June 18, 1957 W. J. SMITH 2,796,181

GRAVITY-FED VENDING MACHINE

Filed May 31, 1955 3 Sheets-Sheet 1

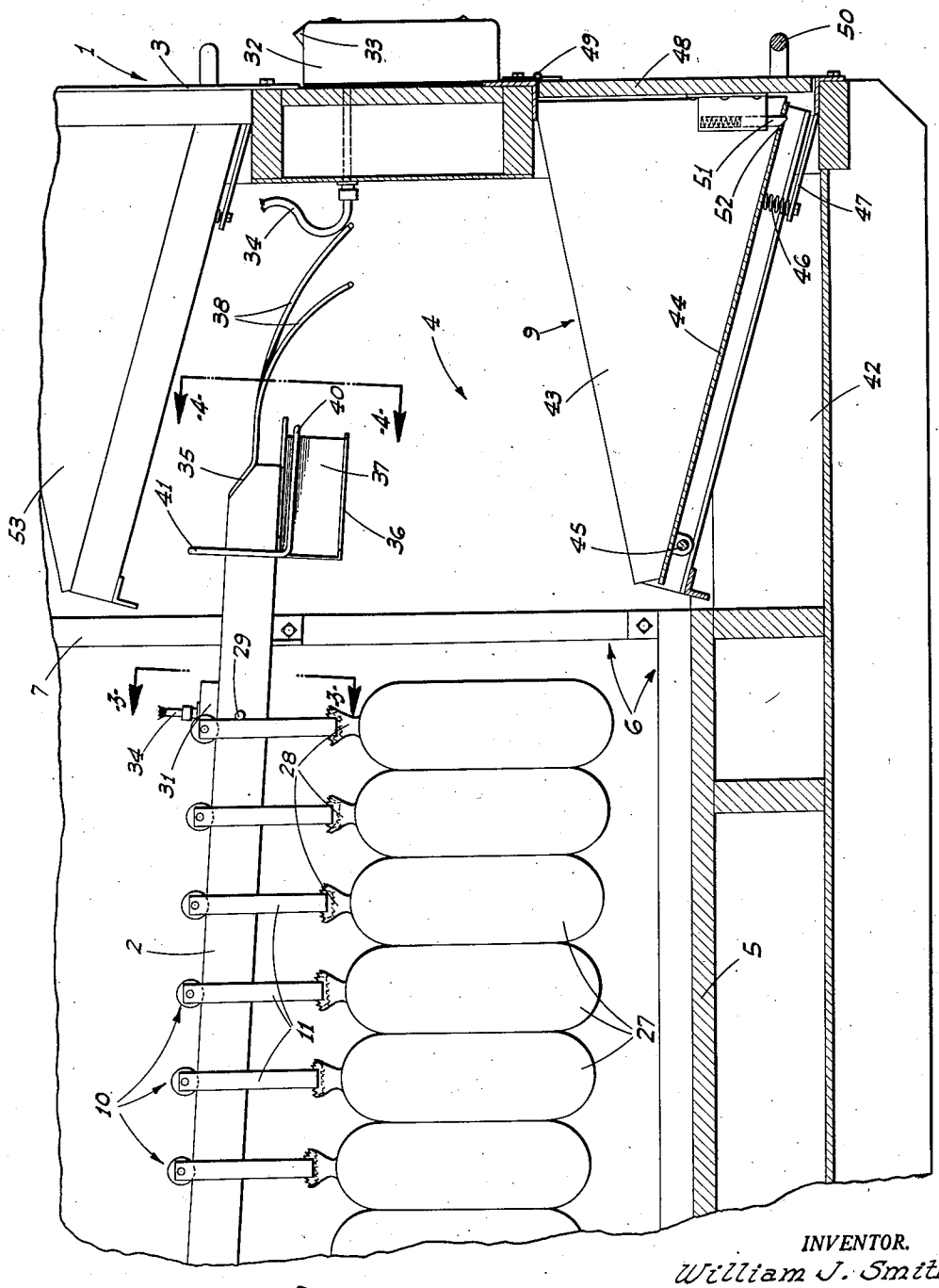

FIG-1

INVENTOR.
William J. Smith
BY
Webster & Webster
ATTYS.

