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NASA TECH BRIEF



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Flexible Drive Allows Blind Machining and Welding in Hard-To-Reach Areas

The problem:

To perform welding and machining operations in confined areas. Conventional power tools are limited in application by the size and shape of the tool. Consequently, machining and welding in confined areas are often impossible.

The solution:

Connect a machine/weld head to a power and control unit by a flexible transmission shaft and incorporate a locking-indexing collar onto the machine/weld head to allow the head to be placed and held in position.

How it's done:

The power and control unit contains an electric motor that provides mechanical power through a gear train coupled to the transmission shaft. This unit is also drilled to provide a passage for inert gas, used to control the atmosphere during welding.

The flexible transmission shaft is inside a neoprene extrusion that contains three passages running lengthwise for gas, electrical power to the head, and the bi-directional flexible shaft.

The machine/weld head is a power reduction unit comprised of a housing, power reduction and drive unit, cutter/weld tools, and a locking-indexing collar. The collar is split and has a centrally bored hole sized

to fit a flange in the area to be welded and machined. During the machining operation a hollow milling cutter is inserted in the head. The head is then assembled onto the transducer and the cutting tool is controlled by an external knurled ring. The head is then dismantled and the weld tip installed. The weld tip is a single wire electrode mounted on a ring carrier and positioned by rotating the external knurled ring until preset stops are contacted.

Note:

Inquiries concerning this innovation may be directed to:

Technology Utilization Officer
Manned Spacecraft Center
Houston, Texas 77058
Reference: B66-10428

Patent status:

No patent action is contemplated by NASA.

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Category 05