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(54) **Apparatus and method for sealing or tying products.**

(57) Apparatus for sealing or tying products, comprising a housing with at least a first tape dispenser comprising adhesive tape and binding means for binding tape from said at least one dispenser around a product or a bundle of products, wherein at least one supply device is provided for supplying items to be connected to said product or bundle of products,, wherein the binding means comprises at least one cell and an urging device for urging part of the product or bundle of products into the cell, especially towards a closed side of said cell, wherein the urging device comprises at least one holding provision for holding an item provided by the supply device, such that when the urging device is operated for urging the product or bundle of products into the cell the item is urged against the product or bundle of products, preferably prior to binding the tape around the product or bundle of products in the cell.

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Title: Apparatus and method for sealing or tying products

The invention relates to an apparatus and method for sealing or tying products. The invention more specifically relates to an apparatus and method for wrapping at least an adhesive strip of tape around at least part of a bundle of products for tying them together.

It is known to gather a bundle of products such as produce, for example flowers, and wrap an elastic band around part of said products, such as around the stems of the flowers, in order to bundle them. It is also known to gather such products into a bundle and then wrap an adhesive tape around part of them, such as around the stem of a bundle of flowers, for bundling them. Such apparatus are for example known from US2841935, NL8902097 and US4545185.

In US2841935 a sealer is shown having a wheel comprising a series of slots defined in the periphery thereof, regularly spaced relative to each other along said periphery. Between each set of two adjacent slots a knife is housed in the wheel, having a cutting edge extending slightly from said periphery. Tape fed over the periphery can be cut by such cutting edge when the wheel is turned during feed through of a bag to be closed and sealed.

In NL8902097 a sealer is shown having a star wheel having six identical slots provided evenly distributed around the periphery of the star wheel. Products can be hand fed though a slot in the housing of this sealer for rotating the wheel and sealing the bag.

In US4545185 a sealer with a star wheel is disclosed, wherein the star wheel has four first slots into which the neck of a bag to be sealed can be fed, and in the middle between two adjacent first slots a second slot is provided for allowing a knife to cut tape fed over the periphery of the wheel.

In WO2012/060701 an automatic sealer is described having a pick and place system for adding a bag to a bundle of produce during taping of

the bundle. The bundle can for example comprise flowers, taped together at the stems. The bag can for example comprise nutrients for the flowers. Such pick and place system is however complicated and costly, both in purchase and in maintenance.

An aim of the present invention is to provide an alternative to these known apparatus and methods. Another aim of the present invention is to provide a method and apparatus for sealing or tying products into bundles. A still further aim is to provide a method and apparatus for tying fresh produce, flowers or the like natural products, especially such that items, for example containers such as, but not limited to, sachets, bags, bottles, flasks and the like can be provided with the bundle.

One or more of these and/or other aims can be obtained with an apparatus and/or method according to invention.

An apparatus for sealing or tying products according to this disclosure can comprise a housing with at least a first tape dispenser comprising adhesive tape and binding means for binding tape from said at least one dispenser around a product or a bundle of products. At least one supply device is provided for supplying items to be connected to said product or bundle of products, which supply device comprises a supply arrangement. The binding means comprises at least one cell and an urging device for urging part of the product or bundle of products into the cell, especially towards a closed side of said cell. The supply arrangement is provided for supplying an item, wherein the urging device comprise holding means for holding the item provided by the supply arrangement, such that when the urging device is operated for urging the product or bundle of products into the cell the item is urged against the product or bundle of products, prior to binding the tape around the product or bundle of products in the cell.

A method for sealing or tying products according to the present disclosure can comprise leading adhesive tape over an open side of a cell of a star wheel, an adhesive side of the adhesive tape facing away from the star

wheel, wherein a product or a bundle of products is pushed against the tape and into the cell, adhering at least part of the adhesive tape around at least part of the product or bundle of products, and rotating the star wheel around an axis. The cell with the product or bundle of products is preferably moved along a feeding station for feeding a second tape, preferably non adhesive tape, over the cell and the product or bundle, adhering to the adhesive tape. The method further comprises the step of tying the tape round the product or the bundle of products. The star wheel is rotated further and the tape is or the two adhered tapes are cut, allowing the bundle to be removed from the cell. The product or bundle of products is pushed into the cell at least by an urging device, wherein an item is pushed into the cell against the product or bundle of products by the urging device.

Such method has the advantage that the items can easily and securely be provided to the products or bundle of products, without the necessity of using pick and place means additional to the binding apparatus.

By way of example apparatus, methods, use and products shall be described hereafter, schematically and in relative detail, with reference to the drawing, in which:

Fig. 1 schematically in perspective view a binding apparatus, in a first embodiment;

Fig. 2 schematically in frontal view, opened, an apparatus of fig. 1;

Fig. 3 schematically in perspective view a binding apparatus, in a second embodiment;

Fig. 4 schematically in frontal view, opened, an apparatus of fig. 3;

Fig. 5 schematically part of an apparatus of fig. 1 or 3, in a first position;

Fig. 6 schematically part of an apparatus of fig. 1 or 3, in a first position;

Fig. 7 schematically in perspective view an apparatus of fig. 3, from the rear;

Fig. 8 schematically in top view an apparatus of fig. 7, with part of a bundle engaging the star wheel;

Fig. 9 schematically in perspective view a knife assembly;

Fig. 10 schematically in frontal view an apparatus, in a further embodiment;

Fig. 11 in side view an apparatus of fig. 10;

Fig. 12 in rear view an apparatus of fig. 10 and 11;

Fig. 13 in perspective view an apparatus of fig. 10 - 12;

Fig. 14 the apparatus of fig. 10 - 13, with a bundle of flowers, together with the supply of containers to be tied with the bundle;

Fig. 15 in perspective view an embodiment of an apparatus for supplying items with bundles tied by at least tape;

Fig. 16 and 17 at an enlarged scale parts of an apparatus of fig. 14;

Fig. 18 in side view part of an urging device for an apparatus of fig. 14 – 17; and

Fig. 19 schematically part of an apparatus of fig. 10 – 17, in top view.

In this description the same or similar or corresponding parts can have the same or corresponding reference signs. The embodiments shown and described are exemplary embodiments only and should by no means be understood as limiting the scope of protection sought as defined by the claims. The apparatus and methods according to the invention are described in relation to fresh products such as flowers, produce and the like, uncovered or covered. This should not be considered limiting. A similar apparatus could be used for for example sealing or tying bags, wrappings, bundles of other products, such as but not limited to rods, sticks and other such elements.

In this description an item such as a container can be described to be tied by the tape with the product or products. Such container can for example be, but is not limited to, a sachet, bag, flask, box, bottle or any container suitable for holding content. Alternatively other items could be tied to a product or bundle of products in the same or similar manner. Such items are, for the purpose of this description, also to be understood as encompassed by the description.

In this description apparatus will be described which are hand-operated, that is wherein products to be tied or sealed are fed through the apparatus manually. However, mechanical means are preferably provided to feed the products through the apparatus, or at least assist a user in feeding the products through the apparatus, such as transport bands, chains and other transport means. Star wheel should be understood as at least including any element, rotational around a real or virtual axis, provided with cells along the periphery forming positions for receiving products or parts thereof to be tied or sealed and/or receiving at least part of a knife or other cutting or slicing tool or element.

Relevant following first cell can be understood as meaning a first cell following the said first cell seen in a direction of rotation of the star wheel, which can be used for tying or sealing products.

In general an apparatus according to the present disclosure comprises a rotating system for tying tape around a product or bundle of products, a system for urging the product or products into a cell of the rotating system and a supply system for supplying items such as bags to the urging system, such that prior to or during urging of the product or bundle of products into said cell the item is positioned against the product or bundle of products and/or to the tape, such that during tying of the tape around the product or bundle of products the item is enclosed between the tape and the product or bundle of products.

In fig. 1 – 9 general principles of an apparatus for tying products or bundles of products are disclosed, for a better understanding of the disclosure.

Fig. 1 and 2 show a first exemplary embodiment of an apparatus for tying products or bundles of products. The apparatus 1 comprises a housing 2, at least a first tape dispenser 3 and a star wheel 4. A slot 5 is defined by or through the housing 2. The star wheel 4 extends at least partly in said slot 5. In this embodiment the housing 2 comprises a front panel 6 and back panel 7 and rests on legs 8 for providing stability and the possibility of moving the apparatus 1 to an appropriate position. The apparatus can thus be mobile. However, it is also possible to install the apparatus permanently or semi permanently in one location, for example at a packaging line. In this embodiment the slot 5 extends from an inlet opening 9 to an outlet opening 10. The outlet opening 10 can be provided between the inlet opening 9 and the legs 8. In the embodiment of fig. 1 and 2 the outlet opening 10 opens into a hole 11 extending through the housing 2, opening to both the front 12 and back 13 thereof. The slot 5 is formed by cut outs in the front panel 6 and back panel 7.

In fig. 2 the front panel 6 has been removed, for example pivoted down around pivots 14, opening the housing 2. As can be seen the star wheel 4 can be mounted on an axis 15, extending substantially perpendicular to the front and back 12, 13 of the housing 2, such that it can be rotated around said axis 15 within the housing 2. In an embodiment the inlet opening 9 and outlet opening 10 can be positioned such that a straight line L drawn between a mid 16 of the inlet opening 9 and a mid 17 of the outlet opening 10 extends past the axis 15 at a distance D1 there from. The slot 5 is curved between the inlet opening 9 and outlet opening 10 such that it passes the axis 15, a mid 18 thereof being at a distance D2 from the axis 15. The distance D2 can in an embodiment be larger than the distance D1. In other embodiments it can be smaller or the same.

The star wheel 4 comprises a series of first cells 19 and a series of second cells 20. The position of each cell 19, 20 is for the sake of this description defined by a line J extending through the axis 15 and a mid M of a relevant cell 19, 20 at the periphery 21. The first cells 19 and second cells 20 can be intermittently disposed in the star wheel 4. This has to be understood as including but not necessarily limited to an arrangement of the cells 19, 20 around the periphery 21 of the star wheel 4 such that between two adjacent first cells 19 seen around the periphery 21 a second cell 20 is provided. Each cell 19, 20 is open to the periphery 21 of the star wheel 4 and two opposite sides 22, 23 thereof. In the embodiments shown there is the same number of first cells 19 as there are second cells 20. In an embodiment there can be three first cells 19 and three second cells 20. In an embodiment the first cells 19 can be distributed around the periphery 21 evenly, as can the second cells 20. For three first cells 19 this means that an angle α included between two lines J through adjacent first cells 19 will be approximately 120 degrees. Similarly for three second cells 20 the angle ß included between two lines J through adjacent second cells 20 will be approximately 120 degrees. For different numbers of first and second cells 19, 20 the angles α, ß will be amended accordingly, by the definition 360 degrees divided by the number of first or second cells 19, 20 respectively.

In an embodiment each first cell 19 comprises a leading edge 24 and a trailing edge 25, whereas each of the second cells 20 has a leading edge 26 and a trailing edge 27, seen in a direction of rotation W of the star wheel 4. A direction of rotation W of the star wheel 4 is defined by rotation of the star wheel 4 around the axis 15 such that a cell 19, 20 moves from near the inlet opening 9 to near the outlet opening 20 over the shortest path of travel, along the slot 5. In an embodiment a distance D3 between a trailing edge 25 of a first cell 19 and a leading edge 26 of an adjacent second cell 20, measured along the periphery 21 of the star wheel 4 is smaller than the distance D4 between the trailing edge 27 of said second cell 20 and a

leading edge 26 of the same second cell 20 and a following relevant first cell 19. In an embodiment the distance D3 can be less than half the distance between two adjacent relevant first cells 19. In an embodiment the first and second cells 19, 20 can be distributed around the periphery such that the angles α and ß will be the same, but an angle γ between lines J through a first cell 19 and an adjacent trailing cell 20, that is the second cell following the first cell 19 in the direction of rotation W of the star wheel 4 is smaller than the angle δ between the lines J through said second cell 20 and the following first cell 19. In an embodiment the angles α, ß can be 120 degrees, the angle γ can be between 5 and 60 degrees, more specifically between 10 and 45 degrees, for example approximately 30 degrees. The angle δ can be about (α - δ), which can e.g. be about 90 degrees.

In an embodiment the edges 24, 25, 26, 27 can extend substantially parallel to the line J extending through the relevant cell 19, 20. In an embodiment the second cells 20 can be smaller than the first cells 19. The first cells 19 can have a width B1 measured between the leading and trailing edge 24, 25 perpendicular to the relevant line J through the cell 19 larger than the width B2 of the second cells 20. In an embodiment the first cells 19 can be distributed such that when a one of the first cells 19 is positioned adjacent the outlet opening 10 of the slot 5, a following relevant first cell 19 is positioned adjacent the inlet opening 9 of the slot 5. A second cell 20 can be positioned in between, extending within the housing and/or in the slot. In an embodiment the depth X of each second cell 20 can be such that it is enclosed within the housing 2, except when passing the inlet opening 9 and/or the outlet opening 10.

A knife carrier 28 is provided near the periphery 21, within the housing 2. The knife carrier 28 can be positioned near the periphery 21 of the star wheel 4 and comprises at least one knife 31 that can be moved into and out of at least one of the second cells 20, for cutting tape, as will be

discussed later on. Preferably the knife carrier 28 is at least partly operated by rotation of the star wheel 4.

The knife carrier 28 can, as is further elucidated in fig. 9, be provided with a number of arms 29, extending from a central core 30, for example substantially radially. In an embodiment there can be four such arms 29. Each arm 29 can comprise a knife 31 with a cutting surface and/or teeth 32 extending substantially away from the core 30. The core 30 can be positioned on an axis 33 extending substantially parallel to the first axis 15. As can be seen especially in fig. 9, each of the arms 29 can be provided with a first side 34 and a second side 35, the knifes 31 being provided between said sides 34, 35. Each of the first sides has a blade 36 that extends at least with a tip region 37 at a side 22 of the star wheel 4. Near the periphery 21 and adjacent a trailing edge 27 of a second cell 20 an operating element 38 is provided that extends from the side 22 of the star wheel 4. The element 38 can for example be a notch, pin, edge, rib or any other suitable element. As will be discussed later, the blade 36 can be brought into contact with the operating element 38, for operating the knife carrier 28.

