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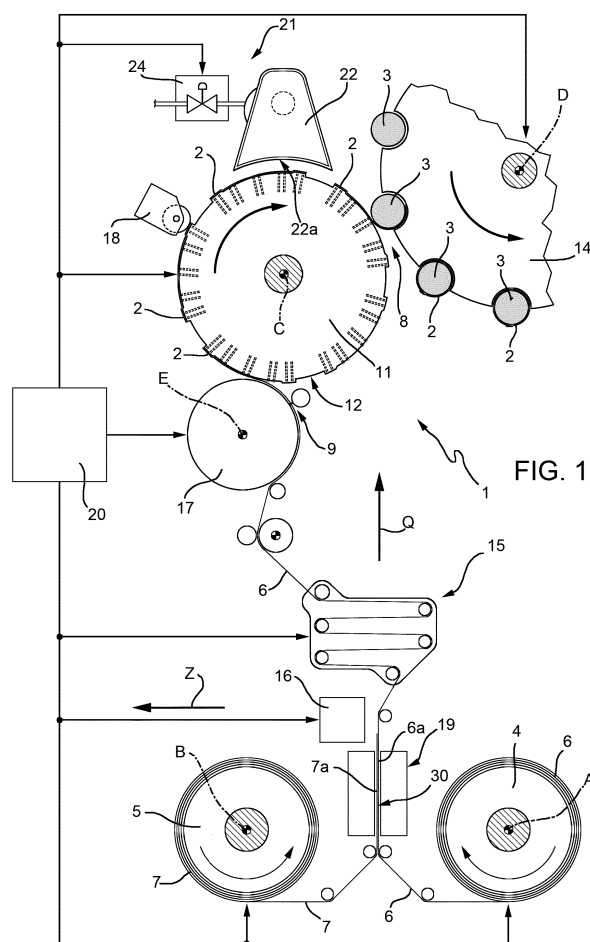
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(54) **LABELLING MACHINE AND METHOD FOR APPLYING DIFFERENT TYPES OR FORMATS OF LABELS ONTO ITEMS**

(57) There is described a labelling machine (1) for applying different types or formats of labels (2) onto items (3); the machine (1) comprises: a first reel (4) and a second reel (5), which are wound by respective first, second webs (6, 7), different from each other and each consisting of a single respective type or format of repeated labels (2); an application station (8), at which the labels (2) are applied onto respective items (3); cutting means (9), which are selectively activated to cut the first web (6) and/or the second web (7) at a boundary line (10) between two successive labels (2); a conveyor (11), configured to receive, at its own receiving surface (12), the cut labels (2) from at least one of reels (4, 5) and to advance the labels (2) on the receiving surface (12) towards the application station (8); and splicing means (19) for splicing the first web (6) to the second web (7), which are formed of different types or formats of labels (2), so as to form a splicing section (30); the machine (1) further comprises extracting means (21), which are positioned adjacent to conveyor (11) and adapted to extract labels (2) from receiving surface (12); and a control unit (20), configured to activate extracting means (21) to extract at least the labels (2) of the first web (6) and splicing section (30) after splicing means (19) have spliced the first and second web (6, 7). (Figure 1)



Description

[0001] The present invention relates to a labelling machine and to a method for applying different types or formats of labels onto items, in particular bottles, containers or the like destined to be filled with pourable products.

[0002] Known labelling machines essentially comprise:

- a rotatable carousel for conveying the items to be labelled along an arc-shaped conveying path; and
- a labelling apparatus for applying one or more labels onto each item advancing along the conveying path.

[0003] The labelling apparatus essentially comprises, in turn:

- a first reel, which is wound by a first web of repeated labels;
- cutting means, which are selectively activated to perform a cutting operation, at the boundary line between two successive labels from the same web;
- an application station, at which the labels are applied onto the items; and
- a conveyor adapted to receive, at its own receiving surface, the labels coming from the first reel and to advance the labels to the application station.

[0004] Labelling apparatuses are also known comprising a second reel, which is wound by a second web, identical to the first web, with the aim of feeding the conveyor when the first web on the first reel is almost exhausted.

[0005] In detail, to this end the second and the first web are spliced to each other during a splicing operation, without the need for stopping the feeding of the first web in use on the labelling machine.

[0006] An example of an apparatus and a method for splicing webs provided with repeated patterns is known from EP2692673 in the name of the same Applicant.

[0007] However, the labelling machines are often required to interrupt or complete the application of a first type or format of labels and to start the application of a different type or format of labels.

