Nov. 28, 1961 R. T. JOLLY 3,010,609

ARTICLE DISPENSING DEVICE

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Fig.1

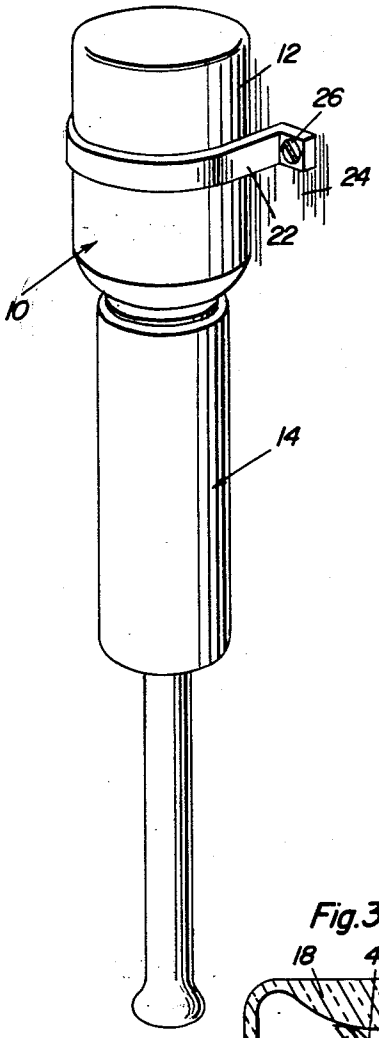


Fig.2

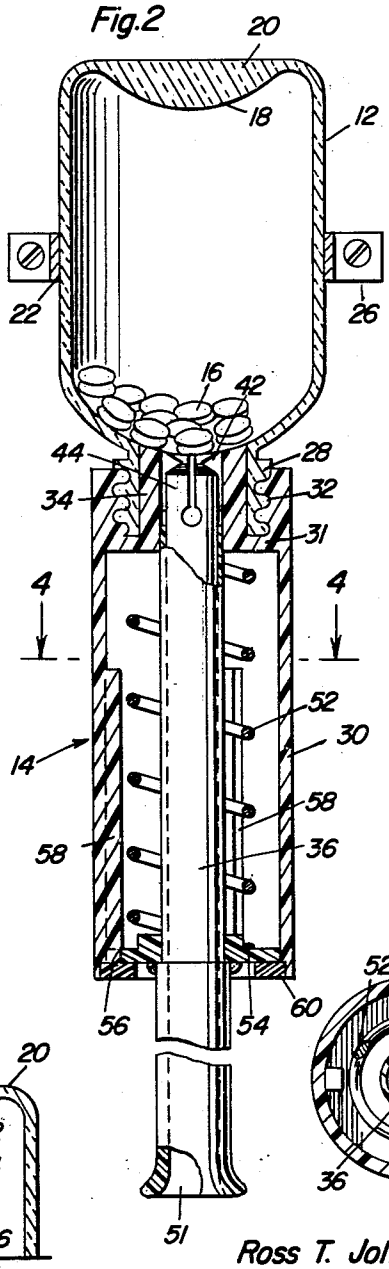


Fig.3

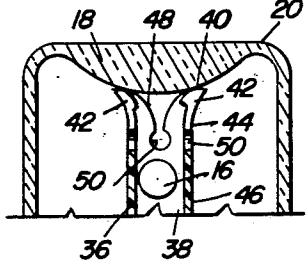
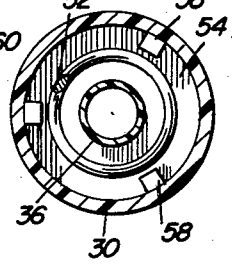