As can be seen in fig. 2 at one side of the slot 5 a first tape dispenser 3 is provided, comprising a roll of adhesive tape 39. A second tape dispenser 40 is provided, for holding a second role of tape 41. In an embodiment the first tape dispenser 3 can be provided at a side of the slot 5 opposite the side of the second tape dispenser 40. The second tape dispenser 40 can be provided at a side of the slot at which the knife carrier 28 is also provided. Sides to the slot should be understood as to the left or right of the line L as seen in a front or rear view of the apparatus 1. Near the knife carrier 28 a tautening device 42 is provided, preferably in the housing 2. The tautening device 42 comprises an arm 43, pivotally connected to the housing 2 in a pivot point 44. A side arm 45 is connected to the arm spaced apart from the pivot point 44, extending substantially in a direction away from the star wheel 4. The knife carrier 28 can be positioned substantially

between the star wheel 4 and the arm 43. A spring 46 is connected between the housing 2 and the arm 43, biasing the arm towards the knife carrier 28. The second side 35 of the arms 29 is substantially in the same plane as the arm 43, such that, as is shown in fig. 2 and 5, at least one arm 29 is in contact with the arm 43 at all times. At the side arm 45 a pin 47 is provided, extending substantially parallel to the axis 15. At two opposite sides of the pin 47 the housing is provided with guide elements 48A, B.

From the first tape dispenser 3 adhesive tape 39 is fed over the periphery 21 of the star wheel 4, at least past a first cell 19 near or adjacent to the inlet opening 9 of the slot 5, an adhesive side 49 of the tape 39 extending outward, away from the star wheel 4. At the side of the slot 5 near the inlet opening 9, between the slot 5 and the arm 43, a guide 50 for the second tape 41 dispensed from the second tape dispenser 40 is provided, for guiding the second tape 41 towards the periphery 21 of the star wheel 4, at a position downstream from the inlet 9. The second tape 41 is preferably non adhesive tape, such as but not limited to paper tape. The second tape preferably is easily tearable, preferably more easily that the adhesive tape 39. The second tape is led from the second tape dispenser 40 over the sides of the guide elements 48A, B facing away from the star wheel 4 and over the side of the pin 47 facing the star wheel 4, and then through the guide 50 towards the periphery 21 of the star wheel 4, over which it is led in a downstream direction, towards the outlet opening 10, adhered to the adhesive tape 39.

As can be seen in for example fig. 2 and 5, the knife carrier 28 can be positioned in a rest position, in which the arm 43 is in contact with two arms 29 of the knife carrier 28. The spring 46 keeps the arm 43 in this position during rotation of the star wheel 4. In the position of fig. 2 a bundle of products, such as the stems S of a bunch of flowers, schematically shown in cross section in fig. 2 directly above the star wheel, in the inlet opening 9, can be pushed into the relevant first cell 19 adjacent the inlet opening 9, in

the direction F, thereby pushing the tape 39 extending over the opening of the relevant first cell 19 into the cell 19, adhering at the same time to the stems S of the flowers and dispensing tape 39. By pushing the stems S further in the general direction F the star wheel 4 will be rotated in the direction W, leading the stems S through the slot 5 towards the outlet opening 10. Tape 39 will be dispensed from the first dispenser 3. Since the second tape 41 is adhered to the first tape 39 at the downstream side of the relevant first cell 19, tape 41 will also be dispensed from the second dispenser 40. The tape will be kept taut by the tautening device 42, also keeping the knife carrier 28 in the rest position. The first tape 39 and the second tape 41 adhered thereto will thus be extended over the second cell 20 following the relevant first cell 19.

When the star wheel 4 is rotated further in the direction W, the operating element 38 of a second cell 20 upstream adjacent the relevant first cell 19 in which the stems S extend is brought into contact with the tip region 37 of the side 36 of an arm 29 of the knife carrier 28 extending substantially into the direction of the slot 5 and inlet opening 9, as is shown in fig. 6. The tip region 37 can be provided with a guide surface 51 which is curved. The guide surface 51 faces outward and is positioned such that upon further rotation of the star wheel 4 the operating element 38 is forced along the guide surface 51, pushing the arm 29 and especially the knife 31 into the second cell 20, bringing the knife carrier 28 and knife 31 in a working position, cutting the tapes 39 extending over the second cell 20. At the same time the arm 43 is pushed away from the star wheel 4, releasing to some extend the tension on the second tape 41 and allowing the knife carrier 28 to rotate further when the star wheel is rotated further in the direction W. This can bring the knife carrier back into a rest position. The stems S are thus enclosed between the first tape 39 extending to a high extend and preferably almost entirely around the bundle of stems S and the second tape 41 extending over a gap 52 between two parts of the first tape 39. This

makes it easy to remove the tapes 39, 41 from the stems, by tearing one of the tapes, preferably the second tape 41 by pulling the two tabs 53A, B, formed on either side of the gap 52, apart.

The position of the knife carrier 28 along the periphery 21 relative to the inlet opening 9 and the relative positions of each first cell 19 and the adjacent upstream second cell 20 defined the length 54 of the tabs 53. Once the tapes 39, 41 have been cut by the knife 31, the star wheel 4 will rotate relative to the tapes, until the stems S are released form the cell 19 and a further bundle of stems S is introduced into the next first cell 19 then adjacent the inlet opening 9. By reducing the distance D between the cell 19 and the position in which the knife 31 cuts the tapes 39, 41 in the adjacent second cell 20 the tab length 54 can be limited, reducing use of tape and preventing excessive tab lengths, which is especially desirable when bundles of products have to be tied or sealed having a relatively large size in cross section.

Fig. 3 and 4, 7 and 8 disclose an alternative embodiment of an apparatus according to the description, having the same or a similar star wheel 4, first and second tape dispensers 3, 40, knife carrier 28 and tautening device 42. In this embodiment the housing is divided basically in two parts 55, 56, the slot 5 extending between and being substantially defined by facing edges 57, 58 of the two parts 55, 56. A carrier 59 is provided, connecting the first and second part 55, 56. The carrier 59 is substantially U shaped, extending substantially perpendicular to the sides 12, 13 of the housing 2, having a central element 60 and two arms 61, connecting ends of the central element 60 with the first and second part 55, 56 respectively. The carrier therefore extends at a distance from the slot 5. In this embodiment the apparatus 1 can be mounted with the carrier on a working surface (not shown) such that a bundle of products such as flowers with stems S can be pushed from the slot 5 through the outlet opening 10

further in the direction of movement they had when passing through the slot 5.

In the description the embodiments are disclosed having the slot 5 or at least the line L extending substantially vertically. It is however obviously possible to have the slot extend in any desired direction and position, for example substantially horizontally or inclined relative to a horizontal and vertical plane.

In an embodiment the inlet opening 9 and first cell 19 can have corresponding widths. In another embodiment the width of the first cell 19 can differ from the inlet 9, for example smaller. The width B1 can for example be between 20 and 100 mm, for example between 30 and 80 mm. In an example the width B1 can be about 30 mm, about 40 mm or about 50 mm. The star wheel can have a diameter of any size, for example between 100 and 500 mm. In an example the star wheel can have a diameter of between 200 and 300 mm, for example about 240 to 250 mm. These sizes are only given by way of example. The star wheel 4 need not be circular. In an embodiment different star wheels 4 can be provided, interchangeable in the same housing. Different star wheels 4 can have for example but not limited to different positions of the first and second cells, different numbers of such cells, different sizes of first and/or second cells or combinations thereof, suitable for for example different sizes of bundles of products or bags or different products. Star wheels can have cells having for example a padding for protecting products from damage by the forces exerted thereon when being bundled, tied and/or sealed.

Figs. 10 - 12 show an embodiment of an apparatus 1 according to the invention, again comprising a housing 2, at least a first tape dispenser 3 and a star wheel 4. A slot 5 is again defined by the housing 2, extending between an inlet 9 and an outlet 10. As can be seen, especially in fig. 10 and 12, the star wheel 4 extends partly in the slot 5. Products fed through the slot 5 therefore have to engage the star wheel 4. In this embodiment the star

wheel 4 is substantially the same as disclosed in the previous figures. However, in all embodiments star wheels 4 could be used having the first and second cells 19, 20 distributed differently, for example evenly spaced around the periphery, whereas the cells 19, 20 could all have the same sizes. In embodiments the second cells could be omitted. The apparatus 1 will be discussed especially as far as it is different from the previous embodiments.

In this embodiment an urging device 62 is provided, at least partly upstream of the star wheel 4. A support surface 63 is provided at least on one side of the slot 5, for supporting products to be tied and/or a transport device fed over the support surface 63. Such transport device can for example be a substantially flexible conveyer 100, which can in embodiments have a relatively soft top side for supporting the products or parts thereof. As can be seen in for example fig. 13, the support surface 63 can have a wavy portion 64 next to the star wheel 4, such that when the support surface 63 extends substantially horizontally a first part 65 of the transport surface 63 next to the star wheel 4 extends higher than an axis 15 of the star wheel 4 and two adjacent parts 66 of the supporting surface 63 extend on either side of the first part 65 at a lower level. The structure is preferably chosen such that when a first cell 19 is open to the inlet opening 9, an edge flush with the transport surface or transport element supported thereon, another first cell is open to the outlet in a similar manner, whereas the curvature of the wavy part is such that upon rotation of the star wheel to bring the relevant cell from the inlet side to the outlet side, a bottom portion 67 of the cell follows the wavy pattern of the first part 65, thus allowing support of the product or products by the supporting surface, directly or indirectly, during such movement.

As can be seen, in fig. 12 especially, the urging device 62 can have a central portion 68, mounted on or formed by an axis of rotation 69, preferably extending substantially parallel to the axis 15 of the star wheel 4. In the embodiment shown the urging device comprises three pairs of

protrusions or fingers 70, extending substantially tangential to the axis 69, at even angles τ of 120 degrees, between their length directions T. Of each pair the fingers 70 are spaced apart in the length direction 69L of the axis 69, such that of each pair the fingers extend on opposite sides of the star wheel 4, at least partly, as is especially clear from fig. 11. The star wheel 4 and the urging device 62 have the same direction of rotation 71, in fig. 12 counter-clockwise, and can both be driven by a motor. Each finger 70 has, seen in the direction of rotation 71, a forward side forming an edge portion 72 for urging products into a cell 19 of the star wheel. This edge portion can be substantially straight and substantially parallel to the length direction T of the finger 70. The opposite, trailing side 73 of the fingers 70 can extend at a slight angle relative to the length direction T and/or the edge portion 72, and there can be a bent transition position 74 between the edge portion 72 of one finger and the trailing side 73 of the an adjacent finger 70. As can be seen the edge portion 72 can be brought into a position in which it extends substantially parallel to and substantially at the same level as the adjacent support surface 63. In fig. 12 this position is shown, wherein the adjacent finger preceding this finger 70 extends to a side of a cell 19 of the star wheel 4. Above the slot 5 near the urging device 62 a sensor 75 is mounted, such as for example an optical sensor, registering during use movement of products into the slot 5, over fingers 70 of the urging device 62.

Above the slot 5 furthermore a pressing device 76 can be mounted. In the embodiment shown the pressing device 76 comprises two substantially parallel arms 77, extending partly on opposite sides of the star wheel 4, above the fingers 70. The arms 77 are mounted on a common carrier 78, mounted on an axis of rotation 79 and biased in a downward direction P, for example by one or more springs 80 and/or gravity. As can be seen in fig. 12 the arms 77 can rest on ends 81 of the fingers 70, such that a rotation of the urging device 62 will move the arms up and down, pivoting around the axis 79. The pressing device can also be an urging device.

Preferably the urging device has a first number N1 of fingers or at least edge portions 73, whereas the star wheel has a second number N2 of first cells 19, wherein the first and second number N1, N2 are related by the formula N1=N*N2 or N2=N*N1, wherein N is an integer. In the embodiment shown N=1, resulting in the same number of cells 19 and fingers 70. N could also be a different number, for example but not limited to 2 or 3. When N=1 the revolutions of the star wheel 4 and the urging device 62 can be synchronised one to one.

In fig. 12 a knife arrangement 82 is shown, above the star wheel 4. A first and second dispenser 3, 40 are shown, for dispensing adhesive tape 39 and paper 41 respectively, in the same or similar manner as discussed with respect to the previous figures. In this embodiment the adhesive tape 39 is fed over the periphery of the star wheel 4, the adhesive side facing outward, from substantially a lower side 84 of the star wheel 4. The paper or second tape 41 is fed from the second dispenser 40 over guide and tensioning wheels 86, 87, towards an upper side 85 of the star wheel 4.

The knife arrangement 82 can comprise a knife or blade 32, which can be movable in a linear direction K, substantially radial to the star wheel 4, into and out of a cell 20, for cutting the tape 39 or combined tapes 39, 41. The knife 32 can be moved by a pneumatic or hydraulic driver 88, or in another suitable way, such as but not limited to electrically or mechanically, for example coupled to the rotation of the star wheel 4.

In fig. 13 in perspective view a device or apparatus 1 is shown, according to fig. 10 - 12. Such device can be used as follows, referring also to the previous description of other embodiments.

A product or bundle of products 51, such as flowers, vegetables, rod like elements or the like, which may or may not be enclosed at least partly in a wrap or bag, can be fed into the slot 5 from the inlet 9, over a pair of fingers 70. In fig. 11 and 12 stems 90 of a bundle of flowers are shown as a bundle of products 51 to be tied. When the stems 90 are moved

over the fingers 70, for example by a transport conveyer 100, extending over the support surface 63, and below the sensor 75, a control unit 91 will drive the star wheel 4 and the urging device 62 in the direction 71, such that the edge portion 72 will urge the stems 90 together and into the cell 19 of the star wheel4, against the tape 39 extending over said cell 19. By rotating further the tape will be forced into the cell, together with the stems 90, as discussed before, whereas the arms 77 of the pressing device will come down and will be forced against the stems 90 on either side of the star wheel 4, urging the stems 90 down towards the bottom portion 67 thereof, keeping them together during tying. Then the star wheel 4 and urging device will be rotated further, such that (if applicable) paper or such tape 41 will be provided in an earlier described manner over part of the adhesive tape 39, forming a tie as discussed and shown in for example fig. 2, in a position leaving the apparatus 1. The knife 32 will then be forced downward, into the relevant second cell 20, for cutting the tape 39 or combined tapes 39, 41, such that the tied stems 90 or at least products 51 can be removed when the star wheel is rotated further, such that the relevant cell 19 holding the stems 90 will be flush with the slot 5 again. For each bundle 51 to be tied the star wheel 4 and urging device 62 will be rotated over the same angle of approximately 120 degrees.

