

Jan. 29, 1929.

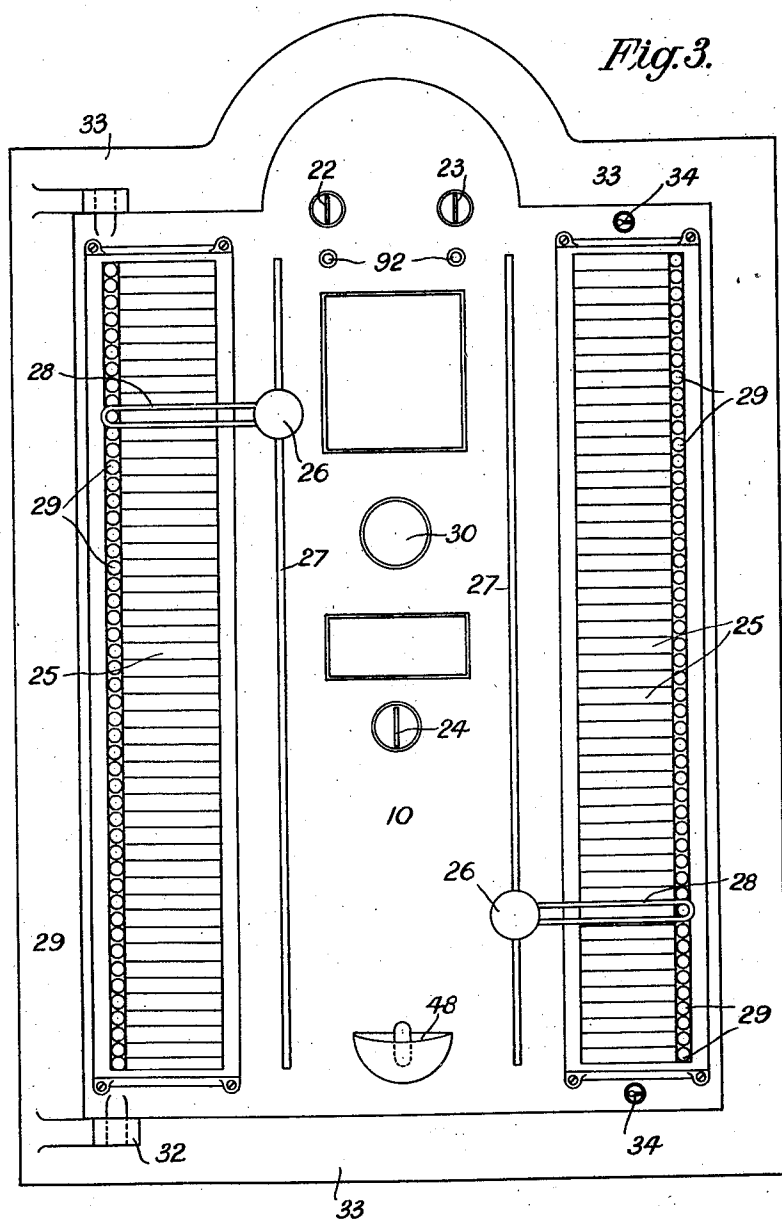
1,700,277

E. J. BAKER

AUTOMATIC VENDING APPARATUS

Filed Jan. 6, 1928

4 Sheets-Sheet 2



INVENTOR:
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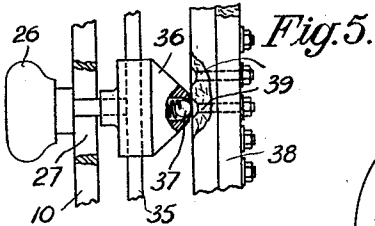


Fig. 5.

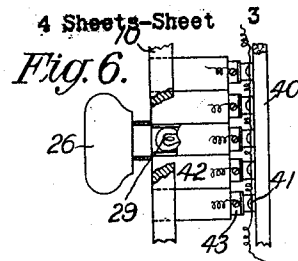


Fig. 6.

