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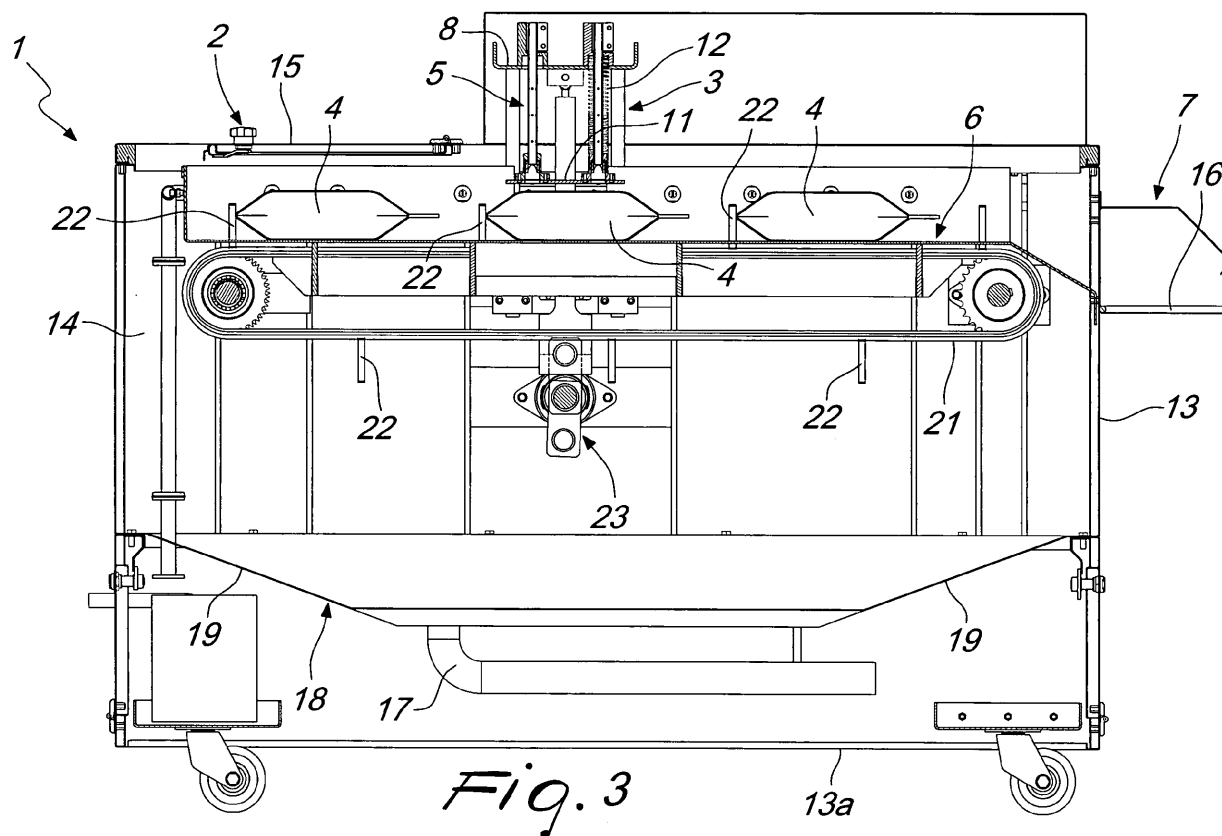
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(54) **Disposal assembly, particularly for deformable containers**

(57) A disposal assembly (1), particularly for deformable containers, comprising at least one station (2) for loading on a processing station (3), which is at least partially shielded, for at least one container (4), of a deform-

able type, of substances to be disposed of. The processing station (3) comprises at least one element (5) for the selective opening of the container (4) and the consequent draining of the substance.



Description

[0001] The present invention relates to a disposal assembly, particularly for deformable containers.

[0002] As is known, patients forced to immobility need catheters or the like connected to collection bags, typically made of plastics, which are capable of collecting urine and possibly other excrements, in view of the impossibility of the patient to go to the toilet personally.

[0003] The task of nurses is therefore to monitor the filling of bags in order to replace them once they are full.

[0004] In hospitals, clinics, nursing homes, retirement homes, etcetera, the need is felt to dispose of such bags filled with urine and other excrements in a number which in some cases can be quite substantial.

[0005] In this regard, the statutory provisions in force impose specific rules for the treatment of such waste and more in detail require it to be sent to appropriate collection and disposal centers, in which the bags can be emptied and subsequently be incinerated or recycled.

[0006] However, this solution is not free from drawbacks.

[0007] The transport and disposal of large quantities of bags filled with liquid entails the management of bulky loads of material, with consequent logistical complications for contract cleaners which are entrusted with the task, these complications leading to high costs which are often unsustainable for hospitals and the like.

[0008] Moreover, compliance with statutory provisions does not allow emptying of the bags into the public sewers before delivering them to the contract cleaners, since this operation would expose the operator (the assigned nurse, for example) to an intolerable biological risk.

[0009] The aim of the present invention is to solve the problems described above, by providing an assembly that allows the disposal of deformable containers such as bags for collecting urine in a practical and easy way.

[0010] Within this aim, an object of the invention is to provide an assembly that allows the disposal of deformable containers, such as urine collection bags, without exposing the assigned personnel to any risk.

[0011] Another object of the invention is to provide an assembly that can be installed directly in hospitals, nursing homes and the like.

[0012] Another object of the invention is to provide an assembly that ensures high reliability in operation.

