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Declarations under Rule 4.17:

[Continued on next page]

(54) Title: INK CONTAINER SUPPORTS

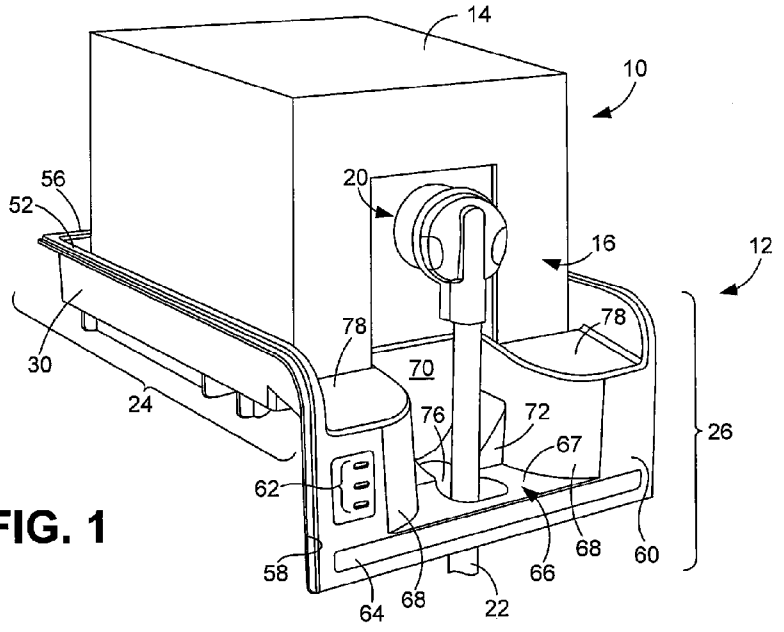

FIG. 1

(57) Abstract: In one embodiment, an ink container support includes a support tray adapted to support an ink container, and a front panel associated with the support tray, the front panel being adapted to facilitate user interfacing with the ink container when supported by the support tray.

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— *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))*

INK CONTAINER SUPPORTS

BACKGROUND

Ink is often supplied in large format printers using plastic containers. For example, the printer may comprise a rack upon which one or more cylindrical plastic ink bottles can be supported.

Currently under development are bag-in-box type ink containers in which a pliable plastic bag that is filled with liquid ink is contained within a corrugated fiberboard carton. Due to the unique features of such containers, it would be desirable to have unique ink containers support that can support the ink containers and facilitate convenient user interfacing with the ink containers.

BRIEF DESCRIPTION OF THE DRAWINGS

The disclosed ink container supports can be better understood with reference to the following drawings. The components in the drawings are not necessarily to scale.

FIG. 1 is a perspective view of an ink container supported by an ink container support, with a supply connector shown connected to the ink container.

FIG. 2 is a further perspective view of the ink container and the ink container support of FIG. 1, with the supply connector shown disconnected from the ink container and supported by the ink container support.

FIG. 3 is a further perspective view of the ink container support shown in FIG. 1, with the ink container and the supply connector removed.

FIG. 4 is a top view of the ink container support shown in FIG. 1.

FIG. 5 is a side view of the ink container support shown in FIG. 1.

DETAILED DESCRIPTION

Disclosed herein are ink container supports that are adapted to support bag-in-box ink containers within or in association with a large format printer. In some embodiments, an ink container support comprises a support tray within which the ink container can be placed. In addition, the ink container support comprises a front panel that facilitates convenient user interfacing with the ink container and a supply connector that is used to deliver ink from the container to the printing mechanism of the printer.

