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(54) **Emptying apparatus, particularly for deformable containers**

Entleerungsvorrichtung, insbesondere für verformbare Behälter

Appareil de vidage, en particulier pour des récipients déformables

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Description

[0001] The present invention relates to an emptying apparatus, particularly for deformable containers.

[0002] As is known, in hospitals, clinics, nursing homes, retirement homes, etcetera, the use in large quantities of catheters and the like, necessary for collecting urine and other excrements produced by patients who, for various reasons, are bedridden, is widespread.

[0003] Therefore, health workers must empty and dispose of the urine progressively collected in the bags (usually made of deformable material) associated with the catheters.

[0004] Tight restrictions are imposed by the statutory provisions of reference legislation on disposal operations and relate to the large quantities of bags accumulated in the facilities mentioned above; they are aimed at safeguarding the safety of health workers and at containing any pollution caused by the excrements.

[0005] The bags containing urine in fact must be sent to adapted collection centers, where they can be incinerated and/or recycled after being emptied.

[0006] This solution, however, is not free from drawbacks.

[0007] The need to store and subsequently send large quantities of bags full of urine to recycling plants requires hospitals and medical institutions to bear very substantial logistic costs, which are often unsustainable.

[0008] On the other hand, indeed to comply with the safety of the operators, which is safeguarded as noted by current statutory provisions, it is not permitted to perform a preliminary manual emptying of the bags (in order then to empty their content directly into the sewers or subsequently transport empty containers, which obviously have a much smaller bulk). In fact, manual emptying would expose assigned workers to unacceptable biological hazards, because they might come into contact accidentally with the urine (or other excrements) of the patients, which might be infected.

[0009] DE 299 17 006 U1 discloses an apparatus having a combination of features as set forth in the pre-characterizing portion of the appended claim 1.

[0010] The aim of the present invention is to solve the problems mentioned above, by providing an apparatus that allows to empty deformable containers, such as bags for collecting urine and other excrements, in a practical and easy manner.

[0011] Within this aim, an object of the invention is to provide an apparatus that allows to empty deformable containers, such as bags for collecting urine and other excrements, without exposing the assigned worker to risks for his safety and hygiene.

[0012] Another object of the invention is to provide an apparatus that can be installed and used directly in hospitals, nursing homes and the like.

[0013] Another object of the invention is to provide an apparatus that ensures high reliability in operation.

[0014] Another object of the invention is to provide an apparatus that can be obtained easily starting from commonly commercially available elements and materials.

[0015] Another object of the invention is to provide an apparatus that has a low cost and is safe in use.

[0016] In accordance with the invention, there if provided an emptying apparatus as defined in the append claims.

[0017] Further characteristics and advantages of the invention will become better apparent from the detailed description that follows of a preferred but not exclusive embodiment of the apparatus according to the invention, illustrated by way of non-limiting example in the accompanying drawings, wherein:

Figure 1 is a perspective view of the emptying apparatus according to the invention;
Figure 2 is a side elevation view of the emptying apparatus according to the invention, partially open in order to show the arrangement of the internal components;
Figure 3 is a top perspective view of a group of components of the emptying apparatus according to the invention;
Figure 4 is a bottom perspective view of the group of components of Figure 3;
Figure 5 is a perspective view of one of the components of Figure 3;
Figure 6 is a schematic side elevation view of the operation of the component of Figure 5.

[0018] With reference to the figures, an apparatus according to the invention, generally designated by the reference numeral 1, comprises at least one conveyance line 2, which is interposed between a loading station 3 and an unloading station 4, for deformable containers A, for which the apparatus 1 is particularly suitable.

[0019] In this regard, it is useful to note that according to the preferred application of the invention, to which reference shall be made constantly in the continuation of the present description, the apparatus 1 is designed for the disposal of deformable containers A such as bags (typically made of polymeric material) used for collecting the urine of patients in a hospital, in a nursing home and the like. The urine (and optionally other waste liquids or excrements) is therefore the substance that must be disposed.

[0020] Reference shall be made to this preferred application in the continuation of the present description, but the possibility is not excluded (and is within the protective scope defined herein) of using the apparatus 1 according to the invention for emptying different type of substances even from containers A of a different kind.

[0021] According to the invention, the emptying apparatus 1 comprises at least one processing station 5, which is arranged along the conveyance line 2 and is partially shielded.

[0022] The processing station 5 comprises at least one cutter 6, which rotates along a trajectory that affects the

containers A, carried by the conveyance line 2, in order to cut them, thus emptying them of any substances (for example, as shown, urine) contained therein.

[0023] By way of the action of the cutter 6, which cuts the containers A inside the processing station 5 that is at least partially shielded, it is thus possible to empty the containers A in a practical and easy manner, without exposing the operators to the risk of contamination, thus achieving the intended aim.

[0024] In particular, the emptying apparatus 1 according to the invention comprises a substantially box-shaped frame 7 (shown in Figures 1 and 2), which has an access hatch 8, in turn comprised within the loading station 3.

[0025] The hatch 8 leads to the conveyance line 2, which is arranged in a compartment 9 located inside the frame 7 and can be shielded completely from the outside (by closing the hatch 8); the conveyance line 2 faces, on the opposite side with respect to the hatch 8, a removal duct 10 for the processed containers A, which lies outside the frame 7 and is comprised within the unloading station 4.

[0026] In order to allow easy collection of the containers A already deprived of the substances previously contained therein, it is possible to arrange a collector of various types downstream of the duct 10: the empty containers A can be thus stored in large quantities in a configuration that has a very small volume.

[0027] According to an embodiment of considerable practical interest, mentioned by way of non-limiting illustration of the application of the invention, the emptying apparatus 1 according to the invention comprises a shaft 11, which is coupled to the frame 7 and rotates about an axis that is substantially transverse to the direction of advancement of the containers A, which is defined by the conveyance line 2: the cutter 6 is then keyed on the shaft 11 in order to cut and empty (even just by gravity) the containers A during their conveyance along the line 2.

[0028] In particular, the cutter 6 is substantially constituted by a disk 12 that is supported coaxially and rigidly by the shaft 11 and has sharp edges for cutting the containers A; as can be deduced in particular from Figure 5, the disk 12 preferably has a substantially multilobed shape.

[0029] More particularly, in order to increase the efficiency and productivity of the apparatus 1, it can comprise a plurality of disks 12, distributed in series along the shaft 11, in order to cut simultaneously one or more containers A (which optionally advance in parallel along the conveyance line 2).

