Dec. 20, 1960 H. G. DU BOIS 2,965,262

GRAVITY FEED PACKAGE MERCHANDISING MACHINE

Filed Sept. 6, 1955 3 Sheets-Sheet 1

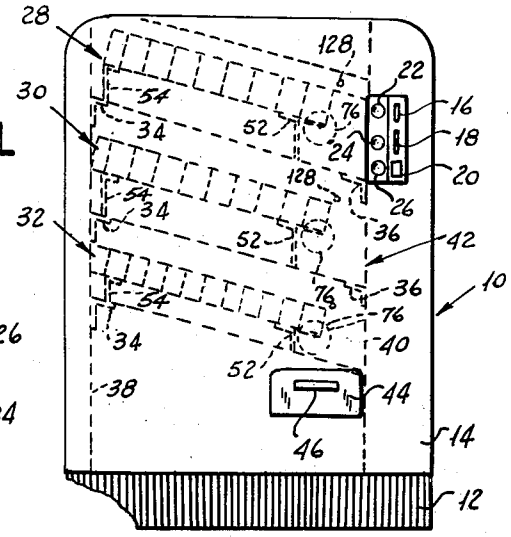

Fig 1

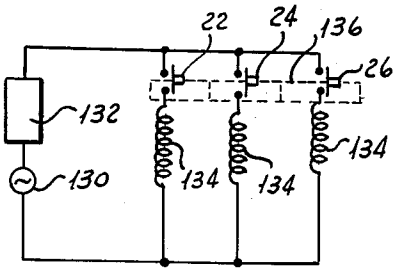

Fig 6