[0008] In this case, the productivity of the known labelling machines drastically decreases due to the need to switch between a first and a second web different from each other.

[0009] It must be pointed out, in fact, that the known labelling machines are not efficiently equipped for switching from a first web to a second web which are formed of different types or formats of labels.

[0010] In view of this, a need is felt within the sector for a labelling machine having increased flexibility and higher productivity.

[0011] It is an object of the present invention to provide a labelling machine, which allows to meet the above-mentioned need in a simple and economic manner.

[0012] This object is achieved by the present invention,

as it relates to a labelling machine, as claimed in claim 1.

[0013] The invention also relates to a method for applying different types or formats of labels onto items, as claimed in claim 9.

[0014] One preferred embodiment is hereinafter disclosed for a better understanding of the present invention, by way of a non-limitative example and with reference to the accompanying drawings, in which:

- Figures 1 and 2 schematically show a top view of a labelling machine according to the present invention and arranged under different operating conditions; and
- Figures 3, 4 and 5 illustrate different types or formats of webs of labels, having different dimensions and/or decorative patterns from one another.

[0015] With reference to Figures 1 and 2, numeral 1 indicates a labelling machine for applying different types or formats of labels 2 onto items 3, in particular bottles or containers destined to be filled with pourable products.

[0016] As shown in Figures 1 and 2, labelling machine 1 essentially comprises:

- two reels 4, 5, which are wound by respective webs 6, 7, each consisting of a single respective type or format of repeated labels 2;
- an application station 8, at which labels 2 are applied onto respective items 3;
- cutting means 9, for example a knife, which are selectively activated to cut web 6 and/or web 7 at a boundary line 10 between two successive labels 2;
- a conveyor 11, which receives, at its own receiving surface 12, the cut labels 2 coming from at least one of reels 4, 5 and advances the labels 2 themselves towards application station 8; and
- splicing means 19 for splicing webs 6 and 7 along a splicing section 30.

[0017] In detail, reels 4, 5 are rotatable about respective axes A, B, so as to allow the unwinding of respective webs 6, 7.

[0018] In particular, with reference to the arrangement of reels 4, 5 shown in Figures 1, 2, reels 4, 5 are rotatable in opposite rotational directions.

[0019] Furthermore, as shown in Figures 3, 4 and 5, labels 2 forming webs 6, 7 have:

- a certain decorative pattern p, p' p";
- a certain width w, w' measured along an unrolling direction U of webs 6, 7;
- a certain height h measured perpendicularly to direction U; and
- a bar code 13, for the identification of the labels.

[0020] In the embodiment shown, labels 2 are "glued labels", i.e. pasted onto items 3 by means of a given amount of glue.

[0021] In detail, labelling machine 1 comprises a glue application unit 18 (Figures 1, 2) configured to apply glue to at least one portion of each label 2.

[0022] Alternatively, labels 2 may be "sleeve labels", i. e. made of a heat-shrinkable material. In detail, sleeve labels are first loosely applied onto items 3 and then heated, in order to shrink and tightly adhere onto the external surface of items 3.

[0023] Furthermore, conveyor 11 rotates about an axis C, in particular parallel to axes A, B, and is configured to retain, in particular through suction, labels 2 during their advancement by at least a portion of receiving surface 12.

[0024] Labelling machine 1 further comprises:

- a carousel 14, only partially sketched in Figures 1 and 2 and rotatable about an axis D, parallel to axes A, B, C, for conveying items 3 to be labelled along an arc-shaped conveying path; and
- advancing rollers 15, for unrolling, tensioning and advancing webs 6 and/or 7 from respective reels 4, 5 towards conveyor 11 along an advancement path Q.

[0025] In the embodiment shown, conveyor 11 and carousel 14 are rotatable in opposite rotational directions.

[0026] Preferably but not necessarily, labelling machine 1 also comprises an auxiliary drum 17 rotating about an axis E, parallel to axes A, B, C, D, configured to advance webs 6 and/or 7 along a final portion of advancement path Q and, in particular, to support the transfer of labels 2 cut by cutting means 9 to receiving surface 12 of conveyor 11.

[0027] In particular, auxiliary drum 17 is arranged downstream of advancing rollers 15 and adjacent, in particular substantially externally tangent, to conveyor 11.

