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(54) CARTRIDGES DISPENSER

(57) A cartridge dispenser (1) is provided, which comprises a cartridge (2) comprising a casing (20) including at least one pierceable membrane (21) and containing a solid, cosmetic or health care or food product in the form of either granules, powder, or powder granules, a container (3) defining a housing (30) configured to house the casing (20) and an opening (31) configured to face the membrane (21) when the cartridge (2) is inserted in the container (3), piercing means (4) protruding from the opening (31) towards the inside of the housing (30) and configured to pierce the membrane (21) when the membrane (21) is pushed against the piercing means (4), dispensing means (5) arranged downstream of the opening (31) so that they can receive the solid product when the membrane (21) is pierced by the piercing means (4) and including a collection compartment (50) configured to contain a predetermined volume of the solid product and movable along or around a predetermined direction (5a) relative to the opening (31) so as to define at least one loading configuration, in which the collection compartment (50) communicates with the opening (31), collects the solid product and is inaccessible from the outside, and an unloading configuration, in which the collection compartment (50) does not communicate with the opening (31) and is accessible from the outside, and a block (51) integral with the collection compartment (50) and configured to completely obstruct the passage of the solid product through the opening (31) at least when the collection compartment (50) is in the unloading configuration.

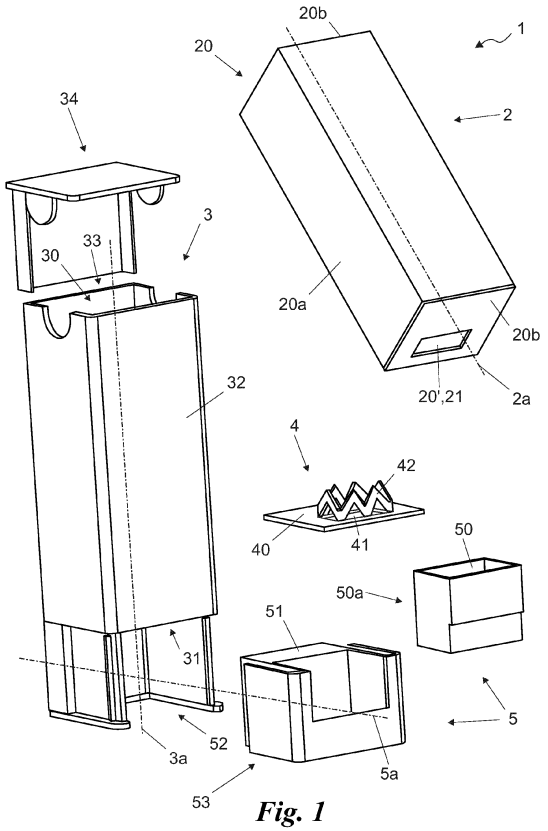

Fig. 1

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Description

[0001] The present invention relates to a cartridge dispenser of the type specified in the preamble of the first claim.

[0002] In particular, the present invention relates to a dispenser which is suitable for the storage and dispensing of solid, cosmetic or health care products, for example detergents, or even food products, in the form of either granules, powder, or powder granules and contained in cartridges.

[0003] Dispensers for cosmetic or health care products are currently known, such as, for example, common dispensers for liquid soap or other substantially fluid cosmetics. These dispensers substantially comprise a reservoir configured to allow the housing of the liquid product or of a cartridge, which in turn comprises a liquid product. Hence, the reservoir may include push mechanisms configured to push liquid out of a nozzle for use by a user.

[0004] However, these dispensers have the important drawback of being anti-ecological and of being destined to become obsolete in a short time.

[0005] In fact, the dispensers of the prior art are marketed filled with liquid and, after use, are designed to be entirely disposed of.

[0006] For this reason, for example, the increasing demand for a worldwide decrease in the manufacture and use of plastics has led to the creation of water-free cosmetics that can be transported and used without the use of synthetic packaging such as plastics and the like.

[0007] In this regard, in fact, solid cosmetic or health care products have been developed in granular form. These products are suitable for mixing with water only shortly before use and are therefore generally contained in packages, which can preferably be opened and resealed and from which the product can be removed when necessary.

[0008] The described prior art has a few major drawbacks.

[0009] In particular, once the package is opened, the product is periodically exposed to the external environment, with the obvious consequence of increasing its degradation. In addition, solid products contained in containers may be mixed with water in incorrect quantities, thereby nullifying the effectiveness of the product itself and diluting its effects.

[0010] If the containers are equipped with a measuring cup, the latter may be used to draw the solid product from the container, as is customary for common detergents; however, even in this case, the time of exposure of the product to external agents is excessive and causes the inherent properties of the product to decay.

[0011] To try to overcome these and other drawbacks, a device was created as described in patent application GB-A-1 100417.

[0012] The patent application substantially describes a soap dispenser comprising a housing for a powder soap supply, and a slide suitable to be moved from a first position, in which a measuring chamber is in communication with the supply, to a second position, in which the chamber is aligned with an outlet opening. Moreover, the device comprises spring-loaded means to return the slide from the second position to the first, and timing means to prevent the return movement before a predetermined period of time. The slide is moved by a pusher, connected to the handle, which is instantly retracted by the springs after a dispensing operation. The timing device comprises a suction cup fixed to the slide by means of a bracket and arranged, in the dispensing position, to cooperate with a second suction cup fixed to the housing. Air is admitted into a chamber between the two joined suction cups at a rate controlled by a valve. The powder soap is contained in a cartridge located inside the housing.

[0013] The device described above also has major drawbacks.

[0014] In particular, the pusher and the slide are not integral with each other and therefore the retraction of the slide does not depend on the action of the handle but solely on the action of the timing means. Due to the conformation of the device, it is not at all uncommon for it to become jammed, which reduces, if not completely disrupts, its functionality. In fact, the suction cups may have difficulty detaching and, when this happens, the device is substantially unusable.

[0015] Furthermore, the pusher and slide configuration does not allow the user to adjust or otherwise manage the instantaneous position of the slide, with the consequence that, if the user wishes to dispense a smaller quantity of product, he/she will never be able to do so since the slide is always automatically brought to the initial position. In this context, the technical task underlying the present invention is to devise a cartridge dispenser which is capable of substantially obviating at least some of the above-mentioned drawbacks.

[0016] Within the scope of said technical task, a major object of the invention is to obtain a cartridge dispenser which allows the solid product to be stored effectively in the granular form, thereby protecting its properties, and safeguarding it from the external environment.

[0017] Another major object of the invention is to create a cartridge dispenser which, while maintaining the above advantages, allows the solid product to be used in a simple and quick way.

[0018] In addition, a further object of the invention is to create a cartridge dispenser which reduces, if not completely eliminates, the possibility of jams and ensures high reliability and efficiency at all times while maintaining high structural simplicity. Thus, a further task of the invention is to create a cartridge dispenser which, while maintaining the advantages stated above, allows the user to easily withdraw a smaller quantity of solid product from the dispenser.

[0019] In conclusion, a further task of the invention is to create a cartridge dispenser which is environmentally friendly and inexpensive and therefore avoids waste.

[0020] The technical task and the specified objects are

achieved by means of a cartridge dispenser as claimed in appended claim 1.

[0021] Preferred technical solutions are set forth in the dependent claims.

[0022] The features and advantages of the invention will be apparent from the detailed description of preferred embodiments of the invention, with reference to the accompanying drawings, in which:

Fig. 1 shows an exploded view of a first embodiment of a cartridge dispenser according to the invention;

Fig. 2 shows a perspective view of the cartridge dispenser in Fig. 1 in which the dispenser components are assembled;

Fig. 3 is an exploded view of a second embodiment of a cartridge dispenser according to the invention;

Fig. 4 represents a perspective view of the cartridge dispenser in Fig. 3 in which the dispenser components are assembled and the collection compartment is in the unloading configuration, i.e., it is pressed against the opposing means, within the bottom of the first chamber;

Fig. 5 shows an exploded view of a third embodiment of a cartridge dispenser according to the invention;

Fig. 6 shows a detailed and exploded view of the chamber and cylinder of the cartridge dispenser in Fig. 5;

Fig. 7 is an exploded view of a fourth embodiment of a cartridge dispenser according to the invention;

Fig. 8 represents a perspective view of the cartridge dispenser in Fig. 7 in which the dispenser components are assembled;

Fig. 9a shows an exploded view of a fifth embodiment of a cartridge dispenser according to the invention;

Fig. 9b shows a detailed view of part of the dispensing means of the cartridge dispenser in Fig. 9a in which the screw is assembled with the cylinder;

Fig. 10a is a perspective view of an embodiment of a cartridge dispenser according to the invention in which the dispenser is a tablet dispenser;

Fig. 10b represents a detailed view of the dispensing means of the cartridge dispenser in Fig. 10a in which the dispensing means are in the loading configuration and the collection compartment is arranged close to, in particular below, the opening;

Fig. 10c shows a detailed view of the dispensing means of the cartridge dispenser in Fig. 10a in which the dispensing means are in the unloading configuration, against the opposing means, and the collection compartment is arranged close to, in particular above, the outlet;

Fig. 11 shows an exploded view of the embodiment of the cartridge dispenser in Figs. 10a-10c;

Fig. 12a is a perspective view of an embodiment of a cartridge dispenser according to the invention in which the dispenser is a toothpaste dispenser adapted to interact with a toothbrush;

Fig. 12b represents a detailed view of the dispensing means of the dispenser in **Fig. 12a** during interaction with a toothbrush;

Fig. 13a shows a detailed view of the dispensing means of the cartridge dispenser in Fig. 12a in which the dispensing means are in the loading configuration and the collection compartment is arranged close to, in particular below, the opening with the bottom plugged by the bottom barrier; and

Fig. 13a shows a detailed view of the dispensing means of the cartridge dispenser in Fig. 12a in which the dispensing means are in the unloading configuration, against the opposing means, and the collection compartment is arranged close to, in particular above, the outlet.

[0023] Herein, the measures, values, shapes, and geometric references (such as perpendicularity and parallelism), when used with words like "about" or other similar terms such as "approximately" or "substantially", are to be understood as except for measurement errors or inaccuracies due to production and/or manufacturing errors and, above all, except for a slight deviation from the value, measure, shape or geometric reference with which it is associated. For example, these terms, if associated with a value, preferably indicate a deviation of not more than 10% of said value.

[0024] Furthermore, when used, terms such as "first", "second", "upper", "lower", "main" and "secondary" do not necessarily refer to an order, a priority relationship, or a relative position, but may simply be used to distinguish different components more clearly from each other.

[0025] Unless otherwise specified, as is apparent from the following discussion, terms such as "treatment", "data processing", "determination", "calculation", or the like, are understood as referring to the action and/or processes of a computer or similar electronic computing device which manipulates and/or transforms data represented as physical, such as electronic sizes of registers of a computer system and/or memories, into other data similarly represented as physical quantities in computer systems, registers or other storage, transmission or information display devices. Unless otherwise indicated, the measurements and data provided herein are to be considered as carried out in International Standard Atmosphere ICAO (ISO 2533:1975).

[0026] With reference to the Figures, the cartridge dispenser according to the invention is indicated as a whole by the numeral 1.

[0027] The dispenser 1 is substantially suitable for dispensing solid, cosmetic or health care products, for example detergents, or even food products, e.g., powdered milk, spices, or the like, in the form of either capsules or granules, or in the form of powder or powder granules.

[0028] In particular, the solid products are preferably contained within cartridges 2. Therefore, the dispenser 1 comprises at least one cartridge 2. The cartridge 2 is substantially a closed containment element that allows

the safe storage of the product contained therein in order to prevent any decay and deterioration thereof. Preferably, therefore, the cartridge 2 comprises a casing 20.

[0029] The casing 20 contains the solid, cosmetic or health care or food product. In addition, preferably, the casing 20 is substantially closed and preferably made of recyclable material, such as cellulose or similar materials.

[0030] The cartridge 2 preferably extends predominantly along a central axis 2a.

[0031] The central axis 2a is preferably a straight trajectory along which the cartridge 2 extends predominantly with respect to the dimensions defined in planes normal to the central axis 2a.

[0032] Therefore, the casing 20 preferably comprises side walls **20a.**

[0033] The side walls 20a substantially extend around the central axis 2a. Therefore, the side walls 20a define the lateral surface of the casing 20. For example, the side walls 20a can define a cylindrical shape, or a parallelepiped with a quadrangular base.

[0034] Furthermore, the casing 20 preferably comprises faces 20b.

[0035] The faces 20b, if any, are preferably arranged at opposite ends of the casing 20 along the central axis 2a. Therefore, the faces 20b are preferably arranged at opposite ends defined by the side walls 20a so as to close the casing 20.

[0036] In any case, the casing 20 preferably comprises at least one port 20'.

[0037] The port 20' is substantially a through hole made in the casing 20 so as to allow the solid product to exit the cartridge 2 to allow its use. If the casing 20 comprises side walls 20a and faces 20b, the port 20' is preferably arranged at one of the faces 20b. Thus, one of the faces 20b comprises the port 20'.

[0038] At least when the cartridge 2 is ready for use, the casing 20 can be provided with a free port 20' through which the solid product can already exit.

[0039] Otherwise, the casing 20 may include a membrane **21.**

[0040] If present, the membrane 21 preferably occupies the port 20'. For example, the membrane 21 may be a removable element of the casing 20, for example a tab, to allow the port 20' to be freed and hence the solid product in the cartridge 2 to be released.

