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(54) **VENDING MACHINE**

(57) A vending machine (1) comprises a frame (2) in which a storage chamber for products to be delivered is delimited, and a plurality of trays (3) arranged one above the other in the storage compartment, and spaced from each other in the vertical direction (X-X). Each tray (3) comprises a base panel (31) and a plurality of partitions (3) fixed to the base panel (31) to define compartments within the storage chamber. The trays (3) comprise spiral coils (4a, 4b), and each spiral coil (4a, 4b) is disposed inside a compartment and extends about a horizontal axis (A-A, B-B). At least one compartment comprises a first spiral coil (4a) and a second spiral coil (4b), the axis

(A-A) of the first spiral coil (4a) and the axis (B-B) of the second spiral coil (4b) being spaced from each other in the vertical direction (X-X). The rear end (41a, 41b) of each spiral coil (4a, 4b) is connected to support members (35) of the trays (3), whereas the front end (42a, 42b) is free. At least the first spiral coil (4a) comprises engagement members (43a), e.g. a wing at its front end (42a), which are configured to engage, i.e. abut, the front end (42b) of the second spiral coil (4b) along a section of the angular rotation path of the first spiral coil (4a) and the second spiral coil (4b).

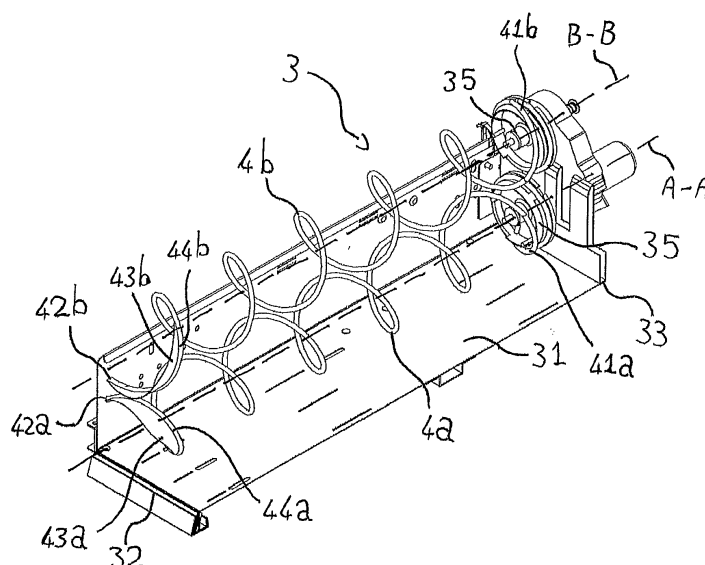


Fig. 3

Description

[0001] The present invention relates to a vending machine.

[0002] Vending machines are used to sell products of various types. Spiral vending machines have a frame, with a product storage chamber delimited therein. The products to be dispensed are stored in the chamber and are placed on special trays, divided into compartments. The compartments contain spiral coils which rotate and push the products within the compartment until they reach a front edge of the tray, where they are made available to a user, e.g. by falling through a drop space into a lower pick-up zone. This arrangement is adequate for standard products, whose length allows them to be impelled by the spirals without risks for the products of coming out of the spirals.

[0003] On the other hand, the need is felt for such vending machines to also dispense long products, such as baguettes. At present vending machines for this type of products have products lying horizontally on the trays and pushed toward the drop space by means of conveyor belts. Nevertheless, this configuration limits the number of products that can be disposed on the trays. In order to maximize the number of dispensable products, these should have a vertical orientation. Nevertheless, in typical trays of vending machines, spirals are not adapted to provide adequate support to this type of products.

[0004] The object of the present invention is to provide a vending machine that can dispense long products by arranging them vertically to maximize the number of products that can be stored on the trays.

[0005] This object is fulfilled by a vending machine as defined in claim 1.

[0006] Further features and advantages of the vending machine of this invention will be apparent from the following description of one preferred embodiment thereof, which is given by way of illustration and without limitation with reference to the accompanying figures, in which:

- Figure 1 shows a spiral vending machine of the present invention,
- Figure 2 shows a tray of the vending machine of Figure 1,
- Figure 3 shows a compartment of the tray of Figure 2,
- Figure 4 shows a side view of the compartment of Figure 3.

[0007] Referring to the accompanying figures, numeral 1 generally designates a vending machine. The vending machine 1 comprises a frame 2 having a rear wall 21, side walls 22 and a front wall which delimit a storage chamber for products to be dispensed.

