Nov. 29, 1932. L. H. LARSEN ET AL 1,889,318

DELIVERY MECHANISM FOR ARTICLE DISPENSING MACHINES

Filed July 11, 1928 2 Sheets-Sheet 1

Fig. 1.

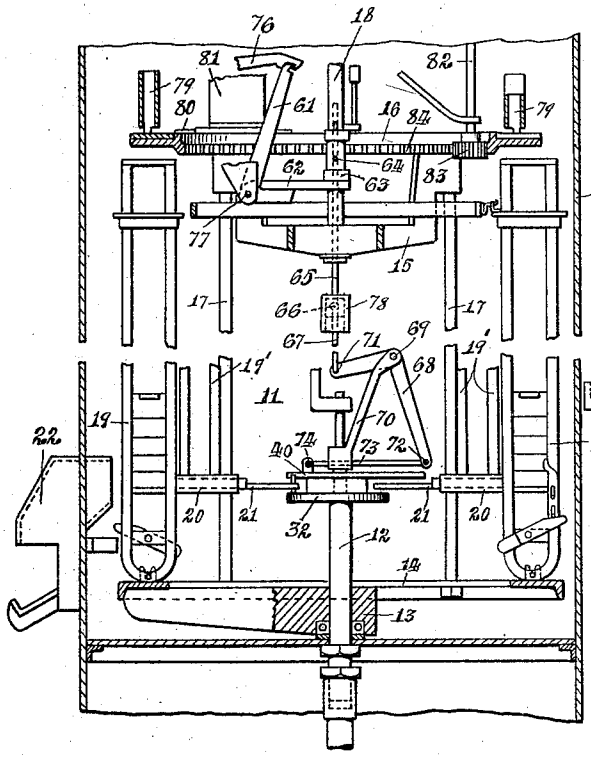
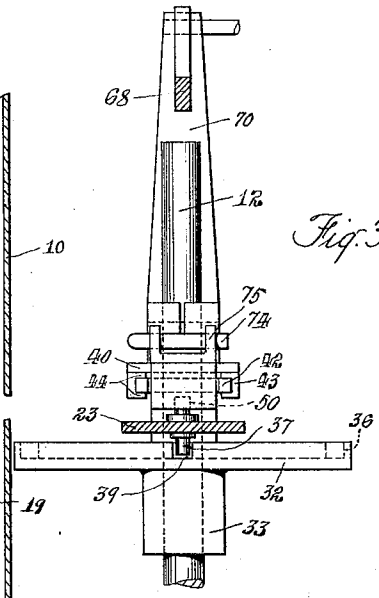


Fig. 3.



