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## I. Field of the Invention

The invention relates to individualizing stacked products.

5

## II. Background of the Invention

Products that are being delivered in a stacked arrangement often have to be individualized before additional processing in the packaging industry.

10 These can be flat cut blanks for folding cartons but also products that are nested inside each other, for example plastic dishes in which for example food products shall be subsequently deposited and sealed.

In particular for products that are nested inside each other, subsequently only  
15 designated as dishes without limiting the invention thereto, individualizing is often difficult since depending on a pressure that is used during stacking the dishes nested inside each other can adhere to each other quite strongly.

So far the individualizing was performed in that a lifting wedge or a lifting spiral typically  
20 provided in multiple embodiments over a circumference of the dish was inserted with increasing thickness between the first dish and the second dish so that the first dish was lifted off increasingly.

On the one hand side this is rather complicated but in particular a path of individual  
25 moving components has to be very precisely adjusted by hand when reconfiguring for a new type of dish or a new size of dish according to dimensions and stiffness of the new dish.

This is quite time consuming for an operator and a quality of the individualizing is highly  
30 dependent from skills of the operator. Thus individualizers of this type can be operated for example in the meat industry in a meat packing plant where the operators are under

extreme time pressure and do not have any time or experience for an incrementally optimizing adjustment of the individualizer.

5 Additionally the dishes used which are typically made from a plastic material are configured thinner and thinner for cost reasons and thus less and less form stable which makes mechanical individualizing even more difficult.

10 As a most pertinent reference FR 27 36 904 A shows an individualizer with the features of the preamble of patent claim 1 in which a lowest of dishes nested in side each other are gripped from a bottom side by suction cups and pulled through adjustable product stops which transversally protrude into a movement path of the dishes wherein the product stops elastically deform an edge portion of a last and lowest dish that is respectively being pulled off.

15 This is also known from DE 197 10 236, however the products are fed and extracted from an identical side, so that no continuous product flow through is provided.

20 However it known from US 3275189 to overcome the product stops in that a lowest product of the products stacked inside each other is pulled actively pulled radially inward by an engaging suction cup so that the product stops are not in a movement path of this lowest product that is being pulled off.

25 It is known from US 4109803 to move one of the two product stops that are arranged opposite to each other radially outward far enough so that a distance there between suffices for running the product through.

### III. Brief Summary of the Invention

#### a) Technical Problem

30 Thus it is an object of the invention to provide a device for individualizing products wherein the device functions reliably, has a simple mechanical configuration and in

particular only requires very simple measures for reconfiguring for a new product. The invention also relates to a method for individualizing stacked products using the device and a method for reconfiguring the device.

5 **b) Solution**

These object are achieved by the features of the claims 1 and 11. Advantageous embodiments can be derived from the dependent claims.

10 The stack of products is applied to plural product stops that protrude at an edge into a transversal portion of the product stack, advantageously with a contact force that is as small as possible. For this purpose the product stack is not oriented perpendicular to the product stops but oriented at a slant angle which is just sufficient to let the stack slide to the stops driven by gravity.

15 The lowest first product which sits directly on the stops and is subsequently gripped by from an extraction side that is arranged opposite to the feed side and pulled through the stops and stored individually.

20 As a matter of principle there are 2 options which can also be combined. The products are either elastically deformable at least in the portions where they contact the stops, thus in their end portion and can therefore be pulled through the stops with a sufficient force.

25 Another option that is not according to the invention stipulates that the products are essentially rigid but the one or plural stops are configured so that they can be moved back and forth between a retaining position and a release position for the products, either through a material intrinsic elasticity or through a spring preload in a direction towards the retaining position or through a controlled displacement between these 2 positions.

The gripping and the pulling through is advantageously performed by a suction cup which is vacuum loaded which yields an optimum low risk for the product of getting damaged and in particular almost known necessity for adapting the suction cup to a new product.

5

Typically the at least one suction cup is arranged below a base of the product and engages at this location in case this is not possible, for example due to excessive rib formation the suction cup can also engage at another location, for example under the typically double elbowed edge of the product, typically a dish.

10

How far the stops protrude into the movement path of the products and at which locations of the circumference they are positioned and by which suction force and over which pull off distance the support head is moved by the pull off tool depends from the respective product, its dimensions and stiffness, but also from the adhesion force of the stacked products relative to each other.

15

Adjusting the products stops can be performed in a particularly simple manner when the products stops are configured as stop sleeves and are moved in position along support mandrels in the longitudinal direction and also in the turning direction wherein the support mandrels extend with their free ends against the feed direction in parallel with the stack of products.

20

The main advantage of the invention is that reconfiguring for a new product does not require adjusting a plurality of parameters individually precisely and with great care as a function of the new product, but most of the parameters that are to be newly adjusted are provided in a completely adjusted stop support which includes all product stops and this stop support only has to be inserted in a receiving device and attached. Thus adjusting the stop support is extremely simple in that the stop support according to the invention is configured as a format plate and advantageously is pushed in guide rails against a stop and attached. Only this way the respective stop support configured as a format plate is already aligned correctly, relative to the position thus the pull off direction

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30

of the support head with the suction cups, namely typically aligned with a center of the format opening.

Product specific readjustments then only have to be performed on a side of the  
5 extraction device which however can be performed partially automatically by a control in  
which the respective parameters can be stored for each product that is to be processed.

