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(54) Filter and quick disconnect fitting assembly for an ink jet printhead

(57) A filter assembly is provided for a continuous ink jet printing system, the continuous ink jet printing system having a fluid system and an ink jet printhead. The filter assembly comprises a filter situated in-line with the ink jet printhead and surrounded by a seal. A quick disconnect fitting is provided for capturing the filter housed within the seal to provide an integral quick disconnect filter assembly.

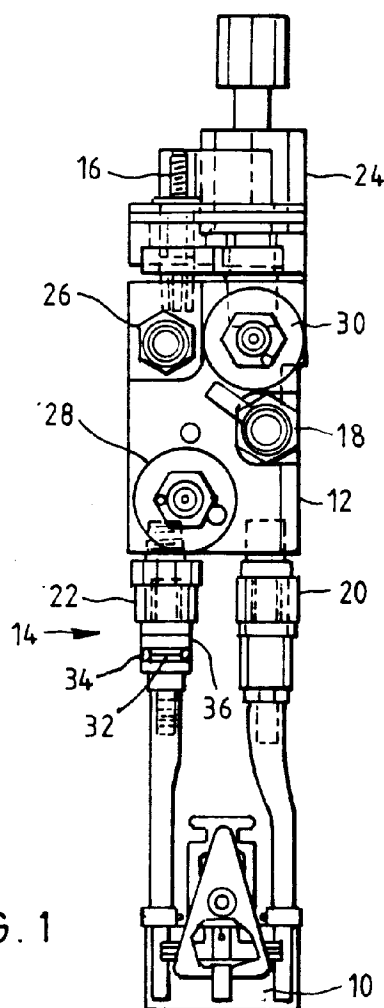


FIG. 1

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Description

Technical Field

The present invention relates to continuous ink jet printers and, more particularly, to an integral filter and quick disconnect fitting assembly for an ink jet printhead.

Background Art

Ink jet printing systems are known in which a print head 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 print heads 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.

As is obvious to those skilled in the art, the fluid system for a continuous ink jet printer must perform a number of functions. These functions include liquid supply, catch fluid return, startup and shutdown of the print head, and long-term storage.

Continuous ink jet fluid systems have filter design and packaging related to the ink jet printhead. Prior continuous ink jet printheads have a final filter that is placed in-line between the inlet to the printhead and the inlet tubing quick disconnect fitting. Existing ink jet printer systems are known which have a one inch 240 dots-per-inch (dpi) printhead. However, such printheads have packaging constraints not previously addressed by prior printheads. With the packaging constraints of a one inch 240 dpi printhead, placement of the final filter in the same manner as prior printheads is nearly impossible.

It is seen then that it would be desirable to eliminate the problems associated with the prior art final filter placement, yet still have the final filter in-line to the printhead inlet.

Summary of the Invention

This need is met by the system according to the present invention, wherein a quick disconnect fitting assembly incorporates the final filter as an integral assembly.

In accordance with one aspect of the present invention, a filter assembly is provided for a continuous ink jet printing system, the continuous ink jet printing system having a fluid system and an ink jet printhead. The filter assembly comprises a filter situated in-line with the ink jet printhead and surrounded by a sealing means. A quick disconnect fitting is provided for capturing the filter housed within the sealing means to provide an integral quick disconnect filter assembly.

Accordingly, it is an object of the present invention to address the packaging constraints of a 1 inch 240 dpi

printhead. It is a further object of the present invention to keep the final filter in-line to the printhead inlet. It is an advantage of the present invention that it provides a quick disconnect fitting that incorporates the final filter as an integral assembly.

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 a front view of a printhead and fluid manifold assembly, illustrating the integral filter assembly according to the present invention; and

Fig. 2 illustrates an enlarged view of the integral filter/quick disconnect fitting assembly shown in Fig. 1.

Detailed Description of the Preferred Embodiments

The present invention is an integral filter and quick disconnect fitting assembly for an ink jet printhead, wherein the final filter of the printhead is packaged in a quick disconnect fitting to eliminate a separately housed in-line filter assembly.

