

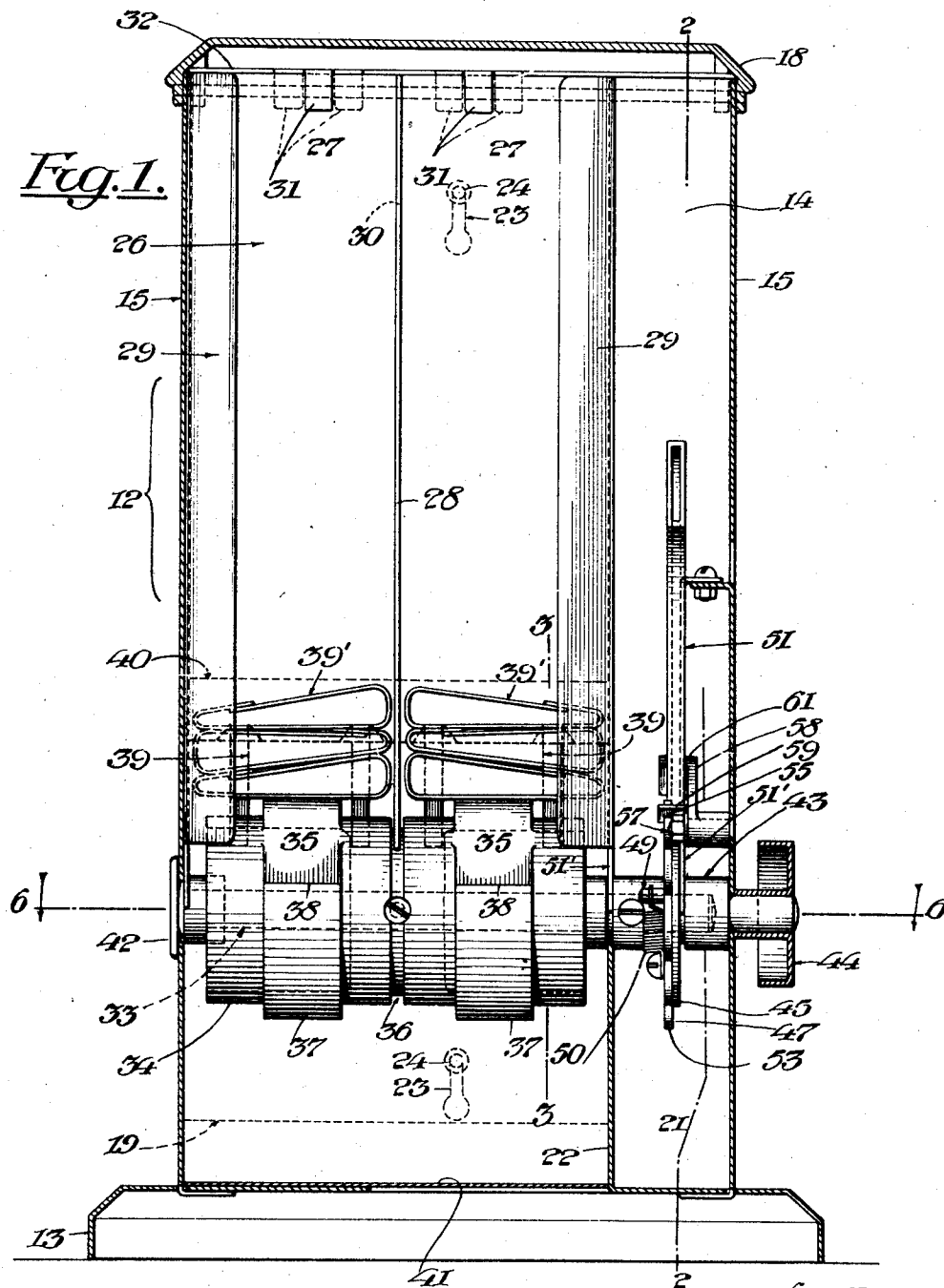
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J. R. NOLAN
VENDING MACHINE