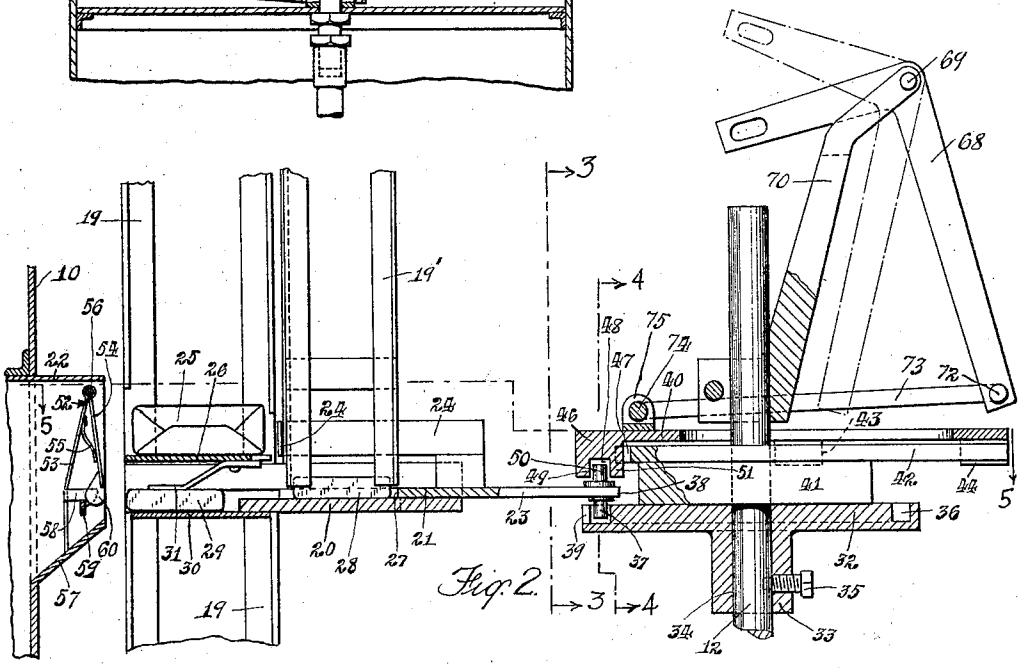


Fig. 2.

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Fig. 4.

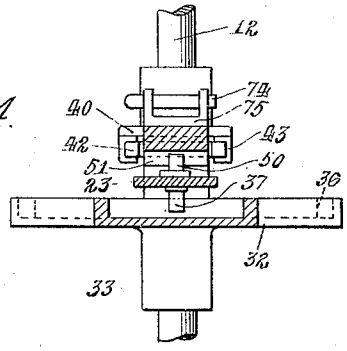
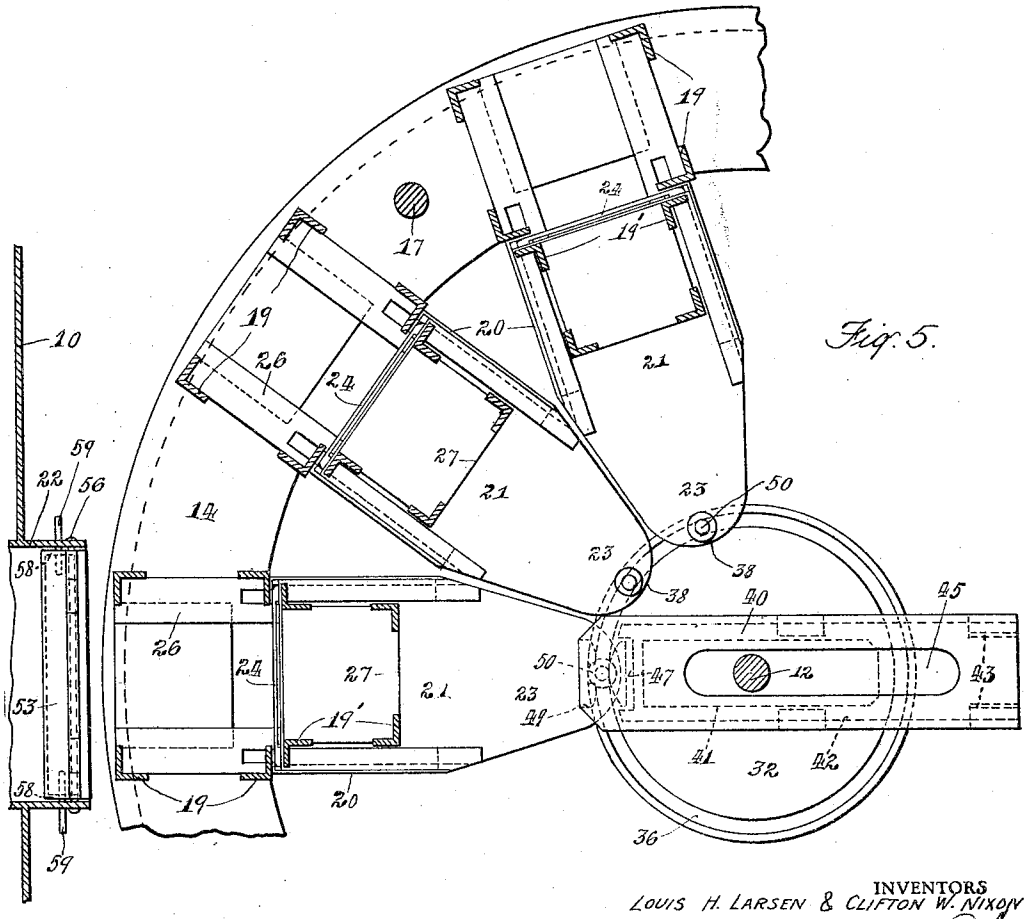


Fig. 5.



