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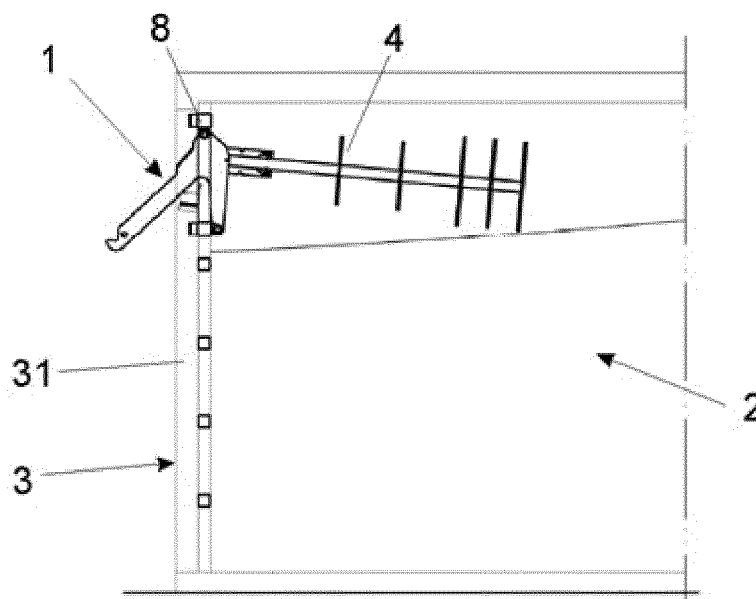
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(54) **Device for breaking up lumps for the free-flowing unloading of granulates into container receptacles**

(57) A device for breaking up lumps for the free-flowing unloading of granulates into container receptacles, for granulates contained in liner-type bags (2) in shipping containers (3), comprising a grinding unit (4) formed by a rotating shaft (5) operated by an electric motor (6), and to the lower end of which there are coupled one or more blades (7), and a securing frame (8) provided with means for fixing and clamping to the frame (31) of the container,

said unit and said securing frame being linked to one another in an articulated manner enabling a rest position aligned with the securing frame (8) for storing, moving and introducing it in the container, and a use position perpendicular to the securing frame (8) and with the blades (7) inside the bag (2) immersed in the granulated product.

FIG. 8



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Description

Object of the Invention

[0001] As expressed by the title of the present specification, the invention relates to a device for breaking up lumps for the free-flowing unloading of granulates into container receptacles.

[0002] More particularly, the object of the invention focuses on a device specifically designed and structured to facilitate discharging or unloading goods, particularly granulates, which are transported in bulk in shipping containers incorporated inside large receptacles in the form of bags of the type called liners, said device being conceived for shifting around said granulates, preventing the formation of lumps which prevent the proper flow thereof through the outlet valve of said bags.

Field of Application of the Invention

[0003] The field of application of the present invention is within the logistics sector, focusing on the area of apparatus, machines and devices for systems for loading and unloading goods, particularly granulated solid goods, from shipping containers into silos.

Background of the Invention

[0004] As is known, receptacles called liners, which normally cover the entire container capacity, are used today to facilitate transport in containers and unloading granulated solid goods (different grain thicknesses) into silos.

[0005] The liner is a large bag which is introduced in shipping transport containers and has certain benefits for filling, closing, fixing and opening it for unloading purposes.

[0006] Compared to conventional small packaging, such as woven sacks or ton sacks, transporting in liners has considerable advantages, such as the increase in volume per packaging unit, easy loading and unloading, reduced unloading time, etc.

[0007] The structure of the liners can be variable, and they can usually be loaded through the upper portion and unloaded through the lower portion through the corresponding opening or valve.

[0008] The problem is that granulates often cake and form blocks or lumps that prevent successfully concluding the unloading process at the destination, because the good do not flow loosely towards the rotary valve responsible for driving said good to the filling ducts of the destination receptacle or deposit (usually silos), which can even make unloading impossible.

[0009] The goods can be of many different kinds, ranging from goods intended for animal feed to goods, such as raw material, intended for the production of plastic manufactures, and users of the liner in container receptacle system experience, due to said inability of free-flow-

ing unloading, return costs and sometimes destruction costs for goods when their condition does not allow unloading.