[0041] Otherwise, the membrane 21 may substantially be a pierceable element of the casing 20. This means that the membrane 21 may be an element which closes the casing 20 but is more yielding than the rest of the casing 20.

[0042] If the latter comprises side walls 20a and faces 20b, coherently with the position of the port 20', the membrane 21 is arranged at one of the faces 20b. Thus, one of the faces 20b comprises the membrane 21.

[0043] The membrane 21 may be an area of the face 20b defining a greater yield than the rest of the face 20b. Otherwise, the membrane 21 can be made from the same face 20b by making pre-cuts thereon. The pre-cuts can thus determine the shape of the membrane 21. They can be closed and entirely delimit the membrane 21, giving it, for example, a circular or quadrangular shape. Otherwise, the pre-cuts can be open and define curves, for example U-shaped curves, so that the membrane 21 can partially open, defining a sort of tab.

[0044] The pre-cuts, if present, are preferably discontinuous cuts, i.e., dashed, which extend along the trajectory delimiting the membrane 21.

[0045] The dispenser 1 further comprises at least one container 3.

[0046] The container 3 is preferably suitable to house the cartridge 2. Therefore, the container 3 is the part of the dispenser 1 inside which the cartridge 2 can be inserted or from which an exhausted cartridge 2 can be removed.

[0047] In this regard, the container 3 preferably defines a housing **30.**

[0048] The housing 30 is the portion of the container 3 configured to house the casing 20. Thus, the housing 30 may define a larger volume than the casing 20 or be counter-shaped to the casing 20 and therefore define a similar volume and shape, as better specified below.

[0049] The container 3 thus comprises an opening 31. The opening 31 is substantially a passage, for example defined by a through hole, made in the container 3 and communicating with the housing 30. In greater detail still, the opening 31 is preferably configured to face the port 20', in particular optionally the membrane 21, if present, when the cartridge 2 is inserted in the container 3. This means that when the cartridge 2 is inserted into the container 3, the port 20', and optionally also the membrane 21, is brought close to the opening 31.

[0050] In detail, the housing 30 also extends predominantly along a main axis **3a.**

[0051] The main axis 3a, similarly to the central axis 2a, is preferably a straight trajectory along which the housing 30 extends predominantly with respect to the dimensions defined in planes normal to the main axis 3a.

[0052] In addition, the container 3 comprises side bulkheads **32.**

[0053] The side bulkheads 32 preferably delimit the housing 30. Moreover, in particular, the side bulkheads 32 extend around the main axis 3a.

[0054] The opening 31 is arranged at one end of the housing 30, that is to say at one of the ends defined by the side bulkheads 32 along the main axis 3a.

[0055] The side bulkheads 32 can, like the side walls 20a, define a cylindrical shape, or a parallelepiped with a quadrangular base. In addition, the side bulkheads 32 may have the same shape as the side walls 20a, as already mentioned.

[0056] In particular, therefore, if the housing 30 is counter-shaped to the casing 20, when the cartridge 2 is inserted in the container 3 the axes 2a, 3a are mutually aligned. Thus, the housing 30 can define for the cartridge 2 a kind of guide through which the cartridge 2 can trans-

late along the axes 2a, 3a relative to the container 3.

[0057] Furthermore, the container 3 may also comprise an inlet **33.**

[0058] If present, the inlet 33 is arranged at one end of the housing 30 opposite the opening 31. Therefore, the inlet 33 is configured to allow the insertion of the cartridge 2 into the container 3 from the outside.

[0059] In greater detail still, the container 3 can also comprise a pusher **34.**

[0060] If present, the pusher 34 is configured to occupy the inlet 33. In addition, the pusher 34 is configured to allow a user to push the cartridge 2 towards the opening 31. The pusher 34, if present, is substantially a plug suitable to close the container 3.

[0061] The dispenser 1 can therefore also comprise piercing means **4.** The piercing means 4 are present mainly, but not exclusively, if the port 20' is occupied by the pierceable membrane 21.

[0062] The piercing means 4, if present, are substantially configured to pierce the membrane 21 when the membrane 21 is pressed, or pushed, onto the piercing means 4.

[0063] Therefore, the piercing means 4 are preferably arranged at the opening 31 or, more generally, protrude from the opening 31 towards the inside of the housing 30. Therefore, if the container 3 comprises a pusher 34, the latter is preferably configured to allow a user to push the cartridge 2, and thus the membrane 21, towards the piercing means 4.

[0064] In some preferred embodiments of the dispenser 1, for example shown in Figs. 1-4, the piercing means 4 may comprise a bottom wall **40.**

[0065] If present, the bottom wall 40 is configured to plug part of the opening 31. Therefore, the piercing means 4 may also comprise a hole **41.**

[0066] The hole 41 is preferably arranged or made in the bottom wall 40. Therefore, the hole 41 is preferably a through hole. Therefore, the hole 41 is suitable for placing the housing 30 in communication with the outside.

[0067] Advantageously, the piercing means 4 also comprise one or more sharp elements 42. The sharp elements 42, in this configuration, extend around the hole 41. In addition, the sharp elements 42 protrude towards the housing 30.

[0068] Alternatively, to the above, the piercing means 4 may also only comprise sharp elements 42, e.g., wedges or needles or other cutting elements capable of penetrating the membrane 21. In this case, the cartridge 2 can be locked at the opening 31 by the sharp elements themselves.

[0069] In general, at least in the embodiments in Figs. 1-4, the piercing means 4 are configured to block the travel of the cartridge 2 within the container 3.

[0070] In any embodiment, the dispenser 1 comprises dispensing means **5.**

[0071] The dispensing means 5 are preferably arranged downstream of the opening 31. Therefore, the dispensing means 5 are arranged externally to the housing 30 on the side of the container 3 opposite the inlet 33, if the latter is present.

[0072] Thus, the dispensing means 5 are generally suitable for receiving the solid product from the port 20', which is located at the opening 31 when the cartridge 2 is arranged in the container 3. In some embodiments, the dispensing means 5 are suitable for receiving the solid product from the membrane 21, or rather from the port 20' at least partially freed of the membrane 21, when the membrane 21 is pierced by the piercing means 4.

[0073] In addition, even more advantageously, the dispensing means 5 include at least one collection compartment **50** and a block **51.**

[0074] The collection compartment 50 is configured to contain a predetermined volume of solid product. In this regard, the collection compartment 50 can be made in different ways. For example, in fact, the collection compartment 50 can be a containment device having a bottom, or a containment device without a bottom, or still an element capable of moving, during motion, predetermined volumes of solid product, as better specified below.

[0075] In general, the collection compartment 50 is advantageously movable along or around a predetermined direction **5a** relative to the opening 31. The predetermined direction 5a may substantially be a straight axis along or around which the collection compartment 50 moves in relation to the opening 31. The movement of the collection compartment 50 in relation to the predetermined direction 5a is therefore to be understood in the broad sense, meaning that the movement can be either translational along the predetermined direction 5a or rotational around the predetermined direction 5a.

[0076] Therefore, the collection compartment 50 can define, by virtue of the movement along the predetermined direction 5a, at least one loading configuration and one unloading configuration.

[0077] In the loading configuration, the collection compartment 50 preferably communicates with the opening 31. Furthermore, the collection compartment 50, in the loading configuration, collects the solid product. This can occur, for example, by gravity by causing the solid product leaving the cartridge 2 to fall through the port 20', optionally through the pierced membrane 21, and then through the opening 31, optionally also through the hole 41. The collection compartment 50, in addition, is advantageously inaccessible from the outside when in the loading configuration. By contrast, when the collection compartment 50 is in the unloading configuration, it does not communicate with the opening 31. In addition, in this configuration, the collection compartment 50 is accessible from the outside.

[0078] Advantageously, the block 51 is integral with the collection compartment 50. Therefore, the block 51 moves together with the collection compartment 50 when the latter translates along the predetermined direction 5a.

[0079] Therefore, the block 51 is configured to completely obstruct the passage of the solid product through

the opening 31 at least when the collection compartment 50 is in the unloading configuration. This means that the block 51 acts as such against the solid product, preventing the latter from falling through the opening 31, possibly through the hole 41, so as to prevent the solid product from coming out of the casing 30.

[0080] To do this, the block 51 may be configured in detail to physically completely obstruct at least the opening 31, possibly the hole 41, when the collection compartment 50 is in the unloading configuration.

[0081] In any case, advantageously, the dispensing means 5 can be manipulated from the outside of the dispenser 1. This means that the dispensing means 5 are manually operable by a user, from the outside of the dispenser 1.

[0082] In addition, in greater detail still, the dispensing means 5 are advantageously configured to control the direct movement, from the outside, of the collection compartment 50 along or around the predetermined direction 5a in both directions. Therefore, the dispensing means 5 are configured to move, by direct handling, the collection compartment 50 from the loading configuration to the unloading configuration, and vice versa.

[0083] In this regard, therefore, the dispensing means 5 may comprise a slide, for example as in the embodiments in Figs. 1-4 and 10a-12a, or a rotary knob, as in the embodiments in Figs. 5-9b, each consisting of, or essentially including, the collection compartment 50 and the block 21.

[0084] Whichever way the dispensing means 5 are designed, they are advantageously configured so as to be able to instantly determine the position of the collection compartment 50, along or around the predetermined direction 5a, relative to the opening 31 in proportion to a manual stimulus by a user.

[0085] This means that, depending on how the user manipulates the dispensing means 5, they define a position, relative to the opening 31, that changes instantaneously in proportion to the manual stimulus or pulse.

[0086] The dispenser 1 can thus be configured, in greater detail, in different ways.

[0087] In the preferred embodiments in Figs. 1-4, wherein the piercing means 4 comprise a bottom wall 40, the predetermined direction 5a can be defined as parallel to the bottom wall 40.

[0088] in the embodiments in Figs. 10a-13b, on the other hand, there may not be piercing means 4 since it is sufficient that there is a port 20' so that, for example, the capsules of solid product can descend in an orderly manner. Therefore, more generally, the predetermined direction 5a may preferably be transversal, e.g., normal, to the main axis 3a.

[0089] In all embodiments in Figs. 1-4 and 10a-13b, the dispensing means 5 may comprise a first chamber **52.**

[0090] The first chamber 52 is also substantially a container defining a housing space. In particular, the first chamber 52 is preferably arranged adjacent to the opening 31, optionally to the bottom wall 40.

[0091] In the latter case, the first chamber 52 is preferably separated from the housing 30 by the bottom wall 40.

[0092] The dispensing means 5, preferably, also comprise a slider **53.**

[0093] The slider 53 is substantially movable along the predetermined direction 5a relative to the first chamber 52. In particular, the slider 53 is movable so that it can be inserted or extracted, at least partially, into/from the first chamber 52. In other words, the slider 53 is a sort of slide, as already described above, or drawer.

[0094] In fact, advantageously, the slider 53 comprises the collection compartment 50 and the block 51. These are positioned mutually adjacent along the predetermined direction 5a. As already mentioned, the collection compartment 50 communicates with the opening 31, optionally through the hole 41, when in the loading configuration.

[0095] Of course, if the hole 41 is present, the collection compartment 50, hole 41 and block 51 are positioned so that in the loading configuration the collection compartment 50 faces the hole 41, whereas in the unloading condition the block 51 plugs the hole 41 and the collection compartment 50 is brought towards an outlet of the first chamber 52.

[0096] In general, the collection compartment 50, opening 31 and block 51 are positioned so that in loading configuration the collection compartment 50 faces the opening 31, whereas in the unloading condition the block 51 plugs the opening 31 and the collection compartment 50 is brought towards an outlet of the first chamber 52.

[0097] Regarding these latter aspects, there are many configuration methods.

[0098] In a first embodiment, as shown in Figs. 1-2, the slider 53 may essentially be a drawer suitable for bringing, during the movement along the predetermined direction 5a, the collection compartment 50 from the inside of the first chamber 52 to the outside, and vice versa.

[0099] In this configuration, the collection compartment 50 preferably consists of a cup **50a.** The cup 50a is substantially a vessel delimited by side walls and a bottom, and whose interior is accessible through an opening opposite the bottom.

[0100] The cup 50a is preferably removably constrained to the slider 53. In particular, the cup 50a is configured to be removed from the slider 53 only when said collection compartment 50 is in the unloading configuration.

[0101] This means that, preferably, the decoupling between the cup 50a and the slider 53 is hindered, preferably by the bottom wall 40, when the slider 53 is not in the unloading configuration.

[0102] Of course, preferably, the slider 53 comprises a cavity suitable for firmly housing the cup 50a.

[0103] In a second embodiment of the dispenser 1, as shown in Figs. 3-4 and 10a-13b, the slider 53 can assume the shape of a button or a transfer trolley.

[0104] The first chamber 52 can comprise, in fact, a

first outlet **52a.**

[0105] If present, the first outlet 52a may be configured to communicate with the collection compartment 50 when the latter is in the unloading configuration. In particular, in the unloading configuration, the collection compartment 50 is accessible from the outside via the first outlet 52a. In addition, in the unloading configuration, the collection compartment 50 can unload the solid product outside the dispensing means 5, in particular outside the first chamber 52.

