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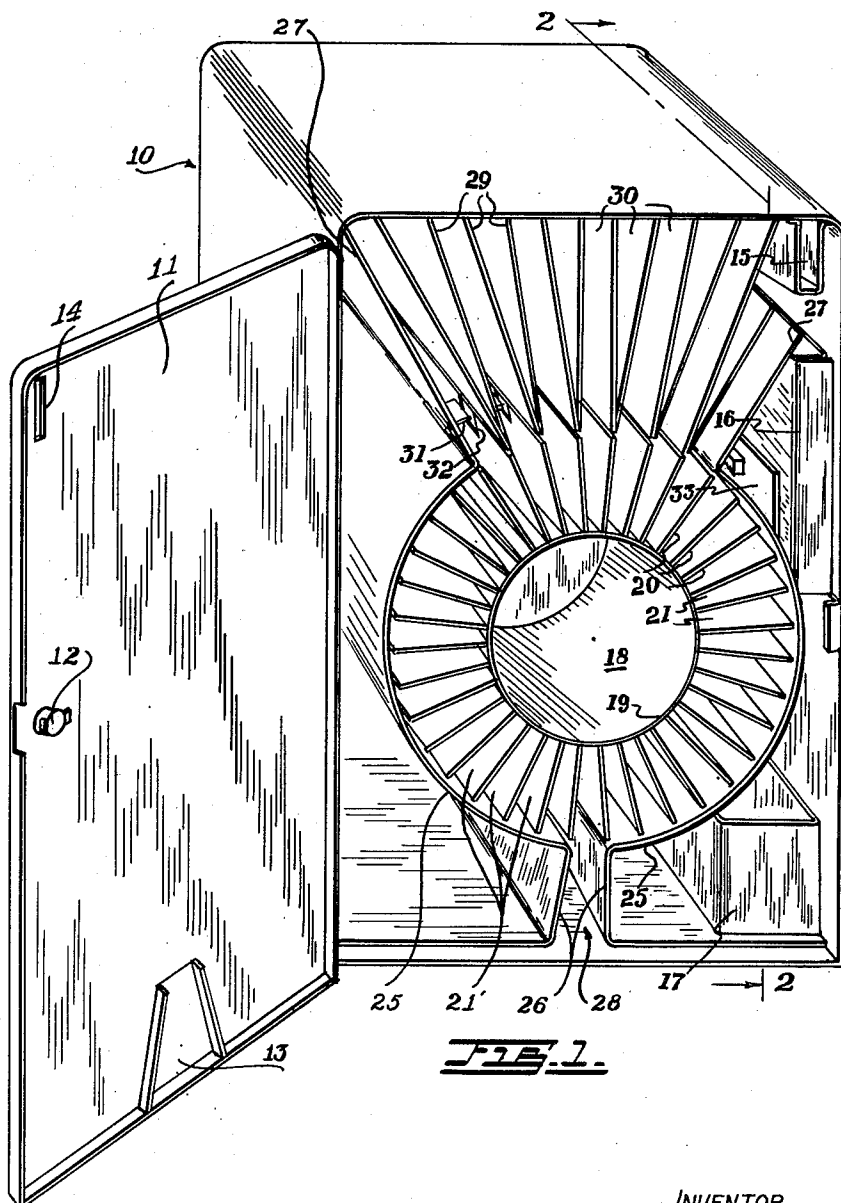
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2,792,147

