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(54) **LABELING APPARATUS**

(57) A labeling apparatus (1), comprising at least one assembly for feeding (2) a film (10) carrying a plurality of labels (11) and at least one assembly for applying the labels (11) obtained from the film (10); the labeling apparatus (1) having at least one assembly for advancing (20) the film (10) from the assembly for feeding (2) to the assembly for applying; along the assembly for advancing (20) and between the assembly for feeding (2) and the assembly for applying, there being at least one device for digitally printing (30) at least one portion (11a) of at least one of the labels (11); the labeling apparatus (1) comprising at least one device for controlling the assem-

bly for advancing (20) and the device for digitally printing (30), which is adapted to control the feeding of the film (10) to the device for digitally printing (30) between at least one first condition in which the film (10) is fed at a first speed value, lower than or equal to a speed v_1 , to the device for digitally printing (30) and in which the device for digitally printing (30) is activated in order to carry out the printing of the portion (11a) of label (11), and at least one second condition in which the film (10) is fed at a second speed value, greater than the speed v_1 , to the device for printing (30) and in which the device for digitally printing (30) is deactivated.

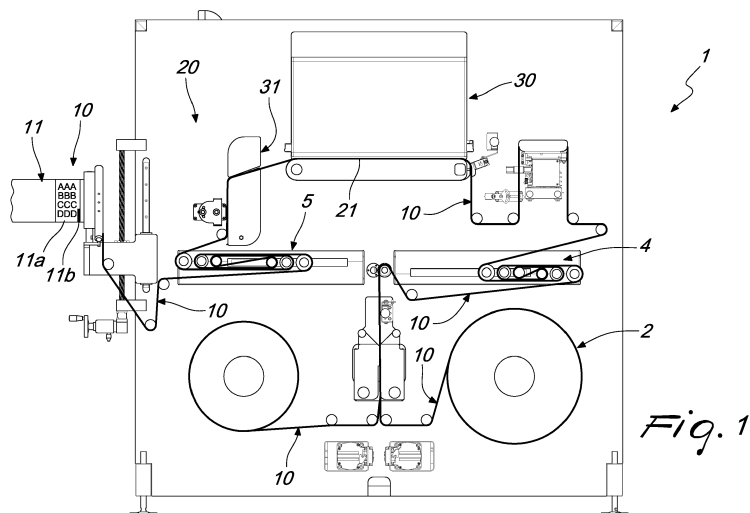


Fig. 1

Description

[0001] The present invention relates to a labeling apparatus.

[0002] Labeling machines are known which allow the in-line printing of label portions.

[0003] For the purposes of example, European patent EP2288550 describes a labeling apparatus for labeling containers which has a storage unit which accommodates a reserve of labeling material, a labeling device, which is arranged along a direction of conveyance of the labels and is designed to attach the labels to the containers, and a printing device that imprints a printed image on the labeling material.

[0004] The solution that is the subject matter of the EP2288550 patent provide that the printing device is spaced apart from the labeling device, differently from some conventional solutions in which the labels are printed after having been applied to the containers or immediately before.

[0005] Furthermore, the apparatus described in EP2288550 involves a buffer which is used to prevent the labeling process from being slowed in the event of substitution of the finished spool with a new one.

[0006] All the solutions that are the subject matter of prior patents have a major drawback which effectively means that it is impossible to offer a labeling machine on the market which is provided with an in-line printing unit.

[0007] In particular, notwithstanding the fact that digital printing devices have now reached particularly high printing speeds, these are significantly lower than the normal labeling speed and, as a consequence, using a device for printing, even partially, the labels in line with the labeling machine would result in an extremely low labeling speed and one that substantially corresponds to the printing speed.

[0008] The aim of the present invention is to provide a labeling apparatus that is capable of improving the known art in one or more of the above mentioned aspects.

[0009] Within this aim, an object of the invention is to provide a labeling apparatus that makes it possible to carry out the printing, at least partially, of the labels in line, while still allowing a labeling speed that is greater than the printing speed.

