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(54) Apparatus for cutting a pizza

(57) An apparatus for cutting a pizza (P) automatically that allows

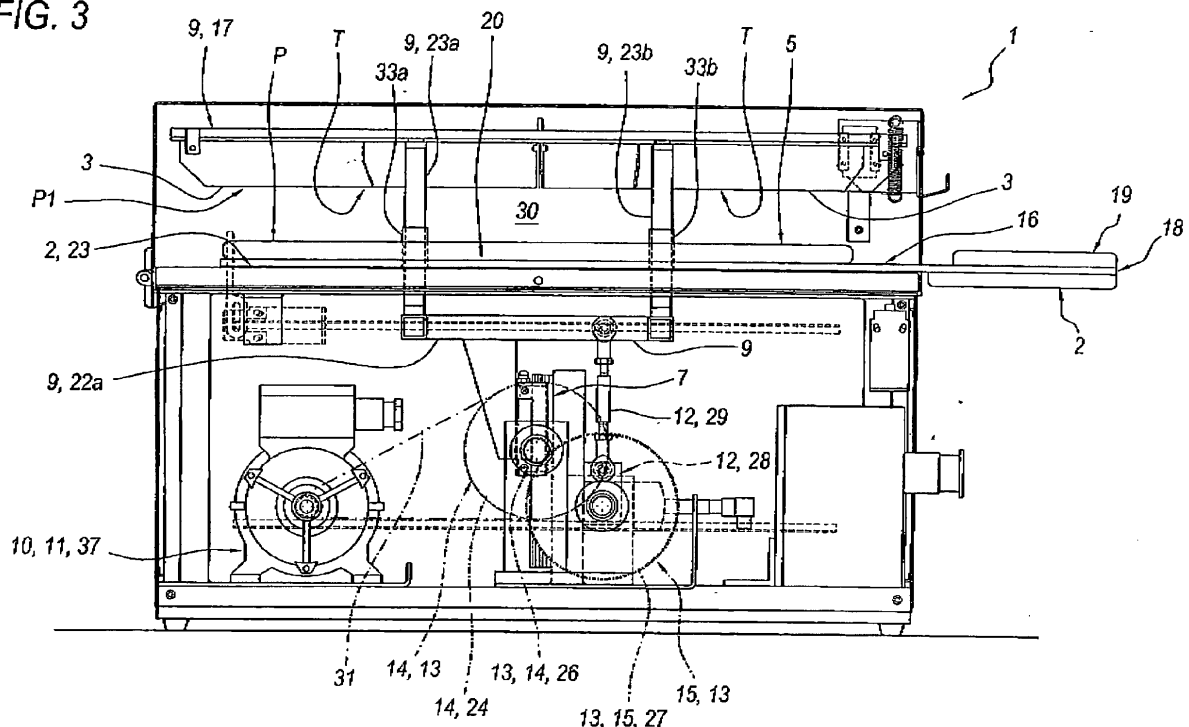
1) an operator to use the same removable instrument for all the operations needed to complete the cycle of work for a pizza, that is:

baking the raw pizza; turning the pizza in the oven; removing the pizza from the oven; cutting the pizza auto-

matically in the apparatus and by which separating it into portions on the plate/tray/etc, making the removable tool an integral part of this invention

2) a variation of the predetermined movement path (an extension or a reduction) of the mobile frame (9) with the blades (3), as is necessary, in a simple and fast way, independently of the levers coupled to it. FIG 3

FIG. 3



EP 2 551 076 A1

Description

FIELD OF INVENTION

[0001] The present invention refers to an automatic apparatus for cutting a pizza (P) into portions in which the removable tool can be used in all stages of the working process.

BACKGROUND OF THE INVENTION

[0002] In reference to the report 1025437 in DE9400282 U1 as in FR1332636A: in the reported apparatus, varying the working height of the apparatus required changing the length of the levers coupled (directly or indirectly) to the blades or to the mobile frame with the blades.

[0003] The structures of the mechanisms and of the automated devices (such as pistons with friction (FR1332636A1), hydraulic mechanics (DE9400282U1), telescopic or vertical rods (DE20115217U1), rods or pinions at high pressure (DE19826114A1 - DE29710485U1)) were as a result different from the automated devices and the dynamic mechanics and electronics contained in the present apparatus.

[0004] Regarding that which is described above there is often the need to reverse the direction of rotation to move the blades and/or the supports with the blades from a raised position to a lowered position and vice versa.

[0005] In reported devices there is not the existence of a removable tool that can be used to move, as well as to cut and then position, the pizza/product (P).

