



US 20100300581A1

(19) **United States**

(12) **Patent Application Publication**
KRÄMER et al.

(10) **Pub. No.: US 2010/0300581 A1**

(43) **Pub. Date: Dec. 2, 2010**

(54) **BEVERAGE BOTTLE FILLING PLANT WITH A BEVERAGE BOTTLE LABELING MACHINE, AND A CUTTING ARRANGEMENT FOR A BEVERAGE BOTTLE LABELING MACHINE**

(76) Inventors: **Klaus KRÄMER**, Dortmund (DE);
Lutz DECKERT, Haltern am See (DE);
Oliver KRESS, Waltrop (DE)

Correspondence Address:
NILS H. LJUNGMAN & ASSOCIATES
P. O. BOX 130
GREENSBURG, PA 15601-0130 (US)

(21) Appl. No.: **12/787,959**

(22) Filed: **May 26, 2010**

Related U.S. Application Data

(63) Continuation-in-part of application No. PCT/EP2008/009757, filed on Nov. 18, 2008.

(30) **Foreign Application Priority Data**

Nov. 27, 2007 (DE) 10 2007 057 409.8

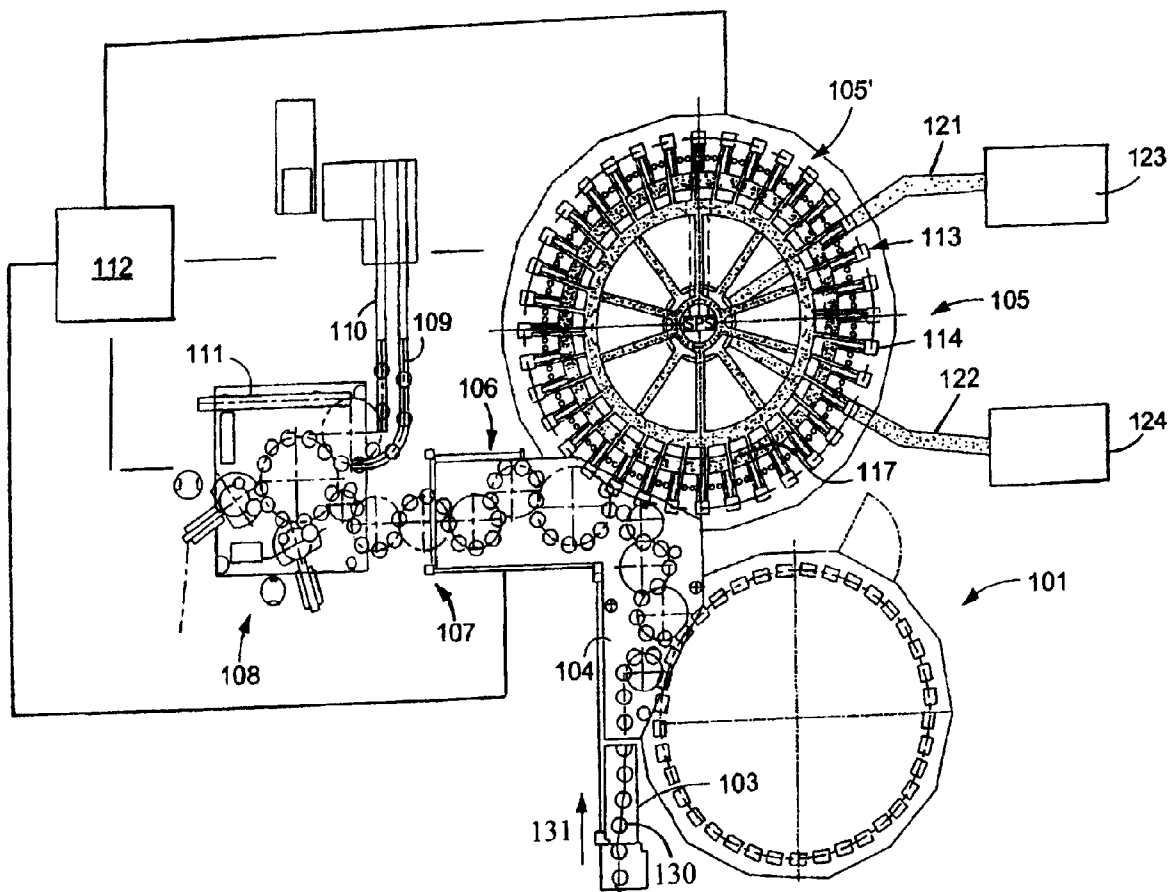
Publication Classification

(51) **Int. Cl.**
B65B 3/02 (2006.01)
B65B 61/00 (2006.01)

(52) **U.S. Cl.** **141/98; 53/135.1**

(57) **ABSTRACT**

A cutting device and method for operating a cutting device. The abstract of the disclosure is submitted herewith as required by 37 C.F.R. §1.72(b). As stated in 37 C.F.R. §1.72 (b): A brief abstract of the technical disclosure in the specification must commence on a separate sheet, preferably following the claims, under the heading "Abstract of the Disclosure." The purpose of the abstract is to enable the Patent and Trademark Office and the public generally to determine quickly from a cursory inspection the nature and gist of the technical disclosure. The abstract shall not be used for interpreting the scope of the claims. Therefore, any statements made relating to the abstract are not intended to limit the claims in any manner and should not be interpreted as limiting the claims in any manner.



