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(54) DEVICE FOR THE POLYMERIZATION OF INKS AND/OR PAINTS IN AN INERT ATMOSPHERE

VORRICHTUNG ZUR POLYMERISATION VON TINTEN UND/ODER FARBEN IN INERTER ATMOSPHÄRE

DISPOSITIF DE POLYMÉRISATION D'ENCRES ET/OU PEINTURES DANS UNE ATMOSPHÈRE INERTE

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(73) Proprietor: **UV Ray S.r.l.**
20010 Cornaredo (IT)

(72) Inventor: **MAIANO, Alberto**
20010 Pregnana Milanese (IT)

(74) Representative: **Pallini Gervasi, Diego et al**
Notarbartolo & Gervasi S.p.A.
Viale Achille Papa, 30
20149 Milano (IT)

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Description

FIELD OF THE INVENTION

[0001] The present invention relates to a device for the polymerization of inks and/or paints. In particular, such a device can be used in printing machines and/or coating machines employing inks, paints or lacquers which are fixed through polymerization, i.e. a chemical reaction which is able to change the molecular structure of components.

[0002] More specifically, reference is made herein to printing machines and/or coating machines, for example but not limited to graphic art printing machines using ultraviolet light sources to cause the polymerization of the ink, paint or lacquer used.

PRIOR ART

[0003] As is known, in printing processes, such as but not limited to flexographic printing processes, ultraviolet light sources are used for the polymerization of inks or paints.

[0004] In the printing machines of the type considered herein, it is known to move the support, such as paper but also films made of polymeric material, so that it passes through several printing stations.

[0005] Various rollers sequentially placed perform the inking of the support.

[0006] This type of printing has the advantage of being used on many supports: paper, cardboard, plastic, aluminium. It allows to use water, UV or solvent colors, at a printing speed.

[0007] In particular, the use of UV reactive inks further speeds up the printing process by including quick drying thereof by exposure to ultraviolet light.

[0008] It is therefore known to use ultraviolet devices, commonly referred to as "lamps", for drying the inks used in the printing processes in high speed coil on paper supports, and the results which can be achieved are good.

[0009] More specifically, a device for the polymerization of inks and/or paints of the type known from the prior art comprises a polymerization chamber. Such a polymerization chamber has an inlet slot for inserting a printed and/or painted support and an outlet slot for ejecting the support once the polymerization has been completed.

[0010] Since a predetermined chemical reaction should take place inside the chamber, the oxygen concentration therein should be minimized. To this end, in use, the chamber is saturated with inert gas, preferably nitrogen. As a result, the device comprises filling means associated with the chamber and configured to introduce inert gas into the chamber. As mentioned above, the device comprises radiation means associated with the chamber and configured to radiate the support with electromagnetic radiation to cause the polymerization of a paint and/or ink layer present on the support. Such radiation means comprise a UV lamp. As a result, the chamber has at least one UV radiation-transparent wall.

[0011] In use, the support is inserted into the chamber through the inlet slot so that one painted and/or inked side is irradiated by UV light. The support is then removed through the outlet slot.

[0012] Disadvantageously, having to provide the inlet for a continuous support, the camber of the known device is not air-tight. As a result, there will be leaks of inert gas and, more disadvantageously, an undesired infiltration of air containing oxygen from the external environment. This would tend to degrade the performance of the polymerization device and, therefore, is a problem already solved in the prior art. The solution, however, consists in increasing the nitrogen introduced into the chamber to compensate for such infiltrations, thereby enormously increasing the consumption of this gas and the costs associated therewith.

[0013] WO 96/34700 A1 describes a method and an apparatus for hardening a layer of ink, paint, adhesive or silicone on a substrate of paper, plastic, wood or metal. The apparatus comprises a housing, which is open in the direction of a transport body of the substrate and covers the substrate while leaving free inlet and outlet openings of the substrate in/from the housing. The apparatus further comprises a UV lamp and a reflector, both arranged in the housing, the reflector being configured to direct the UV rays emitted by the UV lamp on the substrate passing into the housing. A gas conduit introduces gas into the housing. The apparatus further comprises gas recovery nozzles positioned adjacent to the inlet and/or outlet openings of the housing and adapted to direct the gas onto the substrate in input and in output in/from the housing, respectively. Each nozzle has a body, which is glued and screwed to the housing, and an opening adjustable in width by means of a screw.

SUMMARY

[0014] Within this context, the technical task underlying the present invention is to propose a device for the polymerization of inks and/or paints according to the present invention which overcomes the above drawbacks of the prior art.

[0015] In particular, it is the main object of the present invention to provide a device for the polymerization of inks and/or paints able to minimize the consumption of nitrogen.

[0016] It is another object of the present invention to provide a device for the polymerization of inks and/or paints able to minimize the presence of oxygen in the chamber, in particular close to the support.

[0017] The specified technical task and the specified objects are substantially achieved by a device for the polymerization of inks and/or paints according to claim 1 of the present invention. Further preferred embodiments are defined in the dependent claims 2-18.

[0018] The device according to the present invention comprises a polymerization chamber. Such a polymeri-

zation chamber has an inlet slot for inserting a printed and/or painted support. The chamber also has an outlet slot for ejecting such a support.

[0019] Filling means are associated with the chamber. Such filling means are configured to introduce inert gas into the chamber itself.