[0028] Advantageously, splicing means 19 are configured to splice webs 6, 7, which are formed of different types or formats of labels 2 and labelling machine 1 further comprises (Figures 1 and 2):

- extracting means 21, which are positioned adjacent to conveyor 11 and adapted to selectively extract labels 2 from receiving surface 12 of conveyor 11; and
- a control unit 20, configured to activate extracting means 21 to extract at least labels 2 of web 6 and splicing section 30 from receiving surface 12 after splicing means 19 have spliced webs 6 and 7.

[0029] In particular, labels 2 of web 6 may differ from labels 2 of web 7 in pattern p, p', p" and/or in width w, w', as shown in Figures 3 to 5.

[0030] As an example, labels 2 of Figure 3 have pattern p different from pattern p' of labels 2 of Figure 4. In addition, labels 2 of Figures 3 and 4 have respective patterns p, p' and width w different from pattern p" and width w' of labels 2 of Figure 5.

[0031] Preferably, labels 2 of respective webs 6, 7 have

the same height h.

[0032] Furthermore, splicing means 19 are selectively activated to attach web 6 to web 7, which are different from each other, at respective overlapping segments 6a, 7a and during the simultaneous advancement of webs 6, 7 along advancement path Q (Figure 1).

[0033] Splicing section 30 is formed of labels 2 of webs 6, 7 which are spliced to each other.

[0034] In further detail, splicing section 30 may be formed of more than one label 2 of each web 6, 7.

[0035] In the embodiment shown, extracting means 21 are of pneumatic type or format and comprise (Figures 1 and 2):

- a pneumatic extractor 22, selectively extracting labels 2 by vacuum;
- a circuit 23, not shown, generating a vacuum force at an output section 22a of extractor 22; and
- valve means 24, selectively isolating circuit 23 from extractor 22.

[0036] In detail, valve means 24 are controlled by control unit 20.

[0037] Alternatively, extracting means 21 are of a mechanical or electrical type.

[0038] In detail, extracting means 21 are arranged upstream of application station 8 with respect to the advancement direction of conveyor 11.

[0039] Labelling machine 1 further comprises identifying means 16 for identifying labels 2 advancing from reel 4 and/or 5 towards conveyor 11.

[0040] In detail, identifying means 16 are arranged upstream of auxiliary drum 17 along advancement path Q.

[0041] Furthermore, identifying means 16 are configured to send to control unit 20 a signal Z correlated to the type or format of label 2 currently advancing towards conveyor 11.

[0042] In the embodiment shown, identifying means 16 comprise a bar code reader, which is capable of reading bar code 13 of labels 2.

[0043] Furthermore, control unit 20 is programmable in order to command the application of different types or formats of labels 2 onto items 3.

[0044] For this purpose, control unit 20, in addition to extracting means 21 and identifying means 16, is adapted to control at least also reels 4, 5, conveyor 11, carousel 14, advancing rollers 15, auxiliary drum 17 and splicing means 19.

[0045] In addition, a memory of control unit 20 can be used to store the sequence of webs to be applied onto items 3 and the data associated with every type or format of labels 2.

[0046] The operation of labelling machine 1 is described starting from an initial condition, wherein control unit 20 controls reel 4, advancing rollers 15 and auxiliary drum 17, so as to advance web 6 towards conveyor 11 along advancement path Q and to cut web 6 into labels 2 by cutting means 9.

[0047] Furthermore, control unit 20 controls conveyor 11 to receive labels 2 at receiving surface 12 and to advance labels 2 towards application station 8.

[0048] In addition, control unit 20 controls carousel 14 to convey items 3 to be labelled along the conveying path.

[0049] When the application of labels 2 of web 6 onto items 3 is completed, and before the exhaustion of web 6, control unit 20 commands reel 4, advancing rollers 15 and auxiliary drum 17 to stop the advancement of web 6 along advancement path Q.

[0050] At the same time, conveyor 11 and carousel 14 stop rotating about respective axes C, D.

[0051] At this stage, web 6 is still unfold along a certain length from reel 4 to auxiliary drum 17 and cut labels 2 from web 6 lie on receiving surface 12 of conveyor 11.

[0052] Control unit 20 subsequently commands reel 5 and advancing rollers 15 to start unrolling web 7, so as to advance web 7 until it overlaps at least partially web 6 upstream of splicing means 19 along advancement path Q.

[0053] Control unit 20 commands splicing means 19 to splice webs 6, 7 to each other at respective overlapping segments 6a, 7a and advancing rollers 15 to unroll both webs 6, 7 from respective reels 4, 5. Splicing section 30 is thus formed.

