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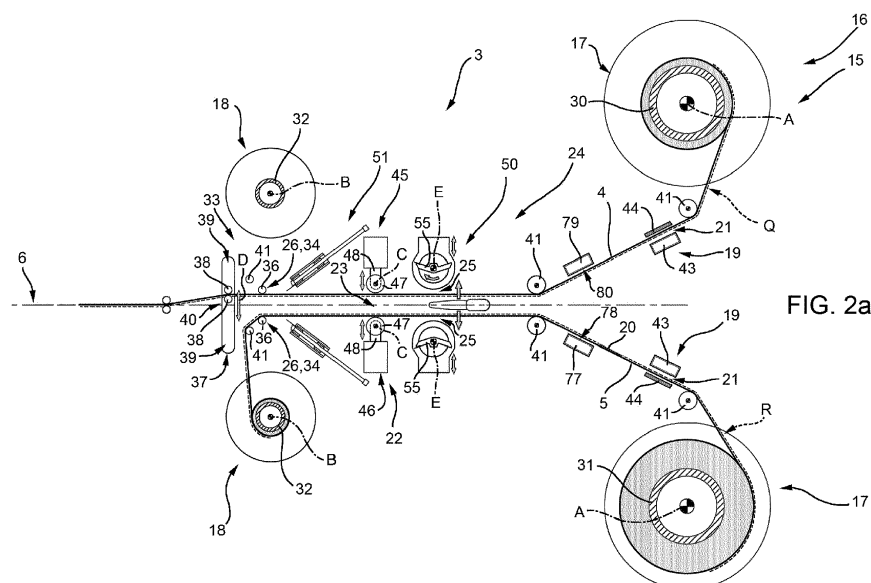
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(54) **METHOD AND APPARATUS FOR SPLICING WEBS**

(57) There is described a method of splicing a new web (5, 4) to a web in use (4, 5) comprising a first advancement phase during which the web in use (4, 5) is advanced at a working advancement speed along a working advancement path (Q), a second advancement phase during which the new web (5, 4) is advanced along an auxiliary path (R) at a splicing advancement speed being substantially equal to the working advancement speed and a bonding phase during which the web in use (4, 5) and the new web (4, 5) are bonded to one another. The method also comprises at least one of a web in use

cutting phase during which the web in use (4, 5) is cut by means of a respective blade element (56) while the respective blade element (56) advances, at least during the cutting of the web in use (4, 5) at a speed being at least equal to the working advancement speed and a new web cutting phase during which the new web (5, 4) is cut by means of a respective blade member (69) while the respective blade member (69) advances, at least at the moment of cutting the new web (5, 4) at a speed being at least equal to the working advancement speed.



Description

TECHNICAL FIELD

[0001] The present invention relates to a method for splicing webs, in particular webs of labeling material. In particular, the present invention relates to a method for splicing a web in use with a new web without reducing the advancement speed of the web in use.

[0002] Furthermore, the present invention relates to an apparatus for splicing webs, in particular webs of labeling material. In particular, the present invention relates to an apparatus for splicing a web in use with a new web without reducing the advancement speed of the web in use.

BACKGROUND ART

[0003] It is known in the art, that there are different types of labeling machines for applying label sheets onto receptacles, such as bottles, containers or the like.

[0004] Furthermore, it is known that there are different kinds of label types.

[0005] One typical label type is the so called "self-stick label", which is directly wrapped around at least part of the respective receptacle and glued thereto. The application of this kind of label typically relies on advancing a web of labeling material towards a cutting station at which the single labels are obtained from the web of labeling material by cutting the web of labeling material at the cutting station. These labels are often also referred to as roll-fed-labels.

[0006] Another typical label type, used with in particular beverage bottles or vessels, is the label commonly known as "sleeve label", which is formed in a tubular configuration and then applied onto the respective article. The "sleeve label" is obtained from cutting a web of labeling material at a respective cutting station. Finally, after application of the "sleeve label" a heat shrinking operation is carried out to make the labels adhere onto the respective receptacles.

[0007] A further typical label type, are the "pressure-sensitive labels" (PLS), which are removably attached on a base web and which are detached from the base web prior to being applied onto the respective receptacles.

[0008] Typically, independently of the label type, a labeling machine comprises a labeling apparatus adapted to receive the web of labeling material, adapted to obtain single label sheets from the web of labeling material and adapted to apply the single label sheets onto the receptacles and a web conveying apparatus for providing for and for conveying the web of labeling material to the labeling apparatus.

[0009] A typical web conveying apparatus comprises a first reel unit for containing a first reel of wound-up web of labeling material and a conveying device for conveying the web of labeling material along a web advancement path from the first reel to labeling apparatus. In other

word, the conveying device is adapted to convey a web in use to the labeling apparatus.

[0010] During a typical labeling process the quantity of web of labeling material wound-up onto the first reel is sufficient for labeling receptacles for about 20 to 30 minutes. This is, why typically, a web conveying apparatus also comprises a second reel unit for containing a second reel of wound-up web of labeling material and a splicing unit for splicing the web of labeling material in use (the web of labeling material from the first reel) with a new web of labeling material (the web of labeling material from the second reel).

[0011] A typical splicing unit comprises a cutting assembly for cutting the web in use at a cutting station and a bonding assembly for bonding the new web of labeling material and the web of labeling material in use with one another at a bonding station. The bonding station being arranged downstream from the cutting station along the web advancement path.

[0012] The bonding assembly comprises e.g. two pad elements one adapted to interact with the web in use and the other one adapted to interact with the new web. As well, each pad element is fluidically connected to an aspiration source. Furthermore, the pad elements are adapted to linearly move from a rest position to an operative position for bringing the web of labeling material in use and the new web of labeling material into contact with one another.

[0013] In use, prior to the actual bonding operation an operator fixes a bi-adhesive tape onto the trailing edge of the new web of labeling material and places the trailing edge of the new web onto the respective pad element, which retains the new web of labeling material in the area of the trailing edge by means of aspiration. Then, by moving simultaneously the two pad elements from the respective rest position to the respective operative position, the web in use and the new web are bonded to one another by means of the bi-adhesive tape. After the bonding, the web in use is cut at the cutting station and the new web is advanced to the labeling apparatus (the new web becomes the web in use).

[0014] A drawback is that it is required to slow down the advancement of the web in use (and therewith the labeling process) for executing the bonding of the web in use and the new web with one another. The slowing down is undesired as the overall production time increases.

[0015] This becomes even more critical with respect to the new compact receptacle processing machines, which have become popular in the recent years. Typically, such machines comprise a blow molding apparatus for producing the receptacles, a filling apparatus for filling the receptacles, a labeling apparatus for labeling the receptacles and a capping apparatus for closing the receptacles, all of which operating at the same processing speed (they are in a blocked configuration).

[0016] The latter drawback has been intended to be circumvented by providing for that the pad elements are

adapted to rotate around a respective rotation axis so that, in use, the pad elements perform an arc-shaped movement when getting into contact with the web in use and the new web during the bonding.

[0017] Even though such an approach allows higher web advancement speeds during web splicing compared to the first web conveying apparatus described above, there is the need to achieve even higher web advancement speeds.

DISCLOSURE OF INVENTION

[0018] It is therefore an object of the present invention to provide a method to overcome, in a straightforward and low-cost manner, at least one of the aforementioned drawbacks.

[0019] According to the present invention, there is provided a method as claimed in claim 1.

[0020] Preferred embodiments of the present invention are claim in the respective dependent claims.

BRIEF DESCRIPTION OF THE DRAWINGS

[0021] One non-limiting embodiment of the present invention will be described by way of example with reference to the accompanying drawings, in which:

Figure 1 is a schematic top view of a labeling machine having a web advancement and splicing apparatus according to a first embodiment and according to the present invention, with parts removed for clarity;

Figure 2a to 2e is a schematic view of the web advancement and splicing apparatus of Figure 1 during differing operational steps, with parts removed for clarity;

Figure 3 is a perspective view of a detail of the web advancement and splicing apparatus of Figure 1 and Figures 2a to 2e, with parts removed for clarity;

Figure 4 is a perspective view of a further detail of the web advancement and splicing apparatus of Figure 1 and Figures 2a to 2e, with parts removed for clarity;

BEST MODES FOR CARRYING OUT THE INVENTION

[0022] Number 1 in Figure 1 indicates as a whole a labeling machine adapted to apply label sheets onto receptacles 2 advancing along an advancement path P.

[0023] The labeling machine 1 comprises:

- a web conveying and splicing apparatus 3 adapted to convey a web of labeling material 4 or a web of labeling material 5 to a delivery station 6 and being adapted to splice, in particular in the case of exhaustion of respectively web 4 or web 5, web 5 to web 4 or web 4 to web 5;
- a labeling apparatus 7 adapted to receive web 4 or

web 5 at delivery station 6 and adapted to obtain single label sheets from web 4 or web 5 and for applying, in use, the single label sheets onto receptacles 2 during their advancement along path P.

[0024] In the present case, web 4 and web 5 each comprises a repeated pattern (not shown), in particular the repeated pattern defining the single label sheets obtainable from respectively web 4 and web 5. More specifically, web 4 and web 5 are provided with the same repeated pattern. In other words, web 4 and web 5 allow for application of the same label sheets onto receptacles 2.

[0025] Furthermore, in the present description, web 4 and web 5 are of the type for providing for label sheets of the self-stick type, which become applied to receptacles 2 by means of an adhesive applied directly onto the label sheets and/or onto receptacles 2.

[0026] However, it must be understood that the description will refer to this kind of web without any limitative scope. It must be further understood, that the present invention can be executed also with any other kind of web, in particular any kind of web of labeling material, such as e.g. a web of labeling material having a base layer and a plurality of label sheets removably attached to the base layer (commonly known as "pressure-sensitive labels") or with a web of labeling material being of a heat-shrinkable material (for "sleeve labels").

[0027] In more detail, labeling apparatus 7 comprises:

- a conveyor device, in particular a conveying carousel 8 adapted to advance receptacles 2 along path P, in particular path P being arc-shaped;
- a cutting unit 9 for cutting the label sheets from web 4 or web 5; and
- a transfer device 10 adapted to transfer the label sheets to a label application station at which the label sheets are applied onto respective receptacles 2; and
- a glue application unit 11 adapted to apply a pattern of glue onto the backside of the label sheets and/or onto the outer surface of receptacles 2 prior to the application of the label sheets onto the receptacles 2.