June 18, 1957 W. J. SMITH 2,796,181

GRAVITY-FED VENDING MACHINE

Filed May 31, 1955 3 Sheets-Sheet 2

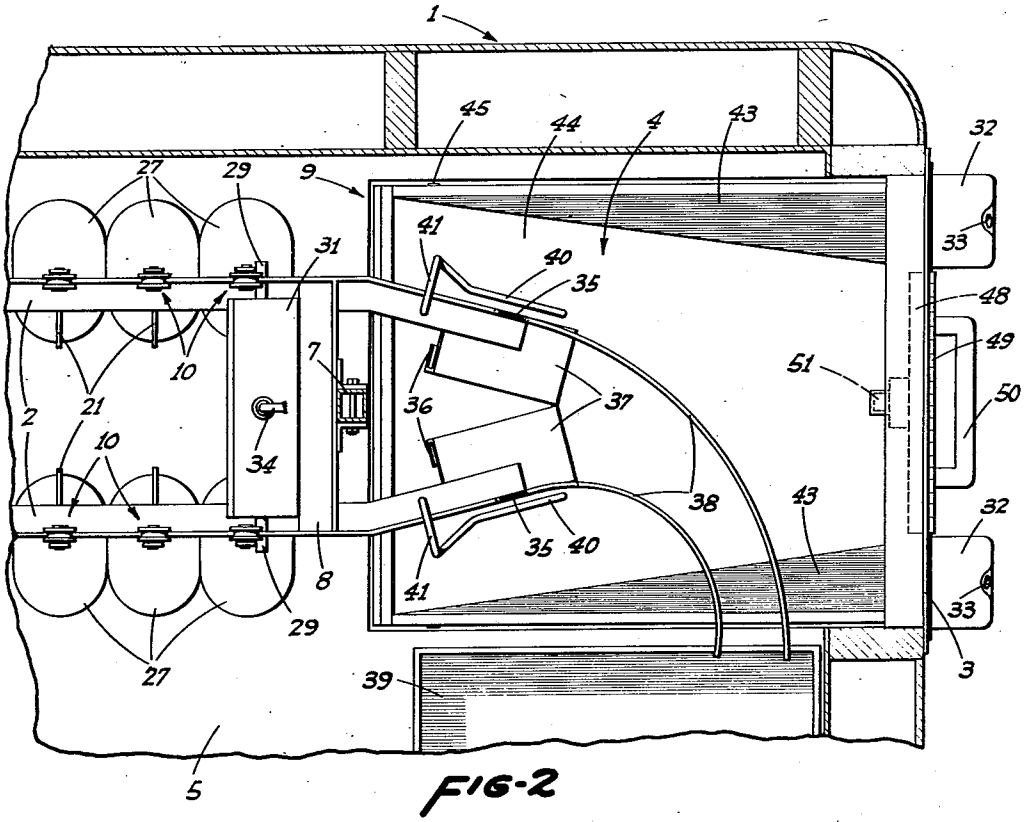

FIG-2

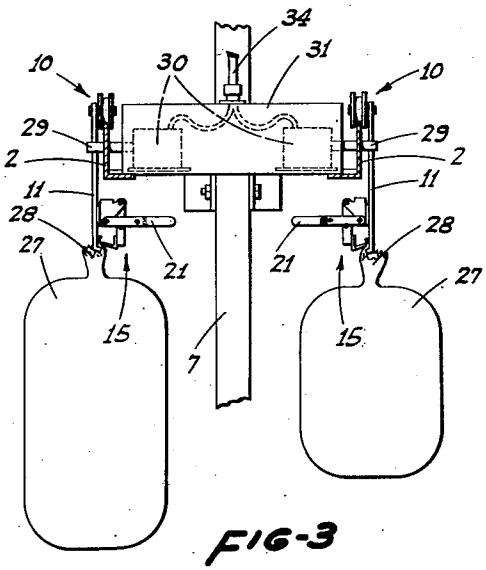

FIG-3

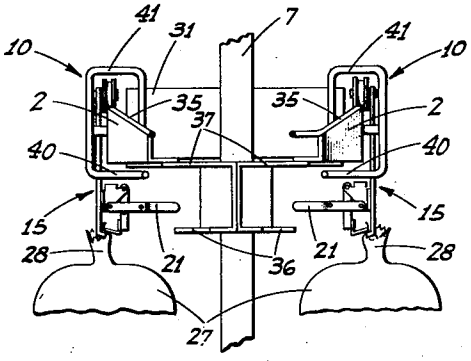

FIG-4

INVENTOR.
William J. Smith
BY
Webster & Webster
ATTYS.