On the one hand side this is the pull off distance over which the extraction device is  
moved while pulling off the product and these are the starting point and the end point of  
10 the pull off distance, furthermore the retaining force thus for a suction cup, the suction  
force represented by the amount of vacuum to be applied.

The individualized products are typically placed on a conveyor belt and conveyed  
individually for further processing. Thus a check can be performed after individualizing  
15 whether the individualized product is actually only one product or for example still  
includes two products that sit on top of each other.

This can be performed by weighing the individualized product or by a height check  
above the extraction conveyor.

20

A device is particularly suited for performing the described method wherein the device  
includes a stop support configured as a format plate at which the products stops are  
firmly mounted and adjusted so that the product stops protrude into the movement path  
of the products at the desired circumferential positions and with a desired radial  
25 overhang.

At a feed side of the stop support a feed device for the stacked products is provided and  
an extraction device is provided on an extraction side that is arranged opposite to the  
stops wherein the extraction device is capable to grip the lowest first product from the  
30 extraction side and to pull it through the stops or to pull it over the stops.

In particular when the extraction device includes at least one suction cup which can adhere to a bottom side of the lowest first product and which pulls this product through the stops by moving the suction cup reconfiguring for a new product hardly requires any adaptations of the extraction device to the new product, in particular no adaptation of a mechanical gripper to the shape and dimension of the new product. Only the size and number of the suction cups and their axial position of engagement at the new product have to be specified wherein however an identical number and position of suction cups can be used for many similar products.

10 The reconfiguration for a new product is also facilitated in that the adjustment and positioning of all product stops respectively at the stop support is fixed wherein a new stop support is inserted for each new product to be individualized into a respective receiver of the individualizer without complex alignment measures with respect to the individual stops.

15

Therefore the stop support according to the invention is configured as a format plate which extends transversal to a movement path of the products to be individualized and which includes a format opening through which the products move and which is slightly larger than the products to be individualized.

20

The stops extend from an end of the optional format opening into the optional format opening so that they protrude into a movement path of the products. The feed device for the stacked products is thus configured so that adhesion of the individual products is augmented by the feed device as little as possible.

25

This is for example achieved in that the feed direction is inclined relative to horizontal strong enough so that the stacked products slide gravity induced by themselves along the feed device downward in a direction towards the stop support. When there is a stronger inclination or a vertical orientation of the stack the weight of the stack loading the lowest product would press the lowest 2 products against each other very strongly which causes a strong adhesion in particular when products are nested into each other.

30

Advantageously the stack of products sits on feed rails which are additionally inclined at an angle of 10° to 20° relative to the longitudinal direction of the support mandrels and advantageously flatter than their longitudinal direction. Thus the stack of products is slightly kinked at a transition into the portion of the support mandrels and thus already at this location the adhesion force of two adjacent products at each other is reduced.

The main advantage of this additional angle however is that this way products with different sizes can be placed onto the same feed rails and can still always be reliably threaded between the stops of the stop support though a center of the product always has to be in the same axial direction in the stop support independently from the size of the product.

The product stops can be adjusted in a particularly simple manner in that on the one hand side plural bore holes are provided about the format opening for receiving and thus positioning the support mandrel and that there is a selection of support mandrels which are configured differently with respect to thickness and in particular length.

The support mandrels are used for a precise lateral support of the products with respect to their movement path in the portion of the product stops. The product stops can be configured in a very simple manner as stop sleeves which fit onto the support mandrels and which can be fixated e.g. by a simple clamping screw with respect to a longitudinal position and a rotational position at the respective support mandrel as a function of the dimensional and shape of the product to be individualized.

Thus not only for a dish forming the product the depth of the dish has to be considered, but in particular its elastic properties.

Thus e.g. for a rectangular dish the edge in the center between 2 corners is much more elastic than proximal to the corners and also from this point of view the stops have to be positioned accordingly.

On the extraction side only the movement of the support head which grips the product, thus the pull off distance over which the support head moves when pulling off a product including its starting point and end point have to be adjusted anew for each product.

5

Thus, the starting point can be set in a simple manner in that the extraction device can be axially adjusted in that it is clamped into a holder and can be fixated at different axial positions in the holder through snap locking.

10 The extraction device that is arranged downstream of the support head includes at least one extraction rail on which the individualized product is placed.

Advantageously these are two extraction rails that are offset from each other on which extraction rails the individualized product sits with its edges. A respective inclination of the one or plural extraction rails at a downward slanted angle to an extraction device, in particular an extraction conveyor belt the individualized products slide downward self-acting following gravity.

The support head of the extraction device is moved over the extraction path advantageously by an operating cylinder, for example a pneumatic cylinder. Thus a starting point and an end point of the extraction path can be defined very easily, wherein the end of the extraction path does not necessarily have to be identical with the end point of the movement path of the operating cylinder, but this can also be the point of the extraction path where the suction head is not loaded with vacuum anymore but with ambient pressure or even a positive pressure so that the product does not move along the extraction direction any further.

When the products to be individualized are dishes the depth of the dish can either be considered by respective longitudinal positioning of the stops and/or by a respective positioning of a beginning of the pull off path.

30

After the individualizing advantageously a checking of successful individualizing is performed, for example by weighing on the conveyor belt whether this is a single product or 2 products that are adhering to each other.

5 Also a height check above the conveyor belt is possible in a simple manner in that for example a extraction rail is arranged at a level above the conveyor belt so that only an individual product can pass below, for two products sitting on top of each other they are already captured by the extraction rail and run out laterally.