[0006] The only reported apparatus in which a "defined removable" tool is found is DE29710485U1 but the dynamics of movement and the characteristics are completely different to the present apparatus, and as such can not be compared, since the removable tool of DE29710485U1 is:

- 1) hinged to the apparatus by the elements (9) coupling pin (48) and fixed sleeve (47)
- 2) works in rotation
- 3) needs a support base (35) on the external of the structure for before and after the cut
- 4) requires some manual operation.

[0007] Also seen in the reported apparatus is the presence of slots in which the blades (3) are sunk to perform a cut, the presence of complex joints between the elements involved in performing a cut and the presence of springs.

DISCLOSURE OF INVENTION

[0008] The aim of the present invention is to realise a new project that is developed and expressed exclusively in the present invention due to all of the automated devices and complex mechanics used, that will lead to a

future generation of new apparatus designed and conceived differently from those cited in the previous report IO25437 or those known until now, and resolve the above-mentioned problems and develop innovative concepts.

[0009] In short this apparatus is different from preceding apparatus in that it allows;

- 1) an operator to use the same removable instrument for all the operations to complete the cycle of work for a pizza, to say: baking the raw pizza; turning the pizza in the oven; removing the pizza from the oven; cutting the pizza automatically in the apparatus and by which successively separating it into portions on the plate/tray/etc, making the removable tool an integral part of this invention;
- 2) variation in the movement path (an extension or a reduction) of the mobile frame (9), as is necessary, in a simple and fast way;
- 3) to perform a cutting stroke and return stroke without reversing the direction of rotation of the driving means of the mobile frame (9) along the predetermined movement path;
- 4) the mobile frame to be automatically activated only after the safety checks are satisfied, making the present apparatus very safe and electronically evolved. The safety checks being: finger and hand guards (not shown in the design) at the entrance of the present apparatus; and sensors that detect the presence of the removable tool inside the apparatus.

BRIEF DESCRIPTION OF DRAWINGS

[0010]

- figure 1 illustrates a plan view of the apparatus for cutting a pizza according to the present invention;
- figure 2 shows a plan view of the apparatus as in figure 1 in which several components have been removed to show other components more clearly;
- figure 3 shows a sectional view of the apparatus as in figure 2 according to the section plane III-III;
- figure 4 shows a sectional view of the apparatus as in figure 2 according to the section plane IV-IV.

DESCRIPTION OF THE PREFERRED ARRANGEMENTS

[0011] In accordance with the attached diagrams, it is indicated with 1 an apparatus for cutting a pizza, i.e. the present invention.

[0012] The apparatus 1 is capable of cutting a pizza P of any shape and form.

[0013] It should be noted however that realization of the illustrated form is better configured to perform the cutting of a pizza P of an approximately circular form, so as to divide it into sectors.

[0014] The apparatus 1 comprises of a fixed frame (a).

[0015] Note that, preferably, the apparatus is equipped with a frame defining a box-like container (40).

[0016] The apparatus P for cutting a pizza comprises of a plurality of cutting blades (3) (which from now on will be referred to as "the blades"), mobile in respect to the fixed frame (8).

[0017] These blades (3) are clearly visible in figure 1.

[0018] Note that in the illustrated form, which is illustrative but not limiting, there are eight blades (3), respectively indicated with the reference numbers 3a, 3b, 3c, 3d, 3e, 3f, 3g and 3h.

[0019] These blades (3) are integrally associated with each other.

[0020] Note that these blades (3) are carried by a support plate, given the reference number 17.

[0021] These blades (3) extend - preferably (but this is not a limitation) - radially from the same point C, the centre. Also, preferably, the blades (3) are mutually angularly ecuidistant.

[0022] Note that each blade (3) is represented by a rod with a bottom cutting edge T.

[0023] According to the invention, the apparatus 1 consists of means of movement of the cutting blades (3) between a raised position (P1) - illustrated in the attached figure - and a lowered position (P2) - not illustrated - in which the cutting blades (3) meet an upper surface (5) of the pizza (P) to perform a cut of the pizza (P) and to divide it into portions.

[0024] Therefore the blades (3) are mobile, in respect to the fixed frame (8) of the apparatus 1, between two extreme positions: a raised position (P1) - an inoperative position of preparation before the cut - and a lowered position (P2) - in which the cutting of the pizza (P) is performed.

[0025] In particular, the blades (3) are moved from the raised position (P1) to the lowered position (P2) following a cutting stroke, and from the lowered position (P2) to the raised position (P1) following a return stroke.

[0026] The apparatus 1 also comprises of a support surface (16) for the pizza (P).

[0027] Observe that the cutting edge T of the blades (3) faces towards the support surface (16) of the pizza (P).

