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E. C. JOHNSON
VENDOR DRIVING MECHANISM

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2 Sheets-Sheet 1

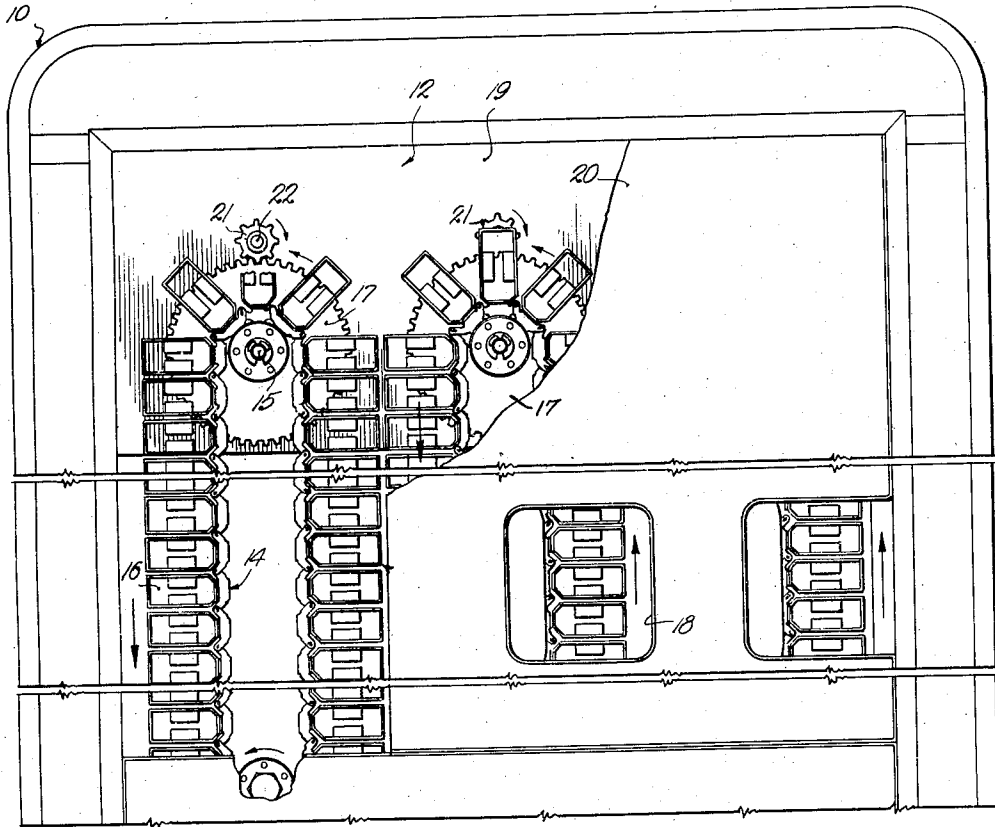


Fig. 1.

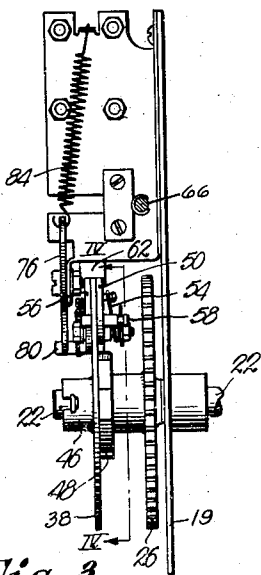


Fig. 3.

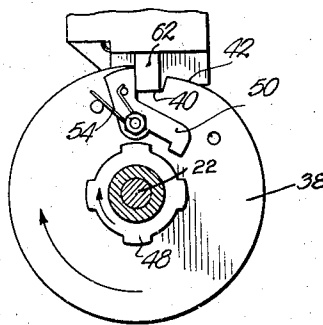


Fig. 4.