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UNITED STATES PATENT OFFICE

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DELIVERY MECHANISM FOR ARTICLE DISPENSING MACHINES

Application filed July 11, 1928. Serial No. 291,912.

This invention relates to article dispensing machines and is illustrated as embodied in a combined vending and change-making machine wherein a rotary magazine structure contains a series of article holding units, the invention being more particularly related to the mechanism for effecting the discharge of articles from the article holding units.

The invention has for its object, among other things, to provide for the use of individual ejectors for the article holding units, to provide a novel pusher through the agency of which the necessary ejecting impulse can be imparted to the individual ejectors, and to provide a greatly improved and simplified construction of means for operatively supporting the individual ejectors and the pusher so that these parts will cooperate and function properly in a relatively small space.

Another object of the invention is the provision of a novel grooved table for retaining the individual ejectors in operative radial relation for free movement into and out of a position in which they can be operated by the pusher, and further the provision on the pusher of a novel coupling or retaining head whereby to transmit the ejecting impulse and yet to retain the connected ejector from getting out of position and also to prevent it from being accidently operated.

A further object is the provision of a mechanism of the character described which will permit the free rotation of the magazine structure in either direction, and which will permit the article holding units to be readily mounted in place upon the magazine structure, as well as to permit their ready removal therefrom.

A further object is the provision of a mechanism of the character described which is capable of effectually causing the discharge of two articles at a time and of effectually causing one of the articles being discharged to engage and open a one-way protecting door for the delivery of both of the articles.

At this point we will state that in illustrating a particular form of our invention as embodied in a combined vending and change-making machine for the purpose of ejecting packages of merchandise, we have not intended to limit the broader aspects of the invention to that particular purpose only; for our improved mechanism involves principles of general application which may be variously adapted and modified for effecting the discharge, not only of packages, but also of articles, whether packaged or otherwise, and of checks and coins, whether packaged or otherwise.

Other objects will appear hereinafter.

The invention consists in the details of construction and in the arrangement and combination of parts hereinafter described and claimed.

The invention will be best understood by reference to the accompanying drawings forming a part of this specification, and in which:—

Fig. 1 represents a fragmentary vertical sectional view through a combined vending and change making machine, showing the adaptation therewith of an ejecting mechanism in accordance with this invention;

Fig. 2 represents a detailed elevation and section, showing an article holding unit in delivery position between the delivery receptacle and pusher, and having its ejector in operative connection with both the retaining table and pusher;

Fig. 3 represents a transverse sectional view, taken on the line 3—3 of Fig. 2, and looking in the direction of the arrows associated with said line;

Fig. 4 is a similar view, taken on the line 4—4 of Fig. 2, looking in the direction of the arrows, this view showing the annular groove in the retaining table and the through groove in the head of the pusher; and

Fig. 5 represents a plan and section taken on the line 5—5 of Fig. 2.

For the purpose of illustration we have shown a preferred example of our invention as embodied in a combined vending and change-making machine comprising a casing 10 and a skeleton magazine structure, which is indicated generally at 11, supported therein for rotation upon a vertical non-rotary axis shaft 12, the magazine structure being composed of a lower section 13 provided with a ring plate 14, of an upper section 15 provided with a ring plate 16, and of vertically extending rods 17 which rigidly connect the lower and upper sections 13 and 15. The upper section 15 turns with a center shaft 18 by which it is suitably maintained in position.

