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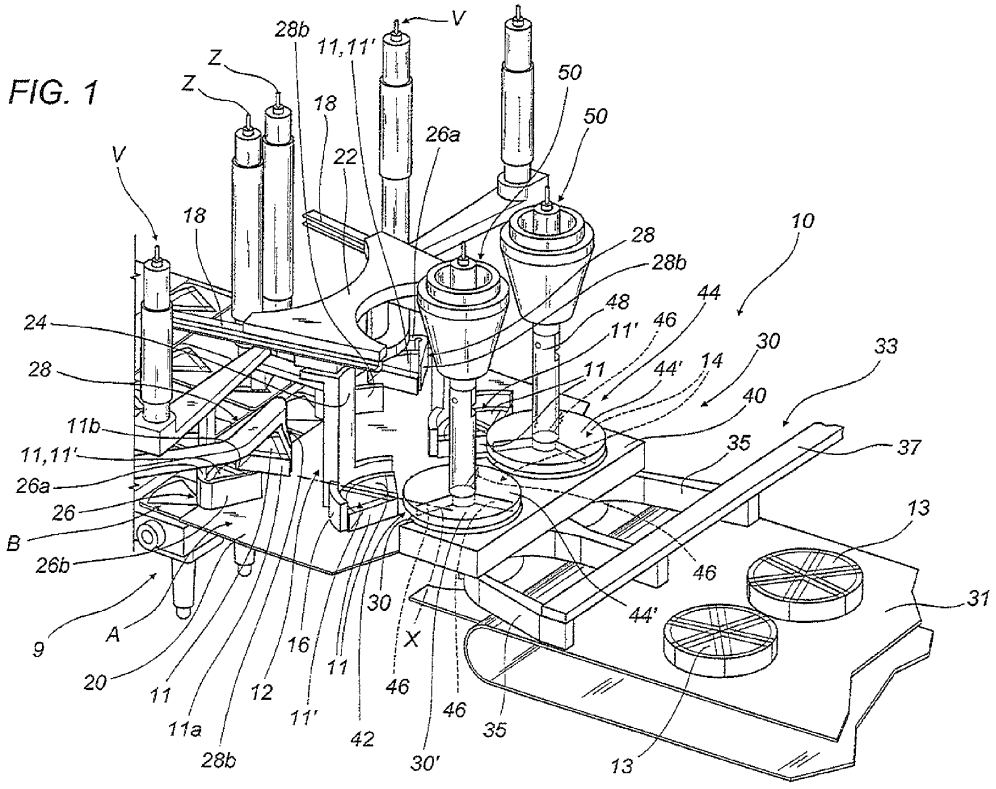
(54) Device for forming groups of packages

(57) A device (10) for grouping together packages (11) of a product, in particular for forming a group (13) to be packed in a suitable container, comprises means (12) for positioning the packages (11) at a grouping area (14), where said means (12) for positioning the packages at the grouping area comprise package feed means that move between a position where they pick up the packages to a position inside the grouping area where the packages are released.

FIG. 1



EP 2 543 604 A2

Description

[0001] This invention relates to a device for grouping together packages of a product, in particular for forming a group to be packed in a suitable container.

[0002] In the field of machines for packaging pasty food products, in particular, processed cheese, several devices are known for forming groups of packages to be packed in a suitable carton, preferably made of card and being circular in shape.

[0003] These prior art devices have the disadvantage of having excessively complicated mechanisms.

[0004] Thus, in the devices known up to now, the means for placing the packages in the grouping area usually comprise first means for feeding the placing means themselves lengthways to the inlet opening leading into the grouping area and second means that move the products transversally into the grouping area. As a result, the structure of these prior art devices is at once complex and cumbersome.

[0005] Another equally disadvantageous complication is due to the fact that for pre-grouping a first and a second package to be placed simultaneously in the grouping area, prior art devices comprise first means for feeding the packages lengthways and second means for moving the packages transversally relative to each other by turning them through the same angle so that the lateral surfaces of the packages are positioned face to face and are oriented lengthways relative to the device. Thus, the pre-grouping means of prior art devices are also unduly complex and cumbersome.

[0006] Further, prior art devices also normally have a product supporting wheel with plates extending upwards from it to form compartments that accommodate respective packages. Once the group of packages has been formed, the plates must be withdrawn to allow the group to move downstream. Therefore, these prior art means for turning the packages in the grouping area are also unduly complex in terms of structure and operation.

[0007] It is therefore provided a device for grouping together packages of a product, as defined in claim 1.

[0008] Other advantageous aspects of the invention according to the present invention are described in the claims.

[0009] These and other technical characteristics of the invention are clearly described in the appended claims and the advantages of the invention are apparent from the detailed description which follows, with reference to the accompanying drawings which illustrate a preferred embodiment of it provided merely by way of example without restricting the scope of the inventive concept, and in which:

- Figure 1 is a perspective view of a preferred embodiment of the grouping device according to this invention;
- Figure 2 is a schematic top view of the preferred embodiment of the package grouping device according to the invention, with a detail shown in partial cutaway view to better illustrate the package aligning paddles;
- Figure 3 is a schematic top view showing the preferred embodiment of the package grouping device according to the invention in the position where the packages are being inserted into the grouping area;
- Figure 4 is a schematic side view showing the preferred embodiment of the package grouping device according to the invention in the position where the feed means are starting to push the packages towards the grouping area;
- Figure 5 is a schematic side view showing the preferred embodiment of the package grouping device according to the invention in the position where the feed means have placed the packages into the grouping area;
- Figure 6 is a schematic side view showing the preferred embodiment of the package grouping device according to the invention in the position where the feed means are raised at the grouping area;
- Figure 7 is a schematic side view showing the preferred embodiment of the package grouping device according to the invention in the position where the feed means are raised to the position where they start pushing the packages towards the grouping area.

[0010] The accompanying drawings illustrate a preferred embodiment 10 of a device for grouping packages 11 of a respective product to form a group 13 to be packed in a suitable container, in particular, a container or carton in the form of a box-like container. The carton is not illustrated in detail in the drawings.