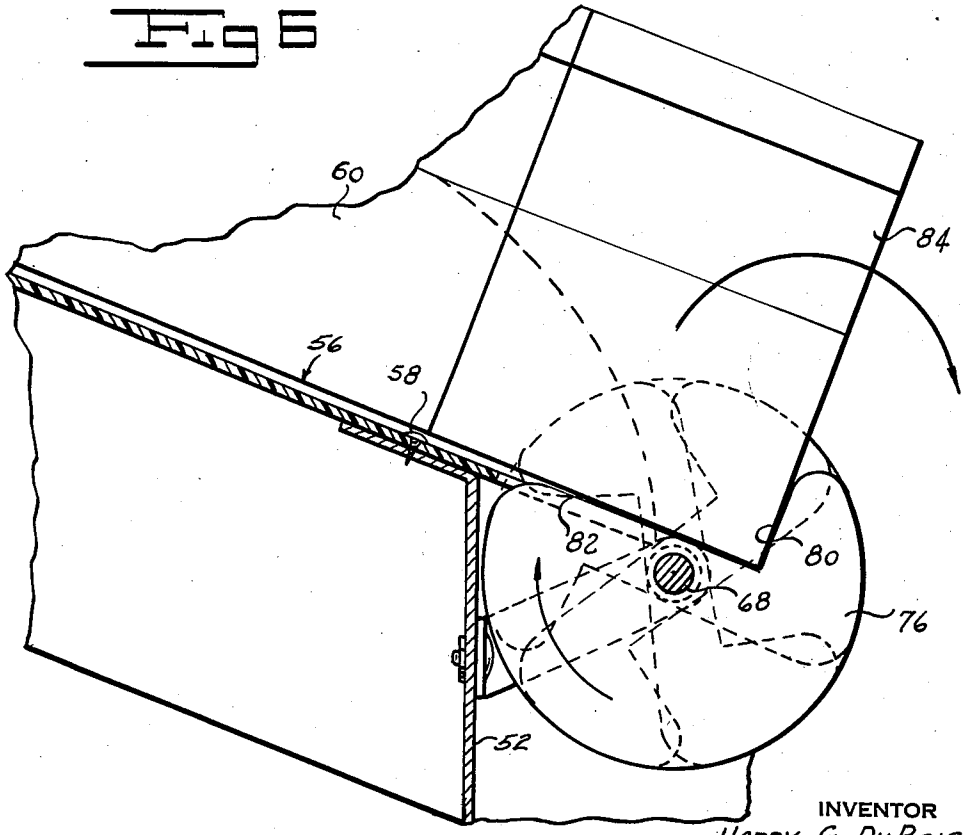

Fig 5

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GRAVITY FEED PACKAGE MERCHANDISING MACHINE

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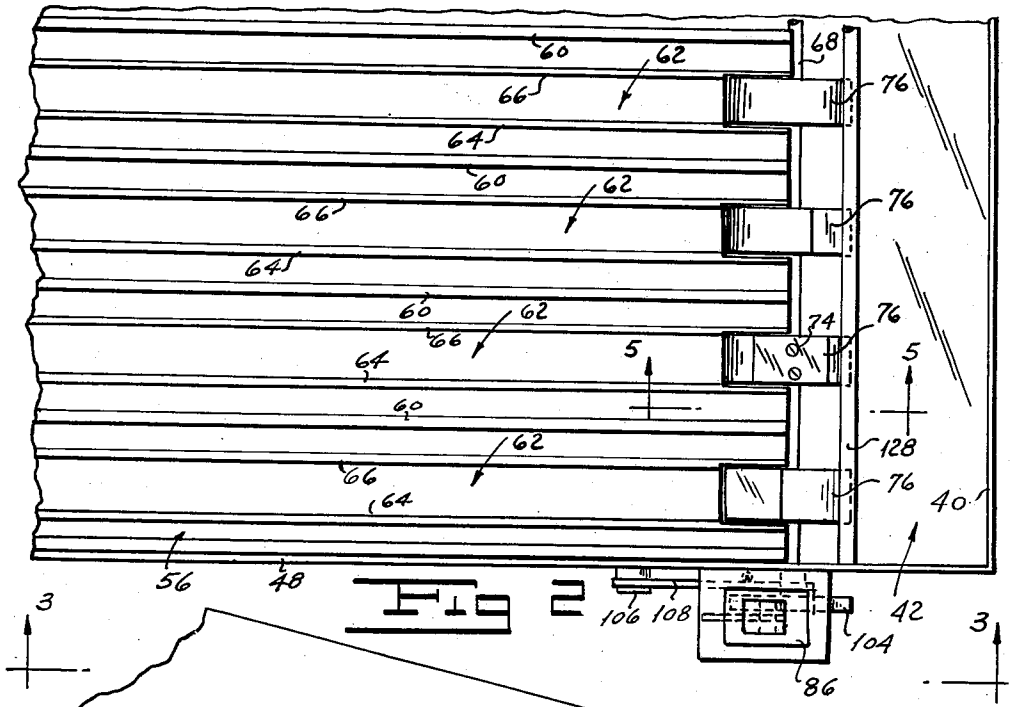

