(54) Printing head assembly comprising a movable closure member

Druckkopfanordnung mit bewegbarem Abdichtungsglied

Ensemble de tête d'impression comprenant un membre de fermeture mobile

(84) Designated Contracting States:
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HU IE IT LI LU MC NL PL PT RO SE SI SK TR

(43) Date of publication of application:

(73) Proprietor: B.V. Korthofah
NL-2222 AG Katwijk (NL)

(72) Inventor: Van der Horst, Rolandus Jacobus Nicolaas
2221 XB, KATWIJK (NL)

(51) Int Cl.:
B41J 2/165(2006.01) B41J 25/304(2006.01)

(74) Representative: de Vries, Johannes Hendrik Fokke et al
De Vries & Metman
Overschiestraat 180
1062 XK Amsterdam (NL)

(56) References cited:
EP-A- 0 088 630
DE-U- 8 205 426
US-A- 5 040 000

Note: Within nine months from the publication of the mention of the grant of the European patent, any person may give notice to the European Patent Office of opposition to the European patent granted. Notice of opposition shall be filed in a written reasoned statement. It shall not be deemed to have been filed until the opposition fee has been paid. (Art. 99(1) European Patent Convention).
The invention relates to a printing head assembly according to the preamble of claim 1.

Nowadays, printing of characters is a common phenomenon. Such characters not only are printed on paper, but on a variety of products and enclosures of products. Information on enclosures and products becomes more and more obligatory for e.g. food manufacturers. The characters may e.g. be a use-by date of the product, a bar code, the manufacturer of the product or other valuable information for customers or intermediate parties in the distribution chain. This branch is known as coding and marking.

A commonly used printing system in the coding and marking branch involves an inkjet printing system. The inkjet printing system has a printing head with a plurality of channels through which ink droplets can be fired. The ink is supplied to channels in the printing head from an ink reservoir by capillary action. The ink in the channels can be ejected from nozzles on the front side of the printing head by controlling piezoelectric elements in these channels. The piezoelectric elements generate a pressure pulse in the ink in the channels on receipt of a control signal for each channel individually instructing a particular channel to eject an ink droplet. Subsequently, the capillary action refills the channel for a next droplet to be ejected. A printing head may comprise a plurality of channels, e.g. 64 channels up to 1000 channels.

A problem of such printers is that the nozzles at the front side of the printing head are exposed to air. Accordingly, the ink in the channels is exposed to air as well. For non-porous surfaces, such as plastic surfaces, typically these inks are alcohol based to enable sufficiently fast drying and adhesion of the ink to the surface to print characters. Consequently, during a state of printing inactivity, the ink also dries in the channels and nozzles such that the printing head channels may get clogged up after a certain time.

Typically, the way to solve this problem in the field of marking and coding of products for inkjet print heads is the spit-technique. This technique involves firing one or more ink droplets from all nozzles every now and then to avoid clogging up the channels of the print head. This spit-technique generally works well.

A problem of this spit-technique is that, although the channels in the printing head normally get not clogged up any more, the environment gets polluted and the use of expensive inks increases.

US 5,883,648 discloses an arrangement for keeping clean nozzles of an ink print head with a large number of nozzles that comprises a seal bonnet. The seal bonnet is flexibly positioned on the ink print head and is formed so that the front surface of all the ink print modules can be covered.

It is an object of the invention to solve at least one of these problems of the prior art spit-technique.

This object is achieved by providing a printing head assembly characterized by the characterizing portion of claim 1.

The closure member avoids that the nozzles are exposed to air when the printing head assembly is not used, i.e. the inactive state. Therefore, fluid will not dry in the nozzles and the nozzles cannot get clogged up. Consequently there is no longer a need to apply the prior art spit-technique and fluid is no longer wasted. The fluid ejection means preferably comprise piezoelectric elements as typically used for inkjet print heads, but may also refer to heating elements as typically encountered in bubble jet printing heads. Further, it should be appreciated that the fluid preferably is ink.

In an embodiment of the invention, the printing head assembly further comprises a carriage holding said printing head and at least one shaft for moving said printing head between a first position associated with said active state and a second position associated with said inactive state. The movement of the carriage can be used to open the movable closure member in the active state and to close the closure member in the inactive state. Alternatively, the movable closure member may be moved otherwise, e.g. by electrically controlling the position of the closure member. Preferably air pressure means are provided for moving said carriage by air flow along said shaft to said first position. The shaft functions as a guide rod in this embodiment. The air pressure means are a simple yet effective means to control the motion of the carriage. More preferably, the air pressure means comprise throttle means to regulate said air flow. The throttle means provide for a gentle motion of the carriage avoiding shock waves in the ink channels of the print head. Otherwise unintended leakage of ink from the nozzles during the translation of the carriage might result.

