

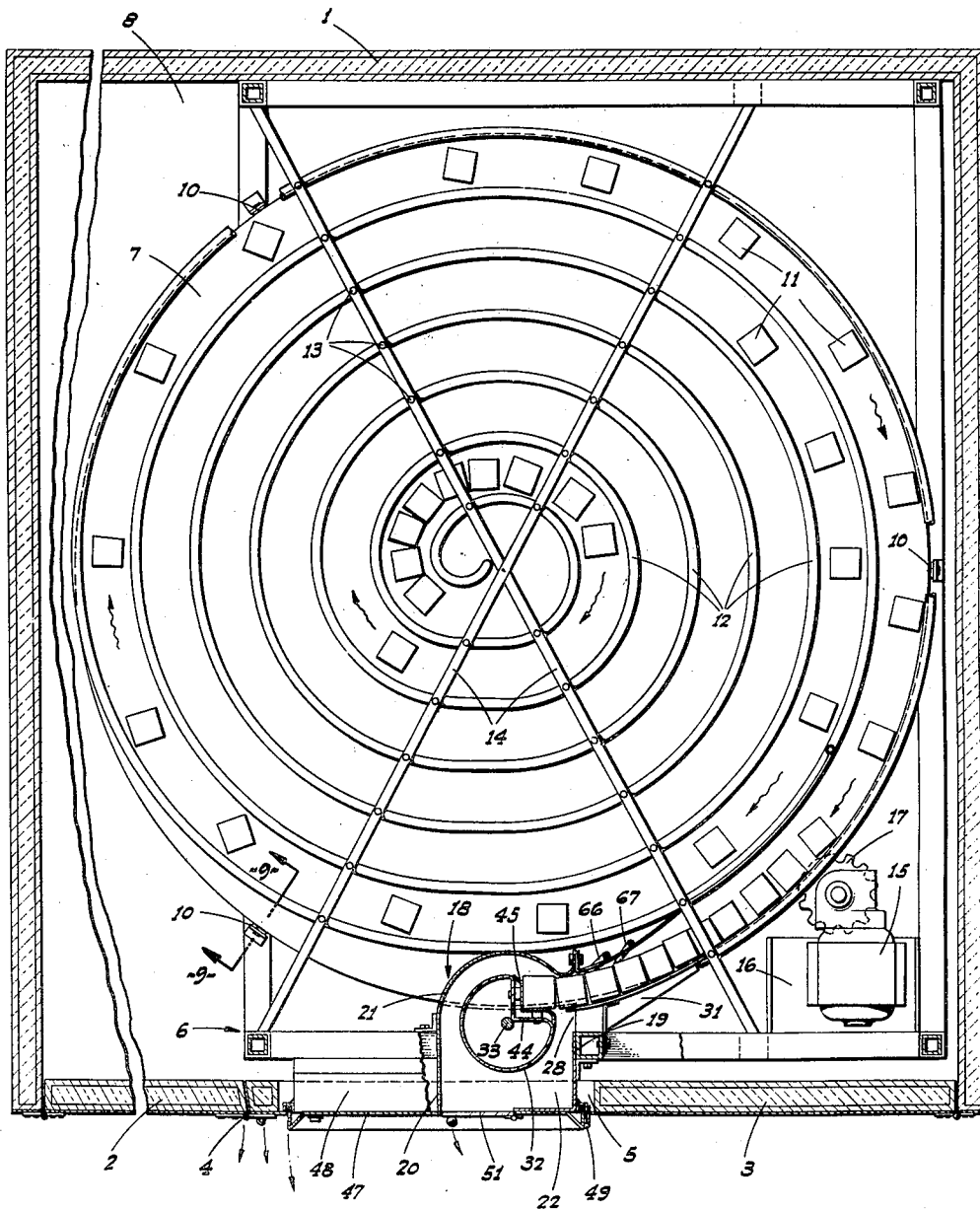
Dec. 23, 1958

W. J. SMITH
VENDING MACHINE

2,865,532

Filed March 7, 1955

4 Sheets-Sheet 1



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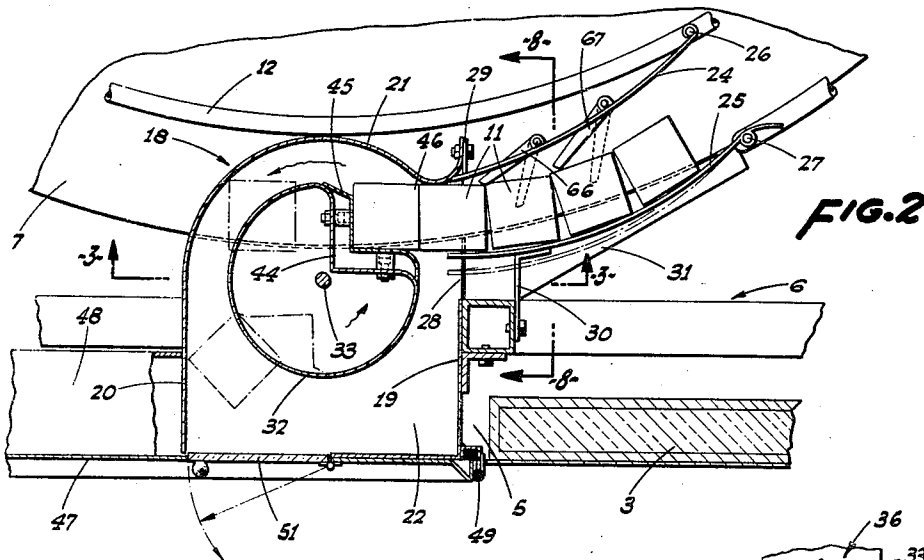
