Aug. 19, 1969 S. A. STRAND 3,461,643

METHOD AND APPARATUS FOR COUNTING AND DISPENSING SOLID ORAL MEDICATION

Filed May 31, 1966 2 Sheets-Sheet 1

FIG. 1.

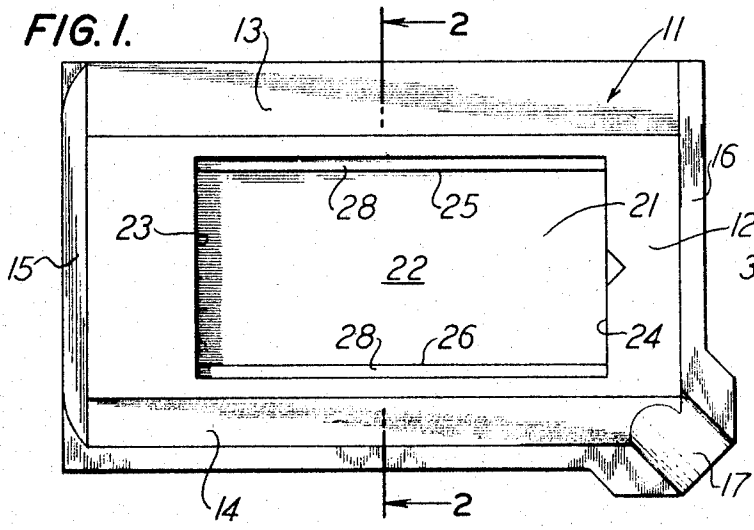


FIG. 3.

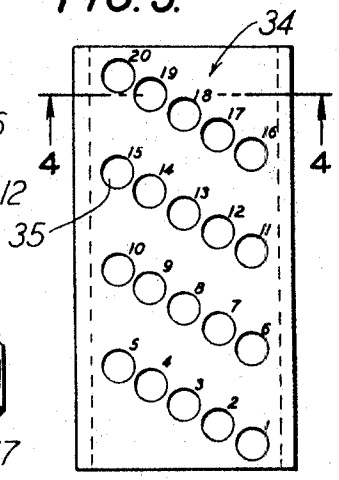


FIG. 5.

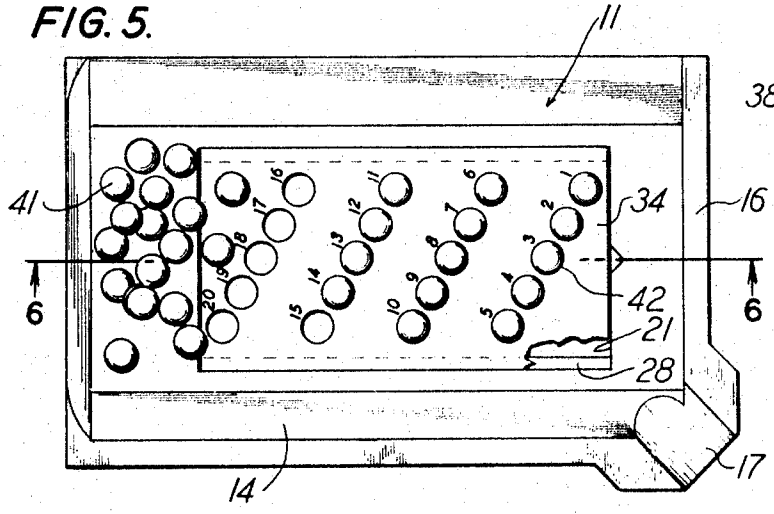


FIG. 4.

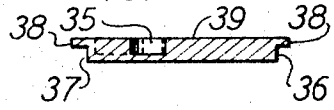


FIG. 6.

