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(54) Title: FULLY AUTOMATIC SMART COFFEE VENDING MACHINE WITH IoT FEATURE AND WORKING METHOD

(57) Abstract: This invention relates to the fully automatic smart coffee vending machine with internet of things (IoT) feature and working method which is usually developed in smart coffee vending machines to provide customers with customizable options and it's characterized by; at least one robotic arm (19), that moves the cups stacked on top of each other in at least one cup tube (16) and the lids stacked on top of each other in at least one lid tube (17) and at least one boiler (10) and/or grinder (12) and/or brewer (13) and/or milk box (21) and/or screen (4) and/or QR code area (5) and/or cup service door (6) and/or at least one robotic block (2) containing at least one laser engraver (20) engraving pictures and/or graphics and/or text on the user interface and/or cup surface, at least one water syrup block (3) including at least one water tank (14) and/or at least one syrup tank (15), refrigerated fresh milk or cold-brewed coffee, or the drink component intended to be consumed cold, or at least one refrigerator (7) in which the drink is stored, at least one internet connected board (8), which is positioned on the machine (1) and where the data is sent, at least one electronics board (9) that processes the data transmitted to the machine (1) and controls the system, at least one cloud (24) database where data is transferred wirelessly, at least one coffee bin (11) where solid waste is stored after the drink is prepared, including at least one waste chamber (22) where liquid waste is stored after the drink is prepared.



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FULLY AUTOMATIC SMART COFFEE VENDING MACHINE WITH IoT FEATURE AND WORKING METHOD

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Technical Field:

This invention relates to the fully automatic smart coffee vending machine with internet of things (Iot) feature and working method which is usually developed in smart coffee
10 vending machines to provide customers with customizable options.

State of the Art:

There are various automatic coffee vending machines available today. These machines
15 typically have built-in coffee bean grinders, brewers, kettles and cup dispensers. Some machines may also offer customization options, such as selecting the coffee hardness or adding syrup. In addition, self-service coffee kiosks are independent units where customers can choose and customize the coffee drinks they want. These kiosks typically have touch screens or buttons for drink selection, water tanks, coffee grinders, brewers
20 and milk dispensers. However, such systems are not fully automated and are lagging our era.

In the patent application numbered KR20160149662A, "Iot Management System and Management Method of Smart Coffee Vending Machine Based on Internet Of Things" is
25 described. The apparatus for managing a smart coffee vending machine based on IoT may be connected to a user terminal and a coffee vending machine through wired/wireless communication and provides a sanitation state to an inside of the coffee vending machine for a user and a manager by using a camera installed in the coffee vending machine, so that the coffee vending machine may be more sanitarily maintained. In addition, a user
30 may allow the apparatus for managing a smart coffee vending machine based on IoT to generate a cup of coffee suitable to a user's taste by controlling amounts of coffee, sugar and cream by using his terminal, so that the apparatus provides coffee suitable for a user's

taste. Specifically, according to the present invention, a blending ratio for coffee is stored in the user terminal or the coffee vending machine, and when a coffee application for producing coffee is executed, the blending ratio is provided to the user, so that the user may purchase coffee produced according to the blending ratio suitable for the users taste
5 at anytime and anywhere.

In the patent application numbered KR20190011581A, "IOT Coffee service methods and systems that incorporate IOT technology" is described. This coffee business of the present invention is provided to: conveniently order and pay for coffee optimized for individual
10 preference through a smartphone by introducing IoT technology to an existing coffee machine in cooperation with KTCM, the largest coffee rental business provider in the country; and, with a certain part of a sales amount, support socially disadvantaged people (children and the elderly recommended through about 500 comprehensive social welfare centers across the country and determined in an incorporated association) selected
15 through a kangaroo campaign (a donation campaign to help one person like a jumping kangaroo holding a joey). Various models of general coffee machines have been developed and supplied now. However, coffee machines applied with IoT technology have not been manufactured for B2B or business except small coffee machines for home use. Especially, the IoT coffee machine of the present invention: manufactures only IoT
20 gateway board, not develops the entire coffee machine, to be integrated with existing coffee machines; and has a main revenue model which is by the revenue of coffee bean distribution from coffee sales instead of a coffee machine itself. A coffee service system provided by the present invention includes an IoT gateway board, an IoT coffee service application, and a store management system.

