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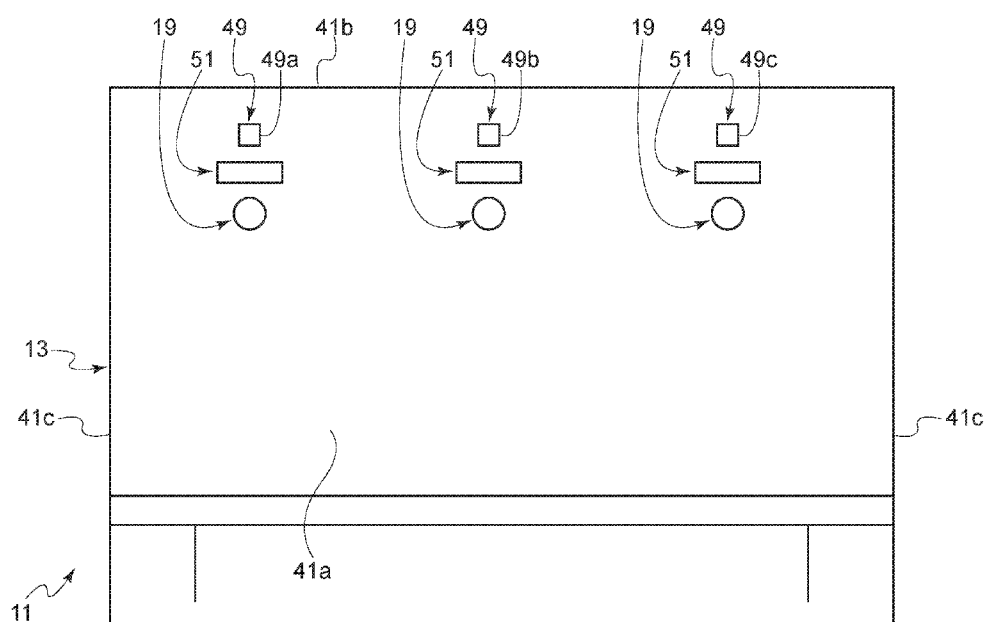


Fig. 1

(57) Abstract: Vending machine (11) for dispensing edible products in a fluid state, comprising: a supporting structure (13); at least one seat (15) defined within the supporting structure (13) and adapted to house at least one flexible container (17) of the product to be dispensed; a dispensing spout (19) from which the dispensed product contained in the container (17) exits; a flexible conduit (21) having one end associated with the container (17) and the opposite end associated with the spout (19); a peristaltic pump (23) for pumping the product contained in the flexible container (17) towards the spout (19); an electronic control unit (25) for controlling the operation of the pump (23), wherein the dispensing spout (19) comprises a rigid tube (19a) adapted to receive therein an end portion (21c) of the flexible conduit (21).

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Vending machine for dispensing edible products in a fluid state

DESCRIPTION

Technical Field

The invention relates to a vending machine for dispensing edible products in a fluid
5 state.

The invention finds particular application in the dispensing to the public of doses of
edible products that are in the fluid state at room temperature. Said products may have a
creamy, pasty or semi-liquid consistency, when they are at room temperature, and may
consist, in particular, though not exclusively, of sauces and food seasonings.

10 The invention is particularly suitable for dispensing doses of edible products in the
fluid state, having a density between 1000 and 3000 cp (centipoise) and even higher densities.

Background Art

Known edible products of the aforementioned type are commonly used to flavor
foodstuffs and include, for example, mayonnaise, ketchup, mustard, various kinds of sauces,
15 tomato sauce, fruit mustard, jams, zabaiones, oils, condiments.

These edible products are sometimes dispensed to the public in the form of loose
foodstuffs to be consumed immediately.

Manual-type dispensers for edible products are known, which use dispensing devices attached
to containers of different shapes and capacities. In general, the dispensing devices comprise
20 small manual pumps, typically lever-operated ones, which are applied to glass jars, buckets or
flexible bags, containing the edible product to be dispensed. In general, these known
dispensers have a series of drawbacks. Although the volume of the container may vary
according to the amount of product to be dispensed and therefore depending on the intended
use, for example in small or large communities, these dispensers still have a reduced capacity
25 for storing food and therefore they do not lend themselves to frequent and prolonged use.

In addition, manual dispensers do not usually have measures for storing the food
product to be dispensed, which comes into contact with the air, for example through the
dispensing conduit. In these cases, the preservation of the food is entrusted to the
preservatives present in the product itself and these dispensers are therefore unsuitable, for
30 example, to dispense biological sauces, which are exempt by law from preservatives.

In general, cleaning and sanitizing of manual dispensers is difficult and sometimes
impossible, unless following the complete disassembly of the pumping system and therefore
with considerable loss of time.

In the case of products in which animal proteins deriving, for example, from eggs,

milk, meat, fish and their derivatives are present, the difficulty of cleaning substantially precludes the use of these dispensers, as it is impossible to provide consumers with sufficient hygienic guarantees in accordance with the laws in force in the food sector.

In known devices it is also difficult to precisely define the quantity of product dispensed, said quantity being given by the force applied to the linkage which drives the pumping mechanism and therefore differing from one operator to another and from one product to another. This last drawback also translates into the impossibility of replicating a predefined dosage, a need that is particularly felt when the device is used in a community or in the catering sector.

For dispensing doses of condiments to be used directly on the purchased food, in the catering sector and in particular in community canteens and fast-food restaurants, small pre-packaged bags containing the condiment are currently used.

However, this practice causes an increase in dispensing costs and product waste, due to the fact that each dose is pre-packaged in a food bag, which therefore can contain an excessive quantity of product for many customers. In addition, bags are frequently not used and are destroyed along with uneaten food residues.

Vending machines capable of dispensing a fluid edible product in the loose state are also known.

An example of a machine of this type for dispensing liquid products such as syrups, concentrates, milk, cheeses, condiments, sauces, is described in US 7,572,113 B2. This machine includes a peristaltic pump to pump the liquid contained in a bag and deliver it through a nozzle.

Machines of this kind are, however, complex and expensive and are suitable for use by service personnel, who work on the machine to dispense the desired dose of product, possibly directly onto the already prepared food.

Furthermore, the cleaning of these machines is cumbersome and, having to be carried out frequently, leads to an increase in operating costs. In addition, the results obtained in the cleaning phase are often not optimal for hygiene.

The use of these machines by the public in the catering sector involves a series of drawbacks.

In the first place, the public tends to dispense a quantity of product greater than the quantity that would be dispensed by service personnel, with a consequent increase in product consumption.

Secondly, the average public is not always capable of operating complex machines,

therefore requiring the presence of an operator, and this brings about an increase in machine management costs.

In known machines of the described type, the use of valves and other organs to interrupt the flow of the product, avoid dripping, etc. makes washing and complete sanitization problematic.

Currently known machines are mostly suitable for dispensing water, beverages, milk, wine and beer, products which, however, involve hygienic problems of a completely different nature and in any case less relevant and critical than in the case of dense products, such as condiments and, for example, protein sauces.

Each element which does not have rounded and blunt shapes and is intercepted by the flow of the edible product can retain parts of the product, which can also be very viscous: think, for example, of a mayonnaise that may have a viscosity (absolute and dynamic) of over 3,000 cp (centipoise).

The treatment of products with these viscosity characteristics consequently makes washing and sanitizing of the machine more complex.

AU 4 612 179 describes a machine for dispensing doses of edible products comprising: a supporting structure, a chamber capable of receiving a container of a product to be dispensed, a dispensing spout from which the doses of the dispensed product exit, a conduit having one end associated with the container and the opposite end associated with the spout, an electric pump capable of pumping the product from the container towards the spout through the conduit, an electronic control unit for controlling the operation of the pump.

However, the machine described in the aforementioned document does not solve the problem of how to avoid excessive dispensing of the product by the user. It also has the disadvantage caused by the delayed and unwanted delivery of a certain amount of product, due to dripping from the spout at the end of delivery.

IT 1408998, in the name of the applicant, describes a machine that overcomes the drawbacks of the known art and solves the aforementioned problems by means of a control circuit, associated with the electronic control unit and programmed to make the pump perform a first, pumping cycle, in which the pump operates to pump the product contained in the container towards the spout, a second, suction cycle, in which the pump operates to suck up at least part of the product remaining in the conduit, and a waiting cycle, in which the pump is inhibited from pumping the edible product.

A problem associated with the aforementioned vending machine derives from the complexity of the washing operations, which must necessarily be carried out when the

product container to be dispensed is replaced, for example when it is exhausted, with a new one.

This problem derives in particular from the fact that known machines of the
aforementioned type generally use flexible conduits for dispensing the fluid product. Flexible
5 conduits are advantageous since they can be adapted to the use of peristaltic pumps,
associated along the conduit, the organs of which do not come into contact with the product
dispensed. This configuration provides advantages in terms of ease of cleaning of the parts of
the vending machine, washing of the conduits alone being sufficient. On the other hand, the
material of the flexible conduits is not suitable for making the outlet portion of the circuit for
10 dispensing the product. It is therefore necessary to connect the flexible conduit to a rigid
spout, firmly attached to the structure of the machine. The spout represents the end part of the
dispensing circuit and the open front end of the spout defines the outlet opening for the
product. In use, in general, the user places a container under the spout to collect the dose of
product dispensed. The container can be a vessel or a glass or a plate and can sometimes
15 contain food products, for example foodstuffs ready to be consumed, destined to be seasoned
with the product supplied by the vending machine. This circumstance, together with the fact
that the container of the product to be dispensed must periodically be replaced, since it is
exhausted, can cause contamination of the spout and the consequent need for thorough
washing.

20 A first object of the invention is therefore to obtain cleaning of the product delivery
circuit so that the vending machine is ready to receive a new container of product to be
dispensed without risk of contamination with unwanted substances.

Another object of the invention is to provide a vending machine for dispensing edible
products in the fluid state, which overcomes the aforementioned drawbacks and can be easily
25 washed, allowing compliance with the hygiene standards adopted in the food sector.

A further object of the invention is to provide a vending machine of the
aforementioned type, which allows flexibility of use and is therefore suitable for multiple
situations of use, both for service to the public, for example for service in canteens, fast food
shops, etc., and service in kitchens and other places for food preparation, as well as in the
30 private sector.

Another object of the invention is to provide a vending machine of the aforesaid type
particularly suitable for dispensing doses of edible products in the fluid state having
preferably a density of between 1000 and 3000 cp (centipoise), but also higher densities.

A further object of the invention is to provide a vending machine which can be

produced industrially at low costs.

Disclosure of the Invention

The aforementioned and other objects are obtained with the vending machine as claimed in the appended claims.

Advantageously, the vending machine for dispensing edible products in the fluid state according to the invention does not require substantially frequent washing operations. This result is achieved thanks to the provision of a container and a conduit for delivering the edible product, which avoids contact between the products and other parts of the machine. In this way, when the container must be replaced with a new one, it is also possible to replace the respective conduit with a new one. Moreover, advantageously, the new container full of product and the relative conduit can be supplied in a kit that is easy to transport and install.

The vending machine for dispensing edible products in the fluid state according to the invention generally comprises a supporting structure within which at least one seat is defined which is adapted to house at least one flexible container of the product to be dispensed. Optionally, the container may comprise a rigid or semi-rigid outer cladding, for example made of cardboard, which facilitates transport and storage thereof.

In a preferred embodiment of the invention, the flexible container is a container for foodstuffs, of a type known in the field as a "bag in box", consisting of a flexible bag with a capacity of 1 to 1,000 kg of product, inserted in a cardboard package. An example of a container suitable for the purpose is currently marketed under the Politainer® brand. This type of containers comprises a flexible bag made of plastic material suitable for foodstuffs, for example based on low density polyethylene (LDPE), or made of an EVOH/PA co-extruded film based on PA (polyamide) and having a barrier layer of EVOH (ethylene vinyl alcohol) having the property of protecting the content from oxidation and reducing gas release processes. The bag, when filled, has a substantially cubic or parallelepiped shape and comprises a base provided with an outlet mouth for the product stored in the container. The outlet mouth is preferably provided with a connecting element on which a closure plug, for example a screw cap or a pressure cap, or a complementary fitting for connecting a conduit or a tap can be fitted, through which the product contained in the container is delivered to the outside.

