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(54) LABEL PREPARATION MACHINE, LABELING APPARATUS HAVING A LABEL PREPARATION MACHINE, METHOD OF PREPARING LABELS AND METHOD OF APPLYING SINGLE LABEL SHEETS ONTO RECEPTACLES

(57) There is described a label preparation machine (6) for preparing decorated single label sheets (2) . The label preparation machine (6) comprises a conveying device (12) configured to (continuously) advance a web (13) of labeling material along a web advancement path (Q) and a light emitting unit (14) configured to decorate the, in use, advancing web (13) of labeling material and to cut single label sheets (2) from the, in use, advancing web (13) of labeling material at a decoration and cutting station (15).

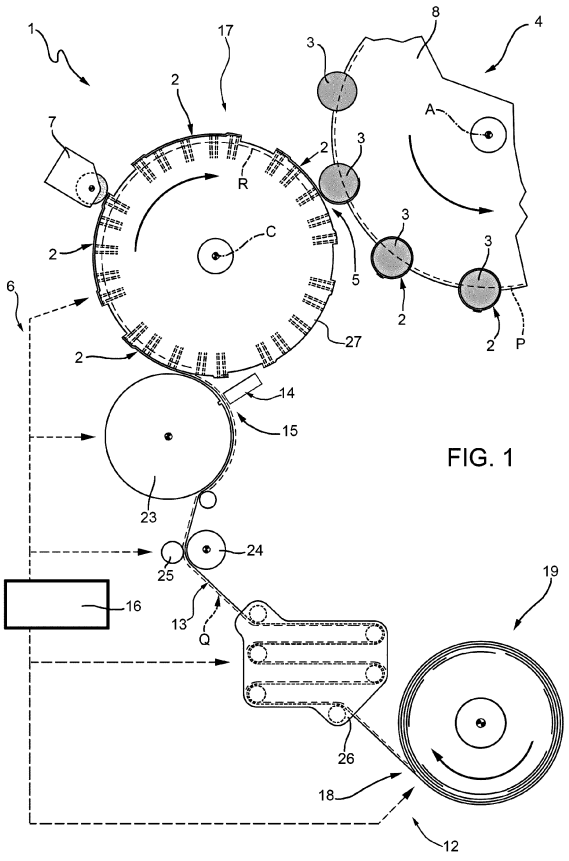

FIG. 1

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Description

TECHNICAL FIELD

[0001] The presen"t invention relates to a label preparation machine for preparing decorated single label sheets.

[0002] Advantageously, the present invention also relates to a labeling apparatus for applying decorated single label sheets onto receptacles, the labeling apparatus having a label preparation machine for preparing decorated single label sheets.

[0003] Advantageously, the present invention also relates to a method of preparing decorated label sheets.

[0004] Advantageously, the present invention also relates to a method of applying decorated single label sheets onto receptacles.

BACKGROUND ART

[0005] Labeling machines for the application of decorated single label sheets onto receptacles such as bottles, containers, cans or the like are known.

[0006] A typical type of labeling machine relies on using a continuous web of labeling material provided in the form of a roll. Such labeling apparatuses comprise at least a label preparation machine, which allows to obtain single label sheets from the web of labeling material, while the web of labeling material advances along a web advancement path. Therefore, the label preparation machine comprises a cutting unit for cutting the web of labeling material at a cutting station so as to obtain the single label sheets.

[0007] A typical cutting unit comprises at least one blade and at least one counter-blade, which are configured to cut in cooperation the web of labeling material. One of the blade and the counter-blade is fixed and the other one is mounted to a roller rotatable around a respective rotation axis.

[0008] An alternative cutting unit comprises a respective laser unit for cutting the web of labeling material by means of a laser light. Even though the use of such laser units allow for a flexible execution of the cutting steps in dependence of the advancing web of labeling material, it is also known that these laser units are, however, known to be rather bulky and occupy a significant space.

[0009] Furthermore, in the recent years, the desire and need to personalize the information and the visual images provided on the single label sheets has grown. One reason resides in the need to offer to the final consumer more and more possibilities to personalize the final appearance of the receptacles e.g. so that the appearance comprises a particular image or a particular photography or a particular written message. A further reason is related to the requirement to increase traceability of the product packaged within the receptacles. The personalization can e.g. be achieved by decorating the label sheets to be applied on the receptacles.

[0010] Therefore, some label preparation machines comprises a decoration unit configured to decorate the web of labeling material or the single label sheets at a decoration station, the decoration station being arranged upstream or downstream of the cutting station.

[0011] Some known decoration units comprise a laser device configured to activate photoactivatable pigments, which are incorporated into the web of labeling material and consequently into the single label sheets.

[0012] Other known decoration units comprise a laser device for ablating parts of the web of labeling material and/or the single label sheets so as to obtain the desired decoration.

[0013] Even though the known label preparation machines and the respective methods of preparing decorated single label sheets work satisfyingly well, a desire is felt in the sector to further improve the label preparation machines and their methods of operation, in particular so as to optimize the extension of the label preparation machines.

