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(54) Means for locating an eyelid assembly to a continuous ink jet printhead

(57) An eyelid assembly (1) is precisely aligned to a catcher (3) in a continuous ink jet printhead (10). An eyelid linkage mechanism (4) associated with the eyelid assembly (1), fastens to the ink jet printhead to provide pivot areas that allow the eyelid assembly to rotate in and out of the catcher (3). A fixture precisely holds and locates the eyelid linkage mechanism to accurately register the eyelid assembly to the catcher. The accurately registered eyelid linkage mechanism is then bonded to the printhead frame, and the eyelid assembly (1) can be secured to the eyelid linkage mechanism (4) using a pivot pin (7).

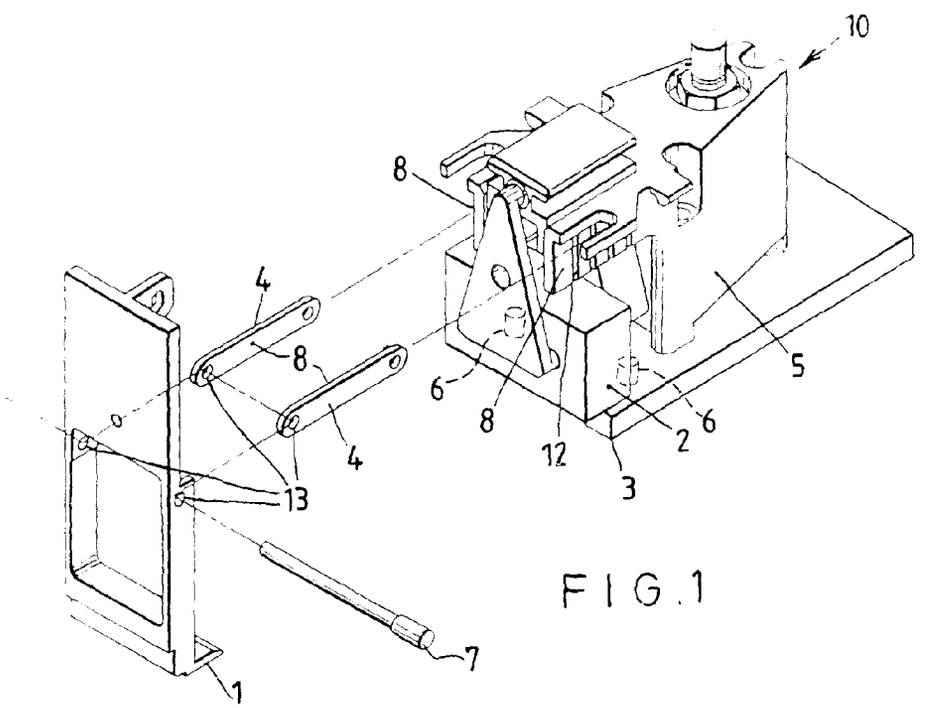

FIG.1

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Description

Technical Field

The present invention relates to continuous ink jet printing and, more particularly, to a method for registering the linkage that locates an eyelid assembly to a continuous ink jet printhead.

Background Art

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.

When the ink jet printhead is not in operation, means must be provided to seal the printhead so that ink does not dry in the catcher face area, or weep from the jets and soil the apparatus or adjacent work surfaces. It is desirable, therefore, to attach an eyelid assembly to a printhead to allow the starting and shutdown of the ink jet printer without requiring the use of a separate catch pan, which must be placed between the printhead and the recording means during startup and shutdown of the printer.

The eyelid diverts the flow of ink from a resonator back into the printhead while the printer is running but not printing. In prior art eyelid assemblies, screws are used to fasten pivot plates into an ink jet printhead. A fixture is used to locate these pivot plates to an unimportant part of the printhead. The optimum relationship is between the catcher and the eyelid assembly. Without this relationship, tolerance is added by the assembly of many parts. Clearance holes for securing the pivot plates with screws also add additional tolerance. Screws require multidirectional assembly instead of the desired unidirectional assembly, which adds labor costs. Furthermore, screws inherently increase part count to a product, which is also undesirable. Whatever means is used to align the catcher to the eyelid assembly, the more precise an alignment is, the better the eyelid operates.