Filed April 8, 1924

3 Sheets-Sheet 1



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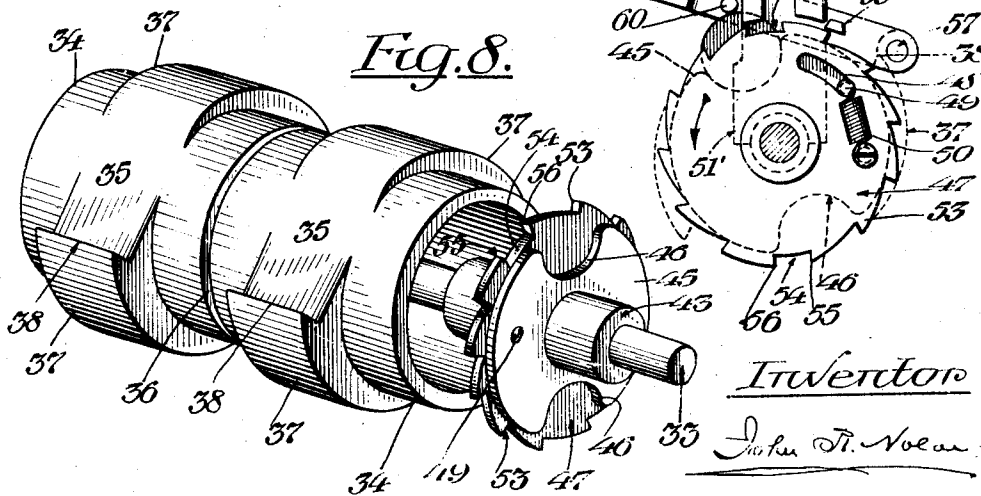
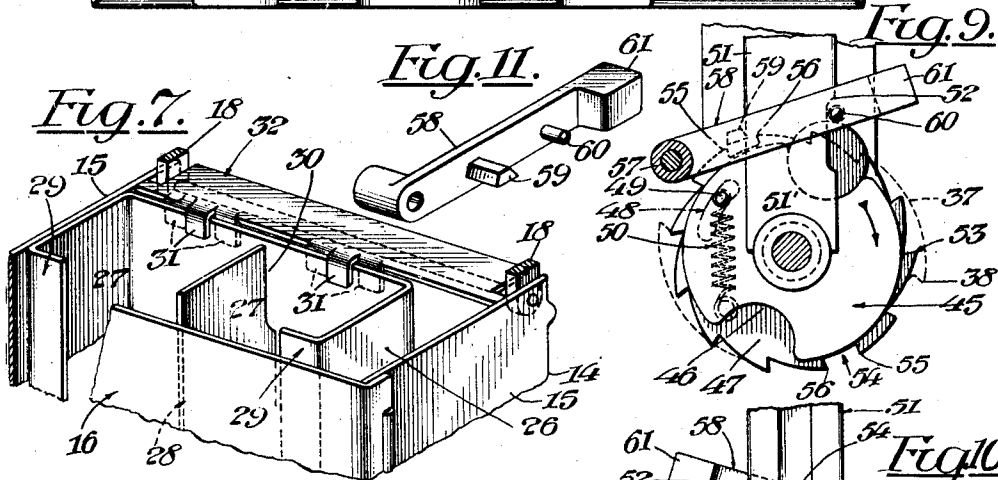
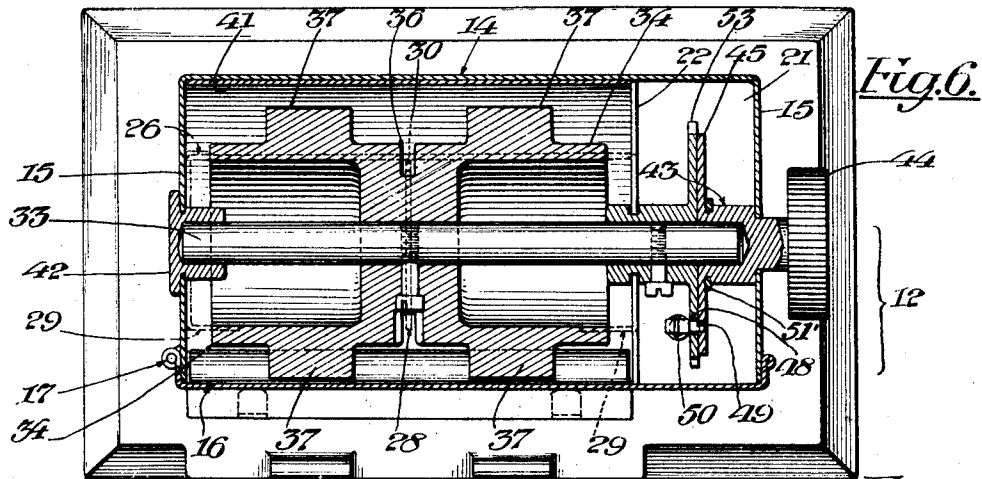


