



(11)

**EP 1 727 099 A2**

(12)

**EUROPEAN PATENT APPLICATION**

(43) Date of publication:  
**29.11.2006 Bulletin 2006/48**

(51) Int Cl.:  
**G07F 11/10 (2006.01)**

(21) Application number: **06117296.1**

(22) Date of filing: **15.04.2004**

(84) Designated Contracting States:  
**AT BE BG CH CY CZ DE DK EE ES FI FR GB GR  
HU IE IS IT LI LT LU LV MC NL PL PT RO SE SI  
SK TR**  
Designated Extension States:  
**AL BA HR MK YU**

(72) Inventor: **Borra, Paolo**  
**21052 Busto Arsizio (Varese) (IT)**

(74) Representative: **Ponzellini, Gianmarco**  
**Bugnion S.p.A.**  
**Viale Lancetti 17**  
**20158 Milano (IT)**

(62) Document number(s) of the earlier application(s) in  
accordance with Art. 76 EPC:  
**04425271.6 / 1 587 038**

Remarks:

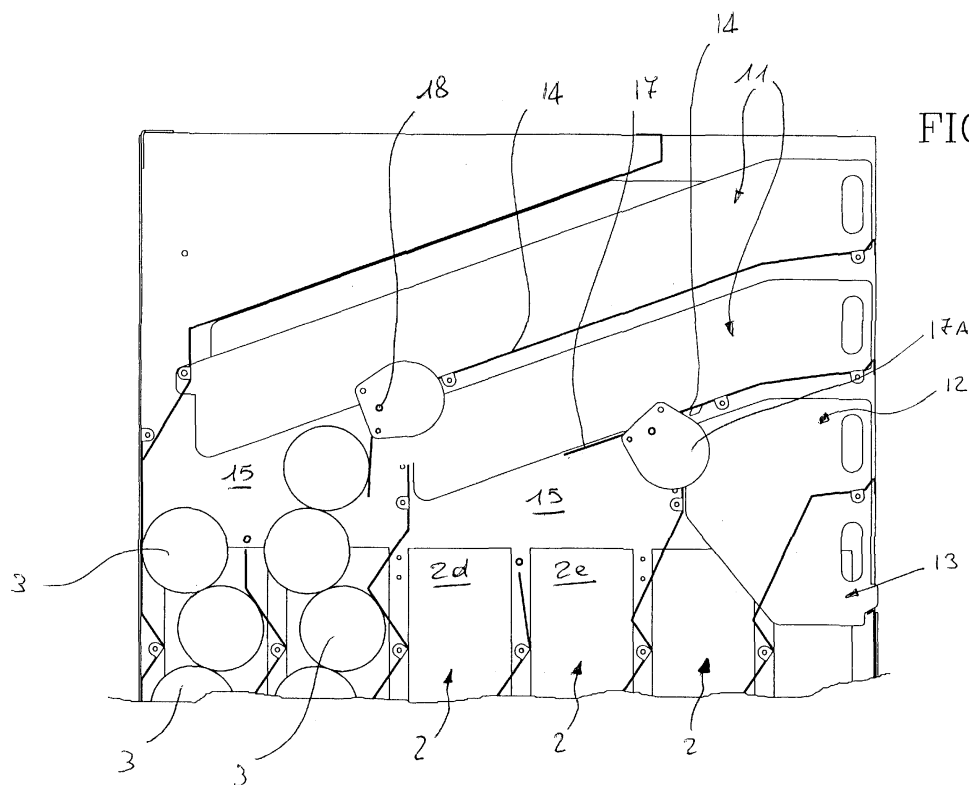
This application was filed on 17 - 07 - 2006 as a  
divisional application to the application mentioned  
under INID code 62.

(71) Applicant: **DAMIAN S.r.l.**  
**21053 Castellanza(Varese) (IT)**

(54) **Vending machine for items substantially of cylindrical shape such as bottles, cans and the like**

(57) It is disclosed a vending machine for items of  
substantially cylindrical shape such as bottles, cans and  
the like, comprising a plurality of storage compartments  
(2) each of them adapted to house said items (3), and  
dispensing devices (4) adapted to dispense the items

coming from at least two respective storage compart-  
ments (2). The machine further comprises a multiple  
loading chute (11) adapted to channel the items them-  
selves towards at least two storage compartments (2)  
disposed in mutual side by side relationship.



**FIG. 6**

## Description

**[0001]** The present invention relates to a vending machine for items substantially of cylindrical shape such as bottles, cans and the like.

**[0002]** It is known that vending machines for substantially cylinder-shaped items such as bottles and/or cans for example, each comprise many storage compartments, usually of a substantially vertical orientation, inside which many products can be stored in an orderly manner, all of them being positioned in a horizontal direction with respect to their longitudinal axes.

**[0003]** In each machine of the above mentioned type, disposed under the storage compartments are dispensing devices, i.e. the devices adapted to carry out, after the required money has been introduced into the machine and selection of the desired product has occurred, dispensing of the products one at a time towards the region where they are picked up.

**[0004]** Sometimes, also provided on top of said storage compartments are loading chutes adapted to facilitate and make the periodical operations for filling said compartments quicker, thereby avoiding the individual items being directly placed in the available spaces.

**[0005]** In the known art there is one dispensing device for each storage compartment and, if loading chutes are provided, one chute for each compartment.

