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(54) Refuse filling lock

(57) Refuse filling lock comprising a vertical passage (3), a lid (7) that is rotatable about a shaft (8) between a position for shutting off a throw-in aperture (4) of the passage and a position for clearing the throw-in aperture, and a baffle plate (16) fitted in the passage, which baffle plate is rotatable about a shaft (17) which is parallel to the shaft of the lid, and which is connected to the lid by means of lifting means which comprise a cam (12). When the lid is out of the shut-off position the lifting means are supported by the cam, which follows the movement of the lid in order to rotate the baffle plate between a position in which it clears the passage and a position in which it substantially blocks the passage. The cam is rotatable relative to the lid over some distance, for the purpose of delaying the return to the admission position during closure.

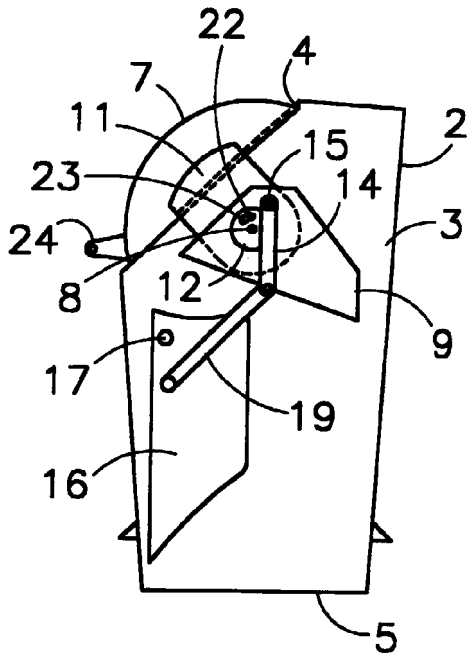

Fig 1

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Description

[0001] The invention relates to a refuse dump column according to the preamble of claim 1.

[0002] A refuse dump column of this type is known from NL-C-1007663. In the case of the known refuse dump column the follower means consist of a follower rail fixed to the shut-off means, diametrically opposite the shut-off means with respect to its shaft, and a follower arm fixed to the blocking means near the shaft of the blocking means, one end of which arm rests upon the follower rail, for the purpose of following the movement of the shut-off means. The follower rail is in the shape of an arc over the greater part thereof relative to the shaft of the shut-off means, while at the end of the rail that is situated closest to the shaft of the blocking means the rail passes by way of a bend into a straight follower part, which from the arcuate follower part onwards extends further from the shaft of the shut-off means. When the shut-off means is rotated from the throw-in position to the shut-off position, the follower element will first follow the arcuate part of the follower rail, during which the blocking means remains in its blocking position. From the time that it reaches the straight part of the follower rail onwards, the blocking means will then rotate rapidly and over a small movement distance from the shut-off means to the admission position.

[0003] In the case of the known refuse dump column the angle through which the blocking means rotates between its blocking position and its admission position is determined by the angle of the bend of the follower rail and the length of the straight part of the follower rail. However, the bend angle and the length of the straight part of the follower rail also determine relative to the shaft of the shut-off means a length of arc over which the follower element follows the straight part of the follower rail. In other words, the greater the angle through which the blocking means can rotate, the greater the abovementioned arc distance is and, corresponding to this, the greater is a height of the throw-in aperture of the column over which the blocking means can rotate during movement of the shut-off means.

[0004] When the shut-off means is rotated to its shut-off position after waste has been deposited on the blocking means in the column, the weight of the waste and the blocking means will result in the blocking means suddenly rotating forcefully into its blocking position after the follower element has passed the bend of the follower rail. In order to prevent injury to fingers or hands which may be inserted into the throw-in aperture, it is therefore desirable for the height of the throw-in aperture over which the blocking means can rotate to be small. In order to reduce this height, it is necessary for the bend of the follower rail to be sharper, in other words, its straight part must extend in a more radial manner. Since the follower element must be moved over the straight part of the follower rail to the bend of the latter during opening of the shut-off means, a sharper bend will, however, mean that greater force is needed to open the refuse dump column, and such force may be too great for many users.