Fig.4



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ARTICLE DISPENSING DEVICE

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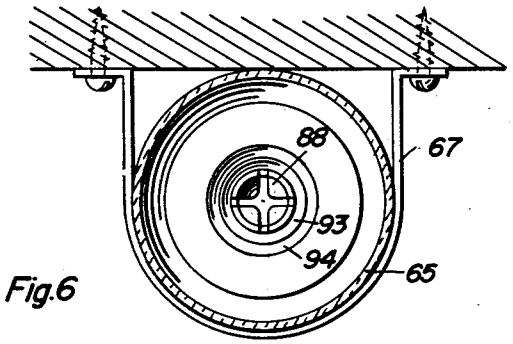


Fig.6

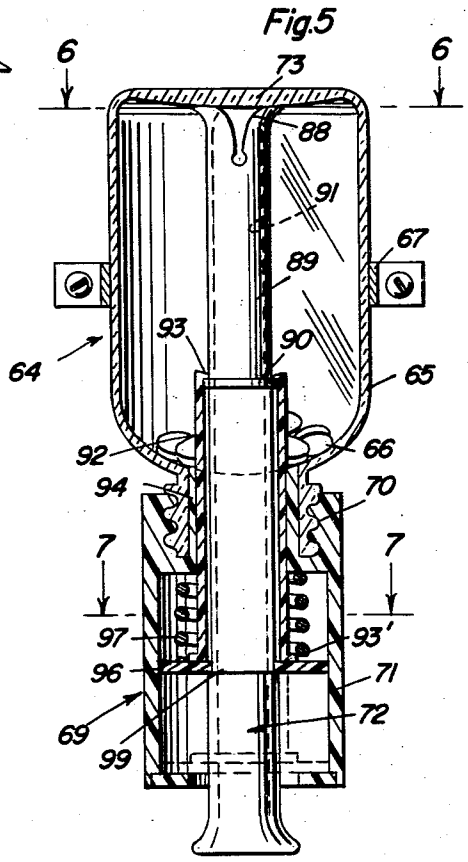


Fig.5

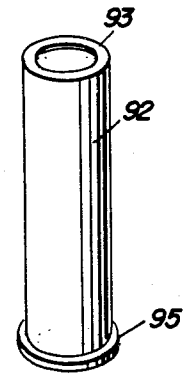


Fig.9

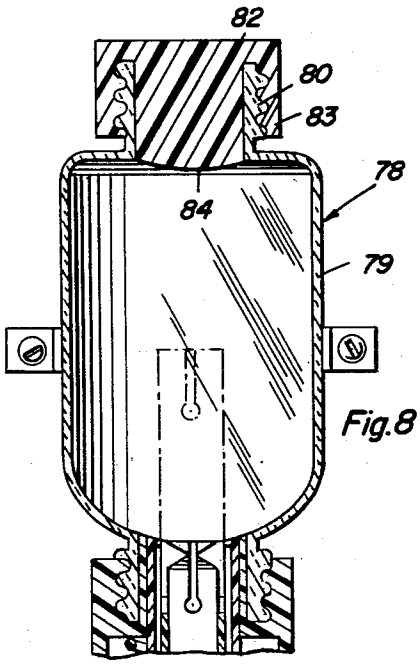


Fig.8

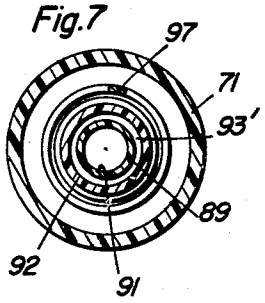


Fig.7

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ARTICLE DISPENSING DEVICE

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Fig.10

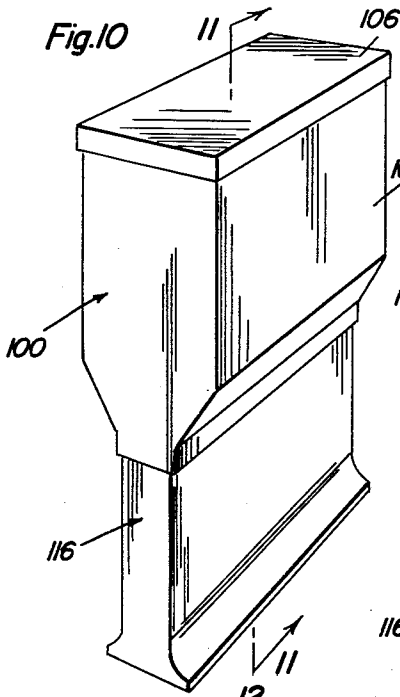


