



(51) International Patent Classification:
B41J 2/175 (2006.01)

(21) International Application Number:
PCT/US2017/038175

(22) International Filing Date:
19 June 2017 (19.06.2017)

(25) Filing Language: English

(26) Publication Language: English

(71) Applicant: **HEWLETT-PACKARD DEVELOPMENT COMPANY, L.P.** [US/US]; 11445 Compaq Center Drive W., Houston, Texas 77070 (US).

(72) Inventors: **VELEZ, Eladia**; Highway 110 N KM 5.1 Bldg 02, Aguadilla, 00603 (PR). **ROSARIO, Carlos E.**; Highway 110 N KM 5.1 Bldg 02, Aguadilla, 00603 (PR). **GONZALEZ, Segi**; Highway 110 N KM 5.1 Bldg 02, Aguadilla, 00603 (PR).

(74) Agent: **LEMMON, Marcus B.** et al.; HP Inc., 3390 E. Harmony Road, Mail Stop 35, Fort Collins, CO 80528 (US).

(81) Designated States (*unless otherwise indicated, for every kind of national protection available*): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DJ, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IR, IS, JO, JP, KE, KG, KH, KN, KP, KR, KW, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States (*unless otherwise indicated, for every kind of regional protection available*): ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, ST, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV,

(54) Title: PRINTING AGENT CONTAINERS

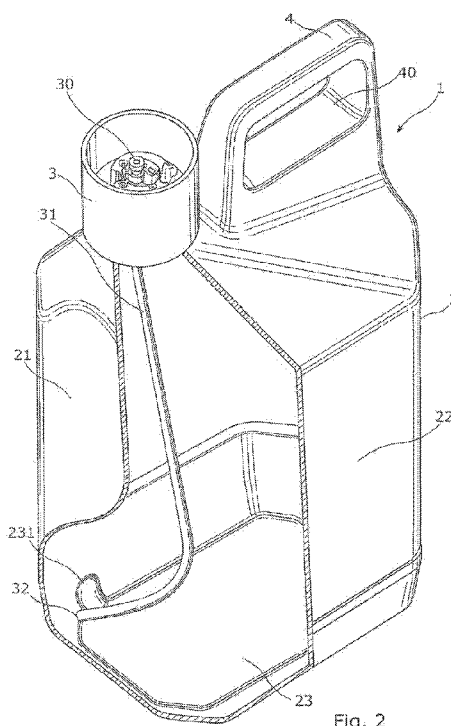


Fig. 2

(57) Abstract: A printing agent container and a method for manufacturing printing agent containers is disclosed wherein the container has improved stability to external collision. The container comprises a receptacle having at least one side wall and a bottom surface defining an internal volume; a cap on a top surface of the receptacle; and a tube connected to the cap and defining a fluid connection between the internal volume and the cap, wherein the receptacle comprises a protrusion that is provided, at least partially, in the bottom surface, and that extends into the internal volume, defining a bottom feed region between the protrusion and a side wall and wherein the tube extends at least partially in the feed region.

MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM,
TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW,
KM, ML, MR, NE, SN, TD, TG).

Declarations under Rule 4.17:

- *as to the identity of the inventor (Rule 4.17(i))*
- *as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))*

Published:

- *with international search report (Art. 21(3))*

PRINTING AGENT CONTAINERS

5

BACKGROUND

10 **[0001]** Printing agent containers are tanks that contain a volume of printing agent for printers. Large format agent containers are designed for large format printers and may contain relatively large volumes of printing agent, for example around ten liters of agent. Existing examples of large format agent containers may be arranged to be emptied into permanent agent containers in the large format
15 printer. Other existing example agent containers are arranged to be fluidically connected to the printer and supply agent to the printer in a connected state. Such agent container may be located in the vicinity of the printer during usage, and connected to an agent inlet. The agent may be drawn from the agent container by a pump or other agent suction device, alternatively, the container may be presurized as to allow agent to flow towards the printer.
20

[0002] Examples of printing agents may be inks, in the case of ink-based printing, or detailing and/or fusing agents in the case of 3D printers.

