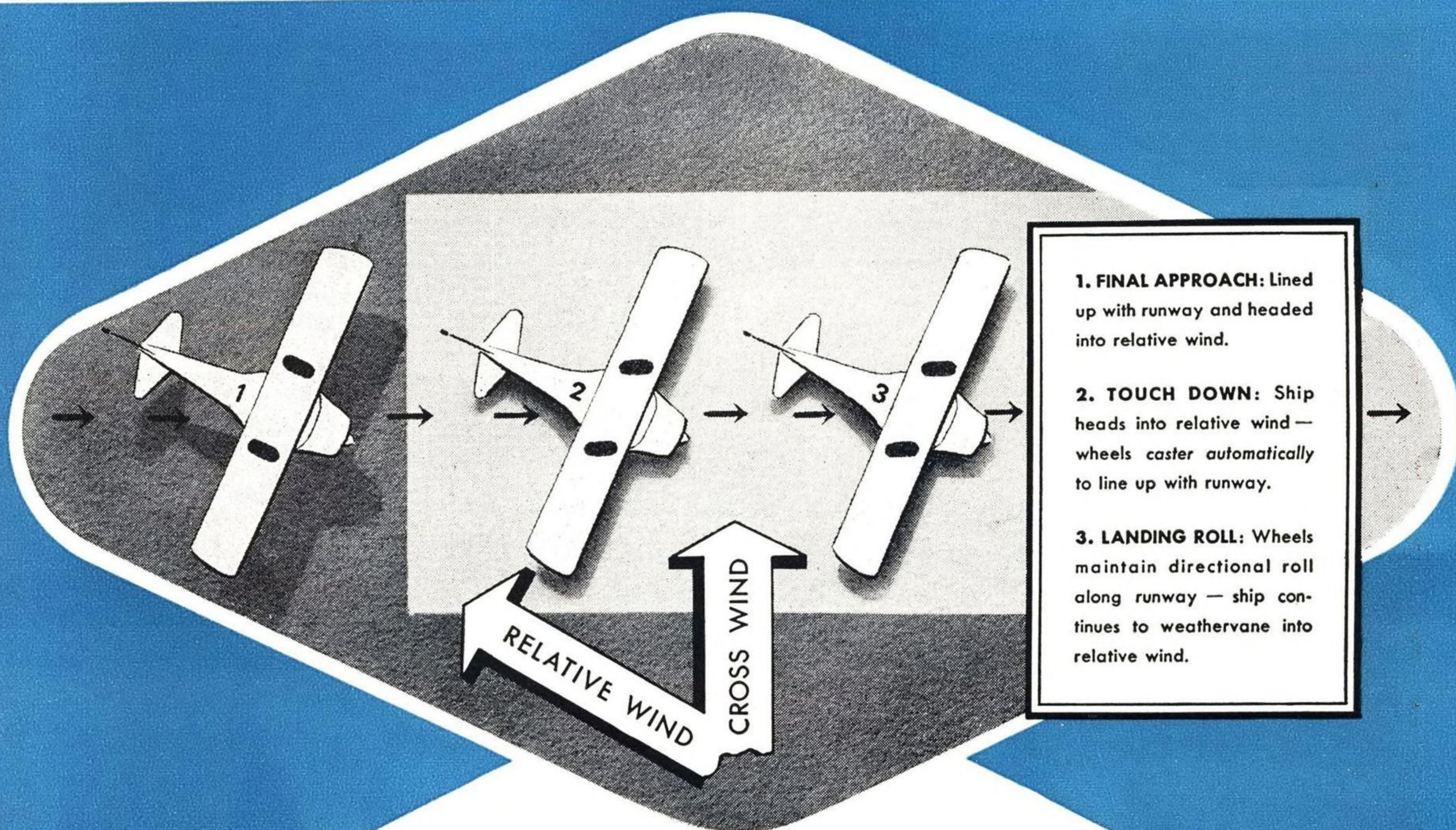


AVIATION WEEK

A MCGRAW-HILL PUBLICATION

JAN. 10, 1949



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—with the new Goodyear Cross-Wind Landing Wheel, now available for Stinson, Cessna and other ships. Developed for the C. A. A. by Goodyear, this revolutionary gear offers these major advantages: use of single-strip airports—more flying hours —flight training in less time, with

less damage to wing tips and props— increased revenue to flight-school operators. For complete information about the new Goodyear Cross-Wind Landing Wheel, write: Goodyear, Aviation Products Division, Akron 16, Ohio or Los Angeles 54, California.



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to merit continually
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aircraft industry
has placed in Honeywell
Aeronautical Controls.



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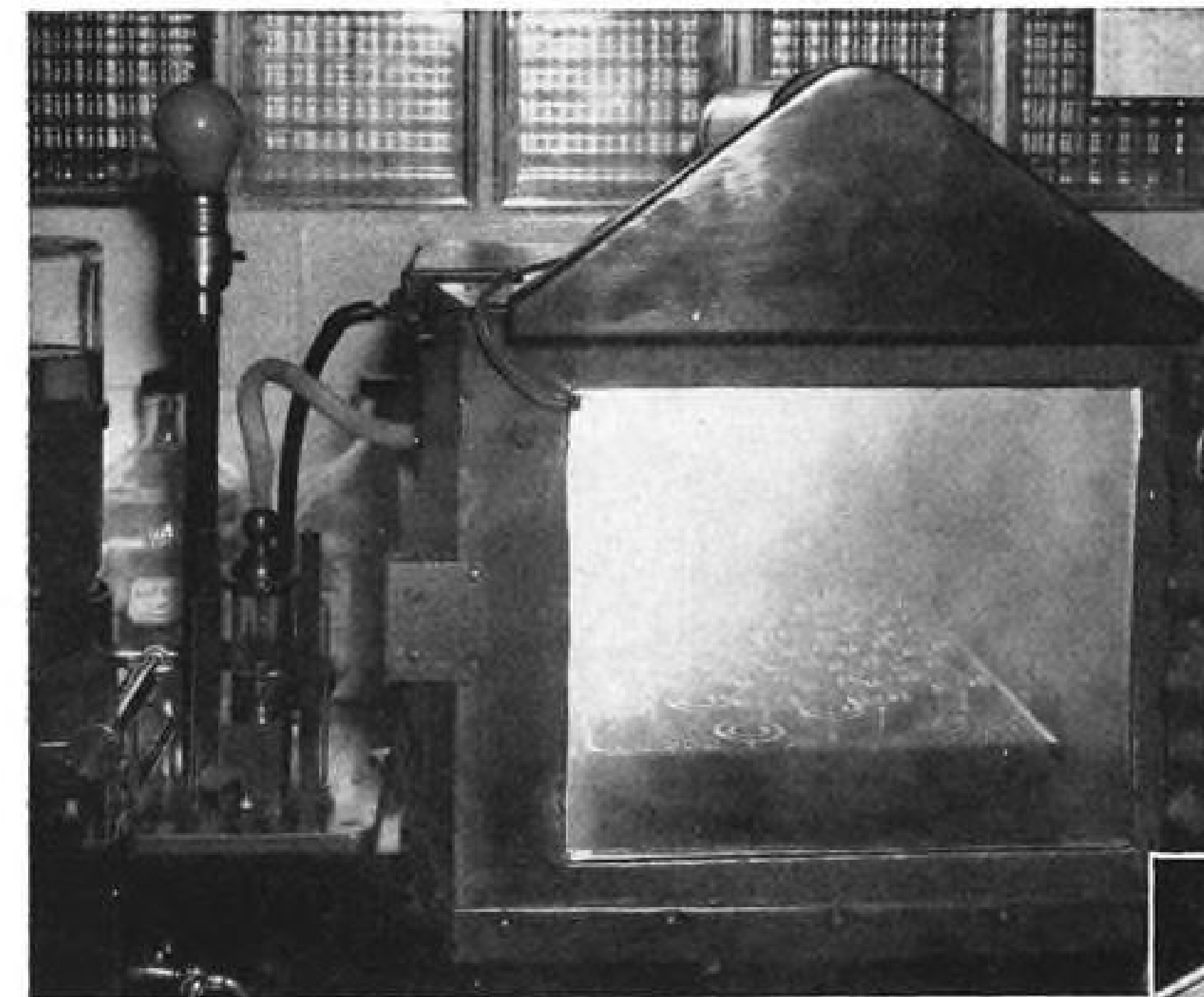


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It requires long experience and a vast fund of specialized knowledge to uniformly produce really good ball bearings. But it takes something more than these to progress—to produce bearings of ever greater merit. This “something” is typified by the collective mind at New Departure, which, never content with “good enough”, ceaselessly works to develop and improve—to make possible for tomorrow something even better than today’s best.



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Right: In clean, air conditioned rooms, bearings move from station to station under cellophane covers—are finally sealed in celluplastic containers—bare hands never touch them.



Above: Special electrical equipment developed by New Departure is used in constant research work directed toward the production of still better instrument bearings.

Right: Customer torque testing equipment—one of many different kinds of checking or testing devices in use verifying the outstanding uniformity of New Departure instrument bearings.



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AVIATION WEEK, January 10, 1949

AXELSON FIRST CHOICE



TOP FLIGHT

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FOR PRECISION AIRCRAFT PARTS

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Axelson is currently producing superchargers for cabin pressurization of the Douglas DC-6 airplane. Numerous Axelson experimental projects are under way, in design stage, production stage and on actual operating tests. Axelson engineering maintains constant research to provide more efficient equipment, combining economy with finest quality.



AXELSON

MANUFACTURING COMPANY

AIRCRAFT DIVISION

6160 South Boyle Ave.
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AVIATION WEEK

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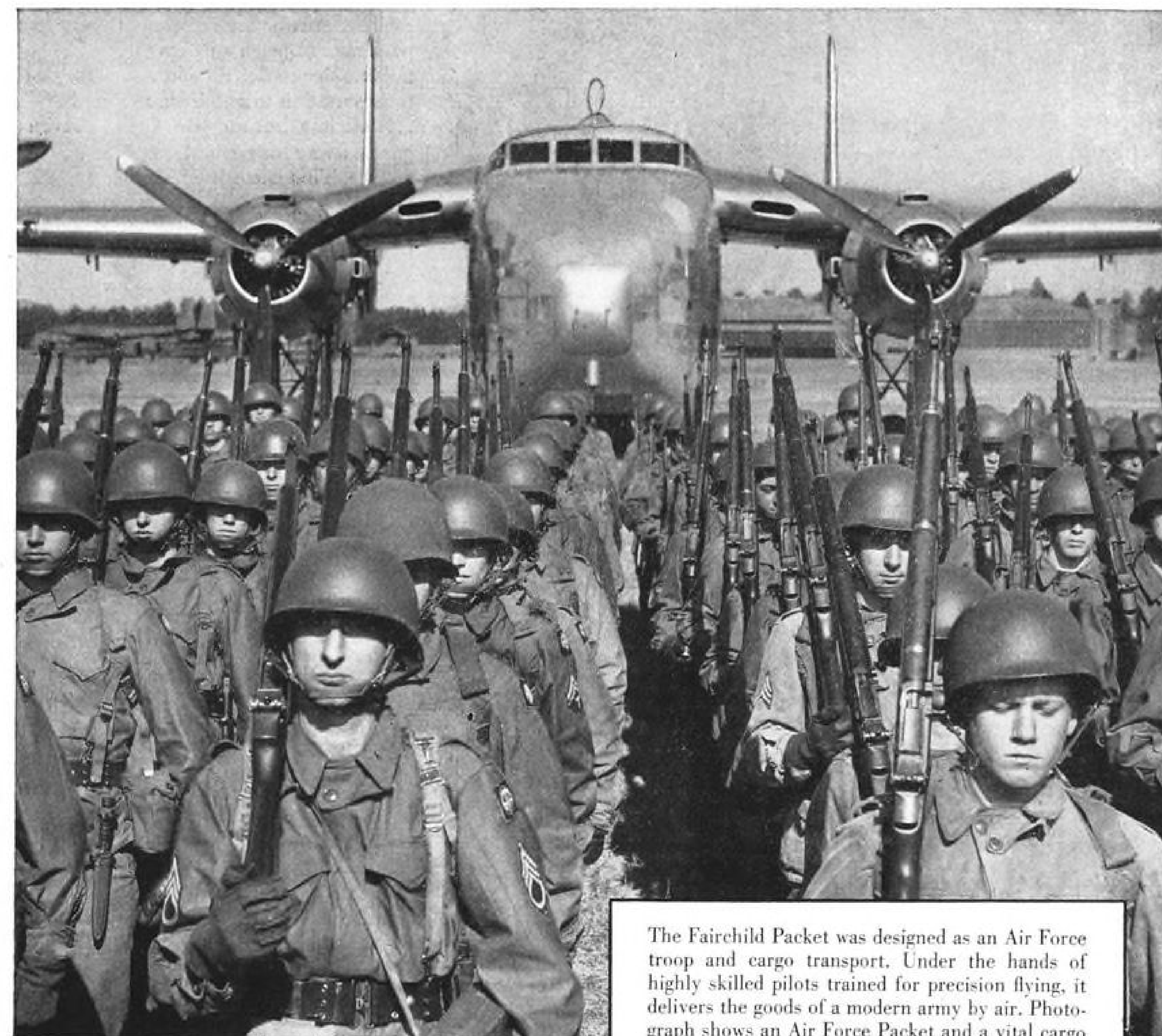
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The Fairchild Packet was designed as an Air Force troop and cargo transport. Under the hands of highly skilled pilots trained for precision flying, it delivers the goods of a modern army by air. Photograph shows an Air Force Packet and a vital cargo... men of America's new air transportable team.

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AVIATION WEEK, January 10, 1949

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And today's airline passenger enjoys a smoother, faster, safer, more comfortable trip because of developments of such companies as Sperry. Sperry has developed, engineered and flight-tested the instruments that help the airlines

maintain schedule reliability in all weathers . . . help build public confidence in commercial flying.

Sperry aeronautical products in use today on many airlines include the A-12 Gyropilot*, for smooth, level flight . . . the Automatic Approach Control, for landings in all kinds of weather . . . the Gyrosyn* Compass and other flight instruments giving accurate information on position and direction . . . the Engine Analyzer that detects, locates and identifies engine irregularities in flight, saving valuable time on the ground.

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AVIATION WEEK, January 10, 1949

NEWS SIDELIGHTS

Decentralized Grading

CAA's new policy to freeze positions vacated by resigning employees in order to effect the cut called for in the proposed reorganization, has brought a halt to the machine grading of pilot and mechanic examinations.

The two IBM grading machine operators in the Airman's Service examination section resigned recently and their posts have not been filled. Result may be to bring about additional "empire building" in the seven CAA regions, by eventually de-centralizing the grading system.

This would mean establishing regional examinations sections with a minimum of seven machines and seven operators to do the work which two machines and two operators have been doing under an efficient centralized setup in Washington. Eventual result would be seven regional sets of records, instead of one centralized set.

Chosen Instrument

Sen. Pat McCarran's (D., Nev.) drive in the new Congress for chosen instrument legislation is not expected to make much—if any—headway.

Sen. Edwin Johnson (D., Colo.), chairman of Senate Interstate and Foreign Commerce, the committee to which the bill will be referred for consideration, is one of the most vigorous opponents of the proposal on Capitol Hill. Johnson led the fight against the White-Brewster-McCarran-McMahon chosen instrument bill in 1946 and succeeded in getting it pigeon-holed in committee.

Berlin Supplemental

U.S. Air Force will ask Congress for a supplemental appropriation to cover costs of the Berlin airlift. USAF figures the first five months of the airlift from June 26 to Dec. 1 have cost it about \$73,000,000.

Of this total \$18,232,800 were in direct operating costs; \$25,169,500 in support operations; \$2,410,000 in crashed aircraft (six C-54s and 5 C-47s); \$6,185,100 in depreciation costs; and a \$21,032,300 reserve for terminating the operation.

USAF estimates that replacement of the cargo capacity of the lost aircraft would now be approximately 10 times the dollar figure charged to costs. The supplemental appropriation will include an item in excess of \$30-million for new cargo transports.

Procurement Board

Aircraft manufacturers have been watching anxiously for indications of what a small group of top USAF generals have been up to for the past two weeks.

Gens. Norstad, McNarney, Craig and Fairchild have been closeted in the Pentagon for top secret meetings during the holidays. The subject—aircraft procurement.

No Subcommittee

All aviation matters in the new Congress will be handled by the full membership of the Senate Interstate and Foreign Commerce Committee, according to its new chairman, Sen. Edwin Johnson (D., Colo.).

Johnson reported this to AVIATION WEEK to correct a misunderstanding resulting from a story appearing in another aviation publication to the effect that he would appoint an aviation subcommittee, and name Sen. Owen Brewster (R., Me.) its top-ranking Republican member.

Johnson said that he has "definitely" decided against a special aviation subcommittee. In the last Congress, a group headed by Brewster functioned as a regular aviation subcommittee, although it was never authorized as such by Sen. Wallace White (R., Me.), who was former chairman of the full committee.

New Crash Report

Civil Aeronautics Board report on the crash of a United Airlines DC-6 near Mt. Carmel, Pa., last spring will give another hotfoot to the Civil Aeronautics Administration on its aircraft inspection and safety administrative procedures.

Main cause of the crash will be credited to carbon dioxide asphyxiation of the pilot and copilot after they discharged their carbon dioxide fire-extinguishers in the forward baggage compartment.

Forrestal's Reverse

Washington observers have noted with interest Defense Secretary James Forrestal's request for additional powers to be vested in the Secretary of Defense. When Forrestal was Secretary of the Navy he vigorously opposed giving any

substantial powers to the new Secretary of Defense and was successful in persuading the last Congress to adopt his view.

Now after a year of trying to run the National Military Establishment under the plan he originally proposed Forrestal wants more authority. He did not, however, request the authority to hire the secretaries of the three services as he recently advocated in a ghost-written magazine article.