[0028] In the example illustration the support surface (16) is defined by a removable tool (18) for moving the pizza. This removable tool (18) comprises of a first part (19) - a handle for the operator - and a second part (20) - the aforementioned support surface (16) for the pizza (P).

[0029] The second part (20) of the tool (18) is designed to be inserted within a space (30) defined by the box-like container (40) of the apparatus 1, supported in a structure (32) - i.e. a plane (32) - fixed to the fixed frame 8().

[0030] Note that the removable tool is totally removable from the apparatus. It can be moved outside in any direction with great ease also when a product is loaded. The removable tool does not work in rotation, it is free of

mechanical constraints and so is not coupled to any element of the apparatus. It allows the complete cycle of work to be performed without manual handling of the product before, during and after the cut, and without the need of an external support base.

[0031] The support surface (16) and the support structure (32) define more generally the support means (2) of the pizza (P) for the apparatus 1.

[0032] Observe that, according to a form not illustrated, the pizza (P) could also be placed directly onto the support structure (32).

[0033] For example, the pizza (P) could be inserted inside the space (30) of the apparatus 1 using an oven pallet that is extracted from the apparatus before performing the cut.

[0034] It should be noted therefore that, for the purpose of the invention, only one support structure for the pizza (P) is needed (however, as it will emerge in the following, the removable tool (18) gives many advantages to the apparatus 1).

[0035] In figure 1 the removable tool (18) for moving the pizza (P) is shown with the second part (20) positioned inside the space (30) defined by the box-shaped container (40) of the apparatus 1.

[0036] The movement means of the cutting blades (3) will be described, with reference to the illustrated example in the figure in an illustrative and not limitative form.

[0037] In the variations not illustrated, it is understood that the movement means can have a different configuration of that shown, to achieve the movement of the cutting blades between the two positions - (P1), raised and (P2), lowered.

[0038] The mobile frame (9), merely as an illustration and not limited to this form, is defined by two longitudinal lengths (21a, 21b) joined by four transverse rods (22a, 22b, 22c, 22d), by four vertical uprights (23a, 23b, 23c, 23d) and by the support plate (17) of the blades (3).

[0039] The vertical uprights (23a, 23b, 23c, 23d) are fixed at, and positioned between, the support plate (17) of the blades (3) and the two longitudinal lengths (21a, 21b).

[0040] Note also that the vertical uprights (23a, 23b, 23c, 23d) are inserted, by a sliding movement, inside the respective tubular hollows (33a, 33b, 33c, 33d), and are integral to the fixed frame (8).

[0041] Observe that, in another possible form not illustrated, the mobile frame (9) could also have a different type of configuration/conformation.

[0042] According to the invention, the apparatus 1 comprises of driving means, kinematically coupled to the movement means, and activated by the operator, to move the cutting blades (3) between the aforesaid positions (P1, P2).

[0043] The structure of a preferred form of the driving means will be described in the following, purely as an illustration, and not limitative.

[0044] According to the preferred form shown, the movement means (4) of the movement comprise of a

motor (11) operated in rotation, a rod-crank mechanism (12) which is kinematically connected to the part motor (11), and the mobile frame (9) movably coupled also to the fixed frame (8) to move it between the aforementioned positions (P1, P2).

[0045] The illustration of the coupling of the mobile frame (9) to the fixed frame (8) is purely given as an illustration and is not limitative in that it can have different conformations or technical solutions which are technically equivalent to those shown, but that consist of one or more guides (7a and 7b) fixed to the fixed frame (8). Note that the mobile frame (9) contains a couple of slides (41a, 41b), each coupled by a sliding movement to the guides (7a and 7b).

[0046] Preferably, the motor (11) is an electronic motor (37). According to the shown illustration, the driving means comprise of a first rotating part (14) and a second rotating part (15) which are coupled together.

[0047] The first rotating part (14) is kinematically coupled to the motor (11) while the second rotating part (15) is kinematically coupled to the mobile frame (9) and defines the connecting rod-crank mechanism (12).

[0048] Note also that, as is clearly seen in figure 3, which is purely an illustration and not limitative, the first rotating part (14) comprises of:

- a first gear wheel (24) adapted to be connected to the motor (37) by means of a gear belt (31);
- a second gear wheel (26);
- a shaft (25) which moves rotationally in respect to the fixed frame (8) and to which the first gear wheel (24) and the second gear wheel (26) are fixed.

[0049] The second rotating part (15) comprises of:

- a gear wheel (27) ;
- a plate-shaped element (28);
- a shaft (35) which moves rotationally in respect to the fixed frame (8) and to which the gear wheel (27) and the element (28) are fixed.

