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(71) Applicant: **Ros Roca Envirotec, S.L.**
25300 Tarrega (ES)

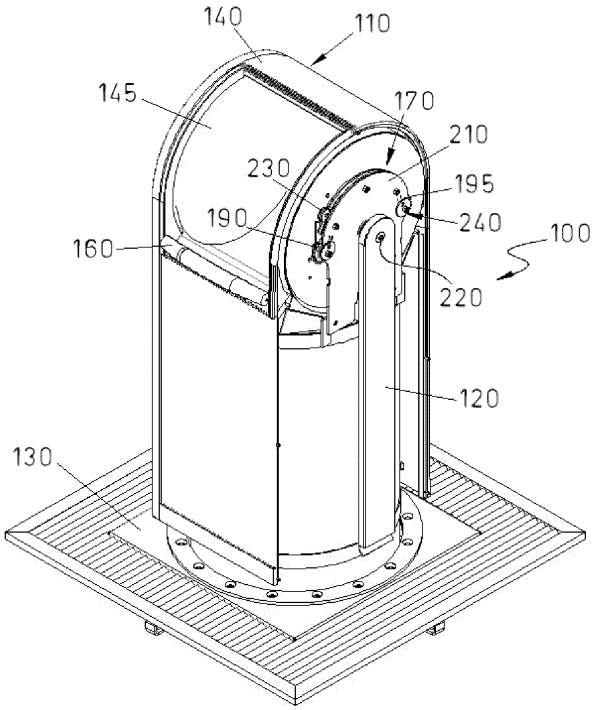
(72) Inventors:
- **Pons Sans, Jaume**
  25300 TÀRREGA (ES)
- **Culleré Vidal, David**
  25300 Tàrrega (ES)

(74) Representative: **ZBM Patents**
Zea, Barlocci & Markvardsen
Plaza Catalunya, 1
08002 Barcelona (ES)

(54) **Refuse container for waste collection**

(57) It comprises a head assembly (110) for containing waste including an inner and outer drums (150, 140) arranged one inside the other so that they can be rotated to each other to define a loading position in which the reception of waste from the outside to the inside of the head assembly (110) is allowed or a unloading position in which the release of the waste contained in the interior of the head assembly (110) into a collecting section is allowed. The refuse container (100) further includes driving means (170) for transmitting the rotation of one drum to the other comprising a driving drag member (180) coupled either to the outer drum (140) or the inner drum (150) which actuation when rotating one of said drums (140; 150) causes rotation in the opposite direction of the other drum (140; 150) to arrange the head assembly (110) in said loading/unloading positions.

FIG.1



EP 2 695 831 A1

Description

[0001] The present invention relates to a refuse container for urban waste collection that is intended primarily but not exclusively to be installed on public spaces. The present refuse container for urban waste collection is generally associated with a pneumatic collection system. Such refuse container comprises a head assembly intended to contain waste therein. The head assembly of the refuse container is conveniently formed by an outer drum and also by an inner drum. In operation, the inner drum is rotatably disposed inside the outer drum. Both drums can be rotated to each other to define a loading position in which reception of waste from outside the head into the inside of the head assembly is allowed, or a unloading position in which the release of waste contained within the inside of the head assembly into a collecting section, typically arranged below the ground level, is allowed. Such loading and unloading positions defined in the refuse container head assembly by rotating the drums to each other are obtained by the user operating the outer drum. Rotation of the outer drum is properly transmitted to the inner drum through the provision of suitable driving means.

BACKGROUND ART

[0002] The use of street refuse containers for urban waste collection is well known in the art. They are receptacles intended to contain a particular type of refuse which can be accessed from the outside.

[0003] For example, the street refuse container described in patent ES2317754 owned by the present applicant is formed by a head assembly intended to contain residues therein. The head assembly has a loading opening and a handle operated closing device is provided.

[0004] The utility model ES1053540U, also owned by the present applicant, discloses a street refuse container comprising a head assembly. The head assembly consists of two drums, an inner drum and an outer drum, mounted concentric with each other and rotating in the opposite direction to each other. Manual rotation of the drums allows a loading position and an unloading position to be defined. Such loading and unloading positions defined by rotating the drums to each other are obtained by the user operating the outer drum. The rotational movement of the outer drum is transmitted to the inner drum. In one embodiment, transmission of movement is performed through driving means consisting of gears associated with both drums and meshed therewith for transmitting the rotational movement from one drum to the other.

