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(54) **A machine for cutting meat into slices**

(57) A machine for cutting meat into slices comprises a blade (16) for describing a cutting tract for meat to be cut, a rest plane (15) parallel to the cutting tract and distanced therefrom in a perpendicular direction to the rest plane, at least a container for the meat to be cut, having an outlet mouth facing towards the rest plane on a side of the cutting tract, pusher means, associated to the container, for pushing the meat towards the outlet mouth, and means for moving the container for translating the container of the meat parallel to the rest plane, with an alternating motion from a side to another of the cutting tract, in which the blade (16) comprises at least a cutting portion (17) and a portion (18) for supporting the meat present in the container.

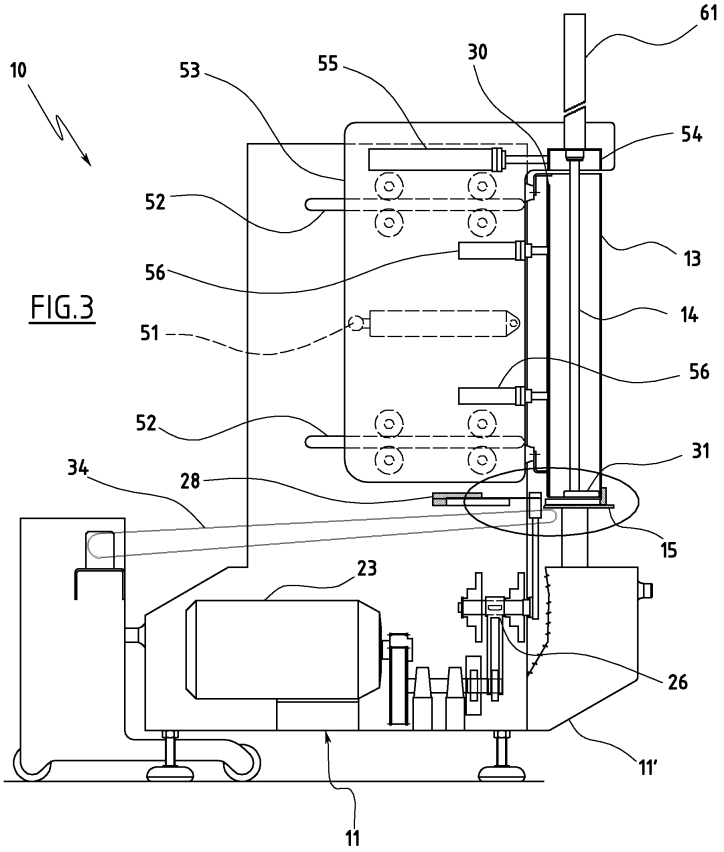

FIG.3

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Description

[0001] The invention relates entirely generally to a machine for cutting meat into slices, in particular for slicing meat which has been boned.

[0002] Italian patent no. RE2005A000097, to which reference is made for better comprehension, describes a machine for slicing meat, comprising a band knife ring-wound around two pulleys, which describes a straight and horizontal cutting tract located at a fixed height from the ground.

[0003] The machine comprises a front rest place for the meat, which is horizontal and parallel to the cutting tract and is distanced therefrom in a perpendicular direction to the rest plane.

[0004] The meat to be cut is fed in by at least a substantially vertical container, and has an outlet mouth which faces towards the rest plane on the cutting side, and is provided with pusher means, such as a plate sliding internally of the container, which pushes the meat towards the outlet mouth.

[0005] The container exhibits its own movement means, which translate the container parallel to the rest plane, with an alternating motion on one side and the other of the cutting tract.

[0006] The thickness of the slices to be cut from the meat is adjusted by varying the distance of the cutting tract from the front rest plane.

[0007] When the machine is turned on, the pusher means push the meat towards the outlet mouth of the respective tubular containers, while the containers translate alternatingly from an advanced position to a retracted position.

[0008] During the translation of the tubular container, it moves the meat against the cutting tract of the moving band knife, which separates the slice.