[0010] Therefore, the objective of the present invention is to avoid said drawbacks by providing the market with a device capable of breaking up and grinding possible lumps of caked material that may have formed inside the liners before the unloading operation so that optimal unloading occurs.

[0011] On the other hand, it should be mentioned that the applicant is unaware of the existence of any other device for breaking up lumps for the free-flowing unloading of granulates into container receptacles, or of any other invention having a similar application, with technical, structural and constitutive features similar to those of the invention herein described and claimed.

Description of the Invention

[0012] Therefore, the device for breaking up lumps for the free-flowing unloading of granulates into container receptacles proposed by the present invention is a novelty in the corresponding field of application, because the objectives indicated above are specifically met as a result of its implementation, the characterizing details making this possible, and said details are suitably described in the final claims accompanying the present specification.

[0013] The device of the invention specifically consists of a grinding unit which, operated by means of an electric motor, comprises a rotating shaft to which there are coupled blades which are introduced in the bag or liner receptacle for shifting around the granulated product and breaking up possible lumps when said blades turn, said grinding unit being coupled to a securing frame designed specifically for being coupled tightly by means of hydraulic pressure to the frame of the container in which the bag is located, and thus assuring the fixing of the device in the container, allowing optimal work thereof with complete safety.

[0014] Furthermore, according to another feature of the invention, said grinding unit and said frame are coupled by means of a safety bolt and hinge system allowing the lowering of the grinding unit with respect to the securing frame and the fixing thereof in the work position to facilitate the moving and coupling operations and the incorporation of the unit into the bag, there also having been provided a storage support which facilitates both securing the assembly of the unit for moving it, for example, by means of a forklift, and for hanging it to store it in a safe and suitable manner when it is not being used, without experiencing damage in the area of the blades.

[0015] The described device for breaking up lumps for the free-flowing unloading of granulates into container receptacles is an innovative structure with structural and constitutive features that were unknown up until now for its intended purpose, and these reasons combined with its practical usefulness give the invention sufficient grounds for obtaining the exclusive right that is sought.

Description of the Drawings

[0016] To complement the description that is being made and for the purpose of aiding to better understand the features of the invention, a set of drawings is attached to the present specification as an integral part thereof, wherein the following has been depicted with an illustrative and non-limiting character:

Figure 1 shows a front elevational view of an embodiment of the device for breaking up lumps for the free-flowing unloading of granulates into container receptacles, object of the invention, showing the main parts and elements comprised therein.

Figure 2 shows a plan section view of the device shown in the preceding figure, depicted in this case without a motor or gears, such that in addition to the securing frame and the hinge provided in it, the configuration of the rotating shaft and the blades incorporated in said shaft which shift around the granulate, is seen clearly.

Figure 3 shows a side elevational view of an example of the device according to the invention, again shown as a complete assembly.

Figure 4 shows a detail of the edge of the securing frame and the manner in which the notches thereof are coupled to the rods of the container.

Figure 5 shows an enlarged detail view of the connecting flat bars incorporated in the upper portion of the grinding unit for the articulated coupling to the securing frame, furthermore showing the arrangement of the motor, the gears and the sleeve of the shaft.

Figure 6 shows a side elevational view of an example of the storage support contemplated by the device of the invention.

Figure 7 shows a side elevational view of the device according to the invention coupled to the storage support and arranged on the forks of a forklift for transport.

Figures 8 and 9 show respective section views of a container to which the device of the invention has been coupled, Figure 8 showing the initial position of introduction and coupling, with the shaft of the grinding unit in a raised position over the bag, and Figure 9 showing the use position with the shaft of the grinding unit in the vertical position once immersed in the bag.

Preferred Embodiment of the Invention

[0017] In view of said drawings and according to the numbering used, a preferred but non-limiting embodiment of the device for breaking up lumps for the free-flowing unloading of granulates into container receptacles, object of the invention, comprising the parts and elements indicated and described below, can be seen in said drawings.

[0018] As seen in said drawings, the device (1) at hand is intended for use for shifting around granulates contained inside liner-type bags (2), incorporated in shipping containers (3), for the purpose of crumbling, breaking up and grinding possible lumps of compacted product before unloading operations and obtaining proper flow thereof in said operations.

