(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 1 413 423 A1

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
28.04.2004 Bulletin 2004/18

(51) Int Cl.[7]: **B30B 9/30**

(21) Application number: **02079344.4**

(22) Date of filing: **18.10.2002**

(84) Designated Contracting States:
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR IE IT LI LU MC NL PT SE SK TR
Designated Extension States:
AL LT LV MK RO SI

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(54) Compressing device for compressing waste to be collected in a waste container

(57) Compressing device for compressing waste to be collected in a waste container, comprising a frame which is placeable on an inlet opening in the upper side of a waste container and in which at least one rotatable first roller, provided with a drive, and a compressing member are mounted at a determined mutual distance (d) for feeding in waste to be compressed into the waste container between this roller and the compressing member.

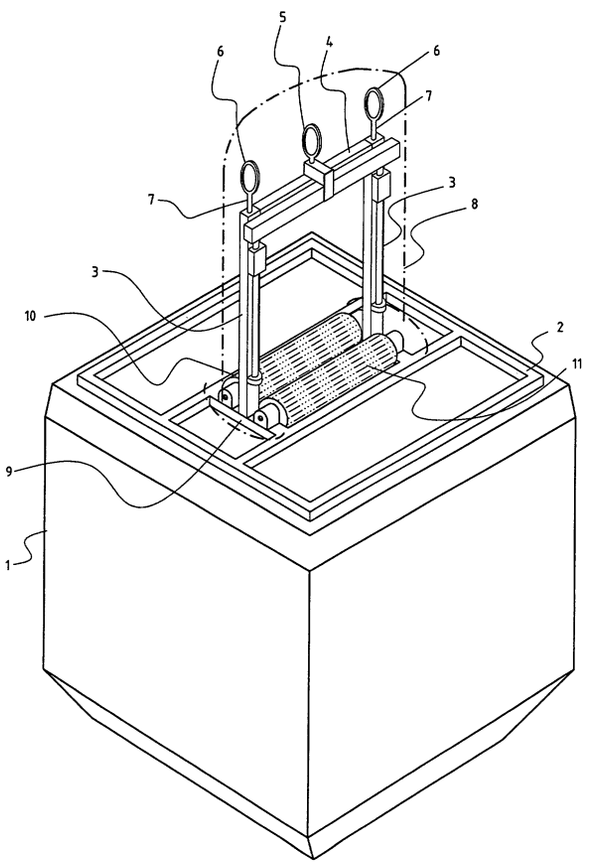

Fig. 1

EP 1 413 423 A1

Description

[0001] The invention relates to a compressing device for compressing waste to be collected in a waste container.

[0002] Known from the Netherlands patent application no. 1005958 is a waste container which can be sunk into the ground in a concrete holder and which is provided with openable bottom parts and with a cover part on which a column is placed with an inlet channel debouching above an inlet opening in the cover part. Such a waste container is used for collecting domestic refuse tendered in plastic sacks, but also for collecting for instance glass. The container is emptied in due time using a hoisting device intended for this purpose, wherein the container is successively lifted out of the concrete holder and placed above the loading platform of a truck and the bottom is opened by activating the operating means.

[0003] It is a drawback of known waste containers that the deposited waste has a low density since the plastic sacks and the waste collected therein (for instance packaging material) contain a large amount of air, as a result of which the waste containers must be emptied relatively frequently. The emptying of waste containers is labour-intensive, and therefore expensive.

[0004] It is an object of the invention to provide a compressing device, using which waste is compressed to a substantial degree so that the volume of a waste container can be optimally utilized, and a waste container with compressed waste requires less frequent emptying than a container with waste which is not compressed.

[0005] It is a further object to provide a compressing device which can be applied in combination with per se known waste containers.

[0006] Another object is to provide a compressing device which is robust and corrosion-free, and thereby requires little maintenance.

