(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) Publication number: **0 104 447**
A2

(12) # EUROPEAN PATENT APPLICATION

(21) Application number: 83108382.9

(51) Int. Cl.³: G 07 F 13/06

(22) Date of filing: 25.08.83

(30) Priority: 27.08.82 US 412232

(43) Date of publication of application:
04.04.84 Bulletin 84/14

(84) Designated Contracting States:
AT BE CH DE FR GB IT LI LU NL SE

(71) Applicant: King, Alan M.
4746 The Boulevard
Westmount Province of Québec(CA)

(72) Inventor: King, Alan M.
4746 The Boulevard
Westmount Province of Québec(CA)

(74) Representative: Casalonga, Axel et al,
BUREAU D.A. CASALONGA OFFICE JOSSE & PETIT
Baaderstrasse 12-14
D-8000 München 5(DE)

(54) **Timing mechanism.**

(57) An apparatus for a customer-operated dispensing machine includes an infinitely variable selector which enables the customer to select a continuously variable quantity of a product dispensed by a dispensing mechanism thereof, the apparatus being adapted to actuate the product dispensing mechanism to thereby dispense the product. The apparatus includes means for adjusting either the dispensing time of the dispensing mechanism or the dispensing rate of the dispensing mechanism to thereby adjust the quantity of the product dispensed.

EP 0 104 447 A2

TIMING MECHANISM

CROSS-REFERENCE TO RELATED APPLICATION

This is a continuation-in-part application of parent application Ser. No. 412,232, filed August 27, 1982, which is abandoned with the filing of this application.

BACKGROUND OF INVENTION

(a) Field of the Invention

The invention relates to an apparatus for a customer-operated dispensing machine wherein the customer can select a continuously variable quantity of a product dispensed by a dispensing mechanism. More specifically, the invention relates to such apparatus with means for adjusting either the dispensing time or the dispensing rate of the dispensing mechanism to thereby adjust the quantity of the product dispensed.

(b) Description of Prior Art

With presently available dispensing machines, quantities of a secondary product can be customer-selected, for dispensing by the dispensing mechanism thereof, only in discrete amounts. Thus, with a coffee dispensing machine, one can select only a preset discrete amount of sugar (for example 0, 1 or 2 spoons), and a discrete amount of cream (usually 0, regular and light). Customers preferring amounts of sugar or cream of different quantities than permitted by the dispensing machine can therefore never be fully satisfied by the combined product delivered. For example, if a customer desires only half a spoon of sugar, or one and a half spoons of sugar, it is not possible to have his taste fully satisfied with present day dispensing machines.

U.S. Patent 3,794,149, teaches an adjustable timing cam for hot drink dispensers. However, the adjust-

ment of the timing cam is a factory adjustment and not under the control of the customer.

To applicant's knowledge, there are no means for adjusting the dispensing rate of a dispensing mechanism.

SUMMARY OF INVENTION

It is therefore an object of the invention to provide a timer mechanism which overcomes the disadvantages of the prior art.

It is a more specific object of the invention to provide a timer mechanism for a customer-operated dispensing machine by which the customer can select a continuously variable quantity of a secondary product dispensed by a dispensing mechanism.

It is an even more specific object of the invention to provide such a timer mechanism which includes means for adjusting either the dispensing time or the dispensing rate of a dispensing mechanism to thereby adjust the quantity of the product dispensed.

It is also an object of the invention to provide a method for a customer-operated dispensing machine whereby the customer can select a continuously variable quantity of a secondary product dispensed by a dispensing mechanism.

In accordance with the invention, there is provided a timer mechanism for a customer-operated dispensing machine by which the customer can select a continuously variable quantity of a secondary product dispensed by a dispensing mechanism thereof, the apparatus being adapted to actuate the secondary product dispensing mechanism to thereby dispense the product. The device includes means for continuously adjusting the dispensing time or the dispensing rate of the dispensing mechanism, to thereby dispense a continuously variable quantity of the product from the dispensing mechanism.

The invention also relates to a method for

a customer-operated dispensing machine by which the customer can select a continuously variable quantity of a product dispensed by a dispensing mechanism thereof and to an apparatus adapted to actuate the product dispensing mechanism to thereby dispense the product, the apparatus including means for continuously varying the dispensing time or the dispensing rate of the dispensing mechanism. The method includes the step of adjusting either the dispensing time or the dispensing rate of the dispensing mechanism. The dispensing mechanism is actuated to dispense a variable quantity of the product.

