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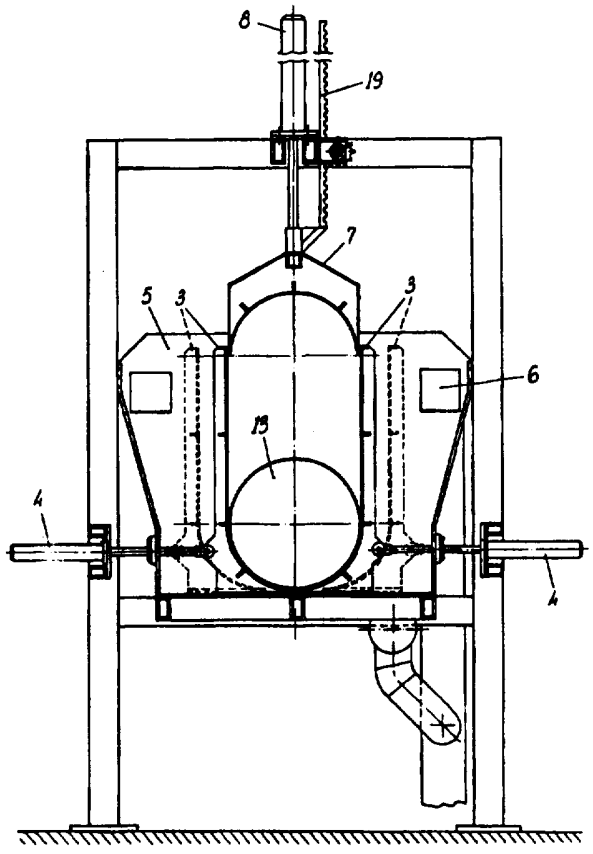
(54) Title: APPARATUS FOR CONTEMPORANEOUSLY SHAPING AND PRESSING A PLURALITY OF GRANA CHEESE FORMS

(57) Abstract

The invention concerns an apparatus (1) for contemporaneously shaping and pressing a plurality of Grana cheese forms comprising a support frame (2), a tank for collecting the curd having movable holed lateral (3) and upper (7) walls, suitable to press and shape the curd under serum and to end the drainage of the serum, a tank (5) to contain the serum, provided external with respect to said curd collecting tank, a platform having the bottom holed, to drain the serum, horizontal thrust means (13, 14) of the pressed and shaped caseous mass coming out from the collecting tank, cut means (15) for the caseous mass coming out from the collecting mass so as to obtain single cheeses, drawing means (11, 17, 18) for the single cheeses obtained, and control means (30) to operate the various components.



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APPARATUS FOR CONTEMPORANEOUSLY SHAPING AND PRESSING A PLURALITY OF GRANA CHEESE FORMS

The present invention relates to an apparatus for contemporaneously shaping and pressing a plurality of Grana cheese forms.

Furthermore, the invention relates to a process for the production of Grana cheese form using said apparatus.

More particularly, the invention concerns an apparatus of the above kind that allows the mechanisation of some steps of the production process for the Grana cheese form.

As it is well known, at present the production of Grana cheese forms, either Parmiggiano Reggiano or Grana Padano, adopts a traditional technology deriving since Middle Ages.

The known technology, providing the utilization of copper kiers, employs local partially skimmed milk, and provides a coagulation step along with curd and enrichment of the lactic micro flora with serum-natural starter.

The caseous mass, that while sedimenting conforms itself to the bottom of the kier, must be kept resting for 30 - 40 minutes, in such a way to spontaneously settle and structure.

Once the step under serum is finished, the caseous mass is lifted by a suitable shovel.

It is then collected within a cloth and suspended in an over-turned position, partially immersed in the serum.

The caseous mass, obtained from a kier having a capacity of 10 q capacity, is then manually separated in two twin forms, that, always wound in a cloth, well settled and with the cut surface folded on itself, are placed within two suitable bands, at first a wood band and then a metal band, respectively with a right and rounded profile.

The form is placed on the inclined plane for the extraction of the serum, wound by cloth and band, and covered by a wood disc (round) of 8 - 10 Kg.

Within one hour from the introduction in the band, it is carried out the first turning over, substituting the original cloth with a new clean one, soaked in hot water and wrung; the second turning over is carried

out substituting the cloth, about after two hours from the first turning over, and the third one after two - three hours from the second.

