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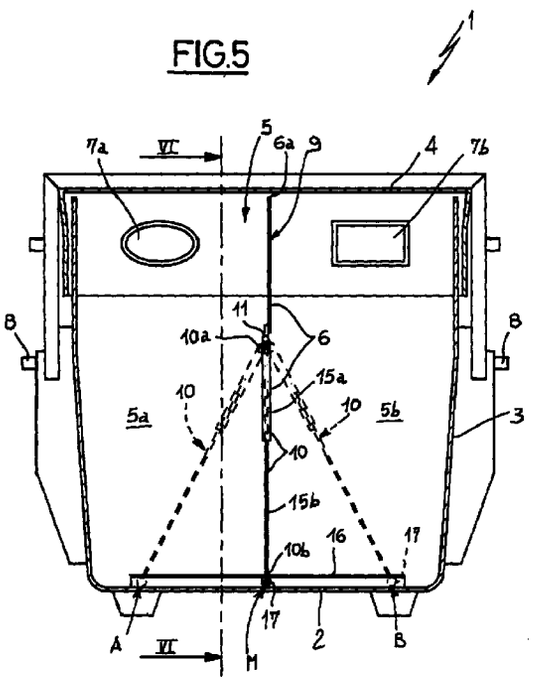
(54) A container for collecting rubbish in a differentiated manner, provided with varying-volume holding chambers

(57) A container for collecting rubbish in a differentiated manner comprises a first and a second holding chamber (5a,5b) separated by a dividing baffle (6) presenting a fixed upper portion (9) and a lower portion (10) able to oscillate around a horizontal axis to modify the volume ratio between the first and the second containment chamber (5a,5b). A cradle element (14) associated to a base wall (2) of the container (1) or extensible connecting organs associated to the movable wall (10) guarantee that the lower edge (10b) of the movable wall (10) is constantly maintained essentially in contact on the base wall (2) to prevent mixing of the waste contained respectively in one and in the other chamber (5a,5b).

FIG.5



EP 0 953 519 A1

Description

[0001] The present invention relates to a container for collecting rubbish in a differentiated manner with varying-volume holding chambers, of the kind comprising the characteristics expressed in the preamble of Claim 1.

[0002] As is well known, the custom and the requirement are becoming more and more consolidated of collecting urban solid waste in a differentiated manner, to favour recycling and/or disposal operations.

[0003] Currently, one of the most widespread practices to perform the differentiated collection of rubbish entails positioning, in certain collection areas, a number of rubbish containers equal to the number of types of waste to be collected.

[0004] Each container is able to be periodically emptied by a vehicle employed for the collection and transport of the waste into tips and/or treatment centres. However, it has been noted that the need to use one container for each type of waste to be collected leads to the requirement to employ urban areas of considerable size, as well as additional problems in logistical terms for the management of the work shifts and of the times required to empty the containers on the vehicles.

[0005] To obviate these problems, rubbish containers have already been proposed, fitted with at least one dividing baffle defining within the container itself two holding chambers each used to receive a specific type of waste.

[0006] Such a container is described for instance in patent EP 718217, in the name of the same Applicant. The container described in that patent, subdivided into two holding chambers by means of a longitudinal baffle, is able to be picked up by a lifting apparatus mounted on a vehicle, and set to operate on grip pins projecting from opposite parts in correspondence with the longitudinal centreline of the container itself, to raise the latter off the ground and empty it by upsetting it into a hopper connected to two different holding spaces provided on the vehicle.

[0007] In a first phase of the emptying process, thanks to the presence of an auxiliary closure element that shuts off one of the two chambers, only one type of waste is discharged into the hopper, to be transferred into one of the holding spaces of the vehicle. Subsequently, the auxiliary closure element is opened as well, and the second type of waste is consequently deposited into the hopper and then transferred and conveyed into the respective holding space.

[0008] Also known are collection systems wherein the different chambers of the rubbish container are emptied simultaneously into collection hoppers which also have two or more chambers divided by separating bulkheads and connected to respective holding spaces.

[0009] The multiple-chamber rubbish containers of the kind described above offer appreciable advantages in relation to the problems associated with occupation of public grounds.

[0010] However, it has been noted that the coexistence of two chambers destined to house the different waste within the same container can easily entail problems for the optimal exploitation of the chambers themselves. Since the production of waste of one or the other type may vary even considerably between different areas of the urban territory, and also according to numerous other factors, hard to foresee and/or quantify, it may easily happen that the capacity of one of the chambers is revealed to be insufficient, whereas the other chamber is only partially filled at the time the container is emptied onto the waste collection vehicle.

[0011] In the attempt to obviate these problems, containers have already been proposed wherein the separation baffle between the two chambers is able to be removably engaged in the container in different position, whereto correspond different volume ratios between the two holding chambers. This solution however is not found suitable to be adopted on containers of the kind employed in combination with automated apparatuses mounted on the collection vehicle, for instance of the kind described in the aforesaid Patent EP 718217 or in Patent EP 776835, also in the name of the same Applicant, which perform all the operations required to pick the container up, empty it and place it back on the ground without requiring any manual intervention on the container itself.

[0012] With the use of such automated apparatuses, it is desirable for the dividing baffle to present a well defined position within the container, so the baffle itself can be brought with its terminal edge in collimation with the dividing bulkhead provided in the waste collecting hopper.

[0013] The object of the present invention is essentially to solve the problems of the prior art, by means of a container wherein the volume ratio between the holding chamber can easily be adapted according to requirements, without entailing problems collimating the dividing baffle with the separating bulkhead which may be provided in the hopper.

[0014] A further object of the invention is to obtain a container which, when the need arises, is able spontaneously to adapt the volume of the holding chamber according to requirements.