[0011] The product is preferably a food product, especially a pasty food product such as processed cheese, stock cubes, butter, margarine and the like. The product might, however, also be a semiliquid food product or a solid food product such as mature cheese.

[0012] The package 11 comprises a product wrapper, in particular a wrapper of aluminium foil, plastic film or other material suitably shaped and folded around the product.

[0013] As illustrated, the packages to be grouped are preferably shaped like the sectors of a circle. Packages with other shapes are, however, also imaginable.

[0014] The device according to the invention is preferably installed at the end 9 of, or otherwise associated with, an apparatus for making the packages from the product in bulk form and from the wrapper in the form of a roll-fed web.

[0015] The device according to the invention comprises means, labelled 12, for positioning the packages 11 at a grouping area 14.

[0016] As illustrated, the device comprises first and second grouping means for forming respective groups 13, 13 of packages 11 positioned transversally in line with each other relative to the longitudinal line L along

which the device extends.

[0017] The means 12 for positioning the packages at the grouping area comprise package feed means 12 that move between a position A where they pick up the packages and a position 14 inside the grouping area where the packages are released or dispensed.

[0018] In practice, the means 12 for feeding the packages to the grouping area move along a rectilinear, or straight, path, or trajectory T, that forms a virtual angle C with the longitudinal line L along which the device extends.

[0019] Thus, the packages are placed in the grouping area by single feed means, which considerably simplify the structure and reduce the size of the device according to the invention.

[0020] In practice, the means 12 for positioning the packages at the grouping area are designed to place a plurality of packages 12 in the grouping area simultaneously.

[0021] In particular, the device extends along a longitudinal line L that may coincide with the direction in which the packages are fed by the devices upstream of the packaging apparatus with which the device according to the invention is associated and with the direction in which the groups are fed out towards the packing unit downstream of the device.

[0022] The means 12 for positioning the packages at the grouping area 14 are designed to position a plurality of packages 11, 11 forming part of the group to be packed, in particular a first and a second package 11, 11, placed side by side with facing side walls 11a, 11b in contact or substantially in contact with each other.

[0023] The means 12 for feeding the packages are designed to feed a plurality of packages 11, 11 simultaneously, and, in particular they simultaneously feed a first and a second package forming part of the group 13 to be packed.

[0024] The package feed means 12 are designed to feed a plurality of packages 11, 11, where the packages are placed side by side with facing side walls 11a, 11b oriented at an angle C to the longitudinal line L along which the device extends.

[0025] Further, these package feed means are designed to feed a plurality of packages 11, 11, where the fed packages 11, 11 are placed side by side with facing side walls 11a, 11b in contact or substantially in contact with each other.

[0026] In practice, the means for feeding the packages constitute means for positioning the packages at the grouping area 14.

[0027] Further, as illustrated, the means 12 for feeding the packages move along a path that has a component of longitudinal movement and a component of transversal movement.

[0028] Advantageously, the package feed means 12 advance the packages towards a predetermined grouping area 14 which is transversally spaced from the picking up area, that is to say, located more centrally than the area where the packages are picked up. Thus, the grouping area 14 and the picking up area B remain fixed for all product sizes. In practice, by suitably adapting only some parts of the grouping device, it is possible to leave the working conditions of the machines upstream and downstream of it unchanged, with obvious advantages in terms of ease of operation for personnel and reduced down time during changeover from one package size to another.

[0029] A considerably simpler structure compared to prior art devices is thus obtained.

[0030] As shown in the accompanying drawings, the package feed means 12 can move between a back position where they pick up the packages in a pre-grouped condition and an advanced position where the packages are released in a respective grouping slot in the grouping area.

[0031] In the drawings, the reference character A, is used to denote the package picking up area, while the numeral 14 is used, as stated above, to denote the package release area.

[0032] These package feed means are therefore embodied by means that push the packages in a straight line, that is to say, that impart to them a rectilinear movement.

[0033] In particular, first and second feed means 12, 12 are provided for feeding respective packages to form corresponding groups 13, 13 of packages, said feed means extending side by side and being moved backwards and forwards simultaneously to form two different groups of packages simultaneously. Although the groups of packages formed by this embodiment of the device are composed of six packages each, as illustrated in the accompanying drawings, it will be understood that the groups to be packed might be composed of a different number of packages. For example, the device according to the invention might be used to form groups of eight, ten, twelve or more packages, to be packed in respective cartons.

[0034] As illustrated, the package feed means 12, comprise package engagement means 16 in the form of respective paddle means which extend transversally and whose extension is sufficient to abut against the rear surface of a plurality of packages, being in this particular embodiment a first and a second package.

[0035] As illustrated, the paddle means 16 are in the form of a curved element designed to abut against the rear surface of a plurality of packages which, in this particular embodiment, are a first package 11 and a second package 11. The axis of symmetry X of the respective paddle is directed along the line of feed and inclined with respect to the longitudinal virtual line L, being in particular inclined towards the centre or middle area of the package feed area 20.

[0036] The package feed means 12 also comprise guide means 18 which extend in a straight line defining a rectilinear path T above means for supporting the packages, said supporting means being comprised of a fixed

surface 20 on which the packages are made to slide.

[0037] As shown in particular in Figure 2, the guide means extend along a straight path T that is inclined at an angle C to the longitudinal line L along which the device extends.

[0038] More specifically, as illustrated, first and second guide means 18, 18 are provided for respective first and second feed means 12, 12, said guide means being in the form of straight, convergent bars mounted on a common mounting plate 22.

[0039] A rod 24 is provided for supporting a respective paddle 16 and which extends vertically downwards from respective guide means 18. The rod 24 slides on the guide means 18 and comprises a suitably shaped end 24a that runs in the guide means 18.

[0040] The numeral 25 in the drawings denotes an arm or lever that swings horizontally to drive the package feed means 12 backwards and forwards.