Fig 2

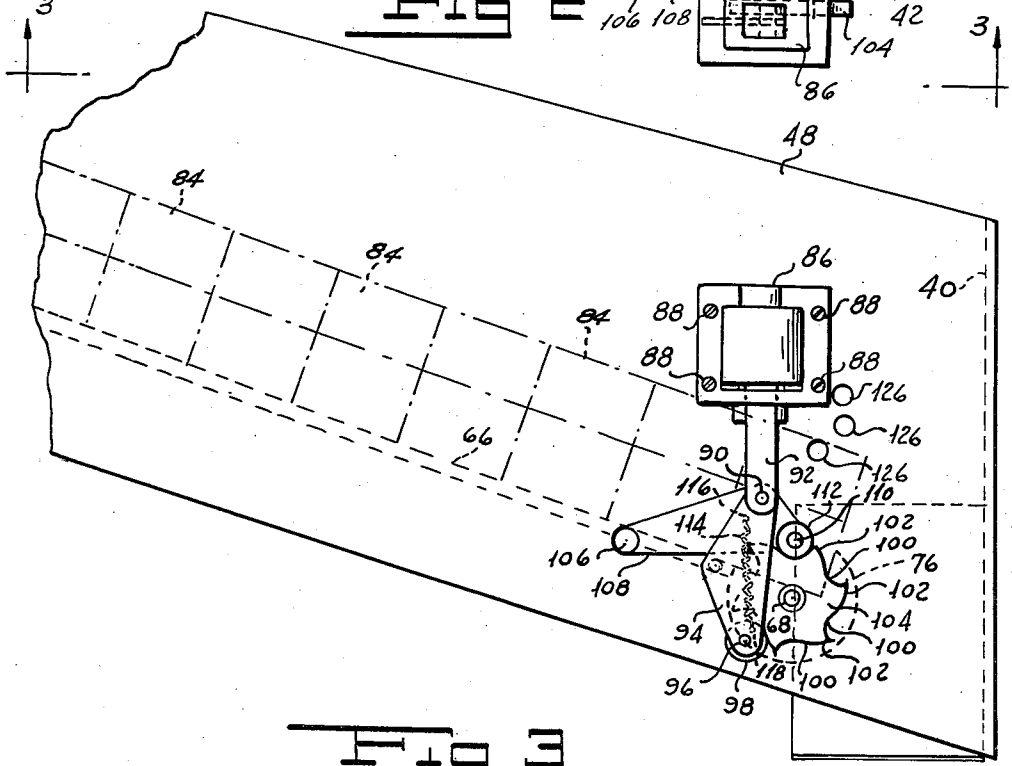

Fig 3

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GRAVITY FEED PACKAGE MERCHANDISING MACHINE

Filed Sept. 6, 1955 3 Sheets-Sheet 3

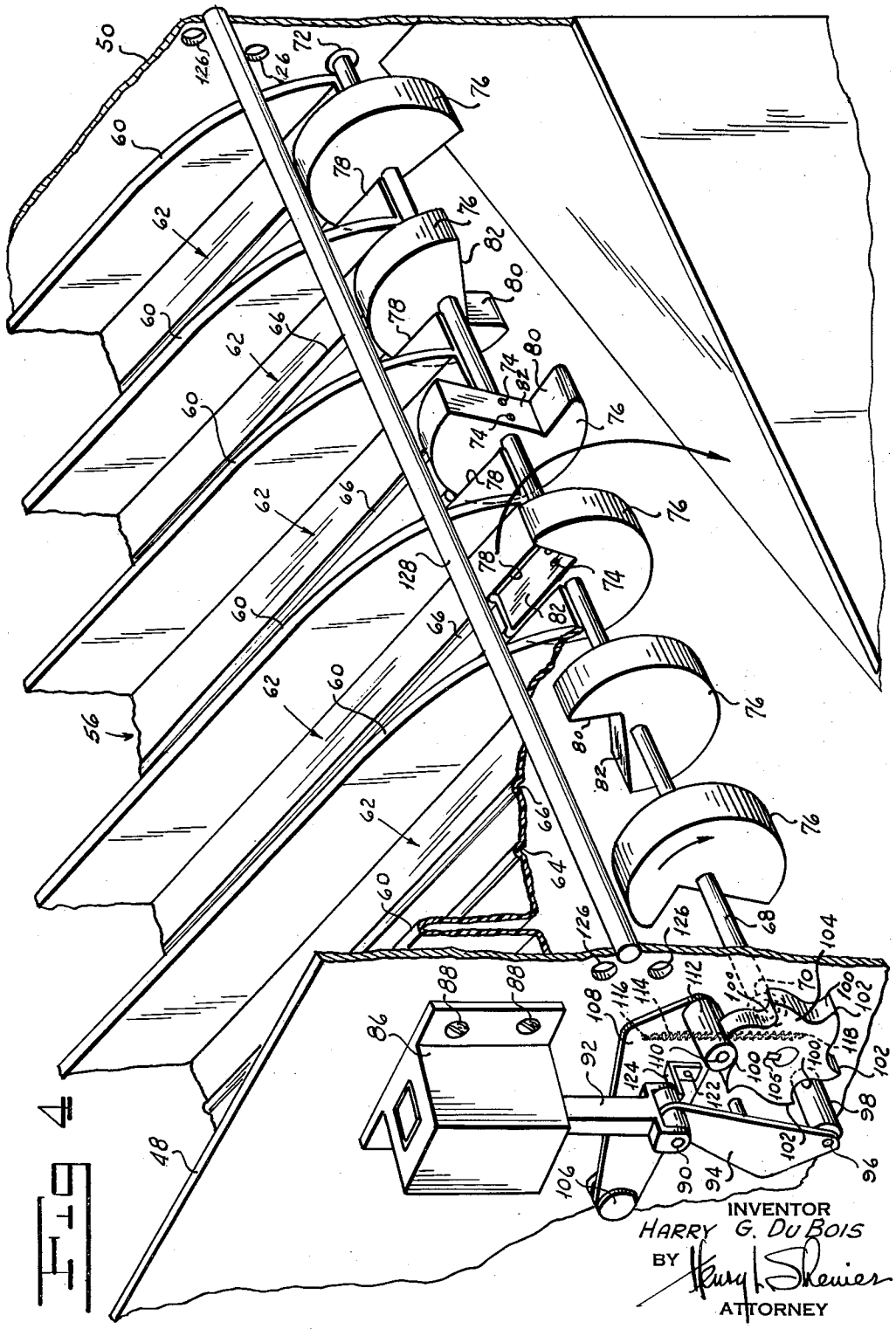

FIG. 4

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2,965,262

GRAVITY FEED PACKAGE MERCHANDISING MACHINE

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7 Claims. (Cl. 221—115)

My invention relates to a gravity feed package merchandising machine and more particularly to a gravity feed package merchandising machine which is simple in construction, certain in operation and inexpensive in manufacture.

Merchandising machines of the prior art for dispensing packages of merchandise, such, for example, as cartons containing beverages, generally employ complicated mechanisms. Means such as a feed bar pushes a plurality of columns of cartons or the like toward a plurality of sequentially actuated trap doors or a feed belt. Separate drive means are employed for the feed bar and the trap door or feed belt operating mechanism. Some of the package merchandising machines of the prior art tumble the packages being dispensed into the machine delivery chute. Where cartoned beverages are being dispensed, tumbling of the cartons into the delivery chute causes some cartons to be broken open with the result that the contents spill. In order to prevent a dishonest person from obtaining merchandise without payment by tilting the machine, machines of the prior art employ antitilt mechanisms including complicated mechanisms having moving parts which may become stuck or jammed and cease to function.

I have invented a package merchandising machine which eliminates the feed bar and feed bar drive means of the prior art. The operating mechanism of my machine is extremely simple in construction and certain in operation. My machine dispenses cartons without tumbling them into the dispensing chute. I provide my machine with a simple antitilt means which includes no moving parts.

One object of my invention is to provide a gravity feed package merchandising machine which is extremely simple in construction and certain in operation.

A further object of my invention is to provide a gravity feed package merchandising machine which is inexpensive to manufacture.