BRIE DESCRIPTION OF THE DRAWINGS

25

[0003] Figure 1 shows a perspective view of a printing agent container.

[0004] Figure 2 shows a partial cut of a longitudinal section of an example of printing agent container.

[0005] Figure 3 shows a set of printing agent containers connected to a printer.

30

DETAILED DESCRIPTION

[0006] Printing agent containers, especially large format, may comprise moveable or flexible parts in the inner volume of the container. Examples of movable parts may be the tube for fluid connection between the inner volume of the container and a printer. It is beneficial for containers to comprise a receptacle wherein mechanisms for positioning and/or preventing the displacement of the moveable parts are provided. For example, when the moveable part is a tube, a collision on the container may cause the tube to move to an area away from the bottom surface so that part of the agent within the container may not be withdrawn from it. This is especially relevant in a printing agent container wherein the tube is, at least, partly flexible.

[0007] In one example, a printing agent container with increased stability to external vibrations and/or collisions is disclosed, although also other effects may be associated with different aspect of this disclosure.

[0008] In the foregoing, reference is made to the accompanying drawings. The examples in the description and drawings should be considered illustrative and are not to be considered as limiting to the specific example or element described. Multiple examples may be derived from the following description and/or drawings through modification, combination or variation of certain elements. Although certain features are shown and described in conjunction they may be applied separately to the ink tank of this description, also if not specifically claimed. Furthermore, it may be understood that examples or elements that are not literally described may be derived from the description and drawings by a person of ordinary skill in the art.

[0009] Figure 1 shows an example of printing agent container 1. In the example of figure 1, the container 1 comprises a receptacle 2 that may be a single cast thermoplastic receptacle 2 that includes a body for containing a printing agent and may be rigid or semi-rigid, i.e., the receptacle 2 may be arranged to at least approximately maintain shape without additional internal or external support structures, while holding at least approximately ten liters of ink. Additionally, the receptacle 2 may comprise a handle 4 with a through-hole 40. The handle 4 may

be manufactured integrally to the receptacle, for example, by blow-molding. In the example of figure 1, a cap 3 is provided wherein, in assembled condition, the cap 3 is affixed to the body. The body of the receptacle 2 may comprise an opening for filling the receptacle 2 with agent. The body may comprise a neck that defines the opening. The cap 3 may be attached, e.g., screwed or otherwise fixed, to the neck.

[0010] The receptacle 2 may comprise at least one side wall and a bottom surface 23 which depending on their distribution may define different shapes, such as cylindrical, rectangular or, as in the case of figure 1, substantially polyhedral. In an example, a set of side walls comprise a pair of frontal faces 22 and a pair of lateral faces 21. The side walls 21, 22 and bottom surface 23 may be connected to each other through rounded corners 232.

[0011] Also, the protrusion 231 may be located, at least partially, on the bottom surface 23 and protrudes upwards into the inner volume of the receptacle 2. In one example the protrusion may also partly extend through a rounded corner edge between a side wall 22 and the bottom surface 23, and/or at least partly in the side wall 22. One function of this protrusion 231 is to provide support as to position a moveable part inside the receptacle 2 wherein in one example the moveable part is a flexible or movable tube

[0012] Figure 2 shows a partial longitudinal cut on the receptacle 2. It is further shown the tube 31 that is fluidically connected to the outlet 30. The tube 31 comprises a proximal end connected to the outlet 30 and a distal end 32 that is open to the inner volume of the receptacle 2. The tube 31 establishes a fluid connection between the inner volume of the receptacle 2 and an external device through the outlet 30 thereby allowing for the transfer of printing agent from the container 1, for example, to a printer.