VENDING MACHINES FOR SMALL ARTICLES

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2 Sheets-Sheet 1



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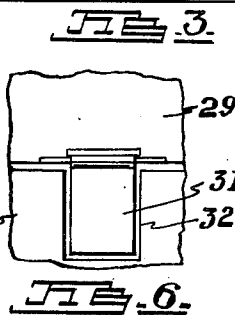
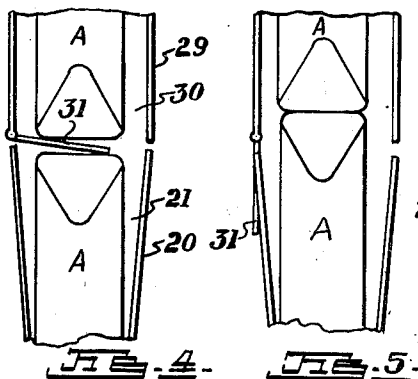
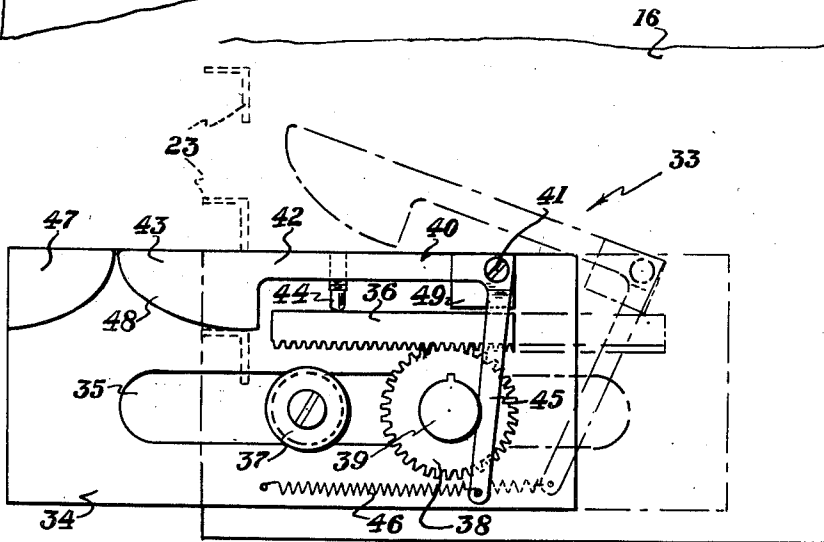
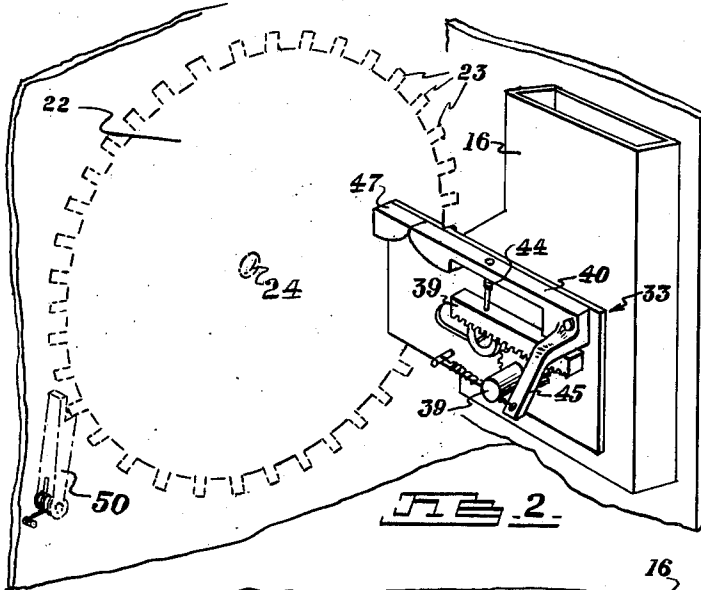
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VENDING MACHINES FOR SMALL ARTICLES

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2 Claims. (Cl. 221—82)

This invention relates to vending machines and more particularly to coin-released mechanical vending machines for packaged units or articles of merchandise.