### 10 c) Embodiments

An embodiment of the invention is subsequently described in more detail in an exemplary manner, wherein:

FIG. 1 a illustrates the entire individualizer in a side view;

FIG. 1b illustrates the individualizer in a front view;

15 FIG. 1c illustrates the individualizer in a top view;

FIG. 2 illustrates a blown up detail of the side view of FIG. 1a;

FIG. 3a illustrates a top view of a format plate provided with stops;

FIG. 3b illustrates a side view of the format plate according to FIG. 3a; and

FIGs. 4a - c illustrate views of the retaining head.

20

The subsequently described embodiment operates with an elastically deformable edge of the dish 50 but with rigid product stops 5.

25 FIGs. 1a, and 2 illustrate the individualizer 1 in the side view which shows the function and the components of the individualizer in the best way possible.

The feed device 4 for the stacked dishes 50 that are nested into each other includes feed rails 23 that run at a slant angle from the top down towards the format plate 2 wherein a stack of dishes 50 rests on the feed rail 23 with one of the sides of the dishes.

30

In the front view of FIG. 1b of the individualizer 1 only the control 24 optionally with a user interface is visible in addition to the base frame.

5 The stacked products 50 slide gravity induced along the support rails 23 in downward direction until the first lowest dish 50 contacts the products stops 5 with its lateral edges 51 wherein the product stops 5 laterally protrude into the movement path of the stacked products 50.

10 The product stops 5 form a component of the format plate 2 which serves as a stop support.

The format plate 2 has a format opening 3 that is arranged approximately in a center of the format plate 2 as evident in the individual illustration of FIGs. 3a, b which is slightly larger than the circumference of the products 50 in the center plane 11.

15

Around the format opening 3 support mandrels 14 protrude from the format plate 2, in particular at a right angle and oriented towards a stack of the products 50 wherein the support mandrels are provided with a tapered clear end portion 14a. The support mandrels 14 which advantageously include a circular outer circumference are used for an exact lateral support of the products 50 inserted there between in a lower portion of the stack and simultaneously provide a fixation of the product stops 5 which are configured as stop sleeves 15 and which can be positioned by a simple clamping screw in a longitudinal direction and also in a rotation direction at will on a respective support mandrel.

25

The longitudinal positioning defines whether and how much the base of the lowest first dish 50 already protrudes through the format opening 3 of the format plate 2 when the dish 50 contacts the product stops 5.

30 The product plate 2 with the product stops 5 attach and adjusted thereon and with the support mandrels 14 is insert able and attach able in a simple manner transversal to the

feed direction 9 of the dishes 50 to be supplied wherein the product plate is inserted and attached in a receiving device 8 and thus precisely positioned in particular with a center of its format opening 3 relative to the axial direction of the extraction device 6.

5 This way a proprietary format plate 2 with a respective format opening 3 and accordingly positioned support mandrels 14 and product stops 5 adjusted there on can be stocked for each type of dishes 50 which can be attached in the receiving device 8 with a few manual operations.

10 In the figures 1a and 2 it is also evident that the longitudinal direction 10 of the support mandrels 14 is not aligned with the feed direction 9 of the feed device 4 and its guide rails 23 so that its guide rails 23 extend at a slightly flatter angle than the support mandrels. Thus a gap 26 in the stack is caused at a transition between the feed rails 23 which terminate approximately in a portion of the free ends of the support mandrels 14  
15 into a portion of the support mandrels 14 wherein the gap opens a distance between two dishes on one side of the stack of dishes 50, wherein a strong adhesion of the dishes 50 nested into each other is already partially removed. Thus it is assured that the differently sized dishes 50 that always rest on the same guide rails 23 still slide between the support mandrels though the center of the format opening 3 is not oriented  
20 towards a center of the dishes 50 fed on the guide rails 23 but towards a center of the extraction device 6.

On an extraction side 13 that is arranged opposite to the feed side 12 initially the support head 20 with its suction cups 7 is visible at a front side wherein the support  
25 head is separately illustrated in FIGs. 4a – c.

The support head 20 is part of the extraction device 6 and can be moved towards the lowest dish 50 in the pull off direction 19 which coincides advantageously with the longitudinal direction 10 of the support mandrels 14 so that the at least on suction cup 7  
30 reaches a bottom side of the dish 50 and supports it by a vacuum and suction force.

When moving the support head 20 backward in the pull of direction 19 the support head 20 pulls the dish 50 along and pulls the dish 50 through the product stops 5 while deforming edges 51 of the dish 50.

5 By turning the suction force of the suction cup 7 off separates the individualized dish 50 from the support head 20 and places it on one or two offset extraction rails 16 which lead downward at a slant angle from the position of the support head 20 in a direction of an extraction conveyor belt 2 so that the individualized dish 50 slides gravity induced along the extraction rail 16 downward onto an extraction conveyor belt 2. Then the  
10 support head moves forward again and grips the next lower dish of the stack and repeats the process.

Typically these are two extraction rails 16 that extend adjacent to each other at such distance so that the individualized dish 50 contacts the extraction rails with its edges  
15 and is suspended between the extraction rail 16 so that the free space there between suffices for the support head 20. In the same manner also the distance between the two feed rails 23 is adjusted to a width of the dishes 50 that is provided in this direction and also typically has to be adjusted anew when switching to a new type of dishes.