[0009] When the tubular containers reach the retracted position, having gone past the cutting tract, their outlet mouths are facing a posterior rest plane with respect to the cutting edge of the blade and are located in a slightly more elevated position with respect to the blade, which prevents the descent of the meat present in the container and which still has to be cut.

[0010] During the cutting of the meat still including the bone, the support plane does not create problems because the product is by its own nature compact and in most cases frozen, and thus during movement it behaves as a monolithic element.

[0011] If, on the other hand, the above-described machine is used for cutting boned meat, which is usually cut non-frozen, a series of problems crops up which lead to an increase in the waste and a lowering in the quality of the cut slice.

[0012] Firstly, the presence of the posterior rest plane, located in a slightly raised position with respect to the blade, means that the vertical distance between the container and the blade must be increased. This fact causes loss of precision in the thickness of the cut and a considerable increase in the working waste.

[0013] Further, meat tends to pile up in the fissure between the rest plane and the blade, causing problems during the stage of expulsion of the slice.

[0014] What is more, the conformation of the posterior rest plane in relation to the blade causes a rubbing between the product to be cut and the edge of the posterior plane and therefore causes damage to the surface of the meat, resulting in a final product of poor quality.

[0015] Finally, the fissure between the blade and the posterior plane constitutes a critical zone from the hygienic point of view, as it is difficult to clean it properly, even when regularly washed.

[0016] The aim of the present invention is to obviate the above-mentioned drawbacks by providing a machine which enables excellent slicing of boned meat.

[0017] A further aim of the invention is to realise a machine which allows considerable reduction of waste and a significant increase in cutting precision, even for non-frozen meat without a bone.

[0018] A further aim of the invention is to realise a machine for cutting meat into slices which eliminates all possible jamming points of the meat, thus ensuring correct expulsion of all the cut slices and the excellent quality thereof.

[0019] A further aim of the invention is to realise a machine for cutting meat into slices which is highly hygienic and easy to clean.

[0020] These aims are realised by means of a machine for cutting meat into slices, comprising a blade which describes a cutting tract for the meat to be cut, a rest plane parallel to the cutting tract and distanced therefrom in a perpendicular direction to the rest plane itself, at least a container for the meat to be cut, having an outlet mouth facing towards the rest plane from the side of the cutting tract, pusher means, associated to the container, for pushing the meat towards the outlet mouth, and movement means of the container for translating the container of the meat parallel to the rest plane, with an alternating motion from one side to the other of the cutting tract, characterised in that the blade comprises at least a cutting portion and a portion for supporting the meat to be cut in the container.

[0021] In a preferred characteristic of the invention, the blade exhibits, in a view from above, a median area which projects in an opposite direction to the above-mentioned cutting portion and which constitutes the meat support portion.

[0022] Further, the blade is associated to means for moving the blade in an alternating cutting movement.

[0023] Further characteristics of the invention are illustrated in the dependent claims.

[0024] Further characteristics and advantages of the invention will emerge from a reading of the following description, which is provided by way of non-limiting example, with the aid of the accompanying figures of the drawings, in which:

figure 1 is a schematic cutaway front view of the machine for cutting meat of the present invention;
figure 2 is a view from above of the blade applied to the machine for cutting meat of the invention, and of a container for the meat to be cut, in two different operative positions;
figure 3 is a cutaway section view of the machine for cutting meat of figure 1;
figure 4 is a detail in enlarged scale of figure 3.

[0025] With reference to the accompanying figures of the drawings, the machine for cutting meat into slices is denoted in its entirety by number 10.

[0026] It comprises a base 11 which includes a housing and support zone 11' of the organs for moving the blade and a housing and support zone 11' of the movement organs of at least a container 13 and 13' for the meat to be cut.

[0027] The containers 13 and 13' are associated to pusher means for the meat, which for each container comprise a plate 31, 32 which is slidable internally of the containers and connected to a respective stem 14 and 14', the plates being activated by a respective jack 61 and 62, and which containers 13 and 13' exhibit outlet mouths 50 facing towards a rest plane 15 located at a side of the cutting tract.

[0028] The rest plane 15 is substantially parallel to the cutting tract and is located at a short distance from the cutting blade 16.