[0019] To that end, said device comprises a grinding unit (4) basically formed by a rotating shaft (5) operated by an electric motor (6) and to the lower end of which there are coupled one or more blades (7), and a securing frame (8) with means that allow fixing and clamping to the frame (31) of the container, said unit and said securing frame being linked to one another in an articulated manner to enable introducing the rotating shaft (5) with the blades (7) through the upper portion of the bag (2) in a first position (Figure 8) and, once the securing frame (8) is fixed, introducing said blades (7) in the bag (2) for shifting around the product (Figure 9).

[0020] Going into further details about the device, and considering Figures 1 to 4, it can be seen how the securing frame (8) consists of a metal tubular structure in the form of a rectangular casing, made up of two parts (81) which are coupled to one another upon insertion of the tubes of one into the tubes of the other with the possibility of expansion in order to fit the width of the frame of the container (3), it having been provided that the fixing is by means of pressure as a result of a hydraulic jack (9) (the circuit of which has not been depicted) which links both parts of the frame by means of respective screwed attachments (91), by operating on the hydraulic pressure system, the frame expand towards the sides and fixes the sides of the frame (31) of the container (3).

[0021] Additionally, and to assure the fixing of the securing frame (8) to the frame of the container (3), the distal ends of the two parts (81) forming the frame (8) are cylindrical tubes (82) in which there have been provided a series of notches (83) at different heights to make them fit with the rods (32) usually incorporated in the container (3) in the inner portion of its sides, as depicted in Figure 4.

[0022] In turn, as can be seen in Figure 5, there has been provided in the upper portion of the rotating shaft (5) for coupling to the motor (6) and transmitting the rotational movement thereof to said rotating shaft (5), a gear mechanism (10) specifically formed by two bevel gears, which are suitably protected inside a metal case (11), to the lower part of which there is coupled a sleeve (12) with respective bearing groups (121) incorporated in its respective upper and lower ends, which sleeve (12) is coupled to the upper end of the rotating shaft (5), screwed below the case (11), serving as a reinforcing element of the assembly to assure the sturdiness of the attachment and to be able to withstand the stress to which it will be subjected in use.

[0023] At the same time, said upper portion of the grinding unit (4) has, on both sides of the case (11), respective parallel and identical connecting flat bars (13) integrally attached to said case (11) which have respective front

prolongations (131, 131') with respective holes (132) at their ends, as well as a third hole (132) in the rear portion of the flat bars opposite said prolongations which allow the articulated attachment of the grinding unit (4) with the securing frame (8) and the fixing thereof in rest or work positions, as will be explained below.

[0024] Therefore, to attach the unit (4) to the securing frame (8), the hole (132) at the end of the lower prolongation (131) of the connecting flat bars (13) is matched up with the hinge (14) provided in the lower central area of the frame (8), passing a bolt (15) therethrough, this being the point of articulated attachment between both portions of the device.

[0025] At the same time, in the upper portion of the frame (8) there has been provided a laterally movable safety pin (16) which, if fastened through the holes (132) of the rear portion of the connecting flat bars (13), assures the position of the grinding unit (4) in the rest position aligned with the securing frame (8), which serves for storing, moving and introducing it in the container

[0026] (Figures 7 and 8), and if said pin (16) is fastened through the holes (132) at the end of the upper prolongation (131') of the connecting flat bars (13), it assures the position of the grinding unit (4) in the use position, perpendicular to the securing frame (8) (Figure 9).

[0027] Considering Figures 6 and 7, it can be seen how the device (1) contemplates the use of a storage support (17) which, in the form of a triangular tubular structure and provided with hooks (171), allows both hanging the device suspended from the securing frame (8), and safely transporting it on the fork (18) of a forklift to facilitate moving it from the point of storage to the incorporation in the container (3).

[0028] Having sufficiently described the nature of the present invention and a manner of putting it into practice, it is not considered necessary to further explain the invention so that a person skilled in the art can understand its scope and the advantages derived from it, hereby stating that within its essential features, the invention can be carried out to practice in other embodiments differing in detail from the embodiment indicated by way of example and they will also be granted the protection that is sought provided that the fundamental principle is not altered, changed or modified.

