March 27, 1934. C. F. GRIM 1,952,244

GOLF BALL VENDING MACHINE

Filed May 5, 1932 4 Sheets-Sheet 1

FIG. 1.

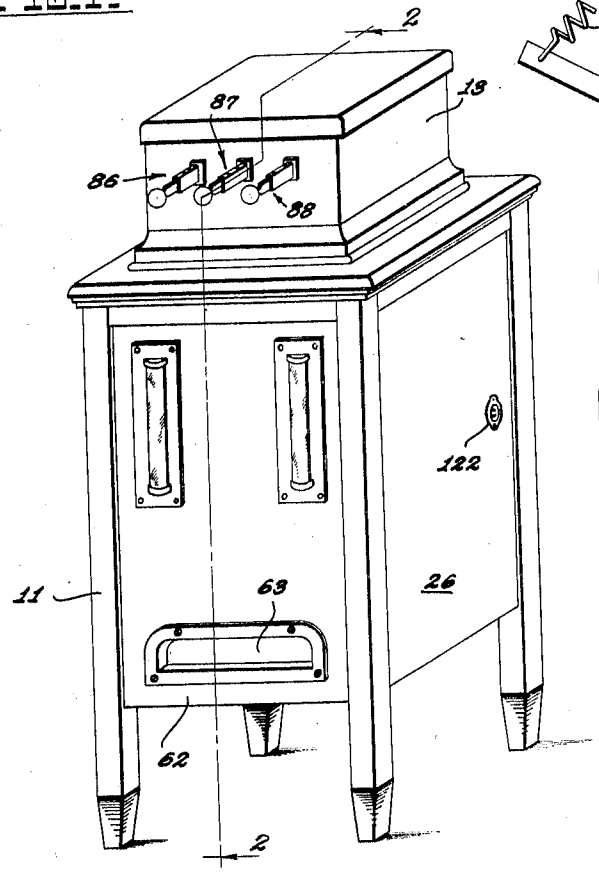


FIG. 6.

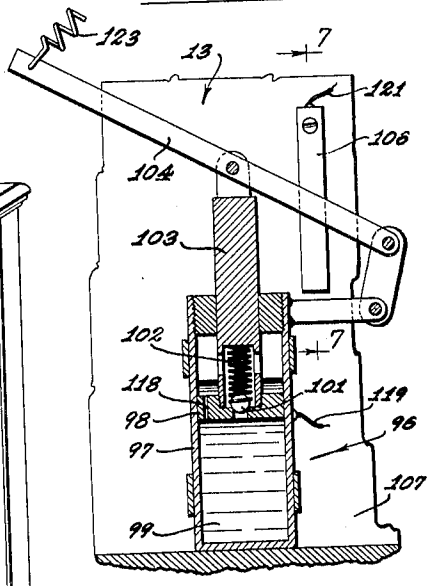


FIG. 7.

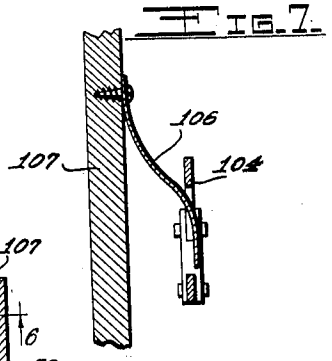
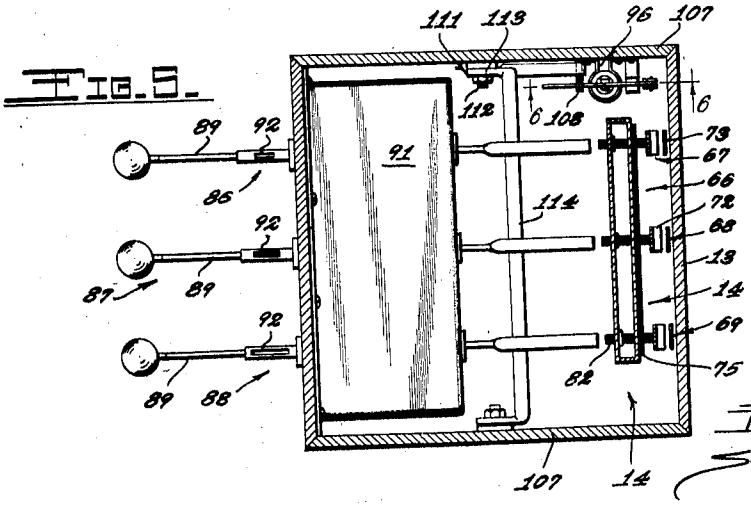


FIG. 5.