The knife arrangement 82 can be provided with a supporting roll 92, supported on a periphery of the star wheel 4. In an embodiment the knife 32 can be biased by the driver 88 into an extended position, such that the roll 92 is forced against the periphery and that the knife 32 will automatically be forced through the tape or tapes 39, 41 when the cell 20 arrives at the roll 92 which will then be forced into said cell 20, together with the knife 32. The driver 88 can then retract the knife and roll 92 after the cutting. Alternatively the knife 32 can be actively forced into the cell 20 by the driver 88, triggered by for example the control unit. Other means of operation are also possible, whereas a similar knife arrangement 82 could

be used in the other embodiments, whereas other knifes and knife carriers, such as but not limited to the rotating knife carriers as described before could also be used in an apparatus according to fig. 10 - 14.

By using the urging device 62 and/or the pressing device 76, and preferably both, the products can be brought into and/or held in a compact bundle during tying thereof.

It shall be clear that an urging device 62 and/or a pressing device 76 could also be used in the same or similar manner with embodiments of the apparatus 1 as discussed before.

As discussed with apparatus according to the present invention items such as containers can be provided to and bound together with products or bundles of products. In fig. 10 – 13 the fingers 70 of the urging device 62 are provided with a holding provision 100, for holding an item 96, such as a bag, supplied to the urging device 62 in any suitable manner. The holding provision 100 in this embodiment comprises a clip 101A at a trailing side 102 of the finger or each finger of a pair of fingers 70, seen in the direction or rotation 71 of the device 62. An edge portion of the item 96 can be clipped by the clip 101A, such that it will rotate with the urging device 62 and will be entered into the cell 19 against a product or a bundle of products in said cell 19. Upon further rotation of the urging device 62 the item 96 will be stopped from following the rotation of the urging device 62 by the product or bundle of products and will be pulled from the clip 101A, such that it can further move with the product or bundle of products 90 in said cell 19, with the star wheel 4, such that the tape or tapes will be provided around the product or bundle of products as discussed before, enclosing the item 96 between the tape or tapes and the product or bundle of products, as discussed before. During the movement of the item 96 it can also be engaged by the tape at a different moment, for example during transfer into the cell.

The items 96 can for example be bags which may be supplied individually to the holding provision 100, or may be provided as a strip and

cut from such strip during the positioning thereof in the holding provision 100.

In fig. 14 schematically an embodiment is shown of an apparatus 1, for example according to fig. 12, combined with a supply device 95 for feeding containers or other items 96 to the tape 39 between the first dispenser 3 and the slot 5. In fig. 14 the device 95 comprises a conveyer 98 on which a container or item 96 or preferably a series or strip of such items 96 and supplied towards the urging device 62 in the direction F_1. At the end of the belt the item 96 is fed directly into the holding provision 100, such as into the clip 101A. The end 98A of the conveyer 98 can extend between the fingers 70 of the urging device 62 for feeding the items into the holding provision 100. The tack of the urging device and conveyer 98 can be controlled for properly positioning one item in each holding provision. The conveyer 98 can conveniently be positioned just below the surface over which the product or bundles of products are supplied towards the star wheel 4.

When in this embodiment a product or bundle of products 51, such as the stems 90 are forced into the relevant cell 19, pushing the tape 39 into the cell, the container or item 96 will be enclosed between the tape 39 and the product or bundle of products 51, such that it will be tied to the product or bundle 51 simultaneously. An example of a container or item 96 can be, but is not limited to a bag, sachet, flask, bottle, leaflet, gift or the like. When bundling flowers the item 96 can for example be a sachet containing nutrition or fertiliser. When packaging produce the item can for example be additives to be used with the produce, such as but not limited to herbs, spices or the like.

In fig. 15 to 18 a further embodiment is shown of an apparatus 1 for binding products or bundles of products, such as but not limited to bundles of flowers or fresh produce, similar to the embodiment of e.g. fig. 10 – 14, again provided with a supply device 95 comprising a supply

arrangement for feeding items to be combined with said products or bundles of products to be bound. In the exemplary embodiments shown and discussed herein, solely by way of example and in a non limiting form, the item to be fed is a sachet 96, especially a sachet with nutrients for flowers with which they are to be combined. Again, in this part of the description only the parts and functions will be described which are different from the embodiment of fig. 10 – 14 and as far as relevant for a good understanding of the claimed invention. For the further description it is referred to the previous part of the description describing fig. 1 – 14, especially fig. 10 – 14 and the relevant drawings.

In the embodiment of fig.15 – 18 the urging device 62, again positioned at least partly upstream of the star wheel 4, has a series of pairs of protrusions or fingers 70 extending from a central part 68, rotatable on an axis 69. This axis extends substantially parallel to the axis 15 of rotation of the star wheel. Of each pair of fingers 70 a first finger 70A extends in a plane on and substantially parallel to a first side of the star wheel 4, whereas the second finger 70B of each pair extends in a plane on and substantially parallel to an opposite second side of the star wheel 4. Thus upon rotation of the central part 68 around axis 69 the fingers 70 are moved alongside the opposite sides of the star wheel 4.

Each finger 70 is provided with at least part of a holding provision 100 for temporarily holding an item 96 to be supplied to the product or bundle of products 51 to be bound. The holding provision 100 is provide such that upon urging a product or a bundle of products into a cell 19 the item is transferred into the same cell 19 and. Preferably, urged against the product or bundle of products then urged into or contained in the cell 19. Thus the items 96 can automatically be fed to the product or bundle of products in a correct manner. The holding provision 100 is preferably such that when the item is brought into the cell and pushed against the product or bundle

provided therein, upon further rotation of the urging device the item is released automatically from the holding provision 100.

In the embodiment shown each finger 70A, 70B is provided with a slot 101 forming a relevant part of a holding provision 100. Seen in the direction of rotation 71 of the urging device 62 the slots 101 are provided in the trailing edges 102 of the fingers 70. Each slot 101 has a holding portion 103 and a mouth 104 opening into said side edge 102. The holding portion 103 is wider than the mouth 104, such that one either side of the mouth 104 an edge portion 105A, B is provided. In the embodiment shown each edge portion 105A, B is provided with an angled surface, such that the holding portion 103 narrows towards the mouth 104. Seen from a side the two slots 101 in a pair of fingers 70 are in line with each other and preferably identical in shape and dimensions.

An item such as a sachet 96 can be placed in the holding provisions 100 in a pair of fingers 70, as shown in fig. 15 - 17, such that two spaced apart parts of the item 96 rest in the relevant holding portions 103 of the slots 101, for example with opposite ends of the item 96. As can be seen in e.g. fig. 15 and 19, an item 96 can be inserted from a side of the urging device 62, for example when a pair of fingers 70 extends substantially horizontally, the mouths 104 of the relevant slots facing downward. As can be seen for example in fig. 15 – 17 and 19, a previously inserted item 96B can have been carried by the urging device 62 towards the star wheel 4, especially towards and into a cell 19 thereof, into which cell a product or bundle of products is fed, urged by leading edges 72 of fingers 70. When the urging device 62 is rotated further, the fingers 70 are moved alongside opposite sides of the star wheel 4, whereas the item 96 is prevented from further movement when abutting a product or bundle of products and/or a wall of the cell 19, which means that the item will be pushed out of the holding provisions 100 through the mouths 104. Meanwhile the following

item 96A is lifted and rotated towards the star wheel 4, especially the following cell 19 since the star wheel 4 will also rotate.

If provided for, the pressing device 76, especially arms 77 thereof can also move between the fingers 70, pressing the item 96 further into the cell 19.

In fig. 15 – 19 a supply device is provided, comprising a conveyer system 106 having a feeding direction F_1 substantially parallel to the axis 69 of the urging device 62, contrary to the embodiment of fig. 14 in which said feeding direction F_1 was shown substantially perpendicular to said axis 69. In this embodiment the conveyer system is 106 is designed for feeding sachets or the like relatively flat, possibly relatively flexible items, for example filled with nutrients. Such conveyer systems are known in the art of conveying. The conveyers system as shown comprises a lower and an upper endless conveyer belt 107, 108, in close proximity in a feeding area 109. A first pair of rollers 110 is provided at a feeding end 112, a second pair or rollers 111 is provided at an outlet end 113. The outlet end is in close proximity to a side of the urging device 62, such that when the belts 107, 108 are driven towards the outlet end 113, items 96 leaving the outlet end 113 are moved directly into the holding provisions 100 of an adjacent pair of fingers 70. A stop 115 can be provided on the opposite side of the urging device, preventing the item from flying through the holding provisions, such that the item will be properly fitted in the holding portions 103.The items 96 can be fed into the conveyer set system between the conveyer belts 107, 108 in any suitable way, mechanically or manually.

The items such as sachets 96 can be fed in single file, as separate items 96. Alternatively they can be fed as a string of interconnected items, such as a string of sachets 96, from which string the item in the holding provisions can be severed, for example directly prior to or after feeding it into said holding provisions 100.

Between a pair of fingers 70 a stationary table could be provided, alongside which the fingers can move. An item inserted into the holding provisions could temporarily be supported and/or guided by the surface of said table. This could aid in proper positioning of the items, especially when they are relatively flexible.

In an alternative embodiment the items could be fed into the holding provisions in a different direction, for example in a direction substantially perpendicular to the axis 69, as shown in fig. 14. For example a feeding mechanism such as a lift could be used with which a single item such as a sachet is pushed upward in fig. 16 into the holding provisions 100, through the mouths 104.

In the embodiments disclosed in and discussed with respect to fig. 15 – 19 the item 96 may be relatively flexible, such that it can bend, at least enough for it to be able to be pushed out of the holding provisions through the mouths, but stiff enough to be able to be carried on the edge portions 105A, B. If for example a stiffer item should be fed, the holding provisions could be provided with for example resiliently flexible edge portions 105A and/or B, such that these could bend away for allowing the item to pass into or out of the holding portion 104, but able to carry the item one inserted. Alternatively or additionally edge portions 105A and/or B could be provided which are movable relative to the fingers 70 such that the can be pushed away when an item is entered into or moved out of the holding provisions 100, but are biased into a position in which they can carry the item in the holding provisions 100. Such moving of such edge portions 105A and/or B could be provided for by movement of the item 96 and/or could be actively forced by for example mechanical means provided along the path of travel of the fingers 70, such as urging cams or the like.

If the item 96 is sufficiently flexible, the holding provisions could be provided on a leading edge 72 of the urging device 62 in stead of at the trailing edge 102.

In the embodiments described and shown in the drawing, there is a first and a second dispenser 3, 40. However, in all embodiments it could be sufficient to have one tape dispenser only, especially the first dispenser for the adhesive tape. A star wheel 4 can have a width measured parallel to the axis 15 which is comparable to a width in the same direction of items 96 to be supplied, so as to provide an even better support and/or preventing possible collision with for example urging means and/or pressing means when available.

At least one of the knife arrangement or knife carrier, the star wheel and the urging device and/or pressing device, and/or at least one dispenser 3, 40 could be connected to a counter, registering the number of revolutions or cutting actions during a period, which will be indicative for the number of products or bundles of products that have been tied during that period. This information can be read directly from the counter or could be transferred to another location, for example by wireless, sms or the like.

The invention is by no means limited to the embodiments shown and discussed here above. Many amendments and variations are possible within the scope of the invention. The star wheel can be driven differently, for example through a step motor engaging the axis 15 or by the feeding and/or discharging means. The knife carrier can be made differently, for example as an arm extending partly in the outlet opening 10, such that when the products are moved through the outlet opening the knife 31 is forced into a second cell 20, cutting loose the stems S. In stead of the star wheel 8 in the present form, rotatable around an axis 15, a star wheel can be in the form of an endless star belt, formed as a belt having a series of cells in an outwardly facing surface, guided over at least two end wheels, such that a series of cells 19, 20 is fed along the guide surface, allowing a series of bundles to be handled at the same time. Means can be provided to print information on and/or in the tape and/or the foil strip, such as sealing date, expiration date of the product, packing apparatus identification,

advertisements or other information. In the embodiments shown the width of the strip of tape 39 is about the same as the width of the tape 41. These widths can be different, for example the second tape 41 can have a greater with in order to provide further information, such as user information, warranties and other communications. The urging means can be designed differently, for example moving substantially linearly. A transport belt of conveyer could be provided on both sides of the star wheel, or on only one side, and could be provided with elements for urging the products into a cell of the star wheel. The pressing device could also be designed differently, for example a flexible element extending alongside one or both of the sides of the star wheel, at an upper side of the cells 19 when opening towards the inlet 9 and/or outlet 10, for holding the products at a lower side 67 of the cell 19. These and other modifications, including all combinations and permutations of aspects and parts of the embodiments shown are supposed to have been disclosed here, both in isolation and in combination.

Conclusies

1. Inrichting voor het sealen of binden van producten, omvattende een huis met tenminste een eerste tapedispenser omvattende klevend tape en bindmiddelen voor het binden van tape, afkomstig van de tenminste ene dispenser, om een product of een bundel van producten, waarbij is voorzien in tenminste één toevoerapparaat voor het toevoeren van artikelen die moeten worden verbonden aan het product of de bundel van producten, waarbij de bindmiddelen tenminste één cel omvatten en een drijfapparaat voor het drijven van een deel van het product of de bundel van producten in de cel, in het bijzonder naar een gesloten zijde van de cel, waarbij het drijfapparaat tenminste één vasthoudvoorziening omvat voor het vasthouden van een artikel dat toegevoerd wordt door het toevoerapparaat, zodanig dat wanneer het drijfapparaat bediend wordt voor het drijven van het product of de bundel van producten in de cel, het artikel gedreven wordt tegen het product of de bundel van producten, bij voorkeur voorafgaand aan het binden van het tape om het product of bundel van producten in de cel.

2. Inrichting volgens conclusie 1, waarbij de bindmiddelen een sterwiel omvatten, waarbij een sleuf is gedefinieerd door het huis of door het huis heen, waarbij het sterwiel zich althans gedeeltelijk uitstrekt in de sleuf, waarbij het sterwiel een serie van eerste cellen en een serie van tweede cellen omvat, de eerste en tweede cellen intermitterend zijn verspreid over het sterwiel, waarbij elke cel open is naar een omtrek van het sterwiel en twee overstaande zijden ervan.

3. Inrichting volgens conclusie 1 of 2, waarbij het drijfapparaat een centraal deel omvat met tenminste één uitsteeksel dat zich uitstrekt vanuit het centrale deel, zodanig dat bij draaiing van het centrale deel, tenminste

één uitsteeksel is geroteerd langs de tenminste één cel, voor het overbrengen van het artikel in de cel.