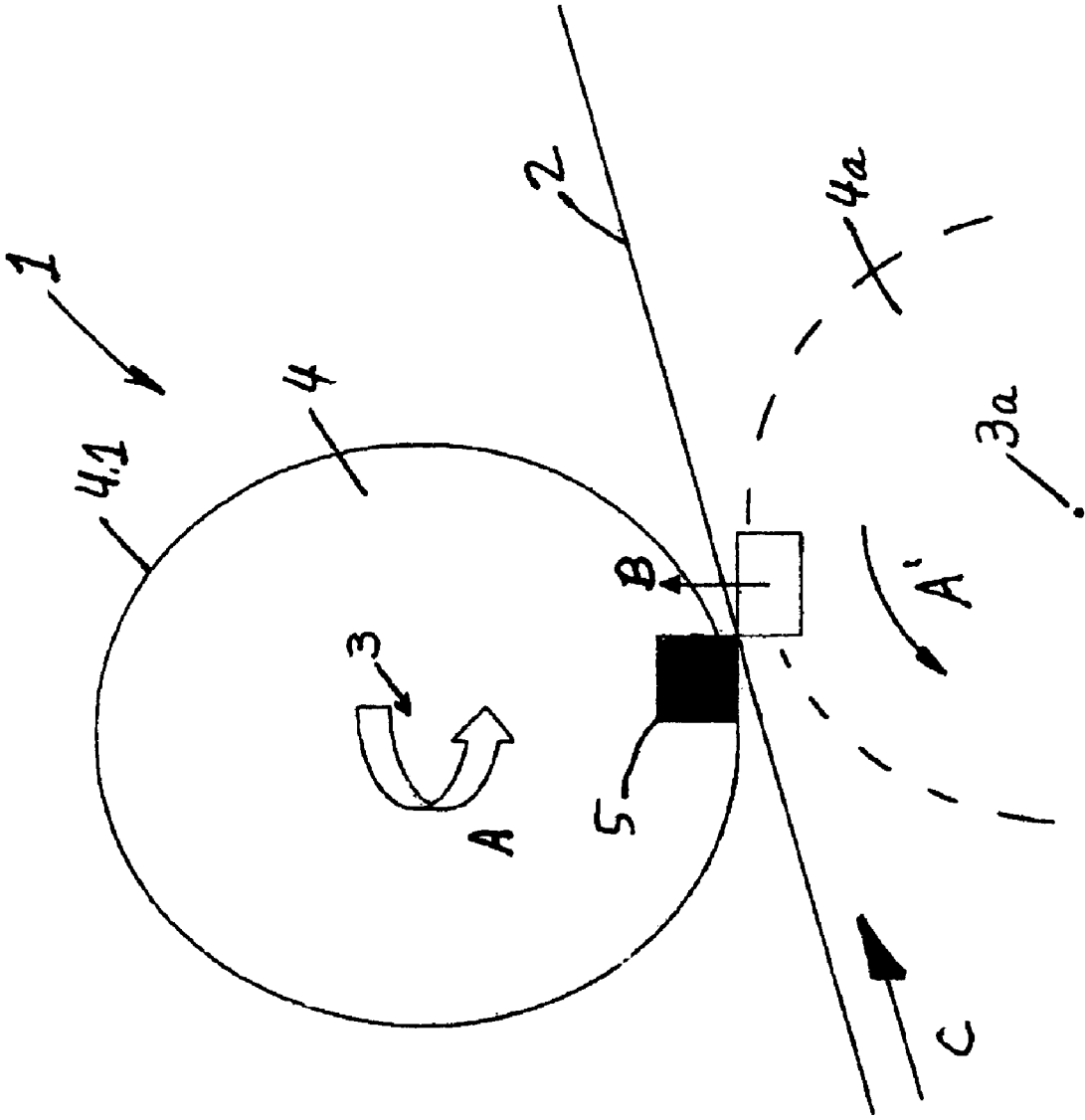


FIG. 1

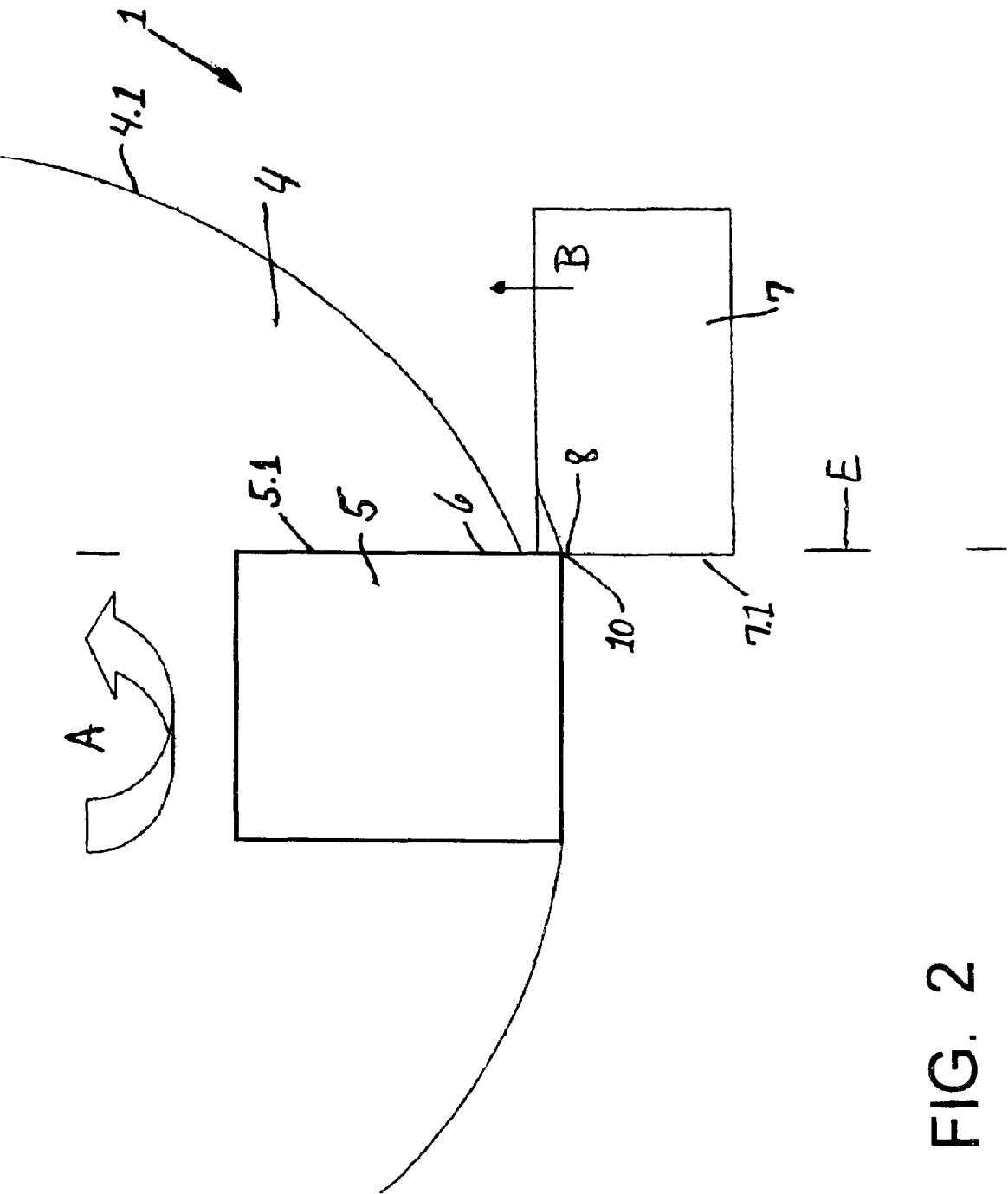


FIG. 2

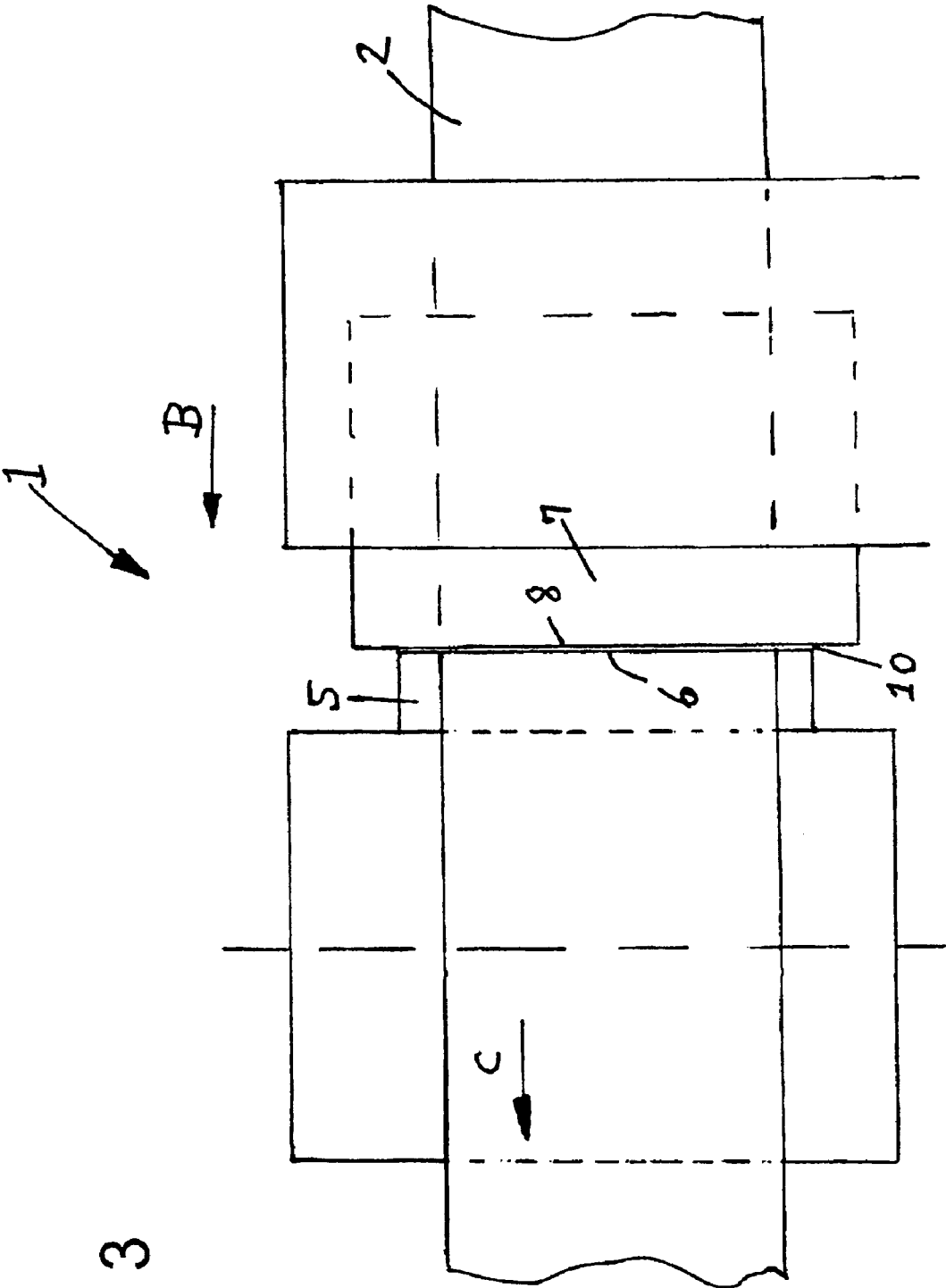


FIG. 3

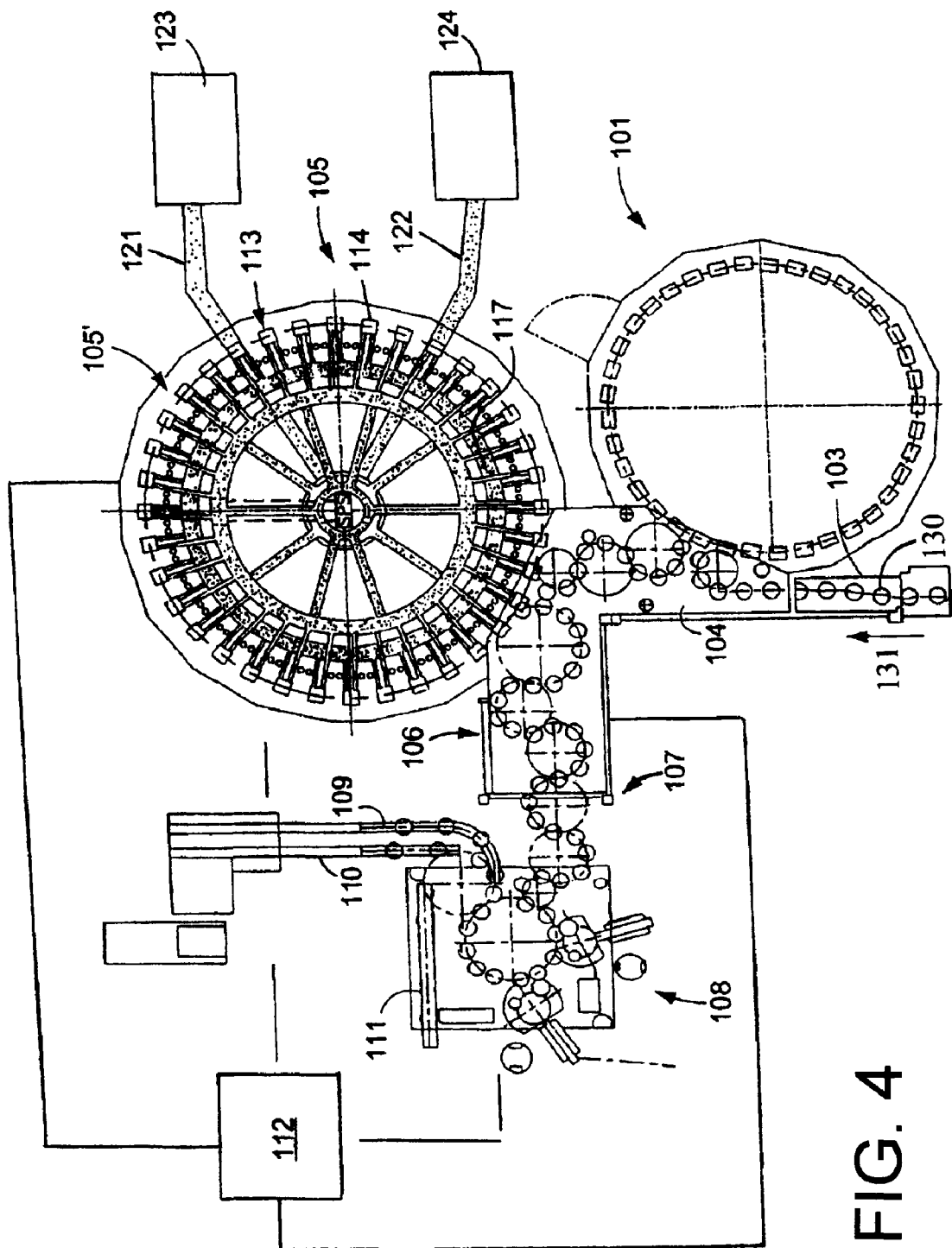


FIG. 4

**BEVERAGE BOTTLE FILLING PLANT WITH
A BEVERAGE BOTTLE LABELING
MACHINE, AND A CUTTING
ARRANGEMENT FOR A BEVERAGE
BOTTLE LABELING MACHINE**

CONTINUING APPLICATION DATA

[0001] This application is a Continuation-In-Part application of International Patent Application No. PCT/EP2008/009757, filed on Nov. 18, 2008, which claims priority from Federal Republic of Germany Patent Application No. 10 2007 057 409.8, filed on Nov. 27, 2007. International Patent Application No. PCT/EP2008/009757 was pending as of the filing date of this application. The United States was an elected state in International Patent Application No. PCT/EP2008/009757.