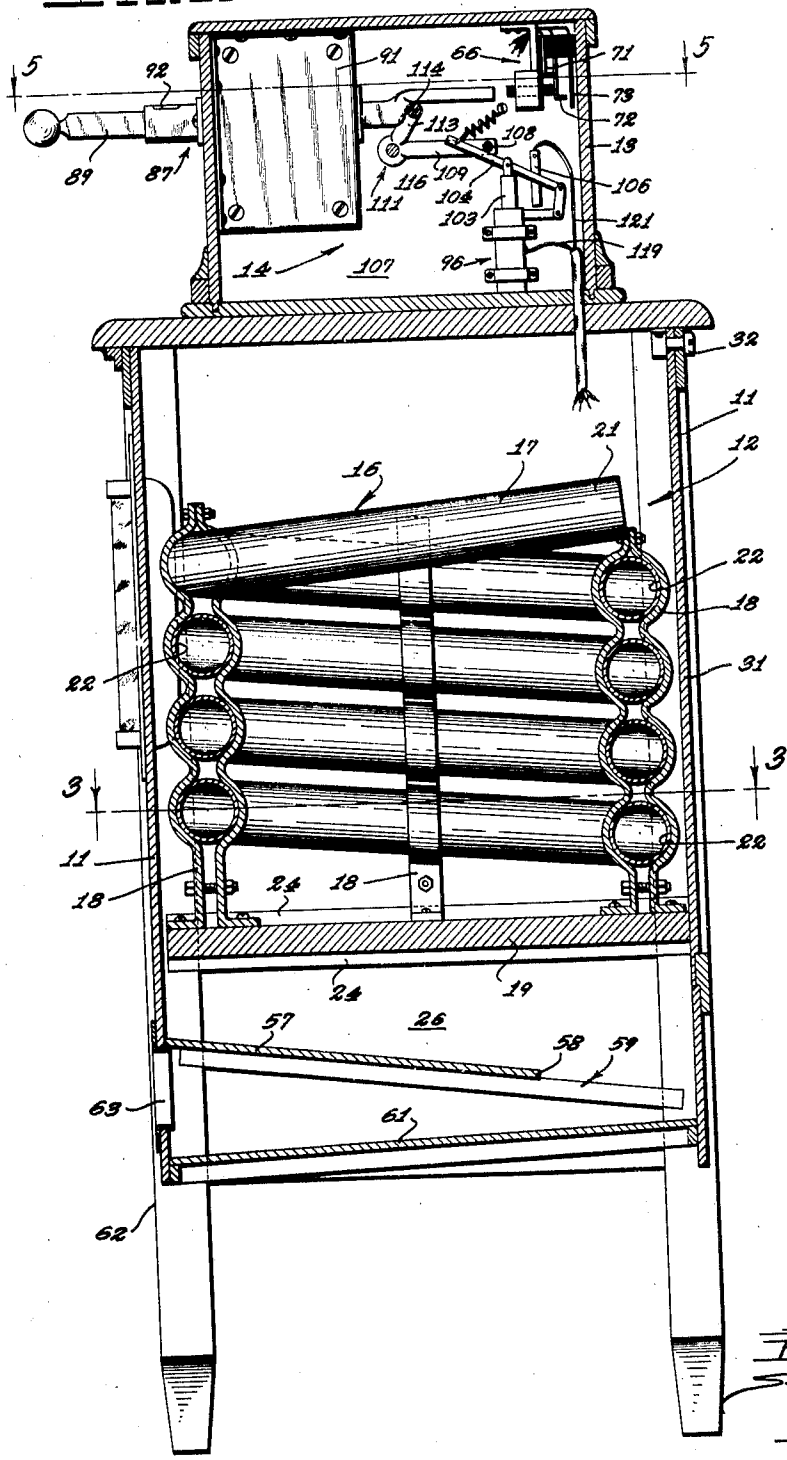
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GOLF BALL VENDING MACHINE

Filed May 5, 1932 4 Sheets-Sheet 2

FIG. 2.



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GOLF BALL VENDING MACHINE

Filed May 5, 1932 4 Sheets-Sheet 3

FIG. 3.

