(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 1 024 932 B1

(12) **EUROPEAN PATENT SPECIFICATION**

(45) Date of publication and mention of the grant of the patent:
28.11.2001 Bulletin 2001/48

(21) Application number: **98905609.8**

(22) Date of filing: **12.02.1998**

(51) Int Cl.[7]: **B26D 7/01**, B26D 3/30

(86) International application number:
PCT/IT98/00023

(87) International publication number:
WO 98/35796 (20.08.1998 Gazette 1998/33)

(54) **A MACHINE FOR CUTTING A PRODUCT INTO EQUAL PARTS**

SCHNEIDEMASCHINE ZUM HALBIEREN EINES SCHNEIDGUTES

MACHINE PERMETTANT DE COUPER UN PRODUIT EN PARTS EGALES

(84) Designated Contracting States:
AT BE CH DE DK ES FI FR GB GR IE IT LI LU MC NL PT SE

(30) Priority: **17.02.1997 IT MO970020**

(43) Date of publication of application:
09.08.2000 Bulletin 2000/32

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EP 1 024 932 B1

Printed by Jouve, 75001 PARIS (FR)

Description

Technical Field

[0001] The invention relates to a machine for dividing a product into equal parts, and is particularly useful for portioning sacked food products such as mortadella, known also as Bologna, salami, cooked ham and suchlike.

Background Art

[0002] Sacked meat products are sold in packages obtained by cutting a whole form of a product into halves and then separately packaging the two halves.

[0003] The cut is normally done by hand, and, being usually imprecise, results in the production of two halves which are not of equal weight and size, sometimes significantly so. This leads to the need to weigh both pieces obtained after the cutting operation.

[0004] DE 9112725 U discloses a machine for cutting a product into equal parts comprising at least one product support that is able to follow an advancement movement along a supply line and a cutting device predisposed along the supply line and operating according to at least one cutting plane.

[0005] The main aim of the present invention is to provide a process and a machine with which the cutting procedure can be carried out very accurately and simply.

[0006] An advantage of the invention is that there are no significant imperfections and irregularities in the cut or in the resulting product, such as for example fatty cutting shavings spread over the cut surfaces.

[0007] A further advantage is that it enables a perfect and regular cut of the product, even when the blade comes into contact, during the cutting action, with small hard objects, such as peppercorns and the like, which can be contained in the product itself, and which are liable to be dragged along by the blade, leading to grooving, scuffing and other imperfections in the final cut product.

[0008] The invention enables a practically perfect cut to be made, with the resulting halves more or less equal in length and consequently also in weight, with only relatively tiny margins of error, in the range of 0.5-1 mm. length which correspond to a range of 10-20 grams weight.

[0009] A further advantage of the invention is that if so desired an unequal cut can be made, according to predetermined measurements, either in weight or in length. These aims and advantages are all achieved by the machine and the process of the invention, as it is characterised in the claims that follow.

Disclosure of Invention

[0010] Further characteristics and advantages of the present invention will better emerge from the detailed description that follows of a preferred but non-exclusive embodiment of the invention, illustrated purely by way of non-limiting example in the accompanying figures of the drawings, in which:

figure 1 is a plan view from above;
figure 2 is a lateral view from below of figure 1;
figure 3 is an enlarged-scale view of a detail of figure 2 in a different operative configuration;
figure 4 is a side view from the left of figure 3;
figure 5 is a vertical-elevation view of a detail of the machine in two successive operative configurations;
figure 6 is a vertical-elevation view of a detail of the machine, with some parts removed better to evidence others.

[0011] With reference to the above-mentioned figures, 1 denotes in its entirety a machine for cutting a product into equal parts. In the specific case which will now be described, the machine 1 is applied to cutting sacked meat products in half, especially mortadella 2, but can also be applied more generally to cutting various other types of products. 3 denotes the base structure of the machine 1.

[0012] The machine 1 is provided with a storage container, not illustrated, for the mortadellas 2, which is constituted by a container in which the mortadellas 2 are stocked in piles. A supply line 4 leads from the container and advances the mortadellas 2 in a straight line, indicated in the figure by arrow 5.

[0013] The supply line 4 comprises a plurality of supports 6, successively aligned along the line itself, each of which supports 6 carries a mortadella 2. Each support 6, in the example shown, is provided with two rests 7 for the mortadella 2. The supports 6 are constrained to at least one flexible endless element: in the example the supports 6 are fixed to two chains 8 situated on opposite flanks of the machine 1 and ring-wound about relative pairs of horizontal-axis pulleys 9.

[0014] Means, not illustrated, are provided in the proximity of the storage container, for positioning the mortadellas 2 one-by-one on the supports 6 as they arrive at the exit point of the containers.

[0015] Each support 6 is mounted on a relative slide 10 coupled slidably along a corresponding straight horizontal guide 11, perpendicular to the advancement direction 5 of the supports 6. The opposite ends of each straight guide 11 are fixed to the transport chains 8. Each support 6 is thus able not only to afford an advancement movement, but also lateral displacements in one direction, indicated . by an arrow 12, perpendicular to the advancement direction 5.

[0016] Means are provided for laterally displacing the supports 6 operating along the supply line 4, which, in the. embodiment illustrated, comprise a mobile guide element 13, slidably coupled to straight guides 14, solidly constrained to the base structure 3 of the machine 1,

parallel to the above-mentioned lateral displacement 12 of the supports 6. Each support 6 bears, solidly constrained thereto, a guided element 15 provided with a cylindrical body 20 couplable to the guide element 13. The guide element 13 is positionable on the straight guides 14 using a small step motor 16 connected to the guide element 13 by means of a coupling between a cogwheel 17 and a rack 18. In the illustrated example the guide element 13 exhibits two parallel lateral walls 19, while the guided element 15 comprises the cylindrical body 20 which can be inserted between the walls 19 of the guide element 13. The distance between the parallel guide walls 19 is practically equal to the diameter of the guided cylindrical body 20. The guide element 13 exhibits a positioner 21 located in the zone comprising the cylindrical body 20 of the guided element 15. The positioner 21 is made of two lateral guide walls 22 set in an open V-type configuration, with the parallel guide walls 19 forming the near-meeting point of the V.

[0017] During the advancement of a support 6 along the supply line 4, the cylindrical body 20 of the guided element 15 solidly constrained to the support 6 enters the positioner 21 constituted by the guide walls 22, and is then forced to pass through the parallel walls 19 of the guide element 13. The guide element 13 operates in such a way as to position the support 6 with respect to the normal advancement direction.