[0054] Furthermore, after splicing means 19 have started splicing webs 6, 7, control unit 20 commands conveyor 11 to resume rotating about axis C and advancing rollers 15 and auxiliary drum 17 to advance webs 6, 7 towards conveyor 11.

[0055] Furthermore, after splicing means 19 have spliced webs 6 and 7, control unit 20 commands extracting means 22 to extract labels 2 of web 6 and splicing section 30 from receiving surface 12.

[0056] Alternatively, control unit 20 commands extracting means 22 to extract labels 2 of web 6 after conveyor 11 is commanded to resume rotating.

[0057] In detail, control unit 20 commands valve means 24 to put in communication pneumatic extractor 22 with circuit 23, in order to generate a vacuum force at output section 22a of extractor 22.

[0058] Consequently, labels 2 of web 6 and of splicing section 30 are drawn by vacuum from receiving surface 12 and discarded.

[0059] Furthermore, after splicing section 30 is formed, web 6 is cut upstream of splicing section 30.

[0060] As a result, the operation of advancing rollers 15 causes the advancement of web 7 only along advancement path Q.

[0061] In other words, after conveyor 11 is commanded to resume rotating, receiving surface 12 receives in succession labels from web 6 only, splicing section 30 (and therefore, spliced labels from both webs 6 and 7) and from web 7 only.

[0062] Carousel 14 may rotate about axis D or remain stationary during the operation of extracting means 21.

[0063] Preferably, in case carousel 14 keeps rotating during the operation of extracting means 21, no item 3

is conveyed along the arc-shaped conveying path.

[0064] While only web 7 advances along advancement path Q, identifying means 16 identify labels 2 advancing from reel 5 towards conveyor 11.

[0065] In detail, bar code reader of identifying means 16 reads bar code 13 of labels 2 of web 7.

[0066] Identifying means 16 subsequently send signal Z correlated to the type or format of label 2 currently advancing towards conveyor 11.

[0067] At this stage, control unit 20 checks that labels 2 identified by identifying means 16 is consistent with the sequence of webs to be applied onto items 3 stored in its memory.

[0068] Thus, the application of labels 2 of web 7 onto items 3 advancing on carousel 14 can start.

[0069] Once the application of labels 2 of web 7 has started, a new web (not shown) is placed on reel 4.

[0070] In detail, the new web may be equal or different from web 7.

[0071] The advantages of labelling machine 1 and of the method according to the present invention will be clear from the above description.

[0072] In particular, since splicing means 19 are configured to splice webs 6, 7, which are formed of different types or formats of labels, and labelling machine 1 comprises extracting means 21 and control unit 20, labelling machine 1 is efficiently equipped for switching from web 6 to web 7, which are different from each other.

[0073] As a consequence, the flexibility and the productivity of labelling machine 1 are far increased compared to the known labelling machines discussed in the introductory part of the present application.

[0074] In fact, since extracting means 21 automatically extract labels 2 from receiving surface 12, labelling machine 1 is capable of efficiently applying labels 2 having different widths w, w' and/or patterns p, p', p" onto items 3.

[0075] Furthermore, since labelling machine 1 comprises identifying means 16, it is possible to automatically check which type or format of label 2 is advancing along advancement path Q.

[0076] Finally, it is apparent that modifications and variants not departing from the scope of protection of the claims may be made to labelling machine 1 and to the method according to the present invention.

Claims

1. A labelling machine (1) for applying different types or formats of labels (2) onto items (3), in particular bottles or containers destined to be filled with pourable products; said machine (1) comprising:
 - a first reel (4) and a second reel (5), which are wound by respective first, second webs (6, 7), each consisting of a single respective type or format of repeated labels (2);

- an application station (8), at which the labels (2) are applied, in use, onto respective items (3);
- cutting means (9), which are selectively activated to cut said first web (6) and/or said second web (7) at a boundary line (10) between two successive labels (2);
- a conveyor (11), configured to receive, at its own receiving surface (12), the cut labels (2) from at least one of said reels (4, 5) and to advance said labels (2) on said receiving surface (12) towards said application station (8); and
- splicing means (19) for splicing along a splicing section (30) said first web (6) to said second web (7); said splicing section (30) being formed of the labels (2) spliced from both first and second webs (6, 7);

characterized in that said splicing means (19) are configured to splice said first web (6) and said second web (7), which are formed of different types or formats of labels (2);

said labelling machine (1) further comprising:

- extracting means (21), which are positioned adjacent to said conveyor (11) and adapted to selectively extract labels (2) from said receiving surface (12) of said conveyor (11); and
- a control unit (20), configured to activate said extracting means (21) to extract at least the labels (2) of said first web (6) and said splicing section (30) after said splicing means (19) have spliced, in use, said first and second webs (6, 7).

