July 19, 1966 R. GAYLE ET AL 3,261,455

MULTILAYER DISPENSER FOR PILLS

Filed July 17, 1964 2 Sheets-Sheet 1

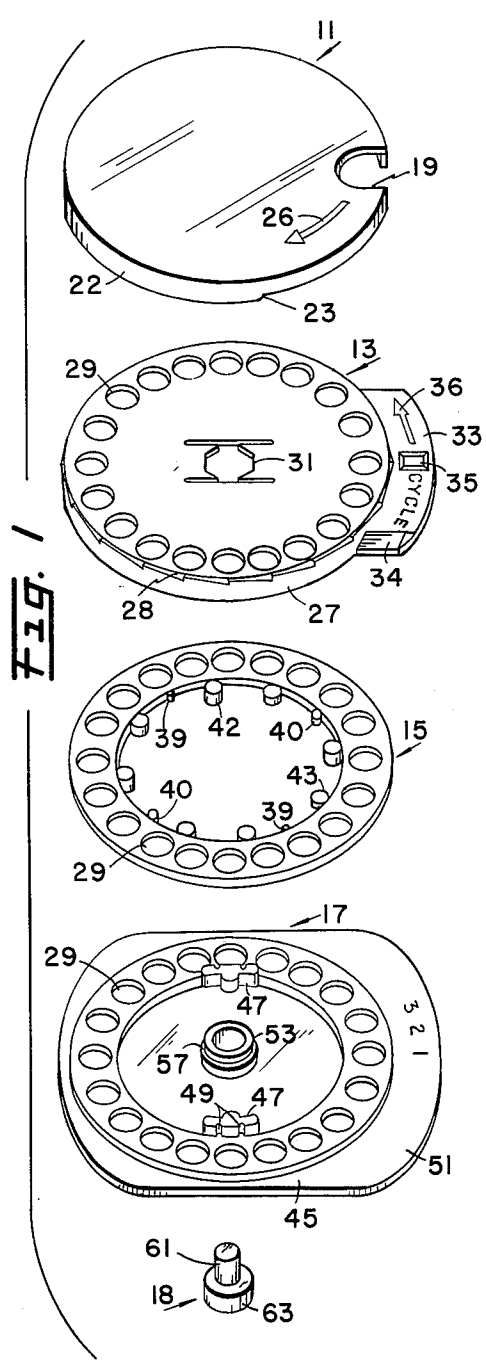


Fig. 1

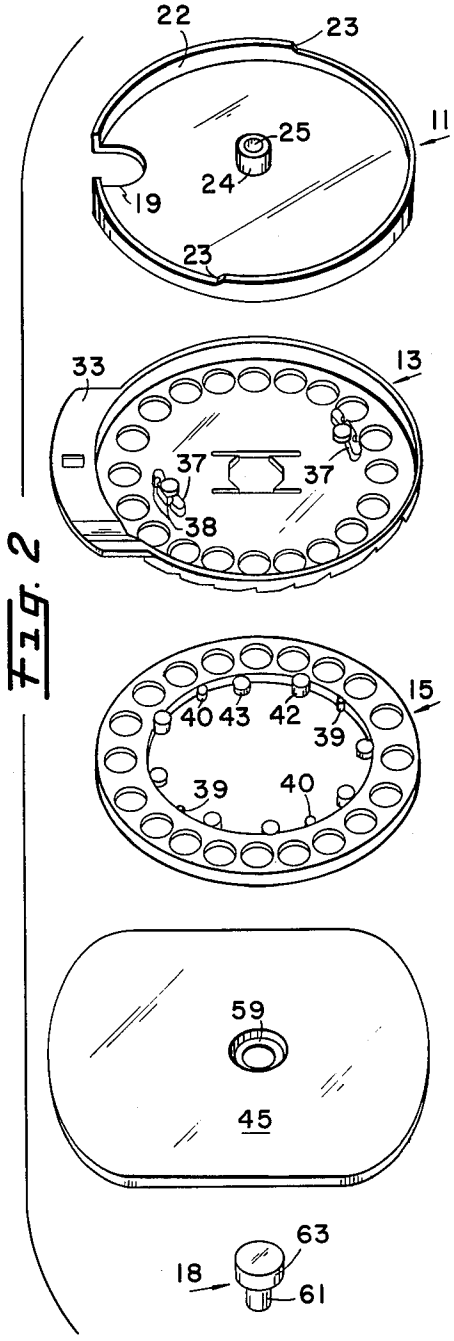


Fig. 2

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MULTILAYER DISPENSER FOR PILLS

