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Diverting apparatus with Coanda stabilizing device

The present application relates to an apparatus for diverting objects, such as containers, cases, packages, which are conveyed on a transport apparatus.

Such diverting apparatuses are used e.g. to separate out defective beverage bottles or other empty or already filled foodstuff containers or packaging. The transport devices are conveyor belts, link chain conveyors or the like, wherein two or more such conveyors run next to each other in parallel at least in sections, and the diverting apparatus is to shift the defective bottles or containers from a first conveyor onto one of the neighbouring conveyors.

It is known from WO 00/68120 (EP 1 175 361 B1) to control the intensity with which the objects are diverted such that the objects receive a diverting impulse of different strength transverse to their transport direction and thereby arrive on one of several second transport apparatuses running next to each other in parallel.

It is likewise known from DE 10 2009 003 847 A1 to control the intensity with which objects are diverted such that the objects receive a diverting impulse of different strength transverse to their transport direction and thereby arrive on a second of several transport apparatuses running next to each other. The transport devices in each case run parallel to each other. The strength of the impulse is defined according to the weight or the centre of gravity of the objects and transmitted to the objects by means of a linear drive.

From DE-C2-36 23 327 an apparatus is known for separating out defective packaging units, wherein the angle at which a pusher pushes the packaging units off the conveyor belt is controlled automatically. The angle is set depending on the transport speed of the conveyor belt and the vector perpendicular thereto of the necessary pushing speed.

It is known from EP 0 019 117 A1 that objects are deflected from a first onto a second transport path running in parallel by means of a plurality of diverting segments. The individual diverting segments form a continuous deflecting surface. After leaving the diverting device, the objects move to the second transport path because of their inertia. For high transport speeds the deflecting surface need not necessarily be continuous. In this case, it is sufficient if only some of the diverting segments form a ramp. The transported objects then move further onto the neighbouring transport paths without guidance because of the inertia.

US 5 135 101 A discloses the preamble of claims 1 and 9.

In particular if the objects to be diverted are relatively light, it can happen in the diverting apparatuses known from the state of the art that the objects tip over during the diversion.

The object of the present invention is therefore to improve the diverting process further and to further reduce the danger of the objects to be diverted tipping over.

This object is achieved in the case of the apparatus of the type named at the beginning by the features of claim 1. The apparatus for diverting objects which are conveyed on a transport apparatus comprises a first transport device, on which the objects are transported in a single row, a second transport device, which is arranged next to the first transport device, and a diverting device, which shifts objects to be diverted from the first transport device onto the second transport device. The diverting device is provided on one side of the transport apparatus. To guide the objects to be diverted, a rail is provided on the side of the transport apparatus situated opposite the diverting device. The diverting device furthermore comprises a device for generating an air jet with at least one flow component which runs parallel to the rail and which is blown along the inner side of the rail. The device for generating an air jet comprises at least one nozzle, which is provided on the rail upstream of the diverting device.

In the present invention, reference is made to an "air jet" in general. Naturally, the jet can also be generated with another gaseous medium. For example, inert gases or protective gases can be used if the objects to be transported require this. The term "air jet" is thus not to be understood as limited to "air" as gaseous medium.

Objects within the meaning of the present invention can be containers such as glass bottles, plastic bottles, containers, cans, cases or other packages. The present invention is particularly suitable for diverting lightweight containers such as empty plastic containers or empty cans, which can very easily tip over during transport because of their low weight.

In the present invention, a rail for guiding the objects to be diverted is provided along the first and second transport device on the side situated opposite the diverting device. At first this rail extends parallel along the first transport device. In the area of the diverting device the rail is designed curved and follows the transport path of the bottles to be diverted. At the end of the diverting apparatus the rail then runs to the side of the second transport device. The rail serves to guide and stabilize the diverted bottles.

Furthermore a device for generating an air jet, which runs parallel to the rail, is provided according to the invention. This air jet represents a preferably locally limited air flow which runs along the plane defined by the rail.

On the one hand the air flow forms an air cushion and serves to absorb hard collisions between the objects to be diverted and the rail. On the other hand the air flow exerts a force pulling in the direction of the rail on the objects to be diverted. This pulling force is produced by the Coanda effect. The Coanda effect occurs when locally limited air flows are guided past surfaces.

Thus, on the one hand, the objects to be diverted are pressed against the rail because of the Coanda effect and, on the other hand, the air stream ensures that the objects do not suffer any hard collisions with the rail. Overall, the objects are therefore guided along the guide rail of the second transport device safely after the diversion process.

As the pulling force on the objects to be diverted produced by the Coanda effect is relatively small, the present invention is suitable in particular for stabilizing relatively lightweight objects such as empty bottles or cans.

The Coanda effect occurs in the case of locally limited flows which extend along a surface. For this reason, it is advantageous if the device for generating the air flow has at least one nozzle. With this nozzle, the jet can be guided along the rail of the second transport apparatus in a targeted manner in the desired orientation.

To generate the Coanda effect, it is necessary for the air jet to run parallel to the rail. In an embodiment the air jet can run parallel to the rail and in the transport direction along the rail. As the air jet follows the course of the rail in this configuration, in this embodiment the length of the effective area is relatively great. However, it is to be taken into account that the objects to be diverted can additionally be accelerated because of the air jet coming from behind. In some circumstances this must be taken into account in the dimensioning of the diverting device. This effect can also be utilized advantageously in order to compensate for a deceleration of the bottles to be diverted by the diverting device.

