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(54) **Assembly and method for processing bead-apexes**

(57) The invention relates to an assembly and method for processing bead-apexes, wherein the assembly comprises a weighing device for measuring the weight of one of the bead-apexes and at least one station for supplying or receiving the bead-apexes to or from the weighing device in a supply direction or a discharge direction, respectively,

wherein. the assembly further comprises a frame for supporting the at least one station,

wherein the weighing device comprises a weighing member for receiving and supporting one of the bead-apexes and a base member connected to and forming a base for the weighing member, wherein the weighing device is arranged for measuring the weight of the one bead-apex on the weighing member,

wherein the weighing member is arranged for keeping the one bead-apex stationary during the weighing, and wherein the frame of the assembly and the base member of the weighing device are supported independently.

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Assembly and method for processing bead-apexes

BACKGROUND

The invention relates to an assembly and method for processing bead-apexes.

JP 06-155627 A discloses a device, wherein a weight of a tire composing member is converted into a wave form and kind and actual weight of the tire composing member are obtained by using the wave form, so that it is not necessary to lay a measuring conveyor and the tire composing member on a weight measuring sensor in a static state. Accordingly, even when the tire composing member is passing on the measuring conveyor, weight measuring work and pass deciding work can be carried out, thereby improving work efficiency.

Although the known device improves work efficiency, the movement of the conveyor during the weighing influences the weight measurement of the bead apex, which may cause deviations in the actual measured weight.

It is an object of the present invention to provide an alternative assembly and method for processing bead-apexes.

SUMMARY OF THE INVENTION

According to a first aspect, the invention provides an assembly for processing bead-apexes, wherein

the assembly comprises a weighing device for measuring the weight of one of the bead-apexes and at least one station for supplying or receiving the bead-apexes to or from the weighing device in a supply direction or a discharge direction, respectively, wherein the assembly further comprises a frame for supporting the at least one station, wherein the weighing device comprises a weighing member for receiving and supporting one of the bead-apexes and a base member connected to and forming a base for the weighing member, wherein the weighing device is arranged for measuring the weight of the one bead-apex in a weighing position on the weighing member, wherein the weighing member is arranged for keeping the one bead-apex stationary during the weighing, and wherein the frame of the assembly and the base member of the weighing device are supported independently.

Because the one bead-apex is kept stationary during the weighing the weighing can be more accurate. Furthermore, because the weighing device is supported independently, negative influences of the rest of the assembly on the weighing accuracy, e.g. vibrations, can be reduced. More in particular, the bead-apex can be stabilized for weighing more quickly.

In a preferred embodiment, the weighing member comprises a weighing surface for supporting the one bead-apex in a horizontal or substantially horizontal weighing plane. A horizontal surface can keep the one bead-apex stationary during the weighing.

In a further embodiment, the at least one station comprises a supply station at a supply position for supplying the bead-apexes to the weighing device in the supply direction. Hence, the weighing device can be supported independently from the supply station.

In a preferred embodiment, the supply station defines a supply plane, wherein the supply plane is parallel or substantially parallel to the weighing plane. Hence, the one bead-apex can be supplied from the supply

plane to the weighing plane in substantially the same orientation.

In a preferred embodiment thereof, the weighing plane is arranged to be in line or substantially in line with the supply plane when supplying the one bead-apex to the weighing device. When the weighing plane and the supply plane are in line, the one bead-apex can be transferred more easily, e.g. by simply moving said one bead-apex in the supply direction from one plane onto the other.

In a further embodiment the assembly further comprises a first transport device for transporting the one bead-apex from the supply station to the weighing device. Thus, the transport may be performed mechanically rather than manually, thereby improving the accuracy of the positioning.

In a preferred embodiment thereof, the first transport device is arranged for picking and placing, dragging, pulling or pushing the one bead-apex from the supply position to the weighing position. These modes of transport allow for the one bead-apex to be transferred onto the weighing plane and to subsequently release said bead-apex from the first transport device to stabilize it in a stationary position on the weighing plane.

In a preferred embodiment, the first transport device is arranged for releasing the one bead-apex in the weighing position. By releasing the one bead-apex, the one bead-apex may be stabilized in a stationary position on the weighing plane prior to the weighing. The release can prevent that the first transport device influences the weighing.

In a further embodiment the at least one station further comprises one or more follow-up stations at one or more follow-up positions for receiving the one bead-apex from the weighing device. The follow-up stations can receive the one-bead apex from the weighing device for follow-up operations, depending on the measured weight, e.g. storage, waste, lab analysis or transport to a

downstream tire-building station. In accordance with the first aspect of the invention, the weighing device can be supported independently from the supply station and/or said one or more follow-up stations.

In a further embodiment, the one or more follow-up positions comprise a first follow-up position and wherein the one or more follow-up stations comprise a pile-up station at said first follow-up position, wherein the pile-up station comprises a pile-up member for receiving and stacking a plurality of the bead-apexes in a pile-up direction. By piling-up the bead-apexes, they can be stacked effectively and/or efficiently. In accordance with the first aspect of the invention, the weighing device can be supported independently from the pile-up station.

In a preferred embodiment thereof, the pile-up station is arranged for receiving the one bead-apex from the weighing device in a pile-up plane, wherein the pile-up plane is parallel or substantially parallel to the weighing plane. Hence, the one bead-apex can be supplied from the weighing plane to the pile-up plane in substantially the same orientation.

In a preferred embodiment, the pile-up plane is arranged to be in line or substantially in line with the weighing plane when receiving the one bead-apex from the weighing device. When the weighing plane and the pile-up plane are in line, the one bead-apex can be transferred more easily, e.g. by simply moving said one bead-apex in the supply direction from one plane onto the other.

In a further embodiment, the one or more follow-up positions comprise a second follow-up position and wherein the one or more follow-up stations comprise a conveyance station at said second follow-up position, wherein the conveyance station comprises a transport conveyor for conveying the bead-apex in a conveyance direction. The transport conveyor can be used to transport the bead-apex directly to a downstream station, e.g. a tire building station. In accordance with the first aspect of

the invention, the weighing device can be supported independently from the conveyance station.

In a preferred embodiment thereof, the conveyance station is arranged for receiving the one bead-apex from the weighing device in a conveyance plane, wherein the weighing plane is parallel or substantially parallel to the conveyance plane. Hence, the one bead-apex can be supplied from the weighing plane to the conveyance plane in substantially the same orientation.

In a preferred embodiment, the weighing plane is arranged to be in line or substantially in line with the conveyance plane when receiving the one bead-apex from the weighing device. When the weighing plane and the conveyance plane are in line, the one bead-apex can be transferred more easily, e.g. by simply moving said one bead-apex in the supply direction from one plane onto the other.

In a further embodiment, each bead-apex comprises a circular or substantially circular bead and a filler apex extending radially outward from said bead, wherein the bead has an inner rim extending in a bead-apex plane and forming a circular opening, wherein the one or more follow-up positions comprise a third follow-up position and wherein the one or more follow-up stations comprise a storage station at said third follow-up position, wherein the storage station comprises one or more storage members for storing one or more of the bead-apexes in a vertical orientation in which the one or more bead-apexes are supported with their respective rims on the one or more storage members and the bead-apex planes are vertical or substantially vertical.

In a preferred embodiment thereof, the storage station is arranged for receiving the one bead-apex from the weighing device in a storage plane, wherein the weighing plane is parallel or substantially parallel to the storage plane. Hence, the one bead-apex can be supplied from the weighing plane to the storage plane in substantially the same orientation.

In a preferred embodiment, the weighing plane is arranged to be in line or substantially in line with the storage plane when receiving the one bead-apex from the weighing device. When the weighing plane and the storage plane are in line, the one bead-apex can be transferred more easily, e.g. by simply moving said one bead-apex in the supply direction from one plane onto the other.

The storage station can also be used for inspecting a bead apex.

In a further embodiment, the storage station is a storage carousel comprising a central member which is rotatable about a central axis, wherein the one or more storage members comprise two or more storage arms extending radially from said central axis for storing the one or more of the bead-apexes in the vertical orientation. The one or more storage arms of the storage carrousel can effective store a large amount of bead-apexes on a relatively small footprint. The storage carousel can be rotated around its central axis to line up its arms with the weighing device or a further processing device for further processing the bead-apexes.

In a preferred embodiment thereof, each storage arm comprises a storage conveyor for conveying the bead-apexes stored thereon radially inward and radially outward along the respective storage member with respect to the central axis. Hence, the bead-apexes can temporarily be stored on a first one of the arms of the carousel being lined up with the weighing device.

In a preferred embodiment thereof, the weighing member and the one or more follow-up stations are movable relative to each other. The movability can facilitate interaction between the weighing member, the supply station and the one or more of the follow-up stations.

In a preferred embodiment thereof, the weighing member is movable relative to the base member in an alignment direction from a first transfer position in alignment with the supply position into a second and/or

further transfer positions in alignment with any one of the one or more follow-up positions. The relative movement between the weighing member and the follow-up stations can facilitate receiving the one bead-apex from the supply position in one transfer position while transporting the one bead-apex from the weighing member to said one follow-up station in another transfer position.

In a preferred embodiment, the weighing device comprises a weighing drive for driving the movement of the weighing member in the alignment direction. Hence, the weighing member can be moved mechanically rather than manually.

In a preferred embodiment, the alignment direction is transverse, perpendicular or substantially perpendicular to the weighing plane. When the weighing plane is horizontal or substantially horizontally, the weighing member can effectively be raised or lowered in the alignment direction while keeping the one bead-apex stationary on the weighing surface.

In a further embodiment thereof, the one bead-apex comprises a circular or substantially circular bead and a filler apex extending radially outward from said bead, wherein the bead has an inner rim extending in a bead-apex plane and forming a circular opening, wherein the weighing member has a circumferential edge facing one of the two or more follow-up stations, wherein the weighing surface is arranged for receiving and supporting the one bead-apex in the weighing position such that a part of the one bead-apex protrudes from the weighing surface towards the one follow-up station and a part of the circular opening of the bead-apex is extending beyond the edge of the weighing member, wherein the rim at the part of the circular opening that extends beyond the edge of the bead and the edge of the weighing member are facing each other at a gap distance, wherein the one follow-up station is arranged for engaging the protruding part of the one bead-apex from its respective position, and wherein the weighing

member and the one follow-up station are arranged for causing the one bead-apex to pivot around the rim of the bead when the weighing member and the one follow-up station are moved relative to each other in the alignment direction and the rim of the bead is supported on the one follow-up station. By placing the one bead-apex in the weighing position such that a part of the one bead-apex protrudes from the weighing surface, transferring of the one bead-apex from the weighing member to the one follow-up station can be achieved by a relative movement between the weighing member and the one follow-up station. No additional transport devices are required for said transfer. Although the protruding part of the one bead-apex protrudes from the weighing surface, the one bead-apex is solely supported by the weighing surface during the weighing and an accurate weight measurement can be performed.

In a preferred embodiment, the weighing member is arranged for dropping away from the one bead-apex, thereby allowing the one bead-apex to pivot about its support on the one follow-up station into a vertical orientation in which the one bead-apex is supported with its respective rim on the one follow-up station and the bead-apex plane is vertical or substantially vertical. Because the weighing member is arranged for dropping away from the one bead-apex, no additional transport devices are required for transferring the one bead-apex from the weighing member to the one follow-up station.

In a preferred embodiment, the assembly further comprises a first transport device and a control unit, wherein the control unit is arranged for controlling the first transport device to place the one bead-apex in the weighing position such that the part of the one bead-apex protrudes from the weighing surface towards the one follow-up station. The control unit can automate the transfer of the one bead-apex from the weighing member to the one follow-up station. By controlling the first transport device, the control unit can ensure accurate placement of

the one bead-apex in the weighing position.

In a further embodiment, the one or more follow-up stations comprise two or more follow-up stations at two or more follow-up positions for receiving the one of the bead-apexes from the weighing device. Based on the weight of the bead-apex, one of two or more follow-up stations can be selected for receiving the one bead-apex, wherein the weighing member is movable relative to the base member in the alignment direction from the first transfer position in alignment with the supply position into a second transfer position and a third transfer position in alignment with a first one of the two or more follow-up station and a second one of the two or more follow-up stations, respectively.

In an alternative embodiment, the assembly further comprises one or more further transport devices for transporting the one bead-apex from the weighing position to one of the one or more follow-up positions. The one or more further transport devices can be used to facilitate and/or aid the transfer of the one bead-apex to the follow-up stations in the one or more follow-up positions.

In a preferred embodiment thereof, the one or more further transport devices are arranged for picking and placing, dragging, pulling or pushing the one of the bead-apexes from the weighing position to the one of the one or more follow-up positions. These modes of transport can be effectively used for picking up the one bead-apex that has previously been release by the first transport device on the weighing surface.

In a further embodiment, the assembly further comprises a control unit which is operationally connected to the weighing member for receiving a signal indicative of the measured weight of the one bead-apex, wherein the control unit is arranged for controlling the movement of the one bead-apex to one of the one or more follow-up stations based on the weight of the one bead-apex. The control unit can select a follow-up station based on the weight of the bead apex. Preferably, the control unit can

control the weighing drive and/or the transport devices, for transferring the one bead-apex from the weighing device to a desired follow-up station.

According to a second aspect, the invention provides a method for processing a bead-apex, wherein the method comprises the steps of providing an assembly for processing bead-apexes, wherein the assembly comprises a weighing device for measuring the weight of one of the bead-apexes and a supply station at a supply position for supplying the bead-apexes to the weighing device in a supply direction, wherein the assembly further comprises a frame for supporting the supply station, wherein the weighing device comprises a weighing member for receiving and supporting the one bead-apex and a base member connected to and forming a base for the weighing member, wherein the weighing device is arranged for measuring the weight of the one bead-apex in a weighing position on the weighing member, wherein the weighing member is arranged for keeping the one bead-apex stationary during the weighing, and wherein the frame of the assembly and the base member of the weighing device are supported independently, wherein the method further comprises the steps of:

a) transporting the one bead-apex from the supply position to the weighing position;

b) measuring the weight of the one bead-apex while stationary.

