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Relyea et al.

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[54] **TRANSPORT APPARATUS FOR UNIT DOSE CONTAINERS OF PHARMACEUTICAL MATERIALS**

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[52] **U.S. Cl.** **312/234.5,** 312/209

[51] **Int. Cl.** **A47b 67/00**

[58] **Field of Search** ..... 312/198, 209, 234–234.5; 24/67.3, 67.5, 73 B

[56] **References Cited**

UNITED STATES PATENTS

864,254	8/1907	Perkins	24/67.5
2,583,567	1/1952	Hanson	24/67.3
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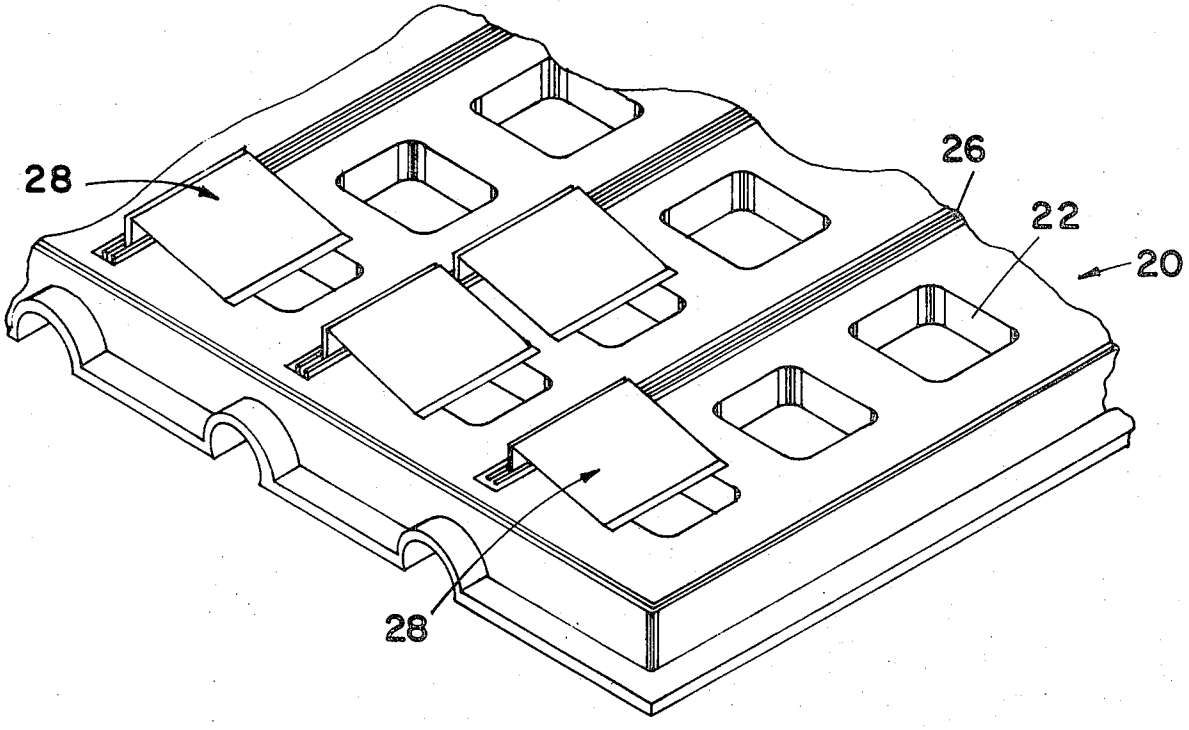
Primary Examiner—Casmir A. Nunberg

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[57] **ABSTRACT**

A transport apparatus for delivering and dispensing unit dose containers of pharmaceutical materials and the like which is characterized by a tray means having plural rows of recesses adapted to removably receive individual pharmaceutical containers. The tray means further includes slot means adapted to receive a plurality of unique container retaining means. Each retainer means include a resilient flange which releasably engages a container within the recess of the tray to insure the positive retention of the containers in the recesses during any form of transit of the tray means.