Skycoach Future

Potentialities of the skycoach in bringing air transportation within the reach of the average citizen's pocketbook have captured the imagination of Civil Aeronautics Board members. As a result, chances are very bright that the Board will approve additional proposals for genuine coach-type service.

This does not mean, however, that nonscheduled carriers which pioneered the low-cost operations will get early hearings on their bids for certificates. Big problem facing CAB in the skycoach picture is how to determine whether a proposed "coach-type" operation is just that and not a disguised move to cut rates. Differences in equipment, speed, time of departure, method of making reservations, meal service, and other factors will be analyzed by the Board in weighing future skycoach proposals.

Inaugural Flying

Washington's committee for the Presidential Inauguration last week went to nearby Virginia and Maryland private flying airports to arrange accommodations for a large number of private planes expected to come to Washington for the ceremony Jan. 20. Washington National Airport was to be restricted for scheduled airline and MATS flights. Meanwhile over \$200,000 in federal airport funds available for a close-in airport for small planes, within the District, was going begging. Maj. Gen. Ulysses S. Grant III, chairman of the National Capitol Park and Planning Commission, is blocking the use of the best available site, Kingman's Island, not far from the Capitol, on the Anacostia River, declaring it "unsuitable."

CAA officials and other Washington aviation interests however have pronounced the site well fitted for a close-in airstrip operation, which would greatly increase utility of small planes in the Capitol area.

AVIATION WEEK, January 10, 1949

AVITRUC aces *an ideal pair*



hase AIRCRAFT CO., Inc.
WEST TRENTON, NEW JERSEY



AVIATION CALENDAR

Jan. 10-11—National Aircraft Standards Council steering committee meeting, AIA offices, Hollywood, Calif.
Jan. 10-14—Materials Handling Show, sponsored by the American Society of Mechanical Engineers, Convention Hall, Phila.
Jan. 10-14—Society of Automotive Engineers, Annual Meeting and Engineering Display, Hotel Book-Cadillac, Detroit, Mich.
Jan. 11—ICAO Communications division, Montreal.
Jan. 12—SAE annual meeting dinner, Detroit Masonic Temple.
Jan. 12-14—Commercial Spray Operators conference, University of Illinois, Urbana, Ill.
Jan. 13-14—Fourth NAS Council meeting, AIA offices, Hollywood, Calif.
Jan. 13-14—National Aircraft Standards Council meeting, Los Angeles.
Jan. 18—January meeting, New York section, Institute of the Aeronautical Sciences, McGraw-Hill Building Auditorium, 330 W. 42nd St., New York.
Jan. 18-Feb. 11—Third Air Transportation Institute, American University, Washington, D. C.
Jan. 20-22—"Minute Plant" conference, Society for Advancement of Management (panel discussions on procurement program and industrial preparedness), Chicago.
Jan. 24—Honors Night dinner, Institute of the Aeronautical Sciences, Hotel Astor, New York City.
Jan. 24-27—IAS seventeenth annual meeting, Hotel Astor, New York City.
Jan. 27—Society of Automotive Engineers, metropolitan section, fuels and lubricants meeting, Engineering Societies Bldg., New York City.
Feb. 8—ICAO Operations division, Montreal.
Feb. 19-27—National Sportsmen's Show, Grand Central Palace, New York.
Feb. 22—ICAO Airworthiness division, Montreal.
Mar. 3—Society of Automotive Engineers, metropolitan section, air transport meeting, Engineering Societies Bldg., New York City.
Mar. 10-12—Annual meeting of American Society of Tool Engineers, Hotel William Penn, Pittsburgh.
Mar. 16—Annual national aircraft propulsion meeting, Hotel Carter, Cleveland, sponsored by IAS.
Apr. 3-6—American Association of Airport Executives, Oklahoma City.
Apr. 11-13—Society of Automotive Engineers national aeronautic and air transport meeting, Hotel New Yorker, New York.
Apr. 11-16—Western Metal Congress and Exposition, sponsored by American Society for Metals, Shrine Civic Auditorium, Los Angeles, Calif.
Apr. 22-24—Second Annual Oklahoma City Air Show, sponsored by Oklahoma City Chamber of Commerce.
May 2-4—2nd annual meeting of the Airport Operators Council, Denver.
May 23-24—Annual meeting of The Magnesium Assn., Edgewater Beach Hotel, Chicago.
July 3-4—First Annual Southern California International Air Race, Long Beach.
July 13—ICAO North Pacific regional air navigation meeting, Seattle.
Sept. 3-5—National Air Races, Cleveland.
Sept. 26-28—National Electronics Conference, Edgewater Beach Hotel, Chicago.

PICTURE CREDITS

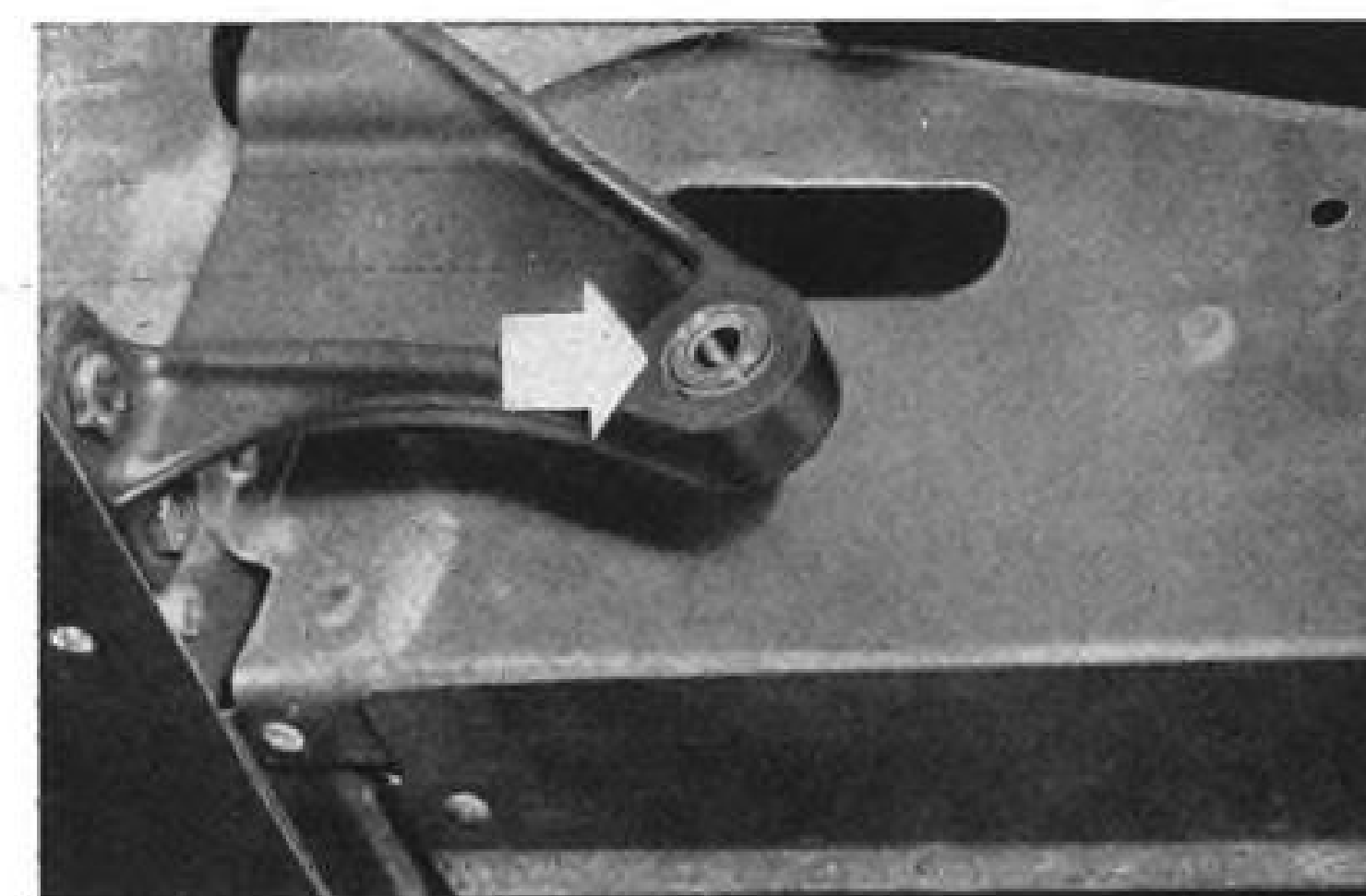
13—Convair; 14—Martin; 17—Fairchild; 20—Republic; 22, 28, 29—Boeing; 42—American Airlines.

AVIATION WEEK, January 10, 1949

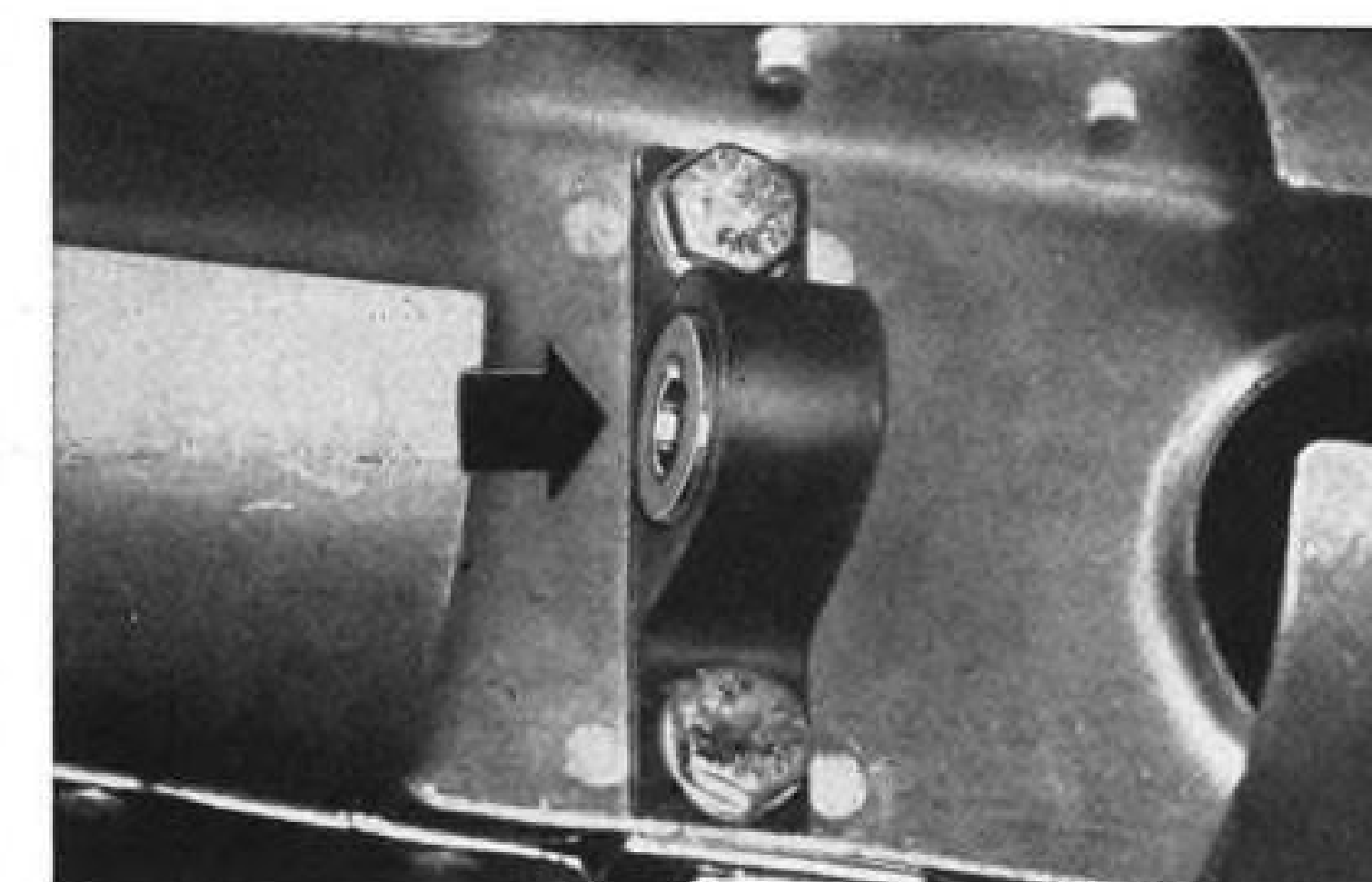


*"We Get Smoother Controls
and Lighter Construction
with Torrington Needle Bearings,"*

say Cessna Engineers



Keeping always as a goal top performance and low operating costs, engineers of Cessna Aircraft Company have spent months testing every part for safety and dependability. Extremely lightweight design with extra sturdiness called for Type AR Torrington Needle Bearings in such applications as the aileron hinge.



Exemplifying compact design is this close-up of one of the elevator hinges in the Cessna Model 190. "Here, as in the bell cranks, push-pull tubes and aileron hinges, Type AR Needle Bearings provide the ease and feel of operation so desirable in all aircraft manual control devices," states Tom Salter, Cessna's chief engineer.



"Torrington Needle Bearings also reduce friction in the control column to so low a coefficient that their use virtually eliminates wear," Mr. Salter continues. "The unit Needle Bearing AR assembly with retained inner race, permits prelubrication that lasts the ordinary service life of the plane."



Where loads are largely static, as in the tail wheel, above, the full complement of hardened rollers offers maximum bearing contact surface, and ample lubricant reserve to assure good lubrication. Torrington Type DC Needle Bearings provide high radial capacity, and easily handle the shock loads of landing.

The high capacity, small size and anti-friction efficiency of Torrington Needle Bearings can be used to improve your product, too. For complete engineering service, call or write the nearest Torrington office. THE TORRINGTON COMPANY, Torrington, Conn., South Bend 21, Ind. District Offices and Distributors in Principal Cities.

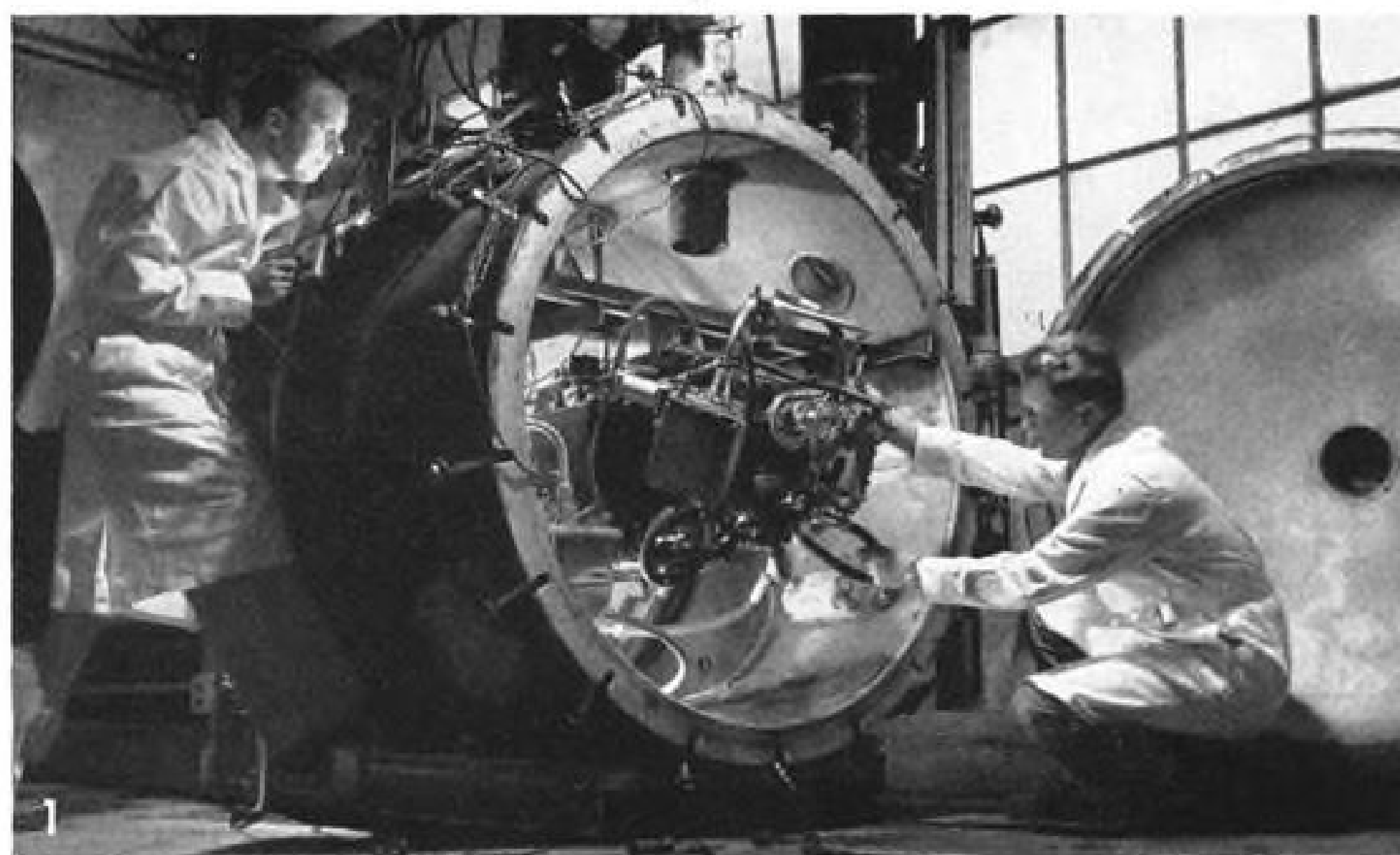


TORRINGTON NEEDLE BEARINGS

Needle • Spherical Roller • Straight Roller

Tapered Roller • Ball • Needle Rollers

AVIATION WEEK, January 10, 1949



Creative engineering at AiResearch



Meeting and solving the critical problems of high-altitude and high-speed flight has been the basic job of AiResearch for nearly a decade. As planes fly higher and faster, AiResearch engineers work constantly on equipment to compensate for the terrific heat, cold, and pressures encountered by the new super jets and giant transports.