Because the one bead-apex is kept stationary during the weighing the weighing can be more accurate. Furthermore, because the weighing device is supported independently, negative influences of the rest of the assembly on the weighing accuracy, e.g. vibrations, can be reduced.

In a preferred embodiment thereof, the method further comprises the step of stabilizing the weighing member prior to step b). Stabilizing the weighing member can eliminate vibrations caused by transferring the one

bead-apex to the weighing member and can thereby improve the accuracy of the weighing.

In a preferred embodiment, the assembly further comprises one or more follow-up stations at one or more follow-up positions for receiving the one bead-apex from the weighing device, wherein the method further comprises the steps of:

c) determining the follow-up station based on the weight of the one bead-apex;

d) transporting the one bead-apex from the weighing position to one of the one or more follow-up positions. The follow-up stations can receive the one-bead apex from the weighing device for storage or further processing.

In a preferred embodiment, the weighing member and the one or more follow-up stations are movable relative to each other, wherein the method comprises the step of moving the weighing member and one of the one or more follow-up stations into alignment with each other prior to step d). Based on the weight of the bead-apex, one of the two or more follow-up stations can be selected for receiving the one bead-apex. The relative movement between the weighing member and the follow-up stations can facilitate transporting the one bead-apex from the weighing member to a selected follow-up station.

In a further embodiment, the weighing member is arranged for supporting the one bead-apex in a horizontal or substantially horizontal weighing plane, wherein the weighing member is movable relative to the base member in an alignment direction transverse, perpendicular or substantially perpendicular to the weighing plane from a first transfer position in alignment with the supply position into a second and/or further transfer positions in alignment with any one of the one or more follow-up positions. The weighing member can thus effectively be raised or lowered in the alignment direction while keeping the one bead-apex stationary on the weighing surface.

In a preferred embodiment, the one bead-apex comprises a circular or substantially circular bead and a filler apex extending radially outward from said bead, wherein the bead has an inner rim extending in a bead-apex plane and forming a circular opening, wherein the weighing member has a circumferential edge facing one of the one or more follow-up stations, wherein, in step a), the one bead-apex is transported to the weighing plane such that a part of the one bead-apex protrudes from the weighing surface towards the one follow-up station and a part of the circular opening of the bead-apex is extending beyond the edge of the weighing member, wherein the rim of the bead at the part of the circular opening that extends beyond the edge and the edge of the weighing member are facing each other at a gap distance, and wherein step d) comprises the steps of:

- moving the weighing member and the one follow-up station into alignment with each other, wherein the rim of the one bead-apex is supported on the follow-up station;
- moving the weighing member relative to the one follow-up station in the alignment direction, causing the one bead-apex to pivot around the support of its rim on the one follow-up station;
- moving the weighing member further in the alignment direction relative to the one follow-up station, causing the one bead-apex to be solely supported by the one follow-up station.

By placing the one bead-apex in the weighing position such that a part of the one bead-apex protrudes from the weighing surface, transferring of the one bead-apex from the weighing member to the one follow-up station can be achieved by a relative movement between the weighing member and the one follow-up station. No additional transport devices are required for said transfer. Although the protruding part of the one bead-apex protrudes from the weighing surface, the one bead-apex is solely supported by

the weighing surface during the weighing and an accurate weight measurement can be performed.

The various aspects and features described and shown in the specification can be applied, individually, wherever possible. These individual aspects, in particular the aspects and features described in the attached dependent claims, can be made subject of divisional patent applications.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention will be elucidated on the basis of an exemplary embodiment shown in the attached schematic drawings, in which:

figures 1-4 show front views of an assembly for processing bead-apexes during exemplary steps of a method for processing bead-apexes according to an exemplary embodiment of the invention;

figures 5 and 6 show top views at the level of the line V-V in figure 1 during exemplary steps of a method for processing bead-apexes;

figures 7 and 8 show top views at the level of the line VII-VII in figure 2 during exemplary steps of a method for processing bead-apexes;

figures 9 and 10 show top views at the level of the line IX-IX in figure 3 during exemplary steps of a method for processing bead-apexes;

figures 11 and 12 show top views at the level of the line XI-XI in figure 4 during exemplary steps of a method for processing bead-apexes;

figure 13 shows the section view of figures 11 and 12 according to a preferred embodiment of the of the invention; and

figures 14A-D show a section view of the line XIV-XIV in figure 13 during exemplary steps of the method for processing bead-apex.

DETAILED DESCRIPTION OF THE INVENTION

Figures 1-4 show an assembly 1 for processing bead-apexes 9 according to an exemplary embodiment of the invention. The bead-apexes 9 comprise a circular or substantially circular bead or bead core 91 and a filler, apex, apex filler or filler apex 92 extending radially outward from said bead 91. The bead 91 has an inner rim 93 extending in a bead-apex plane P9 and forming a circular opening 94.

The assembly 1 comprises a weighing device 2 for measuring the weight of one of the bead-apexes 9 and at least one station 3, 4, 5, 6, 7 for supplying or receiving the bead-apexes 9 one by one to or from the weighing device 2 in a supply direction S or a discharge direction, respectively. The assembly 1 further comprises a frame 10 for supporting the at least one station 3, 4, 5, 6, 7. Preferably, the assembly 1 comprises a supply station 3 at a supply position for supplying the bead-apexes 9 to the weighing device 2 in the supply direction S. More preferably, the assembly 1 further comprises one or more follow-up stations 4, 5, 6, 7 at one or more follow-up positions for receiving the one bead-apex 9 from the weighing device 2.

As can best be seen in figures 1-4, in this exemplary embodiment, the assembly 1 comprises one supply station 3 at the supply position and four follow-up stations 4, 5, 6, 7 at four follow-up positions. The frame 10 is arranged for supporting both the supply station 3 and the follow-up stations 4, 5, 6, 7 and is placed on a horizontal or substantially horizontal ground plane P1.

The weighing device 2 comprises a weighing member 21 for receiving and supporting the one bead-apex 9 and a base member 20 connected to and forming a base for the weighing member 21. The weighing device 2 is arranged for measuring the weight of the one bead apex 9 in a weighing position on the weighing member 21. Preferably, the

weighing member 21 comprises a weighing surface 22 for supporting the one bead-apex 9 in a horizontal or substantially horizontal weighing plane P2. The weighing member further comprises a circumferential edge 24. Preferably, the weighing plane P2 is parallel or substantially parallel to the ground plane P1. The weighing member 21 is arranged for keeping the one bead-apex 9 stationary during the weighing. Preferably, the weighing member 21 is arranged for keeping the one bead-apex 9 stationary in at least the supply direction S. More preferably, the weighing member 21 is arranged for keeping the one bead-apex stationary in at least the weighing plane P2. Most preferably, the weighing device 2 is arranged for stabilizing the weighing member 21 prior to weighing the one bead apex 9.

The frame 10 of the assembly 1 and the base member 20 of the weighing device 2 are supported independently i.e. the frame 10 and the base member 20 are placed separately on the ground plane P1.

In this exemplary embodiment, the weighing member 21 and the stations 3, 4, 5, 6, 7 are movable relative to each other. In particular, the weighing member 21 is movable relative to the base member 20 in an alignment direction A from a first transfer position X3 in alignment with the supply position into a second and/or further transfer positions X4, X5, X6, X7 in alignment with any of the two or more follow-up positions. Preferably, the alignment direction A is transverse to the weighing plane P2. More preferably, the alignment direction A is perpendicular or substantially perpendicular to the weighing plane P2. Preferably, the weighing member is only moved in the alignment direction A when not weighing. The weighing device 2 comprises a weighing drive 23 for driving the movement of the weighing member 21 in the alignment direction A. The weighing drive 23 could for example be a spindle drive or a pneumatic cylinder.

As can best be seen in figure 1, the weighing

member 21 is movable into the first transfer position X3 for transferring the one bead-apex 9 from the supply position to the weighing position. The supply station 3 defines a supply plane P3. The supply plane P3 is parallel or substantially parallel to the weighing plane P2. In the first transfer position X3, the supply plane P3 is in line or substantially in line with the weighing plane P2. The supply station 3 could for example be an assembling device for assembling bead-apexes 9 or a repository or storage for temporarily storing the bead-apexes 9.

The assembly 1 further comprises a first transport device 11 for transporting the one bead-apex 9 from the supply position to the weighing position. Preferably, the first transport device 11 is arranged for picking and placing, dragging, pulling or pushing the one bead-apex 9 from the supply position onto the stationary weighing surface 22 at the weighing position. The first transport device 11 is further arranged for releasing the one bead-apex 9 in the weighing position, after which the bead-apex 9 is left stationary. In this exemplary embodiment, the first transport device 11 is a hook. Preferably, the first transport device 11 is a linearly movable hook. Alternatively, the first transport device 11 could for example be a pick-and-place unit such as a robotic arm or any other suitable transport means.

In this exemplary embodiment, the assembly 1 further comprises further transport devices 14, 15, 16, 17 for transporting the one bead-apex 9 from the weighing position to one of the one or more follow-up positions. The one or more further transport devices 14, 15, 16, 17 are arranged for picking and placing, dragging, pulling or pushing the one of the bead-apexes from the weighing position to a respective one of the one or more follow-up positions. The further transport devices 14, 15, 16, 17 are further arranged for releasing the one bead-apex 9 in the respective one of the one or more follow-up positions.

The one or more follow-up positions comprise a

first follow-up position and the one or more follow-up stations 4, 5, 6, 7 comprise a pile-up station 4 at said first follow-up position. The pile-up station 4 comprises a pile-up member 40 for receiving a plurality of the bead-apexes 9 thereon and for stacking said plurality of bead-apexes 9 one onto the other in a pile-up direction Y. As can best be seen in figure 2, the weighing member 21 is movable into the second transfer position X4 in alignment with the first follow-up position for transferring the one bead-apex 9 from the weighing position to the pile-up station 4 at the first follow-up position. The pile-up station 4 is arranged for receiving the one bead-apex 9 from the weighing device 2 in a pile-up plane P4. The pile-up plane is located above the bead-apexes 9 stacked on the pile-up member 40. The pile-up plane P4 is parallel or substantially parallel to the weighing plane P2. In the second transfer position X4, the weighing plane P2 is in line or substantially in line with the pile-up plane P4.

As can further be seen in figures 2, 7 and 8, the assembly 1 comprises a second transport device 14 for transporting the one bead-apex 9 from the weighing position to the first follow-up position. In this exemplary embodiment, the second transport device 14 is a hook, preferably a linearly movable hook, for dragging or pulling the one bead-apex from the weighing position to the first follow-up position in the pile-up plane P4. The second transport device 14 is arranged for releasing the one bead-apex 9 above the pile-up member 40 and/or the bead-apexes 9 stacked on the pile-up member 40 to drop the one bead-apex 9 onto the pile-up member 40 or said stacked bead-apexes 9 for stacking a plurality of bead-apexes 9 in the pile-up direction Y.

The one or more follow-up positions comprise a second follow-up position and the one or more follow-up stations 4, 5, 6, 7 comprise a conveyance station 5 at said second follow-up position. The conveyance station 5 comprises a transport conveyor 50 for conveying the one

bead-apex 9 in a conveyance direction C. As can best be seen in figure 1, the weighing member 21 is movable into a third transfer position X5 in alignment with the second follow-up position for transferring the one bead-apex 9 from the weighing position to the conveyance station 5 at the second follow-up position. The conveyance station 5 is arranged for receiving the one bead apex 9 from the weighing device 2 in a conveyance plane P5. The conveyance plane P5 is parallel or substantially parallel to the weighing plane P2. In the third transfer position X5, the weighing plane P2 is in line or substantially in line with the conveyance plane P5.

As can further be seen in figures 1, 5 and 6, in this exemplary embodiment, the third transfer position X5 is equal to the first transfer position X3. The assembly comprises a third transport device 15 for transporting the one bead-apex 9 from the weighing position to the second follow-up position. In this exemplary embodiment, the third transport device 15 is a hook, preferably a linearly movable hook, for dragging or pulling the one bead-apex from the weighing position to the second follow-up position in the conveyance plane P5. The third transport device 15 is arranged for releasing the one bead-apex 9 on the transport conveyor 50. Alternatively, the functions of the first transport device 11 and the third transport device 15 can be combined in the first transport device 11 which is then arranged for transporting the one bead-apex 9 from the weighing position up to the second follow-up position. The first transport device 11 is arranged for dragging or pulling the one bead-apex from the weighing position to the second follow-up position in the conveyance plane P5.

The one or more follow-up positions comprise a third follow-up position and the one or more follow-up stations 4, 5, 6, 7 comprise a first storage station 6 at said third follow-up position. The first storage station 6 comprises one or more first storage members 61 for storing one or more of the bead-apexes 9 in a vertical orientation.

As can best be seen in figure 4, in said vertical orientation, the one or more bead-apexes 9 are supported with their respective rims 93 on the one or more first storage members 61 and the bead-apex planes P9 are vertical or substantially vertical. Preferably, the one or more bead-apexes 9 stored on the one or more first storage members 61 are separated by separator sheets 99. An additional separator sheet 99 supply unit (not shown) may be added to the assembly for supplying said separator sheets 99 to the one or more first storage members 61.

As can further be seen in figure 4, the weighing member 21 is movable into a fourth transfer position X6 in alignment with the third follow-up position for transferring the one bead-apex 9 from the weighing position to the first storage station 6 at the third follow-up position. The first storage station 6 is arranged for receiving the one bead-apex 9 from the weighing device 2 in a first storage plane P6. The weighing plane P2 is parallel or substantially parallel to the first storage plane P6. In the fourth transfer position X6, the first storage plane P6 is in line with, substantially in line with or located below the weighing plane P2.