June 18, 1957 W. J. SMITH 2,796,181

GRAVITY-FED VENDING MACHINE

Filed May 31, 1955 3 Sheets-Sheet 3

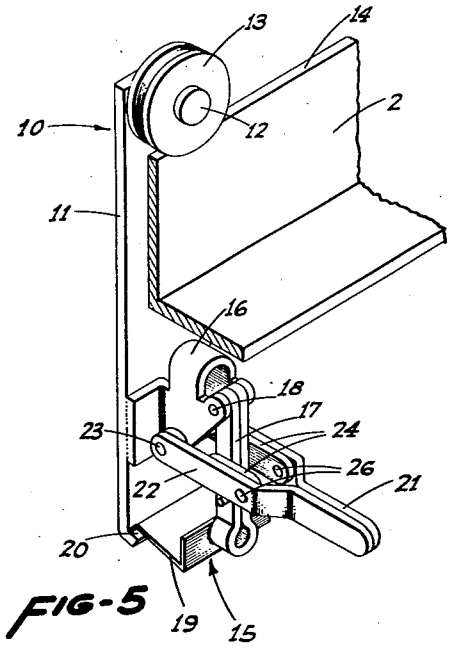

FIG-5

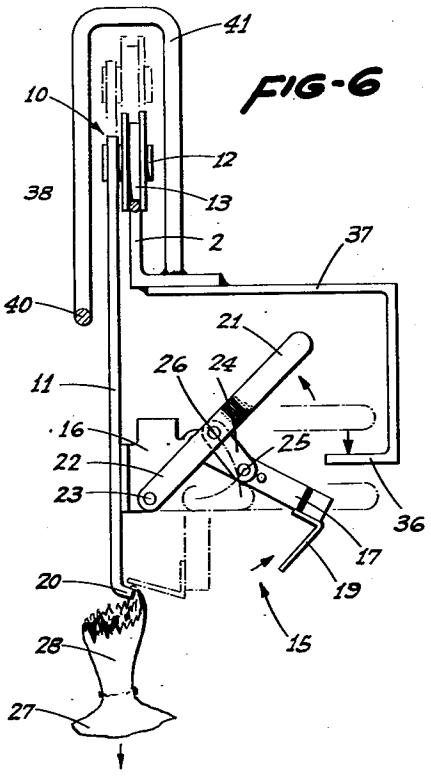

FIG-6

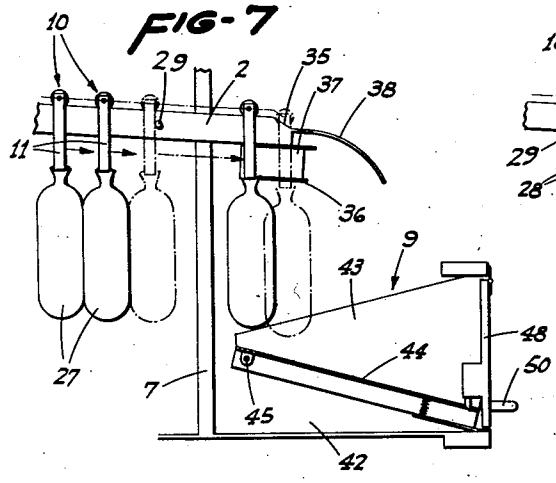

FIG-7

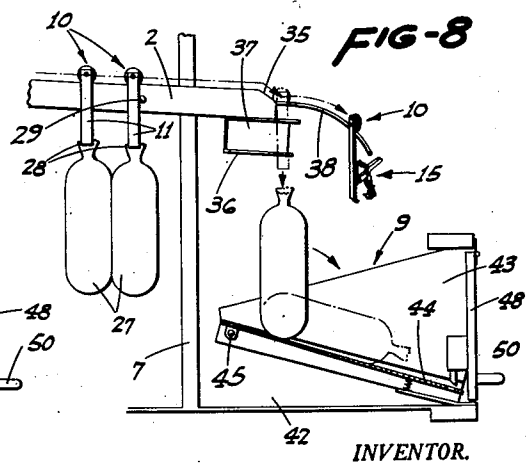

FIG-8

INVENTOR.
William J. Smith
BY Webster & Webster
ATTYS.

