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1118007

THE UNITED STATES OF AMERICA

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February 04, 2021

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APPLICATION NUMBER: 63/068,292

FILING DATE: August 20, 2020

RELATED PCT APPLICATION NUMBER: PCT/US21/13412

THE COUNTRY CODE AND NUMBER OF YOUR PRIORITY APPLICATION, TO BE USED FOR FILING ABROAD UNDER THE PARIS CONVENTION, IS US63/068,292



Certified by

Anders Ivarsson

Under Secretary of Commerce
for Intellectual Property
and Director of the United States
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Application Number: 63068292

Document Date: 08/20/2020

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Application Data Sheet 37 CFR 1.76		Attorney Docket Number	SBUX1.536PR2
		Application Number	
Title of Invention	AUTOMATED DISPENSING SYSTEM FOR CUSTOMIZED BEVERAGES		
The application data sheet is part of the provisional or nonprovisional application for which it is being submitted. The following form contains the bibliographic data arranged in a format specified by the United States Patent and Trademark Office as outlined in 37 CFR 1.76. This document may be completed electronically and submitted to the Office in electronic format using the Electronic Filing System (EFS) or the document may be printed and included in a paper filed application.			

Secrecy Order 37 CFR 5.2:

☐	Portions or all of the application associated with this Application Data Sheet may fall under a Secrecy Order pursuant to 37 CFR 5.2 (Paper filers only. Applications that fall under Secrecy Order may not be filed electronically.)
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Inventor Information:

Inventor	1				Remove
Legal Name					
Prefix	Given Name	Middle Name	Family Name	Suffix	
	Natarajan		Venkatakrishnan		
Residence Information (Select One) ☒ US Residency ☐ Non US Residency ☐ Active US Military Service					
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	Andrew		Corlett		
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Postal Code	98134	Country i	US		
Inventor	3				Remove
Legal Name					
Prefix	Given Name	Middle Name	Family Name	Suffix	
	Jonathan		Levey		
Residence Information (Select One) ☒ US Residency ☐ Non US Residency ☐ Active US Military Service					

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Application Data Sheet 37 CFR 1.76		Attorney Docket Number	SBUX1.536PR2		
		Application Number			
Title of Invention	AUTOMATED DISPENSING SYSTEM FOR CUSTOMIZED BEVERAGES				
City	Kirkland	State/Province	WA	Country of Residence	US
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Address 1	2401 Utah Avenue South				
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Postal Code	98134	Country	US		
All Inventors Must Be Listed - Additional Inventor Information blocks may be generated within this form by selecting the Add button.				Add	

Correspondence Information:

Enter either Customer Number or complete the Correspondence Information section below. For further information see 37 CFR 1.33(a).			
☐ An Address is being provided for the correspondence Information of this application.			
Customer Number	20995		
Email Address	efiling@knobbe.com	Add Email	Remove Email

Application Information:

Title of the Invention	AUTOMATED DISPENSING SYSTEM FOR CUSTOMIZED BEVERAGES		
Attorney Docket Number	SBUX1.536PR2	Small Entity Status Claimed	☐
Application Type	Provisional		
Subject Matter	Utility		
Total Number of Drawing Sheets (if any)	32	Suggested Figure for Publication (if any)	

Filing By Reference:

Only complete this section when filing an application by reference under 35 U.S.C. 111(c) and 37 CFR 1.57(a). Do not complete this section if application papers including a specification and any drawings are being filed. Any domestic benefit or foreign priority information must be provided in the appropriate section(s) below (i.e., "Domestic Benefit/National Stage Information" and "Foreign Priority Information").

For the purposes of a filing date under 37 CFR 1.53(b), the description and any drawings of the present application are replaced by this reference to the previously filed application, subject to conditions and requirements of 37 CFR 1.57(a).

Application number of the previously filed application	Filing date (YYYY-MM-DD)	Intellectual Property Authority or Country

Publication Information:

☐ Request Early Publication (Fee required at time of Request 37 CFR 1.219)
☐ Request Not to Publish. I hereby request that the attached application not be published under 35 U.S.C. 122(b) and certify that the invention disclosed in the attached application has not and will not be the subject of an application filed in another country, or under a multilateral international agreement, that requires publication at eighteen months after filing.

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Application Data Sheet 37 CFR 1.76		Attorney Docket Number	SBUX1.536PR2
		Application Number	
Title of Invention	AUTOMATED DISPENSING SYSTEM FOR CUSTOMIZED BEVERAGES		

Representative Information:

Representative information should be provided for all practitioners having a power of attorney in the application. Providing this information in the Application Data Sheet does not constitute a power of attorney in the application (see 37 CFR 1.32). Either enter Customer Number or complete the Representative Name section below. If both sections are completed the customer Number will be used for the Representative Information during processing.

Please Select One:	☒ Customer Number	☐ US Patent Practitioner	☐ Limited Recognition (37 CFR 11.9)
Customer Number	20995		

Domestic Benefit/National Stage Information:

This section allows for the applicant to either claim benefit under 35 U.S.C. 119(e), 120, 121, 365(c), or 386(c) or indicate National Stage entry from a PCT application. Providing benefit claim information in the Application Data Sheet constitutes the specific reference required by 35 U.S.C. 119(e) or 120, and 37 CFR 1.78. When referring to the current application, please leave the "Application Number" field blank.

Prior Application Status		Remove	
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)
Additional Domestic Benefit/National Stage Data may be generated within this form by selecting the Add button.			Add

Foreign Priority Information:

This section allows for the applicant to claim priority to a foreign application. Providing this information in the application data sheet constitutes the claim for priority as required by 35 U.S.C. 119(b) and 37 CFR 1.55. When priority is claimed to a foreign application that is eligible for retrieval under the priority document exchange program (PDX)ⁱ the information will be used by the Office to automatically attempt retrieval pursuant to 37 CFR 1.55(i)(1) and (2). Under the PDX program, applicant bears the ultimate responsibility for ensuring that a copy of the foreign application is received by the Office from the participating foreign intellectual property office, or a certified copy of the foreign priority application is filed, within the time period specified in 37 CFR 1.55(g)(1).

Application Number	Country ⁱ	Filing Date (YYYY-MM-DD)	Access Code ^j (if applicable)	Remove
Additional Foreign Priority Data may be generated within this form by selecting the Add button.				Add

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Application Data Sheet 37 CFR 1.76		Attorney Docket Number	SBUX1.536PR2
		Application Number	
Title of Invention	AUTOMATED DISPENSING SYSTEM FOR CUSTOMIZED BEVERAGES		

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications

☐	This application (1) claims priority to or the benefit of an application filed before March 16, 2013 and (2) also contains, or contained at any time, a claim to a claimed invention that has an effective filing date on or after March 16, 2013. NOTE: By providing this statement under 37 CFR 1.55 or 1.78, this application, with a filing date on or after March 16, 2013, will be examined under the first inventor to file provisions of the AIA.
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Application Data Sheet 37 CFR 1.76		Attorney Docket Number	SBUX1.536PR2
		Application Number	
Title of Invention	AUTOMATED DISPENSING SYSTEM FOR CUSTOMIZED BEVERAGES		

Authorization or Opt-Out of Authorization to Permit Access:

When this Application Data Sheet is properly signed and filed with the application, applicant has provided written authority to permit a participating foreign intellectual property (IP) office access to the instant application-as-filed (see paragraph A in subsection 1 below) and the European Patent Office (EPO) access to any search results from the instant application (see paragraph B in subsection 1 below).

Should applicant choose not to provide an authorization identified in subsection 1 below, applicant **must opt-out** of the authorization by checking the corresponding box A or B or both in subsection 2 below.

NOTE: This section of the Application Data Sheet is **ONLY** reviewed and processed with the **INITIAL** filing of an application. After the initial filing of an application, an Application Data Sheet cannot be used to provide or rescind authorization for access by a foreign IP office(s). Instead, Form PTO/SB/39 or PTO/SB/69 must be used as appropriate.

1. Authorization to Permit Access by a Foreign Intellectual Property Office(s)

A. Priority Document Exchange (PDX) - Unless box A in subsection 2 (opt-out of authorization) is checked, the undersigned hereby **grants the USPTO authority** to provide the European Patent Office (EPO), the Japan Patent Office (JPO), the Korean Intellectual Property Office (KIPO), the State Intellectual Property Office of the People's Republic of China (SIPO), the World Intellectual Property Organization (WIPO), and any other foreign intellectual property office participating with the USPTO in a bilateral or multilateral priority document exchange agreement in which a foreign application claiming priority to the instant patent application is filed, access to: (1) the instant patent application-as-filed and its related bibliographic data, (2) any foreign or domestic application to which priority or benefit is claimed by the instant application and its related bibliographic data, and (3) the date of filing of this Authorization. See 37 CFR 1.14(h)(1).

B. Search Results from U.S. Application to EPO - Unless box B in subsection 2 (opt-out of authorization) is checked, the undersigned hereby **grants the USPTO authority** to provide the EPO access to the bibliographic data and search results from the instant patent application when a European patent application claiming priority to the instant patent application is filed. See 37 CFR 1.14(h)(2).

The applicant is reminded that the EPO's Rule 141(1) EPC (European Patent Convention) requires applicants to submit a copy of search results from the instant application without delay in a European patent application that claims priority to the instant application.

2. Opt-Out of Authorizations to Permit Access by a Foreign Intellectual Property Office(s)

☐ A. Applicant **DOES NOT** authorize the USPTO to permit a participating foreign IP office access to the instant application-as-filed. If this box is checked, the USPTO will not be providing a participating foreign IP office with any documents and information identified in subsection 1A above.

☐ B. Applicant **DOES NOT** authorize the USPTO to transmit to the EPO any search results from the instant patent application. If this box is checked, the USPTO will not be providing the EPO with search results from the instant application.

NOTE: Once the application has published or is otherwise publicly available, the USPTO may provide access to the application in accordance with 37 CFR 1.14.

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	SBUX1.536PR2
		Application Number	
Title of Invention	AUTOMATED DISPENSING SYSTEM FOR CUSTOMIZED BEVERAGES		

Applicant Information:

Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.

Applicant	1	Remove
If the applicant is the inventor (or the remaining joint inventor or inventors under 37 CFR 1.45), this section should not be completed. The information to be provided in this section is the name and address of the legal representative who is the applicant under 37 CFR 1.43; or the name and address of the assignee, person to whom the inventor is under an obligation to assign the invention, or person who otherwise shows sufficient proprietary interest in the matter who is the applicant under 37 CFR 1.46. If the applicant is an applicant under 37 CFR 1.46 (assignee, person to whom the inventor is obligated to assign, or person who otherwise shows sufficient proprietary interest) together with one or more joint inventors, then the joint inventor or inventors who are also the applicant should be identified in this section.		
Clear		
☒ Assignee	Legal Representative under 35 U.S.C. 117	Joint Inventor
Person to whom the inventor is obligated to assign.		Person who shows sufficient proprietary interest
If applicant is the legal representative, indicate the authority to file the patent application, the inventor is:		
Name of the Deceased or Legally Incapacitated Inventor:		
If the Applicant is an Organization check here. ☒		
Organization Name	Starbucks Corporation	
Mailing Address Information For Applicant:		
Address 1	2401 Utah Avenue South	
Address 2		
City	Seattle	State/Province
Country	US	Postal Code
Phone Number		Fax Number
Email Address		
Additional Applicant Data may be generated within this form by selecting the Add button. Add		

Assignee Information including Non-Applicant Assignee Information:

Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	SBUX1.536PR2
	Application Number	
Title of Invention	AUTOMATED DISPENSING SYSTEM FOR CUSTOMIZED BEVERAGES	

Assignee	1
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Complete this section if assignee information, including non-applicant assignee information, is desired to be included on the patent application publication. An assignee-applicant identified in the "Applicant Information" section will appear on the patent application publication as an applicant. For an assignee-applicant, complete this section only if identification as an assignee is also desired on the patent application publication.

Remove

If the Assignee or Non-Applicant Assignee is an Organization check here. ☐

Prefix	Given Name	Middle Name	Family Name	Suffix

Mailing Address Information For Assignee including Non-Applicant Assignee:

Address 1				
Address 2				
City		State/Province		
Country i		Postal Code		
Phone Number		Fax Number		
Email Address				

Additional Assignee or Non-Applicant Assignee Data may be generated within this form by selecting the Add button.

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Signature:

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NOTE: This Application Data Sheet must be signed in accordance with 37 CFR 1.33(b). However, if this Application Data Sheet is submitted with the **INITIAL** filing of the application and either box A or B is not checked in subsection 2 of the "Authorization or Opt-Out of Authorization to Permit Access" section, then this form must also be signed in accordance with 37 CFR 1.14(c).

This Application Data Sheet **must** be signed by a patent practitioner if one or more of the applicants is a **juristic entity** (e.g., corporation or association). If the applicant is two or more joint inventors, this form must be signed by a patent practitioner, **all** joint inventors who are the applicant, or one or more joint inventor-applicants who have been given power of attorney (e.g., see USPTO Form PTO/AIA/81) on behalf of **all** joint inventor-applicants.

See 37 CFR 1.4(d) for the manner of making signatures and certifications.

Signature	/Michael R. Christensen/		Date (YYYY-MM-DD)	2020-08-20
First Name	Michael R.	Last Name	Christensen	Registration Number
				57505

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Application Data Sheet 37 CFR 1.76		Attorney Docket Number	SBUX1.536PR2
		Application Number	
Title of Invention	AUTOMATED DISPENSING SYSTEM FOR CUSTOMIZED BEVERAGES		

This collection of information is required by 37 CFR 1.76. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 23 minutes to complete, including gathering, preparing, and submitting the completed application data sheet form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these records.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

THE FOLLOWING IS CLAIMED:

1. A dispensing system comprising:
 - a housing;
 - a plurality of modular dispensers configured to interface with the housing, each of the plurality of modular dispensers is configured to store an ingredient;
 - a main controller within the housing, the main controller configured to communicate instructions to at least one of the plurality of modular dispensers, the instructions including a pump variable for dispensing ingredient from the at least one of the plurality of modular dispensers.
2. The dispensing system of Claim 1, wherein the pump variable comprises speed and/or timing.
3. The dispensing system of Claim 1 or 2, wherein the pump variable is dependent on the ingredient stored in the at least one of the plurality of modular dispensers.
4. The dispensing system of Claim 3, wherein the ingredient stored in the at least one of the plurality of modular dispensers is identified by the user using a user input device on the dispensing system.
5. The dispensing system of Claim 3, wherein the ingredient stored in the at least one of the plurality of modular dispensers is identified by the user an external device remote from the dispensing system.
6. The dispensing system of Claim 3, wherein the ingredient stored in the at least one of the plurality of modular dispensers is identified by a sensing device.
7. The dispensing system of any one of the preceding claims, wherein each of the plurality of modular dispensers comprises a pump system having a motor.
8. The dispensing system of Claim 7, wherein when a speed of the motor is above an operating limit, the pump is configured to continually pump until the speed of the motor falls below the operating limit.
9. The dispensing system of any one of the preceding claims, further comprising a common power supply within the housing, the common power supply configured to supply power to each of the plurality of modular dispensers.
10. The dispensing system of any one of the preceding claims, wherein each of the plurality of modular dispensers is configured to be manually operated.

11. A dispensing system comprising:

a housing;

a plurality of modular dispensers configured to interface with the housing,
each of the plurality of modular dispensers is configured to store an ingredient;

a main controller within the housing, the main controller configured to
communicate instructions to at least one of the plurality of modular dispensers, the
instructions including a quantity of the ingredient to be dispensed from the at least
one of the plurality of modular dispensers.

12. The dispensing system of Claim 11, wherein the plurality of modular dispensers
comprises a first modular dispenser and a second modular dispenser, and wherein the
controller is configured to communicate instructions to the first modular dispenser to
dispense a first quantity of the ingredient in the first modular dispenser and communicate
instructions to the second modular dispenser to dispense a second quantity of the ingredient
in the second modular dispenser.

13. The dispensing system of Claim 11 or 12, wherein the controller receives an
instruction from a point of sale system.

14. The dispensing system of any one of Claims 11 to 13, wherein each of the
plurality of modular dispensers comprises a display.

15. The dispensing system of Claim 14, wherein the display is configured to display
one or more light indicators indicative of the quantity of the ingredient to be dispensed.

16. The dispensing system of Claim 14, wherein the display is configured to
numerically display the quantity of the ingredient to be dispensed.

17. The dispensing system of any one of Claims 14 to 16, wherein the display is
configured to indicate a sequence for dispensing ingredient from the at least one of the
plurality of modular dispensers.

18. The dispensing system of any one of Claims 11 to 13, wherein the dispensing
system comprises a single display on the housing.

19. A dispensing system comprising:

a housing;

a plurality of modular dispensers configured to interface with the housing,
each of the plurality of modular dispensers comprises:

a tray configured to store an ingredient; and

a dispensing outlet configured to dispense the ingredient;

wherein the plurality of modular dispensers comprises a first dispenser stacked on top of a second dispenser, and wherein the dispensing outlet of the first dispenser is offset from a dispensing outlet of the second dispenser in a front-to-rear direction.

20. The dispensing system of Claim 19, wherein each of the plurality of modular dispensers comprises a pump.

21. The dispensing system of Claim 20, wherein the pump is a peristaltic pump.

22. A dispensing system comprising:

a housing;

a plurality of modular dispensers configured to interface with the housing, each of the plurality of modular dispensers comprises a user input device; and

a main controller within the housing, the main controller configured to communicate instructions to at least one of the plurality of modular dispensers to dispense ingredient.

23. The dispensing system of Claim 22, wherein the user input device enables the user to select an ingredient stored in each of the plurality of modular dispensers.

24. The dispensing system of Claim 23, wherein the main controller is configured to receive instructions from a network interface for each of the plurality of modular dispensers based on the selected ingredient.

25. The dispensing system of Claim 24, wherein the instructions received from the network interface include a pump variable for dispensing the selected ingredient from each of the plurality of modular dispensers.

26. The dispensing system of any one of Claims 22 to 25, wherein the user input device enables the user to adjust a quantity of the ingredient to be dispensed.

27. The dispensing system of Claim 26, wherein upon actuation of the user input device, the at least one of the plurality of modular dispensers dispenses the ingredient.

28. The dispensing system of Claim 27, wherein each actuation of the user input device is configured to dispense a single pump of the ingredient from the at least one of the plurality of modular dispensers.

29. The dispensing system of Claim 27, wherein each actuation of the user input device is configured to dispense multiple pumps of the ingredient from the at least one of the plurality of modular dispensers.