[0028] With particular reference to Figures 2a to 2e, web conveying and splicing apparatus 3 is adapted to splice a web in use and a new web to one another. In the particular example shown in Figures 2a to 2e, web 4 is the web in use and web 5 is the new web. However, it must be understood that after any splicing process the new web becomes the web in use, as specifically shown in Figure 2e.

[0029] In the following, we refer for reasons of simplicity to web in use 4 and new web 5. However, it must be considered that the description also refers to web 5 being the web in use and web 4 being the new web.

[0030] In more detail, web conveying and splicing apparatus 3 comprises:

- a web magazine unit 15 for providing for web in use 4 and new web 5;
- an advancement device 16 adapted to at least continuously advance the web in use 4 at a working advancement speed along a working advancement path Q from a respective storing station 17 to delivery station 6 and being adapted to advance new web 5 along an auxiliary path R, in particular from the respective storing station 17 to a collection station 18; and
- an application device 19 adapted to apply a bonding element 20, in particular a bi-adhesive tape, onto (a segment of) new web 5 at an application station 21, in particular application station 21 being interposed between the respective storing station 17 and collection station 18 along path R;
- a bonding device 22 adapted to adhesively bond web in use 4 together with new web 5 at a bonding station 23 by attaching bonding element 20 also to (a segment of) web in use 4, in particular bonding station 23 being arranged between station 17 and respectively station 6 and station 18 along respectively path Q and path R, even more particular station 23 is positioned downstream of application station 21 along path R; and
- a cutting device 24 adapted to cut web in use 4 at a first cutting station 25, in particular cutting station 25 being arranged upstream of bonding station 23 along path Q; and being adapted to cut new web 5 at a second cutting station 26, in particular second cutting station 26 being positioned downstream of bonding station 23 along path R and/or path Q.

[0031] Preferentially, apparatus 3 also comprises a control unit 27 adapted to control at least operation of apparatus 3 itself.

[0032] In particular, control unit 27 is at least adapted to detect the respective pattern and/or a respective mark provided on web in use 4 and new web 5. Furthermore, control unit 27 is adapted to detect bonding element 20 applied to new web 5. As will be explained in more detail further below, control unit 27 is also adapted to activate bonding device 22 in function of an analysis on whether a possible activation of bonding device 22 leads to a correct or incorrect bonding of new web 5 with web in use 4.

[0033] With particular reference to Figures 2a to 2e, web magazine unit 15 is adapted to removably receive a first reel 30 carrying wound-up web 4 and a second reel 31 carrying wound-up web 5. In particular, unit 15 is adapted to receive and to house reel 30 and reel 31 at the respective station 17 and such that reel 30 and reel 31 are rotatable around respective central axes A, in particular axes A having a vertical orientation.

[0034] With particular reference to Figures 2a to 2e, advancement device 16 is configured such that path R is distinct from path Q, in particular prior to bonding new

web 5 with web in use 4. In other words, path R and path Q are distinct from one another, in particular prior to activation of bonding device 22.

[0035] Preferably, path R and path Q are parallel to each other at least in the area of bonding station 23.

[0036] Preferentially, advancement device 16 is adapted to advance web in use 4 at a working advancement speed of 20 to 320 meters per minute, in particular of 60 to 280 meters per minute.

[0037] Advancement device 16 is furthermore adapted to advance, in use, new web 5 at a splicing advancement speed equal to the working advancement speed of web in use 4.

[0038] In particular, device 16 is adapted to accelerate, in use, new web 5 to the splicing advancement speed equal to the working advancement speed.

[0039] Even more particular, device 16 is adapted to accelerate, in use, new web 5 to the splicing advancement speed equal to the working advancement speed from a resting position of new web 5 as will be described in more detail further below.

[0040] Preferably, device 16 is adapted to accelerate, in use, new web 5 to the advancement speed equal to the working advancement speed so that, in use, during activation of bonding device 22 web in use 4 and new web 5 advance at the same speed, in particular at the same speed and the same pitch, along respectively path Q and path R.

[0041] Preferably, advancement device 16 is also configured to advance web in use 4 and new web 5 at the same pitch (i.e. once new web 5 and web in use 4 are bonded to one another, the patterns provided on web in use 4 and new web 5 overlap one another).

[0042] Preferentially, advancement device 16 is also configured such that prior or during acceleration of new web 5 to the respective advancement speed the working advancement speed of web in use 4 is (substantially) not altered. In particular, by accelerating, in use, new web 5 to the splicing advancement speed equal to the unaltered working advancement speed it is possible to splice, in use, new web 5 to web in use 4 without influencing operation of labeling apparatus 7.

[0043] In further detail, advancement device 16 comprises at least a first drive unit, in particular an electrical motor (not shown) and at least a second drive unit, in particular an electrical motor (not shown), each one adapted to actuate rotation of respectively reel 30 and reel 31 around the respective axis A.

[0044] Furthermore, device 16 comprises at least one collection device arranged at station 18 and being adapted to advance new web 5, in particular in collaboration with unit 15, along path R and to collect new web 5.

[0045] In particular, the collection device comprises a wind-up roller 32 arranged at station 18 and being rotatable around a central axis B. The collection device also comprises at least one drive assembly, in particular an electrical motor (not shown), adapted to actuate rotation of roller 32 around axis B.

[0046] More specifically roller 32 is adapted to receive a new web 5, in particular a leading edge of new web 5. Roller 32 is also adapted to, in use, wind-up new web 5 with new web 5 advancing along path R.

[0047] In particular, new web 5 extends from reel 30 positioned at the respective station 17 to roller 32. In other words, reel 31 positioned at the respective station 17 and roller 32 at least partially define in collaboration path R.

[0048] Preferably, the drive assembly and the second drive unit are adapted to control and/or actuate advancement of new web 5 along path R, in particular by simultaneously actuating rotation of respectively roller 32 around axis B and reel 31 around axis A.

[0049] Preferentially, advancement device 16 also comprises a deflection assembly 33 adapted to deviate/deflect web in use 4 at a deflection station 34 downstream of bonding station 23 along path Q and/or to deviate/deflect new web 5 at deflection station 34 downstream of bonding station 23 along path R.

[0050] In particular, deflection assembly 33 is adapted to deviate/deflect, in use, in particular prior to activation of cutting device 24 cutting new web 5 at station 26, web in use 4 so as to define a main portion Q1 of path Q and an auxiliary portion Q2 of path Q downstream of portion Q1 along path Q. Even more particular, portion Q2 and portion Q1 define an obtuse angle 35.

[0051] In further detail, deflection assembly 33 comprises at least a guide element, in particular a deflection roller 36, adapted to guide at least web in use 4 at deflection station 34.

[0052] Preferentially, the guide element, in particular deflection roller 36, is arranged, in particular rotatably arranged, at station 34.

[0053] Preferably, web in use 4 is in position against the guide element, in particular deflection roller 36, at deflection station 34.

[0054] Preferentially, deflection assembly 33 also comprises a control group 37, in particular a pair of deflection rollers 38; and an actuation group (not shown) adapted to move control group 37, in particular the pair of guide rollers 38 into a direction D. Preferably, direction D being transversal to axes A (and to axes B); and direction D being also transversal to web in use 4. In other words, direction D is also transversal to the direction of advancement of web in use 4.

[0055] More specifically, the actuation group is adapted to control control group 37, in particular the pair of deflection rollers 38 between at least two lateral positions 39 and at least a central position 40.

[0056] In other words, deflection assembly 33, in particular the actuation group, is adapted to at least partially define path Q, in particular to define portion Q2, by defining the exact position of control group 37.

[0057] In further detail, advancement device 16 also comprises a plurality of auxiliary rollers 41 interposed between stations 17 and respectively station 6 and station 18 along respectively path Q and path R.

[0058] With particular reference to Figures 2a to 2e,

application device 19 is configured to apply the respective bonding element 20 onto new web 5 with new web 5 being at rest (i.e. new web 5 is not advanced along path R, but extends between the respective station 17 and station 18).

[0059] In more detail, application device 19 comprises a deposition assembly 43 containing or adapted to receive at least one, preferably a plurality, of bonding elements 20 and being adapted to place at least one bonding element 20 onto new web 5. In particular, deposition assembly 43 is adapted to be controlled between a rest configuration at which deposition assembly 43 is idle (on rest) and an operative configuration at which deposition assembly 43 is designed to place the respective bonding element 20 onto new web 5.

[0060] Preferentially, application device 19 also comprises a counter surface 44 adapted to cooperate with deposition assembly 43 for securely applying the respective bonding element 20 onto new web 5. In particular, counter surface 44 and deposition assembly 43 are arranged such that new web 5 is interposed between counter surface 44 and deposition assembly 43. Furthermore, deposition assembly 43 when being in the operative configuration is adapted to apply bonding element 20 to new web 5 and to exert a force towards counter surface 44 so as to bring new web 5 into contact with counter surface 44.

[0061] With particular reference to Figures 2a to 2e, bonding device 22 comprises at least a first interaction assembly 45 adapted to interact with web in use 4 and at least a second interaction assembly 46 adapted to interact with new web 5.

[0062] More specifically, interaction assembly 45 and interaction assembly 46 are adapted to approach in collaboration with one another web in use 4 and new web 5 towards one another at station 23 and to sandwich web in use 4, bonding element 20 and new web 5 in between themselves for adhesively coupling web in use 4 and new web 5 to one another.

[0063] Even more specifically, interaction assembly 46 is adapted to move new web 5 towards web in use 4 and interaction assembly 45 is adapted to at least contact web in use 4 and, preferably, to also move web in use 4 towards new web 5, in particular for coupling, in use, bonding element 20 also to web in use 4.

[0064] In further detail, interaction assembly 45 and interaction assembly 46 each comprise a respective interaction roller 47 rotatable around a respective central axis C and a respective actuation group 48 adapted to move the respective interaction roller 47 to or away from bonding station 23, in particular for moving respectively web in use 4 and new web 5 towards bonding station 23.