[0018] Upstream of the mobile guide element 13 is a fixed guide element 23, destined to act upon the cylindrical body 20 of the guided element 15 of the support 6. The fixed guide element 23, like the mobile guide element, exhibits two parallel guide walls, situated at a reciprocal predetermined distance and having a widened positioner entrance. The fixed guide element 23 has the task of centring the supports 6 in transit along the supply line 4 in a known reference position; When a support passes through the fixed guide element, the support itself is centred in a position (according to. a horizontal axis perpendicular to the advancement direction) which represents, so to speak, the "zero" of lateral displacements of the support 6, as will be better explained herein below.

[0019] Located downstream of the mobile guide element 13 along the supply line 4 is a position sensor 24, which reads the position of the lateral ends 2a, 2b of the mortadella 2 borne on the support 6. In the present embodiment, the sensor 24 is optic and comprises two fixed optic sensors 25 positioned on opposite sides of the support 6 transiting on the supply line 4. Each optic sensor 25 is predisposed to read off a lateral end 2a, 2b of the product. The position data supplied by the sensors 25 enable a calculation of the length of the mortadella 2 to be made, according to the horizontal advancement direction 12 (perpendicular) thereof.

[0020] In particular, this data enables a calculation of the half-line of the mortadella 2 to be made, i.e. the vertical plane which is equidistant from the lateral ends 2a, 2b of the mortadella itself. This plane can be considered more or less perpendicular to the line conjoining the lateral ends 2a, 2b, of the mortadella 2 and passing through the halfway point of said conjoining line.

[0021] In place of the optic sensor 24 device, various other types of position sensor systems could be used, for example, ultra-sound sensors, infra-red, microwave, and also mechanical sensors.

[0022] A cutting device 26 is arranged along the supply line 4, downstream of the optic sensors 25. which cutting device 26 operates according to a vertical cutting plane, perpendicular to the direction 12 of the lateral displacements the support 6 can make and thus parallel to the advancement direction 5.

[0023] The data read off by the optic sensors 25 is processed by a control and command unit, not illustrated, which compares said data, inasmuch as it indicates the position of the lateral ends 2a, 2b of the mortadella 2, with preimposed reference values which are indicators of the cutting plane position along which the cutting device 26 works. This data comparison enables the relative position of a mortadella 2 passing through the sensors 25 to be known as well as the distance between the halfway line thereof and the cutting plane of the cutting device 26.

[0024] Thus, by moving the support 6 of a mortadella 2 to the left or right by a distance equal to the distance between the above-mentioned mortadella 2 halfway line and the cutting line of the cutting device 26, the two planes can be made to coincide.

[0025] Thus the mortadella 2 can be cut exactly at its halfway line.

[0026] The cutting device 26 will now be described. It comprises a frame 27 which is mobile along straight guides 28 which are parallel to the advancement direction 5 of the supports 6 along the supply line 4. In the illustrated embodiment, the cutting device 26 comprises a single blade 29 mounted on the frame 27 and constrained to move along the vertical cutting plane according to an oblique cutting direction with respect to the horizontal advancement direction 5 of the supports 6 and the relative mortadella 2. The angle α of inclination of the cutting direction can be widely varied: in particular, a 90° angle can be chosen for angle α. In the case described herein, the angle α is preferably 45° and the blade 29, which is horizontal, is stretched on a frame 30 able to move parallel to itself in the cutting direction. The frame 30 of the blade 29 is coupled on straight sliding guides 31 and its movements are controlled by a linear actuator, for example a hydraulic cylinder 32. The blade 29 is preferably straight and horizontally disposed. Figure 3 shows (broken line) the blade-bearing frame 30 in the lowered position, that is, the position it assumes after cutting the mortadella 2,

[0027] The cutting device 26 further comprises two presses 33 for blocking the mortadella 2 during the cutting operation. Two hydraulic cylinders 34 control the lowering of said presses 33 on the mortadella 2 and raising same both before and after the cutting operation.

[0028] The blade 29 exhibits a sharp lower edge 35, destined to cut the product, and an upper edge 36, also sharp. The fact that the upper edge 36 is also sharpened means that the blade does not dirty or damage the cut surfaces of the product during the return run after the cut has been performed.

[0029] In other embodiments, other cutting devices can be employed instead of the blade 29. In particular, steel or other-material wires or bands might be used, fixed or having their own cutting motion.

[0030] The blade 29 run and the press 33 motion are adjustable according to the dimensions of the product to be cut, so that the machine avoids disproportionate cutting runs with respect to the strictly necessary run for the cut needed.

[0031] Means are provided for connecting the frame 27 and the support 6 bearing the mortadella 2 solidly one to another during advancement of the mortadella 2 towards the cutting operation. In other words, the means for solidly connecting guarantee that during the cutting operation the frame 27 holding the blade 29 and the mortadella 2 advance solidly, so that the relative motion between the cutting element and the product to be cut is in substance an obliquely-directed translation (inclined by an angle α) with respect to the horizontal. The means for connecting are evidenced in figure 5. They comprise a lever 37 having an end pivoted to the frame 27 on a pivot 38 having a horizontal axis. The opposite end of the lever 37 exhibits a hook 39 which can interact strikingly with a vertical projection 40 solidly constrained to a support drawing chain 8. A jack 41 lowers the lever 37 into a lower engaging position in which the projection 40 can meet the hook 39 and raises the lever 37 into an upper disengaging position. Figure 5 shows the lever 37 in the two positions, respectively in continuous and a broken lines. Once the projection 40 meets the hook 39 in the lowered position, the frame 27 is drawn forwards by the chain 8. Each support 6 is associated to a respective projection 40, so the chain 8 bears a plurality of said projections 40, distanced among themselves. The frame 27 is further provided with means for controlling, which can move the frame itself backwards and forwards along the sliding guides 28. The control means comprises a cylinder 43. With a backwards movement the frame 27, once the cut has been made, returns to position ready for the next cut.

[0032] Then, with a forward movement of the frame 27 (indicated by an arrow 42 in figure 5), the lever 37 is raised gently and without the risk that it might rub against the projection.

[0033] There now follows a description of the functioning of the machine 1, with reference to the cutting of a single product (mortadella). Obviously the functioning cycle is repeated continuously for a multiplicity of products.

[0034] Initially, a mortadella 2 is placed on a support 6 transiting on the supply line 4, drawn by the transport chain 8. The support first passes by the fixed guide element 23. The cylindrical body 20 of the guided element 15, solidly constrained to the slide 10, enters the fixed guide element 23 and the slide 10, together with the support 6 and the mortadella 2, can be, if needed, displaced laterally along the guides 11 in a normal direction 12 to the advancement direction. At the exit of the fixed guide 23, the support 6 is practically centred with respect to the blade 29 with the aim of reducing the corrective intervention on the part of the guide element 13, as the initial positioning does not guarantee centring of the product 2 on the support 6.