As can best be seen in figures 11 and 12, in this exemplary embodiment, the first storage station 6 is a storage carousel 6 comprising a central member 60 which is rotatable about a central axis R. Preferably, the central axis R is vertical or substantially vertical. The one or more first storage members 61 comprise two or more storage arms 62 extending radially from said central axis R for storing the one or more of the bead-apexes 9 in the vertical orientation. Preferably, each storage arm 62 comprises a storage conveyor 63 for conveying the bead-apexes 9 stored thereon radially inward and radially outward along the respective storage member 61 with respect to the central axis R. The circumferential edge 24 of the weighing member 21 and the first storage station 6 are spaced apart by a mutual distance D1 to facilitate pivoting

of the one bead-apex 9 into the vertical orientation as soon as the one bead-apex 9 is no longer supported by the weighing member 21.

As can further be seen in figures 4, 11 and 12, one of the further transport devices 16 is arranged for transporting the one bead-apex 9 from the weighing position to the third follow-up position. The second transport device 16 is arranged for dragging or pulling the one bead-apex from the weighing position to the second follow-up position in the storage plane P6.

The one or more follow-up positions comprise a fourth follow-up position and the one or more follow-up stations 4, 5, 6, 7 comprise a second storage station 7 at said fourth follow-up position. The second storage station 7 comprises one or more first storage members 71 for storing one or more of the bead-apexes 9 in the vertical orientation. In this exemplary embodiment, the second storage station 7 comprises a central member 70 and two parallel storage members 71. The bead-apexes 9 stored on the second storage station 7 can be removed from the second storage station 7 manually or automatically for inspection. Preferably, the second storage station 7 is arranged at the front or the back of the assembly 1 to facilitate manual removal of the bead-apexes stored on the second storage station 7.

As can be seen in figure 3, the weighing member 21 is movable into a fifth transfer position X7 in alignment with the fourth follow-up position for transferring the one bead-apex 9 from the weighing position to the second storage station 7 at the fourth follow-up position. The second storage station 7 is arranged for receiving the one bead-apex 9 from the weighing device 2 in a second storage plane P7. The weighing plane P2 is parallel or substantially parallel to the second storage plane P7. In the fifth transfer position X7, the weighing plane P2 is in line or substantially in line with the second storage plane P7.

As can further be seen in figures 3, 9 and 10, the second transport device 17 is arranged for transporting the one bead-apex 9 from the weighing position to the fourth follow-up position. The second transport device 17 is arranged for dragging or pulling the one bead-apex from the weighing position to the second storage member 7 in the fourth follow-up position in the second storage plane P7.

As can best be seen in figure 1, the assembly 1 further comprises a control unit 8 which is operationally connected to the weighing member 21 for receiving a signal indicative of the measured weight of the one bead-apex 9. The control unit 8 is arranged for controlling the movement of the one bead-apex 9 to one of the one or more follow-up stations 4, 5, 6, 7 based on the weight of the one bead-apex 9. Preferably, the control unit 8 is arranged for determining the follow-up station 4, 5, 6, 7 based on the weight of the bead-apex 9.

Figures 13 and 14A-D show a preferred assembly 101 for processing bead-apexes 9 which differs from the previously discussed assembly 1 in that the circumferential edge 24 of the weighing member 21 and the first storage station 6 are spaced apart by a mutual distance D1 smaller than the mutual distance D1 of the previous embodiment.

The weighing surface 22 is arranged for partly or partially supporting the one bead-apex 9 in the weighing position. In particular, the weighing surface 22 is arranged for receiving and supporting the one bead-apex 9 in the weighing position such that a part 95 of the one bead-apex 9 protrudes from edge 24 of the weighing member 21 towards the first storage station 6. Preferably, the control unit 8 is arranged for controlling the first transport device 11 to place the one bead-apex 9 in the weighing position such that the part 95 of the one bead-apex 9 protrudes from the weighing surface 21 towards the first storage station 6.

As is best shown in figures 13 and 14A, the one bead-apex 9 is placed in the weighing position such that a

part of the circular opening 94 of the bead-apex 9 is extending beyond the circumferential edge 24 of the weighing member. Preferably, at least fifty percent of the one bead-apex 9 is supported by the weighing surface 22 in the weighing position. The edge 24 of the weighing member 21 is facing the first storage station 6. The rim 93 of the bead 91 and the edge 24 of the weighing member 21 are facing each other at a gap distance D2. Alternatively, the first storage station 6 is arranged for pulling the protruding part 95 of the one bead-apex 9 towards the first storage station 6 and away from the weighing member 2 until the rim 93 of the bead 91 and the edge 24 of the weighing member 21 are facing each other at the gap distance D2. Preferably the gap distance D2 is larger than the mutual distance D1 between the edge 24 of the weighing member 21 and the first storage station 6, such that the rim 93 of the bead 91 may pivot on the first storage station 6.

As is best shown in figure 14B, the weighing member 21 with the one bead-apex 9 thereon is movable in the alignment direction A into the fourth transfer position X6 in alignment with the third follow-up position. The first storage station 6 is arranged for engaging the protruding part 95 of the one bead-apex 9 from its respective position. Preferably, the first storage station 6 is arranged such that the first storage plane P6 is in line with or below the supply plane P3.

As is best shown in figure 14C, the weighing member 21 and the first storage station 6 are arranged for causing the bead-apex 9 to pivot around the rim 93 of the bead 91 when the weighing member 21 and the first storage station 6 are moved relative to each other in the alignment direction A and the rim 93 of the bead 91 is supported on the first storage station 6.

In this example, as shown in figures 14D, the weighing member 21 drops away from the one bead-apex 9, thereby allowing the one bead-apex 9 to pivot into the vertical orientation.

It is to be understood that the above description is included to illustrate the operation of the preferred embodiments and is not meant to limit the scope of the invention. From the above discussion, many variations will be apparent to one skilled in the art that would yet be encompassed by the scope of the present invention.

C O N C L U S I E S

1. Samenstel (1, 101) voor het verwerken van bead-apexes (9), waarbij het samenstel (1, 101) een weeginrichting (2) omvat voor het meten van het gewicht van een van de bead-apexes (9) en ten minste een station (3, 4, 5, 6, 7) voor het toevoeren of het ontvangen van de bead-apexes (9) aan of respectievelijk van de weeginrichting (2) in een toevoerrichting (S) of een afvoerrichting, waarbij het samenstel (1, 101) verder een frame (10) omvat voor het ondersteunen van het ten minste ene station (3, 4, 5, 6, 7), waarbij de weeginrichting (2) een weegdeel (21) omvat voor het ontvangen en ondersteunen van een van de bead-apexes (9) en een basisdeel (20), verbonden met en een basis vormend voor het weegdeel (21), waarbij de weeginrichting (2) is ingericht voor het meten van het gewicht van de ene bead-apex (9) in een weegpositie op het weegdeel (21), waarbij het weegdeel (21) is ingericht voor het stationair houden van de ene bead-apex (9) gedurende het wegen, en waarbij het frame (10) van het samenstel (1, 101) en het basisdeel (20) van de weeginrichting (2) onafhankelijk zijn ondersteund.

2. Samenstel (1, 101) volgens conclusie 1, waarbij het weegdeel (21) een weegoppervlak (22) omvat voor het ondersteunen van de ene bead-apex (9) in een horizontaal of in hoofdzaak horizontaal weegvlak (P2).

3. Samenstel (1, 101) volgens conclusie 2, waarbij het ten minste ene station (3, 4, 5, 6, 7) een toevoerstation (3) omvat op een toevoerpositie voor het toevoeren van de bead-apexes (9) aan de weeginrichting (2) in de toevoerrichting (S).

4. Samenstel (1, 101) volgens conclusie 3, waarbij het toevoerstation (3) een toevoervlak (P3) definieert, waarbij het toevoervlak (P3) parallel of in hoofdzaak parallel is aan het weegvlak (P2).

5. Samenstel (1, 101) volgens conclusie 4, waarbij het weegvlak (P2) is ingericht teneinde in lijn of in hoofdzaak in lijn te zijn met het toevoervlak (P3) wanneer de ene bead-apex (9) aan de weeginrichting (2) wordt toegevoerd.

6. Samenstel (1, 101) volgens een der conclusies 3-5, waarbij het samenstel (1, 101) verder een eerste transportinrichting (11) omvat voor het transporteren van de ene bead-apex (9) van het toevoerstation (3) naar de weeginrichting (2).

7. Samenstel (1, 101) volgens conclusie 6, waarbij de eerste transportinrichting (11) is ingericht voor het oppakken en plaatsen, het slepen, het trekken of het duwen van de ene bead-apex (9) van de toevoerpositie naar de weegpositie.

8. Samenstel (1, 101) volgens conclusie 6 of 7, waarbij de eerste transportinrichting (11) is ingericht voor het loslaten van de ene bead-apex (9) in de weegpositie.

9. Samenstel (1, 101) volgens een der conclusies 2-8, waarbij het ten minste ene station (3, 4, 5, 6, 7) verder een of meer vervolgstations (4, 5, 6, 7) omvat op een of meer vervolgposities voor het ontvangen van de ene bead-apex (9) vanaf de weeginrichting (2).

10. Samenstel (1, 101) volgens conclusie 9, waarbij de een of meer vervolgposities een eerste vervolgpositie omvatten en waarbij de een of meer vervolgstations (4, 5, 6, 7) een opstapelstation (4) op de eerste vervolgpositie, waarbij het opstapelstation (4) een opstapeldeel (40) omvat voor het ontvangen en stapelen van een meervoud van bead-apexes (9) in een opstapelrichting (Y).

11. Samenstel (1, 101) volgens conclusie 10, waarbij het opstapelstation (4) is ingericht voor het ontvangen van de ene bead-apex (9) vanaf de weeginrichting (2) in een opstapelvlak (P4), waarbij het opstapelvlak (P4) parallel of in hoofdzaak parallel is aan het weegvlak (P2).

12. Samenstel (1, 101) volgens conclusie 11, waarbij het opstapelvlak (P4) is ingericht teneinde in lijn of in hoofdzaak in lijn te zijn met het weegvlak (P2) wanneer de ene bead-apex (9) wordt ontvangen vanaf de weeginrichting (2).

13. Samenstel (1, 101) volgens een der conclusies 9-12, waarbij de een of meer vervolgposities een tweede vervolgpositie omvatten en waarbij de een of meer vervolgstations (4, 5, 6, 7) een transportstation (5) omvatten op de tweede vervolgpositie, waarbij het transportstation (5) een transportband (50) omvat voor het transporteren van de ene bead-apex (9) in een transportrichting (C).

14. Samenstel (1, 101) volgens conclusie 13, waarbij het transportstation (5) is ingericht voor het ontvangen van de ene bead-apex (9) vanaf de weeginrichting (2) in een transportvlak (P5), waarbij het weegvlak (P2) parallel of in hoofdzaak parallel is aan het transportvlak (P5).

15. Samenstel (1, 101) volgens conclusie 14, waarbij het weegvlak (P2) is ingericht teneinde in lijn of in hoofdzaak in lijn te zijn met het transportvlak (P5) wanneer de ene bead-apex (9) wordt ontvangen vanaf de weeginrichting (2).

16. Samenstel (1, 101) volgens een der conclusies 9-15, waarbij elke bead-apex (9) een cirkelvormige of in hoofdzaak cirkelvormige bead (91) omvat en een filler apex (92) die zich radiaal naar buiten uitstrekt vanaf de bead (91), waarbij de bead (91) een binnenrand (93) heeft die zich uitstrekt in een bead-apexvlak (P9) en een cirkelvormige opening (94) vormt, waarbij de een of meer vervolgposities een derde vervolgpositie omvatten en waarbij de een of meer vervolgstations (4, 5, 6, 7) een opslagstation (6, 7) omvatten op de derde vervolgpositie, waarbij het opslagstation (6, 7) een of meer opslagdelen (61, 71) omvat voor het opslaan van een of meer van de bead-apexes (9) in een verticale oriëntatie waarin de een

of meer bead-apexes (9) worden ondersteund met de betreffende randen (93) hiervan op de een of meer opslagdelen (61, 71) en waarin bead-apexvlakken (P9) verticaal of in hoofdzaak verticaal zijn.

17. Samenstel (1, 101) volgens conclusie 16, waarbij het opslagstation (6, 7) is ingericht voor het ontvangen van de ene bead-apex (9) vanaf de weeginrichting (2) in een opslagvlak (P6, P7), waarbij het weegvlak (P2) parallel of in hoofdzaak parallel is aan het opslagvlak (P6, P7).

18. Samenstel (1, 101) volgens conclusie 17, waarbij het weegvlak (P2) is ingericht teneinde in lijn of in hoofdzaak in lijn te zijn met het opslagvlak (P6, P7) wanneer de ene bead-apex (9) wordt ontvangen vanaf de weeginrichting (2).

19. Samenstel (1, 101) volgens een der conclusies 16-18, waarbij het opslagstation (6) een opslagcarrousel (6) is omvattend een centraal deel (60) dat roteerbaar is om een centrale hartlijn (R), waarbij de een of meer opslagdelen (61) twee of meer opslagarmen (62) omvatten die zich radiaal uitstrekken vanaf de centrale hartlijn (R) voor het opslaan van de een of meer bead-apexes (9) in de verticale oriëntatie.

20. Samenstel (1, 101) volgens conclusie 19, waarbij elke opslagarm (62) een opslagtransporteur (63) omvat voor het ten opzichte van de centrale hartlijn R radiaal naar binnen en radiaal naar buiten langs het betreffende opslagdeel (61) transporteren van de bead-apexes (9) die hierop zijn opgeslagen.

21. Samenstel (1, 101) volgens een der conclusies 9-20, waarbij het weegdeel (21) en de een of meer vervolgstations (4, 5, 6, 7) beweegbaar zijn ten opzichte van elkaar.