[0005] While most refuse containers known hitherto used for urban waste collection in pneumatic collection systems have acceptable performance, there remains the need for improving certain aspects thereof. In particular there is the need for further facilitating the use of the head assembly, especially regarding the loading and unloading operations of the refuse container and also reducing the overall costs of the refuse container. One of the main objects of the present invention is to improve access to the interior of the refuse container by the user from the outside in an easy, convenient, accurate and especially economical way.

SUMMARY OF THE INVENTION

[0006] The present refuse container for urban waste collection comprises a head assembly made of metal, plastic or other suitable resistant material. The head assembly of the refuse container of the invention has an internal space adapted to contain waste. One refuse container is envisaged for each specific type of waste.

[0007] More specifically, the refuse container head assembly of the invention comprises two mutually rotating drums: an outer drum and an inner drum. In use, the inner drum is disposed within the outer drum, so that they can be mutually rotated.

[0008] Rotation of the outer drum relative to the inner drum, which can be performed by manual rotation of the outer drum, allows two different operative positions of the refuse container head assembly to be defined: a loading position in which reception of waste from outside the head into the inside of the head assembly is allowed, and a unloading position in which the release of waste contained within the inside of the head assembly into a collecting section is allowed. The collecting section, which is disposed generally below the ground level, is integrated in a pneumatic collection system and it is not part of the present invention.

[0009] The head assembly of the present refuse container for waste collection further comprises means for transmitting rotary motion from one drum to the other. Such means for transmitting rotary motion allows rotation of one drum to be converted into rotation of the other drum to adequately define the above defined operating positions.

[0010] According to an important aspect of the present invention, the driving means comprise a driving drag member. In a preferred embodiment of the invention, the driving drag member is, for example, a drive chain, specifically an endless (closed) chain. Other forms of driving drag members are not ruled out according to the invention, such as for example a belt drive and the like, provided that the transmission is by dragging.

[0011] The driving drag member (in the preferred embodiment, the chain) is properly coupled to the outer drum or the inner drum. Thus, when rotating one of said drums the other of the drums is synchronously rotated in the opposite direction. This allows properly positioning the head assembly in the above mentioned loading or unloading positions.

[0012] In some embodiments, the driving means comprise, in addition to said drag member, a third wheel that is attached to the inner drum. In use, the driving drag member is meshed with the wheel attached to the inner

drum. Thus, as the outer drum is rotated the driving drag member is displaced and causes the wheel attached to the inner drum to be rotated which in turn causes the inner drum to be rotated in opposite direction to that of the outer drum. This arrangement allows a good transmission for properly positioning the head assembly, that is the inner and outer drums, in the above mentioned loading or unloading positions. In one embodiment, the wheel attached to the inner drum may be mounted concentrically with the inner drum and meshing with the driving drag member (in the preferred embodiment, the chain) through an outer part thereof.

[0013] In a preferred embodiment, the driving means may further include at least two oppositely arranged idler wheels. Thus, in use, the driving drag member is meshed with said two idler wheels and also with the wheel that is attached to the inner drum as described above. Thus, when the outer drum is rotated the driving drag member is displaced causing said two idler wheels to be rotated and also the wheel attached to the inner drum to be rotated in the opposite direction. This, in turn, causes the inner drum to be rotated opposite the outer drum for positioning the head assembly, that is the drums, in said loading or unloading positions.

[0014] The diameters of the first and second idler wheels, and especially the diameter of the third wheel attached to the inner drum where the driving drag member is meshed with, are selected for proper synchronization of the relative movements of the drums depending on the desired multiplication (if required).

[0015] The use of a driving drag member as a driving means, such as a chain, in the waste collection refuse container of the present invention allows costs to be significantly reduced. This reduction of costs is important especially when compared to refuse containers with driving means comprising gears. The lower costs are due to the simplicity of the design and to the low manufacturing costs of the above described driving means. Furthermore, the use of a driving drag member allows for a good synchronization of the movements of rotation of the drums since the teeth of the three wheels engage very precisely the chain links, thus driving the movement smoothly and quietly. With this a high mechanical efficiency mechanism is obtained since no relative displacement exists between the wheels and the chain. In addition, the use of a driving drag member as a driving means allows different configurations including those in which the respective axes of the drums are spaced apart at considerable distances. Finally, a further important advantage of using a driving drag member as the driving means is that operations of maintenance and repair of the driving means are facilitated. For example, if jamming of the driving means occurs, the chain can be loosened and jamming easily removed.

