 6

(a) “The infused beverage brewing assembly according to claim 5, wherein: the electronic controller is communicatively coupled to the thermal modulator in fluid communication with the first solvent conduit and the thermal modulator in fluid communication with the second solvent conduit and”

120. Startz in view of one or more of the knowledge of a POSA, Lai, Santi, and/or Majer discloses this limitation. The analysis of this disclosure with respect to the communicative coupling of the electronic controller and “the thermal

modulator in fluid communication with the first solvent conduit” is set forth above, in the analysis of claim element 1(i). And, as set forth in the analysis of claim 5, Startz discloses the use of two thermal modulators for the two conduits.

121. As noted above, a POSA would have recognized that many electronic controllers were connected to communicate with heating devices in beverage machines.

122. Lai teaches, “...a water temperature sensor 198 detects a temperature of the water exiting the heater 136 and relays this temperature to the PCB 196 of the control panel 118. The heater power and pump rate may then be adjusted to keep the water temperature within the optimal range...” Ex. 1007, ¶0098. A POSA would have understood that Lai discloses that the heater is also communicatively connected to the electronic controller and would have further understood that, in a two heater system, both heaters could be connected to Lai’s electronic controller.

123. Santi teaches, “The control means 80 are, moreover, operatively connected to the heating means 40... for continuous and combined control of the temperature...” Ex. 1005, ¶63. A POSA would have understood that Santi discloses that the heating means is communicatively connected to the electronic controller and would have further understood that, in a system with two heating means, both could be connected to Santi’s electronic controller.

124. Majer teaches, “Having two separate and different heating means for the two circuits makes it possible to obtain a wide range of different tastes in the final beverage; in fact, the invention makes it possible to change the temperature of the first circuit with respect to the temperature of the second circuit and to adapt both temperatures and volumes of the liquids dispensed by the two circuits according to the required taste of the final beverage.” Ex. 1008, page 7:14-19. A POSA would have understood that Santi’s disclosure of adapting both temperatures is a disclosure that both heating means would have been connected to Santi’s electronic controller.

(b) “the electronic controller is operably configured to dynamically modulate the temperature of the solvent in the first solvent conduit and the another solvent in the second solvent conduit.”

125. Startz in view of one or more of AAPA, Lai, Santi, and/or Majer discloses this limitation.

126. Notably, while this limitation requires dynamically modulating the temperature of solvent, the claim limitation does not require that such modulation be performed with the thermal modulators. Modulating the temperature can be accomplished by opening or closing valves and/or by changing the pumping rates of the two conduits while leaving the thermal modulators in a steady state.

127. The applicant admitted prior art in Startz (“AAPA”) discloses such

dynamic modulation of temperature. “As a patentee's admissions about the scope and content of the prior art provide a factual foundation as to what a skilled artisan would have known at the time of invention, it follows that AAPA may be used in similar ways in an inter partes review. Such uses include... supplying a missing claim limitation.” *Qualcomm Inc. v. Apple Inc.*, 24 F.4th 1367, 1376 (Fed. Cir. 2022) (internal citations omitted). The patent applicant admitted, “Some known devices... enable the user to create and execute brew formulas which modulate ...temperature with respect to time... Temperature control of infusion water is performed by utilizing a proportional mixing valve that is controlled by a controller to mix hot and cold water.” Ex. 1001, 1:65-2:10.

128. Lai teaches, “Importantly, the water temperature is regulated throughout the brewing process for optimum brewing and taste. In connection with this, a water temperature sensor 198 detects a temperature of the water exiting the heater 136 and relays this temperature to the PCB 196 of the control panel 118. The heater power and pump rate may then be adjusted to keep the water temperature within the optimal range.” Ex. 1007, ¶0098.

129. Santi teaches, “said control means being operatively connected to said heating means and to said pumping means for continuous and combined control of said temperature and of said pressure during said operating phase of said device;...” Ex. 1005, ¶¶0026-0031. Santi teaches, “the control means 80 performs

continuous and combined control of the temperature and of the pressure during the operating phase...” Ex. 1005, ¶¶0088.

130. A POSA would have recognized that it would be obvious to communicatively couple the controller to two thermal modulators, where the controller was configured to dynamically modulate the solvent temperature in the two conduits.

131. Accordingly, Startz in view of one or more of the knowledge of a POSA, AAPA, Lai, Santi, Porzio, and/or Majer renders claim 6 obvious.