[0013] Another object of the invention is to provide an assembly that can be obtained easily starting from commonly commercially available elements and materials.

[0014] Another object of the invention is to provide an assembly that has low costs and is safe in application.

[0015] This aim and these objects, as well as others that will become better apparent hereinafter, are achieved by a disposal assembly, particularly for deformable containers, characterized in that it comprises at least one station for loading on a processing station, which is at least partially shielded, for at least one container of a deformable type of substances to be disposed, said

processing station comprising at least one element for the selective opening of the container and the consequent draining of the substance.

[0016] Further characteristics and advantages of the invention will become better apparent from the following detailed description of a preferred but not exclusive embodiment of the assembly according to the invention, illustrated by way of non-limiting example in the accompanying drawings, wherein:

Figure 1 is a perspective view of the assembly according to the invention;

Figure 2 is a top view of the assembly according to the invention, with the internal components shown in dashed lines;

Figure 3 is a sectional view of Figure 2, taken along the line III-III;

Figure 4 is a perspective view of a detail of the assembly;

Figure 5 is a front view of the detail of Figure 4.

[0017] With reference to the figures, a disposal assembly according to the invention, generally designated by the reference numeral 1, comprises at least one station 2 for loading onto a processing station 3, which is at least partially shielded, for at least one container 4 of the deformable type of substances to be disposed.

[0018] It should be specified immediately that a preferred application of the invention is the disposal of bags for collecting the urine of patients in a hospital, in a nursing home and the like.

[0019] The container 4 therefore preferably consists of a collecting bag, even of a known type and typically made of plastics, while the urine that fills the bag partially or completely constitutes the substance to be disposed of.

[0020] Reference shall be made several times to this preferred application in the continuation of the present description, but embodiments (which are in any case within the protective scope claimed herein) are provided which are aimed at the disposal of substances even of a different type optionally contained in different containers 4.

[0021] The processing station 3 comprises at least one element 5 for the selective opening of the container 4 and the consequent draining of the substance.

[0022] The shielding at least of the processing station 3 prevents the operator from coming into contact with the urine in some way during emptying, and thereby avoids the biological risk with a solution that is extremely simple and easy to use, thus achieving the intended aim.

[0023] According to a first possible embodiment, the loading station 2 and the processing station 3 can substantially coincide: assemblies 1 can in fact be provided in which the operator feeds, even manually, containers 4 directly into the processing station 3 (provided for example in the ways described hereinafter).

[0024] Access to the processing station 3 can be pre-

vented selectively by a protective screen, in order to protect the operator against any splashes and leaks of substance; as anticipated in the preceding paragraph, the loading station 2 and the processing station 3 in this embodiment substantially coincide.

[0025] According to a preferred embodiment, which is cited by way of non-limiting example of the application of the invention, the assembly 1 according to the invention comprises a line 6 for moving the container 4 from the loading station 2 to an unloading station 7, with the processing station 3 interposed between the loading station 2 and the unloading station 7. This conveying line 6 is preferably arranged substantially parallel to the ground, but different orientations thereof are not excluded if this is deemed preferable.

[0026] As can be seen in particular in Figure 2, the line 6 allows the parallel movement of two series of containers 4 in order to allow therefore the simultaneous opening of two of them by means of two respective selective opening elements 5, thus increasing the achieved productivity.

[0027] Moreover, embodiments of the assembly 1 according to the invention in which a larger number of containers 4 are moved in parallel (by means of a corresponding number of elements 5), according to the specific requirements of the application, are not excluded.

[0028] Conveniently, the processing station 3 comprises a supporting framework 8 for the element 5: the framework 8 can move automatically and selectively from a first configuration, in which the element 5 is spaced from the line 6, to at least one second configuration, in which it substantially crosses the line 6, in order to allow the element 5 to open the container 4 and thus cause the consequent draining of the substance, and vice versa.

[0029] As described hereinafter, in the preferred embodiment the stroke of the framework 8 can continue beyond the second configuration for piercing the containers 4 from side to side and ensure their optimum emptying.

[0030] With further reference to the preferred embodiment, the element 5 substantially consists of a needle 9, which is adapted to pierce the container 4 substantially in the second configuration.

[0031] Transition from the first configuration to the second configuration is thus provided by lowering the framework 8, which moves toward the line 6, moving the needle 9 so that it pierces the container 4, thus allowing the outflow of the urine (or other substance to be disposed of).

[0032] In the embodiment proposed merely by way of illustration in the accompanying figures, the piercing of each container 4 is achieved by means of the action of four needles 9, which are arranged for example at the vertices of an imaginary square (accordingly, eight needles 9 are provided to pierce the two containers 4 to be emptied in each work cycle).

[0033] Advantageously, the needle 9 is internally hollow and open at its pointed end (designed to pierce the container 4): along the lateral surface of the needle 9 there is at least one hole 10 for allowing the outflow of any substance that may have risen within the needle 9

through the open pointed end.

[0034] The choice to resort to an open and internally hollow needle 9 makes it possible to avoid the danger of bursting of the bag (due to the pressure generated on the internal surface of said bag) directly after its piercing, because the urine can indeed rise along the needle 9 and exit through the hole 10, thus removing the pressure from the internal surface of the bag.

[0035] In order to optimize piercing, the pointed end can have an obliquely bevel-cut tip so as to obtain a profile (optionally with more than one cutting edge) which can better pierce the bag.