In order to facilitate the regular and uniform draining all over the surface and avoid stagnation of acid serum with the consequent defects on the crust, it is necessary to over turn the form at least 4 - 5 times within the first 10 hours.

As it can be noted, the known process is substantially a manual process, so that it is surely needed to automatize and mechanise, at least at a certain degree, the same process.

This need to reach the mechanisation of the production system obviously imposes the introduction of modifications to the original technology.

A first solution of this kind has been proposed by the same Istituto Sperimentale Lattiero Caseario in the Italian patent application N° RM94A000110, filed on March 2, 1994 and concerning an "Apparatus for shaping and pressing Grana cheese form".

In said patent application it is described and claimed an apparatus, and the relevant process, for the production of a Grana cheese form each time, based on a substantially vertical operating principle as to the shaping and the pressing of the curd is concerned.

In this picture it can be introduced the solution according to the present invention, said solution allowing to automatize different steps of the Grana production, further being an improvement of the solution described in the former patent application.

The solution according to the present invention suggests a different motion and collection of the curd.

It is therefore specific object of the present invention an apparatus for contemporaneously shaping and pressing a plurality of Grana cheese forms comprising a support frame, a tank for collecting the curd having movable holed lateral and upper walls, suitable to press and shape the curd under serum and to end the drainage of the serum, a tank to contain the serum, provided external with respect to said curd collecting tank, a platform having the bottom holed, to drain the serum, horizontal thrust means of the pressed and shaped caseous mass coming out from the collecting tank, cut means for the caseous mass coming out from the collecting mass so as to obtain single cheeses, drawing means for the

single cheeses obtained, and control means to operate the various components.

Particularly, according to the invention, said tank for collecting the curd provides two holed lateral walls and an upper holed wall, said walls being shaped so as to give to the curd the desired shape during the pressing.

Preferably, according to the invention, said lateral and upper walls are operated by hydraulic, pneumatic and/or oleo pneumatic cylinders.

Further, according to the invention, said tank for the containment of the serum can be provided with means for completely draining the serum and with overflow for the exit of the excess serum.

Still according to the invention, in front of the outlet of the curd collection tank, a cheese support can be provided, hinged to said frame, in order to receive the cut cheese coming out and to rest it on said drawing means.

Particularly, said drawing means can be comprised of a trolley bearing a band for the containment of the cheese.

Always according to the invention, said cut means for the caseous mass can be comprised of a guillotine provided with a cut blade, operated by a hydraulic, pneumatic, oleo pneumatic piston or like.

Said horizontal thrust means for the caseous mass will be preferably made up of a hydraulic, pneumatic and like horizontal piston, acting on said plate sliding within said serum collection tank.

Further according to the invention, at the outlet of said collection tank a bulkhead for the containment of the curd is provided.

The apparatus according to the invention allows to contemporaneously produce a plurality of forms, preferably 4 Grana cheese forms.

The invention further provides a process for the production of Grana cheese form employing an apparatus of the above kind.

The present invention will be now described for illustrative and not limitative purposes, according to its preferred embodiments, with particular reference to the enclosed drawings, wherein:

figure 1 is a side view of the apparatus according to the invention;

figure 2 is a front view of the apparatus of figure 1;

figure 3 is a section view taken along the line III-III figure 1;

figure 4 is a plan view of the apparatus of figure 1; and

figure 5 is a section view taken along line V-V of figure 4.

Before beginning to describe in detail the apparatus according to the invention, it is necessary to describe with greater detail the working steps for the Grana cheese form occurring before the steps carried out by the apparatus.

To the already partially skimmed milk (2.2 - 2.5 % fat), the serum - natural starter is added until obtaining an acidity of the mixture of 4.3 - 4.5 °SH/50 ml.

It is then coagulated in a multivalent apparatus by the curd enzymes for a time of about 9 - 15 min.

Once reached the most proper rheology of the curd (measured by a proper instrument), the cut and start of the extraction of the serum operations of the curd granules are started, said granules being subjected to the two traditional cooking at 44°C and 53°C, with an interval of stirred stop of about 6 - 15 minutes.

At this stage of the production process, the apparatus according to the invention is used.

Referring now to figures 1 - 5, it can be noted an embodiment of the apparatus 1 according to the invention comprising a support frame 2, supporting all the parts of the apparatus 1.

Above said frame 2, a curd collection tank is provided, said tank having holed lateral walls 3, shaped below, for laterally pressing the same curd, operated by two horizontal hydraulic pistons.

