April 21, 1942. G. E. COOK 2,280,218

FOUR COLUMN EJECTOR

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Fig. 1.

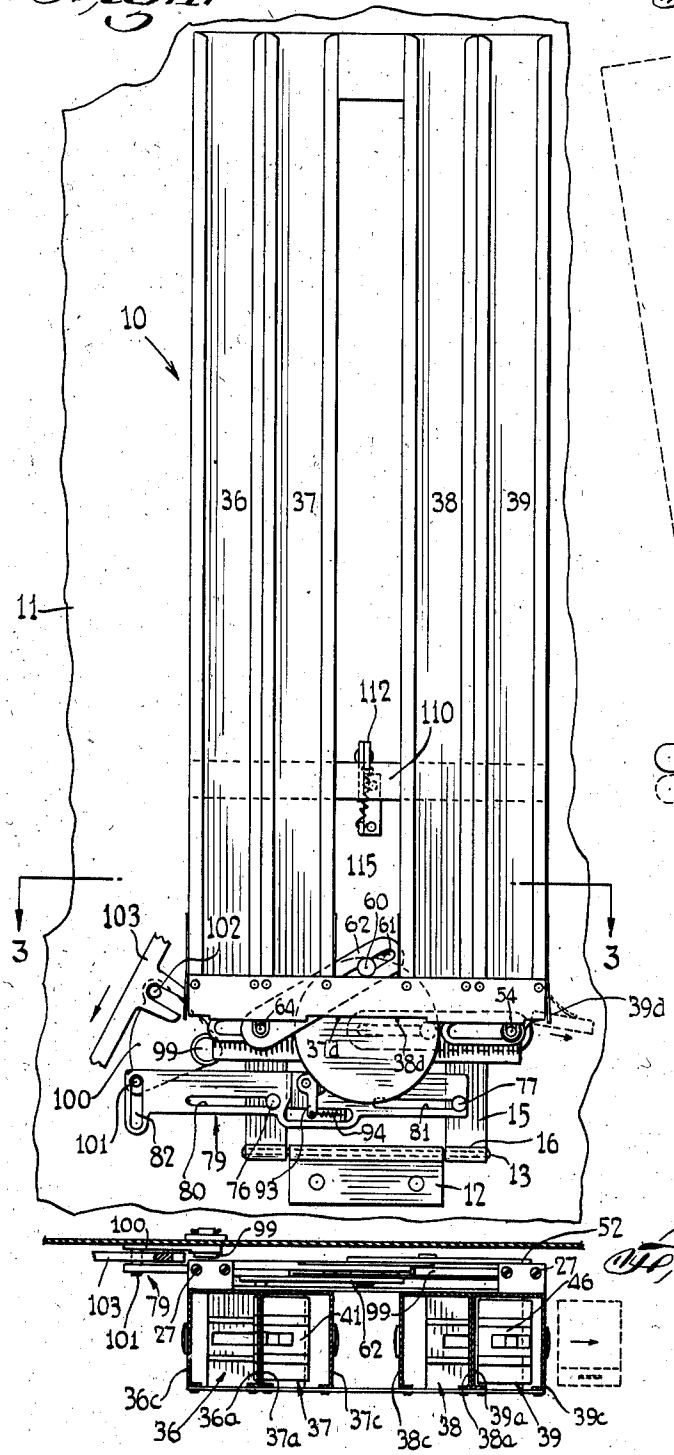


Fig. 2.