[0020] Radiation means are further associated with the chamber. The radiation means are configured to radiate the support with an electromagnetic radiation, so as to cause the polymerization of a paint and/or ink layer present on the support.

[0021] A first member for moving the inert gas is placed close to the inlet slot. Said first movement member is configured to move the inert gas from the interior of the chamber towards the inlet slot. The first movement member has a first side surface and a first longitudinal development axis and is rotatable about said first longitudinal development axis in such a direction of rotation that the speed of the first side surface close to the support has an opposite direction with respect to the feeding speed of the support.

[0022] The first movement member allows the dragging effect of the support to be counterbalanced, which tends to drag air from the outside to the interior of the chamber. Therefore, a small amount of inert gas present into the chamber is ejected but at the same time, the entry of air from the outside is strongly limited. The result of these two effects is still a net reduction in the consumption of nitrogen compared to that found in the known solution of the prior art.

[0023] The device may further comprise a second movement member placed close to the outlet slot. Said second movement member is configured to move the inert gas from the outlet slot to the interior of the chamber. In particular, and similar to the first movement member, the second movement member has a second side surface and a second longitudinal development axis and is rotatable about said second longitudinal development axis in such a direction of rotation that the speed of the second side surface close to the support has an opposite direction with respect to the feeding speed of the support.

[0024] Advantageously, in this manner, the amount of nitrogen escaping from the outlet slot dragged by the support is decreased. Therefore, a further reduction in the consumption of nitrogen is achieved.

[0025] The filling means mentioned above can further comprise at least one inert gas distribution member placed close to the inlet slot and/or the outlet slot. Such a distribution member is configured to evenly distribute the inert gas along at least part of the extension of the slot.

[0026] Advantageously, the distribution member close to the inlet slot or the outlet slot collaborates with the movement member already present close to the slot. In fact, a constant flow of nitrogen evenly distributed close to the support is ensured. Any oxygen residues are thus eliminated, improving the printing quality.

LIST OF DRAWINGS

[0027] Further features and advantages of the present invention will become more apparent from the indicative, non-limiting description of a preferred but non-exclusive embodiment of a device for the polymerization of inks and/or paints in an inert atmosphere, as shown in the accompanying drawings, in which:

- figure 1 is a schematic side view of a device for the polymerization of inks and/or paints according to the present invention; and
- figure 2 is a plan view of the device in figure 1 with some parts removed to better show others.

DETAILED DESCRIPTION

[0028] With particular reference to the accompanying figures, reference numeral 1 indicates a device for the polymerization of inks and/or paints according to the present invention.

[0029] Device 1 comprises a polymerization chamber 2 which has an inlet slot 3 for inserting a printed and/or painted support "S" and an outlet slot 4 for ejecting support "S". By way of example only, support "S" may be schematized as a continuous sheet having a printed surface "ST". Such a support "S" is movable along a feeding direction "A". In particular, the feeding direction "A" is perpendicular to both the inlet slot 3 and to the outlet slot 4. It should be noted, however, that since support "S" is not part of the present invention, it can still be of any type.

[0030] More in detail, device 1 comprises movement means (not shown) of support "S", such movement means comprise at least one motorized roller. A plurality of further rollers 6 are placed underneath support "S", in particular on the side opposite to the printed surface "ST", so as to support it.

[0031] With reference in particular to figure 1, device 1 comprises filling means 7 associated with chamber 2. Such filling means 7 are configured to introduce inert gas, preferably nitrogen, into chamber 2. The filling means 7 will be described in detail in a following part of the present description.

[0032] Device 1 further comprises radiation means 8 associated with chamber 2. Such radiation means 8 are configured to radiate support "S" with an electromagnetic radiation to cause the polymerization of a paint and/or ink layer present on support "S". In particular, the radiation means 8 operate in a radiation area 2a of chamber 2.

[0033] More in detail, the radiation means 8 comprise a UV lamp 9. Such a lamp 9 faces the printed surface "ST" of support "S". The power of lamp 9 is calibrated according to the feeding speed of support "S", so as to provide the right amount of UV radiation to cause a complete polymerization on support "S". Optionally, the radiation means 8 may comprise a mirror 10 placed behind lamp 9, capable of concentrating the UV radiation of lamp 9 on support "S", thereby allowing the use of a low-power

lamp 9.

[0034] Suitable radiation means for use with the current invention may be similar to that disclosed in the patent application IT 10 2015 902331688 of the same Applicant.

[0035] The filling means 7 comprise at least one inert gas distribution member 11 placed close to the inlet slot 3 and/or the outlet slot 4. The distribution member 11 is configured to evenly distribute the inert gas along at least part of the extension of slot 3, 4 to which it is applied. Within the context of the present description, the term "extension" means the prevailing dimension of each of slots 3, 4. As is shown in the accompanying drawings, such a prevailing dimension substantially extends in a direction perpendicular to the feeding direction "A" support "S" and substantially parallel to the plane of support "S" itself.

[0036] More in detail, the distribution member 11 is configured to evenly distribute the inert gas along at least 60% of the extension of slot 3, 4, and preferably as much as possible along 100% of the extension of slot 3, 4.

[0037] In further detail, device 1 preferably comprises a pair of distribution members 11, placed at the inlet slot 3 and at the outlet slot 4, respectively. In other words, the distribution members 11 are placed outside the radiation area 2a of chamber 2. In yet other words, the radiation zone 2a is placed between the distribution members 11.