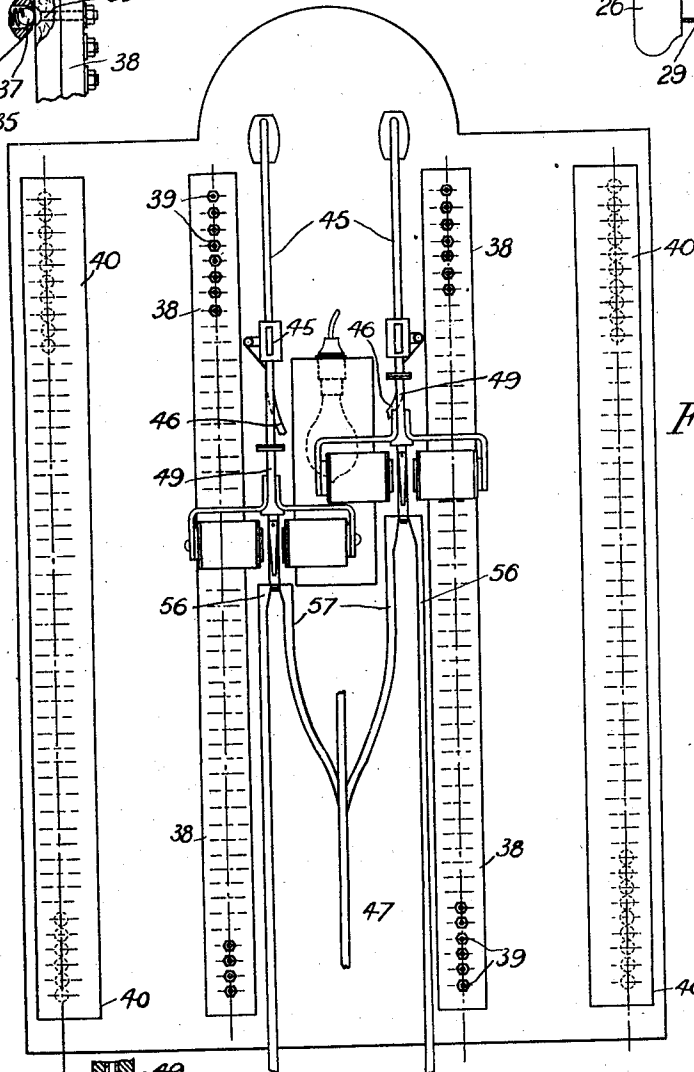


Fig. 4.

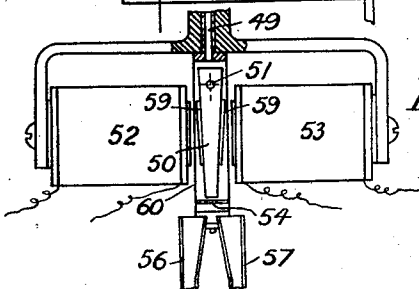


Fig. 7.

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Fig. 9.

Fig. 8.

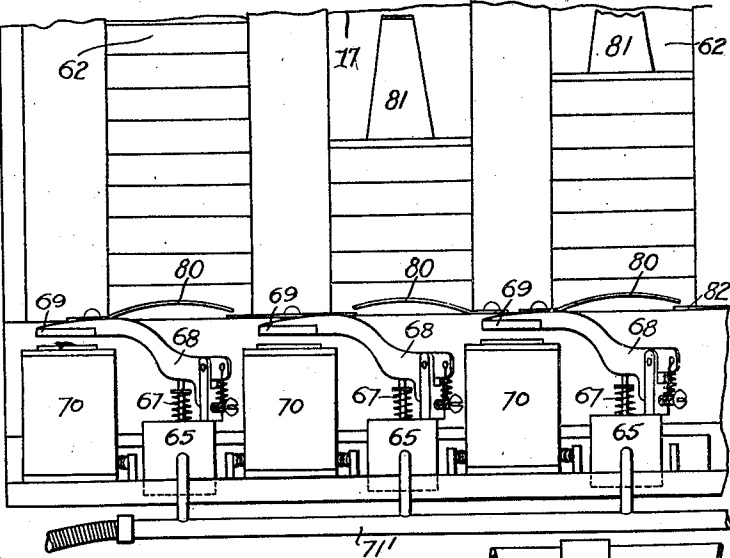
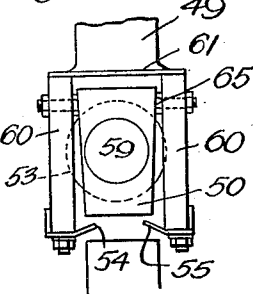