22. Samenstel (1, 101) volgens conclusie 21, waarbij het weegdeel (21) beweegbaar is ten opzichte van het basisdeel (20) in een uitlijnrichting (A) vanaf een eerste overdrachtspositie (X3) uitgelijnd met de

toevoerpositie naar een tweede en/of verdere overdrachtsposities (X4, X5, X6, X7) uitgelijnd met een van de een of meer vervolgposities.

23. Samenstel (1, 101) volgens conclusie 22, waarbij de weeginrichting (2) een weegaandrijving (23) omvat voor het aandrijven van de beweging van het weegdeel (21) in de uitlijnrichting (A).

24. Samenstel (1, 101) volgens conclusie 22 of 23, waarbij de uitlijnrichting (A) dwars, loodrecht of in hoofdzaak loodrecht op het weegvlak (P2) staat.

25. Samenstel (101) volgens conclusie 24, waarbij de ene bead-apex (9) cirkelvormige of in hoofdzaak cirkelvormige bead (91) omvat en een filler apex (92) die zich radiaal naar buiten uitstrekt vanaf de bead (91), waarbij de bead (91) een binnenrand (93) heeft die zich uitstrekt in een bead-apexvlak (P9) en een cirkelvormige opening (94) vormt, waarbij het weegdeel (21) een omtreksrand (24) heeft die is gericht op een van de een of meer vervolgstations (6), waarbij het weegoppervlak (22) is ingericht voor het ontvangen en ondersteunen van de ene bead-apex (9) in de weegpositie zodanig, dat een deel (95) van de ene bead-apex (9) uitsteekt vanaf het weegoppervlak (22) richting het ene vervolgstation (6) en een deel van de cirkelvormige opening (94) van de ene bead-apex (9) zich uitstrekt voorbij de rand (24) van het weegdeel (21), waarbij de rand (93) van de bead (91) bij het deel van de cirkelvormige opening (94) dat zich uitstrekt voorbij de rand (24) en de rand (24) van het weegdeel (21) op elkaar gericht zijn op een spleetafstand (D2), waarbij het ene vervolgstation (6) is ingericht voor het aangrijpen van het uitstekende deel (95) van de ene bead-apex (9) vanuit de betreffende positie hiervan, en waarbij het weegdeel (21) en het ene vervolgstation (6) zijn ingericht voor het veroorzaken dat de ene bead-apex (9) om de rand (93) van de bead (91) roteert wanneer het weegdeel (21) en het ene vervolgstation (6) ten opzichte van elkaar worden bewogen in de uitlijnrichting (A) en de rand (93) van de bead (91)

wordt ondersteund op het ene vervolgstation (6).

26. Samenstel (101) volgens conclusie 25, waarbij het weegdeel (21) is ingericht voor het wegzakken vanaf de ene bead-apex (9), waardoor wordt toegestaan dat de ene bead-apex (9) om de ondersteuning op het ene vervolgstation (6) draait naar een verticale oriëntatie waarin de een of meer bead-apexes (9) worden ondersteund met de betreffende rand (93) op het ene vervolgstation (6) en waarbij het bead-apexvlak (P9) verticaal of in hoofdzaak verticaal is.

27. Samenstel (101) volgens conclusie 25 of 26, waarbij het samenstel (101) verder een eerste transportinrichting (11) omvat en een stuureenheid (8), waarbij de stuureenheid (8) is ingericht voor het aansturen van de eerste transportinrichting (11) teneinde de bead-apex (9) in de weegpositie te plaatsen zodanig, dat het deel (95) van de ene bead-apex (9) uitsteekt vanaf het weegoppervlak (22) richting het ene vervolgstation (6).

28. Samenstel (1, 101) volgens een der conclusies 21-27, waarbij de een of meer vervolgstations (4, 5, 6, 7) twee of meer vervolgstations (4, 5, 6, 7) omvatten op twee of meer vervolgposities voor het ontvangen van de ene van de bead-apexes (9) vanaf de weeginrichting (2), waarbij het weegdeel (21) beweegbaar is ten opzichte van het basisdeel (20) in de uitlijnrichting (A) vanaf de eerste overdrachtspositie (X3) uitgelijnd met de toevoerpositie naar een tweede overdrachtspositie (X4) en een derde overdrachtspositie (X5) uitgelijnd met respectievelijk een eerste van de twee of meer vervolgstations (4, 5, 6, 7) en een tweede van de twee of meer vervolgstations (4, 5, 6, 7).

29. Samenstel (1) volgens een der conclusies 9-25, waarbij het samenstel (1) verder een of meer verdere transportinrichtingen (14, 15, 16, 17) omvat voor het transporteren van bead-apex (9) van de weegpositie naar de een of meer vervolgposities.

30. Samenstel (1) volgens conclusie 29, waarbij de een of meer verdere transportinrichtingen (14, 15, 16,

17) zijn ingericht voor het oppakken en plaatsen, het slepen, het trekken of het duwen van bead-apexes (9) van de weegpositie naar de ene van de een of meer vervolgposities.

31. Samenstel (1, 101) volgens een der conclusies 9-30, waarbij het samenstel (1, 101) verder een stuureenheid (8) omvat die operationeel is verbonden met het weegdeel (21) voor het ontvangen van een signaal dat indicatief is voor het gemeten gewicht van de ene bead-apex (9), waarbij de stuureenheid (8) is ingericht voor het sturen van de beweging van de ene bead-apex (9) naar een van de een of meer vervolgstations (4, 5, 6, 7) op basis van het gewicht van de ene bead-apex (9).

32. Werkwijze voor het verwerken van een bead-apex (9), waarbij de werkwijze de stappen omvat van het verschaffen van een samenstel (1, 101) voor het verwerken van bead-apexes (9), waarbij het samenstel (1, 101) een weeginrichting (2) omvat voor het meten van het gewicht van een van de bead-apexes (9) een toevoerstation (3) op een toevoerpositie voor het toevoeren van de bead-apexes (9) aan de weeginrichting (2) in een toevoerrichting (S),

waarbij het samenstel (1, 101) verder een frame (10) omvat voor het ondersteunen van het toevoerstation (3), waarbij de weeginrichting (2) een weegdeel (21) omvat voor het ontvangen en ondersteunen van de ene bead-apex (9) en een basisdeel (20) verbonden met en een basis vormend voor het weegdeel (21), waarbij de weeginrichting (2) is ingericht voor het meten van het gewicht van de ene bead-apex (9) in een weegpositie op het weegdeel (21), waarbij het weegdeel (21) is ingericht voor het stationair houden van de bead-apex (9) gedurende het wegen, en waarbij het frame (10) van het samenstel (1, 101) en het basisdeel (20) van de weeginrichting (2) onafhankelijk ondersteund zijn, waarbij de werkwijze verder de stappen omvat van:

a) het transporteren van de ene bead-apex (9) van toevoerpositie naar de weegpositie;

b) het meten van het gewicht van de ene bead-apex (9) terwijl deze stationair is.

33. Werkwijze volgens conclusie 32, waarbij de werkwijze verder de stap omvat van het stabiliseren van het weegdeel (21) voorafgaand aan stap b).

34. Werkwijze volgens conclusie 33, waarbij het samenstel (1, 101) verder een of meer vervolgstations (4, 5, 6, 7) omvat op een of meer vervolgposities voor het ontvangen van de ene bead-apex (9) vanaf de weeginrichting (2), waarbij de werkwijze verder de stappen omvat van:

c) het bepalen van het vervolgstation (4, 5, 6, 7) op basis van het gewicht van de ene bead-apex (9);

d) het transporteren van de ene bead-apex (9) vanaf de weegpositie naar een van de een of meer vervolgposities.

35. Werkwijze volgens conclusie 34, waarbij het weegdeel (21) en de een of meer vervolgstations (4, 5, 6, 7) beweegbaar zijn ten opzichte van elkaar, waarbij de werkwijze de stap omvat van het met elkaar uitlijnen van het weegdeel (21) en een van de een of meer vervolgstations (4, 5, 6, 7) voorafgaand aan stap d).

36. Werkwijze volgens conclusie 35, waarbij het weegdeel (21) is ingericht voor het ondersteunen van de ene bead-apex (9) in een horizontaal of in hoofdzaak horizontaal weegvlak (P2), waarbij het weegdeel (21) beweegbaar is ten opzichte van het basisdeel (20) in een uitlijnrichting (A) dwars, loodrecht of in hoofdzaak loodrecht op het weegvlak (P2) vanaf een eerste overdrachtspositie (X3) uitgelijnd met de toevoerpositie naar een tweede en/of verdere overdrachtsposities (X4, X5, X6, X7) uitgelijnd met een van de een of meer vervolgposities.

37. Werkwijze volgens conclusie 36, waarbij de ene bead-apex (9) een cirkelvormige of in hoofdzaak cirkelvormige bead (91) omvat en een filler apex (92) die zich radiaal naar buiten uitstrekt vanaf de bead (91), waarbij de bead (91) een binnenrand (93) heeft die zich uitstrekt in een bead-apexvlak (P9) en een cirkelvormige opening (94) vormt, waarbij het weegdeel (21) een

omtreksrand (24) heeft die is gericht op een van de een of meer vervolgstations (6), waarbij, in stap a), de ene bead-apex (9) wordt getransporteerd naar het weegvlak (P2) zodanig, dat een deel (95) van de ene bead-apex (9) uitsteekt vanaf het weegoppervlak (22) richting het ene vervolgstation (6) en een deel van de cirkelvormige opening (94) van de bead-apex (9) zich uitstrekt voorbij de rand (24) van het weegdeel (21), waarbij de rand (93) van de bead (91) bij het deel van de cirkelvormige opening (94) dat zich uitstrekt voorbij de rand (24) en de rand (24) van het weegdeel (21) naar elkaar gericht zijn op een spleetafstand (D2), en waarbij stap d) de stappen omvat van:

- het met elkaar uitlijnen van het weegdeel (21) en het ene vervolgstation (6), waarbij de rand (93) van de ene bead-apex (9) wort ondersteund op het ene vervolgstation (6);
- het bewegen van het weegdeel (21) ten opzichte van het ene vervolgstation (6) in de uitlijnrichting (A), veroorzakend dat de ene bead-apex (9) roteert om de ondersteuning van de rand (93) hiervan op het ene vervolgstation (6);
- het verder bewegen van het weegdeel (21) in de uitlijnrichting (A) ten opzichte van het ene vervolgstation (6), veroorzakend dat de ene bead-apex (9) enkel ondersteund wordt door het vervolgstation (6).

