United States Patent [19]

Shaw

[11] **3,752,359**

[45] **Aug. 14, 1973**

[54] **PROGRAMMED DISPENSERS**

[76] Inventor: **Joseph Denman Shaw,** 508 Church St., Brownsville, Pa. 15417

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[21] Appl. No.: **229,770**

[52] **U.S. Cl.** **221/5,** 221/94

[51] **Int. Cl.** **B65g 1/00**

[58] **Field of Search** 221/4, 5, 65, 87, 221/92, 225, 238, 287, 126, 131, 94

[56] **References Cited**

UNITED STATES PATENTS

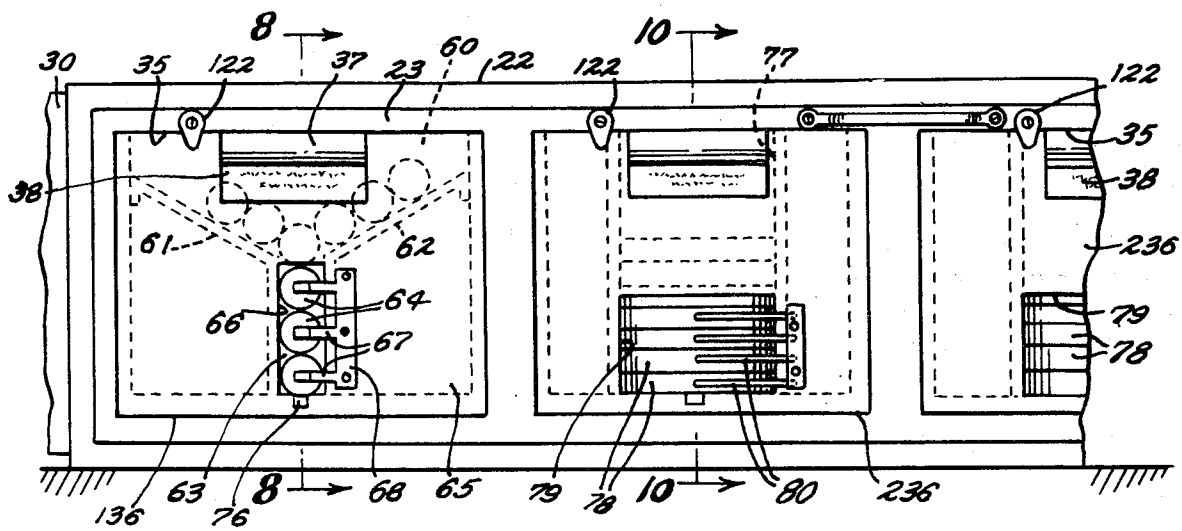
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Primary Examiner—Stanley H. Tollberg
Attorney—Walter S. Murray

[57] **ABSTRACT**

The programmed dispenser for pharmaceuticals disclosed herein employs a cabinet containing a plurality of individually coded drawers each having a pharmaceutical magazine cooperative with a dispensing slide means, and an indexed selector means adapted to periodically receive the cabinet to thereby operate a slide means and dispense one or the prescribed number of pharmaceuticals from a magazine.

