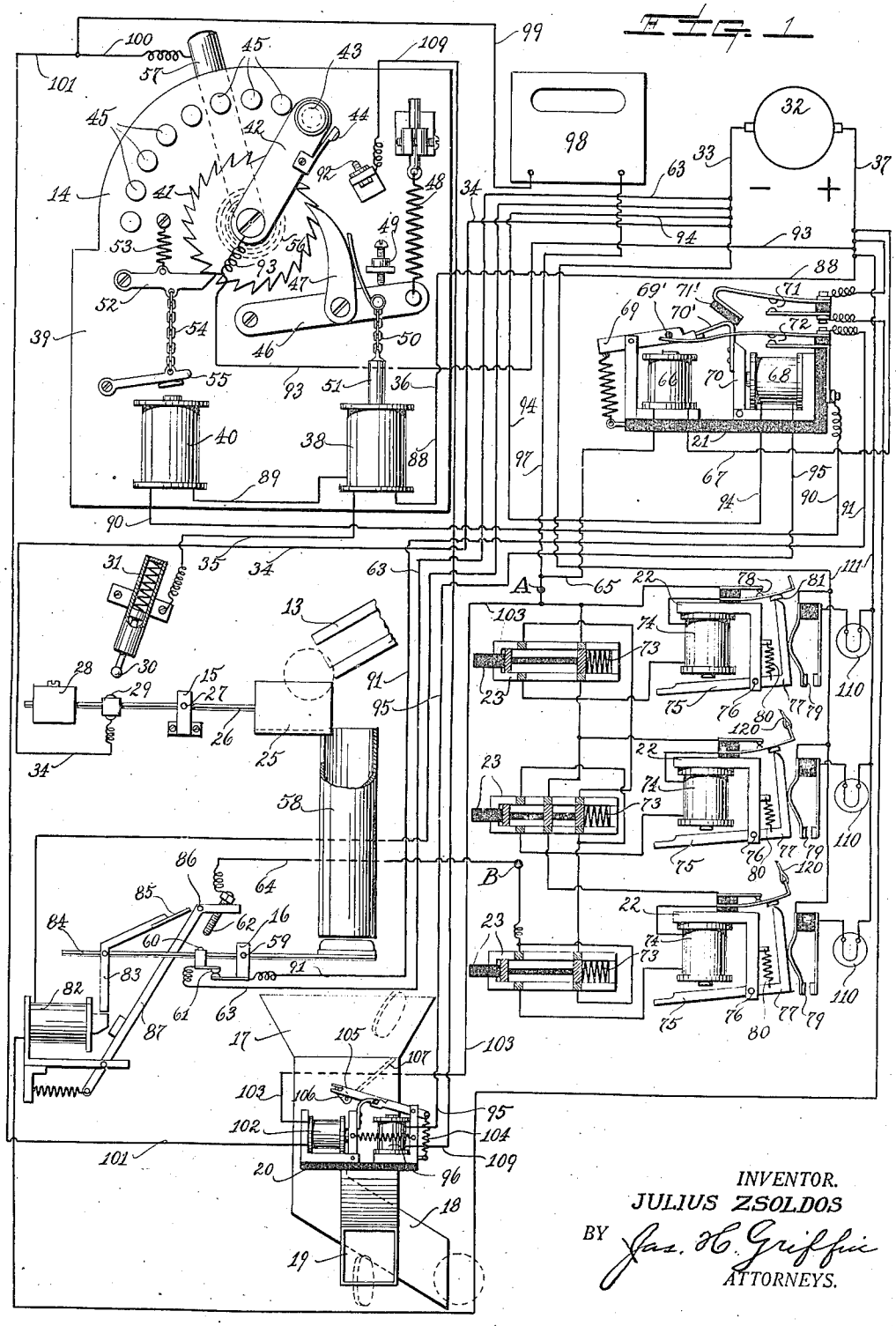
July 12, 1927. 1,635,451

J. ZSOLDOS

VENDING MACHINE

Filed Dec. 15, 1919 3 Sheets-Sheet 1

FIG. 1



INVENTOR.
JULIUS ZSOLDOS
BY Jas. H. Griffin
ATTORNEYS.