**[0006]** Correspondence between a dispensing device and each storage compartment involves, above all in the case of many compartments, heavy production costs since each dispensing device usually comprises an electric motor of its own and suitable mechanical and electronic control elements, and also a great construction complexity due to the presence of many components and, as a result, an operating-reliability rate in inverse proportion to the number of storage compartments contemplated in a machine.

**[0007]** Also the fact that there is one loading chute for each of the storage compartments, which is acceptable if there is a small number of said compartments, gives rise to an increase in the volume taken up by said chutes when, on the contrary, availability of a machine with many compartments to be reloaded with a great number of items is required; as a result, the height of the machine being the same, there will be a reduction in the lower space to be dedicated to the compartments for storage of said items.

**[0008]** Under this situation, the technical task underlying the present invention is to devise a vending machine for items of a substantially cylindrical shape such as bottles, cans and the like, capable of substantially obviating the mentioned drawbacks.

**[0009]** Within the scope of this technical task, it is an important aim of the invention to devise a machine that is operatively more reliable than those of the known art, the number of storage compartments being the same.

**[0010]** It is a further aim of the invention to limit the overall weight of the items insisting on the dispensing

device and also to study a device operating with motors of lower power than those of the known art.

**[0011]** Another important aim of the invention is to devise a machine that, while being provided with loading chutes, also comprises a great number of storage compartments, a big space being dedicated to the compartments themselves so that a great loading capacity is available.

**[0012]** The technical task mentioned and the aims specified are substantially achieved by a vending machine for items of substantially cylindrical shape that is characterised in that it comprises one or more of the technical solutions claimed in the following.

**[0013]** The description of a preferred but not exclusive embodiment of a vending machine in accordance with the invention is now given by way of non-limiting example, with reference to the accompanying drawings, in which:

- Fig. 1 is a perspective view of a machine in accordance with the invention devoid of some parts of the external holding casing;
- Figs. 2 and 4 are elevation front views of the machine in Fig. 2 with and without further protection panels, respectively;
- Figs. 3 and 3a show the dispensing devices of the machine in Fig. 1 to an enlarged scale;
- Fig. 5 is a side view of the loading chutes provided in the machine in Fig. 1 with some items stored in the last column; and
- Fig. 6 is similar to Fig. 4 but with some items already stored in the storage compartments.

**[0014]** With reference to the drawings, the machine in accordance with the invention has been generally identified by reference numeral 1.

**[0015]** It comprises a plurality of storage compartments 2 of a substantially vertical orientation that are separated from each other and are each adapted to house items or products 3 of a substantially cylindrical shape that are horizontally positioned with respect to their longitudinal axes 3a.

**[0016]** Provided below the storage compartments 2 are some dispensing devices 4 adapted to carry out supply of the products 3, obviously one at a time, dropping them towards a region 1a where they can be picked up.

**[0017]** In an original manner, the dispensing devices 4 consist of multi-purpose devices, each adapted to deliver products from at least two respective storage compartments 2.

**[0018]** More specifically, each multi-purpose dispensing device 4 comprises a conveying chamber 5 in communication with two respective storage compartments 2 and adapted to prepare some products for the dispensing step by arranging them in superposed and offset positions by means of the opposite walls 5a of the chamber itself. For example, in a conveying chamber 5 shown in Fig. 3A four products 3 identified with letters A, B, C, D are present.

**[0019]** In an outlet space 5b of the conveying chamber 5 there is a movable supporting unit 6 moved by drive means 7 and adapted to selectively enable dropping of a single product 3 towards the picking-up region 1a, by its movement between a closed position and an open position.

**[0020]** The movable supporting unit 6 is oscillatable around a hinging axis 6a between two inclined end positions corresponding to two closed positions, passing through intermediate positions also comprising two open positions and has two opposite sides on which an overlying item 3 rests, which sides are designed to be alternately used during passage from one of said inclined positions to the other.

**[0021]** Practically, the movable supporting unit 6 comprises two opposite end elements substantially in the form of a plate 6b that are terminally rigidly connected with each other by two parallel rod-like elements 6c adapted to define said two opposite sides designed to laterally support an item 3 (in this connection, also see Fig. 1).

**[0022]** The rod-like elements 6c can be fastened to a mutually farther or closer position depending on the diameters of the items designed to rest thereon.

**[0023]** The drive means 7 causing oscillation of the movable unit 6, comprises a kinematic chain formed of a crank 8 moved by an electric motor and a connecting-rod 9 interposed between said crank and the movable unit 6 itself.

**[0024]** Advantageously, the storage compartments 2 are each made up of a column-shaped space of a substantially vertical orientation formed of opposite walls 2a with an undulated extension, which space has a substantially zigzag course. In this manner items 3 during loading greatly slow down their fall velocity and in the static stacked situation they partly discharge their weight on the wall 2a of the storage compartment, rather than on the items disposed below, thereby avoiding bruises and deformations and reducing weight and consequently stresses on the motor during the operations for dispensing said items.

**[0025]** In other words, the presence on the opposite walls 2a of segments in succession having the same inclinations as, and opposite to, the vertical, which segments also repeat themselves, generates a winding path for the items in the walls, said items resting on each other but at offset positions.

**[0026]** The machine 1 in accordance with the invention further has a loading region 10 in the upper part thereof, which region in an original manner comprises at least one multiple loading chute 11 adapted to channel items 3 at least towards two compartments 2 disposed in side by side relationship, rather than towards a single storage compartment as it happens in the known art.