25 Coffee vending machines with the internet of things mentioned above are mentioned. However, when the relevant applications are examined, no extra action is taken except for the user's remote access to the vending machine. In addition to these features, new technology is needed in which the drink content is adjusted in the vending machine,
30 custom designed cups are created and a gift is sent to a different user.

Description of the Invention:

This invention is a fully automatic smart coffee vending machine with IoT and its working method, and it's characterized by; It is a new technology in which the drink content is
5 adjusted in the vending machine, custom designed cups are created, and a gift is sent to a different user.

The invention in order to realize all the objectives mentioned above and which will emerge from the detailed description below; It includes IoT integration for remote
10 monitoring and management, vending integrated order creation within the mobile application, personalized cup engravings and advertising display capabilities.

The invention includes features such as IoT integration, a mobile application for ordering, personalized cup engravings, display of advertisements on the screen, and built-in
15 refrigerator for chilled fresh milk storage. These additional features make the invention more advanced and are intended to improve the user experience and provide customization options.

The advantages of the device subject to the invention are as follows:

20 Enhanced User Experience: The primary goal may be to improve the overall coffee-drinking experience for users. By automating the coffee preparation process, providing customization options, and offering convenience through the mobile application and QR code scanning, the machine aims to make ordering and receiving coffee drinks effortless and enjoyable for customers.

25 Efficiency and Cost Savings: Developing this invention may also aim to streamline operations and reduce costs for businesses. By automating the preparation process, the machine can minimize the need for human intervention and associated labor costs. Additionally, it can help reduce waste by precisely measuring and using ingredients, such as fresh milk and syrup, leading to more efficient resource utilization.

30 Personalization and Customization: The goal of developing this smart vending machine could be to provide customers with a personalized coffee experience. Enabling users to choose between hot or cold drinks, have graphics or text engraved onto the cup, and

customize their orders through the mobile application adds a unique touch and allows individuals to tailor their drinks to their preferences.

Advertising and Revenue Generation: The screen on the machine can serve as an advertising platform, creating an additional revenue stream for businesses. The goal may be to leverage the machine's visibility and customer engagement to display targeted advertisements, promotions, or brand messages, thereby increasing brand awareness, attracting partnerships with advertisers, and generating advertising revenue.

Technological Innovation and Differentiation: The development of this smart vending machine can showcase technological innovation and provide a competitive advantage in the coffee market. By leveraging IoT capabilities, mobile integration, and automation, businesses can differentiate themselves from traditional vending machines or manual coffee preparation methods. The goal may be to position the invention as a cutting-edge solution that attracts customers and creates a buzz in the industry.

Scalability and Market Expansion: Another goal of developing this invention could be to expand into new markets or reach a wider customer base. By offering a self-service, automated coffee solution, businesses can potentially penetrate various sectors such as offices, public spaces, events, and more. The goal may be to establish partnerships, secure distribution channels, and grow the business footprint.

The objectives of the system subject to the invention are stated below:

Convenience and Time Efficiency: Traditional coffee vending methods often involve manual processes, long queues, and waiting times. The smart vending machine solves this problem by automating the entire coffee preparation process. The built-in coffee bean grinder, brewer, and high-pressure water heater enable quick and efficient brewing, ensuring a fresh cup of coffee within a short period. The Core XY system allows the cup to move smoothly, reducing waiting times for customers.

Freshness and Quality Control: Storing fresh milk at an optimal temperature is crucial to maintaining its freshness and quality. The built-in fridge in the machine helps solve this problem by providing a controlled environment for chilled fresh milk storage. This ensures that customers receive coffee drinks made with high-quality, fresh ingredients.