Fig. 10.

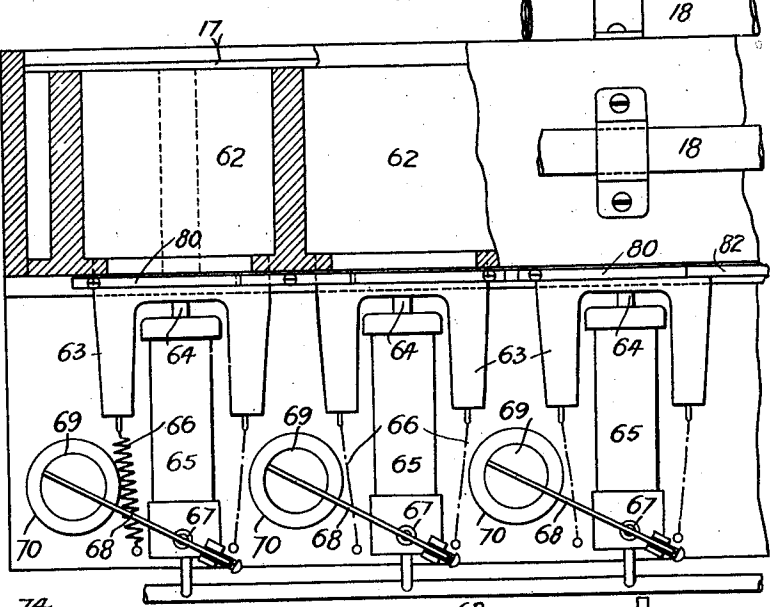


Fig. 12.

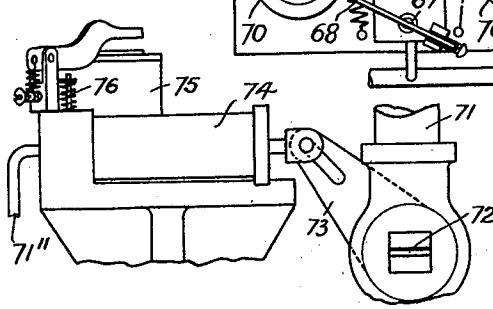
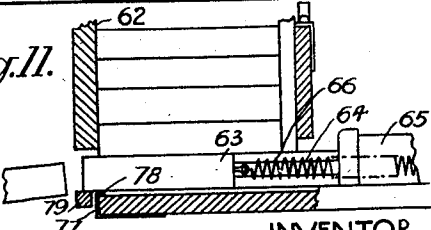


Fig. 11.



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UNITED STATES PATENT OFFICE.

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AUTOMATIC VENDING APPARATUS.

Application filed January 6, 1928, Serial No. 244,960, and in Great Britain December 31, 1926.

This invention relates to coin-controlled automatic delivery or vending apparatus, and is intended more especially for the sale of packeted goods such as tobacco and cigarettes.

The invention comprises an operating system in which the delivery of the articles or packets is effected through mechanical means by power derived from an electric supply or other convenient external source.

The invention also comprises improved means for the delivery of the articles or packets by fluid-operated rams or the like, the admission of pressure fluid being controlled by the action of an acceptacle coin or token.

The invention likewise comprises an improved arrangement in which the articles may be stored at a distance from the operating face of the machine or apparatus, the delivery being effected under remote control.