**[0027]** It is apparent that this technical configuration is very important in combination with dispensers which too are capable of working on two columns; however these chutes can be possibly mounted \*\*\* on other dispensers,

irrespective of the presence of dispensers of the above described configuration. For example, in Fig. 5 the loading region 10 comprises two multiple loading chutes 11, one normal chute 12 for a single compartment and a mere loading inlet 13 for the outermost compartment 2.

**[0028]** Each multiple loading chute 11 in turn comprises an inclined duct 14 opening into an entrance chamber 15 disposed above two compartments 2 in side by side relationship and in succession with respect to the slipping direction 16 of the products so as to define a first compartment 2b and a second compartment 2c.

**[0029]** It is also to be pointed out that the loading region comprises several different entrances for the products, all disposed close to each other so as to facilitate the machine loading procedures by the operator.

**[0030]** Provided in the extension of the lower slipping wall of duct 14 and at a position of partial overlapping with compartment 2b is a conveying baffle 17 oscillatable about a horizontal oscillation axis 18. The conveying baffle 17 has a balancing counterweight 17a adapted to automatically allow the selective rotation of the baffle itself when the weight of a product 3 persists thereon, in order to channel the latter towards the first compartment 2b. It is however apparent that deflecting means for the products equivalent to those shown can be utilised. For example, provision can be made for use of an electronic movable device with manual control (outer push-button controlled by the operator to fill the second column when the first is completely loaded) or also of a device with automatic control (a sensor capable of detecting filling of the first column and operating opening of the movable device).

**[0031]** In addition, in the embodiment shown the counterweight can be possibly replaced by return springs or others.

**[0032]** Operation of a vending machine described above mainly as regards structure is as follows.

**[0033]** The items 3 stored up in the storage compartments 2, are disposed in each of the conveying chambers 5 ready to be sent to the picking-up region 1a. In particular the products from two compartments disposed in side by side relationship stand on a respective dispensing device 4 the movable supporting unit 6 of which is disposed in a first inclined position, as shown in Fig. 3a, which is adapted to laterally bear an item A.

**[0034]** When a command of emitting a product reaches the dispensing device 4, the corresponding crank rotates through 180° causing, by the connecting-rod 9, oscillation of the movable unit 6 and therefore falling of item A and simultaneous lowering of the subsequent item B. At the end of this oscillation the movable unit 6 takes a second inclined closed position at which item B rests on said unit on the side of the rod-like elements 6c opposite to that previously used for bearing item A.

**[0035]** When a new emitting command arrives, rotation through 180° of crank 8 imposes oscillation of the supporting unit 6 in the opposite direction until said unit reaches the first inclined position again. During the new

oscillation, emission of item B takes place and the supporting unit 6 is ready for another cycle.

[0036] When loading of machine 1 is carried out through a multiple loading chute 11, items 3 descend along the inclined duct 14, go beyond the first compartment 2b and progressively fill the second compartment 2c (Fig. 5) since the quick passage over the conveying baffle 17 is not able to cause rotation of the latter.

[0037] When filling of the second compartment 2c has been completed, the items that are further admitted to the inclined duct 14 impinge on the item or items disposed to a higher position and already present in the second compartment 2c itself and fall into the first compartment 2b that is therefore progressively filled with the items as well, since said items have caused rotation of the conveying baffle 17 by their weight persisting thereon for some instants (see Fig. 6).

[0038] Obviously, the same loading condition also occurs with reference to the central compartments 2d and 2a.

[0039] The invention achieves important advantages.

[0040] In fact, first of all, the dispensing devices used in the machine in accordance with the invention can be provided in a reduced number, a halved number for example, as compared with those that are present in the known art, the storage compartments and therefore the loading capacity being the same. It will be recognised that an important reduction in the number of the dispensing devices allows reliability to be increased and therefore the maintenance costs of the machine to be reduced to an important degree.

[0041] In addition, the machine being the objet of the invention enables a greater choice of items to be ensured, the filling columns and volumes being the same, as compared with equivalent machines of the known art.

[0042] Then, due to the presence of vertical compartments having an undulated course, the weight insisting on the dispensing device can be reduced so that said devices can be actuated using motors of less power.

[0043] It will be recognised that the original loading chutes of the machine in accordance with the invention allow periodical operations for filling the storage compartments to be carried out in a facilitated manner and the bulkiness of the loading region does not affect the loading capacity of said compartments since the chutes can be provided in a smaller number than the number of the storage compartments themselves.

[0044] In addition, the particular embodiment provided with an oscillating baffle 17 ensures filling of all columns without arising of jamming problems during loading of the items to be dispensed, and in the version herein provided no intervention by the operator is required.

[0045] Furthermore, arrangement of the opposite side walls 2a consisting of sections having opposite inclinations allows a weight component of the product to be discharged on the machine structure, so that the items at the column bottom are not squashed and consequently there are less risks that jamming of the machine may

occur.

## Claims

1. A vending machine for items of substantially cylindrical shape such as bottles, cans and the like, comprising:

- a plurality of storage compartments (2) separated from each other and each of them adapted to house said items (3) that are oriented in a mainly horizontal direction with reference to their longitudinal axes (3a),
- and dispensing devices (4) disposed in an underlying position with respect to said storage compartments (2) and adapted to carry out dispensing of the items generally one at a time towards a region (1a) where the items (3) themselves can be picked up,
- loading chutes (11, 12) for the items (3) disposed on top of said storage compartments (2), **characterised in that** said loading chutes comprise at least one multiple loading chute (11) adapted to channel the item themselves towards at least two storage compartments (2) disposed in mutual side by side relationship.