Referring now in more detail to the drawings in which like numerals identify corresponding parts throughout the views, FIGs. 1 and 2 illustrate a bag-in-box ink container 10 supported by an ink container support 12. As is apparent from those figures, the ink container 10 comprises a box-shaped outer carton 14, which contains an internal ink containment bag (not visible). In some embodiments, the carton 14 is constructed of a corrugated fiberboard material, commonly called cardboard. Irrespective of the material from which it is made, the carton 14 comprises multiple sides, including a front side 16 at which an outlet port 18 (FIG. 2) can be accessed. In FIG. 1, a supply connector 20 is shown connected to the port 18 such that ink contained within the internal ink containment bag can flow out from the container 10, through the connector, and into a supply tube 22 that is connected to a printer to which the ink is to be provided. In FIG. 2, the supply connector 20 is shown disconnected from the port 18 and, as described below, is supported by the ink container support 12.

FIGs. 3 and 4 illustrate an example configuration for the ink container support 12. As shown in that figure, the ink container support 12 generally comprises a support tray 24 used to physically support the ink container 10 and a front panel 26 with which a user may interface. In some embodiments, the support tray 24 and the front panel 26 are unitarily formed from the same piece of material, such as a plastic material. Such construction can, for example, be achieved by forming the ink container support 12 using an injection molding process.

As is further shown in FIGs. 3 and 4, the support tray 24 includes a base or pan 28 and a plurality of walls that extend upward from the pan at its peripheral edges. In the illustrated embodiment, those walls include a left wall 30, a right wall 32, a rear wall 34, and a front wall 36 that is at least partly formed by the front panel 26. Also extending upward from the pan 28 are container support elements, including two front support elements 38 and two rear support elements 40 (see FIG. 4). The support elements 38, 40 support the ink container 10 above the surface of the pan 28 so that, in case of a leak, ink can flow out down to a central portion of the pan that includes a drain hole 42 through which the leaked ink can be drained from the pan and deposited in a suitable receptacle. In some embodiments, the pan 28 is sloped such that ink will naturally flow toward the drain hole 42 when it falls onto the pan. Positioned between the drain hole 42 and the rear wall 34 is a rear sloped element 43, which is also configured to direct leaked ink to the pan 28 and the drain hole.

In the illustrated embodiment, each support element 38, 40 comprises a circular portion and a linear portion that extends from the circular portion toward the center of the pan 28. As indicated most clearly in FIG. 4, the linear portions of the left side pair of elements 38, 40 and the right side pair of elements 38, 40 are each

separated by a diagonal channel 44 that enables ink that drips into the pan 28 adjacent the left and right walls 30, 32 to flow toward the center of the pan 28 and, ultimately, to the drain hole 42. As is further indicated in FIG. 4, provided within each circular portion is a recess 46. Each recess 46 surrounds a mounting hole 48 through which a fastener, such as a bolt, can be passed to secure the ink container support 12 to a printer. As is further indicated in FIG. 3, the support tray 24 further comprises a support structure 50 that underlies and provides structural rigidity to the pan 28.

With further reference FIGs. 3 and 4, each of the left wall 30, right wall 32, and the rear wall 34 terminates at its top end at a laterally extending flange. In particular, the left wall 30 comprises a left flange 52, the right wall 32 comprises a right flange 54, and the rear wall 34 comprises a rear flange 56. As is apparent from the figures, the left flange 52 is contiguous with the rear flange 56, which is also contiguous with the right flange 54. As indicated most clearly in FIG. 3, the left and right flanges 52, 54 extend beyond the support tray 24 to the front panel 26. As is also most clear from FIG. 3, extending laterally outward from the left flange 52 along both the support tray 24 and the front panel 26 is a continuous tongue 58 that is adapted to be received by the right flange of an identical ink container support 12 and, at least partly, by a groove of the right flange (see FIG. 5). Accordingly, multiple ink container supports 12 can be aligned side-by-side in a nested configuration, if desired.

The front panel 26 will now be described in relation to FIGs. 3 and 4. With reference first to FIG. 3, the front panel 26 comprises a generally planar front surface 60 that includes openings 62 for user notification lights, such as light emitting diodes (LEDs) and a space 64 reserved for a label that identifies the color of ink that is

within the ink container supported by the ink container support 12. Extending inward from the front surface 60 is a recess 66 that is adapted to both retain and support the supply connector 20 shown in FIGs. 1 and 2.