The seat defined within the supporting structure preferably comprises a supporting base for the container, and side walls. Preferably, the supporting base, or lower base, has a horseshoe shape capable of supporting the periphery of the base of the container, leaving free the central part provided with an outlet mouth for the product contained in the container.

Preferably, the supporting base comprises a horseshoe-shaped horizontal shelf arranged in a raised position at a certain distance from the base of the housing in order to facilitate the operations of replacing the bag. In addition, according to the invention, preferably the side walls of the seat for the flexible container partially surround the container, so that at least a portion of the side wall of the container is visible from the outside of the seat, so that its filling level can be appreciated, thanks to the fact that the container is made of transparent material or thanks to the fact that the container collapses as it is emptied. The upper base of the seat for the flexible container is, instead, preferably open or possibly equipped with a corresponding openable lid, in order to allow easy replacement of the container housed in the corresponding seat.

The vending machine according to the invention further comprises a dispensing spout from which the dispensed product contained in the container exits. According to a preferred embodiment of the invention, the dispensing spout is firmly but removably fixed to the supporting structure.

According to the invention, the fluid product contained in the flexible container housed in the seat inside the supporting structure is transported to the dispensing spout by means of a flexible conduit, cooperating with a pump driven by an electric motor and associated with the supporting structure.

A first end of the flexible conduit is preferably associated with the container by means of a corresponding fitting which connects the conduit to the inside of the container through the outlet mouth.

The pump is adapted to create, at predetermined intervals, a throttling slidable along a portion of the flexible conduit. The slidable throttling is capable of imparting prevalence to the fluid carried within the conduit and consequently of pumping the product contained in the flexible container towards the spout. Still according to the invention, the pump is preferably a pump of the peristaltic type.

The vending machine according to the invention further comprises an electronic control unit for controlling the operation of the electric motor of the pump. According to the invention, the electronic control unit is programmed to control the operation of the pump, i.e. for causing the electric motor of the pump to perform a certain number of revolutions, either depending on a signal of movement, for example coming from an encoder, or depending on a time signal imparted by a counter.

Preferably, the electronic control unit is housed in a suitable housing defined within the supporting structure.

In a first preferred embodiment, the invention is advantageous mainly due to the fact that the dispensing spout comprises a rigid tube which can house therein an end portion of said flexible conduit.

Advantageously, thanks to this configuration, the spout is able to house therein an end portion of the flexible conduit. Therefore, according to the invention, the fluid product contained in the container can be carried to the outside, and delivered to the user that may request it, solely through the flexible conduit, which, however, extends through the end portion inside a rigid guide defined by the dispensing spout. The presence of the rigid guide forces the conduit to follow a predetermined optimal path and prevents the conduit from being deformed under the possible thrust exerted by the containers used for collecting the dispensed product and brought each time under the spout by the users of the vending machine.

Preferably, the rigid tube is made of stainless steel. Preferably, the rigid tube further has a circular cross-section having an inner diameter no smaller than the outer cross-section of the conduit.

According to this embodiment of the invention, the dispensing spout preferably comprises a connecting portion provided with means capable of cooperating with corresponding counter-means, firmly associated with the supporting structure. The cooperation between the connecting means provided on the spout and the counter-means provided on the supporting structure allows to removably connect the spout to the supporting structure.

In a second preferred embodiment, the invention is advantageous mainly due to the fact that the supporting structure comprises a housing provided with a front wall having at least one hole receiving an annular elastic member adapted to hold said spout. The annular elastic member is removable and axially bored so as to hold said spout within its axial bore. The spout is also held within the annular member so that a first spout portion associated with the flexible conduit is inside the housing and a second spout portion, ending in an outlet end for the product to be dispensed, protrudes outside the housing.

According to this embodiment of the invention, dispensing of the fluid edible product contained in the container associated with the spout through the flexible conduit takes place through said outlet end of the spout, and the kit comprising the container, the conduit and the spout can be removed from the vending machine for being replaced with a similar kit once the product in the container has been entirely dispensed. Preferably, according to the invention, the outlet end of the spout is provided with a duckbill valve for preventing a residue of product that may remain after completion of product dispensing from being left exposed on

the outside of the spout and coming into contact with the atmosphere of the surrounding environment. Advantageously, according to this embodiment of the invention, all the members passed through by the edible product dispensed by the vending machine are replaced simultaneously and without the need to separate them from one another, thus avoiding the risks for parts of the vending machine to become contaminated with said edible product.

Still according to this second embodiment of the invention, said dispensing spout preferably comprises a tube made of plastic material, in which a first portion is defined having, on its outside, annular retaining protrusions, adapted to keep the flexible conduit firmly fixed to the spout, which flexible conduit is arranged with interference fit on said retaining portion. Preferably, in addition, said tube comprises a second portion which is smooth on its outside and is intended for remaining outside the housing of the vending machine, when the spout is retained within the supporting structure by the annular elastic member. Even more preferably, an annular projection adapted to form a corresponding abutment edge for said annular elastic member is provided between said two spout portions, said annular projection being arranged outside said housing in order to prevent said spout from withdrawing into the housing due to an outer thrust applied by a vessel inadvertently brought into contact with the spout during dispensing of the edible product.

Advantageously, according to the invention, the supporting structure further comprises preferably a front, inclined wall from which the dispensing spout protrudes, so as to at least partially conceal the outer portion of the dispensing spout. The inclination of the inclined wall is preferably comprised between 30° and 60° relative to the horizontal plane supporting the vending machine. Still more preferably, said inclination is about 45°.

The vending machine according to the invention has a series of further advantages that will be listed here below.

The vending machine has high constructive simplicity and low cost and is therefore suitable to meet the needs of a wide market range.

In the event that the vending machine has to dispense more edible products, each product will be dispensed by a separate dedicated hydraulic circuit equipped with a respective pump and dispensing spout. This feature determines the advantage of keeping edible products separated and reducing the number of components subject to product accumulation and therefore difficult to clean.

Advantageously, the vending machine according to the invention exploits the capillary effect of the dispensing spout itself and therefore preferably has no block valves for the exiting product.

Advantageously, the dispensing spout, once removed from the vending machine, can be washed with various means, for example by using hot water and steam without using chemical detergents, thereby avoiding the risk deriving from the possibility that residues of the washing liquid may come into contact with the edible product dispensed to the consumer.

5 The vending machine according to the invention can advantageously be equipped with any number of dispensing spouts, for example two or three or more spouts, and can be used for dispensing products that are all different from one another, or only partially different from one another or even all equal to one another, in order to guarantee higher autonomy.

Brief Description of the Figures

10 Some preferred embodiments of the invention will be described below by way of non-limiting example with reference to the appended figures, in which:

- Fig.1 is a front plan view of the vending machine according to a first embodiment of the invention;
- Fig.2 is a side plan view of the vending machine of Fig.1 with front panel closed;
- 15 – Fig.3 is a side plan view of the vending machine of Fig.1 with front panel open;
- Fig.4 is a front plan view of the inside of the vending machine of Fig.1 from which the flexible conduits have been removed;
- Fig.5 is a top plan view of the inside of the vending machine of Fig.1 from which two flexible conduits out of three have been removed;
- 20 – Fig.6 is a side plan view of the inside of the vending machine of Fig.1 from which the flexible conduit has been removed;
- Figs.7A and 7B are schematic views of corresponding embodiments of the spout;
- Fig. 8 is a perspective view of the vending machine according to a second embodiment of the invention;
- 25 – Fig. 9 is a front plan view of the vending machine of Fig. 8;
- Fig. 10 is a lateral section along a vertical plane of the vending machine of Fig. 8;
- Fig. 11 is a lateral section along a vertical plane of the vending machine of Fig. 8 with front panel open;
- Fig. 12 is a front plan view of the vending machine of Fig. 8 with front panel open;
- 30 – Fig. 13 is a perspective view of a further embodiment of the spout.

The same reference numerals have been used in all figures to identify the same or functionally equivalent components.

Description of Some Preferred Embodiments

Referring to Figures 1 to 6, a first preferred embodiment of the vending machine is

shown, which has been indicated as a whole with reference numeral 11.

The vending machine 11 for dispensing edible products in the fluid state comprises a supporting structure 13 in which three seats 15 are defined capable of housing a corresponding flexible container 17 containing a product to be dispensed by means of the vending machine 11.

A seat 15 defined within the supporting structure 13 comprises a supporting base 15a for the container 17, and side walls 15b,15c, a rear wall 15d and a pair of front wings 15e partially frontally extending in order to hold the peripheral edges of the containers 17.

In the illustrated embodiment, the side walls of adjacent seats 15 are in common between the seats 15. The base 15a, the side walls 15b,15c, the rear wall 15d and the front wings 15e are made of sheet metal or plastic.

A corresponding number of spouts 19 are provided for the exit of the product contained in each of the three containers 17.

A flexible conduit 21 is associated, at a first end 21a thereof, with the container 17 by means of a corresponding fitting 31. The supporting base 15a, or lower base, has a horseshoe shape capable of supporting the periphery of the base of the container 17, leaving free the central part provided with an outlet mouth and a corresponding fitting 31 for the product contained in the container.

The opposite end 21b of the conduit 21 is associated with the spout 19, as will become more evident from the ensuing description.

A pump 23 associated with the supporting structure 13 and driven by an electric motor 23a is adapted to create, at predetermined intervals, a throttling slidable along a portion of the conduit 21. The cyclic sliding of the throttling is capable of imparting prevalence to the fluid carried within the conduit 21 and, consequently, of pumping the product contained in the flexible container 17 towards the open end 21b of the conduit 21 associated with the spout 19.

An electronic control unit 25, comprising a corresponding electronic circuit board and respective printed circuits, is provided for controlling the operation of the electric motor 23a of the pump 23.

According to the invention, the dispensing spout 19 comprises a rigid tube 19a made of stainless steel and having opposite open ends 19b,19c. Advantageously, according to a preferred embodiment of the invention, the spout 19 has a circular cross-section having a diameter "D" substantially equal to the diameter "d" of the outer cross-section of the conduit 21, so that the flexible conduit 21 can be inserted and held by interference fit in the spout 19. Possibly the inner diameter of the spout 19 may be made slightly smaller than the diameter of

the conduit 21, which, being made of a compressible material, can be inserted by interference fit into the spout 19. In still further embodiments, the inner diameter of the spout 19 may be made so as to interfere with the outer diameter of the conduit 21 only over a portion of said spout. In this case, the spout may contain, for example, a squashing or narrowing, for holding
5 therein the flexible conduit 21.

The spout 19, being adapted to receive therein an end portion 21c of the conduit 21, having a length at least substantially equal to the length of the spout 19, allows exit of the product without the product coming into contact with the surface of the spout 19, which, therefore, does not substantially require internal washing, but only, if at all, external cleaning.

10 As can be better appreciated in Fig.7A, the spout 19 comprises a connecting portion 19d provided with means 33 capable of cooperating with corresponding counter-means 35 for removably connecting the spout 19 to the supporting structure 13. According to this embodiment of the invention, said means include a flange 33a extending radially outside the spout 19 and having holes for the passage of the threaded shafts of screws engaging in
15 threaded bores provided in the supporting structure 13, or in corresponding threaded nuts.

In an embodiment variant shown in Fig.7B, the end portion 21c of the flexible conduit 21 comprises a proximal end 21d having stop means 21e capable of interfering with the first end 19b, or inner end, of the dispensing spout 19. Thanks to this measure, advantageously, when said stop means 21e are in abutment against said first end 19b of the dispensing spout
20 19, the flexible conduit 21 extends within the spout 19 over the entire length of the spout, until at least the open end 19c, which is opposite to said first end and from which the dispensed product exits. In a particular embodiment, the stop means 21e may consist of a ring 37 surrounding the conduit 21 and press-fitted on the conduit 21. Alternatively, a mark, for example a colored annular band can be provided on the conduit 21, said mark indicating to
25 the installer the correct position for placing the portion 21c into the spout 19.

Still referring to Fig.7B, an embodiment variant of the means 33 capable of cooperating with corresponding counter-means 35 for removably connecting the spout 19 to the supporting structure 13 is also illustrated. According to this embodiment variant, the means 33,35 comprise a corresponding quick release coupling of the bayonet-like type.