Fig. 8.

Fig. 11.

Fig. 9.

Fig. 10.

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VENDING MACHINE.

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This invention relates to coin controlled vending machines; having reference, especially, though not exclusively, to machines designed to contain and vend so-called book-matches.

In the preferred form of embodiment of the invention herein illustrated the machine comprises an intermittently rotatable delivery device of novel construction manually operative to engage the lowermost articles contained in a magazine and discharge them positively therefrom, which device in its rotary travel effects a gradual lowering of the superposed contents of the magazine preparatory to their discharge; simple and efficient coin-controlled locking and releasing mechanism for the delivery device, and a magazine of novel construction into which plural rows of book matches as packed in a commercial carton can be directly transferred with facility from the carton.

The invention also comprises novel features of construction and combinations of parts which will be hereinafter described and claimed.

In the drawings—

Figure 1 is a longitudinal vertical section of the machine.

Fig. 2 is a transverse vertical section thereof, as on the line 2—2 of Fig. 1.

Fig. 3 is a similar section, as on the line 3—3 of Fig. 1, showing the rotary delivery device as partially turned to engage the lowermost articles contained in the magazine.

Fig. 4 is a similar view, showing the delivery device farther advanced and illustrating its ejecting action.

Fig. 5 is a reduced view of the resilient guard fingers which are located at the delivery opening of the magazine.

Fig. 6 is a horizontal section of the machine, as on the line 6—6 of Fig. 1.

Fig. 7 is a detail, in perspective, of the upper portions of the casing and magazine.

Fig. 8 is a perspective view of the rotary delivery device, showing the associated coin disk and ratchet wheel on the shaft of said device.

Fig. 9 is a view of the coin disk and ratchet wheel, together with the locking and releasing pawl for the latter, showing the relation of the parts at the instant the pawl is disengaged from the wheel by the action of the coin in the coin disk, and indicating,

by dotted lines, the position of the shouldered portions of the delivery device.

Fig. 10 is a similar view looking at the opposite side of the coin disk and ratchet wheel, showing the ratchet wheel as released and as initially advanced by the spring.

Fig. 11 is a perspective view of the locking and releasing pawl.

Referring to the drawings, 12 designates a casing of suitable shape and size for its intended purpose. In the present instance this casing, which is preferably of sheet metal, comprises a base 13, a back 14, sides 15, a door 16 hinged, as at 17, to one of the sides and a flanged top or cover 18, which, when closed, is adapted to embrace the upper portions of the sides and of the closed door. In the lower portion of the door is an article delivery opening 19, and adjacent the free edge of the door is a suitably-disposed coin slot 20. A coin receiving compartment 21 is provided within the casing by the provision of a vertical partition 22 which rises from the base in a plane between the delivery opening and the right hand side of the casing. The casing is preferably provided with suitable suspension means whereby it can be conveniently hung on a wall, if desired. To this end the back 14 may have formed therein keyhole slots 23 adapted to receive supporting nails 24, or the like, projecting from wall strips 25, as seen in Fig. 2.

Within the casing is supported in any suitable manner an article containing magazine, which, in the present instance, comprises a sheet metal trough-like structure 26 divided into two vertical compartments 27 by a median partition 28. The longitudinal edges of the side walls of the structure are provided with in-turned flanges 29 which afford guards to prevent forward displacement of the contents of the respective compartments. The upper rearward portion of the partition is longitudinally recessed, as at 30, to facilitate the transfer of articles from cartons directly into the compartments, as will presently be explained.

