United States Patent [19]

Patterson

[11] **3,897,855**

[45] **Aug. 5, 1975**

[54] **PORTABLE PHARMACY SYSTEM FOR IN-PATIENTS IN HOSPITALS AND CARE CENTERS**

[76] Inventor: **Richard J. Patterson,** 2170 Century Park East, Los Angeles, Calif. 90067

[22] Filed: **Mar. 29, 1974**

[21] Appl. No.: **456,040**

Related U.S. Application Data

[63] Continuation-in-part of Ser. No. 334,138, Feb. 20, 1973, abandoned.

[52] **U.S. Cl.** ..... **186/1 R;** 211/49 D; 221/70; 280/79.2; 312/196; 312/234; 312/278

[51] **Int. Cl.** **E04h 3/04**

[58] **Field of Search** ..... 186/1 R, 1 A, 1 AC, 1 B, 186/1 C, 1 D; 312/36, 324, 244, 196, 234, 278; 211/49 D; 221/70, 71; 280/79.2

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Primary Examiner—Stanley H. Tollberg
Assistant Examiner—Hadd S. Lane
Attorney, Agent, or Firm—William W. Haefliger

[57] **ABSTRACT**

A pharmacy cart supplies drugs directly to patients at different rooms in a patient-care building, the drugs being carried for ease of replacement on the cart.

8 Claims, 22 Drawing Figures

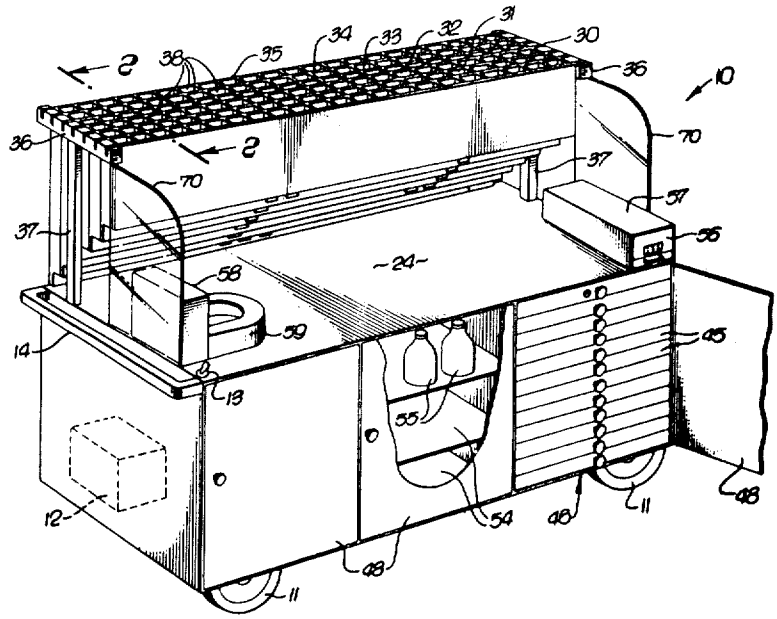


FIG. 1.