30 Referring again to Figs. 1 to 6, the supporting structure 13 comprises a housing 13a defining therein a chamber 39, separated from the environment outside the vending machine 11 by the walls 41 of the housing 13a. In the shown embodiment, the chamber 39 houses therein three seats 15 for corresponding flexible containers 17. In addition, the pump 23 and the conduit 21 are also housed within the chamber 39 on the horizontal base wall 41d.

Preferably, each pump 23 is arranged with the motor 23a under the base wall 41d and with the pump portion above said base wall 41d. Advantageously, this arrangement allows to rationally distribute the parts within the chamber 39 and to separate the electric motors from the region exposed to liquid or semi-liquid products, while also making cleaning of the chamber 39 safer and easier. The dispensing spout 19 communicates the chamber 39 with the environment outside the vending machine 11. According to this preferred embodiment of the invention, the conduit 21 exits said chamber 39 with an end portion 21c extending within said spout 19.

In order to facilitate the operations of cleaning the structure 13, each seat 15 comprises a supporting base 15a defining a corresponding horseshoe-shaped horizontal shelf arranged in a raised position at a certain distance from the horizontal base 41d of the vending machine.

In this preferred embodiment of the invention, the front wall 41a of the housing 13a is openable, preferably hinged at its lower part, and the counter-means for removably connecting the spout 19 are associated with said openable wall 41a at a corresponding hole 43 for the passage of the tube made of stainless steel 19a defining the spout 19. A rear wall 41e, possibly a removable one, is also provided for closing the chamber 39 at its rear.

The electronic control unit 25 preferably comprises a microprocessor, a storage unit and a power supply unit and is connected to a visual display 47 as well as to a set of control push-buttons 49 and a set of indicator lights 51. The electronic control unit 25 is programmed to cause the pump to complete a pumping cycle which corresponds to a number N1 of revolutions of the rotor of the electric motor 23a driving the pump 23. For this reason, the pump 23 is provided at its inside with an encoder device arranged to generate an electric signal indicative of the number of revolutions performed by the motor 23a. The pump 23 operates to pump the product contained in the container 17 towards the spout 19. In addition, the pump 23 preferably operates, at the end of the cycle of dispensing the predetermined dose, a suction cycle corresponding to a number N2 of revolutions of the rotor of the electric motor 23. The suction cycle can be obtained by inverting the direction of rotation of the electric motor 23a driving the pump 23. In the suction cycle, at least part of the product that may be present in the end portion of the flexible conduit 21 is sucked up towards the container 17.

In addition, preferably, the electronic control unit 25 is programmed for carrying out, after each dispensing cycle, a waiting cycle having a duration T1, in which the pump 23 is inhibited from pumping the product contained in the container 17.

According to the invention, for each product to be dispensed, i.e. for each container 17, a corresponding dispensing spout 19, a corresponding conduit 21 and a corresponding

pump 23 are preferably provided, said spout 19, conduit 21 and pump 23 being dedicated solely to a single product and container 17. Furthermore, still according to a preferred embodiment of the invention, the product contained in the corresponding container 17 can be dispensed by acting onto a corresponding push-button 49a,49b,49c provided on the wall 41a of the housing 13a next to the hole 43 from which the corresponding spout 19 protrudes. A label or indicator light or display 51 may preferably be provided next to each push-button 49a,49b,49c in order to indicate the kind of product dispensed through the corresponding spout 19.

In a preferred embodiment of the invention, the supporting structure 13 comprises panels 41, for example made of wood, metal or plastic, mutually associated so as to form a self-standing structure. At least one of the panels 41 is preferably removable for accessing the inside of the vending machine 11 and in particular the chamber 39, for example for placing or removing the containers 17. In order to make visible the parts of the vending machine 11 that are arranged within the chamber 39, the illustrations of Figs. 4, 5, 6 show a vending machine 11 without the front panel 41a, the top panel 41b and the side panel 41c, respectively. In addition, for the sake of simplicity, the conduit 21 has been shown only in Fig. 5 in association with the container 17 located in the central seat 15. The conduit 21 may, preferably, be part of a refill kit for the vending machine 11. Said kit preferably comprises a container 17 full of the product to be dispensed, a conduit 21 already associated with the container 17 by means of the fitting 31, and a closing element, for example a removable clip or a cap which prevents the product from exiting the container 17 through the conduit 21 during transport. Alternatively, it will also be possible to provide the container 17 and the conduit 21 separated from each other, and to fit the conduit 21 onto the fitting 31 only when the kit has to be installed on the vending machine 11. In this case, the conduit 21 can be associated with the container 17, for example made as a bag, by means of the fitting 31, preferably of the quick release type, which allows to associate the conduit 21 with a flexible-type container having, in turn, a complementary fitting.

In the illustrated example, the vending machine 11 defines a corresponding unit provided with three dispensing spouts 19, each of them being associated with a corresponding container 17 through a corresponding conduit 21 associated with a corresponding pump 23. However, embodiments of the vending machine 11 according to the invention are possible in which a single dispensing spout 19 is provided or more than three spouts are provided. In addition, the panels 41 preferably define a supporting structure 13 of the modular type, adapted to be associated with an equivalent structure, for making a complex vending machine

11, equipped with any number of dispensing spouts, for example multiples of three in the illustrated example.

The dispensing spout 19 preferably has a curved or “L” shape and is preferably oriented downwards when the vending machine 11 is in operation, as illustrated in the figures, and is preferably free, i.e. it has no block valves. According to the invention, indeed, any leakage of the edible product dispensed through the corresponding spout 19 is substantially prevented by the suction cycle of the pump 23. Preferably, outside the housing 13a a collecting region 53 is provided having a grid 53a and a pan 53b, preferably a removable pan, for collecting drops of product that may be dispersed during dispensing through the spouts 19.

The conduit 21 extends from the container 17 to the dispensing spout 19, preferably in a seamless manner, i.e. without any interruptions of the conduit 21, whereby the edible product flows through the conduit 21 without coming into contact with other parts of the vending machine 11. The conduit 21 is made of an elastic compressible material, which makes said conduit flexible. In addition, preferably, the conduit 21 will be made of a single material.

Referring to Figs. 8 to 12, a second preferred embodiment of the invention is described. According to this second embodiment, the supporting structure 13 comprises a housing 13' provided with a front wall 14 having at least one hole 16 receiving a removable annular elastic member 18. The annular elastic member 18 is axially bored and is adapted to hold a spout 19' within said axial bore. More precisely, according to this second embodiment of the invention, the spout 19' is held within said axial bore provided in the annular elastic member 18 so that a first spout portion 20 associated with the flexible conduit 21 is inside the housing 13' and a second spout portion 22, ending in an outlet end 24 of the spout 19' protrudes outside the housing 13' for dispensing, through said outlet end 24 of the spout 19', the fluid edible product contained in a container 17 from which the conduit 21 comes.

Referring to Fig. 13, according to a further embodiment of the invention, said dispensing spout 19' comprises a tube made of plastic material, said tube being rectilinear with a cylindrical shape in the illustrated example, in which a first portion 20 is defined having, on its outside, annular retaining protrusions 20a, adapted to keep the flexible conduit 21 firmly fixed to the spout 19', which flexible conduit is arranged with interference fit on said tube portion 20.

Still referring to the illustrated example, said tube comprises a second portion 22 which is smooth on its outside in order to reduce the possibility that the edible product or some dirt may adhere to the spout.

An annular projection 26 adapted to form a corresponding abutment edge for said annular elastic member 18 is provided between said two spout portions 22, 24. Said annular projection 26 is arranged outside said housing 13a and forms an abutment edge preventing said spout 19 from withdrawing through the annular member 18 and into the housing 13' due to an accidental thrust applied for example by the vessel in which the edible product is being dispensed.

Referring again to Figs. 8 to 12, in this second embodiment of the invention, the structure 13 comprises a front wall 14 in which the holes 16 retaining the corresponding annular elastic member 18 are provided. The wall 14 is advantageously inclined so as to at least partially conceal the outer portion 24 of the spout 19'. The wall 14, in the illustrated example, has an inclination of about 45° relative to a horizontal plane supporting the vending machine when in use.

Advantageously, according to the invention, the pump 23 will preferably be of the peristaltic type and the conduit 21 will be associated with the pump 23 in a known manner. More precisely, the conduit 21 passes through the moving parts of the pump 23, typically rotary lobes or cams, without these or other parts of the pump coming into contact with the product to be pumped. These moving parts have the purpose of periodically pressing the conduit 21 so as to create, according to prior art, a pumping effect through said conduit. This kind of peristaltic pumps has proved particularly suitable for intermittent operation for periodical dispensing of doses. In this illustrated embodiment, the peristaltic pump 23 is provided with an openable lid 23b which can be opened in the direction indicated by arrow 23c for placing or removing the flexible conduit 21 into or from the pump 23.

Still referring to the annexed figures, the operation of the vending machine 11 according to the invention will now be described in greater detail.

By pressing one of the push-buttons 49a,49b,49c, the circuit controlling operation of a first counter determining starting of the pump 23 for dispensing the product for a predetermined number of revolutions N1 of the motor of the pump 23 is closed. The push-button 49a,49b,49c will preferably be of the internally lit type for facilitating identification thereof by the user and will preferably have a different color depending on the edible product to be dispensed. Preferably, the push-buttons are always lit when the vending machine is on, to facilitate identification thereof by users and the light flashes during dispensing of the product.

The starting of the pump 23 as a consequence of the pressure on one of the push-buttons 49a,49b,49c causes pumping of the product contained in the container 17 through the

conduit 21 and dispensing, through the spout 19, 19', of an amount of product contained in the container which will be proportional to the number of working cycles of the pump 23.

For example, a number of revolutions N1 of the motor 23a may correspond to the dispensing of approximately 35 gr of product through the corresponding spout 19.

5 The electronic control unit 25 is preferably programmed for controlling, at the end of the cycle of revolutions N1, i.e. at the end of the dispensing of the product, a cycle of starting of the pump 23 in a direction opposite to the pumping direction. This causes suction of at least part of the edible product present between the pump 23 and the spout 19, 19', and forming a residue that might exit the spout 19, 19', for example by gravity, even when the pump is not
10 operating. Advantageously, this measure prevents undesired leakages of product out of the spout 19, 19' and guarantees more cleanness and hygiene for the vending machine 11, thus reducing product waste, and therefore allows to save money.

The number of revolutions N2 of the motor 23a of the pump 23 for the suction cycle may be for example about N1/10.

15 A controller 27 is also preferably programmed to control, at the end of the cycle of revolutions N2, therefore at the end of the cycle of sucking the product, a timer which has the purpose of inhibiting operation of the pump over a predetermined time T1. Advantageously, this measure prevents consumption of an excessive amount of product, due to the repeated demand by a user of the vending machine. Indeed, in the event that the vending machine is
20 used to dispense edible products "on free service", i.e. without paying any consideration (for example in diners, company canteens, self-service restaurants), by dispensing a few grams of product for each dose (30-50 g) control of the dose itself will be obtained simply by adjusting the number of revolutions N1. In addition, preferably, if a plurality of dispensing spouts 19 and corresponding conduits 21 are present, the operation of the pump 23 associated therewith
25 will also preferably be inhibited by the electronic control unit 25.

At the end of the inhibiting cycle with the duration T1, the pump 23 is again ready to dispense a new dose of edible product from the container 17 associated therewith and can therefore be actuated through one of the push-buttons 49a, 49b, 49c for dispensing a further dose of the same edible product. Said push-buttons may, for example, correspond to the
30 delivery of a first sauce = mayonnaise, a second sauce = rice mayonnaise and a third sauce = ketchup.

Although the vending machine according to the invention has been described with reference to a configuration in which three different types of products to be dispensed are provided, it will nevertheless be possible, still in accordance with the same inventive

principle, to provide vending machines for dispensing a greater number of products, or even a single product. In the latter case, in particular, though not exclusively, the vending machine can be made modular, so as to allow a combined vending machine to be obtained for any number of products by mutually associating a sufficient number of modules.