The magazine is conveniently supported at its upper end by down-turned lips 31 formed on an overhanging flange 32 at the top of the casing, which lips embrace the back of the magazine as shown in Figs. 2 and 7; the side walls of the magazine being extended downwardly and bifurcated to em-

brace a shaft 33 (or hubs or bushings thereon) which is mounted to rotate in the lower portion of the casing as hereinafter described.

5 Fast on the shaft 33 is a rotary delivery device of novel construction, which, being positioned in proximity to the lower end of the magazine, supports the contents of the
10 respective compartments. The delivery device in its preferred form comprises a cylindrical body 34 having peripheral flat portions 35 extending transversely thereof. In the present instance two spaced-apart pairs of flat portions are employed, those of each
15 pair being diametrically opposite to each other so that either may be positioned in proximity to the lower end of the magazine by the act of partially rotating the delivery device. The body is preferably provided,
20 midway between its ends, with a circumferential groove 36. The partition 28 depends into this groove, and the side walls of the magazine depend laterally adjacent the respective ends of the body, thus insuring the
25 proper disposition upon the delivery device of the lowermost articles contained in the respective compartments of the magazine.

The delivery device is provided adjacent each of the flat portions with a circumferential projection 37, one end of which is located at or adjacent the trailing edge of the flat portion and presents an impelling shoulder 38 adapted to engage an article, such as
30 a match book 39', seated on the flat portion when the delivery device is properly rotated. The shoulder is of less height than the thickness of a single article at the place against which the shoulder impinges, and when the
35 articles are match books the shoulder is arranged to engage each succeeding lowermost book about midway of its ends so as not to impinge against the proximate upper book or books. Each projection extends from the
40 shoulder through an eccentric arc which merges with the periphery of the body 34; thus providing a circumferential wedge-like rib that trails the adjacent flat portion of the device when it is turned clockwise.

The lower edge of the back of the magazine terminates somewhat above the periphery of the delivery device to afford an opening deeper than the greatest width of the article to be vended, which edge is provided
50 with a series of independently movable fingers 39 that are so disposed as to flank the paths of the respective projections 37 and extend to or near to the peripheral path of the delivery device. In the present instance these fingers are formed on and depend from
55 a transverse strip 40 of thin spring metal which is rigidly secured to the back of the magazine.

When the position of the delivery device is such that the contents of the magazine
60 rest upon or near the upper flat surfaces of

the device, the fingers 39 bar the discharge opening, and thus prevent the accidental escape therethrough of the lowermost articles, but when the device is turned in a clockwise direction, the upper impelling
70 shoulders 38 thereof bear against the opposing articles and force them rearwardly and against the fingers, which fingers by their elasticity initially press the articles against the shoulders. As such articles are being
75 forcibly advanced by the shoulders, the fingers are swung outwardly and are caused to ride yieldingly upon the tops of the advancing articles in a manner to maintain them seated squarely upon the flat surfaces of the
80 delivery device until they are discharged from the magazine. Thereupon the fingers, resuming their normal position, prevent the escape of the succeeding articles from the magazine until such time as the latter shall
85 be engaged and acted upon by the next following pair of impelling shoulders.

It is to be noted that when the articles are engaged and initially advanced by the impelling shoulders the trailing ends of the
90 articles are slightly elevated, which upward movement, in the absence of counteracting means, would tend to displace the leading ends of the books. The resilient fingers, however, initially act to bind the articles
95 against the shoulders, and as such articles are tilted by the gradual declination of the flat surfaces in their continued rotary travel, the leading ends of the articles are caused to bear against the fingers with a downward
100 and rearward force which operates to swing the fingers outward and to permit the articles to pass smoothly thereunder, which fingers thereupon press yieldingly against the tops of the underlying articles and maintain them upon the flat supporting surfaces
105 of the delivery device as previously mentioned.