[0029] It is further located at a lower height with respect to the cutting blade 16 to define the thickness of the slices of meat, and exhibits means for adjusting the height.

[0030] The containers 13 and 13' further exhibit movement means for translating the containers parallel to the rest plane 15, with alternating motion from one side to the other of the cutting tract.

[0031] In particular, the movement means of the containers 13 and 13' comprise a mobile carriage 53 fixed to the container, which is supported by the machine frame, and is activated by a jack 51 and is slidable on guides 52.

[0032] Each container 13 and 13' is vertical and closed by a lid 54, mobile in an upper part thereof, each of which exhibits a cylinder 55 for activating the opening and closure.

[0033] Hollow closed-profile elements can be used for the walls of the container 13 and 13', or C-section elements opened from one side.

[0034] In the latter case, the containers 13 and 13' can each exhibit a steel vertical side 30 for subjecting the meat to pressure such as to obtain slices of homogeneous dimensions, where the pressure of the steel sections is regulated by two identical cylinders 56.

[0035] In the zone between the rest plane 15 and the lower end of each container there is a posterior wall 90, associated to the respective container, which posterior wall 90 can also have the same shape as the container and which enables the meat to be pushed towards the blade 16, facilitating the obtaining of homogeneous slices.

[0036] The containers 13 and 13' can be made to work independently of one another.

[0037] The blade 16 comprises at least a cutting portion 17 and a portion 18 for supporting the meat in the containers once the cutting portion has been passed following the alternating motion of the containers.

[0038] Consequently the blade 16 is preferably realised in a monolithic single piece and exhibits, viewed from above, thin ends 77 and a broader median area which projects in an opposite direction to the cutting portion 17 and which constitutes the rest portion 18 for the meat still to be cut in the containers 13 and 13'.

[0039] This conformation of the blade 16 is clearly visible in figure 2, which also illustrates a container 13 in an advanced position, before the cut, and in a retracted position 13" after the cut.

[0040] The blade 16 is in turn associated to means for making an alternating cutting movement, in a substantially horizontal plane.

[0041] In more detail, the means for alternatingly moving the cutting blade comprise two tilting plates 19 and 20, actuable synchronisedly and to which the blade 16 is constrained at the ends 77 thereof.

[0042] The synchrony of the motion of the two tilting plates 19 and 20 is generated and maintained by a con-rod-crank mechanism 21, activated by a motor 23, which acts on a bar 22 that moves it alternatingly.

[0043] In turn, the bar 22 is connected at ends thereof 74 and 75 to respective return arms 24 and 25 which transmit the alternating motion of the bar to the tilting plates 19 and 20.

[0044] In particular, the return arms 24 and 25 are solidly connected to respective pivots 26 and 27, rotation of which turns the tilting plates 19 and 20, to which the blade 16 is connected, in synchronised rotation.

[0045] The blade 16 is associated to guides 28 and 29 located near the cutting zone and aimed at preventing flexion of the blade in the cutting zone. Further, the blade exhibits means 80 for adjusting the tension thereof.

[0046] For unloading the cut meat, there is a belt 34 having its movement synchronised to the movement of the containers, in order to enable the slices of meat to be arranged according to the client's requirements.

[0047] The functioning of the cutting machine of the meat of the invention is the following.

[0048] Before cutting, the thickness of the slice of meat to be cut is regulated, by varying the height of the front rest plane 15 from the cutting tract of the blade 16.

[0049] By activating the machine, the blade 16 is set in motion by the motor 23 which activates the con-rod-crank 21 mechanism to impart an alternating motion to the bar 22.

[0050] The bar 22, in its motion, sets the pivots 26 and 27 in synchronised motion, first in one direction and then in another direction, which in turn cause the tilting plates 19 and 20, connected to ends 77 of the blade 16 to os-

cillate in synchrony.

[0051] The blade 16 is thus set in alternating motion along a substantially horizontal plane, synchronised such as to prevent undesired flexion thereof.