[0035] Subsequently, the optic sensors 25 read off the positions of the lateral ends 2a, 2b, of the mortadella 2. The control and command unit calculates the displacement of the halfway line of the mortadella 2 from the cutting plane of the cutting device 26, and commands a lateral displacement of the mobile guide 13. either left or right, by operating the step motor 16 so that the lateral displacement, normal to the cutting plane, of the. mobile guide element 13 is equal to the distance calculated between the cutting plane of the machine 1 and the halfway line of the mortadella 2. Then, the support 6 passes across the mobile guide element 13 and is laterally displaced by the correct distance. Thus upon exiting from the mobile guide element 13 the halfway line of the mortadella 2 will coincide with the cutting plane of the machine 1.

[0036] Once the product has been correctly positioned, the cutting operation can take place. The lever 37 is lowered into the position where it can engage with the porjection 40 associated to the support 6 which bears the mortadella 2 to be cut; the transport chain 8 thus draws both mortadella 2 and frame 27. The presses 33 lower to block the product. During this phase the blade 29 lowers along the cutting plane and divides the mortadella 2 into two parts, cutting along a section which coincides with the median plane of the mortadella 2. Then the blade 29 rises, crossing the cut product, with the upper sharp edge 36 penetrating into the cut between the two halves without dirtying or damaging the cut surfaces thereof, then the presses 33 are raised and the frame 27 displaces slightly forwards with respect to the projection 40 on the chain 8; the lever 37 is also raised, disengaging the frame 27 which can then return backwards into the start position for the next cycle.

[0037] The two halves of the product are then taken to other work stations.

[0038] All of the above-mentioned functioning phases, both those relative to the positioning and those relative to the cutting, occur with the transport chains 8 advancing continuously.

[0039] During functioning the machine 1 follows a process comprising the following phases: advancing the product along a supply line 4; reading off the positions of the lateral ends of the product, said positions being indicators of the length and the position of the product; comparing the positions read off with reference data indicating the position of a fixed cutting line along which

the means for cutting can operate; laterally displacing the production the basis of the comparison so as to bring a preferred product cutting plane into line with tha fired cutting line, cutting the product according to the fixed cutting line.

[0040] The weight and length differences between the two pieces of mortadella thus obtained will be respectively less than 10-20 grams and 0.5-1mm.

[0041] With the machine and the process of the invention a product can also be cut into three or more equal parts.

[0042] A product can even be cut into unequal parts, but according to a predetermined relationship (size or weight). The control and command unit can be programmed to align, with the cutting plane of the machine, a predetermined section of mortadella 2 completely independently of the half-line.

[0043] In a different embodiment of the invention, not illustrated, the cutting device could be made capable of lateral displacements in a normal direction to the product supply line. In this case, having received the position of the ends of the product predisposed on the support, the cutting device is laterally displaced so that a predetermined cutting plane of the device itself can coincide with a predetermined cutting section of the product.

Claims

1. A machine for cutting a product into parts of equal lateral dimensions, comprising:

at least one support (6) for bearing a product (2) to be cut, able to follow an advancement movement along a supply line (4) and further able to make lateral displacements according to a normal direction (12) to said supply line (4);
a position sensor device (24), predisposed along said supply line (4), for sensing a position of opposite ends (2a, 2b) of a product (2) borne by said support (6);
a cutting device (26), predisposed along said supply line (4) downstream of the position sensor device (24) and operating according to at least one cutting plane which is perpendicular to said direction (12) of said lateral displacements of the support (6);
a control and command unit which compares positions of the lateral ends (2a, 2b) of the product supplied by the position sensor device (24) with pre-set reference values corresponding to a position of a known point of said machine, and further consequently commands a lateral displacement of the support (6) of the product (2) or the cutting device (26) in such a way that, during use, at least one predetermined cutting section of said product (2) coincides with at least one cutting plane of said device (26).

2. The machine of claim 1, comprising a plurality of said supports (6), aligned one following another along said supply line (4).

3. The machine of claim 2, wherein said supports (6) are constrained to at least one flexible transport element (8).

4. The machine of any one of the preceding claims, comprising a storage container for the products to be cut, at a position of which means for placing a product (2) in said container on a support (6) are provided.

5. The machine of any one of the preceding claims, wherein the position sensor device (24) is of an optic type.

6. The machine of claim 5, wherein the position sensor device (24) comprises two optic sensors (25) situated on opposite sides with respect to one of the plurality of supports (6) transiting along the supply line (4), each of which optic sensors (25) is predisposed to operate on a relative lateral end (2a, 2b) of the product (2).

7. The machine of any one of the preceding claims, wherein each of the plurality of supports (6) is provided with at least one pair of inclined surfaces (7) arranged in a V-shape.

8. The machine of any one of the preceding claims, comprising means for laterally displacing each of the plurality of supports (6) operating along the supply line (4) and commanded by said control and command unit.

9. The machine of any one of the preceding claims, wherein said means for laterally displacing comprise a mobile guide element (13), positionable along said normal direction (12) to the supply line (4) and couplable to a body (20) fixed to a guided element (15) which is solidly constrained to the support (6).

10. The machine of claim 9, wherein the mobile guide element (13) exhibits a positioner (21) to favour coupling with said body (20) of the guided element (15).

11. The machine of claim 9 or 10, comprising a fixed guide element (23), couplable to said body (20) of the guided element (15), predisposed along the supply line (4) upstream of the position sensor device (24), for centring the support (6) in a reference position.

12. The machine of any one of the preceding claims,

wherein the cutting device (26) comprises at least one blade (29) constrained to move along a cutting plane according to an oblique cutting direction with respect to the advancement direction (5) of the support (6).

13. The machine of claim 12, wherein the blade (29) is mounted on a mobile frame (27) which is mobile in the advancement direction (5), means for connecting being provided which on command can constrain the frame (27) to the support (6) in the advancement direction.

14. The machine of claim 12 or 13, wherein an edge (36) of the blade (29) which is opposite to a cutting edge of said blade (29) is also sharp.

15. The machine of any one of the preceding claims, comprising two presses (33) which can operate on the product (2) during the cut, on opposite sides with respect to the cutting plane.

16. A process using the machine according to claims 1 to 15 comprising the following phases:

advancing the product (2) along a supply line (4);
reading of a position of the lateral ends (2a, 2b) of the product (2), said positions being indicators of a length and position of the product (2);
comparing positions read with reference data which are indicators of a position of a fixed cutting plane along which means for cutting can operate;
displacing the product laterally on a basis of a comparison so as to make a
preferred cutting product plane coincide with the fixed cutting plane of the means for cutting;
cutting the product along said fixed cutting plane.