[0010] A still further object of the invention is to provide a labeling apparatus that is highly reliable, easy to implement and low cost.

[0011] This aim and these and other objects which will become better apparent hereinafter are achieved by a labeling apparatus according to claim 1, optionally provided with one or more of the characteristics of the dependent claims.

[0012] Further characteristics and advantages of the invention will become better apparent from the description of some preferred, but not exclusive, embodiments of the labeling apparatus according to the invention, which are illustrated for the purposes of non-limiting example in the accompanying drawings wherein:

Figure 1 is a front elevation view of a portion of the labeling apparatus according to the invention;

Figure 2 shows possible progressions of the speed of feeding the film to the device for digitally printing as a function of the advancement of the film.

[0013] With reference to the figures, the labeling apparatus according to the invention, generally designated by the reference numeral 1, comprises at least one assembly for feeding 2 a film 10 carrying a plurality of labels 11 and at least one assembly for applying the labels 11 obtained from the film 10.

[0014] The film 10 can be a film of labels or a ribbon supporting self-adhesive labels.

[0015] The labeling apparatus 1 has at least one assembly for advancing 20 the film 10 from the assembly for feeding 2 to the assembly for applying.

[0016] Along the assembly for advancing 20 and, specifically, between the assembly for feeding 2 and the assembly for applying, there is at least one device for digitally printing 30 at least one portion 11a of at least one of the labels 11.

[0017] According to the present invention, the labeling machine 1 comprises at least one device for controlling the assembly for advancing 20 and the device for digitally printing 30.

[0018] The device for controlling is, in particular, adapted to control the feeding of the film 10 to the device for digitally printing 30 between at least one first condition and a second condition.

[0019] In the first condition the film 10 is fed at a first speed value, lower than or equal to a speed v_1 , to the device for digitally printing 30, and the device for digitally printing 30 is activated in order to carry out the printing of at least one portion 11a of label 11.

[0020] In the second condition the film 10 is fed at a second speed value, greater than the speed v_1 , to the printing device 30 and in which the device for digitally printing 30 is deactivated. In the second condition the portion not to be printed of the same label 11 passes through the device for digitally printing 30.

[0021] Preferably, the first speed value is substantially constant in the first condition and substantially corresponds to the maximum printing speed, which corresponds to the speed v_1 , guaranteed by the device for digitally printing 30.

[0022] The second speed value in the second condition can comprise portions at a constant speed (for example equal to a second speed v_2) and transient portions where the speed is comprised between the printing speed and the speed v_2 (trapezoid-shaped progression).

[0023] However, there is no reason why the second speed value cannot have different progressions, for example a triangle-shaped progression or according to different laws of motion.

[0024] The progression of the speed as a function of the advancement of the film 10 can therefore also be different as a function of the characteristics of the film 10

and of the printing operation to be carried out: two different speed profiles (one trapezoid-shaped and one triangle-shaped) are for example shown purely for the purposes of example in Figure 2.

[0025] As a consequence it appears evident that, by virtue of the action of the device for controlling, it is possible to vary the speed at which the film 10 passes through the device for digitally printing 30, setting a first speed value (substantially equal to the printing speed v_1) when the device for digitally printing 30 is activated, and a second speed value, greater than the printing speed, when the device for digitally printing 30 is deactivated.

[0026] In this manner, for each label to be partially printed, what is obtained is an intermediate speed of passing through the device for digitally printing 30, comprised between the first speed value and the second speed value, an intermediate speed that corresponds, effectively, to the actual speed at which the labels can be processed (labeling speed).

[0027] In this manner, the smaller the portion 11a of label 11 to be printed in the direction of advancement of the film 10 with respect to the extension of the label 11 in the direction of advancement of the film 10, the higher the labeling speed can be increased.

