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## AUTOMATIC INK REDISPERSION IN THE INTERMEDIATE TANK BY USING MAGNETIC FIELDS

HP INC

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## ***Automatic ink redispersion in the Intermediate Tank by using magnetic fields***

### ***Abstract***

When a supply is stored, the heavier pigments settle on the bottom part of the supply. Due to that, prior to installing a new ink supply, it is necessary to do a certain number of shakes to ensure that the ink is properly mixed.

In some printers, a printhead receives a stream of printing fluid from an Intermediate Tank, which is supplied with ink from a supply tank by an ink pump. Depending on the Intermediate Tank orientation, the heavier pigments settle on the deposit.

If the ink is not properly mixed, there would be depleted and enriched ink inside the supply, which could impact on the Image Quality, such as opacity consistency, Nozzle health, and potentially issues with de-cap and spray. Furthermore, could lead to a printhead failure due to filter clogging.

This invention describes a process to automatically redisperse the ink inside the Intermediate Tank by agitating one or several metallic balls by the interaction of a magnetic field to prevent the ink settling on the deposit. The routine is scheduled to be done when the printer is in Idle conditions and does not impact on the printer functionality or the Ink Delivery System algorithms.

### ***Invention***

The solution reduces the chances of having enriched ink arriving to the printhead, preventing issues related to Image Quality, such as opacity consistency, Nozzle health, and potentially issues with de-capped spray. Furthermore, could lead to a printhead failure due to filter clogging.

Currently, depending on the ink settling rate, a maintenance of the Intermediate Tank is done, which typically consist of replacing the deposit prior to reaching its life goal.

This implies not only the cost of replacing a part earlier than expected, but a Service Engineer visit.

Note that depending on the printer usage, the ink settling rate is impacted. In order to ensure that there is no customer suffering issues with the ink settling, the replacement considers the worst-case usage.

There are other solutions that relies on having a preferred Intermediate Tank orientation that minimizes the ink settling on the deposit by pulling the ink from the bottom part, but there could be physical or technical restrictions that does not allow that configuration.

The solution is based on redisperse the ink inside the Intermediate Tank by agitating one or several metallic balls by the interaction of a magnetic field in order to disperse the ink that is settling on the bottom part of the deposit, ensuring that the ink is properly mixed.

The magnetic field can be created by permanent magnets that change their relative position to the Intermediate Tank (get closer or move away) modifying the magnetic field that the metallics balls perceive, or for instance, by using electromagnets.

The routine is triggered before starting a print job to ensure that the ink is properly mixed.

Figure 1 describes the issue of the ink settling on the Intermediate Tank. The layer of enriched ink is settled on the bottom part of the deposit, the enriched ink will be pulled from the deposit depending on the Intermediate Tank orientation, shape, and remaining volume of ink inside of it.

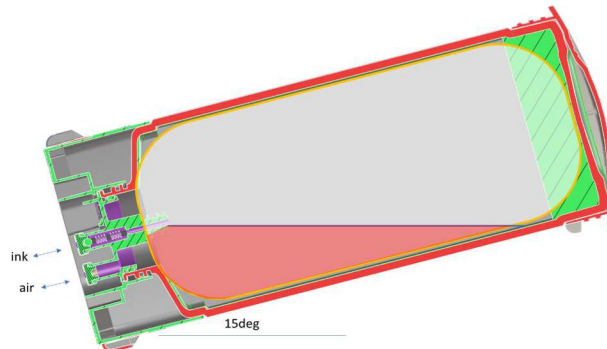


Figure 1. Ink is settled on the bottom part of the Intermediate Tank

Figure 2 describes an example of a mechanism that allows to automatically agitate the metallic balls, helping to redisperse the settled ink. The mechanism is composed by permanent magnets that comes closer or gets away from the Intermediate Tank attracting the metallic balls to them.

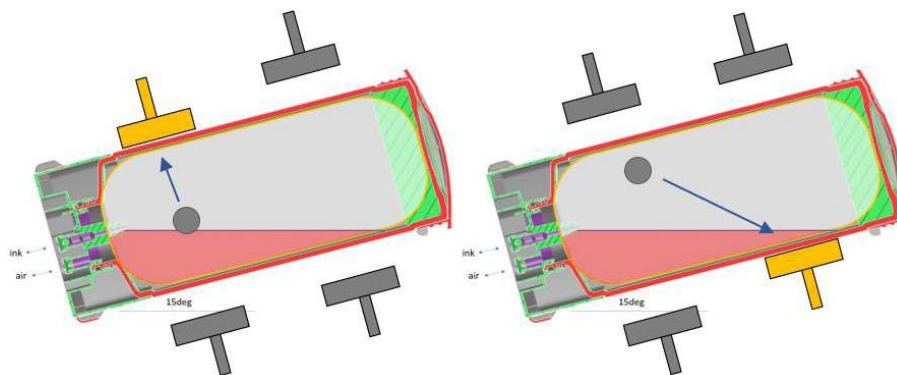


Figure 2. Example of a mechanism based on moving permanent magnets closer or getting away from the Intermediate Tank in order to redisperse the ink with the metallic ball movement.

The advantages of the invention are as follows:

- Ink settling: avoids that the ink is settling on the Intermediate Tank
- Printhead reliability: it is increased because it reduces the chances of enriched ink arriving to the printheads, which could cause a printhead failure.
- Cost per copy: reduces the cost per copy by reducing the Image Quality defects related to color consistency.
- Ink Compatibility: Flexible solution valid for multiple ink formulation since the only component in contact with the ink is the metallic balls.
- Warranty cost (HP): reduces the cost of replacing a printhead within warranty due to enriched ink arriving to the printhead.
- Customer Assurance: reduces preventive maintenances of the Intermediate Tank related to the ink settling.

***Disclosed by Ana Oropesa, Dorkaitz Vazquez and David Butinya, HP Inc.***