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(54) **Insertion column for a bulk material container**

(57) Insertion column (1) placeable on a cover (2) of a container for bulk material round an inlet opening (3) in this cover (2) for the purpose of providing an inlet channel debouching above this inlet opening (3), which column (1) is provided with a closing flap (4) and a movable drum (7,26,8,15) which is open on one side and coupled to the closing flap (4) in a manner such that, when the closing flap (4) is opened, the open side of the drum (7,26,8,15) is directed toward an opening left clear by the closing flap (4) and, when the closing flap (4) is closed, the open side is directed toward the inlet opening (3) in the cover (2) of the container, wherein the drum (7,26,8,15) is suspended for rotation through a first angle (ϕ_1) in a yoke (5,27) coupled pivotally to the column (1) and tiltable between a first position and a second position.

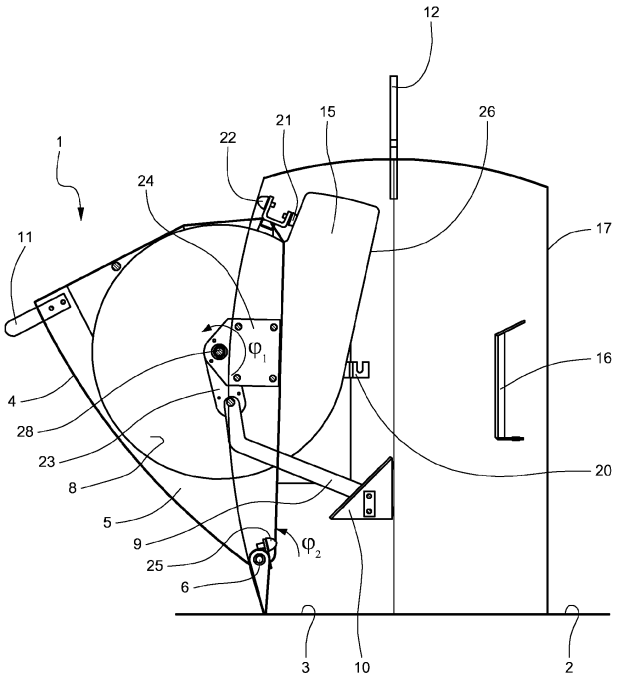

Fig. 6

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Description

[0001] The invention relates to an insertion column placeable on a cover of a container for bulk material round an inlet opening in this cover for the purpose of providing an inlet channel debouching above this inlet opening, which column is provided with a closing flap and a movable drum which is open on one side and coupled to the closing flap in a manner such that, when the closing flap is opened, the open side of the drum is directed toward an opening left clear by the closing flap and, when the closing flap is closed, the open side is directed toward the inlet opening in the cover of the container.

[0002] Such a column is for instance applied as insertion column on an underground waste container, wherein the closing flap can be opened for insertion of domestic waste by an authorized user, for instance after identification by means of a PIN card.

[0003] Known from the Netherlands patent publication NL-1005958-C is an insertion column wherein a drum is tiltably suspended from a fixed yoke and coupled to a closing flap using an operating rod pivotable about two points.

[0004] After opening of the closing flap the drum in the known insertion column is directed tilted in horizontal position toward the user, who requires two hands to be able to deposit for instance a refuse bag in the drum and here risks dirtying his/her hands on the inner wall of the drum. This can result in ergonomically and hygienically undesirable situations.

[0005] In the known insertion column there is also the option of depositing in the insertion column objects of small size or objects with a small cross-section but with a great length, which objects then come to lie alongside the drum in the container via the inlet channel and the opening in the cover. This so-called bypass tipping involves the risk of the insertion column becoming blocked and moreover goes against the principle that a quantity of bulk material set within determined limits, for instance one refuse bag with content, can be deposited at a time into the column when the closing flap is opened. Each time the closing flap is opened can be recorded by means of the PIN card, for instance with a view to cost to be charged.

[0006] It is an object of the invention to provide an insertion column, of which the open side of the drum, after opening of the closing flap, is directed toward the user such that he/she can deposit bulk material in the drum by allowing it to drop therein, without the bulk material having to be pressed or pushed in a horizontal movement into the drum.

[0007] It is a further object to provide an insertion column wherein it is not possible to deposit bulk material into the container alongside the drum when the closing flap is wholly or partially opened.