[0065] Preferably, interaction assembly 45 and interaction assembly 46 each comprise a respective driving assembly configured to rotate the respective interaction roller 47 around the respective axis C, in particular such that the surface speed of the respective interaction roller 47 (substantially) equals the working advancement

speed of web in use 4 (and the advancement speed of new web 5).

[0066] With particular reference to Figures 2a to 2e, 3 and 4; cutting device 24 comprises:

- a first cutting assembly 50 adapted to cut web in use 4 at cutting station 25; and/or
- a second cutting assembly 51 adapted to cut new web 5 at cutting station 26.

[0067] In more detail, with particular reference to Figure 3, cutting assembly 50 comprises:

- at least one carrier structure 55 rotatable around a rotation axis E;
- at least one blade element 56 connected to (carried by) carrier structure 55 and extending at least partially parallel to axis E; and
- a respective actuation group (not shown) adapted to actuate rotation of carrier structure 55 around axis E so as to actuate rotation of blade element 56 around axis E.

[0068] In further detail, actuation group is adapted to accelerate blade element 56 to a speed (substantially) equal to the working advancement speed, in particular so that blade element 56, in use, cuts web in use 4 when advancing at a speed being at least substantially identical to or higher than the working advancement speed of web in use 4, preferentially the speed being substantially identical to the working advancement speed.

[0069] In this way, unwanted forces possibly acting on web in use 4 during the cutting are significantly reduced as the interaction of blade element 56 with web in use 4 during the cutting does not lead to a deceleration action on the advancing web in use 4.

[0070] Preferably, each cutting assembly 50 is also configured in such a manner that the respective blade element 56 advances in the moment of cutting web in use 4 at cutting station 25 into a direction, which is substantially identical to the advancement direction of web in use 4. Thereby, the respective blade element 56 does not necessarily advance parallel to the advancement direction of web in use 4.

[0071] Preferentially, cutting assembly 50 also comprises a counter surface element 57, in use, arranged in the area of cutting station 25 and adapted to cooperate with blade element 56 for cutting, in use, web in use 4 at cutting station 25.

[0072] In more detail, carrier structure 55 comprises a rotatable shaft portion 58 being coaxially arranged to axis E and being coupled to the actuation group of assembly 24; and

- at least one wing portion 59 carrying blade element 56 and being connected to and protruding radial away from shaft portion 58 (i.e. wing portion 56 protrudes away from axis E).

[0073] Preferentially, carrier structure 55 also comprises a further wing portion 60 connected to shaft portion 58 and protruding away from shaft portion 58. In particular, wing portion 60 is similar to wing portion 59 and is designed such to guarantee that the center of gravity of carrier structure 55 is substantially positioned along axis E.

[0074] In more detail, blade element 56 comprises a plurality of jaws 61 defining a jaw-like structure of blade element 53.

[0075] In further detail, counter surface element 57 comprises a plurality of grooves 62 adapted to cooperate with jaws 61. In particular, grooves 62 are complementary to jaws 61. In other words, grooves 61 define a grooved structure of surface element 57 complementary to the jaw-like structure of blade element 56. Thus, in use, when blade element 56 cuts web in use 4 each jaw 61 at least partially enters (penetrates) one respective groove 62.

[0076] Preferentially, cutting assembly 50 also comprises a displacement assembly (not shown) adapted to move carrier structure 55 to or away from cutting station 25 for moving carrier structure 55 between a base position at which the respective blade element 56 is detached from cutting station 25 (blade element 56 is positioned such that any contact between web in use 4 and blade element 56 is avoided) and a cutting position at which the respective blade element 56 is placed at cutting station 25 (blade element 56 is adapted to cut web in use 4 at cutting station 25).

[0077] In particular, the displacement assembly of cutting assembly 50 is adapted to move, in use, carrier structure 55 into a direction transversal, even more particular perpendicular, to web in use 4.

[0078] In more detail, control unit 27 is adapted to control cutting assembly 50 at least into an active configuration, at which cutting assembly 50 is configured to cut web in use 4, or into an inactive configuration, at which cutting assembly 50 is detached from cutting station 25 (i.e. blade 56 is, in use, spaced apart from web in use 4, so as not to cut web in use 4) by controlling the displacement assembly cutting assembly 50.

[0079] In particular, cutting assembly 50 is controlled into its active configuration with carrier structure 55 being positioned at the cutting position; and cutting assembly 50 is controlled into its inactive configuration with carrier structure 55 being positioned at the base position.

[0080] Preferably, cutting assembly 50 also comprises a positioning assembly (not shown) adapted to move counter surface element 57 to or away from cutting station 25, in particular into a direction transversal, even more particular perpendicular, to web in use 4. In other words, positioning assembly 64 is adapted to move counter surface element 57 to or away from web in use 4. In particular, the positioning assembly is activated for defining the (correct) relative position between counter surface element 57 and blade element 56, in particular so that, in use, each jaw 61 penetrates into one respective

groove 62 during the cutting of web in use 4.

[0081] Preferentially, control unit 27 is adapted to set cutting assembly 50 into at least a first operation mode and into a second operation mode.

[0082] In a first operation mode, control unit 27 is configured to control cutting assembly 50 into the inactive configuration prior to activation of cutting assembly 50 and into an intermediate configuration prior to controlling cutting assembly 50 into the active configuration. When cutting assembly 50 is controlled into the intermediate configuration, the actuation assembly of cutting assembly 50 is activated for rotating blade element 56 around axis E and blade element 56 is still distanced from web in use 4. In other words, blade element 56 rotates, but does not cut web in use 4. This allows, in use, to accelerate blade element 56 to the respective advancement speed being at least equal to the working advancement speed while allowing for continuously rotating blade element 56 around axis E.

[0083] In more detail, in the first operation mode, cutting assembly 50 is controlled such that prior to the cutting carrier structure 55 is moved to the base position, the actuation assembly actuates rotation of carrier structure 55, in particular so that the advancement speed of blade 56 substantially equals the working advancement speed, and then carrier structure 55 is moved to the cutting position so that blade 56 cuts web in use 4.

[0084] In the second operation mode, control unit 27 is configured to control cutting assembly 50 such that prior to activation of rotation of blade element 56 (and of carrier structure 55), carrier structure 55 is arranged at the cutting position. Then, control unit 27 controls the actuation assembly to actuate rotation of blade element 56 around axis E. In particular, when carrier structure 55 is arranged at the cutting position, blade element 56 is arranged at an axial position (at a rest position), which allows to accelerate blade element 56 to the advancement speed substantially equal to the working advancement speed.

[0085] Preferably, control unit 27 is also configured such that after cutting web in use 4 at cutting station 25 (both in the first operation mode and the second operation mode; i.e. independent of the operation mode) blade element 56 is decelerated, in particular blade element 56 is set to rest, even more preferably blade element 56 is decelerated by reducing the rotation speed of blade element 56 around axis E until the complete interruption of rotation of blade element 56 around axis E.

[0086] With particular reference to Figures 2c, 2d and 4, cutting assembly 51 is configured such to cut new web 5 in the area of, in particular at, deflection station 34, in particular while cooperating with deflection assembly 33, even more particular while cooperating with the guide element, in particular deflection roller 36.

[0087] In other words, cutting station 26 is arranged in the area of deflection station 34, in particular cutting station 26 and deflection station 34 are substantially identical.

[0088] It must be noted, that, in use, (shortly) prior to cutting assembly 51 cutting new web 5 at cutting station 26, new web 5 being spliced to web in use 4 at bonding station 23 comprises an auxiliary web portion 68, which is transversally oriented with respect to web in use 4, in particular, which extends from cutting station 26 (or deflection station 34) to collection station 18.

[0089] In other words, auxiliary web portion 68 protrudes away, in use, from web in use 4.

[0090] In even other words, in use, new web 5 is deflected at cutting station 26 such that auxiliary web portion 68 protrudes away from web in use 4.

[0091] It should be noted that auxiliary web portion 68 being transversally oriented with respect to web in use 4 guarantees the presence of a vertex (a cutting edge) so as to cut new web 5 at cutting station 26 at the vertex (and, thereby avoiding to cut web in use 4). In particular, the vertex evolves in the area of deflection roller 36. Even more particular, the vertex is at least partially defined by cooperation of web in use 4 with deflection roller 36.

[0092] It should be furthermore noted that as web in use 4 and new web 5 are bonded to one another, new web 5 also comprises a main web portion 67 being at least partially parallel to web in use 4 between bonding station 23 and cutting station 26.

[0093] In particular, in use, at the moment of cutting assembly 51 cutting new web 5 at cutting station 26, auxiliary web portion 68 extends from cutting station 26 to collection station 18 and main web portion 67 extends between bonding station 23 and cutting station 26.

[0094] In other words, main web portion 67 and auxiliary web portion 68 define a respective angle and the respective vertex is positioned at station 26 (and/or station 34).

[0095] It must be further noted, that as a result of the splicing of web in use 4 and new web 5, path R of new 5 is dynamic (i.e. path R varies due to the advancement of web in use 4 along path Q, the coupling of new web 5 to web in use 4 and to the collection device, in particular to roller 32).

[0096] In more detail, cutting assembly 51 comprises:

- at least one blade member 69 adapted to cut new web 5 at cutting station 26; and
- an acceleration assembly 70 adapted to accelerate blade member 69 from a rest position towards and through cutting station 26 for cutting new web 5.

[0097] In particular, acceleration assembly 70 is adapted to accelerate blade member 69 such that blade member 69 cuts, in use, new web 5 tangential to deflection roller 36 at deflection station 34 and/or cutting station 26.

[0098] Even more particular, acceleration assembly 70 is configured such that the advancement speed of blade member 69 is at least equal to the splicing advancement speed (advancement speed of new web 5), preferably larger than the splicing advancement speed of new web 5 at the moment of cutting new web 5.

[0099] Preferably, acceleration assembly 70 is also adapted to decelerate blade member 69 after cutting of new web 5.

[0100] In even more detail, acceleration assembly 70 comprises:

- a linear motor 71 adapted to accelerate and advance blade member 69 along a rectilinear path S; and
- a support structure 72, in particular having an L-like shape, coupled to linear motor 71 and carrying blade member 69.

[0101] In particular, linear motor 71 is adapted to accelerate and to advance support structure 72 for accelerating and advancing blade member 69.