11 Claims, 19 Drawing Figures



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SHEET 1 OF 3

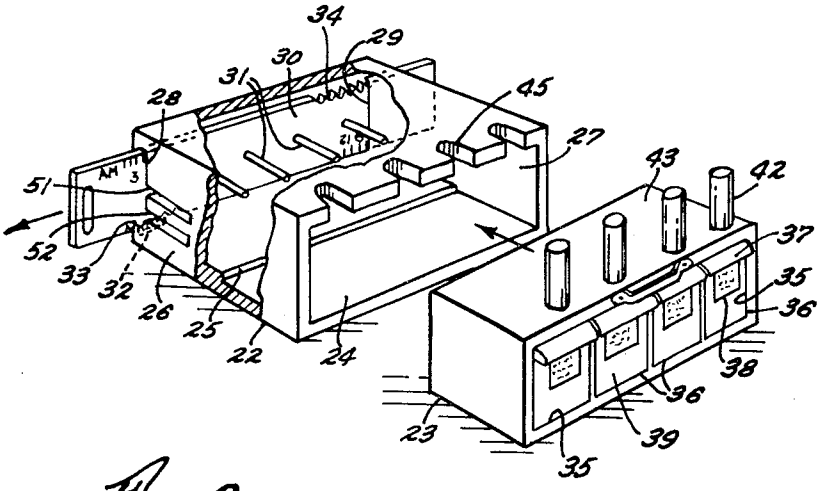


Fig. 1

Fig. 2

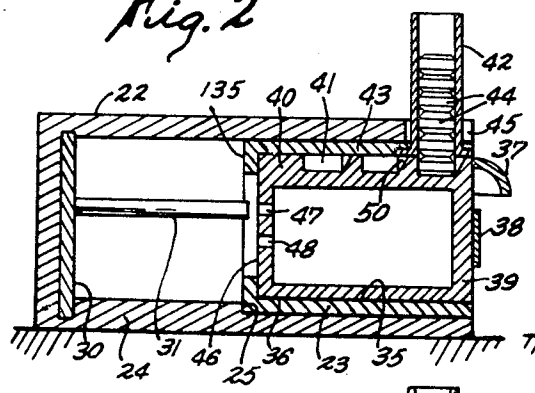
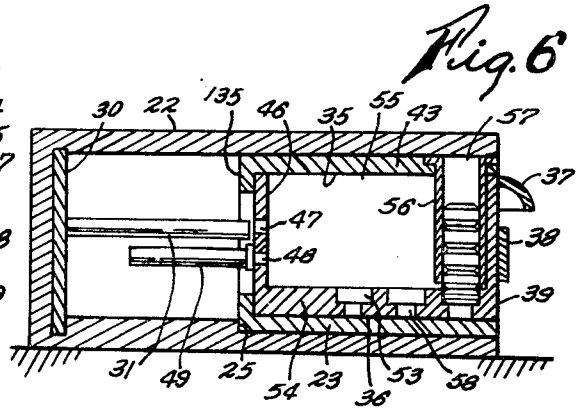


