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(54) PUMP SYSTEM FOR A WALL-MOUNTED FLUID DISPENSER AND METHOD FOR MODIFYING A FLUID DISPENSER

(57) The invention relates to a pump system (1) for a wall-mounted fluid dispenser (2) having an actuation element (200) moveable in horizontal direction. The pump system comprises a fluid pump; an adapter having a translation element (530) for translating a substantially horizontal movement of the actuation element into a substantially vertical movement; and an engagement element (540) connected to the translating element; wherein the fluid pump has a holding surface (320) adapted to be removably held in a holding element of the adapter; and wherein the fluid pump (300) has an operating element (340) moveable in a substantially vertical direction; and wherein the operating element of the fluid pump and the engagement element of the adapter are adapted for engaging each other such that the vertical movement of the translation element is transmitted to the operating element of the fluid pump via the engagement element.

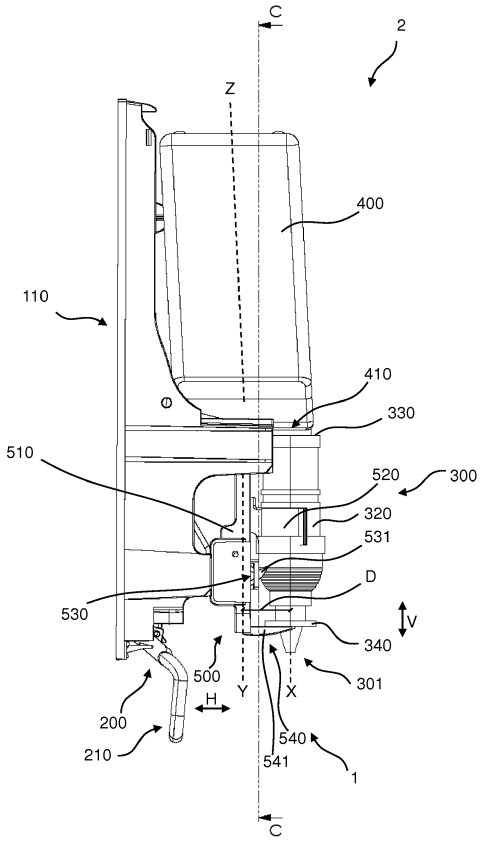

Fig. 9

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Description

[0001] The invention relates to a pump system for a wall-mounted fluid dispenser, a wall-mounted fluid dispenser, an adapter, a fluid pump, a wall-mounted fluid dispensing system and a method for modifying a wall-mounted fluid dispenser.

[0002] Wall-mounted fluid dispensers are typically known from washrooms and other hygienic environments which are frequented by a high number of people. Typical application areas are hotels, restaurants, hospitals, airports, and the like. Wall-mounted fluid dispensers are fluid dispensers which - in use - are, often releasably, mounted to a wall or wall-like structure. They can be also referred to as wall-mountable fluid dispensers.

[0003] Fluid dispenser are known, for example, from WO 2009/094789 A1, DE 20 2012 003 310 U1, US 2010/0112914 A1, US 2008/0185399 A1, AU 2014227493 A1, US 2013/0119083 A1, or US 2015/0366411 A1.

[0004] Existing fluid dispensers provide different solutions and advantages. However, further improvements are sought.

[0005] Therefore, it is an objective of the present invention to provide a pump system for a wall-mounted fluid dispenser, a wall-mounted fluid dispenser, an adapter, a fluid pump, a wall-mounted fluid dispensing system and a method for modifying a wall-mounted fluid dispenser, which address this need for further improvement. In particular, it is an objective of the present invention to provide a pump system for a wall-mounted fluid dispenser, a wall-mounted fluid dispenser, an adapter, a fluid pump, a wall-mounted fluid dispensing system and a method for modifying a wall-mounted fluid dispenser, which allow for high versatility and/or have good hygienic properties and/or are cost efficient.

[0006] According to a first aspect, this objective is solved by a pump system for a wall-mounted fluid dispenser having an actuation element moveable in a substantially horizontal direction from a first actuation position to a second actuation position; the pump system comprising a fluid pump with a substantially vertical pump axis and a fluid outlet arranged at a lower end of the fluid pump; an adapter connectable to the actuation element and having an adapter base, and a holding element for removably holding the fluid pump; wherein the adapter has a translation element for translating a substantially horizontal movement of the actuation element from the first actuation position to the second actuation position into a substantially vertical movement; and an engagement element connected to the translating element; wherein the fluid pump has a holding surface adapted to be removably held in the holding element of the adapter; and wherein the fluid pump has an operating element positioned on the exterior of the fluid pump and being moveable in a substantially vertical direction along the pump axis from a first operating position to a second operating position; and wherein the operating element of the fluid pump and the engagement element of the adapter are adapted for engaging each other such that the vertical movement of the translation element is transmitted to the operating element of the fluid pump via the engagement element.

[0007] The invention is based, inter alia, on the finding that is it advantageous to provide a solution for equipping existing fluid dispensers, which are operated by an actuation element moveable in a substantially horizontal direction, with a pump system which allows to use these fluid dispensers with a fluid pump, which has an operating element moveable in a substantially vertical direction. In this way, fluid dispensers which are originally designed for fluid pumps being operable by receiving a substantially horizontal activation movement from the actuation element of the fluid dispenser can be used with fluid pumps being operable by receiving a substantially vertical activation movement.

[0008] In order to achieve this, the pump system presented herein provides for a fluid pump and an adapter, which interact such that the substantially horizontal movement of an actuation element of a fluid dispenser is transferred into a substantially vertical movement operating the fluid pump. The substantially horizontal movement of the actuation element is translated to the translation element of the adapter and from there to an engagement element of the adapter. The engagement element of the adapter engages the operating element of the fluid pump and transfers the activation movement to the fluid pump. The translation element of the adapter translates the substantially horizontal movement of the actuation element into a substantially vertical movement and transfers this substantially vertical movement to the engagement element which then transfers the substantially vertical movement to the operating element of the fluid pump.

[0009] A wall-mounted fluid dispenser, in which the pump system described herein can be used, usually has a housing base connectable to a wall or wall-like structure and a housing cover connected to the housing base. The housing cover usually is connected to the housing base in an openable manner in order to allow access to a housing interior. The openable connection can be a pivotable connection, for example. The housing cover can be completely removable from the housing base or can remain connected to the housing base via a hinge, for example, in the opened state.

[0010] Fluids to be dispensed through the fluid outlet of the fluid pump can be different kinds of fluids, in particular sanitary fluids. Examples for fluids to be dispensed are liquid, gel, lotion, emulsion, aerosol, gas, foam, etc. Examples for functions of the fluids are soap, cleanser, skin-care, moisturizer, disinfectant, deodorizer, etc.

[0011] A wall-mounted fluid dispenser, for which the pump system described herein can be used, has an actuation element, which can be connected to or can be part of the housing base of the fluid dispenser.

[0012] The actuation element can be driven manually

by a user and/or automatically, via an electric drive, for example. An automatic activation, in particular via an electrically driven actuation element, can be realized as a non-touch activation, where a user does not have to touch the actuation element and/or other parts of the dispenser. An automatic activation, in particular via an electrically driven actuation element, can be initiated when a user, e.g. a user's hand, comes into the proximity of the dispenser. The actuation element can be in the form of an actuation lever.

[0013] Preferably, the actuation element is biased, via an actuation spring, for example, in the first actuation position and can be operated by a user and/or an electric drive, against the actuation biasing force, into the second actuation position. Ultimately, this movement from the first actuation position into the second actuation position is meant to actuate the dispenser to the dispense the fluid.

[0014] The actuation element, in particular an actuation lever, can be arranged for automatic operation and/or for manual operation by a user, in particular for being gripped by a user by hand and preferably being pulled towards the user.

[0015] Preferably, a distance - in particular in a substantially horizontal direction when the fluid dispenser is operably mounted - between the housing base and the actuation element is smaller the first actuation position than in the second actuation position. Preferably, the substantially horizontal movement of the actuation element from the first actuation position to the second actuation position is realized by a pulling action of a user. The actuation element preferably is moveable from the second actuation position back into the first actuation position, preferably via the actuation biasing force and preferably without a user's action.

[0016] Typically, the actuation element, in particular an actuation lever, is arranged at a lower end of the fluid dispenser. Preferably, a gripping portion of the actuation element, in particular an actuation lever, protrudes from a lower end of the housing, in particular of the housing cover.

[0017] The adapter of the pump system described herein, in particular the translation element of the adapter, can be connected to such an actuation element of a fluid dispenser. Preferably, the connection is a releasable connection. Further preferably, the adapter can be arranged substantially between the housing base and the fluid pump in a direction substantially horizontal when the fluid dispenser is operably mounted. The adapter can be connected to the actuation element preferably in a releasable and/or retrofit manner. In this way, existing fluid dispenser can be equipped with the adapter and the fluid pump of the pump system described herein, but the pump system can preferably also be removed again and the fluid dispenser will be available again for use with fluid pumps being operable by receiving a substantially horizontal activation movement.

[0018] Preferably, the pump system can be arranged at least partly, in particular with its larger part, within a housing interior of a fluid dispenser. Preferably, the pump system can be arranged substantially within a housing interior of a fluid dispenser.

[0019] Further preferably, the fluid outlet of the fluid pump is arranged at a lower end of the fluid dispenser. Preferably, the fluid outlet of the fluid pump protrudes from a lower end of the housing, in particular of the housing cover.

[0020] The pump system described herein is adapted for use in a fluid dispenser having a housing and an actuation element as described. The housing and the actuation element, however, preferably are not part of the pump system.

[0021] Herein, relative terms like upper, lower, horizontal, vertical and the like, are used with respect to a wall-mounted fluid dispenser having a pump system installed therein, being operably mounted.

[0022] The adapter, in particular the adapter base, can have a longitudinal adapter axis which is substantially parallel to the pump axis. Preferably, an axial and/or vertical extension of the fluid pump, particularly from the operating element, preferably a lower surface of the operating element, to the upper end of the fluid pump, substantially corresponds to an axial and/or vertical extension of the adapter, particularly from the engagement element, preferably an upper surface of the engagement element, to the upper end of the adapter, in particular to a first contact area of a support element of the adapter for supporting a fluid container arranged at an upper end of the fluid pump. Further preferably, a horizontal distance between the pump axis and the adapter axis is larger than a maximum radius of the fluid pump and/or smaller than a maximum diameter of the fluid pump.

[0023] All or some the adapter parts, in particular the adapter base, the holding element, the translation element and the engagement element, can be formed integral with each other. All or some the adapter parts, in particular the adapter base, the holding element, the translation element and the engagement element, can also be formed as separate elements, which are connected to each other in a releasable or non-releasable manner. All or some the adapter parts, in particular the adapter base, the holding element, the translation element and the engagement element, can be rotatably and/or translatably connected or can be connected in a manner which does not allow relative movement between the parts. Different connections can be formed between different parts of the adapter.

[0024] In particular, the engagement element can be arranged translatably relative to the adapter base. Further, the engagement element can be arranged moveably relative to the adapter base in a substantially vertical direction when the fluid dispenser is operably mounted.

[0025] In particular, the translation element can be arranged moveable relative to the adapter base in a manner allowing rotation and translation relative to the adapter base. Preferably, the connection between the translation

element and the adapter base allows for rotation about a substantially horizontal axis and/or a translation in a substantially vertical direction when the fluid dispenser is operably mounted.

[0026] In particular, the holding element can be arranged fixed relative to the adapter base. For example, the holding element can be formed integral with the adapter base or can be connected to the adapter base by a snap joint and/or a slilp-on joint.

[0027] Preferably, the fluid pump can be removed and/or exchanged. Thus, it is preferred that the holding surface of the fluid pump is held removably by the holding element of the adapter. In particular, the holding element of the adapter provides stability to the fluid pump and/or aids in the correct installation and/or orientation of the fluid pump.

[0028] Preferably, the operating element is biased, via an operating spring, for example, in the first operating position and can be operated, against the operating biasing force, into the second operating position. Preferably, the first operating position is lower that the second operating position when the fluid dispenser is operably mounted. The operating element preferably is moveable from the second operating position back into the first operating position, preferably via the operating biasing force and preferably without a user's action. The operating element is positioned on the exterior of the fluid pump and can form part of an outer periphery of the fluid pump or can be positioned on an outer periphery of the fluid pump. For example, the operating element of the fluid pump is formed integrally with at least a part of the fluid pump exterior. Advantageously, the operating element can be accessible from the exterior of the fluid pump via the engagement element of the adapter.

[0029] The engagement between the operating element of the fluid pump and the engagement element of the adapter can be a releasable engagement. For example, the engagement between the operating element of the fluid pump and the engagement element of the adapter can be in the form of contacting surfaces, in particular during transfer of movement and related forces from the engagement element to the operating element.

[0030] The movement of the operating element from the first operating position to the second operating position operates the fluid pump such that a portion of fluid is dispensed via the fluid pump out through the fluid outlet. Fluid can be provided to the fluid pump from a fluid container, which preferably is arranged at an upper end of the fluid pump and can be, releasably or non-releasably, connected to the fluid pump or can be made integral with the fluid pump.

[0031] In order to realize the substantially vertical operating movement of the operation element of the fluid pump, the adapter translates the substantially horizontal movement of the actuation element via the translation element into a substantially vertical movement and transfers this substantially vertical movement from the translation element via the engagement element to the operating element of the fluid pump. The holding element holding the holding surface of the fluid pump provides for stability.

[0032] The pump system described herein has several advantages. The adapter and fluid pump of the pump system are adapted to mutually engage and interact in order to operably install and operate a fluid pump, which has an operating element moveable in a substantially vertical direction, in a fluid dispenser, which is operated by an actuation element moveable in a substantially horizontal direction. Thus, the versatility of such a fluid dispenser, which is conventionally used with a fluid pump being operable by receiving a substantially horizontal activation movement from the actuation element, is enhanced.

[0033] In addition, a fluid pump with a substantially vertical pump axis and having an operating element moveable in a substantially vertical direction, can have advantages from a hygienic perspective. Such a fluid pump my build up less residue than a fluid pump, which is operable by receiving a substantially horizontal activation movement from the actuation element.

[0034] Herein, in general, a releasable and/or removable arrangement and/or connection can be understood, for example, as contacting surfaces, in particular for transferring pressure, and/or as a snap joint and/or as a slip-on joint and/or as a form fit and/or as a screw connection or the like.