[0041] The feed means 12 can also move vertically between a lowered position in which they engage and advance the packages, and a raised position in which they move back to a point behind two other packages 11, 11 to be advanced in turn towards the grouping area.

[0042] Upstream of the package feed means 12 aligning means 26, 28 are advantageously provided for drawing a plurality of packages 11, 11 close to each other and positioning them so they are side by side, with their facing side walls 11a, 11b in contact or substantially in contact with each other.

[0043] The package aligning means move a plurality of packages 11, 11 forming part of the group 13 closer to each other and, in particular they move a first and a second package closer to each other, as illustrated.

[0044] As illustrated, starting from a condition in which the packages 11, 11 are transversally spaced, the aligning means 26 move the packages closer together and place them in the position labelled A in the drawings, where they can be picked up by the package feed means.

[0045] In practice, the packages advancing along the feed line in parallel with each other on the packaging machine 9 are first drawn closer together and then placed in the grouping area.

[0046] Advantageously, the aligning means move the packages closer together while advancing them longitudinally, thus also constituting means for feeding the packages lengthways.

[0047] A considerably simpler structure compared to prior art devices is thus obtained.

[0048] More specifically, the packages are aligned transversally by rotating them towards each other through different defined angles. Thus, looking in more detail at the pair of packages to be aligned, the package 11' on the outer side is rotated through a larger angle than the package on the inner side, so that the facing side walls 11a, 11b of the packages are oriented according to an angle C with respect to the longitudinal line L, as shown clearly in Figure 2.

[0049] Also, the contacting facing side walls 11a, 11b of the packages 11, 11 are positioned according to the line of feed towards the grouping area, which, as illustrated, is inclined at an angle C to the longitudinal line L.

[0050] As illustrated, the package aligning means 26 move the packages between a back, pick up position and an advanced, release position where the packages are transferred to the feed means. The back position is labelled B in the accompanying drawings.

[0051] In practice, the aligning means also constitute means for orienting the packages which move the packages from a position where their centre distance, or pick up spacing, corresponds to the spacing when they are fed out of the packaging unit to a position where the centre distance, or release spacing, between the pre-grouped pairs of packages corresponds to and is suitable for their insertion into the grouping area downstream.

[0052] More specifically, the package aligning means 26 are means for pushing the packages.

[0053] In particular, the package aligning means 26, 28 are rotationally mobile and consist of first and second means 26, 28 for engaging respecting packages 11, 11 and being rotatable about respective vertical axes V, Z perpendicular to the surface on which the packages move.

[0054] Looking in more detail, the first and second engagement means 26, 28 are mounted on respective arms 27, 29 extending on opposite sides of the package 11, 11 picking up area.

[0055] As shown also in the detail in Figure 2, the package engagement means comprise respective paddle means 26, 28, with respective curved portions 26a, 28a forming abutment surfaces for the back of respective packages.

[0056] At the abutment portion 26a, 28a, on the outer side of the device, the paddle means 26, 28, also comprise an engagement portion 26b, 28b for abutting against a lateral surface of a respective package, said lateral engagement portion 26b, 28b extending from the respective rear engagement portion 26a, 28a. In practice, when viewed from above, the engagement means 26, 28 have a hooked shape, or more specifically, the general shape of an L.

[0057] Further, the arms 27, 29 for the respective engagement means 26, 28 of the separate packages 11, 11 to be aligned are advantageously mounted at different heights so as not to interfere during movement.

[0058] The package aligning means 26, 28 can also move vertically between a lowered position in which they engage and advance the packages, and a raised position in which they move back to a point behind two other packages to be aligned.

[0059] The aligning means make the packages slide on a respective supporting surface 20 on which the package feed means also operate.

[0060] Further, the means for aligning the packages and the means for feeding them towards the grouping area move vertically together.

[0061] Further, the backward and forward movements

are synchronized in such a way that when the feed means pick up the aligned packages from the aligning means, they do not interfere with the aligning means. In practice, when the package aligning means are moved backwards, the feed means are also moved backwards and, in the same way, when the aligning means are advanced, the feed means are also advanced.

[0062] As illustrated, first aligning means 26, 28 and second aligning means 26, 28 are provided for respective pluralities of packages to form respective groups 13, 13 to be packed.

[0063] In particular, the first aligning means 26, 28 and the second aligning means 26, 28 for respective pluralities of packages to form respective groups 13, 13 are positioned side by side and are moved backwards and forwards simultaneously.

[0064] Outfeed means, labelled 30 in the drawings, are also provided for removing the group of packages from the forming area 14, 14. The outfeed means 30 are designed to lower the group relative to the grouping area and comprise a respective circular plate 30' which releases the group onto a conveyor belt 31 on which the groups 13, 13 are positioned by a transfer unit 33 having a respective paddle 35, 35 for engaging the respective group 13, 13 and pushing it onto the belt 31.

[0065] The means 30 comprise a transversal rod 37 that mounts the paddles 35, 35, said rod 37 being open at the front to define means for transferring the groups 13, 13 to the belt 31.

[0066] While it is being formed in the area 14, the group is supported by the plate 30' in the raised condition.

[0067] The means 30' for supporting the packages at the grouping area have a top supporting surface which, advantageously, is smooth.

[0068] Means 40 are also provided for laterally, or circumferentially, containing the packages in the grouping area 14.

[0069] Advantageously, the means for laterally containing the packages are in the form of a fixed element 40, having an inside circumferential surface 40' for coming into contact with the packages being grouped, and an opening 42 in the side facing the package feed means, said opening 42 being delimited by opposite edges 42a, 42b of the wall 40 and having a transversal dimension large enough to allow a plurality of packages 11, 11 forming part of the group 13 to be fed in simultaneously.

[0070] In particular, the transversal dimension of the opening 42 is such as to allow the simultaneous infeed of a first and a second package 11, 11 after they have been moved close together and, as described above, having facing side walls 11a, 11b in contact or substantially in contact with each other.