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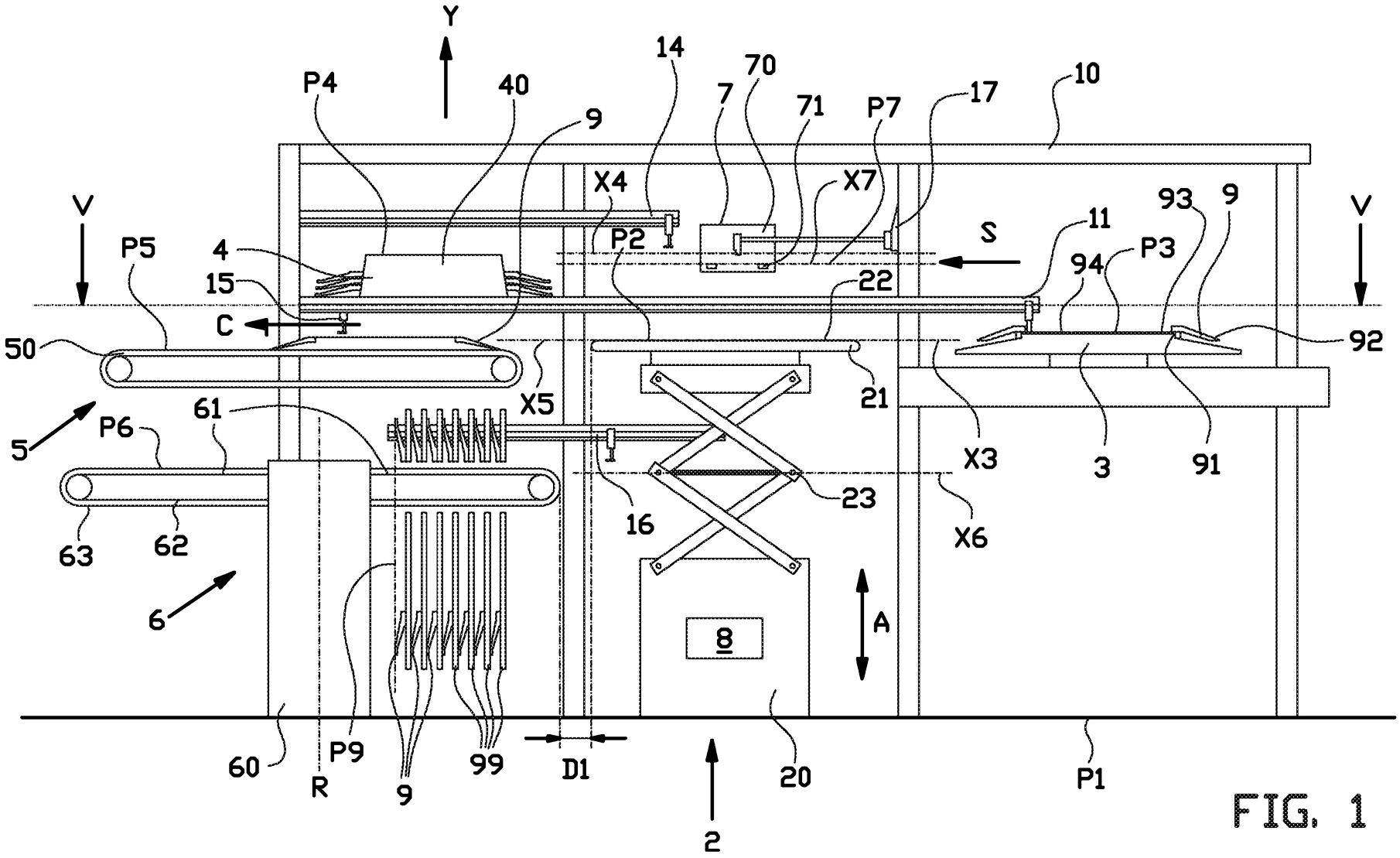
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P4
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14
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71
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V
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C
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X4
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S
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5
P6
61
X3
3
91
63
62
16
23
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6
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A
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R
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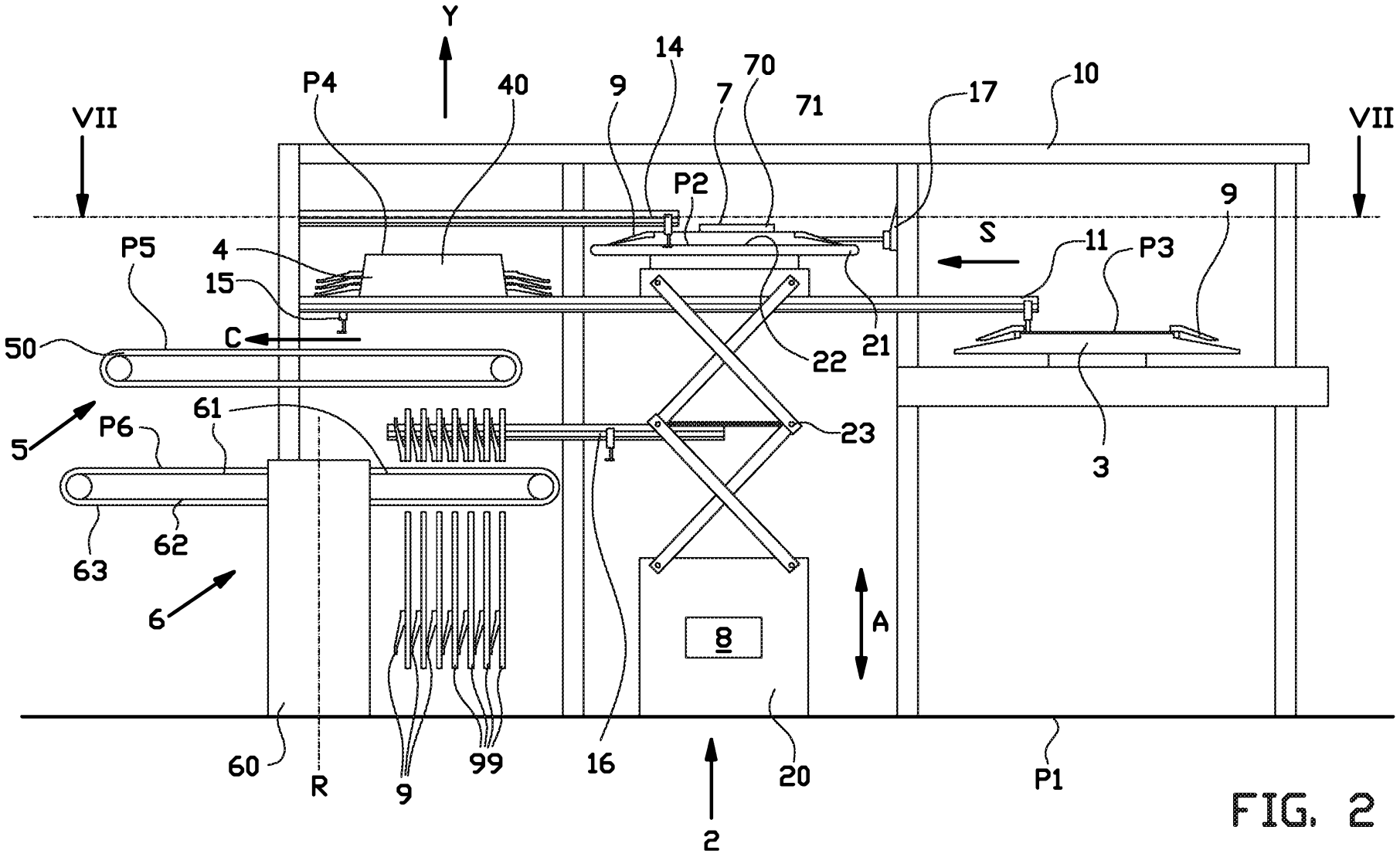
D1
20
P1
2

FIG. 1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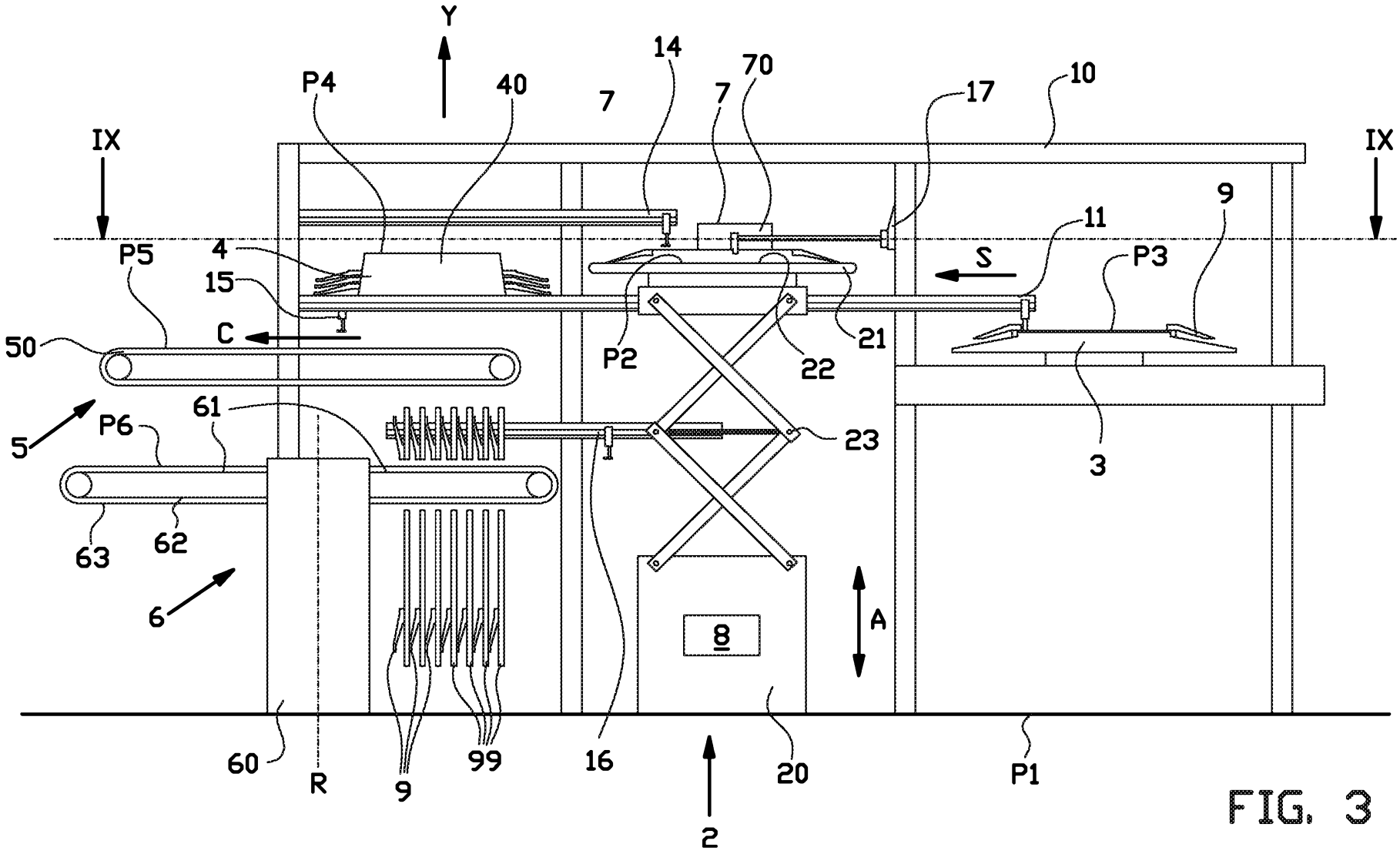
8
A
60
R
9
99
16
2
20
P1

FIG. 2


Y
P4
40
7
14
7
70
17
10
IX
IX
9
11
P5
4
15
C
S
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P2
22
21
5
P6
61
23
3
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62
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8
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60
R
9
99
16
20
P1
2