[0106] In detail, therefore, the first outlet 52a may correspond to a through hole made in the walls of the first chamber 52 preferably on the side opposite the opening 31, optionally opposite the bottom surface 40.

[0107] Therefore, the collection compartment 50 may comprise a simple duct delimited by side walls, but without a bottom, which is therefore suitable for receiving from the top, i.e., from the opening 31, or from the hole 41, the solid product when in the loading configuration, and for bringing the solid product towards the first outlet 52a when transported along the predetermined direction 5a to the first outlet 52a. Therefore, preferably, the opening 31, and optionally the hole 41, and the first outlet 52a are mutually offset in relation to directions parallel to the axes 2a, 3a so as to define a stroke for the slider 53 along the predetermined direction 5a along which the slider 53 moves to move the collection compartment 50 from the loading configuration to the unloading configuration, and vice versa. In this case, too, the block 51 is configured to obstruct the opening 31, optionally the hole 41, when the collection compartment 50 reaches the first outlet 52a.

[0108] To facilitate the dispensing of the solid product, the dispensing means 5 may also comprise a chute **55.**

[0109] If present, the chute 55 is arranged downstream of the first outlet 50a. This means that the chute 55 is arranged externally to the first chamber 52. Therefore, the chute 55 is configured to convey the solid product, coming out of the first chamber 52, in particular out of the collection compartment 50 of the slider 53 in the unloading configuration, along a predetermined path.

[0110] In addition, in this configuration, the dispensing means 5 may also comprise opposing means **54.**

[0111] If present, the opposing means 54 are arranged between the first chamber 52, in particular a wall thereof, and the slider 53. Furthermore, in detail, the opposing means 54 are configured to oppose the movement of the slider 53 when the collection compartment 50 changes from the loading configuration to the unloading configuration.

[0112] For example, the opposing means 54 may consist of a spring or other equivalent elastic component.

[0113] In greater detail still, in the second embodiment, the slider 53 may be partially extracted from the first chamber 52 when in the loading configuration and may therefore be pressed along the predetermined direction 5a inside the first chamber 52 in opposition to the opposing means 54, to bring the collection compartment 50 to the first outlet 52a in order to unload the solid product, optionally onto the chute 55.

[0114] The opposing means 54 could also be used in the first embodiment of the dispenser 1. In fact, the opposing means 54 could, in this embodiment, oppose the extraction of the slider 53, in this case defining a drawer, so as to automatically return the collection compartment 50 to the loading configuration.

[0115] Furthermore, the collection compartment 50 could also not include a bottom and only be adapted to push the solid product out when in the unloading configuration, in opposition to the opposing means 54.

[0116] In the embodiments in Figs. 10a-13b, the dispenser 1 defines some specific features.

[0117] In particular, preferably, the dispenser 1 in Figs. 10a-11 is substantially a tablet dispenser. Therefore, it preferably comprises a solid product in capsular form which is unloaded into the collection compartment 50 when the dispensing means 5 are in the loading configuration. In this embodiment, it is preferable that the height of the collection compartment 50, understood as the size thereof along the main axis 3a, is almost identical to, or slightly greater than, the thickness defined by the individual capsule to prevent the capsule from obstructing the passage of the slider 53 from the loading configuration to the unloading configuration.

[0118] In the embodiment in Figs. 12a-13b, on the other hand, the dispenser 1 is substantially a dispenser for toothpaste in solid form. Therefore, the dispenser is suitable for interacting with a toothbrush. This means that the user's handling of the dispensing means 5 preferably occurs by means of the toothbrush, in detail, via the bristle head portion of the toothbrush.

[0119] In this embodiment, there is a slider 53, as previously described, and a first chamber 52. The first chamber 52, therefore, defines an outlet 52a as previously described, but also includes a bottom barrier **52b.**

[0120] The first chamber 52, therefore, overall defines a bottom in which the bottom barrier 52b is substantially complementary to the outlet 52a. Therefore, in this embodiment, the collection compartment 50 is bottomless and the bottom barrier 52b is configured to plug the bottom of the collection compartment 50 only when the dispensing means 5 are in the loading configuration, that is, when the collection compartment 50 communicates with the opening 31. Thus, when the slider 53 is moved along the movement axis 5a to bring the dispensing means 5 into the unloading configuration, the bottomless collection compartment 50 moves from the bottom barrier and overlaps the outlet 52a, thereby allowing the previously loaded solid product to be unloaded.

[0121] In this embodiment, preferably, the container 3 may also comprise a compartment 37. The compartment 37 is preferably arranged adjacent to the outlet 52a and the bottom barrier 52b, preferably below them. Moreover, the compartment 37 is at least suitable for housing a toothbrush bristle head.

[0122] Therefore, the slider 53 may comprise a control

bulkhead **53a** extending transversely, preferably normally, to the movement axis 5a and extending inside the compartment 37.

[0123] In particular, the control bulkhead 53a is configured to be moved by the toothbrush head when the latter is inserted into the compartment 37. Therefore, the control bulkhead 53a is a portion of the slider 53 that allows the toothbrush head to control the slider 53 in the chamber 52 along the movement axis 5a.

[0124] Preferably, if the toothbrush is not in the compartment 37, the dispensing means 5 are in the loading configuration. In order to guarantee this, preferably, in this embodiment too, there are opposing means 5a. These can be arranged between the first chamber 52 and the slider 53, or equivalently between the compartment 33 and the control bulkhead 53a, and are configured to oppose the movement of the slider 53 when the collection compartment 50 changes from the loading to the unloading configuration, that is, when a toothbrush is inserted into the compartment 37 and pushes the control bulkhead 53a, and hence the slider 53, along the movement axis 5a, in opposition to the opposing means, so that the collection compartment 50 moves from overlapping the bottom barrier 53b to the outlet 52a. It is important to specify that the dispenser 1 in Figs. 10a-11 may also include a chamber 52 equipped with a bottom barrier 52b. In this case, the bottom barrier 52a can be useful in determining the correct thickness for housing the tablet.

[0125] In a third embodiment, as shown in Figs. 5-6, the dispensing means 5 may comprise a first chamber 52 defining a cylindrical cavity therein. In addition, the first chamber 52 may comprise the first outlet 52a misaligned, along directions parallel to the main axis 3a, relative to the opening 31, optionally the hole 41. Therefore, the first chamber 52 can contain a cylinder **56.**

[0126] The cylinder 56 is configured to rotate around the predetermined direction 5a relative to the first chamber 52 within the cylindrical cavity. Therefore, in this configuration, the predetermined direction 5a is preferably aligned with the main axis 3a.

[0127] Also, the cylinder 56 comprises at least one through slit **56a** off-centre relative to the main direction 5a. This slit 56a substantially forms the collection compartment 50. Therefore, when the cylinder 56 is rotated around the main direction 5a inside the first chamber 52, the slit 56a may alternately pass by the opening 31, optionally the hole 41, or the first outlet 52a. When the slit 56a is at the opening 31, optionally at the hole 41, the dispensing means 5 are in the loading configuration; when the slit 56a is at the first outlet 52a, the solid product can be unloaded from the dispenser 1 and the dispensing means 5 are in the unloading configuration.

[0128] In this embodiment, the block 51 is substantially formed by the rest of the cylinder 56 which, in the absence of the slit 56a, prevents the solid product from exiting through the opening 31 or the hole 41.

[0129] Of course, the first chamber 52 may comprise a radial opening allowing access to the cylinder 56 from the outside to facilitate the rotation thereof by the user. Otherwise, other mechanisms could be used which are in any case widely known in the current state of the art.

[0130] The dispenser 1 can also be made according to a fourth embodiment, shown in detail in Figs. 7-8.

[0131] in this case, the predetermined direction 5a is aligned with the main axis 3a. In addition, the collection compartment 50 is not only configured to move along the predetermined direction 5a, but also to move around it.

[0132] In detail, furthermore, the piercing means 4 are in one piece with the dispensing means 5. The container 3, instead, comprises a partition wall **35.**

[0133] The partition wall 35 is substantially comparable to the bottom wall 40. In fact, the partition wall 35 is arranged at the opening 31 so that it plugs it, at least partially. Thus, the partition wall 35 also comprises a slot **35a.**

[0134] The slot 35a is substantially a hole or a through slit through which the dispensing means 5 communicate with the opening 31.

[0135] In greater detail still, the container 3 also comprises a second chamber **36.**

[0136] The second chamber 36 is similar to the first chamber 52. In fact, the second chamber 36 is arranged adjacent to the partition wall 35. In addition, the second chamber 36 is separated from the housing 30 by the partition wall 35.

[0137] The second chamber 36 thus comprises a second outlet **36a.**

[0138] Similar to the first outlet 52a, the second outlet 36a is also configured to make the second chamber 36 accessible from the outside.

[0139] Advantageously, in this embodiment, the dispensing means 5 comprise a screw 57. The screw 57 preferably extends along the predetermined direction 5a. It is loosely connected to the second chamber 36 so that it can be rotated around the predetermined direction 5a relative to the housing 30.

[0140] In addition, the screw 57 extends from the second chamber 36 to the housing 30. Therefore, the screw 57 is able to interact with at least part of the cartridge 2.

[0141] In this respect, the screw 57 comprises at least one punch **57a.**

[0142] The punch 57a is arranged at one end of the screw 57, in particular at an end located in the housing 30.

[0143] In addition, the punch 57a substantially corresponds to a sharp part of the screw, i.e., capable of penetrating yielding elements, in particular preferably the membrane 21. Therefore, the punch 57a substantially forms the piercing means 4.

[0144] In this case, when the cartridge 2 is inserted into the housing 30, it is pushed towards the punch 57a so that the membrane 21 can be pierced and part of the screw 57 inserted into the casing 20, i.e., in contact with the solid product.

[0145] The screw 57, therefore, preferably comprises a helical barrier **57b.**

[0146] The helical barrier 57a extends around the predetermined direction 5a. Moreover, the helical barrier 57b

forms the block 51 as it hinders the movement of the solid product parallel to the predetermined direction 5a.

[0147] In addition, the helical barrier 57b defines a collection compartment 50 for each complete revolution around the predetermined direction 5a. In other words, the spaces between the various stretches of helical barrier 57b define the collection compartments 50.

[0148] In order for the screw 57 to interact efficiently with the solid product, the slot 35a is preferably countershaped to the helical barrier 57b, i.e., it defines an extent in a plane normal to the predetermined direction 5a approximately equal to the extent of the helical barrier 57b in the same plane.

[0149] In conclusion, the dispensing means 5 in the embodiment in Figs. 7-8, preferably also comprise a flywheel **58.**

[0150] The flywheel 58 is substantially a control element. Therefore, it is accessible from the outside. The flywheel 58 is therefore integral with the screw 57 so that a user can rotate, on command, the screw 57 around the predetermined direction 5a, in particular in proportion to the rotation imparted on the flywheel 58.

[0151] In conclusion, the dispenser 1 can be made according to a fifth embodiment, shown in detail in Figs. 9a-9b.

[0152] Basically, the dispenser 1 combines the teachings according to the third and fourth embodiments.

[0153] Therefore, the dispensing means 5 according to the fifth embodiment define two dispensing stages. The first dispensing stage, immediately adjacent to the opening 31, is made like the dispensing means according to the fourth embodiment. Therefore, there is a second chamber 36 separated from the housing 30 by a partition wall 35 comprising a slot 35a substantially defining, or overlapping with, the opening 31. In any case, the slot 35a communicates with the opening 31 in order to receive, preferably by gravity, the solid product from the cartridge 2 located in the chamber 30.

[0154] There is also a screw 56 comprising a helical barrier 57b and a punch 57a forming the piercing means 4.

[0155] In contrast with the embodiment in Figs. 7- 8, in the fifth embodiment in Figs. 9a-9b, the second outlet 36a is arranged on one side of the second chamber 36 opposite the slot 35a. In addition, the remainder of the side on which the second outlet 36a lies defines a collection wall **36b.**

[0156] The collection wall 36b is substantially arranged below the slot 35a, and complementary thereto, so as to collect the solid product guided out of the slot 35a by the screw 57 rotating around the movement axis 5a.

[0157] In the fifth embodiment, the flywheel 58 is determined by a component of the second stage of the dispensing means 5. The second stage, adjacent to the first stage, substantially corresponds to the third embodiment. There is therefore a first chamber 52, equipped with a first outlet 52a, inside which a cylinder 56, equipped with a slit 56a, can rotate around the movement axis 5a.

[0158] Therefore, the flywheel 58 consists of the cylinder 56. This means that the screw 57 and the cylinder 56 are integral with each other.

[0159] In addition, the first chamber 52 and the second chamber 36 communicate via the second outlet 36b and are instead separated along the main axis 3a by the collection wall 36b.

[0160] In addition to the above, in the fifth embodiment as shown in Figs. 9a-9b, there is a vane **57c.**

[0161] The vane 57c is substantially integral with the screw 57. Therefore, the vane 57c rotates integrally with the screw 57, and therefore also with the cylinder 56, around the movement axis 5a relative to the second chamber 36, in detail relative to the collection wall 36b.