[0013] For example, the tube 31 is at least partly flexible for bending and repositioning and may be partly rigid for maintaining a certain orientation or shape. For example, the tube includes only plastic material and is held in place between cap and bottom (as shown). In an example, the tube 6 has a slightly bended shape and may be dimensioned as to touch the bottom surface 23, i.e., with a height above the height of the container 1. In a further example, the distal end 32 is kept

in contact with the bottom surface 23 using the force generated from bending it between the cap 3 on one end and the bottom surface 23 of the receptacle 2 on the other end.

5 **[0014]**As mentioned above, the protrusion 231 acts as a positioning member to avoid that a collision or unwanted movements on the container 1 cause the tube 31 to move to a position other than a predefined feed region. In the example of figure 3, the feed region comprises a section of the receptacle wherein the maximum amount of fluid may be transferred through the output 30. Also, often containers 1 are installed tilted over a platform so that the printing agent is moved to
10 a specific section of the receptacle 2 wherein the feed region may be located. In the example of figure 2, the protrusion is located in the bottom surface, but any protrusion towards the inner volume in the vicinity of the bottom surface will have the same effect.

15 **[0015]**In the example of figure 3, the feed region is located between the protrusion 231 and at least one of the side walls. In this configuration the protrusion 231 helps maintain the tube 31 in its position together with the bending force on the tube. The protrusion 231 prevents movements of the tube in the direction between the side faces 21 and the bending force prevents the tube 31 from moving in the direction between the frontal faces.

20 **[0016]**The protrusion may be integrally molded to the receptacle, as in the case of figure 2, or may be attached to the container by adhesives or any other fixing means.

25 **[0017]**The location of the protrusion 231 is preferably on the bottom surface and spaced-apart from at least one of the walls by a separation distance in the range of 1-3 times the diameter of the tube. The separation distance defining the feed region, that is, the region between the protrusion and at least one of the side walls.

30 **[0018]**The protrusion 231 may have a different shapes depending on the application. In the example of figures 1-3 the protrusion 231 has a substantially cylindrical shape, nonetheless, other shapes are envisaged such as an L-shape or an arch to also contact one of the sidewalls and increase the positioning effect on the tube 31.

[0019] The manufacturing of the receptacle may be made by molding. In an example, the receptacle is manufactured by blow-molding and the receptacle is made of a thermoplastic material, for example, high-modulus high-density polyethylene (HM-HDP).

5 **[0020]** The cap 3 may include an agent outlet 30 arranged to be fluidically connected to a tube on its inner part and to an adaptor or printer on its outer part as to supply the agent of the inner volume of the receptacle 2 to a printer. The outlet 30 may protrude from the cap 3, for example in an upwards direction and in an installed and upright condition of the container 1. The cap 3 may include further
10 interface features such as at least one of a chip, an adaptor interconnect latch feature, a key lock out feature and a vent device. For example, these interface features may interface with connector or printer elements at least at some point during usage. In an example, some of the interface features protrude from the cap 3.

15 **[0021]** In a further example, the vent device may provide for an ambient air opening in the receptacle 2 during usage. The vent device may be closed before usage and is arranged to break open when beginning usage, for example by connecting a connector. The chip can include a memory or integrated circuit or microprocessor and is designed for interconnection with a printer or adaptor connector for
20 one- or two-way data or signal exchange. In one example, the chip is designed to interconnect with printer electrodes, triggering a signal in the printer that the container 1 has been connected and the signal may also indicate a property of the agent, for example, the agent's color, level or type.

[0022] Figure 3 shows an example of a printer 5 wherein several containers 1 are
25 installed. It is noted that containers 1 may be installed over platform 10 wherein such platform is inclined as to tilt the container 1 towards the feed region to optimize the amount of agent that may be withdrawn from the container 1.

[0023] In the example of figure 3 a five container arrangement is shown but the same principle can be applied to other printing arrangements.