2. A machine as claimed in claim 1, **characterised in that** said multiple loading chute (11) comprises:

- an inclined duct (14) opening into an entrance chamber (15) placed on the upper part of two storage compartments (2) disposed in side by side relationship and in succession with respect to the sliding direction (16) of the items (3) so as to define a first (2b) and a second (2c) compartment,
- and at least one conveying baffle (17) preferably oscillatable about a horizontal oscillation axis (18), disposed in said entrance chamber (15) in the extension of a lower sliding wall of said inclined duct (14) for example, at a position at least partly overlapping said first compartment (2b).

3. A machine as claimed in claim 2, **characterised in that** said conveying baffle (17) has a balancing counterweight (17a) adapted to automatically enable a selective rotation of the baffle itself on persisting of an item thereon, to channel said item towards said first compartment (2b).

4. A machine as claimed in claim 2, **characterised in that** the conveying baffle (17) is driven by an electronic mechanism, said mechanism being manually actuated by the operator by means of a push-button or being actuated in an automatic manner by means

of a filling sensor.

walls (2a) with an undulated extension and substantially a zigzag course.

5. A machine according to anyone of the previous claims **characterised in that** the dispensing devices (4) comprise at least one multi-purpose dispensing device adapted to dispense items coming from at least two respective storage compartments (2). 5
  
6. A machine as claimed in claim 5, **characterised in that** said multi-purpose dispensing device (4) comprises: 10
  - a conveying chamber (5) in communication with at least two respective storage compartments (2) and adapted to prepare some items for the dispensing step, 15
  - a movable supporting unit (6) disposed in an outlet space (5b) of the conveying chamber (5) and adapted to selectively allow falling of a single item at a time towards said picking-up region (1a) by its moving between at least one closed position and at least one open position, 20
  - and drive means (7) for said movable unit (6), said conveying chamber (5) comprising opposite walls (5a) adapted to arrange the items contained therein in superposed and offset positions. 25
  
7. A machine as claimed in claim 6, **characterised in that** said movable supporting unit (6) is oscillatable about a hinging axis (6a) between two inclined end positions corresponding to two closed positions, passing through intermediate positions comprising two open positions and has two opposite sides for rest of an overlying item (3), which sides are designed to be alternately used in passing from one of said inclined positions to the other. 30 35
  
8. A machine as claimed in claim 6, **characterised in that** said drive means (7) of the movable supporting unit (6) comprises a kinematic chain made up of a crank (8) driven by a motor and of a connecting-rod (9) interposed between the crank (8) and the movable supporting unit (6). 40 45
  
9. A machine as claimed in claim 7, **characterised in that** said movable supporting unit (6) comprises a frame formed of two opposite end elements (6b) substantially in the form of a plate that are rigidly connected with each other by at least two parallel rod-like elements (6c) adapted to define said two opposite rest sides designed to laterally bear an item (3). 50
  
10. A machine as claimed in anyone of the preceding claims, **characterised in that** said storage compartments (2) each consist of a column-shaped space of a substantially vertical orientation, said column-shaped space being preferably formed of opposite 55