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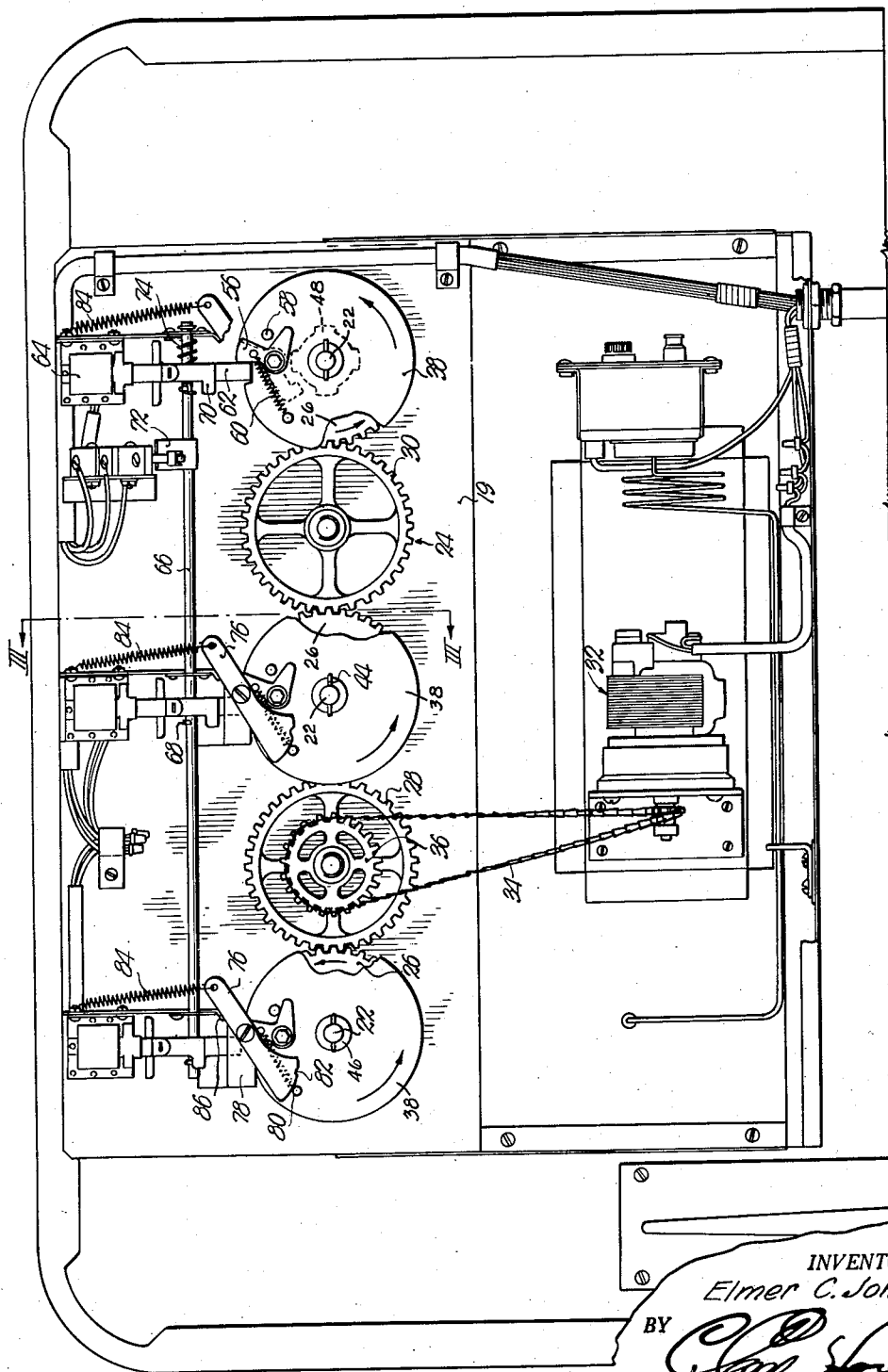


Fig. 2.

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VENDOR DRIVING MECHANISM

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4 Claims. (Cl. 312-97)

This invention relates to improvements in vending machines and particularly to the driving mechanism therefor, the primary object being to provide novel means for actuating a selected vending unit from a common prime mover.

It is the most important object of the instant invention to provide in a vending machine of the kind having a series of vending units each of which in turn is provided with a rotatable shaft, driving mechanism that includes a single prime mover that is automatically coupled with the shaft of a selected unit upon insertion of a coin in the machine and/or upon otherwise making of a selection by the customer.

Another object of the present invention is to provide drive mechanism that includes a train of gears connected to a prime mover and including a control assembly for operably connecting a selected vending assembly into the train of gears for operation thereby to the exclusion of the remaining vending units of the machine.