[0071] Advantageously, the lateral, or circumferential, containment means 40 - that is to say, the means for containing the perimeter of the packages - have an opening 42 whose axis of symmetry is oriented at an angle C with respect to the longitudinal line L along the respective outer or lateral edge of the device.

[0072] Means 44 are also provided for arranging the packages 11 at the grouping area, said means being embodied by means for rotating the packages about the line through the centre of the group 13.

[0073] The package arranging means 44 comprise means 46 for engaging a respective package and being in the form of respective vertical blades that engage one side of a respective package 11.

[0074] A plurality of radial blades is provided and, more specifically, there are three radial blades 46, 46, 46 for each arranging element 44, said blades engaging one side of a respective package 11 and being spaced at angular intervals such that they can accommodate between them respective pluralities of packages 11, 11 forming part of the group of packages to be packed. In particular, the blades are spaced at angular intervals such that they can accommodate a first and a second package 11, 11 positioned side by side, that is to say, having their facing side walls 11a, 11b in contact or substantially in contact with each other.

[0075] The arranging blade mounting element 44 is appropriately rotatable, being embodied by a circular plate 44' mounted on a central revolving shaft 48 extending above element 44 itself, and is appropriately power driven at 50.

[0076] As illustrated, outfeed means 30, 30 positioned side by side are provided for respective groups of packages.

[0077] Below is a brief description of how the device according to the invention works. Starting from a condition where the grouping area 14 is empty and the supporting plate 30' is in the raised position or just about to reach the uppermost raised position, the feed means 12 move a pair of packages 11, 11 lengthways, with a component of movement transversal to the line along which the machine extends, starting from a position A where the first and the second package 11, 11 were previously positioned by the aligning means 26, 28 (as illustrated in Figures 2, 3, 4, 5).

[0078] Once the first two packages 11, 11 have been positioned in the element 40, the wheel 44 starts turning in such a way as to move the two packages away from the inlet opening 42.

[0079] As the two packages are advanced, as illustrated in Figure 1, the aligning means 26, 28 position another two packages 11, 11 at the area A where they are received by the feed means.

[0080] Once the consecutive pairs of packages have been simultaneously aligned and fed in, the aligning means 26, 28 and the feed means 12 are simultaneously lifted (as shown in Figure 6), moved back lengthways (as shown in Figure 7) and lowered when they reach the positions where the respective engagement means are behind the packages to be aligned and fed forward respectively.

[0081] At this point, the process proceeds as described above starting from the condition shown in Figure 4, so that a second pair of packages can be fed in, and a third

pair and so on.

[0082] Once the group has been completed, while the feed means 12 and the aligning means 26, 28 move back, the plate 30' supporting the group of packages moves down and moves to the belt 31 below it, which carries the groups 13, 13 away.

[0083] The device according to the invention has a much simpler and advantageous structure compared to prior art devices.

[0084] Furthermore, the infeed movement is preferably such as not to interrupt the forward motion of the packages from the picking up area to the inside of the grouping area.

[0085] The invention described above is susceptible of industrial application and may be modified and adapted in several ways without thereby departing from the scope of the inventive concept. Moreover, all the details of the invention may be substituted by technically equivalent elements.

Claims

1. A device (10) for grouping together packages (11) of a product to be packed in a suitable container, the product being a pasty food product such as processed cheese, stock cubes, butter, margarine and the like; the device comprising means for positioning the packages (11) at a grouping area (14) and being **characterized in that** it comprises means (44) for arranging the packages (11) at the grouping area having means (46) for engaging a respective package; said means (46) for engaging and rotating a respective package, comprising at least a blade that engages one side of the respective package (11) and extends from a mounting block above it.

2. The device according to claim 1, **characterized in that** the means (44) for arranging the packages (11) at the grouping area are means that rotate the packages.

3. The device according to any of the foregoing claims, **characterized in that** the means (44) for arranging the packages (11) at the grouping area comprise means (46) for engaging a respective package, said means being a blade that engages one side of the respective package (11).

4. The device according to any of the foregoing claims, **characterized in that** the means (44) for arranging the packages (11) at the grouping area comprise a plurality of radial blades (46, 46, 46), said blades engaging one side of a respective package and being spaced at angular intervals such that they can accommodate between them respective pluralities of packages (11, 11) forming part of the group (13) of packages to be packed.

5. The device according to any of the foregoing claims, **characterized in that** the means (44) for arranging the packages (11) at the grouping area comprise a plurality of radial blades (46, 46, 46), said blades engaging one side of the respective package (11) and being spaced at angular intervals such that they can accommodate between them respective pluralities of packages (11, 11), where the packages of the plurality of packages are positioned side by side with facing side walls (11a, 11b) in contact or substantially in contact with each other.

6. The device according to any of the foregoing claims, **characterized in that** the means (44) for arranging the packages (11) at the grouping area comprise a plurality of radial blades (46, 46, 46), said blades engaging one side of the respective package and being spaced at angular intervals such that they can accommodate between them respective pluralities of packages (11, 11), each composed of a first and a second package (11, 11).

7. The device according to any of the foregoing claims, **characterised in that** the arranging blade mounting element (44) is rotatable.

8. The device according to any of the foregoing claims, **characterized in that** the arranging blade mounting element is a circular plate (44) mounted on a respective revolving shaft (48).

9. The device according to any of the foregoing claims, **characterized in that** it comprises means (30) for feeding the group out of the grouping area (14) and designed to lower the group relative to the grouping area (14).

10. The device according to claim 9, **characterized in that** the means for feeding the group out of the grouping area comprise a circular plate (30') for supporting the group.

11. The device according to claim 10, **characterized in that** the group supporting plate (30') can move vertically between a raised, grouping position and a lowered position designed to enable the group to be moved away.

12. The device according to any of the foregoing claims from 9 to 11, **characterized in that** it comprises a plate (30') for supporting the group and constituting the bottom of the grouping area.

