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(54) **Attachable/detachable umbilical platform for a continuous ink jet printhead**

Anbring- und abnehmbare Verbindungskabelplattform für einen kontinuierlich arbeitenden Tintenstrahldruckkopf

Plate-forme ombilicale amovible pour tête d'impression à jet d'encre continu

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Description

Technical Field

[0001] The present invention relates to continuous ink jet printing and, more particularly, to an attachable and detachable umbilical cap that facilitates ink, power, air, data and registration for a continuous ink jet printhead and printing system.

Background Art

[0002] Ink jet printing systems are known in which a printhead defines one or more rows of orifices which receive an electrically conductive recording fluid from a pressurized fluid supply manifold and eject the fluid in rows of parallel streams. Printers using such printheads accomplish graphic reproduction by selectively charging and deflecting the drops in each of the streams and depositing at least some of the drops on a print receiving medium, while others of the drops strike a drop catcher device.

[0003] Continuous ink jet printing systems include an umbilical that supplies fluid (ink), air, power, and data to the printhead. In previously proposed designs, installation of the umbilical has been a difficult and tedious process, comprised of a complex weldment with precision machined features that contributed little to assembling of the hardware. The umbilical has typically had many lines, cables, and connectors. Additionally, in the previously proposed designs, the printhead housing cap and spine (i.e., ink jet printhead support) have been welded together. While threading the umbilical to the welded assembly, cables become twisted, connectors get caught on other features, and various elements end up out of position. After component parts from the printing assembly were assembled to the spine, disassembly was almost impossible without damaging the hardware.

[0004] It is seen then that there exists a need for an improved connection between a printing system umbilical and the structure known as a spine that supports an ink jet printhead.

Summary of the Invention

[0005] In accordance with the present invention, there is provided a system for linking an umbilical to a continuous ink jet printhead comprising:

an ink jet printhead support structure for supporting the ink jet printhead;
a rigid printhead housing cap located between the ink jet printhead support structure and the umbilical;
attachment/detachment means for attaching/detaching the ink jet printhead support structure to/from the rigid printhead housing cap; and
receiving means associated with the rigid printhead housing cap for receiving the umbilical, whereby the umbilical is threadable into and out of the receiving means of the rigid printhead housing cap.

[0006] In the system according to the present invention, the rigid printhead housing cap serves as a platform in that it serves as an attachment/detachment point for the umbilical, covers, and structural elements of a continuous ink jet printhead. The umbilical is easily attachable/detachable by separating the printhead housing cap from the ink jet printhead support structure, and threading the umbilical into or out of the rigid printhead housing cap.

[0007] It is an advantage of the present invention that it facilitates serviceability, functionality, manufacturability, registration, and cost effectiveness of a continuous ink jet printing system.

[0008] An embodiment of the invention will now be described with reference to the accompanying drawings.

Brief Description of the Drawing

[0009] Fig. 1 is an exploded view of an ink jet printhead structure illustrating alignment between the ink jet printhead support structure and the umbilical, in accordance with the present invention.

Detailed Description of the Preferred Embodiment

[0010] Referring to Fig. 1, there is illustrated a linkage system 10 for linking a printing system umbilical 1 and an ink jet printhead support structure 2. There is a need for a device in a continuous ink jet printing system that will serve as a rigid link between the umbilical 1 that supplies fluid (ink), air, power, and data to a continuous ink jet printhead (not shown) and the support structure 2 which supports the printhead and receives the fluid, air, power and data.

[0011] Continuing with Fig. 1, the air provided a rigid ink jet printhead housing cap and umbilical platform 3. The rigid member 3 is located between the ink jet printhead support structure 2 and the umbilical 1. The rigid member 3 operates as a "cap" or lid for the structure 2, and as a platform under the umbilical 1.

[0012] As can be seen in Fig. 1, the umbilical 3 has a threaded end portion 7. The umbilical is easily attached/detached by separating the rigid member 3 from the support structure 2 and threading the umbilical end portion 7 into or out of receiving means or threaded aperture 9 of the rigid member 3. A locking means, such as a nut 8, can be placed between the threaded end portion 7 and the rigid member 3 as umbilical 1 is attached to member 3, to lock the umbilical 1 to the rigid member 3. The support structure 2 can also be easily attached/detached from the umbilical and rigid member assembly by removing attachment means, such as screws 5. Hence, the umbilical 1 is threaded into the top of rigid member 3, and the support structure 2 is screwed onto the bottom of rigid member 3.