2. Claim 7

- (a) “The infused beverage brewing assembly according to claim 6, further comprising: at least one solvent flow meter communicatively coupled to the first and second solvent pumps.”**

132. Claim 7 is almost identical to the language of claim 2. Accordingly, the above analysis regarding claim 2 applies equally to claim 7.

3. Claim 8

- (a) **“The infused beverage brewing assembly according to claim 7, wherein: the electronic controller is communicatively coupled to the at least one solvent flow meter and operably configured to receive an electronic signal from the at least one solvent flow meter indicative of a flow rate and to modulate the flow of the solvent through at least one of the first solvent pump and the another solvent through the second solvent pump based on the flow rate ascertainable from the at least one solvent flow meter.”**

133. Claim 8 is almost identical to the language of claim 3. Accordingly, the above analysis regarding claim 3 applies equally to claim 8.

4. Claim 9

- (a) **“The infused beverage brewing assembly according to claim 8, further comprising: a temperature measuring device communicatively coupled to the electronic controller and fluidly coupled to the resulting solvent conduit,”**

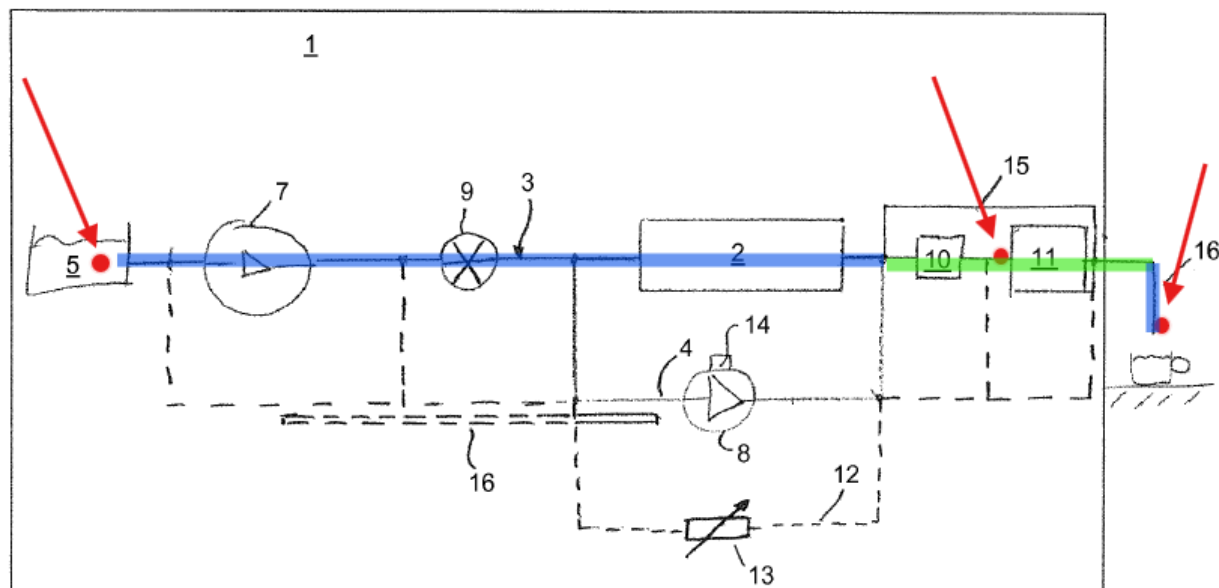
134. Startz discloses this limitation. Startz discloses a temperature measuring device (either through a beverage temperature, a water temperature, or a sensor element) communicatively coupled to the electronic controller (14) and fluidly coupled to the resulting solvent conduit (conduit on either side of elements 10 and 11 in FIG. 1).

135. Startz states, “Provision can furthermore be made for a control device

14, which controls/regulates the bypass flow pump 8 as a function of a flow volume, a beverage temperature at the dispensing location 6 or a water temperature in the water tank 5.” Ex. 1001, 3:52-57. Startz further states, “...different mixing temperatures can furthermore be generated specifically and a sensor element (not illustrated), for example, which is connected downstream, can be regulated through this.” Ex. 1001, 4:1-5. In these statements, Startz confirms the presence of at least one “sensor element” that is not illustrated for regulating temperatures. By stating that control/regulation of the pump by controller 14 is “a function of ... beverage temperature at the dispensing location 6 or a water temperature in the water tank 5,” Startz confirms the inherent presence of temperature sensors both “at the dispensing location 6” and “in the water tank 5,” as well as inherently confirming that the measurements of those temperature sensors are used by the controller, meaning that the temperature measuring device and controller are communicatively coupled.