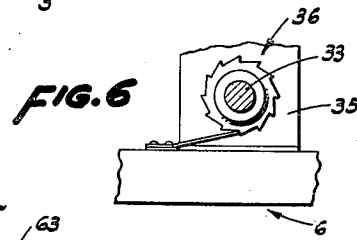
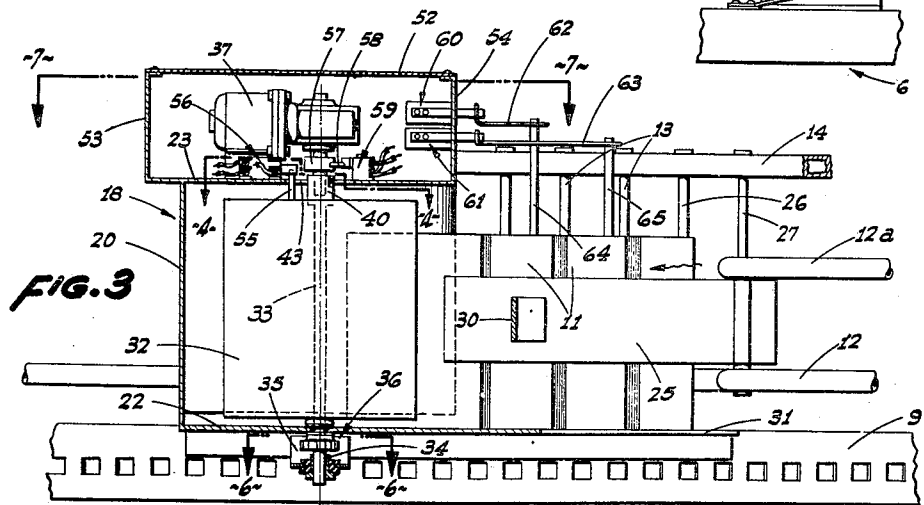
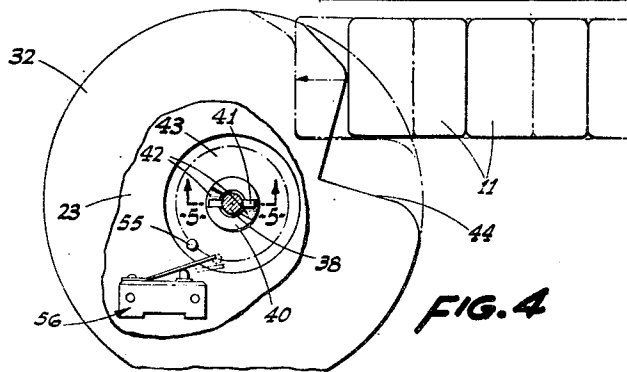
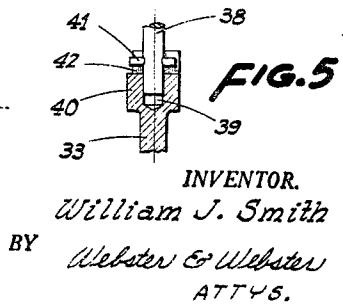
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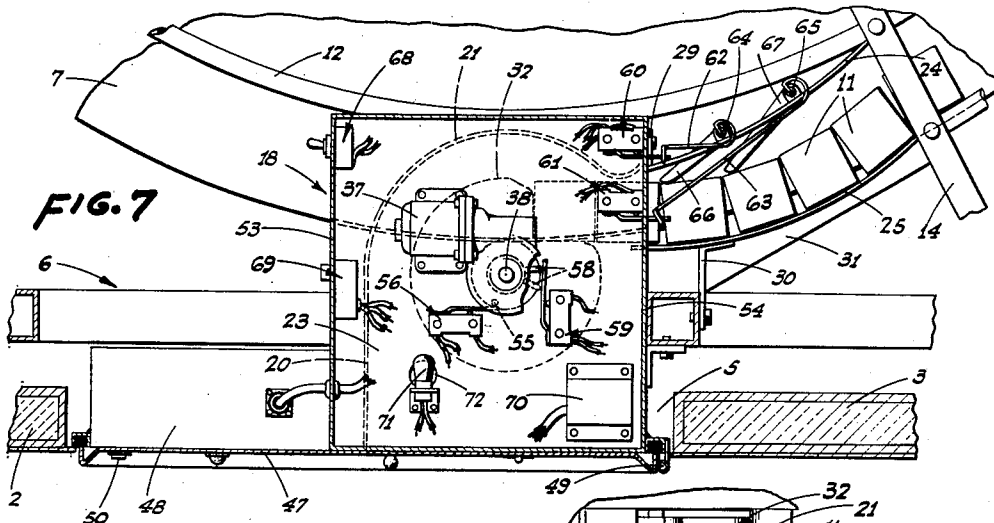


