ENGINEERING

Magnetic Alloy Promises Better Radio Loudspeakers

Method of Removing Ice From Airplane Propellers Among Engineering Achievements Viewed on Tour

EDITOR'S NOTE: Robert Potter of the Science Service staff accompanied the business executives on this interesting research tour of American industries. Further accounts of the trip will appear in next week's Science News Letter.

A NEW magnetic alloy, whose permanent magnetism is so powerful that it will lift sixty times its own weight, was shown at the laboratories of the General Electric Company, on the first stop of the Tour of Industries sponsored by the engineering division of the National Research Council.

The purpose of the tour was to emphasize the importance of scientific research for industry, not only in developing new products and better ways of making old ones, but also to replace testimonials and high-pressure selling, in the court of consumer acceptance, with scientific truth and tested realities, declared Maurice Holland, who organized the tour.

The new magnetic alloy is made of aluminum, cobalt, nickel and iron, and will have important applications in the radio industry for the construction of high-quality radio loud-speakers at low cost.

Present dynamic loudspeakers, said W. E. Ruder of the research laboratory, require strong magnetic fields obtained by use of electromagnets. The new permanent magnetic alloy will replace these more costly electromagnets.

The new alloy provides illustration of the unforeseen developments possible through scientific research. Mr. Ruder pointed out. It was not originally developed for its magnetic qualities, but as a heat-resisting alloy which would not deteriorate at high temperatures.

In Japan, on the other side of the world, Prof. T. Mishima of Imperial University, Tokyo, discovered the magnetic properties of a somewhat similar alloy. When the Japanese research was made known, the American laboratory needed only the development of a heat-treating process which would bring out the full magnetic properties of the alloy, Mr. Ruder said.

Carrying Power

What may well be the scientific salvation of the federal government's scheme of widely-scattered power-generating plants at such places as Grand Coulee Dam on the Columbia River, Norris Dam in the Tennessee Valley and Maine's Passamaquoddy project, was described at the laboratories. It is power transmission by direct instead of alternating current.

In the forefront of criticism over the Administration's efforts to put the nation in the electric power business has been the hard-to-answer question of how the enormous amount of power to be created will be used.

With cross-country transmission of electric power by alternating current methods limited to about 300 miles, one suggested solution for isolated projects has been to establish industry on Maine's rockbound coast and the Columbia River —to choose only two examples.

Investigation of the possibilities of direct current power transmission over unlimited distances cross-country at the General Electric laboratories suggests the alternative solution—to bring the power to established industrial centers.

Newly developed direct current power transmission involves no changes in either the generating or distributing systems which both work on alternating current.

Convert Where Needed

The secret of success of the plan is to convert easily and cheaply from direct to alternating current where the electricity is needed, and particularly to make the direct-current form carry the power over the long-distance cross-country jumps.

Conversion from one to the other type of electric current is accomplished by using potentials up to 30,000 volts and 6,000 kilowatts power capacity, obtained with various types of specially designed metal vacuum tubes.

Some tubes, operating as "valves," change alternating to direct current; others convert the current in the reverse sense. Such tubes, standing more than a yard in height, are in principle akin to the tubes used in home radio receivers.

The cost of vacuum-tube converting systems is now near the price level where installation on a power line more than fifty miles long is as cheap as are the huge transformer systems needed with the alternating current systems.

As oil aids sailors by quelling tossing seas, so may oil be the newest help for aviators in their battle with the menace of ice formation on airplane propellers.

Scientists at the B. F. Goodrich Rubber Company described to tour members the newest tricks in de-icing airplane wings and propellers with the aid of studies in the refrigerated wind tunnel in their laboratories.

Ice forming on the propeller is a hazard in commercial and military aviation not so much because of the added weight of the ice but because the propeller may become unbalanced by unequal weights on the propeller blades. Moreover, a coating of ice can change the contour of the propeller and decrease its efficiency.

De-icing propellers, said Harry E. Waner, Goodrich engineer, involves the covering of the propeller hub with a spinner cap which is covered with rubber and then treated with a special oil preparation.

"The propeller blades," he added, "are also covered with rubber on the thrust side, around the entering edge and back to approximately the line of the thickest section on the convex side.

"This treatment, it must be understood, is not designed to prevent the formation of ice. Its purpose is, however, to minimize adhesion and thus allow centrifugal force to throw off the ice in smaller quantities, instead of large chunks. This, it will be seen, will prevent the off-balancing of propellers."

Work is at present under way, Mr. Waner indicated, on the use of a continuous flow of oil over the rubber propeller surfaces instead of the single oil treatment now in use.

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