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PASSIVE CAPPING HOLD POSITION FOR PRINT HEAD CARRIAGE

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Passive capping hold position for Print Head Carriage

Abstract

Large Format Printers usually consists on a Media Path (Y axis) which advances and rewinds the media and a Scan Axis (X axis) which allows the Print Head Carriage to spit the ink while moving perpendicular to the advancing direction of the media.

Print Head Carriage is a big and heavy component that contains all the needed Print Heads, Ink management assets, Electronics, Sensors, etc.

Print Head Carriage is always in the capping station while it is not printing or doing any Service routine as Print Heads needs to be in a capped mode to prevent them from becoming dry or getting clogged.

Capping Station is a passive element that engages and moves together with the Print Head Carriage when this moves to the Capping Position, thereby capping and protecting the Print Heads to keep them functional. Capping station is a slave tray equipped with as many caps as printheads on the carriage. It is moved from rest (low) position to cap (high) position when the carriage is moved from printing to "cap position" (-X direction). In order to ensure a proper alignment, it is spring loaded to opposite direction (+X direction).

The lifting movement is currently done by X-Z axis guides with low-degree ramps in which the capping tray is pulled along a -X direction and upwards by the carriage. Also, the spring generates a force in the +X direction that may become critical for the Carriage's cap position since it can overcome friction, move it along such +X direction and destabilize the servo control which could cause the printheads to stay uncap and dry or generate unwanted continuous servo corrections and movements to hold carriage on position.

Close to the Capping Station, there is a bump with two main functions:

(1) give the ZERO reference for the Print Head Carriage and (2) as a SAFETY element, avoid the Print Head Carriage to come out from the Scan Axis if any malfunction occurs while printing.

Problem solved

Print Head Carriage moves along X axis while printing and stays on the Capping Station while not. It is very important to ensure that the Print Head Carriage stops on its Capping Position while it is not printing to prevent Print Head nozzles from drying and, therefore, becoming nonfunctional.

Due to design tolerance, it is difficult to keep the Print Head Carriage in the Capping Position as the Capping design contains a spring to push back the Capping tray. In some cases, this spring force (3.9N in this case) is enough to move the Print Head Carriage back from its capping position and uncap the Print Heads, damaging all the Print Heads because they dry.

The proposed invention disclosed herein includes a passive holder system that would equilibrate the Capping Spring force to avoid this unintended uncaps.

Passive capping hold position for Print Head Carriage

Prior Solutions

No prior solution is known to the authors.