[0035] According to a preferred embodiment, an upper surface of the engagement element of the adapter and a lower surface of the operating element of the fluid pump are in contact with each other. Preferably, the upper surface of the engagement element of the adapter and the lower surface of the operating element of the fluid pump can be brought into contact with each other for transferring the substantially vertical movement from the engagement element to the operating element. Further preferably, the upper surface of the engagement element of the adapter and/or the lower surface of the operating element of the fluid pump are arranged substantially horizontal when the fluid dispenser is operably mounted. It is particularly preferred that the upper surface of the engagement element of the adapter is position below the lower surface of the operating element of the fluid pump when the fluid dispenser is operably mounted.

[0036] According to a preferred embodiment, the operating element of the fluid pump is a ring-shaped protrusion. Preferably, the operating element is in the form of a protrusion protruding in a radial direction with respect to the pump axis. Further preferably, an extension of the operating element in a radial direction is a multiple of its extension in the direction of the pump axis.

[0037] It is further preferred that the fluid pump or at least parts thereof are rotationally symmetric with respect to the pump axis. Further preferably, the fluid pump has a cross section in a plane orthogonal to the fluid axis that varies along the pump axis. In particular, the fluid pump has a radius varying along the pump axis.

[0038] Further preferably, the operating element of the fluid pump is arranged at an upper end of the fluid outlet and/or below the holding surface.

[0039] According to a further preferred embodiment, the engagement element of the adapter has a fork unit with two legs adapted to receive the fluid outlet of the fluid pump therebetween. Preferably, the legs are arranged substantially horizontal when the fluid dispenser is operably mounted and/or protruding away from the housing base and/or from the adapter base.

[0040] According to a further preferred embodiment, the translation element of the adapter is rotatably mounted on the adapter base such that at least one lifting tip of the translation element is arranged to move vertically upward upon horizontal movement of the actuation element. Preferably, two lifting tips are provided on the translation element which are arranged to move vertically upward upon horizontal movement of the actuation element.

[0041] According to a preferred embodiment, the engagement element of the adapter has at least one opening for receiving the at least one lifting tip of the translation element of the adapter. Preferably, two openings for receiving the two lifting tips of the translation element of the adapter are provided. In particular, by reception of the at least one lifting tip in the at least one opening a vertical movement of the translation element can be transferred to the engagement element, via form fit and/or contacting surfaces, for example.

[0042] According to a preferred embodiment, the adapter base has at least one slotted hole guiding the at least one opening of the engagement element and/or the at least one lifting tip therein and providing for a stop of the movement of the engagement element. In particular, the at least one slotted hole can be arranged for guiding a frame of the at least one opening of the engagement element therein. Preferably, two slotted holes are provided guiding the two openings of the engagement element and/or the two lifting tips therein.

[0043] According to a preferred embodiment, the translation element and the engagement element are in the form of a cam disc and a slide block. Further preferably, the translation element and the engagement element are in the form of two cam discs, which preferably are connected, in particular in a fixed manner, and two slide blocks, which preferably are connected, in particular in a fixed manner.

[0044] According to a preferred embodiment, the holding surface of the fluid pump and the holding element of the adapter comprise corresponding surface structures. Preferably, the corresponding surface structures are in the form of corresponding projections and recesses and/or corresponding stepped and/or graduated and/or inclined and/or curved surface portions. Further preferably, the holding surface is rotationally symmetric with respect to the pump axis. For example, the holding surface can have the shape of a cylinder, possibly with a varying diameter along the pump surface. Preferably, the holding element can be in the form of a double-sided gripper. For example, the holding element can have at least one grip arm in the shape of a ring segment or a hollow cylinder segment. Preferably, the holding element can have two such grip arms forming a receptacle therebetween for receiving and holding the holding surface of the fluid pump, which preferably can be introduced through an opening between the tips of the grip arms. Preferably, the grip arms can bend elastically to receive the holding surface of the fluid pump in a snap joint. Preferably, the corresponding surface structures are in the form of corresponding cylinders, or cylinder sections, respectively, possibly with correspondingly varying diameters to form corresponding stepped surfaces, for example.

[0045] According to a further preferred embodiment, the operating element of the fluid pump and the engagement element of the adapter comprise corresponding surface structures. Preferably, the corresponding surface structures of the operating element of the fluid pump and the engagement element of the adapter are in the form of corresponding projections and recesses and/or corresponding stepped and/or graduated and/or inclined and/or curved surface portions. In a preferred embodiment the corresponding surface structures of the operating element of the fluid pump and the engagement element of the adapter, in particular a lower surface of the operating element and an upper surface of the engagement element, are in the form of corresponding flat, plane surfaces.

[0046] According to a preferred embodiment, the fluid pump is connected to a fluid container at its upper end. The fluid container can be connected to the upper end of the fluid pump in a releasable or non-releasable manner. For example, the fluid container can be formed integral with the fluid pump, preferably by injection molding. For example, a fluid container can be integrally formed on an upper end of the fluid pump and the fluid pump can be exchanged together with the fluid container. Preferably, the fluid container has longitudinal container axis which is inclined with respect to the pump axis.

[0047] According to a further preferred embodiment, the adapter comprises a support element for supporting a fluid container connected to the upper end of the fluid pump, in particular for supporting a lower back part of a fluid container. This provides for additional stability of the container and helps to ensure that the correct container is installed in the correct position.

[0048] According to a further aspect, the objective mentioned above is solved by a wall-mounted fluid dispenser comprising a housing base for wall mounting the fluid dispenser and a housing cover openable connected to the housing base; an actuation element connected to or part of the housing base; the actuation element being moveable in a substantially horizontal direction from a first actuation position to a second actuation position; and a pump system as described herein.

[0049] According to a further aspect, the objective

mentioned above is solved by an adapter for a pump system for a wall-mounted fluid dispenser having an actuation element moveable in a substantially horizontal direction from a first actuation position to a second actuation position as described herein; the adapter being connectable to the actuation element and the adapter comprising an adapter base, and a holding element for holding the fluid pump; a translation element for translating a substantially horizontal movement of the actuation element from the first actuation position to the second actuation position into a substantially vertical movement; an engagement element connected to the translating element; wherein the engagement element of the adapter is adapted to engage the operating element of the fluid pump such that the vertical movement of the translation element is transmitted to the operating element of the fluid pump via the engagement element.

[0050] According to a further aspect, the objective mentioned above is solved by a fluid pump for a pump system for a wall-mounted fluid dispenser having an actuation element moveable in a substantially horizontal direction from a first actuation position to a second actuation position as described herein; the fluid pump comprising a fluid outlet arranged at a lower end of the fluid pump; a substantially vertical pump axis and a holding surface adapted to be removably held in the holding element of the adapter; and an operating element positioned on the exterior of the fluid pump and being moveable in a substantially vertical direction along the pump axis from a first operating position to a second operating position; and wherein the operating element of the fluid pump is adapted to engage the engagement element of the adapter such that the vertical movement of the translation element is transmitted to the operating element of the fluid pump via the engagement element.

[0051] According to a further aspect, the objective mentioned above is solved by a wall-mounted fluid dispensing system comprising a housing base or wall mounting a fluid dispenser and a housing cover openable connected to the housing base; an actuation element connected to or part of the housing base; the actuation element being moveable in a substantially horizontal direction from a first actuation position to a second actuation position; a receptacle for receiving a first exchangeable fluid pump with a fluid outlet arranged at a lower end of the fluid pump; the first exchangeable fluid pump being operable by receiving a substantially horizontal activation movement from the actuation element; and an adapter as described herein connectable to the actuation element for receiving a second exchangeable fluid pump; the second exchangeable fluid pump being a fluid pump as described herein.

[0052] According to a further aspect, the objective mentioned above is solved by use of a wall-mounted fluid dispensing system as described herein with a fluid pump as described herein and/or a pump system as described herein.

[0053] According to a further aspect, the objective mentioned above is solved by use of a fluid pump as described herein and/or a pump system as described herein in a wall-mounted fluid dispensing system as described herein and/or in a wall-mounted fluid dispenser as described herein.

[0054] According to a further aspect, the objective mentioned above is solved by a method for modifying a wall-mounted fluid dispenser, comprising providing a fluid dispensing system as described herein; removing a first exchangeable fluid pump with a fluid outlet arranged at a lower end of the fluid pump; the first exchangeable fluid pump being operable by receiving a substantially horizontal activation movement from the actuation element from the receptacle; connecting the adapter to the actuation element; installing a second exchangeable fluid pump as described herein.

[0055] As to the advantages, preferred embodiments and details of these further aspects and preferred embodiments, reference is made to the corresponding aspects and embodiments described above.

[0056] Preferred, exemplary embodiments shall now be described with reference to the attached drawings, in which

Figs. 1A-E:	show different views of an exemplary embodiment of a pump system, namely a top view (Fig. 1A), a bottom view (Fig. 1E), a front view, Fig. 1C and two side views (Figs. 1B, 1D);
Fig. 2A:	shows a front view of the pump system according to Figs. 1A-E with a housing base;
Fig. 2B:	shows a sectional view along B-B of Fig. 2A;
Fig. 3A:	shows a side view of the pump system according to Figs. 1A-E with a housing base;
Fig. 3B:	shows a sectional view along C-C of Fig. 3A;
Figs. 4A-B:	show views corresponding to Figs. 2A, B but without the adapter base;
Figs. 5A-B:	show views corresponding to Figs. 3A, B but without the adapter base;
Fig. 6:	shows an enlarged view of Fig. 1D;
Fig. 7:	shows an enlarged view of Fig. 1E;
Fig. 8:	shows an enlarged view of Fig. 2B, but without the housing cover which is shown in Fig. 2B;
Fig. 9:	shows an enlarged view of Fig. 3A;
Fig. 10:	shows an enlarged view of Fig. 4A;
Fig. 11:	shows an enlarged view of Fig. 4B;
Fig. 12:	shows an enlarged view of Fig. 5A;
Fig. 13:	shows a further version of a side view of the pump system according to Fig. 1B; and
Fig. 14:	shows a three-dimensional view of the pump system according to Figs. 1A-E with a housing base;

Fig. 15: shows an exemplary fluid dispensing system.

[0057] In the figures, identical elements or elements with similar functions are indicated with the same reference signs.

[0058] Figs. 1A-E show different views of an exemplary embodiment of a pump system 1, namely a top view (Fig. 1A), a bottom view (Fig. 1E), a front view, Fig. 1C and two side views (Figs. 1B, 1D).

[0059] Fig. 2A shows a front view of the pump system 1 according to Figs. 1A-E as part of a fluid dispenser 2 with a housing base 110 and Fig. 2B shows a sectional view along B-B of Fig. 2A. Fig. 3A shows a side view of the pump system 1 according to Figs. 1A-E as part of a fluid dispenser 2 with a housing base 110 and Fig. 3B shows a sectional view along C-C of Fig. 3A. In Fig. 2B, a housing cover 120 in indicated with broken lines. Although not shown in the other Figures, a housing cover can be applied to the fluid dispenser 2 as shown herein. The fluid dispenser 2 is a wall-mounted fluid dispenser and suitable for dispensing sanitary fluids, like foam soap, disinfectant liquid or moisturizing lotion.

[0060] Figs. 4A-B and 5A-b show views corresponding to Figs. 2A, B and Figs. 3A, B but without the adapter base 510. Figs. 6-12 show enlarged views of previous Figs. 1D, 1E, 2B, 3A, 4A, 4B, 5A.

[0061] Fig. 13 shows a further version of a side view of the pump system 1 according to Fig. 1B, in which the upper end of the adapter is modified. Fig. 14 shows a three-dimensional view of the pump system 1 according to Figs. 1A-E as part of a fluid dispenser 2 with a housing base 110.

[0062] Fig. 15 shows a fluid dispensing system 3 with a housing base 110 and an actuation element 200 in the form of an actuation lever for use with a conventional fluid pump 700 which can be received in receptacle 710 and which is operable by receiving a substantially horizontal activation movement from the actuation element 200. A fluid container 400' can be connected to an upper end of the conventional fluid pump 700. Instead of being used with the conventional fluid pump 700, the housing base 110 and the actuation element 200 of the fluid dispensing system 3 can be used with a pump system 1 as described herein having an adapter and a fluid pump 300 and a fluid container 400 at its upper end.

[0063] The pump system 1 shown in the figures can be used with a wall-mounted fluid dispenser 2 having an actuation element 200 moveable in a substantially horizontal direction H from a first actuation position to a second actuation position. The actuation element 200 is connected to or part of the housing base 110.

[0064] The figures generally show the actuation element 200 of the fluid dispenser 2 in the first actuation position, where it is biased by actuation spring 220. A distance in a substantially horizontal direction when the fluid dispenser is operably mounted between the housing base 110 and the actuation element 200, in particular the handle portion 210, is smaller the first actuation position than in the second actuation position.

[0065] The actuation element 200 of the embodiment shown is arranged for manual operation by a user. By gripping the handle portion 210 of the actuation element 200 in the form of an actuation lever, a user can move the actuation element 200 into its second actuation position against the actuation biasing force in the form of actuation spring 220, in particular by pulling the handle portion 210 in a substantially horizontal direction H toward the user and/or away from the housing base. From the second actuation position the actuation element 200 will be biased back to the first actuation position by the actuation biasing force. Preferably, the handle portion 210 protrudes from a housing 100, in particular from below the housing cover 120, when the fluid dispenser is operably mounted on a wall. For mounting the fluid dispenser 2 at a wall or wall-like structure, the housing base 110 can be fixed to a wall or wall-like structures by suitable fasteners (not shown). Although the figures show an actuation element 200 in the form of a manually driven actuation lever, the actuation element can be realized for automatic activation and can be automatically driven, e.g. by an electric drive, and further can be in the form of a non-touch actuation element, where a user does not need to touch the actuation element and/or the dispenser, but rather brings a hand, for example, into close proximity with the dispenser.

[0066] The pump system 1 comprises a fluid pump 300 and an adapter 500. The adapter has an adapter base 510, a holding element 520, a translation element 530 and an engagement element 540 connected to the translation element 530. The fluid pump 300 has a substantially vertical pump axis X and a fluid outlet 301 arranged at a lower end of the fluid pump1.