[0050] The gear wheel (27) of the second rotating part (15) is coupled with the second gear wheel (26) of the first rotating part (14).

[0051] Note the rod-shaped element (29) is articulated to the element (28) and the mobile frame (9), and the element (28) also fixed to the shaft (35) of the second rotating part (15) define rod-crank mechanism (12) that achieves the aim of varying the extension or reduction of the predetermined movement path of the mobile frame (9).

[0052] Note that the rod-shaped element (29) is composed of two arms of connection and a central core that allows to extend or reduce the length of the outer connection arms. Element (29) could also have a different realised form (not illustrated).

[0053] Note that, according to a realization not illustrated, other elements could also exist in the mechanism.

[0054] For example, according to a realization not illustrated, the driving means can include a pneumatically activated raising/lowering mechanism for the blades (3), for example a hydraulic cylinder/piston, always attached to the elements (28), (29).

[0055] According to yet another variation, a screw mechanism can be present - a nut screw to allow movement of the mobile frame (9) between the aforementioned positions (F1) and (P2).

[0056] Note that the rotating parts, first (14) and second (15), together define a torque multiplier mechanism (13), active between the motor part (11) and the connecting rod-crank mechanism (12).

[0057] In order to allow a torque multiplication, the rotating parts (14, 15) are configured to allow a greater torque at the shaft (35) of the second rotating part (15) - output shaft of the torque multiplier mechanism (13) - than the torque present at the shaft of the motor part (11) - input shaft of the mechanism (13).

[0058] This allows, advantageously, to give a greater force at the cutting blades (3), giving a neat and precise separation of the portions of the pizza (P).

[0059] The operator cutting the pizza (P) positions the pizza (P) onto the top of the tool (18), and inserts the second part (20) of the same tool (18) inside the space (30) where the pizza (P) is to be received.

[0060] Following the positioning of the pizza (P) inside the space (30) of the apparatus 1, the motor (37) is activated automatically.

[0061] The action of the motor (37) causes the entrainment of the rotation of the gear belt (31) and, consequently, the rotation of the shaft (25) and of the attached elements (first gear wheel (24) and second gear wheel (26)).

[0062] The second gear wheel (26) rotates the gear wheel (27) of the second rotating part (15) - coupled to it - that, consequently, causes the rotation of the shaft (35) and the element (28).

[0063] The rotation of the element (28) causes the activation of the connecting rod-crank mechanism (12) defined by the same element (28) and the rod-shaped element (29).

[0064] Note that one complete turn of the plate-shaped element (28) of the connected rod-crank mechanism (12) about the axis of rotation of the shaft (35) allows the mobile frame (9) to move from a raised position (P1) to a lowered position (P2) following the cutting stroke and from the lowered position (P2) to the raised position (P1) always following the cutting stroke and complete return stroke without reversing the direction of the driving notion of the mobile frame (9).

[0065] Observe that, advantageously, the connecting rod-crank mechanism (12) causes an automatic reversal of the stroke of the mobile frame (9) in the two extreme positions - raised (P1) and lowered (P2) - without the need to reverse the sense of rotation of the motor part (11): this gives the advantage of making the apparatus very simple.

[0066] The blades (3), in the lowered position (P2), find

and penetrate the upper surface of the pizza (P) performing a cut of the pizza (P) into portions.

[0067] Note that the apparatus 1 is equipped with command means that allow activation/deactivation of the motor (37). Preferably the command means are configured to be activated automatically after:

- a prior check of the finger and hand guards - positioned at the mouth of the space (30) - to avoid any risk for the user of introducing their hand inside the space (30) during the cut
- a successive check of the other sensors that detect the presence of the removable tool inside the apparatus.

[0068] These sensors are connected to the control unit, forming part of the apparatus 1, that, once the checks are complete, commands the activation of drive means as a function of the signals of these sensors.

[0069] Note that the described configuration of the blades (3) and the frame (9) can also be of a different form.

[0070] The described apparatus is particularly practical, simple and economical.

[0071] This apparatus allows the cutting of the pizza (P) to be performed in a fast and precise manner.

[0072] In fact only the simple positioning removable tools of the pizza (P) inside the space (30) of the box-shaped container (40) of the apparatus 1 is required and (following the automatic safety checks) the drive means are automatically activated.

[0073] According to a variation, the drive means are manually activated by the operator (or by means of manual force from the operator). In such a variation, the motor part (11) is not defined by the motor (37) but by a (manual) mechanism (38) configured to allow a user to generate a rotational motion which is kinematically connected to the rod-crank mechanism (12).