In the initial advancement of the lowermost articles engaged by the impelling shoulders the projections pass directly beneath
110 the superposed articles contained in the respective compartments. The advancing articles slightly raise those above, and then permit them to descend upon the projections. Owing to the curvature of these projections
115 the articles contained in the magazine are permitted to settle gradually until the next succeeding flat portions of the delivery device pass beneath the articles preparatory to a succeeding operation to remove the next
120 lowermost articles from the magazine; and so on. The described rising and falling motion of the articles contained in the magazine insures their uniform descent to and upon
125 the body of the delivery device.

A guide plate 41 is spaced slightly from the rear of the spring-guarded discharge opening of the magazine and is curved
130 downwardly and forwardly to the bottom

of the delivery opening 19 in the door of the casing. This plate is so disposed in relation to the path of the delivery device that when the articles are ejected from the magazine they encounter the opposing curved surface of the plate and are deflected downward thereby until they escape from the action of the impelling shoulders, whereupon such articles fall upon the lower part of the plate and are directed forwardly thereby to and through the discharge opening. The spaced relation of the upper portion of the curved surface of the guide plate to the delivery device is preferably such that the articles are not released until the device has been turned a substantial distance.

In the present instance one end of the shaft 33 of the delivery device is journaled in a bearing 42 in the left side wall of the casing, and the opposite end of the shaft is rotatably mounted in a sleeve or hub 43 which is journaled in and projects outwardly of the other side wall of the casing. The outer end of the sleeve or hub is equipped with a suitable knob or handle 44, and its inner end has fixed thereto a disk 45 having two diametrically opposite peripheral recesses 46 which are each shaped to receive the greater portion of a coin. Fast on the shaft 33, in close proximity to the face of the coin disk 45, is a ratchet wheel 47 which provides a side wall for the respective coin receiving recesses. The disk and wheel are independently rotatable within limits relatively to each other, and to this end the ratchet wheel is preferably provided with an arcuate slot 48 through which extends a stud 49 from the coin disk; and a spring 50, which is secured to the stud and to the ratchet wheel, maintains the disk and wheel normally in a position with the stud at the trailing end of the slot. The tension of the spring connection between the coin disk and the ratchet wheel is such that during the clockwise rotation of the knob 44 the spring permits an initial advance movement of the coin disk, whereupon the stud 49 bears firmly against the end of the arcuate slot of the ratchet wheel and ensures a positive impelling action between the disk and ratchet members. When the turning force on the knob is released the spring returns the coin disk to its normal or retracted position in relation to the ratchet wheel.

A coin chute 51 is suitably supported within the casing so as to overhang the coin disk, the upper end of the chute being formed and arranged to register with the coin slot of the door 16 when the latter is closed. The outer or right hand wall of the chute is extended downwardly in close relation to the adjacent side of the coin disk, the free end of the leg 51' thus formed being bifurcated to embrace a circumferential groove in the hub 43. The chute leg thus

being maintained in close parallel relation to the coin disk affords an efficient side wall for each recess of the disk when a recess is in its upper position directly beneath the throat of the chute. Hence the upper recess, with its embracing side walls, constitutes a socket into which a coin, when entered in the coin slot of the door, is directed by the chute. The lower rearward edge of the chute is cut away, as at 52, to permit the free passage of the up-projecting portion of the coin when the coin disk is partially rotated by proper manipulation of the knob 44.

The ratchet wheel is not only provided with inclined back-stop teeth 53, but also with two diametrically opposite peripheral spaces 54 one adjacent each socket and in such relation thereto that when an impelling shoulder of the delivery device is located adjacent its article-engaging position, i. e., forward of the magazine, the upper socket is in substantial vertical alinement with the throat of the chute. The ends of each space 54 provide oppositely-disposed stops 55, 56, respectively. Pivoted on a stud 57 supported on the adjacent wall of the casing, (or other fixture) is a pawl arm 58 which extends rearwardly and lies laterally of the position of the upper coin socket. This arm is provided near its pivotal end, forwardly of the proximate coin socket with an inwardly extending stop stud 59 that drops normally into a peripheral space 54 when the latter is positioned beneath the stud, the stops 55, 56 at the respective ends of the space thus preventing forward or backward movement of the delivery device. The pawl arm is also provided, adjacent the rear open edge of the chute, with an inwardly extending trip stud 60 which overhangs but does not engage the coin disk, and which stud crosses the rearward path of the upper portion of a coin contained in the upper socket.