[0005] On account of the above, the angle through which the blocking means of the known refuse dump column can be rotated is relatively small. The result of this is that when it is in the blocking position the blocking means leaves a large space open up to the inside wall of the column and keeps a large part of the passage blocked when it is in the admission position. These disadvantages could be limited by increasing the height of the throw-in aperture whereby the blocking means just turns or not together with the shut-off means, in other words, making the bend of the follower rail less sharp or making the length of the straight part of the follower rail longer. However, in view of safety a height as small as possible of the throw-in aperture in such situation is desired.

[0006] In addition it is desired for the refuse dump column to be operable without great difficulty by all users. Therefore, with the known column the height of the throw-in aperture over which the blocking means rotates will be greater than the thickness of a finger or even of a hand. This means that there is a great risk of physical injury.

[0007] The object of the invention is to eliminate the drawbacks of the known refuse dump column.

[0008] The invention therefore provides a refuse dump column according to claim 1.

[0009] Owing to the fact that the follower means of the refuse dump column according to the invention have a hysteresis effect, the height of the throw-in aperture over which the blocking means rotates during closure can be reduced considerably and the risk of injury to fingers or hands inserted into the throw-in aperture is reduced considerably.

[0010] Other features and advantages of the invention will become clear from the description following below in conjunction with the appended drawings, in which:

Fig. 1 shows a phantom view from a side of a preferred embodiment of a refuse dump column according to the invention, in a position with covered throw-in aperture;

Fig. 2 shows on a larger scale a part of a lifting mechanism of the column of Fig. 1;

Figs. 3 to 5 show three positions of the column of Fig. 1 during rotation of the lid from the shut-off position shown in Fig. 1 to the throw-in position shown in Fig. 5;

Fig. 6 shows the column of Fig. 1 with the lid in a position where during its rotation back it has almost reached the shut-off position of Fig. 1; and

Fig. 7 shows an elevational view of the part of the lifting mechanism of Fig. 2 when the lid is in the position of Fig. 6.

[0011] Fig. 1 shows a phantom view of a preferred embodiment of a refuse dump column according to the invention, from one side. The column comprises a housing 2 with a vertical passage 3 which has a throw-in aperture 4 on the top side and an outflow aperture 5 on the bottom side. The refuse dump column is suitable to be placed above a charging aperture of a collection container (not shown).

[0012] A shut-off means formed by a lid 7 is fixed in such a way that it is rotatable about a horizontal shaft 8 fixed to a fixing structure 9, which is fixed on the inside wall of the housing 2. In Fig. 1 the column is in a position in which the lid 7 is covering the throw-in aperture 4. For the sake of clarity, parts of the wall of the housing 2 and the part of the lid 7 towards which the viewer normally looks are omitted in Fig. 1.

[0013] The lid 7 is rotatable about the shaft 8 by way of a connecting plate 11 fixed to the lid 7.

[0014] A cam 12, which is rotatable independently about the shaft 8, is fitted.

[0015] An arm 14 is fixed by way of a shaft coupling with a shaft 15 in a rotatable manner on the fixing structure 9. All shafts already mentioned and yet to be mentioned, such as 8 and 15, are horizontal, parallel to each other and parallel to a main surface of the throw-in aperture 4.

[0016] In the positions of the lid 7 and the cam 12 shown in Fig. 1 the arm 14 hangs down and, viewed from the throw-in aperture 4, lies past the shaft 8 against the cam 12.

[0017] A blocking means, formed by a baffle plate 16, is fitted in the passage 3. The baffle plate 16 is rotatable about a shaft 17. Between the bottom end of the arm 14 and a point of the baffle plate 16 below the shaft 17 a connecting element 19 is connected in such a way that the connecting element 19 can swing relative to the arm 14 and the baffle plate 16. The connecting element 19 is shown as a rod, but can also be a piece of cable or the like.

[0018] It is pointed out that the shape of the fixing structure 9, which consists of plates, and that of the baffle plate 16 are determined by the peripheral shape of the inside wall of the housing 2.

[0019] A pin 22 or the like is fixed to the fixing plate 11 for the lid 7, which pin projects into an opening 23 of the cam 12. Fig. 2 shows this on a larger scale.

[0020] A handle 24 is fixed on the lid 7.

[0021] When, as shown in Fig. 3, a user rotates the lid 7 in the direction of the arrow 26 by means of the handle 24, the throw-in aperture 4 will be opened to an increasing degree until the throw-in position shown in Fig. 5 is reached.

