United States Patent [19]

Syverson

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[54] **HOT DRINK DISPENSER**

[76] Inventor: **Martelle J. Syverson,** 102 Ridge Rd., Albert Lea, Minn. 56007

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[21] Appl. No.: **318,180**

Related U.S. Application Data

[62] Division of Ser. No. 238,447, March 27, 1972.

[52] **U.S. Cl.** **222/129.4**

[51] **Int. Cl.** **G07f 13/02**

[58] **Field of Search**..... 222/129.1, 129.3, 129.4, 222/132; 221/96; 141/90, 359

[56] **References Cited**

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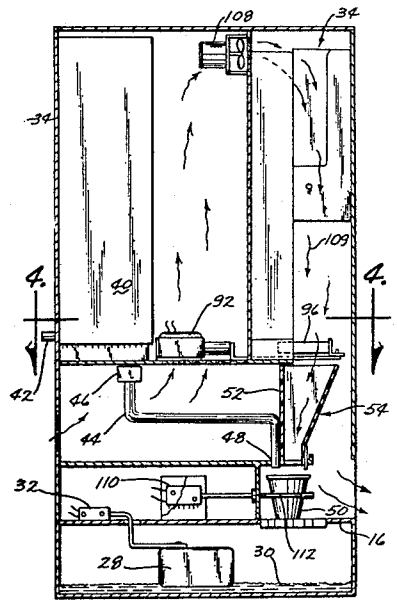
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Primary Examiner—Robert B. Reeves
Assistant Examiner—Thomas E. Kocovsky
Attorney, Agent, or Firm—Zarley, McKee & Thomte

[57] **ABSTRACT**

A housing includes a heated water tank, two pairs of particulate food product cartridges from which metered servings are funneled into a cup along with hot water. The hot water vapors are blown out of the housing by a fan directing air downwardly past the agitation and metering scoop in the food cartridges and through the funnel out of the machine. A cup support shelf is provided below the funnel and heated water conduit and a float is provided therebelow connected to a switch for lighting a warning light should liquid in the bottom of the housing rise above a predetermined level. The electrical circuitry is also de-energized. A control switch is actuatable by the cup to insure the cup's presence before water or food product is discharged. A coin mechanism is provided in the housing and includes a first cam in the path of a coin for holding the coin which actuates a switch connected to a motor for rotating the cam shaft. A second cam will cause the motor to turn the cam shaft one full revolution after it has started turning by the coin actuating the switch. The coin is then dropped to the bottom of the coin mechanism. Upon the cam shaft making one complete revolution the first cam will again be in a position to receive the next coin to repeat the cycle. During the one revolution of the cam shaft food product cams will operate switches a predetermined number of times to cause solenoids connected thereto to discharge corresponding numbers of scoops of food product from the food cartridges. Still another cam controls the maximum quantity of water which can flow from a solenoid valve controlled water conduit such that no more than a cup of water will be discharged. The water cam is adjustable and includes coaxial overlapping portions which are engaged by the switch previously engaging the coin for the desired degrees of the one revolution of the cam shaft. Upon the coin dropping from the coin guide the switch actuating element moves through the coin guide for engagement with the adjustable cam.

