

## **METHOD FOR PROVIDING A SINGULATION DEVICE OF A STORING AND DISPENSING CONTAINER**

The present invention relates to a method for providing a  
5 singling device of a storage and dispensing container for drug portions.

Modern automated blister machines, as they are, for example, disclosed in the publication WO 2013/034504 A1, comprise, depending on the level of configuration, several hundred storage  
10 and dispensing containers for drug portions. These storage and dispensing containers store a plurality of drug portions of a specific drug and, upon request, individual drug portions may be dispensed. Using the automated blister machines, the drug portions stored in the storage and dispensing containers are  
15 combined and individually blister-packaged for each patient according to the medically prescribed administration time points.

In order to combine the drug portions, respective storage and dispensing containers are actuated for dispensing one or a  
20 plurality of singularized drug portions. When actuating a storage and dispensing container, a singling device, which is part of the storage and dispensing container, separates an individual drug portion which is transferred via a discharge aperture to a guiding device of the automated blister machine.  
25 By means of the guiding device, a dispensed drug portion is, optionally by inter-positioning a collecting device, fed into a packaging device, which blister-packages individual or a plurality of drug portions according to the medical specifications.

30 By means of the previously mentioned automated blister machines, not only prescription drugs but also, for example, food supplements (in the form of individual portions) or similar compositions can be blister-packaged. Within the scope of this

application, the term drug portions shall also comprise such products or compositions. In other words, all compositions that can be dispensed and distributed in dimensionally stable portions shall be included.

5 In order to singularize the drug portions stored in a storage container of a storage and dispensing station, the singling device comprises a rotor having a plurality of ducts conventionally situated at the outer circumference of the rotor. The ducts are, with regard to their measurements or dimensions,  
10 adapted to the respective drug portions to be separated in such a manner that, in a duct, the drug portions can be situated one above the other, however, not be situated one next to the other. The number of drug portions disposed one above the other in a duct depends on the specific implementation of the singling  
15 device. If the ducts are implemented in such a manner that only one drug portion is received into a duct, a restraint means is situated above the duct rotated over a dispensing aperture, preventing further drug portions from entering. If a plurality of drug portions can be received into a duct, a restraint means  
20 usually divides the duct into two parts, only the drug portions situated in the lower part of the duct being dispensed.

As set out above, it is required that, inter alia, the measurements of the ducts of the rotors of the singling device are adapted to the size of the drug portions to be separated  
25 because, only when the measurements of the ducts are optimally adapted to the measurements of the drug portions, a gentle singularizing of the drug portions can be ensured. A precise adaptation also ensures a safe dispensing. In this way, only for a precise adaptation can it be ensured that for each dispensing  
30 process (rotor rotation) indeed one drug portion is dispensed. In the case of a non-precise adaptation, the drug portions can be wedged in the ducts and block the same.

The measurements or dimensions of individual drug portions of different types of drugs vary highly so that a plurality of  
35 storage and dispensing containers having different singling devices are used in an automated blister machine. Before first

operating an automated blister machine, it is typically proceeded in such a way that the operator of the automated blister machine informs the manufacturer about the drug types which are to be blister-packaged. According to the  
5 specifications of the operator, the drug types adapted to the singling devices to be blister-packaged are then installed in the storage and dispensing containers and then adapted storage and dispensing containers are provided.

It depends on the measurements or dimensions of drug  
10 portions to be singularized which singling devices are installed. For known drug types, existing adapted singling devices can be accessed.

If the drug type is, however, new or the shape of the individual drug portion of a drug type known per se has been  
15 changed, the measurements or dimensions of the drug portion have to be ascertained. According to the prior art, said drug portions are manually measured for this purpose. This can be carried out by the operator. The operator, however, often sends "new" drug portions also to the manufacturer for the new drug  
20 portions to be measured by said manufacturer.

This procedure is generally time-consuming and prone to error. For example, it can be difficult, for oval drug portions, to determine the length of the drug portion without error; small measuring errors quickly slip in. As already mentioned above, an  
25 adaptation as precise as possible of the singling device to the dimensions of the drug portions to be singularized is, however, necessary because the risk of damaging the drug portions during the singling process is significantly increased. For this reason, even small measuring errors are, if possible, to be  
30 avoided.