[0008] The insertion column must be of simple construction and maintenance-friendly, and a user must be able to operate it in ergonomically and hygienically responsible manner.

[0009] These objects are achieved, and other advantages gained, with an insertion column of the type specified in the preamble, wherein according to the invention the drum is suspended for rotation through a first angle (φ_1) in a yoke coupled pivotally to the column and tiltable between a first position and a second position, wherein in the first position the closing flap is closed, the yoke and the drum are situated wholly inside the column and in operative mode the open side of the drum is directed substantially toward the inlet opening in the cover of the container, and in the second position the closing flap is opened, the yoke and the drum are situated at least partially outside the column and in operative mode the open side of the drum is directed substantially upward.

[0010] In an insertion column according to the invention the drum is pulled partially out of the column in the second position of the yoke and into the space created between the opened closing flap and the column. By suspending the drum in the yoke such that in the first position of the yoke it is directed with the open side in operative mode substantially toward the inlet opening in the container, a suitably chosen value of the first angle (φ1) can achieve that in operative mode the drum is directed substantially with its open side upward in the second position.

[0011] The word "substantially" indicates that a drum whose open side is directed obliquely downward or upward in the first or second position must likewise be deemed to fall within the inventive concept.

[0012] In an embodiment of an insertion column according to the invention the drum is formed by two substantially circular side walls, between which is received a substantially semi-cylindrical jacket which is connected along corresponding parts of the periphery of the side walls to these side walls.

[0013] "Substantially circular side walls" must also be understood to mean side walls whose periphery approximates a circle, such as regular or irregular polygons, and "a substantially semi-cylindrical jacket" must also be understood to mean a jacket having in cross-section the form of a regular or irregular polygon which approximates the form of a semicircle.

[0014] In a practically advantageous embodiment the circular side walls are each provided with a tangential side piece extending upward in the first position, between which respective side pieces is received a lengthened bottom part extending tangentially from the cylinder jacket.

[0015] The side pieces and the lengthened bottom part together form a channel extending from the drum. In the first position the channel is directed toward the inlet opening in the container and the channel functions as slide chute for the bulk material falling from the drum into the container. In the second position of the yoke this channel blocks the direct access to the interior of the column via the opening in the column left clear by the inlet flap, and thereby further prevents bypass tipping.

[0016] In an embodiment the column has from its up-

right side opposite the closing flap a narrowing directed toward the drum.

[0017] Owing to this narrowing the space between the drum and said upright side is minimized, whereby bypass tipping is further prevented.

[0018] In order to bring about the rotation of the drum between the first and the second position, at least one of the side walls in an insertion column according to the invention is for instance coupled pivotally on its outer side to a drive rod coupled pivotally to a fixed part of the column.

[0019] In a practically advantageous embodiment the yoke is formed by a pair of plates coupled fixedly to each other.

[0020] With plates of suitable shape and dimensions the space created when the closing flap is opened between this flap and the column can be covered.

[0021] The plates take for instance substantially the form of a triangle, one corner of which is directed downward in operative mode.

[0022] In an embodiment of an insertion column according to the invention the yoke and the closing flap are tiltable through a second angle (φ_2) about a shared shaft on their underside.

[0023] In such an insertion column the sum of the first angle (φ_1) and the second angle (φ_2) lies for instance in the range $150°<((\varphi_1+(\varphi_2)<180°$.

[0024] The second angle (φ_2) lies for instance in the range $30°<\varphi_2<50°$.

[0025] The second angle (φ_2) amounts more particularly to about 40°.

[0026] In an embodiment in which the yoke and the closing flap are tiltable about a shared shaft on their underside the yoke is preferably formed by a pair of plates which are coupled at corresponding edges to the closing flap.

[0027] In order to facilitate the tilting by the user of the yoke with the drum suspended therein, the yoke is preferably coupled to a fixed part of the column by means of at least one spring.

[0028] The invention will be elucidated hereinbelow on the basis of an exemplary embodiment, with reference to the drawings.