[0102] Preferably, support structure 72 comprises a longitudinal main portion 73 extending parallel to a main body 74 of linear motor 71; and a transversal portion 75 transversally arranged to main portion 73 and carrying blade member 69.

[0103] Furthermore, control unit 27 comprises at least a first detection sensor 77 adapted to detect a pattern and/or a mark provided on new web 5 at a detection station 78 upstream of bonding station 23 along path R.

[0104] Preferentially, control unit 27 also comprises at least a second detection sensor 79 adapted to detect a pattern and/or a mark provided on web in use at a detection station 80 upstream of bonding station 23 along path Q.

[0105] In further detail, detection sensor 77 is also adapted to detect bonding element 20 applied onto new web 5.

[0106] Preferentially, control unit 27 is adapted to calculate and/or to predict:

- based on the pattern and/or mark detected by detection sensor 77 and the bonding element 20 detected by detection sensor 77, in particular the relative position of bonding element 20 with respect to the pattern and/or the mark;
- the working advancement speed of web in use 4; and
- the advancement speed of new web 5;

whether activation of bonding device 22 would result in a correct or incorrect splicing of new web 5 and web in use 4.

[0107] It must be noted that preferably a correct splicing is a splicing of new web 5 and web in use 4 so that the respective patterns of web in use 4 and new web 5 correctly or incorrectly overlap. The correct overlap is when the respective patterns substantially match each other and the incorrect overlap is when the patterns do not match each other. In other words, web in use 4 and new web 5 have the same pitch.

[0108] Control unit 27 is also adapted to calculate and/or to predict the correct or incorrect splicing based on the pattern and/or mark detected, in use, by detection sensor 79.

[0109] Furthermore, control unit 27 is adapted to activate bonding device 22 for splicing web in use 4 and new web 5 with one another in case of calculating and/or to predicting a correct splicing and it is adapted not to activate bonding device 22 in the case of calculating and/or to predicting an incorrect splicing. In this way, it is ensured that, in use, no erroneous splicing occurs.

[0110] Preferentially, control unit 27 is also adapted not to activate cutting device 24, in particular cutting assembly 50 and cutting assembly 51, in the case of control unit 27 calculating and/or to predicting, in use, an incorrect splicing.

[0111] In use, machine 1 applies label sheets onto receptacles 2 advancing along path P. In particular, apparatus 7 advances receptacles 2 along path P and simultaneously receives web in use 4 at station 6, cuts web in use 4 into single label sheets and applies the single label sheets on the respective receptacles 2.

[0112] In particular, apparatus 3 advances web in use 4 to delivery station 6. Even more particularly, web in use 4 advances along path Q from station 17 to station 6.

[0113] Web in use 4 is provided within magazine unit 15, in particular web in use 4 is wound-up onto reel 30. As after a given time web in use 4 exhausts, in order to extend operation of machine 1 without interruption, a splicing process of new web 5 to web in use 4 is activated.

[0114] Advantageously, with particular reference to Figures 2a to 2e, the splicing process of new web 5 to web in use 4 comprises:

- a first advancement phase during which web in use 4 is continuously advanced at the working advancement speed along advancement path Q, in particular from the respective station 17 to station 6;
- a second advancement phase during which new web 5 is advanced along path R at the splicing advancement speed being substantially equal to the working advancement speed; and
- a bonding phase during which web in use 4 and new web 5 are adhesively bonded to one another at bonding station 21.

[0115] The splicing process also comprises:

- a web in use cutting phase during which the web in use 4 is cut by means of the respective blade element 56 at cutting station 25 while the respective blade element 56 advances at a respective advancement speed being at least equal to the working advancement speed; and/or
- a new web cutting phase during which new web 5 is cut by means of the respective blade member 69 at a respective cutting station 26 while the respective blade member 69 advances at a respective advancement speed being at least equal to the working advancement speed, preferentially being larger than the working advancement speed.

[0116] Preferentially, the splicing comprises the web in use cutting phase and the new web cutting phase.

[0117] Preferably, the splicing process also comprises:

- an arrangement phase during which new web 5 is arranged, in particular between the respective station 17 and station 18, such that at least a portion of new web 5 is spaced apart and adjacent to the advancing web in use 4 in the area of bonding station 23; and
- an application phase during which bonding element 20 is applied onto new web 5 at application station 21.

[0118] In more detail, during the first advancement phase, advancement device 16 advances web in use 4 along path Q. In particular, the first drive unit of advancement device 16 actuates rotation of reel 30 around the respective axis A.

[0119] Preferentially, during the first advancement phase the working advancement speed remains substantially unvaried.

[0120] Furthermore, during the first advancement phase also a deflection sub-phase is executed during which deflection assembly 33 is controlled such that web in use 4 is deflected at station 34 so that web in use 4 advances portions Q1 and Q2 which define an obtuse angle 35. In particular, the deflection sub-phase is at least executed prior to the new web cutting phase.

[0121] In further detail, during the deflection sub-phase control group 37 is positioned such that web in use 4 is in contact with deflection roller 36 at deflection station 34.

[0122] In more detail, the second advancement phase advancement device 16 advances new web 5 at the splicing advancement speed along path R.

[0123] Preferably, during the second advancement phase an acceleration sub-phases is executed during which new web 5 is accelerated to the splicing advancement speed along path R. In particular, the acceleration sub-phase is executed during start of the second advancement phase.

[0124] In more detail, during the acceleration sub-phase advancement device 16 accelerates new web 5 to the splicing advancement speed which is substantially identical to the working advancement speed and advancement device 16 advances new web 5 along path R.

[0125] In particular, during the second advancement phase new web 5 is wound-up from reel 31 and is wound-on onto roller 32.

[0126] In even more detail, the second drive unit of advancement device 16 actuates rotation of reel 31 around the respective axis A and the drive assembly of the collection device actuates rotation of roller 32 around axis B.

[0127] During the second advancement phase and prior to the bonding phase new web 5 is continuously advanced at the splicing advancement speed being substantially identical to the working advancement speed.

[0128] Preferably, the splicing advancement speed equals the working advancement speed during the execution of the bonding phase.

[0129] In more detail, the bonding phase is executed such that the respective patterns of new web 5 and web in use 4 match one another after bonding of new web 5 and web in use 4.

[0130] In particular, with particular reference to Figure 2b, during the bonding phase web in use 4 and new web 5 are bonded to one another by attaching bonding element 23 also to web in use 4 at bonding station 23.

[0131] In more detail, during the bonding phase bonding device 22 approaches web in use 4 and new web 5 at bonding station 23 to one another until bonding element 20 also adheres to web in use 4.

[0132] In further detail, during the bonding phase interaction assembly 45 and interaction assembly 46 move web in use 4 and new web 5 towards one another, in particular interaction assembly 45 moves web in use 4 towards new web 5 and interaction assembly 46 moves new web 5 towards web in use 4.

[0133] In even further detail, during the bonding phase the respective interaction rollers 47 rotate around the respective axes C and the respective actuation group 48 moves the respective interaction rollers 47 towards one another. In particular, interaction rollers 47 rotate at speeds so that the respective surface speeds equal the working advancement speed and the splicing advancement speed.

[0134] In more detail, with particular reference to Figure 2c, the web in use cutting phase is executed during or after the bonding phase.

[0135] In particular, during the web in use cutting phase cutting assembly 51 cuts web in use 4 at cutting station 25 by the respective blade element 56.

[0136] Preferably, during cutting web in use 4 at the respective cutting station 25 blade element 56 advances at the respective advancement speed being at least substantially equal to the working advancement speed, preferentially being equal to the working advancement speed.

[0137] Preferentially, during the web in use cutting phase blade element 56 advances at least during the cutting of web in use 4 into a direction, which is substantially identical to the advancement direction of web in use 4. Thereby, the respective blade element 56 does not necessarily advance parallel to the advancement direction of web in use 4.

[0138] More specifically, during the web in use cutting phase blade element 56 rotates around axis E, in particular at a rotation speed so that the respective blade element 56 advances at the speed being at least substantially identical to the working advancement speed.

[0139] Even more specifically, during the web in use cutting phase the actuation assembly of cutting assembly 50 actuates rotation of carrier structure 55 around axis E so that blade element 56 cuts web in use 4, in particular in cooperation with counter surface element 57.

[0140] In particular, during the web in use cutting phase cutting assembly 50 is controlled by control unit 27 to operate in the first operation mode or the second operation mode.

[0141] In the first operation mode, cutting assembly 50 is controlled such that prior to the cutting of web in use 4 carrier structure 55 is moved to the base position, the actuation assembly actuates rotation of carrier structure 55 (cutting assembly 50 is set into the intermediate configuration), in particular so that the respective advancement speed of blade 56 substantially equals the working advancement speed, and then carrier structure 55 is moved to the cutting position so that blade 56 cuts web in use 4.

[0142] In the second operation mode, control unit 27 controls cutting assembly 50 such that prior to activation of rotation of blade element 56 (and of carrier structure 55), carrier structure 55 is arranged at the cutting position. Then, control unit 27 controls the actuation assembly to actuate rotation of blade element 56 around axis E. In particular, when carrier structure 55 is arranged at the cutting position, blade element 56 is arranged at the axial position so that the acceleration of blade element 56 leads to the respective advancement speed of the blade element 56 being substantially equal to the working advancement speed at least in the moment of cutting web in use 4.

[0143] Preferably, after cutting web in use 4 at cutting station 25 (both in the first operation mode and the second operation mode; i.e. independent of the operation mode) blade element 56 is decelerated, in particular blade element 56 is set to rest, even more preferably blade element 56 is decelerated by reducing the rotation speed of blade element 56 around axis E until the complete interruption of rotation of blade element 56 around axis E.

[0144] In more detail, with particular reference to Figures 2b and 2c, the new web cutting phase is executed during or after the bonding phase, preferentially after the bonding phase.

[0145] In particular, during the new cutting phase cutting assembly 51 cuts new web 5 at cutting station 26.

[0146] Even more particular, during the new web cutting phase blade member 69 is accelerated, in particular by acceleration assembly 70, from the respective rest position towards and through cutting station 26, in particular so that blade member 69 advances at an advancement speed being at least equal to, preferentially higher than the splicing advancement speed of new web 5 (and the working advancement speed of web in use 4) at the moment of cutting new web 5 at station 26.