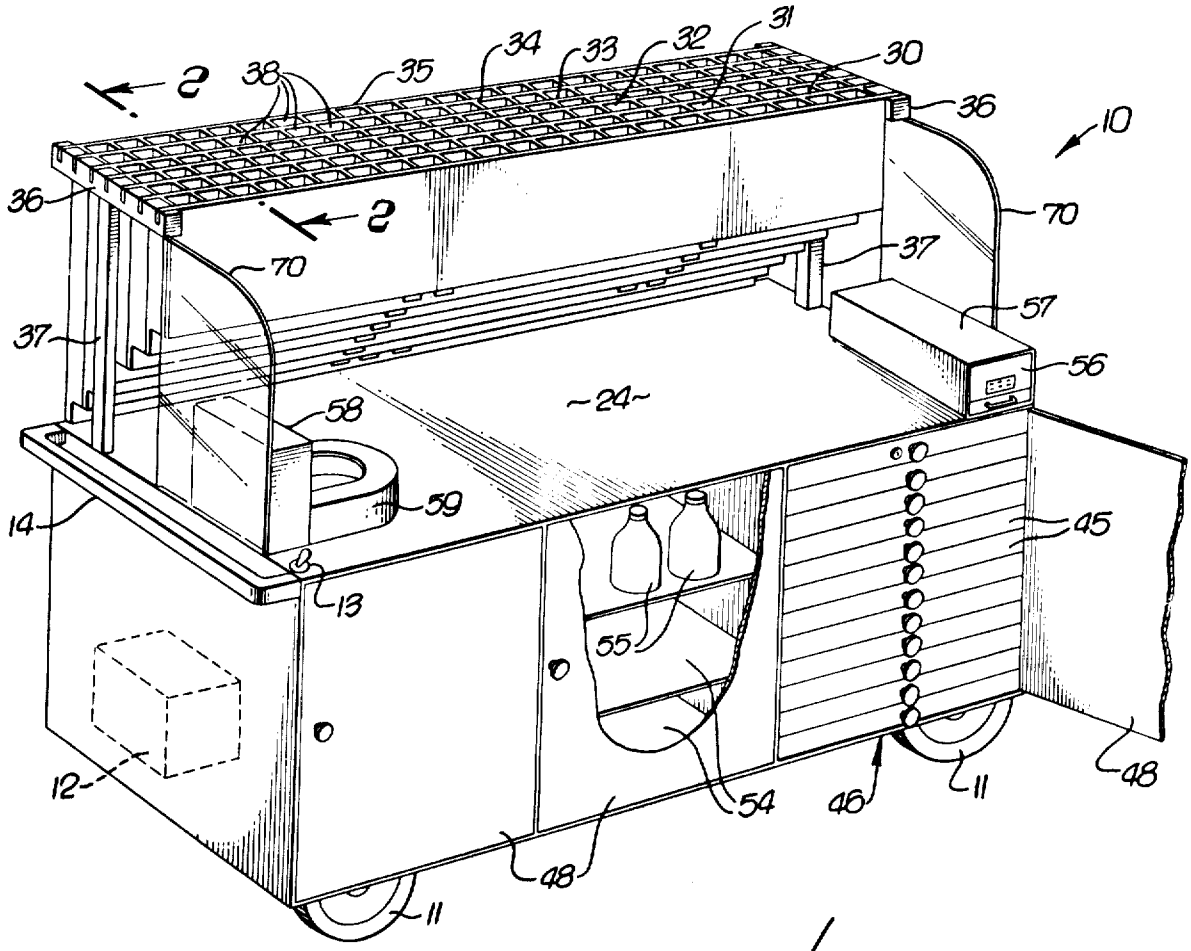

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FIG. 6.

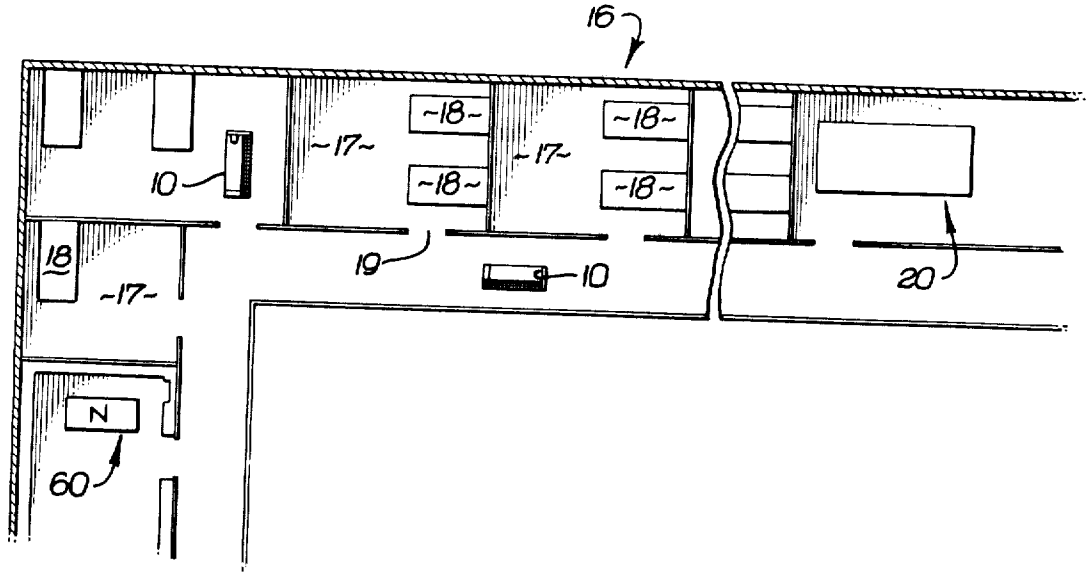

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FIG. 2.

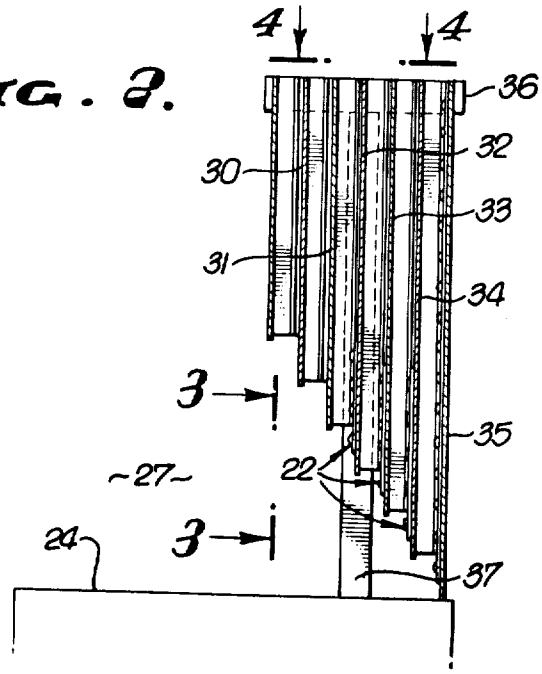


FIG. 3.

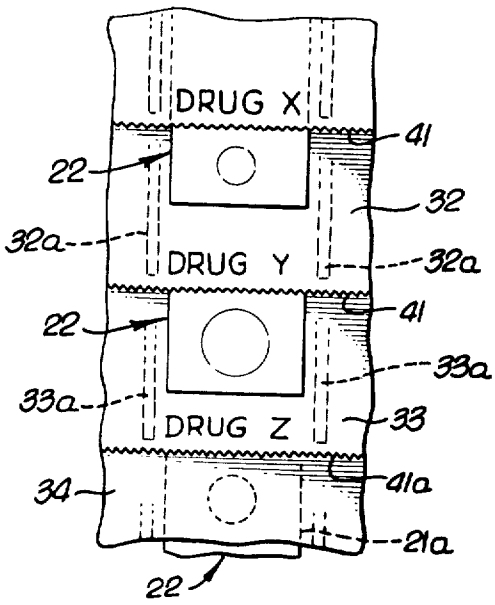


FIG. 4.