[0029] In the drawings

Fig. 1 is a cut-away perspective top view of an embodiment of an insertion column according to the invention in the first position,

Fig. 2 is a cut-away perspective first side view of the insertion column shown in fig. 1 in the first position,

Fig. 3 is a second side view of the insertion column shown in fig. 1 in the first position,

Fig. 4 is a cut-away perspective top view of the insertion column shown in fig. 1 in the second position,

Fig. 5 is a cut-away perspective first side view of the insertion column shown in fig. 1 in the second position, and

Fig. 6 is a second side view of the insertion column shown in fig. 1 in the second position.

[0030] Corresponding components are designated in the figures with the same reference numerals.

[0031] Fig. 1 shows an insertion column 1 placed on cover 2 of an underground waste container (not shown) round an inlet opening 3 in this cover 2. Column 1 is closed by a closing flap 4 which is fixedly connected on both its side edges to respective triangular side plates 5, one corner of which is directed downward. Side plates 5 are rigidly coupled at their rear corner by a connecting beam 27. Closing flap 4 and side plates 5 together form a yoke which is coupled on its underside for tilting about a shared shaft 6 which is bearing-mounted in a fixed part in the underside of column 1, wherein a drum 7 is suspended rotatably in the yoke. Drum 7 is pivotally coupled on its side walls 8 to respective drive rods 9, which are each pivotally coupled to a fixed coupling point 10 in column 1. The figure also shows a handle 11 on closing flap 4, a passage opening 14 in the upper side of column 1, above which a box with equipment for access control (including a PIN code reader) can be placed, and a beam 12 with lifting eye 13 with which column 1, cover 2 and the waste container sunk into the ground and connected thereto can be hoisted upward.

[0032] Fig. 2 shows a perspective view of column 1 from the left-hand side, with a circular side wall 8 and a tangential side piece 15, which in the shown closed position of closing flap 4 is directed downward toward inlet opening 3 in cover 2 of the container. The figure also shows a profile 16 against rear wall 17 of column 1 which forms a narrowing directed toward drum 8, wherein the space between drum 8 and profile 16 is minimal, whereby bypass tipping of loose articles behind the drum is made impossible. The shown side plate 5 is coupled pivotally to a draw spring 9 which is coupled pivotally to a fixed coupling point 20 in column 1. Placed close to the rearmost corner of triangular plates 5 (on the left in the figure) are rubber buffers 21, 22 which, during respective closing and opening of closing flap 4, support on respectively profile 16 and front wall 18 and thus damp sound and impacts.

[0033] Fig. 3 shows a right-hand side view of column 1 with, in addition to the above stated components on side wall 8 of the drum, a coupling plate 23 which is mounted rigidly thereon and which is coupled pivotally to drive rod 9, a bearing 24 for a shaft 28 mounted rigidly against triangular plate 5, and a third rubber buffer 25 at the bottom on the front side of column 1, against which the lengthened bottom part 26 of the drum supports when closing flap 4 is closed. Triangular plates 5, which are coupled rigidly to closing flap 4 and connecting beam 27 (shown in fig. 1), form a tiltable yoke in which the drum (with side walls 8, side pieces 15, semi-cylindrical bottom and tangential bottom part 26) is received for rotation about shaft 28.

[0034] Fig. 4 shows insertion column 1 with opened closing flap 4 from the same angle as in fig. 1. In addition

to the above stated components, the figure shows the semi-cylindrical bottom of drum 7, which transposes into the tangential bottom part 26 which closes the direct access via the drum to inlet opening 3.

[0035] Fig. 5 shows a perspective view from the left-hand side of column 1 with opened closing flap 4.

[0036] Fig. 6 shows a right-hand side view of column 1 with opened closing flap 4.

[0037] The operation of the insertion column can be understood by comparing figures 3 and 6. When closing flap 4 is closed (fig. 3), the open side of the drum, and particularly the channel formed by side pieces 15 and the tangential bottom part 26, is directed toward inlet opening 3 in cover 2 of the container, and just before closing flap 4 is closed the channel functions as slide chute for the bulk material falling out of the drum. When closing flap 4 is opened (fig. 6), the channel formed by side pieces 15 and the tangential bottom part 26 is directed upward and this channel closes the direct access via the drum to inlet opening 3. Closing flap 4 is opened from its closed position by pulling handle 11, wherein closing flap 4 and side walls 5 are tilted about pivot shaft 6 through an angle φ_2 of about 40°. During this tilting movement the drum 8, 26 is forced by drive rod 9 to perform a rotating movement about shaft 28 over an angle φ_1 of about 120°, so that the overall angle (φ_1+φ_2) through which the drum rotates relative to the fixed world amounts to about 160°.