4. Inrichting volgens een der conclusies 1-3, waarbij de bindmiddelen een sterwiel omvatten, dat roteerbaar is om een as, een sleuf gedefinieerd door het huis of door het huis heen, waarbij het sterwiel zich althans gedeeltelijk uitstrekt in de sleuf, waarbij het sterwiel een serie van eerste cellen omvat, welke zijn voorzien langs een omtrek van het sterwiel op reguliere intervallen, waarbij elke cel open is naar een omtrek van het sterwiel en twee overstaande zijden daarvan, waarbij het drijfapparaat een centraal deel omvat, dat roteerbaar is om een as die parallel is aan de as van het sterwiel, waarbij een serie uitsteeksels is aangebracht die zich uitstrekken vanuit het centrale deel, langs tenminste één zijde van het sterwiel, in het bijzonder langs twee overstaande zijden van het sterwiel, waarbij de vasthoudvoorzieningen op de uitsteeksels zijn aangebracht.

5. Inrichting volgens conclusie 4, waarbij een serie paren van eerste en tweede uitsteeksels op het centrale deel is aangebracht, waarvan de eerste uitsteeksels zich uitstrekken in een vlak dat zich uitstrekt langs een eerste zijde van het sterwiel en de tweede uitsteeksels zich uitstrekken in een vlak dat zich uitstrekt langs een tegenoverstaande tweede zijde van het sterwiel.

6. Inrichting volgens conclusie 5, waarbij tijdens overbrenging een artikel rust op beide uitsteeksels van een paar, zodanig dat een deel van het artikel dat zich uitstrekt tussen de uitsteeksels vrij is voor aangrijping.

7. Inrichting volgens één der conclusies 4-6, waarbij de toevoeropstelling een artikeltoevoerder omvat met een hoofdrichting van toevoer die in hoofdzaak parallel is aan de rotatie-as van het drijfapparaat, voor het toevoeren van artikelen in de vasthoudmiddelen.

8. Inrichting volgens één der conclusies 4-6, waarbij de toevoeropstelling een artikeltoevoerder omvat met een hoofdrichting van toevoer die in

hoofdzaak loodrecht is op de rotatie-as van het drijfapparaat, voor het toevoeren van artikelen in de vasthoudmiddelen.

9. Inrichting volgens één der voorgaande conclusies, waarbij de toevoeropstelling een transportinrichting omvat, zoals een transportband.

10. Inrichting volgens één der voorgaande conclusies, waarbij het toevoerapparaat zodanig is voorzien dat artikelen die aan het tape zijn geplakt ingesloten zullen worden tussen de klevende zijde van het tape en het product of de bundel van producten wanneer het tape daarna aan het product of de bundel van producten wordt gekleefd.

11. Inrichting volgens één der voorgaande conclusies, waarbij een controleapparaat is voorzien, voor het synchroniseren van tenminste de bediening van de bindmiddelen en het toevoerapparaat.

12. Bundel van producten, gebonden met behulp van tenminste een klevend tape dat zich uitstrekt om en gekleefd is aan een omtrekdeel daarvan, waarbij tussen het tape en de bundel van producten een artikel althans gedeeltelijk is ingesloten.

13. Werkwijze voor het sealen of binden van producten, waarbij klevend tape wordt geleid over een open zijde van een cel van een sterwiel, waarbij een klevende zijde van het klevende tape is afgewend van het sterwiel, waarbij een product of een bundel producten tegen het tape en in de cel wordt geduwd, waarbij ten minste een deel van het klevende tape om ten minste een deel van het product of de bundel producten wordt gekleefd, en waarbij het sterwiel om een as wordt geroteerd, waarbij de cel met het product of de bundel producten bij voorkeur wordt bewogen langs een toevoerstation voor het toevoeren van een tweede tape, bij voorkeur een niet klevend tape, over de cel en het product of de bundel, waarbij dit wordt gekleefd aan het klevende tape, waarbij het tape om het product of de bundel producten wordt gebonden, waarbij het sterwiel verder wordt

geroteerd en het tape wordt of de twee gekleefde tapes worden afgesneden, waarbij wordt toegestaan dat het product of de bundel uit de cel kan worden verwijderd, waarbij het product of bundel van producten tenminste door een drijfapparaat in een cel wordt geduwd, waarbij een artikel door het drijfapparaat in een cel wordt geduwd tegen het product of bundel van producten.

14. Werkwijze volgens conclusie 13, waarbij het artikel althans gedeeltelijk wordt ingesloten tussen het product of de bundel van producten en het tape.

15. Werkwijze volgens conclusie 13 of 14, waarbij het product of de bundel van producten door het drijfapparaat en/of een drukapparaat in een cel wordt geduwd, waarbij voordat het product of de bundel van producten in een cel wordt geduwd, een artikel op het drijfapparaat wordt geplaatst, zodanig dat het naar de cel wordt gedragen door het drijfapparaat.

16. Gebruik van een sealinrichting met een sterwiel, een klevend tapedispenser en een tapedispenser voor een tweede tape, die makkelijker scheurbaar is dan het klevende tape, voor het binden van producten, in het bijzonder verse producten, waarbij klevend tape wordt verstrekt door de dispenser en wordt gewikkeld om ten minste een deel van een bundel producten met gebruik van het sterwiel, waarna een tweede tape zodanig aan het klevende tape wordt gekleefd, dat uiteinden van het klevende tape worden bedekt door de tweede tape en niet aan elkaar kleven, waarbij de bundel producten door een drijfapparaat in de cel wordt geduwd, waarbij een artikel door het drijfapparaat in een cel wordt geduwd, tegen het product of de bundel van producten.

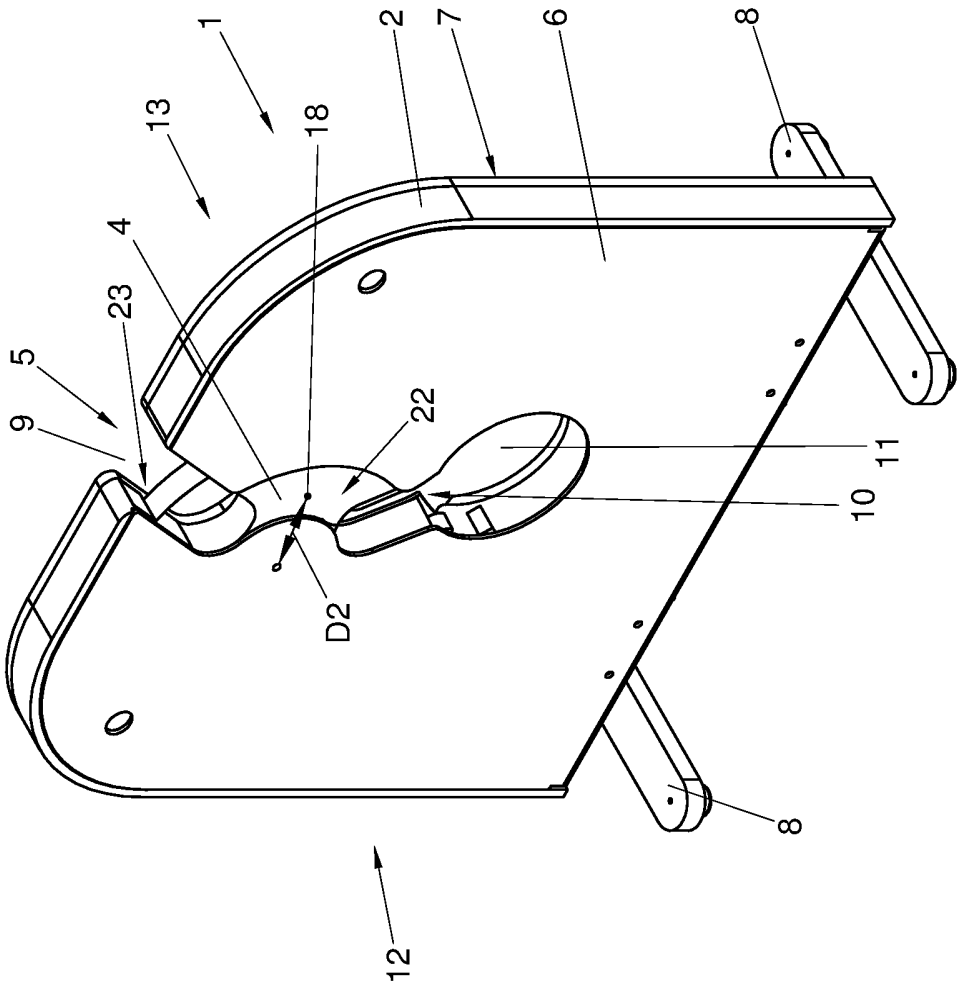
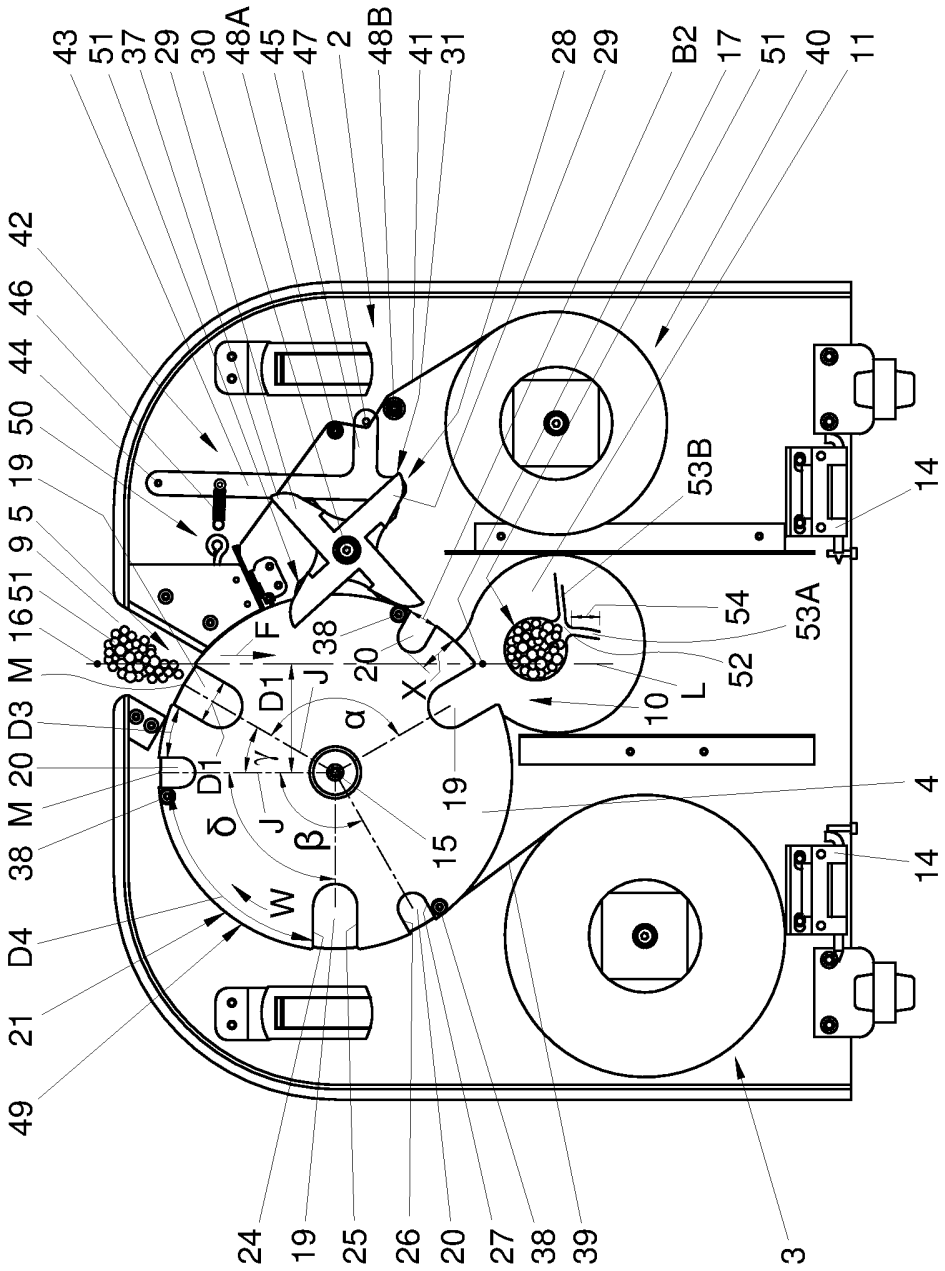


FIG. 1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51
37
29
30
48A
45
47
2
48B
41
31
28
29
B2
17
51
40
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46
44
50
19
5
9
51
M
16
D3
M
20
38
D4
21
49
53B
14
54
53A
52
L
10
F
38
20
X
D1
J
α
γ
D1
δ
J
β
W
19
15
4
14
24
19
25
26
20
27
38
39
3