1 AiResearch laboratory facilities include numerous atmosphere chambers where altitudes up to 70,000 feet can be simulated and temperatures dropped to -110° F. Here a cabin supercharger is being readied for a high-altitude test.

2 Many areas are restricted by the Army Air Force and Navy Bureau of Aeronautics. In this concrete blockhouse a new gas turbine for use as a self-starter for jet aircraft is being developed.

3 A new type AiResearch oil cooler for jet powered aircraft is about to be tested in a refrigerated wind tunnel at -35° F. AiResearch is currently producing 75 different heat exchanger assemblies in the oil-to-air, oil-to-fuel and air-to-air categories.

4 Here an air cooling turbine test setup is being made inside one of the many sound-proof test cells. AiResearch turbines are among the most efficient ever developed.

● AiResearch engineers, designers of rotors operating in excess of 100,000 r.p.m., invite your toughest problems involving high-speed wheels. Specialized experience is also available in creating compact turbines and compressors; actuators with high-speed rotors; air, gas and fluid heat exchangers; air pressure, temperature and other automatic controls.

Write: AiResearch Manufacturing Company
Los Angeles 45, California

AiResearch
DIVISION OF
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NEWS DIGEST

DOMESTIC

Howard Hughes called off sale of Hughes Tool Co., which owns controlling interest in TWA and Hughes Aircraft Co. Negotiations for the sale to a syndicate headed by a New York investment firm had been underway more than nine months.

Crash of an Air Charter Service DC-3 at Boeing Field, Seattle, killed 11 passengers and three crew members. Accident occurred on takeoff from icy runway during heavy fog. Of the 30 persons aboard, 16 survived.

Wesley B. Nyce, well-known aerobatic flyer, was killed in a crash at Pottstown, Pa., airport as he was practicing for an appearance at the Miami All-American Air Maneuvers.

New altitude record for gliders reportedly has been set by Paul McCready, national soaring champion, at Bishop, Calif. Altitude reached, subject to checking by National Aeronautics Assn., is set at above 27,000 ft.

FINANCIAL

North American Aviation, Inc. reports net income for year ended Sept. 30, 1948, of \$6,779,561, after taxes, on sales of \$94,782,739. In the preceding fiscal year, company showed loss of \$28,259 after carry-back tax credits of \$11,700,000. In the last quarter of the 1948 fiscal year, NAA deliveries spurted to \$54,732,695, more than double the value of shipments in the third quarter. Consequently, backlog fell from \$418,685,645 to \$380,307,078 as of Sept. 30.

Air Associates, Inc., reports profit for year ended Sept. 30 of \$75,355. This result was due to sale of Los Angeles plant at a profit of \$171,988. Without this non-recurring item, loss for year would have been \$96,633 on sales of \$5,965,917. Progress in restoring financial health of company was indicated by a second-half loss of about \$18,000, compared to first half deficit of more than \$78,000.

Texas Engineering & Mfg. Co. declared a 75-cent dividend per share of common stock, paid Dec. 30 to holders of record Dec. 20. It was first dividend of three-year-old company.

FOREIGN

British pilotless rocket-propelled miniature aircraft reportedly attained speed of 900 mph. in tests off Cornish coast. Craft used have 8-ft. wingspan.

India has signed bilateral air agreement with Ceylon, giving reciprocal rights between Bombay and Colombo and between Colombo and Trivandrum.

INDUSTRY OBSERVER

► Convair's experimental flying test model for the XP-92 supersonic fighter has made more than 30 test flights at the U. S. Air Force Muroc base. Convair test pilots made more than 20 flights before they were able to land the plane at less than 200 mph. So far no extremely high air speeds have been attempted with the experimental model. Convair plans to use the flying mockup to test various wing configurations and power plants for the final design of the XF-92.

► Chance Vought's twin-jet Cutlass (XF7U-1) has been hitting some high Mach numbers as its flight test program proceeds at Patuxent River, Md. Test pilots report good stability and control characteristics at relatively high Mach numbers. Increase in the Navy's order for 19 of the Chance Vought speedsters is already in the mill.

► North American has delivered its second XAJ-1 composite powered attack plane to the Navy. Both XAJ-1s are now flying at Muroc. The XAJ-1 is powered by two Pratt & Whitney Wasp Major reciprocating engines with an Allison jet engine in the fuselage.

► Convair set a new B-36 delivery record during December, rolling out 12 B-36Bs at its Fort Worth plant. Six of the giant bombers were delivered during November. The record December delivery brought Convair up to its schedule on the bomber and returned some 2000 special production workers to a regular five-day week. They had been working a 10-hr. shift and six-day week since early fall to bring the B-36 line back to schedule. The 7th Bomb Group of the Eighth Air Force has taken delivery on the 18 B-36Bs over to the 11th Bomb Group for training purposes. Both groups are based at Carswell Field across from the Convair plant.

► McDonnell is modifying its XF-85 jet parasite fighter to provide additional stability. The porcupine style tail that already had five vertical fins is acquiring several more fins to provide more control surface while still allowing the fighter to fit into the forward bomb bay of the Convair B-36Bs. Flight test program on McDonnell's XF-88 is continuing at Muroc with company test pilot Bob Edholm taking the sweptwing fighter up in 45-minute installments.

► United Helicopters, Inc. has started a nation-wide private demonstration tour of its "Hiller 360" helicopter, with Los Angeles the first port of call and New York and Washington on the eastern end of the extensive flight route. It is believed to be the first tour of such distance to be attempted by a commercial helicopter manufactured in sales promotion. Primary purpose is to give news, magazine and radio reporters opportunity to fly the copter and convince them of designer Stanley Hiller's claim that the 360 has "inherent stability" and can be flown with hands and feet off controls.

► Cal-Aero Technical Institute's single-place "baby jet" sport plane (Aviation Week, Oct. 25) should be ready for test flight next fall. A mockup now is under construction, and metal work on structural components will be under way before the end of this year.

► CAA-CAB contract to Flight Safety Foundation for investigating size of crew complement is only one aspect of a thorough FSF study of this subject. The Foundation recently completed for a group of airlines a report on what factors should be considered in determining size of the crew. CAA-CAB's report will tell how study of those factors should be made. A third, as yet uncontracted for, report would be the actual study of those factors.

► French are building a new swept-wing jet attack plane to be powered by a British Nene jet engine. Known as the Nord 2200 the new jet plane is 44 ft. long with a wingspan of 39 ft. French have also launched a new twin-engine seaplane, the Nord 1400, at Le Havre. It is a high-wing monoplane of about 22,000 lb. gross weight. Total of 25 are on order for French Navy as a patrol plane.

► Royal Air Force will soon award a contract for 500 new primary trainers. Competition is keen between Fairey Aviation Co. Ltd. with their two-seater Primer and deHavilland's Canadian-design Chipmunk. Fairey is building 10 Primers and deHavilland is working on five Chipmunks at their newly acquired Broughton plant.

Navy Revamps '49 Plane Buying Program

Vought Pirate and Martin Mauler dropped in revision; \$84,600,000 still available.

Navy has revised its current fiscal 1949 aircraft procurement program by eliminating the Vought F6U-1 Pirate jet fighter and the Martin AM-1 Mauler attack planes. The new program also adds 120 Vought F4U-5 Corsair, new helicopters and three anti-submarine warfare patrol aircraft.

The revised program does not complete the Navy fiscal 1949 procurement program, however, and Navy still has \$84,600,000 which is available for expenditure.

These additional funds are awaiting Presidential certification and will go for additional procurement of types already purchased, including more Grumman F9Fs, Vought F7Us, Lockheed P2V-4s and Douglas AD-3s and AD-4s, the latter three types powered by the Wright Turbo-Cyclone compound engine.

The revised program raises the total aircraft to be procured from 1165 to 1223, although the cancellation of plans for 80 aircraft in the process results in the addition of 137 previously unannounced new aircraft.

► **Pirate Delays**—Ultimate plans for the Vought F6U jet fighter remain unclear at the moment, although it is known that production delays occasioned by the transfer of Chance Vought manufacturing facilities to Texas together with difficulties in obtaining desired performance from the afterburner assembly have combined to delay the airplane more than one year behind original schedule. The afterburner installation has proved satisfactory in operation but its presence in the tailpipe when not in use adds internal drag and reduces the efficiency of the airplane turbojet installation. Previous directional stability and spin recovery difficulties have been solved by the addition of a large dorsal fin and the additional area of the afterburners.

Cancellation of the present F6U order does not seriously affect the outlook for Chance Vought, since the Navy is known to be extremely enthusiastic about the new F7U Cutlass (AVIATION WEEK, Nov. 29, 1948) and plans for

additional production beyond the 19 airplanes presently on order are in the mill. The Cutlass is not expected to be in production status until the spring of 1950.

► **Mauler Cancellation**—The Martin AM-1 Mauler contract cancellation follows extensive flight tests including recent carrier qualification trials aboard the U. S. S. Kearsage. Although earlier maneuverability problems, particularly a slow rate-of-roll, have been overcome by the use of small spoiler panels, the size and weight of the craft make future improvements in control dubious. Meanwhile, continued development of the Douglas AD Sky Raider into two and three-seat versions gives carrier air groups an attack plane with the performance and load-carrying ability of the huge Mauler at some 25 percent less power.

The new AD-3 and AD-4 versions will carry radar and radar countermeasure in addition to aircraft early warning operators.

Increased weight of the added crew members is accommodated by the Wright R-3350 compound engine, which provides 20 percent additional takeoff power and places the AD in the same power class as the AM with substantially less weight and consequently improved performance. Navy is buying a total of 356 Douglas ADs during fiscal 1949.

► **New Attack Plane**—Purchase of 28 North American AJ-1 combination reciprocating and turbojet engine attack plane gives the Navy the heaviest airplane ever assigned to tactical duty aboard an aircraft carrier. The jet engine will be used only for maximum performance conditions and will normally be shut down during the cruise portion of the mission.

Five additional patrol aircraft, beyond the 82 Lockheed P2V types already on order, include two specially-equipped Lockheed Constellation transports adapted for use as long-range seasearch and anti-submarine warfare types. The three remaining patrol craft are of a new type incorporating secret anti-submarine

warfare electronic and combat equipment. The Wright Turbo-Cyclone compound engine will be fitted to the P2V-4 to render the twin-engine patrol plane the longest-range aircraft in the navy.

► **Helicopter Plans**—Helicopter procurement has been revised with the original commitment for 19 Sikorsky HJs being cancelled and split up into additional Sikorsky HO3s, for use aboard battleships and cruisers, 9 Bell HTL training helicopters and 7 Piasecki HJP utility types, prototype of which is now undergoing flight test at Naval Air Test Center, Patuxent River, Md.

Procurement plans remaining unchanged over that announced last June include 317 Grumman F9Fs, 179 McDonnell F2Hs, 23 Grumman AFs, 19 Vought F7Us, 16 Lockheed TO (TF-80C) two-seat jet trainers, 6 Grumman JR2F-1s and the Goodyear "N-class" non-rigid airship.

► **More Corsairs**—Navy decision to buy 120 additional Vought F4U-5 Corsair reciprocating engine fighters exemplifies its cautious attitude towards the transition from piston to jet engine aircraft. While Navy favors the turbojet for fast-climbing, high-speed combat air patrol fighters, it does not yet believe that the jet is ready for long-range operations against shore-based installations and ground strafing of shore targets located several hundred miles away from the carrier.

Navy arrangements for procurement of 8 Fairchild R4Q-1 (C-119 Packet) transports through a transfer of funds to the Air Force continues in effect, cognizance of the Packet production being vested in the Air Force. Navy purchase of 16 Lockheed TF-80C two-seat jet trainers will augment the 50 F-80 single-seat trainers obtained last summer.

Although these final changes represent the latest Navy plans for aircraft procurement with fiscal 1949 funds, Navy points out that Congressional action on the fiscal 1950 budget request can force alterations in this program. For example, a slash in fiscal 1950 funds for such items as aircraft maintenance, carrier operation, shore based facilities, etc., would require a cutback in production plans for aircraft during the current year.

Forrestal Warns Of Schedule Lag

Warning that the aircraft industry is behind schedule in production of new planes to meet the requirements of the long-range expansion program of U. S. air power, was sounded by Defense Secretary James V. Forrestal in his first annual report on the National Military Establishment.

Forrestal's warning echoes an earlier note sounded last summer by Air Secretary W. Stuart Symington at the Aircraft Industries Assn. Board of Governors meeting which was held at Williamsburg, Va.

► **Weak Industry**—Forrestal blamed the sub-normal condition of the aircraft industry during the 2½ years after V-J Day for its current inability to meet production schedules. He pointed out that during this period the industry was forced to operate far below the minimum essential necessary for a healthy aircraft industry.

The provision of funds necessary to expand the aircraft industry by Congress last spring found the industry poorly prepared to cope with the multitude of expansion problems which presented themselves, Forrestal noted.

He listed as the most perplexing problems facing the industry:

1—Technical aspects of design and manufacture incident to the transition from conventionally powered planes to jet-type aircraft.

2—Limited availability of essential materials and components normally produced by suppliers outside the aircraft industry who have reconverted to other types of production since the end of the war.

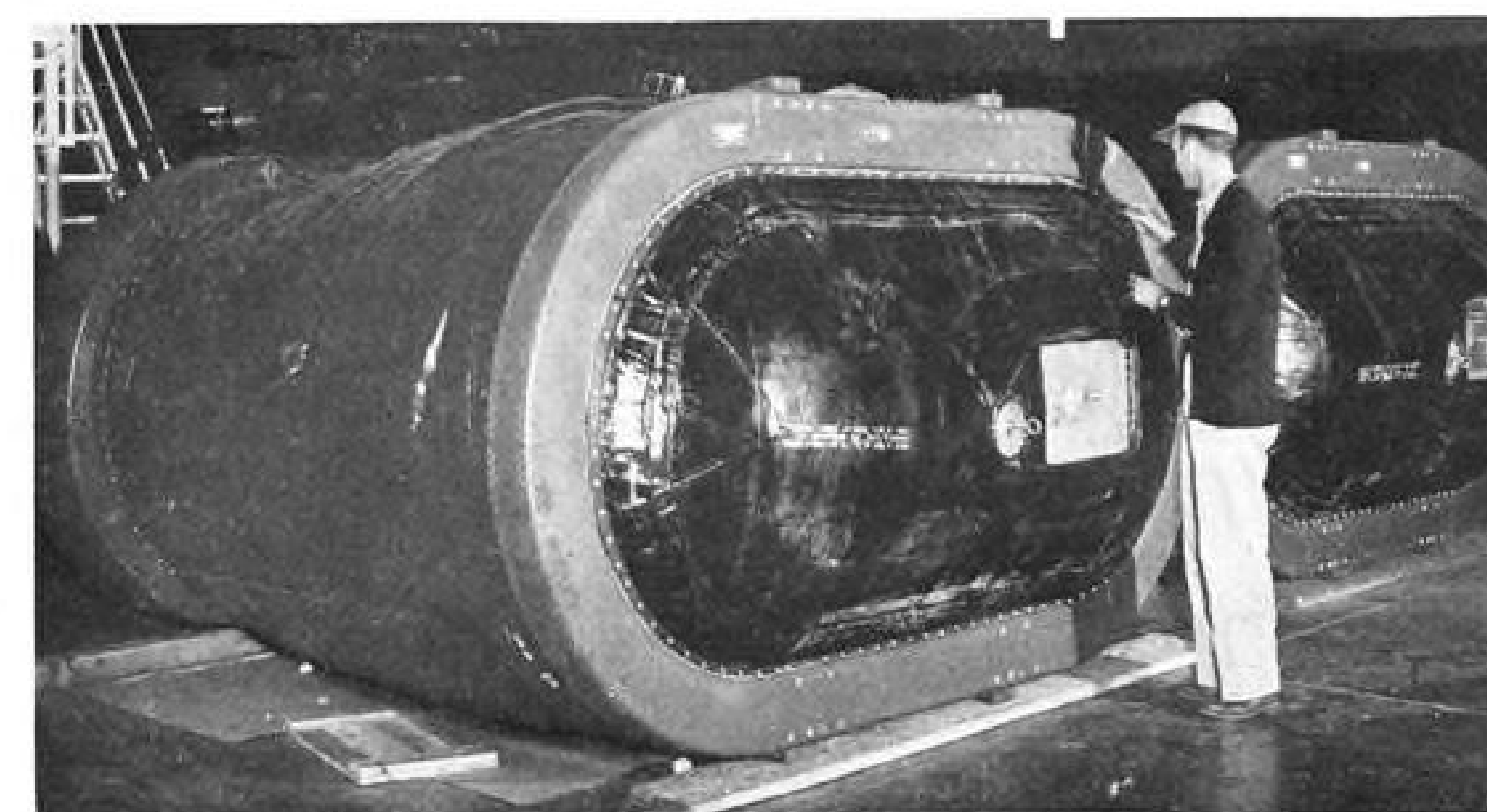
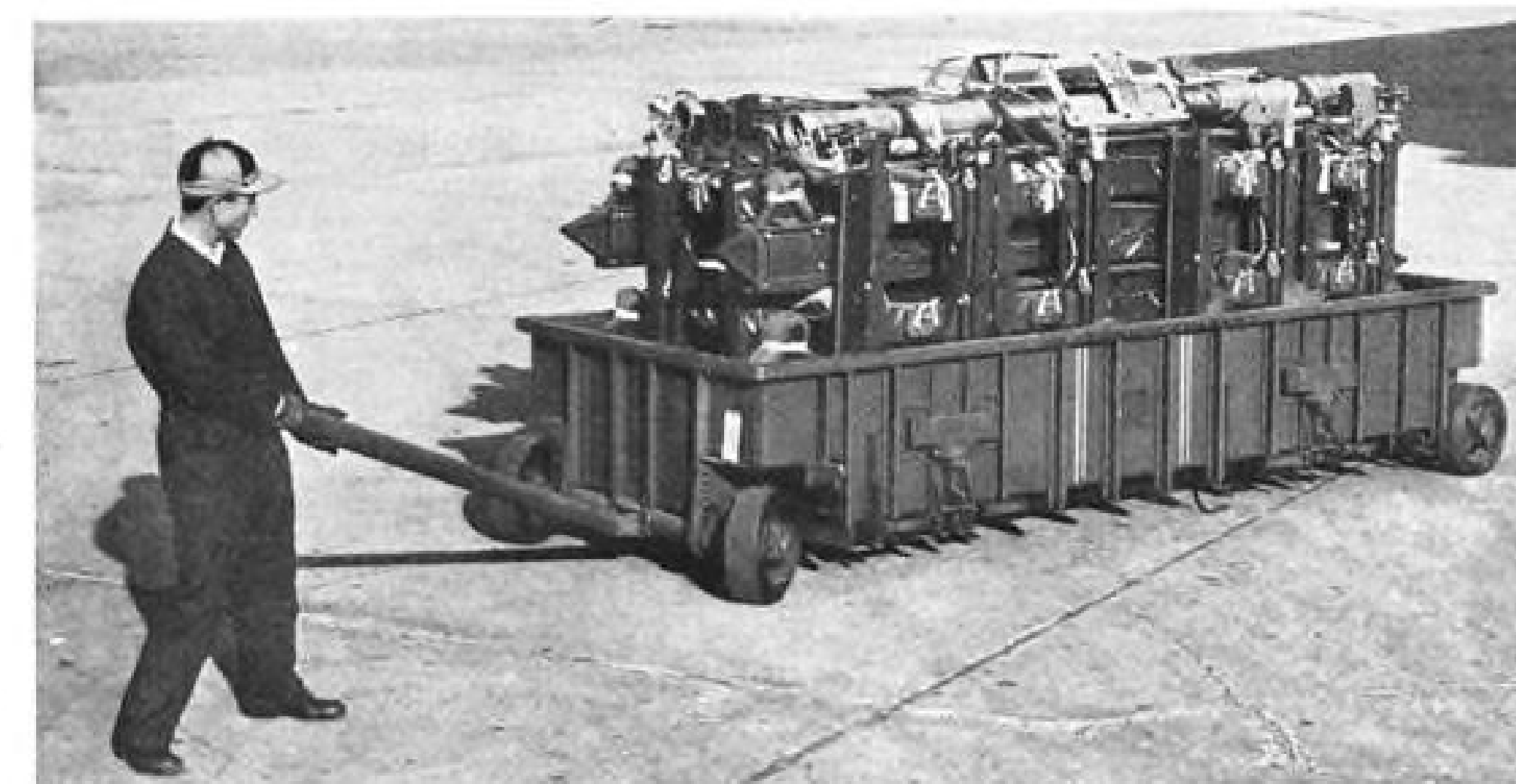
3—Manpower problems resulting from the necessity of rapid expansion during a period of full employment and rising wages and other costs.