[0028] Preferably, the assembly for advancing 20 comprises a first device for accumulating 4 the film 10 which is arranged between the assembly for feeding 2 and the device for digitally printing 30.

[0029] Such first device for accumulating 4 is capable of enabling the management of the variations of speed between the first speed value and the second speed value.

[0030] In fact, the film 10 has, in output from the assembly for feeding 2, and therefore upstream of the first device for accumulating 4, a speed that is substantially equal to the labeling speed while, immediately downstream of the first device for accumulating 4, a speed that is variable and lower than the labeling speed in the first condition, while is greater than the labeling speed in the second condition.

[0031] The first device for accumulating 4 makes it possible to accumulate the film 10 when the film 10 in proximity to the device for digitally printing 30 is in the first condition, and to instead consume it when the film 10 in proximity to the device for digitally printing 30 is in the second condition.

[0032] Advantageously, the first device for accumulating also makes it possible to accumulate film 10 in order to make it possible to manage the spool change.

[0033] Conveniently, the assembly for advancing 20 comprises a second device for accumulating 5 the film 10 which is arranged between the device for digitally printing 30 and the assembly for applying.

[0034] Such second device for accumulating 5 makes it possible to feed the film 10 to the assembly for applying, at a speed that is substantially constant and equal to the labeling speed.

[0035] In fact, the film 10 has, in output from the digital

printing device 30, a speed that can vary between the first speed value and the second speed value, while the film must be fed to the assembly for applying at a speed that is substantially constant and equal to the labeling speed.

[0036] The second device for accumulating 5 makes it possible to accumulate the film 10 when the film 10 in proximity to the device for digitally printing 30 is in the second condition, and to instead consume it when the film 10 in proximity to the device for digitally printing 30 is in the first condition.

[0037] Conveniently, the labeling apparatus 1 is provided with a first device for entraining the film 10 in order to enable the feeding of the film 10 to the assembly for applying, at the labeling speed.

[0038] In general, such device for entraining comprises for example at least one roller for entraining the film 10 which is arranged at the assembly for applying.

[0039] Furthermore, the assembly for advancing 20 comprises, a second device for entraining 21, which is conveniently associated with the device for digitally printing 30 and, more generally, is arranged between the first device for accumulating 4 and the second device for accumulating 5.

[0040] The second device for entraining 21 is controlled by the device for controlling so as to adjust the advancement speed of the film 10 at the device for digitally printing 30.

[0041] It is possible for the second device for entraining 21 to comprise a supporting element, such as for example a belt, controlled by movement means, which is intended to support the film 10 in the condition of engagement with the device for digitally printing 30.

[0042] Advantageously, the belt comprises a suction belt.

[0043] Conveniently, the labeling apparatus 1 comprises a device for drying 31 which is arranged downstream of the device for digitally printing 30.

[0044] Use of the labeling apparatus 1 according to the invention is the following.

[0045] The film 10 is unwound from the spool and fed to the assembly for feeding 20.

[0046] Along the extension of the film 10, markers 11b are provided for each label 11, arranged in a preset position with respect to the portion of label 11a to be printed.

[0047] Along the assembly for feeding, and upstream of the device for digitally printing 30, is a detection device.

[0048] On the basis of the detection of the marker 11b, the device for controlling commands the feeding of the film 10 to the device for digitally printing 30.

[0049] In particular, the device for controlling acts on the device for digitally printing 30 and on the second device for entraining 21.

[0050] Specifically, the device for controlling acts on the device for entraining 21 in order to give the film 10 that passes through the device for digitally printing 30 a first speed value, lower than or equal to a speed v_1 , when the device for digitally printing 30 is activated, and a sec-

ond speed value, greater than v_1 , when the device for digitally printing 30 is deactivated.

[0051] The first device for accumulating 4 and the second device for accumulating 5 make it possible to manage the differences in instantaneous speed respectively between the assembly for feeding 2 and the film 10 passing through the device for digitally printing 30 and between the film 10 passing through the device for digitally printing 30 and the assembly for applying.