Patentansprüche

1. Maschine zum Schneiden eines Produktes in Teile von gleichen seitlichen Abmessungen, enthaltend:

- wenigstens einen Support (6) zum Tragen eines zu schneidenden Produktes (2), in der Lage, eine Vorschubbewegung entlang einer Zuführbahn (4) und ausserdem seitliche Verschiebungen nach einer normalen Richtung (12) im Verhältnis zu der genannten Zuführbahn (4) auszuführen;
- eine Vorrichtung (24) zum Erfassen der Position, vorgesehen entlang der genannten Zuführbahn (4) zum Abtasten der Position von den entgegengesetzten Enden (2a, 2b) eines von dem genannten Support (6) getragenes Produktes (2);
- eine Schneidvorrichtung (26), angeordnet entlang der Zuführbahn (4) stromabwärts der Vorrichtung (24) zum Erfassen der Position und nach wenigstens einer Schneidebene arbeitend, welche lotrecht zu der genannten Richtung (12) der genannten seitlichen Verschiebungen des Supportes (6) verläuft;
- eine Steuer- und Antriebseinheit, welche die Positionen der seitlichen Enden (2, 2b) des Produktes, die von der Vorrichtung (24) zum Erfassen der Position geliefert sind, mit eingestellten Bezugswerten, die einer Position eines bekannten Punktes der Maschine entsprechen, vergleicht und folglich eine seitliche Verschiebung des Supportes (6) des Produktes (2) oder der Schneidvorrichtung (26) auslöst, und zwar auf solche Weise, dass während des Betriebes wenigstens ein bestimmter Schneidabschnitt des genannten Produktes (2) mit wenigstens einer Schneidebene der genannten Vorrichtung (26) übereinstimmt.

2. Maschine nach Patentanspruch 1, enthaltend eine Anzahl von genannten Supporten (6), die einer nach dem anderen entlang der genannten Zuführbahn (4) ausgerichtet sind.

3. Maschine nach Patentanspruch 2, bei welcher die genannten Supporte (6) an wenigstens einem flexiblen Transportelement (8) gehalten werden.

4. Maschine nach einem beliebigen der vorstehenden Patentansprüche, enthaltend einen Vorratsbehälter für die zu schneidenden Produkte, und zwar in einer Position, an welcher Mittel zum Anordnen eines Produktes (2) aus dem genannten Behälter auf einem Support (6) vorgesehen sind.

5. Maschine nach einem beliebigen der vorstehenden Patentansprüche, bei welcher die Vorrichtung (24) zum Erfassen der Position von optischer Art ist.

6. Maschine nach Patentanspruch 5, bei welcher die Vorrichtung (24) zum Erfassen der Position zwei optische Fühler (25) enthält, die im Verhältnis zu einem entlang der Zuführbahn (4) durchlaufenden Support (6) aus der Anzahl von Supporten an sich gegenüberliegenden Seiten angeordnet sind, wobei der optische Fühler (25) dazu vorgesehen ist, an einem entsprechenden seitlichen Ende (a, 2b) des Produktes (2) zu arbeiten.

7. Maschine nach einem beliebigen der vorstehenden Patentansprüche, bei welcher ein jeder Support aus der Anzahl von Supporten (6) mit wenigstens einem Paar von schrägen Oberflächen (7) verse-

hen ist, die V-förmig angeordnet sind.

8. Maschine nach einem beliebigen der vorstehenden Patentansprüche, enthaltend Mittel zur seitlichen Verschiebung eines jeden Supportes aus der Anzahl von Supporten (6), die entlang der Zuführbahn (4) arbeiten und von der genannten Steuer- und Antriebseinheit angetrieben werden.

9. Maschine nach einem beliebigen der vorstehenden Patentansprüche, bei welcher die genannten Mittel zur seitlichen Verschiebung ein bewegliches Führungselement (13)enthalten, das entlang der zu der Zuführbahn (4) normal verlaufenden Richtung (12) positionierbar und mit einem Körper (20) verbindbar ist, letzterer befestigt an einem geführten Element (15), das fest an dem Support (6) gehalten wird.

10. Maschine nach Patentanspruch 9, bei welcher das bewegliche Führungselement (13) eine Einführung (21) aufweist, um die Verbindung mit dem genannten Körper (20) des geführten Elementes (15) zu erleichtern.

11. Maschine nach Patentanspruch 9 oder 10, enthaltend ein mit dem genannten Körper (20) des geführten Elementes (15) verbindbares feststehendes Führungselement (23), das entlang der Zuführbahn (4) stromaufwärts der Vorrichtung (24) zum Erfassen der Position angeordnet ist, um den Support (6) in einer Bezugsposition zu zentrieren.

12. Maschine nach einem beliebigen der vorstehenden Patentansprüche, bei welcher die Schneidvorrichtung (26) wenigstens ein Messer (29) enthält, das sich zwangsweise entlang einer Schneidebene nach einer schrägen Schneidrichtung im Verhältnis zu der Vorschubrichtung (5) des Supportes (6) bewegt.

13. Maschine nach Patentanspruch 12, bei welcher das Messer (29) an einem beweglichen Rahmen (27) montiert ist, welcher in der Vorschubrichtung (5) beweglich ist, wobei Mittel zum Verbinden vorgesehen sind, welche auf einen Befehl hin den Rahmen (27) in der Vorschubrichtung an dem Support (6) halten.

14. Maschine nach Patentanspruch 12 oder 13, bei welcher eine Kante (36) des Messers (29), welche einer Schneidkante des genannten Messers (29) gegenüberliegt, ebenfalls scharf ist.

15. Maschine nach einem beliebigen der vorstehenden Patentansprüche, enthaltend zwei Presser (33), welche während des Schneidvorgangs auf entgegengesetzten Seiten im Verhältnis zu der Schneidebene auf das Produkt (2) wirken können.

16. Verfahren, welches die Maschine nach den Patentansprüchen von 1 bis 15 benutzt, enthaltend die folgenden Phasen:

- Vorlauf des Produktes (2) entlang einer Zuführbahn (4);
- Ablesen einer Position der seitlichen Enden (2a, 2b) des Produktes (2), wobei die genannten Positionen Hinweise auf eine Länge und die Position des Produktes (2) sind;
- Vergleichen der abgelesenen Positionen mit Bezugsdaten, welche Hinweise auf eine feststehende Schneidebene sind, entlang welcher die Schneidmittel arbeiten können;
- seitliche Verschiebung des Produktes auf der Grundlage eines Vergleiches, so dass eine vorgezogene Schneidebene des Produktes mit der feststehenden Schneidebene der Schneidmittel übereinstimmt;
- Schneiden des Produktes entlang der genannten feststehenden Schneidebene.