Claims

1. Insertion column (1) placeable on a cover (2) of a container for bulk material round an inlet opening (3) in this cover (2) for the purpose of providing an inlet channel debouching above this inlet opening (3), which column (1) is provided with a closing flap (4) and a movable drum (7, 26, 8, 15) which is open on one side and coupled to the closing flap (4) in a manner such that, when the closing flap (4) is opened, the open side of the drum (7, 26, 8, 15) is directed toward an opening left clear by the closing flap (4) and, when the closing flap (4) is closed, the open side is directed toward the inlet opening (3) in the cover (2) of the container, **characterized in that** the drum (7, 26, 8, 15) is suspended for rotation through a first angle (φ_1) in a yoke (5, 27) coupled pivotally to the column (1) and tiltable between a first position and a second position, wherein in the first position the closing flap (4) is closed, the yoke (5, 27) and the drum (7, 26, 8, 15) are situated wholly inside the column (1) and in operative mode the open side of the drum (7, 26, 8, 15) is directed substantially toward the inlet opening (3) in the cover (2) of the container, and in the second position the closing flap (4) is opened, the yoke (5, 27) and the drum (7, 26, 8, 15) are situated at least partially outside the column (1) and in operative mode the open side of the drum (7, 26, 8, 15) is directed substantially upward.

2. Insertion column (1) as claimed in claim 1, **characterized in that** the drum is formed by two substantially circular side walls (8), between which is received a substantially semi-cylindrical jacket (7) which is connected along corresponding parts of the periphery of the side walls (8) to these side walls (8).

3. Insertion column (1) as claimed in claim 2, **characterized in that** the circular side walls (8) are each provided with a tangential side piece (15) extending upward in the first position, between which respective side pieces (15) is received a lengthened bottom part (26) extending tangentially from the cylinder jacket (7).

4. Insertion column (1) as claimed in claim 3, **characterized in that** it has from its upright side (17) opposite the closing flap (4) a narrowing (16) directed toward the drum (7, 26, 8, 15).

5. Insertion column (1) as claimed in any of the claims 2-4, **characterized in that** at least one of the side walls (8) of the drum (7, 26, 8, 15) is coupled pivotally on its outer side to a drive rod (9) coupled pivotally to a fixed part (10) of the column (1) .

6. Insertion column (1) as claimed in any of the claims 1-5, **characterized in that** the yoke is formed by a pair of plates (5) coupled fixedly to each other.

7. Insertion column (1) as claimed in claim 6, **characterized in that** the plates (5) take substantially the form of a triangle, one corner of which is directed downward in operative mode.

8. Insertion column (1) as claimed in any of the claims 1-7, **characterized in that** the yoke (5, 27) and the closing flap (4) are tiltable through a second angle (φ_2) about a shared shaft (6) on their underside.

9. Insertion column (1) as claimed in claim 8, **characterized in that** the sum of the first angle (φ_1) and the second angle (φ_2) lies in the range 150°<((φ_1+(φ_2)<180°.

10. Insertion column (1) as claimed in either of the claims 8-9, **characterized in that** the second angle (φ_2) lies in the range 30°<φ_2<50°.

11. Insertion column (1) as claimed in claim 10, **characterized in that** the second angle (φ_2) amounts to about 40°.

12. Insertion column (1) as claimed in any of the claims 8-11, **characterized in that** the yoke is formed by a pair of plates (5) which are coupled at correspond-

ing edges to the closing flap (4).

13. Insertion column (1) as claimed in claim 12, **characterized in that** the yoke (4, 5, 27) is coupled to a fixed part (20) of the column (1) by means of at least one spring (19).