30. A dispensing system comprising:

- a housing;

- a plurality of modular dispensers configured to interface with the housing, each of the plurality of modular dispensers is configured to store an ingredient;

- a main controller within the housing, the main controller configured to communicate instructions to at least one of the plurality of modular dispensers, the instructions including a pump variable for cleaning the at least one of the plurality of modular dispensers.

31. The dispensing system of Claim 30, wherein the plurality of modular dispensers comprises a first modular dispenser and a second modular dispenser, and wherein the controller is configured to communicate instructions including a first pump variable to the first modular dispenser and communicate instructions including a second pump variable to the second modular dispenser.

32. An automated beverage production system comprising:

- a dispensing system comprising:

- a housing;

- a plurality of modular dispensers configured to interface with the housing, each of the plurality of modular dispensers comprises a user input device; and

- a main controller within the housing, the main controller configured to communicate instructions to at least one of the plurality of modular dispensers to dispense ingredient;

- a store production controller configured to receive beverage order information from a point of sale system and to separate each beverage item ordered into individual beverage item orders comprising the beverage name and any modifier information;

- an aggregator communicatively coupled to the store production controller and to the main controller of the dispensing system,

- wherein the aggregator is configured to:

receive an individual beverage item order from the store production controller;

display an icon on a display screen of the aggregator corresponding to a beverage identified from the individual beverage item order;

receive a user selection of the icon via touch screen interaction with the display screen; and

send instructions to the main controller of the dispensing system to prepare and dispense the beverage identified from the individual beverage item order upon receipt of the user selection of the icon corresponding to the beverage.

33. The system of Claim 32, wherein the aggregator is configured to communicate with the store production controller via a wireless communication network.

34. The system of Claim 32, wherein the aggregator is configured to communicate with the store production controller via a wired Ethernet communication network.

35. The system of any one of Claims 32 to 34, wherein the aggregator is configured to communicate with the main controller of the dispensing system over a serial communications bus.

36. The system of any one of Claims 32 to 35, wherein the aggregator is further configured to send information corresponding to the individual beverage item order to a label printer communicatively coupled to the aggregator.

37. An automated order fulfillment system comprising:

a store production controller configured to receive food and beverage order information from a point of sale system and to separate each food and beverage item ordered into separate individual item orders comprising the name of the food or beverage item and any modifier information;

an aggregator communicatively coupled to the store production controller and to an automated dispensing system,

wherein the aggregator is configured to:

receive an individual item order from the store production controller;

display an icon on a display screen of the aggregator corresponding to an item identified from the individual item order;

receive a user selection of the icon via touch screen interaction with the display screen; and

send instructions to the automated dispensing system to prepare and dispense the item identified from the individual item order upon receipt of the user selection of the icon corresponding to the item.

38. The system of Claim 37, wherein the aggregator is configured to communicate with the store production controller via a wireless communication network.

39. The system of Claim 37 or Claim 38, wherein the aggregator is configured to communicate with the automated dispensing system over a serial communications bus.

40. The system of any one of Claims 37 to 39, wherein the aggregator is further configured to send information corresponding to the individual beverage item order to a label printer communicatively coupled to the aggregator.

41. The system of any one of Claims 37 to 40, wherein the automated dispensing system comprises a plurality of modular dispensers each configured to dispense a particular ingredient.

42. The system of any one of Claims 32 to 41, wherein the aggregator comprises a processor and software containing instructions stored in memory on a non-transitory storage medium, wherein the processor is configured to execute the instructions.

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AUTOMATED DISPENSING SYSTEM FOR CUSTOMIZED BEVERAGES**FIELD**

[0001] An automated dispensing platform for creating customized beverages.

BRIEF DESCRIPTION OF THE DRAWINGS

[0002] Figures 1 and 2 illustrate prior art pump containers.

[0003] Figures 3 and 3A illustrate automated dispensing systems.

[0004] Figure 4 illustrates a modular dispenser that may be used with the automated dispensing systems shown in Figure 3.

[0005] Figures 5-8 illustrate partial exploded views of a modular dispenser shown in Figure 4.

[0006] Figure 9 illustrates a cross-section of a modular dispenser.

[0007] Figure 10 illustrates stacked modular dispensers.

[0008] Figure 11 illustrates a label plate for a modular dispenser.

[0009] Figure 12 illustrates a rear view of the dispensing system shown in Figure 3.

[0010] Figure 13 shows a block diagram of the dispensing system.

[0011] Figure 14 shows a flow diagram of an automated mode of the dispensing system.

[0012] Figure 15 illustrates individual modular dispensers with light indicators.

[0013] Figure 15A shows a block diagram of a modular dispenser shown in Figure 15.

[0014] Figure 16 illustrates the automated dispensing system.

[0015] Figure 17 illustrates a partial enlarged view of a user interface of an individual modular dispenser.

[0016] Figure 18 shows a flow diagram of an automated mode of the dispensing system.

[0017] Figure 19 shows a flow diagram for cleaning a modular dispenser.

[0018] Figure 20 shows a block diagram of a manually operable modular dispenser.

[0019] Figure 21 illustrates a modular dispenser that may be used with the automated dispensing systems shown in Figure 3.

[0020] Figures 22-27 illustrate partial exploded views of the modular dispenser shown in Figure 20.

[0021] Figures 28A-28D schematically illustrates an aggregator of an automated dispensing system and operation of the aggregator.

[0022] Various embodiments are depicted in the accompanying drawings for illustrative purposes, and should in no way be interpreted as limiting the scope of the embodiments. Furthermore, various features of different disclosed embodiments can be combined to form additional embodiments, which are part of this disclosure.

DETAILED DESCRIPTION

[0023] Coffee or tea beverages usually have a base of coffee or tea extracts mixed with dairy enhanced by a variety of textures, tastes and aromas. One can create different textures, tastes and aromas by adding different quantities of sauces, syrups and flavors or adding the same in different sequences. For example, to create a menu offering of 70 handcrafted coffee beverages, there may be 10 flavors, 2 syrups and 7 sauces. Flavors are usually alcohol based. Examples of some flavors are vanilla, toffee nut, and hazelnut. Sauces are usually multiple ingredients blended together in a water solution. Examples of some sauces are white chocolate mocha, chai and mocha. Syrups are usually liquid forms of sugar or sugar free substitutes.

[0024] Currently, flavors, sauces, and syrups are dispensed using disposable mechanical pumps as shown in Figure 1 or reusable mechanical pumps as shown in Figure 2. The syrup, sauce or flavor is filled in the pump containers 2 and 4. The barista pumps the flavor, sauce or syrup by pushing down on the pump levers 1 and 2 to dispense fixed volumes of flavors, sauces and syrups thru the pump nozzles 5 and 6.

[0025] Sauces are inherently dense and viscous. Hence, it requires a lot of effort to push down on the pump lever. For very viscous sauces, forces in excess of 20lbs to 30lbs are required. For a barista making hundreds of beverages, pumping sauces frequently with this high force leads to arm fatigue and injuries.

[0026] A recipe for a creamy coffee beverage could be to dispense hot espresso coffee extract into a cup, followed by two pumps of vanilla syrup, followed by a pump of

white chocolate mocha sauce, followed by a fixed volume of steamed almond milk and finished with two pumps of toffee nut flavor. The recipe for a non-creamy beverage would be the same ingredients and quantities but dispensed in a different order, e.g., dispense a pump of white chocolate mocha sauce, followed by two pumps of vanilla syrup, followed by a fixed volume of steamed almond milk and followed with two pumps of toffee nut flavor and finished by dispensing a hot espresso coffee extract on top. Different beverages are made not only by varying the type and quantities of sauces, syrups and flavors, but also by changing the order in which they are added to the beverage.

[0027] A coffee store may offer a menu with 80 – 100 hand crafted beverages. This means that each barista must memorize the recipes for each of the 80 – 100 beverages, including the sauces, syrups and flavors in each beverage, the number of pumps, and the order in which the ingredients are added. This creates a lot of complexity and memorization effort which creates a challenge to increase the size and variety of the menu.

[0028] If the coffee store uses disposable pumps as shown in Figure 1, it leads to negative environmental impact due to discarding of the plastic containers. If the coffee store uses reusable pumps as in Figure 2, then the pumps must be disassembled and cleaned every week, which requires a lot of manual effort. In addition, each pump is customized to the sauce, syrup, and flavor being dispensed because of their unique density and viscosity. Errors happen when the sauce, syrup or flavor is filled in the wrong container.

[0029] When a coffee store introduces a new beverage recipe that uses a new type of sauce, syrup, or flavor, it must procure a new pump system customized to the new ingredient. This is expensive as a new container needs to be manufactured and filled for every new type of ingredient. This leads to lot of complexity in the store as the store must procure, store, and use a variety of pumps for all the sauces, syrups and flavors. The baristas must also be retrained on the new recipe.

[0030] Customers like to adjust the amount of sauce, syrup, and flavor in their beverages to suit their taste and health needs. A customer may want half the sugar and twice the amount of vanilla flavor in the beverage. The current pump systems allow the reduction in discrete number of pumps, but do not allow for a fraction of a pump of syrup, sauce, or flavor. This is inherently problematic as customers want more customization with precise control.

[0031] The systems described herein automate the dispensing of ingredients, for example, sauces, syrups, and flavor. The systems include modular dispensers that can dispense any type of ingredient without any force exerted by the barista. The user interface may guide the barista through the sequence of dispensing, thereby avoiding memorization of recipes, while doing away with the complexity of cleaning.

[0032] Figure 3 shows an automated dispensing system according to an embodiment of the present disclosure. Coffee espresso machines 7, 8 extract coffee liquor out of coffee beans. The automated dispensing system 9 may sit between two espresso machines, for easy access by two baristas working on each of the coffee espresso machines. The automated dispensing system 9 comprises one or more individual modular dispensers 10-16. The automated dispensing system 9 may include a shelf 17, for example between modular dispensers 15, 16 of the dispensing system 9, to store one or more manual pumps for less frequently used flavors. The individual modular dispensers 10-16 are modular and may be controlled from one or more controllers. For example, the individual modular dispensers 10-16 may be controlled from a single controller that supplies power and control signals to each of the modular dispensers.

[0033] Figure 3A shows another embodiment of the automated dispensing system with bottles instead of pumps. The system may include a central display screen as an alternative to, or in addition to, the display screens on the modular dispensers. The system may also include a water dispensation system.

[0034] Individual modular dispensers 10-16 may replace conventional manual pump systems with an electrical pump system to alleviate arm fatigue. As explained further below, the dispense instruction (e.g., number of pumps) may be input by an individual barista through a user input device on the modular dispenser or remote from the modular dispenser. Alternatively, the dispense instruction may be received from a point of sale system. Even when the dispense instruction is received from a point of sale system or other remote system, the user may be able to modify the dispense instruction manually.

[0035] Figure 4 shows an embodiment of individual modular dispensers 10-16 having a housing 18 that houses all the components of a respective modular dispenser 10-16. As shown in Figure 4, each modular dispenser 10-16 may include a display 19 that shows operational dispensing information for that modular dispenser 10-16 to the barista. The

information can include number of pumps being dispensed, volume being dispensed, amount of sauce left in the modular dispenser, cleaning status, etc. A display 19 showing the operational status of the modular dispenser enables the barista to react and change the settings, if required and/or desired. The display 19 can be in the form of light indicators, LEDs, LCD displays, OLED displays or any other form of display. Each modular dispenser 10-16 may include input devices 20, such as a lighted button input device. A barista can click the button or other input device to change the status/value on any of the icons on the display 19. This can also be accomplished by making the display 19 a touch screen, so that the barista can directly change values on the display by touching them with his or her finger. The display 19 will have the capability to show multiple languages. Other input devices 20 may include a switch, knob, wheel, slide key, capacitive touch sensor, voice recognition, remote input devices, etc.

[0036] Each modular dispenser 10-16 can be changed to dispense any ingredient by changing the pump speed, timing, volumetric dispensation, and algorithm of dispensing. This can be done remotely in the digital twin or can be done at the machine. For example, the ingredient in the modular dispenser can be identified using the user interface on the particular modular dispenser or the ingredient in the modular dispenser can be identified in the remote server. Once the appropriate ingredient is selected, the modular dispenser will be programmed with the necessary pump characteristics.

[0037] The modular dispenser can also have a sensing or reading device that can identify the ingredient (e.g., sauce, syrup, or flavor) being loaded into the modular dispenser and automatically program itself to dispense the ingredient (for example, the specific speed or timing needed for optimal dispensation). As one example, the modular dispenser can have a load cell to sense the ingredient based on weight. As another example, the identification of the ingredient can be a barcode, RFID tag, QR code or any other identifiable information on the packaging containing the ingredient.

[0038] The modular dispenser can be hot swapped with another modular dispenser, for example if a modular dispenser malfunctions, runs out of ingredient, or is in low demand. The new modular dispenser will adopt the dispensing characteristics of the replaced modular dispenser. The modular dispenser may include the same or different ingredient. The system will recognize the ingredient in the modular dispenser regardless of

the location of the modular dispenser within the system. Accordingly, the modular dispensers may be positioned in any order preferred by the store or individual barista.

[0039] Figures 5 and 6 show one possible construction of the modular dispenser 10-16. The modular dispenser 10-16 may include a tray 22 to hold the ingredient (e.g., sauce, syrup or flavor) to be dispensed. The ingredient can be poured into the tray 22 or can be loaded into the tray 22 in a bag holding the sauce. The tray 22 can be made from metal, plastic or a biodegradable material.

[0040] The tray 22 may be removably positioned in a housing 18. The modular dispenser housing 18 may include guiding features 23 incorporated into the housing 18 and/or tray 22 so that the tray 22 can be easily pushed in and pulled out of the housing 18.

[0041] The ingredient can be packaged into a bag with a valve that can be easily loaded into the dispensing tray 22. Figure 7 shows an ingredient bag 25 with a valve 26 that slides into the locating feature 27 on the tray 22.

[0042] As shown in Figure 8, each modular dispenser housing 18 may hold a removable pump frame that can slide in and out of the housing 18. The pump frame has a pump 28, such as a positive displacement pump including but not limited to a peristaltic pump, attached at the rear. Various type of pumps 28 can be used within the system to pump the ingredients. For example, the dispensing system 9 may include individual modular dispensers with two or more different types of pumps. A first set of modular dispensers may include a first type of pump for low viscosity and low density ingredients, and a second set of modular dispensers may include a second type of pump for high viscosity and high density ingredients.

[0043] The pump 28 draws in the ingredient through the inlet tube 29 and pumps the ingredient out through outlet tube 27 into a cup or pitcher thru the dispenser spout 33. The outlet tube 27 may include a flow meter to measure a volumetric dispensation of ingredient. The dispenser spout 33 may have special features to incorporate air or water into the pumped ingredient as the ingredient exits the spout 33. The inlet tube 29 terminates in a fluid connector 30.

[0044] This connector 30 may be a quick connect, e.g., the connector 30 should seal to the bag 25 in a leak proof manner as soon as a bag 25 is attached to the connector 30.

[0045] The pump 28, the display 19 and the input device 20 are connected to a main controller through a harness 31 that terminates in a connector 32. The harness 31 and connector 32 have the requisite conductors to transmit power and two-way communications to the pump 28, display 19, and input device 20. The pump 28, display 19, and input device 20 may or may not have embedded software to make these devices function. All the functional hardware and software to make these devices function could be built into the main controller.

[0046] The individual modular dispenser may have a self-priming mechanism that may be actuated by the user interface. Priming should only need to be initiated after cleaning cycle and upon refilling supply lines. Once the pump has been primed, the ingredients can be changed without losing prime.

[0047] The system can pump and dispense enough ingredient to fill all the input and output lines for the pump to prevent air pockets in the ingredient that will make dispensation inaccurate. When there is air in the outlet tube, it is easier to pump and the motor runs faster. The modular dispensing system can sense the motor speed to prime the system. If motor speed is high, it means there is air in the system, and the pump keeps pumping until the air pockets are pushed out and the speed drops to the normal operating limits.

[0048] Each modular dispenser can include a load cell at the bottom so that the system can sense a weight and alert a barista to change out a bag when ingredient is low without losing priming.

[0049] The modular dispenser 10-16 may be designed so that the ingredient can be easily dispensed into a pitcher, cups and glasses as shown in Figure 9. For example, a height and angle of the spout 33 may be positioned to facilitate dispensation of the ingredient.

[0050] As shown in Figure 10, the modular dispensers 10-16 may be designed so that two or more modular dispensers 10-16 can be stacked on top of each other using locating and locking features 34. The modular dispensers 10-16 may be stacked such that the spout of an upper modular dispenser is offset from the spout of a lower modular dispenser. For example, the spout of the lower modular dispenser may be rearward of the spout of the upper modular dispenser. This may be accomplished by staggering the position of the upper

modular dispenser relative to the lower modular dispenser. The offset prevents the spout of the upper modular dispenser from dripping onto the spout of the lower modular dispenser.

[0051] Each modular dispenser can include a badge 35 to show the ingredient in that particular modular dispenser as shown in Figure 11. The badge 35 can be fastened to the modular dispenser using magnets, adhesives or screws.

[0052] Figure 12 shows the rear of the dispensing system 9. In Figure 12, the individual modular dispensers 37 are controlled by a main, or central, controller 36. The central controller 36 has the processing capability and power required to run the individual modular dispensers 37. This makes the design cost-efficient and easily upgradeable. In this modular design, the controller 36 can be upgraded for features and functionality without upgrading the individual modular dispensers 37.

[0053] Figure 13 shows the controller architecture that can be used with the dispensing system 9. The main controller 38 can house the power supply 39 to power all the modular dispensers 45, the microprocessor 41 to process all algorithms, memory 40 to store recipes and algorithms, and motor driver hardware 42 to control the motors in the modular dispensers 45. The main controller 38 is connected to the individual modular dispensers 45 thru harnesses 43 with enough conductors to transmit power and communicate with the modular dispensers 45. The harness terminates in a sealed connector 44. The modular dispensers 45 have corresponding harnesses and connectors to interface with the main controller 38.

[0054] The housing holds may hold a common power supply and logic board separate from the individual modular dispensers 45. Each modular dispenser simply connects to the common control system through a connector. The modular dispensers 45 may be powered by a household plug in the country of use. The main controller 38 for the dispensing system also has a port for battery power, so that the system can be run on battery, when the main power is shut down. Each modular dispenser can be manually operated, for example hand cranked, to dispense ingredient in case of electronic malfunction or power outage (see Figure 20).