Referring now to the drawings, in Fig. 1 a front view of a printhead 10 connected to a fluid manifold 12 is shown, illustrating the filter assembly 14 of the present invention. The present invention is described in detail with particular reference to certain preferred embodiments thereof, including particular reference to a fluid manifold such as is described and claimed in commonly assigned, co-pending patent application Serial No. 08/530,418, filed September 19, 1995, totally incorporated herein by reference, but it will be understood that modifications and variations can be effected without departing from the spirit and scope of the invention.

The manifold assembly 12 comprises a variety of fluidic features. These include inlet and outlet fluid connections 16 and 18, respectively, to a supply umbilical (not shown), for providing fluidic quick disconnect between the umbilical and manifold 12. The integrated fluidic features also include inlet and outlet fluid connections 20 and 22, respectively, to the printhead 10, for providing fluidic quick disconnect between the manifold 12 and the printhead 10, in accordance with the present invention.

A pressure transducer 24 to the outlet of the printhead 10 and a temperature thermistor 26 to the inlet of the printhead 10 are also associated with the fluid manifold 12. The pressure transducer 24 senses pressure at the printhead 10 and is part of a servo loop control of the fluid pump to provide given printhead pressures. The temperature thermistor 26 senses ink temperature at the printhead 10, and provides servo loop control of the ink heater in the fluid system, to maintain a minimal fluid temperature.

In addition, the fluid manifold assembly 10 has as-

sociated inlet and outlet solenoid valves 28 and 30, respectively, to the printhead 10. The inlet fluid valve 28 shuts off fluid to the printhead and prevents fluid from draining into the printhead during shutdown periods, where the printhead position may be lower than the fluid system position. The outlet fluid valve 30 provides a means for establishing pressure in the printhead when closed, while providing flow through cleaning of the printhead when open.

Continuing with Fig. 1 and referring to Fig. 2, the filter assembly 14 of the present invention is illustrated. A final filter 32 with a seal 34 is captured in a quick disconnect fitting 36 to provide an integral quick disconnect filter assembly 14. In a preferred embodiment of the present invention, the filter 32 comprises a pleated stainless steel disc filter rated at two micron nominal and ten micron absolute. The seal 34, preferably a silicone ring, seals the edges of the final filter 32, preventing fluid from bypassing the filter. The final filter and seal assembly is captured between the pair of molded fittings 36. A first end of the filter assembly comprises a male end, with an o-ring, for mating with a female end of the fluid manifold quick disconnect fitting. The other, second, end of the filter assembly 14 comprises a barb 37 for silicone fluid tubing 39 of Fig. 1, to provide mechanical gripping for the silicone tubing. It should be noted, of course, that the quick disconnect fitting can be either the female or male end of the filter assembly. Together, the male and female ends comprise a quick disconnect coupling. The components 32, 34 and 36 are permanently sealed, using any suitable means, to form an integral quick disconnect and final filter fitting assembly 14.

The final filter fitting assembly 14 comprises filter 32 situated in-line with the ink jet printhead 10. Sealing means 34 surround filter 32. The quick disconnect fitting 36 captures the filter 32 housed within the sealing means 34, to provide the integral quick disconnect filter assembly 14. The assembly 14 addresses the packaging constraints of certain printheads by eliminating an additional housing for the final filter, as has previously been required in prior continuous ink jet printheads.

Industrial Applicability and Advantages

The present invention is useful in the field of ink jet printing, and has the advantage of addressing packaging constraints of certain printheads. The present invention provides the further advantage of providing an integral filter/quick disconnect fitting assembly for an ink jet printhead. Finally, the present invention provides the advantage of eliminating a separate housing for the final filter.