Revendications

1. Une machine permettant de couper un produit en parts de dimensions latérales égales, comprenant:

- au moins un support (6) portant un produit (2) devant être coupé, pouvant suivre un mouvement avançant le long d'une ligne d'alimentation (4) et pouvant en outre accomplir des déplacements latéraux selon une direction (12) normale à ladite ligne d'alimentation (4);
- un dispositif capteur de position (24), prédisposé le long de ladite ligne d'alimentation (4), relevant la position des extrémités opposées (2a, 2b) d'un produit (2) porté par le support (6);
- un dispositif de coupe (26), prédisposé le long de la ligne d'alimentation (4) en aval du dispositif capteur de mouvement (24) et opérant selon au moins un plan de coupe perpendiculaire à ladite direction (12) desdits déplacements latéraux du support (6);
- une unité de contrôle et de commande comparant les positions des extrémités latérales (2a, 2b) du produit, fournies par le dispositif capteur de position (24), avec des valeurs de référence préréglées correspondant à une position d'un point connu de la machine, et commandant en conséquent un déplacement latéral du support (6) du produit (2) ou du dispositif de coupe (26) de manière à ce que, pendant le fonctionnement, au moins une section de coupe prédéterminée dudit produit (2) coïncide avec au moins un plan de coupe dudit dispositif (26).

2. Une machine selon la revendication 1, comprenant

une pluralité de supports (6), alignés l'un après l'autre le long de ladite ligne d'alimentation (4).

3. Une machine selon la revendication 1, dans laquelle lesdits supports (6) sont fixés sur au moins un élément de transport flexible (8).

4. Une machine selon n'importe laquelle des revendications précédentes, comprenant un conteneur magasin pour les produits devant être coupés, en correspondance duquel sont prévus des moyens pour placer un produit (2) du conteneur sur un support (6).

5. Une machine selon n'importe laquelle des revendications précédentes, dans laquelle le dispositif capteur de position (24) est de type optique.

6. Une machine selon la revendication 5, dans laquelle le dispositif capteur de position (24) comprend deux capteurs optiques (25) situés sur des côtés opposés par rapport à l'un des supports (6) transitant le long de la ligne d'alimentation (4), chacun desdits capteurs optiques (25) étant prédisposé pour opérer sur une relative extrémité latérale (2a, 2b) du produit (2).

7. Une machine selon n'importe laquelle des revendications précédentes, dans laquelle chacun des supports (6) est pourvu d'au moins une paire de surfaces inclinées (7) disposées en forme de V.

8. Une machine selon n'importe laquelle des revendications précédentes, comprenant des moyens pour déplacer latéralement chacun des supports (6) opérant le long de la ligne d'alimentation (4) commandés par ladite unité de contrôle et de commande.

9. Une machine selon n'importe laquelle des revendications précédentes, dans laquelle lesdits moyens pour déplacer latéralement comprennent un élément de guidage mobile (13), positionnable le long de ladite direction (12) normale à la ligne d'alimentation (4) et pouvant être accouplé à un corps (20) fixé à un élément guidé (15) solidaire du support (6).

10. Une machine selon la revendication 9, dans laquelle l'élément de guidage mobile (13) présente un positionneur (21) favorisant l'accouplement entre ledit corps (20) et l'élément guidé (15).

11. Une machine selon la revendication 9 ou 10, comprenant un élément de guidage fixe (23), pouvant être accouplé audit corps (20) de l'élément guidé (15), prédisposé le long de la ligne d'alimentation (4) en amont du dispositif capteur de position (24), pour centrer le support (6) dans une position de référence.

12. Une machine selon n'importe laquelle des revendications précédentes, dans laquelle le dispositif de coupe (26) comprend au moins une lame (29) devant se déplacer le long d'un plan de coupe selon une direction de coupe oblique par rapport à la direction d'avancement (5) du support (6).

13. Une machine selon la revendication 12, dans laquelle la lame (29) est montée sur un cadre (27) mobile dans la direction d'avancement (5), étant prévus des moyens de blocage pouvant, sur commande, rendre le cadre (27) solidaire du support (6) dans la direction d'avancement.

14. Une machine selon la revendication 12 ou 13, dans laquelle un bord (36) de la lame (29) opposé au bord de coupe de ladite lame (29) est lui aussi affilé.

15. Une machine selon n'importe laquelle des revendications précédentes, comprenant deux presseurs (33) opérant sur le produit (2) pendant la coupe, sur des extrémités opposées par rapport au plan de coupe.

16. Un procédé utilisant la machine selon les revendications 1 à 15, comprenant les phases suivantes:

- avancée du produit (2) le long de la ligne d'alimentation (4);
- lecture d'une position des extrémités latérales (2a, 2b) du produit (2), lesdites positions indiquant la longueur et la position du produit (2);
- comparaison des positions relevées avec les données de référence indiquant la position d'un plan de coupe fixe le long duquel les moyens de coupe peuvent opérer;
- déplacement du produit latéralement sur la base de la comparaison de. manière à faire coïncider un plan de coupe du produit préféré avec le plan de coupe fixe des moyens de coupe;
- coupe du produit le long dudit plan de coupe fixe.

