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(54) **WASTE FEEDING DEVICE OF WASTE CONTAINER AND METHOD FOR FORMING WASTE FEEDING DEVICE**

(57) In the presented solution a waste feeding device of a waste container comprises a rotary drum (2), a lid (3), and a gearing mechanism. The rotary drum (2) has an opening (6), and the rotary drum (2) is rotatable to a feeding position where the opening (6) is upwards and to a discharge position where the opening (6) is downwards. The lid (3) is turnable between an open position and a closed position. The gearing mechanism is arranged to transform a motion of the lid (3) to a rotation motion of the rotatable drum (2) such that in the open position of the lid (3) the rotatable drum (2) is rotated to the feeding position and in the closed position of the lid (3) the rotatable drum (2) is rotated to the discharge position. The gearing mechanism comprises a gearwheel (4) and a tothing (5). The gearwheel (4) is integral with the rotatable drum (2) the gearwheel (4) and the rotatable drum (2) forming a single uniform piece, and/or the tothing (5) is integral with the lid (3) the tothing (5) and the lid (3) forming a single uniform piece.

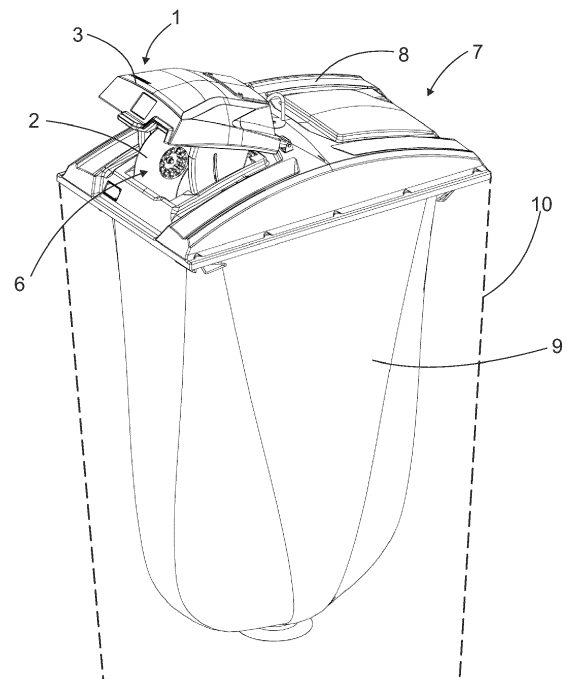


FIG. 1

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Description

FIELD OF THE INVENTION

[0001] The invention relates to a waste container, and particularly to a waste feeding device of a waste container.

[0002] It is sometimes desirable to restrict access to a waste container such that the material in the container cannot be easily removed from the container through the lid or cover of the container. It is also sometimes desirable to restrict the size of the objects or packages that are positioned to the container. Document WO 2017/207871 A1 discloses a waste feeding device.

BRIEF DESCRIPTION OF THE INVENTION

[0003] An object of the present invention is to provide a new waste feeding device of a waste container and a method for forming a waste feeding device. The invention is characterized by what is stated in the independent claims. Some embodiments of the invention are disclosed in the dependent claims.

[0004] In the presented solution a waste feeding device of a waste container comprises a rotary drum, a lid, and a gearing mechanism. The rotary drum has an opening, and the rotary drum is rotatable to a feeding position where the opening is upwards and to a discharge position where the opening is downwards. The lid is turnable between an open position and a closed position. The gearing mechanism is arranged to transform a motion of the lid to a rotation motion of the rotatable drum such that in the open position of the lid the rotatable drum is rotated to the feeding position and in the closed position of the lid the rotatable drum is rotated to the discharge position. The gearing mechanism comprises a gearwheel and a toothing. The toothing is integral with the lid the toothing and the lid forming a single uniform piece. According to an embodiment the gearwheel may be integral with the rotatable drum the gearwheel and the rotatable drum thereby forming a single uniform piece. By forming the toothing integral with the lid and optionally also forming the gearwheel integral with the rotatable drum the waste feeding device is formed such that it comprises very few parts. Manufacturing the waste feeding device is easy and simple. The structure of the waste feeding device is strong and reliable.

[0005] According to an embodiment the gearwheel and the rotatable drum are manufactured as the single uniform piece from plastic material by moulding and/or the toothing and the lid are manufactured as the single uniform piece from plastic material by moulding. In this connection moulding may be injection moulding or rotation moulding, for example. Forming the uniform pieces by moulding provides an efficient way of manufacturing the waste feeding device.