[0052] With the blade 16 in motion, the pusher means 31, 32 internal of the containers push the meat towards the outlet mouth of the respective tubular containers 13 and 13', while the containers 13, 13' translate from an advanced position to a retracted position.

[0053] During translation of the tubular containers 13 and 13', the containers 13, 13' move the meat against the cutting portion 17 of the blade 16, which cuts away the slice.

[0054] When the tubular containers 13, 13' reach the retracted position, having passed by the cutting tract, the outlet mouths 50 thereof are facing the portion 18 which supports the meat present in the containers, once the cutting portion 17 has been passed. The movement of one of the containers is schematically represented in figure 2, in a view from above.

[0055] Finally, the slice of cut meat falls on the belt 34 and is conveyed towards suitable means for collecting (not shown in the figures).

[0056] The present invention exhibits the following important advantages.

[0057] Firstly, thanks to the presence of a single-piece blade, as described herein above, the vertical distance between the container mouth and the blade can be reduced to zero.

[0058] In this way a considerable reduction of waste product can be obtained, together with a significant increase in the precision of the cut.

[0059] Further, thanks to the continuity created by the form of blade used in the invention, the cutting zone is freed of all possible meat jamming points, thus ensuring a correct expulsion of all the slices cut.

[0060] The surface of the product to be cut is perfectly whole and thus of excellent quality as there are no further contact elements beyond the cutting blade.

[0061] Further, the meat comes into contact only with the cutting blade, so the whole hygienic situation is more certain, as the possibility of contamination is reduced to a minimum.

[0062] Finally the cleaning of the machine is made especially easy and rapid, reducing to a minimum the parts which have to be cleaned at the end of a work shift.

[0063] Obviously modifications or improvements required by contingencies or details may be brought to the machine of the invention as it is described herein, without its forsaking the ambit of the invention as it is claimed herein below.

Claims

1. A machine for cutting meat into slices, comprising a blade (16) for describing a cutting tract for meat to be cut, a rest plane (15) parallel to the cutting tract and distanced therefrom in a perpendicular direction to the rest plane, at least a container (13, 13') for the meat to be cut, having an outlet mouth (50) facing towards the rest plane (15) on a side of the cutting tract, pusher means, associated to the container, for pushing the meat towards the outlet mouth (50), and container movement means for translating the container of the meat parallel to the rest plane (15), with an alternating motion from a side to another side of the cutting tract, **characterised in that** the blade (16) comprises at least a cutting portion (17) and a portion (18) for supporting the meat present in the container.

2. The machine of claim 1, **characterised in that** the blade (16) exhibits, in a view from above, a median area which projects in an opposite direction to the cutting portion (17) and which constitutes the support portion (18) for the meat.

3. The machine of claim 1 or 2, **characterised in that** the blade (16) is associated to means for inducing the blade (16) to perform alternating cutting movements.

4. The machine of claim 3, **characterised in that** the means for moving the cutting blade (16) alternatingly comprise two tilting plates (19, 20) activated synchronically.

5. The machine of claim 4, **characterised in that** synchrony of the movement of the tilting plates (19, 20) is generated and maintained by a con-rod-crank mechanism (21) which acts on a bar (22) and moves the bar (22) alternatingly.

6. The machine of claim 5, **characterised in that** the bar (22) is connected, at ends thereof, to return arms (24, 25) functioning as intermediate transmission organs of movement of the bar to the tilting plates (19, 20).

7. The machine of claim 6, **characterised in that** the return arms (24, 25) are solidly connected to respective pivots (26, 27), rotation of which rotates the tilting plates (19, 20).

8. The machine of claim 1, **characterised in that** the blade (16) is associated to guides (28, 29) located near the cutting zone and aimed at preventing flexions of the blade (16) in the cutting zone.

9. The machine of claim 1, **characterised in that** the cutting tract (17) and the rest plane (15) are both horizontal.

10. The machine of claim 1, **characterised in that** the rest plane (15) is height-adjustable.

11. The machine of claim 1, **characterised in that** the means for moving the containers comprise a mobile carriage fixed to the containers, which is supported by a frame of the machine, and activated by a jack.