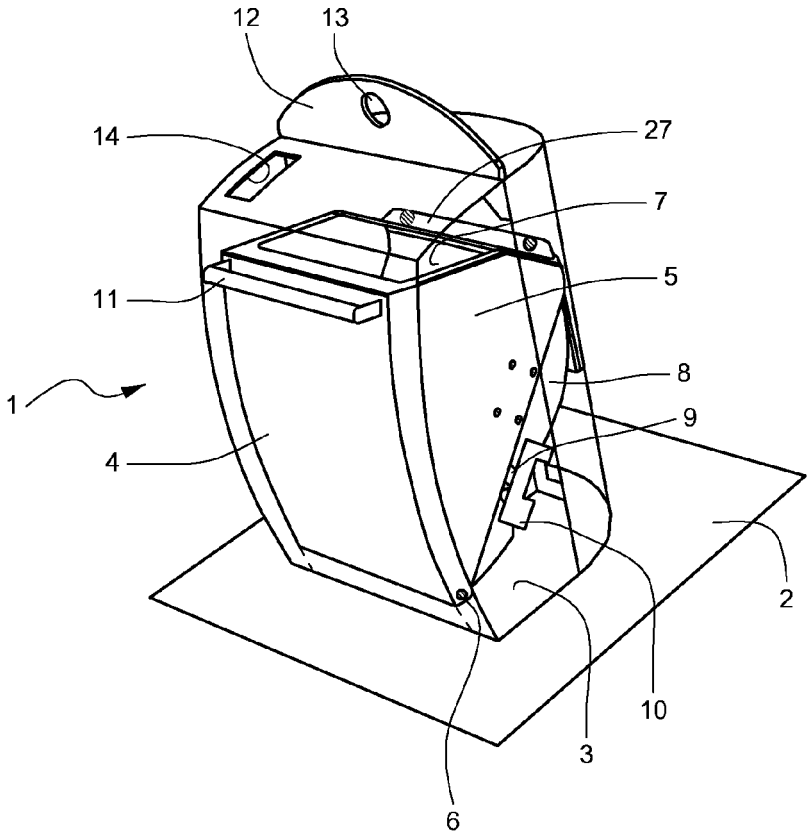
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Fig. 1

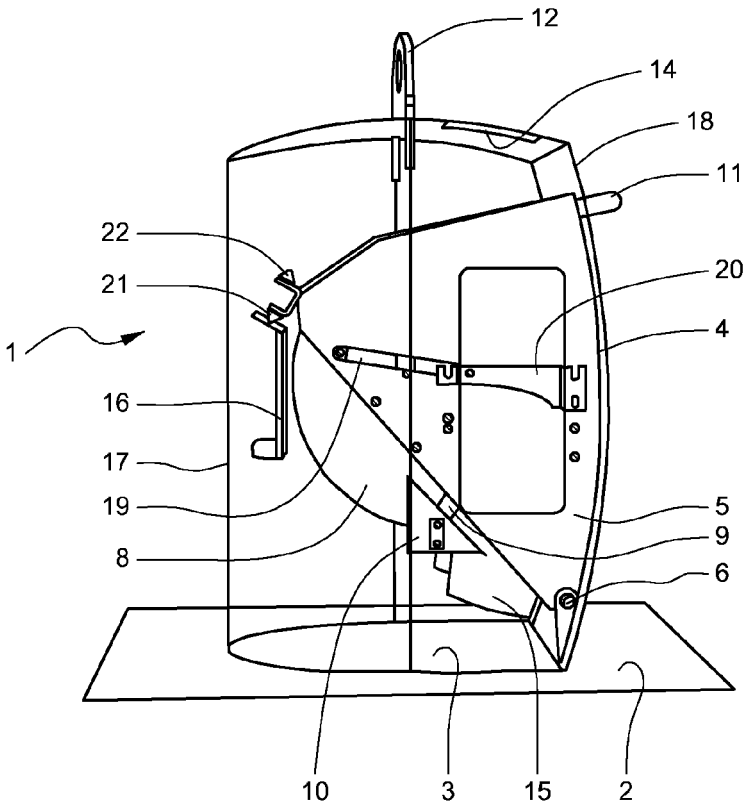
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Fig. 2