[0038] In particular, the distribution member 11 has a cavity 12 placed in fluid communication with a source of inert gas. Such an inert gas source may be a nitrogen cylinder, commercially available. Cavity 12 has a plurality of first nozzles 13, each placed close to slot 3, 4. The first nozzles 13 are substantially aligned, thereby defining a dispensing line substantially parallel to slot 3, 4. In practice, in the preferred embodiment, cavity 12 is a tube, closed at the ends, on the side surface of which holes are obtained for defining the first nozzles 13 already mentioned.

[0039] The distribution member 11 further comprises a conduit 14 placed in fluid communication with a source of inert gas. In practice, the cavity 12 mentioned above is placed in fluid communication with the source thereof through conduit 14. In particular, conduit 14 is inserted into cavity 12 and is placed in fluid communication with cavity 12 so as to saturate it with the inert gas.

[0040] In greater detail, conduit 14 has a plurality of second nozzles 15 opening into cavity 12. The second nozzles 15 have a smaller passage area than a passage area of the first nozzles 12. Within the context of the present description, "passage area" means the total area of the first 13 and second nozzles 15, respectively. Accordingly, a greater area of the second nozzles 15 can be obtained by increasing the number of second nozzles 15 with respect to the first nozzles 13 with the same section of each nozzle. Alternatively or in combination, the size of each first nozzle 15 may also be increased with respect to a single first nozzle 13.

[0041] Device 1 comprises at least a first movement member 19 for the inert gas. In particular, such a first movement member 19 is placed close to the inlet slot 3, and is configured to move the inert gas from the interior of chamber 2 towards the inlet slot 3. In other words, the first movement member 19 is placed between the distribution member 11 close to the inlet slot 3 and the inlet slot 3 itself. Preferably, the first movement member 19 is inserted into a containment compartment 2b of chamber 2. A partition 22 separates the containment compartment 2b from the rest of chamber 2. Such a partition 22 is therefore placed between the first movement member 19 and the distribution member 11 closest to the inlet slot 3. The first movement member 19 has the function of countering the action of support "S", which would tend to bring air from the external environment towards the interior of chamber 2.

[0042] In greater detail, the first movement member 19 has a prismatic shape, preferably cylindrical. Said first movement member 19 has a first side surface 20 and a first longitudinal development axis "L1" which, in particular, is an axis of symmetry of said first movement member 19. Accordingly, the first side surface 20 is symmetrical with respect to the first longitudinal development axis "L1". The first longitudinal development axis "L1" is in particular oriented along a direction substantially parallel with respect to the outlet slot 4.

[0043] The first movement member 19 is rotatable with respect to the first longitudinal development axis "L1" thereof. The direction of rotation of the first movement member 19 is such that the speed of the first side surface 20 close to support "S" has an opposite direction with respect to the feeding speed of support "S" itself. In this way, the air which would tend to penetrate into chamber 2 through the inlet slot 3 is stopped by a flow of inert gas generated by the rotation of the first movement member 19.

[0044] In greater detail, the first side surface 20 of the first movement member 19 has an area proximal to the inlet slot 3, through which support "S" entering chamber 2 passes. The first side surface 20 is movable approaching the inlet slot 3 along such a proximal area.

[0045] To improve the efficacy of the inert gas dragging effect of the first movement member 19, the first side surface 20 has a plurality of first bumps 21. Such first bumps 21 have the function of triggering a turbulent motion in the vicinity of the first side surface 20 of the first movement member 19. In the embodiment shown, first bumps 21 may consist of recesses obtained on the first side surface 20 of the first movement member 19.

[0046] Advantageously, the rotation of the first movement member 19 together with the presence of said partition 22 causes the onset of a high-pressure area inside the containment compartment 2b of chamber 2.

[0047] In the preferred embodiment, device 1 also comprises a second movement member 16 for the inert gas. Said second movement member 16 is placed close to the outlet slot 4 and is configured to move the inert

gas from the outlet slot 4 towards the interior of chamber 2. In other words, the second movement member 16 counteracts the action of support "S", which would tend to drag the inert gas therewith out of chamber 2.

[0048] Structurally, the second movement member 16 is made in a similar way to the first movement member 19 and therefore has a prismatic shape, preferably cylindrical. In particular, the second movement member 16 has a second side surface 17, similar to the first side surface 20 of the first movement member 19 and a second longitudinal development axis "L2".

[0049] In particular, the second longitudinal development axis "L2" is an axis of symmetry of the second movement member 16. Accordingly, the second side surface 17 is symmetrical with respect to the second longitudinal development axis "L2". The second longitudinal development axis "L2" is in particular oriented along a direction substantially parallel with respect to the outlet slot 4.

[0050] In order to improve the efficacy of the dragging effect of the second movement member 16, the second side surface 17 has a plurality of second bumps 18, similar to first bumps 21 of the first side surface 20 of the first movement member 19. Such bumps, similar to first bumps 21 of the first movement member 19, have the function of triggering a turbulent motion in the vicinity of the second side surface 17 of the second movement member 16. Preferably, second bumps 18 may consist of recesses obtained on the second side surface 17.

[0051] The second movement member 16 is rotatable with respect to the second longitudinal development axis "L2" thereof, similar to the first longitudinal development axis "L1" of the first movement member 19 and preferably parallel thereto. The direction of rotation of the second movement member 16 is such that the speed of the second side surface 17 thereof close to support "S" has an opposite direction with respect to the feeding speed of support "S" itself. In this way, the inert gas which would tend to escape from chamber 2 through the outlet slot 4 is returned back by the rotation of the second movement member 16.