1 Claim, 13 Drawing Figures



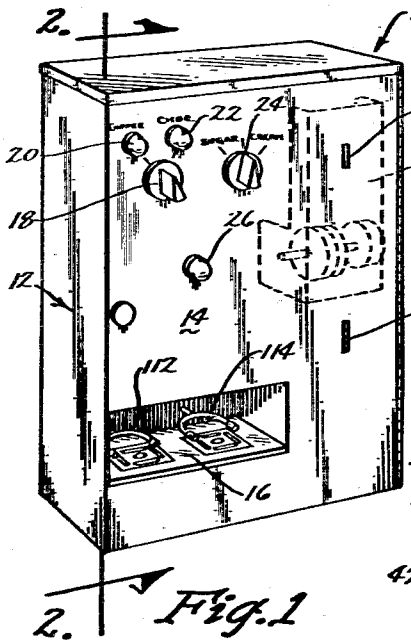


Fig. 1

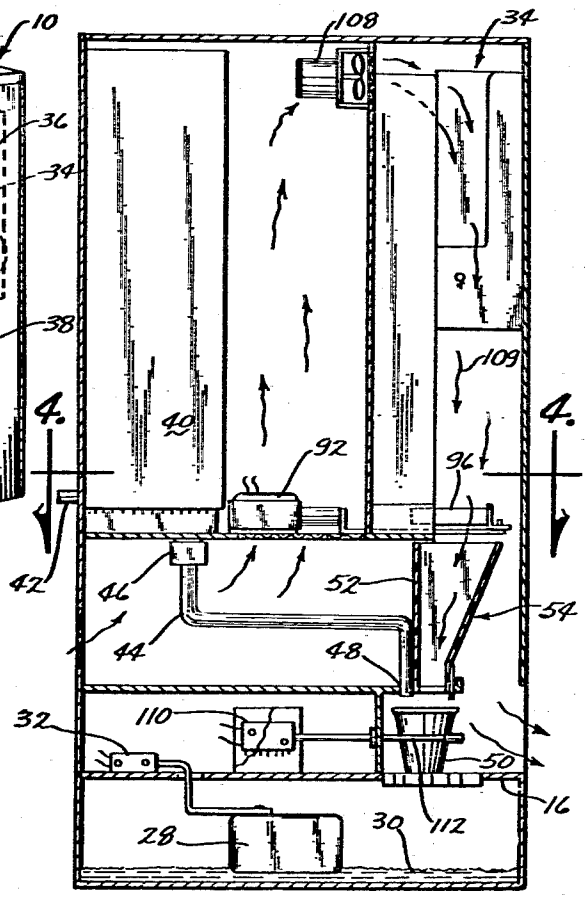


Fig. 2

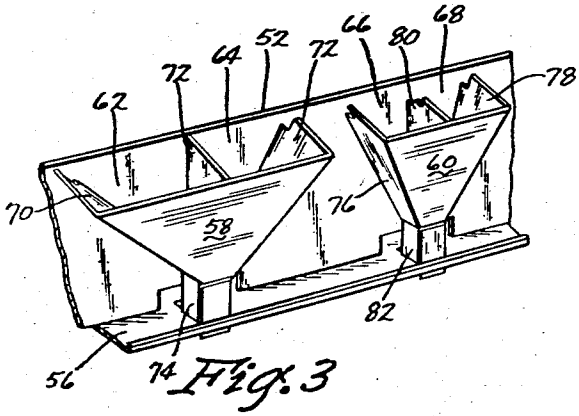


Fig. 3

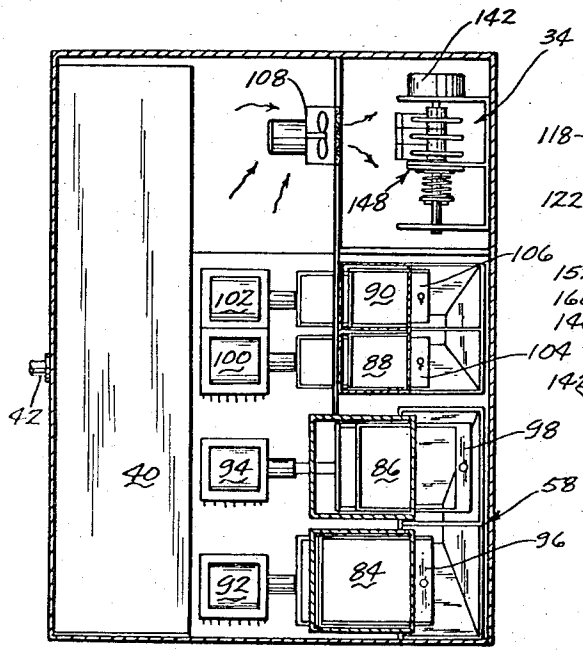


Fig. 4

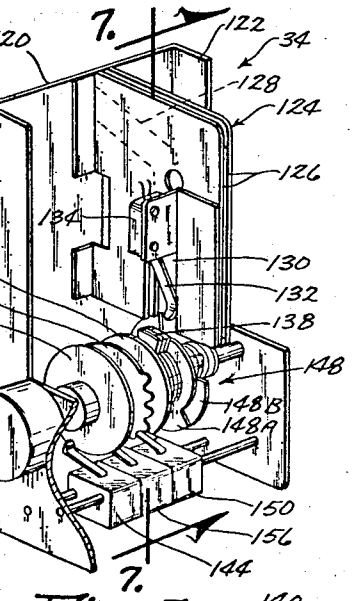


Fig. 5

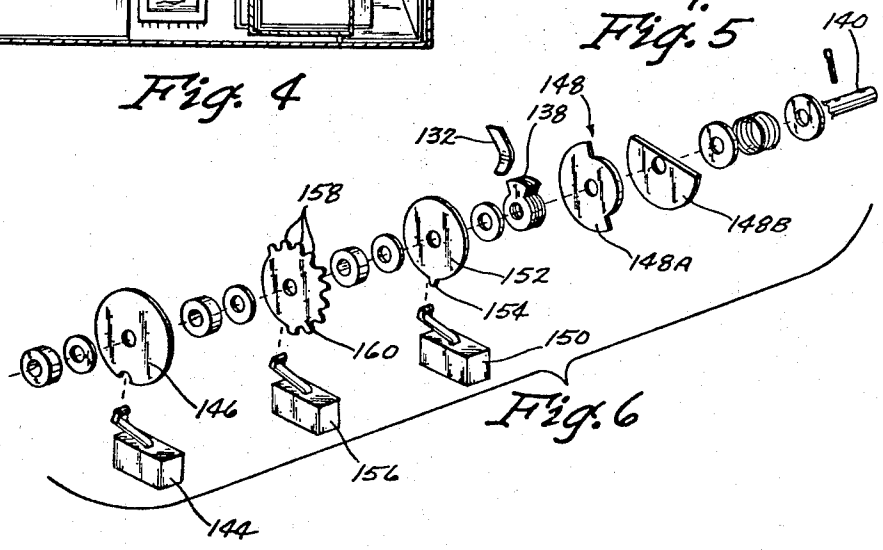


Fig. 6

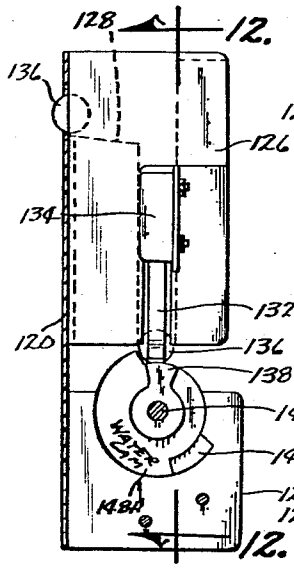


Fig. 7

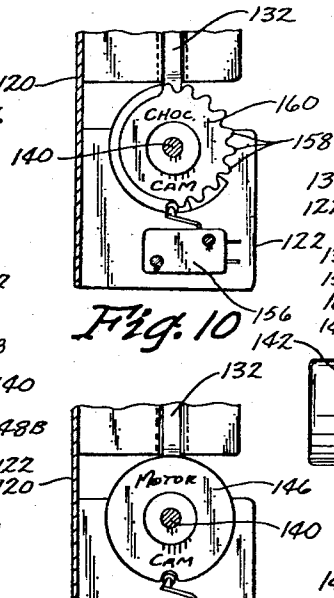


Fig. 10

Fig. 11

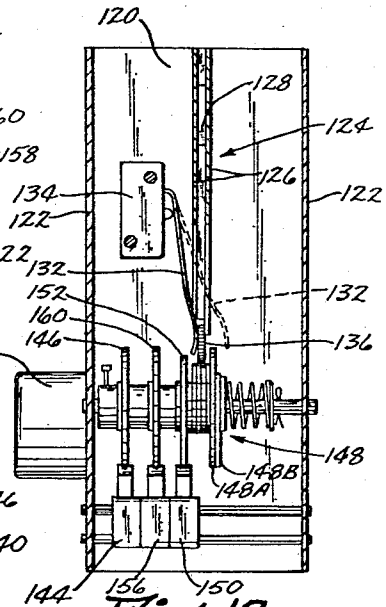


Fig. 12

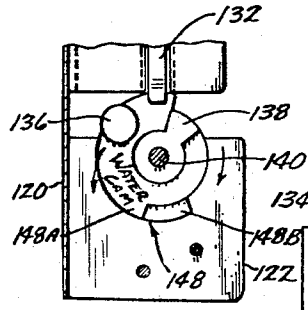


Fig. 8

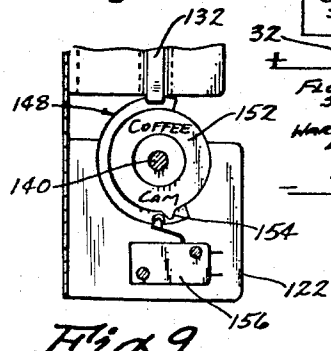


Fig. 9

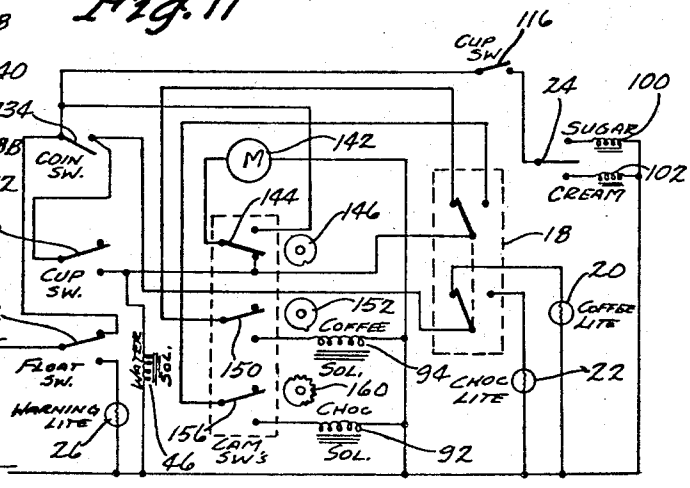


Fig. 13

HOT DRINK DISPENSER

This is a divisional application of application Ser. No. 238,447 filed Mar. 27, 1972.

The most desirable vending machine is a machine that is trouble free, simple to operate and inexpensive to manufacture. The machine of this invention is suitable for use in a variety of locations including offices, homes and restaurants. In most places where coffee and other hot drinks are served it is necessary to prepare a fresh pot several times a day. The machine of this invention includes throw-away food cartridges for coffee and hot chocolate, for example, in addition to cartridges of non-dairy cream and sugar. Water may be plumbed into a heated holding tank in the machine. The use of particulate freeze-dry coffee, hot chocolate and the like make it unnecessary to prepare these drinks in advance. An agitation and metering scoop in the base of each of the product cartridges is connected to a solenoid