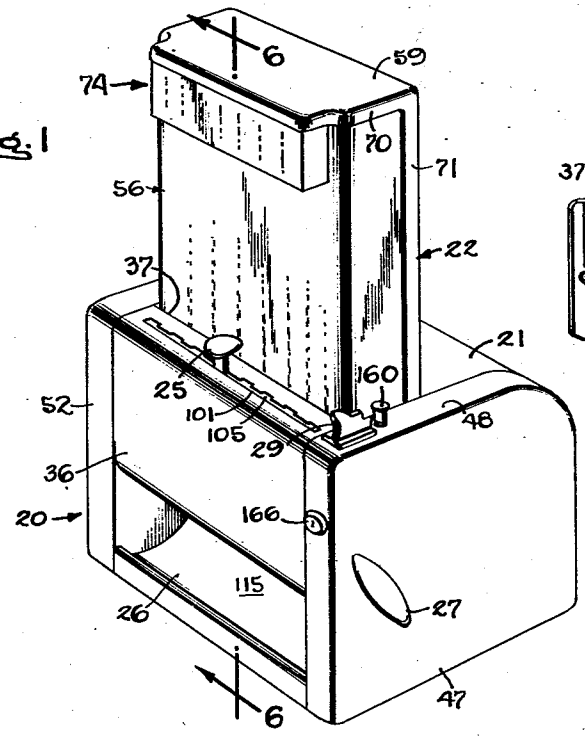
July 16, 1957 J. D. KINTZEL 2,799,430

COIN CONTROLLED VENDING MACHINE

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Fig. 1



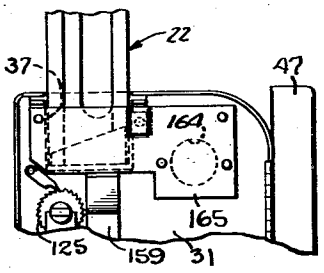
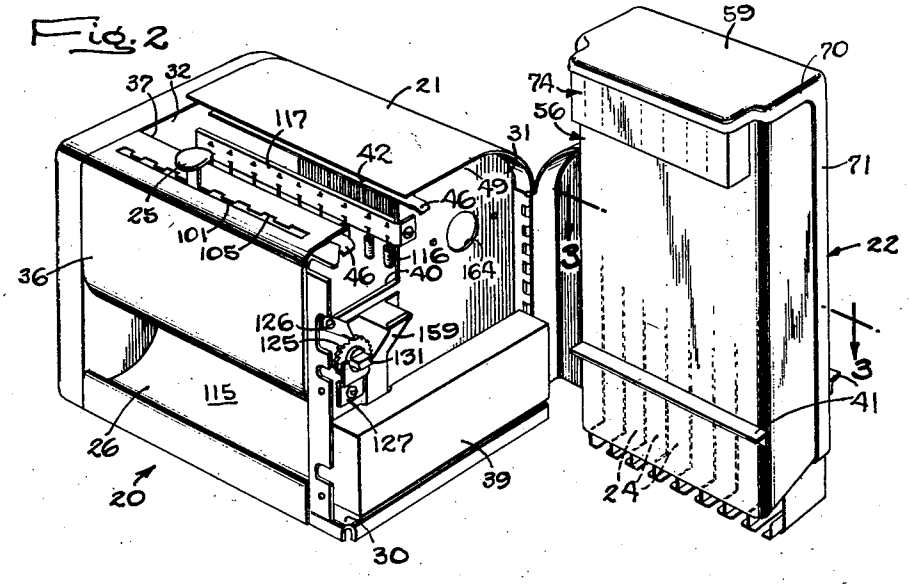


Fig. 2a

Fig. 2



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COIN CONTROLLED VENDING MACHINE

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Fig. 3

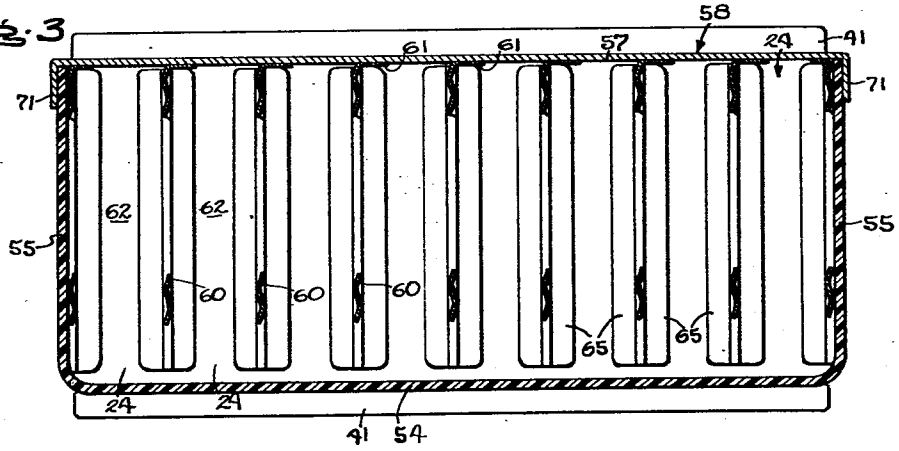


Fig. 4

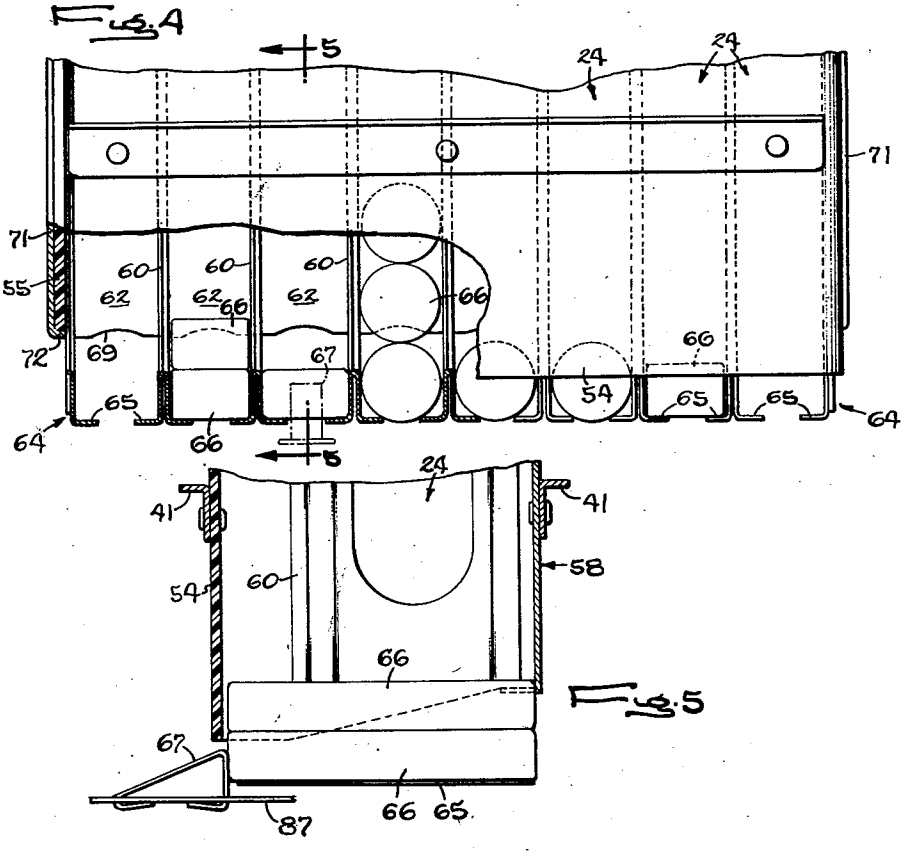


Fig. 5

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COIN CONTROLLED VENDING MACHINE