"These problems are not insuperable but their solution requires intensive effort," Forrestal noted.

► **Strong Air Power**—Strong emphasis on the need for developing both strategic and tactical air power of the U. S. Air Force and Naval Aviation also featured the report.

Forrestal credited much of the current controversy between the Air Force and Naval Aviation to the fact that officers of these services have not had the opportunity to become familiar with the operations of their rival services. He indicated that leaders of both services still have considerable to learn regarding the capabilities and limitations of each other's weapons.

► **Roles Defined**—"Many officers in the Air Force honestly believe that the carrier will have a limited use in any war that we may fight in the future," Forrestal wrote, "and therefore chal-



NEW FEATURES OF CONVAIR B-36B

Convair's latest version of the B-36, long range bomber, features special conversion arrangements for operation as a flying tanker or cargo carrier. Six of the cargo carriers shown above can be carried in the B-36B bomb bay, giving the plane an 84,000 lb. cargo payload. The aluminum cargo carriers were specially designed by Convair's Fort

Worth staff to carry all maintenance, auxiliary and spare equipment used by the B-36. Built-in bomb bay winches hoist and lower the cargo carriers. The 3000 gal. self-sealing bomb bay gas tanks shown below are built by the Firestone Tire and Rubber Co. of Akron. Four can be carried in the B-36B bomb bay.

lenge the maintenance of important carrier task forces. These misgivings are honestly held, as undoubtedly are the Navy's regarding the capabilities of the long range bomber.

"My own view," Forrestal reported, "is that the concept of strategic air force has established itself as an essential part of modern warfare, although I believe the Air Force must see to it that its tactical air remains capable of close cooperation with ground troops.

"I likewise hold the view that Naval air will have a part to play in any war of the foreseeable future. The time may come when both the carrier and the long range bomber are obsolete weapons but that time has not yet arrived.

► **Toughest Job**—"Balancing the demands of these two aspects of air power and seeing to it that adequate funds are allocated to each is one of the most difficult tasks of the Secretary of Defense."

Forrestal repeated that the Air Force has been given full responsibility for

development of strategic air power while Naval aviation is responsible primarily for anti-submarine warfare. However he emphasized that the rapidly changing capabilities of aircraft and air defense weapons required a continuous re-evaluation of the roles assigned to each service.

Forrestal cited the participation of Naval and Marine aviators in the joint air-ground maneuvers of Operation Combine in Florida and the flights of Air Force pilots off Navy carriers during Atlantic Fleet maneuvers off Newfoundland during last fall as excellent examples of what was needed to develop better cooperation and understanding between the Navy and Air Force. He indicated that combination of primary flight training for both the Navy and Air Force would have important psychological advantages in promoting unified thinking in addition to its monetary economies.

Some action along this line is probable to go into effect during this year.

Boeing Busy

More C-97s are ordered;
Company extends B-47
subcontracting program.

Boeing Airplane Co. will get another U. S. Air Force order for 23 C-97A Stratofreighters at a cost of \$39,422,000.

Authority to accelerate the C-97 program was signed at Boeing's Seattle plant last week by Maj. Gen. K. B. Wolfe, director of procurement and industrial planning for the Air Materiel Command, after Presidential certification of the funds required.

USAF said the planes were ordered to meet increased attrition rate among its transport caused by the Berlin airlift. USAF exhausted its fiscal 1949 aircraft procurement funds with the allocations announced in AVIATION WEEK, Dec. 27. Money for the additional C-97As was obtained by dipping into funds previously earmarked for purchase of tooling, modifications and plant expansion.

Meanwhile Boeing delivered the last of its order for 10 YC-97s to USAF. Of these 10 planes the first six are powered by Wright R-3350 engines and the last four by Pratt & Whitney Wasp Majors. Boeing previously had a production order for 27 C-97As making a total of 50 now on order for USAF. All will have Wasp Major engines. Boeing expects to begin deliveries on this order by the middle of 1949 and hopes to hit a production rate of five per month. Total of 55 commercial transport versions of the C-97 are on order by U. S. and foreign airlines with deliveries expected to begin early this year.

Spreading the Work

Boeing will subcontract about 40 percent of its U. S. Air Force production order for 10 B-47, six jet sweptwing bombers.

The USAF contract will be for about \$39,000,000 with \$28,000,000 going to Boeing for the airframe and \$11,000,000 to General Electric and other contractors for engines and other government furnished equipment.

► **Basic Subcontracts**—Basic airframe subcontracts have already been awarded Bell Aircraft Corp. of Buffalo, Curtiss-Wright Corp. Airplane division at Columbus, Ohio, and the Glenn L. Martin Co. of Baltimore.

Bell gets the largest subcontract with a \$7,575,072 order for engine nacelles, horizontal stabilizers and elevators. Curtiss-Wright will build ailerons and flaps under a \$1,353,424 contract. Martin has a contract for \$1,081,569.97 for

dorsal fins, vertical fins and rudders.

All of the subassemblies will be shipped to Boeing's Wichita plants where B-47 production is now in its preliminary stages. The B-47 production program is now planned as a five year program by USAF with a large increase in the B-47 order already earmarked in the fiscal 1950 budget.

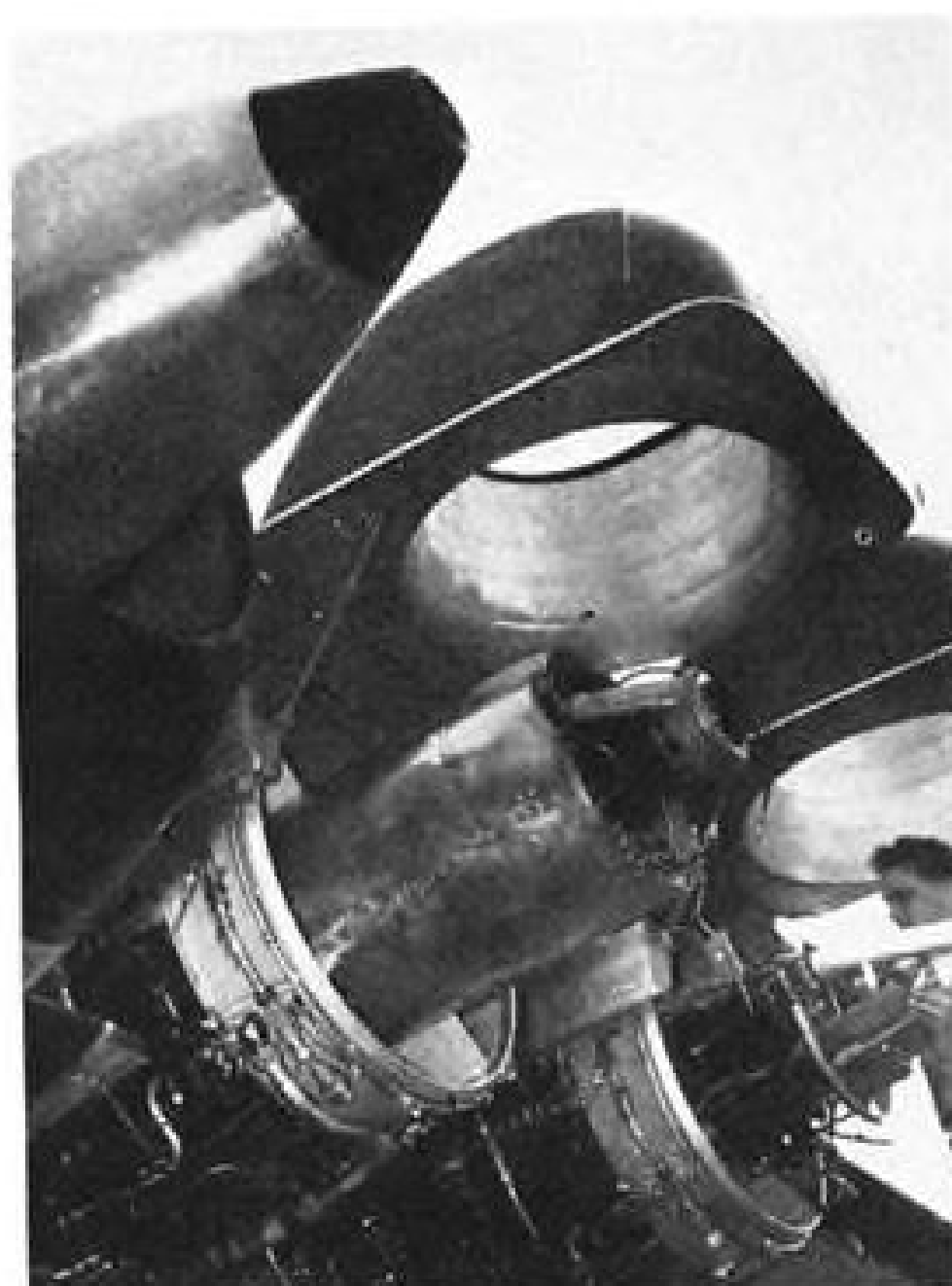
Cargo Craft Get Solon Priority

Legislation authorizing a gigantic—probably \$500 million—program to build up the United States' fleet of cargo aircraft is high on the priority list of the Senate Interstate and Foreign Commerce Committee, according to the committee's new chairman, Sen. Edwin Johnson (D. Colo.).

Bills being readied for introduction by Johnson and Rep. John Kennedy (D., Mass.) had three common objectives: to furnish a national defense backlog of cargo planes, promote air commerce, and stimulate the aircraft manufacturing industry.

► **Backstage Fight**—Spirited backstage fight was underway over methods. Two basic points in controversy were whether the program should be under civilian or military control and whether it should be directed at promoting scheduled airline operations or competitive nonscheduled operations.

Kennedy is lined up on the side of a civilian-controlled program aimed at stimulating nonscheduled operations.



MARTIN JET INSTALLATION

Details of how three General Electric-Allison TG-180 jet engines are installed in each wing of the Glenn L. Martin Co. XB-48 bomber is shown here for the first time. Streamlined engine cowlings can be raised to permit easy access to the engines for inspection. Two XB-48s are now at Wright-Patterson Air Base for flight testing.

Johnson is on the other side, "tentatively" in favor of a military-controlled program benefiting only certificated airlines.

► **Bill Highlights**—Following are highlights of bills being drafted by Johnson and Kennedy—some details of which may be changed before introduction.

• **Air Cargo Corporation.** Both measures would set up an independent government corporation to finance the development, production, and purchase of cargo craft. Under Kennedy's measure, the corporation would have a \$500 million capitalization furnished from the federal treasury. Johnson's measure would provide a \$100 million capitalization, to be obtained through loans from the Reconstruction Finance Corp. (Johnson told AVIATION WEEK that he wanted to "start low", but felt that hearings would probably point to the need for capitalization "nearer the \$500 million neighborhood.")

• **Management.** Under the Kennedy bill, the corporation would be headed by five presidentially-appointed civilians serving as \$15,000-a-year directors. The directors would appoint a seven-member industry advisory board to assist with the program. The Johnson proposal, on the other hand, would keep the program under the thumb of the military by having the corporation headed by the Secretary for Air and giving him authority to appoint five \$12,000-a-year directors. There would be no industry advisory board.

• **Leasing.** Both bills would underwrite a policy of heavy government subsidization for the development of a national air cargo fleet by authorizing the corporation to lease planes under extremely easy terms, reimbursing the government only a small part of its investment. Under Kennedy's measure, the corporation would be directed to encourage plane leases to nonscheduled operators (and even operators newly-organized to utilize the government planes under easy leases) as well as certificated airlines. Johnson's measure would restrict leasing to the airlines.

► **Favor Government Role**—Kennedy and Johnson are both strongly in favor of a government purchasing and leasing program. This would permit aircraft manufacturers to sell existing cargo types to the government, as well as new types developed under the program, and eliminate their main objection to the Brewster-Hinshaw bill of the last Congress. The Brewster-Hinshaw measure authorized the government to finance prototype costs on new transport and cargo types, but made no provision for government purchasing or leasing. Some manufacturers feared that under this program airlines would forego purchases of types now on the market, awaiting the arrival of new government-subsidized types.

New Contract Rules Will Appear Soon

Manufacturers of military aircraft, notified last July that all contracts for military planes would contain a renegotiation clause, will get their first look at the new regulations shortly.

The National Military Establishment has released the first two parts of the full eight-part text. These point out that contractors are subject to renegotiation when total sales to the government in any year exceed \$100,000. Only contracts of \$1000 or more are renegotiable, regardless of the number of contracts held or the total they all constitute. Several types of contract are exempted by the regulations, regardless of cost.

► **Deductions Allowed**—In the first section released (part 421), the authority and organization of the Renegotiation Act of 1948 are reviewed. One section in this part is devoted to the determination of excessive profits, and provides that items allowable as deductions or exclusions for federal income tax purposes will be allowed to the extent allocable to renegotiable business.

The second section (part 422) deals with procedures. This states that, among other things, no renegotiations will be conducted with any contractor or subcontractor until an assignment has been made by the policy and review board. Renegotiation assignments ordinarily will be made to the division of the military having predominant interest. Under this section the contractor is provided right of review by the Military Renegotiation Policy and Review Board in case of disagreement with a department. He may also appeal to the Tax Court of the United States.

Six more parts are to be issued in the future. The first two can be found in the Federal Register of Dec. 29, obtainable from the Superintendent of Documents, Government Printing Office, Washington 25, D. C.

Approval Sought For Navigation Aids

International approval of the United States interim all-weather airways program will be at stake during the International Civil Aviation Organization communications division meeting underway last week at Montreal.

The U. S. delegation headed by Capt. Charles Horne, USN, and now special assistant to Delos W. Rentzel, will seek international approval for the omni-range and distance measuring equipment as the standard short range navigation aids.

At the last ICAO session the British were the main opponents of the omni-range but there are indications that they will swing into line behind the omni-

range during the present session and abandon their advocacy of the GEE system now in use in England.

Other developments in air navigation last week:

• **Award of a CAA contract** to General Electric for construction of 27 search radar for traffic control at U. S. civil airports. Contract totals \$2,840,427.

• **Postponement of a contract award** on precision beam landing radar (GCA) until next July. Bendix Radio of Baltimore was the low bidder in the CAA competition last fall but CAA deferred procurement until next July when larger quantities can be purchased with fiscal 1950 money.

• **Approval of distance measuring equipment** specifications by the Air Coordinating Committee Nav Panel and the Air Navigation Development Board. The DME specifications were prepared by RTCA Special Committee No. 40 and call for the use of a 2½ megacycle frequency band with crystal control plus coding within the frequencies to obtain the 100 different channels required. The SC-40 report utilizes features from two types of development DME models made by the Federal Telecommunications Laboratories and the Hazeltine Electronics Corp.

Final production specifications for DME ground and airborne equipment will be drawn by the Air Force, Navy and CAA to meet their individual needs but all conforming to the basic technical requirements of the SC-40 report.