As indicated in FIG. 3, the recess 66 is defined by a base 67, opposed curved lateral walls 68, and a rear wall 70. In addition, the recess 66 is defined by opposed lateral connector support elements 72 that extend upward from the base 67, inward from the lateral walls 68, and outward from the rear wall 70. The support elements 72 comprise curved top surfaces 74 that are specifically sized and configured to approximate the contours of the supply connector 20 so that the connector can be supported by the support elements 72 and the base 67 when not in use (see FIG. 2). The front panel 26 further comprises an elongated aperture 76 that extends through the base and through which the supply tube 22 of the supply connector 20 may pass. Because the aperture 76 forms a closed loop, the supply tube 22 and its supply connector 20 are retained by the ink container support 12 and cannot be pulled away from the ink container support 12 unless they are separated. With reference to FIG. 3, the front panel 26 further comprises pitched top surfaces 78 that extend down from the front wall 36 of the support tray 24 to the front surface 60 of the front panel.

FIG. 5 illustrates the ink container support 12 from the right side. From that angle, the groove 80 described in the foregoing is visible. Part of the above-described tongue 58 of an identical ink container support can be received by the groove 80 at the front panel 26, and the remainder of the tongue can simply be tucked in below the right flange 54 along the support tray 24. Also, visible in FIG. 5 is a transverse slot 82 that extends from one side of the front panel 26 to the other that is adapted to receive an edge of a printer housing panel. In some cases, such

panels have rough and unsightly edges. Therefore, the slot 82 serves both a safety and aesthetics function.

As described above, the ink container support 12 can be used to support an ink container, such as container 14 illustrated in FIG. 1. It is noted, however, that alternative, for example smaller, containers can be supported by the support 12. By way of example, the ink container 14 is a five liter container, and the support 12 can further support three liter containers. The footprint 84 of an example three liter container is identified by dashed lines 84 in FIG. 4. As shown in that figure, a rear edge of such a container can be positioned at the bottom edge of an incline 86 formed in each rear support element 40.

CLAIMS

Claimed are:

1. An ink container support comprising:

a support tray adapted to support an ink container; and

a front panel associated with the support tray, the front panel being adapted to facilitate user interfacing with the ink container when supported by the support tray.

2. The ink container support of claim 1, wherein the support tray comprises a pan and multiple walls that extend up from the pan.

3. The ink container support of claim 2, wherein the pan comprises a drain hole and wherein the pan slopes down toward the drain hole.

4. The ink container support of claim 2, wherein the pan comprises container support elements that extend up from a surface of the pan, the container support elements being adapted to support the ink container above the pan surface.

5. The ink container support of claim 4, wherein the container support elements include recesses in which are provided mounting holes used to secure the ink container support to a printer.

6. The ink container support of claim 2, further comprising flanges that extend outward from top ends of the walls of the support tray.

7. The ink container support of claim 6, further comprising a tongue that extends outward from one of the flanges, the tongue being adapted to be received by a groove of a flange of an identical ink container support when the ink container supports are positioned next to each other.

8. The ink container support of claim 1, wherein the front panel includes a front surface that has openings for user notification lights and a space for a label that identifies an ink color.

9. The ink container support of claim 8, wherein the front panel further comprises a recess that extends inward from the front surface.

10. The ink container support of claim 9, wherein the recess is defined by a base and multiple walls that extend upward from the base.

11. The ink container support of claim 10, wherein the base includes an aperture through which a supply tube used to deliver ink from the ink container to a printer can pass.

12. The ink container support of claim 11, wherein the front panel further comprises connector support elements positioned adjacent the aperture, the connector support elements being adapted to support a supply connector that is connected to the supply tube.

13. The ink container support of claim 8, wherein the front panel further comprises a transverse slot adapted to receive a panel of a printer to which ink is to be supplied.

