(12) **Oversettelse av europeisk patentskrift**

(11) **NO/EP 3368452 B1**

(19) NO

NORGE

(51) Int Cl.

B65G 47/22 (2006.01)
B07C 1/06 (2006.01)
B65G 47/244 (2006.01)

Patentstyret

(45)	Oversettelse publisert	2021.04.19
(80)	Dato for Den Europeiske Patentmyndighets publisering av det meddelte patentet	2021.01.13
(86)	Europeisk søknadsnr	16777973.5
(86)	Europeisk innleveringsdag	2016.10.03
(87)	Den europeiske søknadens Publiseringsdato	2018.09.05
(30)	Prioritet	2015.10.08, AT, 508652015
(84)	Utpekte stater	AL ; AT ; BE ; BG ; CH ; CY ; CZ ; DE ; DK ; EE ; ES ; FI ; FR ; GB ; GR ; HR ; HU ; IE ; IS ; IT ; LI ; LT ; LU ; LV ; MC ; MK ; MT ; NL ; NO ; PL ; PT ; RO ; RS ; SE ; SI ; SK ; SM ; TR
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(54) Benevnelse **ALIGNMENT STATION FOR ALIGNING CONVEYED GOODS TRANSPORTED IN A CONVEYOR SYSTEM**

(56) Anførte publikasjoner

EP-A2- 0 218 550
US-A- 3 799 319
DE-A1-102013 212 317
US-A- 4 889 224
DE-A1- 19 728 659

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Description

[0001] The invention relates to an alignment station for aligning conveyed goods transported in a conveyor system.

[0002] DE 10 2013 212 317 A1 and EP 1 556 297 B1 disclose alignment stations in which the conveyed goods which are transported in a conveyor system can be aligned.

[0003] The designs of DE 10 2013 212 317 A1 and EP 1 556 297 B1 have the drawback that they are complex to construct and therefore susceptible to faults and that the conveyed items cannot be precisely aligned.

[0004] The DE 197 28 659 A1 discloses a device for realigning objects.

[0005] The objects each lie with their longitudinal ends against two conveyor belts arranged side by side. These two conveyor belts are assigned a further conveyor belt wherein one of the two first conveyor belts extends beyond the second conveyor belt.

[0006] The document EP 0 218 550 A2 discloses an alignment station for chocolate bars which have a uniform shape and are to be turned through 90◦ at the highest possible throughput rates. The alignment station comprises a feed conveyor device, a pre-orientation device with two conveying means arranged next to one another and circulating in the form of belts, and a main orientation device. This main orientation device comprises a conveying means and a lateral guide unit arranged at an angle thereto so that a lateral surface of the conveyed goods is pressed against the lateral guide unit during the conveying process.

[0007] The document EP 0 218 550 A2 discloses the preamble of Claim 1. The document EP 0 218 550 A2 discloses a method for aligning conveyed goods transported in a conveyor system, the method comprising the following method steps:

- feeding the conveyed goods to a feed device;
- pre-aligning the conveyed goods in a pre-orientation device wherein the pre-orientation device, viewed over its width, has at least two conveying means circulating preferably in the form of a belt, and the pre-alignment is carried out in that the two conveying means are driven at different advancing speeds and in that the conveyed object which rests on at least two of the conveying means is turned in the direction of its target position; wherein in a subsequent main orientation device the conveyed object is end-aligned wherein the main orientation device has a lateral guide unit and further has at least one conveying means, preferably circulating in the form of a belt, which, viewed in the conveying direction, is arranged at an angle to the lateral guide unit, wherein the conveyed object is pressed by the conveying means against a guide surface of the lateral guide unit, wherein a lateral surface of the conveyed object is aligned parallel to the guide surface of the lateral guide unit, and wherein the conveying means of the main orientation device is aligned at an angle to the guide surface, with respect to its conveying direction.

[0008] The object of the present invention was to overcome the drawbacks of the prior art and to provide a device and a method by means of which the transported conveyed goods can be aligned in the best possible manner.

[0009] This is achieved by a device and a method according to Claims 1 and 14.

[0010] According to the invention an alignment station is formed for aligning conveyed goods, preferably piece of luggage, transported in a conveyor system. The alignment station comprises: a feed device for feeding the conveyed goods; an optical detection means for detecting the position of the conveyed goods transported on the feed device; a pre-orientation device for aligning the conveyed goods, which pre-orientation device, viewed over its width, has at least two conveying means preferably circulating in the form of a belt, which can be driven independently of one another; and further comprises a main orientation device for the end alignment of the conveyed goods, which main orientation device has a lateral guide unit and further has at least one conveying means, preferably circulating in the form of a belt, which, viewed in the conveying direction, is

arranged at an angle to the lateral guide unit so that the a lateral surface of the conveyed goods is pressed against the lateral guide unit during the conveying process. The guide surface is aligned parallel to the longitudinal extent of the pre-orientation device. It is further proposed that the conveying means of the main orientation device is aligned at an angle to the guide surface with respect to the conveying direction.

[0011] An advantage of the design of the alignment station according to the invention is that a conveyed object to be aligned can be roughly aligned in the pre-orientation device with respect to its desired target position. The conveyed object can then be end-aligned in the following main orientation device. Through the main orientation device it is further possible that a lateral surface to be determined of the conveyed object is aligned parallel to the lateral guide unit of the main orientation device, and bears against this. It is thereby possible to align both the rotary orientation relative to a vertical axis of the conveyed object and also the position of the lateral surface of the conveyed object in the main orientation device. The position of the conveyed object on leaving the main orientation device is designated as the end alignment or end orientation of the main orientation device. It is conceivable that further orientation measures adjoin the main orientation device.

[0012] It can be further expedient that the optical detection means is arranged above the feed device, preferably centrally with respect to the width of the feed device. It has proved particularly expedient if the optical detection means is arranged in the region of the feed device, in particular centrally with respect to the width of the feed device and at a distance above this. The conveyed goods can thereby be detected in good time by the optical detection means with respect to their orientation about the vertical axis. In a further method step the actual orientation and the desired target orientation of the conveyed goods can thereby be calculated by a computer unit.

[0013] It can furthermore be proposed that the feed device is formed in the form of a belt conveyor. It is hereby advantageous that a belt conveyor can be constructed

in the simplest possible way and need have only one drive unit. The susceptibility to faults and the maintenance costs of the feed device can thereby be kept as low as possible.

[0014] It can furthermore be proposed that a further optical detection means is formed which is arranged above the feed device, preferably centrally with respect to the width of the pre-orientation device. It is advantageous that the actual position of the conveyed goods can be monitored by means of the further optical detection means during the orientation at the pre-orientation device, and where applicable the detected data of the further optical detection means can be included to correct the control data of the pre-orientation device. In other words, a control circuit for orientating the conveyed goods can be implemented by means of the further optical detection means.

