

Jan. 5, 1954

P. E. HORD
VENDING MACHINE

2,665,184

Filed July 19, 1951

4 Sheets-Sheet 1

Fig. 1.

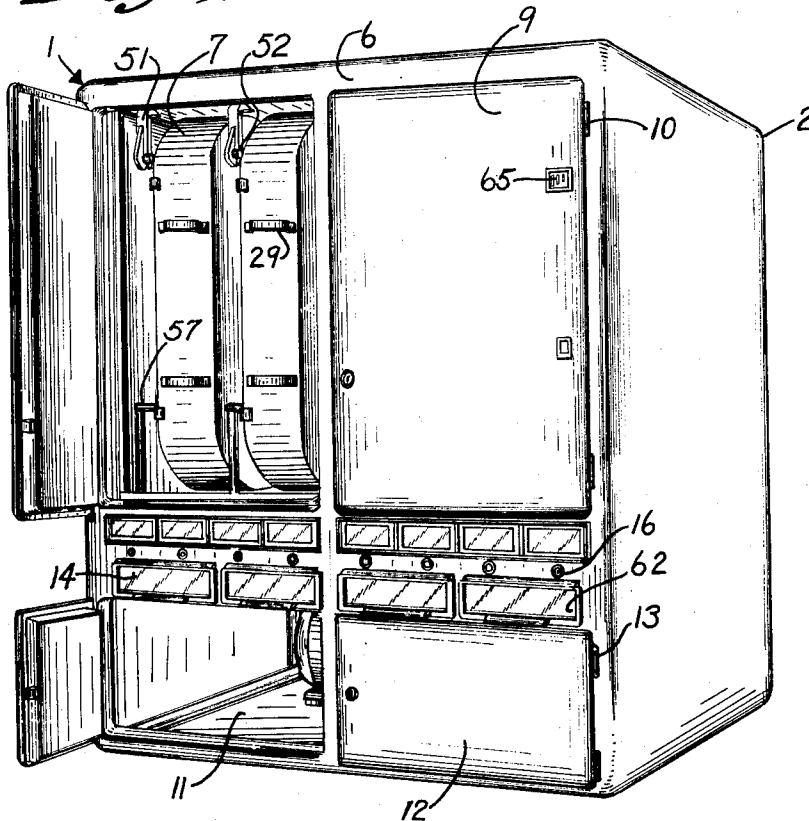


Fig. 9.

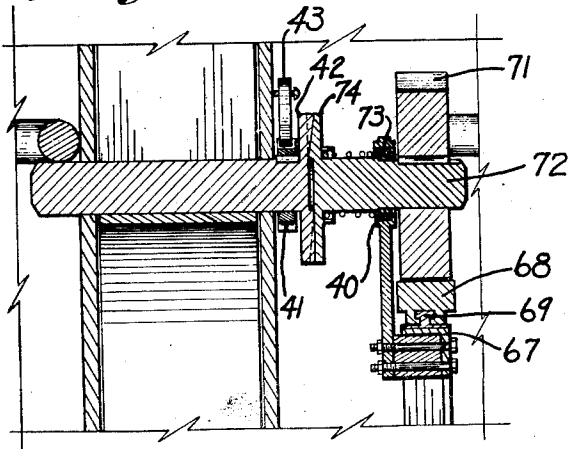
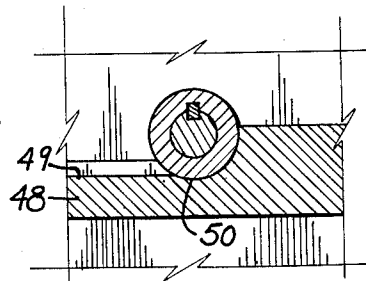


Fig. 10.