Fig.12

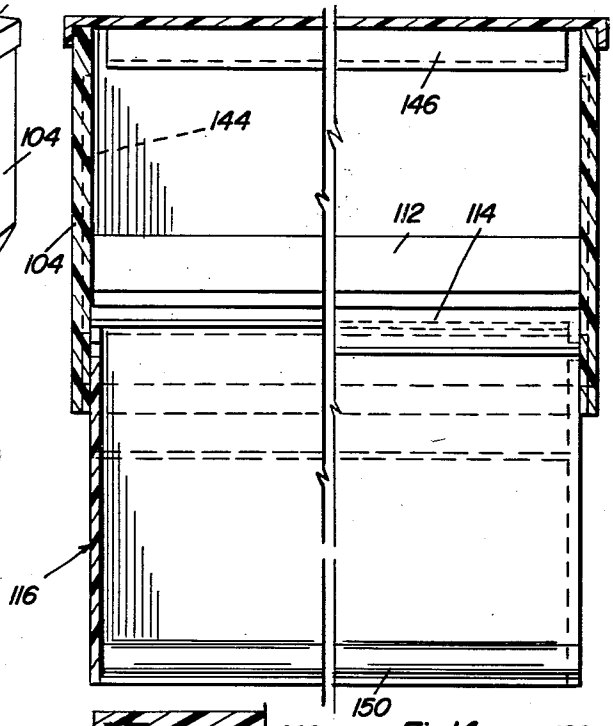
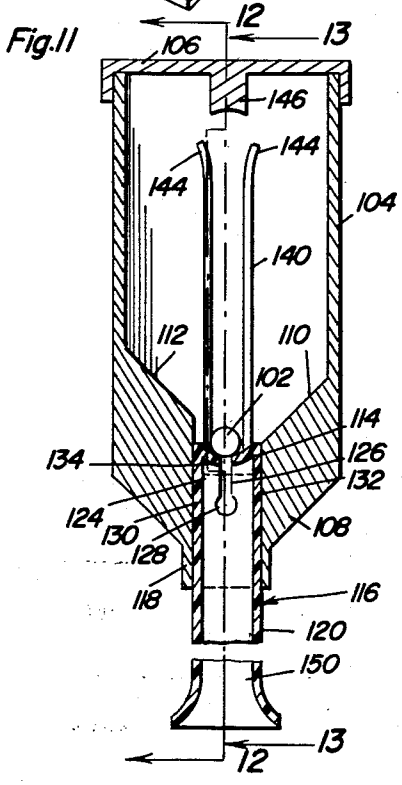


Fig.11



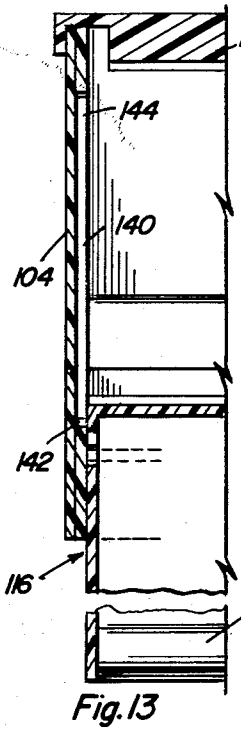


Fig.13

Fig.14

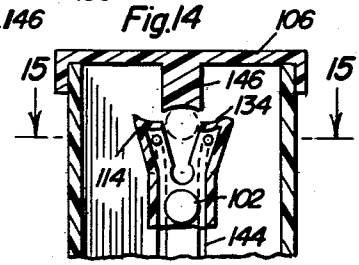
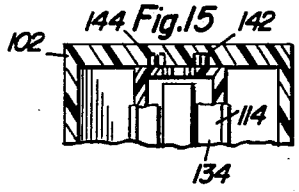


Fig.15



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3,010,609
ARTICLE DISPENSING DEVICE

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17 Claims. (Cl. 221—254)

This invention relates to dispensers and more particularly to manually operated dispensers for discrete objects.