[0015] A characteristic is also advantageous according to which it can be proposed that the conveying means of the pre-orientation device are designed in the form of a link chain. A link chain is in particular to be constructed very strong and simple and thus cost-effective and less maintenance-intensive. A link chain can furthermore be easily driven.

[0016] According to a further development it is possible that the conveying means of the pre-orientation device have a width between 200 mm and 5 mm, in particular between 150 mm and 10 mm, preferably between 70 mm and 20 mm. It is advantageous that conveying means with a width of this size have a surprisingly good performance regarding the possibility for rotating conveyed goods of various different types. Conveying means with a width of this size furthermore require the lowest possible space with the greatest possible functionality.

[0017] It can furthermore be expedient that the pre-orientation device has between 5 and 30, in particular between 10 and 25, preferably between 15 and 25, conveying means spread out over its width. It is then advantageous that through the described formation of the pre-orientation device the most varied of conveyed goods can be properly aligned, such as for example packets, hard shell suitcases, bags and the

like.

[0018] It can furthermore be proposed that an intermediate strip is arranged between the individual conveying means of the pre-orientation device, which strip separates the individual conveying means from one another. It is then advantageous that the individual conveying means do not bear against one another and thus no friction can occur between the individual conveying means. The individual conveying means can furthermore be expediently guided by the intermediate webs whereby a high lateral stability of the narrow conveying means can be achieved.

[0019] It can further be proposed that each of the individual conveying means of the pre-orientation device can be driven by its own drive unit wherein the speed of the individual drive units is continuously adjustable. It is advantageous that the travelling speed or conveying speed of each individual conveying means can be pre-set individually whereby the conveyed goods can be turned into any position with respect to the vertical axis.

[0020] According to a particular characteristic it is possible that the drive units are arranged in rows on the pre-orientation device, as viewed in the longitudinal extent thereof, wherein it is possible each conveying means located at a distance n-1 can be driven by the drive units arranged in a row, in dependence on the number n of rows. It is advantageous that a high number of drive units required can be arranged in space-saving manner on the pre-orientation device. If for example two rows are formed on the conveying means then each second conveying means can be driven in one row of drive units, which means in particular that next to a conveying means which is driven by a drive unit of the first row there is a conveying means which is driven by a drive unit of the second row.

[0021] According to an advantageous further development it can be proposed that the lateral guide unit of the main orientation device has a circulating belt. In particular it is advantageous here that the circulating belt prevents the conveyed goods from having to be moved relative to a guide surface of the guide unit.

Damage to the conveyed goods through the grinding relative movement can thus be prevented as far as possible. It can thereby be achieved that the conveyed goods are not braked by the lateral guide unit and there is no increased energy requirement.

[0022] In a further development it can be proposed that the circulating belt of the lateral guide unit of the main orientation device is coupled to a drive motor. It is then advantageous that the circulating belt of the lateral guide unit cannot be actively driven thereby and does not have to be moved by the conveyed goods.

[0023] In particular it can be advantageous that the angle between the conveying means and the lateral guide unit of the main orientation device is between 2◦ and 45◦, in particular between 5◦ and 30◦, and preferably between 8◦ and 20◦. An arrangement of the conveying means of the main orientation device within this angle range has the surprising advantage that the conveyed goods can be aligned as smoothly as possible and thus with the least possible susceptibility to error.

[0024] According to a further development it is possible that the main orientation device has a plurality of conveying means which are distributed over the width and circulate in the form of a belt and which are driven by a common drive unit wherein the deflection rollers of the individual conveying means circulating in the form of a belt are arranged in a stepped manner with respect to one another such that the deflection rollers form a terminating edge arranged at a right angle to the lateral guide unit. It is advantageous then that the transition between the pre-orientation device and the main orientation device and between the main orientation device and a delivery conveyor belt on the output side can be formed substantially free of gaps and the conveyed goods are thereby transported as smoothly as possible in the alignment station.

[0025] It can furthermore be expedient that the common drive unit is arranged within the two deflection rollers of the main orientation device. It is then advantageous that the common drive unit can have the simplest possible construction wherein all the conveying means of the main orientation device can be driven by the common drive unit.

[0026] It can furthermore be proposed that a computer unit, preferably a memory-programmable controller, or an industrial computer is formed which is coupled to the individual component groups of the alignment station for data transfer. It is advantageous here that the computer unit can be configured as a central computer unit and can evaluate all the connection data of the built-in detection means and can transmit corresponding control data to the drive units. A computer unit can furthermore have input/output interfaces for the conveying devices which are connected in upstream or downstream.

[0027] With the method for aligning conveyed goods, preferably pieces of luggage, transported in a conveyor system it is proposed that the method comprises the following method steps:

- feeding the conveyed goods on a feed device;
- detecting the position of the fed goods by means of an optical detection means;
- evaluating the data from the optical detection means and calculating the desired target position of the conveyed goods;
- pre-aligning the conveyed goods in a pre-orientation device wherein the pre-orientation device, viewed over the width thereof, has at least two conveying means which circulate preferably in the form of a belt, and the pre-alignment is achieved by the two conveying means being driven at different feed speeds according to an evaluation based on data from the optical detection means, and thereby the conveyed goods which rest on at least two of the conveying means, are rotated;
- the conveyed goods are end-aligned in an adjoining main orientation device wherein the main orientation device has a lateral guide unit and also has at least one conveying means which circulates preferably in the form of a belt and which, viewed in the conveying direction, is arranged at an angle to the lateral guide unit, wherein the conveyed goods are pressed by the conveying means against the lateral guide unit, and thereby a lateral surface of the conveyed goods is aligned in parallel with the guide surface of the lateral guide unit, wherein the guide surface is aligned in parallel with a longitudinal extent of the pre-orientation device and wherein the conveying means of the main orientation device is aligned, with respect to its conveying direction, at an angle to the guide surface.

[0028] Advantageously in the method according to the invention the conveyed goods to be orientated can be aligned as accurately as possible by the use of the individual method steps so that in a subsequent conveying unit they can be further processed in the best possible way. The method according to the invention can furthermore have the highest possible cycle time in order to be able to align a large number of conveyed goods within a predetermined time.

[0029] It can further be proposed that during the pre-alignment of the conveyed goods the position of the conveyed goods is detected by a further optical detection means and the data from this position evaluation are included as a controlled variable in the determination of the feed speed of the different conveying means of the pre-orientation device. It is then advantageous that the accuracy and quality of the alignment of the conveyed goods in the pre-orientation device can be provided. This is particularly necessary if different shapes of conveyed goods, such as for example hard shell suitcases with a bulged support surface, are to be correspondingly aligned.

[0030] According to a particular characteristic it is possible that the feed device is operated at a constant conveying speed. It is advantageous that the geometric shape of the conveyed goods can be easily determined.

[0031] Finally it can be proposed that the desired target position of the conveyed goods is calculated in such a way that a longitudinal side of the conveyed goods is aligned roughly parallel to the lateral guide unit of the main orientation device. It is then advantageous that the longitudinal side of the conveyed goods is then brought to bear against the lateral guide unit of the main orientation device and thus all the conveyed goods are aligned in such a way that, viewed in the conveying direction, these are conveyed with a wide side in front.