July 12, 1927. 1,635,451

J. ZSOLDOS

VENDING MACHINE

Filed Dec. 15, 1919 3 Sheets-Sheet 2

FIG. 2

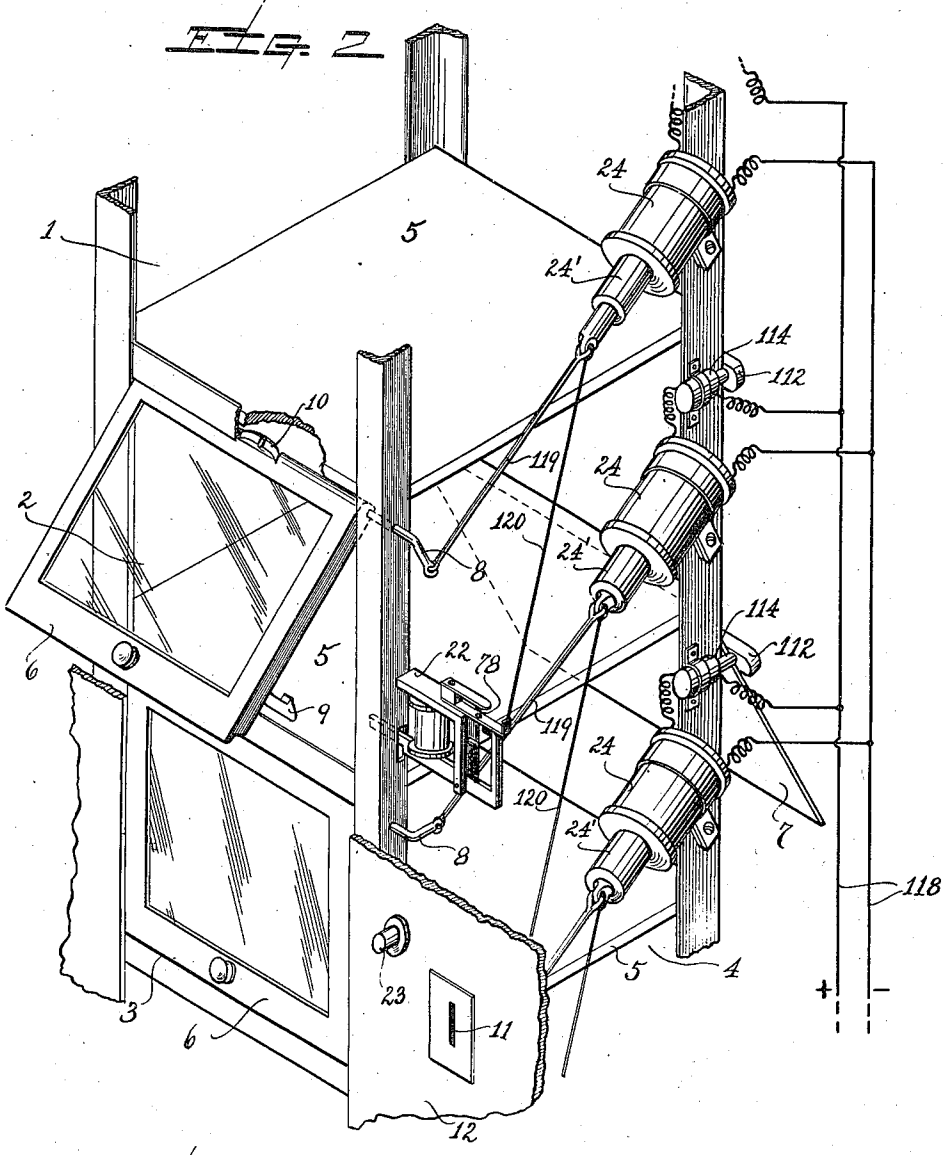
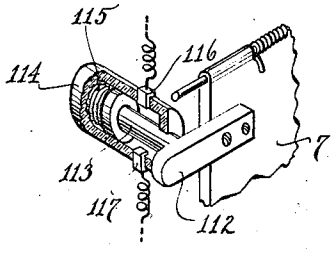


FIG. 2a



INVENTOR.
JULIUS ZSOLDOS
BY Jas. H. Griffin
ATTORNEYS.

July 12, 1927. 1,635,451

J. ZSOLDOS

VENDING MACHINE

Filed Dec. 15, 1919 3 Sheets-Sheet 3

FIG. 3

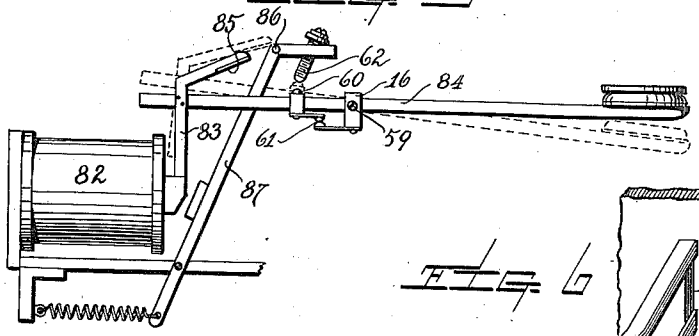


FIG. 6

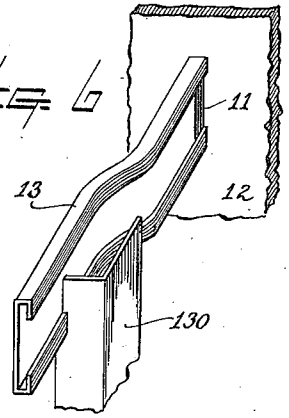
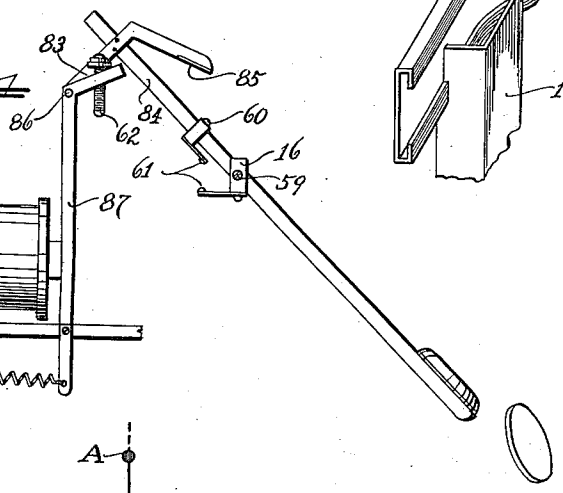


FIG. 4



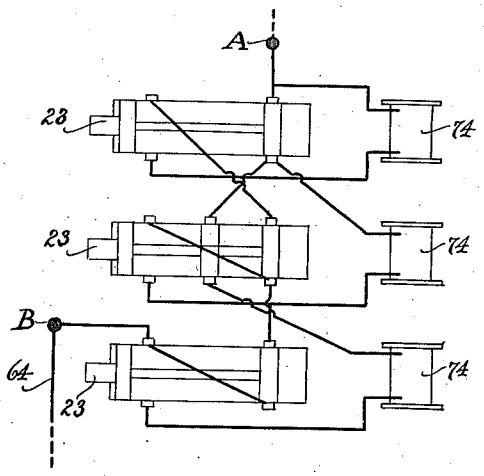


FIG. 5

INVENTOR.
JULIUS ZSOLDOS

BY Jas. H. Griffin
ATTORNEYS.

Patented July 12, 1927. 1,635,451

UNITED STATES PATENT OFFICE.

JULIUS ZSOLDOS, OF BROOKLYN, NEW YORK, ASSIGNOR, BY MESNE ASSIGNMENTS, TO AUTOMAT EQUIPMENT CORPORATION, A CORPORATION OF DELAWARE.

VENDING MACHINE.

Application filed December 15, 1919. Serial No. 344,828.

This invention is a vending machine and particularly adapted for employment in the vending of food in automatic restaurants, although its use is, manifestly, not restricted to this environment.