4 Claims, 3 Drawing Figures



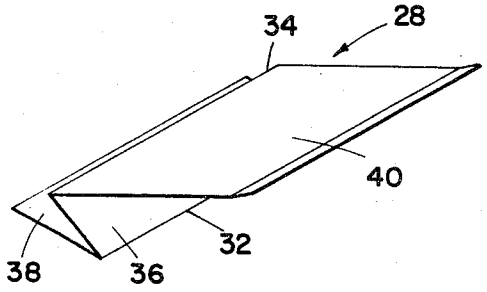


FIG. 3

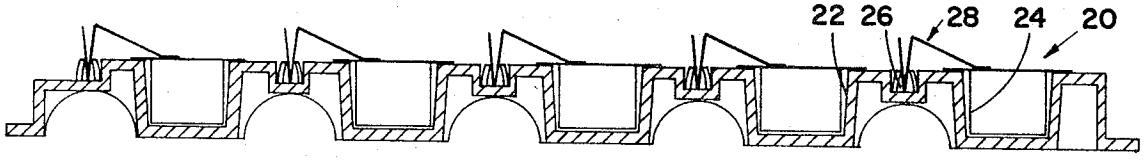


FIG. 2

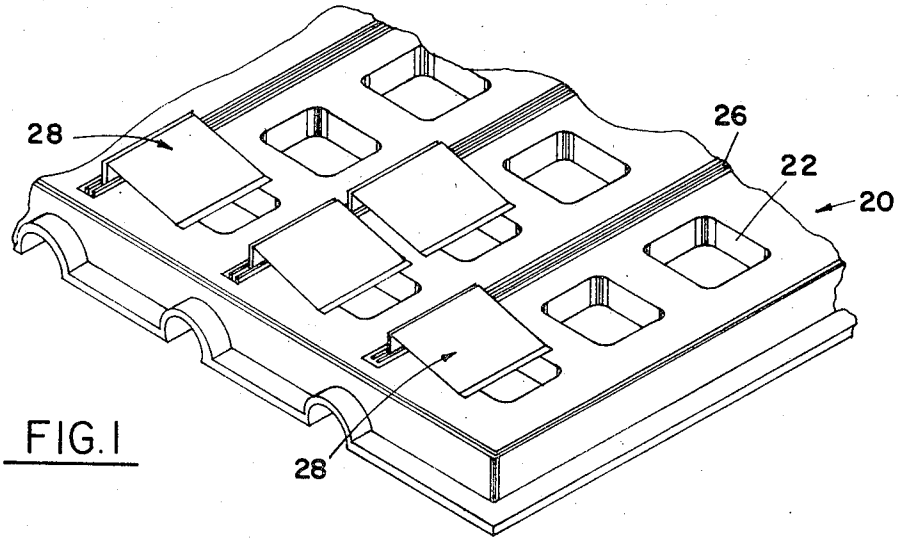


FIG. 1

TRANSPORT APPARATUS FOR UNIT DOSE CONTAINERS OF PHARMACEUTICAL MATERIALS

BACKGROUND

Prior to the introduction of the unit-dose concept of serving nursing homes and similar institutions, these institutions obtained prescriptions from a pharmacy in much the same manner as the individual who seeks filling of an occassional prescription. However, the large number of patients in a nursing home and the normal frequency of receiving medication required by such patients created problems unique to both the pharmacist and to the personnel of the institutions.

For example, the nurses must keep separate facilities for each patient to store the various types of pharmaceutical materials that each patient may be receiving. Then, according to each prescription, the nurse must remove an individual dose for distribution to each patient at each prescribed time during each day. This may occur three or four times a day for some prescriptions. A typical institution of this type, having 50 to 100 patients, makes such a procedure a very time consuming task.

As each prescription order runs out or a new one is obtained, the pharmacist would receive a relatively large volume of orders which were difficult to fill in the time required to supply the patients needs.

With the aid of delivery apparatus such as described in U.S. Pat. No. 3,512,858 and in my co-pending application Ser. No. 302,257 filed Oct. 30, 1972, a convenient and very reliable unit dose delivery system has been greatly enhanced. The present invention relates to transport apparatus for use in conjunction with the above mentioned delivery apparatus which provides a substantial advance in the reliability of the system. Enhancement of reliability is particularly important in such an application wherein most of the materials concerned require a doctor's prescription. Further, this reliability of proper delivery of important medicine to the patient which relates directly to his proper care and health is advanced in a manner which adds no substantial increase in the cost of the mode of delivery.

SUMMARY OF INVENTION

In general, the transport apparatus of the present invention relates to an improved delivery tray construction which includes positive container retaining means for each of the unit dose containers deposited in the container-receiving recesses formed in the tray means.