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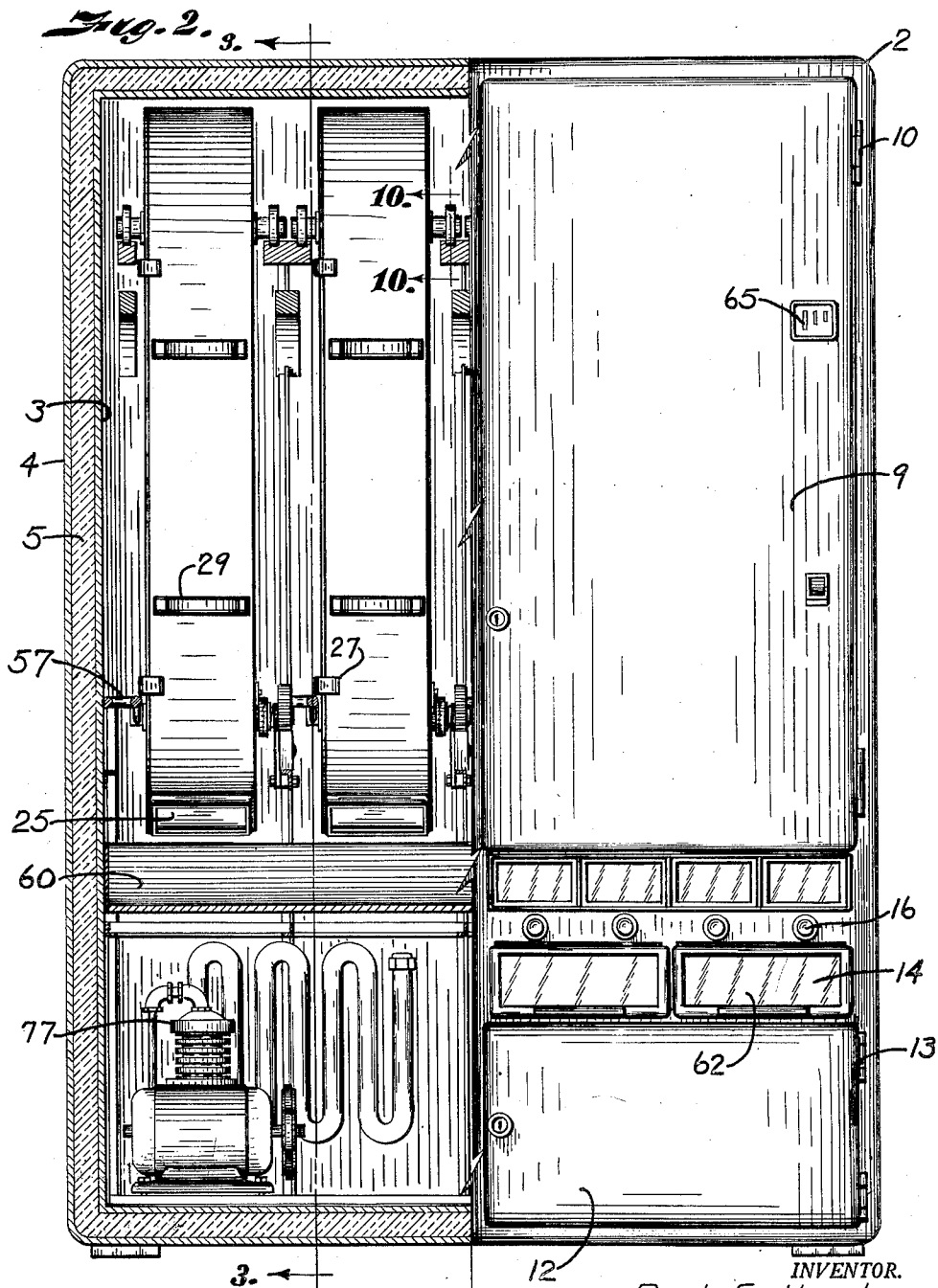
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