It is an object of this invention to provide a vending machine which is reliable in vending but a single article each time it is operated. It is a correlative object of this invention to provide a vending machine which is mechanically operated, thus avoiding the problem of electricity supply and obviating the uncertainty of operation inherent in many electrical devices, and the necessity for obtaining approval from local electric authorities. A further object of this invention is to provide a machine which is sufficiently rugged to withstand rough usage, and having features which disallow operation of the machine by tampering or means other than the coin-released actuating mechanism. Still another object of the invention is to provide a vending machine having capacity for a considerable number of units or articles of merchandise, without requiring an unduly massive dispensing device. Previously known vending machines usually have to be specially adapted for use with one particular type of merchandise, but in the present invention it is an object to provide a machine which is quite versatile in this respect, and which may be used with no major alterations for the vending of such diverse articles as cigarettes, packaged tobacco, chocolate bars, packages of peanuts, packages of "Kleenex" etc. The only limitation with respect to the type of article which may be vended by the machine is that the article must be small enough to fit freely in the machine but this limitation is considered to be general for most vending machines.

The above objects have been realized in the present invention, according to which I provide a vending machine comprising a freely rotatable drum-type magazine having a plurality of radially disposed merchandise compartments uniformly positioned about the periphery thereof, and having a plurality of studs also uniformly spaced about the periphery of the magazine in 1:1 relationship with the compartment; said magazine being housed in a cabinet having a vending station arranged to receive articles of merchandise from successive compartments as the latter are successively brought into register therewith during operation of the machine. The operation of the machine is effected by a novel mechanism comprising a coin-actuated release mechanism having a shaft rotatable through a predetermined angle upon depositing appropriate coinage in the mechanism, and a frame member slideably mounted in the cabinet, the shaft and frame member being arranged in cooperative engagement for translating rotary movement of the shaft to a reciprocal sliding movement of the frame member between a position of rest and a withdrawn position. An indexing finger is pivotally mounted on the frame member for pivotal movement between an indexing position when the frame member is in its withdrawn position, and a locked position when the frame member is in its position of rest, suitable stop means being arranged for articulative association with the finger to hold it in said

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locked position. The indexing finger has a cam-shaped head which is adapted to fit slideably between two adjacent studs of the plurality of studs on the magazine, and when the finger is in its locked position it holds the latter securely, with one merchandise compartment in register with the vending station. A cam-shaped stud, corresponding in size and shape to the cam-shaped head of the indexing finger, is mounted on the frame member in alignment with the head of the finger when the latter is in its locked position and closely adjacent thereto. When the frame member is brought to its withdrawn position the cam-shaped stud is brought into the space previously occupied by the head of the indexing finger, and the latter is pivoted to its indexing position by suitable biasing means. The return movement of the frame member to its position of rest causes the cam-shaped head to move between the next adjacent space between two peripheral studs, whereupon contact with the stop means returns the indexing finger to its locked position rotating the magazine to bring another merchandise compartment into register with the vending station.

In this manner of operation, the rotation of the magazine is completely controlled by the pivotal movement of the indexing finger from its indexing position to its locked position. The peripheral studs of the magazine are always in contact with either the cam-shaped head of the indexing finger or the cam-shaped stud on the frame member, thus preventing the magazine from being rotated in any manner other than that just described.

In a preferred form of this invention, the drum-type magazine is mounted with its axis of rotation horizontally disposed and the vending station is positioned near the lower circumference thereof. The manual reloading of a machine so arranged is greatly simplified since all of the compartments are in view, and accessible, when the door of the cabinet is opened. Also with this arrangement the articles of merchandise drop by gravity, from the merchandise compartment into the vending station, so that the person operating the machine need have no occasion to reach into the interior of the machine.

An additional feature of the invention is that the vending machine may be adapted by means of replenishing chutes disposed within the cabinet above the magazine for automatically refilling the empty merchandise compartments.

The invention will now be described with reference to the attached drawings in which:

Figure 1 is a perspective view showing the interior of a preferred form of the vending machine;

Figure 2 is a perspective cut-away view along 2—2 showing the interrelation of the operating mechanism and the periphery of the drum magazine;

Figure 3 is a detail view of the operating mechanism;

Figure 4 is a sectional view of the replenishing chute and a full merchandise compartment;

Figure 5 is a sectional view of the replenishing chute and an empty merchandise compartment; and

Figure 6 is a detail plan view showing the tab on the bottom of a replenishing chute.