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Fig. 6

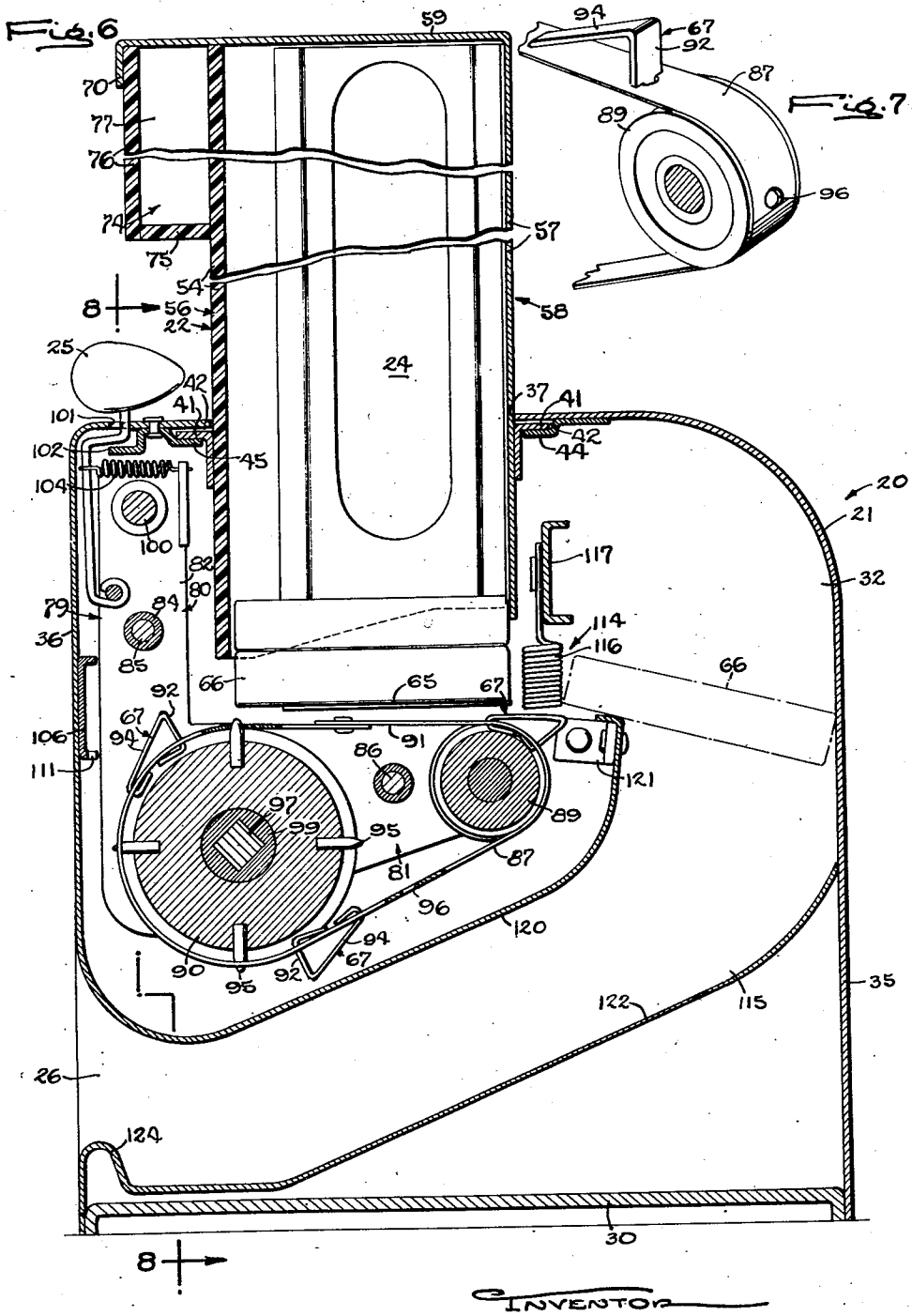


Fig. 7

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COIN CONTROLLED VENDING MACHINE

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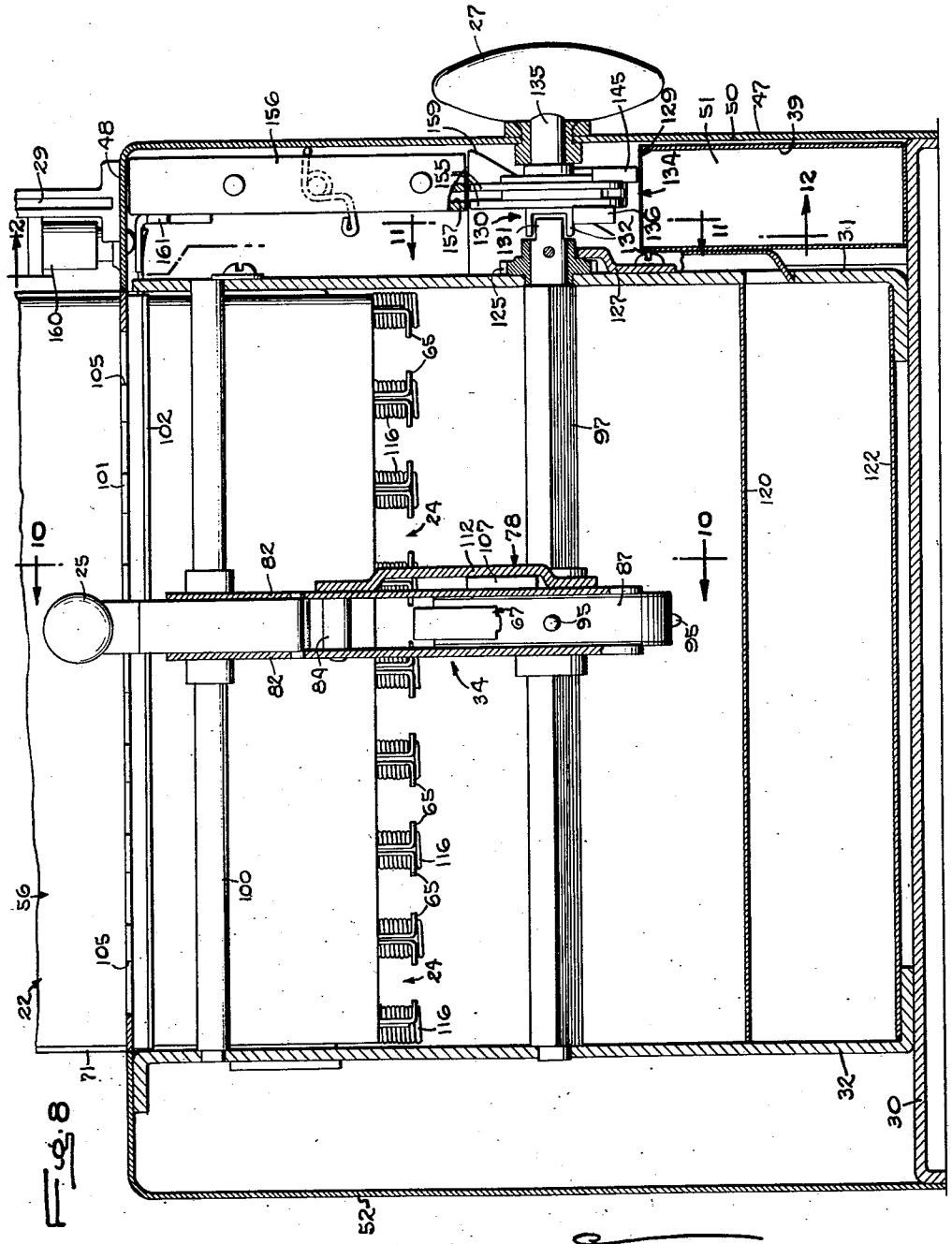


Fig. 8

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COIN CONTROLLED VENDING MACHINE