The invention further comprises selective means for the delivery of any one of a plurality of varieties or different sizes of articles or packets.

In the preferred embodiment of the invention, the selected articles are delivered into a common chute by reciprocating pushers arranged at the lower ends of the several containers and operated by pneumatic rams, compressed air being admitted to actuate any particular ram through an electromagnetically controlled valve from a common receiver in which the pressure is maintained by an electrically driven compressor; the admission valves are controlled by separate electromagnets, the energizing circuits of which are prepared by the selective setting of a sliding or rotating indicator, and completed by the action of an inserted coin or token after passing a testing mechanism of suitable kind.

At the end of the forward movement of the delivery ram, a circuit is closed to energize an electromagnet which allows the coin to fall into a cash receptacle; the valve-controlling circuit is thereby interrupted, shutting off the pressure and allowing the ram to return under the action of a spring or the like. If, for any reason, such as failure of the air pressure, the ram does not operate to deliver the article, a relay comes into operation after a predetermined period, causing another electromagnet to divert the coin into a return chute.

The invention is hereafter described with

reference to the accompanying drawings, in which:—

Figure 1 represents the exterior view of a suitable arrangement of the automatic delivery apparatus.

Figure 2 is a side view of the same, partly in section.

Figure 3 is a front elevation of the operating face or front of the apparatus on a larger scale.

Figure 4 is a rear elevation of the same.

Figures 5 and 6 are details in side view of the selector device or indicator, on an enlarged scale.

Figures 7 and 8 represent one of the electromagnetic means for diverting the coins, Figure 7 being a rear elevation, and Figure 8 a side view with one magnet removed.

Figure 9 illustrates one corner of a multiple container.

Figure 10 is a plan view of the same, partly in section.

Figure 11 is a detail showing the operation of the pusher delivering an article from one of the containers.

Figure 12 represents a master valve controlling the supply of air to the several pushers.

Referring to Figures 1 and 2, the machine face 10 is mounted at a convenient height in the central panel 11 of a fascia, shop front or other structure, the side panels 12, 13 of which may constitute show-cases, windows, advertisement or the like. Beneath the machine face 10 is provided a delivery tray 14, into which the articles are delivered by a chute 15, terminating in a mouth 16.

Behind the panel 11, and at any convenient position, for example on an upper floor of the building, are arranged a number of containers 17, suspended from cross bars 18 supported in any suitable manner. The packeted goods are stacked vertically in these containers which may be placed in one or more rows according to the space available; each row may be capable of movement to the side, or half to one side and half to the other, by sliding sideways along the bars 18, so that any one container may be brought to a convenient position for refilling, without interfering with the remaining rows, and afterwards returned to position above the chute 15.

An air compressor 19, driven by an electric motor 20, supplies air to a receiver 21, the compressed air being employed for operating

the delivery apparatus. Preferably the compressor is controlled automatically as described hereafter, so as to maintain sufficient working pressure in the air receiver.

Referring to Figures 3 to 6, the machine face 10 is shown provided with two slots 22, 23 for the insertion of coins or tokens of different values, the machine being arranged to deliver articles of two values, for example small and large packets of cigarettes, tobacco or other goods. In addition, there is shown a third coin slot 24, intended for example for the purchase of boxes of matches; the mechanism for the delivery of these articles may be of any well known kind, or may be of similar type to that controlling the delivery of the cigarettes, tobacco or the like, as hereafter described.

Each side of the machine face displays a list of the articles on sale, these lists being fitted in glass fronted frames 25 corresponding to the two values of the articles. A selector device, comprising a knob 26 adapted to travel up and down a slot 27, and carrying a laterally projecting slotted arm 28, works in conjunction with each list, the arm 28 registering with the name of the articles selected according to the setting of the selector knob. In line with the names of the articles in each list, there are mounted signal lamps 29 for indicating when the stock of any article is exhausted, these lamps being preferably so located as to come in line with the slot in the arm 28 when the selector knob is set to the corresponding article.