12. The machine of claim 1, **characterised in that** the meat container is associated to pusher means operated by a jack.

13. The machine of claim 12, **characterised in that** the meat pusher means comprise a plate (31, 32) which is slidable internally of the container.

14. The machine of claim 13, **characterised in that** the slidable plate is activated by a jack, which jack is connected to the container, such as to translate solidly there-with.

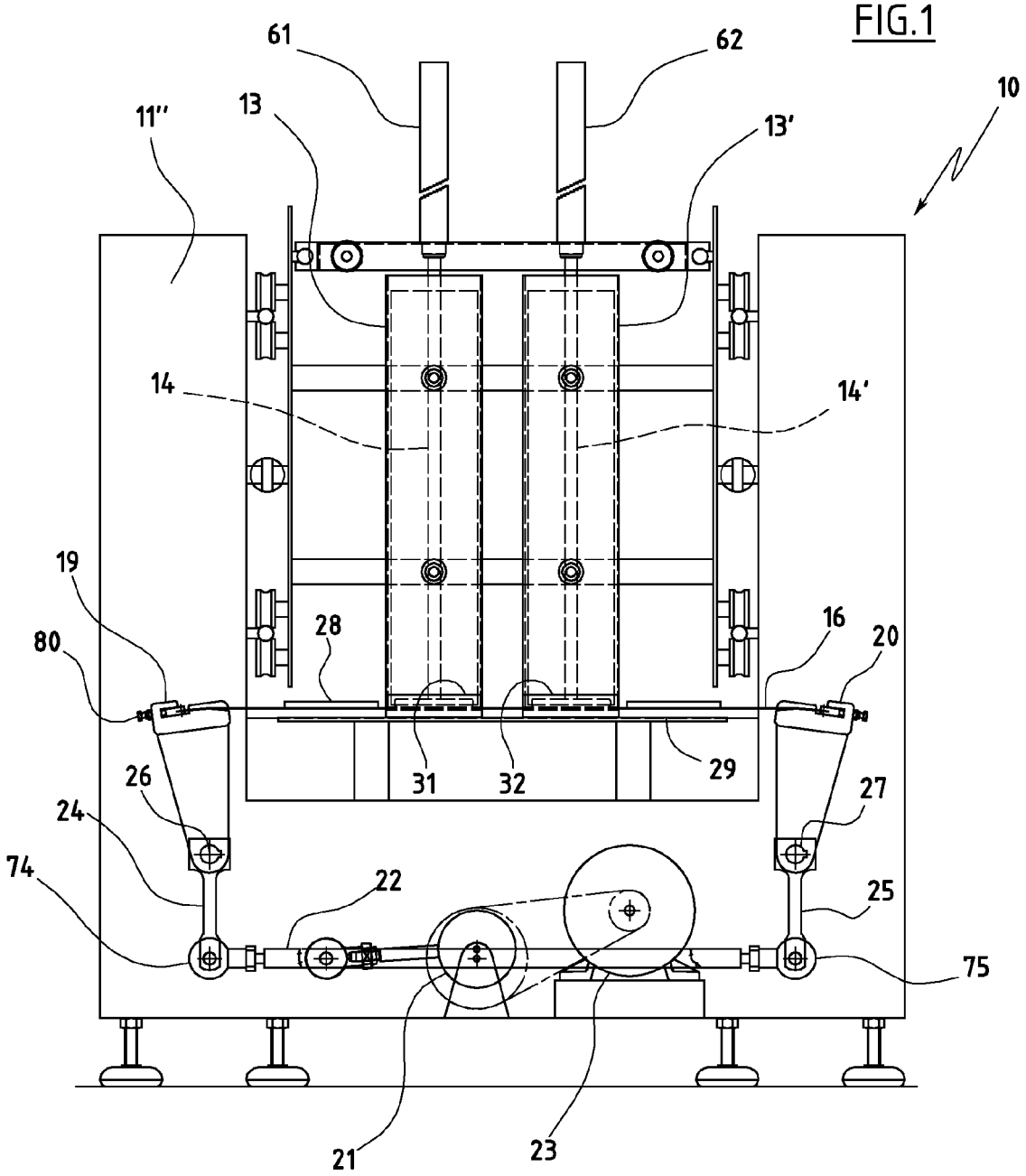
15. The machine of claim 1, **characterised in that** the meat container exhibits a vertical side provided with a steel sheet to place the meat under a pressure such as to enable homogeneously-dimensioned slices to be obtained.