In an embodiment of the invention the printing head assembly further comprises biasing means arranged to exert a force on said carriage substantially along said shaft in a direction towards said second position. Accordingly, a fail safe assembly is obtained, wherein the printing head assembly is forced in the inactive state by having the biasing means acting on the carriage with the printing head when power and/or air pressure fall away. The biasing means may comprise a spring.

In an embodiment of the invention, the carriage further comprises a printing head interface arrangement and said printing head comprises a first connector plug arranged to cooperate with a second connector plug of said printing head interface arrangement. Although the printing head may be connected directly to control means not deployed on the carriage, the connections between the printing head and the control means typically are fragile and therefore not suitable for an industrial environment. Accordingly, preferably at least a printing head interface arrangement is positioned on the carriage together with the print head, such that this printing head interface arrangement moves along with the print head, while the printing head and the printing head interface arrangement are connected by reliable plug connections.
In an embodiment of the invention, the printing head assembly further comprises a housing and said closure member is pivotally arranged in said housing. Although the closure member may be movable in other ways to expose or hermetically seal the nozzles, such as translation or rolling it up, rotational motion of the closure member is preferred since such an embodiment combines simplicity and minimum space consumption in the housing. Preferably, the housing comprises a front plate with an opening and said closure member is pivotally attached to said front plate. The front plate provides for a robust printing head arrangement. Spacers are provided to enable rotation of said closure member within said housing. The spacers are preferred means to enable the accommodation of the closure member in the housing. Accordingly, the closure member is not present outside the housing and cannot be easily damaged. Adequate positioning of the closure member is relevant to maintain a state of hermetic sealing of the nozzles in the inactive state. Therefore damage of the closure member may result in decreased performance of the sealing function of the closure member.

In an embodiment of the invention, the printing head is arranged on a carriage movable along at least one shaft in an axial direction of the housing, said carriage comprising a first structure adapted to contact a second structure of said closure member to rotate said closure member when moving along said at least one shaft. Accordingly the translation of the carriage is used to rotate the closure member over the pivot point. Preferably the first structure of the carriage comprises a bearing member to enable smooth rotation of the closure member during translation of the carriage.

In an embodiment of the invention, the closure member comprises a base with a plastic top structure arranged to abut said front side of said printing head in said inactive state. The base, which is preferably metallic, supports the plastic top structure. The plastic top structure facilitates hermetic sealing of the nozzles as a result of the resilient nature of this structure. Preferably, the plastic top structure is arranged to abut a dummy area around the nozzles without abutting said nozzles. Consequently, the nozzles can be sealed by abutting the front side of the printing head without pushing dirt particles into the nozzles when the closure member abuts the front side of the printing head. The plastic structure may comprise a circular structure, such as an integral O-ring, to minimize contact forces to arrive at a state of hermetic sealing of the nozzles.

In an embodiment of the invention, the printing head assembly comprises a fluid supply tube, said fluid supply tube comprising a fluid filter. The filter serves to filter impurities or dirt particles from the ink as well as to avoid shock waves in the ink supply tube when translating the carriage.

It should be appreciated that the previous embodiments or aspects of the previous embodiments of the invention can be combined.

The invention also relates to a system comprising a printing head assembly as described above, a fluid reservoir (preferably an ink reservoir) and, optionally, a control unit, said system (preferably the control unit) being adapted to receive detection signals from one or more detectors for detecting a product to eject said fluid on, said detectors being arranged to enable said detection signals to trigger said printing head assembly to expose said nozzles. As the exposure of the nozzles by the closure members of the printing head assembly may cause some delay before the active state is obtained, the printing head assembly should be triggered in time that the active state is required. Accordingly, the system provides detectors to warn the printing head assembly that a product is approaching. The detectors may e.g. be photo detectors. Preferably, the system comprises at least two detectors. One of these detectors is positioned to timely trigger the printing head assembly to expose the nozzles by removing the closure member, while the other is positioned at the printer head assembly to instruct the printing head to eject fluid such that the fluid is deposited on the correct position of the product. The detectors may be part of the system. Typically, such detectors are provided along a conveyer belt.