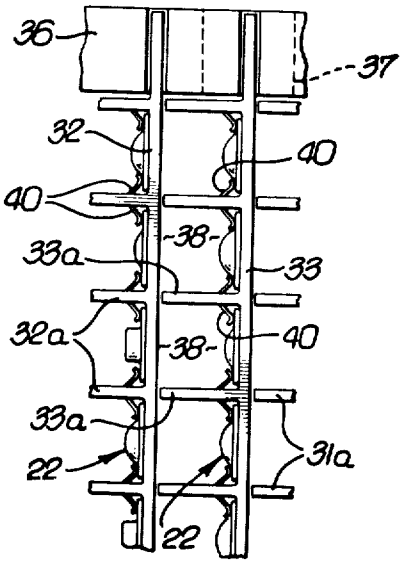


FIG. 5.

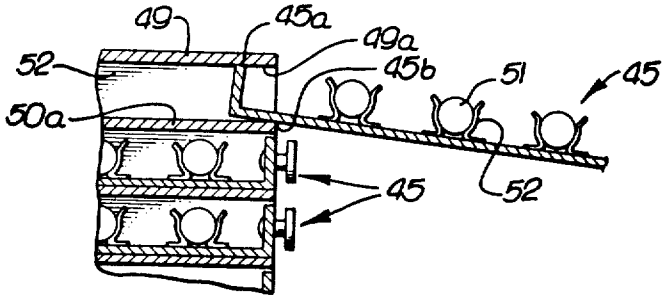


FIG. 7.

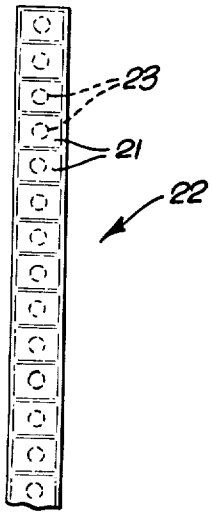


FIG. 8.

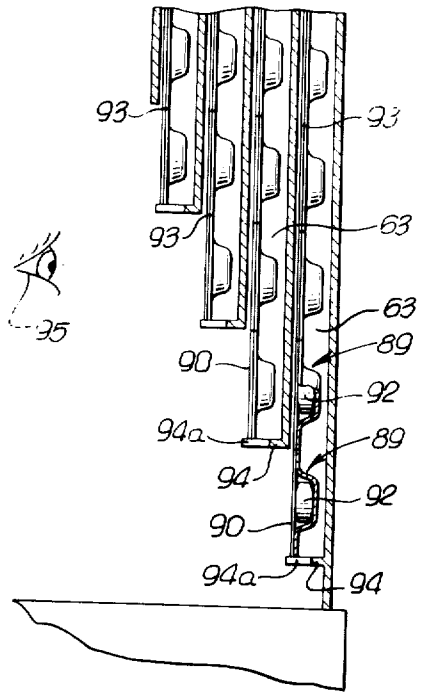


FIG. 9.

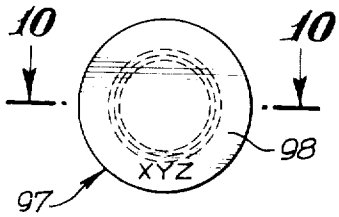


FIG. 10.

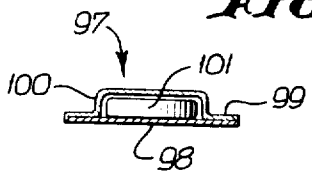


FIG. 11.

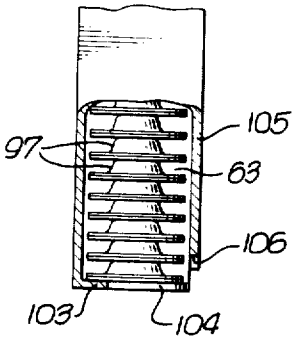


FIG. 12.

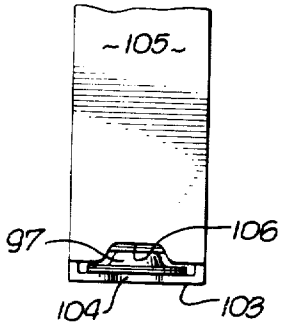


FIG. 13.

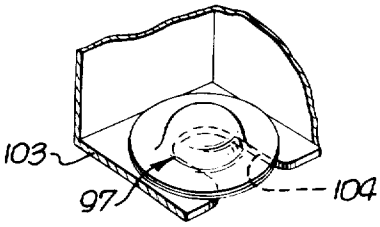


FIG. 16.

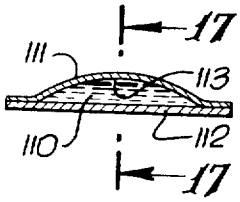


FIG. 17.

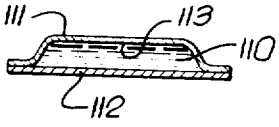


FIG. 14.