United States Patent Office

2,796,181

Patented June 18, 1957

2,796,181

GRAVITY-FED VENDING MACHINE

William J. Smith, San Jose, Calif., assignor to S & S Vending Machine Co., San Jose, Calif., a corporation of California

Application May 31, 1955, Serial No. 512,098

2 Claims. (Cl. 214—59)

This invention relates in general to a merchandise vending machine of coin-controlled type; the machine being especially designed—but not limited—for dispensing merchandise, such as cube ice, in bags or the like. Each separate quantity of the merchandise and the retaining means therefor is hereinafter referred to as a "merchandise unit."

In particular, this invention is directed to, and it is a major object to provide, a gravity-fed vending machine wherein a plurality of merchandise units are trolley suspended in a row from an inclined rail; the lead trolley normally being engaged by a movable stop, and coin-controlled means is included to move the stop in a manner to permit said lead trolley and the merchandise unit suspended therefrom to run forward on the rail to a discharge point, at which said merchandise unit is automatically released from the trolley and drops into a dispensing area.

Another important object of the invention is to provide a vending machine, as above, wherein each trolley includes a novel releasable clamp which engages the corresponding merchandise unit and normally holds the same in suspension from such trolley; there being instrumentalities arranged to automatically release such clamp upon each trolley reaching said discharge point.

An additional object of the invention is to provide a vending machine, as in the preceding paragraph, wherein the rail is formed with a relatively sharp drop-off at the discharge point, and an instrumentality is mounted adjacent such point for engagement by an element of the clamp whereby to release the latter as each trolley reaches and traverses such drop-off.

A separate object of the invenion is to provide a novel rail extension, beyond such drop-off, arranged to carry each empty trolley to a point clear of the dispensing area and to then deliver such trolley into a receiving container for subsequent re-use.

A further object of the invention is to provide the vending machine with a novel dispensing chute and access door assembly; the chute being disposed to receive each merchandise unit as it is released and drops from a trolley, and the access door being unlatched by the weight of the merchandise unit resting on the floor of said chute.

A still further object of the invention is to provide a vending machine which has substantial capacity and yet compact, permitting a number of the vending machine assemblies to be mounted in a conventional walk-in type dispensing box which an operator enters to load said assemblies.

It is also an object of the invention to provide a vending machine, for the purpose, which is relatively simple in structure, and designed for ease and economy of manufacture, and long service with a minimum of maintenance or repair.

Still another object of the invention is to provide a practical, reliable, and durable vending machine, and

one which will be exceedingly effective for the purpose for which it is designed.

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

In the drawings:

Fig. 1 is a side elevation, partly broken away, showing one of the vending machine assemblies as mounted in a dispensing box; portions of the latter, and the chute, being in section.

Fig. 2 is a fragmentary plan view of such vending machine assembly as mounted in the dispensing box; the latter being shown only in part and in section.

Fig. 3 is a fragmentary transverse section on line 3—3 of Fig. 1; the view looking rearwardly toward and showing the lead trolleys, and suspended merchandise units, in their initial or stop position.

Fig. 4 is a fragmentary transverse section on line 4—4 of Fig. 1; the view looking rearwardly toward and showing the drop-off portions of the rails.

Fig. 5 is an enlarged, fragmentary, perspective view of one of the trolleys riding its rail; the clamp being closed but the merchandise unit omitted.

Fig. 6 is an enlarged fragmentary front elevation of one trolley at the discharge point; the view, in full lines, showing said trolley after traversing the drop-off in the related rail with the resultant opening of the clamp and release of the merchandise unit.

