(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
4 October 2001 (04.10.2001)

PCT

(10) International Publication Number
WO 01/72350 A1

(51) International Patent Classification[7]: A61M 1/00

(21) International Application Number: PCT/US00/08594

(22) International Filing Date: 31 March 2000 (31.03.2000)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
60/192,751 28 March 2000 (28.03.2000) US

(71) Applicant: **BEMIS MANUFACTURING COMPANY** [US/US]; 300 Mill Street, Sheboygan Falls, WI 53085-0901 (US).

(72) Inventors: **ANDERSON, Barry, G.**; 1728 North 13th Street, Sheboygan, WI 53081 (US). **HAND, Joseph, M.**; 436 Prospect Avenue, Sheboygan Falls, WI 53085 (US).

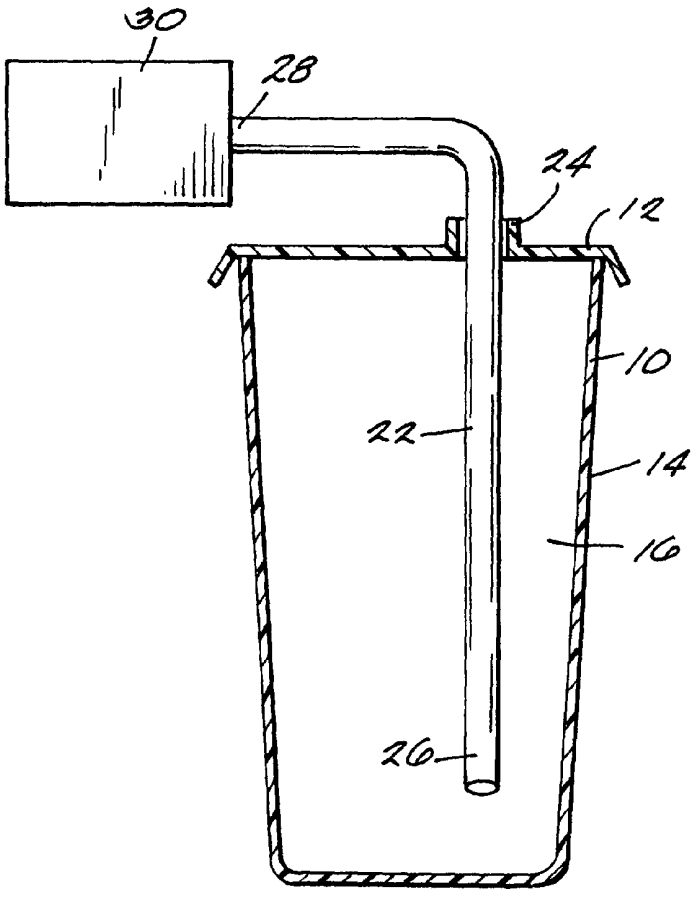
(74) Agent: **STRANDT, Billie, Jean**; Michael Best & Friedrich LLP, 100 East Wisconsin Avenue, Milwaukee, WI 53202 (US).

(81) Designated State *(national)*: CA.

Published:
— *with international search report*

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: MEDICAL SUCTION APPARATUS AND METHODS FOR DRAINING SAME



(57) Abstract: The invention provides several methods, and an apparatus (10) for removing body fluids from a liner-type (14) medical suction apparatus to eliminate the potential for a person handling the apparatus to come into contact with the fluid being drained.

WO 01/72350 A1

MEDICAL SUCTION APPARATUS AND METHODS FOR DRAINING SAME

FIELD OF THE INVENTION

The invention relates to draining bodily fluid contained in the liner of a liner-type medical suction apparatus.

BACKGROUND OF THE INVENTION

Medical suction systems are used in hospital environments and particularly during various surgical procedures to drain and store bodily fluid from a patient. In general, medical suction systems are used in conjunction with a vacuum source which enables the bodily fluid to be drained from the patient.

One type of medical suction system used to drain and contain fluid from a patient is an apparatus including a disposable bag-like liner and a cover secured to the liner. Such liners are thin-walled pliable plastic members. The cover typically includes a patient port for receiving the fluid from a patient and a vacuum port for establishing a vacuum within the liner. The vacuum draws fluid from the patient through the patient port for collection in the liner.