[0074] An example of such a mechanism (38) is illustrated in figures 3 and 4, composed of a flywheel (36) that is fixed to the shaft (25) to allow a rotational drive in the shaft (25).

[0075] In such a realised form of the apparatus 1, preferably - but not necessarily - the motor (37) is not present, or rather, the motor (37) is kinematically disconnected from the connecting rod-shank mechanism (12).

[0076] The user, in such a realised form, activates rotation of the flywheel (36) to operate the cutting of the pizza (P), according to an entirely similar method to that described before.

[0077] The conceived invention is susceptible to evident industrial applications; it can be subjected to numerous modifications and variations all falling within the inventive concept; all the details can also be substituted by technically equivalent elements.

Claims

1. Apparatus (1) for cutting a pizza, comprised of:

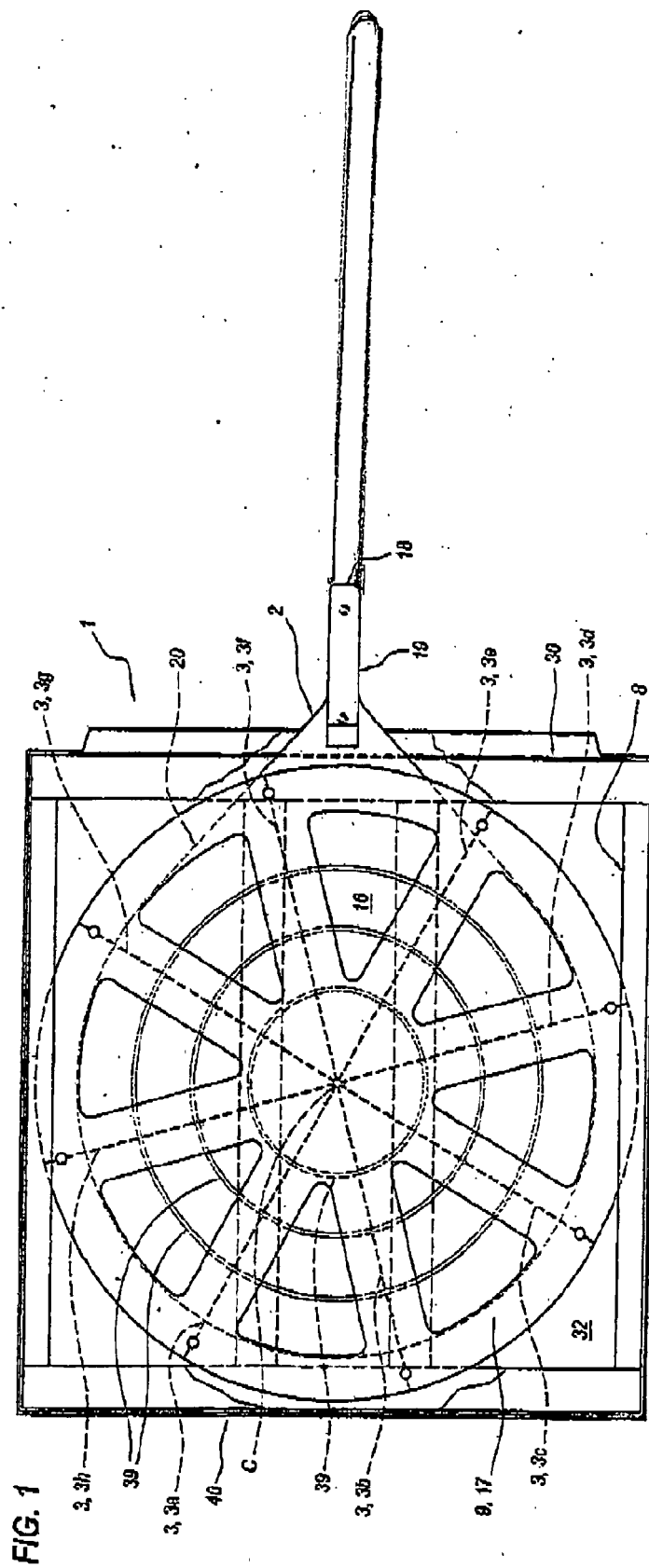
- a motor part (11) activable in rotation
- an articulated rod-crank mechanism (12), kinematically connected to the motor part (11) to be moved and to the mobile frame (9), supporting the blades, to move it between the aforementioned cutting positions (P1, P2)