13. The device according to any of the foregoing claims from 9 to 12, **characterized in that** the supporting means (30') comprise a smooth supporting surface.

14. The device according to any of the foregoing claims,

characterized in that it comprises means (40) for laterally containing the packages within the grouping area (14).

15. The device according to claim 14, **characterized in that** the means for laterally containing the packages are in the form of an element (40) having an opening (42) wide enough to allow infeed of a plurality of packages (11, 11) forming part of the group (13).

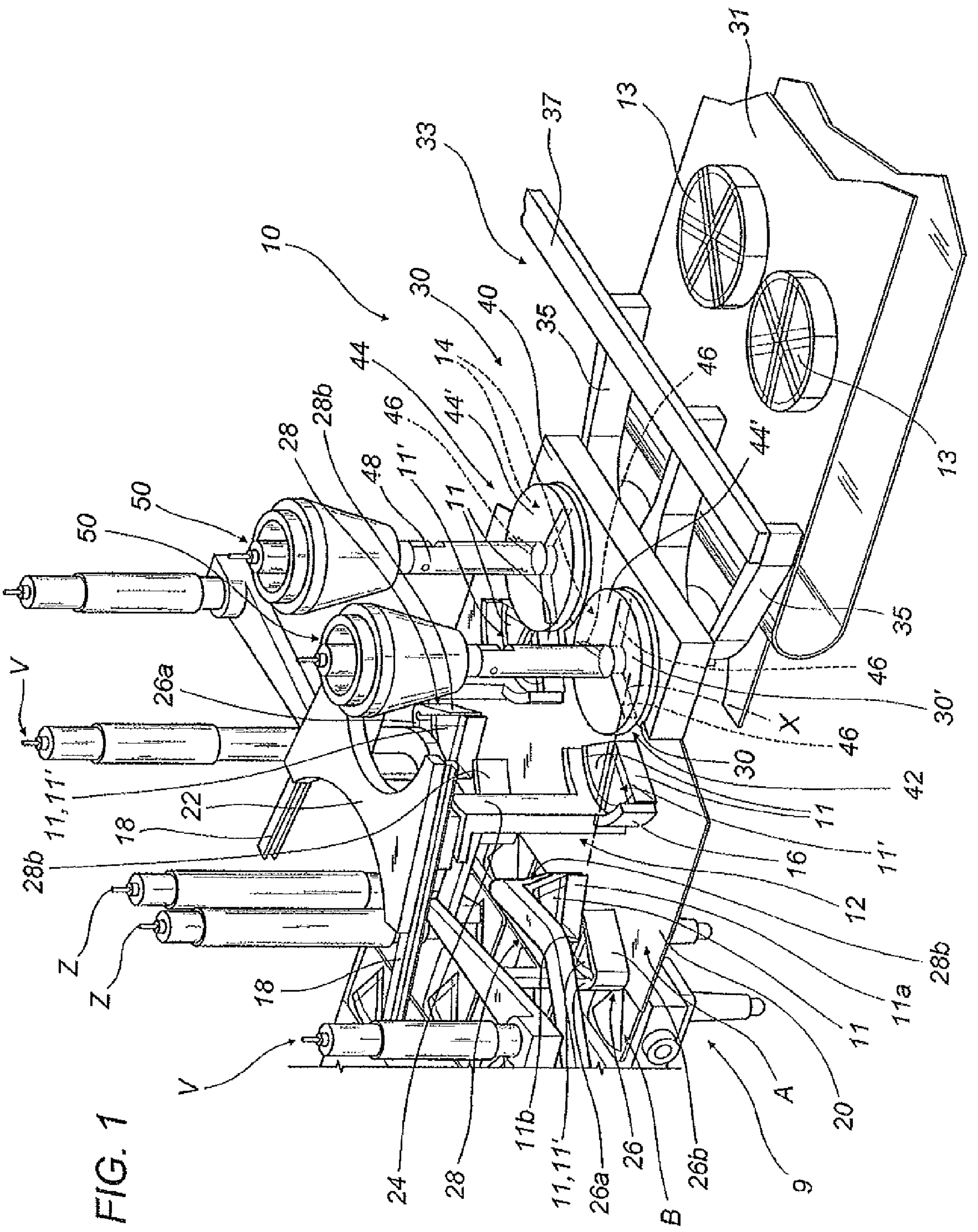

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FIG. 1

FIG. 2

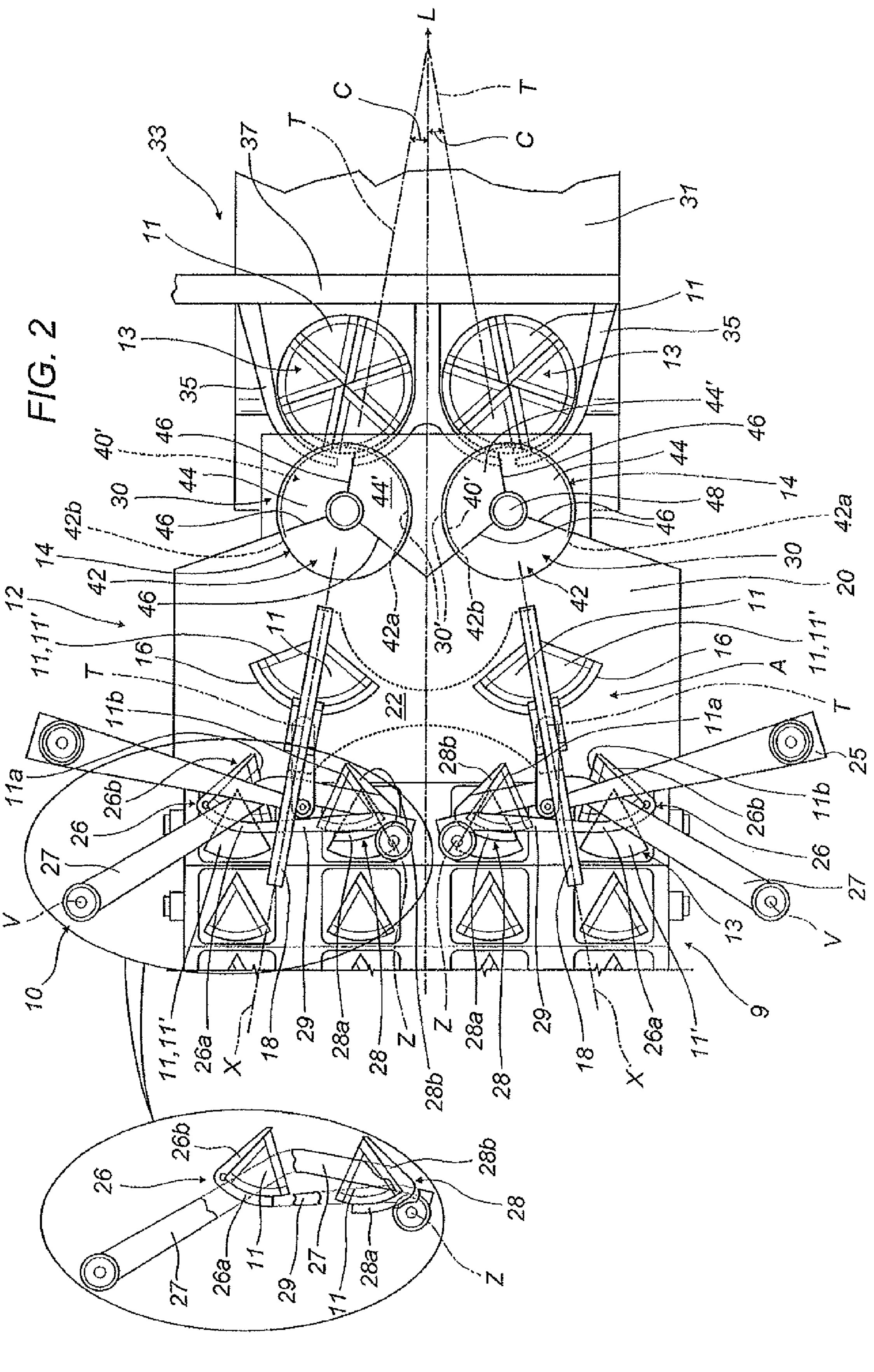

FIG. 3

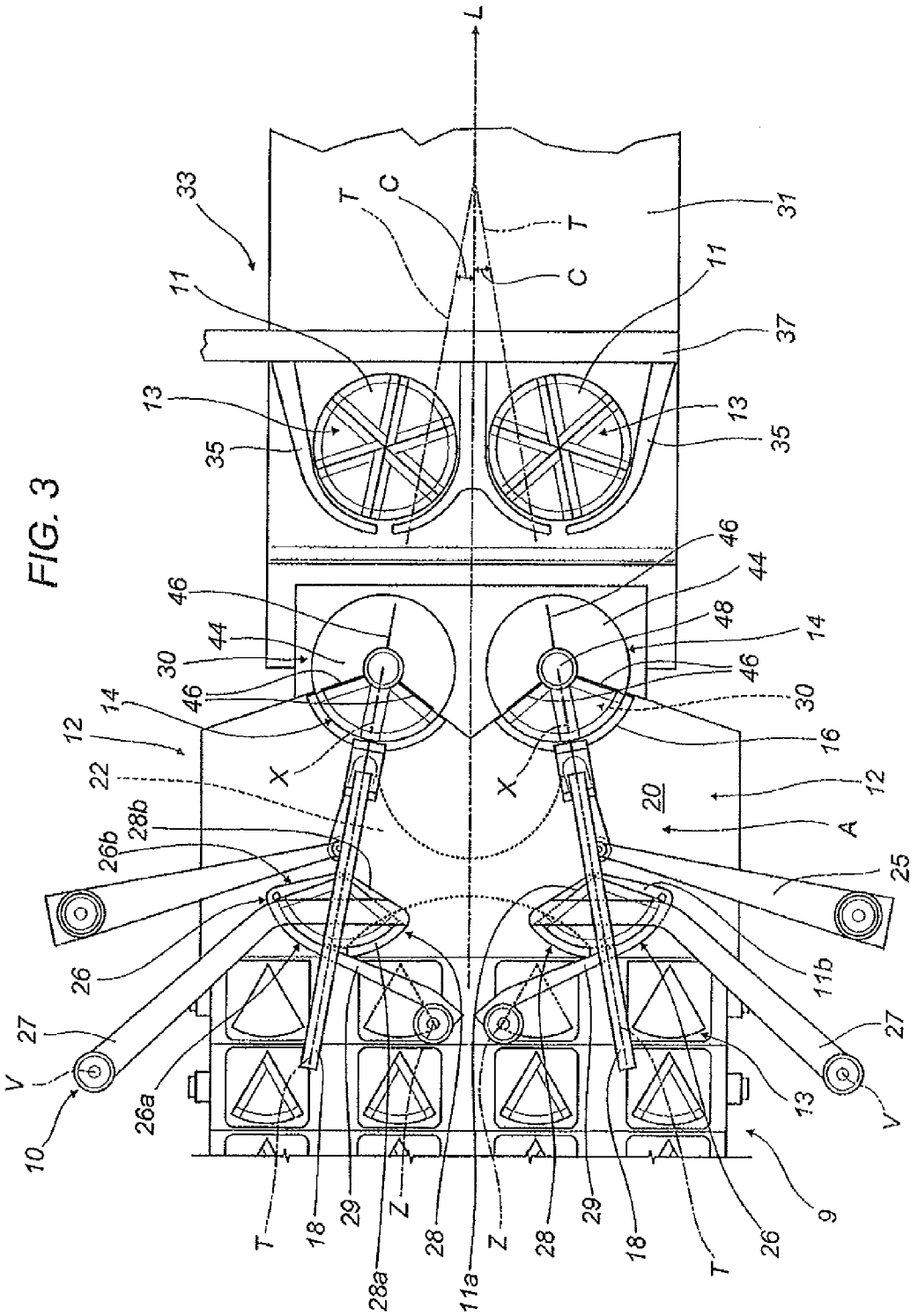
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FIG. 4