Fig. 6



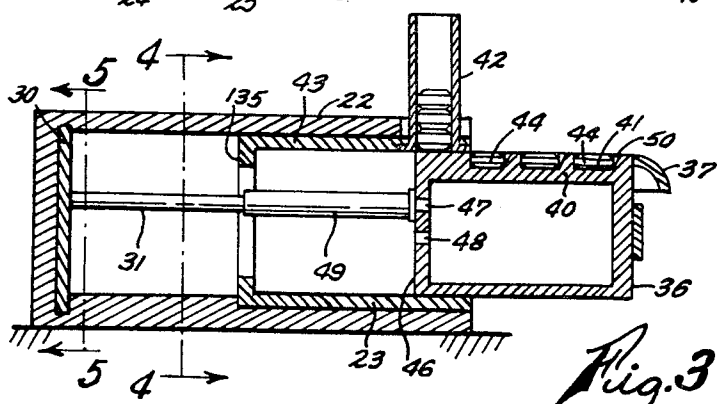


Fig. 3

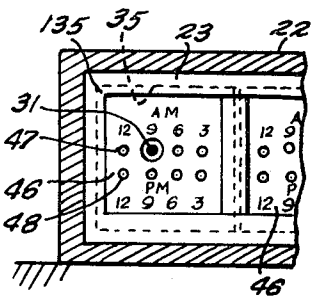


Fig. 4

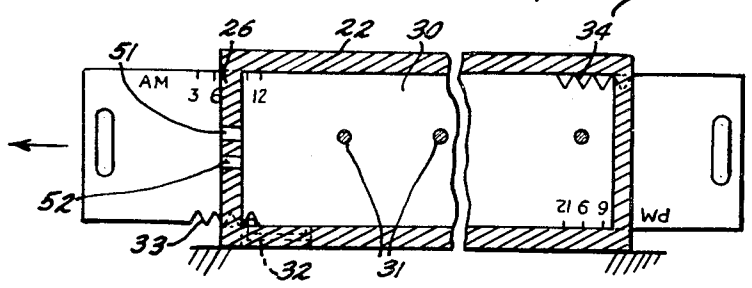


Fig. 5

Fig. 7

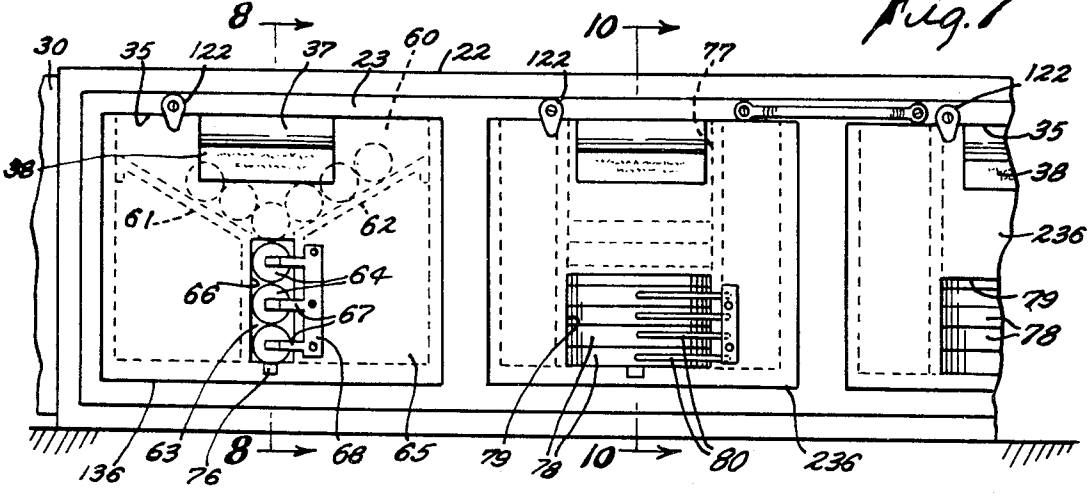


Fig. 8

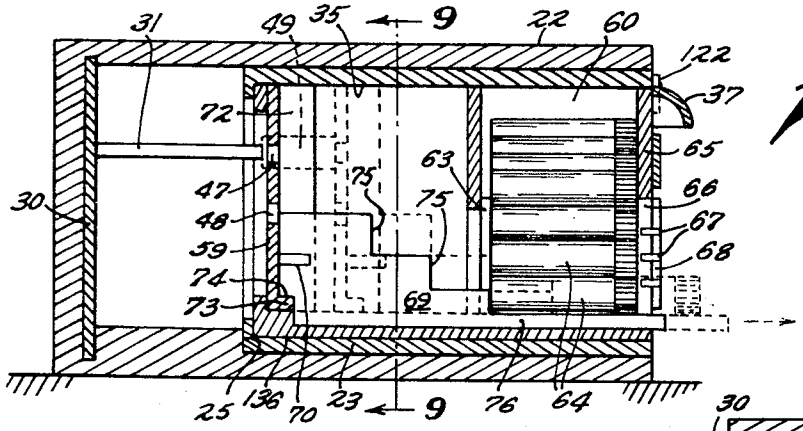
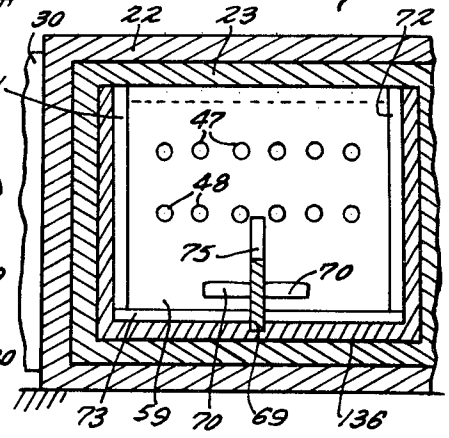


