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(54) **METERING MODULE, AND METHOD OF METERING PASTY PRODUCTS**

MESSMODUL SOWIE VERFAHREN ZUM MESSEN VON PASTÖSEN PRODUKTEN

MODULE ET PROCEDE DE MESURE DE PRODUITS PATEUX

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(73) Proprietor: **Cima 27, S.L.
08029 Barcelona (ES)**

(72) Inventor: **CORTES FERRIZ, José
E-08190 Sant Cugat del Vallès (ES)**

(74) Representative: **Barroso Sánchez-Lafuente,
Ignacio M.
Barroso Hernández
Abogados e Ingenieros
C/ Balmes 92 - 2.o - 1.a
08008 Barcelona (ES)**

(56) References cited:
**EP-A1- 0 165 098 EP-A1- 0 585 997
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Description

Technical field of the invention.-

[0001] The present invention relates to a module for the metering of pasty products, of the type comprising a tank for the pasty product, provided with pushing means for the pasty product and opening and closing means, adapted for opening and closing an outlet of aforementioned tank.

[0002] The present invention also relates to a process for using the metering module and the aforementioned mixing system.

[0003] The present invention is particularly for use in the metering and mixing of dyes in paint production.

State of the art.-

[0004] At present, the mixing of primary dyes used in the production of paint is mainly done manually, putting the previously measured amount of dye in a recipient. However, there are good number of automatic or semi-automatic metering systems in which the dye is poured from an upper tank onto a lower recipient with a loading cell which, once a predetermined weight of dye is captured, orders a valve on the higher tank to close and stop the pouring. This operation is repeated for each of the primary dyes until the mixture with the required proportions of each one has been made.

[0005] WO 94 21554 A1 discloses a metering mechanism according to preamble of claim 1.

[0006] Although these existing automatic or semi-automatic systems work effectively, they are not completely devoid of problems and inconveniences, especially as they are extremely complex and very expensive and the fact that, when the valve closes, a last drop is formed which can harm the precise metering, dirty the installation and hamper the next operation.

[0007] The purpose of the present invention is to provide a module for metering pasty products, which offers an integral solution to all of these problems and inconveniences.

Explanation of the invention.-

[0008] To this end, the first aspect of the invention is a new module for metering pasty products, as claimed is claim 1, which is basically characterized in that the tank is a hollow prism and the pushing means comprises a vertical-action piston which runs tight within the tank and coaxially with the same, the opening and closing means comprising a lower metering valve, the body of which contains an internal space for a vertical axle which opens into with the tank, the sealing element of the valve being a closing head, which is movable between a maximum open position and a closed position, on which the main base of the seal remains level with the valve outlet, closing the tank.

[0009] Said sealing element can be built in to an actuating rod which passes inside said internal cylindrical space of the valve body and which is also activated by a trip dog, counter to the action of a spring.

[0010] Preferentially, said closing head is frustoconical and the tank is cylindrical.

[0011] According to another characteristic of the invention herein, the module comprises a device for purging the air remaining trapped inside the tank below the piston.

[0012] In accordance with a preferred embodiment, each module comprises a device for injecting air inside the tank for the actuation of the piston.

[0013] The metering module of the invention can comprise a mechanism for opening a container packaging the pasty product, once it is placed inside the tank.

[0014] Preferably, said opening mechanism consists of a blade, whose cutting edge is situated on the side of a cylinder which circles, or at least partially circles, the out-let of aforementioned tank.

[0015] Preferably, the metering module shall comprise control means for controlling the corresponding measuring of the metering module that must pour pasty products into a vessel, with certain predetermined mixing parameters.

[0016] In particular, said control means comprises a microprocessor, a computer and/or a programmable logic controller, supplied with the relevant software, and a conventional interface with the user, which activate motor and timer means of the vessel and the metering valves of each of the metering modules.

[0017] With respect to a second aspect of the invention, a process for metering pasty products according to claim 11 is disclosed, for application in conjunction with a metering module defined earlier.