Another object of my invention is to provide a gravity feed package merchandising machine which dispenses packages into a delivery chute without tumbling the packages into the chute.

A still further object of my invention is to provide a gravity feed package merchandising machine which includes a simple antitilt means having no moving parts.

Other and further objects of my invention will appear from the following description.

In general, my invention contemplates the provision of a gravity feed package merchandising machine including an inclined platform formed with one or more chutes down which packages, such as cartons of merchandise, are adapted to slide under the influence of gravity. At the end of each chute I arrange a respective package dispenser of a generally circular shape having a segmental recess providing a surface for receiving a carton from the chute. I mount the dispensers on a shaft for rotation with it, with their surfaces relatively angularly spaced around the shaft. The arrangement is such that in any position of the shaft the recess of one dispenser supports a carton on its surface. I provide drive means for stepping the shaft on successive merchandising operations to dispense cartons successively from the various chutes in proper phase relation. My machine includes an antitilt bar adjustably disposed in front of the chutes.

In the accompanying drawings which form part of the instant specification and which are to be read in conjunction therewith and in which like reference numerals are used to indicate like parts in the various views:

Figure 1 is a front elevation of my gravity feed package merchandising machine.

Figure 2 is a fragmentary top plan view of one merchandising unit of my gravity feed package merchandising machine drawn on an enlarged scale.

Figure 3 is a fragmentary side elevation of one merchandising unit of my gravity feed package merchandising machine taken along the line 3—3 of Figure 2.

Figure 4 is a fragmentary perspective view, with parts removed and with other parts broken away, of one merchandising unit of my gravity feed package merchandising machine.

Figure 5 is a fragmentary sectional view of my gravity feed package merchandising machine taken along the line 5—5 of Figure 2 and drawn on an enlarged scale.

Figure 6 is a schematic view showing one form of electrical circuit which may be employed with my gravity feed package mercandising machine.