Supported upon the lower ring plate 14 is a circular series of radially arranged article holders of skeleton form, those shown herein being of a duplex character, being composed of a front column 19 and a rear column 19'. Each duplex article holder comprises a quick detachable unitary structure including a frame 20 in which is slidably mounted an ejector 21 adapted to have a forward or outward movement radially of the magazine structure for ejecting articles from the columns 19 and 19' into a delivery receptacle 22 and a corresponding backward or inward movement to starting position where its reduced portion 23 protrudes a distance beyond the inner end of the frame 20. The reciprocatory ejector 21 has a suitable pushing arm 24 adapted to eject from the front column 19 the lowermost article therein resting upon the bottom 26; and it has a pushing end 27 adapted to eject from the rear column 19' the lowermost article 28 which rests in the frame 20, the said article 28 during ejection being thrust against a similar article 29 which is thereby cast into the delivery receptacle 22, being removed from between its retaining means comprising a platform 30 and a spring 31. The ejector moves the article 28 far enough to be substituted beneath the spring 31 for the delivered article 29. Thus on each forward stroke of the ejector 21, two articles are ejected into the delivery receptacle, one from the bottom 26 and one from the platform 30. To a separate application filed on April 2, 1928, Serial No. 266,680, by Louis H. Larsen, one of the joint inventors herein, reference may be had for full illustration and description of a duplex article holder of the kind depicted herein and of the preferred means by which the same may be mounted for quick detachment.

With the arrangement above described, the article holders carry individual article ejectors and they are mounted in the magazine structure in circular series so that by turning the magazine in either direction, that is to say either to the right or to the left, any selected article holder may be brought into delivery position behind the delivery receptacle for the discharge of articles thereinto. Our present invention, in its preferred form of construction as illustrated in the accompanying drawings, comprises article ejector retaining means in the form of a disk-shaped table 32 provided with a suitable hub portion 33 and axially holed at 34 to be received on the non-rotary axis shaft 12 and to be secured thereon at the requisite elevation by means of a screw 35 or its equivalent, passed through the hub portion to engage the axis shaft. Near its circumferential edge the table 32 is provided inwardly into its body from its top surface with an annular groove 36 in which pins 37 depending from the article ejectors are loosely received. As best observed in Fig. 5, the reduced portions 23 of the article ejectors are formed by converging the sides thereof to rounded points 38 along radial lines in respect of the axis shaft in order to provide a compact radial arrangement of the article holders with their ejectors and one in which the ejectors for effecting the discharge of the articles must be thrust forward from starting position; and the pins 37 are shown as depending from the ejectors near the rounded points 38 centrally thereof. With the parts arranged as described, the pins 37 during the rotation of the magazine structure in either direction slide freely in the groove 36 and the ejectors are retained in proper starting position, being restrained by said groove, which serves as a guide, against any forward movement outwardly of the magazine structure and as well against any backward movement inwardly toward the axis shaft. Moreover, in mounting or removing the article holders, the pins can be inserted in or removed from the guide groove with ease.

The table 32 is provided with a suitable outlet 39 from the groove 36 at that predetermined point where it is necessary to allow the escape of a pin 37 for the forward thrust of its ejector when articles are to be discharged thereby from an article holder into the delivery receptacle. The means for imparting forward and backward movements to the ejectors comprises a single elongated actuating slide 40 supported upon the table 32 for lengthwise movement in directions toward and away from the delivery receptacle. In the present instance for operatively supporting the slide 40, we show a block 41 arranged upon the table and an elongated guide plate 42 arranged upon the block 41, said guide plate and block being suitably holed to receive the axis shaft therethrough.

The slide is shown as provided with depending guide blocks 43 having flanges 44 slidably embracing the marginal edges of the guide plate, and with a suitable lengthwise opening 45 to allow free movement astride the axis shaft. At its front end the slide has

a central depending coupling head 46 adapted to fit loosely in a retaining recess 47 provided in the corresponding end of the guide plate; and these parts are so arranged that when the slide is in retracted position, a transverse groove 48 therein comes opposite the groove 36 with the front abutment wall 49 occupying a position above the escape outlet 39. Each ejector, opposite its depending pin 37, has an upwardly projecting contact pin 50 adapted freely to pass through the groove 48 as the magazine structure is rotated, and it is to be noted in this connection that the ejector cannot slide forwardly under centrifugal urge so that the pin 37 will escape through the opening 39 because the front abutment wall 49 will be engaged by the contact pin 50. In this way, provision is made for operatively maintaining the article ejectors in starting position, against displacement or disarrangement, under the rotation of the magazine structure. When an article holder is in delivery position behind the delivery receptacle, its ejector can be thrust forwardly to effect the discharge of articles thereinto, since the pin 37 can pass through the escape opening 39. Forward thrusting movement is imparted by the slide to a coupled ejector by the engagement of the rear abutment wall 51 on the head 46 with the contact pin 50. The articles having been discharged, the ejector is retracted by the slide to starting position by the engagement of the front abutment wall 49 with the contact pin 50.