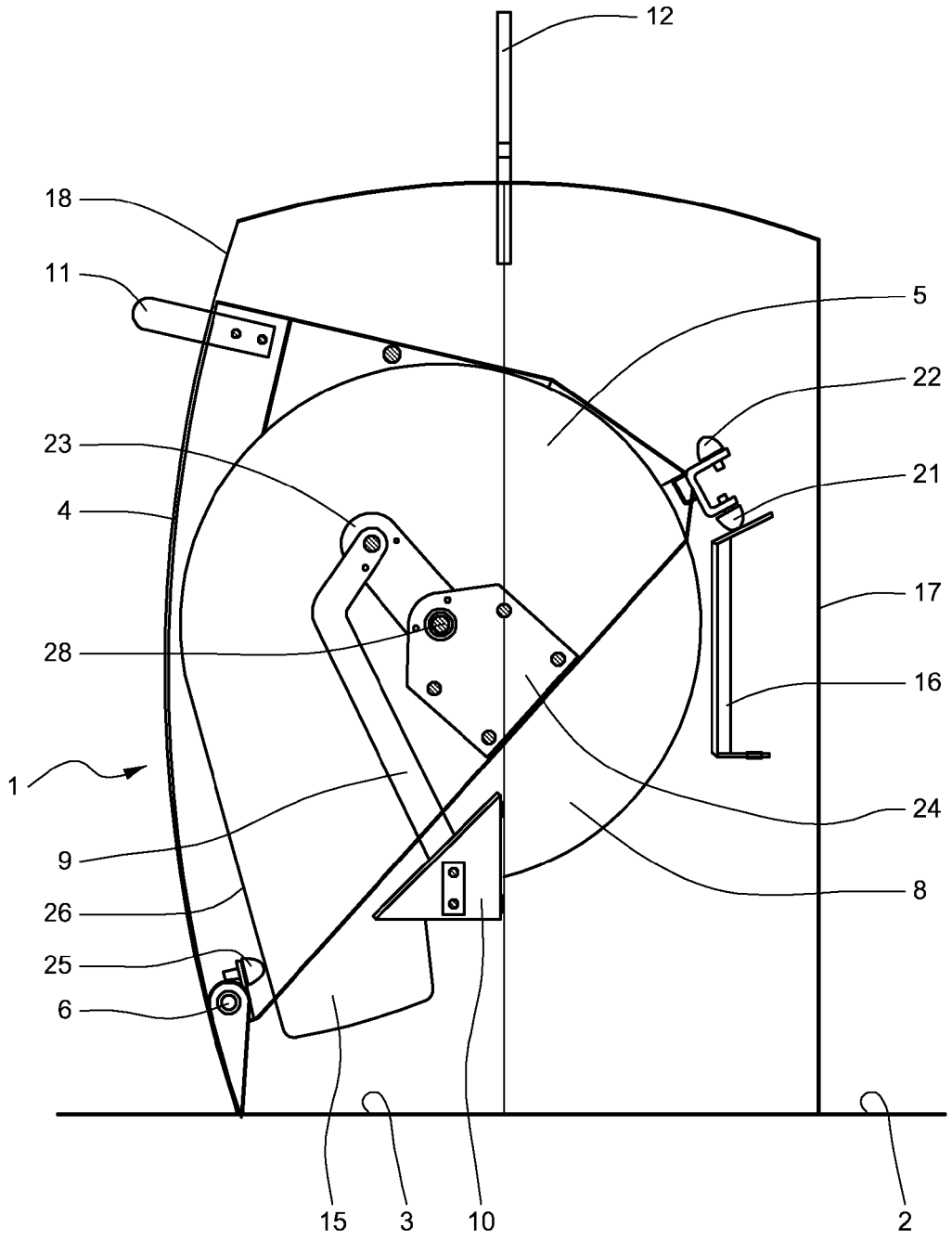
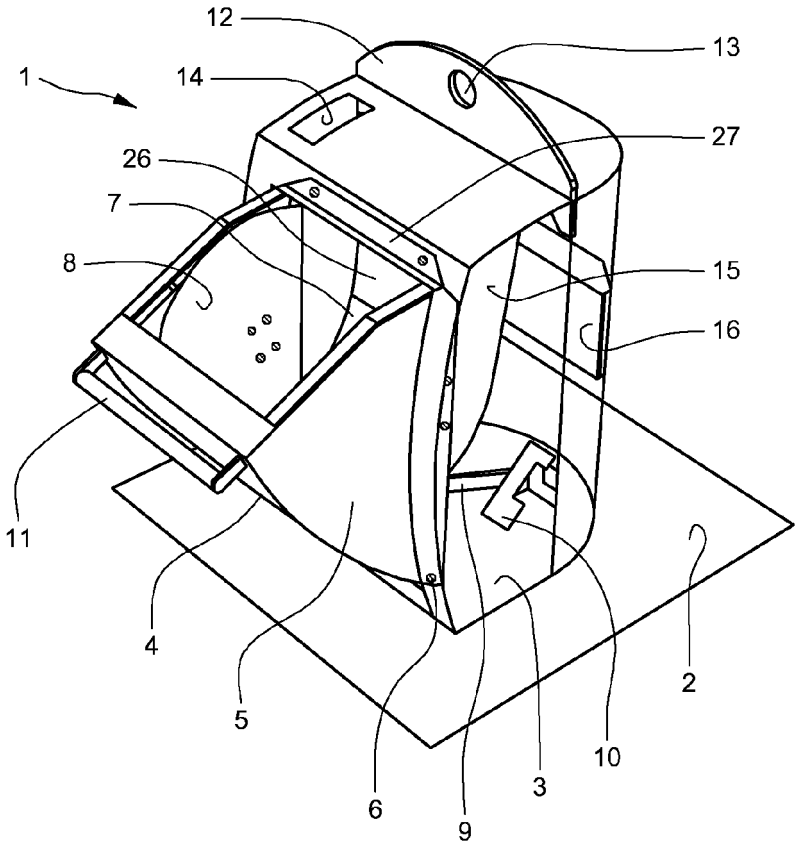