[0055] In certain embodiments, the main controller 38 not only makes the individual modular dispensers 45 dispense as per the recipes, but also keeps track of the system health and communicates with a remote server for recipe updates and software

upgrades. It can also schedule cleaning of the individual modular dispensers 45 based on the ingredient. The main controller 38 can be able to decode modular dispensers running simultaneously as well as a plurality of channels to communicate to pump modular dispensers.

[0056] The dispensing equipment controller of Figure 13 has a Wi-Fi and Ethernet interface to communicate with the Internet to receive information on new recipes and software and also transmit information on consumption of sauces and beverages being made to a remote server.

[0057] The main controller 38 can query the Wi-Fi or Ethernet access point in the location to find the store identity or location and store it in memory. This way it can transmit store specific information to the remote server. Recipes can also be sent from the remote server to the memory of the main controller 38 of the dispensing system.

[0058] The dispensing equipment can also maintain a digital version—the digital twin—of its functionality on a remote server. Changes to this digital twin can result in changes in software functionality in the dispensing system controller.

[0059] More modular dispensers can be added to the dispensing system by daisy chaining several controllers in series and connecting modular dispensers to them.

[0060] Location-specific dispensing algorithms can be incorporated into the dispensing controller. For example, a sauce dispense volume in one location could be half the dispense volume in another location.

[0061] In a simple manual mode, a barista can use the dispensing system 9 in Figure 3. The number of pumps of the ingredient being dispensed or the volume of ingredient being dispensed is shown on display 19 as in Figure 4. Using the input device 20, the barista can toggle to decrease or increase the number or pumps or volume being dispensed. When the barista has made the selection, a cup or other vessel is placed below the dispensing spout 21. The main controller 38 retrieves the algorithm for dispensation from its memory 40 and sends the power, dispense and display signals to the modular dispenser 45. The pump 28 in the modular dispenser 45 then dispenses the exact volume of ingredient into the vessel through the spout 21 when activated by the barista or upon detecting the vessel. Each actuation of a user input device may be equivalent to one dose or all the doses needed for that

particular beverage. The light indicators may also alert the barista that the bag is empty or maintenance is needed.

[0062] In the automated mode shown in Figure 14, the barista scans in the cup bar code or QR code 46 through an optical or digital scanner 47. The beverage information is then transmitted to the main controller 48 of the automated dispensing system 9. The main controller 48 retrieves the recipe from its memory or from a remote server, and then supplies power and the algorithm to the modular dispenser 45 to dispense the right amount of ingredient(s) when activated by the barista or upon detecting the vessel. The barista can adjust the amount of flavor based on the customer preference as shown in Figure 15. For example, the light indicators may show the number of pumps of ingredients desired by the customer. The light indicators or other indicator may indicate the number of pumps to be dispensed automatically or the instruct the barista of the number of pumps to be dispensed manually. Each actuation of a user input device may be equivalent to one dose or all the doses needed for that particular beverage. As the doses are dispensed, the display may decrease the number of remaining doses. The light indicators may also alert the barista that the bag is empty or maintenance is needed. Figure 15A shows a block diagram of the individual modular dispenser shown in Figure 15.

[0063] The automated dispensing system shown in Figure 16 can also prompt the barista to follow a sequence of dispensing by lighting up the display lights 46 – 49 in a sequential manner. When a light is on, the barista takes the cup to that modular dispenser to automatically or manually dispense ingredient. Multiple baristas can work with the system simultaneously, by changing the color of the light or other aspect of the indicator for each order. That way two or more baristas can be prompted on the beverage sequence at the same time.

[0064] As shown in Figure 17, the display 19 for the display modular dispensers can have multiple icons to indicate different operational parameters like cleaning 50, erroneous sauce bag loading 51 and the amount of sauce remaining in the dispenser 52, so that it can prompt the barista to change out the sauce bag before it is depleted.

[0065] The order can also originate remote from the dispensing system as in Figure 18. The order can originate in a remote server 53 or in a point of sale system 54 and

communicated to the controller 55 that can retrieve the recipe from memory and prompt the modular dispenser 56 to dispense the right amount of sauce.

[0066] Cleaning is an important part of the system as this equipment is used to dispense food substances. Cleaning can be prompted in a timely manner as shown in Figure 19. The cleaning prompt can originate remotely 57 or from the controller 59 or it can also be manually initiated by the barista 58. The controller can then send the individual modular dispenser a prompt to display the cleaning icon on the display. The barista then loads the cleaning solution in the dispenser tray 60 and directs the modular dispenser to go into cleaning mode 61. The modular dispenser completes the cleaning cycle and prompts the barista to reload the ingredient 62. The capability to have a cleaning cycle for each individual modular dispenser without any disassembly of the equipment is useful as each ingredient may have a different cleaning requirements.

[0067] Figure 21-27 illustrate another embodiment of the modular dispenser without a display screen. As shown in Figures 26 and 27, the pump frame may be removed to access the pump for maintenance.

[0068] Figures 28A-28D schematically illustrate a sample workflow or operation and show an example embodiment of an aggregator 63 that can be incorporated into or can be communicatively and operably coupled to the automated dispensing systems 9 described herein. The aggregator 63 may be configured to efficiently process customer orders to facilitate high throughput while maintaining quality control and accuracy of customer orders communicated to the automated dispensing system.

[0069] With reference to FIG. 28A, customer orders may be received by the point of sale system 54 from (1) a barista entering a customer order locally at the coffee store in response to oral instructions from a customer ordering at the in-store counter or via a drive-thru order, (2) a customer entering a customer order locally via an in-store self-service kiosk, (3) a customer using a mobile order and pay software application, (4) a customer using an online ordering method, and/or other source. FIG. 28A shows an example customer order 64 and the data or information that may be captured and received by the point of sale system 54. The customer order information may include, for example, a date, time, customer name, and the beverage and food items ordered by the customer, along with any modifiers (e.g., flavors, sauces, or syrups or reduction of sugar).

[0070] The point of sale system 54 may then send the customer order data to a server or store production controller 65. The server or store production controller 65 may be located in the coffee store and may be communicatively coupled to the point of sale system 54 via a communication cable (e.g., Ethernet cable) or via a wireless connection (e.g., Wi-Fi connection via a wireless network such as a local area network or a Bluetooth connection). In some implementations, the server or store production controller 65 may not be located in the coffee store and may be located at a remote location and communicatively coupled to the point of sale system 54 via a telecommunications network (e.g., the Internet, Telex network, wireless radio network, etc.).

[0071] The store production controller 65 is configured to, upon execution of instructions stored on a non-transitory storage medium, disaggregate the customer order data into separate, individual food or beverage item orders 66. Each individual item order 66 includes a customer order number, a customer name, a name of the food or beverage item, and a list of any requested modifiers for that food or beverage item.

[0072] With reference to FIG. 28B, each disaggregated individual item order 66 is sent to the aggregator in sequence. In several implementations, the individual item orders 66 may be published as webhooks (e.g., messages or notifications with information sent between network resources). The aggregator 63 includes software instructions stored in memory that are executed to cause an icon 67 associated with each individual item order 66 (at least the beverage item orders) to appear on a display screen 68 of the aggregator 63.

[0073] Turning to FIG. 28C, the display screen 68 may comprise a touch screen display (e.g., LCD or OLED display) that allows a barista or operator to both visualize output on the display screen 68 and to provide input to cause the aggregator to send control signals to the modular dispensers 45 of the automated dispensing system 9 (e.g., to the main controller 38). For example, a barista may select a beverage to be made by touching the display screen 68 at the location of the icon 67 corresponding to the beverage with his or her finger. The display screen 68 may be configured to have two pages or tabs. A first tab 69 may be configured to display pending customer orders and a second tab 70 may be configured to display completed orders.

[0074] Upon selection of an icon by the barista, the aggregator 63 is configured to send the beverage item data (e.g., beverage name and modifiers) corresponding to the

selected icon to the modular dispensers 45 (e.g., to the main controller 38,55 of an automated dispensing system 9 including the modular dispensers 45). The main controller 38,55 may then execute instructions to prepare the beverage based on the beverage item data received from the individual beverage item order 66 and based on recipe information for the particular beverage stored in memory (e.g., memory 40). The aggregator 63 may also send the beverage item data for each individual item order 66 to a label printer 71 (e.g., communicatively coupled via a wired or wireless connection, such as Ethernet, Wi-Fi or Bluetooth connection) so that a label can be automatically printed with the individual item order information and placed on a beverage cup or other vessel.

[0075] With reference to FIG. 28D, the aggregator 63 is a standalone unit or module having its own local processor or controller, memory, and display. The aggregator 63 may be implemented using hardware, software, and/or firmware. The aggregator 63 includes communications network interface hardware 72 (e.g., a wired Ethernet network interface card and/or one or more wireless network interface cards, such as a Wi-Fi and/or Bluetooth network interface card) to enable wired and/or wireless communications with the store production controller 53 or a remote server. The aggregator 63 also includes serial communications interface hardware 73 to facilitate one-way or two-way communication (e.g., data transmission, control signals) with the main controller 38,55 of the automated dispensing system 9 over a serial bus link. A parallel bus link may be used in alternative embodiments.

[0076] The aggregator 63 further includes local memory 74. The local memory 74 may store a backup copy of beverage recipes for the automated dispensing system 9 and may store firmware of the aggregator 63. The local memory may include, for example, RAM memory, flash memory, ROM memory, EPROM memory, EEPROM memory, and/or the like. The aggregator 63 may include user experience/user interface software 75 stored in memory to be executed by one or more processors (e.g., digital signal processor, microprocessor, graphics processing unit, special-purpose processor). The user experience/user interface software 74 may be executed to generate icons for display on the display screen 68 corresponding to various beverages, to generate the two tabs of pending orders and past orders, to react to touch screen input received from the barista, and to display and adjust content on the display screen 68 (e.g., display brightness, alerts, notices, etc.).

[0077] Although certain embodiments have been described herein in connection with flavors, sauces, or syrups for coffee or tea beverages, the systems described herein can be used for any type of ingredient or food product. For example, in some embodiments, the systems herein can be used to deliver fluid or solid ingredients, such as ketchup, mustard, barbecue sauce, cheese sauce, relish, onions, etc. In some embodiments, the systems herein can be used to produce other types of beverages such as sodas, juices, smoothies, milkshakes, etc.

[0078] Conditional language used herein, such as, among others, “can,” “might,” “may,” “e.g.,” and the like, unless specifically stated otherwise, or otherwise understood within the context as used, is generally intended to convey that some embodiments include, while other embodiments do not include, certain features, elements, and/or states. Thus, such conditional language is not generally intended to imply that features, elements, blocks, and/or states are in any way required for one or more embodiments or that one or more embodiments necessarily include logic for deciding, with or without author input or prompting, whether these features, elements and/or states are included or are to be performed in any particular embodiment.

[0079] Depending on the embodiment, certain acts, events, or functions of any of the processes or algorithms described herein can be performed in a different sequence, can be added, merged, or left out altogether (e.g., not all described operations or events are necessary for the practice of the algorithm). Moreover, in certain embodiments, operations or events can be performed concurrently.

[0080] The various illustrative logical blocks, modular dispensers, routines, and algorithm steps described in connection with the embodiments disclosed herein can be implemented as electronic hardware, computer software, or combinations of both. To clearly illustrate this interchangeability of hardware and software, various illustrative components, blocks, modular dispensers, and steps have been described above generally in terms of their functionality. Whether such functionality is implemented as hardware or software depends upon the particular application and design constraints imposed on the overall system. The described functionality can be implemented in varying ways for each particular application, but such implementation decisions should not be interpreted as causing a departure from the scope of the disclosure.

[0081] Moreover, the various illustrative logical blocks and modular dispensers described in connection with the embodiments disclosed herein can be implemented or performed by a machine, such as a general purpose processor device, a digital signal processor (DSP), an application specific integrated circuit (ASIC), a field programmable gate array (FPGA) or other programmable logic device, discrete gate or transistor logic, discrete hardware components, or any combination thereof designed to perform the functions described herein. A general purpose processor device can be a microprocessor, but in the alternative, the processor device can be a controller, microcontroller, or state machine, combinations of the same, or the like. A processor device can include electrical circuitry configured to process computer-executable instructions. In another embodiment, a processor device includes an FPGA or other programmable device that performs logic operations without processing computer-executable instructions. A processor device can also be implemented as a combination of computing devices, e.g., a combination of a DSP and a microprocessor, a plurality of microprocessors, one or more microprocessors in conjunction with a DSP core, or any other such configuration. Although described herein primarily with respect to digital technology, a processor device may also include primarily analog components. For example, some or all of the signal processing algorithms described herein may be implemented in analog circuitry or mixed analog and digital circuitry. A computing environment can include any type of computer system, including, but not limited to, a computer system based on a microprocessor, a mainframe computer, a digital signal processor, a portable computing device, a device controller, or a computational engine within an appliance, to name a few.

[0082] The elements of a method, process, routine, or algorithm described in connection with the embodiments disclosed herein can be embodied directly in hardware, in a software module executed by a processor device, or in a combination of the two. A software module can reside in RAM memory, flash memory, ROM memory, EPROM memory, EEPROM memory, registers, hard disk, a removable disk, a CD-ROM, or any other form of a non-transitory computer-readable storage medium. An exemplary storage medium can be coupled to the processor device such that the processor device can read information from, and write information to, the storage medium. In the alternative, the storage medium can be integral to the processor device. The processor device and the storage medium can

reside in an ASIC. The ASIC can reside in a user terminal. In the alternative, the processor device and the storage medium can reside as discrete components in a user terminal.

[0083] While the above detailed description has shown, described, and pointed out novel features as applied to various embodiments, it can be understood that various omissions, substitutions, and changes in the form and details of the devices or algorithms illustrated can be made without departing from the spirit of the disclosure. As can be recognized, certain embodiments described herein can be embodied within a form that does not provide all of the features and benefits set forth herein, as some features can be used or practiced separately from others. The scope of certain embodiments disclosed herein is indicated by the appended claims rather than by the foregoing description. All changes which come within the meaning and range of equivalency of the claims are to be embraced within their scope.

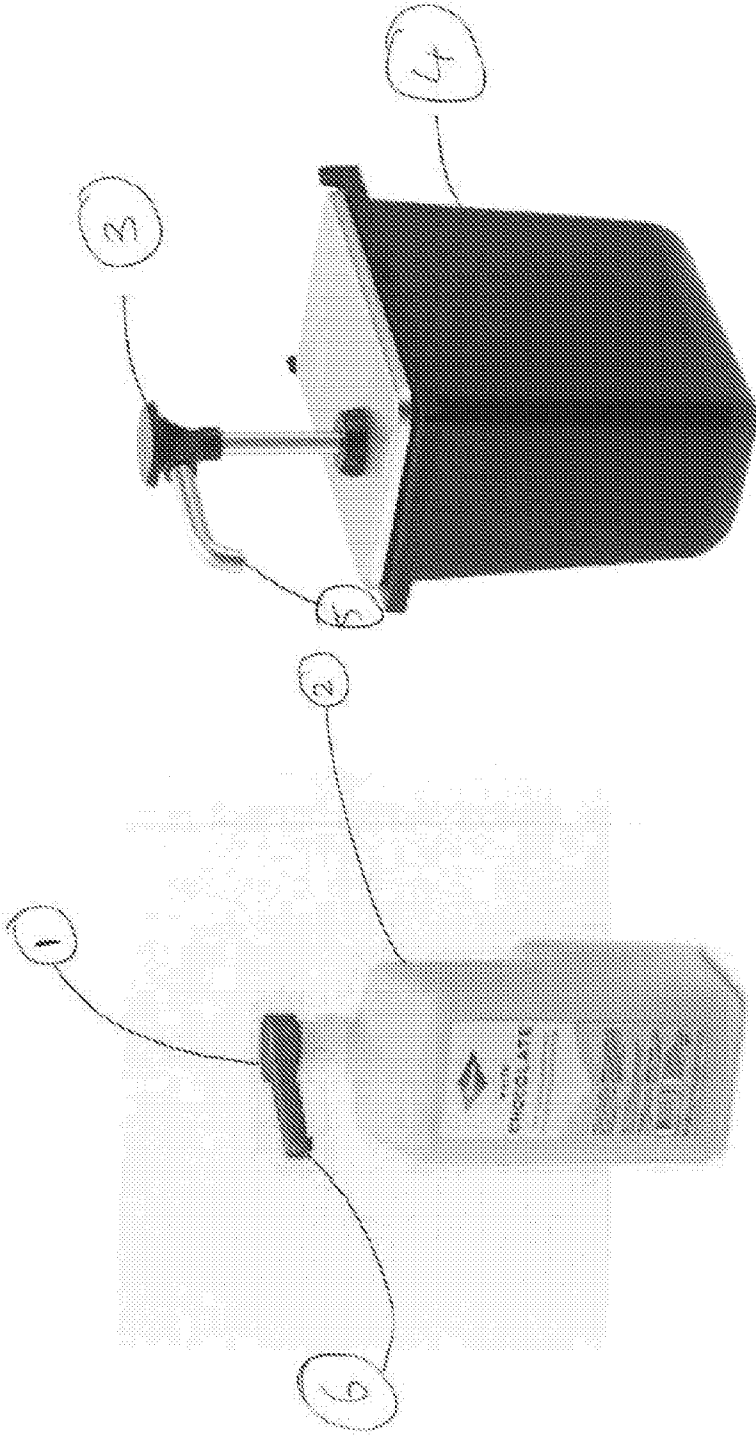


Fig 1
(Prior Art)

Fig 2
(Prior Art)