16. The machine of claim 1, **characterised in that** in a zone between the rest plane (15) and the lower end of each container there is a posterior wall (90) associated to a respective container, which posterior wall (90) can have a same profile as the container and which enables the meat to be pushed towards the blade (16).

17. The machine of claim 1, **characterised in that** the meat container exhibits a substantially vertical configuration.

18. The machine of claim 1, **characterised in that** it comprises a plurality of containers, each container of which is associated to respective pusher means and movement means, such as to work independently of other containers of the plurality of containers.

FIG.1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62
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11''
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13'
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23

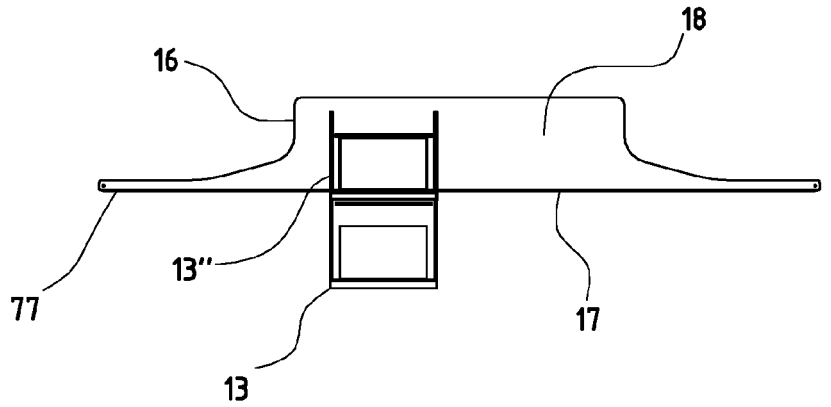
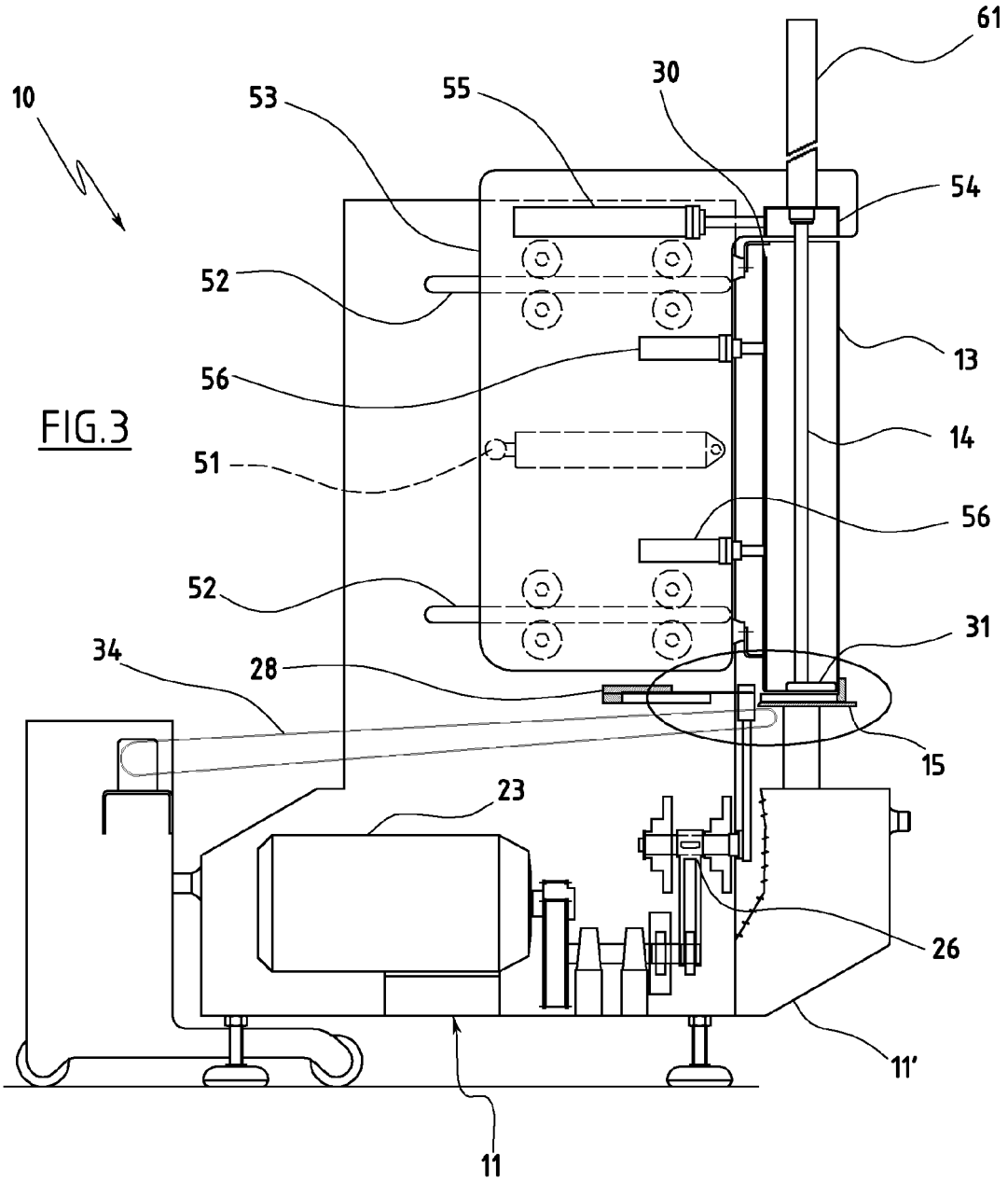

