Nov. 20, 1956 I. DANCHIG 2,771,198

COUNTING AND SORTING DEVICE

Filed Aug. 31, 1950 2 Sheets-Sheet 1

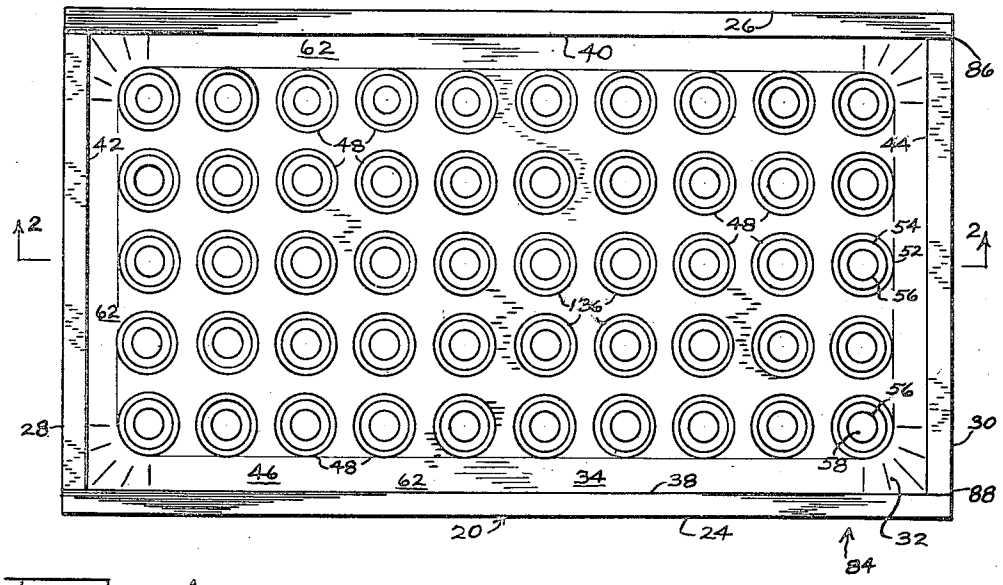


Fig. 1

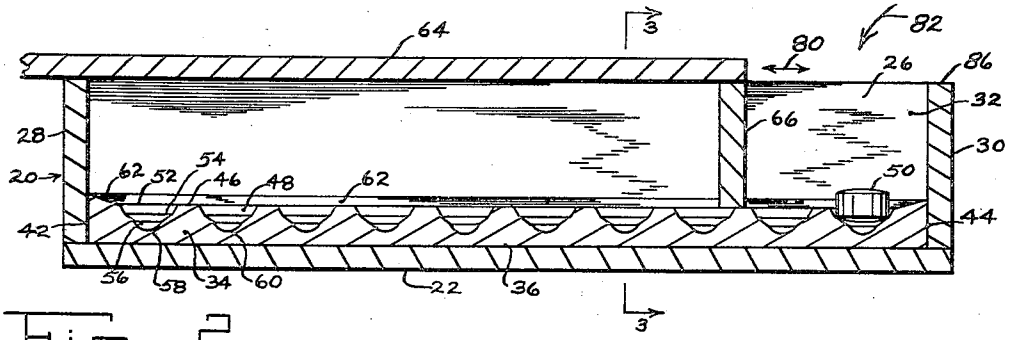


Fig. 2

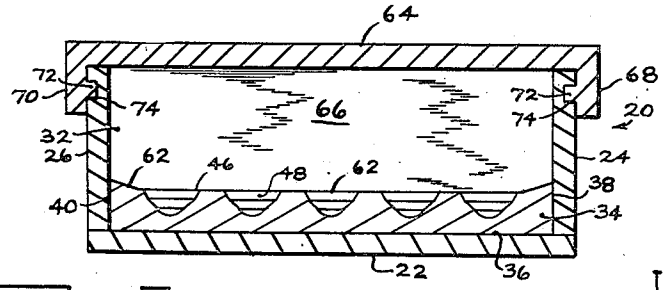


Fig. 3

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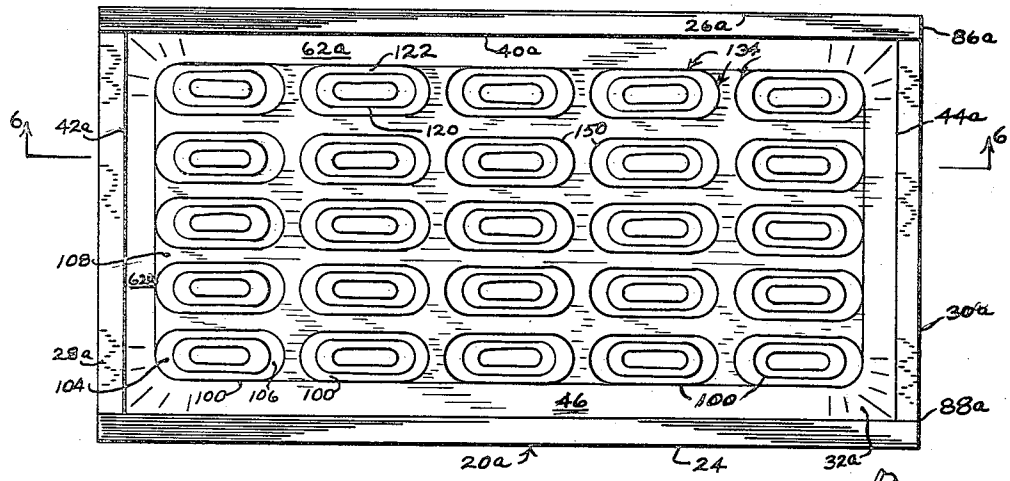