External with respect to said curd collection tank, and more particularly externally with respect to said holed lateral walls, a steel tank 5 is provided for collecting the serum during the pressing of the curd.

Said tank 5 is provided with an adjustment valve for the flow of the serum, beside of an overflow 6 for discharging the excess serum.

Above the curd collection tank, a movable wall 7 is provided, shaped in such a way to give from the above the desired shape to the cheese form, exerting a vertical pressure and operated by vertical hydraulic pistons 8.

The cylinder comprised of the lateral walls 3 and of the upper movable wall 7 is frontally closed by a bulkhead 9 for the containment of the form. Said bulkhead is operated by the pneumatic piston 10 in order to

allow the passage of part of the curd, as it will be described in greater detail in the following, toward a form-supporting die 11, the turning over of which is controlled by the piston 12.

Behind said cylinder, a plate 13 is provided to draw the form, said plate being operated by a horizontal hydraulic piston 14.

In correspondence of the front part of the cylinder, i.e. of the bulkhead 9, a guillotine 15 is provided, moved by an hydraulic piston 16, to cutting the produced forms.

Below said form-supporting die 11 a drawing system is provided, comprised of a trolley 7 upon which the form within the band 18 rests.

Racks 19 and a shaft 20 are provided above the movable upper wall 7, in order to compensate the vertical pressing.

All the controls of the different parts of the apparatus 1 are provided in the control panel 21.

By the reference 22 it is indicated the hole for the complete discharging, while the reference 23 indicates the collection manifold for the serum.

The curd is fed by gravity within the collection tank, and then lateral pressure by the lateral walls 3 and the vertical pressure by the wall 7 are started, employing pressure and time values established on the basis of the specific needing, so as to obtain a pressed curd cylinder.

The serum passes through the holed walls 3 and 7 and is maintained around the curd for the necessary period of time.

Once terminated the pressure and the rest steps, the plate 13 is operated, opening the bulkhead 9 blocking the form.

When the plate 13 has brought a quantity of curd corresponding to a Grana form beyond the guillotine 15, within the form-supporting die 11, the same guillotine cuts the form.

The form-supporting die 11 turns over about the hinge 24 so as to be in the position for discharging the Grana cheese form within the band 18 on the trolley 17, said form being ready to be brought toward the hot room and the following salting and seasoning steps.

The same procedure of drawing and cut is then repeated for the other forms obtained from a single curd cylinder.

The apparatus 1 according to the invention allows to contemporaneously obtain four Grana forms, but it is well evident that it

can be also realized for a different production, being it necessary only to modify the parameters and the dimensions to obtain the desired result.

The present invention has been described for illustrative, but not limitative purpose, according to its preferred embodiments, but it is to be understood that changes and/or modifications could be introduced by those skilled in the art without departing from the relevant scope as defined by the enclosed claims.

CLAIMS

1. Apparatus for contemporaneously shaping and pressing a plurality of Grana cheese forms characterized in that it comprises a support frame, a tank for collecting the curd having movable holed lateral and upper walls, suitable to press and shape the curd under serum and to end the drainage of the serum, a tank to contain the serum, provided external with respect to said curd collecting tank, a platform having the bottom holed, to drain the serum, horizontal thrust means of the pressed and shaped caseous mass coming out from the collecting tank, cut means for the caseous mass coming out from the collecting mass so as to obtain single cheeses, drawing means for the single cheeses obtained, and control means to operate the various components.

2. Apparatus for contemporaneously shaping and pressing a plurality of Grana cheese forms according to claim 1, characterized in that said tank for collecting the curd provides two holed lateral walls and an upper holed wall, said walls being shaped so as to give to the curd the desired shape during the pressing.

3. Apparatus for contemporaneously shaping and pressing a plurality of Grana cheese forms according to claim 1, characterized in that said lateral and upper walls are operated by hydraulic, pneumatic and/or oleo pneumatic cylinders.

4. Apparatus for contemporaneously shaping and pressing a plurality of Grana cheese forms according to one of the preceding claims, characterized in that said tank for the containment of the serum is provided with means for completely draining the serum and with overflow for the exit of the excess serum.

5. Apparatus for contemporaneously shaping and pressing a plurality of Grana cheese forms according to one of the preceding claims, characterized in that in front of the outlet of the curd collection tank, a cheese support is provided, hinged to said frame, in order to receive the cut cheese coming out and to rest it on said drawing means.