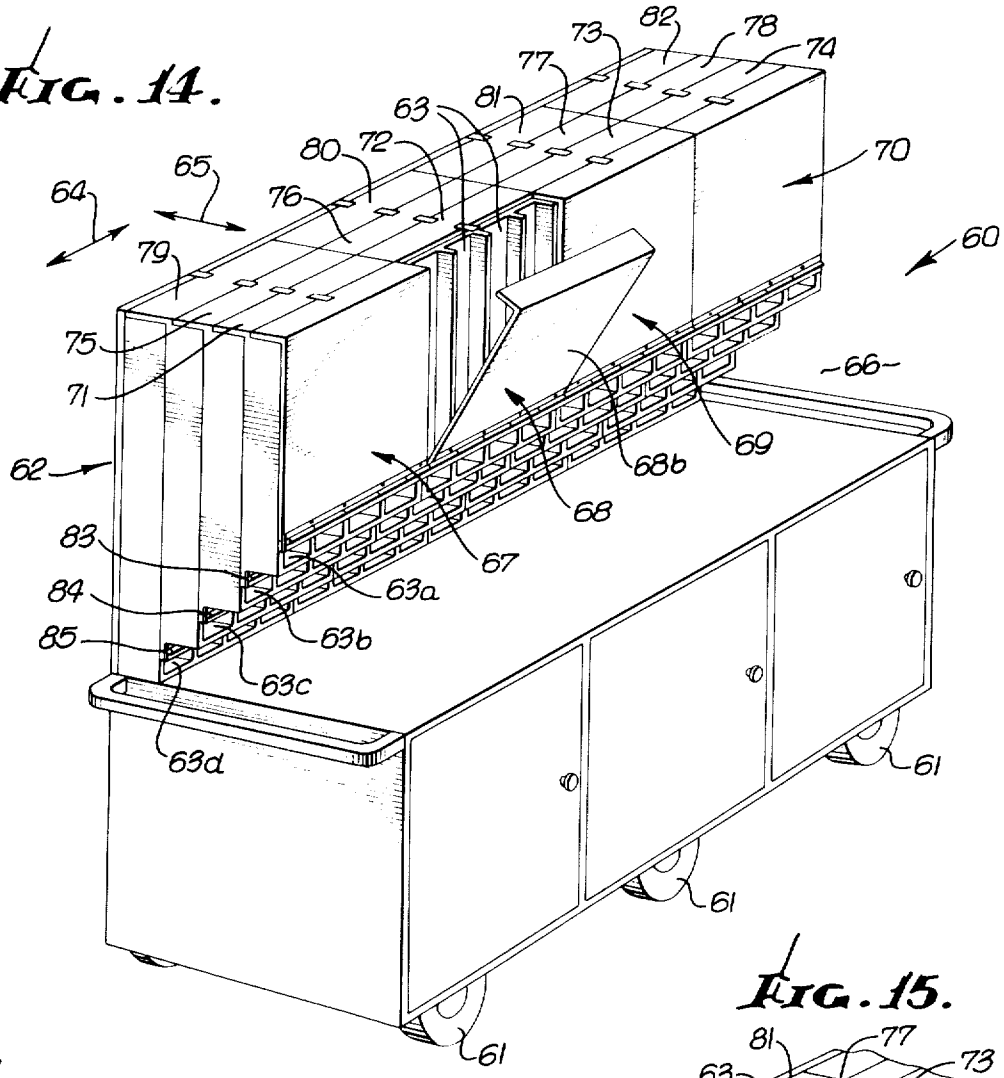


FIG. 15.

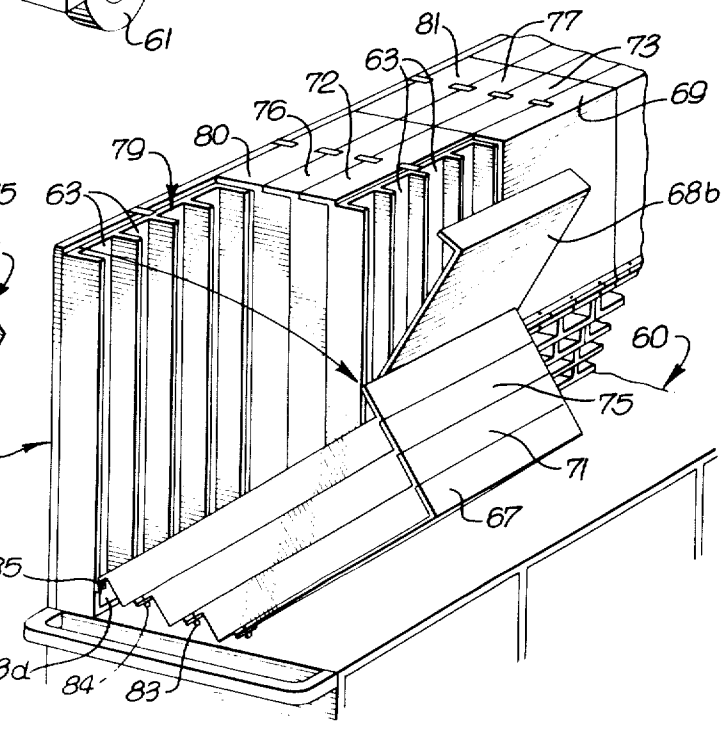


FIG. 15a.