FIG. 3

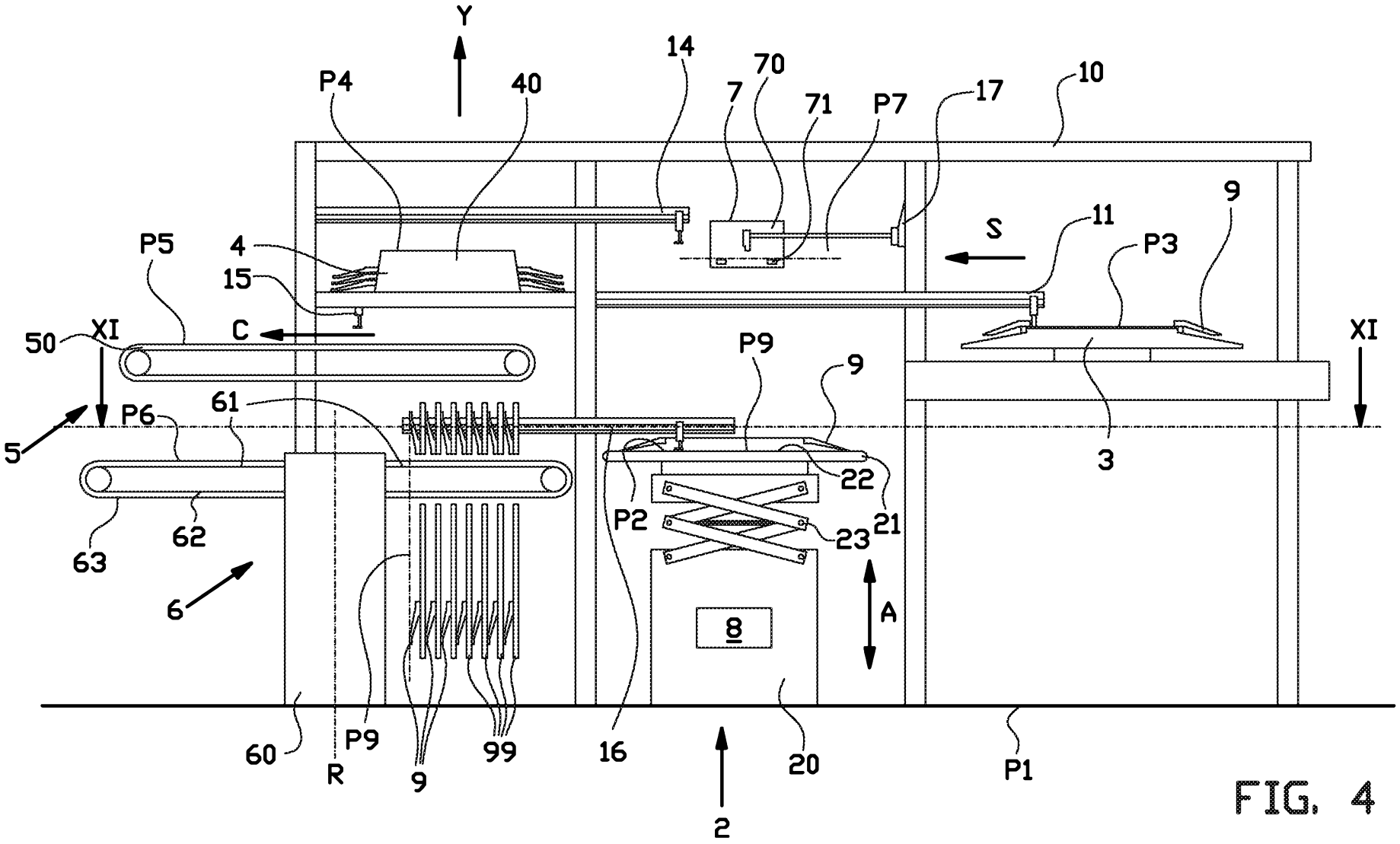

Y
P4
40
14
70
7
71
P7
17
10
S
11
9
P3
P5
4
15
C
XI
50
XI
P9
9
61
P6
5
3
22
P2
21
23
63
62
6
A
8
60
P9
R
9
99
16
20
P1
2

FIG. 4

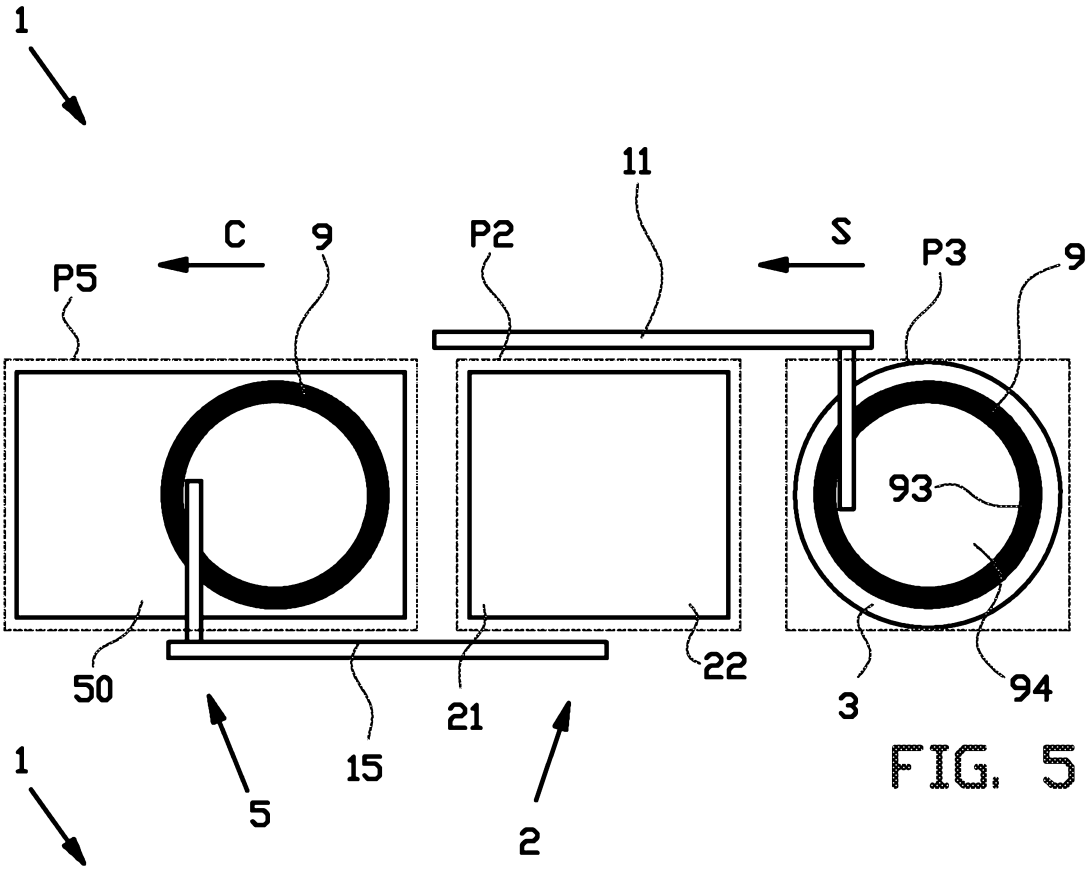
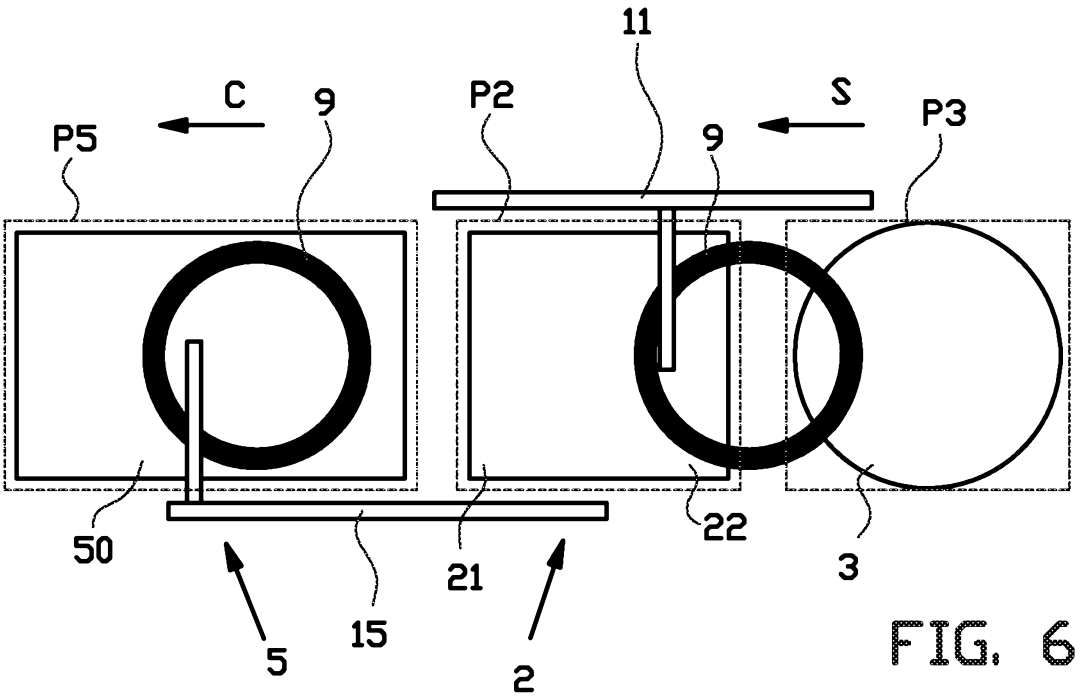

1
11
C
9
P2
S
P3
9
P5
93
50
22
3
94
21
15
5
2

FIG. 5


1
11
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P3
9
P5
9
50
22
3
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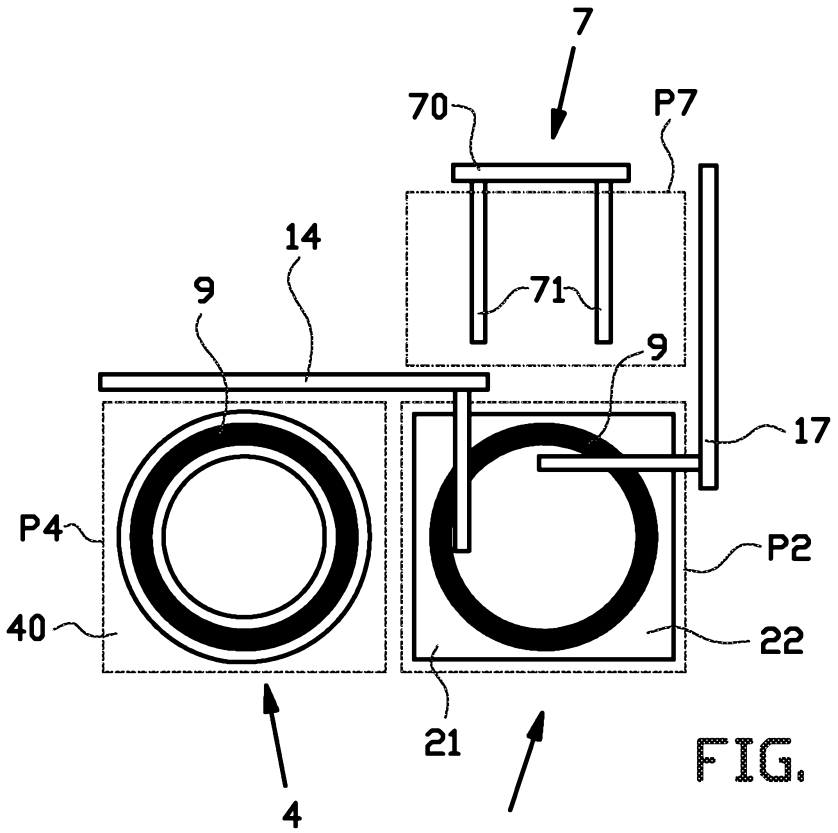
FIG. 6


7
70
P7
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71
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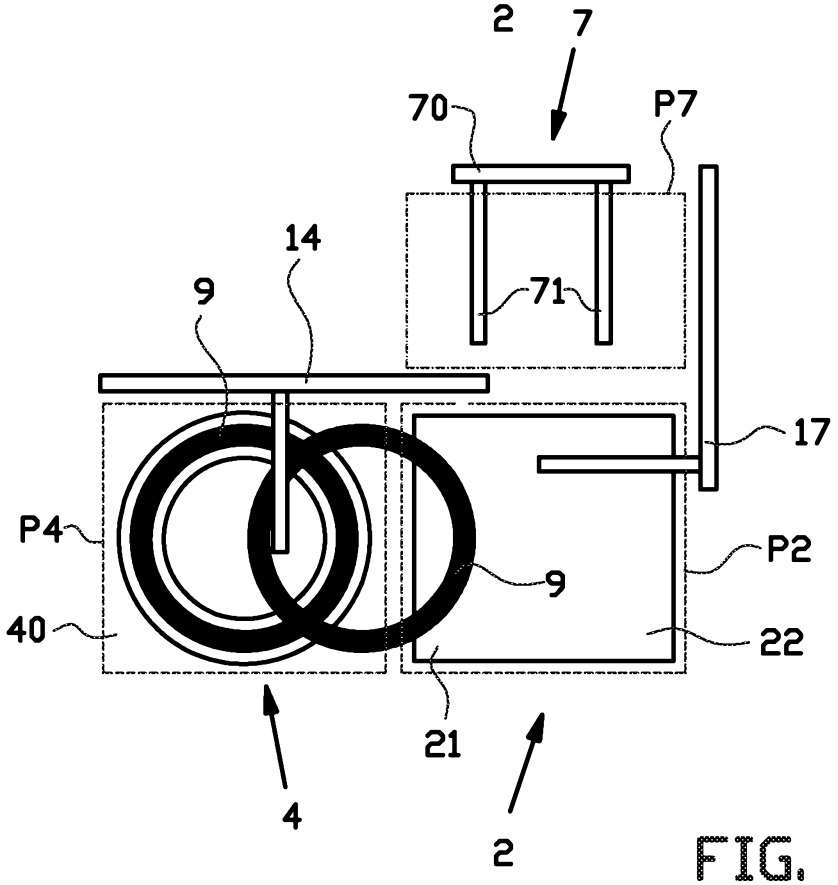
17
P4
P2
40
22
21
4
2

FIG. 7


7
70
P7
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17
P4
P2
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40
22
21
4
2

FIG. 8

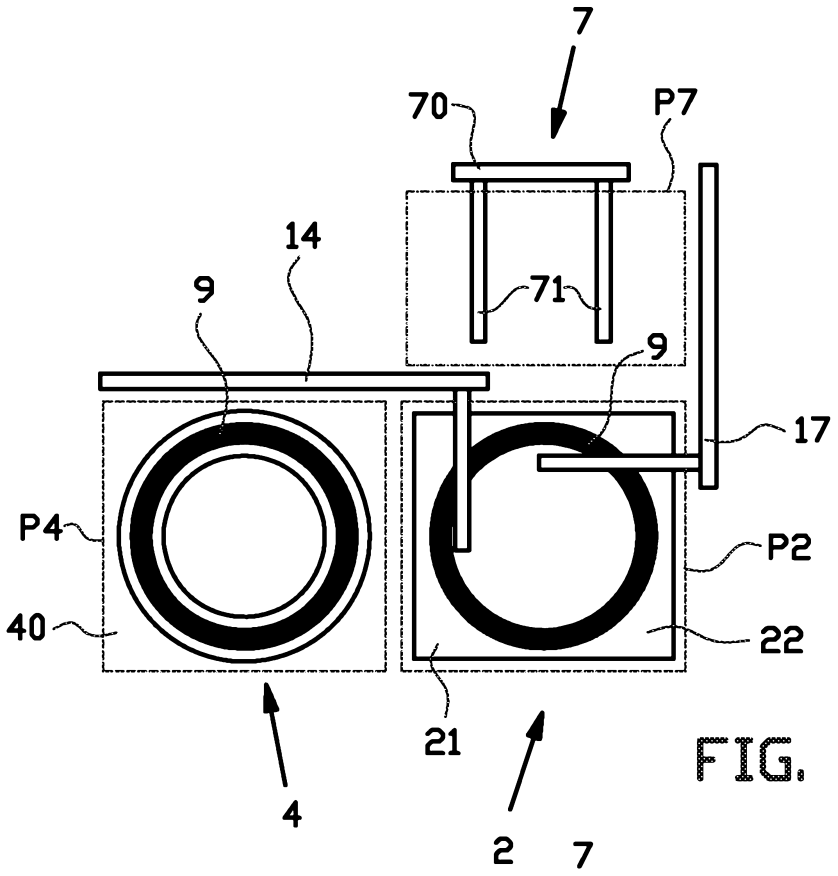
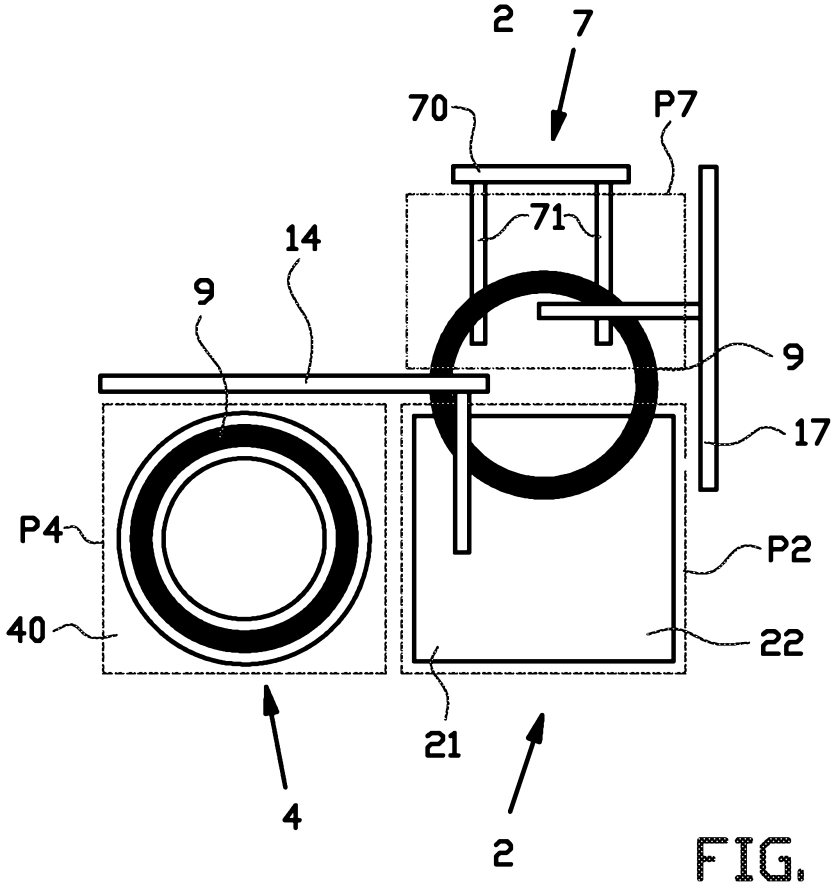