It is the object of the present invention to create a method which enables to provide singling devices of a storage and dispensing container in a quick, cost-effective and error-minimizing manner.

35 The object is achieved by a method for providing a singling device of a storage and dispensing container for drug portions

according to patent claim 1. According to the present invention a to-be-measured drug portion of a specific drug type is provided, the dimensions or measurements of this drug portion being typically known.

5 By means of a detection device, a digital image of the drug portion, after providing said drug portion, is generated and at least one digital image is processed by image analysis, the specified drug information for the provided drug portion being determined. This drug information comprises at least the  
10 dimensions or measurements of the drug portion.

During the course of this application, "image-analytical processing" is to be understood that, based on the at least one digital image of the drug portion, the desired drug information is ascertained, methods for image processing and image analysis  
15 known to the skilled person being used. The processing can be carried out by an appropriate control device (for example, a personal computer having appropriate software), so that the required drug information can be provided in a quick and reliable manner.

20 On the basis of the ascertained drug information, a singling device suitable the drug portions to be singularized is identified. As soon as the suitable singling device is identified, said singling device can be provided and be made available to the user. For this purpose, the storage inventory  
25 can be optionally accessed; however, it is potentially also required to manufacture a singling device adapted to the drug information.

According to the present invention, ascertaining the measurements of a drug portion of a drug type and ascertaining a  
30 suitable singling device, thus, is carried out in a fully automated manner by using methods for image processing and analysis, it being substantial that the applied methods and the detection device are suitable to ascertain the measurements or dimensions for such small objects such as drug portions with a  
35 required precision. Appropriate hardware and software is known to the skilled person and is available on the market.

By the method according to the present invention, an identification of a suitable singling device can be carried out in a quick and reliable manner because the error proneness caused by a human user is prevented owing to the automated  
5 measuring of a drug portion. Though furnishing the necessary hardware is associated with certain expenses, said expenses are, owing to the quick processing and the avoidance of erroneously assigned singling devices, quickly amortized.

For the manufacture of drug portions, certain deviations  
10 with regard to the measurements between the different drug portions can, owing to certain production tolerances, result. In order to recognize this and to, if necessary, adapt the singling device, it is preferable that the drug information of a plurality of drug portions of the same drug type are determined  
15 and the singling device is identified on the basis of the plurality of drug information. For this purpose, steps a) through c) of the method according to the present invention are respectively often repeated. If then a respective plurality of drug information is provided, the suitable singling device is  
20 identified. In this way, it is, for example, conceivable to adapt the singling device to the largest measurements determined. In this manner, the probability of faulty function is further reduced.

The color of a drug portion can also be relevant for the  
25 dispensing process and, that is, with regard to controlling the dispensing as such. For this purpose, for example, a sensor can monitor a certain area for the dispensing opening. In order to optimize the monitoring, it is provided for a preferred embodiment that for the image-analytical processing the color of  
30 the drug portion is additionally determined as part of the drug information.

On the basis of the determined drug information, a suitable singling device is identified. For this purpose, it is determined on the basis of the measurements of the drug portion  
35 which singling device is suitable. In a preferred embodiment, for identifying a suitable singling device, an inquiry is, on

the basis on the drug information, made in a database, in which data for a plurality of singling devices are stored. In this manner, the suitable singling device can be ascertained quickly and without errors.

5 As already indicated, a plurality of storage and dispensing containers are installed in modern automated blister machines so that a manufacturer always has a plurality of singling devices in stock, however, it not being ensured that each known singling device, that is, each singling device listed in a database used  
10 for an inquiry, is always in stock. For this reason, in a preferred embodiment, as long as a suitable singling device is identified in a database, an updated inventory of these singling devices is determined. The database can comprise the respective inventory information or, alternatively, a respective database  
15 of the manufacturer of the automated blister machine or of a third party (supplier of singling devices) can be accessed. If it turns out that the inventory of a specific singling device is low, the manufacture of further singling devices can be initiated.