Such an air jet can advantageously be achieved by using a rail with a hollow profile. For example, the rail can have the form of a C profile, wherein a continuous opening or slit is provided on the side of the rail facing the transport area. The outlet of the device for generating the air jet can be arranged inside the hollow profile of the rail. The air jet can then exit through the opening substantially parallel to the rail and in the transport direction following the course of the rail.

This embodiment moreover has the advantage that the air flow can never be completely shielded by the objects to be diverted. Independently of the respective diversion task, in this embodiment a predetermined length of the area of influence of the air jet can be provided.

Through the positioning of the nozzle, it can be determined from what position along the diverting apparatus the air jet is generated and from when the Coanda effect occurs. The stabilizing action of the Coanda effect can thereby also for example already be utilized before the diverting device in the transport direction.

The rail can in principle have any desired suitable cross section. In particular the inner side of the rail, thus the side along which the objects and the air jet are guided, can be designed straight, curved, convex or concave.

The air jet need not necessarily run parallel to the transport direction. The Coanda effect also acts when the air jet is guided parallelly past the rail, but for example at an angle from above or from below. Quite generally, the air jet can be guided past the rail at any desired angle in the rail plane.

The greater the angle of the air jet relative to the transport plane, the shorter the rail area which is covered by the air jet and in which the Coanda effect acts on the objects to be

diverted. At the same time, however, the direct acceleration of the bottles, brought about because of the air jet, is also reduced. The angle at which the air jet is guided past the rail in the rail plane can be optimally set individually depending on the diversion task and depending on the field of use.

5 The flow rate, the air pressure, the jet profile etc. can likewise be set individually depending on the respective diversion task and depending on the field of use. Compressors or compactors customary in the trade can be used to generate the air jet. The specifications of the compressors used can be adapted to the respective diversion task. It has been shown that compactors with a nominal power of between 1 and 4 kW, preferably of approximately 1.5
10 kW, and a throughflow of between 40 and 100 m³/h, preferably approximately 65 m³/h, at a maximum pressure of between 200 and 600 mbar, are sufficient for the diversion of conventional empty PET containers. In order to limit the quantity of throughflow, for example a frequency converter can additionally be used, with the result that the compactor can be operated not exclusively at the usual mains frequency of 50 Hz, but also at any desired lower
15 frequencies.

The term "transporting devices", as used herein, comprises any type of conveyors typically used in the transport of the above-specified objects. Bottles or cans are preferably transported on chain link conveyors or conveyor belts, which are motor-driven via deflection rollers and can be designed both rectilinear and curved. However, the present invention is not
20 limited to the use in chain link conveyors or belts.

The transport devices can in each case be designed rectilinear and arranged either parallel or at a particular angle relative to each other. Rectilinear transport apparatuses are easier to handle and are subject to less wear.

The angle between the first and second transport apparatuses can in principle be
25 chosen as desired. The angle between the first and second transport devices is preferably between 0° and 90°, further preferably between 30° and 60° and particularly preferably approximately 45°. The choice of the angle also depends among other things on the speed at which the objects are conveyed on the first transport device. For very low speeds of the first transport device the angle at which the second transport device is arranged can be very great,
30 e.g. over 80°. For very high speeds, on the other hand, the angle must be chosen to be smaller.

In principle, it is also possible for the angle between the first and second transport devices to be adjustable. For this, for example, the second transport device can be designed movable and can be actuated via a positioning mechanism. If the angle between the transport devices is adjustable, the diverting apparatus can be adapted flexibly to different objects to be
35 transported.

In particular embodiments of the invention the first and second transport devices can be arranged one above the other in the area of the diverting device. This makes sense in

particular in the case of second transport devices running in a straight line. Through this stacked arrangement, a continuous transport surface can be guaranteed, without the need for stationary transition elements between the transport devices. Such transition elements would lead to undesired friction effects and could negatively influence the diversion.

5 The transport surface of the first or upper transport device can be designed relatively thin-walled and can be approximately only 0.2 mm, with the result that only a small step must be negotiated by the objects to be diverted during the transition from the first onto the second transport device. This is usually possible without the objects tipping over in the process.

10 The transport device arranged on top can preferably be designed asymmetrical in the transport direction, with the result that the transport surface of the first transport device is lengthened in the direction of the second transport device, and thus there is a larger overlapping surface between the two transport devices.

15 The second transport device can also have a non-rectilinear or curved course. The second transport device preferably runs substantially parallel to the first transport device upstream of the diverting apparatus in the conveying direction, then takes a curved course in the area of the diverting apparatus, and then passes over into a rectilinear area again, which then defines the angle between the two transport devices. A non-rectilinearly arranged second transport device can also be arranged underneath the first transport device. In principle, the first transport device can also or only have a non-rectilinear course.

20 If the second transport device has a curved or convex course, the guide rail is also formed correspondingly convex in the area of the second transport device. However, the effect of the present invention can nevertheless be achieved thereby. Namely, the air jet follows the course of the rail because of the Coanda effect. This behaviour of the air jet is advantageous in particular when the air jet is guided parallel to the rail substantially in the transport direction, as the air jet then follows the course of the guide rail even in the case of a curved course of the second transport device. However, even if the air jet is aligned at an angle relative to the transport plane, this effect can be utilized. In such embodiments the jet, for example coming from above, can be guided past a convexly formed inner side of the rail in order then to leave the diverting apparatus on the underside of the rail with an outwardly directed flow component, without resulting in disruptive turbulence which could impair the stability of the objects to be diverted.

30 The diverting element can in principle be any desired diverting element known to a person skilled in the art. More preferably, the diverting element can be a controllable pusher or slider, which is driven for example via a position-controlled linear motor. Such linear motors are particularly suitable as they are actuated at high speed and high precision and can generate high actuating forces.