[0006] According to an embodiment the gearwheel is formed as an outward extending protrusion in an end wall

of the rotatable drum. Thereby, the shape of the end wall forms the gearwheel whereby inside the rotatable drum the end wall comprises a recess that has a shape that corresponds to the shape of the outer protrusion forming the gearwheel. Such a structure of the rotatable drum and the gearwheel is extremely simple, sturdy, reliable, and relatively easy to manufacture.

[0007] According to an embodiment the lid is arranged to turn around a turning axis, the rotatable drum is arranged to rotate around a rotation axis, and the turning axis is at a distance from the rotation axis. Thereby the structure of the waste feeding device becomes extremely simple and reliable.

[0008] According to an embodiment the lid has a top part and sides extending downwards from the top part, the side has a slot, and the toothing is formed on one side of the slot in the side. Such a structure provides a very simple and sturdy solution. According to an embodiment the other side of the slot is arranged to support the gearwheel. Supporting the gearwheel by the other side of the slot further toughens the structure of the waste feeding device.

[0009] According to an embodiment the slot in the side is a recess in the side. Forming the slot as a recess in the side makes the side very strong whereby the overall structure endures use extremely well.

[0010] According to an embodiment the rotatable drum has a central shaft from which the rotatable drum is arrangeable in connection with the waste container and the side of the lid has a slit for the central shaft of the rotatable drum. The slit keeps the rotatable drum and the lid reliably in connection with each other. This also allows an easy way to position the waste feeding device in connection with the waste container. The waste feeding device may be arranged in connection with a cover of the waste container or in connection with a body of the waste container.

[0011] According to an embodiment the slit has a length defining an amount of turning of the lid. Thereby the amount of turning the lid may be easily defined.

[0012] According to an embodiment the lid has a recess provided with a service cover, the recess of the lid forming a space for electrical devices of the waste container. When the lid has a space for electrical devices wiring between the waste container and the lid may be reduced or avoided. The waste feeding device is easily formed as an entity that is easily assembled. The waste feeding device may be assembled also in connection with existing waste containers as a retrofit.

[0013] According to an embodiment the drum and the service cover are moulded together as a single uniform piece and the service cover is a part that is formed when forming the opening of the rotatable drum. This provides an efficient way of manufacturing the device. The number of moulds needed is also very low.

BRIEF DESCRIPTION OF THE DRAWINGS

[0014] In the following the invention will be described in greater detail by means of some embodiments with reference to the attached drawings, in which

Figure 1 shows schematically a waste container shown obliquely from above;
 Figure 2 shows schematically a side view of a waste feeding device in cross-section;
 Figure 3 shows schematically a cross-sectional view of the waste feeding device along line A-A in Figure 2;
 Figure 4 shows schematically a rotary drum shown obliquely from above;
 Figure 5 shows schematically a lid shown obliquely from above;
 Figure 6 shows schematically a cross-sectional side of the lid shown in Figure 5;
 Figure 7 shows schematically a cross-sectional view of a side of the lid along line B-B in Figure 6; and
 Figure 8 shows schematically a drum and a service cover during a manufacturing phase.

DETAILED DESCRIPTION OF THE INVENTION

[0015] Figure 1 shows a waste feeding device 1. The waste feeding device 1 comprises a rotary drum 2 and a lid 3. Figure 1 also shows a waste container 7. The waste container 7 comprises a cover 8 of the waste container, a bag 9, and a body 10 of the waste container. For the sake of clarity the body 10 of the waste container is shown in Figure 1 only schematically by a dashed line.

[0016] The cover 8 of the waste container is positioned on top of the body 10 of the waste container. The bag 9 is attached to the cover 8 of the waste container. The bag 9 is positioned inside the body 10 of the waste container. The cover 8 of the waste container is provided with a lifting equipment. The lifting equipment may be made of metal such as aluminium, for example. Thereby the cover 8 may be lifted from above the body 10 of the waste container and simultaneously the bag 8 may be lifted from inside the body 10 of the waste container.

[0017] The lifting may be performed by a lifting device that grabs the lifting equipment. The bag 9 may be emptied from the bottom part of the bag 9.

[0018] The waste feeding device 1 is attached to the cover 8 of the waste container. If the waste container 7 is smaller, for example, a cover 8 is not necessarily needed. In such an embodiment the waste feeding device maybe attached directly to the body 10 of the waste container, for example.

