pounds, fatigue durability goes up from 5,960 stress cycles to more than 5,000,000. When a nut is tightened against reasonably rigid abutments to produce in the bolt a tension equal to or greater than the working tension load, the speaker stated, practically no stress change takes place and the bolt's operating strength approaches its static strength.

Science News Letter, February 5, 1944

AERONAUTICS

Indium Used on Planes

Rare metal adds life to aircraft engine bearings and propeller blades. Coatings of zinc-indium combination eliminate need of greasing surfaces.

➤ INDIUM, one of the rarer and less known metals, is contributing to the war effort by increasing the service life of airplane bearings and propellers. Known to chemists for 80 years, indium has been used commercially for only the past 15 years or so. A small amount of it added to nonferrous metals gives them greater tensile strength, increased hardness and resistance to wear, friction, abrasion and corrosion.

The search for a source of indium in the United States, beginning early in the twenties, its successful location in connection with zinc ores, and its separation and purification, were discussed at the New York meeting of the Institute of the Aeronautical Sciences by William S. Murray, president of the Indium Corporation of America. Prior to the search its values in stabilizing nonferrous metals had been proven.

"The aviation industry," he stated, "was the first industry to recognize the value of indium-treated bearings."

These are mostly a silver-lead-indium alloy. The same bearing material is used in automotive and stationary engines. Aviation engine bearings with indium-diffused surfaces can be overspeeded and over-loaded without fear. "Because of relatively high oil temperatures, because of the generation of acid in the oil and because of heavy loads and the necessity of having a surface of high wettability, indium is of prime importance and has contributed vitally to the efficiency of your power plants," the speaker continued.

Coatings of a zinc-indium combination have proved satisfactory in laboratory and service tests for airplane propeller steel blades, to protect them from corrosion and wear. The coatings adhere firmly to the steel, and do not chip or peel. Use of indium eliminates the need of greasing or oiling the blade surfaces.

Some half-million ounces of indium are now available annually in the United States. Most of it is produced as a by-product of zinc and lead operations. It is a silvery white metal, softer than lead, both malleable and ductile. It is used as a dental alloy and in silverware to harden the silver and give it greater surface stability.

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Fire Hazards Decreased

➤ FIRE HAZARDS in aircraft will be greatly lessened in the future by the use of proper materials connected with engine installations, automatic fire-detection devices, and semi-automatic fire-extinguishing apparatus, predicted Harvey L. Hansberry of the U. S. Civil Aeronautics Administration at the meeting of the Institute of the Aeronautical Sciences.

Studies to determine fire-resistant engine installations in future aircraft, and to develop fire-extinguishing systems for use in aircraft already in service, have been under way for the past four years by this government agency. In its studies and tests four basic investigations were made concerning fire resistance of materials, fire sources, fire detection, and fire extinguishment, Mr. Hansberry said.

The material tests, he stated, "have proved the superiority of steel over aluminum alloy in and around the engine installation." Fire-detection apparatus should warn the pilot within three seconds of the ignition of a fire. They should be located in all areas through which flame might pass regardless of the location of the fire source.

Science News Letter, February 5, 1944

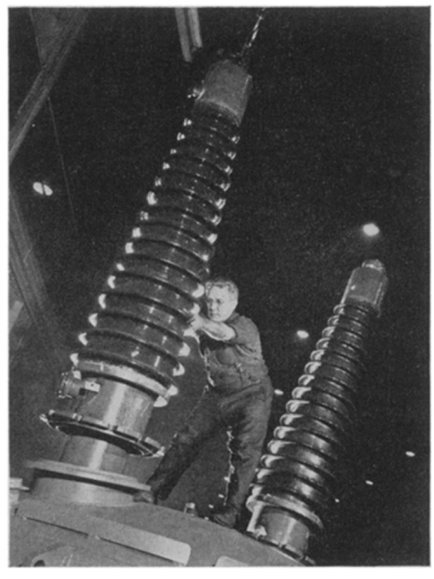
Stall-Warning Devices

➤ NEW stall-warning devices, now perfected, for use on private flying planes probably will greatly lessen the number of fatal accidents. This is the opinion of James George of the Civil Aeronautics Administration, expressed at the meeting of the Institute of the Aeronautical Sciences, where he announced the development of two new reliable stall-warning devices by the office he represents in cooperation with several industrial and college research laboratories.

More than half the fatal private flying accidents are caused by stalls, with a death toll exceeding 100 a year, he stated. The new devices will warn pilots of approaching stalls so that they may take the necessary steps to prevent crashing. The devices will be low-cost, dependable, light in weight, and easily installed in existing planes. They will be available commercially in the near future.

Stalling of planes in the air occurs when they lose flying speed. Until the speed is regained a plane is unable to sustain itself in level flight and begins to fall.

A plane may stall when loss of power causes loss of speed. It may stall when the angle of attack of the plane is so increased that the airflow over the wings and body leaves the upper surface, and forms a turbulent wake or eddy toward



GIANT "SPARK PLUG"—This 14-foot condenser bushing is part of a huge automatic switch that will guard flow of electric power into a new Westinghouse war plant. The bushing conducts 230,000 volts of power into the tank on which the workman is standing, just as a spark plug in your automobile conducts electricity into the gas-filled cylinder.