[0052] In practice it has been found that the invention fully achieves the intended aim and objects by providing a labeling machine that makes it possible to carry out the in-line printing of at least a portion of the labels while at the same time ensuring a labeling speed that can be appreciably greater than the printing speed.

[0053] The invention, thus conceived, is susceptible of numerous modifications and variations, all of which are within the scope of the appended claims. Moreover, all the details may be substituted by other, technically equivalent elements.

[0054] In practice the materials employed, provided they are compatible with the specific use, and the contingent dimensions and shapes, may be any according to requirements and to the state of the art.

[0055] The content of Italian patent application no. 102017000022716 (UA2017A001369), the priority of which is claimed in the present application, is incorporated as a reference.

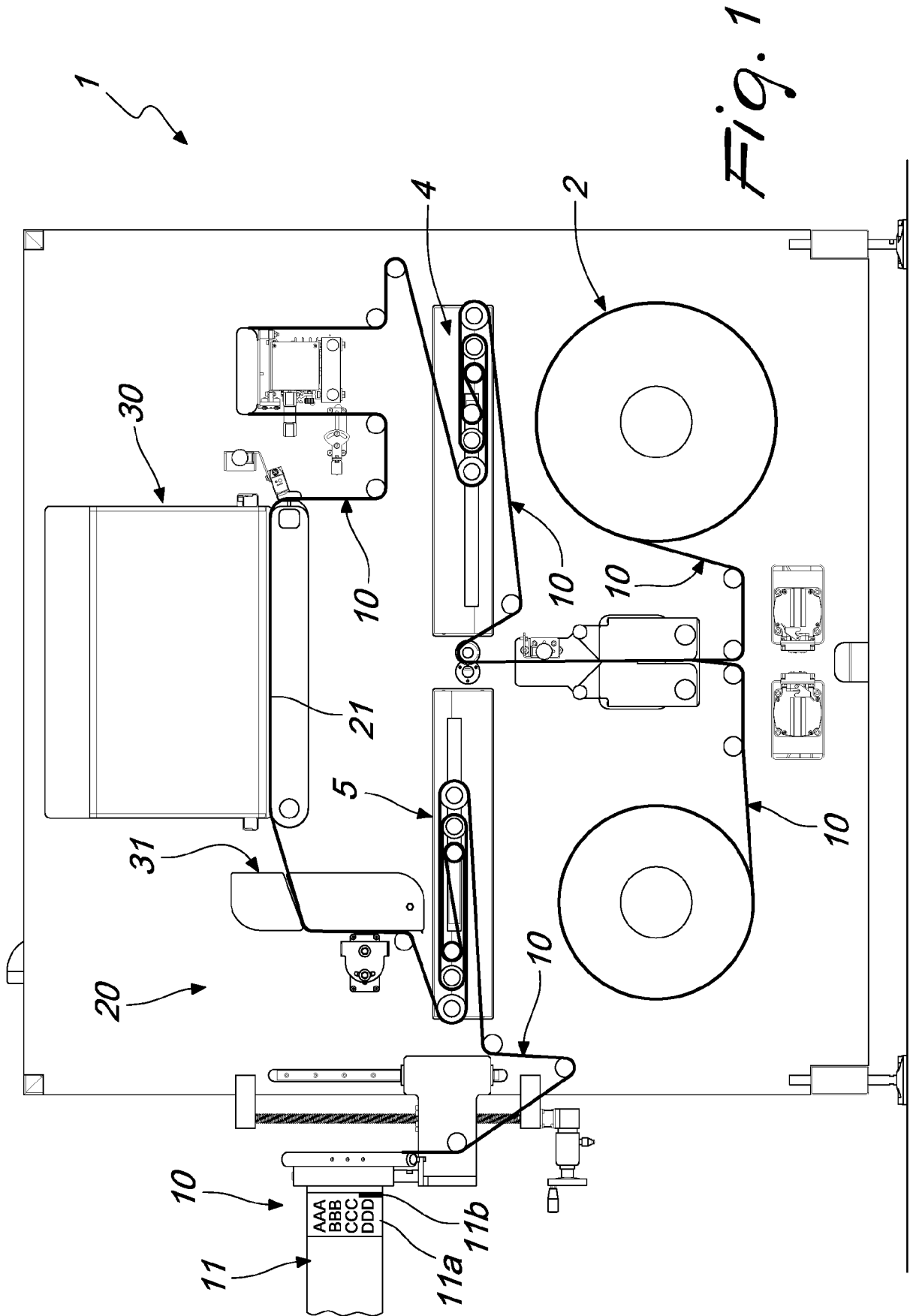
[0056] Where technical features mentioned in any claim are followed by reference signs, those reference signs have been included for the sole purpose of increasing the intelligibility of the claims and accordingly, such reference signs do not have any limiting effect on the interpretation of each element identified by way of example by such reference signs.