The invention will be further illustrated with reference to the attached drawings, which show a preferred embodiment according to the invention. It will be understood that the invention is not in any way restricted to this specific and preferred embodiment.

Fig. 1 shows a schematical illustration of a printing head assembly in an inactive state according to an embodiment of the invention;

Fig. 2 shows a schematical illustration of a system comprising a printing head assembly in an active state according to an embodiment of the invention;

Fig. 3 shows a detailed view of a system comprising a printing head assembly according to an embodiment of the invention;

Fig. 4 shows a detailed three-dimensional view of a part of a printing head assembly according to an embodiment of the invention;

Figs. 5A-5D show a top view, a side view, a bottom view and a view from the opposite side of the printing head assembly of Fig. 4, and

Figs. 6A-6C show a front view, a side view and a three dimensional view of a closure member according to an embodiment of the invention.

Fig. 1 shows a schematical illustration of a printing head assembly 1 in an inactive state according to an embodiment of the invention. The printing head assembly 1 comprises a printing head 2 with a front side 3 having a plurality of nozzles 4. As an example, the XJ128 printing
head manufactured by XAAR can be used. The interior of the printing head 2 comprises a plurality of capillary channels 5 connected to nozzles 4 at the front side 3 of the printing head 2. The capillary channels 5 are provided with fluid ejection means 6, which preferably are piezoelectric elements, to generate a pressure pulse in the channel 5. Fluid, hereinafter referred to as ink, present in the channel 5 is ejected from a nozzle 4 as a result of the pressure pulse for that particular nozzle 4.

[0023] It is noted that for clarity purposes only a few nozzles 4 are shown. Typically the number of nozzles 4 ranges from 128 up to 1000. The enlarged portion of Fig. 1 shows an example of the arrangement of the nozzles 4. A dummy area 7 is present around the nozzles 4 on the front side 3 of the printing head 2.

[0024] The components of the printing head assembly 1 are provided in a housing 8. The housing 8 defines an axial direction indicated by the arrow A. The housing has a front plate 8A with an opening O to allow ejection of ink droplets from the printing head 2 onto a product and a dividing wall 9.

[0025] The printing head assembly 1 further comprises a moveable closure member 10 facing the front side 3 of the printing head 2 that is arranged to expose the nozzles 4 in an active state and to hermetically seal the nozzles 4 in an inactive state. Fig. 1 schematically shows the printing head assembly 1 in an inactive state, i.e. the closure member 10 hermetically seals the nozzles 4 such that the ink in the nozzles 4 and capillary channels 5 is not exposed to air. Accordingly, this ink cannot dry and the nozzles 4 do not get clogged up after a period of printing inactivity. Details for an embodiment of the closure member 10 are discussed with reference to Figs. 6A-6C.

[0026] The printing head assembly 1 further comprises a carriage 11 supporting the printing head 2. The carriage 11 is arranged on support members 12 such that it can be moved or translated along a shaft 13 between a first position associated with the active state wherein the nozzles 4 are exposed by the closure member 10 and a second position associated with the displayed inactive state. The housing 8 is configured to allow the translation of the carriage 11 by providing additional space. As an example, the translation of the carriage between the first and second position amounts to 20 mm.

[0027] Although the translation of the carriage 11 along the shaft 13 can be arranged in various ways, such as mechanically by e.g. providing the shaft with screw thread or electromagnetically by applying electromagnets, air flow induced motion of the carriage 11 is preferred. Air pressure means 14 are provided for moving the carriage 11 along the shaft 13 by air flow to the first position. The air supply inlets and tubes are shown in Fig. 3. Further throttle means 15, such as an air valve, are provided to regulate the air flow to allow smooth translation of the carriage 11 along the shaft 13. Consequently shock waves in the capillary channels 5 of the printing head 2 can be avoided. Otherwise unintended leakage of ink from the nozzles 4 during the translation of the carriage 11 might result.

[0028] The printing head assembly 1 further comprises biasing means 16 arranged to exert a force on the carriage 11 in a direction towards the second position. The biasing means comprises a spring of adequate properties adapted to return the carriage 11 along the shaft 13. The carriage 11 with the printing head 2 is forced in the second position by the spring 16, e.g. when power and/or air pressure fall away. In such a case, the nozzles 4 of the printing head 2 are hermetically sealed by the closure member 10.