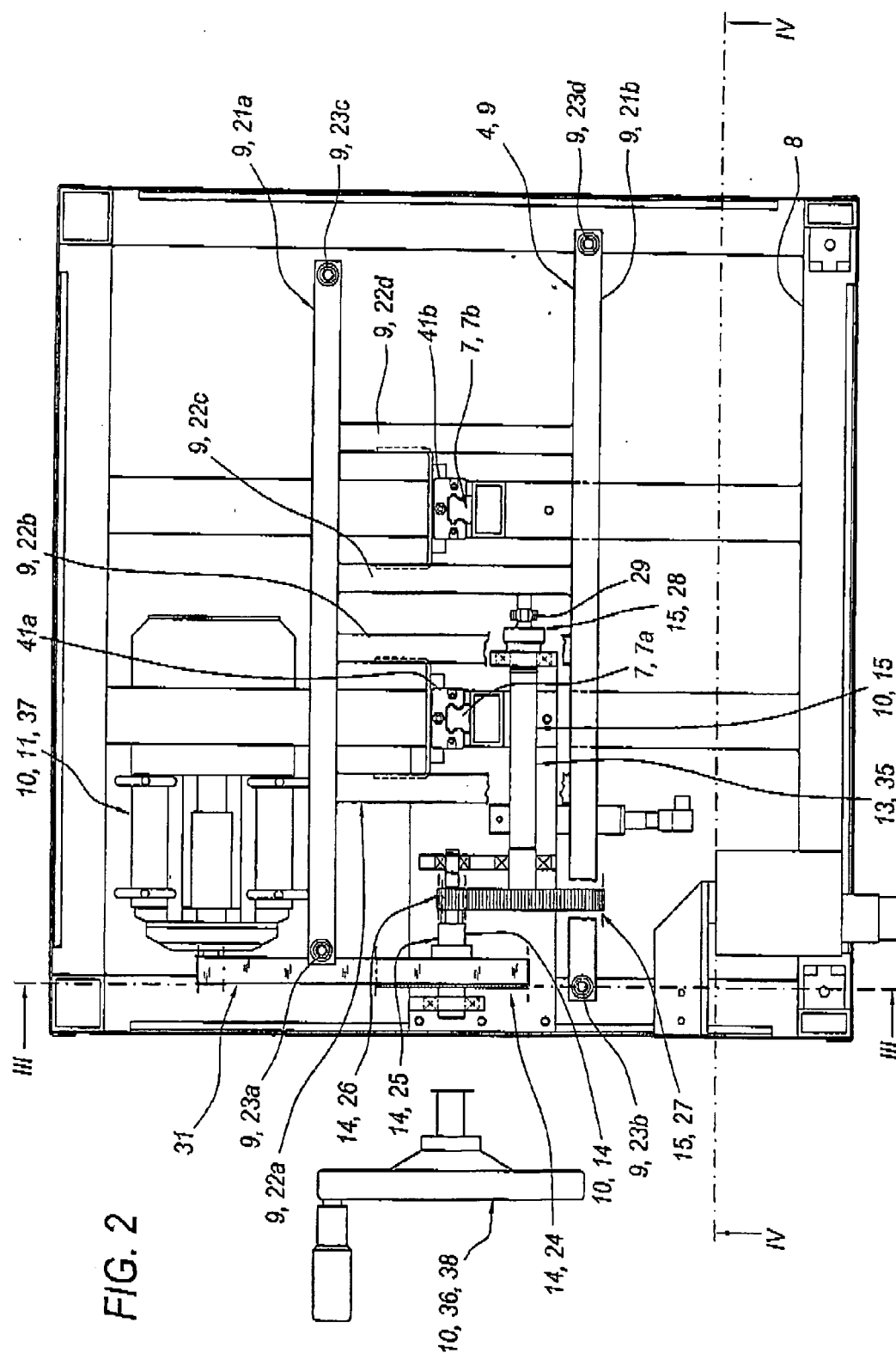
2. An apparatus according to the previous claim in which the mechanism (13) comprises of at least a first rotating part (14) and a second rotating part (15) which are kinematically coupled to each other, the first (14) of said rotating parts being kinematically connected to the motor part (11) and the second (15) kinematically coupled to the mobile frame (9) and defining the rod-crank mechanism (12), where these rotating parts (14, 15) are configured to make a greater torque available at the shaft (35) of the second rotating part (15) than the torque at the shaft of the motor part (11).

3. An apparatus according to the preceding claims in which the rod-shaped element (29) is articulated to the element (28) and the mobile frame (9), and the element (28) also fixed to the shaft (35) of the second rotating part (15) define rod-crank mechanism (12).