[0015] These objects and others besides, which shall become more readily apparent in the course of the present description, are essentially reached by a container for collecting rubbish in a differentiated manner with varying-volume holding chambers, characterised in that it comprises the characteristics expressed in the characterising part of claim 1.

[0016] Additional features and advantages shall become more readily apparent from the detailed description of some preferred, but not exclusive, embodiments of a container for collecting waste in a differentiated manner, according to the present invention. Such description shall be made hereafter with reference

to the accompanying drawings, provided solely by way of non limiting indication, wherein:

- Figure 1 is a longitudinal section, performed according to trace I-I of Figure 2, showing a first embodiment of a container according to the invention;
- Figure 1a shows an enlarged detail of the first embodiment of Figure 1;
- Figure 2 shows a section performed according to trace II-II of Figure 1;
- Figure 3 shows a longitudinal section of a container constructed according to a second embodiment of the invention;
- Figure 4 shows, also in cross section, a third embodiment of the invention;
- Figure 5 is a longitudinal section, performed according to trace V-V of Figure 6, of a fourth embodiment of the invention;
- Figure 6 is a section performed according to trace VI-VI of Figure 5;
- Figure 6a shows an enlarged detail of the fourth embodiment in Figure 6;
- Figure 7 is a longitudinal section, performed according to trace VII-VII of Figure 8, showing a fifth embodiment of the invention;
- Figure 7a shows an enlarged detail of the fifth embodiment in Figure 7;
- Figure 8 is a section performed according to trace VIII-VIII of Figure 7.

[0017] With reference to the aforementioned figures, the number 1 indicates in its entirety a container for collecting rubbish in a differentiated manner, according to the present invention.

[0018] In a way known in itself, the container 1 comprises at least one base wall 2, at least one side wall 3 rising from the perimeter of the base wall 2 and at least one closure element 4 engaged to the side wall 3 to form therewith and with the base wall 2 at least one holding space 5.

[0019] The container 1 internally presents at least one dividing baffle 6 which subdivides the holding space 5 into at least a first holding chamber 5a and at least a second holding chamber 5b destined respectively to receive a first type of waste, for instance glass, and a second type of waste, for instance paper.

[0020] The first and the second type of waste can be inserted through respective insertion openings 7a, 7b provided on the closure element 4, possibly shaped differently from each other and connected respectively to the first and to the second holding chamber 5a, 5b.

[0021] On the outer faces of the side wall 3 are present grip means, comprising for instance grip pins 8 aligned along the longitudinal centreline of the container 1, able to be engaged in a known manner by a lifting and upsetting apparatus (not shown) to empty the waste from the container 1.

[0022] More specifically, in a way known in itself, the emptying operation entails parking a vehicle alongside the container 1 whereupon, by means of the aforesaid lifting apparatus interacting with the grip pins 8 and with the closure element 4, the container itself is upset above a hopper or other collecting element provided on the vehicle itself. The hopper, not shown as it is not relevant to the purposes of the invention, is subdivided by means of an internal bulkhead into at least a first and a second compartment which are able to receive respectively the first type of waste and the second type of waste emptied from the container 1.

[0023] When the container 1 is upset during the emptying phase, the dividing baffle 6 is brought with its upper edge 6a in collimation with a terminal edge of the bulkhead provided in the hopper, thereby assuring the correct routing of the waste in the respective compartments of the hopper.

[0024] In a preferential embodiment, the upper edge 6a of the dividing baffle 6 is obtained on a fixed wall 9 of the dividing baffle itself, and it can be shaped according to a broken line profile, as shown in Figure 2, 6 and 8, or according to an arc, to adapt itself to the conformation of the closure element 4.

[0025] In accordance with the present invention, the dividing baffle 6 presents at least one movable wall 10 which is able to be selectively positioned between a first extreme position and a second extreme position respectively indicated as A and B. Between the first and the second extreme position A, B, the movable wall 10 of the baffle 6 can assume different intermediate positions, indicated for instance as C and C', as well as a median position indicated as M. To each of the extreme positions A, B, intermediate positions C and C' and median position M corresponds a pre-set value of the volume ratio between the first and the second holding chamber 5a, 5b. For instance, in the embodiments shown to the first extreme position A of the movable wall 10 corresponds a first value of the volume ratio, roughly equal to 70/30, whereas to the second extreme position B corresponds a second value of the volume ratio, roughly equal to 30/70.

[0026] In the median position M, the value of the volume ratio corresponds preferably to 50/50.

[0027] Advantageously, in accordance with the present invention, the movable wall 10 is fastened in oscillatory engagement, in proximity with its upper terminal edge 10a, according to an essentially horizontal axis of oscillation X-X inside the space 5, and it is able to be oriented around its own constraining axis X-X to assume the different operative positions A, B, C, C' and M.

[0028] The fact that the movable wall 10 is in oscillatory engagement in correspondence with or anyway in proximity to its top edge 10a, causes the different positions assumed by it not to modify substantially the position of the top edge 6a of the dividing baffle 6. This holds true also in the case wherein, in the absence of the fixed

wall 9 extending above the upper terminal edge of the movable wall 10, the upper edge 6a of the dividing baffle 6 comprises the same upper terminal edge 10a of the movable wall 10.

[0029] The top edge 10a of the movable wall 10 can be fastened by means of one or more hinges 11 operatively engaged between the terminal edge itself and a lower edge of the fixed wall 9, as can be seen in the embodiment as per Figures 1 through 4. Alternatively, to the upper terminal edge 10a of the movable wall can be associated a pair of constraining pins 12 projecting laterally from opposite parts according to a horizontal axis and engaging in respective seats obtained in the opposite sides of the side wall 3 of the container 1, as provided for in the embodiment as per Figures 5 and 6.