An object of the invention is to provide a practical, easily operated dispenser for individually dispensing single objects, for instance, pills, cigarettes, a newspaper in a tube and many others, in response to a single cycle of operation.

Briefly, the invention is embodied in dispensers which have a storage compartment for the objects and in which a plunger mechanism is movable. The plunger mechanism is unique in that it selects a single object to be dispensed, transports it to a station at which the object is released from its supported position on the plunger and is permitted to fall by gravity through a passageway in the plunger and into the same hand of the user which is employed for actuating the plunger.

There have been numerous prior dispensers for individually dispensing single objects such as cigarettes. In all of the prior dispensers, there have been some means by which to select individual objects for dispensing. However, the dispensing feature of this invention is dependable and practical and very certain in its operation. This is made so because the dispensing plunger selects only a single object for dispensing, it being impossible due to space limitations, to move more than a single object to the release station. The release station is composed of a wall against which one end of the plunger is moved. When the plunger is moved against this wall, the seat on which the object is disposed, is opened enabling that object to fall through a passageway and to the exterior of the dispenser.

The invention is capable of being embodied in numerous structural adaptations. One includes a plunger seat and wall for releasing the object, but the principles of the invention are equally well practiced by having the object seat opened by other means. For instance, for odd shaped or even for normal shaped objects wherein design factors indicate, the seat may be opened by other means, a cam track assembly could be used to open a long slender seat on which a cigarette is disposed whereby a more positive action tailored to suit cigarette dispensing, is realized. It is to be clearly understood that other shaped objects may dictate the desirability of other mechanical changes, but always preserving the concept of having the seat on which a single object is disposed, open to permit the object to be released.

Other objects and features of importance will become apparent in the following descriptions of the illustrated forms of the invention.

In the accompanying drawings:

FIGURE 1 is a perspective view showing one form of the invention.

FIGURE 2 is an enlarged sectional view taken longitudinally of the dispenser in FIGURE 1.

FIGURE 3 is a fragmentary sectional view showing the plunger being opened to release a pill thereon.

FIGURE 4 is a sectional view taken on the line 4—4 of FIGURE 2.

FIGURE 5 is a longitudinal sectional view of a modification of the dispenser.

FIGURE 6 is a sectional view taken on the line 6—6 of FIGURE 5.

FIGURE 7 is a transverse sectional view taken on the line 7—7 of FIGURE 5.

FIGURE 8 is a fragmentary sectional view showing another modification.

FIGURE 9 is a perspective view of one of the parts of the dispenser in FIGURE 5.

FIGURE 10 is a perspective view of another modification of the dispenser.

FIGURE 11 is a sectional view taken on the line 11 of FIGURE 10.

FIGURE 12 is a sectional view taken on the line 12—12 of FIGURE 11.

FIGURE 13 is a sectional view taken on the line 13—13 of FIGURE 11.

FIGURE 14 is an enlarged fragmentary sectional view showing a detail of operation.

FIGURE 15 is a sectional view taken on the line 15—15 of FIGURE 14.

In the accompanying drawings reference is first made to FIGURES 1–4 inclusive. Dispenser 10 is made of a receptacle 12 together with a dispensing mechanism 14 connected therewith. Receptacle 12 in this instance may be a conventional receptacle in which pills 16 are purchased. Alternatively, the receptacle may be slightly altered by having an enlargement 18 facing inwardly of the receptacle and made integral or otherwise secured with bottom wall 20 of receptacle 12. Bracket 22 is illustrated merely to show one possible way of securing receptacle 12 to a supporting surface 24. The bracket is essentially U-shaped and attached by fasteners e.g. screws 26 to supporting surface 24. It supports receptacle 12 in an inverted, vertical position.