BRIEF DESCRIPTION OF DRAWINGS

The invention is now described with reference to the accompanying drawings which show preferred forms thereof and wherein:

FIGURE 1 is a top view of the timer mechanism with a solenoid in its unactuated position;

FIGURE 2 is a top view of the timer mechanism with the solenoid in its actuated position, small arrows indicating the direction in which parts have moved;

FIGURE 3 is a vertical sectional view, taken from the front of the timer mechanism, with parts omitted;

FIGURE 4 illustrates a cycle cam;

FIGURE 5 illustrates a product timer cam with the lever arms in its lowest position;

FIGURE 6 illustrates the product timer cam with the lever arm in its highest position;

FIGURE 7 illustrates an example of a customer product selection panel for selecting continuously variable amounts of a product;

FIGURE 8 is a highly schematic illustration of a variable RC timing circuit;

FIGURE 9 is a highly schematic illustration of a variable LC timing circuit;

FIGURE 10 is a highly schematic illustration of a Mylar switch variable RC timing circuit;

FIGURE 11 illustrates an embodiment of a timer arrangement using a wave signal transmitter and receiver arrangement; and

FIGURE 12 illustrates a further approach for providing a continuously variable quantity of a product from a dispensing machine.

DESCRIPTION OF PREFERRED EMBODIMENTS

As shown on the drawings, the timer mechanism, illustrated generally at 1, includes a cycle cam 3 and one or more product timer cams 5. As shown in FIG. 4, the cycle cam 3 is a notch cam whereas the product timer cams 5 include raised portions 5a (FIG. 5) and unraised portions.

As shown in FIGS. 1 & 2, associated with each product timer cam 5 is a selector lever arm 7. Movement of each lever arm 7, when the timer is in its unactuated position, is prevented by a latch 9 which is mounted on a movable latch rod 11. An end of the latch rod 11 is connected to a plunger 13 of a solenoid 15 for axial movement. As shown in FIGS. 5 and 6, each of the selector lever arms 7 is pivotable about a rod 23 and it is urged into its upper or non-select position (i.e., the position at which none of the secondary product is selected) by a spring 17.

As best shown in FIGS. 1, 2 and 3, all of the cams 3, 5, are corotatably mounted for rotation on a common cam axle 19.

A brake mechanism 21 is provided for holding each of the selector lever arms 7 in a selected position. The brake mechanism includes an axially movable support rod 23 slidably mounted on a frame 8, a pair of non-rotatable apertured friction plates 25 secured to the frame 8 and through which the support rod extends, a reaction surface 25a on the frame 8, a pair of hubs 26 secured to the selector lever arms 7

and pivotally supported on the support rod 23, and four friction or rubber rings 27 respectively disposed at opposite ends of said hubs 26 for frictionally acting between an end thereof and one of said friction plates 25 or reaction surface 25a. A collar 24 is pinned to the support rod 23 at such point as to provide such axial preload through the friction plates 25, 25, the four friction rings 27, and the hubs 26, 26 against the reaction surface 25a as may be desired in the unactuated position, and so as to transmit the axial braking force from the support rod 23 to the components disposed between the reaction surface 25a and the more remote friction plate 25.

A pull rod 29 is pivotally connected near one end thereof to an end of the support rod 23. The closer end thereof is adjustably fulcrumed on the frame 8, while the more remote end is reciprocated. The pull rod 29 is reciprocated by a pivoting member 31, which pivoting member has one end pivotably connected to the frame 8 at 33 and the other end connected to the plunger 13 of an electric solenoid 15. The pivoting member 31 has a roller 35 which engages the free end of the pull rod 29 to force it downwardly as is explained below. The pivoting member 31 is a second class lever acting through the roller 35 on the pull rod 29, which in turn is also a second class lever for acting on the brake support rod 23.

A latch rod spring 37 urges the latch rod 11, and hence the solenoid plunger 13, into its locked or uppermost position (as drawn) as shown in FIG. 1 while a brake rod spring 39 urges the brake support rod 23 into its uppermost position (as drawn). A motor 41 is connected to the cam axle 19 through an internal gear train, not shown, to thereby rotate the cams 3 and 5.

As shown in FIGS. 4, 5 and 6, a cycle cam

switch 43 having an actuating pin 45, is fixedly secured to the frame 8 and is associated with the cycle cam 3, while a product cam switch 47, having an actuating pin 49, is associated with each product timer cam 5. The cycle cam switch 43 has a cam-follower or switch arm 51, and each product cam switch 47 has a cam follower or switch arm 53. Each switch 43, 47 can be actuated by movement of the switch arms 51, 53 towards the respective actuating pin 45, 49 so that the switch arm shifts the actuating pin 45, 49. Each product cam switch 47 is fixedly secured to a mounting plate 48 pivotally supported on a pin 50 carried on the frame 8, there being a pin-and-slot connection 52 between each selector lever arm 7 and one of the pivotal mounting plates 48. When the selector arm 7 is in its uppermost position, the pin-and-slot connection moves the mounting plate 48 to its uppermost position, and hence pivots the switch 47 as far away from the cam 5 as possible. But when the selector arm 7 is lowered to its lowermost position, the pin-and-slot connection pivots the switch 47 as close to the cam 5 as possible. The position of the switch cam thus is shifted over a range with respect to the cam 5 where it is not actuated to where it is continuously actuated for the duration of the cam cycle.