[0030] In accordance with the invention, as shown in figures 3, 4, cutting occurs while a motor 13 actuates the rotation of one or more platforms 14, which constitute the line 2 and are assigned to conveying the containers A. The platforms 14 are wound in a loop around a pair of pulleys 15 (one of which is actuated directly by the motor 13).

[0031] Conveniently, the emptying apparatus 1 comprises a presser 16 for the containers A, arranged along the conveyance line 2 proximate to the cutter 6 (or cutters 6), in order to keep the containers A forcibly pressed in position during their cutting and in order to facilitate their emptying.

[0032] In particular, the presser 16 is constituted by a substantially cylindrical brush 17 (preferably made of a polymeric material, for example propylene), which rotates about an axis which is parallel to the shaft 11.

[0033] During the rotation, a peripheral region of the brush 17 assumes a trajectory for affecting the containers A, in order to press and crush them at least partially, thus ensuring that they are kept in position and at the same time facilitating their complete emptying.

[0034] Conveniently, the emptying apparatus 1 comprises a disposal outlet, substantially provided along the base of the frame 7, in order to allow the evacuation of the substances expelled from the containers A.

[0035] Moreover, in order to collect and convey the substances toward such disposal outlet, below the conveyance line 2 there are inclined metal plates that lead to such outlet.

[0036] The disposal outlet can thus be connected directly to the sewer system, in order to dispose of the urine without it being able to return, after insertion in the apparatus 1, in any way in contact with workers and operators assigned to the emptying of the containers A.

[0037] Optionally, the apparatus 1 can be provided with a region for collecting the urine, associated with a disposal pump, in order to facilitate expulsion through the outlet described above.

[0038] Advantageously, the emptying apparatus 1 according to the invention comprises a unit for washing and disinfecting the compartment 9, in order to clean and remove the residues of any substances accumulated following the emptying of the containers A.

[0039] In particular, such washing and disinfection unit comprises a plurality of nozzles, arranged inside the compartment 9 and adapted to spray it with a washing fluid (for example water optionally with the addition of disinfectant liquid, optionally scale remover).

[0040] In order to ensure the complete emptying of the containers A, in particular if receptacles have formed which collect the substances among the folds of the container A after cutting, the apparatus 1 according to the invention comprises positively a dripping station, which is interposed between the processing station 5 and the unloading station 4. In this dripping station it is possible to impose a stop of preset duration to the containers A, after the cut performed in the processing station 5, for complete emptying.

[0041] The operation of the apparatus according to the invention is as follows.

[0042] If it is necessary to empty bags of urine without exposing the worker to risks of contamination, it is possible to use the emptying apparatus 1 according to the invention.

[0043] First of all, the operator can access the compartment 9 inside the frame 7 through the hatch 8: by

opening it, he can in fact deposit one or more containers A along the conveyance line 2.

[0044] After closing the hatch 8, and having thus shielded completely the compartment 9 and particularly the processing station 5, he can start the working cycle (or, as an alternative, the cycle can start automatically when the hatch 8 closes), for example through a control interface 18 associated with the motor 13 (and with the other actuation systems of the apparatus 1).

[0045] It should be noted that the hatch 8 can be provided with an electric lock that prevents the accidental opening of the hatch 8 during the operation of the apparatus 1, as a further assurance of safety for operators.

[0046] The motor 13 thus turns the pulleys 15, which move the platforms 14, which in turn carry the containers A toward the rotating cutters 6. Such cutters can thus cut the bags, while the brush 17 conveys them and keeps them forcibly pressed in position, thus ensuring the emptying and the expulsion of the urine and of the other substances contained therein, which are thus evacuated through the disposal outlet provided at the base of the frame 7.

[0047] The containers A, carried by the platforms 14, can thus continue past the processing station 5 and, after an optional stop in the dripping station in order to complete the emptying process, are automatically evacuated through the duct 10.

[0048] The unloading of the emptied containers A can cause, even automatically, the activation of the washing and disinfection unit, which sprays the compartment 9 with the chosen washing fluid; at the end of this operation, the hatch 8 is released and it is possible to start a new working cycle.

[0049] It is thus evident that the apparatus 1 according to the invention ensures the disposal even of large quantities of bags full of urine with a practical and easy solution that has a small size and can thus easily be installed directly in hospitals and in nursing homes, relieving them from the burden of managing the full bags.

[0050] The possibility to shield completely the compartment 9 (or anyway the processing station 5) is a guarantee of hygiene and avoids the risk of contamination or biological hazard for the operator.

[0051] The emptying method, particularly for deformable containers, consists in a first step a., in feeding a loading station 3 with at least one container A of the deformable type for substances to be disposed.

[0052] Subsequently it is possible, in a step b., to transfer, by means of a conveyance line 2, the container A to a processing station 5, which is at least partially shielded.

[0053] With the container A in the processing station 5, it is thus possible, in a step c., to cut the containers A, by means of at least one rotating cutter 6, arranged along a trajectory for affecting the containers A, in order to allow to empty the containers A of the substances contained therein.

[0054] In practice it has been found that the apparatus according to the invention fully achieves the intended aim, because, thanks to the action of the cutter that cuts the containers inside a processing station that is at least partially shielded, it is possible to obtain the emptying of such containers in a practical and easy manner, without however exposing the operators to the risk of contamination.

[0055] The invention thus conceived is susceptible of numerous modifications and variations, all of which are within the scope of the appended claims; all the details may further be replaced with other technically equivalent elements.

[0056] In the exemplary embodiments shown, individual characteristics, given in relation to specific examples, may actually be interchanged with other different characteristics that exist in other exemplary embodiments.

[0057] Moreover, it is noted that anything found to be already known during the patenting process is understood not to be claimed and to be the subject of a disclaimer.

[0058] In practice, the materials used, as well as the dimensions, may be any according to requirements and to the state of the art.

[0059] Where technical features mentioned in any claim are followed by reference signs, those reference signs have been included for the sole purpose of increasing the intelligibility of the claims and accordingly such reference signs do not have any limiting effect on the interpretation of each element identified by way of example by such reference signs.