Fig. 7 is a somewhat diagrammatic, fragmentary, side elevation showing—in full lines—a lead trolley as approaching the drop-off in the related rail, and—in broken lines—such trolley as traversing said drop-off.

Fig. 8 is a similar view, but shows such lead trolley on the carry-off rod after opening of the clamp and release of the merchandise unit from said trolley; the view additionally illustrating the release of the door latch in response to the weight of the merchandise unit on the floor of the chute.

Referring now more particularly to the drawings and to the characters of reference marked thereon, the invention is here illustrated in a dual rail vending machine assembly; i. e., one wherein two separate vending mechanisms deliver to a common dispensing area so that merchandise units of two sizes or kinds may be accommodated by such assembly.

Such vending machine assembly is mounted in a walk-in type dispensing box, indicated generally at 1, and into which the public does not have access. As is conventional, such type of dispensing box is provided with a locked door (not shown), but by means of which an operator gains access into such box for the purpose of loading the vending assembly or otherwise servicing the equipment.

The vending machine assembly, as here illustrated, comprises a pair of elongated, transversely spaced rails 2 mounted, in parallel, at a forward, downward, and relatively slow incline toward but terminating short of the front 3 of the box 1; such rails being disposed at their forward or terminal ends in the upper portion of a dispensing area, indicated generally at 4.

The rails 2, each with one flange vertical and unobstructed on the outside, and the other flange projecting laterally inwardly, are supported from and above the floor 5 of box 1 by a frame, indicated generally at 6; such frame including, at the front, a central post 7 which carries a cross bar 8 spanning between, and secured to, the rails 2.

The dispensing area 4, which lies directly inwardly from the front 3 of the box 1, is defined—at the bottom—by a merchandise unit receiving chute, indicated gen-

erally at 9, and which is hereinafter described in greater detail; the forward end portions of the rails 2 being angled laterally inwardly, as shown in Fig. 2, so that the forward or terminal ends of such rails are disposed in a position to provide a discharge point properly related to the chute 9.

As the vending mechanisms, each including a rail 2, are identical, a description of one will suffice for both; each such vending mechanism including—with the related rail—a plurality of trolleys, as indicated generally at 10. A longitudinal row of such trolleys rides the related rail 2, and each trolley comprises a vertical hanger 11 disposed laterally out from the vertical flange of the rail. At its upper end each hanger 11 is fitted with a laterally inwardly projecting spindle 12 having a grooved roller 13 thereon, and which roller engages and rides the upper edge 14 of the vertical flange of the rail.

The hangers 11 are each of a length to depend a distance below the rail, and at the lower end portion each hanger is fitted, on the inside, with a releasable clamp, indicated generally at 15. Each such clamp comprises a bracket 16 secured to the hanger 11 on the inside, and a depending laterally swingable link 17 is pivoted at its upper end, as at 18, to the bracket 16. The depending link 17, which is disposed inwardly a distance from the lower portion of each hanger 11, is fitted at its lower end with a laterally outwardly and upwardly inclined, movable jaw 19 of substantial transverse width; such jaw 19—at its outer edge—normally cooperating in overlapping relation with a downwardly and inwardly inclined fixed jaw 20 on the lower end of the hanger 11. The fixed jaw 20 is relatively short transversely.

A clamp actuating finger 21 projects laterally inwardly with respect to, and intermediate the ends of, the depending link 17, and said finger 21 is formed, at its inner end portion, with a fork 22 which straddles such link 17. At its inner end the fork 22 is pivoted, as at 23, in connection with the bracket 16 for vertical swinging movement of said finger 21.

Toggle links 24 pivotally connect at one end to the link 17 intermediate its ends, as at 25; such toggle links thence extending lengthwise of the legs of the fork 22 and pivotally connecting thereto, as at 26.

With such arrangement of each clamp 15, upward swinging of the finger 21 causes opening of the clamp; i. e. retraction of the movable jaw 19 from the fixed jaw 20. Conversely, when the finger 21 is swung downwardly the clamp 15 closes; i. e., the movable jaw 19 moves toward and then laps the fixed jaw 20. In this latter or closed position of the clamp 15, the finger 21—by reason of the assembly of link 17 and toggle links 24—passes slightly below dead-center, locking the clamp 15 against accidental release.

