



SPEEDING MACHINING

A test "billet" of armor plate is here being machined with a tungsten carbide cutting tool at the plant of the Carboloy Company, Detroit. The fast machining of cast armor plate is a difficulty in tank production. It is hoped that the use of this sort of cutting tool may speed the process.

METALLURGY

Defense Work Speeded by New Way of Making Parts

New Industrial Revolution Predicted Through Use Of Powdered Metal Molded Under Heat and Pressure

ALTHOUGH science has not yet found out exactly what happens in the process, the making of metal parts for machinery used in defense and other industries from powdered metal under heat and pressure promises a new industrial revolution. The Axis powers have already made wide use of these methods to speed their production, but they are now coming into extensive use in this country, announced Dr. Harvey N. Davis, President of Stevens Institute of Technology, which is inaugurating a special laboratory for powder metallurgy.

As an example, Dr. Davis cited the oil pump gear of a 1940 automobile.

"Previous to the production of this gear from powders," he said, "it was customary to produce it from a cast iron gear blank by generating the teeth in a

highly specialized gear shaper. It was startling to find that a gear possessing comparable physical properties could be accurately produced in large quantities by simply filling a mold with an iron or mild steel powder which would pass through a one hundred mesh screen, subjecting the powder to a moderately high pressure of approximately 15 tons per square inch and applying a consolidating and welding heat treatment to the pressed powder compacts.

"The molded gear proved in service to be lighter, more nearly noiseless, and in every way more satisfactory than the machined cast iron product, and it was produced at a fraction of the cost of its predecessor. Many other articles have been similarly produced from ferrous and non-ferrous powders and it is becoming

generally accepted that in a great many applications the molding of metal powders will eventually replace other production methods."

Development of these methods may lead to amazing results, said Dr. Davis, who continued:

"Imagine, for example, an exhaust valve for an airplane engine, fashioned and completely finished to exact size in one operation, the rim of which is composed of a special alloy peculiarly well fitted to hold an accurate seating surface, while the cap merges over into another alloy specially fitted to resist high temperatures, and the stem is made of still a third alloy specially fitted to withstand wear as it moves back and forth through its guides. Of course, many new problems, such as differential thermal expansion, to say nothing of the as yet unsolved problems of the diffusion alloying of the steels themselves, would have to be worked out before such a valve could be made. But here, as everywhere in the field of powder metallurgy, the slogan of its devotees is never 'impossible' but always merely 'not yet.'"

Cutting tools used in lathes, millers and similar machines used for making other machines, are made in this way, he stated, citing the cemented carbides "which have proved to hold such an important position in our present defense program as superlatively high speed cutting and metal working materials."

The Axis powers, he said, are believed to have gained much of their large scale production by the use of similar cemented carbide cutting tools applied to ordnance and munitions.

No one yet knows exactly how minute particles of metal are made to adhere so tightly to one another at temperatures far below their melting points. Another mystery is why some mixtures shrink considerably, while others, almost the same, shrink hardly at all. To understand more fully the finer points of these phenomena and to apply them intelligently in industry, it was decided to establish the powder metallurgy laboratory at Stevens Institute, Dr. Davis declared. Here, he announced, technical personnel will be trained, researches will be made with the cooperation of several large manufacturing corporations which have established fellowships, and the unknown fundamentals will be investigated.

Science News Letter, May 24, 1941

There is a trend toward lighter-weight bottles in the glass container industry.