[0016] It is also envisaged that the driving means further comprise means for tensioning the driving drag member. Such tensioning means may consist, for example, of grooves provided on one piece that is fixed relative to the drums. Said grooves are adapted such that the shafts of said opposite idler wheels can be moved therethrough. The relative displacement of said opposite idler wheels, i.e., the increase of distance between the idler wheels, causes tensioning of the driving member. Wheel fastening means associated with said tensioning means can be also provided for fastening the wheels in position in said grooves once the desired chain tension for proper transmission of the movement of the drums in the head assembly of the refuse container has been achieved.

[0017] A counterweight may be provided associated with at least one of said drums to facilitate operation of the refuse container. In one embodiment, the counterweight can be attached to the outer drum of the head assembly. The counterweight is adapted for tending to keep the drums arranged in the unloading position. This also allows compensating for forces for opening and closing the refuse container, thus facilitating its use. Thus, less effort is required by the user for driving the drums when arranging them in the loading or unloading positions.

[0018] In accordance with the invention, provision of damping means is envisaged for absorbing shocks which could occur while driving the drums of the head assembly in the refuse container.

[0019] Further objects, advantages and features of embodiments of the invention will become apparent to those skilled in the art upon examination of the description, or may be learned by practice of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

[0020] A particular embodiment of the present invention is given below by way of a non-limiting example with reference to the accompanying drawings, in which:

Figure 1 is a perspective view of one embodiment of a refuse container for urban waste collection according to the present invention in which a part of the driving means can be seen where the drive chain has been removed for the sake of clarity;

Figure 2 is a side elevational view of the embodiment of the refuse container for urban waste collection in Figure 1 shown in an unloading position, which also partially illustrates the driving means with the drive chain removed for the sake of clarity;

Figure 3 is a side elevational view of the embodiment of a refuse container for urban waste collection in Figure 1, shown in a loading position;

Figure 4 is a front elevational sectional view of the embodiment of the refuse container for urban refuse collection of the invention;

Figure 5 is a perspective view of the outer drum of the refuse container for urban refuse collection of

the invention;

Figure 6 is a perspective view where the driving means of the refuse container are partially shown in which the drive chain has been also removed for the sake of clarity;

Figure 7 is a front elevational view of the driving means shown in Figure 6; and

Figure 8 is a sectional elevational view of one side of the refuse container in the previous figures.

DESCRIPTION OF A PREFERRED EMBODIMENT

[0021] In the figures enclosed herein one embodiment by way of a non-limiting example of a refuse container for waste collection is shown. The refuse container shown in the figures has been generally indicated with reference numeral 100. According to the figures, the refuse container 100 comprises a head assembly 110, made for example of a metal resistant for being installed in the street, and a support structure 120 intended to be coupled to the ground through a base 130, as generally shown in Figure 1.

[0022] The head assembly 110 of the refuse container 100 is a hollow body having an internal space 115. The internal space 115 is conveniently adapted to contain residues therein loaded by a user from the outside. The head assembly 110 of the refuse container 100 comprises an outer drum 140 and an inner drum 150. Both drums 140, 150 are mounted on the support structure 120 of the refuse container 100 so that they can be rotated to each other. The inner drum 150 of the head assembly 110 is disposed within the outer drum 140.

[0023] The head assembly 110 of the refuse container 100 is driven through the outer drum 140 of the head assembly 110. A knob 160 is provided to drive the rotating outer drum 140. The knob 160 is a piece that is attached to the outer drum 140. The knob 160 allows the outer drum 140 to be manually rotated comfortably by the user from the outside of the refuse container 100.

[0024] Rotation of the outer drum 140 to the inner drum 150 allows a loading position, as shown in Figure 3, and an unloading position, as shown in Figure 2, to be defined. In the loading position, waste can be loaded by the user from the outside into the interior 115 of the head assembly 110. In the unloading position the refuse received in the interior 115 of the head assembly 110 can be released into a collecting section (not shown) located below the ground.