[0032] The invention will now be explained in further detail for improved comprehension with reference to the following drawings.

[0033] The figures show in a heavily simplified diagrammatic illustration:

Fig. 1 a perspective view of an alignment station;

Fig. 2 a plan view of the alignment station;

Fig. 3 a side view of the alignment station;

Fig. 4 a perspective view of a pre-orientation device inclined from below;

Fig. 5 a sectional view of the pre-orientation device according to the sectional line V-V in Figs. 3 and 4.

[0034] It is first established that in the different embodiments described the same parts are provided with the same reference numerals and same component part names wherein the disclosures contained in the entire description can be transferred in the same sense to the same parts with the same reference numerals and the same component part names. The position details selected in the description, such as top, bottom, lateral etc. relate to the figure directly described and illustrated and these position details are to be transferred in the same sense to the new position in the event of a position change.

[0035] The following description is for clarity divided according to component parts wherein Figs. 1 to 5 are used equally for describing the component parts and wherein an overview of the individual figures is used, or is varied in sequence between the individual figures. It can furthermore happen that individual component parts were not provided with a reference numeral in individual figures for the sake of clarity.

Fig. 1 shows a perspective view of an alignment station 1 which can be incorporated into a conveying system 2 in order to be able to align conveyed goods in their position.
Fig. 2 shows a plan view and Fig. 3 shows a side view of the alignment station 1.

[0036] Figs. 1 to 5 illustrate and describe an exemplary embodiment of the alignment station 1 wherein individual sub-design variations were not shown in the drawings but were described in the brief exemplary embodiments. The individual sub-design variations can naturally be combined with one another in order to reach

an advantageous overall design.

[0037] The alignment station 1 can be used for example in a conveying system 2 which serves for example at an airport for conveying pieces of luggage. In particular it can be proposed that a conveying device 4 is formed upstream before the alignment station 1 and transports the pieces of luggage for example at a reception counter to the alignment station 1. It can furthermore be proposed that after the alignment station 1 there is a conveying device 5 on the output side at which the aligned conveyed goods 3 are transferred from the alignment station 1. The conveying device 5 on the output side can lead for example to an X-ray apparatus at which it is necessary for conveyed goods 3 to be aligned in the proper order.

[0038] As is apparent from Fig. 1 it can be proposed that an alignment station 1 has a feed device 6 in which the conveyed goods 3 are sent to a pre-alignment device 8 connected in on the output side in the conveying direction 7.

[0039] The feed device 6 has a width 9 which can also be termed a width extent. The feed device 6 furthermore has a length 10 which can also be termed a length extent. The conveying direction 7 is produced from the travelling movement of the conveyed goods 3 in the longitudinal extent of the feed device 6. The conveying direction 7 is therefore aligned parallel to a longitudinal side 11 of the feed device 6.

[0040] As is further apparent from Fig. 1 it can be proposed that the feed device 6 has one or more light beams 12 by means of which it is possible to detect the entry of the conveyed goods 3 into the feed device 6.

[0041] The feed device 6 is preferably formed as a belt conveyor. A belt conveyor of this kind can be formed for example by a conveyor belt which consists mainly of a rubber material. In an alternative design variation, it is also conceivable that the feed device 6 is formed for example as a roller conveyor or as another type of conveyor unit.

[0042] It can further be proposed that an optical detection means 13 is arranged in the region of the feed device 6 and is designed to detect the position of the conveyed goods 3.

[0043] Position is to mean in the sense of this document a combination of position and orientation.

[0044] It can be proposed in particular that the optical detection means 13 detects an external contour of the conveyed goods 3 and thus their projected base surface area. In particular a lateral surface 14 of the conveyed goods 3 simulating the external contour is detected and thereby determines the position of the conveyed goods 3. The lateral surfaces 14 can in the case of an approximately rectangular conveyed object 3 be further specified into a longitudinal side 15 which has the larger extent and a broad side 16 which has the shorter extent. As already explained the external contour of the conveyed object 3 can be detected by the optical detection means 13 and thus the surface area centre of the external contour or base surface or a vertical axis 17 running through this centre can be calculated.

[0045] The optical detection means 13 is preferably arranged above the feed device 6 in the middle of the width 9 of the feed device 6. It can hereby be proposed that there is a distance 18 between the feed device 6 and the optical detection means 13 of between 500 mm and 5000 mm, in particular between 1000 mm and 3000 mm and preferably between 1500 mm and 2500 mm. The distance 18 is determined in particular starting from a conveyor surface or a support surface of the feed device 6.

[0046] The optical detection means 13, viewed in the conveying direction 7, is preferably positioned so that it can detect the conveyed goods 3 already level with the feed device 6. In an alternative variation it can also be proposed that the optical detection means 13 is arranged in a transition area between the feed device 6 and the pre-orientation device 8.

[0047] The conveyed goods 3 are transferred from the feed device 6 and passed over to the pre-orientation device 8.

[0048] In the pre-orientation device 8 the conveyed goods 3 are turned relative to their vertical axis 17 on the basis of the calculated data which was detected by the optical detection means 13 and processed in a computer unit 19. This is achieved in that the pre-orientation device 8 has at least two conveying means 20 which are arranged next to one another as viewed over the width 21 of the pre-orientation device 8, and extend over the length 22 of the pre-orientation device. The conveyed goods 3 then rest on the at least two conveying means 20 of the pre-orientation device 8 and are turned in that the two conveying means 20 have a different advancing speed.

[0049] The smaller a width 23 of the conveying means 20 or the more conveying means 20 are spread over the width 21 of the pre-orientation device 8 so the better small conveyed goods 3 or conveyed goods 3 having a curved support surface can be turned. Such conveyed goods 3 having a curved support surface are for example hard-shell cases. A width 23 of the conveying means 20 is preferably less than a tenth of the width 21 of the pre-orientation device 8.

[0050] The conveying means 20 are preferably configured in the form of conveying means circulating in the form of a belt. These can be for example link chains, a flat conveyor belt, a cogged belt, circulating cables or other conveying means.

[0051] It can further be proposed that intermediate webs 24 are arranged between the individual conveying means 20 and serve to separate or guide the individual conveying means 20.

[0052] Fig. 4 shows a view from below of an exemplary embodiment of a pre-orientation device 8.

[0053] Fig. 5 shows a sectional view of the pre-orientation device 8 according to the sectional line V-V from Figs. 3 and 4.

[0054] As can be seen particularly well from viewing Figs. 4 and 5, it can be proposed that each of the conveying means 20 of the pre-orientation devices 8 is assigned its own drive unit 25 through which all the conveying means 20 can be driven independently of one another. The individual conveying means 20 can thereby have different travelling speeds. As is particularly apparent in Fig. 5 it can be proposed that the individual drive units 25 can have a drive motor and where applicable a reduction gearing.