Air Navigation Development Board expects to complete its technical staff of five electronic engineers next week by the time Dr. Douglas Ewing, ANDB technical director, assumes his new post in Washington.

House Gets Bill On 70 Groups

Two proposals were in the legislative mill last week to establish the legal size of the U. S. Air Force and authorize the number of aircraft it can maintain and procure.

Rep. Carl Vinson (D., Ga.) chairman of the House Military Affairs Committee, introduced a bill calling for a permanent 70-Group regular Air Force with a personnel strength of 502,000; an aircraft strength of 24,000; and an annual aircraft procurement of 5200 planes totalling 85,000,000 airframe lb.

► **Forrestal Bill**—Meanwhile the National Military Establishment was preparing a legislative recommendation to implement Defense Secretary Forrestal's request that the Air Force be given legal status commensurate with that of the Army and Navy. This proposed legislation was still in Forrestal's office and there was no indication as to whether it will conform with the 70-Group program sponsored by Vinson. Forrestal last year opposed the Air Force 70-Group program.

Another measure introduced by Vinson would raise a new hurdle for Naval plans for expansion of carrier-based aviation by requiring Congressional authorization for the building of any vessel of more than 45,000 tons. The Navy's new super-carrier prototype is 65,000 tons.

Other bills, many of them measures on which action was not completed by the last Congress, introduced at the opening session of the House:

• **Air warning network**, programmed and operated by the Air Force, would

Canadian Production of U.S. Craft

Canadian and United States aircraft manufacturing officials are due to meet shortly to conduct final negotiations on whether U. S. Air Force tactical aircraft will be licensed for production in Canada.

So far the Canadians have indicated they wish to manufacture the North American F-86A, fastest jet fighter now in service with the USAF, and the Fairchild Packet (C-82) military transport. There are indications that they will also seek manufacturing rights for the North American F-93, a greatly improved version of the F-86A; and the Fairchild C-119, an improved version of the C-82; the C-120, a detachable fuselage transport, and the tractor landing gear developed by Fairchild.

► **Canadian Deal**—Canadair Ltd. of Montreal is seeking the licensing agreement with Fairchild. Canadair has been producing its own versions of the DC-4

and DC-6 under a licensing agreement with Douglas Aircraft Co. and using British built Merlin engines. British engines would also be used to power the proposed Canadair versions of the Packet series.

DeHavilland aircraft of Toronto is scheduled for Canadian F-86A production if negotiations with North American are successful. DeHavilland recently completed assembly of 85 Vampire jet fighters for the Royal Canadian Air Force and is now manufacturing only Chipmunk trainers and Beaver, bush transports.

Both the proposed F-86A and C-82 agreements would give the Canadian firms the right to sell these models in other British dominions such as South Africa, Australia, and England and would exclude them from competition with the American-built models in other export markets.

be authorized by another Vinson bill.

- **National Science Foundation** to promote basic research in national defense and other scientific fields is proposed in bills introduced by Rep. Percy Priest (D., Tenn.), Rep. Charles Wolverton (R., N. J.), Rep. Oren Harris (D., Ark.), and Rep. Emanuel Celler (D., N. Y.). Similar legislation has been passed by the House and Senate several times over the past few years, but died because of controversy over details. Early Congressional approval this year, however, is expected. Sen. Elbert Thomas (D., Utah), new chairman of the Senate Labor and Public Welfare Committee plans to have his group act on it during the first weeks of the session.

- **Air Force Academy** is authorized in bills introduced by Rep. Gordon McDonough (R., Calif.), Rep. Paul Kilday (D., Tex.), and Rep. George Christopher (D., Mo.). Kilday's measure stipulates its location at Randolph Field, Tex.

- **Sea-Air.** Doors would be opened to air transport operations by steamship lines under a measure proposed by Rep. Emanuel Celler (D., N. Y.).

- **Prototype program.** Rep. Carl Hinshaw (R., Calif.) re-introduced his bill authorizing a civil air transport evaluation and development board—composed of representatives of the Air Force, Navy, Civil Aeronautics Board, Civil Aeronautics Administration, and National Advisory Committee for Aeronautics—to finance development costs on commercial cargo and transport aircraft.

- **Customs compensation.** Airlines would be relieved from assuming the over-time expenses of customs employees under another measure introduced by Hinshaw.

- **Department of Transportation** would be established under a bill introduced by Rep. Karl Stefan (R., Neb.).

- **NACA** would be authorized ten additional \$15,000-a-year professional and scientific personnel under a measure introduced by Rep. John Lyle (D., Tex.).

ECA Aviation Aid Totals \$33.5 Million

ECA dollars for aircraft and aviation equipment totaled over \$33.5 million on Jan. 3—more than double the Nov. 4 figure of \$13.6 million. Of the \$19.9 million authorized for November and December, \$6.4 million are in the form of reimbursements for material already delivered. The rest is for aircraft, parts, accessories and ground handling equipment scheduled for delivery over the next six months. These orders are being placed now or will be placed in the near future.

November also saw four new countries added to the list of those getting U. S. recovery money for their airlines.

They are Italy, Belgium, Sweden, and Ireland.

- **Italy Largest Share**—Italy boasts the biggest single aviation procurement authorization to date, \$5.5 million. Reports are that some of this money will be used to buy Lockheed Constellations which may be the first step in realization of Italian postwar dreams of an overseas airline to South America. Rest of the money is for maintenance (parts and accessories) of Italian airlines now operating DC-3s within Italy and between Europe and the Near East.

- **Belgium** came in for \$1.6 million for planes and equipment already delivered to Sabena.

- **Sweden's share** is \$1.3 million—to be used to pay for parts and accessories for SAS. This also is reimbursement, and some of it probably goes back to an original SAS order for 17 DC-6s, four of which were resold to Australia and the rest of which have been delivered to Denmark, Norway, and Sweden.

- **Irish Buy Parts**—Ireland received \$265,360, another reimbursement, for parts and equipment bought by member airlines of the Irish holding company, Aer Rianta Teoranta. Early in November, Ireland was scheduled for an additional \$35,000 for aviation material to be bought in Canada, but this was subsequently cancelled.

- **American Airlines** is scheduled to get a share of the \$10.7 million December-November aviation authorizations for France. Plans are for Air France to buy ten of American's DC-4s. Other U. S. suppliers will be Lockheed, Douglas, Pratt and Whitney, Wright, and commercial surplus property dealers. French overseas territories also come in for \$1.5 million for aircraft and equipment. None of the money for this period was authorized for purchases outside the U. S.

- **Netherlands** gets \$3 million for DC-3s and DC-6s already purchased and brings the country total to \$10 million in ECA aviation aid, second only to France in total aviation grants to date.

- **Other totals** to date: Norway, \$1.3 million; Denmark, \$0.8 million; Greece, \$480,000; French North Africa, \$10,000; Iceland, \$15,000.

- **First specific order** received by U. S. aviation equipment suppliers to appear on ECA's commodity suppliers' list went to United Aircraft Export Corp., East Hartford, Conn.

RFC Foreclosure

Reconstruction Finance Corp. has announced foreclosure action on a \$2 million loan to the Warren McArthur Co., New York manufacturer of airplane seats. RFC officials said the firm was delinquent on repayments, and showed no hope of being able to meet its obligations.

Senate Approval Seen For Mortgage Proposal

An important step has been taken in Washington to improve airline chances for credit financing by banking institutions.

A conference, attended by representatives of the State Department, Civil Aeronautics Board, International Air Transport Assn., Air Transport Assn., American Bar Assn., and banking houses, agreed that the proposal of the International Mortgage Conference, held earlier this year at Geneva, should be recommended for Senate ratification.

The proposal lays down the legal rights of owners of aircraft operating internationally. At present, there is no international law to protect the owner of aircraft seized by a foreign power, and nations theoretically, at least, have a free hand to make attachments on foreign planes. The fact that mortgagees of U. S. aircraft have no ownership rights recognized by foreign governments has resulted in reluctance by financial houses to extend credit for purchases of aircraft, which could be arbitrarily attached by foreign nations. The International Mortgage Conference proposal, spelling out the rights of mortgagees, as well as the holders of aircraft, it is believed in airline circles, would facilitate airline financing.

The unanimous concurrence of interested parties in the proposal indicates that Senate ratification will be only routine. Of the 33 nations attending the Geneva meeting, 20 have signed the proposal, but as yet, it has not been ratified by any nation.

CAA Change

Phillips Moore, former CAA airport engineering service director, has been promoted to assistant administrator in charge of airports, by CAA Administrator Del Rentzel. Edgar N. Smith, who has been acting assistant administrator, returns to the post of deputy airports administrator.

Moore is a civil engineering graduate of Alabama Polytechnic Institute, and has been with CAA and its predecessor, the Bureau of Air Commerce, since 1933. Previously he was with American Telephone and Telegraph Co. and the Georgia Highway Department.

Unofficial reports that Howard Rough, assistant administrator for field operations until that office was recently abolished, would take over a similar level post combining operations and state relations were described as premature by a CAA spokesman. He said final decision on Rough's appointment had not yet been made. Rough has been attached to Rentzel's office since abolition of the field operations post.

Monarch Certificate Extended One Year

Monarch Air Lines has won a year's extension of its feeder certificate on the basis of continually improving operating results and the likelihood of further advances in the future.

CAB's decision to maintain MAL's Rocky Mountain services at least through Mar. 30, 1950, paralleled similar Board action recently which extended Challenger Airlines' certificate for a year (AVIATION WEEK, Nov. 29). Both certificates were issued in March, 1946, and would have expired next Mar. 30 had the extension not been granted. Based at Denver, Monarch operates west to Salt Lake City and south to Albuquerque, N. Mex.

- **Activities Combined**—During the first half of 1948, Monarch and Challenger, which have common terminals at Denver and Salt Lake City, consolidated traffic, sales, station, advertising, maintenance, overhaul and engineering activities. In giving Monarch a longer lease on life, CAB said the cooperative arrangements should result in lower expenses for both companies.

- **Monarch's DC-3 passenger loads** during the 12-month period ended Aug. 31 averaged 3.9 a revenue plane mile—about the same as Challenger's. For the year ending Sept. 30, 1949, MAL estimates it will have nonmail revenues of \$626,575 (37.72 cents a mile), operating expenses of \$1,793,340 (97.29 cents a mile), break-even mail pay need of \$1,166,765 (59.97 cents a mile) and an average passenger load of 6.35 per mile.

As of Oct. 5, 1948, Monarch was indebted to its president, Harold S. Darr, for \$382,000 advanced to meet current obligations during past periods. Darr owns about 54 percent of Monarch's outstanding stock.

Project Privately Backed

Work on a slow-flying experimental plane design by Prof. Otto Koppen, aeronautics professor at Massachusetts Institute of Technology (AVIATION WEEK, Dec. 27), is being carried on as a private venture.

Koppen's slow-flight design is an independent development which preceded existence of the Aeronautical Research Foundation at Boston, and still is being explored independently with private backing. The Foundation has no connection with the project, says Lynn L. Bollinger, executive director.

Prof. Koppen, however, was associated with the Aeronautical Research Foundation in its NACA-sponsored quiet airplane development project.

Rocket Course

A new course called "Rocket Flight Theory" will be offered in February by the graduate division of New York University College of Engineering.

It will cover motion equations of the rocket, motion during and after burning, boundary conditions and properties of pertinent mathematical functions.

Course will be given by G. L. Gross, adjunct professor of aeronautical engineering at the College of Engineering. Gross is also associated with Grumman Aircraft Engineering Corp.

\$815 Million Program For Aussie Defense

Australia will spend \$815 million during the next five years to boost its defenses. The amount will be about equally split among the three services—Army, Navy and Air Force.

It is officially stated that the Royal Australian Air Force is rapidly approaching its approved postwar strength. But even when it touches this target, it will consist of only 3243 men and 144 aircraft. This force will be divided into two components, a home defense force of 54 aircraft and 1182 men and a task force of 2061 men and 90 aircraft.

- **Lineup**—The home defense force will consist of four fighter squadrons of eight aircraft each, one bomber squadron of eight aircraft, one target-towing squadron of eight aircraft and one air-sea rescue squadron of six aircraft.

The task force that would be available for overseas operations will consist of two fighter squadrons of 16 aircraft each, three bomber squadrons of eight aircraft each, one technical reconnaissance squadron of eight aircraft, two transport squadrons of eight aircraft each and one survey squadron of eight aircraft.

Besides, there will be a reserve of 439 operational and 698 training planes of World War II vintage.

Under present plans, the total available combat strength would be only 86 planes. Even if rescue and reconnaissance squadrons are included in the tabulation, the force would comprise only 111 aircraft.



PACKET MOUNTS WINGTIP RADOME

Bulge on the Fairchild C-119 wingtip is not a fuel tank but a radio-radar antenna housing. Removal of the equipment to the wingtip saves valuable space in the fuselage. The dome contains antenna for air-ground com-

munication, aircraft detection and ground search equipment. Equipment weighs about 200 lb. and this weight is balanced by standard radio equipment mounted in the other wing. The radio-radar antenna hous-

ing on the wingtip will also be used on the Fairchild C-120 "Pack Plane." This structural change was mandatory due to the detachable fuselage "pod" design of this unique new cargo aircraft.

PRODUCTION

Metal Outlook

Aluminum firm official warns industry against mandatory allocations.

The aircraft industry, already warned that it faces a shortage of aluminum this year, is advised by the top economist of one of the nation's leading aluminum manufacturers not to seek government allocations to get a better flow of the metal.

Informal suggestion made in Washington for mandatory allocation of aluminum to aid the aircraft industry (AVIATION WEEK, Dec. 27), "ignores the long-range interests of the plane makers," in the opinion of Irving Lipkowitz, director, economic research department, Reynolds Metals Co.

"If we start this early with top priorities and allocations to meet aircraft requirements," Lipkowitz says, "the aluminum industry will never have the production necessary to meet the demands of a full-scale industrial mobilization . . . All the priority decrees in the world cannot increase the total supply of aluminum."

► **Reynolds Statement**—Adding that "now is the time to build up the ability to produce aluminum," Lipkowitz pointed to a year-end statement by Richard S. Reynolds, president of Reynolds Metals, that declares aluminum production in 1949 will be four times as much as in the best prewar year, but "supply is not likely to be sufficient to meet the demand."

"Priorities should only be used as the means of last resort when it is no longer possible to get greater production," Lipkowitz comments. "It is sheer defeatism to rely on priority protection to get the aluminum necessary for the present aircraft program, which is but a fraction of what would be needed in the event of industrial mobilization."

► **New Experience**—The Reynolds economist cannot see that the aircraft industry would stand much to gain by institution of priorities. For one thing, he questions the wisdom of mandatory allocations in peacetime. It would be "a brand new experience for this country and cannot be expected to fit in very smoothly with regular purchasing and selling practices of private business."

He points out, also, that other essential industries use large amounts of aluminum, and even military uses of the metal are not limited to aircraft. So

the amount going to the aircraft industry still "will be determined by the total supply available," Lipkowitz says. "The best way for the aircraft industry to assure itself of enough aluminum is to do all it can to step up total production. The bigger the pie, the better its chance will be of getting a big enough slice."

► **Five in Three**—As Reynolds stressed in his statement, the aluminum industry has stepped up production greatly. It has "telescoped into the three postwar years as much market development as would normally take two decades to accomplish," Reynolds says. "The industry now provides five times as much direct and indirect employment as it did in 1938. Over 17,000 businesses rely on aluminum as an important material in their manufacturing operations."

"It is just that tremendous growth that has created much of the present difficulty." From an "aircraft and pot-and-pan material," aluminum has spread out into general industry use. According to Reynolds, the only limitation on its use this year will be supply.

► **Worse Off**—Power is still the bottleneck, Lipkowitz says. "In fact, the aluminum industry is worse off now than it was at the beginning of 1948. Some of the power it was then using has since been taken away."

Company Will Produce Pre-rotation Motors

Military and commercial interest in the Otto E. Dever electric landing wheel pre-rotation motor has resulted in strong financial support of Electric Motor Wheel, Inc., Los Angeles, the organization which will produce and market the device.

Two major markets—both military—appear to be in sight for the company: the heavy military transport or bomber, such as the Constitution and B-36, to relieve dangerous landing gear and wing stresses imposed by landing contacts; and the supersonic fighter which is subject to an extremely high incidence of tire damage caused by excessive landing speeds.

Success of the Dever pre-rotation motors installed in the main gear of the Lockheed Constitution is largely responsible for the formation of the new company. Pre-rotation of the wheels has been so close to landing contact rotating speeds that crew members have been unaware of the moment of runway contact.

Directors of the newly-formed company: Brohr Dahlberg, president of Celo-

tex Corp. of Chicago; Jack Lane, president of American Pipe and Steel Corp., Alhambra, Calif.; Carl Hannemann, president of American Belt and Trim Corp., Los Angeles, who is also president of Electric Motor Wheel; and Roy Dolly, Los Angeles attorney. General manager of the company is Carl Dahlberg.

Otto Dever, the inventor of the drive, is chief engineer.

Steel Replacement

Four types of lightweight equipment capable of airborne transportation are being developed under a Navy program in which aluminum or other light metals are used in place of steel. Lighter metals are used only where they do not impede the performance or wearing ability of the equipment.

Equipment under development:

- A diesel-driven 60-kilowatt generator set, which weighs about 3000 lb. in comparison with the standard set which weighs from 5000 to 6000 lb. It is now being tested at the Naval Construction Battalion Test Center, Port Hueneme, Calif.

- A six-by-six ft. motor grader, which weighs about 17,000 lb. in comparison with the four-by-four ft. wartime commercial grader weighing approximately 22,000 lb. It is being built for the Navy by the Austin-Western Road Machinery Co., of Aurora, Ill.

- An air-cooled 260-CFM air compressor, expected to weigh about 2000 lb. in comparison with the water-cooled 210-CFM air compressor machine used during World War II which weighed from 5000 to 7000 lb. It is being developed in cooperation with the U. S. Air Force and other Navy bureaus which use air compressors for different purposes.