As shown in Figure 1, the vending machine is enclosed in a cabinet 10, which is fitted with a hinged door 11, and provided with a suitable lock 12. The door is also provided with an opening 13, for removal therethrough of the vended article, and further provided with a coin slot 14, for the insertion of the proper coinage. A coin chute 15 is arranged to receive the coinage which is inserted in the slot 14, and leads to the coin actuated release mechanism, or coin-lock 16. A money receptacle 17, may be provided to collect the coins, issued from the coin lock 16, after the operation thereof.

Medially disposed in the cabinet 10 is the drum magazine 18 which comprises a cylinder 19 and a plurality

of compartment walls 20 fixed to the cylinder 19 and extending radially outward therefrom. The walls 20 thus define a plurality of radially disposed merchandise compartments 21 which are open at the front and at the circumference of the drum magazine 18. The back or inner end of the drum magazine 18 is closed by means of a circular wall 22 (see Figure 2) having a plurality of studs 23 mounted on the periphery thereof, and spaced in 1:1 correspondance with the merchandise compartments 21. The circular wall 22 is adapted at its hub 24 for rotational mounting of the drum magazine 18 in the cabinet 10.

Fixed retaining walls 25 surround the rotatable drum magazine 18 and serve to prevent the articles to be vended from falling out of the merchandise compartments, 21 which are at any given time below the horizontal centerline of the drum magazine 18. The retaining walls 25 are preferably cylindrical sections having an inner radius just large enough to allow the drum magazine to rotate freely. The longitudinal edges of the retaining walls 25 are flared radially outward to form the supporting members 26 and 27 by means of which the retaining walls 25 are fixed to the cabinet 10. The lower supporting members 26 are spaced apart by a distance about equal to the width of one of the merchandise compartments 21, thus forming a vending station 28 into which the contents of one merchandise compartment may drop, when said merchandise compartment is brought into register with it. It is obvious that the position of the vending station 28 need not be as shown in Figure 1, but may be arranged to receive the contents of any one of a number of merchandise compartments in the lower segment of the drum magazine. For any desired arrangement, however, it is preferred that the vending station be in register with a merchandise compartment when the drum is at rest, in order to prevent jamming. The opening 13 in the door 11 is positioned to allow access to the vending station 28 and preferably is of the same size and shape as the cross-section thereof so that no other part of the interior of the vending machine is accessible.

The upper supporting members 27 may be attached to the sides or top of the cabinet 10 as desired. The supporting members 27 are spaced apart by a distance corresponding to the width of several merchandise compartments 21. Pairs of parallel disposed wall members 29 are attached at their upper edges to the top of the cabinet 10, and extend downward to the circumference of the drum magazine 18 forming a plurality of replenishing chutes 30 the width of each corresponding to that of one merchandise compartment 21. The arrangement shown in Figure 1, wherein the members 27 are utilized also as walls of two of the replenishing chutes 30 may be used, but this is obviously not a necessity. The replenishing chutes 30 are arranged to deposit an article to be vended into an exhausted merchandise compartment 21 each time such a compartment is brought into register. It is preferred that the replenishing chutes as well as the vending station be arranged so that they are in register with the merchandise compartments when the drum magazine is at rest. Obviously the provision of the replenishing chutes is not essential to the invention, and their inclusion in any particular machine is optional.

The bottom of each replenishing chute 30 is provided with a hinged tab 31 for supporting the articles to be vended stacked therein. The tab 31 normally rests on top of an article in a full compartment, as illustrated in Figure 4. The vended article is indicated as A. When an empty merchandise compartment 21 comes into register with the replenishing chute 30 the tab 31 will swing downward and allow a package from the chute 30 to drop into the merchandise compartment 21. It is obvious that the tab 31 should be hinged so that when it swings downward its direction of rotation will be opposite to that of the drum magazine 18 thus avoiding the possibility of catching or jamming during rotation. To further avoid

jamming a cut-away section 32 just slightly larger than the dimensions for the tab 31, is provided at the outer edge of each compartment wall 20 which allows the tab 31 to freely pass therethrough. In other words, once the tab 31 has swung downward it remains thus disposed until such time as the vending machine is reloaded manually.