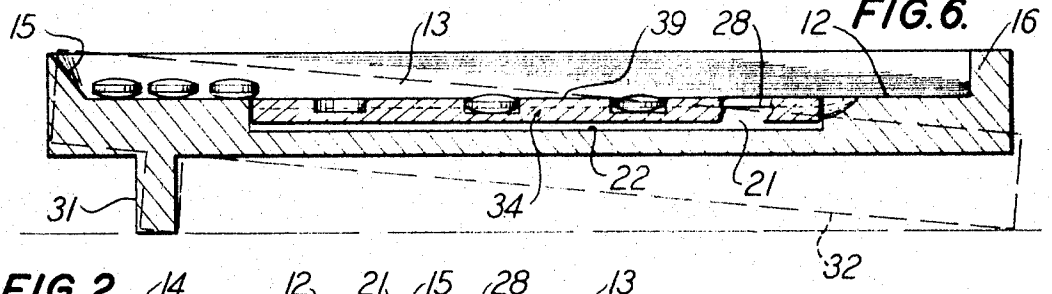
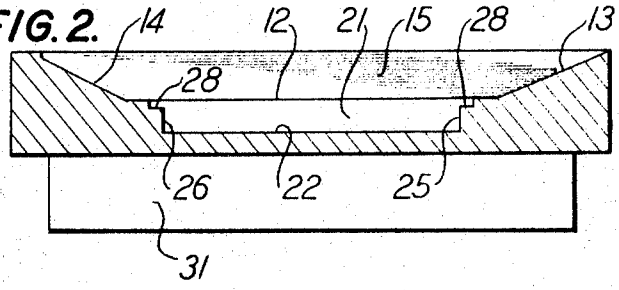


FIG. 2.



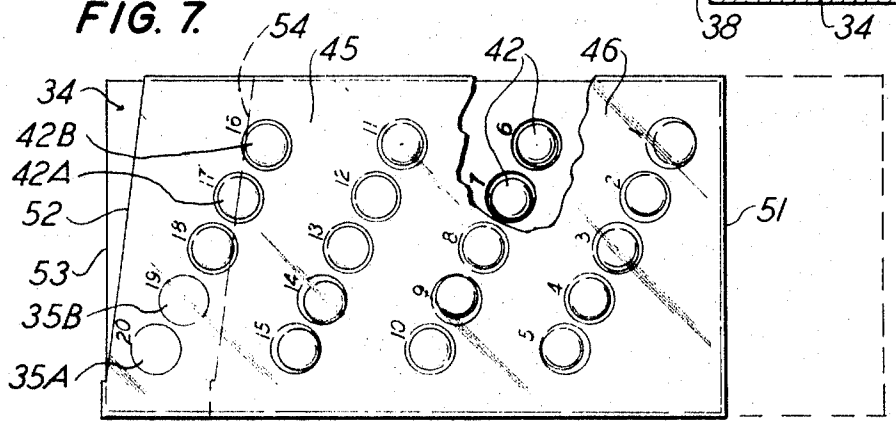
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Filed May 31, 1966 2 Sheets-Sheet 2

FIG. 7.



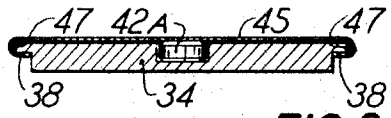


FIG. 8.

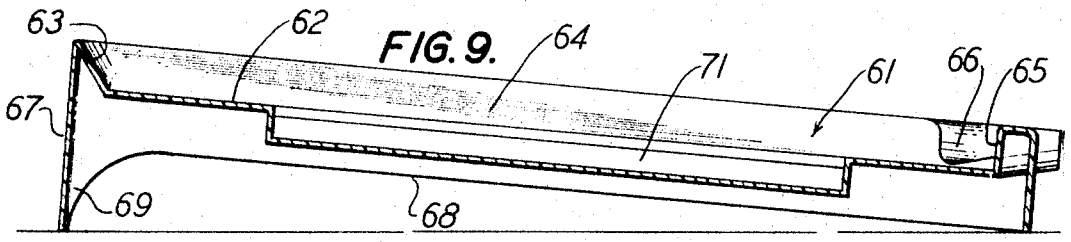


FIG. 9.

