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Nozzle Wiping solutions

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Title: Nozzle Wiping Solutions II

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Abstract: The solution is directed to the cleaning a printing nozzle during printing. By moving a nozzle across multiple lamellae and spacings, continuous wiping is achieved and all plastic residues are directed downwards. The lamellas can be arranged at different heights and/or have cutouts for better wiping of the nozzle surface.

In Figure 1 you can see the overview of the invention in its easiest embodiment. The solution consists of a frame (1) which may be combined with purge collector underneath and series of flexible lamellae (2). These lamellae can be made of e.g. Silicone rubber, but may also be made out of another flexible solutions as thin spring steel sheets.

The lamellae (2) are placed so that they are spaced by a distance that is no shorter than the width of the extruded filament string, yet the spacing to be really practical shall start at around 10 mm. This spacing may be consistent, but also may vary from one lamella to another.

The working is quite simple; the nozzle (3) makes a move in direction (4) across the lamellae (2) at a specific height w.r.t each other in order to swipe off any plastic residue from the outside of the nozzle. The plastic that's swiped off falls down through the spacing between the lamellae (2). As some filaments are prone to oozing, by moving the nozzle across multiple lamellae and spacings, continuous wiping is achieved and all plastic residues are directed downwards.

This hugely improves the wiping of one such lamella as well as assures that the plastic residues are always guided down from the nozzle and into a suitable place, which could be a purge collecting bucket, tray, box, etc.

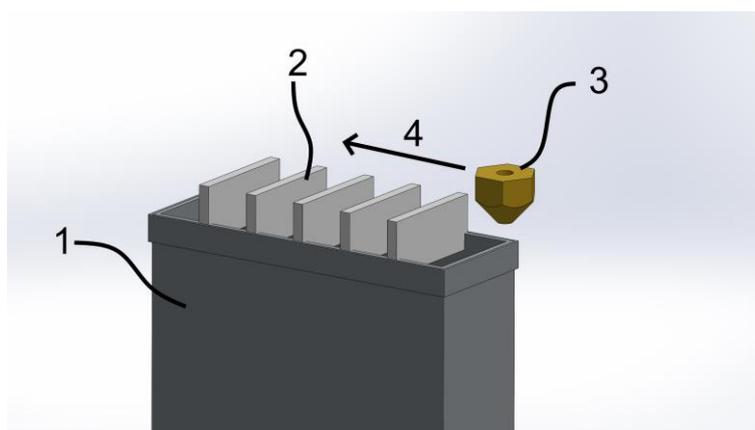


Fig. 1 – Overview of the solution. (1) – Frame, (2) – Series of lamellae, (3) – Nozzle, (4) – Direction of nozzle move

Another embodiment can be seen in figure 2. In this case the lamellae (2) are aligned so that their vertical distance to the nozzle (3) decreases while moving in the direction (4). This way a gradual wiping action is achieved. The vertical graduation of the lamellae (2) may be linear as pictured in the embodiment in figure 2 as well as any other graduation. This way the wiping process can be exactly designed for the needs of a specific situation.

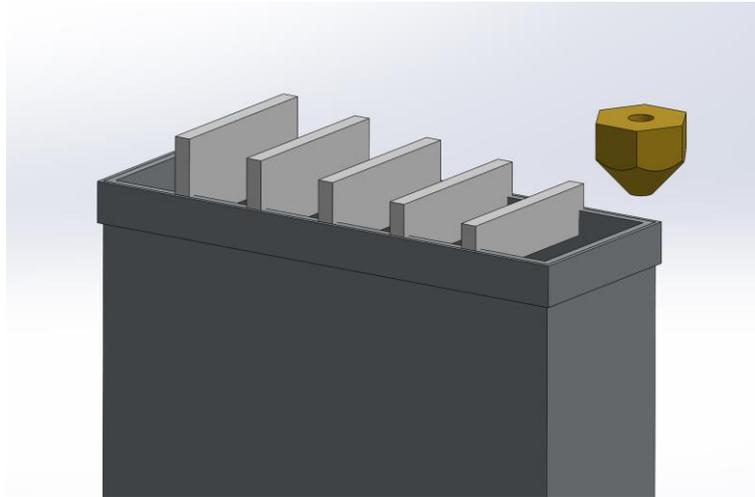


Fig. 2 – Alternative embodiment

Yet another embodiment is pictured in figure 3. This one introduces a series of cutouts in lamellae (2). The purpose of the cutouts is to better wipe the conical part of the nozzle (3).

The cutouts may be of any shape and any height w.r.t the nozzle as well as they don't need to have a common shape across all lamellae. This makes it easy to design the wiping process for the maximum efficiency.

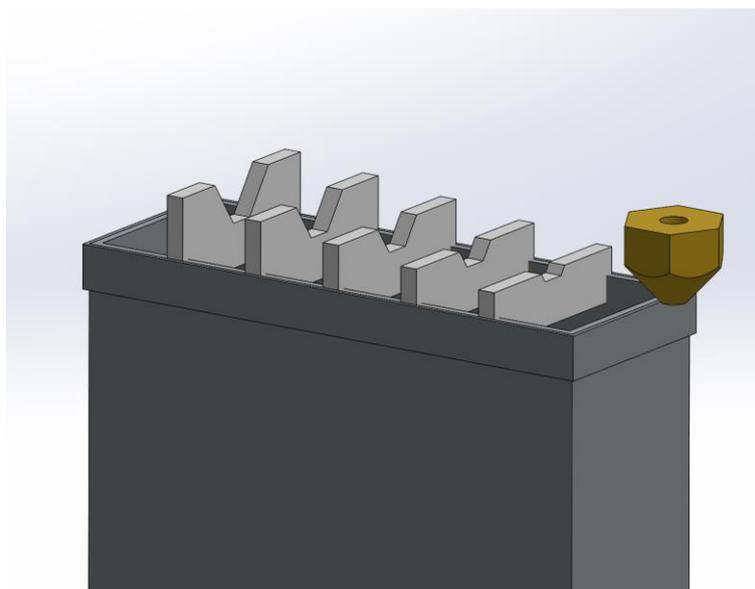


Fig. 3 – Lamellae with cutouts

This solution is envisioned to be fixed to the FFF machine while nozzle automatically moves to purge, but other applications of the same principle (nozzle wiper moving and nozzle stationary) or even a handheld nozzle cleaning device might be considered within the scope of the invention.