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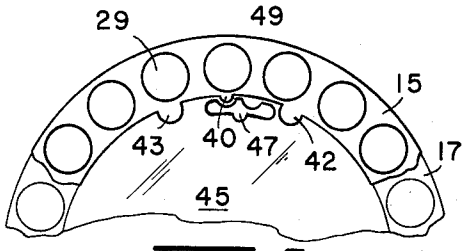


Fig. 3

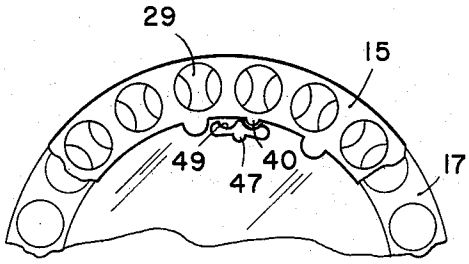


Fig. 4

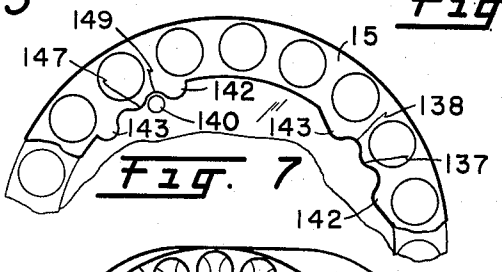


Fig. 7

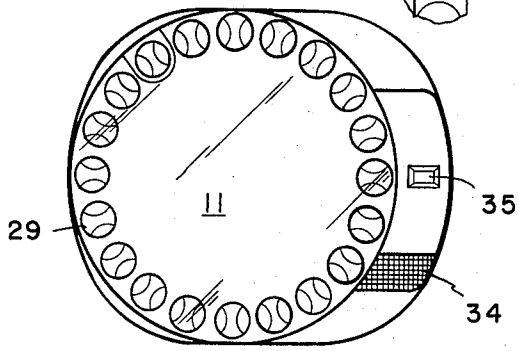


Fig. 5

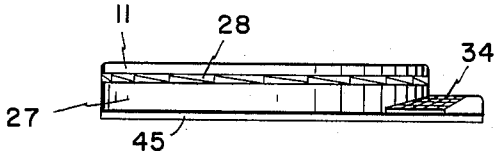


Fig. 6

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United States Patent Office 3,261,455 Patented July 19, 1966

3,261,455

MULTILAYER DISPENSER FOR PILLS

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Filed July 17, 1964, Ser. No. 383,432
9 Claims. (Cl. 206—42)

This invention relates to a pill dispenser and, in particular, to a dispenser having a plurality of compartments for containing pills.

It is frequently desirable to have a dispenser which will contain a number of pills in individual compartments whereby the pills do not contact each other. This is particularly true in some medicaments where pills are extremely fragile and will be likely to crumble if permitted to freely move against each other. Another advantage for individual pill compartments is the ease in dispensing single pills. However, in constructing such isolated compartments, the containers generally become rather large. They are often too cumbersome to carry in one's pocket or purse, unless they are built to hold only a small number of pills, such as 20 or 30. It is therefore apparent that the ideal pill dispenser or container is one which is extremely compact inside but still securely holds a large number of pills which do not rattle within the container and which also do not rattle against each other.