DISCLOSURE OF INVENTION

[0014] It is therefore an object of the present invention to provide in a straightforward and low-cost manner an improved label preparation machine.

[0015] Advantageously, it is another object of the present invention to provide in a straightforward and low-cost manner an improved labeling apparatus.

[0016] Advantageously, it is another object of the present invention to provide in a straightforward and low-cost manner an improved method of preparing decorated single label sheets.

[0017] Advantageously, it is another object of the present invention to provide in a straightforward and low-cost manner an improved method of applying labels onto receptacles.

[0018] According to the present invention, there is provided a label preparation machine as claimed in claim 1.

[0019] According to the present invention, there is also provided a labeling apparatus according to claim 9.

[0020] According to the present invention there is also provided a method of preparing decorated single label sheets according to claim 10.

[0021] According to the present invention there is also provided a method of applying decorated single label sheets onto receptacles according to claim 15.

[0022] Preferred embodiments of the labeling preparation machine, the labeling apparatus and the method of preparing decorated single label sheets are claimed in the respective dependent claims.

BRIEF DESCRIPTION OF THE DRAWINGS

[0023] Two non-limiting embodiments 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 apparatus having a label preparation machine according to a first embodiment of the present invention, with parts removed for clarity;

Figure 2 is a schematic sectioned view of a web of labeling material used in the labeling apparatus of Figure 1, with parts removed for clarity;

Figure 3 is a schematic view of a time-dependent power curve of a light beam used for the cutting and decoration of the web of labeling material, with parts removed for clarity;

Figure 4 is a perspective view of a detail of the label preparation machine of Figure 1, with parts removed for clarity; and

Figure 5 is a schematic top view of a portion of a labeling apparatus having a label preparation machine according to a second embodiment of the present invention, with parts removed for clarity.

BEST MODES FOR CARRYING OUT THE INVENTION

[0024] Number 1 in Figure 1 indicates as a whole a labeling apparatus for applying single label sheets 2 onto a plurality of receptacles.

[0025] The receptacles can be of any type including bottles 3, jars, vessels, cans, containers or the like, in particular being made of base components, like glass, paper or cardboard, plastics, aluminum, steel, and composites.

[0026] In particular, the receptacles are adapted to be filled and/or are filled with a pourable product, in particular a pourable food product and/or a pourable non-food product.

[0027] In the following, we limit the description to the specific example of bottles 2 adapted to be filled with any type of pourable food product such as carbonated liquids (e.g. sparkling water, soft drinks and beer), non-carbonated liquids (including still water, juices, teas, sport drinks, wine, edible oil, etc.) beverages containing pulps and granular media such as salt or sugar or bottles 2 being adapted to be filled with pourable non-food products such as (cleaning and/or washing) detergents, shampoo, shower gel, mineral oils and the like. However, it should be clear that the invention also relates to other types of receptacles. It should also be clear that the invention also relates to receptacles, which are adapted to be filled with other kinds of pourable products different from the above-mentioned ones.

[0028] In particular, each bottle 2 extends along a longitudinal axis and comprises a pouring/inlet opening allowing for the introduction and the outpouring of the pourable product respectively into and out of bottle 2.

[0029] With particular reference to Figure 1, labeling apparatus 1 comprises at least:

- a conveyor device 4 for advancing bottles 3 along a receptacle advancement path P and through a labeling station 5 at which at least one single label sheet 2 is applied onto each one of the advancing bottles 3; and
- a label preparation machine 6 for preparing decorated single label sheets 2, and in particular for feeding decorated single label sheets 2 towards and/or to labeling station 5.

[0030] Preferentially, labeling apparatus 1 also comprises a glue application device 7 configured to apply glue onto web 13 and/or single label sheets 2 and/or bottles 3 at a glue application station for allowing attachment of single label sheets 2 onto bottles 3. In the specific case shown, glue application device 7 is configured to apply glue onto single label sheets 2 prior to their application onto bottles 3.

[0031] In more detail, conveyor device 4 comprises at least one conveying carousel 8 rotatable around a rotation axis A and a plurality of retaining units (not shown and known as such) mounted to conveying carousel 8 and configured to retain one respective bottle 3 during advancement of the respective bottle 3 along receptacles advancement path P. Preferentially, each retaining unit is also configured to execute a rotation of the respective bottle 3 around the respective longitudinal axis during application of the respective label sheet 2.

[0032] With particular reference to Figure 1, labeling preparation machine 6 comprises at least:

- a conveying device 12 configured to (continuously) advance a web 13 of labeling material along a web advancement path Q, in particular from an initial station 18 to a decoration and cutting station 15; and
- a light emitting unit 14, in particular a laser light emitting unit, configured to decorate the, in use, advancing web 13 and to cut single label sheets 2 from the, in use, advancing web 13 at decoration and cutting station 15; in particular light emitting unit 14 is arranged at decoration and cutting station 15.

[0033] It should be noted that web 13 can already be partially decorated or web 13 can be completely void of any previous decoration.

[0034] Preferentially, labeling apparatus 1, in particular labeling preparation machine 6, comprises a control unit 16 configured to control operation of at least labeling preparation machine 6.