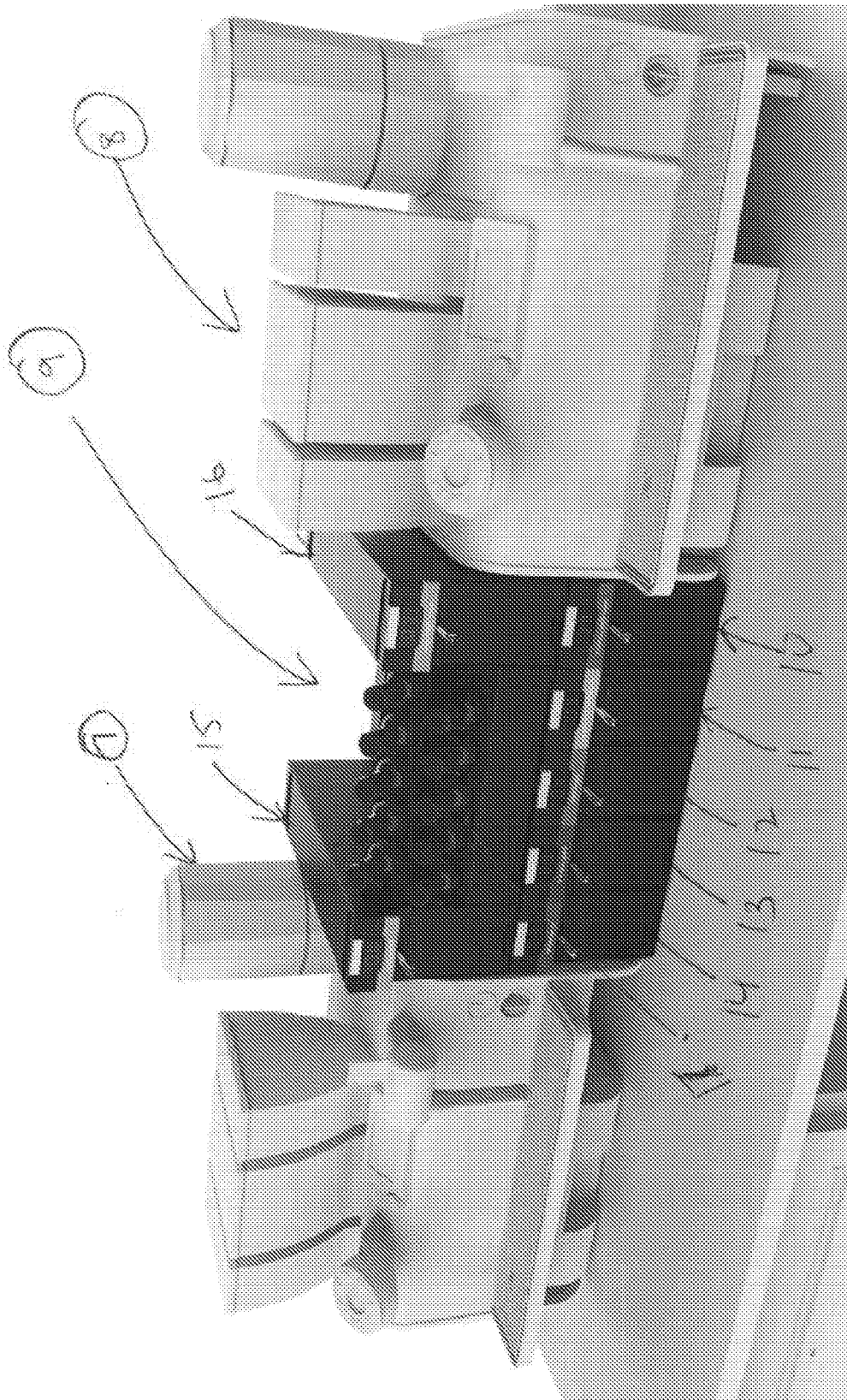


Fig 3

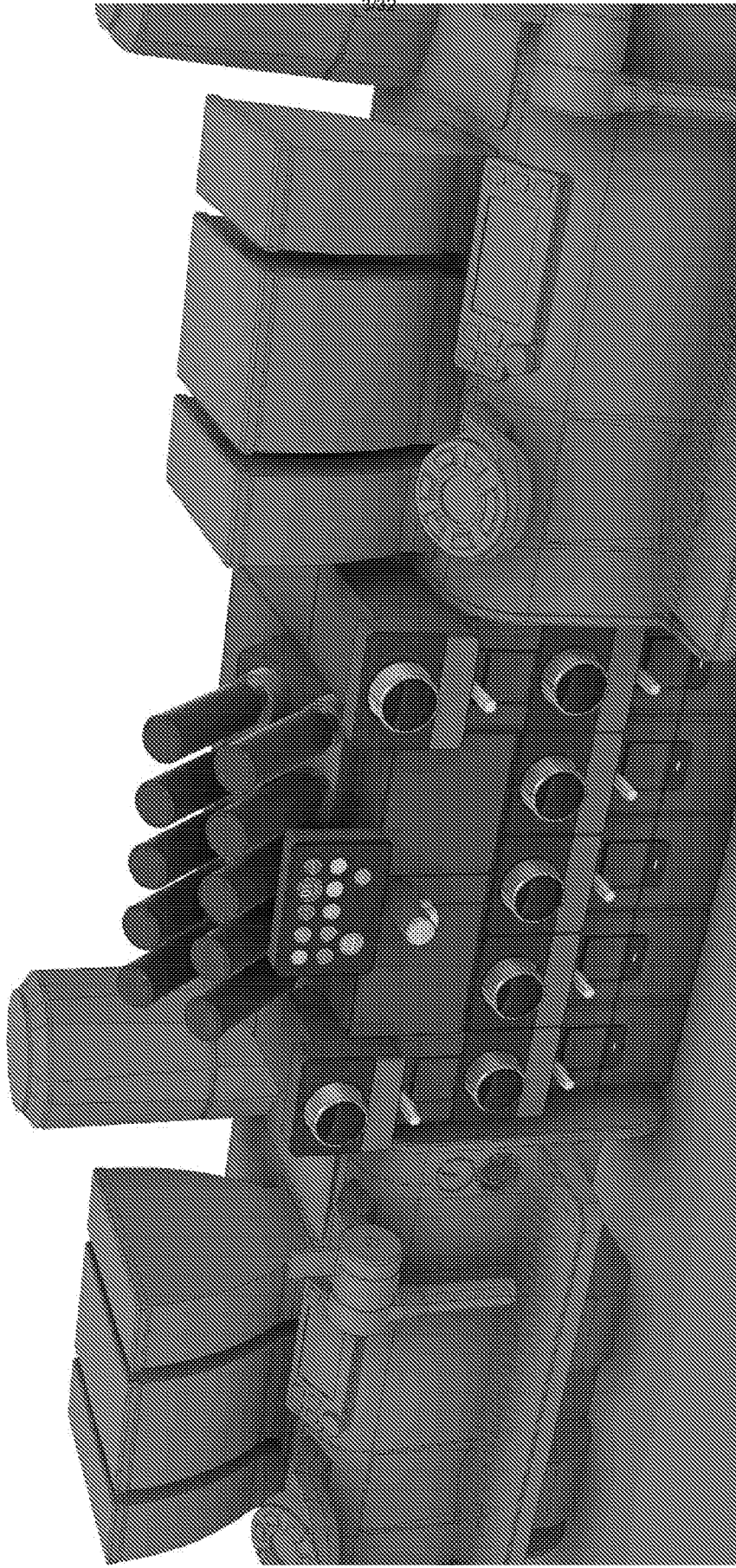


Fig. 3A

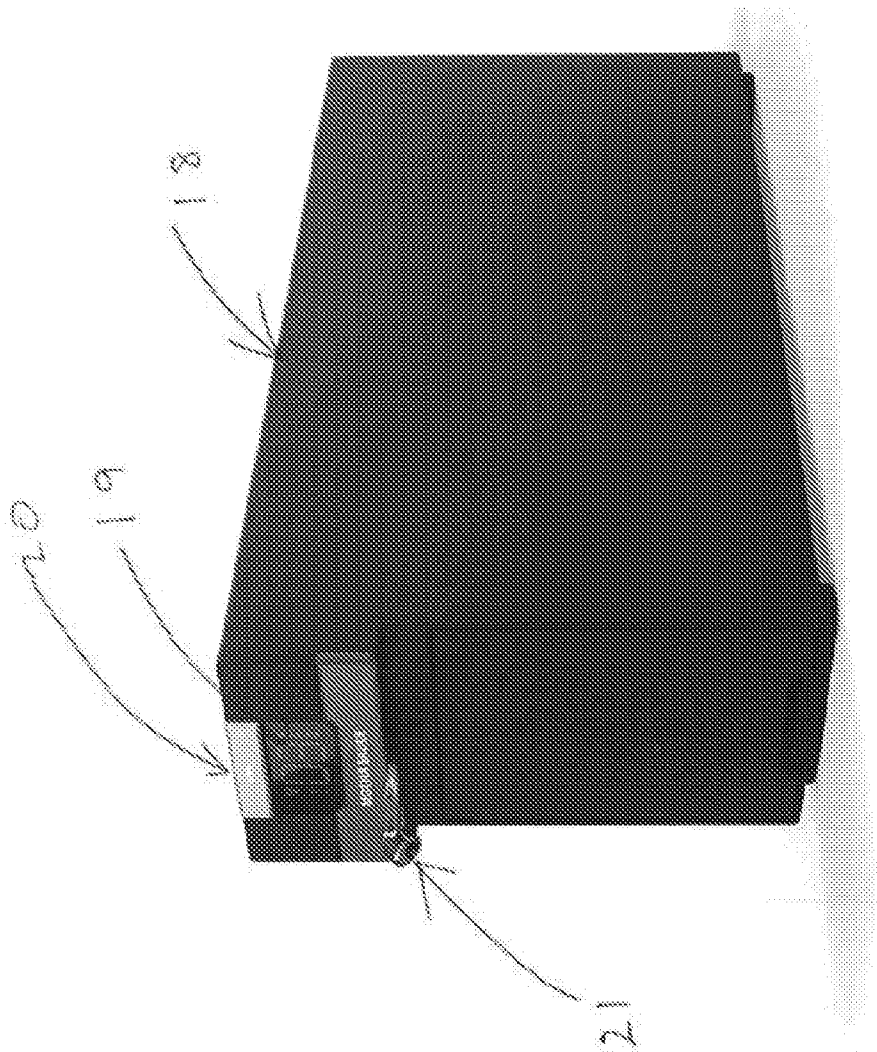


FIG 4

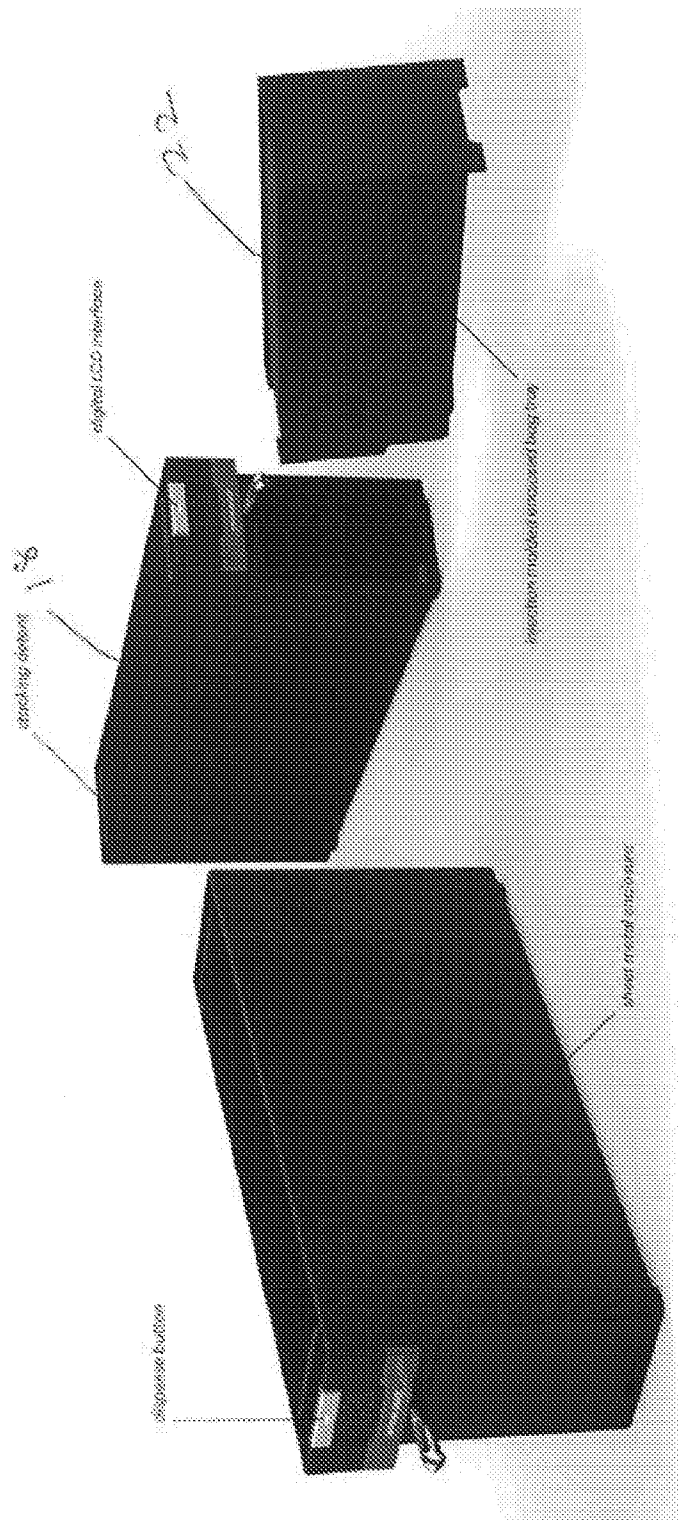


Fig 5