Brief description of the drawings.-

[0018] Hereafter, a description will be given of a preferred embodiment of the invention herein, which is accompanied with drawings to help provide a better understanding in which:

- Fig. 1 is a section view of a valve of the metering module of the invention herein;
- Fig. 2 is an elevation and part section view of a preferred embodiment of the metering module of the invention herein;
- Fig. 3 is a front-elevation schematic view of a system for mixing pasty products, comprising seven modules like those in Fig. 2;
- Fig. 4 is a side-elevation schematic view of the metering system in Fig. 3;
- Fig. 5 is a view similar to that in Fig. 2 of a module, with a packaging of the pasty product inserted in the tank, in the rest position; and
- Fig. 6 is a view similar to that in Fig. 5, but with the piston in its operational position.

Description of a preferred embodiment.-

[0019] It can be seen in said drawings that the metering module 1 concerned, for pasty products, for example, for dyes or paints, comprises a cylindrical tank 2, and a piston 4, essentially discoidal, for pushing the pasty product 34 in the tank 2. Some O-rings 19 ensure that the piston is adjusted 4 on the inside of the tank. The piston 4 is moved vertically along an axle 8, using a known method, via a built-in actuating rod 24, and hydraulically or pneumatically operated. The tank 2 sits on a lower base 27, connected to an upper support base 28 and guided by the actuator 24 via columns 23.

[0020] The lower central part of the tank 2 opens into an outlet 3, through which a bushing tube passes 29, in the lower end of which is a manual cut-off key 25, followed by a metering valve 5, located on the inside of an end piece 30.

[0021] The valve 5 has a valve body 6 with a space inside 7, whose axle 8 is, in this case, shown with the vertical axle 8 of the tank 2. This internal space 7 is open to the bushing 29 and, through this, to the inside of the tank 2. The valve 5 has a sealing element 12 made up of a closing head 9, which is preferably frustoconical in shape or in the form of a trumpet, although it may also be spherical.

[0022] The head 9 can be moved continually between a maximum open position and a closed position (represented in Fig.1), in which the main base 11 of the seal 12 is essentially level with the valve 5 outlet 31, closing the tank 2.

[0023] The sealing element 12 is built in to an actuating rod 13, which passes inside the aforementioned internal cylindrical space 7 of the valve body 6 and which is activated by a trip dog 14, counter to the action of a spring 10. The rod 13, and consequently the opening and closing of the valve 5, can therefore be operated mechanically or manually, in this case, for example, via the manual key 25.

[0024] Fig. 2 shows the metering module 1 for pasty products in the invention with a device for purging the air, which remains trapped inside the tank 2 below the piston 4. In the example embodiment given, such purging device comprises a hydraulic tube 20, connected to a flexible pipe 17 which passes through the piston 4 and has a manual key 21. The tube 20 is connected upstream from the manual key 21, with a relative vacuum source with respect to the internal pressure of the tank 2.

[0025] The module 1 also has a mechanism for injecting air inside the tank 2, adapted so that the piston 4 can be separated from the bottom of the tank or from the mass of pasty product in the tank. This injection mechanism also has an air injector 22 linked to another flexible pipe 18 which passes through the piston 4, allowing air to enter inside the tank 2 when the piston 4 is to be separated and which may be trapped in the tank 2.

[0026] Figs. 3 and 4 show a system for mixing pasty products 100 which has various modules 1, in this case

seven, described above.

[0027] The modules 1 are placed consecutively and adjacently in a first horizontal plane with corresponding and essentially aligned metering valves 5, fixed to the vertical element 32 of a support structure 26.

[0028] The support structure 26 comprises a horizontal table 33, on which there are guides 16 for a receiving vessel 15 for the pasty products 34 contained in the modules 1.

[0029] On the upper part of the vessel 15 is a loading cell 35 (Fig. 4) and the vessel can be positioned under each module 1 and receive a measured amount of the pasty product contained in the module for mixing the pasty products.

[0030] The system 100 comprises a means of controlling the movement of the receive vessel and of the corresponding metering of pasty products of each metering module 1 that must be poured into the vessel 15, with certain predetermined mixing parameters.

[0031] Such control means can include a microprocessor, a computer and/or programmable logic controller, with the relevant software, and a conventional interface with the user which, being extensively known, are neither shown nor described in greater detail. The control devices activate a motor and timer of the vessel and the metering valves 5 of each of the metering modules 1.