[0030] An additional embodiment, shown in Figures 7 and 8, calls for the presence of at least one flexible portion 13 made of elastomeric material (shown more clearly in Figure 7a) engaged between the upper terminal edge 10a of the movable wall 10 and the lower edge of the fixed wall 9.

[0031] Upon movement of the movable wall 10 around its respective axis of oscillation X-X, the lower terminal edge 10b of the movable wall itself tends to describe an arc trajectory, concentric to the axis of oscillation itself. In this situation, the lower edge 10b of the movable wall 10 tends to modify its distance from the base wall 2 of the container 1. To prevent these distance variations from placing the holding chambers 5a, 5b in mutual communication, with consequent mixing of the different types of waste, to the dividing baffle 6 are associated compensation means to neutralise the aforesaid distance variations between the base wall 2 and the lower terminal edge 10b of the movable wall 10.

[0032] In the embodiments as per Figures 1, 2 and 3 such compensation means essentially comprise a cradle element 14 associated to the base wall 2 and extending along a profile arched concentrically to the axis of oscillation X-X of the movable wall 10. The lower terminal edge 10b of the movable wall 10 ends in proximity to the cradle element 14 in such a way as constantly to ensure the complete obstruction of the passage of waste from one to the other holding chamber 5a, 5b.

[0033] It should be noted that the cradle element 14 can be obtained directly in the base wall 2 itself, suitably shaped for this purpose when the container 1 is manufactured.

[0034] Alternatively or additionally to the cradle element 14, the compensation means can comprise extensible connecting organs operatively associated to the movable wall 10 to adapt the distance of the lower terminal edge 10b thereof in such a way as to maintain the terminal edge itself in proximity to the base wall 2. In the embodiments shown in Figures 4, 5 and 6, the extensible connecting organs provide for the movable wall 10 essentially to comprise a guide portion 15a fastened in the holding space 5 of the container 1 according to the axis of oscillation X-X, and engaging in telescoping fashion a sliding portion 15b bearing the lower terminal edge 10b.

[0035] In order to ease the motion of the lower terminal edge 10b on the base wall 2, and to aid the sliding portion 15b in sliding correctly with respect to the guide portion 15a, to the base wall 2 can be integrally associated one or more guide elements 16 each of which cooperates with a respective roller or other sliding element 17 engaged to the lower terminal edge 10b of the movable wall 10, thereby maintaining the terminal edge itself in proximity to the base wall 2. For this purpose, each guide element 16 can be constituted for instance by a U, C or L section bar, and the sliding element can in turn be constituted by a roller 17 possibly made of self-lubricating material slidingly guided below a horizontal wing of the section bar itself, as shown in Figure 6a.

[0036] Alternatively, each guide element 16 can be constituted by a bar, preferably with tubular cross section, suspended at a short distance above the base wall 2 and presenting respective ends bent at right angles and fastened on the base wall itself. In this case each sliding roller 17 can act in contact on the respective guide element 16 by means of a rolling surface with concave profile.

[0037] Elastic return means can be provided, able to contrast elastically the motion of the dividing baffle 6 from the median position M, in such a way that the baffle itself is automatically brought back to the median position M once the waste has been emptied from the container 1. In the presence of guide elements 16 and sliding elements 17 similar to the description provided with reference to Figure 6a, the elastic return means can comprise springs 15c operating between the guide portion 15a and the sliding portion 15b.

[0038] In the embodiment represented in Figures 7 and 8, the extensible connecting organs essentially comprise the aforementioned flexible portion 13. For this purpose, the flexible portion 13 extends along a profile with undulated development, so as to be able easily to modify its extension in the plane of development of the movable wall 10 to maintain the lower terminal edge 10b thereof essentially in contact relationship on the base wall 2.

[0039] Thanks to the elastic behaviour of the material whereof it is made, the flexible portion 13 can also perform the function of the aforesaid elastic return means to bring the dividing baffle 6 automatically back into the median position M.

[0040] In accordance with an additional characteristic of the invention, to the movable wall 10 can be associated locking means to fix removably the movable wall itself selectively in any one of the positions between the first and the second extreme positions A, B.

[0041] As shown in Figures 1, 2, 4, 7 and 8, and more in detail in Figure 1a such locking means can for instance comprise one or more latches 18 able to be

inserted removably, possibly by effect of a spring or equivalent elastic means, into respective coupling seats 19 associated to the base wall 2. In particular the coupling seats 19, to each of which corresponds one of the operative positions A, B, C, C', can be obtained directly in the base wall 2, as in the examples shown in Figures 4, 7 and 8, or they can be obtained in the cradle element 14, as in the example shown in Figures 1 and 2.

[0042] Each latch 18 can also present a latching portion 18a able to be engaged manually or with the aid of a suitable tool by an operator to disengage the latch itself form the coupling seat 19 and allow the displacement of the movable wall 10 into a different operative position, whereto shall correspond the engagement of the latch itself in a respective coupling seat 19.

[0043] Alternatively to the employment of the locking means 18, 19, the movable wall 10 can be able to oscillate freely between the first and the second extreme position A, B to adapt the volume ratio automatically between the first and the second chamber 5a, 5b according to the quantities of waste of one or of the other type placed respectively in one or in the other chamber. The movable wall 10 can be displaced towards one or the other of the extreme positions A, B under the thrust imparted as an effect of the weight of the material accumulated in one or the other holding chamber 5a, 5b.

[0044] In this situation, on the cradle element 14 possibly associated to the base wall 2, are preferably combined limit stop elements 20 able to interfere with the movable wall 10 to limit its oscillation respectively in correspondence with the first and with the second extreme position A, B. This contrivance has the purpose of preventing the movable wall 10 from taking its lower terminal edge 10b beyond the end of the cradle element 14, thereby placing the first and the second chamber 5a, 5b in mutual communication.