20 FIG. 3a illustrates the format plate 2 in top view with the support mandrels 14 arranged about the format opening 3 and with stop sleeves 15 placed thereon and adjusted.

Thus, it is evident that the format plate 2 is unambiguously designated (at 27), for example labeled to provide an association with a typical type of dishes 50.

25

Furthermore one or plural indentations are visible at an outer circumference of the format plate 2 wherein the indentations are used for a precise form locking positioning of the format plate 2 after insertion into the receiver 8.

30 FIG. 3b illustrates a side view of the support mandrels 14 which shows that the support mandrels have different lengths and do not have to have their tapered portions exactly

at the free end 14a but can also have a tapered portion that is offset backward from the free end. The longer support mandrels 14 with the backward offset tapered portion are advantageously arranged on a back side of the supplied stack of products 50.

5 FIG. 4 illustrates the extraction device 6 in various views.

In the side view of FIG. 4a, thus in the same viewing direction as for the FIGs. 1a and 2 it is visible that 7 suction cups 3 are arranged on a front side of the support head 2 wherein the suction cups are loadable with a vacuum wherein a center suction cup  
10 protrudes further forward because an elastic bellows of this center suction cup is extended slightly further. The entire support head 20 is moveable relative to the base element 22 of the receiving device 6 in the pull off direction 19 in that the base element 22 includes a pneumatic cylinder in whose forward edge the support head 20 is arranged which is thus move able relative to the base element 22 of the extraction  
15 device 6 along the extraction direction 19 by a pull off distance 18 as indicated in FIG. 4a.

For a minimal approximation of the support head 20 to the base element 22 of the extraction device 6 a spring 28 is arranged there between which also a compensating  
20 effect has with respect to correct axial position when contacting the lowest dish 50 with the support head 20 and its suction cup 7.

The rear end of the base element 22 shows the two connections for the vacuum supply of the suction cups 7a which controlled by a control 24 of the individualizer 1 like the  
25 other functions of the individualizer.

The entire extraction device 6 is adjustable in the pull off direction 19 along the base frame of the individualizer 1 in that the bulges that are visible in FIG. 4b are optionally pressed into a fork shaped non-illustrated support device of the base frame which  
30 facilitates an adaptation of the forward most extended position of the support head 20 an adaptation to a depth of the dishes 50 that are to be individualized.

The axial adaptation between the extraction device 6 and the dishes 50 respectively to be processed can thus be performed in a different manner:

5 - The coarse adjustment is provided by the employed format plate 2 that is adapted to the respective dishes and by the axial positioning of the products stops 5 along the support mandrels 14 implemented at the format plate 2.

- The center adjustment is performed by interlocking the base element 22 of the  
10 extraction device 26 in the receiver at the base frame.

- The fine positioning is provided by a compensating effect of the spring 28 and the axial variability of the bellows of the suction cups 7.

15 Additionally as evident from the rear view of the support head 20 in FIG. 4c the support head 20 can be disengaged by disengaging the visible locking lobes from a remainder of the extraction device 6 and by rotating it by 90° about the axial direction in adaption to the respective dishes 50 having to be processed with their largest extension in their transversal direction or in a vertical position.

20

In the side view of FIG. 1a and the top view of FIG. 1c the extraction rail 25 is furthermore visible which protrudes transversally into the movement path of the individualized dishes 50 that are extracted by the extraction conveyor belt 17 and wherein the extraction rail 25 is configured to deflect dishes that are still nested off the  
25 extraction conveyor belt 17.

This, however, occurs only when as illustrated in FIG. 1a, two dishes nested into each other are placed onto the extraction conveyor 17 presuming that they were already individualized since the nested dishes in combination have a height that is greater than an height of an individualized dish so that the upper dish is still captured by the

30 extraction rail 25.

**REFERENCE NUMERALS AND DESIGNATIONS**

	1	individualizer
	2	stop support, format plate
5	3	format opening
	4	feed device
	5	product stop
	6	extraction device
	7	suction cup
10	8	receiving device
	9	feed direction
	10	longitudinal direction
	11	main plane
	12	feed side
15	13	extraction side
	14	support mandrel
	14a	free end
	15	stop sleeve
	16	extraction rail
20	17	extraction conveyor
	18	extraction path
	19	extraction device
	20	support head
	21	pneumatic cylinder
25	22	base element
	23	feed rail
	24	control
	25	extraction rail
	26	kink, distance
30	27	designation
	28	spring

50 dish, product  
51 edge

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## **Patentkrav**

1. Sorteringsindretning til stablede produkter (50), især skåle (50), med
- 5 - en forsyningsindretning (4) til at levere de stablede produkter (50) langs med en bevægelsesvej,
  - mindst en produktstopper (5), som rager ind i produkternes (50) bevægelsesvej og holdes af en stopholder (2),
  - hvor forsyningsindretningen (4) er anbragt på en forsyningside (12) af stopholderen (2),
  - 10 - en aftagningsindretning (6) på en aftagningside (13), der ligger over for forsyningsiden (12) i forhold til stopholderen (2), hvilken aftagningsindretning er i stand til at gribe det nederste af de stablede produkter (50) på aftagningsiden (13) og trække det hen over den mindst ene produktstopper (5), hvor de stablede produkter (50) er elastiske i det mindste ved deres
  - 15 yderste kant **(51)**,
- kendetegnet ved, at**
- alle produktstopperne (5) holdes af stopholderen (2),
  - stopholderen (2) er en formatplade (2), som står på tværs af bevægelsesvejen for de produkter (50), der skal sorteres, med en formatåbning (3), som er
  - 20 større end produktet (50), betragtet på tværs af dets hovedplan (11), og ud igennem hvilken produkterne (50), der skal sorteres, bevæges af aftagningsindretningen (6),
  - produktstopperne (5) rager fra kanten af formatåbningen (3) ind i denne så langt, at de rager ind i bevægelsesvejen for de produkter (50), der bevæges
  - 25 ind igennem formatåbningen (3),
  - formatpladen (2) med produktholderne (5) er optaget i en optagelsesindretning (8), i hvilken de kan placeres positionsnøjagtigt, hurtigt og nøjagtigt på en formluttende måde.
- 30 **2.** Sorteringsindretning ifølge krav 1,
- kendetegnet ved, at**
- produktstopperne (5) er forskudt ud fra planet for stopholderen (2) i retning mod forsyningsiden (12).