- A portable welding unit, expected to weigh half as much as the 2000-2500 lb. model previously used by the Bureau of Yards and Docks.

Start for New Year

Seven west coast airframe plants entered the new year with a backlog of \$1,330,811,000 and 27,736,465 square feet of factory space in full production use.

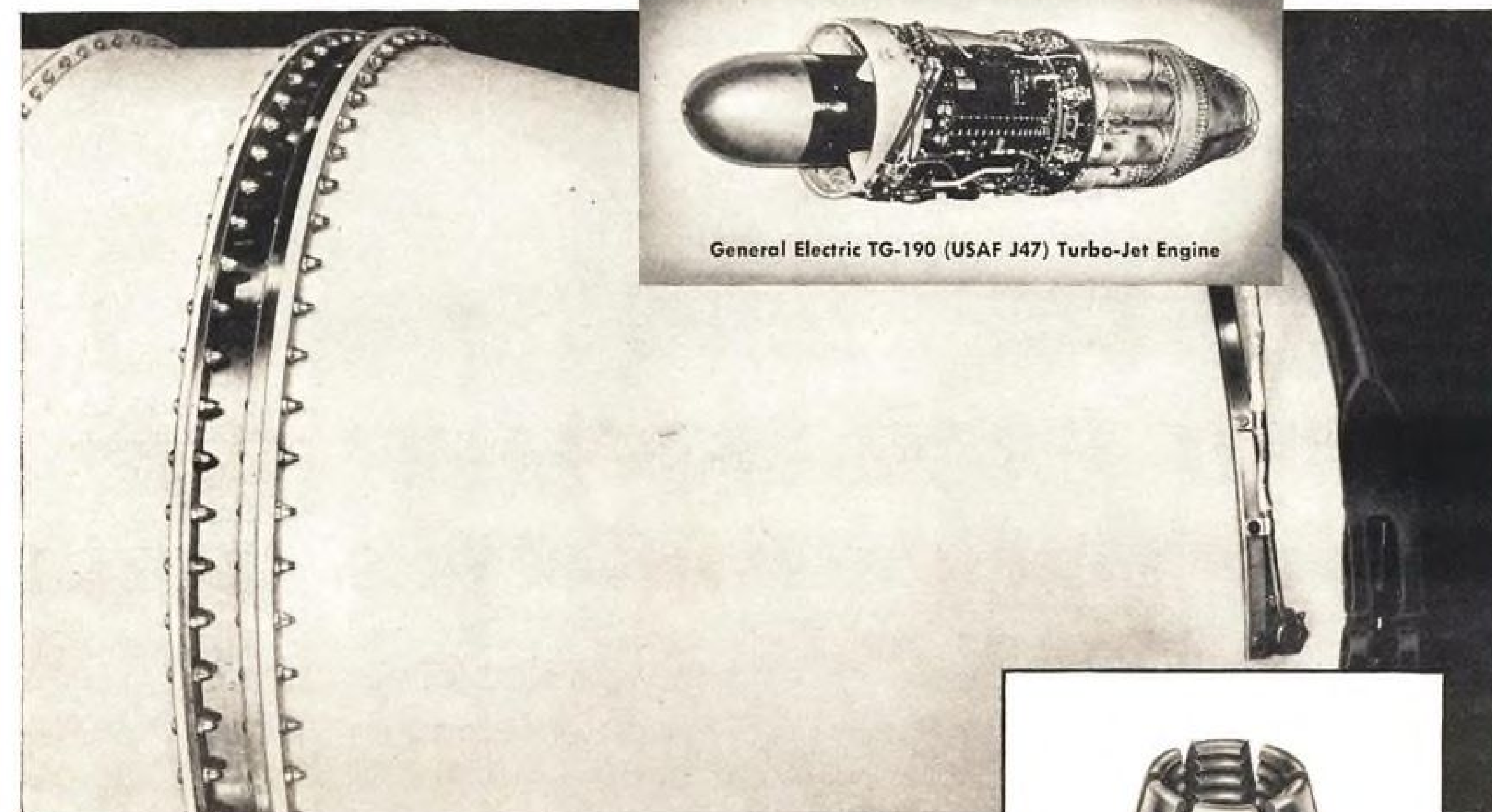
Employment now stands at 107,740 for the seven companies—Boeing, Convair, Douglas, Lockheed, North American, Northrop, and Ryan—or one-fifth of peak wartime employment.

Major problem of factories is a shortage of engineers and toolmakers, and factories are advertising heavily for qualified engineering designers; draftsmen and laboratory specialists; template, die, pattern and form block makers; jig tool designers; die finishers; master layout men; and mill machinists.

NEW!

High-Temp Nut

HOLDS WITHOUT SEIZURE AT 1200°F.



General Electric TG-190 (USAF J47) Turbo-Jet Engine

Self-locking Elastic Deflection protects against VIBRATION! permits INTERCHANGEABILITY!

The extreme heat generated in exhaust manifold systems, turbo-jet tail cones and similar installations create strength and seizure problems in ordinary fasteners—problems that are solved by ESNA's New Z-1200 Hex and Anchor Nuts.

These new nuts shown above on the tail cone flanges of the General Electric TG-190 retain their strength and locking torque characteristics even after repeated use at 1200°F. They are readily removed . . . do not seize the bolt or damage the threads.

Further, the elastic deflection built into the Z-1200's locking-beams makes them re-usable—interchangeably . . . because exact design assures locking

torque within the tolerance range of Class 3 bolts.

ESNA Z-1200 Nuts—like all Elastic Stop Nuts—are designed for rapid field service replacements to simplify maintenance. They are self-locking anywhere on a bolt or stud without frictional aid from bolt tension or seat pressure.

HERE'S A CHALLENGE. Send us complete details of your toughest bolted trouble spot. We'll supply test nuts—FREE, in experimental quantities. Or, if you want further information, write for literature.

Elastic Stop Nut Corporation of America, Union, New Jersey. Representatives and Agents are located in many principal cities.



ELASTIC STOP NUTS



HIGH TENSILE



ANCHOR



WING



SPLINE



CLINCH



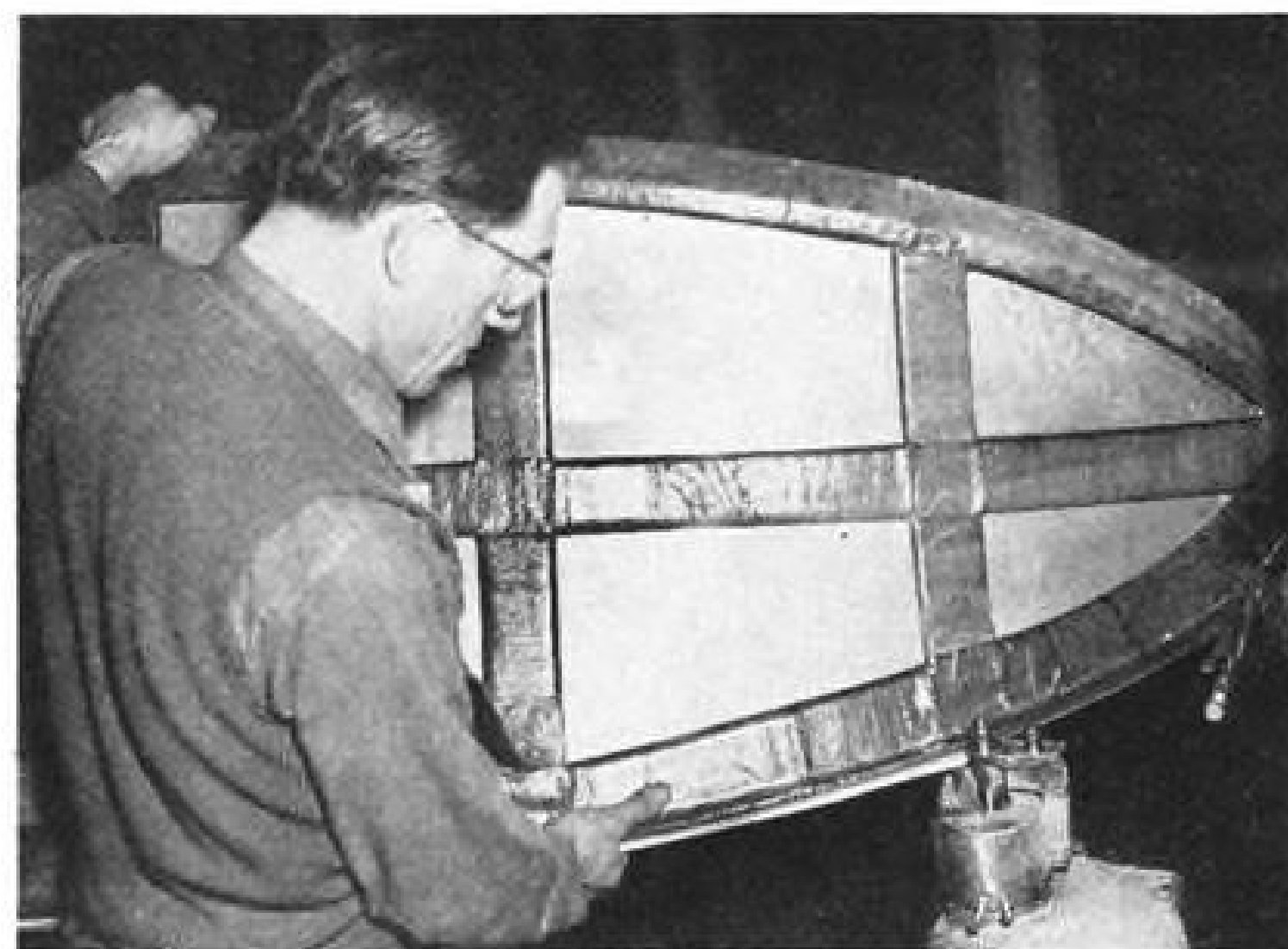
GANG CHANNEL



NYLON CAP

OVER 450 TYPES AND SIZES IMMEDIATELY AVAILABLE FROM STOCK

ENGINEERING



Light weight of plastic tooling is highlighted in this routing fixture (left) used to trim sheet metal edge to low tolerance flange width. Fixture is easily guided, and operation such as this would be impos-

sible with steel counterpart. Right: More than 50 man-hours were saved in fabrication of this routing fixture used in manufacture of large part for F-84 Thunderjet.

Plastic Tooling Proves Its Worth

Substantial savings in aircraft production costs effected with use of jigs, fixtures fabricated of molded laminate.

By Robert McLauren

An effective plastic material—molded laminate—has invaded the aircraft tooling field and promises not only substantial savings in costs but improved jigs and fixtures as well.

By using resin-impregnated Fiberglas cloth cured under heat and pressure, Republic Aviation Corp., Farmingdale, L. I., N. Y., has developed plastic tools that are already producing savings at the rate of \$200,000 per year in the production of F-84 Thunderjet fighters.

Republic engineers point out that plastic is by no means merely a "substitute" material for the steel used in aircraft tooling but actually produces a better tool at lower cost. Plastic tooling has already demonstrated these advantages:

- Complex shapes are more easily formed.
- Dimensional stability is greatly improved.
- Shrinkage problem is eliminated.
- Skilled tool-makers are not required.
- Tool making time is reduced 60 per cent.
- Duplication is greatly simplified.
- Weight is tremendously reduced.
- Reworking and repair is markedly simplified.

The company has actually replaced

all of its steel project tooling with plastic units wherever applicable, and is continually seeking and finding new uses.

Applications already include drill and spotweld jigs, routing, checking, assembly, and installation fixtures, and, to a limited extent, metal-forming and milling fixtures.

In short, plastic has replaced steel in all but heavy forming, drawing, stretching or punching blocks and dies, and Republic engineers have already achieved preliminary success in even these applications.

► **Preparation**—Fabrication of plastic tooling is a simple and rapid process. The operation starts with the conventional plaster form or hand-formed sample of aluminum backed with plaster.

After careful study, those portions of the tool which will ultimately be in contact with the part (and therefore require strength and surface toughness) are marked on the form.

This completes the portion of the job requiring highly trained personnel. Remainder of the work can be accomplished by the average worker, with brief instruction.

A parting agent is then painted on the form in the areas ultimately in contact with the plastic.

Hi-Glo plastic parting lacquer plus

aluminum stearate in vaseline (1 part powder, by weight, to 2 parts heat-softened jelly) is used as the parting agent for plaster molds.

The aluminum stearate in vaseline is used alone on wood, phenolic laminate, compreg or masonite forms.

For metal molds, Centrol 4, Lecithin is used.

The resin-impregnated laminate is then laid across the mold in the pattern described by the marks on the form.

The cloth is Fiberglas ECC-11-162 or -164 cut in strips of desired width. This material is stocked in a standard 44-in. width and then cut as required, Fiberglas tape having been rejected because of the necessity for stocking a wide variety of widths.

The Fiberglas is impregnated with du Pont BCM polymethyl methacrylate, although any low pressure polyester resin may be used.

The laminate is stored under refrigeration until ready for use to prevent its melting in hot weather.

As many thicknesses of laminate as required can be laid on various areas of the mold to provide added strength to the tool.

Although intersections of two strips produce a double thickness when they cross each other, a skilled "lay-up" man can produce a staggered pattern produc-

ing a fixture of uniform thickness.

► **Molding Process**—The mold is next placed on a mobile table where it is completely covered with a transparent bag (or "vacuum blanket"), which is securely clamped around the bed of the table to provide an air-tight joint.

A vacuum line is then attached to the bag and 20-28 in. vacuum applied. This sucks the bag up tightly against the laminate strips and holds them in place and in shape.

The table is then rolled into a circulating hot-air oven, which maintains 250 F. for 1½ to 2 hr., depending on the size of the mold.

Actually, this curing time could be reduced to ½ hr. or less for small molds or thin laminates but exact time would have to be determined by experiment. This would prove a useless procedure because most molds are used only once to form the one tool and a dozen tools could be wasted in the process.

For actual production lots of tools, however, the procedure might produce a worthwhile saving.

► **Finishing**—After removal from the mold the tool is trimmed and finished as required. About ½ in. is left around working edges of the laminate to permit trimming to accurate dimensions. Trim lines can be scribed into the plaster mold, from which they are molded into the laminate to provide an easy guide to follow.

Rough trim is provided by a high-speed bandsaw, finish trim by wet sanding, routing or hand filing.

If the tool is to be used as a drill jig, drill guide bushings are inserted directly into the tool. If tolerances closer than 0.005-7 are required, the bushings are mounted in small steel plates attached to the laminate.

These plates are mounted in the mold and seat themselves in the plastic during the curing process. After removal from the mold, they are attached to the plastic by riveting, bolting or cementing.

► **Dimensional Stability**—Simplicity and economy of this process belies the remarkable characteristics of the resulting tools. Since the principal purpose of tools is to provide constant accuracy of hole-spacing, curve shape or cutting line, they must preserve absolute dimensional stability.

In plastic tools, this quality is a function of both the laminate and the resin. Since glass cloth is of inorganic composition and non-cellular structure, it is impervious to normal humidity changes. Low pressure resins, since they are fully thermosetting with a complete absence of volatiles, have demonstrated freedom from adverse aging effects.

As a result, plastic tools hold their dimensions and shape over an indefinite period.

► **Plastic vs. Steel**—Marked superiority

of plastic tooling over steel is its adaptability to the forming of complex shapes. These shapes represent the greatest expense in steel tooling since they often require hundreds or man-hours of handwork and machining.

Complex shapes require no more curing time than simple shapes and the "lay up" is the only part of the operation demanding special skill and expert care. The shrinkage-free characteristic of plastic provides accurate reproduction of contour.

Actual experience has shown that edgewise wear, such as is experienced on router guides, is actually less in plastic tooling than on normalized cold rolled steel.

Ruggedness makes it near-impervious to shop damage such as might be occasioned by being dropped or when subjected to excessive hard useage, and impact properties are high.

An index to the remarkable saving in man-hours provided by plastic tooling is the fact that the basic cost of materials is actually substantially higher than steel. This cost inequality is expected to be overcome in the very near future, however, by the constantly lowering cost of plastic materials in its increasingly competitive market.

Since skilled craftsmen are not required for plastic tool making, labor costs are reduced and the availability of the required labor is increased. Actually, the frequent critical shortage in skilled tool makers is of no consequence to shops using plastic tools.

► **Fabrication Factors**—Production of plastic tools can be systematized by dividing the shop into various groups, each responsible for a different phase of the operation.

This permits a work flow through the shop, improvement in efficiency and faster production. Such streamlining is virtually impossible in steel tool shops in which it is customary for a single tool-maker to carry his individual project through to completion.

Simplicity of plastic tool making also permits breakdown of the work to a point making judgment on the part of the operator unnecessary and eliminating any trial-and-error activities. This permits shop output to be determined by the work and not by the worker, thereby creating maximum labor utilization.

A substantial cost item in tooling is frequent product design changes necessitating tool reworking. Plastic tooling can be altered easily and the result is an integral, strong, and often indistinguishable, part of the whole. Most changes can be made on the spot using heated clamps to provide the heat and pressure required.

When major changes require reworking of the mold, the tool is applied to the mold with fresh plastic cloth laid

up in the rework areas and the curing process is repeated.

Sandwich-type construction has been applied to plastic tools of large size with comparatively long, thin members requiring high strength.

This construction is easily made by laying up a strip of laminate, applying a low-density core material over the first strip and covering the core material with a second strip. After curing, a strong sandwich construction is obtained.

► **Other Applications**—Although plastic tooling has been used extensively to date only for jigs and fixtures, applications to metal-forming tools have been made experimentally and, in some cases, in regular production tools.

The face of the die or form is molded as previously described to produce the pattern face of the tool. This shell is then backed up by any dense, rugged material bonded to the shell. The result is a block that possesses all the attributes of stability, accuracy and toughness of unsupported plastic tools.