[0045] Naturally, nothing prohibits the use of limit stop elements 20 also in the presence of locking means 18, 19, and/or in the absence of the cradle element 14.

[0046] Both in the presence and in the absence of the cradle element 14, the spontaneous displacement of the movable wall 10 can be favoured by providing guide elements 16 and roller sliding elements 17 similar to the description provided with reference to Figures 5 and 6.

[0047] The present invention thus attains the proposed objects. The contrivances proposed by the invention allow to obtain the adaptability of the volume ratio of the holding chambers of a container employable in combination with apparatuses with fully automated operation, without such volume adaptability thereby entailing any additional problem connected with emptying the container.

[0048] The invention also allows, when required, a spontaneous adaptation of the volume of the holding chambers 5a, 5b.

[0049] It should also be noted that the subject container can be constructed without entailing appreciable increases in manufacturing costs with respect to traditional containers.

Claims

1. Container for collecting rubbish in a differentiated manner with varying-volume holding chambers comprising:

   - at least one base wall (2), at least one lateral wall (3) rising from the perimeter of the base wall (2) and at least one closure element (4) engaged to the lateral wall (3) to form therewith and with the base wall (2) at least one holding space (5);
   - at least one dividing baffle (6) positioned inside the holding space (5) to define therein at least a first holding chamber (5a) and at least a second holding chamber (5b), said dividing baffle comprising at least one movable wall (10) able to be selectively positioned between a first extreme position (A) whereto corresponds a first value of volume ratio between the first containment chamber (5b), and a second extreme position (B) wherein said volume ratio presents a second value different from the first;
   - grip means (8) able to be operatively engaged by a lifting and upsetting apparatus to determine the emptying of waste from the holding chambers (5a, 5b),

   characterised in that said movable wall is fastened in oscillatory manner in proximity to its upper terminal edge (10a) according to a horizontal axis of oscillation, so that the position of an upper terminal edge (6a) of the dividing baffle (6) remains essentially unchanged upon the motion of the movable wall (10) between said first and second extreme positions (A,B).

2. Container according to claim 1, further comprising compensating means (13,14,15) to neutralise distance variations between the base wall (2) and a lower terminal edge (10b) of said movable wall (10) following the displacement thereof between the first and the second extreme position (A,B).

3. Container according to claim 2, wherein said compensating means comprise at least one cradle element (14) associated to the base wall (2) and extending according to a profile arched concentrically to the axis of oscillation of said movable wall (10), the lower terminal edge (10b) thereof ending in proximity to the cradle element (14).

4. Container according to claim 2, wherein said compensating means comprise extensible connecting organs (13,15) operatively associated to said movable wall (10) to maintain the lower terminal edge

(10b) thereof in correspondence with said base wall (2) adapting its distance from the axis of oscillation.

5. Container according to claim 4, wherein said extensible connecting organs comprise a guide portion (15a) fastened in the holding space (5) according to said axis of oscillation and engaging in telescoping fashion a sliding portion (15b) bearing said lower terminal edge (10b) of the movable wall (10).

6. Container according to claim 5, further comprising at least one guide element (16) integral to said base wall (2) and co-operating with at least one sliding element (17) engaged to the lower terminal edge (10b) of the movable wall (10) of the dividing baffle (6) to maintain the lower terminal edge itself at a predetermined distance from the base wall (2).

7. Container according to claim 4, wherein said extensible connecting organs comprise a flexible portion (13) made of elastomeric material extending according to an undulated profile between said movable wall (10) and a fixed wall (9) of the dividing baffle (6), extending upwards from the axis of oscillation of the movable wall (10)

8. Container according to claim 1, further comprising locking means (18) to fasten removably the movable wall (10) of the dividing baffle (6) selectively in a position chosen between said first and second extreme position (A,B).

9. Container according to claim 8, wherein said locking means comprise at least one latch (18) able to be removably inserted into coupling seats (19) associated to said base wall (2), each in correspondence with one of the fastening positions of the movable wall (10).

10. Container according to claim 1, wherein the movable wall (10) of the dividing baffle (6) is able to translate freely around said axis of oscillation.

11. Container according to claim 10, further comprising at least one guide element (16) integral to said base wall (2) and co-operating with at least one sliding roller (17) engaged to the lower terminal edge of the movable wall (10) of the dividing baffle (6).

12. Container according to claims 3 and 10, further comprising limit stop elements (20) associated to said cradle element (14) and set to interfere with the lower terminal edge (10b) of the movable wall (10) to limit its oscillation between the first and the second extreme position (A,B).

13. Container according to claim 10, further comprising elastic return means (15c) acting in contrast to the motion of the dividing baffle (6) away from a median position

