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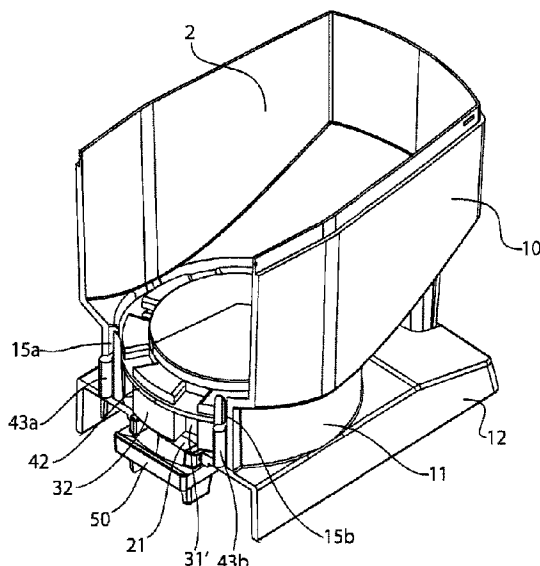
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(54) Title: RESERVOIR CONTAINER FOR A SUPPLY AND DISPENSING STATION FOR MEDICATION



(57) Abrégé/Abstract:

The present invention relates to a storage container for a storage and dispensing station for drugs. The storage container according to the related art includes a slit, through which a restraint portion of a restraint means is guided. The slit is to be adjusted to the proportions of the drugs and, furthermore, dust may discharge through said slot.

A storage container according to the present invention includes a housing (10) enclosing a receiving space (2), having a circular-cylindrical section (11) and a bottom area (20), which has a discharge opening (21), a singling device (30) situated in the circular-cylindrical portion (11) of the housing (10) having at least one duct (31), and a restraint means (40) completely situated within the housing (10, 11) enclosing the receiving space (2), which comprises a fastening portion (41) and a restraint portion (42), wherein the restraint portion (42) is kept above the discharge opening (21) and wherein the fastening portion (41) works together with at least one fastening socket (15a, 15b) within the housing (10) to fix the restraint means (40) in the housing (10, 11).

**Reservoir container for a supply and dispensing station for
medication**

ABSTRACT

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The present invention relates to a storage container for a storage and dispensing station for drugs. The storage container according to the related art includes a slit, through which a restraint portion of a restraint means is guided. The slit is to
10 be adjusted to the proportions of the drugs and, furthermore, dust may discharge through said slot.

A storage container according to the present invention includes a housing (10) enclosing a receiving space (2), having a circular-cylindrical section (11) and a bottom area (20),
15 which has a discharge opening (21), a singling device (30) situated in the circular-cylindrical portion (11) of the housing (10) having at least one duct (31), and a restraint means (40) completely situated within the housing (10, 11) enclosing the receiving space (2), which comprises a fastening portion (41)
20 and a restraint portion (42), wherein the restraint portion (42) is kept above the discharge opening (21) and wherein the fastening portion (41) works together with at least one fastening socket (15a, 15b) within the housing (10) to fix the restraint means (40) in the housing (10, 11).

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Reservoir container for a supply and dispensing station for medication

FIELD OF THE INVENTION

5 The present invention relates to a storage container for drugs and, in particular, a storage container for a storage and dispensing station for drugs.

BACKGROUND OF THE INVENTION

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

20 In order to compile the drug portions, respective storage and dispensing stations are actuated for dispensing one or a plurality of individual drug portions. When actuating a storage and dispensing station, a singling device separates an individual drug portion, which is transferred via a discharge
25 opening to a guiding device of the automatic blistering machine. Using the guiding device, a dispensed drug portion is, if applicable, by inter-positioning a collecting device, fed into a packaging device, which blister-packs individual or a plurality of drug portions according to medical specifications.

30 In order to individualize the drug portions, which are stored in a storage container of a storage and dispensing station, the singling device includes a rotor having a plurality of ducts, which conventionally are situated at the outer circumference of the rotor. The ducts are, with regard to their

dimensions, adapted to the respective drug portions to be separated in such a manner that the drug portions in a duct may be situated only above one another, however, not next to one another.

5 In order to dispense a drug portion from a duct, a duct is moved above a discharge opening in the housing of the storage container, and the drug portion disposed at the undermost location in the duct slides or drops into the discharge opening. In order to avoid that additional drug portions stored in or
10 above the duct are dispensed as well, a restraint portion of a restraint means in the area above the discharge opening is guided at least into or above the duct that is aligned with the discharge opening. This restraint portion is, in relation to the height of the duct, situated in or above said duct in such a
15 manner that only one drug portion may be disposed below the restraint portion. In case the restraint portion is guided into the duct for separating the undermost drug portion from drug portions located above it, the projections separating the individual ducts have a slot, which receives the restraint
20 portion when rotating the rotor. In case the restraint portion is guided above the ducts, the restraint portion is regularly only slightly guided above the upper end of the projections, so to avoid that additional drug portions enter the duct when dispensing the drug portion.