20 Since new drug types are constantly put on the market, it can occur that for "new" or very rare measurement combinations a suitable singling device cannot be ascertained, that is, that a singling device adapted to the ascertained measurements does not exist. In a preferred embodiment of the method, model data for a  
25 suitable singling device are, as long as no suitable singling device is identified in a database inquiry, determined on the basis of the drug information. On the basis of the automatically generated model data, the suitable singling device can then be manufactured and provided. The necessary singling devices can be  
30 manufactured by the user him/herself; however, the model data can also be transmitted to the manufacturer or a third party, and the manufacturer or the third party manufacture the required singling device on the basis of the obtained model data.

Furthermore, the model data can be used for the purpose of  
35 printing a model of a drug portion by means of a 3D printer and to test the (new) singling device by means of this model.

As already indicated, it is necessary for a gentle singularizing of the drug portions to precisely adapt the singling device to the measurements of the drug portions. In order to be able to particularly precisely determine these measurements, a preferred embodiment provides that, in step b), a plurality of images is generated by an imaging device, the drug portions to be measured being rotated between the recordings by a specified angular step, and, in a step c), a 3D model of the drug portion is determined during the image-analytical processing, on the basis of which the drug information is ascertained. In this embodiment, a plurality of images is generated, each of which are differentiated by a specified angular step. In this manner, a very precise 3D model can be generated, on the basis of which the measurements of the drug portion can be very precisely determined.

In a preferred embodiment, the precision of the aforementioned method can be even further enhanced, the plurality of images in this embodiment in step b) being generated by an imaging device having a telecentric lens. When using a telecentric lens (including suitable lighting), only almost axis-parallel rays of light pass this lens so that almost no measuring inaccuracies result on the basis of a varying distance of the drug portion/lens. A variation of the distance can occur if the drug portion, which is rotated during the course of the measurement, is not centrally situated on a respective rotation means. Thus, the use of a telecentric lens also facilitates operating because the central arrangement of the drug portion is no longer so relevant.

It is important to provide singling devices before the first operation to be able to deliver an automated blister machine to a user, which is adapted to his/her needs. It will also occur, however, that, during the course of operating the automated blister machine, new drug types are to be blister-packaged or that the shape of the drug portions of known drug types changes. This requires that, in a storage and dispensing container to be loaded with "new" drug portions, a new, respectively adapted

singling device is used. In order to ascertain said singling devices, the operator has to send a drug portion having unknown measurements to the manufacturer, who measures the drug portion and identifies and provides the suitable singling device. This  
5 is time and cost intensive. It can also occur that certain drug portions are not allowed to be imported into the country in which the manufacturer of the automated blister machine has his/her production location.

For this reason, it is provided in a preferred embodiment  
10 that steps a) and b) are carried out by a first user and at least step d) is carried out by a second user. Thus, in this embodiment, the method is divided, the first user regularly corresponding to the operator of the automated blister machine. The operator thus provides and measures the drug portion; the  
15 identification on the basis of the ascertained drug information can then be carried out via the manufacturer or a third party. This method makes it superfluous that the drug portions are send out for measuring and analysis. Measuring is carried out by the operator who, of course, has to have the necessary equipment.  
20 Within this context, it is preferred that the data of the at least one image generated in step b) or of the drug information determined in step c) are transmitted by the first user by means of data remote transmission to the second user.

If the first and the second user operate in different  
25 locations, it is preferred that a specified number of singling devices is made available to the first user by the second user.

In the following, a preferred embodiment of the method according to the present invention describes a storage and a dispensing container for drug portions and different devices, by  
30 means of which images of drug portions can be made. In the drawing,

Figures 1a and 1b show slanted views of a storage and dispensing container;

Figures 2a and 2b show two illustrations of a singling  
35 device of a storage and dispensing container;

Figure 3 shows a schematic side view of a device for capturing a plurality of images of a drug portion;

Figures 4a through 4c show top views onto the device schematically shown in Figure 3, the drug portion being  
5 illustrated in different angular positions;

Figures 5 and 6 each show a schematic side view of a further device for capturing an image of a drug portion; and

Figure 7 shows a flow chart for image-analytical processing of a plurality of images of a drug portion.

