Modular Investment Casting Mold Assembly

INVENTORS • Daniel McGuire, Eric Hellstrom

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OVERVIEW

Professor Dan McGuire of UW-Whitewater has developed a novel methodology which provides for reduced infrastructure associated with traditional sprue creation and will allow for centralized production of modular sprues to decrease duplicative work in investment casting foundries.

THE INVENTION

Traditional ceramic investment casting requires that patterns duplicating the desired finished product are attached directly to a wax or plastic sprue. Multiple patterns may be attached to a sprue creating an inverted tree-like structure. The pattern-sprue assembly is then encased in a ceramic mold material or refractory. The refractory containing the wax pattern-sprue assembly is then heated to melt and burn off the wax pattern and sprue in order to create a cavity in which molten metal can be poured. Volatilized hydrocarbon wax released during burnout is a major cause of pollution from investment casting foundries and wax is a major expense for foundries. There is an opportunity to markedly reduce wax usage, reduce pollution from the casting process and centralize sprue creation by making a prefabricated, modular, ceramic sprue. The wax pattern material is melted/burned off from the individual shells before they are attached to the prefabricated sprue. If a pattern breaks before it is cast, this technology allows for the broken pattern to be replaced without needing to recreate the entire sprue assembly. This reduces the amount of pattern material needed to create an end product. It also permits the use of less expensive and less precise refractory material for the prefabricated sprue than is used to coat the patterns. The technology will allow foundries to reduce infrastructure associated with traditional sprue creation and will allow for centralized production of modular sprues to decrease duplicative work within each foundry.

APPLICATIONS

Commercial investment casting
KEY BENEFITS

- Lower cost (lower mesh) refractories can be used to create sprue
- Easier control of damage that arises in the molding process
- Potential to mix different patterns constructed with different pattern materials on a single tree
- Centralized/off site sprue fabrication possible
- Reduced weight compared to traditional sprue-pattern assembly for easier handling within foundry
- Uses less wax, which reduces the cost of the sprue and reduces emissions

STAGE OF DEVELOPMENT

Prototypes developed and tested in commercial foundry

ADDITIONAL INFORMATION

Tech Fields
Materials & Chemicals - Metals

CONTACT INFORMATION

For current licensing status, please contact Jennifer Souter at jennifer@wisys.org or (608) 316-4131.