[0162] In greater detail still, the vane 57c extends radially from the movement axis 5a to the walls of the second chamber 36 so that, when rotated, the vane 57c can make a pass along the entire radius defined around the movement axis 5a of the second chamber 57. The effect of the vane 57c is therefore to move the solid product deposited on the collection wall 36b by the screw 57, in particular thanks to the helical barrier 57b, towards the second outlet 36a so as to allow the solid product to exit. Thus, when the slit 56a passes by the second outlet 36a, the solid product can enter it and, when the slit 56a, in turn, passes by the first outlet 52a of the second stage of the dispensing means 5, the solid product can be dispensed by the dispenser 1. In order to make the dispensing more efficient, the first outlet 52a and the second outlet 36a can be aligned parallel to the main axis 3a, and therefore also to the movement axis 5a. In addition, the vane 57c can be arranged close to the slit 56a so that the solid product is immediately pushed into the slit 56a when the vane 57a encounters the second outlet 36a.

[0163] The operation of the cartridge dispenser 1, previously described in structural terms, is as follows.

[0164] Basically, once the cartridge 2 is inserted into the container 3, the membrane 21 is pierced by the piercing means 4 so that a passage opens in the casing 20 through which the solid product can exit the cartridge 2.

[0165] The solid product is then dispensed by the dispenser 1 in a controlled manner through the dispensing means 5 which, in any embodiment, allow a predetermined volume of solid product to be dispensed according to the actuation imposed by the user.

[0166] The conformation of the dispensing means 5, in any of the embodiments described, always allows the user to manipulate the dispensing means 5 directly. Indeed, even when the opposing means 54 are present, the user acts directly, making the opposing means 54 react directly to his/her own pressure, on the collection compartment 50, always being able to define the position of the collection compartment 50 instantaneously according to the pressure of the finger, or of the toothbrush, applied to the slider 53, which defines a button, or to the control barrier 53a, which defines a wall of the compartment 37.

[0167] When the opposing means 54 are not present,

it is always the user himself/herself who directly causes the movement of the collection compartment 50 along or around the movement axis 5a.

[0168] The cartridge dispenser 1 according to the invention achieves important advantages.

[0169] In fact, the cartridge dispenser 1 allows the solid product to be stored effectively in the granular form, thereby protecting the intrinsic properties thereof and safeguarding it from the external environment.

[0170] In addition, the cartridge dispenser 1 allows the solid product to be used in a simple and quick way while maintaining the above advantages.

[0171] Furthermore, the cartridge dispenser 1 drastically reduces the possibility of jams and ensures high reliability and efficiency at all times, while maintaining high structural simplicity.

[0172] Thus, the cartridge dispenser 1, while maintaining the advantages stated above, allows the user to easily withdraw a smaller quantity of solid product from the dispenser 1.

[0173] In conclusion, the cartridge dispenser 1 is environmentally friendly and inexpensive, and therefore avoids waste.

[0174] The invention is susceptible of variations falling within the scope of the inventive concept as defined by the claims.

[0175] In this context, all details can be replaced by equivalent elements, and the materials, shapes, and dimensions may be any materials, shapes, and dimensions.

Claims

1. A cartridge dispenser (1) comprising:

- a cartridge (2) comprising a casing (20) including at least one port (20') and containing a solid, cosmetic or health care or food product in the form of either granules, powder, or powder granules;
- a container (3) defining a housing (30) configured to house said casing (20) and an opening (31) configured to face said port (20') when said cartridge (2) is inserted in said container (3);
- dispensing means (5) arranged downstream of said opening (31) so that they can receive said solid product from said port (20') and including:

  - a collection compartment (50) configured to contain a predetermined volume of said solid product and movable along or around a predetermined direction (5a) relative to said opening (31) so as to define at least one loading configuration, in which said collection compartment (50) communicates with said opening (31), collects said solid product and is inaccessible from the outside, and an unloading configuration, in which said collection compartment (50) does not communicate with said opening (31) and is accessible from the outside, and
  - a block (51) integral with said collection compartment (50) and configured to completely obstruct the passage of said solid product through said opening (31) at least when said collection compartment (50) is in the unloading configuration;

and **characterised in that**

- said dispensing means (5) can be manipulated from the outside of said dispenser (1) and are configured to control the direct movement, from the outside, of said collection compartment (50) along or around said predetermined direction (5a) in both directions, hence to move said collection compartment (50) from said loading configuration to said unloading configuration, and vice versa, so as to be able to instantly determine the position of said collection compartment (50), along or around said predetermined direction (5a), relative to said opening (31) in proportion to a manual stimulus by a user.

2. The dispenser (1) according to claim 1, wherein said casing (20) includes at least one pierceable membrane (21) occupying said port (20'); said dispenser (1) further comprises piercing means (4) protruding from said opening (31) towards the inside of said housing (30) and configured to pierce said membrane (21) when said membrane (21) is pushed against said piercing means (4); and said dispensing means (5) receive said solid product when said membrane (21) is pierced by said piercing means (4).

3. The dispenser (1) according to any one of the preceding claims, wherein said cartridge (2) extends predominantly along a central axis (2a), and said casing (20) comprises side walls (20a) extending around said central axis (2a) and faces (20b) arranged at opposite ends of said casing (20), along said central axis (2a), and wherein one of said faces (20b) comprises said port (20').

4. The dispenser (1) according to any one of the preceding claims, wherein said housing (30) extends predominantly along a main axis (3a), said container (3) comprises side bulkheads (32) delimiting said housing (30) and extending around said main axis (3a), and wherein said opening (31) is arranged at one end of said housing (30), and said container (3) further comprises an inlet (33) arranged at one end of said housing (30), opposite said opening (31), and

configured to allow the insertion of said cartridge (2) into said container (3).

5. The dispenser (1) according to claims 3-4, wherein said axes (2a, 3a) are mutually aligned when said cartridge (2) is inserted in said container (3), and said housing (30) is counter-shaped to said casing (20) so as to define a guide through which said cartridge (2) can translate along said axes (2a, 3a).

6. The dispenser (1) according to claim 2 and any one of claims 4-5, wherein said container (3) comprises a pusher (34) configured to occupy said inlet (33) and allow a user to push said cartridge (2) towards said piercing means (4) through said pusher (34).

7. The dispenser (1) according to any one of claims 2-6, wherein said piercing means (4) comprise at least one bottom wall (40) configured to plug part of said opening (31), a through hole (41) arranged on said bottom wall (40), and one or more sharp elements (42) extending around said hole (41) and protruding towards said housing (30).

8. The dispenser (1) according to any one of the preceding claims, wherein said predetermined direction (5a) is transversal to said main axis (3a), and said dispensing means (5) comprise a first chamber (52) arranged adjacent to said opening (31), and a slider (53) movable along said predetermined direction (5a) relative to said first chamber (52) so that it can be inserted or extracted, at least partially, into/from said first chamber (52) and comprising said collection compartment (50) and said block (51) located adjacent to each other along said predetermined direction (5a), said collection compartment (50) communicating with said opening (31) through said opening (31) when in the loading configuration.

9. The dispenser (1) according to the preceding claim, wherein said dispensing means (5) comprise opposing means (54) arranged between said first chamber (52) and said slider (53) and configured to oppose the movement of said slider (53) when said collection compartment (50) changes from said loading configuration to said unloading configuration.

10. The dispenser (1) according to any one of claims 8-9, wherein said first chamber (52) comprises a first outlet (52a) configured to communicate with said collection compartment (50) in said unloading configuration, so that said collection compartment (50) is accessible from the outside via said first outlet (52a) and can unload said solid product outside said dispensing means (5).

11. The dispenser (1) according to the preceding claim, wherein said dispensing means (5) further comprise a chute (55) arranged downstream of said first outlet (52a) and configured to convey said solid product along a predetermined path.

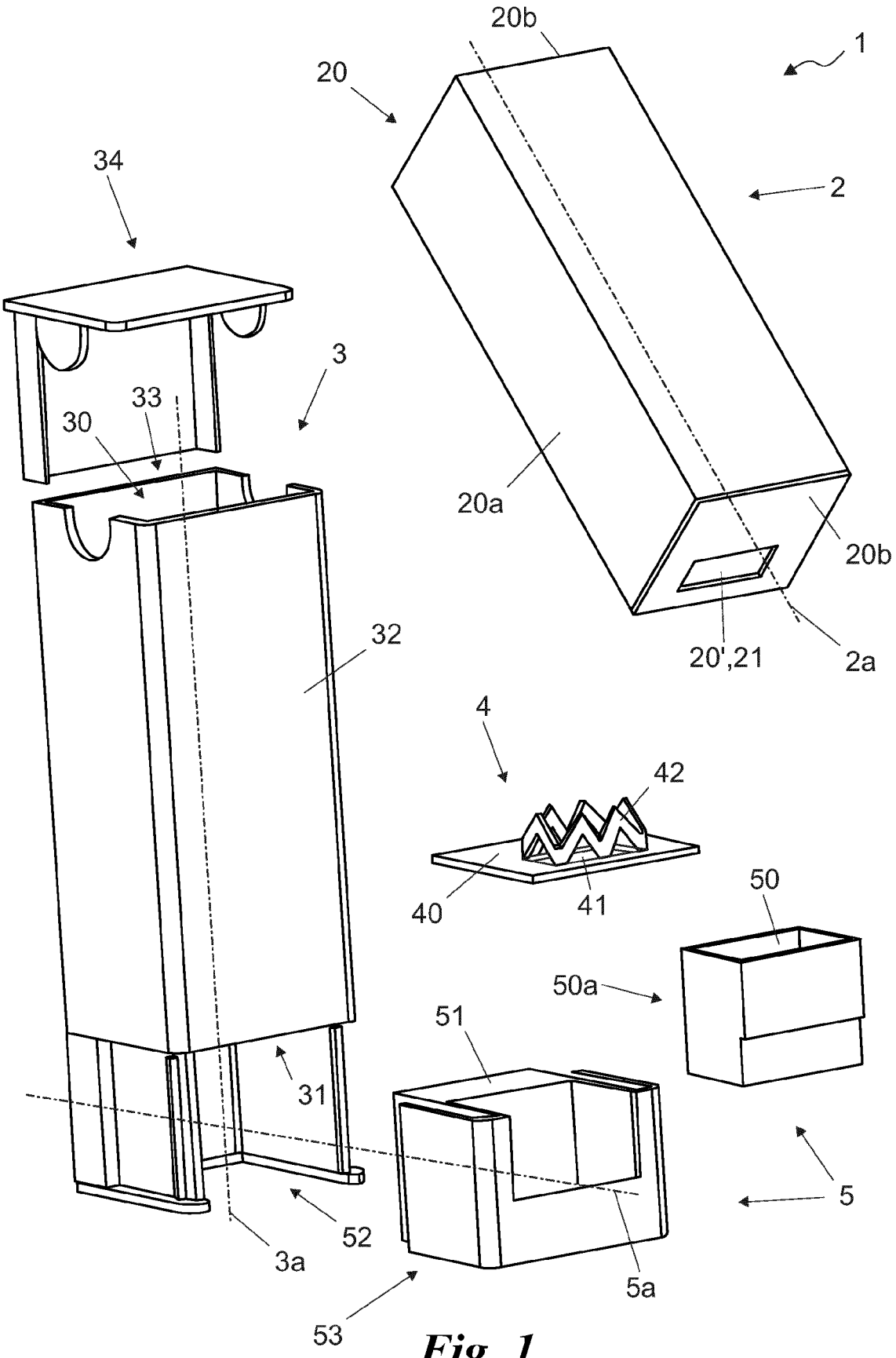
12. The dispenser (1) according to claim 7 and any one of claims 1-6, wherein said predetermined direction (5a) is aligned with said main axis (3a), said dispensing means (5) comprise a first chamber (52) arranged adjacent to said bottom wall (40), separated from said housing (30) by said bottom wall (40), defining a cylindrical cavity therein and including:

- a first outlet (52a) configured to communicate with said collection compartment (50) in said unloading configuration, so that said collection compartment (50) is accessible from the outside via said first outlet (52a) and can unload said solid product outside said dispensing means (5), and
- a cylinder (56) configured to rotate around said predetermined direction (5a) relative to said first chamber (52) within said cylindrical cavity and including a through slit (56a) off-centre relative to said main direction (5a) and forming said collection compartment (50).

13. The dispenser (1) according to claim 7 and any one of claims 1-6 and 12, wherein said predetermined direction (5a) is aligned with said main axis (3a), said piercing means (4) are in one piece with said dispensing means (5), and said container (3) comprises a partition wall (35) including a slot (35a) through which said dispensing means (5) communicate with said opening (31).

14. The dispenser (1) according to the preceding claim, wherein said container (3) comprises a second chamber (36) arranged adjacent to said partition wall (35) and separated from said housing (30) by said partition wall (35) and including a second outlet (36a) configured to make said second chamber (36) accessible from the outside, and said dispensing means (5) comprise a screw (56) extending along said predetermined direction (5a) from said second chamber (36) to said housing (30) and loosely connected to said second chamber (36) so that it can be rotated around said predetermined direction (5a) relative to said housing (30).

15. The dispenser (1) according to the preceding claim, wherein said screw (56) comprises an end punch (56a) forming said piercing means (4), and a helical barrier (56b) forming said block (51) and defining, for each complete revolution of said helical barrier (56b) around said predetermined direction (5a), said collection compartment (50), and wherein said slot (35a) is counter-shaped to said helical barrier (56b).