14. An ink container support for use with a large format printer, the ink container support comprising:

a support tray adapted to support a bag-in-box ink container, the support tray including a pan and multiple walls that extend up from the pan, the pan comprising a drain hole and container support elements that extend up from a surface of the pan, the container support elements being adapted to support the bag-in-box ink container above the pan surface; and

a front panel extending from the support tray, the front panel comprising a front surface and a recess that extends inward from the front surface, the recess being defined by a base and multiple walls that extend upward from the base, the base including an aperture through which a supply tube used to deliver ink from the bag-in-box ink container to a printer can pass, the front panel further comprising connector support elements positioned adjacent the aperture that are adapted to support a supply connector that is connected to the supply tube.

15. The ink container support of claim 14, further comprising flanges that extend outward from top ends of the walls of the support tray and outward from the front surface of the front panel and a tongue that extends outward from one of the flanges, the tongue being adapted to be received by a groove of a flange of an identical ink container support when the ink container supports are positioned next to each other in the printer.

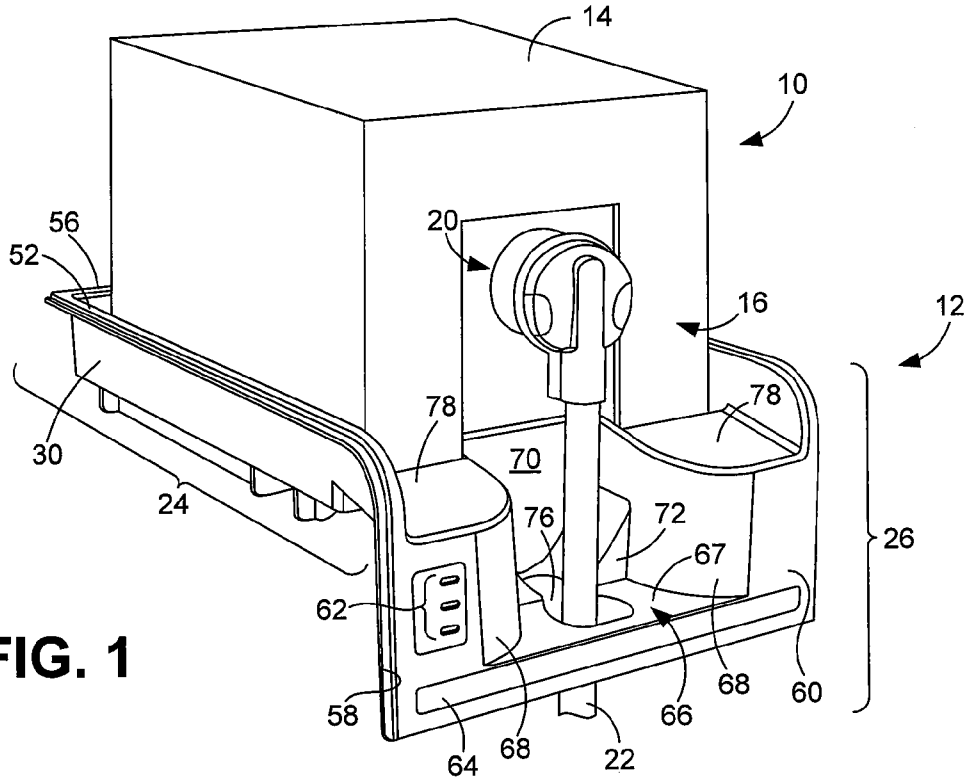
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FIG. 1