[0022] When the lid 7 is rotated from the shut-off position shown in Fig. 1, the pin 22 will carry along the cam 12, with the result that a top point of the cam 12 is pressed against the arm 14, so that the arm 14 will rotate about the shaft 15 in a direction that is opposite to the direction 26. This will cause the arm 14 to lift the baffle plate 16 by way of the connecting element 19 out of an admission position thereof, so that the baffle plate 16 rotates about the shaft 17.

[0023] Owing to the fact that the top point of the cam 12 is situated a short distance away from the shaft 15, the baffle plate 16 will be lifted over a relatively great distance already after a small rotation movement of the lid 7 in the direction of the arrow 26 and will quickly substantially block the passage 3, as shown in Figs. 4 and 5.

[0024] Since during the upward rotation of the lid 7 to the throw-in position the baffle plate 16 is generally not carrying any material, a user still need only exert a relatively slight lifting force on the handle 24, despite the short distance between the top point of the cam 12 and the shaft 15.

[0025] If in the situation shown in Fig. 5 the user throws material into the column through the throw-in aperture 4, the material will be substantially retained and carried by the baffle plate 16. Owing to the fact that in this situation the arm 14 is resting on the cam 12, the weight of the material is largely transmitted by way of the cam 12 and the shaft 8 to the housing 2. The result is that a limited load is placed upon the lid 7 and the user can also close the lid 7 without exerting great force.

[0026] A refuse dump column can work in the manner explained above using a cam 12 which has an opening in the form of a hole into which the pin 22 fits with slight play. According to the invention, the opening 23 is, however, larger than the pin 22, in such a way that the cam 12 can rotate over a length of arc relative to the pin 22. The opening 23 is in particular, but not necessarily, a slot, as shown.

[0027] If the opening 23 relative to the shaft is over a length of arc greater than the pin 22, it is ensured that when the lid 7 is rotated back from the throw-in position shown in Fig. 5 in the direction of the arrow 28 to the shut-off position shown in Fig. 1, the rotation back of the cam 12 is delayed until, as shown in Figs. 6 and 7, the pin 22 reaches the side of the opening 23 situated opposite the side of the opening 23 against which the pin 22 rests during the opening of the lid 7. The result of this is that the arm 14 is supported for a relatively long time by the cam 12 and the baffle plate 16 shuts off the passage 3 for a correspondingly long time. Only when the lid 7 covers the throw-in aperture 4 almost completely will the arm 14 no longer or almost no longer be supported by the cam 12, and the baffle plate 16 will quickly rotate to the admission position shown in Fig. 1. Until that time the baffle plate 16 will exert only a slight force upon the lid 7, with the result that it is easy for the user to operate the lid 7.

[0028] The length of arc of the opening 23 can be altered without it affecting the amount of force needed for lifting the lid 7 out of the shut-off position.

[0029] The operation of the refuse dump column according to the invention provided with the ample opening 23 of the cam 12 explained above is as an

operation with hysteresis, in particular asymmetrical hysteresis. Hysteresis is possible in another way, for example by means of a mechanism (not shown) fitted between the housing 5, the lid 7 and the baffle plate 16 with bistable control pawls and locking pawls.

[0030] It is possible according to the invention to use for the opening 23 a length of arc with which the height of the throw-in aperture 4 at the moment when the baffle plate 16 can rotate to the admission position shown in Fig. 1 is less than the thickness of a finger of the user. This prevents physical injury from occurring.

[0031] Owing to the fact that during the rotation of the lid 7 to the shut-off position of Fig. 1 the baffle plate 16 blocks the passage 3 until almost the last moment, it is also ensured that until that moment material, wanted or otherwise, thrown through the throw-in aperture 4, or objects or living beings, do not fall into the collection container below the column. This means that users have until almost the last moment when the throw-in aperture is closed completely to change their minds about depositing unsafe or forbidden items. This makes the refuse dump column safer in environments with children and animals. Furthermore, it is ensured that objects which are too long and could prevent further use of the refuse dump column are prevented from being deposited.