[0052] In greater detail, the second side surface 17 of the second movement member 16 has an area proximal to the outlet slot 4, through which support "S" exiting from chamber 2 passes. The second side surface 17 is movable away from the outlet slot 4 along such a proximal area.

[0053] In other words, the second side surface 17 of the second movement member 16 has an area proximal to the outlet slot 4. The second side surface 17 of the second movement member 16 is movable away from the outlet slot 4 along such a proximal area.

Claims

1. A device (1) for the polymerization of inks and/or paints, comprising a polymerization chamber (2) having an inlet slot (3) for inserting a printed and/or painted support (S) and an outlet slot (4) for ejecting said support (S); filling means (7) associated with said chamber (2) and configured to introduce inert gas into said chamber (2); radiation means (8) associated with said chamber (2) and configured to radiate said support (S) with electromagnetic radiation to cause the polymerization of a paint and/or ink layer present on said support (S); and a first movement member (19) of said inert gas placed close to said inlet slot (3), **characterized in that**
said first movement member (19) is configured to move said inert gas from the interior of said chamber (2) towards the inlet slot (3) and has a first side surface (20) and a first longitudinal development axis (L1), said first movement member (19) being rotatable about said first longitudinal development axis (L1) in such a direction of rotation that the speed of said first side surface (20) close to the support (S) has an opposite direction with respect to the feeding speed of the support (S).

2. A device (1) according to claim 1, **characterized in that** said chamber (2) has a containment compartment (2b), said first movement member (19) being inserted in said containment compartment (2b).

3. A device (1) according to claim 2, **characterized in that** it comprises a partition (22) for defining said containment compartment (2b), said partition (22) being placed between the first movement member (19) and the filling means (7).

4. A device (1) according to any one of the preceding claims, **characterized in that** said first longitudinal development axis (L1) of said first movement member (19) is arranged along a direction substantially parallel to said inlet slot (3).

5. A device (1) according to any one of the preceding claims, **characterized in that** said first side surface (20) of said first movement member (19) is symmetric with respect to said first longitudinal development axis (L1).

6. A device (1) according to any one of the preceding claims, **characterized in that** said first side surface (20) has a plurality of first bumps (21).

7. A device (1) according to claim 6, **characterized in that** said first bumps (21) are recesses obtained on said first side surface (20) of said first movement member (19).

8. A device (1) according to any one of the preceding claims, **characterized in that** it comprises a second movement member (16) placed close to said outlet slot (4) and configured to move said inert gas from the outlet slot (4) towards the interior of said chamber

(2), said second movement member (16) having a second side surface (17) and a second longitudinal development axis (L2), said second movement member (16) being rotatable with respect to said second longitudinal development axis (L2) in such a direction of rotation that the speed of said second side surface (17) close to the support (S) has an opposite direction with respect to the feeding speed of the support (S).

9. A device (1) according to claim 8, **characterized in that** said second longitudinal development axis (L2) is arranged along a direction substantially parallel to said outlet slot (4).

10. A device (1) according to claim 8 or 9, **characterized in that** said second side surface (17) of said second movement member (16) is symmetric with respect to said second longitudinal development axis (L2).

11. A device (1) according to any one of claims 8 to 10, **characterized in that** said second side surface (17) has a plurality of second bumps (18).

12. A device (1) according to claim 11, **characterized in that** said second bumps (18) are recesses obtained on said second side surface (17).

13. A device (1) according to any one of the preceding claims, **characterized in that** said filling means (7) comprise at least one distribution member (11) of said inert gas placed close to said inlet slot (3) and/or said outlet slot (4) and configured to evenly distribute said inert gas along at least a part of the extension of said slot/slots (3, 4).

14. A device (1) according to claim 13, **characterized in that** said at least one distribution member (11) is configured to evenly distribute said inert gas along at least 60% of the extension of said slot/slots (3, 4), preferably along 100% of the extension of the slot/slots (3, 4).

15. A device (1) according to any one of the preceding claims 13 to 14, **characterized in that** it comprises a pair of distribution members (11), placed at said inlet slot (3) and said outlet slot (4), respectively.

16. A device (1) according to any one of claims 13 to 15, **characterized in that** said at least one distribution member (11) comprises a cavity (12) placed in fluid communication with a source of inert gas, said cavity (12) having a plurality of first nozzles (13), each placed close to said slot/slots (3, 4), said first nozzles (13) being substantially aligned and defining a dispensing line substantially parallel to said slot/slots (3, 4).

17. A device (1) according to claim 16, **characterized in that** said distribution member (11) comprises a conduit (14) placed in fluid communication with an inert gas source, said conduit (14) being inserted in said cavity (12) and being placed in fluid communication with said cavity (12) in order to saturate said cavity (12) with inert gas.

18. A device (1) according to claim 17, **characterized in that** said conduit (14) has a plurality of second nozzles (15) opening into said cavity (12), said second nozzles (15) having a smaller passage area with respect to a passage area of said first nozzles (13).

