

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-_____

**DECLARATION OF IAN TINKLER, IENG MIED
IN SUPPORT OF PETITION FOR *INTER PARTES* REVIEW OF
U.S. PATENT 10,772,456**

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Declaration of Ian Tinkler Regarding U.S. Pat. No. 10,772,456

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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. 10,772,456 (the 456 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 456 patent and the prior art, at the time of the earliest priority date claimed in the 456 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 456 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 456 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 or the August 16, 2013, timeframe, which I have been informed is the earliest possible priority date of the 456 Patent.

III. Overview of U.S. Patent No. 10,772,456

A. Patent Disclosure

30. U.S. Patent No. 10,772,456 (the 456 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 456 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 456 Patent is to describe devices that may be used for making coffee.

31. With respect to the claims of the 456 Patent, the specification describes a system in which solvent (301) is pumped through two conduits by two pumps (311, 312) through a heat exchanger (323). The conduits are joined at a conduit joint to form a resulting conduit for mixing the solvents. The mixed solvents (301a) are pumped into a brewing chamber (330) where they encounter a solute (e.g., ground coffee) to create a solution (e.g., espresso coffee) that is discharged into a receptacle (350). A valve (328) has three states, in which it can (1) remain closed, (2) direct solvent flow to the brewing chamber (330), or (3) direct solvent flow to a drain (not shown). A recirculation conduit (326) having a third pump (recirculation pump (327)) is also provided to recirculate solvent back to the heat exchanger. The system is illustrated in FIG. 3, below:

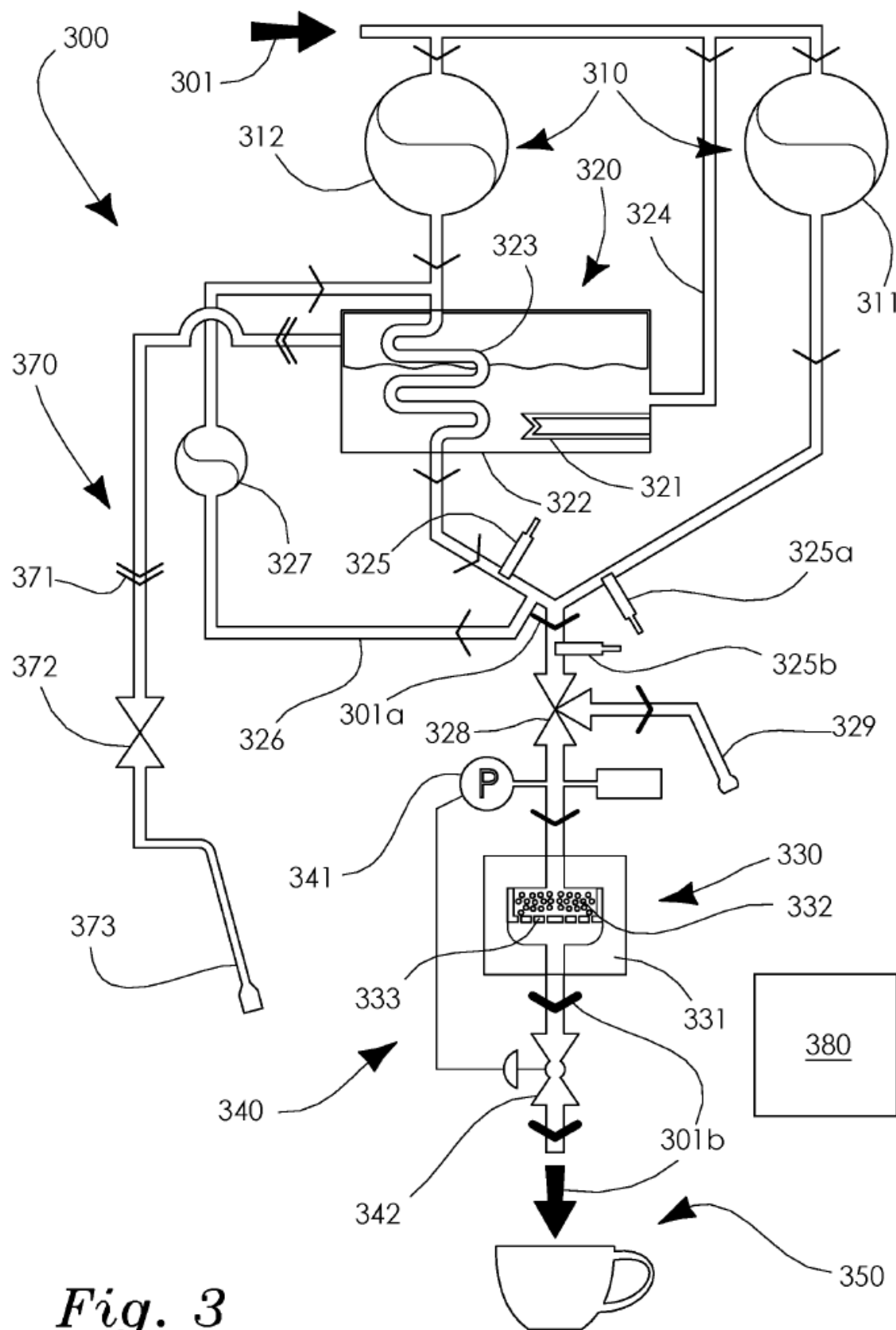


Fig. 3

32. The 456 Patent refers to using an electronic controller (380) 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 456 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 456 Patent are most closely related to the first goal, i.e., precise, accurate and dynamic temperature control.

B. The Claims of the 456 Patent

35. The following claims of the 456 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 at least one solvent pump operably configured to receive a solvent and induce a flow of the solvent through a first solvent conduit and a second solvent conduit; a solvent temperature modulation system in fluid communication with the solvent flow management system and operably configured to thermally modulate the solvent disposed within the first solvent conduit to a raised temperature higher and different than a temperature of the solvent disposed within the second solvent conduit, the first and second solvent conduits directly coupled together to form a conduit joint downstream of the solvent temperature modulation system to form a resulting solvent conduit with a resulting solvent disposed therein at a resulting temperature; 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 a resulting solvent valve disposed upstream of the brewing chamber, downstream of the conduit joint, and in fluid communication with the solvent conduit, the valve operably configured to selectively have a closed state inhibiting flow of the resulting solvent to the brewing chamber and an active state that includes a first selective directional flow path directing the flow of the resulting solvent to a removal conduit without passing the resulting solvent through the brewing chamber and a second selective directional flow path directing the flow of the resulting solvent to the brewing chamber, thereby enabling resulting solvent delivered to the brewing chamber at a desired temperature.

Claim 2

2. The infused beverage brewing assembly according to claim 1, wherein the solvent flow management system further comprises: a first solvent pump fluidly coupled to the first solvent conduit and operably configured to receive the solvent and induce the flow of the solvent therethrough; and a second solvent pump fluidly coupled to the second solvent conduit and operably configured to receive the solvent and induce the flow of the solvent therethrough.

Claim 3

3. The infused beverage brewing assembly according to claim 1, further comprising: a temperature measuring device coupled to and in fluid communication with the resulting solvent conduit and operably configured to measure the resulting solvent temperature and communicate the resulting solvent temperature to an electronic controller.

Claim 4

4. The infused beverage brewing assembly according to claim 3, wherein: the electronic controller communicatively is coupled to the solvent temperature modulation system, the valve, the temperature measuring device, the electronic controller operably configured to at least one of dynamically modulate the solvent temperature modulation system and selectively maintain the valve in the first selective directional flow path of the active state until the desired temperature of the resulting solvent is ascertained by the temperature measuring device, the electronic controller selectively switching from the first selective directional flow path of the active state to the second selective directional flow path of the active state.

Claim 5

5. The infused beverage brewing assembly according to claim 4, wherein: the resulting solvent valve is disposed downstream of the conduit joint, the first solvent conduit having a temperature measuring device coupled thereto, in fluid communication therewith downstream of the solvent temperature management system, and communicatively coupled to the electronic controller, the electronic controller operably configured to send a control signal to the solvent temperature management system to dynamically and thermally modulate the solvent disposed within the first solvent conduit to the raised temperature when receiving a temperature from the temperature measuring device coupled to the first solvent conduit.

Claim 6

6. The infused beverage brewing assembly according to claim 4, wherein: the desired temperature is greater than the resulting solvent temperature.

Claim 7

7. The infused beverage brewing assembly according to claim 6, wherein: the solvent temperature modulation system is a heating exchanging container having a heating element and solvent disposed therein.

Claim 8

8. The infused beverage brewing assembly according to claim 7, wherein: the removal conduit spans from the resulting solvent valve to the heating exchanging container to form a recirculation conduit, the recirculation conduit having a recirculation pump fluidly coupled thereto and operably configured to induce a flow of the resulting solvent to the heating exchanging container.

Claim 9

9. The infused beverage brewing assembly according to claim 1, further comprising: an electronic controller operably configured to send a control signal to the solvent temperature management system to dynamically and thermally modulate the solvent disposed within the first solvent conduit with respect to a brew parameter that includes at least one of an overall time and dispensed volume of the infused beverage.

Claim 10 is not being challenged.

Claim 11

11. An infused beverage brewing assembly comprising: a solvent flow management system with at least one solvent pump operably configured to receive a solvent and induce a flow of the solvent through at least one solvent conduit having a first solvent conduit and a second solvent conduit; a solvent temperature modulation system in fluid communication with the solvent flow management system and operably configured to thermally modulate the solvent disposed within the at least one solvent conduit to a raised temperature; a brewing chamber in fluid communication with the at least one solvent conduit and for housing a solute disposed to receive the solvent to produce an infused beverage; an outlet for discharging the infused beverage; and an electronic controller communicatively coupled to the solvent temperature modulation system and operably configured to send a control signal to the solvent temperature management system to dynamically and thermally modulate the solvent disposed within the first solvent conduit to a raised temperature when receiving a temperature from a temperature measuring device fluidly coupled to at least one of the first solvent conduit downstream of the solvent temperature modulation system and a resulting solvent conduit and a conduit joint formed by the first and second solvent conduits directly coupling together, the resulting solvent conduit with a resulting solvent disposed therein at a resulting temperature and the temperature measuring device fluidly coupled upstream of the brewing chamber.

Claim 12

12. The infused beverage brewing assembly according to claim 11, wherein the electronic controller is operably configured to send a control signal to the solvent flow management system to thermally modulate the solvent disposed within the first solvent conduit to a raised temperature higher and different than a temperature of the solvent disposed within the second solvent conduit.

Claim 13

13. The infused beverage brewing assembly according to claim 12, wherein the electronic controller is operably configured to send a control signal to the solvent temperature management system to dynamically and thermally modulate the solvent disposed within the first solvent conduit with respect to a brew parameter that includes at least one of an overall time and dispensed volume of the infused beverage.

Claim 14

14. The infused beverage brewing assembly according to claim 12, further comprising: a resulting solvent valve disposed upstream of the brewing chamber, downstream of the conduit joint, and in fluid communication with the resulting solvent conduit, the valve operably configured to selectively have a closed state inhibiting flow of the resulting solvent to the brewing chamber and an active state that includes a first selective directional flow path directing the flow of the resulting solvent to a removal conduit without passing the resulting solvent through the brewing chamber and a second selective directional flow path directing the flow of the resulting solvent to the brewing chamber, thereby enabling resulting solvent delivered to the brewing chamber at a desired temperature.

Claim 15

15. The infused beverage brewing assembly according to claim 14, wherein: the temperature measuring device is coupled to and in fluid communication with the resulting solvent conduit and operably configured to measure the resulting solvent temperature and communicate the resulting solvent temperature to the electronic controller.

Claim 16

16. The infused beverage brewing assembly according to claim 15, wherein: the electronic controller communicatively is coupled to the solvent temperature modulation system, the valve, the temperature measuring device, the electronic controller operably configured to at least one of dynamically modulate the solvent temperature modulation system and selectively maintain the valve in the first selective directional flow path of the active state until the desired temperature of the resulting solvent is ascertained by the temperature measuring device, the electronic controller selectively switching from the first selective directional flow path of the active state to the second selective directional flow path of the active state.

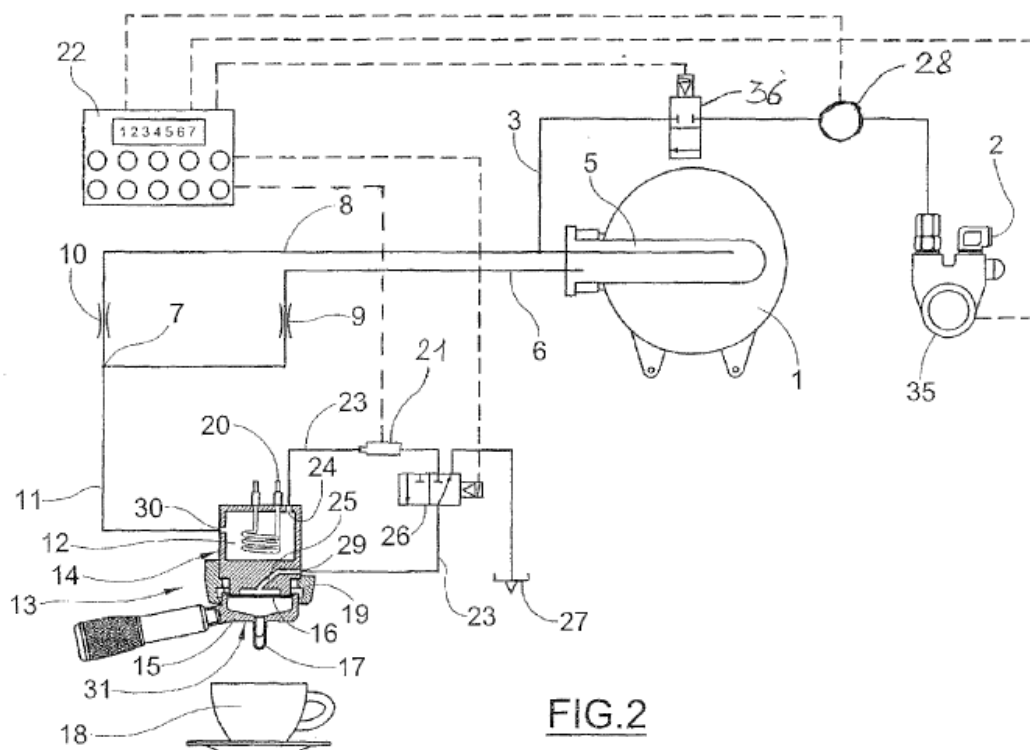
IV. Overview of the Prior Art

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

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

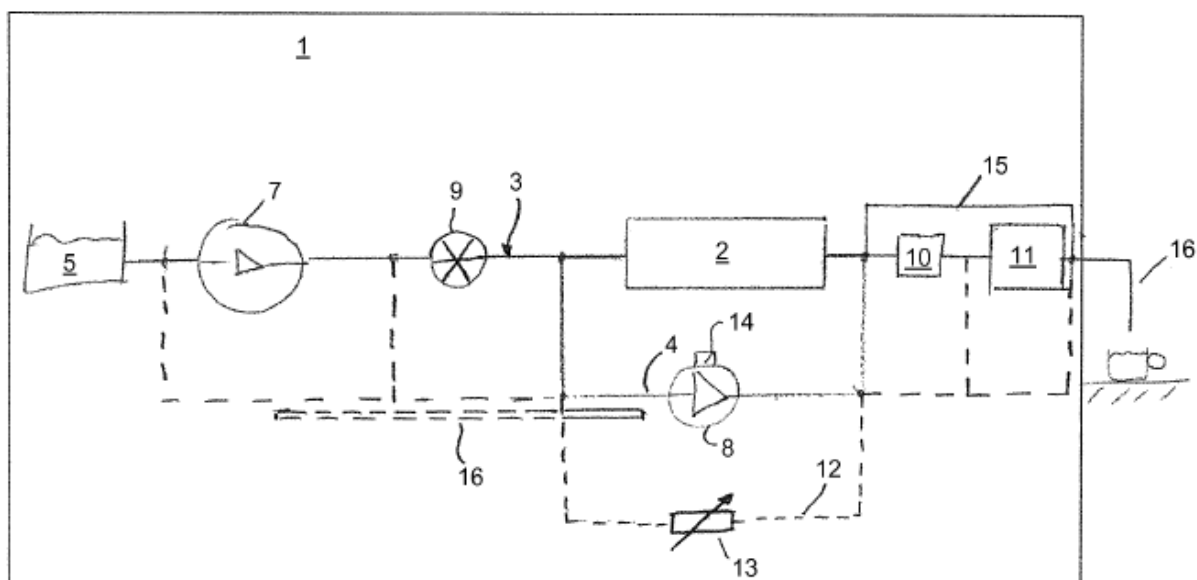
brewing chamber (31, 15, 16) to create an infused beverage (e.g., coffee) that is discharged at an outlet (17). Coccia's machine includes a valve (26, 36) that can be positioned downstream of junction (7), upstream of brewing chamber (31, 15, 16), and can have three operational states: i) closed; ii) open to brewing chamber; iii) open to discharge (27). The system is illustrated in FIG. 2:



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

B. Startz - U.S. Patent No. 8,973,487 B2 (Ex. 1008) (and U.S. Patent Application Publication No. 2012/0291634A1 (Ex. 1009))

39. 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:



40. Startz refers to using a control device (14) to modify one or more of flow rate, temperature, and pressure, by receiving data from a flow meter (9) and/or temperature sensors (not shown), then using that data to control/modulate one or more of the pumps and/or thermal modulators to affect temperature or flow.

