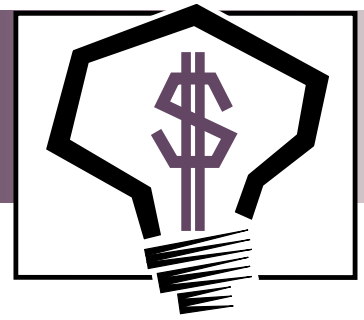


INVENTIONS & INNOVATION

Project Fact Sheet



PRODUCTS FROM METAL POWDERS

BENEFITS

- Energy savings of up to 70% by reducing process time
- Increases productivity by several-fold
- Uses known and proven technologies in new configurations
- Equipment that is simple and inexpensive to install
- The closed-chamber design promotes energy efficiency and pollution prevention

APPLICATIONS

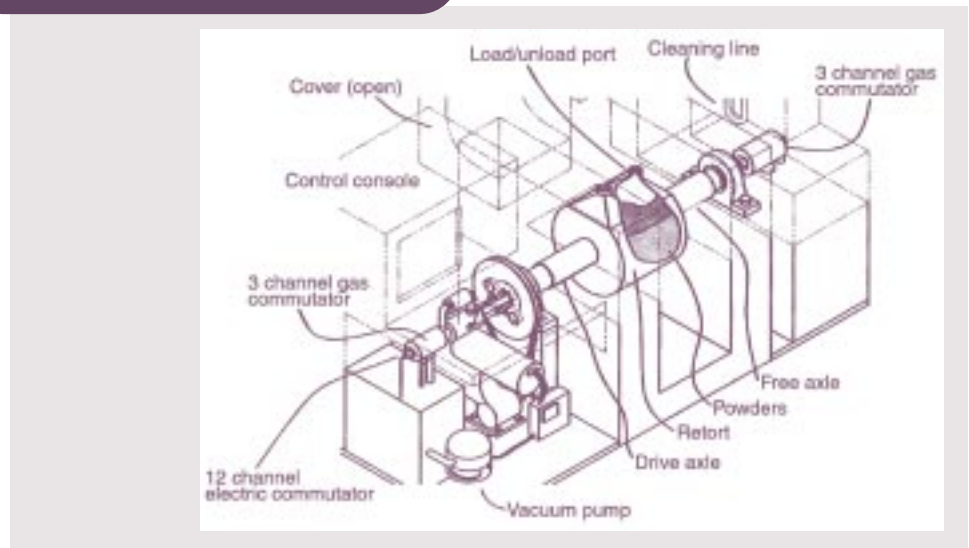
Applies to the pretreatment of metal powders by heat treating or gas reaction, or both, and may also be applicable to the treatment of ceramic powders, diffusion of chromium and other metals for corrosion resistance. Other applications are heat storage and exchange as used in industries such as paper making, food making and heat treating.

INNOVATIVE METHOD OF TREATING METAL POWDERS REDUCES COSTS AND SAVES ENERGY

Manufacturing products using powdered metal will reduce costs and save energy. Before the metal is pressed or otherwise processed, the powder is often heat-treated, strengthened through exposure to nitrogen, or alloyed by coating with metallic gases. By placing the metal powder in a rotary vacuum drum, instead of heating in the shallow trays that are currently used, the rate of heat transfer and exposure to reactive gases are greatly accelerated, thus speeding up the processes that prepare the powder for manufacturing.

A grant from the Department of Energy's Inventions and Innovation Program is helping to demonstrate and commercialize this technology that holds the promise of saving the powdered metal processing industry up to 70% in energy and productivity improvements.

POWDER ENHANCEMENT TECHNOLOGY



More than 500,000 tons of powdered metals are processed each year into products in the United States. By treating the metal powder before it is processed in this rotating powder treatment machine, up to 70% in energy savings and much faster production can be achieved.



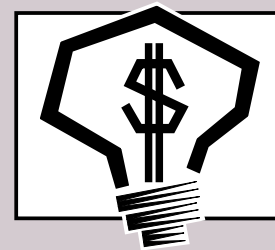
Project Description

Goal: The goal of the project is to build and operate a pilot-scale kiln to optimize processing conditions and equipment design, demonstrating and documenting the equipment's applicability to several metal powder treatment processes.

The metal powder treatment processes commonly used include heat treating to anneal or soften the metal, and nitriding, aluminizing, or carburizing to improve product appearance and performance. The presence of a vacuum prevents formation of oxides during heating and cooling, and the constant movement of the particles in the rotary drum prevents agglomeration. The need for an extra step of grinding up the agglomerated powders is thus eliminated. Also, the rotary action can be adjusted to different speeds so that the tumbling metal powders will be treated optimally.

Progress and Milestones

- The technology has been well defined and tested with a laboratory model.
- Key aspects of the technology have been validated.
- Test results include the successful nitriding and aluminizing of several metals without agglomeration.
- A patent has been obtained.
- Technology has been licensed to several companies for most powder applications and the treatment of solid parts with powder.



The Inventions and Innovation Program works with inventors of energy-related technologies to establish technical performance and conduct early development. Ideas that have significant energy savings impact and market potential are chosen for financial assistance through a competitive solicitation process. Technical guidance and commercialization support are also extended to successful applicants.

PROJECT PARTNERS

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