[0029] The printing head assembly 1 further comprises a printing head interface arrangement 20 provided on the carriage 11 with the printing head 2. The printing head interface arrangement 20 may be an electronic module adapted to perform a variety of functions, such as signal transformation and generation of clock signals for the printing head 2. Further powering or control for other components of the printing head assembly 1 can be executed from the printing head interface arrangement 20, e.g. by controlling a valve of the air pressure means 14 to initiate translation of the carriage 11 to the first position.

[0030] The printing head 2 comprises a first plug connector 21 that is arranged to cooperate with a second plug connector 22 of the printing head interface arrangement 20 to transmit signals from a control unit 31 (see Fig. 2). The plug connectors 21, 22 guarantee reliable connection to the printing head 2. A signal transmission module 23 is provided off the carriage 11 behind wall 9 and connected to the printing head interface arrangement 20 by a flexible signal cable 24 to allow motion of the carriage 11.

[0031] It is noted that, for clarity reasons, Fig. 1 neither shows an ink reservoir nor shows an ink supply tube to transfer ink from the ink reservoir to the capillary channels 5. These are shown in Fig. 3.

[0032] Fig. 2 schematically shows a system 30 in top view comprising the printing head assembly 1 of Fig. 1 in an active state, a control unit 31 and an ink reservoir 32. The printing head assembly 1 and the ink reservoir 32 are together referred to as a coding unit. The system 30 further comprises an air supply unit 33 and photo detectors 34 and 35. The photo detectors 34, 35 are arranged along a conveyor belt 36 that transports products P to be coded by the printing head assembly 1 with an appropriate speed. The positions of the photo detectors 34, 35 enable them to perform the functions to be described next.

[0033] In operation, the system 30 functions as follows. A product P is transported by the conveyor belt 36 along the photo detector 34 that is positioned away from the printing head assembly 1. The product P particularly has a non-porous surface on which a coding pattern is to be applied.

[0034] Photo detector 34 generates a detection signal for the control unit 31, that subsequently instructs the printing head interface arrangement to control the air
pressure means 14 to move the carriage 11 with the printing head 2 in the axial direction A of the housing 8 to the first position. Accordingly, the delay before the printing head assembly is ready to print, resulting from the translation of the printing head 2 along the shaft 13, is compensated for by the early detection of the product P by the photo detector 34.

[0035] Subsequently, the photo detector 35, positioned at the stationary printing head assembly 1 detects the product 2 and generates a detection signal that is transmitted to the control unit 31. The control unit 31 generates a printing instruction for the printing head assembly 1, that now is in the first position wherein nozzles 4 are exposed by the closure member 10, to eject ink as to form an appropriate coding pattern on the product P. The product P subsequently moves further over the conveyor belt 36.

[0036] After the deposition of the coding pattern on the non-porous surface of the product P, the carriage 11 will usually not immediately return to the second position associated with the inactive state of the printing head assembly 1. Probably further products P will follow on the conveyor belt 36. If all nozzles 4 eject ink the priming process can be finished. The arrangement is such that in the second position of the carriage 11 (the inactive state), air cannot be supplied to the ink reservoir 32 such that the priming operation cannot accidentally be performed if the closure member 10 seals the nozzles 4.

[0037] Fig. 3 shows a detailed view of a coding unit comprising a printing head assembly 1 and an ink reservoir 32. The printing head assembly 1 and the ink reservoir 32 are mechanically attached to each other by brackets 40. The ink reservoir 32 is appropriately positioned with respect to the nozzles 4 of the printing head assembly 1 to avoid spontaneous leakage of ink from the printing head 2. Ink can be supplied to the ink reservoir 32 via supply inlet 41. The ink from the ink reservoir 32 is supplied to the printing head assembly 1 via supply tube 42. The printing head assembly 1 comprises a filter 43, provided in the housing 8 behind the wall 9, for filtering dirt particles from the ink before the ink reaches the printing head 2 and to avoid shock waves in the ink supply tube 42 when transporting the carriage 11. On the front side of the wall 9, the supply tube 42 is coiled around one of the shafts 13, as more clearly shown in Fig. 5C.

[0038] Air supply tube 44 runs via the inkjet reservoir 32 directly to the printing head assembly 1 for the supply of air for the air pressure means 14. The air pressure means 14 comprises a valve that can be controlled from the printing head interface arrangement 20 as described above.

[0040] A further tube 45 is connected to the valve of the air pressure means 14 on one side and to a pressure reducing valve (not shown) on the side of the ink reservoir 32. The pressure reducing valves brings the air pressure from 5 to 1 bar. The air pressure can be fed to the ink reservoir 32 by means of an air switch (not shown).