Fig. 3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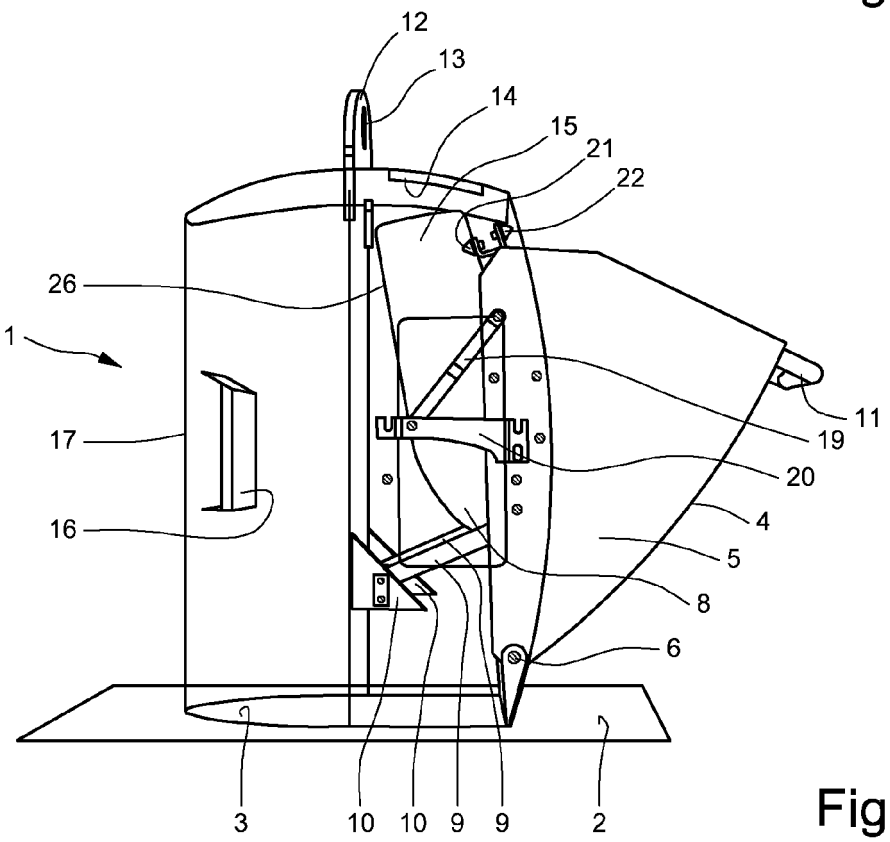
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Fig. 5