As shown herein, a door 52, arranged in the delivery receptacle in line with the actuating slide and as well with any ejector coupled therewith, is opened outwardly upon the engagement therewith of an article 25 that is being discharged. This door comprises a front plate 53 and a rear plate 54 separated by a spring 55, both plates depending from a common hinge pin 56 with which they have separate turning engagement. The front plate 53, which is of sufficient length to engage the outwardly sloping bottom 57 of the receptacle when the door is closed, carries catch hooks 58 adapted to engage behind rockable latches 59 suitably mounted in the receptacle. The rear plate 54 carries cam parts 60 arranged to co-operate with the rockable latches 59. By this arrangement, when the rear plate 54 is engaged by an article 25, the cam parts 60 will force the latches 59 out of engagement with the catch hooks 58, thereby releasing the door so that it can be swung outwardly by the force of the issuing article 25 to provide for the discharge into the receptacle of both articles 25 and 29. It is in place to state here that this one-way door in association with the delivery receptacle does not, in and of itself, form part of the present application and hence is not herein claimed in and of itself, as it constitutes the subject matter for a companion application.

In the illustrated embodiment, the means whereby movement is transmitted to the actuating slide comprises a bell crank actuator 61, lift frame 62, lift sleeve 63 slidable on the shaft 18 and pinned at 64 to a lift shaft 65 telescoping within the shaft 18 and connected at its lower end by a ball and socket joint 66 with a lift rod 67. A bell crank lever 68 supported by a pivot pin 69 on the bracket 70 attached to the shaft 12, has its short arm pivoted at 71 to the lift rod 67 and its long arm pivoted at 72 to a connecting rod 73 provided with an angular end portion 74 having turning fit in a bracket 75 fixed to the actuating slide. By this arrangement, when the bell crank actuator 61 through the engagement therewith of a draw bar 76 or similar moving part is rocked forwardly upon its pivot pin 77 toward the front of the casing, the frame 62, sleeve 63 and shaft 65 with parts subjoined thereto are lifted up so as to swing the bell crank lever 68 on its pivot pin and impart a forward thrusting movement to the actuating slide 40. For repositioning these parts after each actuation and causing the withdrawal of the actuating slide 40 to its starting position, a hollow cylindrical weight 78, which surrounds the ball and socket joint 66, is attached to the lift shaft 65 to be lifted therewith, the repositioning action being positively induced by the weight immediately upon the disengagement of the draw bar 76 with the bell crank actuator 61.

Upon the upper ring plate 16 is mounted a circular series of change holders 79, of which there is one in conjunction with each article holder, in order to deliver the exact change, if any change be due, in connection with the delivery of the articles. The change is ejected from the change holders 79 by means of coin ejectors 80 operatively supported in a frame 81 and commanded by the bell actuator 61. In the present embodiment, rotary movement is imparted to the magazine structure through the medium of a shaft 82 and pinion 83 which has driving connection with an internal gear 84 secured to the upper ring plate. Any suitable mechanism may be employed for effecting the rotation of the magazine structure illustrated herein and for partially rotating the bell crank actuator 61 illustrated herein, such mechanism for instance as that illustrated and described in the two applications of Clifton W. Nixon, one of the joint inventors herein, both filed on June 7, 1927, and bearing, respectively, Serial No. 197,075, and Serial No. 197,076; or the improved mechanism thereon illustrated and described in the application of Louis H. Larsen and Samuel C. McKeown, the first named being the same Louis H. Larsen who is a joint inventor herein, filed on April 2, 1928, Serial No. 266,798. Cross ref-

erences are hereby made to said applications.

The delivery mechanism illustrated and described herein is very simple in construction, inexpensive to manufacture and easy to assemble. It permits the article holders as unitary structures to be quickly mounted in place in the magazine structure, and to be as quickly detached for purposes such as reloading, changing the stock, interchanging the holders and the like.

