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(54) **FORCE REFLECTING HAPTIC INTERFACE**

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(57) **ABSTRACT**

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A six degree of freedom force reflecting haptic interface includes three powered axes and three free axes, all of which are tracked so that the position of a user connection element in the work volume can be determined. The interface includes cable drives with polymer composite or metallic cables, automatic cable tensioning devices, and grounded actuator capstans. A nested hub and transfer drive provide a compact, weight balanced interface. User comfort and safety features are also provided.

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**Related U.S. Application Data**

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