[0032] The operational mode of the system for mixing and metering pasty products 100 is as follows. With the tanks 2 of the modules 1 completely or partially full of pasty product, the receive vessel 15 is moved along the guides 16 and is positioned successively below each of the modules 1 whose product is to be used in the mixture required. The vessel 15 can be moved manually or by a motor, in this case with stepped motors which is programmed when to move and stop.

[0033] Each time it is positioned below a module 1, the corresponding valve 5 opens via, for example, the manual key 25, with which the dye in the tank 2 in question starts to be poured, until the loading cell 35 detects that the quantity programmed or a quantity sufficiently close to the programmed quantity has been poured, which is when the valve 5 closes and the pouring of the pasty product is stopped. The aforementioned software can take into account the weight of the column of dye remaining between the valve 5 outlet 31 and the vessel 15, to close at the appropriate time in order to add the weight in this column to that detected by the loading cell 35 and to programme the measured amount of dye, within a certain tolerance.

[0034] This operation is constantly repeated for each of the modules 1 containing dye used in the mixture.

[0035] In Figs. 5 and 6 an embodiment of the module 1 of the invention herein is shown. This module 1 is designed particularly to demonstrate the process of the invention in practice.

[0036] More specifically, the module 1 comprises a mechanism for opening a container packaging 36 with deformable walls, which contains the pasty product 34

for metering, consisting of a blade 37, whose cutting edge 38 is situated on the side of a cylinder which circles at least partially the outlet 3 of the aforementioned tank 2. The blade 37 can be in the form of a half shaft, or half bevel, for example, not with its upper edge or blade 38 perpendicular with respect to the axle 8.

[0037] The packaging 36, which may be a bag, for example made of a plastic material, with or without seams, or cardboard packaging, contains a measured amount of the pasty product to be administered and is inserted inside the tank 2 of the module 1 (Fig. 1). The packaging 36 could therefore be a recipient made of cardboard or paper whose measurements allow it to fit within the inner prismatic walls of the tank 2.

[0038] Once the packaging 36 is inside the tank, for metering the pasty product 34 via the valve 5, all that needs to be done is lower the piston 4, compressing the packaging 36 by collapsing its sides against the inner walls of the tank 2. For the compressing force exerted by the piston 4 to continue, the container packaging 36 is opened by the blade 37, which cuts it, making an opening 39 in the packaging (Fig. 6), aligned line with the outlet 3, to let out the pasty product 34 contained in the packaging 36 towards the metering valve 5, by the subsequent compression of the piston 4.

[0039] Once the container packaging is empty 36, all that needs to be done is raise the piston 4, leaving the rest of the packaging 36 empty, so that it can be removed. In this way, an exact and measured quantity of the paste material is administered, without staining the tank walls 2.

[0040] An expert skilled in the art will understand that the valve design and, in particular, the shape of the sealing element 12, ensures that the metering of dye with this system produces no drops around the outlet 31. It also significantly reduces wastage of the raw material and consequently the environmental problems related to managing the waste, compared to earlier techniques.

[0041] Furthermore, if the packaging material 36 can be recycled, the process in the invention is efficient from an environmental point of view, by minimizing the amount of waste produced.

Claims

1. Metering module (1) for pasty products, of the type comprising a tank (2) for pasty products, provided with pushing means for pushing the pasty product and opening and closing means, adapted for opening and closing an outlet (3) of the aforementioned tank, **characterized in that** the tank is a hollow prism and the pushing means comprises a vertical-action piston (4) which runs tight within the tank coaxially to the same, the opening and closing means comprising a lower metering valve (5), the body of which (6) contains an internal space (7) for a vertical axle (8) which opens into the tank, the sealing element (12) of the valve being a closing head (9), which is

movable between a maximum open position and a closed position, on which the main base (11) of the seal remains level with the valve outlet (31), closing the tank.