[0008] The vending machine 1 comprises a plurality of trays 3 and a pick-up zone (for simplicity only one tray 3 is depicted in the figures). The trays 3 are arranged one above the other in the storage chamber, are spaced from each other in a first direction X-X, which is preferably

vertical, and are connected to the side walls 22 of the frame 2.

[0009] Each tray 3 comprises a preferably flat base panel 31, upon which the products to be dispensed can be laid. The trays extend between a front edge 32, spaced from the front wall, and a rear edge 33 situated proximate to the rear wall 21.

[0010] A front space is defined between the front edges 32 and the front wall to make the products available to a user. In a possible embodiment, the products to be picked up fall into the front space and reach a pick-up zone, placed below the storage chamber. According to a different embodiment, the vending machine 1 comprises an arm which extends into the front space, and carries the products to be picked up from the trays 3 to the pick-up zone through the front space.

[0011] Each tray 3 comprises a plurality of partitions 34. The partitions 34 are fixed to the base panel 31 of their respective tray 3, and are spaced in a second direction Y-Y perpendicular to the first direction X-X, and define a plurality of compartments of their respective tray 3 in the storage chamber.

[0012] Namely, each compartment is delimited at its sides by two adjacent partitions 34 and vertically (i.e. in the direction X-X) by the base panels 31 of their respective tray 3 and of the tray 3 that is directly above it (or by a top surface of the frame 2). Each compartment extends between the front edge 32 and the rear edge 33 of its respective tray 3.

[0013] Each tray 3 comprises a plurality of spiral coils 4a, 4b, each spiral coil 4a, 4b being disposed within a respective compartment. Each spiral coil 4a, 4b has a helical shape and extends about its respective axis A-A, B-B with a number of turns, a radius and a helical pitch. The axis A-A, B-B of each spiral 4a, 4b extends in a third direction Z-Z perpendicular to the first direction X-X and the second direction Y-Y.

[0014] Each spiral coil 4a, 4b extends along the entire length of its respective compartment, between a rear end 41a, 41b and an opposite front end 42a, 42b, which are spaced from each other in the third direction Z-Z. Each tray 3 comprises support members 35 situated at the rear edge 33 of the tray 3. The rear end 41a, 41b of each spiral coil 4a, 4b is rotatably connected to the support members 35 of its respective tray 3, whereas the front end 42a, 42b is free.

[0015] The vending machine 1 comprises motor means (not shown), which are configured to rotate one or more spiral coils 4a, 4b about their respective axes A-A, B-B through the support members 35. The products to be dispensed are disposed between two consecutive turns of a spiral coil 4a, 4b and the rotation of the spiral coil 4a, 4b impels the products in the third direction Z-Z toward the front edge 32 of a tray 3.

[0016] In one aspect of the invention, at least one compartment comprises a first spiral coil 4a and a second spiral coil 4b, the axis A-A of the first spiral coil 4a and the axis B-B of the second spiral coil 4b being spaced

from each other in the first direction X-X.

[0017] Advantageously, a long product may be disposed in a compartment of the vending machine with a vertical orientation, i.e. along the first direction X-X, and is adequately supported by the spiral coils only, with the compartment not being required to have additional support elements for the products, and to have an excessive width in the second direction Y-Y.

[0018] In one aspect of the invention, the first spiral coil 4a comprises engagement members 43a at its front end 42a, which are configured to engage the front end 42b of the second spiral coil 4b along a section of the angular rotation path of the first spiral coil 4a and the second spiral coil 4b.

[0019] It shall be noted that, according to various embodiments, the engagement members 43a may be provided in the underlying spiral coil or in the overlying spiral coil only.

[0020] In a preferred embodiment, the second spiral coil 4b also comprises engagement members 43b at its front end 42b. The engagement members 43b of the second spiral coil 4b are configured to engage the engagement members 43a of the first spiral coil 4a along said section of the angular rotation path or, equivalently, the engagement members 43a of the first spiral coil 4a are configured to engage the front end 42b of the second spiral coil 4b at the engagement members 43b of the second spiral coil 4b, in detail by realizing a contact therewith.