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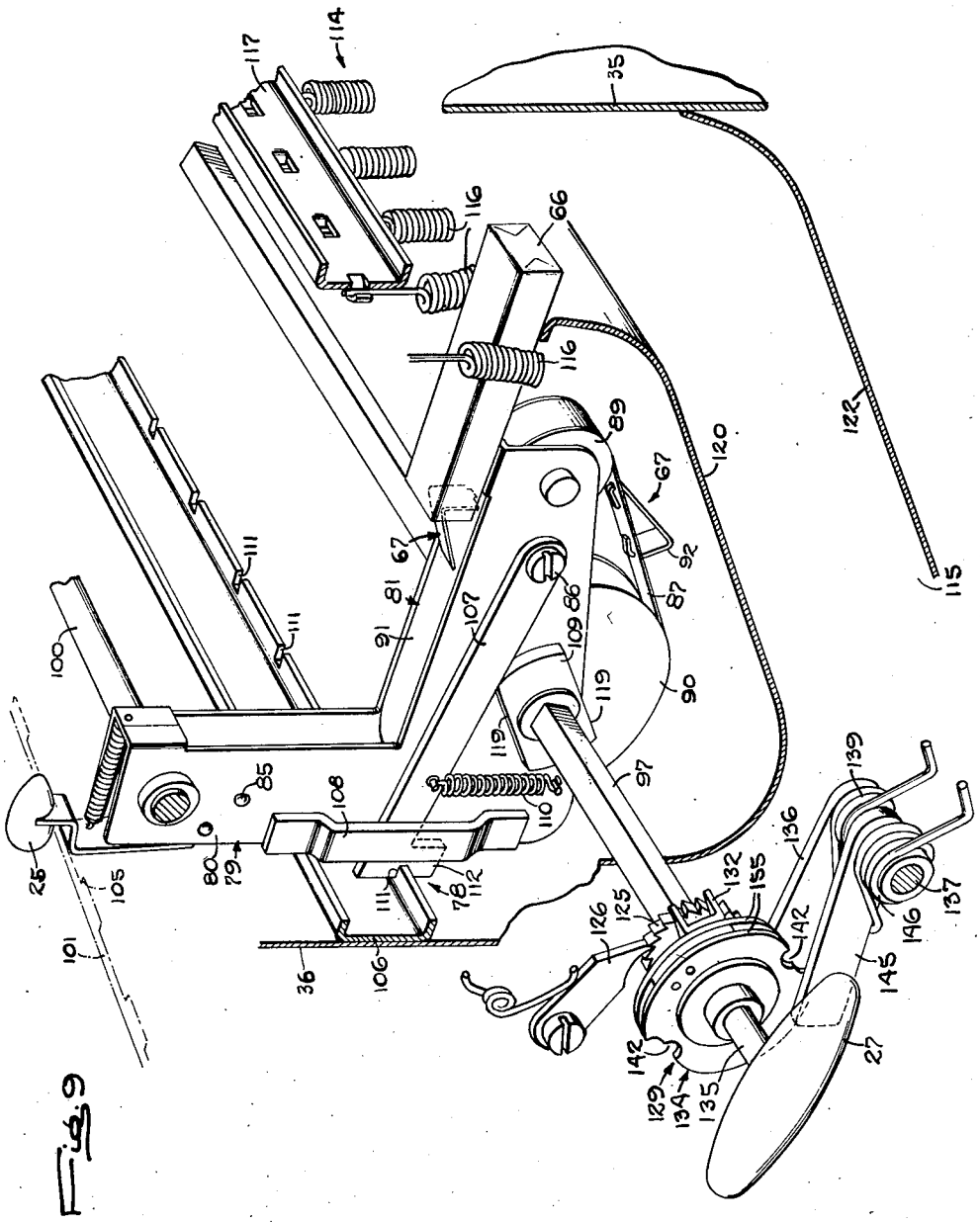


Fig. 9

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COIN CONTROLLED VENDING MACHINE

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Fig. 10

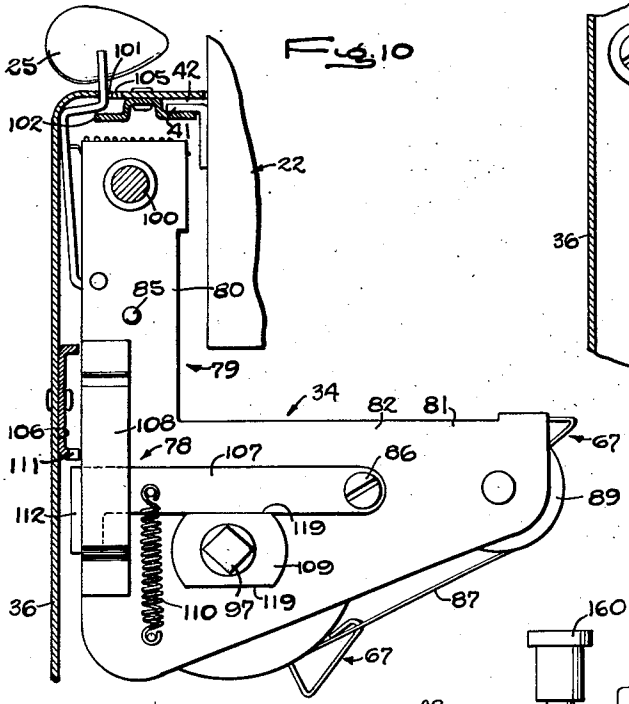


Fig. 11

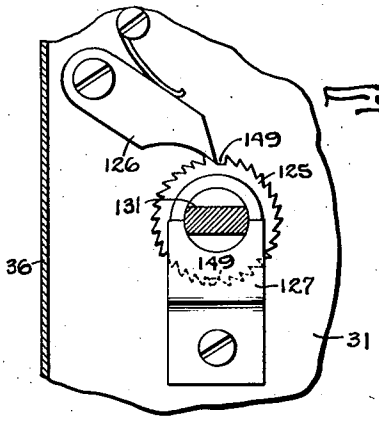
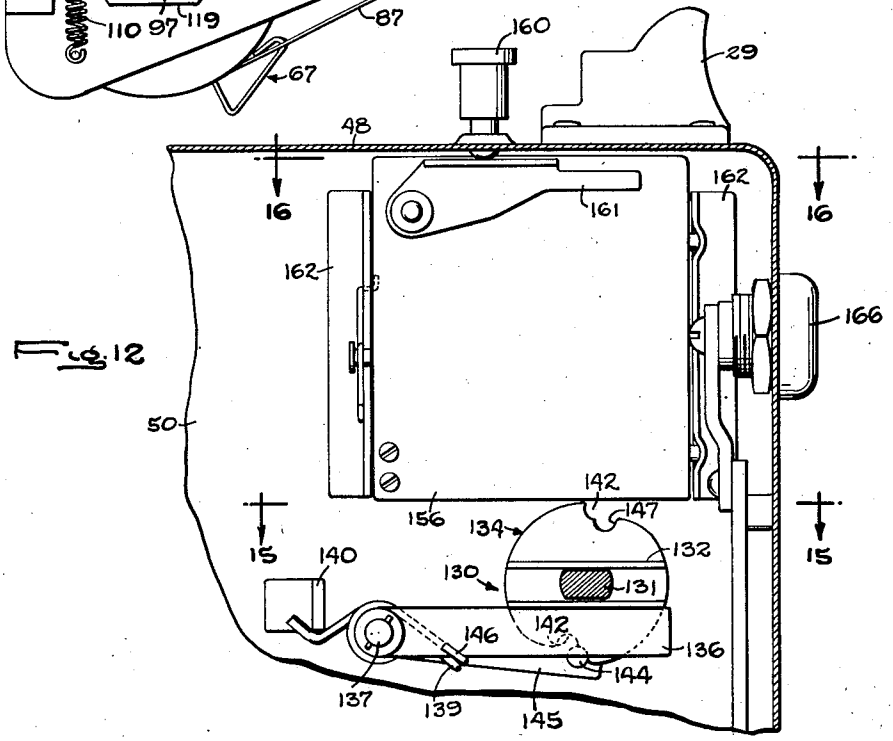


Fig. 12



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COIN CONTROLLED VENDING MACHINE

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Fig. 13

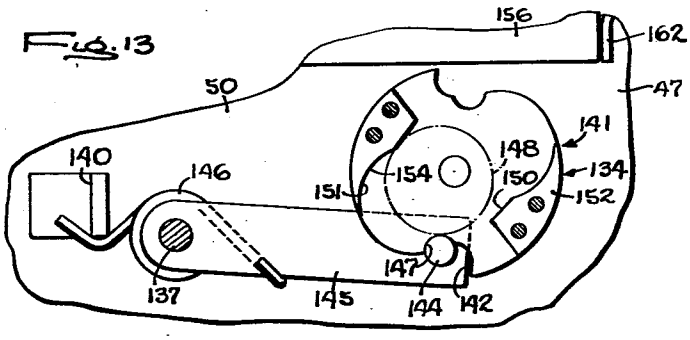
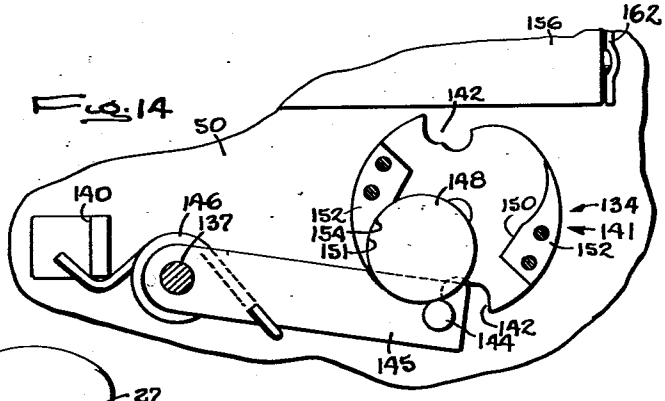