[0007] These objectives are achieved, and other advantages gained, with a compressing device for compressing waste to be collected in a waste container, which according to the invention comprises a frame which is placeable on an inlet opening in the upper side of a waste container and in which at least one first roller provided with a drive and rotatable in a first direction and a compressing member are mounted at a determined mutual distance for feeding in waste to be compressed into the waste container between this roller and the compressing member.

[0008] The compressing of waste by feeding it into a waste container between a roller and a compressing member provides the advantage that no separate compressing operation is required. Because a frame with a roller and a compressing member can be placed outside a waste container, it is not necessary to take any volume from this container for the compressing device, and the compressing device according to the invention moreover provides the advantage that it can be placed on waste containers which are already in use.

[0009] In an embodiment of a compressing device according to the invention, the compressing member comprises a second roller parallel to the first roller and rotatable in a second direction opposite to the first direction.

[0010] In this latter embodiment at least one of the rollers is for instance mounted in displaceable bearings confined under a spring force in a manner such that the mutual distance between the rollers is variable.

[0011] This embodiment provides the advantage that non-compressible constituents, inasmuch as the dimensions thereof remain within determined limits, can pass through the rollers, wherein these are pressed apart.

[0012] In yet another embodiment of a compressing device according to the invention, the compressing member comprises a flat plate running obliquely downward in the operating position toward the first roller and parallel to this first roller, which plate is preferably suspended on its top side for pivoting counter to a spring force.

[0013] The spring force is produced for instance by a gas spring directed toward the first roller.

[0014] In an embodiment the drive is an external drive, for instance a motor reductor provided with chain wheels.

[0015] In a preferred embodiment the drive is provided in the interior of the first roller.

[0016] An internal drive is for instance provided by a so-called drum motor.

[0017] The drive comprises for instance a mains motor.

[0018] In a preferred embodiment the drive comprises a low-voltage direct current motor.

[0019] A suitably chosen low-voltage direct current motor, for instance a 12-volt or 24-volt motor, provides the advantage that the power supply required therefor is already available for the required read electronics in waste containers which can be placed underground and which are only accessible after recording of the tendered waste by means of electronic reading of a chipcard intended for this purpose.

[0020] In an advantageous embodiment of a compressing device according to the invention, at least the roller provided with a drive is provided with a releasable sleeve, the outer surface of which comprises an anti-slip material.

[0021] With such a roller the anti-slip material prevents waste slipping on the surface of the roller. The fact that the outer sleeve is releasable provides a cost advantage, particularly in the case of driving by a drum motor, in that only the outer sleeve, and not the entire roller, need be replaced in the case of damage or wear of the surface of the roller.

[0022] In yet another embodiment at least the first roller is provided with longitudinal ribs extending in longitudinal direction on the outer surface for easy infeed of waste for compressing.

[0023] In another embodiment the compressing de-

vice is provided with an infeed funnel debouching above and between the first roller and the compressing member.

[0024] In a further embodiment the compressing device is provided in a column which is placeable on a cover part of a waste container and which is provided with an inlet channel debouching above an inlet opening in this cover part.

[0025] In a practically advantageous embodiment the compressing device according to the invention is provided with detecting and signal processing means for detecting waste to be compressed which is fed between the roller and the compressing member.

[0026] This latter embodiment is particularly suitable for use in combination with a waste container wherein information concerning the amount of waste to be fed in must be recorded in combination with an identification of the user, for instance in a situation where costs for the use of the waste container are charged to the user.

[0027] The invention will be elucidated hereinbelow on the basis of an embodiment and with reference to the drawings.

[0028] In the drawings

Fig. 1 shows a perspective view of a waste container placeable underground, provided with a first embodiment of a compressing device according to the invention,

Fig. 2 shows a top view in more detail of the compressing device of fig. 1,

Fig. 3 shows a vertical longitudinal section in more detail of one of the rollers of the compressing device of fig. 1, and

Fig. 4 shows in a schematic vertical cross-section a detail of a second embodiment of a compressing device according to the invention.

[0029] Corresponding components are designated in the drawings with the same reference numerals.