5 When an edible product is to be dispensed which must be stored at a temperature lower than ambient temperature, the corresponding container 17 and the dispensing circuit comprising the conduit 21 can be cooled, for example down to about +8°C, by means of Peltier cells. On the other hand, if a lower temperature is required, typically between 0 and +4°C (for example in the case of so-called fresh products, typically sauces), it will be
10 necessary to use a cooling machine equipped with a compressor.

In the example, a vending machine 11 has also been described provided with containers 17 placed aboard the machine, which therefore lends itself to not too high dispensed quantities, for example to containers 17 for about 10 kg of product.

When the vending machine 11 is intended for an environment in which consumption is
15 higher, for example to dispense products contained in large-volume containers, typically from 100 to 1000 kg, the container 17 will preferably be placed outside the vending machine 11, for example in another room (a conditioned warehouse, a refrigerated store, etc.) connected by means of a suitable conduit 21 to the room where the vending machine 11 is located. Certain parts of the vending machine, such as the pump 23 and the conduit 21, must obviously
20 be suitably sized. The principle of operation of the vending machine will, however, remain substantially the same.

If the edible product is dispensed through the vending machine 11 upon payment of a consideration, the vending machine 11 may be equipped with a coin validator or equivalent, a small load cell, a controller of the cell itself and a receipt emitter with report on the dispensed
25 dose: weight, type of product, price, etc.

Furthermore, by reading a carrier, such as a receipt, by means of a small optical scanner and a PLC that manages reading thereof, the vending machine can dispense the desired product. It is also clear that a magnetic stripe reader and corresponding card, a microchip reader, etc., or an Ethernet network can be used to give consent, for example by the
30 cash desk, to the dispensing itself, after the consideration has been paid. For this purpose, the vending machine 11 can be equipped with a switching apparatus 57 connected to the electronic control unit 25. Moreover, in rooms where electrical wiring is problematic, the vending machine may be equipped with a WiFi system that performs, even remotely, the above operations.

Advantageously, the vending machine according to the invention does not provide for washing cycles for cleaning the conduits for dispensing the edible product, thanks to the fact that the conduits carrying the product are replaced together with the flexible container, and thanks to the fact that the product never comes into contact with fixed parts of the vending machine, i.e. with parts that are not intended to be replaced together with the container.

A set of push-buttons 49, in the illustrated example seven push-buttons 49d, 49e, 49f, 49g, 49h, 49i are also provided close to the visual display 47 for programming the electronic unit 25 and, consequently, the functions and working cycles of the vending machine 11.

By keeping the push-button “menu” 49d pressed for a time t_1 (for example: $t_1=3$ sec), the displaying function of the minimum stock, i.e. of the minimum quantity of product below which the electronic control unit 25 is programmed to emit an optical or acoustic alert signal, corresponding to the signaling of the almost exhausted container (bag), is activated on the visual display 47.

The electronic control unit 25 is programmed to vary the minimum quantity by acting on the push-buttons “+” and “-“ 49e, 49f. Further pressing on the push-button “menu” allows, by subsequent pressing on the push-buttons “+” and “-“, to inhibit or enable the alarm.

Further pressing on the push-button “menu” allows, by subsequent pressing on the push-buttons “+” and “-“, to adjust the duration of an acoustic signal emitted by a buzzer, when any programming push-button 49 is pressed. A zero duration corresponds to the inhibition of said acoustic signal.

Further pressing on the push-button “menu” allows, by subsequent pressing on the push-buttons “+” and “-“, to enable or disable the request for a password in order to start the function of replacing the exhausted container (bag).

In a preferred embodiment of the invention, the password is stored in the storage unit associated with the electronic unit 25 and corresponds to a predetermined sequence of push-buttons 49. Access to this function is preferably protected by a password known only to the authorized personnel and stored in the storage unit, for example corresponding to pressing some push-buttons 49 in a predetermined sequence.

The function allowing replacement of the container of the product to be dispensed, either because it is exhausted or almost exhausted, or because dispensing of another product is desired, can preferably be accessed by means of a password known only to the authorized personnel.

The settings menu allows to change some functional parameters of the vending machine.

In particular, it is possible to vary the duration of the interval in which dispensing is inhibited. A time $t_1 = 0$ corresponds to the programming that allows continuous dispensing, useful when the vending machine is used in a private environment, for example in a kitchen.

The settings menu further comprises a function of setting the options for each dispensed product. The main functions allow the Name Change of the product on the visual display 47, the quantity of product to be dispensed expressed in number or revolutions N1 of the electric motor 23a of the pump 23, the number of revolutions N2 of the motor 23a of the pump 23 for the inversion function, the capacity of the flexible container (bag) present in the vending machine (default = 5 Kg).

The refill function of the container (bag) requires pressing of the push-button "Refill" 49g for three seconds and subsequent selection, by means of the push-buttons "Product1", "Product2", "Product3" 49h, 49i, 49l, respectively, of the product whose container is to be replaced: the instructions to be followed appear on the display, namely:

- open the front panel 41a of the vending machine 11;
- remove the container 17, if present, from the corresponding seat 15 and pull the conduit 21 out of the pump 23, by opening the lid 23b of the pump, and out of the spout 19;
- place a fresh container 17 into the free seat 15;
- connect the conduit 21 to the pump 23 and the spout 19;
- close the front panel 41a;
- dispense until the product exits the spout 19;
- press the push-button 49g "Refill" for ending the operation and clear the counter of dispensed doses, which is incremented upon each pressing of one of the push-buttons 49a, 49b, 49c.

The vending machine as described and illustrated is capable of numerous variants and modifications falling within the same inventive principle.

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CLAIMS

1. Vending machine (11) for dispensing edible products in a fluid state, comprising:

- a supporting structure (13);
- at least one seat (15) defined within the supporting structure (13) and adapted to house
- 5 at least one corresponding flexible container (17) of the product to be dispensed, which product is in the fluid state at room temperature;
- a dispensing spout (19) comprising a rigid tube having a first outlet end from which the dispensed product contained in the container (17) exits;
- a flexible conduit (21) having one end associated with the container (17) by means of
- 10 a corresponding fitting (31) and the opposite end associated with the spout (19) at a second inlet end of said spout opposite to the outlet end;
- a pump (23) associated with the supporting structure (13) and actuated by an electric motor (23a), said pump being adapted to create, at predetermined intervals, a throttling slidable along a portion of the conduit (21), said throttling being capable of imparting
- 15 prevalence to the fluid carried within the conduit (21) and consequently of pumping the product contained in the flexible container (17) towards the dispensing spout (19);
- an electronic control unit (25) for controlling the operation of the electric motor (23a) of the pump (23), characterized in that the dispensing spout (19) comprises a rigid tube (19a) adapted to receive at least partially with interference fit an end portion (21c) of said flexible
- 20 conduit (21).

2. Vending machine according to claim 1, wherein the dispensing spout (19) comprises a rigid tube (19a) adapted to receive therein with interference fit an end portion (21c) of said flexible conduit (21).

3. Vending machine according to claim 2, wherein said dispensing spout (19) comprises a tube made of stainless steel with opposite open ends (19b,19c) and having a circular cross-section with a diameter ("D") no smaller than the diameter ("d") of the outer cross-section of the conduit (21).

4. Vending machine according to claim 2 or 3, wherein the end portion (21c) of the flexible conduit (21) extends within the dispensing spout (19) over the entire length of said dispensing spout, thus preventing contact of the spout (19) with the product carried by the conduit (21).

5. Vending machine according to claim 4, wherein the end portion (21c) of the flexible conduit (21) comprises a proximal end (21d) having stop means (21e) capable of interfering with a first end (19b) of the dispensing spout (19), so that, when said stop means (21e) are in abutment against said first end (19b) of the dispensing spout (19), the flexible conduit (21) extends within the spout over the entire length of the spout, until at least the end (19c), which is opposite to said first end (19b) and from which the dispensed product exits.

6. Vending machine according to claim 1 or 2 or 3, wherein said spout (19) comprises a connecting portion (19d) having a quick release bayonet-like coupling (33) capable of cooperating with corresponding counter-means (35) for removably fixing the spout (19) to the supporting structure (13).

7. Vending machine according to any of the preceding claims, wherein the supporting structure (13) comprises a housing (13a) defining therein a chamber (39), separated from the environment outside the vending machine (11) by the walls (41) of the housing, said chamber housing therein said at least one seat (15) for the flexible container (17), the pump (23) and the conduit (21), and wherein the dispensing spout (19) communicates the chamber (39) with the outer environment, and wherein the conduit (21) exits said chamber with an end portion extending within said spout (19).

8. Vending machine according to claim 6, wherein at least one of the walls (41) is openable, and wherein the counter-means (35) for the removable connection of the spout are associated with said openable wall.

9. Vending machine according to claim 1, wherein the supporting structure (13) comprises a housing (13') provided with a front wall (14) having at least one hole (16) receiving a removable annular elastic member (18) axially bored and adapted to hold said spout (19') within said hole (16) so that a first spout portion (20) associated with the flexible conduit (21) is inside the housing (13') and a second spout portion (22), ending in an outlet end (24) for dispensing, through said outlet end (24) of the spout (19'), the fluid edible product contained in said container (17), protrudes outside the housing (13').

10. Vending machine according to claim 9, wherein said dispensing spout (19') comprises a tube made of plastic material, in which a first portion (20) is defined having, on its outside,

annular retaining protrusions (20a), adapted to keep the flexible conduit (21) firmly fixed to the spout (19'), which flexible conduit is arranged with interference fit on said tube portion (20).

5 11. Vending machine according to claim 10, wherein said tube comprises a second portion (22) which is smooth on its outside.

12. Vending machine according to claim 11, wherein an annular projection (26) adapted to form a corresponding abutment edge for said annular elastic member (18) is provided
10 between said two spout portions (20, 22), said annular projection (26) being arranged outside said housing (13').

13. Vending machine according to any of the preceding claims, wherein the seat (15) in the housing (13') receiving the container (17) comprises a horseshoe-shaped horizontal shelf
15 arranged in a raised position at a certain distance from the base of the housing (13').

14. Vending machine according to any of the preceding claims, wherein the electronic control unit (25) comprises a microprocessor, a storage unit, a visual display, at least one control push-button (49) and a power supply unit, and wherein said electronic control unit is
20 programmed to cause the pump to complete a pumping cycle which corresponds to a number N1 of revolutions of the rotor of the electric motor (23a) and in which the pump (23) operates for pumping the product contained in the container (17) towards the spout (19), a suction cycle which corresponds to a number N2 of revolutions of the rotor of the electric motor (23a)
25 and in which the pump (23) operates for sucking at least part of the product that may be present in the end portion of the flexible conduit (21), and a waiting cycle which has a duration T1 and in which the pump (23) is inhibited from pumping the product contained in the container (23).