Fig. 14



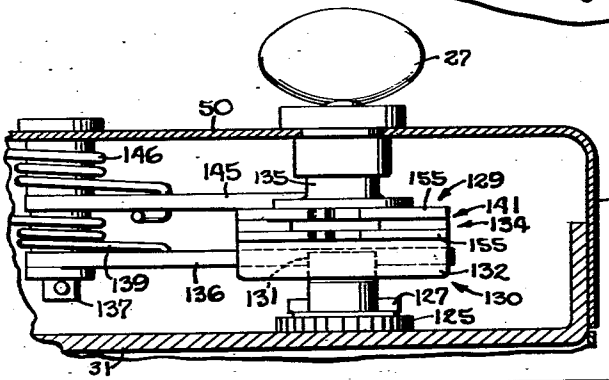
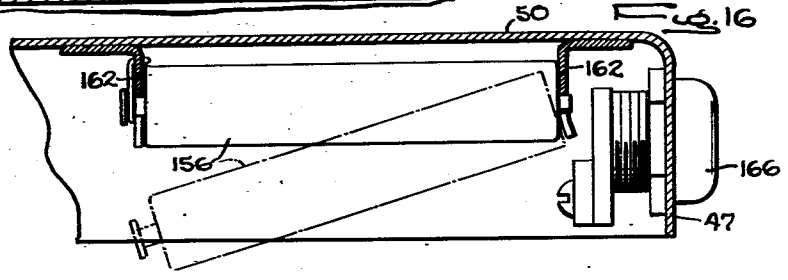


Fig. 15

Fig. 16



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United States Patent Office

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2,799,430

COIN CONTROLLED VENDING MACHINE

John D. Kintzel, Chicago, Ill., assignor to Nordendale Manufacturing Company, Inc., Chicago, Ill., a corporation of Illinois

Application January 10, 1952, Serial No. 265,861

3 Claims. (Cl. 221—151)

The present invention relates to improvements in coin controlled vending machines designed for customer operation to dispense small articles of merchandise, such as chewing gun, candy, and the like, from any selected one of a plurality of magazines containing different varieties of articles.

One important object of the invention is to provide a vending machine of the character recited with an improved ejector mechanism that is selectively shiftable into dispensing relation with any one of the plurality of article-containing magazines and which is provided with a dual purpose interlocking device that not only prevents operation of the ejector until it is properly registered with a selected magazine, but also serves, once an ejection cycle is instituted, to positively retain the ejector in registry with the magazine until the ejecting cycle is completed.

Another object of the invention is to provide a unitized multi-magazine cartridge for containing the articles to be vended and particularly characterized by display pockets to which access may be had or which are closed as an incident to gaining access to or closing the magazines.

It is a further object to provide in a vending machine a movable closure member, such as a door, carrying drive means connected to an ejector mechanism by a separable drive coupling, the arrangement including means for assuring that the drive coupling will engage smoothly when the door is closed.

An additional object is to effect greater reliability in the ejection of articles from magazines through means for imparting an abrupt "kick" to the articles just as they are about to leave the magazines.

Other objects and advantages reside in the novel correlation and arrangement of structural elements forming the exemplary embodiment of the invention described herein and illustrated in the accompanying drawings, in which:

Figure 1 is a front perspective view of the vending machine forming the exemplary embodiment of the invention.

Fig. 2 is a perspective view similar to Fig. 1 and showing the service door of the machine opened and the merchandise cartridge disposed alongside the machine.

Fig. 2A is a fragmentary end view of the machine with the service door open and showing the shield used to prevent coins from being shaken from the machine.

Fig. 3 is a transverse sectional view of the merchandise cartridge taken along line 3—3 of Fig. 2.

Fig. 4 is a fragmentary vertical front view of the lower portion of the cartridge with certain parts broken away for clearness in illustration.

Fig. 5 is a fragmentary transverse sectional view taken along line 5—5 of Fig. 4 and illustrating the relationship of the cartridge to a coacting element of the ejector mechanism.

Fig. 6 is a vertical sectional view taken along line 6—6 of Fig. 1 and showing the ejector mechanism returned to initial position after completing an ejecting cycle.

Fig. 7 is a fragmentary perspective view of the forward portion of the ejector mechanism.

Fig. 8 is a vertical sectional view taken generally along line 8—8 of Fig. 6 with certain parts broken away for clearness in illustration.

Fig. 9 is a skeletonized perspective view of the dispensing mechanism showing the positional relationship of the parts at an intermediate point in an ejecting cycle.

Fig. 10 is a fragmentary vertical sectional view taken along line 10—10 of Fig. 8.

Fig. 11 is a fragmentary sectional view taken along line 11—11 of Fig. 8.

Fig. 12 is a fragmentary vertical section view taken along line 12—12 of Fig. 8 and illustrating the positional relationship of the coin rejector and the coin controlled detent with the latter disposed in coin receiving position.

Fig. 13 is a vertical sectional view taken along the lower end of line 12—12 of Fig. 8 with parts broken away to show the relationship of the elements of the coin controlled detent in precluding continued actuation of the ejector upon termination of an ejecting cycle.

Fig. 14 is a view similar to Fig. 13 and showing the action of a coin in releasing the detent mechanism to permit operation of the ejector mechanism.

Fig. 15 is a horizontal sectional view taken along line 15—15 of Fig. 12.

Fig. 16 is a horizontal sectional view taken along line 16—16 of Fig. 12 and showing in phantom the manner in which the coin rejector can be disassembled from the service door.

While the invention is susceptible of various modifications and alternative constructions, there is shown in the drawings and will herein be described in detail the preferred embodiment, but it is to be understood that it is not thereby intended to limit the invention to the form disclosed, but it is intended to cover all modifications and alternative constructions falling within the spirit and scope of the invention as expressed in the appended claims.

Adverting more particularly to the drawings, the coin controlled vending machine 20, Figs. 1 and 2, constituting the exemplary embodiment of the invention, comprises a casing 21, of generally rectilinear outline, housing the working parts of the machine and adapted to support in assembled relation therewith a detachable cartridge 22 containing a battery of upright magazines 24 designed to contain stacks of small articles of merchandise of various kinds, such as chewing gum, candy, and the like. Speaking generally, the machine 20, which is intended for customer operation, is designed to enable the customer to choose the type or variety of merchandise he wishes to receive from the cartridge 22 by shifting a selector handle 25 into registry with the magazine 24 containing the desired article. This selection having been made, the machine is operative to dispense the article to the customer through a discharge window 26 at the front of the machine upon rotation of an operating handle 27 on the side of the machine after insertion of a coin into a coin receiving slot 29, at the top of the casing.

After the magazines 24 of the cartridge 22 have been emptied of merchandise, the cartridge, which is a self-contained unit, is removed from the machine and replaced by a loaded cartridge that is prefilled outside of the machine. In accordance with one of the concepts involved in the present invention, provision is made, by virtue of a novel arrangement and correlation with each other of the component elements and mechanisms of the machine, for securely locking the cartridge 22 in its assembled relation to the casing 21 as an incident to the closing of a single service door on the casing; the service door, when open, serving to free the cartridge for removal from the casing and at the same time affording

convenient access to the coin box and working parts of the coin controlled mechanism of the machine. Appreciation of the achievements effected in this manner is facilitated by a more particularized review of the implementation of the invention shown in the drawings.

Referring to Figs. 1 and 2, taken together with Figs. 6 and 8, it will be perceived that, in the present instance, the generally rectilinear casing **21** comprises a rectangular bottom panel **30** and two vertical sheet metal bulkheads **31, 32** of rectangular configuration attached at their lower edges to the bottom panel somewhat inwardly of the respective bottom panel ends and extending upwardly from the bottom panel in parallel spaced relation to each other. As best shown in Figs. 6 and 8, an ejector **34**, employed to selectively dispense articles from the cartridge **22**, is supported between the bulkheads **31, 32** in the front central portion of the casing **21**.

The rear side of the casing **21** is enclosed by a vertical sheet metal plate **35**, opposite side edges of which are attached to the rear vertical edges of the respective bulkheads **31, 32**. The upper end of the rear plate **35** is wrapped around the arcuate rear upper corners of the bulkheads **31, 32** and attached to outwardly flanged upper marginal edges of the bulkheads **31, 32** to extend nearly half way across the top of the casing. Starting from a position spaced from the forward longitudinal edge of the plate **35** a distance equal to or slightly greater than the thickness of the cartridge **22**, a second plate **36** is attached along its opposite side edges to the flanged upper edges of the bulkheads **31, 32** to extend the remaining distance across the top of the casing **21** and down the front side of the casing to the discharge window **26**, as shown.

The opposed longitudinal edges of the two plates **35, 36** at the topside of the casing **21** define the opposite longitudinal sides of a slot **37** designed to receive the cartridge **22**, which is detachably assembled into the casing with its lower end depending below the top of the casing into cooperative relation with the dispensing mechanism, including the ejector **34**, contained within the casing.

In carrying out the invention, the left longitudinal end of the slot **37** (as viewed in Figs. 1 and 2) is closed by the left bulkhead **32** and the right longitudinal end of the slot (adjacent a coin collector or box **39** and other coin receiving elements of the dispensing mechanism at the right end of the casing) is opened horizontally outward by forming in the top edge of the right bulkhead **31** a recess **40** having a width substantially equal to that of the slot and a depth commensurate with the extent to which the cartridge **22** depends below the top of the casing.