C. Santi - U.S. Patent Application Publication No. 2014/0053734 (Ex. 1010)

41. 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). Santi provides a valve (7) that allows cold water remaining in the ducts to be discharged. One embodiment of the system is illustrated in FIG. 6:

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). Lai provides a valve (151) that can be used to control the flow path by diverting solvent to the drain (120). The system is illustrated in FIG. 60:

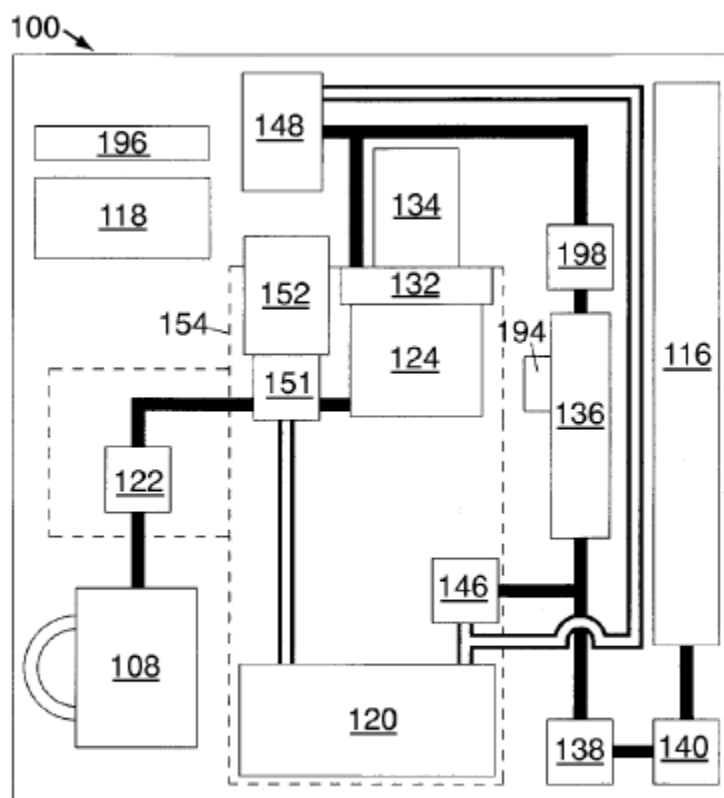


FIG. 60

44. 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.

E. Majer - International Publication No. WO2011/151703A2 (Ex. 1013)

45. 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:

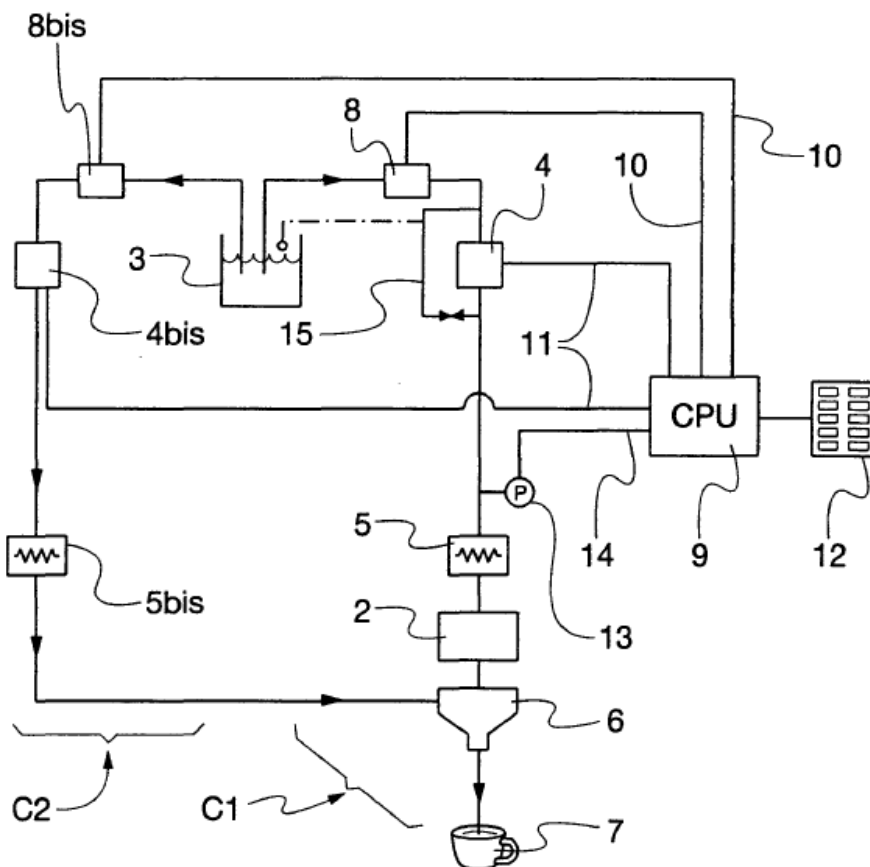
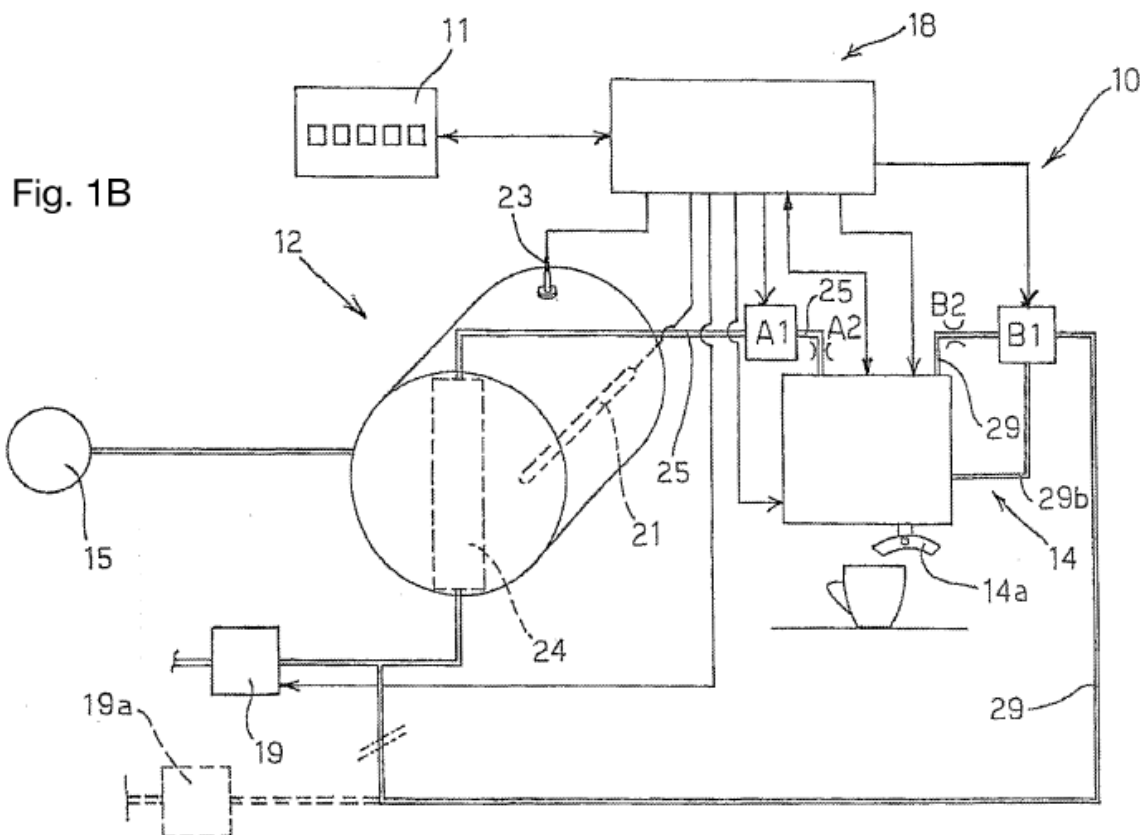


Fig. 1

46. 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.

F. Porzio - International Publication No. WO2011/158131 (Ex. 1014)

47. Porzio describes a system in which two solvents (water, aromatic liquid) are pumped through two conduits (25, 29) by two pumps (19, 19a) through at least one thermal modulator (heat exchanger 24). The conduits are joined at brew group 14 for mixing the solvents. The mixed solvents are pumped into a brewing chamber (brew group 14) where they encounter a solute (e.g., ground coffee) to create a solution (e.g., espresso coffee) that is discharged into a receptacle (via spout 14a). Porzio provides valves (A1, B1) to control flow and temperature of the water. The system is illustrated in FIG. 1B:



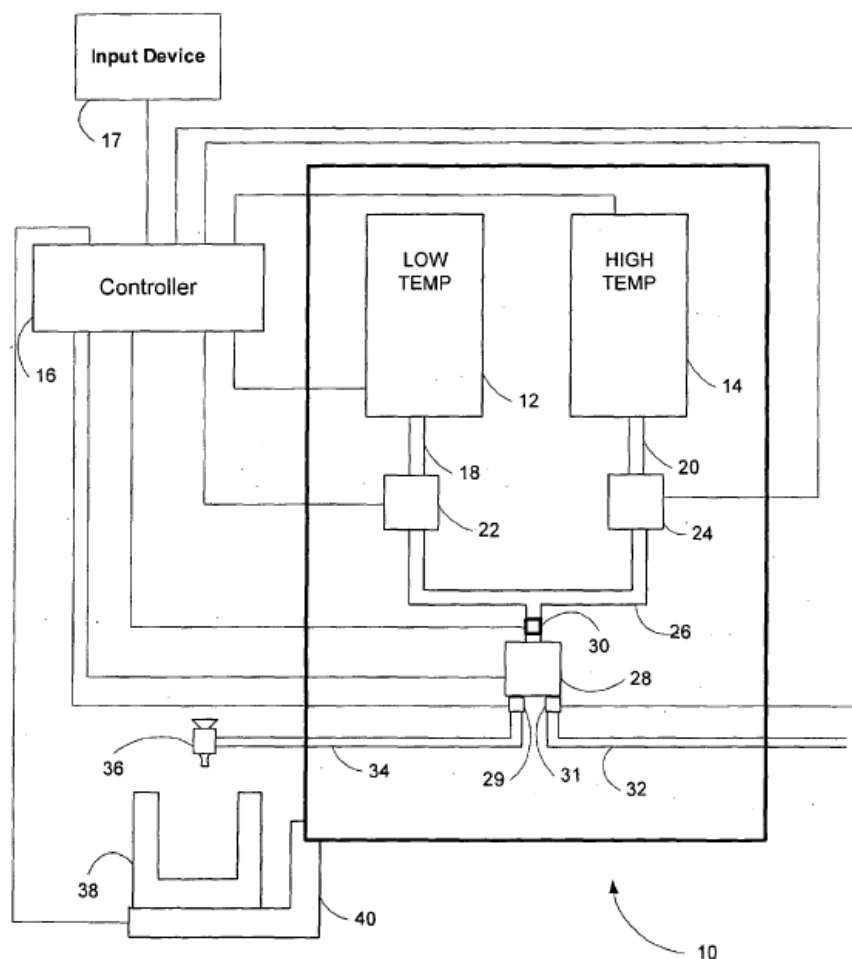
48. Porzio refers to using an electronic controller (control unit 18) to modify one or more of flow rate, temperature, and pressure, by receiving data from temperature measuring devices (23), then using that data to control/modulate one or more of the pumps and/or thermal modulators to affect temperature,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

G. Anson - U.S. Patent Application Publication No. 2006/0042470A1 (Ex. 1018)

49. Anson describes hot water dispensing apparatus for use “in connection with a variety of beverage making machines used to brew a variety of beverages” including “brewing of coffee.” Low temperature water (12) and high

temperature water (14) are fed through two conduits (18, 20) that form a conduit joint for mixing. Anson provides valves (22, 24, 28) to control the temperature of the water. The system is illustrated in FIG. 1:

FIG. 1



50. A controller (16) receives data from temperature sensor (30) regarding the mixed water temperature and uses such data to control the operation of valves (22, 24, 28) to achieve the desired temperature. The controller directs mixing valve (28) to either send water to a brewing chamber (not shown, along conduit 34)

or direct water to a drain conduit (32).

H. Buttiker - European Patent Publication EP 2 612 577 A1 (Ex. 1003, Ex. 1004 (translation))

51. Buttiker describes a coffee brewing system in which two pumps (31, 32) pump solvent (water from liquid container 10) along two conduits (31a, 31b, 32a, 32b) through two heaters (41, 42) and on to a brewing chamber (60). The two conduits form a conduit joint (53) and the solvent travels through a resulting conduit (54) before

being dispensed (outlet unit 70). Buttiker provides valves (50, 55) that have states including closed, active - directed toward dispensing (outlet unit 70), and active - directed toward a discharge (72). The system is illustrated in FIG. 1:

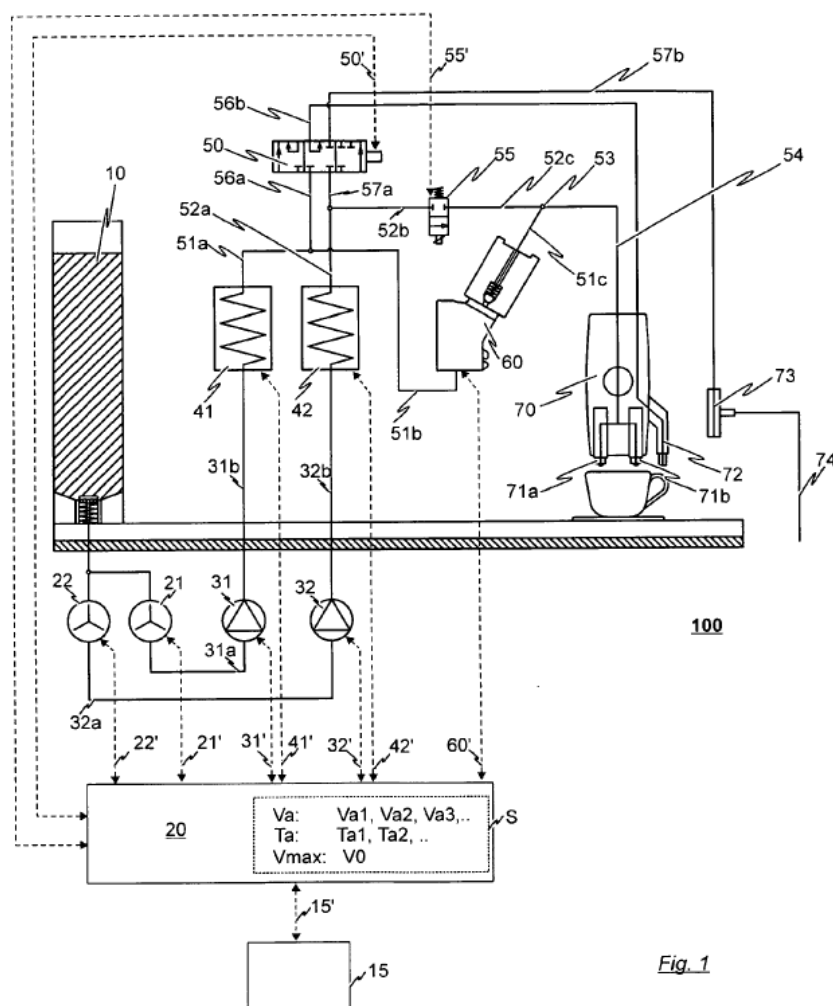


Fig. 1

52. Buttiker describes a controller (20) that controls pumps (31, 32), heaters (41, 42), and valves (50, 55) based on data received from flow meters (21, 22) and temperature sensors (not shown, via 41', 42') to achieve optimal temperatures.