[0035] Preferentially, labeling preparation machine 6 also comprises a conveying unit 17 configured to advance single label sheets 2 along a label advancement path R, in particular from decoration and cutting station 15 towards and/or to labeling station 5.

[0036] Preferentially, labeling preparation machine 6 comprises a magazine unit 19 configured to host web 13, in particular in the form of a bobbin, at initial station 18.

[0037] According to the specific embodiment shown, conveying device 12 comprises an auxiliary conveyor, in particular an auxiliary drum 23, for supporting transfer of web 13 and/or single label sheets 2 to conveying unit 17.

In particular, light emitting unit 14 is arranged such that, in use, light emitting unit 14 decorates and cuts web 13 while being advanced on auxiliary conveyor 23.

[0038] In particular, conveying device 12 comprises a driven feed roller 24 configured to rotate about a respective rotation axis being interposed between initial station 18 and decoration and cutting station 15, and being configured to at least partially control advancement of web 13 along web advancement path Q; and

- even more particular an auxiliary roller 25, arranged adjacent, in particular tangential, to feed roller 24 for interposing, in use, web 13 between auxiliary roller 25 and feed roller 24.

[0039] Preferentially, conveying device 12 also comprises a buffer 26 configured to accumulate in a variable manner portions of web 13. In particular, buffer 26 is arranged between initial station 18 and decoration and cutting station 15, even more particular between initial station 18 and feed roller 24.

[0040] With particular reference to Figure 1, conveying unit 17 comprises at least one transfer drum 27 rotatable around a rotation axis C configured to advance single label sheets 2 along at least a portion of label advancement path R, and in particular through the glue application station.

[0041] The transfer drum 27 is configured to apply the label sheets 2 on respective receptacles 3 by means of the rotation of the transfer drum 27 on itself .Advantageously, light emitting unit 14 is configured to emit a(n) (electromagnetic) light beam, in particular a laser irradiation, for decorating and cutting web 13 at decoration and cutting station 15.

[0042] It should be noted that decoration and cutting station 15 defines that the decoration and the cutting of web 13 occurs by a light beam, which is locally confined to the same area. In other words, a cutting station at which web 13 is cut and a decoration station at which web 13 is decorated coincide defining the common decoration and cutting station 15.

[0043] It should be noted that in contrast to the state-of-the-art machines known, label preparation machine 6 does not rely on two distinct and locally separated units, one for executing a decorating step at a decoration station and one for executing a cutting step at a cutting station distinct from the decoration station (i.e. the two separated units are arranged at two distinct and locally separated locations), but relies on one single light emitting unit 14 being arranged at a common decoration and cutting station 15, in particular being configured to emit the light beam, in particular the laser irradiation, both for decorating and cutting web 13.

[0044] In particular, light emitting unit 14 is configured to execute, in particularly to alternately execute, a decorating step during which light emitting unit 14 emits the light beam, in particular the laser irradiation, for decorating the, in use, advancing web 13 and a cutting step for cutting the, in use, advancing web 13.

[0045] According to one preferred non-limiting embodiment, web 13 comprises photoactive pigments 28 (see Figure 2). Preferably, web 13 comprises one or more layers containing pigments 28.

[0046] Preferentially, pigments 28 provided in web 13, are configured to change the respective color by receiving an electromagnetic activation energy in the form of a light beam, e.g. a laser irradiation.

[0047] In particular, pigments 28 are in a deactivated state and can be controlled into at least one activated state upon the application of the electromagnetic activation energy leading to a change in the respective color.

[0048] Preferentially, when being in the deactivated state pigments 28 are transparent or white. Upon activation pigments 28 can change their respective color (e.g. from transparent to black or white or from white to black). In particular, the color in the deactivated state and the color in the activated state is dependent on the specific molecular structure of the specific pigments 28 chosen.

[0049] Preferentially, the final color is defined by the total energy transferred to pigments 28 (e.g. allowing to obtain different gray shades or respective other color tonalities) in dependence of the total transferred energy.

[0050] In particular, when using web 13 comprising photoactive pigments 28, light emitting unit 14 is configured to activate the photoactive pigments of web 13 in order to decorate web 13.

[0051] Alternatively or in addition, light emitting unit 14 is configured to ablate portions of web 13, in particular by means of the light beam, in particular the laser irradiation, in order to decorate web 13.

[0052] With particular reference to Figure 4, light emitting unit 14 is configured to cut web 13 such to define simultaneously a trailing edge of one decorated single label sheet 2 and a leading edge of the successive single label sheet 2 (which, in use, has not yet been decorated) .

[0053] In particular, after the execution of a first cutting step, light emitting unit 14 is configured to decorate the successive single label 2 prior to the execution of a second cutting step. In particular, the first cutting step defines the leading edge of the label sheet 2 to be decorated, which is still part of web 13 prior to the execution of the decorating step and prior to the second cutting step, which defines the trailing edge of the respective decorated single label sheet 2.

[0054] Preferentially, light emitting unit 14 is configured to cut single label sheets 2 from the, in use, advancing web 13 by means of a single light pulse, in particular a single laser pulse.