Claims

1. An emptying apparatus (1), particularly for deformable containers, comprising at least one conveyance line (2) for deformable containers (A), which is interposed between a loading station (3) and an unloading station (4), and at least one processing station (5), which is arranged along said conveyance line (2) and is partially shielded, said at least one processing station (5) comprising at least one cutter (6), which rotates about a shaft (11) along a trajectory that affects the containers (A), conveyed by said conveyance line (2), in order to cut them and consequently empty them of any substances contained therein, the apparatus being **characterized in that** said conveyance line (2) comprises a plurality of mutually spaced platforms (14), for supporting said containers (A), that are wound in a loop around a pair of pulleys (15) and rotatably actuated by a motor (13), said shaft (11) being arranged below the surface of said spaced platforms (14) supporting said containers (A), and said at least one cutter (6) rotating about said shaft (11) with an upward trajectory in the spacing between said spaced platforms (14) to cut the containers (A) supported on said spaced platforms (14), and the apparatus further comprising a rotating presser (16) for the containers (A), which

is arranged along said conveyance line (2) proximate to said at least one cutter (6), in order to keep said containers (A) forcibly in position during cutting and in order to facilitate their emptying, said presser (16) being constituted by a substantially cylindrical brush (17), which rotates about an axis which is arranged above and parallel to said shaft (11), during the rotation at least one peripheral region of said brush (17) assuming a trajectory that is arranged distally from said at least one cutter and that affects the containers (A), in order to press and crush them at least partially between said at least one cutter (6) and said at least one peripheral region of said brush (17), in order to keep them in position and facilitate their complete emptying.

2. The emptying apparatus according to claim 1, **characterized in that** it comprises a substantially box-shaped frame (7), which has at least one access hatch (8), which is comprised in said loading station (3) and leads to said conveyance line (2), which is arranged in a compartment (9) inside said frame (7) and can be shielded completely with respect to the outside, said conveyance line (2) facing, on the opposite side, a duct (10) for evacuating the containers (A), said duct (10) extending externally with respect to said frame (7) and being comprised in said unloading station (4).

3. The emptying apparatus according to claims 1 and 2, **characterized in that** it comprises a shaft (11) that rotates about an axis which is substantially transverse to the direction of advancement of the containers (A), which is defined by said conveyance line (2), said at least one cutter (6) being keyed on said shaft (11) in order to cut and empty the containers (A) during their conveyance.

4. The emptying apparatus according to one or more of the preceding claims, **characterized in that** said at least one cutter (6) is substantially constituted by a disk (12) which is supported coaxially and rigidly by said shaft (11) and is provided with sharp edges, in order to cut the containers (A), said disk (12) having preferably a substantially multilobed shape.

5. The emptying apparatus according to claim 4, **characterized in that** it comprises a plurality of said disks (12) distributed in series along said shaft (11), in order to cut simultaneously one or more containers (A).

6. The emptying apparatus according to one or more of the preceding claims, **characterized in that** it comprises a disposal outlet, provided substantially along the base of said frame (7), in order to evacuate the substances expelled from the containers (A), below said conveyance line (2) there being inclined metal plates which lead to said outlet, in order to collect and convey the substances toward said disposal outlet.

7. The emptying apparatus according to one or more of the preceding claims, **characterized in that** it comprises a unit for washing and disinfecting the compartment (9), in order to clean and remove the residues of any substances accumulated following the emptying of the containers (A).

8. The emptying apparatus according to claim 7, **characterized in that** said washing and disinfection unit comprises a plurality of nozzles, arranged inside said compartment (9) and adapted to spray it with a washing fluid.

9. The emptying apparatus according to one or more of the preceding claims, **characterized in that** it comprises a dripping station, which is interposed between said processing station (5) and said unloading station (4), in order to impose a stop of preset duration to the containers (A), after the cutting performed in said processing station (5), in order to ensure the complete emptying of said containers (A).

10. An emptying method using the emptying apparatus (1) according to the preceding claims, which comprises the steps of:

a. feeding said loading station (3) with said at least one container (A) of the deformable type of substances to be disposed;
b. transferring, by means of a said conveyance line (2), the container (A) to a processing station (5), which is at least partially shielded;
c. pressing and crushing the containers (A) between said at least one rotating cutter (6) and said at least one peripheral region of said brush (17) and cutting the containers (A), by means of said at least one rotating cutter (6) arranged along a trajectory that passes upwardly through the spacing between said spaced platforms (14) and that cuts the containers (A), in order to allow to empty said containers (A) of the substances contained therein.

Patentansprüche

1. Eine Entleerungsvorrichtung (1), insbesondere für verformbare Behälter, die mindestens eine Förderlinie (2) für verformbare Behälter (A) umfasst, welche zwischen einer Ladestation (3) und einer Entladestation (4) angeordnet ist, und mindestens eine Verarbeitungsstation (5), die entlang der Förderlinie (2) angeordnet und die teilweise abgeschirmt ist, wobei die mindestens eine Verarbeitungsstation (5) mindestens eine Schneidemaschine (6) umfasst, die

sich um eine Welle (11) entlang einer Bahn dreht, die die Behälter (A) beeinflusst, welche von der Förderlinie (2) befördert werden, um sie zu schneiden und folglich von eventuell darin enthaltenen Substanzen zu leeren, wobei die Vorrichtung **dadurch gekennzeichnet ist, dass** die Förderlinie (2) eine Vielzahl voneinander beabstandeter Plattformen (14) zum Tragen der Behälter (A) umfasst, die in einer Schleife um ein Paar von Riemenscheiben (15) gewunden sind und drehbar von einem Motor (13) betätigt werden, wobei die Welle (11) unterhalb der Oberfläche der beabstandeten Plattformen (14) angeordnet ist, die die Behälter (A) tragen, und die mindestens eine Schneidemaschine (6) sich um die Welle (11) dreht, mit einer Aufwärtsbahn in dem Raum zwischen den beabstandeten Plattformen (14), um die Behälter (A) zu schneiden, die auf den beabstandeten Plattformen (14) getragen werden, und wobei die Vorrichtung weiter eine sich drehende Pressvorrichtung (16) für die Behälter (A) umfasst, die entlang der Förderlinie (2) nahe an der mindestens einen Schneidemaschine (6) angeordnet ist, um die Behälter (A) während des Schneidens zwangsweise in Position zu halten und um ihr Entleeren zu erleichtern, wobei die Pressvorrichtung (16) aus einer im Wesentlichen zylindrischen Bürste (17) besteht, die sich um eine Achse dreht, welche oberhalb und parallel zu der Welle (11) angeordnet ist, wobei während der Drehung mindestens ein peripherer Bereich der Bürste (17) eine Bahn annimmt, die distal von der mindestens einen Schneidemaschine angeordnet ist und die die Behälter (A) beeinflusst, um sie zumindest teilweise zwischen der mindestens einen Schneidemaschine (6) und dem mindestens einen peripheren Bereich der Bürste (17) zu pressen und zu zerkleinern, um sie in Position zu halten und ihre vollständige Entleerung zu erleichtern.