in turn operated by a cam for reciprocating the scoop the required number of times to give a precise quantity of required food product. Use of the exact amount of freeze-dry food product is particularly important for giving the best drink possible and minimizing materials expense.

The hot drink dispensing machine of this invention also includes controls which allow the machine to be only operated safely and honestly. A coin is required to start the operation and a predetermined quantity of food product will be dispensed from the cartridge along with no more than one cup of heated water. A control switch is operated by a float under a cup support thus leakage of water will cause the system to be deactivated while a warning light is turned on.

A problem frequently encountered with the use of dry product mixed with water is that the fumes from the hot water will moisten the supply of product thus preventing it from flowing from its container. This is prevented in the dispensing machine of this invention by a fan blowing air from around the food product cartridges down into the area of the hot water discharge conduit feeding into the cup along with the food product and then out of the machine taking the water vapors with it and, of course, preventing the water vapors from rising to contaminate the particulate food product in the cartridges by entering the cartridges through the opening in which the agitation scoop is positioned.

This invention consists in the construction, arrangements and combination of the various parts of the device, whereby the objects contemplated are attained as hereinafter more fully set forth, specifically pointed out in the claims, and illustrated in the accompanying drawings in which:

FIG. 1 is a front perspective view of the hot drink dispenser of this invention.

FIG. 2 is a cross sectional view taken along line 2—2 in FIG. 1 showing the product and hot water flow and the air flow for removing hot water varpors from the machine.

FIG. 3 is a fragmentary perspective view of the particulate food funnels positioned below the food cartridges and above the cup support.

FIG. 4 is a cross sectional view taken along line 4—4 in FIG. 2.

FIG. 5 is an enlarged fragmentary perspective view of the coin mechanism.

FIG. 6 is an exploded perspective view of the cams in the coin mechanism.

FIG. 7 is a cross sectional view taken along line 7—7 in FIG. 5 showing the starting cam holding a coin in the coin guide for actuating a motor starting switch.

FIG. 8 is a view similar to FIG. 7 but showing the starting switch being actuated by an adjustable cam after the cam shaft has started to turn causing the first cam to release the coin from the coin guide and engagement with the starting switch.

FIG. 9 shows the coffee cam having one cam surface for actuating a switch connected to a solenoid in turn connected to the scoop in the coffee cartridge.

FIG. 10 is a view showing the chocolate cam having a plurality of cam surfaces for actuating an associated switch in turn connected to a solenoid for operating a scoop in the chocolate food cartridge to give multiple metered scoops of chocolate.