More particularly referring now to Figure 1 of the drawings, my gravity feed package merchandising machine includes a cabinet, indicated generally by the reference character 10, supported on a base 12 and having a door or cover 14. Cover 14 carries a coin slot 16, coin return lever 18 and coin return slot 20, all of which parts are well known to the art. Cover 14 also carries respective selecting buttons 22, 24 and 26 associated with the dispensing units of the machine to be described in detail hereinafter.

My machine includes respective dispensing levels, indicated generally, respectively, by the reference characters 28, 30 and 32, each of which is supported by any convenient means, such as brackets 34 and 36, carried by support plates 38 and 40 disposed within cabinet 10. I dispose each of the levels 28, 30 and 32 at a different height within cabinet 10 and arrange it to deliver packages of merchandise to a delivery chute, indicated generally by the reference character 42. Chute 42 guides a dispensed package to a delivery area fitted with a cover 44 hingedly mounted in the door 14 of the machine cabinet. After a package, such as a carton containing a beverage, is dispensed by one of the units in response to the deposit of coins in coin slot 16 and operation of one of the buttons 22, 24 or 26, it may be obtained by the customer by pulling cover 44 outwardly by means of a handle 46. Each of the dispensing units 28, 30 and 32 may contain the same kind of merchandise as the other units or the respective units may contain different kinds or flavors of merchandise or beverages.

Referring now to Figures 1 to 5 of the drawings, each of the levels 28, 30 and 32 includes a pair of respective side plates 48 and 50 held in spaced relationship by respective front and rear flanged brackets 52 and 54 secured to side plates 48 and 50 by any convenient means, such as welding or the like. Each level 28, 30 and 32 also includes an inclined shelf or platform, indicated generally by the reference character 56. If desired, I may mold platforms 56 from a suitable plastic material, such, for example, as polyethylene, polystyrene or the like. Screws or the like 58 secure platforms 56 to the respective pairs of brackets 52 and 54 of the units of the machine.

I form each platform 56 with a plurality of walls or separating panels 60 which divide the platform into a plurality of chutes, each of which is indicated generally by the reference character 62. As can best be seen by reference to Figures 1, 3 and 4, platforms 56 are inclined downwardly from left to right as viewed in the drawings. I arrange a plurality of packages to be dispensed from each of the chutes 62. Owing to the inclination of the platforms with respect to the horizontal plane, the packages in each chute slide downwardly under the influence of gravity toward the right-hand ends of the chutes as viewed in the figures. In order to reduce the area of frictional contact between the bottoms of the packages and the chutes, I form the base of each of the chutes 62 with a pair of tracks 64 and 66 offering reduced contact area with the bottom of the packages.

From the foregoing it will be seen that the packages, such as cartons of beverages, in each chute 62 normally slide downwardly to the right, as viewed in the figures, under the influence of gravity toward dispensing chute 42. It will be understood that I may provide a dummy member (not shown), or sliding weight, behind the columns of packages to augment the force urging the rows of packages downwardly. I rotatably mount a shaft 68 in respective bearings 70 and 72 adjacent to the lower end of each platform 56. Set screws 74 secure a plurality of respective dispensers 76 on shaft 68 for rotation with it. I space dispensers 76 along shaft 68 to position one of the dispensers substantially centrally of each chute 62. As shaft 68 rotates, each dispenser 76 is adapted to pass through a slot 78 formed in the bottom of its associated chute 62.

As can best be seen by reference to Figures 4 and 5, each dispenser 76 is generally circular and is cut away to form a recess 80 providing a surface 82 on which a package 84 of merchandise to be dispensed is adapted to rest. It is to be noted that the surface 82 of each dispenser 76 extends for a distance greater than a radius from the periphery of a dispenser 76 to a point beyond shaft 68 to afford a firm support for the package being dispensed and to ensure that a package being dispensed will initially rotate with the dispenser in order to avoid the antitilt bar.

In a certain position of any dispenser 76 its surface 82 registers with slot 78 in the base of the corresponding chute 62 to receive a package 84 from the chute. As can best be seen by reference to Figures 4 and 5, I arrange dispensers 76 on shaft 68 with the surfaces 82 relatively angularly displaced around shaft 68 so that only one surface 82 registers with a slot 78 in any position of the shaft 68.