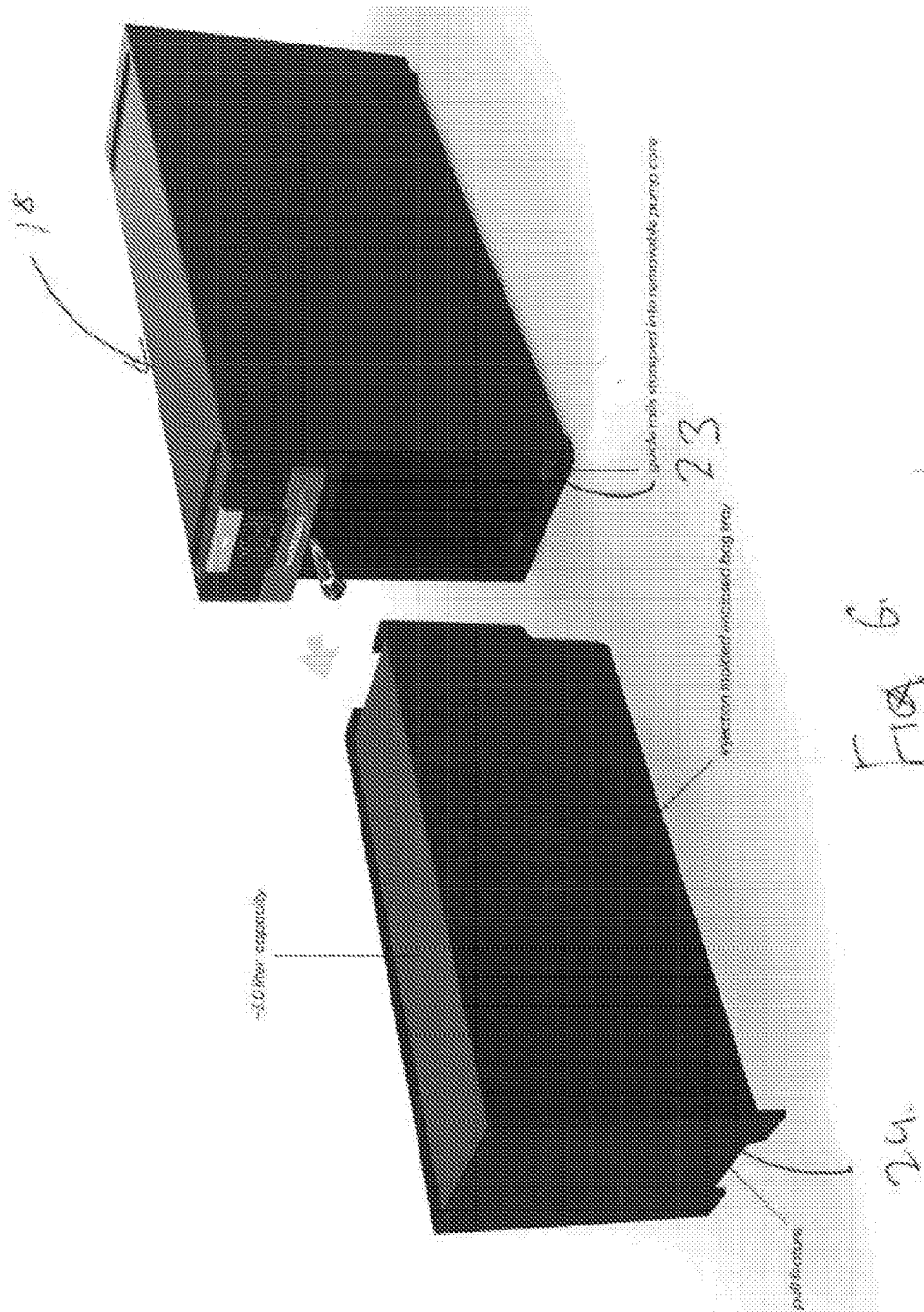
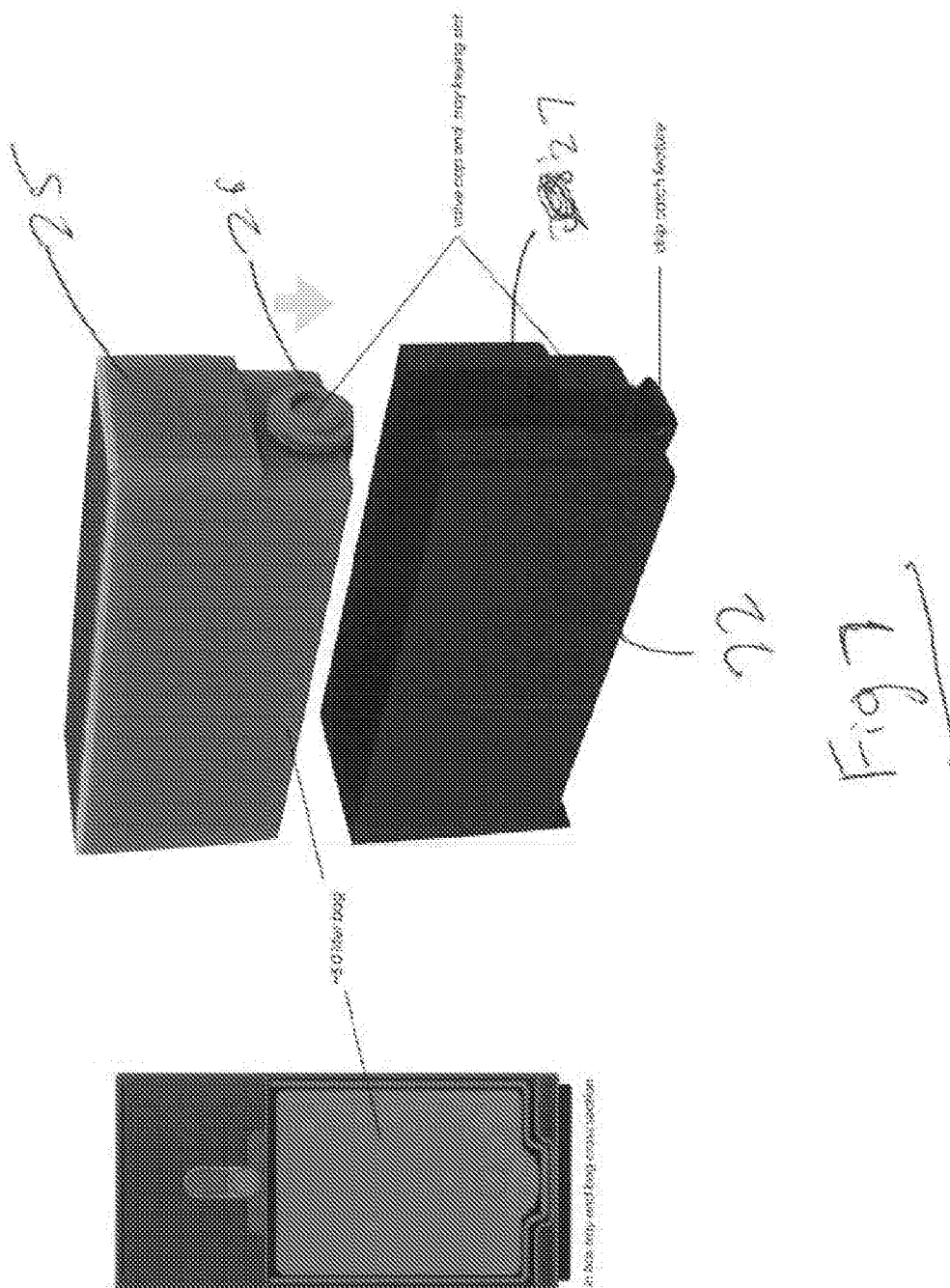
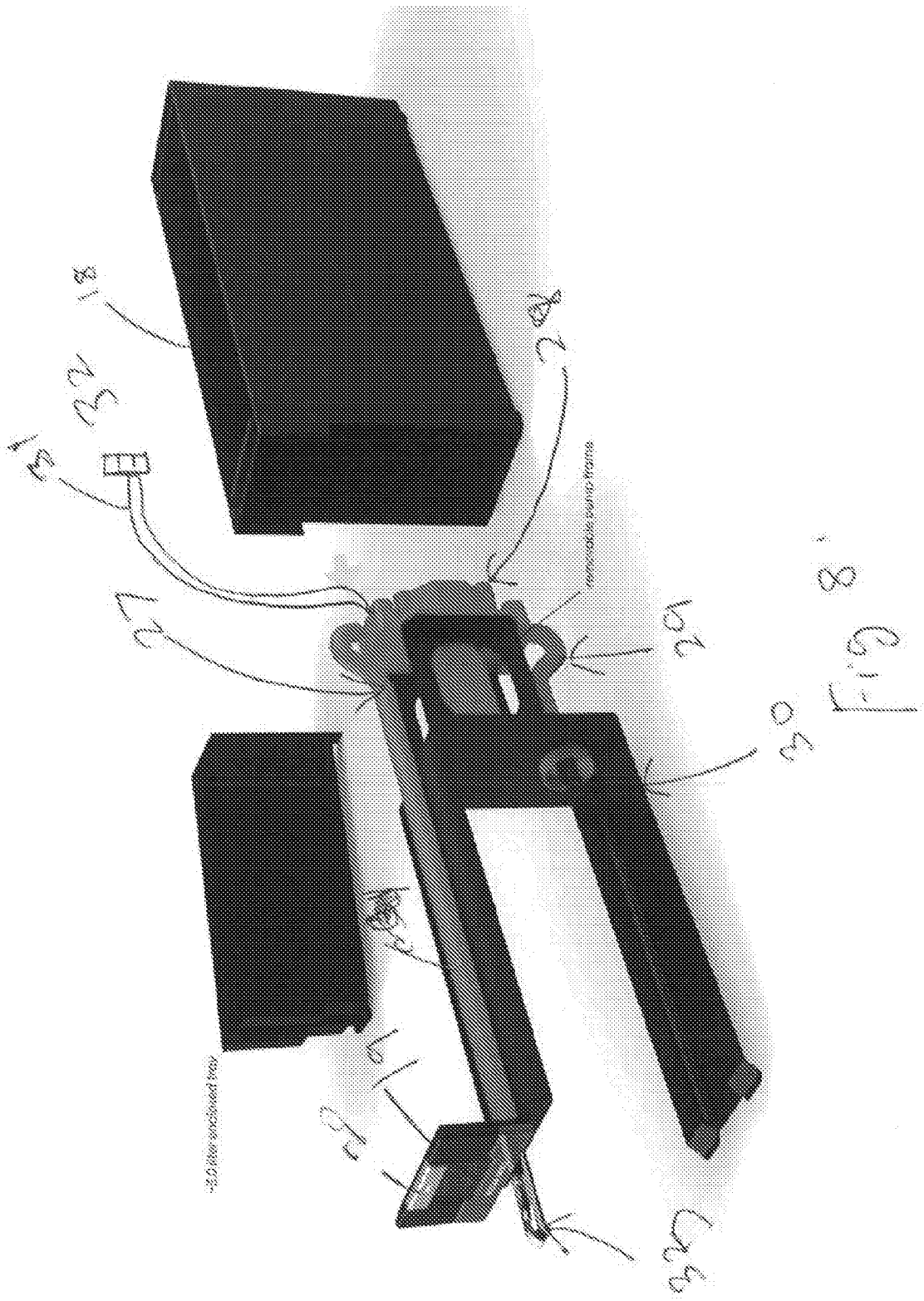
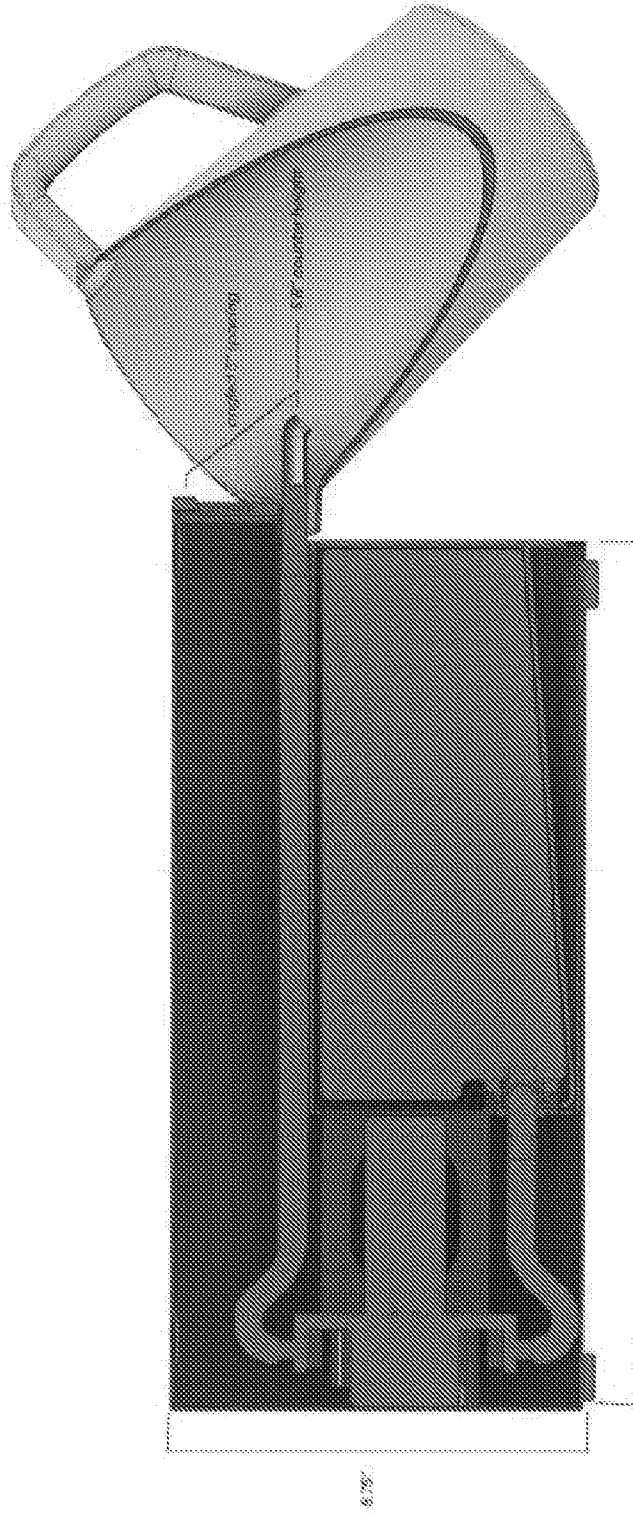
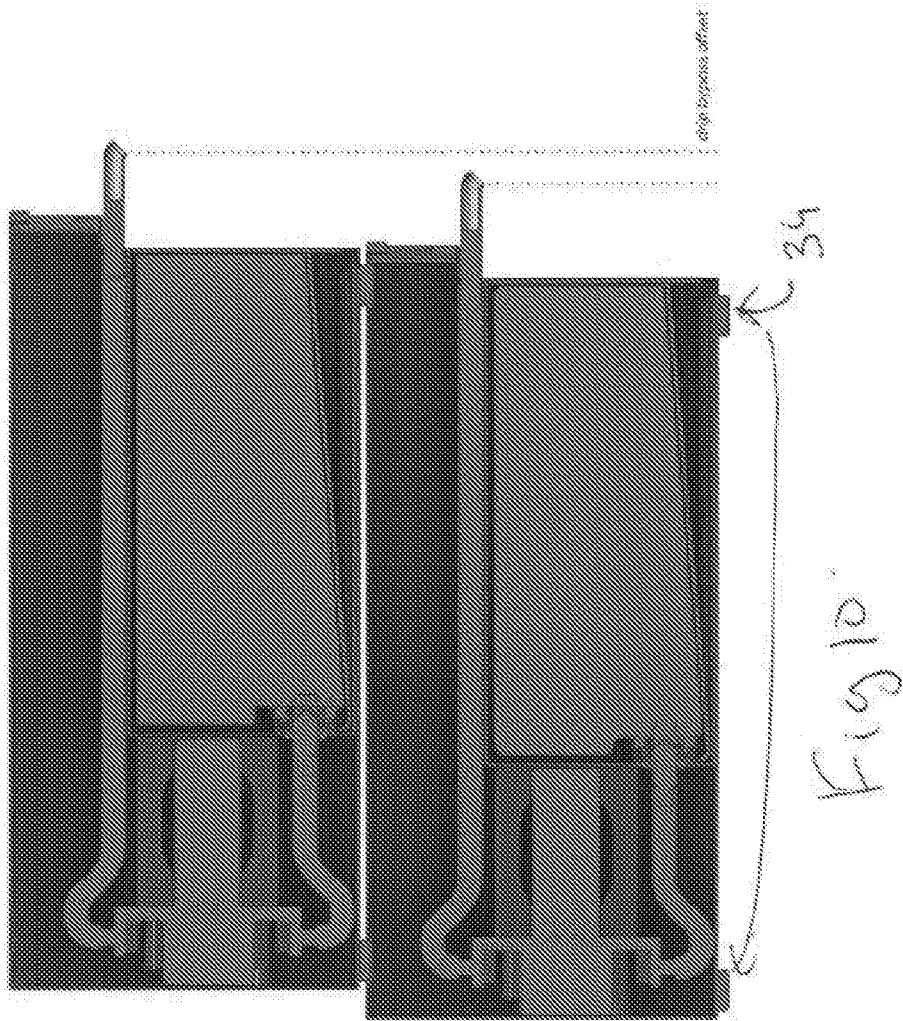


Fig. 6.









