February 2020

SEMI-AUTOMATED DECACKING SYSTEM FOR 3D PRINTER

HP INC

Semi-Automated Decacking System for 3D Printer

Abstract

Disclosure to explain a system that will help customers during decacking process, optimizing timings and making process less human dependent. Current decacking process in some 3D printing material processing stations are based on two buttons (buttons that causes several escalations in the field) that help moving the platform of the Build Unit up and down manually to carry out decacking process. Customers starts vacuuming printed parts and make the platform move up as parts start to get cleaned. The proposed solution will remove these buttons and will make the platform move up and down at specific speeds, depending on the packing density of the job at different Z dimensions of it.

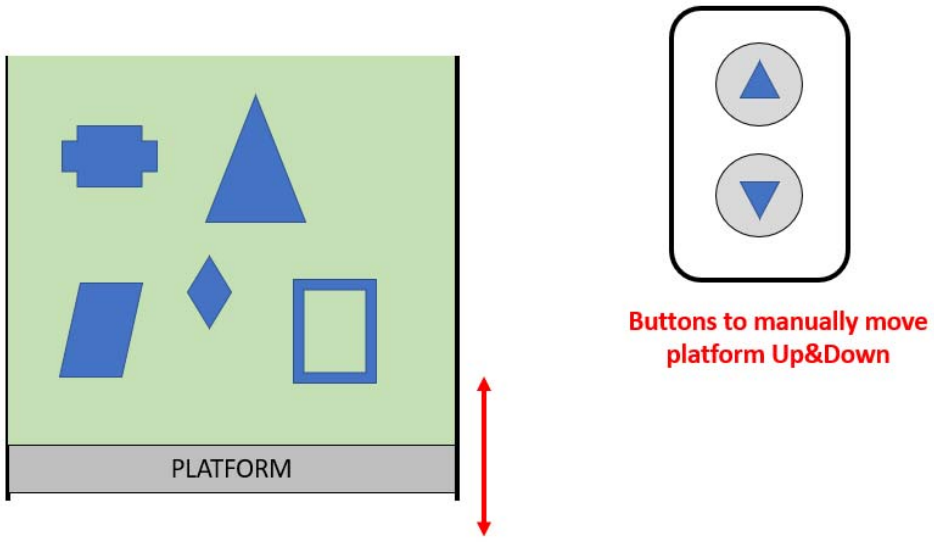
Problems Solved

The presented solution solves the following problems:

- Processing Station buttons get stacked (customer escalations)
- Optimized decacking process depending on each printed job
- Reduces human dependency of decacking process

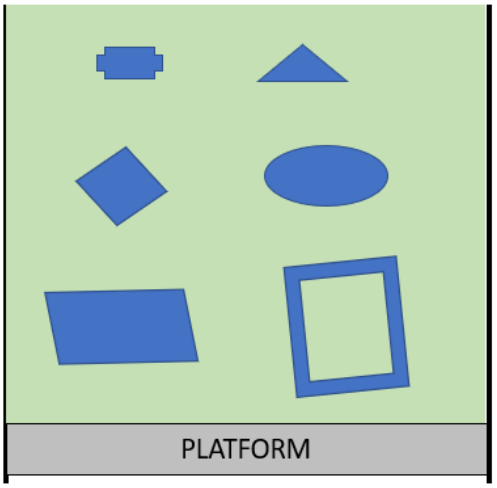
Description

As explained in abstract section, current decacking system/process is very manual. Once the job is finished and is brought to the processing station for cleaning, customers will push up and down buttons manually according to the needs of the cleaning process. Once first "layer" of parts is cleaned, customer will push up button in order for the platform to raise and make visible the next "layer" of parts needing to be cleaned.

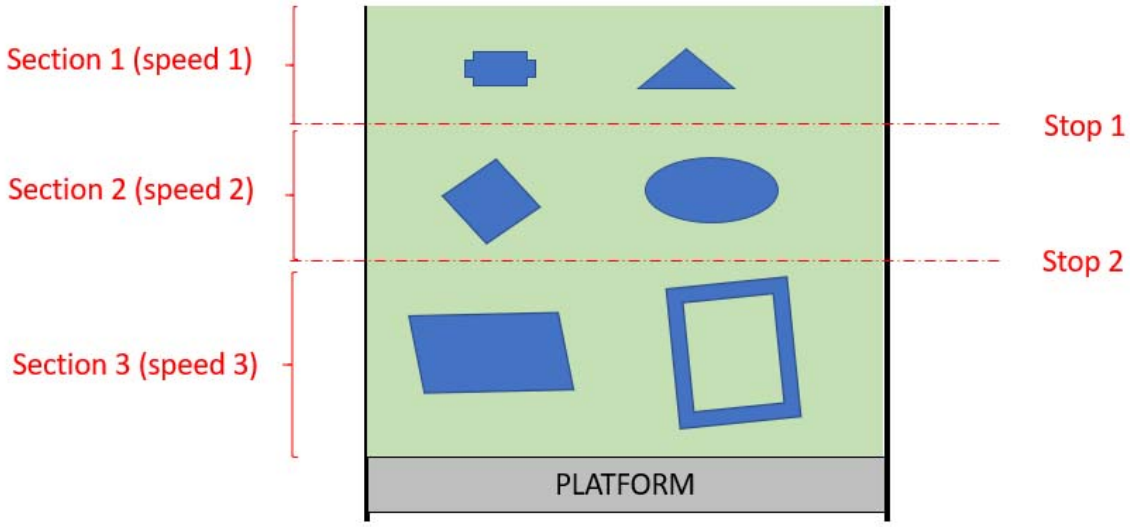


The proposed solution will automatically move the platform at a calculated speed during different sections of platform stroke (platform speed will vary depending on the nature of the parts to be cleaned). In order to help performing these calculations the software in charge of positioning the parts inside the bucket before printing will consider the nature of the parts (geometry, size, weight) in order to position them in a smart way for subsequent decacking. After first section will be risen, the platform will perform a safety stop in order for customers to remove the parts from the bucket and fine tune cleaning process if not enough time during up time.

To better describe the proposed solution let's figure out following example with characteristic bucket distribution:



This job has 3 different kind of parts depending on their size, small, medium and big. The software will automatically position them inside the bucket in a way the smaller parts will be located on top the job and bigger ones will be located in the bottom. This is due to smaller parts are easier and faster to decake than bigger ones, so platform will move faster for this specific section of small parts. The software will differentiate 3 different sections for this specific job (as many sections as required can be generated) and 2 safety tops in between each section end to make sure customers can remove parts or can fine-tune cleaning process.



Above picture shows how the job would be sectioned, defining 3 different speeds of platform rising and 2 different stops at each section change.

According to decacking simplicity for small parts, speed and stop settings would follow this rule:

S1>S2>S3 (slower movement needed to decacke bigger parts)

Stop1<Stop2 (longer time might be required for bigger parts)

This will help to optimize decacking timings, removing human dependency from platform rising movement.

Advantages

- No buttons or any other mechanical actuators are needed to move the platform up (no escalations related to this anymore, no human interaction)
- Optimized decacking process customized for each job

Prior solutions

No prior solutions to automate decacking process in 3D printing processing stations.

Disclosed by Guillermo Moliner; Carolina Begara; Maria Llorens, HP Inc.