2. The labelling machine of claim 1, **characterized in that** said labels (2) have a decorative pattern (p, p', p'') and a width (w, w'), measured along an unrolling direction (U) of said first, second webs (6, 7); said labels (2) of respective first, second webs (6, 7) differing from each other in pattern (p, p', p'') and/or in width (w, w').
3. The labelling machine of claims 1 or 2, **characterized in that** said extracting means (21) are arranged upstream of said application station (8) with respect to the advancement direction of said conveyor (11).
4. The labelling machine of any one of the foregoing claims, **characterized by** further comprising identifying means (16) configured to identify labels (2) and to send a signal (Z) to said control unit (20) correlated to the type or format of label unrolled, in use, from said first or second reel (4, 5).
5. The labelling machine of anyone of the foregoing claims, **characterized by** further comprising:
 - a carousel (14), which is rotatable about an axis (D) for conveying said items (3) to be la-

- belled along a conveying path; and
- advancing rollers (15) for unrolling, tensioning and advancing said first web (6) and/or said second web (7) from the respective first, second reels (4, 5) along an advancement path (Q).

6. The labelling machine of claim 5, **characterized in that** said control unit (20) is further configured to control said identifying means (16) and/or said conveyor (11) and/or said advancing rollers (15); said control unit (20) comprising a memory, which is adapted to store a sequence of webs to be unrolled from respective reels (4, 5) and the data associated with said labels (2).

7. The labelling machine of any one of the foregoing claims, **characterized in that** said extracting means (21) are of a pneumatic type or format and comprise:

- a pneumatic extractor (22), adapted to selectively extracting said labels (2) from said receiving surface (12);
- a circuit (23), adapted to generate a vacuum force at pneumatic extractor (22); and
- valve means (24), selectively isolating said circuit (23) from said pneumatic extractor (22).

8. The labelling machine of claim 7, **characterized in that** said control unit (20) controls, in use, said extracting means (21) by acting on said valve means (24).

9. Method for applying different types or formats of labels (2) onto items (3), in particular bottles or containers destined to be filled with pourable products, comprising the steps of:

- i) advancing a first web (6) from a first reel (4) towards a conveyor (11); said first web (6) being wound around said first reel (4) and consisting of a first type or format of repeated labels (2);
- ii) advancing said items (3) to be labelled along a conveying path on a carousel (14);
- iii) cutting said first web (6) by cutting means (9) at boundary lines (10) between each pair of successive labels (2);
- iv) receiving said labels (2) cut by said cutting means (9) on a receiving surface (12) of said conveyor (11);
- v) advancing said labels on said receiving surface (12) towards an application station (8);
- vi) applying said labels (2) of said first web (6) onto said items (3) at said application station (8);

characterized by comprising the further steps of:

- vii) advancing a second web (7) from a second reel (4) towards said conveyor (11); said second

web (7) being wound around said second reel (4) and consisting of a second type or format of repeated labels (2); said first, second types or formats of labels (2) being different from each other; 5

viii) splicing by splicing means (19) said first web (6) to said second web (7) along a splicing section (30); said splicing section (30) being formed of the labels (2) spliced from both first and second webs (6, 7); 10

ix) activating extracting means (21) to selectively extract labels (2) of said first web (6) and said splicing section (30) from said receiving surface (12) after said step viii);

x) cutting said first web (6) upstream of said splicing section (30); and 15

xi) repeating said steps iii) to vi) with said second web (7) only.

