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(54) **Machine for filling containers with liquids**

Maschine zum Befüllen von Behältern mit Flüssigkeiten

Machine de remplissage de récipients avec des liquides

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## Description

**[0001]** The present invention concerns filling containers with liquids.

**[0002]** It is known that containers like bottles and the like are filled with liquids by automatic machines generally equipped with an operating bed structure.

**[0003]** In particular, known machines usually feature a conveying line for containers to be filled, situated over the bed.

**[0004]** This conveying line feeds a singling device, which includes e.g. a screw feeder, with containers. The singling device brings the containers one by one to a rotary drum that moves in the region of the liquid delivering means situated over the bed, in a containers filling station.

**[0005]** The containers filled with the liquid are moved to further working stations, in particular for caps application.

**[0006]** The dimensions of the bed structure of these machines are usually big and do not allow the operators to control easily the operation steps.

**[0007]** Moreover, it is often difficult to approach the machine driving means and electric devices, e.g. for maintenance operations or the like.

**[0008]** An automatic filling machine is known from the US-A-4.083.389. This machine includes pump units for filling containers which are advanced along a conveyor belt and a star wheel which is rotated by the containers as they pass by. When the star wheel is locked, it holds the container in a position for filling.

**[0009]** The machine described by document US-A-4.083.389 does not teach housing the means for driving the machine inside a body and supporting the conveyor belt on cantilevered support means protruding from the body. Moreover, the cited document does not disclose a singling device for singling out the containers downstream of the conveying line.

**[0010]** The object of the present invention is to propose a compact structure for a container filling machine, which allows a rapid operation on the machine working parts and easy access to the machine inner means.

**[0011]** Another object of the present invention is to propose a structure, whose form allows to clearly separate electric board area from the machine driving means area.

**[0012]** The above mentioned objects are obtained in accordance with contents of the claims.

**[0013]** The characteristic features of the invention will be pointed out in the following description, with particular reference to the enclosed drawings, in which:

- fig. 1 shows a prospective schematic view of a machine for filling containers with liquids, equipped with the structure, being the subject of the present invention;
- fig. 2 shows a front schematic view of this machine;
- figs. 3 and 4 show respectively, corresponding top and lateral views of the machine;
- fig. 5 show a partial top view of a different embodiment of the machine.

**[0014]** With reference to the above described figures, numeral 1 indicates the structure of a machine for filling containers 2, e.g. bottles, with liquids.

**[0015]** The structure 1 features a box-like body 3, of e.g. prismatic form, extending suitably upwards.

**[0016]** The body 3 of the structure is divided longitudinally in a part 4 with a fixed configuration, which contains machine driving means, and a part 5 which can be opened and contains electric devices.

**[0017]** The part 5, that can be opened, includes e.g. two covers 5a, 5b, hinged to the fixed part 4, as seen in figure 3; obviously only one cover can be provided to form the part which can be opened.

**[0018]** Both the driving means contained inside the fixed part 4 and the electric devices can be easily approached by opening the covers 5a, 5b.

**[0019]** A cantilevered bracket 6, supporting a conveying line 7 for the containers 2, protrudes from the front part of the fixed part 4 of the body 3, on the side opposite to the covers 5.

**[0020]** The conveying line 7 is situated over the shelf 6 and is operated by the said driving means through transmission means, known to those skilled in the art, housed inside the said bracket 6.

**[0021]** Obviously, the conveying line can be place on one side of the bracket, close thereto, without that the machine goes out of the scope on the claims.

**[0022]** The conveying line 7 is preferably equipped with a steel conveying belt 8, like the one disclosed in the Italian Patent Application no. BO93U 000222 of the same Applicant.

**[0023]** The conveying line 7 feeds a singling device 9 with containers 2. The singling device includes e.g. a screw feeder 9 which is carried in cantilevered fashion by the bracket 6, downstream of the conveying line 7, and that extends in the same direction as the containers 2 move.

**[0024]** Liquid dosing means 10, situated over the shelf 6 and working along the conveying line 7, are carried in cantilevered way by the fixed part 4 f the structure body 3.

**[0025]** In the illustrated example liquid dosing means 10 are includes cylinder-piston assemblies 10, nevertheless it is possible to use other delivering means, like e.g. peristaltic pumps or flow cut off devices.