[0055] The light emitting unit 14, for each label sheet 2, is configured to define completely a leading edge of the respective label sheet 2 by emitting a single light pulse and to define completely a trailing edge of the same respective label sheet 2 by emitting another single light pulse.

[0056] The defining of the leading edge and the trailing edge by respective single pulses improves the precision

in the defining of the label edges, but requires more power with respect to using more than one pulse for each edge.

[0057] Therefore it is provided a very compact label preparation machine comprising a light emitting unit 14 for single pulse cutting, by employing the same single pulse light emitting unit 14 also for decorating the web.

[0058] According to some preferred non-limiting embodiments, control unit 16 is configured to control, in particular to alternately control, light emitting unit 14 into at least:

- a decoration mode in which light emitting unit 14 is configured to decorate the, in use, advancing web 13 at decoration and cutting station 15; and
- a cutting mode in which light emitting unit 14 is configured to cut one single label sheet 2 from the, in use, advancing web 13 at decoration and cutting station 15.

[0059] In other words, control unit 16 is configured to control light emitting unit 14 into the decoration mode and the cutting mode for executing respectively one decorating step and one cutting step.

[0060] With particular reference to Figure 3, light emitting unit 14 is configured to modulate a light (laser) beam power, in particular a power of the laser irradiation, in dependence on whether light emitting unit 14 is controlled in the cutting mode or decoration mode.

[0061] In particular, light emitting unit 14 is configured such that the emitted light beam power, in particular the power of the emitted light, even more particular the emitted laser irradiation, is higher when light emitting unit 14 is controlled, in use, in the cutting mode than when being, in use, controlled in the decoration mode.

[0062] According to some preferred non-limiting embodiments, light emitting unit 14 comprises one or more light emitting elements, in particular one or more laser light elements. The light emitting elements could be arranged in a group of light emitting elements and/or having a matrix organization. In particular, each light emitting element is configured to selectively emit one respective single light beam, in particular one respective single laser beam. Even more particular, in use, the light beam emitted by light emitting unit 14 can be the result of one or more of the respective single light beams emitted, in use, by the one or more light emitting elements.

[0063] Preferentially (see Figure 4), the light emitting elements, in particular the group of light emitting elements and/or the matrix of light emitting elements is transversally arranged with respect to an advancement direction D of, the, in use, at decoration and cutting station advancing web 13 (i.e. the group of light emitting elements and/or the matrix of light emitting elements is along a line and/or an area transversal to advancement direction D). In this manner, light emitting unit 14 can direct its light emission on each single portion of web 13.

[0064] Alternatively or in addition, one or more of the light emitting elements are mounted onto a support, the support being moveable along a direction transversal to advancement direction D. In particular, the support could be moved, in use, such to partially follow the advancement movement of web 13.

[0065] In use, labeling apparatus 1 applies at least one single label sheet 2 onto bottles 3 at labeling station 5.

[0066] In particular, during operation of labeling apparatus 1 bottles 3 advance, in particular by means of conveyor device 4, along bottle advancement path P.

[0067] Preferentially, glue application device 7 adds glue onto web 13 and/or single label sheets 2 and/or bottles 2. In the specific case disclosed, glue application device 7 adds glue onto single label sheets 2 during advancement of single label sheets 2 along label advancement path R.

[0068] Single label sheets 2 are prepared from web 13 by labeling preparation machine 6. In particular, labeling preparation machine 6 decorates and cuts web 13 at decoration and cutting station 15.

[0069] In more detail, operation of labeling preparation machine 6 comprises at least the steps of:

- advancing web 13 along web advancement path P;
- decorating the advancing web 13 at decoration and cutting station 15 by operating light emitting unit 14; and
- cutting single label sheets 2 from the advancing web 13 at decorating and cutting station 15 by operating light emitting unit 14.

[0070] In particular, during the step of advancing web 13, web 13 is continuously advanced along web advancement path P.

[0071] Even more particular, during the step of advancing web 13, web 13 advances from initial station 18 to decoration and cutting station 15.

[0072] Preferentially, during the step of advancing web 13, the advancement speed of web 13 is at least partially controlled by feed roller 24.

[0073] According to some preferred non-limiting embodiments, control unit 16 controls, in particular alternatingly controls, light emitting unit 14 into the decoration mode or cutting mode.

[0074] Preferentially, the step of decorating and the step of cutting are executed in an alternating manner.

[0075] In particular, the preparation of each one single label sheet 2 comprises, during advancement of web 13 along web advancement path Q:

- a first cutting step, in particular thereby obtaining the leading edge of the respective single label sheet 2;
- the decorating step so as to decorate web 13 on the respective single label sheet 2; and
- a second cutting step, in particular obtaining thereby the trailing edge of the respective single label sheet 2. It should be noted that the second cutting step defines the first cutting step for obtaining the successive single label sheet 2.

[0076] It should be noted that the decorating step is executed on web 13 and the respective single label sheet 2 is only obtained after the second cutting step, which separates the respective single label sheet 2 from the remaining web 13.