Each of the row of trolleys 10 supported from the related rail 2 suspends a merchandise unit below such rail; the merchandise units here being illustrated as bags 27 whose closed necks 28 are each gripped by the closed clamp 15 of the related trolley. The bags 27 each contain a predetermined quantity of the merchandise—such as cube ice—to be dispensed.

The bags 27, with the predetermined quantity of merchandise therein, engage—in face to face relation—in a row, and the front to rear thickness of such bags maintains the trolleys 10 in spaced relation along the related rail 2 (see Fig. 1).

The row of trolleys 10, and the loaded bags 27 suspended therefrom, are normally maintained against gravitational advance on such rail by a retractible, stop-forming plunger 29 which slidably projects through the vertical flange of the rail 2 at a point immediately ahead of the lead trolley 10.

The stop-forming plunger 29 is an included part of a solenoid 30 suitably mounted in a transverse housing 31 which spans between and is supported by the bottom flanges of the two rails 2 of the vending machine assembly.

Each solenoid 30, for a dispensing operation, is controlled from a coin box 32 mounted exteriorly on the front 3 of the dispensing box 1, and such coin box 32 includes a coin reception slot 33.

Upon deposit of a coin (or coins) of predetermined value in the slot 33, the coin box 32, and associated mechanism, functions—through the medium of a control circuit whose cable is indicated in part at 34—to cause actuation of the corresponding solenoid 30.

Upon actuation of the solenoid 30 the plunger 29 retracts and the lead trolley 10 is released to advance on the related rail 2. The actuation of the solenoid 30 continues only a sufficient time for the lead trolley 10 to be released and advance clear of the plunger 29; the solenoid 30 being deenergized and the plunger 29 returning to a stop position in sufficient time to engage the next following trolley 10. Of course all of the trolleys 10, and the suspended bags 27, advance one step upon the lead trolley and its bag being released from the stop forming plunger 29.

After the lead trolley 10 is released from the stop forming plunger 29, such trolley—by gravity—travels forwardly (see Fig. 7), and at the front end of the related rail 2 runs down a relatively fast inclined drop-off 35 (see Figs. 6 and 8), which results in relatively forceful downward movement of such trolley under the weight of the suspended bag 27 and the load of merchandise therein.

When this occurs the finger 21 lowers rapidly, strikes, and is moved relatively upwardly by a horizontal trigger plate 36 mounted, parallel to the forward portion of rail 2, in a fixed position in a plane below but laterally inwardly of such drop-off 35. Upon the finger being so moved relatively upwardly, the clamp is automatically opened, whereupon the suspended bag 27 is released in the dispensing area 4 and falls into the chute 9.

The trigger plate 36 is supported by an inverted L-shaped bracket 37 which is fixed to, and extends laterally from, the rail. The bracket 37 connects with the inner edge of such trigger plate 36 so that the finger 21 may move, without obstruction, to a position over such trigger plate as the lead trolley 10 advances to the start of the drop-off 35.

After the lead trolley 10 traverses the drop-off 35, with release of the suspended bag 27 as above described, the empty trolley is received on a carry-off rod 38 which projects forwardly from the lower end of said drop-off at a downward incline, and with a lateral curve. The length of the carry-off rod 38 is such that its free end extends to a point laterally of the chute 9. The empty trolley runs down the carry-off rod 38, and at such free end thereof drops into a receiving box 39 set on the floor 5 to one side of said chute. In this way the empty trolleys are accumulated in the receiving box 39 for subsequent reuse.

In order to properly guide each lead trolley as it traverses the drop-off 35 and is received on the carry-off rod 38, a longitudinal guide rod 40 is disposed in adjacent but spaced relation laterally out from the forward portion of the rail 2 and the inner end portion of said carry-off rod 38; the guide rod 40 being supported by an inverted U-shaped bracket 41 which is secured to the bottom flange of the rail and spans the vertical flange in clearance relation, whereby to not obstruct passage of each trolley (see particularly Fig. 6).