By the mechanism just described it will be seen that when the delivery device is turned in a clockwise direction by the manipulation of the knob 44, the stud 59 rides on the ratchet teeth until the leading space 54 passes beneath the stud, whereupon the latter drops into such space and is engaged by the opposing stop 55, which stop positively checks the continued rotation of the delivery device, the upper socket of the coin disk then being directly beneath the throat of the coin chute. Thereupon, as the knob is turned, the coin disk is independently advanced within the limits of the slot 48 of the ratchet wheel and against the action of the spring 50. If the knob now be released the spring will retract the coin disk to position the upper coin socket thereof beneath the coin chute, so that if a coin be inserted in the coin slot 20 such coin will drop directly into the socket. Thereupon the act of turning the knob will again move the coin disk

against the action of the spring and press the coin against and under the trip stud 60, thereby raising the stud, together with the pawl arm, in a manner to lift the stop stud above and clear of the stop 55 of the ratchet wheel. The instant the ratchet wheel is thus released the tensioned spring slightly advances the wheel and the delivery device, thereby causing the proximate stop 55 to pass beyond the overhanging stop stud 59 of the pawl arm, and as the manual rotation of the knob is continued the coin is carried beyond the trip stud 60 and discharged from the socket. As the coin passes below and beyond the trip stud the pawl arm drops by gravity (being preferably provided with a weight 61) the stop-stud 59 thus riding on the periphery of the ratchet wheel. Continuing the manual movement of the knob, the delivery device is turned sufficiently to effect the discharge of the lowermost articles from the magazine by the impingement thereagainst of the impelling shoulders of the said device, as previously described. During the ejecting action, owing to the counter-acting force incident thereto, the coin-disk is independently advanced within the limits of the slot 48 of the ratchet wheel and against the action of the spring 50, the stud 40 thus bearing firmly against the opposing end of the slot. When the articles have been discharged and the knob released the spring 50 retracts the coin disk to its normal position relatively to the ratchet wheel.

In the continued rotation of the delivery device, after the coin has passed the trip stud of the pawl arm, the stop-stud 59 rides idly upon the toothed periphery of the ratchet disk, but if an attempt be made to turn the device backward the stud 59 will at once engage a back-stop tooth 53 adjacent thereto and prevent the retrograde movement. Immediately after the coin has passed the trip stud, as previously mentioned, the coin escapes from the socket and drops into the coin compartment. The flat surfaces of the delivery device are so arranged in cooperative relation to the associated ratchet wheel and coin disk, that the coin is discharged from the coin socket just at or immediately before the engagement of the impelling shoulders of the device with the contents of the magazine.

When the delivery device has been rotated a sufficient distance to position the second coin socket at the top, the stop stud 59 of the pawl arm, resuming its original position, enters the second space 54 of the ratchet wheel and co-operates with the end stops of such space to prevent a succeeding operative rotation of the delivery device unless and until a coin be introduced into the now upper coin socket. If at any time the coin disk and delivery device should not be ro-

tated sufficiently to present the upper coin socket to the coin chute after articles have been ejected, a coin subsequently introduced in the chute will nevertheless enter the socket when the latter is properly positioned during the succeeding rotation of the coin disk.

As previously mentioned the present apparatus has been more especially designed to vend so-called book-matches, which, as is well known, are of wedge-like form. These books, on account of their shape, must be filed flatwise in alternate reverse order, or generally so, in each of the compartments; and since the books are thus compactly arranged in two juxtaposed rows in the commercial carton, it is desirable to transfer them directly from the carton into the respective compartments of the magazine. Accordingly the compartments are arranged in close parallel relation to each other, and the upper rear portion of the partition is longitudinally recessed or offset at 30, as aforesaid. To charge the magazine with match books the top 18 and the door 16 of the casing are swung open, and the machine is placed on its back upon a table or the like. One end of the carton is then cut or torn along its vertical edges and such end is swung outwardly similarly to a flap. The carton is placed in horizontal position, or substantially so, with its open end flap at the mouth of the magazine; the flap is pushed into the recess, and the two rows of books contained in the carton, being in close proximity to and in substantial alinement with the respective compartments of the magazine, can then be readily pushed directly thereinto from the carton.