25 In known storage and dispensing stations, the restraint portion of the restraint means is guided from the outside through a housing slit into the storage container. Disadvantageous in this embodiment is that dust generated when operating a storage and dispensing station may exit through the
30 slit into the storage container and contaminate the automatic blistering machine.

For this reason, it is an object of the present invention to provide a storage container for a storage and dispensing station, which minimizes the contamination of the automatic

blistering machine, in which the storage and dispensing station is used.

SUMMARY OF THE INVENTION

5 In one aspect, there is provided a storage container. The storage container according to the present invention for a storage and dispensing station for drugs includes a housing enclosing a receiving space for drug portions, having a section in the shape of a circular cylinder and a bottom area, wherein
10 this bottom area has a discharge opening for receiving singularized drug portions.

 In the circular-cylindrical section of the housing, a singling device having at least one duct for receiving at least one drug portion is provided. Depending on the precise design of
15 the singling device, the duct may receive only one drug portion or a plurality of drug portions, wherein these drug portions then may only be located above one another in the duct.

 Furthermore, the storage container includes a restraint means located completely inside the housing, which encloses the
20 receiving space, having a fastening portion and a restraint portion, and the restraint portion is kept above the discharge opening and prevents additional drug portions from entering a duct aligned with the discharge opening, and wherein the fastening portion works together with at least one fastening
25 socket inside the housing for fixing the restraint means in the housing. The fastening socket may have any design, as long as it is provided that the restraint means is fixedly kept in place. The design of the fastening portion of the restraint means is also arbitrary, as long as it is provided that the restraint
30 portion itself is fixed into place in the housing. For example, the fastening portion and the restraint portion may relate to the same component of the restraint means, but may, however, have different functions.

Owing to the design and the positioning of the restraint means according to the present invention, the insertion of a slot, through which the restraint portion is guided into the housing, may be omitted. Dust generated when operating the storage and dispensing station may not reach the outside; rather, the dust, to a great extent, remains in the interior of the storage and dispensing station and may there be collected before a possible discharge to the outside.

As a function of the precise refinement of the at least one duct for receiving drug portions, the restraint portion may be situated above an upper opening of the duct aligned with the receiving space. In this case, the duct is spatially designed in such a manner that only one drug portion is able to be situated in said duct. In case the duct is designed such that a plurality of drug portions may be situated above one another, the restraint portion of the restraint means is guided into the duct aligned with the discharge opening in such a manner that the drug portions situated in the duct are separated and, namely that at least one drug portion is situated above the restraint portion and exactly one drug portion below the restraint portion. The drug portion situated below the restraint portion is dispensed via the discharge opening. Additional drug portions entering the duct is, however, prevented because only the bottom drug portion is dispensed and the restraint means prevents that additional drug portions slide through and thus prevents the entry of additional drug portions. In such an embodiment, the projections of the singling device defining the ducts have a slot, in which the restraint portion is guided.

Independent of which type of duct is used, it is always necessary to adapt the positioning of the restraint portion to above or in the duct and the design of the duct itself to the dimensions of the drug portions. In known storage and dispensing stations, this is achieved in that singling devices adapted to the drug portions (design of the duct) and housings (positioning

of the slot or restraint portion) are used. This, however, has again the disadvantage that a plurality of different restraint means, singling devices and housings are to be provided. Owing to the displacement of the restraint means completely into the housing, the storage and dispensing station according to the present invention advantageously enables that providing a plurality of housings is no longer necessary.

In order to also avoid using different restraint means adapted to the design of the at least one duct, a preferred embodiment provides that the at least one fastening portion of the restraint means works together with the fastening socket within the housing in such a manner that the restraint portion of the restraint means may be fixed in a height-adjustable manner.

In order to fix the restraint means, the fastening section of the restraint means works together with at least one fastening socket within the housing. The fastening socket may be situated at any point within the housing, and the location of the fastening socket determines the precise refinement of the restraint means and, in particular, of the fastening portion of the restraint means. In a preferred embodiment, in which the restraint means is embodied in a particularly simple manner, it is provided that the at least one fastening socket is disposed at the circular-cylindrical section of the housing. A singling device is also disposed in the circular-cylindrical section of the housing, in which ducts or above which ducts the restraint portion of the fastening means are fixed, so that this spacial arrangement of the fastening socket enables a constructionally particularly simple restraint means.

