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November 2021

INK LEAKAGE DETECTION IN LOW-COST PRINTERS

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Recommended Citation

INC, HP, "INK LEAKAGE DETECTION IN LOW-COST PRINTERS", Technical Disclosure Commons, (November 15, 2021)
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Ink leakage detection in low-cost printers

Abstract

Even though the Ink Delivery System is designed to do not have ink leakages, during the normal operation of the printer it may happen that an ink leakage occurs. For instance, due to a connection that is loosen, a component is broken (e.g., hardware quality part) or a part is not replaced when is required and exceed its life goal.

Typically, Ink Delivery System includes sensors to detect the ink leakage presence on strategic areas. For instance, near the Ink Supply Station, which is the prone area to have ink leakage due to multiple fluidic connections (between tubes, to other component such as pressure sensors, ink pumps, ...), as well as failure on the Ink Delivery System components, such as the ink pump, pressure sensors, ... However, this implies a cost increase of the printer to detect a failure mode that it is expected to have a low occurrence, but due to its criticality it must be detected before damaging other components.

In Low-cost printers, there is a strong request to reduce the total cost of the printer. Thus, searching for alternatives to current solutions reducing the cost. In leakages are expected to have a low occurrence, so having a considerable cost increase for a leakage sensor is not desired.

The invention provides a low-cost solution to detect ink leakages on the Ink Supply Station by redirecting the ink using a transparent tube to a visible area for the customer.

Invention

The invention allows to detect ink leakage without requiring a leakage sensor, just based on a visual inspection.

The solution proposed consists of using a transparent tube with a close end that redirects the ink collected on the Ink Supply Station trays to a visible point for the customer. The customer can detect that there is an ink leakage (and the line affected) if the transparent tube is filled with ink and take the proper actions.

In the following images you can see a possible printer that might benefit from this invention and the location of the transparent tube:



Figure 1. Large Format Printer with a low- cost target and location



Figure 2. Example of a possible location of the transparent tube for leakage detection



Figure 3. Magenta leakage seen by the customer thanks to the transparent tube

The advantages that the invention provides are:

- Cost: a direct cost on the ink leakage subsystem, replacing the cost of sensor and electronics by a simple transparent tube.
- Repair cost: detecting ink leakage at the early stage may prevent further damages on other hardware or electronic parts.
- Electronics requirements reduction: current leakage sensors solution requires of electronics on PCA like resistors, capacitors, comparators and μ controller ports dedicated for this purpose. New solution is free of electronics.
- FW implementation: No FW implementation required neither testing and diagnostics validation.

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