[0041] The above mentioned arrangement of air tubes provides an advantageous way for priming the system. Priming involves the initiation of the printing process by supplying ink from the ink reservoir 32 to the printing head 2 up to the level where the ink is further transported in the printing head assembly 1 by the capillary action of the channels 5. Priming is typically applied in the coding and marking field for inkjet printers that do not possess nozzles that can be sealed or closed.

[0042] In the priming process of the invention, the ink reservoir 32 can be pressurized by opening the air switch. Consequently, a pressure of 1 bar is present in the ink reservoir 32 that forces the ink to the printing head 2 via the ink supply tube 42. The ink is ejected from the nozzles 4. If all nozzles 4 eject ink the priming process can be finished. The arrangement is such that in the second position of the carriage 11 (the inactive state), air cannot be supplied to the ink reservoir 32 such that the priming operation cannot accidentally be performed if the closure member 10 seals the nozzles 4.

[0043] In summary, the fact that in an embodiment of the invention, air pressure is applied to translate the carriage 11 can be used simultaneously for the priming process.

[0044] Finally Fig. 3 shows a connector 50 to connect the printing head assembly to the control unit 31.

[0045] Fig. 4 shows a front portion of the printing head assembly 1 according to an embodiment of the invention. Identical reference numerals indicate identical or corresponding features.

[0046] A spacer 60 is attached on one side to the front wall 8A and on the other side pivotally accommodating the closure member 10 in the housing 8. This closure member 10 is discussed in more detail with reference to Figs. 6A-6C. On one side of the spacers 60 a torsion spring 61 is provided to drive the closure member 10 to the closed position if the carriage 11 is moved to the second position.

[0047] The carriage 11 comprises a first structure having an upstanding plate 62 and a bearing member 63 that are adapted to cooperate with the closure member 10. If the carriage 11 is moved to the first position, the bearing member 63 interacts with the closure member 10 and pushes it away to expose the nozzles 4 by exerting a force exceeding the counteracting forces of e.g. the torsion spring 61 and the spring 16.

[0048] Finally, the printing head assembly 1 comprises alignment means 64 to control the position of the closure member 10 with respect to the printing head 2, since hermetic sealing of the nozzles 4 requires accurate positioning of the closure member 10.
A printing head assembly (1) comprising a printing head 2, as shown in Fig. 1, in the inactive state, wherein said air pressure means (14) comprise throttle means (15) to regulate said air flow.

On the base 100, a plastic top structure 110 is arranged to abut the front side 3 of the printing head 2 in an inactive state to hermetically seal the nozzles 4 from air. The plastic top structure 110 preferably is made from a material that does not deteriorate when in contact with ink. Such a material is e.g. EPDM-rubber. The plastic top structure 110 comprises a support plate 111 and an integrally formed plastic circular structure 112, such as an O-ring. A circular structure 112 reduces the force to seal the nozzles 4. The second structure 102 is dimensioned such that, when applied in the printing head assembly 1 as e.g. shown in Fig. 5A, it extends towards the front side 3 to a further extent than the upper surface of the O-ring 112. This is to ensure that in opening the closure member 10, the bearing member 63 abuts this second structure.

The O-ring 112 is integrally formed with the plastic support plate 111 to form the plastic top structure 110. The plastic top structure 110 may be glued in an appropriate position on the recessed portion of the metallic base 100. The O-ring 112 is arranged such that its surface abuts the dummy area 7 of the front side 3 of the printing head 2, as shown in Fig. 1, in the inactive state of the printing head assembly 1. Consequently, possibly present dirt particles are not pushed into the nozzles 4 of the printing head 2.

Claims

1. A printing head assembly (1) comprising a printing head 2 with a front side 3 having one or more nozzles (4), said printing head 2 comprising fluid ejection means (6) to eject fluid from said nozzles (4) and a closure member (10) movable to face said front side 3, wherein said closure member (10) is arranged to expose said nozzles (4) in an active state of said printing head assembly (1) and to hermetically seal said nozzles (4) in an inactive state of said printing head assembly (1) characterized in that the assembly (1) further comprises a carriage (11) holding said printing head (2) and at least one shaft (13) for moving said printing head (2) between a first position associated with said active state and a second position associated with said inactive state and comprising air pressure means (14) for moving said carriage (11) along said shaft (13) by air flow to said first position.

2. The printing head assembly (1) of claim 1, wherein said air pressure means (14) comprise throttle means (15) to regulate said air flow.