I provide drive means for stepping shaft 68 on successive operations of the dispensing means of a level sequentially to dispense packages from the respective chutes 62 of the level. Referring now to Figures 2 to 4, side plate 48 of each unit carries a solenoid 86 secured by means such as screws 88. A pin 90 pivotally connects the solenoid armature 92 to one end of a link 94. A pin 96 pivotally carries a drive roller 98 on the other end of link 94. Roller 98 rests under the influence of gravity in a recess 100 formed by a pair of adjacent teeth 102 of a star wheel 104. I mount star wheel 104 on shaft 68 for rotation with it by any convenient means such as a key 105. When solenoid 86 is energized, it draws armature 92 upwardly, as viewed in Figures 3 and 4, to pull roller 98 upwardly to drive star wheel 104 through one step of revolution. Each dispensing level 28, 30 and 32 of my machine may include any convenient number of chutes 62. For example, the illustrated embodiment includes six chutes 62 with which six respective dispensers 76 are associated.

I provide star wheel 104 with a number of teeth 102 equal to the number of chutes 62 and dispensers 76 in a unit of my machine. For one revolution shaft 68 makes a number of steps equal to the number of dispensers 76 in the unit. This ensures that the surfaces 82 of all dispensers 76 will sequentially register with the respective slots 78 in the course of one revolution of shaft 68 when the parts are assembled in proper phase relation. A pin 106 carried by side 48 pivotally mounts a link 108 for preventing the return or reverse rotation of star wheel 104 and ensures the correct positioning of the parts. A pin 110 carried by the end of link 108 remote from pin 106 rotatably mounts a roller 112. A spring 114 connected between a pin 116 on link 108 and a pin 118 on plate 48 urges a link 108 to position roller 112 in a recess 100 between a pair of adjacent star wheel teeth 102 thus determining the angular position of shaft 68. As has been explained hereinabove, when solenoid 86 is energized it pulls armature 92 upward to drive star wheel 104 through a step of revolution by reason of the engagement of roller 98 with a tooth 102. As the wheel 104 steps, a tooth 102 cams roller 112 out of engagement with a recess 100. At the end of a step of revolution, roller 112 is pressed into the recess 100 following, in the direction of rotation of wheel 104, the recess in which it rested initially. When solenoid 86 is de-energized, armature 92 will drop out of solenoid 86 and roller 98 will fall under the influence of gravity into the recess 100 following that in which it initially rested. The armature 92 and the weight of the link 94, the pin 96, and roller 98 are such that the link will promptly return to the position shown in Figure 4 by gravity. The bracket 124 carried by the lever 108 forms a platform upon which a projecting portion of the armature 92 may rest. This bracket will position the armature in its correct position for the next stroke.

I form the side plates 48 and 50 of each of my dispensing levels with a plurality of holes 126, a pair of corresponding ones of which position an antitilt bar 128 over the inner side of the chutes 62. If a dishonest person attempts to tumble the package ready for dispensing into the delivery chute by tilting the machine, the carton tends to roll over the upstanding portion of the dispenser 76 at the end of a recess 80. In doing this a corner edge of the top of the carton is raised and engages bar 128 which prevents the carton from rolling over the upstanding portion of the dispenser at the end of the recess 80.

While the antitilt bar prevents a package, such as a carton of beverage, from rolling or tumbling over a dispenser 76, it does not prevent a dispenser from carrying a package out of a chute 62. In the normal operation of dispensing a carton from a level into the delivery chute, the dispenser rotates. The dimension of the floor 82 of the recess in the dispenser 76 is such that a carton will rotate with the dispenser. This rotation continues until the upper leading edge of the carton engages the outboard wall 40 of the delivery chute. As the rotation continues, the carton is elevated, assumes a generally erect position and slides off the dispenser. This permits the carton to fall to the delivery opening. The dimension of the delivery chute is such that the carton will travel downwardly in a substantially upright position without tumbling. It is to be noted that in a normal dispensing operation, the upper trailing edge of the carton describes a path which lies below the antitilt bar 128.