6. Apparatus for contemporaneously shaping and pressing a plurality of Grana cheese forms according to one of the preceding claims, characterized in that said drawing means are comprised of a trolley bearing a band for the containment of the cheese.

7. Apparatus for contemporaneously shaping and pressing a plurality of Grana cheese forms according to one of the preceding claims, characterized in that said cut means for the caseous mass are comprised of a guillotine provided with a cut blade, operated by a hydraulic, pneumatic, oleo pneumatic piston or like.

8. Apparatus for contemporaneously shaping and pressing a plurality of Grana cheese forms according to one of the preceding claims, characterized in that said horizontal thrust means for the caseous mass are made up of an hydraulic, pneumatic and like horizontal piston, acting on said plate sliding within said serum collection tank.

9. Apparatus for contemporaneously shaping and pressing a plurality of Grana cheese forms according to one of the preceding claims, characterized in that at the outlet of said collection tank a bulkhead for the containment of the curd is provided.

10. Apparatus for contemporaneously shaping and pressing a plurality of Grana cheese forms according to one of the preceding claims, characterized in that allows to contemporaneously produce a plurality of forms, preferably 4 Grana cheese forms.

11. Process for the production of Grana cheese forms characterized in that it utilzes an apparatus according to one of the preceding claims.

12. Apparatus for contemporaneously shaping and pressing a plurality of Grana cheese forms according to anyone of the preceding claims 1 - 10, and the relevant production process, substantially as illustrated and described.