FIG. 2

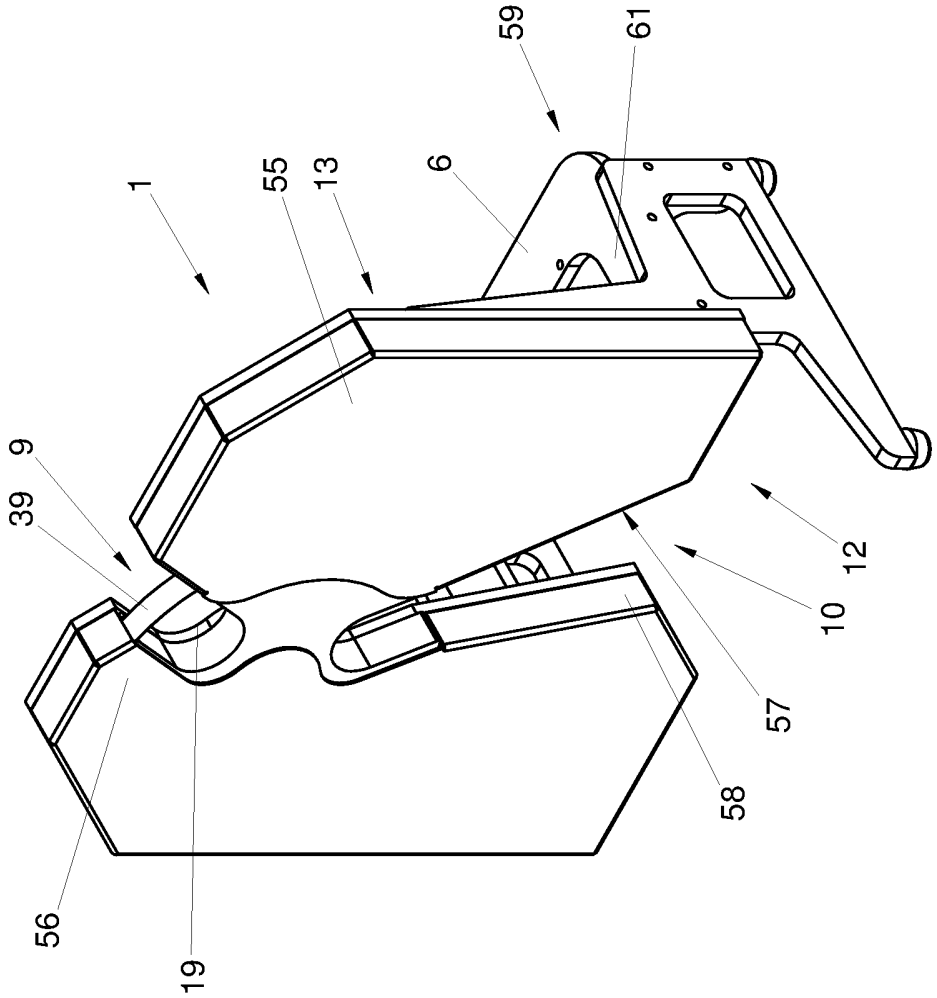

FIG. 3

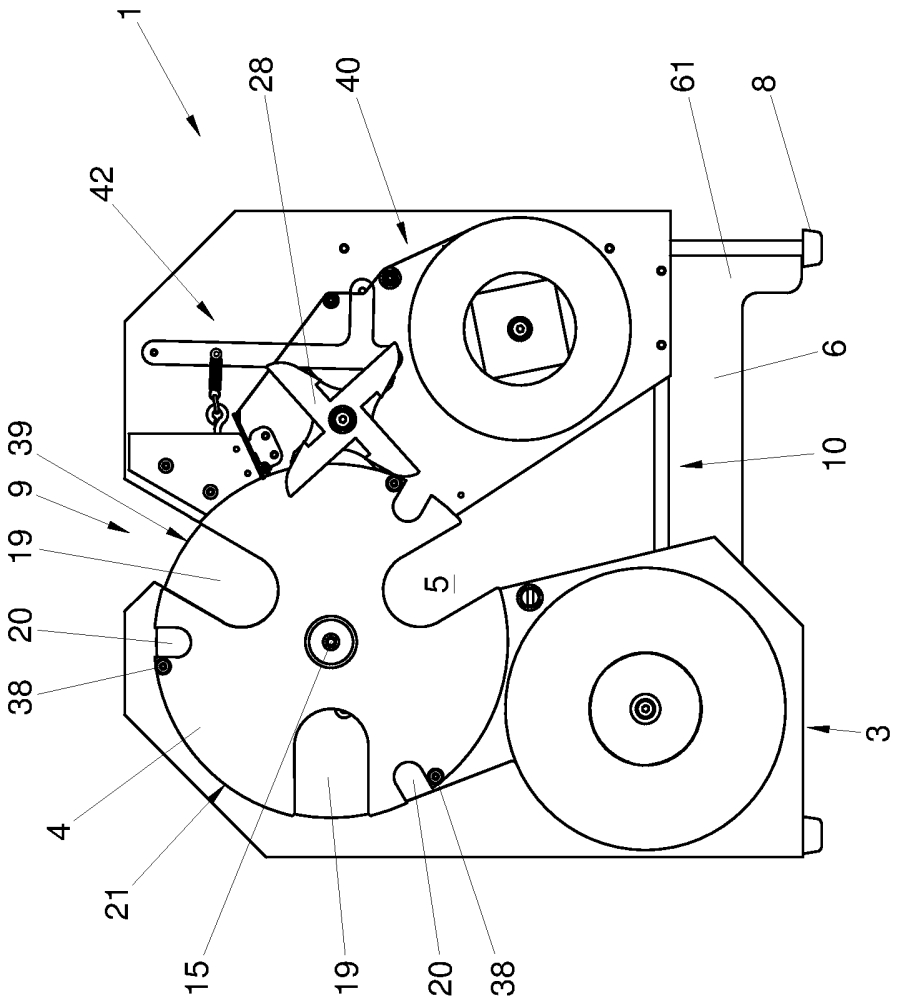

FIG. 4

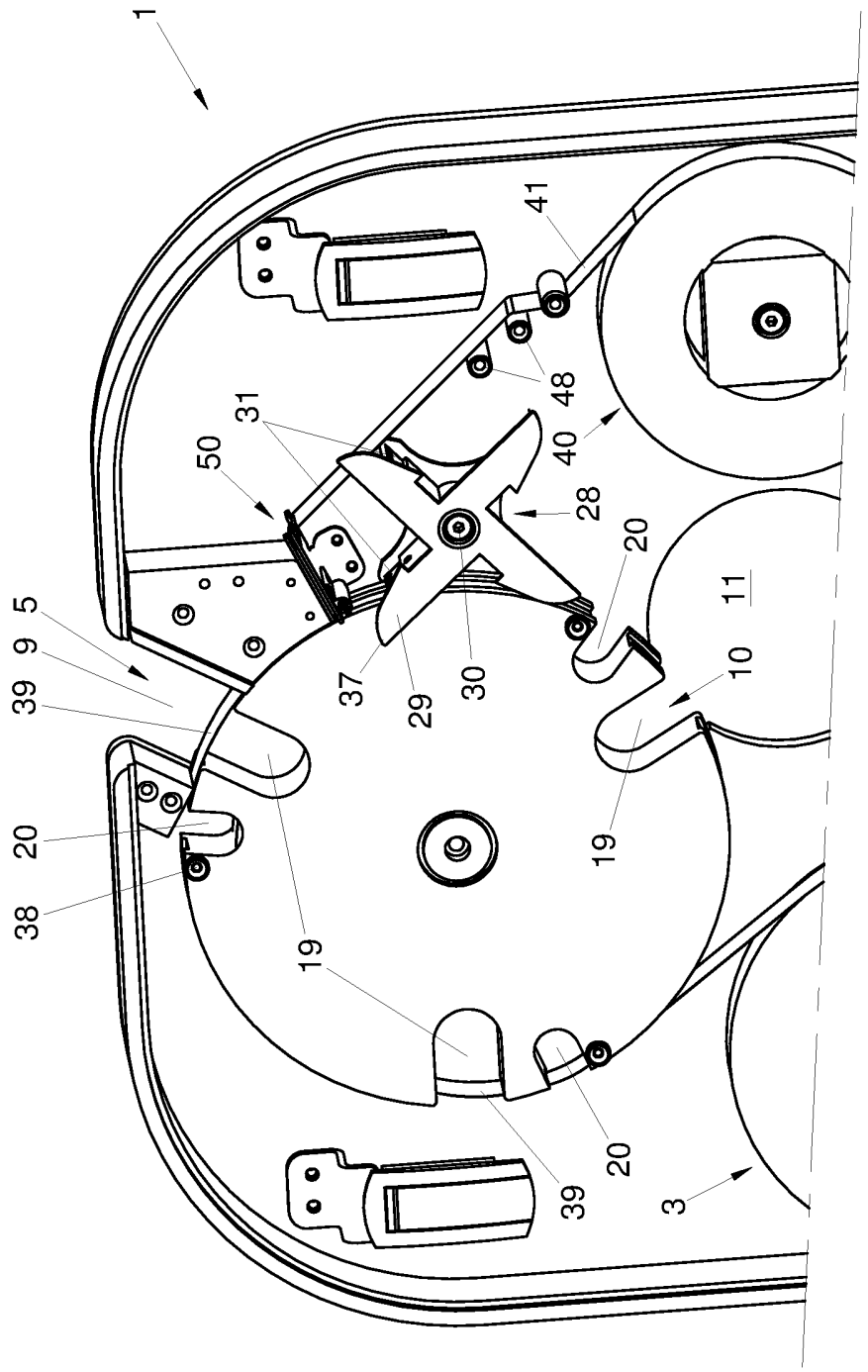

FIG. 5

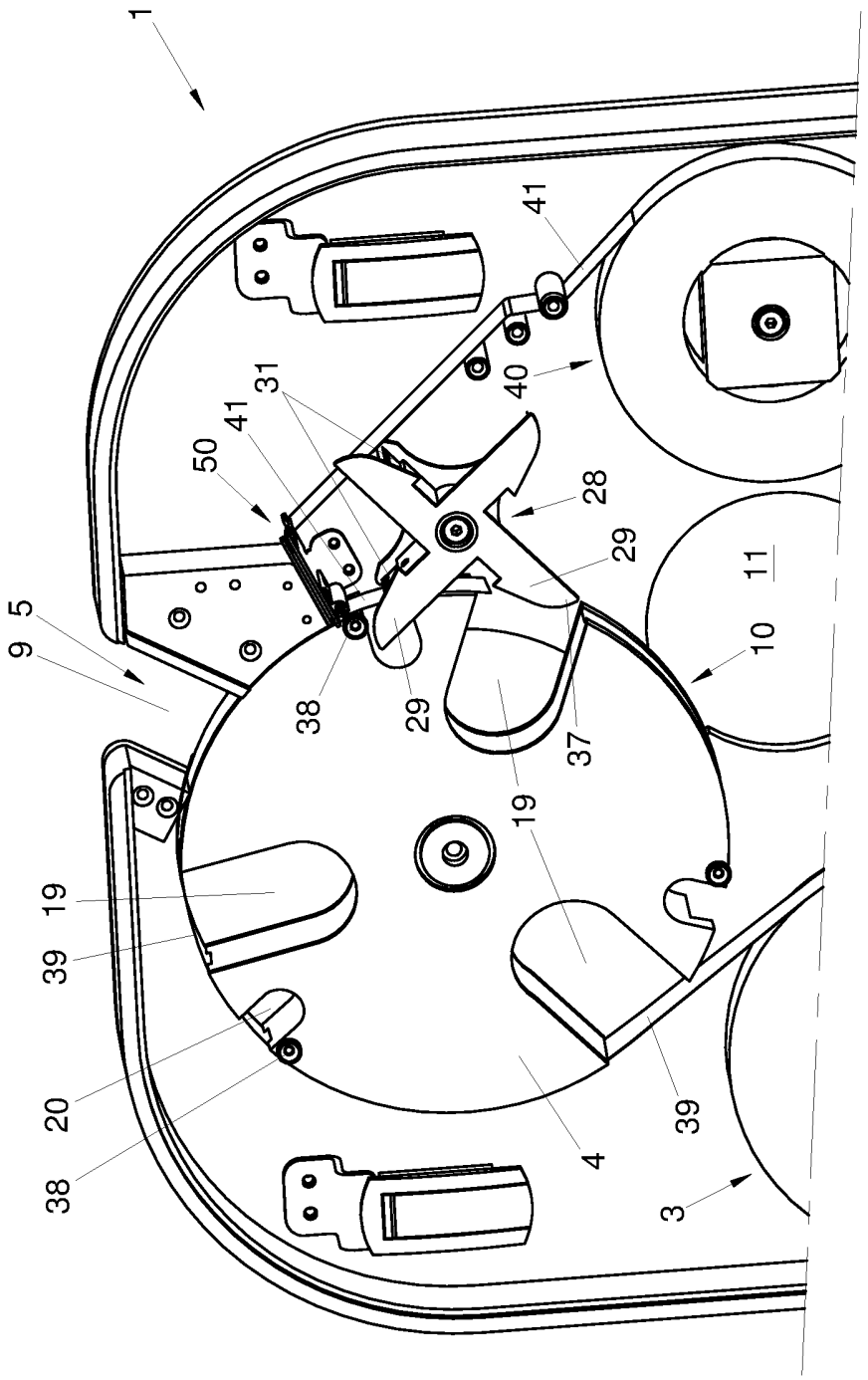

FIG. 6

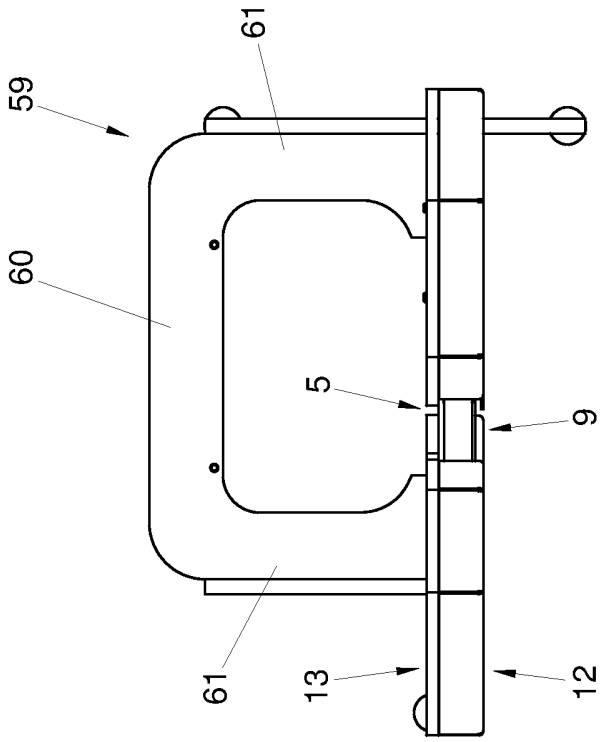

FIG. 8

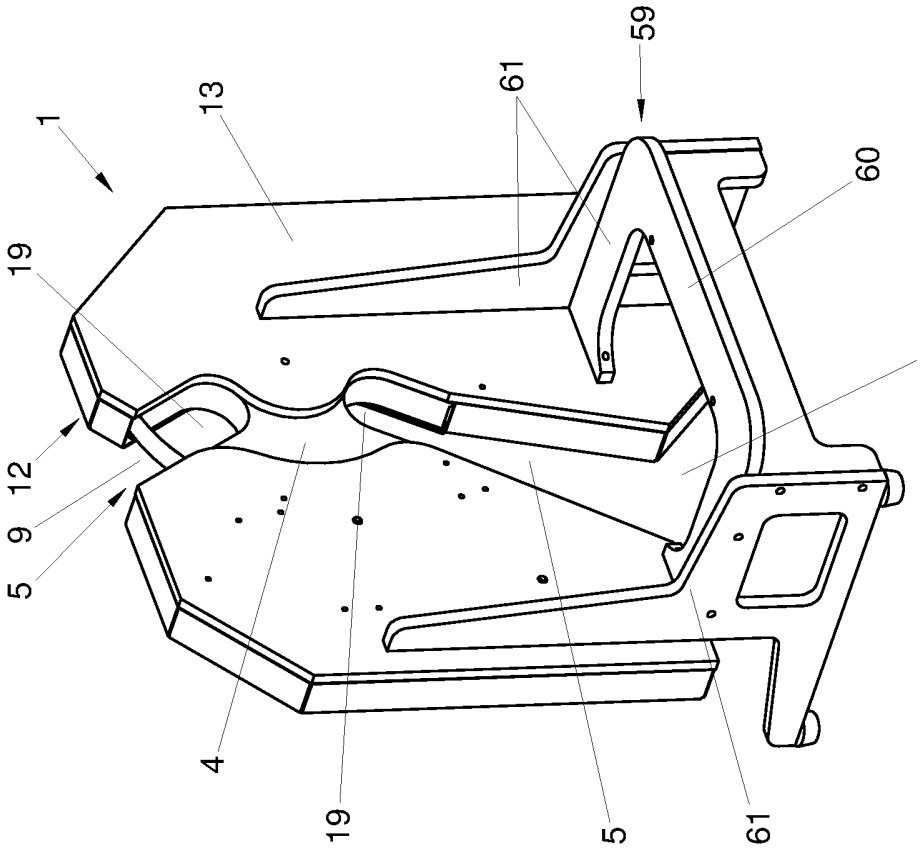

FIG. 7

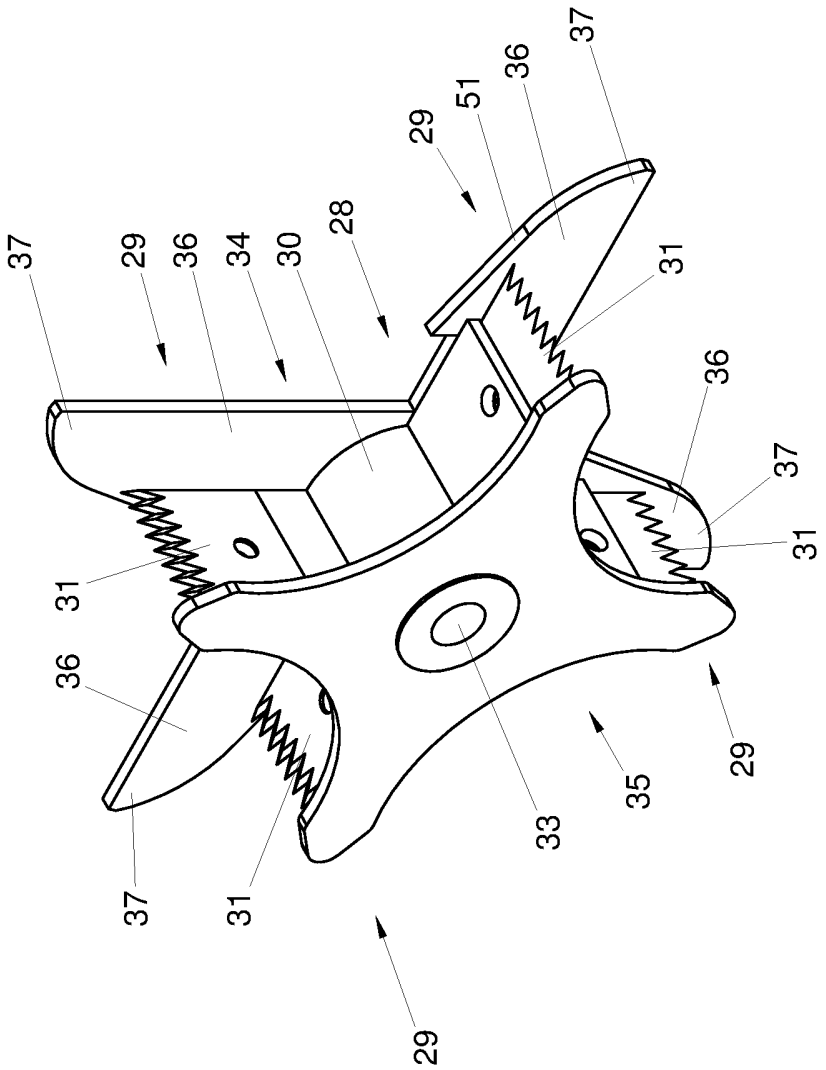

FIG. 9

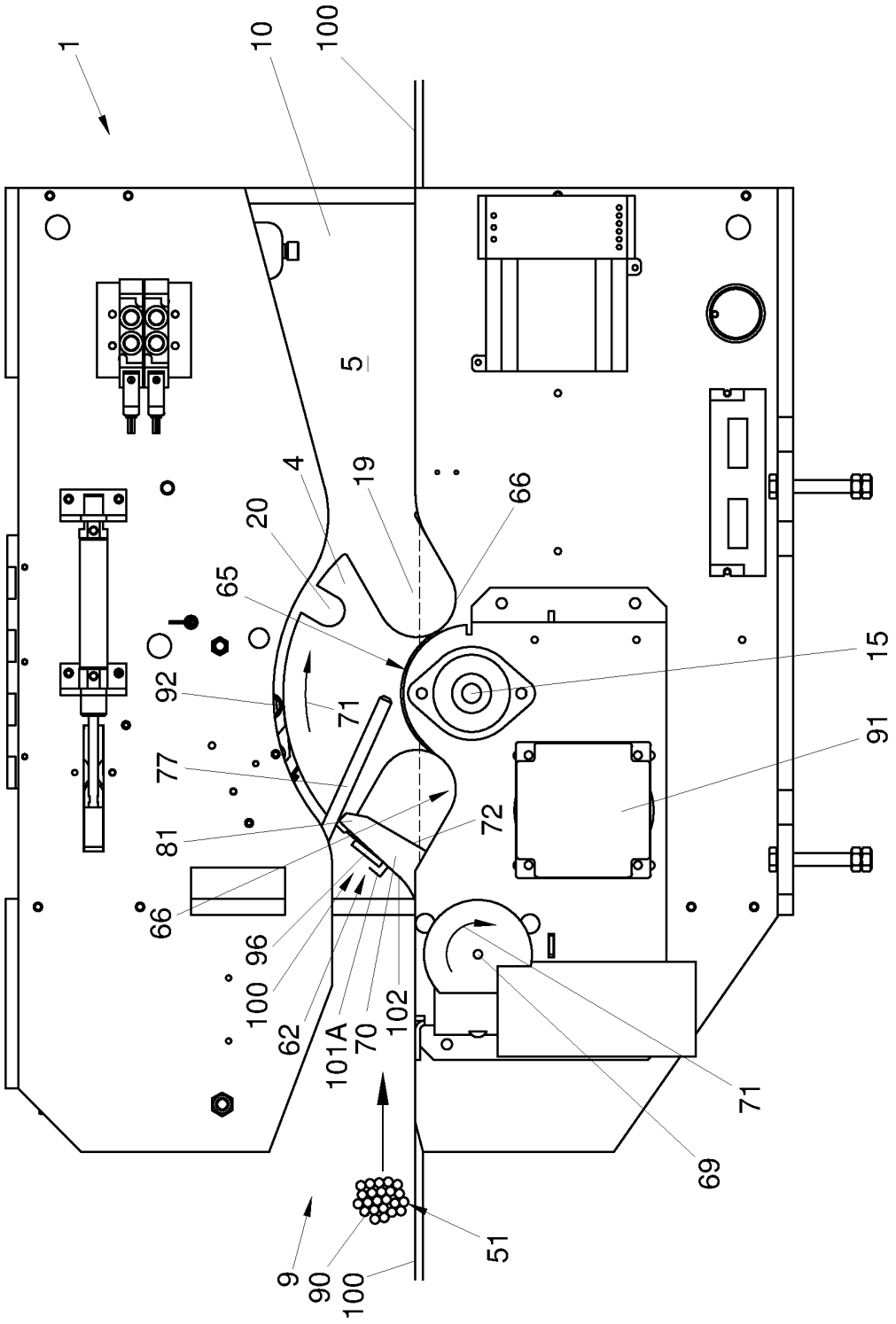