It is seen then that there exists a need for a precise eyelid assembly registration means which can be used with continuous ink jet printheads.

Summary of the Invention

This need is met by the registration system and method according to the present invention, wherein mounts and linkage for locating an eyelid assembly for a continuous ink jet printhead are precisely registered. The precision design establishes a direct locational relationship between the catcher and the eyelid assembly. This accuracy is assured by eliminating screws and their clearance holes, and by fixturing directly to the catcher via precise alignment apertures in the bottom of the catcher.

In accordance with one aspect of the present invention, an eyelid assembly is precisely aligned to a catcher in a continuous ink jet printhead. An eyelid linkage mechanism associated with the eyelid assembly, fastens to the ink jet printhead to provide pivot areas that allow the eyelid assembly to rotate in and out of the catcher. A fixture precisely holds and locates the eyelid linkage mechanism to accurately register the eyelid assembly to the catcher. The eyelid linkage mechanism is bonded to the printhead frame in reference to the catcher, to provide the pivot areas that allow the eyelid assembly to rotate in and out of the catcher. The accurately registered eyelid assembly is then secured to the eyelid linkage mechanism.

Accordingly, it is an object of the present invention to provide precise registration of the linkage mechanism that locates an eyelid assembly to a continuous ink jet printhead. It is an advantage of the present invention to provide such a registration method and system wherein the optimum relationship between the catcher and eyelid assembly is realized.

Other objects and advantages of the invention will be apparent from the following description, the accompanying drawings and the appended claims.

Brief Description of the Drawings

Fig. 1 is an exploded view of an ink jet printhead structure illustrating alignment between the ink jet printhead and the eyelid assembly, in accordance with the present invention; and

Fig. 2 illustrates achievement of the precision locational relationship of Fig. 1, between the eyelid assembly and the catcher, using a temporary fixture.

Detailed Description of the Preferred Embodiments

Referring to Figs. 1 and 2, precise registration between an eyelid assembly and a continuous ink jet printhead, according to the present invention, is shown. A typical ink jet printhead, generally designated 10, includes a resonator 2, a catcher 3, and an eyelid assembly 1.

An eyelid linkage mechanism, or pivot plates 4, fasten to and travel with the ink jet printhead 10. The pivot plates are bonded into place, such as with an instant adhesive that is wicked or placed between identified bond sites 8 of the eyelid linkage 4 and a printhead frame 5. The pivot plates provide pivot areas that allow the eyelid assembly 1 to rotate in-and-out of the catcher 3, thereby diverting ink from the resonator 2 when actuated into the ink path and sealing against the catcher 3.

The eyelid assembly 1 can be disconnected from the printhead 10 by pulling a pivot pin 7, receivable into pivot apertures 13, from the eyelid assembly 1 and linkage plates 4. The eyelid assembly 1 stays with the printer and the linkage plates go with the printhead.

Continuing with Figs. 1 and 2, the precision design according to the present invention succeeds by establishing a direct locational relationship between the catcher 3 and the eyelid assembly 1. This accuracy is ensured by eliminating screws and their clearance holes, and by fixturing directly to the catcher 3 via precise alignment holes 6 located in the bottom of the catcher 3. Fixture 9 precisely holds and locates the eyelid links 4, and accurately registers to the catcher assembly via the catcher alignment holes 6 and associated mating pins 11. This creates the most accurate possible relationship between the eyelid assembly 1 and the catcher 3 by bypassing all of the hardware between these parts via the fixture. A bonding means can then be applied to bond sites 8, associated with the precisely aligned eyelid assembly 1 and catcher 3, to permanize the relationship between these parts. The bonding means can be any suitable means, including instant adhesive.