Other objects include the way in which each vending unit is provided with a driven element loosely mounted on its driven shaft and constituting one of the gears of the train of gears aforementioned; the way in which a control disc is made fast to each of said shafts respectively, and operably coupled with the corresponding gear through pawl-ratchet means; the manner of providing a latching bolt engageable within a notch of the disc for normally holding the latter against rotation; the way in which the bolt is held out of the notch and out of engagement with the said pawl by a holding dog swingable similarly to the pawl across the notch when the bolt is retracted; the manner of providing a pallet engageable with a stud on the disc for holding the latter against retrograde movement; the way in which safety means in the nature of an indentation is provided on the said pallet; the manner of spring-loading the latter to positively align the notch with the bolt; and the manner of providing switch means for the prime mover, together with mechanism operably coupled with the latching bolts to control the prime mover each time a selection is made by a customer.

In the drawings:

Figure 1 is a fragmentary, front elevational view of a vending machine with the access door normally provided therefor entirely removed and parts being broken away to illustrate the driving mechanism of the instant invention.

Fig. 2 is a fragmentary, rear elevational view with the rear panel of the cabinet entirely removed and with parts broken away for clearness.

Fig. 3 is a fragmentary, cross-sectional view taken on line III-III of Fig. 2; and

Fig. 4 is a fragmentary, detailed, cross-sectional view taken on line IV-IV of Fig. 3.

The vending machine chosen for illustration of the principles of the instant invention includes a suitable cabinet broadly designated by the numeral 10 having a storage compartment 12 adapted to contain a plurality of

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separate vending units, there being three of such units illustrated in Fig. 1 of the drawings.

Each unit consists of a continuous conveyor 14 having open front, article-receiving pockets or holders 16, successively registrable with openings 18 in a vertical partition 20. Manifestly, the access door for cabinet 10, not illustrated in the drawings, is provided with secondary doors, gates or the like, rendering the merchandise carried by the pockets 16, available to the customer after insertion of a suitable coin or the like.

Conveyors 14 are manifestly each provided with spaced, horizontal shafts in the usual manner, one of which is shown in Fig. 1 of the drawings and designated by the numeral 15. Each of the shafts 15 has a relatively large gear 17 fast thereto and disposed inwardly of a vertical partition 19 within the cabinet 10.

Each conveyor 14 respectively, is provided with an operating shaft 22 journaled in the partition 19, and, as shown in Fig. 2 of the drawings, there is provided a train of gears broadly designated by the numeral 24 operably interconnecting the three uppermost driven shafts 22 of the three corresponding vending units 14. To this end each shaft 22 respectively, has a gear 26 loosely mounted thereon and intermeshing with idler gears 28 and 30. Gear 28 is driven by a prime mover 32 such as an electric motor, through a continuous chain 34 trained around a small gear 36 operably connected with the gear 28.

Thus, upon energization of the electric motor 32 to drive the gears 36 and 28 clockwise, viewing Fig. 2, the three gears or driven elements 26 will all be rotated anti-clockwise, viewing Fig. 2.

The train of gears 28 are all located behind the partition 19 as is clear in Figs. 2 and 3, and each driven shaft 22 respectively is provided with a pinion 21 rigid thereto and disposed forwardly of the partition 19 in meshing relationship with corresponding gears 17.

Each conveyor shaft 22 respectively is also provided with a control member in the nature of a disc 38 provided with a peripheral notch 40 and cut away slightly as at 42 on its periphery adjacent the notch 40. Each disc 38 is made fast to its corresponding shaft 22 by a key 44 passing through its shaft 22 and through slotted hub 46 integral with each disc 38 respectively. Each gear 26 respectively is provided with a peripherally toothed ratchet wheel 48, the ratchet wheels 48 being disposed between the discs 38 and the gears 26 as seen in Fig. 3 of the drawings and being secured rigidly to the gears 26 for rotation therewith.

Releasable locking means in the nature of a spring-loaded, swingable locking pawl 50, is provided on the front face of each disc 38 respectively, adjacent its notch 40. Swingable pawls 50 carried by the discs 38 for rotation therewith are biased toward ratchet wheels 48 by springs 54 interposed between pawls 50 and discs 38. Similarly, each disc 38 respectively, carries a swingable holding dog 56 on the rearmost faces of the discs 38 adjacent the notches 40, and biased toward stops 58 on the discs 38 by springs 60 interconnecting the dogs 56 and the discs 38.