Claims

1. Refuse dump column, comprising a housing (2) with a vertical passage (3) which has a top throw-in aperture (4), a bottom outflow aperture (5), a shut-off means (7) which is rotatable about a horizontal shaft (8) relative to the housing, between a shut-off position and a throw-in position, in which the shut-off means shuts off and clears the throw-in aperture (4) respectively, for preventing and permitting the throwing in of material respectively, and a blocking means (16) which is fitted at a lower level in the passage than the shut-off means and which is rotatable relative to the housing about a horizontal shaft (17) between an admission position and a blocking position for not blocking and blocking the passage respectively, the shut-off means and the blocking means having such interacting follower means (14, 22) that the shut-off position and throw-in position of the shut-off means correspond to the admission position and the blocking position of the blocking means respectively, characterized in that the follower means have a hysteresis effect which is such that when the shut-off means (7) rotates from the throw-in position to the shut-off position the blocking means (16) does not follow the shut-off means (7) until after the shut-off means has covered a certain distance.

2. Refuse dump column according to claim 1, characterized in that the follower means comprise a lever (14), which by way of one end thereof is rotatable relative to the housing (5) about a horizontal shaft (15), and one end of which is connected to the blocking means, the follower means comprise a cam (12), which is rotatable about a horizontal shaft (8), one end of the cam (12) rests against the lever (14), the cam (12) has an opening (23), in which a follower element (22) of the shut-off means engages, and over an arc relative to the shaft (8) of the cam (12) the opening (23) provides play for the follower element.

3. Refuse dump column according to claim 2, characterized in that the cam (12) has a curved follower side and a reverse side, the latter forming an angle with the follower side which in the blocking position of the blocking means (16) determines a transition to the admission position of the blocking means (16).