Machines for the automatic vending of foods have heretofore been used, but such machines are so constituted that each vending compartment thereof requires its own complete operating mechanism so that these various compartments, with their own individual operating units, are assembled in tiers or rows with the mechanism for operating them duplicated as many times as there are compartments. While these structures worked tolerably well in the carrying out of their functions, a great waste in space in installation is required, through the duplication of the operating devices as specified, and also a great financial outlay is required in the installation of any number of compartments.

With these considerations in mind, the object of the present invention, in its broad sense, is to provide a machine wherein any number of compartments may be controlled from a unitary coin actuated device, embodying a single coin slot, and controllable by any predetermined number of coins to actuate simple adjunctive devices associated with each closure through the medium of a common or unitary electrical selective push button system.

In the present invention where the unitary controlling system is common to any number of compartments, no duplication is required as heretofore, and, for a given space, compartments may be installed by the present invention in much greater numbers than was possible under the prior practice. Moreover, the cost of installation of the present invention is but a relatively small fraction of the cost of any of the prior art systems because it is unnecessary to duplicate the parts as heretofore when the present invention is practiced.

Another feature of the invention is the improved manner by which the front closure of each compartment is automatically closed and locked by electrical devices controllable by the operations of the rear closure. In the prior art machines where the locking of the front closure is effected by the movement of the rear closure, the connections are entirely mechanical, toggle joints, links and levers being usually employed. These mechanical devices have considerable friction and weight, and require continual lubrication, with the result that they collect the dust and dirt and are entirely unsanitary. Furthermore, considerable power is required for their operation, and this must be imparted to the rear door by the operator or attendant. When the present invention is practiced, the parts are such that lubrication is not required and the electrical connections operate without imparting the slightest load on the rear door. A further advantage of the electrical connections is that the closing of the front door is very rapidly accomplished in a sure and positive manner.

Features of the invention other than those specified will be apparent from the hereinafter detailed description taken in conjunction with the accompanying drawings.

In the accompanying drawings I have illustrated one practical embodiment of the invention, but the construction therein shown is to be understood as illustrative only, and not as defining the limits of the invention.

Figure 1 is a diagrammatic view of the operating devices of the present invention, showing the various electrical and mechanical adjuncts operatively wired together for conjoint cooperation in proper sequence;

Figure 2 is a fragmental perspective view of a portion of the machine showing adjacent vending compartments and the electrical connections and devices for relocking the same;

Figure 2^a is a perspective detail of switch mechanism shown in Figure 2;

Figures 3 and 4 are detached details of coin balance construction employed, showing the same in different operative positions;

Figure 5 is a wiring diagram of a selective push button system or unit by means of which the opening of a plurality of compartments may be controlled in an efficient selective manner; and

Figure 6 is a detail fragmental perspective section of coin chute construction which I preferably employ.

In the accompanying drawings, a food vending machine of the present invention is shown as embodying the several features of construction and associated wiring, which, for the purpose of clearness, will first be

described separately, and later in conjunction with one another so that their conjoint interaction and cooperation may be more fully and thoroughly understood.

In installing the food vending machine, the compartments from which the food is vended may be installed in any number, and may embody any desired structural features or peculiarities in design as may be desired, so long as the general arrangement of the compartments relative to one another is carried out after the general manner shown in Figure 2. In this figure, which is not to be construed as limiting the invention to any specific form, two substantially complete compartments are shown and the adjoining upper and lower compartments fragmentarily illustrated. The upper fragmental compartment is designated 1, the next lower compartment 2, the next lower 3, and the lowermost compartment 4. As shown, this bank or tier of compartments, which may be duplicated side by side, is constructed by associating spaced platforms 5 in an upright angle iron frame. Each compartment is provided at its front with a door 6, and at its back with a door 7. The doors 6 are each pivoted at their upper edges in the angle iron frame on suitable trunnions, one of which is continued to form a crank 8, the purpose of which will be hereinafter more fully set forth, while the back doors are pivoted at their upper edges in any suitable manner to allow of their being raised or lowered into open or closed position. Each of the front doors is provided with a keeper 9, by means of which it may be normally locked in closed position, and at the upper edge of each door is preferably provided a spring 10, the purpose of which is to move the door into slightly open position as soon as released or unlocked by mechanism hereinafter to be described. The front doors are preferably provided with glass or otherwise transparent panels, so that the contents of the compartments may be viewed by the perspective purchasers, but, in practice, the back doors are preferably made opaque so as to conceal the space back of the compartments. In the carrying out of its functions, the several compartments are charged by an attendant who introduces the food into the compartments through the rear door which is thereafter closed. At this time the front door is locked and remains locked until the prospective purchaser has introduced a coin or coins into the machine, and through suitable mechanism the door is unlocked to allow of the removal of the food.

In order that the machine may function in its predetermined manner, and in accordance with this invention, there is associated with this machine a coin slot 11, only one of which is required for practically any number of compartments, and back of this coin slot, which is formed in a suitable panel 12 of the machine, is positioned a coin chute 13, shown in Figure 1, so that the coin introduced through the coin slot 11 passes through the coin chute 13 to the coin controlled mechanism operating in accordance with the predetermined number of coins required for the functioning of the machine, to bring about a step by step advance of an electrical multiple contact maker so as to assure the operations of the machine only when the predetermined number of coins has been deposited therein. This multiple contact maker is designated, as a whole, 14, in Figure 1. The coin in passing through the machine is directed by suitable mechanism, hereinafter to be described, which serves to count the number of coins deposited, so that the proprietor may know the number of sales of the machine at a glance, actuates further mechanism which determines whether the coin shall be finally deposited in the machine or returned to the perspective purchaser, renders operable selective push button mechanism by virtue of which any one compartment may be unlocked for the dispensation of its contents, and finally causes a signal to be given at the back of the compartment which notifies the attendant that the particular compartment is empty and should be replenished.