10 Figures 1a and 1b show two slanted views of a storage and dispensing container 1. Storage and dispensing container 1 comprises a housing 10 enclosing a receiving space 2 for drug portions, which in the bottom portion has a circular-cylindrical section 11. Housing 10 is delimited downwards by a bottom area  
15 having a (not-shown) dispensing aperture via which a drug portion, situated in a duct 23 aligned with the dispensing aperture, can be dispensed. As it in particular can be seen in Figure 1b, a singling device 20 is situated in the circular-cylindrical section of housing 10, which at its outer  
20 circumference has a plurality of ducts 23 and protrusions 22 separating said ducts. Protrusions 22 form together with a center part 21, which is moved by a (not-shown) actuator, ducts 23. Projections 22 may be integrally formed with center 21 part; however, it is also conceivable that projections 22 are attached  
25 at the outer circumference of center part 21 and, in this way, the ducts are created at the outer circumference of center part 21.

As it can be seen in Figure 1b, storage and dispensing container 1 comprises a restraint means 30 situated at the  
30 outside at circular-cylindrical section 11 of housing 10. Restraint means 30 comprises a restraint section 31 inserted above a slot in circular-cylindrical section 11 into housing 10 and that is in such a manner that restraint means 31 is held slightly above a plain arranged by protrusions 22. The  
35 dispensing aperture of the storage and dispensing container and restraint section 31 of restraint means 30 are aligned to each

other in such a manner that restraint section 31 is situated above the dispensing aperture. In doing so, it is prevented that further drug portions enter a duct situated above the dispensing aperture. Only when this duct is rotated away from below  
5 restraint section 31 by a movement of the rotor, can a new drug portion enter the duct.

Figure 2a shows a slanted view of singling device 20 having center part 21 and a plurality of protrusions 22 and a plurality of ducts 23. A singling device is one of the central components  
10 of a storage and dispensing container. Owing to the aforementioned reasons, the singling devices are installed in the storage and dispensing container in such a manner that they can be replaced in a quick and uncomplicated manner by another singling device.

Figure 2b shows a side view of singling device 20, the  
15 middle duct being orthogonally aligned with the drawing plane. As it is already set out further above, the measurements of the duct, meaning its width B1, its height H and its depth T, have to be precisely adapted to the measurements of the drug portions  
20 to be singularized so that, when singularizing the drug portions, damaging said drug portions can be prevented by the geometry of the ducts and of the protrusions.

In the shown embodiment, the ducts are, for example, situated in such a manner that their width is smaller than the  
25 width of protrusions 22 separating the ducts. In other embodiments it is also conceivable that the width of the protrusions is only slightly greater or even smaller than the width of the ducts themselves. Furthermore, it is conceivable that the ducts are implemented significantly wider and that the  
30 width corresponds, for example, approximately to the height of the ducts.

As it can be concluded from Figure 2b, singling device 20 can have a shoulder 24, which can be inserted into a respective aperture in the storage and dispensing container and via which  
35 the singling device can be coupled to a motor.

Figure 3 shows a schematic side view of a device or arrangement for capturing a plurality of images of a drug portion 5. Figures 4a through 4c show different top views of the same device, the drug portion being illustrated in different angular positions in Figures 4a through 4c.

The device comprises a transmitted light source 44 situated on a support 43. Furthermore, the device comprises a detection device 45, 46, which in this embodiment is implemented as camera 45 having lens 46, is situated on a support 40. Between the detection device and transmitted light source 44, a table 41 having a rotary plate 42 on which a drug portion 5 is situated. Rotary plate 42 enables a refined adjustment of the rotary angle of the rotary plate in relation to the axis transmitted light source/detection device.

A diffused planar light having a red luminous color can be used for transmitted light source 44; an IDS UI-5480CP-M-GL camera having a 5 mega-pixel sensor and a resolution of 2.560x1.920 pixels can be, for example, used as a camera. The camera can, for example, be used with a 35mm lens having an adapter ring.