[0067] The adapter 500 of the pump system 1 is connectable to the actuation element 200 of the fluid dispenser 2. As can be seen from Figs. 6, 8, 11, the adapter 500 is connected to the actuation element 200 via connection element 600, which is connected to the translation element 530 at eye 532 (see Fig. 13). However, it is also possible that the actuation element is directly connected to the translation element.

[0068] The fluid pump 300 has a holding surface 320 and an operating element 340. The operating element 340 is positioned on the exterior of the fluid pump 300 and is moveable in a substantially vertical direction V along the pump axis X from a first operating position to a second operating position. The figures generally show the operating element 340 in the first operating position, where it is biased. From the first operating position shown in the figures the operating element 340 can move upward in a substantially vertical direction V along the pump axis X to the second operating position against an operating biasing force. From the second operating position the operating element 340 will be biased back to the first operating position. The operating element 340 of the fluid pump 30 is arranged at an upper end of the fluid outlet

301 and below the holding surface 320.

[0069] The holding element 520 of the adapter 500 is arranged for removably holding the fluid pump 1 and the holding surface 320 of the fluid pump 300 is adapted to be removably held in the holding element 520 of the adapter 500. The holding element 520 of the adapter 500 provides stability to the fluid pump 300 and aids in the correct installation and/or orientation of the fluid pump 300 within the pump system 1 and the fluid dispenser 2.

[0070] The fluid pump 300 is substantially rotationally symmetric with respect to the pump axis X. Further, the fluid pump 300 has a cross section in a plane orthogonal to the fluid axis X that varies along the pump axis X. In particular, the fluid pump 300 has a radius varying along the pump axis X.

[0071] The holding surface 320 of the fluid pump 300 and the holding element 520 of the adapter 500 comprise corresponding surface structures. In the example shown, the corresponding surface structures are in the form of corresponding cylinders, with correspondingly varying diameters to form corresponding stepped cylinder surfaces. The holding surface 320 is rotationally symmetric with respect to the pump axis X. The holding element 520 is in the form of a double-sided gripper with two such grip arms each in the shape of a ring segment or a hollow cylinder segment, forming a receptacle therebetween for receiving and holding the holding surface 320 of the fluid pump 300. The grip arms of the holding element 520 can bend elastically to receive the holding surface 320 of the fluid pump 300 in a snap joint.

[0072] The adapter 500 is arranged substantially between the housing base 100 and the fluid pump 300 in a direction substantially horizontal when the fluid dispenser 2 is operably mounted.

[0073] The translation element 530 of the adapter 500 is arranged for translating a substantially horizontal movement of the actuation element 200 from the first actuation position to the second actuation position into a substantially vertical movement. Via the connection between the translation element 530 and the engagement element 540 and further via the engagement between the engagement element 540 of the adapter and the operating element 340 of the fluid pump 300, the vertical movement of the translation element 530 is transmitted to the operating element 340 of the fluid pump 300. Thus, ultimately, the substantially horizontal movement of the actuation element 200 is translated into a substantially vertical movement of the operating element 340 of the fluid pump 300 in order to dispense a portion of fluid out of the fluid outlet 301 of the fluid pump 300.

[0074] This has the advantage that existing fluid dispensers, which are operated by an actuation element moveable in a substantially horizontal direction, can be equipped with a pump system 1 which allows using these fluid dispensers with a fluid pump 300, which has an operating element 340 moveable in a substantially vertical direction V. In this way, fluid dispensers which originally might be designed for fluid pumps 700 being operable by receiving a substantially horizontal activation movement from the actuation element of the fluid dispenser can be used with fluid pumps 300 being operable by receiving a substantially vertical activation movement.

[0075] The adapter 500 is connected to the actuation element 200 in a releasable and/or retrofit manner. In this way, existing fluid dispensers can be equipped with the adapter 500 and the fluid pump 300 of the pump system 1, but the pump system 1 can also be removed again and the fluid dispenser will be available again for use with a different fluid pump, such as a fluid pump 700 being operable by receiving a substantially horizontal activation movement.

[0076] The adapter 500, in particular the adapter base 510, has a longitudinal adapter axis Y which is substantially parallel to the pump axis X. The axial and/or vertical extension E of the fluid pump 300, particularly from the operating element 340, preferably a lower surface of the operating element 340, to the upper end 330 of the fluid pump 300, substantially corresponds to the axial and/or vertical extension of the adapter 510, particularly from the engagement element 540, preferably an upper surface of the engagement element 540, to the upper end of the adapter 500, in particular to a first contact area 551 of a support element 550 of the adapter for supporting the fluid container 400. The horizontal distance D between the pump axis Y and the adapter axis X is larger than the maximum radius of the fluid pump 300 and smaller than a maximum diameter of the fluid pump 300.

[0077] The fluid container 400 is arranged at an upper end 330 of the fluid pump 300. The fluid container has longitudinal container axis Z which is inclined with respect to the pump axis X. A container base line 402 preferably is orthogonal (90°) to the pump axis Y. In Fig. 13, line 401 indicates an intermediate fill level of the fluid container 400.

[0078] The fluid container 400 has a lower collar 410 with a sealing arrangement 411 thereon for sealingly protruding into an opening in the upper end 330 of the fluid pump 300. This connection between the fluid pump 300 and the fluid container 400 can be releasable or non-releasable. If it is releasably connected, the fluid pump 300 and the fluid container 400 can be exchanged independently from each other. It can also be preferred that the fluid pump 300 and the fluid container 400 are made integral with each other and can only be exchanged together. This is particularly advantageous in environments with high hygienic standards. The fluid container may be provided with two lower recessed portions 430 and an upper recessed portion 440. At least a part of the upper recessed portion may be adapted to accommodate a locking mechanism 111 for locking the housing cover 120 to the housing base 110.

[0079] The engagement element 540 is arranged translatably relative to the adapter base 510 and moveably relative to the adapter base 510 in a substantially vertical direction V when the fluid dispenser 2 is operably mounted.

[0080] The translation element 530 is arranged moveable relative to the adapter base 510 in a manner allowing rotation and translation relative to the adapter base 510. The connection between the translation element 530 and the adapter base 510 allows for rotation about a substantially horizontal axis 533 and a translation in a substantially vertical direction V when the fluid dispenser 2 is operably mounted.

[0081] The engagement element 540 of the adapter 500 has a fork unit 541 with two legs adapted to receive the fluid outlet 301 of the fluid pump 300 therebetween. The legs of the for unit 541 are arranged substantially horizontal when the fluid dispenser 2 is operably mounted and are protruding away from the housing base 100 and from the adapter base 510.

[0082] The translation element 530 of the adapter 500 is rotatably mounted on the adapter base 510 such that the two lifting tips 531 of the translation element 530 are arranged to move vertically upward upon horizontal movement of the actuation element 200.

[0083] The engagement element 540 of the adapter 500 has two openings 542 for receiving the two lifting tips 531 of the translation element 530 of the adapter 500. By reception of the two lifting tips 531 in the two openings 542 a vertical movement of the translation element 5430 can be transferred to the engagement element 540, via form fit and/or contacting surfaces, for example.

[0084] The adapter base 510 has two slotted holes 513 guiding the two openings 542, in particular the frames of the two openings 542, of the engagement element 540 and the two lifting tips 531 therein and providing for a stop of the movement of the engagement element 540. The translation element 530 and the engagement element 540 are in the form of two cam discs, which are connected to each other in a fixed manner, and two slide blocks, which are connected to each in a fixed manner, and wherein the two cam discs of the translation element 530 and the two slide blocks of the engagement element 540 are moveable relative to each other.

[0085] The operating element 340 is positioned on the exterior of the fluid pump 300 and forms part of an outer periphery of the fluid pump 300. For example, the operating element 340 of the fluid pump can be formed integrally with at least a part of the fluid pump exterior Advantageously, the operating element 340 is accessible from the exterior of the fluid pump 300 via the engagement element 540, in particular the two legs of the fork unit 541, of the adapter 500.

[0086] The adapter 500 comprises a support element 550 at its upper end for supporting the fluid container 400, in particular for supporting a lower back part 420 of the fluid container. This provides for additional stability of the container and helps to ensure that the correct container is installed in the correct position. As shown in Fig. 13, the support element 550' at the upper end of the adapter 500 for supporting the lower back part 420 of the fluid container may have a shape corresponding to the shape of the lower back part 420 of the fluid container 400. As indicated in die Fig. 13, the lower back part 420' can also have a different form. Preferably, the support element 550 of the adapter 500 is adapted to fit the respective lower back part 420, 420'. For example, the support element 550 of the adapter 500 can adapted to accommodate different shapes of lower back parts 420, 420' of containers. E.g., the support element 550 of the adapter 500 can be exchangeable and/or flexible and/or have different supporting surfaces for different shapes of lower back parts 420, 420'.

[0087] An upper surface of the legs of the fork unit 541 of the engagement element 540 of the adapter 500 and a lower surface of the operating element 340 of the fluid pump 300 are in contact with each other, in particular when transferring the substantially vertical movement from the engagement element 540 to the operating element 340. The upper surface of the legs of the fork unit 541 of the engagement element 540 of the adapter 500 and/or the lower surface of the operating element 340 of the fluid pump 300 are arranged substantially horizontal when the fluid dispenser 2 is operably mounted. The upper surface of the legs of the fork unit 541 of the engagement element 540 of the adapter 500 is position below the lower surface of the operating element 340 of the fluid pump 300 when the fluid dispenser 3 is operably mounted.

[0088] The operating element 340 of the fluid pump 300 is a ring-shaped protrusion protruding in a radial direction with respect to the pump axis X. The extension of the operating element 340 in a radial direction is a multiple of its extension in the direction of the pump axis X.

[0089] The pump system 1 described herein has several advantages. As described, the adapter 500 and the fluid pump 300 of the pump system 1 are adapted to mutually engage and interact in order to operably install and operate a fluid pump 300, which has an operating element 340 moveable in a substantially vertical direction V, in a fluid dispenser 2, which is operated by an actuation element 200 moveable in a substantially horizontal direction H. Thus, the versatility of such a fluid dispenser, which is conventionally used with a fluid pump 700 being operable by receiving a substantially horizontal activation movement from the actuation element, is enhanced.

[0090] In addition, a fluid pump 300 with a substantially vertical pump axis X and having an operating element 340 moveable in a substantially vertical direction V, can have advantages from a hygienic perspective in particular when it is integral with a fluid container 400 or non-releasably connected thereto, for example by building up less residue in the fluid pump, which might be transferred to the fluid from the next fluid container, in case only the fluid container is exchanged without an exchange of the fluid pump.

Claims

1. Pump system (1) for a wall-mounted fluid dispenser (2) having an actuation element (200) moveable in a substantially horizontal direction from a first actuation position to a second actuation position; the pump system comprising

   - a fluid pump (300) with a substantially vertical pump axis (X) and a fluid outlet (301) arranged at a lower end of the fluid pump;
   - an adapter (500) connectable to the actuation element (200) and having an adapter base (510), and a holding element (520) for removably holding the fluid pump;
   - wherein the adapter (500) has a translation element (530) for translating a substantially horizontal movement of the actuation element (200) from the first actuation position to the second actuation position into a substantially vertical movement; and an engagement element (540) connected to the translating element;
   - wherein the fluid pump has a holding surface (320) adapted to be removably held in the holding element (520) of the adapter (500); and
   - wherein the fluid pump (300) has an operating element (340) positioned on the exterior of the fluid pump and being moveable in a substantially vertical direction along the pump axis from a first operating position to a second operating position; and
   - wherein the operating element (340) of the fluid pump and the engagement element (540) of the adapter are adapted for engaging each other such that the vertical movement of the translation element (530) is transmitted to the operating element (340) of the fluid pump via the engagement element (540).

2. Pump system (1) according to the preceding claim, wherein an upper surface of the engagement element (540) of the adapter and a lower surface of the operating element (340) of the fluid pump are in contact with each other.

3. Pump system (1) according to at least one of the preceding claims,
   wherein the operating element (340) of the fluid pump is a ring-shaped protrusion.

4. Pump system (1) according to at least one of the preceding claims,
   wherein the engagement element (540) of the adapter has a fork unit (541) with two legs adapted to receive the fluid outlet (301) of the fluid pump therebetween, and/or
   wherein the translation element (530) of the adapter is rotatably mounted on the adapter base such that at least one lifting tip (531) of the translation element (530) is arranged to move vertically upward upon horizontal movement of the actuation element.

5. Pump system (1) according to at least one of the preceding claims,
   wherein the engagement element (540) of the adapter has at least one opening for receiving the at least one lifting tip (531) of the translation element (530) of the adapter, and/or
   wherein the adapter base (510) has at least one slotted hole guiding the at least one opening of the engagement element (540) and/or the at least one lifting tip therein and providing for a stop of the movement of the engagement element (540).

6. Pump system (1) according to at least one of the preceding claims,
   wherein the translation element (530) and the engagement element (540) are in the form of a cam disc and a slide block.

7. Pump system (1) according to at least one of the preceding claims,
   wherein the holding surface (320) of the fluid pump and the holding element (520) of the adapter comprise corresponding surface structures, and/or
   wherein the operating element (340) of the fluid pump and the engagement element (540) of the adapter comprise corresponding surface structures.

8. Pump system (1) according to at least one of the preceding claims,
   wherein the fluid pump is connected to a fluid container (400) at its upper end, and/or
   wherein the adapter (500) comprises a support element for supporting a fluid container (400) connected to the upper end of the fluid pump.

9. Wall-mounted fluid dispenser (2) comprising

   - a housing base (110) for wall mounting the fluid dispenser and a housing cover openable connected to the housing base;
   - an actuation element connected to or part of the housing base; the actuation element being moveable in a substantially horizontal direction from a first actuation position to a second actuation position; and
   - a pump system (1) according to any of the previous claims 1-8.

10. Adapter (500) for a pump system (1) for a wall-mounted fluid dispenser (2) having an actuation element (200) moveable in a substantially horizontal direction from a first actuation position to a second actuation position according to at least one of the preceding claims 1-8; the adapter being connectable

to the actuation element and the adapter comprising

- an adapter base, and a holding element for holding the fluid pump;
- a translation element (530) for translating a substantially horizontal movement of the actuation element from the first actuation position to the second actuation position into a substantially vertical movement;
- an engagement element (540) connected to the translating element;
- wherein the engagement element (540) of the adapter is adapted to engage the operating element (340) of the fluid pump such that the vertical movement of the translation element (530) is transmitted to the operating element (340) of the fluid pump via the engagement element (540).