BACKGROUND

[0002] 1. Technical Field

[0003] The present application relates to a cutting device, for example a cutting device of a labeling machine. The cutting device having a machine element that is driven in a rotating manner about a machine axis. The cutting device also comprises at least one first blade element that forms a first cutting edge and is provided at the machine element. The first blade element, when the machine element is rotating, may interact with a second cutting edge of at least a second blade element and forming a cutting gap. The first blade element or the second blade element, at least in the region of its cutting edge, has a hardness that is greater than the hardness of the second blade element or of the first blade element. The cutting edge at the blade element with the lesser hardness is created by material removal with the cutting edge of the blade element that is designed to be harder at least at this cutting edge.

[0004] 2. Background Information

[0005] Background information is for informational purposes only and does not necessarily admit that subsequently mentioned information and publications are prior art.

[0006] The labeling of packaging, for example for bottles or for other containers, is effected in many cases using a web-shaped or strip-shaped label material, which is drawn off a roll in a labeling machine (labeling unit), the individual labels to be applied to the packaging to be labeled being separated, among other things, from the label material by means of cutting. This cutting is normally effected in a cutting station or cutting device which, for example, is then a component of the labeling unit and essentially comprises at least one first blade or blade element which is provided on a rotating machine element and forms at least one cutting edge, said first blade element interacting for the cutting procedure with the cutting edge of a counter blade or second blade element. The second blade element, in this case, is provided so as not to rotate with the machine element in such a manner, for example, that a cutting gap is formed between the blade elements for cutting, through which cutting gap the label material is guided and in which the separating of the labels from the label material is effected. During the cutting process, the two cutting edges forming the cutting gap are positioned in such a manner that, lying directly opposite one another, they do not quite contact each other so that, for example, the width of the cutting gap is practically zero.

[0007] It may be desired for the cutting gap to be considerably smaller than the thickness of the web-shaped label mate-

rial over the entire length of the cutting gap. The length of the cutting gap is at least identical or substantially identical, but may be, for example, greater than the width of the web-shaped label material. Each contact of the cutting edges during the adjustment procedure or during the cutting procedure leads to increased wear or to a deterioration in the blade elements. For example where the label material is very thin, for example a material thickness of $\frac{4}{100}$ of a millimeter (0.25 mm) or less as is usual for, among other things, label materials for foil labels, the adjusting of the cutting gap is extremely difficult and time-consuming, and may be carried out in a reliable manner exclusively by highly-qualified specialist personnel.

[0008] Some cutting devices comprise rotating cutting blades that interact with stationary counter blades for the production of form cuts in the edges of moving strips of material, for example in the edges of strips of paper for the manufacture of envelopes or blanks, whereby the interacting blades are made of materials with different hardnesses so that the softer blade can be machined on the harder blade without damaging the harder blade, and whereby at least one of the blades of the interacting pair of blades is mounted so that it can come into contact with its counter blade when the cutting device is in rotation.

[0009] For the softer blade, some cutting devices use an aluminum alloy, such as a wrought aluminum alloy, for example. For the harder blade, some cutting devices use hardened steel. As a result of these measures, a useful life of at least 200,000 cuts between two adjustment processes is achieved.

[0010] Some cutting devices use suitable materials for self-sharpening cutting devices. For example, these cutting devices may use, for the softer blade, copper, brass or bronze.

[0011] Some cutting devices may use tungsten carbide, i.e. a ceramic material, for the harder blade.

[0012] Although some methods of using cutting devices may in fact achieve an improvement in the useful life of the blades or the number of cuts between two adjustment processes, a further increase in the number of cuts would offer significant cost savings.

[0013] The present application may also related to a method for operating a cutting device, for example a cutting device of a labeling machine. The cutting device comprises at least one machine element that is driven so as to rotate about a machine axis and at least one first blade element, which forms a first cutting edge and is provided at the machine element. The first blade element may interact with a second cutting edge of at least a second blade element and form a cutting gap when the machine element is rotating. The forming of the cutting edge at the blade element of lesser hardness is effected by material removal using the cutting edge of that blade element that has the greater hardness at least in the region of its cutting edge.

OBJECT OR OBJECTS

[0014] It is an object of the present application to provide a cutting device which avoids, restricts, and/or minimizes the aforementioned disadvantages, in one possible embodiment avoiding, restricting, or minimizing a time-consuming adjusting of the cutting gap.

[0015] An object of the present application is to create a cutting device which, while preserving the advantageous self-sharpening of such a device, significantly improves the

wear strength and thus the useful life of the blades used, and thus in turn the number of cuts that can be executed between two adjustment processes.

SUMMARY

[0016] This object is achieved by a cutting device, for example a cutting device of a labeling machine. The cutting device comprises a machine element that is driven in a rotating manner about a machine axis and at least one first blade element that forms a first cutting edge and is provided at the machine element. The first blade element, when the machine element is rotating, may interact with a second cutting edge of at least a second blade element and also may form a cutting gap. The first blade element or the second blade element, at least in the region of its cutting edge, has a hardness that is greater than the hardness of the second blade element or of the first blade element. The cutting edge at the blade element with the lesser hardness is created by material removal with the cutting edge of the blade element that is designed to be harder at least at this cutting edge. The object may also be achieved by a method for operating a cutting device, for example a cutting device of a labeling machine. The cutting device comprises at least one machine element that is driven so as to rotate about a machine axis and at least one first blade element, which forms a first cutting edge and is provided at the machine element. The first blade element interacts with a second cutting edge of at least a second blade element and forms a cutting gap when the machine element is rotating. The forming of the cutting edge at the blade element of lesser hardness is effected by material removal using the cutting edge of that blade element that has the greater hardness at least in the region of its cutting edge. This object may also be achieved by a cutting device, for example a cutting device of a labeling machine. The cutting device comprises a machine element that is driven in a rotating manner about a machine axis and at least one first blade element that forms a first cutting edge and is provided at the machine element. The first blade element, when the machine element is rotating, interacts with a second cutting edge of at least a second blade element and forms a cutting gap. The first blade element or the second blade element, at least in the region of its cutting edge, has a hardness that is greater than the hardness of the second blade element or of the first blade element. The cutting edge at the blade element with the lesser hardness is created by material removal with the cutting edge of the blade element that is designed to be harder at least at this cutting edge. The blade element with the lesser hardness is produced from a material, for example a metallic material, e.g. aluminum or brass, which (material), on account of its lesser hardness, is machinable by the at least one cutting edge of greater hardness so as to remove material or provide a machine finish. The blade element and/or the blade element is coated in at least portions of its surfaces with nano-particles and/or by carbon diffusion and/or the blade element is anodized.

[0017] A characteristic of the present application is not producing the two cutting edges that form the cutting gap from the same material, but selecting such a material pairing so that the two cutting edges have different hardnesses and/or wear resistances. In this case, it is possible that when one of the two cutting edges forming the respective cutting gap is created or re-sharpened in an appropriate manner primarily by the other cutting edge through material removal so that when the cutting device is setup, i.e. during a first commissioning or during a recommissioning of the cutting device

after operating elements, e.g. the blade elements, have been exchanged, a rough adjusting of the blade element one relative to the other, but no time-consuming, precise or substantially precise aligning is necessary or may be desired.

[0018] The precise or substantially precise cutting gap is then created through material removal at the blade element with the lesser hardness by means of the cutting edge of the blade element that has the greater hardness at least in the region of its cutting edge.

[0019] Further developments, embodiments, and application possibilities of the present application proceed from the following description of possible embodiments and from the Figures. In this case, described and/or graphically represented features, on their own or in arbitrary combination, are, in principle, objects of the present application.

[0020] The above-discussed embodiments of the present invention will be described further herein below. When the word “invention” or “embodiment of the invention” is used in this specification, the word “invention” or “embodiment of the invention” includes “inventions” or “embodiments of the invention”, that is the plural of “invention” or “embodiment of the invention”. By stating “invention” or “embodiment of the invention”, the Applicant does not in any way admit that the present application does not include more than one patentably and non-obviously distinct invention, and maintains that this application may include more than one patentably and non-obviously distinct invention. The Applicant hereby asserts that the disclosure of this application may include more than one invention, and, in the event that there is more than one invention, that these inventions may be patentable and non-obvious one with respect to the other.

BRIEF DESCRIPTION OF THE DRAWINGS

[0021] The present application is described below by way of the Figures of possible embodiments, in which, in detail:

[0022] FIG. 1 shows a schematic representation and top view of a machine element that is driven in a rotating manner about a vertical or substantially vertical axis, said machine element having a first cutting blade or blade element together with a second blade element of a cutting device, for example a cutting device of a labeling machine, said second blade element interacting with the machine element and not rotating with the machine element;

[0023] FIG. 2 shows an enlarged representation of the two blade elements in a view as in FIG. 1, together with a part representation of the machine element;

[0024] FIG. 3 shows a simplified representation of the side view of the cutting device; and

[0025] FIG. 4 shows schematically the main components of one possible embodiment example of a system for filling containers, for example, a beverage bottling plant for filling bottles.

DESCRIPTION OF EMBODIMENT OR EMBODIMENTS

[0026] The reference 1 in FIG. 1 is given to a cutting device for cutting a strip-shaped or web-shaped flat material 2, for example a label material with a maximum thickness of $\frac{4}{100}$ of a millimeter (0.25 mm) or less, i.e. for the separating of individual labels from the material 2.