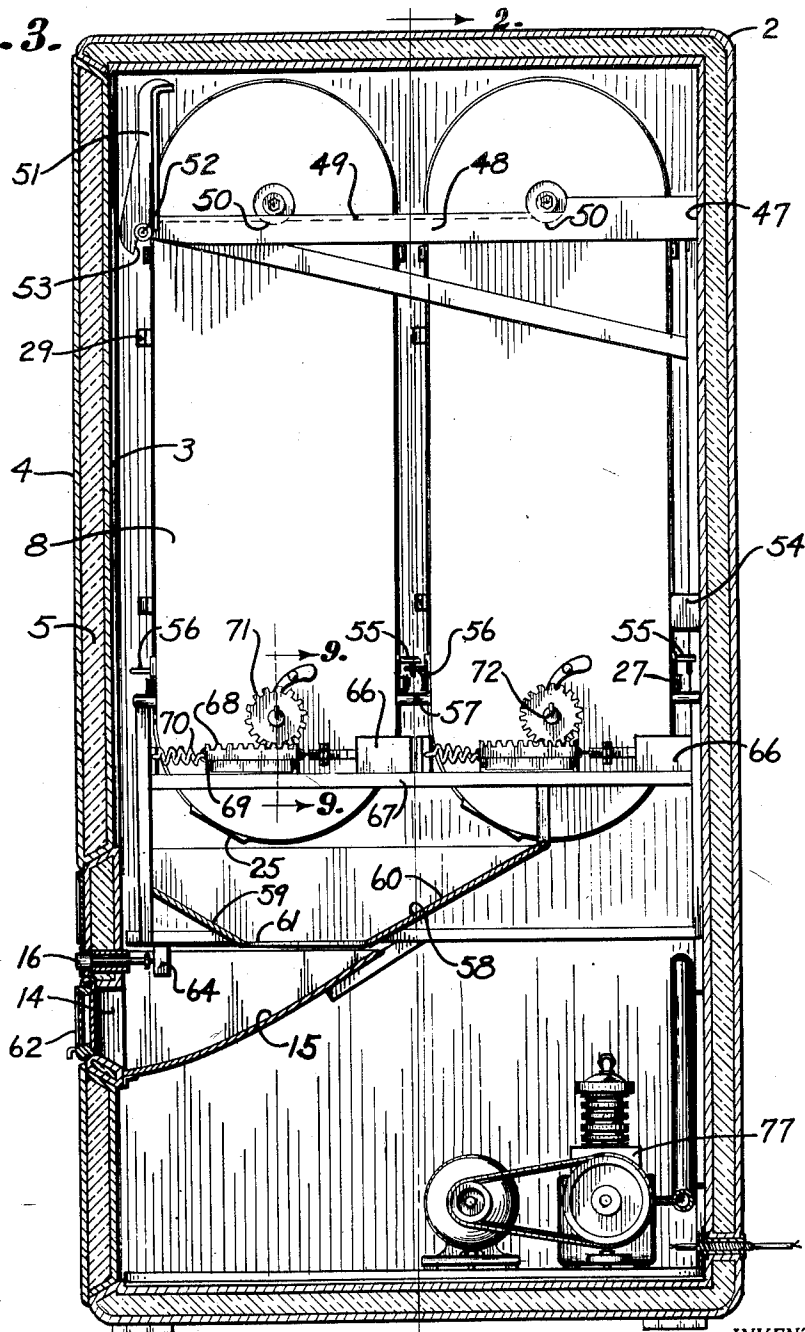
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Fig. 3.