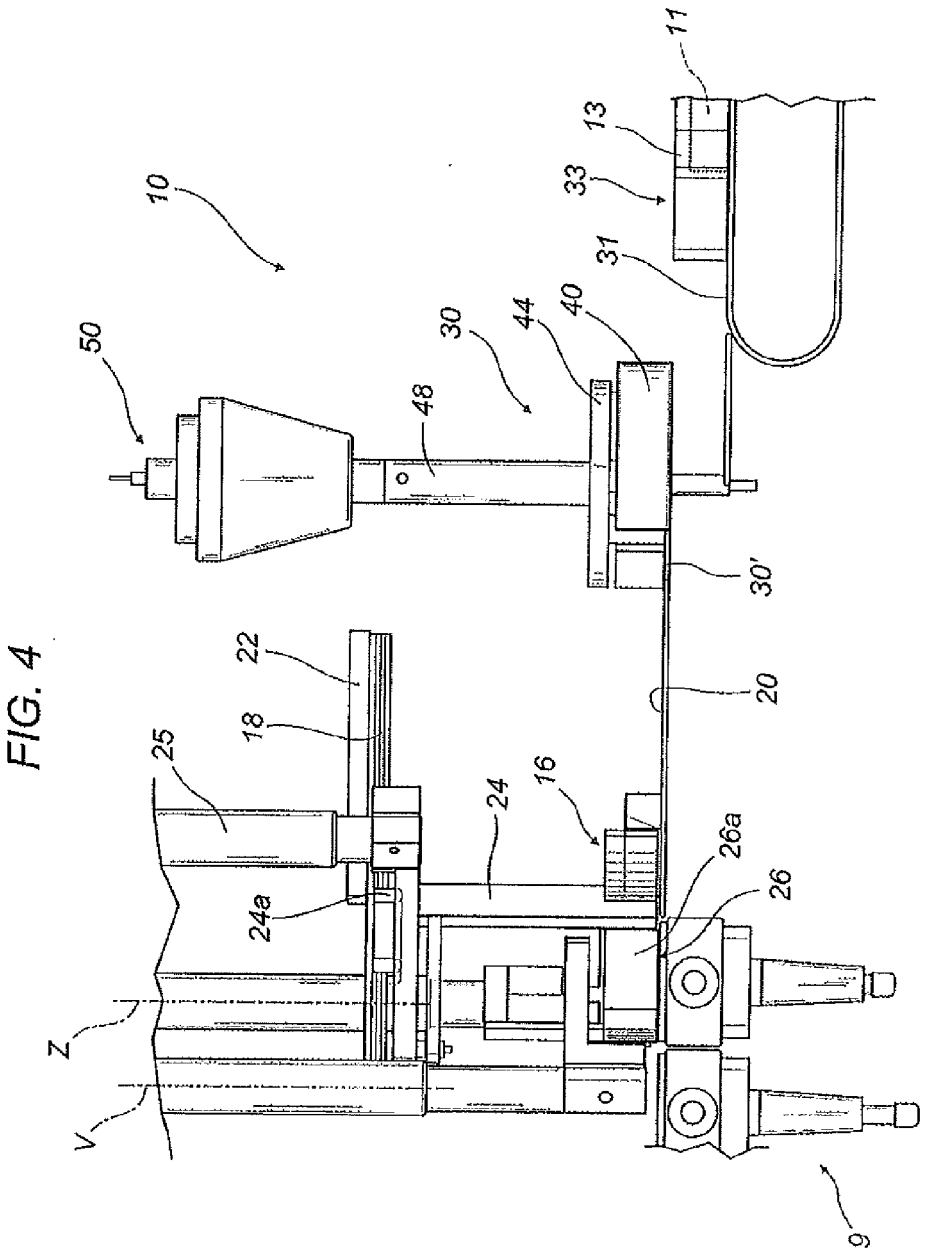

FIG. 5

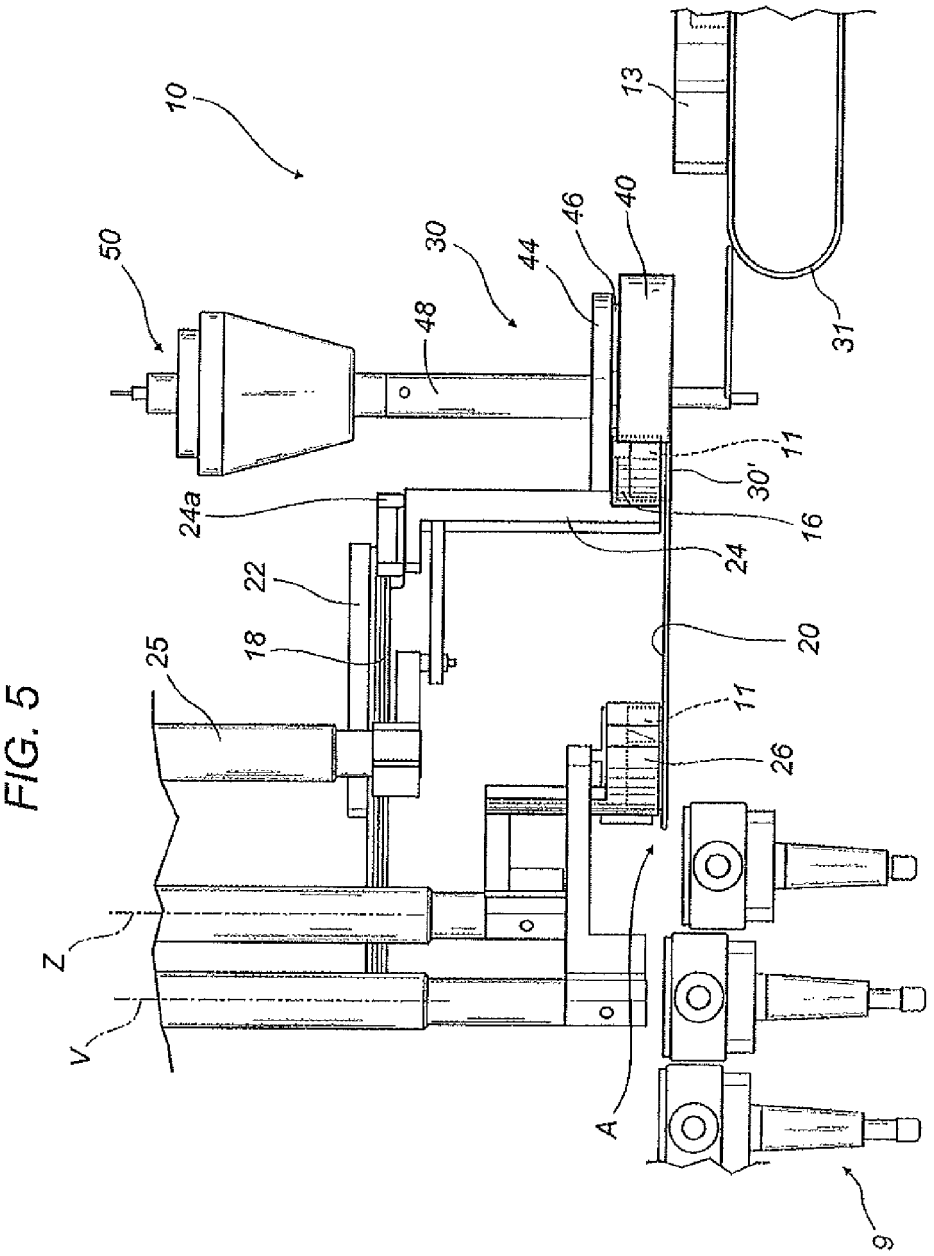

FIG. 6