FIG.1

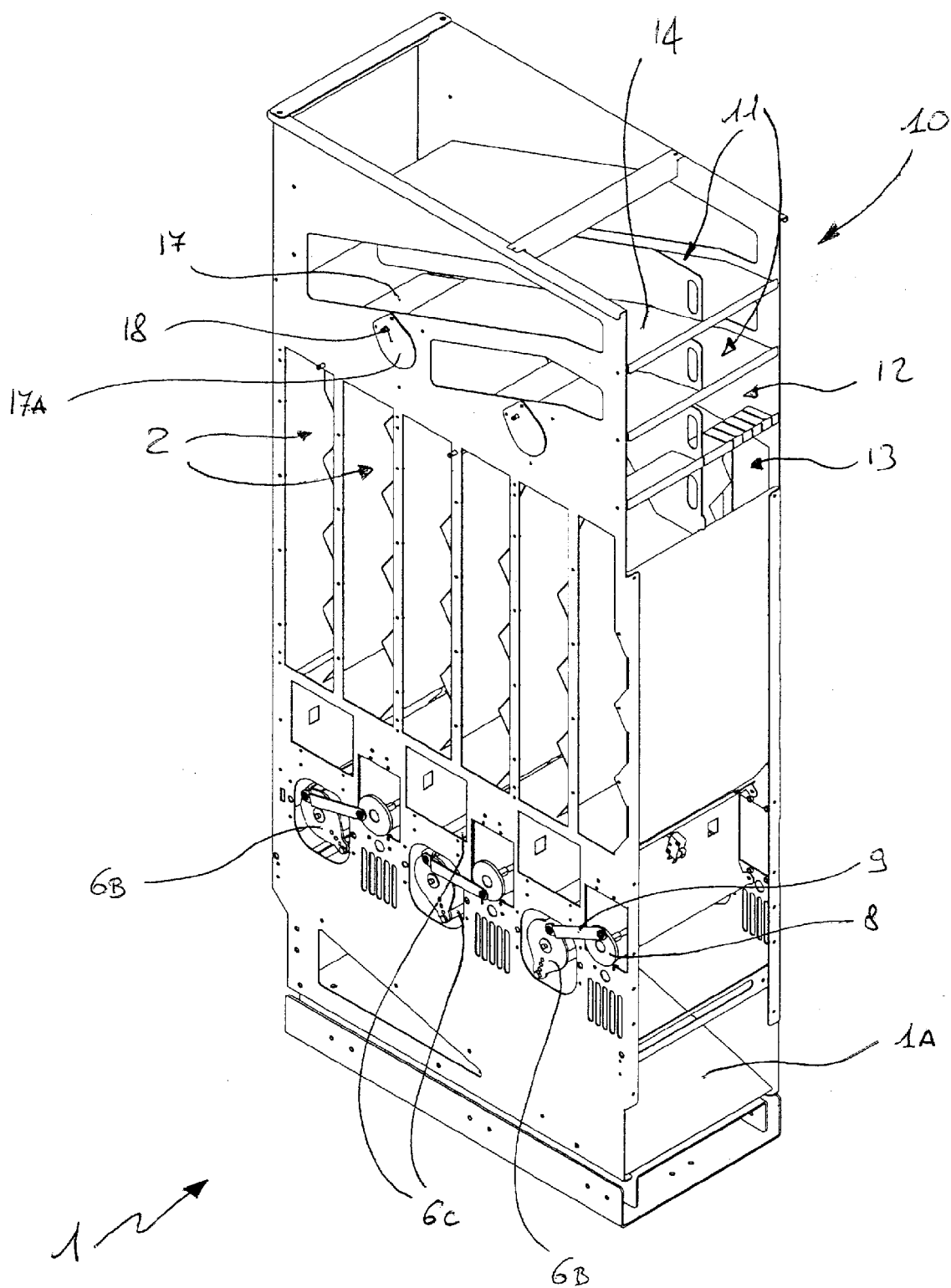