FIG. 7

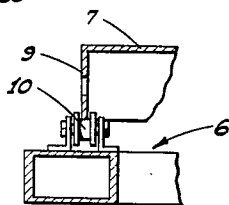


FIG. 9

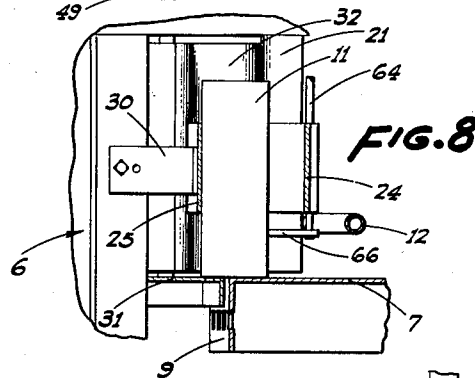


FIG. 8

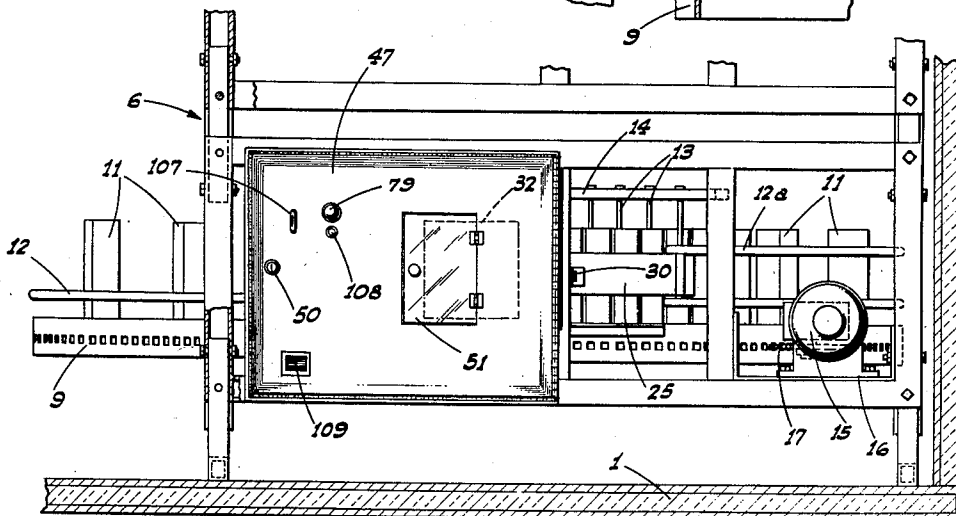


FIG. 10

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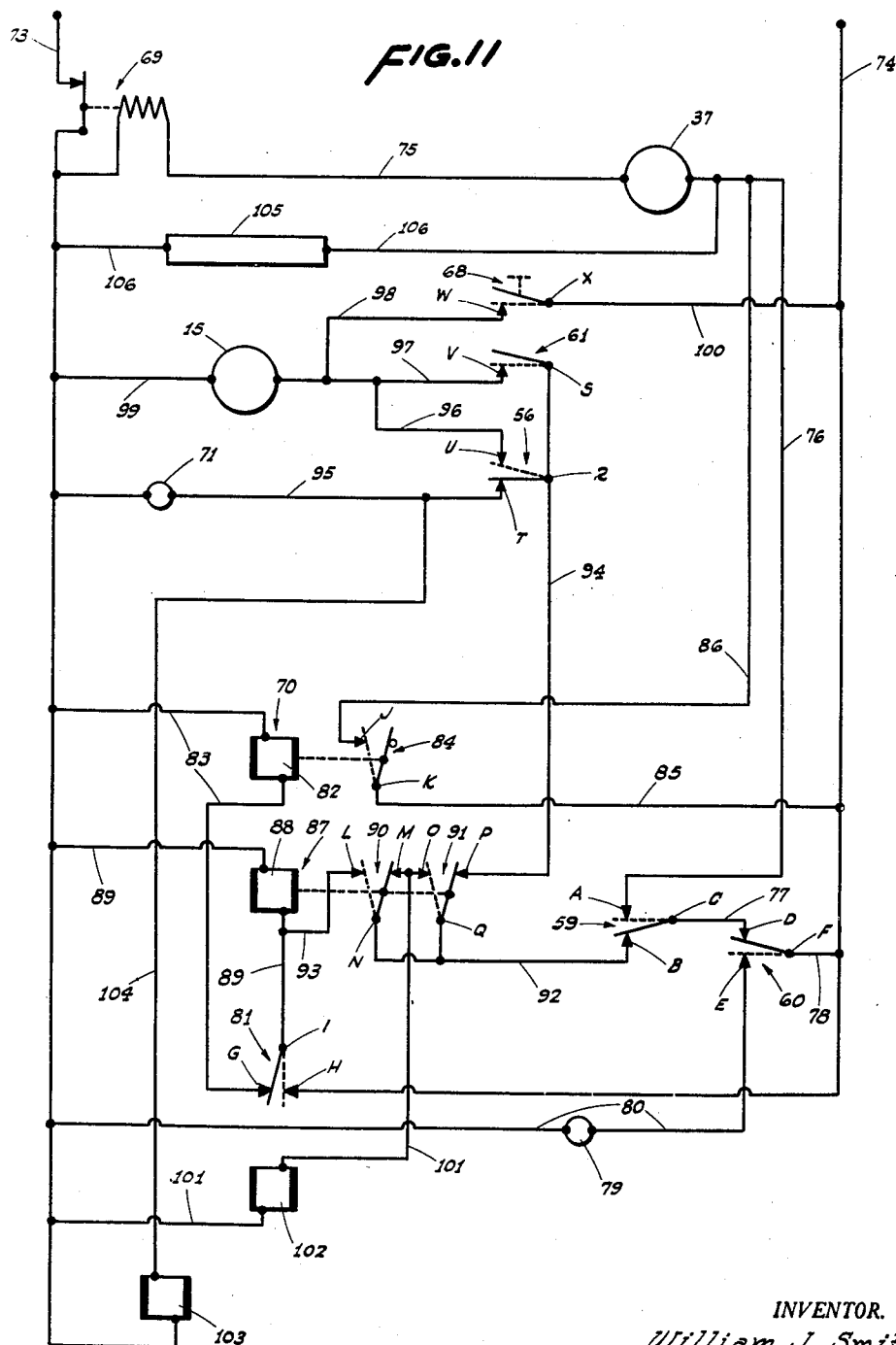
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4 Sheets-Sheet 4



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2,865,532

VENDING MACHINE

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Application March 7, 1955, Serial No. 492,688

12 Claims. (Cl. 221-13)

This invention relates to, and it is a major object to provide, a novel power actuated, coin controlled, vending machine; the latter being especially designed—but not limited—for use to vend milk in paper cartons.

Another important object of the invention is to provide a vending machine which is arranged to vend cartons, containing a perishable commodity such as milk, from within a refrigerated housing.

A further object of the instant invention is to embody in the machine a vending mechanism having a relatively large capacity, to the end that an attendant need be present only infrequently for the purpose of refilling the machine with cartons.

A separate object of the invention is to provide a vending machine which includes a carton supporting and advancing turntable and cooperating spiral guide assembly; and a rotary dispensing unit operative to receive one carton at a time from such assembly and to vend such one carton in response to a coin controlled unit.

Still another object of the invention is to provide a vending machine, as in the preceding paragraph, which is arranged for effective and positive cyclic operation, and so that the carton dispensing unit can function only after a carton has been delivered thereto by the turntable and guide assembly.

The vending machine, of the type described, includes one electric motor for driving the turntable, and another electric motor for driving the rotor which is part of the carton dispensing unit; it being an additional object to provide a novel switching and control unit, in which said motors are interposed, to accomplish the desired cyclic operation of the machine.