This particular type of tray means is referred to as a distribution tray in that it is the tray which continually passes between the pharmacist and the nursing home and is used by the nursing personnel to directly distribute the unit dose to the patient. A plurality of distribution trays are removable mounted on the tracks in the cabinet housing of the main delivery apparatus. Each distribution tray includes a plurality of rows of recesses, each adapted to receive a container carrying a predetermined individual dosage unit of a particular pharmaceutical material. The unit dose containers are arranged in the tray in a predetermined order preferably relating to the order of the arrangement of the patients who are to receive the particular dosage unit. Each distribution tray includes a slot means between each row

of recesses adapted to receive means for the identification of the patients being served.

The present invention specifically relates to an improved and unique construction wherein the means for identifying the appropriate recess with a patient, as well as the specific medication to be delivered, is also designed to ensure positive retention of the unit dose container in the recess. This serves to guard against inadvertent spilling or other accidental disturbance of the unit dose containers during any form of transit.

The design of the container retaining means is such that removal of the containers from the tray or placement thereof into the recess is not unduly encumbered to interfere with the convenience of handling the containers.

OBJECTS

It is therefore an object of the present invention to provide an apparatus of the type described which facilitates the general handling of volume prescription orders of pharmaceutical materials in a reliable, yet convenient manner.

It is another object of the present invention to provide apparatus of the type described which facilitates the specific distribution of individual dosage units to individual patients by the nursing personnel responsible for the ultimate dispensing of the medication.

It is another object of the present invention to provide apparatus of the type described which improves the reliability of the proper delivery of medication to the patient and further reduces the potential of costly and time consuming confusion caused by inadvertent spilling of containers from their proper position in the trays during transit to the institution as well as during specific distribution to the patients.

It is a further object of the present invention to provide apparatus of the type described which accomplishes the positive retention of the containers in the recesses in a simple and relatively inexpensive manner without significantly effecting the convenience of dispensing each container from the tray means.

IN THE DRAWINGS

FIG. **1** is a perspective view of transport apparatus for the delivery and dispensing of unit dose pharmaceutical materials constructed in accordance with the present invention;

FIG. **2** is a side elevational view, in section, of the apparatus shown in FIG. **1**, the section being taken through the centerline of a row of recesses in the apparatus shown in FIG. **1**; and

FIG. **3** is a perspective view of the container retaining means forming a portion of the apparatus shown in the preceding Figures, the retaining means being illustrated in a removed condition apart from the tray.

DETAILED DESCRIPTION

Referring in detail to the drawings, container apparatus for delivering and dispensing individual dosage units of pharmaceuticals constructed in accordance with the present invention is illustrated in FIG. **1** and includes a supporting tray means, indicated generally at **20.**

Tray means **20** is preferably made of a molded plastic material and includes a plurality of container-receiving recesses **22** arranged in parallel rows. Each recess **22** is adapted to receive an individual unit dose container

24. Suitable containers 24 are preferably constructed as described in detail in my co-pending application Ser. No. 239,278 filed Mar. 29, 1972, or as in my U.S. Pat. No. 3,512,858.

Tray means 20 also includes a plurality of longitudinally extending recesses each of which includes a slot means 26 disposed in adjacent but spaced relationship to each row of recesses 22.

Individual container retaining means 28 are provided for each recess 22 to assure positive retention of each container 24 in the proper respective recess. Preferably, retaining means 28 also are adapted to carry patient identity data to aid the pharmacist in properly positioning each unit dose container 24 in tray 20. Also this aids the nursing personnel in the subsequent dispensing of pharmaceuticals to the patient.

Retaining means 28 comprises a relatively thin, resilient sheet material, preferably a plastic, which is folded to provide two permanent edges 32 and 34, as best seen in FIG. 3.

These edges define the border of a first flange portion which preferably includes two legs portions 36 and 38 and a second flange portion 40 which extends from leg portion 36 at an angle of substantially less than 90°. The first flange portion is adapted to be received in slot means 26 with edge 32 of the slot means extending downwardly in the slot means. In view of the resilient nature of the material comprising retaining means 28, the two leg portions 36 and 38 tend to spring away from one another to add a degree of force which tends to hold the first flange portion in slot means 26.

Second flange portion 40, to a much greater degree, is resiliently biased downwardly as viewed in FIG. 2, and is designed to cover a significant portion of an adjacent container receiving opening 22. Such a configuration offers positive retention of a container 24 within the recess 22. To remove a container from a recess 22, one must lift flange 40 sufficiently to overcome the light, but significant spring force of flange 40.