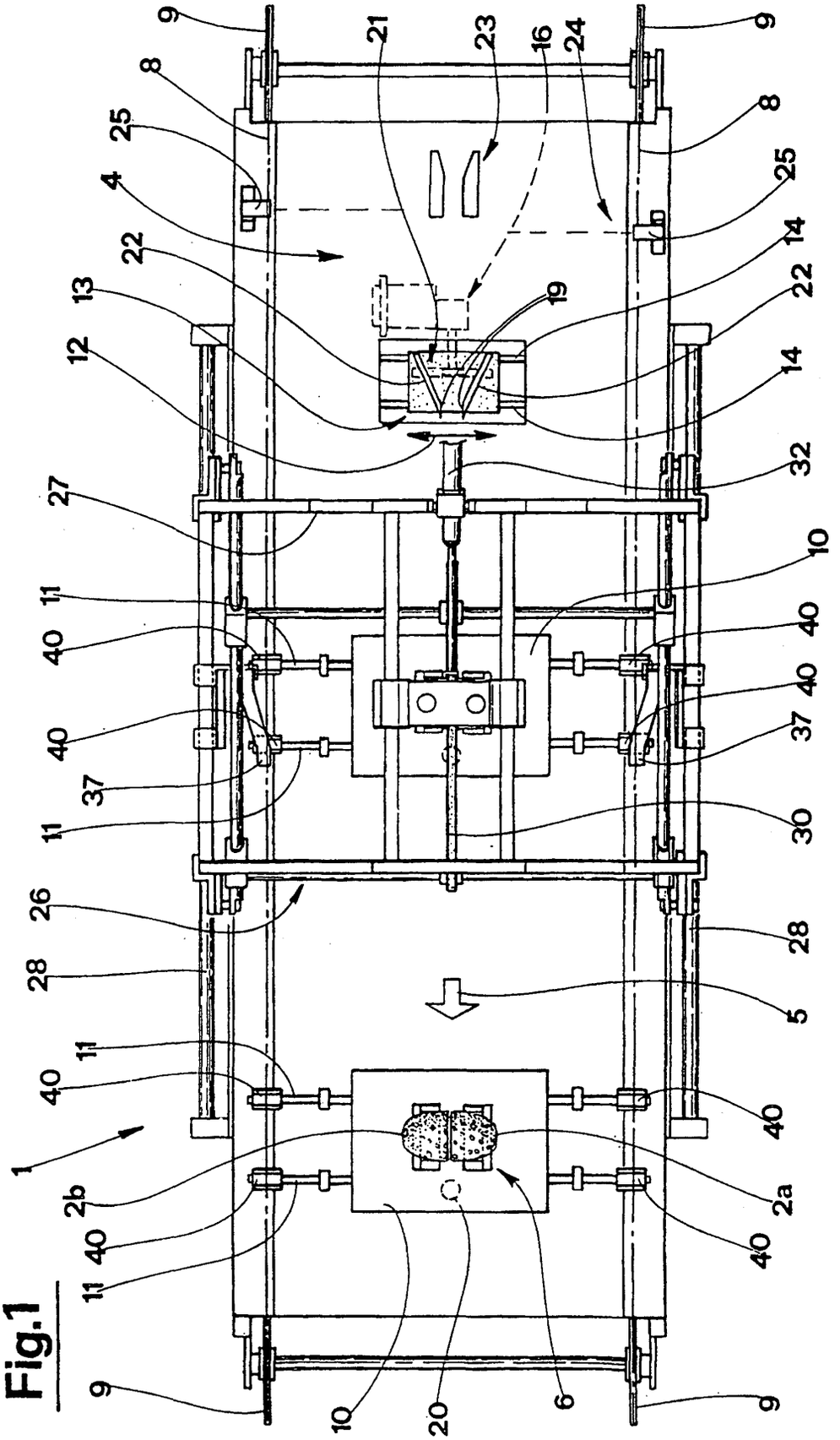
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Fig.1