4. An apparatus according to the previous claim in which the connecting rod-crank mechanism (12) is defined by the elements it is comprised of the rod-shaped element (29) is composed of two outer connecting arms and a central core that allows the length of the outer connecting arms to be extended or reduced, and being the rod-shaped element (29) is also connecting to the mobile frame (9) and being the plate-shaped element (28) is kinematically connected to the motor part (11), the rod-crank mechanism (12) defines the extension-reduction stroke of the mobile frame (9) along the predetermined movement path, and performs with a single movement the cutting stroke and return stroke without reversing the direction of rotation of the drive means that move the mobile frame (9) along the predetermined motion path.

5. An apparatus according to any one of the previous claims, in which the means of supporting (2) the pizza (P) include a tool (18) which is removable from the said apparatus to enable movement of the pizza (P).





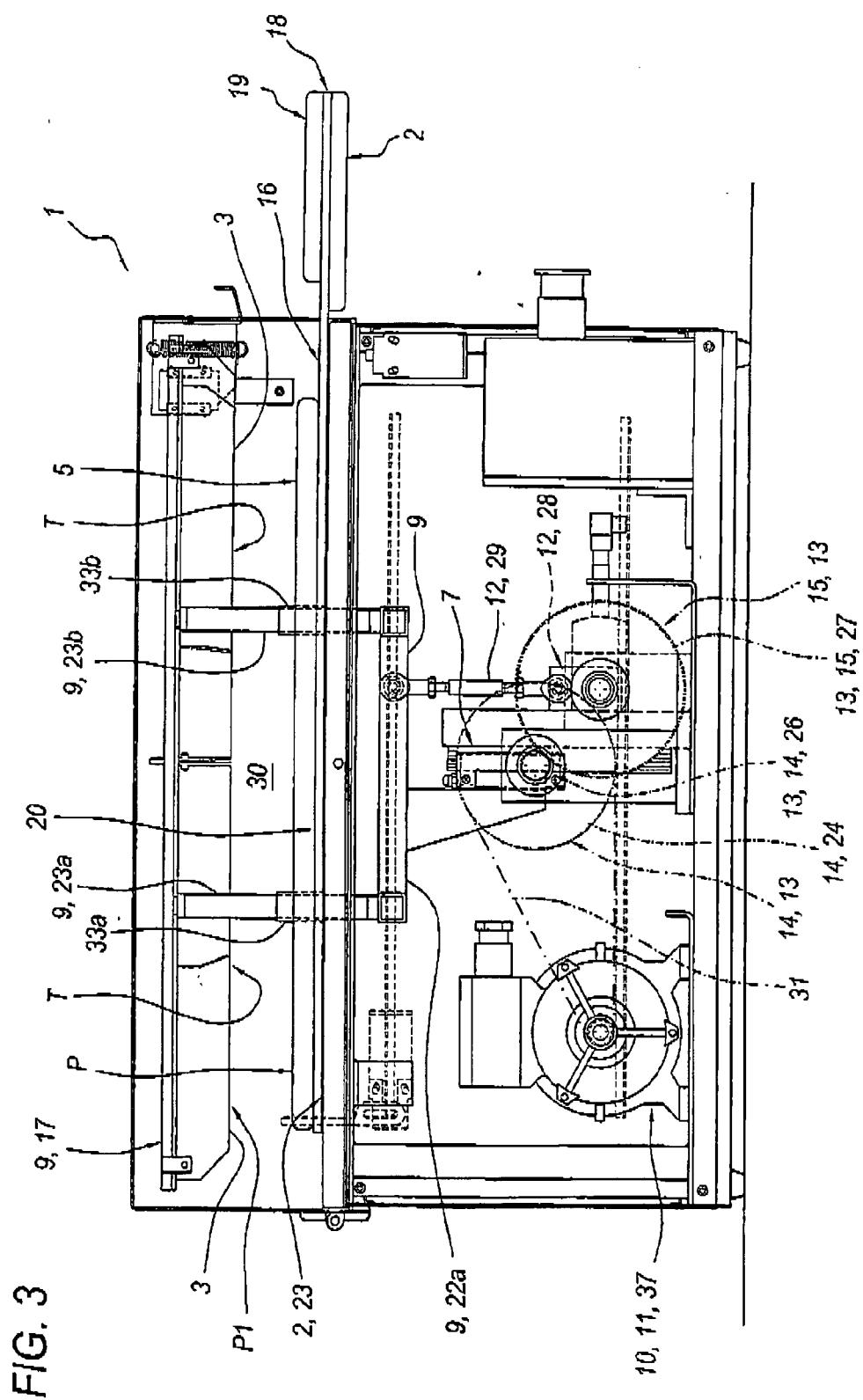
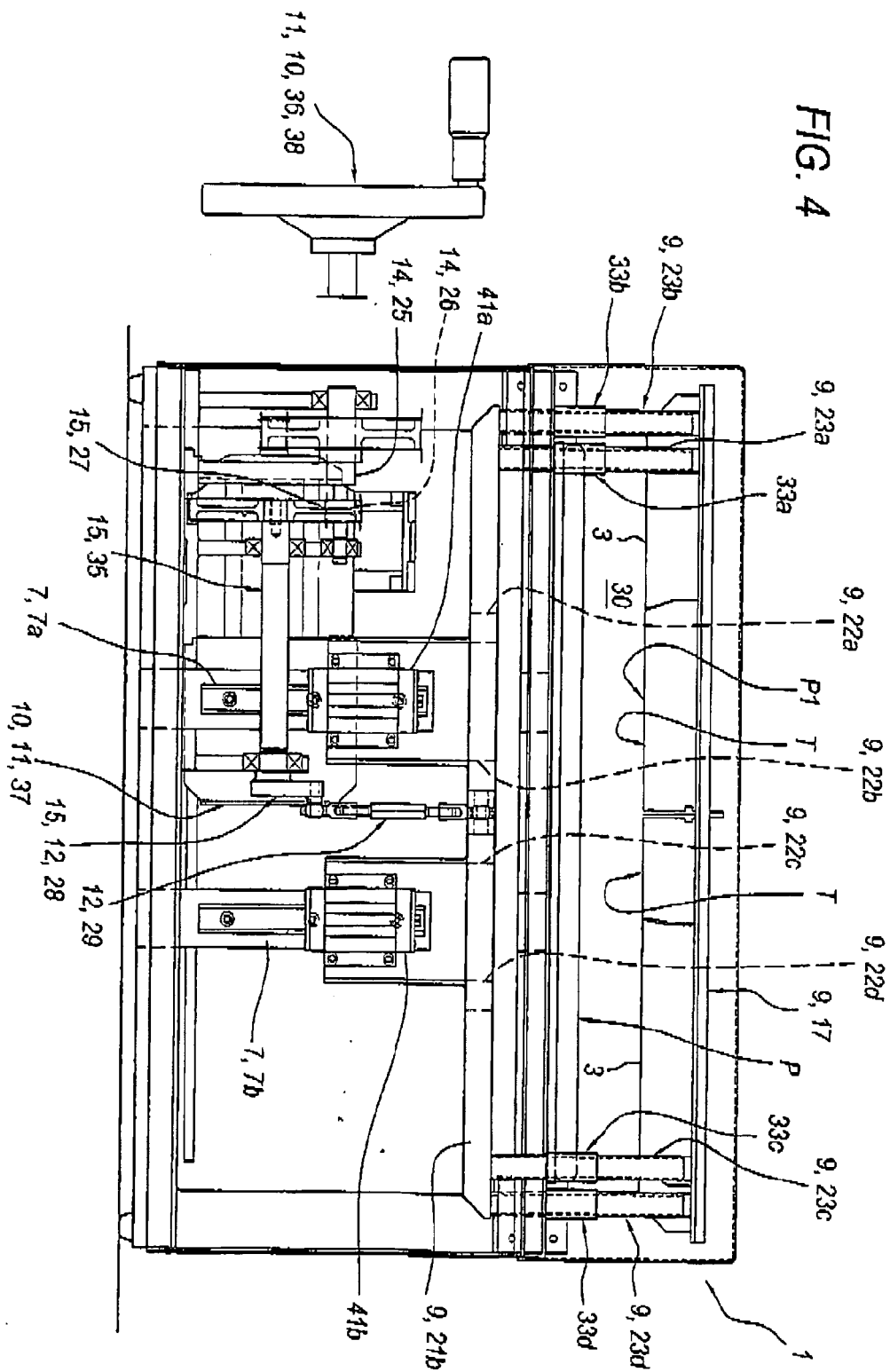


FIG. 4





EUROPEAN SEARCH REPORT

Application Number
EP 12 00 5515

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	CA 487 697 A (BUROFF ALVIN F) 4 November 1952 (1952-11-04) * page 5 - page 6; figures 1-4 *	1-5	INV. B26D5/14 B26D3/24
A	DE 201 15 217 U1 (DOMA GMBH [DE]) 15 November 2001 (2001-11-15) * figure 1 *	1-5	
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A	DE 198 26 114 A1 (POPP THOMAS [DE]) 29 July 1999 (1999-07-29) * the whole document *	1-5	TECHNICAL FIELDS SEARCHED (IPC) B26D
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 8 November 2012	Examiner Wimmer, Martin
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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

EP 12 00 5515

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
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08-11-2012

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