At least rotary plate 42 and detection device 45, 46 are connected to a control device 50, which controls the rotary plate and which, at an appropriate angular position, actuates the detection device for generating the images. Control device 50 can also carry out the image-analytical processing and the identification of the suitable singling device. Alternatively, these method steps can, however, also be carried out by a separate control device, for example, by a PC having appropriate software. Said PC can be connected to control device 50 via means for data transmission.

As is already evident from the description of this embodiment, supports 40, 43 and table 41 are only used to simplify the handling of the overall arrangement; they are not substantial for the method according to the present invention and for the arrangement.

When using the aforementioned arrangement or device, the drug portions are viewed in the transmitted light by means of the detection device, here the camera, to obtain a plurality of two-dimensional images or projections. The drug information is not directly ascertained from a 2D image, but drug portion 5 is situated on rotary plate 42 and a plurality of images of the drug portion are generated, drug portion 5 being rotated further by a small angular step (for example, 1 or 2 degree) after each image. In this manner, 2D images or projection result from a plurality of different directions. Owing to the shape of drug portions, said drug portions are detected from approximately all relevant spatial directions according to an overall rotary angle of 180° and, by overlaying the 2D images or projections obtained from the different directions, a 3D model having high resolution can be reconstructed during the image-analytical processing. On the basis of the aforementioned 3D model, the specified drug information is then determined according to the present invention, this information at least comprising the dimensions of the drug portion. On the basis of this drug information, the suitable singling device is then identified and subsequently is provided to the operator.

In Figure 3, the path of rays from transmitted light source 44 to lens 46 of camera 45 is schematically illustrated on the basis of rays 60, 61, 62. It can be seen that rays 62, 61 are covered by the drug portion, while ray 60 unobstructedly impinges on the lens.

As it is already set out above, using a classic (entocentric) lens results in the problem that the enlargement scale depends on the distance between drug portion 5 and lens 46. If the drug portion is moved closer to the lens (for example, by rotating rotary plate 42 when the drug portion is non-centrally aligned on the rotary plate), the image is respectively enlarged. The reconstruction principle used for the image analysis leads to that the object areas relevant for the reconstruction of a slice of the drug portion change between the individual images in their vertical position, leading to errors

for the reconstruction. In order to prevent these errors, in this arrangement or device, a telecentric lens and a telecentric illuminator can be used for transmitted light source 44.

5 A telecentric lens is distinguished in that only light rays having an almost axis-parallel path of rays pass the optics. Different from entocentric lenses, the image scale in the focus range of the lens is, for this reason, (nearly) independent from the distance between drug portion and lens. The telecentric illuminator emits light in which all light rays are aligned in  
10 an axis-parallel manner to the optical axis. This enables a very sharp display of the edges of the drug portion and prevents reflections owing to light impinging laterally onto the drug portion.

A telecentric lens and a telecentric illuminator are quite  
15 cost intensive so that their use is only optional. Using a suitable software and corresponding "normal" lighting and a "normal" lens, results having sufficient precision to identify a suitable singling device or to supply corresponding model data (if no suitable singling device is provided) can also be  
20 achieved.

As already indicated, the rotary plate is adjusted between the individual images by a certain rotary angle. For this purpose, the rotary plate can be stopped between the individual steps and an image can be generated in the resting position of  
25 the rotary table by the detection device. Alternatively, the rotary table can be continuously rotated. The rotary table is then, for example, coupled with an encoder, which converts the mechanical rotary movement of the rotary table into an electric signal which, in turn, triggers generating an image by the  
30 detection device.

Furthermore, it is possible to rotate the rotary platform at a constant, known speed. At a known rotary speed, the required time for half a rotation of the rotary table is known so that the points in time at which an image of the drug portion is  
35 generated by the detection device are known. In which way the plurality of images of the drug portion in detail is generated

is, however, not relevant for the present invention as such. Within the scope of this embodiment, it is only important that a plurality of images is generated, it being preferable that the detection device in this instance comprises a telecentric lens.

5        Figures 4a through 4c show top views onto the arrangement shown in Figure 3, drug portion 5 being shown in three different rotary angles. On the basis of the only schematically indicated rays 62', the effect of the rotation on the path of rays can be seen. The further components correspond with those described in  
10 Figure 3.