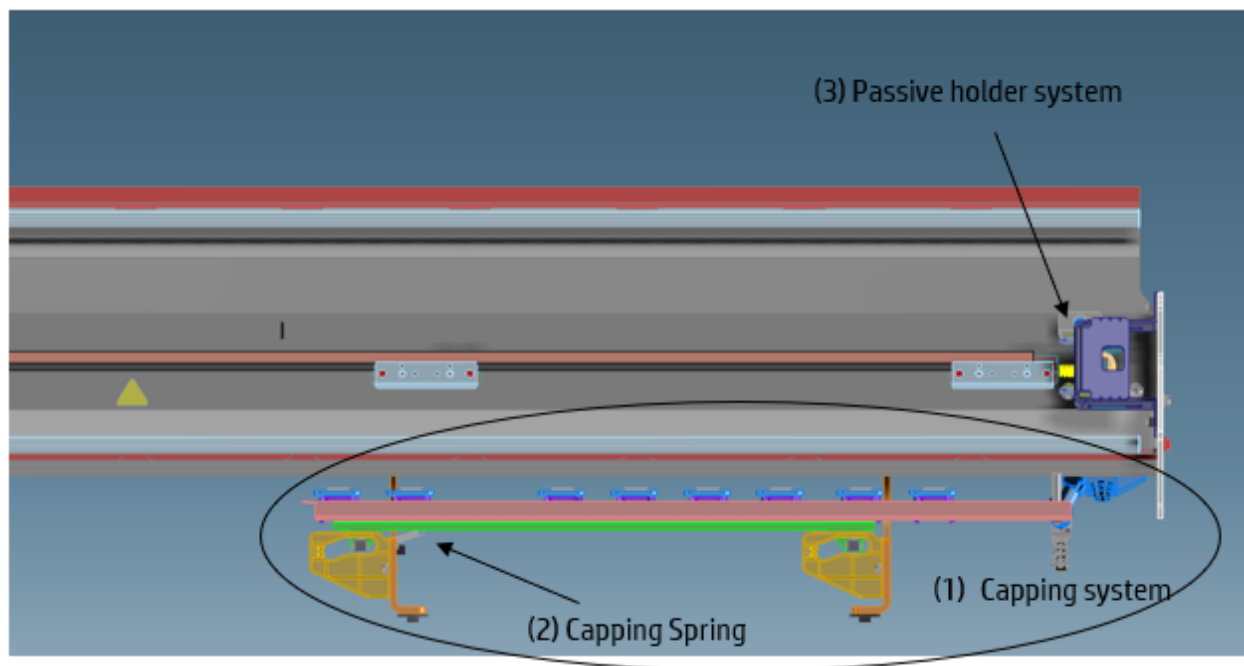
Description

The passive holder system is intended to retain the Print Head Carriage on the Capping Position correctly while this is not printing. This passive holder system may be a holding system, for example, a magnet that compensates the Spring Force from the Capping spring that allows the Capping to move back when Print Head Carriage moves out from the Capping Station.