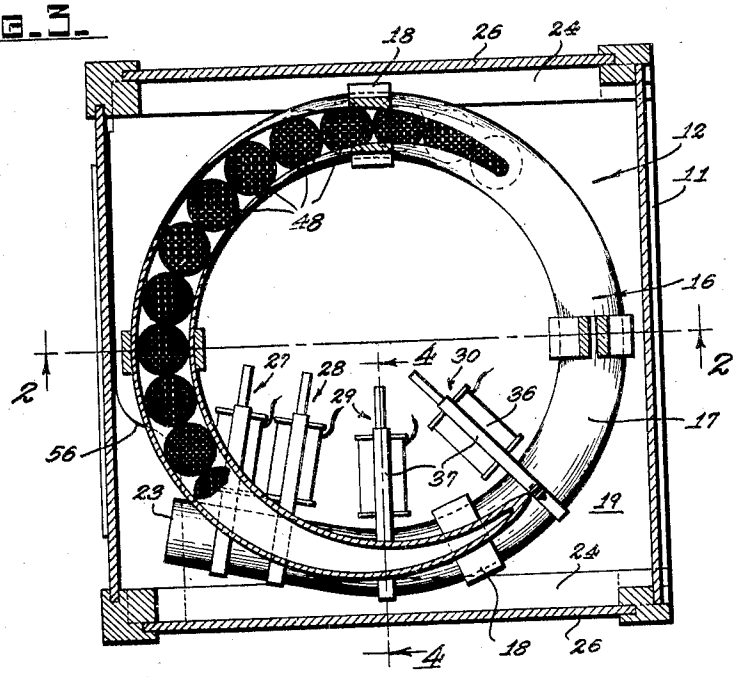
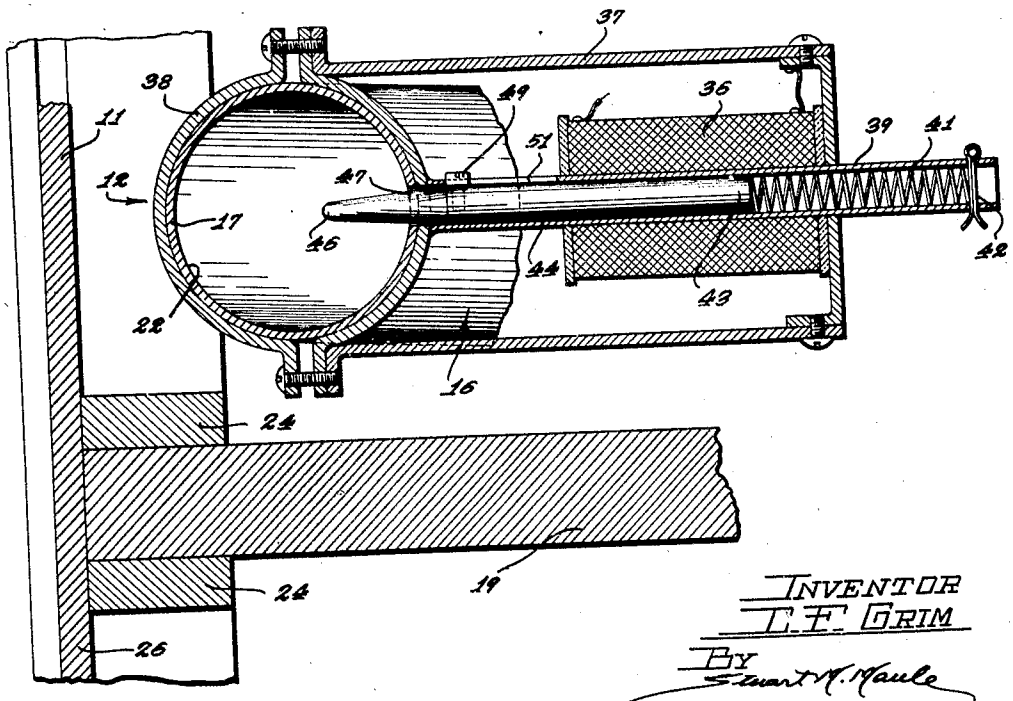


FIG. 4.



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GOLF BALL VENDING MACHINE

Filed May 5, 1932 4 Sheets-Sheet 4

FIG. 8.