2. Metering module (1) for pasty products according to claim 1, **characterized in that** said sealing element (12) is built in to an actuating rod (13) which passes inside said internal cylindrical space (7) of the valve body (6) and which is also activated by a trip dog (14), counter to the action of a spring (10).
3. Metering module (1) for pasty products according to claim 1, **characterized in that** said closing head (9) is frustoconical.
4. Metering module (1) for pasty products according to any of the previous claims, **characterized in that** the tank (2) is cylindrical.
5. Metering module (1) for pasty products according to any of the previous claims, **characterized in that** it comprises a device for purging the air which remains trapped inside the tank (2) below the piston (4).
6. Metering module (1) for pasty products according to any of the previous claims, **characterized in that** it comprises a mechanism for injecting air inside the tank (2) for the actuation of the piston (4).
7. Metering module (1) for pasty products according to claim 1, **characterized in that** it comprises a mechanism for opening (37, 38) a packaging (36) containing the pasty product inserted inside the tank (2).
8. Metering module (1) for pasty products according to claim 7, **characterized in that** said opening mechanism consists of a blade (37), whose cutting edge (38) is situated on the side of a cylinder which circles, at least partially, the outlet (3) of the aforementioned tank.
9. Metering module according to any of previous claims **characterized in that** it comprises control means for controlling the metering of the pasty products of the metering module (1) that is to be poured into a vessel, with certain predetermined mixing parameters.
10. Metering module according to claim 9, **characterized in that** said control means comprises a microprocessor, a computer and/or a programmable logic controller, supplied with the relevant software, and a conventional interface with the user, which act on motor and timer means of the vessel and the metering valve (5) of the metering module (1).
11. Metering process for pasty products, **characterised**

in that it comprises the steps of: providing a pasty product (34) in a container packaging (36) with deformable walls; inserting the closed packaging and filling a tank (2) with the pasty product: making a piston (4) within the tank to descend; compressing the packaging (36), by deforming its sides, against the inner walls of the tank; and opening the container packaging by opening means, making an opening (39) in the packaging, aligned with the outlet (3), allowing the pasty product contained in the packaging to exit towards a metering valve (5), via the subsequent compression of the piston (4).

Patentansprüche

1. Messmodul (1) für pastöse Produkte, von der Art, die einen Tank (2) für pastöse Produkte beinhaltet, der mit Schubmitteln zum Schieben des pastösen Produktes sowie mit Öffnungs- und Schließmitteln ausgestattet ist, die dazu ausgelegt sind, einen Auslass (3) des besagten Tanks zu öffnen und zu schließen, **dadurch gekennzeichnet, dass** der Tank ein hohles Prisma bildet und das Schubmittel über einen senkrecht arbeitenden Kolben (4) verfügt, der eng innerhalb des zu diesem koaxialen Tanks läuft, wobei die Öffnungs- und Schließmittel ein unteres Messventil (5) beinhalten, dessen Gehäuse (6) über eine innere Aussparung (7) für eine senkrechte Achse (8) verfügt, die sich in den Tank hinein öffnet, wobei es sich bei dem Dichtelement (12) des Ventils um einen Verschlusskopf (9) handelt, der zwischen einer maximalen geöffneten Position und einer geschlossenen Position beweglich ist, auf der die Grundplatte (11) der Dichtung waagrecht gegenüber dem Ventilauslass (31) bleibt und den Tank verschließt.
2. Messmodul (1) für pastöse Produkte nach Anspruch 1, **dadurch gekennzeichnet, dass** das besagte Dichtelement (12) in eine Antriebsstange (13) eingebaut ist, das innerhalb der besagten inneren zylindrischen Aussparung (7) des Ventilgehäuses (6) verläuft, und das zudem durch einen Anschlagbolzen (14) entgegen der Einwirkung einer Feder (10) angetrieben wird.
3. Messmodul (1) für pastöse Produkte nach Anspruch 1, **dadurch gekennzeichnet, dass** der besagte Verschlusskopf (9) kegelstumpfförmig ist.
4. Messmodul (1) für pastöse Produkte nach einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** der Tank (2) zylinderförmig ist.
5. Messmodul (1) für pastöse Produkte nach einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** dieses eine Vorrichtung zum Aus-

blasen der Luft umfasst, die innerhalb des Tanks (2) unter dem Kolben (4) verbleibt.