The operating mechanism 33 is arranged to cooperate with the studs 23 mounted on the periphery of the circular wall 22 of the drum magazine 18. In one contemplated form of this invention, shown in Figure 3, the operating mechanism 33 comprises a frame member 34 having a longitudinal, horizontally disposed guide channel 35 and a horizontally disposed toothed rack 36. The frame member 34 is mounted on the coin lock 16 by means of a guide member 37 which slideably engages the sides of the guide channel 35. A toothed gear 38 is keyed to the lock shaft 39 of the coin lock 16 and is arranged so that its teeth mesh with the teeth of the rack 36. Thus, rotation of the lock shaft 39 by a suitable handle or knob (not shown) will rotate the gear 38 which rotation will be translated through the rack 36 to a horizontal shifting of the frame member 34. In the normal position of rest, as indicated by solid lines in Figure 3, the lock shaft 39 is positioned at the extreme right-hand end of the guide channel 35 and may act as an abutment limiting the leftward travel of the frame member 34. When the frame member 34 is shifted to the withdrawn position as indicated by broken lines in Figure 3, its limit of travel may be determined by the abutment of the guide member 37 against the extreme left-hand end of the guide channel 35. In this connection, it is preferred that the coin lock 16 be so constructed that the lock shaft 39 may be rotated through only a certain angle, thereby limiting the travel of the frame member 34 and preventing undue force being applied to the operating mechanism 33. It will be obvious to those skilled in the art that the means of translating the rotation of the lock shaft 39 into reciprocal movement of the frame member 34, need not be a rack and pinion as just described. A mechanical linkage, or cam arrangement could obviously be substituted and would serve equally as well.

An indexing finger 40 is pivotally mounted on a pivot means 41 on the frame member 34. In the preferred form of this invention illustrated in Figures 2 and 3, the indexing finger 40 comprises a shaft 42 and a cam shaped head 43, said shaft and said head having a continuous, flat upper surface, which is normally horizontal when the operating mechanism 33 is at rest, i. e., when the indexing finger is in the locked position. A stud 44 which may be fixed to the shaft 42 as illustrated in Figure 2, or adjustably mounted thereon as illustrated in Figure 3 is preferably provided to maintain the indexing finger 40 in its proper locked position. A lever arm 45 is connected to the indexing finger 40 adjacent to the pivot means 41 and is disposed outward and downward therefrom. The lever arm 45 is biased toward the left by suitably biasing means, such as the spring 46. A cam arrangement could also be used effectively as a biasing means, and in the case where the pivotal movement of the indexing finger is in a vertical plane a weight on the end of the indexing finger would serve the same purpose.

The spring 46 is connected at one end thereof with the free lower end of the lever arm 45 and anchored at the other end thereof on the frame member 34. In the rest position of the operating mechanism 33, the lever arm 45 bears against the lock shaft 39 which thus serves as a stop means for the indexing finger 40 and said arm may be made with a curve or bend, as shown in Figure 2, in order to bear properly against said lock shaft. Here also, it will be obvious that the stop means need not be limited to the arrangements shown, but could be arranged in a number of other ways such as at separate stud member mounted within the cabinet adjacent the frame member, or as a part of a cam arrangement also adapted for

biasing the finger to its indexing position as indicated hereinabove.

The cam shaped head 43 is preferably formed substantially as illustrated in the accompanying drawings. The widest part of the cam shaped head 43 is arranged to contact or almost contact the edges of two successive studs 23 when the frame member 34 is in its position of rest. The drum magazine 18 is thus prevented from rotation in either direction. When the frame member 43 is removed from engagement with the studs 23 and the indexing finger 40 is pivoted upward by the spring 46. A cam shaped stud 47 is mounted on the frame member 34 so that the shifting to the withdrawn position causes it to be interposed between the studs just disengaged by the cam shaped head 43. Thus the drum magazine 18 remains non-rotatable.