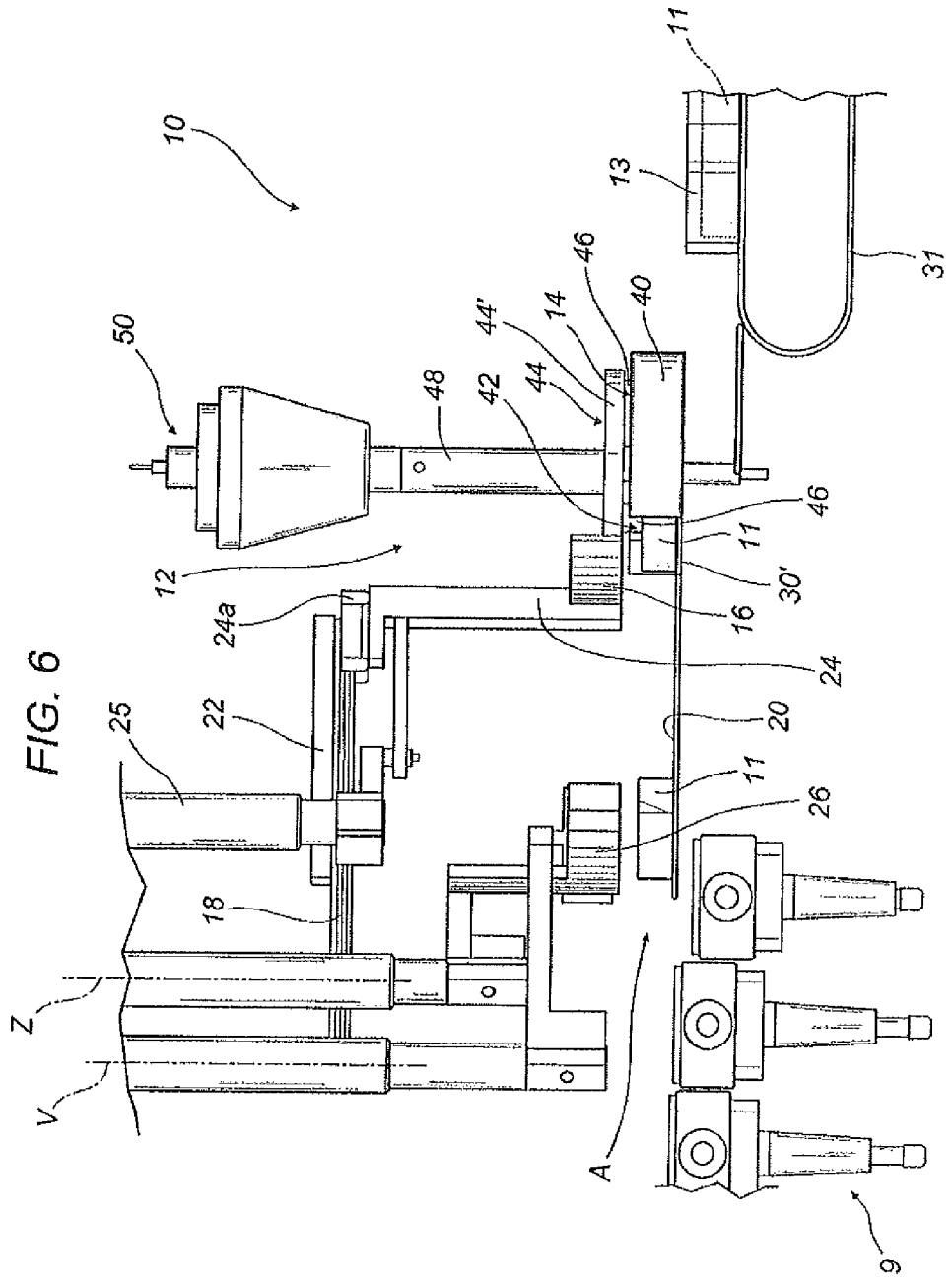
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FIG. 7