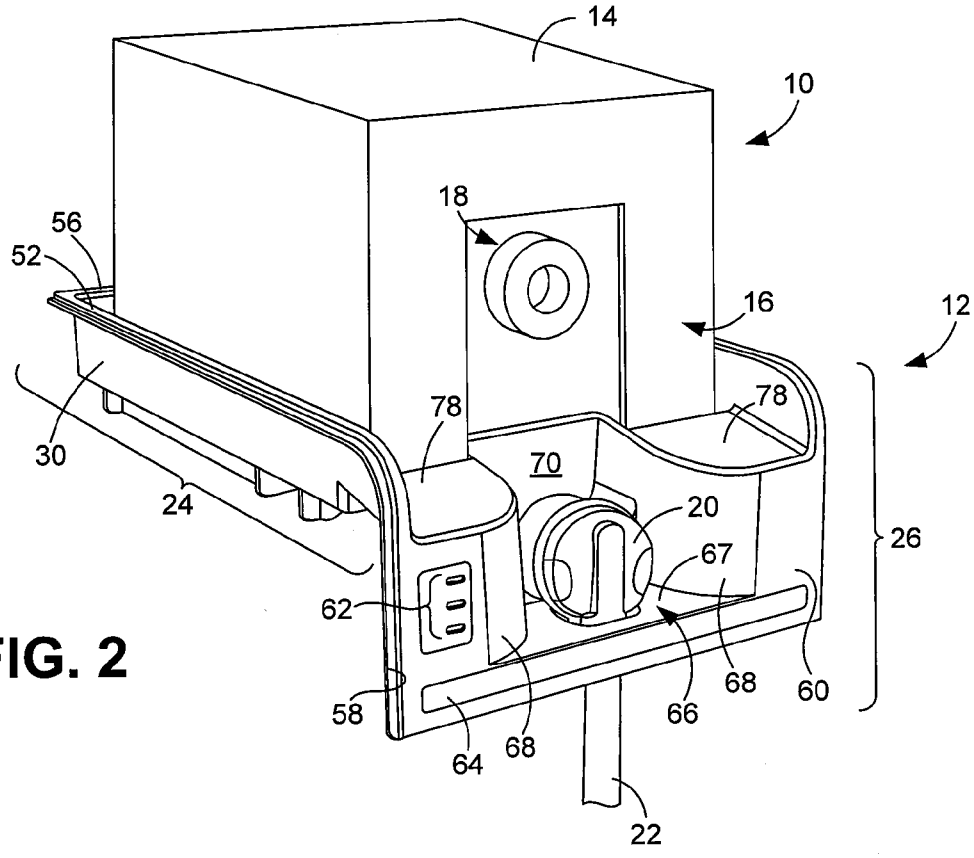
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FIG. 2

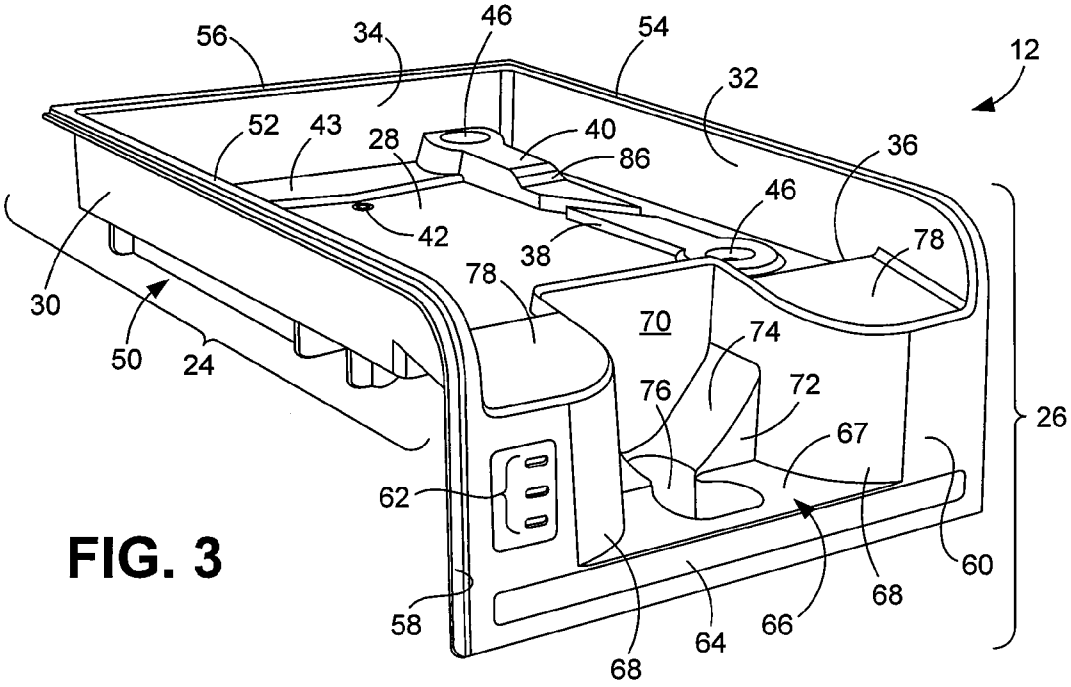
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FIG. 3

