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ANTISLIP LOW-COST ARRANGEMENT TO SAFELY LIFT LARGE FORMAT PRINTERS

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Antislip low-cost arrangement to safely lift large format printers

This document is organized as a “step-by-step” guide to reproduce the invention in a correct way.

1. Ensure the pallet is designed in order to have the stringers aligned with machine feet. The idea is that the stringer must limit the slipping of the machine.

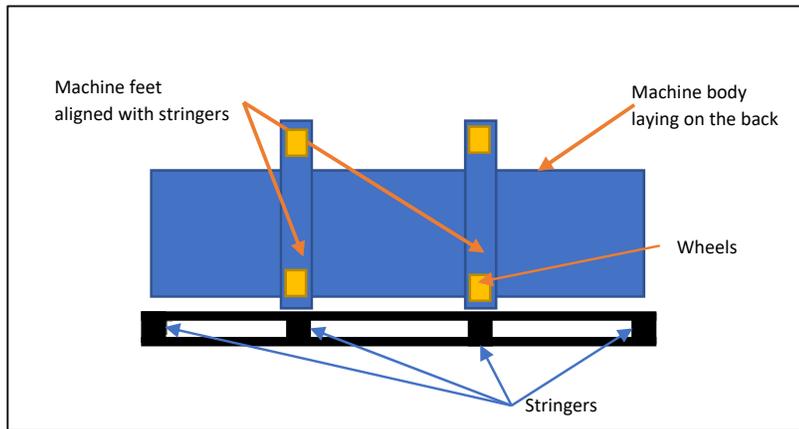


Figure 1

2. Measure the distance that the cord must cover, passing over the leg, through the stringer and around the lower wheels as in following scheme of Figure 2 and the picture attached, Figure 3. Measure the distance roughly, a bit loose, to assure extra material of the cord that will allow to manipulate it with ease.

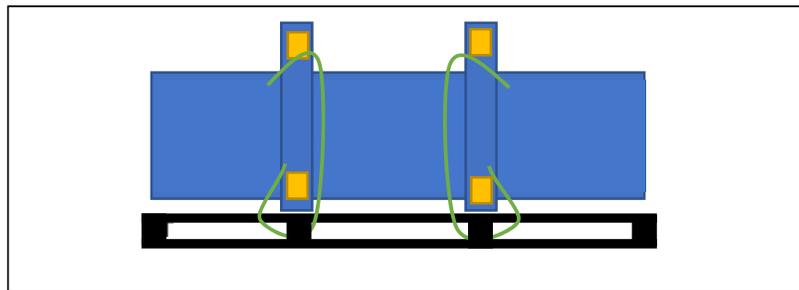


Figure 2

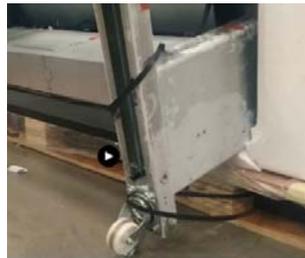


Figure 3

3. Several materials can be used to manufacture this device. Once measured the length, multiply by 2. Then unite the open ends in order to make a circle as in Figure 4. The idea is that the circle, when stretched, is long roughly L, with a bit of extra length for ease of operations. In Figure 5 is shown an example. In the project is used packaging strip welded with friction welder. Rope can be used instead.

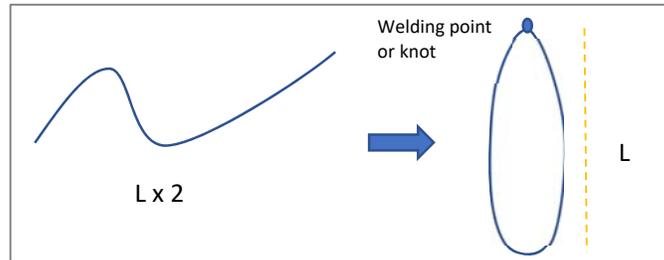


Figure 4

4. In Figure 5, as well as in Figure 3, it is shown how to use the device:
 - a. Hang the cord around the upper part of the leg in order to assure one side of the cord.
 - b. Pass the cord around the pallet stringer
 - c. Pass the other end around the lower wheel
 - d. Optional: turn and lock the lower wheel 90° and lock it in order to assure the cord does not fall, being it a bit loose.