1
10
100
5
4
19
66
20
65
92
71
77
81
72
66
96
100
62
101A
70
102
15
91
71
69
51
9
90
100

FIG. 10

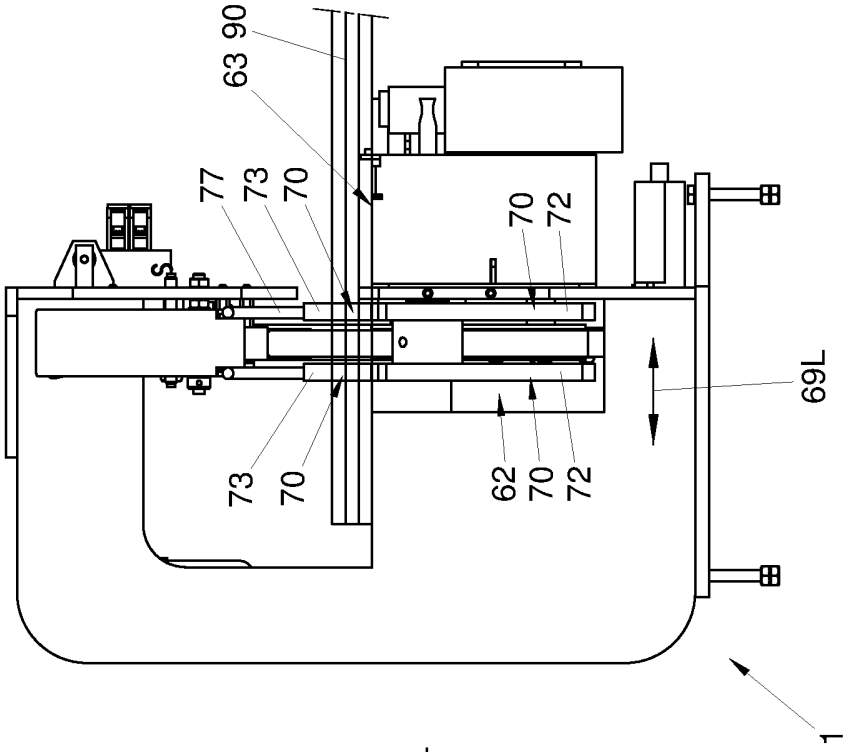
63 90
77
73
70
70
72
S
69L
73
70
62
70
72
1

FIG. 11

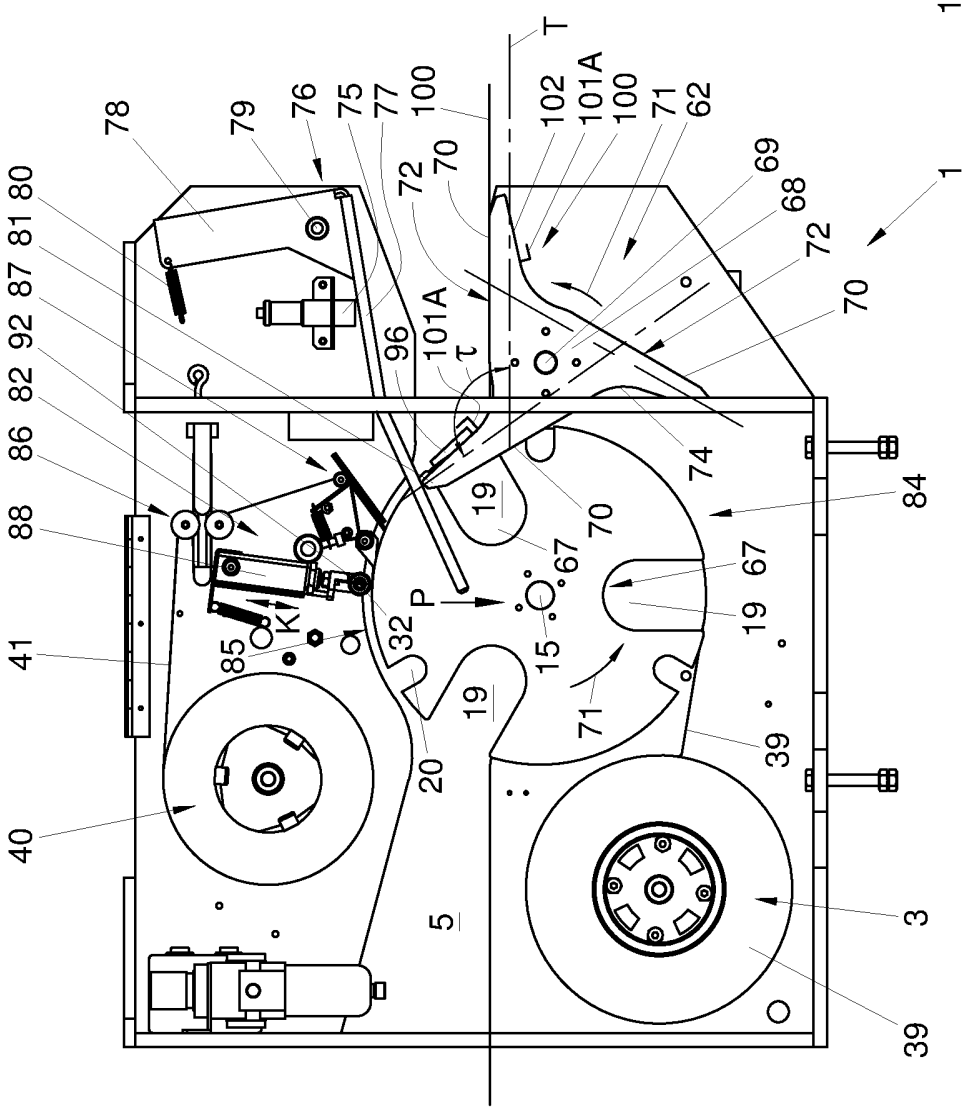
T
78
79
76
75
77
100
102
101A
100
71
62
69
68
72
70
1
80
81
87
92
82
86
88
41
40
96
101A
τ
74
84
19
70
67
67
19
P
K
85
32
15
71
39
20
19
5
3
39