11. Fluid pump for a pump system (1) for a wall-mounted fluid dispenser (2) having an actuation element (200) moveable in a substantially horizontal direction from a first actuation position to a second actuation position according to at least one of the preceding claims 1-8; the fluid pump comprising

- a fluid outlet (301) arranged at a lower end of the fluid pump;
- a substantially vertical pump axis (X) and a holding surface adapted to be removably held in the holding element of the adapter; and
- an operating element (340) positioned on the exterior of the fluid pump and being moveable in a substantially vertical direction along the pump axis from a first operating position to a second operating position; and
- wherein the operating element (340) of the fluid pump is adapted to engage the engagement element (540) of the adapter such that the vertical movement of the translation element (530) is transmitted to the operating element (340) of the fluid pump via the engagement element (540).

12. Wall-mounted fluid dispensing system (3) comprising

- a housing base (110) for wall mounting a fluid dispenser and a housing cover openable connected to the housing base;
- an actuation element (200) connected to or part of the housing base; the actuation element being moveable in a substantially horizontal direction from a first actuation position to a second actuation position;
- a receptacle (710) for receiving a first exchangeable fluid pump (700) with a fluid outlet arranged at a lower end of the fluid pump; the first exchangeable fluid pump being operable by receiving a substantially horizontal activation movement from the actuation element; and
- an adapter (500) according to claim 10 connectable to the actuation element (200) for receiving a second exchangeable fluid pump (300); the second exchangeable fluid pump being a fluid pump according to claim 11.

13. Use of a wall-mounted fluid dispensing system according to claim 12 with a fluid pump according to claim 11 and/or a pump system (1) according to any of the previous claims 1-8.

14. Use of a fluid pump according to claim 11 and/or a pump system (1) according to any of the previous claims 1-8 in a wall-mounted fluid dispensing system according to claim 12 and/or in a wall-mounted fluid dispenser according to claim 9.

15. Method for modifying a wall-mounted fluid dispenser (2),
comprising

- providing a fluid dispensing system according to claim 12;
- removing a first exchangeable fluid pump with a fluid outlet arranged at a lower end of the fluid pump; the first exchangeable fluid pump being operable by receiving a substantially horizontal activation movement from the actuation element from the receptacle;
- connecting the adapter to the actuation element;
- installing a second exchangeable fluid pump according to claim 11.

Amended claims in accordance with Rule 137(2) EPC.

1. A computer-implemented method for supply chain management and provenance in a data processing network,

wherein the supply chain has a plurality of types of goods,
wherein the network has at least one physical node and the network is configured to have at least one distributed ledger instance having a smart contract functionality;
wherein the distributed ledger instance has a corresponding smart contract for each type of good;
wherein within the smart contract tokens correspond to at least one unit of a good and/or a batch of goods in the supply chain;
wherein every token is non-fungible; and
wherein a client is configured to operate in dif-

ferent roles,
wherein the method comprises the step of the client calling at least one function of the smart contract for every production step of the supply chain.

2. The method according to claim 1, further comprising at least one of the steps a1)

in a supplier role the client calling a creating function for a primary token,

wherein for calling the creating function no input token is required and
wherein a supplier upon creation in the distributed ledger becomes the owner of the primary token, and

a2) in a supplier role the client calling a handle function for a primary token.

3. The method according to claim 1 or 2, further comprising at least one of the steps

b1) in a producer role the client calling a produce function,

wherein calling the produce function requires a predetermined set of input token;
wherein the produce function creates a secondary token;
wherein the input token is at least one of a primary token and a secondary token; and
wherein the producer upon creation in the distributed ledger becomes the owner of the secondary token;

b2) in a producer role the client calling a consume function for consuming at least one of a primary token and a secondary token;
b3) in a producer role the client calling a handle function for at least one of a primary token and a secondary token; and

wherein the predetermined set of input token is stored in the smart contract and/or a certificate for at least one input token of the predetermined set of input token is stored in the smart contract.

4. The method according to any one of claims 1 to 3, further comprising the step
c) in a handling role the client calling at least one of

c1) a splitting function for in the distributed ledger splitting at least one of a primary token and a secondary token,
c2) a merging function for in the distributed ledger merging at least one of a primary token and a secondary token, and
c3) a transfer function for in the distributed ledger transferring at least one of a primary token and a secondary token from a first entity to a second entity.

5. The method according to any one of claims 1 to 4, further comprising the step
d) in a consumer role the client calling a consume function for consuming at least one of a primary token and a secondary token,
wherein the calling the consume function represents an end point of the supply chain.

6. The method according to any one of claims 1 to 5, further comprising the step
e) in a certifier role introducing an ontology, which comprises the step of defining any one of the functions and/or the smart contracts for steps a) to d) and/or the step of defining a certificate for at least one token.

7. The method according to any one of claims 1 to 6, wherein the corresponding smart contracts are turing complete contracts, preferably solidity contracts, deployable on a distributed ledger, preferably an Ethereum virtual machine.

8. The method according to any one of claims 1 to 7, wherein when a function is called for storing in the distributed ledger a batch identifier, preferably 12 byte long, is concatenated to a token contract address, preferably 20 byte long, and a single, preferably 32 byte long, write operation is used.

9. The method according to claim 8, wherein for generating the unique batch identifiers, resources, sender address, and time are hashed using a SHA-3 hash function or a counter.

10. The method according to claim 8 or 9, wherein the concatenation and a respective split operation is implemented using in-line assembly.

11. The method according to any one of claims 8 to 10, wherein adding a new product to the supply chain is conducted through a factory contract which is called, preferably using Ethereum's JavaScript API, and deploys a corresponding token contract on the distributed ledger.

12. A data processing network for supply chain provenance comprising

at least one physical node, and wherein the network is configured have at least one distributed ledger instance having a smart contract functionality;

wherein the supply chain has a plurality of types of goods,
wherein the distributed ledger instance has a corresponding smart contract for each type of good;
wherein within the smart contract tokens corresponds to at least one unit of a good and/or a batch of goods in the supply chain;
wherein every token is non-fungible; and
wherein the node is configured to perform any one of the steps of any one of claims 1 to 11.

13. A computer program comprising instructions which, when the program is executed by a computer, cause the computer to carry out any one of the steps of any one of claims 1 to 11.

14. A computer-readable medium comprising instructions which, when executed by a computer, cause the computer to carry out any one of the steps of any one of claims 1 to 11.