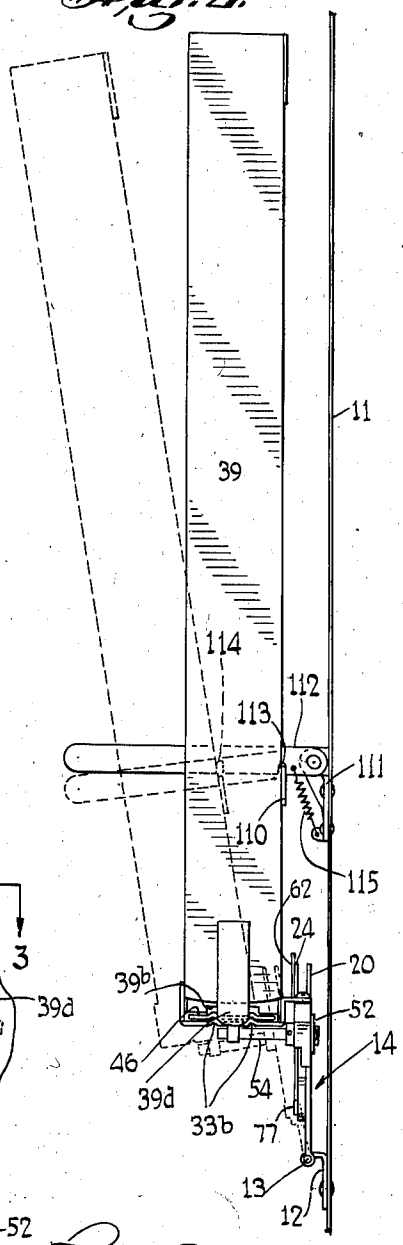


Fig. 3.

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Fig. 4.

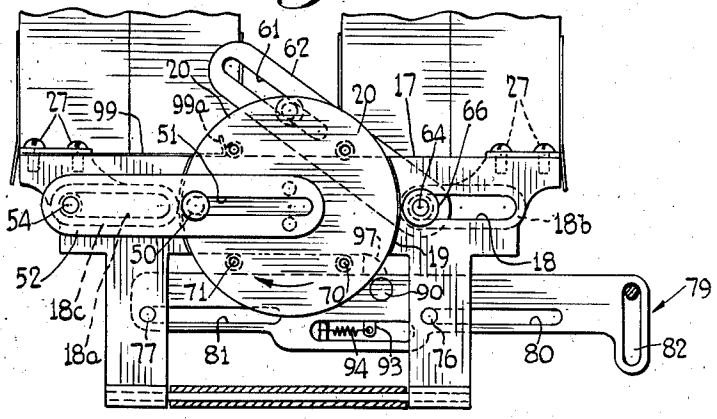
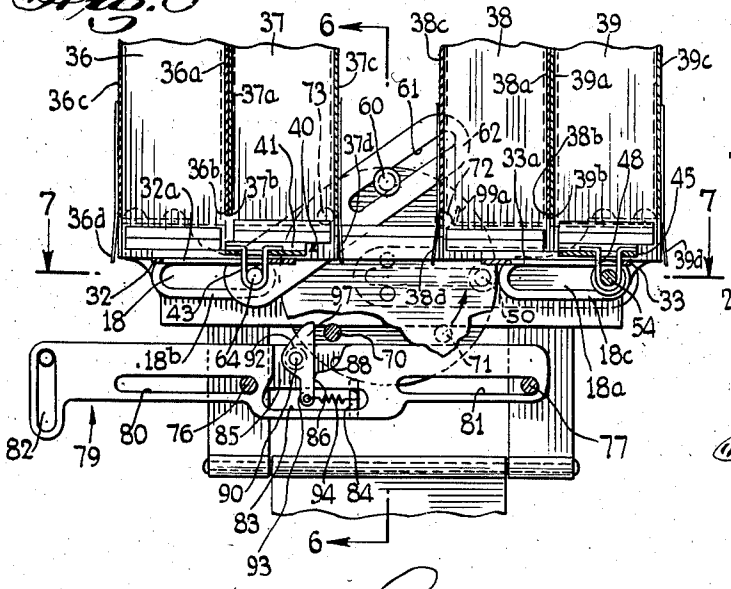


Fig. 5



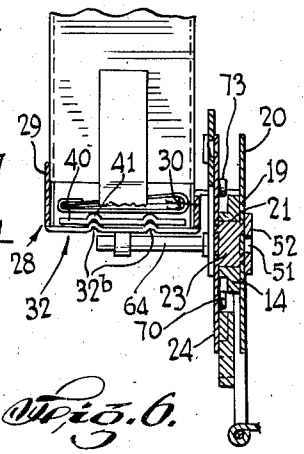
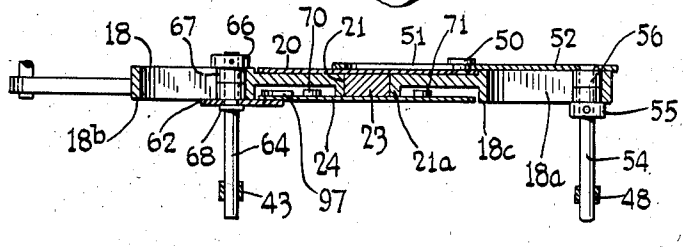


Fig. 6.

Fig. 7.



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Fig. 8.