[0019] The waste feeding device 1 also comprises a gearing mechanism. The gearing mechanism comprises a gearwheel 4 and a toothing 5. The gearwheel 4 is in connection with the rotary drum 2 as shown in Figure 4, for example. The gearwheel 4 is positioned at least on one end of the rotary drum 2. In the embodiments shown

in the Figures both ends of the rotary drum 2 are provided with the gearwheel 4.

[0020] The toothing 5 is in connection with the lid 3 as shown in Figures 5 and 6, for example. The lid 3 has a top part 11 and sides 12 extending downwards from the top part. The toothing 5 is formed in the side 12 of the lid 3. The side 12 of the lid is positioned against the end of the rotary drum 2. If both ends of the rotary drum 2 are provided with a gearwheel 4 then preferably the lid 3 has two sides 12 and both the sides 12 are provided with a toothing 5.

[0021] The rotary drum 2 has an opening 6. The rotary drum 2 is rotatable to a feeding position where the opening 6 is upwards and to a discharge position where the opening 6 is downwards. The lid 3 is turnable between an open position and a closed position. The gearing mechanism is arranged to transform a motion of the lid 3 to a rotation motion of the rotatable drum 2 such that in the open position of the lid 3 the rotatable drum 2 is rotated to the feeding position and in the closed position of the lid 3 the rotatable drum 2 is rotated to the discharge position. The open position of the lid 3 and thus the feeding position of the rotatable drum 2 is shown in Figure 1, for example. The closed position of the lid 3 and thus the discharge position of the rotatable drum 2 is shown in Figure 2, for example.

[0022] The gearwheel 4 is integral with the rotatable drum 2. Thus, the gearwheel 4 and the rotatable drum 2 form a single uniform piece. When the gearwheel 4 is integral with the rotatable drum 2 the gearwheel 4 and the rotatable drum 2 cannot be separated without breaking or damaging the structure of the rotatable drum 2. According to an embodiment the gearwheel 4 and the rotatable drum 2 are manufactured as the single uniform piece from plastic material by moulding. The gearwheel 4 is formed as an outward extending protrusion in the end wall of the rotatable drum 2. Thus, the shape of the end wall forms the gearwheel 4 whereby inside the rotatable drum 2 the end wall comprises a recess 13 that has a shape that corresponds to the shape of the outward extending protrusion forming the gearwheel 4.

[0023] The toothing 5 is integral with the lid 3. Thus, the toothing 5 and the lid 3 form a single uniform piece. When the toothing 5 is integral with the lid 3 the toothing 5 and the lid 3 cannot be separated without breaking or damaging the structure of the lid 3. According to an embodiment the toothing 5 and the lid 3 are manufactured as the single uniform piece from plastic material by moulding. In this connection moulding may be injection moulding or rotation moulding, for example. The rotatable drum 2 and the lid 3 may be manufactured from plastic material such as polyethylene PE or polypropylene PP, for example.

[0024] According to an embodiment the lid has a top part 11 and sides 12 extending downwards from the top part 11. The side 12 has a slot 14. The toothing 5 is formed on one side of the slot 14 in the side 12. According to an embodiment the other side 15 of the slot 14 is arranged to support the gearwheel 4. Thus, the other side 15 of the

slot 14 and the gearwheel 4 are arranged such that the tooth of the gearwheel 4 slide along the other side 15 of the slot 14. According to an embodiment the other side 15 of the slot 14 is not arranged to support the gearwheel 4 and the tooth of the gearwheel 4 do not slide along the other side 15 of the slot 14 but there is a clearance between the other side 15 of the slot 14 and the gearwheel 4.

[0025] The side of the slot 14 that is provided with the toothing 5 and the other side 15 of the slot 14 are both arc formed. The centre of curvature of the arc having the toothing 5 and the centre of curvature of the arc forming the other side 15 of the slot 14 is a turning axis 16 of the lid 3.

[0026] In the embodiment shown in Figures 5, 6, and 7, for example, the slot 14 in the side 12 is a recess in the side 12. Forming the slot 14 as a recess in the side 12 makes the side 12 very strong whereby the overall structure endures use extremely well.

[0027] According to an embodiment the lid 3 is arranged to turn around a turning axis 16, the rotatable drum 2 is arranged to rotate around a rotation axis 17, and the turning axis 16 is at a distance from the rotation axis 17. This embodiment is illustrated in Figure 2, for example.