When the books are arranged within the compartments as just explained the edges of the cover folds of the books are parallel with the sides of the magazine, and hence during the expulsion of the lowermost books from the magazine there is no liability of their folds being interlocked with those of the contiguous superposed books within the magazine. The independently movable spring fingers 39, which are located at the discharge opening of the magazine, prevent the passage of the thin ends of the alternately arranged books through such opening, and said fingers also readily accommodate themselves to the different levels of the inclined surfaces of the books as the latter are being ejected by the delivery device.

Although the machine hereinbefore described is intended to vend articles from two compartments during each operative movement of the delivery device, the number of compartments of the magazine and the ejecting surfaces of the device may be correspondingly increased to accomplish the vending of a greater number of articles; or, if desired, the invention may be embodied in a single instead of a plural delivery ma-

chine. In other respects the construction herein disclosed may be variously modified within the spirit of the invention and the scope of the appended claims.

5 I claim—

1. In a vending machine, the combination with a magazine adapted to contain a column of articles to be vended, of a delivery element mounted to rotate below the magazine, and support the lowermost article and the entire column, said element comprising a generally cylindrical body having a peripheral projection affording an impelling shoulder and extending through an arc eccentric to the axis of the delivery element, which arc merges with the periphery of the body, a portion of such periphery in advance of the projection affording a supporting surface for the entire column preparatory to the delivery operation.

2. In a vending machine, the combination with a magazine adapted to contain a column of articles to be vended, of a delivery element mounted to rotate below the magazine, and support the lowermost article and the entire column, said element comprising a generally cylindrical body having a peripheral flat portion and having also a peripheral projection adjacent the trailing edge of the flat portion, said projection affording an impelling shoulder and extending through an arc eccentric to the axis of the delivery element, which arc merges with the periphery of the body, and the portion of such periphery in advance of the projection affording a supporting surface for the entire column preparatory to the delivery operation.

3. In a vending machine, the combination with an article magazine having a discharge opening at the foot of one wall thereof, of a delivery element mounted to rotate below the magazine, and support the lowermost article, said element comprising a generally cylindrical body having a peripheral projection affording an impelling shoulder and extending through an eccentric arc which merges with the periphery of the body, and resilient fingers depending across the opening and laterally of the path of said projection, said fingers being so positioned in relation to the body that during the partial rotation of the latter they initially oppose the exit of the leading end of the article and maintain the

opposite end thereof against the projection, said fingers then pressing yieldingly upon the top of the advancing article in a manner to maintain it seated on the said body as the article is swung downward.

4. In a vending machine, the combination with an article magazine having a discharge opening at the foot of one wall thereof, of a delivery element mounted to rotate below the magazine, and support the lowermost article, said element comprising a generally cylindrical body having a peripheral flat portion and having also a peripheral projection adjacent the trailing edge of the flat portion, affording an impelling shoulder and extending through an eccentric arc which merges with the periphery of the body, and resilient fingers depending across the opening and laterally of the body, said fingers being so positioned in relation to the body that during the partial rotation of the latter they initially oppose the exit of the leading end of the article and maintain the opposite end thereof against the projection, said fingers then pressing yieldingly upon the top of the advancing article in a manner to maintain it seated on the said body as the article is swung downward.

5. In a vending machine, a casing, a magazine therein, a shaft mounted below the magazine, and a rotary delivery device on the shaft, said magazine being secured at its upper end to the casing and having depending side walls bifurcated at their lower ends and straddling the axis of the shaft.

6. In a vending machine, a casing having walls and a movable cap, an open top magazine therein having wall portions separate from the walls of the casing, for engaging three sides of articles in two columns to be vended, a partition in the magazine for maintaining the columns separate from each other, the upper rear portion of the partition being longitudinally spaced from the adjacent back wall of the said structure to afford a slot or recess to receive the wall of a carton containing two rows of articles, thus permitting the filling of the two compartments directly from the carton.

Signed at New York in the county and State of New York this 7th day of April A. D. 1924.

JOHN R. NOLAN.