It has become important in environments such as hospitals to eliminate the handling of and thus reduce personnel exposure to bodily fluids. Hospitals typically dispose of the bodily fluid contained in a liner-type medical suction apparatus in various ways. Bodily fluid can be poured from the liner through a port in the cover down the hospital sink and into the sewer system, can be incinerated as a liquid or solid, or can be disposed of at an approved hazardous waste site. Since the liner is in the form of a pliable bag filled with liquid, special disposal handling is required in order to prevent puncturing or bursting due to contact with sharp objects.

SUMMARY OF THE INVENTION

The invention provides improved methods and apparatus for removing body fluids from a liner-type medical suction apparatus to eliminate the potential for a person handling the apparatus to come into contact with the fluid being drained.

Specifically, the invention provides for methods of draining bodily fluid from a liner that is drained of potentially hazardous fluid without contact with the fluid. The liner is drained in conjunction with a drainage device. Various types of drainage devices can be employed to drain the liner.

Other features and advantages of the invention will become apparent to those of ordinary skill in the art upon review of the following description, claims and drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a front view of a liner-type medical suction apparatus;

Fig. 2 is a sectional view of the apparatus and one method for draining the liner;

Fig. 3 is a sectional view of the apparatus and a second method for draining the liner;

Figs. 4 and 5 are sectional views of the apparatus and a third method for draining the liner;

Fig. 6 is a sectional view of the apparatus and a fourth method for draining the liner;

Fig. 7 is a sectional view of the apparatus and a fifth method for draining the liner;

Fig. 8 is a perspective view of a liner and sixth method for draining the liner; and

Fig. 9 is a front view of a seventh method for draining the liner.

Before one embodiment of the invention is explained in detail, it is to be understood that the invention is not limited in its application to the details of construction and the arrangement of components set forth in the following description or illustrated in the drawings. The invention is capable of other embodiments and of being practiced or being carried out in various ways. Also, it is to be understood that the phraseology and

terminology used herein is for the purpose of description and should not be regarded as limiting.

DESCRIPTION OF THE PREFERRED EMBODIMENT

With reference to Fig. 1, there is shown a liner-type medical suction apparatus 10. The apparatus 10 includes a cover 12 and a liner 14 suitably attached to the cover 12. The liner 14 is a thin-walled bag having an interior 16 adapted to hold the fluid drained from a patient. The liner 14 is preferably fabricated from a plastic such as ultra low density polyethylene, however, other materials can be used as desired.

The cover 12 includes a patient port 18, a suction port 20, and other access ports as desired. A patient conduit is connectable to the patient port 18 to enable communication between the patient and the interior 16 of the liner 14. A suction conduit is connectable to the suction port 20 to enable communication between the interior 16 of the liner 14 and a suction source, such as a hospital suction system.

To drain fluid from a patient, the patient and suction conduits are respectively secured to the patient and suction ports 18 and 20, the liner 14 is support by a stand or rigid container, and fluid is drained from a patient as is conventionally known.

When it is desired to drain the fluid contained in the liner 14, one of the seven methods described herein can be employed to drain the fluid contents from the interior 16 of the liner 14 while eliminating any contact with the fluid by the person handling the apparatus 10.

Turning now to Fig. 2, there is shown the liner-type medical suction apparatus 10. To drain the fluid contents of the interior 16 of the liner 14, a conduit 22 is positioned in the interior 16 of the liner 14, such as through an open port 24 in the cover 12. One end 26 of the conduit 22 is positioned in the interior 16 of the liner 14 and the other end 28 is in communication with a drainage device 30 which evacuates the fluid from the interior 16 of the liner 14. To support the apparatus during drainage, the apparatus 10 can be hung from a stand or hung from a bracket secured to a wall.

With reference to Fig. 3, a second method for draining the apparatus 10 is shown. In this embodiment, a tube 32 is preattached to the inside of the cover 12 and hangs down into the interior 16 of the liner 14. To drain the liner 14, the end 26 of the conduit 22 is secured to the open port 24 on the cover 12 and the second end 28 is secured to the drainage device 30, such as was described above.

Turning now to Figs. 4 and 5, a third method for draining the liner 14 is shown. With this method, the cover 12 includes a flapper style valve 34 positioned in a port 36. To drain the fluid from the liner 14, the apparatus 10 is inverted with respect to a drainage device 38 and the cover 12 is positioned in a cradle 40 of the drainage device 38. Preferably, the drainage device 38 creates a negative pressure or suction force within the cradle 40 to hold the apparatus 10 in place. The drainage device 38 includes a breakout pipe 42 that is movable vertically. After the cover 12 has been positioned in the cradle 40, the pipe 42 is actuated such that it moves upwardly toward the valve 34. Further upward movement of the pipe 42 pivots the valve 34 to enable fluid to escape the liner 14 through the pipe 42 as is shown by the arrow in Fig. 5. After drainage, the pipe 42 is actuated downwardly, the valve 34 returns to its normally closed position and the apparatus 10 can be removed from the cradle 40.