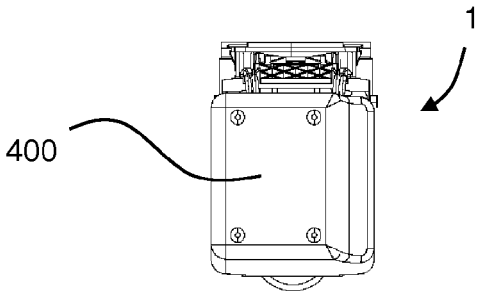

Fig. 1A

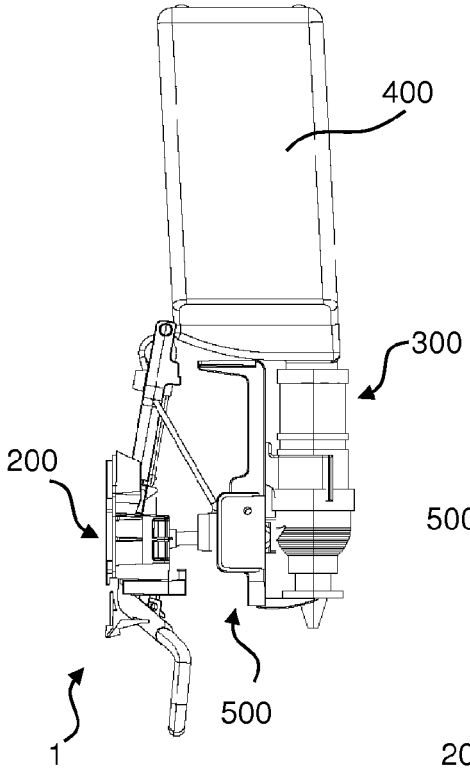

Fig. 1B

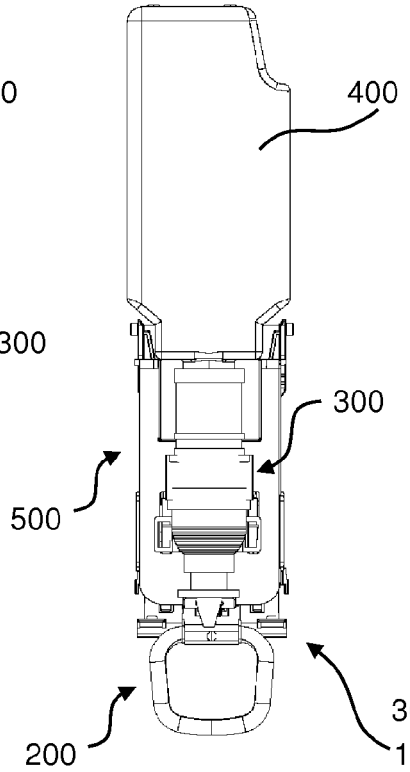

Fig. 1C

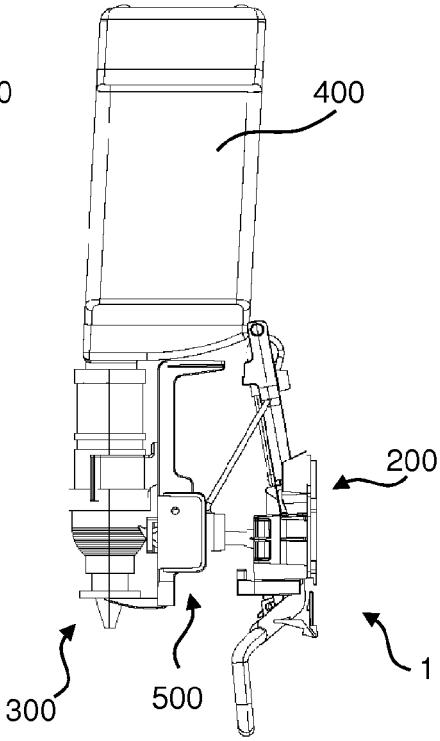

Fig. 1D

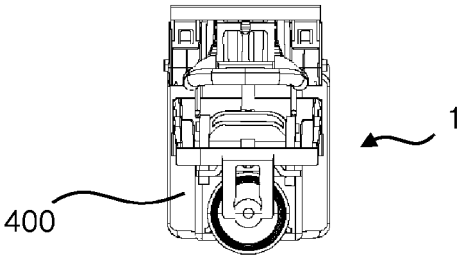

Fig. 1E

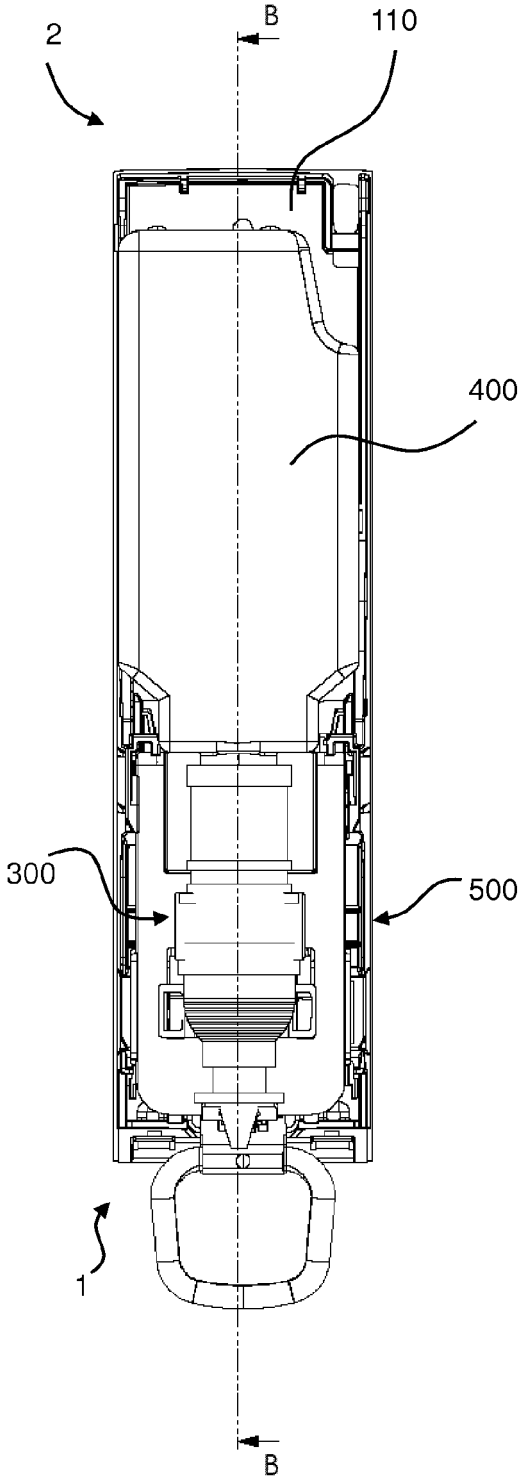

Fig. 2A

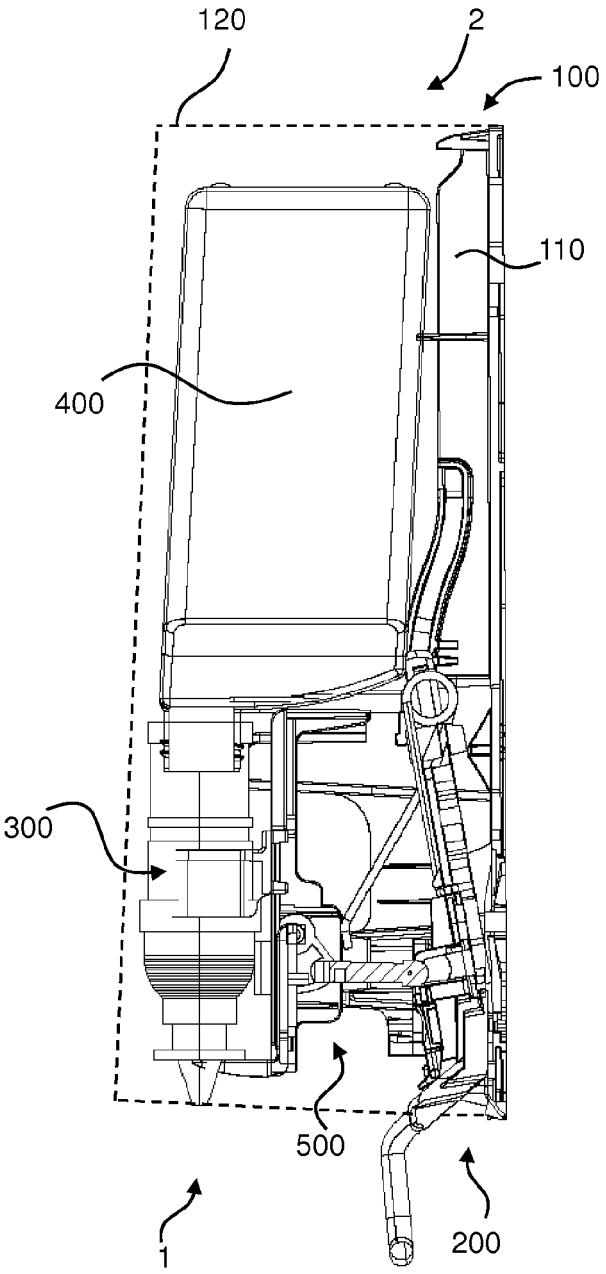

Fig. 2B

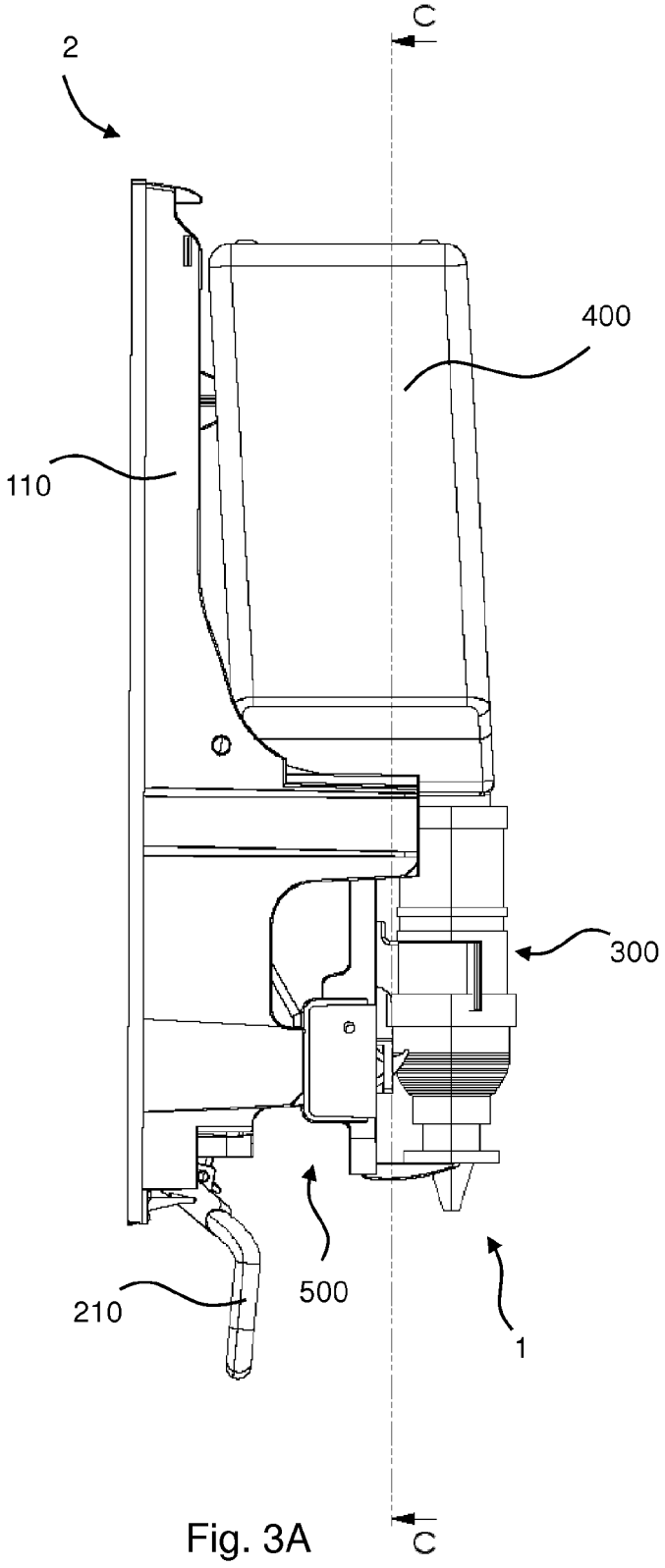

Fig. 3A

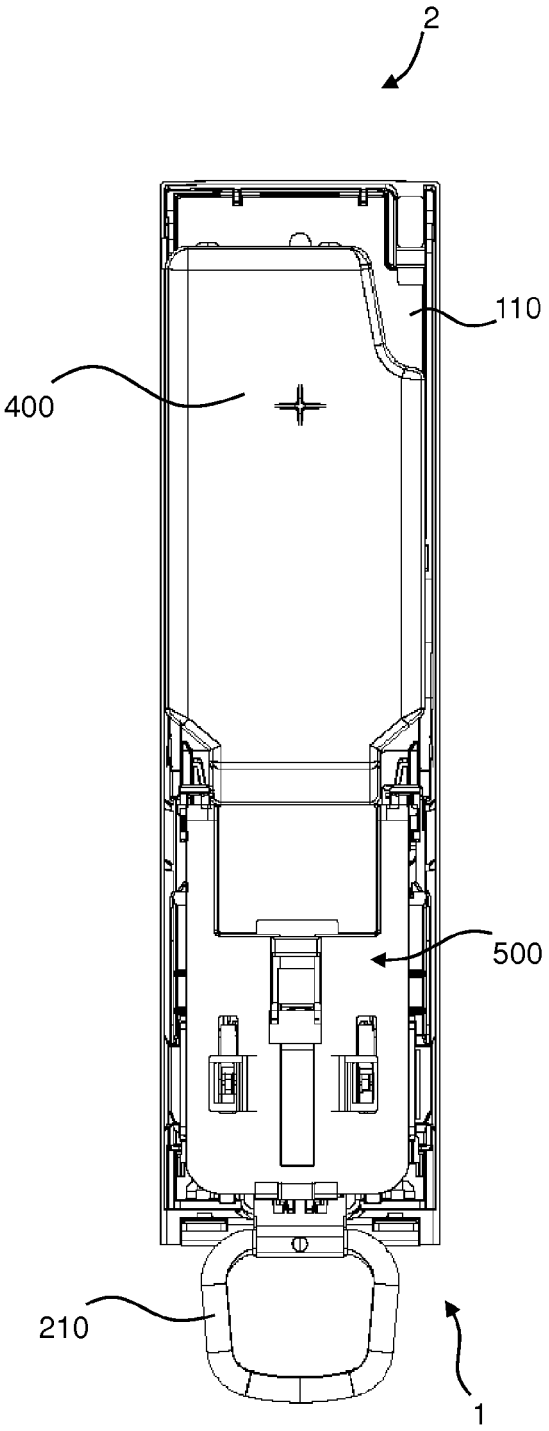

Fig. 3 B