There is also shown at 30 a lens or bull's eye, adapted to be illuminated by a lamp 31 at the rear of the machine face, this constituting a main signal for indicating whether the machine is operative or not. The electric circuit to the lamp 31 may be controlled by the air pressure in the receiver 21.

The machine face 10 is hung upon hinges 32 in a metal framing 33 securely fastened to the walls of the structure. Two locks 34 of any suitable type are fitted at top and bottom of the machine face, so that the latter can be opened and swung forward (as indicated in dotted lines in Figure 2) by an inspector or other authorized person.

Upon the back of the machine face (see Figure 5), there are provided two vertical bars 35 immediately behind the slots 27, the selector knobs 26 being secured to contact blocks 36 sliding upon these bars. Each block carries a spring-pressed ball or other contact 37 adapted to press against the edge of a tee-section post 38, which supports a series of fixed contacts such as screws 39 corresponding to the number of articles listed; as the selector knob is moved up or down the slot 27, the contact 37 establishes a circuit from the bar 35 through the selected contact 39 to cause delivery of the desired article.

Towards each side of the machine face,

there is provided a vertical batten 40 immediately behind the row of signal lamps 29, this batten carrying a series of contact fingers 41 which engage the central contacts of the lamps, the latter being preferably of the miniature screw type and mounted in insulated sockets 42 with individual contact rings 43. The battens 40, and also the bars 35 and posts 38, are suitably supported from the machine face by means of clips or brackets.

There may also be provided coin-testing apparatus of any suitable kind, according to the particular coins or tokens for which the machine is intended; in the present instance, separate coin-testing mechanisms are provided for the two values of coins to be inserted through the slots 22, 23, the testing mechanisms being indicated generally by the reference 45. Any coins or tokens rejected by the testers will fall through the chutes 46, which lead into a common chute 47 extending to a cup 48 at the front of the machine (Figure 3).

From the coin-testing apparatus 45, the coin (if accepted) passes down a shoot 49 into a swinging trap 50, which is pivoted at 51 under the control of two electromagnets 52, 53, so that it can be moved to either side according as one or other of the magnets is energized; see Figure 7. While in the trap, the coin rests upon two fixed contacts 54, 55, so as to close an electric circuit from one pole of a suitable source of supply, to the two selector bars 35 and also to other points as mentioned hereinafter. Below the trap 50, and at the opposite sides thereof, are two coin-chutes 56, 57, the former leading to the cash receptacle 58 of the machine (see Figure 2) and the other to the chute 47 for rejected coins; consequently, the swinging movement of the trap 50 to one side will discharge the coin into the receptacle 58 whereas movement in the other direction will return the coin by way of the rejection chute 47 into the cup 48.

The opposite faces of each swinging trap 50 are fitted with discs 59 of soft iron, facing the adjacent ends of the cores of the electromagnets 52, 53, and its pivotal support is provided by screws 51 or the like passing through insulating pillars 60 attached to a flange 61 at the bottom of the coin chute which receives accepted coins from the testing apparatus 45. The coin contacts 54, 55 are arranged at the lower ends of the pillars 60, as seen in Figure 8, their adjacent extremities being upturned and reduced in width so that the coin will slip off as soon as the trap is moved to either side of its central position; the coin then falls into one or other of the two chutes 56, 57.

The containers 17, which may have their side walls adjustable in any convenient manner to take packets of various sizes, are shown more fully in Figures 9 to 11.

Each container comprises a number of bins

or receptacles 62, having a front opening for the insertion of the articles, as seen in Figure 9.