3. Sorteringsindretning ifølge et af de foregående krav,

**kendetegnet ved, at**

formatpladen (2) kan skubbes ind i optagelsesindretningen (8), fortrinsvis med midten af formatåbningen (3) orienteret mod midten og udtrækningsretningen (19) for aftagningsindretningen (6).

4. Sorteringsindretning ifølge et af de foregående krav,

**kendetegnet ved, at**

aftagningsindretningen (6) har mindst en sugekop (7), som kan påvirkes styret med undertryk, og som er bevægelig på tværs af hovedplanet (11) for det første produkt (50), der skal gribes, og sugekoppen (7) er placeret især under bunden eller under den dobbelt udkrængede kant af det første produkt (50).

5. Sorteringsindretning ifølge et af de foregående krav,

**kendetegnet ved, at**

- forsyningsindretningen (4) til de stablede produkter (50) er orienteret skråt fra oven og ned mod stopholderen (2), og forsyningsindretningen (9) skråner lige netop så meget, at de stablede produkter (50) betinget af tyngdekraften glider langs med forsyningsindretningen (4) mod stopholderen (2), og/eller  
- der rundt omkring formatåbningen (3) er anbragt føringsdorne (14), som rager ud fra formatpladen (2) i forsyningsretningen (9) og især har en tilspidset fri ende (14a).

6. Sorteringsindretning ifølge krav 5,

**kendetegnet ved, at**

- produktstopperne (5) er stophylstre (15), som passer til føringsdornene (14) og kan placeres, især klikkes eller klemmes ind i samt især også drejes ind i disse i føringsarmenes (14) længderetning (10), og/eller  
- aftagningsindretningen (6) kan indstilles og placeres i udtrækningsretningen (19).

7. Sorteringsindretning ifølge et af de foregående krav,

**kendetegnet ved, at**

- aftagningsindretningens (6) udtrækningsstrækning (18) kan indstilles, og/eller

- aftagningsindretningen (6) omfatter mindst en udførselsskinne (16), som forløber på tværs af aftagningsindretningen (6), og som det sorterede produkt (50) kan lægges på, og udførselsskinnen (16) er orienteret især skråt nedad mod en borttransportindretning, især et borttransportbånd (17).

5

**8.** Sorteringsindretning ifølge et af de foregående krav 5-7,

**kendetegnet ved, at**

- produktstopperne (5) i det mindste er anbragt på to over for hinanden liggende sider af formatåbningen (3), og/eller

10 - forsyningsindretningens (4) forløbsretning står i en vinkel på 10° til 20° i forhold til føringsdornenes (14) længderetning (10) og forløber fladere end disse.

**9.** Sorteringsindretning ifølge et af de foregående krav,

15 **kendetegnet ved, at**

- et holdehoved (20) af aftagningsindretningen (6), især sugekoppen (7), bevæges i udtrækningsretningen (19) ved hjælp af en arbejdscylinder, især en pneumatikcylinder (21), og/eller

20 - der er tilvejebragt en styreenhed (22), som styrer både aftagningsindretningens (6) holdehoved (20) i og modsat udtrækningsretningen (19) samt griberingen af det første produkt (50), især ved at styre sugerens sugeluftpåvirkning.

**10.** Sorteringsindretning ifølge et af de foregående krav 7-9, **kendetegnet**

25 **ved, at**

- der nedstrøms for aftagningsindretningen (6), især for enden af udførselsskinnerne (16), er anbragt en vægt, som produktet (50) falder ned på med henblik på ved hjælp af vejning at konstatere, om der er tale om kun et produkt (50), og/eller

30 - der oven over borttransportindretningen er anbragt en udledningsskinne i en sådan højde over borttransportindretningen, at et enkelt produkt (50) løber under denne, men to oven på hinanden liggende produkter (50) gribes af udledningsskinnen og ledes ned af borttransportindretningen.