A fourth method for draining the liner is shown in Fig. 6. In this embodiment, the cover 12 includes a breakaway portion 44. Preferably, the breakaway portion 44 is a frangible part of the cover 12. To drain the fluid from the liner 14, the apparatus 10 is inverted with respect to the drainage device 38, the cover 12 is positioned in the cradle 40, and drainage device 38 creates a suction force within the cradle 40 to hold the apparatus 10 in place. After the cover 12 has been positioned in the cradle 40, the pipe 42 is actuated upwardly toward the portion 44. Further upward movement of the pipe 42 breaks the breakaway portion 44 allowing fluid to drain from the interior 16 of the liner 14 through the pipe 42. After drainage, the pipe 42 is actuated downwardly and the apparatus 10 can be removed from the cradle 40.

As shown in Fig. 7, a fifth method is depicted for draining the liner 14. In this method, the cover 12 includes a port 46 that is normally occluded with a plug 48. To drain the fluid from the liner 14, the apparatus 10 is inverted with respect to the drainage device 38, the cover 12 is positioned in the cradle 40, and the drainage device 38 creates a suction force within the cradle 40 to hold the apparatus 10 in place. After the cover 12 has been positioned in the cradle 40, the pipe 42 is actuated upwardly toward the plug 48. Further upward movement of the pipe 42 dislodges the plug 48 from the port 46 allowing fluid to drain from the interior 16 of the liner 14 through the pipe 42. After drainage, the pipe 42 is actuated downwardly and the apparatus 10 can be removed from the cradle 40.

Turning now to Fig. 8, a sixth method is shown for draining the liner 14. In this embodiment, the liner 14 includes a nipple portion 50 on the bottom of the liner 14. To

drain the contents of the liner 14, the nipple portion 50 is severed or punctured allowing fluid to drain from the interior 16 of the liner 14.

With reference to Fig. 9, a seventh method for draining the liner 14 is shown. In this embodiment, a drainage device 52 includes a pivotable swing arm 54 that rotates about a pivot point 56. To drain the liner 14, the apparatus 10 is positioned in the swing arm 54 with the swing arm 54 in a first position, shown in phantom in Fig. 9. One end 58 of a conduit 60 is secured to a port on the cover 12 and the second end 62 of the conduit 60 is secured to the drainage device 52. The swing arm 54 is then pivoted to a second position as shown in solid lines in Fig. 9 and the contents of the liner 14 drained. After drainage is completed, the swing arm 54 is returned to its first position and the apparatus 10 can be removed from the swing arm 54.

The embodiments of the drainage device shown herein can operate using various methods to drain the liner such as a venturi action, a pumping action, or the like. One example of a drainage device is the Eductor Fluid Management System available from Deknatel or Bemis Manufacturing Company. However, it should be noted that other drainage devices can be utilized and the invention herein is not limited to use of the Eductor Fluid Management System to drain the liner-type medical suction apparatuses shown herein.

We claim:

1. A method for draining a liner-type medical suction apparatus filled with fluid, said method comprising:

positioning a liner-type medical suction apparatus relative to a drainage device; and

operating said drainage device to drain the fluid contained in the liner of said apparatus.