**[0026]** The dosing means 10 are fed by a suitable liquid container, not shown, via respective valves 11. The containers 2 are filled by a series of nozzles 12 connected with respective dosing means 10 through the valves 11.

**[0027]** The nozzles 12 are carried by a carriage 13, moving longitudinally to the conveying line 7, over the

support bracket 6, following a closed-loop path.

**[0028]** A rotary drum 14, equipped with capping means 15 for application caps to the containers 2, is situated downstream of the screw feeder 9.

**[0029]** The drum 14 brings the capped containers 2 to an exit line 16, also preferably provided with a conveying steel belt 17 of the above mentioned type.

**[0030]** For this purpose, the drum 14 co-operates, with rotary star-like distribution means 18,19, situated at the inlet and at the outlet thereof and operated in time relation with the drum 14.

**[0031]** The caps, supplied by a vibration feeder 20, are sent by a feeding line 21 to another star-like distributor 22, situated over the entrance distributor 18, that carries the containers 2, and is operated in time relation therewith.

**[0032]** If two caps are to be applied to each container 2, there is provided a second rotary drum 24, equipped with capping means 25, situated downstream of the first rotary drum 14, as shown in fig. 5.

**[0033]** Another star-like distributor 26, operated in time relation with the drums 14,24, is situated therebetween.

**[0034]** It is to be pointed out that operating mechanism of the drum 14 is housed inside a case 27, placed vertically below the drum 14; obviously the same is provided for a possible second drum 24.

**[0035]** It is also to be pointed out that the exit line 16 of the filled and capped containers 2 protrudes from the front part of the body 3 of the machine 1 and is more or less longitudinally aligned with the conveying line 7, that feeds the containers 2 to be filled. Preferably this exit line 16 is equipped with a steel belt.

**[0036]** The nozzles 12 are connected to respective containers 2 to be filled, placed one after another on the conveying belt 8 of the line 7.

**[0037]** As has already been said, these nozzles 12 move longitudinally to the conveying line 7, along a close-loop path, so as to follow the containers 2 during the filling step.

**[0038]** In fact, during the filling step, the group of nozzles 12 moves in synchrony with the conveying line 7, as indicated with broken line in figs. 2 and 3.

**[0039]** When the filling step is completed, the group of nozzles 12 is moved vertically to a raised position 12b, so as to disengage from the containers 2, and then translated longitudinally to the conveying line 7, in the direction opposite to this line 7 movement direction, as shown with broken line 12c.

**[0040]** Afterwards, the group of nozzles 12 is brought back to the lowered position to fill a next group of containers 2, in the same way as described previously.

**[0041]** The nozzles 12 fill the containers 2, moving along the conveying line 7, with the liquid supplied by the relative dosing means 10.

**[0042]** At the exit of the conveying line 7, the filled containers 2 are taken up by a separating device 9 which includes a screw feeder, that co-operates with the star-like distributor 18 to send them one by one to the drum 14.

**[0043]** On the drum 14 the containers 2 are capped and afterwards transferred to the exit line 16, with the help of the star-like distributor 19.

**[0044]** The described structure achieves the object of realising a compact and clean machine for filling containers.

**[0045]** In fact, containers conveying and filing means protrude from one side of the box-like body containing the machine driving means and electric devices.

**[0046]** Therefore, these means are visible and easily accessible for the operators, which facilitates maintenance and size change over operations.

**[0047]** Moreover, this structure allows an easy access to the machine inner means, i.e. the above mentioned driving means and electric devices, due to their location inside the box-like body, that can be opened on the side opposite the side on which the containers conveying and filling means are situated.

## Claims

**1.** Machine (1) for filling containers (2) with liquids, the machine including :

a conveying line (7) for the containers (2) to be filled;

delivering means (12) for delivering a liquid product that is to fill the containers (2);

the machine **characterised in that** it includes :

a body (3) for housing machine driving means;

cantilevered support means (6) protruding from said body (3) and carrying said conveying line (7);

a singling device (9) for singling out said containers (2), that is situated downstream of the said conveying line (7); with said delivering means (12) being interposed between the said body (3) and the said conveying line (7).