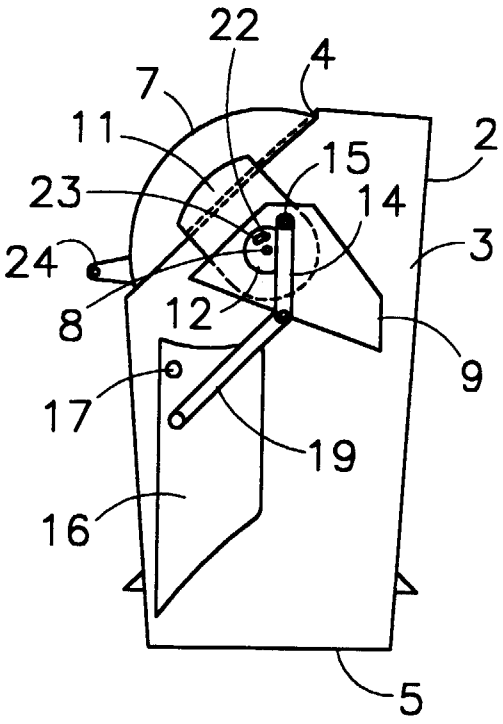

Fig 1

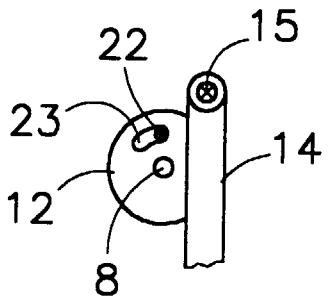

Fig 2

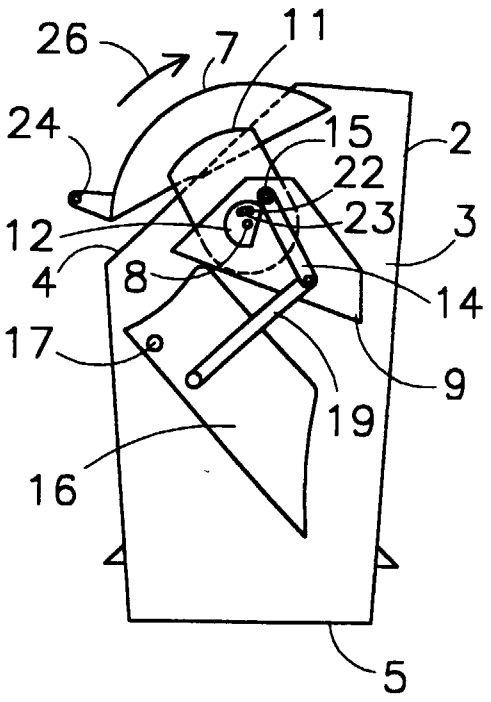

Fig 3

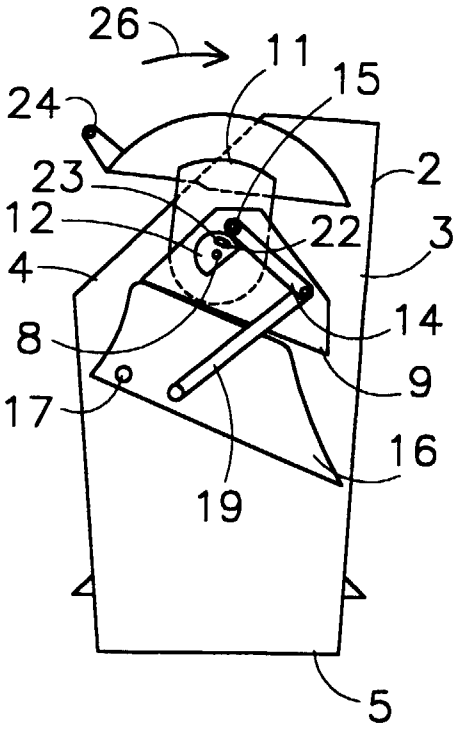

Fig 4

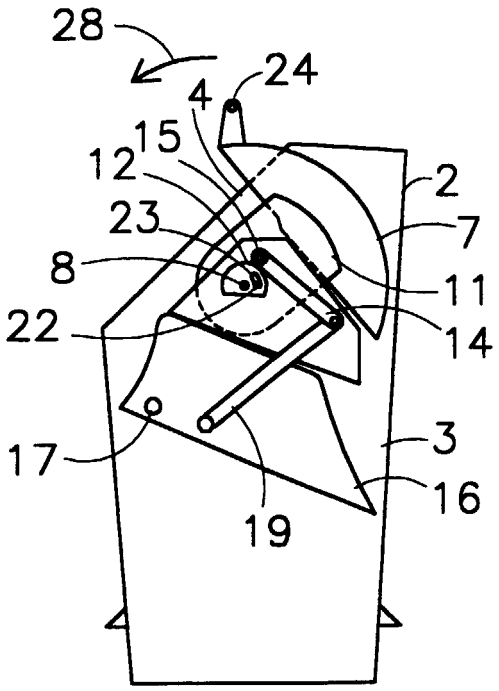

Fig 5

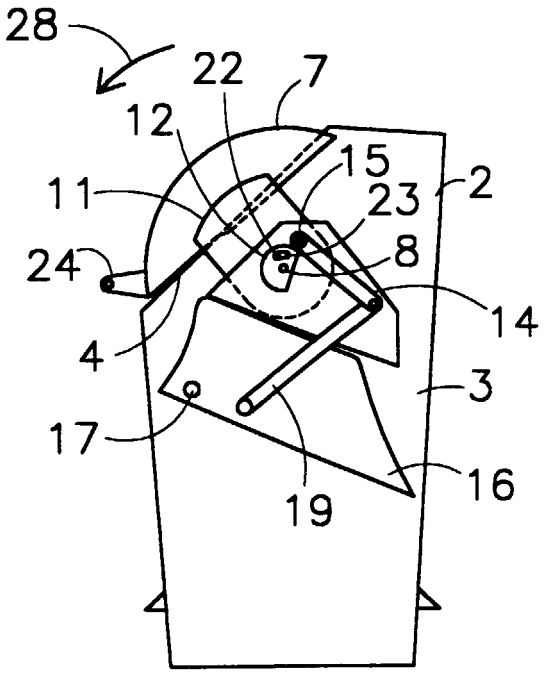

Fig 6

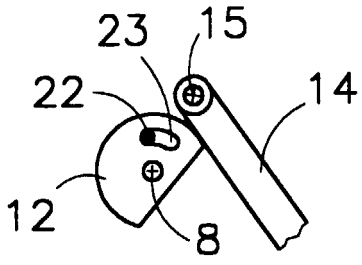

Fig 7

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 00 20 2953

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.7)
D,A	NL 1 007 663 C (PLASTIC OMNIUM BV) 2 June 1999 (1999-06-02) * page 7, line 3 - page 9, line 21; figures 1-3 *	1	B65F1/10
A	DE 94 21 756 U (M. EISELSBERGER) 1 August 1996 (1996-08-01) * page 3, line 32 - page 5, line 26; figures 1A,1B *	1	

TECHNICAL FIELDS SEARCHED (Int.Cl.7)

B65F

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	21 November 2000	Smolders, R

CATEGORY OF CITED DOCUMENTS

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21-11-2000

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
NL 1007663 C	02-06-1999	NONE	
DE 9421756 U	01-08-1996	DE 4439503 A	09-05-1996

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