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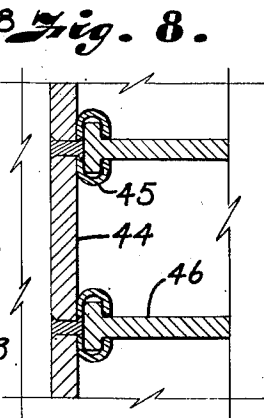
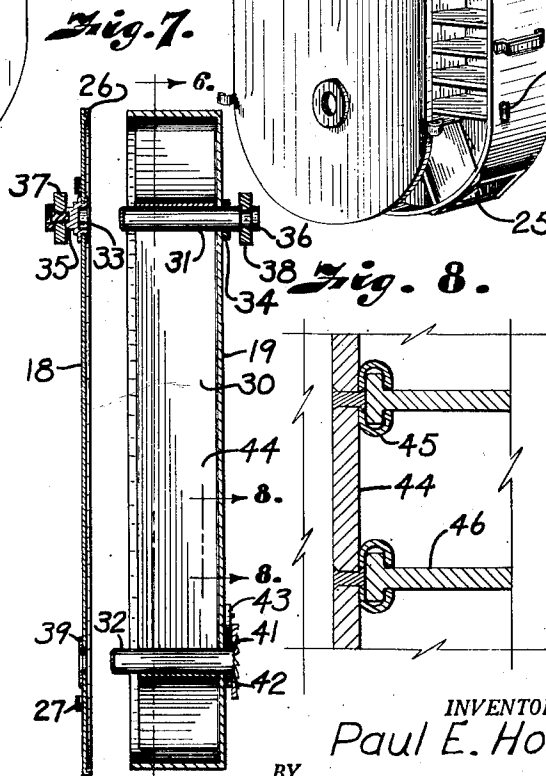
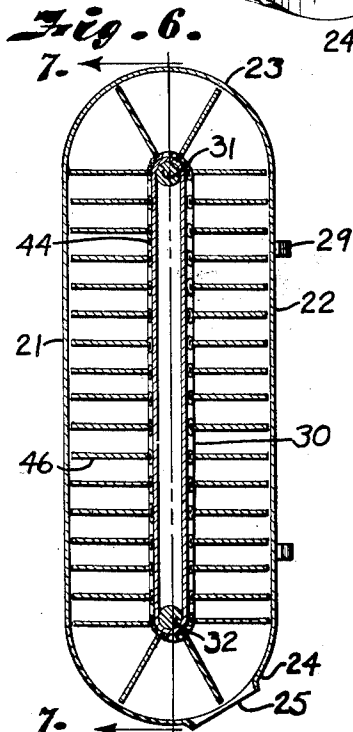
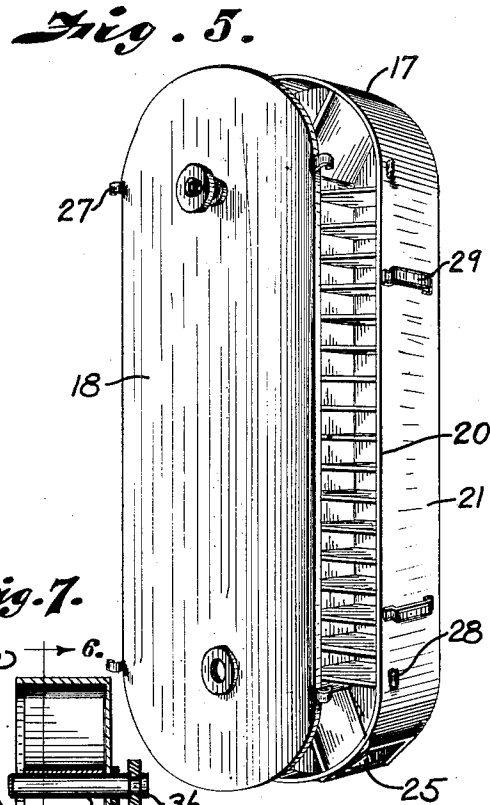
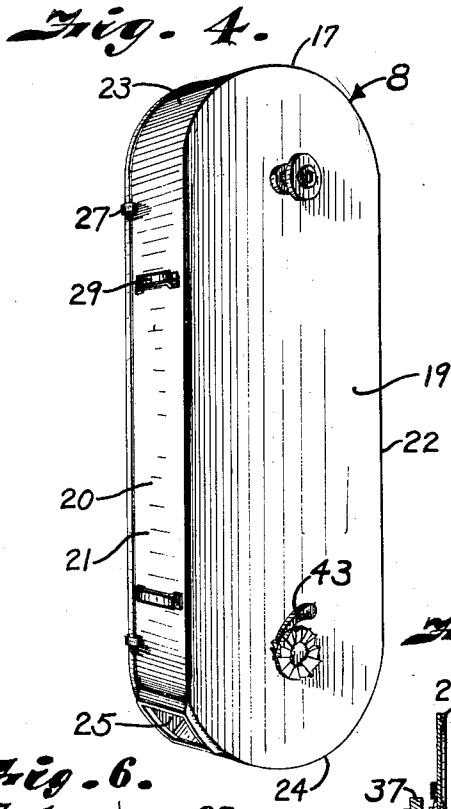
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UNITED STATES PATENT OFFICE