136. These sensor “at the dispensing location,” “in the water tank,” or for sensing “mixing temperatures ... not illustrated” are all fluidly coupled to the resulting solvent conduit. The patent applicant stated that coupling need not be direct (Ex. 1001, 6:25-27). Thus, the claimed “temperature measuring device” can be located anywhere within the assembly, so long as it is directly or indirectly fluidly coupled to the resulting solvent conduit. As illustrated in the annotated

FIG. 1 (below), the resulting solvent conduit is highlighted in green (see also analysis of claim element 1(e), above), while the locations of Startz's inherent sensor(s) are illustrated with red dots and arrows, and the fluid coupling is highlighted in blue:



The water in Startz's system flows from left to right, from water tank 5 to dispensing location 16; thus, the entire highlighted flow path is "fluidly coupled," and each of Startz's temperature sensors lies along that flow path.

137. To the extent that Startz does not disclose the claimed temperature measuring device, the use of such a device would have been obvious to a POSA in view of one or more of the knowledge of a POSA, Lai, and/or Santi.

138. Lai teaches, "As shown in FIG. 59, the heater may include a sensor 194 that controls the heater 136 so that a suitable temperature (or temperature

range) for brewing is obtained. The heater sensor 194 is electrically coupled to the PCB 196 of the control panel 118 such that the PCB 196 may control the temperature of the heater 136 through the heater sensor 194.” Ex. 1007, ¶97. Lai states, “Importantly, the water temperature is regulated throughout the brewing process for optimum brewing and taste. In connection with this, a water temperature sensor 198 detects a temperature of the water exiting the heater 136 and relays this temperature to the PCB 196 of the control panel 118. The heater power and pump rate may then be adjusted to keep the water temperature within the optimal range.” Ex. 1007, ¶98. Lai confirms the fluid coupling: “a temperature sensor in fluid communication with an outlet of said heater and electrically coupled to said control unit.” .” Ex. 1007, claim 31. Lai also confirms the complete fluid coupling between sensor and outlet: “Normal brewing is then commenced wherein water is continuously pumped through the heater 136 and into the filter cup 10.” Ex. 1007, ¶98.

139. Santi describes a prior art system, “This is subsequently sent, again by pumping, to a brewing chamber inside which there is inserted a temperature sensor. This sensor is connected to a control device capable of interrupting the flow of the pump and/or the heating of the heating device when the temperature exceeds a given threshold value.” Ex. 1005, ¶0012. Santi describes a second prior art system, “This machine also has a temperature sensor, connected to a control

device, capable of detecting the temperature of the water supplied to the brewing chamber. By means of the control device, the temperature of the water is therefore regulated... to perform brewing.” Ex. 1005, ¶0014.

140. Santi, referring to his own FIG. 4, describes embodiments with up to three temperature sensors, “FIG. 4 illustrates a fourth embodiment in which the device 4 also comprises third sensor means 5' for measuring third temperature data of the input water to the heating means 40. The advantage of a further temperature sensor that detects the temperature of the input water lies in greater precision of the operating phase. In fact, in this way the variations in temperature of the input water can be kept under control, whatever the supply source... Therefore, by means of the control means 80, the number of calories to be produced and the energy required for this purpose are calculated. In this case, the second temperature sensor 60 performs a control for the feedback which can subsequently trigger corrective actions...” Ex. 1005, ¶0092, claims 10-14. The first sensor means 50 comprise a temperature sensor at the heating means 40. Ex. 1005, ¶0066. Santi confirms that the sensors are in fluid communication with the water flowing through the system: “These can be positioned at the input of the brewing portion to ensure precise control of the temperature to be used in contact with the coffee. The temperature sensor can also, or concurrently, be positioned at the heating means. In particular, it can be positioned in contact with the heating means and/or at the hot water

dispensing point thereof.” Ex. 1005, ¶0038. Santi teaches an embodiment using temperature sensors in the “resulting solvent conduit” (i.e., mixing means): “in this embodiment, the device 5 comprises mixing means 21 for mixing the hot water produced by the heating means 40 with the input cold water to these latter. Furthermore, the mixing means 21 can comprise at least one temperature sensor, operatively connected to the control means 80.” Ex. 1005, ¶0098. And Santi confirms the communication between other sensors and controller: “The control means 80 receive from the temperature sensor 50 the temperature data relating to the water...” Ex. 1005, ¶0073.