Claims

1. A device for breaking up lumps for the free-flowing unloading of granulates into container receptacles, applicable for shifting around granulates contained inside liner-type bags (2), incorporated in shipping containers (3) for the purpose of crumbling, breaking up and grinding possible lumps of compacted product before unloading operations, **characterized by** comprising a grinding unit (4), formed by a rotating shaft (5) operated by an electric motor (6) and to the lower end of which there are coupled one or more

blades (7), and a securing frame (8) provided with means for fixing and clamping to the frame (31) of the container, said unit and said securing frame being linked to one another in an articulated manner, enabling a rest position aligned with the securing frame (8) for storing, moving and introducing it in the container, and a use position perpendicular to the securing frame (8) and with the blades (7) inside the bag (2) immersed in the granulated product.

2. The device for breaking up lumps for the free-flowing unloading of granulates into container receptacles according to claim 1, **characterized in that** the means for fixing and clamping the securing frame (8) to the frame (31) of the container (3) work under pressure.
3. The device for breaking up lumps for the free-flowing unloading of granulates into container receptacles according to claim 1 or 2, **characterized in that** the securing frame (8) consists of a metal tubular structure in the form of a rectangular casing, made up of two parts (81) which are coupled to one another with the possibility of expansion in order to fit the width of the frame of the container (3).
4. The device for breaking up lumps for the free-flowing unloading of granulates into container receptacles according to claim 2 or 3, **characterized in that** the pressure fixing of the securing frame (8) is by means of a hydraulic jack (9).
5. The device for breaking up lumps for the free-flowing unloading of granulates into container receptacles according to any of claims 1-4, **characterized in that** the distal ends of the frame (8) are cylindrical tubes (82) in which there have been provided notches (83) at different heights which can fit with the rods (32) incorporated in the container (3) in the inner portion of its sides.
6. The device for breaking up lumps for the free-flowing unloading of granulates into container receptacles according to any of claims 1-5, **characterized in that** a gear mechanism (10) has been provided in the upper portion of the rotating shaft (5) for coupling to the motor (6) and transmitting the rotational movement thereof to said rotating shaft (5).
7. The device for breaking up lumps for the free-flowing unloading of granulates into container receptacles according to claim 6, **characterized in that** the gear mechanism (10) consists of two bevel gears.
8. The device for breaking up lumps for the free-flowing unloading of granulates into container receptacles according to claim 6 or 7, **characterized in that** the gear mechanism (10) is arranged inside a metal case

(11).

9. The device for breaking up lumps for the free-flowing unloading of granulates into container receptacles according to any of claims 1-8, **characterized in that** a sleeve (12), with respective bearing groups (121) incorporated in its respective upper and lower ends, is coupled to the upper end of the rotating shaft (5). 5

10. The device for breaking up lumps for the free-flowing unloading of granulates into container receptacles according to any of claims 1-9, **characterized in that** in the upper portion of the grinding unit (4) there are respective parallel and identical connecting flat bars (13) which, integrally attached to said upper portion, have holes (132) for the articulated attachment with the securing frame (8) and fixing in the rest or use positions. 10 15

11. The device for breaking up lumps for the free-flowing unloading of granulates into container receptacles according to claim 10, **characterized in that** the point of articulated attachment between the grinding unit (4) and the securing frame (8) is a hinge (14) provided in the lower central area of the frame (8) attached to the connecting flat bars (13) through a bolt (15) passing through the hole (132) at the end of the lower prolongation (131) of said connecting flat bars (13). 20 25 30

12. The device for breaking up lumps for the free-flowing unloading of granulates into container receptacles according to claim 10 or 11, **characterized in that** in the upper portion of the frame (8) there has been provided a laterally movable safety pin (16), suitable for being fastened either through holes (132) of the rear portion of the connecting flat bars (13), to assure the position of the grinding unit (4) in the rest position, or through the holes (132) at the end of the upper prolongation (131') of the connecting flat bars (13), to assure the position of the grinding unit (4) in the use position. 35 40

