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(54) METHOD FOR COMPACTING AND SEALING OF GARBAGE

(57) A description is given of a method, wherein an airtight bag (2) is placed on the upper surface of a piston (4) which is movable inside a container (3), after which a reduced pressure is created below the piston (4), which has air ducts (7) extending from the upper surface through the piston, said reduced pressure causing the piston together with the bag held on the piston by said reduced pressure to move downwards in the container. Objects or waste is deposited in said bag. The device comprises a container (3) comprising a piston (4) which is movable therein and which has air ducts (7) extending from the upper surface through said piston (4), and an air pump (8) connected to the container space (3-1) below the piston in order to create a reduced pressure there by means of which the piston (4) together with a bag (2) to be held on the piston by means of said reduced pressure are made to move downwards in the container (3) . By means of an excess pressure below the piston and/or a reduced pressure above the piston (4), the content of the bag (2) can be made to move upward to be compressed against a lid (11), and, if necessary, the bag can be sealed.

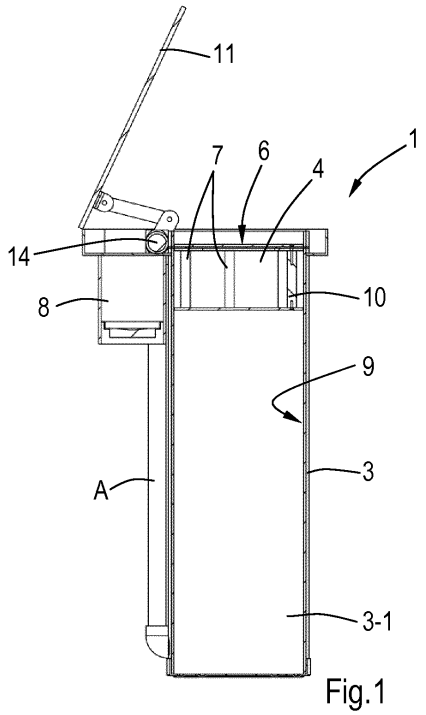

Fig.1

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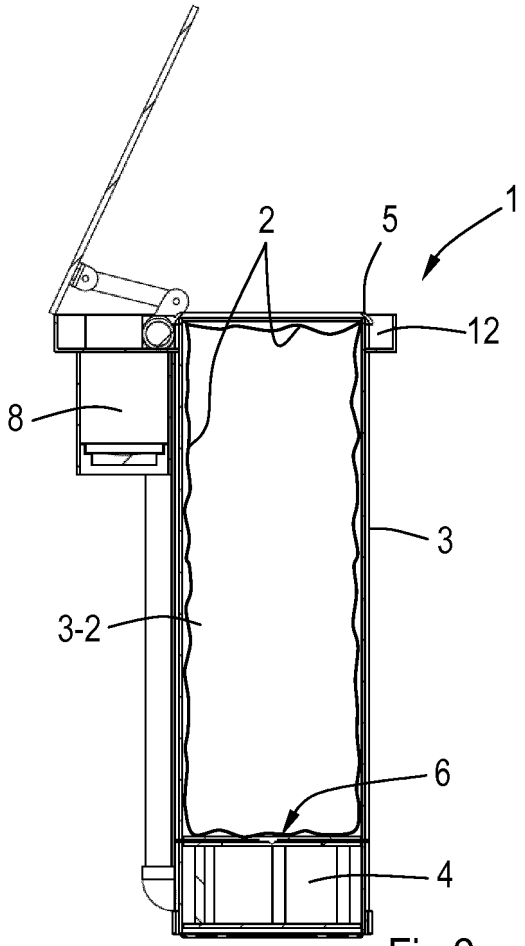

Fig.2

Description

[0001] The present invention relates to a method which can be used in compacting and, if necessary, sealing of, for example, products, goods or waste.

[0002] The present invention further relates to a device for carrying out said method.

[0003] Such devices are generally known, but they have the drawback that they are heavy and, in addition, that they usually are vacuum packaging machines.

[0004] This has the drawback that the field of application is usually confined to industry.

[0005] It is an object of the present invention to provide a more universally applicable method and device, wherein objects, goods and/or waste can be collected, which method and device do not give off a bad smell and are capable of packaging, compressing and, if necessary, also sealing.

[0006] To achieve this, the method according to the invention is characterized in that an airtight bag is placed on the upper surface of a piston which is movable inside a container, after which a reduced pressure is created below the piston, which has air ducts extending from the upper surface through the piston, said reduced pressure causing the piston together with the bag held on the piston by said reduced pressure to move downwards in the container.