- 11.** Fremgangsmåde til sortering af stablede produkter (50), især skåle (50), under anvendelse af en sorteringsindretning (1) ifølge et af de foregående krav, og til ændring af sorteringsindretningen, hvor
- de stablede produkter (50) med henblik på sorteringen tilføres fra forsyningsiden (12) til den mindst ene produktstopper (5), som rager ind i produkternes (5) bevægelsesvej, og som det første, nederste produkt (50) af de stablede produkter (50) sidder på,
  - det nederste af de stablede produkter (50) gribes fra aftagningsiden (13) og trækkes hen over produktstopperen (5), idet det derved deformeres elastisk af den mindst ene produktstopper (5) ved dens yderste rand (51) og
  - det nederste, sorterede produkt (50) aflægges enkeltvis,
- kendetegnet ved, at**
- der med henblik på et skift til et nyt produkt (50) i stedet for en forhåndenværende formatplade ud over produktstopperne
- 15 indsættes og fastgøres en stopholder (2), som passer til det nye produkt (50) og er udformet som en formatplade, og som bærer alle monterede produktstopper (5), der er indstillet til det nye produkt (50), i en optagelsesindretning (8) af sorteringsindretningen (1).
- 20 **12.** Fremgangsmåde ifølge krav **11**,
- kendetegnet ved, at**
- gribningen af det nederste af de stablede produkter (50) og væktrækningen hen over produktstopperne (5) ved hjælp af fastsugning og trækning af et holdehoved (20) af aftagningsindretningen (6) ved hjælp af en sugekop (7)
- 25 foregår ved bunden og/eller en dobbelt udkrænget kant af produktet (50).
- 13.** Fremgangsmåde ifølge et af de foregående fremgangsmådekrav,
- kendetegnet ved, at**
- produktstopperne (5) er udformet som stophylstre (15) og køres langs med
- 30 føringsdorne (14) af stopholderen (2) og placeres, både i længderetningen (10) og i føringsdornenes (14) drejeretning.
- 14.** Fremgangsmåde ifølge et af de foregående fremgangsmådekrav,
- kendetegnet ved, at**
- 35 med henblik på omstilling til et nyt produkt positionen af aftagningsindretning

gen (6) justeres i udtrækningsretningen (19) og især også den udtrækningsstrækning (18) for et holdehoved (20) af aftagningsindretningen (6), der skal tilbagelægges med henblik på udtrækningen, fastlægges i udtrækningsretningen (19).

5

**15. Fremgangsmåde ifølge et af de foregående fremgangsmådekrav, kendetegnet ved, at**

der efter sorteringen af produkterne (50) udføres en kontrol af, om der ved det produkt, der trækkes hen over den mindst ene produktstopper, er tale om et enkelt produkt (50) eller mere end et produkt (50) oven på et andet, især ved hjælp af højdekontrol ved borttransportbåndet (17) eller vægtkontrol ved borttransportbåndet (17).