It is also an object of the invention to provide a practical and reliable vending machine, and one which will be exceedingly effective for the purpose for which it is designed.

These objects are accomplished by means of such structure and relative arrangement of parts as will fully appear by a perusal of the following specification and claims.

In the drawings:

Fig. 1 is a sectional plan view of the vending machine; the turntable and guide assembly being illustrated in full, and the refrigerated housing being foreshortened.

Fig. 2 is an enlarged fragmentary sectional plan view showing particularly the carton dispensing unit and its relationship to the turntable and guide assembly.

Fig. 3 is a fragmentary vertical sectional elevation of the carton dispensing unit; the view being taken on line 3—3 of Fig. 2.

Fig. 4 is a fragmentary sectional plan view taken substantially on line 4—4 of Fig. 3, and partly broken away.

Fig. 5 is a fragmentary vertical sectional elevation of the lost-motion connection between the drive shaft for

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the carton dispensing unit and the rotor shaft of the latter; the view being taken on line 5—5 of Fig. 4.

Fig. 6 is a fragmentary horizontal section showing the anti-reverse ratchet unit for the rotor of the carton dispensing unit; the view being taken on line 6—6 of Fig. 3.

Fig. 7 is a fragmentary sectional plan view showing particularly the electric drive motor for the carton dispensing unit, together with the rotor and carton actuated switches; the view being taken on line 7—7 of Fig. 3.

Fig. 8 is a fragmentary vertical transverse section on line 8—8 of Fig. 2.

Fig. 9 is a fragmentary vertical transverse section on line 9—9 of Fig. 1.

Fig. 10 is a front elevation of the vending machine, with the main housing in section and open at the front; i. e. with the doors omitted.

Fig. 11 is a diagram of the switching and control circuit.

Referring now more particularly to the drawings, and to the characters of reference marked thereon, the novel vending machine comprises a main housing 1 which is of relatively large size; such housing being initially open at the front but normally there closed by a pair of hinged doors 2 and 3 adapted to be locked shut by a paddle-lock hasp 4. The door 3 is formed therein with a rectangular opening 5, and through which opening a customer gains access to an exposed portion of the machine, as will hereinafter appear.

The housing 1 is internally refrigerated by a suitable cooling unit (not shown).

An upstanding, rectangular, open or skeleton frame, indicated generally at 6, is mounted in the housing 1, and such frame supports a turntable 7 disposed a distance above the housing floor 8; the turntable being formed, at its periphery, with a depending ring gear 9.

At its lower end the ring gear 9 is carried, at circumferentially spaced points, on grooved rollers 10 mounted on the frame 6, whereby to rotatably support the turntable 7.

The frame 6 and turntable 7 are laterally offset in the housing 1 sufficient to leave a walk-way along the left side thereof. When the door 2 is open an attendant may enter the housing 1, which is of substantial height, for the purpose of loading the turntable 7 with cartons to be dispensed.

The cartons 11 are maintained on the table 7, for travel therewith in a spiral path, by means of a spiral guide 12 which overlies said turntable 7 in spaced relation thereabove. The spiral guide 12 is suspended by vertical rods 13 from a pair of intersecting top or overhead bars 14 fixed at their ends in connection with the frame 6 at a suitable level. The spiral guide 12 is a single element for substantially its full length, although in the final or outer convolution, and adjacent the carton dispensing unit 18, such guide may include a supplementary guide 12a thereabove in symmetrical relation.

The turntable 7 is driven from a gear head motor 15 mounted on a platform 16 supported by the frame 6; said gear head motor 15 including a drive pinion 17 which meshes with the ring gear 9.

Upon actuation of the gear head motor 15 the turntable 7 is driven in the direction indicated by the arrows in Fig. 1; the cartons 11 supported by the turntable and maintained in a spiral path by the guide 12, ultimately delivering substantially tangentially from said turntable at the front thereof and adjacent the door 3 into a carton dispensing unit, indicated generally at 18.

The carton dispensing unit 18, which lies directly to

the rear of the rectangular opening 5 in door 3, comprises straight parallel sidewalls 19 and 20 disposed at a right angle to the door 3; an arcuate rear wall 21; a floor 22; and a top 23.

The row of cartons 11 as they reach the front of the turntable 7 are transferred therefrom into the carton dispensing unit 18 by a pair of longitudinally extending guide plates 24 and 25 pivotally secured at their rear ends, as at 26 and 27 respectively, in connection with certain of the rods 13; such guide plates being disposed in a plane lying between the upper and lower ends of adjacent cartons 11 on the turntable 7. See Fig. 3.

At the forward end the guide plates 24 and 25 project through an opening 28 in the sidewall 19; such opening being of a height greater than the cartons 11, and of substantially greater width. The guide plates 24 and 25 are secured at their forward ends by brackets 29 and 30 to fixed parts of the machine; at least the bracket 30 being adjustable so as to regulate the distance between said guide plates 24 and 25 at the forward end of the guideway defined by such plates. The purpose of this adjustment is to set the width of said guideway at its forward or discharge end to substantially the width of the cartons 11.

The floor 22 of the carton dispensing unit 18 includes a lateral extension 31 which projects contra to the direction of rotation of the turntable 7 and lies symmetrically alongside the periphery thereof immediately ahead of said dispensing unit 18. The purpose of such extension 31 is to provide supplementary bottom support for the cartons as they transfer into said dispensing unit 18.

The carton dispensing unit 18 includes, within the confines thereof, a vertical axis, cylindrical, carton dispensing rotor 32 disposed so that such rotor is peripherally symmetrical to, but spaced from the arcuate rear wall 21 of said unit 18; the side walls 19 and 20 projecting to a forward termination a substantial distance ahead of the front of said rotor 32.

The rotor 32 includes a vertical center shaft 33, and a distance below the floor 22 such shaft is fitted with a rubber mounted bushing 34 supported by a bracket 35.