If a pusher is used as diverting device, then it is preferably set such that the objects are diverted in a guided manner, thus that the pusher and the object to be diverted are in direct contact with each other over as long a time as possible. The longer an object is guided, the smaller the probability is that the object will tilt during the diversion. At the end of the diversion process, thus when the object to be diverted is located directly on the second transport device, it is then ideally already moving in the direction and at the speed of the second transport device, with the result that no relative movement between the transport device and the object results during this phase. The security against tipping by the diverting apparatus is thereby substantially increased.

A pusher can be arranged perpendicular to or at any desired angle relative to the first transport device. The actuating force of the pusher is preferably so great that objects to be diverted are always acted upon with the same speed component perpendicular to the transport direction of the first transport device independently of their weight and the friction on the transport devices.

The diverting device can also comprise a row of diverting segments, wherein the individual diverting segments are actuatable individually or jointly, and together form a continuous deflecting surface. The advantage of such a diverting apparatus is that the direction of the diversion is fixedly predefined by the deflecting surface, and is thus independent of the transport speed of the first transport device. Moreover, the objects are at all times guided against a rail, with the result that this again contributes to the increase in the stability of the diversion process.

Diverting apparatuses which consist of individual diverting segments are sufficiently known in the state of the art and by way of representation reference is made at this point to the statements in EP-A1-0 019 117 by the same applicant.

Preferably, the diverting device is attached to one side of the transport device. The second transport device, onto which the objects to be diverted are shifted, is then attached to the opposite side of the first transport device. The guide rail, against which the air jet extends, is on the side of the respective transport device situated opposite the diverting device. At first the guide rail extends parallel along the first transport device and then follows the curved course of the transport path of the bottles to be diverted. At the end of the diverting apparatus the rail then runs on the side of the second transport device.

In a further embodiment the first transport device can likewise have a curved course at least after the diverting device. The first transport device preferably has a curved course with an opposite curvature compared with the second transport device. In order to hold the objects on the first transport device, a further diverting device can be provided. In addition, a further device for generating an air jet with at least one flow component, which runs parallel to a rail assigned to the first transport device, can be provided. The construction and mode of operation

of this further device for generating an air jet can be identical to that of the device described above. The further device for generating an air jet then serves to stabilize the containers remaining on the first transport device during the transport. If the radius of curvature of the first transport device is large enough, then a second diverting device can even be dispensed with. The Coanda effect alone is namely then sufficient to press the containers against the rail of the first transport device, with the result that the containers can even follow the curved course of this rail without additionally requiring a change in direction by an additional diverting device in the process. The limit radius, thus the radius up to which the containers can still be diverted because of the Coanda effect alone, is dependent on the parameters of the diversion, in particular the transport speed, the container shape, the container weight as well as the strength of the air flow and the flow profile. A person skilled in the art must therefore take these parameters into account in the design of the diverting device. This embodiment can be used advantageously in particular in the case of high container speeds and small diversion angles.

In transport devices which are operated at very high speeds of over 80,000 bottles per hour, it can be sufficient that only some of the diverting segments are used in order to form a ramp which gives the objects to be diverted the required transverse impulse. The objects then move, because of their inertia, in an unguided manner down from the first transport device and then arrive on the second transport device at the desired speed and with the desired movement direction. The short unguided movement section in this case barely impairs the diversion process.

In order to optimize the diversion process, additional data regarding the objects to be diverted can be determined via inspection devices installed upstream of the diverting apparatus. In this way, for example, parameters such as weight, speed, material, friction or contents of an object to be diverted, can be determined. Although this information is in principle not necessary, it can be used to control the diversion process in an even more targeted manner.

The present invention also relates to a method for diverting objects, wherein the objects are transported on a first transport device in a single row, wherein the objects to be diverted are diverted by a diverting device from the first transport device onto a second transport device. To guide the objects to be diverted, a rail is provided on the side situated opposite the diverting device. An air jet, which runs parallel to this rail, is generated by means of a device for generating an air jet and wherein the device for generating an air jet comprises at least one nozzle, which is provided on the rail upstream of the diverting device.

A further advantage of the present invention is that apparatuses in which diverted objects are additionally also conveyed further in an altered direction can be built more compact with the aid of the present invention. Until now, a two-stage method had to be used for this in conventional transport systems. At first, the objects to be diverted are diverted onto a parallel-

running track. These diverted objects can then be brought onto the desired transport direction via a curved conveyor or the like. Because of this sequential method, such conventional systems have a relatively high space requirement. The present invention, on the other hand, allows both a diversion and a change in direction of the objects to be diverted to be brought about on a shorter transport path.

Embodiment examples of the invention are explained below with reference to the drawing. There are shown in:

Fig. 1 top view of a diverting apparatus with a rectilinear first transport device and a curved second transport device;

Fig. 2 cross section of the second transport device in the diversion area;

Fig. 3 cross sections of different rail profiles;

Fig. 4 top view of a further diverting apparatus, wherein the air jet extends at an angle relative to the transport plane;

Fig. 5 side view of the diverting apparatus with rail and diagonally running air jet according to Fig. 4,

Fig. 6 cross section of the second transport device according to Fig. 4 in the diversion area,

Fig. 7 top view of a diverting apparatus with a rectilinear first transport device and a second transport device running parallel thereto, and

Fig. 8 diverting apparatus according to Fig. 7 with a pusher as diverting device.