**2.** Machine according to claim 1, **characterised in that** the said body (3) is divided longitudinally in a part (4) with a fixed configuration, that houses thereinside the said machine driving means, and a part (5) which can be opened and is situated on the side opposite to the side from which the support means (6) protrude.

**3.** Machine according to claim 1, **characterised in**

**that** the said support means (6) include a support bracket, over which the said conveying line (7) is situated and inside which driving means for the said conveying line (7) are housed.

**4.** Machine according to claim 1, **characterised in that** the said support means (6) include a support bracket, in front of which the said conveying line (7) is situated and inside which driving means for the said conveying line (7) are housed.

**5.** Machine, according to claim 1, **characterised in that** at least one rotary drum (14), equipped with capping means (15) for application of caps to the said containers (2), is carried in cantilevered fashion by the said body (3), downstream of the said singling device (9), and is operated by means housed inside a case (27) situated vertically below the said drum (14).

**6.** Machine, according to claim 5, **characterised in that** it includes an exit line (16) for the filled and capped containers (2), said exit line (16) protruding from the front part of the said body (3) and downstream of the said rotary drum.

**7.** Machine, according to claim 1, **characterised in that** it includes an exit line (16) for the filled containers (2), said exit line protruding from the front part of the said body (3) and being longitudinally aligned with the said conveying line (7).

**8.** Machine, according to claim 1, **characterised in that** the conveying line (7) is provided with a steel conveying belt (8).

**Patentansprüche**

**1.** Maschine (1) zum Befüllen von Behältern (2) mit Flüssigkeiten, wobei die Maschine folgendes umfaßt:

eine Transportbahn (7) für die zu befüllenden Behälter (2) Zuführmittel (12) zum Zufübren eines flüssigen Produkts, mit dem die Behälter (2) befüllt werden sollen;
wobei die Maschine **dadurch gekennzeichnet ist, daß** sie folgendes umfaßt:

einen Körper (3) zum Unterbringen der Maschinenantriebsmittel;
von dem Körper (3) hervorstehende und die Transportbahn (7) tragende, frei-tragende Trägermittel (6);
eine stromab der Transportbahn (7) angeordnete Vereinzelungsvorrichtung (9) zum Vereinzeln der Behälter (2);
wobei die Zuführmittel (12) zwischen dem Körper (3) und der Transportbahn (9) eingeschaltet sind.

**2.** Maschine nach Anspruch 1, **dadurch gekennzeichnet, daß** der Körper (3) in Längsrichtung in einen Teil (4) mit einer festen Konfiguration, in dessen Innem die Maschinenantriebsroittel untergebracht sind, und in einen Teil (5) unterteilt ist, der sich öffnen läßt und sich auf der Gegenseite zu der Seite befindet, von der die Trägermittel (6) hervorstehen.

**3.** Maschine nach Anspruch 1, **dadurch gekennzeichnet, daß** die Trägermittel (6) einen abstützenden Träger umfassen, über dem die Transportbahn (7) angeordnet ist und innerhalb dessen Antriebsmittel für die Transportbahn (7) untergebracht sind.

**4.** Maschine nach Anspruch 1, **dadurch gekennzeichnet, daß** die Trägermittel (6) einen abseützenden Träger umfassen, vor dem sich die Transportbahn (7) ange-ordnet ist und innerhalb dessen Antriebsmittel für die Transportbahn (7) untergebracht sind.

**5.** Maschine nach Anspruch 1, **dadurch gekennzeichnet, daß** wenigstens eine mit Vcrschlußmitteln (15) zum Aufbringen von Kappen auf die Behälter (2) ver-sehene, umlaufende Trommel (14) stromab der Vereinzelungsvorrichtung (9) in freitragender Weise von dem Körper (3) getragen wird und von innerhalb eines vertikal unterhalb der Trommel (14) befindlichen Gehäuses (27) untergebrachten Mitteln betätigt wird.

**6.** Maschine nach Anspruch 5, **dadurch gekennzeichnet, daß** sie eine Austrittsbahn (16) für die befüllten und verschlossenen Behälter (2) umfaßt, wobci die Aus-trittsbahn (16) von dem Vorderteil des Körpers (3) und stromab der umlaufenden Trommel hervorsteht.