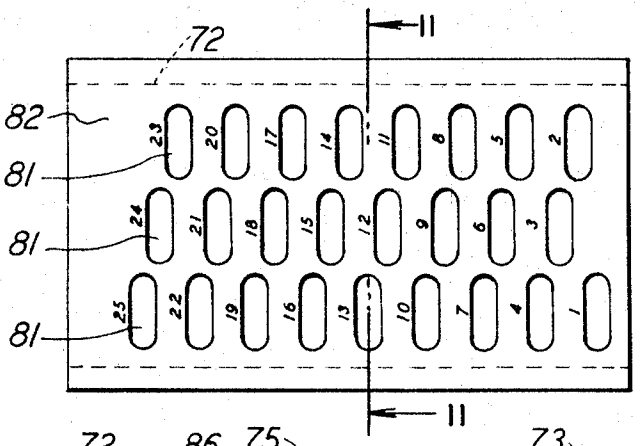


FIG. 10.

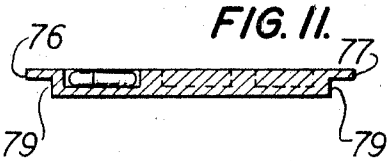


FIG. 11.

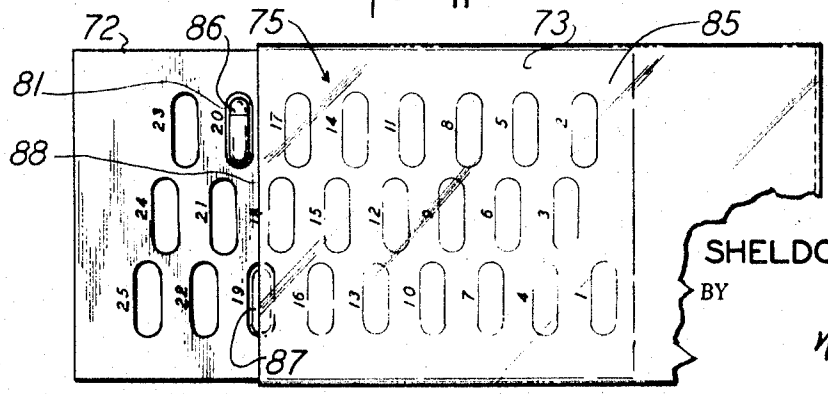


FIG. 12.

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METHOD AND APPARATUS FOR COUNTING AND DISPENSING SOLID ORAL MEDICATION

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Int. Cl. B65b *1/04, 3/04, 19/18*
U.S. Cl. 53—37 6 Claims

ABSTRACT OF THE DISCLOSURE

A shallow counting tray has a central recess which receives a pallet indented to hold a quantity of pills. A walled floor of the tray is substantially coplanar with the upper surface of the pill-receiving pallet. Pills in the tray are moved into the cavities in the pallet by shaking the tray. A transparent or translucent cover for the pallet seals the pills within the pallet, making a pill package. The cover is slidable on the pallet and the cavities thereof are sequentially numbered. The cavities are so arranged that sliding the cover progressively releases a single pill while covering other pill-filled cavities sufficiently to prevent the removal of a second pill until the cover is removed another increment. The numbered cavities can indicate either the number of pills removed or the number of pills remaining.

The invention relates to the counting and dispensing of medicines in capsule and tablet form and more particularly to pill handling method and apparatus for use in medical institutions.

Both federal and state leigslation impose strict requirements on medical personnel as to the handling of such medicines as narcotics and hypnotics. Other drugs of like potental danger may soon be placed under the same restrictive requirements. Medical personnel must now account each day for every tablet and capsule within this field of medication. This necessitates extreme care by both pharmacists and patient-administering personnel. In hospitals such drugs are usually dispensed from the pharmacy in quantities of 20 or 25 doses, or some other fraction of 100 to the floor station near the patients. At the change of shift each dosage must be accounted for. This has required highly trained medical help to manually count pills, such as capsules and tablets, with increased adverse effect upon hospital overhead and personnel morale.

