gine, and aerodynamic, airborne, ventilating and miscellaneous noises," Mr. Arnhym stated.

Various technical methods of decreasing noises at their source were discussed by the speaker. Aerodynamic noises, caused by the flow of fast-moving air over the plane and its parts, are decreased by proper design of the plane. Airborne noises are those which originate during flight and are usually due to inefficient design.

Cabins in military planes necessarily contain many openings through which outside noises enter. In commercial airliners these noises can be kept out. In military planes part of them may be absorbed by covering the walls and ceiling with suitable materials "to trap the soundwaves which strike them in millions of diminutive air pockets and convert the sound energy into heat."

Sound-proofing materials must be easy to flame-proof without losing their properties, highly moisture-repellent, vermin-proof, stable, easy to apply, and have good heat insulation values.

Science News Letter, February 5, 1944

ENGINEERING

Not For Automobiles

High-octane fuels are not suitable for car engines. Any machine which could be developed would be too heavy, too noisy and too expensive.

➤ HIGH-OCTANE fuels such as are used in aircraft, are not suitable for ordinary automobiles. These fuels produce tremendous pressure, and any automobile engine which could be developed to use them effectively would be too expensive, too heavy and too noisy.

This is the opinion expressed by C. B. Veal, of the Coordinating Research Council, Inc., New York, at the Detroit meeting of the Society of Automotive Engineers. The council he represents is sponsored jointly by the Society of Automotive Engineers and the American Petroleum Institute.

Even if designers should produce an automobile engine capable of satisfactory operation with high-octane fuels, petroleum refiners would be forced to adopt expensive and uneconomical refining methods, he stated.

"Production of these fuels consumes special chemicals at costs prohibitive in peacetime," he added, "and greatly reduces the yield of fuel per barrel of crude oil."

Science News Letter, February 5, 1944

Chrome-Plated Cylinders

➤ CHROME-PLATED cylinder barrels of new automobile engines give longer service life, and the art of plating worn cylinders is developing into a science. New plating techniques which make engine cylinders highly resistant to wear and corrosion were presented at the meeting of the Society of Automotive Engineers by B. A. Yates of the McQuay-Norris Manufacturing Company of St. Louis.

Treated surfaces are showing a wear-life several times greater than that of metals generally used, he said, assuring longer periods and higher operating efficiency between overhauls. He indicated that salvage of worn cylinders presents unusual problems. The preparation of the surfaces requires specialized techniques in grinding, honing and finishing, but scientific methods are proving satisfactory.

Chromium-plated piston rings, particularly with the top ring plated, drastically cut engine wear, according to Tracy C. Jarrett of the Koppers Company, Baltimore, who presented data to show that with such rings, even under abnormal dust conditions, cylinder wear is cut one-half at least. The data indicated that a 2,000-horsepower engine operated 590 hours developed cylinder wear of only 0.003 inches when a porous chromium-plated ring was run in a chromium-molybdenum cylinder. With a plain cast-iron ring, 307 hours of operation produced more than twice this amount of wear.

Science News Letter, February 5, 1944

Proper Machine Assembly

➤ THE MAN with the wrench holds the responsibility for the service life of assembled machine parts, declared J. O. Almen of the General Motors Corporation at the same meeting. "Just how much he tightens a nut, bolt or stud determines the ultimate working life of the assembly." He is "held to be a factor 16 times more important than design, metallurgy, or processing."

"Good design and materials, heat-treatments, and superior manufacturing processes all are desirable," Mr. Almen said, "but the fatigue strength of highly loaded bolts, studs, and nuts finally is determined by the man with the wrench —and how little, or much, he applies that tool in the tightening procedure."

Tests show, according to the speaker, that if the initial tension on a bolt is increased from 1,420 pounds to 8,420

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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

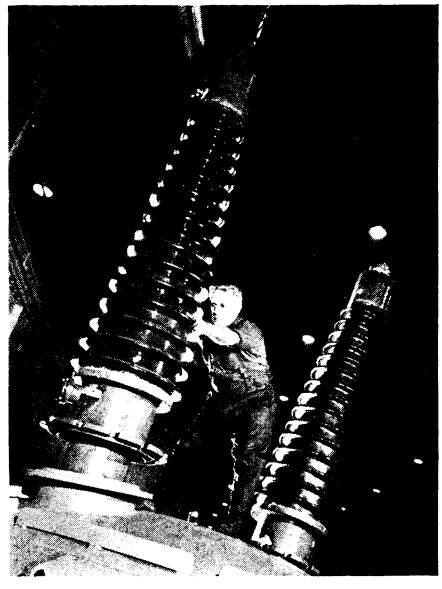
Stall-Warning Devices

➤ 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.