I. Aigner - European Patent Publication 1 986 530 B1 (Ex. 1019, Ex. 1020 (translation))

53. Aigner discloses a coffee machine (10) with a first solvent pump (20) inducing the flow of solvent (water) through a first conduit (water pipe 18) and heater 14 past a temperature sensor 32, and to a valve 36. Ex. 1020 ¶¶0017, 0023. Controller 34 receives a signal from temperature sensor 32 and controls valve 36 to direct water to recirculate via recirculation conduit (return pipe 24) to pump 20 and heater 14 until a predetermined temperature has been reached, at which time

controller 34 controls valve 36 to direct water to brewing chamber 16. Ex. 1020 ¶¶0023-0025. This machine is shown in

FIG. 2:

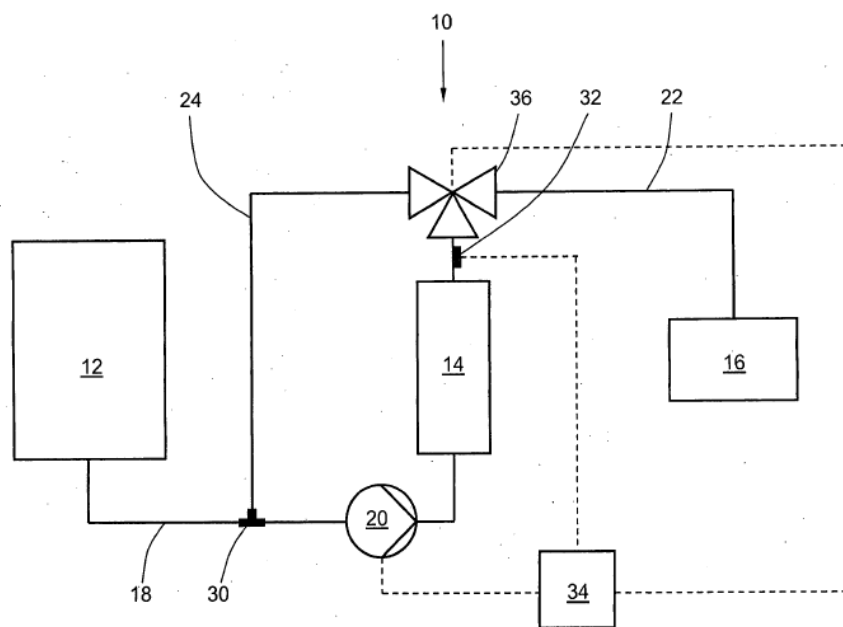


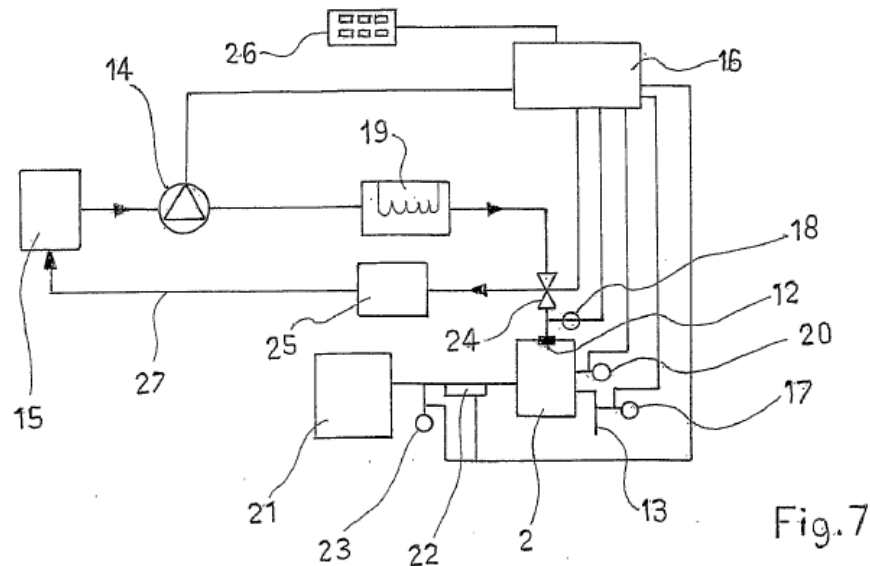
Fig. 2

Ex1019-9.

54. Aigner states, “Depending on the switching position of the 2-way valve 36, the water can now flow either into the water pipe 22 or into the return pipe 24.” Ex. 1020 ¶¶0024.

J. Majer II - U.S. Patent Application Publication No. 2008/0050480 (Ex. 1022)

55. Majer II discloses a coffee machine with a first solvent pump (14) inducing the flow of solvent (water) through a first conduit and heating device 19 to a valve 24. Ex. 1022 ¶¶0052-0054, 0078. Controller 16 receives a signal from sensor 18 and controls valve 24 to direct water to recirculate via recirculation conduit (27) to reservoir 15, pump 20, and heater 14 until controller 16 controls valve 24 to direct water to brewing chamber 2. Ex. 1022 ¶¶0052-0054, 0078. This machine is shown in FIG. 7:

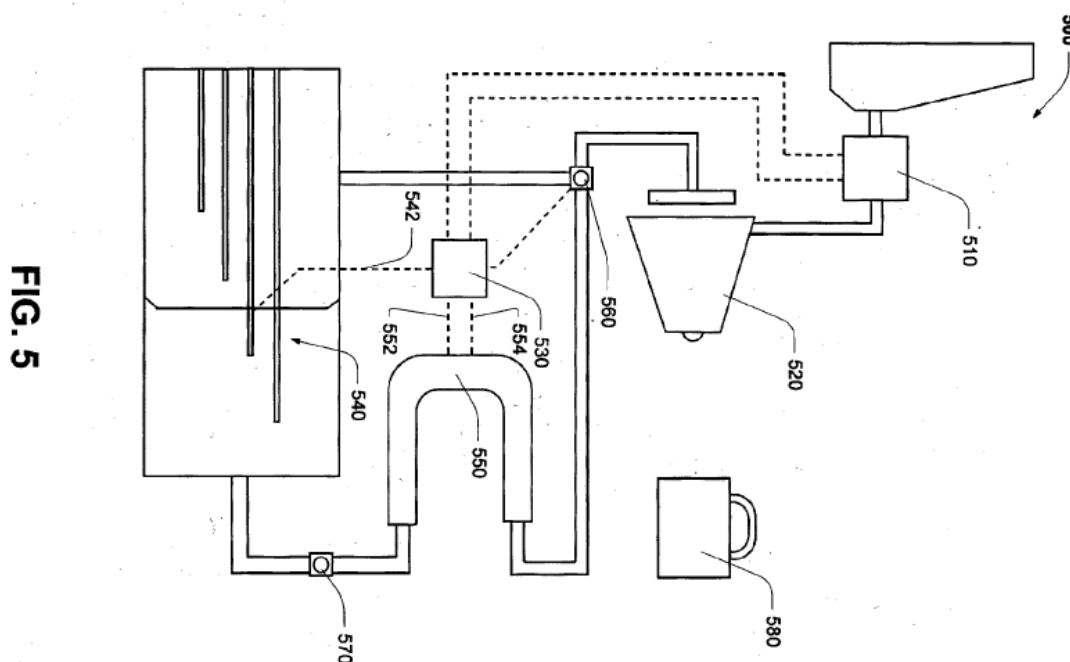


Ex1022-4.

56. Majer II states, “valve 24 is operated to send a portion of the flow of water to a circuit...connected to reservoir 15, or to the pump or to a discharge means.” Ex. 1022 ¶0078.

K. White - International Publication WO/2013/003891A1 (Ex. 1023)

57. White discloses a beverage brewing machine (500) with a first solvent pump (not shown) inducing the flow of solvent (fluid in reservoir) through a first conduit and heater 550 to a recycle valve 560. Ex. 1023-9:23-27, 14:12-15:3. Controller 530 receives a signal from temperature sensor (not shown) and controls recycle valve 560 to direct solvent to recirculate to reservoir, pump, and heater 560 until a condition is met, at which time controller 530 controls valve 560 to direct water to brewing chamber 520. Ex. 1023-9:23-27, 14:12-15:3. This machine is shown in FIG. 5:



Ex. 1023.

58. White states, “These embodiments include...a recycle valve 560 controlled by the processor element to inhibit or allow a determined fluid temperature within the riser to pass towards the brew chamber or reservoir...” Ex. 1023-12:27-30.

V. Analysis of the Claims of U.S. Patent No. 10,772,456

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

59. As noted above, the 456 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.”

60. 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.

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

62. 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.

63. Coccia discloses much or all of the subject matter claimed by multiple claims of the 456 patent. However, Coccia does not disclose a second pump or mandate specific placement of the valve(s). A POSA attempting to solve the problem of precision, accuracy, and dynamic temperature control with Coccia's system would seek control systems, sensors, and components (such as pumps, heaters, and valves) that enhanced the precision, accuracy, and dynamic temperature control of Coccia's system.

64. 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.

65. Thus, a POSA would have had motivation to combine Coccia's disclosure with one or more of the POSA's knowledge, Buttiker, Startz, Lai, Santi, Porzio, Majer, Aigner, Majer II, White, and/or Anson.

B. Claims 1-9 and 11-16 are Obvious

66. It is my opinion that claim 1 is obvious over Coccia in view of one or more of the knowledge of a POSA and/or Anson.

67. It is my opinion that claim 2 is obvious over Coccia in view of one or more of the knowledge of a POSA, Startz, Majer, Porzio, Buttiker, and/or Anson.

68. It is my opinion that claims 3-6, 9, and 11-16 are obvious over Coccia in view of one or more of the knowledge of a POSA, Lai, Santi, and/or Anson.

69. It is my opinion that claim 7 is obvious over Coccia in view of one or more of the knowledge of a POSA, Lai, Santi, Porzio, and/or Anson.

70. It is my opinion that claim 8 is obvious over Coccia in view of one or more of the knowledge of a POSA, Lai, Santi, Porzio, Aigner, Majer II, White, and/or Anson.

1. Claim 1

(a) “1. An infused beverage brewing assembly comprising: ”

71. Coccia discloses an infused beverage brewing assembly. Ex. 1006, Abstract, ¶0029.

72. Coccia states, “The present invention relates to a coffee machine for producing and dispensing coffee-based beverages.” Ex. 1006, Abstract. Coccia confirms, “In the present description and the accompanying claims, ‘infusion’ indicates the step of wetting of the coffee powder contained in the filter...” Ex.

1006, ¶0029.

- (b) **“a solvent flow management system with at least one solvent pump operably configured to receive a solvent and induce a flow of the solvent through a first solvent conduit and a second solvent conduit;”**

73. Coccia discloses a solvent flow management system with at least one solvent pump (hydraulic pump 4 or 35) operably configured to receive a solvent (water) and induce a flow of the solvent through a first solvent conduit (duct 6) and a second solvent conduit (duct 8).

74. Coccia states, “The water source 2, by means of a duct 3 and a hydraulic pump 4, supplies a heat exchanger 5, also conventional, disposed within the boiler 1. The hydraulic pump 4 is a motor pump actuated by an electronic drive. The output of the heat exchanger 5 supplies heated water via a duct 6 to a mixing point 7 which is also reached by a duct 8 connected to the duct 3 supplying cold water.” Ex. 1006, ¶¶0037-0038. Coccia describes, “The embodiment of FIG. 2 differs from the embodiment of FIG. 1 chiefly in that it comprises a hydraulic pump 35 which is not necessarily of variable speed.” Ex. 1006, ¶0069.

- (c) **“a solvent temperature modulation system in fluid communication with the solvent flow management system and operably configured to thermally modulate the solvent disposed within the first solvent conduit to a raised temperature higher and different than a temperature of the solvent disposed within the second solvent conduit,”**

75. Coccia discloses a solvent temperature modulation system (heat

exchanger 5 in boiler 1) in fluid communication (via duct 3) with the solvent flow management system (4 or 35) and operably configured to thermally modulate (heat) the solvent (water) disposed within the first solvent conduit (6) to a raised temperature higher and different than a temperature of the solvent (cold water) disposed within the second solvent conduit (8).

76. Coccia states, “The water source 2, by means of a duct 3 and a hydraulic pump 4, supplies a heat exchanger 5, also conventional, disposed within the boiler 1... The output of the heat exchanger 5 supplies heated water via a duct 6 to a mixing point 7 which is also reached by a duct 8 connected to the duct 3 supplying cold water.” Ex. 1006, ¶¶0037-0038.

77. Additionally, the solvent temperature management system may include electrical resistance 20 / heating resistance 20 in heating chamber 12. Ex. 1006, ¶¶0044, 0051-0053.

(d) “the first and second solvent conduits directly coupled together to form a conduit joint downstream of the solvent temperature modulation system to form a resulting solvent conduit with a resulting solvent disposed therein at a resulting temperature;”

78. As displayed in Fig. 2 (below), Coccia discloses the first (6) and second (8) solvent conduits directly coupled together to form a conduit joint (mixing point 7) downstream of the solvent temperature modulation system (5, 1)

to form a resulting solvent conduit (supply duct 11) with a resulting solvent (mixed water) disposed therein at a resulting temperature (supply temperature T1).

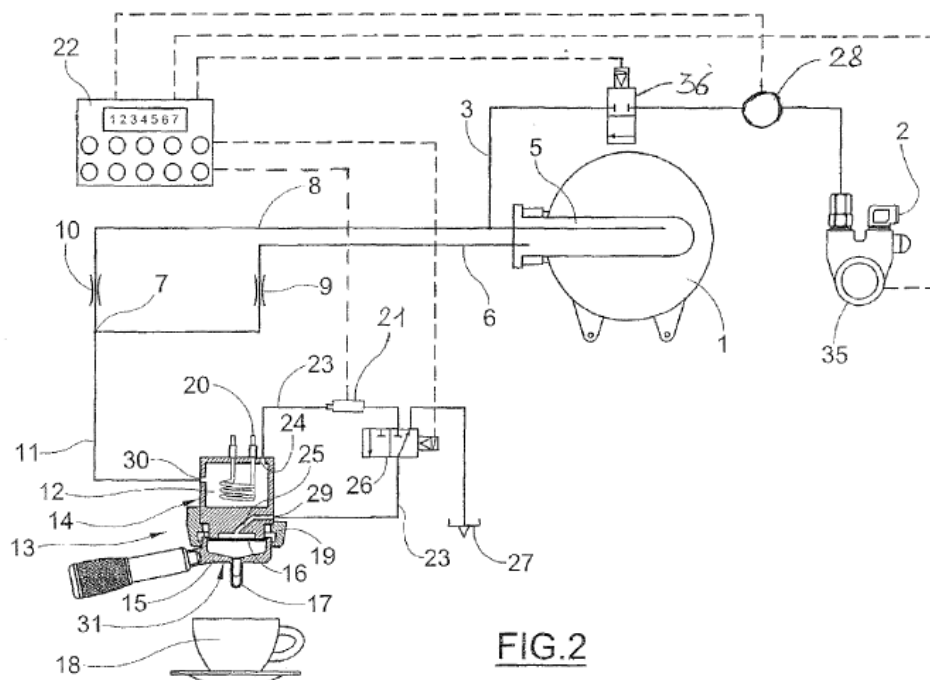
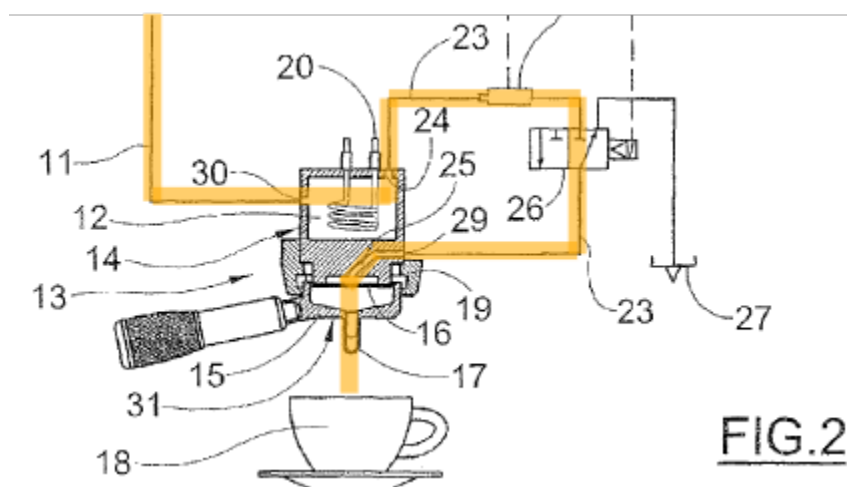


FIG.2

79. Coccia states, “The output of the heat exchanger 5 supplies heated water via a duct 6 to a mixing point 7 which is also reached by a duct 8 connected to the duct 3 supplying cold water. Flow calibrators, shown by 9 and 10 respectively, are optionally included on the hot water duct 6 and on the cold water duct 8, upstream of the mixing point 7. These flow calibrators make it possible to regulate the quantity of cold with respect to hot water so as to obtain a flow of mixed water in the supply duct 11 at a supply temperature T1. Downstream of the mixing point 7, the mixed water reaches the dispensing device 13.” Ex. 1006, ¶¶0038-0040.

- (e) **“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;”**

80. Coccia discloses a brewing chamber (filter unit 31) in fluid communication (via heating chamber 12, connection duct 23, and dispensing duct 25) with the resulting solvent conduit (11) and for housing a solute (ground coffee, coffee powder) disposed to receive the resulting solvent (mixed water) to produce an infused beverage (coffee).