[0147] In more detail, during the new web cutting phase blade member 69 is accelerated along path S, in particular being linear, into a direction being substantially identical to the advancement direction of web in use 4. During advancement of blade member 69 along path S, blade member 69 is not necessarily parallel to web in use 4. This leads to a significant reduction of detaching bonding

element 20 from new web 5 and/or web in use 4 when compared to a cutting against the advancement direction of web in use 4 and new web 5.

[0148] Preferentially, during the new web cutting phase and at least after the cutting of new web 5 at cutting station 26, blade member 69 advances parallel to web in use 4. In particular, after the cutting of new web 5 at cutting station 26 blade member 69 advances parallel to web in use 4 for a certain time needed to decelerate blade member 69.

[0149] In further detail, during the new web cutting phase and at the moment of cutting new web 5 at cutting station 26 new web 5 has auxiliary web portion 68 being transversal to web in use 4 and blade member 69 cuts new web 5 at the vertex, which results from auxiliary web portion 68 protruding away from web in use 4 at cutting station 26. In particular, new web 5 is cut by blade member 69 at the vertex while cooperating with deflection roller 36.

[0150] In other words, new web 5 is deflected away from web in use 4 at cutting station 26.

[0151] In the particular example shown in Figure 2e, during a first sub-phase of the new web cutting phase blade member 69 advances transversal to portion Q1 of path Q and during a second sub-phase of the new web cutting phase blade member 69 advances parallel to portion Q2 of path Q.

[0152] In particular, during the new web cutting phase at the moment of blade member 69 cutting new web 5, main web portion 67 and auxiliary web portion 68 define the respective angle with one another and the respective vertex is positioned at cutting station 26 (and at deflection station 34). I.e. blade member 69 cuts new web 5 at the respective vertex from which auxiliary web portion 68 and main web portion 67 extend.

[0153] Preferably, blade member 69 cuts new web 5 tangential to roller 36 at deflection station 34. In other words, blade member 69 cuts new web 5 at deflection station 34 when auxiliary web portion 68 extends from station 34 to collection station 18.

[0154] More specifically, linear motor 71 accelerates and advances blade member 69 along path S, in particular path S being substantially parallel to portion Q2 of path Q. Even more specifically, linear motor 71 accelerates blade member 69 by accelerating support structure 72.

[0155] Preferably, the splicing operation further comprises an analyzes phase, in particular executed prior to the bonding phase, during which it is calculated and/or predicted whether after execution of the bonding phase the new web and the web in use would result in a correct or incorrect splicing.

[0156] In particular, during the analyzes phase control unit 27 calculates and/or predicts whether the respective patterns of new web 5 and web in use 4 would match if the bonding phase is executed (correct splicing) or they would not match if the bonding phase is executed (incorrect splicing).

[0157] In more detail, during the analyzes phase at least detection sensor 77 detects the pattern and/or the mark on new web 5 and bonding element 20, in particular the relative positioning of bonding element 20 with respect to the pattern and/or the mark.

[0158] Furthermore, preferentially, during the analyzes phase control unit 27 calculates and/or predicts whether execution of the bonding phase would result in a correct or incorrect splicing, in particular whether the respective patterns of web in use 4 and new web 5 would match one another or not:

- based on the pattern and/or the mark detected by detection sensor 77 and the bonding element 20 detected by the detection sensor 77, in particular the relative position between bonding element 20 and the pattern and/or the mark;
- the working advancement speed of web in use 4; and
- the splicing advancement speed of new web 5.

[0159] Preferably, the calculation and/or the prediction is also based on the pattern and/or mark detected by detection sensor 79.

[0160] Preferably, if during the analysis phase it is predicted and/or calculated that the execution of the bonding phase would result in an incorrect splicing, the bonding phase will not be executed. In such a case also the web in use cutting phase and the new web cutting phases will not be executed. Then, the splicing operation will be repeated until web in use 4 and new web 5 are bonded to one another.

[0161] In the case that a correct splicing is predicted and/or calculated, the bonding phase and the web in use cutting phase and the new web cutting phase are regularly executed.

[0162] Preferentially, the splicing operation also comprises a positioning phase executed after the application phase and prior to the acceleration and advancement phase during which new web 5 is advanced to position bonding element 20 at a starting position, in particular upstream of bonding station 23, even more particular interposed between bonding station 23 and the respective station 17, along path R.

[0163] Preferably, control unit 27 controls positioning of bonding element 20, in particular based on the relative position of the pattern and/or the mark on new web 5 and bonding element 20 as detected by detection sensor 77.

[0164] In more detail, the starting position is chosen such to guarantee that the respective patterns of web in use 4 and new web 5 match once web in use 4 and new web 5 are bonded to one another. Preferably, the starting position is also chosen such that the splicing advancement speed of new web 5 is identical to the working advancement speed of web in use 4 when executing the bonding phase.

[0165] In other words, positioning of bonding element 20 is such that execution of the bonding phase and the execution of the acceleration and advancement phase

lead to a bonding of web in use 4 and new web 5 such that the respective patterns match.

[0166] In even other words, positioning of bonding element 20 is to ensure that the risk that the calculation and/or prediction of an incorrect splicing during the prediction phase is limited.

[0167] With particular reference to Figure 2e, after splicing of new web 5 to web in use 4, web 4 becomes the web in use and is further advanced to station 6.

[0168] Preferably, a loading phase is executed during which a new reel 30 having a wound-up web 4 is placed at the respective station 17. Then web 4 is arranged in the manner as described above between station 17 and station 18 so that web 4 is ready to be spliced to web 5. In other words, web 4 becomes the new web. The splicing of web 4 to web 5 is then executed according to the above described phases at the appropriate moment.

[0169] The advantages of apparatuses 3 according to the present invention will be clear from the foregoing description.

[0170] In particular, an advantage of apparatuses 3 resides in cutting of web in use 4 and new web 5 by respectively cutting assembly 50 and cutting assembly 51, which reduce tensional forces acting on respectively web in use 4 and new web 5 at the moment of cutting, in particular as the respective blade cutting web in use 4 and new 5 advance at a speed themselves which equals at least the working advancement speed.

[0171] Another advantage is that as blade element 56 of cutting assembly 50 cutting web in use 4 advances in the moment of cutting at the same speed as the web in use 4 it is possible to perform the splicing process without reducing the working advancement speed (and the splicing advancement speed).

[0172] A further advantage is that as blade member 69 advances at the moment of the cutting of new web 5 at a speed being higher than the splicing advancement speed (and therewith also of the working advancement speed) guaranteeing thereby to maintain the splicing advancement speed and the working advancement speed.

[0173] Furthermore, as blade member 56 advances at the moment of cutting web in use 4 into the same direction as web in use 4 no forces into the opposite direction act onto web in use 4 during its cutting.

[0174] Additionally, as blade member 69 advances during the new web cutting phase into the direction of new web 5 (and web in use 4) no forces act onto new web 5 into the direction opposite of the advancement direction. This also avoids the risk bonding element 20 detaching from new web 5 and/or web in use 4 when compared to a cutting against the advancement direction of web in use 4 and new web 5.

[0175] Furthermore, as the cutting of web in use 4 and/or new web 5 is such to have no influence on the advancement of web in use 4 and new web 5 the working advancement speed can be maintained constant. This is particularly advantageous in the new compact receptacle processing machines, which are known to operate

in a blocked configuration (i.e. the varying treatment machines of the compact receptacle processing machine operate at the same processing speed), as in these machines a reduction of the working advancement speed of web in use 4 would have significant influence on operation of the other treatment machines.

[0176] Clearly, changes may be made to apparatus 3 as described herein without, however, departing from the scope of protection as defined in the accompanying claims.

Claims

1. Method of splicing a new web (5, 4) to a web in use (4, 5) comprising:

- a first advancement phase during which the web in use (4, 5) is advanced at a working advancement speed along a working advancement path (Q);
- a second advancement phase during which the new web (5, 4) is advanced along an auxiliary path (R) at a splicing advancement speed being substantially equal to the working advancement speed; and
- a bonding phase during which the web in use (4, 5) and the new web (5, 4) are adhesively bonded to one another at a bonding station (21);

the method further comprises:

- a web in use cutting phase during which the web in use (4, 5) is cut by means of a respective blade element (56) at a respective cutting station (25) and during which the respective blade element (56) advances, at least during the cutting of the web in use (4, 5) at a speed being at least equal to the working advancement speed; and/or
- a new web cutting phase during which the new web (5, 4) is cut by means of a respective blade member (69) at a respective cutting station (26) while the respective blade member (69) advances, at least at the moment of cutting the new web (5, 4) at a speed being at least equal to the working advancement speed.

2. The method according to claim 1, wherein during the web in use cutting phase the blade element (56) advances at least during the cutting of the web in use (4, 5) into a respective direction, which substantially equals the advancement direction of the web in use; and/or
wherein during the new web cutting phase the blade member (69) advances at least during the cutting of the new web (5, 4) into a respective direction, which substantially equals the advancement direction of

the web in use (4, 5).

3. The method according to claim 1 or 2, wherein during the web in use cutting phase the respective blade element (56) cooperates with a respective counter surface (57) for cutting the web in use (4, 5).
4. The method according to claim 3, wherein the blade element (56) comprises a plurality of jaws (61) and the respective counter surface (57) comprises a plurality of grooves (62) complementary to the jaws (61); wherein during the web in use cutting phase and at the moment of cutting web in use (4, 5) each jaw (61) penetrates into one respective groove (62).
5. The method according to any one of the preceding claims, wherein during the web in use cutting phase the respective blade element (56) rotates around a respective rotation axis (E) at a rotation speed ensuring that at the moment of cutting the web in use (4, 5) the speed of the respective blade element (56) is at least substantially equal to the working advancement speed.
6. The method according to claim 5, wherein during the web in use cutting phase the blade element (56) is accelerated from a rest position so as to advance at the moment of cutting web in use (4, 5) at a speed being at least substantially equal to the working advancement speed.
7. The method according to claim 5, wherein during the web in use cutting phase a carrier structure (55) carrying the blade element (56) is moved to a base position so that the blade element (56) is detached from the cutting station (25), the blade element (56) is set to rotate around the rotation axis (E) by rotating the carrier structure (55) around the rotation axis (E) and the rotation speed is accelerated such that the advancement speed of the blade element (56) is at least substantially equal to the working advancement speed and, then, the carrier structure (55) is moved to a cutting position so that the blade element (56) cuts the web in use (4, 5) at the cutting station (25).
8. The method according to any one of the preceding claims, wherein during the new web cutting phase the blade member (69) advances along a linear path (S) through the respective cutting station (26).
9. The method according to claim 8, wherein during the new web cutting phase the blade member (69) is accelerated along the linear path (S), in particular by means of a linear motor (71), so that the advancement speed of the blade member (69) is at least substantially equal to the working advancement speed when cutting the new web (5, 4) at the respective cutting station (26).