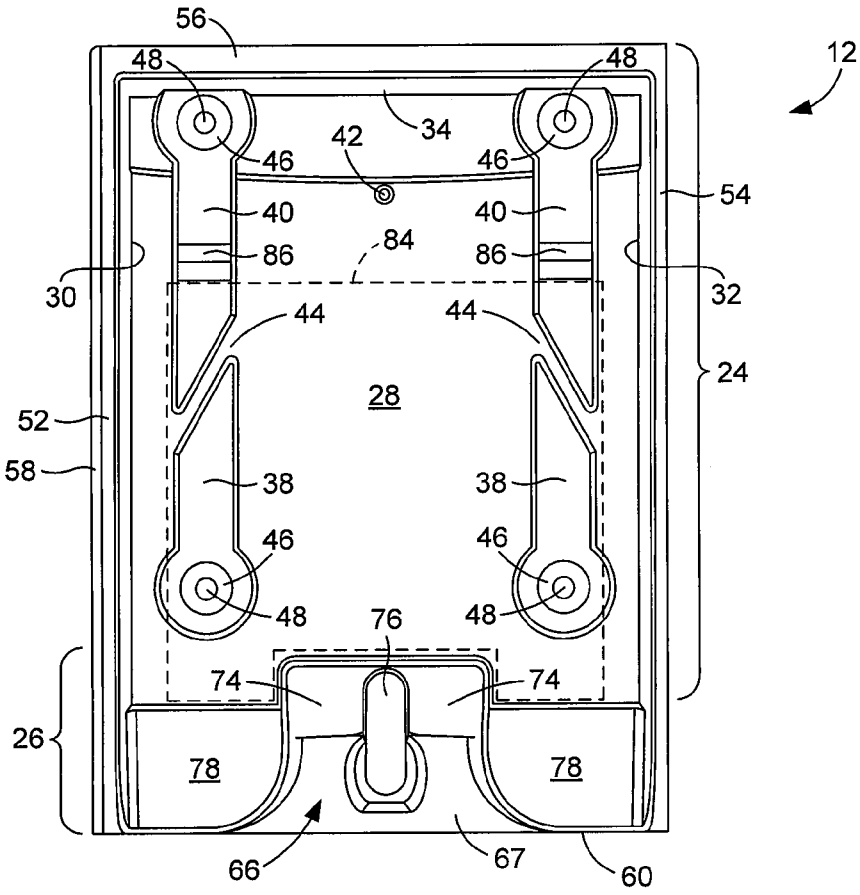
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FIG. 4

