

ELECTRONICS

Bombers Get Gadgets

Brushes for electrical generators permit the B-17's to fly indefinitely at altitudes above 30,000 feet, where previously they lasted a few hours.

► THE SUCCESS of our Flying Fortresses and Superfortresses is due in large part to the new electrical gadgets that help them to fly, bomb, fight and live to fight another day. One of these developments provides brushes for electrical generators, permitting the B-17's to fly indefinitely at altitudes above 30,000 feet. Before the development of these brushes, the generators were not expected to last more than two to three hours at such altitudes.

In the development of the new generator brushes, and other devices, a young civilian engineer, George W. Sherman III, chief of the Direct Power Unit, and Col. Ted Holliday, chief of the Electrical Branch, have played an important part at the Equipment Laboratory of the Air Technical Service Command, where the work has been carried on.

Every pound that an engineer can save in equipment aboard a plane means that one more pound of military punch can be added in bombs and bullets, since weight is a factor of prime importance aboard airplanes. Through careful design, these engineers have built electrical generators for the B-29 that save 300 pounds of weight. A .50-caliber cartridge weighs four ounces, so that 300 pounds saved means 1,200 additional rounds for the gunners. At the same time these electrical generators have been increased in power over those in the first B-17 by 1,200%, with only a 50% increase in weight and almost no increase in size. There are six low-voltage direct current generators on every B-29; each delivers 54 kilowatts, which is about 70 horsepower. By comparison, you run your refrigerator on one-sixth horsepower and your radio on one-seventh horsepower.

In today's big bombers electrical systems perform literally hundreds of jobs. The B-17 contains 11 miles of wiring; and the B-29 has about 75,000 feet of wire strung throughout the fuselage and in equipment. There are about 150 electrical motors in a Superfortress.

In a combat mission aboard a big bomber, this is what electricity does: It starts the engines, changes the propeller pitch, raises and lowers the landing gear,

opens and closes the bomb bay doors, manipulates the flaps and brakes, runs the bombsights, releases the bombs, turns the gun turrets, computes the gunners' sights, fires the guns, by radar waves detects and identifies ground units, and provides light and heat for the air crewmen.

The huge airplanes of the not too distant future are still military secrets, but some idea of their size can be gained from the statement of Mr. Sherman, "They will be plenty large, in view of the fact that we have to increase the 30-volt direct current system to 120 volts in order to meet the electrical demands of the new aerial battleships."

To go along with the complicated B-29 electrical system, an electrical repair shop has been developed which is now being used in India and on Saipan to maintain the Superfortresses striking at Tokio. One of the problems confronting repairmen

is the fact that electrical motor armatures grow beards of fungus in tropical areas. In addition to equipment for the repair and testing of all electrical units on the B-29's, repairmen now receive instructions on how to prevent the growth of fungus on vital equipment parts through the use of special anti-fungus powders and sprays.

Science News Letter, March 31, 1945

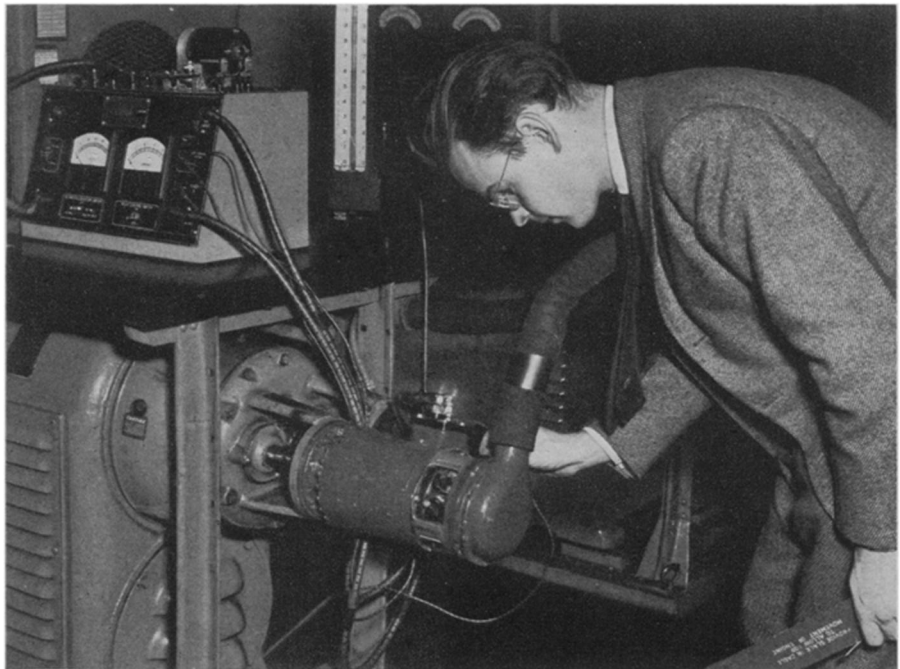
METALLURGY

Magnetic Separation of Pure Iron Particles

► A HARVARD faculty member, Prof. John Wulff, offers a method for magnetic separation of pure iron particles from those containing carbon, as subject of patent 2,371,665. Purest possible iron is needed in powder metallurgy; too high a carbon content interferes with proper sintering.

Prof. Wulff's process depends on the fact that at a certain critical temperature carbon-containing iron becomes much less magnetic than pure iron. Heated to this temperature, the finely powdered iron is flowed over a magnetic separator. The pure iron particles stick, while the carbon-contaminated ones fall off.

Science News Letter, March 31, 1945



NEW GENERATOR—The secret of its ability to continue operating at extreme altitudes lies in the efficient brush design. George W. Sherman, who spent more than 50 hours flying at high altitudes working on the problem of developing long-wearing generator brushes, is shown examining the modern high flying aircraft generator.