As already illustrated above, it is provided that in a preferred embodiment the restraint portion of the restraint means may be fixed in a height-adjustable manner. In order to achieve this object, it is, for example, conceivable to provide different fastening settings for the fastening socket, by which

settings the fastening portion of the restraint means may work together with the fastening socket. The different fastening settings may, for example, be realized by a catch means or the like, which, depending on the precise design of the ducts, positions the restraint portion.

A constructionally particularly simple, preferred embodiment provides that the at least one fastening socket has a cylindrical cavity and the fastening portion has at least a cylindrical guiding portion, wherein the cylindrical guiding portion is situated in the cylindrical cavity of the fastening socket, wherein the cylindrical cavity is preferably of equal depth or deeper than the length of the cylindrical guiding portion. This preferred embodiment provides the encompassing flexibility in regard to the height adjustability of the restraint means.

In order to situate or fix the restraint means in a particularly secure manner in the housing, a preferred embodiment provides that the fastening portion has a two-part design and each part works together with one fastening socket. Within this context, it is particularly advantageous that both parts of the fastening portion are situated at the outer end portions of the restraint means. The, in the broader sense, u-shaped resulting restraint means can be fixed in the housing in a particularly stable and secure manner.

As already illustrated, the restraint portion of the restraint means may cover a duct aligned with the discharge opening from above or may grip into the duct, to avoid that more than one drug portion is transferred into the discharge opening. In the first alternative it is preferred that in the at least one fastening socket a return means is situated, which pushes or pulls the restraint means in the direction of the discharge opening, i.e., pushing or pulling it from above onto the upper surface of the projections situated between the ducts. In that a pressure or tension is exerted upon the restraint means, a

height-adjustable restraint means ensures that the restraint portion does not "lift off" from the projections separating the ducts, which would result in drug portions sliding through.

5 **BRIEF DESCRIPTION OF THE DRAWINGS**

In the following, two preferred embodiments of the storage container for storage and dispensing stations according to the present invention are described in reference to the appended drawings, in which

10 Figures 1a-1d show different views of a first embodiment of the storage container;

Figures 2a-2c show different sectional views of the first embodiment;

15 Figure 3 shows an additional sectional view of the first embodiment;

Figure 4 shows a sectional view with the singling device being removed;

Figure 5 shows a detailed view of the singling device in combination with the restraint means;

20 Figure 6 shows a detailed view of the restraint means; and

Figures 7a and 7b show two sectional views of a second embodiment.

DETAILED DESCRIPTION

25 Figures 1a and 1b show two slanted views of a storage and dispensing station 1 having a first embodiment of the storage container according to the present invention. Figures 1c and 1d show top views onto the storage and dispensing station, wherein Figure 1d omits a singling device 30, which is at least implied
30 in Figures 1a-1c. In order to provide a better overview, a cover is omitted in all illustrations of the storage and dispensing station. The cover is typically part of the housing. It is, however, also conceivable that a storage container is used without a cover.

The storage container according to the first embodiment includes a housing 10 enclosing a receiving space 2 for drug portions, which in the bottom portion has a circular-cylindrical portion 11. The storage container (and the housing 10) is sealed on the bottom by a bottom area 20, which has a discharge opening 21 (see Figure 1d). The bottom area 20 has a further central reception 22, which works together with a singling device 30. As can be seen from Figure 1c, the singling device 30 is situated in the circular-cylindrical portion 11 of the housing 10 and includes a plurality of ducts 31 for receiving at least one drug portion. The ducts 31 are formed by a plurality of projections 32 forming, together with a central part 34, a rotor, which is moved by an actuator (not shown) situated in a housing section 12. The projections 32 may be designed as one piece with the central part 34; however, it is also conceivable that the projections 32 are attached to the outer circumference of central part 34 and, in this way, the ducts are built at the outer circumference of central part 34. As can particularly be seen from Figure 1b, the circular-cylindrical section 11 of the housing 10 includes two convexities 14a and 14b, in which fastening sockets 15a, 15b are formed, which are described in more detail in subsequent figures.

In the housing 12 situated below the storage container, the engine for moving the singling device 30, and additional components of the storage and dispensing station, for example, a sensor for verifying the dispensing of a drug portion, are situated. The storage container may be detached from the bottom portion of the storage and dispensing station, for example, to fill new drug portions into the storage container. In order to be able to better handle the storage and dispensing station (or, if applicable, only the storage container), a handle 13 is provided in the front area.