Fig. 9



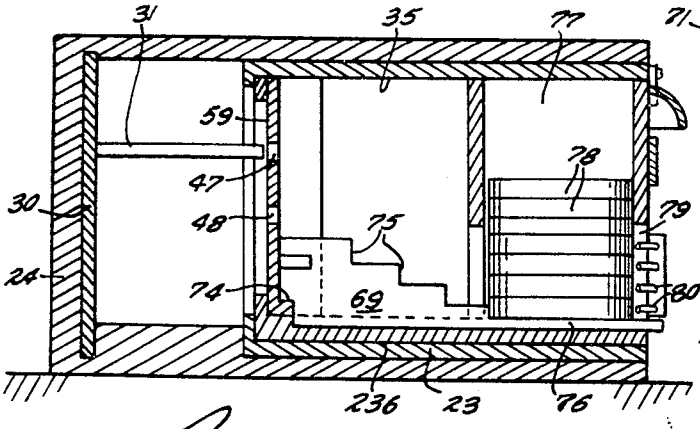


Fig. 10

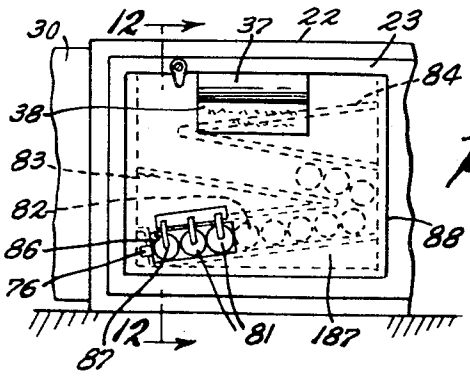


Fig. 11

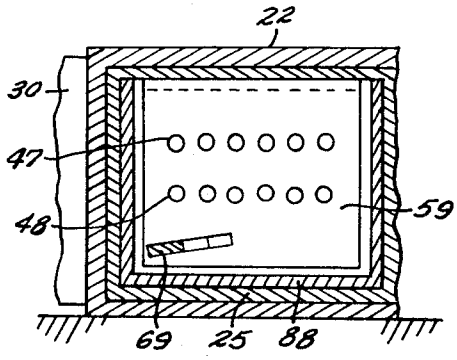


Fig. 13

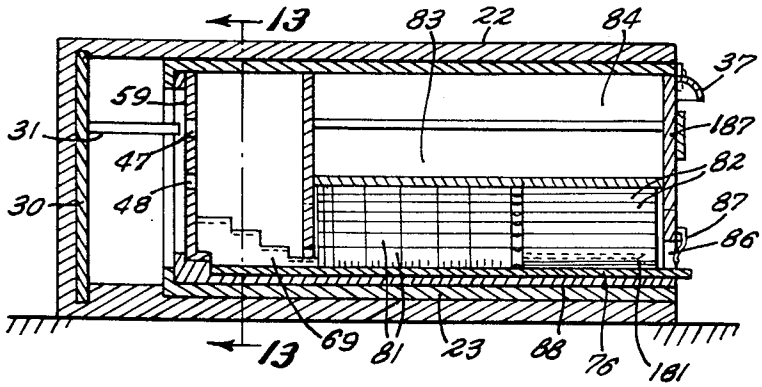


Fig. 12

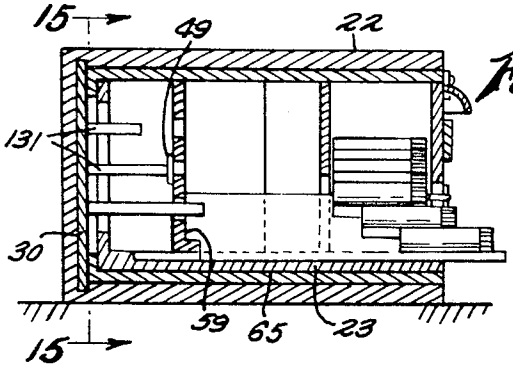


Fig. 14

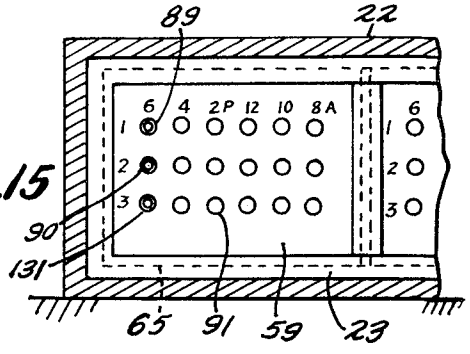


Fig. 15

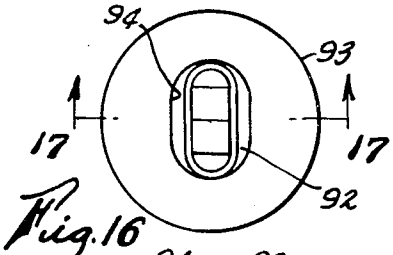


Fig. 16

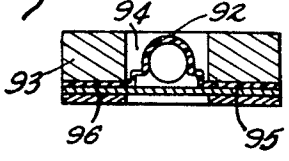


Fig. 17

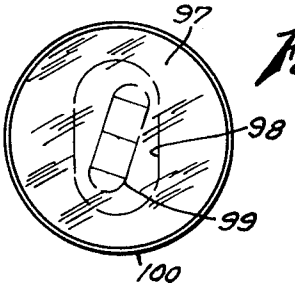


Fig. 18

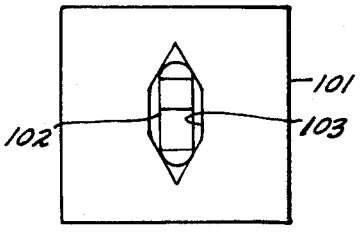


Fig. 19

PROGRAMMED DISPENSERS

This invention relates to programmed dispensers adapted to allocate for individual consumption medication, pharmaceuticals and other medical or dental items at predetermined times and in prescribed amounts.

An object of the invention is to provide a novel and positive functioning dispenser that is readily programmed and is operated to present, at particular times, the exact amount of medication or pharmaceutical items for each of a plurality of patients.

Another object of the invention is to provide a programmed dispenser having means for holding a stack of hospital or dental items combined with a programmed slide mechanism adapted to discharge a prescribed number of items from the stack into a dispensing position at a predetermined time.

According to another aspect of this invention a dispensing slide is provided for each of a series of cabinet contained drawers which are coded to cooperated with a decoding case to dispense a prescribed number of hospital or dental items from a stack in each drawer upon movement of the cabinet into the decoding case at predetermined times.

For a better understanding of the invention reference should be had to the accompanying drawings which illustrate preferred embodiements thereof, and wherein like reference numerals indicate similar parts throughout the several views.