[0030] Fig. 1 shows a container 1 for underground collection of waste. The upper part of container 1 is connected to a fixed frame 2 on which rests a cover (not shown), through which protrude two standing tubes 3 connected on their top side to a lifting eye 5 by a transverse connection 4. Further shown are lifting eyes 6 on pull rods 7 for operating openable bottom parts (not shown) and a column 8 (dash-dot line) on the cover of container 1 over the tubes 3, transverse element 4 and lifting eyes 5, 6. Fixedly connected to frame 2 is a frame 9, wherein two mutually parallel rollers 10, 11, rotatable in opposite directions are mounted at a determined mutual distance, one roller 11 of which is provided with a drive. In the present embodiment the frame 9 forms an integrated component of fixed frame 4, but can also be formed by a separate frame to be fixed to the container. An inlet channel (not shown) debouching above the centre of container 1, above and between rollers 10, 11, is formed through column 8.

[0031] Fig. 2 shows a top view of compressing device 9, 10, 11 of fig. 1 in more detail, with frame 8 and rollers 10, 11, the shaft stubs 12 of which are mounted in bearings 13 in bearing housings 14 which are connected fixedly to frame 9. Bearings 13 are displaceable in bearing housings 14, in a direction opposite to the direction of a spring force produced by compression springs 15, from a rest position which is adjustable using adjusting screws 16. This rest position directly determines the distance d between rollers 10, 11 in the absence of solid waste constituents. The figure further shows an electric connecting cable 17 for the drum motor (not shown) in the foremost roller 11.

[0032] Fig. 3 shows a vertical longitudinal section along the line III-III in fig. 2 of the driven roller 11 which, just as non-driven roller 10, is provided with a releasable sleeve 18 on which is arranged a layer 19 of an anti-slip material, for instance rubber or a granulate embedded in araldite.

[0033] Fig. 4 shows a part of the top side of the fixed frame 2 of a waste container, with standing tube 3 and column 8, in which is received an infeed drum 25 (shown in broken lines) operated by a filling flap 26. Column 8 debouches above an opening in which a roller 11 driven by an electric motor is arranged on the right-hand side. A rubber flap 24 provides a seal between column 8 and roller 11. Roller 11 co-acts with a plate 20 suspended from a hinge 21 and running obliquely downward, which plate can be pressed to the right counter to a force exerted by a gas spring 22. Roller 11 is provided on its outer periphery with longitudinal ribs 23 for easy co-displacement and size reduction between roller 11 and plate 20 of waste deposited in column 8 (in infeed drum 25).

[0034] It is noted that, although an embodiment of the compressing device has been described above for use in combination with a waste container placeable underground, use is by no means limited to such a combination.

[0035] The compressing device is for instance also suitable for use in combination with a per se known rolling container for waste used in individual households. For this purpose the compressing device is for instance provided with a frame with four legs having a length such that the rolling container can be rolled under the frame in open state, wherein the frame connects precisely onto the opening of the rolling container

Claims

1. Compressing device (9, 10, 11, 20) for compressing waste to be collected in a waste container (1), comprising a frame (9) which is placeable on an inlet opening in the upper side of a waste container (1) and in which at least one first roller (11) provided with a drive and rotatable in a first direction and a compressing member (10, 20) are mounted at a de-

termined mutual distance (d) for feeding in waste to be compressed into the waste container (1) between said roller (11) and said compressing member (10, 20).

2. Compressing device (9, 10, 11) as claimed in claim 1, **characterized in that** the compressing member comprises a second roller (10) parallel to the first roller (11) and rotatable in a second direction opposite to the first direction.

3. Compressing device (9, 10, 11) as claimed in claim 2, **characterized in that** at least one of the rollers (10, 11) is mounted in displaceable bearings (13) confined under a spring force (15) in a manner such that the mutual distance (d) between the rollers (10, 11) is variable.

4. Compressing device (9, 11, 20) as claimed in claim 1, **characterized in that** the compressing member comprises a flat plate (20) running obliquely downward in the operating position toward the first roller (11) and parallel to this first roller (11).