30 **[0024]** In essence, it is disclosed a printing agent container comprising:

- a receptacle having at least one side wall and a bottom surface defining an internal volume,

- a cap on a top surface of the receptacle, and
- a tube connected to the cap and defining a fluid connection between the internal volume and the cap,

wherein the receptacle may comprise a protrusion that is provided, at least partially, in the bottom surface, and that extends into the internal volume, defining a bottom feed region between the protrusion and a side wall and wherein the tube extends at least partially in the feed region.

[0025] In an example, the tube is at least partly flexible and may have a proximal end attached to the cap, a distal end in the internal volume and a length to enable the distal end to engage the bottom surface of the receptacle. In a further example, the length of the tube is dimensioned to enable a bend of the tube over the bottom surface.

[0026] In an example, the tube is at least partly flexible, and a distal end of the tube extends in the feed region and engages one of the protrusion and a proximal side wall that together define the feed region, to hold the distal end of the flexible tube in place so that agent flows into the tube in the feed region. Also, the receptacle may have four upright side walls connected to each other through four rounded corners wherein the protrusion is provided near one of the rounded corners and the tube's end extends near said corner.

[0027] In an example, the protrusion is integrally molded with the receptacle thereby forming a monolithic structure. In an example, this is done by manufacturing the receptacle using, e.g., blow molding.

[0028] The receptacle may be made of high-density thermoplastic material, e.g., high-density polyethylene.

[0029] In a further example, the cap may comprise an outlet for connection to a printer.

[0030] Regarding the type of agents, the agent may be ink and, therefore, the inner volume contains ink.

[0031] Furthermore, it is disclosed a method of manufacturing a printing agent container comprising:

- providing a receptacle that defines an internal volume wherein the receptacle comprises a top surface, at least one side wall and a bottom surface,

the receptacle further comprising a protrusion protruding into the internal volume; and

- attaching a cap to the receptacle wherein the cap comprises a tube attached on its proximal end to the cap;

5 wherein the attaching of the cap comprises locating the distal end of the tube in a feed region between the protrusion and the side wall.

In an example, providing the receptacle comprises blow molding the receptacle.

[0032] In another example, the distal end of the tube is installed to contact the bottom surface of the receptacle.

10 **[0033]** In a further example, the receptacle is made of a high-density thermoplastic material, for example, high-density polyethylene.

15

CLAIMS

WHAT IS CLAIMED IS:

- 5 1. Printing agent container comprising:
- a receptacle having at least one side wall and a bottom surface defining an internal volume,
 - a cap on a top surface of the receptacle, and
 - a tube connected to the cap and defining a fluid connection between the
- 10 internal volume and the cap,
- wherein the receptacle comprises a protrusion that is provided, at least partially, in the bottom surface, and that extends into the internal volume, defining a bottom feed region between the protrusion and a side wall and wherein the tube extends at least partially in the feed region.
- 15 2. Printing agent container according to claim 1 wherein the tube is at least partly flexible.
3. Printing agent container according to claim 2 wherein the tube has a
- 20 proximal end attached to the cap, a distal end in the internal volume and a length to enable the distal end to engage the bottom surface of the receptacle.
4. Printing agent container, according to claim 3 wherein the length of the tube is dimensioned to enable a bend of the tube over the bottom surface.
- 25 5. Printing agent container, according to claim 1, wherein
- the tube is at least partly flexible, and
 - a distal end of the tube extends in the feed region and engages one of the protrusion and a proximal side wall that together define the feed region, to hold the
- 30 distal end of the flexible tube in place so that agent flows into the tube in the feed region.

6. Printing agent container of claim 5, wherein the receptacle has four up-right side walls connected to each other through four rounded corners wherein the protrusion is provided near one of the rounded corners and the tube's end extends near said corner.

5

7. Printing agent container, according to claim 5, wherein the protrusion is integrally molded with the receptacle.

10

8. Printing agent container, according to any of claim 5, wherein the receptacle is manufactured by blow molding.

9. Printing agent container, according to claim 5, wherein the receptacle is made of high-density thermoplastic material.