The neck 28 of receptacle 12 is shown screw-threaded so that dispensing mechanism 14 can be threadedly engaged with the neck. Dispensing mechanism 14 is made of a hollow dispenser body 30 with a threaded socket 32 at one end threadedly engaged on neck 28. Sleeve 34 is concentrically arranged with reference to socket 32 and enters neck 28 of receptacle 12 to function as a spacer. The upper edge of sleeve 34 is smoothly contoured to form a smooth continuation of the inner surface of the receptacle 12 at the neck thereof.

Plunger 36 is reciprocably mounted in the hollow dispenser body 30. The plunger is of special construction, having a longitudinal passageway 38 extending completely therethrough and having a pill seat forming structure 40 at the upper end thereof. This pill seat forming structure is made of a plurality of shoulders 42 at the upper ends of segments 44 of the plunger wall 46. The segments are divided from the plunger wall by means of longitudinal slots 48 cut or otherwise formed in the plunger wall. Apertures 50 at the lower ends of the slots 48 serve the purpose of removing some of the material of the plunger wall 46 at the lower extremities of the slots 48 and thereby form hinges for segments 44.

Plunger 36 is made of an elastomeric substance. There are numerous commercially available plastic materials which will serve the purpose very effectively, and there are also a number of different types of natural and synthetic rubber substances. It is further within the comprehension of the invention to use spring metal, although it is believed that from a cost standpoint an elastomeric plastic is preferable.

While discussing the seat forming structure 40, the operation thereof will now be mentioned. As shown in FIGURE 2 a quantity of pills 16 are disposed at the lower part of the receptacle 12. The plunger is adapted to be moved upwardly with reference to FIGURE 2, and the size of seat forming structure 40 is such that only one pill is capable of being rested thereon or seated thereon as the plunger is moved upwardly. With the pill disposed on the seat forming structure and the plunger 36 moved upwardly, the shoulders 42 will have their extremities

brought to bear against enlargement 18 on wall 20. As the plunger is moved further upward, a camming action takes place between shoulders 42 and the surface of enlargement 18, causing the segments 44 to be spread. When they are spread sufficiently to enable pill 16 to drop (FIGURE 3) the pill falls through passageway 38 and into the hand of the user located at the discharge end 51 of plunger 36 (FIGURE 2).

There is resilient means operatively connected with the plunger to cause the plunger to return to the rest position (FIGURE 2) at which the shoulders 42 are withdrawn within or at the level of the upper end of sleeve 34. This resilient means can assume numerous configurations, one of which is to have a spring 52 in the cavity of hollow body 30. One end of the spring reacts on the upper wall 31 of the body 30 and the other end of the spring reacts on a collar 54 secured to the plunger 36. Collar 54 has a plurality of notches 56 in its periphery, and these are engaged with splines 58 extending longitudinally of and located within hollow body 30. This is a locking device for plunger 36. For instance, when plunger 36 is up, by turning it clockwise or counterclockwise the plunger will remain up. The importance is if a person did not want the plunger down for any reason, one of which is to prevent a child from operating the plunger. As the plunger is moved upward to dispense a single pill, the upward movement is opposed by spring 52 whereby upon release of the upward force on the plunger, the spring 52 returns the plunger to the rest position at which collar 54 contacts stop 60 at the power part of the plunger body 30.