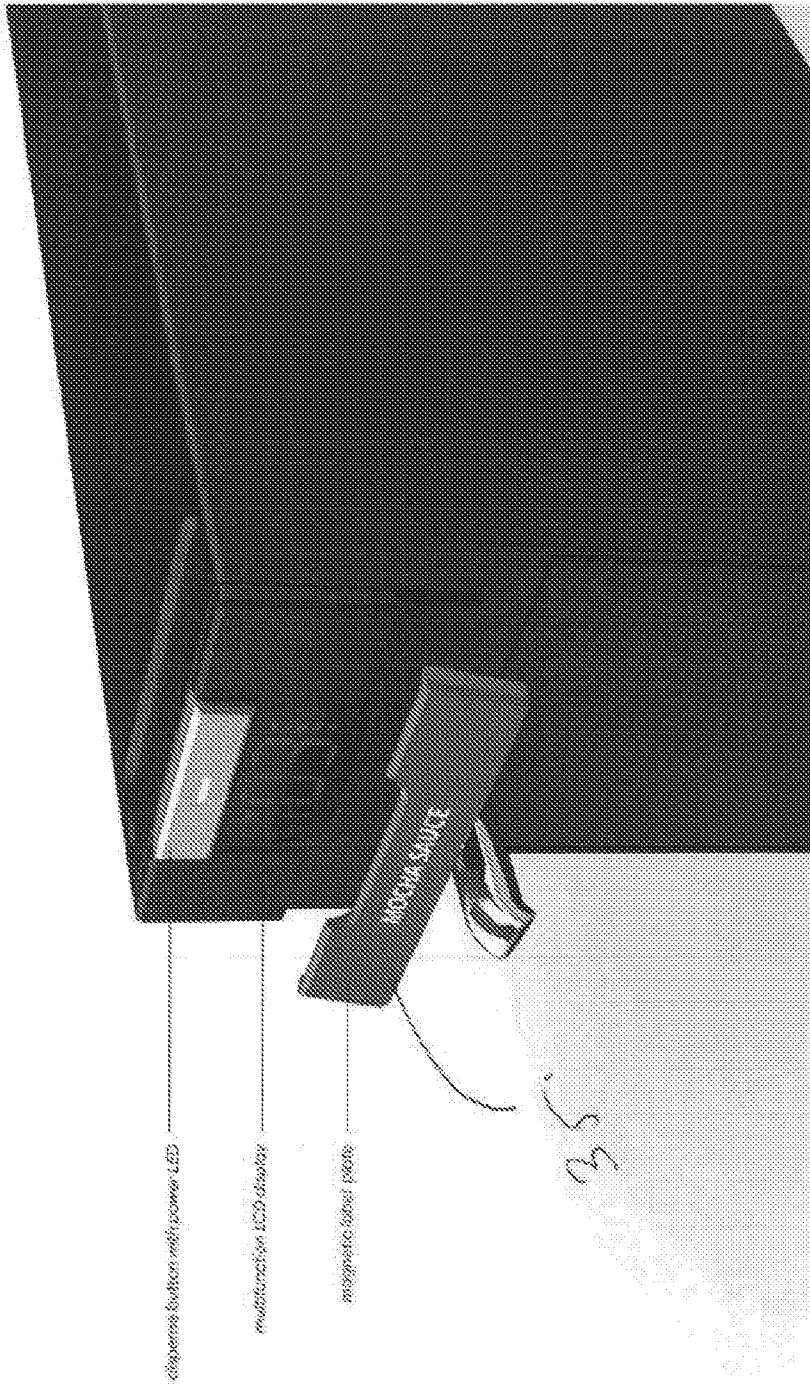


Fig 11

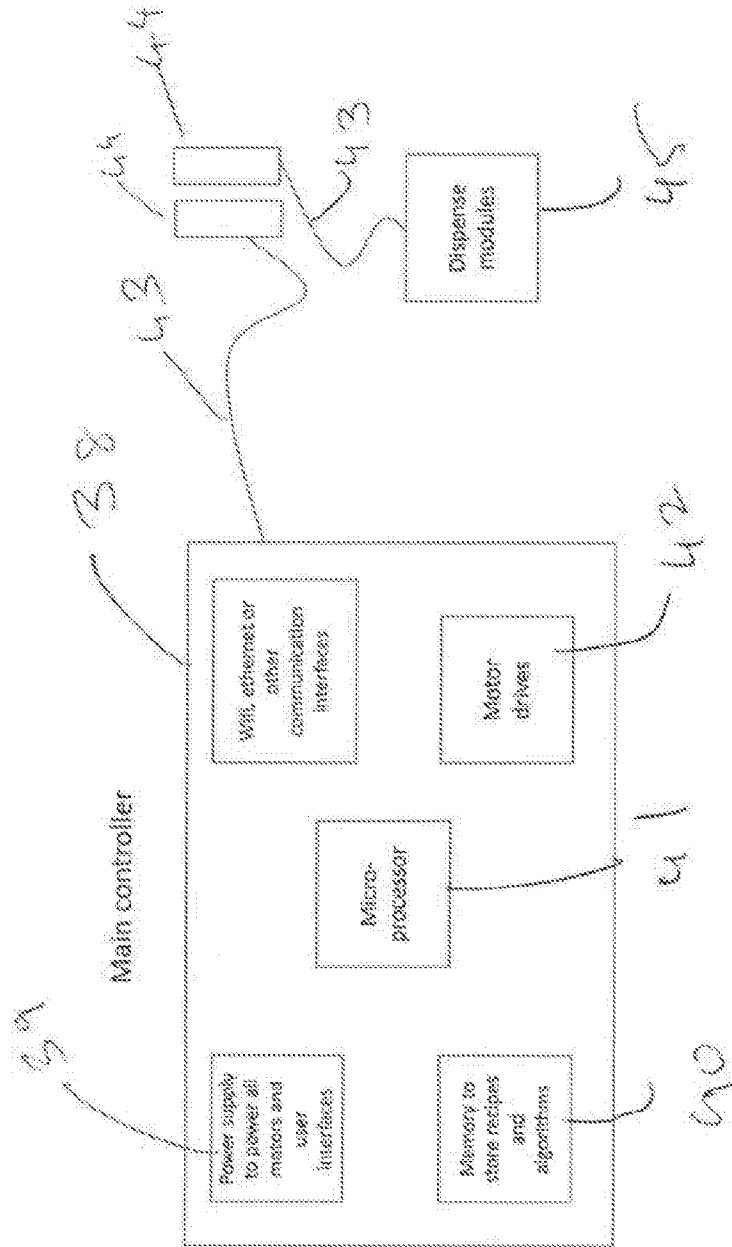


FIG 13

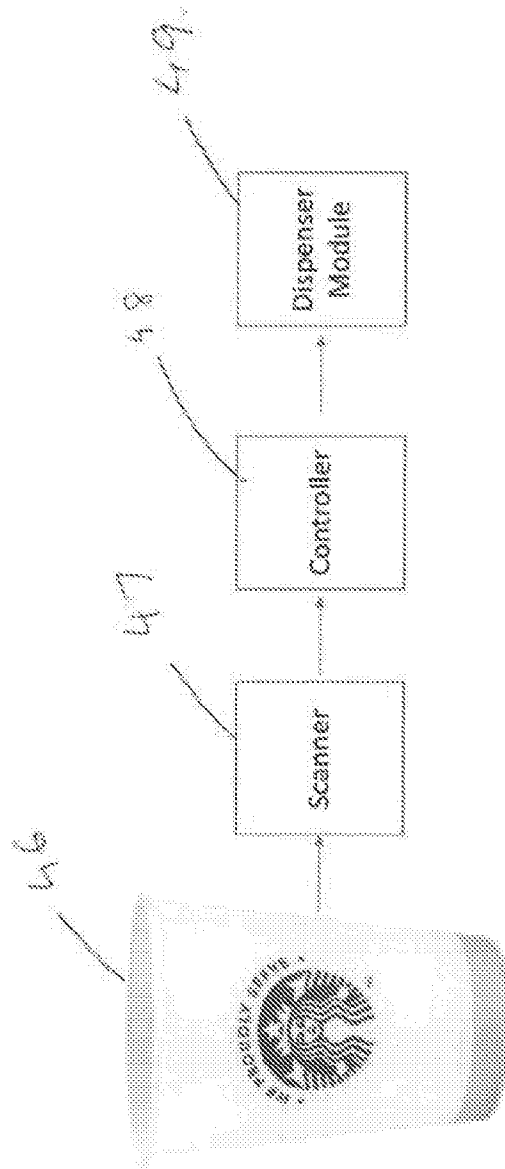


Fig 14

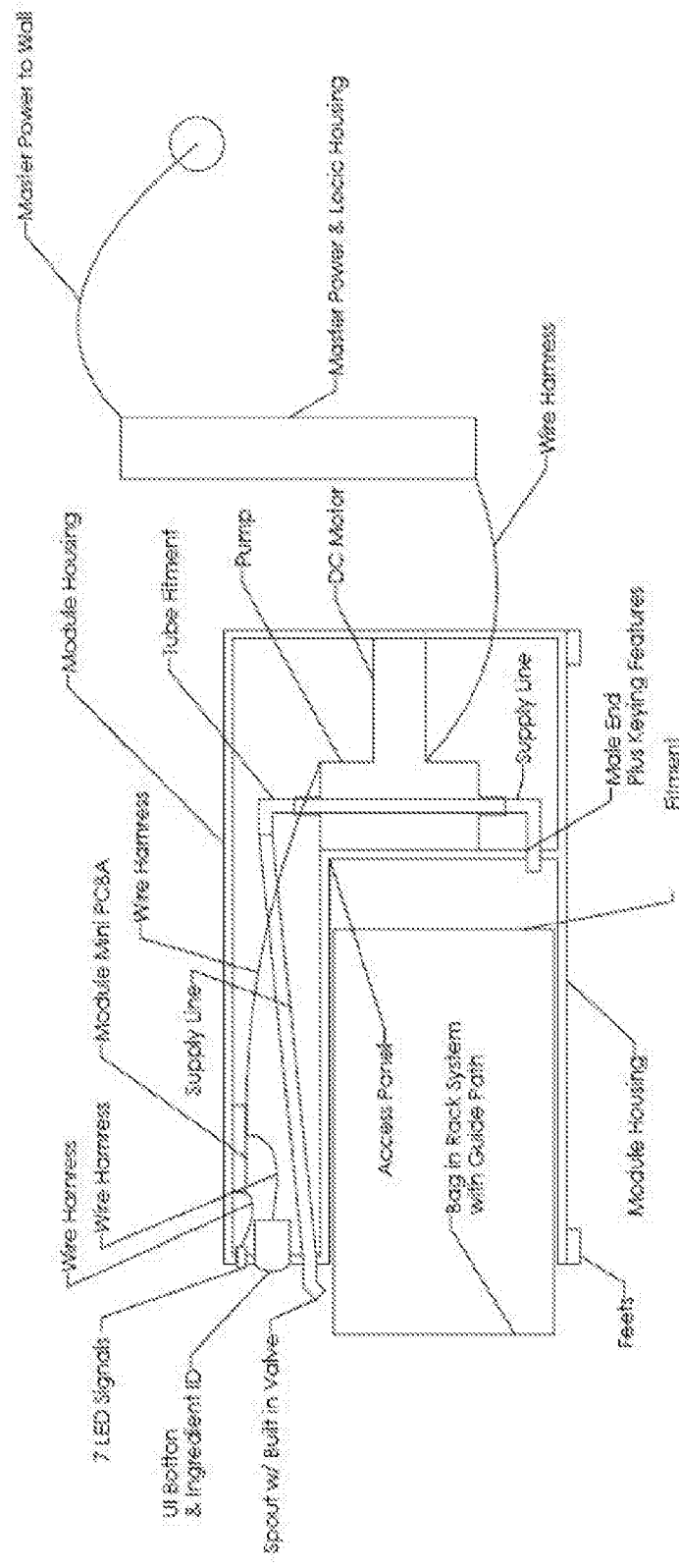


Fig. 15A

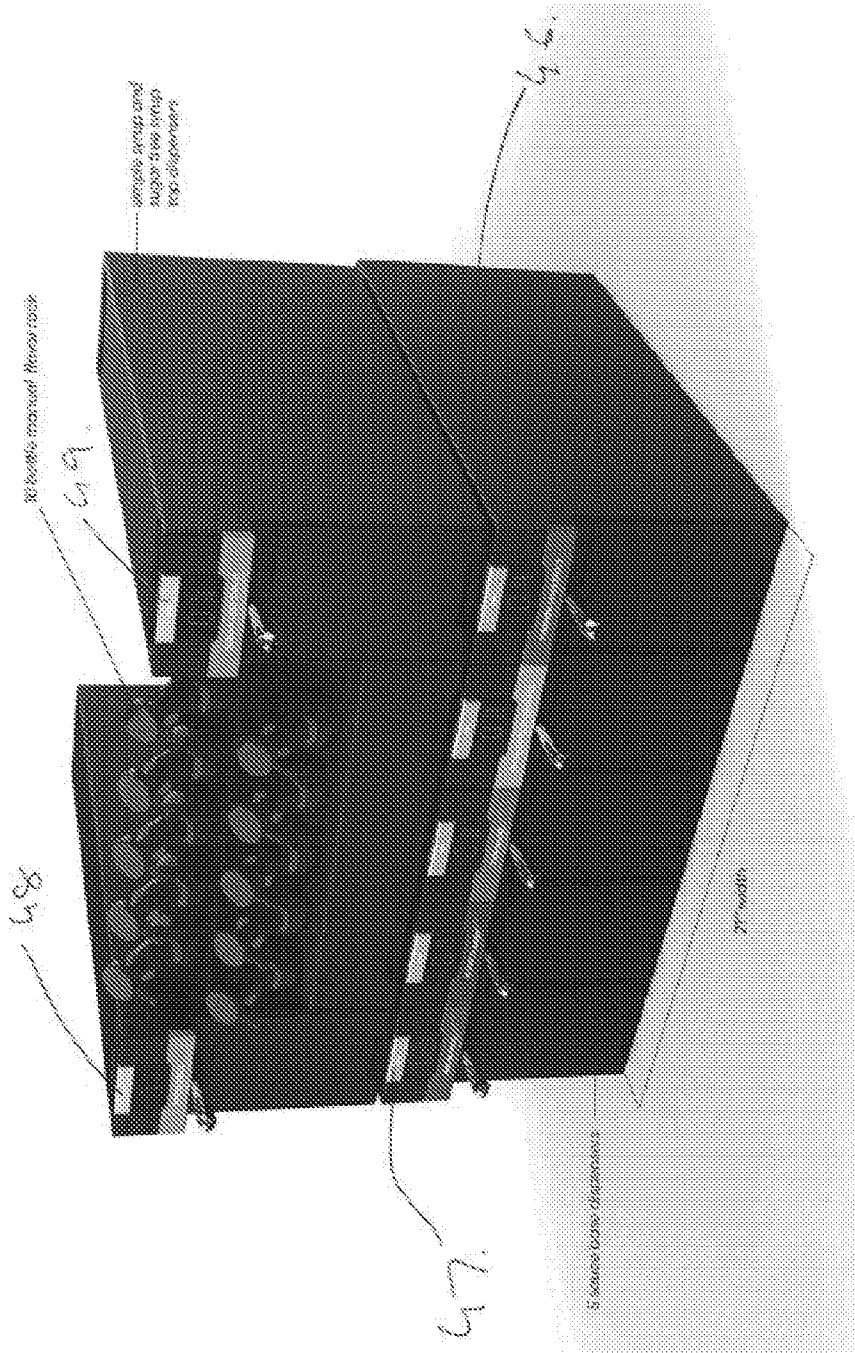


Fig 16

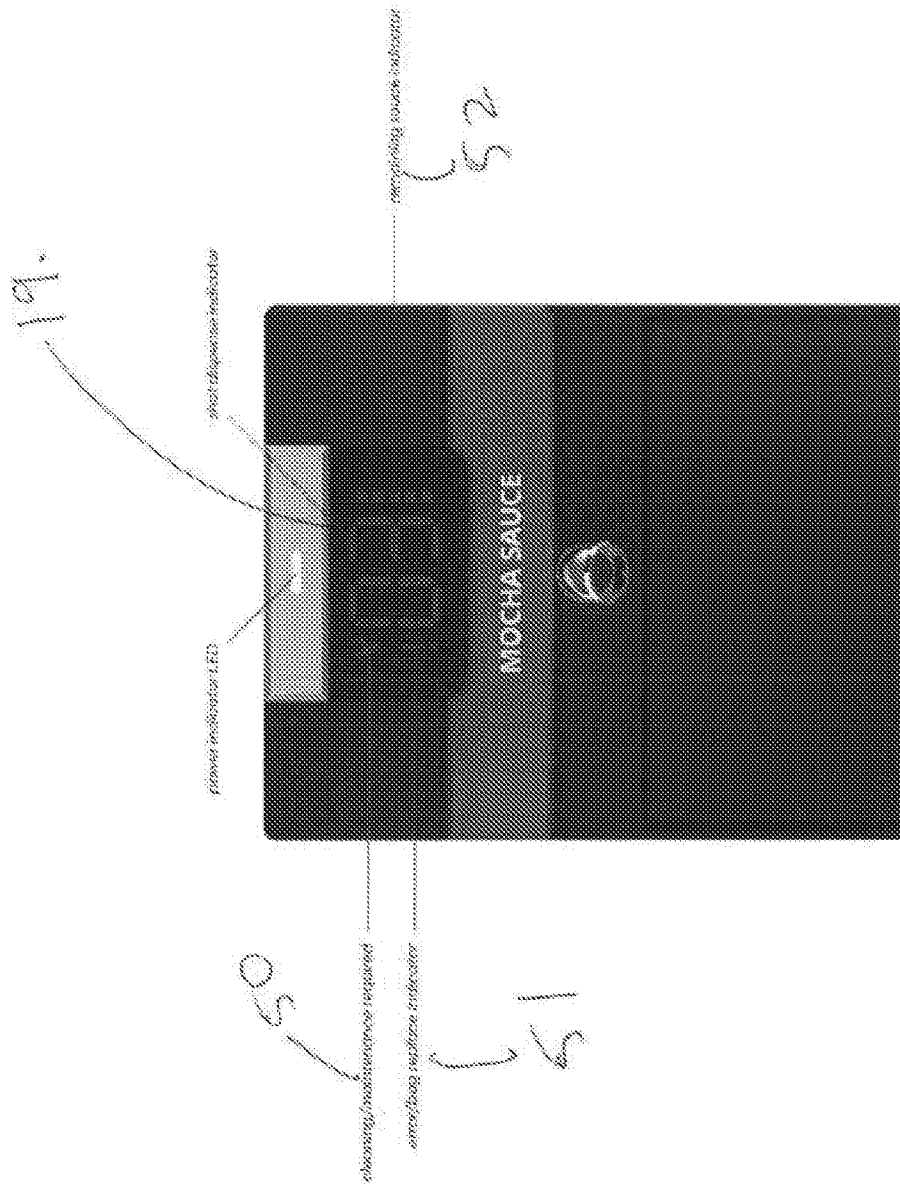


Fig 17

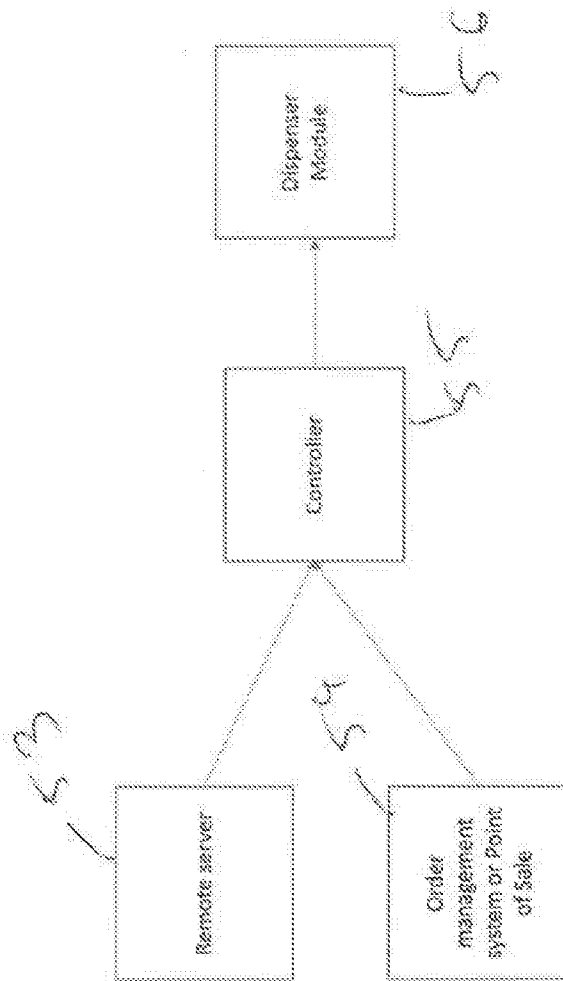


Fig 1e

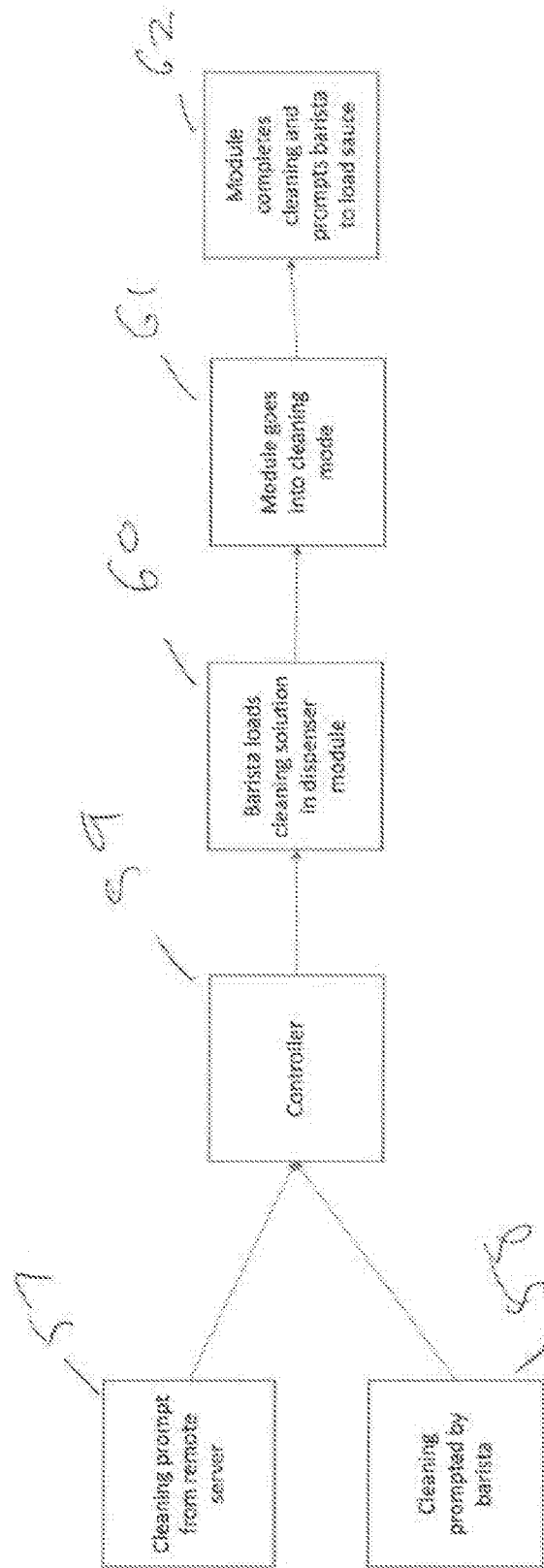


Fig 19.