[0027] The cutting device 1 essentially comprises a machine element 4 that is driven in a rotating manner about a vertical or substantially vertical machine axis 3 in the direc-

tion of the arrow A, said machine element having, for example, a peripheral surface or outer surface 4.1 that surrounds the vertical or substantially vertical machine axis 3 in a circular cylindrical manner and being provided, for example, so as to be exchangeable and adjustable on the peripheral surface or outer surface 4.1 with at least one blade element 5, in such a manner that the blade element 5 forms a cutting edge 6 on a region protruding beyond the outer surface 4. In the case of the specific embodiment represented, the cutting edge 6 is formed on a planar side face 5.1 of the blade element 5 leading in the direction of rotation A of the machine element 4 or of the part region of said blade element protruding beyond the outer surface 4.1, in such a manner that the cutting edge 6, with the machine element 4 driven in a rotating manner, is moved on a circular cylindrical path that surrounds the vertical or substantially vertical machine axis 3 in a concentric manner. In addition the cutting edge 6 is in one possible embodiment also oriented parallel or substantially parallel to the machine axis 3.

[0028] A blade element 7 acting as counter blade with cutting edge 8 is associated with the blade element 5 or with its cutting edge 6. The blade element 7 is provided on the cutting device 1, for example, so as not to rotate with the machine element 4. The blade element is provided on a suitable holder 9 in such a manner that the blade 7 or its cutting edge 8 is adjustable relative to said machine element (arrow B) in a radial or approximately radial manner relative to the rotating machine element 4. For a first rough adjustment, the blade element 7 or its cutting edge 8 are also adjustable, for example, in such a manner that the blade element 7 or its cutting edge, which is already present directly after installation into the cutting device 1, is oriented at least approximately parallel or substantially parallel to the cutting edge 6 when said cutting edge is situated directly at the cutting edge 8.

[0029] A cutting gap 10 is formed between the cutting edges 6 and 8 in such a manner that during each cutting procedure, i.e. every time, with the machine element 4 rotating, the blade element 5 moves past the blade element 7, the cutting edges 6 and 8 just contact each other or do not quite contact each other over the entire length of the cutting gap 10 extending in the direction of the machine axis.

[0030] The length of the cutting gap 10 is at least identical or substantially identical, in one possible embodiment however is greater than the width of the strip-shaped or web-shaped flat material 2. In this case, the strip-shaped or web-shaped flat material 2 is moved through the gap 10 in the direction of the arrow C and is, for example, oriented at least in the region of the cutting gap 10 in a plane parallel or substantially parallel to the machine axis 3.

[0031] In order to obtain the necessary and/or desired cutting gap 10 without a cumbersome adjustment or alignment of the blade elements 5 and 7 being necessary and/or desired, the blade element 5 is produced, at least at its cutting edge region that forms the cutting edge 6, with a greater hardness, i.e. at that location it is produced, for example, from hardened steel, e.g. tool steel, hard metal or ceramic, whereas the blade element 7 is produced from a material that is softer in comparison to the cutting region of the blade element 5, for example from aluminum or brass. In another possible embodiment of the present application, the blade element 7 may comprise anodized aluminum on at least the surface of the blade element 7.

[0032] In the case of the first commissioning of the cutting device, for example, and also after operating elements of the cutting device 1, e.g. one of the blade elements 5 and 7, have been exchanged, the rough adjusting of said blade elements is carried out initially and at the same time, in one possible embodiment, also the adjusting of the blade element 7 in such a manner that the blade element 7 is oriented at least approximately parallel or substantially parallel to the blade element 5 or to the cutting edge 6. Then, with the machine element 4 rotating or with the blade element 5 rotating, an adjusting of the blade element 7 is effected such that the cutting edge 8 is formed on the blade element 7 by means of material removal with the cutting edge 6. The adjusting of the blade element 7 relative to the rotating machine element 4 in the direction of the arrow B is terminated when the cutting edge 8, created through material removal, extends over the entire length or the substantially entire length of the cutting gap 10 and the cutting gap 10 is realized over its entire length or substantially entire length such that the cutting edge 6 and the cutting edge 8 formed by material removal, every time the blade element 5 moves past the blade element 7, just contact one another over the entire length of the cutting gap 10 or no longer just contact one another. The correct realization of the cutting edge 8 is monitored or ascertained by way of specimen cuts of the flat material 2, and the adjusting of the blade element 7 is terminated when the forming of the cutting edge 8, by means of the material removal created by the cutting edge 6, is completed, or when the cutting procedure to separate a label is effected in an error-free and uniform manner over the entire width of the label.

[0033] During the operation of the cutting device 1 there is, for example, a slight manual re-adjusting or adjusting of the blade element 7 in the direction of the arrow B in order to re-sharpen the cutting edge 8.

[0034] In at least one possible embodiment of the present application, the blade elements or cutting elements 5 and 7 may comprise rectangular shapes or substantially rectangular shapes. In such an embodiment, the cutting edges 6 and 8 may be formed at the intersection of two perpendicular or substantially perpendicular sides, at a right angle or a generally right angle. During operation of the cutting device 1, the cutting element 5 and/or cutting edge 6, with the greater hardness, may sufficiently contact the cutting edge 8 and/or cutting element 7 and may sharpen and/or deform and/or machine the cutting edge 8 and/or the cutting element 7 as the cutting element 5 and/or cutting edge 6 contacts the cutting element 7 and/or cutting edge 8. Upon the cutting edge 8 and/or cutting element 7 being machined and/or deformed and/or sharpened, the shape of the cutting element 7 may no longer be rectangular. The cutting edge 8 of the cutting element 7 may then be formed at the intersection of two transverse or substantially transverse sides of the cutting element 7, at an obtuse angle or a generally obtuse angle.

[0035] An automatic slight readjusting or adjusting of the blade element 7 in the direction of the arrow B is in one possible embodiment carried out in a time-controlled manner and/or in dependence on the number of steps carried out, i.e. respectively after a predetermined number of cutting procedures, in order to "re-sharpen" the cutting edge 8 or its cutting edge, i.e. to eliminate, restrict, and/or minimize the wearing down of the cutting edge 8 due to abrasion. The adjusting necessary and/or desired for said re-sharpening of the blade element 7 and the material removal at the blade element 7

caused by this are so slight that the material accumulating does not impair the correct operating of the cutting device 1.

[0036] To form the cutting edge 8, the blade element 7 has, for example, a planar face 7.1, for example, in a plane E, in which, when the blade element 5 moves past the blade element 7, the cutting edge 6 and/or the lateral face 5.1 of the blade element 5 are also disposed and which extends transversely relative to the direction of movement of the cutting edge 6 when moving past the blade element 7, i.e. the plane E extends in an approximately radial manner relative to the machine axis 3.

[0037] The rotating machine element 4 is, for example, a blade shaft of the cutting device 1, for example, of a labeling machine or of a labeling unit. The rotating machine element 4, however, can also be another rotating operating element of a labeling machine, for example a labeling drum that is driven in a rotating manner about the machine axis 3 (e.g. vacuum drum), on which the labels, separated from the strip-shaped or web-shaped material or label material 2, are held before the transfer to the packaging to be labeled, for example containers or bottles.

[0038] The present application has been described above by way of one possible embodiment. It is obvious that numerous modifications and conversions are possible without thereby departing from the teaching concept underlying the present application.

[0039] Thus, for example, it has been assumed above that the pairing of the materials used for the blade elements 5 and 7 is selected such that the blade element 5, at least in the region of its cutting edge 6, has a greater hardness than the blade element 7. Obviously the material pairing can also be selected in the reverse order, i.e. the blade element 7 can have, at least in the region of its cutting edge, a greater hardness than the blade element 5.

[0040] In addition, it has also been assumed above that the blade element 5 is provided on the rotating machine element 4. Obviously embodiments are conceivable where a plurality of blade elements is provided on the rotating machine element 4 offset about the axis 3 of said element, for example on a rotating machine element realized in the form of a labeling drum.

[0041] In addition it is possible to realize the cutting device 1 in such a manner that the blade element 7 is also provided on the periphery of a rotating machine element 4a on a machine element 4a that rotates about an axis 3a parallel or substantially parallel to the machine axis 3. In one possible embodiment, the rotational movement of the blade element 7 is matched to the rotational movement of the machine element 4. In this case or embodiment, the rotational movements can be both in the same direction and also in opposing directions.

[0042] In another possible embodiment of the present application, the machine element 4a and the blade element 7 may be stationary or non-rotating.

[0043] In addition it is possible to treat and/or to coat the blade element 5 and/or 7 at least in part regions on the surface, for example to coat the blade element 5 with nano particles or to harden it by means of carbon diffusion at least in the region of its cutting edge 6 to improve the abrasion resistance and/or to anodize the surfaces of the blade element 7.

[0044] In the case of the specific embodiment represented, the cutting edge 6 of the blade element 5 is formed on a planar face 5.1 of said blade element that is leading when viewed in the direction of rotation of the machine element 4.

[0045] FIG. 4 shows schematically the main components of one possible embodiment example of a system for filling containers, for example, a beverage bottling plant for filling bottles 130 with at least one liquid beverage, in accordance with at least one possible embodiment, in which system or plant could possibly be utilized at least one aspect, or several aspects, of the embodiments disclosed herein.

[0046] FIG. 4 shows a rinsing arrangement or rinsing station 101, to which the containers, namely bottles 130, are fed in the direction of travel as indicated by the arrow 131, by a first conveyer arrangement 103, which can be a linear conveyor or a combination of a linear conveyor and a starwheel. Downstream of the rinsing arrangement or rinsing station 101, in the direction of travel as indicated by the arrow 131, the rinsed bottles 130 are transported to a beverage filling machine 105 by a second conveyer arrangement 104 that is formed, for example, by one or more starwheels that introduce bottles 130 into the beverage filling machine 105.

[0047] The beverage filling machine 105 shown is of a revolving or rotary design, with a rotor 105', which revolves around a central, vertical machine axis. The rotor 105' is designed to receive and hold the bottles 130 for filling at a plurality of filling positions 113 located about the periphery of the rotor 105'. At each of the filling positions 113 is located a filling arrangement 114 having at least one filling device, element, apparatus, or valve. The filling arrangements 114 are designed to introduce a predetermined volume or amount of liquid beverage into the interior of the bottles 130 to a predetermined or desired level.