Fig. 1 shows a diverting apparatus according to the present invention. The diverting apparatus forms a diverting deflector 10 for empty plastic bottles. The diverting deflector 10 comprises a first rectilinearly running transport device 12, on which bottles 18 are transported in the direction of the arrow X. The bottles 18 are shifted from the first transport device 12 onto a second transport device 16 by means of a diverting device 14. The second transport device 16 runs parallel to the first transport device 12 in a section located upstream of the diverting device 14, and branches off from the first transport device 12 at an angle α of 30° in a section located downstream of the diverting device 14.

The diverting device 14 is provided on the side of the first transport device 12, namely on the side situated opposite the second transport device 16. In the embodiment depicted in Figure 1 the diverting device 14 consists of a plurality of individual segments 14a, which together form a continuous deflecting surface.

A rail 20 curved in sections which runs through the diverting apparatus along the transport path of the bottles 18 to be diverted is provided opposite the diverting apparatus. This rail 20 at first extends parallel along the first transport device 12. In the area of the

diverting device 14 the rail 20 is designed curved and follows the transport path of the bottles 18 to be diverted. At the end of the diverting apparatus the rail 20 then runs on the side of the second transport device 16. The rail 20 serves to guide and stabilize the diverted bottles 18.

The diverting deflector 10 furthermore comprises a compressed-air generator 22 for generating an air jet 24, which runs along the rail 20. In the embodiment according to Figure 1, for this purpose, ambient air is blown via a compressed-air hose 26 and a correspondingly arranged nozzle 28 in the transport direction along the inner side of the rail 20.

Because of the Coanda effect, the air jet 24 follows the convex course of the rail 20 at all times. This means that the air jet 24 continues along the surface of the rail 20 even when the rail 20 describes a curve and follows the transport path of the bottles 18 to be diverted through the diverting apparatus. The air jet 24 thus, starting from the nozzle 28, does not run in a straight line, but follows the bent course of the rail 20.

The air jet has a stabilizing effect on the diverted bottles 18. On the one hand, the air jet 24 forms an air cushion between the bottles 18 and the rail 20, and thus absorbs any collisions between the bottles 18 and the rail 20. On the other hand, the air jet 24 has the effect, because of the Coanda effect, that at the same time the bottles 18 experience a pulling force in the direction of the rail 20. This pulling force and the air cushion generated by the air jet 24 ensure that the bottles 18 are guided safely along the rail 20. The bottles 18 are thereby largely prevented from tipping over during the diversion process.

The nozzle 28 is provided on the rail 20 upstream of the diverting device 14. The bottles 18 thereby already come into contact with the air jet 24 before the diverting device. A stabilizing of the bottles 18 during the entire diversion process can thereby be achieved.

In the embodiment represented in Figure 1, the rail 20 for guiding the air jet 24 is formed as a hollow profile, which has a continuous opening to the transport area.

To generate the air jet 24, in this embodiment, the nozzle 28 of the compressed-air line 26 can open into the inside of the hollow profile of the rail 20. The air jet 24 then runs inside the profile along the rail 20 and also extends through the continuous opening 30 outside the profile parallel to the rail 24. There, the air jet 24 then also flows past the bottles 18 and generates the above-described stabilizing effect on the bottles 18. This embodiment has the advantage that the air jet 24 can never be completely shielded by the bottles 18. If several bottles 18 are diverted directly one behind another, the air jet 24 thus acts on all preceding and already diverted bottles 18.

A cross section of the diverting area of Fig. 1 is depicted in Fig. 2. The diverted bottle 18 is guided on the second transport device 16 between the rail 20 and an opposite rail 20a. The rail 20 is formed by a hollow profile, more precisely by a C profile. The C profile has a continuous slit or a continuous opening 30 on the side 20a of the rail 20 facing the transport

area. The rail depicted in Fig. 2 has a size of approximately 5 cm x 1 cm. The continuous slit has a width of approximately 4 cm.

A compactor customary in the trade can be used to generate the air jet. For example, this can be a compactor with a power of 1.5 kW with a quantity of blowing air of 70 m³/h at 400 mbar.

The rail 20 can also have other profiles. Alternative rail profiles are depicted in Fig. 3. Besides the already described hollow profile, such as is depicted in Fig. 3c, a rail with a rectangular profile according to Fig. 3a or a rounded profile according to Fig. 3b can also be used.

In the embodiments represented in Figures 1 and 2 the air jet 24 runs substantially in the transport direction and parallel along the inner side of the rail 20. The stabilizing effect can, however, also be achieved with an air jet 24 which runs substantially parallel to the rail plane, but at a predefined angle β with respect to the transport plane.

Such an embodiment is represented in Figs. 4 to 6. A diverting deflector 10 is likewise depicted in Fig. 4, in which the second transport device 16 describes a curve, and branches off at an angle of 30° relative to the first transport device 12. The diverting device again consists of a plurality of individual segments 14a, which together form a continuous deflecting surface.

The stabilizing air jet 24 is generated by means of several nozzles 28. As represented in Fig. 5, the nozzles 28 are arranged above the rail 20 at an angle of approximately 40° in relation to the transport plane. In this embodiment the air jets 24 are likewise guided between the bottles 18 and the rail 20 on the inner side of the rail 20. Although the air jet 24 interacts with the bottles 18 only in a relatively short area, this area can be lengthened as required through the arrangement of several nozzles 28 spaced apart from each other.

The rail profile in this case, as represented in Fig. 6, is rounded on the inner side 20a, wherein the air jets 24 again follow the curvature of the inner side 20a of the rail 20 because of the Coanda effect.

As the component of the air jet 24 running in the transport direction is smaller in this embodiment, the acceleration of the bottles caused by the air jet 24 is likewise greatly reduced.