[0036] Conveniently, the processing station 3 comprises at least one pusher, which is associated with the supporting frame 8: at least in the second configuration, the pusher moves so as to press against the container 4 to be pierced and thus facilitates its complete emptying in addition to ensuring its motionlessness during piercing.

[0037] More particularly, according to the preferred embodiment, the pusher substantially consists of a plate 11 which is substantially parallel to the direction defined by the conveying line 6 and can move at right angles thereto from the first configuration, in which the plate 11 is lifted from the line 6, to at least the second configuration, in which it is instead pressed against the container 4, and vice versa.

[0038] In order to ensure that the above cited tasks entrusted to the plate 11 are completed even when the dimensions of the bag and the quantity of urine therein vary, the processing station 3 comprises an elastic element for connection between the plate 11 and the supporting frame 8. The elastic reaction of the elastic element is in fact capable of keeping the plate 11 under pressure against the container 4 for any volume and degree of filling thereof (thus compensating for dimensional differences that impart strokes of different length to the plate 11 in passing from the first configuration to the second configuration).

[0039] In particular, according to the preferred embodiment, the elastic element substantially consists of a spring 12, which is substantially coaxial to the needle 9 and wound around it: the fixed end of the spring 12 is coupled to the framework 8, while the movable end thereof is coupled to the plate 11, which in turn is associated slidingly with the needle 9.

[0040] Conveniently, the disposal assembly 1 comprises an outer casing 13, which forms a chamber 14 that can be shielded completely with respect to the outside and accommodates the line 6: the complete shielding of the chamber 14 is thus an absolute guarantee of safety for the operator, who cannot come into contact in any way with the urine and/or the other substances to be disposed of during bag emptying operations.

[0041] Along the casing 13 there are, therefore, at least one entry hatch 15 and at least one exit hatch 16 for selective access to the line 6 to allow respectively the loading and unloading of the containers 4; the entry hatch 15 and the exit hatch 16 are in fact substantially provided

respectively at the loading station 2 and at the unloading station 7.

[0042] In order to allow automatic evacuation of the urine (or other substance to be disposed of) outside the assembly 1, the latter comprises, substantially proximate to the lower end face 13a of the casing 13, a discharge manifold 17 for the substances to be disposed. Below the line 6 there is, therefore, a collector 18, which substantially consists of a plurality of funnel-shaped surfaces 19 which lead toward the manifold 17, in order to collect the substances to be disposed of and discharge them to the outside by the effect of gravity.

[0043] The manifold 17 can thus be connected directly to the sewage network, in order to ensure disposal of the urine without said urine, after introduction in the assembly 1, being able in any way to return into contact with operators assigned to disposal.

[0044] Conveniently, the disposal assembly 1 comprises an apparatus for washing and sterilizing the chamber 14 in order to prevent the accumulation of the substance to be disposed of, particularly for deposits along the internal walls of the casing 13 and/or on the various internal components of the assembly 1, with consequent loss of the necessary conditions of hygiene and more simply the inevitable inconvenience caused by bad odor.

[0045] More particularly, according to the preferred embodiment, the washing and sterilization apparatus comprises a plurality of nozzles which are arranged inside the chamber 14 and are adapted to spray it with appropriate gaseous substances for its washing and sterilization.

[0046] Advantageously, the disposal assembly 1 comprises a dripping station, which is interposed between the processing station 3 and the unloading station 7, in order to allow complete emptying of the container 4. After the needle 9 has pierced the container 4 and therefore, also due to the action of the plate 11, the bag has been emptied, small quantities of urine in fact might still remain trapped between the creases of the container 4. By thus holding the container 4 for a predefined time in a position along the line 6 which is intermediate between the element 5 and the exit hatch 16, which in practice forms the dripping station, it is possible to ensure complete emptying.

[0047] The operation of the assembly according to the invention is as follows.

[0048] By opening the entry hatch 15, an operator (for example a nurse or a worker of the hospital or nursing home) can load one or more containers 4 to be emptied onto the conveying line 6 (in the hypothesis shown in the figure, he places two containers for each working cycle).

[0049] After closing the entry hatch 15, it is then possible to activate the line 6, for example by means of a button or another suitable actuation device which can be accessed from the outside.

[0050] The line 6 moves the containers 4 until they are at the processing station 3 (below the element 5 and the supporting framework 8), which is in the first configuration

described above. Upon recognition that such position has been reached, for example by means of suitable sensors, an appropriately provided driving unit actuates the descending motion of the supporting framework 8 and accordingly of the needles 9 and the plate 11. For example, the descending motion of the frame 8 (and its subsequent rise) can be actuated by a rotary pusher crank system 20 (which therefore constitutes the driving unit cited above).

[0051] The plate 11 thus rests on the bag and, as the descent of the framework 8 continues, moves so as to press elastically against it while it slides on the lateral surfaces of the needles 9.

[0052] As mentioned, during this step the presence of the springs 12 (at least one for each plate 11) ensures that the plate 11 achieves the task for any degree of filling of the container 4 and also allows handling of any variations of format thereof.

[0053] With the container 4 being pressed by the plate 11, the needles 9 continue their stroke and pierce the bag upward, thus commencing its emptying and reaching the second configuration. In this step, the urine can rise along the needle 9 and exit through the holes 10, avoiding the danger of bursting due to excessive pressure.

[0054] To ensure better emptying, once this second configuration has been reached, in the preferred embodiment the framework 8 continues in its descending stroke in order to allow the needles 9, which have already penetrated into the bag, to exit from it on the opposite side (in a lower region) and ensure optimum emptying.