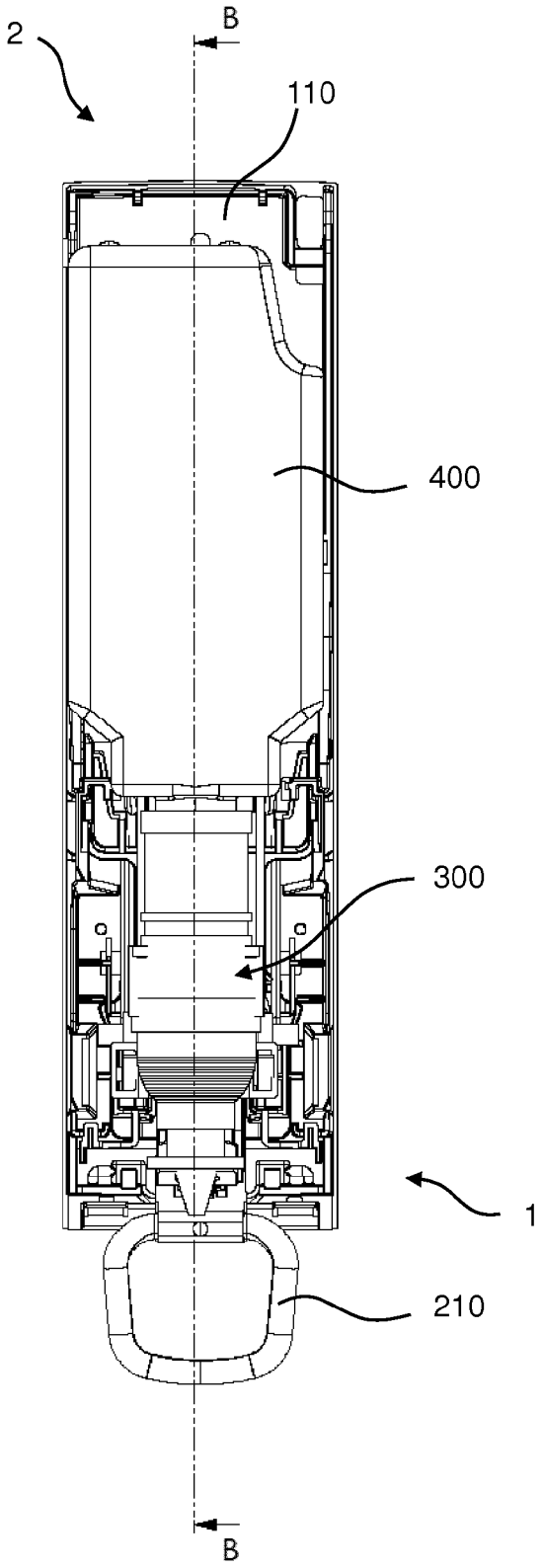

Fig. 4A

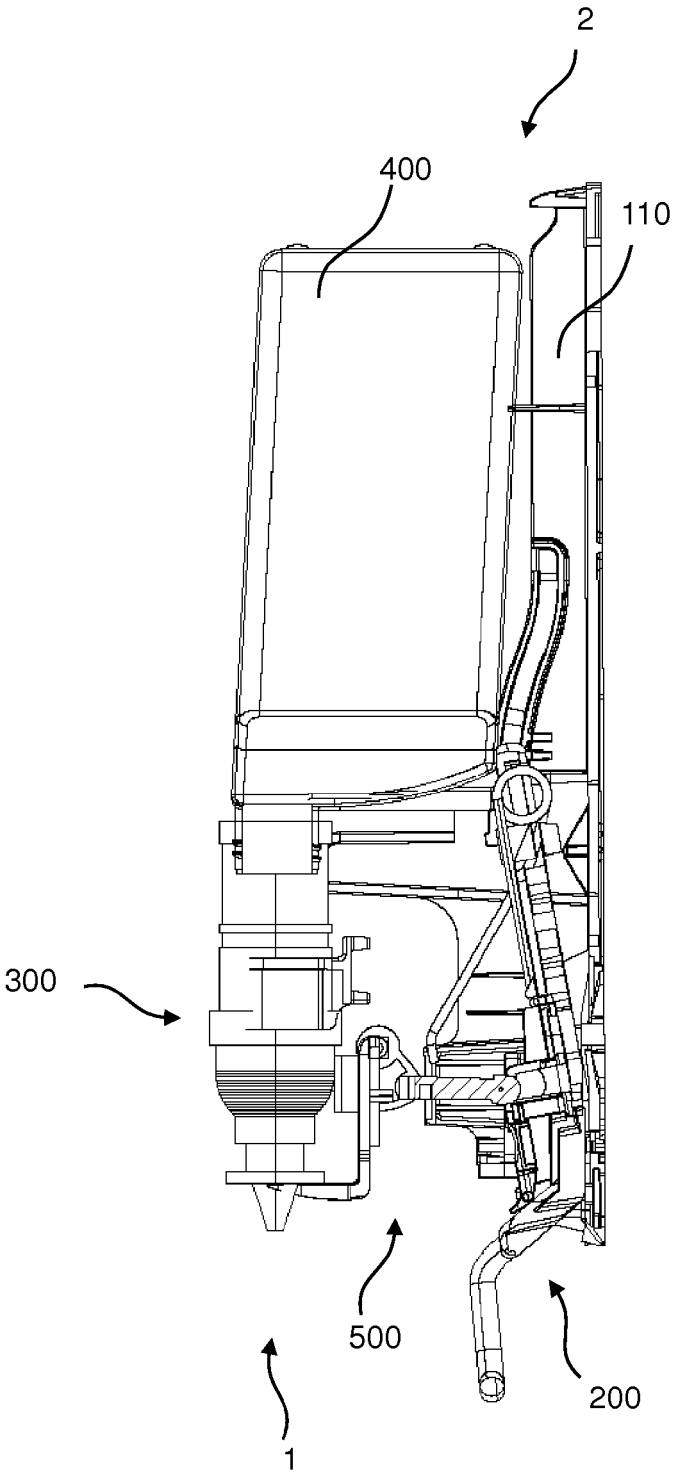

Fig. 4B

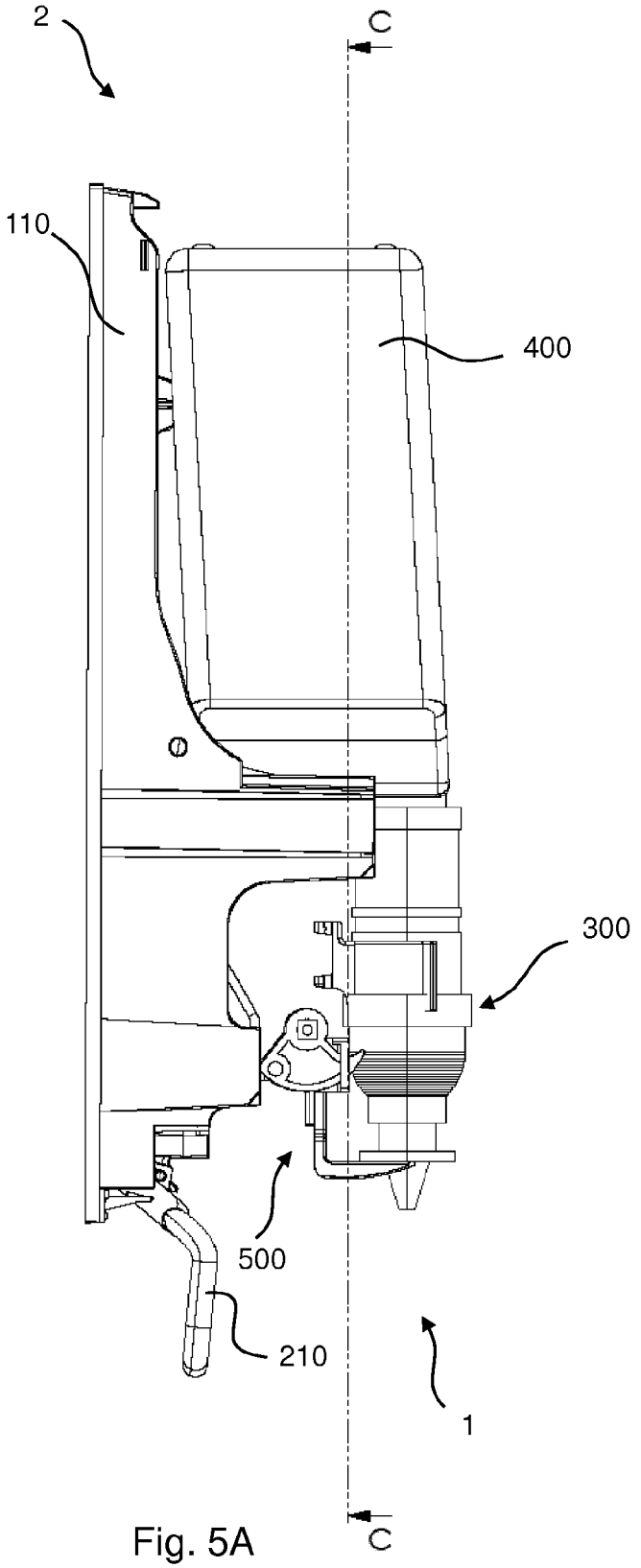

Fig. 5A

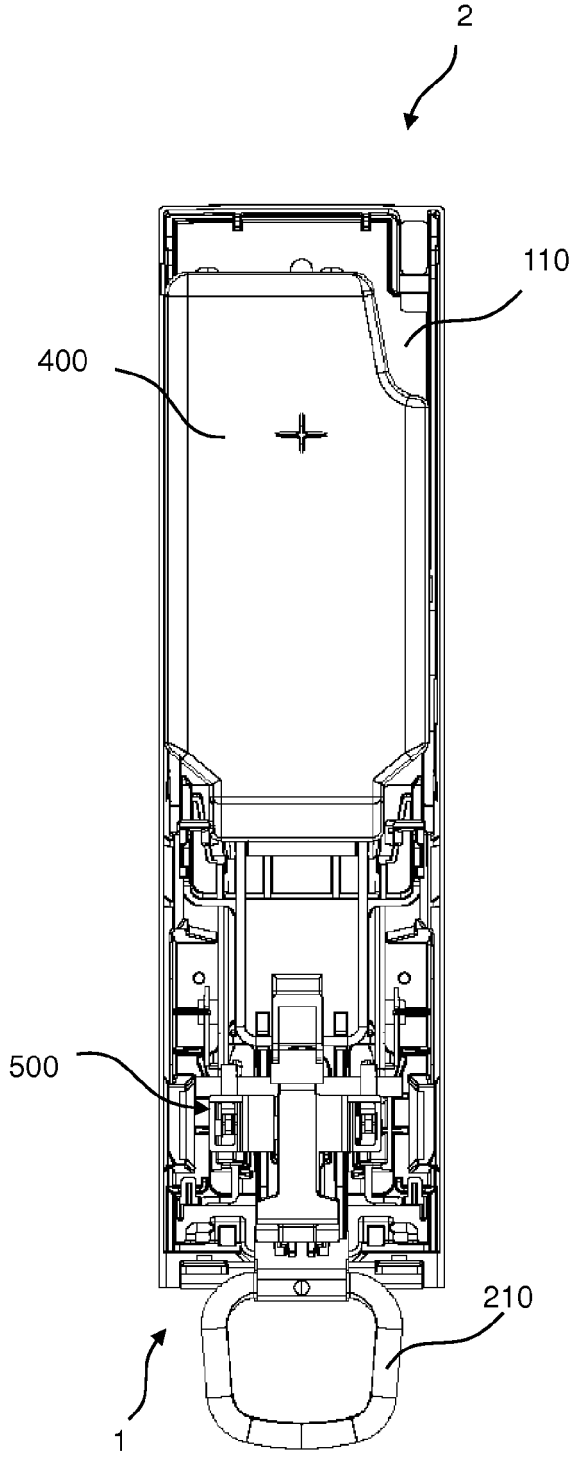

Fig. 5B

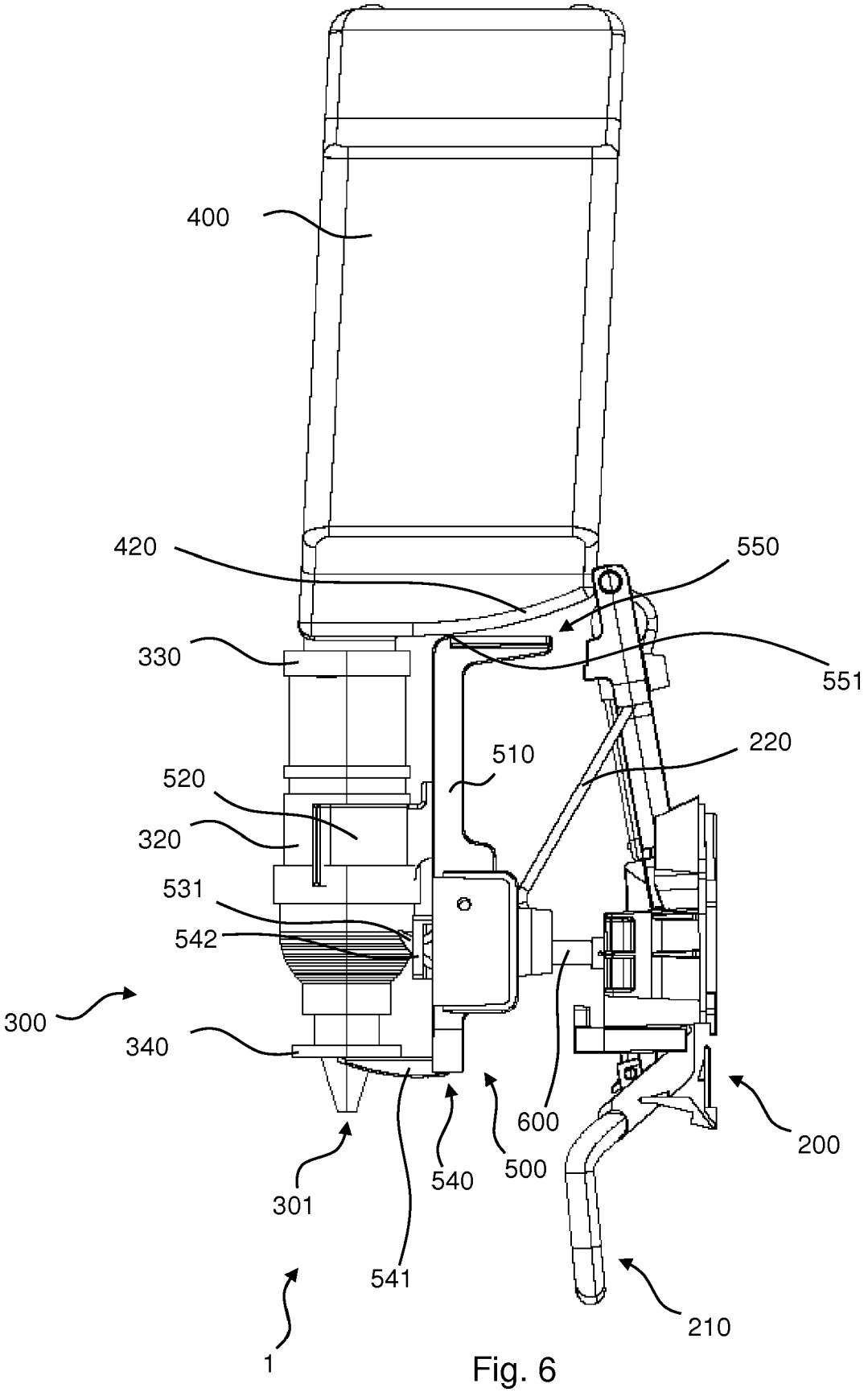
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Fig. 6

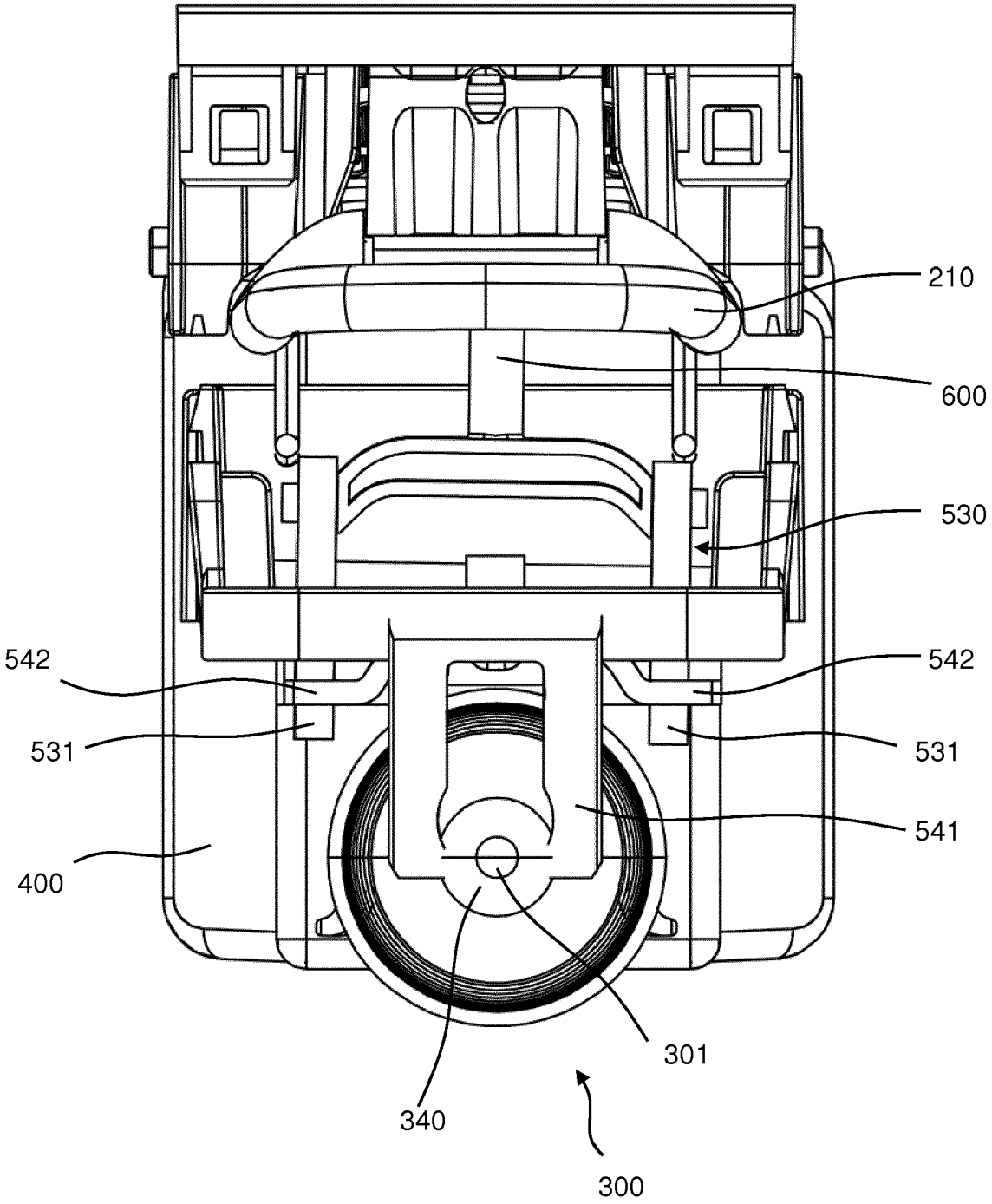

Fig. 7

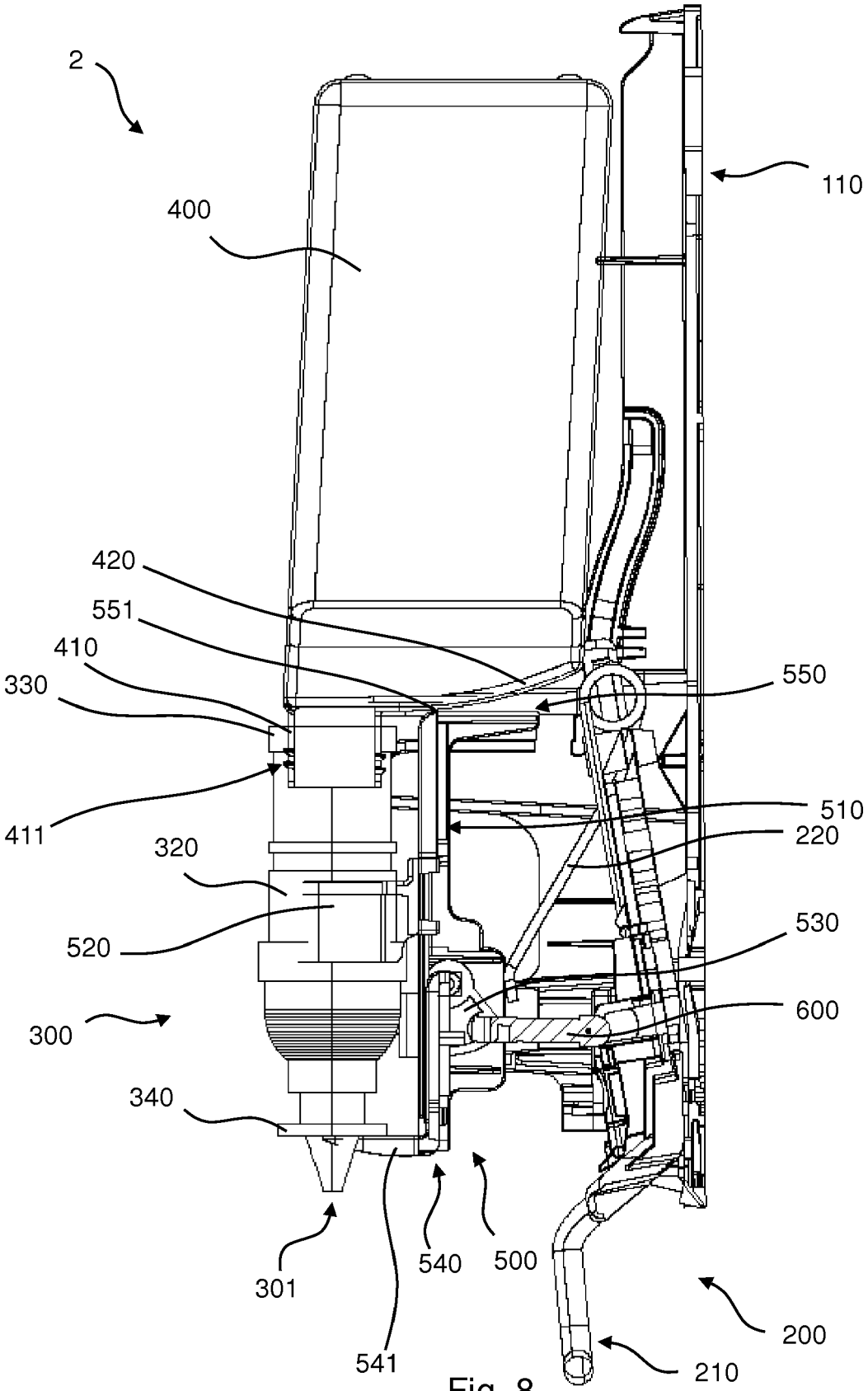
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Fig. 8