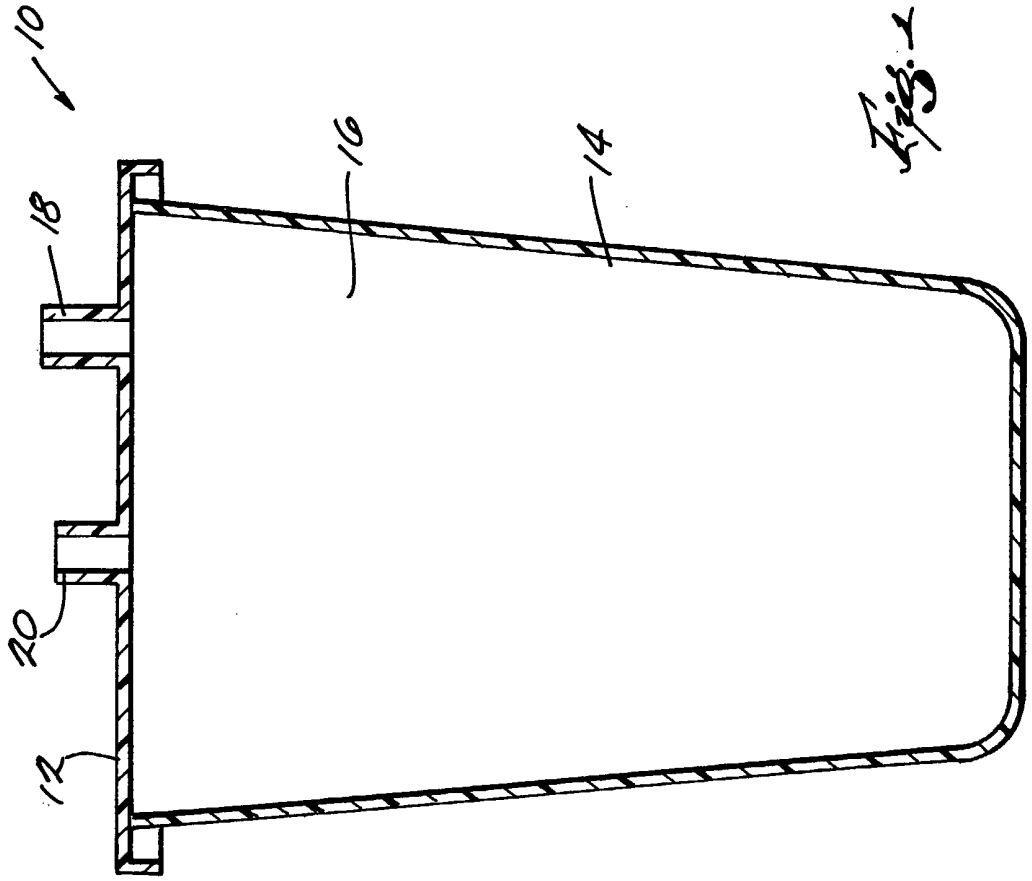


Fig. 1

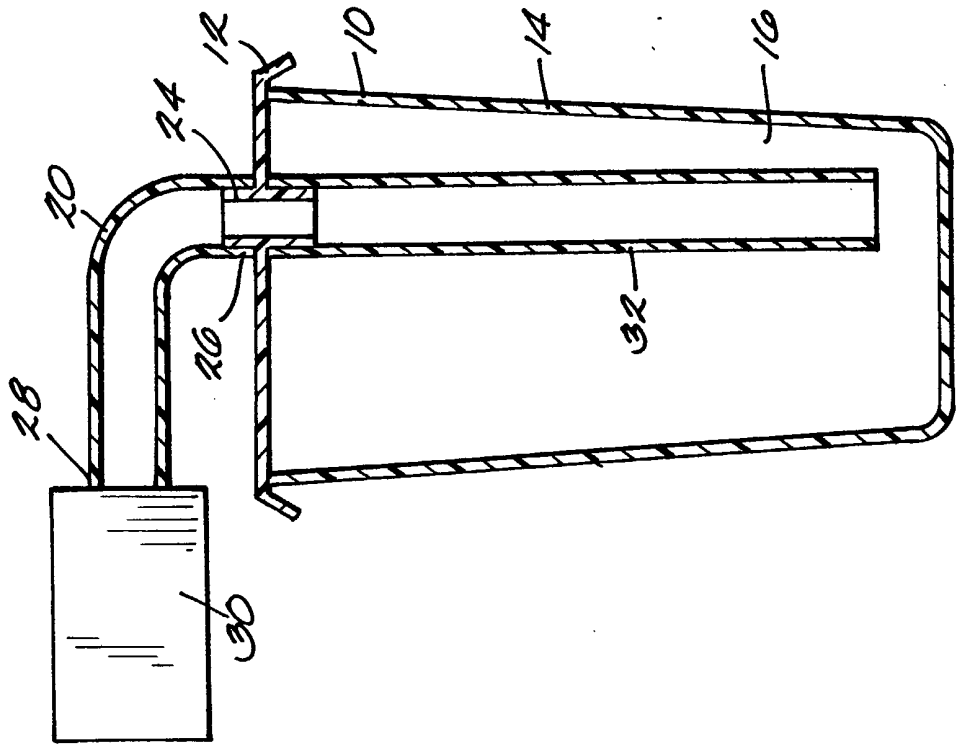


Fig. 3

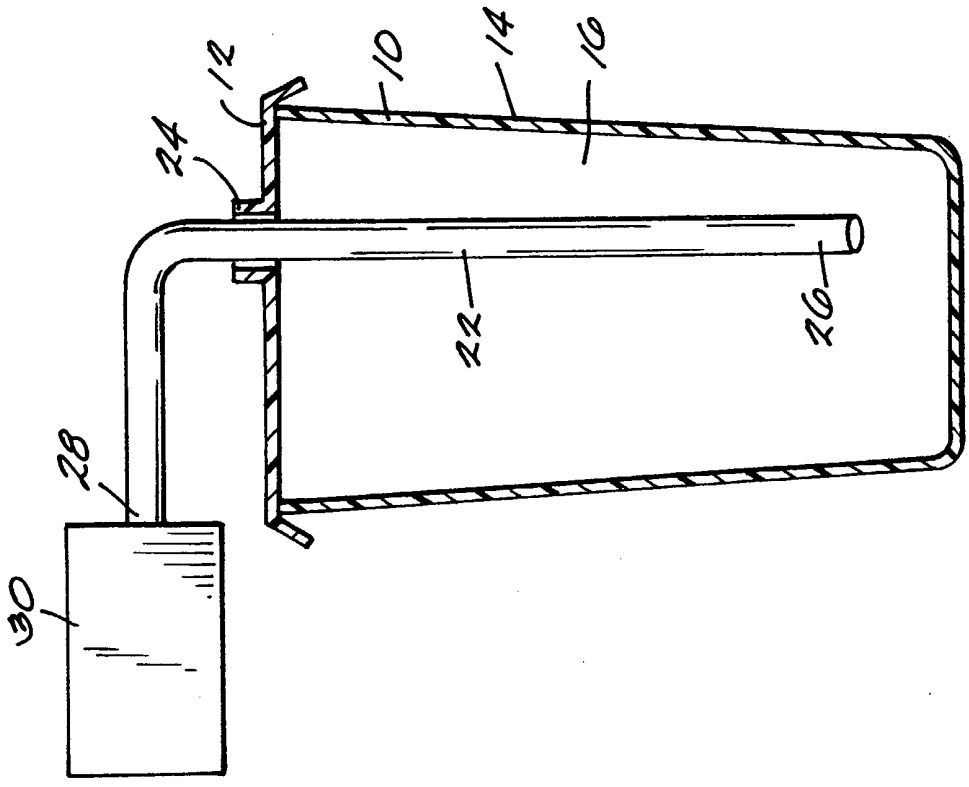


Fig. 2

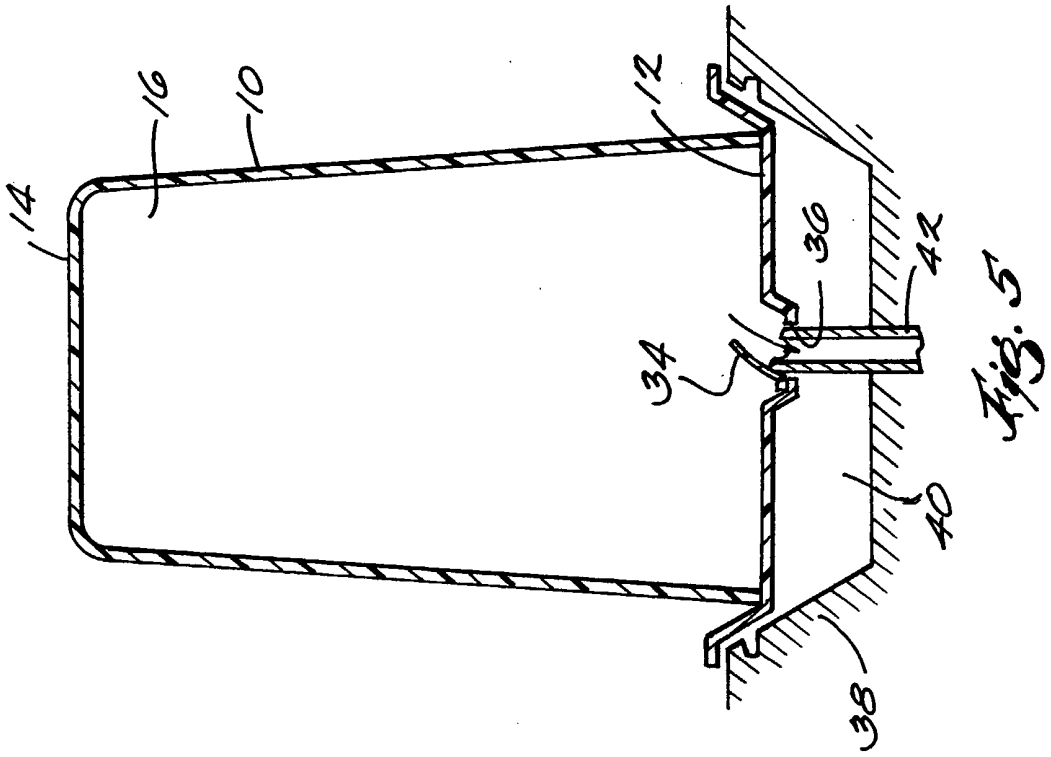


Fig. 5

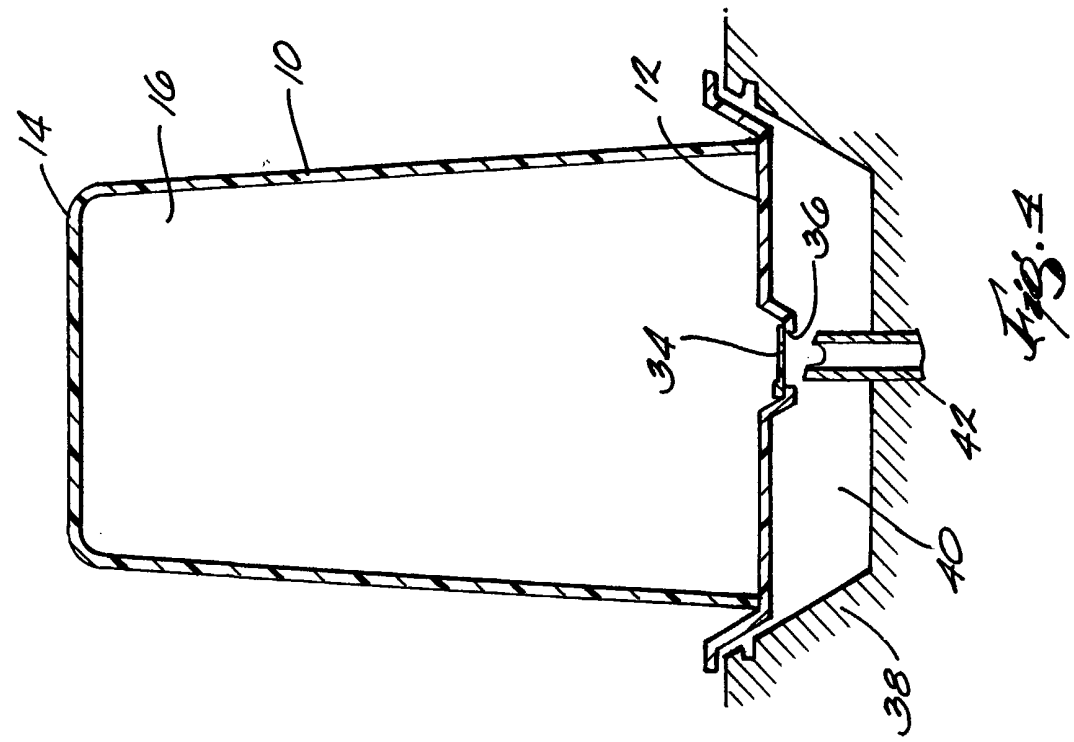


Fig. 4

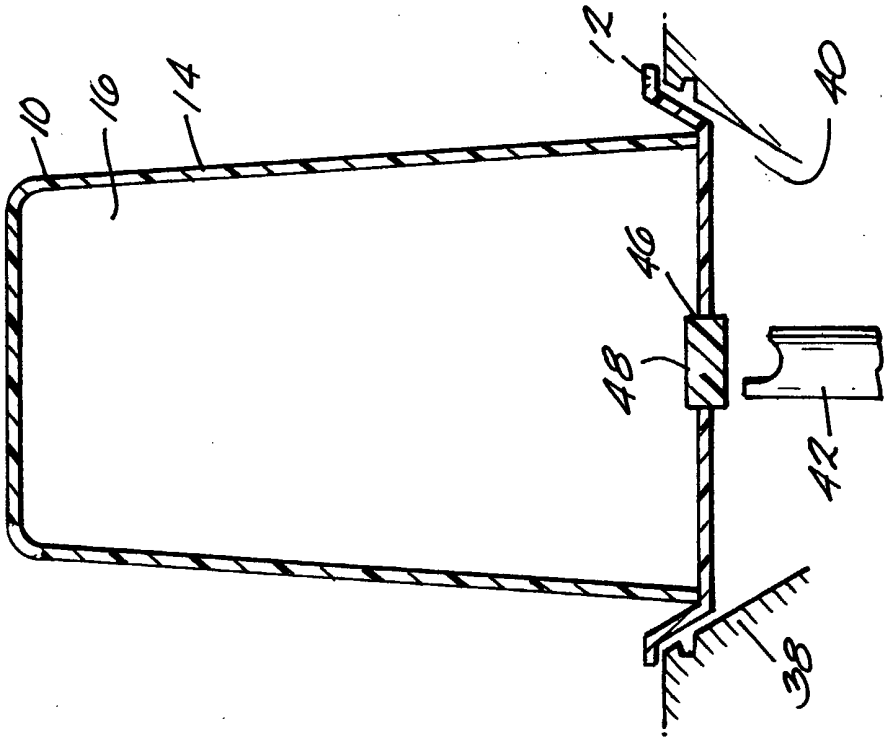


Fig. 4

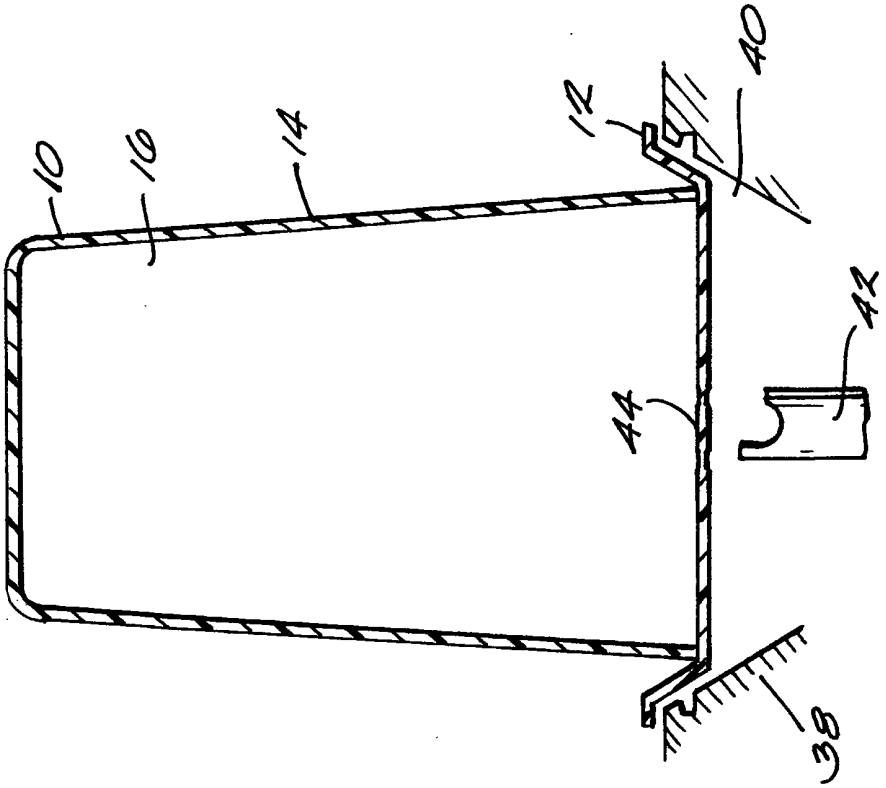


Fig. 6

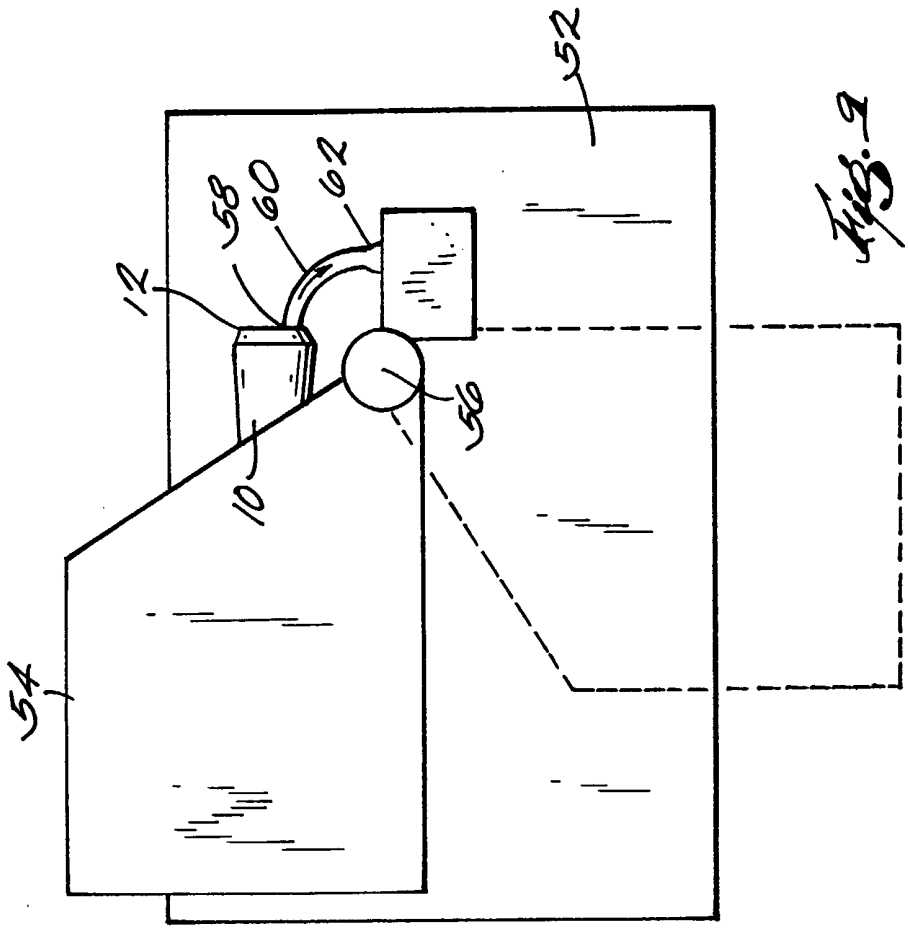


Fig. 9

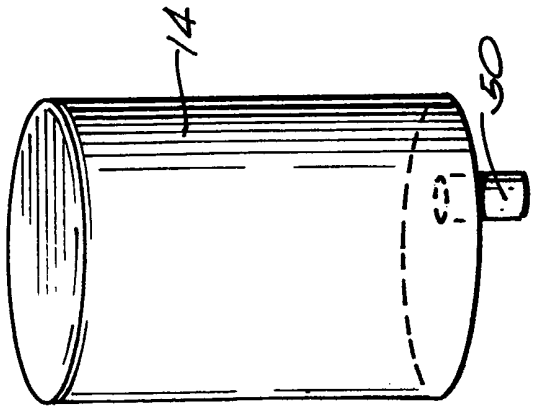


Fig. 8

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US00/08594