Beside the structural elements already enumerated, the machine embodies the following general elements which may here briefly be referred to, but which will be presently described in connection with one another, viz the upper coin balance 15, into which the coin comes into cooperative relation upon leaving the coin chute 13, the lower balance 16 into which the coin next comes in engagement, the final coin chute 17 which is divided into two branches, 18 and 19, the former of which directs the coin to be deposited in the machine, and the latter of which causes it to be returned to the perspective purchaser, the accept and reject electrical magnet arrangement 20, which controls the direction of the coin into either of the branches 18 and 19. Besides these mechanisms just described which lie in the immediate path of the coin through the machine, there are other mechanisms, electrical and mechanical, which are conditioned by the mechanisms just described through switch mechanism 21 to render adjunctive devices 22, one of which is associated with front door 6 of each compartment, responsive to the operations of a push button mechanism 23, the other of which is also associated with each compartment.

While the front door is released or unlocked by coin controlled mechanism, it is adapted to be subsequently automatically closed and relocked by the operation of the back door 7, which, as will hereinafter be

more fully explained, is operable to complete an electrical circuit adapted to energize solenoids 24 shown in Figure 2, and the function of which is to close and lock the front door.

The conjoint operation of the various parts of the machine referred to, together with the further elements of construction will now be described as they coordinate and cooperate during the passage of a coin through the machine, and in setting forth these elements a specific structure and mode of operation will be clearly explained.

A coin introduced into the coin slot 11 enters the coin chute 13, gravitates the length of said coin chute into cooperative relation with, and drops into a tray 25, forming a part of the upper balance 15. This upper balance 15 is in the form of a lever 26 fulcrumed intermediate its ends at 27, and carrying at one of its ends the tray 25. At the other end the lever is weighted with a suitable adjustable counterbalance 28, and preferably between the counterbalance 28 and the fulcrum 27 is a movable contact 29. Cooperating with the contact 29, and normally spaced therefrom is a contact 30 provided with a cushioning spring 31. The contacts 29 and 30 are connected by electrical wiring to a source of electrical supply 32, which wiring includes such elements that when the coin drops into the tray 25 and overbalances the upper balance to complete the circuit at the contacts 29 and 30, the following closed circuit is established. From the source of electrical supply 32, through the wires 33 and 34 to the contact 29 and from the contact 30 through the wires 35, 36 and 37, back to the source of supply. Included, however, in the wires 35 and 36 is a solenoid 38 which forms one element of the multiple-point contact maker 14.

The multiple-point contact maker may vary in structure without departing from the spirit of the invention, but a very efficient construction is shown in Figure 1 of the drawings. Upon a suitable block of insulation 39 are mounted two coils 38 and 40, the coil 38 constituting a solenoid, and the coil 40 a simple electro-magnet. Journalled for rotation in the insulation 39 is a ratchet wheel 41 to which is rigidly attached a contact arm 42, the outer end of which carries a movable contact button 43, and an additional spring button 44. Arranged on the block 39 co-axially of the axis of rotation of the contact arm 42 are a plurality of fixed contacts 45 with which the movable contact 43 is adapted to cooperate during its movements through the arc of a circle. Pivoted adjacent the ratchet 41 is an arm 46 which carries a pawl 47 normally held in contact with the ratchet 41 by a spring 48. An adjustable stop 49 is adapted to limit the upward movement of the pawl, while downward or retrograde movement of the pawl is accomplished through its connection 50 with core 51 of the solenoid 38. When the solenoid 38 is energized, its core is drawn in with the result that the arm 46 is drawn downwardly against the tension of the spring 48. However, as soon as the current is broken and the solenoid 38 deenergized, the spring 48 returns the arm to a position against the stop 49, but during this movement the pawl 47, which is in engagement with the ratchet, rotates the ratchet in a counter-clockwise direction. The distance of movement of the pawl, being regulated by the adjustable stop 49, is such that at each energization of the solenoid 38, and subsequent deenergization thereof, the contact arm 42 will be advanced one contact. That is to say, each time the the solenoid 38 is operated the arm 42 is caused to make one forward step to the next contact 45. To preclude the return of the contact arm 42 to its initial position when released by the pawl 47, a second pawl, termed a locking pawl, and designated 52, is normally held in engagement with the ratchet 41 by a spring 53, and serves to normally lock the ratchet against retrograde rotation. It will be here noted, however, that the locking pawl 52 is secured by connection 54 to the armature 55 of the magnet 40, so that at proper times, as more fully explained hereinafter, the locking pawl may be retracted to allow of the return of the ratchet and contact arm 42 to initial position. This retrograde movement of the ratchet and contact arm is automatically accomplished by a spring 56 coiled about the pintle of the ratchet wheel.

All of the mechanism thus far described as mounted on the insulating block 39, is on the front of the block, but, in addition thereto, there is mounted on the rear of the block, a selecting switch 57. This switch, although preferably mounted for rotation on the pintle which carries the ratchet 41 and contact arm 42, is insulated therefrom The contacts 45 extend completely through the block 39, and the selecting switch 57 is adapted to be shifted into engagement with any particular contact desired when adjusting the machine. It is the position of this switch which controls the number of coins which it is required to deposit in the machine before the machine can be opened to dispense the vendable articles.

It will thus be manifest that the coin upon dropping from the coin chute to the upper balance 15, completes the circuit through the solenoid 38 with the result that the contact arm 42 will shift the movable contact 43 into engagement with the first contact 45. As the system is shown in Figure 1 it requires the introduction of three coins into the machine to dispense the articles, and, accordingly, the shifting of the

movable contact 43 to the first contact 45 is insufficient to complete the dispensing operations. Two other coins must be introduced and operate in the same manner as the first coin before, through their successive operations, the movable contact 43 will have come into engagement with the contact 45, the rear end of which is in engagement with the selecting switch 57. As each coin is successively dropped in tray 25 of the upper balance and weighs down said tray it immediately rolls off the tray, after completing the circuit at the contacts 29 and 30, into a chute 58, and the tray returns to normal position to receive the next coin. Thus a plurality of successive tiltings of the upper balance 15 brings the arm 42 and selecting switch 57 into cooperative relation.