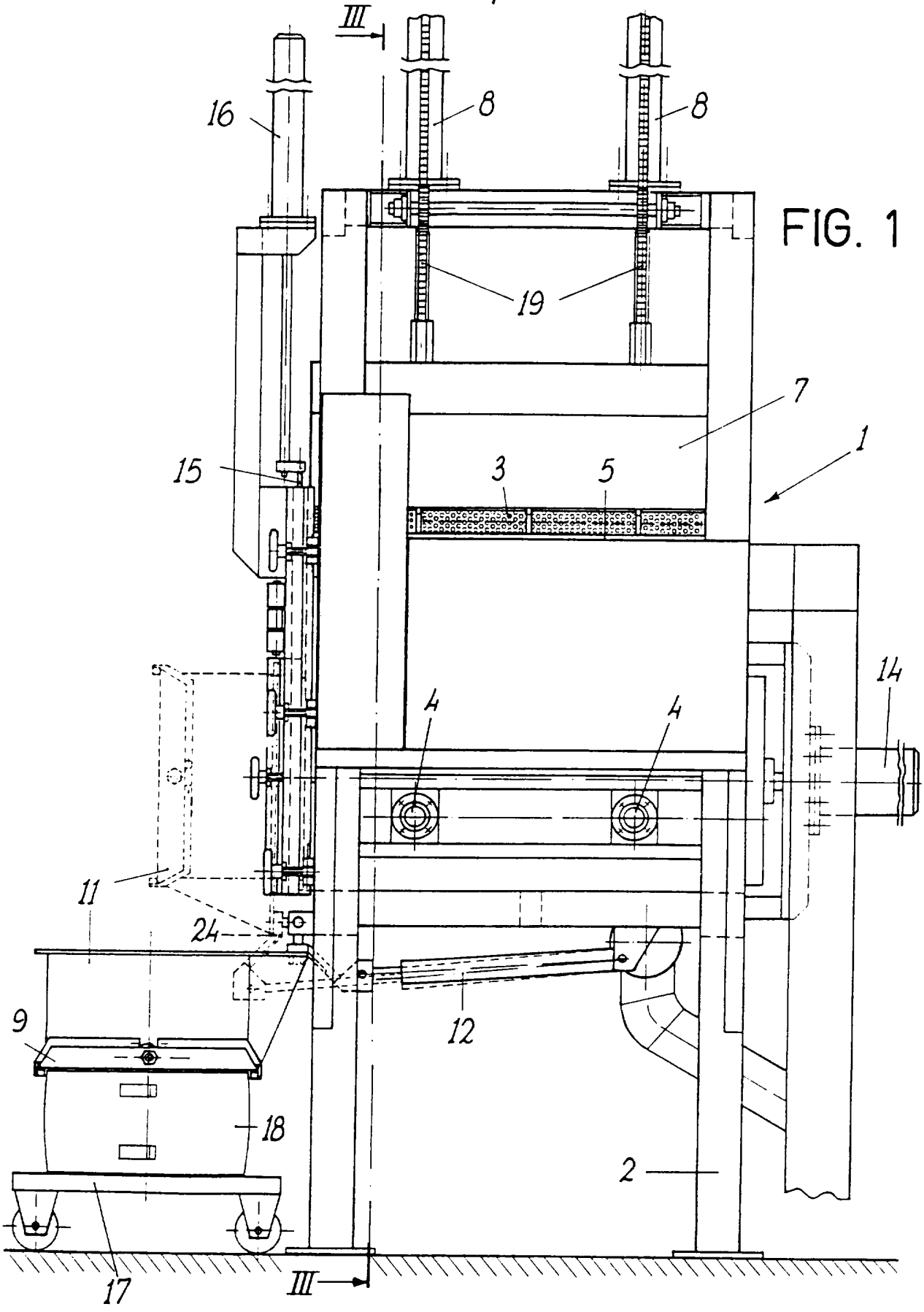
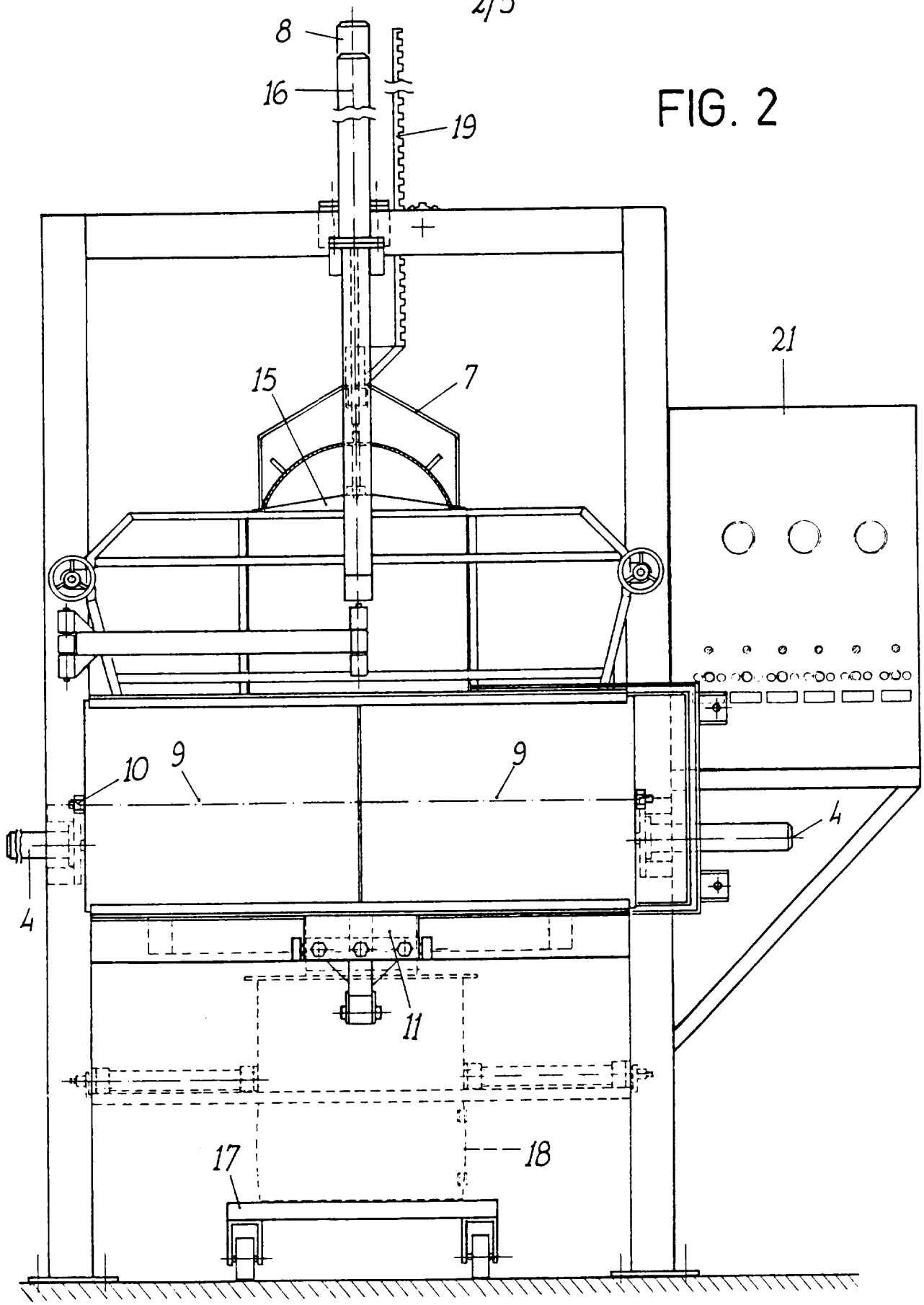