Patentansprüche

1. Vorrichtung (1) zur Polymerisation von Tinten und/oder Farben, umfassend eine Polymerisationskammer (2), die einen Einlassschlitz (3) zum Einsetzen eines bedruckten und/oder gefärbten Trägers (S) und einen Auslassschlitz (4) zum Auswerfen des Trägers (S) aufweist; Einfüllmittel (7), die der Kammer (2) zugeordnet sind und die ausgebildet sind, um Inertgas in die Kammer (2) einzuführen; Strahlungsmittel (8), die der Kammer (2) zugeordnet sind und die ausgebildet sind, um den Träger (S) mit elektromagnetischer Strahlung zu bestrahlen, um die Polymerisation einer auf dem Träger (S) vorhandenen Farb- und/oder Tintenschicht zu bewirken; und ein erstes Bewegungselement (19) des Inertgases, das in der Nähe des Einlassschlitzes (3) angeordnet ist,
dadurch gekennzeichnet, dass
das erste Bewegungselement (19) ausgebildet ist, um das Inertgas aus dem Inneren der Kammer (2) in Richtung des Einlassschlitzes (3) zu bewegen und eine erste Seitenfläche (20) und eine erste Längsabwicklungsachse (L1) aufweist, wobei das erste Bewegungselement (19) um die erste Längsabwicklungsachse (L1) in einer solchen Drehrichtung drehbar ist, dass die Geschwindigkeit der ersten Seitenfläche (20) nahe dem Träger (S) eine entgegengesetzte Richtung in Bezug auf die Vorschubgeschwindigkeit des Trägers (S) aufweist.

2. Vorrichtung (1) nach Anspruch 1, **dadurch gekennzeichnet, dass** die Kammer (2) einen Behälterraum (2b) aufweist, wobei das erste Bewegungselement (19) in den Behälterraum (2b) eingesetzt ist.

3. Vorrichtung (1) nach Anspruch 2, **dadurch gekennzeichnet, dass** sie eine Trennwand (22) zum Definieren des Behälterraums (2b) umfasst, wobei die Trennwand (22) zwischen dem ersten Bewegungselement (19) und den Einfüllmitteln (7) angeordnet ist.

4. Vorrichtung (1) nach einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** die erste Längsabwicklungsachse (L1) des ersten Bewegungselements (19) entlang einer Richtung im Wesentlichen parallel zu dem Einlassschlitz (3) angeordnet ist.

5. Vorrichtung (1) nach einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** die erste Seitenfläche (20) des ersten Bewegungselements (19) symmetrisch zur ersten Längsabwicklungsachse (L1) ist.

6. Vorrichtung (1) nach einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** die erste Seitenfläche (20) eine Vielzahl von ersten Vorsprüngen (21) aufweist.

7. Vorrichtung (1) nach Anspruch 6, **dadurch gekennzeichnet, dass** die ersten Vorsprünge (21) Einbuchtungen sind, die auf der ersten Seitenfläche (20) des ersten Bewegungselements (19) erhalten werden.

8. Vorrichtung (1) nach einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** sie ein zweites Bewegungselement (16) umfasst, das in der Nähe des Auslassschlitzes (4) angeordnet ist und das ausgebildet ist, um das Inertgas aus dem Auslassschlitz (4) in Richtung des Inneren der Kammer (2) zu bewegen, wobei das zweite Bewegungselement (16) eine zweite Seitenfläche (17) und eine zweite Längsabwicklungsachse (L2) aufweist, wobei das zweite Bewegungselement (16) in Bezug auf die zweite Längsabwicklungsachse (L2) in einer solchen Drehrichtung drehbar ist, dass die Geschwindigkeit der zweiten Seitenfläche (17) nahe dem Träger (S) eine entgegengesetzte Richtung in Bezug auf die Vorschubgeschwindigkeit des Trägers (S) aufweist.

9. Vorrichtung (1) nach Anspruch 8, **dadurch gekennzeichnet, dass** die zweite Längsabwicklungsachse (L2) entlang einer Richtung im Wesentlichen parallel zu dem Auslassschlitz (4) angeordnet ist.

10. Vorrichtung (1) nach Anspruch 8 oder 9, **dadurch gekennzeichnet, dass** die zweite Seitenfläche (17) des zweiten Bewegungselements (16) symmetrisch zur zweiten Längsabwicklungsachse (L2) ist.

11. Vorrichtung (1) nach einem der Ansprüche 8 bis 10, **dadurch gekennzeichnet, dass** die zweite Seitenfläche (17) eine Vielzahl von zweiten Vorsprüngen (18) aufweist.

12. Vorrichtung (1) nach Anspruch 11, **dadurch gekennzeichnet, dass** die zweiten Vorsprünge (18) Einbuchtungen sind, die auf der zweiten Seitenfläche (17) erhalten werden.

13. Vorrichtung (1) nach einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** die Einfüllmittel (7) mindestens ein Verteilerelement (11) des Inertgases umfassen, das in der Nähe des Einlassschlitzes (3) und/oder des Auslassschlitzes (4) angeordnet ist und das ausgebildet ist, um das Inertgas gleichmäßig entlang mindestens einer Strecke der Ausdehnung des Schlitzes/der Schlitze (3, 4) zu verteilen.

14. Vorrichtung (1) nach Anspruch 13, **dadurch gekennzeichnet, dass** das mindestens eine Verteilerelement (11) ausgebildet ist, um das Inertgas gleichmäßig entlang mindestens 60% der Ausdehnung des Schlitzes/der Schlitze (3, 4), vorzugsweise entlang 100% der Ausdehnung des Schlitzes/der Schlitze (3, 4) zu verteilen.