As assembled into the casing **21**, the cartridge **22** is positively secured against either upward or downward movement relative to the casing by coacting supporting means on the cartridge and casing, which means, as provided by the invention, are correlated with each other in a manner whereby the cartridge, upon being assembled into or disassembled from the casing, is constrained to move horizontally for a short distance at least through the right or open longitudinal end of the casing slot **37**. In the present embodiment of the invention, the cartridge **22** is fitted with horizontal support rails **41** attached to opposite longitudinal side panels thereof. As shown, each rail **41** is fabricated from a length of angle iron, one flange of which is riveted to the contiguous cartridge panel to fix the other flange of the iron in a laterally outwardly projecting position. With the cartridge **22** held in its upright position, the cartridge rails **41** are slid longitudinally into complementary casing support grooves **42**, along opposite sides of the casing slot **37**, as an incident to horizontal movement of the cartridge through the casing slot **37** into its assembled position in the casing. Preferably, the casing support grooves **42**, which receive the respective cartridge rails **41**, are formed

by the marginal edges of the casing plates **35, 36** on opposite sides of the casing slot **37** and offset marginal edges of elongated metal strips **44, 45** riveted or welded respectively to the underside of the respective casing panels **35, 36** in parallel contiguous relation to the slot **37**. It will be noted that the outer ends of the strips **44, 45** are extended beyond the adjacent bulkhead **31** to form downwardly curved guides **46** which facilitate insertion of the cartridge rails **41** into the respective support grooves **42**.

After insertion of the cartridge **22** fully into the casing slot **37**, removal of the cartridge from the casing **21** is prevented by the closing of a service door **47** hinged to the rear vertical edge of the adjacent bulkhead **31** to swing across the contiguous end of the casing and block the open right end of the slot **37** across the cartridge. This door **47**, when open, releases the cartridge **22** for free removal from the casing **21** and affords access to coin controlled mechanisms within the casing. The top and side marginal edges of the door **47** are provided with inwardly projecting marginal flange **48** which interfits into overlapping relation with complementary outwardly extending marginal flange **49** on the bulkhead **31** when the door is swung into closed position. As a matter of fact, it is the top portion of the marginal flange **48** of the door **47** which, upon closing of the door, extends across the right end of the casing slot **37** to abut against the cartridge **22** and normally block its removal from the slot.

It is noteworthy at this point (see Fig. 8) that the service door **47** is so arranged that its central panel **50**, upon closing of the door, is vertically alined with the adjacent end of the bottom casing panel **30** to define, with the latter panel and the neighboring bulkhead **31**, a vertical compartment **51** for coin controlled mechanisms which will be subsequently described in detail. To give the casing **22** a balanced appearance from its external aspect, the end of casing opposite from the door **47** and extending beyond the bulkhead **32** is closed by an end shell **52** shaped as a mirror image of the door and fixedly attached to marginal edges of the adjacent bulkhead **32**.

Adverting to the more detailed construction of the detachable cartridge **22**, which embodies concepts of the invention, it will be perceived that the cartridge readily lends itself to either of two convenient methods of servicing the machine **20**. By virtue of the self-contained character of the cartridge **22**, together with its previously described adaptability to be bodily assembled with and removed from the casing **21**, the custodian of the machine can be supplied with a number of cartridges, prefilled with merchandise, whereby his duties in servicing the machine consist essentially of replacing an empty or partially empty cartridge with a loaded one after opening the service door **47** and of collecting the receipts from the coin box **39**. The advantages of this mode of servicing the machine are particularly manifest in instances in which the custodian of the machine would be disinclined, by reason of other pressing duties or a general distaste for manipulating mechanical contrivances, to personally refill each of the cartridge magazines **24** individually. On the other hand, provision is also made in the design of the cartridge **22** for expeditious on-the-spot refilling of the cartridge by the custodian, should he care to do so.

The structural features of the cartridge **22** which provide for refilling of the magazines **24** are integrated into the cartridge in conjunction with other features which provide for a conspicuous and inviting display of the articles available to the customer. As shown best in Figs. 1 to 6, the front and side panels **54, 55** of the cartridge **22** are formed of a transparent construction fully exposing the magazines **24** to the view of the customer. These transparent panels, which are preferably fabricated from a single sheet of Lucite or other suitable plastic bent at right angles along the intersections of the front panel

54 with the side panels 55, are combined into a unitary side cover 56 which is detachably positioned in place on the cartridge. Upon removal of this cover, the magazines 24 are exposed along virtually their entire length to permit ready sidewise insertion of a new supply of merchandise.

Aside from the cartridge cover 56, the remaining elements of the cartridge 22 are combined into a unitary frame-like assembly 58 which is preferably fabricated from sheet metal parts spot welded together. Having reference to Figs. 1 to 6, the rear panel 57 and the top panel 59 of the cartridge 22 are formed by a single sheet of metal bent at a right angle along the top edge of the rear panel. These top and rear panels form supports for vertical partitions 60 having side and top flanges 61 spot welded to the contiguous cartridge panels and spaced horizontally from each other to define sidewalls of vertical chambers 62 for the magazines 24. The lower ends of the partitions 60 are attached in supporting relation to horizontal feet members 64 which form narrow shelf-like support elements 65 on the side of each partition facing one of the magazine chambers 62. The pair of opposed shelf elements 65 at the lower end of each magazine chamber 62 are vertically alined with each other to support in the magazine a stack of articles 66, such as packaged chewing gum or "Life Savers." As best shown in Figs. 5 and 6, the shelf elements 65 are disposed below the lower edge of the rear cartridge panel 57 a distance greater than the height of one of the packages 66 to be dispensed, but less than the combined height of two packages, whereby only the lowermast package in any magazine 24 can be ejected rearwardly from the stack by a single pass of an ejecting member 67 moving horizontally between the longitudinal ends of the associated shelf elements 65 of the magazine, which elements are purposely spaced apart to permit passage of the ejecting member. Preferably, the lower marginal edge of the rear casing panel 57 is provided with downwardly facing recesses 69 alined with the medial section of each magazine 24 (see Figs. 4 and 8). It will be perceived that these recesses 69 provide additional clearance at the lower end of each magazine 24 which facilitates dispensing of cylindrical packages, such as "Life Savers," without diminishing the utility of the magazine in dispensing, one at a time, thinner but rectilinear packages of chewing gum.

At this point it will be observed that when the side cover 56 is removed from the cartridge frame 58, each magazine 24 is open along its entire length, which feature permits expeditious filling of the cartridge.

Interconnection of the cartridge frame 58 with the transparent side cover 56 is provided for by the formation of downwardly depending flanges 70 on the forward and side edges of the top cartridge panel 59 and forwardly extending flanges 71 on the opposite side edges of the rear panel 57, the latter flanges being disposed outwardly of the adjacent magazine partitions 60 a distance equal to the thickness of the cover side panels 55. With this arrangement, the cover 56 is assembled onto the frame by inserting the upper marginal edges of the cover under the top panel flanges 70 and swinging the cover toward the rear panel 57 to engage the rear marginal edges of the cover side panels into the grooves between the side flanges 71 and the contiguous magazine partitions 60. The cover 56 thus assembled on the frame 58 is held against downward movement relative to the frame by inturned steps 72 on the lower ends of each side flange 71, Fig. 4, which extend under the adjacent corners of the respective side panels 55.

To prevent the articles 66 from moving along the magazine shelf elements 65 out the front of the cartridge 22 the front panel 54 of the cartridge side cover 56 is extended to a level at which the distance between the lower edge of the panel is less than the height of the smallest package to be dispensed, the lower panel edge at the same time being disposed above the shelf elements sufficiently to expose the forward end of the lowermast package of each magazine 24 to the action of the ejecting members 67 of the ejector 34 contained within the casing 21, Fig. 5. The lower edges of the cover side panels 55 are inclined upwardly from the lower edge of the cover front panel 54 to the previously mentioned flange support steps 72. When the cartridge 22 is to be stored or carried separately from the casing 21, it is desirable to place a rubber band or the like around the lower end of the cartridge to retain the lower part of the cover 56 seated against the frame 58.

It will be appreciated that when the cartridge cover 56 is assembled in the cartridge frame 58 the articles in the filled magazines 24 are attractively displayed through the front and side panels of the cover. It is also noteworthy that the longitudinal medial sections of the magazine partitions 60 are cut away, as best shown in Fig. 6, to afford substantially unobscured side views of the articles stacked in the magazines 24.