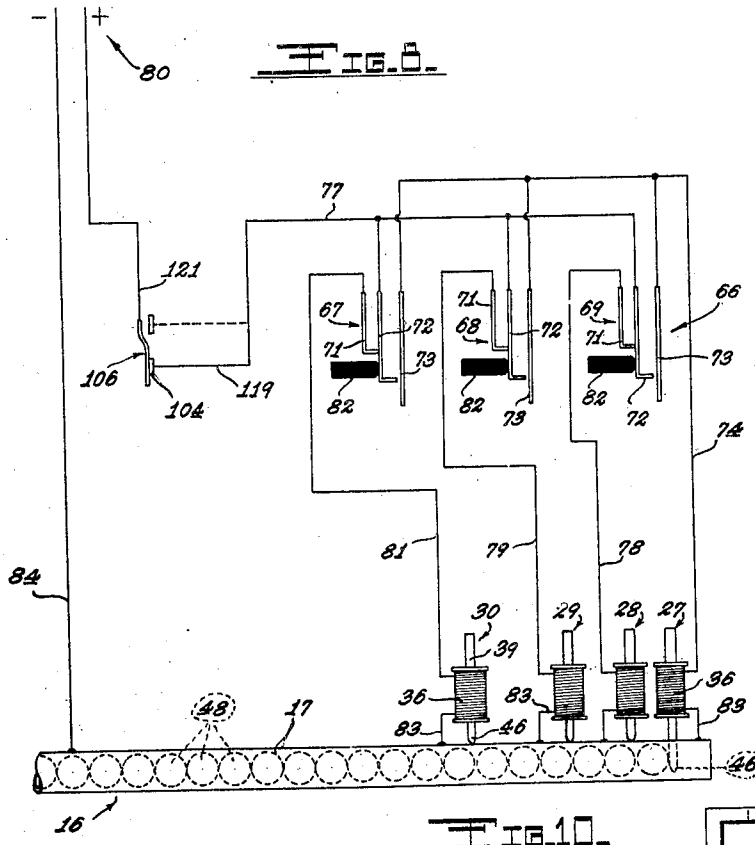


FIG. 9.

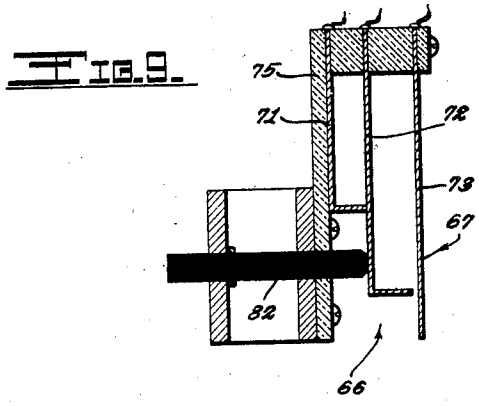
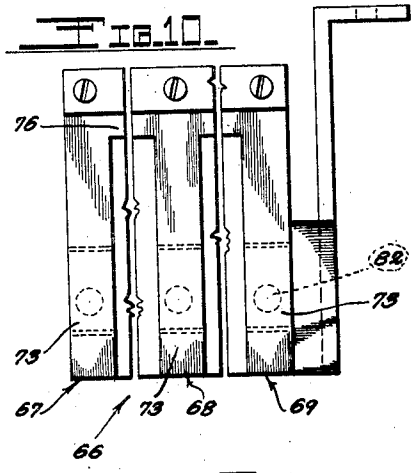


FIG. 10.



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UNITED STATES PATENT OFFICE

1,952,244

GOLF BALL VENDING MACHINE

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Application May 5, 1932, Serial No. 609,455

8 Claims. (Cl. 312—49)

This invention relates to vending machines, and has for an object the provision of an improved and simplified form of vending machine adapted to dispense one or more articles.

A more detailed object is to provide a vending machine having a plurality of suitably differentiated operating devices, any one of which may be actuated to effect operation of the dispensing mechanism, but each of which is adapted to cause the delivery of a different number of the articles with which the magazine or storage compartment is charged.

A further object is to provide a vending machine adapted to function as above outlined, and in which simplicity and economy of construction and positiveness of operation are secured by utilizing electromagnetic means for operating the dispensing means, thereby facilitating the establishment of suitable interconnection between the several operating means and their respective dispensing means, and also making it possible to mount the dispensing means in a position remote from the operating means, as for example in a separate cabinet.

Another object in this connection is to provide means adapted to disconnect the circuits of the electromagnetic means from their source of electrical energy whenever the vending machine is permitted to stand idle for any appreciable length of time, and to re-establish the necessary electrical connection upon actuation of any one of the several operating means and in time to insure operation of the dispensing means in the same manner as though the supply circuit had not been broken.

Another object is to provide an improved, simplified and highly efficient storage magazine for a vending machine, this magazine being especially well adapted for, but not necessarily limited to, use in storing and dispensing spherical articles such as golf balls.

My invention possesses other objects and valuable features, some of which, with the foregoing, will be set forth in the following description of the preferred form of my invention which is illustrated in the drawings accompanying and forming a part of the specification. It is to be understood that I do not limit myself to the showing made by the said drawings and description, as I may adopt variations of the preferred form within the scope of my invention as set forth in the claims.

According to the drawings:

Figure 1 is a perspective view of a vending machine involving the principles of the present invention.

Figure 2 is an enlarged vertical medial sectional view, taken upon the line 2—2 of Figures 1 and 3 with the direction of view as indicated.

Figure 3 is a horizontal sectional view taken through the dispensing mechanism upon the line 3—3 of Figure 2 with the direction of view as indicated.

Figure 4 is an enlarged detail view taken upon the line 4—4 of Figure 3 with the direction of view as indicated.

Figure 5 is a horizontal sectional view taken through the operating mechanism upon the line 5—5 of Figure 2 with the direction of view as indicated.