In the drawings:

FIG. 1 is a perspective view of one form of my programmed dispenser depicted in a coded but non-dispensing position; several wall portions being broken away and shown in section.

FIGS. 2 and 3 are sections taken longitudinally through the central portion of the programmed dispenser shown in FIG. 1, the parts in the Figures being illustrated in decoded, non-dispensing and dispensing positions, respectively.

FIGS. 4 and 5 are fragmental sections taken on lines 4—4 and 5—5, respectively, of FIG. 3.

FIG. 6 is section like FIG. 2 showing a modification of the dispenser depicted in FIGS. 1-5 of the drawings.

FIG. 7 is a fragmental, front elevational view of a modified form of my programmed dispenser adapted to dispense hospital or dental items of various shapes.

FIG. 8 is a section taken on line 8—8 of FIG. 7.

FIG. 9 is a section taken on line 9—9 of FIG. 8.

FIG. 10 is a fragmental section taken on line 10—10 of FIG. 7.

FIG. 11 is a fragmental, front elevational view of another modified form of my programmed dispenser.

FIG. 12 is a section taken on line 12—12 of FIG. 11.

FIG. 13 is a section taken on line 13—13 of FIG. 12.

FIG. 14 is a central section through a still further modified form of my programmed dispenser.

FIG. 15 is a fragmental section on line 15—15 of FIG. 14.

FIG. 16 is a plan view of an item adapter particularly useful with my programmed dispenser shown in FIGS. 7 and 10 of the drawings.

FIG. 17 is a section on line 17—17 of FIG. 16.

FIGS. 18 and 19 are plan views of modified forms of the adapter shown in FIGS. 16 and 17 of the drawings.

With particular reference to FIGS. 1-5 of the drawings the numeral 22 refers to a rectangular, decoding

case similar to the case depicted in my copending patent application for Programmed Dispenser filed Dec. 17, 1970 and given Ser. No. 99,165 by the Patent Office (continuation application filed Apr. 3, 1972, Ser. No. 240,869). This case 22 is open at the front and has internal dimensions adapted to snugly and slidably receive a portable cabinet 23. A bottom wall 24 of the case has a lateral shoulder 25 formed thereon which acts as a limit stop fixing the fully inserted position of the cabinet in the case. Opposed side walls 26 and 27 of the decoding case are each provided with a vertical slot 28 and 29, respectively, formed through the rear portions thereof to receive a laterally slidable, time selector board 30. As best shown in FIG. 1 the board has a number of pins 31 projecting at right angles from one major face thereof, said pins being preferably arranged in a lateral row and vertically off center with respect to the width of the board, said board being adapted for controlled, intermittent lateral movement across the inside rear portion of the decoding case by a suitable indexing means 32 mounted in a bottom corner of the case and cooperative with each of a row of time related teeth 33 and 34 formed on diagonally opposed corner portions of the selector board.

The cabinet 22 has a number of horizontally disposed compartments 35 formed therein, each being adapted to slidably receive a drawer 36 that has a hand pull 37 and an index card frame 38 on its front wall 39. A marginal inturned flange 135 is provided on the back of the cabinet to act as a limit stop determining the fully inserted position of each drawer in the cabinet. Each drawer includes a graduated ejector member which takes the form of a top wall 40 having a longitudinal row of uniformly spaced apart medication receiving pockets 41 therein. Each of said rows is in registery with the delivery end of a magazine in the form of a vertical tube 42 mounted on a top wall 43 of the cabinet 23 and adapted to hold a stack of items to be dispensed, such as medication in the form of disc-shaped pills 44. This magazine is gravity operated but it is contemplated that the items could be spring urged toward its discharge end without a departure from the spirit of the invention. The front edge portion of the decoding case 22 is provided with clearance slots 45 to freely receive the tubes 42 when the cabinet 23 is slid into the fully closed, decoded position within the case 22; as illustrated in FIG. 2 of the drawings.

Each drawer 36 is provided with a lateral wall such as a back wall 46 having two vertically spaced, lateral rows of coding holes 47 and 48 formed therethrough, selected holes being adapted to frictionally and detachably hold program plugs 49 of different lengths, which cooperate with the pins 31 on the selector board 30 to provide means of predetermined longitudinal extents which push a drawer a selected distance out of the cabinet when the latter is fully inserted into the case 22.