Upon shifting the frame member 34 back to its position of rest, the cam-shaped stud 47 is disengaged from the space between two peripheral studs and the cam-shaped head 43 enters the immediately superadjacent space and contacts the lower of the two studs. The lower surface 48 of the cam shaped head 43 is suitably adapted for sliding engagement with the thus contacted stud 23 and commences to force it downward. Then finally the indexing finger 40 is itself pivoted downward by the stop means, namely the lever arm 45 bearing against the lock shaft 39. In this manner the drum magazine 18 is smoothly rotated through a predetermined angle by each operation of the operating mechanism 33.

It will be realized from the description given hereinbefore of the drum magazine 18 that this predetermined angle will depend upon the chosen dimensions of the merchandise compartments 21 and it will also be realized from the above description of the operation of the operating mechanism 33 that the position of the studs 23 must be carefully determined to ensure at all times the proper registration of the merchandise compartments 21 with the venting station 28 and the chutes 30.

To ensure proper operation of the operating mechanism 33 it is obvious that the indexing finger 40 should not be pivoted upward more than a definite distance. The pivotal movement may be limited by providing suitable arrestment means in conjunction with the pivot means 41, the shaft 42 or the lever arm 45 as desired. In a preferred form shown in Figure 3, the end of the indexing finger 40 is modified to form a shoulder 49, the lower corner of which contacts the upper surface of the rack 36 and thus acts as an arrestment means. The details of this adjustment of the pivotal movement of the indexing finger 40 should not be construed as a limitation of the scope of the present invention.

During the operation thus described, the rotation of the drum magazine 18 is controlled entirely by the operating mechanism 33 and in particular by the cam-shaped head 43 and the cam-shaped stud 47 mounted thereon. With such an arrangement it might be possible to tamper with the normal movement while the operating mechanism is between its limits of travel. In other words, one might hold the operating mechanism between its position of rest and withdrawn position and force the drum magazine to rotate in the reverse direction damaging the operating mechanism and perhaps the replenishing chutes, if present. To prevent this possibility, it is preferred to provide a ratchet 50 pivotally mounted with the cabinet 10 and arranged to cooperate with the peripherally mounted studs 23 so as to prevent any reverse rotation of the drum magazine 18. When this feature is included in the present invention, it ensures positive action of the operating mechanism.

From the foregoing it will be realized that the vending machine of the present invention is of simple construction, assuring reliable trouble-free operation. In the general form of the invention, the dimensions of the machine and, particularly of the merchandise compartments 21 and of the venting station 28 and the chutes 30, need not be

determined by the size of the article to be vended. The vending machine is thus quite versatile and anything small enough to fit into one of the merchandise compartments can be vended. However, in a preferred form of the invention in which the use of replenishing chutes 30 is desirable, the dimensions of the machine should be determined by the size of the article to be vended, in order better to ensure trouble-free operation. As illustrated by the sectional view of Figure 4, the compartment walls 20 should extend only a short way past the end of the article to be vended, which is indicated as "A." The width of the merchandise compartments 21 should also be just ample to accommodate one article to be vended. This arrangement obviously prevents more than one article entering a merchandise compartment 21 at any time from one of the replenishing chutes 30.

It will be appreciated that the described operation of the vending machine causes the articles of merchandise to be vended in an orderly sequence which obviates the possibility of any given article remaining in the machine too long. This fact is quite important in the vending of goods which tend to be perishable.

It will also be appreciated that the operating mechanism of the present invention is per se novel and capable of wide application where controlled intermittent motion is required. Obviously the interrelation of the operating mechanism 33 and the device or object whose motion is to be controlled, need not be restricted to that indicated in Figure 2. For example, instead of being extended radially as shown therein, the peripheral studs 23 of the drum magazine 18 could be extended axially from the wall 22, in which case the operating mechanism 33 could be disposed either inside or outside the circumference of the said magazine.