13. The device for breaking up lumps for the free-flowing unloading of granulates into container receptacles according to any of claims 1-12, **characterized in that** it contemplates the use of a support (17), in the form of a triangular tubular structure and provided with hooks (171). 45 50

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FIG. 1

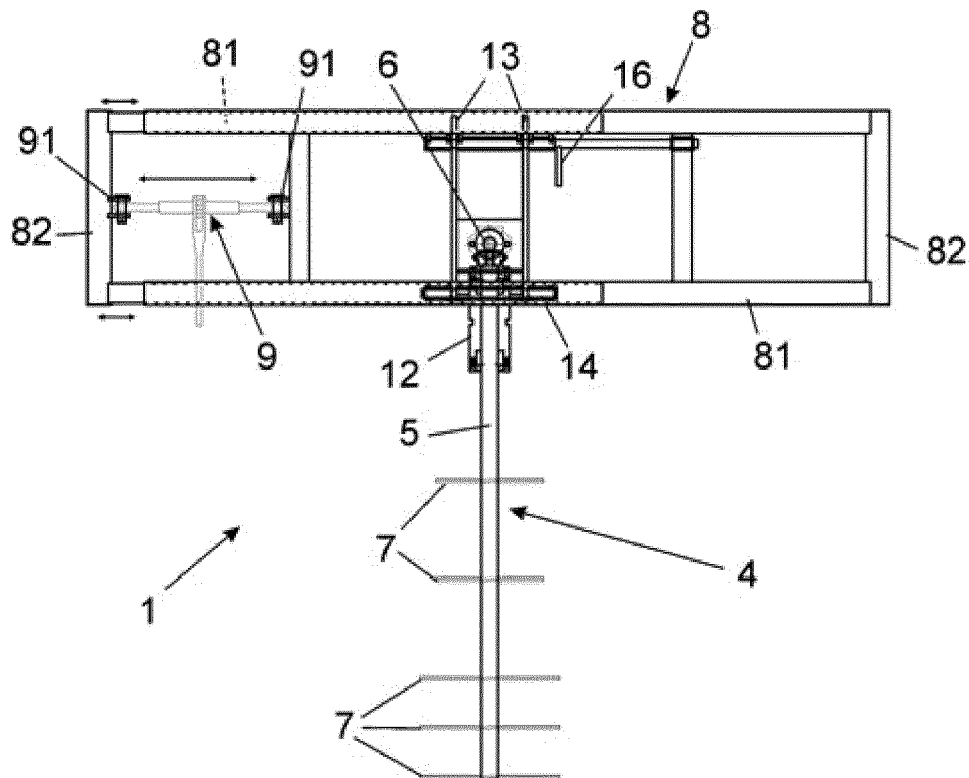