Individual drawers 36 are each initially identified by the pharmacist, or other authorized person, by filling out an index card with a patient's name and room number abd inserting the card into the frame 38 on said drawer. The proper number and kinds of medication are stacked in the magazine 42 of that drawer and finally the back of each drawer is programmed to dispense the stacked medication therein in the amounts and at predetermined times by inserting a plug or plugs 49 of proper lengths into selected places in the rows of holes 47 and 48 in the back wall of the drawer. When

all the cabinet drawers are identified, filled, programmed and fully slid into the cabinet, said cabinet is transported to say, a nurses' station, on a hospital floor and at predetermined indexed times marked on the selector board and the drawer backs, the cabinet will be fully inserted into the decoding case **22** and stopped by the shoulder **25.** If no medication is to be dispensed at that particular time from a particular drawer, the pin **31,** on the selector board, will not contact a plug **49** on the back of said drawer as indicated in FIG. **2** of the drawings, and the drawer will remain within the cabinet in non-dispensing position but if, for example, three medical items **44** are to be dispensed to a patient at that time the pin **31** will cooperate to engage a program plug **49** of sufficient length to push the drawer outwardly whereby three items will be carried from beneath the stack of pills **44** by the pockets **41** and be moved longitudinally out of the cabinet and presented for dispensation, as indicated in FIG. **3** of the drawings. Each pocket has a thumbnail entrance slot **50** formed in the top wall **40** of the drawer at the periphery of the pocket for ready removal of the pill **44** therefrom. After this dispensing operation the cabinet is removed from the case, all the drawers are closed and the cabinet is then in readiness for the next following dispensing operation.

It is to be noted that the vertical slot **28** in the decoding case **22** is provided with two through slots **51** and **52,** (FIG. **1**), that the horizontal row of pins **31** on the time selector board **30** are vertically removed from the horizontal centerline of the board and that the board is calibrated in "AM" and "PM" hours opposite the teeth **33** and **34,** respectively. Also, the rows of coding holes **47** and **48** (FIG. **4**) are calibrated in "AM" and "PM" hours, respectively. The pins **31** are disposed on the time selector board **30** one to a drawer, whereby the board serves as a selector for both "AM" and "PM" periods by merely reversing it end for end in the slots **28** and **29** and manually advancing it laterally in accordance with the indexing means **32** which, in the illustrated example, is for periods of 3 hours. The indexing means and the codes on the drawers could be calibrated for other time periods such as an 8 hour day, or the like.

With reference to FIG. **3** of the drawings it will be further understood that by controlling the presence or absence and the lengths of the plugs **49** in the rows of coding holes **47** and **48** one or more pharmaceutical items will be dispensed from a particular drawer (FIG. **3**) or no drug will be dispensed if the particular hole has no plug in it as is indicated in FIG. **2** of the drawings.

Now with reference to FIG. **6** of the drawings it will be see that pockets **53,** similar to pockets **41** for the dispenser shown in FIGS. **1–5,** are located in a bottom wall **54** of the drawer **36** and that said drawer is open at the top **55.** A magazine **56** is mounted in the cabinet **23** and depends from the top wall **43** of the cabinet into the drawer through the open top **55.** A stack of pills, or the like, is loaded into the magazine from its opened top **57** when the cabinet is out of the decoding case **22** and when the drawer is properly programmed by insertion of plugs **49** in selected holes **47** and/or **48** and the cabinet entered in to the decoding case, the drawer may be pushed outwardly from the cabinet thereby moving a required number of pills from the bottom of the stack into the pockets **53** and thence into dispensing positions. Each pocket **53** has a hole **58** formed in the bottom to provide a means for readily removing a pill from its pocket.

Referring now to FIGS. **7–10** of the drawings a modified form of my programmed dispenser is adapted to dispense either cylindrical or flat items having regular or irregular shapes in plan as required for dental or hospital uses. This device also comprises the cabinet **23** having a number of compartments **35** for slidably receiving drawers **136** and **236,** each drawer including a coded laterally disposed back wall **59** that has sliding face-wise movement within its respective drawer. The cabinettis operatively associated with the decoding case **22** in the same manner and for the same purposes heretofore described with respect to the dispenser depicted in FIGS. **1–6** of the drawings, it being noted that a rotatable catch **122** is mounted on the front of the cabinet to maintain each drawer in fully closed position during the dispensing operation.

As best illustrated in FIGS. **7–8** of the drawings the drawer **136** is open at the top and the front interior portion thereof has a hopper **60** positioned therein and formed with downwardly inclined bottom walls **61** and **62** that communicate with a centrally located vertical magazine **63** for holding in dispensing condition cylindrically shaped items **64** in the nature of pill bottles, or the like. A front wall **65** of the drawer **136** is provided with a vertical discharge opening **66** that is in registry with the magazine **63** and has a dimension adapted to permit discharge of one or a plurality of items **64** held in the magazine **63.** Across the discharge opening are preferrably disposed a number of resilient fingers **67** biased to normally preclude discharge of the items held in the magazine, each finger being preferrably positioned across the discharge path of a single item in the magazine. The fingers are connected to a base plate **68** best stamped from flat resilient stock, said plate being mounted on the front wall **65** to one side of the opening **66.** It will therefore be understood that I have provided an expandable keeper for the discharge opening **66** in the drawer that is resiliently biased to normally close said opening by restricting passage of items therethrough but which is responsive to item pressure to pass one or a selected number of items through said opening and hold said item or items in presented, dispensing positions in front of the drawer.