Referring to Fig. 1, the bond sites 8 preferably have a surface finish of 100-200 RMS to enhance mechanical interlocking of the bonding means. The printhead frame 5 utilizes capillary channels 12 to feed instant adhesive between the eyelid links 4 and the printhead frame 5 to the bond sites 8. An instant adhesive can be pre-applied to the printhead frame 5 or the eyelid links 4, as long as the positioning of the parts takes place before the adhesive dries, typically within 45 seconds.

Industrial Applicability and Advantages

The present invention is useful in the field of ink jet printing, and has the advantage of maximizing print quality by allowing the print media to be particularly close to the printer. The present invention provides the further advantage of providing a precisely registered sealing surface between the eyelid assembly and the printhead. Finally, the registration system and method of the present invention provides the advantage of eliminating screws, thereby saving labor and assembly costs.

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 means for precisely aligning an eyelid assembly to a catcher in a continuous ink jet printhead comprising:
   an eyelid linkage mechanism associated with the eyelid assembly;
   a fixture for precisely holding and locating the eyelid linkage mechanism to accurately register the eyelid assembly to the catcher;
   a bonding means for bonding the eyelid linkage mechanism to the printhead frame in reference to the catcher, to provide pivot areas that allow the eyelid assembly to rotate in and out of the catcher; and
   securement means to secure the accurately registered eyelid assembly to the eyelid linkage mechanism.

2. A means for precisely aligning an eyelid assembly to a catcher as claimed in claim 1 wherein the pivot areas comprise a pivot point where the eyelid rotates.

3. A means for precisely aligning an eyelid assembly to a catcher as claimed in claim 1 wherein the securement means comprises a pivot pin.

4. A means for precisely aligning an eyelid assembly to a catcher as claimed in claim 1 wherein the eyelid linkage mechanism is precisely held and located by the fixture that accurately registers to the catcher assembly via catcher alignment holes and associated mating pins.

5. A means for precisely aligning an eyelid assembly to a catcher as claimed in claim 1 wherein the fixture is temporary.