The pill dispenser of this invention comprises multiple layers in which a large number of pills may be stored without causing damage to them. Each layer is provided with a plurality of compartments for containing a predetermined number of pills. The layers are stacked and serve to cooperate with each other in keeping the individual pills substantially isolated. The stacked layers are capped by a cover having a small opening for dispensing only one pill at a time.

It is therefore one object of this invention to provide a new and improved pill dispenser having separated pill compartments;

Another object of this invention is to provide a new and improved pill dispenser which holds a large number of pills in a stable and isolated relationship with each other;

Another object of this invention is to provide a new and improved pill dispenser which is exceptionally compact and yet contains a large number of pills;

Another object of this invention is to provide a novel dispenser which may be readily loaded with a predetermined number of pills.

Other objects and advantages of this invention will be apparent on reading the specification in connection with the drawing in which:

FIG. 1 represents an exploded perspective view of the pill dispenser of this invention;

FIG. 2 is a perspective view of the pill dispenser elements in their exploded relationship, but with the parts turned over from that of FIG. 1 in order to expose their opposite surface;

FIG. 3 is a fragmentary view of two of the layers of the pill dispenser in one relative position to be referred to as the third position of the dispenser;

FIG. 4 is a fragmentary view of the layers of the pill dispenser of FIG. 3 in their second position;

FIG. 5 is a top plane view of the pill dispenser with its layers in the first position;

FIG. 6 is a side view in elevation of the pill dispenser illustrated in FIG. 5; and

FIG. 7 is a fragmentary view of the second and third layers in a modified embodiment of this invention.

The illustrated pill dispenser of this invention is circular and is adapted for containing 60 pills in isolated

relationship. However, it will be apparent from the following description that the pill dispenser may be enlarged or reduced with respect to the number of pills it may contain.

Referring to FIGS. 1 and 2, it is to be noted that the particular pill dispenser comprises only five different parts. Going from top to bottom of FIG. 1, the dispenser comprises a cover **11**, a first layer **13**, a second layer **15**, and a third layer **17**. The thickness of each layer may be identical and need be no more than the thickness of the pill to be contained. A retaining pin **18** may be used to secure the cover and layers together. If desired, the dispenser may be reduced to four parts by adapting the third layer and cover to forcibly fit together, thereby eliminating the need of a pin.

One advantage of this invention is that all of the elements of the dispenser may be formed from a plastic material such as polystyrene and polypropylene. Mass production is readily obtained through standard plastic injection molding techniques. Referring to the cover **11**, which may be of transparent material, an opening **19** is defined which has a diameter just sufficient for passing only one pill at a time. Cover **11** is of circular configuration and has a flange **22** extending about its periphery. Flange **22** has two sharp cutoffs **23** (FIG. 2) in its edge which serve a purpose to be explained later. On the inner surface of cover **11** is a hub **24** having a bore **25**. An arrow **26** indicates the proper direction to turn the cover.

The first layer **13** is of substantially circular configuration and of a diameter approximately equal to that of cover **11**. Layer **13** has a flange **27** extending downwardly around its perimeter which serves as an enclosure wall for the dispenser. A ratcheted shoulder **28** is also provided about the periphery of the first layer. This ratcheted shoulder **28** has a ratchet or niche for each of the pill compartments **29** which are spaced about the periphery of layer **13**. Pill compartments **29** comprise apertures or bores extending through layer **13** and in the particular illustration are of circular configuration to receive disk shaped pills. While twenty pill compartments are shown other quantities may also be used. Retaining element **31** in the center of layer **13** is adapted to receive other elements of the dispenser and maintain them in an assembled position.

Extending to the right of layer **13** and from its flange **27** is an actuating or shifting lever **33**. This lever has a thumb element **34** and an index aperture **35**, which extends through the lever. Arrow **36** indicates the direction for moving lever **33**.

Referring to FIG. 2, a pair of arcuate clutch elements **37** are diametrically mounted on the inner surface of the first layer **13**. Each clutch element **37** has a pair of spaced semi-circular recesses **38**.