[0013] With the present embodiment, the umbilical 1 and the rigid platform 3 can be built as a module, thereby eliminating twisting of components. The support structure 2 and all of its related hardware can also be built as a module. Final assembly, then, merely comprises placing both assemblies together via self-locating features, and fastening the modules with attachment means 5. Built-in registration features in the rigid plate 3 accurately align the support structure 2. This insures transference of position of everything that mounts on the support structure 2 to the rigid platform 3. Covers 4A and 4B then enclose the entire linkage apparatus 10. Built-in alignment features also automatically locate and properly position the covers 4A and 4B.

[0014] The self-locating or built-in features can be seen in Fig. 1 as naturally occurring features of tongue-and-groove, lap joining, and pin-in-hole. These naturally occurring features are the keys that locate all of the separate pieces together, without resorting to complex weldment. With the loose hardware precisely located together from printhead to rigid platform 3, tolerances involving the continuous ink jet printhead are known at remote mount holes 6. Hardware that is modular and self-locating is easier to fabricate, inspect, assemble, and is more cost effective, functional, and reliable.

Industrial Applicability and Advantages

[0015] The present invention is useful in the field of ink jet printing, and has the advantage of providing an optimum connection between a printing system umbilical and the structure that supports an ink jet printhead. The present invention provides the further advantage of providing a platform that serves as an attachment/detachment point for the umbilical, covers, and structural elements of a continuous ink jet printing system. Finally, the attachable/detachable umbilical platform facilitates ink, power, air, and data transference, and registration of a continuous ink jet printhead and printing system.

[0016] Having described the invention in detail and by reference to the preferred embodiment thereof, it will be apparent that other modifications and variations are possible without departing from the scope of the invention defined in the appended claims.

Claims

1. A system for linking an umbilical to a continuous ink jet printhead comprising:

an ink jet printhead support structure (2) for supporting the ink jet printhead;
a rigid printhead housing cap (3) located between the ink jet printhead support structure (2) and the umbilical;
attachment/detachment means for attaching/detaching the ink jet printhead support structure (2) to/from the rigid printhead housing cap (3); and
receiving means (9) associated with the rigid printhead housing cap (3) for receiving the umbilical (1), whereby the umbilical (1) is threadable into and out of the receiving means (9) of the rigid printhead housing cap (3).

2. A system for linking an umbilical to a continuous ink jet printhead as claimed in claim 1 wherein the attachment means comprise at least one screw (5).

3. A system for linking an umbilical to a continuous ink jet printhead as claimed in claim 1 wherein the receiving means comprises a threaded aperture (9) through the rigid printhead housing cap (3).

4. A system for linking an umbilical to a continuous ink jet printhead as claimed in claim 1 further comprising first built-in registration features in the rigid printhead housing cap (3) to accurately align with the ink jet printhead support structure (2).

5. A system for linking an umbilical to a continuous ink jet printhead as claimed in claim 1 further comprising enclosure means (4A, 4B) for enclosing the linkage system.

6. A system for linking an umbilical to a continuous ink jet printhead as claimed in claim 5 further comprising second built-in registration features to automatically locate and properly position the enclosure means (4A, 4B).

7. A system for linking an umbilical to a continuous ink jet printhead as claimed in claim 1 further comprising self-locating features for properly aligning the umbilical (1) and the rigid printhead housing cap (3) with the ink jet printhead support structure (2).

Patentansprüche

1. System zum Verbinden eines Versorgungskabels mit dem Druckkopf eines kontinuierlichen Tintenstrahldruckers, enthaltend:

eine Tintenstrahldruckkopf-Haltestruktur (2) zum Halten des Tintenstrahldruckkopfes,
eine steife Druckkopfgehäuseabdeckung (3), die zwischen der Tintenstrahldruckkopf-Haltestruktur (2) und dem Versorgungskabel angeordnet ist,
Anbring-/Lösemittel zum Anbringen der Tintenstrahldruckkopf-Haltestruktur (2) an bzw. zum Lösen der Tintenstrahldruckkopf-Haltestruktur (2) von der steifen Druckkopfgehäuseabdekkung (3) und

ein Aufnahmemittel (9), das zu der steifen Druckkopfgehäuseabdeckung (3) gehört, zum Aufnehmen des Versorgungskabels (1), wobei das Versorgungskabel (1) in das Aufnahmemittel (9) der steifen Druckkopfgehäuseabdekkung (3) einschraubbar und herausschraubbar ist.