The delivery mechanism for each individual bin or receptacle 62 consists of a reciprocating pusher, in the form of a rectangular block 63 of approximately the same dimensions as the article in question, and a pneumatic ram or piston 64 connected to the rear edge of the pusher block, the front and rear walls of the receptacle being cut away to permit the entrance of the pusher block and the discharge of the packet in the well known way. The pneumatic cylinder 65 in which the ram or piston reciprocates is preferably single-acting, compressed air being admitted behind the ram from the respective branches 71¹, 71², 71³, 71⁴ and 71⁵ of an air main 71 to cause the delivery of an article, and the return movement being produced by a pair of springs 66. The admission valve, consisting for example of a lift valve 67, normally held closed by a spring or by the air pressure, is controlled by one end of a horizontal lever 68, the other end of which forms the armature 69 of a stationary electromagnet 70 mounted beside the pneumatic cylinder, and connected to the stationary selector contact 39 corresponding to the article delivered by this cylinder. The same valve 67 may be arranged to open the cylinder to exhaust when it shuts off the air supply.

To obviate the necessity of keeping all the admission valves 67 air-tight, there may be provided a master air-valve fitted in the main air line which supplies all the pneumatic cylinders, this master valve being opened only when one of the rams is required to operate.

A suitable arrangement of the master valve is shown in Figure 12, where the main air pipe 71 is fitted with a plug cock 72 operated by a slotted crank 73 engaged by the piston rod of a pneumatic cylinder 74, the latter being controlled by an electromagnet 75 which when energized opens the admission valve 76 to admit compressed air from a branch 71⁶ of the main air line 71, as in the case of the cylinders 65. The electromagnet 75 is connected in a common lead which supplies all the electromagnets 70 of the individual cylinders 65, so that the master valve 72 is opened whenever air is to be admitted to any of the latter cylinders, the valve closing automatically for example by the action of a spring, when the magnet 75 is de-energized.

As seen in Figure 11, there is mounted below each of the bins or receptacles 62, an insulated contact blade 77, the end of which is turned up so as to be engaged by projection 78 on the lower side of the pusher block 63 at the end of the travel of the ram, the blade 77 being thereby pressed against an insulated rail 79 which extends along the container approximately level with the bottom of the bins.

The circuit through these contacts, closed when the ram is operated to its extreme extent, energizes the electromagnet 52 of the swinging trap 50; the latter thereupon discharges the coin down the chute 56 leading to the cash receptacle 58.

The individual signal lamps 29 of the selective indicator on the machine face are connected to spring contacts 80 arranged near the bottom of the several bins or receptacles, suitable weights 81 resting upon the packets being adapted to close the signal circuits by pressing these spring contacts down upon fixed contacts 82 when the respective bins become empty; these signal circuits may be connected through the selector contacts 39. There is also included in the apparatus an electromagnetic relay 83, preferably connected in series with the electromagnet 75 of the master air valve 72, and provided with a pneumatic dashpot 84 or other device giving an adjustable time-limit for the closure of its secondary contacts. The circuit through these secondary contacts energizes the other electromagnets 53 of the two swinging traps 50, causing the latter to discharge the coin into the rejection chute 57 if the trap has not already been attracted to the opposite side by the electromagnet 52, within the interval determined by the adjustment of the dashpot.

The air compressor 19 and its driving motor are preferably controlled by a pressure-sensitive device of known kind, which starts up the motor and compressor when the pressure in the receiver falls to a given minimum value, and maintains them in operation until the pressure reaches a given maximum. As indicated in figure 2, the receiver is fitted with a pressure gauge 85 of the spring balance type, the indicating finger 87 of which is adapted in its two extreme positions to engage one or other of two contacts 86, 88, connected to the electromagnets 89, 90 of a starting switch 91; the motor 20 is started up by the operation of the magnet 89 as soon as the pressure in the receiver falls to a minimum value; when the pressure reaches the set maximum, the engagement of the upper contact 86 energizes the second magnet 90, which breaks the circuit to the motor. The low-pressure contact 88 may be arranged to illuminate the main signal lamp 31 on the machine and/or other signals elsewhere in the event of the pressure falling below the minimum working pressure.