As it can be seen from Figure 1d, the circular-cylindrical section 11 of the housing 10 provides, in the area of

convexities 14a, 14b, two fastening sockets 15a and 15b, which extend perpendicularly cylindrically in the convexities. In the shown embodiment, the surface shell of the cylindrical fastening sockets is designed as a blind hole extending in a circular
5 manner, wherein an opening to the circular-cylindrical section 11 of the housing exists. A fastening portion 41 of a restraint means, which existence may only be guessed from Figure 1c, is fixed in these fastening sockets 15a, 15b.

In alternative embodiments it may be provided that the
10 fastening sockets are situated in other areas of the housing, for example, at the upper opening of the housing 10 or at a cover (not shown in the figures illustrated).

As can already be seen from Figure 1b, the restraint means only implied in Figure 1c does not protrude from the housing 10
15 with its circular-cylindrical section 11, i.e., is situated entirely in housing 10, 11.

Figure 2a shows a partial lateral sectional view of the storage and dispensing station having a storage container according to the first embodiment, wherein the housing 10
20 including circular-cylindrical section 11 is partially cut away and, this way, the view onto the central singling device 30 is cleared.

The singling device 30 includes a central part 34, at which outer circumference a plurality of projections 32 are provided,
25 through which positioning and design a plurality of ducts 31 are defined at the circumference of the central part 34. As can already be seen from Figure 2a, the projections 32 are each divided at the same height by a slot 33, into which a restraint portion 42 of the restraint means is guided. The fastening
30 socket 15a, into which a circular-cylindrical portion 43a of a fastening portion component 41a of the restraint means is guided, is formed in the convexity 14a at the circular-cylindrical section 11 of the housing 10. The special design of the fastening socket 15a and the circular-cylindrical guiding

portion 43a of the fastening portion provides that, given that the depth of the fastening socket and length of the circular-cylindrical guiding portion are appropriately selected, the restraint means is mounted in a height-adjustable manner, so that restraint portion 42 of the restraint means may adapt to the height of the slot 33 in the projections 32. This enables that the same restraint means may be used for a plurality of different singling devices. Owing to the special placement and fixing of the restraint means, it is furthermore not necessary to provide different storage containers for drugs having different dimensions, as inserting a slit into the housing of the storage container is no longer necessary (the location for inserting a slit in known storage containers depends on the size of the drug portions to be stored).

Figure 2b shows a further sectional view, in particular a section through the circular-cylindrical section 11 of the housing 10 and through the singling device situated in the circular-cylindrical section 11. It can be well seen from this illustration that the projections 32 are designed in such a manner that they attach at the inner circumference of the circular-cylindrical section 11, so that a defined duct 31 is formed between two projections. Furthermore, two fastening sockets 15a, 15b can be seen in this illustration, which are situated in convexities 14a, 14b of the circular-cylindrical section.

Figure 2c shows a further sectional view, wherein merely the housing 10 and a part of the circular-cylindrical section 11 are cut away, so that the precise embodiment of the singling device 30 and its positioning in the circular-cylindrical section 11 of the housing can be seen. As already described in reference to Figure 2a, the projections 32 each include a slot 33 for receiving a restraint portion 42 of the restraint means 40. The restraint means 40 is guided via two circular-cylindrically designed guiding portions 43a, 43b, which are situated at two

fastening portion components 41a, 41b, into two fastening sockets 15a, 15b in a height-adjustable manner.

Figure 3 shows a further sectional view of the storage and dispensing station 1 having a first embodiment of the storage container according to the present invention. In this embodiment, the rear section of the housing 10 with circular-cylindrical section 11 and the bottom housing portion 12, which is not part of the storage container according to the present invention, are cut away. In this illustration, the two circular-cylindrical guiding portions 43a, 43b of the two fastening portion components 41a, 41b of the guiding means are shown again. In this figure it can be seen that below the discharge opening 21, in which a drug portion is dispensed, a guide 50 is situated, via which the dispensed drug portion is, for example, fed into a guidance apparatus. Furthermore, it can be seen in Figure 3 that the restraint portion 42 of the restraint means is (temporarily) situated above duct 31' aligned with the discharge opening 21.

Figure 4 shows a further sectional view, wherein in this illustration, the singling device in the circular-cylindrical section 11 of the housing 10 is omitted, to illustrate the spatial arrangement of the restraint portion 42 of the restraint means in the circular-cylindrical section. In particular, it can be seen that the restraint portion 42 is positioned above the discharge opening 21 and, in this way, always covers or separates the ducts that are rotated above the discharge opening 21 when rotating the singling device. At the center of the bottom area 20, a reception 22 for the singling device 30 is illustrated, which is designed in such a manner that, via this reception 22, the singling device 30 is rotatable by a motor (not illustrated).

