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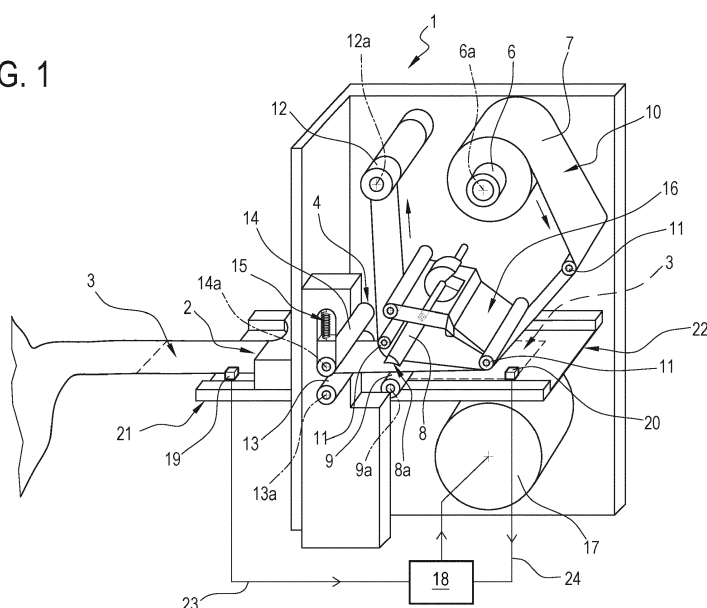
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(54) **PRINTER FOR SUPPORTS MADE OF COMPOSTABLE MATERIAL**

(57) Described is a printer of supports made of compostable material comprising an inlet opening (2) configured for inserting a flap (3) of the support made of compostable material, means (4) for feeding said flap (3) configured for picking up the flap (3) introduced through the inlet opening (2) and feeding it to an end of stroke position;
the feed means (4) are configured to expel the flap (3) through the inlet opening (2) from the end of stroke position;
a thermal transfer printing unit (5) comprising a roller (6) for unwinding a reel (7) of carbon-coated tape (10), a print head (8), configured to heat, and a contact element

(9) of the print head (8); the print head (8) is configured to pass from a non-operating position, at which it is positioned raised relative to the contact element in such a way that the flap (3) can advance through the gap defined by the print head (8) and by the contact element (9), to an operating position, at which the print head (8) lowers towards the contact element (9) in such a way as to bring into contact a respective portion of the carbon-coated tape (10) with the flap (3) and it heats to release the ink of the carbon-coated tape (10) on the flap (3); the print head (8) passes from the non-operating position to the operating position during the expulsion of the flap (3) through the inlet opening (2).

FIG. 1



Description

[0001] This invention relates to a printer and in particular a printer for supports made of compostable material and relative printing method.

[0002] Currently, in order to limit the contamination of the environment, more and more articles made with the use of plastic material are made of compostable material.

[0003] One known example is the bag for containing fruit and/or vegetables used in supermarkets.

[0004] However, even though the replacement of plastic material for compostable material is a virtuous operation for the environment, the articles made of compostable material may, when used, be "contaminated" with other non-compostable materials which affect the compostability of the article itself. Taking as reference the bag for containing fruit and/or vegetables used in supermarkets, the user will, generally, stick a label to the bag to keep track of information about the product contained, such as, for example, purchase price, weight and type of product, so as to be able to purchase the product.

[0005] The prior art labels are not compostable, since they comprise supports made of plastic material such as, for example, the silicone adhesive support, consequently the bag made of compostable material to which the label is attached becomes, however, no longer compostable.

[0006] In this context, the need has been felt of maintaining the compostability of the compostable supports, such as, for example, the bags for fruit and vegetable.

[0007] In this context, the need has been felt of printing information directly on supports made of compostable material in order to maintain its compostability over time, making a printer of supports made of compostable material comprising an inlet opening configured for inserting a flap of the support made of compostable material, means for feeding said flap configured to pick up the flap introduced through the inlet opening and feeding it to an end of stroke position.

[0008] The feed means are configured to expel the flap through the inlet opening from the end of stroke position.