Reference is now made principally to FIGURES 5–7 and 9. In this form of the dispenser 64 there is a receptacle 65 for pills 66 or other discrete objects. Bracket 67 is used to hold the receptacle 65 mounted on a supporting surface, and there is a dispenser structure 69 separably connected to the receptacle 65 by a connecting means 70 including the neck of the receptacle, essentially identical to that of dispenser 10. Dispenser body 71 is hollow and has a plunger assembly 72 mounted for reciprocation therein. The only essential differences between dispenser 64 and dispenser 10 are found in the wall 73 of receptacle 65 and in the plunger mechanism. Wall 73 is flat or almost flat i.e. unaltered by the inclusion of enlargement 18. The dispenser will function very well with an ordinary bottle, can etc., but when the receptacle is made special for the dispensing mechanism, it may be made with an enlargement such as 18 in FIGURE 2. Further, FIGURE 8 shows dispenser 78 to illustrate that the receptacle 79 may have openings at both ends to facilitate refilling. In such a case there will be an additional hollow neck 80 together with a plug 82 in the neck. The plug has a skirt 83 threadedly engaged with hollow neck 80, and the lower surface 84 of plug 82 can be smoothly rounded to have a functional utility identical to that of enlargement 18 or of wall 20. The balance of the dispenser shown in FIGURE 8 is the same as that of FIGURE 2 or of FIGURE 5 of even that of FIGURE 10 with slight obvious modification required.

The plunger assembly in FIGURE 5 has a shorter stroke requirement for the portion of the plunger assembly contained within body 71. The plunger has a seat forming structure 88 the same as the seat forming structure 40, and the plunger assembly has an inner tube 89 provided with a stop shoulder 90 intermediate the upper and lower ends thereof. Passageway 91 the same as passageway 38, extends completely through tube 89. An outer sleeve 92 is concentrically mounted on tube 89 and has an inward flange 93 at the upper end thereof adapted to be contacted by collar 90 during the operation of plunger assembly 72. The sleeve 92 extends through the sleeve 94 of structure 70 and has a lower flange 95 disposed on collar 96. The collar is slidably disposed in the cavity of body 71, as is spring 97. The spring reacts at one end on the upper wall of the cavity of body 71 and reacts on collar 96. The function of the spring is to yieldingly oppose the movement of the plunger assembly 72 in an upward direction and to return the plunger to the lowered position.

In operation of plunger assembly 72, it is assumed that the plunger assembly is in the lowermost position. In this position, the structure 88 is located beneath the supply of pills 66. As the plunger assembly is manually moved upward, the inner tube 89 moves upward without motion of sleeve 92 nor compression of spring 97. Then, when the inner tube 89 is moved far enough for shoulder 99 to engage flange 96, the outer sleeve 92 commences to move upward. Since it is connected at its lower end to collar 96, for instance by having the spring 97 bear on flange 95, and since the inner tube has a shoulder 99 thereon (FIGURE 5) which is brought to bear against the lower surface of collar 96, the collar 96 plus tube 92 commence to move upwardly thereby compressing spring 97. Before the spring is compressed to its minimum thickness, structure 88 becomes effective to drop a pill down passageway 91. Thereafter, upon release of the manual force to the lower end of the plunger assembly 72, inner tube 89 drops down as required by the stored potential energy in spring 97, and the outer tube 92 also drops down placing the dispenser in preparedness for another cycle of operation.

Reference is now made to FIGURES 10–15 inclusive. Dispenser 100 shown in these figures has a different envelope configuration. It is shaped for dispensing cigarettes 102 and to show that the principles of the invention are in no way restricted to dispensing pills. Receptacle 104 is in the form of a hopper having a closure 106 secured to the open upper end thereof. The lower wall 108 of the hopper-like receptacle 104 has a pair of sloping wall surfaces 110 and 112, one above the other to assure that cigarettes will be individually deposited on seat forming structure 114 which is the same in function and very much the same in construction as structures 40 and 88 respectively.

Plunger assembly 116 is reciprocatively mounted in the neck 118 of receptacle 104. Although the plunger assembly is gravity returned, a spring could easily be incorporated for a positive return of the plunger assembly. Plunger assembly 116 consists of a flat elongate tube 120 approximately of the same dimension of an ordinary cigarette, either large size or small size, and is made at least in the seat forming structure 114 region of an elastomeric substance. This seat forming structure (FIG. 11) is made of segments 124 divided from the side and end walls of tube 120 by means of slots 126 with apertures 128 at the lower extremities thereof. Elongate grooves 130 and 132 are in the larger side walls of tube 120 in order to further aid in forming hinges or hinge axes for the sections of structure 114. Moreover, the shoulders 134 which respond in function to shoulders 124, are slightly broader because of the shape of the cigarette 102, assuring that it will be seated in place properly and only a single cigarette is capable of being mounted thereon.