Figure 5 shows a detailed view of the interaction between the restraint means 40 and the singling device 30. As can be seen, the restraint portion 42 of the restraint means 40 is

guided in a slot 33 of the projections 32 and prevents at both ducts, which are positioned between the two guiding portions 43a, 43b in the shown illustration, that a drug portion situated in the receiving space above the singling device 30 enters into the duct section below the restraint portion 42. In this way, a sliding-through of additional drug portions is prevented.

Figure 6 shows a detailed view of the restraint means 40 having a central restraint portion 42, at which outer ends two fastening portion components 41a, 41b are situated, which each, in turn, have a circular-cylindrical guiding portion 43a, 43b, which may be guided into respective fastening sockets 15a, 15b at the circular-cylindrical section 11 of the housing.

Figures 7a and 7b show two slanted views of a storage and dispensing station having a second embodiment of the storage container according to the present invention. The second embodiment corresponds substantially with the first embodiment with the difference that the projections 32 do not have slots for guiding the restraint portion 42 of the restraint means 40, but that the restraint means 40 is guided on the upper side of the projections 32 and, in this way, the entry of another drug portion into at least duct 31', which is aligned with the discharge opening 21, is prevented. The further details in regard to the fixing or placement of the restraint means correspond with those of the first embodiment, so that here a repeated, detailed description may be omitted.

WHAT IS CLAIMED IS:

- 5 1. A storage container for a storage and dispensing station for drugs, comprising:
- A housing enclosing a receiving space for drug portions, having a circular-cylindrical section and a bottom area, wherein the bottom area has a discharge opening;
 - 10 - A singling device situated in the circular-cylindrical section of the housing having at least one duct for receiving at least one drug portion; and
 - A restraint means, situated completely inside of the housing, which encloses the receiving space, having a
 - 15 fastening portion and a restraint portion,
 - wherein the restraint portion is kept above the discharge opening and prevents additional drug portions from entering a duct aligned with the discharge opening, and
 - wherein the fastening portion works together with at least
 - 20 one fastening socket within the housing for fixing the restraint means in the housing.
2. The storage container for a storage and dispensing station according to Claim 1, characterized in that the at
- 25 least one fastening portion of the restraint means works together with the fastening socket within the housing in such a manner that the restraint portion of the restraint means may be fixed in a height-adjustable manner.
- 30 3. The storage container for a storage and dispensing station for drugs according to any one of Claims 1 and 2, characterized in that the at least one fastening socket is situated at the circular-cylindrical section of the housing.
- 35 4. The storage container for a storage and dispensing station for drugs according to any one of Claims 1 through 3, characterized in that the at least one fastening socket has a

cylindrical cavity and the fastening portion has at least one cylindrical guiding portion, which is situated in the cylindrical cavity of the fastening socket.

5 5. The storage container for a storage and dispensing station for drugs according to any one of Claims 1 through 3, characterized in that the at least one fastening socket has a cylindrical cavity and the fastening portion has at least one cylindrical guiding portion, which is situated in the
10 cylindrical cavity of the fastening socket, wherein the cylindrical cavity is deeper than the length of the cylindrical guiding portion.

 6. The storage container for a storage and dispensing
15 station for drugs according to any one of Claims 1 through 5, characterized in that the fastening portion has a two-part design and each of the fastening portion components works together with one fastening socket.

20 7. The storage container for a storage and dispensing station for drugs according to Claim 6, characterized in that the two fastening portion components of the fastening portion are situated at outer end sections of the restraint portion.

25 8. The storage container for a storage and dispensing station for drugs according to Claim 7, characterized in that the restraint means is situated in the fastening socket, which restraint means pushes in the direction of the discharge opening.

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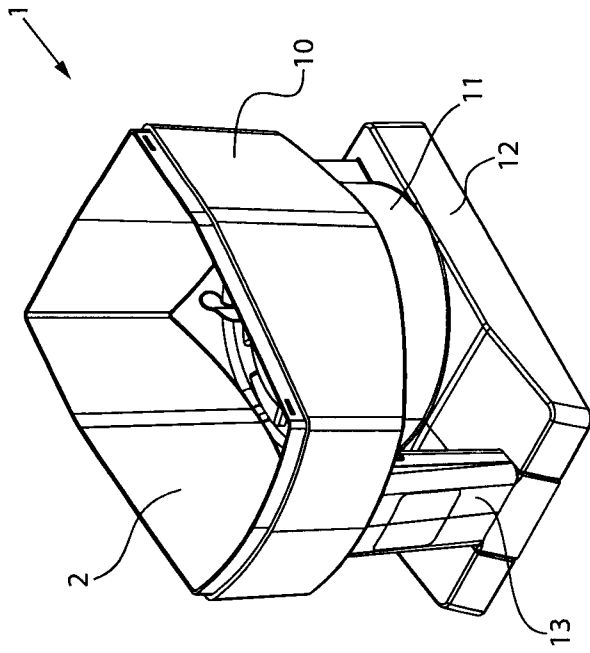