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 filter assembly for a continuous ink jet printing system, the continuous ink jet printing system having a fluid system and an ink jet printhead, the filter assembly comprising:
 - a filter situated in-line with the ink jet printhead;
 - a sealing means surrounding the filter; and
 - a quick disconnect fitting for capturing the filter housed within the sealing means to provide an integral quick disconnect filter assembly.
2. A filter assembly as claimed in claim 1 wherein the filter comprises a pleated stainless steel disc filter.
3. A filter assembly as claimed in claim 2 wherein the pleated stainless steel disc filter is rated at two micron nominal and ten micron absolute.
4. A filter assembly as claimed in claim 1 wherein the sealing means comprises a silicone ring.
5. A filter assembly as claimed in claim 1 wherein the filter comprises a central portion and edge portions.
6. A filter assembly as claimed in claim 5 wherein the sealing means seals the edge portions of the filter to prevent fluid from bypassing the filter.
7. A filter assembly as claimed in claim 1 wherein the quick disconnect fitting comprises a pair of molded fittings.
8. A filter assembly as claimed in claim 1 further comprising a first end and a second end.
9. A filter assembly as claimed in claim 8 wherein the first end comprises a male end for mating with a female end of the quick disconnect fitting.
10. A filter assembly as claimed in claim 8 further comprising a barb at the second end of the filter assembly.

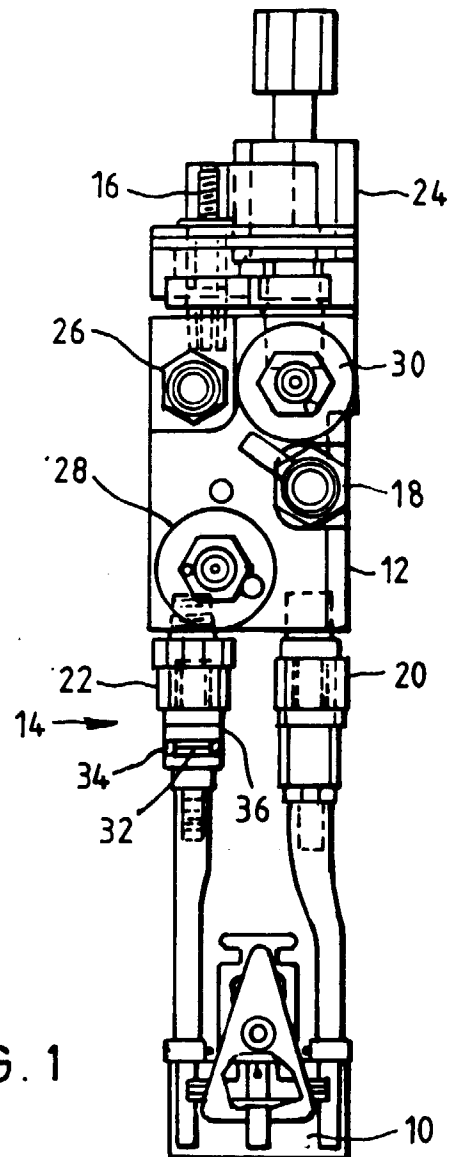


FIG. 1

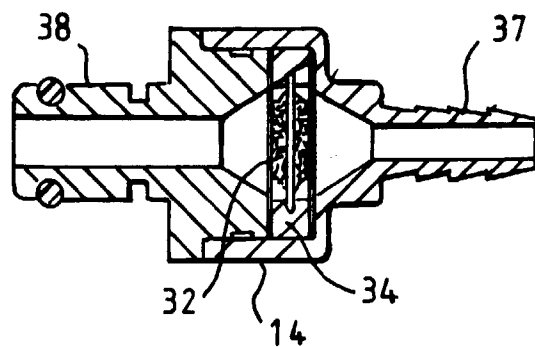
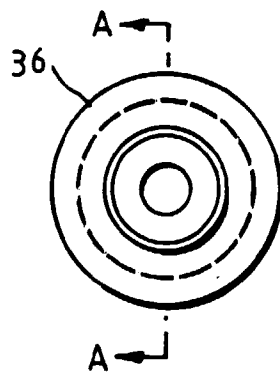


FIG. 2