81. Coccia states, “The present invention relates to a coffee machine ...comprising... a filter unit (31) apt to contain ground coffee...” Ex. 1006, Abstract. Coccia describes brewing within the filter, “In the present description and the accompanying claims, ‘infusion’ indicates the step of wetting of the coffee powder contained in the filter and ‘extraction’ indicates the step of using the technical process which forces the hot water under pressure through the ground coffee.” Ex. 1006, ¶0029. Coccia describes the fluid communication, “The hot

water under pressure is caused to flow through the supply duct 11 to the heating chamber 12 ...and is then introduced into the filter unit 31. ...the water is introduced into the filter-holder 15 via a duct 23 which connects the outlet 24 of the heating chamber 12 to the inlet 29 of the dispensing duct 25.” Ex. 1006, ¶10045.

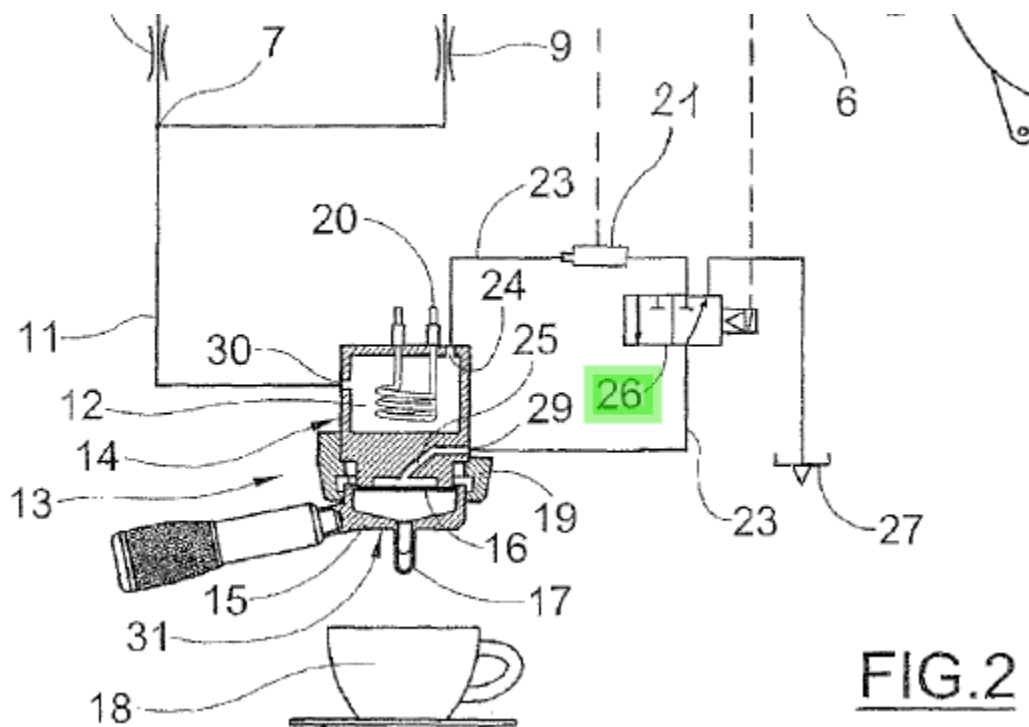
(f) “an outlet for discharging the infused beverage; and”

82. Coccia discloses an outlet (nozzle 17) for discharging the infused beverage (dispensing the coffee into cup 18).

83. Coccia states, “The dispensing device 13 comprises... a nozzle 17 for dispensing the coffee under which a collection cup 18 is disposed in operation. Ex. 1006, ¶10041.

(g) “a resulting solvent valve disposed upstream of the brewing chamber, downstream of the conduit joint, and in fluid communication with the solvent conduit,”

84. Coccia discloses a resulting solvent valve (electrovalve 26, variable-flow valve 36) disposed upstream of the brewing chamber (31), downstream of the conduit joint (7), and in fluid communication with the solvent conduit (any one or more of 3, 6, 8, 11, 12, 23, or 25)

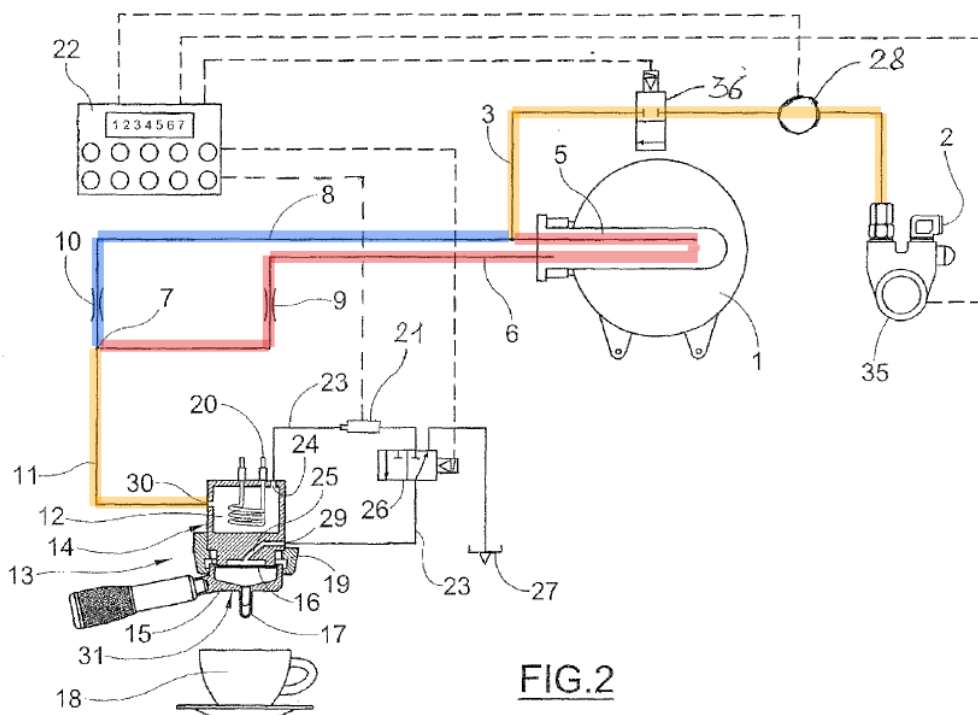


85. The patent applicant acted as lexicographer and stated, “The terms ‘a’ or ‘an,’ as used herein, are defined as one or more than one.” Ex. 1001, 6:40-41. Thus, the term “a resulting solvent valve” means one or more valves. Coccia provides a combination of two valves (26 and 36) that disclose this limitation. Coccia states, “The duct 23 is provided with an electrovalve 26 which has two operating positions.” Ex. 1006, ¶0046. Coccia further states, “A hydraulic variable-flow valve 36 is disposed along the hydraulic circuit which brings the hydraulic pump into fluid communication with the dispensing device 13.” Ex. 1006, ¶0071.

86. The claim language “the solvent conduit” does not specify which of the many pre-defined conduits must be in fluid communication with the valve.

Thus, for this analysis, fluid communication with any of the conduits will be sufficient. As shown in the preceding analysis of claim limitations (a) through (g), conduits 3, 6, 8, 11, 12, 23, and 25 are all in fluid communication with one another. In FIG. 2, valve 26 is shown as regulating the flow of water from one portion of conduit 23 to another portion of conduit 23. And valve 36 brings the pump into fluid communication, meaning that valve 36 is in fluid communication with various conduits.

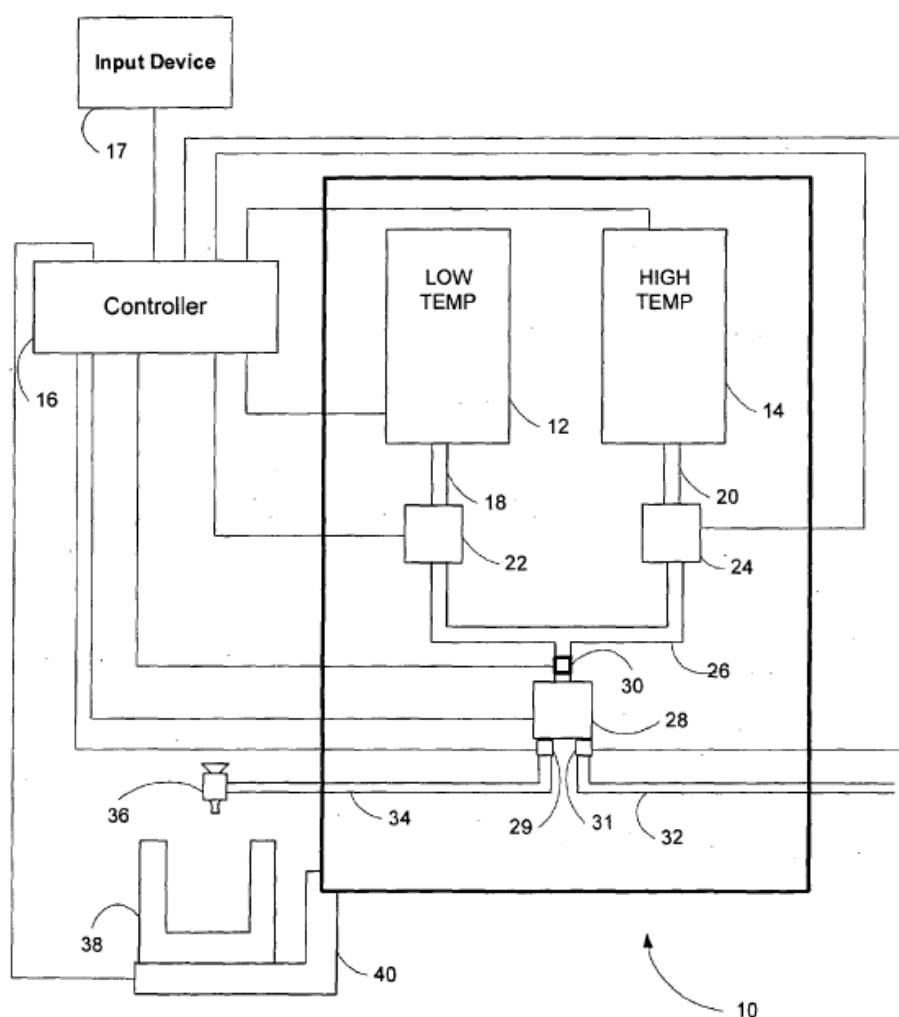
87. A POSA would have understood that valve 36 could be disposed upstream of the brewing chamber 31 and downstream of the conduit joint 7, based on Coccia's description. Coccia states, "A hydraulic variable-flow valve 36 is disposed along the hydraulic circuit which brings the hydraulic pump into fluid communication with the dispensing device 13." Ex. 1006, ¶0071. As illustrated in the annotated FIG. 2 below, the highlighting indicates the "hydraulic circuit which brings the" pump 35 into communication with device 13. The orange highlighting indicates single conduits in the circuit where a single valve could block flow, while the red and blue highlighting indicates parallel conduits where a single valve could not block flow.



88. A POSA would have known that the valve 36 must be located along one of the orange portions of the hydraulic circuit to accomplish restricting or blocking flow. Thus, even though Coccia states a preferred location (i.e., “The valve 36 is preferably disposed along the cold water duct 3, more preferably downstream of the flow rate measurement device 28.”), a POSA would have understood that the preference did not limit the location of the valve. Thus, a POSA would have understood that Coccia’s language regarding “disposed along the hydraulic circuit” encompasses a valve 36 disposed between conduit joint 7 and device 13, i.e., along conduit 11. Thus, Coccia discloses the location of the valve as claimed.

89. If Coccia does not disclose the location of the valve as claimed, it would have been obvious to a POSA to place the valve downstream of the conduit joint and upstream of the brewing chamber, as disclosed by Anson. Anson discloses a valve (28) downstream of a conduit joint (common passage 26), that is controlled by controller 16 to control the flow of water in the machine:

FIG. 1



Ex. 1018, FIG. 1.

90. Anson states, "Mixing valve 28 may be operated by controller 16 to

selectively permit flow to dispensing tube 34 or drain tube 32.” Ex. 1018 ¶0015.

91. Accordingly, Coccia in view of one or more of the knowledge of a POSA and/or Anson renders this element obvious.

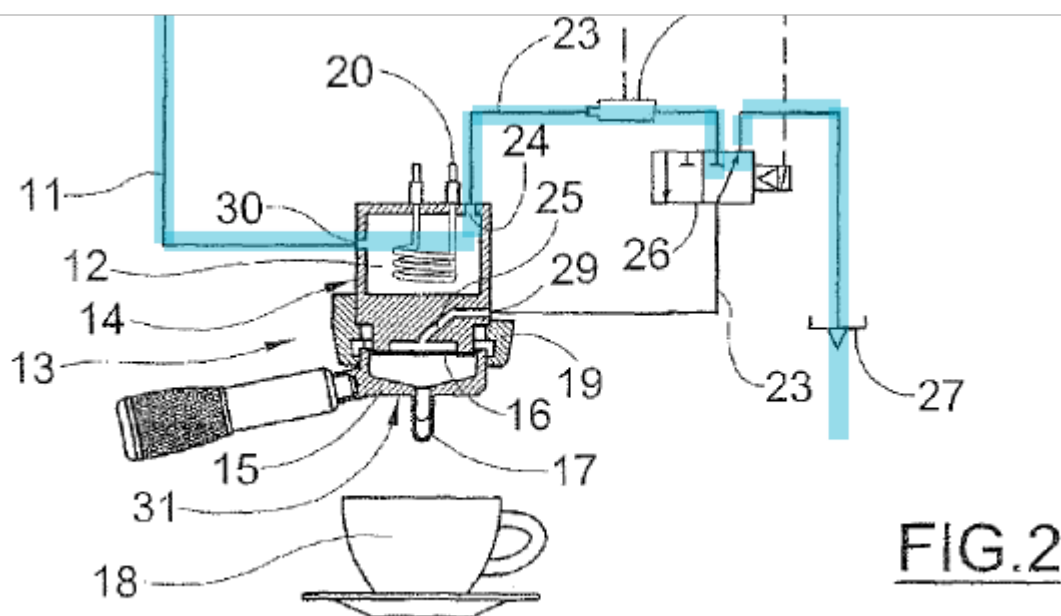
(h) “the valve operably configured to selectively have a closed state inhibiting flow of the resulting solvent to the brewing chamber and”

92. Coccia discloses the valve (26 and 36) operably configured to selectively have a closed state inhibiting flow of the resulting solvent (mixed water) to the brewing chamber (31).

93. Coccia states, “For example, at the start of a dispensing operation, the variable-flow valve 36 is actuated in order to supply a predetermined flow rate of water to the dispensing device... The control unit closes the opening of the valve when the quantity of water metered by the flow measurement device is equal to the quantity of water corresponding to one dispensing operation.” Ex. 1006, ¶¶0086-0087. When the valve is closed, the flow of water to the brewing chamber will be inhibited.

- (i) **“an active state that includes a first selective directional flow path directing the flow of the resulting solvent to a removal conduit without passing the resulting solvent through the brewing chamber and”**

94. Coccia discloses that the valve(s) have an active state (valve 36 open) that includes a first selective directional flow path (to discharge 27) directing the flow of the resulting solvent (mixed water) to a removal conduit (conduit to discharge 27) without passing the resulting solvent (mixed water) through the brewing chamber (31), as illustrated in the highlighted excerpt of FIG. 2:

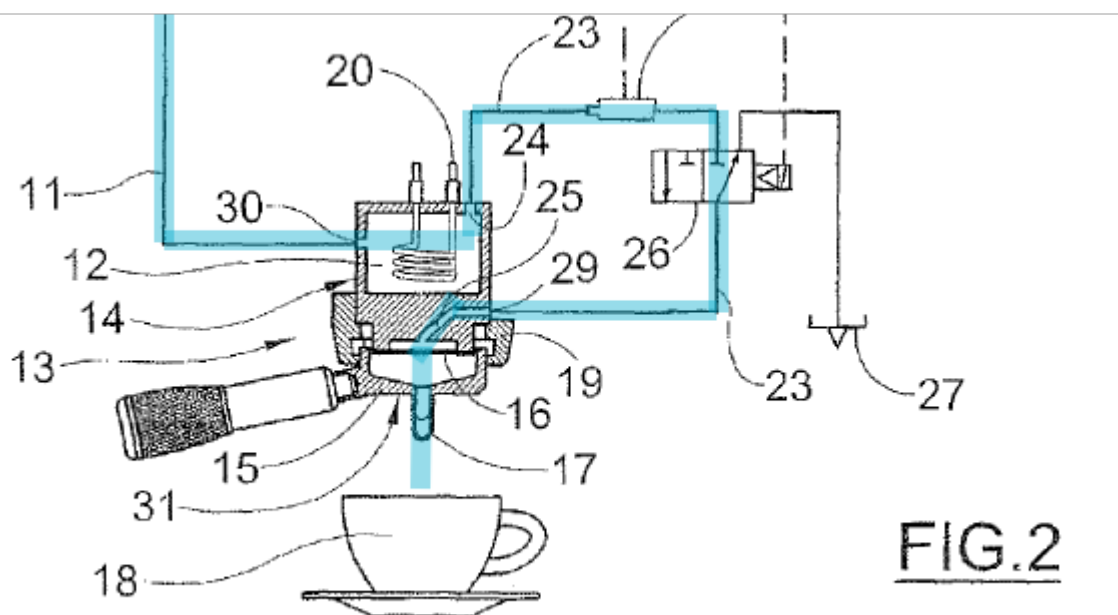


95. Coccia states, “The duct 23 is provided with an electrovalve 26 which has two operating positions. This electrovalve 26, in one position, causes the water to be supplied to the filter-holder and thus the formation of the beverage, and in the other position it discontinues the supply of the water and communicates with a

discharge 27 external to the machine.” Ex. 1006, ¶0046.

