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EMBEDDED TEMPERATURE SENSOR COLUMN FOR 3D SYSTEMS

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Embedded temperature sensor column for 3D systems

Some thermal fusion 3D printing systems need to accurately control the temperature within a build unit.

This disclosure describes a temperature sensor column that consists of a device that contains several temperature sensors that allow the temperature evolution within the powder as the job is printed to be monitored.

This device contains an array of temperature sensors close each other (e.g. separated by 1cm) in the vertical axis.

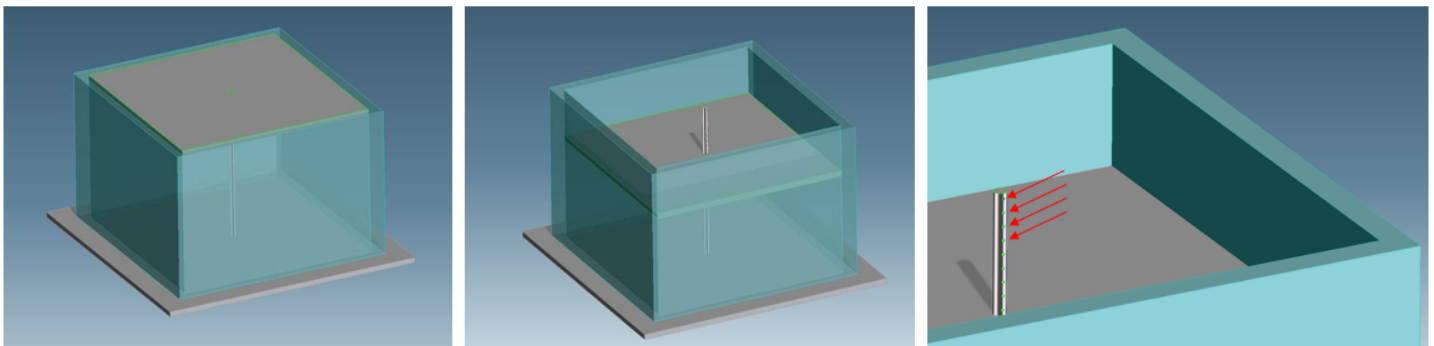
3D Printers may melt the top powder layer of the build unit using fusing lamps. It is important to monitor the temperature along the job to properly control the quality of the printed parts. However, there is no current practical way to monitor and predict the temperature within the plot without affecting the geometry of the parts already printed.

Existing solutions consists of a thermal camera that only tracks the temperature on the upper surface of the build unit.

During the printing process, the static temperature sensor column as described herein will monitor the temperature profile along the Z axis while the build platform keeps moving down, being able to control the temperature distribution inside the bucket in real time.

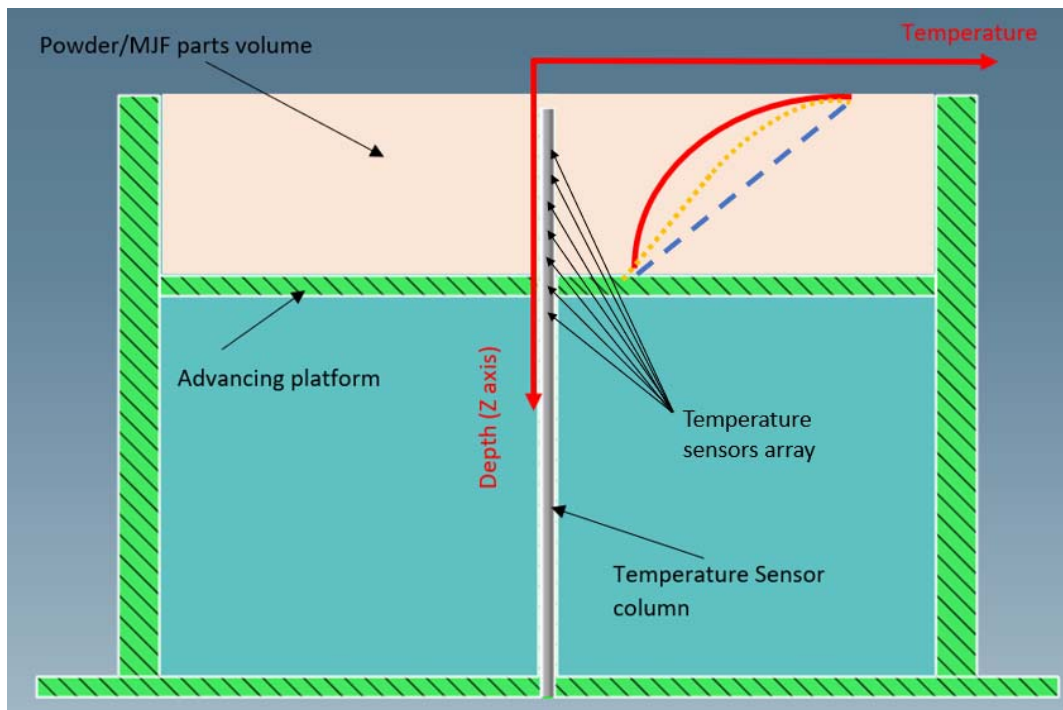
Invention consists on a static column placed into the printer bucket which contains temperature sensors separated by 1cm in Z axis. (see attached documentation with images)

The build platform has a hole that perfectly fits with the column (where the temperature sensors are placed) and during the job, the build platform will move down, and temperature sensor column will contact the powder in the build unit, sensing the Temperature among the job. The printer will be able to collect real data of the temperature inside the job and will be able to regulate the temperature from the fusing lamps and other heating sources.



The described system allows the printer to monitor the temperature inside the job along the Z axis to better control the printing and cooling time and ultimately improve part quality.

By knowing the temperature profile among the job, the printer can regulate the temperature from the fusing lamps by increasing or reducing the power to ensure good parts.



This invention is also giving the possibility of predicting the temperature in the future powder layer and regulating the temperature of the fusing lamps.

As the invention is containing the temperature sensors embedded in the build unit, printed parts are not getting deformed by the Temperature sensors.

Disclosed by Marc Clotet , Cesar Serpa and Jordi Reig , HP Inc.