The second layer **15** may be annular and is provided with a similar number of pill compartments **29**. As is the case for the compartments in the first layer, the pill compartments in the second layer comprise bores or apertures. On the inside perimeter of the second layer **15**, two pairs of projections **39** and **40** are positioned. As will be explained later, these two pairs of projections **39** and **40** serve as elements for a limited two-position clutch. It is to be noted that the pair of projections **39** are slightly smaller in diameter than the other pair of projections **40**. Projections **39** have a diameter which permits them to snugly fit into recesses **38** on the clutch element of the first layer **13**. Also positioned on the inside perimeter of layer **15** are two pairs each of cylindrical projections **42** and **43** which serve as stopping devices or limiters for restricting the clutch means of the three layers of the dispenser to only two positions. Limiters **42** have an axial length that is nearly twice that of limiters **43**. Limiters

43 may be approximately the same thickness as the second layer 15. Consequently, limiters 42 will extend into the plane of the third layer 17 enabling them to freely travel along the inner periphery of the third layer 17. In this manner, limiters 42 also serve to maintain layers 15 and 17 in their proper relative positions.

The third layer 17 is also annular and, for simplicity in molding, may be formed integrally with a base element or platform 45. Similar to the first and second layer, the third layer 17 has an equal number of pill compartments which are formed from apertures or bores 29. A pair of arcuate clutch elements 47 are mounted on the inner periphery of layer 17 and extend upwardly from base 45. Clutch elements 47 are similar to the clutch elements 37 on the first layer, with the exception that the two recesses 49 in elements 47 are of a slightly larger diameter. These recesses 49 are dimensioned to snugly receive the pair of clutch element projections 40 on the second layer.

The base member 45 has an extension 51 which bears the numerals 1, 2, and 3. These numerals are positioned for individually appearing through the index aperture 35 of lever 33 and relate to the three available positions of the dispenser. A hub 53 is centrally positioned on base 45 for rotatably receiving hub 24 on cover 11. Annular shoulder 57 formed on the hub is of a predetermined diameter to permit it to be snugly received within retaining element 31. As noted in FIG. 2, the reverse side of base member 45 has a recessed portion 59 beneath hub 53. This recessed portion 59 permits a pin 18 to be flush with the base. Pin 18 has an extension 61 of a diameter substantially equal to that of the inside diameter of hub 24 on the cover for snug reception therein. The diameter of the pin's head 63 is such that it may freely rotate within recessed portion 59. Pin 18 can be substituted by molding a small ledge or hook (not illustrated) on a portion of the end of cover hub 24 which may then be forced over recessed portion 59.

The assembly of the above-described dispenser may be accomplished in the following manner. The second layer 15 is stacked on the third layer 17 with their respective pill compartments 29 being aligned with each other. Limiters 42 extend downwardly against the inner periphery of third layer 17. It is essential that the clutch element projections 40 on the second layer 15 are fitted into the grooves 49 in the clutch element 47 of the third layer 17. These two layers will now be in the position shown in FIG. 3 which is referred to as the third position. The first layer 13 may now be placed over the second and third layers with index aperture 35 positioned over the numeral 3 on the extension 51 of base 45. A slight amount of pressure will be needed against retaining element 31 in order to force it down on shoulder 57 of hub 53. With the three layers now assembled in their third position, all of the pill compartments are aligned and the dispenser may be loaded with 60 pills if 20 compartments are provided in each layer. Each of the twenty aligned pill compartments 29 will receive three pills. Cover 11 is subsequently placed on top of the filled layers with its hub 24 extending through hub 53 of the bottom member. It is to be noted that hub 24 does not extend into the recessed portion 59 on bottom member 45 in order for the pin head 63 to be flush in recessed portion 59. For securing the various elements together, pin 60 is inserted through hub 53 and forced into hub 24. At this point it is apparent that the three pills in each of the pill compartments are in contact with each other. For effecting separation of the pills, pressure is applied in the opposite direction of arrow 36 on thumb element 34 of the actuating lever 33 to back the layers 13 and 15 clockwise into their first position, which is illustrated in FIG. 5. In this position layers 13 and 17 are aligned but offset from middle layer 15. Two limiters 43 are now abutting clutch elements 47 and two limiters 42 abut clutch elements 37.