[0009] A thermal transfer printing unit comprising means for unwinding a reel of carbon-coated tape, a print head configured to heat up and a contact element of the head.

[0010] The head is configured to pass from a non-operating position, at which it is positioned raised relative to the contact element in such a way that the flap can advance through the gap defined by the head and by the contact element, to an operating position, at which the head lowers towards the contact element in such a way as to bring into contact a respective portion of the carbon-coated tape with the flap and it heats to release the ink of the carbon-coated tape on the flap.

[0011] The head passes from the non-operating position to the operating position during the expulsion of the flap through the inlet opening. Advantageously, the impact on the environment is positive both with respect to maintaining the compostability of the support and the

drastic reduction in the use of paper material to make the prior art labels.

[0012] Further features and advantages of the invention are more apparent from the non-limiting description which follows of a preferred embodiment of a lift truck as illustrated in the accompanying drawings, in which:

- Figure 1 is a schematic perspective view of a printer for supports of compostable material according to the invention;
- Figure 2 is a schematic view of a weighing device for fruit and/or vegetables comprising the printer of Figure 1.

[0013] The numeral 1 denotes a printer of supports made of compostable material according to the invention.

[0014] The printer 1 comprises an inlet opening 2 configured for inserting a flap 3 of the support made of compostable material illustrated schematically in Figure 2.

[0015] The printer 1 comprises means 4 for feeding said flap 3 configured for picking up the flap 3 introduced through the inlet opening 2 and feeding it to an end of stroke position.

[0016] In Figure 1, the flap 3 is shown by a dashed line in the end of stroke position.

[0017] The feed means 4 are configured to expel the flap 3 through the inlet opening 2 from the end of stroke position towards the outside.

[0018] The feed means have a window for passage of the flap to allow the movement through it towards the end of stroke position and from the end of stroke position.

[0019] The printer 1 comprises a thermal transfer printing unit 5 comprising a roller 6 for unwinding a reel 7 of carbon-coated tape 10, a print head 8 and a contact element 9 of the print head 8.

[0020] The unwinding roller 6 rotates about a relative axis of rotation 6a.

[0021] The axis of rotation 6a is preferably a horizontal axis.

[0022] The unwinding roller 6 is a motor-driven roller.

[0023] The print head 8 has a face 8a, designed to make contact with a portion of the carbon-coated tape 10, configured to heat itself in such a way as to transfer onto the flap 3 ink deriving from the carbon-coated tape.

[0024] It should be noted that at the end of stroke position the flap 3 is positioned at least partly facing the print head 8.

[0025] The face 8a of the print head 8 is configured to transfer information comprising letters and/or numbers and/or bar codes and/or special characters.

[0026] The print head 8 is configured to pass from a non-operating position, at which it is positioned raised relative to the contact element 9, to an operating position, at which the print head 8 lowers towards the contact element 9 in such a way as to bring into contact a respective portion of the carbon-coated tape 10 with the flap 3.

[0027] The print head 8 in the non-operating position and the contact element 9 define a gap for the passage

of the flap 3 at least when fed towards the end of stroke position, in such a way that the flap 3 can feed through the gap formed by the print head 8 and by the contact element 9.

[0028] The print head 8 is configured to heat so as to release the ink of the carbon-coated tape 10 onto the flap 3 in particular when the flap 3 is expelled from the feed means 4.

[0029] In other words, at the operating position, the carbon-coated tape 10 is interposed between the print head 8 and the flap 3 and in contact with the latter.

[0030] The contact element 9 is in the form of a roller rotating about a relative axis of rotation 9a.

[0031] The axis of rotation 9a is a horizontal axis.

[0032] Downstream of the print head 8, in a feed direction V of the carbon-coated tape 10, the printing unit 5 comprises a roller 12 for winding the carbon-coated tape 10 after its ink has finished, coming out from the print head 8. The print head 8 passes from the non-operating position to the operating position during the expulsion of the flap 3 through the inlet opening 2, from the end of stroke position towards the outside.

[0033] The printing unit 5 comprises movement means 16 configured to move at least the print head 8 from the non-operating position to the operating position, and vice versa.