I have invented method and apparatus for handling tablets and capsules which permits rapid counting and packaging in the numerical units most common in hospital and medical installations and which perimts rapid visual inspection of the number of pills remaining or the number of pills used from a package. Highly paid and competent medical help is therefore not burdened with time-consuming clerical routine to the detriment of hospital efficiency.

The method of the invention contemplates the steps of placing a pill-receiving pallet of selected pill capacity within a shallow counting tray, adding the pills from bulk storage to the tray, and then causing relative motion of the pills within the tray with respect to the pallet such that the requisite number of pills are loaded into the pallet. The pallet is then removed from the tray and a sliding cover placed over the pills within the pallet. The excess pills may then be discharged from the counting tray back into bulk storage.

The apparatus of the invention is ideally suited to the practice of the method and comprises a shallow tray, a preferably planar floor in which a shallow recess resides, and a pill-receiving pallet adapted to fit within the recess.

A plurality of cavities in the pallet is adapted to receive the desired number of capsules or tablets. The configuration of the cavity depends upon the size and shape of the pills to be received. Support means within the tray recess hold the pallet such that the cavity openings in the upper pallet surface are substantially coplanar with the planar floor of the tray. Preferably both the surface of the tray floor and the upper surface of the pallet are smooth so as not to interfere with the flow of pills across the tray and the pallet. A cover for the pallet closes over the cavities after the pallet and the pills are removed from the counting tray to form a closed pill package. The cover may be transparent and preferably is slidable across the pallet.

In a preferred embodiment of the invention indicia adjacent the cavities of the pallet sequentially number each cavity beginning with the number **1** and ending with the number representing the capacity of the pallet. The sliding cover has an edge that transverses the top surface of the pallet as the cover is removed. The cavities in the pallet are arranged in staggered relationship with respect to the travel of the cover during removal such that the edge of the cover successively exposes the entirety of a single cavity with progressive movement without exposing the next pill cavity. Thus a single capsule or tablet may be removed from the pallet without the next successive capsule or tablet being exposed for removal. The sequential numbering of the cavities may be such that the number next to the cavity having the next accessible pill represents either the number of the pills removed or the number of pills remaining in the pallet.

The shallow tray may be made of any suitable material. Preferably the tray is made of sheet plastic which has been vacuum-formed into the desired configuration. However, the tray and the pallet may be made of pressed paper, molded plastic, or other similar inexpensive materials without departing from the spirit of the invention.

The method of the invention is easy to comprehend and put into practice. The apparatus of the invention may be economically manufactured with materials presently available. Both the method and the apparatus are easily adapted to present practices in medical institutions.

These and other advantages of the invention are apparent in the following detailed description and drawing in which:

FIG. 1 is a plan view of a counting tray in accordance with the invention;

FIG. 2 is a transverse sectional elevation to a larger scale taken along line **2—2** of FIG. 1;

FIG. 3 is a plan view of a pill-receiving pallet in accordance with the invention;

FIG. 4 is a sectional elevation taken along line **4—4** of FIG. 3;

FIG. 5 is a plan view illustarting the tray of FIG. 1 combined with the pallet of FIG. 3 in use for counting and packaging tablets;

FIG. 6 is a sectional elevation to a large scale taken along lines **6—6** of FIG. 5;

FIG. 7 is a plan view of a tablet-filled pallet with a sliding cover in accordance with the invention;

FIG. 8 is a transverse sectional elevational of the pallet package of FIG. 7;

FIG. 9 is an alternate embodiment of a counting tray in accordance with the invention;

FIG. 10 is a plan view of a pallet in accordance with the invention adapted for use with capsules;

FIG. 11 is a sectional elevation taken along line **11—11** of FIG. 10; and

FIG. 12 is a plan view, partly broken away, of the pallet package of FIG. 10 with a portion of the capsules removed therefrom.

A tray 11 of FIGS. 1–6 comprises a planar floor 12 from which sloping side walls 13, 14 rise on opposite sides of the floor. A more sharply sloping wall end 15 extends from the floor at one of its short ends. An abrupt wall 16 at right angles to the floor forms the other short end of the tray. A discharge spout 17 opens outwardly at the intersection of walls 14 and 16.