An anti-reverse ratchet unit 36, mounted in connection with shaft 33 between the bushing 34 and floor 22, prevents rotation of the rotor 32 contra to its normal direction, as indicated by the arrow in Fig. 2.

A gear head motor 37 is mounted on the top 23 and includes a depending stub drive shaft 38 which projects into a bore 39 of an upwardly opening socket 40 formed on the upper end of the rotor shaft 33. The connection between the drive shaft 38 and the socket 40 comprises a cross pin 41 fixed on said drive shaft 38 and projecting at the ends into radially opposed segmental notches 42 formed in said socket; the notches being of such circumferential extent as to permit a predetermined amount of rotary lost-motion between the rotor 32 and the drive shaft 38. The purpose of this lost-motion connection will be evident from the description of the switching and control circuit for the vending machine, and which hereinafter appears. The socket 40 projects upwardly through an enlarged opening 43 in said top 23.

The rotor 32 is formed with a full height, peripheral notch or carton receiving pocket 44 of substantial depth; the sides of such pocket extending at right angles to each other, as shown. The pocket 44 includes a bolted-in symmetrical filler 45 so that with the use of differently dimensioned fillers the pocket 44 may be adapted to receive a carton of a given size.

In the normal or starting position of the vending machine, the rotor 32 is disposed with one wall of the pocket 44 facing in the direction from which the cartons transfer into the dispensing unit 18 from the turntable 7, and the other wall of such pocket then faces rearwardly. See Fig. 2. In such position of the rotor the lead carton of the row thereof feeding from the turntable 7 into the dispensing unit 18 rests symmetrically in the pocket 44,

one outer corner 46 of said lead carton being then substantially in engagement with the adjacent portion of the arcuate rear wall 21.

Disregarding for the present the purpose of the lost-motion connection between the shaft 38 and the rotor shaft 33, the rotor 32—when driven by the motor 37—advances the pocketed carton within the unit 18; such carton, as it rides about the arcuate rear wall 21, remaining in symmetrical position in the rotor pocket. However, when such carton reaches the straight side wall 20 the frictional drag of the carton on the floor 22 causes such carton to ride out of the pocket 44 and to ultimately come to rest in a stationary position on the forward portion of the floor, and from which position a customer can manually grasp the carton by reaching into the front part of the dispensing unit 18; such access being provided in the following manner:

The carton dispensing unit 18 is covered at the front by a panel 47 which substantially fills the rectangular opening 5 in the door 3; such panel not only embracing the front of said dispensing unit 18, but extending to the left a sufficient distance to also cover the front of a coin controlled unit, indicated generally at 48, which is mounted on the corresponding side of said unit 18. The panel 47 is hinged at one end, as at 49, and is releasably locked at the other end against opening, the lock being shown in part at 50.

Directly in front of the carton dispensing unit 18 the panel 47 is provided with an access door 51, and upon opening of such door a customer can reach into the dispensing unit 18 to grasp the carton delivered as aforesaid by the rotor 32 to a position standing on the front part of the floor 22. The panel 47, when opened by the operator, affords access into the carton dispensing unit 18 for cleansing or servicing, and also opens the front of the coin controlled unit 48 for maintenance purposes.

The turntable actuating motor 15 and the rotor actuating motor 37 are caused to function in a predetermined cycle and in response to the placement of a coin or coins of proper denomination in the coin controlled unit 48; the latter being of conventional construction and thus not here shown in detail, saving and excepting certain parts thereof which are illustrated diagrammatically in the circuit shown in Fig. 11, and which circuit is hereinafter described in detail.

The motor 37 is enclosed within a case 52 which upstands from the top 23 of the dispensing unit 18; such case including opposed side walls 53 and 54.

The rotor 32 is fitted on top thereof, and in offset relation to its axis, with an upwardly projecting, switch actuating pin 55 which extends upwardly through the opening 43. The position of the pin 55 circumferentially on rotor 32 is such that it contacts and reverses a turntable switch 56 when said rotor is in its starting position at the beginning of each vending cycle; the switch 56 being known as the "table switch," and is mounted on said top 23 in predetermined position.

The depending drive shaft 38 of motor 37 is fitted above the top 23 with a collar 57 which carries a radial pin 58 which is adapted to engage and reverse another two-way switch 59 at the end of each vending cycle, and at which time the rotor is disposed short of its starting position by reason of the lost-motion connection between the shaft 38 and the rotor shaft 33. The switch 59 is likewise mounted on the top 23 in a predetermined position, and is known as the "carrier and limit switch."

When a carton is transferred by rotation of the turntable 7, after each vending cycle, to the carton dispensing unit 18, such carton—as it enters the pocket 44—rotates the rotor 32 through its over-travel permitted by the aforesaid lost-motion connection, and when this occurs pin 55 engages and reverses the switch 56; such actuation of switch 56 causing the turntable to stop. The vending machine is then in condition for the next coin

controlled vending cycle, all as will appear in connection with a description of the specific circuit.

The pin 55 escapes switch 56, and pin 58 escapes switch 59, upon limited initial turning of the rotor from its starting position after each cycle of operation has begun.

A two-way switch 60, known as the "empty switch," and a one-way switch 61, known as the "spacing catch-up switch," are mounted on the side wall 54 of case 52; such switches being controlled by spring arms 62 and 63, respectively, which are mounted on turnable spindles 64 and 65 journaled in connection with the guide plate 24. The spindles 64 and 65 carry triggers 66 and 67, respectively, which triggers are normally swung laterally outwardly by corresponding cartons resting between the guide plates 24 and 25.

When triggers 66 and 67 are thus swung laterally outwardly the two-way empty switch 60 is actuated to one of its positions, and the spacing catch-up switch 61 is actuated to an open position. Additionally, a normally open manual switch 68 is mounted on the side wall 53 of case 52, as is an over-load circuit breaker 69.

Within the case 52 the top 23 supports an anti-jackpot relay 70, and a light 71 which shines downwardly into the dispensing unit 18 through an opening 72 in said top; such light being known as the "coin acceptance light."

The foregoing switches etc. are included in the switch and control circuit shown in detail in Fig. 11, and which will now be described.