[0055] According to this embodiment, the conveying line 6 thus consists of a platform consisting of a net, for example of the type of a chain conveyor 21, the links of which can thus be crossed by the needles 9 that have penetrated the bags.

[0056] In order to facilitate movement, it is possible to provide locators 22 along the belt 21 which protrude vertically from the deck and are thus able to push the containers 4 during motion.

[0057] After completing the descent stroke, the framework 8 can rise, thus disengaging the needles 9, and then the plate 11, from the bags; such bags then advance along the line 6 and it is possible to provide subsequently a further stop for them at a dripping station in order to better ensure complete emptying.

[0058] Finally, the bags are sent from the dripping station to the unloading station 7, where the bags which are now empty can be for example collected, manually or better still automatically, in containers which can even be made of plastics to be then sent to the disposal plants.

[0059] It thus appears evident that the assembly 1 according to the invention ensures the disposal even of large quantities of bags filled with urine with a solution that is practical, easy and compact and can therefore be installed easily directly in hospitals and in nursing homes, relieving them of the burden of managing the full bags.

[0060] The possibility of shielding the chamber 14 (or in any case the processing station 3) completely is a guar-

antee of hygiene and avoids the danger of biological risk to the operator.

[0061] In this regard, the possibility is provided of equipping the assembly 1 with safety devices which for example prevent the opening of the entry hatch 15 or of the exit hatch 16 during the movement of the line 6 or the rise and descent of the element 5, in order to avoid accidental exposures to the liquid contained in the bags. There are also devices for controlling the correct operation of the various components designed for movement, such as the crank system 20 and an electric motor 23 (for example) capable of controlling the deck.

[0062] Figure 1 further shows the possibility of providing a further supplemental hatch 24, for example to allow the connection of the discharge manifold 17 to the sewage system or to provide a convenient access to the tank that contains the gaseous substance assigned to washing and sterilization.

[0063] The method for disposal, particularly of deformable containers, consists, in a first step a), in feeding a loading station 2 with at least one container 4 of substances to be disposed of of the deformable type.

[0064] Subsequently, the method provides for transferring, in a step b), the container 4 to a processing station 3 that is at least partially shielded.

[0065] The processing station 3 (which can also coincide with the loading station 2) comprises at least one element 5 for selective opening of the container 4 and consequent draining of the substance.

[0066] After moving the container 4 to the processing station 3, it is possible to actuate, in a step c), the element 5 for selective opening and thus to allow drainage.

[0067] In practice it has been found that the assembly according to the invention fully achieves the intended aim, by means of the choice to resort to an assembly which comprises at least one station for loading onto a processing station, which is at least partially shielded, for at least one container of substances to be disposed of, with the processing station which, by comprising at least one element for selective opening of the container and consequent drainage of the substance, ensures disposal of such containers in a practical and easy manner.

[0068] 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.

[0069] In the exemplary embodiments that follow, individual characteristics, given in relation to specific examples, may actually be interchanged with other different characteristics that exist in other exemplary embodiments.

[0070] 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.

[0071] In practice, the materials used, as well as the contingent shapes and dimensions, may be any accord-

ing to requirements and to the state of the art.

[0072] 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. A disposal assembly (1), particularly for deformable containers, **characterized in that** it comprises at least one station (2) for loading on a processing station (3), which is at least partially shielded, for at least one container (4), of a deformable type, of substances to be disposed of, said processing station (3) comprising at least one element (5) for the selective opening of the container (4) and the consequent draining of the substance.
2. The disposal assembly according to claim 1, **characterized in that** it comprises a line (6) for moving the container (4) from said loading station (2) to an unloading station (7), said processing station (3) being arranged between said loading station (2) and said unloading station (7).
3. The disposal assembly according to claims 1 and 2, **characterized in that** said processing station (3) comprises a supporting framework (8) for said at least one element (5), said framework (8) being movable automatically and selectively from a first configuration, in which said element (5) is spaced from said line (6), to at least one second configuration of substantial intersection of said line (6), for allowing said element (5) to open the container (4) and allowing the consequent drainage of the substance, and vice versa.
4. The disposal assembly according to one or more of the preceding claims, **characterized in that** said element (5) substantially consists of a needle (9), which is adapted to pierce the container (4) substantially in said second configuration.
5. The disposal assembly according to claim 4, **characterized in that** said needle (9) is internally hollow and is open at its pointed end, along the lateral surface of said needle (9) there being at least one hole (10) for allowing the outflow of any substance that might have risen inside said needle (9) through said open pointed end.
6. The disposal assembly according to one or more of the preceding claims, **characterized in that** said processing station (3) comprises at least one pusher

which is associated with said supporting framework (8), in at least said second configuration said pusher moving so as to press against the container (4) to be pierced, in order to facilitate its complete emptying and ensure its motionlessness during piercing.

7. The disposal assembly according to claim 6, **characterized in that** said pusher substantially consists of a plate (11), which is arranged substantially parallel to the direction defined by said conveying line (6) and can move, at right angles thereto, from said first configuration, in which said plate (11) is raised from said line (6), to at least said second configuration, in which said plate (11) is pressed against the container (4), and vice versa.

8. The disposal assembly according to one or more of the preceding claims, **characterized in that** said processing station (3) comprises an elastic element for connection between said plate (11) and said supporting framework (8), the elastic reaction of said elastic element keeping said plate (11) pressed against the container (4) for any volume and degree of filling thereof.