In the realization of the diverting apparatus according to the invention, the angles α , β and the speed of the air jet 24 can be adapted to the respective transport task and can be set depending on the transport devices 12, 16 used and the properties of the bottles 18 to be diverted.

A further embodiment of the diverting apparatus 10 according to the invention is depicted in Fig. 7. This apparatus substantially corresponds to the apparatus such as is depicted in Fig. 1. However, in Fig. 7 the bottles 18 to be diverted are pushed onto a second transport device 16 which runs parallel to the first transport device 12. In this case too, the stabilizing action of

the air jet 24 can be advantageously utilized, as the air jet 24 also follows the curvature of the lateral rail 20 in this case.

5 The embodiment represented in Fig. 8 substantially corresponds to the apparatus such as is depicted in Fig. 7. Again, the bottles 18 to be diverted are pushed onto a second transport device 16 which runs parallel to the first transport device 12. In Fig. 7, however, the diverting device 14 is formed by a pusher, which comprises a position-controlled linear drive. Bottles 18 to be diverted are shifted from the first transport device 12 onto the second transport device 16 with the pusher.

List of reference numbers

10	diverting deflector	21	rail
12	first transport device	22	compressed-air generator
14	diverting device	24	air jet
14a	diverting segments	26	compressed-air hose
16	second transport device	28	nozzle
18	bottles	30	rail opening
20	rail		
20a	rail inner side		

P a t e n t k r a v

1. Indretning til udledning af objekter (18) såsom beholdere, bundter, pakkestykker, der transporteres på en transportindretning,

5 med en første transportindretning (12), som objekterne (18) transporteres på i én række,

med en anden transportindretning (16), der er anbragt i siden af den første transportindretning (12),

10 med en udledningsindretning (14), der er tilvejebragt på en side af transportindretningen og hvormed et objekt (18), der skal udledes, udledes fra den første transportindretning (12) til den anden transportindretning (16), og

med et rækværk (20), der er tilvejebragt på en side af transportindretningen, der ligger modsat udledningsindretningen,

kendetegnet ved

15 en indretning til generering af en luftstråle (24), hvor indretningen er konfigureret til generering af luftstrålen således, at den genererede luftstråle (24) forløber parallelt med rækværket (20) og blæses langs indersiden af rækværket (20), og

20 hvor indretningen til generering af en luftstråle (24) har mindst en dyse (28), der er tilvejebragt på rækværket (20) opstrøms for udledningsindretningen (14).

2. Indretning ifølge krav 1, hvor luftstrømningen på objekterne (18), der skal udledes, bevirker en kraft i retning af rækværket (20).

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3. Indretning ifølge et af de foregående krav, hvor luftstrålen genereres af en trykluftgenerator (22) og ved hjælp af en trykluftledning (26) med dysen (28) er orienteret parallelt med rækværket (20).

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4. Indretning ifølge et af de foregående krav, hvor luftstrålen forløber parallelt med rækværket (20) og i objekternes (18) transportretning.

5. Indretning ifølge et af de foregående krav, hvor rækværket (20) har en hul profil, som luftstrålen (24) ledes gennem, og hvor rækværket (20) har mindst

en åbning (30), som luftstrålen (24) i det væsentlige parallelt med rækværket (24) kommer ud af.

5 **6.** Indretning ifølge et af de foregående krav, hvor luftstrålen (24) forløber parallelt med rækværket (20) og i en forudbestemt vinkel (β) i forhold til transportplanet, der er defineret af transportindretningerne (12, 16).

10 **7.** Indretning ifølge et af kravene 1 til 5, hvor den anden transportindretning (16) forløber opstrøms i transportretningen i det væsentlige parallelt med den første transportindretning (12) og i området ved udledningsindretningen (14) i en vinkel (α), der eventuelt kan indstilles, afviger fra den første transportindretning (12).

15 **8.** Indretning ifølge et af de foregående krav, hvor udledningsindretningen (14) omfatter en række udledningssegmenter (14a), og hvor de enkelte udledningssegmenter (14a) sammen danner en kontinuerlig afbøjningsflade.

20 **9.** Fremgangsmåde til udledning af objekter (18) såsom beholdere, bundter, pakkestykker, der transporteres på en transportindretning, med en første transportindretning (12), som objekterne (18) transporteres på i én række, med en anden transportindretning (16), der er anbragt i siden af den første transportindretning (12), med en udledningsindretning (14), der er tilvejebragt på en side af transportindretningen og hvormed et objekt (18), der skal udledes, udledes fra den første transportindretning (12) til den anden transportindretning (16), med et rækværk (20), der er tilvejebragt på den side af transportindretningen, der ligger modsat udledningsindretningen,

25 **kendetegnet ved, at**
30 der er tilvejebragt en indretning til generering af en luftstråle (24), hvor indretningen er konfigureret til generering af luftstrålen således, at den genererede luftstråle (24) forløber parallelt med rækværket (20) og blæses langs indersiden af rækværket (20), og

hvor indretningen til generering af en luftstråle (24) har mindst en dyse (28), der er tilvejebragt på rækværket (20) opstrøms for udledningsindretningen (14).

