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MECHANICAL DEVICE TO PREVENT RODENT DAMAGE

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Mechanical device to prevent rodent damage

Rodent damage is one cause of high service costs in some countries. With this proposal we plan how to diminish the number of field interventions with the help of a mechanical device.

Antecedents

Rodent damage is a problem in certain areas of the world, the animals can enter inside the printer and damage many electrical components (cables, PCAs) resulting high costs related to warranty, servicing and to the end customer. In some cases, fixing the printer can cost as much as a new printer: very long and complicated fix and expensive elements to fix (PCAs tend to be the most expensive parts).

Analyzing company printers versus the competitors, some empirical tests show that rodents tend to attack more company printers than others. The root causes might be 2: Some printers have more open spaces that allow rodents enter in the unit or that electrical components’ smell attracts more rodents than competitors. Competitors offer chemical coating to prevent rodent damages

One of the countries that faces higher rodent damages issues is India. Customer Assurance fellows report that the damages can happen any time after the printer, from days to months. In India almost 4-5% of LFP installations suffer from rodent damage, there are 4 to 5 cases a month reported. When the printer is out of warranty not always is reported by the customer.

Considerations

Rodent damage happens specially when:

- Printers have open free spaces: the bottom of the unit is not fully covered and allow animals to enter.
- The electrical elements are visible and easy to access: the smell of these components will attract rodents and will try to access the units.

With above considerations it is possible to define 2 ways to diminish the risk:

- Close the gaps and modify the routing: define design guidelines to prevent the issue, these are to be followed during the NPI phase.
- Prevent the access with an external device: apply a mechanical element that can prevent the rodents to access the printer.
**Mechanical Rodent Protector (MeRP)**

**Area of the problem**
As stated above, rodents tend to enter inside the printers with open spaces and with accessible electrical components. The most open area of a unit is the bottom side of the printer: since it is not visible by the user in a normal operating position it doesn't matter if there is an open space or not.

In some products, it is precisely in the bottom area of the printer where the Electrical Box (box that contains the main PCA boards) is placed, around this EBOX there are a lot of cabling with very easy access.

**Design Rational**
The idea behind the Mechanical Rodent Protector is to prevent the access to the bottom area of the printer, not by covering it (big space that requires a lot of material and expensive) but by placing contingent elements before the access.

The element defined to prevent the access is a coned shape plastic part that fits the leg of the printer. It will be manufactured using HP Fusion technology.

![Mechanical Rodent Protector](image-url)

The shape above will difficult the rodent to access the leg of the printer. With the surface shape it also difficult standing over it. The part is divided in two, so it doesn't require the end-user to disassemble any printer component to install it. Both elements are directly clipped between them.

The MeRP is to be installed at a determined height, this way we ensure the rodent is not close to the printer's foot and cannot use MeRP as an external device to ease the access to the bottom area of the unit.
Advantages
This solution can be applied to any printer with a stand, only need to define different configurations to fit the different kind of stand.
It is cheap and self-applied so it can help reducing servicing costs very quickly. Since it is 3D printed the cycle time is also greatly reduced.

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