15

10. Printing agent container, according to claim 8, wherein the receptacle is made of high-density polyethylene.

11. Printing agent container, according to claim 1, wherein the cap comprises an outlet for connection to a printer.

20

12. Printing agent container, according to claim 1, wherein the agent is ink and the inner volume contains ink.

13. Method of manufacturing a printing agent container comprising:

25

- providing a receptacle that defines an internal volume wherein the receptacle comprises a top surface, at least one side wall and a bottom surface, the receptacle further comprising a protrusion protruding into the internal volume; and
- attaching a cap to the receptacle wherein the cap comprises a tube attached on its proximal end to the cap;

30

wherein the attaching of the cap comprises locating the distal end of the tube in a feed region between the protrusion and the side wall.

14. Method, according to claim 12, wherein providing the receptacle comprises blow molding the receptacle.

5 15. Method, according to claim 12 wherein the distal end of the tube is installed to contact the bottom surface of the receptacle.

16. Method, according to claim 12, wherein the receptacle is made of a high-density thermoplastic material.

10

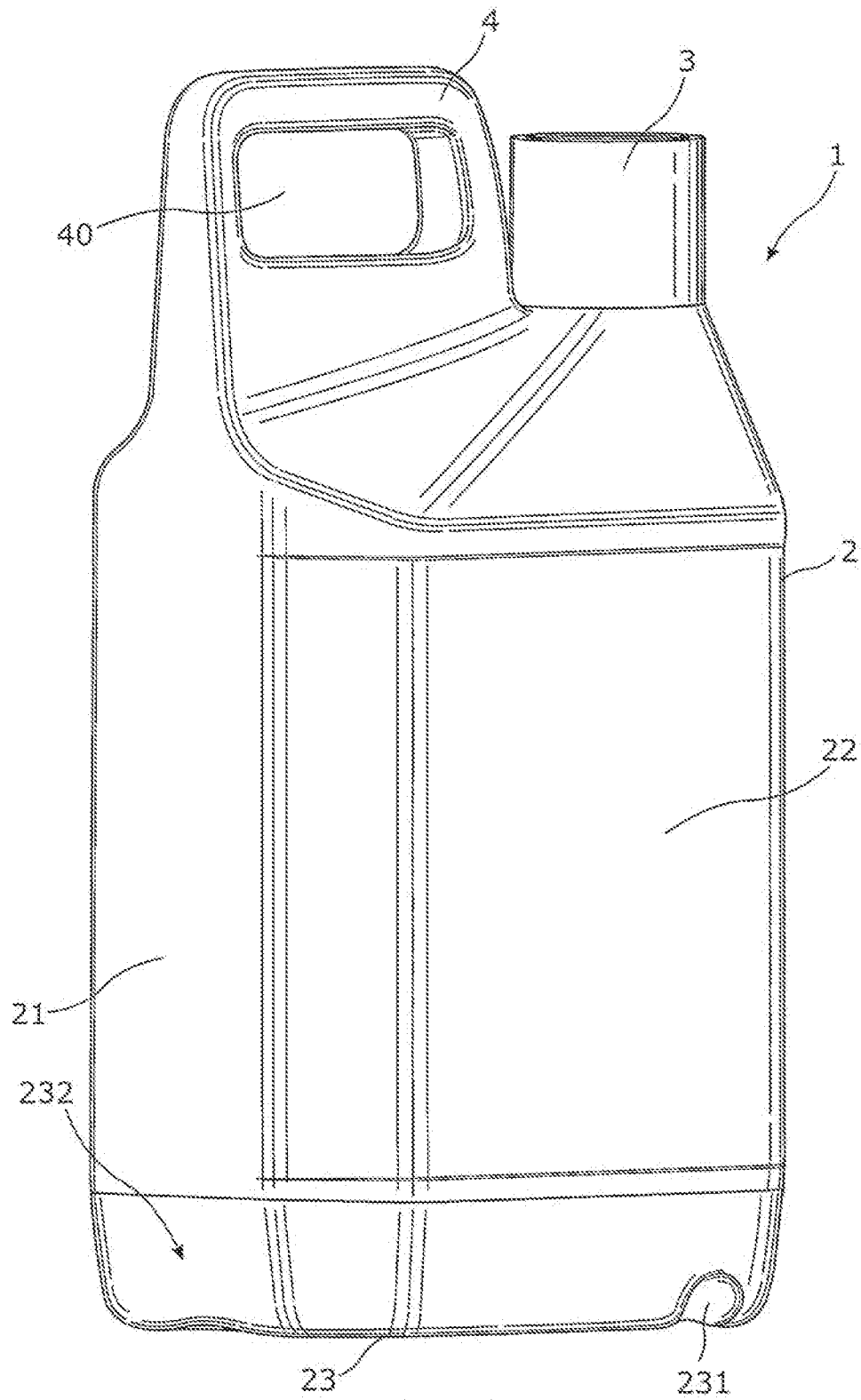


Fig. 1

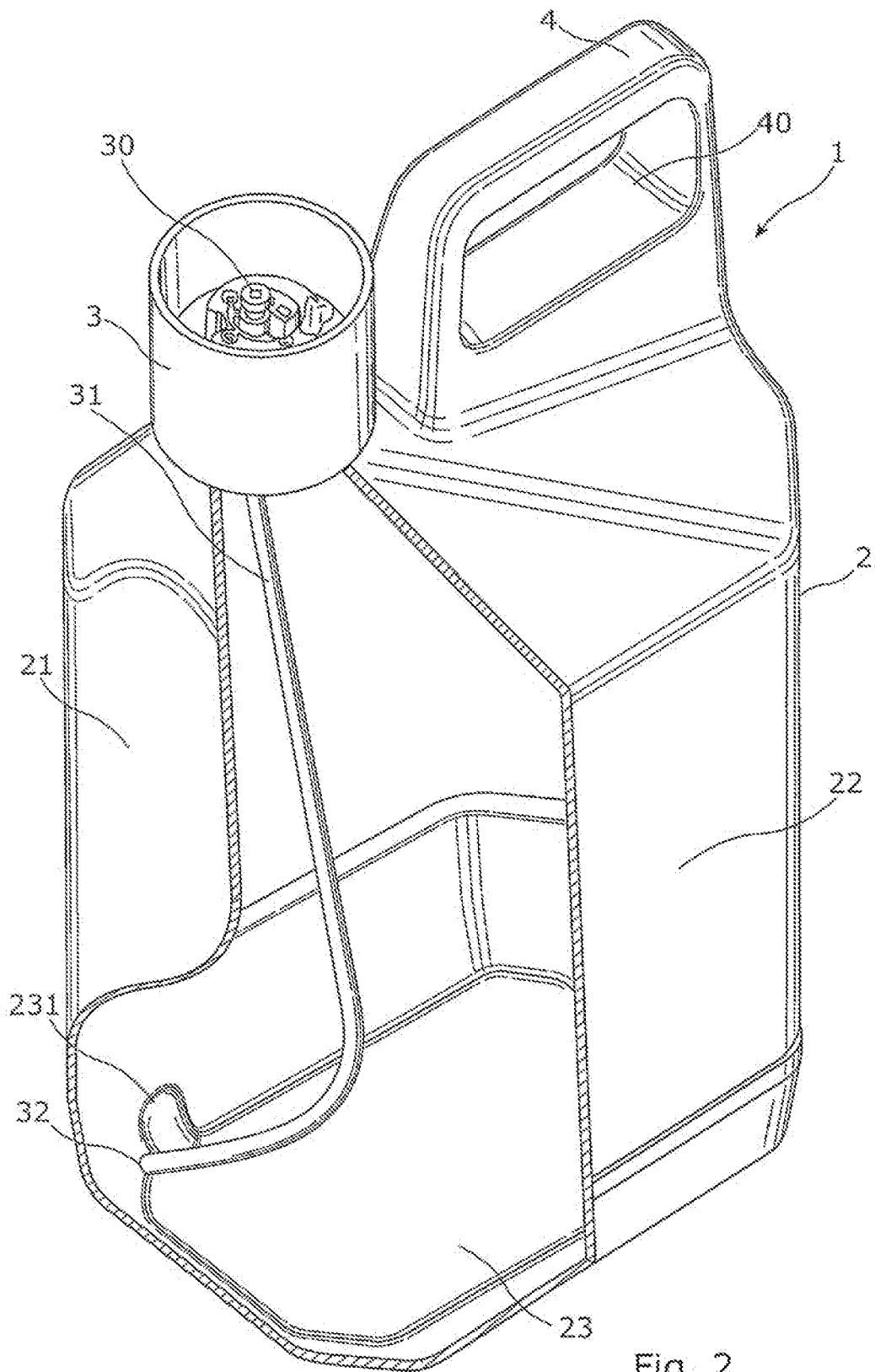


Fig. 2

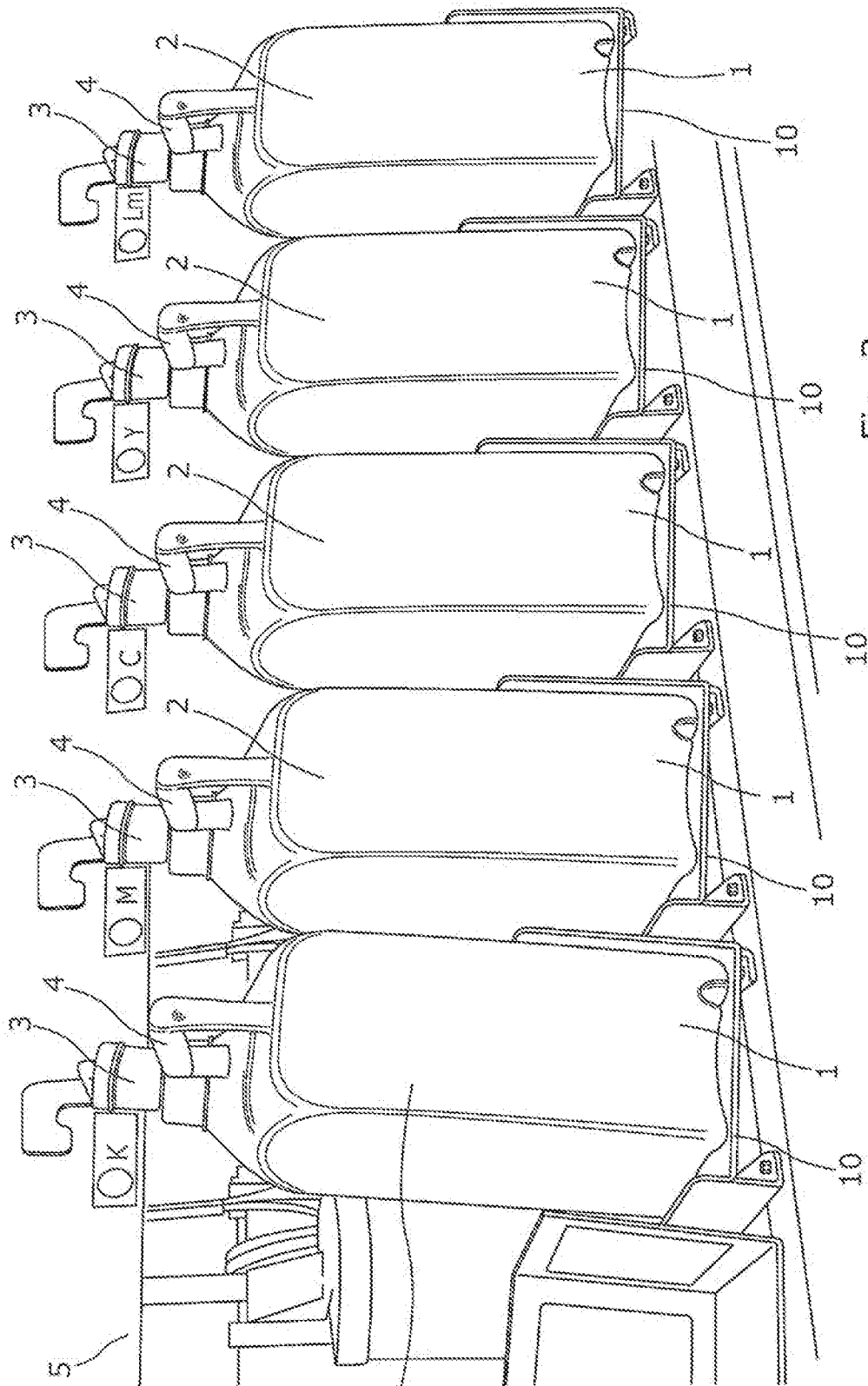


Fig. 3

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2017/038175

A. CLASSIFICATION OF SUBJECT MATTER
INV. B41J2/175
ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
B41J

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2016/236476 A1 (GONZALEZ SEGI [US]) 18 August 2016 (2016-08-18) paragraphs [0016], [0022]; figures 1, 3, 4	1-16
X	FR 2 676 022 A1 (FUJI ELECTRIC CO LTD [JP]) 6 November 1992 (1992-11-06) page 17, line 28 - page 18, line 11; figure 9	1-16