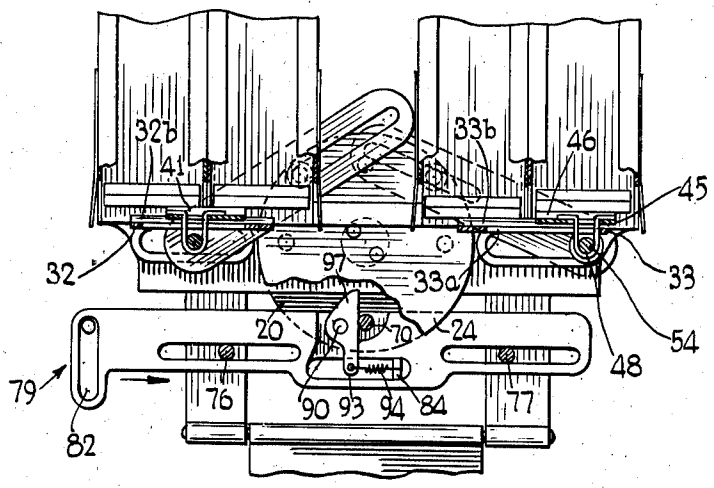


Fig. 9.

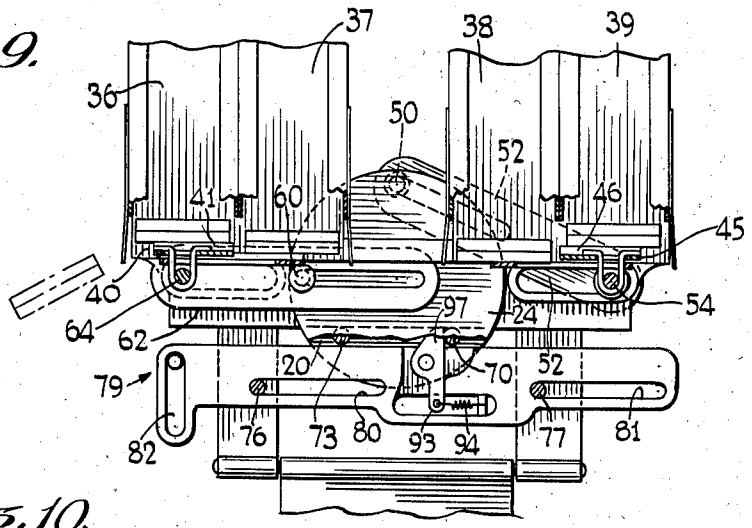
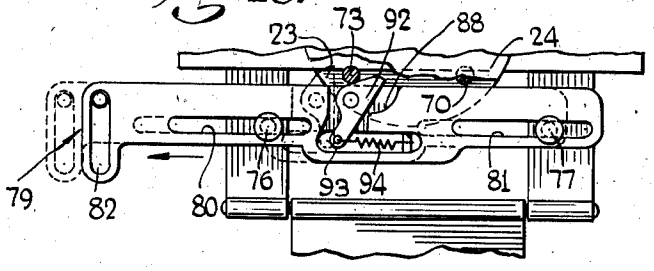


Fig. 10.



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UNITED STATES PATENT OFFICE

2,280,218

FOUR COLUMN EJECTOR

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Application December 28, 1939, Serial No. 311,299

13 Claims. (Cl. 312—67)

This invention relates to four column ejectors. It is particularly directed to a dispensing device, including four chutes and means for ejecting articles stacked in said four chutes in rotation, upon successive actuation of a single control member.

In cigarette vending machines now on the market it is customary to dispense a book of matches each time a package of cigarettes is vended. Heretofore, such machines have been provided with means to eject the books of matches as shown in my Patent No. 2,076,750. It has been found that in cigarette vending machines, the provision of only two chutes for books of matches requires too frequent servicing or refilling.

It is therefore an object of this present invention to provide four chutes in each of which is a column or stack of match books, highly improved means being provided to eject or dispense a book of matches from said chutes in a predetermined order, upon successively dispensing packages of cigarettes, the match book dispensing mechanism being so arranged that after a book of matches has been dispensed from each of the four chutes in said predetermined order, the operation is repeated to again dispense books of matches from the four chutes in the same order.

A further object of this invention is to provide a dispensing device of the character described, so constructed that the chutes together with the ejecting mechanism may be tilted forwardly and held in a forwardly tilted position to facilitate refilling of the chutes.

A still further object of this invention is to provide a strong, rugged and compact device of the character described, which shall be relatively inexpensive to manufacture, easy to assemble, positive in operation, and yet practical and efficient to a high degree.