In operating the pill dispenser, the pills will first be removed from the top or first layer 13. This is accomplished by rotating cover 11 clockwise as indicated by arrow 26 relative to all three layers, whereby the pill opening 19 coincides with a pill compartment 29. The two cutoffs 23 on flange 22 of the cover 11 register with the ratcheted shoulders 28 on the first layer 13 to simplify the alignment of pill opening 19 with a pill compartment. Once all twenty pills have been removed from the top layer, the pills in the second layer 15 are removed in the following manner.

The dispenser may be gripped between the left forefinger and thumb which are placed on flange 27. Several fingers of the right hand may be placed underneath the bottom member 45 with the right thumb against the thumb element 34, pushing counterclockwise in the direction of the arrow 36 on the actuating lever 33 of flange 27. The index aperture 35 is advanced counterclockwise to coincide with the numeral 2 on the base extension 51. Once the numeral 2 appears, the first and second layers of the dispenser are in an aligned position. This second position for the dispenser differs from the first position illustrated in FIG. 5 in that the first and second layers, 13 and 15, have their pill compartments aligned with each other but offset from the third layer 17. Thus, the pills contained in the second layer 15 may be dispensed through the cover opening 19 since they freely pass through the first layer 13.

The alignment of the bores or pill compartments 29 in the first and second layers is achieved through the unique cltuch elements cooperating between the three layers. It is to be noted that the second layer 15 is physically coupled with its adjacent layers 13 and 17 through several clutch means. In particular, the second layer 15 is coupled with the first layer 13 by the two smaller projection elements 39 positioned on the inner periphery of the second layer 15 through engagement in one of the two recesses 38 on each of the two clutch elements 37 mounted on the inner surface of the cover. As the first layer is advanced relative to layers 15 and 17, the clutch elements 37 are forced to override the small projections 39 until the projections drop into the second recess in each of the clutch elements 37. Temporary deflection and strain on the elements are easily withstood by the plastic material. Further relative movement between the layers is prevented by means of the limiters 43, which abut the clutch elements 37. The dimensioning of the two recesses 38 on each of the clutch elements 37 is such that movement of a projection 39 from one recess to the other recess causes the pill compartments of the first and second layers 13 and 15 to change from an offset relationship to one of alignment. This action is similar to the operation for aligning the second layer 15 with the third layer 17, illustrated in FIGS. 3 and 4.

Inasmuch as all three layers of the dispenser are coupled to each other, it would appear that actuation of the lever 33 might cause relative movement between the second and third layers 15 and 17 instead of the first and second layers 13 and 15. This is prevented by providing clutch means between the adjacent layers of varying dimensions. The clutch means cooperating between the second and third layers 15 and 17 which comprises the larger pair of projections 40 mounted on the inner periphery of the second layer 15 and the pair of clutch elements 47 mounted on the inner periphery of the third layer 17 requires a greater amount of energy for shifting. This is because projections 40 and recesses 49 are respectively greater and deeper than projections 39 and recesses 38, which cooperate with the first layer 13, and therefore a greater amount of force is needed to shift projections 40 into the second recesses 49 (FIGS. 3 and 4).

Thus, after all of the pills have been removed from the second layer 15, the first and second layers 13 and 15 may be advanced relative to the third layer 17 by forcing the actuating lever into a position where the numeral 3 appears through the index aperture 35. As shown in FIG.

4, the second and third layers **15** and **17** are in an offset relationship in the dispenser's second position and are aligned (FIG. 3) when the dispenser is in its third position. The first and second layers **13** and **15** are maintained in their aligned relationship since the clutch elements **37** are butted against the limiters **43** similar to the way limiters **42** are butted against clutch elements **47** (FIG. 3). Therefore, layer **15** is carried on rotation of layer **13**. Thus, the three layers of the dispenser have their pill compartments aligned with each other, and pills in the third layer pass through the second and first layers and are dispensed through the opening in the cover **11**.