[0034] The printing unit 5 comprises means 11 for tensioning the carbon-coated tape 10 located along the path of the carbon-coated tape from the unwinding roller 6 of the reel 7 to the winding roller 12 of the carbon-coated tape 10 when its ink has finished.

[0035] The winding roller 12 rotates about a relative axis of rotation 12a.

[0036] The axis of rotation 12a is preferably a horizontal axis.

[0037] The winding roller 12 is a motor-driven roller.

[0038] The tensioning means 11 are preferably positioned upstream and downstream of the print head 8 in such a way as to keep the carbon-coated tape 10 tensioned when the print head 8 is in the operating position.

[0039] The tensioning means 11 comprise, for example, rotary rollers with a horizontal axis, that is, they are in the form of rotary rollers with a horizontal axis.

[0040] The means 4 for feeding the flap 3 comprise a first roller 13 and a second roller 14 spaced apart from each other in such a way as to allow the passage of the flap 3.

[0041] The distance between the first roller 13 and the second roller 14 defines the above mentioned passage window, that is, the space interposed between the outer surface of the first roller 13 and the outer surface of the second roller 14 through which the flap 3 is moved.

[0042] In other words, the distance between the first roller 13 and the second roller 14 defines the thickness of the flap 3 which may be introduced in the printer 1 through the inlet opening 2.

[0043] The feed means 4 comprise a contact element 15 configured to act on at least one between the first

roller 13 and the second roller 14 in such a way as to define the distance between the first roller 13 and the second roller 14.

[0044] The contact element 15 is preferably in the form of a spring.

[0045] The first roller 13 and the second roller 14 rotate about respective axes of rotation 13a, 14a.

[0046] The distance between the first roller 13 and the second roller 14 is used to mean the distance between the axis of rotation 13a of the first roller 13 and the axis of rotation 14a of the second roller 14.

[0047] The axes of rotation 13a, 14a are preferably horizontal axes.

[0048] It should be noted that at least one between the first roller 13 and the second roller 14 is a motor-driven roller.

[0049] According this embodiment, the first roller 13 is a motor-driven roller whilst, according to an alternative embodiment, the roller 14 is motor-driven.

[0050] The printer 1 comprises a motor 17 configured for controlling the movement of the motor-driven units of the printing unit 5 and means 4 for feeding the flap 3 by respective transmission means, for example a system of transmission belts, not illustrated.

[0051] In practice, preferably, with reference to the motor-driven means of the printing unit and/or to the feed means 4, the term "motor-driven" means driven or rotated by the motor 17 by means of the transmission means. Advantageously, the use of a single motor 17 guarantees the synchronisation of the movement of the motor-driven units of the printing unit 5 and of the means 4 for feeding the flap 3.

[0052] A control unit 18 is connected electronically with the motor 17 for activating or deactivating it selectively.

[0053] At the inlet opening 2 there is an element or sensor 19 for detecting the presence of the flap 3 connected electronically to the control unit 18 configured for activating the motor 17 for feeding the flap 3 to the end of stroke position by means of the feed means 4..

[0054] In order to feed the flap 3 to the end of stroke position, the first motor-driven roller 13 of the feed means 4 is rotated in a clockwise direction, with reference to Figure 1.

[0055] At the end of stroke position of the tab 3 there is an element or sensor 20 for detecting the presence of the tab 3 connected electronically to the control unit 18.

[0056] The control unit 18 is configured to stop the feed means 4, and in particular the roller 13, when the detection element 20 encounters the flap 3.

[0057] Moreover, the control unit 18 is configured for lowering at least the head 8 on the flap 3 when the latter has reached the end of stroke position. Lastly, the control unit 18 is configured to activate the movement of the feed means 4 for expelling the flap 3 towards the outside through the inlet opening 2 from the end of stroke position.

[0058] In order to expel the flap 3 from the end of stroke position towards the outside, the first motor-driven roller

13 of the feed means 4 is rotated in an anticlockwise direction, with reference to Figure 1.

[0059] The detection element 19, 20, for example, is an optical sensor.

[0060] In order to support the flap 3 during the entrance and exit through the inlet opening 2, at the inlet opening 2, the printer 1 comprises an element 21 for supporting the flap 3.