**7.** Maschine nach Anspruch 1, **dadurch gekennzeichnet, daß** sie eine Austrittsbahn (16) für die befüllten Behälter (2) umfaßt, wobei die Austrittsbahn von dem Vor-derteil des Körpers (3) hervorsteht und in Längsrichtung mit der Transportbahn (7) ausgerichtet ist.

**8.** Maschine nach Anspruch 1, **dadurch gekennzeichnet, daß** die Transportbahn (7) mit einem Transportband aus Stahl versehen ist.

**Revendications**

**1.** Machine (1) de remplissage de récipients (2) avec

des liquides, la machine comprenant :

une ligne de transport (7) destinée aux récipients (2) devant être remplis ;

un moyen de fourniture (12) destiné à fournir un produit liquide qui doit remplir les récipients (2) ;

la machine étant **caractérisée en ce qu'**elle comprend :

un corps (3) destiné à loger les moyens d'entraînement de la machine ;

un moyen de support en porte à faux (6) en saillie à partir dudit corps (3) et qui porte ladite ligne de transport (7) ;

un dispositif de tri (9) destiné à trier lesdits récipients (2), qui est situé en aval de la dite ligne de transport (7) ;

ledit moyen de fourniture (12) étant intercalé entre ledit corps (3) et ladite ligne de transport (7).

**2.** Machine selon la revendication 1, **caractérisée en ce que** ledit corps (3) est divisé dans la direction longitudinale en une partie (4) ayant une configuration fixe, qui loge à l'intérieur lesdits moyens d'entraînement de machine, et une partie (5) qui peut être ouverte et qui est située sur le côté opposé à celui à partir duquel le moyen de support (6) est en saillie.

**3.** Machine selon la revendication 1, **caractérisée en ce que** ledit moyen de support (6) comprend une console de support, sur laquelle est installée ladite lione de transport (7) et à l'intérieur de laquelle sont logés les moyens d'entraînement destinés à ladite ligne de transport (7).

**4.** Machine selon la revendication 1, **caractérisée en ce que** ledit moyen de support (6) comprend une console de support, en face de laquelle est située ladite ligne de transport (7) et à l'intérieur de laquelle sont logés lesdits moyens d'entraînement destinés à ladite ligne de transport (7).

**5.** Machine selon la revendication 1, **caractérisée en ce qu'**au moins un tambour rotatif (14), équipé de moyens d'obturation (15) destinés à l'application de couvercles d'obturation sur lesdits récipients (2), est porté en porte à faux par ledit corps (3), en aval dudit dispositif de tri (9), et est mis en action par des moyens logés à l'intérieur d'un boîtier (27) situé verticalement en-dessous dudit tambour (14).

**6.** Machine selon la revendication 5, **caractérisée en ce qu'**elle comprend une ligne de sortie (16) destinée aux récipients remplis et obturés (2), ladite ligne de sortie (16) étant en saillie depuis la partie avant audit corps (3) et en aval dudit tambour rotatif.

**7.** Machine selon la revendication 1, **caractérisée en ce qu'**elle comprend une ligne de sortie (16) destinée aux récipients remplis (2), ladite ligne de sortie étant en saillie depuis la partie avant dudit corps (3) et étant alignée dans la direction longitudinale avec ladite ligne de transport (7).

**8.** Machine selon la revendication 1, **caractérisée en ce que** la ligne de transport (7) est pourvue d'une bande transporteuse en acier (8).

