



INTERZINC

ZA-12 castings enable manufacturer to get the grip on design award.

The TUCKER™ vise, manufactured and distributed worldwide by Veritas® Tools Inc., Ottawa, Ontario, is a newly patented vise for the woodworking industry. But even new ideas have their origin in the past. In this case, the predecessor of the Tucker vise is the 19th century Emmert vise developed for the patternmaking industry. Starting from the point where the famous Emmert vise of 100 years ago left off, Tucker completely redesigned the vise.

The TUCKER vise is a professional tool designed for patternmakers, moldmakers, cabinetmakers, carvers and even the home hobbyist. New to the Tucker vise are a front jaw which may be locked or left free floating to clamp irregular work, integral swivelling dogs, a quick-release mechanism, and automatic opening by foot or hand operation. The design also incorporates three types of jaws which can be rotated or tilted to an infinite variety of positions in order to present any workpiece in its optimum orientation. In fact, the design of the TUCKER vise is notable enough to have been awarded *Popular Mechanics'* 1992 Design Engineering Award.

Eight separate ZA-12 alloy castings are utilized in the woodworking vise. Castings form the pivot block, front jaw, rear jaw, quick-release nut, yoke, stanchion, mounting plate and keeper plate.

Based on the shapes needed to form the woodworking vise, casting easily became the metal forming process of choice. The question was, what metal to use. The inventor/designer, Ed Tucker, investigated both cast iron and ZA-12. In fact, the prototype vise was made in cast iron.

As a material, ZA-12 compares favorably to cast iron. ZA-12's density approaches cast iron, 0.218 versus 0.25, but its tensile strength is actually greater, 48,000 psi versus 31,000 psi. The real advantage of ZA-12 over cast iron is its fluidity, which allows for thinner wall sections and greater dimensional control.

Graphite molds produce tight tolerance castings with superior

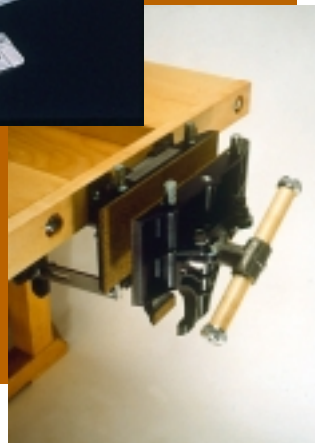
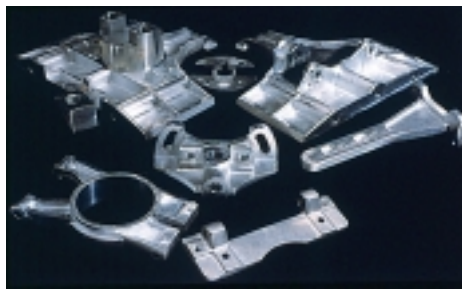
surface finish compared to sand castings because the molds themselves can be precision machined. In addition, overall tooling costs for graphite mold casting can be lower than sand casting.

Tucker cited five reasons for choosing ZA-12 and graphite permanent mold casting. The first reason given was the ability to design features into the various components without machining or assembling multiple components. Another factor akin to this is dimensional control. As a sand cast iron casting, the components would not have the dimensional accuracy needed, thus requiring supplemental machining.

Another important factor is quality control. Through the prototyping process, Tucker experienced hard spots in the castings, voids in the material distortion and warpage. These problems were eliminated with the introduction of ZA-12 casting. Associated with quality is surface finish. Graphite molds produce a smooth surface finish with good detail.

Finally Veritas Tools calculates that total tooling costs are 25-30 percent lower with graphite permanent mold casting. This is comparing the graphite mold with sand casting patterns, match plates and tooling jigs.

All eight components are graphite permanent mold cast by Cash Mould and Casting, Hyde Park, Ontario.



The Tucker vise takes advantage of ZA-12's castability and superior mechanical properties.