Figure 6 is an enlarged detail view taken upon the line 6—6 of Figure 5 with the direction of view as indicated, showing the dash pot mechanism used in shutting off the supply of electrical energy whenever the vending machine is permitted to stand idle for any appreciable length of time.

Figure 7 is a vertical sectional view taken upon the line 7—7 of Figure 6 with the direction of view as indicated.

Figure 8 is a wiring diagram showing the electrical connections of the vending machine.

Figure 9 is an enlarged vertical sectional view taken through one of the operating switches.

Figure 10 is a view in side elevation of the operating switch of Figure 9.

In terms of broad inclusion, the vending machine of the present invention comprises a magazine adapted to receive and store a relatively large number of articles to be dispensed, such as golf balls or the like. Associated therewith is a plurality of devices for releasing articles from the magazine, each of the devices being adapted to release a number of the articles differing from the number released by any of the other releasing devices. The control mechanism, which may be mounted in a separate cabinet if desired, includes a plurality of selectively operable mechanisms, each suitably interconnected to one of the releasing or dispensing devices so as to release the appropriate number of articles from the magazine when that mechanism is actuated.

More specifically described, the vending machine of my invention comprises a cabinet 11 within which is disposed the dispensing mechanism indicated in its entirety as 12, and preferably a separate cabinet 13 having therein the operating mechanism indicated in its entirety as 14. It should be understood, however, that both

the dispensing mechanism 12 and the operating mechanism 14 may be mounted within a single cabinet if a more advantageous unit would be presented thereby.

The dispensing mechanism 12 comprises a magazine or storage compartment 16, preferably in the form of an elongated tube 17 bent to helical form and mounted by suitable brackets 18 upon a baseboard 19 so as to dispose the magazine 16 with its axis vertical, as clearly shown upon Figure 2. As a result of this arrangement, all portions of the tube 17 will be disposed at a sufficient inclination from the horizontal to cause spherical objects placed within the upper end 21 of the tube 17 to roll downwards through the bore 22 of the tube toward the lower end 23, until they encounter an obstruction within the bore 22. Inasmuch as the vending machine of the present invention has been designed primarily for use in vending golf balls, the tube 17 selected is of such inside diameter that a golf ball may easily be placed within the bore 22 thereof with sufficient clearance between the ball and the walls of the tube to permit the ball to roll freely down through the tube. It should be understood, however that the vending machine may be employed to dispense a wide variety of other articles, preferably spherical, and that a tube 16 of greater or less inside diameter may be employed to adapt it to whatever use may be intended.

It should be observed that the baseboard 19 is loosely mounted within the cabinet 11, being supported therein upon suitable cleats 24 rigid with the sidewalls 26 of the cabinet 11. This permits ready removal of the magazine 16 and the releasing devices 27, 28, 29, and 30, which are carried thereby and which will be described in detail hereinbelow; and toward this same end the afterwall 31 of the cabinet 11 is made removable so that it may be displaced when it is desired to replace, inspect, and/or repair the magazine 16 and/or the parts associated therewith. A lock 32 is provided upon the removable afterwall 31 so as to prevent access to the interior of the cabinet 11 by any but authorized persons.

Each of the releasing devices 27, 28, 29 and 30 comprises a solenoid 36 rigidly mounted upon the tube 17 by means of a bracket 37 anchored to the tube 17 by suitable clamp 38 (see Figure 4). Extending axially through the solenoid 36 and rigid therewith is a tube 39 having a coil spring 41 disposed thereinside. This spring 41 is under compression between a cotter pin 42 and the outer end 43 of a plunger 44 which is slidably disposed within the tube 39. The outer end 43 of the plunger 44 serves as the armature for the solenoid 36, whereas the inner end 46 of the plunger 44 extends through an opening 47 formed in the tube 17 as into the bore 22 thereof so as to provide abutment means adapted to intercept balls 48 moving downwards within the bore 22. I prefer that the end 46 of each of the plungers 44 be slightly tapered, so as to facilitate its entering the bore 22 and thrusting its way between two adjacent balls 48 within the bore 22. The extent of the reciprocatory movement of which the plunger 44 is capable is limited as by means of a screw 49 rigid with the plunger 44 and slidable within a longitudinally extending slot 51 in a wall of the tube 39.

Whereas four solenoids 36 and associated parts are shown, it should be understood that this number may be increased or decreased according to the requirements of any particular installation. Under practically all circumstances, however, there will be included a lower releasing device 27 and a plurality of upper releasing devices 28, 29, etc., in each of which the solenoid 36 and the plunger 44 are so disposed in relation to each other that when the solenoid 36 is de-energized the spring 41 will force the plunger 44 substantially to the position illustrated upon Figure 4, causing the end of 46 to enter the bore 22 of the tube 17; and when the solenoid 36 is energized the armature 43 will be drawn further into the solenoid 36 thereby retracting the end 46 of the plunger 44 from the bore 22. As will be explained hereinbelow, the lowermost releasing device 27 will normally have its solenoid 36 de-energized, so that it will under normal circumstances block the passageway through the magazine 16, whereas the upper releasing devices 28, 29, etc., will each have its solenoid 36 energized so as to retract the plunger 44 of each of these upper releasing devices.