Fig. 5

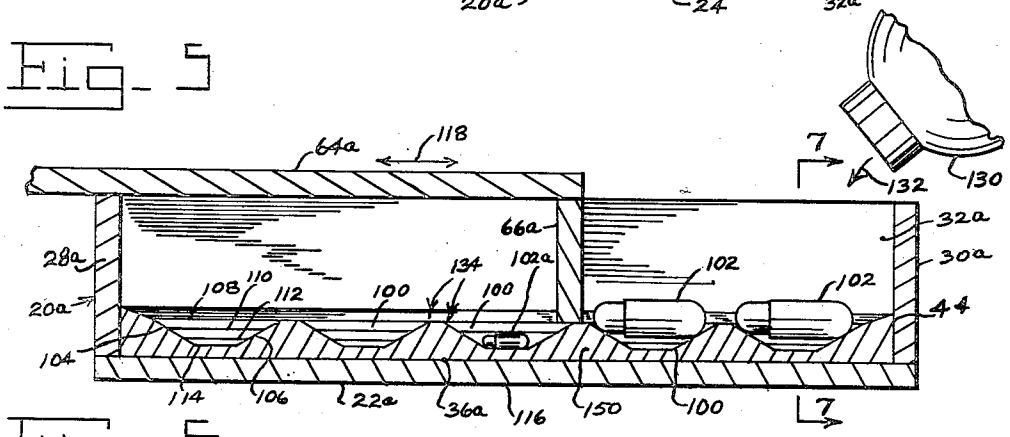


Fig. 6

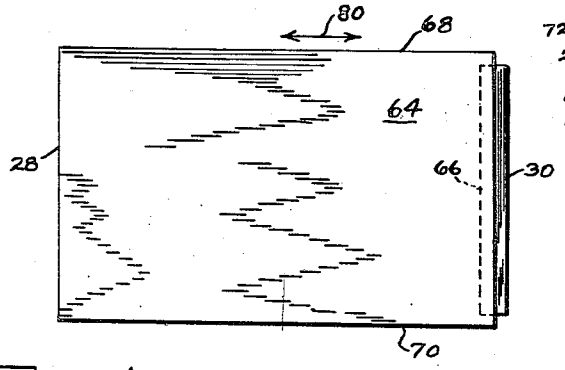


Fig. 4

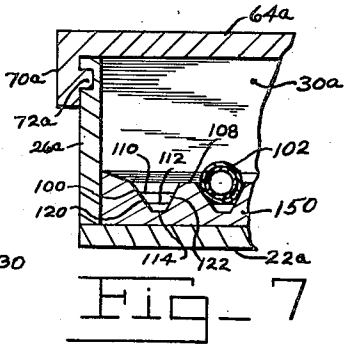


Fig. 7

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COUNTING AND SORTING DEVICE

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Application August 31, 1950, Serial No. 182,522

4 Claims. (Cl. 214—1)

This invention relates to sorting and counting devices and apparatus.

An object of the invention is to provide a novel and improved counting and sorting apparatus and device whereby a plurality of discrete objects or particles may be counted and or sorted quickly and easily, without the use of complicated apparatus.

Another object of the invention is to provide novel and improved counting and sorting apparatus in which there is an object receiving device adapted to receive a plurality of discrete objects to be counted and or sorted, and means in said object receiving device whereby individual ones of said plurality of discrete objects may be received, one object in each individual means, whereby counting thereof may be carried out by immediate inspection.

A further object of the invention is to provide a novel and improved counting and sorting device which is equipped with a plurality of object-receiving recesses, each of the recesses being constructed according to a novel pattern, so that upon dumping a plurality of discrete or separate objects into the device, they are automatically caused to arrange themselves so that only one such object lies in each of the object receiving recesses, the recesses being arranged according to a novel pattern, so that by visual inspection, taking into account the unfilled recesses, or the filled recesses, as convenient, the exact quantity of the objects dumped therein being instantly ascertained without going through the process of counting them individually, and without the need for handling them individually.

Still another object of the invention is to provide novel article or object counting means which is adapted for counting not only such articles or discrete objects of a predetermined specific size or diameter, by the construction shown and described herein, but is also adapted to count or sort such articles or objects of a range of different sizes.