[0055] If a large number of conveying means 20 are installed in the pre-orientation device 8 or the conveying means 20 have a small width 23, then it can be necessary that for reasons of space the drive units 25 are each arranged in one row 26 each wherein the individual rows 26 are off-set slightly relative to one another. It is thereby possible that, as can be seen particularly clearly in Fig. 5, in the first row 26 for example only each third conveying means 20 is driven by a drive unit 25 of the first row 26, and that the remaining conveying means 20 are driven analogous with the first row 26 by drive units 25 arranged in the further rows 26.

[0056] The individual drive units 25 can have for example gearwheels 27 which engage in and drive the conveying means 20.

[0057] A further optical detection means 28 can also be provided which can be arranged in the region of the pre-orientation device 8. The further optical detection means 28 can be arranged analogous with the optical detection means 13 centrally in the width 21 of the pre-orientation device 8 or at a certain distance from the latter. The further optical detection means 28 can serve to detect the actual position of the conveyed goods 3 during the orientation process in the pre-orientation device 8. Where applicable the computer unit 19 can correct the control commands to the pre-orientation device 8 on the basis of the data of the further optical detection means 28 in the form of a control circuit.

[0058] A light beam 29 can further be formed by means of which the passage of the conveyed goods 3 can be detected at the end of the pre-orientation device 8.

[0059] Furthermore, viewed in the conveying direction 7, a main orientation device 30 can be provided following the pre-orientation device 8 and designed for the end-alignment of the conveyed goods 3.

[0060] The main orientation device 30 can comprise at least one conveying means 31 which extends over the width 32 of the main orientation device 30 or length 33 of the main orientation device 30. In particular it is proposed that the main orientation device 30 has a lateral guide unit 34 in which a guide surface 35 is formed. The guide surface 35 forms a contact bearing surface which faces the centre of the main orientation device 30. The guide surface 35 is aligned parallel to the longitudinal extent 22 of the pre-orientation device 8.

[0061] It is further proposed that the conveying means 31 of the main orientation device 30 is aligned, with respect to its conveying direction, at an angle 36 to the guide surface 35. Through this configuration a conveyed object 3 which was already roughly aligned in the pre-orientation device 8 can be transferred from the pre-orientation device 8 to the main orientation device 30 and is pressed there by the inclined position of the conveying means 31 against the lateral guide unit 34, in particular the guide surface 35 thereof.

[0062] A further alignment of the conveyed object 3 is thereby produced wherein a lateral surface 14 of the conveyed object 3 is aligned parallel to the guide surface 35 of the lateral guide unit 34.

[0063] In order to damage the conveyed object 3 as little as possible it can be proposed that the lateral guide unit 34 comprises a circulating belt 37 which can co-rotate synchronously with the conveyed object 3. In this design variation, the guide surface 35 of the lateral guide unit 34 is formed by the circulating belt 37.

[0064] If no relative speed or relative movement occurs between the circulating belt 37 and the lateral surface 14 of the conveyed goods 3 then the wear on the goods 3 can be kept as low as possible.

[0065] In a further development it can be proposed that the circulating belt 37 of the lateral guide unit 34 is actively driven by a drive motor 38.

[0066] In a further design variation (not shown) it can be proposed that the lateral guide unit 34 has several rollers which serve to guide the conveyed goods 3. Such rollers can be actively driven analogous with the circulating belt 37 or be mounted to rotate freely.

[0067] In a further design variation (not shown) it can be proposed that the lateral guide unit 34 is formed only by a friction wall along which the conveyed goods 3 slide.

[0068] As is apparent from Fig. 2 it can be proposed that the guide surface 35 of the lateral guide unit 34 is aligned flush with a secondary conveying unit 39, in particular with a lateral wall 40 of the secondary conveyor unit 39. It can also further be proposed that a secondary conveyor unit 39 is arranged off-set so that the lateral wall 40 of the secondary conveyor unit 39 lies outside of the guide surface 35 of the lateral guide unit 34 and thus the conveyed goods 3 do not slide along the lateral wall 40 of the secondary conveyor unit 39.

[0069] It can further be proposed that several conveying means 31 running parallel to one another are formed in the main orientation device 30 and, as particularly apparent in Fig. 2, are arranged in stepped manner relative to one another in the region of their ends, thus in the region of deflection rollers 41, so that a terminating edge 42 of the main orientation device 30 is arranged at right angles to the guide surface 35 of the lateral guide unit 34. It can thereby happen that the inclined position of the conveying means 31 in the transition region from the pre-orientation device 8 and to the secondary conveyor unit 39 is balanced as much as possible so that a conveying gap 43 between the individual conveying devices can be kept as small as possible in order not to damage the conveyed goods 3.

[0070] As can be seen particularly well in Fig. 1, it can be proposed that a drive

unit 44 of the main orientation device 30 drives all the conveying means 31 in unison. It can be proposed here that the drive unit 44 is not arranged directly on the deflection rollers 41 but that the drive unit 44 is arranged between two deflection rollers which are located in the longitudinal extent 33.

[0071] The conveying means 31 of the main orientation device 30 can be formed by different types of conveying means analogous with the conveying means 20 of the pre-orientation device 8.

[0072] It can further be proposed that a light beam 45 is likewise formed in the region of the secondary conveyor unit 39 and can be used to detect the passage of the conveyed goods 3.

[0073] Fig. 2 shows by way of example the individual steps of the conveyed goods 3 passing through the alignment station 1.

[0074] In the feed device 6 the actual position of the conveyed goods 3 is detected and then a target position is calculated. The conveyed goods 3 are transferred from the feed device 6 to the pre-orientation device 8 and are pre-aligned in the latter. The pre-aligned conveyed goods 3 are then transferred to the main orientation device 30 and are pressed in this against the lateral guide unit 34 and are thus end-aligned. The conveyed goods 3 can then be transferred via the optional secondary conveyor unit 39 for further processing.

[0075] The exemplary embodiments show possible design variations wherein it should be noted at this point that the invention is not restricted to the design variations specifically shown but rather various combinations of the individual design variations with one another are possible and these variation possibilities are within the knowledge of the person skilled in this technical field based on the instruction through the invention.

[0076] The extent of protection is determined by the claims. The description and the drawings are however used for interpreting the claims. Individual features or

combinations of features from the different exemplary embodiments described and illustrated can represent stand-alone inventive solutions. The object on which the independent inventive solutions are based can be drawn from the description.

[0077] All the details on the value ranges in the description of the object are thus to be understood so that these comprise any and all partial regions, e.g. the indication 1 to 10 is to mean that all partial regions, starting from the lower limit 1 and upper limit 10 are included, i.e. all partial regions start with a lower limit 1 or greater, and end with an upper limit 10 or less, e.g. 1 to 1.7, or 3.2 to 8.1, or 5.5 to 10.

[0078] For the sake of procedure it should finally be pointed out that for an improved comprehension of the structure, elements were in part shown not to scale and/or enlarged and/or reduced.