A rectangular recess 21 is centrally located in planar floor 12. The recess is defined by a bottom 22, opposed end walls 23, 24 and opposite side walls 25, 26 rising from the recess bottom. Each of side walls 25, 26 is stepped to form a shoulder 28 extending the length of the recess on either side thereof.

The tray has a single leg 31 (FIGS. 2 and 6) which raises one end of the tray, as shown by the dotted lines 32 of FIG. 6, when the tray is placed upon a flat surface.

In FIG. 3 a pallet 34 of generally rectangular shape has a plurality of annular tablet cavities 35. Each of the cavities is adapted to receive a tablet. The size of the cavities and their depth may vary with the particular tablet or tables for which the pallet is adapted. The cavities are arranged in transverse diagonal rows for reasons to be discussed later.

FIG. 4 shows pallet 34 in transverse section. Each long side 37 of the pallet has an extending lip 38. The lips and the proportions of the pallet are such that the pallet may be placed in the tray recess, as shown in FIG. 5, with the lips 38 resting upon the recess shoulders 28.

Pallet 34 rests within recess 21 such that an upper surface 39 of the pallet is substantially coplanar with floor 12 of the tray. A plurality of tablets 41 reside on the floor of the tray. Several tablets 42 rest in the cavities 35 of the pallet. As can be seen in FIG. 5, the cavities are numbered from 1 through 20 in serial fashion. Cavities 1 through 14 have received tablets. Cavities 15–20 are vacant.

In the practice of the method of the invention, pallet 34 is placed within the recess in tray 11. Tablets or capsules are then introduced into the tray from a bulk container. The tray is then agitated to cause migration of the tablets into the cavities of the pallet. Instead of agitation of the tray a spatula or other scraper may be used to propel the tablets across the pallet, causing the tablets to fall into the cavities. After the pallet is filled the tray may be tilted even more than is shown in FIG. 6 to move the excess tablets against wall 16. Then the pallet is removed and a pallet cover 45, such as the one shown in FIGS. 7 and 8, is suitably engaged with the ballet to comprise a tablet package retaining the tablets. After the pallet is removed the excess tablets in the tray may be returned to bulk storage through discharge spout 17.

As can be seen from FIG. 6, the upper surface of the pallet, being coplanar with the floor of the tray, affords no resistance to the movement of tablets or pills from the tray into the cavities of the pallet. While the two surfaces have been shown as coplanar, the upper surface of the pallet may be below the surface of the floor, if desired. The proper orientation of the pallet with respect to the tray floor may be determined by the shoulders 28 and the thickness of the lips 38 of the pallet.

In FIGS. 7 and 8 pallet 34 is covered by a sliding transparent cover 45. A plurality of tablets 42 resides in the cavities of the pallet beneath a top surface 46 of the cover. The cover extends entirely across the top of the pallet and the tablets and curves downwardly and inwardly to form a channel 47 at each of its long edges. The channel fits about the lip 38 at each side of the pallet.

The lead edge 51 of the cover may depend downwardly from the surface of the cover to form a stop in registry with the end of the pallet when the pallet is completely covered. A trailing edge 52 of the cover extends at an angle to a pallet edge 53. A broken line 54 denotes the trailing edge of the cover when the cover slides along the pallet. A tablet 42A is exposed for removal while the

trailing edge of the cover still extends across the adjacent tablet 42B, precluding its removal. The cavities 35A, 35B are empty, with the tablets that previously resided therein having been administered. As the indicia next to each cavity indicates, there are still 18 tablets within the pallet. When tablet 42A is removed, the next filled cavity will be number 17, thus signalling that 17 tablets remain. With the cover restored to the fully closed orientation of FIG. 7, the cavity numbers are visible through the transparent cover such that the custodians of the supply can ascertain immediately the contents of the package in terms of the number of doses remaining without the need for a laborious individual count of each tablet.