Still a further object of the invention is to provide novel article and object counting means of the character described, which is useful in counting and sorting pharmaceutical products such as pills, tablets, capsules and the like, of a range of sizes and diameters.

Another object of the invention is to provide a novel article and object counting device of the character described, which is sanitary for use in handling pharmaceutical products, such that there will be no contamination of such products while being processed therein.

A further object of the invention is to provide a novel article and object counting and sorting device of the character described, which is simple in design, inexpensive to manufacture, and effective and efficient in use.

Other objects and advantages of the invention will become apparent from the following description of a preferred embodiment thereof as illustrated in the accompanying drawings, forming a part hereof, and in which,

Figure 1 is a top plan view of one form of the device, with the top closure and divider not shown.

Figure 2 is a sectional elevational view taken substantially on plane 2—2 of Figure 1, the top closure and divider being shown in one position.

Figure 3 is a sectional elevational view taken substantially on plane 3—3 of Figure 1, the top closure and divider being likewise illustrated in the view.

Figure 4 is a top plan view of the device shown in Figures 1, 2 and 3, but showing it with its top closure and divider in position, and retracted to normally closed rightward position.

Figure 5 is a top plan view of a modified form of the invention, preferred for use with capsules and similar elongated articles, with the top closure and divider not shown.

Figure 6 is a sectional elevation taken on plane 6—6 of Figure 5, with the top closure and divider in one position, and illustrating the positions occupied by large size capsules when poured into the device from a bottle shown to the right; a small size capsule is also shown in this view.

Figure 7 is a sectional elevational view taken on plane 7—7 of Figure 6, one capsule being shown, the view being fragmentary.

Figure 4 represents the appearance of both forms of the device, that is, of Figures 1 and 5, when the top closure is in position and moved to closed position.

