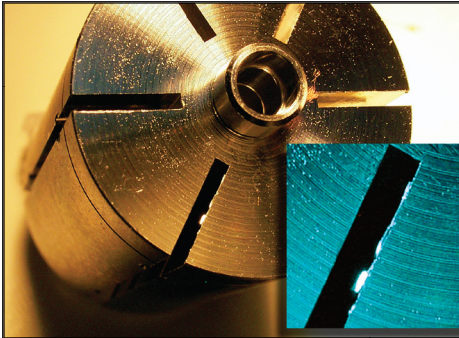


Reprinted from MAN, Modern Application News.

## Magnetic Pin Tumbler Deburs Tight Tolerances



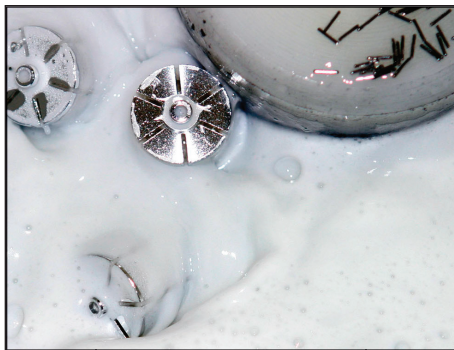
Detail of burr causing problems for a manufacturer of medical heart pumps.

It's true that little things mean a lot, especially when it comes to tolerances in machined components for medical equipment. For an Indiana shop, the little things were unacceptable burrs in a 1mm slot.

For Greenwood Machine (Franklin, IN) even the smallest burrs were not acceptable for this critical tolerance (0.0001") air motor.

The company had an opportunity to diversify into the medical industry, manufacturing an air motor for a biopsy device that takes breast tissue samples for diagnostic analysis. Metal burrs left over from the manufacturing process were a part quality problem that had to be solved before it could move ahead with the project. These burrs could not be removed with conventional tumbling equipment, and that limited Greenwood's ability to provide the quality and quantity of parts the customer needed.

### Alternative Technology



While looking for alternative deburring technologies, Greenwood discovered the sPINner small parts deburring machine from Earth-Chain USA, Inc. (Indianapolis, IN). Greenwood found that sPINner's unique stainless steel pin media was able to quickly deburr the small slots.

With 25 years in the business, Greenwood's owner, Fred McWilliams, has loads of experience producing small, complex parts. His business began machining small, precision parts (primarily RF connectors) for the electronics industry, and has grown to include a variety of quick-setup, short-run jobs, and also some high-end bicycle components.

When the opportunity to manufacture the air pump came up, McWilliams decided to move quickly and increase capacity by purchasing a bar-fed, Citizen/Cincom M32 CNC swiss-type turning machine to expedite production of the air pump.



The medical air motor (above left) is only one of the variety of products Greenwood produces and deburrs with the sPINner.

Parts and stainless steel pins, hardened to HRC 30, are mixed in a media solution and processed unattended in a "sPINner" deburring system. (left)

This configuration allowed the shop to perform three operations at once, giving them a big advantage in cycle time. Greenwood's customer asked that it produce prototypes within three weeks of the CNC machine hitting the shop floor.

Burrs in a 1mm slot in an air motor for a medical device were unacceptable and a challenge to efficiently deburr.

During the few weeks they had to set-up the machine and begin running prototypes, the deburring problem was discovered by Manufacturing Engineering Manager Joe Bowman. His background includes experience with ISO 9001 certification and eight years in CNC machining. Bowman

manages all the manufacturing processes even down to the CNC programs and setups.

### Cross-Drilled Parts

"This part is a cylindrical rotor that has six, 1mm slots, each cross-drilled twice. The burrs in the 1mm slots could not be reached with our conventional tumbling deburring equipment, and our only other options were deburring by hand or sending the parts out for electrolytic deburring," explains Bowman. Both options were unacceptable due to the additional cost and time they added to the production cycle.

Bowman had heard about the sPINner and sent some sample parts to for testing. A few days later the parts were returned, completely deburred, with a report documenting the media used and the run time (20 minutes).

Pleased with the results, Greenwood purchased the sPINner and has been very satisfied with it. "This machine paid for itself in about a year. It reduced our cycle time, and gave us the ability to control quality in house," says Bowman.

The sPINner saved Greenwood 17% on the cost to deburr each part compared to hand or electrolytic deburring, and even though it expects to nearly double production this year, the shop knows deburring will not be a bottleneck.

"The sPINner is unlike other deburring technology," observes Bowman, "because the media is stainless steel pins, hardened to HRC 30 for long-life. These special pins are why the sPINner can deburr small, complex parts so well."

### Reverse Polarity

The parts and pins are placed in a deburring container and media solution is added. Next, the container is put into the machine and the cycle time and rotation speed are set. While it runs, the pins are activated by a rotating magnetic plate underneath the deburring container. This causes the pins to rapidly reverse polarity, and jump up and down from 1" – 3", while rotating in the deburring container along with the parts. The parts and pins "spin" together to perform the deburring. The sPINner can even deburr internal cavities like slots and cross-drilled holes other media cannot reach.

The sPINner is most efficiently used for deburring small, precision parts made from non-ferrous metals including aluminum, brass, copper, stainless steel or titanium. The aggressiveness of the deburring is controlled by programming the speed of the magnetic plate and selecting from a variety of media sizes. The machine is designed for easy programming and unattended operation.