2,665,184

VENDING MACHINE

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Application July 19, 1951, Serial No. 237,497

2 Claims. (Cl. 312-97)

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This invention relates to vending machines and similar apparatus and more particularly to such a machine with removable goods holding and dispensing units adapted to deliver articles of merchandise selected by the purchaser.

In vending machines of both the so-called selective type and non-selective type, either coin-controlled or otherwise, the articles to be dispensed are arranged in conveyors or chutes with suitable operating mechanism for effecting delivery of the article. In servicing such machines it is customary for the service man to carry the various articles in a box or other container to the machine location, then open the machine and after checking same, fill the empty spaces with new or fresh articles. In many machines there are a number of different conveyors, each having empty spaces that must be filled. This servicing requires considerable time. Each article or package thereof is handled and since such machines are usually in well frequented spots, the service man's supplies and space taken up thereby will cause congestion. Also, the time required for servicing each machine severely limits the number of machines a single service man can handle. When the articles of merchandise are food products or the like, there are sanitation problems, the transportation of the articles, and servicing of the machine as well as the storage and dispensing of the articles from the machines, yet most of the machines in present day use are not adapted to be cleaned and sterilized except by complete removal of the machine to a work shop and partial dismantling of same.

The objects of the present invention are to provide a vending machine with goods holding and dispensing units bodily removable therefrom, whereby the units may be replaced with filled units and the removed unit returned to a commissary or other central plant for cleaning, sterilizing and refilling with new or fresh articles; to provide a vending machine having coin mechanism which acts to permit delivery of a single article from one of a plurality of goods holding and dispensing units removably mounted in the machine; to provide goods holding and dispensing units in the form of closed cartridges, each of which contains endless conveyors for the articles of merchandise, said cartridges being bodily removable from vending machines adapted to contain same for replacement with cartridges filled with fresh merchandise; to provide goods holding and dispensing units in the form of cartridges having article conveyors therein adapted

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to be opened and serviced in a commissary or other central plant for cleaning and sterilizing same and filling with new merchandise, the cartridge then being closed and transported to a vending machine location and placed bodily in such machine in operative engagement with the dispensing operating mechanism therein; to provide conveyor driving mechanism on each cartridge releasably connected with operating mechanism in a vending machine; and to provide a food vending machine having hot and cold compartments with removable goods holding and dispensing cartridge units which facilitate servicing of the machine and maintenance of sanitary conditions therein.

In accomplishing these and other objects of the present invention, I have provided improved details of structure, the preferred forms of which are illustrated in the accompanying drawings, wherein:

Fig. 1 is a perspective view of a vending machine with certain doors open to show the goods holding and dispensing cartridges therein.

Fig. 2 is a front elevation of the vending machine with a portion thereof broken away on the line 2-2, Fig. 3, to better illustrate the structure thereof.

Fig. 3 is a vertical sectional view through the vending machine on the line 3-3, Fig. 2.

Fig. 4 is a perspective view of a goods holding and dispensing cartridge unit.

Fig. 5 is a disassembled perspective view of the goods holding and dispensing cartridge unit showing the cover removed from the body thereof.

Fig. 6 is a vertical sectional view through the goods holding and dispensing cartridge unit on the line 6-6, Fig. 7.

Fig. 7 is a vertical sectional view through the goods holding and dispensing cartridge unit on the line 7-7, Fig. 6.

Fig. 8 is a detail sectional view through the conveyor and the mounting of the pocket forming members thereon taken on the line 8-8, Fig. 7.

Fig. 9 is a detail sectional view through the conveyor drive mechanism on the line 9-9, Fig. 3.

Fig. 10 is a detail sectional view through the cartridge mounting roller and track on the line 10-10, Fig. 2.

Referring more in detail to the drawings:

1 designates a vending machine having an enclosing case 2 provided with spaced inner and outer shells 3 and 4 respectively preferably

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formed of metal. Suitable insulating material 5 is arranged between the inner and outer shells to facilitate maintenance of uniform temperatures inside of the casing. The front wall 6 of the casing has one or more openings 7 in the upper portion thereof for access to goods holding and dispensing cartridge units 8 and other mechanism inside the casing as later described. The openings 7 are closed by doors 9 mounted by hinges 10 on the casing 2 at the sides of the openings 7. Openings 11 are preferably provided in the lower portion of the front wall 6 to provide access to the lower portion of the casing interior. Doors 12 are arranged to close the openings 11, said doors being mounted on hinges 13 on the casing at the sides of the openings 11. Both the upper and lower portions of the casing may be divided by insulated partitions if desired for temperature differential between compartments. The upper edges of the doors 12 are spaced from the lower edges of the doors 9 to provide sufficient area on the front wall of the casing to accommodate discharge openings 14 for delivery chutes 15 and selector control members 16 as later described.