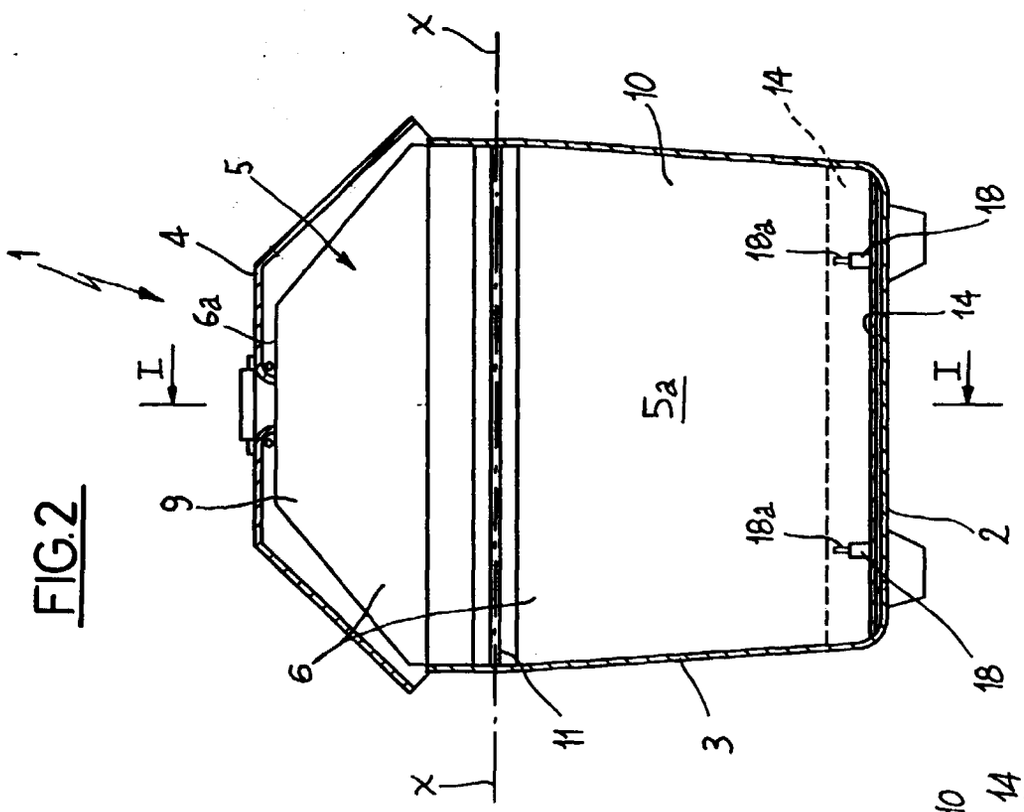


FIG.2

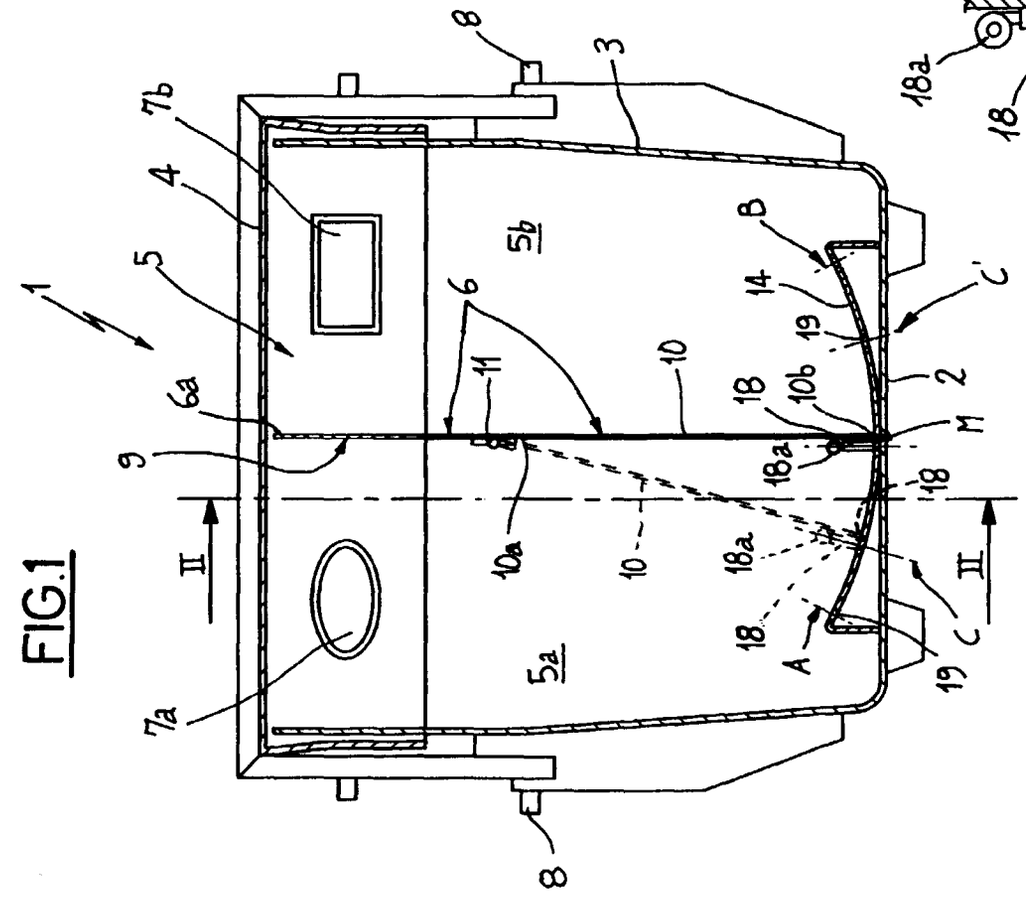


FIG.1

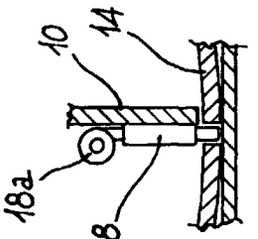


FIG.1a

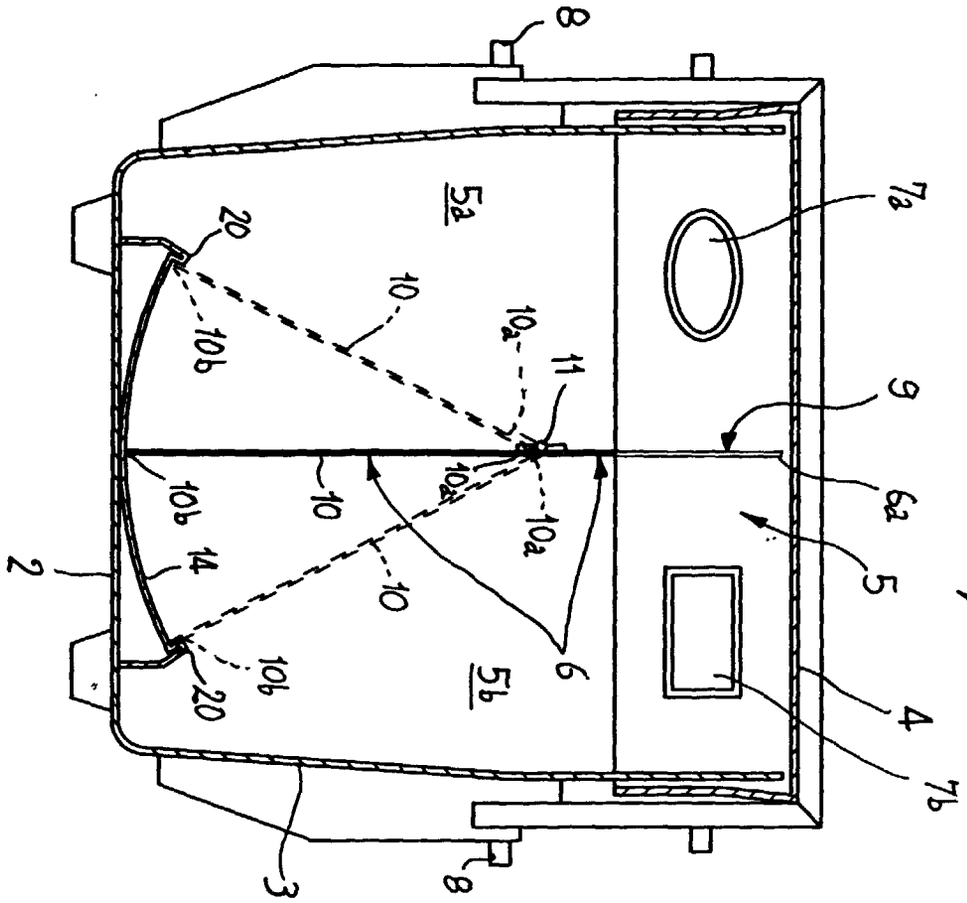

8
7a
5a
20
10
10b
10a
11
9
6a
5
10
10a
10b
14
2
10
6
20
10b
5b
4
7b
3
8

FIG.3

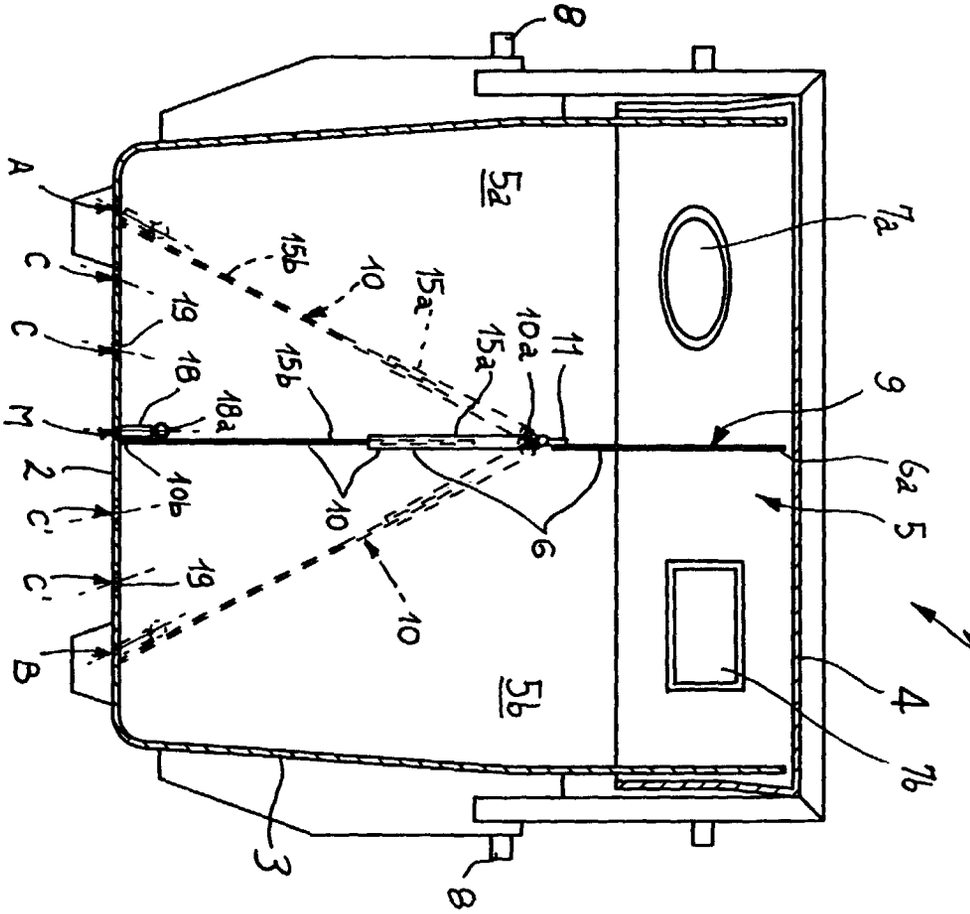

8
A
5a
7a
15b
10
15a
C
19
C
18
15b
10a
11
9
M
18a
6a
2
10b
5
C'
10
6
C'
19
10
B
5b
4
7b
3
8