In this modification the coded laterally disposed back wall **59** instead of being stationary in the drawer is mounted for face-sise, longitudinal movement within the rear portion of the drawer **136.** A graduated ejector in the form of a stepped pusher member **69** has its rear edge fastened to the forward face of the back wall, said pusher being firmly secured to the back wall by means of braces **70—70.** As best shown in FIGS. **8** and **9** the back wall has stabilizing flanges **71** and **72** extending at right angles from the edges thereof and in sliding engagement with the inside opposed surfaces of the sidewalls for the drawer; a bottom flange **73** being formed on the back wall and fastened in a notch **74** in the rear lower edge of the pusher member **69.** Steps **75** in the forward edge of the pusher member have riser portions corresponding to the diameters of the items **64** in the magazine except the lowest step which has a riser portion that is half a diameter of the items to insure clearance of each step from the item next above it. An item supporting arm **76** normally extends from the lower front part of the pusher member to beneath the lower-

most item in the magazine and terminates forwardly of the front wall **65** of the drawer.

As in the modification shown in FIGS. **1–6** of the drawings a program plug **49** of predetermined longitudinal extent is secured in a selected coding hole or holes **47** and **48** in the back wall **59** of the drawer (FIG. **8**) and when the cabinet **23** is fully inserted into the decoding case **22** as is depicted in dotted lines in said Figure, the back wall **59** of the drawer **136** will move forwardly within the drawer latched in the cabinet by catch **122** and advance the pusher member **69** forwardly, thereby axially moving one or more of the items **64** in the magazine outwardly against the fingers **67**, expanding the fingers and resiliently holding one or more of the items exteriorally of the drawer for dispensation.

In FIGS. **7** and **10** there is shown a slight modification of my invention wherein the drawer **236** is provided with a magazine **77** for holding a stack of flat and preferrably disc-shaped items **78** and having an expandable discharge opening **79** formed in the front wall which is normally closed by resiliently biased spring fingers **80** that restrict the passage of items through the opening except in response to item pressure thereon programmed for dispensation by the method heretofore described.

Now with reference to FIGS. **11–13** of the drawings there is shown a device programmed to dispense conventional syringes **81**, or other hospital or dental items having elongated, cylindrical forms. These syringes are substantially uniformly cylindrical throughout their longitudinal extents by fitting detachable tubes **181** FIG. **12**) over the hollow injection needles therefor. This device includes an inclined magazine **82** fed by a number of communicating zig-zag ramps **83** and **84**, an inclined discharge opening **86** being formed in the front wall **187** of a drawer **88** in registry with the discharge opening **86**. The opening **86** is normally closed by spring fingers **87** to preclude discharge of the items except when programmed for axial dispensation by longitudinal movement of the pusher member **69** operated by the programmed dispensing method described above. Because of the relative longer lengths of the syringes only their forward ends are exposed when resiliently held in dispensing position thus not being dependent on the presence of the arm **76** for support as in the device depicted in FIGS. **7–10** of the drawings.

FIGS. **14** and **15** of the drawings show a programmed device like that shown in FIG. **7–9** of the drawings with the exception that a plurality of horizontal rows of coding holes **89,90** and **91** are formed in the back wall **59** of the drawer **65**. As best shown in FIG. **15** of the drawings the holes in the rows are in vertical alignment and the vertical rows of coding holes are labeled by the numerals **1,2** and **3** corresponding to the number of items to be dispensed at a particular time, while the horizontal rows of holes are calibrated to represent the hours of the day when items may be dispensed. By mounting three pins **131** on different lengths in the time selector board **30** in vertical alignment, it is only necessary to place uniform plugs **49** in the proper coding holes in the rows to program the dispenser to discharge the proper number of items at the proper times with the programmed dispensing system described hereinabove.

In FIGS. **16** and **17** of the drawings there is shown a conventional blister package **92** for medication which is provided with an adapter **93** in the form of a flat disc, the disc body having a recess **94** formed centrally therethrough to receive the blister package **92**. The marginal flange **95** of the package is adhesively secured to a major face **96** of the adapter whereby the composite item is conditioned for dispensation with the modification of my invention shown in FIGS. **7** and **10** of the drawings. The reference numeral **97** (FIG. **18**) identifies a disc-shaped adapter having a recess **98** therein for loosely receiving a pill form **99**, said disc and pill being enclosed in a sterile plastic cover **100**. As illustrated in FIG. **19** other items forms may be dispensed with the invention shown in FIGS. **7** and **10** such as the flat rectangular adapter **101** which has a pill form **102** wedged within an irregular recess **103** formed centrally in the adapter body.