10. The method of claim 9, **characterized by** further comprising the steps of: 20

xii) stopping the advancement of said first web (6) from said first reel (4) towards said conveyor (11), before the exhaustion of said first web (6), after said step vi) and before said step vii); and 25

xiii) resuming the advancement of said first web (6) from said first reel (4) towards said conveyor (11) after said step xii) and during said step viii). 30

11. The method of claims 9 or 10, **characterized by** comprising the further steps of:

xiv) storing in a memory a sequence of webs (6, 7) to be unrolled from respective first, second reels (4, 5); 35

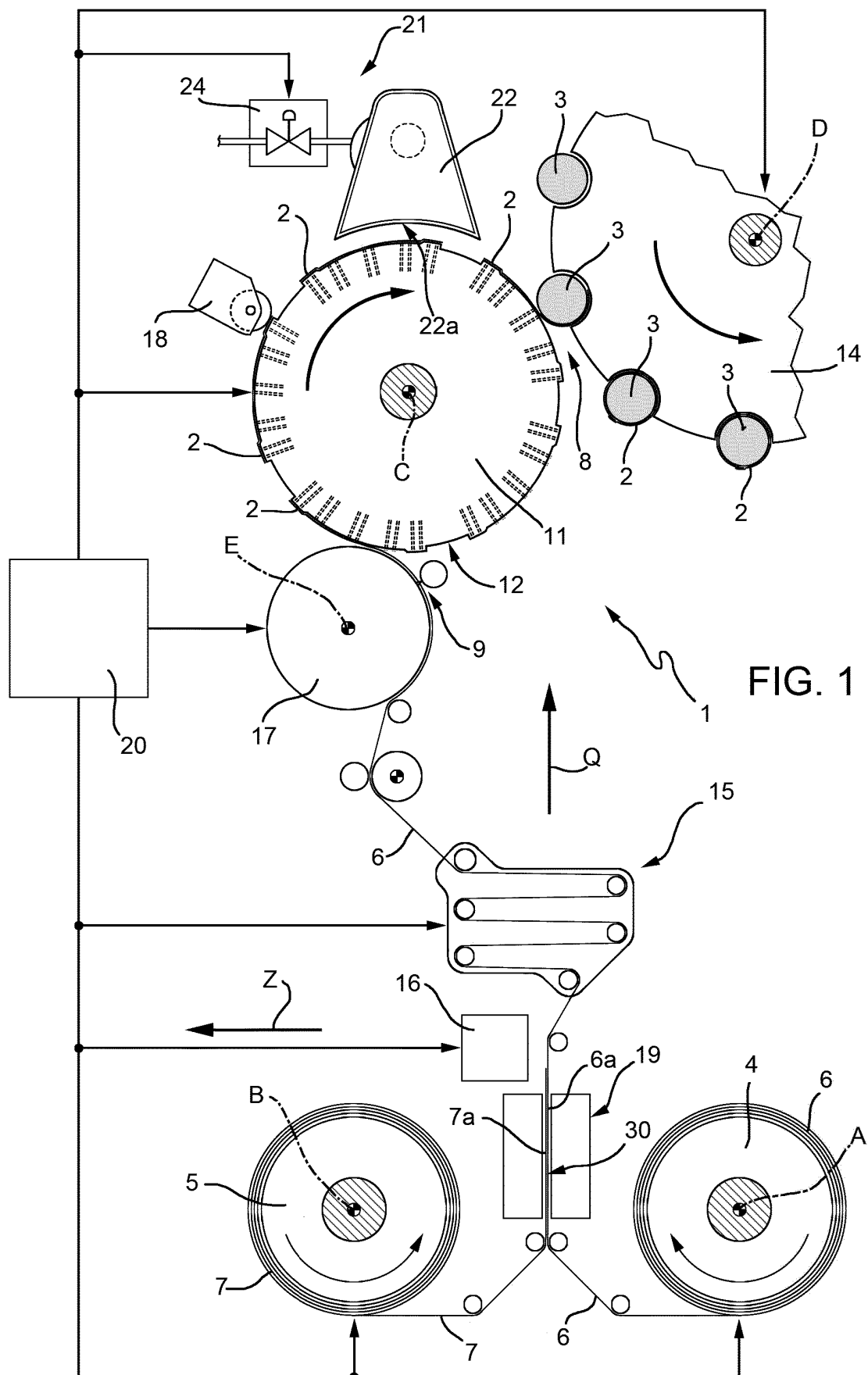
xiv) identifying labels (2) advancing from first or second reel (4, 5) by identifying means (16); and