FIG.4

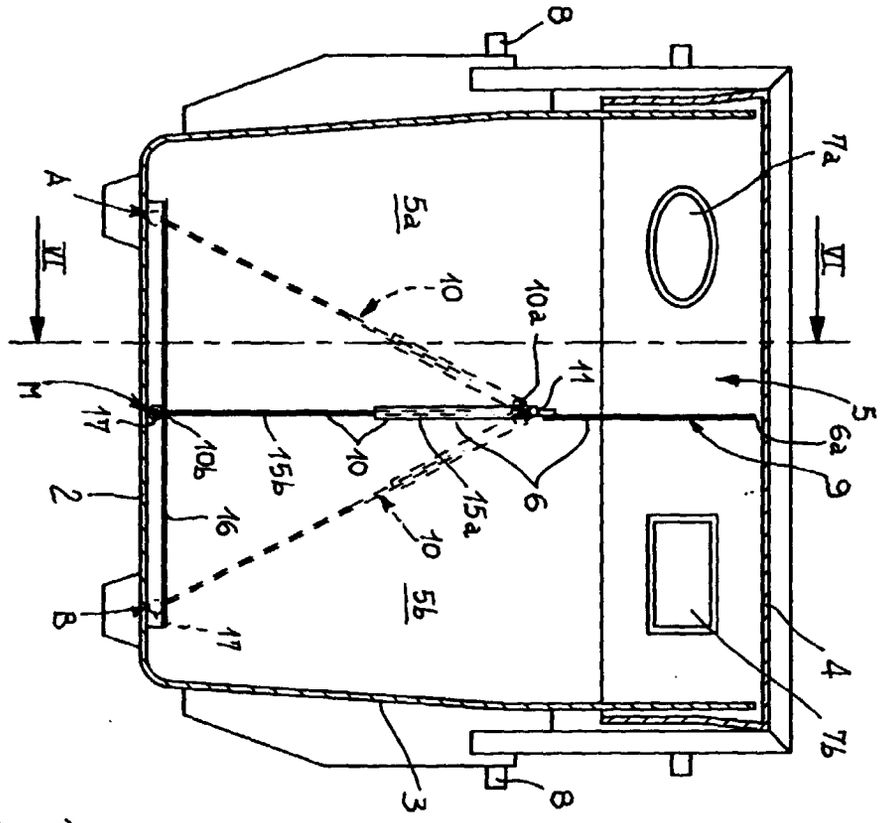


FIG.5

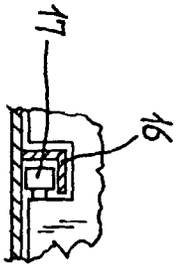


FIG.6a

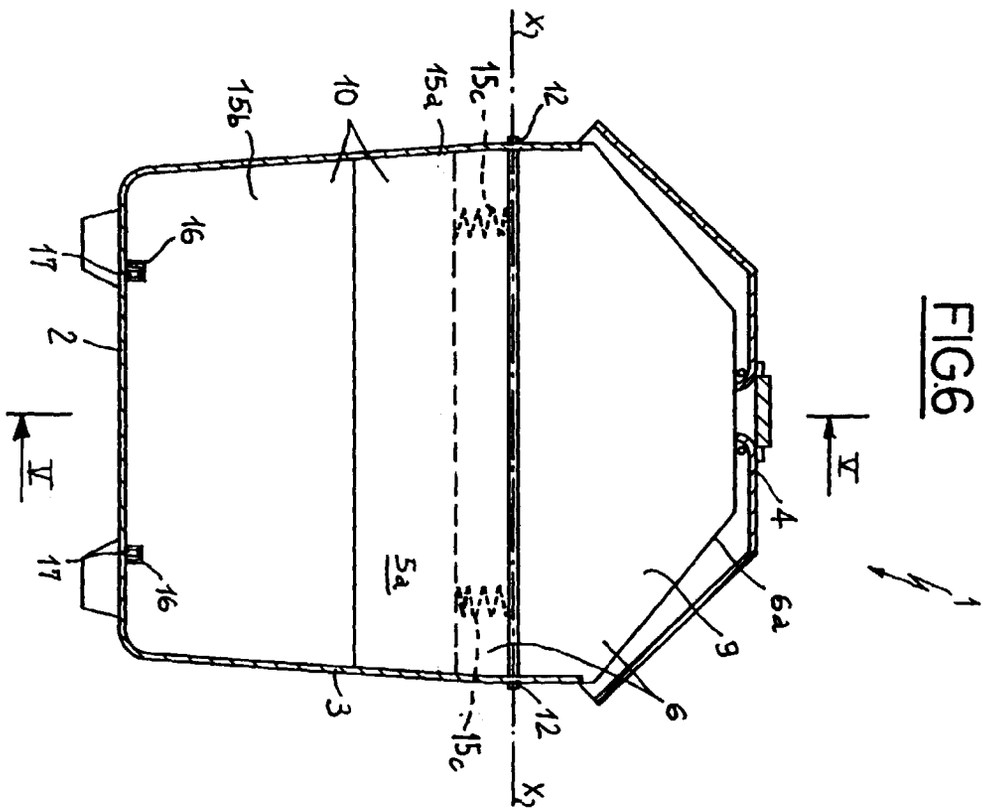


FIG.6

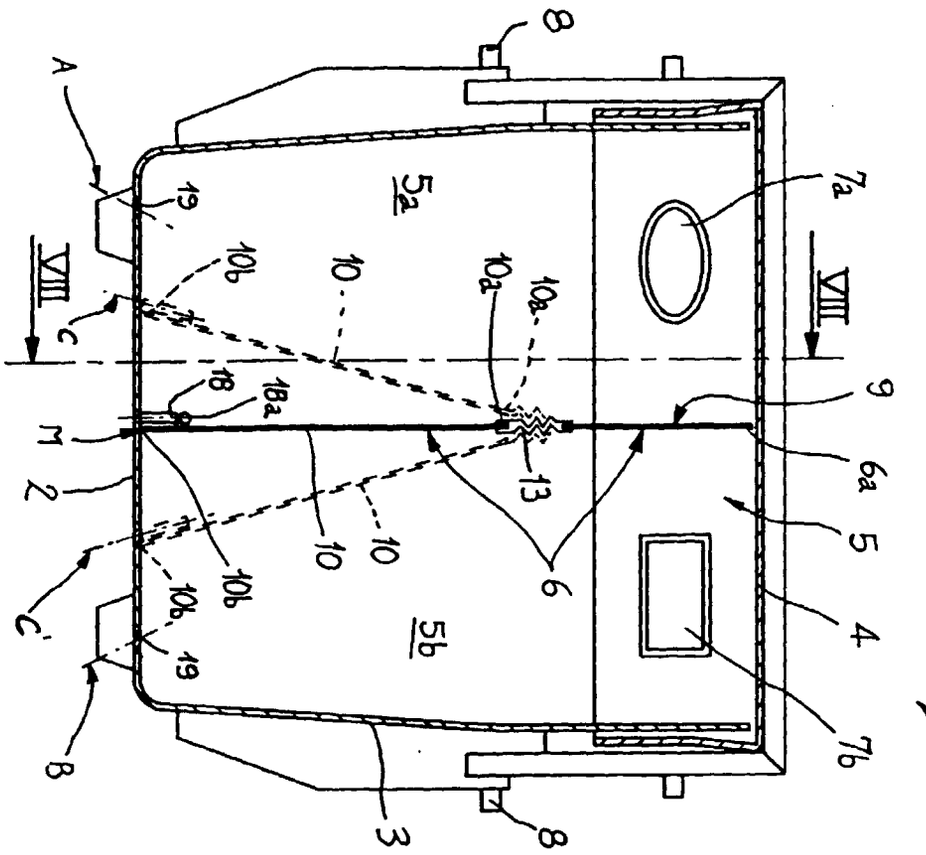


FIG.7

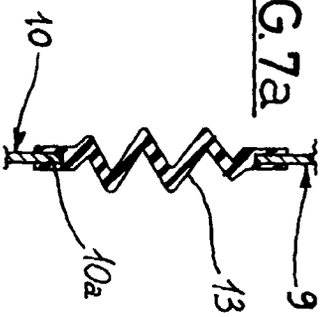


FIG.7a

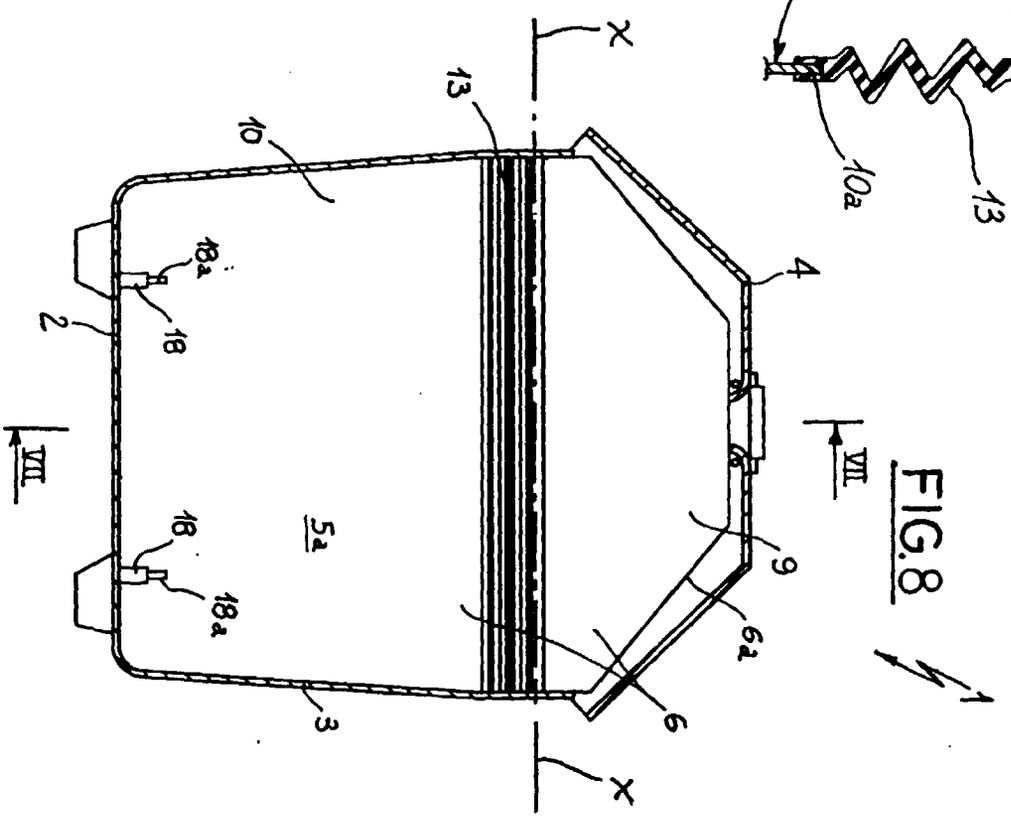


FIG.8

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 98 83 0255

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
Y	EP 0 574 374 A (BROSOWITSCH JOSEF) 15 December 1993 * column 1, line 35 - line 49 * * column 3, line 8 - line 19 * * column 4, line 3 - line 6 * * column 4, line 54; figure 1 *	1-3,8, 10,12	B65F1/00
Y	EP 0 713 833 A (KANN MFG CORP) 29 May 1996 * column 4, line 48 - line 54; figure 1 *	1-3,8, 10,12	
A	EP 0 180 874 A (BOCK NORMAN) 14 May 1986 * column 10, line 34 - line 43; figure 10 *	1	
			TECHNICAL FIELDS SEARCHED (Int.Cl.6)
			B65F

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	11 September 1998	Martínez Navarro, A.

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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L : document cited for other reasons

& : member of the same patent family, corresponding document

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