141. Startz, Lai, and Santi each describe at least one temperature sensor that meets this limitation.

(b) “the electronic controller operably configured to dynamically thermally modulate, through at least one of the thermal modulators, at least one of the solvent and the another solvent disposed within the first and second solvent conduits, respectively.”

142. This claim element requires thermal modulation “through” a thermal modulator, but does not require that the controller perform the thermal modulation by directly controlling the thermal modulator. And, as noted (claim construction, above), the patent applicant defined “modulate” to mean keep constant or change. Thus, this limitation is met by prior art that discloses manners of passing a solvent

through one of the two thermal modulators to either keep the temperature constant or change the temperature during brewing.

143. Startz discloses an electronic controller (control device 14) operably configured to dynamically thermally modulate (change or maintain temperature during brewing), through at least one of the thermal modulators (pumping solvent through bypass flow pump 8 and further heating device 16), at least one of the solvent (mixing portion of water) and the another solvent (admixing portion of water) disposed within the first (flow path 3) and second (flow path 4) solvent conduits, respectively.

144. Startz states, “Provision can furthermore be made for a control device 14, which controls/regulates the bypass flow pump 8 as a function of a flow volume, a beverage temperature at the dispensing location 6 or a water temperature in the water tank 5.” Ex. 1003, 3:53-56. As can be seen, the control device 14 regulates the bypass flow pump 8 as a function of variables that include dispensing temperature; this changes or maintains the temperature of the dispensed coffee during brewing.

145. To the extent that Startz does not disclose the claimed controller configuration, such a configuration would have been obvious to a POSA in view of one or more of the knowledge of a POSA, Lai, and/or Santi.

146. Lai teaches, “... the PCB 196 may control the temperature of the

heater 136 through the heater sensor 194.” Ex. 1007, ¶97. Lai states,

“Importantly, the water temperature is regulated throughout the brewing process for optimum brewing and taste. In connection with this, a water temperature sensor 198 detects a temperature of the water exiting the heater 136 and relays this temperature to the PCB 196 of the control panel 118. The heater power and pump rate may then be adjusted to keep the water temperature within the optimal range.” Ex. 1007, ¶98.

147. Santi describes a prior art system with, “...a control device capable of interrupting the flow of the pump and/or the heating of the heating device when the temperature exceeds a given threshold value.” Ex. 1005, ¶0012. Santi describes a second prior art system, “This machine also has a temperature sensor, connected to a control device, capable of detecting the temperature of the water supplied to the brewing chamber. By means of the control device, the temperature of the water is therefore regulated... to perform brewing.” Ex. 1005, ¶0014.

148. Santi, referring to his own FIG. 4, describes control during brewing, “The advantage of a further temperature sensor that detects the temperature of the input water lies in greater precision of the operating phase. In fact, in this way the variations in temperature of the input water can be kept under control, whatever the supply source... Therefore, by means of the control means 80, the number of calories to be produced and the energy required for this purpose are calculated. In

this case, the second temperature sensor 60 performs a control for the feedback which can subsequently trigger corrective actions...” Ex. 1005, ¶0092, claims 10-14.

149. Startz, Lai, and Santi each describe a controller configured to meet this limitation.

150. A POSA would have recognized that it would be obvious to configure the electronic controller to dynamically thermally modulate, through at least one thermal modulator, at least one of the solvents.

151. Accordingly, Startz in view of one or more of the knowledge of a POSA, AAPA, Lai, Santi, Porzio, and/or Majer renders claim 9 obvious.

5. Claim 10

- (a) **“The infused beverage brewing assembly according to claim 1, further comprising: a temperature measuring device communicatively coupled to the electronic controller and fluidly coupled to the resulting solvent conduit, the electronic controller operably configured to dynamically thermally modulate, through the at least one thermal modulator, the solvent disposed within the first solvent conduit.”**

152. Claim 10 is almost identical to the language of claim 9, except that claim 10 requires thermal modulation of the solvent in the first solvent conduit, while claim 9 allows the choice of which solvent to thermally modulate. The analysis of claim 9 shows that the solvent in the first conduit is dynamically

thermally modulated by at least Lai and Santi. Moreover, if the alternative reading of Startz, set forth in the analysis of claim elements 1(c) and 1(d) is applied, Startz also dynamically thermally modulates the solvent in the first conduit.