3. The printing head assembly (1) of claim 1 or 2, further comprising biasing means (16) arranged to exert a force on said carriage (11) substantially in a direction towards said second position.

4. The printing head assembly (1) of one or more of the claims 1-3, wherein said carriage (11) further comprises a printing head interface arrangement (20) and said printing head (2) comprises a first connector plug (21) arranged to cooperate with a second connector plug (22) of said printing head interface arrangement (20).

5. The printing head assembly (1) of claim 4, further comprising a signal transmission module (23) attachable to a flexible signal cable (24), said flexible signal cable (24) being connectable to said printing head interface arrangement (20).

6. The printing head assembly (1) of one or more of the claims 1-5, wherein said shaft (13) is positioned substantially parallel to an axial direction (A) of a housing (8) of said printing head assembly (1), said housing (8) comprising a front plate (8A) with an opening (O) aligned with said nozzles (4) such that, in said first position, said fluid can be ejected onto a product (P) when positioned in front of said opening (O).

7. The printing head assembly (1) according to one or more of the preceding claims, wherein said assembly (1) further comprises a housing (8) and said closure member (10) is pivotally arranged in said housing (8).

8. The printing head assembly (1) of claim 7, wherein said housing (8) comprises a front plate (8A) with an opening (O) and said closure member (10) is pivotally attached to said front plate (8A).

9. The printing head assembly (1) of claim 8, wherein spacers (60) are provided to enable motion of said closure member (10) within said housing (8).

10. The printing head assembly (1) of one or more of the claims 7-9, wherein said carriage (11) comprises a first structure (62,63) adapted to contact a second structure (102) of said closure member (10) to rotate
said closure member (10) when moving said carriage (13) along said at least one shaft (13).

11. The printing head assembly (1) of claim 10, wherein said first structure comprises a bearing member (63).

12. The printing head assembly (1) according to one or more of the preceding claims, wherein said closure member (10) comprises a base (100) with a plastic top structure (110) arranged to abut said front side (3) of said printing head (2) in said inactive state.

13. The printing head assembly (1) of claim 12, wherein said front side (3) comprises said nozzles (4) surrounded by a dummy area (7) and said plastic top structure (110) is arranged to abut said dummy area (7) without abutting said nozzles (4).

14. The printing head assembly of claim 13, wherein said plastic top structure (110) comprises a circular structure (112).

15. The printing head assembly (1) according to one or more of the preceding claims, wherein said assembly (1) comprises a fluid supply tube (42), said fluid supply tube comprising a fluid filter (43).

16. A system (30) comprising a printing head assembly (1) according to one or more of the preceding claims, a fluid reservoir (32) and, optionally, a control unit (31), said system being adapted to receive detection signals from one or more detectors (34, 35) for detecting a product (P) to eject said fluid on, said detectors (34, 35) being arranged to enable said detection signals to trigger said printing head assembly (1) to expose said nozzles (4).

**Patentansprüche**

1. Druckkopfanordnung (1), aufweisend: einen Druckkopf (2) mit einer Frontseite (3), die eine oder mehrere Düsen (4) aufweist, wobei der Druckkopf (2) Fluidausgabemittel (6) zum Ausgeben von Fluid aus den Düsen (4) und ein Schließelement (10) aufweist, das so bewegbar ist, dass es der Frontseite (3) gegenüberliegt, wobei das Schließelement (10) so eingerichtet ist, dass es in einem Aktivzustand der Druckkopfanordnung (1) die Düsen (4) freigibt und in einem Inaktivzustand der Druckkopfanordnung (1) die Düsen (4) hermetisch abdichtet, dadurch gekennzeichnet, dass die Anordnung (1) ferner einen Wagen (11), der den Druckkopf (2) hält, und wenigstens eine Achse (13) aufweist zum Bewegen des Druckkopfes (2) zwischen einer ersten Position, die dem Aktivzustand zugeordnet ist, und einer zweiten Position, die dem Inaktivzustand zugeordnet ist, und aufweisend Luftdruckmittel (14) zum per Luftstrom Bewegen des Wagens (11) entlang der Achse (13) zu der ersten Position hin.

2. Druckkopfanordnung (1) gemäß Anspruch 1, wobei die Luftdruckmittel (14) Drosselmittel (15) aufweisen zum Regulieren des Luftstroms.

3. Druckkopfanordnung (1) gemäß Anspruch 1 oder 2, ferner ein Vorspannmittel (16) aufweisend, das so eingerichtet ist, dass es auf den Wagen (11) eine Kraft im Wesentlichen in eine Richtung zur zweiten Position hin ausübt.