- (j) **“a second selective directional flow path directing the flow of the resulting solvent to the brewing chamber, thereby enabling resulting solvent delivered [sic] to the brewing chamber at a desired temperature.”**

96. Coccia discloses that the active state (valve 36 open) of the valve (26) has a second selective directional flow path (to filter holder 15 of filter unit 31) directing the flow of the resulting solvent (mixed water) to the brewing chamber (31), thereby enabling resulting solvent (mixed water) delivery to the brewing chamber (31) at a desired temperature (optimum temperature T2), as illustrated in the highlighted excerpt of FIG. 2:



97. Coccia states, “The duct 23 is provided with an electrovalve 26 which

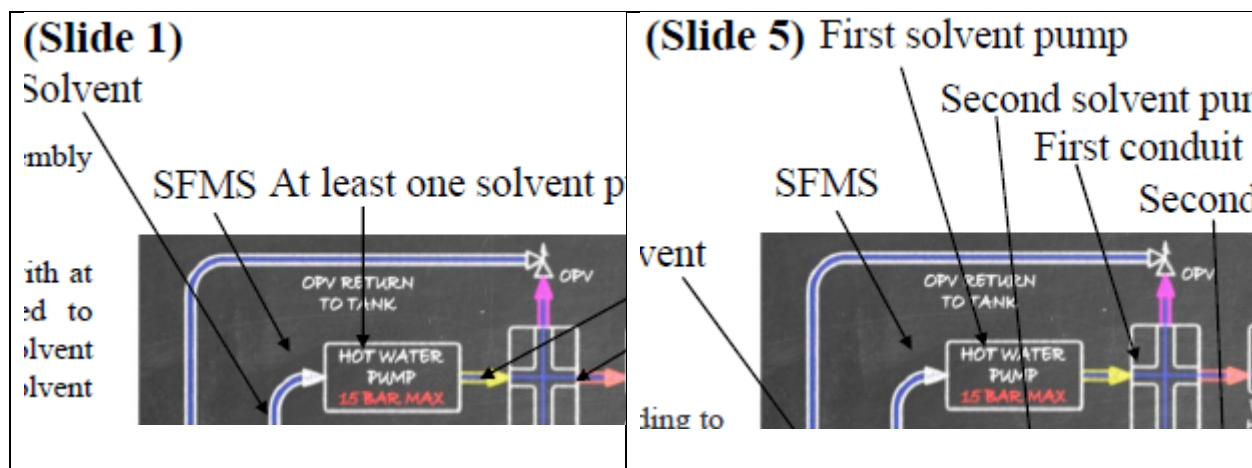
has two operating positions. This electrovalve 26, in one position, causes the water to be supplied to the filter-holder and thus the formation of the beverage...” Ex. 1006, ¶0046. Coccia confirms heating to a desired temperature: “...the water supplied to the inlet 30 of the heating chamber 12 from the supply duct 11 ...is already at a relatively high supply temperature T1 (for example not lower than approximately 80° C.) and therefore the heating time needed to reach the optimum temperature T2 for the formation of the beverage (for example, approximately 90° C.) is short ...” Ex. 1006, ¶0051. And Coccia confirms that water is delivered to the brewing chamber at the desired temperature (T2): “In the heating chamber 12 an electrical resistance 20 is provided for heating the water to a dispensing temperature T2 suitable for the formation of the coffee beverage, which temperature is greater than the temperature T1 of the water downstream of the mixing point 7 which acts as a source as regards the heating chamber 12. The hot water under pressure is caused to flow through the supply duct 11 to the heating chamber 12 via the inlet 30, in which chamber is stabilised in temperature, and is then introduced into the filter unit 31.” Ex. 1006, ¶¶0044-0045.

98. Accordingly, Coccia in view of one or more of the knowledge of a POSA and/or Anson renders claim 1 obvious.

2. Claim 2

- (a) **“The infused beverage brewing assembly according to claim 1, wherein the solvent flow management system further comprises: a first solvent pump fluidly coupled to the first solvent conduit and operably configured to receive the solvent and induce the flow of the solvent therethrough; and”**

99. By use of the term “further comprises”, claim 2 appears to add a second pump (called “a first solvent pump”) and a third pump (called “a second solvent pump”) to the already existing pump (“at least one solvent pump”) of claim 1. Thus, it appears that claim 2 requires three pumps. However, in infringement contentions (Exs. 1016, 1017), Patent Owner alleged that the same pump (i.e., the “HOT WATER PUMP”) fulfilled both the “at least one solvent pump” and the “a first solvent pump” limitations of claims 1 and 2:



Ex. 1016 page 1, Ex. 1017 pages 1, 5.

100. Accordingly, the analysis of this claim limitation 2(a) is the same as the analysis of claim limitation 1(b), above.

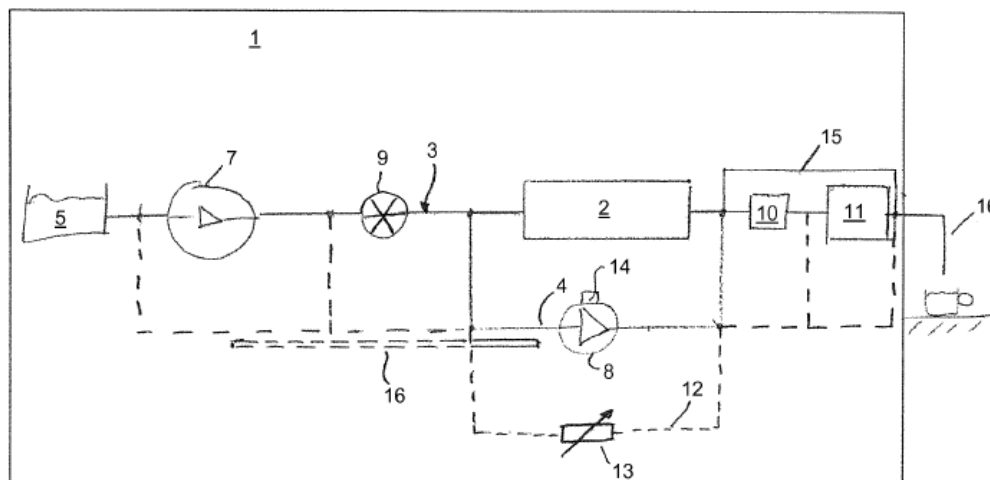
- (b) **“a second solvent pump fluidly coupled to the second solvent conduit and operably configured to receive the solvent and induce the flow of the solvent therethrough.”**

101. Coccia does not disclose a second solvent pump. However, a POSA would have found the inclusion of a second solvent pump as claimed to be obvious in view of one or more of the knowledge of a POSA, Startz, Majer, Porzio and/or Buttiker.

102. A POSA would have had knowledge of each of the disclosures of Startz, Majer, Porzio, and Buttiker as described below, and would have known that it would have been obvious to include a second solvent pump to pump the water through the second conduit 8. Thus, this limitation would have been obvious in view of the knowledge of a POSA.

103. Startz discloses a coffee machine with a first solvent pump 7 inducing the flow of solvent (water) through a first conduit (3) and a second solvent pump 8 inducing the flow of solvent (water) through a second conduit (4), as shown in

FIG. 1:



104. Startz states, “According to FIG.1, a beverage machine 1 ...which can be embodied as a coffee machine,... In the main flow path 3, a main flow pump 7 is thereby arranged between the water tank 5 and the heating device 2. According to the invention, a bypass flow pump 8 is now arranged in the bypass flow path 4...” Ex. 1008, 3:9-23.

105. Majer discloses a coffee machine with a first solvent pump 4 inducing the flow of solvent (water) through a first conduit (C1) and a second solvent pump 4bis inducing the flow of solvent (water) through a second conduit (C2), as shown in FIG. 1:

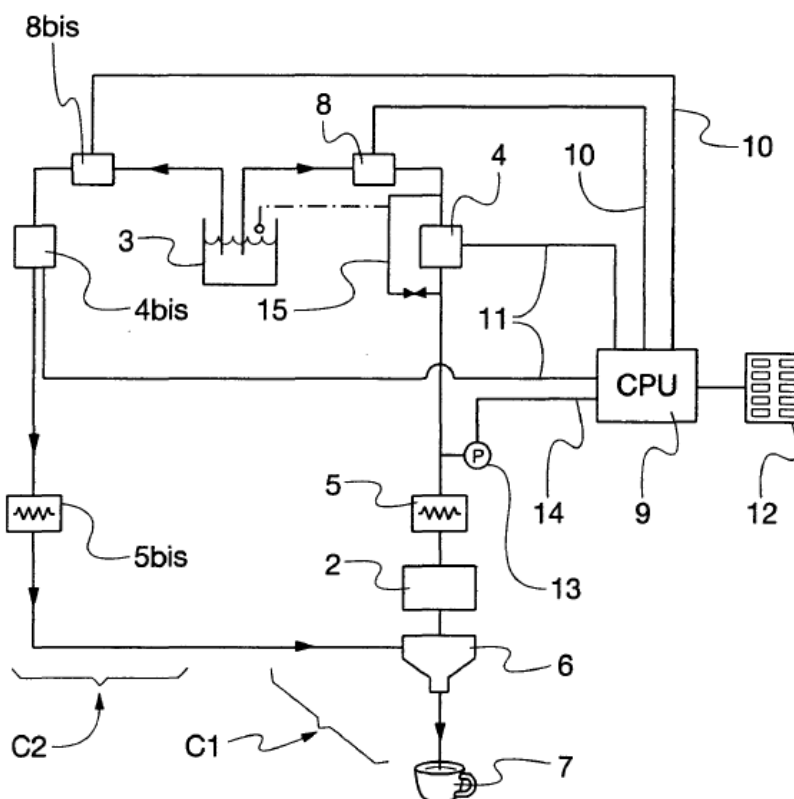
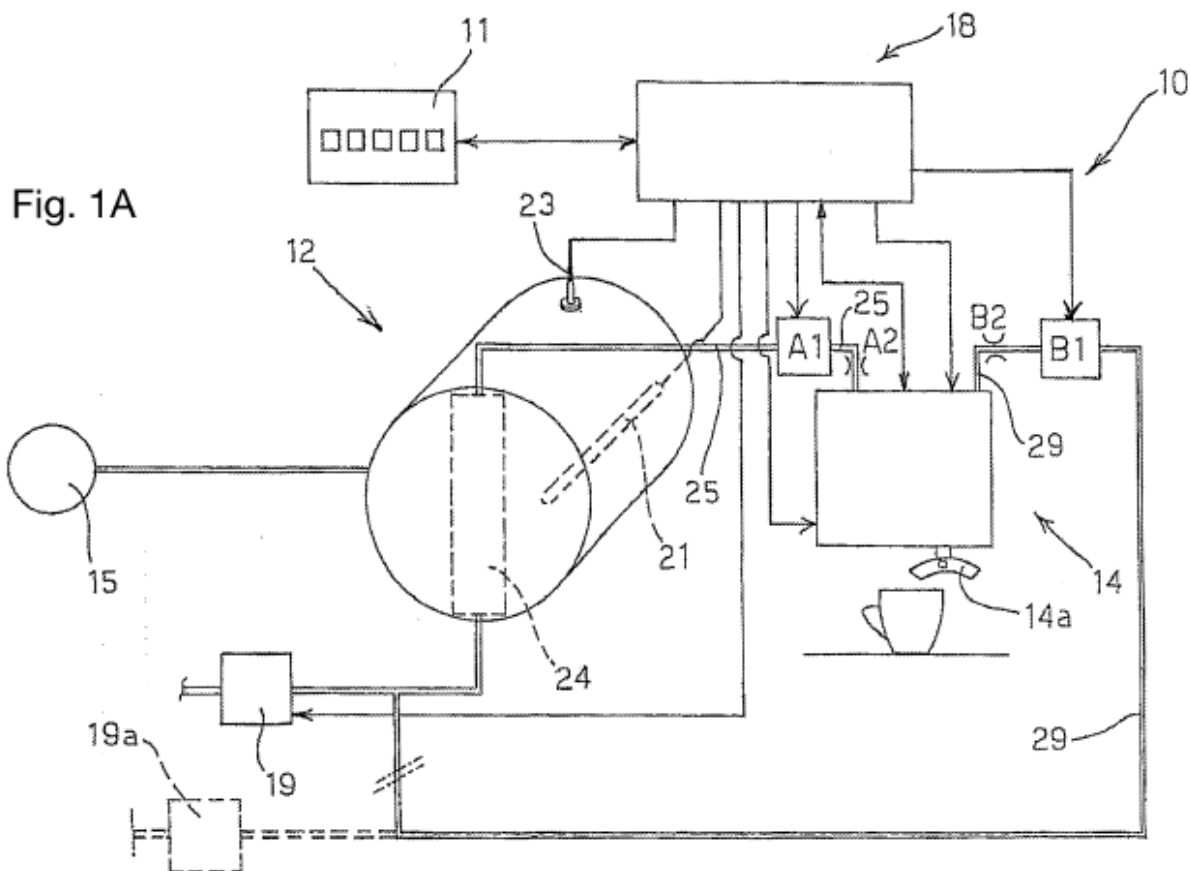


Fig. 1

106. Majer claims, “A beverage dispensing machine (1) comprising a first hydraulic circuit (C1) including a water source (3), a pump (4), ...a brewing means (2), ...further comprising a second hydraulic circuit (C2) that includes a second pump (4bis)...” Ex. 1013, Claim 1.

107. Porzio discloses a coffee machine with a first solvent pump (19) inducing the flow of solvent (water) through a first conduit (25) and a second solvent pump (19a) inducing the flow of solvent (water) through a second conduit (29), as shown in FIG. 1A:



108. Porzio states, “With reference to Figure 1a an espresso coffee

inducing the flow of solvent (water) through a first conduit (31a, 31b, 51a, 51b) and a second solvent pump (32) inducing the flow of solvent (water) through a second conduit (32a, 32b, 52a, 52b), as shown in FIG. 1;



110. Buttker states, “Fig. 1 shows a schematic view of the brewing device

100... a water tank, is connected to an initial feed pump 31 via a liquid pipe 31a and, independently thereof, to a second feed pump 32 via a liquid pipe 32a.” Ex. 1004 ¶0018.

111. Accordingly, Coccia in view of one or more of the knowledge of a POSA, Startz, Majer, Porzio, Buttiker, and/or Anson renders claim 2 obvious.

3. Claim 3

- (a) **“The infused beverage brewing assembly according to claim 1, further comprising: a temperature measuring device coupled to and in fluid communication with the resulting solvent conduit and operably configured to measure the resulting solvent temperature and communicate the resulting solvent temperature to an electronic controller.”**

112. Coccia discloses a temperature measuring device (temperature sensor-not shown) coupled to (indirectly coupled) and in fluid communication with (via heating chamber 12) the resulting solvent conduit (11) and operably configured to measure the resulting solvent temperature (measure T1) and communicate the resulting solvent temperature (T1) to an electronic controller (CPU 22).

113. Coccia states, “In the heating chamber 12 an electrical resistance 20 is provided for heating the water to a dispensing temperature T2 suitable for the formation of the coffee beverage, which temperature is greater than the temperature T1 of the water downstream of the mixing point 7 which acts as a

source as regards the heating chamber 12... In the case of a relatively high temperature T1, the electrical power needed for the electrical resistance 20 to start and to stabilise the temperature to the temperature T2 for the preparation of the beverage is relatively low... The operation of the heating resistance 20 is preferably controlled by a temperature sensor (not shown in the figure) in contact with the water in the heating chamber in order to detect the dispensing temperature T2 and is logically connected to the CPU 22.” Ex. 1006, ¶¶0044, 0052-0053. Coccia further states, “in one embodiment, the heating chamber receives water at ambient temperature which is heated to the temperature T2 by the resistance disposed in the heating chamber. Ex. 1006, ¶0078.