FIG. 2

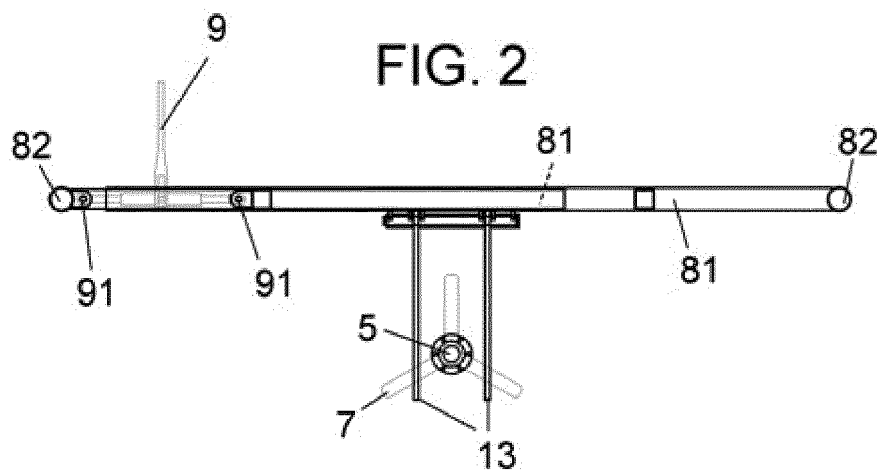


FIG. 3

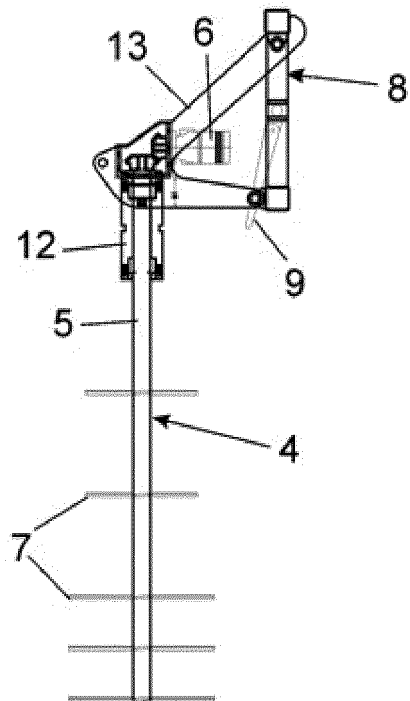


FIG. 4

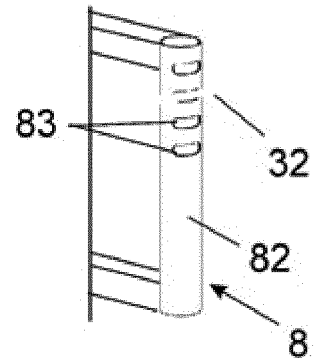


FIG. 5

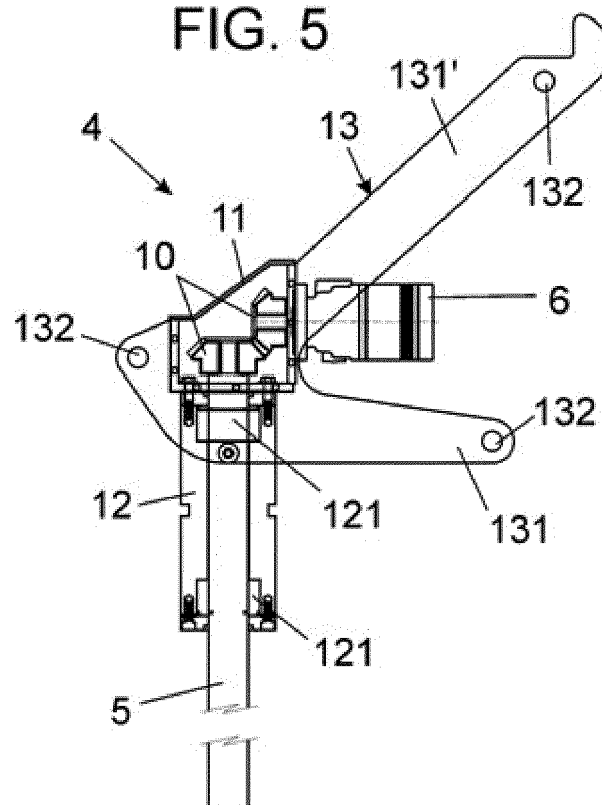


FIG. 6

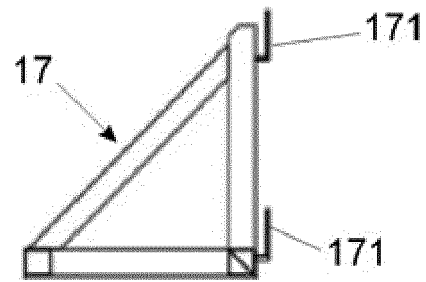


FIG. 7

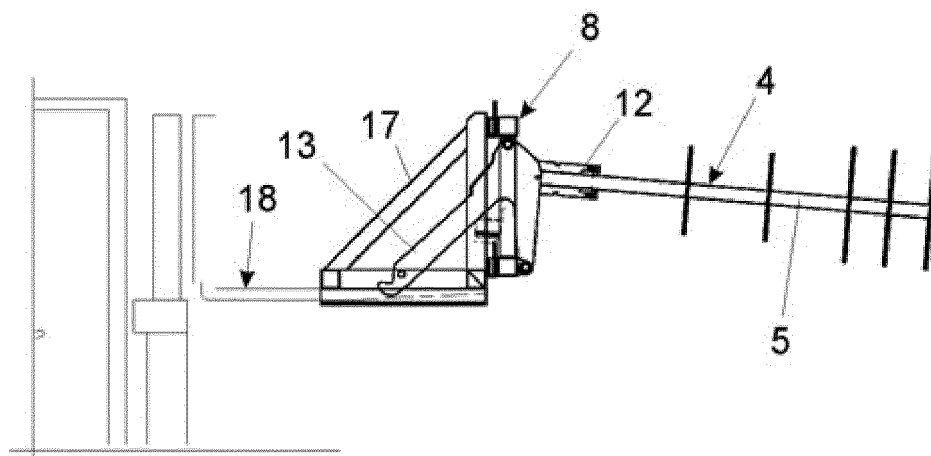


FIG. 8

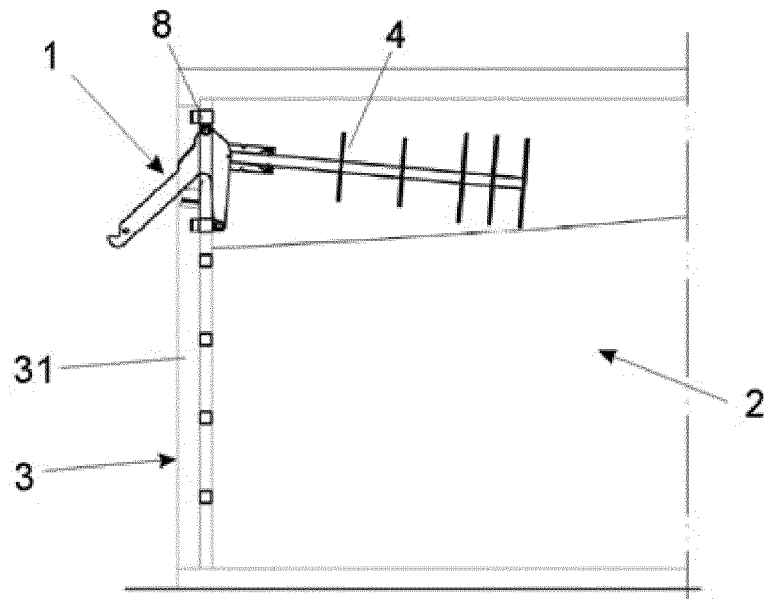
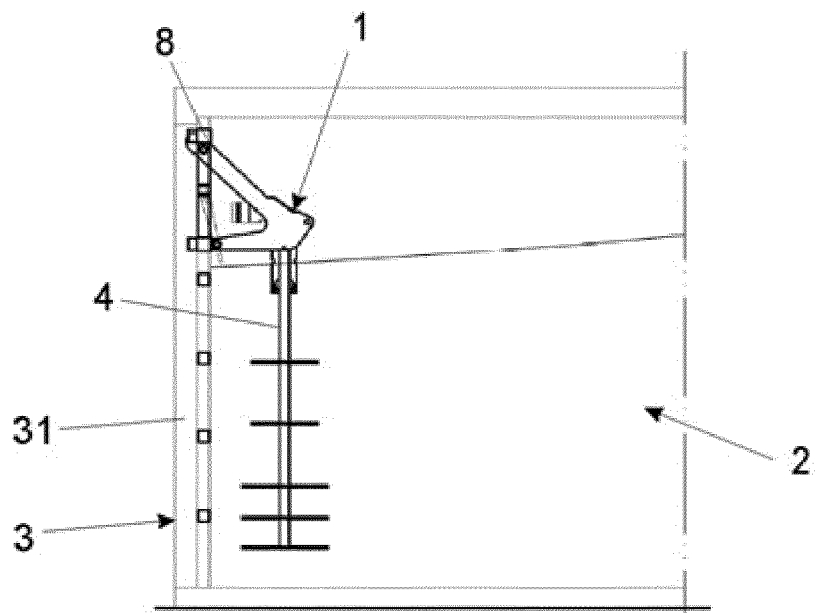


FIG. 9





EUROPEAN SEARCH REPORT

Application Number
EP 14 15 4263

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The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 4 June 2014	Examiner Lämmel, Gunnar
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

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04-06-2014

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