Engineering Abstracts

RADIO FOR AIRCRAFT

Because of unfavorable operating conditions encountered in flight, and because of space and weight limitations imposed on the equipment, reliable communication can be maintained only by the use of equipment of the highest grade especially adapted for aircraft purposes, is the opinion of Malcolm P. Hanson, radio expert of the United States Naval Research Bureau.

"The only conditions favorable to communication is the normally high altitude of the single-wire antenna above the energy-absorbing ground and obstructions," explains Mr. Hanson. "But the disadvantage exists that the customary trailing wire with a lead weight or 'fish' on its end must be paid out fro ma reel after the plane has reached a safe altitude, and again must be taken in before landing to avoid its loss. This wire is usually from 100 to 400 feet long. Instead of the customary ground, connection is made to the metallic framework and bracing of the airplane itself. The engines, fuel supply tanks and piping must be well 'grounded' to the remainder of the structure, and other metallic objects should be either grounded or well insulated from the adjacent metal to avoid dangerous sparking, reception clicks, and poor radiating conditions.

"The continuous vibration produced by the engines and by the wind blast require a most durable but resilient construction as well as careful flexible suspension of equipment, while often additional cushioning is necessary to avoid damage from a hard landing. The equipment muse be light in weight and very compact, yet be accessible in flight for simple adjustments and occasional replacements of the tubes. Reception is rendered difficult, not only by the motor and propeller noises, but also is often considerably interfered with by the engine ignition system, which itself acts like a broadly tuned transmitter. The resultant continuous clicking and growling noises in the receiver may completely blanket out reception of the desired radio signals. While the interference can be reduced by several methods, it can be entirely eliminated only by surrounding all parts and wiring of the ignition system with metallic shielding grounded at frequent intervals to the engine structures. A ringing, so-called 'microphonic' sound in the receiver, set up in the receiving tubes themselves by vibration and external noises, is another factor which must be guarded against by special design."—Scientific American.

Effect of Stratification of Furnace Gases on Steam Boiler Losses is the title of an engineering experiment station bulletin now in press. This bulletin reports the results of tests run on one of the boilers in the University Power Plant, and also on the Robinson Boiler in the Mechanical Engineering Laboratory. The work was done by Professors Marquis and Bucher of the M. E. Dept. and Mr. H. M. Faust, who was holding the Robinson Fellowship at the time the tests were run.

COMMERCIAL STEEL FROM INDUCTION FURNACES

At the beginning of the year the Edgar Allen Steel Company of Sheffield, England began the commercial production of steel in an Ajax Northrop high-frequency induction furnace. This furnace is said to be the first of its kind in the world to be used in the manufacture of high quality tool steel.

The new furnace heats 450 pounds of steel an hour, the heat being induced within the furnace by an alternating electric current developed in a square wooden box, which remains so cool that the hand can be placed upon it. There is no contact between the induction coil and the crucible or steel, the heat being induced in a way similar to that in which a radio set picks up ether waves. —(New York Times).

LARGEST POWER SHOVEL IN THE WORLD

An electric power shovel, with a dipper that will gouge out fifteen cubic yards, or nearly twenty-four tons of earth in one bite and lift it to the top of a ten-story building, is being constructed by the Marion Steam Shovel Company of Marion, Ohio, and electrically equipped by the General Electric company. The large shovel will be used in the open-pit mining of coal in Illinois.

Its scope of operations will be unusually wide. The shovel boom will be 120 feet long and the dipper stick 82 feet long. Thus, it will be able to lift to a height from 90 to 100 feet, and will be able to reach out over a radius of 150 feet from the center of operations, covering a circle 100 yards in diameter. If this shovel was placed in the center of the football field in the stadium it could dig out the entire playing field, deposit the dirt in the seats, and could continue its digging in this manner to a depth of more than 75 feet. —(New York Times).

CASTING OF PERKINS OBSERVATORY GLASS SUCCESSFUL

A mould of about two tons of molten optical glass that had been cooling from a high temperature of 2400 degrees F. during the last eight months, has been opened at the Bureau of Standards and found to be satisfactory for use as a mighty concave mirror in the new reflecting telescope of the Perkins Observatory, Ohio Wesleyan University, Delaware, Ohio. It is the first optical disk of the size ever made in the United States and has been equalled only twice abroad. Since May 7, 1927, when the boiling glass was poured out to "set", Bureau of Standards experts have been allowing it slowly to cool at the rate of a few degrees a day in a specially designed mold and annealing furnace. The giant disk that will be used in looking at the stars weighs about 3500 pounds, while in width it is just under six feet and in thickness 11 inches. Four unsuccessful attempts were made before the present satisfactory disk was molded.—(Christian Science Monitor).