114. A POSA would have understood this disclosure as disclosing this claim element. As Coccia describes, when the heating chamber receives water either at ambient temperature or at temperature T1, it is heated until it reaches temperature T2. Coccia further describes that the temperature sensor is logically connected to the CPU 22 and that the operation of the heating is controlled by a temperature sensor. Thus, a POSA would have understood that the temperature sensor was reading the temperature of the mixed water entering or within the heating chamber and relaying that temperature to the CPU. The CPU could then activate or deactivate the heating based on the temperature read by the temperature sensor. Thus, a POSA would have understood that the temperature sensor would

have been configured to measure the resulting solvent temperature and communicate that measurement to the electronic controller.

115. This temperature sensor was “in contact with the water in the heating chamber” and, thus, “in fluid communication with the resulting solvent conduit,” as water flows from duct 11 into chamber 12. And the temperature sensor was indirectly “coupled to ...the resulting solvent conduit.” The ‘456 patent states that the term “coupled” can include indirect coupling. The temperature sensor is part of the heating chamber 12, which is coupled to supply duct 11 (i.e., the resulting solvent conduit); thus, it is indirectly coupled to the resulting solvent conduit.

116. To the extent that Coccia 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 Lai and/or Santi.

117. 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. 1012, ¶197. 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. 1012, ¶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. 1012, 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. 1012, ¶98.

118. 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. 1010, ¶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. 1010, ¶0014.

119. 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. 1010, ¶0092, claims 10-14. The first sensor means 50 comprise a temperature sensor at the heating means 40. Ex. 1010, ¶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. 1010, ¶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. 1010, ¶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. 1010, ¶0073.

120. Accordingly, Coccia in view of one or more of the knowledge of a POSA, Lai, Santi, and/or Anson renders claim 3 obvious.

4. **Claim 4**

(a) “The infused beverage brewing assembly according to claim 3, wherein: the electronic controller communicatively is coupled to the solvent temperature modulation system, the valve, the temperature measuring device,”

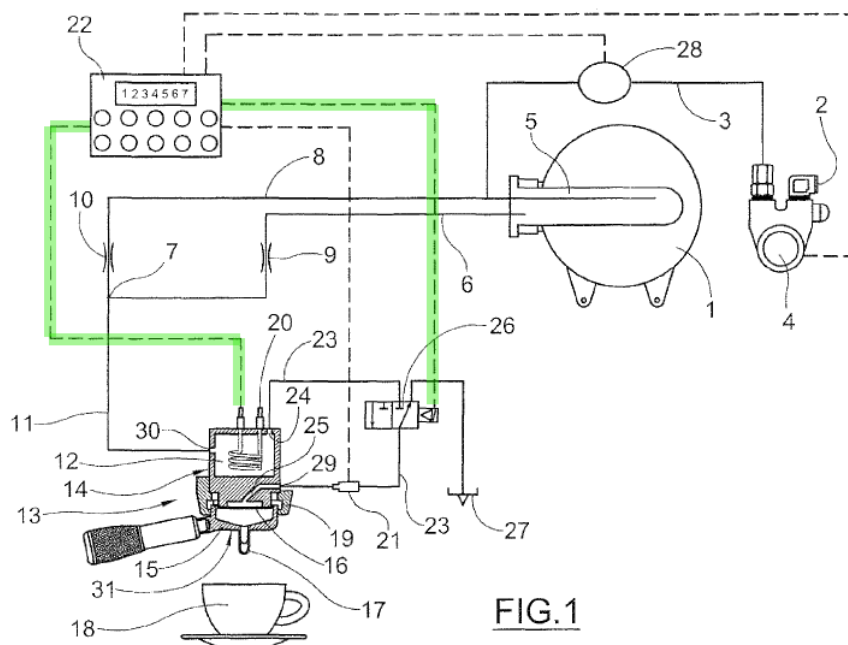
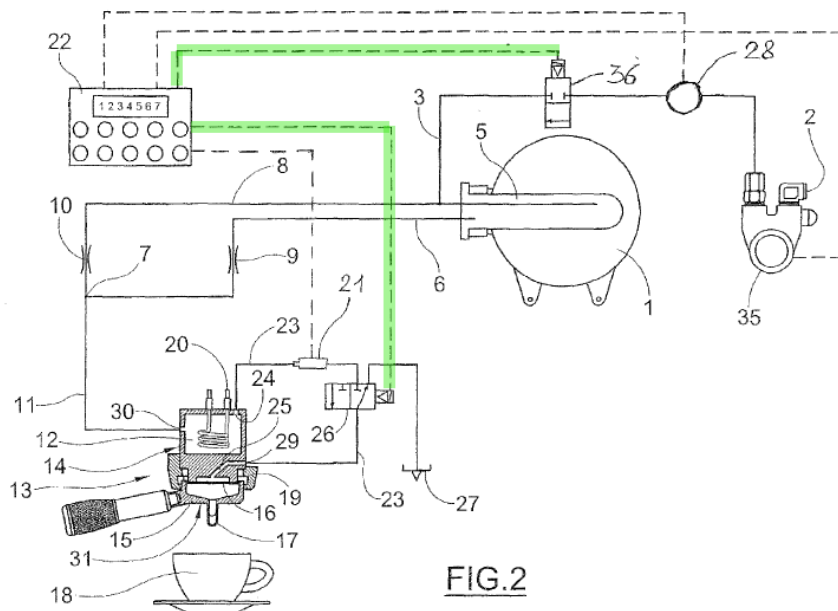
121. Coccia discloses that the electronic controller (CPU 22) communicatively is coupled to the solvent temperature modulation system (at least heating resistance 20), the valve (26, 36), and the temperature measuring device (not pictured).

122. As noted above, in the analysis of claim limitation 1(c), the solvent temperature modulation system (“STMS”) is not limited solely to the boiler 1 and heat exchanger 5, such that the STMS may include resistance 20. Thus, a coupling between resistance 20 and CPU 22 is a coupling between the electronic controller and the STMS.

123. Coccia states, “The control lines through which the control signals

from and to the control unit 22 pass are shown by dashed lines in the drawings.”

Ex. 1006, ¶0050. Highlighted reproductions of FIGS. 1 and 2 (below) show that the control lines extend between the CPU 22 and each of heating resistance 20, valve 26, and valve 36:



Ex. 1006, FIGS. 1-2.

124. In addition to the illustrated control lines, Coccia states, "...a temperature sensor (not shown in the figure) ...is logically connected to the CPU 22." Ex. 1006, ¶0053.

125. If the Board determines that this limitation requires a connection between the controller and the primary heating system, a POSA would have understood that such connections were well known in the prior art including at least by Lai and Santi.

126. 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." Ex. 1012, ¶0098. Lai refers to PCB 196 as "printed circuit board 196." Ex1012 ¶0082. And control panel 118 is described as having an LCD display 200, confirming that Lai's controller is electronic. Ex1012, ¶0100. Thus, a POSA would have understood that Lai discloses that the heater is also communicatively connected to the electronic controller.

127. 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. 1010, ¶¶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. 1010, ¶¶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. 1010, ¶¶0088.

- (b) **“the electronic controller operably configured to at least one of dynamically modulate the solvent temperature modulation system and selectively maintain the valve in the first selective directional flow path of the active state until the desired temperature of the resulting solvent is ascertained by the temperature measuring device,”**

128. Coccia discloses that the electronic controller (CPU 22) is operably configured to at least one of (only one option required) dynamically modulate the solvent temperature modulation system (20) and selectively maintain the valve (26) in the first selective directional flow path (to discharge 27) of the active state until the desired temperature (T2) of the resulting solvent (mixed water) is ascertained by the temperature measuring device (not picture).

129. Coccia’s controller only needs to perform one of the “at least one of” operations. Coccia discloses both.

130. Coccia discloses stabilizing the temperature at T2: “In a preferred embodiment, the water supplied to the inlet 30 of the heating chamber 12 from the supply duct 11 downstream of the mixing point 7 is already at a relatively high supply temperature T1...In the case of a relatively high temperature T1, the electrical power needed for the electrical resistance 20 to start and to stabilise the temperature to the temperature T2 for the preparation of the beverage is relatively low... The operation of the heating resistance 20 is preferably controlled by a temperature sensor (not shown in the figure) in contact with the water in the

heating chamber in order to detect the dispensing temperature T2 and is logically connected to the CPU 22.” Ex. 1006, ¶¶0051-0053.

131. Coccia teaches that the temperature is stabilized in chamber 12 before the water is introduced to the brewing chamber: “The hot water under pressure is caused to flow through the supply duct 11 to the heating chamber 12 via the inlet 30, in which chamber is stabilised in temperature, and is then introduced into the filter unit 31.” Ex. 1006, ¶0045. A POSA would have understood that use of the term “then introduced into the filter unit 31” meant that the water was not permitted to enter filter unit 31 until it reached the stabilized temperature T2, and that water flowing into the chamber 12 would need another outlet until temperature T2 was reached. A POSA would have understood that the only other outlet provided by Coccia was to discharge 27 via valve 26, meaning that valve 26 would have stayed open to discharge 27 and closed to filter unit 31 until temperature T2 was reached: “The duct 23 is provided with an electrovalve 26 which has two operating positions. This electrovalve 26, in one position, causes the water to be supplied to the filterholder and thus the formation of the beverage, and in the other position it discontinues the supply of the water and communicates with a discharge 27 external to the machine.” Ex. 1006, ¶¶0045-0046.

132. If Coccia does not disclose that the controller dynamically thermally modulates the STMS, a POSA would have understood that Lai and Santi both

disclose such a feature and that it would have been obvious to combine Coccia with one or more of the knowledge of a POSA, Lai, and/or Santi.

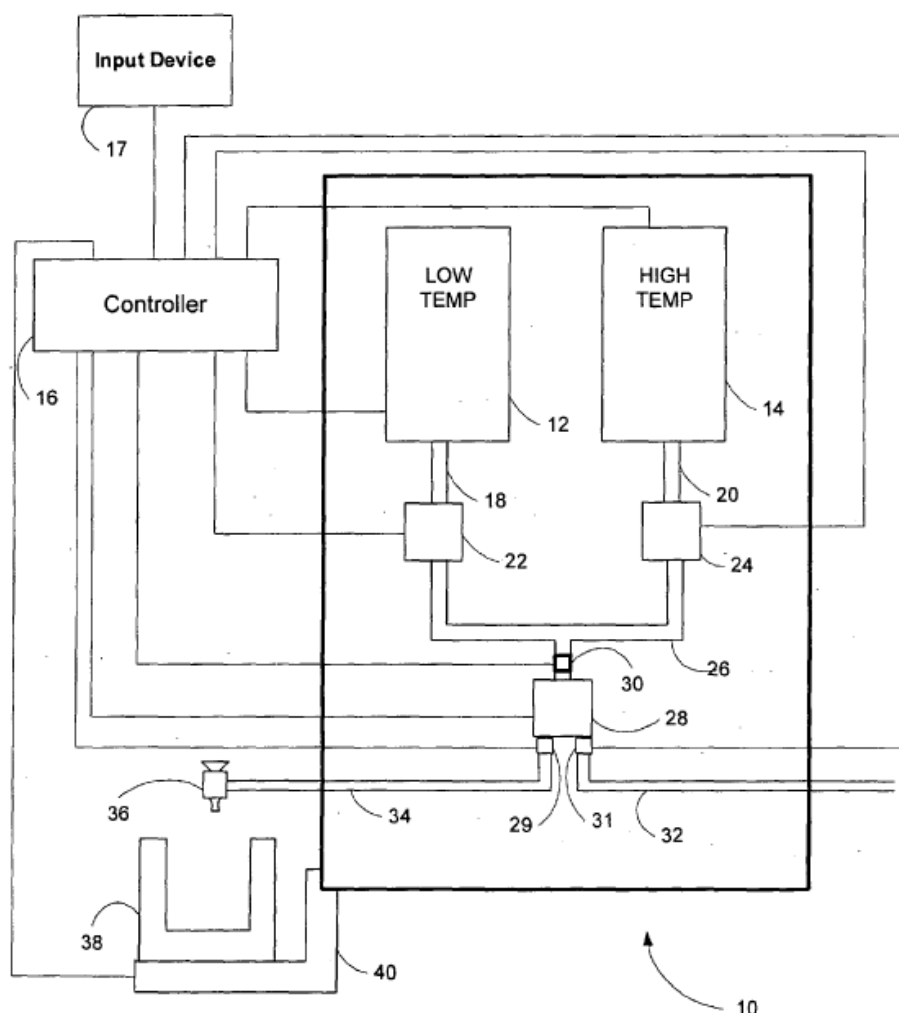
133. Lai teaches, “Importantly, the water temperature is regulated throughout the brewing process for optimum brewing and taste. In connection with this, a water temperature sensor 198 detects a temperature of the water exiting the heater 136 and relays this temperature to the PCB 196 of the control panel 118. The heater power and pump rate may then be adjusted to keep the water temperature within the optimal range.” Ex. 1012, ¶0098.

134. 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. 1010, ¶¶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. 1010, ¶¶0088.

135. If Coccia does not disclose this limitation, a POSA would have understood that Anson discloses a hot water device for brewing coffee, in which the controller (16) selectively maintaining the valve (28) in the first selective directional flow path (toward dispensing tube 34) of the active state until the desired temperature (desired Dispense Temperature) of the resulting solvent (mixed water) is ascertained by the temperature measuring device (temperature

sensor 30):

FIG. 1



Ex. 1018, FIG. 1.

136. Anson states, “Low and high temperature tanks, water sources 12, 14, are associated with low and high temperature outlet tubes, first outlet tube 18, second outlet tube 20... Low and high temperature valves, first valve 22 and second valve 24 are in communication with and controllably operated by controller 16. ...Temperature sensor 30 is associated with the common passage 26 in a

position to sense the water's temperature in the common passage 26. Mixing valve 28 may be operated by controller 16 to selectively permit flow to dispensing tube 34 or drain tube 32. Water flowing through drain tube 32 can be directed to any other application, including being recycled, disposed... Water that is directed through the dispensing tube 34 may be further directed out a dispensing device 36, shown in FIG. 1 as a faucet. Water may then be directed... directly into another portion of food or beverage making equipment for use in a particular food or beverage making application. In use, a user inputs a desired Dispense Temperature... into the controller 16 using input device 17... Temperature sensor 30 senses the temperature of the mixed volume to verify the mixed volume temperature is at the Dispense Temperature, in this example, at 72° F. If the mixed volume temperature is not correct, controller 16 may operate first and second valves 22, 24 to dispense more high or low temperature water to achieve the desired temperature.” Ex. 1018, ¶¶0014-0019. Anson explains, “...the desired hot water characteristics, such as temperature and volume, are entered... In a next step 52, a volume of water from each tank ...dispensed into common dispensing passage 26 to form a mixed volume. The temperature of mixed volume is sensed in step 56 and compared to the selected Dispense Temperature in step 58. If the mixed volume temperature does not match the Dispense Temperature within acceptable tolerances, the valves 22, 24 are operated to dispense either cooler or

hotter water to adjust the mixed volume's temperature (step 60). Excess water building up in common tube 26 may be drained via drain tube 32 (step 62). If the mixed volume temperature matches the Dispense Temperature, drain tube 32 is closed and the selected or recalled volume of water is dispensed to container 38 or to another portion of the beverage making process (step 64)." Ex. 1018, ¶0023.

(c) "the electronic controller selectively switching from the first selective directional flow path of the active state to the second selective directional flow path of the active state."

137. Coccia discloses the controller switching valve 26 between the two states.

138. Coccia states, "The operating positions of the electrovalve 26 are preferably controlled by the control unit 22." Ex. 1006, ¶0049. Coccia further states, "...electrovalve 26, in one position, causes the water to be supplied to the filter-holder and thus the formation of the beverage, and in the other position it discontinues the supply of the water and communicates with a discharge 27 external to the machine." Ex. 1006, ¶¶0045-0046.

139. If Coccia does not disclose this element, a POSA would have understood that such connections were well known in the prior art including at least by Anson.

140. Anson states, "Mixing valve 28 may be operated by controller 16 to

selectively permit flow to dispensing tube 34 or drain tube 32...” Ex. 1018,

¶¶0015.

141. Accordingly, Coccia in view of one or more of the knowledge of a POSA, Lai, Santi, and/or Anson renders claim 4 obvious.

5. Claim 5

(a) “The infused beverage brewing assembly according to claim 4, wherein: the resulting solvent valve is disposed downstream of the conduit joint,”

142. The language of this limitation is almost identical to a portion of the language of claim limitation 1(g). Accordingly, the above analysis regarding claim limitation 1(g) applies equally to this limitation.