Other objects of this invention will in part be obvious and in part hereinafter pointed out.

The invention accordingly consists in the features of construction, combinations of elements, and arrangement of parts which will be exemplified in the construction hereinafter described, and of which the scope of application will be indicated in the following claims.

In the accompanying drawings, in which is shown one of the various possible illustrative embodiments of this invention,

Fig. 1 is a front elevational view of a four column ejector embodying the invention;

Fig. 2 is a side elevational view thereof and showing the chutes together with the ejecting mechanism in a forwardly tilted position in dot and dash lines;

Fig. 3 is a cross-sectional view taken on line 3—3 of Fig. 1;

Fig. 4 is a rear elevational view of the lower end of the chutes and the ejecting mechanism;

Fig. 5 is an enlarged detailed view of the ejecting mechanism with portions broken away and in cross-section;

Fig. 6 is a cross-sectional view taken on line 6—6 of Fig. 5;

Fig. 7 is a cross-sectional view taken on line 7—7 of Fig. 5;

Fig. 8 is a view similar to Fig. 5, but showing the position of the mechanism when the cross-bar is moved partially to the right from the position of Fig. 5;

Fig. 9 is a view similar to Fig. 8 but disclosing the position of the ejecting mechanism when the cross-bar has been moved fully to the right; and

Fig. 10 is a partial view similar to Fig. 9, and illustrating the position of the ejecting mechanism when the cross-bar is retracted from the position of Fig. 9.

Referring now in detail to the drawings, 10 designates a four column ejector embodying the invention for ejecting books of matches or any other suitable articles and which may be used in a vending machine or the like. The same comprises a fixed wall, which may be a rear wall of a vending machine. Attached to said rear wall is a bracket 12 supporting a hinge pin 13. Hinged to said pin 13 is a plate 14 having a pair of parallel aligned portions 15 disposed on opposite sides of the bracket 12 and formed with aligned sleeves 16 at the lower ends thereof, to receive the pivot pin 13.

Plate 14 has a top edge 17, and is formed with a pair of aligned, horizontal, symmetrically disposed slots 18, 18*a*, for the purpose hereinafter appearing. Said plate is formed with flanges 18*b*, 18*c* on the front face thereof, surrounding said slots 18, 18*a*, respectively. On the rear face of plate 14 is a central recess 19, adapted to rotatably receive a circular disc 20, the center whereof is located on the vertical axis of the plate. Said plate 14 is furthermore formed with a through opening 21 concentric with the axis of disc 20. Journalled in the opening 21 is a shaft 23, riveted to disc 20. Riveted to said shaft 23 is a second circular disc 24, similar to the disc 20, and parallel thereto, and located on the opposite side of plate 14. The discs 20 and 24

thus rotate together about the axis of the shaft 23, for the purpose hereinafter appearing.

Attached to the upper edge 17 of plate 14, as by screws 27, is a forwardly extending bracket 28 having parallel walls 29 and 30 interconnected by a pair of spaced bottom walls 32 and 33 symmetrically disposed about the vertical axis of plate 14 and extending forwardly therefrom. The bottom walls 32 and 33 are formed with similar, longitudinal slots 32*a* and 33*a*, respectively. Said bottom walls are formed with upstanding longitudinal ridges 32*b* and 33*b*, located on opposite sides of the slots 32*a* and 33*a*, respectively.

Mounted on the bracket 28 are four upstanding chutes 36, 37, 38 and 39 adapted to contain stacks of columns of books of matches or other special articles. The lower ends of the chutes are received between the walls 29 and 30 and are riveted thereto. One pair of chutes 36 and 37 may be contiguous to each other and spaced from the other pair of chutes 38 and 39 which are also contiguous to each other. The chutes 36 and 37 are symmetrically disposed with respect to the chutes 38 and 39 on opposite sides of the vertical mid-section of plate 14. Said chutes have rear and side vertical walls and inwardly extending flanges at the front.

The contiguous walls 36*a* and 37*a* of chutes 36 and 37 have cut-outs 36*b*, 37*b* at their lower ends, for the purpose hereinafter appearing. The outer walls 36*c* and 37*c* of the chutes 36 and 37 terminate above the bottom wall 32 of bracket 28. The contiguous walls 38*a* and 39*a* of chutes 38 and 39 have cut-outs 38*b* and 39*b* at their lower ends, for the purpose hereinafter appearing. The lower ends of the outer walls 38*c* and 39*c* of chutes 38 and 39 terminate above the bottom wall 33 of bracket 28.