In operation, the purchaser sets one or other of the selective indicator knobs to the article desired, and then inserts the appropriate coin; a button 92 controlling the coin tester may have to be actuated if the tester is of the type requiring such movement. The accepted coin then falls into the swinging trap 50 where it lodges upon the pair of trap contacts 54, 55, thereby establishing a circuit

from a local battery or other source, through the trap contacts, the time relay 83, the selector brush 37 and selected contact 39, the corresponding admission-valve electromagnet 70, and the master-valve electromagnet 75.

The opening of the admission-valve 67 and master-valve 72 allows air to pass from the receiver 21 to the pneumatic cylinder 65 corresponding to the selected article; at the same time, the electromagnetic relay 83 starts its movement, which may be timed for example to operate in five seconds. The forward stroke of the ram pushes out the selected article, which falls on to the delivery chute 15 and thence to the tray 14 from which it is taken by the purchaser. At the end of its travel, the ram closes its contacts 77, 79 so as to energize the electromagnet 52 on one side of the swinging trap 50; the movement of the trap dislodges the coin from the pair of contacts 54, 55, bridged thereby, and delivers the coin into the chute 56 leading to the cash receptacle 58 of the machine. The interruption of the circuit allows the air-valves 67, 76 to close and the springs then return the rams of the pusher 63 and master-valve 72 to their original positions; the master-valve therefore closes and the articles in the container-bin move downwards to bring the next one into line with the pusher, all parts being therefore in condition for another operation.

If the ram fails to act, due for example to failure of the air pressure or of the valve-controlling electromagnets, the relay 83, which started in action upon the closing of the circuit through the coin, will complete its movement at the end of the predetermined interval; the secondary contacts of this relay will then cause the energization of the electromagnet 53 upon the other side of the swinging trap 50, the resulting movement of the trap diverting the coin into the rejection chute 57 and thereby interrupting the original circuit to the electromagnets 70 and 75.

Provision may also be made for obtaining the return of the coin in the event of total failure of the electric supply or for preventing the insertion of a coin under such conditions. In the preferred arrangement, however, the controlling and signal circuits are supplied by a local battery, which may be kept fully charged through a suitable resistance and regulating switches from the external supply, and only the compressor motor receives current direct from the mains; consequently, if the external supply fails, the machine will continue to operate by means of the compressed air stored in the receiver, while the local battery will be able to supply current for the various control and signal circuits. By providing an air-receiver and a local battery of sufficient capacities, the apparatus can thus be rendered independent of

temporary failures of the external supply, the battery being however arranged to illuminate the main signal lamp to indicate that the machine is inoperative when the air pressure falls below the fixed minimum; a mechanical signal may also be provided to come into operation, for example by blocking the coin slots, when the battery fails, this signal being normally kept inoperative by an electromagnet energized by the battery.

It will be understood that the invention is not limited to the particular arrangement and construction of apparatus shown and described; for example, a single selector device may be arranged to serve for two or more sizes of each article or packet, distinction being made by the insertion of a coin in one slot or the other, according to the size required.

What I claim is:—

1. Automatic vending apparatus, comprising a container for vendible goods, mechanical means for delivering goods from said container, means for applying pneumatic power derived from an external source to said mechanical means, coin-controlled means including electromagnetically operated pneumatic valves determining the operation of said mechanical means, and timing means for returning the coin in the event that said mechanical means does not operate within a given time.

2. In automatic vending apparatus, an electric contact device, said contact device being included in a circuit for the electromechanical delivery of vendible goods, said circuit being normally interrupted at said contact device but being completed through an inserted coin or token resting upon said contact device, means for removing the coin from said contact device after delivery of the goods, other means for removing the coin from said contact device in the event of failure to deliver the goods, and timing means for retarding said last named means.