While the foregoing description has dealt in the main with the structure and operation of one of the separate vending mechanisms, they exist in the vending machine assembly in duplicate, as hereinbefore indicated; each mechanism however dispensing the merchandise units—here the loaded bags 27—one at a time at the dispensing area 4 and into the chute 9.

With dual vending mechanisms, one may be used to dis-

pense a loaded bag of one weight, and the other to dispense a loaded bag of another weight, as illustrated in Fig. 3. Alternatively, one of the vending mechanisms could be used to dispense one type of merchandise and the other to dispense another type.

The chute **9**, which is disposed in a well **42** in the floor **5**, includes sides **43** and a floor **44**; said floor **44** inclining forwardly and downwardly from the rear end of said chute. The chute **9** is pivoted on a rear, transverse axis, as at **45**, for limited downward swinging movement, which movement is yieldably resisted by one or more compression springs **46** engaged between the forward portion of the floor **44** and a rigid mounting member **47**.

The chute **9** is open at the front, and immediately ahead thereof the dispensing box **1** is provided with an access door **48** hinged at its upper end, as at **49**, for upward and outward swinging movement to open. On the outside thereof and adjacent the bottom the door is fitted with a handle **50**.

On its back side and adjacent but short of the bottom the door **48** is provided with a cam closing latch **51** which projects downwardly and normally engages in a receiving opening **52** in the floor **44** adjacent its front edge.

When a loaded bag **27** is released from the lead trolley **10** in the dispensing area **4** and falls into the chute **9**, as hereinbefore described, the weight of such bag, resting on the chute floor **44**, causes the same to yield downwardly against the compression of the spring **46**; the movement being sufficient to remove the latch **51** from the opening **52**.

Thereupon, the customer may grasp the handle **50** and swing the access door **48** outwardly and upwardly to open the same. With the door open, the customer reaches into the chute **9** and manually removes the loaded bag **27** resting on the chute floor **44**.

After the loaded bag or other merchandise unit is so withdrawn the customer merely releases the handle **50**, whereupon the door **48** swings closed and the latch **51** automatically re-engages in the opening **52** of the chute floor **44**; this for the reason that such floor raises to its initial or starting position the moment that the loaded bag or other merchandise unit is removed therefrom.

To assure that the door **48** has sufficient momentum to cause engagement of the latch **51** in the opening **52** the handle may be relatively heavy.

As the described vending machine assembly is of limited height, another such assembly may be mounted thereabove in the box **1**; the chute of the uppermost assembly being shown in part at **53**. In this manner, the capacity of the vending machine may be doubled with respect to the floor area occupied, while providing for the dispensing of merchandise units of different weights or kinds.

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

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

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

1. In a gravity-fed vending machine for merchandise units, a rail unit including a main portion having a relatively small downward slope toward one end, a trolley supported on and movable along the rail unit, the trolley including a depending hanger, releasable jaw means on the hanger to engage and hold a merchandise unit in suspended relation, means to release the jaw means including a laterally projecting finger pivoted on the hanger and arranged when swung upwardly to release the jaws, a relatively abrupt-drop portion formed with the rail unit intermediate its ends and relatively close to said one end thereof, and a trigger plate fixed with the rail unit in position to engage and cause the finger to be so swung upwardly about its pivot upon the trolley riding down said abrupt-drop portion of the rail unit.

2. A structure, as in claim 1, in which said trigger plate extends lengthwise of the rail unit below said abrupt-drop portion and is substantially parallel to the main portion of the rail unit.

References Cited in the file of this patent

UNITED STATES PATENTS

301,138	MacDonald	July 1, 1884
1,457,962	Chambers	June 5, 1923
1,760,077	Morrison	May 27, 1930
1,864,114	Angerpointner	June 21, 1932
1,994,032	Angerpointner	Mar. 12, 1935
2,000,556	Brady	May 7, 1935
2,131,499	Cruse	Sept. 27, 1938
2,383,835	Ackermann	Aug. 28, 1945
2,643,169	Wells et al.	June 23, 1953
2,679,810	Schutt	June 1, 1954

FOREIGN PATENTS

70,031	Sweden	Aug. 12, 1930
512,314	Germany	Nov. 8, 1930
350,612	Great Britain	June 18, 1931
52,593	Netherlands	June 15, 1942