[0061] At the end of stroke position of the flap 3, the printer 1 comprises a supporting element 22 for supporting it during the movement from the end of stroke position towards the outside of the printer 1.

[0062] According to a preferred embodiment, the supporting element 21 and the supporting element 22 define a guide for the flap 3 from the inlet opening 2 to the end of stroke position.

[0063] In use, the user positions the flap 3 on the supporting element 21 at the inlet opening 2, the detection element 19 detects the presence of the flap 3 and sends a detection signal 23 to the control unit 18.

[0064] The control unit 18, having received the detection signal 23, activates the motor 17 after which the feed means 4 pick up the flap 3 and feed it inside the printer 1 up to the end of stroke position.

[0065] Once the flap 3 reaches the end of stroke position, the detection element 20 detects the presence of the flap 3 and sends a detection signal 24 to the control unit 18.

[0066] After receiving the detection signal 23, the control unit 18 stops the motor 17 and starts it in the opposite direction, in particular the roller 13, after which the feed means 4 expel the flap 3 from the end of stroke position towards the outside through the inlet opening 2.

[0067] During the expulsion of the flap 3 towards the outside through the inlet opening 2 from the end of stroke position, the motor 17 drives the means 16 for moving the print head 8 from the non-operating position to the operating position, in such a way that the print head 8 transfers the ink from the carbon-coated tape 10, interposed between it and the flap 3, onto the flap 3.

[0068] In this way, the flap 3 at the outfeed from the printer 1 has at least one printed portion.

[0069] Advantageously, the use of carbon-coated tape considerably increases the autonomy of the printer 1 according to the invention with respect to the use of heat transfer tape, an increase of 300% considering that currently 200 metres of carbon-coated tape correspond to 65 metres of heat transfer tape, which translates into less machine down time per year.

[0070] This invention also relates to a method for printing supports made of compostable material comprising a step of feeding at least one flap 3 of a support made of compostable material facing at least partly a print head 8 of a thermal transfer printing unit 5.

[0071] The method comprises a step of releasing ink onto a portion of the flap 3 by means of the print head 8.

[0072] The method comprises a step of expelling the flap 3 from the printing unit 5 having a printed portion.

[0073] The step of feeding the flap 3 facing the print head 8 of the printing unit 5 continues until the flap 3 reaches an end of stroke position.

[0074] The step of releasing ink on the flap 3 occurs during the step of expelling the flap 3 from the printing unit 5.

[0075] This invention also relates to a weighing device 25 comprising the printer 1 as described above configured for printing a flap 3 of a bag of compostable material.

[0076] The flap 3 is a portion of the bag handle.

[0077] The handle is preferably longer than the handle of a known bag made of compostable material.

[0078] The weighing device 25 comprises at least one plate 26 on which to position the articles to be weighed, preferably fruit and/or vegetables, a unit 27 for selecting the product to be weighed, positioned on the plate 26. The plate is connected to weighing means, not illustrated, configured for measuring the weight of the products positioned on the plate 26. Preferably, the selection unit 27 is a touch screen having a plurality of icons having a respective identification mark referable to the product to be weighed.

[0079] The identification sign may be, for example, an image and/or a letter and/or a number.

[0080] An electronic unit 28 is connected electronically to the selection unit 27 and to the weighing means, not illustrated, in such a way as to process the product information and send the information to be printed on the handle 3 of the bag using the printing unit 5 of the printer 1, such as, for example, weight, product, bar code, price etc.

[0081] By means of the weighing device 25, the user, after positioning the product on the plate 26, defines, by means of the selection unit 27, the product and inserts the flap 3 of the handle of the compostable bag, designed to house the weighed product, in the inlet opening 2 of the printer 1 which releases the printed flap 3.

[0082] This invention also relates to a printing machine comprising the printer 1 as described above configured for printing a flap 3 of a ticket for public transport, such as, for example, trains, aircraft, buses.