Reference numeral list

1	Alignment station
2	Conveying system
3	Conveyed goods
4	Upstream conveying device
5	Downstream conveying device
6	Feed device
7	Conveying direction
8	Pre-orientation device
9	Width of the feed device
10	Length of the feed device
11	Longitudinal side of feed device
12	Light beam of feed device
13	Optical detection means
14	Lateral surface of conveyed goods
15	Longitudinal side of conveyed goods
16	Broad side of conveyed goods

17 Vertical axis of conveyed goods
18 Distance of feed device – optical detection means
19 Computer unit
20 Conveying means of pre-orientation device
21 Width of pre-orientation device
22 Length of pre-orientation device
23 Width of conveying means of pre-orientation device
24 Intermediate web
25 Drive unit of pre-orientation device
26 Row of drive unit
27 Gearwheel
28 Further optical detection means
29 Light beam of pre-orientation device
30 Main orientation device
31 Conveying means of main orientation device
32 Width of main orientation device
33 Length of main orientation device
34 Lateral guide unit of main orientation device
35 Guide surface of lateral guide unit
36 Angle between the conveying means and lateral guide unit of main orientation device
37 Circulating belt of lateral guide unit
38 Drive motor of lateral guide unit
39 Secondary conveyor unit
40 Lateral wall of secondary conveyor unit
41 Deflection rollers
42 Terminating edge of main orientation device
43 Conveyor gap
44 Drive unit of main orientation device
45 Light beam of secondary conveyor unit

Patentkrav

1. Innrettingsstasjon (1) til innretting av transporterte transportgods (3), fortrinnsvis bagasjegods, i et transportsystem (2), hvor innretningsstasjonen (1) omfatter:

en forsyningsanordning (6) for å forsyne transportgodset (3);

en fororienteringsanordning (8) for innretting av transportgodset (3), hvor fororienteringsanordningen (8), sett over bredden (21) derav, har i det minste to, fortrinnsvis båndformet omløpende, transportelementer (20), som kan kjøres uavhengig av hverandre, hvor

innrettingsstasjonen (1) utover dette omfatter en hovedorienteringsanordning (30) for endeinnretting av transportgodset (3), hvor hovedorienteringsanordningen (30) har en lateral føringsenhet (34) og videre i det minste ett, fortrinnsvis båndformet omløpende, transportelement (31), som, sett i transportretningen, er anordnet i en vinkel (36) til den laterale føringsenheten (34), slik at en lateral flate (14) av transportgodset (3) under transportprosessen presses mot en føringsflate (35) av den laterale føringsenheten (34), hvorved transportelementet (31) av hovedorienteringsanordningen (30) er innrettet i forhold til dens transportretning i en vinkel (36) til føringsflaten (35), **karakterisert ved at** føringsflaten (35) er innrettet parallelt til en langsgående forlengelse (22) av fororienteringsanordningen (8), og **ved at** innrettingsstasjonen (1) har et optisk deteksjonselement (13) for å detektere posisjonen av transportgodset (3) som er transportert ved forsyningsanordningen (6).

2. Innrettingsstasjon ifølge krav 1, **karakterisert ved at** det optiske deteksjonselementet (13) er anordnet over forsyningsanordningen (6), fortrinnsvis sentralt i forhold til bredden (9) av forsyningsanordningen (6).

3. Innrettingsstasjon ifølge et hvilket som helst av de foregående kravene, **karakterisert ved at** en ytterligere optisk deteksjonselement (28) er dannet, som er anordnet over fororienteringsanordningen (8), fortrinnsvis sentralt i forhold til bredden (21) av fororienteringsanordningen (8).

4. Innretningsstasjon ifølge et hvilket som helst av de foregående kravene, **karakterisert ved at** transportelementet (20) av fororienteringsanordningen (8) har en bredde (23) mellom 200 mm og 5 mm, spesielt mellom 150 mm og 10 mm, fortrinnsvis mellom 70 mm og 20 mm.

5. Innretningsstasjon ifølge et hvilket som helst av de foregående kravene, **karakterisert ved at** fororienteringsanordningen (8) har mellom 5 og 30,

spesielt mellom 10 og 25, fortrinnsvis mellom 15 og 25 transportelementer (20) fordelt over bredden (21).

6. Innretningsstasjon ifølge et hvilket som helst av de foregående kravene, **karakterisert ved at** en mellomsteg (24) er anordnet mellom de individuelle transportelementene (20) av fororienteringsanordningen (8), som adskiller de individuelle transportelementene (20) fra hverandre.

7. Innretningsstasjon ifølge et hvilket som helst av de foregående kravene, **karakterisert ved at** hvert av de individuelle transportelementene (20) av fororienteringsanordningen (8) drives av en egen drivenhet (25), hvor hastigheten av de individuelle drivenhetene (25) er kontinuerlig justerbart.

8. Innrettingsstasjon ifølge krav 7, **karakterisert ved at** drivenhetene (25) sett i den langsgående forlengelsen (22) av forretningsanordningen (8), er anordnet rekkevis derpå, hvor i avhengighet av antallet n av rekkene (26), hvert transportelement (20), plassert på en avstand n-1, kan drives av drivenhetene (25) som er anordnet i en rekke (26).

9. Innretningsstasjon ifølge et hvilket som helst av de foregående kravene, **karakterisert ved at** den laterale føringsenheten (34) av hovedorienteringsanordningen (30) har et omløpende bånd (37).

10. Innrettingsstasjon ifølge krav 9, **karakterisert ved at** det omløpende båndet (37) av den laterale føringsenheten (34) av hovedorienteringsanordningen (30) er koblet med en drivmotor (38).

11. Innretningsstasjon ifølge et hvilket som helst av de foregående kravene, **karakterisert ved at** vinkelen (36) mellom transportelementet (31) og den laterale føringsenheten (34) av hovedorienteringsanordningen (30) er mellom 2° og 45°, spesielt mellom 5° og 30°, fortrinnsvis mellom 8° og 20°.

12. Innretningsstasjon ifølge et hvilket som helst av de foregående kravene, **karakterisert ved at** hovedorienteringsanordningen (30) har et antall av båndformet omløpende transportelementer (31) som er fordelt over bredden (32), og som drives av en felles drivenhet (44), hvorved avbøyningsrullene (41) av de individuelle, båndformet forløpende transportelementene (31) er trinnvis anordnet i forhold til hverandre på en slik måte at avbøyningsrullene (41) danner en avslutningskant (42) som er anordnet i en rett vinkel med den laterale føringsenheten (34).

13. Innrettingsstasjon ifølge krav 12, **karakterisert ved at** den felles drivenheten (44) er anordnet mellom avbøyningsruller (41) av hovedorienteringsanordningen (30).