What is claimed is:

1. A programmed dispenser of the class described comprising;

a. a generally rectangular cabinet having a number of compartments therein for slidably receiving a plurality of drawers,

b. a lateral wall for each drawer having a lateral coding means thereon,

c. an item containing magazine associated with each drawer,

d. means urging the items toward the discharge end of the magazine,

e. a graduated ejector member connected to the lateral wall of each drawer and adapted to take off an item or items from the discharge end of the magazine and move said item or items into a dispensing position; the number of items dispensed being in direct proportion to the extent of movement of the ejector member,

f. a decoding case having an open front adapted to slidably receive the cabinet therethrough,

g. a time selector mounted for intermittent lateral movement in the rear of the decoding case, and having a cooperative code means on its forward face,

h. and means of predetermined, longitudinal extents selectively positioned between the coding means on each drawer and the cooperative code means on the time selector, whereby to move the ejector member a predetermined distance when the cabinet is slid into fully inserted position in the decoding case.

2. The programmed dispenser set forth in claim **1** wherein the item containing magazine is an upstanding tube mounted on the cabinet, and the graduated ejector member is a series of equally spaced apart pockets formed in a horizontal wall of each drawer and in registry with the bottom of the magazine.

3. The programmed dispenser set forth in claim **1** wherein the lateral coding means on the lateral wall of each drawer is a lateral row of holes for selectively receiving program plugs of different lengths, and the selector member has plug engaging pins of equal lengths positioned on its major face.

4. The programmed dispenser set forth in claim **1** wherein the lateral coding means on the lateral wall of each drawer is a series of vertically spaced lateral rows of plug receiving holes, and the selector member has a vertical row of pins of different lengths positioned on its major face.

5. The programmed dispenser set forth in claim **1** characterized by the fact that the magazine is tubular

in section and contains a stack of items therein, each item constituted by a flat adapter having a medication holding recess formed therein.

6. The programmed dispenser set forth in claim **5** wherein the adapter has a regular contour in plan.

7. The programmed dispenser set forth in claim **5** wherein the medication is in a blister package.

8. The programmed dispenser set forth in claim **5** wherein the adapter has an irregular contour in plan.

9. A programmed dispenser of the class described comprising;

a. a generally rectangular cabinet having a number of compartments therein for slidably receiving a plurality of drawers,

b. a back wall slidable face-wise within each drawer and having a lateral coding means thereon,

c. a front wall for each drawer having discharge opening formed therethrough,

d. means associated with the forward portion of each drawer forming an item containing magazine, said magazine being disposed in registry with the discharge opening in each drawer,

e. means urging the items toward the discharge end of the magazine,

f. an expandable keeper biased to normally close the discharge opening and responsive to item pressure thereon to pass a selected number of items through the opening into dispensing position,

g. a graduated ejector member connected to the back wall of each drawer and adapted to take off an item or items from the discharge end of the magazine, the number of items taken off being in direct proportion to the extent of movement of the ejector member,

h. a decoding case having an open front and adapted to dlidably receive the cabinet therethrough,

i. a time selector member mounted for intermittent lateral movement in the rear of the decoding case.

j. and means of predetermined longitudinal extents selectively positioned between the coding means of each drawer and the selector member whereby to move the ejector a predetermined distance when the cabinet is slid into its fully inserted position within the decoding case.

10. The programmed dispenser set forth in claim **9** wherein the expandable keeper comprises spring fingers each associated with an item in the magazine, and the graduated ejector is a pusher member having a number of steps formed in its forward edge, each step having a riser adapted to engage one item at a time.

11. The programmed dispenser set forth in claim **10** wherein the pusher member has an arm projecting forwardly from the forward edge, beneath the lowermost item in the magazine and beyond the front wall of the drawer.

* * * * *

PO-1050
(5/69)

UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,752,359 Dated August 14, 1973

Inventor(s) Joseph Denman Shaw

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Column 6, line 37 cancel "a time" and insert --an indexed---.

Column 6, line 44 cancel "time".

Column 8, line 9 cancel "a time" and insert --an indexed--.

Signed and sealed this 20th day of November 1973.

(SEAL)
Attest:

EDWARD M.FLETCHER,JR.
Attesting Officer

RENE D. TEGTMEYER
Acting Commissioner of Patents