[0048] The filling arrangements 114 receive the liquid beverage material from a toroidal or annular vessel 117, in which a supply of liquid beverage material is stored under pressure by a gas. The toroidal vessel 117 is a component, for example, of the revolving rotor 105'. The toroidal vessel 117 can be connected by means of a rotary coupling or a coupling that permits rotation. The toroidal vessel 117 is also connected to at least one external reservoir or supply of liquid beverage material by a conduit or supply line. In the embodiment shown in FIG. 4, there are two external supply reservoirs 123 and 124, each of which is configured to store either the same liquid beverage product or different products. These reservoirs 123, 124 are connected to the toroidal or annular vessel 117 by corresponding supply lines, conduits, or arrangements 121 and 122. The external supply reservoirs 123, 124 could be in the form of simple storage tanks, or in the form of liquid beverage product mixers, in at least one possible embodiment.

[0049] As well as the more typical filling machines having one toroidal vessel, it is possible that in at least one possible embodiment there could be a second toroidal or annular vessel which contains a second product. In this case, each filling arrangement 114 could be connected by separate connections to each of the two toroidal vessels and have two individually-controllable fluid or control valves, so that in each bottle 130, the first product or the second product can be filled by means of an appropriate control of the filling product or fluid valves.

[0050] Downstream of the beverage filling machine 105, in the direction of travel of the bottles 130, there can be a beverage bottle closing arrangement or closing station 106 which closes or caps the bottles 130. The beverage bottle closing arrangement or closing station 106 can be connected by a third conveyer arrangement 107 to a beverage bottle labeling arrangement or labeling station 108. The third con-

veyor arrangement may be formed, for example, by a plurality of starwheels, or may also include a linear conveyer device.

[0051] In the illustrated embodiment, the beverage bottle labeling arrangement or labeling station 108 has at least one labeling unit, device, or module, for applying labels to bottles 130. In the embodiment shown, the labeling arrangement 108 is connected by a starwheel conveyer structure to three output conveyer arrangements: a first output conveyer arrangement 109, a second output conveyer arrangement 110, and a third output conveyer arrangement 111, all of which convey filled, closed, and labeled bottles 130 to different locations.

[0052] The first output conveyer arrangement 109, in the embodiment shown, is designed to convey bottles 130 that are filled with a first type of liquid beverage supplied by, for example, the supply reservoir 123. The second output conveyer arrangement 110, in the embodiment shown, is designed to convey bottles 130 that are filled with a second type of liquid beverage supplied by, for example, the supply reservoir 124. The third output conveyer arrangement 111, in the embodiment shown, is designed to convey incorrectly labeled bottles 130. To further explain, the labeling arrangement 108 can comprise at least one beverage bottle inspection or monitoring device that inspects or monitors the location of labels on the bottles 130 to determine if the labels have been correctly placed or aligned on the bottles 130. The third output conveyer arrangement 111 removes any bottles 130 which have been incorrectly labeled as determined by the inspecting device.

[0053] The beverage bottling plant can be controlled by a central control arrangement 112, which could be, for example, computerized control system that monitors and controls the operation of the various stations and mechanisms of the beverage bottling plant.

[0054] A cutting device, for example cutting device of a labeling device, comprising a machine element 4 driven to rotate about a machine axis 3 and further comprising a first blade element 5 forming at least one first edge 6 and provided on the machine element 4, said blade element interacting with a second edge 8 of at least one second blade element 7 when the machine element 4 is rotating to form a cutting gap 10, characterized in that the first blade element 5 or the second blade element 7 has a hardness at least in the region of the edge 6, 8 thereof that is higher than the hardness of the second blade element 7 or of the first blade element 5, and that the edge 8 on the blade element 7 having lower strength is produced by material removal with the edge 6 of the blade element 5 that is harder at least on said edge 6.

[0055] One feature or aspect of an embodiment is believed at the time of the filing of this patent application to possibly reside broadly in a cutting device, for example a cutting device of a labeling machine, said cutting device having a machine element 4 that is driven in a rotating manner about a machine axis 3 and at least one first blade element 5 that forms a first cutting edge 6 and is provided at the machine element 4, said first blade element, when the machine element 4 is rotating, interacting with a second cutting edge 8 of at least a second blade element 7 and forming a cutting gap 10, wherein the first blade element 5 or the second blade element 7, at least in the region of its cutting edge 6, 8, has a hardness that is greater than the hardness of the second blade element 7 or of the first blade element 5, and in that the cutting edge 8 at the blade element 7 with the lesser hardness is created by material

removal with the cutting edge 6 of the blade element 5 that is designed to be harder at least at this cutting edge 6.

[0056] Another feature or aspect of an embodiment is believed at the time of the filing of this patent application to possibly reside broadly in the cutting device, wherein the blade element 5 that is harder at least at its cutting edge is produced, at least in the region of the cutting edge, from hardened steel, hard metal or ceramic.

[0057] Yet another feature or aspect of an embodiment is believed at the time of the filing of this patent application to possibly reside broadly in the cutting device, wherein the blade element with the lesser hardness is produced from a material, for example a metallic material, e.g. aluminum or brass, which, on account of its lesser hardness, is machinable by the at least one cutting edge 6 of greater hardness so as to remove material or provide a machine finish.

[0058] Still another feature or aspect of an embodiment is believed at the time of the filing of this patent application to possibly reside broadly in the cutting device, wherein the at least one second blade element 7 is provided on the cutting device 1 so as not to rotate with the machine element 4, but so as to be adjustable relative to said machine element 4 or to a circular path of the first blade element 5.

[0059] A further feature or aspect of an embodiment is believed at the time of the filing of this patent application to possibly reside broadly in the cutting device, wherein the at least one second blade element 7 is provided at the periphery of another machine element 4a, which is driveable in a rotating manner about a machine axis 3a in a manner coordinated with the one machine element 4.

[0060] Another feature or aspect of an embodiment is believed at the time of the filing of this patent application to possibly reside broadly in the cutting device, wherein the other machine element 4a is driveable so as to rotate in a contra-rotating manner or in a contra-rotating manner relative to the one machine element 4.

[0061] Yet another feature or aspect of an embodiment is believed at the time of the filing of this patent application to possibly reside broadly in the cutting device, wherein the first blade element 5 and/or the second blade element 7 are realized with a planar face 5.1, 7.1 that forms the cutting edge 6, 8, said face being oriented in a plane E, enclosing the cutting edge 6, 8, transversely relative to the movement of the first blade element 5 when the machine element 4 is rotating.

[0062] Still another feature or aspect of an embodiment is believed at the time of the filing of this patent application to possibly reside broadly in the cutting device, comprising at least two first and/or second blade elements 5, 7.

[0063] A further feature or aspect of an embodiment is believed at the time of the filing of this patent application to possibly reside broadly in the cutting device, wherein the cutting edge 6 of the at least one first blade element 5 is oriented with its longitudinal extension in the direction of the machine axis 3 of the one machine element 4 and, when the machine element is rotating, is moved on a circular cylinder surface enclosing said machine axis 3.

[0064] Another feature or aspect of an embodiment is believed at the time of the filing of this patent application to possibly reside broadly in the cutting device, wherein the first machine element 4 and/or the second machine element 4a are a blade shaft or a drum-like operating element, for example a labeling drum or vacuum drum of a labeling machine.

[0065] Yet another feature or aspect of an embodiment is believed at the time of the filing of this patent application to

possibly reside broadly in a method for operating a cutting device, for example a cutting device of a labeling machine, said cutting device having at least one machine element 4 that is driven so as to rotate about a machine axis 3 and at least one first blade element 5, which forms a first cutting edge 6 and is provided at the machine element 4, said first blade element interacting with a second cutting edge 8 of at least a second blade element 7 and forming a cutting gap 10 when the machine element 4 is rotating, wherein the forming of the cutting edge 8 at the blade element 7 of lesser hardness is effected by material removal using the cutting edge 6 of that blade element 5 that has the greater hardness at least in the region of its cutting edge 6.

[0066] Still another feature or aspect of an embodiment is believed at the time of the filing of this patent application to possibly reside broadly in the method, wherein in the case of a first commissioning and/or in the case of a recommissioning of the cutting device 1, e.g. after a change of at least one blade element 5, 7, the blade elements 5, 7, with the cutting device 1 switched on, are adjusted to one another until the suitable cutting edge 8 has been formed through material removal by means of the cutting edge of greater hardness 6 at the blade element 7 with the lesser hardness.

[0067] A further feature or aspect of an embodiment is believed at the time of the filing of this patent application to possibly reside broadly in the method, wherein the blade element 7 with the lesser hardness is adjusted to the blade element 5 with the greater hardness at least in the region of its cutting edge 6.

[0068] One feature or aspect of an embodiment is believed at the time of the filing of this patent application to possibly reside broadly in the method, wherein the blade element 5 with the greater hardness at least in the region of its cutting edge 6 is adjusted to the blade element 7 with the lesser hardness.

[0069] Another feature or aspect of an embodiment is believed at the time of the filing of this patent application to possibly reside broadly in the method, wherein for re-sharpening the cutting edge 8 at the at least one blade element 7 of lesser hardness, an adjusting of the blade elements 5, 7 one to the other is carried out during the operation of the cutting device 1, for example in a time-controlled manner and/or in dependence on the number of cutting procedures.

[0070] Yet another feature or aspect of an embodiment is believed at the time of the filing of this patent application to possibly reside broadly in a cutting device, for example a cutting device of a labeling machine, said cutting device having a machine element 4 that is driven in a rotating manner about a machine axis 3 and at least one first blade element 5 that forms a first cutting edge 6 and is provided at the machine element 4, said first blade element, when the machine element 4 is rotating, interacting with a second cutting edge 8 of at least a second blade element 7 and forming a cutting gap 10, whereby the first blade element 5 or the second blade element 7, at least in the region of its cutting edge 6, 8, has a hardness that is greater than the hardness of the second blade element 7 or of the first blade element 5, and in that the cutting edge 8 at the blade element 7 with the lesser hardness is created by material removal with the cutting edge 6 of the blade element 5 that is designed to be harder at least at this cutting edge 6, whereby the blade element with the lesser hardness is produced from a material, for example a metallic material, e.g. aluminum or brass, which (material), on account of its lesser hardness, is machinable by the at least one cutting edge 6 of

greater hardness so as to remove material or provide a machine finish, wherein the blade element 5 and/or the blade element 7 is coated in at least portions of its surfaces with nano-particles and/or by carbon diffusion and/or the blade element 7 is anodized.