FIG. 7 shows a customer panel for the continuously variable selection of a product such as, for example, cream and sugar in a coffee dispensing machine. The selector lever arms 7 are each movable in a slot 55. The panel is marked or calibrated at the top and at the bottom of each slot to indicate appropriate quantities. In FIG. 7, these markings are illustrated as zero (0) and full (F). Other appropriate markings or calibrations could be selected.

In operation, the timer works as follows:

When a coin is placed into a coin mechanism

of a dispensing machine, the coin mechanism will actuate the electric solenoid 15 so that the latch rod 11 is moved laterally (appearing downwardly in FIG. 2) to release the selector lever arms 7. Simultaneously the electric solenoid 15 actuates the brake mechanism 21 to maximize the braking force on the lever arms. The customer can now adjust the lever arms to the amount of supplementary product desired in his selected drink. On doing so, the brake mechanism 21 is manually over-ridden and more energy is stored in the springs 17. The brake mechanism 21 will hold each lever arm 7 in the selected position. As shown in FIG. 2, the friction or rubber rings 27 are compressed against the hubs 26 of the selector lever arm 7 and the friction surfaces of the friction plates 25 and the reaction surface 25a due to the pulling action of the support rod acting through the collar 24. The compressed rubber acting against the sides of the lever arm hubs 26 will brake the selector levers at any selected position.

The pivot member 31 amplifies the force from the solenoid. Thus, the solenoid is loaded only to the extent of retaining the movable end of the pivot member 31 in its actuated position rather than having to hold down the support rod 23 against the full force of the spring 39. The roller 35 of the pivoting member 31 urges the free end of the rod 29 to the actuated position of FIG. 2 to thereby actuate the brake support rod 23.

After the selector levers 7 have been set in their selected position, a further customer-actuated signal initiates the dispensing of the main product, which also energizes the motor 41 independently of the switch 43. The motor 41 rotates the axle 19 to thereby rotate the cams 3 and 5. The cam 3 actuates the switch 43 which is in a holding circuit for the motor 41. The cam 3 thus ensures that the motor 41

will remain energized so that cam rotation ceases after a travel of 360°. Thus, when a travel of 360° is completed, the arm 51 falls into the notch of the cam 3 so that the switch 43 is deactuated to turn off the motor 41.

The switch 47 is provided for being connected to a secondary product dispensing means such as a product door opener or to a product motor dispenser to actuate the dispensing means by either opening the door or turning on the motor dispenser. When the arm 53 moves into a position to actuate the switch 47, by displacing the actuating pin 49, such secondary product dispensing means is activated. It is the duration of such activation which this invention provides.

As shown in FIG. 5, with the lever 7 in its topmost position, the switch arm 53 cannot depress the actuating pin 49 even if the free end of the arm 53 were riding on the raised position 5a of the cam 5. Thus no supplementary product can be dispensed. When the lever arm 7 is in the lowermost position, as shown in FIG. 6, the switch arm 53 will depress the actuating pin 49 continuously for any cam position, i.e. the full cycle of the cam 5. Thus, the actuating pin 49 will be depressed for a longer time, to provide a longer time period, when the lever arm is in the position shown in solid lines in FIG. 6 than when the lever arm is in the position shown in solid lines in FIG. 5. Accordingly, a greater quantity would be dispensed with the lever arm in the bottom-most position as shown in FIG. 6.

When the lever arm 7 is moved to a position intermediate the topmost and bottom-most position, the amount of the time that the actuating pin will remain depressed is intermediate between the time of FIG. 5 and the time of FIG. 6, that is, the time period and therefore the amount of product dispensed, will be

intermediate the time period, and therefore the amount dispensed in the FIG. 5 position and the time period and therefore the amount dispensed in the FIG. 6 position. As the position of the lever arm is continuously variable, the amount of product dispensed is also continuously variable. Product is dispensed in the time period during which the actuating pin is depressed.

Although a particular mechanical timing arrangement has been illustrated for showing how a continuously variable quantity of a product can be selected, it will be appreciated that this represents only one approach. A different approach could be to use electronic timer means, for example, a rheostat in series with a capacitor. Such means is illustrated in Fig. 8 where 209 is a shaft of a variable rheostat 211. The shaft 209 will rotate when the lever 7 is pivoted about the point 8 as illustrated above.

A source of power, illustrated in the drawings as battery 205, is in series with a capacitor 207. One output of the rheostat 211 is connected to the other side of the capacitor. The other output of the rheostat is grounded.

Lead 209 is connected to the dispensing motor or a product door opener to provide a power input for a period of time as determined by the RC constant.

In a further electronic embodiment, an LC timing circuit is used. Referring to Fig. 9, slot 201 of inductance 203 is connected to be upwardly and downwardly movable with the pivoting of the lever 7. One output of the inductor is connected to a source of power, illustrated as battery 205. The other output of the inductor is connected to the top end of a capacitor 207. Lead 209 is connected to a product dispensing motor or a product door opener which will be activated for a period dependent on the LC constant

which is, in turn, dependent on the position of the lever 7.