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. An actuating mechanism for a vending machine of the type comprising a freely rotatable drum-type magazine having a plurality of radially disposed merchandise compartments uniformly positioned about the periphery thereof, a cabinet adapted to house said magazine and provide a mounting therefor and means within said cabinet providing a venting station arranged to receive articles of merchandise from successive compartments as the latter are successively brought into register therewith during operation of said machine, said mechanism comprising; a plurality of studs uniformly spaced about the periphery of said magazine in 1:1 relationship with said compartments; a coin actuated release mechanism mounted in said cabinet, and including a shaft rotatable through a predetermined angle upon deposit in said mechanism of predetermined coinage; a frame member slidably mounted within said cabinet and arranged for reciprocation between a position of rest and a withdrawn position; means for translating rotary movement of said shaft to sliding movement of said frame member; and indexing finger pivotally mounted on said frame member, pivotally movable between an indexing position and a locked position, and having a cam-shaped head adapted to fit slidably between two adjacent studs of said plurality of studs; a cam-shaped stud corresponding in size and shape to said cam-shaped head mounted on said frame member in alignment with said cam-shaped head when the latter is in its locked position and closely adjacent thereto; means for biasing said indexing finger towards said indexing position; fixed stop means comprising the shaft of said cam actuated release mechanism in articulative association with said indexing finger and arranged to hold the latter in its locked position when said frame member is in its position of rest; said plurality of studs, said frame, said cam-shaped stud, and said indexing finger being so arranged that in its locked position the cam-shaped head on said indexing finger fits between two adjacent peripheral studs on said magazine holding the latter securely in position with one merchandise compartment in register with

said vending station, withdrawal of said frame member brings said cam-shaped stud into the space between said two peripheral studs previously occupied by said cam-shaped head and frees said indexing finger to move to its indexing position, and return movement of said frame member to its position of rest causes said cam-shaped head to move into the next adjacent space between two peripheral studs whereupon contact with said stop means return said indexing finger to its locked position rotating said magazine to bring another merchandise compartment into register with said vending station.

2. An actuating mechanism for a vending machine of the comprising a freely rotatable drum-type magazine having a plurality of radially disposed merchandise compartments uniformly positioned about the periphery thereof, a cabinet adapted to house said magazine and provide a mounting therefor, and means within said cabinet providing a vending station arranged to receive articles of merchandise from successive compartments as the latter are successively brought into register therewith during operation of said machine, said mechanism comprising a plurality of studs uniformly spaced about the periphery of said magazine in 1:1 relationship with said compartments; a coin actuated release mechanism mounted in said cabinet, and including a shaft rotatable through a predetermined angle upon deposit in said mechanism of predetermined coinage; a frame member slidably mounted within said cabinet and arranged for reciprocation between a position of rest and a withdrawn position; means for translating rotary movement of said shaft to sliding movement of said frame member; a bell crank pivotally mounted on said frame member, pivotally movable between an indexing position and a locked position, and having on one arm thereof a cam-shaped head adapted to fit slidably between two adjacent studs of said plurality of studs; a cam-shaped stud corresponding in

size and shape to said cam-shaped head mounted on said frame member in alignment with said cam-shaped head when the latter is in its locked position and closely adjacent thereto; spring means biasing said bell crank towards said indexing position; one arm of said bell crank being in articulative association with said shaft of the coin actuated release mechanism and arranged to hold the bell crank in its locked position when said frame member is in its position of rest; said plurality of studs, said frame, said cam-shaped stud, and said bell crank being so arranged that in its locked position the cam-shaped head on said bell crank fits between two adjacent peripheral studs on said magazine holding the latter securely in position with one merchandise compartment in register with said vending station, withdrawal of said frame member brings said cam-shaped stud into the space between said two peripheral studs previously occupied by said cam-shaped head and frees said bell crank to move to its indexing position, and return movement of said frame member to its position of rest causes said cam-shaped head to move into the next adjacent space between two peripheral studs whereupon contact with said stop means returns said bell crank to its locked position rotating said magazine to bring another merchandise compartment into register with said vending station.

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