X	JP 2003 312002 A (BROTHER IND LTD) 6 November 2003 (2003-11-06) paragraphs [0018], [0025]; figure 3	1,6,7, 11-13,15
X	JP 2000 103078 A (BROTHER IND LTD) 11 April 2000 (2000-04-11) figures 1,12	1,6,7, 11-13,15
	-/-	



Further documents are listed in the continuation of Box C.



See patent family annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search

9 February 2018

Date of mailing of the international search report

16/02/2018

Name and mailing address of the ISA/

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040,
Fax: (+31-70) 340-3016

Authorized officer

Adam, Emmanuel

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2017/038175

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2010/295905 A1 (TAMAKI KAZUTAKA [JP]) 25 November 2010 (2010-11-25) paragraph [0052]; figure 7 -----	1,6,7, 13,15
X	US 2010/201761 A1 (LU YI-CHING [TW] ET AL) 12 August 2010 (2010-08-12) paragraphs [0022], [0024]; figures 1, 3a -----	1
X	WO 2014/046075 A1 (MIMAKI ENG KK [JP]) 27 March 2014 (2014-03-27) figures 4, 5 -----	1

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/US2017/038175

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2016236476 A1	18-08-2016	US 2015217573 A1 US 2016236476 A1 WO 2014084825 A1	06-08-2015 18-08-2016 05-06-2014
FR 2676022 A1	06-11-1992	CA 2060047 A1 DE 4201923 A1 FR 2676022 A1 JP H04251750 A	29-07-1992 06-08-1992 06-11-1992 08-09-1992
JP 2003312002 A	06-11-2003	NONE	
JP 2000103078 A	11-04-2000	JP 3019842 B1 JP 2000103078 A	13-03-2000 11-04-2000
US 2010295905 A1	25-11-2010	CN 101925466 A EP 2281688 A1 JP 5348575 B2 JP 5532485 B2 JP 2012210824 A JP WO2009128506 A1 US 2010295905 A1 WO 2009128506 A1	22-12-2010 09-02-2011 20-11-2013 25-06-2014 01-11-2012 04-08-2011 25-11-2010 22-10-2009
US 2010201761 A1	12-08-2010	TW 201029852 A US 2010201761 A1	16-08-2010 12-08-2010
WO 2014046075 A1	27-03-2014	NONE	