In a different arrangement, a series of RC circuits having different time constants could be connected through Mylar^{tm} switches, which would appear on the front face of the dispensing machine, to a source of power. A customer would select the amount of product desired by pressing the appropriate Mylar^{tm} switch which would then activate its associated timing circuit. Once again, the timing arrangement would activate either a product door opener or a product dispensing motor. Such an arrangement is illustrated in Fig. 10. In Fig. 10, S1, S2, S3 ... Sn are Mylar switches which would appear on the face of the machine. RC circuits, R1C1, R2C2, R3C3 ... RnCn are arranged so that each one has a different value. Thus, by pressing a different one of the switches, a different time constant is selected.

FIG. 11 illustrates yet another embodiment for providing a continuously variable quantity of a product from a dispenser. In Fig. 8, 101 comprises a hopper for storing the product. The hopper has an output means such as a funnel 103 through which the product from the hopper is dispensed. A guide means 105 may guide the product to a container such as a cup 106 or the like. The product is dispensed from the hopper 101 by means of a dispensing motor 107.

The embodiment in FIG. 11 also includes a transmitter 109 for transmitting wave signals, for example, optical, solar or electronic waves. Receiver 111 receives the waves after a variable interval as will be explained below, and means 113 calculates the distance the waves have travelled between the transmitter output 110 and the receiver input 112. Such means are well known in the art and require no further description here.

The calculated distance is then provided, as an analog or digital signal, to a converter 115 which

converts the distance to a time. The output of 115 is fed to the dispensing motor to turn the motor on for the time as provided at the output of 115.

In order to vary the time period in the embodiment illustrated in FIG. 11, the length of the travel path between the output of the transmitter 110 and the input of the receiver 112 is varied. In the illustrated embodiment, the length of the path is varied by a movable means, for example, movable adjustment arm 117. The adjustment arm is varied along the scale 119 to provide an indication to the customer of the quantity of the product he has selected.

In operation, the output 110 of the transmitter 109 is directed at the movable arm 117. The input 112 of the receiver 111 is also directed at the movable arm 117. Accordingly, signal waves transmitted by the transmitter will propagate to the arm 117 and be bounced off the arm back to the input 112 of the receiver. Moving the movable arm, by pivoting it about the pivot point 118, will change both the distance from the output 110 of the transmitter 109 to the movable arm as well as the distance from the movable arm 117 to the input 112 of the receiver. Accordingly, by pivoting the movable arm, the travel path between the output 110 of the transmitter 109 and the input 112 of the receiver 111 is varied.

The path length is calculated in the calculator 113 in, for example, the same manner that path length is calculated in a radar system. The path length quantity is then transmitted, either as an analog level, or a digitally coded signal, to converter 115 where the quantity is converted to a time period. Converter 115 will then turn the dispensing motor on for a period equal to the time period as arrived at in 115, so that the dispensing motor will cause the product to be dispensed from the hooper 101 for this time period.

Accordingly, by adjusting the position of the movable arm 117, the quantity of the product dispensed is similarly adjusted.

In all of the above arrangements, in order to provide a different quantity of product, the amount of dispensing time is adjusted. In the FIG. 9 embodiment, the dispensing time is constant for all quantities dispensed. However, the total quantity dispensed is varied by varying the dispensing rate.

In FIG. 12, the movable arm 117 includes a lifter portion 121. The lifter portion adjusts the level of a movable stopper means 123, which is disposed in front of the opening 104 of the output funnel 103 of hopper 101, by sliding along the ramp portion 124 of the stopper 123. The front end of the stopper is biased downwardly by spring 125, and the stopper is pivotable about the point 126 at the other end thereof.

In operation, when arm 117 is pivoted about point 118, it will cause the top edge of 121 to slide along the ramp 124 so that stopper 123 will be pivoted about 126. In this way, a greater or lesser portion of the opening 104 will be covered. Thus, even though the dispensing motor will operate for the same period of time in all cases, a greater or lesser quantity will be dispensed depending upon the position of the arm 117.

In both the FIGS. 11 and 12 embodiments, the dispensing motor or a product door opener will, of course, be activated by insertion of a coin as described in the embodiments illustrated in FIGS. 1 to 7.

Although several embodiments have been above-described, this was for the purpose of illustrating, but not limiting, the invention. Various modifications which will come readily to the mind of one skilled in the art are within the scope of the invention as defined in the appended claims.

CLAIMS

1. Apparatus for a customer-operated dispensing machine for which the customer can select a continuously variable quantity of a product dispensed by a dispensing mechanism thereof, said apparatus being adapted to actuate said product dispensing mechanism to thereby dispense said product, comprising:

(a) a continuously variable timer means;

(b) means for continuously adjusting the time period of said timer means; and

(c) means for connecting said timer means to said dispensing mechanism to actuate said dispensing mechanism during said time period;

whereby, said dispensing mechanism is actuatable for a continuously variable time period to thereby dispense a continuously variable quantity of the product.