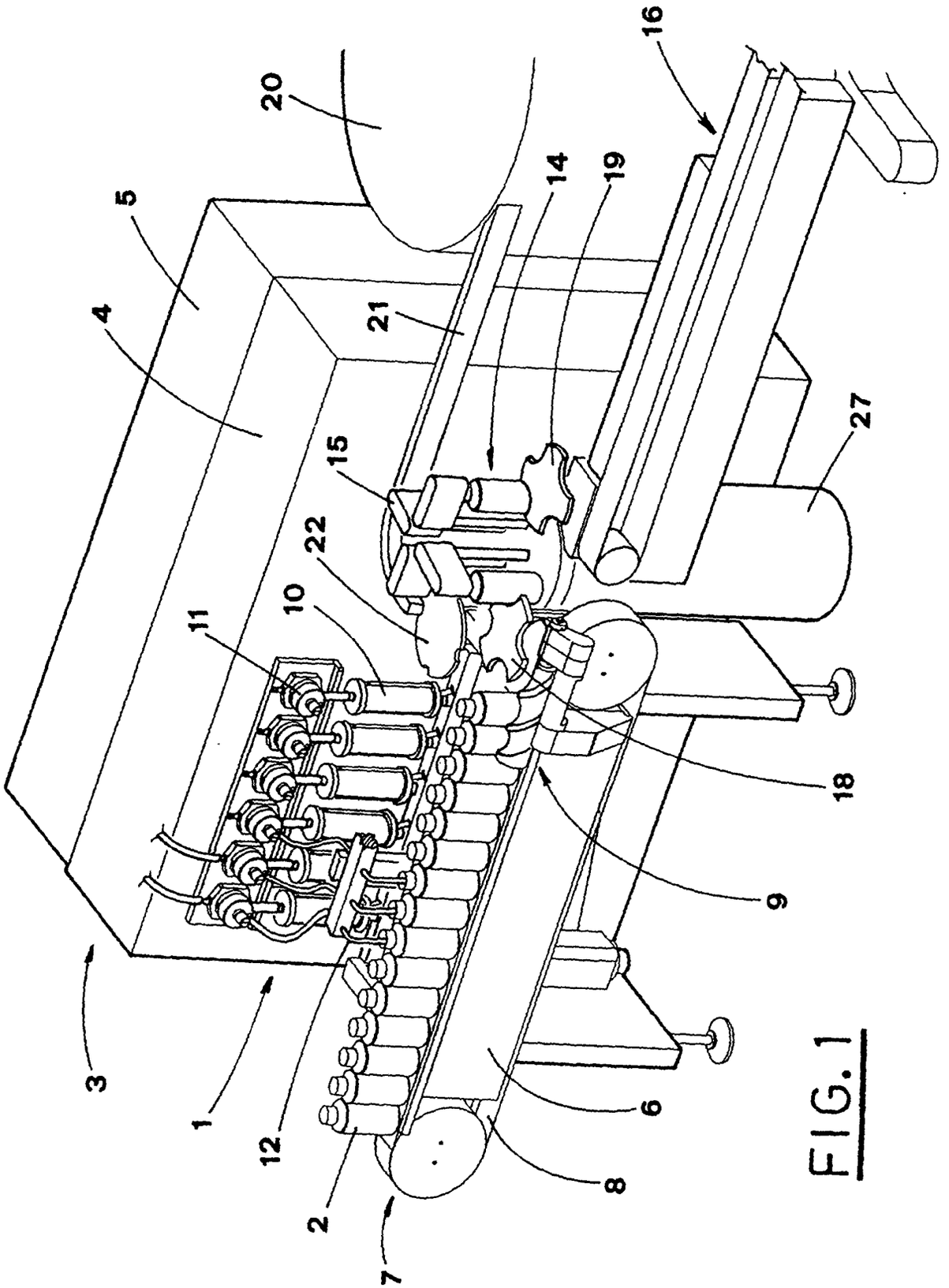
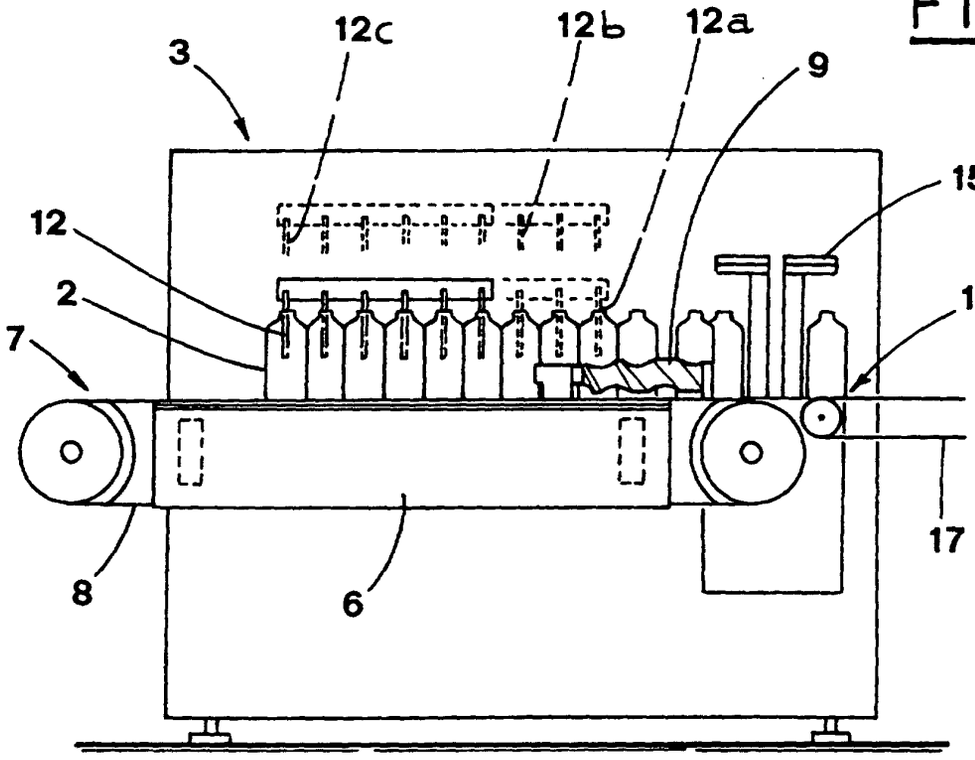