15. Vorrichtung (1) nach einem der vorhergehenden Ansprüche 13 bis 14, **dadurch gekennzeichnet, dass** sie ein Paar von Verteilerelementen (11) umfasst, die jeweils an dem Einlassschlitz (3) und dem Auslassschlitz (4) angeordnet sind.

16. Vorrichtung (1) nach einem der Ansprüche 13 bis 15, **dadurch gekennzeichnet, dass** das mindestens eine Verteilerelement (11) einen Hohlraum (12) umfasst, der in Fluidverbindung mit einer Inertgasquelle angeordnet ist, wobei der Hohlraum (12) eine Vielzahl von ersten Düsen (13) aufweist, die jeweils in der Nähe des Schlitzes/der Schlitze (3, 4) angeordnet sind, wobei die ersten Düsen (13) im Wesentlichen ausgerichtet sind und eine Abgabelinie im Wesentlichen parallel zum Schlitz/zu den Schlitzen (3, 4) definieren.

17. Vorrichtung (1) nach Anspruch 16, **dadurch gekennzeichnet, dass** das Verteilerelement (11) eine Leitung (14) umfasst, die in Fluidverbindung mit einer Inertgasquelle angeordnet ist, wobei die Leitung (14) in den Hohlraum (12) eingesetzt und in Fluidverbindung mit dem Hohlraum (12) angeordnet ist, um den Hohlraum (12) mit Inertgas zu sättigen.

18. Vorrichtung (1) nach Anspruch 17, **dadurch gekennzeichnet, dass** die Leitung (14) eine Vielzahl von zweiten Düsen (15) aufweist, die in den Hohlraum (12) münden, wobei die zweiten Düsen (15) eine kleinere Durchgangsfläche in Bezug auf eine Durchgangsfläche der ersten Düsen (13) aufweisen.

Revendications

1. Dispositif (1) de polymérisation d'encres et/ou peintures, comprenant une chambre de polymérisation

(2) ayant une fente d'entrée (3) pour insérer un support imprimé et/ou peint (S) et une fente de sortie (4) pour éjecter ledit support (S) ; des moyens de remplissage (7) associés à ladite chambre (2) et configurés pour introduire un gaz inerte dans ladite chambre (2) ; des moyens de rayonnement (8) associés à ladite chambre (2) et configurés pour rayonner sur ledit support (S) avec un rayonnement électromagnétique pour provoquer la polymérisation d'une couche de peinture et/ou d'encre présente sur ledit support (S) ; et un premier élément de déplacement (19) dudit gaz inerte placé à proximité de ladite fente d'entrée (3), **caractérisé en ce que**
ledit premier élément de déplacement (19) est configuré pour déplacer ledit gaz inerte de l'intérieur de ladite chambre (2) en direction de la fente d'entrée (3) et possède une première surface latérale (20) et un premier axe de développement longitudinal (L1), ledit premier élément de déplacement (19) étant apte à tourner autour dudit premier axe de développement longitudinal (L1) dans un sens de rotation tel que la vitesse de ladite première surface latérale (20) à proximité du support (S) a un sens opposé par rapport à la vitesse d'alimentation du support (S).

2. Dispositif (1) selon la revendication 1, **caractérisé en ce que** ladite chambre (2) possède un compartiment de confinement (2b), ledit premier élément de déplacement (19) étant inséré dans ledit compartiment de confinement (2b).

3. Dispositif (1) selon la revendication 2, **caractérisé en ce qu'**il comprend une cloison (22) pour définir ledit compartiment de confinement (2b), ladite cloison (22) étant placée entre le premier élément de déplacement (19) et les moyens de remplissage (7).

4. Dispositif (1) selon l'une quelconque des revendications précédentes, **caractérisé en ce que** ledit premier axe de développement longitudinal (L1) dudit premier élément de déplacement (19) est agencé le long d'une direction sensiblement parallèle à ladite fente d'entrée (3).

5. Dispositif (1) selon l'une quelconque des revendications précédentes, **caractérisé en ce que** ladite première surface latérale (20) dudit premier élément de déplacement (19) est symétrique par rapport audit premier axe de développement longitudinal (L1).

6. Dispositif (1) selon l'une quelconque des revendications précédentes, **caractérisé en ce que** ladite première surface latérale (20) possède une pluralité de premières aspérités (21).

7. Dispositif (1) selon la revendication 6, **caractérisé en ce que** lesdites premières aspérités (21) sont des évidements obtenus sur ladite première surface latérale (20) dudit premier élément de déplacement (19).

8. Dispositif (1) selon l'une quelconque des revendications précédentes, **caractérisé en ce qu'**il comprend un second élément de déplacement (16) placé à proximité de ladite fente de sortie (4) et configuré pour déplacer ledit gaz inerte de ladite fente de sortie (4) en direction de l'intérieur de ladite chambre (2), ledit second élément de déplacement (16) ayant une seconde surface latérale (17) et un second axe de développement longitudinal (L2), ledit second élément de déplacement (16) étant apte à tourner par rapport audit second axe de développement longitudinal (L2) dans un sens de rotation tel que la vitesse de ladite seconde surface latérale (17) à proximité du support (S) a un sens opposé par rapport à la vitesse d'alimentation du support (S).

9. Dispositif (1) selon la revendication 8, **caractérisé en ce que** ledit second axe de développement longitudinal (L2) est agencé le long d'une direction sensiblement parallèle à ladite fente de sortie (4).