Figure 1

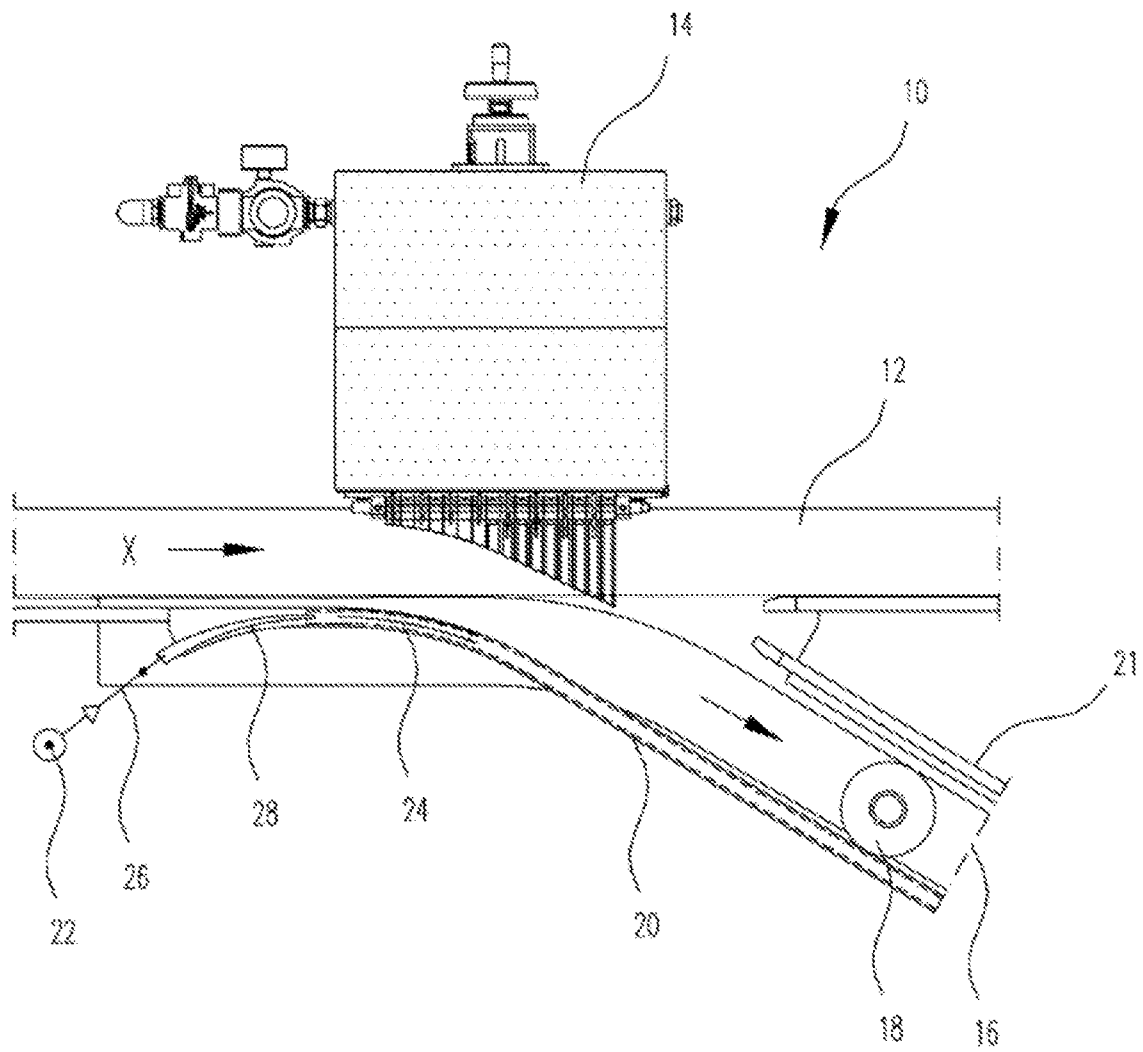


Figure 2

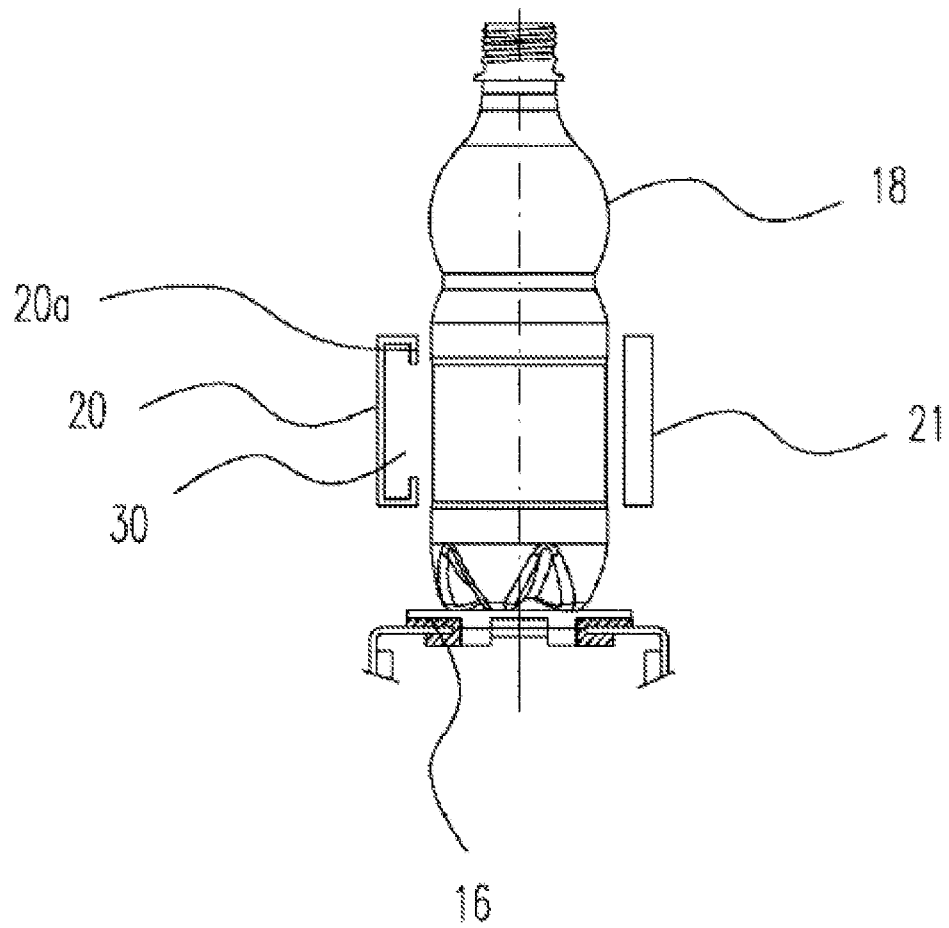