FIG. 1

FIG. 2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12c
12b
12a
9
15
12
2
14
7
17
8
6

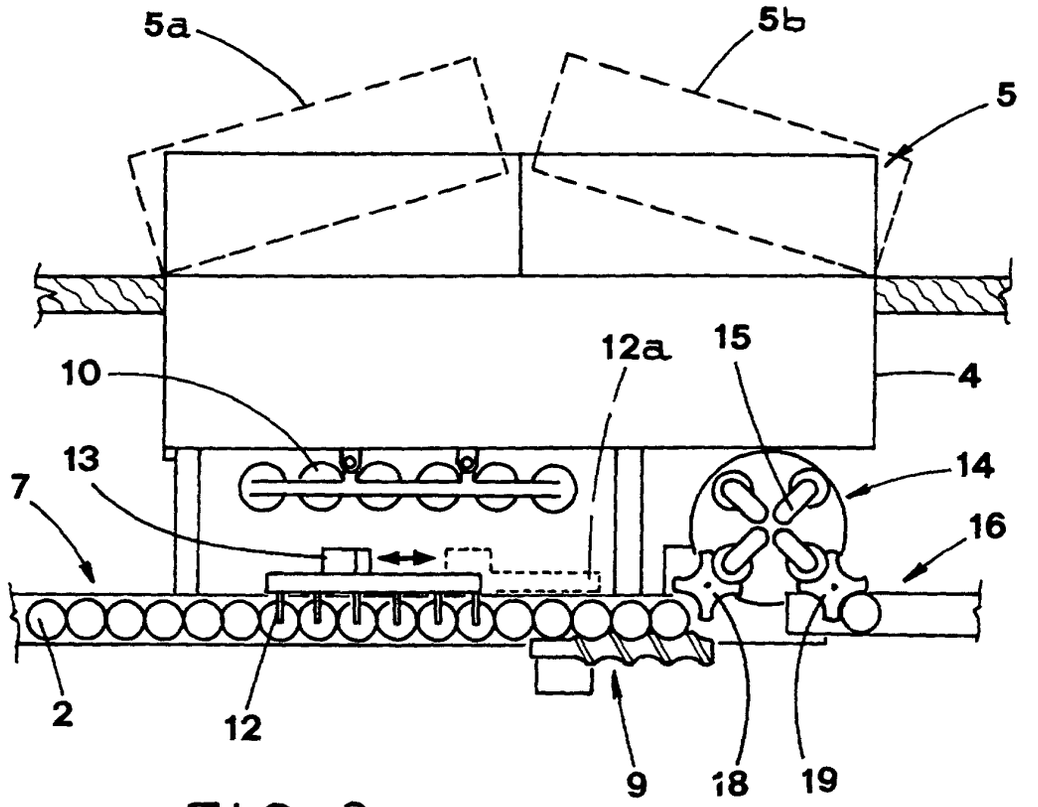
5a
5b
5
10
12a
15
4
13
14
7
16
2
12
9
18
19