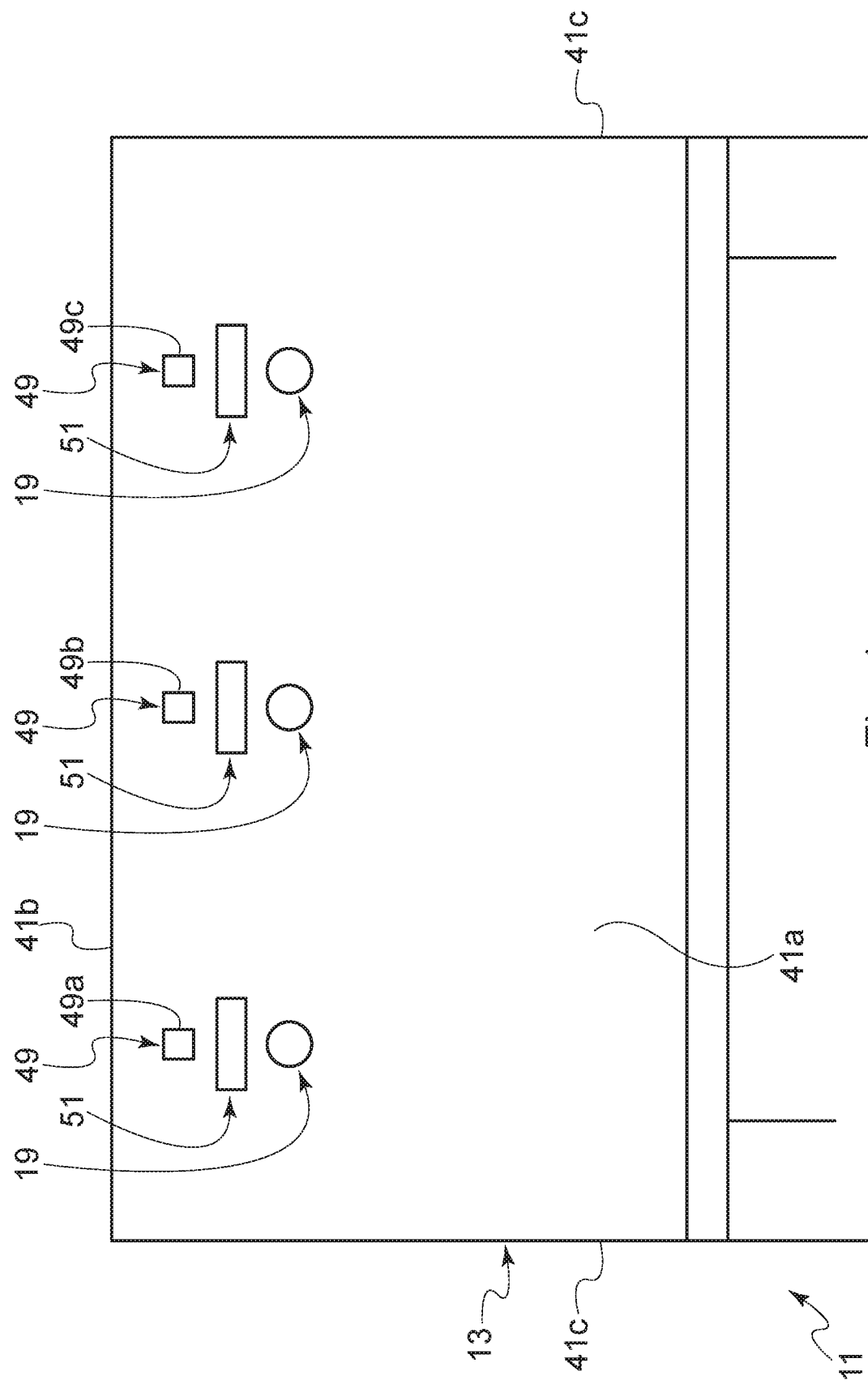


Fig. 1

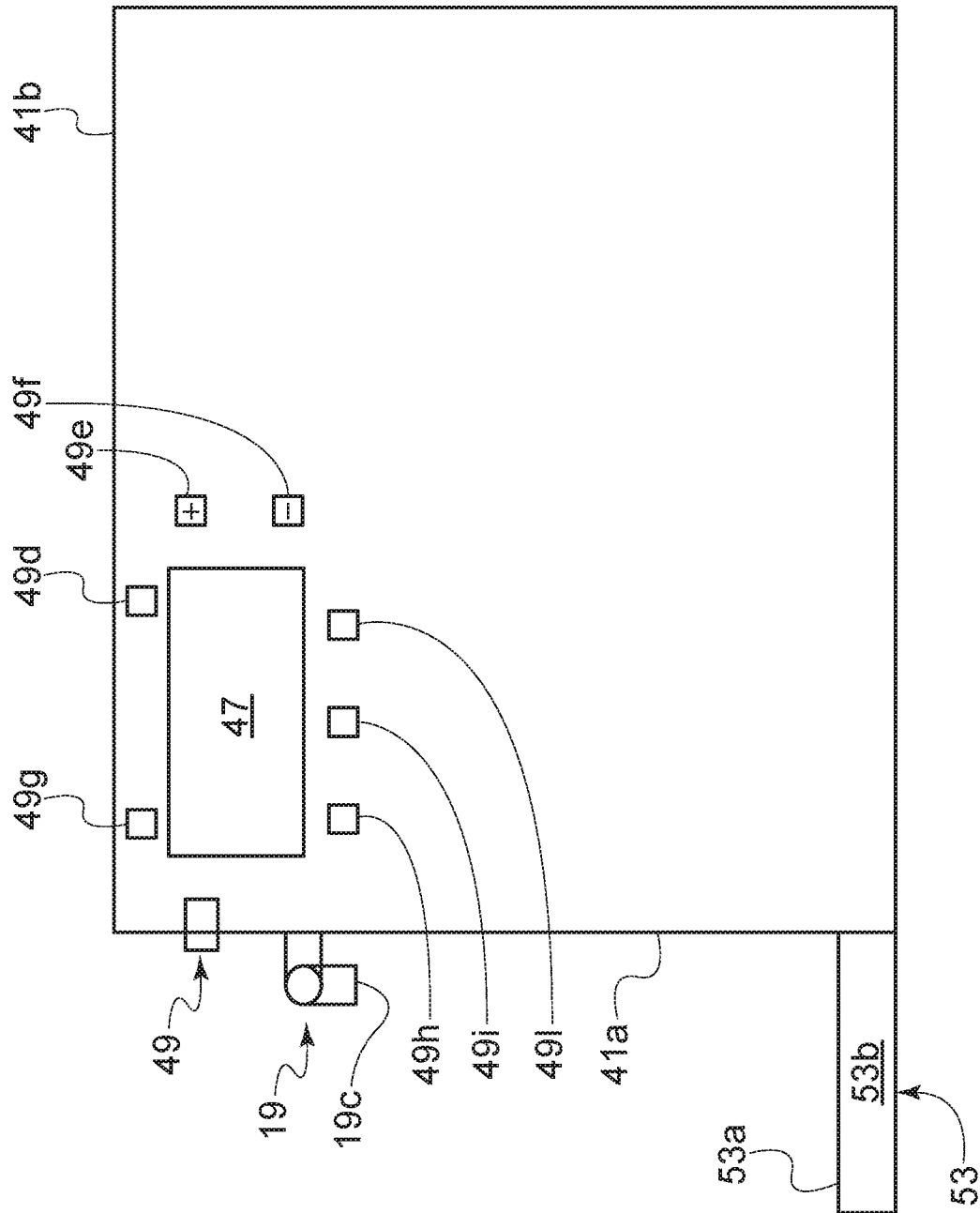


Fig. 2

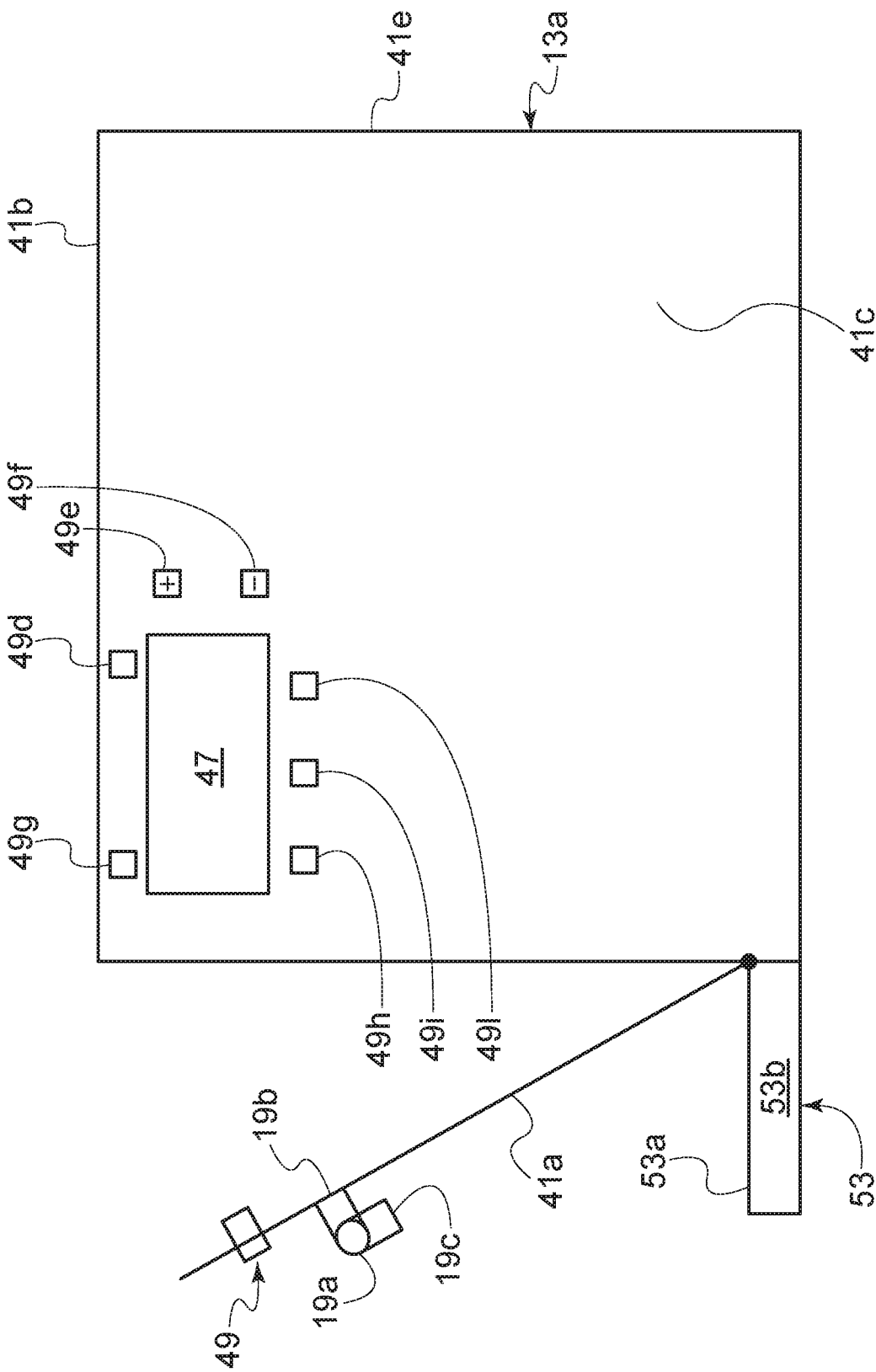


Fig. 3