2. Apparatus according to claim 1, said timer means comprising:

(a) switch means having an actuating pin;

(b) a movable switch arm operatively associated with said switch means and being disposed to actuate said actuating pin for actuating said dispensing mechanism;

(c) cam means associated with a free end of said movable switch arm, said switch arm being a cam follower for moving said actuating pin when riding on an outer cam surface of said cam means; and

(d) means for infinitely varying the position of said switch arm relative to said cam means, whereby said free end of said switch arm will ride on the cam surface of said cam means for different amounts of time depending on the continously variable position of said movable switch arm.

3. Apparatus according to claim 2, said means for infinitely varying said position of said

switch arm comprising a selector lever arm, the position of said switch arm relative to said cam means being adjustable by movement of the selector lever arm for changing the angle of said switch arm relative to said cam means during said movement.

4. Apparatus according to claim 3, including:

(a) reciprocable latch means engageable with said selector lever arm for latching said selector lever arm into a locked position;

(b) a reciprocably movable rod supporting said latch means for moving said latch means into and out of a position in which said selector lever is locked; and

(c) an electric solenoid assembly having a movable portion connected to said movable rod.

5. Apparatus according to claim 4,

(a) said selector lever arm being mounted for pivoting from a normal position to other continuously variable positions;

(b) a spring for urging said selector lever arm into said normal position; and

(c) a brake mechanism for retaining said selector lever arm in any other one of said positions when said solenoid assembly is actuated.

6. An apparatus according to claim 1, said means for continuously adjusting comprising a pivotable selector lever arm.

7. An apparatus according to claim 1, said timer means being an electronic circuit.

8. An apparatus according to claim 7, said electronic circuit including

(a) a rheostat having a movable terminal; and

(b) a capacitor;

(c) said rheostat being connected in series with said capacitor to thereby provide a variable time period.

9. An apparatus according to claim 8, said means for continuously adjusting comprising a selector lever arm connected to said movable terminal.

10. An apparatus according to claim 1, said timer means comprising a series of RC circuits having different time constants associated therewith.

11. An apparatus according to claim 10, said means for continuously adjusting comprising a series of Mylar (TM) switches interconnected with said RC circuits.

12. A method for operating a customer-controlled dispensing machine, said machine having apparatus enabling the customer to select a continuously variable quantity of a product dispensed by a dispensing mechanism thereof, said apparatus being adapted to actuate said product dispensing mechanism to thereby dispense said product, said apparatus including a continuously variable timer means, said method comprising the steps of:

(a) adjusting the time period of the timer means in predetermined proportions; and

(b) electrically connecting the output of the timer means to the dispensing mechanisms to actuate the dispensing mechanism during said time period;

whereby a quantity of the product is dispensed during said time period.

13. An apparatus according to claim 1,

(a) said means for continuously adjusting comprising movable adjustment means; and

(b) said timer means comprising

(c) a wave signal transmitter; and

(d) a wave signal receiver;

(e) said movable adjustment means being disposed in the path between said transmitter and said receiver;

whereby movement of said movable adjustment means varies the length of said path to thereby vary

said time period.

14. An apparatus according to claim 13, said transmitter and said receiver being disposed in parallel arrangement, the output of said transmitter being disposed adjacent to the input of said receiver; and

said adjustment means being disposed adjacent to said output of said transmitter and said input of said receiver, and being located so that signals transmitted from said transmitter will bounce off said movable adjustment means and be returned to the input of said receiver.

15. An apparatus according to claim 14,

(a) said dispensing mechanism comprising (1) a hopper for storing the product and (2) a dispensing motor for dispensing the product from said hopper; and

(b) said apparatus further including;

(1) means for calculating the length of said path;

(2) means for converting said calculated length to a time quantity;

(3) said time quantity comprising said time period; and

(4) said means for converting being connected to said dispensing motor and being adapted to actuate said dispensing motor for a time equal to said time period.

16. An apparatus according to claim 15, said movable adjustment means comprising a movable arm in the path between the output of said transmitter and the input of said receiver, for adjusting the path length between the output of said transmitter and the input of said receiver.

17. An apparatus for a customer operated dispensing machine by which the customer can select a continuously variable quantity of a product dispensed by a dispensing mechanism thereof, said dispensing mechanism comprising:

(a) a hopper having an output including an output opening;

(b) a movable stopper disposed in front of

said opening; and

(c) means for moving the movable stopper to cover a varying portion of said opening;

whereby to vary the dispensing rate of said dispensing mechanism.

18. An apparatus according to claim 17, said movable stopper being pivotable at one end thereof and spring biased downwardly at the other end thereof and including a ramp at the bottom edge of said other end.