Such circuit comprises current supply leads 73 and 74. A wire 75 connects between lead 73 and one side of the motor 37, while another wire 76 connects between the other side of such motor and one contact A of the two-way carrier and limit switch 59, whose other contact is indicated at B.

The common terminal C of switch 59 is connected by a wire 77 to one contact D of the empty switch 60, whose other contact is indicated at E. The common terminal F of switch 60 is connected by a wire 78 to lead 74. The over-load circuit breaker 69 is associated with the leads 73 and wire 75, as shown.

An empty light 79 is interposed in a wire 80 which connects between the contact E of switch 60 and the lead 73. Such empty light is disposed on the face of the panel 47, where it is visible to a customer.

The numeral 81 indicates a two-way vend switch which includes contacts G and H and a common terminal I; the lead 74 extending to and being connected with the contact H.

The solenoid coil 82 of the anti-jackpot relay 70 is interposed in a wire 83 which leads from the contact G to connection with the lead 73. The anti-jackpot relay 70 includes a one-way switch 84 having a contact J and a terminal K, the latter being connected by a wire 85 to the lead 74.

The contact J is connected to a wire 86 having a connection with the motor 37 common to the wire 76.

The numeral 87 indicates a vend relay of double-pole, double-throw type; such relay including a solenoid coil 88 interposed in a wire 89 which leads from the common terminal I of switch 81 to the lead 73. The vend relay 87 includes separate two-way switches 90 and 91; the switch 90 having contacts L and M, with a common terminal N, while the switch 91 has contacts O and P, with a common terminal Q.

A wire 92 connects between the contact B of switch 59 and both of the common terminals N and Q of switches 90 and 91. Contact L of switch 90 is connected by a wire 93 with the wire 89 intermediate the switch 81 and the solenoid coil 88 of the vend relay 87.

The contact P of switch 91 is connected to a wire 94 which leads to the common terminals R and S of the turntable switch 56 and spacing catch-up switch 61, respectively. The turntable switch 56, which is two-way, includes contacts T and U, and a wire 95 extends be-

tween the contact T and lead 73, with the coin acceptance light 71 being interposed therein.

The one-way spacing catch-up switch 61 and the one-way manual switch 68 include contacts V and W respectively; the contacts U, V and W of the switches 56, 61, and 68 having a common connection with one side of the turntable drive motor 15 by means of wires 96, 97, and 98, respectively. The other side of the turntable drive motor 15 is connected by a wire 99 to the lead 73.

A wire 100 connects the common terminal X of switch 68 to the lead 74. The contacts M and O of the switches 90 and 91 of the vend relay 87 are connected in common to a wire 101 which extends to connection with the lead 73, and such wire 101 has what is known as the reset solenoid 102 interposed therein; such reset solenoid being part of a mechanism within the coin controlled unit 48.

A coin acceptance solenoid, indicated at 103, and likewise part of the coin controlled unit 48, is connected on one side to lead 73 and on the other side to a wire 104 which extends to the wire 95 at a point between contact T and the coin acceptance light 71.

An electric counter 105 is interposed in a wire 106 which connects between lead 73 and wire 76.

The coin controlled unit 48 includes, as conventional parts thereof, not only the reset solenoid 102 and the coin acceptance solenoid 103, but also the vend switch 81, vend relay 87, empty light 79, and counter 105.

The above described circuit is shown with the parts as at the start; i. e., ready for a vending cycle of the machine; the turntable 7 and rotor 32 being stationary, with the latter advanced through the over-travel permitted by the lost-motion connection between shaft 38 and rotor shaft 33, and caused by the lead carton entering the pocket 44 and pushing ahead a limited distance, at the end of the previous cycle, and until the turntable drive motor 15 is automatically stopped, in the manner later described.

Upon a coin or coins of proper denomination being deposited by a customer in the conventional coin controlled unit 48, through a coin slot 107 on panel 47, the vend switch 81 of said unit is caused to close between contacts H and I, which completes an initial energizing circuit, between leads 73 and 74 and through 89, for solenoid coil 88 of vend relay 87.

When this occurs, said vend relay 87 is actuated and the switches 90 and 91 reverse to their dotted line positions; the solenoid coil 88 then being energized—to hold said relay 87 in such position—by a holding circuit between leads 73 and 74, comprised of the portion of wire 89 between lead 73 and said coil 88, together with 93, L, N, 92, B, C, 77, D, F, and 78.

Upon actuation of the vend relay 87 as above, the reset solenoid 102 is energized and in response thereto vend switch 81 is reset to position G, I; the resetting or energizing circuit for solenoid 102 comprising 101, O, Q, 92, B, C, 77, D, F, and 78.

When the vend switch is reset to G, I, with the vend relay held actuated by the aforesaid holding circuit, the anti-jackpot relay 70 is likewise actuated, closing its switch 84; the energizing circuit, between leads 73 and 74, comprising 83, G, I, the portion of 89 between I and 93, 93, L, N, 92, B, C, 77, D, F, and 78.

Closing of the switch 84 results in completion of an energizing circuit for motor 37 and the latter is actuated to begin carton dispensing rotation of the rotor 32 from its starting position; such last named circuit comprising, between leads 73 and 74 and with switch 84, the wires 75, 85, and 86.

After motor 37 drives rotor 32 a limited distance in a carton advancing direction from starting position, pin 55 escapes switch 56 and it closes to its dotted line position between contacts U, R. At substantially the same time the pin 58 escapes the two-way carrier and limit switch 59, and the same closes to its dotted-line position between contacts A, C; the motor 37 for the remainder

of the dispensing cycle then being energized from leads 73 and 74, through a relay bypassing circuit comprised of 75, 76, A, C, 77, D, F, and 78. With switch 59 closed between contacts A, C, the holding circuit for the vend relay 87 is opened, and such relay—as well as the anti-jackpot relay—are deenergized and the switches of both return to their full-line or starting positions.