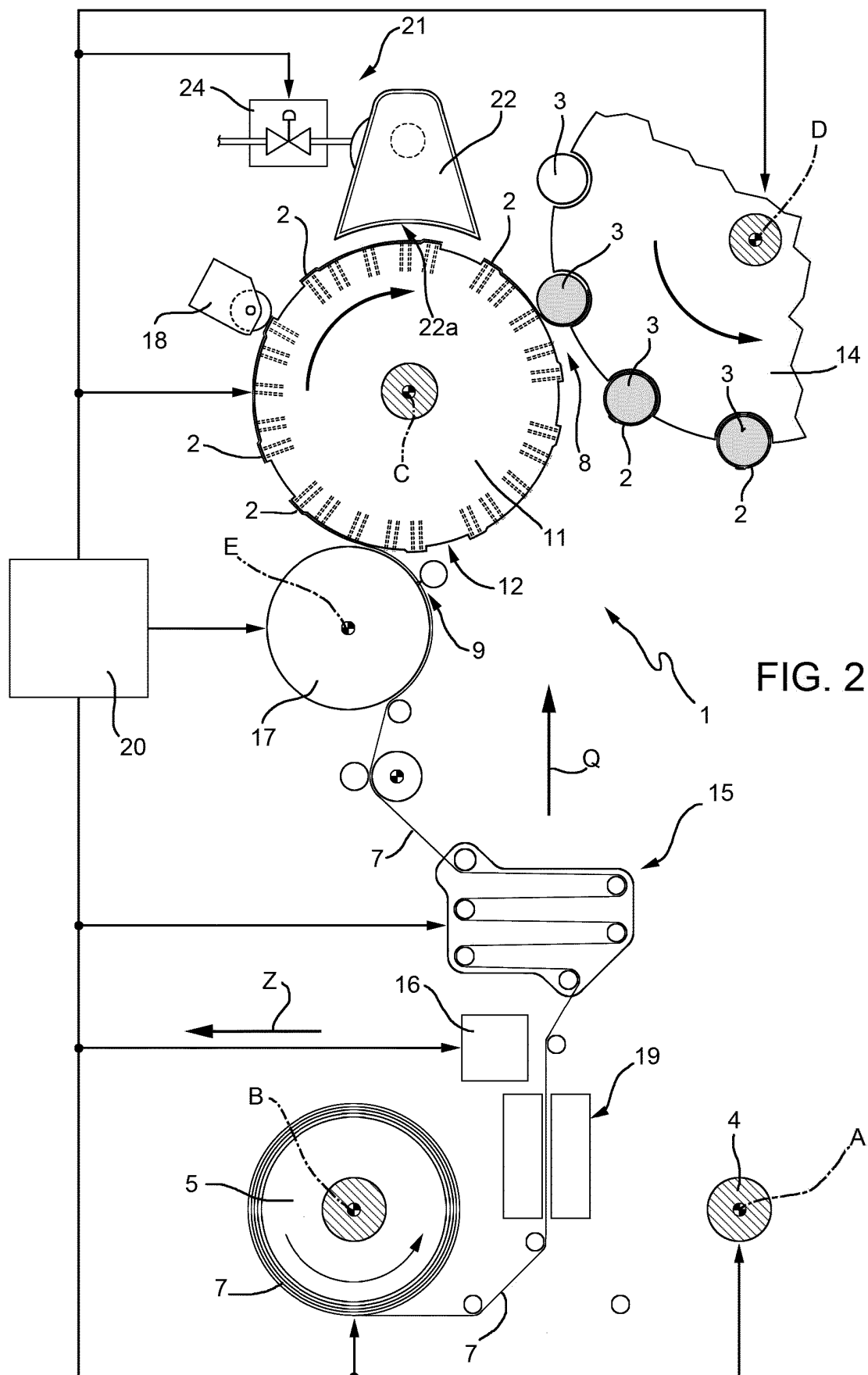
xv) checking whether said identified labels (2) are consistent with the stored sequence of said webs (6, 7). 40