Slidably mounted on bottom wall 32 is a slider 40 having ridges 41 receiving the ridges 32*b* of bottom wall 32. Fixed to the slider 40 is a U-shaped strap 43 extending down through slot 32*a*, for the purpose hereinafter appearing. Slidably mounted on the bottom wall 33 is a slider 45 formed with parallel ridges 46 receiving the ridges 33*b* of the bottom wall 33. Fixed to the slider 45 is a U-shaped strap 48 extending downwardly through the slot 33*a* of said bottom wall 33, for the purpose hereinafter appearing.

As will appear hereinafter, means is provided for reciprocating the slider 40 on the bottom wall 32 to eject the books of matches or articles from the chutes 36 and 37; and to reciprocate the slider 45 to eject books of matches or articles from the chutes 38 and 39.

To this end, there is fixed to the disc 20, a headed rivet 50 located adjacent the periphery of the disc. The rivet 50 extends through a longitudinal slot 51 in a link 52.

The slot 51 is located in one half of the link 52. Fixed to an opposite end of the link 52 is a pin 54 disposed at right angles to the plate 14, and extending through the slot 18*a* and strap 48. On pin 54 is a collar 55 fixed thereto and contacting the flange 18*c*. Received on said pin 54 furthermore are sleeves 56 disposed within the slot 18*a*. Fixed to the disc 24 and extending forwardly therefrom is a headed pin 60, located ninety degrees back of the pin 50. The rivet or pin 60 passes through a slot 61 in a link 62 similar to the link 52. Extending through one end of the link 62 is a pin 64 passing through the strap 43. The pin 64 passes through slot 18 and is provided at one end with a fixed collar 66 contacting the rear of the plate 14. On the pin 64 are sleeves 67 disposed within slot 18. Fixed to pin 64 is a collar 68 contacting the front side of the link 62.

Surrounding the opening 21 of plate 14 is a forward extending annular flange 21*a* which spaces the disc 24 from the front face of plate 14, said disc being disposed however between the flanges 18*b* and 18*c* which surround the slots 18 and 18*a*. Fixed to the inner side of the disc 24 and extending rearwardly toward the front face of plate 14 are four pins 70, 71, 72 and 73 spaced 90 degrees apart, for the purpose hereinafter appearing.

Fixed to the side portions 15 of the plate 14 and extending forwardly therefrom are a pair of horizontally aligned headed pins 76 and 77. Slidably mounted on the pins 76 and 77 is a cross-bar 79 having a pair of horizontally aligned spaced slots 80 and 81 receiving said pins. The cross-bar 79 extends beyond one end of the slot 80 and is formed with a vertical slot 82 at said end. Between the slots 80 and 81 is a horizontal slot 83 at one end of which is fixed a vertical transverse pin 84. The front face of the cross-bar 79 above slot 83 is recessed, as at 85, forming a vertical shoulder 86, and a quadrangular recessed portion 88 at one side of the shoulder 86. Fixed to the bottom of the recess 85 is a pin 90 on which is pivoted a pawl 92. The pawl 92 has an arm 93 projecting downwardly into the slot 83 and interconnected by a coil tension spring 94 to the fixed pin 84. Shoulder 86 limits rotation of pawl 92. The upper end 97 of the pawl 92, projects above the cross-bar 79.

It will be noted that the cross-bar 79 is disposed between the discs 20 and 24, and that the pawl 92 is in the plane of the pins 70, 71, 72 and 73.

Fixed to the upper edge 17 of plate 14, as by screws 27, is a spring 99, the free end of which is in the plane of the pins 70, 71, 72 and 73. This spring has an upstanding finger 99*a* positioned to engage one of said pins, when another of said pins has contacted cross-bar 79, to prevent backward rotation of the discs 20, 24.

Fixed to the walls 36*c*, 37*c*, 38*c* and 39*c* of the chutes 36, 37, 38 and 39 are downwardly extending springs 36*d*, 37*d*, 38*d* and 39*d*, projecting below the lower ends of said side walls, to guide the books of matches or other articles within said chutes downwardly as said articles are ejected.

Pivoted to the back wall 11, as at 99*a*, is segmental plate or bell crank 100 provided with a pin 101 extending forwardly and projecting through the slot 82 in crossbar 79. At the upper end of the bell crank 100 is another pin 102 engaged by the yoke of a member 103 adapted to be reciprocated in any suitable manner (not shown), as for example, each time a package of cigarettes is dispensed.