The coins, falling in succession through the chute 58 fall upon one end of the lower balance arm 84, which is fulcrumed at 59 and carries two movable contacts 60 and 61. The weight of the coins on the lower balance brings the contact 60 into contact with another contact 62, with the result that the following circuit is partially completed: From the contact 60, through the wire 63 to the main 33 leading to the source of electrical supply, and from the contact 62 through the wire 64 to one terminal B of a selective push button system which is a complete unit within itself and has two terminals, the terminal B referred to, and another terminal A. The circuit from the contact 62 leads into the selective push button system at the terminal B and out of said system at A. From A the circuit continues through wire 65, through a magnet 66 and thence to the main 37 connected with the source of supply. The magnet 66 forms an element of a relay switch 21 which also embodies another magnet 68. The magnet 66 has an armature 69 and the magnet 68 has an armature 70, and these armatures 69 and 70 are operable to control the opening and closing of a pair of electric switches 71 and 72 as will be hereinafter more fully explained. If the circuit completed by the coins at the contacts 60 and 62 were otherwise complete, the making of the circuit at such contacts would cause the magnet 66 to be energized, but this is not the case since the selective push button system which forms a connection between its terminals A and B is normally an open circuit and is only closed when one of the push buttons is pressed. Accordingly, the dropping of the coins to complete the circuit in question only completes it in so far as such portions of the circuit are outside of the selective push button system. The circuit cannot be entirely completed until one of the push buttons is pressed.

As stated, the selective push button system is a complete electrical circuit or unit in itself, having inlet and outlet terminals A and B so that it is, practically speaking, cut into the remainder of the electrical wiring of the machine, and in order that this system may be clearly understood a wiring diagram thereof is shown in Figure 5, while Figure 1 shows all the wiring of Figure 5, but in conjunction therewith the mechanisms which are included in the wiring of such system. Referring to this unitary system, between its terminals A and B there are two distinct mechanical elements employed. The first is a push button mechanism, and the second is an associated magnet, and the mechanical parts which it operates control additional electrical circuits. This electro-magnet and associated parts has been previously referred to as a door opening magnet 22.

The push button mechanism is very clearly diagrammatically shown in Figure 1, each push button 23 having an insulating core which carries metallic plugs or contacts which are movable with the push button, and at either side of the push button, and in the path of travel of the metallic plugs, are fixed contacts. Back of each push button is a spring 73 which normally retracts the push button, so that when any particular push button is pressed, the fixed contacts are plugged by the movable contacts of the push button in the well known manner. It will be noted, however, that the fixed and movable contacts are so relatively positioned that in the retracted position of the push button, some of the fixed contacts are plugged, and that when the push button is pressed, the circuit is broken at these contacts and the circuit simultaneously closed at other contacts. This plug switch construction will be clearly apparent to those skilled in the art from the showing in Figures 1 and 5.

With each push button switch is associated one of the door opening magnets 22. The magnet itself is designated 74, and is provided with an armature 75, pivoted at 76, and provided with a substantially right-angular extension 77. The nose of the extension 77 serves to control the operations of a switch 78, while the face of the extension 77 controls a second switch 79. The armature 75 is normally held in the position shown in Figure 1 by a spring 80. It will be noted in Figure 1 that the switch 78 is included in one of the leads to the magnet 74, and it may also be added, though hereinafter more fully explained, that the switch 79 is included in a signaling system for the attendant, and that the free end of the armature 75 serves as a locking latch for locking the front door of the compartment. To this end the switch mechanism 22 for each compartment is mounted in close proximity to its respective compartment after the manner shown in Fig-

ure 2, so that the end of the armature can project into the compartment and into a position to engage with a keeper 9 at the door, as will be clearly understood. It will be manifest that if the magnet 74 is energized, its armature 75 will be attracted, causing the switch 79 to be closed, and the switch 78 to be opened. This will break the current to the magnet, but the armature will be locked in raised position because the toe of its projection 77 will be engaged behind the stop 81, associated with the switch 78. Because of the fact that the free end of the armature 75, when in depressed position, serves to lock the front door 6 closed, it will appear that when the armature is raised, the front door will be unlocked and will immediately be swung open by the spring 10 of Figure 2. The door will be locked open by the projection 81 until such time as the projection 77 of the armature is released from the stop 81 by a closing of the switch 78 in the manner hereinafter explained.

In practice, it is recommended that one complete wiring unit, as shown in Figure 5, be associated with each vertical tier of boxes, and that this system be duplicated for each successive vertical tier. This lends not only to simplicity in wiring, but renders the circuits more easily coupled up. When the system shown in Figure 5 is associated with the vertical tier of compartments, the uppermost push button and the lowermost push button are each provided with two movable plug contacts, whereas, all the intermediate push buttons are provided with three movable plug contacts. This allows of the wiring diagram shown in Figure 5 wherein the pushing of any one button automatically cuts out all the others while being operated to complete its own individual circuit. This is very important since it obviates any chance of the purchaser being able to open two or more compartments by depositing in the machine the required amount to open one. This automatic cut-out is the result of the operations of the push buttons which causes one contact to be made and at least one to be broken when the push button is operated. That is to say, in the terminal buttons, one contact is made and one broken, while in all the intermediate ones one contact is made and two are broken. In the operations of the push button, the straight through circuit through the push button is broken, and the magnet with which the button is associated is shunted into the circuit as will be clearly apparent to those skilled in the art.

From what has been said relative to the selective push button system, it will appear that when the coins drop on the lower balance 16 and partially complete the circuit through the wires 64 and 63, that the circuit can only be fully completed by the pressing of one of the push buttons 23. We will assume for purposes of illustration, that the uppermost push button, shown in Figure 1, is now pressed. When button 23 is pressed it breaks the straight-through circuit at its rear end, in which straight through circuit is included all of the other buttons. At the same time that this straight through circuit is broken, a shunt circuit through its magnet 74 is made by the foremost movable contact. As a result, the circuit is completed and the magnet 66 energized. It pulls down its armature 69 which has the effect of closing switches 71 and 72.