However, the principal problem of plastic metal-forming tools is not the fabrication of the tool but the mold itself. Gypsum plaster mold surfaces, while excellent for fabricating-tool patterns, are not smooth enough for metal-forming patterns since the plastic accurately reproduces every minute grain or surface irregularity.

The plastic tooling program at Republic began in the fall of 1942 under the direction of Lawrence Wittman, now senior plastic engineer of the company.

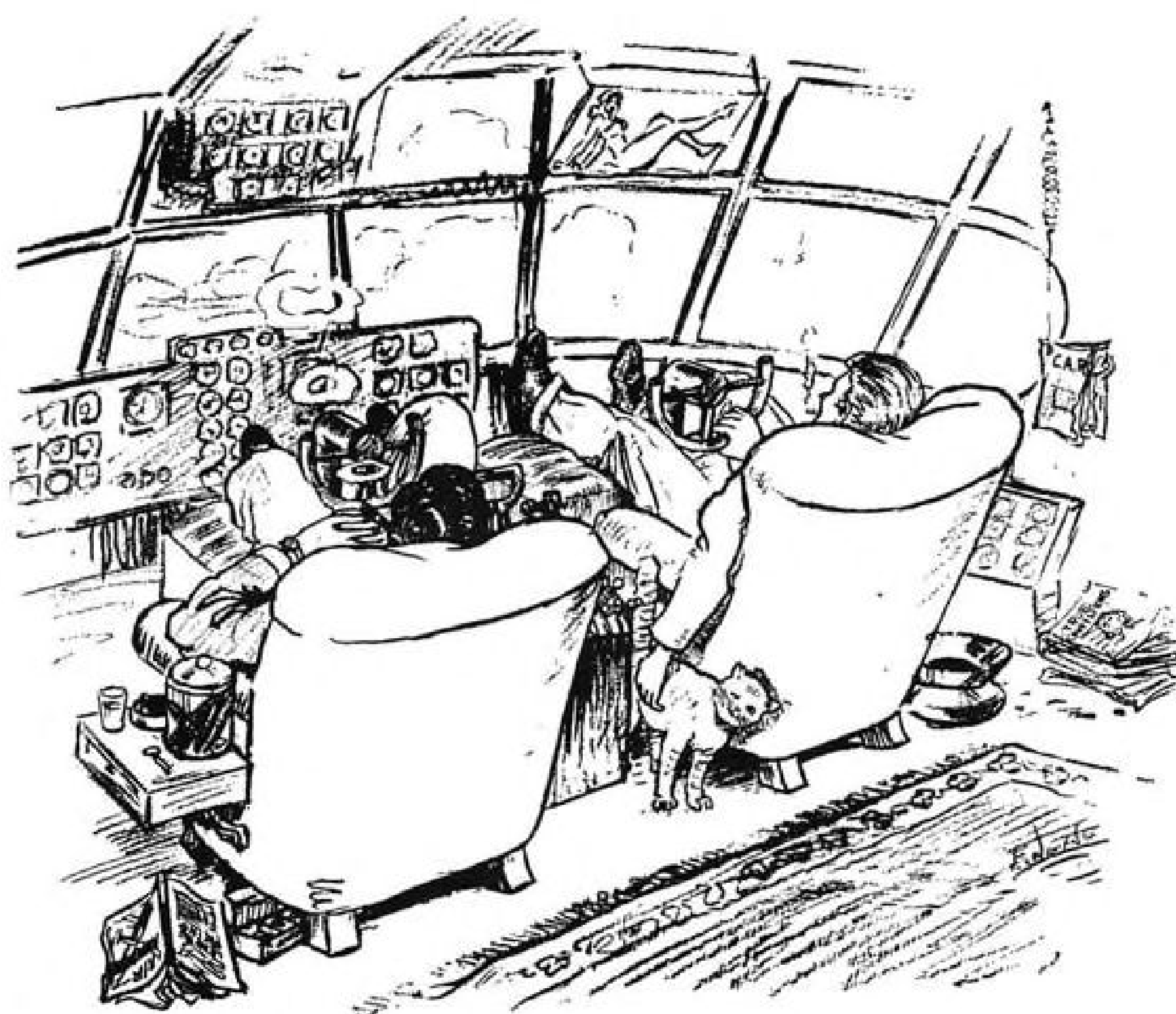
This initial effort ultimately led to the adoption of low-pressure molding technique as a standard tool manufacturing process.

Although remarkable progress has been made in the application of molded laminates to aircraft tooling, it is apparent that only the surface of this activity has been scratched. Future developments are certain to expand the new method into inestimable importance in the industry.

The range of applications is limited only by the imagination and perseverance of the tooling engineer.

In addition to economic and strategic importance in the rapid expansion of volume aircraft production, simplicity and low cost of the tooling render it equally applicable to small-scale production—even for a single experimental airplane.

Because tooling investment will be low and tooling changes simple and economical to make, engineering design changes in aircraft can be made more extensively and more frequently in production, thereby overcoming one of the obstacles to technical improvement in production aircraft experienced during World War II.



Exaggerated luxury of Stratocruiser cockpit as seen by Boeing engineer Ernest Norling.

Stratocruiser: Built for Comfort

Passenger convenience supplemented by engineering refinements that increase transport performance.

First of the giant airliners to go into commercial service, the Boeing Stratocruiser gives promise of setting, for a long time, the maximum size of airliner which will be economic to operate over long-haul routes.

The plane's present maximum gross weight is 142,500 lb. but the Civil Aeronautics Administration has approved the basic structure for a gross of 147,000 lb. Thus, higher-rated engines can be used without change in major structure of the wings, body or landing gear, allowing increased useful load.

Overall dimensions of the craft are only slightly larger than those of transports now in use by the airlines, but its ability to carry a bigger useful load (43 percent of gross weight) farther (4200 mi. normal range) faster and at lower cost is noteworthy. Nor does the increased size require any great addition in handling, ground service and operating personnel over other four-engine transports.

The Stratocruiser can meet direct flying costs at the very low load factor of 16.4 percent, equivalent to 10 passengers at 5.5 cents per mile plus one ton of cargo at 51 cents a ton mile, leaving 84 percent available for indirect expense and profit.

With cruising speed of 340 mph. at

25,000 ft. using about 70 percent power, it will cut air time substantially between world cities. It is slated to do the New York-London run in about 11½ hr.; New York-Tokyo, 22½ hr.; San Francisco-Honolulu, 7½ hr.; New York-Stockholm, less than 12 hr.; Miami-Buenos Aires, less than 13 hr.

► **Lounge Is Feature**—Although the plane can be equipped to carry as many as 114 passengers, maximum seating in the 55 craft now ordered is for 61 passengers, and some will carry only 56.

Seating is provided in the main, or upper deck, while a 500-cu. ft. area on the lower deck is reserved as a lounge. To carry a greater number of passengers, this lounge would be installed with conventional seating.

The lounge, reached by circular stairway from main deck, can accommodate as many as 16, but for extra comfort, five airlines have specified seating for only 14 and British Overseas Airways Corp. has specified 12. Seats are arranged in horseshoe shape, with a circular, removable table at the forward end. Service bar is located under the stairway and a rear door gives direct access to a 305-cu. ft. baggage compartment as well as the auxiliary lower rear entrance.

Main deck is divided into five sec-

tions—flight cabin; forward parlor section seating eight persons; men's and women's dressing rooms on opposite sides of the aisle; main cabin; and galley.

Main entrance is on left side, midway of the main cabin, with the stairway to the lower deck aft of the entrance. Stewardess' station, with seat, desk and intercom phone as well as light, temperature and humidity controls, is at rear of cabin, with coat racks near it on both sides.

► **Cabin Facilities**—Main cabin, 68 ft. long, 11½ ft. wide and 8 ft., 9 in. high at the aisle, has Boeing-designed-and-built chairs spaced 40 in. apart. Each two sets of chairs make into a lower berth 74½×42 in., ample room for two persons, with headroom enough to sit up. Mattresses, curtains, blankets, pillows, etc., are stowed in the upper berth (75×40 in.), which swings down from the side walls and ceiling. Conversion from daytime arrangement can be quickly made, with sleeping space for 24 to 45, as the airline wishes.

Seating aft of the main cabin door is with luxury day chairs. These chairs, as well as those which make into berths, are adjustable from vertical for reclining, have sponge rubber upholstery and built-in absorption units to eliminate transmission of vibration. A panel on each seat arm includes seat number, reading light switch, ash tray, seat adjustment latch, stewardess call button, "occupied" sign and receptacle for service table legs. "Wedgit" fasteners, quickly removable, make re-arrangement easy for special flights or conditions.

► **Interior Decoration**—Appointments vary not only from airline to airline but, in the case of the Scandinavian Airlines System, from plane to plane. Colors and materials have been selected to reduce air sickness and passenger fatigue, the designers trying to reduce difference in color values between sky and the plane interior. Light-tones are used in upper half of cabin, heavier colors on seats and floor.

Northwest Airlines, whose Stratocruisers will fly the northern route to the Orient, will feature warm colors: Beige carpets and walls; reddish-brown seat fabric in a woven stripe design; rough-textured, deep-pile upholstery.

United Air Lines, flying to Honolulu, will have a Hawaiian motif in the lounge, with bulkheads faced with mats woven from products of the Pandanus tree, with bamboo trim strips. Lounge curtains will feature abstract designs of Hawaiian fish, and pineapples.

Lounge seats of American Overseas Airlines will be white leather.

BOAC Stratocruisers will feature English oak Flexwood paneling in dressing rooms, galley and stairwell.

Pan American Airways will divide its passenger cabin into three sections, with

beige curtains and blue-green seats in two of them, blue-green curtains and beige seats in the other.

SAS planes will have hand-woven materials made in Scandinavia. Lounge walls in two of the ships will bear hand-painted appliques, stylized animals, trees and human figures on dyed all-wool materials. Curtains in main cabins will be striped vertically in more colors than a rainbow.

Plastics are used on the cabin walls up to the windows and fabrics on the upper walls and ceiling. All fabrics are flame-resistant, mildew-proof and color-fast. A flooring of honeycomb plywood and dural is covered by sponge rubber and carpeting.

Planes of SAS and UAL each have a single stateroom aft along one side, seating or sleeping two, with private lavatory. SAS and PAA each have a luxury compartment forward of the dressing rooms, seating four or sleeping three. NWA has two such luxury compartments forward.

The luxury compartment is curtained, while the stateroom is walled off.

► **Galley Details**—Planes ordered by PAA, NWA, AOA and SAS have a 170-cu. ft. galley, largest ever installed on a commercial aircraft, directly aft of the main cabin. UAL and BOAC are installing the galley amidships.

A hatch in the starboard side of the fuselage permits food boxes to be loaded directly into the galley. Basic plan includes four cold-food boxes, along the port side just inside the galley door, each holding 48 complete frozen meals. SAS has eliminated two of the boxes and the large coffee urn installed for each of the other airlines. In place of the urn it will have four compartments from which to serve trays on which meals will be set up in the airport commissary prior to loading.

The galley is of aluminum with the exception of three working surfaces, of stainless steel. A 17-cu. ft. refrigerator will carry perishables, soft drinks, ice cubes and 50 lb. of wet ice. Additional foods may be carried in four dry bins beneath the cold-food boxes.

Four of the six airlines which have ordered Stratocruisers have the galley equipped for the Maxson food system—two 12-shelf ovens to produce 24 hot meals at a time. In addition, there is wiring for a third oven.

Each galley will have seven 2-gal. liquid containers for tea, juices, soups and drinking water, each with electrical outlet and switch for heating.

Liquor will be carried in two compartments beneath the portside counter top. Cocktail glasses may be carried in four compartments bolted to the galley wall above the food boxes, behind roll-up doors, each type of glass fitted into its own rack.

STRATOCRUISER—BASIC DATA

Wing

Span	141 ft. 3 in.
Area	1,769 sq. ft.
Aspect ratio	11.58
Airfoil section	Boeing 117
Type	Full cantilever, two-spar, stressed metal covering
Flaps	Fowler type, all-metal
Wing loading (142,500 lb.)	80.5
Power loading (142,500 lb.)	10.2

Fuselage

Length	110 ft. 4 in.
Height (Taxi condition)	38 ft. 3 in.
Height (Vertical tail hinged down)	26 ft. 7 in.
Maximum width	11 ft.
Maximum depth	15 ft. 3 in.
Ground clearance	22 ft. 5 in.
Diameter upper lobe	11 ft.
Diameter lower lobe	9 ft. 6 in.

Empennage

Fixed surfaces: All metal, stressed skin, two-spar type with hot air anti-icing	
Movable surfaces: Metal frame, fabric covered, aerodynamically and mass balanced	
Span of horizontal tail	43 ft.

Performance

Cruising speed at 25,000 ft.	300-340 mph.
Normal operating altitude	15,000 to 25,000 ft.
Service ceiling at 110,000 lb. gross weight	33,000 ft.
Three-engine operational ceiling, 110,000 lb.	26,000 ft.
Rate of climb, four engines, sea level, maximum continuous hp., 142,500 lb.	1100 ft./min.
Rate of climb, two engines, sea level, maximum continuous power, 110,000 lb.	335 ft./min.
Stalling speed, sea level, (110,000 lb. gross)	93 mph.

Range:

Maximum (zero wind, no fuel reserve) 10,500 lb. payload	4,600 mi.
20,000 lb. payload	3,550 mi.
25,000 lb. payload	3,000 mi.

Takeoff:

C.A.R. field length at sea level (142,500 lb.)	6,250 ft.
(130,000 lb.)	4,900 ft.

Landing:

C.A.R. field length (sea level) at 110,000 lb. gross	5,860 ft.
at 110,000 lb. using four reverse propellers	3,470 ft.
ground run at 110,000 lb., four reverse propellers	1,230 ft.

Weights

Maximum takeoff	142,500 lb.
Maximum landing	121,700 lb.
Maximum payload	30,000 lb.
Operating weight empty	83,500 lb.

Powerplants

Four P & W Wasp Major R-4360 TSB3-G, 28-cylinder, air-cooled, four-row radial.	
Takeoff power (with water injection)	3500 hp. at 2700 rpm.
Takeoff power (dry)	3250 hp. at 2700 rpm.
Maximum continuous power	2800 hp. at 2550 rpm.
Maximum cruise power	1900 hp. at 2300 rpm.
Each power package equipped with one General Electric BH-4 turbosupercharger for high altitude cruising condition and pressurization system air bleed.	

Propellers

Curtiss Electric, 16 ft. 8 in. diameter, or Hamilton-Standard, 16 ft. 6 in. diameter.	
Both four-blade, constant speed, full-feathering, reverse-thrust.	

Landing Gear

Type: Tricycle, retractable, dual wheels.	
Main gear tires	56 in. diam.
Nose wheel tires	36 in. diam.
Tread	28 ft. 5.6 in.

Supercharging

Sea level cabin pressure up to 15,000 ft.	
5500 ft. equivalent cabin pressure at 25,000 ft.	

Miscellaneous

Wheelbase	36 ft. 5 in.
Minimum turning radius	28 ft. 6 in.
Fuel capacity	7,790 gal.



"Should we braze more aluminum assemblies?" As higher production becomes more important, you may have to answer that question. Brazing has proved to be a fast, cheap, neat method for joining numerous parts such as intercoolers, duct work, air dispensers, heat exchangers, radiators, tanks, instrument boxes, etc.

Intricate assemblies can be brazed which cannot be fabricated by other methods because of inaccessible joints. Costs are low. Production rates are high. An unlimited number of joints can be made in one assembly. Distortion is minimized because of the lack of localized heat. Joints are neat—practically no finish is required other than flux removal. Weight saving up to 50% is possible by replacing castings with brazed aluminum assemblies.

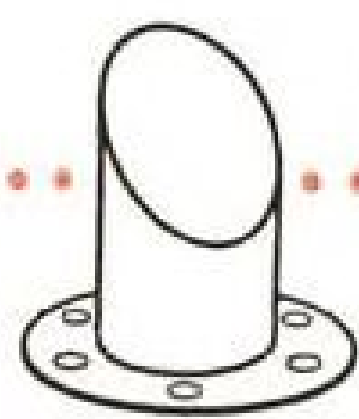
Jigged or self-jigging assemblies of 2S, 3S, 53S, 61S

and special Alcoa Aluminum Alloys may be brazed by either of two production methods: in a hot air furnace, or in a molten flux-bath furnace. The latter method is preferable for assemblies that lend themselves to flux drainage after removal from the pot. All assemblies should be designed so that differences in wall thickness of the detail parts is as small as possible.

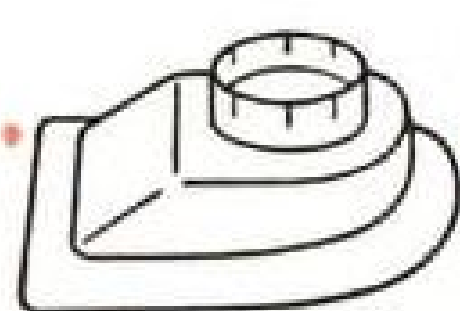
MUCH OF THE PIONEER WORK on aluminum brazing has been done by Alcoa. Complete Alcoa Flight-metal fabricating knowledge is at your disposal. Send for your copy of the useful manual, "Welding and Brazing Alcoa Aluminum". Or contact your nearby Alcoa sales office. ALUMINUM COMPANY OF AMERICA, 2182 Gulf Building, Pittsburgh 19, Pennsylvania.



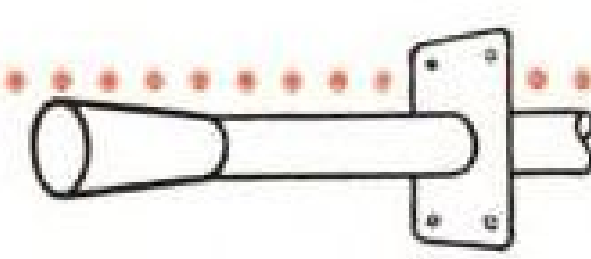
AIR DISPENSER ASSEMBLY
Welded: 100 parts in 20 hours.
Brazed: 100 parts in 2 hours.



