

## METALLURGY

# Metallic Titanium Uses

May become as widely used as aluminum and magnesium because it is possible to extract a relatively pure ductile titanium from its natural ores.

► METALLIC TITANIUM, a strong light metal, may become perhaps as widely known and used as aluminum and magnesium because of methods perfected by the U. S. Bureau of Mines, making possible the extraction of a relatively pure ductile titanium from its natural ores.

The process can be expanded and used on a large scale, Bureau officials state. Titanium ranks fourth in abundance among metallic elements suitable for engineering purposes.

Titanium has long been known and used; not, however, as a metal but in its compounds. Titanium dioxide, the mineral rutile, is used in large quantities as a pigment in paint because of its great whitening power. It is also used in rubber, linoleum, leather, plastics, soap, printing inks, paper, textiles, and ceramics. Certain alloys are also of importance, particularly ferro-carbon-titanium, which is used in the steel industry, and titanite, an aluminum-manganese-titanium alloy that takes a high, corrosion-resistant polish.

The successful method of producing ductile titanium by the Bureau of Mines was described at a meeting of the American Institute of Mining and Metallurgical Engineers by R. S. Dean, assistant director of the Bureau, and J. R. Long, F. S. Wartman and E. L. Anderson, metallurgists or chemists of the Bureau.

The method involves reduction of titanium tetrachloride by a more active metal and yields titanium in a granular or powdered form. It follows in general what is known as the Kroll process. The active metal used is magnesium, and the reaction is carried out at a temperature of about 800 degrees Centigrade.

The reaction mixture, they state, consists of titanium, magnesium chloride, and unreacted magnesium. After cooling it is crushed and leached. The resulting granular titanium is ground wet, re-leached to remove the magnesium, dried, and consolidated by powder methods or by a special arc process.

The titanium powder produced was compacted into small pellets at a pressure of 100 tons per square inch and heat-treated or sintered at 1000 degrees

Centigrade in a high vacuum. After this treatment the compacts were usually malleable enough to withstand considerable cold deformation.

In an expansion of the process, great enough to produce 15 pounds of titanium in a single batch, various changes in apparatus and techniques were found both necessary and desirable. One of these, Mr. Dean said, was the use of an unlined iron pot instead of the molybdenum-lined pot initially used. Several methods of grinding the titanium were tried. One was in a small hammer mill operating in an atmosphere of helium to prevent oxidation of the titanium particles. A wet grinding process, with frequent screening to remove undersize particles, was finally used.

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## GENERAL SCIENCE

## Dispute Is Delaying Peacetime Atomic Energy

► PEACEFUL development of atomic energy is being delayed by legislative disputes over its control, Dr. Vannevar Bush, president of the Carnegie Institution of Washington and director of the Office of Scientific Research and Development, charged in a press conference.

Terming the delay unfortunate, Dr. Bush, who was a leading figure in the development of the atomic bomb, declared that a civilian control commission for atomic energy should be established with "plenty of authority."

Asserting that there is general agreement that control of atomic energy should be civilian, he said the question of military men serving on the commission was not a fundamental problem.

"We should make it clear from the outset that we want civilian control," Dr. Bush said, adding, "the military must have an interest in atomic energy, but not control."

Urging a commission made up of the most able men possible, he advocated that the group should have full discretion to decide what details of atomic energy should be released to the public and how far industry could go in its use.



**SAVES TIME**—Gaping metal jaws frame the 2500 horsepower Wright engine of the Lockheed Constellation as a mechanic makes a minor adjustment. Ground crews who have worked with the new type cowling say that as much as 15 to 20 minutes is saved every time an engine must be serviced or inspected. This saving in time will be passed on to Constellation airline passengers in reduced ground time during scheduled flights.

He denied that rigid government control would retard private developments and cited the regulation of narcotics manufacture and distribution as an example of private enterprise working under stiff government rule.

Dr. Bush said the Office of Scientific Research and Development is "still carrying on a small bit of research," and he hoped that this could be carried on by the proposed National Research Foundation which he favors.

The proximity fuze rather than the atomic bomb received Dr. Bush's nomination as the wartime weapon that "took more resource and courage than any other scientific development."

Describing the problems of producing the fuze as a radio station that could be fired from guns and turned out by the millions, he praised the scientific work on the fuze as a job that did the impossible.

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