Standard Surface Grinder for Precision Machining of Thin-Wall Tubing

The problem:
To devise a low cost method for precision machining of thin-wall stainless steel tubing. Conventional machining methods caused excessive tubing distortion, resulting in additional straightening and deburring operations.

The solution:
Adapt a standard 40-inch Model B Thompson Surface Grinder to perform the machining operation by electrical discharge grinding.

How it's done:
Strips of micarta are used to insulate the headstock of the surface grinder from the machine frame. The grinding wheel drive is replaced with a constant torque, variable speed, (0 to 65 rpm) direct current motor. The grinding wheel is replaced with a step-dressed graphite wheel electrode (12 inch dia. x 2 inches thick). Electrical energy is supplied by a standard 60 ampere power unit. Liquid dielectric, filtered automatically through a diatomaceous earth media, is used for cooling during the grinding operation.

In one pass, a number of parts are rough machined simultaneously. The wheel electrode is then re-dressed with a form-type high speed steel dressing tool, and a finish pass concludes the machining. A hydraulic servovalve and hydraulic motor are used to drive the machine table. Erratic motion experienced in the reciprocating table at the slow speed in cutting is eliminated by additional forced lubrication of the bearing ways. A related adaptation, a traveling wire electrode fixture, is used for machining slots in thin-walled tubing.

Note:
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Patent status:
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