[0071] Still another feature or aspect of an embodiment is believed at the time of the filing of this patent application to possibly reside broadly in the cutting device, wherein the blade element 5 that is harder at least at its cutting edge is produced, at least in the region of the cutting edge, from hardened steel, hard metal or ceramic.

[0072] A further feature or aspect of an embodiment is believed at the time of the filing of this patent application to possibly reside broadly in the cutting device, wherein the at least one second blade element 7 is provided on the cutting device 1 so as not to rotate with the machine element 4, but so as to be adjustable relative to said machine element 4 or to a circular path of the first blade element 5.

[0073] Another feature or aspect of an embodiment is believed at the time of the filing of this patent application to possibly reside broadly in the cutting device, wherein the at least one second blade element 7 is provided at the periphery of another machine element 4a, which is driveable in a rotating manner about a machine axis 3a in a manner coordinated with the one machine element 4.

[0074] Yet another feature or aspect of an embodiment is believed at the time of the filing of this patent application to possibly reside broadly in the cutting device, wherein the other machine element 4a is driveable so as to rotate in a contra-rotating manner or in a contra-rotating manner relative to the one machine element 4.

[0075] Still another feature or aspect of an embodiment is believed at the time of the filing of this patent application to possibly reside broadly in the cutting device, wherein the first blade element 5 and/or the second blade element 7 are realized with a planar face 5.1, 7.1 that forms the cutting edge 6, 8, said face being oriented in a plane E, enclosing the cutting edge 6, 8, transversely relative to the movement of the first blade element 5 when the machine element 4 is rotating.

[0076] A further feature or aspect of an embodiment is believed at the time of the filing of this patent application to possibly reside broadly in the cutting device, comprising at least two first and/or second blade elements 5, 7.

[0077] Another feature or aspect of an embodiment is believed at the time of the filing of this patent application to possibly reside broadly in the cutting device, wherein the cutting edge 6 of the at least one first blade element 5 is oriented with its longitudinal extension in the direction of the machine axis 3 of the one machine element 4 and, when the machine element is rotating, is moved on a circular cylinder surface enclosing said machine axis 3.

[0078] Yet another feature or aspect of an embodiment is believed at the time of the filing of this patent application to possibly reside broadly in the cutting device, wherein the first machine element 4 and/or the second machine element 4a are a blade shaft or a drum-like operating element, for example a labeling drum or vacuum drum of a labeling machine.

[0079] Still another feature or aspect of an embodiment is believed at the time of the filing of this patent application to possibly reside broadly in a cutting device, for example a cutting device of a labeling machine. The cutting device having a machine element that is driven in a rotating manner about a machine axis and at least one first blade element that forms a first cutting edge and is provided at the machine

element. The first blade element, when the machine element is rotating, interacts with a second cutting edge of at least a second blade element and forms a cutting gap. The first blade element or the second blade element, at least in the region of its cutting edge, has a hardness that is greater than the hardness of the second blade element or of the first blade element. The cutting edge at the blade element with the lesser hardness is created by material removal with the cutting edge of the blade element that is designed to be harder, and that the blade element with the lesser hardness, on account of its lesser hardness, is machinable by the at least one cutting edge of greater hardness so as to remove material or provide a machine finish, wherein the blade element has, in the area of its cutting edge a hardness which is greater than the hardness of the second blade element and whereby the second blade element is made of aluminum and is anodized on its surface.

[0080] The components disclosed in the various publications, disclosed or incorporated by reference herein, may possibly be used in possible embodiments of the present invention, as well as equivalents thereof.

[0081] The purpose of the statements about the technical field is generally to enable the Patent and Trademark Office and the public to determine quickly, from a cursory inspection, the nature of this patent application. The description of the technical field is believed, at the time of the filing of this patent application, to adequately describe the technical field of this patent application. However, the description of the technical field may not be completely applicable to the claims as originally filed in this patent application, as amended during prosecution of this patent application, and as ultimately allowed in any patent issuing from this patent application. Therefore, any statements made relating to the technical field are not intended to limit the claims in any manner and should not be interpreted as limiting the claims in any manner.

[0082] The appended drawings in their entirety, including all dimensions, proportions and/or shapes in at least one embodiment of the invention, are accurate and are hereby included by reference into this specification.

[0083] The background information is believed, at the time of the filing of this patent application, to adequately provide background information for this patent application. However, the background information may not be completely applicable to the claims as originally filed in this patent application, as amended during prosecution of this patent application, and as ultimately allowed in any patent issuing from this patent application. Therefore, any statements made relating to the background information are not intended to limit the claims in any manner and should not be interpreted as limiting the claims in any manner.

[0084] All, or substantially all, of the components and methods of the various embodiments may be used with at least one embodiment or all of the embodiments, if more than one embodiment is described herein.

[0085] The purpose of the statements about the object or objects is generally to enable the Patent and Trademark Office and the public to determine quickly, from a cursory inspection, the nature of this patent application. The description of the object or objects is believed, at the time of the filing of this patent application, to adequately describe the object or objects of this patent application. However, the description of the object or objects may not be completely applicable to the claims as originally filed in this patent application, as amended during prosecution of this patent application, and as ultimately allowed in any patent issuing from this patent

application. Therefore, any statements made relating to the object or objects are not intended to limit the claims in any manner and should not be interpreted as limiting the claims in any manner.

[0086] All of the patents, patent applications and publications recited herein, and in the Declaration attached hereto, are hereby incorporated by reference as if set forth in their entirety herein except for the exceptions indicated herein.

[0087] The summary is believed, at the time of the filing of this patent application, to adequately summarize this patent application. However, portions or all of the information contained in the summary may not be completely applicable to the claims as originally filed in this patent application, as amended during prosecution of this patent application, and as ultimately allowed in any patent issuing from this patent application. Therefore, any statements made relating to the summary are not intended to limit the claims in any manner and should not be interpreted as limiting the claims in any manner.

[0088] It will be understood that the examples of patents, published patent applications, and other documents which are included in this application and which are referred to in paragraphs which state "Some examples of . . . which may possibly be used in at least one possible embodiment of the present application . . ." may possibly not be used or useable in any one or more embodiments of the application.

[0089] The sentence immediately above relates to patents, published patent applications and other documents either incorporated by reference or not incorporated by reference.

[0090] All of the patents, patent applications or patent publications, except for the exceptions indicated herein, which were cited in the German Office Action dated Aug. 8, 2008, and/or cited elsewhere are hereby incorporated by reference as if set forth in their entirety herein, as follows: DE 26 28 728, having the German title "SCHNEIDVORRICHTUNG MIT ROTIERENDEN FLUEGELMESSERN ZUR HERSTELLUNG VON FORMSCHNITTEN IN DIE RAENDER BEWEGTER WERKSTOFFBAHNEN," published on Jan. 5, 1978; DE 26 41 370, having the German title "GERAET ZUM VERNICHTEN VON MIKROFILMEN UND DERGLEICHEN," published on Mar. 23, 1978; DE 26 39 218, having the German title "SCHNEIDWERKZEUG FUER EINEN LAUFENDEN STREIFEN," published on Mar. 31, 1977; and U.S. Pat. No. 5,445,054, having the title "Sheet cutting apparatus and method," published on Aug. 29, 1995.

[0091] All of the patents, patent applications or patent publications, except for the exceptions indicated herein, which were cited in the International Search Report dated Feb. 17, 2009, and/or cited elsewhere are hereby incorporated by reference as if set forth in their entirety herein, as follows: U.S. Pat. No. 4,041,816, having the title "Rotary web chopper," published on Aug. 16, 1977; U.S. Pat. No. 5,776,289, having the title "Apparatus and method for applying labels using static electrical attraction," published on Jul. 7, 1998; DE 297 19 348, having the German title "Falzapparat," published on Jan. 22, 1998; DE 36 07 907, having the following German title "Schneidwerkzeug," published on Aug. 13, 1987; and DE 10 2004 052682, having the following English translation of the German title "Industrial or laboratory mill has sickle-shaped self-cutting blades has core material encased within a harder case," published on May 4, 2006.

[0092] Some examples of labeling machines which may possibly be utilized in at least one possible embodiment may

possibly be found in the following U.S. Pat. No. 6,634,400, entitled "Labeling machine;" U.S. Pat. No. 6,561,246, entitled "Labeling machine capable of precise attachment of a label to different sizes of containers;" U.S. Pat. No. 6,550,512, entitled "Labeling machine capable of preventing erroneous attachment of labels on containers;" U.S. Pat. No. 6,543,514, entitled "In-line continuous feed sleeve labeling machine and method;" U.S. Pat. No. 6,378,587, entitled "Cylindrical container labeling machine;" U.S. Pat. No. 6,328,086, entitled "Labeling machine;" U.S. Pat. No. 6,315,021, entitled "Labeling machine;" U.S. Pat. No. 6,263,940, entitled "In-line continuous feed sleeve labeling machine and method;" U.S. Pat. No. 6,199,614, entitled "High speed labeling machine having a constant tension driving system;" U.S. Pat. No. 6,167,935, entitled "Labeling machine;" U.S. Pat. No. 6,066,223, entitled "Labeling machine and method;" U.S. Pat. No. 6,050,319, entitled "Non-round container labeling machine and method;" and U.S. Pat. No. 6,045,616, entitled "Adhesive station and labeling machine."

[0093] Some examples of blade cutting apparatus and methods that may possibly be utilized or adapted for use in at least one possible embodiment may possibly be found in the following U.S. Pat. No. application publications: No. 2003/0146943 A1, entitled "Label Printer-Cutter with Mutually Exclusive Printing and Cutting Operation"; U.S. Pat. No. 5,614,278 entitled "Strip of Separable Labels or Tags Having a Display Surface for Display of Information Thereon"; U.S. Pat. No. 4,189,337, entitled "Real Time Labeler System"; No. 2004/0226659 A1, entitled "Label Application System"; and No. 2004/0226659 A1, entitled "Label Application System".