Claims

1. A printer of supports made of compostable material comprising an inlet opening (2) configured for inserting a flap (3) of the support made of compostable material, means (4) for feeding said flap (3) configured for picking up the flap (3) introduced through the inlet opening (2) and feeding it to an end of stroke position;
the feed means (4) are configured to expel the flap (3) through the inlet opening (2) from the end of stroke position;
the feed means (4) have a window for passage of the flap (3) to allow the movement through it towards the end of stroke position and from the end of stroke position;

- a thermal transfer printing unit (5) comprising a roller (6) for unwinding a reel (7) of carbon-coated tape (10), a print head (8), configured to heat, and a contact element (9) of the print head (8);
the print head (8) is configured to pass from a non-operating position, at which it is positioned raised relative to the contact element in such a way that the flap (3) can advance through a gap defined by the print head (8) and by the contact element (9), to an operating position, at which the print head (8) lowers towards the contact element (9) in such a way as to bring into contact a portion of the carbon-coated tape (10) with the flap (3) and it heats to release the ink of the carbon-coated tape (10) on the flap (3);
the print head (8) passes from the non-operating position to the operating position during the expulsion of the flap (3) through the inlet opening (2).
2. The printer according to claim 1, **characterised in that** the printing unit (5) comprises means (11) for tensioning the carbon-coated tape (10) unwound from the reel (7); the tensioning means (11) are positioned at least upstream and downstream of the print head (8) in such a way as to keep the carbon-coated tape (10) tensioned when the print head (8) is in the operating position.
 3. The printer according to claim 1 or 2, **characterised in that** the feed means (4) comprise a first roller (13) and a second roller (14) spaced apart from each other in such a way as to allow the passage of the flap (3).
 4. The printer according to claim 3, **characterised in that** the feed means (4) comprise a contact element (15) configured to act on at least one between the first roller (13) and the second roller (14) in such a way as to define the distance between the first roller (13) and the second roller (14).
 5. The printer according to any one of the preceding claims, **characterised in that** it comprises a motor (17) configured for controlling the movement of the motor-driven units of the printing unit (5) and of the movement means (4).
 6. The printer according to any one of the preceding claims, **characterised in that** at the inlet opening (2) there is an element (19) for detecting the presence of the flap (3) connected electronically to a control unit (18) configured for activating the movement of the feed means (4) for feeding the flap (3) to the end of stroke position.
 7. The printer according to any one of the preceding claims, **characterised in that** at the end of stroke position of the flap (3) there is an element (20) for detecting the presence of the flap (3) connected elec-
- tronically to a control unit (18) configured for activating the movement of the feed means (4) for expelling the flap (3) through the inlet opening (2) from the end of stroke position.
8. The printer according to any one of the preceding claims, **characterised in that** at the inlet opening (2) there is an element (21) for supporting the flap (3) for facilitating the entrance through the inlet opening (2).
 9. The printer according to any one of the preceding claims, **characterised in that** at the end of stroke position of the flap (3) there is an element (22) for supporting the flap (3) for supporting it during the expulsion of the flap.
 10. A method for printing supports made of compostable material comprising a step of feeding at least one flap (3) of a support made of compostable material facing at least partly a print head (8) of a thermal transfer printing unit (5);
a step of releasing ink onto a portion of the flap (3) by means of the print head (8);
a step of expelling the flap (3) from the printing unit (5) having a printed portion.
 11. The method according to claim 10, **characterised in that** the step of feeding the flap (3) facing the print head (8) of the printing unit (5) continues until the flap (3) reaches an end of stroke position.
 12. The method according to claim 10 or 11, **characterised in that** the step of releasing ink on the flap (3) occurs during the step of expelling the flap (3) from the printing unit (5).
 13. A support made of compostable material comprising a flap (3) having a printed portion using the printer according to any one of claims 1 to 9.
 14. The support according to claim 13 in the form of a bag of compostable material the handle of which at least partly defines the above-mentioned flap (3) having the printed portion.
 15. The support according to claim 14 in the form of a card.
 16. A weighing device comprising a printer according to any one of claims 1 to 9.
 17. A stamper comprising a printer according to any one of claims 1 to 9.