Because of the configuration of the cover and the arrangement of the cavities, the single tablet desired can be removed easily by inverting the pallet without the danger of unwanted tablets falling out. Simple sliding adjustment of the cover makes possible access to one, two, three or more tablets at a single manipulation, as desired.

In FIG. 9 a tray 61 in accordance with the invention is shown in longitudinal sectional elevation. Tray 61 is similar to the tray of FIG. 1 except that it has a thin wall construction adapting it for fabrication by vacuum forming from sheet plastic. The tray has a floor 62, a sloping end wall 63 and slanting side walls, such as the wall 64. A vertical wall 65 opposite end wall 63 guides excess tablets or capsules from the tray through an exit spout 66. An exterior end skirt 67 extends below the bottom of tray side skirts 68 in a leg 69. Leg 69 tilts tray floor 62 so capsules or tablets poured into the tray at its raised end migrate toward end wall 65 across any pallet in recess 71.

FIGS. 10–12 show an alternate pallet 72 and cover 73 combined in a pill package 75. The pallet is substantially rectangular in configuration and has extending lips 76, 77 along its side walls 78, 79. A plurality of elongate cavities 81 lie in staggered rows in a top surface 82 of the pallet. Pallet 72 has 25 such cavities. The size of the cavities is dependent upon the capsule to be recived. The cavities of the embodiment of FIG. 10 and of FIG. 3 may be such that several different capsule and tablet sizes may be accommodated. Therefore, only three or four pallet sizes are necessary to accommodate pratically all of the standard capsules and tablets generally utilized in medical installations.

In FIG. 12 cover 73 is moved along pallet 72 to expose several of the cavities 81. Cover 73 is preferably transparent. A capsule 86 is in the last exposed cavity. A next capsule 87 is partly exposed by the position of trailing edge 88 of the cover. However, capsule 86 may be removed from the pallet without removal of capsule 87. The cavities are numbered to indicate immediately that the removal of capsule 86 reduces the number of pills within the pallet package to 19.

The disclosed embodiments all benefit from the advantages of the invention. Other modifications within the scope of the invention will occur to those skilled in the art. Therefore, I wish the invention to be measured by the appended claims rather than by the illustrative embodiments disclosed herein.

I claim:

1. A process for packaging and counting individual solid medications comprising steps of sequentially numbering the medications-receiving cavities of a pallet, placing the pallet within a shallow tray, bringing the upper surfaces of the pallet and the floor of the tray into substantially coplanar relationship, introducing a plurality of individual solid medications into the tray, inducing relative motion between the medications and the pallet cavities such that each cavity receives a medication, removing the filled pallet from the tray, and placing a slidable cover across the pallet over the medications therein.

2. A process in accordance with claim 1 further comprising the steps of sliding the cover in incremental movements from the pallet, dispensing medications individu-

ally from the partially uncovered pallet, and registering periodically the number of the filled cavity next to the last emptied pallet cavity.

3. Pill-counting and dispensing apparatus comprising a tray floor, tray side walls, and tray end walls defining a shallow tray capable of being held in a hand; a pill-receiving pallet, a pallet-receiving recess in the tray floor, a planar tray floor portion adjacent the pallet-receiving recess, a plurality of cavities in the pallet adapted to receive pills, means supporting the pallet in the tray recess so that the level of the cavity entries is substantially coplanar with the planar tray floor, and a sliding cover for closing the filled cavities of the pill-receiving pallet after the pallet is removed from the tray.

4. Apparatus in accordance with claim 3 wherein the cavities are disposed in the pallet in staggered relationship such that the edge of the sliding cover which traverses the pallet on progressive removal of the cover uncovers one cavity entirely before another cavity is uncovered.

5. Apparatus in accordance with claim 4 wherein each

of the cavities is serially numbered in agreement with the order in which each cavity is exposed by progressive removal of the sliding cover.

6. Apparatus in accordance with claim 3 wherein each of the cavities is serially numbered in agreement with the order in which each cavity is exposed by progressive removal of the sliding cover.

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U.S. Cl. X.R.

53—169, 390; 206—42