Figure 5

It is clear from Figure 5 why it is specified in step 1 to make a rough measure overestimating the length. We can see the cord is a bit loose, but this will give extra degree of freedom while placing it around the feet. When operators will lift the machine from behind, the cord will tense, therefore the extra length will not play any role.

Appendix I Disclosure Document

Low-cost antislip device to safely lift large format printers

Abstract

In order to save space and money, many large format printers are shipped without the stand mounted. When end-user or operators must lift the machine up, after having mounted the stand, the machine tends to slip away. In current HP products, neoprene socks are provided to act as “anti slip” but it does not work well, especially on slippery floors as tiles, microcement, etc. The solution provided is safer, cheaper and works disregarding the floor composition as it does not increase the grip but blocks the machine and avoids the runaway while lifting it.

Problem statement

Typically, large format printers 44” -64” width, are shipped laying on the back and with the stand not mounted, as shown in Figure 1. When the end user or the reseller unboxes and mounts the stand of a large format printer, the last step before starting up the printer is lifting it up.

The weight of the machines involved can span from ~100kg to ~300kg and to lift them up, operators handle it from its back side. As undesired side-effect, the printer tends to slide forward, especially if the floor is microcement, ceramic etc.

Current product include some neoprene antislip “socks”. These “socks” are installed on the back wheels and are intended to provide more grip and prevent the slide effect. They are not working very well, so as it is needed one operator to block the machine holding it from the front part, being that dangerous for the operator.

The arrangement with packaging strips proposed solves in a cost-effective way this problem. Moreover, it changes the approach to the problem from giving more grip to the machine to block it to the pallet and prevent the unexpected movement.

Once the machine is lifted, the strips lay down on the floor and moving the machine apart will allow to recover the strips and discard them.



Figure 1: A 64” printer just before being lifted up.

Our solution

The “antislip socks” in use are replaced with a simple packaging strip. The packaging strip provided is a closed round and it is installed as shown in Figure 1.

The strip is mounted by making a loop around the back wheel, then around a pallet leg and finally hanged on the front part of the stand.

In Figure 2 and Figure 3 it is detailed how the loop is made up. In figure 2, the detail of looping the strip around the pallet leg is shown with a red line. In Figure 3, the continuous red line shows the strip and the dashed red line gives a hint of its position in the non-visible area. Opposite leg is pointed out with red arrows.



Figure 2: mounting detail of the strip



Figure 3: mounting detail of the strip



Figure 4: still image while lifting the machine. The red arrows show the strip in tension, working against the natural runaway of the machine. Yellow arrows show the position of the feet of the operators, acting as “weight” to counter-rest the machine weight.

Evidence the solution works and comparative results

The solution has been tested on more than 100 printers. Comparing the solution here described with the previous, at first, the loop was difficult to understand for operators, in comparison with the installation of antislip socks. On the other hand, they felt much more confident the machine would not slide away.

Advantages

The clear advantage is that the solution does not rely on the grip that the printer can have on the specific floor. The solution works on any floor. It provides more safety as printer is held directly to the transportation pallet, where at least two people are standing while lifting the machine. The operators feel more confident with the proposed solution and there is no need to hold the printer from the front side.

The cost comparison is 1.6\$ (antislip neoprene socks) to 0.03\$ of the strip proposed. In future, packaging strip could be used as antislip strip, lower the discardable material and decrease the environmental impact.

Disclosed by Vito Di Virgilio, Volker Seidel and Alba Farran, HP Inc.