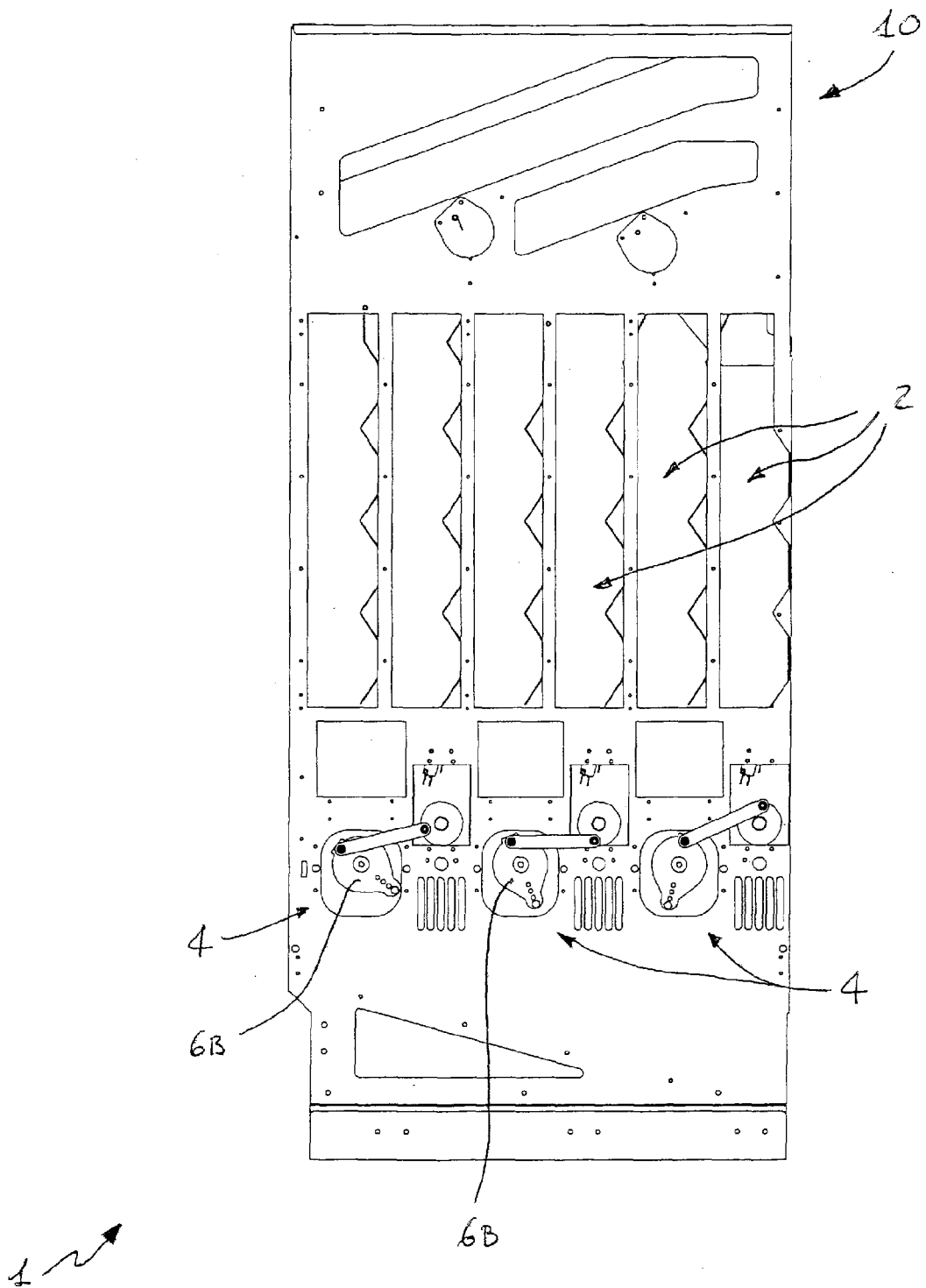
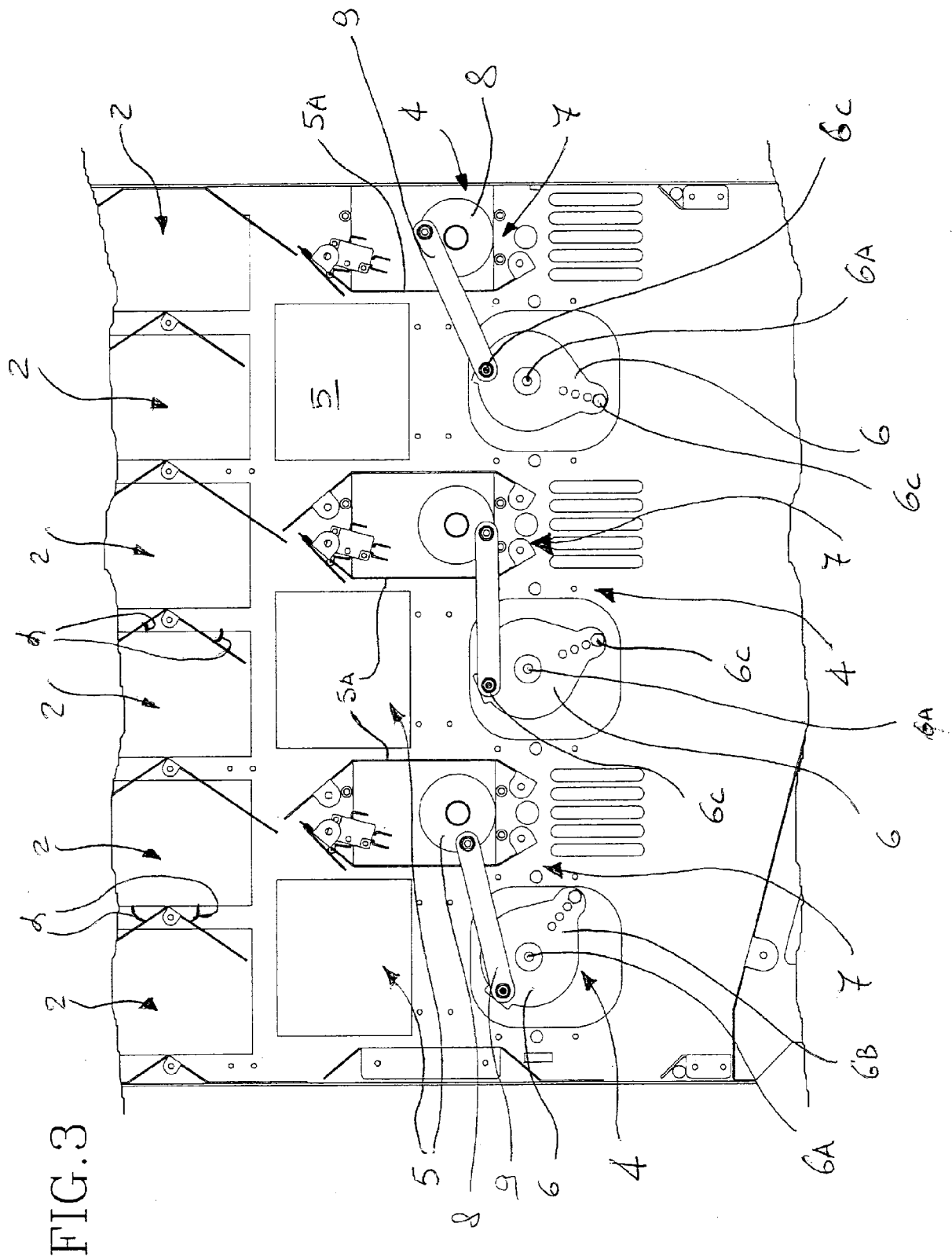