[0077] In more detail, during the execution of the decorating step and the cutting step, light emitting unit 14 emits a light beam, in particular a laser beam.

[0078] Furthermore, light emitting unit 14 modulates an emitted light beam power of the light beam in dependence on whether light emitting unit 14 executes the decorating step or the cutting step (or in other words, on whether light emitting unit 14 is controlled in the decoration mode or cutting mode).

[0079] Preferentially, light emitting unit 14 modulates the emitted light beam power such that the emitted light beam power is higher when light emitting unit 14 executes the cutting step than when executing the decorating step.

[0080] According to some possible non-limiting embodiments, during the decorating step, light emitting unit 14 emits the light beam for activating photoactive pigments 28 and/or for ablating portions of web 13.

[0081] According to some possible embodiments, during the step of cutting, for each label sheet 2, the light emitting unit 14 defines completely a leading edge of the respective label sheet 2 by emitting a single light pulse and defines completely a trailing edge of the same respective label sheet 2 by emitting another single light pulse.

[0082] According to some preferred non-limiting embodiment, operation of label preparation machine 6 also comprises the step of advancing single label sheets 2 along label advancement path R. In particular, conveying unit 17, even more particular conveying drum 27, advances single label sheets 2 from decoration and cutting station 15 to labeling station 5.

[0083] With reference to Figure 5, number 1' indicates an alternative embodiment of a labeling apparatus according to the present invention; as labeling apparatus 1' (only partially shown to the extend necessary for the understanding of the differences between labeling apparatus 1' and 1) is similar to labeling apparatus 1, the following description is limited to the differences between them, and using the same references, where possible, for identical or corresponding parts.

[0084] In particular, labeling apparatus 1' differs from labeling apparatus 1 in comprising label preparation machine 6'.

[0085] As labeling preparation machine 6' is similar to label preparation machine 6, the following description is limited to the differences between them, and using the same references, where possible, for identical or corresponding parts.

[0086] In particular, label preparation machine 6' (only partially shown to the extend necessary for understanding the differences between label preparation machine 6' and 6) differs from label preparation machine 6 in the position of decoration and cutting station 15. While light emitting unit 15 of label preparation machine 6 is arranged such that light emitting unit 14 is configured to decorate and cut web 13 while web 13 advances on auxiliary conveyor 23, light emitting unit 14 of label preparation machine 6' is arranged such that light emitting unit 14 is configured to decorate and cut web 13 while web 13 advances on conveying unit 17, in particular transfer drum 27.

[0087] In the machine 6', the decoration and cutting station 15 is on the transfer drum 27. This improves further reduces the mechanical complexity of the preparation machine 6'.

[0088] In machine 6', the transfer drum 27 defines a part of the conveying device 12. As operation of labeling apparatus 1' is similar to labeling apparatus 1 and as operation of label preparation device 6' is similar to operation of label preparation device 6', we refer to the above provided description.

[0089] The advantages of labeling apparatus 1 and/or label preparation machine 6 and/or the methods according to the present invention will be clear from the foregoing description.

[0090] In particular, by providing for light emission unit 14 being configured to execute both the decoration and the cutting, it is possible to both provide for a flexible cutting as the light emission unit 14 can be precisely controlled in dependence of the advancing web 13 and to optimize the space requirements.

[0091] A further advantage resides in light emission unit 14 being configured to modulate the light beam power so as to adapt the operation to the cutting and decoration requirements. While the cutting needs to separate the single label sheets 2 from web 13, the decoration of web 13 requires leaving web 13 substantially intact.

[0092] Clearly, changes may be made to labeling apparatus 1 and/or label preparation machine 6 and/or the methods as described herein without, however, departing from the scope of protection as defined in the accompanying claims.

[0093] In the specific embodiment disclosed, single label sheets 2 are of the "self-stick"-type.

[0094] The present invention could, however, also work with single label sheets 2 of the "sleeve-label-type" or the "pressure-sensitive label-type". In this latter case, during the cutting step, the base layer removably carrying the label layer would be left intact and only the label layer would be cut so as to obtain the single label sheets being separable from the base layer.

Claims

1. A label preparation machine (6) for preparing decorated single label sheets (2) comprising:

   - a conveying device (12) configured to advance a web (13) of labeling material along a web advancement path (Q); and

- a light emitting unit (14) configured to decorate the, in use, advancing web (13) of labeling material and to cut single label sheets (2) from the, in use, advancing web (13) of labeling material, at a decoration and cutting station (15); wherein:

the machine (6) further comprises a control unit (16) configured to control, in particular to alternatingly control, the light emitting unit (14) into a decoration mode and a cutting mode;
the light emitting unit (14) is configured to decorate the, in use, advancing web (13) of labeling material at the decoration and cutting station (15) when being controlled into the decoration mode and to cut one single label sheet (2) from, in use, advancing web (13) of labeling material at the decoration and cutting station (15) when being controlled into the cutting mode;
the light emitting unit (14) is configured to modulate an emitted light beam power in dependence on whether the light emitting unit (14) is controlled in the cutting mode or in the decoration mode;
the light emitting unit (14) is configured such that the emitted light beam power is higher when the light emitting unit (14) is controlled, in use, in the cutting mode than when being, in use, controlled in the decoration mode;
the light emitting unit (14) is configured to activate photoactive pigments (28) of the web (13) of labeling material and/or to ablate portions of the web (13) of labeling material in order to decorate the web (13) of labeling material;
the light emitting unit (14), for each label sheet (2), is configured to define completely a leading edge of the respective label sheet (2) by emitting a single light pulse and to define completely a trailing edge of the same respective label sheet by emitting another single light pulse.