When a dishonest person attempts to steal the package ready for dispensing by tilting the machine, the package will start to rotate about the upper surface of the upstanding portion 80 of the recess in the dispenser 76. This will cause the trailing edge of the package to describe an arc whose locus is considerably above the arc described by the trailing edge of the package in normal dispensing operation. The position of the antitilt bar is below the upper path so that the carton will engage the antitilt bar to prevent it from falling into the delivery chute. Stated otherwise, I position

the antitilt bar 128 between the locus of the trailing edge of the package when the machine is tilted and the locus of the trailing edge of the package during a normal dispensing operation. It will be observed that the height of the package determines the position of the antitilt bar 128 and it is for this reason that I provide holes 126 so that the antitilt bar may be adjustably positioned for different heights of packages.

Referring now to Figure 6, one form of electrical circuit which may be used with my machine includes a source of electric potential 130 connected in series with a coin register 132 of any suitable type known to the art. Each of the selecting buttons 22, 24 and 26 is connected in series with a respective solenoid 134 associated with one of the dispensing levels 28, 30 and 32 of the machine. Each of the series connected buttons 22 and solenoid windings 134 is connected in parallel with the series connected source 130 and coin register 132. When a customer has deposited the correct sum in coins in coin slot 16, the circuit through coin register 132 is completed in a manner known to the art and the push buttons are energized. The customer then presses the button 22, 24 or 26 corresponding to the kind of packaged merchandise he desires to energize the solenoid 134 corresponding to the dispensing level containing the desired kind of merchandise. A mechanical interlock 136 operated by buttons 22, 24 and 26 prevents actuation of more than a single button at one time. Such an interlock is not described in detail since it is known to the art. One form of such interlock is shown in patent to Christian Gabrielsen 2,546,690, granted March 27, 1951. It will also be understood, as is common practice in the art, that the energization of one of the solenoids 134 acts to accept the coins in the coin register 132 to de-energize the buttons so that a fresh deposit of coins will be required for another operation.

In operation of my gravity feed package merchandising machine, the rows of packages or cartons carried by the chutes 62 of the various dispensing levels 28, 30 and 32 of my machine slide under the influence of gravity down chutes 62 toward the dispensers 76 positioned at the ends of the chutes. The surface 82 of one of the dispensers 76 of each unit will register in succession with the corresponding column 78 to receive a package of merchandise. When a customer desires to make a purchase, he first deposits in coin slot 16 a sum in coins aggregating the purchase price of the desired article to complete the circuit of coin register 132 in a manner known to the art. He then pushes a selecting button 22, 24 or 26 corresponding to the level 28, 30 or 32 containing the particular kind or brand of merchandise he desires. This action results in the energization of the solenoid 134 of the particular level. Energization of a solenoid 134 draws its armature 92 upwardly as viewed in Figure 4 to drive star wheel 104 through one step of revolution by reason of the engagement of roller 98 in a recess 100. Star wheel 104 drives shaft 68 through a step of revolution to carry a package from one of the chutes 62 out of the chute and into the delivery chute 42. In the course of this action, the surface 80 of a dispenser 76 carriers the package under bar 128 until the upper leading edge engages delivery chute wall 40. The dispenser 76 then moves to permit the package to fall down the delivery chute in an upright position. The coins are accepted and the coin register is de-energized during this operation.

At the end of the upward stroke of armature 92 after a carton or package has been dispensed, spring 114 snaps link 108 back to its initial position to engage roller 112 with the recess 100 following the recess in which the roller initially rested. As link 108 snaps back, its underside engages pin 120 to drive armature 92 out of the solenoid 86 to permit link 94 to return to its initial position. Bracket 124 on link 108 limits this return movement of armature 92. When the armature has returned to its initial position, roller 98 rests in the recess 100 following that in which it rested initially. The dispensing of one package brings the adjacent dispenser into a position to receive a package from the adjacent column. It is understood that gravity urges all of the packages downwardly to effect this action. Normally the unrecessed portions of the dispensers retain the packages in their columns. As the recesses in the dispensers are successively aligned with the column floors, packages successively move into the recesses. After an operation is completed, the phase relation of the parts is such that one dispenser will be loaded. The machine is then ready for the next dispensing operation.

If a dishonest person attempts to obtain a package of merchandise without payment by tilting the machine, the packages of the various units which are positioned on the surfaces 82 of respective dispensers 76 of each unit tend to roll over the dispensers and into delivery chute 42. In the course of this action, the upper trailing edges of the packages or cartons describe paths which are higher than the paths described by these edges when carried out of columns 62 by the rotation of dispensers 76. The bars 128 of the respective levels are positioned between the two paths to prevent the cartons from rolling over dispensers 76 when the machine is tilted. Thus bars 128 provide a simple and effective antitilt means. Holes 126 permit the positions of bars 128 to be adjusted to accommodate various sizes of cartons.