An opening 56 through the baseboard 19 under the lower end 23 of the tube 17 permits balls 48 released by the lowermost releasing device 27 to drop onto a partition 57 which inclines downwards and toward the rear wall. This partition 57, however, terminates short of the rear wall, as indicated at 58, leaving an opening 59 through which the balls may drop onto the bottom 61 of the cabinet 11; and inasmuch as this bottom 61 slopes downwards and towards the front 62 balls dropping thereon will roll toward the front to be made accessible through an opening 63. The number of balls released from the magazine 16 depends upon which of the several upper releasing devices 28, 29, etc., is de-energized substantially at the time of energization of the lowermost solenoid 27. In this connection it should be explained that the releasing devices 27 to 30 inclusive are disposed at predetermined intervals of spacing along the tube 17 so as to accommodate a predetermined number of balls 48 between the respective plungers 44 thereof. For example, there may be sufficient space for only one ball between the plungers 44 of the lowermost releasing device 27 and the releasing device 28 next adjacent thereto. Hence, if, when the lowermost releasing device 27 has its solenoid 36 energized, the solenoid 36 of the next adjacent releasing device 28 is de-energized, only one ball 48 will be permitted to roll from the magazine 16. This follows from the fact that upon de-energization of the solenoid 36 of the second releasing device 28, the plunger 44 associated therewith will be thrust by its spring 41 into the bore 22, thereby positioning the end 46 of the plunger 44 between the first and second balls 48 at the lower end of the tube 17. Accordingly, when the plunger 44 of the lowermost releasing device 27 is retracted by energization of the solenoid 36 associated therewith, only the lowermost ball within the tube 17 will be permitted to roll to and drop from the lower end 23 of the tube, all the remaining balls within the tube being prevented from moving downwards therein by the end 46 of the plunger 44 of the second releasing device 28. In the modification illustrated there is room to accommodate two balls 48 between the respective plungers 44 of the second and third releasing devices 28 and 29 respectively, the result being that if the third releasing device 29 instead of the second releasing device 28 has its solenoid 36 de-energized substantially at the time of energization of the solenoid 36 of the lowermost releasing device 27, three balls 48 will be dispensed, and so on.

The operating mechanism 14 comprises a bank 66 of double switches 67, 68 and 69. These double switches correspond in number to the upper releasing devices 28, 29 and 30, i. e. there being three upper releasing devices, there will likewise be three double switches. Each of the switches 67, 68 and 69, is made of three contacts 71, 72 and 73; and inasmuch as the third contact 73 of each of the double switches 67, 68 and 69 is connected by a conductor 74 (see Figure 8) to the solenoid 36 of the lowermost releasing device 27, I have found it a convenient expedient to construct all three contacts 73 of a single piece of metal, leaving the contacts 73 integrally connected as by webs 76. Similarly, the intermediate contact 72 of each of the three switches 67, 68 and 69 is intended to be connected as by a conductor 77 to a source of current 80 common to all contacts 72; hence these three contacts 72 also may be integrally united if desired. The contact 71 however of each of the three switches 67, 68 and 69 is connected to a separate solenoid 36, conductors 78, 79 and 81 respectively being employed for this purpose; hence these three contacts 71 must be electrically insulated from each other. Accordingly the contacts 71 are mounted upon a block 75 of insulation, which serves also as the means for supporting the other contacts 72 and 73. The parts are so proportioned and arranged that the intermediate contacts 72 of each of the three switches 67, 68 and 69 normally engages the associated contact 71, the result being that each of the solenoids 36 of the three upper releasing devices 28, 29 and 30 are energized from the conductor 77. However, adjacent the lower end of each of the intermediate contacts 72 a plunger 82 is reciprocally mounted and so arranged that when slid to the right as viewed upon Figure 9, the intermediate contact 72 will be withdrawn from engagement with the associated contact 71 and brought into engagement with the associated contact 73, thereby de-energizing the solenoid 36 of the associated upper releasing device 28, 29 or 30 as the case might be, and energizing the solenoid 36 of the lowermost releasing device 27.

Whereas the conductors 74, 78, 79 and 81 lead to one terminal of the solenoids 36 of the releasing devices 27, 28, 29 and 30, respectively, I have found it convenient to ground the other terminal of each of these solenoids to the tube 17 as by short conductors 83 and to connect the tube 17 as by a conductor 84 back to the source of current 80, thereby avoiding the necessity of connecting each solenoid individually back to the source of current.