4. Druckkopfanordnung (1) gemäß einem oder mehreren der Ansprüche 1-3, wobei der Wagen (11) ferner eine Druckkopf-Schnittstelleneinrichtung (20) aufweist, und wobei der Druckkopf (2) einen ersten Anschlussstecker (21) aufweist, der eingerichtet ist zum Zusammenwirken mit einem zweiten Anschlussstecker (22) der Druckkopf-Schnittstelleneinrichtung (20).

5. Druckkopfanordnung (1) gemäß Anspruch 4, ferner ein Signalübertragungsmodul (23) aufweisend, das an ein flexibles Signalkabel (24) anschließbar ist, wobei das flexible Signalkabel (24) mit der Druckkopf-Schnittstelleneinrichtung (20) verbindbar ist.

6. Druckkopfanordnung (1) gemäß einem oder mehreren der Ansprüche 1-5, wobei die Achse (13) im Wesentlichen parallel zu einer Axialrichtung (A) eines Gehäuses (8) der Druckkopfanordnung (1) angeordnet ist, und wobei das Gehäuse (8) eine Frontplatte (8A) mit einer Öffnung (O) aufweist, die derart zu den Düsen (4) fluchtet, dass in der ersten Position das Fluid auf ein Produkt (P) ausgeben werden kann, wenn es vor der Öffnung (O) angeordnet ist.

7. Druckkopfanordnung (1) gemäß einem oder mehreren der vorhergehenden Ansprüche, wobei die Anordnung (1) ferner ein Gehäuse (8) aufweist, und wobei das Schließelement (10) schwenkbar in dem Gehäuse (8) angeordnet ist.

8. Druckkopfanordnung (1) gemäß Anspruch 7, wobei das Gehäuse (8) eine Frontplatte (8A) mit einer Öffnung (O) aufweist, und wobei das Schließelement (10) schwenkbar an der Frontplatte (8A) angebracht ist.

9. Druckkopfanordnung (1) gemäß Anspruch 8, wobei Abstandshalter (60) vorgesehen sind, so dass eine Bewegung des Schließelementes (10) in dem Gehäuse (8) ermöglicht ist.

10. Druckkopfanordnung (1) gemäß einem oder mehreren der Ansprüche 7-9, wobei der Wagen (11) eine erste Struktur (62; 63) aufweist, die angepasst ist
Ensemble de tête d'impression (1) comprenant une tête d'impression (2) avec un côté frontal (3) ayant une ou plusieurs buses (4), ladite tête d'impression (2) comprenant des moyens d'éjection de fluide (6) permettant d'éjecter un fluide hors desdites buses (4) et un élément de fermeture (10) mobile de façon à faire face audit côté frontal (3), dans lequel ledit élément de fermeture (10) est conçu pour exposer lesdites buses (4) dans un état actif dudit ensemble de tête d'impression (1) et pour fermer hermétiquement lesdites buses (4) dans un état inactif dudit ensemble de tête d'impression (1), caractérisé en que l'ensemble (1) comprend en outre un chariot (11) supportant ladite tête d'impression (2) et au moins un arbre (13) permettant de déplacer ladite tête d'impression (2) entre une première position à pression d'air (14) et une seconde position à pression d'air (16) conçus pour exercer une force sur ledit chariot (11) sensiblement en direction de ladite seconde position.

1. Ensemble de tête d'impression (1) comprenant une tête d'impression (2) avec un côté frontal (3) ayant une ou plusieurs buses (4), ladite tête d'impression (2) comprenant des moyens d'éjection de fluide (6) permettant d'éjecter un fluide hors desdites buses (4) et un élément de fermeture (10) mobile de façon à faire face audit côté frontal (3), dans lequel ledit élément de fermeture (10) est conçu pour exposer lesdites buses (4) dans un état actif dudit ensemble de tête d'impression (1) et pour fermer hermétiquement lesdites buses (4) dans un état inactif dudit ensemble de tête d'impression (1), caractérisé en que l'ensemble (1) comprend en outre un chariot (11) supportant ladite tête d'impression (2) et au moins un arbre (13) permettant de déplacer ladite tête d'impression (2) entre une première position associée audit état actif et une seconde position associée audit état inactif et comprenant des moyens à pression d'air (14) permettant de déplacer ledit chariot (11) le long dudit arbre (13) à l'aide d'un écoullement d'air vers ladite première position.