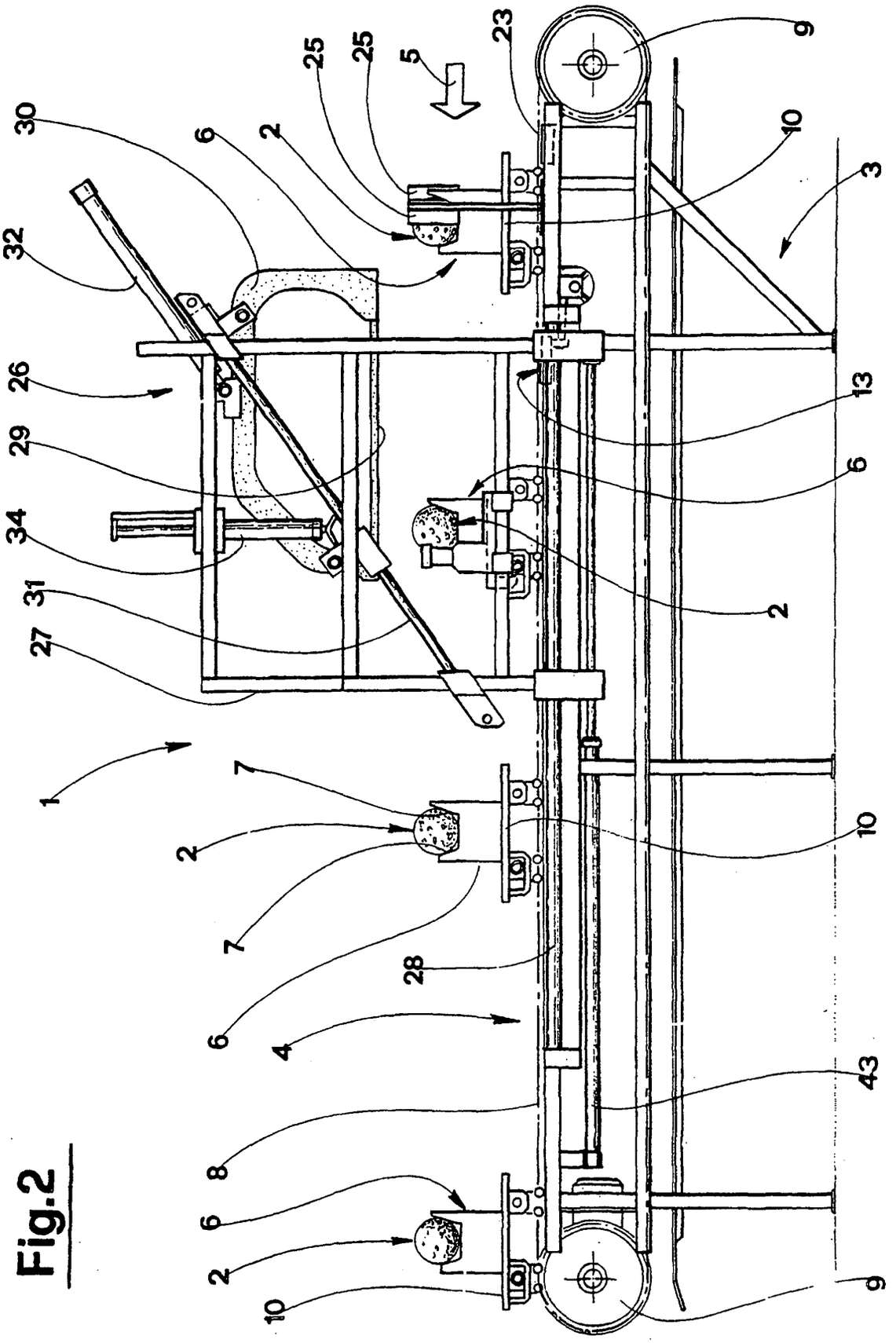


Fig.2

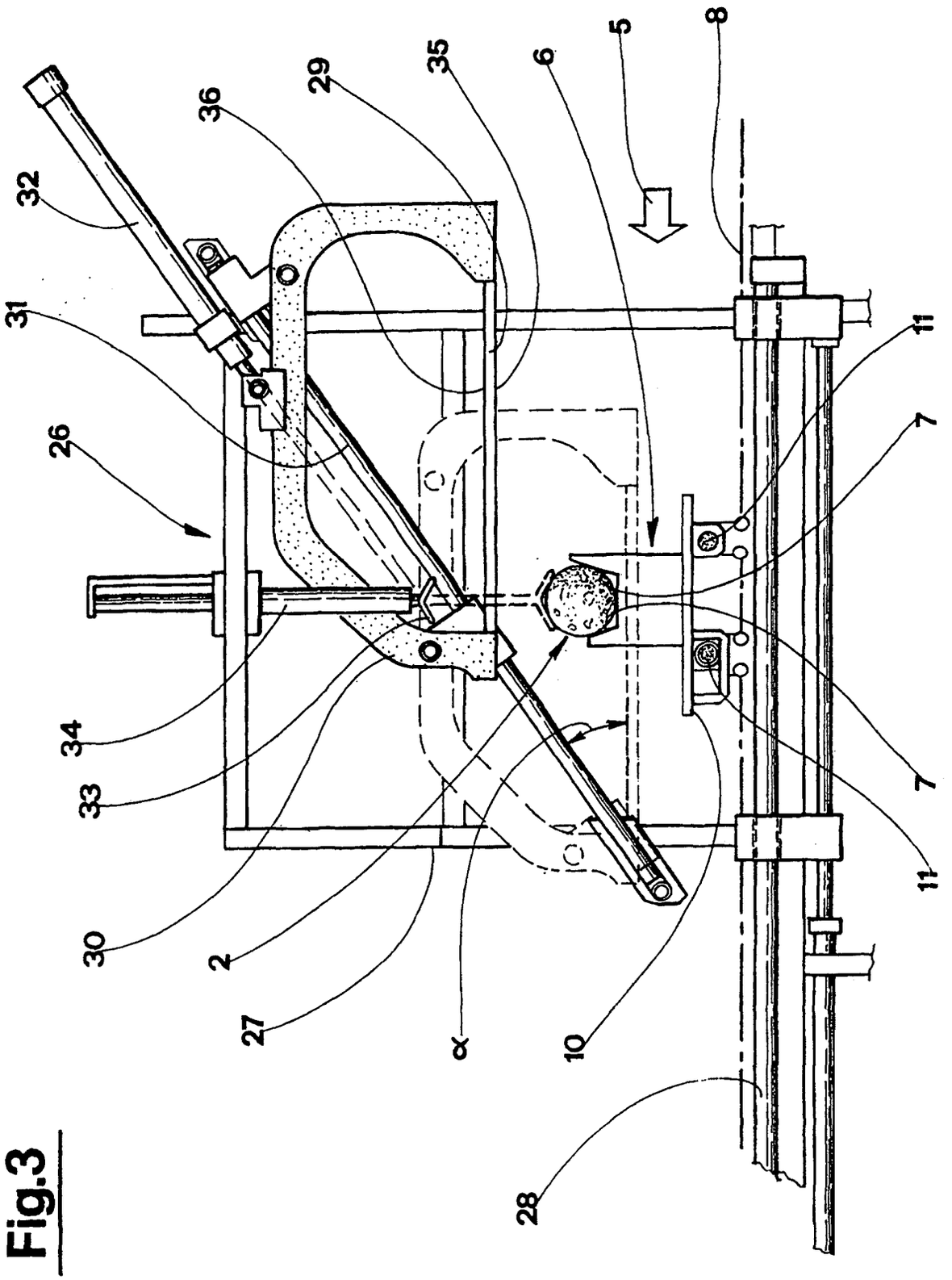
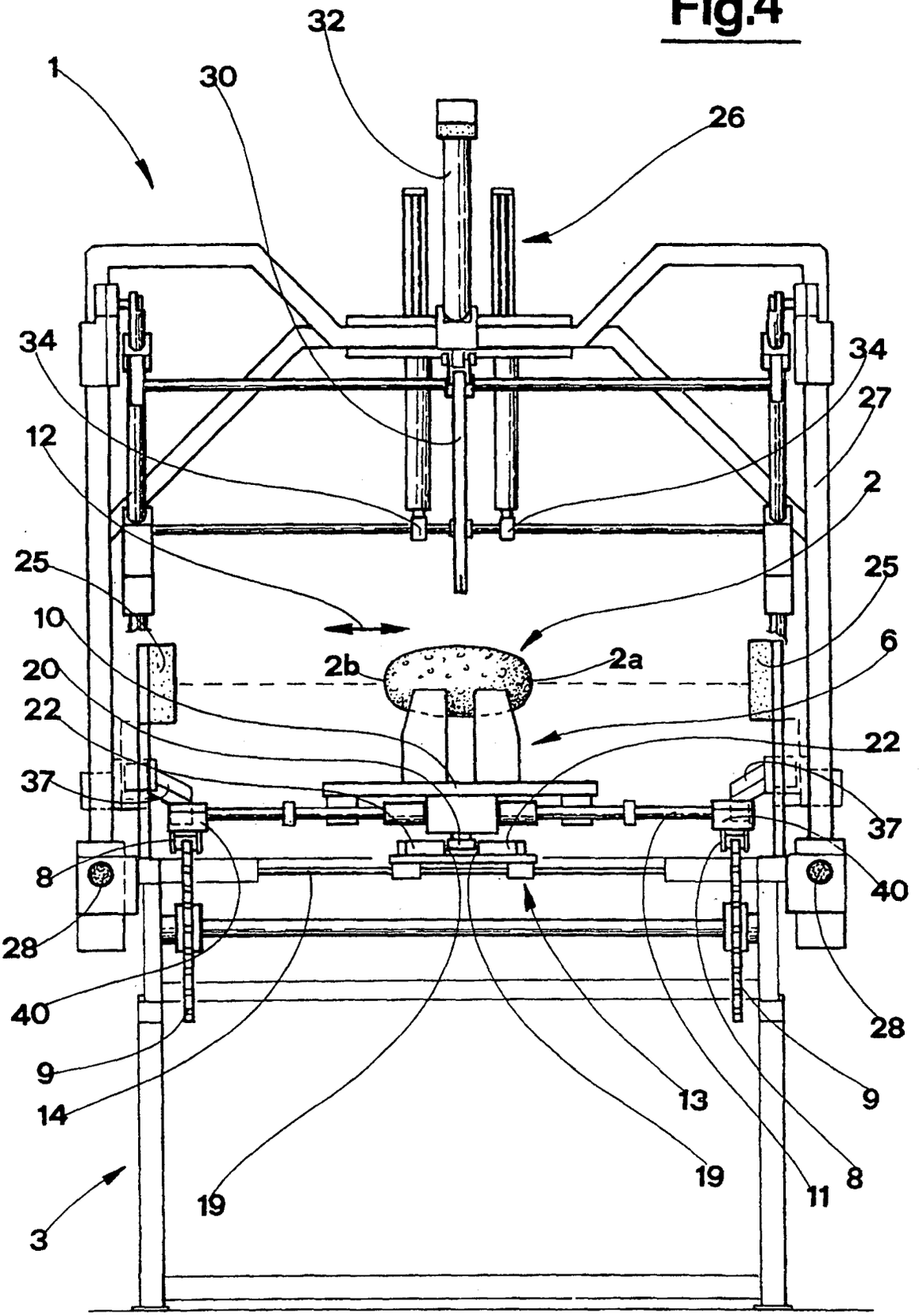