The notches 40 normally receive releasable latching means in the nature of a vertically reciprocable bolt or plunger 62 operably coupled with power means such as solenoids 64.

A rotatable rod 66 above the discs 38 and the train of gears 24 is provided with a radial pin 68 within the path of travel of a lateral extension or projection 70 on each bolt 62 respectively. The rod 66 is operably coupled with an electric switch 72 that is in turn coupled with prime mover 32 in a conventional manner (not shown) to energize the motor 32 when switch 72 is closed.

Normally open switch 72 is closed upon rotation of

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rod 66 against the action of a spring 74 coiled thereon and such rotation of the rod 66 is caused by upward movement of the pins 68 to the position shown in Fig. 2 of the drawings upon retraction of any one of the bolts 62 from within corresponding notch 40 through energization of the associated solenoid 64. It is seen, therefore, that the mechanism for closing the switch or control device 72 is common to the three vending units 14.

A spring-loaded, swingable pallet 76 is mounted on a bracket 78 for engagement with a lateral stud 80 on disc 38 to hold the latter against retrograde rotation. It is seen that there is a pallet 76 for each disc 38 to hold the latter against clockwise rotation when in engagement with studs 80. An indentation 82 in the lowermost arcuate end of the pallet 76 is adapted to receive the stud 80 under circumstances hereinafter to be more fully described. Springs 84 for normally holding the pallets 76 biased against stops 86 are of sufficient strength to tend to rotate the discs 38 counter-clockwise for purposes also to be hereinafter clarified.

As above indicated, the latching bolts or plungers 62 are normally disposed within their corresponding notches 40, thereby locking the control discs 38 against rotation in either direction. Consequently, if at that time, the motor 32 were energized, it would idly drive the train of gears 24 together with the three ratchet wheels 48 without any consequent rotation of the discs 38, the shafts 22 or the conveyors 14.

Upon selection by the customer of desired merchandise by insertion of a coin or other selection of one of the solenoids 64, the latter will be energized to first lift the corresponding bolt 62 from within its notch 40. One of the said bolts 62 is shown retracted in Fig. 2 and consequently its lateral projection 70 has moved to a position engaging the pin 68 thereabove, rotating the rod 66 against the action of spring 74 and closing the switch 72. Such closing of switch 72 energizes the prime mover 32 and switch 72 remains closed during the succeeding cycle of operation even though the solenoid 64 is deenergized by movement of the coin to a collection box.

As soon as the latching bolt 62 is thus retracted the corresponding pawl 50 will swing into engagement with the proximal ratchet wheel 48 under the influence of spring 54. Simultaneously, the holding dog 56 will be swung against the stop 58 by spring 60. Both the pawl 50 and the dog 56 move across the notch 40 beneath the bolt 62. Upon deenergization of solenoid 64, bolt 62 drops to a position engaging the dog 56 but does not drop sufficiently to open switch 72. It is to be noted in Fig. 4 of the drawings that the upper end of pawl 50 is spaced below the periphery of disc 38 so that when the bolt 62 moves into engagement with the dog 56, it will not contact the pawl 50 and tend to retract the latter from engagement with ratchet wheel 48 when disc 38 commences to rotate.

As the motor 32 drives the train of gears 24, the ratchet wheel 48 that is locked with its disc 38 by pawl 50, will rotate such disc 38 and, therefore, the corresponding shaft 22 through hub 46 and key 44. Disc 38 rotates one revolution clockwise, viewing Fig. 4, until the bolt 62 drops back into the notch 40 and by virtue of such single rotation of the disc 38, the corresponding conveyor 14 will be advanced one step. Manifestly, the dog 56 and the pawl 50 are engaged by the bolt 62 as the disc 38 completes its cycle of revolution, thereby moving the dog 56 and the pawl 50 to the normal position against the action of springs 60 and 54 respectively.

As the stud 80 rotates with the disc 38, it first moves away from the lowermost arcuate edge of the corresponding pallet 76, and thereupon re-engages the pallet 76 swinging the latter against the action of spring 84 until the stud 80 snaps into position beneath the holding pallet 76, as shown in Fig. 2.