[0007] The respective device is characterized according to the invention in that the device comprises:

> a container comprising a piston which is movable therein and which has air ducts extending from the upper surface through said piston, and an air pump connected to the container space below the piston in order to create a reduced pressure there by means of which the piston together with a bag to be held on the upper surface by said reduced pressure are made to move downwards in the container.

[0008] An advantage resides in that the reduced pressure created below the piston causes the bottom of the airtight bag, via the air ducts opening at the bottom of said bag, to be held on the upper surface, while at the same time said reduced pressure causes the piston to move downwards in the container to a position where the holding capacity of the bag is readily accessible for objects, goods, products or, for example, waste.

[0009] In an embodiment, the piston is provided with passage means operating the air ducts, so that only air is allowed to pass, via the air ducts, which flows from the upper surface through the piston. As a result, by creating an excess pressure below the piston and/or by creating a reduced pressure above the piston, the piston can move back, causing the bag containing objects to be ejected. When the piston moves back, and if the container is closed by a lid, the bag with content in it will be pressed against said lid or compressed.

[0010] In a further embodiment it is advantageously possible to seal the packaged objects, which are compressed in volume, by means of a sealing unit, so that the bag with content maintains this volume also at a later point in time. In particular, said sealing of the at least partially filled, compressed bag takes place by means of a sealing unit arranged near the input opening in the container space, while there is a reduced pressure in the space above the piston. Advantageously, when the bag is sealed in said condition, the contents of the bag will not be able to spring back to its original form when the lid is opened.

[0011] Further, detailed, possible embodiments explained in the remaining claims are mentioned together with the associated advantages in the description given hereinbelow.

[0012] The method and the device according to the present invention will now be explained in greater detail with reference to the figures mentioned below, in which corresponding elements are indicated by means of the same reference numerals.

In the figures:

> Figure 1 is a schematic sectional view of a preferred embodiment of a device for compressing and/or sealing goods, whose piston is in the topmost position;
>
> Figure 2 shows the device of figure 1, wherein the piston is in the bottommost position;
>
> Figure 3 is a perspective view of the device shown in figures 1 and 2; and
>
> Figure 4 shows a control valve whose rotary shaft is connected, in a simple construction, with the hinge pin of the lid by means of which the device can be closed.

[0013] Figures 1, 2 and 3 show a device 1 by means of which objects such as goods, products, but also for example waste contained in a bag 2 can be brought into a densified or compressed state. In said state, the bag 2, which in this case is airtight and made of a synthetic resin material, is sealed by closing it, in particular by sealing the synthetic resin bag. The device 1 shown is in a vertical position, but may just as well be rotated through 90 degrees, so that the objects contained therein can be moved, which may be desirable in industrial applications. In the vertical position of said device, products or, for example, waste can be introduced therein, which may be desirable, for example, for use in household application.

[0014] The device 1 comprises a container 3 which is provided with a piston 4 which is movable therein, said piston being shown, in figure 1, in the topmost position proximate to the input opening 5 of the container. From the top surface 6 of the piston, air ducts 7 extend through the piston 4, which open into the container space 3-1 below the piston 4. Said device 1 also comprises an air pump 8 which opens into the space 3-1, which can be used, inter alia, to create a reduced pressure in said

space. The bottom of the schematically shown bag 2 is placed on the air ducts 7, after which, in an working mode, the bag is held on the air ducts under the influence of the reduced pressure created in said space 3-1, and if said reduced pressure is large enough, the piston 4 starts to move by itself, together with the bag 2 held on the upper surface, in this case in a downward direction in the container 3 up to the bottom of said container 3, if necessary. During this inward motion, the airtight bottom of the bag 2 remains fixed on the upper surface 6, and if the air ducts or perforations 7 also extend along the edge of the upper surface 6 of the piston, the bag will remain proximate to the inside wall 9 of the container 3. The walls of the bag 2 can be draped over the input opening 5 of the container 3. The objects, goods or waste introduced into the container do not contaminate the inside wall 9 of the container 3, which has a favourable effect on the unobstructed motion of the piston 4 in said container.