It will be seen that I have accomplished the objects of my invention. I have provided a gravity feed package merchandising machine which does not employ the separate feed and dispensing mechanisms used in package merchandising machines of the prior art. My machine is simple in construction and certain in operation. It is inexpensive to manufacture owing to the simplicity of construction. My machine dispenses cartons to a delivery chute in an upright position without upsetting or tumbling the cartons during delivery. My machine includes a simple and effective antitilt mechanism and employs no moving parts.

It will be understood that certain features and subcombinations are of utility and may be employed without reference to other features and subcombinations. This is contemplated by and is within the scope of my claims. It is further obvious that various changes may be made in details within the scope of my claims without departing from the spirit of my invention. It is therefore to be understood that my invention is not to be limited to the specific details shown and described.

Having thus described my invention, what I claim is:

1. A machine for dispensing cartons including in combination a platform having a surface for supporting a plurality of cartons to be dispensed, said supporting surface lying in a plane, means mounting said platform at an acute angle with respect to a horizontal plane to cause said cartons to feed under the influence of gravity along said surface toward the lower end of said platform, a delivery chute adjacent the lower end of said platform, a dispenser formed with a surface for receiving a carton to be dispensed, means mounting said dispenser adjacent the lower end of said platform for pivotal movement about an axis disposed below the plane of said supporting surface to a first position at which said dispenser surface forms a continuation of said platform surface to permit said dispenser to receive a carton and to a second position at which said dispenser lifts a received carton from said platform and delivers the same to said delivery chute, said dispenser surface in said first position of the dispenser extending over and beyond said axis and means for driving said dispenser mounting means to move the dispenser

to a position to receive a carton on its surface and to lift a carton from the platform and delivers the same to the delivery chute.

2. A machine for dispensing cartons including in combination a platform having a surface for supporting a plurality of cartons to be dispensed, said supporting surface lying in a plane, means dividing said platform into a plurality of supply chutes containing respective supplies of said cartons, means mounting said platform at an acute angle with respect to a horizontal plane to cause said supplies of cartons to feed under the influence of gravity along said surface toward the lower ends of said chutes, a delivery chute adjacent to the lower ends of said supply chutes, respective dispensers formed with surfaces for receiving cartons from said chutes, means mounting said dispensers adjacent the lower ends of said chutes for pivotal movement about an axis disposed below the plane of said supporting surface to first positions at which said dispenser surfaces form continuations of said platform surface to permit said dispensers to receive articles from said chutes and to second positions at which said dispensers lift cartons from said platform and delivers the same to the delivery chute, each of said dispenser surfaces in the first position of the dispenser extending over and beyond said axis and means for driving said dispenser mounting means to move the dispensers to positions at which they receive articles on their surfaces and to positions at which they lift received articles from the platform and delivers the same to the delivery chute.

3. A machine as in claim 2 in which said carton-receiving surfaces are relatively angularly disposed around said axis whereby said dispensers sequentially lift articles from the platform in response to operation of said drive means.

4. A machine as in claim 2 in which said dispenser mounting means comprises a shaft and means for mounting the dispensers on the shaft with the surfaces relatively angularly displaced around the shaft and in which said mounting means drive means comprises means for stepping the shaft on successive operations of the machine.

5. A machine as in claim 2 in which said dispenser mounting means comprises a shaft and means for mounting the dispensers on said shaft with said surfaces relatively angularly displaced around the shaft and in which said mounting means drive means comprises a star wheel carried by said shaft for rotation therewith, means for driving said star wheel to step said shaft on successive operations of the machine and means for positioning said star wheel drive means after an operation of the machine.

6. A machine as in claim 2 including an antitilt bar, means mounting said bar above the lower end of said platform to prevent cartons from being dispensed upon tilting of the machine while permitting said dispensers to lift cartons from said platform to said delivery chute.

7. A machine as in claim 2 including an antitilt bar and means for adjustably positioning said antitilt bar over the lower end of said platform.

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