Customization and Personalization: The machine's ability to engrave graphics or text onto the cup addresses the desire for customization and personalization. It offers users the

option to have a unique design or message on their cup, adding a personal touch to their coffee experience.

Advertising and Promotion: The display screen on the machine serves as an advertising platform, addressing the need for promotional opportunities. Businesses can utilize the screen to display advertisements, promotions, or brand messages, effectively reaching out to customers and increasing brand visibility.

Payment Convenience: The inclusion of a credit card payment module in the machine solves the problem of limited payment options. Customers can easily make cashless payments using their credit cards, enhancing convenience, and eliminating the need for physical currency.

Resource Management: The machine's water tanks, and syrup bottles contribute to efficient resource management. They can be designed to hold appropriate quantities of water and syrups, minimizing wastage, and ensuring that the machine can serve a considerable number of customers before requiring refills.

The objects of the above-mentioned invention are provided as follows:

Convenience and Accessibility: The machine's automated process, mobile application integration, and QR code scanning provide a convenient and user-friendly experience. Customers can easily order their coffee drinks, customize their drinks, and make cashless payments, all through a seamless process. The structure's integration of various components such as the coffee bean grinder, brewer, high-pressure water heater, and automatic cup and lid drop ensures a streamlined and hassle-free experience.

Freshness and Quality: With the built-in fridge for chilled fresh milk storage, the machine ensures that each cup of coffee is made with fresh ingredients. This maintains the quality and taste of the drinks and enhances customer satisfaction. The peculiar structure of the machine, including the fridge and the storage compartments for water tanks and syrup bottles, allows for efficient temperature control and preservation of the ingredients.

Personalization and Customization: The ability to engrave graphics or text onto the cup offers a personalized touch to each drink. This unique feature allows customers to have a cup that reflects their individual preferences or messages, enhancing their overall coffee-drinking experience.

Advertising and Promotion: The display screen on the machine serves as an advertising platform, enabling businesses to promote their products or services. This feature helps increase brand visibility, generate additional revenue through advertising partnerships, and engage customers while they wait for their orders. The peculiar structure includes the screen and the software integration that allows the display of targeted advertisements and promotional content.

Remote Monitoring and Management: The stock level monitoring and sales performance tracking capabilities, accessible through a web platform, provide valuable insights for optimizing machine locations and resource management. Operators can remotely monitor the stock levels of ingredients, such as coffee beans, milk, and syrups, ensuring timely restocking. They can also analyze the sales data to make informed decisions regarding machine placement and inventory management. The peculiar structure integrates the necessary sensors and connectivity features to enable remote monitoring and management.

Emergency Handling: The ability to put the machine offline remotely, either by an operator or automatically in case of emergencies, ensures the safety and maintenance of the machine. This feature allows operators to remotely address issues such as maintenance, repairs, or safety concerns without physical intervention. The peculiar structure includes the necessary remote control mechanisms and connectivity features to enable seamless offline management.

The structural and characteristic features and all advantages of the product subject to the invention will be understood more clearly thanks to the figures given below and the detailed explanation written by making reference to these figures, and therefore the evaluation should be made by taking these figures and detailed explanation into consideration.

Description of the Figures:

The invention will be described with reference to the accompanying figures, so that the features of the invention will be more clearly understood and appreciated, but the purpose of this is not to limit the invention to these certain regulations. On the contrary, it is intended to cover all alternatives, changes and equivalences that can be included in the area of the invention defined by the accompanying claims. The details shown should be understood that they are shown only for the purpose of describing the preferred embodiments of the present invention and are presented in order to provide the most convenient and easily understandable description of both the shaping of methods and the rules and conceptual features of the invention. In these drawings;

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Figure 1 A perspective view of the automation subjected in the invention.

Figure 2 A schematic view of the working method of the automaton subject in the invention.

Figure 3 A schematic view of the working method of the automaton subject in the invention.

