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DYNAMIC FRICTIONLESS CABLE & TUBE BUNDLE

HP INC

Dynamic Frictionless Cable & Tube Bundle

Abstract: Wear-out due to friction of electrical cables and ink tubes in a scan printer is minimized or eliminated through use of a flexible membrane through which the cables and tubes pass.

This disclosure relates to the field of printers.

A technique is disclosed that prevents wear-out due to friction within a bundle of electrical cables and ink tubes in a scan printer.

Scan printers have printheads which are disposed in a carriage that moves from side to side along the width of the printer. A printing operation requires 3 types of flow to be provided to the printheads: (1) power providing the energy needed for printhead operation; (2) data providing the information and the trigger for printhead operation; and (3) printing fluid or inks bringing the dye or pigments that are ejected from the printheads.

These 3 types of flow are transported through a "Bundle" of cables and tubes, which in the case of a large format printer can be quite long. The Bundle uses internal plastic “shelves” to locate and guide the cables and the ink tubes. These cables and tubes have a special outer layer having a low friction material to allow movement of the cables and tubes relative to each other inside the Bundle. This relative movement results from the Bundle traversing a loop when the carriage moves side to side, and the resulting different loop radii of the cables and/or tubes. Depending on the layout of cables and tubes in the Bundle, the relative movement can be a difference of several millimeters.

Even though the cables and tubes have the low friction outer layer, this small relative movement of the cables and/or tubes will, over time, cause to the components to wear out or fail, requiring replacement. Some prior Bundles use static separators secured to the Bundle which ensure that tubes and cables do not rub against each other. However, the tubes and cables rub against the separator itself. Tubes and cables have some room inside the separator and can slightly move to cause wear and noise when the Bundle moves.

According to the present disclosure, and as understood with reference to the Figure, a flexible rubber or membrane 10 is fixed to the cables 20 and tubes 30 inside the Bundle 40 to constrain any relative movement between the membrane 10 and the cables 20 and tubes 30. The membrane 10 flexes as needed to allow the relative movement of the cables 20 and tubes 30 in an essentially frictionless manner during side-to-side carriage movement and resulting Bundle 40 movement. The membrane 10 eliminates the need for any special low-friction outer layer on the cables 20 and tubes 30, providing a significant cost reduction to the Bundle 40.

The disclosed technique advantageously prevents wear-out of the internal cables and tubes inside the Bundle, resulting in manufacturing, warranty, and service cost savings.

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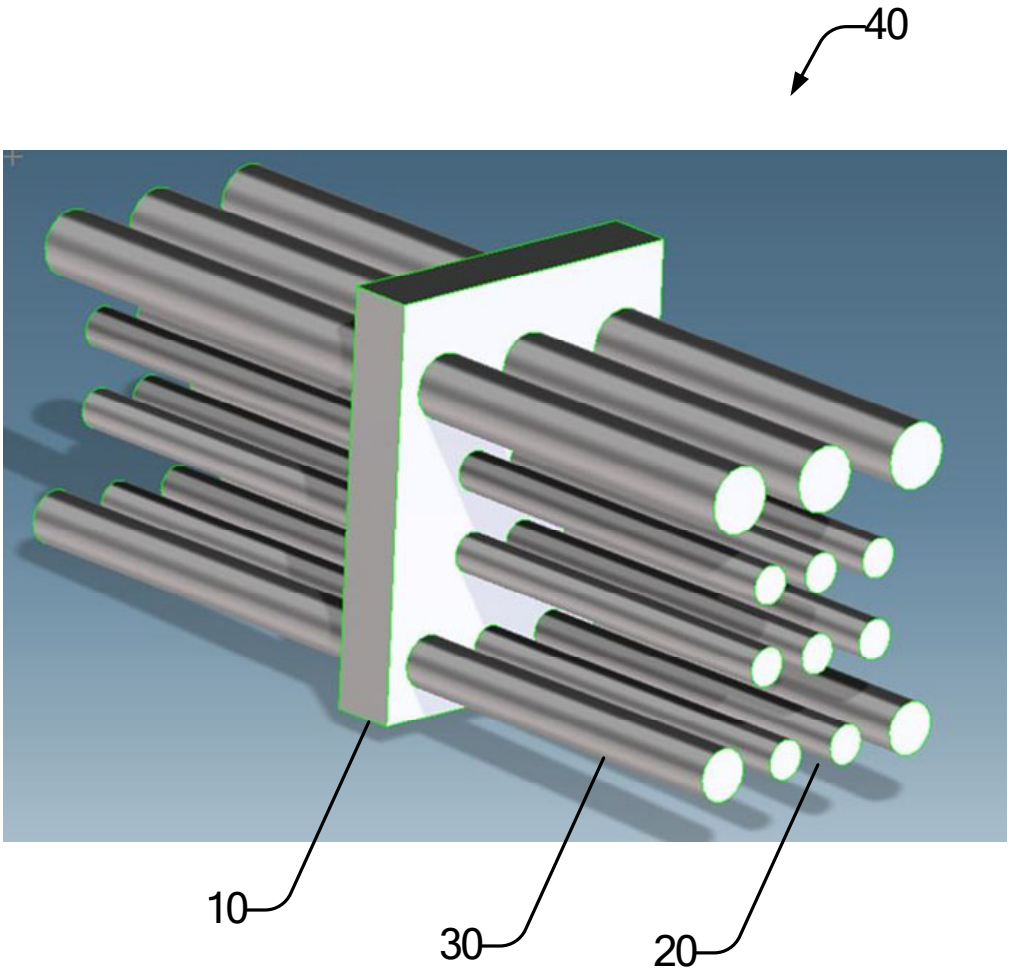
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