Thus it may be seen that the dispensing mechanism 12 may be actuated to release one or more golf balls 48 depending upon which of the several plungers 82 is actuated. Whereas any suitable mechanism may be employed for actuating any one of the plungers 82, I have shown a plurality of coin controlled mechanisms, 86, 87 and 88, each of which includes a reciprocal bar 89 adapted to be slid to the right, as viewed upon Figures 2 and 5 and engage one of the plungers 82 to effect operation thereof. Associated with each of the bars 89 is a suitable coin-releasable mechanism (not shown) which is contained within a suitable casing 91 and which is adapted to prevent reciprocation of the bar 89 until a suitable coin has been inserted into a coin slot 92 provided for that purpose. By way of illustration, it may be assumed that a coin-releasable mechanism will be released when a twenty-five cent piece is inserted into the associated coin slot 92 of any one of the three coin controlled mechanisms 86, 87 and 88. This will permit the bar 89 of that coin controlled mechanism to be slid inwards of the cabinet 14, striking the associated plunger 82 and actuating the associated contact 72 to move it away from the contact 71 and into engagement with the contact 73 of the associated operating switch 67, 68 or 69, as the case might be. Each of the three coin-releasable mechanisms is adapted to be released by a coin of a different denomination—for example, the coin-releasable mechanism associated with the ball-releasing device 28 is adapted to be actuated by a twenty-five cent piece, the coin-releasable mechanism associated with the next ball-releasing device 29 requires the insertion of a fifty-cent piece into its coin slot 92 before it can be actuated, whereas the coin-releasable mechanism associated with the uppermost ball-releasing device 30 can be actuated by means of a silver dollar. Hence, it is possible by means of the machine of the present invention, to purchase one ball for twenty-five cents, three balls for fifty cents, or six balls for a dollar, it being understood that the plungers 44 of the releasing devices 29 and 30 are so spaced along the tube 17 that three balls 48 may be accommodated therebetween within the bore 22 of the tube 17.

Inasmuch as the normal or inactive position for the plungers 44 of each of the three upper releasing devices 28, 29 and 30 is withdrawn, this being accomplished by energization of their respective solenoids 36, these three solenoids should be energized before any one of the plungers 82 is moved in order to insure satisfactory operation of the vending machine. It is undesirable, however, to leave solenoids energized for any great length of time, due to their tendency to overheat and to hum when current is flowing therethrough. Hence, I have provided means for disconnecting the operating switches 67, 68 and 69 from the source of energy 80 when the machine is permitted to stand idle for any appreciable length of time. This is in the form of a dash pot mechanism 96, best shown upon Figures 6 and 7, which comprises a cylinder 97 having a plunger 98 closely fitted therein and adapted to reciprocate longitudinally thereof. The cylinder 97 contains a fluid 99 adapted to resist upward motion of the plunger 98, downward motion being facilitated by the presence of a ball check valve 101 pressed into its seat by a spring 102. The rod 103 of the plunger 98 is adapted to be moved by means of a lever 104, which is so disposed that it engages a spring contact 106 mounted upon a side wall 107 of the cabinet 13, such engagement taking place, however, only when the lever 104 is moved downwards away from its upper extreme of motion. The lever 104 is adapted to be swung downward from its upper extreme of motion by means of a pin 108 carried by one end 109 of a bell crank 111 pivotally mounted as by a pin 112 upon a side wall 107 of the cabinet 13. To the other end 113 of the bell crank 111 a transverse bar 114 is secured in position to be engaged by shoulders 116 on the reciprocating bars 89 of all three coin controlled mechanisms 86, 87 and 88, and be swung downwards as any one of the three bars 89 is moved inwards. The parts are so proportioned and arranged that as the bar 114 is swung downwards, the bell crank 111 swings the lever 104 downwards, bringing it into engagement with the contact 106, and forcing the plunger 98 down into the cylinder. The conductor 77 leading from the source of current 80 to the in-

termediate contacts 72 of the switches 67, 68 and 69 is severed, one end 119 being connected to the lever 104, and the other end 121 to the spring contact 106, so that the intermediate contacts 72 are energized whenever the lever 104 is displaced from its upper extreme of movement.

Return of the plunger 98 and lever 104, as induced by a spring 117 is retarded by the fluid 99, a limited flow past the plunger being permitted by means of a bleeder hole 118 in the plunger. Hence the engagement between the lever 104 and the contact 106 is maintained for a sufficient period to insure completion of the cycle of operation of the machine before the master circuit is again opened.