Fig. 1a

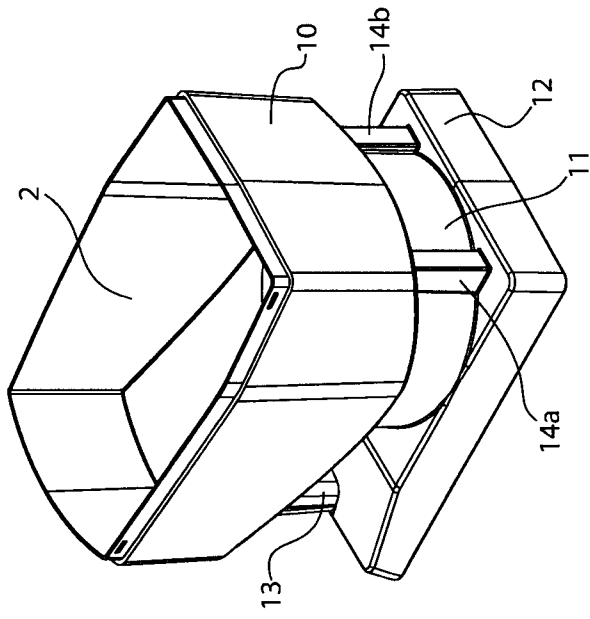


Fig. 1b

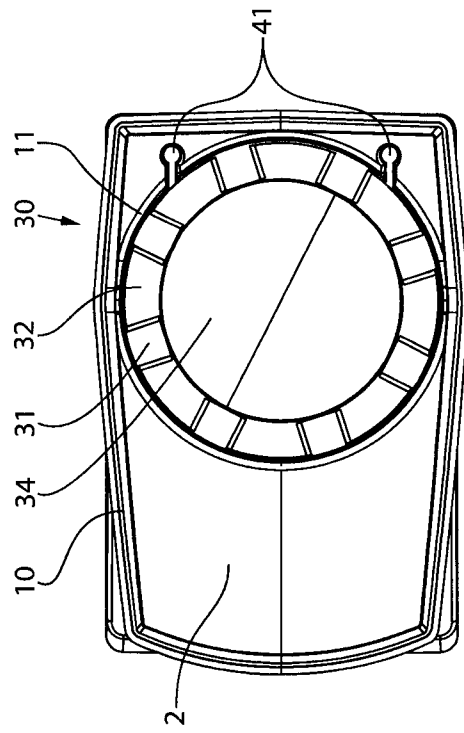


Fig. 1c

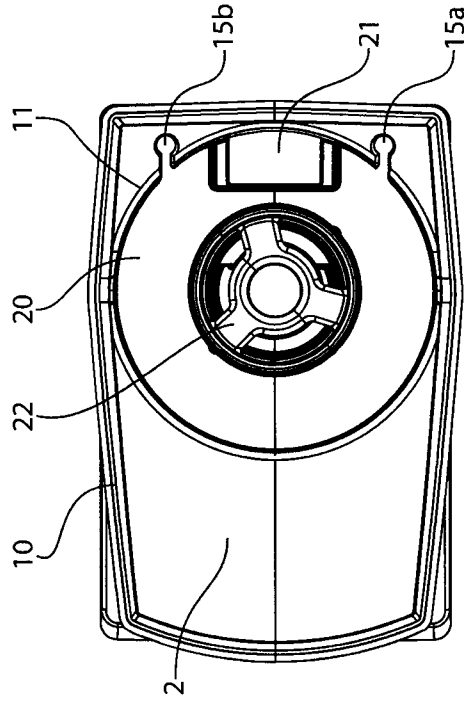


Fig. 1d

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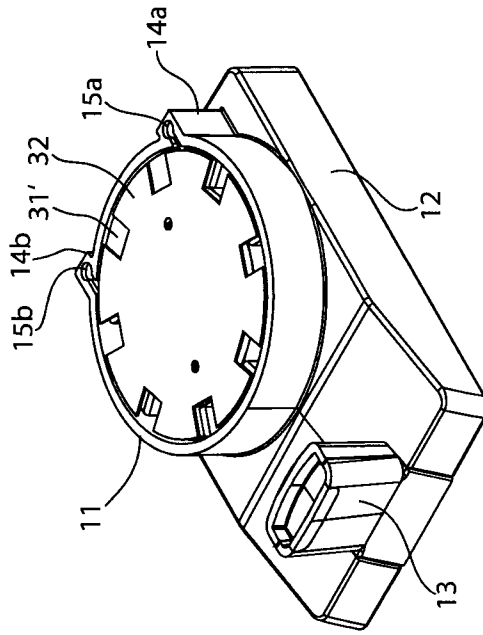