[0015] If the piston 4 is provided with passage means 10 operating the air ducts 7, so that said air ducts 7 only pass air which flows from the upper surface 6 through the piston 4 in a downward direction, then, by pressing air into the space 3-1 below the piston during this working mode, the piston 4 with the bag filled with objects or waste can move upwards by virtue of the compressed air. It is alternatively possible to move the piston 4 upwards by drawing off air above the piston during said working mode. In the latter case, it is sufficient if an air pump 8, which can be used as a suction pump, and which is to be correctly connected to the spaces 3-1 and 3-2 to be evacuated, is made to move up or down around the piston 4. Advantageously, this does not require heavy means, and during the upward movement the bottom of the bag 2 remains resting on the upper surface 6, and hence, during this movement, the compressed air cannot escape upwards through the channels 7. In principle, the bag 2 can be removed from the container 3 if necessary.

[0016] The container 3 has a lid 11 which closes off the upper space 3-2 and which remains closed during the abovementioned upward movement of the piston 4, and the objects and the bag 2 in which they are contained being pressed together and compressed against said lid. The air drawn from the spaces 3-1 and 3-2 can be led by the pump 8 through an active carbon filter to the outside air, so that no stench is released into the outside air. If necessary, the bag 2 with content can be subsequently removed and sealed.

[0017] In an embodiment which can be used in industry, hospitals, nursing homes, hotel and catering industry, kitchens, restaurants or at home, wherein the container 3 has an input opening 5 from which the bag 2 protrudes and at the location of which the container 3 and/or the lid 11 have a sealing unit 12, the filled, compressed synthetic resin bag 2 can be sealed in an airtight manner. This takes place by folding over the part of the bag 2 extending in the space 3-2 (see fig. 2) and sealing it by means of the heat generated by the sealing unit 12. After said sealing operation and after opening the lid 11, the sealed packet of minimal volume can be removed from the container 3.

[0018] In a practical embodiment, if the container 3 is provided with lid 11 closing off the space 3-2 above the piston 4, the air pump 8 will be coupled to a sensor provided in said space. Such a sensor is arranged to detect the open or closed state of the lid 11.

[0019] If the device 1, comprises a control valve 13, shown in fig. 4, which is connected to the air pump 8, and which is arranged to influence the air pressure in the spaces 3-1 and/or 3-2 above or below the piston 4, it would be possible to make use of the shaft 14 about which the lid 11 pivots. Said shaft 14 can easily extend directly to the shaft 15, shown in figure 4, which rotates in the valve block, provided with ports A, B and C, of, in this case, the control valve 13. The air pump 8 may be a suction/pressure pump, for example a customary vacuum cleaner pump having a pressure side and a suction side, which can be connected in a controlled manner known to those skilled in the art by means of one or more valves to the spaces 3-1 and/or 3-2, in order to perform the abovementioned working modes and piston movements.

[0020] The control valve 13, schematically shown in figure 4, connects port A, which extends to the suction side of, in this case, a suction pump 8, to either port B or port C in dependence on the position of the shaft 14, 15. The reduced pressure on port B or port C is controlled by means of the control valve 13 which is connected to the space 3-1 below the movable piston 4 or the space 3-2 above said movable piston 4. Advantageously, a suction pump 8 is sufficient.

[0021] Provided the surface of the piston 4 is suitably chosen, a low-power air pump 8 is sufficient in practice. Obviously, electronic, sensor-controlled variants are applicable. In a manner which will not be explained further herein, the device 1 is provided with a control unit by means of which the abovementioned working modes of the device 1 are connected. For this purpose, the device 1 further comprises an electronic processing unit which is connected to one or more of the following, provided it/they are present in the embodiment in question: the pump, the control valve, the control unit, the sensor coupled to the lid, a motion sensor coupled to the piston, a dynamometer coupled to the lid. Likewise, air pressure and/or piston-position sensors may be used. For domestic use, for example, the device 1 may be in the form of a pedal container or pedal bin the lid 11 of which can be operated electronically or by foot.

[0022] The present claims 1 and 7 relate to a method and a device for introducing a bag into a container. The method forms a possible first step in the application of a method in which the bag containing objects can be compressed.

Claims

1. A method wherein an airtight bag is placed on the upper surface of a piston which is movable inside a container, after which a reduced pressure is created below the piston, which has air ducts extending from the upper surface through the piston, said reduced pressure causing the piston together with the bag held on the piston by said reduced pressure to move downwards in the container.

2. The method according to claim 1, **characterized in that** the piston is provided with passage means operating the air ducts, so that only air is allowed to pass, via the air ducts, which flows from the upper surface through the piston.

3. The method according to claim 2, **characterized in that** by creating an excess pressure below the piston and/or by creating a reduced pressure above the piston, the piston moves out of the container.