153. Accordingly, the above analysis regarding claim 9 applies equally to claim 10.

D. Claim 11 is Obvious

154. It is my opinion that claim 11 is obvious over Startz in view of one or more of the knowledge of a POSA, Upston, Lai, Santi, and/or Majer

1. Claim 11

- (a) **“The infused beverage brewing assembly according to claim 10, wherein: the electronic controller is operably configured to receive a desired temperature for the resulting temperature in the brewing chamber and a desired flow rate for the resulting solvent in the brewing chamber.”**

155. Startz discloses this limitation. Startz discloses that the electronic controller (14) is operably configured to receive a desired temperature for the resulting temperature in the brewing chamber (a beverage temperature at the dispensing location 6) and a desired flow rate (a defined rate of flow) for the resulting solvent in the brewing chamber (11, 6).

156. Startz teaches, “Provision can furthermore be made for a control

device 14, which controls/regulates the bypass flow pump 8 as a function of a flow volume, a beverage temperature at the dispensing location 6 or a water temperature in the water tank 5.” Ex. 1003, 3:53-56. Startz further states, “By means of the active reactions of the bypass flow pump 8, a defined rate of flow can furthermore be established quickly... the admixing quantity of the bypass flow pump 8 can be controlled accurately if the total rate of flow is known...” and “A defined rate of flow can furthermore be generated via the bypass flow path 4...” Ex. 1003, 3:61-65, 4:34-38. Startz discusses the controller controlling/regulating based on various variables. The values of such variables must have been received by the controller prior to being used. Startz does not disclose the dispensing location 6 being separated from the brewing chamber, meaning that the dispensing location temperature can be the same as the brewing chamber temperature. And Startz refers to a “defined rate of flow” that can be implemented in the bypass flow path by controlling the bypass flow pump with the control device. The “defined rate of flow” must be received by the controller before the controller can use that value to control the bypass flow pump.

157. To the extent that Startz does not disclose the claimed controller configuration, such a configuration would have been obvious to a POSA in view of one or more of the knowledge of a POSA, Upston, Lai, Santi, and/or Majer.

158. Upston teaches, “In an embodiment, the apparatus 200 includes a

processor 202 for receiving inputs from user interface 204 and water level probes, thermistors, and thermal fuse/thermostats. The processor is also used to control/activate heating elements and pumps.” Ex. 1009, ¶0124. Upston describes using a calculated flow rate to stop the pump: “By calculating resultant flow over a time period of coffee production, a dose measure can be determined. It will be appreciated that this calculation can be performed in real time, and used to stop the pump when a suitable dose has been delivered through the showerhead.” Ex. 1009, ¶0124. Upston further states, “It will be appreciated that it is beneficial for an espresso machine (commercial or consumer/domestic) to: maintain accurate brew temperature consistently over multiple coffee extractions and intra extraction (such as, during a pour)...” Ex. 1009, ¶¶0150-0151. Upston describes controlled heating, “B. pre-heated water from heat exchanger (below optimum brew temperature) is then heated in a brew boiler 260 to an optimum brew temperature (for example to about 92 deg Celsius); and C. water from brew boiler passes through heated group head 700 (to maintain optimum brew temperature) and is infused into coffee grinds... The brew boiler and group head are typically temperature controlled using proportional integral—derivative (PID) control module.” Ex. 1009, ¶¶0160-6351. Upston’s controller uses both (1) a flow rate to control a pump and (2) an optimum brew temperature in the brewing chamber (i.e., group head) to control heaters. Both (1) and (2) must necessarily have been

received by the controller before being used.