[0021] Particularly, the engagement members 43a, 43b of the first and/or second spiral coils 4a, 4b provide contact, i.e. abutment, between the first spiral coil 4a and the second spiral coil 4b, such that the front end 42a, 42b of one of the spiral coils 4a 4b, namely the overlying spiral coil, will be supported by the front end 42a, 42b of the other, underlying, spiral coil, through the engagement members 43a, 43b of the first and/or second spiral coils 4a, 4b and/or through contact therebetween.

[0022] In one embodiment, the engagement members 43a, 43b of a spiral coil 4a, 4b have the shape of a wing. The wing has a base 44a, 44b fixed to the front end 42a, 42b of its respective spiral coil 4a, 4b. The wing extends from the front end 42a of its respective spiral coil 4a, 4b in the third direction Z-Z toward the front wall.

[0023] In one embodiment, the first spiral coil 4a is placed below the second spiral coil 4b and rests upon the base panel 31 of its respective tray 3. The second spiral coil 4a is placed vertically above the first spiral coil 4a, and the wing of the second spiral coil 4b rests upon the wing of the first spiral coil 4a along said section of their angular rotation path.

[0024] Advantageously, the overlying spiral coil, e.g. the second coil 4b, is supported both at the rear end 41b, by the support members 35 of the tray 3, and at the front end 42b, by the engagement members 43a, 43b of the first spiral coil 4a and/or the second spiral coil 4b, and by the first spiral coil 4a. This prevents that the second spiral coil 4b tilts toward the first spiral 4a under its own weight, and therefore prevents that the front end 42b of

the second spiral coil 4b approaches the front end 42a of the first spiral coil 4a, thereby hindering the rotary motion of the first spiral coil 4a.

[0025] Advantageously the engagement members 43a, 43b provide support to the front end 42b of the second spiral coil 4b during rotation of the spiral coils 4a, 4b.

[0026] Preferably, in order to ensure smooth movement of the products to be dispensed, the distance between the axis A-A of the first spiral coil 4a and the axis B-B of the second spiral coil 4b is constant, and is equal to, or greater than, the sum of the radii of the first spiral coil 4a and the second spiral coil 4b. Preferably, the first spiral coil 4a and the second spiral coil 4b have the same geometric characteristics, i.e. the same radius, pitch and number of turns, and even more preferably, but without limitation, they are configured to rotate in two respective opposite directions of rotation.

[0027] It will be appreciated from the above that the vending machine of the present invention obviates the above mentioned prior art drawbacks.

[0028] Those skilled in the art will obviously appreciate that a number of changes and variants may be made to the invention as described hereinbefore to meet specific needs, without departure from the scope of the invention as defined in the following claims. For example, a compartment may be provided in which more than two spiral coils are placed vertically one above the other, or the spiral coils may be offset in the third direction Z-Z.

Claims

1. A vending machine (1) comprising:

- a frame (2) having a rear wall (21), side walls (22) and a front wall which delimit a storage chamber (3) for products to be dispensed, and
- a plurality of trays (3) arranged in the storage chamber one above the other and spaced apart in a first direction (X-X),

wherein each tray (3) extends from a front edge (32), spaced from the front wall, and a rear edge (33) situated proximate to the rear wall (21), and comprises:

- a base panel (31);
- a plurality of partitions (34) arranged on the base panel (31) side-by-side and spaced apart in a second direction (Y-Y) perpendicular to the first direction (X-X), to define a plurality of compartments on said tray (3),
- support members (35) situated at the rear edge (33) of the tray (3), and
- a plurality of spiral coils (4a, 4b),

wherein

- each spiral coil (4a, 4b) extends along an axis

(A-A, B-B) extending in a third direction (Z-Z), perpendicular to the first direction (X-X) and the second direction (Y-Y),
 - each spiral coil (4a, 4b) extends between a rear end (41a, 41b), which is rotatably connected to the support members (35), and an opposite free front end (42a, 42b),
 - at least one compartment comprises a first spiral coil (4a) and a second spiral coil (4b),

characterized in that:

- the axis (A-A) of the first spiral coil (4a) and the axis (B-B) of the second spiral coil (4b) are spaced apart in the first direction (X-X),
 - the first spiral coil (4a) comprises engagement members (43a) at its front end (42a), which are configured to engage the front end (42b) of the second spiral coil (4b) along a section of the angular rotation path of the first spiral coil (4a) and the second spiral coil (4b).
2. A vending machine (1) as claimed in claim 1, wherein the engagement members (43a) of the first spiral coil (4a) are configured to engage the front end (42b) of the second spiral coil (4b) by providing contact between the engagement members (43a) of the first spiral coil (4a) and the front end (42b) of the second spiral coil (4b) such that the front end (42a, 42b) of one of the spiral coils (4a, 4b) is supported by the front end (42a, 42b) of the other spiral coil (4a, 4b) through the engagement members (43a) of the first spiral coil (4a).
 3. A vending machine (1) as claimed in claim 1, wherein the second spiral coil (4b) comprises engagement members (43b) at its front end (42b), the engagement members (43a) of the first spiral coil (4a) being configured to engage the front end (42b) of the second spiral coil (4b) at the engagement members (43b) of the second spiral coil (4b) along said section of angular rotation path.
 4. A vending machine (1) as claimed in claim 3, wherein the engagement members (43a) of the first spiral coil (4a) are configured to engage the engagement members (43b) of the second spiral coil (4b) by providing contact between the engagement members (43a) of the first spiral coil (4a) and the engagement members (43b) of the second spiral coil (4b), such that the front end (42b) of the second spiral coil (4b) is supported by the front end (42a) of the first spiral coil (4a) through the contact of the engagement members (43a, 43b) of the first and second spiral coils (4a).
 5. A vending machine (1) as claimed in any of claims 1 to 4, wherein:

- each engagement member (43a, 43b) is a wing,
- each wing has a base (44a, 44b) fixed on the front end (42a, 42b) of its respective spiral coil (4a, 4b),
- said wing extends from the front end (42a, 42b) of its respective spiral coil (4a, 4b) in the third direction (Z-Z) toward the front wall of the frame.

6. A vending machine (1) as claimed in claims 3 and 5, wherein:

- the first spiral coil (4a) rests upon the base panel (31) of its respective tray (31),
- the second spiral coil (4b) is placed above the first spiral coil (4a), and
- the wing of the second spiral coil (4b) rests upon the wing of the first spiral coil (4a) along said section of angular rotation path.

7. A vending machine (1) as claimed in any of claims 1 to 6, wherein the distance between the axis (A-A) of the first spiral coil (4a) and the axis (B-B) of the second spiral coil (4b) is constant and is equal to, or greater than, the sum of the radii of the first spiral coil (4a) and the second spiral coil (4b).