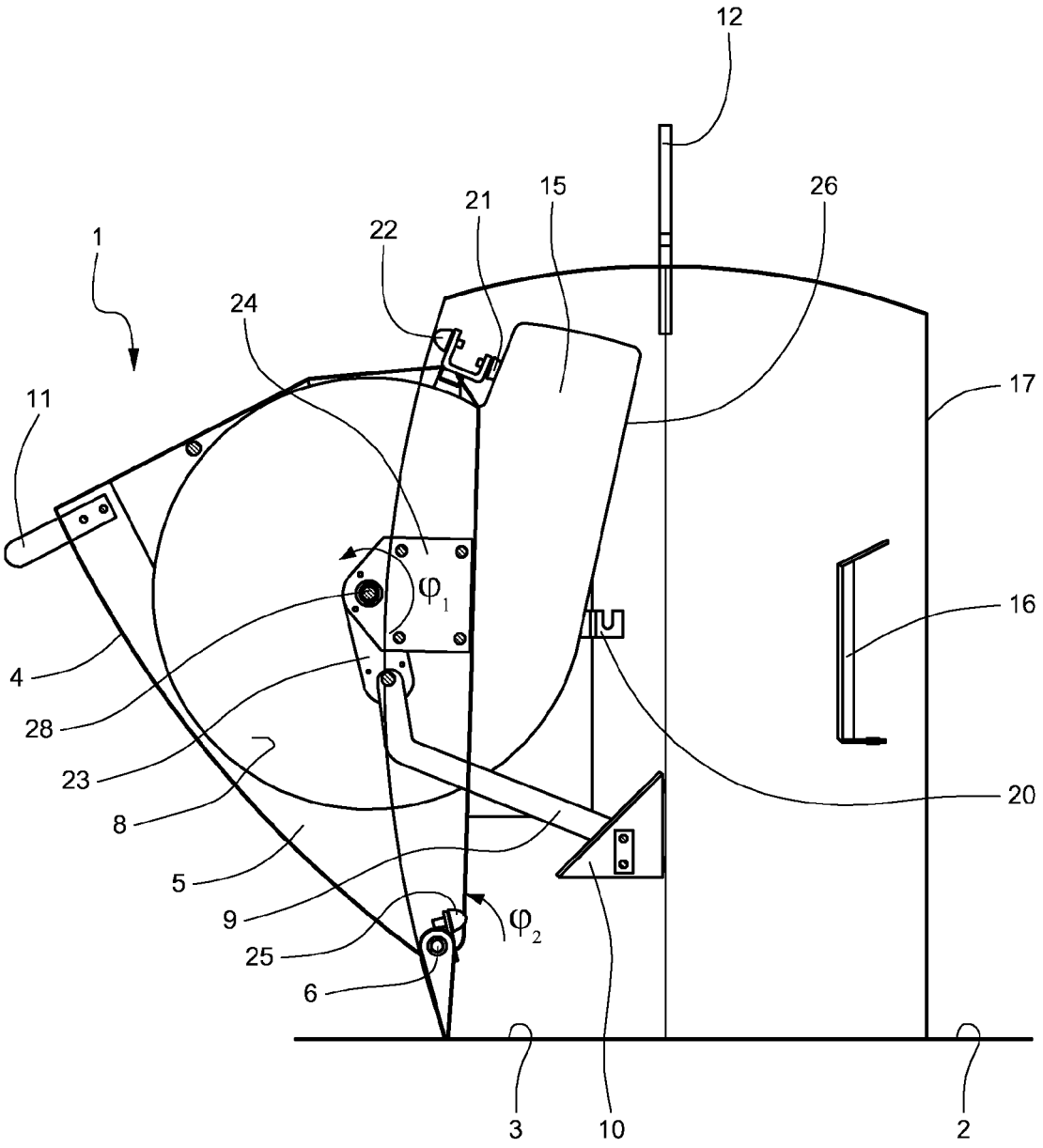
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Fig. 6

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EUROPEAN SEARCH REPORT

Application Number
EP 11 15 0657

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A,D	NL 1 005 958 C2 (SCHIPHORST MILIEUTECHNIEK B.V.) 15 April 1998 (1998-04-15) * page 7, line 34 - page 8, line 3 * * figure 5 * -----	1,2	INV. B65F1/10 B65F1/14

TECHNICAL FIELDS SEARCHED (IPC)

B65F

1 The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	4 April 2011	Smolders, Rob

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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04-04-2011

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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		EP 0876971 A1	11-11-1998
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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

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