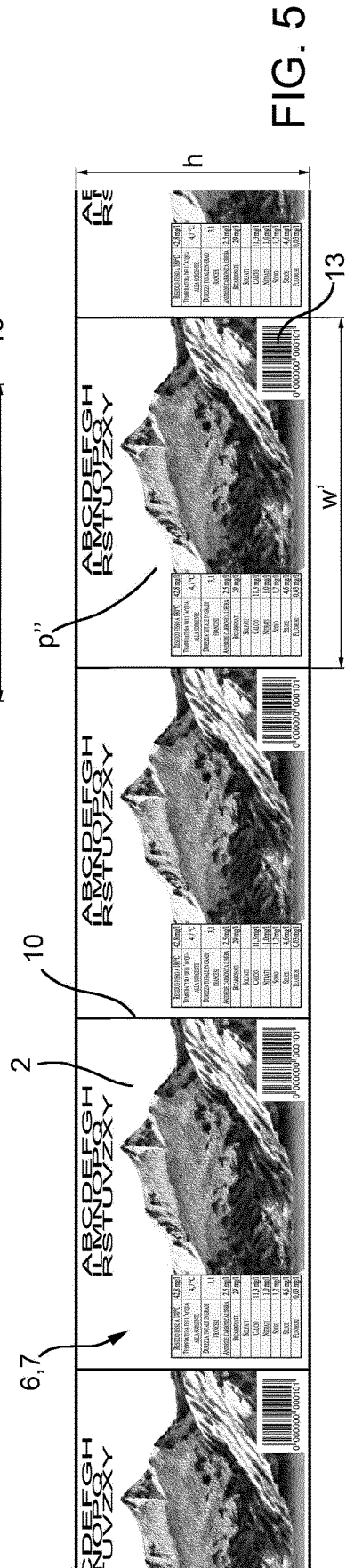
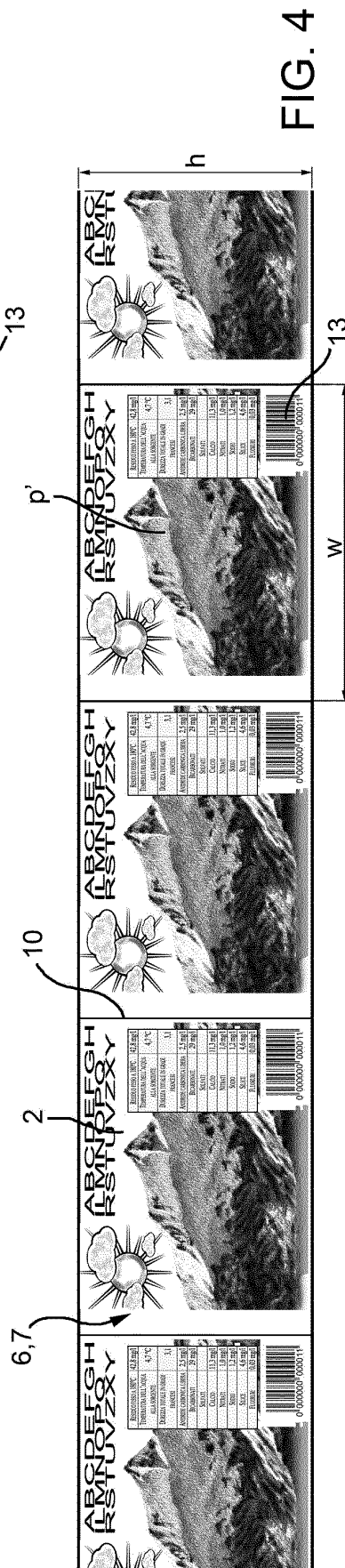
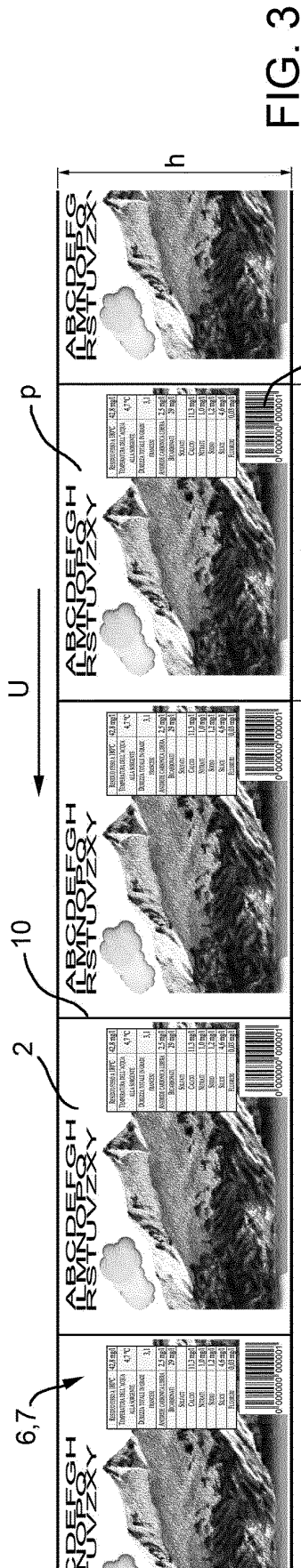
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EUROPEAN SEARCH REPORT

Application Number
EP 19 30 6462

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**ANNEX TO THE EUROPEAN SEARCH REPORT
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EP 19 30 6462

5 This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
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