6. Messmodul (1) für pastöse Produkte nach einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** dieses einen Mechanismus zur Einspritzung von Luft in den Tank (2) für den Antrieb des Kolbens (4) beinhaltet.
7. Messmodul (1) für pastöse Produkte nach Anspruch 1, **dadurch gekennzeichnet, dass** dieses einen Mechanismus zur Öffnung (37,38) einer Verpackung (36) umfasst, die das in den Tank (2) eingefügte pastöse Produkt enthält.
8. Messmodul (1) für pastöse Produkte nach Anspruch 7, **dadurch gekennzeichnet, dass** der besagte Öffnungsmechanismus aus einer Klinge (37) besteht, dessen Schnittkante (38) sich auf der Seite eines Zylinders befindet, der den Auslass (3) des besagten Tanks zumindest teilweise umrundet.
9. Messmodul nach einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** dieses Steuergeräte zur Steuerung der Messung der pastösen Produkte des Messmoduls (1) einschließt, die mit gewissen vorherbestimmten Mischparametern in das Gefäß eingefüllt werden müssen.
10. Messmodul nach Anspruch 9, **dadurch gekennzeichnet, dass** das besagte Steuergerät einen Mikroprozessor, einen Computer und/oder eine Speicherprogrammierbare Steuerung beinhaltet, die mit einer entsprechenden Software und einer herkömmlichen Schnittstelle zum Benutzer ausgestattet ist, die auf Motor- und Timermittel des Gefäßes und auf das Messventil (5) des Messmoduls (1) einwirken.
11. Messverfahren für pastöse Produkte, **dadurch gekennzeichnet, dass** dieses folgende Schritte umfasst: Bereitstellen eines pastösen Produktes (34) in einer Behälterverpackung (36) mit verformbaren Wänden; Einfügen der geschlossenen Verpackung und Befüllen eines Tanks (2) mit dem pastösen Produkt; Herablassen eines Kolbens (4) innerhalb des Tanks; Komprimieren der Verpackung (36) mittels der Verformung der Seiten gegen die Innenwände des Tanks; sowie Öffnen der Behälterverpackung durch die Öffnungsmittel, indem eine gegenüber dem Auslass (3) ausgerichtete Öffnung (39) in der Verpackung angebracht wird, die es dem pastösen, in der Verpackung enthaltenen Produkt erlaubt, über die anschließende Komprimierung des Kolbens (4) zu einem Messventil (5) hinauszutreten.