5. Compressing device (9, 11, 20) as claimed in claim 4, **characterized in that** the plate (20) is suspended on its top side (21) for pivoting counter to a spring force.

6. Compressing device (9, 11, 20) as claimed in claim 5, **characterized in that** the spring force is produced by a gas spring (22) directed toward the first roller (11).

7. Compressing device (9, 10, 11, 20) as claimed in any of the claims 1-6, **characterized in that** the drive is an external drive.

8. Compressing device (9, 10, 11) as claimed in any of the claims 1-6, **characterized in that** the drive is provided in the interior of the first roller (11).

9. Compressing device (9, 10, 11) as claimed in any of the claims 1-8, **characterized in that** the drive comprises a low-voltage electric motor.

10. Compressing device (9, 10, 11, 20) as claimed in any of the claims 1-9, **characterized in that** at least the first roller (11) is provided with a releasable sleeve (18), the outer surface of which comprises an anti-slip material (19).

11. Compressing device (9, 10, 11, 20) as claimed in any of the claims 1-9, **characterized in that** at least the first roller (11) is provided with longitudinal ribs (23) extending in longitudinal direction on the outer surface.

12. Compressing device (9, 10, 11, 20) as claimed in any of the claims 1-11, **characterized in that** it is provided with an infeed funnel debouching above and between the first roller (11) and the compressing member (10, 20) .

13. Compressing device (9, 10, 11, 20) as claimed in any of the claims 1-12, **characterized in that** it is provided in a column (8) which is placeable on a cover part of a waste container (1) and which is provided with an inlet channel debouching above an inlet opening in said cover part.

14. Compressing device (9, 10, 11, 20) as claimed in any of the claims 1-13, **characterized in that** it is provided with detecting and signal processing means for detecting waste to be compressed which is fed between the roller (11) and the compressing member (10, 20).