4. The method according to any one of the claims 1 to 3, **characterized in that** the container can be closed by a lid provided thereon.

5. The method according to claim 3 or 4, **characterized in that** when the piston moves under the influence of excess pressure and/or reduced pressure, the bag with its content will be compressed against said closed lid.

6. The method according to any one of the claims 1 to 5, **characterized in that** the container has an input opening, at the location of which a sealing unit is arranged, where the compressed bag with content is sealed.

7. A device comprising:

   - a container comprising a piston which is movable therein and which has air ducts extending from the upper surface through said piston, and
   - an air pump connected to the container space below the piston in order to create a reduced pressure there by means of which the piston together with a bag to be held on the piston by means of said reduced pressure are made to move downwards in the container.

8. The device according to claim 7, **characterized in that** the piston is provided with passage means operating the air ducts, which passage means are arranged so as to only allow passage of air, via the air ducts, which flows from the upper surface through the piston.

9. The device according to claim 7 or 8, **characterized in that** the container is provided with a lid closing the space above the piston, wherein a sensor coupled to the air pump is coupled to said lid, which sensor detects the open or closed state of the lid.

10. The device according to any one of the claims 7 to 9, **characterized in that** the device comprises a control valve which is connected to the air pump and which is arranged to influence the air pressure in the space below the piston and/or above the piston.

11. The device according to any one of the claims 7 to 10, **characterized in that** the container is provided with a lid which closes off the space above the piston, said lid being pivotable about a shaft, which is connected to the control valve, and the rotation of which controls the control valve.

12. The device according to any one of the claims 7 to 11, **characterized in that** the air pump is a suction pump and/or a suction/pressure pump.

13. The device according to any one of the claims 7 to 12, **characterized in that** the device is provided with a control unit by means of which working modes of the device are controlled.

14. The device according to any one of the claims 7 to 13, **characterized in that** the device comprises an electronic processing unit which is connected to one or more of the following, provided it/they are present: the air pump, the control valve, the control unit, a sensor coupled to the lid, a motion sensor coupled to the piston, a dynamometer coupled to the lid.

15. Domestic use of the device according to any one of the claims 7 to 14, wherein the device additionally is in the form of a pedal container or pedal bin.

