

SPEEDS UP TO 5,000 MPH CAPACITY OF NRC TUNNEL

A NEW WIND tunnel capable of speeds up to 5,000 mph has been installed by the National Research Council. With a working section only 10 inches square, the tunnel achieves the high air speeds by sucking air in through a venturi passage to occupy the void of a 35-ft.-diameter vacuum sphere.

Air enters the intake throat and is drawn through a nozzle box. Here the curving shapes of the roof and floor form a venturi-like nozzle which determines the speed of air flow past the model. Nine interchangeable nozzle boxes are provided, each having a different venturi shape. Thus the air speed through the tunnel may have nine separate values, depending on which box is in use.

Box No. 1 is rated to give an air speed of Mach. 1.4, or 1.4 times the speed of sound. Boxes 2 to 6 are designed to give a progressive range of air speeds up to Mach. 3.47. The venturi shapes for the remaining boxes will be built by the National Research Council and it is estimated that with them, air speed equivalent to 5,000 mph at sea level will be reached.

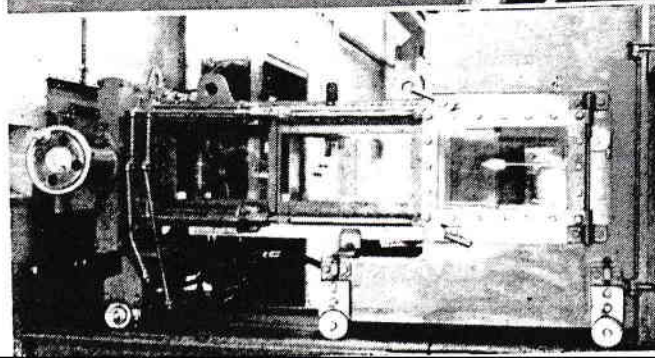
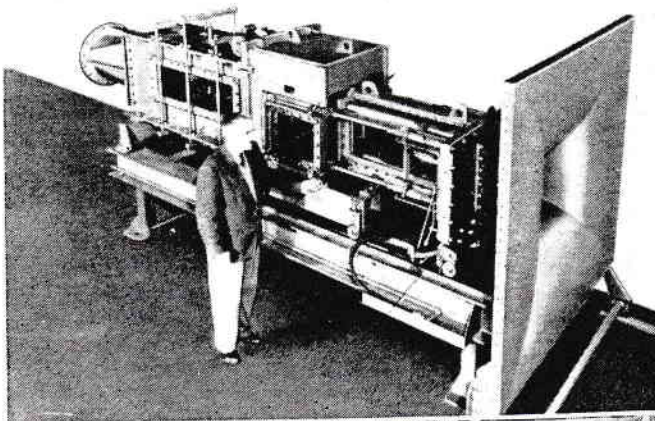
The nozzle box projects into the balance box, where the model is mounted, and which contains the ap-

paratus for measuring the wind effects on the model.

Both the nozzle boxes and the balance box have optical glass windows, 1.25 in. thick, through which shock waves, boundary layers and other flow phenomena can be observed and photographed by means of a schlieren apparatus.

When the nozzle box is removed, the balance box is capable of being moved forward to allow easy access for mounting the model and adjusting balance apparatus. The air leaving the balance box flows through the "adjustable throat" section. Here the roof and floor of the tunnel consist of flexible aluminum plates, capable of being flexed by a system of screw jacks to give varying tunnel heights, ranging from 12.5 to 6.25 inches. The purpose of this device is to provide means of pressure adjustment inside the balance box (i.e. in the space around the high speed jet) and to increase the efficiency of pressure recovery. Connected to the adjustable throat is a transition piece which transforms the tunnel cross section from a rectangle to a circle. A 15-inch-diameter globe valve is bolted to the transition piece from which a conical diffuser leads to the vacuum sphere.

Two views of the new wind tunnel being installed at the National Research Council.



MUFFLER FOR DC-3

An exhaust muffler for DC-3 airplanes which reduces noise on take-off by some 60% has been perfected by the Aero Sonic Corp. of Brooklyn, N.Y., and given preliminary approval by the Civil Aeronautics Administration.

The new mufflers have been service-tested on a C-47 operated by Meteor Air Transport, Teterboro Air Terminal, Teterboro, N.J. Tests on the Aero Sonic muffler on the C-47 of Meteor Air Transport have included both day-in and day-out use of the plane's regular cargo flights and special tests under severest engine operating conditions to determine that the mufflers cause no excessive back pressure nor high head temperatures.

The basic design of the Aero Sonic muffler consists of a tube mounted within a tube with a Venturi-shaped tail pipe to induce a jet action in scavenging gases from the muffling chamber. The outer stainless steel pipe is insulated with quarter inch of steel wool blanketing with the inner wall of the pipe perforated to let sound be absorbed more readily.

The inner pipe is in effect a tube of steel wool running the length of the muffler with perforated outer casing and inside wall. This provides three surfaces of 1,200 sq. in. and nearly 50,000 perforations to absorb noise as it passes through the muffler.

The danger of backfire has been eliminated by the incorporation of a vent which draws in fresh air by means of a small funnel-shaped scoop forward to the muffler. Piped directly into the head of the muffler, this fresh air automatically creates a "wall" of air between explosive fumes which might collect in the muffler and any exhaust fumes which might try to enter the muffler from the engine after intermittent operation, idling or other cause.

SILENCER FOR DC-3: A new lightweight exhaust muffler installed on a DC-3 is shown here (white section). Developed by Aero Sonic Corporation of Brooklyn, the muffler attaches to the end of a standard Douglas exhaust pipe. The pipe running forward along the cowlings scoops in cool air to eliminate backfiring. Specially designed tail pipe section employs jet principle to scavenge exhaust gases and eliminate back pressure. Noise reduction of 60% is claimed.