A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) :A61M 1/00
US CL :604/317, 319, 320

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)

U.S. : 433/ 91, 92; 604/35, 131, 313, 314, 317, 319, 320;

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)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5,669,892 A (KEOGH et al.) 23 September 1997, col. 3 lines 14-36.	1
Y	US 3,556,101 A (ECONOMOU)) 19 January 1971 , col. 2 lines 18-70.	1
X	US 3,680,560 A (PANNIER, JR. et al.) 01 August 1972, col. 4 lines 18-56.	1
X	US 3,685,517 A (REYNOLDS et al) 22 August 1972, col. 3 lines 13-41.	1
X	US 3,719,197A (PANNIER, JR. et al.) 06 March 1973, col. 6 lines 16-52.	1
X	US 4,321,922 A (DEATON) 30 March 1982, Abstract.	1

[X] Further documents are listed in the continuation of Box C. [ ] See patent family annex.

*	Special categories of cited documents:	"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
"A"	document defining the general state of the art which is not considered to be of particular relevance	"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
"E"	earlier document published on or after the international filing date	"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
"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)	"&"	document member of the same patent family
"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		

Date of the actual completion of the international search 01 JULY 2000	Date of mailing of the international search report 01 AUG 2000
Name and mailing address of the ISA/US Commissioner of Patents and Trademarks Box PCT Washington, D.C. 20231 Facsimile No. (703) 305-3230	Authorized officer MICHELE KIDWELL Telephone No. (703) 308-0858

Form PCT/ISA/210 (second sheet) (July 1998)★

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US00/08594

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 5,185,007 A (MIDDUGH et al) 09 February 1993, col. 2 lines 12-36.	1
Y	US 5,678,564 A (LAWRENCE et al.) 21 October 1997, col. 6 lines 28-42.	1
X	US 4,781,707 A (BOEHRINGER et al.) 01 November 1998, col. 4 lines 3-22.	1
X	US 4,681,571 A (NEHRING) 21 July 1987, col. 4 line 58 to col. 5 line 68.	1