19. An apparatus according to claim 18, said means for moving comprising a movable arm having a lifter portion, said lifter portion being movable along said ramp of said movable stopper for adjusting the level of said movable stopper to thereby cover a varying portion of said opening.

20. A method for operating a customer-controlled dispensing machine, said machine having apparatus enabling the customer to select a continuously variable quantity of a product dispensed by a dispensing mechanism thereof, said apparatus being adapted to actuate said product dispensing mechanism to thereby dispense said product, said apparatus including means for continuously varying the dispensing rate of said dispensing mechanism, said method comprising the steps of:

(a) adjusting the dispensing rate of the dispensing mechanism in predetermined portions; and

(b) actuating the dispensing mechanism for a time period;

whereby a quantity of the product, proportional to said dispensing rate, is dispensed during said time period.

21. An apparatus for a customer-operated dispensing machine for which the customer can select a continuously variable quantity of a product dispensed by a dispensing mechanism thereof, said apparatus being

adapted to actuate said product dispensing mechanism to thereby dispense said product, comprising:

means operated by the customer for continuously adjusting the dispensing time or the dispensing rate of said dispensing mechanism for dispensing a continuously variable quantity of the product from said dispensing mechanism.

22. A method for operating a customer-controlled dispensing machine, said machine having apparatus enabling the customer to select a continuously variable quantity of a product dispensed by a dispensing mechanism thereof, said apparatus being adapted to actuate said product dispensing mechanism to thereby dispense said product, said apparatus including means for continuously varying the dispensing time or dispensing rate of said dispensing mechanism, said method comprising:

(a) adjusting either the dispensing time or the dispensing rate of said dispensing mechanism; and

(b) actuating said dispensing mechanism;

whereby a variable quantity of the product is dispensed.

23. An apparatus as defined in claim 7 wherein said electronic means comprises a variable inductor having a movable member for varying the inductance thereof; and

a capacitor;

said inductor being connected in series with said capacitor to thereby provide a variable time period.

24. An apparatus as defined in claim 23 wherein said means for continuously adjusting comprises a lever arm connected to said movable terminal.