7
70
P7
14
9
71
9
17
P4
P2
40
22
21
4
2

FIG. 9


7
70
P7
71
14
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P4
P2
40
22
21
4
2

FIG. 10

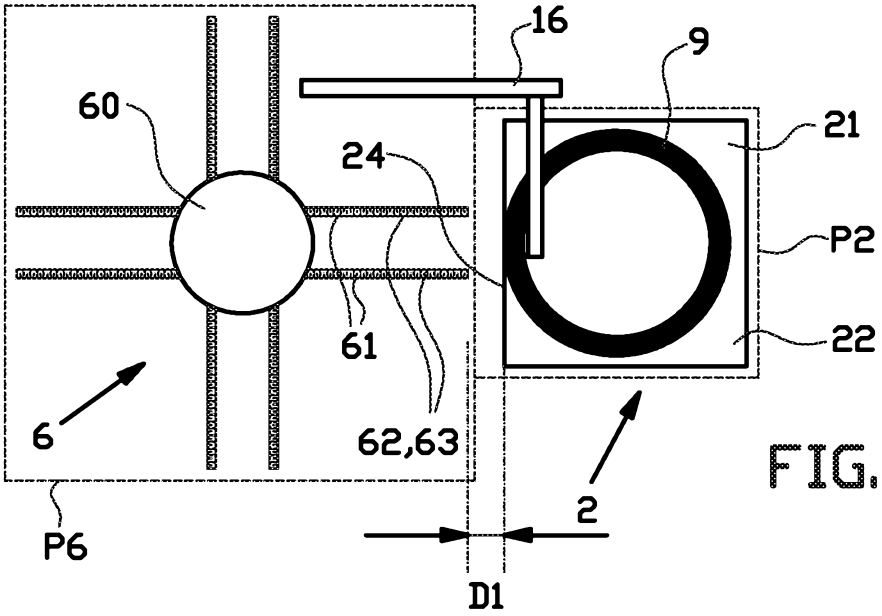

FIG. 11

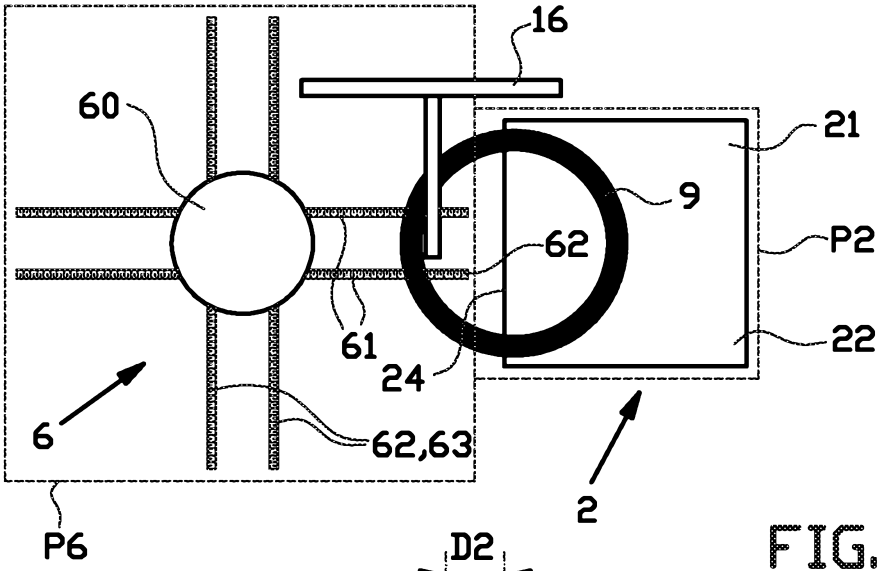

FIG. 12

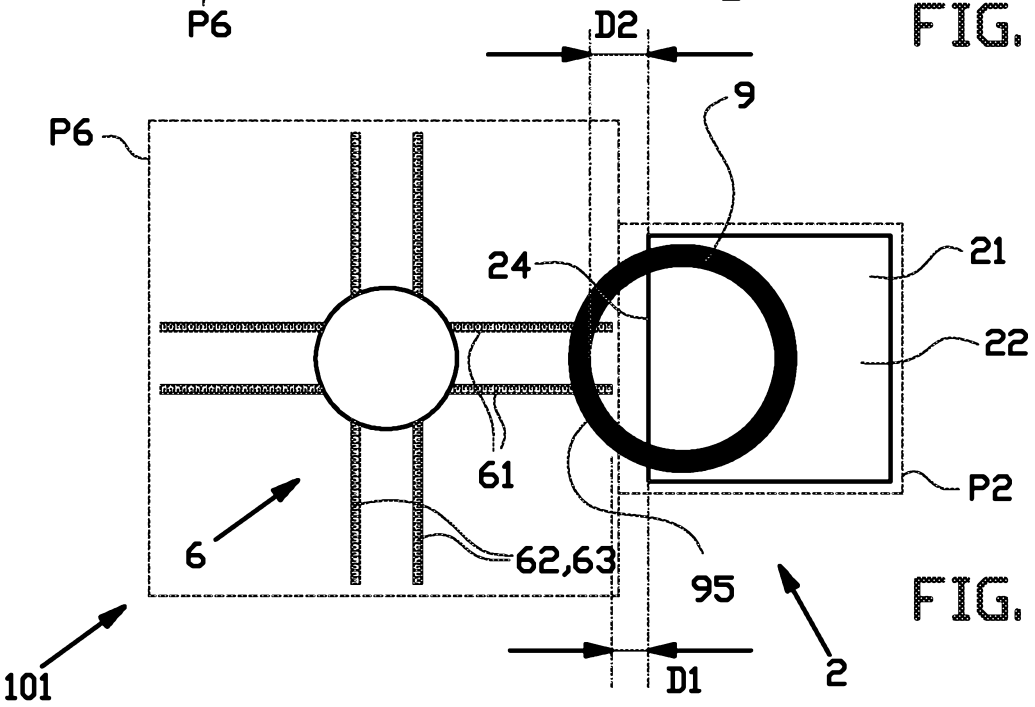

FIG. 13

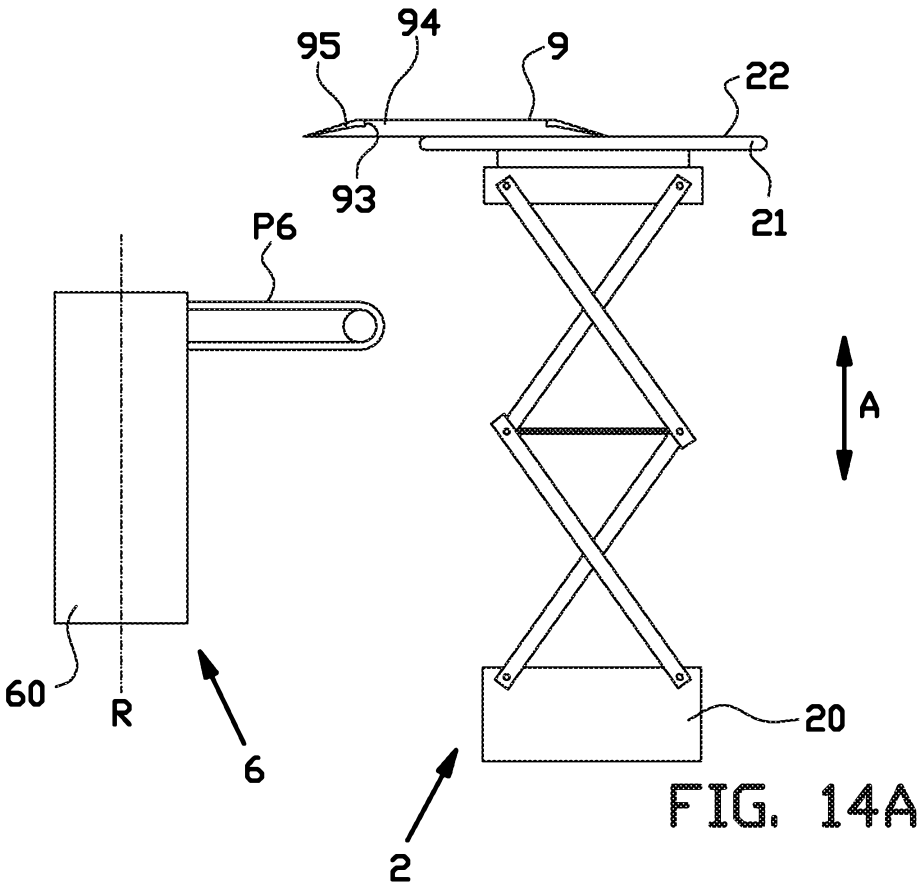

FIG. 14A

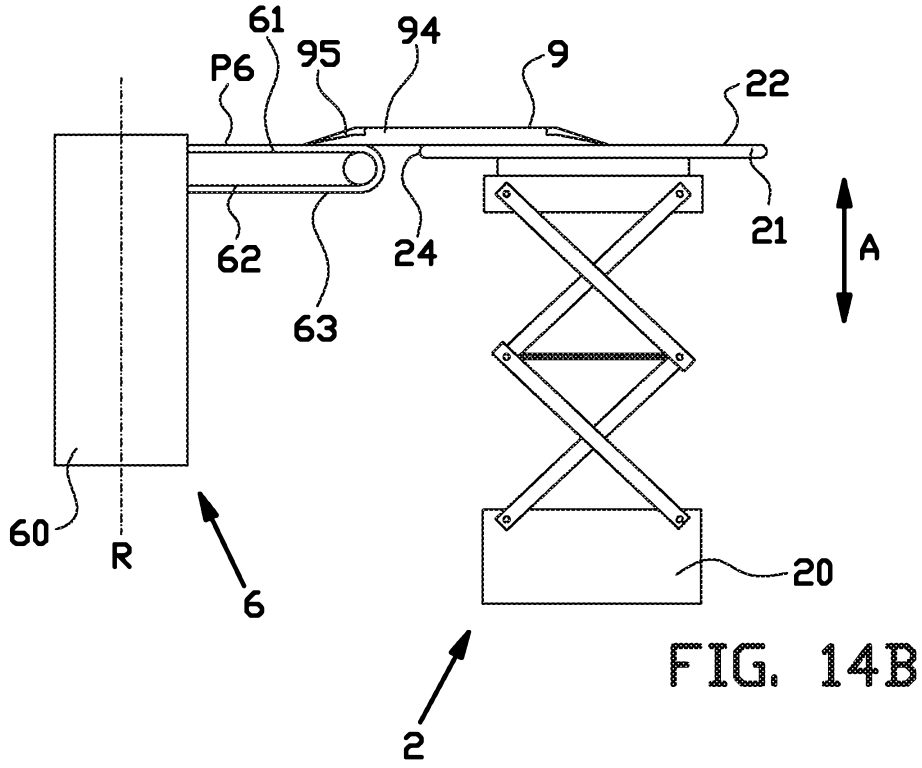

FIG. 14B

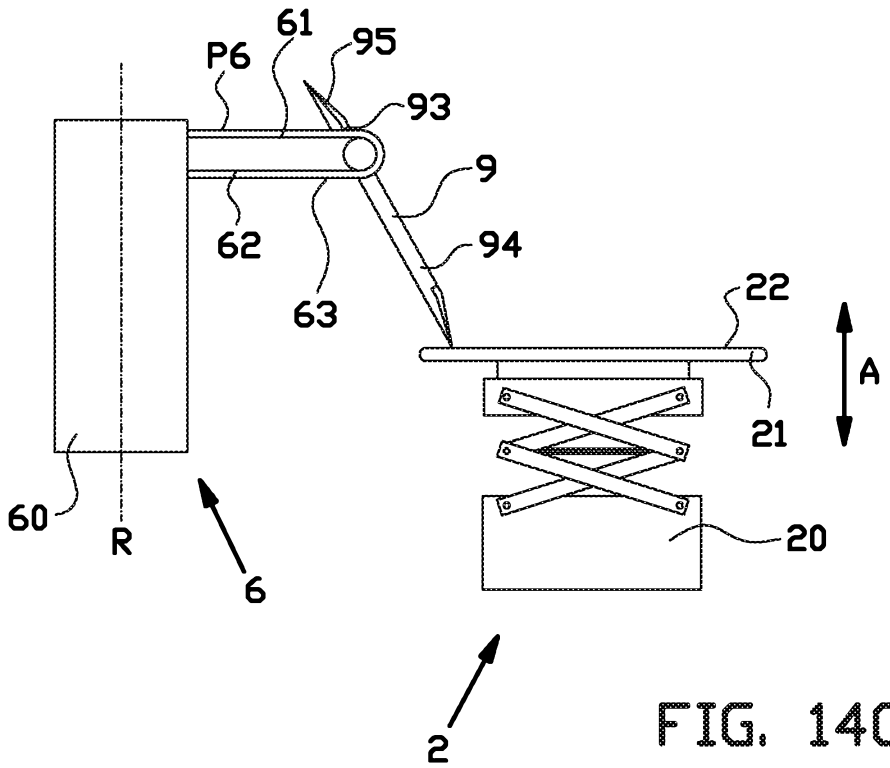

FIG. 14C

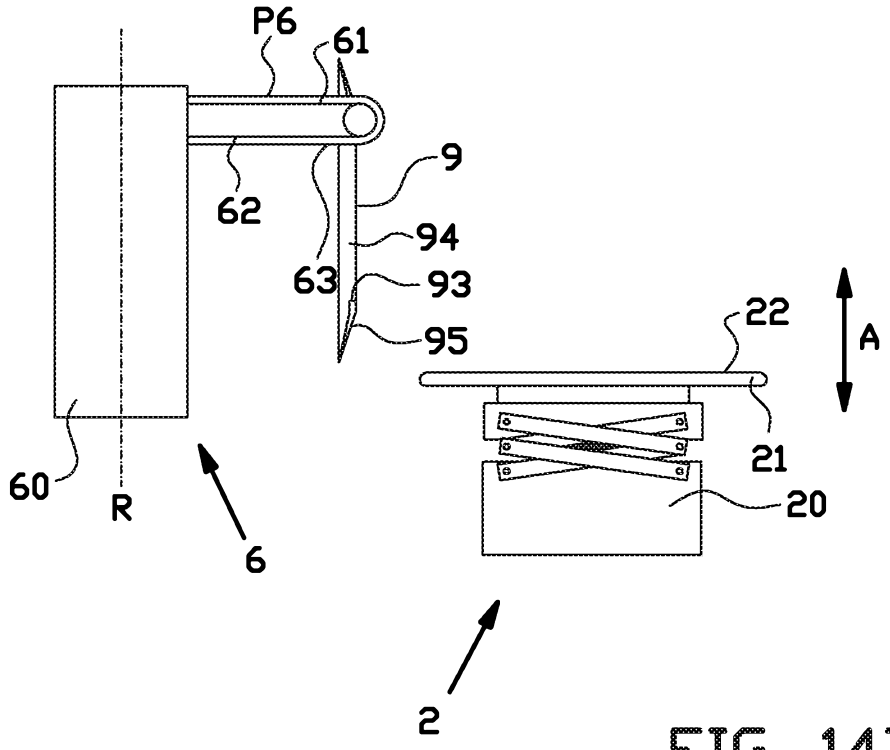

FIG. 14D

A B S T R A C T

The invention relates to an assembly and method for processing bead-apexes, wherein the assembly comprises a weighing device for measuring the weight of one of the bead-apexes and at least one station for supplying or receiving the bead-apexes to or from the weighing device in a supply direction or a discharge direction, respectively,