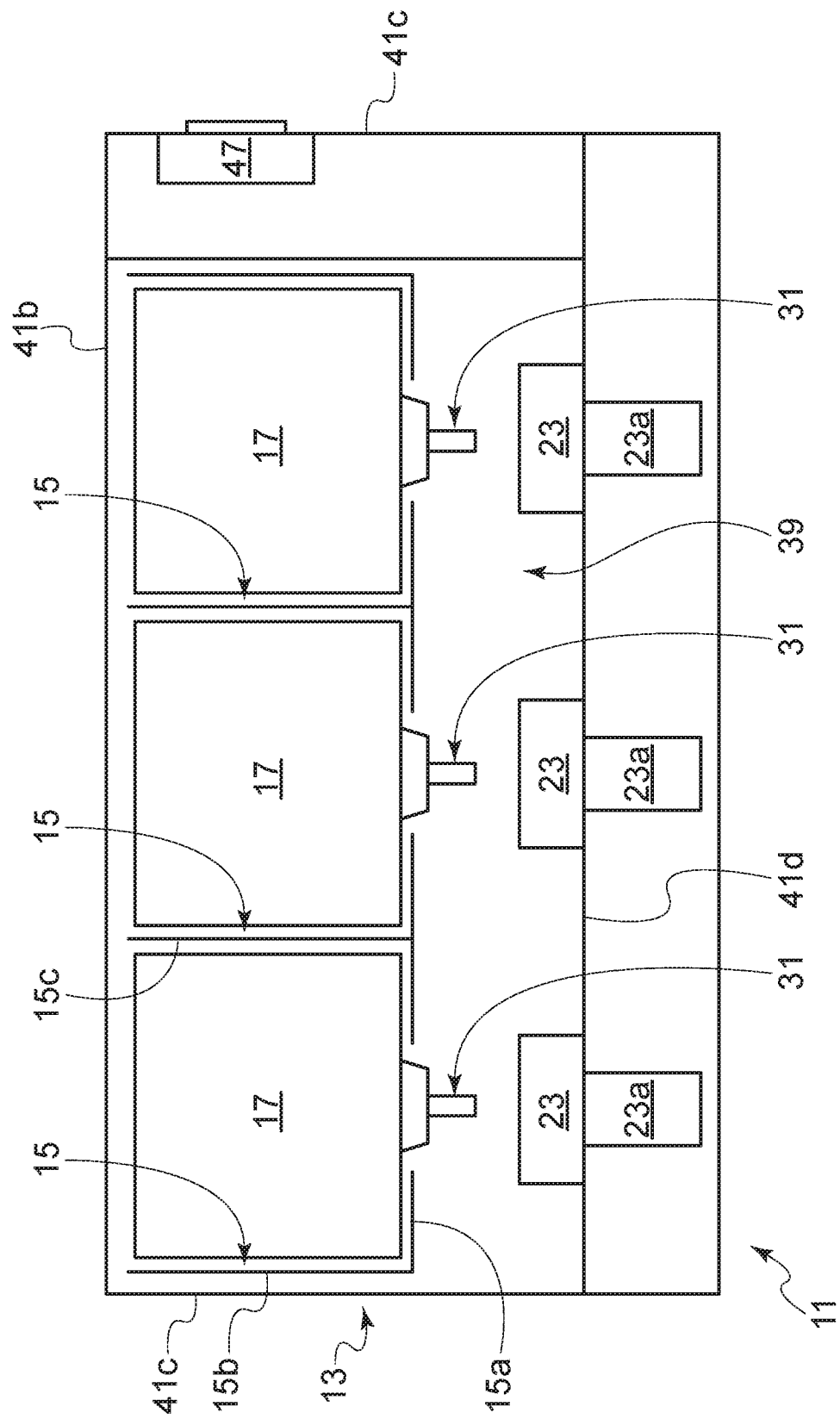


Fig. 4

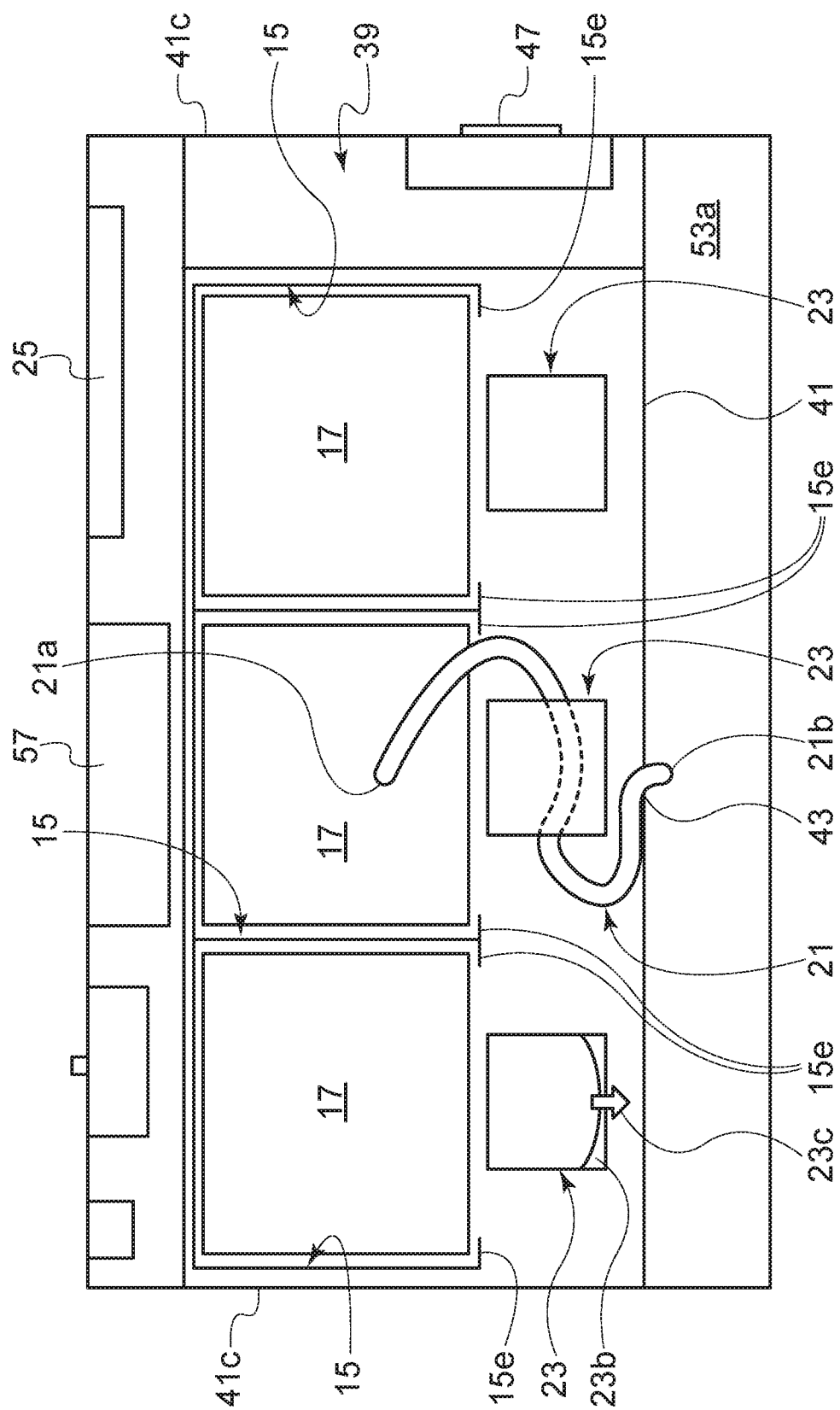


Fig. 5

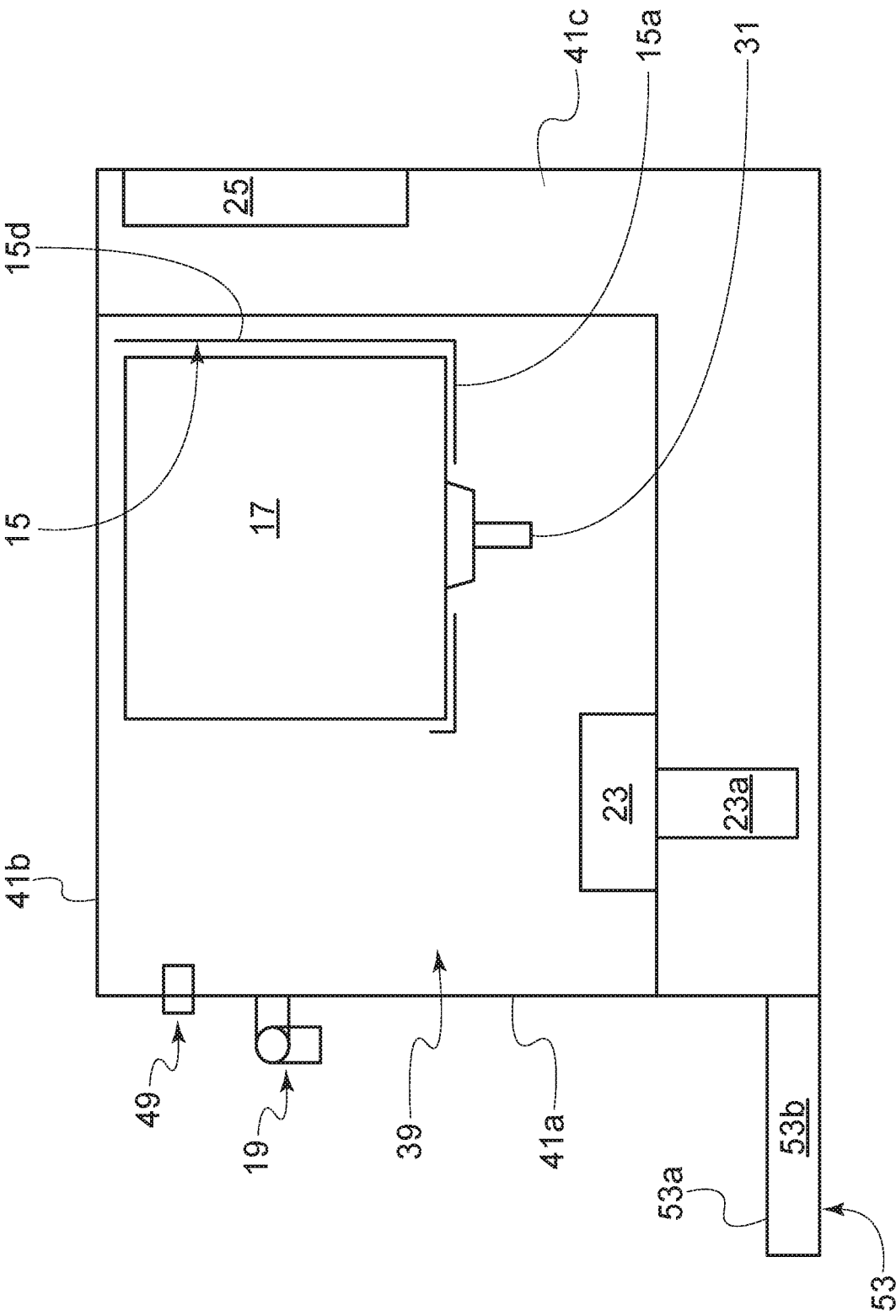


Fig. 6

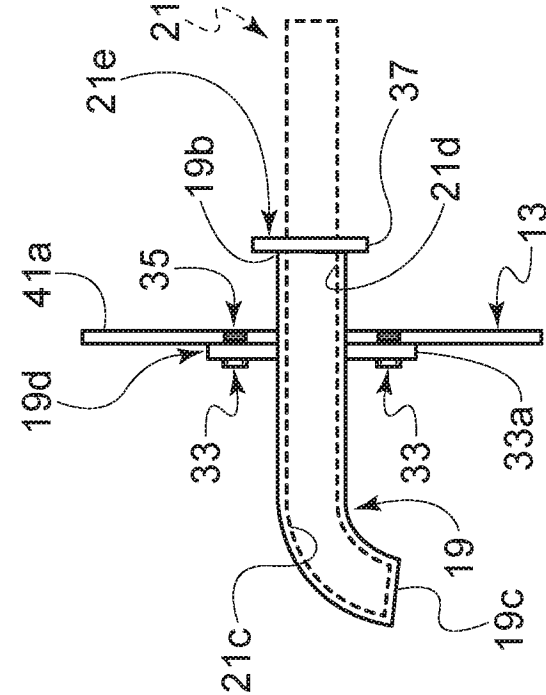


