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BEARING COATING TO IMPROVE FATIGUE AND LATERAL FRETING OF A LINEAL GUIDED SYSTEM, REDUCE HERTZ PREASURES AND FRICTION

HP INC

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1. ABSTRACT

This disclosure relates to the field of linear guided systems used in 3D printing machines.

Linear guides with bearings can be designed in several forms. Some common linear guides with bearings use a flat surface with a bearing rolling on top of it, but also can use a linear rod or any other shape.

For this linear guide with bearings, hertz pressures are critical for fatigue and lateral freating.

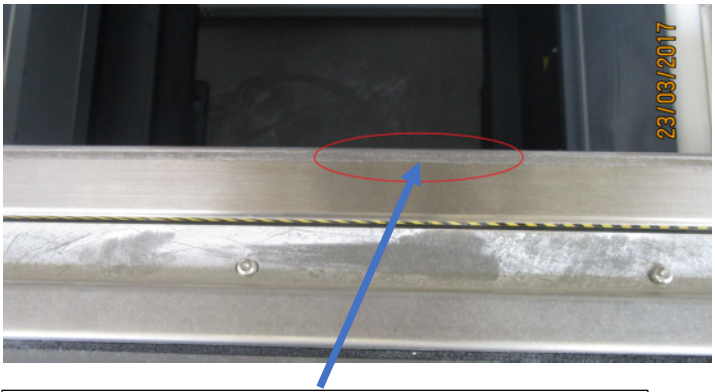
Finding a method to reduce this hertz pressures will provide a way to improve performance of the machine.

This disclosure provides a method an apparatus to reduce that hertz pressures increasing the maximum weight that the system can carry and/or the amount of cycles that this system can perform without visible damage via fatigue or lateral freating.

2.ACTUAL SOLUTION AND PROBLEM SOLVED

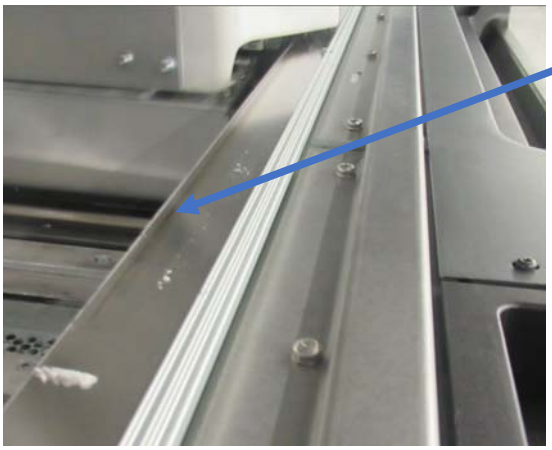
The actual front bar suffers mechanical degradation in some cases, due to fatigue and lateral freting:

ISSUE WHEN NICKEL PLATING QUALITY OF THE FRONT BAR IS NOT PROPERLY APPLIED OR MECHANICAL ASSEBLY WORSTCASE CORNER CASE



ISSUE WITH BEARING HERTZ PREASURE IN FRONT BAR

CRAIT FRETING



FRONT BAR FRETING SUPERFICIAL MARKS

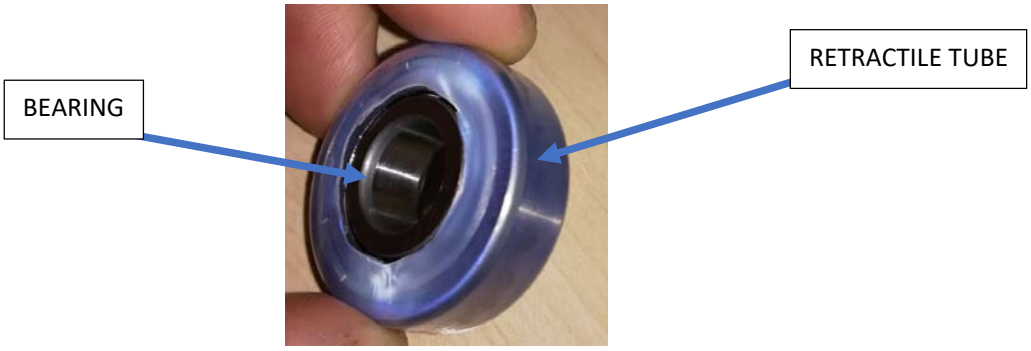
3. METHOD AND APARATUS TO IMPROVE FATIGUE AND LATERAL FRETING OF A LINEAL GUIDED SYSTEM, REDUCE HERTZ PREASURES AND FRICTION

The method consist in using a softer material than the material of the bearing to produce a coating to cover the external surface of the bearing.

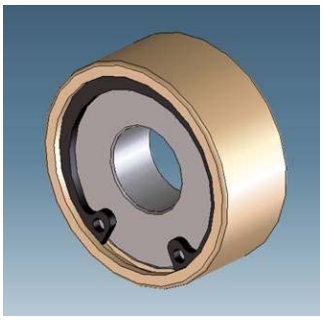
This coating can be plastic, soft metal, wood, or any other material with a smaller young modulus than the bearing material uses, in order to reduce the superficial hertz preasures on linear guides udes in 3D printers.

The way to apply this coating can be multiple, we give here some alternatives, but can be other.

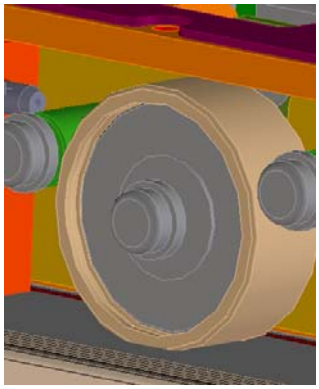
A) Thermo Retractile plastic



B) A hollow plastic with a circlip

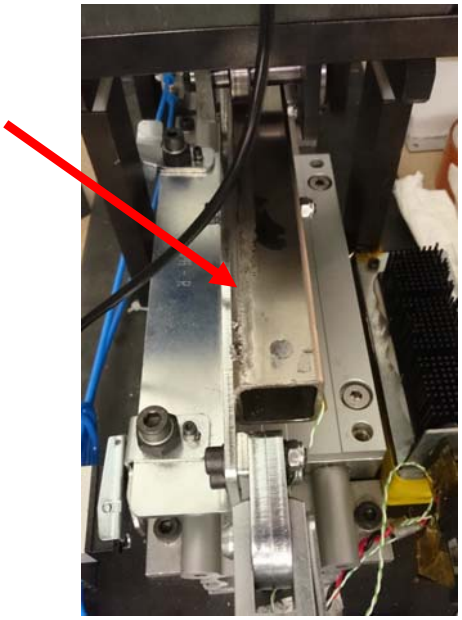


C) A hollow plastic mounted with interference.



4. VALIDATION TEST

We tested this solution, the original solution after 50.000 cicles, with a load of 80N presents severe fatigue effects on the surface of the linear guide



Coated Bearing after cicling 50000 times with a coating and a load of 80N→ no visible effects.

This demostrates that the hertz preasures has been reduced and fatigue and lateral freating effects have been improved.

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