[0028] The back end of the lid 3 may be provided with a sleeve and the cover 8 of the waste container may also be provided with a sleeve. A pin or metal bar, for example, may be provided through the sleeves such that the sleeves and the pin or bar together form a hinge. The lid 3 may be turned around the hinge. The turning axis 16 resides in the middle of the hinge.

[0029] According to an embodiment the rotatable drum 2 has a central shaft 18 from which the rotatable drum 2 is arrangeable in connection with the waste container 7. The waste feeding device 1 may be arranged in connection with a cover 8 of the waste container or in connection with a body 10 of the waste container. If the waste feeding device 1 is arranged in connection with the cover 8 of the waste container 7, the central shaft 18 may be connected to material of the cover 8 or to the lifting equipment of the cover 8, for example. The central shaft 18 may be connected to a metal beam or metal bar of the lifting equipment of the cover 8, for example.

[0030] The central shaft 18 may be a metal rod or bolt, for example. As shown in Figure 4, for example, the rotatable drum 2 may be provided with a hole 19 for the central shaft 18. A bushing 20 may be provided around the central shaft 18. The rotation axis 17 resides in the middle of the central shaft 18.

[0031] According to an embodiment the side 12 of the lid 3 has a slit 21 for the central shaft 18 of the rotatable drum 2. According to an embodiment the slit 21 has a length defining an amount of turning of the lid 3. Thereby the amount of turning the lid 3 may be easily defined.

[0032] According to an embodiment the lid 3 has a recess 22 provided with a service cover 23. The recess 22 of the lid 3 forms a space for electrical devices of the

waste container 7. The electrical devices may comprise control equipment for controlling an electric lock of the lid 3, communication devices and a power source such as an accumulator, for example.

[0033] According to an embodiment the service cover 23 is a part that is formed when forming the opening 6 of the rotatable drum 2. Thus, the service cover 23 and the rotatable drum 2 are formed together in the same mould. Figure 8 shows the service cover 23 and the rotatable drum 2 after moulding when they are removed from the mould. Thereafter the service cover 23 is removed from the part that forms the rotatable drum 2 and the opening 6 is formed to the rotatable drum 2. This provides an efficient way of manufacturing the device. The number of moulds needed is also very low.

[0034] It will be obvious to a person skilled in the art that, as technology advances, the inventive concept can be implemented in various ways. The invention and its embodiments are not limited to the examples described above but may vary within the scope of the claims.

Claims

1. A waste feeding device of a waste container, the device (1) comprising a rotary drum (2), a lid (3), and a gearing mechanism, the rotary drum (2) having an opening (6) and the rotary drum (2) is rotatable to a feeding position where the opening (6) is upwards and to a discharge position where the opening (6) is downwards, the lid (3) being turnable between an open position and a closed position, and the gearing mechanism is arranged to transform a motion of the lid (3) to a rotation motion of the rotatable drum (2) such that in the open position of the lid (3) the rotatable drum (2) is rotated to the feeding position and in the closed position of the lid (3) the rotatable drum (2) is rotated to the discharge position, **characterized in that** the gearing mechanism comprises a gearwheel (4) and a toothing (5) such that the toothing (5) is integral with the lid (3) the toothing (5) and the lid (3) forming a single uniform piece and optionally such that the gearwheel (4) is integral with the rotatable drum (2) the gearwheel (4) and the rotatable drum (2) forming a single uniform piece.
2. A device as claimed in claim 1, wherein the gearwheel (4) and the rotatable drum (2) are manufactured as the single uniform piece from plastic material by moulding, and/or the toothing (5) and the lid (3) are manufactured as the single uniform piece from plastic material by moulding.
3. A device as claimed in claim 2, wherein the gearwheel (4) and the rotatable drum (2) are manufactured as the single uniform piece from plastic material by moulding, the gearwheel (4) is formed as an outward extending protrusion in an end wall of the