Fig. 7B

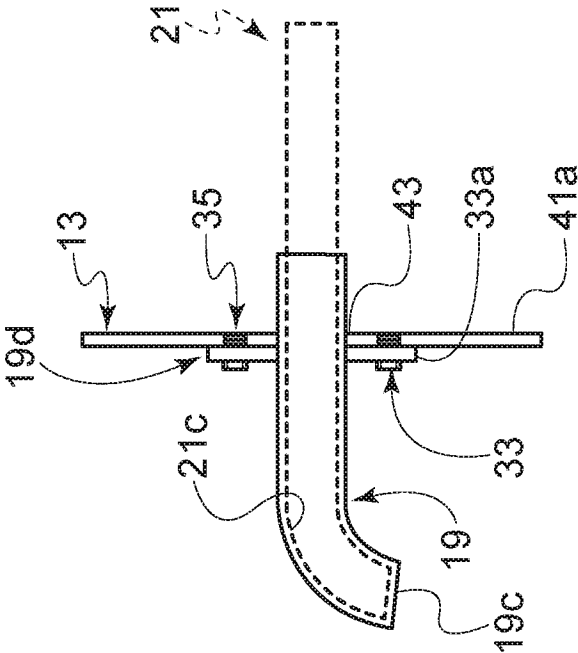


Fig. 7A

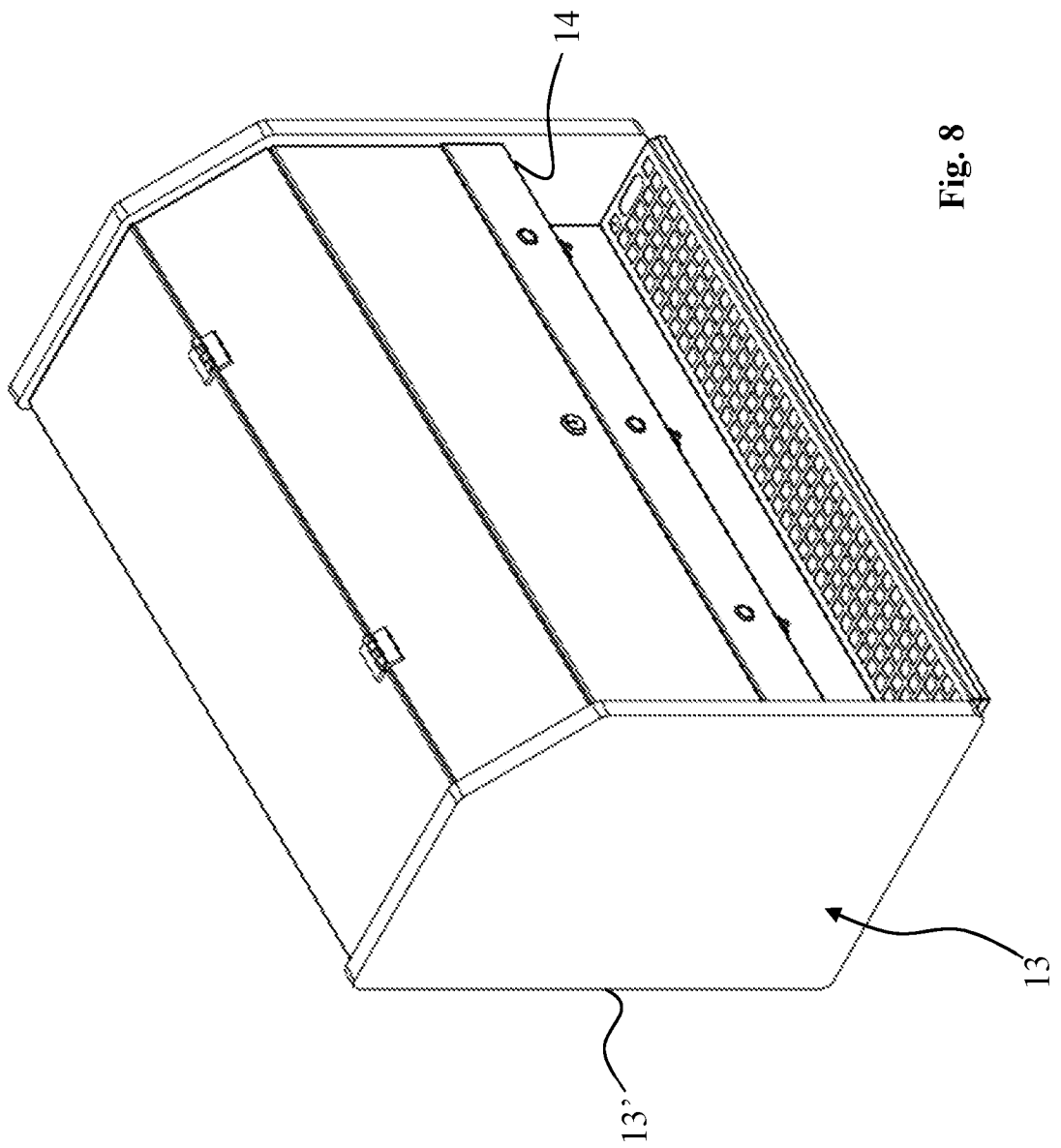
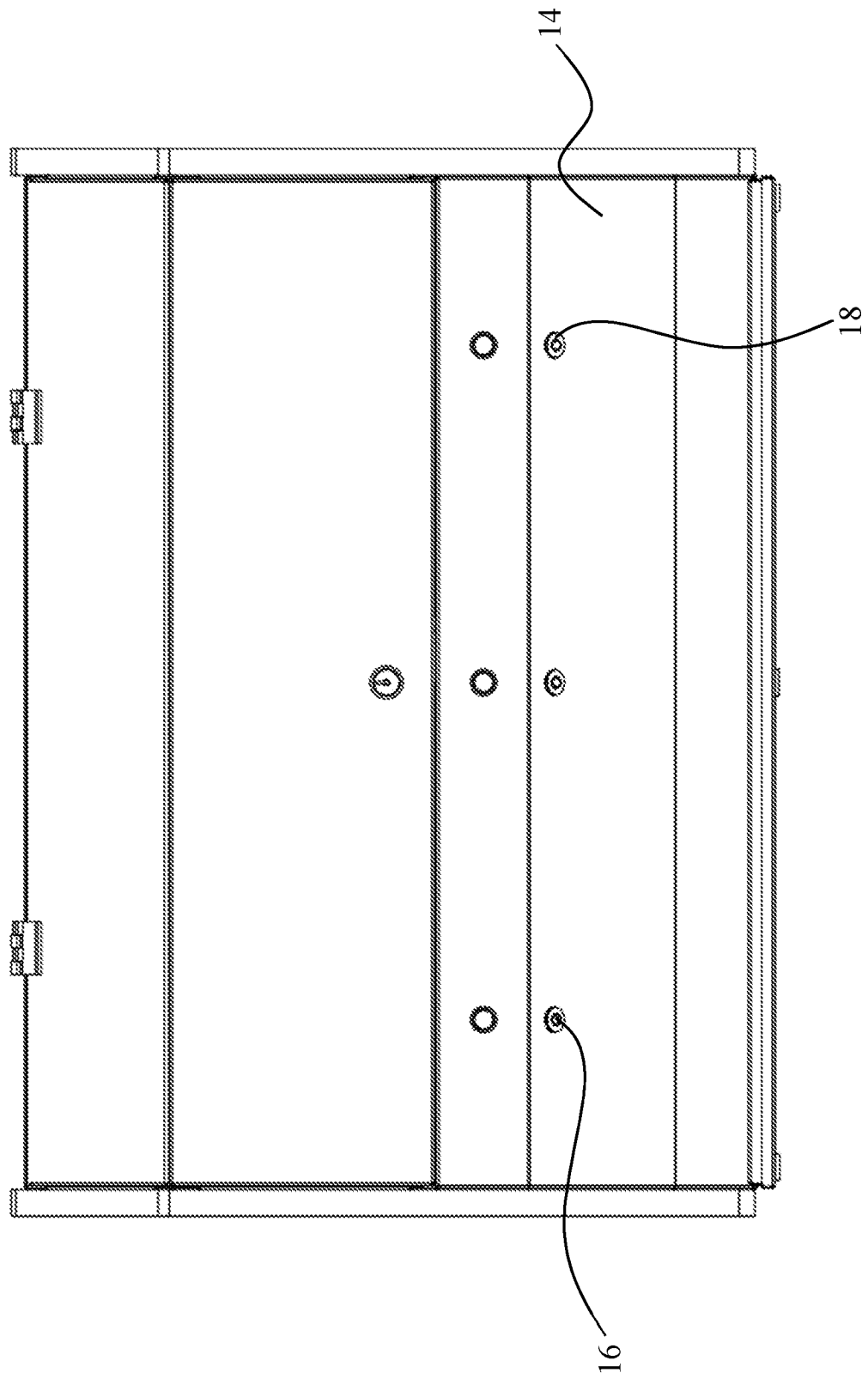