0104447

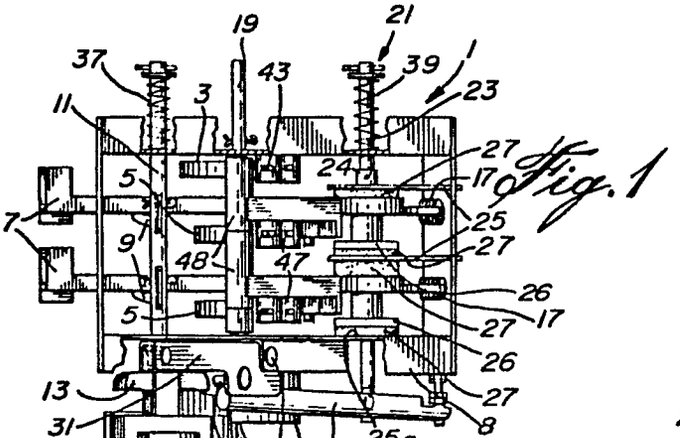

Fig. 1

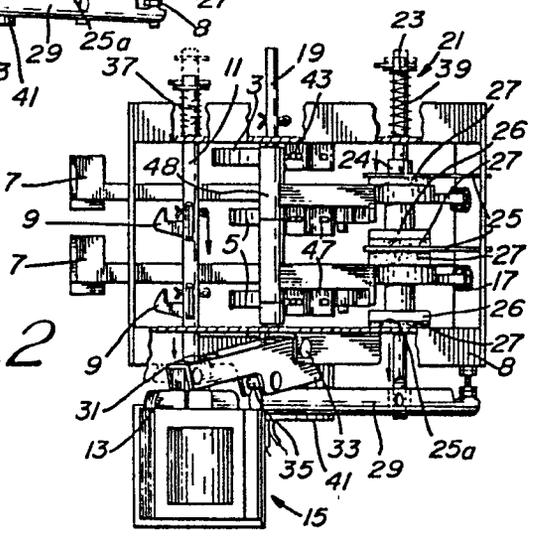

Fig. 2

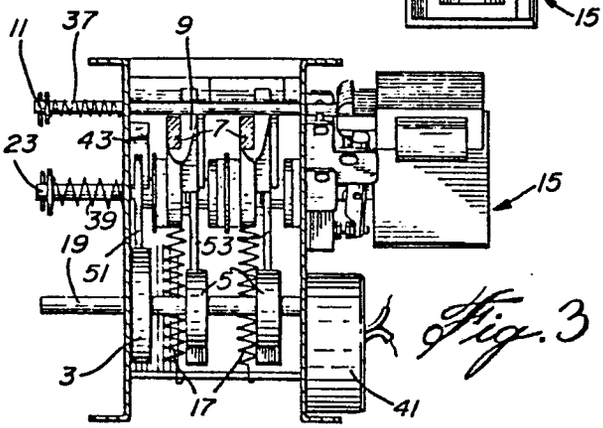

Fig. 3

0104447

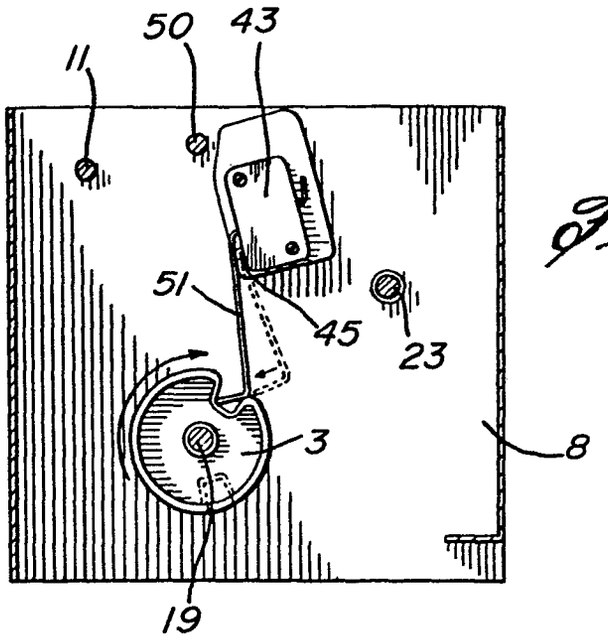

Fig. 4

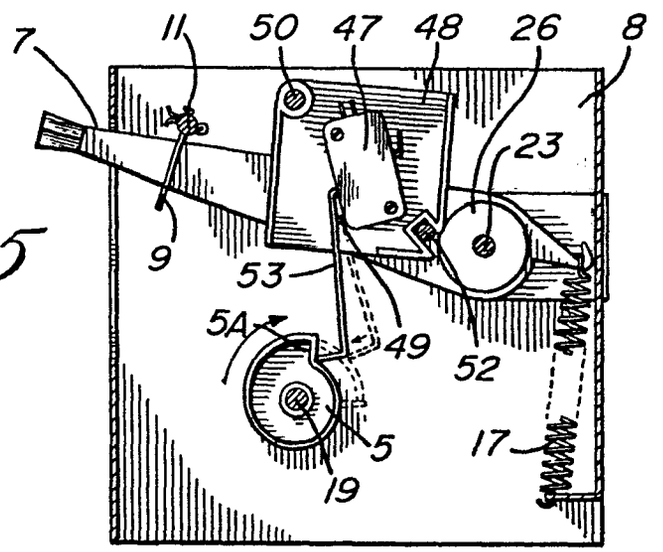

Fig. 5

0104447

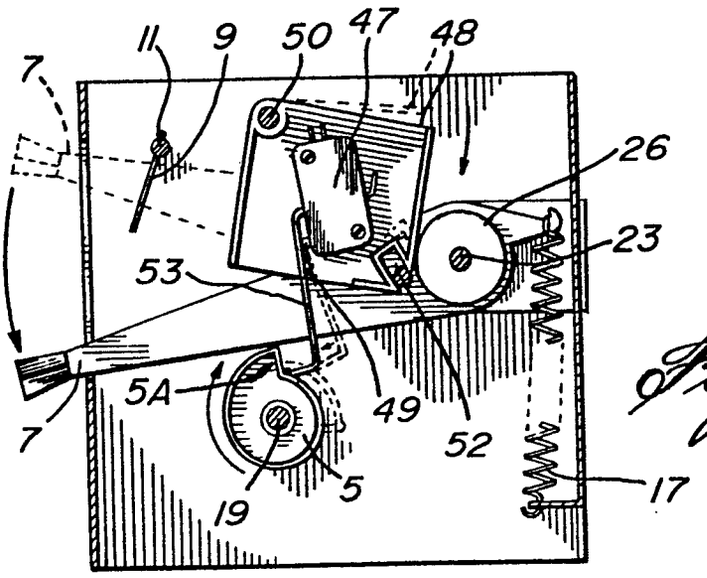