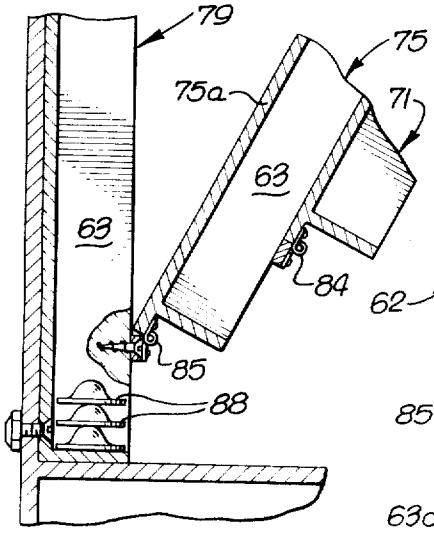


FIG. 18.

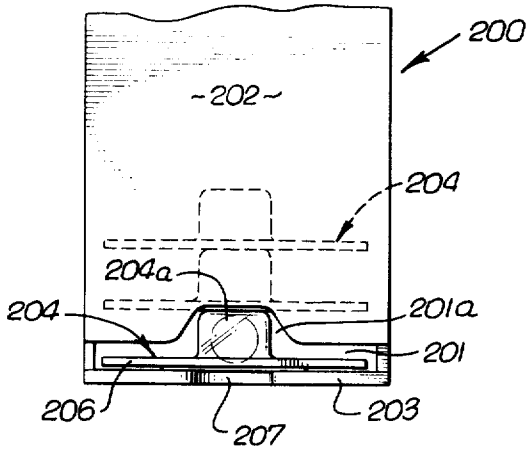


FIG. 19.

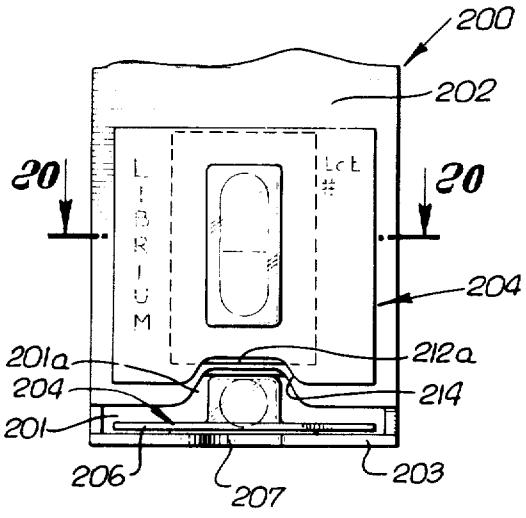


FIG. 20.

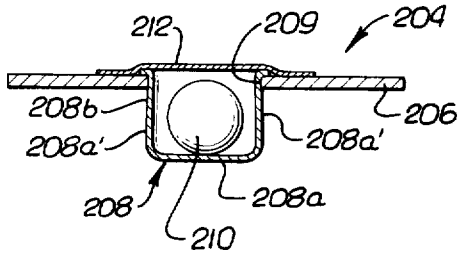
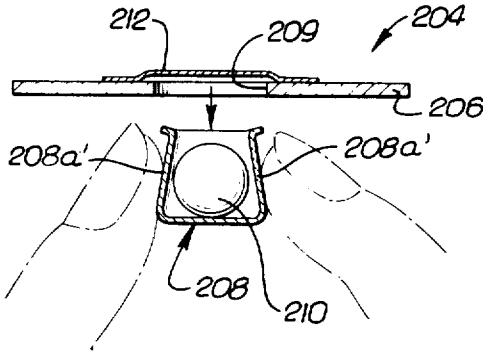


FIG. 21.



PORTABLE PHARMACY SYSTEM FOR IN-PATIENTS IN HOSPITALS AND CARE CENTERS

BACKGROUND OF THE INVENTION

This application is a continuation-in-part of my copending application Ser. No. 334,138, filed Feb. 20, 1973, now abandoned.

This invention relates generally to dispensing of drugs in hospitals and similar patient-care buildings and more particularly concerns method and system for supplying needed drugs directly to patients from portable satellite pharmacy equipment.

At the present time, drugs are normally supplied in hospitals from a fixed pharmacy location. Disadvantages with this system include the need for intermediaries such as nurses between the pharmacist and patient; the risk of error inherent in the operations of such intermediaries due to their normal lack of pharmacological training; the great expense of operating such pharmacies and the uneconomical usage of otherwise needed space occupied by such pharmacies.

SUMMARY OF THE INVENTION

It is a major object of the invention to provide a solution to the above as well as other problems associated with operation of pharmacies in hospitals. Basically, the invention contemplates the mounting of different dispensable drugs in packets on a cart movable in a hospital corridor and into or near patient's rooms; traveling the cart to different zones in the hospital proximate patient's rooms; and at each such zone, dispensing to the patient the selected drugs as listed on prescription records. As will be seen, the drug packets may be hung on the cart in strips visible from one side of the cart so that packets may be removed from the strips, or the packets may be stacked in supply chutes, and the strips may be periodically replenished, in a very simple manner. Accordingly, nurses need not be trained to administer drugs as the trained pharmacist is enabled to be directly with patients, reducing risk of error in drug dispensation; space is saved as the pharmacy becomes a few carts; the physician may write a prescription directly into an order sheet on the pharmacological dispensing cart saving time and record space; and records may be removed from the cart for use at a nursing station while the cart is being replenished.