FIG. 11 is a view showing the motor cam and a switch which is deactivated until the cam rotation has been started by the coin actuated switch.

FIG. 12 is a cross sectional view taken along line 12—12 in FIG. 7 showing alternate positions of the coin switch actuating element first engaging the coin and then after the coin has been released by the coin cam upon rotation thereof; and

FIG. 13 is an electrical schematic.

The hot drink dispenser of this invention is referred to in FIG. 1 generally by the reference numeral **10** and includes a housing **12.** A front wall **14** includes a cup support shelf **16** having space for two cups. A selection switch **18** is adjustable between a coffee position **20** and a chocolate position **22,** as indicated by the related lights. Sugar and cream may be selected by a switch **24** and a warning light **26** is provided for signalling when a float **28** has risen due to water **30** in the bottom of the housing **12** such that a switch **32** is actuated.

A coin mechanism **34** is positioned behind the front panel **14** to receive coins through an opening **36.** Rejected coins are returned through an opening **38.**

Inside the housing it is seen that water is plumbed into a heating storage tank **40** through a conduit **42** and is released from the tank through a conduit **44** controlled by a water solenoid valve **46.** The lower end **48** of the water conduit **44** is positioned directly above a cup **50** on the support shelf **16** abutting the back side wall **52** of a particulate product funnel **54** such that food product and water are fed into the cup **50** simultaneously.

The funnel **54** is seen in FIG. **3** on a shelf **56.** Two pairs of funnels **58** and **60** are provided, the funnel **58** adapted to receive coffee and chocolate in sections **62** and **64,** respectively, while sections **66** and **68** of funnel **60** receive sugar and cream respectively. The forward walls **58** and **60** extend downwardly and rearwardly and cooperate with end walls **70** and **72** in funnel **58** and the rear wall **52** and center wall **72** to channel the food product to the throat **74** for feeding the cup **50.** The funnel **60** includes end walls **76** and **78** and center wall **80** feeding through a throat **82.**

As seen in FIG. **4,** four product cartridges are provided for feeding the respective funnel sections. Two larger cartridges **84** and **86** are provided for coffee and chocolate, respectively, while the smaller cartridges **88** and **90** are for the sugar and cream. A pair of solenoids **92** and **94** are connected to scoops **96** and **98** for the coffee and chocolate cartridges while solenoids **100**

and 102 are connected to agitation and metering scoops 106 for the sugar and cream cartridges.

As seen in FIG. 2, the interior of the particulate material food cartridges is kept dry by a fan 108 blowing air as indicated by the arrows 109 downwardly from the top of the housing 12 along the cartridges and through the scoops 96, 98, 104 and 106 and then through the funnel sections 62, 64, 66 and 68 where the air then escapes past the cup 50 taking with it hot water vapors from the discharge end 48 of the water conduit 44. The normal tendency of the water varpors to rise through the funnels to contaminate the particulate material in the cartridges is thus overcome and prevented. A cup actuatable control switch 110 is provided having an actuating yoke element 112 and is operated by pushing the yoke 112 rearwardly with the cup 50 which, as will be described hereinafter, causes the controlling electrical circuits to be energized and thereby allow product and water to be dispensed. Accordingly, water and product can only be dispensed when a cup is in place ready to receive the water and the food product for mixing in the cup. The cup switch 110 and associated yoke 112 function to operate the coffee and chocolate solenoids 92 and 94 and water solenoid valve 46 while a yoke actuating element 114 connected to a switch 116 controls the sugar and cream solenoids 100 and 102.