With such relay bypassing circuit remaining closed, the motor 37 continues to drive the rotor 32 until the carton therein is dispensed and the rotor reaches a point somewhat short of its starting position; i. e., short a distance equal to the over-travel permitted by the lost-motion connection between shaft 38 and the rotor shaft 33. As the rotor reaches such point, and at which time the pocket 44 is in the full-line position of Fig. 4, pin 58 engages switch 59 and returns it to its full-line or starting position, with A, C, open and B, C, closed. This breaks the relay bypassing circuit, and the motor 37, and rotor 32, stop with pin 55 adjacent but short of turntable switch 56.

At the same time, by reason of the previous deenergization of vend relay 87, with switches 90 and 91 closed to their full-line positions, a circuit is established for the drive motor 15 and it begins to rotate the turntable; such circuit—between leads 73 and 74—comprising 99, 96, U, R, 94, P, Q, 92, B, C, 77, D, F, and 78. With such rotation of the turntable, the row of cartons thereon is advanced; the lead carton entering the dispensing unit 18 and engaging one face of the pocket 44. Continued advance of such lead carton pushes the rotor 32 ahead a short distance and to its starting position with the lead carton fully engaged in pocket 44. (See Figs. 1 and 2.) At this position pin 55 engages switch 56 and reverses it to its full-line position, breaking from contact U, and closing between contacts T, R. This opens the circuit for motor 15 and the turntable stops; the cycle thus being completed and the machine is ready for the next vending cycle.

At the completion of each cycle, and upon switch 56 closing between contacts T, R, the coin acceptance light 71 is energized, illuminating the interior of the dispensing unit 18 through opening 72; and simultaneously the coin acceptance solenoid 103 of coin controlled unit 48 is likewise energized and functions in the usual manner so that said unit 48 will accept a coin or coins only after completion of a vending cycle of the machine.

The spacing catch-up switch 61 is normally held open by engagement of a carton with the trigger 67, but if a void occurs at such point trigger 67 swings inward, switch 61 closes, and motor 15 drives the turntable until the void between the cartons is closed. Switch 61, being in parallel to switch 56, controls motor 15 through the same energizing circuit. By reason of this spacing, catch-up arrangement, a void cannot occur to prematurely acutate the empty switch 60.

Thus, the empty switch 60 is normally maintained closed between contacts D, F, for normal operation of the machine, by engagement of trigger 66 with an adjacent carton. However, when all the cartons have been vended but one, and none is adjacent said trigger 66, the latter swings inward. This breaks contacts D, F, and switch 60 reverses and closes between E, F, whereupon the light 79 is energized, indicating to the customer that the vending machine is empty, and the machine cannot thereafter be operated until an attendant reloads the turntable with cartons.

During reloading of the turntable with cartons, it is necessary that such turntable be operated to properly position the load of cartons, and this is accomplished by use of the manual switch 68. When the attendant closes switch 68, motor 15 is energized through the circuit 99, 98 and 100 and the turntable rotates.

The electric counter 105 in circuit as shown, serves to record each operation of the motor 37 and, of course, the number of cartons which the machine vends.

As is usual, the coin controlled unit 48 includes, on

panel 47, a "cancel-sale" button 108, and a coin return chute 109.

With the described vending machine, including the foregoing switching and control circuit, cartons are effectively dispensed one at a time in response to a coin or coins of proper denomination being deposited in the coin controlled unit 18. Further, by reason of the fact that the turntable cannot be operated to replace a carton in the rotor 32 until each dispensing cycle thereof is complete and the circuit for motor 37 opened, the machine cannot make accidental multiple or "jackpot" deliveries.

From the foregoing description it will be readily seen that there has been produced such a device as will substantially fulfill the objects of the invention, as set forth herein.

While this specification sets forth in detail the present and preferred construction of the device, still in practice such deviations from such detail may be resorted to as do not form a departure from the spirit of the invention, as defined by the appended claims.

Having thus described the invention, the following is claimed as new and useful and upon which Letters Patent are desired:

1. In a carton vending machine, a dispensing unit including a rotor having a pocket for the reception of a carton, the rotor having a starting position, a carton dispensing position, and a stopping position, all in circumferentially spaced relation in one direction of rotation of said rotor, a drive motor for the rotor, a driving connection between the motor and rotor, means to place the motor in operation at said starting position of the rotor and to stop the motor at said stopping position of the rotor, said driving connection including a lost-motion device to permit rotation of the rotor between said stopping position and starting position independently of the motor; a conveyor arranged to move cartons one at a time into the pocket of the rotor when the latter is in said stopping position and with continuance such movement to cause rotation of the rotor from said stopping position to said starting position, a separate drive motor for the conveyor, and means operative to place said separate motor in operation when the rotor reaches said stopping position and to stop said separate motor when the rotor is so rotated from said stopping position to said starting position.

2. A carton vending machine, as in claim 1, including energizing circuits for said motors; said means to stop the drive motor for the rotor, and said means to place the separate drive motor for the conveyor in operation and to stop the same, being switches in said circuits responsive to rotational positions of said rotor.

3. In a carton vending machine, a carton dispensing unit including a drive motor, a conveyor adapted to support and advance a plurality of cartons in a single file row, a drive motor for the conveyor, the conveyor when driven feeding the lead carton of said row to the dispensing unit, and circuit means including switches adapted to energize the motors one at a time in normally predetermined order; said circuit means including a carton-controlled instrumentality separate from the switches operative to prevent energization of either motor upon the last carton in said row being advanced to a point back from the dispensing unit a distance sufficient to leave a single carton only between the dispensing unit and said point.

4. In a carton vending machine, a carton dispensing unit including a drive motor, a conveyor adapted to support and advance a plurality of cartons in a single file row, a drive motor for the conveyor, the conveyor when driven feeding the lead carton of said row to the dispensing unit, and circuit means adapted to energize the motors one at a time in normally predetermined order; said circuit means including a carton-controlled instrumentality operative to cause energization of the drive motor for the conveyor irrespective of said order and upon the occurrence of a void at a predetermined point in said row

of cartons, and to deenergize said last named motor upon closing of said void by the conveyor, and a separate carton-controlled instrumentality operative to prevent energization of either motor upon the last carton in said row being advanced beyond said predetermined point to another point back from the dispensing unit a distance sufficient to leave a single carton only between the dispensing unit and said other point.