Revendications

1. Module de mesure pour produits pâteux, du type comprenant un réservoir (2) pour produits pâteux, muni d'un dispositif de poussage pour pousser les produits pâteux et d'un dispositif d'ouverture et de fermeture, adapté pour ouvrir et fermer un orifice d'écoulement (3) du réservoir mentionné précédemment, **caractérisé en ce que** le réservoir est un prisme creux et **en ce que** le dispositif de poussage comprend un piston à action verticale (4) serré à l'intérieur du réservoir et qui fonctionne coaxialement à ce dernier, le dispositif d'ouverture et de fermeture comprenant un robinet de mesure inférieur (5), dont le corps (6) contient un espace interne (7) pour un axe vertical (8) qui s'ouvre dans le réservoir, l'élément de fermeture étanche (12) du robinet étant une tête de fermeture (9), pouvant se déplacer entre une position ouverte maximale et une position fermée, sur laquelle la base principale (11) de la fermeture étanche reste au niveau de l'orifice d'écoulement du robinet (31), fermant ainsi le réservoir. 5
2. Module de mesure (1) pour produits pâteux conformément à la revendication 1, **caractérisé en ce que** ledit élément de fermeture étanche (12) est intégré à une tige d'actionnement (13) qui passe à l'intérieur dudit espace cylindrique interne (7) du corps du robinet (6) et qui est aussi activé par un taquet (14), contrariant l'action d'un ressort (10). 10
3. Module de mesure (1) pour produits pâteux conformément à la revendication 1, **caractérisé en ce que** ladite tête de fermeture (9) est un cône tronqué. 15
4. Module de mesure (1) pour produits pâteux conformément à quelconque des revendications précédentes, **caractérisé en ce que** le réservoir (2) est cylindrique. 20
5. Module de mesure (1) pour produits pâteux conformément à quelconque des revendications précédentes, **caractérisé en ce qu'il** comprend un dispositif pour purger l'air qui reste emprisonné à l'intérieur du réservoir (2) en dessous du piston (4). 25
6. Module de mesure (1) pour produits pâteux conformément à quelconque des revendications précédentes, **caractérisé en ce qu'il** comprend un mécanisme pour injecter de l'air à l'intérieur du réservoir (2) pour l'activation du piston (4). 30
7. Module de mesure (1) pour produits pâteux conformément à la revendication 1, **caractérisé en ce qu'il** comprend un mécanisme pour ouvrir (37, 38) un conditionnement (36) contenant le produit pâteux inséré à l'intérieur du réservoir (2). 35
8. Module de mesure (1) pour produits pâteux conformément à la revendication 7, **caractérisé en ce que** ledit mécanisme d'ouverture est constitué d'une lame (37), dont le bord coupant (38) est situé sur le côté d'un cylindre qui encercle, au moins partiellement, l'orifice d'écoulement (3) du réservoir mentionné précédemment. 40
9. Module de mesure conformément à quelconque des revendications précédentes, **caractérisé en ce qu'il** comprend un dispositif de contrôle pour contrôler la mesure du produit pâteux du module de mesure (1) qui doit être versé dans un récipient, avec certains paramètres de mélange prédéterminés. 45
10. Module de mesure conformément à la revendication 9, **caractérisé en ce que** ledit dispositif de contrôle comprend un microprocesseur, un ordinateur et/ou un contrôleur logique programmable, alimenté par le logiciel approprié, et une interface conventionnelle avec l'utilisateur, qui agissent sur le moteur et le dispositif de minuterie du récipient et le robinet de mesure (5) du module de mesure (1). 50
11. Procédé de mesure pour produits pâteux, **caractérisé en ce qu'il** comprend les étapes suivantes : déposer un produit pâteux (34) dans un conteneur de conditionnement (36) aux parois déformables ; insérer le conditionnement fermé et remplir un réservoir (2) avec le produit pâteux ; faire descendre un piston (4) à l'intérieur du réservoir ; comprimer le conditionnement (36), en déformant ses côtés, contre les parois internes du réservoir ; et ouvrir le conteneur de conditionnement par un dispositif d'ouverture, en faisant une ouverture (39) dans le conditionnement, alignée sur l'orifice d'écoulement (3), ce qui permet au produit pâteux contenu dans le conditionnement de sortir en direction d'un robinet de mesure (5), par la compression ultérieure du piston (4). 55