2. Die Entleerungsvorrichtung gemäß Anspruch 1, **dadurch gekennzeichnet, dass** sie einen im Wesentlichen kastenförmigen Rahmen (7) umfasst, der mindestens eine Einstiegluke (8) hat, die in der Ladestation (3) enthalten ist und zu der Förderlinie (2) führt, die in einem Fach (9) innerhalb des Rahmens (7) angeordnet ist und vollständig nach außen hin abgeschirmt werden kann, wobei die Förderlinie (2) an der gegenüberliegenden Seite einem Gang (10) zum Entleeren der Behälter (A) gegenüberliegt und der Gang (10) sich außerhalb des Rahmens (7) erstreckt und in der Entladestation (4) enthalten ist.

3. Die Entleerungsvorrichtung gemäß Anspruch 1 und 2, **dadurch gekennzeichnet, dass** sie eine Welle (11) umfasst, die sich um eine Achse dreht, welche im Wesentlichen transversal zur Vorschubrichtung der Behälter (A) ist, die von der Förderlinie (2) bestimmt wird, wobei die mindestens eine Schneidemaschine (6) auf der Welle (11) verkeilt ist, um die Behälter (A) während ihrer Beförderung zu schneiden und zu entleeren.

4. Die Entleerungsvorrichtung gemäß einem oder mehreren der obigen Ansprüche, **dadurch gekennzeichnet, dass** die mindestens eine Schneidemaschine (6) im Wesentlichen aus einer Scheibe (12) besteht, die koaxial und starr von der Welle (11) getragen wird und mit scharfen Kanten versehen ist, um die Behälter (A) zu schneiden, wobei die Scheibe (12) vorzugsweise eine im Wesentlichen mehrlapping Form hat.

5. Die Entleerungsvorrichtung gemäß Anspruch 4, **dadurch gekennzeichnet, dass** sie eine Vielzahl der Scheiben (12) umfasst, die seriell entlang der Welle (11) verteilt sind, um einen oder mehrere Behälter (A) gleichzeitig zu schneiden.

6. Die Entleerungsvorrichtung gemäß einem oder mehreren der obigen Ansprüche, **dadurch gekennzeichnet, dass** sie einen Entleerungsauslass umfasst, der im Wesentlichen entlang der Basis des Rahmens (7) angebracht ist, um die Substanzen zu entsorgen, die von den Behältern (A) ausgestoßen werden, wobei unter der Förderlinie (2) geneigte Metallplatten sind, die zu dem Auslass führen, um die Substanzen zu sammeln und zu dem Entleerungsauslass hin zu befördern.

7. Die Entleerungsvorrichtung gemäß einem oder mehreren der obigen Ansprüche, **dadurch gekennzeichnet, dass** sie eine Einheit zum Waschen und Desinfizieren des Faches (9), um nach dem Entleeren der Behälter (A) zu reinigen und die Rückstände eventueller angesammelter Substanzen zu entfernen, umfasst.

8. Die Entleerungsvorrichtung gemäß Anspruch 7, **dadurch gekennzeichnet, dass** die Wasch- und Desinfektionseinheit eine Vielzahl von Düsen umfasst, die innerhalb des Faches (9) angeordnet und ausgebildet sind, um es mit einer Waschflüssigkeit zu besprühen.

9. Die Entleerungsvorrichtung gemäß einem oder mehreren der obigen Ansprüche, **dadurch gekennzeichnet, dass** sie eine Abtropfstation umfasst, die zwischen der Verarbeitungsstation (5) und der Entladestation (4) angeordnet ist, um die Behälter (A) für eine voreingestellte Dauer anzuhalten, nachdem das Schneiden in der Verarbeitungsstation (5) durchgeführt wurde, um die vollständige Entleerung der Behälter (A) sicherzustellen.

10. Ein Entleerungsverfahren, das die Entleerungsvorrichtung (1) gemäß den obigen Ansprüchen nutzt

und folgende Schritte umfasst:

a. Zufuhr des mindestens einen Behälters (A), vom verformbaren Typ, für zu entsorgende Substanzen in die Ladestation (3),
b. Überführung, durch eine Förderlinie (2), des Behälters (A) in eine Verarbeitungsstation (5), die zumindest teilweise abgeschirmt ist,
c. Pressen und Zerkleinern der Behälter (A) zwischen der mindestens einen sich drehenden Schneidemaschine (6) und dem mindestens einen peripheren Bereich der Bürste (17) und das Schneiden der Behälter (A) mit Hilfe der mindestens einen sich drehenden Schneidemaschine (6), die entlang einer Bahn angeordnet ist, welche durch den Raum zwischen den beabstandeten Plattformen (14) aufwärts verläuft, und die die Behälter (A) schneidet, um das Entleeren der in den Behältern (A) enthaltenen Substanzen aus denselben zu ermöglichen.