Fig. 6

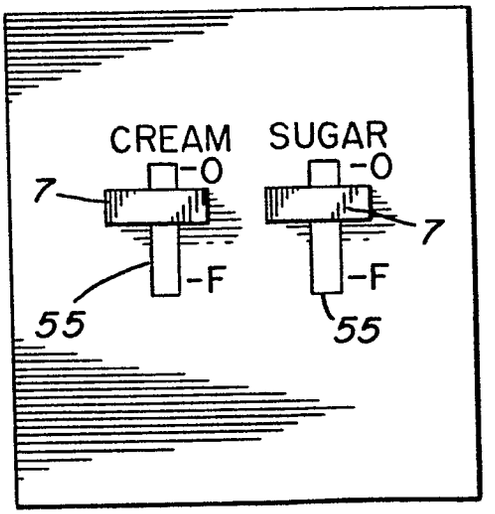

Fig. 7

0104447

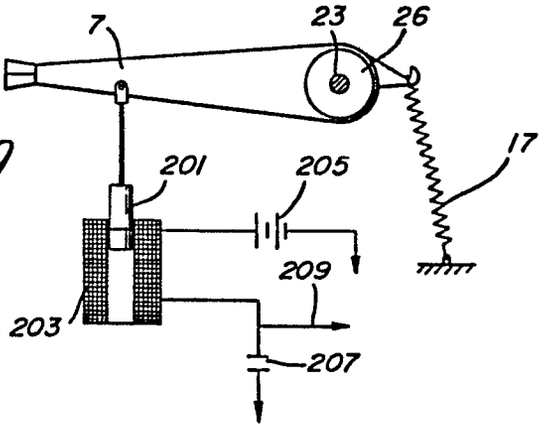

Fig 9

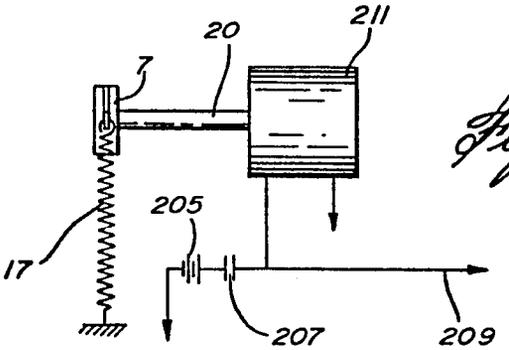

Fig. 8

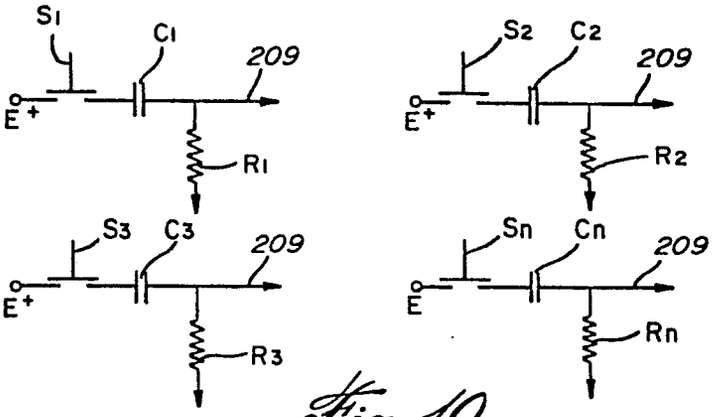

Fig. 10

0104447

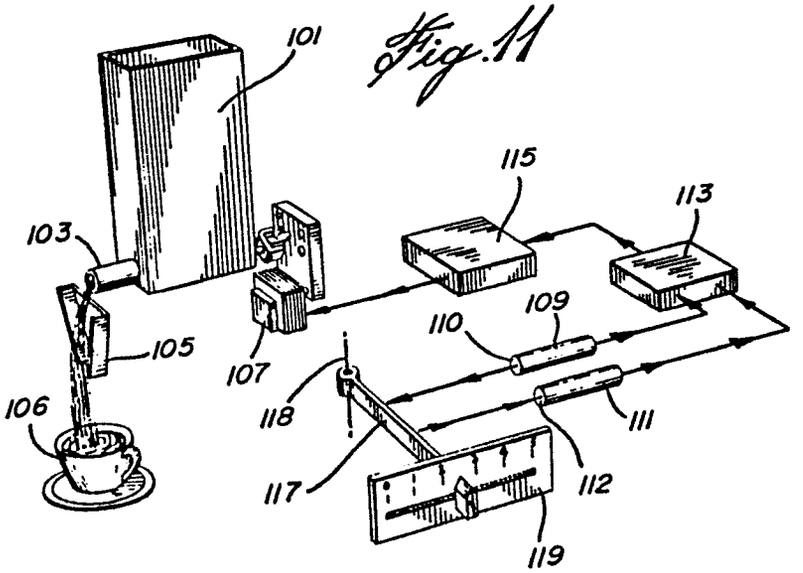

Fig. 11

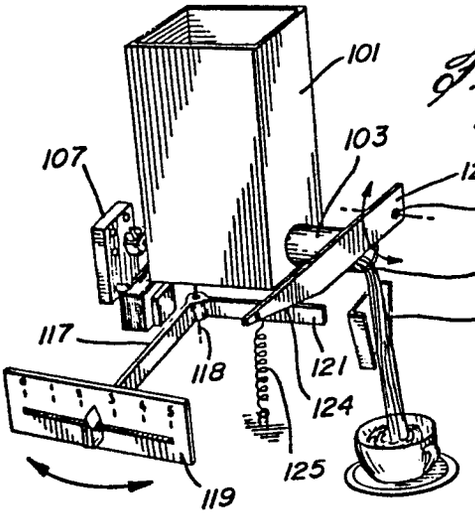

Fig. 12