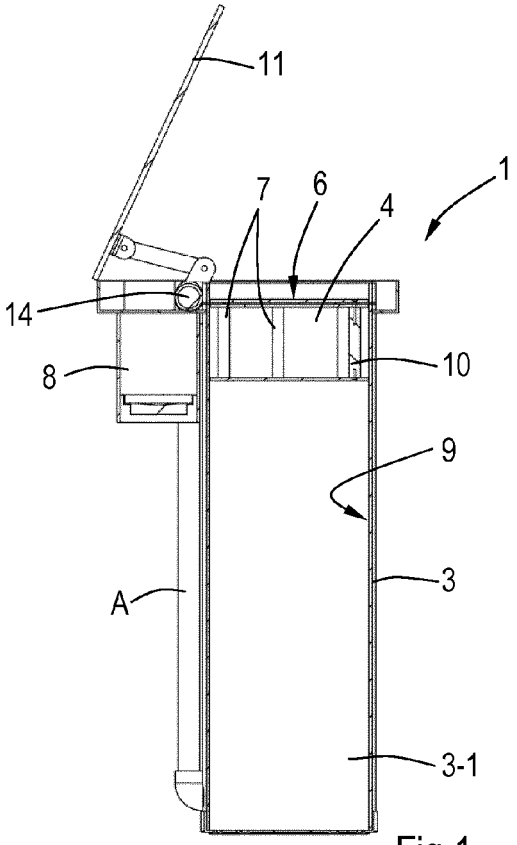

Fig.1

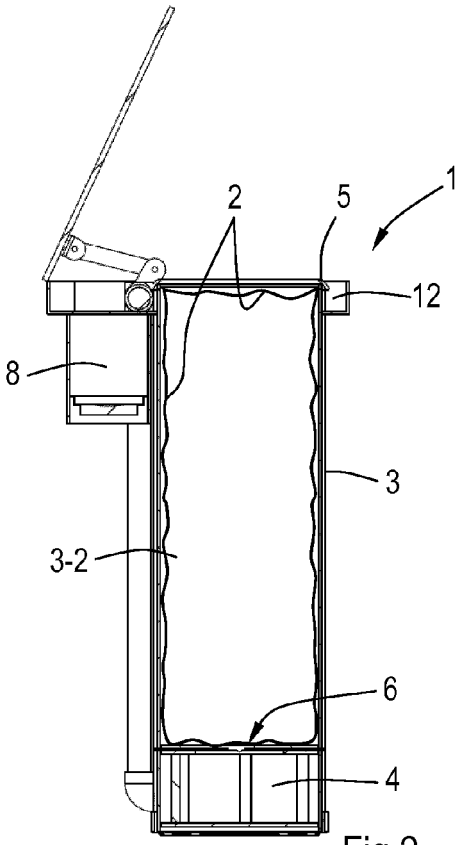

Fig.2

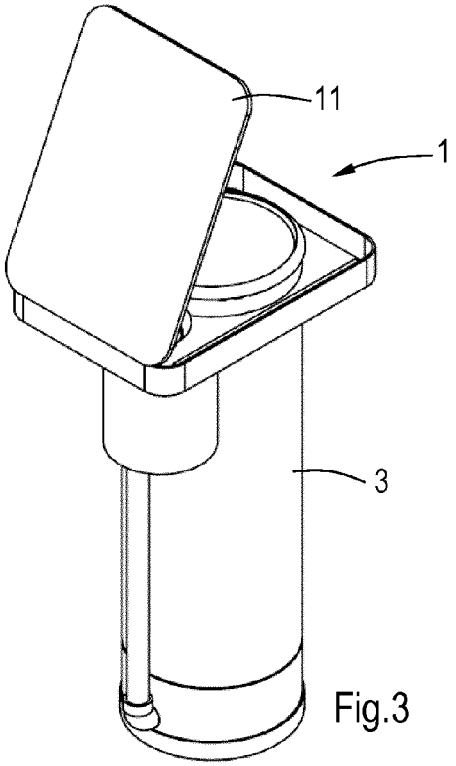

Fig.3

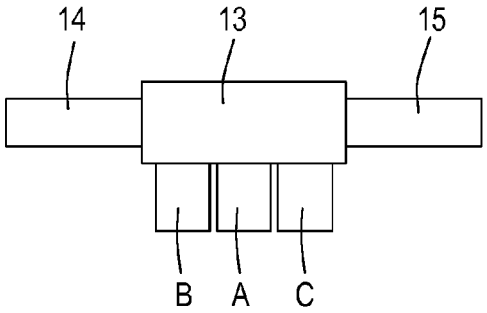

Fig.4

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EUROPEAN SEARCH REPORT

Application Number
EP 15 19 1854

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 1 498 364 A1 (ROSOLINI LTD [IE]) 19 January 2005 (2005-01-19) * paragraph [0068] - paragraph [0087]; figures 3-5 *	1-15	INV. B30B9/30 B65F1/06 B65F1/14 B65B1/24 B65B67/12
A	US 5 083 509 A (HANSEN NIELS K [AU] ET AL) 28 January 1992 (1992-01-28) * column 4, line 44 - line 66; figures 11,12 *	1-15	
A	EP 2 589 487 A1 (CRAFTWORKS B V [NL]) 8 May 2013 (2013-05-08) * paragraph [0036]; figures 2A, 2B *	13,14	
A	DE 20 2011 050997 U1 (KO WEN HSIUNG [TW]) 13 October 2011 (2011-10-13) * paragraph [0016]; figure 1 *	15	
A	US 3 683 795 A (HARRIS LYNN C) 15 August 1972 (1972-08-15) * the whole document *	7	
A	WO 2011/152738 A1 (GARDINER THOMAS FALKLAND [NZ]) 8 December 2011 (2011-12-08) * claim 1; figures 1,2 *	1,7	TECHNICAL FIELDS SEARCHED (IPC) B30B B65F B65B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	29 January 2016	Schelle, Josef

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 1498364 A1	19-01-2005	AT 338706 T	15-09-2006
		CN 1576190 A	09-02-2005
		EP 1498364 A1	19-01-2005
		US 2005028689 A1	10-02-2005
US 5083509 A	28-01-1992	US 5083509 A	28-01-1992
		WO 8809264 A1	01-12-1988
EP 2589487 A1	08-05-2013	EP 2589487 A1	08-05-2013
		NL 2007708 C	07-05-2013
DE 202011050997 U1	13-10-2011	NONE	
US 3683795 A	15-08-1972	NONE	
WO 2011152738 A1	08-12-2011	AU 2011262454 A1	10-01-2013
		WO 2011152738 A1	08-12-2011

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