It will be apparent from what has been said that we have provided a novel and useful construction of delivery mechanism which embodies the features of advantage enumerated in the statement of invention and the above description, and while we have, in the present instance, shown and described a specific form of mechanism embodying the principle of our invention, it is to be understood that this is susceptible of modification in various particulars without departing from the spirit and scope of our invention or sacrificing any of its advantages.

Having thus described our invention, what we claim is:

1. In a machine of the character described, a rotary article holding magazine structure provided with reciprocating ejectors, a circular element provided with means for retaining said ejectors in place while the magazine structure is rotated and having an escape outlet at one point for said ejectors, and an actuating slide arranged to engage and actuate said ejectors at said escape outlet.

2. In a machine of the character described, a rotary article holding magazine structure provided with ejectors arranged to have individual movement, a table encompassed by said magazine structure and having therein an annular groove with an outlet, means on said ejectors slidably engaging said groove and adapted to escape through said outlet, and an actuating slide mounted on said table and having a part arranged to engage and actuate an ejector moved to escape position at said outlet.

3. In a machine of the character described, a rotary article holding magazine structure provided with ejectors arranged to have individual reciprocating movement, a table having therein an annular groove with an outlet, retaining pins on said ejectors slidably engaging said groove and adapted to escape through said outlet, an actuating slide mounted on said table and provided with a head having a transverse groove therein, contact pins on said ejectors adapted to pass freely through said head groove, the walls defining said head groove comprising contact pin engaging abutments for the actuation by said slide of an ejector moved to escape position at said outlet.

4. The combination of an article holder, a reciprocating article ejector for said holder, a reciprocating slide engageable by said ejector so as to have a positive coupling connection therewith, to reciprocate said ejector in accompaniment with the reciprocating movements of the slide, and means co-operating with said ejector to restrain the reciprocating movements thereof except when said ejector is in coupling connection with said slide.

5. The combination of an axis shaft, an article holding magazine structure mounted to turn thereon, a reciprocating article ejector carried by said magazine structure, an actuating slide operatively supported on said shaft and engageable by said ejector, and means upon said shaft arranged to restrain the reciprocating movements of said ejector except when the latter is in engagement with said slide.

6. The combination of an axis shaft, an article holding magazine structure mounted to turn thereon, a series of individually reciprocable article ejectors carried by said magazine structure, an actuating slide operably supported on said shaft and selectively engageable by said ejectors, and means upon said shaft arranged to restrain the reciprocating movements of each one of said ejectors except when it is in actual engagement with said slide.

7. The combination of an axis shaft, an article holding magazine structure mounted to turn thereon, a reciprocable article ejector carried by said magazine structure, a table on said shaft having said ejector in sliding engagement therewith to restrain the reciprocating movements thereof except at a predetermined releasing point, and an actuating slide on said table having a head arranged to be engaged with said ejector at said releasing point whereby to operate said ejector by said slide.

8. In a machine of the character described, the combination with an axis shaft and a magazine structure mounted to turn thereon, of a series of detachable article holders on said magazine structure furnished individually with reciprocable article ejectors, a table on said shaft with an annular groove therein in which retaining pins on said ejectors are slidably received, there being an escape outlet from said groove for said pins, an actuating slide on said table having a grooved head through which contact pins on said ejectors may freely pass, said grooved head including abutment walls for engaging the contact pin of a selected ejector to be operated by said slide at said escape outlet.

9. In a machine of the character described, consisting of a casing having a doorway, an axis shaft in the casing, an article holding magazine structure mounted to turn on said shaft, a series of individually reciprocable article ejectors carried by said magazine structure and each provided with a projection, an actuating slide common to said

ejectors and having a grooved head for receiving the projection of any selected ejector, said slide being adapted, when actuated, to cause the selected ejector to eject an article through said doorway and a table on said shaft supporting said slide and having therein a groove for receiving the projections of said ejectors, to restrain the movement of each one of said ejectors except when it is in actual engagement with the grooved head of said slide.

In testimony whereof, we have signed our names to this specification.

LOUIS H. LARSEN.
CLIFTON W. NIXON.