Fig. 8

**Fig. 9**

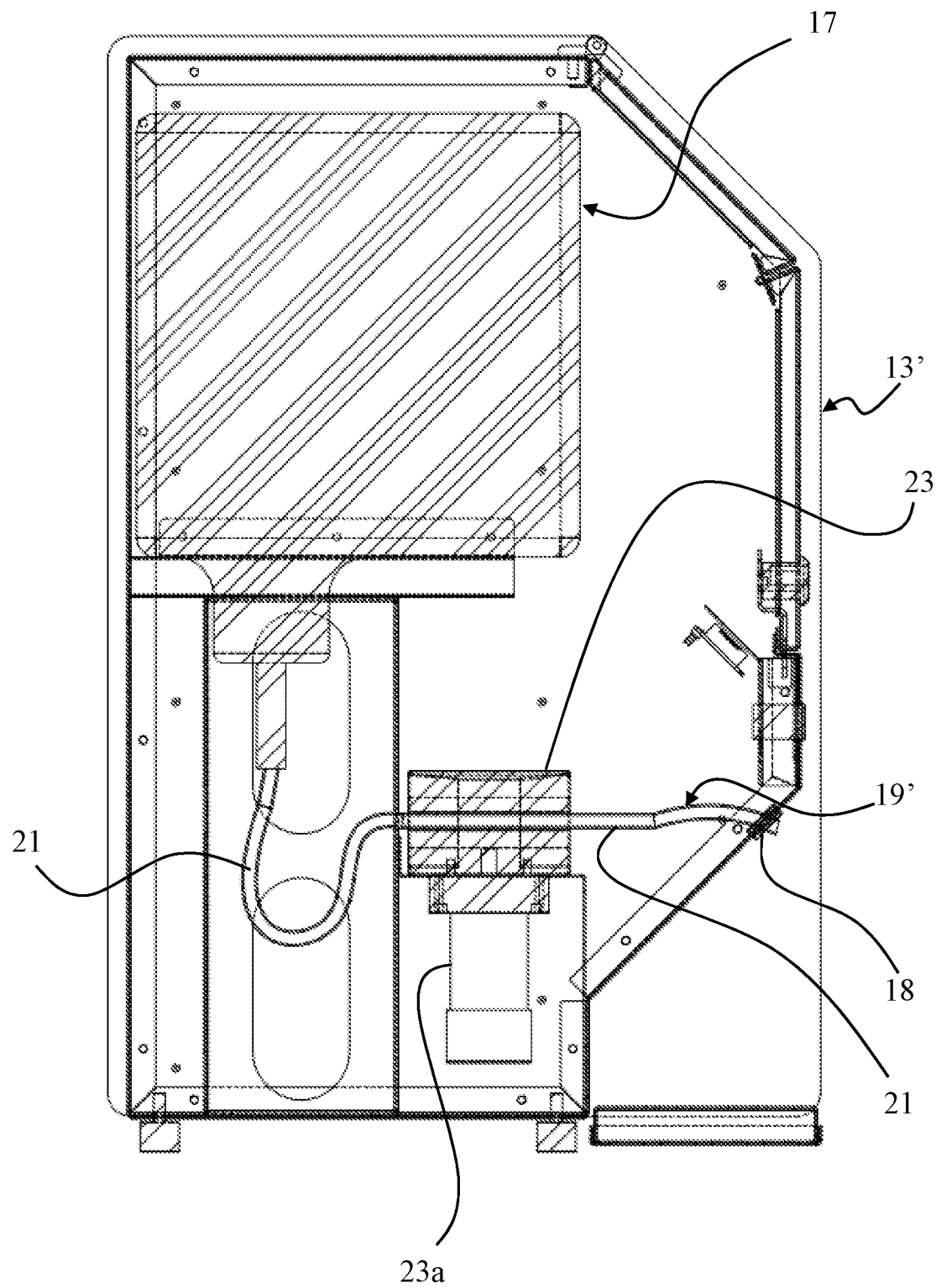


Fig. 10

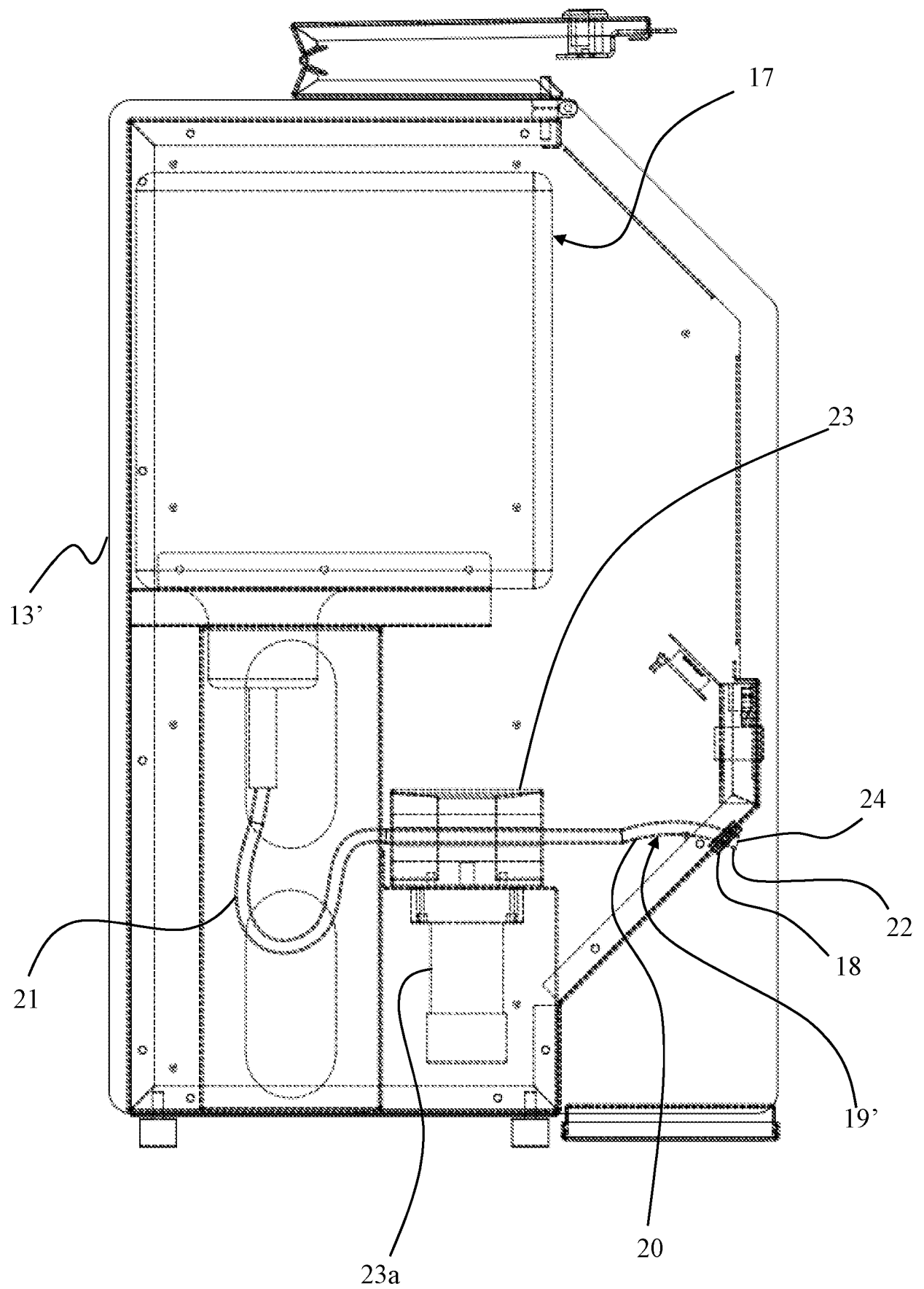


Fig. 11

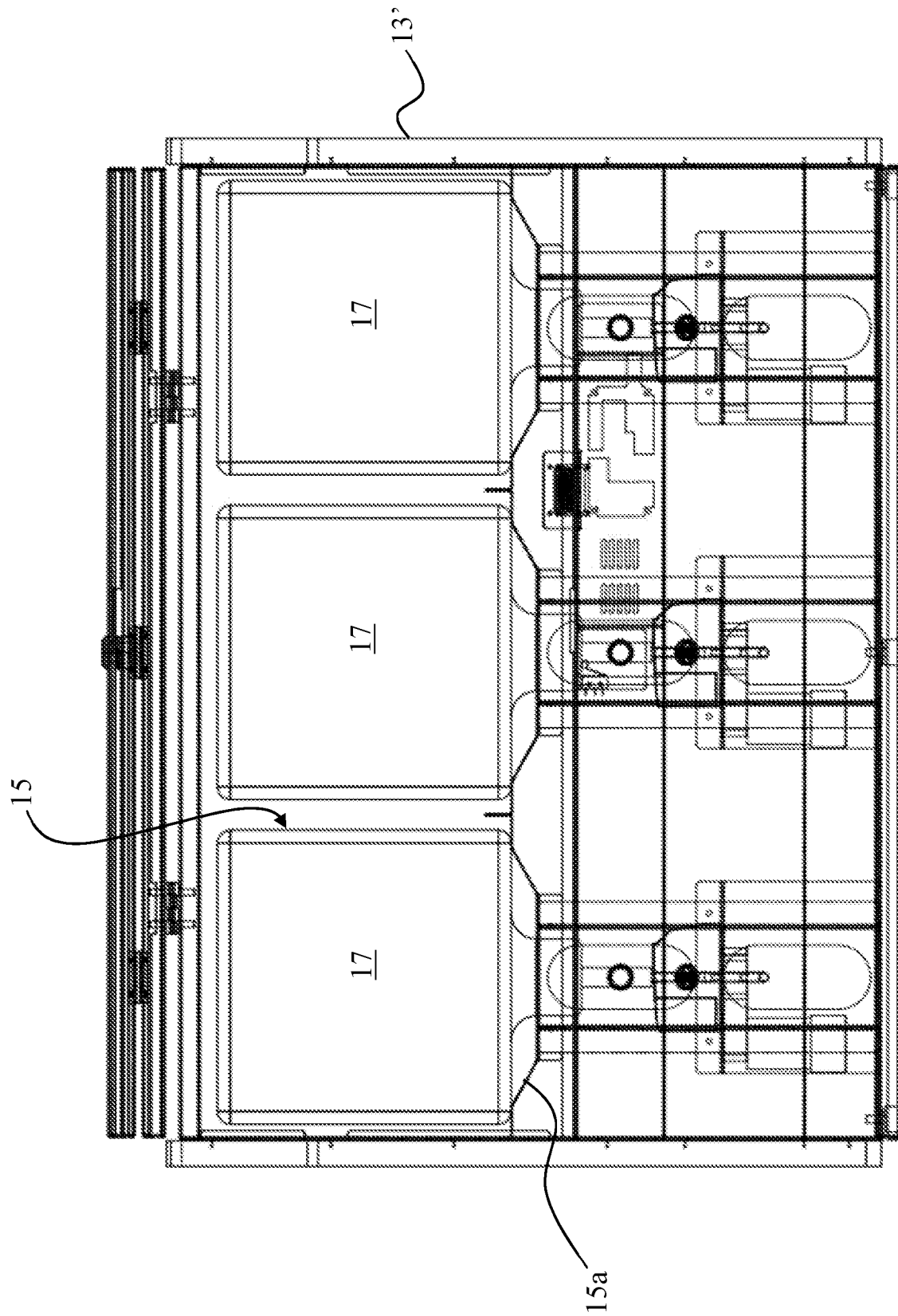
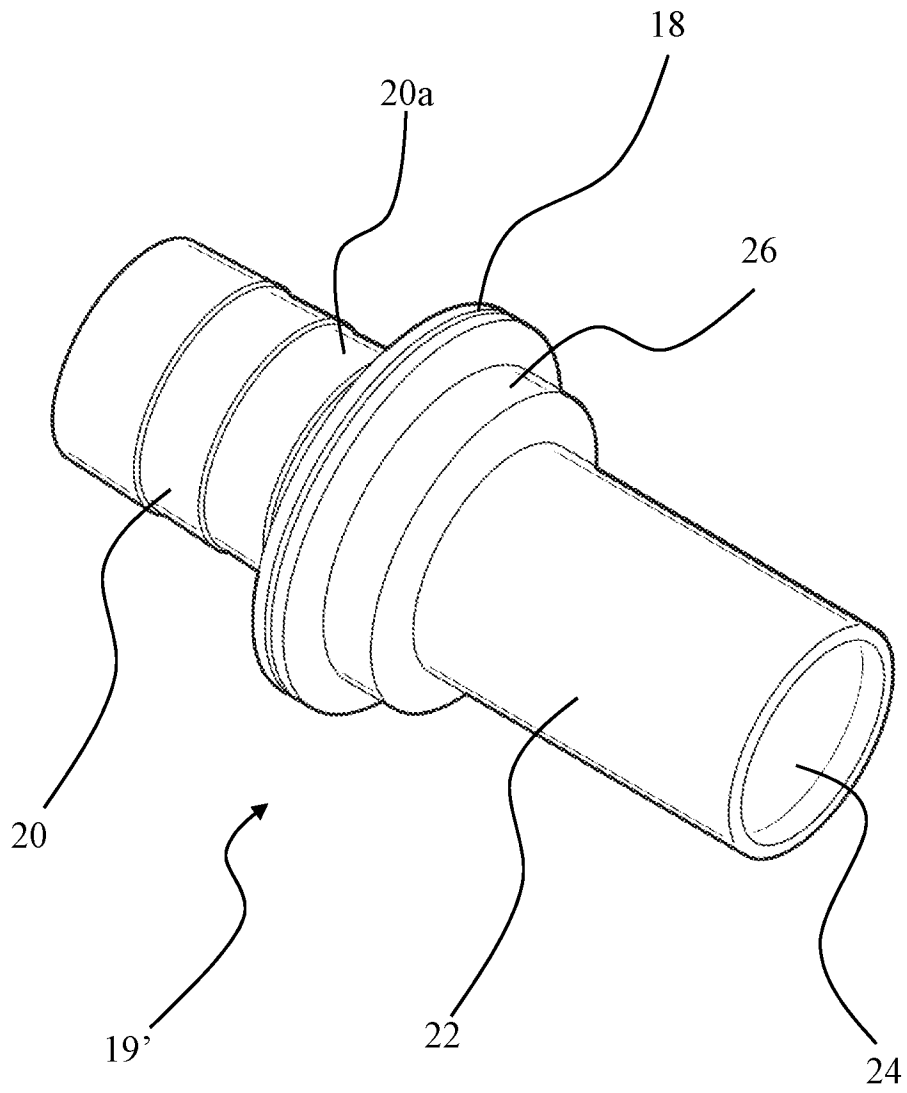


Fig. 12

**Fig. 13**

INTERNATIONAL SEARCH REPORT

International application No
PCT/IB2019/056789

A. CLASSIFICATION OF SUBJECT MATTER
INV. G07F13/00
ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
G07F A47K B67D A23G

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5 803 317 A (WHEELER JAMES R [US]) 8 September 1998 (1998-09-08) column 4, line 1 - column 5, line 65; figures 1,3,4,8, 9 column 8, line 4 - line 14 -----	1-14
A	Anonymous: "Interference fit - Wikipedia", 15 April 2016 (2016-04-15), XP055558849, Retrieved from the Internet: URL:https://en.wikipedia.org/w/index.php?t itle=Interference_fit&oldid=715413969 [retrieved on 2019-02-19] the whole document ----- -/-	1



Further documents are listed in the continuation of Box C.



See patent family annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

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"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

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"&" document member of the same patent family

Date of the actual completion of the international search

21 April 2020

Date of mailing of the international search report

06/05/2020

Name and mailing address of the ISA/

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Authorized officer

van Praagh, Kay

INTERNATIONAL SEARCH REPORT

International application No
PCT/IB2019/056789

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	IT TO20 111 093 A1 (FANTOLINO CLAUDIO) 29 May 2013 (2013-05-29) page 7, line 14 - line 17; figure 5 page 10, line 25 - page 11, line 24 -----	1
A	US 4 469 150 A (GRIMALDI PIERRE-FRANCOIS A [FR]) 4 September 1984 (1984-09-04) column 2, line 13 - line 14 -----	1
A	EP 0 053 813 A2 (CADBURY SCHWEPPES LTD [GB]) 16 June 1982 (1982-06-16) figure 1 -----	5
A	Anonymous: "Bayonet mount - Wikipedia", Wikipedia, 29 May 2019 (2019-05-29), XP055684465, Retrieved from the Internet: URL:https://en.wikipedia.org/w/index.php?t itle=Bayonet_mount&oldid=899225808 [retrieved on 2020-04-08] the whole document -----	6

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/IB2019/056789

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 5803317	A	08-09-1998	NONE

IT T020111093	A1	29-05-2013	-----
US 4469150	A	04-09-1984	DE 3272278 D1 04-09-1986
			EP 0069036 A1 05-01-1983
			US 4469150 A 04-09-1984

EP 0053813	A2	16-06-1982	AT 18187 T 15-03-1986
			AU 7843181 A 17-06-1982
			CA 1163609 A 13-03-1984
			DE 3173922 D1 03-04-1986
			EP 0053813 A2 16-06-1982
			ZA 8108533 B 24-11-1982