2. A label preparation machine (6) according to claim 1, further comprising a transfer drum (27) configured to apply the label sheets (2) on respective receptacles (3) by means of the rotation of the transfer drum (27) in itself.

3. A label preparation machine according to claim 2, wherein the decoration and cutting station (15) is on said transfer drum (27).

4. A label preparation machine according to any one of the previous claims, wherein, in use, the web (13) of labeling material advances at the decoration and cutting station (15) along an advancement direction (D).

5. A label preparation machine (6) according to claim 4, wherein the light emitting unit (14) comprises a group of light emitting elements and/or a matrix of light emitting elements transversally arranged with respect to the advancement direction (D).

6. A label preparation machine (6) according to claim 4, wherein the light emitting unit (14) comprises at least one light emitting element mounted onto a support being moveable along a direction transversal to the advancement direction (D).

7. A labeling apparatus for applying at least one single label sheet (2) onto each one of a plurality of receptacles (3) comprising at least one label preparation machine (6) according to any one of the preceding claims for preparing the decorated single label sheets (2) to be applied onto the receptacles (3).

8. Method of preparing decorated single label sheets (2), the method comprising:

- advancing a web (13) of labeling material along a web advancement path (Q);
- decorating the advancing web (13) of labeling material at a decoration and cutting station (15); and
- cutting single label sheets (2) from the advancing web (13) of labeling material at the decorating and cutting station (15);

wherein the step of decorating and the step of cutting are executed by a light emitting unit (14), arranged at the decorating and cutting station (15); wherein
during the step of advancing, the web (13) of labeling material is continuously advanced along the web advancement path (Q);
the step of decorating and the step of cutting are executed in an alternating manner;
during the decorating step and the cutting step the light emitting unit emits a light beam and modulates an emitted light beam power of the light beam in dependence on whether the light emitting unit (14) executes the decorating step or the cutting step;
the light emitting unit (14) modulates the emitted light beam power such that the emitted light beam power is higher when the light emitting unit (14) executes the cutting step than when executing the decorating step;
during the decorating step, the light emitting unit (14) emits a light beam for activating photoactive pigments (28) of the web (13) of labeling material and/or to ablate portions of the web (13) of labeling material;
for each label sheet (2), the light emitting unit (14) defines completely a leading edge of the respective

label sheet (2) by emitting a single light pulse and defines completely a trailing edge of the same respective label sheet by emitting another single light pulse.

9. Method of labeling a plurality of receptacles (3), the method comprising the method of preparing according to claim 8 and a step of application, during which the decorated single labels (2) are applied at a labeling station (5) onto the receptacles (3).