Inasmuch as the operation of each of the constituent parts of the machine has been described hereinabove in conjunction with the description of the construction thereof, it is believed that no difficulty will be encountered in understanding the operation of the entire machine. Suffice it to say, therefore, that by operation of one of the plungers 82, as by depositing the proper coin in the associated coin slot 92 and pressing the associated bar 89 inwards, a certain number of balls 48 will be dispensed, a different number of the balls 48 being delivered as a result of actuation of each different plunger 82.

I claim:

1. In a device of the character described, a magazine comprising a tube adapted to receive a plurality of balls, means providing a lower and a plurality of upper movable abutments adapted to extend into the bore of said tube to restrain said balls from moving downwards therein, said abutments being spaced at predetermined distances from each other along said tube to accommodate predetermined numbers of said balls therebetween, and means operable to extend a selected one of said upper abutments into said bore and to withdraw said lower abutment from said bore.

2. In a device of the character described, a magazine comprising a tube adapted to receive a plurality of balls, means providing a lower and a plurality of upper movable abutments adapted to extend into the bore of said tube to restrain said balls from moving downwards therein, said abutments being spaced at predetermined distances from each other along said tube to accommodate predetermined numbers of said balls therebetween, individually operable operating means associated with each of said upper abutments, each of said operating means being adapted to extend the associated abutment into said bore, operating means adapted to withdraw said lower abutment, and means for actuating the operating means associated with said lower abutment substantially at the time of actuation of the operating means associated with any of said upper abutments.

3. In a device of the character described, means providing a guideway adapted to contain a plurality of balls, means providing a lower and a plurality of upper movable abutments adapted to extend into said guideway to restrain said balls from moving therein, said abutments being spaced at predetermined distances from each other along said guideway to accommodate predetermined numbers of said balls therebetween, and means operable to extend a selected one of said upper abutments into said guideway and to withdraw said lower abutment from said guideway.

4. In a device of the character described, means providing a guideway adapted to contain a plurality of balls, means providing a lower and a plurality of upper movable abutments adapted to extend into said guideway to restrain said balls from moving therein, said abutments being spaced at predetermined distances from each other along said guideway to accommodate predetermined numbers of said balls therebetween, and individually operable operating means associated with each of said upper abutments, each of said operating means being adapted to extend the associated abutment into said guideway, operating means adapted to withdraw said lower abutment, and means for actuating the operating means associated with said lower abutment substantially at the time of actuation of the operating means associated with any of said upper abutments.

5. In a device of the character described, means providing a guideway adapted to contain a plurality of balls, a plurality of solenoids arranged at spaced intervals along said guideway, a movable plunger associated with each of said solenoids, each plunger comprising an armature disposed in operative relation to the associated solenoid and a portion adapted to be extended into said guideway to restrain said balls from moving therein when the associated solenoid is deenergized, said plungers being spaced at predetermined intervals along said guideway to accommodate predetermined numbers of said balls therebetween, yieldable means urging each of said plungers into restraining position, an energizing circuit associated with each of said solenoids, the circuit associated with the solenoid proximal to the delivery end of said guideway normally being open and the other of said circuits normally being closed, and means for opening any selected one of said normally closed circuits and for closing said normally open circuit.

6. In a vending machine, electromagnetically operated means for dispensing articles from said machine, an electrical circuit associated with said dispensing means, a control switch interposed into said circuit, yieldable means urging said switch open, a plurality of operating means for actuating said dispensing means, means operable upon operation of any of said actuating means for closing said control switch, and means resisting operation of said yieldable means to hold said control switch closed for a material time interval after operation of any of said actuating means.

7. In a vending machine, a plurality of differentiated electromagnetic means for dispensing articles from said machine, an electric circuit associated with each of said electromagnetic means, an operating switch interposed into each of said circuits, a plurality of differentiated operating means for actuating said switches, a master circuit adapted to energize all of said circuits associated with said electromagnetic means, a control switch interposed into said master circuit, yieldable means urging said control switch open, means operative upon actuation of any of said operating means for closing said control switch, and means resisting operation of said yieldable means to hold said control switch closed for a material time interval after operation of said closing means.

8. In a device of the character described, a magazine adapted to receive a plurality of balls and retain them in readiness to be vended, and comprising an elongated tube bent to helical form, the bore of said tube being of greater diameter than the balls to be vended, means providing a lower and a plurality of upper movable abutments adapted to extend into the bore of said

tube to restrain said balls from moving downwards therein, said abutments being spaced at predetermined distances from each other along said tube to accommodate predetermined numbers of said balls therebetween, individually operable operating means associated with each of said upper abutments, each of said operating means being adapted to extend the associated abutment into said bore, operating means adapted to withdraw said lower abutment from said bore, and means for actuating the operating means associated with said lower abutment substantially at the time of actuation of the operating means associated with any of said upper abutments.

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