Dispenser 100 differs from the previously described dispensers by relying on cam tracks 140 together with cam followers 142 for opening structure 114. The cam tracks 140 are in pairs in opposite end walls of receptacle 104, and they have outwardly directly upper portions 144 near the stop 146 attached to the closure 106 and projecting inwardly of the receptacle cavity. The cam followers 142 are merely pin-like projections at the ends of the sections 124. These are held captive in slots 140, and as the plunger assembly 116 is moved upwardly, the cam followers in the tracks 140 require structure 114 to be opened and enable the cigarette to drop through passageway 150 in the plunger assembly 116.

Stop 146 of dispenser 100 does not cause the structure 114 to be opened as in dispensers 14 and 64. It serves as a baffle giving final assurance that only one cigarette is on the structure 114 when the plunger assembly 116 is completely elevated.

The foregoing is considered as illustrative only of the principles of the invention. Further, since numerous modifications and changes will readily occur to those skilled in the art, it is not desired to limit the invention to the exact construction and operation shown and described, and accordingly all suitable modifications and equivalents may be resorted to, falling within the scope of the invention as claimed.

What is claimed as new is as follows:

1. A dispenser for discrete objects, said dispenser comprising a receptacle in which the objects are adapted to be disposed, a dispenser mechanism connected with the receptacle and having a dispenser body, a plunger mounted for movement in said body and having a passageway therethrough through which an object is adapted to move, a split, resilient seat connected with said plunger and communicating with the passageway and on which a single object is adapted to be selected and supported from the supply thereof in the receptacle and means for opening the seat for dropping the object into the passageway.

2. A dispenser for discrete objects, said dispenser comprising a receptacle in which the objects are adapted to be disposed, a dispenser mechanism connected with the receptacle and having a dispenser body, a plunger mounted for movement in said body and having a passageway therethrough through which an object is adapted to move, and a resilient seat connected with said plunger and on which a single object is adapted to be selected and supported from the supply thereof in the receptacle, said resilient seat including a pair of sections which are hingedly movable between a closed and opened position at which the object on the seat falls into the passageway, and means for opening the seat for discharging the object therefrom.

3. A dispenser for discrete objects, said dispenser comprising a receptacle in which the objects are adapted to be disposed, a dispenser mechanism connected with the receptacle and having a dispenser body, a plunger mounted for movement in said body and having a passageway therethrough through which an object is adapted to move, and a resilient seat connected with said plunger and on which a single object is adapted to be selected and supported from the supply thereof in the receptacle, said resilient seat including a pair of sections which are hingedly movable between a closed and opened position at which the object on the seat falls into the passageway, said resilient seat having inwardly extending shoulders which partially bridge the passageway at the upper end thereof and which are adapted to be spread in an amount sufficient to enable the object to fall into the passageway.

4. The combination of claim 3 wherein there are resilient means operatively connected with the plunger to yieldingly oppose at least a portion of the movement of the plunger in one direction and to return the plunger to a rest position after a single object is dropped from the seat into the passageway.

5. The combination of claim 4 wherein the receptacle has a wall against which said shoulders are adapted to bear and cause said shoulders to separate enabling the object on the seat to drop into said passageway as aforesaid.

6. The combination of claim 4 wherein said receptacle and said plunger have cam tracks and cam followers respectively operatively connected therebetween, and said cam tracks being shaped to spread the seat forming structure when the plunger has been moved inwardly of the receptacle a distance to move the seat forming structure near the top of the receptacle.

