

NASA TECH BRIEF



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Variable-Speed, Portable Routing Skate

A lightweight, portable router with a variable-speed driving mechanism has been developed for use on large, heavy metal subassemblies, such as cylindrical tank sections, which are often impractical to move to a stationary machine. This portable machine tool, called a variable-speed, portable routing skate, has been successfully used in the construction of an aluminum alloy multicell propellant tank. The entire skate assembly, consisting of the housing with rollers, router, and driving mechanism with transmission, weighs approximately 40 pounds.

Designed to follow a desired cutting path, the routing skate housing is supported on an aluminum alloy track set alongside the path. Four sets of rollers are attached to the skate housing. Two of these sets are positioned on each double-beveled edge of the track. All four sets of rollers are adjustable to allow for track width variations, to permit leveling of the skate, and to facilitate its mounting and removal. Travel of the skate along the track is powered by an electric motor. When the track is horizontal or nearly so, the motor drives a simple sprocket whose teeth engage a roller chain fastened to the track. When the track is vertical, the motor drives a "caterpillar belt", with male cogs of the belt engaging the roller chain and providing more points of contact between the belt and the chain, thus making the skate travel smoother. The roller chain is located in a groove of the track to keep the chain aligned and prevent its sagging. The track is supported by a number of special adjustable brackets. One end of each bracket is bolted to the back face of the track and the other to a vacuum pad or chuck, which is held to the workpiece by vacuum.

When a cut is to be made on a piece of aluminum alloy sheet or plate or on a subassembly, the vacuum chucks with the brackets and track are set on the workpiece first and vacuum is drawn. The brackets are adjusted and tightened to align and maintain the track at a proper distance, vertically and horizontally, from the path of the cut. Next, the skate is mounted on the track, with the caterpillar belt engaging the chain, and the rollers are adjusted to grip the track. With the tungsten carbide-tipped cutter of the router set at the desired depth of cut, the air motor, which drives the cutter, is turned on. The skate, driven by the electric motor, travels along the track at a desired speed while the router is making the cut. The skate speed and depth of cut are both adjustable while the skate is in motion.

Note:

Inquiries concerning this portable machine tool may be directed to:

Technology Utilization Officer
Marshall Space Flight Center
Huntsville, Alabama 35812
Reference: B67-10525

Patent status:

No patent action is contemplated by NASA.

Source: W. A. Pesch
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Category 05

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Experimental Investigation of ...

The purpose of this investigation was to determine the effect of ...

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