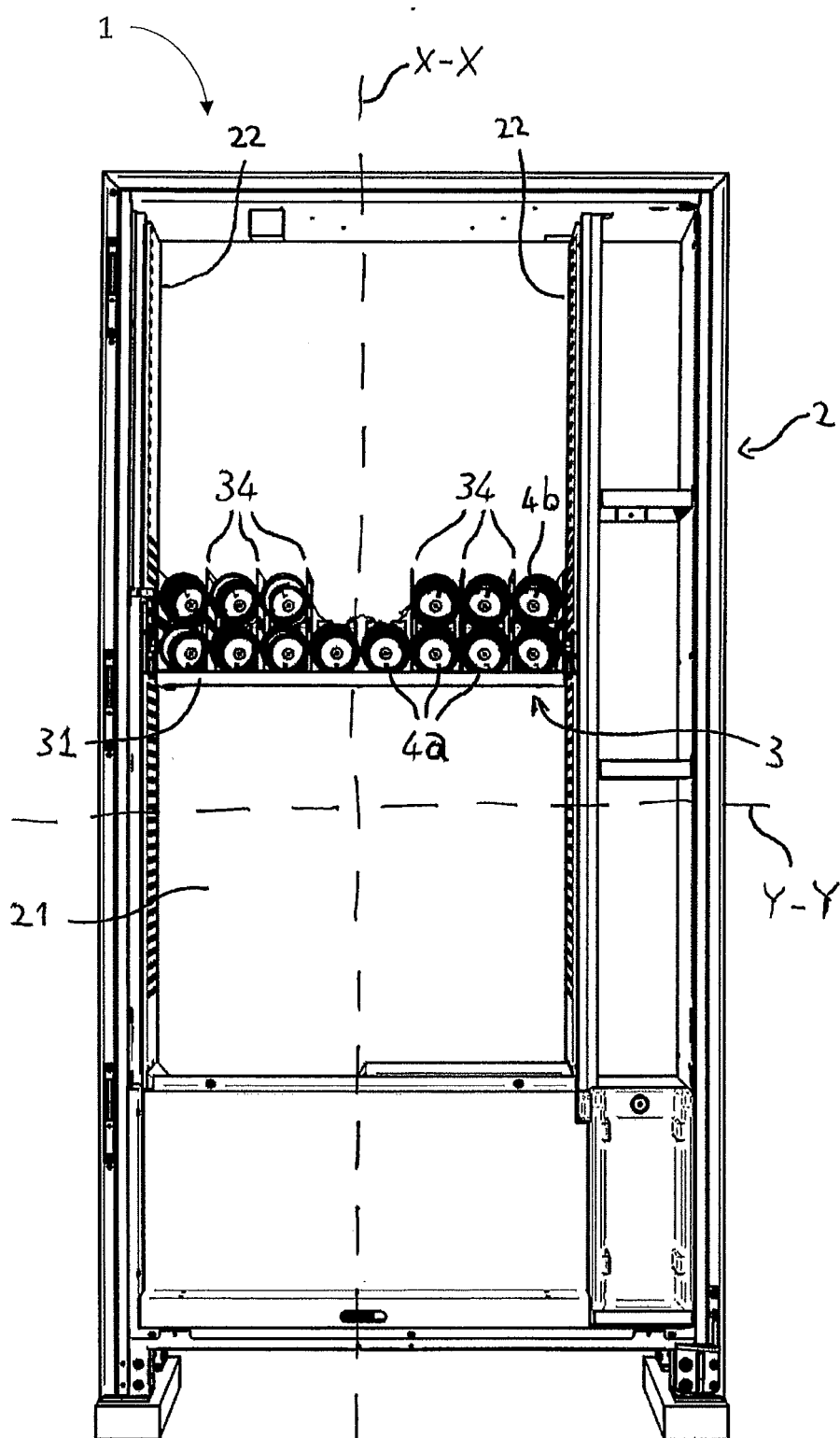


Fig. 1

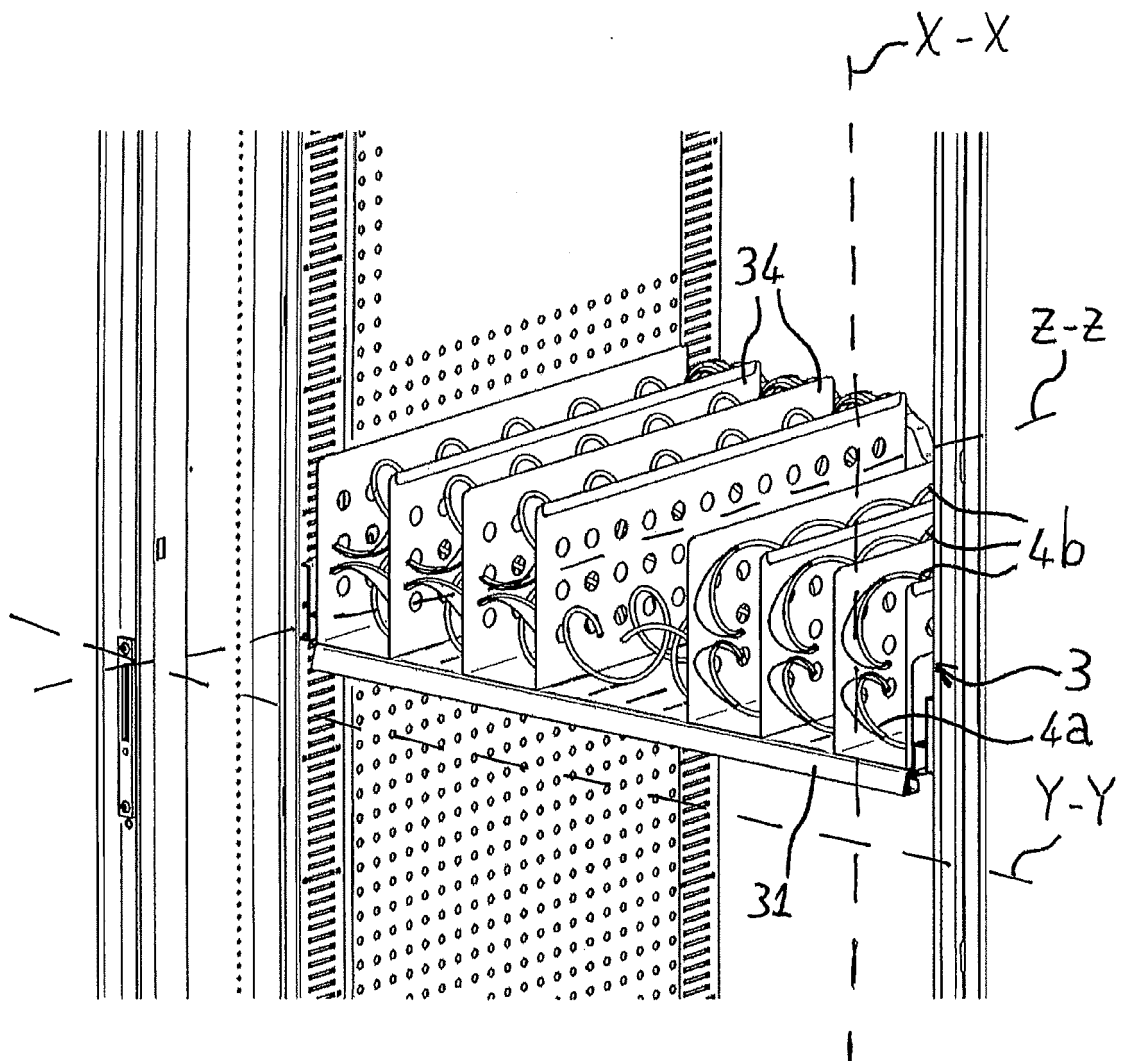