Moreover, specimens of articles in the respective magazines are displayed in a special transparent pocket 74 provided on the upper end of the front cartridge cover panel 54 (see Figs. 1, 2 and 6). This pocket, which is also fabricated from sheets of Lucite or the like, is formed by a horizontal bottom panel 75 attached to the cover panel 56 and by a vertical panel 76 spanning the pocket 74 horizontally and extending across its opposite ends to junctures with the cover panel. The upper end of the pocket 24 is closed by the top cartridge panel 59 which extends over the pocket. The pocket 24 is, moreover, dimensioned to contain the specimens of merchandise positioned vertically therein in front of the respective magazines. It is preferred that the samples be steadied in the pocket 74 by the insertion of separate partitions 77, made from transparent plastic strips, between the adjacent samples.

With the filled cartridge 22 fully installed in the casing 21, articles of merchandise may be selectively dispensed from any one of the magazines 24 by a novel coin controlled dispensing mechanism disposed in the casing 21 and embodying features of the invention. As best shown in Figs. 6 through 10, the ejector 34, constituting the portion of the dispensing mechanism which coacts directly with the cartridge 22 to dispense articles therefrom, is slidably mounted in the front central portion of the casing 21 between the bulkheads 31, 32 for longitudinal movement by the customer into registry with any one of the magazines 24 to eject the type and variety of articles to be purchased. In addition to being structurally simple in design and exceedingly efficient in operation, the ejector 34 provided by the invention for this purpose is mechanically integrated with an interlocking arrangement 78 coacting with the casing 21 to serve the dual purposes of positively precluding operation of the ejector until it is properly alined with a single one of the magazines 24 and also positively precluding longitudinal shifting movement of the ejector out of registration with the selected magazine while an ejecting cycle is in progress.

Again referring to Figs. 6 through 10, the working mechanism of the ejector 34 is mounted on a boot-shaped carriage 79, the upright leg portion 80 of which is disposed in the upper portion of the casing 21 in front of the cartridge 22 and the lower foot portion 81 of which extends across the lower end of the cartridge. In the preferred construction shown, the carriage 79 is fabricated from a pair of sheet metal plates 82 suitably secured in spaced parallel relation to each other as by spacer bushings 84, Fig. 6, disposed between the leg and foot portions of the plates and pins 85, 86 extending through the bushings between the plates to hold the latter in positive engagement with opposite ends of the bushings.

The working parts of the ejector mechanism comprise a single belt of steel band 87 trained over a guide wheel

89 journaled between the plates 82 at the toe of the carriage 79 and a relatively large drive wheel 90 journaled between the plates at the heel of the carriage. Positioning of the bearing supports for the two wheels 89 and 90 on the carriage is such that the top run 91 of the band 87 between the wheels is disposed just beneath the magazine shelf elements 65 in parallel relation thereto to extend from the front edge of the cartridge 22 to a point of tangency with the guide wheel 89 just short of the rear edge of the cartridge. The band 87, thus supported for clockwise movement, Figs. 6 and 7, along a closed course extending under the cartridge 22 serves as a carrier for a plurality of ejecting members 67, in this instance three, attached to the band to project outwardly therefrom in lug-like fashion at positions spaced along the band at intervals somewhat greater than the transverse thickness of the cartridge 22 as viewed in Fig. 6. Preferably, the members or lugs 67 are fashioned from triangular metal strips each of which presents an abutment section 92 perpendicular to the band 87 and an inclined brace 94 extending rearwardly to the band from the outer edge of the abutment. The two ends of each lug strip are anchored to the band 87 by integral tabs on the strips which extend through holes in the band to grip the opposite side of the band.

As each lug 67 moves along the upper run of the band 87 it engages the forward end of the lowermost article of the magazine 24 in registry with the ejector (see Fig. 5) and upon continued movement of the band, the lug passes between the shelf elements 65 of the magazine, Figs. 4 and 9, to force the article out the rear end of the magazine, Fig. 6.

The drive wheel 90 is fitted with radial sprockets 95 which engage spaced apertures 96 in the band 87 to maintain the movements of the ejector lugs 67 in fixed synchronization with the rotation of the drive wheel. Moreover, the drive wheel 90 is dimensioned to have a circumference equal to twice the spacing along the band between the lugs 67 whereby the wheel, starting from the position shown in Fig. 6, is effective to move one lug through an ejecting sweep extending across the upper run 91 of the band upon successive rotations of the wheel through angular increments of 180 degrees.

Rotation of the ejector drive wheel 90 to actuate the ejector 34 is effected by a squared, longitudinal drive shaft 97 journaled at opposite ends in the casing bulkheads 31, 32 and extending through a hollow, squared axial sleeve 99 in the wheel which also serves to journal the wheel in the carriage plates 82. Thus, the drive shaft 97 doubles as a support for the lower end of the carriage 79, the upper end of which slidably engages a guide bar 100 extending between the bulkheads 31, 32 in parallel relation to the drive shaft.

Longitudinal movement of the carriage 79 along the shaft 97 and guide bar 100 into registry with various ones of the magazines 24 is effected by the handle 25 pivoted at its lower end between the upright portions of the carriage plates 82 and extending upwardly through a narrow longitudinal slot 101 in the casing top panel 36. Tampering with the mechanism of the machine through the slot 101 is prevented by shielding the slot on its underside by the downwardly offset marginal edge 102 of the cartridge support strip 45 opposite from the cartridge slot 37. To clear this shield the shank of the handle 25 is reversely bent to extend around the free edge of the shield, Figs. 6 and 10.

Once the ejector carriage 79 is shifted into registry with one of the magazines 24 by the handle 25, it is retained in this position until intentionally moved therefrom by the handle which is biased by a spring 104 on the carriage (see Fig. 6) into engagement with one of a plurality of notches 105 arrayed along one edge of the slot 101 in alinement with the respective magazines.

The previously mentioned interlocking mechanism 78 provided by the invention to preclude operation of the ejector 34 unless it is properly alined with one of the magazines 24, comprises a longitudinal stop member 106, in this instance an inwardly facing channel, secured to the inner face of the casing front panel 36 to overlie the free outer end of a generally horizontal elongated dog 107 pivoted at its inner end to the carriage 79 by one extended end of the carriage pin 86 and held against the carriage at its outer end by an upright carriage bracket 108. The central portion of the dog 107 overlies a double-lobed cam 109 fixed to the drive shaft 97 at the adjacent side of the carriage 79 whereby rotation of the shaft to actuate the ejector 34 necessarily pivots the dog upwardly against the action of a spring 110 interconnected between the dog and the carriage as shown in Fig. 9. This upward movement of the dog 107 is blocked by the stop member 106 to preclude rotation of the drive shaft 97 unless the carriage 79 is properly alined with one of the magazines 24, in which case the dog passes up through the adjacent one of a plurality of spaced slots 111 provided in the stop member at stations determined by the longitudinal position of the respective magazines.

Once the drive shaft 97 has been rotated from its starting position, the double-lobed cam 109 maintains the dog 107 in raised position until the drive shaft has turned through a full 180 degrees to complete an ejecting cycle. Thus, by providing a depending extension 112 on the free end of the dog 107 (see Fig. 9), the dog is positively interlocked with the stop member 106 to prevent longitudinal movement of the carriage until an ejecting cycle is fully completed.

It is fitting at this point to advert to the improved snubbing means 114 provided in the casing 21 for cooperation with related parts of the machine to perform the dual functions, first, of assuring retention in the cartridge 22 of the lowermost article in each magazine 24 until it is positively forced from the magazine by the ejector 34, and, second, of finally kicking each ejected article clear of the ejecting mechanism into a dispensing chute 115 leading to the discharge window 26 at the front of the casing, as best shown in Figs. 2, 6, and 9. The snubbing means 114 comprises a plurality of depending coil springs 116 attached at their upper ends to a longitudinal anchor bar 117 spanning the casing between the bulkheads 31, 32. The coiled bodies of the springs 116 are spaced horizontally from each other to cover the vertical interstices between the lowermost articles 66 in adjacent ones of the magazines 24. Moreover, the springs are formed with a diameter exceeding the width of these interstices whereby the springs partially overlap the outer ends of the adjacent articles 66 thus blocking removal of the articles from the respective magazines 24 until each article is individually moved rearwardly by the ejector 34 with sufficient force to push aside the springs, as shown in Fig. 9. Upon rearward movement of an article 66 by the ejector 34 the springs 116 on opposite sides of the article are spread apart until the rear end of the article passes the vertical medial plane of the springs. At this moment the springs snap together, the cylindrical sides of the springs imparting a final kick to the article, hurling it rearwardly of the cartridge 22 into the dispensing chute 115 (see Fig. 6).

