

Hearth-Beat

Fireplace manufacturer sparked by machine technology

Canadian fireplace manufacturer **Montigo Delray Corp.** began operations in 1976 as a distributor of wood-burning fireplaces. Today, the company has evolved into one of the leading manufacturers of gas fireplaces, primarily positioned in the new construction market, with hundreds of thousands of units installed throughout North America,

Montigo has three manufacturing facilities located in Surrey and Langley in B.C. and in Ferndale, Washington.

The fabrication equipment in Ferndale grew to include a laser, press brakes, and two **Finn-Power** F Series hydraulic turret punch presses. A Finn-Power E5 servo electric turret punch press has operated there for over 20 years.

The six-axes **E5 Work Center** features a servomotor-driven punch mechanism, and both the position and speed of the punch and die are programmable like normal CNC axes, which allows punching, nibbling, cutting, forming, marking, bending, and tapping in a single set up.

The machine can run up to .630 inches (16 mm) with no die interference. It features intelligent tool management, interface via touch screen, forming repeatability of .0004 inches, and doesn't require a lot of energy.

Montigo general manager Mark Wilczak says, the company's new fabrication equipment helped to dramatically increase productivity. "Four years ago, we used to run three shifts, five days per week. For the past three years, our volume has grown at an annual rate of 10 per cent, explains Wilczak.

"Thanks to the turret punch presses and laser, and the skills of our production manager Joel Nelson, we now run one shift five days a week...with more production."

SERVO-MOTOR DRIVEN

The punching process of the E machine combines electrical servo technology with mechanical power transmission, enabling strict punch control.

A servo motor, together with a lead screw, move a roll that in turn moves the ram by means of a guiding surface.

Due to the wedge shaped surface, the force exerted against the ram is 200 kilonewtons (22.5 tons) on the top of the guiding surface. This is the area of the ram movement where force for punching or forming is needed. At both ends of the guiding surface, the wedge angle is larger, so ram speed is higher in the upper stroke area where force is not required. Because of the optimized shape of the guiding surface, heavy force and outstanding positioning accuracy can be reached in the lower stroke. Optimal speed and accuracy of the punching stroke will thus be achieved.

The punching mechanism is designed for two basic modes: punching and forming. In the punching mode, the roll moves horizontally over the top of the guiding surface, producing a punching stroke during each movement.

The punching stroke is generated by a servomotor-driven mechanism. The ram that moves the tool has numerically settable upper and lower limits (CNC-axis). For punching, the operator enters the tool length for each tool in the tool table.

The CNC control determines the optimum stroke length



according to tool length and sheet thickness. The stroke lower limit is based on the ram's mechanical bottom position that is fixed in punching. In forming, the upper and lower limits of the ram are freely set from its bottom position upwards.

The punching stroke is numerically controlled by the CNC, which provides a very fast and optimal punching stroke. The stroke position and speed are controlled by the CNC. With forming tools, you can program a lower ram speed and use a lower forming speed and a positioning tolerance based on G-code, which allows for making exact and intricate parts.

"The Finn-Power E machine has really increased our efficiency and accuracy," says Joel Nelson. "We also noticed less tool wear on the servo electric press compared to the hydraulic models. In some cases the tools in the E machine have kept their sharpness twice as long as the hydraulic machines."

At Montigo, Finn-Power incorporates an individual tool holder concept that allows customers to design their own



The Finn-Power E machines at Montigo have increased productivity but not power costs.

turret layouts. Unlike other designs, specific tool stations are not machined into the turret. Finn-Power offers a flexible selection of tool holders that accommodate any style from Mate Precision Tooling or Wilson Tool International can be installed in a Finn-Power turret. Up to 10 auto-index, forming, or **Multi-Tool** stations may be installed in a Finn-Power turret.

Finn-Power's Multi-Tool stations increase the number of tools available in a turret, thus reducing set-up and increasing productivity. It allows multiple tools to be put in one station. Finn-Power Multi-Tool offers six, eight, 10 or 24 different punch/die combinations in only one station—a turret within a turret. Using 40 station alpha/numeric Multi-Tool part identification programs are fast and easily done. Montigo has an eight-station Multi-Tool.

AUTO INDEX SYSTEM

Finn-Power's unique auto-index system precisely rotates the punch and die in their tool holders using a single AC servo-motor system. The system does not need to match separate servo-motors as in some other machines. Rotation in .001 degree programmable increments gives the machine the ability to rotate beyond 360 degrees, thus allowing the system to automatically select the shortest path to rotate to a programmed angle input into the NC part program with simplicity, speed, and reliability.

Finn-Power's upward forming option provides forming heights up to 16 mm (.63 inches) and five inches in diameter. Another advantage is that all dies are at the same height and there are more high-forming dies in the turret, thus, reducing risk of material damage and increasing machine uptime. "We use the E machine's upforming capability for forming explosion ports," explains Nelson. "The Finn-Power upform station sits below the turret and raises when it is in use and then drops back down, eliminating the chance of grabbing or catching the metal."

NC EXPRESS SOFTWARE

Another area of satisfaction for Montigo is the Finn-Power operating software. The NC Express CNC programming system is a user friendly, integrated, and automated tool for managing Finn-Power equipment in the most efficient manner.

NC Express is a tooling, nesting, and optimizing software package designed to easily integrate into an existing manufacturing environment, taking full advantage of the CAM features and the Finn-Power machine tool product line.

Other E5 Work Center features include:

A large work chute capable of removing large parts up to 19.6 inches-by-19.6 inches. These parts are then dropped onto a conveyor to be exited out the end of the machine, thereby reducing shaker parts and eliminating skeletons.

The operator interface makes use of a touch screen for easy access to all punching and forming parameters and tooling date. Tooling is made to learn its own length. When a new or sharpened tool is installed, its length value is simply set at zero. The first punch programmed for the tool automatically stops at the sheet contact and the correct, accurate length of the tool is automatically recorded in the tool library. Intelligent Stroke Control (ISC) takes care of stroke control, setting optimal length for all tools and also individually for each sheet movement. The operator is free to concentrate on more important tasks—Finn-Power's ISC handles all punch stroke settings automatically.

ENERGY SAVINGS

Another major benefit Montigo realized was the energy savings aspects of the E5. According to Finn-Power International, recent tests have proven that by using an ingenious combination of servo-electric technology and mechanical power transmission the E5 consumes less than one third the amount of electrical power of a comparable hydraulic turret punch press. More specifically, the E5 concept is an astonishing money saver in terms of energy consumption. It uses breaking energy in the acceleration of the following movement. "The E5 is cheap to operate," explains Wilczak. "Since we've installed the E machine, our power cost increases have been insignificant."

And how has the E5 performed at Montigo? "The E machines has been running pretty much maintenance free since we've installed it," reflects Wilczak. "It just runs with little or no downtime except for planned maintenance." **CM**

REFERENCE: Finn-Power www.finnpower.com