The coin mechanism 34 includes a frame 118 having a front wall 120 and oppositely disposed rearwardly extending side walls 112. A coin guide 124 is formed by closely spaced together plates 126 providing a coin path 128 therebetween and extending from the coin slot 36 on the front wall of the dispenser housing 12, as seen in FIG. 1. A slot 130 is formed in the walls 126 in the path 128 of the coin such that the actuating element 132 of a microswitch 134 will be actuated by any coin 136, as seen in FIG. 7, when the coin is held by a coin cam 138 on a cam shaft 140 mounted between the frame side walls 122 and rotated by a motor 142. The cam 138 includes a trio of segmental disk plates sufficiently wide enough collectively to provide a support base for the coin 136. The peripheral length of the cam 138 may be as great as is needed. It is seen in the electrical schematic of FIG. 13 that upon the coin switch 134 being actuated by the coin 136 a circuit is established through the motor 142, the cup switch 110 and a switch 144 operated by a motor cam 146. It is seen in FIG. 11 that when the coin 136 is first inserted into the machine the switch 144 is in the position of the solid line in FIG. 13 but upon the motor 142 turning the cams the cam 146 moves the switch 144 to the dash line position of FIG. 13 making an alternate circuit through the motor 142. At this time, as seen in FIG. 8, the cam 138 has moved away from alignment with the coin guide 128 thereby releasing the coin 136 to fall to the bottom of the coin mechanism and thereby allowing the coin switch 134 to open except that it moves then into engagement with an adjustable water cam 148, as seen in FIG. 9, thereby maintaining the switch 134 in its closed position. The cam 148 includes two relatively rotatable disk elements 148A and 148B adjustable to provide a peripheral cam surface of between approximately 180° to 360° or any other configuration as the conditions might warrant upon varying the shape of the component cam portions 148A and 148B. The adjustment of these cam portions 148A and 148B is made to keep the switch 134 closed sufficiently long for the water solenoid 146 to give no more than one full cup of water.

The switch 18 on the front of the dispenser 12 has been set for coffee and thus the coffee light 20 has been energized and the coffee solenoid 94 is actuated upon a switch 150 being operated by a coffee cam 152 having a single actuating cam surface 154. A single cam surface 154 is needed for coffee since only one scoop of coffee material is needed per cup and thus one solenoid operation will be sufficient. In the case of chocolate, with the switch 18 being turned to its right-hand position, the chocolate solenoid 92 will be actuated upon the switch 156 being operated by the plurality of cam shoulders 158 on the cam 160. Accordingly, the desired number of scoops of chocolate may be provided by varying the number of cam shoulders 158. Thus it is seen that the coin switch 134 and the cup switch 110 function as master switches for operating the coffee and chocolate solenoids 94 and 92 in addition to the water solenoid 46. The motor 142 is initially dependent upon the switch 134 while the coin 136 is in a position on the cam 138 to close the switch 134 but after that the motor is in a circuit with the switch 144 which will remain closed for substantially a full revolution of the cam 146. It is reopened when the cam 146 returns to its position of FIG. 11 with the actuating element of the switch being in the notch in the cam 146. Should water accumulate in the bottom of the machine in an excessive amount the float 28 will actuate the switch 32 to open the circuit through the coin switch 134 thereby rendering inactive the entire system until the problem has been corrected. At the same time the warning light 26 will go on as a circuit through it will have been established. The sugar and cream solenoids 100 and 102 are seen to be operated by the switch 24 on the front of the dispenser housing 12 and the cup switch 116 actuatable by the yoke 114.

Thus it is seen that substantial simplicity has been built into a very effective hot drink machine which provides complete control over the dispensing of a variety of hot drink products such as coffee and chocolate milk.

I claim:

1. A hot drink dispensing machine, comprising, a housing, a heated water tank in said housing having a discharge outlet above a cup support, a particulate food product storage chamber in said housing having a discharge outlet closely adjacent said heated water outlet, a pair of solenoids for controlling the discharge of heated water and particulate food product into a cup on said cup support, a cup actuatable switch at said cup support connected to and controlling said pair of solenoids, a fan in said housing directing air from around the discharge outlet of said particulate food product storage chamber and away therefrom such that any hot vapors from said heated water discharge outlet cannot rise into the area of said discharge outlet for said particulate food chamber, said particulate food product storage chamber being further defined as including a pair of cartridges having different particulate foods, and a metering and agitation scoop being provided in each cartridge, one of said pair of solenoids being connected to the scoop in one of said cartridges and a third solenoid being connected to the scoop in the other cartridge, and a two section funnel being provided below the discharge outlet of said two cartridges for channeling said particulate material into said cup, said funnel

including a common vertical dividing wall, a common forward wall extending downwardly and rearwardly, a common rear vertical wall, and opposite side walls extending downwardly and laterally inwardly, said two section funnel having a two-compartment throat with said common vertical dividing wall cooperating to form said two compartments on opposite sides thereof, and said discharge outlet of said water tank being closely adjacent and behind said common rear vertical wall, and said fan being located in said housing to blow air past the discharge outlet of said cartridges through the two sections of said funnel out and away from said heated water outlet conduit, a second switch being connected to said three solenoids and a float being provided in said housing below said cup support, said float being positioned to actuate said second switch upon liquid in the bottom of said housing rising above a predetermined level.

* * * * *