- rotatable drum (2) such that the shape of the end wall forms the gearwheel (4) whereby inside the rotatable drum (2) the end wall comprises a recess (13) that has a shape that corresponds to the shape of the outward extending protrusion forming the gearwheel (4). 5
4. A device as claimed in any one of the preceding claims, wherein the lid (3) is arranged to turn around a turning axis (16), the rotatable drum (2) is arranged to rotate around a rotation axis (17), and the turning axis (16) is at a distance from the rotation axis (17). 10
 5. A device as claimed in any one of the preceding claims, wherein the lid (3) has a top part (11) and sides (12) extending downwards from the top part (11), the side (12) has a slot (14), and the toothing (5) is formed on one side of the slot (14) in the side (12). 15
 6. A device as claimed in claim 5, wherein the other side (15) of the slot (14) is arranged to support the gearwheel (4). 20
 7. A device as claimed in claim 5 or 6, wherein the slot (14) in the side (12) is a recess in the side (12). 25
 8. A device as claimed in any one of the claims 5 to 7, wherein the rotatable drum (2) has a central shaft (18) from which the rotatable drum (2) is arrangeable in connection with the waste container (7) and the side (12) of the lid (3) has a slit (21) for the central shaft (18) of the rotatable drum (2). 30
 9. A device as claimed in claim 8, wherein the slit (21) has a length defining an amount of turning of the lid (3). 35
 10. A device as claimed in any one of the preceding claims, wherein the lid (3) has a recess (22) provided with a service cover (23), the recess (22) of the lid (3) forming a space for electrical devices of the waste container (7). 40
 11. A device as claimed in claim 10, wherein the service cover (23) is a part that is formed when forming the opening (6) of the rotatable drum (2). 45
 12. A method for forming a waste feeding device of a waste container, the device (1) comprising a rotary drum (2), a lid (3), and a gearing mechanism, the rotary drum (2) having an opening (6) and the rotary drum (2) is rotatable to a feeding position where the opening (6) is upwards and to a discharge position where the opening (6) is downwards, the lid (3) being turnable between an open position and a closed position, and the gearing mechanism is arranged to transform a motion of the lid (3) to a rotation motion of the rotatable drum (2) such that in the open position of the lid (3) the rotatable drum (2) is rotated to the feeding position and in the closed position of the lid (3) the rotatable drum (2) is rotated to the discharge position, **characterized by** the gearing mechanism comprising a gearwheel (4) and a toothing (5), forming the toothing (5) integral with the lid (3) such that the toothing (5) and the lid (3) form a single uniform piece and optionally forming the gearwheel (4) integral with the rotatable drum (2) such that the gearwheel (4) and the rotatable drum (2) form a single uniform piece. 50
 13. A method as claimed in claim 12, wherein the gearwheel (4) and the rotatable drum (2) are manufactured from plastic material by moulding, and/or the toothing (5) and the lid (3) are manufactured from plastic material by moulding. 55
 14. A method as claimed in claim 13, wherein the rotatable drum (2) is formed from plastic material by moulding, the lid (3) has a recess (22) provided with a service cover (23), the recess (22) of the lid (3) forming a space for electrical devices of the waste container (7), and the service cover (23) and the rotatable drum (2) are formed together in the same mould.
 15. A method as claimed in claim 13 or 14, wherein the gearwheel (4) and the rotatable drum (2) are manufactured as the single uniform piece from plastic material by moulding, the gearwheel (4) is formed as an outward extending protrusion in an end wall of the rotatable drum (2) such that the shape of the end wall forms the gearwheel (4) whereby inside the rotatable drum (2) the end wall comprises a recess (13) that has a shape that corresponds to the shape of the outward extending protrusion forming the gearwheel (4).