20b
1
20
34
2
3
33
30
20a
20b
32
20',21
2a
4
42
40
41
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50a
51
31
5
52
3a
5a
53

Fig. 1

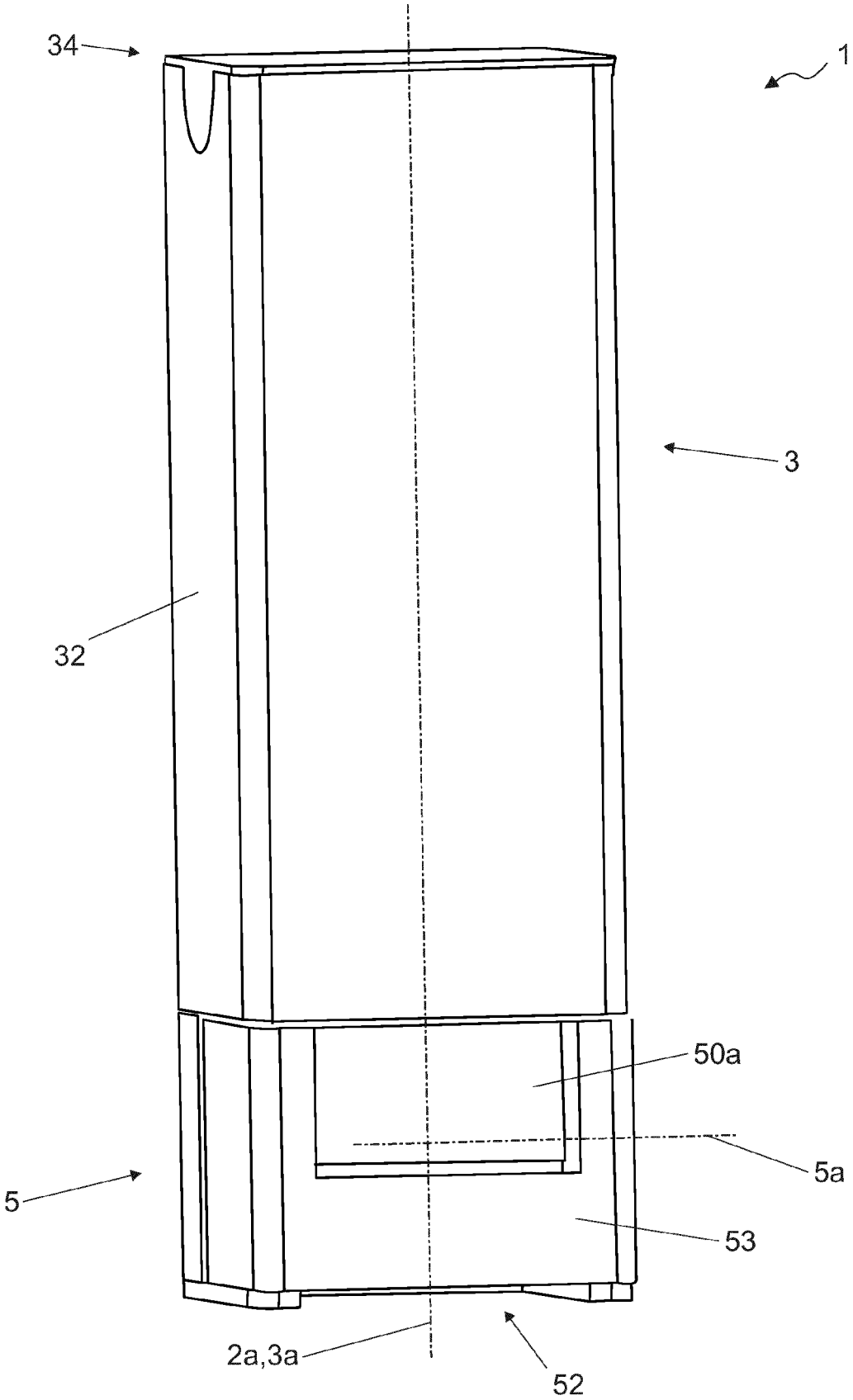


Fig. 2

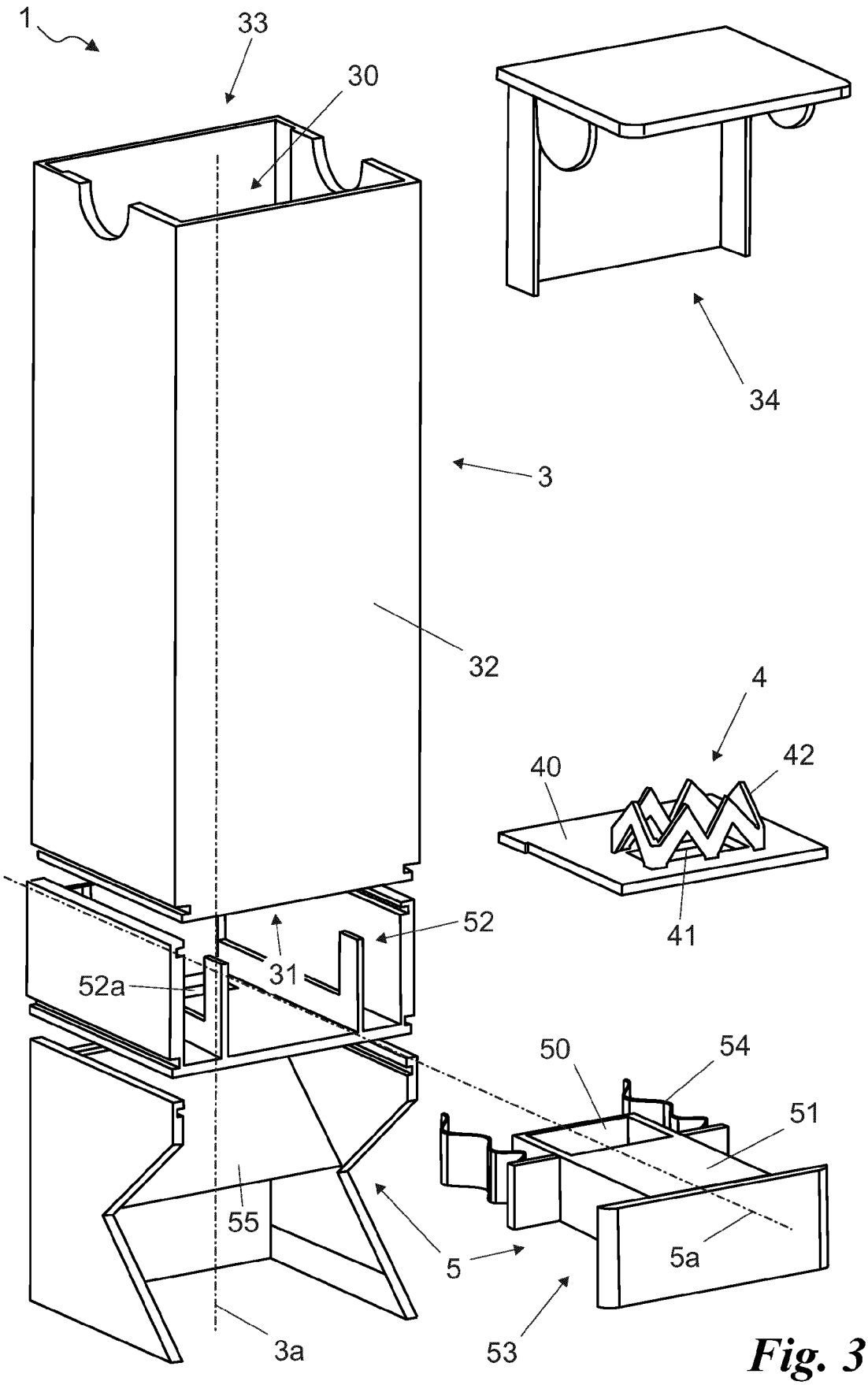


Fig. 3

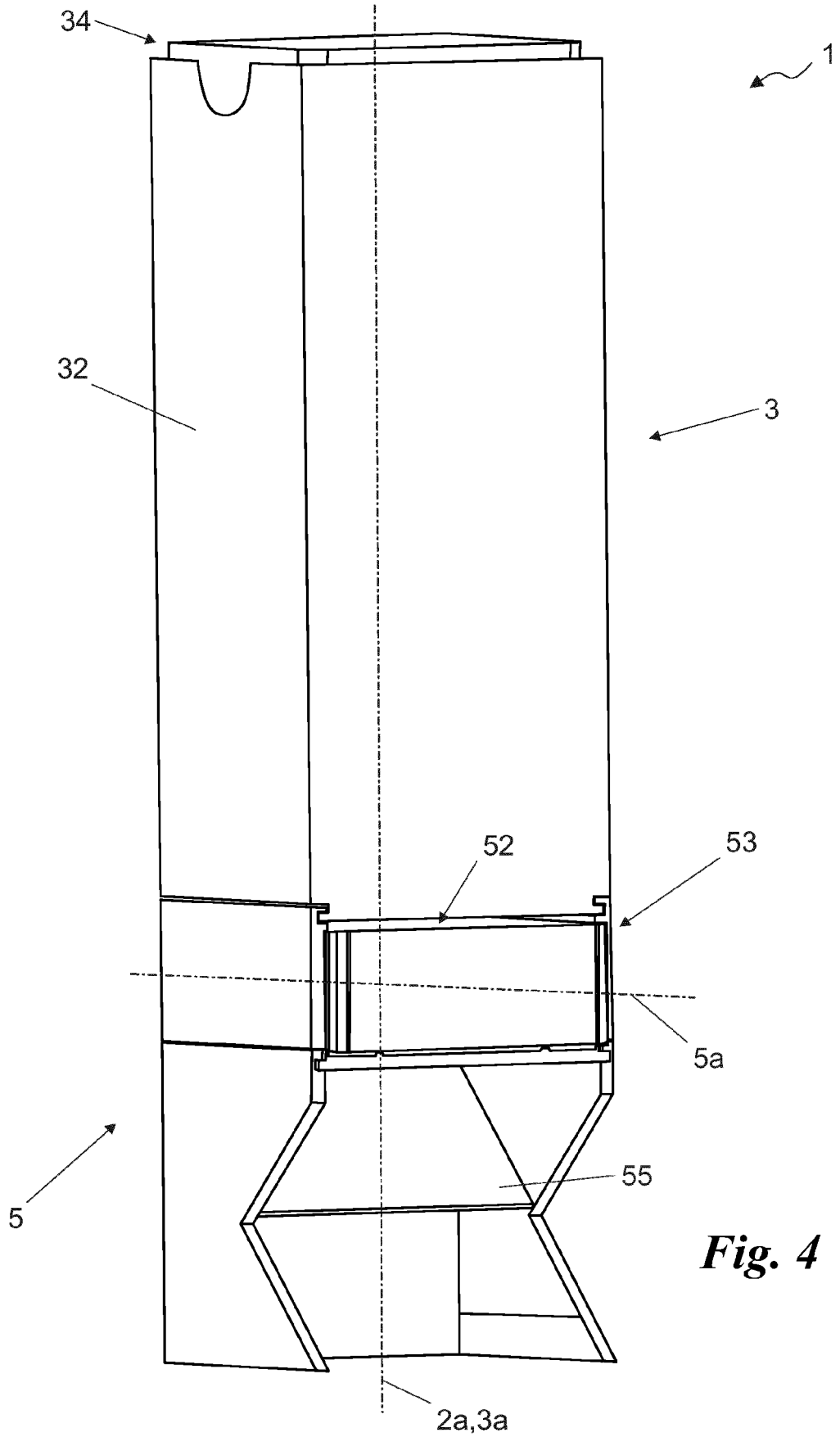


Fig. 4