FIG. 12

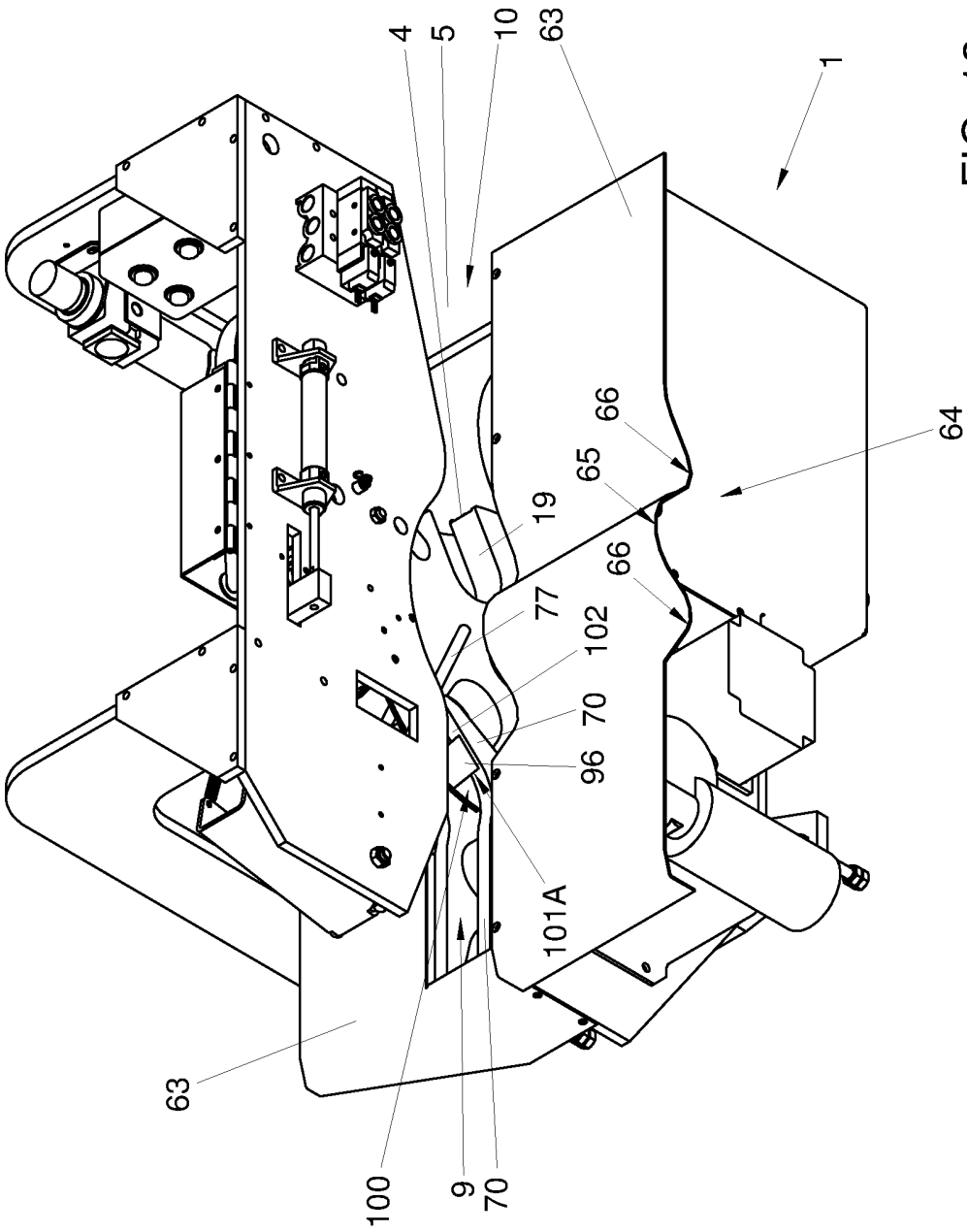

FIG. 13

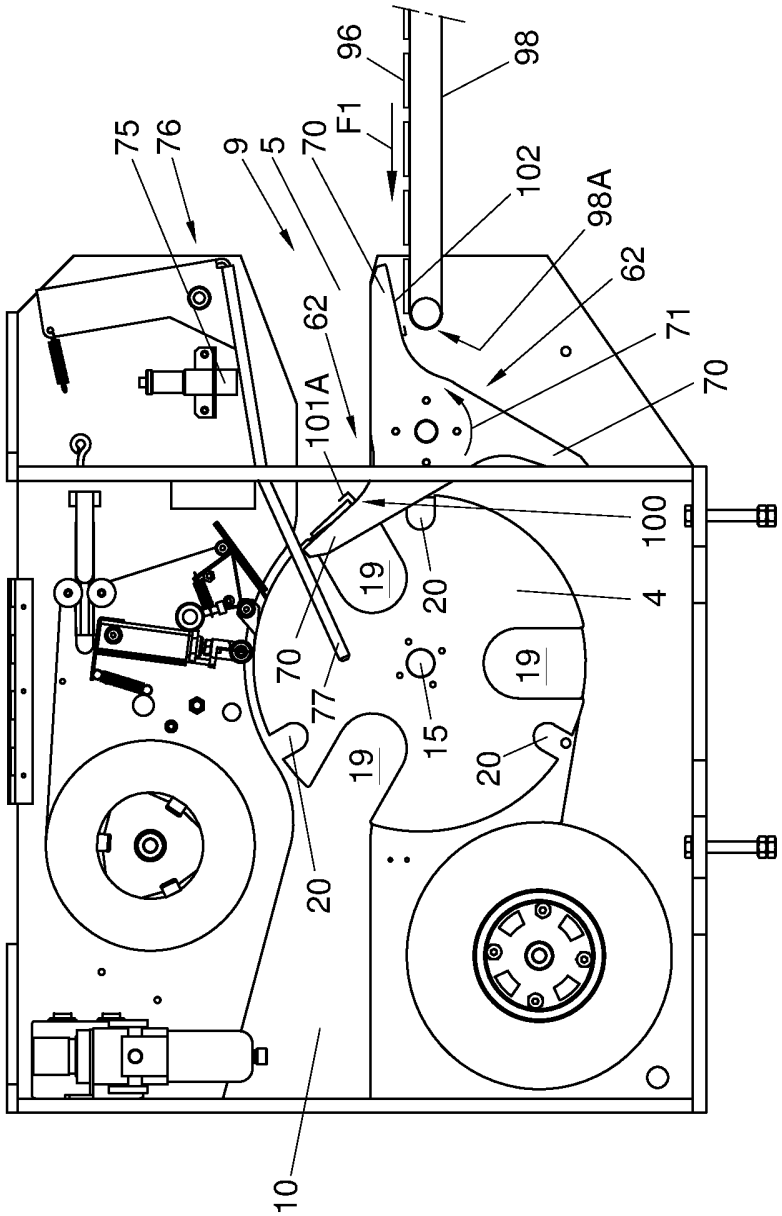
96
98
75
76
9
5
70
F1
102
98A
62
71
70
62
101A
100
19
20
4
70
77
15
19
20
19
20
10

FIG. 14

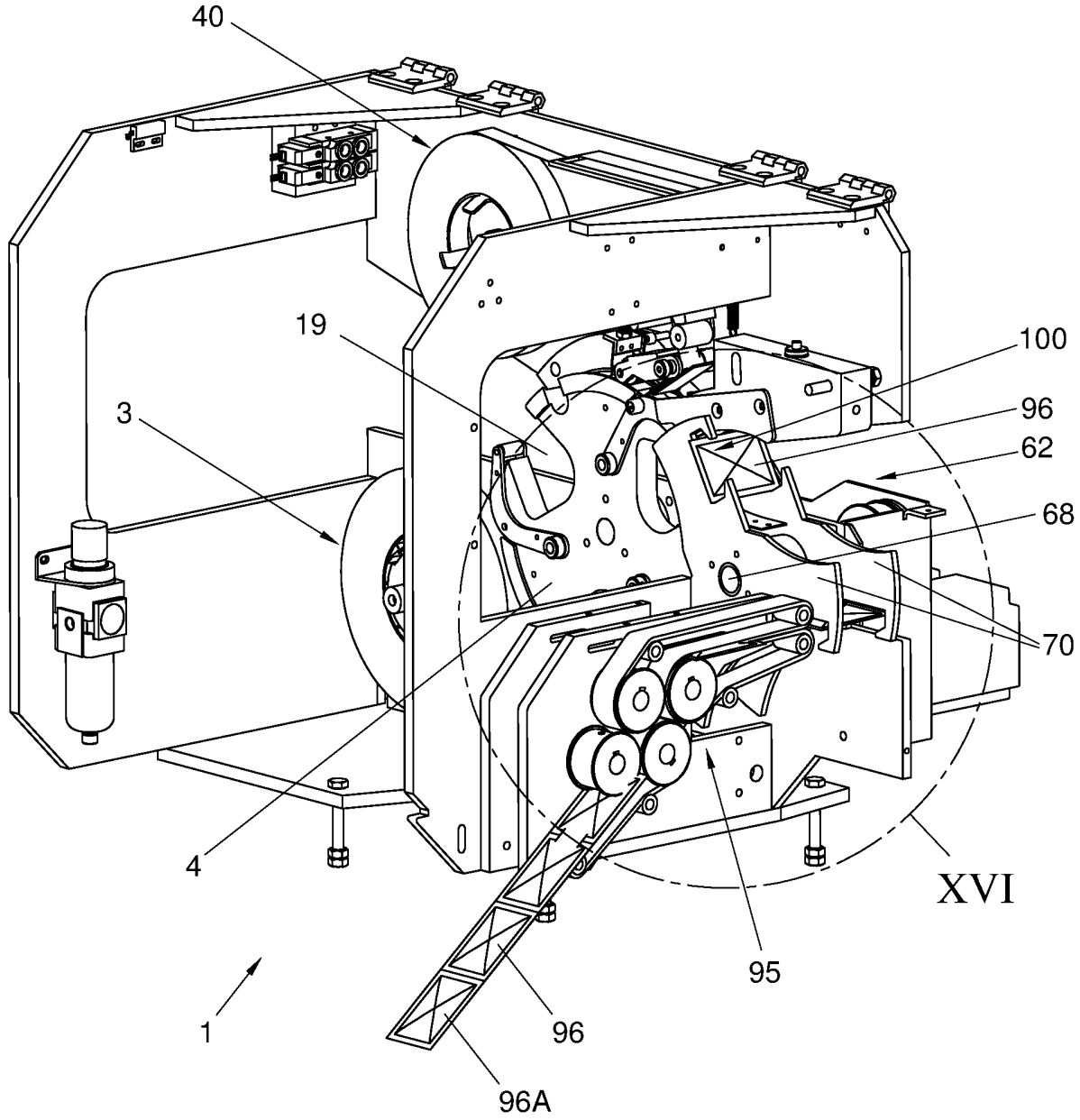

FIG. 15

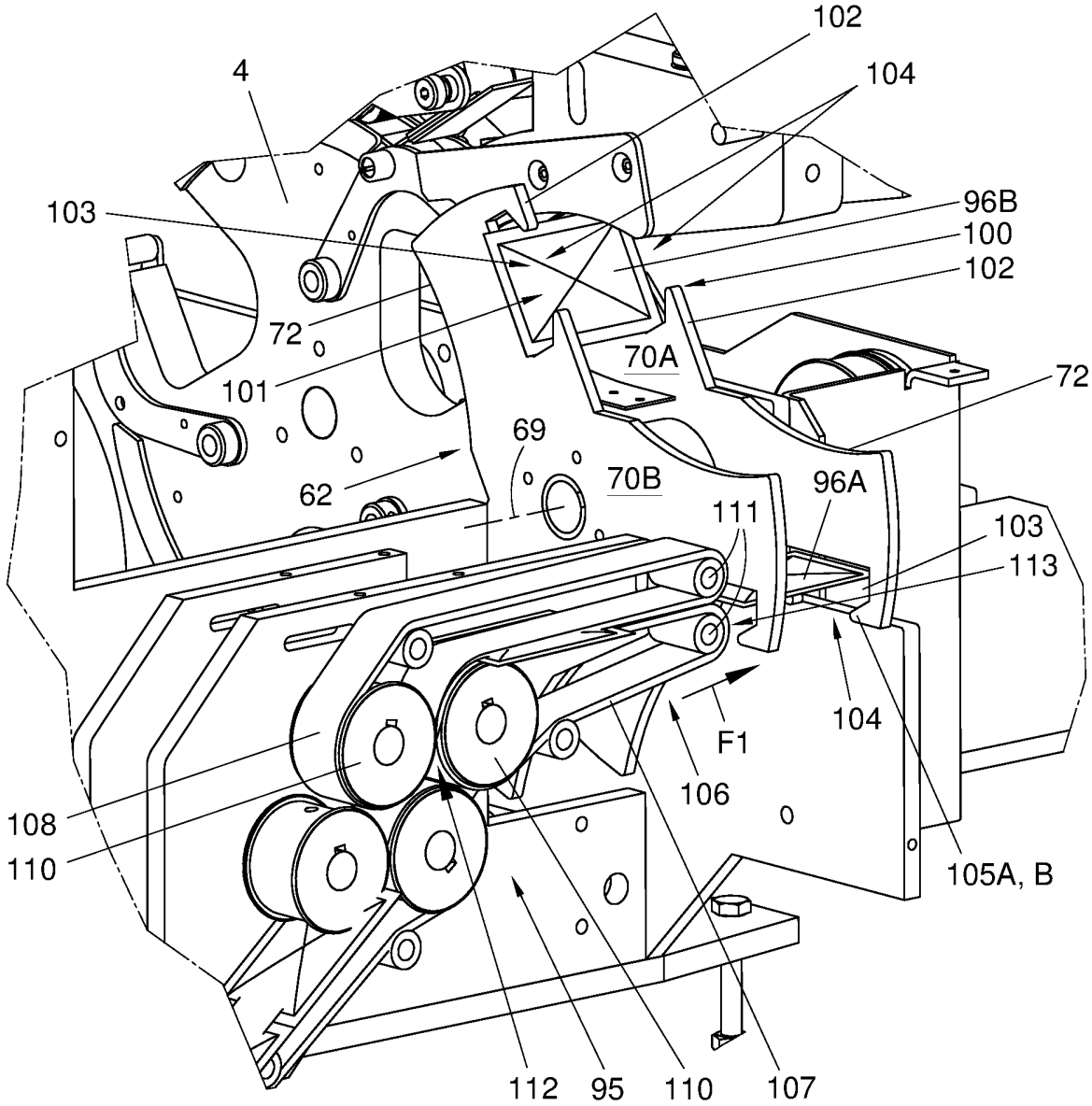
102
4
104
103
96B
100
102
72
70A
72
101
69
62
70B
96A
111
103
113
104
F1
106
108
110
105A, B
112
95
110
107