7. The combination of claim 4 wherein said receptacle has two openings therein, one of said openings being in registry with said plunger assembly and the other of said openings having a closure connected therewith for refilling the receptacle.

8. A dispenser comprising a receptacle for articles to be dispensed, a plunger mounted for movement in said receptacle, said plunger having a passageway extending therethrough communicating with the receptacle and through which the articles are adapted to pass, seat forming structure on the plunger in the receptacle for receiving therein and elevating an article and including sections which are movable between opened and closed positions, and means responsive to predetermined movement of the plunger in the receptacle for opening said seat forming structure.

9. A dispenser comprising a receptacle for articles to be dispensed, a plunger mounted for movement in said receptacle, said plunger having a passageway extending therethrough communicating with the receptacle and through which the articles are adapted to pass, seat forming structure on the plunger in the receptacle for receiving therein and elevating an article and including sections which are movable between opened and closed positions, and means responsive to predetermined movement of the plunger in the receptacle for opening said seat forming structure, said seat forming structure having shoulders at the upper end thereof movable between open and closed positions in response to said predetermined movement.

10. A dispenser comprising a receptacle for articles to be dispensed, a plunger mounted for movement in said receptacle, said plunger having a passageway extending therethrough communicating with the receptacle and through which the articles are adapted to pass, seat forming structure on the plunger in the receptacle for receiving therein and elevating an article and including sections which are movable between opened and closed positions, means responsive to predetermined movement of the plunger in one direction in the receptacle for opening said seat forming structure, and resilient means opposing the movement of said plunger in said one direction and reacting on said receptacle and said plunger.

11. A dispenser comprising a receptacle for articles to be dispensed, a plunger mounted for movement in said receptacle, said plunger having a passageway extending therethrough communicating with the receptacle and through which the articles are adapted to pass, seat forming structure on the plunger in the receptacle for receiving therein and elevating an article and including sections which are movable between opened and closed positions, means responsive to predetermined movement of the plunger in one direction in the receptacle for opening said seat forming structure, and resilient means opposing the movement of said plunger in said one direction and reacting on said receptacle and said plunger, said resilient means including a spring, said plunger having a sleeve mounted on the exterior thereof, a lost motion structural connection between said plunger and said sleeve whereby said plunger is movable a distance inwardly of the receptacle before said sleeve is engaged with the plunger and moved therewith.

12. An article dispenser comprising a receptacle for articles to be dispensed, a tubular plunger extending slidably into the receptacle and including on one end a split, resilient seat operable in the receptacle for receiving and supporting an article thereon, said seat having communication with the plunger for dropping the article thereinto from the receptacle, and means in the receptacle responsive to predetermined movement of the plunger in one direction for opening the seat for releasing the article.

13. An article dispenser comprising a receptacle for articles to be dispensed, a tubular dispensing plunger mounted for vertical reciprocation in the receptacle and including a normally closed but openable upper end operable in the receptacle for receiving on said upper end and elevating an article in the receptacle, and means in the receptacle for opening said upper end of said plunger in response to predetermined upward movement thereof for dropping the article thereinto.

14. An article dispenser in accordance with claim 13, wherein said means includes an abutment in the recep-

tacle in the path of the plunger for engagement by said upper end thereof.

15. A dispenser comprising a container for the reception of articles to be dispensed, said container including a top and having an opening in its lower portion, a vertically slidable tubular plunger in the container depending therefrom through the opening, said plunger comprising a split, resilient upper end portion operable in the container for receiving thereon and elevating an article and engageable with the container top to be opened thereby for dropping the article into said plunger, and means for yieldingly urging the plunger downwardly in the container.

16. A dispenser in accordance with claim 15, wherein said container top includes a depending, rounded enlargement in the container in the path of the plunger for engagement by said split upper end portion thereof.

17. A dispenser in accordance with claim 15, wherein said container top includes an upstanding hollow neck, and a removable closure plug in the neck aligned with the plunger and engageable by said split upper end portion thereof.

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