Revendications

1. Appareil de vidage (1), particulièrement pour contenants déformables, comprenant au moins une ligne de transport (2) pour contenants déformables (A), qui est interposée entre une station de chargement (3) et une station de déchargement (4) et au moins une station de traitement (5), qui est agencée le long de ladite ligne de transport (2) et est partiellement blindée, ladite au moins une station de traitement (5) comprenant au moins une découpeuse (6), qui tourne autour d'un arbre (11) le long d'une trajectoire qui atteint les contenants (A), transportés par ladite ligne de transport (2), afin de les découper et par conséquent de les vider de toutes substances qui y sont contenues, l'appareil étant **caractérisé en ce que** ladite ligne de transport (2) comprend une pluralité de plates-formes espacées les unes des autres (14), permettant de supporter lesdits contenants (A), qui sont enroulées en boucle autour d'une paire de poulies (15) et actionnées en rotation par un moteur (13), ledit arbre (11) étant agencé en dessous de la surface desdites plates-formes espacées (14) supportant lesdits contenants (A), et ladite au moins une découpeuse (6) tournant autour dudit arbre (11) avec une trajectoire ascendante dans l'espacement entre lesdites plates-formes espacées (14) afin de découper les contenants (A) supportés sur lesdites plates-formes espacées (14), et l'appareil comprenant en outre une presse rotative (16) pour les contenants (A), qui est agencée le long de ladite ligne de transport (2) à proximité de ladite au moins une découpeuse (6), afin de maintenir lesdits contenants (A) de force en position pendant la découpe et afin de faciliter leur vidage, ladite presse (16) étant constituée par une brosse sensiblement cylindrique (17), qui tourne autour d'un axe qui est agencé au-dessus et parallèle audit arbre (11), pendant la rotation dans une région périphérique de ladite brosse (17) adoptant une trajectoire qui est agencée de façon distale par rapport à ladite au moins une découpeuse et qui atteint les contenants (A), afin de les presser et de les écraser au moins partiellement entre ladite au moins une découpeuse (6) et ladite au moins une région périphérique de ladite brosse (17), afin de les maintenir en position et de faciliter leur vidage total.

2. Appareil de vidage selon la revendication 1, **caractérisé en ce qu'**il comprend un châssis sensiblement en forme de caisson (7), qui comporte au moins une trappe d'accès (8), qui est comprise dans ladite station de chargement (3) et mène à ladite ligne de transport (2), qui est agencée dans un compartiment (9) à l'intérieur dudit châssis (7) et peut être blindée totalement par rapport à l'extérieur, ladite ligne de transport (2) faisant face, sur le côté opposé, à un conduit (10) permettant d'évacuer les contenants (A), ledit conduit (10) s'étendant vers l'extérieur par rapport audit châssis (7) et étant compris dans ladite station de déchargement (4).

3. Appareil de vidage selon les revendications 1 et 2, **caractérisé en ce qu'**il comprend un arbre (11) qui tourne autour d'un axe qui est sensiblement transversal à la direction d'avancée des contenants (A), qui est défini par ladite ligne de transport (2), ladite au moins une découpeuse (6) étant clavetée sur ledit arbre (11) afin de découper et de vider les contenants (A) pendant leur transport.

4. Appareil de vidage selon une ou plusieurs des revendications précédentes, **caractérisé en ce que** ladite au moins une découpeuse (6) est sensiblement constituée par un disque (12) qui est supporté de façon coaxiale et rigide par ledit arbre (11) et est pourvu de bords tranchants, afin de découper les contenants (A), ledit disque (12) ayant de préférence une forme sensiblement multilobée.

5. Appareil de vidage selon la revendication 4, **caractérisé en ce qu'**il comprend une pluralité desdits disques (12) distribués en série le long dudit arbre (11), afin de découper simultanément un ou plusieurs contenants (A).

6. Appareil de vidage selon une ou plusieurs des revendications précédentes, **caractérisé en ce qu'**il comprend un refoulement d'élimination, disposé sensiblement le long de la base dudit châssis (7), afin d'évacuer les substances expulsées des contenants (A), en dessous de ladite ligne de transport (2) où se trouvent des plaques métalliques inclinées qui mènent audit refoulement, afin de recueillir et de transporter les substances vers ledit refoulement

d'élimination.

7. Appareil de vidage selon l'une ou plusieurs des revendications précédentes, **caractérisé en ce qu'**il comprend une unité permettant de laver et de désinfecter le compartiment (9), afin de nettoyer et d'éliminer les résidus de toutes substances accumulées suite au vidage des contenants (A).

8. Appareil de vidage selon la revendication 7, **caractérisé en ce que** ladite unité de lavage et de désinfection comprend une pluralité de buses, agencées à l'intérieur dudit compartiment (9) et adaptées pour le pulvériser avec un fluide de lavage.

9. Appareil de vidage selon une ou plusieurs des revendications précédentes, **caractérisé en ce qu'**il comprend une station d'égouttage, qui est interposée entre ladite station de traitement (5) et ladite station de déchargement (4), afin d'imposer un arrêt d'une durée préétablie aux contenants (A), après réalisation de la découpe dans ladite station de traitement (5), afin d'assurer le vidage total desdits contenants (A).

10. Procédé de vidage utilisant l'appareil de vidage (1) selon les revendications précédentes, comprend les étapes de :

a. alimentation de ladite station de chargement (3) dotée de l'au moins un contenant (A) du type déformable en substances à éliminer ;
b. transfert, au moyen de ladite ligne de transport (2), du contenant (A) à une station de traitement (5), qui est au moins partiellement blindée ;
c. pressage et écrasement des contenants (A) entre ladite au moins une découpeuse rotative (6) et ladite au moins une région périphérique de ladite brosse (17) et découpe des contenants (A), au moyen de ladite au moins une découpeuse rotative (6) agencée le long d'une trajectoire qui passe de façon ascendante à travers l'espacement entre lesdites plates-formes espacées (14) et qui découpe les contenants (A), afin de permettre de vider lesdits contenants (A) des substances qui y sont contenues.