[0025] With particular reference to Figures 6 and 7 of the drawings, the head assembly 110 of the refuse container 100 includes driving means 170. The driving means 170 act as mechanical means for synchronization of the rotational movement of the outer drum 140 and the inner drum 150. In particular, the driving means 170 are adapted to allow rotation of the outer drum 140 when actuated by the user through the knob 160 to be converted into rotation of the inner drum 150.

[0026] As seen in the above mentioned figures 6 and 7 of the drawings, the driving means 170 comprise, in the particular embodiment shown merely by way of a non-limiting example, a driving drag member 180, a first idler wheel 190, a second idler wheel 195, opposite the first idler wheel 190, and a third wheel 200 attached to the inner drum 150. In the embodiment, the shaft 220 of the third wheel 200 coincides with the shaft 220 of the inner drum 150 so that these elements (the third wheel 200, the common shaft 220 and the inner drum 150) are rotated at the same time.

[0027] The first and second idler wheels 190, 195 of the means 170 for transmitting the movement of the drums 140, 150 are mounted opposite each other spaced apart at a given distance. The first and second idler wheels 190, 195 are arranged on a supporting substructure 210 so that they can be freely rotated. The third wheel 200 of the driving means 170 is provided concentrically to the inner drum 150 and, as noted above, coupled to its rotation shaft 220. As a result, the third wheel 200 rotates with the inner drum 150 as it is driven, as indicated too. A bearing 225 is provided above the shaft, 220 attached to the outer drum 140 which allows the movement of the two concentric drums 140, 150 of head assembly 110.

[0028] In the particular embodiment shown by way of a non-limiting example in the figures, the driving drag member 180 consists of a drive chain. As depicted in Figure 6, the drive chain 180 engages the first and second idler wheels 190, 195 and also the third wheel 200. In particular, the third wheel 200 is meshed outwardly with the drive chain 180, as it can be seen, thereby providing a more efficient transmission.

[0029] In order to facilitate the drag movement of the drive chain 180, the supporting substructure 210 is provided with a sliding member (not shown). This sliding member facilitates sliding of the drive chain 180 at the top of the supporting substructure 210. The sliding member may be a low-friction wearproof semicircular plastic piece. The sliding member is configured so that the path of the chain link 230 is followed by the drive chain 180.

[0030] The drive chain 180 has, in a section thereof, a coupling 230 attached thereto by any suitable means. Specifically, this coupling is a pivot 230 that is suitably adapted for fixedly joining the outer drum 140 of the head assembly 110 to a point of the drive chain 180. The coupling 230 may be removable to facilitate repair and/or maintenance operations of the driving means 170.

[0031] With the above described configuration, starting from the unloading position, which is the default position of the head assembly 110 of the refuse container 100, as shown in Figure 2 of the drawings, the outer drum 140 is driven by the user to get the loading position of head assembly 110 of the refuse container 100, shown in Figure 3, for accessing the interior 115 of the head assembly 110 and for being able to put the waste in the interior

thereof. Specifically, for performing this action, the outer drum 140 is manually driven in rotation by the user using the knob 160 coupled thereto. Upon rotation of the outer drum 140, the drive chain 180 is moved through its coupling 230 that joins it to the outer drum 140. The displacement of the drive chain 180 thus causes the opposite idler wheels 190, 195 to be rotated in the same direction and the third wheel 200 to be rotated in the opposite direction. Rotation of the third wheel 200 in the opposite direction to the idler wheels 190, 195, also causes the inner drum 150 to be rotated synchronously in the opposite direction to the rotation of the outer drum 140 due to the connection between the third wheel 200 and the inner drum 150.

[0032] The particular embodiment of the driving means 170 driven by a driving drag member 180 in the form of a chain allows a very accurate and smooth synchronization of the rotational movements of the drums 140, 150. The driving means 170 for transmitting the rotational movements of said drums 140, 150 allows opening or access area 145 to be exposed when the refuse container 100 is opened by the user (loading position) by actuating the knob 160 of the outer drum 140 allowing reception of the waste loaded by the user in the interior 115 of the head assembly 110. When closing the head assembly 110 of the refuse container 100 by actuating the outer drum 140, and with the help of a counterweight 260, the access area 145 of the outer drum 140 is closed (unloading position). Simultaneously, a discharge area 155 inside the inner drum 150 is left open for releasing of waste into a collecting section (not shown) located below the ground. These movements, as indicated, are carried out smoothly and accurately.