Figure 3

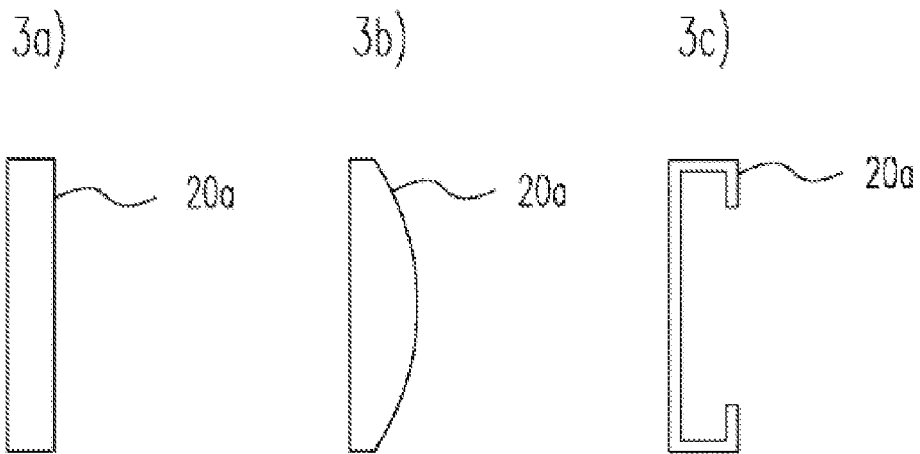


Figure 4

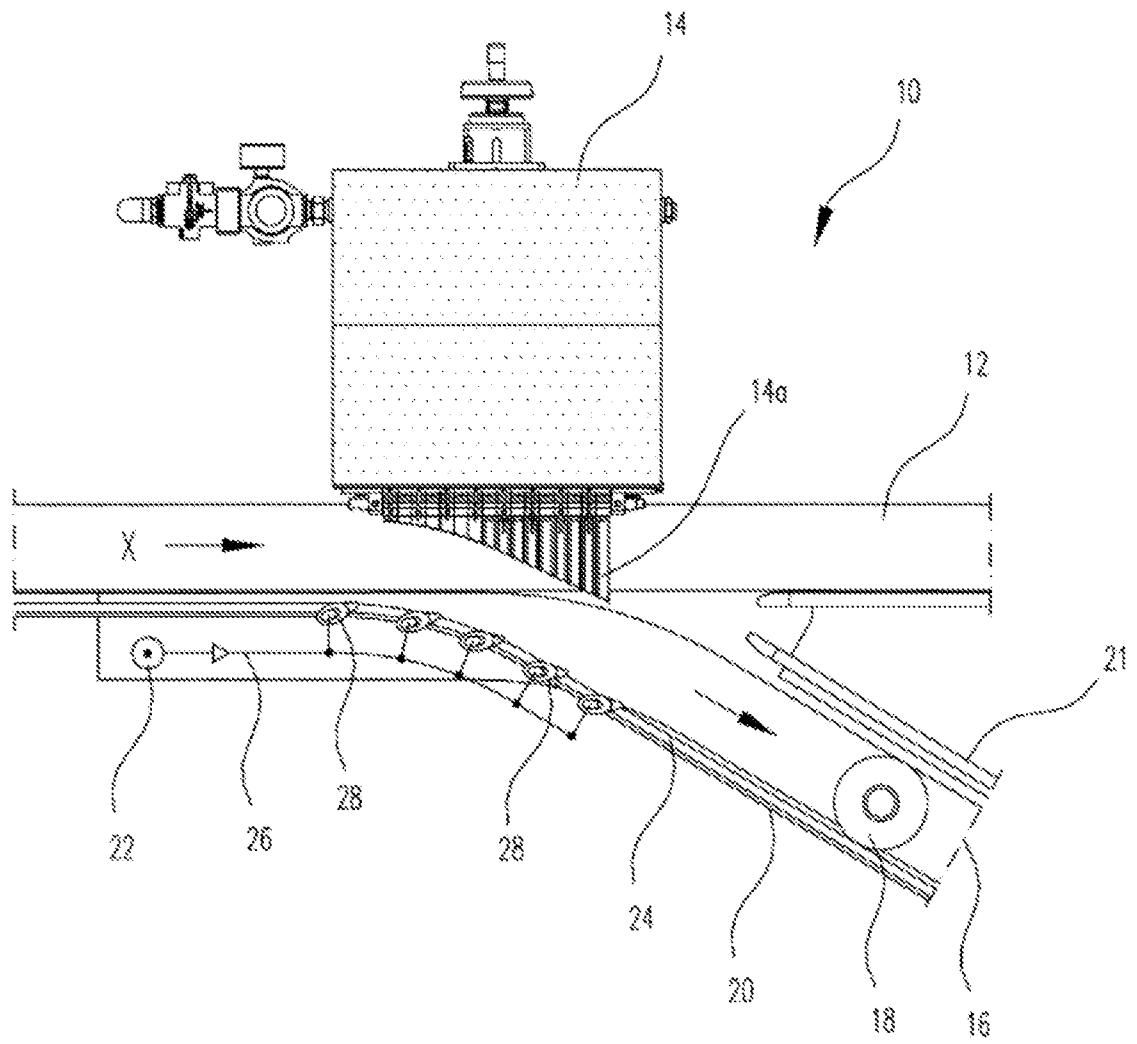


Figure 5