10. The method according to claim 9, wherein during the new web cutting phase and after the cutting of the new web (5, 4) at the respective cutting station (26), the blade member (69) is decelerated. 5
11. The method according to any one of the preceding claims, wherein during the new web cutting phase and after the cutting of the new web (5, 4) at the respective cutting station (26), the blade member (69) advances at least for a certain time parallel to the web in use (4, 5). 10
12. The method according to any one of the preceding claims, wherein during the new web cutting phase and during the cutting of the new web (5, 4) at the respective cutting station (26) the new web (5, 4) and/or the web in use (5, 4) are advanced along respectively the working advancement path (Q) and the auxiliary advancement path (R) such at least an auxiliary portion (68) of the new web (5, 4) is trans- 15
versal to the web in use (4, 5) at the cutting station (26) and a vertex is present between the web in use (4, 5) and the new web (5, 4) at the cutting station (26); 20
wherein the blade member (69) cuts the new web (5, 4) at the vertex. 25
13. The method according to any one of the preceding claims, wherein during the advancement phase the web in use (4, 5) and/or the new web (5, 4) is/are 30
deflected at a deflection station (34) downstream of the bonding station (23) along respectively the web advancement path (Q) and the auxiliary advance-
ment path (R); and 35
wherein during the new web cutting phase the blade member (69) is accelerated towards and through the deflection station (34) so that the blade member (69) cuts the new web (5, 4) at the deflection station (34).
14. The method according to claim 13, wherein during the new web cutting phase the web in use (4, 5) is 40
guided at the deflection station (34) by a guide element arranged at the deflection station (34).
15. The method according to claim 13 or 14, wherein during the new web cutting phase the blade member (69) cuts the new web (5, 4) tangential to a deflection 45
roller (36) arranged at the deflection station (34).
16. The method according to any one of the preceding claims, wherein during the second advancement phase an acceleration sub-phase is executed during 50
which the new web (5, 4) is accelerated to the splicing advancement speed. 55