Fig. 2b

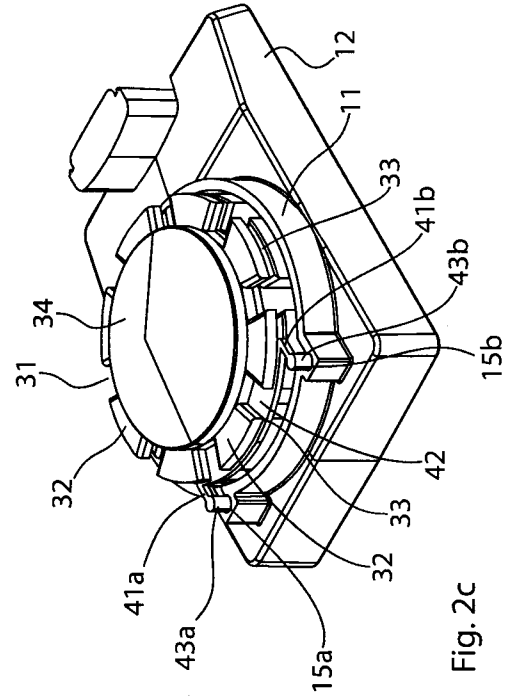


Fig. 2c

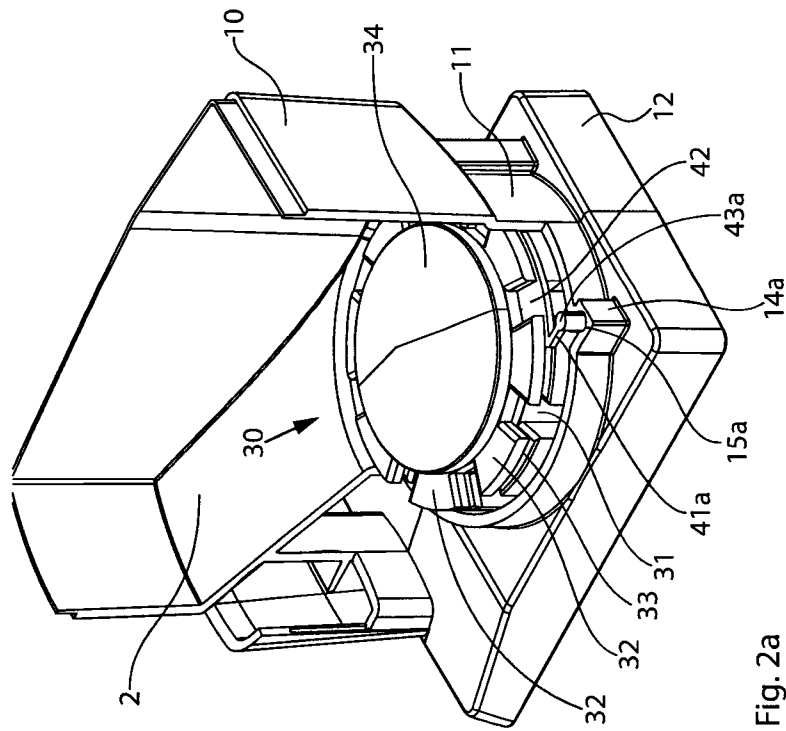


Fig. 2a

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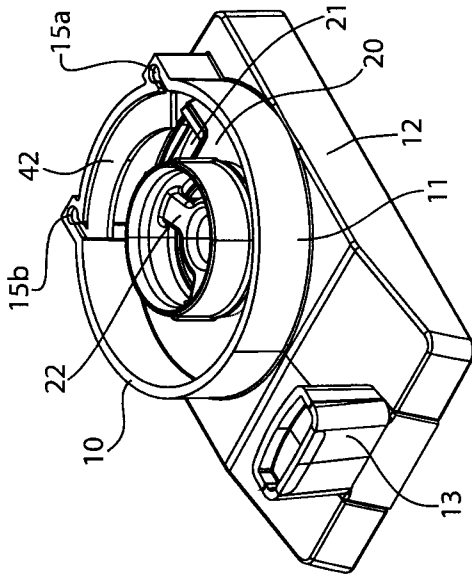