Figure 5 shows a schematic side view of a further device or arrangement suitable for capturing an image of a drug portion. The device comprises a rest surface 61 situated at a stand 62. A detection device 65, 66 is situated in the top area of stand 62.  
15 In this embodiment, the detection device is a 3D scanner. Said scanner can be formed by a stereo camera system having a centrally positioned LED projector. The LED projector emits a cone of light 67 onto rest surface 61, and it is to be ensured that to-be-measured drug portion 5 is situated in this cone of  
20 light.

For generating an image, a striped pattern of blue, red or IR light is projected onto to-be-measured drug portion 5, the spatial frequency and phase shift of light varying with time. In this way, by means of a triangulation method, in addition to an  
25 intensity value and the position in the X and Y directions, the respective distance from the camera system can also be ascertained for each camera pixel, and that is, without having to move the drug portion or the 3D scanner itself.

The measuring process itself takes up less than one second  
30 to up to a few seconds, depending on the set exposure time. In this arrangement or device, the minimum distance from the measuring object is approximately 150mm, and the measuring area has a size of 60X105mm. The 3D scanner generates an image in form of a 3D point cloud, from which the specified drug  
35 information is determined during the image-analytical

processing, this information comprising at least the dimensions of the drug portion.

Figure 6 shows a further device or arrangement for capturing an image of a drug portion. The device or arrangement comprises a bottom area 70 having a recess in which a transmitted light source 74 is situated. Two perpendicular supports 71, 75 are situated on bottom area 70. A horizontal arm 72 is attached at support 71, at which a detection device 78, 79 is situated. A comparable detection device 76, 77 is situated at support 75, and opposite of this detection device 76, 77, a second transmitted light source 73 is situated. In this embodiment, the detection devices 76, 77 and 78, 79 are matrix cameras, meaning cameras having matrix-like sensors, opposite of which respectively one transmitted light source 74, 73 is situated.

The optical axis of detection device 78, 79 is aligned perpendicular to the rest surface of transmitted light source 74, and the optical axis of detection device 76, 77 is aligned perpendicular to the surface of transmitted light source 73 so that the detection devices can detect the respective maximum cross section of the drug portion resting on transmitted light source 74.

In Figure 6, the path of rays of some of the rays of light emitted by transmitted light sources 73, 74 is schematically illustrated. Caused by the shape of the drug portion, rays 90, 91 of transmitted light source 73 are covered by drug portion 5, while rays 92, 93 are detected by detection device 76, 77. This applies correspondingly to detection device 78, 79 only receiving emitted rays of light 80 through 83 by transmitted light source 74, while the rays of light radiated in the area of the drug portion are blocked by the drug portion.

On the basis of the construction of the device or arrangement illustrated in Figure 6, 3D recordings cannot be generated; however, on the basis of using two detection devices and two transmitted light sources, an image can be generated on the basis of which all necessary measurements of drug portion 5

resting on transmitted light source 74 can be ascertained during the image-analytical processing.

Subsequently, the image-analytical processing of the recordings, which are generated by a device or arrangement according to Figures 3, 4a through 4c, is briefly discussed with reference to the flow chart in Figure 7. As already indicated, when generating the images, a drug portion is situated on a rotary table, which is located between a detection device and a transmitted light source. Images of the drug portion are generated at different rotary angles so that, for an angular step of, for example, one degree, a series of 180 single recordings is generated. With regard to the shape of conventional drug portions, the result would be repeated for angular areas of more than 180 degrees, which would entail superfluous processing.

For an angular step of one degree, 180 images or projections of the drug portion onto the two-dimensional sensor surface of the detection device result, thus, recordings from  $N=180$  of different spatial directions result. Subsequent to the 180 two-dimensional projections or recordings of the drug portion obtained in this way, a 3D model is reconstructed layer by layer, on the basis of which the defined drug information for the drug portion is determined.

The actual reconstruction of the 3D model is described in detail in the sequence chart in Figure 7. Since the exact execution of the image-analytical processing (here, the reconstruction) is, however, not a substantial aspect of the present invention, only a short summary is subsequently provided. On the basis of the flow chart from Figure 7, it is immediately evident to the skilled person in which way the image-analytical processing in detail unfolds when using a device according to Figures 3, 4a through 4c.