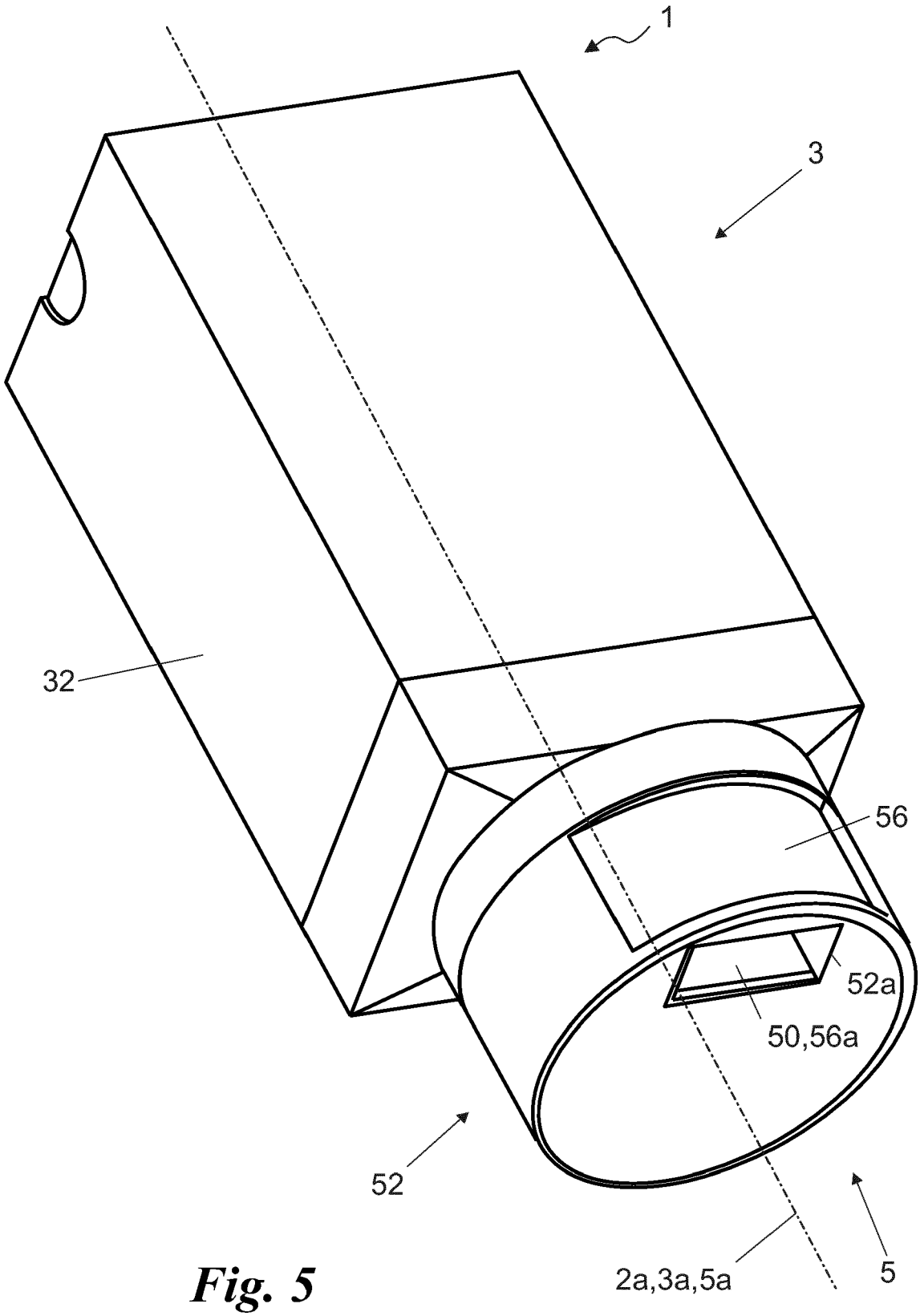


Fig. 5

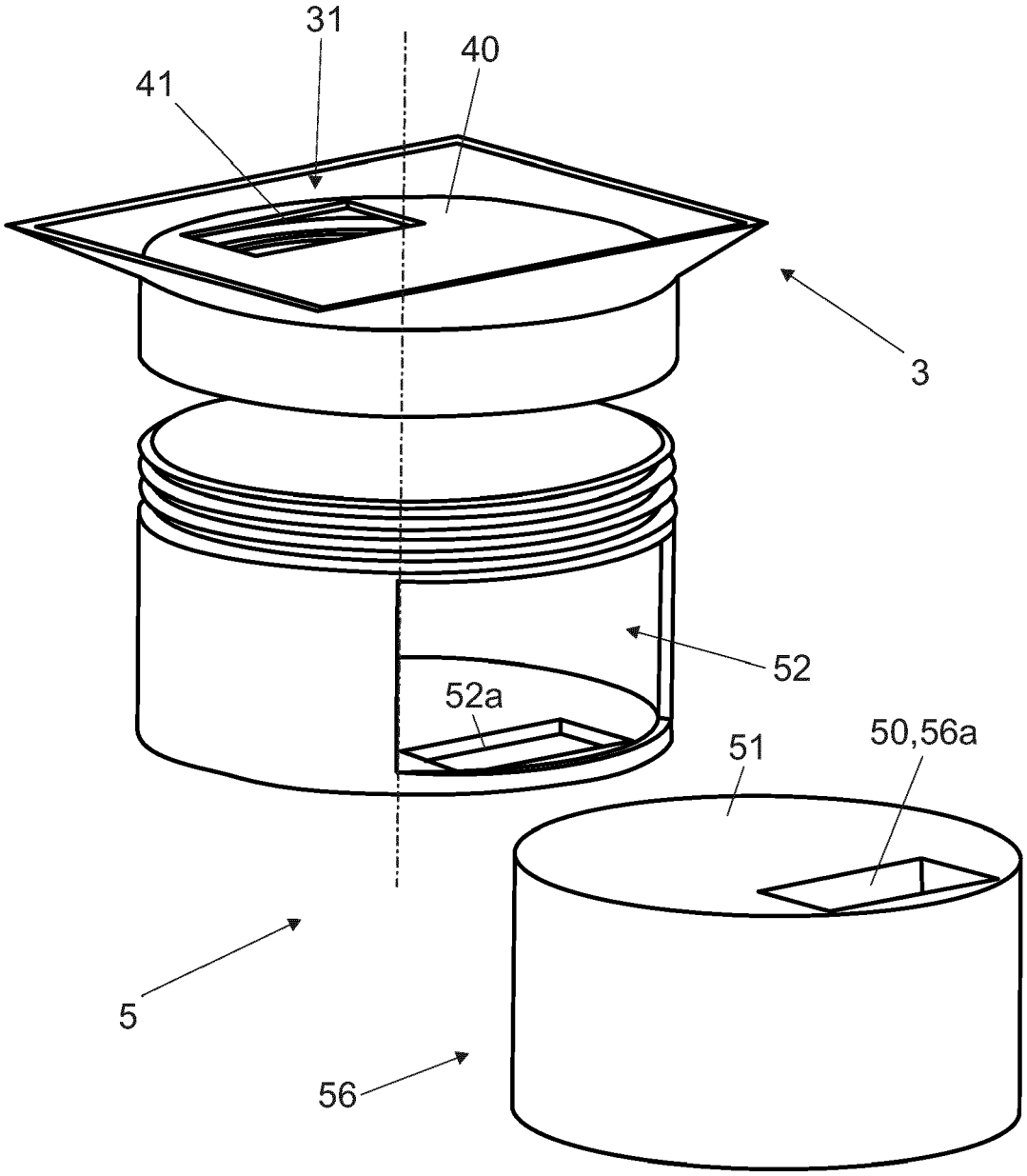
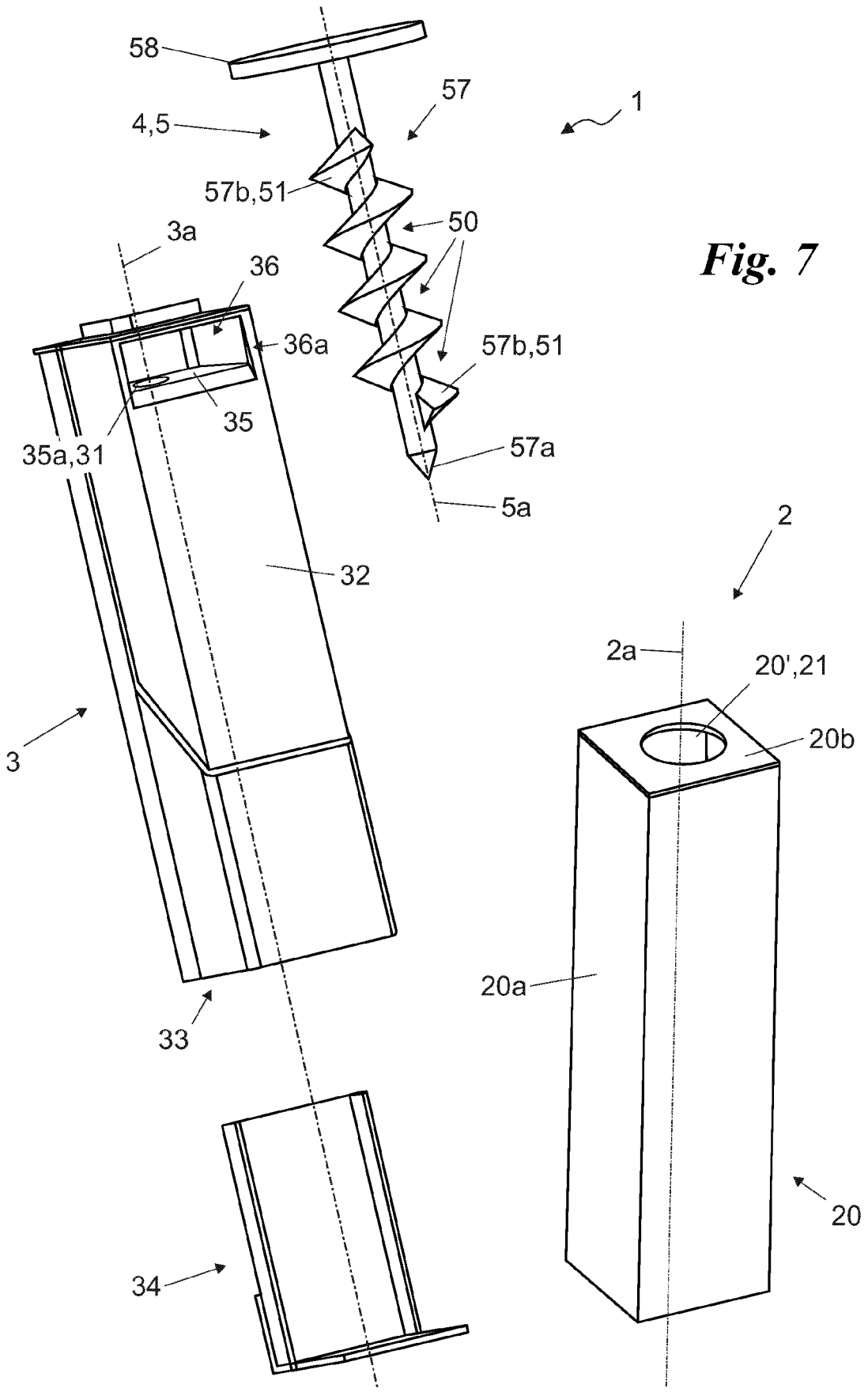


Fig. 6


58
57
1
4,5
57b,51
50
3a
36
36a
57b,51
35
35a,31
57a
5a
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32
2a
20',21
20b
3
20a
33
20
34