[0033] In order to maintain the refuse container 100 in the unloading position as a default position, a counterweight 260 is provided as explained above. The counterweight 260 is coupled to the outer drum 140 in a radial position. This position at which the counterweight 260 is coupled to the outer drum 140 tends to keep the drums 140, 150 in the unloading position when not actuated. In addition to keep the refuse container 100 in the unloading position as a default position, the counterweight 260 also facilitates actuation of the refuse container 100 to compensate for opening and closing efforts. In particular, the counterweight 260 allows the user to perform the opening and closing operations of the head assembly 110 of the refuse container 100 with minimal efforts. As shown in Figure 3 of the appended drawings, a tensioner 265 is provided to adjust the position of said counterweight 260.

[0034] In the particular embodiment shown by way of a non-limiting example, the driving means 170 also include tensioning means 240. The tensioning means 240 are intended to allow the tension of the drive chain 180 (driving drag member) to be adjusted. For this purpose, in the embodiment shown, the tensioning means 240 comprise respective slots 250, 255 formed in the supporting substructure 210. The slots 250, 255 of the tensioning means 240 are adapted so that the respective axis of the first and second idler 190, 195 can be moved therethrough. By moving each opposing idler wheels 190, 195 away from each other the drive chain 180 is tensioned. Once the required tension of the drive chain 180 has been achieved, the shaft of the opposite idler wheels 190, 195 is fixed against displacement to the supporting substructure 210. This is carried out through fastening means such as screws and nuts. The tensioning means 240 are used to adjust the tension of the chain 180 in order to provide a precise adjustment of the movement of the drums 140, 150.

[0035] The provision of damping means 270 is also envisaged. The damping means 270 consist of elastomer blocks adapted to absorb shocks that may occur when driving the drums 140, 150 of the head assembly 110 in rotation.

[0036] It has been found that with the above described configuration movements of the drums 140, 150 of the head assembly 110 are much smoother and simpler than other refuse containers used for the same purpose. It has also been found that the overall costs of the refuse container 100 are considerably reduced due to the simplicity of the driving means 170 and since machining operations of many components involved in the driving means 170 and other mechanical elements of the refuse container 100 are reduced. Since a better fitting of the relationship of the relative movement between the inner drum 150 and the outer drum 140 is obtained, gaps between access openings 145, 155 in the loading and unloading positions are significantly reduced and consequently a much smoother and accurate movement of the drums 140, 150 is achieved when the refuse container 100 of the present invention is employed by the user.

[0037] Although only a number of particular embodiments and examples of the invention have been disclosed herein, it will be understood by those skilled in the art that other alternative embodiments and/or uses of the invention and obvious modifications and equivalents thereof are possible. Furthermore, the present invention covers all possible combinations of the particular embodiments described. The scope of the present invention should not be limited by particular embodiments, but should be determined only by a fair reading of the claims that follow.

Claims

1. A refuse container for waste collection (100) comprising a head assembly (110) adapted to contain waste, the head assembly (110) comprising an outer drum (140) and an inner drum (150), the drums (140, 150) being arranged one inside the other so that they can be rotated to each other to define a loading position in the which the reception of waste from the outside to the inside of the head assembly (110) is allowed or a unloading position in which the release of the waste contained in the interior of the head

assembly (110) into a collecting section is allowed, and the refuse container (100) further comprising driving means (170) for transmitting the rotational movement of one drum to the other, wherein said driving means (170) comprise a driving drag member (180) coupled either to the outer drum (140) or the inner drum (150) the actuation of which by rotating one of said drums (140; 150) causes rotation in the opposite direction of the other drum (140; 150) to arrange the head assembly (110) in said loading or unloading positions.