FIG. 1

FIG. 2



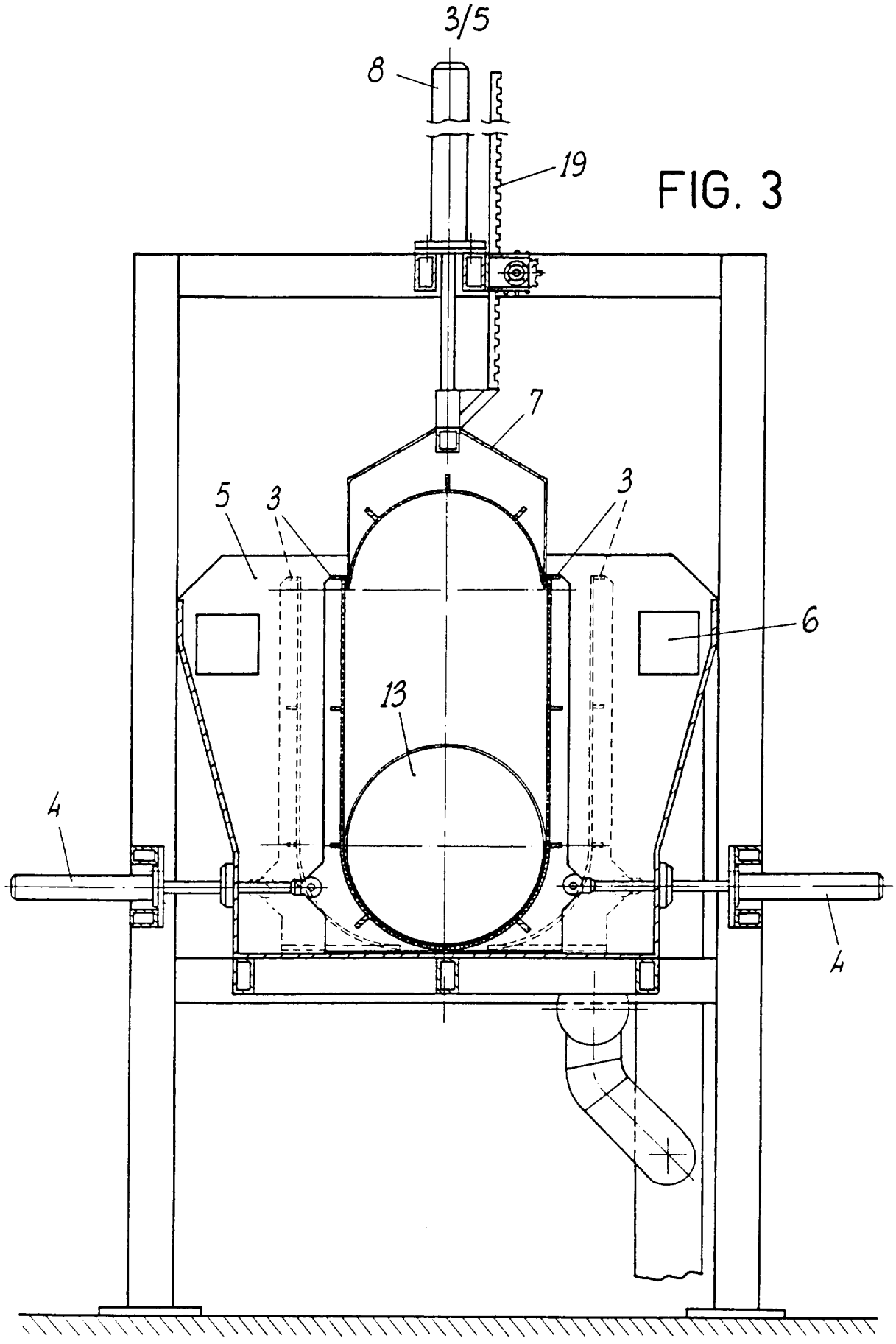


FIG. 3

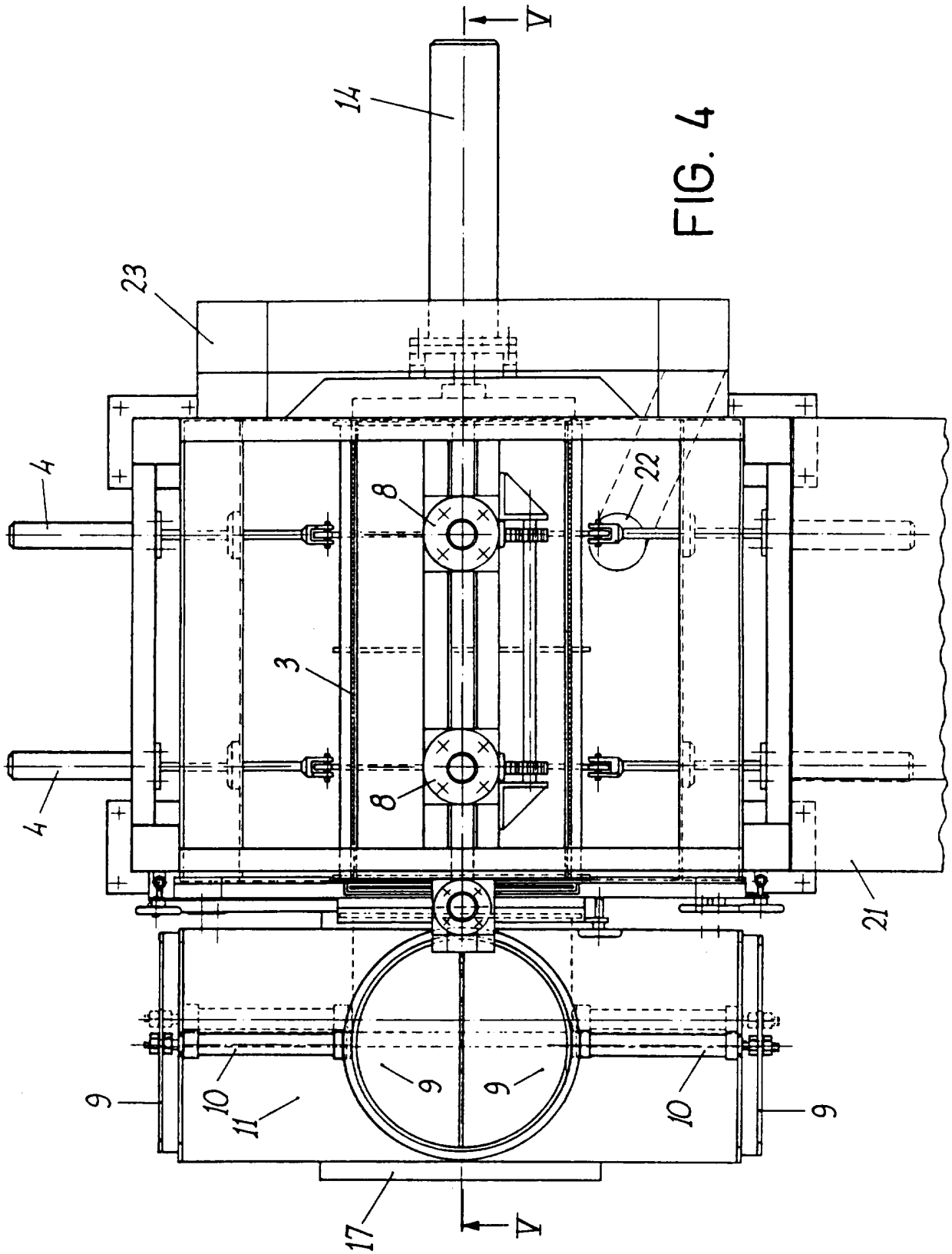
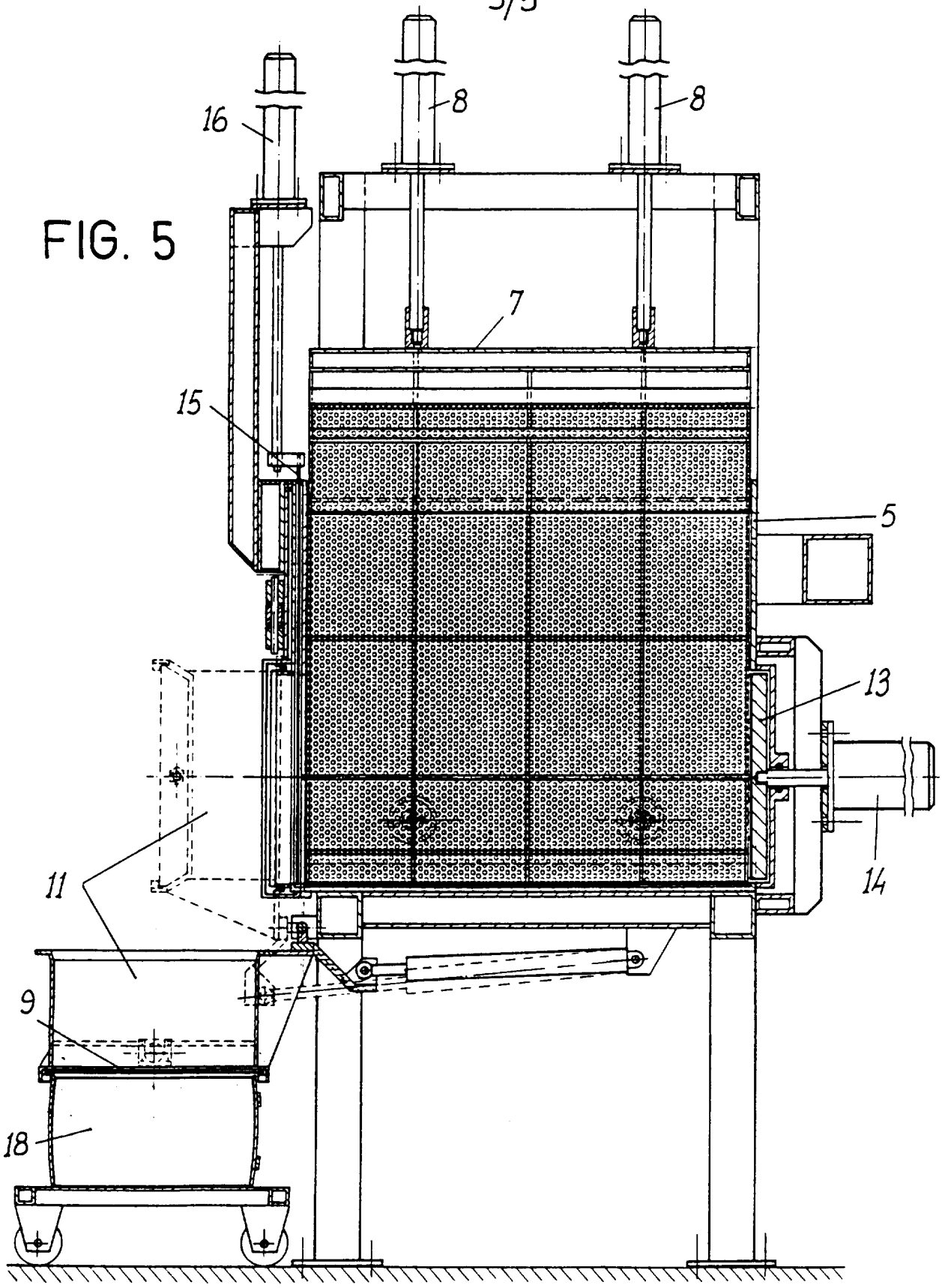


FIG. 4

FIG. 5



INTERNATIONAL SEARCH REPORT

Inter nal Application No
PCT/IT 95/00114

A. CLASSIFICATION OF SUBJECT MATTER
IPC 6 A01J25/15 A01J25/11

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 6 A01J

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	FR,A,2 569 332 (LAMEX LIBIAI BETETI TARTULAS) 28 February 1986 see claims; figures ---	1,6,7
A	FR,A,1 460 510 (SOCIETE ALFA-LAVAL) 2 December 1966 see claims; figures -----	1

☐ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

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Date of the actual completion of the international search	Date of mailing of the international search report
17 October 1995	06. 11. 95

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INTERNATIONAL SEARCH REPORT

Information on patent family members

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FR-A-2569332	28-02-86	DE-A-	3529899	27-02-86
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FR-A-1460510	08-02-67	NONE		