15

The figures to help understand the present invention are numbered as indicated in the attached image and are given below along with their names.

Description of References:

20

1. Machine
2. Robotic Block
3. Water Syrup Block
4. Screen
- 25 5. QR Code Area
6. Service Door
7. Refrigerator
8. Connected Board
9. Electronics Board
- 30 10. Boiler
11. Coffee Bin
12. Grinder

- 13. Brewer
- 14. Water Tanks
- 15. Syrup Tanks
- 16. Cup Tube
- 5 17. Lid Tube
- 18. Lid Closer
- 19. Robotic Arm
- 20. Laser Engraver
- 21. Milk Box
- 10 22. Waste Bin
- 23. Rotating Door
- 24. Cloud
- 25. Preparation of the drink
- 26. Engraving
- 15 27. Closing with a Lid
- 28. Getting Ready for Delivery
- 29. Rotation Around Vertical Axis
- 30. Detection of Cup Taken
- 31. Rotating Door Close
- 20 C1. First User
- C2. Second User

Detailed Description of The Invention:

- 25 The tasks of the basic elements that make up the system that is the subject of the invention are as the following: Robotic block (2): it surrounds the system that processes the coffee drink by moving the cup inside the cup tube (16) from station to station. It also includes the user interface, including screen (4), QR code area (5) and cup service door (6). Here, the screen (4) can be circular or rectangular as shown in Figure 1. Water syrup block (3):
- 30 it encloses some ingredients of the drink such as bottles of water and syrup. Refrigerator (7): it is used to store chilled fresh milk and cold brew coffee.

The operation of the system subject to the invention is as follows:

Customer input: With a mobile phone on which the machine (1) application is installed, the first user (C1) opens the application and scans the QR code area (5) located on the machine (1). Then the menu is shown to the first user (C1) via the mobile phone. In this way, the first user (C1) can choose a prepared drink or make his own drink by mixing the amount of ingredients available. Then, the first user (C1) can upload a graphic or text to engrave on the cup. From this point on, the order becomes ready to be sent to the machine (1) via the cloud (24) for processing. The first user (C1) can also send a customized cup to the second user (C2) as a gift. In a different arrangement of this process, the user scans the QR code area (5) on the machine (1) to send the order to the cloud (24). Drink customization and cup design can also be done directly from the touch screen without using any application.

Order and cup processing: The cloud (24) processes the payment paid from pre-installed cups/points in the application or a credit card reader on the machine (1). The drink recipe and cup design are converted into data that can be used by the machine (1). This data is sent to the internet connected board (8) located on the machine (1) and controlled by an electronics board (9) that performs the preparation of the drink (25) and engraving (26). Finally, the cup is closed with a lid (27) and getting ready for delivery (28).

Cup delivery: Robotic arm (19) brings the prepared cup to a delivery mechanism. After the cup is isolated in the mechanism, the cup and the door rotate around vertical axis (29) to present the cup to the customer. After the mechanism detection of the cup taken (30), the rotating door closes (31). An anti-pinch safety feature is included to ensure no obstructions, such as fingers, are injured or damaged if pinched during closing. This process is provided by the sensor integrated into the system.

Control system: machine (1) has internet connected board (8) and electronics board (9) for communication and direct hardware control purposes.

Food loop: Contains all parts used to process drink ingredients by direct contact. Here boiler (10), coffee bin (11), grinder (12), brewer (13), water tanks (14), syrup tanks (15),

cup tube (16), lid tube (17), lid closer (18), robotic arm (19), refrigerator (7), milk box (21). They are connected by pipe for liquid contents. The drink is prepared by grinding the coffee bean, brewing the powder and adding milk and syrup. A variety of hot or cold drinks are available upon request. After the drink is prepared, solid waste is collected in a bin under the brewer (13) and liquid waste is collected in a waste bin (22) under the refrigerator.

User interface: it contains the screen to display the food preparation status, or advertisement, or news or other contents, the QR code screen (4) (circular or square) which the user scans from the mobile application to start the service. The customized drink and engraved cup is delivered in a vertically rotating door (23).