3. In automatic vending apparatus, comprising a plurality of containers for vendible goods, mechanical means operated by fluid pressure for delivering goods from any one of said containers, and means including electromagnetically operated valves, for said fluid pressure for determining the operation of said mechanical means, a selector device comprising a displaceable member, an indicator associated with said displaceable member, a plurality of signalling devices, a plurality of fixed contacts, a movable contact associated with said displaceable member, said movable contact adapted to engage said fixed contacts respectively according to the position of said displaceable member, and contact devices associated with said containers, said contact devices being closed to prepare an electrical circuit upon the delivery of the last of the goods in the respective con-

tainer, said fixed and movable contacts co-operating to complete said electrical circuit to actuate the respective signalling device when said indicator registers with selected goods of which the last has been delivered.

4. Automatic vending apparatus for several different varieties of goods, comprising a control panel, a selector device mounted upon said panel, a plurality of containers for the respective varieties of goods, said containers being arranged at a distance from said control panel, mechanical means operated by fluid pressure for delivering goods from any one of said containers means for guiding the delivered goods to the vicinity of said control panel, and coin-controlled mechanism including electromagnetically operated valve controlling said fluid pressure for determining the operation of the mechanical means delivering the goods selected.

5. An automatic vending system, comprising a control panel accessible to the buyer, a container located at a distance from said panel, fluid-operated delivery means adjacent to said container, means for admitting fluid to said delivery means, said fluid admitting means being operated under remote control by the insertion of a coin at said panel, and means for conveying the articles delivered by said delivery means into the vicinity of said control panel.

6. An automatic vending system, comprising a control panel accessible to the buyer, a plurality of containers for varieties of articles located at a distance from said panel, fluid operated means for the delivery of any one of said varieties of articles, said delivery means being located adjacent to the respective containers, coin-controlled means for admitting fluid to said delivery means, selective means for determining the particular variety delivered, the selected variety being delivered in response to the insertion of a coin in a slot common to all varieties at the same selling price, said selective means and said slot being located at said panel, and means for conveying into the vicinity of said panel the variety of article selected and delivered.

7. An automatic vending system, comprising a container, a reciprocating pusher adapted to deliver the lowermost article in said container, a pneumatic ram adapted to operate said pusher, an electromagnetically operated valve controlling the admission of compressed air to said pneumatic ram, coin-controlled means for completing the operating circuit of said electromagnetically operated valve, a pair of oppositely arranged electromagnets controlling the subsequent disposal of the coin, means carried by said

pneumatic ram for closing the circuit of one of said electromagnets at the end of the delivery stroke of said pusher, and timing means for closing the circuit of the other of said electromagnets in case of failure of the operation of said ram within a predetermined period.

8. An automatic vending system, comprising a plurality of containers for different varieties of articles, reciprocating pushers arranged at the lower ends of the several containers, a common delivery chute into which the articles are delivered by the operation of said pushers, pneumatic rams adapted to operate said pushers, a receiver for compressed air, electromagnetically operated valves adapted to admit air from said receiver to the respective pneumatic rams, selective means for preparing an operating circuit for any one of said electromagnetically operated valves, a master valve controlling the main supply of air to said pneumatic rams, electromagnetic means for operating said master valve, said electromagnetic means being included in a lead common to the operating circuits of said electromagnetically operated valves, and coin-controlled means for completing the operating circuit of the selected electromagnetically operated valve to cause delivery of the desired variety of article.

9. Automatic vending apparatus for several different varieties of goods, comprising a control panel, a selector device including a plurality of electrical contacts mounted upon said panel, a plurality of containers for the respective varieties of goods, said containers being arranged at a distance from said control panel, mechanical means operated by fluid pressure for delivering goods from any one of said containers, means for guiding the delivered goods to the vicinity of said control panel, and remote-control mechanism for determining the operation of the mechanical means delivering the goods selected, said remote-control mechanism including electrical contact devices arranged adjacent to said control panel and adapted to be closed through an inserted coin, valves arranged adjacent to said containers and adapted to admit pressure fluid to said mechanical means, electromagnetic means arranged adjacent to said containers and adapted to operate said valves, and electrical circuit connections extending between said electrical contact devices and said electromagnetic means and through the electrical contacts of said selector device.

In testimony whereof I hereunto affix my signature.

ERNEST JAMES BAKER.