The goods holding and dispensing units 8 are arranged to constitute cartridges or the like for containing a plurality of articles or packages thereof to be dispensed, the articles being maintained in the cartridges in columns or other suitable arrangement with mechanism operable to advance the articles to a dispensing opening through which it is delivered to a position accessible by the purchaser or the like. The cartridge is supported in the casing in such a manner as to be easily removable and replaceable and is also constructed in such a manner as to provide access to the contents of the cartridge for cleaning, sterilizing and servicing of same at a central plant or commissary of the person or firm handling the servicing of such machines.

In the present exemplification the goods holding and dispensing unit 8 consists of a cartridge including a housing 17 having spaced substantially parallel side walls 18 and 19 and a peripheral wall 20. The peripheral wall 20 is illustrated as being integral with a side wall 19 and conforming to the shape of the peripheral edge thereof whereby the front and rear portions 21 and 22 respectively of said peripheral wall are parallel and are connected by upper and lower cylindrical end portions 23 and 24 respectively. The bottom portion 24 is provided with a dispensing opening 25, through which articles are discharged from the cartridge.

One of the side walls, for example side wall 18, is removably connected to the peripheral wall 20 to provide access to the interior of the housing. In the illustrated structure the wall 18 is provided with a peripheral flange 26 adapted to be sleeved over the edge of the peripheral wall 20, suitable latch members 27 being provided on the removable side wall or cover 18 for engagement with cooperating members 28 on the peripheral wall 20, for securing the side wall thereto. The front portion 21 of the peripheral wall is preferably provided with spaced handles 29 for facilitating handling of the cartridge and insertion and removal thereof in the casing 2.

A conveyor 30 is arranged in each housing for supporting and moving goods or articles to be dispensed, said conveyors being arranged to advance said articles toward the opening 25. Upper and lower shafts 31 and 32 are arranged in the housing coaxially of the end portions 23 and 24

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of the peripheral wall, said shafts being suitably supported for rotation to move the conveyor. The upper shaft 31 is mounted in bearings 33 and 34 suitably carried by the side walls 18 and 19 respectively. In the illustrated structure, the bearing 33 has an outwardly extending shank 35 and the shaft 31 extends through the bearing 34 to provide an outwardly extending portion 36. Rollers 37 and 38 are rotatably mounted on the stub shaft 35 and extending portion 36 for aiding in positioning and supporting the cartridge in the casing 2, as later described.

The lower shaft 32 is mounted in bearings 39 and 40 carried by the side walls 18 and 19 respectively. The shaft 32 extends through the bearing 40 and fixed thereon exteriorly of the housing 17 is a ratchet wheel 41 and a driven clutch member 42, said driven clutch member being adapted to be engaged by a driving member to rotate the shaft 32 and move the conveyor in one direction to advance the articles in the cartridge toward the opening 25. A pawl 43 is pivotally mounted on the side wall 18 for engaging the ratchet wheel 41 and preventing reverse movement of the shaft 32 and conveyor 30. The conveyor 30 consists of an endless belt 44 operating over and engaged with the shafts 31 and 32 with a plurality of spaced holders 45 secured thereon. Shelves 46 are removably mounted in the holders 45 to form article holding pockets between the respective shelves.

The casing 2, as illustrated in Fig. 3, is of such depth to accommodate two cartridges in the upper portion thereof. A plurality of brackets 47 is suitably supported on the rear wall of the casing, each bracket having forwardly extending track members 48 provided with grooves 49 for receiving the rollers 37 and 38 on the cartridges for suspending the cartridges in the casing. The grooves 49 have spaced recesses 50 suitably located to receive the rollers when the cartridges are in selected position in the casing, whereby said cartridges cannot move forwardly or rearwardly in the casing except when lifted to remove the rollers from said recesses.

Track extensions 51 are pivotally mounted as at 52 on the forward end of the track members 48. The extensions normally extend vertically, as illustrated in Fig. 3, but may be swung downwardly to a horizontal position at which a stop 53 engages the track member 48 whereby the extensions form a continuation of the track members extending outwardly through the openings 7 for facilitating removal and insertion of the cartridges in the casing.