2. System zum Verbinden eines Versorgungskabels mit dem Druckkopf eines kontinuierlichen Tintenstrahldruckers nach Anspruch 1, bei dem die Anbringmittel zumindest eine Schraube (5) enthalten.

3. System zum Verbinden eines Versorgungskabels mit dem Druckkopf eines kontinuierlichen Tintenstrahldruckers nach Anspruch 1, bei dem das Aufnahmemittel eine mit einem Gewinde versehene Öffnung (9) durch die steife Druckkopfgehäuseabdeckung (3) enthält.

4. System zum Verbinden eines Versorgungskabels mit dem Druckkopf eines kontinuierlichen Tintenstrahldruckers nach Anspruch 1, weiterhin enthaltend Ersteinbau-Registriermerkmale in der steifen Druckkopfgehäuseabdeckung (3), um mit der Tintenstrahldruckkopf-Haltestruktur (2) genau ausgerichtet zu sein.

5. System zum Verbinden eines Versorgungskabels mit dem Druckkopf eines kontinuierlichen Tintenstrahldruckers nach Anspruch 1, weiterhin enthaltend Umschließungsmittel (4A, 4B) zum Umschließen des Verbindungssystems.

6. System zum Verbinden eines Versorgungskabels mit dem Druckkopf eines kontinuierlichen Tintenstrahldruckers nach Anspruch 5, weiterhin enthaltend Zweiteinbau-Registriermerkmale, um die Umschließungsmittel (4A, 4B) automatisch zu lokalisieren und genau auszurichten.

7. System zum Verbinden eines Versorgungskabels mit dem Druckkopf eines kontinuierlichen Tintenstrahldruckers nach Anspruch 1, weiterhin enthaltend selbstzentrierende Mittel zum korrekten Ausrichten des Versorgungskabels (1) und der steifen Druckkopfgehäuseabdeckung (3) mit der Tintenstrahldruckkopf-Haltestruktur (2).

Revendications

1. Système de liaison d'une pièce ombilicale sur une tête d'impression à jet d'encre en continu, comprenant :

- une structure de support de tête d'impression à jet d'encre (2) pour supporter la tête d'impression à jet d'encre ;
- un capuchon rigide de logement de tête d'impression (3) placé entre la structure de support de tête d'impression à jet d'encre (2) et la pièce ombilicale ;
- des moyens de fixation/libération pour fixer/libérer la structure de support de tête d'impression à jet d'encre (2) sur/à partir du capuchon rigide de logement de tête d'impression (3) ; et
- un moyen de réception (9) associé au capuchon rigide de logement de tête d'impression (3) pour recevoir la pièce ombilicale (1), la pièce ombilicale (1) pouvant ainsi être vissée et dévissée du moyen de réception (9) du capuchon rigide de logement de tête d'impression (3).

2. Systèmes de liaison d'une pièce ombilicale sur une tête d'impression à jet d'encre en continu selon la revendication 1, dans lequel les moyens de fixation comprennent au moins une vis (5).

3. Système de liaison d'une pièce ombilicale sur une tête d'impression à jet d'encre en continu selon la revendication 1, dans lequel le moyen de réception comprend une ouverture taraudée (9) traversant le capuchon rigide de logement de tête d'impression (3).

4. Système de liaison d'une pièce ombilicale sur une tête d'impression à jet d'encre en continu selon la revendication 1, comprenant, de plus, des premiers dispositifs intégrés de repérage dans le capuchon rigide de logement de tête d'impression (3) pour un alignement précis avec la structure de support de tête d'impression à jet d'encre (2).

5. Système de liaison d'une pièce ombilicale sur une tête d'impression à jet d'encre en continu selon la revendication 1, comprenant, de plus, des moyens de fermeture (4A, 4B) pour fermer le système de liaison.

6. Système de liaison d'une pièce ombilicale sur une tête d'impression à jet d'encre en continu selon la revendication 5, comprenant, de plus, des seconds dispositifs intégrés de repérage pour localiser, de façon automatique, et pour positionner, de façon correcte, les moyens de fermeture (4A, 4B).