14. Fremgangsmåte til innretting av transporterte transportgods (3), fortrinnsvis bagasjegods, i et transportsystem (2), spesielt ved bruk av en innretningsstasjon (1) i samsvar med et hvilket som helst av de foregående kravene, hvor fremgangsmåten omfatter de følgende fremgangsmåtetrinnene:

- forsyning av transportgodset (3) ved en forsyningsanordning (6);
- detektering av posisjonen av transportgodset (3) ved hjelp av et optisk deteksjonselement (13);
- evaluering av dataene av det optiske deteksjonselementet (13) og beregning av den ønskete målposisjonen av transportgodset (3);
- førinnretting av transportgodset (3) i en fororienteringsanordning (8), hvor fororienteringsanordningen (8), sett over bredden (21) derav, har i det minste to, fortrinnsvis båndformet omløpende, transportelementer (20) og forinnrettingen oppnås ved at de to transportelementene (20), i henhold til en evaluering som er basert på data fra det optiske deteksjonselementet (13), med forskjellige forsyningshastigheter og derved transportgodset (3), som hviler på i det minste to av transportelementene (20), roteres i retning av målposisjonen; hvor i en umiddelbart tilstøtende hovedorienteringsanordning (30) transportgodset (3) er endeinnrettet, hvorved hovedorienteringsanordningen (30) har en lateral føringsenhet (34) og også i det minste ett, fortrinnsvis båndformet omløpende, transportelement (31), som sett i transportretningen er anordnet i en vinkel (36) til den laterale føringsenheten (34), hvorved transportgodset (3) presses av transportelementet (31) mot en føringsflate (35) av den laterale føringsenheten (34), og derved blir en lateral flate (14) av transportgodset (3) innrettet parallelt til føringsflaten (35) av den laterale føringsenheten (34), hvorved føringsflaten (35) er innrettet parallelt til en langsgående forlengelse (22) av fororienteringsanordningen (8) og hvorved transportelementet (31) av hovedorienteringsanordningen (30) er innrettet, i forhold til dens transportretning, i en vinkel (36) til føringsflaten (35).

15. Fremgangsmåte ifølge krav 14, **karakterisert ved at**, under forinnrettingen av transportgodset (3), blir posisjonen av transportgodset(3) detektert av et ytterligere optisk deteksjonselement (28) og dataene fra denne posisjonsevalueringen blir inkludert som en kontrollvariabel i bestemmelsen av forsyningshastigheten av de forskjellige transportelementene (20) av fororienteringsanordningen (8).

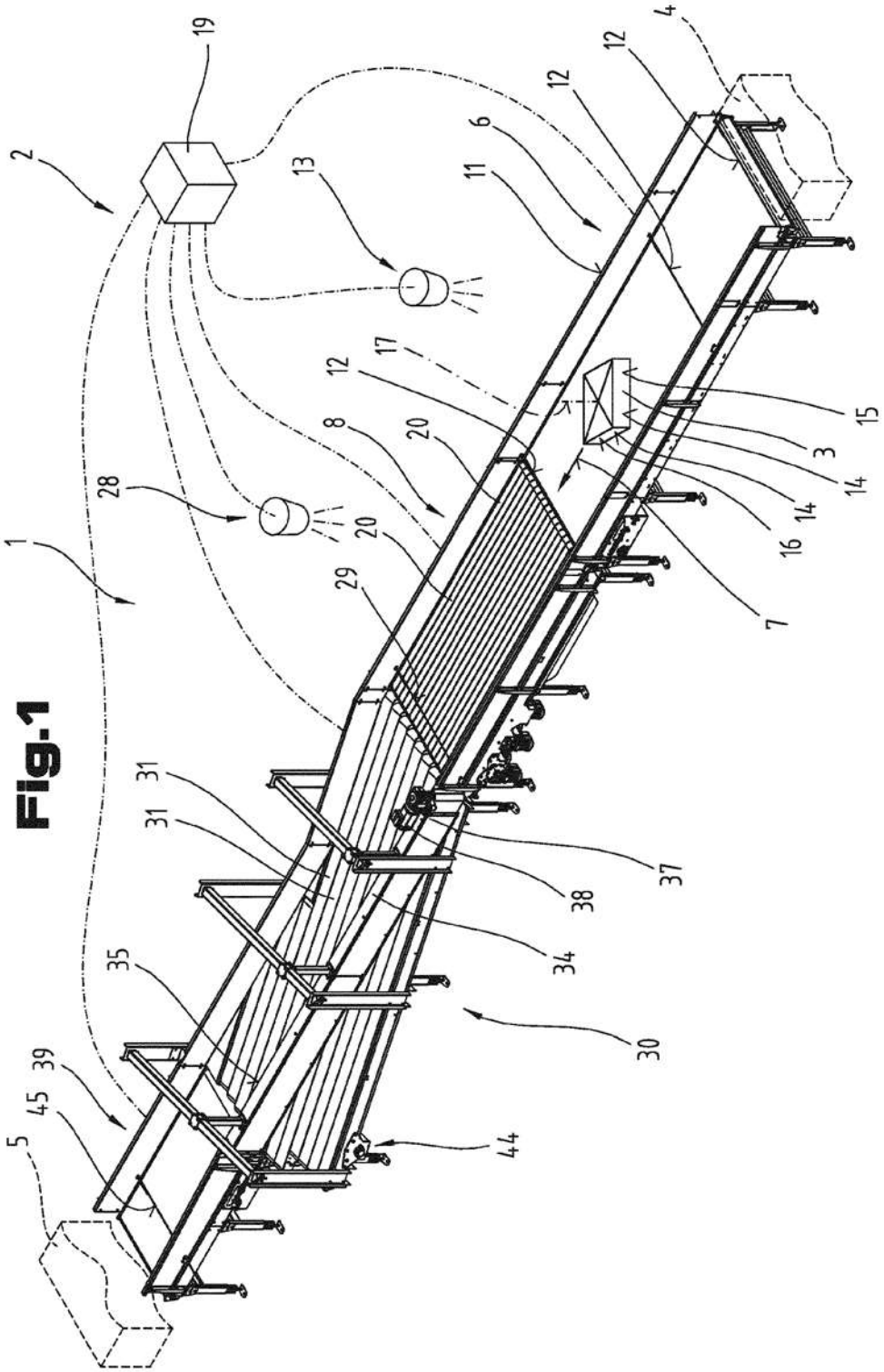
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Fig.1