Further objects include the provision of separately tilting magazines forming the packet supply chutes, a cart wherein panels are removably supported in vertical parallel relation to hang the drug packet strips, whereby panels and premounted strips may very easily be replenished on a cart; the hanging of the strips so that lowermost packets are exposed to access from one side of the cart, successive strips hanging lower in each front to rear row; the provision of removable and replaceable drawers carrying vials or other containers, below a work table surface above which the drug strips are hung as described; the provision of cabinet space as will be seen; and the provision of novel drug packets and dispensing chutes therefor.

These and other objects and advantages of the invention, as well as the details of an illustrative embodiment, will be more fully understood from the following description and drawings, in which:

DRAWING DESCRIPTION

FIG. 1 is a perspective illustration of a cart embodying the invention;

FIG. 2 is an enlarged end view on line 2—2 of FIG. 1;

FIG. 3 is an enlarged elevation on lines 3—3 of FIG. 2;

FIG. 4 is an enlarged plan view on line 4—4 of FIG. 2;

FIG. 5 is an enlarged section showing drawer construction on the cart;

FIG. 6 is a schematic view of a hospital floor serviced by a cart embodying the invention;

FIG. 7 is an elevation showing a strip of drug packets;

FIG. 8 is a view like FIG. 2, showing a modification;

FIG. 9 is a plan view of a modified unit dose package;

FIG. 10 is a section on lines 10—10 of FIG. 9;

FIG. 11 is a side elevation, in section, showing stacking and, dispensing of FIG. 9 tablet packages;

FIG. 12 is a frontal elevation of the FIG. 11 structure;

FIG. 13 is a schematic perspective of a portion of the FIG. 11 and 12 structure;

FIG. 14 is a perspective showing of modified tablet storage means on a pharmacy cart;

FIG. 15 is a perspective showing of a portion of the FIG. 14 tablet storage structure, in partially opened up condition; and FIG. 15*a* is a fragmentary view showing hinging details;

FIG. 16 is a vertical elevation taken through a unit liquid dose package; and

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

FIG. 18 is an elevation showing a drug packet dispensing chute;

FIG. 19 is a view like FIG. 1 and with an identifying drug packet on the chute;

FIG. 20 is a section through a drug packet; and

FIG. 21 is a view like FIG. 20 showing packet disassembly.

DETAILED DESCRIPTION

The traveling cart 10 seen in the drawings FIGS. 1 and 2 includes wheels 11, a suitable power drive 12 if needed, a toggle control 13 for the drive, and a steering handle 14. The cart is sized to be traveled about corridors (such as at 15 in FIG. 6) in a hospital 16, and into different zones in selected proximity to different in-patients. FIG. 6 shows the in-patient rooms 17 containing beds 18 and having entrances 19 into which the cart may be taken by the pharmacist-operator who may then directly supply drugs to the patient, alleviating any necessity for a nurse to carry out this function. The cart or carts may be replenished with drugs at intervals as from a stock room seen at 20.

An important aspect of the invention concerns the provision of a multiplicity of dispensable drugs carried on the cart to be readily identified, removed for dispensing to a patient and latter replaced on the cart; and, means on the cart mounting different patient's drug prescription records and in a predetermined sequence so that the pharmacist on arrival in each patient's room may quickly determine the drugs to be dispensed to that patient. As seen in FIG. 7, the drugs may be carried in packets 21 interconnected to form a strip 22, the packets for example comprising jackets suitably enclosing pills 23, although other forms of packets and strips may be employed.

The strips 22 are carried to hang in multiple lateral and longitudinal rows on the cart above the level of a table working surface 24 on the cart, for ease of access to the pharmacist-operator of the cart. Further, the bottoms of all strips are exposed to access from one side of the cart, as seen in FIGS. 1 and 2, whereby the pharmacist may quickly locate the needed drug, since the bottom of each bin is labelled, and tear off a packet containing same. For this purpose, and as seen in FIG. 2, successive strips hang lower in each row extending away from the work area 27 directly above the table 24.

Quick replacement or replenishment of the strips on the cart is facilitated by hanging the strips on modular panels removably supported in parallel vertical relation on the cart. Thus, for example, panels 30–35 may be removably hung from horizontal rods 36 mounted by uprights 37 on the cart, so as to be easily removed to replenish strips 22 carried by the panels in hanging relation. FIG. 4 shows strip compartments 38 formed by successive panels, as for example panels 32 and 33, with forwardly projecting vertical dividers 33*a* on panel 33, interengaging the back side of panel 32. The latter also has similar dividers 32*a*. Accordingly, lateral and longitudinal rows of compartments are formed for reception of the strips, and are opened up when the panels are removed off rods 36, to enable strip replenishment. Suitable detents or flat springs 40 may be carried by the dividers to lightly press against the edges of strips 22, to frictionally retain them against panel flat surfaces as shown, to hang them in position to be pulled down for tearing off successive packets at the strip bottoms.

Reference to FIG. 3 shows that the lower exposed portion of each panel may carry a label identifying the drugs on the strip 22 carried by and at the front side of that panel. Also, the lower edges of the panels may be serrated as at 41 to enable tear-off removal of drug packets, as indicated by the broken line packet position 21*a* in front of panel 34 for tear-off removal against edge 41*a* of panel 33. To facilitate this, the flat springs 40 may be spaced substantially above the lower edges 41 of their associated panels.