It will now be understood that the rotary interconnected discs 20 and 24 constitute a ratchet plate, bearing ratchet elements or pins 70, 71, 72 and 73, and that the spring pressed pawl 92 cooperates with the ratchet elements to rotate the ratchet plate.

The operation of the ejecting mechanism will now be described:

Upon reciprocating member 103, bell crank 100 will be oscillated to reciprocate the cross-bar 79. Each time the cross-bar 79 is reciprocated, the discs 20 and 24 are rotated through an

angle of ninety degrees in the following manner:

Beginning with the cross-bar 79 at the left, as shown in Fig. 5 and moving said cross-bar to the right, to the position shown in Fig. 9, the pawl 92 engages pin 70 and rotates the discs in a counter-clockwise direction. Complete movement of the cross-bar to the right will move the discs 20, 24 through an angle of ninety degrees.

It will be noted that when the cross-bar 79 has been moved to the right, the pin 70 moves downwardly into the notch or recess 88 to permit rotation of the discs. However, the following pin 73 strikes the upper edge of the cross-bar 79, to positively stop rotation of the discs after said discs have rotated ninety degrees, and the discs cannot be further rotated until the cross-bar 79 has been retracted to the left.

As the cross-bar 79 is retracted or moved from the right to the left, the pawl 92 engages the pin 73 which is moved to the position formerly occupied by pin 70, and the pawl is rotated in a clockwise direction against the tension spring 94, as shown in Fig. 10, permitting the latch to pass said pin and again snap into upright position after it passes said pin. When the cross-bar is again reciprocated, the discs are again advanced through an angle of ninety degrees.

The operation of the mechanism to eject the books of matches from the chutes 36, 37, 38 and 39, as the discs are rotated will now be described:

Beginning with the parts as shown in Fig. 5 of the drawings, the slider 40 is in chute 37 and the slider 45 is in chute 39. As the slider 40 is moved to the left into chute 36, it will move the lowermost article therein, out of the chute to the left beneath the lower end of wall 36c. As the slider 40 is thereafter moved to the right, it will move the lowermost article in the chute 37 to the right, out of said chute, below the lower end of wall 37c. As the slider 45 in chute 39 is moved to the left, it will move the lowermost article in chute 38 out of said chute, below the lower end of wall 38c. As the slider 45 is thereafter moved to the right, it will move the lowermost article in chute 39 out of said chute, below the lower end of wall 39c. The springs 36d, 37d, 38d and 39d cause the articles to drop downwardly upon being ejected.

When the parts are in the position shown in Fig. 5, pin 64 is at the right end of slot 18, and the link 62 is inclined upwardly and to the right, the pin or rivet 60 being at the top of the disc 24 and hence near the left end of the slot 61. The pin 54 is at the right end of slot 18a, and the headed pin 50 on the disc 20 is at the right end of slot 51 of link 52, said link being in a horizontal position.

As the cross-bar 79 is moved to the right from the position shown in Fig. 5 through the position shown in Fig. 8, to the position shown in Fig. 9, the discs 20 and 24 are rotated in a counter-clockwise direction through an angle of ninety degrees, bringing the pin 60 first down to the lower end of the slot 61 and then moving the link to cause pin 64 to move to the left in the slot 18, causing the slider 40 to move to the left from the chute 37 to the chute 36 to eject an article therefrom, and swinging the link 62 in a clockwise direction to a horizontal position. At the same time, the pin 50 merely causes the link 52 to swing in a clockwise direction about the pin 54 to the position shown in Fig. 9 without moving the slider 45.

As the cross-bar 79 is retracted to the left, the discs and the remainder of the mechanism is stationary. Upon moving the cross-bar 79 to the right again, the link 62 is rotated downwardly about the pin 64 in a clockwise direction without affecting the slider 40, while the pin 50 pulls the link 52 to the left causing the slider 45 to move from the chute 39 to the chute 38, to eject an article from the chute 38. During this action, link 52 is swung about pin 54 in a clockwise direction to horizontal position.

Upon reciprocating the cross-bar a third time, the link 62 is moved to the right and swung up in a counter-clockwise direction to horizontal position, to merely swing down about its pivot 54 in a counter-clockwise direction without moving the slider 45.