In connection with work on pharmaceutical products, such as pills, tablets, capsules and the like, it is frequently necessary to determine quickly and accurately, the number of such pills, tablets, capsules, and the like, poured out of a larger container or bottle thereof, or for other purposes. Thus, for example, the pharmacist may have to make up a prescription which calls for ten capsules, pills or tablets. The capsules may commonly be contained in a large jar or bottle, and to take out exactly ten capsules therefrom would necessitate handling them while counting out the exact number desired. For sanitary reasons, among others, it is desirable to avoid as much as possible actual physical handling of individual pills, tablets or capsules.

The present invention provides means by which the pharmacist or other person may assort, count or enumerate any given quantity of discrete objects, such, for example, as pills, tablets or capsules, quickly, and without actually touching the objects at all during the counting process. He maiy either count the exact number of such pills in a bottle or jar, for example, or may count out from the bottle, jar, or other container or a pile thereof, any predetermined quantity of such pills, capsules or tablets, with great facility and convenience.

In order to understand clearly the nature of the invention, and the best means for carrying it out, reference may now be had to the drawings, in which like reference numerals denote similar parts throughout the several views.

As shown, there is a main housing generally indicated at 20, and having a bottom wall 22, upstanding side walls 24 and 26 secured to the bottom wall, and interconnecting end walls 28 and 30 similarly secured to the bottom wall and to the side walls. The bottom, end and side walls thus define a housing main chamber or compartment 32, which extends the entire length and breadth of the main housing. Inside the main chamber, is disposed an object-receiving matrix member 34, which, as shown, has its bottom surface 36 lying against the upper surface of the bottom wall 24 of the main housing. The edges 38, 40, 42 and 44 of the matrix member 34 lie snugly against the corresponding inner wall surfaces of the walls 24, 26, 28 and 30 of the main housing, and may be secured adhesively or in any other manner in position, so as to be stationary relative thereto.

In the upper surface 46 of the matrix member 34, I form a number of recesses 48, which are upwardly open,

to receive the objects to be sorted out or counted, such, for example, as pills or tablets. Such pills or tablets may be shaped with cylindrical side walls, as shown at **50**, being circular in plan as seen in Figure 1. The diameters of the pills **50** may vary, and the device shown can accommodate a range of diameters of pills. For this purpose, I do not make the recesses cylindrical, but make them stepped as shown. For example, the walls of the recesses slope inwardly convergently conically downwardly, from level **52** to level **54**, to accommodate pills of the size shown at **50** in Figure 2, for example. Thence the walls of the recesses slope conically downwardly convergently inwardly from level **54** to level **56**, being thus progressively smaller in cross section. This accommodates between levels **54** and **56**, smaller diameter pills. The lowermost portion **58** of the recesses is still smaller in diameter, being conveniently hemi-spherical in shape and progressing downwardly to a lower level **60**.

By merely pouring some pills out of a bottle or jar of pills, into the housing chamber **32**, it will be found that the pills will tend to enter the pill receiving recesses **48**, one pill in each recess. The marginal surfaces or border **62** of the matrix member also slope inwardly downwards to the level **46**, so that any pills that impinge thereon are urged toward the pill receiving recesses and do not pile up there.

A top wall member **64** has an end wall **66** depending from one end thereof, and into the chamber **30** to slide over the upper surface of the matrix member **34**. It also has depending side walls **68** and **70** which are receptive on their ribs **72** into the grooves **74** in the housing walls so as to slide thereon.