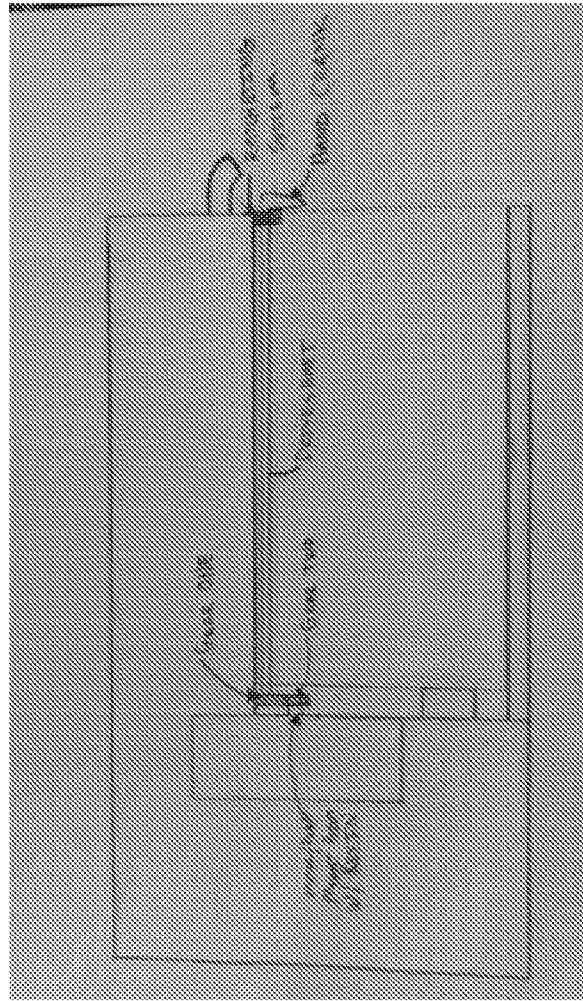


Fig. 20

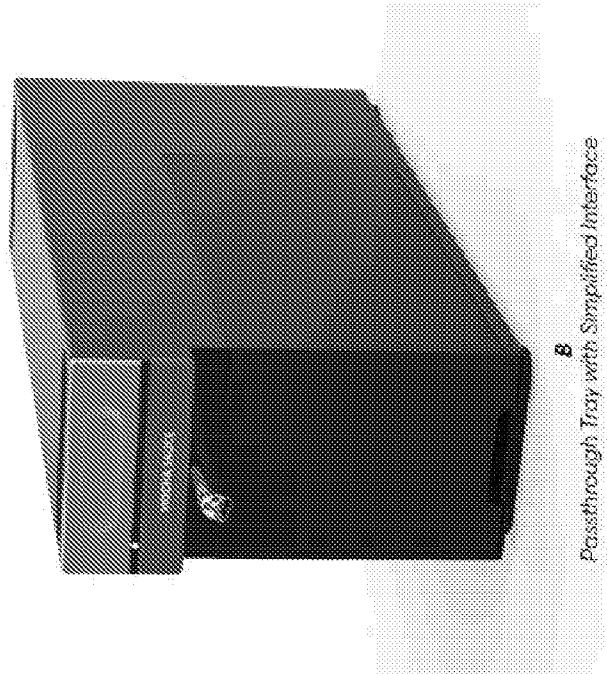


Fig. 21

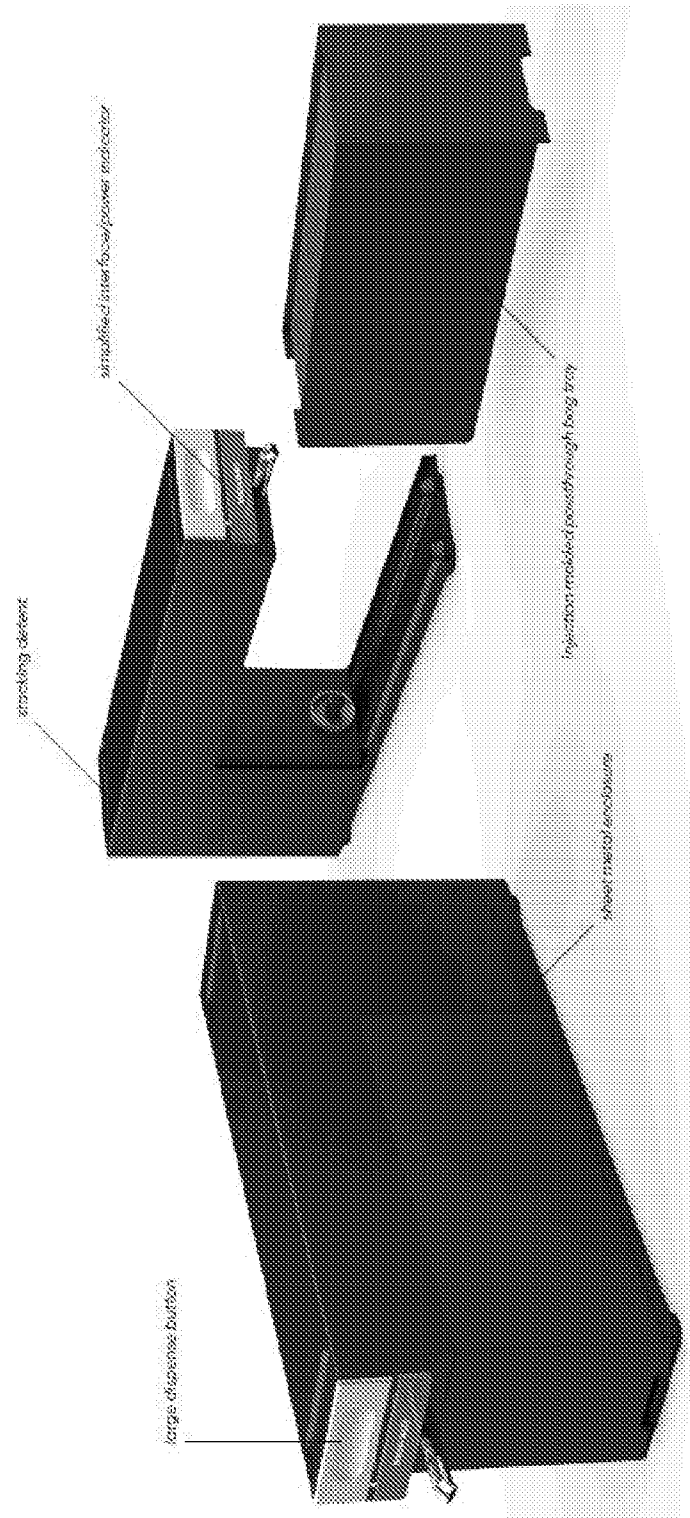


Fig. 22

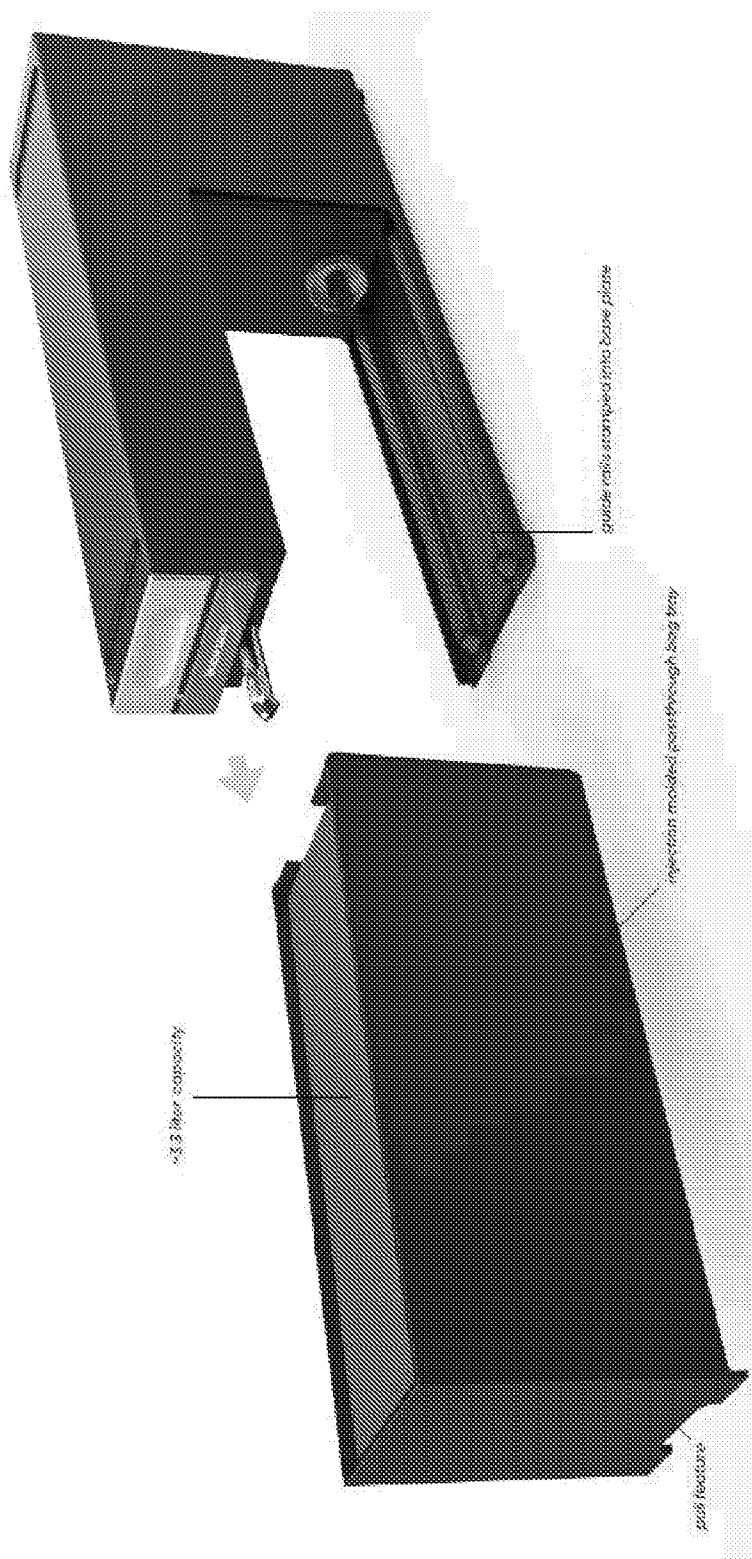


Fig. 23

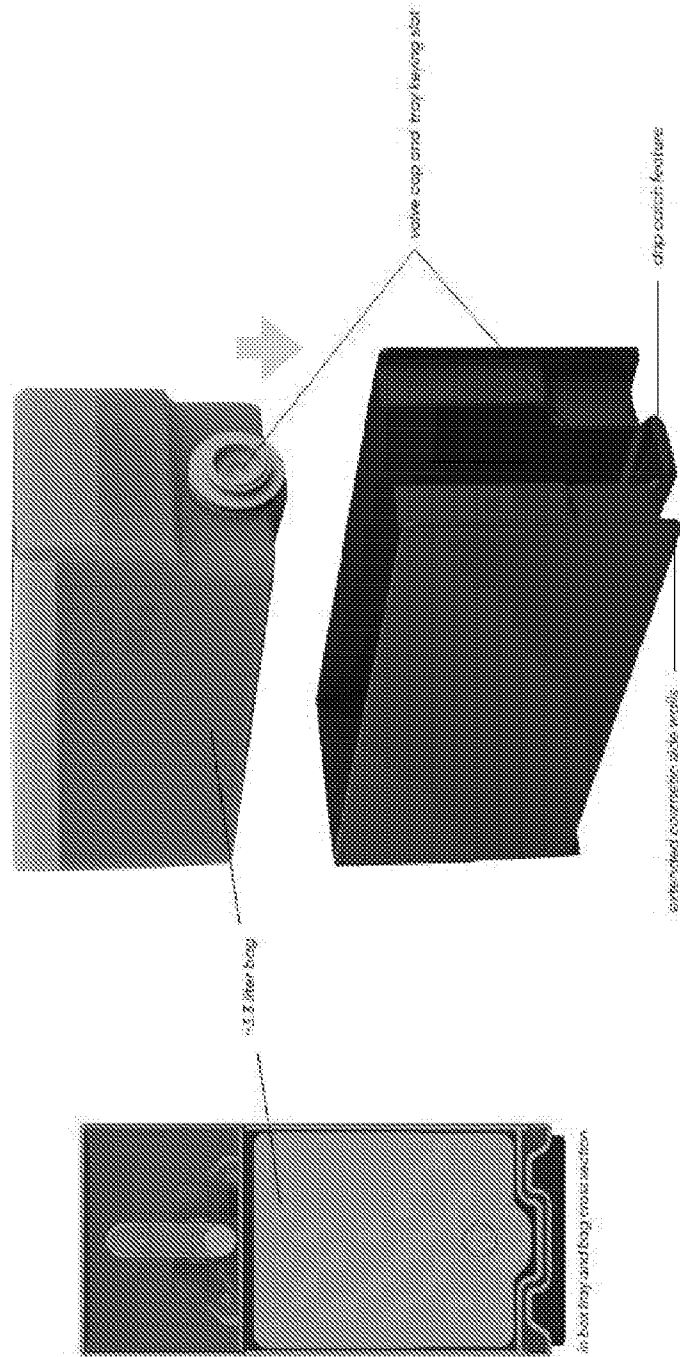


Fig. 24

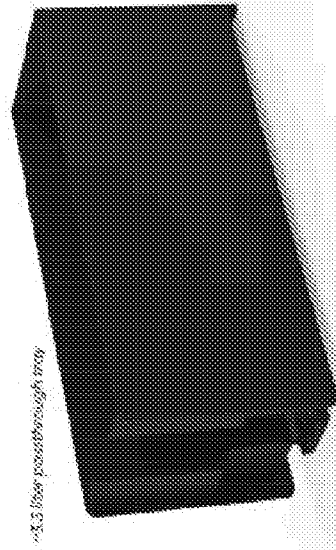
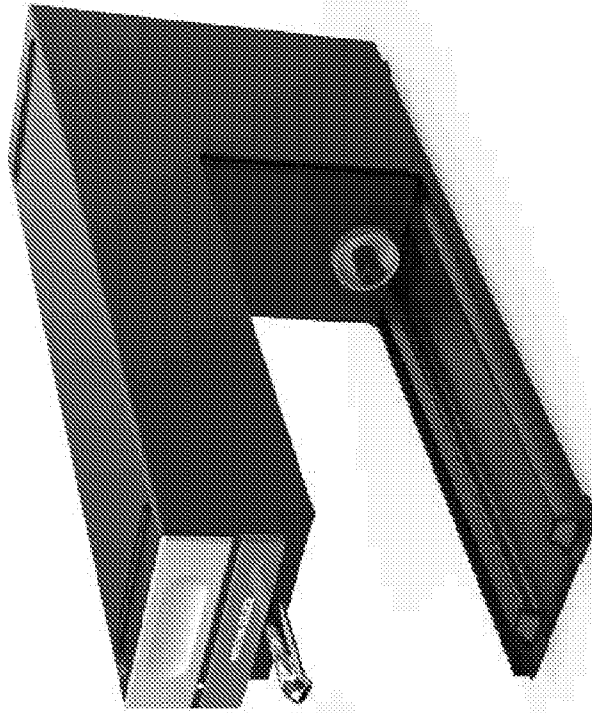