wherein the assembly further comprises a frame for supporting the at least one station,

wherein the weighing device comprises a weighing member for receiving and supporting one of the bead-apexes and a base member connected to and forming a base for the weighing member, wherein the weighing device is arranged for measuring the weight of the one bead-apex on the weighing member,

wherein the weighing member is arranged for keeping the one bead-apex stationary during the weighing,

and wherein the frame of the assembly and the base member of the weighing device are supported independently.

SAMENWERKINGSVERDRAG (PCT)

RAPPORT BETREFFENDE NIEUWHEIDSONDERZOEK VAN INTERNATIONAAL TYPE

IDENTIFICATIE VAN DE NATIONALE AANVRAGE	KENMERK VAN DE AANVRAGER OF VAN DE GEMACHTIGDE
	NLP201393A
Nederlands aanvraag nr. **2018974**	Indieningsdatum **24-05-2017**
	Ingeroepen voorrangsdatum
Aanvrager (Naam) **VMI Holland B.V.**	
Datum van het verzoek voor een onderzoek van internationaal type **08-07-2017**	Door de Instantie voor Internationaal Onderzoek aan het verzoek voor een onderzoek van internationaal type toegekend nr. **SN69277**

I. CLASSIFICATIE VAN HET ONDERWERP (bij toepassing van verschillende classificaties, alle classificatiesymbolen opgeven)

Volgens de internationale classificatie (IPC)

B29D30/00

II. ONDERZOCHTE GEBIEDEN VAN DE TECHNIEK

Onderzochte minimumdocumentatie

Classificatiesysteem	Classificatiesymbolen
IPC	**B29D;G01G**

Onderzochte andere documentatie dan de minimum documentatie, voor zover dergelijke documenten in de onderzochte gebieden zijn opgenomen

III. ☐ **GEEN ONDERZOEK MOGELIJK VOOR BEPAALDE CONCLUSIES** (opmerkingen op aanvullingsblad)

IV. ☐ **GEBREK AAN EENHEID VAN UITVINDING** (opmerkingen op aanvullingsblad)

ONDERZOEKSRAPPORT BETREFFENDE HET RESULTAAT VAN HET ONDERZOEK NAAR DE STAND VAN DE TECHNIEK VAN HET INTERNATIONALE TYPE

Nummer van het verzoek om een onderzoek naar de stand van de techniek
NL 2018974

A. CLASSIFICATIE VAN HET ONDERWERP
INV. B29D30/00
ADD.

Volgens de Internationale Classificatie van octrooien (IPC) of zowel volgens de nationale classificatie als volgens de IPC.

B. ONDERZOCHTE GEBIEDEN VAN DE TECHNIEK

Onderzochte minimum documentatie (classificatie gevolgd door classificatiesymbolen)
B29D G01G

Onderzochte andere documentatie dan de minimum documentatie, voor dergelijke documenten, voor zover dergelijke documenten in de onderzochte gebieden zijn opgenomen

Tijdens het onderzoek geraadpleegde elektronische gegevensbestanden (naam van de gegevensbestanden en, waar uitvoerbaar, gebruikte trefwoorden)
EPO-Internal

C. VAN BELANG GEACHTE DOCUMENTEN

Categorie *	Geciteerde documenten, eventueel met aanduiding van speciaal van belang zijnde passages	Van belang voor conclusie nr.
X	US 2007/215265 A1 (SATA YOSHIYUKI [JP]) 20 september 2007 (2007-09-20) * alinea [0014] * * alinea [0034]; figuur 4 *	1,32
A	US 2014/161584 A1 (KOHNEN DANIEL [BE] ET AL) 12 juni 2014 (2014-06-12) * alinea [0049] - alinea [0067]; figuur 3 *	1-37
A	US 5 203 938 A (MOODY DALE R [US] ET AL) 20 april 1993 (1993-04-20) * kolom 4, regel 18 - regel 66; figuur 1 *	1-37
A	US 2012/228791 A1 (CREASAP MARCK [US] ET AL) 13 september 2012 (2012-09-13) * alinea [0009] - alinea [0037]; figuren 1-5 *	1-37

-/--

[X] Verdere documenten worden vermeld in het vervolg van vak C.

[X] Leden van dezelfde octrooifamilie zijn vermeld in een bijlage

* Speciale categorieën van aangehaalde documenten

"A" niet tot de categorie X of Y behorende literatuur die de stand van de techniek beschrijft

"D" in de octrooiaanvrage vermeld

"E" eerdere octrooi(aanvrage), gepubliceerd op of na de indieningsdatum, waarin dezelfde uitvinding wordt beschreven

"L" om andere redenen vermelde literatuur

"O" niet-schriftelijke stand van de techniek

"P" tussen de voorrangsdatum en de indieningsdatum gepubliceerde literatuur

"T" na de indieningsdatum of de voorrangsdatum gepubliceerde literatuur die niet bezwarend is voor de octrooiaanvrage, maar wordt vermeld ter verheldering van de theorie of het principe dat ten grondslag ligt aan de uitvinding

"X" de conclusie wordt als niet nieuw of niet inventief beschouwd ten opzichte van deze literatuur

"Y" de conclusie wordt als niet inventief beschouwd ten opzichte van de combinatie van deze literatuur met andere geciteerde literatuur van dezelfde categorie, waarbij de combinatie voor de vakman voor de hand liggend wordt geacht

"&" lid van dezelfde octrooifamilie of overeenkomstige octrooipublicatie

Datum waarop het onderzoek naar de stand van de techniek van internationaal type werd voltooid	Verzenddatum van het rapport van het onderzoek naar de stand van de techniek van internationaal type
25 januari 2018	

Naam en adres van de instantie	De bevoegde ambtenaar
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Fregosi, Alberto

2

ONDERZOEKSRAPPORT BETREFFENDE HET RESULTAAT VAN HET ONDERZOEK NAAR DE STAND VAN DE TECHNIEK VAN HET INTERNATIONALE TYPE

Nummer van het verzoek om een onderzoek naar de stand van de techniek
NL 2018974

C.(Vervolg). VAN BELANG GEACHTE DOCUMENTEN

Categorie *	Geciteerde documenten, eventueel met aanduiding van speciaal van belang zijnde passages	Van belang voor conclusie nr.
E	WO 2017/139541 A1 (BARTELL MACHINERY SYSTEMS L L C [US]) 17 augustus 2017 (2017-08-17) * alinea [0010] * * alinea [0017] - alinea [0033]; figuren 1-4 * -----	1,32

Formulier PCT/ISA/201 (vervolg tweede blad) (januari 2004)

ONDERZOEKSRAPPORT BETREFFENDE HET RESULTAAT VAN HET ONDERZOEK NAAR DE STAND VAN DE TECHNIEK VAN HET INTERNATIONALE TYPE

Informatie over leden van dezelfde octrooifamilie

Nummer van het verzoek om een onderzoek naar de stand van de techniek
NL 2018974

In het rapport genoemd octrooigeschrift	Datum van publicatie	Overeenkomend(e) geschrift(en)	Datum van publicatie
US 2007215265 A1	20-09-2007	EP 1683628 A1	26-07-2006
		JP 4632650 B2	23-02-2011
		JP 2005111786 A	28-04-2005
		US 2007215265 A1	20-09-2007
		WO 2005035230 A1	21-04-2005
US 2014161584 A1	12-06-2014	BR 102013031409 A2	02-09-2014
		EP 2743069 A1	18-06-2014
		JP 2014117955 A	30-06-2014
		US 2014161584 A1	12-06-2014
US 5203938 A	20-04-1993	US 5203938 A	20-04-1993
		US 5391342 A	21-02-1995
US 2012228791 A1	13-09-2012	CA 2781928 A1	03-06-2011
		CN 102741041 A	17-10-2012
		EP 2507043 A1	10-10-2012
		JP 5580903 B2	27-08-2014
		JP 2013512133 A	11-04-2013
		KR 20120099095 A	06-09-2012
		RU 2012127313 A	10-01-2014
		US 2012228791 A1	13-09-2012
		WO 2011065951 A1	03-06-2011
		ZA 201203072 B	27-12-2012
WO 2017139541 A1	17-08-2017	US 2017234677 A1	17-08-2017
		WO 2017139541 A1	17-08-2017

WRITTEN OPINION

File No.	Filing date *(day/month/year)*	Priority date *(day/month/year)*	Application No.
SN69277	24.05.2017		NL2018974

International Patent Classification (IPC)
INV. B29D30/00

Applicant
VMI Holland B.V.

This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☐ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☐ Box No. VII Certain defects in the application
- ☐ Box No. VIII Certain observations on the application

Examiner
Fregosi, Alberto

Application number

WRITTEN OPINION

NL2018974

Box No. I Basis of this opinion

1. This opinion has been established on the basis of the latest set of claims filed before the start of the search.

2. With regard to any **nucleotide and/or amino acid sequence** disclosed in the application and necessary to the claimed invention, this opinion has been established on the basis of:

   a. type of material:

   ☐ a sequence listing

   ☐ table(s) related to the sequence listing

   b. format of material:

   ☐ on paper

   ☐ in electronic form

   c. time of filing/furnishing:

   ☐ contained in the application as filed.

   ☐ filed together with the application in electronic form.

   ☐ furnished subsequently for the purposes of search.

3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.

4. Additional comments:

Box No. V Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty	Yes:	Claims	2-31, 33-37
	No:	Claims	1, 32
Inventive step	Yes:	Claims	
	No:	Claims	1-37
Industrial applicability	Yes:	Claims	1-37
	No:	Claims	

2. Citations and explanations

see separate sheet

Re Item V

Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. State of the Art

Reference is made to the following documents:

D1 : US 2007/0215265 - A;

D2 : US 2014/0161584 - A;

D3 : US 5203938 - A;

D4 : US 2012/0228791 - A;

D5 : WO 2017/139541 - A.

2. Claims **1**, 32 - Lack of Novelty

2.1 Claim **1** relates to an assembly (1) for processing bead-apexes (9), wherein the assembly comprises :

(a) - a weighing device (2) for measuring the weight of one of the bead-apexes;

(b) - at least one station (3, 4, 5, 6, 7) for supplying or receiving the bead-apexes to or from the weighing device in a supply direction (S) or a discharge direction, respectively;

(c) - a frame (10) for supporting the at least one station;

(a1) - wherein the weighing device (2) comprises a weighing member (21) for receiving and supporting one of the bead-apexes and a base member (20) connected to and forming a base for the weighing member (21);

(a2) - wherein the weighing device is arranged for measuring the weight of the one bead-apex in a weighing position on the weighing member;

(a1.1) - wherein the weighing member (21) is arranged for keeping the one bead-apex stationary during the weighing;

(d) - wherein the frame (10) of the assembly and the base member (20) of the weighing device are supported independently.

2.2 Document **D1** (US 2007/0215265 - A) concisely discloses an assembly for processing bead-apexes ("preset bead **32**"), the assembly essentially comprising the above combination of features **(a)** to **(d)**, wherein :

- the weighing device is represented by "inspection station **24**";

- the stations for supplying or receiving the bead-apexes to or from the weighing device are represented by "stations **22**, **1**, **25**";

- the different frames supporting respectively weighing member and the at least one station are implicitly disclosed in figure 4 ;

- the provision that the weighing member is arranged for keeping the one bead-apex stationary during the weighing is derivable from figure 4 and from paragraph [0034] of **D1**.

Claim **1** lacks therefore novelty vis-à-vis of **D1**.

2.3 The same arguments hold, "mutatis mutandis", to substantiate that also independent claim **32** lacks novelty vis-à-vis of **D1.**

3. Claims **2-31, 33-37** - Lack of Novelty and/or of Inventive Step

3.1 Dependent claims **2** to **31** and **33** to **37** do not appear to contain any additional features which, in combination with the features of any claim to which they refer, meet the requirements of novelty and/or inventive step, since these features appear to be either disclosed or suggested in the available prior art or are simply considered as part of the common knowledge of the person skilled in the art of tire manufacture.

4. Additional remarks

Document **D5** (WO 2017/139541 - A), published on: 17. 08. 2017 and claiming priority on: 12. 12. 2016, is particularly relevant, although it cannot be considered prior art since it has not been made available to the public before the filing date (24. 05. 2017) of the present application.

****