Fig. 7

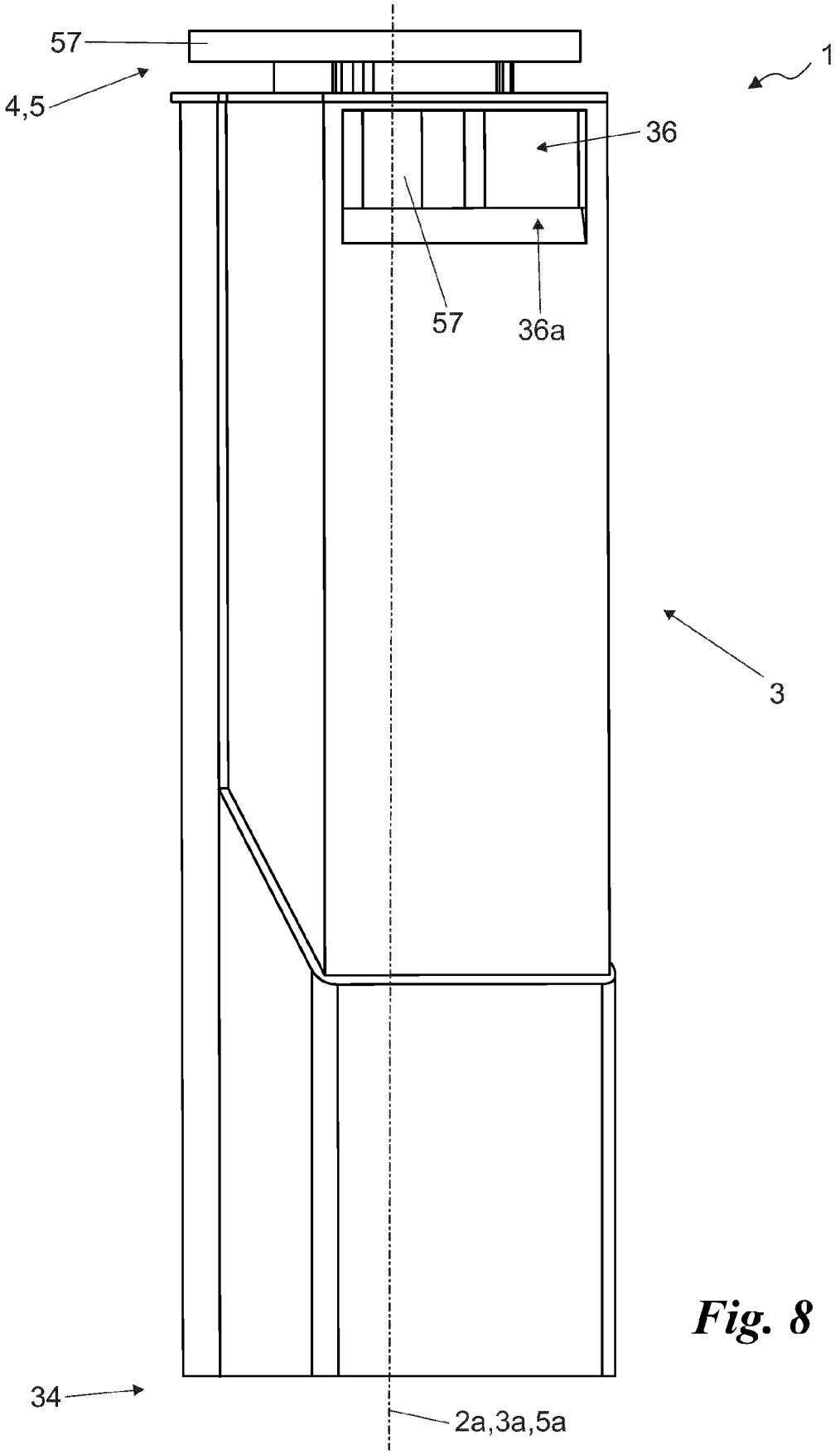

Fig. 8

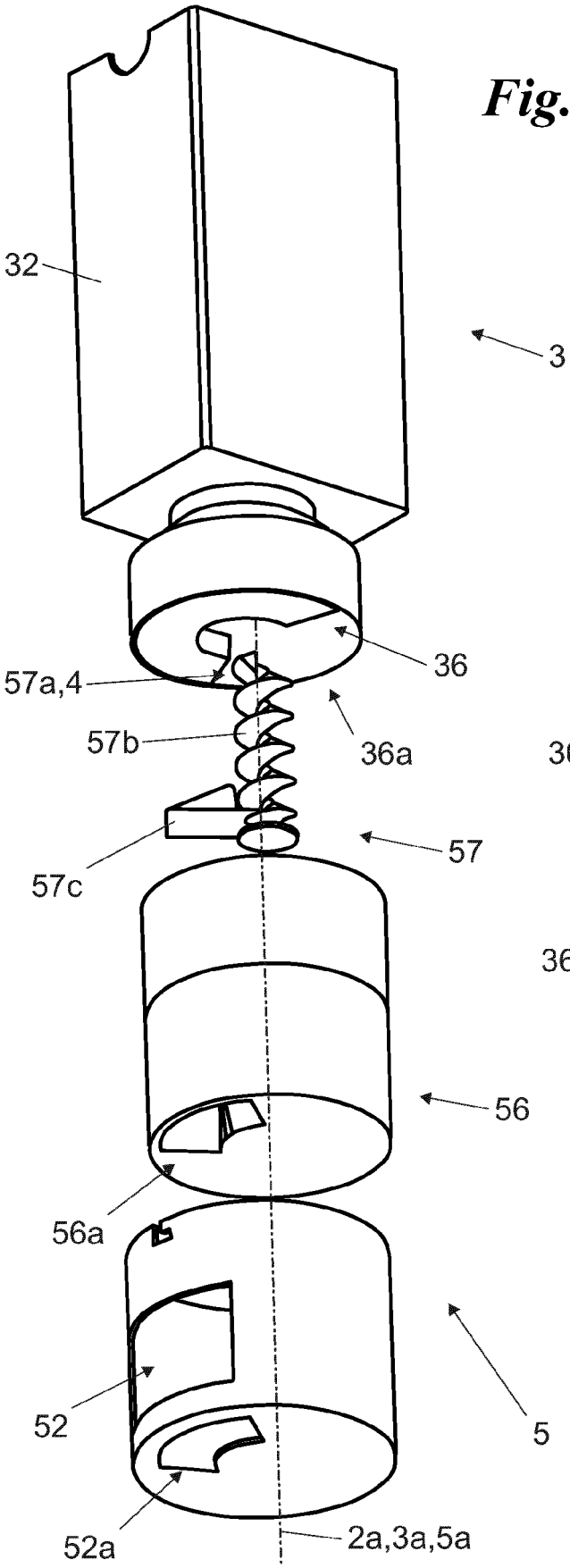
32
3
57a,4
36
57b
36a
57
57c
56
56a
52
52a
5
2a,3a,5a

Fig. 9a

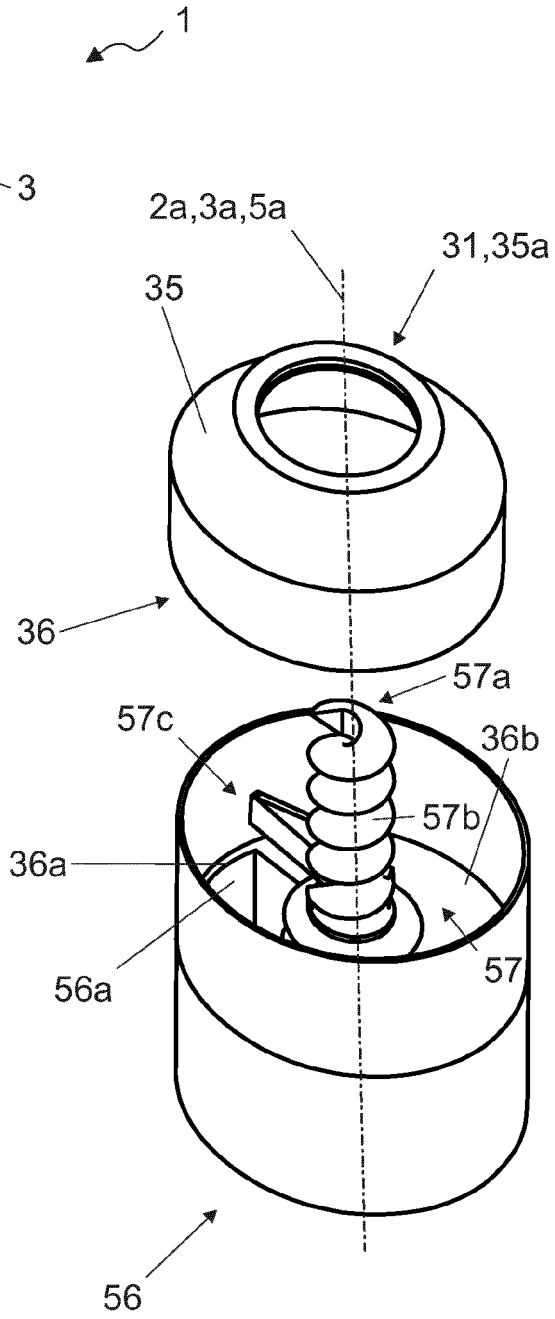
1
2a,3a,5a
31,35a
35
36
57a
57c
36b
57b
36a
56a
57
56