FIG. 2





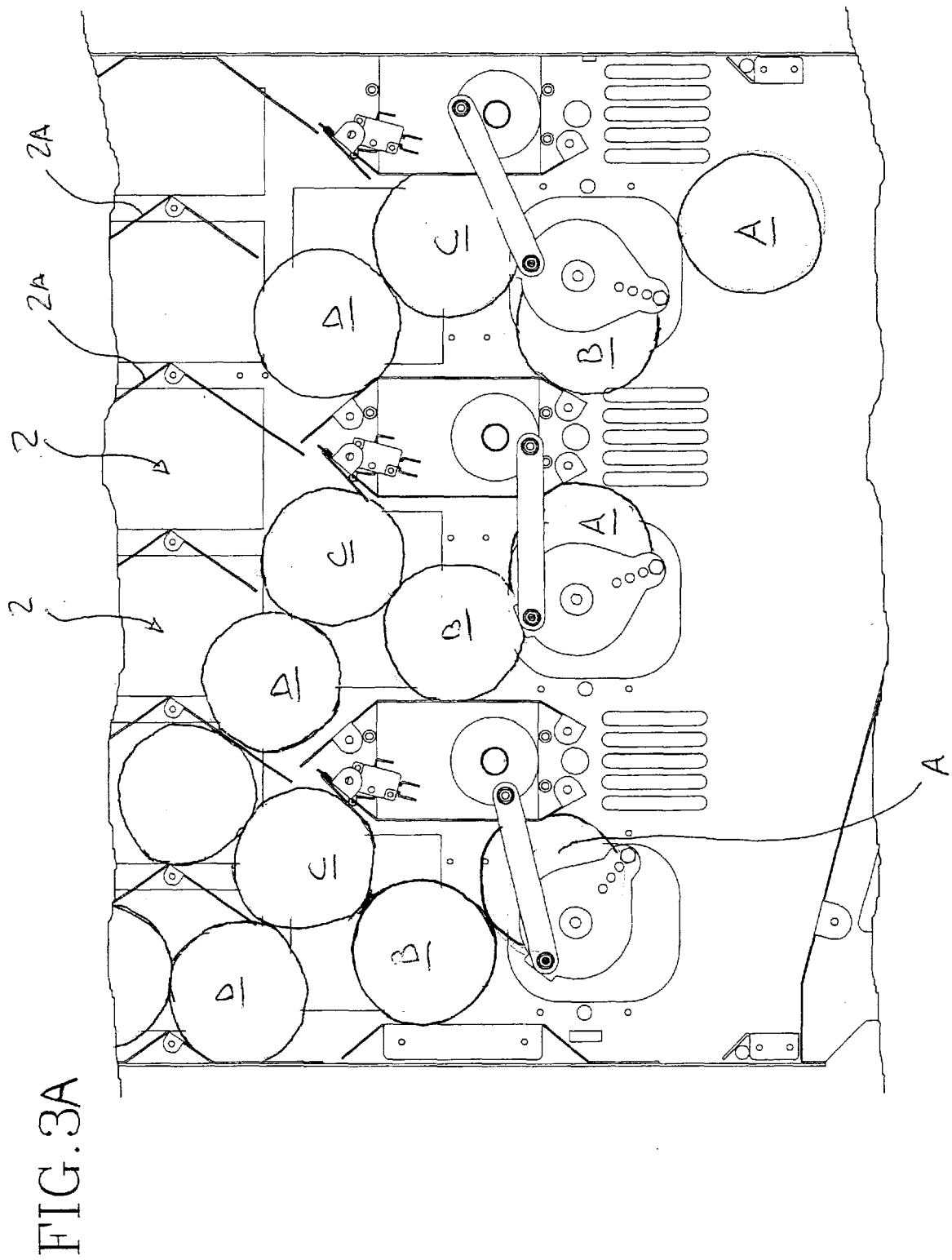
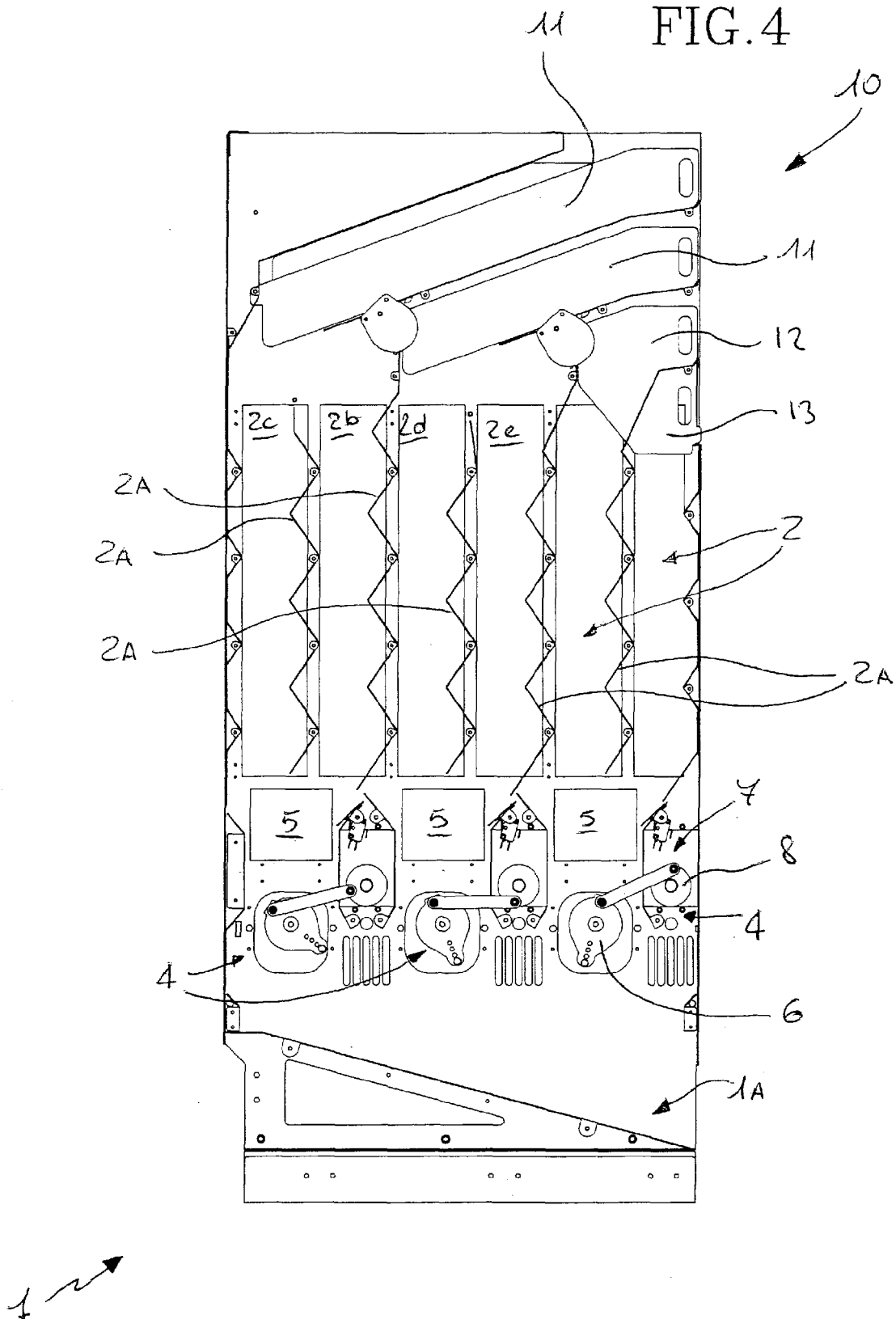