7. Système de liaison d'une pièce ombilicale sur une tête d'impression à jet d'encre en continu selon la revendication 1, comprenant, de plus, des dispositifs à auto-positionnement pour aligner, de façon correcte, la pièce ombilicale (1) et le capuchon rigide de logement de tête d'impression (3) avec la structure de support de tête d'impression à jet d'encre (2).

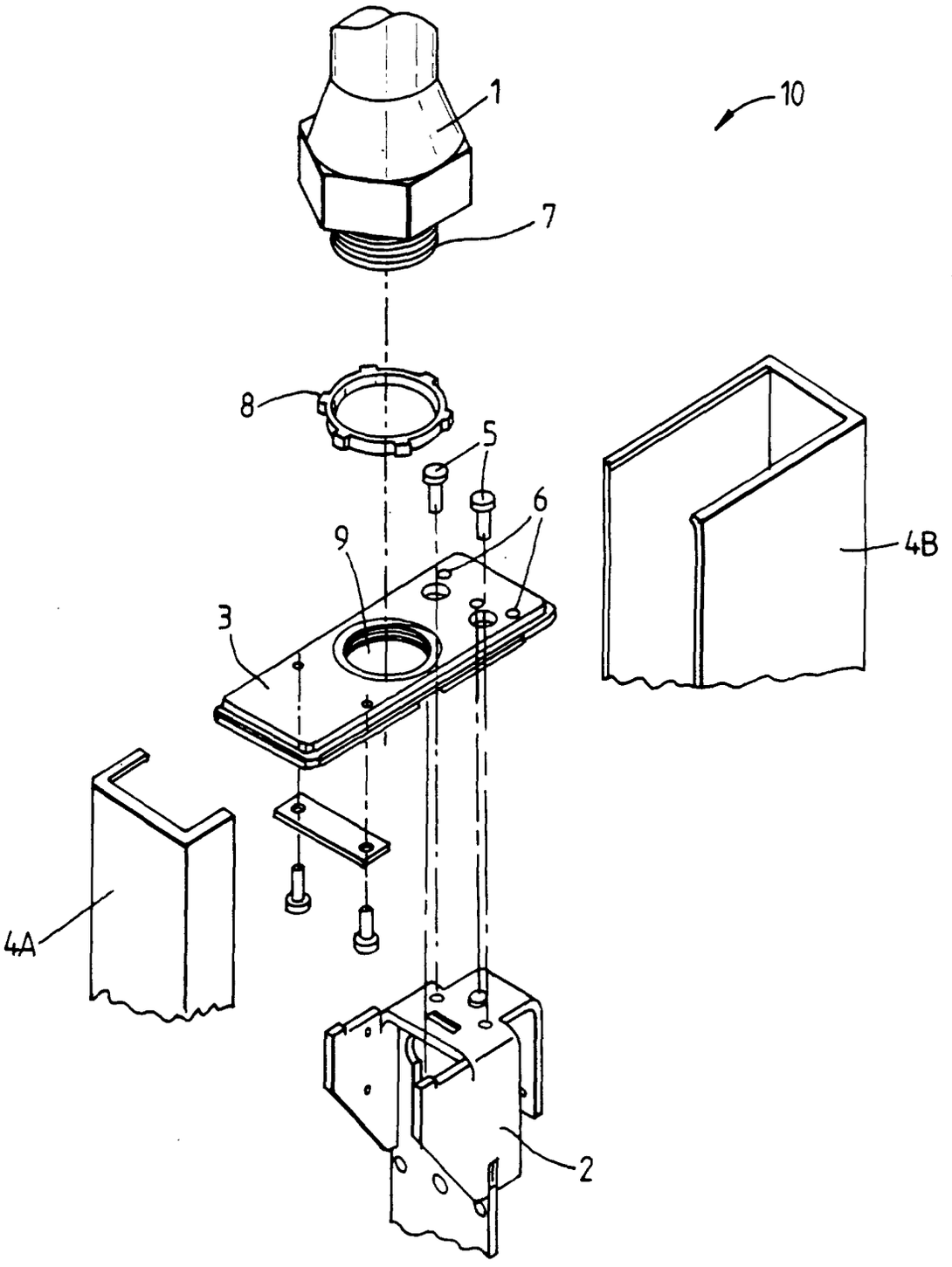

FIG . 1