Fig. 9b

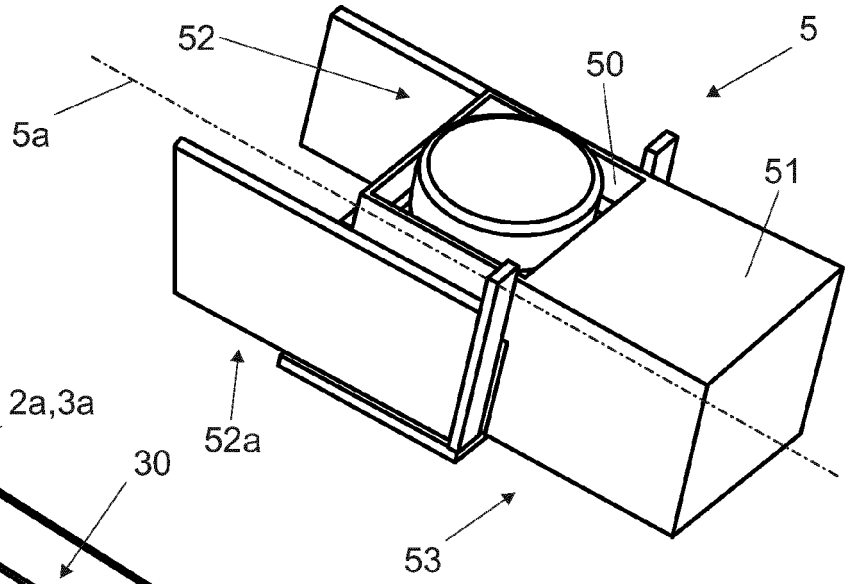

Fig. 10a

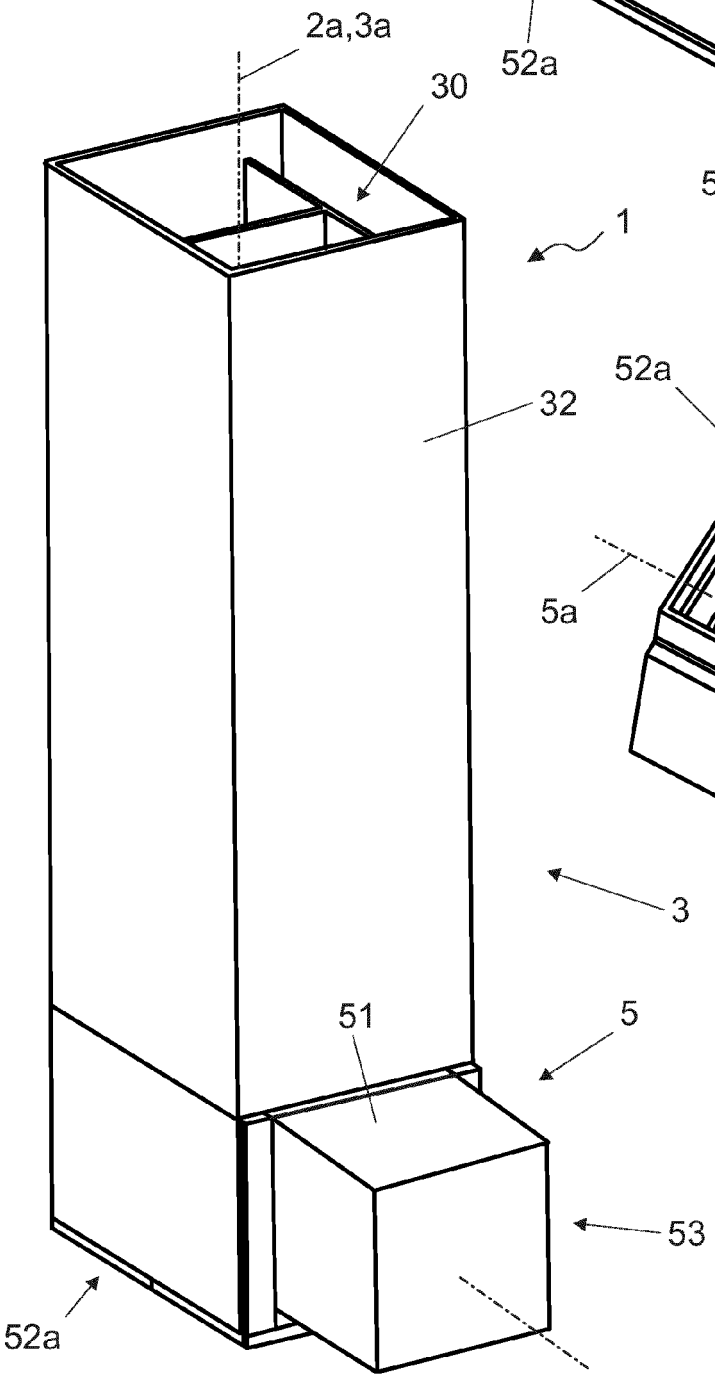

Fig. 10b

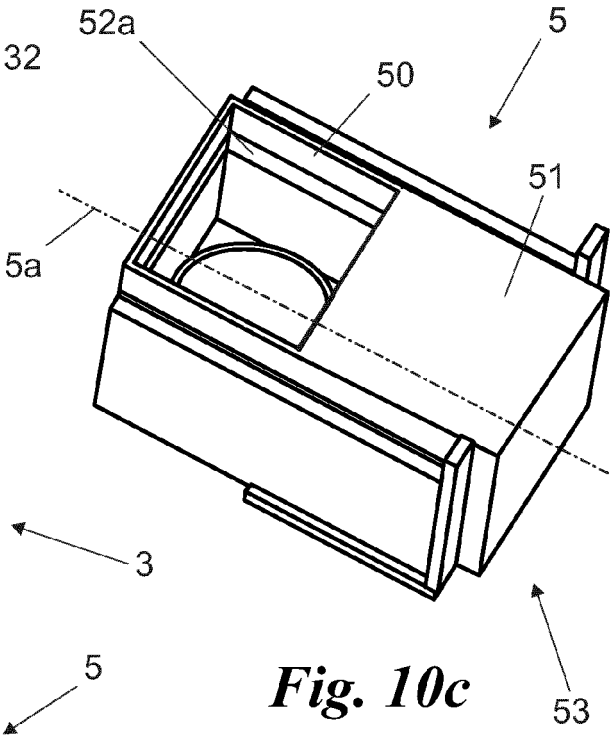

Fig. 10c

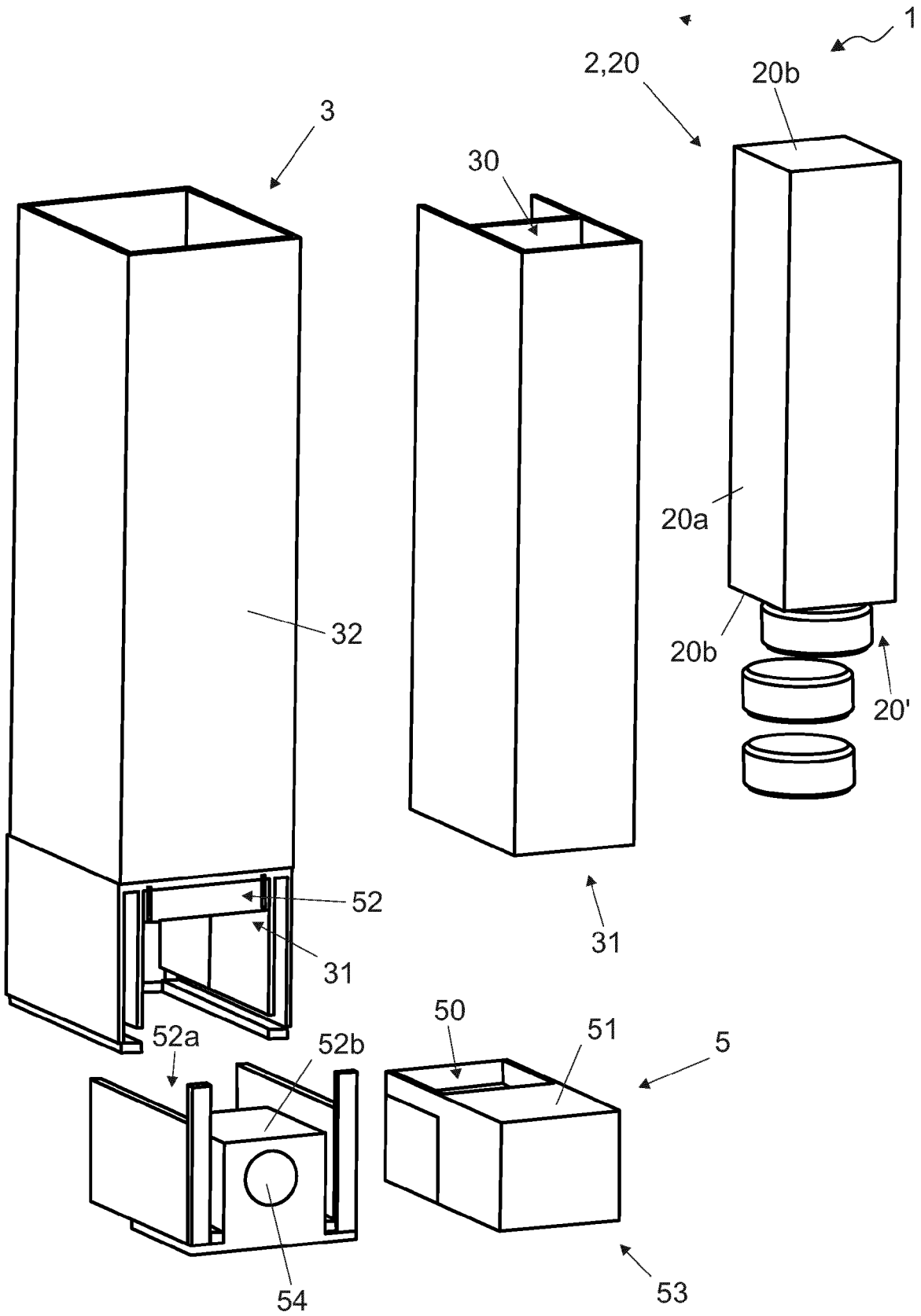

Fig. 11

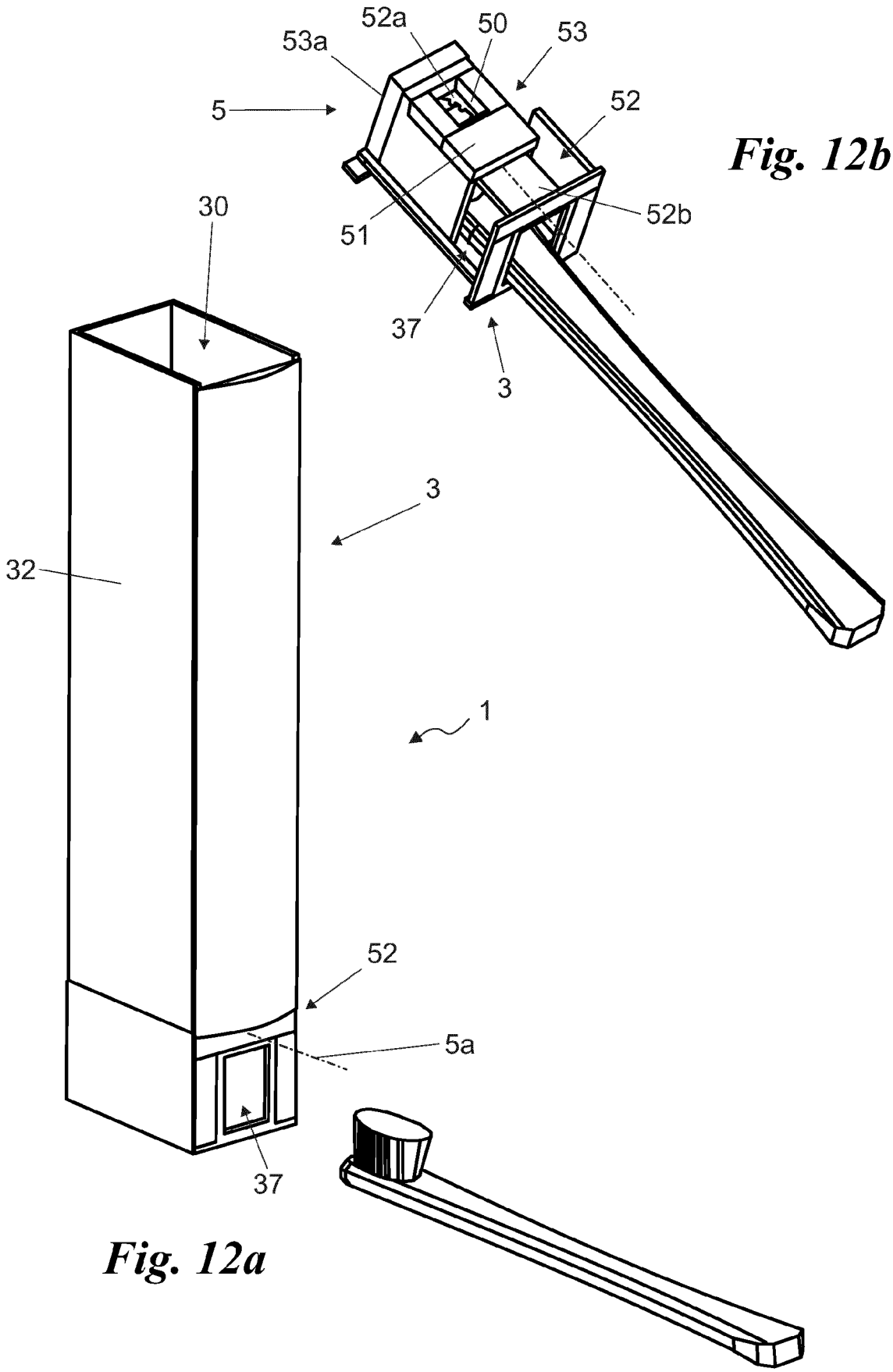

Fig. 12b

Fig. 12a

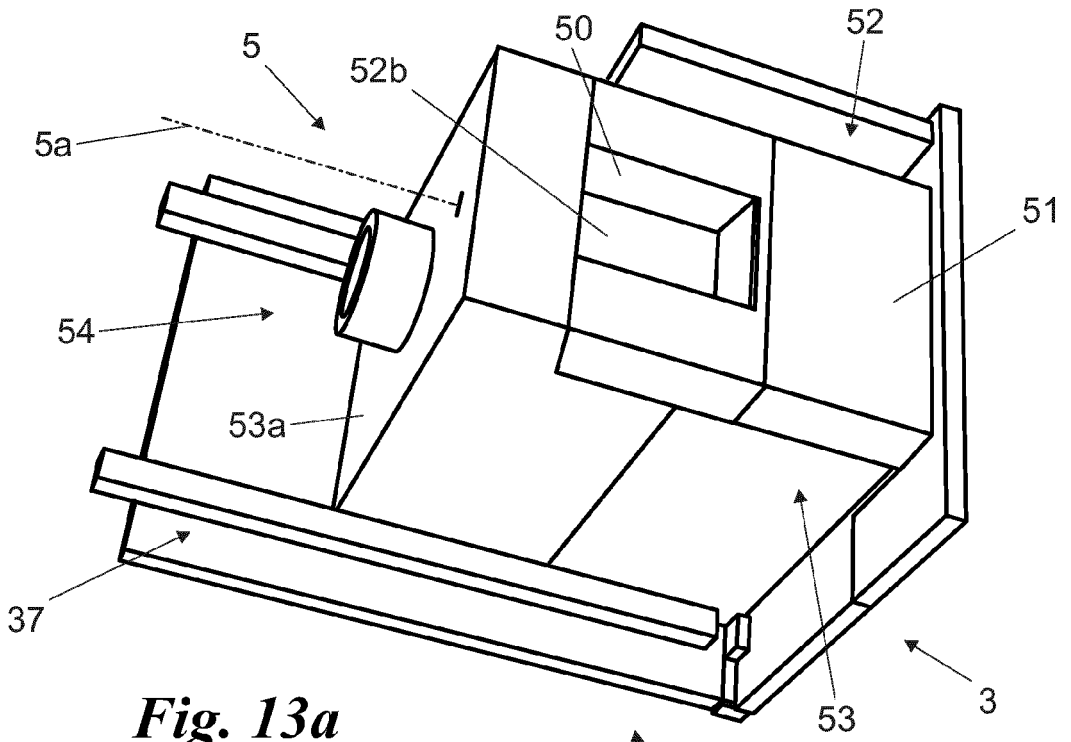

Fig. 13a

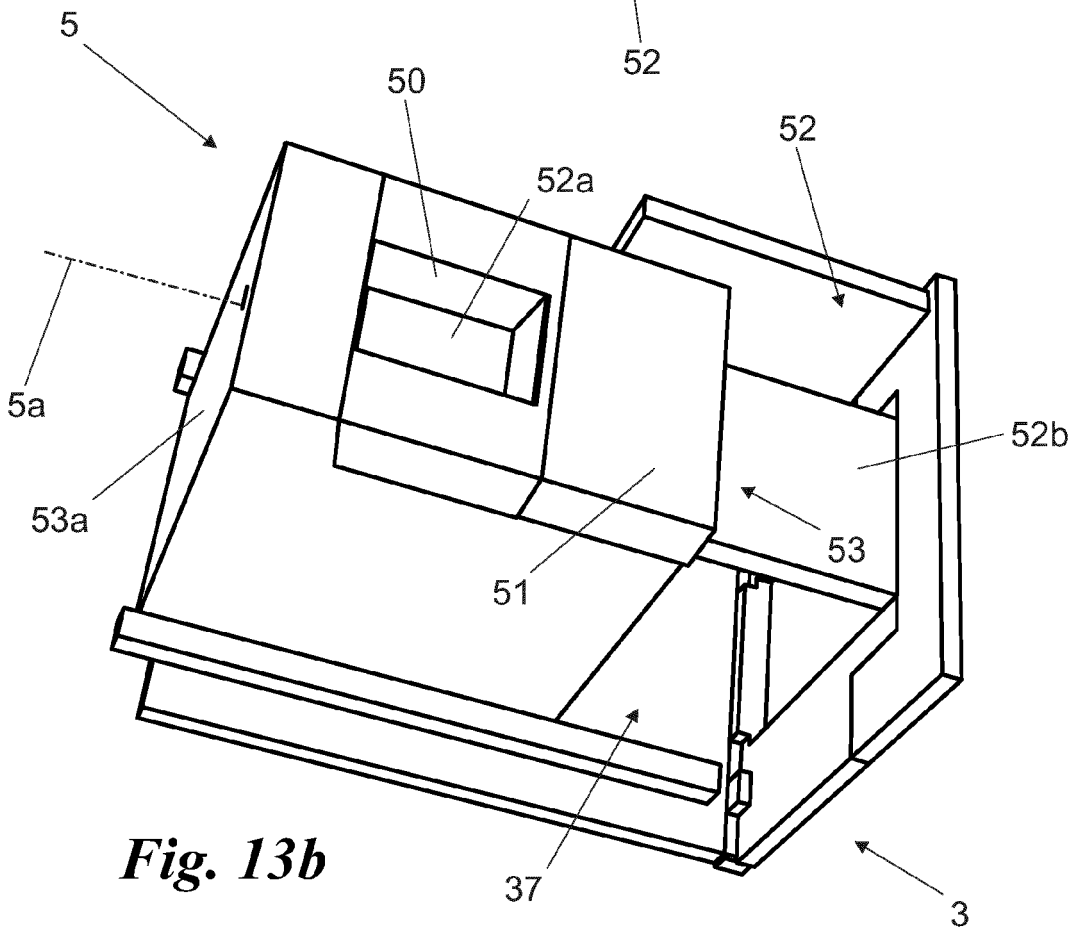

Fig. 13b

Europäisches Patentamt
European Patent Office
Office européen des brevets

EUROPEAN SEARCH REPORT

Application Number
EP 23 18 3464

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	GB 1 100 417 A (STEINER CO LAUSANNE SA) 24 January 1968 (1968-01-24)	1-11,13	INV. A47K5/10
Y	* page 1, line 49 - page 2, line 72; figures 1-8 *	12,14,15	
Y	US 2 723 783 A (ERVIN EWIN FRANK) 15 November 1955 (1955-11-15) * figures 1-14 *	12,14,15	

TECHNICAL FIELDS SEARCHED (IPC)

A47K

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	31 October 2023	Oliveras, Mariana

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

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