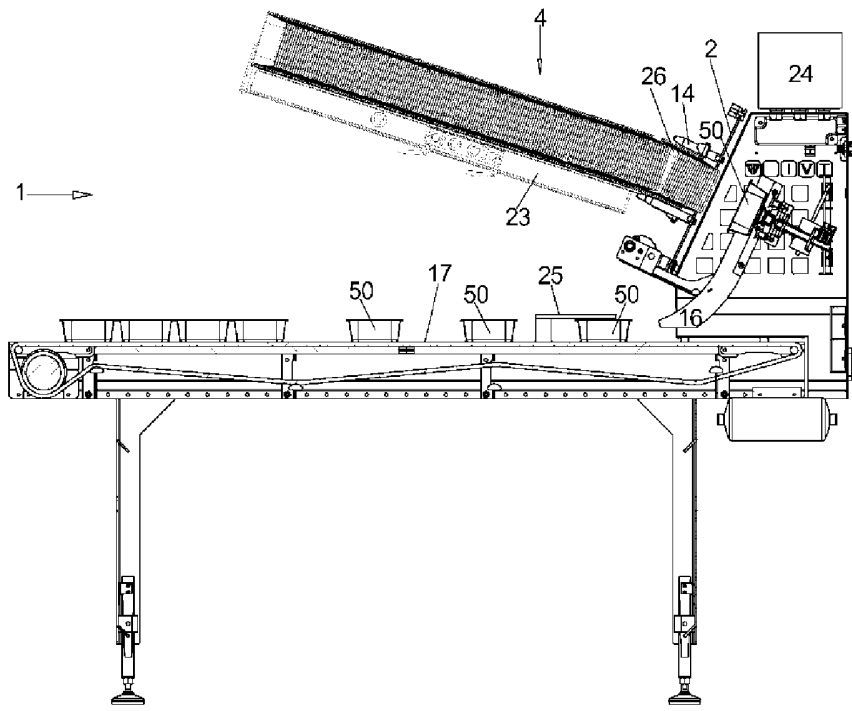


Fig. 1a

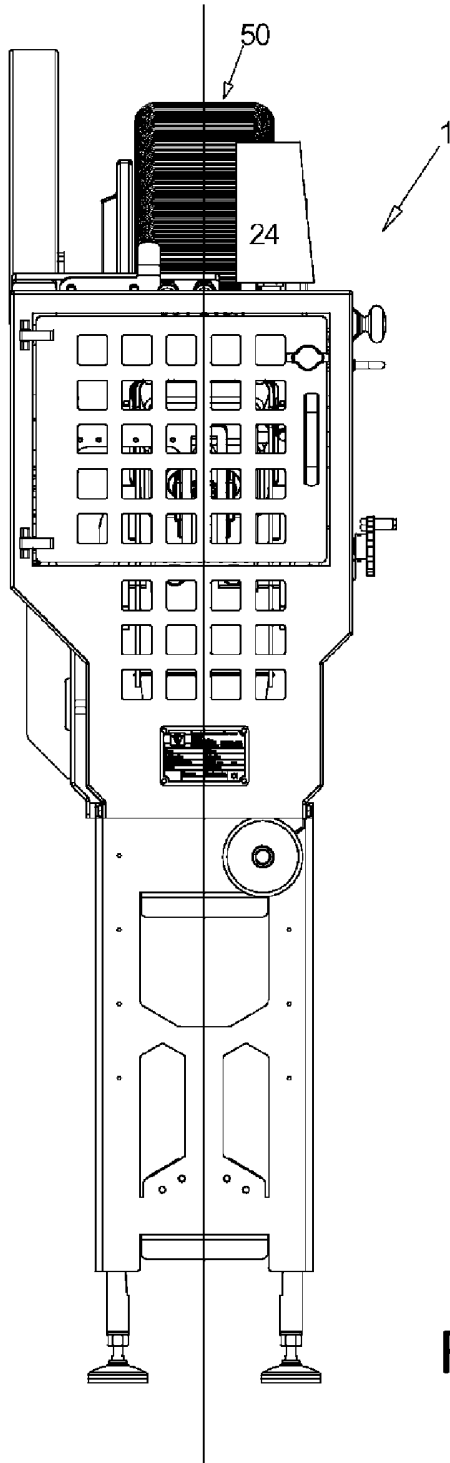


Fig. 1b

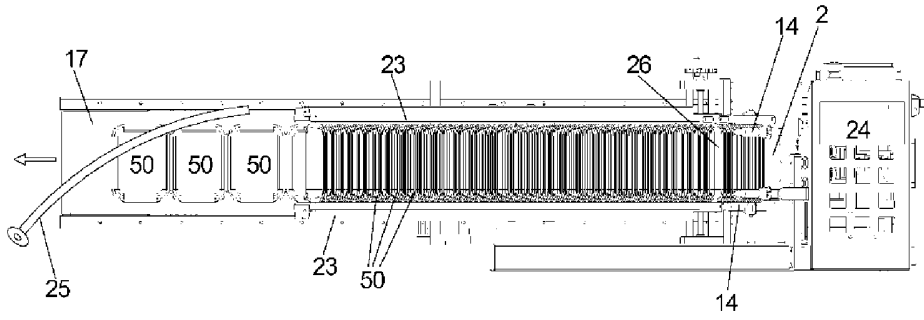


Fig. 1c

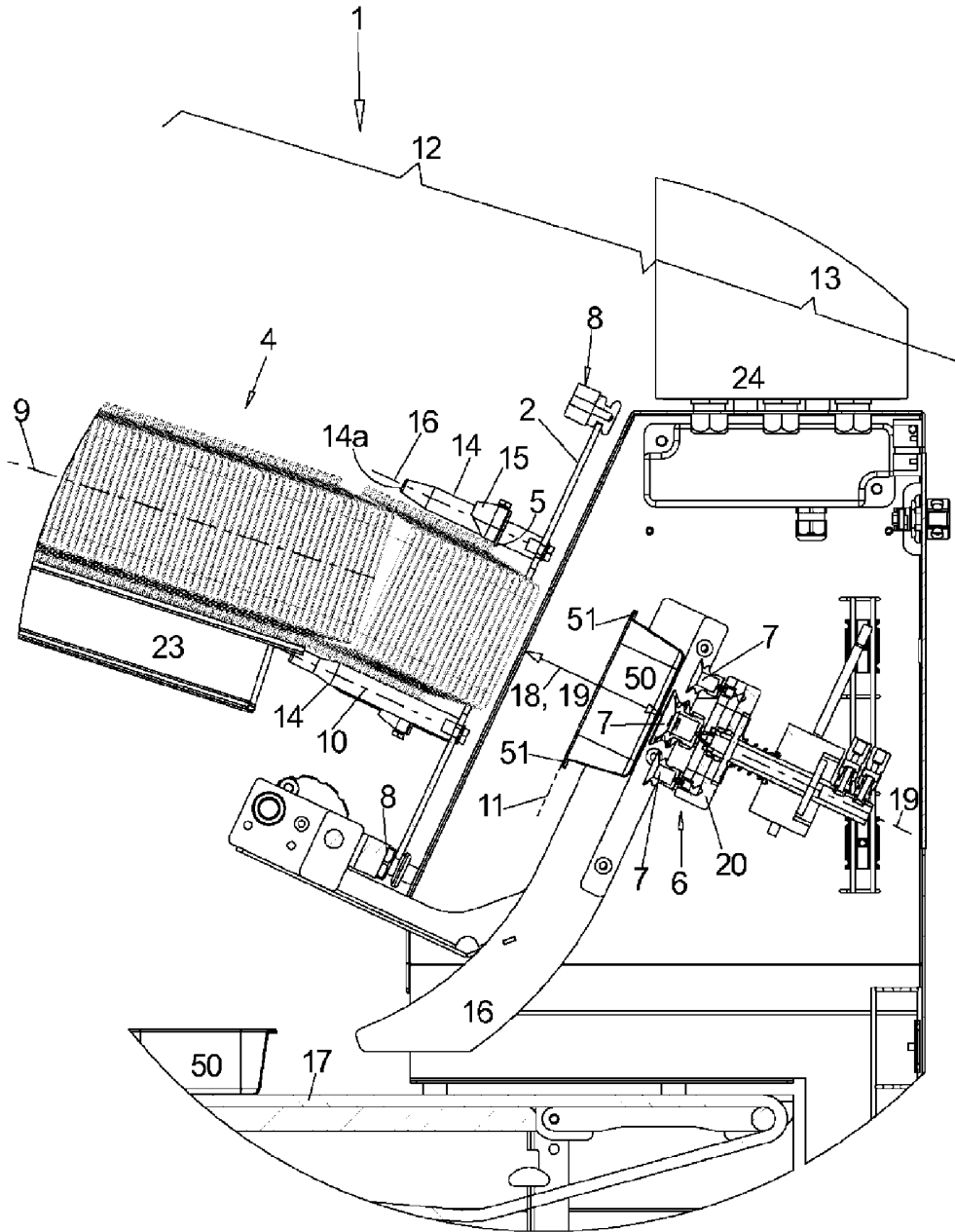


Fig. 2