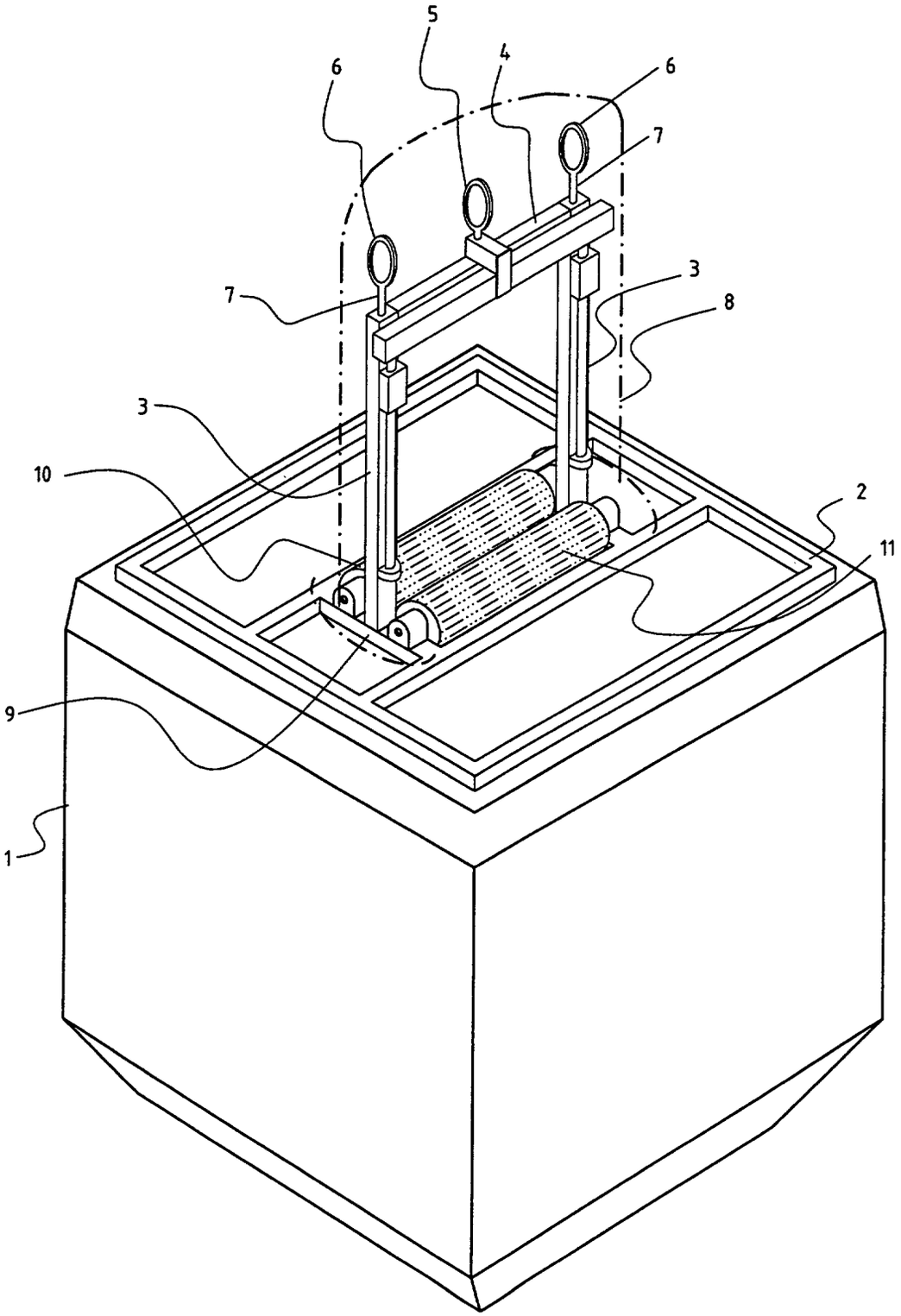

Fig. 1

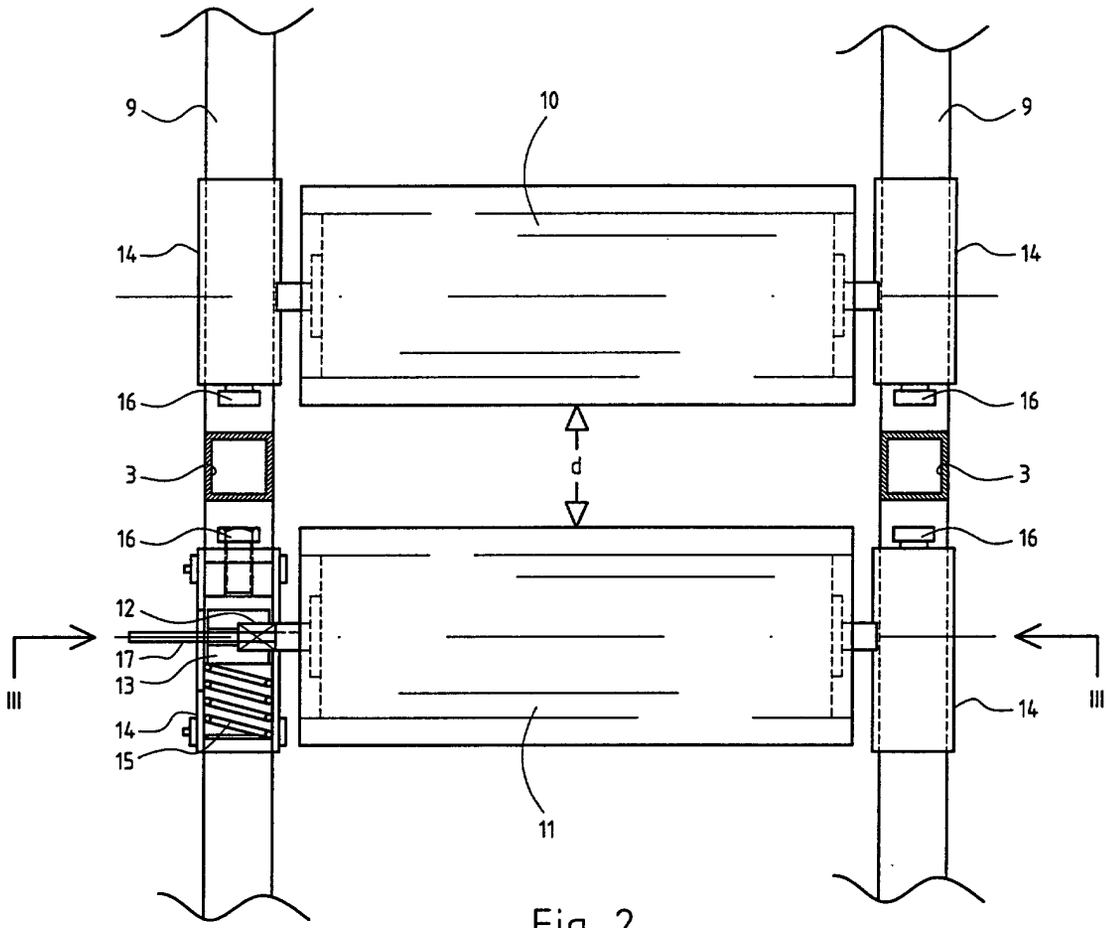
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Fig. 2