The pressing of the push button 23 not only completes a circuit through the magnet 66, but also completes a circuit through the magnet 74, which is also included in the same circuit. This circuit is so constituted, however, that the resistance therein is so great that insufficient current can be fed to the magnet 74 to operate said magnet for the purpose of opening the door of the vending compartment, and said door can only be opened through the operation of such magnet when an additional circuit is thrown in to assist in feeding current to that magnet. Thus, when the current is fed through the two circuits, the additional one of which will presently be described, the magnet functions and the door of the vending compartment is unlocked. This additional circuit is in parallel with the circuit just described, and includes the following wiring. From the terminal A, through the wire 97 to a cash register or sales counter 98, thence through wires 99 and 100 to the selecting switch 57. If a predetermined requisite number of coins have been deposited in the machine the movable contact arm 42 will at this time be in contact with the same fixed contact 45 as is selecting switch 57, so that current will flow from the switch 57, through the movable contact arm 42, and wire 93 to the positive main 37, and from the negative main 33, through the wires 63, switch contacts 60 and 62, and through the wire 64 to the push button terminal B, and thence through the magnet, the push button of which was operated. At the same time another circuit is thrown, this circuit being shown as a branch of the wire 99, on the upper left hand corner of Figure 1. The branch circuit 101 leads to the magnet 102, which is the accept magnet of the coin selecting combination 20. From the magnet 102, a wire 103 leads to the terminal A. When the magnet 102 is energized it attracts its armature with the result that a spring 104, acting through a pivoted arm 105 on a crank 106, moves a pivoted flap 107 which directs a coin into either the accept chute 18 or into the reject chute 19.

As hereinbefore explained, the engagement of the contacts 60 and 62 through the depositing of the coins on the lower balance,

results in energizing the magnet 66 when the push button is pressed, and causes the closing of the switches 71 and 72.

Switch 71 closes the circuit through the magnet 82 of the lower balance. The switch 72 partially closes another circuit in which is also included the switch 61 and the magnets 40 and 38, which collectively serve the function of resetting the device for a subsequent operation as later set forth. When the magnet 82 is energized the following mechanical operations result.

The magnet 82 is provided with an armature 83, permanently fastened on and insulated from the tilting balance arm 84 of the lower balance. The armature 83 has an inclined portion 85, which is adapted to be engaged by a projecting cam pin 86 mounted on a second armature 87 with which the magnet 82 is also provided. The armatures 83 and 87 are so arranged that the magnet is adapted to have a much greater pull on the armature 87 than on the armature 83. As a result of this construction, the energizing of the magnet 82 by the circuit described causes the armature 87 to be drawn quickly toward the pull of the magnet, whereupon the cam pin 86 strikes the inclined portion 85 of the other armature 83 and throws the balance upwardly into the position in which it is shown in Figure 4. This movement is very rapid, and serves to efficiently unseat the coins from the opposite end of the balance arm with the result that they are deposited into the coin chute 17 from which they are eventually returned to the customer, or accepted by the machine.

In the present instance, it will be accepted by the machine and will pass down through the accept chute 18, since the magnet 102 will have been previously energized to shift the directing flap 107 into the position shown in dotted lines in Figure 1, and the coin will be directed down through the chute 18 into a suitable receptacle in the machine.

During this rapid tilting movement of the lower balance the circuit is broken between the contacts 60 and 62 with the result that all the push buttons are immediately rendered inoperative, so that another push button cannot be pushed to open a further compartment until further coins are inserted. As soon as the balance is released from the weight of the coins, it will gravitate back into the positions shown in Figures 1 and 3, and when the armature 83 comes into proximity with the core of the magnet it will be drawn tightly to it, the purpose being to make a firm contact at the switch contacts 61. As soon as the switch 61 is closed, a current is established as follows: through wire 63 to the negative main 33 of the source of current supply 32, from the source of current supply 32, through the main 37, wire 88 to the magnet 38, then through wire 89 to the magnet 40, from magnet 40 through wire 90, to the switch 72, from switch 72 through wire 91, back to the switch 61. Through the completion of this circuit the magnets 38 and 40 are simultaneously energized with the result that both pawls 46 and 52 are simultaneously drawn free from the ratchet 41, whereupon the ratchet is mechanically thrown back toward normal position by the spring 56 about its pintle. Further, because of the momentum of the moving parts, the contact arm 42 over-rides the normal terminus of its travel, and the contact switch 44 momentarily engages a fixed contact 92. A circuit is established as follows: from contact 44 through the arm 42, wire 93 to the positive main 37, and from the negative main 33 through wire 94, to magnet 68, then through wire 95 to magnet 96, which is a coin rejecting magnet, thence through the wire 109, back to the contact 92, with the result that the magnet 96 will be energized, and through the arm 105 and crank 106 will throw the flap 107 over to the opposite position for the purpose of deflecting subsequent coins through the chute 19, whereby they are returned to the customer. Simultaneously the coil 68, being energized, attracts its armautre 70, which, through the mechanical connections shown, simultaneously opens both of the switches 71 and 72, deenergizing the magnet 82 of the lower balance and deenergizing the magnets 38 and 40 of the multiple-point contact maker 14, at which time the spring 48 lifts the pawl 47 into engagement with the ratchet 41, and moves the contact arm 42 into a neutral position where it is intermediate the contacts 92 and the first contact 45, but, free from engagement with either.

The manner in which the energizing of the coil 68 effects a simultaneous opening of both the switches 71 and 72 will be manifest from Figure 1 of the drawings. It will be noted that the armature 70 carries a finger 70′, which bears against a heel 71′ formed on one of the spring fingers of the switch 71. The upper spring finger of the switch 72 projects beneath a pin 69′ on the armature 69. When the coil 66 is energized and its armature 69 depressed, the pin 69′ will force the upper spring finger of the switch 72 downwardly to complete the circuit at the contacts of this switch and at the same time the stepped end of the armature 69 will be moved below the end of the finger 70′ of the armature 70 thereby allowing the upper spring finger of the switch 71 to spring downwardly and close its circuit. When the coil 68 is energized, it will attract its armature 70, thereby causing the elbow of the finger 70′ to press against the heel 71′ and lift the upper spring finger of the switch 71, thereby breaking the circuit of

this switch and simultaneously the free end of the finger 70′ will be withdrawn over the stepped end of the armature 69, so as to permit the spring associated with the opposite end of said armature to tilt the armature up into the position shown in Figure 1. The raising of the pin 69′ thus effected will permit the upper spring finger of the switch 72 to be lifted and break the circuit of this switch.