FIG. 25

FIG. 25

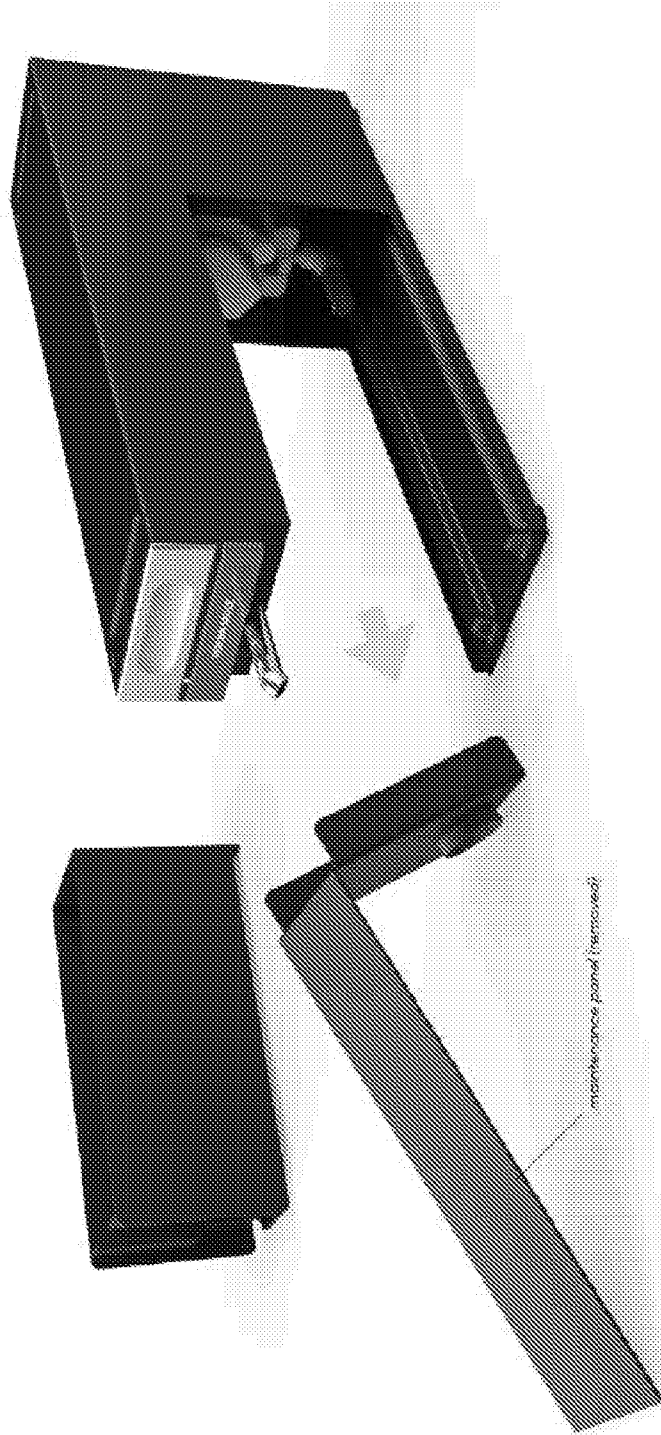


Fig. 26

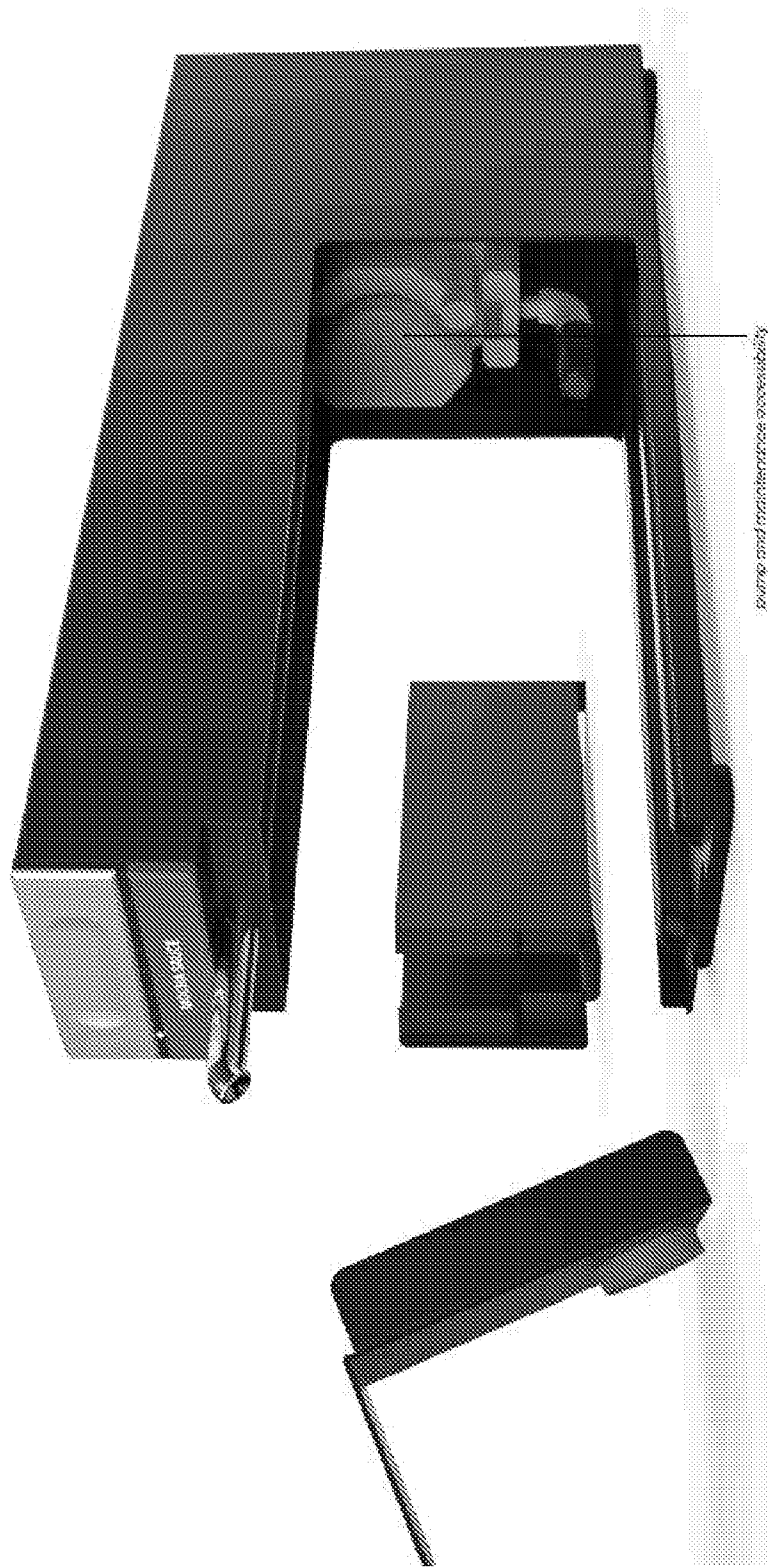


Fig. 27

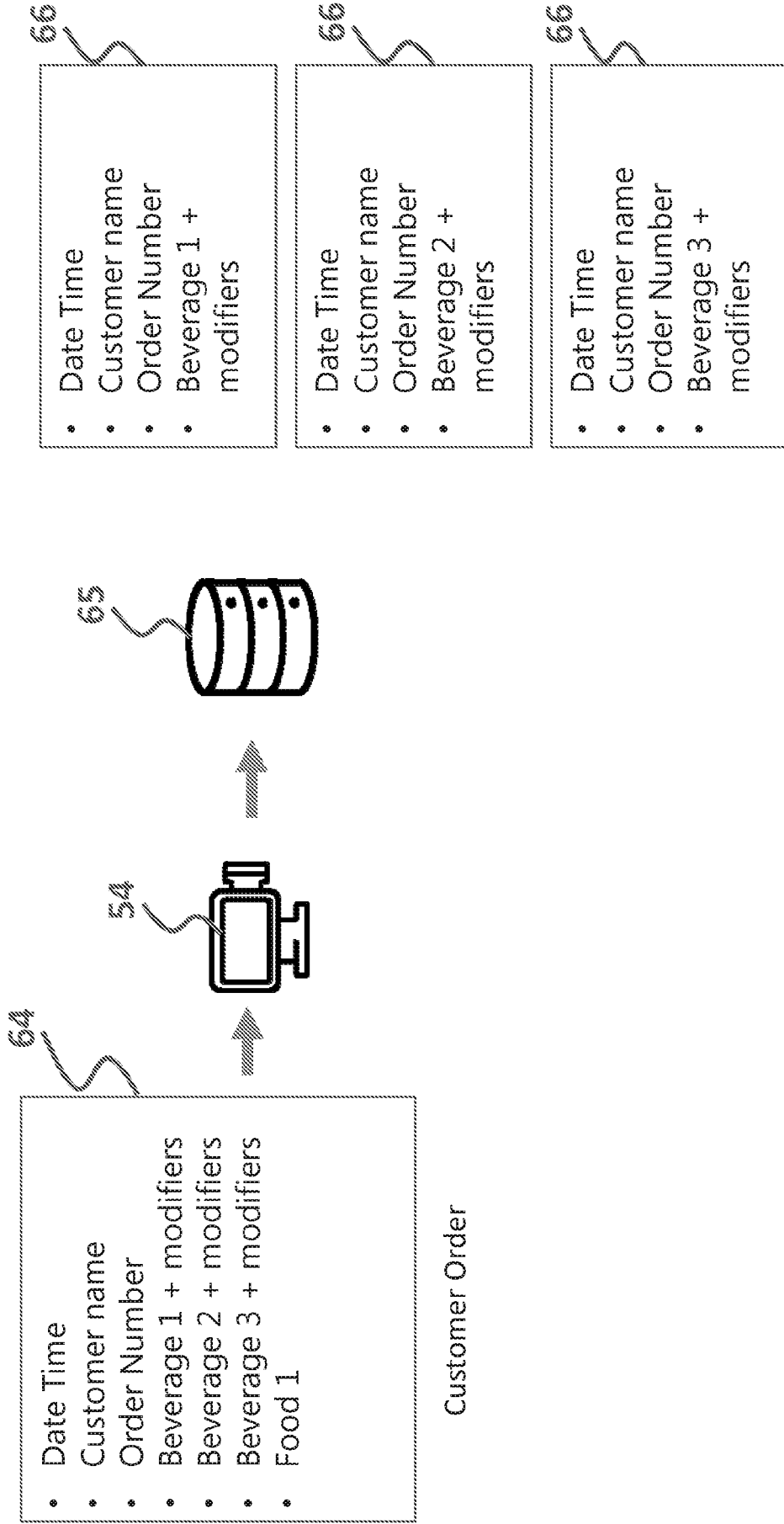


Fig. 28A

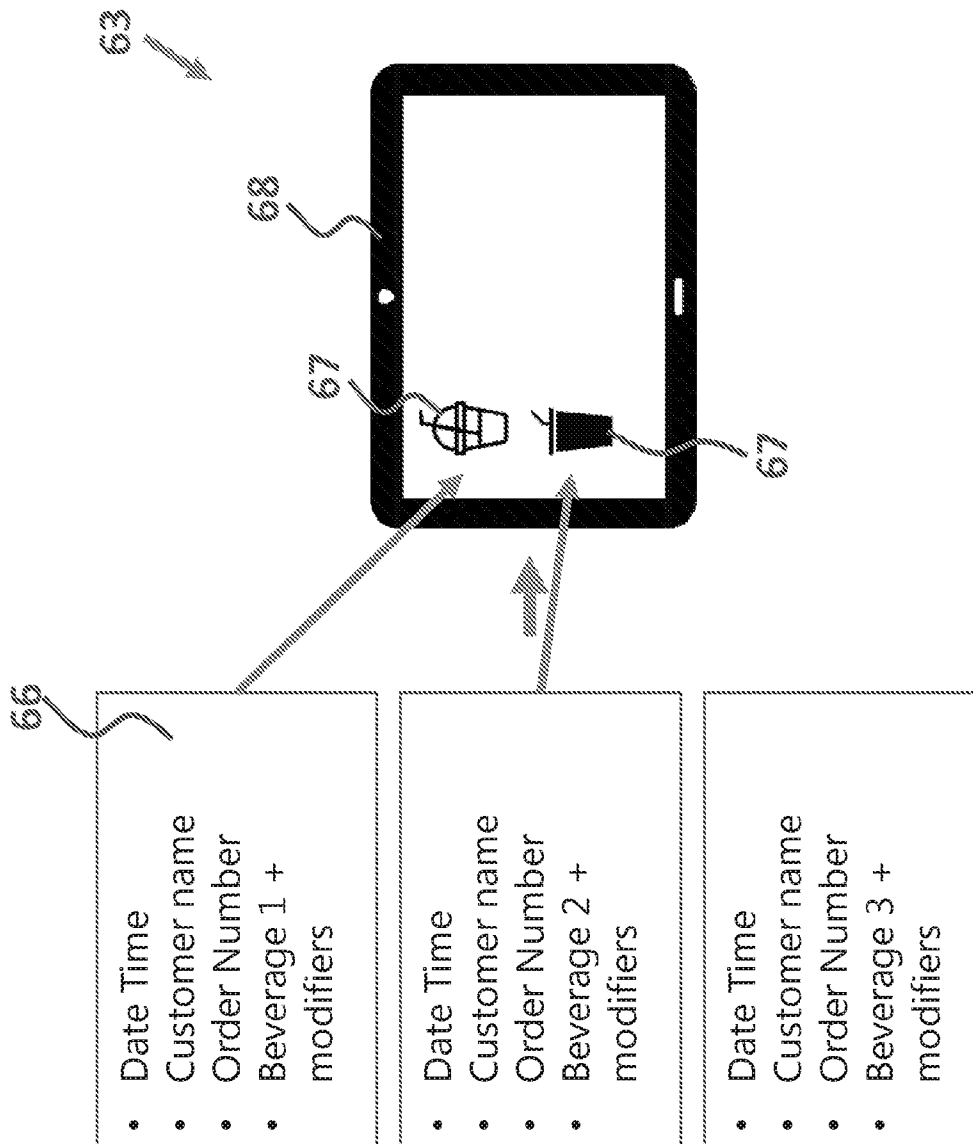


Fig. 28B

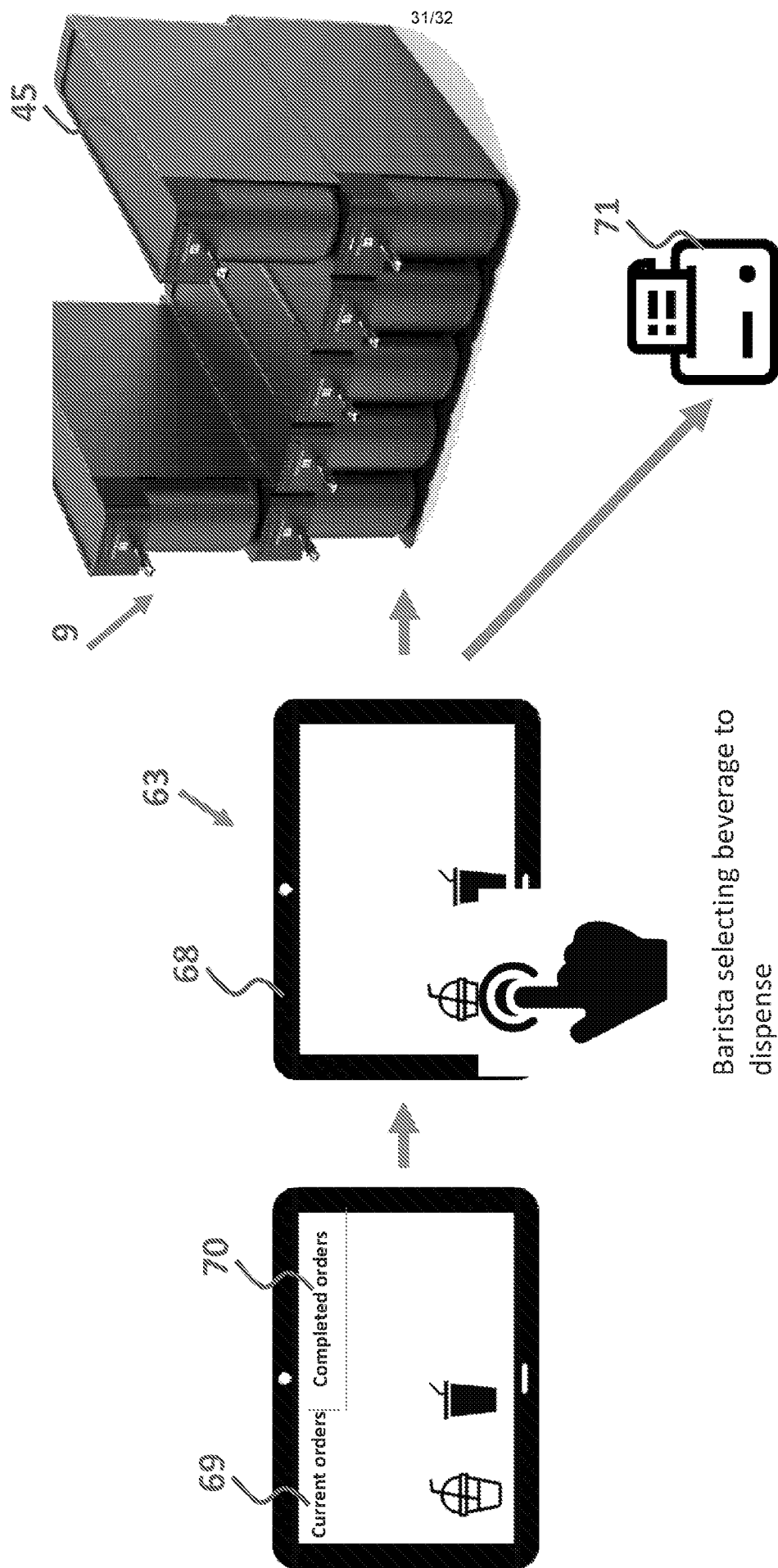


Fig. 28C

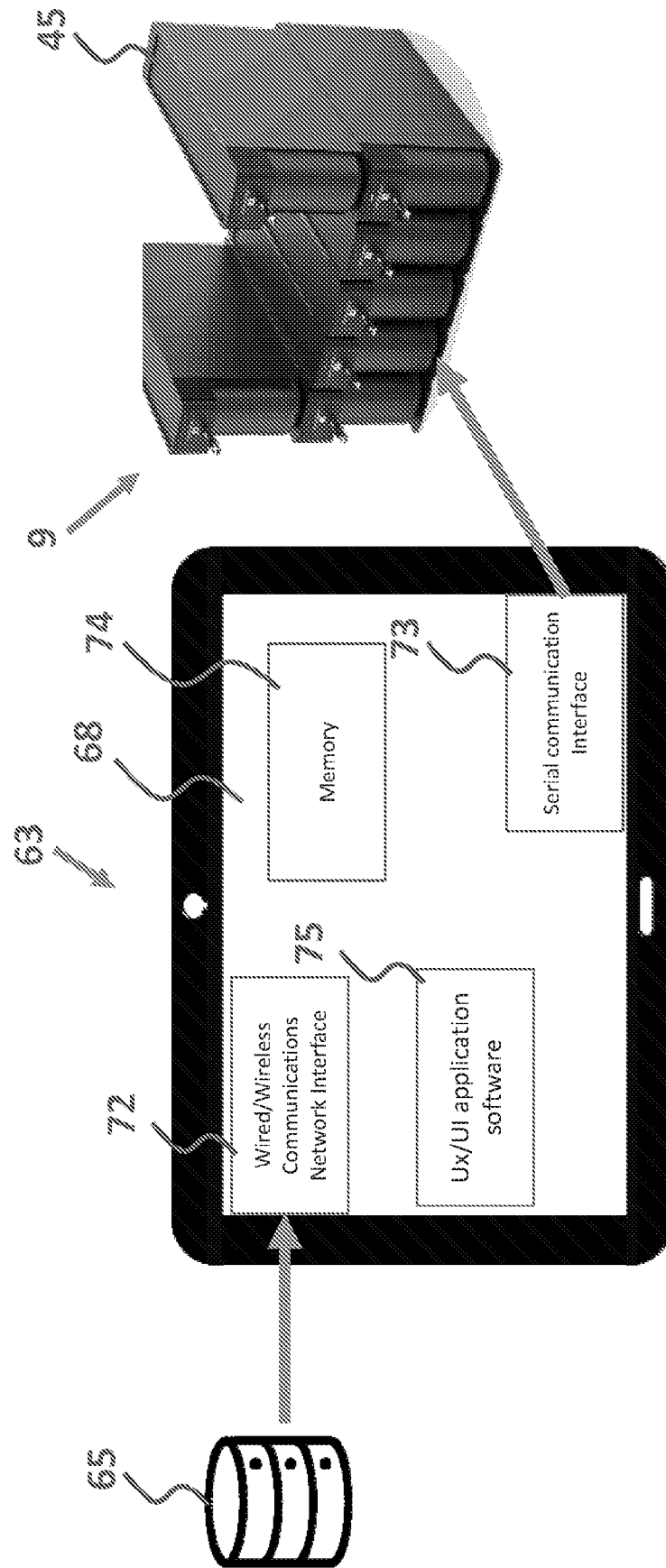


Fig. 28D

Electronic Acknowledgement Receipt

EFS ID:	40343138
Application Number:	63068292
International Application Number:	
Confirmation Number:	2183
Title of Invention:	AUTOMATED DISPENSING SYSTEM FOR CUSTOMIZED BEVERAGES
First Named Inventor/Applicant Name:	Natarajan Venkatakrishnan
Customer Number:	20995
Filer:	Michael R. Christensen/Melanie Terrazas
Filer Authorized By:	Michael R. Christensen
Attorney Docket Number:	SBUX1.536PR2
Receipt Date:	20-AUG-2020
Filing Date:	
Time Stamp:	19:45:59
Application Type:	Provisional

Payment information:

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Payment Type	CARD
Payment was successfully received in RAM	\$ 280
RAM confirmation Number	E20208JJ47152623
Deposit Account	111410
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Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Application Data Sheet	ADS.pdf	1255928	no	9
			61a6a3b431633b661ca091c046b95ca15b14f763		
Warnings:					
Information:					
2		Specification.pdf	109547	yes	22
			d35afc07d1d8e1fd4da565487c5f2209ee7129ea		
	Multipart Description/PDF files in .zip description				
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	Claims		17	22	
	Specification		1	16	
Warnings:					
Information:					
3	Drawings-other than black and white line drawings	Drawings.pdf	3623134	no	32
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4	Fee Worksheet (SB06)	fee-info.pdf	30206	no	2
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