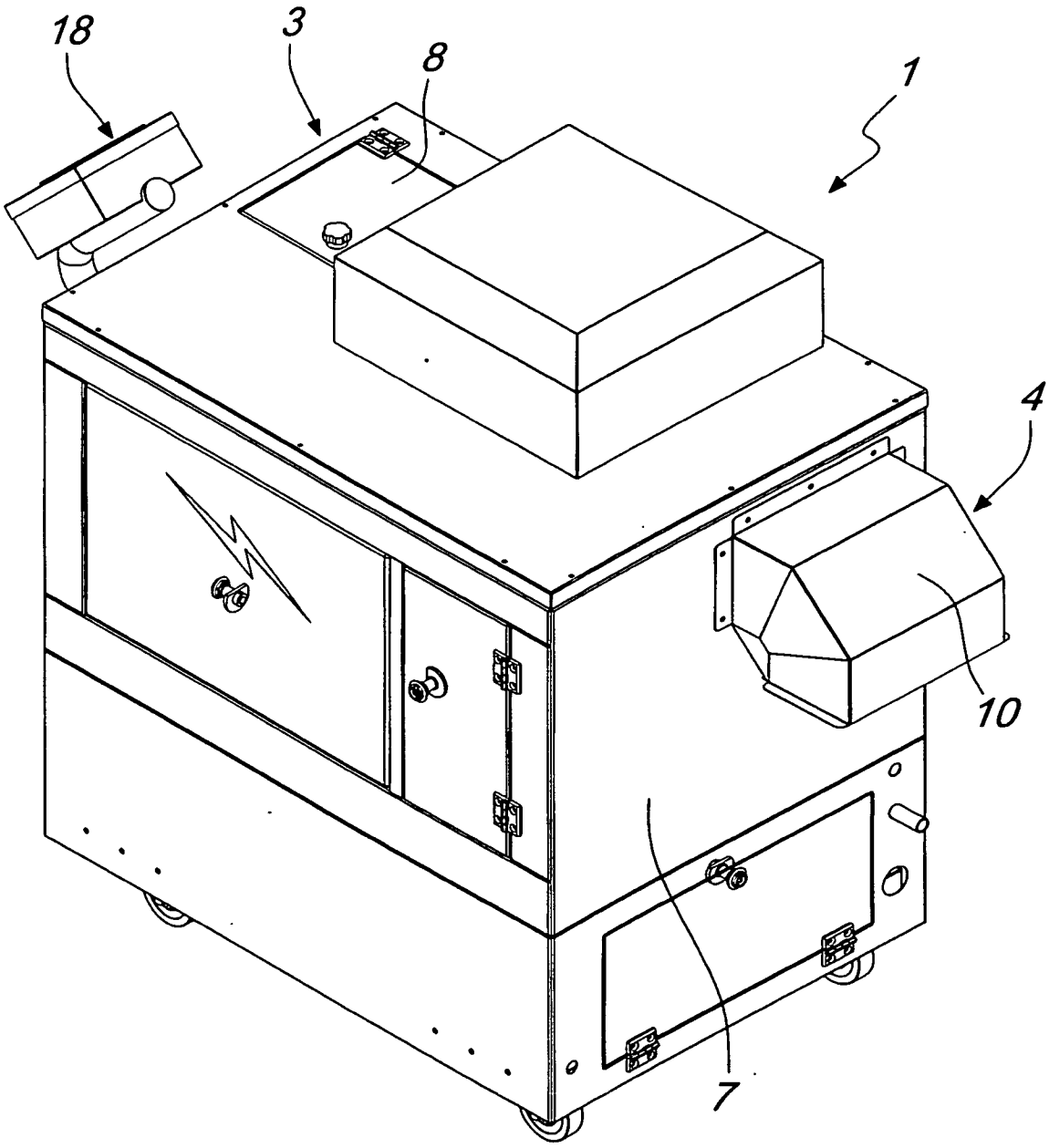

Fig. 1

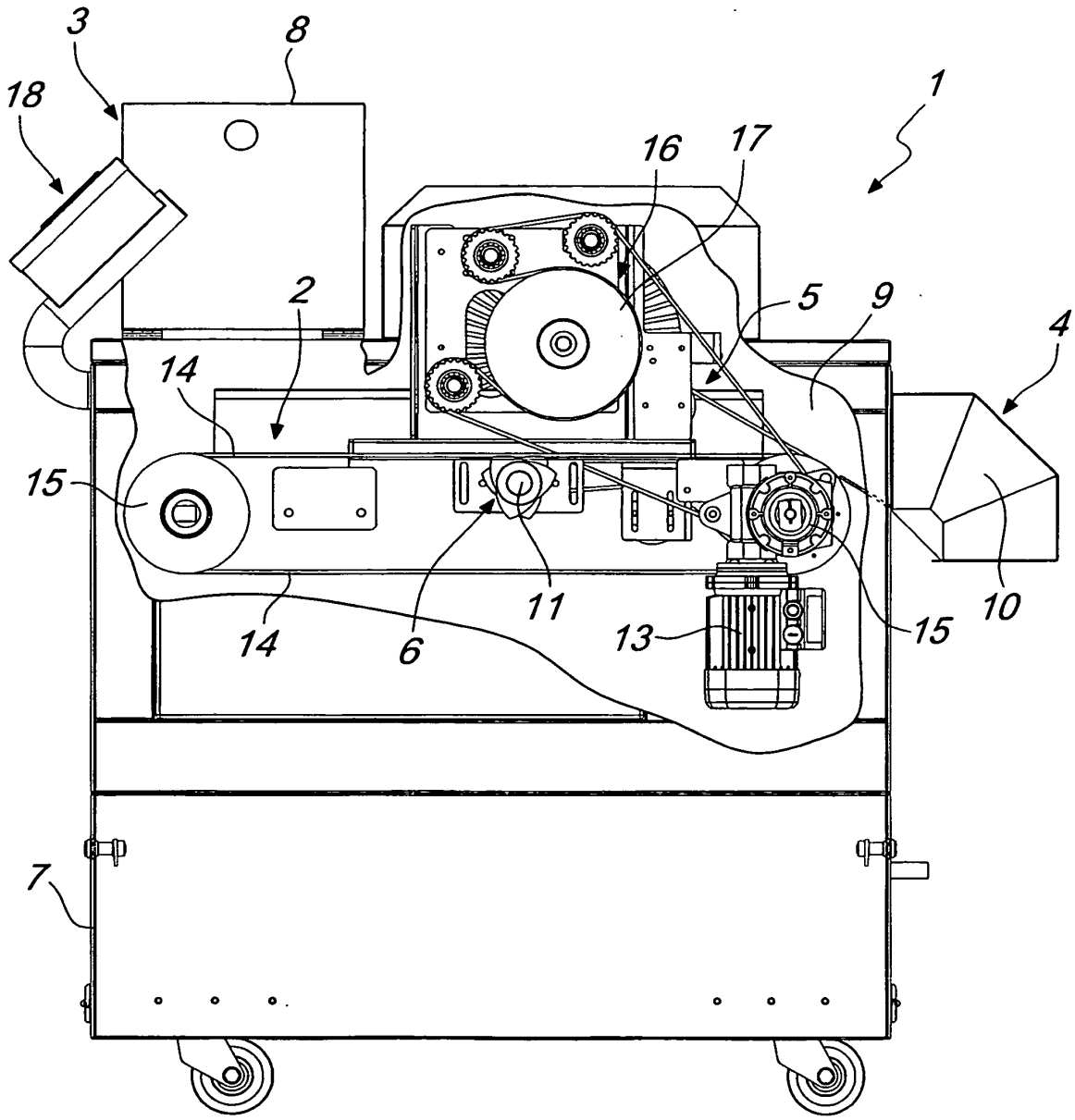

Fig. 2

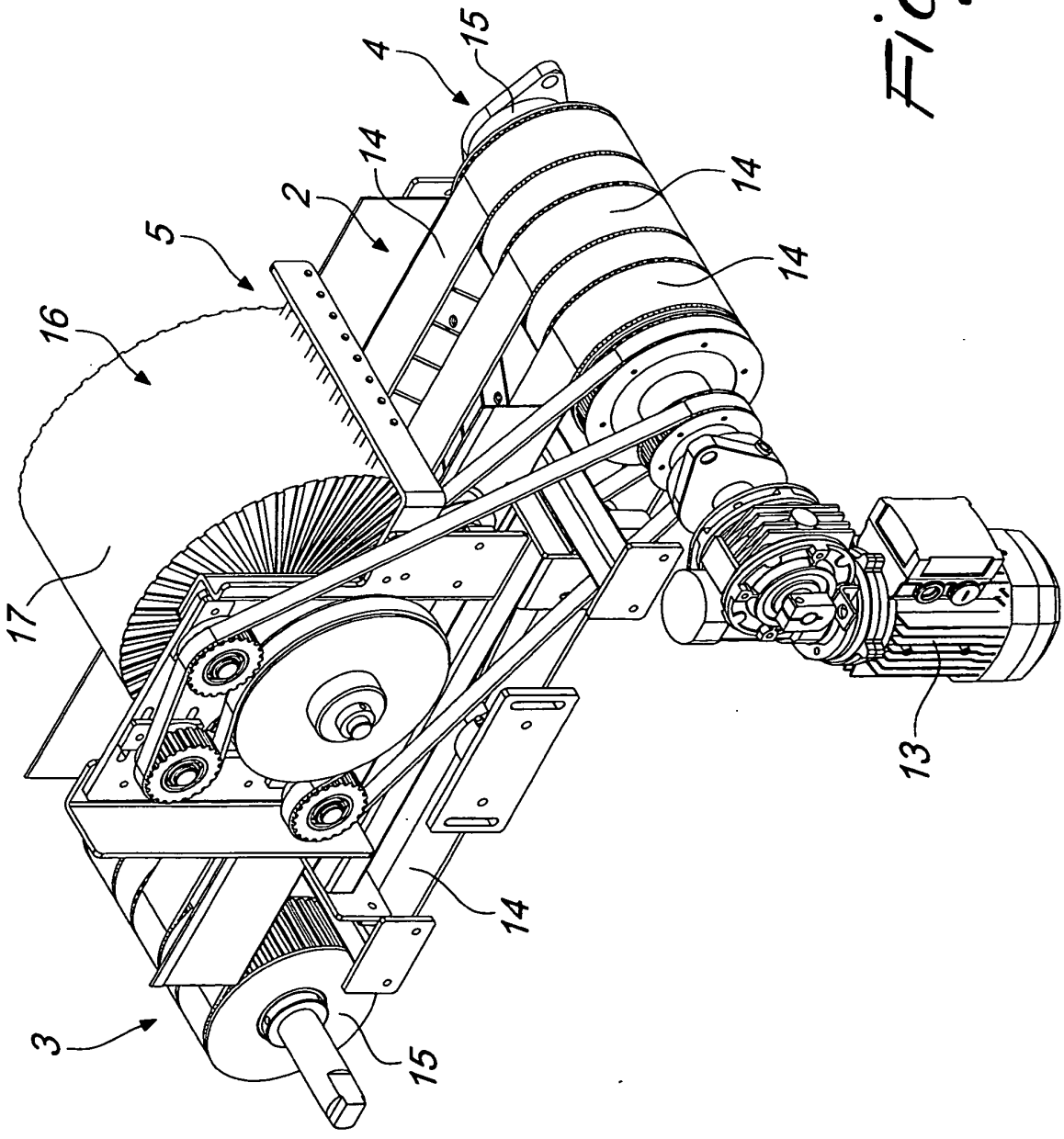