[0094] Some examples of labeling apparatus and methods that may possibly be utilized or adapted for use in at least one possible embodiment may possibly be found in the following U.S. Pat. No. 4,189,337, entitled "Real Time Labeler System"; No. 2004/0226659 A1, entitled "Label Application System"; U.S. Pat. No. 6,191,382 B1, entitled "Dynamic Laser Cutting Apparatus"; No. 2003/0146943 A1, entitled "Label Printer-Cutter with Mutually Exclusive Printing and Cutting Operation"; and No. 2002/0029855 A1, entitled "System for Printing and Applying Tape onto Surfaces"; U.S. Pat. No. 6,634,400, entitled "Labeling machine;" U.S. Pat. No. 6,561,246, entitled "Labeling machine capable of precise attachment of a label to different sizes of containers;" U.S. Pat. No. 6,550,512, entitled "Labeling machine capable of preventing erroneous attachment of labels on containers;" U.S. Pat. No. 6,378,587, entitled "Cylindrical container labeling machine;" U.S. Pat. No. 6,328,086, entitled "Labeling machine;" U.S. Pat. No. 6,315,021, entitled "Labeling machine;" U.S. Pat. No. 6,199,614, entitled "High speed labeling machine having a constant tension driving system;" U.S. Pat. No. 6,167,935, entitled "Labeling machine;" U.S. Pat. No. 6,066,223, entitled "Labeling machine and method;" U.S. Pat. No. 6,050,319, entitled "Non-round container labeling machine and method;" and U.S. Pat. No. 6,045,616, entitled "Adhesive station and labeling machine."

[0095] Some examples of labels that may possibly be used with a possible embodiment of the present invention may be found in the following U.S. Pat. No. 5,905,099; U.S. Pat. No. 6,391,415; and U.S. Pat. No. 6,391,415.

[0096] U.S. patent application Ser. No. 12/429,427, filed on Apr. 24, 2009, having inventors Lutz DECKERT and Oliver KRESS, Attorney Docket No. NHL-HOL-234, and title "A BEVERAGE BOTTLE OR CONTAINER LABELING DEVICE WITH A CUTTING UNIT AND CUTTING UNIT

FOR A BEVERAGE BOTTLE OR CONTAINER LABELING DEVICE," and U.S. patent application Ser. No. 12/352,627, filed on Jan. 13, 2009, having inventors Lutz DECKERT and Oliver KRESS, Attorney Docket No. NHL-HOL-205, and title "A LABELING MACHINE IN A BOTTLE OR CONTAINER FILLING PLANT HAVING A TRANSPORT ROLLER, SUCH AS A CUTTING OR SEVERING ROLLER; AND SUCH A ROLLER FOR LABELING EQUIPMENT OR A LABELING ARRANGEMENT, AS WELL AS LABELING EQUIPMENT OR A LABELING ARRANGEMENT," are hereby incorporated by reference as if set forth in their entirety herein.

[0097] The following patents, patent application, and patent publications are incorporated by reference as if set forth in their entirety except for the exceptions indicated herein: U.S. Pat. No. 6,883,576, having the title "QUICK CHANGE ROLL-FED HIGH SPEED LABELING SYSTEM AND METHODS FOR USING SAME," published on Apr. 26, 2005; EP 0990588, having the title "DEVICE FOR CUTTING FROM A WEB ELEMENTS FOR LAMINATING," published on Apr. 5, 2000; WO 2007/110199, having the following English translation of the German title "VACUUM DRUM AND LABELING MACHINE COMPRISING SUCH A DRUM, FOR ATTACHING WRAP-AROUND LABELS TO BOTTLES OR THE LIKE CONTAINERS," published on Oct. 4, 2007; DE 1196058, having the following English translation of the German title "ADJUSTABLE ANVIL FOR CUTTING WINDOW APERTURES AND LIKE OPENINGS IN BLANKS," published on Jul. 1, 1965; EP 1,279,604, having the title "CUTTING DEVICE FOR A LABELLING MACHINE," published on Jan. 29, 2003; U.S. Pat. No. 4,355,554, having the title "WEB SECTIONING APPARATUS INCLUDING AN INTERFERENCE INDICATOR," published on Oct. 26, 1982; DE 10 2004 032030, having the following English translation of the German title "MATERIAL CHANNEL PRESSING AND SHAPING DEVICE, HAS PUNCHING AND IMPRESSION CYLINDERS WHOSE BEARINGS ARE ARRANGED ON BEVEL, WHERE DISTANCE BETWEEN PUNCHING AND IMPRESSION CYLINDERS IS ADJUSTABLE BY MOVEMENT OF BEVEL," published on Jan. 19, 2006; GB 2,204,851, having the title "ARTICLE LABELLING APPARATUS," published on Nov. 23, 1988; EP 0 025 332, having the title "LABELLING MACHINE AND METHOD, APPARATUS AND METHOD OF SEVERING FILM FOR USE THEREIN AND CONTAINER LABELLED THEREBY," published on Mar. 18, 1981; U.S. Pat. No. 4,561,928, having the title "LABELLING MACHINE," published on Dec. 31, 1985; and U.S. Pat. No. 6,158,316, having the title "CONTACT PRESSURE CONTROL METHOD AND DEVICE FOR ROTARY CUTTER," published on Dec. 12, 2000.

[0098] The patents, patent applications, and patent publications listed above in the preceding paragraphs are herein incorporated by reference as if set forth in their entirety except for the exceptions indicated herein. The purpose of incorporating U.S. patents, Foreign patents, publications, etc. is solely to provide additional information relating to technical features of one or more embodiments, which information may not be completely disclosed in the wording in the pages of this application. However, words relating to the opinions and judgments of the author and not directly relating to the technical details of the description of the embodiments therein are not incorporated by reference. The words all,

always, absolutely, consistently, preferably, guarantee, particularly, constantly, ensure, necessarily, immediately, endlessly, avoid, exactly, continually, expediently, ideal, need, must, only, perpetual, precise, perfect, require, requisite, simultaneous, total, unavoidable, and unnecessary, or words substantially equivalent to the above-mentioned words in this sentence, when not used to describe technical features of one or more embodiments of the patents, patent applications, and patent publications, are not considered to be incorporated by reference herein.

[0099] The corresponding foreign and international patent publication applications, namely, Federal Republic of Germany Patent Application No. 10 2007 057 409.8, filed on Nov. 27, 2007, having inventors Klaus KRAMER, Lutz DECKERT, and Oliver KRESS, and DE-OS 10 2007 057 409.8 and DE-PS 10 2007 057 409.8, and International Application No. PCT/EP2008/009757, filed on Nov. 18, 2008, having WIPO Publication No. WO 2009/068205 and inventors Klaus KRAMER, Lutz DECKERT, and Oliver KRESS, are hereby incorporated by reference as if set forth in their entirety herein, except for the exceptions indicated herein, for the purpose of correcting and explaining any possible misinterpretations of the English translation thereof. In addition, the published equivalents of the above corresponding foreign and international patent publication applications, and other equivalents or corresponding applications, if any, in corresponding cases in the Federal Republic of Germany and elsewhere, and the references and documents cited in any of the documents cited herein, such as the patents, patent applications and publications, except for the exceptions indicated herein, are hereby incorporated by reference as if set forth in their entirety herein.

[0100] The purpose of incorporating the corresponding foreign equivalent patent application(s), that is, PCT/EP2008/009757 and German Patent Application 10 2007 057 409.8, is solely for the purpose of providing a basis of correction of any wording in the pages of the present application, which may have been mistranslated or misinterpreted by the translator. However, words relating to opinions and judgments of the author and not directly relating to the technical details of the description of the embodiments therein are not to be incorporated by reference. The words all, always, absolutely, consistently, preferably, guarantee, particularly, constantly, ensure, necessarily, immediately, endlessly, avoid, exactly, continually, expediently, ideal, need, must, only, perpetual, precise, perfect, require, requisite, simultaneous, total, unavoidable, and unnecessary, or words substantially equivalent to the above-mentioned word in this sentence, when not used to describe technical features of one or more embodiments of the patents, patent applications, and patent publications, are not generally considered to be incorporated by reference herein.

[0101] Statements made in the original foreign patent applications PCT/EP2008/009757 and DE 10 2007 057 409.8 from which this patent application claims priority which do not have to do with the correction of the translation in this patent application are not to be included in this patent application in the incorporation by reference.

[0102] Any statements about admissions of prior art in the original foreign patent applications PCT/EP2008/009757 and DE 10 2007 057 409.8 are not to be included in this patent application in the incorporation by reference, since the laws

relating to prior art in non-U.S. Patent Offices and courts may be substantially different from the Patent Laws of the United States.

[0103] All of the references and documents cited in any of the documents cited herein, except for the exceptions indicated herein, are hereby incorporated by reference as if set forth in their entirety herein. All of the documents cited herein, referred to in the immediately preceding sentence, include all of the patents, patent applications and publications cited anywhere in the present application.

[0104] The description of the embodiment or embodiments is believed, at the time of the filing of this patent application, to adequately describe the embodiment or embodiments of this patent application. However, portions of the description of the embodiment or embodiments may not be completely applicable to the claims as originally filed in this patent application, as amended during prosecution of this patent application, and as ultimately allowed in any patent issuing from this patent application. Therefore, any statements made relating to the embodiment or embodiments are not intended to limit the claims in any manner and should not be interpreted as limiting the claims in any manner.

[0105] The details in the patents, patent applications and publications may be considered to be incorporable, at applicant's option, into the claims during prosecution as further limitations in the claims to patentably distinguish any amended claims from any applied prior art.

[0106] The purpose of the title of this patent application is generally to enable the Patent and Trademark Office and the public to determine quickly, from a cursory inspection, the nature of this patent application. The title is believed, at the time of the filing of this patent application, to adequately reflect the general nature of this patent application. However, the title may not be completely applicable to the technical field, the object or objects, the summary, the description of the embodiment or embodiments, and the claims as originally filed in this patent application, as amended during prosecution of this patent application, and as ultimately allowed in any patent issuing from this patent application. Therefore, the title is not intended to limit the claims in any manner and should not be interpreted as limiting the claims in any manner.

[0107] The abstract of the disclosure is submitted herewith as required by 37 C.F.R. §1.72(b). As stated in 37 C.F.R. §1.72(b):

[0108] A brief abstract of the technical disclosure in the specification must commence on a separate sheet, preferably following the claims, under the heading "Abstract of the Disclosure." The purpose of the abstract is to enable the Patent and Trademark Office and the public generally to determine quickly from a cursory inspection the nature and gist of the technical disclosure. The abstract shall not be used for interpreting the scope of the claims.

Therefore, any statements made relating to the abstract are not intended to limit the claims in any manner and should not be interpreted as limiting the claims in any manner.