FIG. 3

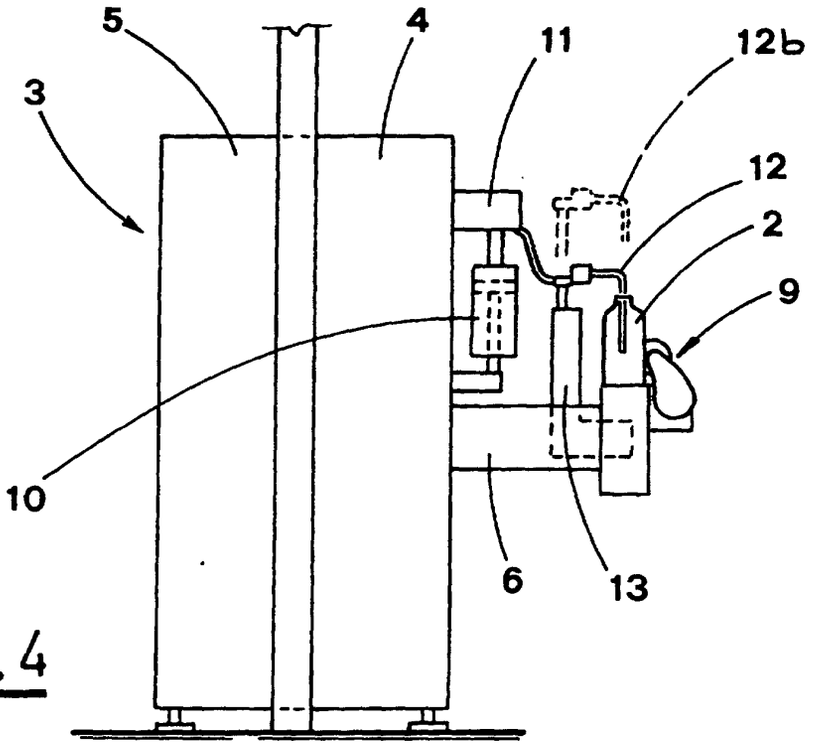


FIG. 4

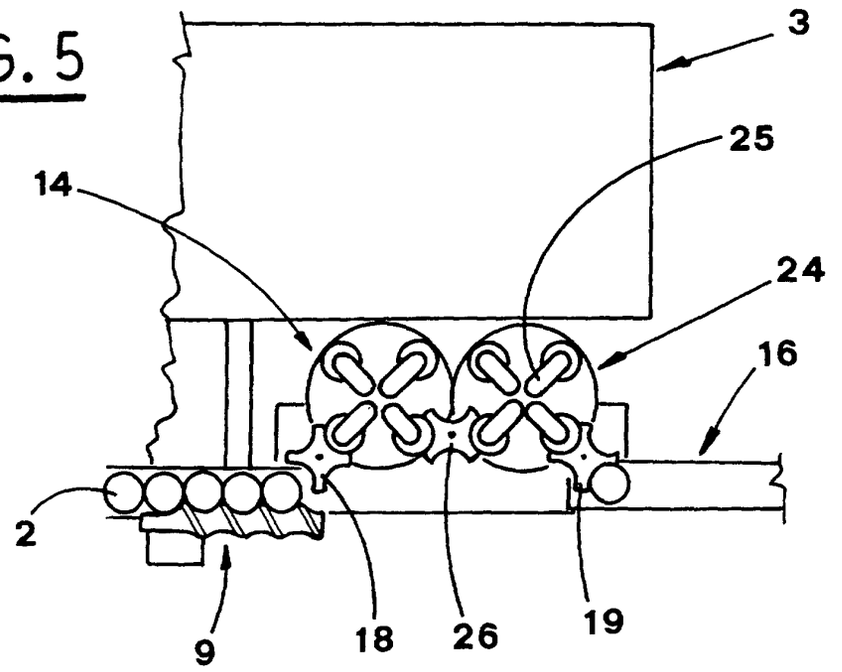


FIG. 5