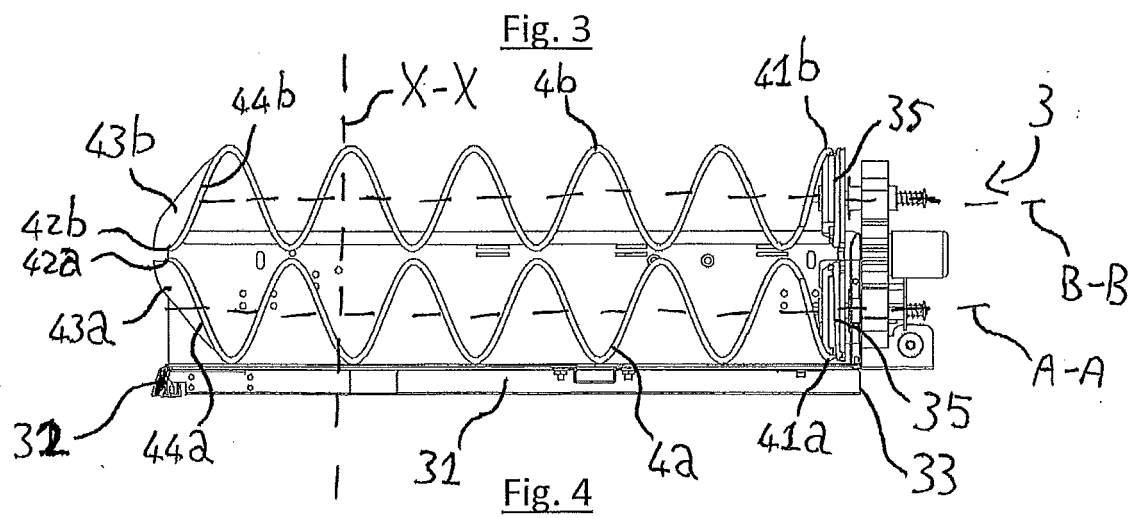
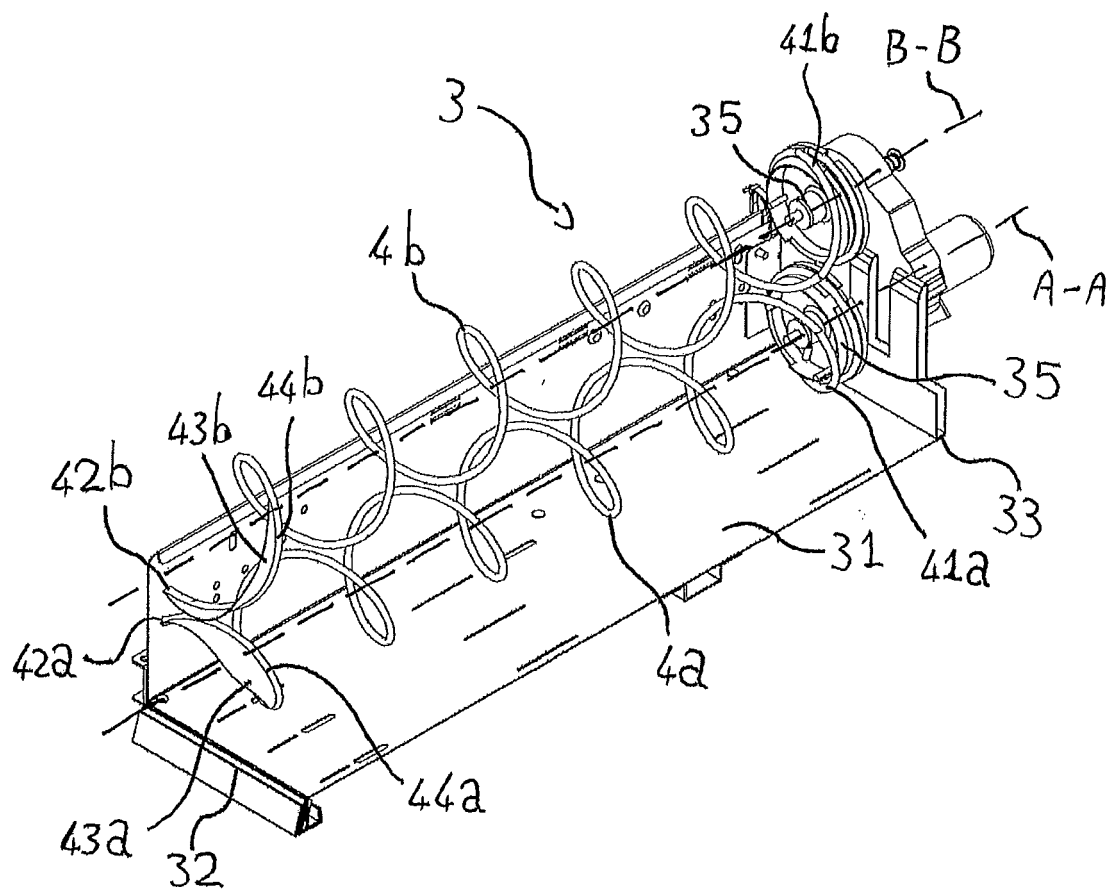