10. Dispositif (1) selon la revendication 8 ou 9, **caractérisé en ce que** ladite seconde surface latérale (17) dudit second élément de déplacement (16) est symétrique par rapport audit second axe de développement longitudinal (L2).

11. Dispositif (1) selon l'une quelconque des revendications 8 à 10, **caractérisé en ce que** ladite seconde surface latérale (17) possède une pluralité de secondes aspérités (18).

12. Dispositif (1) selon la revendication 11, **caractérisé en ce que** lesdites secondes aspérités (18) sont des évidements obtenus sur ladite seconde surface latérale (17).

13. Dispositif (1) selon l'une quelconque des revendications précédentes, **caractérisé en ce que** lesdits moyens de remplissage (7) comprennent au moins un élément de distribution (11) dudit gaz inerte placé à proximité de ladite fente d'entrée (3) et/ou de ladite fente de sortie (4) et configuré pour distribuer uniformément ledit gaz inerte le long d'au moins une partie de l'extension de ladite fente/desdites fentes (3, 4).

14. Dispositif (1) selon la revendication 13, **caractérisé en ce que** ledit au moins un élément de distribution (11) est configuré pour distribuer uniformément ledit gaz inerte le long d'au moins 60 % de l'extension de ladite fente/desdites fentes (3, 4), de préférence le long de 100 % de l'extension de ladite fente/desdites fentes (3, 4).

15. Dispositif (1) selon l'une quelconque des revendica-

tions 13 à 14 précédentes, **caractérisé en ce qu'**il comprend une paire d'éléments de distribution (11), placés au niveau de ladite fente d'entrée (3) et de ladite fente de sortie (4), respectivement.

16. Dispositif (1) selon l'une quelconque des revendications 13 à 15, **caractérisé en ce que** ledit au moins un élément de distribution (11) comprend une cavité (12) placée en communication fluidique avec une source de gaz inerte, ladite cavité (12) ayant une pluralité de premières buses (13), chacune placée à proximité de ladite fente/desdites fentes (3, 4), lesdites premières buses (13) étant sensiblement alignées et définissant une ligne de distribution sensiblement parallèle à ladite fente/auxdites fentes (3, 4).

17. Dispositif (1) selon la revendication 16, **caractérisé en ce que** ledit élément de distribution (11) comprend un conduit (14) placé en communication fluidique avec une source de gaz inerte, ledit conduit (14) étant inséré dans ladite cavité (12) et étant placé en communication fluidique avec ladite cavité (12) afin de saturer ladite cavité (12) avec le gaz inerte.

18. Dispositif (1) selon la revendication 17, **caractérisé en ce que** ledit conduit (14) possède une pluralité de secondes buses (15) débouchant dans ladite cavité (12), lesdites secondes buses (15) ayant une aire de passage plus petite par rapport à une aire de passage desdites premières buses (13).