A further aspect of the invention concerns the provision of removable and replaceable drawers 45 in cabinet portions 46 of the case, the drawer for example mounting vials 51 for injectable drugs and the like. Access to the drawers may first be had by opening the front closures 48. FIG. 5 shows a drawer 45 pulled out to hang as shown, with rear edge 45*a* engaged against the lower side 49*a* of the cabinet panel 49, and drawer lower side 45*b* engaged against the upper side 50*a* of the cabinet panel 50. The drawers removably mount vials 51, as by spring clips 52 on the drawers, as shown, and the drawers and vials may easily be replaced. Drawer slots appear at 52.

In addition, the cart forms a cabinet space or spaces 54 below the work surface 24, and suitable items such as intravenous bottles 55 and associated equipment may be carried in such spaces.

Further, patient's drug prescription records may be located in alphabetical or other sequence in a drawer 56 in file box 57 carried on the cart, as shown. Also, a source of water 58 and a sink 59 may be provided, as illustrated. In use, the prescriptions may be removed from the cart, as at a nursing station 60 in FIG. 6, following completion of drug dispensing at the patients' rooms, and the forms may be temporarily retained at that station for observation and use by the floor nursing staff, as while the cart is being replenished in supply room 20.

A particularly advantageous prescription form and filing system, which may be employed at 57 herein, is disclosed in my co-pending application, "PRESCRIPTION FORM FILING SYSTEM", Ser. No. 334,139.

FIG. 1 also shows that clear plastic walls 70 may be provided at opposite ends of the cart, to reduce air contamination of working surfaces.

Referring now to FIGS. 14, 15 and 15*a*, a modified cart 60 includes wheels 61, and is sized to be traveled about corridors in a patient-care building, as for example a hospital or nursing center or home, and into proximity to different in-patients' rooms. Structure is provided on the cart, as for example is generally indicated at 62, for carrying a plurality of dispensable drug containing packets. The latter may be so called "unit dose" packets, and may hang in strips, or may be vertically stacked, as will be described, but in any event, the packets are continued in re-fillable dispensing chutes or zones, as indicated at 63. As will further appear, there are rows of such zones extending longitudinally (as for example in the longitudinal direction indicated by arrows 64), and there are lateral banks of such rows, the lateral direction indicated by arrows 65. Further, the zones 63 in laterally successive banks project progressively further downwardly, and the packets are dispensable at the lower ends of the zones, so that all of such lower end portions are accessibly presented laterally, as for example toward the side of the cart indicated at 66. As a result, all of the different drugs in the multiple closely packed zones remain visible and accessible for quick selection and dispensing, by a pharmacist or operator at one side of the cart. See for example the successive lower end portions of the zones indicated at 63*a*, 63*b*, 63*c* and 63*d*.

In this regard, the structure 62 may comprise multiple like magazines, each forming a portion of a row of the zones; thus, front row magazines are indicated at 67, 68, 69 and 70; second row magazines at 71–74; third row magazines at 75–78; and fourth row magazines at 79–82; these being illustrative only, thus, the magazines are arranged in rows and banks, also. Longitudinal axis hinge means is provided at the lower portion of the magazines to facilitate individual lateral tilting of the magazines to provide access the interiors of the magazines and said zones, as for re-filling or to relieve jamming of the packets feeding downwardly in the zones 63. FIG. 15 shows longitudinally extending piano hinge pins 83–85 attached to the magazines, allowing tilting of individual magazines such as is illustrated in FIGS. 15 and 15*a*, for example. Note that each magazine may have a wall at the rear side thereof (as for example rear wall 75*a* of magazine 75 in FIG. 15*a*) which when tilted forward exposes the interior of the next successive untilted magazine. Packets in exposed magazine 79 are indicated at 88. The front magazines may have covers which are likewise hinged to open frontwardly as appears in FIG. 14, with cover 68*b* of magazine 68 tilted forwardly to expose its contents.

FIG. 8 illustrates packets 89 supported in zones 63 by strips 90, the latter suitably bonded to the packet flaps 91 so that solid or liquid drugs may be sealed into the packets, as exemplified by solid tablets 92. The strips may be severed at locations 93 intermediate the pack-

ets, for dispensing purposes. Restraints, such as ledges **94**, are provided at the lower terminals of the zones **63** to block downward advancement of the strips while allowing the lowermost packets to remain laterally presented for selection and severance from the strips. The sides of the strips facing the observor's eye **95** may be appropriately labeled with drug identification indicia. The ledges **94** may be laterally slotted as at **94***a* to facilitate finger grasping of the lowermost extents of the strips **93** lodged against the ledges, for packet severing purposes.

Alternatively, the packets may be stacked in the zones **63** to self-feed downwardly therein, as upon removal of the lowermost packet in the stack. See in this regard the stacked packets **97** in FIG. **11**, each packet comprising a backer strip **98** bonded to circumferential flap **99** of a receptacle **100** which centrally receives the drug **101**, as seen in FIGS. **9** and **10**. The backer strip may be labelled as at XYZ in FIG. **9**, so that identification of the "unit dose" is positive.

FIGS. **11–13** also show the provision of restraints proximate the lower terminals of the zones **63** to confine the packet stacks, the restraints forming lateral access slots. Thus, bottom restraint or shelf **103** is slotted as at **104** to give finger access to the lowermost packet **97**; and the front wall **105** of the zone defining structure may be apertured at **106** to allow withdrawal of the tablet filled "bulge" of the packet.

FIGS. **16** and **17** show a liquid "unit dose" drug **110** retained within a packet receptacle **111** and a backer or closure strip **112** sealed to the receptacle flap. Upon removal of the backer, the user may conveniently remove all the liquid as by endwise licking the shallowly concave elongated depression **113** in the receptacle.