To prevent swinging of the cartridges in the casing, bumpers 54 are provided on the rear wall of the casing for engagement with the rearmost cartridge to limit rearward movement of the lower ends of the cartridges. Also hook members 55 are arranged on the rear portions 22 of the peripheral walls of the casing and adapted to engage eyes 56 mounted on the forward portion 21 of the peripheral wall to secure the forward and rearward cartridges together. Latch members 57 are also positioned to engage around the end of the shaft 32 extending from the bearing 39 of the cartridge to limit movement of the lower end thereof. This arrangement positions the cartridges with the openings 25 above a discharge hopper 58 having forwardly and rearwardly sloping bottom walls 59 and 60 to direct articles discharged from the cartridges to an opening 61 registering with the open upper portion of a delivery chute 15, the forward end of which aligns

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with the opening 14 closed by a hingedly mounted door 62 which may be opened to provide access to the discharge chute for removing articles therefrom.

Suitable operating and selecting mechanism, as well as coin-selecting mechanism, may be arranged in the casing to drive the shafts 32 of a cartridge containing selected articles to advance the conveyor the distance between adjacent shelves to discharge a single article. The coin mechanism may also have suitable conventional apparatus whereby when one of the cartridge-operating and conveyor-advancing mechanisms is actuated to deliver a single article, the entire mechanism is inactivated until another coin is placed in the coin mechanism, as in conventional practice.

In the illustrated structure, pairs of frames are arranged in the panel above the doors 62, said frames being adapted to receive pictures or illustrations of the articles in a respective cartridge. Below the frames are buttons 16 adapted to be pressed to operate respective switches 64 which, when an electric circuit is energized in response to insertion of a coin into the coin mechanism through coin slots 65, will energize the respective conveyor-advancing mechanism for the cartridge containing the article selected. The conveyor-advancing mechanism each consists of a solenoid 66 mounted on a bar 67 supported in the casing adjacent the side wall 19 of each cartridge. Energization of the respective solenoid moves a gear rack 68 rearwardly in a track 69 carried on the bar 67. When the solenoid is de-energized a spring 70 connected to the gear rack 68 returns same to its forward position. The gear rack meshes with a gear 71 fixed on a shaft 72 rotatably mounted in a bearing 73 coaxially of the lower shaft 32 of the respective cartridge. A clutch driving member 74 is slidably mounted on the shaft 72 and drivingly engaged therewith by splines 75. A spring 76 sleeved on the shaft 72 urges the clutch driving member 74 into driving engagement with the clutch member 42 on the respective cartridge shaft 32 whereby rearward movement of the gear rack 68 effects rotation of the shaft 32 to advance the conveyor one space to deliver one article. Interengaging teeth on the clutch members 42 and 74 have abutments and sloping surfaces whereby upon forward movement of the gear rack 68, the pawls 43 will prevent rearward movement of the shafts 32 and the interengaging surfaces of the clutch members will slide the clutch member 74 on the shaft 73 to permit rotation of the shaft 72 without driving the shaft 32 in a rearward direction.

Suitable refrigeration apparatus 77 and/or heating apparatus may be arranged in the lower portions of the casing to maintain the temperature as desired for preservation of the articles therein at desired temperatures.

The servicing and operation of a vending machine constructed and assembled as described is as follows:

Assuming the machine is on location and operating with articles to be dispensed in the cartridges, a person desiring merchandise looks at the pictures in the frames 63 and selects the article desired. A suitable coin is then inserted in the coin slot 65 and the coin mechanism (not shown) energizes a circuit for selection of the desired article. A button 16, under the respective illustration of the article desired, is pressed to actuate the switch 64, completing the circuit to the respective solenoid 66, energizing same,

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whereby the solenoid overcomes the tension of the spring 70 and moves the gear rack 68 rearwardly, rotating the respective gear 71 meshed therewith. Rotation of the gear turns the shaft 72 and through interengagement of the clutch members 74 and 42 rotates the shaft 32 to move the conveyor 30 a distance corresponding to the spacing between adjacent shelves 46 to advance the articles supported by the conveyor toward the opening 25 of the respective cartridge, one shelf being moved across the opening to discharge the article supported thereby through the opening into the hopper and through the opening 61 thereof to the chute 15. The article, dropping by gravity, moves to a point immediately behind the respective door 62, which is then opened by the purchaser for removal of the dispensed article.