FIG. 16

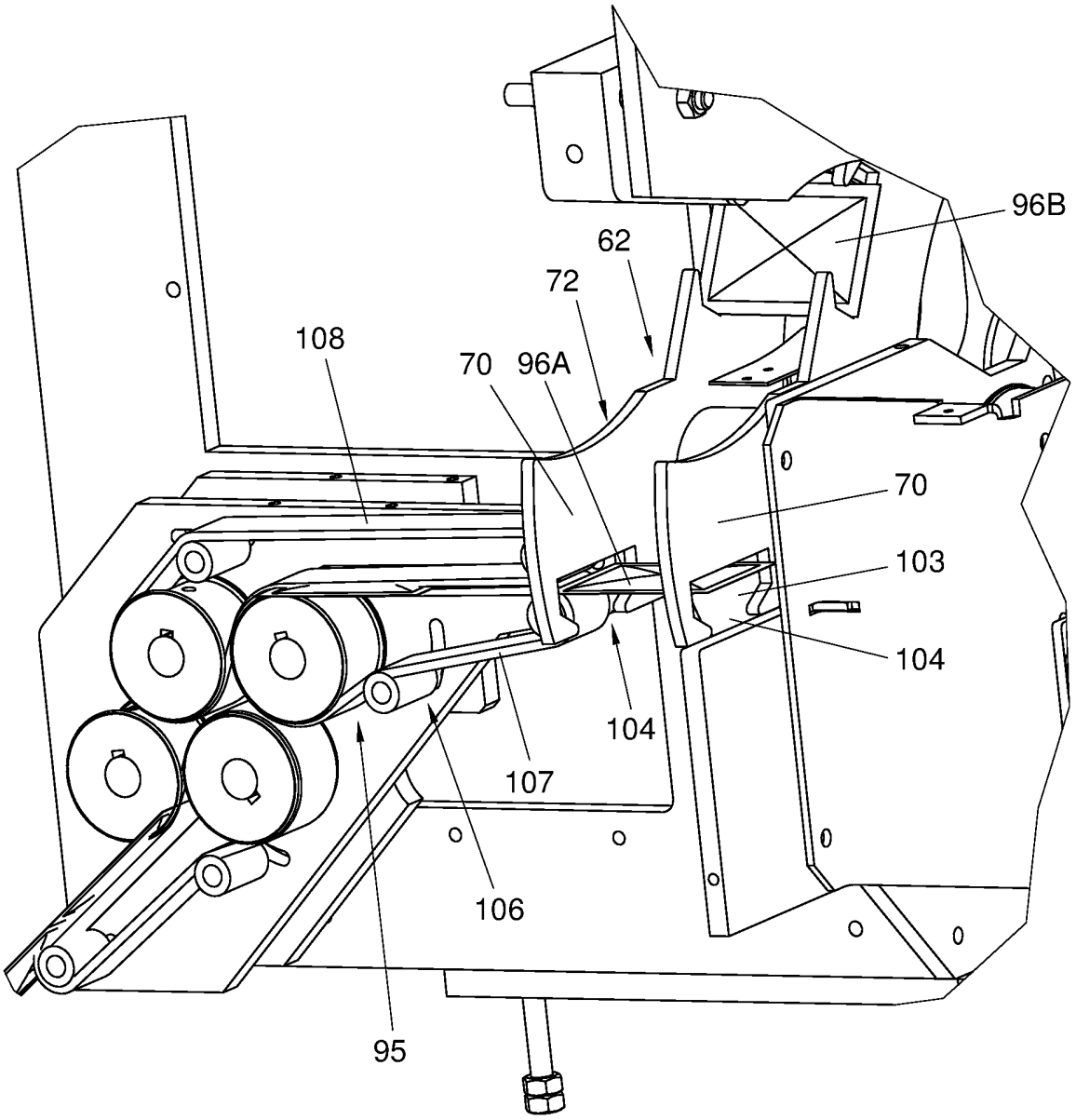

FIG. 17

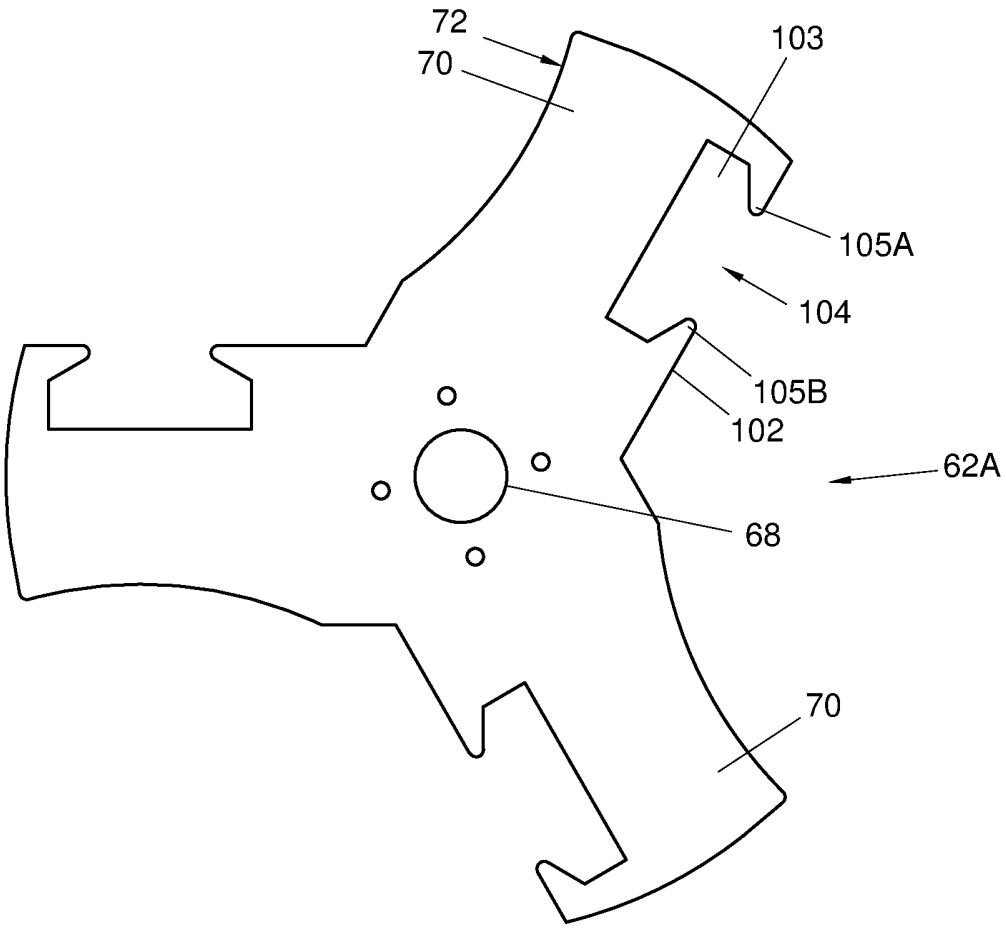

FIG. 18

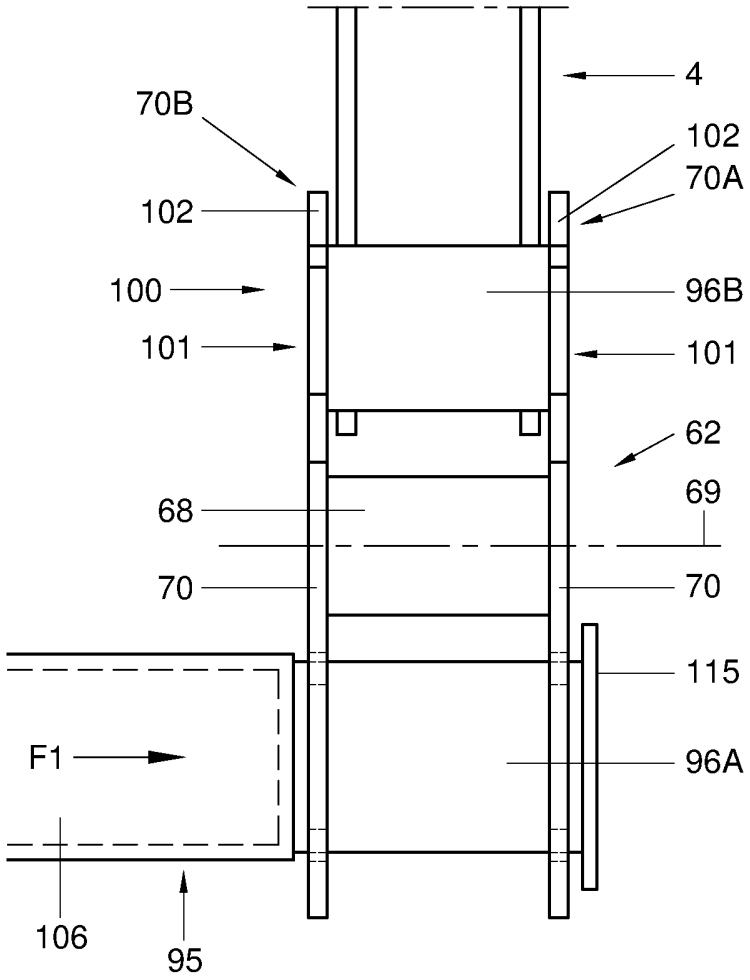

FIG. 19

Title: Apparatus and method for sealing or tying products

Abstract

Apparatus for sealing or tying products, comprising a housing with at least a first tape dispenser comprising adhesive tape and binding means for binding tape from said at least one dispenser around a product or a bundle of products, wherein at least one supply device is provided for supplying items to be connected to said product or bundle of products, , wherein the binding means comprises at least one cell and an urging device for urging part of the product or bundle of products into the cell, especially towards a closed side of said cell, wherein the urging device comprises at least one holding provision for holding an item provided by the supply device, such that when the urging device is operated for urging the product or bundle of products into the cell the item is urged against the product or bundle of products, preferably prior to binding the tape around the product or bundle of products in the cell.

SAMENWERKINGSVERDRAG (PCT)

RAPPORT BETREFFENDE NIEUWHEIDSONDERZOEK VAN INTERNATIONAAL TYPE

IDENTIFICATIE VAN DE NATIONALE AANVRAGE	KENMERK VAN DE AANVRAGER OF VAN DE GEMACHTIGDE
	P104647NL00
Nederlands aanvraag nr. **2012818**	Indieningsdatum **15-05-2014**
	Ingeroepen voorrangsdatum
Aanvrager (Naam) **DuoSeal Automatics B.V.**	
Datum van het verzoek voor een onderzoek van internationaal type **15-07-2014**	Door de Instantie voor Internationaal Onderzoek aan het verzoek voor een onderzoek van internationaal type toegekend nr. **SN62371**

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

Volgens de internationale classificatie (IPC)

B65B51/06 **B65B61/20** **B65B67/06**

II. ONDERZOCHTE GEBIEDEN VAN DE TECHNIEK

Onderzochte minimumdocumentatie

Classificatiesysteem	Classificatiesymbolen
IPC	**B65G**

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 2012818

A. CLASSIFICATIE VAN HET ONDERWERP
INV. B65B51/06 B65B61/20 B65B67/06
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 miminum documentatie (classificatie gevolgd door classificatiesymbolen)
B65B

Onderzochte andere documentatie dan de mimimum 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, WPI Data

C. VAN BELANG GEACHTE DOCUMENTEN

Categorie °	Geciteerde documenten, eventueel met aanduiding van speciaal van belang zijnde passages	Van belang voor conclusie nr.
X,D	WO 2012/060701 A1 (DUOSEAL AUTOMATICS B V [NL]; AARTS GUIDO MAURINUS ADRIANA MARIA [NL]) 10 mei 2012 (2012-05-10) in de aanvraag genoemd	12-14,16
A	* bladzijde 17, regel 4 - bladzijde 18, regel 3; figuren 14A, 14B *	1-11,15

☐ Verdere documenten worden vermeld in het vervolg van vak C.

☒ 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
21 januari 2015

Verzenddatum van het rapport van het onderzoek naar de stand van de techniek van internationaal type

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

De bevoegde ambtenaar
Schelle, Joseph

1

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 2012818

In het rapport genoemd octrooigeschrift	Datum van publicatie	Overeenkomend(e) geschrift(en)	Datum van publicatie
WO 2012060701 A1	10-05-2012	EP 2635496 A1	11-09-2013
		NL 2005627 C	07-05-2012
		US 2013277240 A1	24-10-2013
		WO 2012060701 A1	10-05-2012

WRITTEN OPINION

File No.	Filing date *(day/month/year)*	Priority date *(day/month/year)*	Application No.
SN62371	15.05.2014		NL2012818

International Patent Classification (IPC)
INV. B65B51/06 B65B61/20 B65B67/06

Applicant
DuoSeal Automatics 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
	Schelle, Joseph

Application number

WRITTEN OPINION

NL2012818

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	1-11, 15
	No:	Claims	12-14, 16
Inventive step	Yes:	Claims	1-11, 15
	No:	Claims	12-14, 16
Industrial applicability	Yes:	Claims	1-16
	No:	Claims	

2. Citations and explanations

see separate sheet

WRITTEN OPINION

Box No. VII Certain defects in the application

see separate sheet

Box No. VIII Certain observations on the application

see separate sheet

Re Item V

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

1 Reference is made to the following document:

D1 WO 2012/060701 A1 (DUOSEAL AUTOMATICS B V [NL]; AARTS GUIDO MAURINUS ADRIANA MARIA [NL]) 10 mei 2012 (2012-05-10) in de aanvraag genoemd

2 The apparatus according to claim 1 is novel over the apparatus known from D1, owing to the fact that the urging device of the known apparatus does not comprise holding means for holding the item provided by the supply arrangement.

Since there is no available prior art suggesting such a type of holding means, the apparatus according to claim 1 can also be said to be inventive.

It goes without saying that the apparatus according to claim 1 is industrially applicable.

2.1 The claims 2 to 11 are dependent and as such also meet the criteria of patentability.

3 The present application does not meet the criteria of patentability, because the subject-matter of claim 12 is not new.

The bundle of products specified by claim 12 is clearly anticipated by the bundle of products produced by the apparatus according to figures 14A, 14B of document D1.

4 The present application does not meet the criteria of patentability, because the respective subject-matters of claim 13 and claim 16 are not new.

In the method carried out by the apparatus according to figures 14A, 14B of D1 the item 96 is also pushed into the cell against the product or bundle of products by the urging device.

Consequently, neither the method according to claim 13 nor the use according to claim 16 are novel over the method/use known from D1.

4.1 The method according claim 15 appears to meet the criteria novelty, inventive step and industrial applicability.

However, attention is drawn to item VIII below,

Re Item VII

Certain defects in the application

The features of the claims defining an apparatus are not provided with reference signs placed in parentheses.

Re Item VIII

Certain observations on the application

It is clear that the presence of a holding device for holding the item on the urging device is essential to the definition of the invention.

Since claim 15 does not contain this feature it does not meet the requirement of clarity that any claim must contain all the technical features essential to the definition of the invention.