AERONAUTICS

New Giant Bomber

The B-32 weighs 50 tons, has a speed of more than 300 miles an hour, has four 2200-horsepower motors and propellers nearly 17 feet in diameter.

➤ THE ARMY's newest heavy bomber, the B-32, built by the Consolidated-Vultee Aircraft Corporation in Fort Worth, has been partially stripped of its veil of wartime secrecy.

Designed for a normal gross weight of 50 tons, the B-32 has a speed of more than 300 miles per hour. It has four 18-cylinder, 2200-horsepower Wright Cyclone engines, equipped with eight turbo-superchargers. During the landing run the huge 16-foot, 8-inch Curtiss electric reversible-pitch propellers can be reversed to enable the plane to land on a shorter runway and increase its maneuverability during ground operation. They are the largest-diameter propellers installed on any production airplane.

Physically, the B-32 has a length of 83 feet, 1 inch, stands 32 feet, 2 inches high on retractable tricycle landing gear equipped with dual 56-inch tires on the landing wheel and 39-inch tires on the nose wheel. The spread of the low-drag Davis wing is 135 feet, only a few feet shorter than that of the Superfortress.

The fuselage of the B-32 is an all-metal, semi-monocoque design, covered with a smooth aluminum alloy stressed skin of various thicknesses. At the thinnest point the skin is only 25 thousandths of an inch thick. Eight men comprise the crew, working in forward and after cabins, with a double bomb bay arranged in tandem in the center.

"The B-32 is a roomy and comfortable plane to work in," Convair officials report. "The bombardier's head clearance is about 4 feet, 6 inches. The flight deck is 14 feet, 6 inches long, and has a head clearance of over 6 feet. The cabin is kept cosily warm by heat supplied by the engines. Although originally designed to have a pressurized cabin and central fire control system like that in the B-29, the B-32 has high-altitude oxygen systems to replace pressurization, thereby making it possible for gunners to take their position in turrets at any time. Gun turrets replace the fire control system."

The use of high-altitude oxygen systems eliminates the danger present in a B-29 when it enters "flak alley". If flak bursts through the skin of a Superfortress the decompression is explosive, sometimes blowing crew members through the plexiglas blisters.

The Davis high-lift, low-drag, long-range wing gives the B-32 a very long range. Heated air from the engine exhaust passes through the leading edge of the wing, amounting to nearly 1,500,000 B.T.U. an hour, or enough heat to make 25 average five-room homes comfortable. This heat prevents ice from forming on the wing. The B-32 is a true all-weather ship, capable of flying under conditions that normally would ground any other type of plane.

To the casual viewer, probably the most impressive thing about the B-32 is the giant single tail. A number of types of tail structures were experimented with in the design of the plane, including a twin tail, such as is used on the B-24 Liberator, and the Boeing B-29 tail. Best results were achieved with the B-29 tail design. The Army wanted to use the B-29 tail so that the structures on the two planes could be interchanged. However, in order to give the pilots plenty of rudder for take-off it was necessary to increase the height of the vertical section of the B-29 tail by about five feet. Other minor revisions were also necessary in the elevators and coupling of the tail structures. Thus, while the present tail structure of the B-32 resembles that of the B-29, it is bigger.

As present, rubber boots are installed on the leading edges of the tail structure to break off ice formations that occur at high altitudes. Soon, however, B-32s will be equipped with heated tail structures that prevent the formation of ice, using engine exhaust heat such as that now piped through the wing.

The B-32's hydraulic system, which controls the operation of the oxygen system and some other parts, is powerful enough to raise a passenger automobile 17 stories above ground in one minute. There are about seven miles of wire in the electrical system, ranging in size from 3/22 inch to the size of a man's thumb.

Maintenance on the ground is made easier on the B-32 than on any other four-engine bomber in use today. The four engines are completely interchangeable. A large trapezoidal door at the top of each engine nacelle allows a man actually to enter the engine housing to work on it.

The four engine nacelles or housings are adaptations of a British design called the "power egg." Exclusive on the B-32, engineers found the power egg, with each nacelle ending in a point behind the trailing edge of the wing flap, the most efficient design to use with the low-drag wing. The engine nacelles are divided at the point where the wing-flaps are joined to the wing, so that they do not interfere with flap operation.

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ENGINEERING

Blind Civilians Inspect Precision Roller Bearings

➤ BLIND civilians, with the use of a new electronic precision gaging device, are able to inspect with accuracy the outside diameters of roller bearings, in a plant of the Timken Roller Bearing Company in Canton, Ohio, to determine if they are the exact size required. Three notes from a loud-speaker on the back of the operator's chair indicate whether a bearing passing through the measuring device is of correct size, oversize or undersize.

Diameters of rolls, cones and cups for precision bearings are ground within very close limits of their specified sizes. Each part is then checked for size by operators using electrical or mechanical dial-type indicators. These indicators show any variation in the diameter of the work-piece being checked. Parts with diameters over or under the specified size limit, or parts out of round, are readily detected and removed.

To enable a blind person to do this identical work with the same accuracy, a sound indicator is used on the same type of gage. The small conical loud-speaker mounted on the back of the operator's chair gives a high note if the article is oversize, a low note if undersize, and a "middle" note if dimensions are correct.

The three notes are produced by an electronic oscillator which is controlled by relays connected to three indicator lights of the electronic gaging system. The three lights correspond to the three notes of the sound device. Chief purpose of the lights is to give the lineman a quick visual check on the gage's efficiency. The gage can be made to give both a visual and sound indication as close as one five-millionth of an inch over or under a specified diameter tolerance.

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