2. Ensemble de tête d'impression (1) selon la revendication 1, dans lequel les moyens à pression d'air (14) comprennent des moyens de poussée (15) pour réguler ledit écoullement d'air.

3. Ensemble de tête d'impression (1) selon la revendication 1 ou 2, comprenant en outre des moyens de polarisation (16) conçus pour exercer une force sur ledit chariot (11) sensiblement en direction de ladite seconde position.

4. Ensemble de tête d'impression (1) selon l'une ou plusieurs des revendications 1 à 3, dans lequel ledit chariot (11) comprend en outre un dispositif d'interface de tête d'impression (20) et ladite tête d'impression (2) comprend une première fiche de connecteur (21) conçue pour interagir avec une seconde fiche de connecteur (22) dudit dispositif d'interface de tête d'impression (20).

5. Ensemble de tête d'impression (1) selon la revendication 4, comprenant en outre un module de transmission de signal (23) pouvant être fixé à un câble de signal flexible (24), ledit câble de signal flexible (24) pouvant être connecté audit dispositif d'interface de tête d'impression (20).

6. Ensemble de tête d'impression (1) selon l'une ou plusieurs des revendications 1 à 5, dans lequel ledit arbre (13) est sensiblement parallèle à une direction axiale (A) d'un boîtier (8) dudit ensemble de tête d'impression (1), ledit boîtier (8) comprenant une plaque frontale (8A) avec une ouverture (O) alignée avec lesdites buses (4) de façon à ce que, dans ladite première position, ledit fluide peut être éjecté sur un produit (P) lorsqu'il est positionné devant ladite ouverture (O).

7. Ensemble de tête d'impression (1) selon l'une ou plusieurs des revendications précédentes, dans lequel ledit ensemble (1) comprend en outre un boîtier (8) et ledit élément de fermeture (10) est disposé de manière pivotante dans ledit boîtier (8).

8. Ensemble de tête d'impression (1) selon la revendication 7, dans lequel ledit boîtier (8) comprend une plaque frontale (8A) avec une ouverture (O) et ledit

Recommandations
élément de fermeture (10) est fixé de manière pivotante à ladite plaque frontale (8A).

9. Ensemble de tête d'impression (1) selon la revendication 8, dans lequel des entretoises (60) sont conçues pour permettre le mouvement dudit élément de fermeture (10) à l'intérieur dudit boîtier (8).

10. Ensemble de tête d'impression (1) selon l'une ou plusieurs des revendications 7 à 9, dans lequel ledit chariot (11) comprend une première structure (62 ; 63) conçue pour entrer en contact avec une seconde structure (102) dudit élément de fermeture (10) afin de tourner ledit élément de fermeture (10) lors d'un mouvement dudit chariot (13) le long dudit au moins un arbre (13).

11. Ensemble de tête d'impression (1) selon la revendication 10, dans lequel ladite première structure comprend un élément de palier (63).

12. Ensemble de tête d'impression (1) selon l'une ou plusieurs des revendications précédentes, dans lequel ledit élément de fermeture (10) comprend une base (100) avec une structure supérieure en matière plastique (110) conçue pour être en butée contre ledit côté frontal (3) de ladite tête d'impression (2) dans ledit état inactif.

13. Ensemble de tête d'impression (1) selon la revendication 12, dans lequel ledit côté frontal (3) comprend lesdites buses (4) entourées d'une zone vide (7) et ladite structure supérieure en matière plastique (110) est conçue pour être en butée avec ladite zone vide (7) sans être en butée contre lesdites buses (4).

14. Ensemble de tête d'impression (1) selon la revendication 13, dans lequel ladite structure supérieure en matière plastique (110) comprend une structure circulaire (112).

15. Ensemble de tête d'impression (1) selon l'une ou plusieurs des revendications précédentes, dans lequel ledit ensemble (1) comprend un tube d'alimentation en fluide (42), ledit tube d'alimentation en fluide comprenant un filtre à fluide (43).

16. Système (30) comprenant un ensemble de tête d'impression (1) selon l'une ou plusieurs des revendications précédentes, un réservoir de fluide (32) et, en option, une unité de contrôle (31), ledit système étant conçu pour recevoir des signaux de détection provenant d'un ou plusieurs détecteurs (34, 35) permettant de détecter un produit (P) sur lequel le fluide doit être éjecté, lesdits détecteurs (34, 35) étant conçus pour permettre auxdits signaux de détection de déclencher ledit ensemble de tête d'impression (1) pour exposer lesdites buses (4).