When the solenoid moves the respective rack to the end of its stroke, the solenoid is deenergized whereby the tension of the spring 70 returns the gear rack 68 to its forward position, the pawl 43 preventing rearward movement of the conveyor and the clutch faces being such that the shaft 72 may be rotated during the forward movement of the gear rack without rotation of the shaft 32.

Conventional apparatus may be arranged in the coin mechanism whereby only one article may be vended and then the operating mechanism be inoperative until after insertion of another coin in the coin slot 65. At periodic intervals, depending upon the capacity of the machine and the average amount of merchandise vended therefrom, the service man must insert additional merchandise into the machine. In the service of the machine, the service man unlocks the upper doors 9 and swings same open to provide access to the cartridges inside the casing. The latches 57 are released and the trackway extensions 51 moved to horizontal position. The lower portion of the cartridges to be removed are then swung to the left (Fig. 2) to disengage the clutch members 42 and 74. The cartridges are then pulled forwardly to move the rollers 37 and 38 out of the recesses 50, after which the cartridges may be easily pulled through the opening 7 to hang suspended from the extensions 51 until lifted therefrom. The cartridges removed from the casing are set to one side and different cartridges filled with articles of merchandise are lifted and the rollers thereon engaged with the trackway extensions 51 and then said cartridges moved rearwardly into the casing until the rollers engage in the recesses 50. The lower ends of the cartridges are moved to engage the clutch members 42 and 74 and latches 57 operate to secure the cartridges in position. The doors 9 are then closed and locked and the vending machine is again ready for dispensing articles therefrom.

The service man then takes the cartridges which have been removed from the casing to his vehicle and transports same to a central plant or commissary for processing and refilling. In the central plant the latches 27 are released and the side wall 18 removed to provide access to the interior of the cartridges. The other portion of the cartridge may then be turned to dump any articles remaining therein from the pockets formed by the shelves of the conveyor. The entire cartridge may then be suitably cleaned and sterilized and new articles placed in the pockets of the conveyor. The side wall 18 is then placed onto the housing and the latches 27 engaged with the portion 28 to secure the side wall 18 in place

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and close the cartridge. The cartridge is then ready to be taken to a vending machine location and used to replace a cartridge in the vending machine.

It is believed obvious that I have provided a vending machine with goods holding and dispensing units which are efficient and facilitate servicing of the machine and maintenance of sanitary conditions therein.

What I claim and desire to secure by Letters Patent is:

1. A vending machine embodying a casing having an opening for access to the interior thereof, a door on the casing closing said opening, a plurality of article containing cartridges removably supported in the casing, each of said cartridges including an elongated vertically arranged housing, said housings each having a discharge opening in the lower portion thereof, spaced shafts rotatably mounted in the housing, a conveyor in each housing and operatively engaged with said shafts, a plurality of article holders on the conveyors, driving means in the casing adjacent each of the cartridges therein, clutch means operatively connecting one of the shafts in each housing with the respective driving means, means selectively operable for actuating the driving means for rotating the shafts and moving the conveyor in the respective housing in one direction sufficiently to move one article holder into alignment with the discharge opening for dispensing an article from said holder, means preventing movement of the shaft and conveyor in the opposite direction, a delivery chute in the casing and having one end thereof accessible from the exterior of the casing, and means in the casing for directing articles dispensed through the discharge openings in the housings to the delivery chute.

2. A vending machine embodying a casing having an opening for access to the interior thereof, a door on the casing closing said opening, a plu-

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ality of article containing cartridges removably supported in the casing, each of said cartridges including an elongated vertically arranged housing with semicylindrical upper and lower portions, said housings each having a discharge opening in the lower portion thereof, spaced shafts rotatably mounted in the housing substantially coaxially of the semicylindrical upper and lower portions, an endless conveyor in each housing and operatively engaged with said shafts, a plurality of article holders on the conveyors, driving means in the casing adjacent each of the cartridges therein, clutch means operatively connecting one of the shafts in each housing with the respective driving means, means selectively operable for actuating the driving means for rotating the shafts and moving the conveyor in the respective housing in one direction sufficiently to move one article holder into alignment with the discharge opening for dispensing an article from said holder, means preventing movement of the shaft and conveyor in the opposite direction, a delivery chute in the casing and having one end thereof accessible from the exterior of the casing, and means in the casing for directing articles dispensed through the discharge openings in the housings to the delivery chute.

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