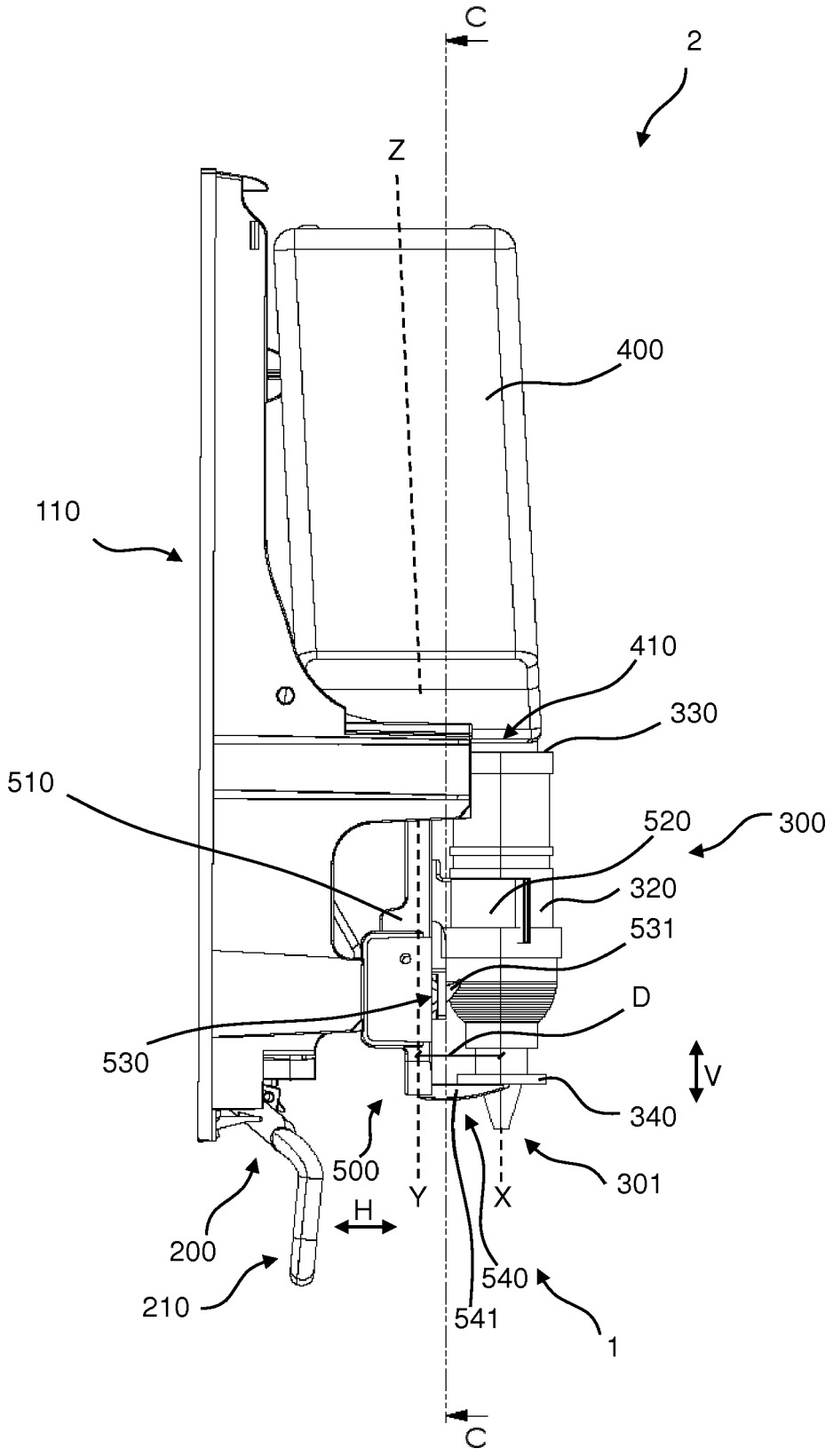
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Fig. 9

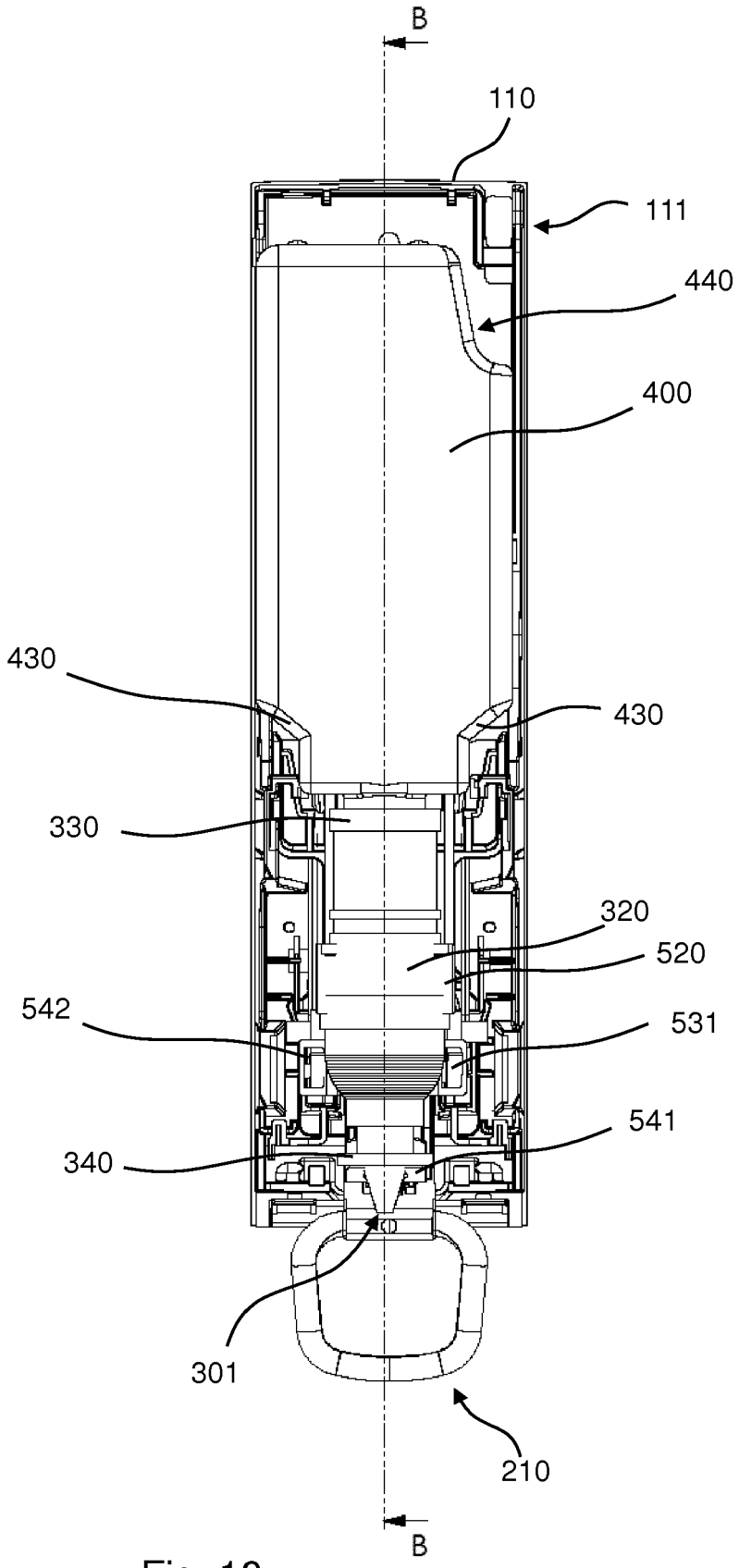

Fig. 10

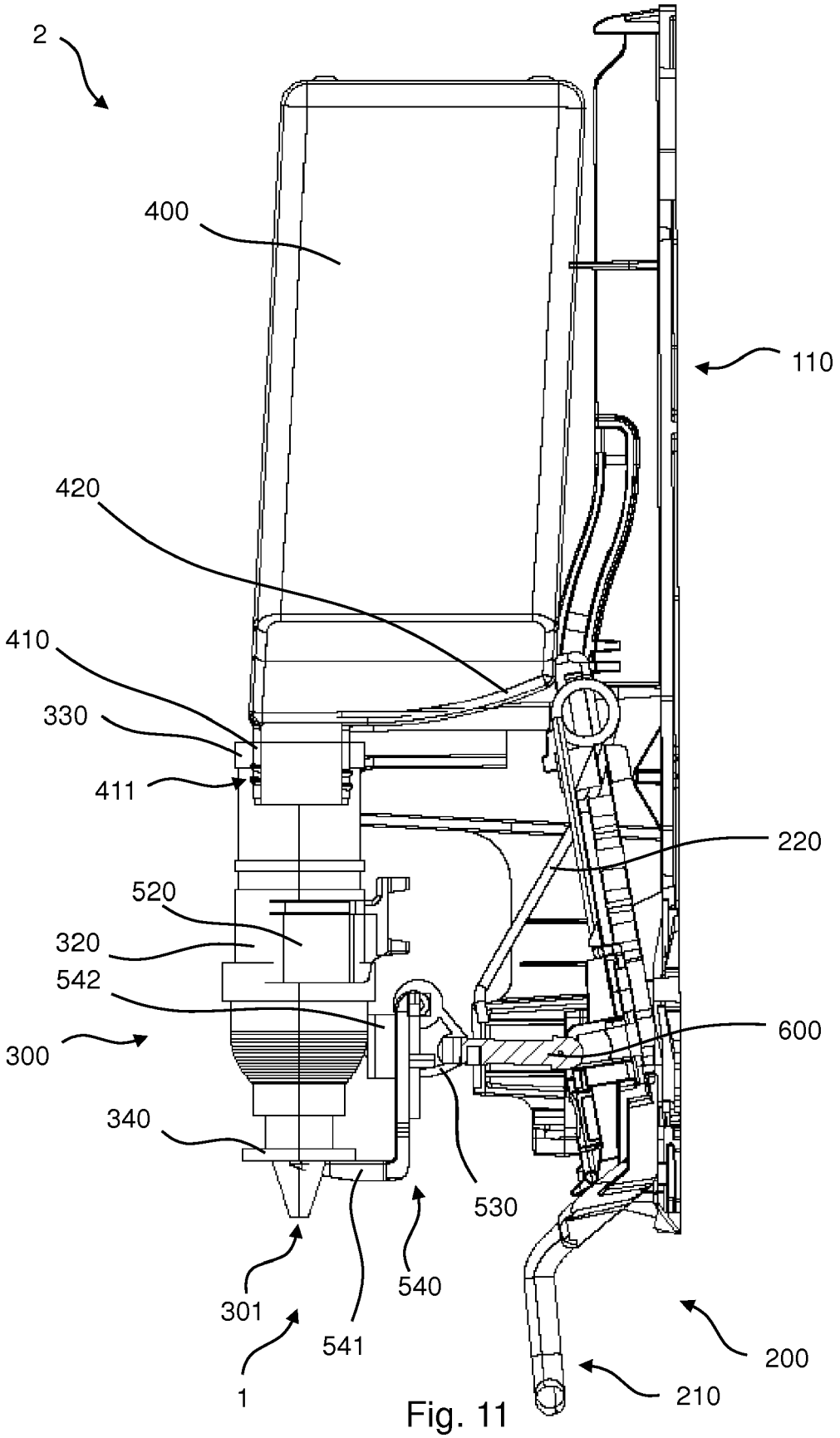
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Fig. 11