Upon reciprocating the cross-bar a fourth time, the link 52 is moved to the right to eject an article from the chute 39, and is swung up in a clockwise direction to horizontal position, as shown in Fig. 5. Link 62 is swung upwardly in a counter-clockwise direction, to the position shown in Fig. 5, without moving the slider 40. Upon reciprocating the bar 79 again and again, the same operations are repeated. Thus, the articles are ejected successively from the chutes 36 and 38, 37, 39 in the order mentioned and the ejection operation is repeated in the same order over and over, as member 103 is repeatedly reciprocated.

Means is provided to support the chutes in upright and in forwardly tilted position, whereby to permit the chutes to be refilled and resupplied with articles. To this end, there is attached to the rear walls of the chutes, a cross strip 110 disposed above the lower ends of the chutes. Fixed to the innerside of the rear wall 11, is a bracket 111, to which there is pivoted a forwardly extending bar 112 formed with a pair of notches 113 and 114 on the under-edge thereof. The bar 112 is connected to the bracket by a coil tension spring 115. When the chutes are in upright position, the strip 110 is engaged in the notch 113. By lifting the bar 112 somewhat to release the strip 110, the chutes may be tilted forwardly until the strip 110 engages in the notch 114. In such position, the articles may be conveniently put into the chute through the upper ends of the latter.

It will be noted that the chutes together with the plate 14 may be swung forwardly about the pivot pin 13. The pin 101 which projects through the slot 82, is preferably sufficiently long to remain in said slot when the chutes are swung forwardly.

It will thus be seen that there is provided a device in which the several objects of this invention are achieved, and which is well adapted to meet the conditions of practical use.

As various possible embodiments might be made of the above invention, and as various changes might be made in the embodiment above set forth, it is to be understood that all matter herein set forth or shown in the accompanying drawings is to be interpreted as illustrative and not in a limiting sense.

Having thus described my invention, I claim as new and desire to secure by Letters Patent:

1. A dispensing device of the character described, comprising two pairs of chutes, a slider at the lower end of each pair of chutes, adapted to slide back and forth from one chute to the other of said pair of chutes, a member formed with a pair of slots, a member rotatably mounted

on the first member, a pair of links, a pin on each link slidably engaged within one of said slots, and connected to one of said sliders, said links being formed with slots, pins on said rotary member engaged within the slots of said links, and means for rotating said rotary member.

2. A dispensing device of the character described, comprising two pairs of chutes, a slider slidably mounted at the lower end of each pair of chutes and adapted to slide from one chute of said pair to the other chute of said pair, back and forth, to eject articles from said chutes, a member formed with a pair of slots, a pair of links each provided with a pin passing through one of said slots, and connected to one of said sliders, each of said links being formed with a longitudinal slot, a rotary member mounted on said first member and having a pair of pins spaced ninety degrees apart and extending within the slots in said links, respectively, a cross-bar slidably mounted on said member, and cooperating means on said cross-bar and rotary member to rotate said rotary member ninety degrees each time said cross-bar is reciprocated.

3. A dispensing device comprising two pairs of chutes, a slider at the lower end of each pair of chutes, a plate fixed with respect to said chutes, and formed with a bearing opening and with a slot disposed below each pair of chutes, a pair of aligned annular discs disposed on opposite sides of said plate, and connected by a central shaft journalled in the bearing opening in said plate, one of said discs having a headed pin, the other of said discs being provided with a headed pin spaced ninety degrees from the first headed pin, a link provided with a pin passing through one of the slots and connected to one of the sliders, and formed with a slot receiving one of said headed pins, and a second link having a pin passing through the other slot, and connected to the other slider, and formed with a slot receiving the other headed pin.

4. A dispensing device comprising two pairs of chutes, a slider at the lower end of each pair of chutes, a plate fixed with respect to said chutes, and formed with a bearing opening and with a slot disposed below each pair of chutes, a pair of aligned annular discs disposed on opposite sides of said plate, and connected by a central shaft journalled in the bearing opening in said plate, one of said discs having a headed pin, the other of said discs being provided with a headed pin spaced ninety degrees from the first headed pin, a link provided with a pin passing through one of the slots, and connected to one of the sliders, and formed with a slot receiving one of said headed pins, and a second link having a pin passing through the other slot, and connected to the other slider, and formed with a slot receiving the other headed pin, a cross-bar slidably mounted on said plate, a spring-pressed pawl pivoted to said cross-bar, one of said discs being provided with four pins spaced ninety degrees apart, adapted to be engaged by said pawl for rotating said discs ninety degrees each time the cross-bar is reciprocated once.