5. A carton vending machine, as in claim 4, in which each of said instrumentalities includes a switch responsive to the absence of a carton at the related predetermined point.

6. In a carton vending machine, a dispensing unit including a housing, a carton dispensing rotor in the housing, a drive motor mounted on the housing, a driving connection between the motor and rotor, said connection including a limited lost-motion coupling, the rotor having a starting position, a carton dispensing position, and a stopping position, all in corresponding circumferentially spaced relation in the direction of turning of the rotor by said motor, means to energize the motor when the rotor is in said starting position, and means to deenergize the motor when the rotor is in said stopping position; a carton supporting conveyor adapted to be driven in a direction and arranged to feed one carton at a time to said dispensing unit, the housing thereof having a carton entry opening through which said one carton is fed, the rotor being formed to receive said one carton as so fed and when the rotor is in said stopping position, the carton as fed to the rotor by the conveyor and upon continuance of the drive thereof imparting turning motion to the rotor between said stopping position and starting position, independently of the rotor drive motor and as permitted by said lost-motion coupling, a drive motor for the conveyor, and means to energize said separate motor for the conveyor when the rotor is in said stopping position and to deenergize such separate motor when the rotor is so turned by the fed carton to said starting position.

7. In a carton vending machine, a carton dispensing mechanism including an electric drive motor, the latter being adapted to drive said mechanism through a predetermined cycle including a starting position and a stopping position, a pair of circuits each of which is adapted when closed to alone energize the motor, each circuit including an initially open circuit closing switch, a vend switch, and control means for the switches in said circuits operative, initially in response to actuation of said vend switch, to first cause closing of the switch in one circuit whereby to energize the motor with resultant initial driving of the mechanism from its starting position; thereafter, in response to the mechanism being driven to a predetermined extent but before it reaches its stopping position, to cause opening of the switch in said one circuit and closing of the switch in the other circuit whereby the latter energizes the motor with resultant continuance of the driving of the mechanism to said stopping position; and, in response to the mechanism reaching said stopping position, to then cause opening of the switch in said other circuit.

8. In a carton vending machine, a conveyor and guide assembly arranged to support and advance cartons in a single file row to a predetermined discharge point, a drive motor for the conveyor, a dispensing unit including an upstanding rotor having a peripheral pocket for the reception of the leading carton of said row of cartons, the rotor being mounted in offset relation to the row at said point and the pocket being arranged so that at the initial stopping position of the rotor a carton being advanced into and initially engaging a side wall of the pocket will rotate the rotor from such position through a predetermined arc until the carton is fully received in the pocket, a drive motor for the rotor, means to stop the conveyor drive motor upon a carton being so fully received in the

pocket, and customer actuated means to place the rotor drive motor in operation.

9. In a carton vending machine, a conveyor and guide assembly arranged to support and advance cartons in a single file row to a predetermined discharge point, a drive motor for the conveyor, a dispensing unit including an upstanding rotor having a peripheral pocket for the reception of the leading carton of said row of cartons, the rotor being mounted in offset relation to the row at said point and the pocket being arranged so that at the initial stopping position of the rotor a carton being advanced into and initially engaging a side wall of the pocket will rotate the rotor from such position through a predetermined arc until the carton is fully received in the pocket, a circuit for the motor, a switch in the circuit, and means controlled by rotor movement to open the switch upon the rotor being rotated through said arc, and to close the switch upon the rotor returning to said initial stopping position subsequent to a carton dispensing movement of the rotor.

10. In a carton vending machine, a conveyor to support and advance a plurality of cartons in a single file row, drive means for the conveyor, a rotor having a pocket to receive the lead carton of the row when the rotor is in a predetermined stopping position, means separate from said drive means to rotate the rotor in one direction from said stopping position, and means controlled by rotation of the rotor to place the drive means in operation only during a relatively small arc of rotation of the rotor from the stopping position in said one direction.

11. In a carton vending machine, a conveyor to support and advance a plurality of cartons, guide elements above the conveyor to maintain the cartons in a single file row to a predetermined point of discharge, a motor to drive the turntable, a carton dispensing unit including a pocket arranged with one position of the rotor to receive the leading carton of the row at said discharge point, and in another position to allow the carton to discharge from the pocket, a motor to drive the rotor, circuits for the motors, a switch in the circuit of the conveyor motor-actuated upon rotation of the rotor through a predetermined arc, another normally open switch in the circuit of the conveyor motor in parallel relation to the first named switch, a normally closed switch in the circuit of the rotor motor; and triggers operatively connected to and controlling the actuation of the last named switches, said triggers depending into the path of adjacent cartons adjacent the rotor; the trigger which controls the normally open switch being disposed to be engaged by the fourth carton in the row when the leading carton is seated in the pocket, while the trigger which controls the normally closed switch is disposed so as to be engaged by the third carton in said row; the triggers when so engaged by cartons maintaining the corresponding switches open and closed, respectively, and when disengaged from such cartons causing a reversal of the setting of the corresponding switches.

12. In a carton vending machine, a movable carton dispensing unit, a first motor for moving said unit, a conveyor adapted to support and advance a plurality of cartons in a single file row, a second motor separate from and in addition to the first motor for driving the conveyor, said conveyor when driven feeding the lead carton of said row to the dispensing unit, a circuit for the second motor having a first normally open switch therein, means to close said first switch upon movement of the unit to cause the second motor to be energized and the conveyor actuated and the cartons thereon to be advanced, a second normally open switch in the circuit in parallel to the first switch, means tending to close said second switch, and means allowing said second switch to close only upon a void occurring at a predetermined point in the row of cartons whereby the second motor will then be actuated to drive the conveyor;

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said last named means comprising an instrumentality projecting into the path of cartons on the conveyor for engagement thereby at said predetermined point in the row, and means between the instrumentality and said second switch to hold the same open as long as said instrumentality is engaged by a carton. 5

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