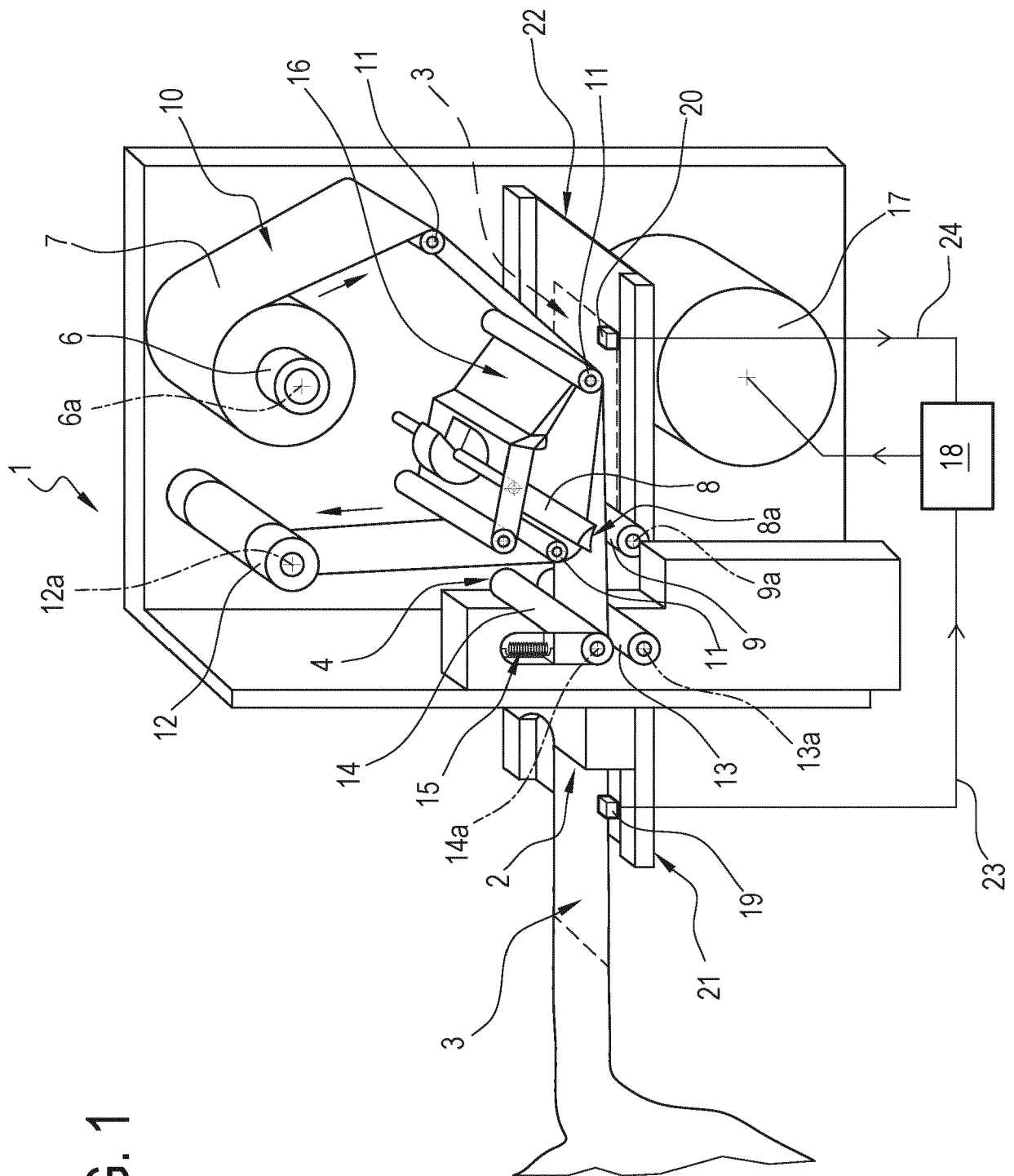
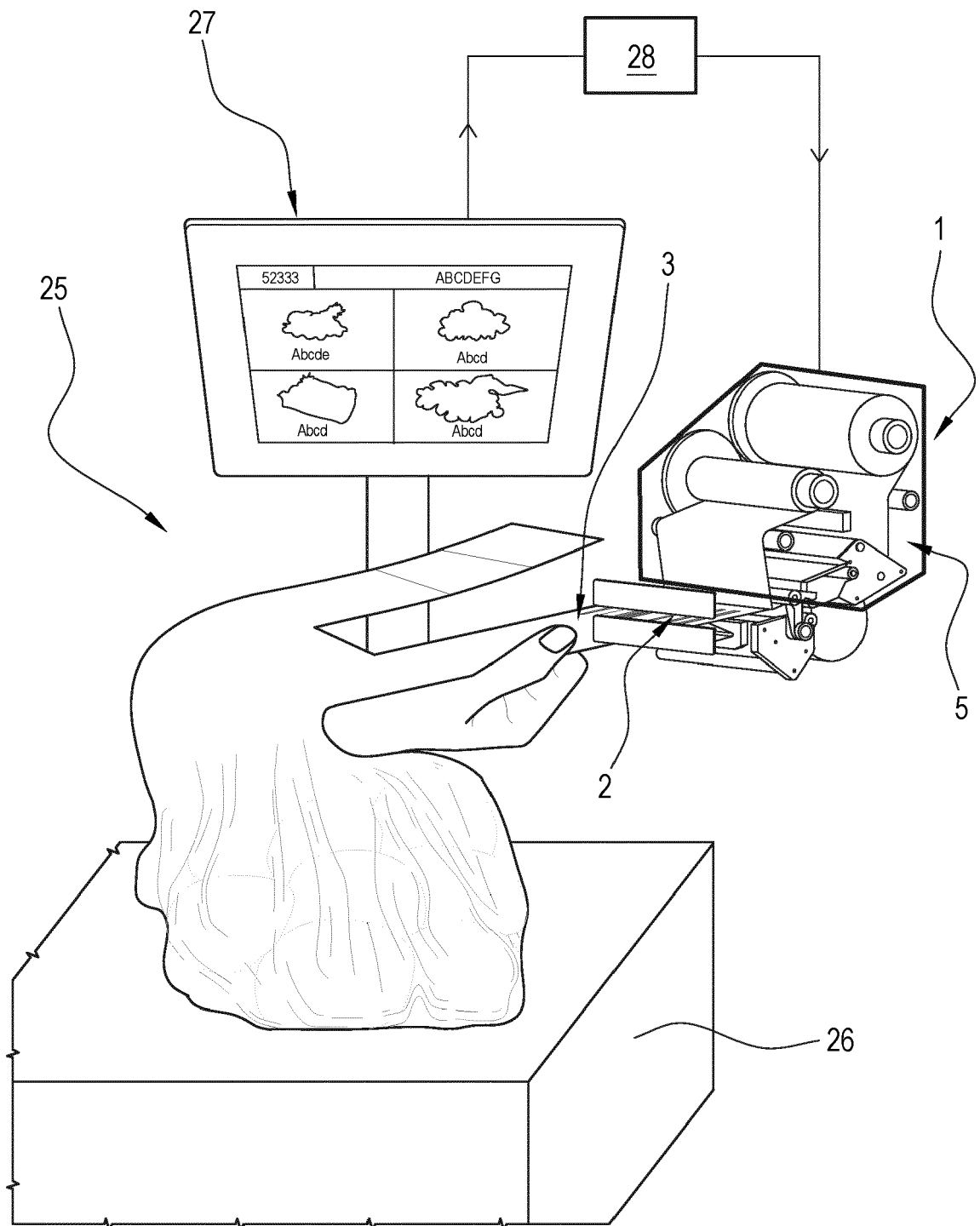


FIG. 1

FIG. 2





EUROPEAN SEARCH REPORT

 Application Number
EP 20 20 1461

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DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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X	US 2012/229822 A1 (SHIMODA TOMOHIKO [JP] ET AL) 13 September 2012 (2012-09-13) * paragraphs [0007], [0012], [0059] - [0064], [0080] - [0082] * * claims; figures *	10-15	TECHNICAL FIELDS SEARCHED (IPC) B41J B65B
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 10 February 2021	Examiner Didenot, Benjamin
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 20 20 1461

5 This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
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