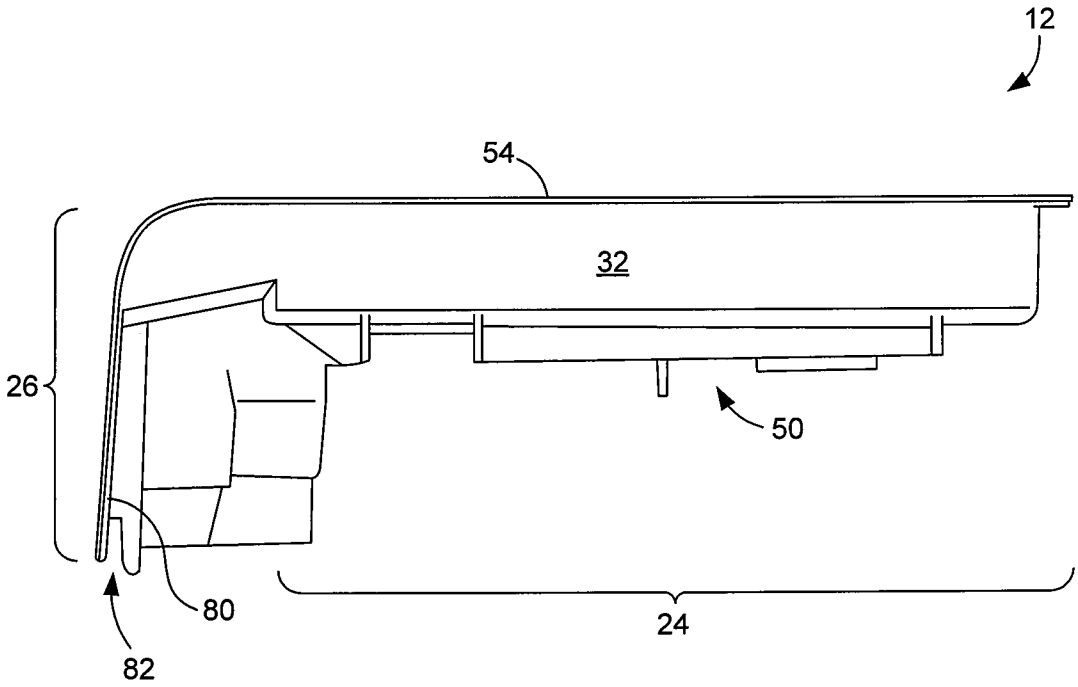

FIG. 5

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2008/064208

A. CLASSIFICATION OF SUBJECT MATTER

B41J 2/175(2006.01)i

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)
IPC B41J 2/175, 2/14, 2/17

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
KOREAN UTILITY MODELS AND APPLICATIONS FOR UTILITY MODELS SINCE 1975
JAPANESE UTILITY MODELS AND APPLICATIONS FOR UTILITY MODELS SINCE 1975

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
eKIPASS(KIPO internal) & keyword : ink, container, support, housing, carriage

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5,138,344 A (TOSHIHIKO UJITA) 11 August 1992 See Column 5, Line 12 - Column 6, Line 64; Claim 1 and Figure 4	14, 15
A	US 6,305,785 B1 (KEN HOSAKA et al.) 23 October 2001 See Column 6, Lines 10 -67; Claim 1 and Figures 1, 2	14, 15
A	US 6,206,510 B1 (MATTHEW J. CASSERINO; DENNIS R. NELSON) 27 March 2001 See Column 3, Line 11 - Column 4, Line 29; Figures 3, 4	14, 15
A	US 6,488,369 B1 (CHARLES R STEINMETZ et al.) 03 December 2002 See Column 6, Line 53 - Column 7, Line 35; Claim 9 and Figure 5	14, 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 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	Date of mailing of the international search report
19 JANUARY 2009 (19.01.2009)	**19 JANUARY 2009 (19.01.2009)**

Name and mailing address of the ISA/KR
Korean Intellectual Property Office
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Facsimile No. 82-42-472-7140

Authorized officer
KIM, Sung Hee
Telephone No. 82-42-481-8467

Form PCT/ISA/210 (second sheet) (July 2008)

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2008/064208

Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. ☒ Claims Nos.: 1-13
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

Claims 1-13 are too vague and unclear to make meaningful search.

3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

1. ☐ As all required addtional search fees were timely paid by the applicant, this international search report covers all searchable claims.

2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.

3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:

4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

☐ The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.

☐ The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.

☐ No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

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International application No.

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