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Filament Width Rejection Method

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Title: Filament width rejection method

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Abstract: A method is described to sort or reject filament which is too wide or has the wrong tip shape for processing in an FFF printer. A slit is arranged between the filament storage and the printer head. This slit is designed to as to be able to reject certain filament.

In many FFF (fused filament fabrication) systems, filament is stored on spools. The filament coming from these spools will be fed into the print head (i.e. extruder) via a feeding path by means of a filament feeder arranged in the filament path. The filament must be of sufficiently sharp tip shape and not exceed a specific diameter for successful handling by the feeding system and the extruder. It may happen that a filament tip swells due to moisture ingress, or is cut of wrong by a user. In those cases, jamming or other feeding problems may occur.

We propose to arrange a slit between the filament spool and the print head, which slit makes an angle α less than 90 degrees with the feeding path (e.g. 60-85 degrees), such that filament of the correct width will go through, but filament which is too wide, or has the wrong tip shape, will slide along the slit and get pushed through a widening (rejection hole) into a separate path where a detector will see the filament. By sorting the filament into a rejection path when it does not fit in the typical material loading flow it will not jam the system. The rejection path may comprise a tube and a sensor that can be used to e.g. prompt the user. Once detected, the filament may be retracted and the user asked to cut of the filament, or a dedicated filament snipper may be arranged in that rejection path and then the filament may be retracted and fed back into the printer.