While the clutch elements **32** and **47** are shown on layers **13** and **17**, they may also be molded on the middle layer **15**. In such an arrangement limiters **42** and **43** and clutch element projections **39** and **40** would be placed on layers **13** and **17**. The precise configuration of these limiters and clutch elements may also be varied.

FIG. 7 illustrates one variation for the clutch elements' configurations and their positions. Middle layer **15** has a pair of clutch elements **137** and a pair of clutch elements **147**, one of each being shown. Each element **137** has two small recesses **138** which cooperate with a post-like projection **139** on the layer **13**. Each element **147** has two larger recesses **149** adapted for gripping post-like projection **140** on layer **17**. Limiters **142** and **143** function to carry layer **15** with layer **13** and to properly effect complete alignment of the pill compartments in all three layers. Since the recesses **138** are not as deep as recesses **149** the first layer will align with the second layer prior to alignment between the second and third layers.

Projections **139** and **140** function similar to projections **39** and **40** in the dispenser illustrated in FIGS. 1–6. Thus, projections **139** and **140** are snugly contained in their respective recesses **138** and **149**. The plastic material used for the dispenser readily withstands the very slight deflection which results when the layers are shifted. In both the previously described dispenser and the dispenser of FIG. 7 it is to be noted that for every available combination of pairs of adjacent layers at least one two-position clutch means is provided.

It is apparent that additional layers may be incorporated into the dispenser of this invention by providing similar clutch means between adjacent layers. The layers need only be offset from their adjacent layers in order to prevent contact with the individual pills. For dispensing pills, it is essential that the layers become successively aligned with each other, and this is achieved by providing clutch elements cooperating between the adjacent layers, which sucessively require a greater amount of force to shift them from their first position to their second position. A limitation of the number of layers possible for a dispenser would be primarily dependent upon the size of the dispenser, inasmuch as a considerable amount of linear space would be required for proper spacing of the various clutch elements throughout the multiple layers.

While the illustrated dispenser is of circular configuration, a dispenser may be formed utilizing the principles of this invention which operates on a straight-line movement. In such an arrangement, the multiple layers would have their pill compartments formed in a straight line and stacked on each other with clutch elements of the above-described type cooperating between adjacent elements. After the dispenser is filled with pills, the layers would all be moved into a staggered relationship with adjacent layers, and as the layers are emptied they would become aligned with the preceding layer.

The above relates to only a few of the various embodiments of this invention which may be developed without departing from the spirit of the invention and the scope of the appended claims.

We claim:

1. A pill dispenser comprising a minimum of three rotatable layers with each of said layers defining a plurality of bores adapted for containing pills, each layer being slidable to the extent of assuming only two relative positions with adjacent layers, said bores in adjacent layers being aligned and offset, and means comprising projecting complementary surfaces positioned on adjacent layers maintaining alignment of said layers successively on advancing the top most layer.

2. A pill dispenser comprising a minimum of three rotatable layers with each of said layers defining a plurality of bores adapted for containing pills, each layer being limited to assuming two relative positions with adjacent layers by two complementary clutch elements mounted therebetween, said bores in adjacent layers being selectively aligned and offset, said clutch elements between each succeeding said adjacent layers having predetermined dimensions requiring increased energy for actuation, alignment of the bores of said layers being successively obtained on advancing the top most layer.

3. In a pill dispenser having a plurality of layers with each of said layers having a plurality of bores adapted for containing pills, a limited two-position clutch means provided for each available combination of pairs of adjacent layers, said limited two-position clutch means comprising a first element extending from one layer and adapted for successive engagement with two portions of a second element on an adjacent layer, said bores in the layers of each pair of layers being offset on the first clutch position and aligned on the second clutch position, each succeeding clutch means from top to bottom having predetermined dimensions requiring increased energy for actuation whereby the bores of each layer from top to bottom are successively aligned with the bores of all succeeding layers on repeated advancement of the top layer relative to the bottom layer.