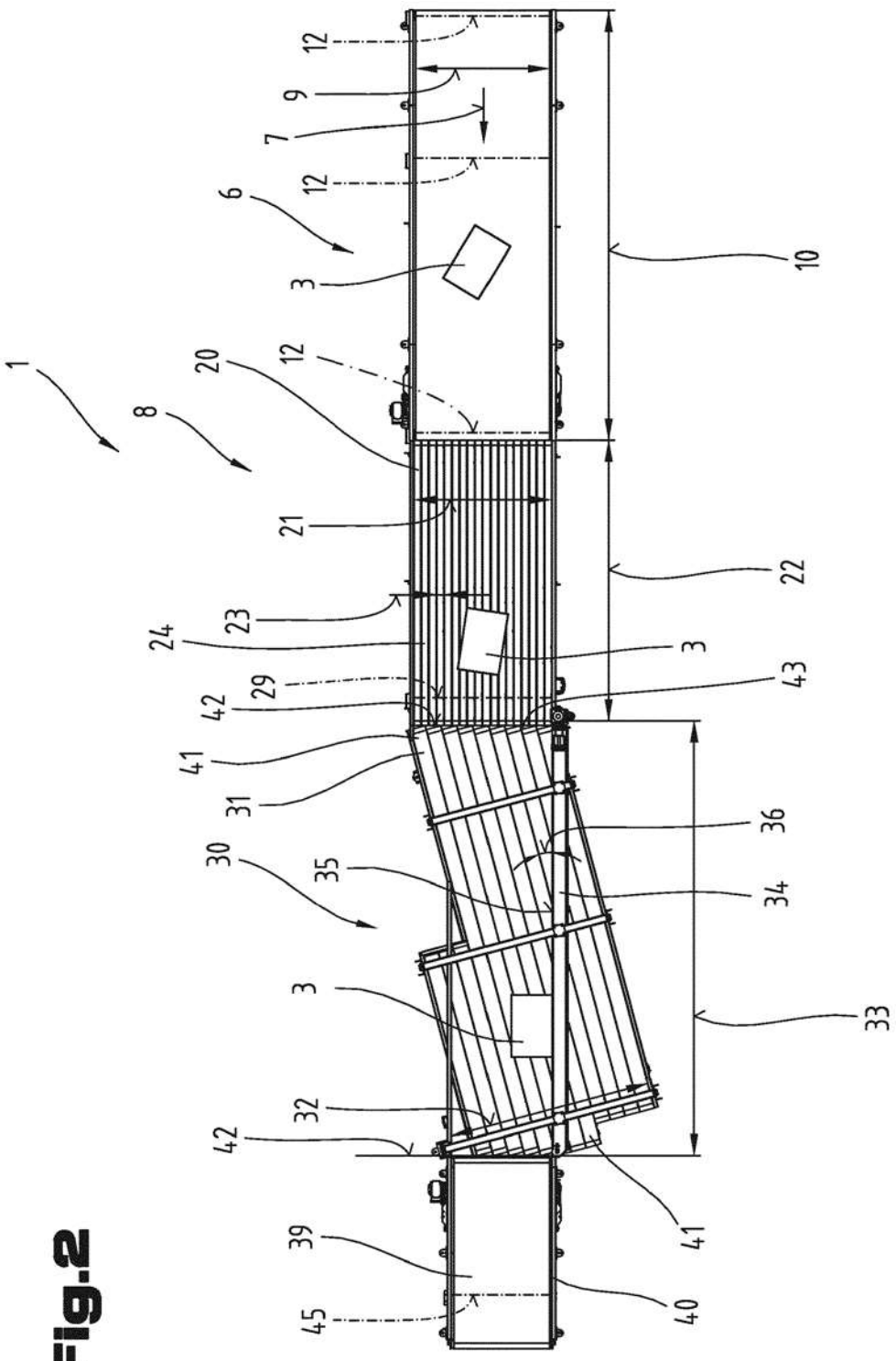
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Fig.2