2. The refuse container (100) of claim 1, wherein the driving means (170) further comprise a wheel (200) attached to the inner drum (150), the driving drag member (180) being meshed with said wheel (200) attached to the inner drum (150) so that the actuation of the driving drag member (180) to rotate the outer drum (140) causes the rotation of the wheel (200) attached to the inner drum (150) causing the rotation of the inner drum (150) in the opposite direction to the outer drum (140) to arrange the head assembly (110) in the loading or unloading positions.

3. The refuse container (100) of claim 2, wherein the driving means (170) further comprise at least two opposite idler wheels (190, 195), the driving drag member (180) meshing with said two idler wheels (190, 195) and with said wheel (200) attached to the inner drum (150) so that the actuation the driving drag member (180) when rotating the outer drum (140) causes the rotation of said two idler wheels (190, 195) and the rotation of the wheel (200) attached to the inner drum (150) in the opposite direction and thus causing the rotation of the inner drum (150) in the direction opposite to the outer drum (140) to arrange the head assembly (110) in the loading or unloading positions.

4. The refuse container (100) of claim 3, wherein the driving means (170) further comprise tensioning means (240) for tensioning the driving drag member (180).

5. The refuse container (100) of claim 4, wherein the tensioning means (240) of the driving drag member (180) comprise slots (250, 255) through which the shaft of said at least two opposite idler wheels (190, 195) can be moved so that their relative displacement causes tensioning of the driving drag member (180).

6. The refuse container (100) of any of the preceding claims, wherein the wheel (200) attached to the inner drum (150) is arranged concentrically to the inner drum (150) and engaging the outside of the driving drag member (180).

7. The refuse container (100) of any of the preceding claims, wherein driving drag member (180) is a chain.

8. The refuse container (100) of any of the preceding claims, wherein further comprises a counterweight (260) associated with at least one of said drums (140, 150) to facilitate its operation.

9. The refuse container (100) of any of the preceding claims, wherein it further comprises damping (270) means to absorb shocks when driving said drums (140, 150).