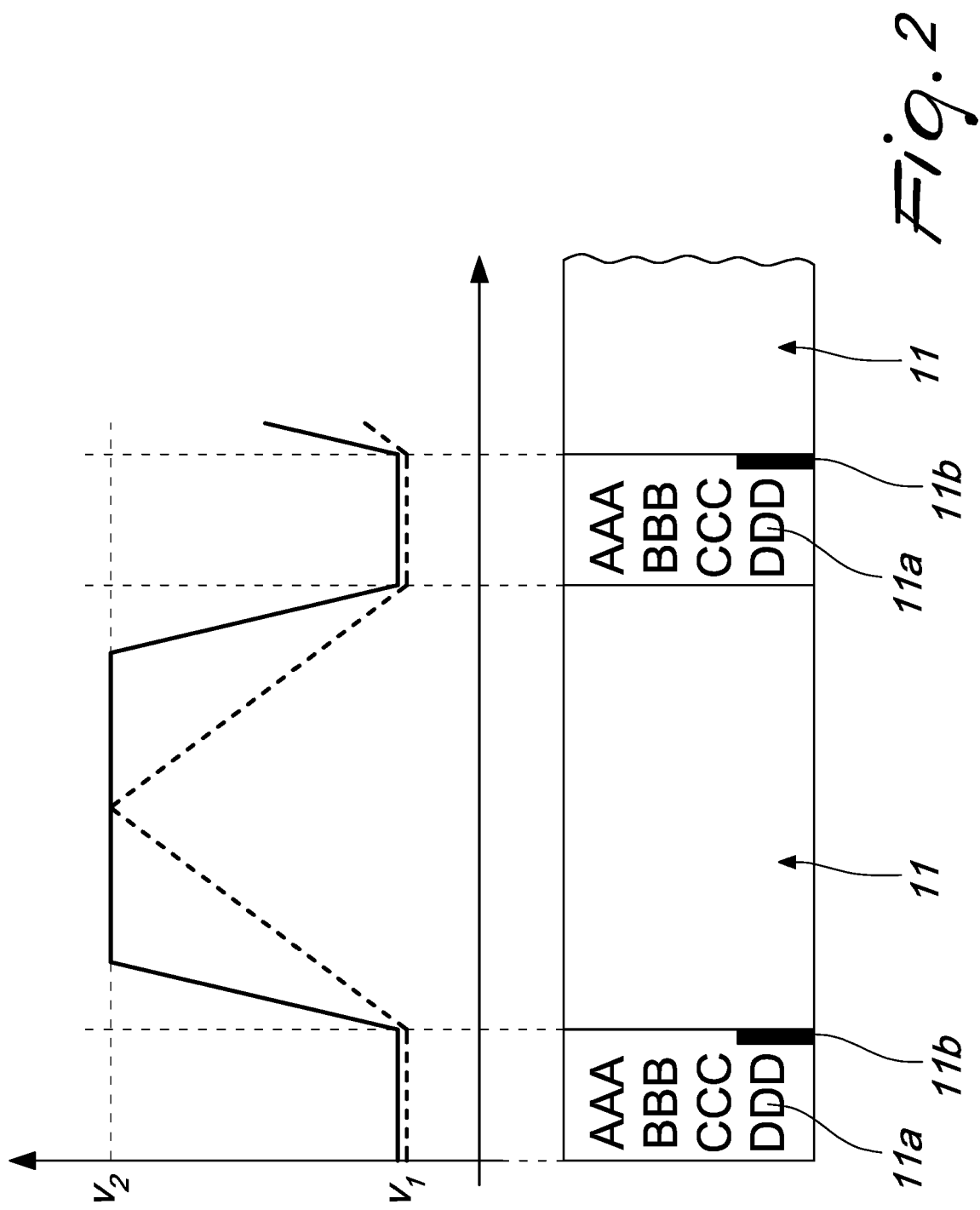
Claims

1. A labeling apparatus (1), comprising at least one assembly for feeding (2) a film (10) carrying a plurality of labels (11) and at least one assembly for applying the labels (11) obtained from said film (10), there being at least one assembly for advancing (20) said film (10) from said at least one assembly for feeding (2) to said at least one assembly for applying, there being, along said assembly for advancing (20) and between said assembly for feeding (2) and said assembly for applying, at least one device for digitally printing (30) at least one portion (11a) of at least one of said labels (11), said apparatus comprising at least one device for controlling said assembly for advancing (20) and said device for digitally printing (30) which is adapted to control the feeding of said film (10) to said at least one device for digitally printing (30) between at least one first condition in which said film (10) is fed at a first speed value, lower than or equal to a speed v_1 , to said device for digitally print-

ing (30) and in which said device for digitally printing (30) is activated in order to carry out the printing of said at least one portion (11a) of label (11), and at least one second condition in which said film (10) is fed at a second speed value, greater than the speed v_1 , to said device for printing (30) and in which said device for digitally printing (30) is deactivated, the portion not to be printed of the same label (11) passing through said device for digitally printing (30) in said second condition, **characterized in that** said assembly for advancing (20) comprises a first device for accumulating (4) said film (10) which is arranged between said device for feeding (2) and said device for digitally printing (30) and a second device for accumulating (5) said film (10) which is arranged between said device for digitally printing (30) and said assembly for applying, said labeling apparatus (1) being provided with a first device for entraining said film (10) in order to enable the feeding of said film (10) at the labeling speed to said assembly for applying, said assembly for advancing (20) comprising a second device for entraining (21) which is arranged between said first device for accumulating (4) and said second device for accumulating (5), said second device for entraining (21) being controlled by said device for controlling so as to adjust the advancement speed of the film (10) at said device for digitally printing (30).

2. The labeling apparatus (1) according to claim 1, **characterized in that** said second device for entraining (21) is associated with said device for digitally printing (30).
3. The labeling apparatus (1), according to one or more of the preceding claims, **characterized in that** said second device for entraining (21) comprises a supporting element that is controlled by means of movement and is intended to support said film (10) in the condition of engagement with said device for digitally printing (30).
4. The labeling apparatus (1) according to one or more of the preceding claims, **characterized in that** said first speed value is substantially constant in said first condition.
5. The labeling apparatus (1) according to one or more of the preceding claims, **characterized in that** said second speed value in said second condition comprises portions at a constant speed v_2 and transient portions in which the speed is comprised between v_1 and v_2 .
6. The labeling apparatus (1) according to one or more of the preceding claims, **characterized in that** it comprises a device for drying (31) arranged downstream of said device for digitally printing (30).







EUROPEAN SEARCH REPORT

Application Number
EP 18 15 9486

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Place of search The Hague		Date of completion of the search 12 July 2018	Examiner Pardo Torre, Ignacio
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