159. Santi describes a prior art item, “This machine also has a temperature sensor, connected to a control device, capable of detecting the temperature of the water supplied to the brewing chamber. By means of the control device, the temperature of the water is therefore regulated so that, to perform pre-brewing, this has a preset value comprised between 50 and 75° C. and a value greater than 85°C., to perform brewing. This solution is capable of setting the temperature according to a predetermined interval.” Ex. 1005, ¶¶0014-0015. Santi further teaches that the controller receives a desired temperature, “The control means 80 receive from the temperature sensor 50 the temperature data relating to the water which will be used in the dispensing means 100. These are then compared with the values associated with the beverage to be produced. By means of a first actuator 10 the control means 80 control the supply of the heating means 40 of the thermoblock or boiler. In particular, the heating element, such as a resistor or the like, of the heating means 40 can be controlled according to different methods. In the embodiment described this is frequency controlled to obtain greater precision over control of the temperature to be reached. Alternatively, it can be controlled all the time at full power (in on/off mode) or current controlled. Control of the heating means 40 allows the desired temperature T_{pi} , T_{es} , T_{er} to be reached, according to the subphase to be performed,...” Ex. 1005, ¶0073. Santi further teaches the

control and variance of flow rates by the controller based on the beverage being produced: “The control means 80 are, moreover, operatively connected to the heating means 40 and to the pumping means 200 for continuous and combined control of the temperature and of the pressure during the operating phase of the dispensing means 100. In particular, the control means 80 comprise a first actuator 10 for controlling the heating means 40 and a second actuator 11 for controlling the pumping means 200. The pumping means 200 are preferably constituted by a vibratory pump with frequency control. By way of example, frequency control allows a reduction in feed and flow rate, reducing the frequency, for the first subphase, increasing the flow rate in the second subphase and, finally, reducing the frequency, and therefore the flow rate, again in the last subphase... In any case, the flow rate of the pump is varied, according to the present invention, as a function of the phases of the operating cycle and according to the type of beverage to be produced.” Ex. 1005, ¶¶0063-0064. Santi explicitly discloses that the controller receives a desired brewing temperature. A POSA would have understood that Santi’s controller must have received desired flow rates to control the flow rates for various phases.

160. Lai teaches, “Normal brewing is then commenced wherein water is continuously pumped through the heater 136 and into the filter cup 10. Importantly, the water temperature is regulated throughout the brewing process for

optimum brewing and taste. In connection with this, a water temperature sensor 198 detects a temperature of the water exiting the heater 136 and relays this temperature to the PCB 196 of the control panel 118. The heater power and pump rate may then be adjusted to keep the water temperature within the optimal range. The flow meter 140 also keeps track of the flow rate and relays this information to the PCB 196.” Ex. 1007, ¶0098. A POSA would have understood that Lai’s controller must have received the optimal temperature range and a flow rate to compare to the tracked flow rate.

161. Majer, referring to controller 9, states, “Alternatively, the flow rates are pre-set in the machine instructions.” Ex. 1008, p. 12:27-29. Majer states, “...the drink’s liquid content is usually pre-determined by appropriate programming means...” Ex. 1008, p. 14:18-19. A POSA would have understood that Majer’s controller received flow rates.

162. A POSA would have recognized that it would be obvious to configure the controller to receive a desired temperature for the resulting temperature in the brewing chamber and a desired flow rate for the resulting solvent in the brewing chamber.

163. Accordingly, Startz in view of one or more of the knowledge of a POSA, Upston, Lai, Santi, and/or Majer renders claim 11 obvious.

E. Claim 12 is Obvious

164. It is my opinion that claim 12 is obvious over Startz in view of one or more of the knowledge of a POSA, AAPA, Upston, Lai, Santi, Porzio, and/or Majer.

1. Claim 12

- (a) **“The infused beverage brewing assembly according to claim 11, wherein: the electronic controller operably [sic] configured to dynamically thermally modulate, through the at least one thermal modulator, the solvent disposed within the first solvent conduit until the resulting temperature in the brewing chamber reaches the desired temperature for the resulting temperature in the brewing chamber.”**

165. The language of claim 12 is almost identical to the language of claims 9 and 10, except that claim 12 requires thermal modulation “until the resulting temperature in the brewing chamber reaches the desired temperature for the resulting temperature in the brewing chamber”, while claims 9 and 10 do not require this. The analysis of claims 9 and 10 shows that the solvent in the first conduit is dynamically thermally modulated by at least Lai, Santi, and the alternative reading of Startz.

166. Accordingly, the above analysis regarding claims 9 and 10 applies equally to claim 12, with the additional analysis stated below.