The walls **64**, **68**, **70** and **66**, being thus secured together, form a movable unit which may be moved from left to right and back again in the directions of the arrow **80** shown in Figure 2, to bring the depending wall **66** right against the lower housing right end wall **30**, as seen best in Figure 4, this being the retracted position, or to move it all the way to the left so that it is in contact with the left end wall **28** of the lower housing. Also, it may be moved so that the dividing wall **66** is in any intermediate position therebetween, as for example shown in Figure 2. When in this position of Figure 2, it is seen that the right hand ten pill receiving recesses **48** remain exposed for receiving pills from a bottle or other container, to be shaken from the bottle right into the remaining exposed portion of the lower housing, in the direction of the arrow **82** in Figure 2. When the pharmacist does this, he will find that the pills **50** will tend to each occupy one of the recesses **48**, and to urge them to do so individually, all he has to do is mildly shake the housing **20** from side to side to mildly agitate the pills **50**. By inspection, the pharmacist can see whether any of the ten openings **48** is not occupied by a pill, and if so, and he wants to count out ten pills, then he merely shakes one or more pills into the housing to make up the required ten. If he wants only eight pills, then he pours pills slowly from the bottle until all but two of the recesses are occupied by pills **50**, which is obvious by inspection.

If he wants only five pills, then he moves his dividing slider assembly comprising the wall **66**, top **64** and flanges **68** and **70**, a little further to the right so that only the rightwardmost column **84** of recesses **48** is exposed, and it will be found quite simple for the pharmacist to pour exactly five pills into the housing. Although each column is shown with five pill receiving recesses, it is apparent that some other number of recesses, such as six or seven, or ten, may be formed in the matrix **34** instead of five, for some special purpose, and similarly, although only ten such columns are shown, there may be a greater or lesser number of such columns. However, I have found that the arrangement shown is convenient for ordinary purposes and simple for counting by inspection.

Once the required number of pills has been poured into the lower housing, they can be discharged therefrom by merely pouring them out again, across either of the corners **86** or **88**, and it is seen that one or both of these corners may be formed to simulate a pouring spout on a beaker, if desired, to even further facilitate such pouring into some other container.

Figure 2 shows one size of pill at **50**, which extends partly inside the recess **48** at the right. Where smaller diameter pills are being used, or smaller diameter spherical pills, they will necessarily extend further toward the bottom of the recess **48**, and the smallest size will come in contact with the rounded lowermost portion **58** of the recesses.

Looking now at Figures 5, 6 and 7, it is seen that the construction of the device shown there is similar to that of the preceding figures, except that the recesses **100**, though also stepped or sloping inwardly, are elongated to receive the elongated capsules **102**. The elongated capsule-receiving recesses **100** have their end walls or surfaces **104** and **106** sloping inwardly convergently downwardly from level **108** to level **110**, to accommodate capsules of the size shown at **102**, for example, and are progressively further sloping downwards from level **110** to **112**, and again progressively further sloping downwards from level **112** to level **114**, each additional sloping portion permitting reception of a smaller length capsule. Thus, in Figure 6, there is shown a very small capsule **102***a* lying at the bottom level of the capsule-receiving recess row **116**, this being shown only for illustration, since normally only one size of capsule at a time will be poured into the lower housing, and it would normally be on the right side of the stop wall **66***a*.

As mentioned for Figures 1, 2, 3 and 4, the depending divider wall **66***a* moves as a unit with the walls **64***a*, **68***a* and **70***a*, from left to right and vice versa, in the directions of the arrow **118**. All parts of Figures 5, 6 and 7 which are similar to those of the preceding views, are given the same numerals with the addition of the suffix "*a*." Looking at the cross sectional views in Figure 7, it is seen that the side surfaces **120** and **122** of the capsule receiving recesses **100** are also inwardly downwardly convergent from their uppermost level **108** to their lowermost level **114**, and that the contour may be stepped if desired, depending upon the particular range and sizes of capsules which are to be accommodated therein.