With our algorithm, which is the subject of the invention, the first user (C1) can upload the data created by the application to the machine (1) and receive his drink, while at the same time sending a gift to the second user (C2), the second user (C2) can receive the drink created by the first user (C1). The steps here are as follows; After the first user (C1) opens the application by any electronic device such as a mobile phone on which the machine (1) application is installed, the second user (C2) pays for the drink to be obtained from the machine (1) and the picture and/or graphic and/or image to be engraved on this drink or sends the file consisting of text data to the second user (C2) as a gift. This sending process can be via any of the wireless access methods such as Bluetooth, WI-FI etc. The second user (C2) will scan the incoming gift file to the QR code area (5) located on the machine (1), and the relevant data will be sent to the machine (1) via the cloud (24) for processing. Then, after the electronics board (9) preparation of the drink (25) and/or engraving (26) the drink, the cup will be closed with a lid (27) by means of at least one robotic arm (19) and made ready for delivery (28). In this way, the second user (C2) will be able to obtain his drink from the machine (1) by using the gift data received without making any payment.

CLAIMS

- 1- The invention relates to the fully automatic smart coffee vending machine (1) with IoT, **and it's characterized by;**
- 5 - at least one robotic arm (19), that moves the cups stacked on top of each other in at least one cup tube (16) and the lids stacked on top of each other in at least one lid tube (17) and at least one boiler (10) and/or grinder (12) and/or brewer (13) and/or milk box (21) and/or screen (4) and/or QR code area (5) and/or cup service door (6) and/ or at least one robotic block (2)
- 10 containing at least one laser engraver (20) engraving pictures and/or graphics and/or text on the user interface and/or cup surface,
- at least one water syrup block (3) including at least one water tank (14) and/or at least one syrup tank (15),
- refrigerated fresh milk or cold-brewed coffee, or the drink component
- 15 intended to be consumed cold, or at least one refrigerator (7) in which the drink is stored,
- at least one internet connected board (8), which is positioned on the machine (1) and where the data is sent,
- at least one electronics board (9) that processes the data transmitted to the
- 20 machine (1) and controls the system,
- at least one cloud (24) database where data is transferred wirelessly,
- at least one coffee bin (11) where solid waste is stored after the drink is prepared,
- including at least one waste chamber (22) where liquid waste is stored after
- 25 the drink is prepared.
- 2- As mentioned in Claim 1, it is a fully automatic smart coffee vending machine with IoT, and it is characterized by having a circular or rectangular or square or any polygon shaped screen (4).
- 30
- 3- The invention is about the fully automatic smart coffee vending machine with IoT and its working method, **and it's characterized by;**

- a first user (C1) opens the application by any electronic device such as a mobile phone on which the machine (1) application is installed,
 - a QR code area (5) of the first user (C1) located on the machine (1) (if there are different alternatives other than QR Code, please specify) via the application interface that opens on the application screen.
 - a system provides the user with the type of prepared drinks, the ratio of drink ingredients and the content of materials from which he can make his own drink,
 - the first user (C1) uploads at least one image and/or graphic and/or text data to be engraved on the cups,
 - the relevant data get uploaded to the machine (1) via the cloud (24) for processing,
 - the payment can be done by the user either by the machine (1) application or cash,
 - the data get uploaded to the internet connected board (8) positioned on the machine (1),
 - electronics board (9) performs drink preparation (25) and/or engraving (26) and,
 - at least one robotic arm (19) that helps covering the cup with a lid (27) and getting it ready for delivery (28), process steps.
- 4- The invention is about the fully automatic smart coffee vending machine with IoT and its working method, **and it's characterized by;**
- a first user (C1) opens the application by any electronic device such as a mobile phone on which the machine (1) application is installed,
 - the first user (C1) creates a gift file consisting of at least one image and/or graphic and/or text data and pays,
 - the first user (C1) sends the gift file to a second user (C2) via wireless access method,
 - the second user (C2) scans the gift file to the QR code area (5) located on the machine (1) (if there are alternatives other than QR Code, please specify),

- the relevant data get uploaded to the machine (1) via the cloud (24) for processing,
- the data get uploaded to the internet connected board (8) positioned on the machine (1),
- 5 - electronics board (9) performs drink preparation (25) and/or engraving (26) and
- at least one robotic arm (19) that helps covering the cup with a lid (27) and getting it ready for delivery (28), process steps.