Fig.3

Fig.4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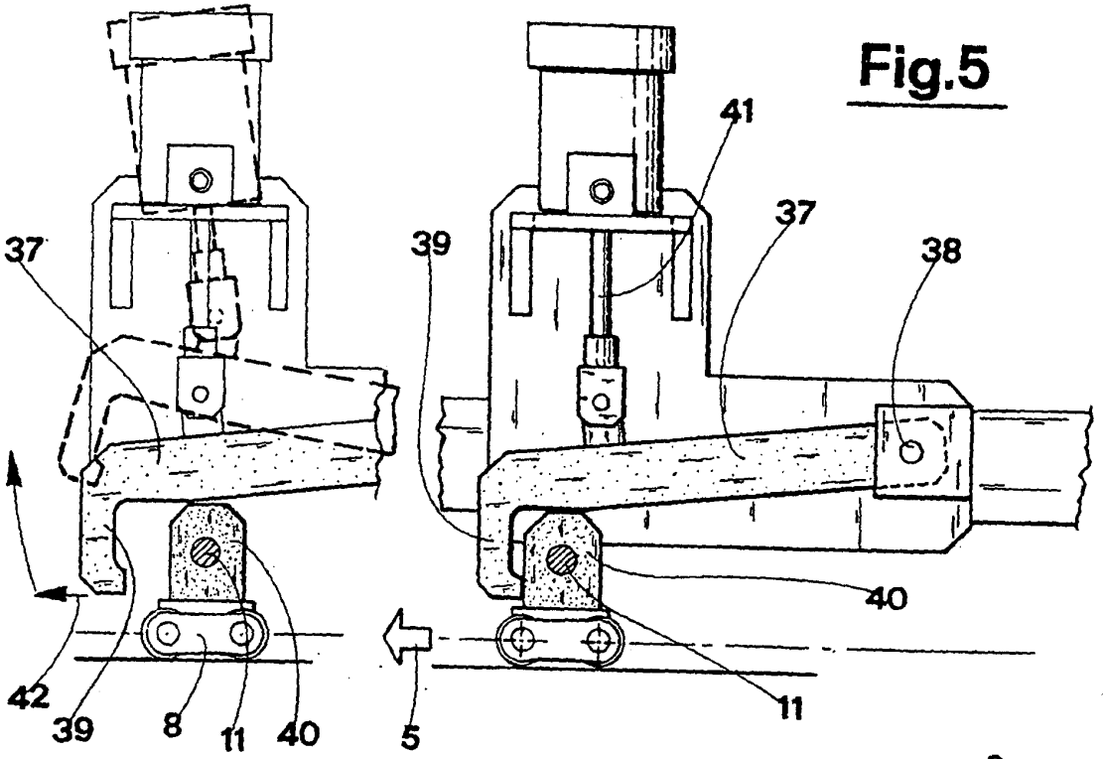

Fig.5

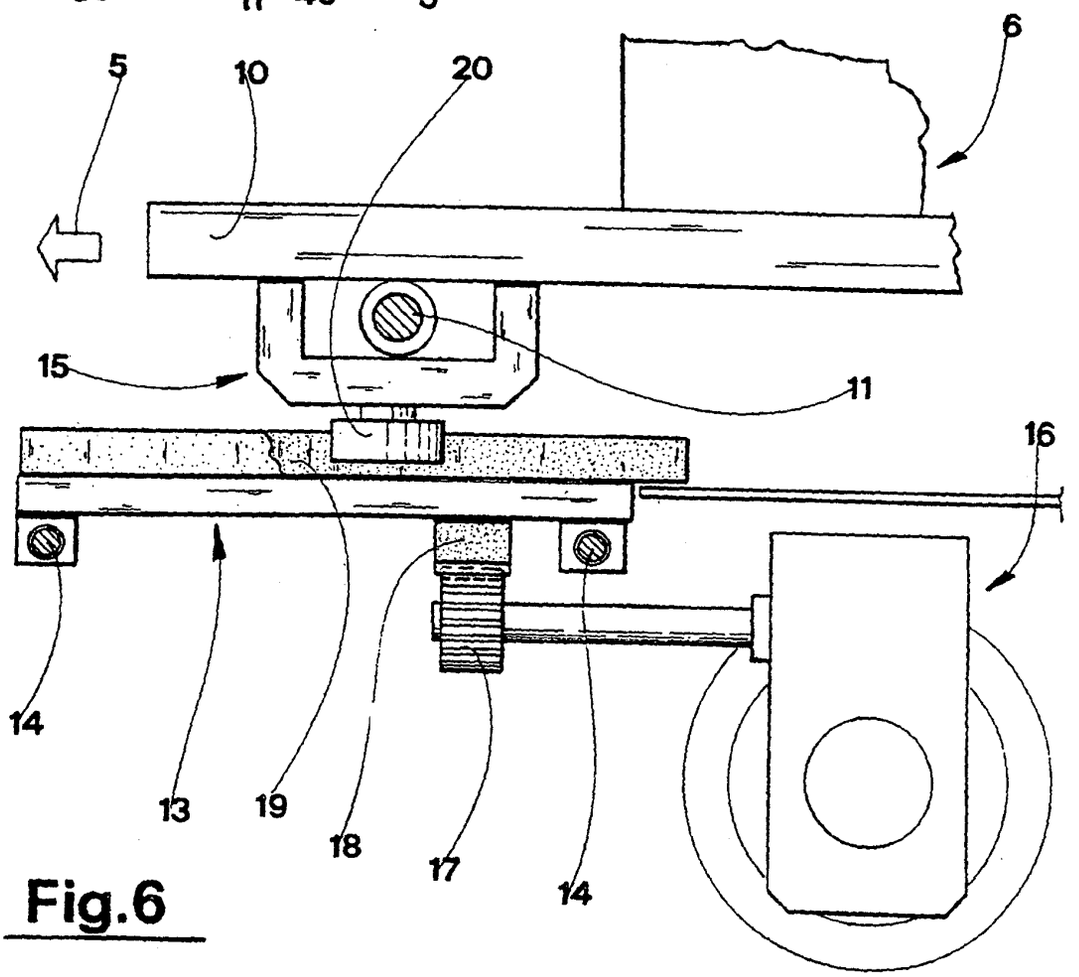

Fig.6