18
16
77
13''
17
13

FIG.2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53
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61
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31
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11'
11

FIG.3

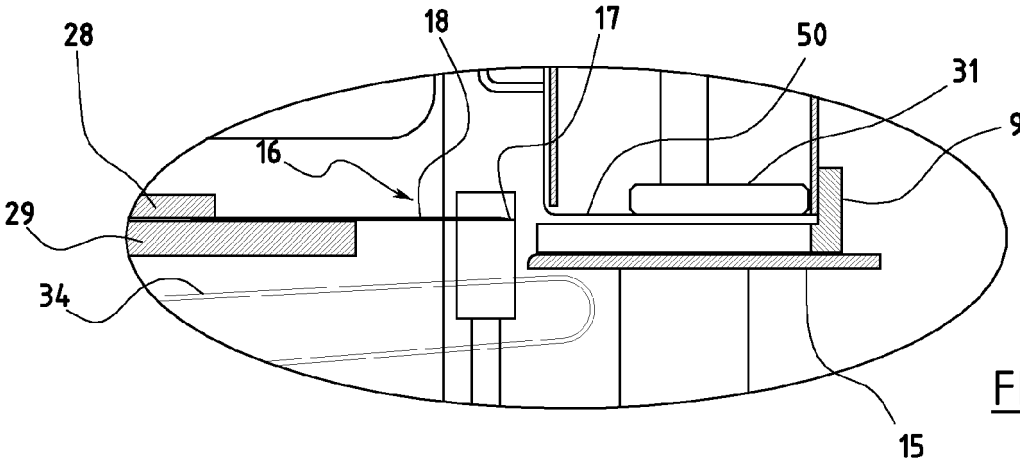
28
18
17
50
31
90
16
29
34
15

FIG.4

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EUROPEAN SEARCH REPORT

Application Number
EP 08 15 5996

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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A	EP 0 791 441 A (J E GROTE COMPANY INC [US]) 27 August 1997 (1997-08-27) * the whole document *	1-18	
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TECHNICAL FIELDS SEARCHED (IPC)

B26D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	16 September 2008	Wimmer, Martin

CATEGORY OF CITED DOCUMENTS

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

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