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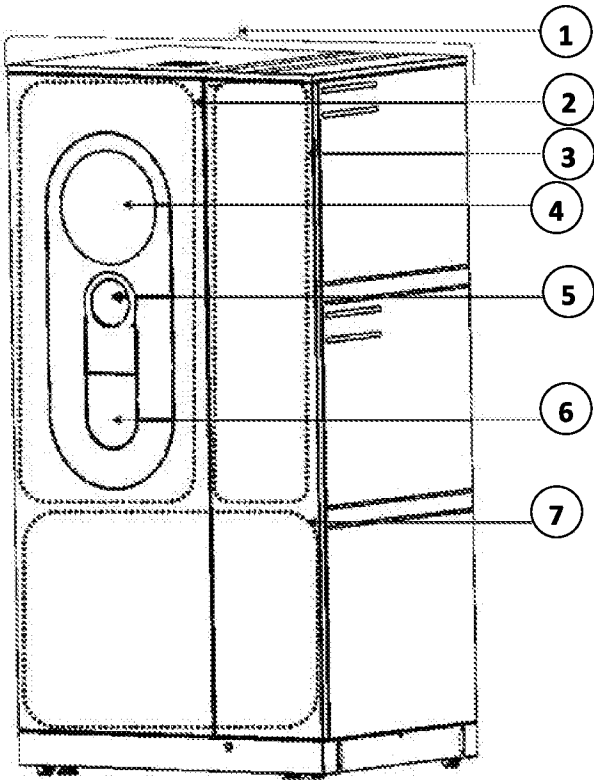