At the conclusion of these operations, the front door of the food vending chamber is open, its back door is closed, and the prospective purchaser is free to remove the food from the compartment. However, when the push button magnets 74 have been operated to close the corresponding switch 79 associated therewith, one of a plurality of lamps 110, or other signaling devices, which are associated with the compartments and in the back thereof, is energized. These lamps 110 are signal lamps and are included in what may be termed a separate illuminating circuit composed of two wires 111 which cut into the mains 33 and 37, and between which wires the respective lamps 110 and switches 79 are cut in in parallel. With this construction, when one of the front doors is unlocked, the corresponding signal 110 is simultaneously illuminated, so that the attendant will know that the food in that particular compartment has been vended and that it should be replenished.

In replenishing the compartment the rear door 7 thereof must necessarily be opened, and this act of opening the rear door is, in accordance with this invention, made capable of performing certain electrical functions which results in the closing and locking of the front door.

To this end each of the back doors 7 is provided with a projection 112, see Figures 2 and 2ª, which projection extends beyond the edge of the door and presses against the stem 113 of the piston switch 114. A spring 115 normally serves to force the piston switch outwardly to cause contacts 116 and 117 to be bridged by the metallic piston of the switch. However, as long as the door is closed the spring is retracted and the contacts broken at this point. The contacts 116 and 117 are cut in in parallel with a circuit 118 which is entirely independent of any of the circuits herein described and is not shown in Figure 1 of the drawings, but in each of the parallel cut-ins of the switches 114 is included one of the solenoids 24 hereinbefore referred to, and one of which is associated with the front door of each compartment through tension member 119, one end of which is connected to the end of the crank 8 on the trunnions of the corresponding front door, and the other end of which is secured to the core 24′ of the associated solenoid 24. The core 24′ of the solenoid also has a tension member 120 which leads from the core and is attached to the end of one element of the switch 78 of the corresponding door locking magnet mechanism 22. These parts are duplicated for each compartment, as clearly shown in Figure 2.

As soon as the operator opens the rear door of a compartment to replenish the supply of food therein, the switch 114 is allowed to complete the circuit 118 and energize the corresponding solenoid 24. The core 24′ of said solenoid is drawn in, exerting tension simultaneously on the tension members 119 and 120. The tension member 119 pulls the door shut, and at the same time the tension member 120 lifts the lower spring elements of the switch 78, and moves the stop 81 from in front of the extension 77 of the magnet armature, whereupon the spring 80 draws the magnet armature away from its magnet bringing the toe of the projection 77 underneath the stop 81 as shown in Figure 1 to hold the switch 78 closed, and simultaneously lock the door in closed position by bringing the free end of the armature into engagement with the latch or keeper 9 of the front door. The movement of the armature as described also automatically opens the switch 79 and deenergizes the switch lamp 110. The machine is now ready for a reoccurrence of the operations described.

It will be noted that the closing and locking of the front door is controlled entirely automatically by the rear door and in contradistinction to prior art devices, such control is effected entirely independently of mechanical connections. The control is effected in a purely electro-magnetic manner, and there is absolutely no direct mechanical connections between the front and back doors.

The advantage of these electrical expedients over the prior mechanical devices are many. In the first place, no manual power is required by the attendant to close the front door, he merely makes a circuit at the back door and the weight of the door assists in the breaking of the same. Another feature is that the electrical device is entirely automatic and instantaneous, and it is cleaner and more sanitary than purely mechanical connections which require lubricating oils and greases for their proper operation. Another advantage is that, in this invention, when current in circuit 118 is shut off, any or all of the back doors may be opened for cleaning, or for other reasons without in any wise affecting any operations of the front doors.

In the foregoing description of the machine there has been set out the proper operation of all of the parts when a correct predetermined number of coins is deposited in the machine. If it should occur, however, that a person endeavor to operate the machine through depositing a greater or less number of coins in the machine than is re-

quired, the coins will simply be returned to the person through the reject chute 19 for the reason that the movable contact arm 42 would not be juxtaposed with selecting switch 57, and, accordingly, the shunt circuit, including the wires 99, 100 and 93, would not be completed, neither would the second shunt circuit 103, 101 and 93 be completed, and, accordingly, there would be insufficient current passing through the magnet 74 to unlock the door and no current passing through the magnet 102 to accept the coins; therefore the coins would simply pass through the machine without accomplishing any useful purpose and will be returned to the customer.

It may be here stated that the relay switch mechanism 21 has the function of translating a momentary closing of a push button switch into a more or less permanent closing of an actuating circuit for controlling the magnet 82 of the lower coin balance 16, and further provides a safety cut-out for the resetting circuit at the switch 72.

In practically applying the electrical arrangement of this invention to mechanical means for carrying out the desired functions, it will be noted that in practically every instance these mechanical means are self locking in their respective positions. An example of this has been clearly explained with reference to the push button magnet mechanism 22, wherein the armature is locked in the position in which it unlocks the door. Another example is evident in the relay switch mechanism 21 from which it will be manifest that the respective armatures of magnets 66 and 68 lock one another in either of their positions, and this is also true of the accept and reject coin mechanism 20, where the armatures of the respective magnets serve to lock the directing flap 107 in either its accepting or rejecting position.

In Figure 6 of the drawings is shown a novel arrangement whereby smaller coins than those required to operate the machine may be diverted from coming in contact with the upper balance 15. This I accomplish by off-setting coin chute 13 slightly to form a reverse curve, and the coin chute is made with an open side as shown. If a coin of the proper dimension (for example a five cent piece) is inserted in the slot 11 it will gravitate down through the coin chute 13, swing around the reverse curve and be deposited on the tray 25 of the upper balance. However, if a small coin (for example a penny or a dime) is introduced into the coin slot 11 its upper edge will not engage with the coin slot, with the result that instead of swinging around the reverse curve, its momentum will cause it to tilt out of the chute 13 and fall into a passageway or chute 130 which leads back to the outside of the machine so that the coin is returned to the prospective customer.