FIG. 4



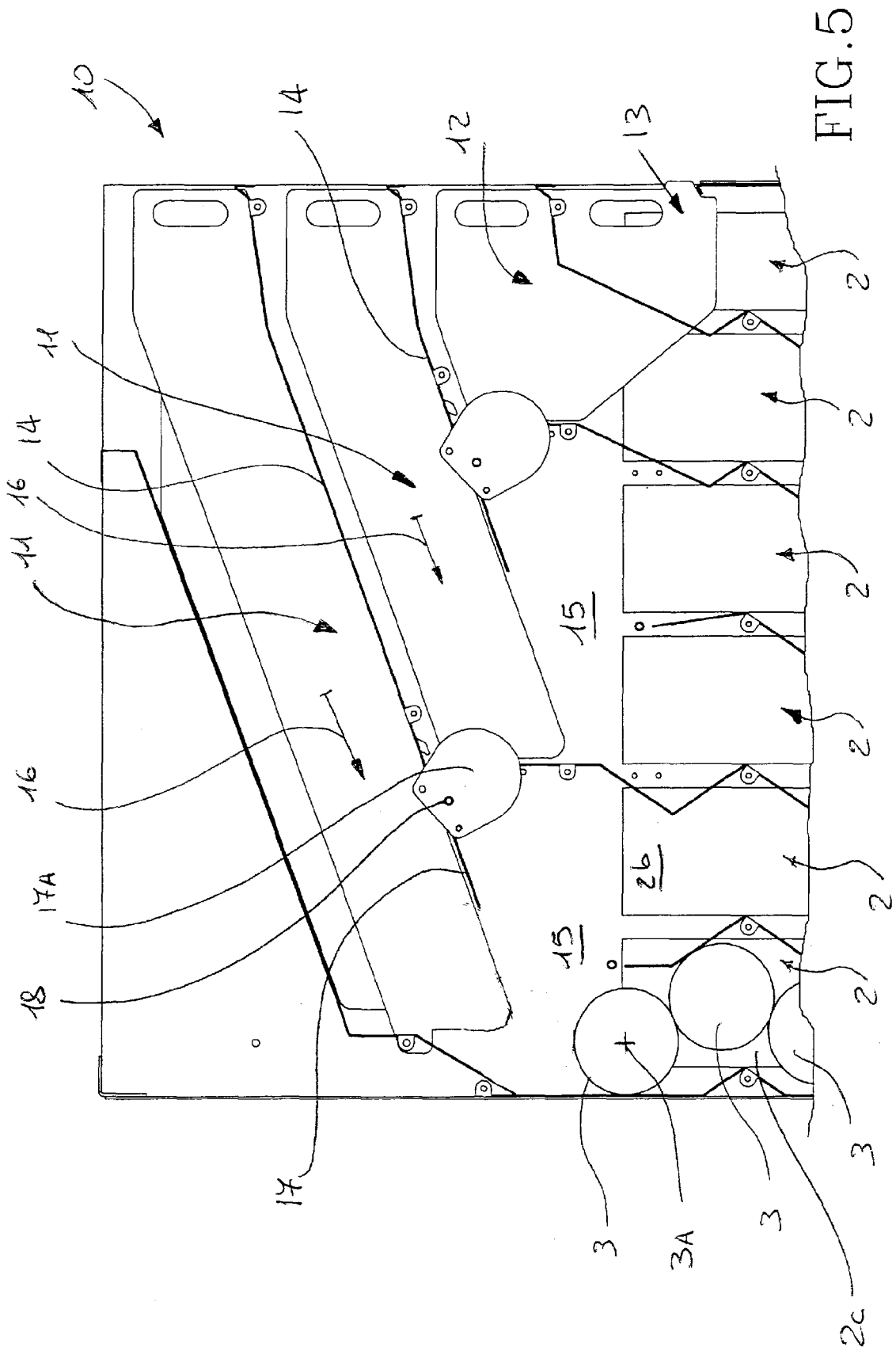


FIG. 6.