Figure-1

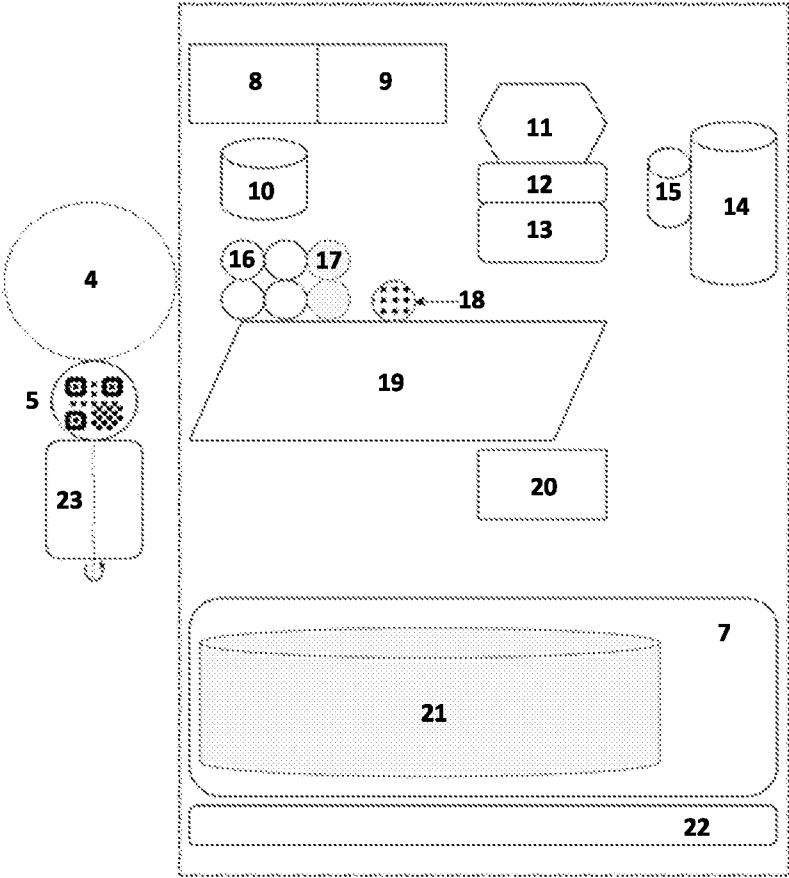


Figure-2

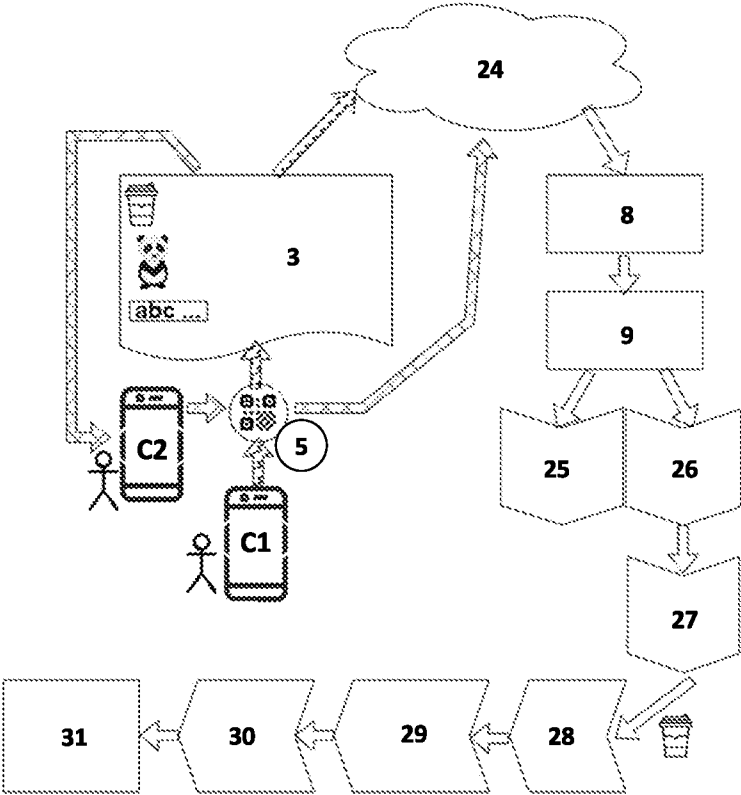


Figure-3

INTERNATIONAL SEARCH REPORT

International application No.

PCT/TR2023/050523

A. CLASSIFICATION OF SUBJECT MATTER

G07F 13/06 (2006.01)i; G06Q 20/14 (2012.01)i

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

G07F 13/06; G06Q 20/14

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

TURKPATENT Patent Databases

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPO Abstract and Fulltext Databases, keywords: coffee, beverage, machine, kiosk, vending, cup, engrave, laser, cloud, gift, deliver, door, administrator, arm, qr code, scan, syrup, waste, iot, remote

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 2022369854 A1 (7 ELEVEN INC [US]) 24 November 2022 (2022-11-24) par 33-76, figure 1,12	1-4
Y	US 2013087050 A1 (BRIGGO INC [US]) 11 April 2013 (2013-04-11) par 139-141,155-164	1-4
A	WO 2018183642 A1 (COCA COLA CO [US]) 04 October 2018 (2018-10-04) Whole document	1-4



Further documents are listed in the continuation of Box C.



See patent family annex.

* Special categories of cited documents:

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“X” document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

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Date of the actual completion of the international search

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Information on patent family members

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US	2022369854	A1	24 November 2022	NONE			
US	2013087050	A1	11 April 2013	WO	2013055938	A1	18 April 2013
WO	2018183642	A1	04 October 2018	CN	110651461	A	03 January 2020
				EP	3603029	A1	05 February 2020
				EP	3603029	A4	02 September 2020