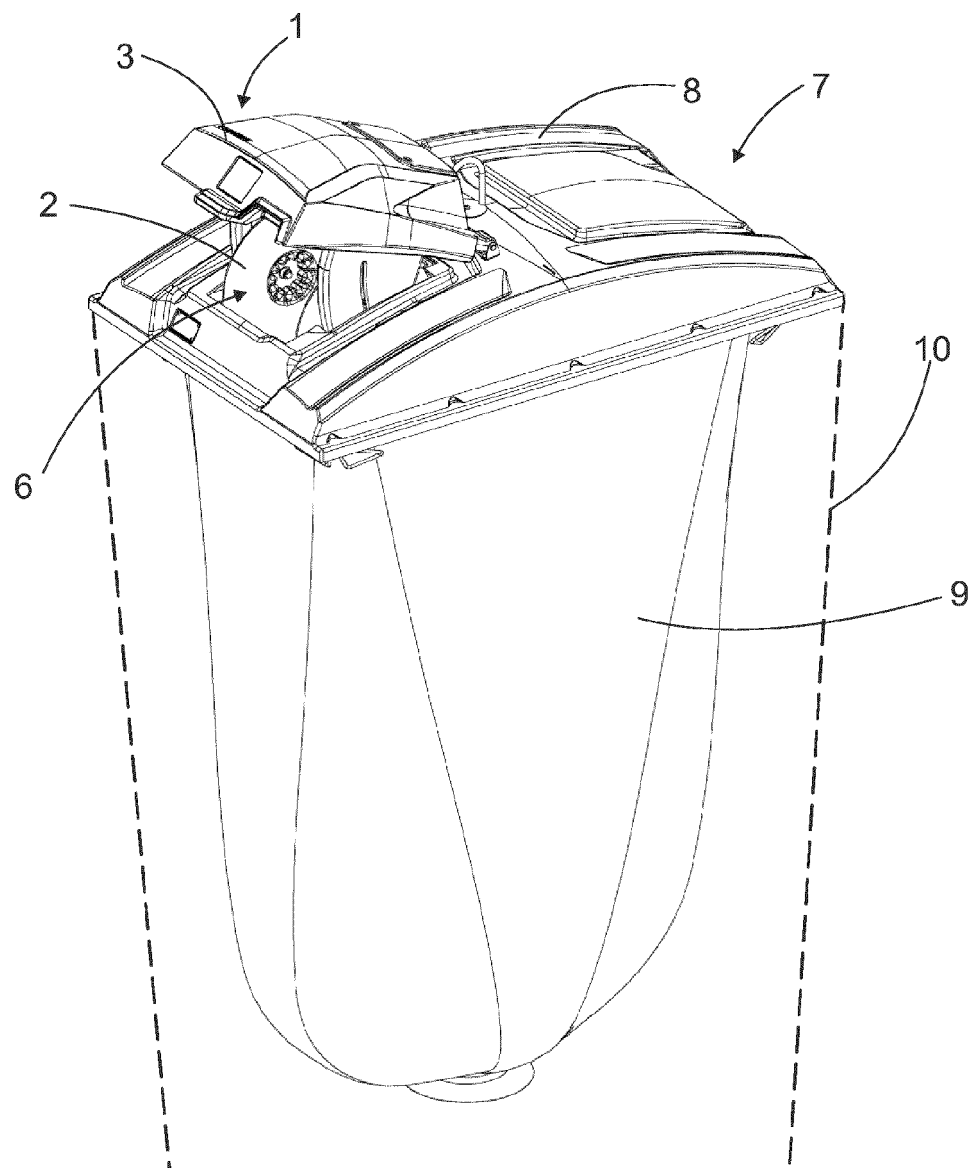


FIG. 1

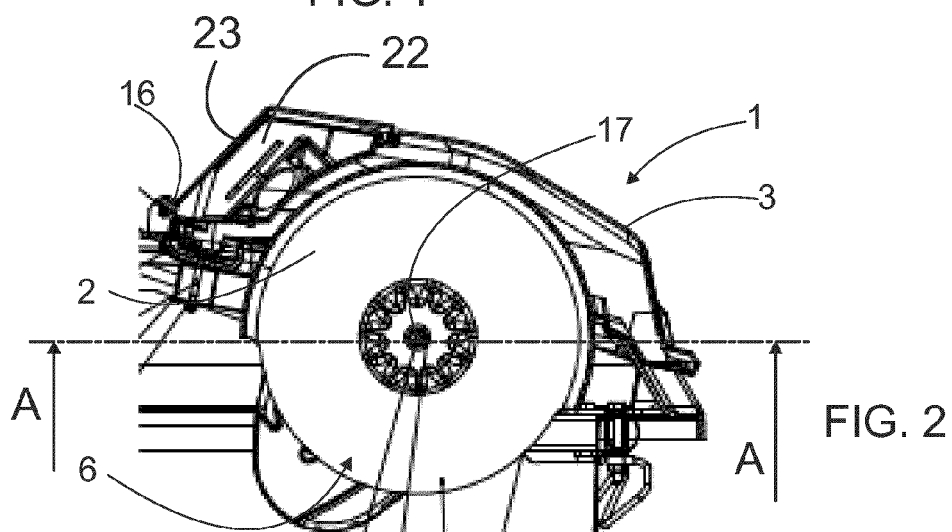


FIG. 2

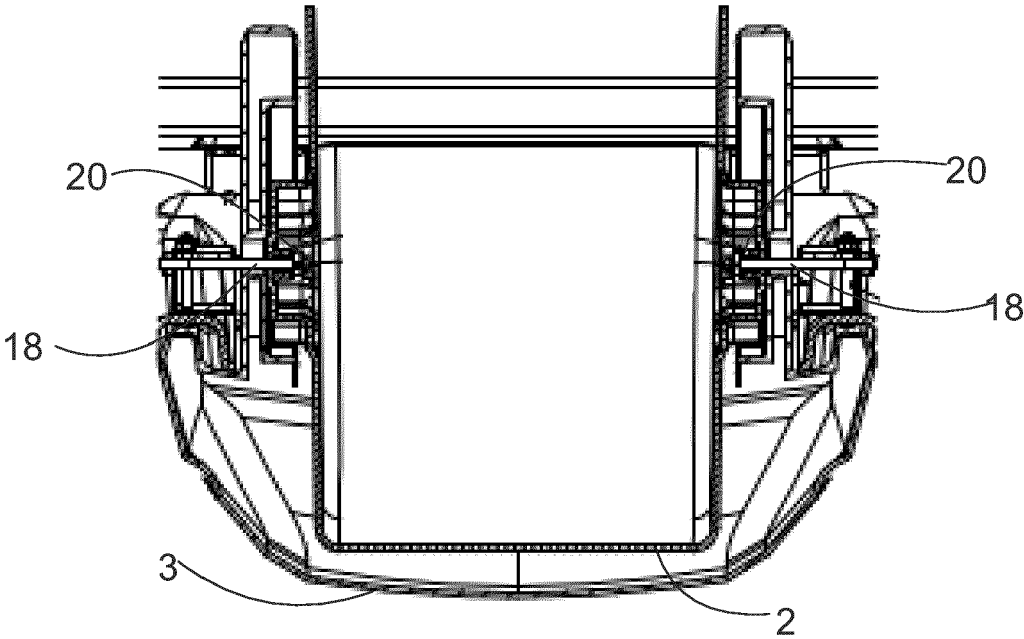


FIG. 3

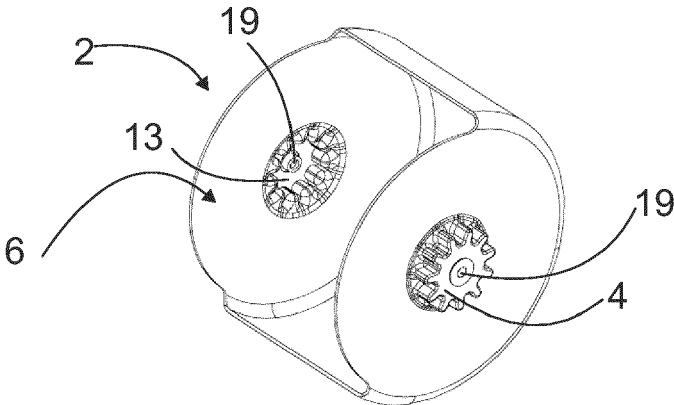


FIG. 4

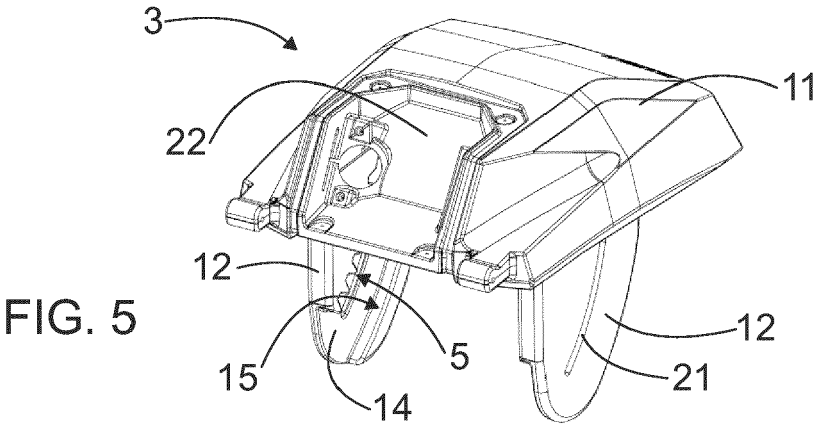


FIG. 5

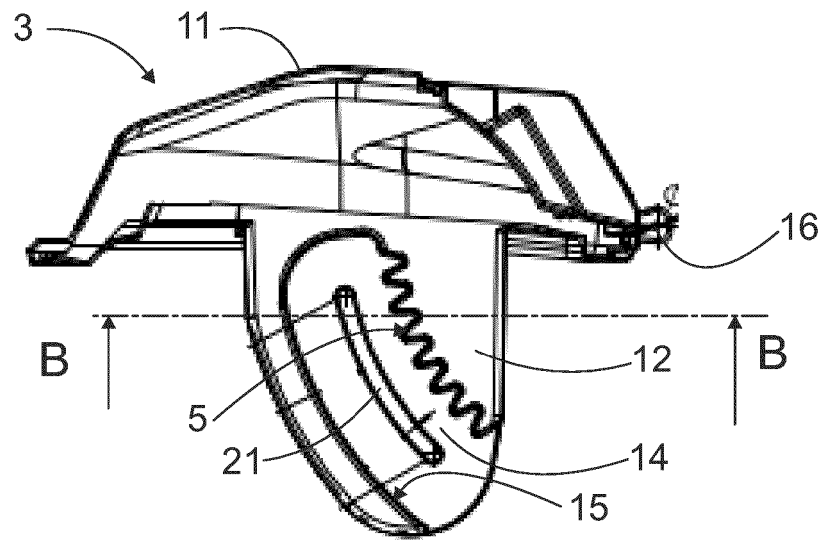


FIG. 6

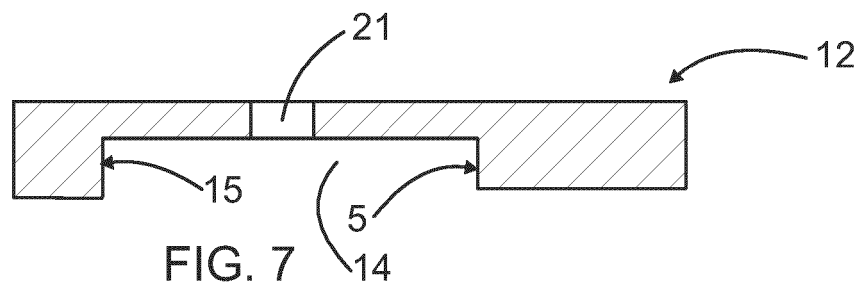


FIG. 7

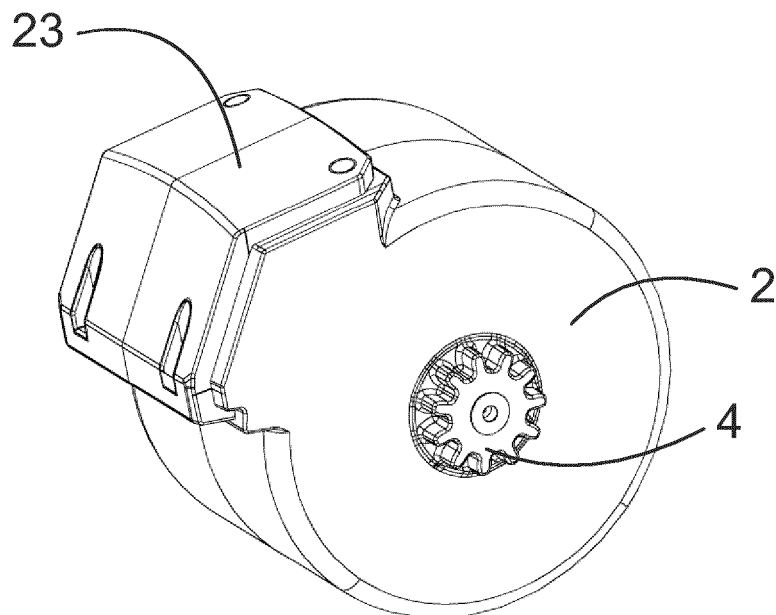


FIG. 8



EUROPEAN SEARCH REPORT

Application Number

EP 24 18 5287

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X A	WO 2017/207871 A1 (MOLOK OY [FI]) 7 December 2017 (2017-12-07) * figures 1-3 *	1,2,4-7, 12,13 3,8-11, 14	INV. B65F1/16
A	FR 2 959 498 A3 (LECOEUR CHRISTOPHE [FR]) 4 November 2011 (2011-11-04) * figure 2 *	1-15	
			TECHNICAL FIELDS SEARCHED (IPC)
			B65F
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 20 December 2024	Examiner de Miscault, Xavier
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10	Patent document cited in search report	Publication date	Patent family member(s)	Publication date
	WO 2017207871 A1	07 - 12 - 2017	NONE	
15	FR 2959498 A3	04 - 11 - 2011	NONE	
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Patent documents cited in the description

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