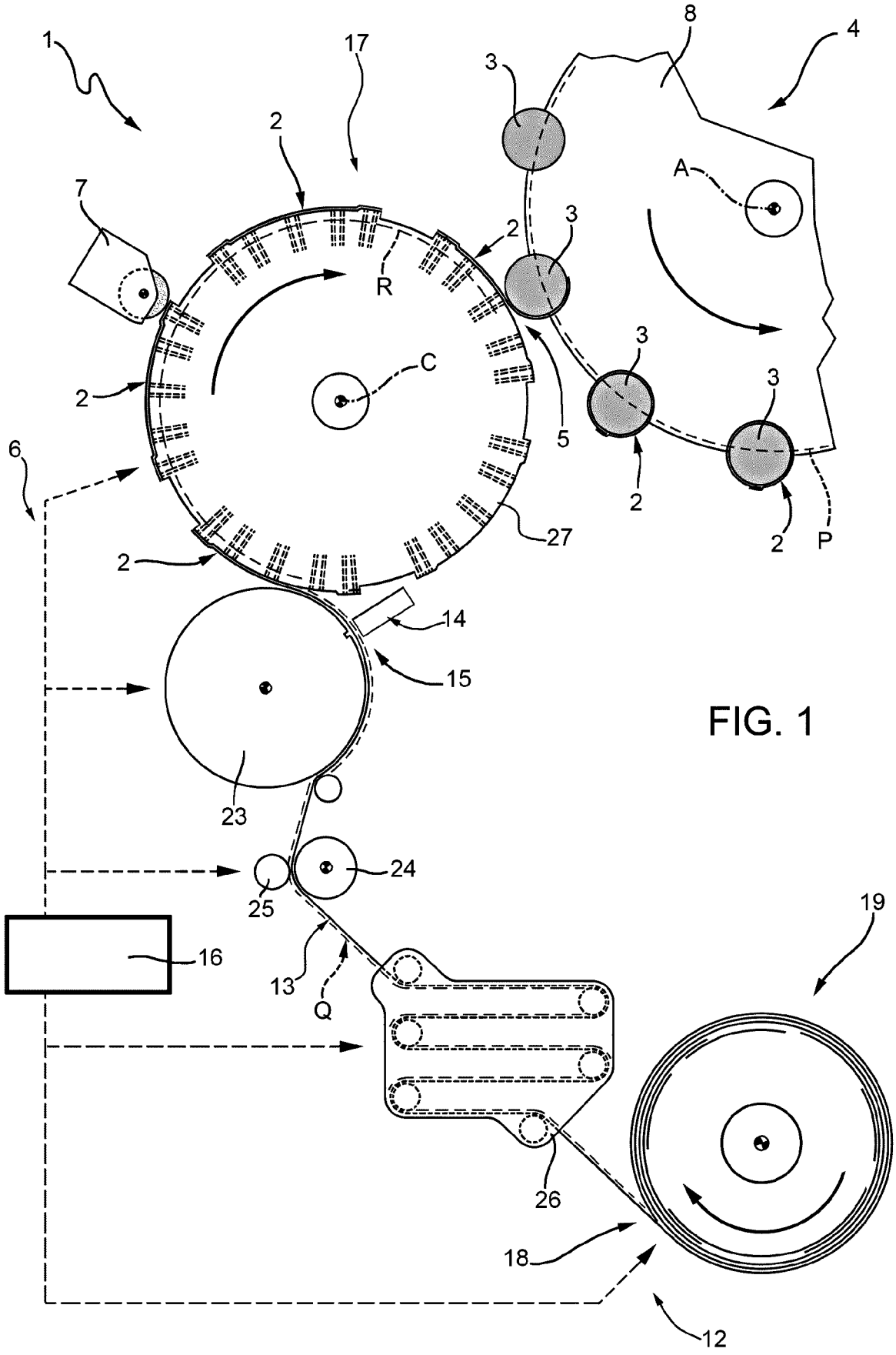

FIG. 1

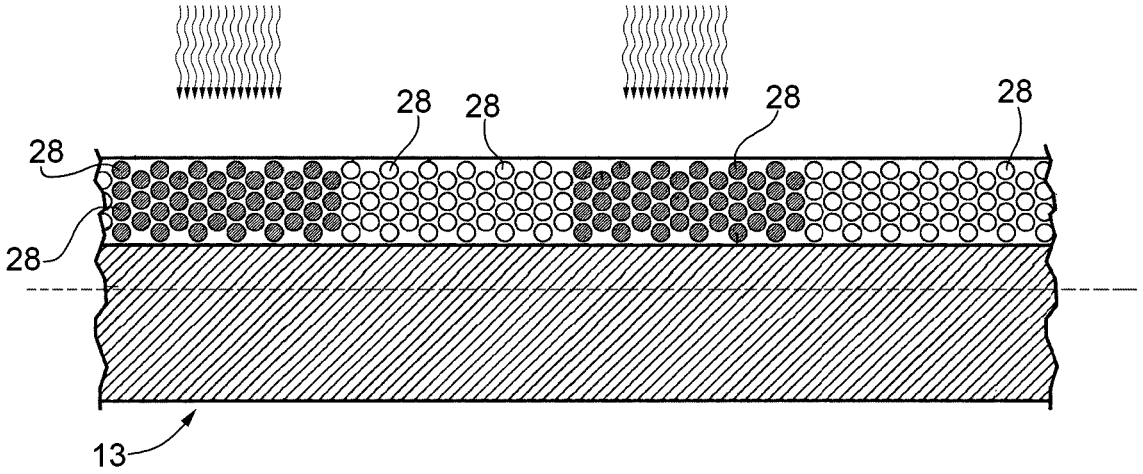

FIG.2

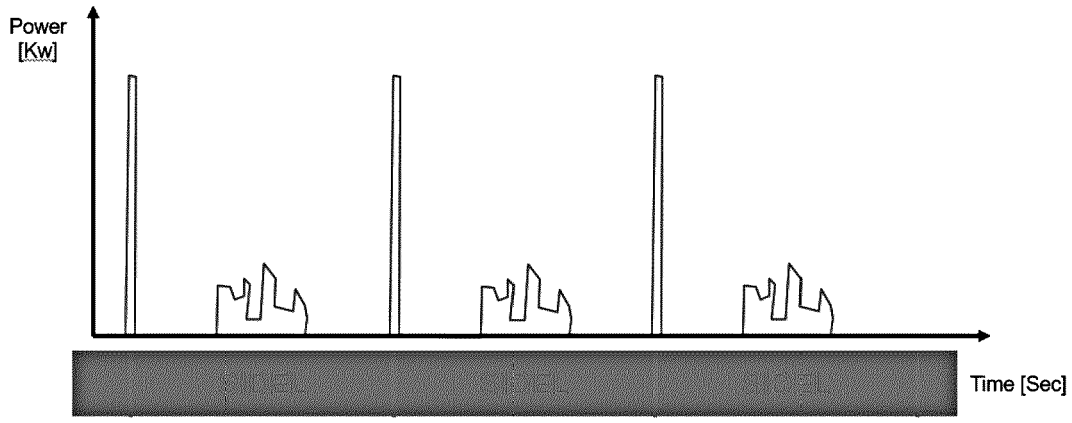

FIG.3

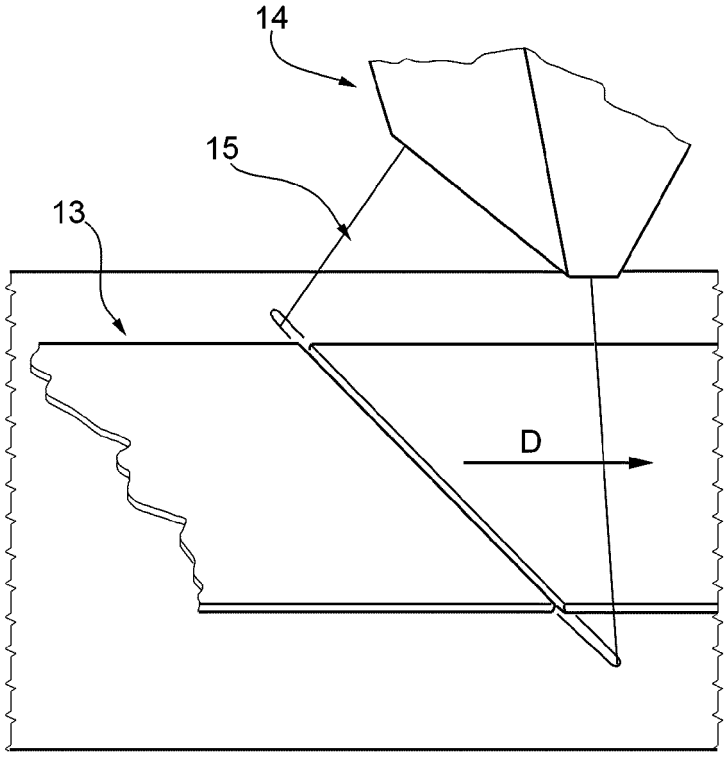

FIG.4

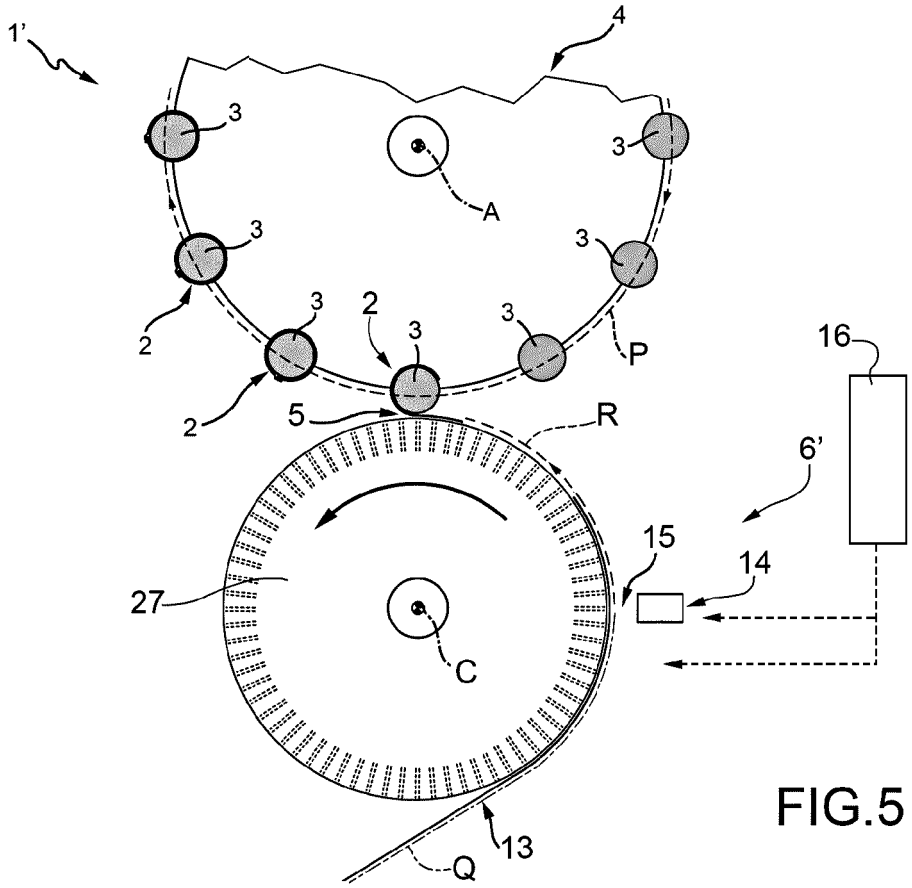

FIG.5

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EUROPEAN SEARCH REPORT

Application Number
EP 20 18 5889

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Place of search	Date of completion of the search	Examiner
The Hague	18 January 2021	Wartenhorst, Frank

CATEGORY OF CITED DOCUMENTS

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