Fig. 2





EUROPEAN SEARCH REPORT

Application Number
EP 17 16 0021

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DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	EP 1 881 464 A1 (DAMIAN S R L [IT]) 23 January 2008 (2008-01-23) * paragraphs [0026] - [0028], [0054], [0058]; figures 1,2 *	1-7	INV. G07F11/36
A	US 8 038 018 B1 (BREITENBACH PAUL T [US] ET AL) 18 October 2011 (2011-10-18) * claim 1; figure 2 *	1-7	
A	EP 2 323 112 A1 (FAS INTERNATIONAL SPA [IT]) 18 May 2011 (2011-05-18) * claim 1; figure 2 *	1-7	
A	US 3 036 730 A (NEWBERRY MEIGS W) 29 May 1962 (1962-05-29) * claim 1; figure 4 *	1-7	
A	WO 01/27739 A1 (PAULUCCI JENO F [US]; KOZLAK DANIEL D [US]; KOZLAK JOEL C [US]) 19 April 2001 (2001-04-19) * claim 1; figures 1,2A,2B *	1-7	
			TECHNICAL FIELDS SEARCHED (IPC)
			G07F
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 22 May 2017	Examiner Beauce, Gaetan
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

EPO FORM 1503 03/82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 17 16 0021

5 This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
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22-05-2017

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 1881464 A1	23-01-2008	AT 410760 T	15-10-2008
		CN 101512607 A	19-08-2009
		EP 1881464 A1	23-01-2008
		ES 2316039 T3	01-04-2009
		JP 5347159 B2	20-11-2013
		JP 2009545046 A	17-12-2009
		US 2009283539 A1	19-11-2009
		WO 2008009688 A1	24-01-2008

US 8038018 B1	18-10-2011	US 8038018 B1	18-10-2011
		US 8090454 B1	03-01-2012

EP 2323112 A1	18-05-2011	EP 2323112 A1	18-05-2011
		ES 2422662 T3	12-09-2013
		IT 1396584 B1	14-12-2012

US 3036730 A	29-05-1962	NONE	

WO 0127739 A1	19-04-2001	AU 7878500 A	23-04-2001
		US 2002004690 A1	10-01-2002
		US 2002077724 A1	20-06-2002
		WO 0127739 A1	19-04-2001