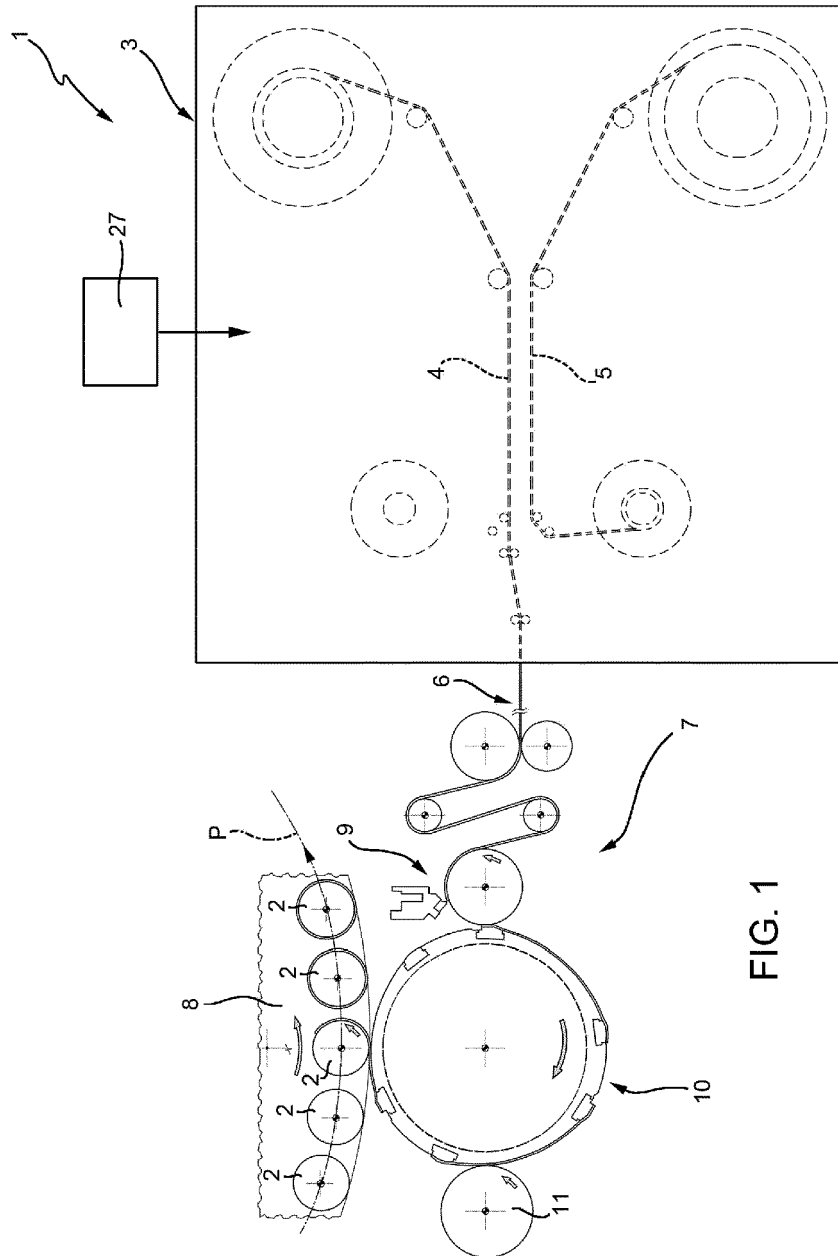
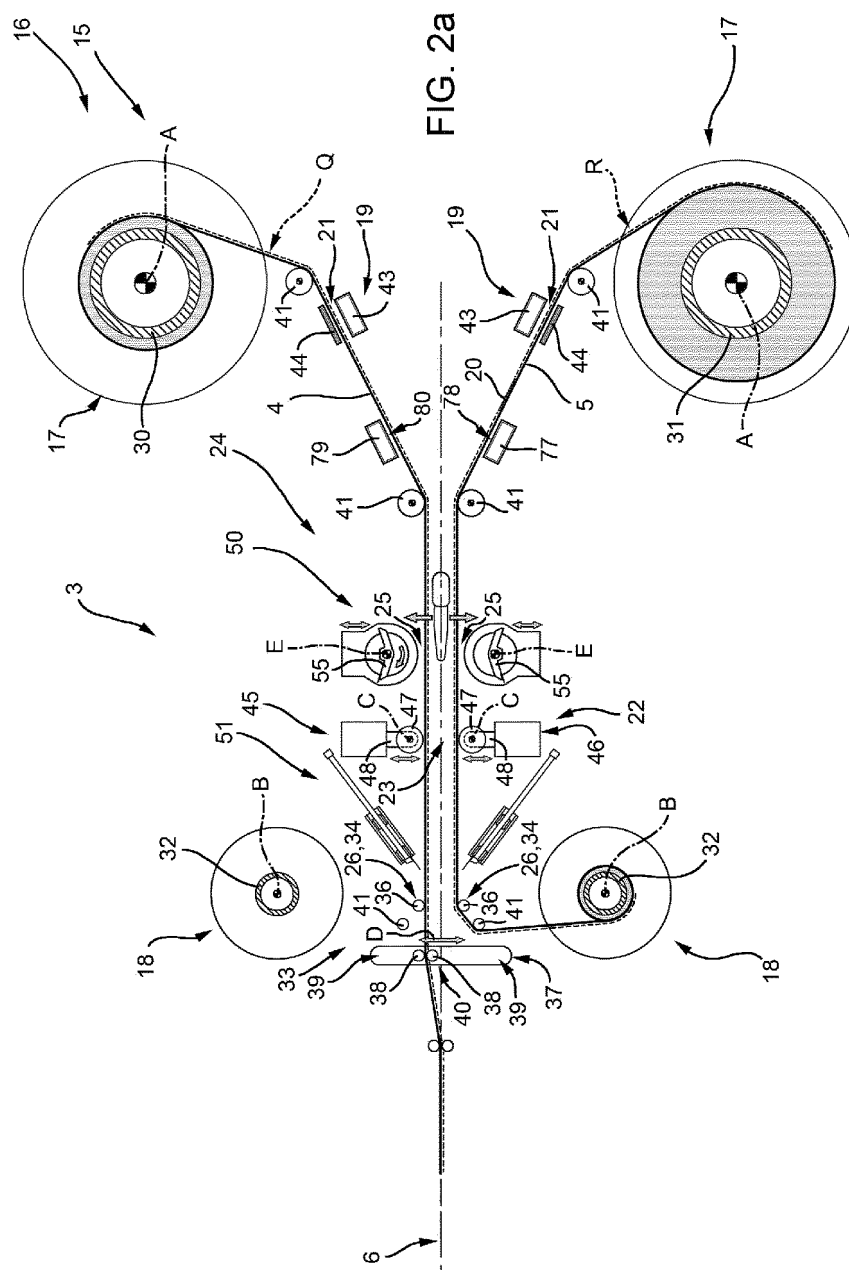
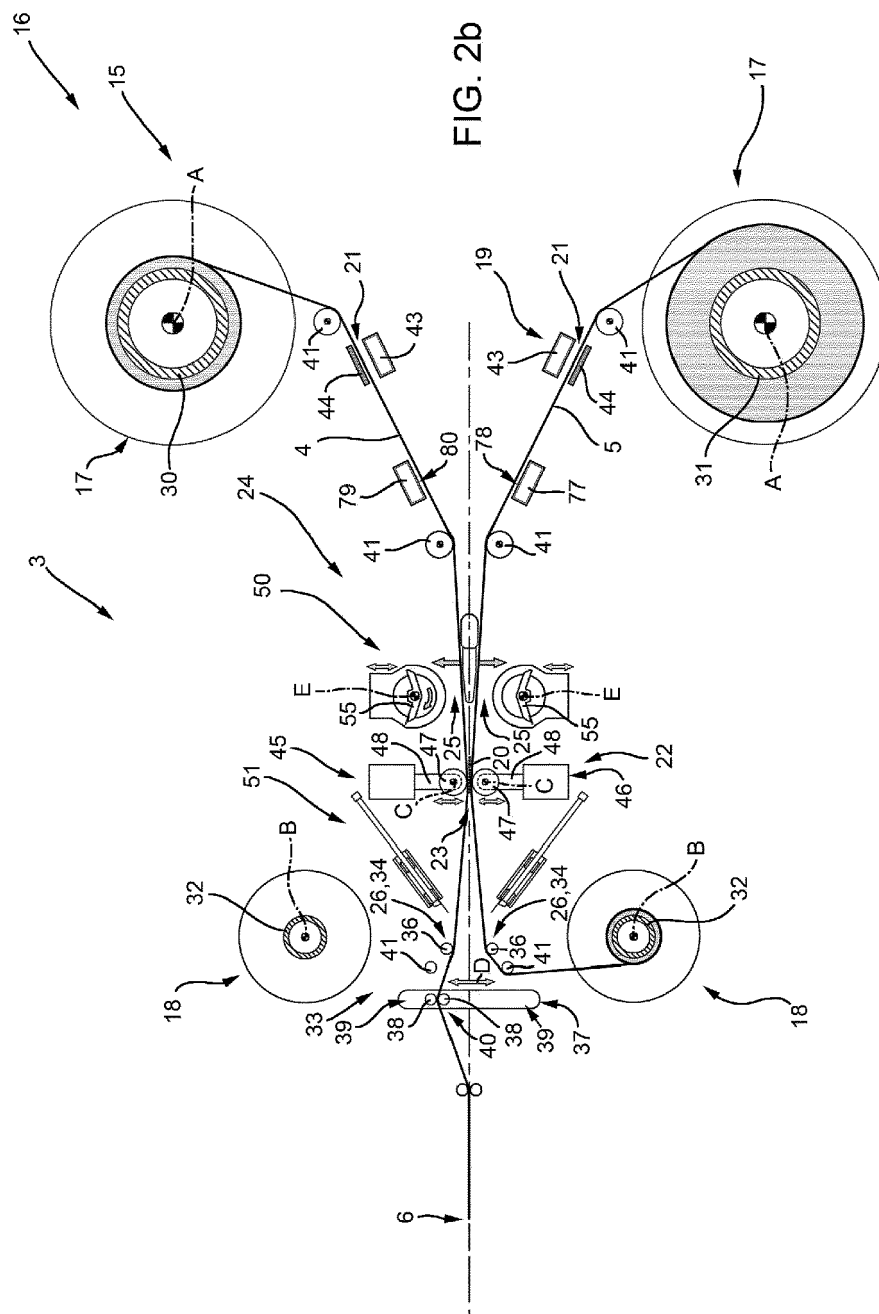
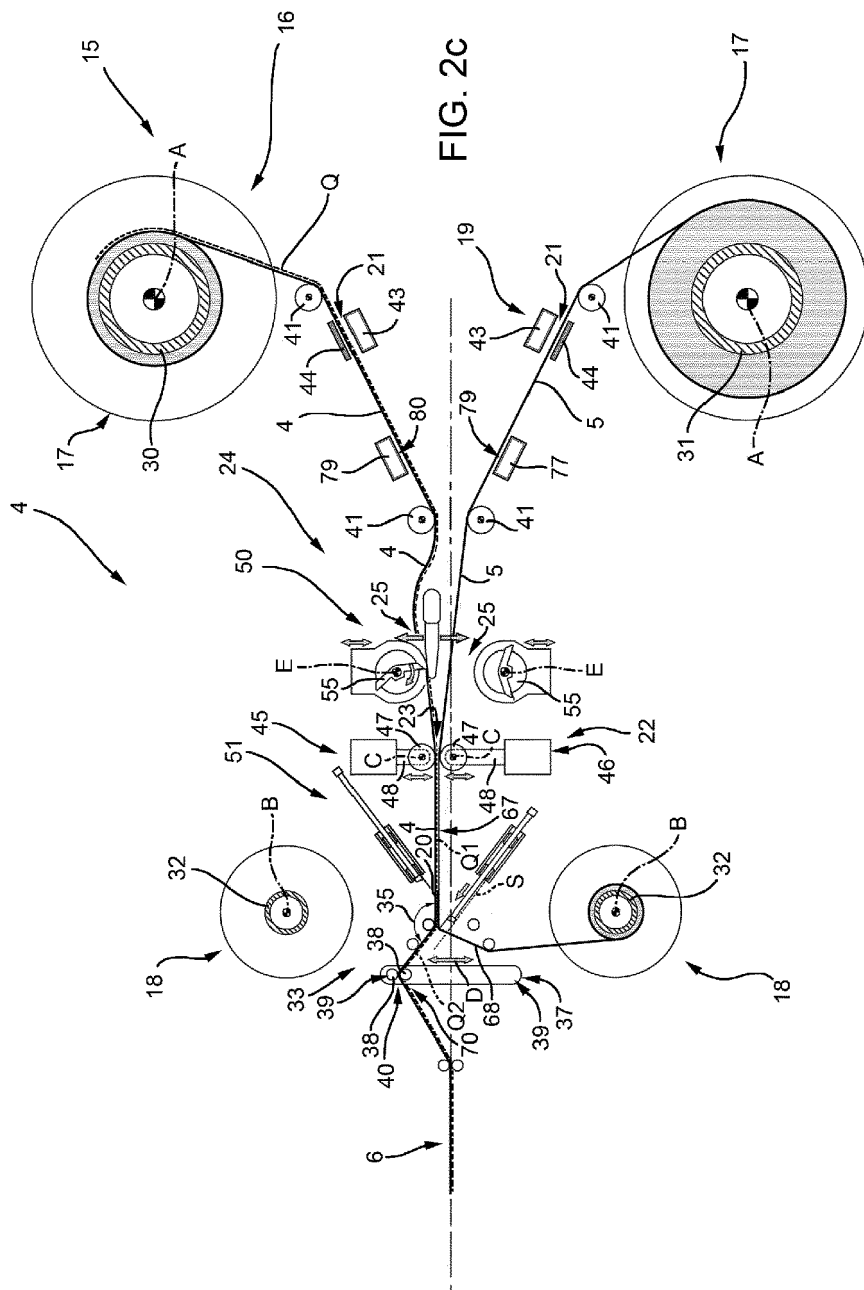
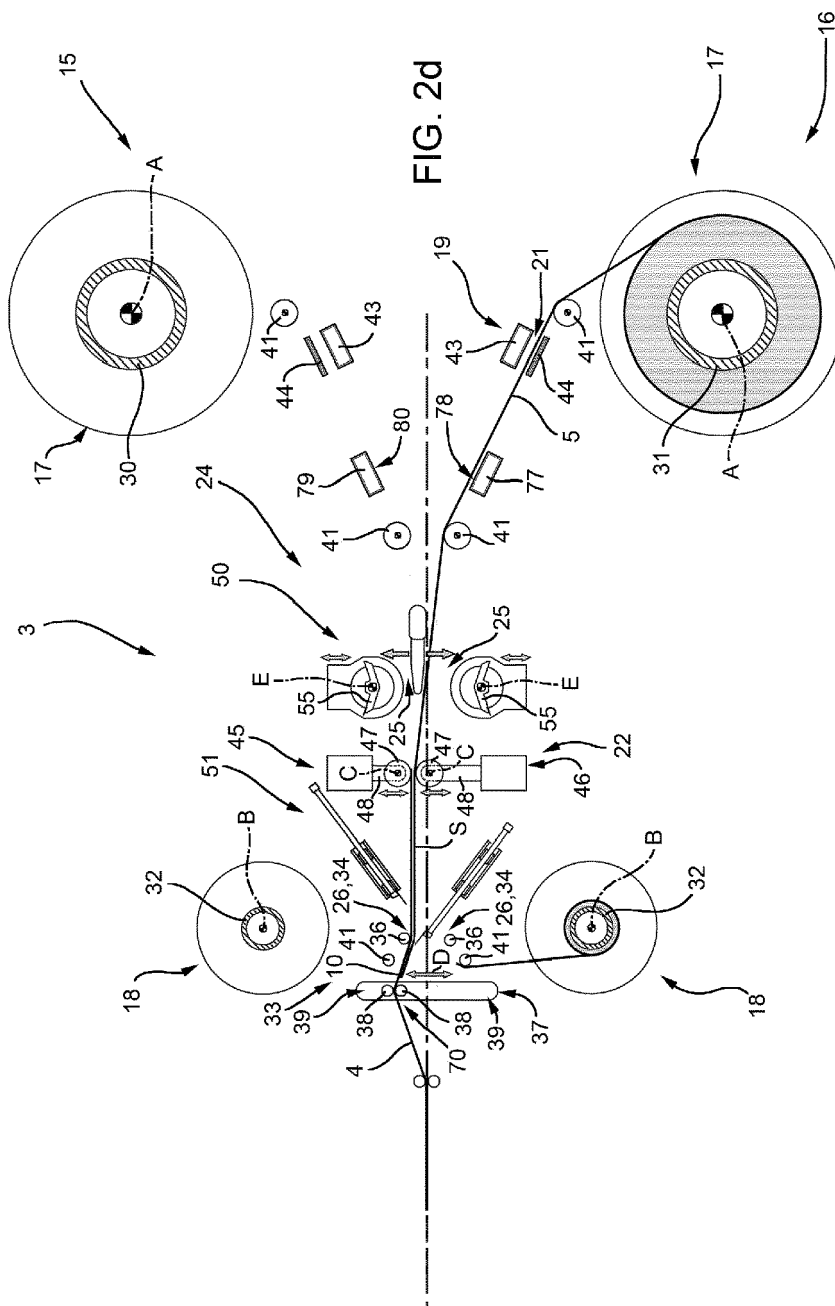