As stated previously for the round and spherical pills, the pharmacist may pour the capsules **102** from a jar or bottle **130** in the direction of arrow **132**, the divider unit depending wall **66***a* having previously been positioned to expose to the right thereof, only the desired number of capsule-receiving openings **100** corresponding to the number of capsules to be counted thereby. In Figures 5 and 6, the divider **66***a* is so positioned as to permit counting of ten or less capsules **102**, or the smaller capsules such as **102***a*. The capsules having been poured into the housing chamber **32***a* in the direction of arrow **132**, while the pharmacist mildly shakes the housing **20***a*, the capsules are jarred so as to move into the individual openings **100**, one capsule in each opening. The upper edges **134** of the capsule receiving recesses, and the upper edges **136** of the pill receiving recesses of Figure 1 may be slightly rounded off to further facilitate the entry therein of the capsules or pills as the case may be.

It will be understood that the capsules **102** which have now been counted out into the recesses **100**, may then be poured out into a pill box or capsule box, or other container or envelope as desired, across the corners **86***a* or **88***a* thereof. The corners **86***a* and **88***a* may be formed outstanding like a spout, to facilitate the pouring into a given form of container if desired. It will also be understood that the walls such as **22**, **24**, **26**, **28**, **30** and even the matrix **34** may be formed of a single piece of molded material such as plastic, and similarly the movable walls

64, 66, 68 and 70 may be cast as a plastic unit if desired. It will also be understood that the same device may be used alternately for pills or capsules, by merely making the matrix units 34 and 150 interchangeable.

Although I have described my invention in specific terms, it will be understood that various changes may be made in size, shape, materials and arrangement without departing from the spirit and scope of the invention.

I claim:

1. A counting and sorting device comprising a housing having a recess formed therein defined by upstanding enclosing side walls, matrix means in said recess, with a plurality of article receiving compartments formed in a surface of said matrix means, said article receiving compartments being constructed and arranged to receive one said article in each article receiving compartment, each of said article receiving compartments being circular in plan, and having inwardly downwardly convergent wall surfaces lying in an imaginary cone of one altitude, and other portions of said inwardly downwardly convergent wall surfaces lying in at least one imaginary cone of a different altitude, said compartments being vertically differentially stepped to form seats for articles of differing cross sections, and means including an outstanding wall adjustably limiting the total number of article receiving compartments opening for the reception of said articles.

2. A counting and sorting device comprising a housing having a recess formed therein defined by upstanding enclosing side walls, matrix means in said recess, with a plurality of article receiving compartments formed in a surface of said matrix means, said article receiving compartments being constructed and arranged to receive one said article in each article receiving compartment, each of said article receiving compartments being trough-like in contour, being elongated longitudinally, with substantially rounded end wall surfaces, and means including an outstanding wall for adjustably limiting the total number of article receiving compartments opening for the reception of said articles.

3. A counting and sorting device comprising a housing having a recess formed therein defined by upstanding enclosing side walls, matrix means in said recess, with a plurality of article receiving compartments formed in a surface of said matrix means, said article receiving compartments being constructed and arranged to receive one said article in each article receiving compartment, each of said article receiving compartments being an elongated trough constructed and arranged to receive therein at least a portion of a range of sizes of capsules, and means including an outstanding wall for adjustably limiting the total number of article receiving compartments opening for the reception of said articles.

4. A counting and sorting device comprising a housing having a recess formed therein defined by upstanding enclosing side walls, matrix means in said recess, with a plurality of article receiving compartments formed in a surface of said matrix means, said article receiving compartments being constructed and arranged to receive one said article in each article receiving compartment, each of said article receiving means and compartments forming an elongated trough-like depression with downwardly inwardly convergent end wall surfaces, and inwardly downwardly convergent side wall surfaces, so as to define a progressively inwardly diminishing cross sectional area of the depression, so that the smallest size of capsule will lie upon the lower surface of said depression, upon entering the same, and so that progressively larger sizes of capsules entering said trough-like depression will have surfaces of said capsules supported therein at an elevation above said lower surface of said depression, and means including an outstanding wall for adjustably limiting the total number of article receiving compartments opening for the reception of said articles and capsules.

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