4. In a pill dispenser having three layers with each of said layers having a plurality of bores adapted for containing pills, a limited two-position clutch means provided for each of the two pairs of adjacent layers, said limited two-position clutch means comprising a first element extending from one layer and adapted for successive engagement with two portions of a second element on an adjacent layer, said bores in the layers of each pair of layers being offset on the first clutch position and aligned on the second clutch position, the second clutch means for said second pair of adjacent layers having predetermined dimensions requiring increased energy for actuation whereby the bores of each layer from top to bottom are successively aligned with the bores of all succeeding layers on repeated advancement of the top layer relative to the bottom layer.

5. In a pill dispenser having a plurality of layers with each of said layers having a plurality of bores adapted for containing pills, a limited two-position clutch means provided for each available combination of pairs of adjacent layers, said limited two-position clutch means comprising a projection forming a first element extending from one layer and adapted for successive engagement with two recessed portions of a second element on an adjacent layer, a pair of limiters positioned on opposite sides of said projection and spaced for abutment with said second clutch element, said bores in the layers of each pair of layers being offset on the first clutch position and aligned on the second clutch position, each succeeding clutch means from top to bottom having predetermined dimensions requiring increased energy for actuation whereby the bores of each layer from top to bottom are successively aligned with the bores of all succeeding layers on repeated advancement of the top layer relative to the bottom layer.

6. In a circular pill dispenser having a plurality of congruent circular layers with each of said layers having a plurality of bores adapted for containing pills, a limited two-position clutch means provided for each available combination of pairs of adjacent layers, said limited two-position clutch means comprising a first element extending from one layer and adapted for successive engagement with two portions of a second element on an adjacent

layer, said bores in the layers of each pair of layers being offset on the first clutch position and aligned on the second clutch position, each succeeding clutch means from top to bottom having predetermined dimensions requiring increased energy for actuation whereby the bores of each layer from top to bottom are successively aligned with the bores of all succeeding layers on repeated rotary advancement of the top layer relative to the bottom layer.

7. A pill dispenser comprising a plurality of layers with each of said layers defining a plurality of bores adapted for containing pills, said layers being stacked between a cover and bottom, each pair of adjacent layers being coupled together through a two-position clutch means, said bores in the layers of each said pair being offset on the first clutch position and aligned in the second clutch position, each succeeding two-position clutch means being dimensioned to require increased energy for advancement from its first position to its second position whereby the bores of each layer are successively aligned with the bores of preceding layers on repeated advancement of the top layer relative to the bottom layer.

8. A pill dispenser comprising a plurality of congruent layers with each of said layers defining a plurality of bores adapted for containing pills, said layers being stacked between a cover and bottom, each pair of adjacent layers being coupled together through a two-position clutch means, each said clutch means comprising a first element on one layer with two recessed portions adapted for receiving a second clutch element comprising a projection on an adjacent layer, said bores in the layers of each said pair being offset on the first clutch position and aligned in the second clutch position, each succeeding two-position clutch means being dimensioned to require increased energy for advancement from its first position to its second position whereby the bores of each layer are successively aligned with the bores of preceding layers on repeated advancement of the top layer relative to the bottom layer.

9. A circular pill dispenser comprising a plurality of congruent circular layers with each of said layers defining a plurality of bores adapted for containing pills, said layers being rotatably stacked between a cover and bottom, each pair of adjacent layers being coupled together for simultaneous rotary movement through a two-position clutch means, said two-position clutch means comprising a projection on one layer engaged with an arcuate element having two recessed portions for receiving said clutch means projection, said bores in the layers of each said pair being offset on the first clutch position and aligned in the second clutch position, each succeeding two-position clutch means being dimensioned to require increased energy for advancement from its first position to its second position whereby the bores of each layer are successively aligned with the bores of preceding layers on repeated advancement of the top layer relative to the bottom layer.

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