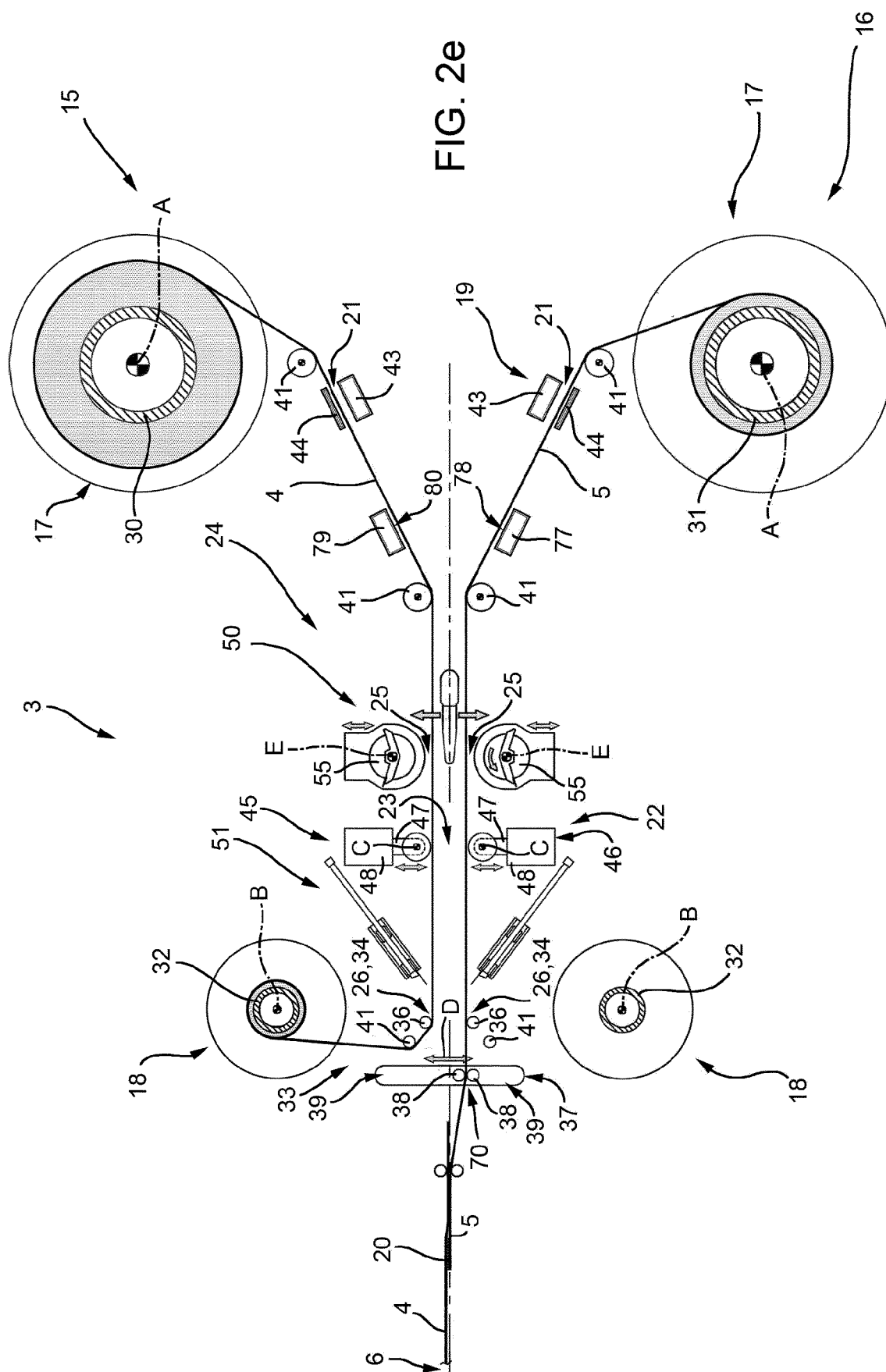
FIG. 1











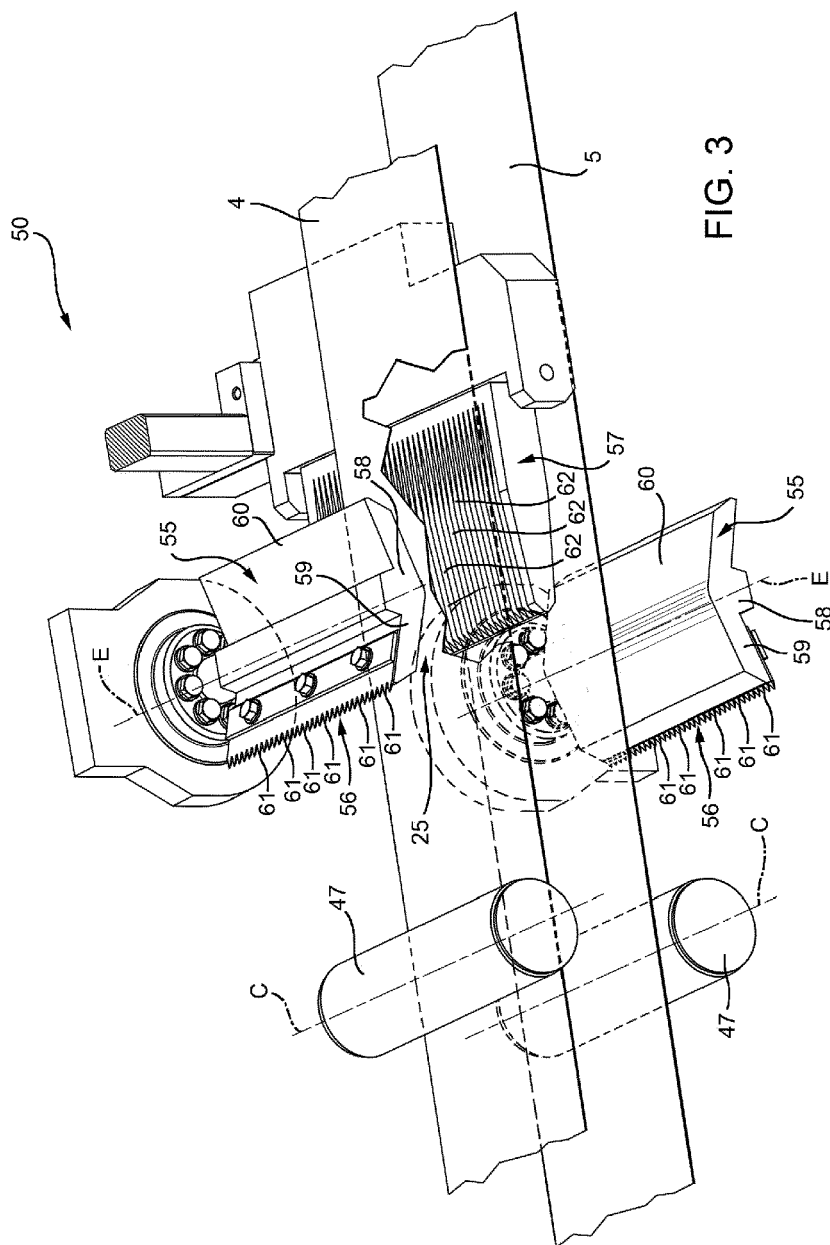


FIG. 3

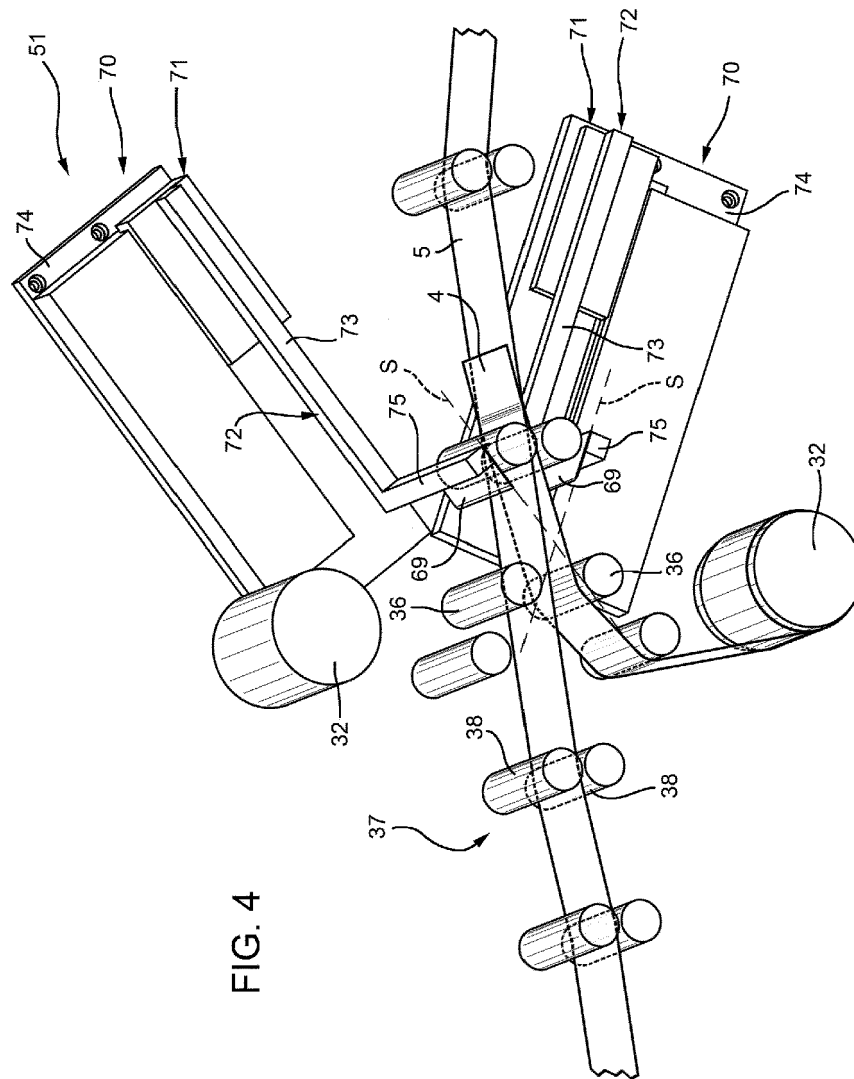


FIG. 4



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Application Number
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