(b) “the first solvent conduit having a temperature measuring device coupled thereto, in fluid communication therewith downstream of the solvent temperature management system, and communicatively coupled to the electronic controller,”

143. Coccia does not disclose this limitation.

144. A POSA would have understood that this feature was commonly known in the prior art, including disclosures by Lai and Santi.

145. 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. 1012, ¶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. 1012, claim 31.

146. Santi, referring to his own FIGS. 3-4, discloses, “a second temperature sensor 60, positioned downstream of the hot water dispensing point of the same heating means 40... 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. 1010, ¶¶0089, 0092, claims 10-14. 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. 1010, ¶0038.

- (c) **“the electronic controller operably configured to send a control signal to the solvent temperature management system to dynamically and thermally modulate the solvent disposed within the first solvent conduit to the raised temperature when receiving a temperature from the temperature measuring device coupled to the first solvent conduit.”**

147. Coccia does not disclose this limitation.

148. A POSA would have understood that this feature was commonly known in the prior art, including disclosures by Lai and Santi.

149. 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. 1012, ¶98.

150. Santi teaches, “... 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. 1010, ¶¶0089, 0092, claims 10-14.

151. Accordingly, Coccia in view of one or more of the knowledge of a POSA, Lai, Santi, and/or Anson renders claim 5 obvious.

6. **Claim 6**

- (a) **“The infused beverage brewing assembly according to claim 4, wherein: the desired temperature is greater than the resulting solvent temperature.”**

152. Coccia discloses the desired temperature (T2) is greater than the resulting solvent temperature (T1).

153. Coccia states: “...the water supplied to the inlet 30 of the heating chamber 12 from the supply duct 11 ...is already at a relatively high supply temperature T1 (for example not lower than approximately 80° C.) and therefore the heating time needed to reach the optimum temperature T2 for the formation of the beverage (for example, approximately 90° C.) is short...” Ex. 1006, ¶0051.

154. Accordingly, Coccia in view of one or more of the knowledge of a POSA, Lai, Santi, and/or Anson renders claim 6 obvious.

7. **Claim 7**

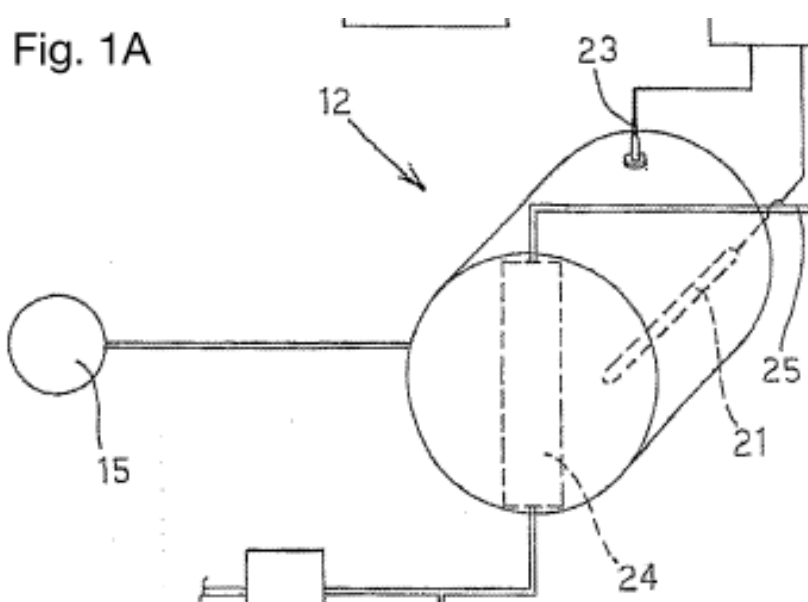
- (a) **“The infused beverage brewing assembly according to claim 6, wherein: the solvent temperature modulation system is a heating exchanging container having a heating element and solvent disposed therein.”**

155. Coccia discloses that the solvent temperature modulation system (boiler 1, heat exchanger 5) is a heating exchanging container (boiler 1) having a heating element (not pictured) and solvent (heated water) disposed therein.

156. Coccia states, “A conventional boiler 1 for the production of hot water and steam is supplied in a conventional manner (not shown in the figure) by an external water source of cold water 2. The water source 2, by means of a duct 3 and a hydraulic pump 4, supplies a heat exchanger 5, also conventional, disposed within the boiler 1.” Ex. 1006, ¶0037.

157. A POSA would have recognized that description of a “conventional” heat exchanger would have included the limitations of claim 7. A POSA would have recognized that the “convention boiler” supplied by “an external water source of cold water” would have had a solvent (i.e., water) disposed in the boiler and would have had an internal heating element to allow “for the production of hot water and steam.”

158. To the extent that Coccia does not disclose these limitations, Porzio discloses that the solvent temperature modulation system (12) is a heating exchanging container (12, 24) having a heating element (heating unit 21) and solvent (mains water) disposed therein:



159. Porzio states, “Boiler 12, of a known type, comprises in the preferred embodiment a heating unit 21... Boiler 12 is preferably fed with mains water...In the first embodiment boiler 12 also comprises a heat exchange unit (heat exchanger) 24” Ex. 1014, page 6:17-26.

160. Accordingly, Coccia in view of one or more of the knowledge of a POSA, Lai, Santi, Porzio, and/or Anson renders claim 7 obvious.

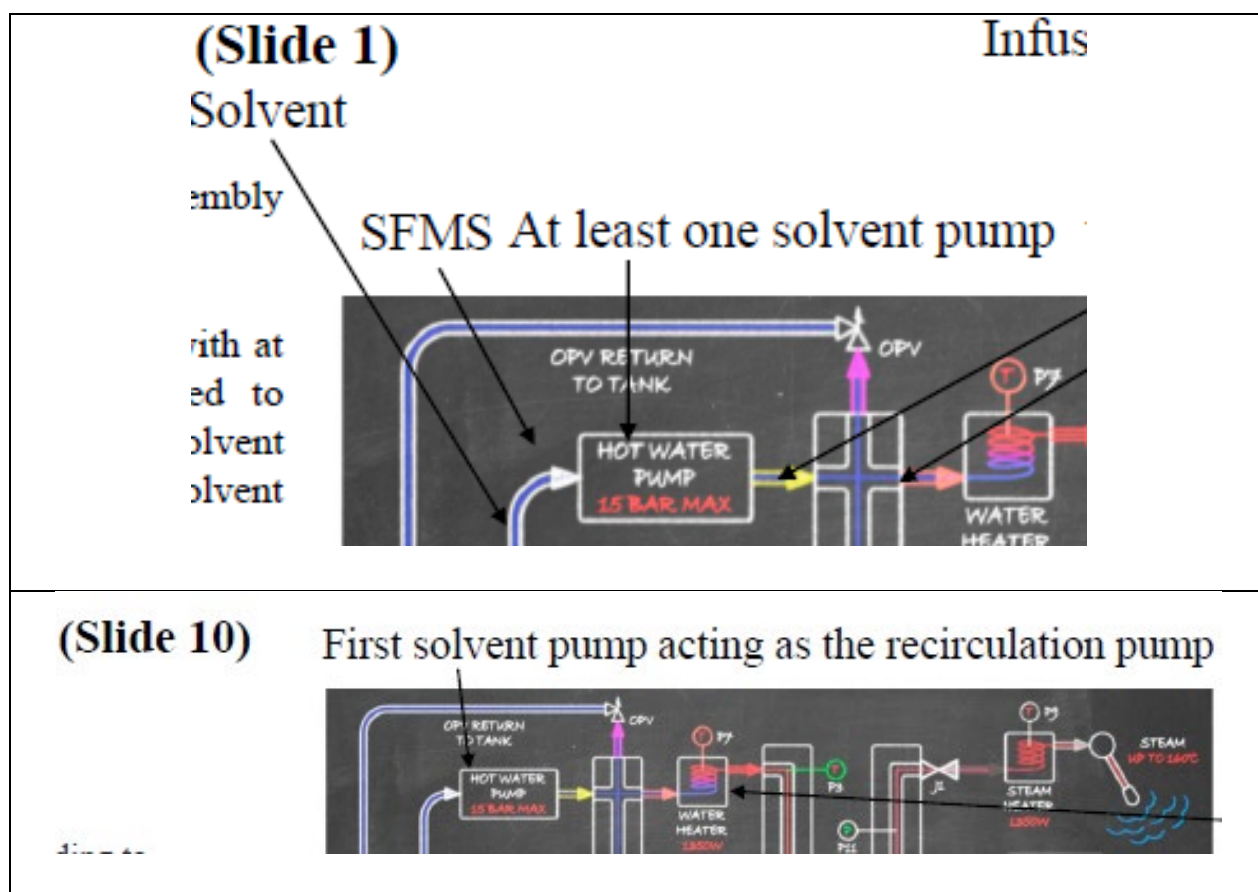
8. Claim 8

- (a) “The infused beverage brewing assembly according to claim 7, wherein: the removal conduit spans from the resulting solvent valve to the heating exchanging container to form a recirculation conduit, the recirculation conduit having a recirculation pump fluidly coupled thereto and operably configured to induce a flow of the resulting solvent to the heating exchanging container.”**

161. Coccia does not disclose a removal conduit spanning from the valve to the heat exchanger or a recirculation pump coupled thereto. Instead, Coccia discloses that the electrovalve 26, in one position, “discontinues the supply of the water and communicates with a discharge 27 external to the machine.” Ex1006 ¶0046. Coccia disclosed a machine in which water was supplied by “an external water source of cold water 2.” Ex1006 ¶0037. However, a POSA designing a machine that included a finite, refillable water source, such as a tank, would have been motivated to preserve water to reduce the number of refills needed. Thus, a

POSA would have found the inclusion of a recirculation conduit, as claimed to be obvious in view of one or more of the knowledge of a POSA, Aigner, Majer II, and/or White.

162. In construing this claim, I note that the Patent Owner has construed the claim such that the “at least one solvent pump” of claim 1(b) is also the “a recirculation pump” of this claim. This is apparent in the infringement contentions, where the Patent Owner asserts that the “HOT WATER PUMP” satisfies both limitations:



Ex1017-1, Ex1017-10. Thus, for purposes of this proceeding only, I will adopt the

Patent Owner's assertion.

163. Accordingly, Coccia discloses the claimed recirculation pump (4, 35) operably configured to induce a flow of the resulting solvent (mixed water) to the heat exchanging container (5, 1). The recirculation conduit could have been realized by connecting discharge 27 to the input of the pump (4, 35).

164. A POSA would have been motivated to do so, and would have had knowledge of each of the disclosures of Aigner, Majer II, and/or White. Thus, this limitation would have been obvious in view of the knowledge of a POSA.

165. Aigner discloses a coffee machine (10) with a first solvent pump (20) inducing the flow of solvent (water) through a first conduit (water pipe 18) and heater 14 past a temperature sensor 32, and to a valve 36. Ex1020 ¶¶0017, 0023. Controller 34 receives a signal from temperature sensor 32 and controls valve 36 to direct water to recirculate via recirculation conduit (return pipe 24) to pump 20 and heater 14 until a predetermined temperature has been reached, at which time controller 34 controls valve 36 to direct water to brewing chamber 16. Ex1020 ¶¶0023-0025. This machine is shown in FIG. 2:

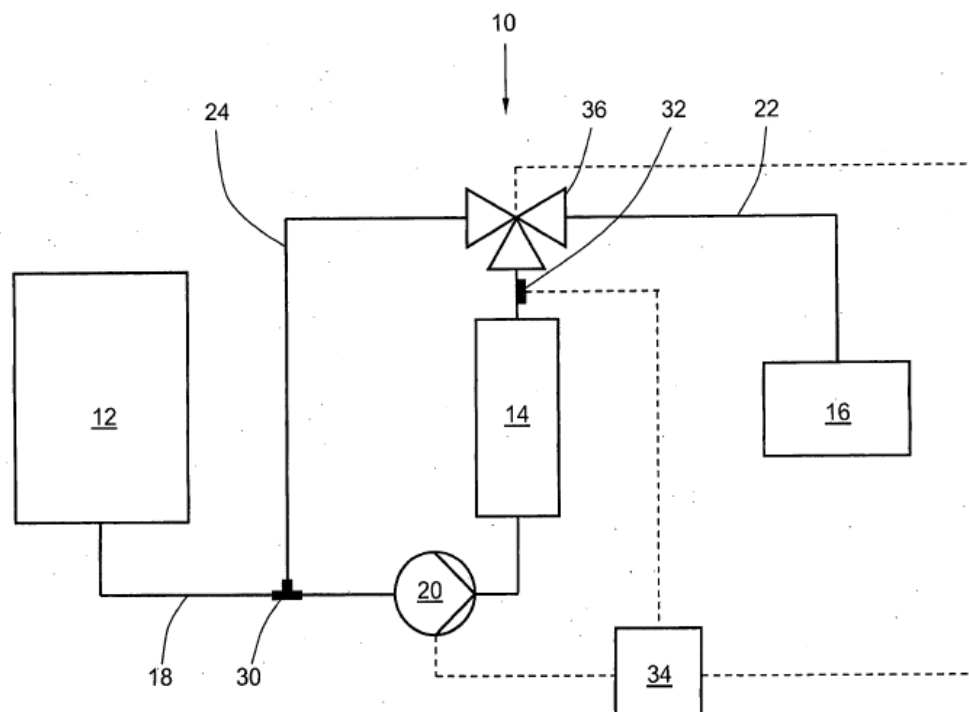


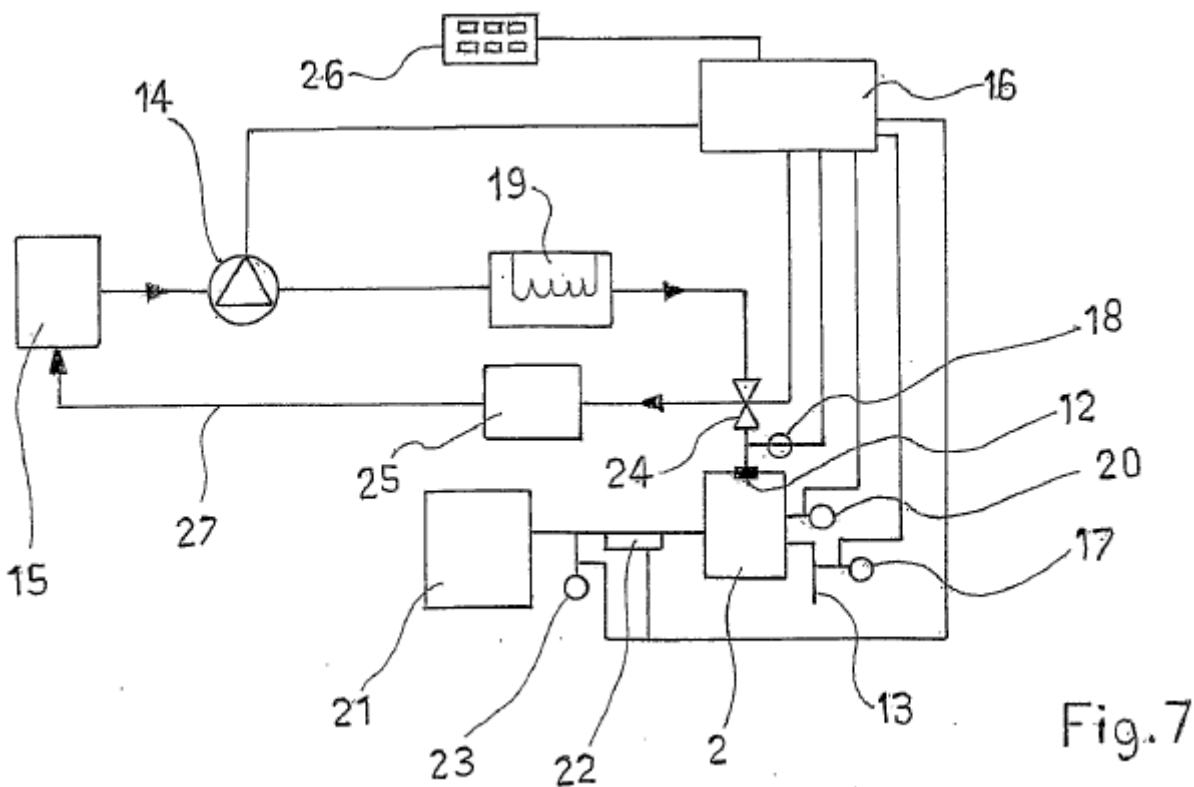
Fig. 2

Ex. 1019-9.

166. Aigner states, “Depending on the switching position of the 2-way valve 36, the water can now flow either into the water pipe 22 or into the return pipe 24.” Ex. 1020 ¶0024.