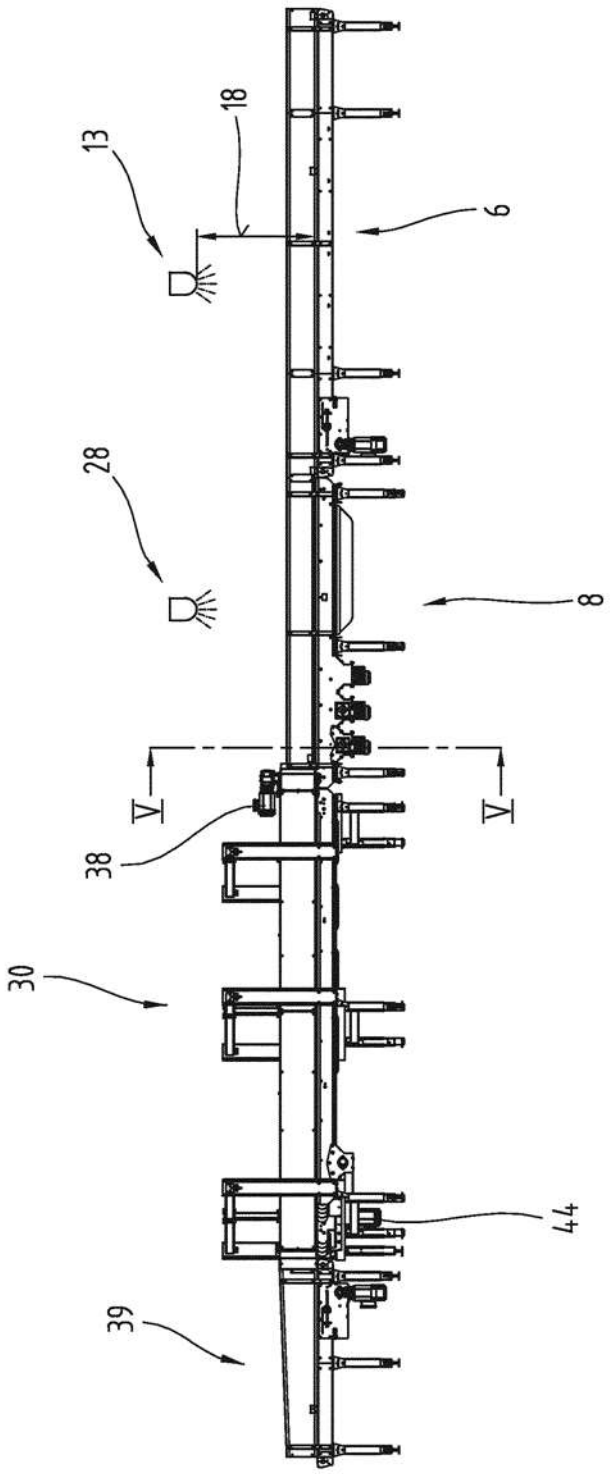

Fig.3

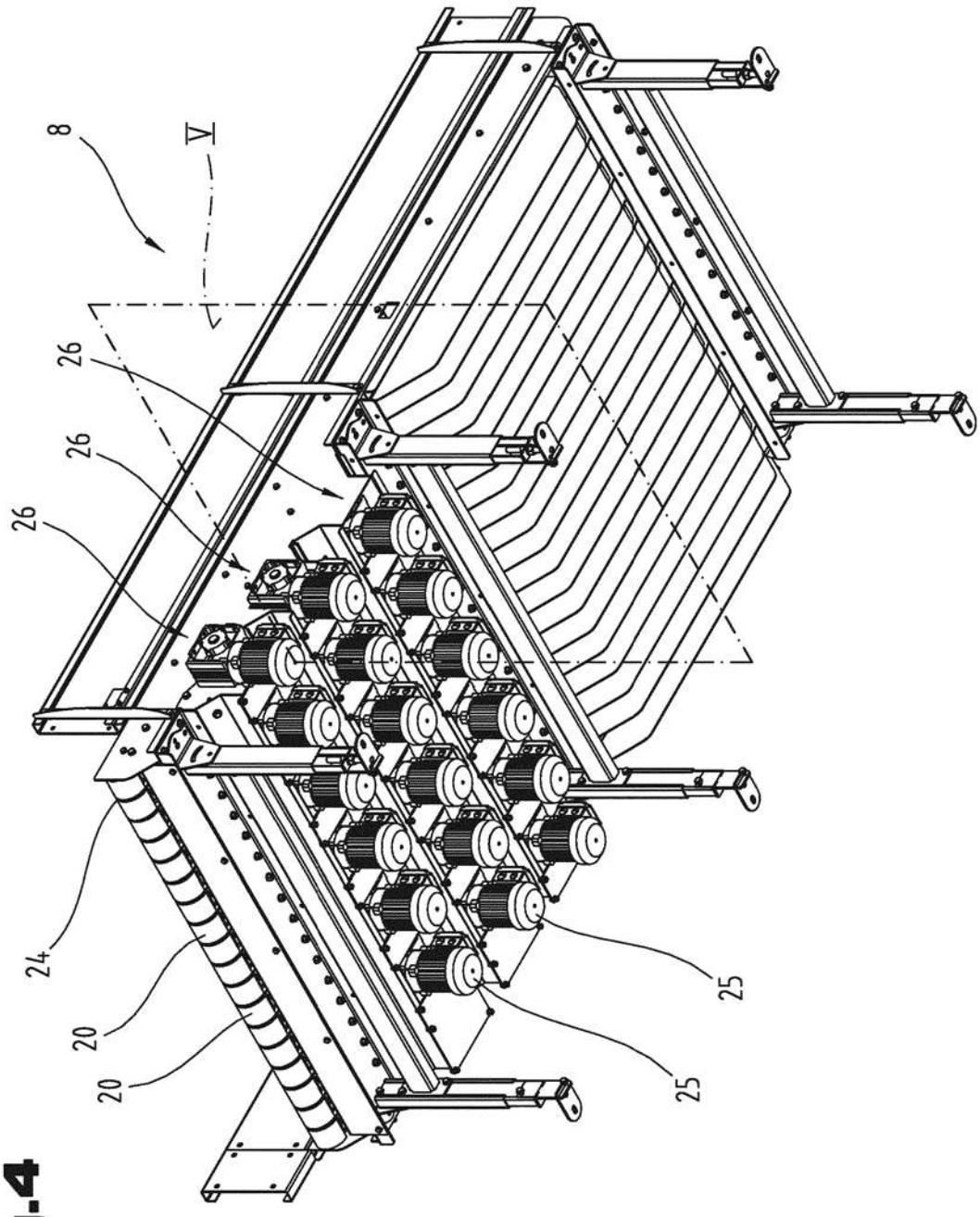

Fig.4

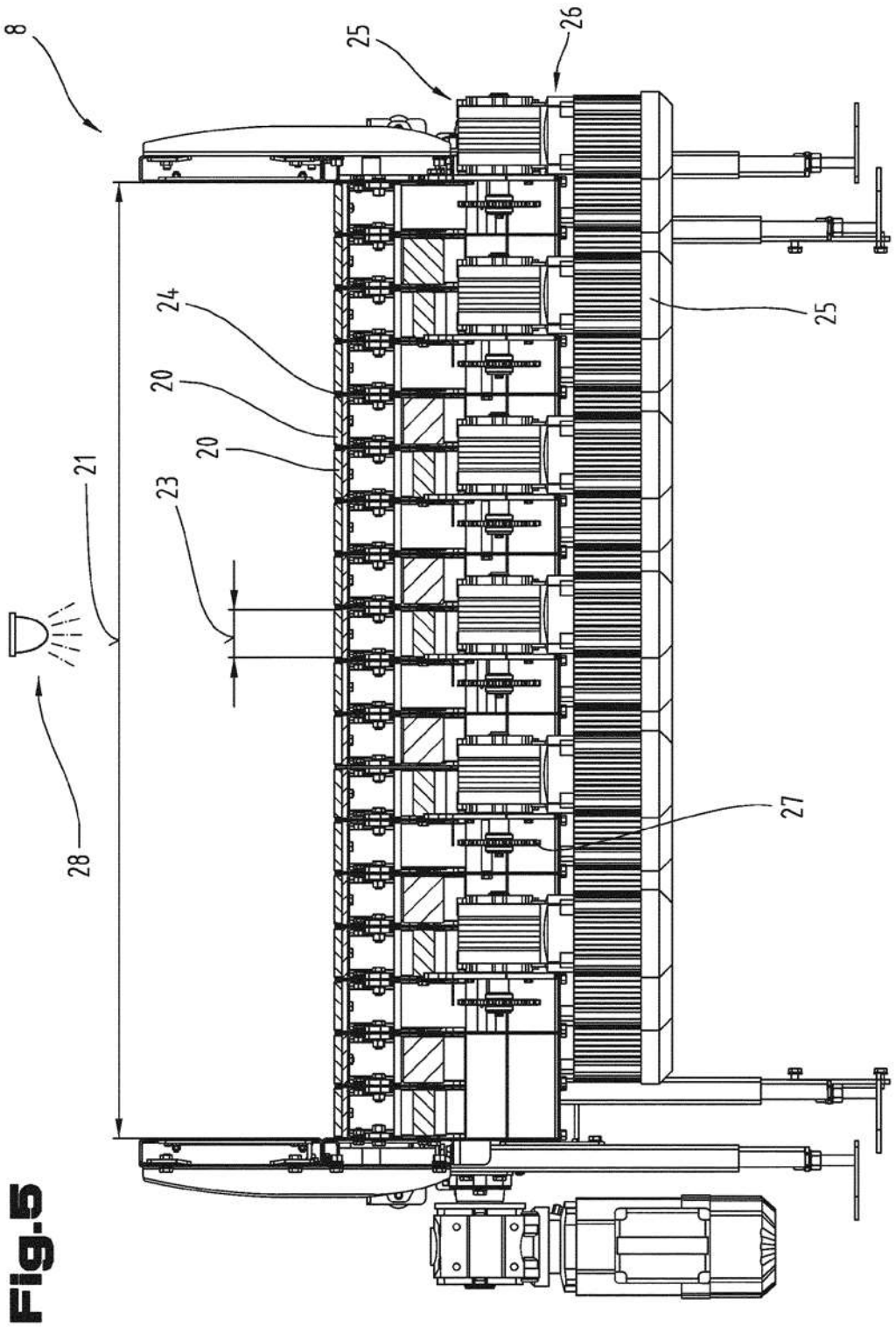

Fig.5