FIG.1

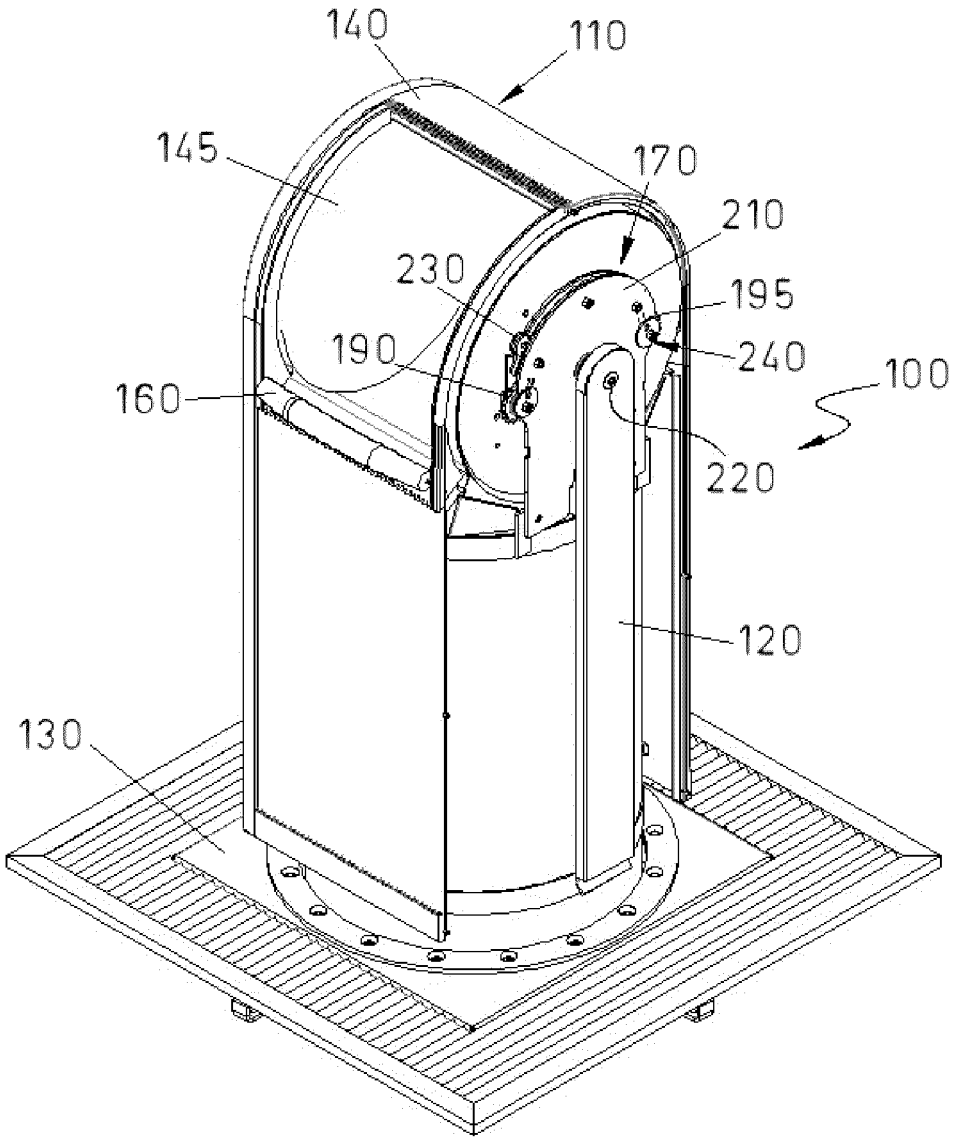


FIG.2

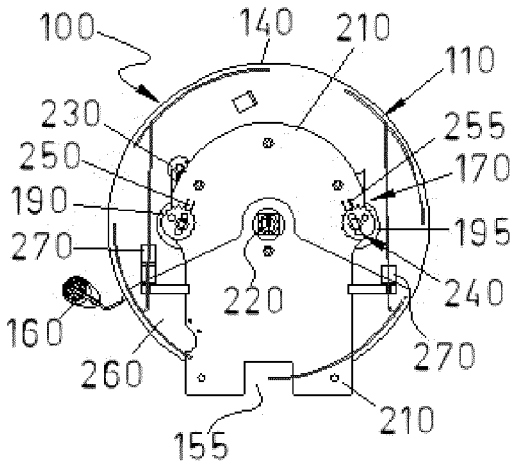


FIG.3

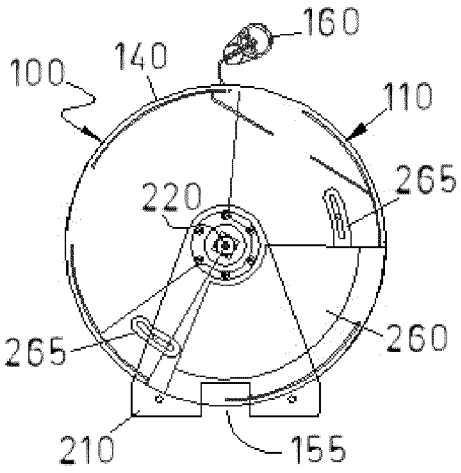


FIG.4

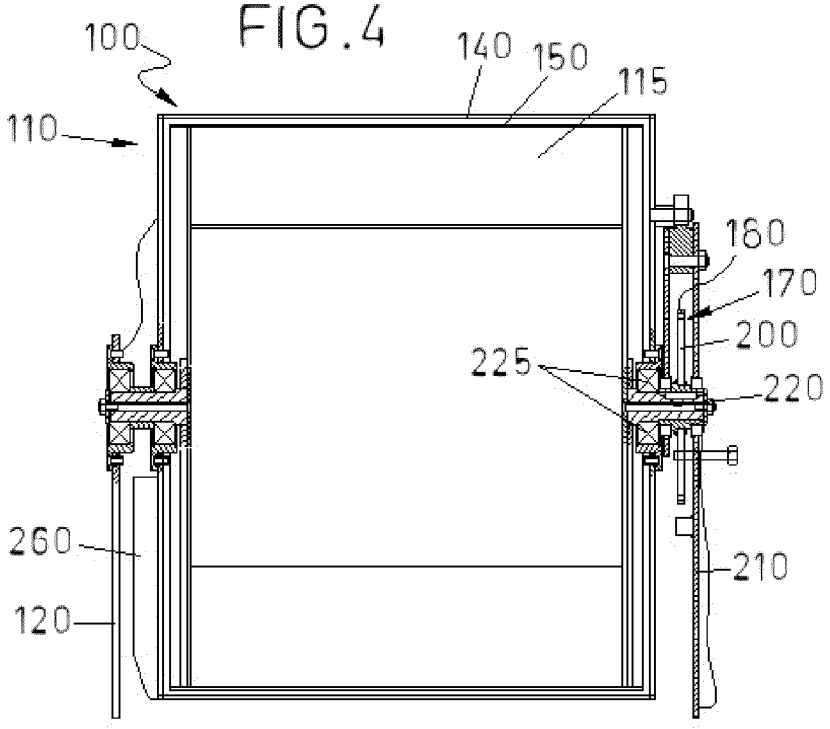


FIG.5

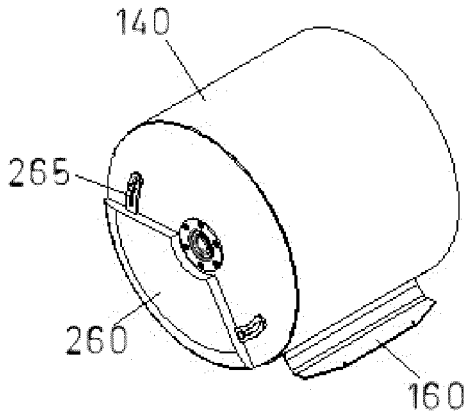


FIG.6

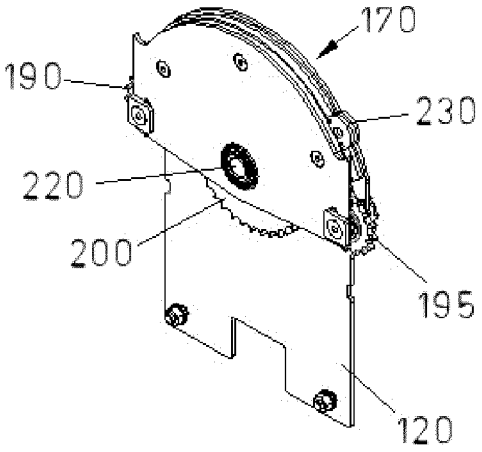


FIG.7

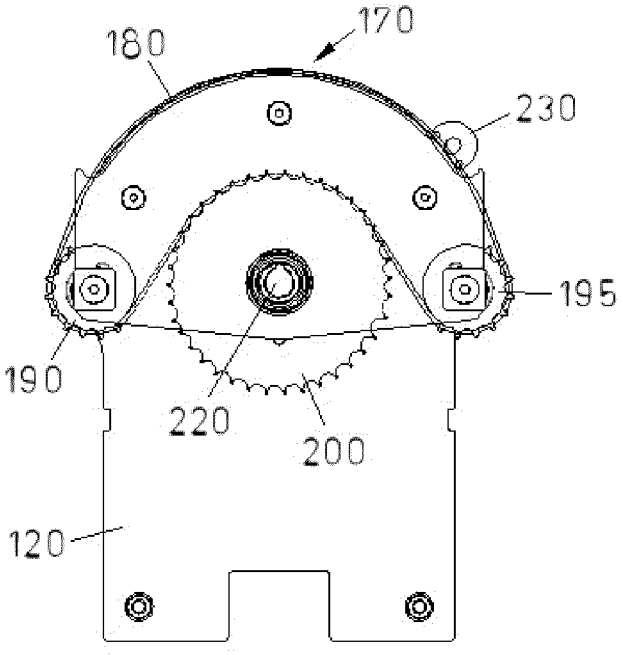
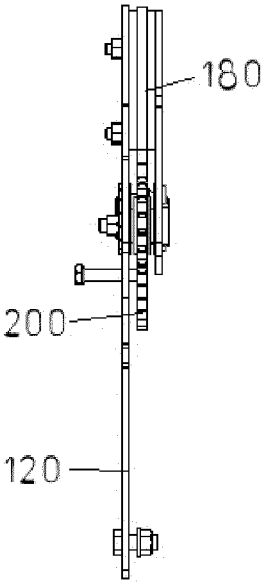


FIG.8



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EUROPEAN SEARCH REPORT

Application Number
EP 12 38 2323

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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			TECHNICAL FIELDS SEARCHED (IPC) B65F

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	10 December 2012	Smolders, Rob

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