Fig. 4

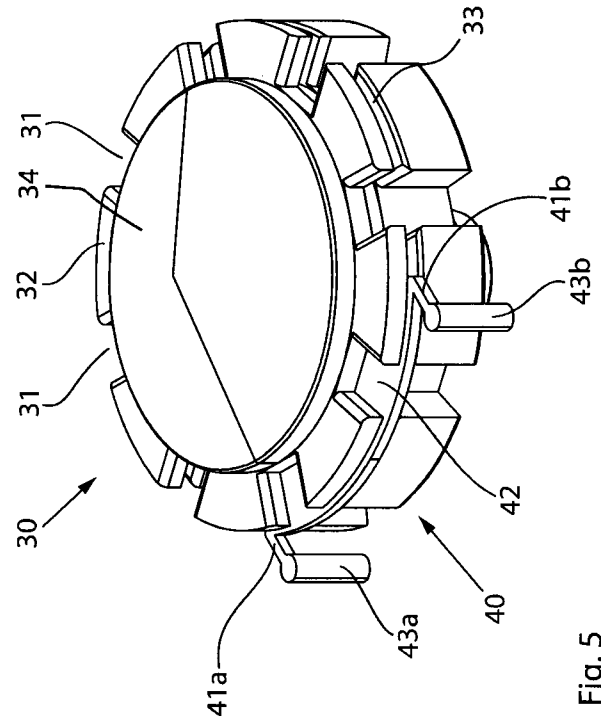


Fig. 5

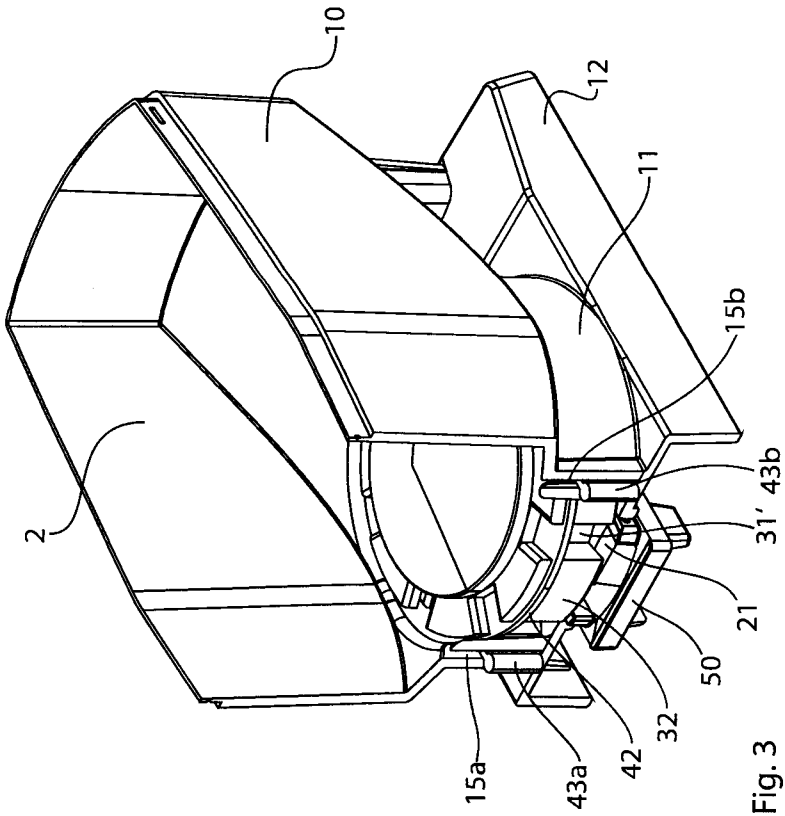


Fig. 3

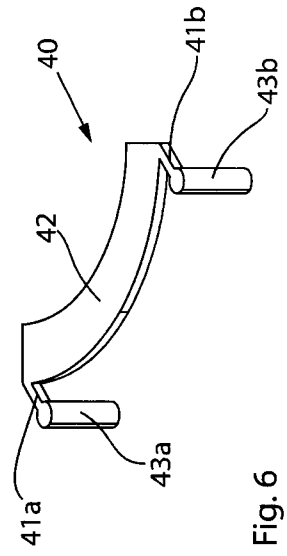


Fig. 6

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