FIG. **18** shows a chute **200** having a dispensing opening **201** at its front side, the opening formed between the lower edge of the chute front wall **202** and the chute bottom wall **203**. The opening is of less height than the overall height of the drug packet **204**, excepting at its middle extent **201***a* which is of sufficient height to pass the packet bulge **204***a*. Accordingly, only the lowermost packet in the stack may be dispensed, as by finger grasping of the packet base strip **206** exposed via the opening. Note that the bottom wall **203** of the chute is slotted at **207** to facilitate such grasping, the base strip **206** directly overlying the slot. Other packets in the gravity fed stack appear at **204**.

Referring to FIGS. **19-21**, the packet **204** is shown to include a receptacle **208**, forming the bulge **204***a* in FIG. **18**, the receptacle removably received in an opening **209** extending through the base strip **206**. The latter may consist of cardboard or other suitable material, and the receptacle of resiliently flexible, transparent, thin-walled plastic material molded into bubble or blip shape. The receptacle has a top or bottom wall **208***a* and a skirt **208***b* defining opposed side walls **208***a'* which are relatively collapsible toward one another in response to finger pressure application (as seen in FIG. **21**) to release or remove the receptacle from the base strip. Easy access to the drug contents **210** of the receptacle is thereby facilitated, and the receptacle then carrying the drug to be "poured out" to a patient, as needed, while the drug remains untouched by the user's fingers or hands, facilitating maintenance of sterile conditions.

The receptacle may advantageously have terminal flanges **211** or walls **208***a'* to project at the side of the strip **206** opposite that at which the main extent of the receptacle projects, as seen in FIG. **20**. The outwardly spring-urged resiliently flexible walls urge the flanges into overlapping relation to the boundary of the opening **209**, to releasably retain the receptacle to the base strip. Means such as a tape **212** extends over the otherwise exposed receptacle interior, and may adhere to the base strip, as shown. The tape **212** may be removable, and may have an exposed lip **212***a* as seen in FIG. **19** to facilitate pull-off removal.

Strip **201** may be edge-notched as at **214** so that the packet may be carried by the chute front wall **202** directly above and close to the opening **201** and **201***a*, the notch **214** conforming to the configuration of the opening enlargement **201***a*. The packet thus identifies the contents of the chute by which it is carried.

I claim:

1. In a pharmacy system for use in hospitals and the like, the combination comprising

a. a traveling cart sized to be traveled about corridors in a hospital or the like and into different rooms in selected proximity to different in-patients, the cart having a top work surface,

b. a plurality of dispensable drugs carried on the cart to be readily identified, removed for dispensing to a patient and latter replaced on the cart, there being packets containing the drugs, the packets for each particular drug sequentially connected in a hanging strip so that the lowermost packets may be torn-off the strip, as needed, there being multiple of said strips as defined, the strips hanging vertically in rows on the cart, with the bottoms of all strips exposed to access from one side of the cart, and including multiple supports for said strips and structure on the cart removably mounting the supports so that the strips hang downwardly from above and toward the work surface to be accessible from one side of the cart, and

c. means on the cart for mounting different patient's drug prescription records and in a predetermined sequence so that the pharmacist upon arrival at each room may quickly determine the drugs to be dispensed to the patients in that room,

d. the supports comprising panels removably supported in parallel vertical relation by said structure on the cart, the panels having vertically elongated flat interior surfaces thereon, the strips frictionally and slidably supported by said surfaces to hang in banks of rows, sequentially successive panels in a rearward direction away from said one side of the cart having lowermost generally horizontal edges which extend progressively closer to the level of said top surface, each strip extending below the lowermost edge of the panel immediately frontwardly thereof and successive strips in said rearward direction projecting downwardly closer to said top surface level.

2. In a pharmacy system for use in patient care buildings, the combination comprising

a. a traveling cart sized to be traveled about corridors in the building and into proximity to different in-patient rooms; and

b. a plurality of dispensable drugs carried in packets;

c. structure on the cart carrying said packets in elongated, generally upright dispensing chutes formed by said structure, there being longitudinal rows of said chutes and lateral banks of said rows, the

chutes in laterally successive banks projecting progressively further downwardly and the packets being dispensable at the lower end portions of said chutes so that all of said lower portions are accessibly presented laterally,

d. the cart having an upper work surface, and said chute lower end portions being spaced above said surface,

e. said structure including magazines forming said chutes, the magazines arranged in rows and banks as defined, and including longitudinal hinge means connected with lower portions of the magazines to permit individual outward tilting of the magazines over and relatively toward said work surface to provide access to the interiors of said chutes.

3. The combination of claim **2** including generally vertical strips in said chutes, the packets carried by the strips to be successively accessible as the strips are advanced downwardly in said chutes.

4. The combination of claim **3** including restraints proximate the lower terminals of said chutes to block said downward advancement while allowing the lowermost packets to remain laterally presented for selection and removal from the strips.

5. The combination of claim **2** wherein the packets are stacked in each chute to self-feed downwardly therein upon removal of the lowermost packet in the stack.

6. The combination of claim **5** including restraints proximate the lower terminals of said chutes to confine the packet stacks, said restraints forming laterally presented access slots.

7. The combination of claim **2** wherein said drugs have solid tablet configuration.

8. The combination of claim **2** wherein certain of said drugs in the packets are in liquid state.

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