167. Startz teaches, “Provision can furthermore be made for a control

device 14, which controls/regulates the bypass flow pump 8 as a function of a flow volume, a beverage temperature at the dispensing location 6 or a water temperature in the water tank 5.” Ex. 1003, 3:53-56. Startz does not disclose the dispensing location 6 being separated from the brewing chamber, meaning that the dispensing location temperature can be the same as the brewing chamber temperature. Thus, a POSA would have understood that controlling/regulating the temperature based on the dispensing location temperature would render claim 12 obvious.

168. To the extent that Startz does not disclose the claimed controller configuration, such a configuration would have been obvious to a POSA in view of one or more of Upston, Lai, and/or Santi.

169. Upston teaches, “The processor is also used to control/activate heating elements and pumps.” Ex. 1009, ¶0124. Upston further states, “It will be appreciated that it is beneficial for an espresso machine (commercial or consumer/domestic) to: maintain accurate brew temperature consistently over multiple coffee extractions and intra extraction (such as, during a pour)...” Ex. 1009, ¶¶0150-0151. Upston describes controlled heating, “B. pre-heated water from heat exchanger (below optimum brew temperature) is then heated in a brew boiler 260 to an optimum brew temperature (for example to about 92 deg Celsius); and C. water from brew boiler passes through heated group head 700 (to maintain optimum brew temperature) and is infused into coffee grinds... The brew boiler

and group head are typically temperature controlled using proportional integral—derivative (PID) control module.” Ex. 1009, ¶¶0160-6351. Upston’s controller thermally modulates the water until it reaches the desired temperature in the brewing chamber (i.e., group head).

170. Santi describes a prior art item, “This machine also has a temperature sensor, connected to a control device, capable of detecting the temperature of the water supplied to the brewing chamber. By means of the control device, the temperature of the water is therefore regulated so that, to perform pre-brewing, this has a preset value comprised between 50 and 75° C. and a value greater than 85°C., to perform brewing. This solution is capable of setting the temperature according to a predetermined interval.” Ex. 1005, ¶¶0014-0015. Santi further teaches that the controller receives a desired temperature, “The control means 80 receive from the temperature sensor 50 the temperature data relating to the water which will be used in the dispensing means 100. These are then compared with the values associated with the beverage to be produced... Control of the heating means 40 allows the desired temperature T_{pi} , T_{es} , T_{er} to be reached, according to the subphase to be performed,...” Ex. 1005, ¶0073. Santi explicitly discloses “the desired temperature [is] reached.”

171. Lai teaches, “Importantly, the water temperature is regulated throughout the brewing process for optimum brewing and taste. In connection with

this, a water temperature sensor 198 detects a temperature of the water exiting the heater 136 and relays this temperature to the PCB 196 of the control panel 118.

The heater power and pump rate may then be adjusted to keep the water temperature within the optimal range.” Ex. 1007, ¶0098. Lai explicitly discloses that the optimal temperature range is maintained.

172. A POSA would have recognized that it would be obvious to dynamically, thermally modulate the water until the resulting temperature reaches the desired temperature for the brewing chamber.

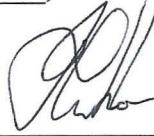
173. Accordingly, Startz in view of one or more of the knowledge of a POSA, AAPA, Lai, Santi, Upston, Porzio, and/or Majer renders claim 12 obvious.

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 September 24th, 2024, in
WAKEFIELD, Massachusetts,

By: _____



Ian Tinkler, IEng MIED

REFERENCES

Exhibit	Description
1001	U.S. Patent No. 11,576,524
1003	U.S. Patent No. 8,973,487 B2 (collectively with Ex. 1004, “Startz”)
1004	U.S. Patent Application Publication No. 2012/0291634A1 (collectively with Ex. 1003, “Startz”)
1005	U.S. Patent Application Publication No. 2014/0053734A1 (“Santi”)
1006	International Publication No. WO2012/146660A1
1007	U.S. Patent Application Publication No. 2012/0171332A1 (“Lai”)
1008	International Publication No. WO2011/151703A2 (“Majer”)
1009	U.S. Patent Application Publication No. 2014/0069279A1 (“Upston”)
1010	International Publication No. WO2012/151629A1
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. 17/020,799
1014	U.S. Patent No. 10,772,456
1015	Patent Owner Infringement Contention Pleading
1016	Patent Owner Claim Chart for 524 Patent
1017	Communicate Definition & Meaning - Merriam-Webster

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