In the event that the disc 38 does not complete its cycle of revolution sufficiently to permit re-entry of the

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bolt 62 into its notch 40, spring 84 acting on the pallet 76 and the latter in turn acting upon the stud 80, will continue the rotation of the disc 38 until the bolt 62 falls into place within its notch 40.

In the event attempt is made to shift any one of the conveyors 14 in a direction to cause clockwise rotation of the corresponding disc 38 (viewing Fig. 2), the stud 80 will slide along the lowermost arcuate edge of the pallet 76 and enter the indentation 82. Further movement of such conveyor 14 is thus prevented by the locking engagement of the stud 80 within the indentation 82 of pallet 76. Manifestly, as soon as the bolt 62 re-enters the notch 40, spring 74 will rotate the rod 66 to swing the pin 68 downwardly and thereby reopen the switch 72, causing deenergization of the prime mover 32.

As above indicated, each cycle of rotation of a disc 38 rotates driven shaft 22 therefor, which in turn rotates the corresponding pinion 21 to impart rotation to gear 17, thereby advancing the conveyor or vending unit 14 one step through its shaft 15.

Having thus described the invention what is claimed as new and desired to be secured by Letters Patent is:

1. In a vending machine having a prime mover and a control device for said prime mover, a cabinet having a storage compartment; a plurality of conveyors in the storage compartment; a shaft operably coupled with each conveyor respectively; a driven element loosely mounted on each shaft respectively; means coupling said elements with said prime mover for simultaneous operation thereby; a control member fast to each shaft respectively, each member being provided with releasable locking means adapted for coupling the same with a corresponding element; releasable latching means for each member respectively, normally holding the latter against rotation, and normally holding the corresponding locking means in an inoperative position whereby, upon release of the latching means, the shafts are driven from said elements through the members; and mechanism operably interconnecting the latching means and said control device for actuating the latter and energizing the prime mover upon said release of the latching means.

2. In a vending machine, a plurality of driven shafts; a driven element loosely mounted on each shaft respectively and each provided with a ratchet wheel; means coupled with said elements for driving the same simultaneously; a control disc fast to each shaft respectively, and provided with a peripheral notch; a latching bolt for each disc respectively normally within the notch thereof; a locking pawl on each disc respectively adapted to engage a corresponding ratchet to couple the discs with said elements, whereby the shafts are driven from said elements through the discs upon withdrawal of the latching bolt from the notches, each latching bolt being provided with power means for withdrawing the same from its notch; and a holding dog mounted on each disc respectively and movable into the path of travel of corresponding latching bolts upon withdrawal of the latter from the notches to restrain the latching bolts from re-entering the notches upon de-energization of said power means.

3. In apparatus of the kind described, a driven shaft; a ratchet wheel loosely mounted on the shaft; a control disc fast to the shaft and provided with a notch; a latching bolt normally disposed within the notch for holding the disc against rotation; a locking pawl swingably mounted on the disc and normally engaging the bolt; spring means interconnecting the pawl and the disc for swinging the pawl into engagement with the ratchet wheel upon withdrawal of the bolt from the notch, whereby the disc and the shaft are rotated as the ratchet wheel is driven; a stud on the disc; and a swingable, spring-loaded pallet engageable with the stud for holding the disc against retrograde rotation, said pallet having a stud-receiving indentation to restrain swinging of the pallet

against the action of its spring upon said retrograde rotation of the disc.

4. In apparatus of the kind described, a driven shaft; a ratchet wheel loosely mounted on the shaft; a control disc fast to the shaft and provided with a notch; a latching bolt normally disposed within the notch for holding the disc against rotation; a locking pawl swingably mounted on the disc and normally engaging the bolt; spring means interconnecting the pawl and the disc for swinging the pawl into engagement with the ratchet wheel upon withdrawal of the bolt from the notch, whereby the disc and the shaft are rotated in one direction as the ratchet wheel is driven; a stud on the discs; and a swingable pallet engageable with the stud for holding the disc against rotation in one direction, said pallet being spring-loaded whereby to tend to rotate the disc in a direction opposite to said one direction when the pallet is in engagement with the stud and thereby align the notch with the bolt.

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