This action of the snubbing means 114 in imparting a final kick to the dispensed article is cumulative with a similar effect achieved by special features of the ejector 34 and coacting parts of the previously described interlock mechanism 78 between the ejector and the casing 21. As shown in Fig. 10, opposite sides of the double-lobed cam 109 of this interlock mechanism are formed with elongated parallel flats 119, one of which, in each starting or "home" position of the cam, has face-to-face engagement with the lower straight side of the dog 107 which is biased hard against the cam by the spring 110. Thus, the biased dog 107 tends to retain the cam 109 in one of its home positions, located 180 degrees apart. Moreover, once the cam has, in the course of an ejecting

cycle, been rotated through an angle somewhat less than 180 degrees (approximately to the position shown in Fig. 9), the dog **107** acts on the cam to snap it on through to its next home position, Fig. 10. This snap action of the cam **109**, which is interconnected with the ejector **34** through the drive shaft **97**, imparts a final impulse to the ejecting lug **67** in contact with the article being ejected to give a final kick to the article, which is in addition to that imparted by the snubbing springs.

The final impetus thus given the ejected article by the ejector **34** is increased even further by virtue of the location of the axis of the ejector guide wheel **89** forward of the central, vertical plane of the snubber springs **116**. Consequently, when an ejector lug **67** is actively ejecting an article **66** reaches the immediate vicinity of the snubber springs, the segment of the band **87** to which the lug is directly attached moves into engagement with the periphery of the guide wheel **89** which immediately imparts a rotative motion to this band segment, causing the top end of abutment section **92** of the lug to be thrust forwardly at a greater speed than the band is traveling (see Fig. 6). This, of course, increases the kick given the ejected article to the extent that it is virtually shot clear of the ejector **34** into the dispensing chute **115**.

As to the construction of this dispensing chute **115**, it will be seen by reference to Figs. 1 and 6 that the upper wall **120** of the chute is formed by turning the lower end of the front casing panel **36** inwardly to extend under the ejector mechanism up to suitable support brackets **121** attached to the bulkheads **31, 32** just rearwardly of the snubbing means **114**. The lower wall **122** of the chute **115** constitutes an inclined apron extending downwardly and forwardly from the medial portion of rear casing panel **35** to the forward edge of the bottom casing panel **30**. A stop for the articles sliding down the chute is provided by a longitudinal ridge **124** formed on the forward edge of the apron **122**.

To dispense an article of merchandise down the chute **115** from any one of the magazines **24**, the ejector **34** is alined with the selected magazine and the drive shaft **97** is rotated through 180 degrees in the forward direction (clockwise, as viewed in Figs. 2, 6, 9, and 11). To assure proper operation of the ejector mechanism, reverse angular movement of the drive shaft **97** is precluded by a ratchet wheel **125** secured to the outer end of the drive shaft and engaged on one side by a spring biased pawl **126** pivoted to the bulkhead **31**. Moreover, the ratchet wheel **125** is held in abutting end engagement with the bulkhead **31** by a bulkhead bracket **127** engaging the outer face of the wheel whereby the wheel also serves to fix the drive shaft **97** against longitudinal movement through its bearing supports in the two bulkheads **31, 32**.

Positive rotation of drive shaft **97** in the forward direction is permitted by a coin controlled actuating mechanism **129** carried by the service door **47** and interconnected with the shaft, upon closing of the door, by a tang and slot coupling **130** (see Figs. 8, 9, and 15). In this instance, the tang **131** of the coupling **129** is formed on the ratchet wheel **125** attached to the outer end of the drive shaft. The coupling slot which receives the tang **131** is defined by a transverse channel member **132** attached to a rotatable coin receiver **134** which is, in turn, fixed to the inner end of a handle shaft **135** journaled in the side panel of the door **47**. With this arrangement, the customer can, by turning the operating handle **27** on the outer end of the shaft **135**, rotate the drive shaft **97** through the coin receiver **134** and coupling **130** to operate the ejector **34**.

As the interfitting parts of the tang and slot coupling **130** are disengaged and engaged with each other upon opening and closing of the service door, provision is made for maintaining these parts in mutual angular alinement while the door is open to assure their smooth re-engagement upon closing of the door. The tang **131** on the end of the drive shaft **97** is, of course, securely held in a fixed position, while the door is open, by the action of the interlocking lever **107** on the cam **109** attached to the drive shaft. It will be apprehended that the function of the interlocking mechanism **78** in this respect constitutes still another advantageous feature attributable to this mechanism.

To hold the channel member **132** in mating position relative to the tang **131** while the door **47** is open, a stabilizing arm **136** is pivoted to an inwardly projecting pin **137** on the door and biased into engagement with the channel by a coil spring **139** disposed around the pin with one end in engagement with the arm and the other end anchored to a bracket **140** fixed to the door alongside the pin. Location of the arm pivot pin **137** relative to the handle shaft **135** is such that when the channel member **132** is in an angular position corresponding to a "home" position of the drive shaft **97**, the arm **136** engages one elongated side of the channel in the same manner as the interlocking dog **107** engages one of the flats **119** on the double-lobed cam **109**.

The operating handle **27** and drive shaft **97** are normally locked against forward rotation by an improved coin controlled detent mechanism **141** carried by the service door **47** and designed to be released for angular rotation through an angular increment of 180 degrees upon the depositing of a coin in the previously mentioned coin receiver **134** forming one of the basic elements of this mechanism. By virtue of novel design features incorporated into this coin controlled detent mechanism **141**, in accordance with concepts of the invention, an exceedingly compact construction of the mechanism is achieved which occupies a minimum amount of space in the door compartment **51** and which is positive and certain in its action, as well as being adapted for most economical manufacture.

As to the details of the coin controlled detent **141**, it will be perceived by reference to Figs. 8, 9, 13, 14, and 15 that the coin receiver **134** of the detent mechanism is of an annular shape and forms in its peripheral edge two diametrically opposite recesses **142** opening radially outward. The circumferential location of the recesses on the receiver **134** is such that one of the recesses is disposed on the lower side of the receiver, as shown in Figs. 12 and 13, when the latter is turned to either one of its "home" positions corresponding to the "home" positions of the drive shaft **97**.

Upon movement of the receiver **134** into one of its "home" positions, the lower recess **142** is engaged by a transverse pin **144** on the free end of a locking dog **145** pivoted on the same pin **137** with the stabilizing arm **136** and biased upwardly into engagement with the receiver by a coil spring **146**, which is mounted to act on the dog in the same manner as the spring **139** acts on the stabilizing arm (see Figs. 12, 13, and 15). The dog pin **144** thus engaged in the lower receiver recess **142** serves to preclude any significant forward rotation of the handle **27** and the drive shaft until the pin is positively cammed from the recess by a coin deposited in the receiver **134**.

To provide for this camming action by a coin, the circumferential width of each recess **142** is made somewhat (approximately fifty percent) larger than the corresponding dimension of the pin **144** whereby a small amount of angular play between the receiver **134** and the engaged pin is provided for. In the course of normal operation of the machine **20** the forward rotation of the drive shaft **97** and the coin receiver **134** at the conclusion of an ejecting cycle is terminated when the pin **144** first drops into the coacting recess (see Fig. 12) by the cumulative action of the interlocking dog **107** on the shaft cam **109** and the stabilizing arm **136** on the channel **132**. However, should an attempt be made to continue rotation of the mechanism without depositing another coin in the receiver, the permissible continued rotation is limited to only a few ineffectual degrees by the abutment of the pin **144** with the ledge **147** at the forward edge of the coacting recess **142** (see Fig. 13). However, when turning

moment is released from the handle **27**, the dog **107** and arm **136** acting on the cam **109** and channel **132** respectively immediately return the receiver **134** to its normal home position, thus backing the abutting recess ledge **147** a short distance away from the pin **144** (see Fig. 12). As best shown in Fig. 11, one or two teeth are left missing on diametrically opposite sides **149** of the ratchet wheel **125** to permit this return movement of the receiver **134** to "home" position.

To release the pin **144** from the coacting recess **142**, a coin **148** is seated in the receiver **134** to have one edge disposed in the space between the pin **144** and the receiver ledge **147** (see Fig. 14). Thus, when the receiver **134** is rotated in the forward direction, the contiguous edge of the coin cams the pin **144** up and over the ledge **147** to release the receiver and, consequently, the drive shaft **97** for movement through another dispensing cycle. At the same time the coin **148** drops free of the receiver **134** and into the box **39** (see Fig. 8). The coin thus passes substantially diametrically through the receiver **134**, being retained only until it has served to release the pin **144**.