9. The disposal assembly according to one or more of the preceding claims, **characterized in that** said elastic element substantially consists of a spring (12), which is substantially coaxial to said needle (9), the fixed end of said spring (12) being coupled to said framework (8), the movable end of said spring (12) being coupled to said plate (11), which in turn is associated slidingly with said needle (9).

10. The disposal assembly according to one or more of the preceding claims, **characterized in that** it comprises an outer casing (13), which forms a chamber (14) which can be shielded completely from the outside and accommodates said line (6), along said casing (13) there being at least one entry hatch (15) and at least one exit hatch (16) for selective access to said line (6) to allow respectively the loading and unloading of the containers (4), said entry hatch (15) and said exit hatch (16) being provided substantially at respectively said loading station (2) and said unloading station (7).

11. The disposal assembly according to one or more of the preceding claims, **characterized in that** it comprises, substantially proximate to the lower end (13a) of said casing (13), a discharge manifold (17) for the substances to be disposed of, below said line (6) there being a collector (18) which substantially consists of a plurality of surfaces (19) which are funnel-shaped and lead toward said manifold (17) in order to collect the substances to be disposed of and discharge them by the effect of gravity.

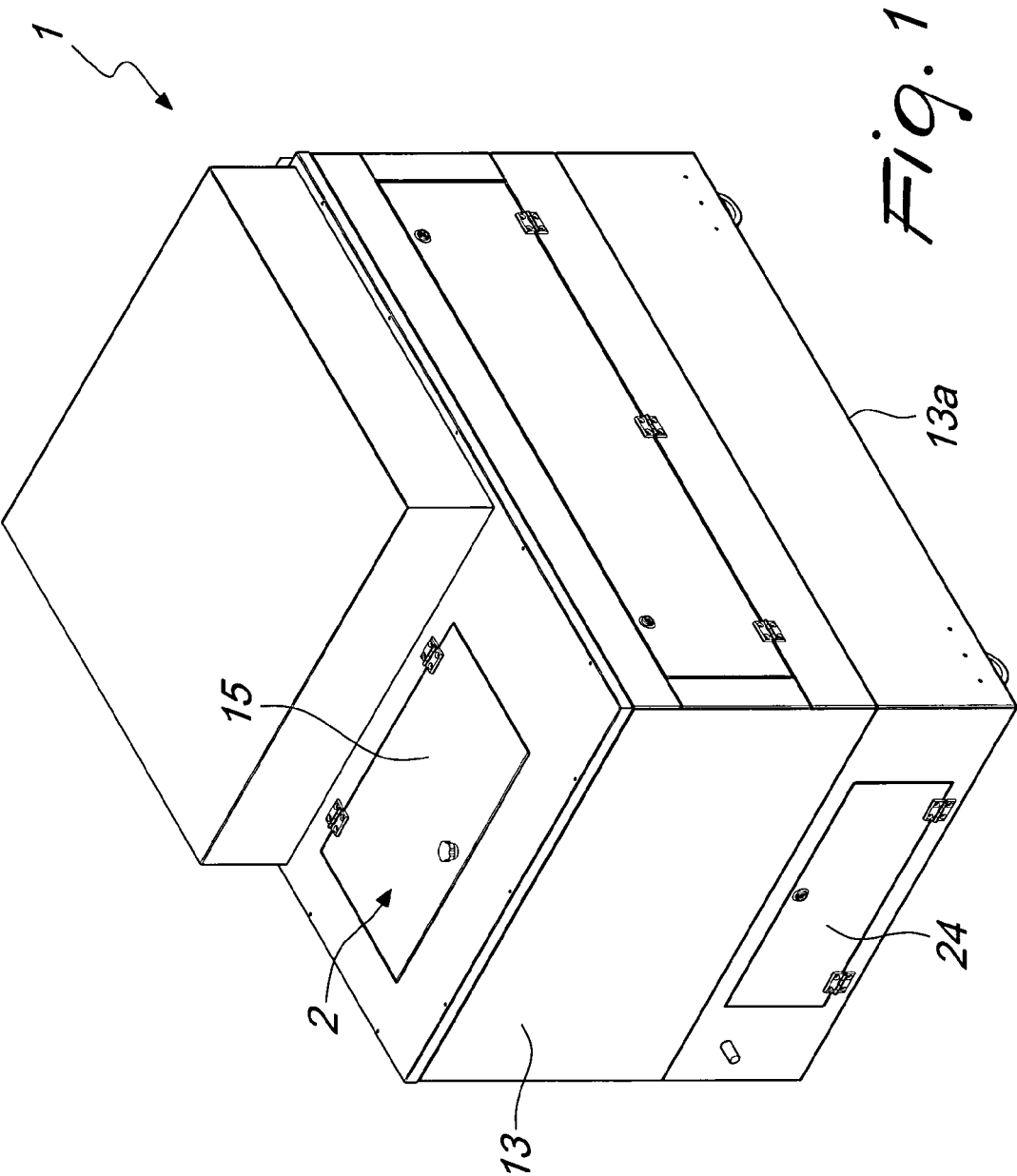
12. The disposal assembly according to one or more of the preceding claims, **characterized in that** it comprises an apparatus for washing and sterilizing said chamber (14) to prevent the accumulation of the substance to be disposed of.

13. The disposal assembly according to claim 12, **characterized in that** said washing and sterilization apparatus comprises a plurality of nozzles arranged inside said chamber (14) and adapted to spray it in order to wash it and sterilize it.