[0109] The embodiments of the invention described herein above in the context of the preferred embodiments are not to be taken as limiting the embodiments of the invention to all of the provided details thereof, since modifications and variations thereof may be made without departing from the spirit and scope of the embodiments of the invention.

AT LEAST PARTIAL NOMENCLATURE

[0110] 1 Cutting device

[0111] 2 Strip-shaped or web-shaped flat material

- [0112] 3, 3a Machine axis
- [0113] 4, 4a Rotating machine element
- [0114] 4.1 Periphery of the machine element 4
- [0115] 5 Blade element
- [0116] 5.1 Cutting face of the blade element 5
- [0117] 6 Cutting edge of the blade element 5
- [0118] 7 Blade element or counter blade
- [0119] 7.1 Planar cutting face of the blade element 7
- [0120] 8 Cutting edge of the blade element 5
- [0121] 9 Holder
- [0122] 10 Cutting gap

What is claimed is:

1. A beverage bottle filling plant for filling beverage bottles with liquid, said beverage bottle filling plant comprising:

a beverage bottle filling machine being configured and disposed to fill beverage bottles with liquid;

a first conveyor arrangement being configured and disposed to convey beverage bottles to be filled to said beverage bottle filling machine;

said beverage bottle filling machine comprising:

a rotor;

a rotatable vertical machine column;

said rotor being connected to said vertical machine column to permit rotation of said rotor about said vertical machine column;

a plurality of beverage bottle filling elements for filling beverage bottles with liquid being disposed on the periphery of said rotor;

each of said plurality of beverage bottle filling elements comprising a beverage bottle carrier being configured and disposed to receive and hold beverage bottles to be filled;

each of said plurality of beverage bottle filling elements being configured and disposed to dispense liquid into beverage bottles to be filled;

at least one liquid reservoir being configured to hold a supply of liquid;

at least one supply line being configured and disposed to connect said at least one liquid reservoir to said beverage bottle filling machine to supply liquid to said beverage bottle filling machine;

a first star wheel structure being configured and disposed to move beverage bottles into said beverage bottle filling machine; and

a second star wheel structure being configured and disposed to move beverage bottles out of said beverage bottle filling machine;

a beverage bottle closing machine being configured and disposed to close tops of filled beverage bottles;

a second conveyor arrangement being configured and disposed to convey filled beverage bottles from said beverage bottle filling machine to said beverage bottle closing machine;

said beverage bottle closing machine comprising:

a rotor;

a rotatable vertical machine column;

said rotor being connected to said vertical machine column to permit rotation of said rotor about said vertical machine column;

a plurality of closing devices being disposed on the periphery of said rotor;

each of said plurality of closing devices being configured and disposed to place closures on filled beverage bottles;

each of said plurality of closing devices comprising a beverage bottle carrier being configured and disposed to receive and hold filled beverage bottles;

a first star wheel structure being configured and disposed to move filled beverage bottles into said beverage bottle closing machine; and

a second star wheel structure being configured and disposed to move filled, closed beverage bottles out of said beverage bottle closing machine;

a beverage bottle labeling machine being configured and disposed to label filled, closed beverage bottles;

a third conveyor arrangement being configured and disposed to convey filled, closed beverage bottles from said beverage bottle closing machine to said beverage bottle labeling machine;

said beverage bottle labeling machine comprising:

a rotor;

a rotatable vertical machine column;

said rotor being connected to said vertical machine column to permit rotation of said rotor about said vertical machine column;

a plurality of beverage bottle support structures being disposed on the periphery of said rotor;

said beverage bottle support structures being configured to support and hold filled, closed beverage bottles;

a first star wheel structure being configured and disposed to move filled, closed beverage bottles into said beverage bottle labeling machine;

a second star wheel structure being configured and disposed to move labeled beverage bottles out of said beverage bottle labeling machine; and

at least one beverage bottle labeling roller being configured and disposed to affix a label to the surface of a beverage bottle; and

a cutting arrangement being configured and disposed to cut labels from a supply of labeling material;

said cutting arrangement comprising:

a cutting rotor being configured and disposed to rotate about an axis;

said cutting rotor comprising a first cutting element;

said first cutting element being disposed about the periphery of said cutting rotor and being configured to rotate with said cutting rotor;

said first cutting element comprising a first side and a second side;

said first side of said first cutting element being disposed substantially perpendicular to said second side of said first cutting element;

said first side and said second side intersecting and forming a cutting edge of said first cutting element;

a stationary element comprising a stationary second cutting element being fixedly mounted to said stationary element;

said second cutting element being configured and disposed to be adjustable toward said first cutting element and permit said first cutting element to sharpen said second cutting element;

said second cutting element comprising a first side and a second side;

said first side of said second cutting element being disposed substantially transverse to said second side of said second cutting element;

said first side and said second side intersecting and forming a cutting edge of said second cutting element;

said cutting edge of said second cutting element being generally a right angle or an obtuse angle;

said cutting edge of said second cutting element being configured and disposed to come into contact with said first cutting element to cut labels therebetween from a supply of labeling material;

upon said first cutting element rotating past said second cutting element, said cutting edge of said at least one first blade element and said cutting edge of said at least one second blade element being disposed to form a cutting gap or no gap upon said first cutting element contacting said second cutting element, between said cutting edge of said at least one first blade element and said cutting edge of said at least one second blade element, which cutting gap or no gap is configured to sufficiently cut labels therebetween from a supply of labeling material;

said first cutting element being configured to remove material from said second cutting element upon said first cutting element contacting said second cutting element upon adjustment of said second cutting element;

said cutting edge of said first cutting element comprising a first material, such as tool steel, hard metal, or ceramic;

said cutting edge of said second cutting element comprising anodized aluminum;

said first material being harder than said anodized aluminum; and

said cutting edge of said second cutting element being configured to be deformable by said cutting edge of said first cutting element, upon said cutting edge of said first cutting element contacting said cutting edge of said second cutting element.

2. The beverage bottle filling plant according to claim 1, wherein the blade element (5) that is harder at least at its cutting edge is produced, at least in the region of the cutting edge, from hardened steel, hard metal or ceramic.

3. The beverage bottle filling plant according to claim 2, wherein the at least one second blade element (7) is provided on the cutting device (1) so as not to rotate with the machine element (4), but so as to be adjustable relative to said machine element (4) or to a circular path of the first blade element (5).

4. The beverage bottle filling plant according to claim 3, wherein the at least one second blade element (7) is provided at the periphery of another machine element (4a), which is driveable in a rotating manner about a machine axis (3a) in a manner coordinated with the one machine element (4).

5. The beverage bottle filling plant according to claim 4, wherein the other machine element (4a) is driveable so as to rotate in a contra-rotating manner or in a contra-rotating manner relative to the one machine element (4).

6. The beverage bottle filling plant according to claim 5, wherein the first blade element (5) and/or the second blade element (7) are realized with a planar face (5.1, 7.1) that forms the cutting edge (6, 8), said face being oriented in a plane (E), enclosing the cutting edge (6, 8), transversely relative to the movement of the first blade element (5) when the machine element (4) is rotating.

7. The beverage bottle filling plant according to claim 6, wherein said cutting arrangement comprises at least two first and/or second blade elements (5, 7).

8. The beverage bottle filling plant according to claim 7, wherein the cutting edge (6) of the at least one first blade element (5) is oriented with its longitudinal extension in the direction of the machine axis (3) of the one machine element (4) and, when the machine element is rotating, is moved on a circular cylinder surface enclosing said machine axis (3).

9. The beverage bottle filling plant according to claim 8, wherein the first machine element (4) and/or the second

machine element (4a) are a blade shaft or a drum-like operating element, for example a labeling drum or vacuum drum of a labeling machine.

10. Cutting device, for example a cutting device of a labeling machine, said cutting device having a machine element (4) that is driven in a rotating manner about a machine axis (3) and at least one first blade element (5) that forms a first cutting edge (6) and is provided at the machine element (4), said first blade element, when the machine element (4) is rotating, interacting with a second cutting edge (8) of at least a second blade element (7) and forming a cutting gap (10), whereby the first blade element (5) or the second blade element (7), at least in the region of its cutting edge (6, 8), has a hardness that is greater than the hardness of the second blade element (7) or of the first blade element (5), and in that the cutting edge at the blade element with the lesser hardness is created by material removal with the cutting edge (6) of the blade element (5) that is designed to be harder and that the blade element with the lesser hardness, on account of its lesser hardness, is machinable by the at least one cutting edge of greater hardness so as to remove material or provide a machine finish, characterized in that the blade element (5) has, in the area of its cutting edge (6) a hardness which is greater than the hardness of the second blade element (7) and whereby the second blade element (7) is made of aluminum and is anodized on its surface.

11. Cutting device according to claim 10, characterized in that the blade element (5) that is harder at least at its cutting edge is produced, at least in the region of the cutting edge, from hardened steel, hard metal or ceramic.

12. Cutting device according to claim 11, characterized in that the at least one second blade element (7) is provided on the cutting device (1) so as not to rotate with the machine element (4), but so as to be adjustable relative to said machine element (4) or to a circular path of the first blade element (5).

13. Cutting device according to claim 12, characterized in that the at least one second blade element (7) is provided at the periphery of another machine element (4a), which is driveable in a rotating manner about a machine axis (3a) in a manner coordinated with the one machine element (4).

14. Cutting device according to claim 13, characterized in that the other machine element (4a) is driveable so as to rotate in a contra-rotating manner or in a contra-rotating manner relative to the one machine element (4).

15. Cutting device according to claim 14, characterized in that the first blade element (5) and/or the second blade element (7) are realized with a planar face (5.1, 7.1) that forms the cutting edge (6, 8), said face being oriented in a plane (E), enclosing the cutting edge (6, 8), transversely relative to the movement of the first blade element (5) when the machine element (4) is rotating.

16. Cutting device according to claim 15, characterized by at least two first and/or second blade elements (5, 7).

17. Cutting device according to claim 16, characterized in that the cutting edge (6) of the at least one first blade element (5) is oriented with its longitudinal extension in the direction of the machine axis (3) of the one machine element (4) and, when the machine element is rotating, is moved on a circular cylinder surface enclosing said machine axis (3).

18. Cutting device according to claim 17, characterized in that the first machine element (4) and/or the second machine element (4a) are a blade shaft or a drum-like operating element, for example a labeling drum or vacuum drum of a labeling machine.

* * * * *