Flange 40 is preferably large enough in area to carry a label which includes all the necessary data to appropriately identify a patient and may include the patient name, the prescribing physician's name, the kind and dosage of medication.

To provide maximum efficiency and accuracy of dispensing the medicine, the unit dose containers preferably are placed in a respective recess 22 in an arrangement coordinated with the specific floor and room plan of an institution. Several trays 22 are generally intended to apply to a given nursing station of the institution and are removably mounted in cabinet type apparatus such as described in the above mentioned U.S. Pat. and patent applications. Although it depends upon the particular situation, usually one cabinet apparatus would hold a daily supply of trays for a nursing station having a responsibility for 20 to 30 patients.

Therefore a plurality of trays 20 are usually being transferred daily to and from the institution and pharmacy in such cabinets and each tray 20 generally is being removed and hand carried by the nursing personnel during the direct dispensing of the medication to the patient.

The pharmacist originally prepared the tray by inserting appropriately identified retaining means 28 in position in accordance with a list of patients and their location in the institution. Then the appropriate pre-pared unit dose container 24 is placed in the proper recess 22. When a tray is filled according to the medical prescription, the pharmacist places the tray in the cabinet apparatus described previously, which is then delivered to the institution.

At the institution, the cabinet apparatus may be conveniently moved to each floor of the institution where the appropriate tray is removed by the nursing personnel. The identity of the patient and the medication prescribed is checked against the label information carried on retaining means 28 and rechecked against the list possessed by the nursing personnel. If a descrepancy should exist, this can be immediately checked further before the medication is delivered to the patient.

Therefore it can be readily appreciated that such a delivery system possesses means to provide a high degree of reliability. Further, it can be readily seen that the possibility of an inadvertent disburbance during transit of the containers 24 from the recesses in which they were placed by the pharmacist is greatly reduced.

In the past, should a cabinet apparatus be upset or tilted to a degree sufficient to displace several containers 24 from the recess 22, a very time consuming effort was required not only to replace the containers but also to assure the proper placement in the correctly identified recess. Another source for potential accident is the inadvertent tilting of an individual tray 20 during direct delivery of the unit dose containers to the patient. In view of human nature, such occurances even though rare, constitute a possible source of error in dispensing the correct medication to a given patient if the nursing personnel is negligent in the replacement of the containers.

In view of the serious results that might follow from such an occurance, any reasonable precaution which tends to significantly lessen the possibility of such an error, is of significant importance.

Evidence that the tray means 20 provided with retaining means 28 is effective to prevent accidental spilling of the containers is demonstrated by the fact that the tray may be turned completely upside down without displacing containers 24 from their respective recesses 22. Therefore most any type of inadvertent spilling of the containers from the recess 22 during transit is substantially eliminated.

However, it should also be pointed out that containers 24 are still very easily removed manually from the recesses 22 by simply applying pressure to raise flange 40. Therefore, neither the convenience of the pharmacist in the preparation of the tray nor the convenience of removing individual unit dose containers is significantly reduced by the construction of the present invention, but the potential of accidental displacement of containers is, for all practical purposes, virtually eliminated.

What is claimed is

1. An improved transport apparatus for the delivery and dispensing of unit dose pharmaceutical materials comprising, in combination, a tray means provided with a plurality of recesses spaced from another, each of said recesses being adapted to removably receive an individual pharmaceutical container, said tray means including means defining a slot disposed adjacent to each of said recesses; the improvement comprising container retaining means comprising an integrally formed flexible sheet of plastic material removably disposed in said slot means and including a resilient flange

portion extending over an adjacent container receiving recess in resilient force transmitting engagement with an individual container disposed in said recess, said flange portion including patient and pharmaceutical identifying indicia.

2. The apparatus defined in claim **1** wherein said container retaining means includes an integrally formed flexible sheet of plastic material a first flange portion removably disposed in said slot means and a second flange portion which engages said container and extends away from said first flange portion at an angle of less than 90°.

3. The apparatus defined in claim **2** wherein said first flange portion includes a pair of leg portions joined to one another at one end to define a common edge, said edge being disposed downwardly in said slot means and said leg portions being resiliently biased away from one another into engagement with side walls defining said slot means.

4. The apparatus defined in claim **3** wherein said leg portions of said first flange portion form a V-shaped slot having a upwardly facing opening.

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