14. The disposal assembly according to one or more of the preceding claims, **characterized in that** it comprises a dripping station, which is interposed between said processing station (3) and said unloading station (7), the container (4) being held at said dripping station for a predefined time in order to allow complete emptying of said container (4).

15. A method for disposal, particularly of deformable containers, which comprises the steps of:

- a) feeding a loading station (2) with at least one container (4), of substances to be disposed of, of the deformable type;
- b) transferring the container (4) to a processing station (3), which is at least partially shielded, said processing station (3) comprising at least one element (5) for the selective opening of the container (4) and the consequent draining of the substance;
- c) actuating said element (5) for selective opening and allowing drainage.



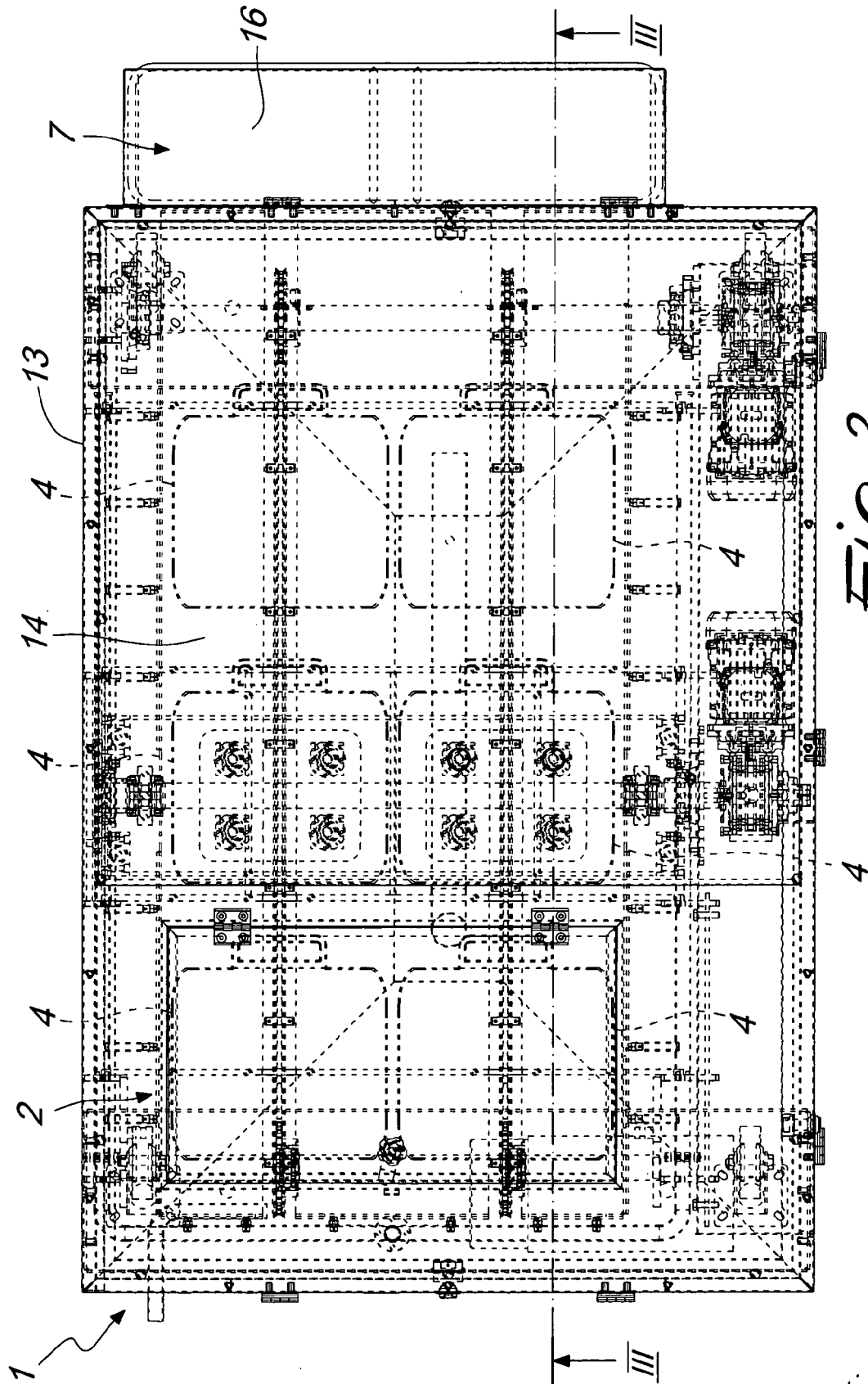


Fig. 2

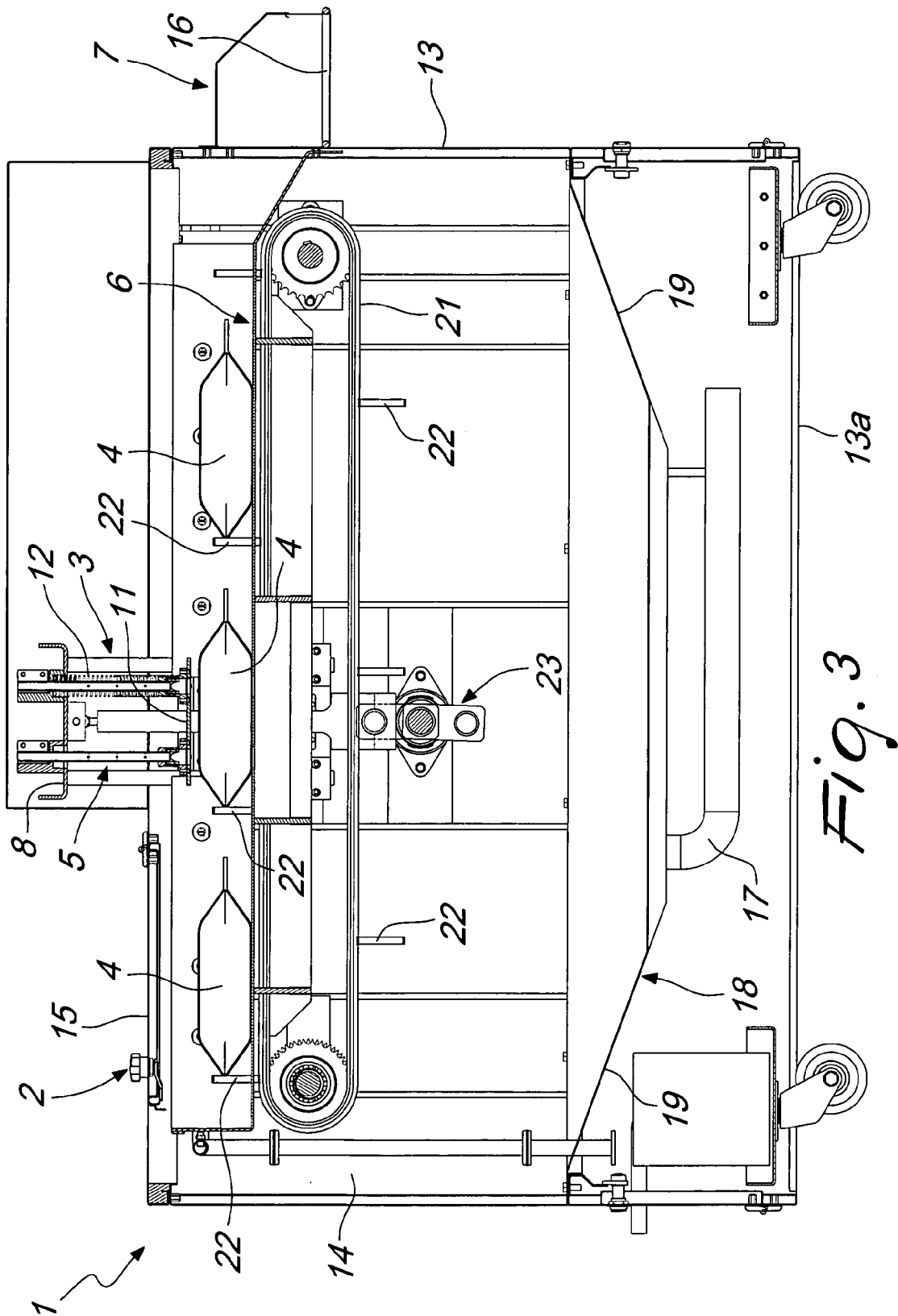


Fig. 3

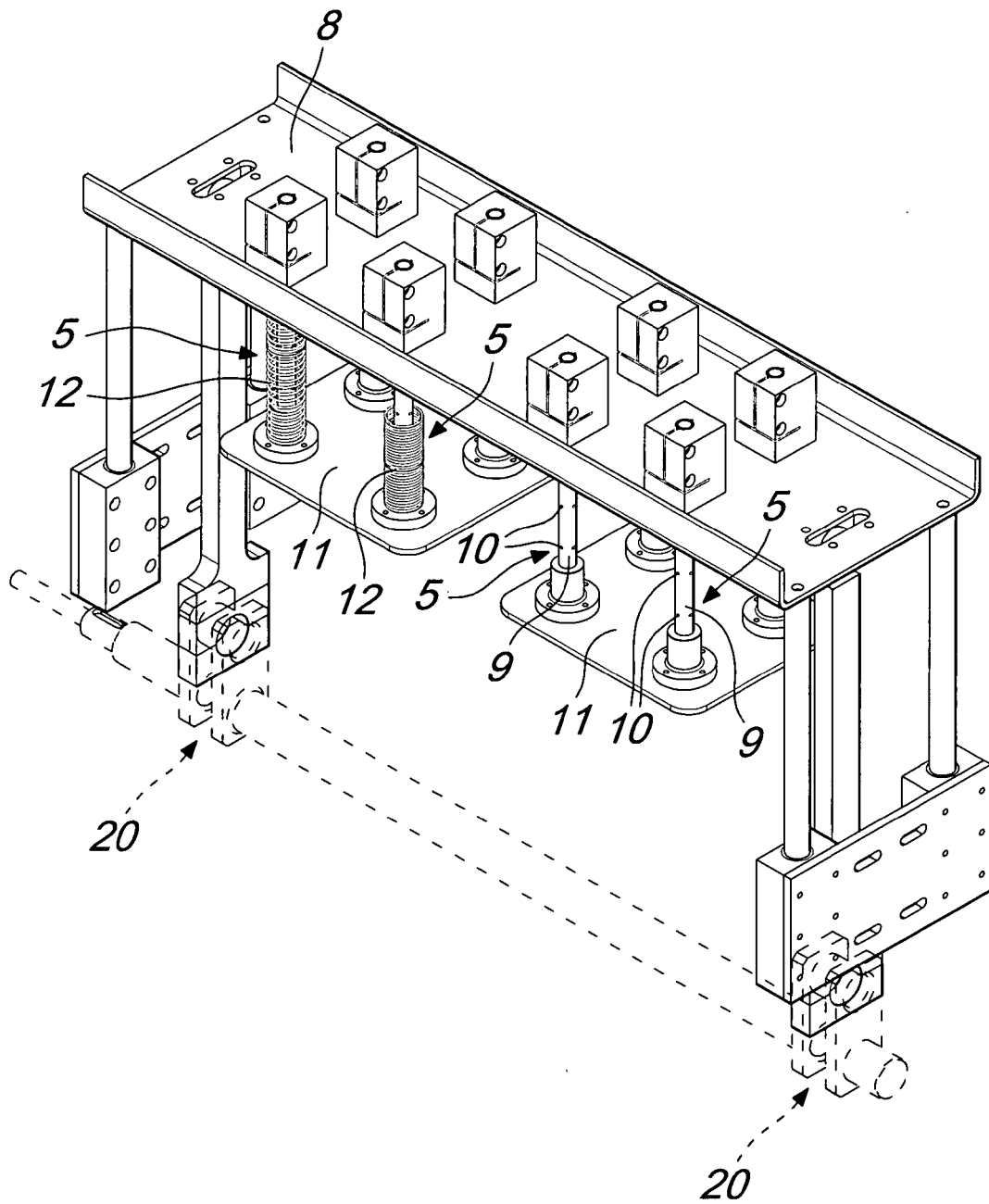
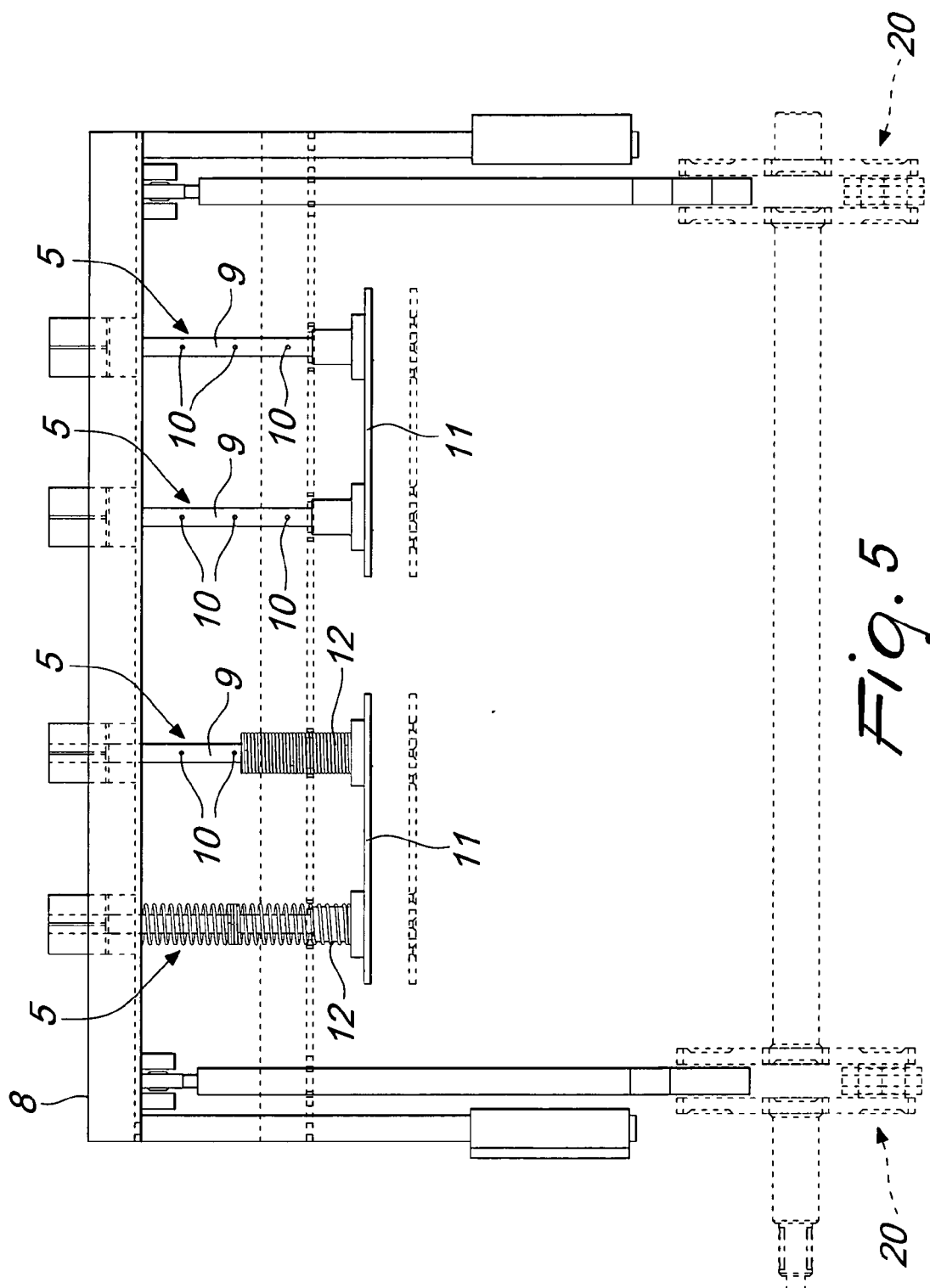


Fig. 4





EUROPEAN SEARCH REPORT

Application Number
EP 09 42 5391

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**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 09 42 5391

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
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