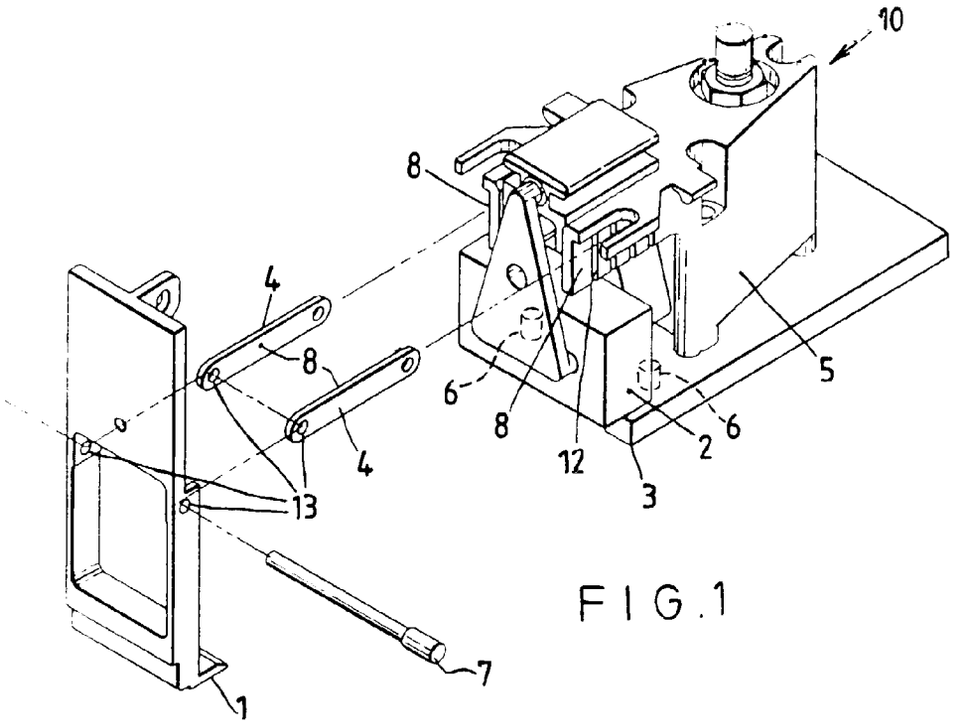

FIG.1

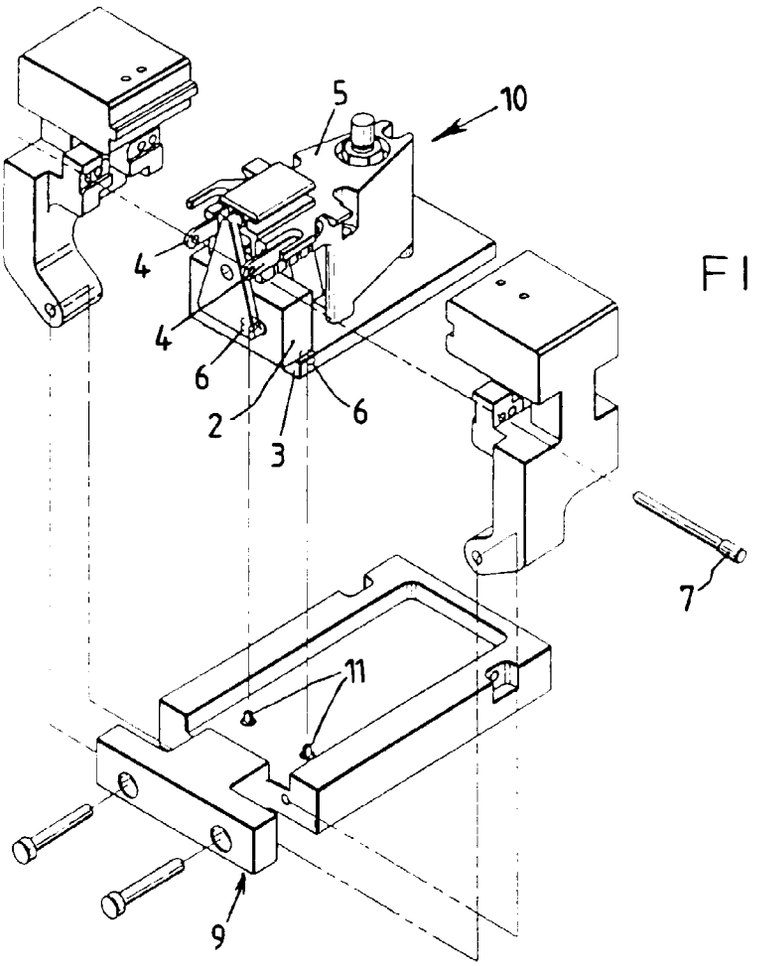

FIG.2

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EUROPEAN SEARCH REPORT

Application Number
EP 97 30 2695

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
A	US 5 475 410 A (DURST HOMER D ET AL) 12 December 1995 * the whole document * ---	1	B41J2/17
A	US 4 928 115 A (FAGERQUIST RANDY L ET AL) 22 May 1990 * column 3, line 51 - column 5, line 18; figures 4,5 * ---	1	
A	EP 0 026 836 A (IBM) 15 April 1981 * page 6, line 1 - page 9, line 1; figure 1 * ---	1	
A	EP 0 028 321 A (IBM) 13 May 1981 * page 7, line 17 - page 12, line 22; figures * -----	1	

TECHNICAL FIELDS SEARCHED (Int.Cl.6)

B41J

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	4 July 1997	De Groot, R

CATEGORY OF CITED DOCUMENTS

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