For reconstructing the 3D model, the individual images are first binarized, that is, the individual pixels of the images are marked as "belonging to the drug portion" or as "belonging to the background." The reconstruction of the 3D model proceeds

in lines or layers. Each layer of the 3D model corresponds to one line of the sensor of the detection device. For reconstructing a layer, the information of the respective lines of all individual images are necessary.

5       For example, for reconstructing the topmost slice, the topmost line of all individual images is consulted. The information from one line is a one-dimensional projection of a slice of the drug portion onto the camera sensor line. These one-dimensional projections are projected from the direction  
10 corresponding to the respective image angle into a two-dimensional space ("back projection", 105). By overlaying all N two-dimensional projections, the layer of the drug portion corresponding with the respective camera line then results.

      After this process has been carried out for all camera lines  
15 in which at least one pixel belongs to the drug portion, the 3D model of the drug portion, from which the drug portions are then ascertained, results by "stacking" the 2D layers obtained as described above in the three-dimensional space. On the basis of the ascertained drug information, the suitable singling device  
20 is then identified and provided to the user.

## **CLAIMS**

1. A method for providing a singling device (20) of a storage and dispensing container (1) for drug portions, wherein

a) a to-be-measured drug portion of a specific drug type is provided;

b) at least one image of the drug portion is generated by a detection device (45, 46; 65, 66; 76, 77; 78, 79);

c) the at least one image is image-analytically processed, wherein specified drug information for the provided drug portion is determined, wherein this information comprises at least the dimensions of the drug portion;

d) on the basis of the ascertained drug information, a singling device (20) fitting the drug portions to be singularized is identified.

2. The method for providing a singling device (20) of a storage and dispensing container (1) according to Claim 1, characterized in that

drug information of a plurality of drug portions of the same drug type are determined by repeating steps a) through c) and on the basis of the plurality of the ascertained drug information, the fitting singling device is identified.

3. The method for providing a singling device (20) of a storage and dispensing container (1) for drug portions according to Claim 1 or 2,

characterized in that

during the image-analytical processing, the color of the drug portion is additionally determined as part of the drug information.

4. The method for providing a singling device (20) of a storage and dispensing container (1) for drug portions according to one of Claims 1 through 3,  
characterized in that  
for ascertaining a suitable singling device, an inquiry is made on the basis of the drug information in a database, in which data for a plurality of singling devices are stored.

5. The method for providing a singling device (20) of a storage and dispensing container (1) for drug portions according to Claim 4,  
characterized in that  
as long as a suitable singling device is identified in the database inquiry, an updated inventory of this singling device is determined.

6. The method for providing a singling device (20) of a storage and dispensing container (1) for drug portions according to Claim 4 or 5,  
characterized in that  
as long as no suitable singling device is identified in the database inquiry, model data for a suitable singling device are determined on the basis of the drug information.

7. The method for providing a singling device (20) of a storage and dispensing container (1) for drug portions according to one of Claims 1 through 6,  
characterized in that  
in step b), a plurality of images is generated by an imaging device, wherein the to-be-measured drug portion is rotated between the images by a specified angular step, and  
in step c), during the image-analytical processing, a 3D model of the drug portion is determined, on the basis of which the drug information is ascertained.

8. The method for providing a singling device (20) of a storage and dispensing container (1) for drug portions according to Claim 7,

characterized in that

in step b) the plurality of images are generated by an imaging device having a telecentric lens.

9. The method for providing a singling device (20) of a storage and dispensing container (1) for drug portions according to one of Claims 1 through 8,

characterized in that

the steps a) and b) are carried out by a first user and at least step d) is carried out by a second user.

10. The method for providing a singling device (20) of a storage and dispensing container (1) for drug portions according to Claim 9,

characterized in that

the data of the at least one image generated in step b) or of the drug information determined in step c) are transmitted by the first user by means of data remote transmission to the second user.

11. The method for providing a singling device (20) of a storage and dispensing container (1) for drug portions according to Claim 9 or 10,

characterized in that

e) a specified number of singling devices is made available to the first user by the second user.