From the foregoing detail description of the invention, it will appear that the machine embodies, broadly speaking, a plurality of compartments each of which is provided with a lock which is operable from what may be termed a master unlocking device which serves to control the locks of all the compartments. This unlocking device is normally inoperative to effect an unlocking of any of the compartments until a predetermined number of coins have been deposited in the machine, and even then it remains inoperative until one of the push buttons in the selective push button system is operated to selectively direct the dormant energy of the master unlocking device for the purpose of unlocking a particular compartment. Moreover, as has been explained, the operation of any particular push button serves to render the remaining push buttons ineffective, so that a purchaser cannot open more than one compartment for the price required for any one of them.

Referring to the selective push button system, it has been thus made for the reason that its controlling elements are, in the preferred embodiment of the invention shown, push buttons. However, these elements may be any form of manually operated switch and the term push button is to be construed as carrying this broad meaning. Furthermore in adapting the invention to its various environments structural changes and modifications may be made without, for example the substitution of equivalents, departing from the spirit of this invention, which is to be understood as is broadly novel as is commensurate with the appended claims.

Having thus fully described the invention, what I claim as new, and desire to secure by Letters Patent is:

1. A vending machine embodying a plurality of dispensing compartments, a single coin slot, a master coin device operable by a plurality of coins passed successively through the slot and adapted to permit the removal of the contents of any of said compartments, manually operable means for adjusting the master coin device to render it responsive to the desired number of coins, and a selective push button system cooperable with the master coin device and embodying a push button for each compartment for selectively rendering any one compartment responsive to the operations of the master device.

2. A vending machine embodying a plurality of dispensing compartments, a single coin slot, a master coin device operable by a plurality of coins passed successively through the slot and adapted to permit the

removal of the contents of any of said compartments, manually operable means for adjusting the master coin device to render it responsive to the desired number of coins, and a selective push button system cooperable with the master coin device and embodying a push button for each compartment for selectively rendering any one compartment responsive to the operations of the master device, and simultaneously rendering the remaining compartments irresponsive to the master device.

3. A vending machine embodying a plurality of dispensing compartments, each of which is provided with a closure, an electrically operated lock associated with each closure for normally locking it shut, a push button associated with each lock, a single coin slot, a normally open switch, adapted, when closed, to render any particular closure responsive to the operations of the corresponding push button, means operable by a number of coins in succession for closing said switch, and a manually operable switch to determine the number of coins which will be required to close the normally open switch.

4. In a vending machine, stationary compartments for containing the different articles to be dispensed in a position to become accessible, a single coin slot, common electrically operated means, controlled by passing a plurality of coins successively through the coin slot, for rendering the vendible articles accessible to a prospective purchaser, manually operable means for adjusting said electrically operated means to render it responsive to the desired number of coins, selective mechanism cooperating with said electrically operated means whereby the latter becomes effective for rendering any particular article accessible as predetermined by the operator to the exclusion of the others, and manually controlled means for actuating said selective mechanism.

5. A vending machine embodying a plurality of vending compartments, means for individually normally locking the compartments closed, electrical unlocking apparatus associated with the locking means of each compartment, a push button electrically connected to each electrical unlocking apparatus, master means common to the unlocking apparatus of all the compartments and controlled by passing a plurality of coins in succession through the coin slot to render the electrical unlocking apparatus responsive to the operation of its associated push button, and manually operable means for adjusting the master coin device to render it responsive to the desired number of coins.

6. A vending machine embodying a single coin slot, a plurality of vending compartments, means for individually normally locking the compartments closed, electrical unlocking apparatus associated with the locking means of each compartment, a push button electrically connected to each electrical unlocking apparatus, master means common to the unlocking apparatus of all the compartments and coin controlled to render the electrical unlocking apparatus responsive to the operation of its associated push button, the operation of any one of said push buttons serving to automatically render the remaining push buttons ineffective until the push button which has been operated is returned to normal position, and manually operable means for adjusting the master coin device to render it responsive to the desired number of coins.

7. A vending machine embodying a single coin slot, a plurality of vending compartments, electrically operable locks for normally locking the compartments, common electrically controlled means, operable by a plurality of coins introduced through the coin slot in succession, for actuating any of said locks, manually operable means for adjusting said electrically operated means to render it responsive to the desired number of coins, and a selective push button system including a plurality of push buttons, one of which is associated with each compartment, and which system is adapted, when a push button is operated, to selectively render the common electrically operated means effective to unlock the lock of the corresponding compartment.

8. A vending machine embodying a single coin slot, a plurality of vending compartments, electrically operable locks for normally locking each compartment, common electrically controlled means operated by a plurality of coins introduced through the coin slot in succession for actuating any of said locks, and a selective push button system including a plurality of push buttons, one of which is associated with each compartment, and which system is adapted, when a push button is operated, to selectively render the common electrically operated means effective to unlock the lock of the corresponding compartment.

9. A vending machine embodying a plurality of dispensing compartments, each of which is provided with a closure, an electrically operated lock associated with each closure for normally locking it shut, a push button associated with each lock, a single coin slot, a normally open switch, adapted, when closed, to render any particular closure responsive to the operations of the corresponding push button, and means operable by a number of coins in succession for closing said switch.

10. A vending machine embodying a single coin slot, a plurality of vending compartments, means for individually normally

locking the compartments closed, electrical unlocking apparatus associated with the locking means of each compartment, a push button electrically connected to each electrical unlocking apparatus, and master means common to the unlocking apparatus of all the compartments and coin controlled to render the electrical unlocking apparatus responsive to the operation of its associated push button, the operation of any one of said push buttons serving to automatically render the remaining push buttons ineffective until the push button which has been operated is returned to normal position.

11. A vending machine embodying a plurality of vending compartments, each of which is provided with a front and rear door, locks for normally locking the front doors of the compartments closed, a master unlocking device common to all the compartments and selective switch means for selectively rendering the lock of any compartment responsive to the operations of the master unlocking means to the exclusion of the locks of the remaining compartments, in combination with means for locking each compartment lock in unlocked position, and electromagnetic means controllable by the operations of the rear door of the compartment for simultaneously closing the front door, releasing the lock locking means and allowing the locking of the front door.

In testimony whereof, I have signed my name to this specification.

JULIUS ZSOLDOS.