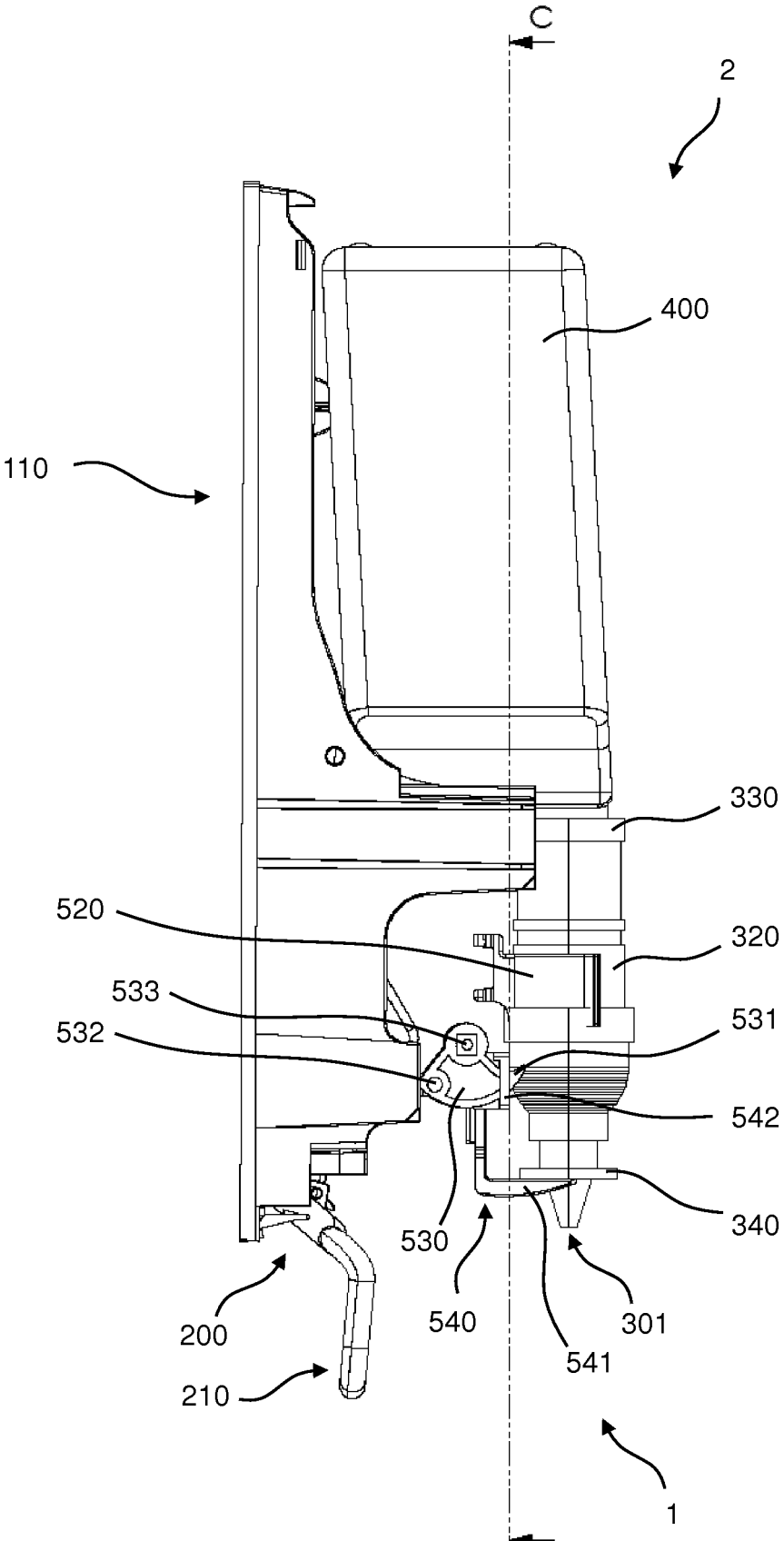
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Fig. 12

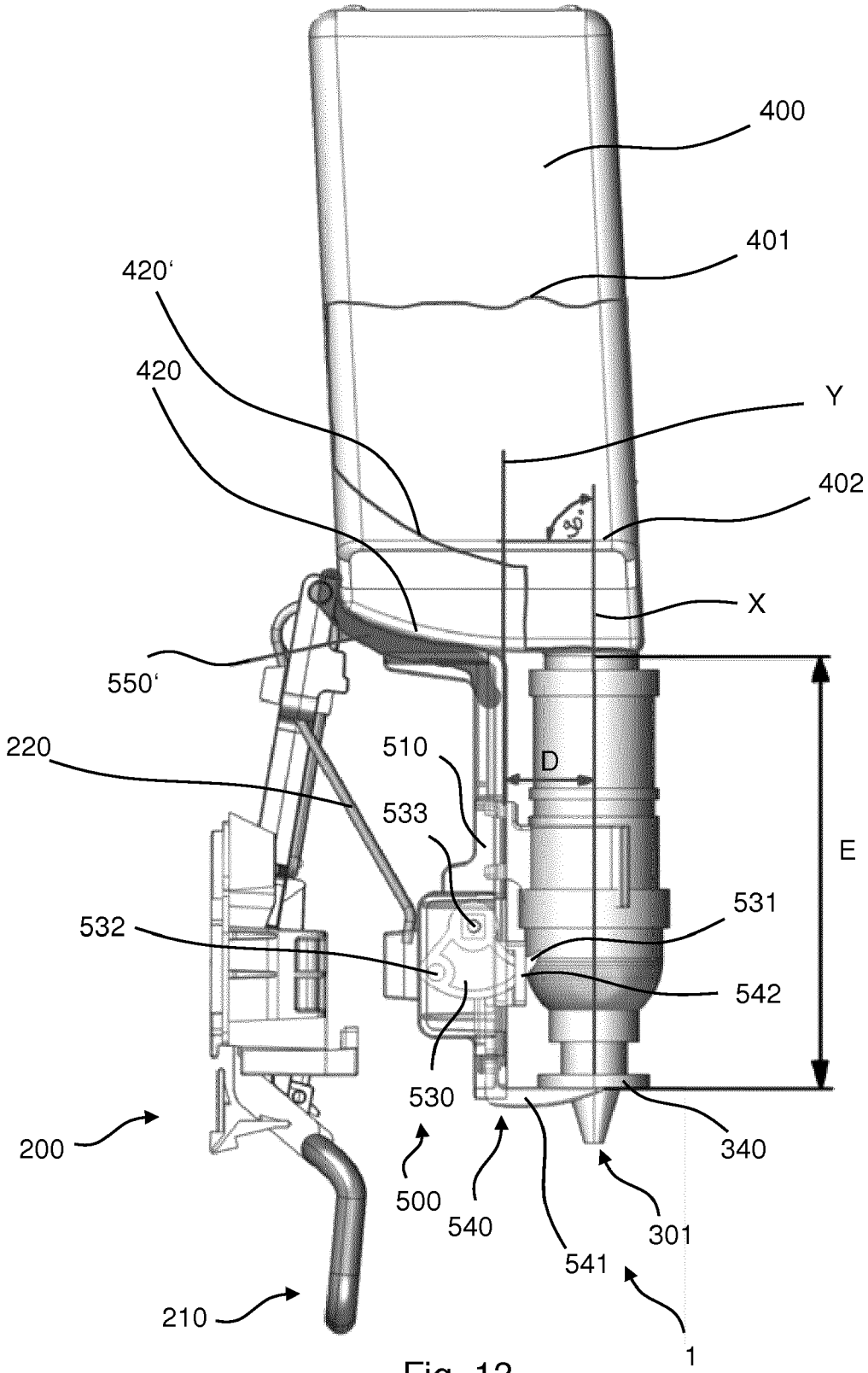
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Fig. 13

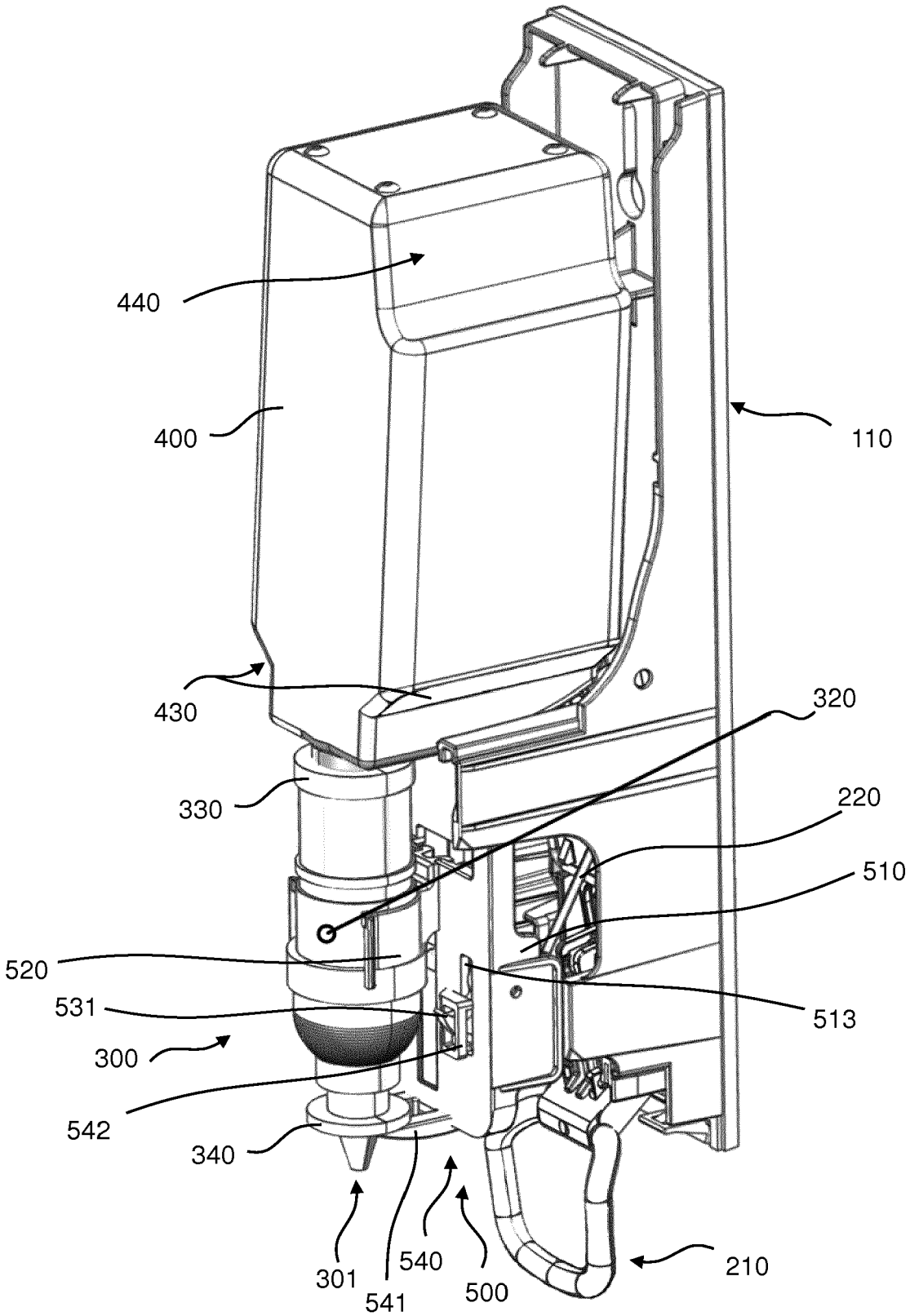
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Fig. 14

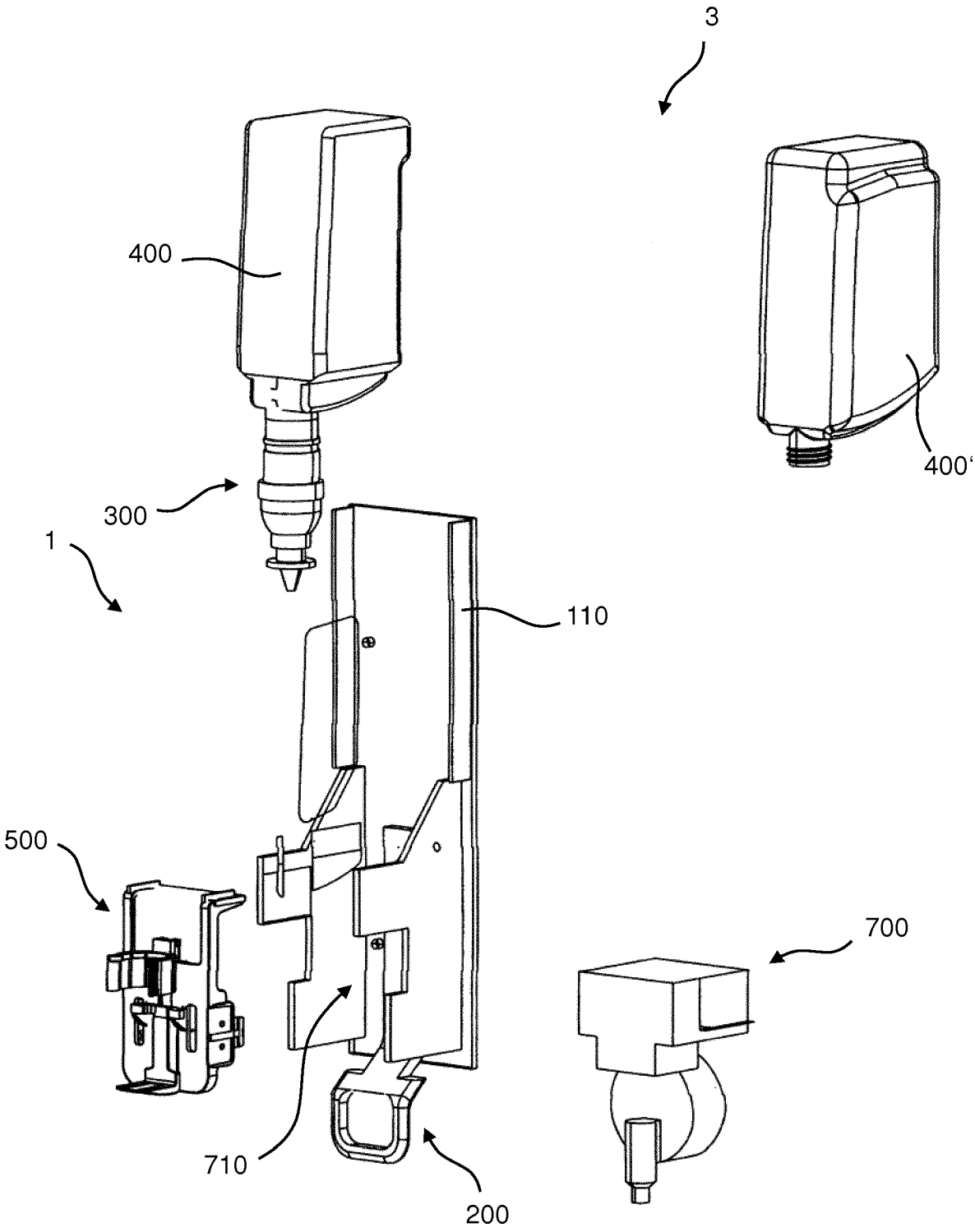

Fig. 15

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EUROPEAN SEARCH REPORT

Application Number
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A47K
B05B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	7 September 2018	Boyer, Olivier

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