Fig. 3

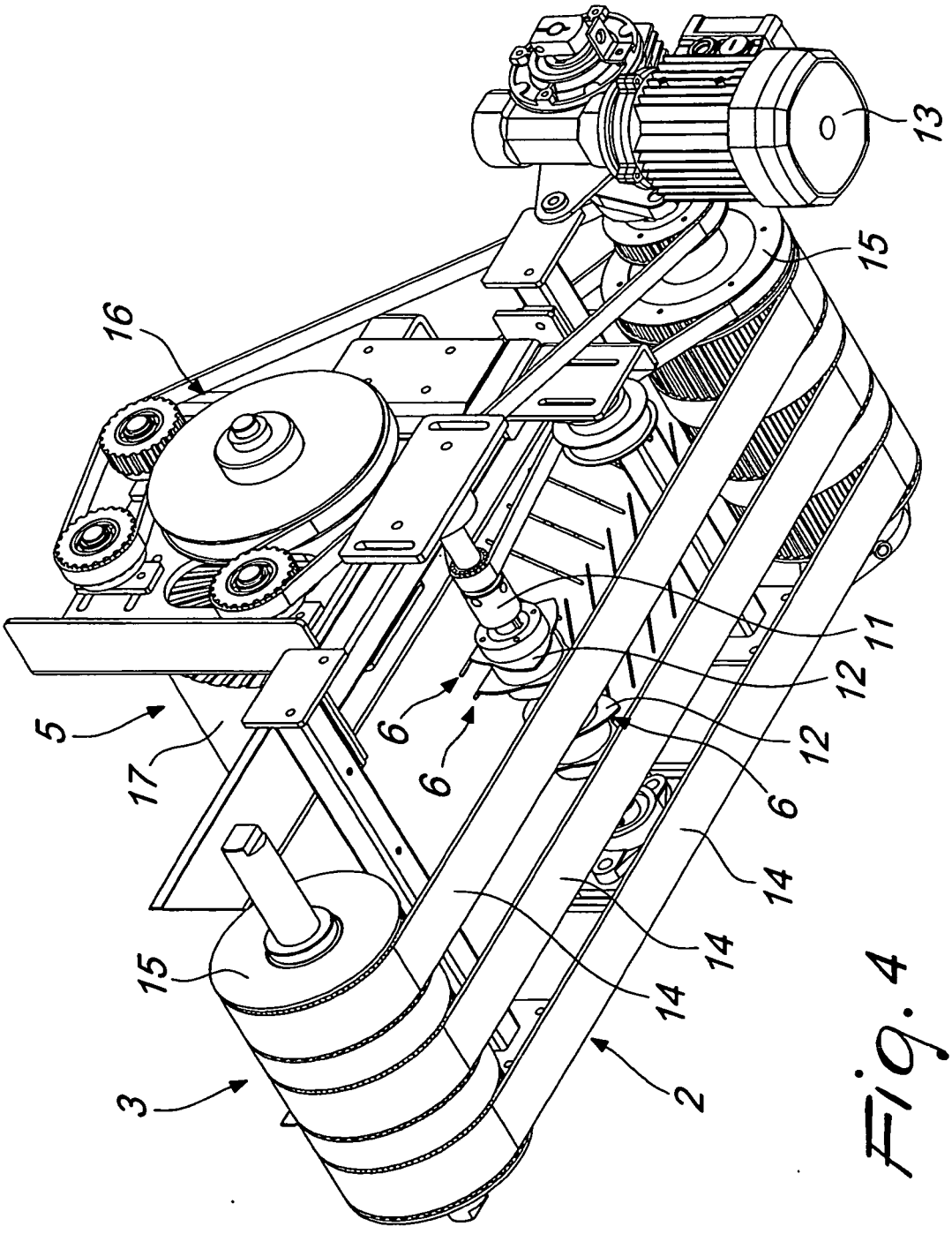

Fig. 4

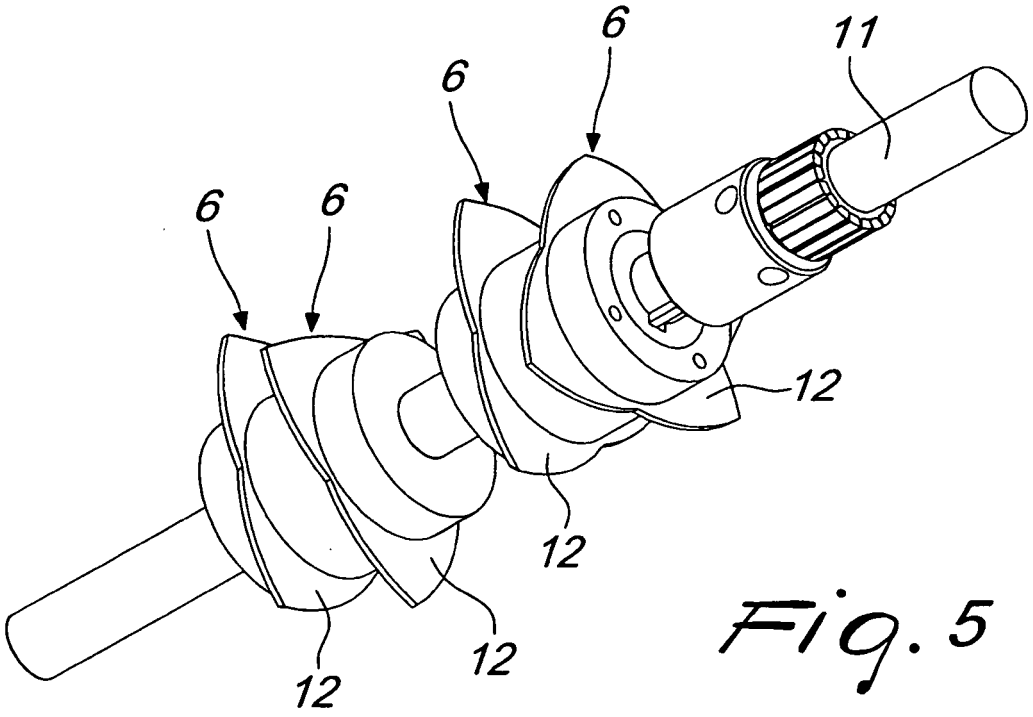

Fig. 5

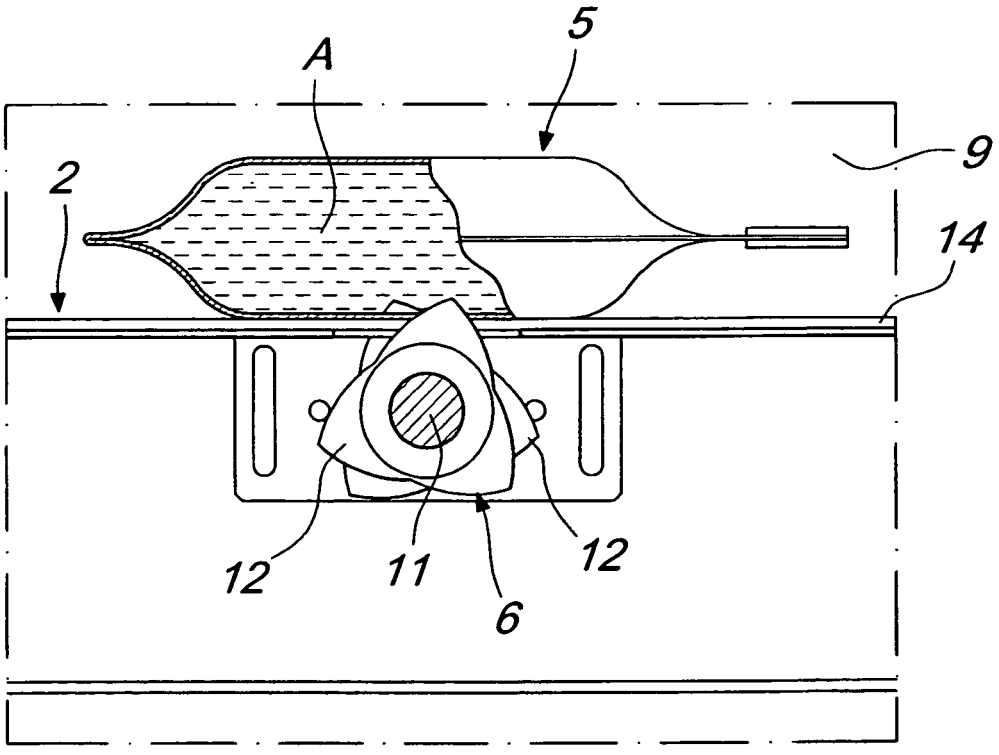

Fig. 6

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

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