To minimize the radial distance through which the pin **144** must be cammed by the coin to release the detent **141**, the forward ledge **147** of each receiver recess is shortened radially inward relative to the inner extension of the rear portion of the recess in which the pin is seated just prior to being cammed over the ledge. Moreover, the height of the abutting faces on the ledges **147**, thus shortened, is maintained undiminished by increasing the radial depth of the respective recesses at the sides adjacent the ledges, as shown in Figs. 13 and 14.

As provided by the invention, coins are seated in camming position in the receiver **134** by dropping the coins into the upper end of a central diagonal slot **150** formed in the receiver to have a generally upright attitude when the receiver is in a "locked" or "home" position (see Figs. 13 to 15). A coin **148**, when dropped into the slot **150**, passes down to a coin pocket **151** at the lower end of the slot formed by the pin **144** disposed in the "rear" side of the lower recess **142** and a saddle member **152** on the receiver which defines a curved face **154** that engages the coin edge opposite from the pin. This curved face **154** abuttingly supports the coin **148** as it cams the pin **144** out of the recess, as shown in Fig. 14. Since the receiver **134** is of symmetrical construction, a similar saddle member **152** is provided on the opposite side of the receiver for releasing the pin **144** from the other of the recesses **142**.

Preferably, the coin receiver **134** is fabricated, as shown, from two congruous plates **155**, one of which is centrally attached in perpendicular relation to the inner end of the handle shaft **135**. The companion plate is riveted to the first plate and spaced therefrom by two diagonally disposed spacer plates **152** defining opposite edges of the receiver slot **150** and shaped to form the previously mentioned saddle members (also designated by the numeral **152**).

As best shown in Figs. 8 and 12, coins are introduced into the coin receiver **134** through the coin slot **29** at the top of the service door **47**, the coins passing through a coin rejector **156** of conventional design attached to the inner face of the door between the coin slot and the receiver. Acceptable coins drop through an outlet slot **157** in the rejector **156** directly into the receiver **134**, Fig. 8, and unacceptable coins are shunted by the rejector **156** into a return chute **159** on the side of the bulkhead **31** to be returned to the customer via the dispensing chute **115**. A plunger **160** is mounted on the top door flange **48** in position to actuate an arm **161** on the coin rejector **156** to dislodge slugs from the rejector into the coin return chute **159**.

To provide for quick replacement of the entire rejector unit **156**, should it for any reason become in need of repair, the unit is detachably mounted between two upright brackets **162** on the service door panel **50**, as shown in Figs. 12 and 16.

Adverting briefly to the arrangement of the mechanical elements in the machine **20** relative to each other, it will be appreciated that by mounting the coin controlled detent mechanism **141** and the coin rejector **156** on the service door **47** these parts are, upon opening of the door, swung away from the casing proper so as not to interfere with the removal of the cartridge **22** from the casing. Moreover, the mechanisms attached to the door **47** are readily accessible to the service man for maintenance purposes.

To permit insertion of maintenance tools into the casing **21** with the cartridge **22** in place, an aperture **164** is provided in the bulkhead just rearwardly of the bulkhead recess **40** (see Figs. 2 and 2A). As shown in Fig. 2A, this aperture, together with the recess **40** and the inner portion of the coin return chute **159**, are covered with a shield **165** detachably secured to the bulkhead **31** after the cartridge **22** is seated in place. This shield effectively prevents coins from being shaken from the coin box **39** out through these openings by persons who may overturn the machine **20** for this purpose.

The service door **47** is, of course, locked in its closed position by a suitable locking arrangement **166** on the door which engages the front marginal edge of the bulk head **31**.

I claim as my invention:

1. A coin controlled vending machine comprising, in combination, a casing, means on said casing defining a longitudinal slot on the top side thereof, a cartridge containing a battery of upright magazines and detachably mounted within said slot with the lower ends of said magazines depending into said casing, a drive shaft journaled in said casing to extend across said magazine battery in spaced relation thereto, coin controlled operating means associated with said shaft for causing rotation thereof through successive predetermined angular increments, an ejector slidably mounted on said drive shaft, a selector handle external of said casing and connected with said ejector for moving the ejector along said shaft into registry with any one of said magazines, and an interlocking mechanism integrated with said ejector and said casing for precluding operation of said ejector until the latter is properly alined with a selected one of said magazines and operative to prevent shifting movement of said ejector out of registration with a selected magazine while an ejecting cycle is in progress; said mechanism including a stop member fixed to said casing in spaced, generally parallel relation to said shaft; a cam rotatable with said shaft and movable longitudinally relative thereto with said ejector, a dog carried in axial alinement with said cam to be displaced transversely relative to said shaft from rest position into engagement with said stop member upon rotation of said cam, said stop member serving to block said transverse displacement of said dog until said ejector is properly registered with one of said magazines and being effective to block movement of said dog along said shaft when the former is in displaced position.

2. A coin controlled vending machine comprising, in combination, a casing, a battery of upright magazines having lower ends thereof depending into said casing, a drive shaft journaled in said casing and extending along said battery in spaced relation thereto, coin controlled operating means associated with said shaft for causing rotation thereof through successive predetermined angular increments, an ejector slidably mounted on said drive shaft, a selector handle external of said casing and connected with said ejector for moving the ejector along said shaft into registry with any one of said magazines, and an interlocking mechanism integrated with said ejector and said casing for precluding operation of said ejector until the latter is properly alined with a selected one of said magazines and operative to prevent shifting movement of said ejector out of registration with a selected

magazine while an ejecting cycle is in progress; said mechanism including an elongated stop member fixed to said casing in spaced, generally parallel relation to said shaft; a lobed cam mounted on said shaft for rotation therewith and longitudinal movement thereon with said ejector, a dog pivotally mounted on said ejector in axial alinement with said cam to be displaced transversely relative to said shaft toward said stop member upon rotation of said cam by said drive shaft as an incident to actuation of said ejector, said stop member having formed therein longitudinally spaced transverse passages registering with said respective magazines and providing for transverse displacement of said dog only upon alinement of said ejector with one of said magazines, and said stop member being effective to block movement of said dog along said shaft so long as the latter is displaced into one of said passages by said cam.

3. In a vending machine, a casing, a battery of supply magazines depending into said casing, a rotatable drive shaft extending along said battery in spaced relation thereto; an ejector slidably mounted on said shaft for dispensing articles from selected ones of said magazines and including a carriage, a drive wheel journaled in said carriage and rotatable with said shaft, a guide wheel journaled on said carriage about an axis parallel to said shaft and spaced therefrom, an endless band trained over said two wheels and extending beneath said battery in transverse relation thereto, ejector lugs mounted on said band and spaced therealong, a cam rotatable with said shaft and a cam follower biased hard into engagement with the cam surface thereon and being displaced from rest position upon rotation of said shaft, an elongated stop member mounted in said casing in spaced parallel relation to said shaft and disposed in position to block displacement of said follower, a plurality of passages spaced along said stop member at stations corresponding to the spacing between said magazines, said passages providing for displacement of said follower only upon registration of said ejector with one of said magazines, and said follower acting on said cam to impart an impulse to each of said lugs through the intermedium of said drive wheel and said band at the conclusion of each operating cycle of said ejector.

References Cited in the file of this patent

UNITED STATES PATENTS

488,610	Kirkham	Dec. 27, 1892
716,058	Laing	Dec. 16, 1902
732,766	Matthewson	July 7, 1903
752,580	Nash	Feb. 16, 1904
821,761	Stanley	May 29, 1906
1,196,105	Groom	Aug. 29, 1916
1,240,413	Bridges	Sept. 18, 1917
1,280,669	Copeland	Oct. 8, 1918
1,283,429	Tily	Oct. 29, 1918
1,621,971	Curtis	Mar. 22, 1927
1,652,816	Clark	Dec. 13, 1927
1,731,352	Shermack	Oct. 15, 1929
1,806,835	Andrews	May 26, 1931
1,842,452	Jacobson	Jan. 26, 1932
1,931,905	Robinson	Oct. 24, 1933
1,947,999	McCormick	Feb. 20, 1934
2,139,433	Bares	Dec. 6, 1938
2,151,352	McKool	Mar. 21, 1939
2,262,425	Grunig	Nov. 11, 1941
2,265,748	Slezak	Dec. 9, 1941
2,283,252	Hartman	May 19, 1942
2,309,008	Pease	Jan. 19, 1943
2,309,802	Vogel	Feb. 2, 1943
2,321,136	Grau	June 8, 1943
2,380,093	Wilder	July 10, 1945
2,577,862	Shaw	Dec. 11, 1951
2,594,147	Fry	Apr. 22, 1952
2,627,362	Balaz	Feb. 3, 1953
2,638,396	Gabrielsen	May 12, 1953