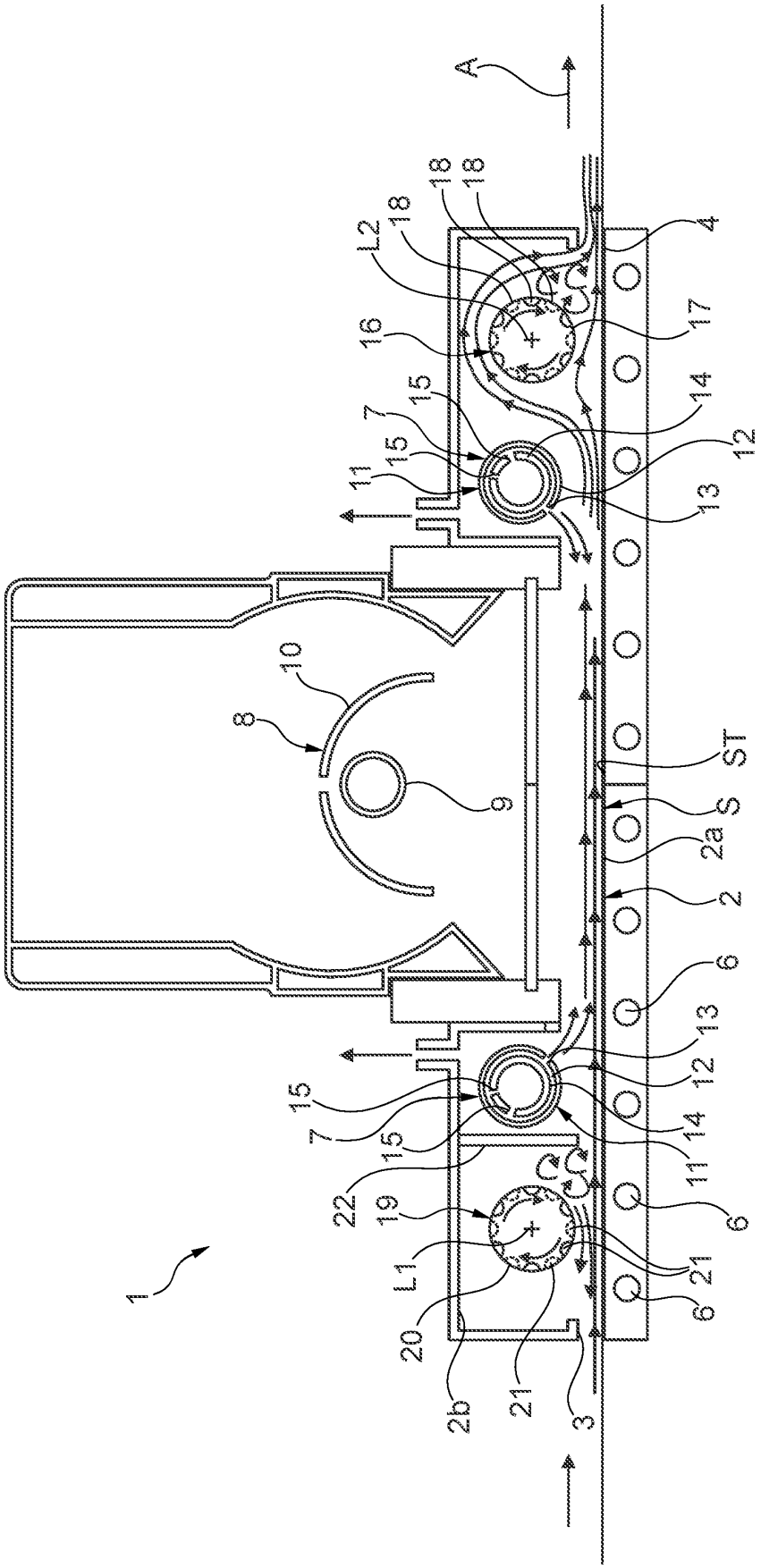

Fig. 1

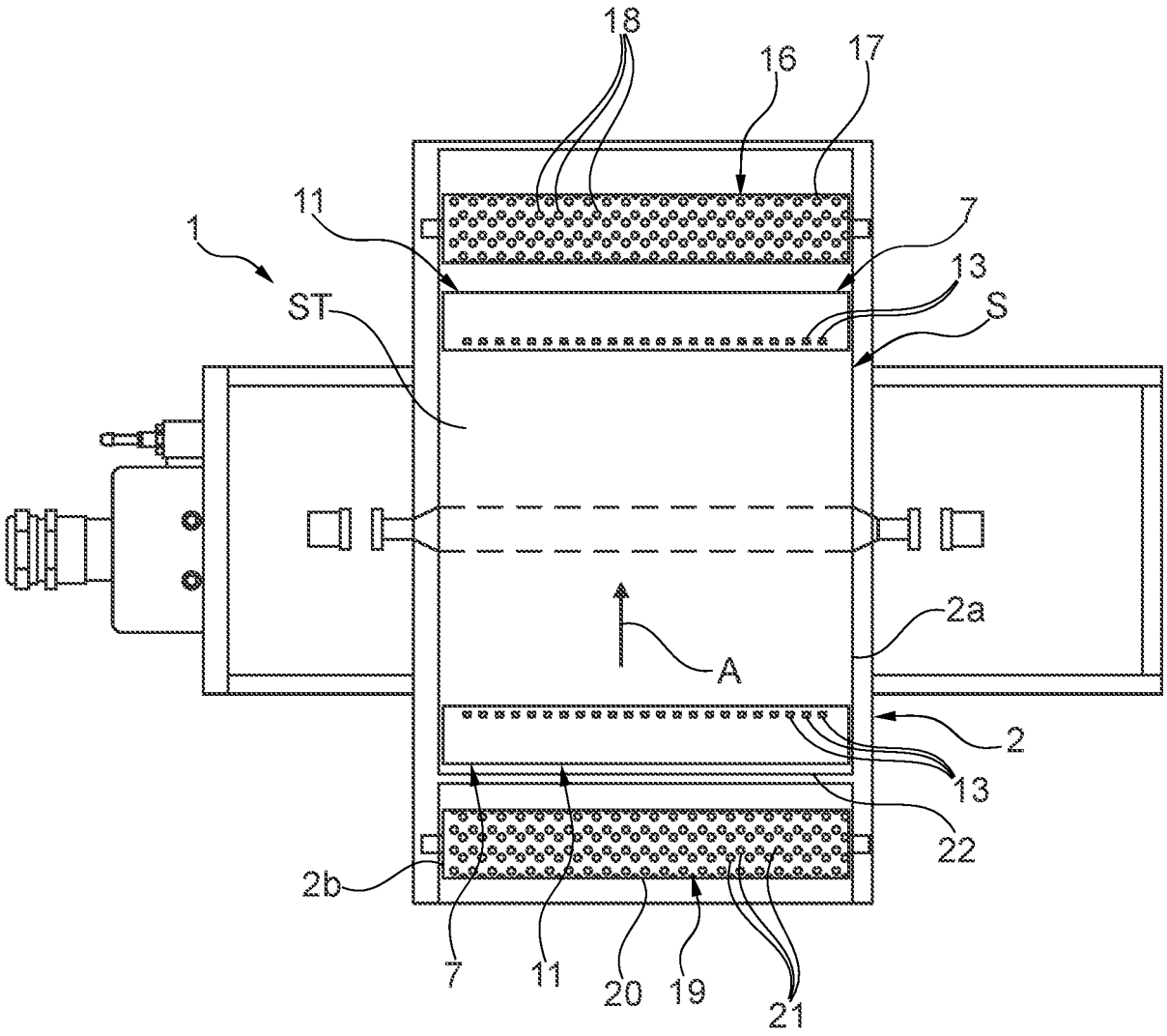

Fig. 2

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

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- IT 102015902331688 **[0034]**