167. Majer II discloses a coffee machine with a first solvent pump (14) inducing the flow of solvent (water) through a first conduit and heating device 19 to a valve 24. Ex1022 ¶¶0052-0054, 0078. Controller 16 receives a signal from sensor 18 and controls valve 24 to direct water to recirculate via recirculation conduit (27) to reservoir 15, pump 20, and heater 14 until controller 16 controls valve 24 to direct water to brewing chamber 2. Ex1022 ¶¶0052-0054, 0078. This

machine is shown in FIG. 7:



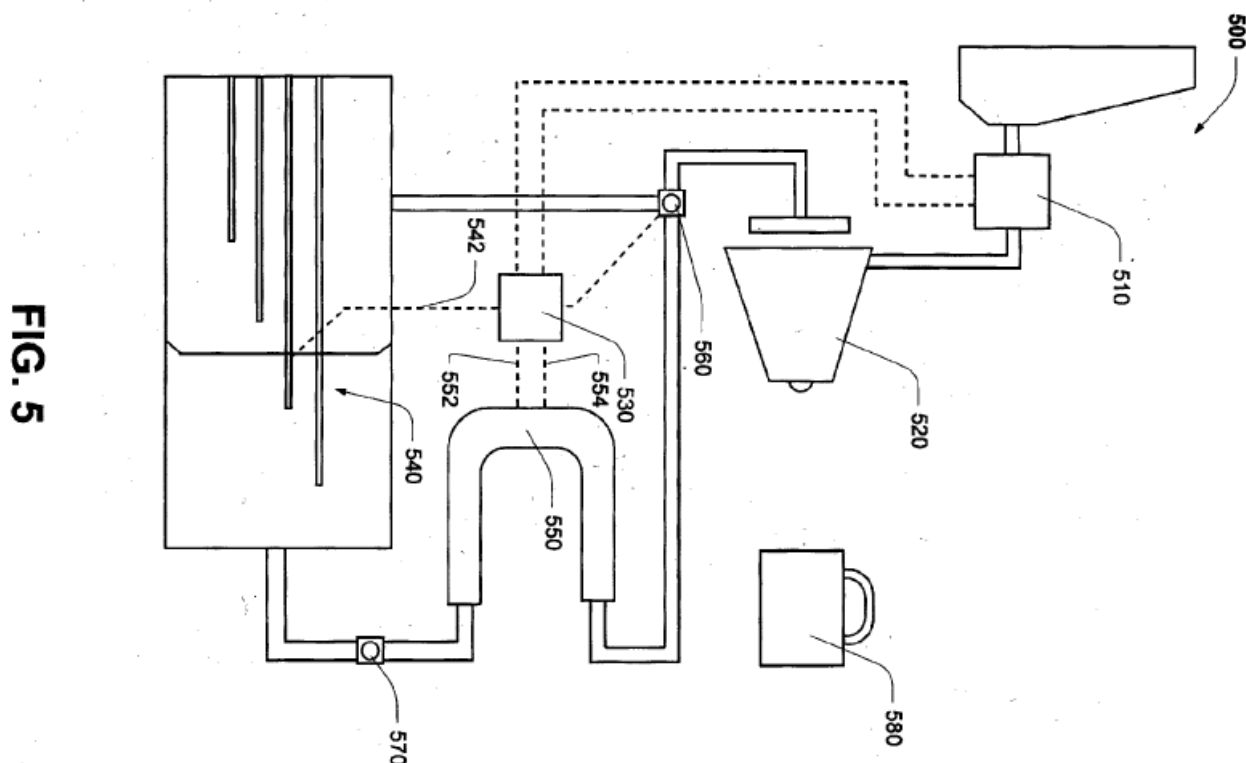
Ex1022-4.

168. Majer II states, “valve 24 is operated to send a portion of the flow of water to a circuit...connected to reservoir 15, or to the pump or to a discharge means.” Ex1022 ¶0078.

169. White discloses a beverage brewing machine (500) with a first solvent pump (not shown) inducing the flow of solvent (fluid in reservoir) through a first conduit and heater 550 to a recycle valve 560. Ex. 1023-9:23-27, 14:12-15:3.

Controller 530 receives a signal from temperature sensor (not shown) and controls recycle valve 560 to direct solvent to recirculate to reservoir, pump, and heater 560

until a condition is met, at which time controller 530 controls valve 560 to direct water to brewing chamber 520. Ex. 1023-9:23-27, 14:12-15:3. This machine is shown in FIG. 5:



Ex. 1023.

170. White states, “These embodiments include...a recycle valve 560 controlled by the processor element to inhibit or allow a determined fluid temperature within the riser to pass towards the brew chamber or reservoir...” Ex. 1023-12:27-30.

171. Accordingly, Coccia in view of one or more of the knowledge of a POSA, Lai, Santi, Porzio, Aigner, Majer II, White, and/or Anson renders claim 8

obvious.

9. Claim 9

- (a) “The infused beverage brewing assembly according to claim 1, further comprising: an electronic controller operably configured to send a control signal to the solvent temperature management system to dynamically and thermally modulate the solvent disposed within the first solvent conduit with respect to a brew parameter that includes at least one of an overall time and dispensed volume of the infused beverage.”**

172. Coccia does not disclose this limitation.

173. A POSA would have understood that this feature was commonly known in the prior art, including disclosures by Lai and Santi.

174. Lai teaches, “... the PCB 196 may control the temperature of the heater 136 through the heater sensor 194.” Ex. 1012, ¶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. 1012, ¶98. Lai teaches that the operation is based upon user-selectable brew

parameters, including volume (serving size) and/or overall time (timer setting): “A user then selects the desired coffee/beverage settings from the control panel 118. Settings may include selectable options such as coffee strength and serving size, timer setting, automatic brew, etc.” Ex. 1012 ¶0076.

175. 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. 1010, ¶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. 1010, ¶0014.

176. 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. 1010, ¶0092, claims 10-14. Santi confirms that heat is modulated with respect to a brew parameter

(volume): “By means of this embodiment, also controlling parameters such as the pressure and the volume of the water effectively dispensed through the pumping means 200, constituted by a volumetric dosing device, it is possible to calculate the thermal gradient necessary to obtain the desired temperature of the water dispensed by the heating means 40.” Ex. 1010, ¶0092.

177. Accordingly, Coccia in view of one or more of the knowledge of a POSA, Lai, Santi, and/or Anson renders claim 9 obvious.

10. Claim 10

I do not analyze claim 10 in this Declaration.

11. Claim 11

- (a) “An infused beverage brewing assembly comprising:”**
- (b) “a solvent flow management system with at least one solvent pump operably configured to receive a solvent and induce a flow of the solvent through at least one solvent conduit having a first solvent conduit and a second solvent conduit;”**
- (c) “a solvent temperature modulation system in fluid communication with the solvent flow management system and operably configured to thermally modulate the solvent disposed within the at least one solvent conduit to a raised temperature;”**

178. Claim 11 limitations (a), (b), and (c) are almost identical to the

language of claim 1 limitations (a), (b), and (c). The only significant difference is that claim 1(b) term “induce a flow of the solvent through a first solvent conduit and a second solvent conduit” has been changed in claim 11(b) to “induce a flow of the solvent through at least one solvent conduit having a first solvent conduit and a second solvent conduit.” The analysis of claim 1(b) and Coccia’s FIGS. 1-2 show that the pump (4, 35) induce flow through multiple conduits (3, 6, 8, 11, etc.).

179. Accordingly, the above analysis regarding claim 1 limitations (a), (b), and (c) applies equally to claim 11 limitations (a), (b), and (c).

(d) “a brewing chamber in fluid communication with the at least one solvent conduit and for housing a solute disposed to receive the solvent to produce an infused beverage;”

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

180. Claim 11 limitations (d) and (e) are almost identical to the language of claim 1 limitations (e) and (f). The only significant difference is that claim 1(e) term “in fluid communication with the resulting solvent conduit” has been changed in claim 11(d) to “in fluid communication with the at least one solvent conduit.” As shown in the analysis of claim 1 limitations (a) through (h), conduits 3, 6, 8, 11, 12, 23, and 25 are all in fluid communication with one another. Thus, being in fluid communication with the resulting solvent conduit (11) is the same as being in

fluid communication with the at least one solvent conduit (6).

181. Accordingly, the above analysis regarding claim 1 limitations (e) and (f) applies equally to claim 11 limitations (d) and (e).

(f) “an electronic controller communicatively coupled to the solvent temperature modulation system and operably configured to send a control signal to the solvent temperature management system to dynamically and thermally modulate the solvent disposed within the first solvent conduit to a raised temperature”

182. Claim 11 limitation (f) is almost identical to the language of claim 4 limitation (a) and a large portion of claim 5 limitation (c). The only significant differences are that claim 1 limitation (a) has additional requirements not required by claim 11 limitation (f) and that claim 5 limitation (c) includes additional requirements not required by claim 11 limitation (f).

183. Accordingly, the above analysis regarding claim 4 limitation (a) and claim 5 limitation (c) applies equally to claim 11 limitation (f).

(g) “when receiving a temperature from a temperature measuring device fluidly coupled to at least one of the first solvent conduit downstream of the solvent temperature modulation system and”

184. Claim 11 limitation (g) is almost identical to a large portion of the language of claim 5 limitation (b) and the last part of claim 5 limitation (c). The

only significant differences are that the language is rearranged in claim 11 limitation (g) and that the claim 5(c) term “coupled to the first solvent conduit” has been changed in claim 11(g) to “coupled to at least one of the first solvent conduit ... and...”

185. Accordingly, the above analysis regarding claim 5 limitations (b) and (c) applies equally to claim 11 limitation (g).

(h) “a resulting solvent conduit and a conduit joint formed by the first and second solvent conduits directly coupling together, the resulting solvent conduit with a resulting solvent disposed therein at a resulting temperature and the temperature measuring device fluidly coupled upstream of the brewing chamber.”

186. Much of the language of claim 11 limitation (h) is almost identical to a large portion of the language of claim 1 limitation (d) and the last part of claim 5 limitation (c). However, where claim 1 limitation (d) defines the requirements of the “resulting solvent conduit” and “conduit joint,” claim 11 limitation (h) provides the requirements of the “resulting solvent conduit” and “conduit joint” as an alternative location for coupling the temperature measuring device of claim 11 limitation (g), and also specifies that the temperature measuring device is upstream of the brewing chamber.

187. The ‘456 patent states that “coupling” may be indirect coupling.

Thus, coupling the “temperature measuring device” to the “resulting solvent conduit” may be accomplished by coupling the “temperature measuring device” to any of the conduits (3, 6, 8, 11, 12, 23, 25), which would ensure that the device was indirectly coupled to the resulting solvent conduit. As shown in the analysis of claim 1 limitations (a) through (h), conduits 3, 6, 8, 11, 12, 23, and 25 are all in fluid communication with one another.

188. Accordingly, the above analysis of the “resulting solvent conduit” and “conduit joint” in claim 5 limitation (c) and claim 1 limitation (d) applies equally to claim 11 limitation (h). And the analysis of claim 3, showing a “temperature measuring device coupled to and in fluid communication with the resulting solvent conduit” also applies equally to claim 11 limitation (h).

189. Accordingly, Coccia in view of one or more of the knowledge of a POSA, Lai, Santi, and/or Anson renders claim 11 obvious.

12. Claim 12

- (a) “The infused beverage brewing assembly according to claim 11, wherein the electronic controller is operably configured to send a control signal to the solvent flow management system to thermally modulate the solvent disposed within the first solvent conduit to a raised temperature higher and different than a temperature of the solvent disposed within the second solvent conduit.”**

190. Claim 12 is almost identical to a large portion of the language of

claim 5 limitation (c) and the “higher and different...” language of claim 1(c). The only significant difference is that the claim 5(c) term “signal to the solvent temperature management system” has been changed in claim 12 to “signal to the solvent flow management system.”

191. Accordingly, much of the above analysis regarding claim 5 limitation (c) applies equally to claim 12.

192. As noted in the analysis of Lai and Santi with respect to claim 5 limitation (c), the pump can be signaled for thermal modulation:

193. 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. 1012, ¶98.

194. Santi teaches, “... 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. 1010, ¶¶0089, 0092, claims 10-14.

195. Accordingly, Coccia in view of one or more of the knowledge of a

POSA, Lai, Santi, and/or Anson renders claim 12 obvious.

13. Claim 13

- (a) “The infused beverage brewing assembly according to claim 12, wherein the electronic controller is operably configured to send a control signal to the solvent temperature management system to dynamically and thermally modulate the solvent disposed within the first solvent conduit with respect to a brew parameter that includes at least one of an overall time and dispensed volume of the infused beverage.”**

196. Claim 13 is almost identical to the language of claim 9. Accordingly, the above analysis regarding claim 9 applies equally to claim 13.

197. Accordingly, Coccia in view of one or more of the knowledge of a POSA, Lai, Santi, and/or Anson renders claim 13 obvious.

14. Claim 14

- (a) **“The infused beverage brewing assembly according to claim 12, further comprising: a resulting solvent valve disposed upstream of the brewing chamber, downstream of the conduit joint, and in fluid communication with the resulting solvent conduit, the valve operably configured to selectively have a closed state inhibiting flow of the resulting solvent to the brewing chamber and an active state that includes a first selective directional flow path directing the flow of the resulting solvent to a removal conduit without passing the resulting solvent through the brewing chamber and a second selective directional flow path directing the flow of the resulting solvent to the brewing chamber, thereby enabling resulting solvent delivered to the brewing chamber at a desired temperature.”**

198. Claim 14 is almost identical to the language of claim 1 limitations (g), (h), (i), and (j). The only significant difference is that claim 1’s term “in fluid communication with the solvent conduit” has been changed in claim 14 to “in fluid communication with the resulting solvent conduit.” The analysis of claim 1 addresses the “resulting” solvent conduit.

199. Accordingly, the above analysis regarding claim 1 limitations (g), (h), (i), and (j) applies equally to claim 14.

200. Accordingly, Coccia in view of one or more of the knowledge of a POSA, Lai, Santi, and/or Anson renders claim 14 obvious.

15. Claim 15

- (a) **“The infused beverage brewing assembly according to claim 14, wherein: the temperature measuring device is coupled to and in fluid communication with the resulting solvent conduit and operably configured to measure the resulting solvent temperature and communicate the resulting solvent temperature to the electronic controller.”**

201. Claim 15 is almost identical to the language of claim 3. Accordingly, the above analysis regarding claim 3 applies equally to claim 15.

202. Accordingly, Coccia in view of one or more of the knowledge of a POSA, Lai, Santi, and/or Anson renders claim 15 obvious.

16. Claim 16

- (a) **“The infused beverage brewing assembly according to claim 15, wherein: the electronic controller communicatively is coupled to the solvent temperature modulation system, the valve, the temperature measuring device, the electronic controller operably configured to at least one of dynamically modulate the solvent temperature modulation system and selectively maintain the valve in the first selective directional flow path of the active state until the desired temperature of the resulting solvent is ascertained by the temperature measuring device, the electronic controller selectively switching from the first selective directional flow path of the active state to the second selective directional flow path of the active state.”**

203. Claim 16 is almost identical to the language of claim 4. Accordingly, the above analysis regarding claim 4 applies equally to claim 16.

204. Accordingly, Coccia in view of one or more of the knowledge of a POSA, Lai, Santi, and/or Anson renders claim 16 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 26, 2024, in
Wakefield, Massachusetts,

By: _____



Ian Tinkler, IEng MIED

REFERENCES

Exhibit	Description
1001	U.S. Patent No. 10,772,456
1003	European Patent Publication EP 2 612 577 A1 (“Buttiker”)
1004	Translation of European Patent Publication EP 2 612 577 A1
1005	Declaration Certifying Translation of European Patent Publication EP 2 612 577 A1
1006	U.S. Patent Application Publication No. 2011/0097454A1 (“Coccia”)
1007	File History for U.S. Pat. App. Serial No. 16/383,607
1008	U.S. Patent No. 8,973,487 B2 (collectively with Ex. 1009, “Startz”)
1009	U.S. Patent Application Publication No. 2012/0291634A1 (collectively with Ex. 1008, “Startz”)
1010	U.S. Patent Application Publication No. 2014/0053734A1 (“Santi”)
1011	International Publication No. WO2012/146660A1
1012	U.S. Patent Application Publication No. 2012/0171332A1 (“Lai”)
1013	International Publication No. WO2011/151703A2 (“Majer”)
1014	International Publication No. WO2011/158131A1 (“Porzio”)
1015	File History for U.S. Pat. App. Serial No. 61/742,688
1016	Patent Owner Infringement Contention Pleading
1017	Patent Owner Claim Chart for 456 Patent
1018	U.S. Patent Application Publication No. 2006/0042470A1 (“Anson”)
1019	European Patent Publication 1 986 530 B1 (“Aigner”)
1020	Translation of European Patent Publication 1 986 530 B1
1021	Declaration Certifying Translation of European Patent Publication 1 986 530 B1
1022	U.S. Patent Application Publication No. 2008/0050480 (“Majer II”)
1023	International Publication WO/2013/003891A1 (“White”)

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

Decent Espresso International Ltd., Exhibit 1002
Page 1002-99

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