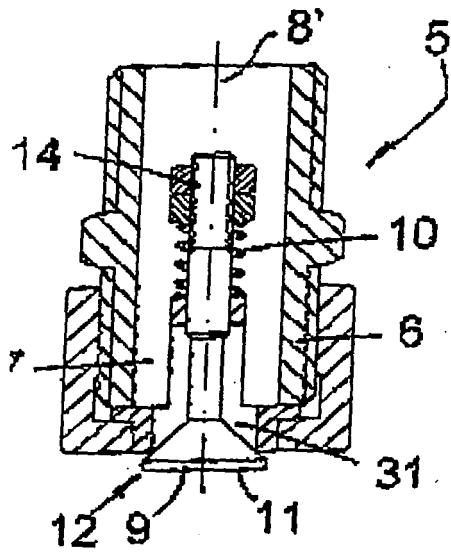


FIG. 1

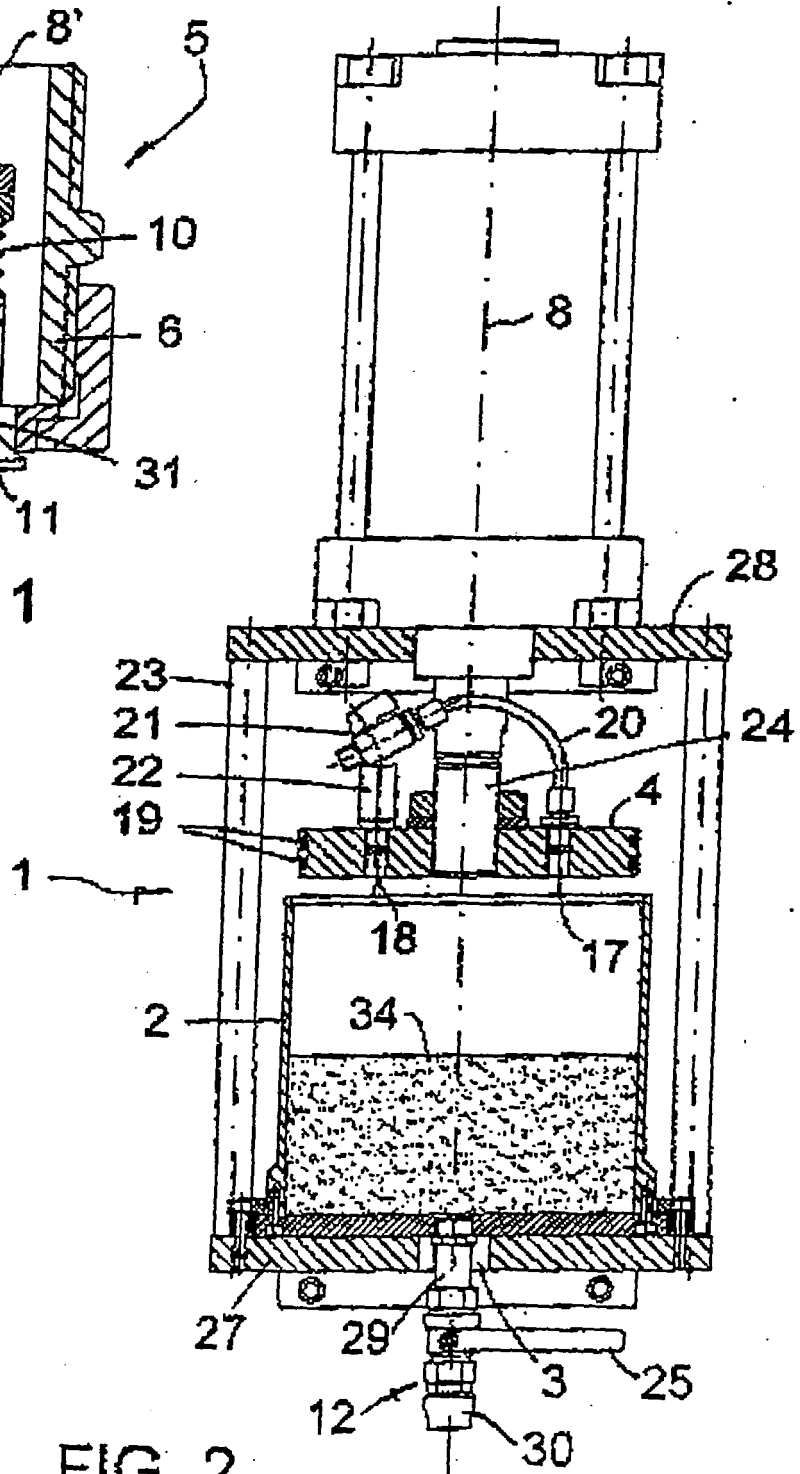
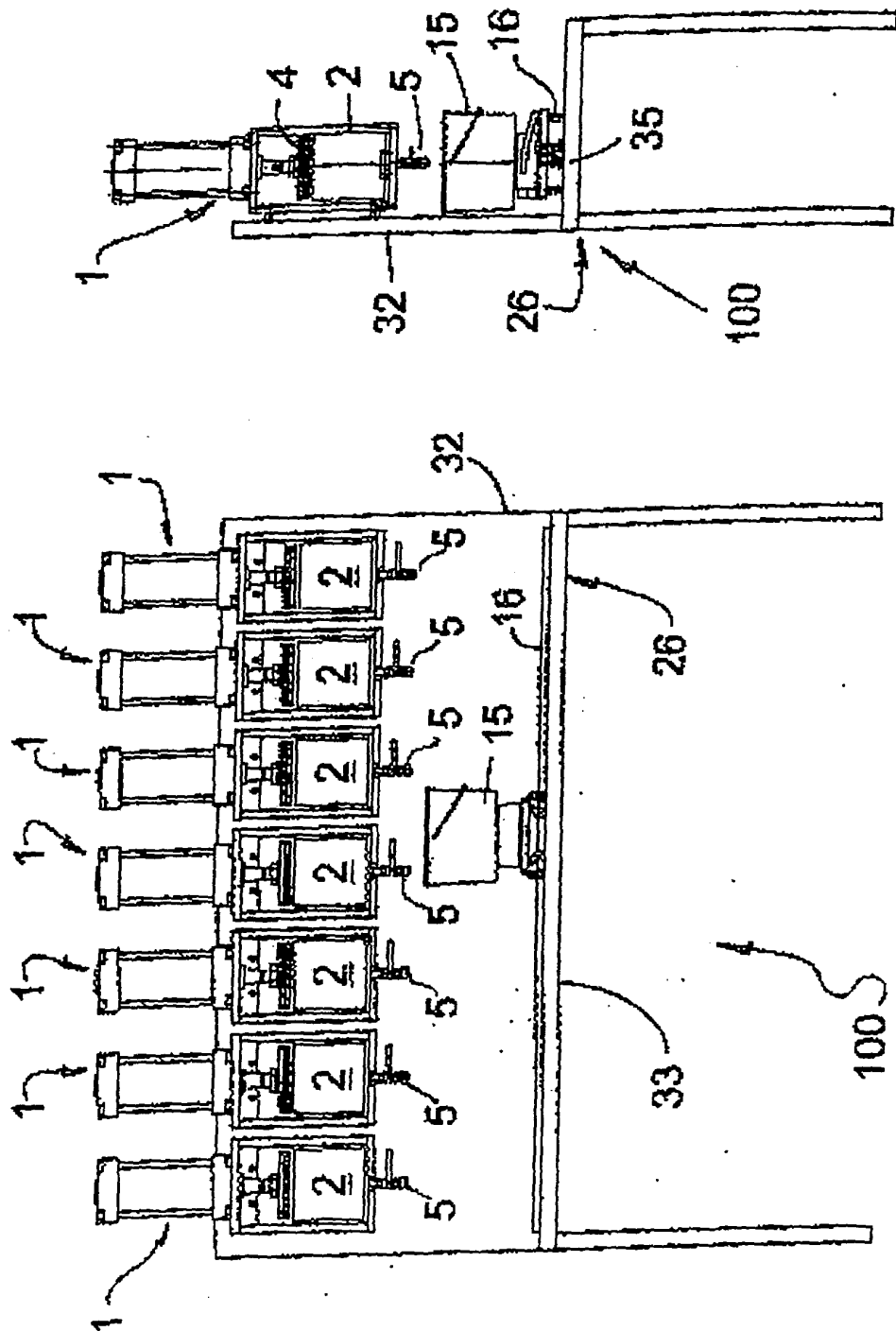
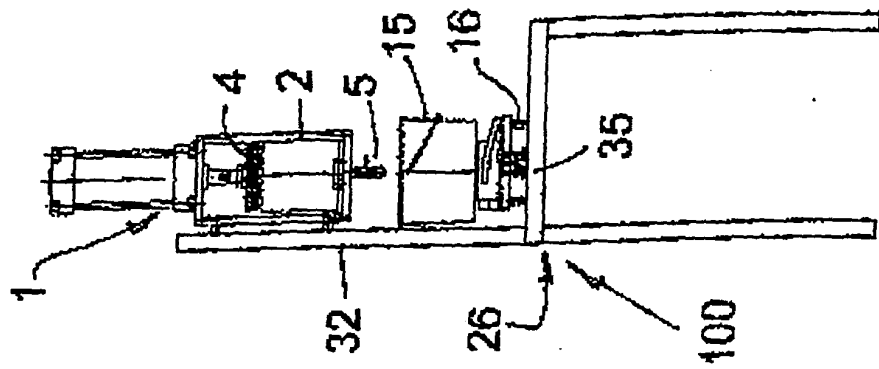


FIG. 2



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