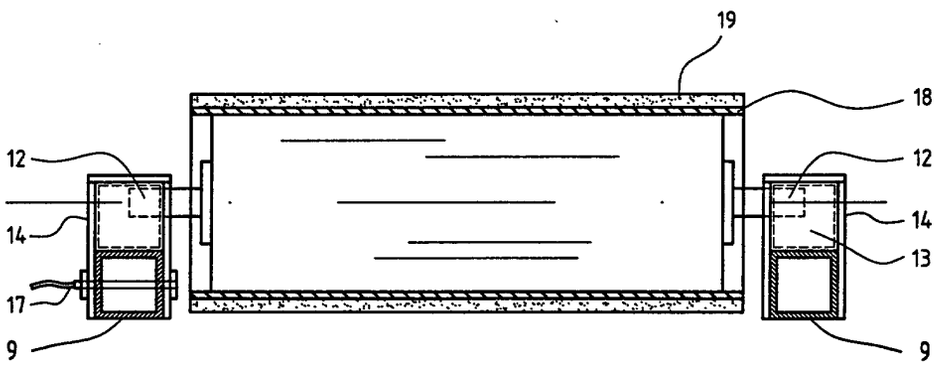
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Fig. 3

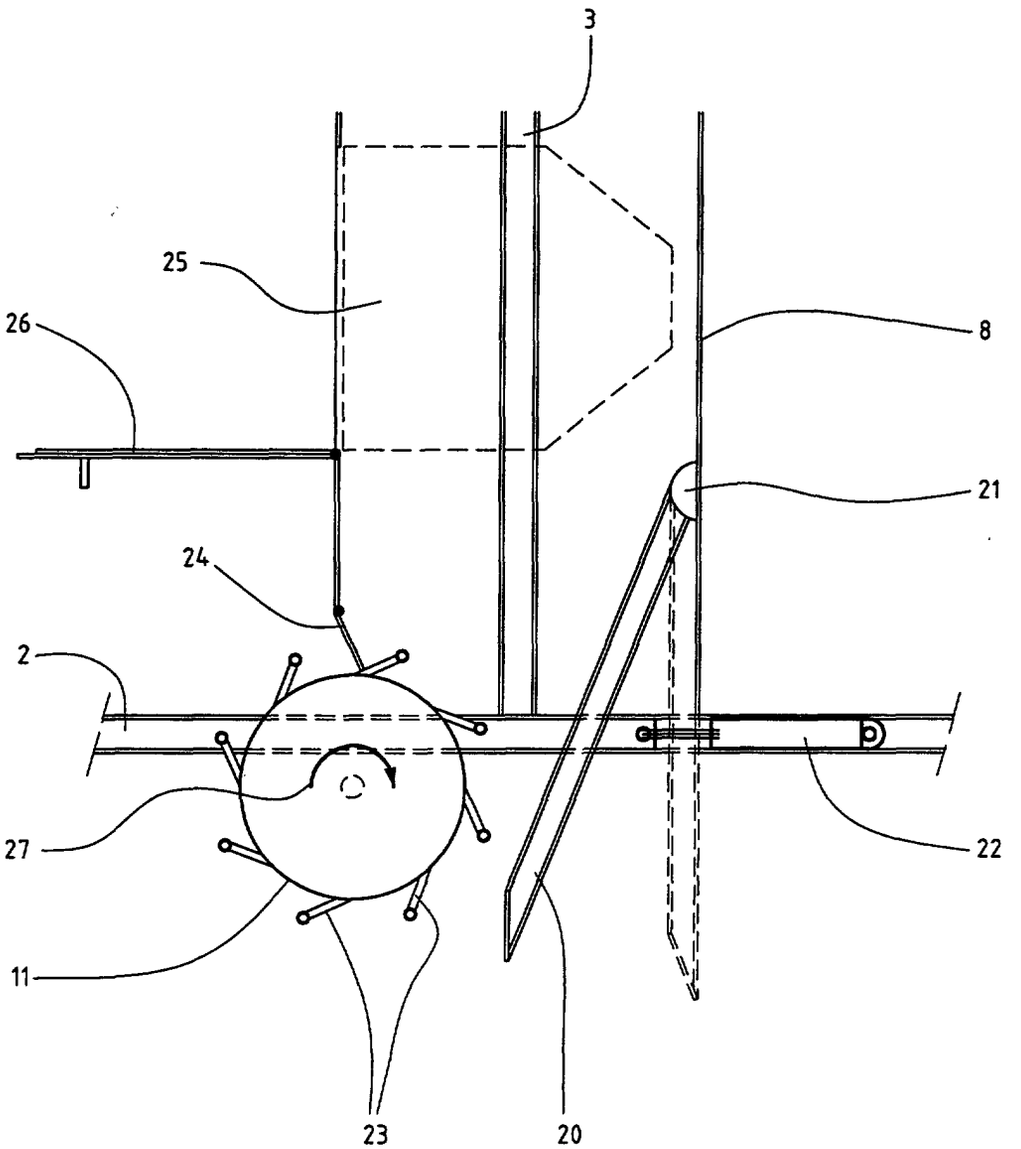

Fig. 4

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 02 07 9344

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)
X	GB 2 279 291 A (ZHANG CHAO YING) 4 January 1995 (1995-01-04) * page 6, line 7 - page 9, line 6; claims 1,8-17; figures 1,5 *	1-14	B30B9/30
X	US 5 211 109 A (DETERMAN JEROME A) 18 May 1993 (1993-05-18) * column 2, line 66 - column 3, line 66; claim 1; figures 2,4 *	1-7,9-14	
X	PATENT ABSTRACTS OF JAPAN vol. 1998, no. 03, 27 February 1998 (1998-02-27) & JP 09 301503 A (WATANABE HITOSHI), 25 November 1997 (1997-11-25) * abstract; figures *	1,2	
X	EP 0 367 146 A (STROBL KARL ;HOFMANN KARL (DE)) 9 May 1990 (1990-05-09) * column 4, line 13 - column 6, line 57; claims *	1,2,4-7, 10-13	

TECHNICAL FIELDS SEARCHED (Int.Cl.7)

B30B
B65F

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
MUNICH	10 February 2003	Lopez Vega, J

CATEGORY OF CITED DOCUMENTS

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10-02-2003

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
GB 2279291 A	04-01-1995	NONE	
US 5211109 A	18-05-1993	NONE	
JP 09301503 A	25-11-1997	NONE	
EP 0367146 A	09-05-1990	DE 8813775 U1	29-12-1988
		DE 8905352 U1	14-12-1989
		AT 87859 T	15-04-1993
		DE 58904008 D1	13-05-1993
		EP 0367146 A1	09-05-1990
		ES 2039803 T3	01-10-1993

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