5. A dispensing device comprising two pairs of chutes, a slider at the lower end of each pair of chutes, a plate fixed with respect to said chutes, and formed with a bearing opening and with a slot disposed below each pair of chutes, a pair of aligned annular discs disposed on opposite sides of said plate, and connected by a central shaft journalled in the bearing opening in said plate, one of said discs having a headed pin, the other of said discs being provided with a headed pin spaced ninety degrees from the first headed pin, a link provided with a pin passing through one of the slots, and connected to one of the sliders, and formed with a slot receiving one of said headed pins, a second link having a pin passing through the other slot, and connected to the other slider, and formed with a slot receiving the other headed pin, a cross-bar slidably mounted on said plate, a spring-pressed pawl pivoted to said cross-bar, one of said discs being provided with four pins spaced ninety degrees apart, adapted to be engaged by said pawl for rotating said discs ninety degrees each time the cross-bar is reciprocated once, and means for reciprocating said cross-bar.

6. A device comprising a pair of chutes, a slider at the lower ends of said chutes, adapted to move from one chute to the other, back and forth, a link pivoted to said slider, said link being formed with a longitudinal slot, a rotary disc having a pin engaged within said slot, a reciprocating member, and means to rotate said disc through a predetermined angle each time said member is reciprocated.

7. A dispensing device comprising two pairs of chutes, a bottom wall for each pair of chutes formed with a longitudinal slot, a slider mounted on each bottom wall, a member fixed to said chutes and formed with a slot disposed beneath each pair of chutes, a pair of links each having a pin passing through one of said slots, below each pair of chutes, means extending through the slots in the bottom walls, to connect said pins to said sliders, said links each being formed with a longitudinal slot, a member rotatably mounted on said first member and having pin and slot connections with said links.

8. A dispensing device comprising a plurality of pairs of chutes, a slider at the lower end of each pair of chutes, links having pivotal connections to said sliders and formed with slots, a rotary member having a pair of pins each pin being slidably received in the slot of one of said links, said pins being angularly spaced apart on said rotary member and means to rotate said rotary member through predetermined angles.

9. A dispensing device comprising a plurality of pairs of chutes, a slider at the lower end of each pair of chutes, links having pivotal connections to said sliders, a rotary member having pin and slot connections with said links, means to rotate said rotary member through predetermined angles, said means comprising a second member mounted for back and forth movement, said rotary member being formed with ratchet elements, and a pawl pivoted to said second member adapted to engage said ratchet elements, to rotate said rotary member each time said second member is moved back and forth.

10. A dispensing device comprising a plurality of pairs of chutes, a slider at the lower end of each pair of chutes, links having pivotal connections to said sliders, a rotary member having pin and slot connections with said links, means to rotate said rotary member through predetermined angles, said means comprising a second member mounted for back and forth movement, said rotary member being formed with ratchet elements, and a pawl pivoted to said second member adapted to engage said ratchet elements, to rotate said rotary member each time said member is moved back and forth, a portion of said second member being disposed in the plane of said ratchet elements so that said second

member is engaged by a ratchet element following the ratchet element engaged by the pawl to stop rotation of said rotary member, after said rotary member has been moved through a predetermined angle, and said second member being formed with a recess through which the ratchet element engaged by said pawl passes, as the rotary member is rotated.

11. A dispensing device of the character described, comprising two pairs of chutes, a slider at the lower end of each pair of chutes, adapted to slide back and forth from one chute to the other of said pair of chutes, a member formed with a pair of slots, a member rotatably mounted on the first member, a pair of links, a pin on each link slidably engaged within one of said slots, and connected to one of said sliders, said links being formed with slots, pins on said rotary member engaged within the slots of said links, means for rotating said rotary member, and means to prevent backward rotation of said rotary member.

12. A dispensing device comprising a plurality of pairs of chutes, a slider at the lower end of each pair of chutes, links having pivotal connections to said sliders, each link being formed with a slot, a rotary member having a pair of pins, each pin being received in the slot of one of said links, said pins being angularly spaced apart on said rotary member, means to rotate said rotary member through predetermined angles, and means to prevent backward rotation of said rotary member.

13. In combination, a chute, a slider at the lower end of said chute, a link pivoted to said slider, a ratchet comprising a rotatable ratchet plate having a pin and slot connection with said link, said ratchet including ratchet elements on said ratchet plate, a member adapted to be moved back and forth, and a pawl thereon adapted to engage said ratchet plate elements to rotate said ratchet, as said member is moved back and forth.

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