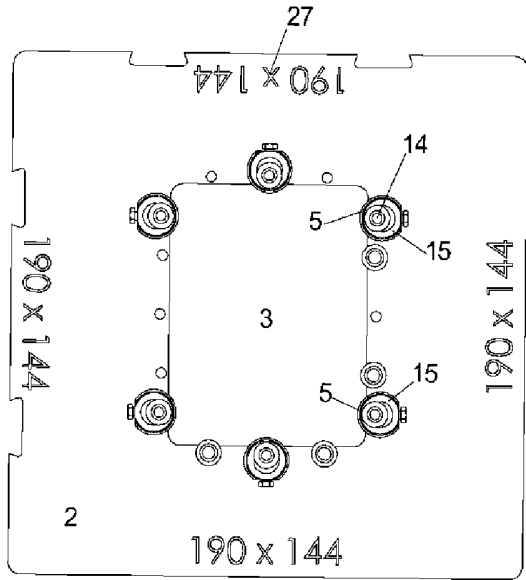


Fig. 3a

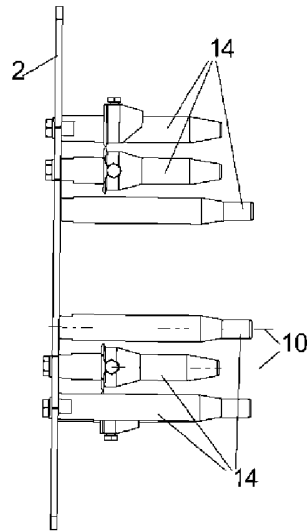


Fig. 3b

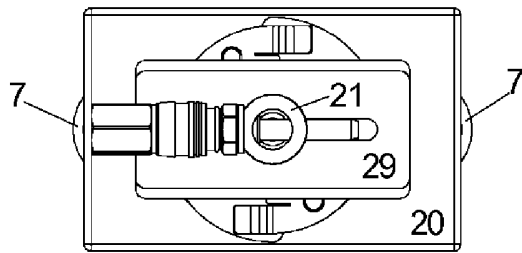


Fig. 4c

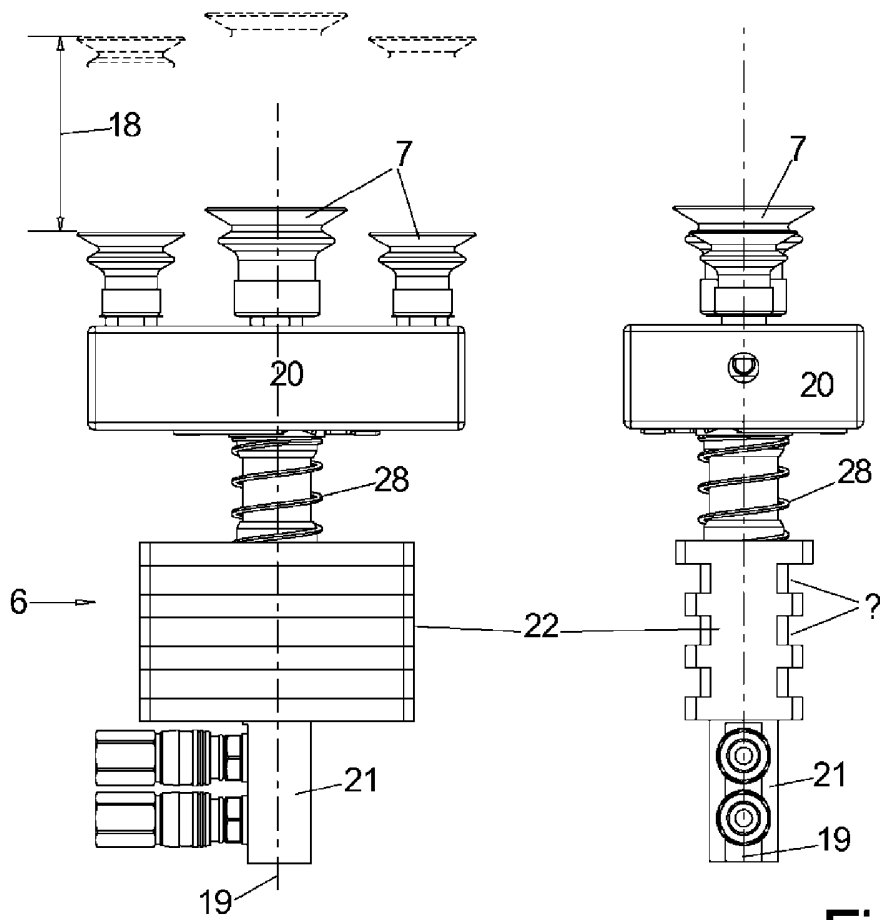


Fig. 4a

Fig. 4b