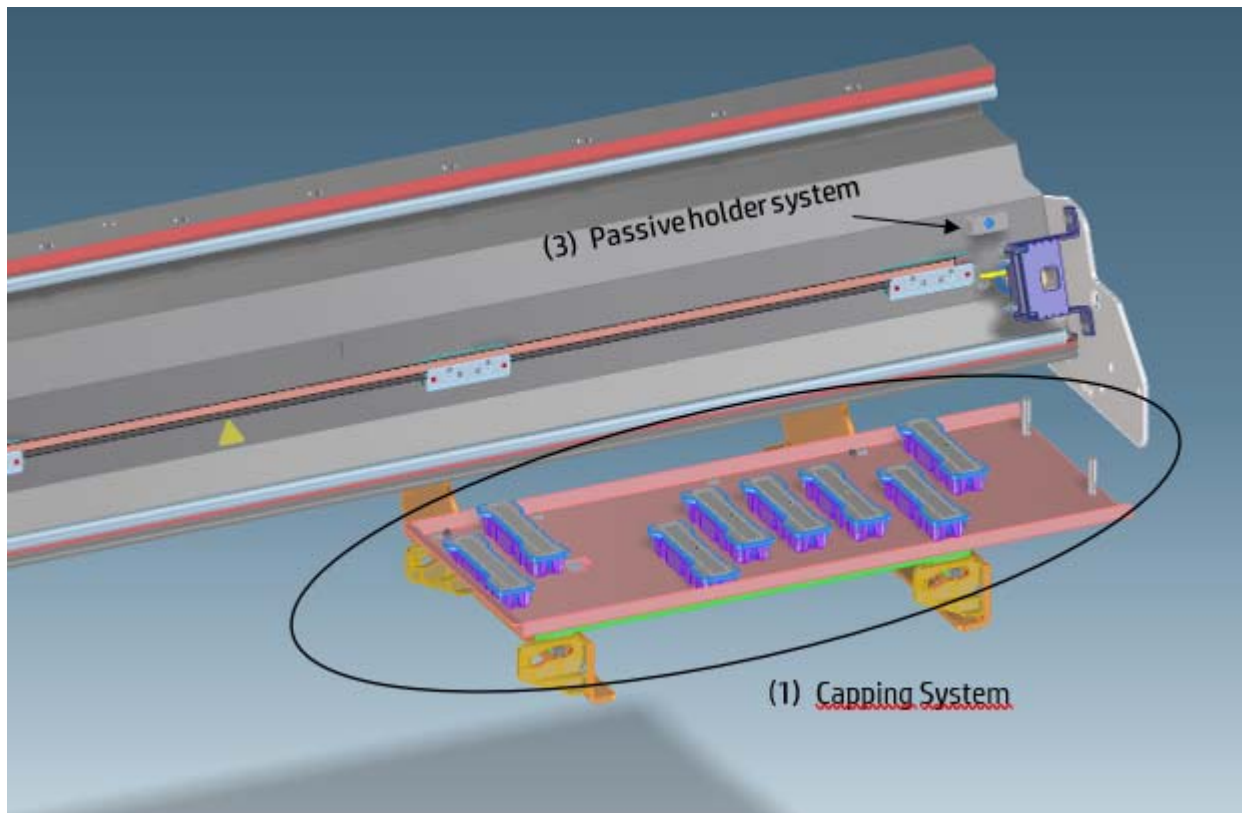
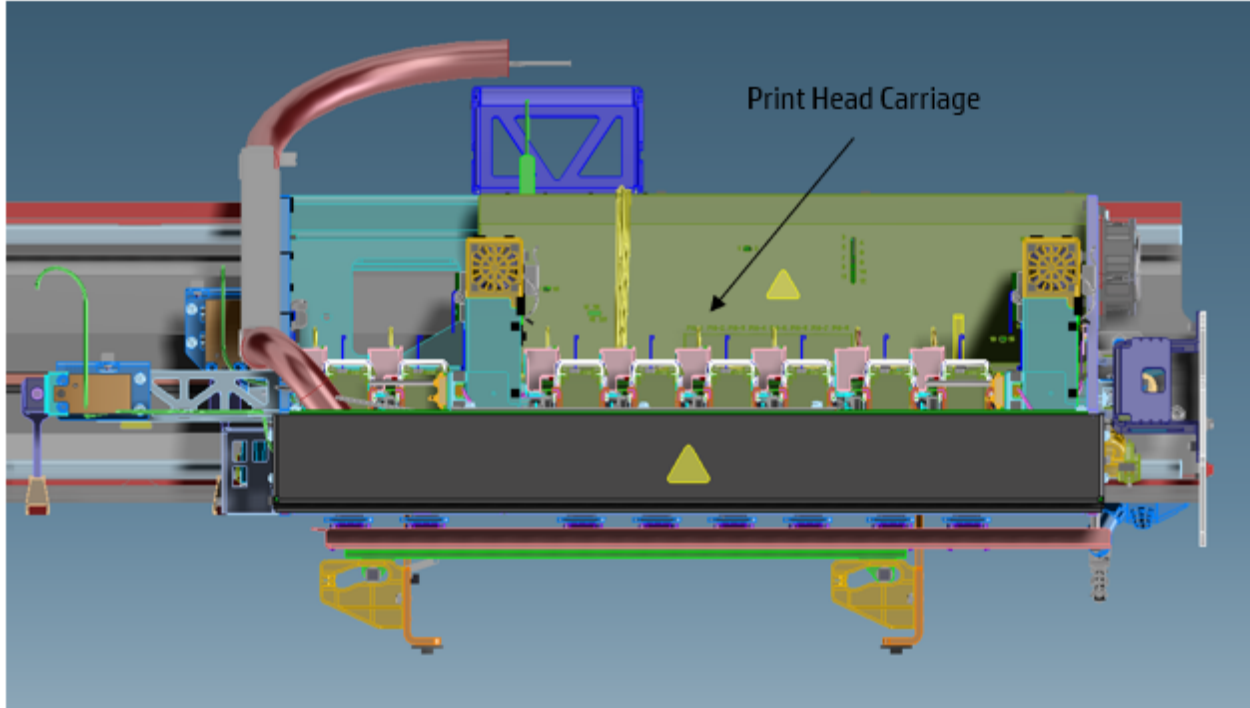
This passive holder system will actuate as (1) ZEROING reference for the Print Head Carriage, (2) as a SAFETY element, avoiding the Print Head Carriage to come out from the capping position along the Scan Axis if any malfunction occurs while printing and (3) as a passive RETAINER element to keep the Print Head Carriage on its correct position while Capping is needed, avoiding drying, crusting and clogging issues on the nozzles of Print Heads.

As reference, see pictures attached (1) Capping System with the (2) Capping Spring and the (3) the Passive Holder System on the right.

Solution proposed is placed in the rightmost side of the printer close to the operator and very accessible and visible for the operator/customer.



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Advantages

This invention allows the final customer to keep all the Print Heads in optimum conditions while Printer is not printing or shutdown, avoiding crusting on the Print Heads' nozzles that would need to be replaced by new ones (which are expensive), saving warranty costs, reducing the maintenance time, avoiding Image Quality issues and maintaining a high-level customer satisfaction.

Solution proposed is low-cost and easy to be implemented and would be key for the products with low friction Capping Systems as Serica.

- *Disclosed by Cesar Serpa Rosa, Marc Clotet Marti and Francesc Tarrida Tirado, HP Inc.*