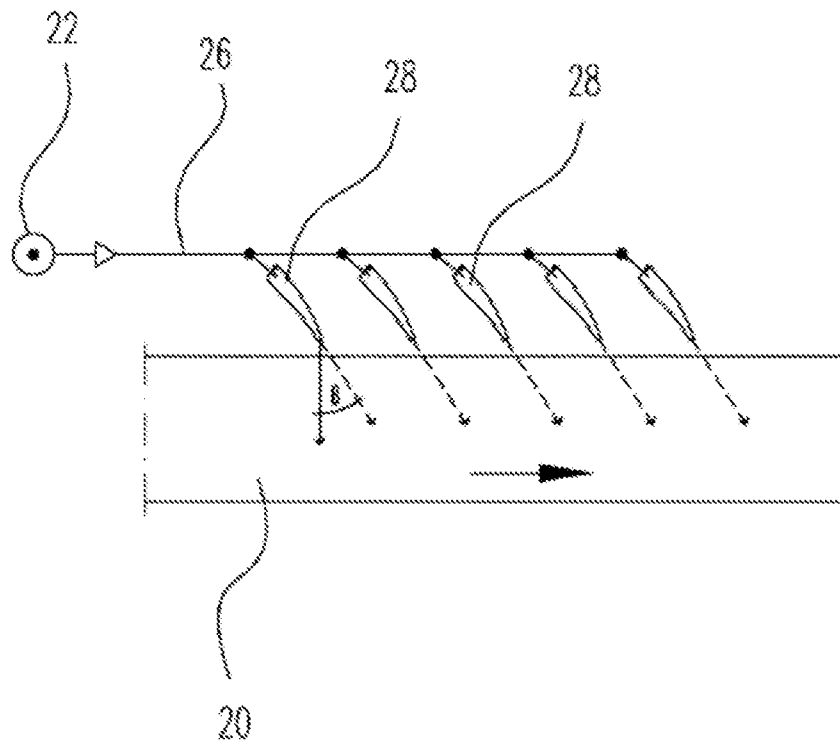


Figure 6

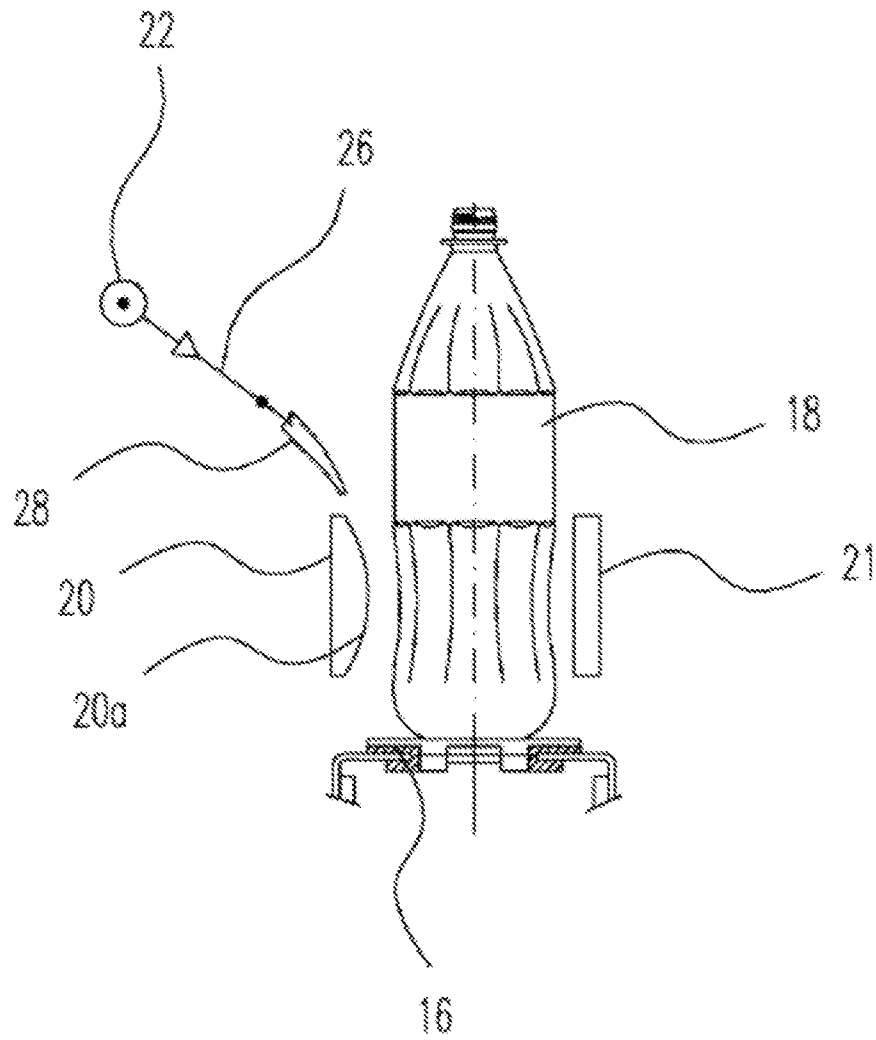


Figure 7