FLANGED TUBE ASSEMBLY
Welded: 100 parts in 1.8 hours.
Brazed: 100 parts in 18 minutes.

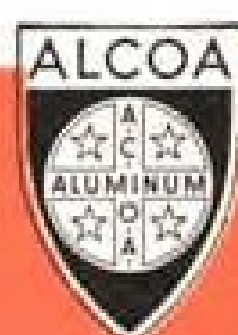


OIL-TANK FILLER NECK PAN
Welded: 100 parts in 8 hours.
Brazed: 100 parts in 40 minutes.



MAGNETO BLAST TUBE ASSEMBLY
Welded: 100 parts in 12 hours.
Brazed: 100 parts in 14 minutes.

ALCOA FIRST IN ALUMINUM



The sink will be provided with self-closing hot and cold water faucets and a pop-up drain.

Plastic piping is used to solve the problem of water in world ports of call, because in some cases the water acts on metal piping to produce unsatisfactory taste.

A "venetian blind" arrangement of the door to main cabin opens to become a series of five shelves, speeding meal service.

All waste matter will be disposed through a small hinged door in a removable panel beneath starboard work counter. It will be caught by a bag attached to the back of the panel, outside of the galley itself.

► **Dressing Rooms, Lighting**—Each of the two dressing rooms contains 225 cu. ft. of space. The women's room has two wash basins with hot and cold running water, lotion dispensers, dental basin, upholstered settee with two individual dressing tables and extra large mirrors. End mirrors give full-length image. The dressing tables have face tissue dispensers and disposal receptacles, ash trays, etc.

The men's room, big enough for five, has three lavatories, dental basin, folding coat hooks, large mirrors, four outlets for electric shavers, etc. Toilets have sliding doors and are flushable.

Separate lavatory and toilet facilities for crew are just aft of flight deck.

The lighting system has 411 separate lights, 30 of which—in main cabin, lounge, galley and dressing rooms—are fluorescent installations which withstand vibration better than filament lamps and give more light with less heat and less wattage. Only 840w. are used by these fluorescent lights as against the 2,560w. needed to provide the same illumination from incandescents.

The plastic used to cover the main-cabin fluorescents is specially treated to prevent electrostatic charge which would gather dust and lint. Directional reading lamps furnish each passenger with 14 foot-candles of light at reading level from a 20w. lamp.

► **Pressurization**—The automatically-controlled cabin pressure system maintains sea level condition up to 15,000 ft. At altitudes above this, cabin atmospheric conditions rise gradually—to 3000 ft. at 20,000-ft. altitude, 5500 at 25,000 and a maximum of 8000 ft. at the 30,000-ft. level. In almost all cases, regardless of the plane's rate of ascent or descent, this change can be limited to a maximum of 200 fpm., reducing the possibility of ear discomfort.

Pressure is developed as a direct bleed from the General Electric turbosuperchargers, used for the first time in a commercial airliner.

Pressurization standards are claimed to be much higher than on any other pressurized transport, the plane's pri-

mary structure being designed to withstand 16 psi., although the maximum pressure differential in actual operation is only 6.55 psi. A double rubber strip seals the doors. Excess air leaves the cabin in regulated amounts through ventilating grilles in the dressing rooms and galley.

Pressure is adjusted by two cabin regulators located in the accessory compartment beneath the control cabin. Although the regulator operates automatically, the flight engineer has on his panel a cabin pressure selector to hold pressure at any density, and a cabin rate-of-change selector for use during ascent and descent.

► **Air Conditioning**—Cabin air is automatically heated, cooled, humidified, deodorized and filtered in flight and on the ground. A continuous flow of conditioned air, at the rate of 40 cfm. per passenger, warms or cools the walls and double-paned windows from within, eliminating all wall drafts and assuring fog- and frost-free glass. Approximately 75 percent of the air, or 3660 cfm., is re-circulated, with 925 cfm. of fresh air added.

Temperature of 70 deg. can be maintained in the cabin with outside temperatures as low as 60 below zero. At the other extreme, the cabin can be cooled to 15 deg. below ambient temperature, a greater differential than in air-cooled theaters.

Air from galley, dressing rooms and cargo compartments is exhausted directly overboard, thus eliminating fumes and odors.

In passenger cabins, used air is drawn off at floor level, pulling all odors, cigarette smoke, etc., downward away from the passengers. Smoke and odors are filtered from the air as it recirculates, with a complete change of air in the cabins every 90 sec. The filters also remove a very large percentage of airborne bacteria.

During flight, ventilating air is brought from the nacelles into the forward cargo compartment, where it passes through air filters and then through two 200,000-Btu./hr. combustion heaters which, like the two heaters in the tail and three in each outboard engine nacelle for anti-icing, are enclosed in double stainless steel shrouds as a fire prevention measure. The heaters automatically shut off if they are not working properly. Compressed air from the turbosuperchargers usually provides all the heat necessary up to 8,000 ft.

After heating, ventilating air is ducted to the air recovery unit, where it is mixed with the recirculated air and carried through a duct system running the entire length of the plane just below main cabin floor.

It then passes between the cabin inner lining and the soundproofing blanket, between each of the circumferen-

tials throughout the entire length of the cabin. Passing upward, it enters the main cabin through the ceiling fabric, then downward within the cabin and is exhausted through grilles located at the intersection of the cabin wall and floor into the return air ducts formed by the cargo compartment ceiling and control cable guards.

On the ground, fresh airflow is obtained by means of two electrically driven blowers, one located in each wing, inboard of the inboard nacelle.

► **Humidity Controlled**—Cooling of the cabin is achieved in the same manner in flight and on the ground. A compressor and a condenser are located in each outboard nacelle, and an evaporator in the air recovery unit, through which recirculated air passes. Control and operation is automatic, with the stewardess selecting desired temperature.

The air recovery unit consists of a motor-driven centrifugal blower, filter, activated charcoal odor absorber, evaporator and means for adding moisture for humidity control. The air filter is replaceable and utilizes a Fiberglas media.

Purpose of the humidifying system is to maintain 73 F. and 20 percent humidity, giving an approximate actual temperature of 68 F. The system is controlled by a moisture-sensing device in main cabin and operates only when cabin heaters are energized and moisture is needed.

One or more of three water nozzle solenoids opens, depending upon humidifying load, and pumps spray water into the heater manifold duct until the humidity reaches the preselected level.

Water is obtained from the main water tank, which carries 60 gal. for engine injection plus 77 gal. for galley, drinking, dressing rooms, etc.

A sensing unit in the air duct actuates a light in front of the flight engineer if air from the turbosupercharger contains any trace of carbon monoxide.

► **Maintenance Facilities**—Facilities for inspection and maintenance afford ample room for the biggest mechanic to ply normal-size tools without twisting or squirming. Every compartment is readily accessible, even in flight. Openings are located to give immediate access to equipment by the shortest possible route.

Grouped panels and simple tubing and wiring runs permit electricians, hydraulic specialists, instrument crews, etc., to perform work simultaneously. The 38-ft., 3-in. vertical fin is hinged at the body line so it can be folded, without disconnecting controls or plumbing, to permit hanging.

One man can change the starter in 30 min., two men can change a prop in 2 hr., 45 min., or a carburetor in 2 hr. 55 min.; while four men can change a power package in 30 min.

Each power package, which includes an R-4360 Pratt & Whitney 28-cyl. engine and accessories; propeller; induction and exhaust systems; engine and supercharger oil systems; cowling; etc., is completely interchangeable on all four nacelle positions with the exception of a minor difference in accessories.

The engine cowling peels off, giving quick access to sparkplugs, intake and exhaust manifolds, and ignition harness. Outboard nacelle-skate doors give full access to combustion heaters of the anti-icing system and the refrigeration units for the cabin air conditioning.

The power package quick-change is made possible by the equipping of all removable panels with latching devices which have automatic safetying arrangements, thus eliminating manual wiring, and with the "auto-rig disconnect system."

The latter eliminates rigging the four throttle and mixture control cables leading to each engine. A spring and ratcheting device and a split nut hold the two ends of a cable together, the spring maintaining proper tension. For disconnection, the handle is simply unlatched from its safety catch. To re-rig the cable during engine installation, the cable's ball terminal is slipped into a slot in the end of the auto-rig and a plunger pushed. This closes the latch, applying spring tension to the cable, and locks it in place with the split nut.

Lower scoop assembly can be removed as a unit, providing speedy access to its two oil coolers, turbosupercharger, intercooler, intercooler flap motor and actuator, most of the induction system, carburetor air door with motor and actuator, and carburetor pre-heat valve.

► **Wing Details**—An underwing system enables complete fueling with 7790 gal. in less than 15 min., although fueling can also be done on top of the wing.

Fuel tanks are individually collapsible cells, easily replaced. A mechanic can get head and shoulders inside the wing for removing or installing each fuel cell, and can complete the task in 30 min.

Engine oil systems also are replenished from beneath the wing.

Outboard wing sections are removable at joints beyond the outboard engines. Leading edge sections hinge upward for access to oil transfer lines, heater and cabin air conditioning ducts. CO₂ lines, instrument wiring and other equipment.

Wing flaps, when lowered, allow access to the interior of the trailing edge section, with its fuel strainers, fuel selector valves, hydraulic lines, and wiring.

► **Fuselage Installations**—In the body of the Stratocruiser, floor panels remove easily where accessibility to control cables, hydraulics, wiring is desirable. Control panels for pilot, co-pilot and flight engineer either hinge or move outward bodily. Beneath the control-

cabin floor, easily reached during flight, are a.c. inverters, the generator and alternator control systems, electronic amplifiers controlling the turbosuperchargers, batteries, nose-wheel steering mechanism, central oil tank, hydraulic equipment, electrical-system controls and forward power panel.

In the forward cargo compartment, either in the ceiling or in the wall behind easily removed side panels, are smoke and CO detectors, fuel-gage amplifiers, electrical cables and junction boxes, waste-water tank, and hydraulic lines.

Air conditioning and cabin heaters are accessible in the rear part of the forward cargo compartment. Farther back in the ship, in the lounge, emergency landing-gear controls, and the motor and associated mechanism which actuates the wing flaps, are located behind hinged mirrors. In the lounge ceiling is the main electrical system junction box with current limiters available for renewal in flight, if necessary.

Numerous access doors in the tail section permit service of the trim-tab; elevator- and rudder-control mechanisms, rudder and elevators, automatic pilot servo motors and combustion heaters for empennage anti-icing.

► **Electricity Favored**—More than 100 tasks are accomplished with electricity in the Stratocruiser. The 70-kw. generative and distributive system, weighing 2,523 lb., includes about 10 mi. of wire, 482 switches. Generators and alternators are coupled directly to the engines, two generators in each of the inboard nacelles and one in each of the outboard nacelles with an alternator.

Each generator has a normal capacity of 9 kw., or 300 amp. at 30v. For very short periods, at cruising speed, they can handle an overload of nearly 300 percent; for 2 min., a 150 percent overload.

Largest demand for current is from the landing gear motors—two for the main gear, one each for nose wheel and tail skid. They draw a total of 616 amp. during the 9 sec. of operation. Cooling compressors in the cabin-conditioning system draw 450 amp.; wing-flap motor, 170 amp.; propeller-pitch reversal, 150 amp. for two props at a time; oil-transfer-pump motor, 140 amp. In all, 119 motors are used.

One of the alternators serves to heat the Nesa glass windshields for anti-icing purposes while the other supplies current for preparation of food. For these purposes, an alternating current of several hundred volts can be generated and distributed at quite a saving in weight over a comparable lower-voltage installation. Each is a three-phase alternator, developing 11 kv.-amp. at 208v. between phases, or 120v. from each phase to the ground.

Alternator output is cut in automatic-

ally as soon as engine speed turns them up to the point where their frequency reaches 400 cps.

► **Inverter Arrangement**—Three rotary inverters, drawing a total of 315 amp. from the 28v. d.c. system, supply constant-frequency a.c. for the fluorescent lights, radio equipment, turbosupercharger regulators, automatic pilot and various flight instruments. A fourth inverter has a capacity of 1500 v.-amp. and supplies current at 115v. and 400c.

No. 1 inverter handles essential loads only. If it fails, the standby inverter starts up automatically and takes over its load. If No. 2 inverter, which handles less essential loads, should fail, the standby can be cut in manually to the No. 2 load. If the No. 1 inverter then fails, the standby will be switched automatically from No. 2 to No. 1 load. If there should be a series of failures, any one of the four inverters can be switched manually to take over essential loads.

The Stratocruiser requires only three batteries, each a 12-cell unit. No. 1 battery connects to an emergency bus, or main line, and serves—in emergencies—aisle, exit, and cockpit lights, flares and sometimes emergency radio gear. No. 2 and 3 batteries are normally connected to the main bus through a relay, charging and discharging into the main bus, but can be switched to the emergency bus.

Voltage regulation for the 28v. system is controlled centrally at the main bus in the lounge ceiling rather than at each generator, giving better regulation and saving about 50 lb. of weight by elimination of wiring. Aluminum wiring is used in the heavier lines and cable sizes.

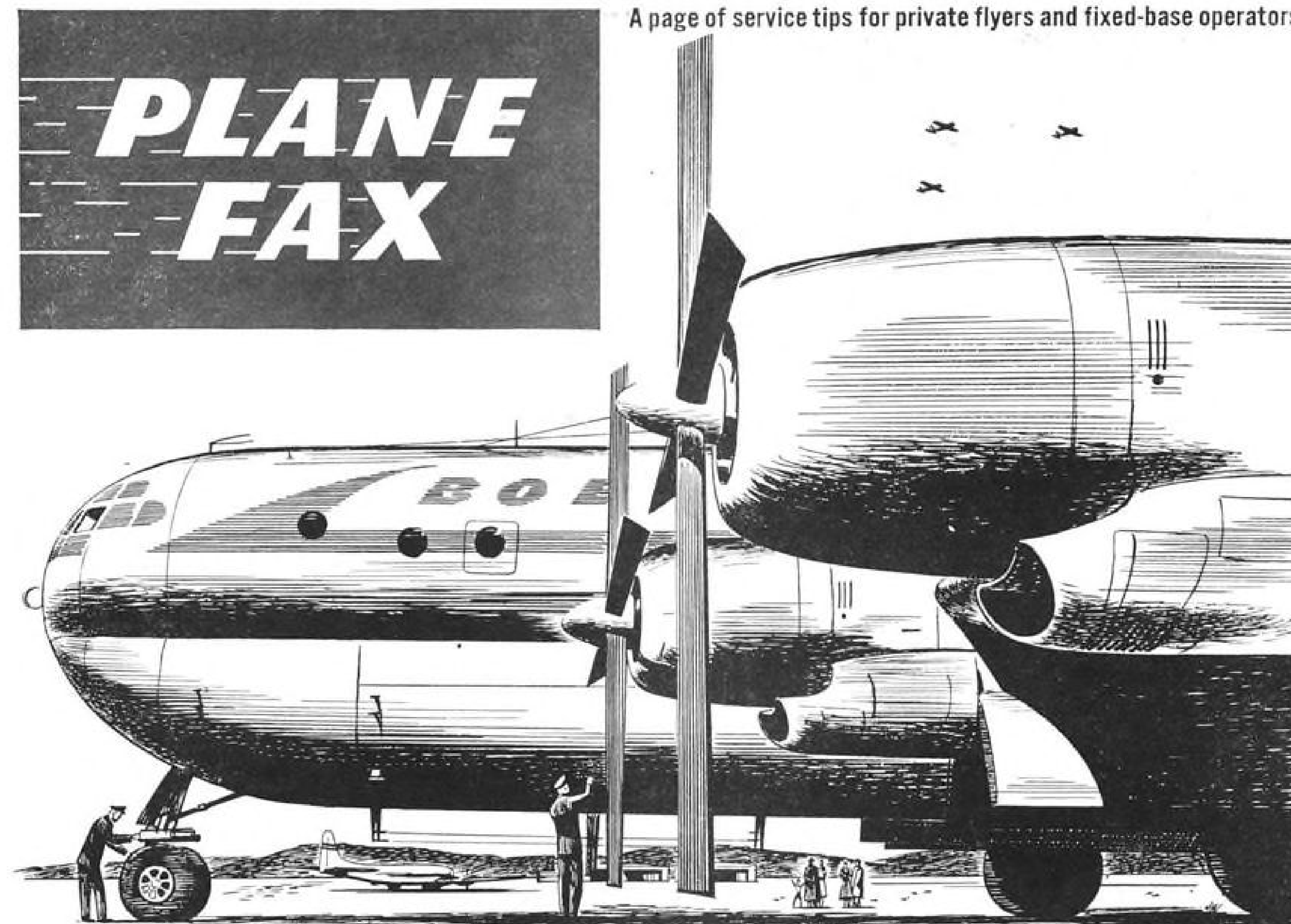
Where power lines travel from unpressurized to pressurized areas, a specially developed body-seal-and-insulation is provided. This is a phenolic block on each side of the bulkhead, firmly bolted and allowing no possibility of shorting.

Main power line consists of six No. 000 cables, extending from the common bus in the lounge ceiling forward to distribution points in the control cabin. Each of the six lines has its own insulation and, at each end, a current limiter. If a short should occur on any line, that line's current limiter would blow but the other five lines would continue to carry the load.

► **Flight Deck**—Unrestricted crew movement, essential in minimizing fatigue on long trips, is available in the 680-cu. ft. flight deck with its 134 sq. ft. of floor area. Field of vision is unusually large, with forward and side windows of flat panes totaling 2864 sq. in., to permit best visibility under adverse conditions.

Forward seven windows of the middle row are of Nesa glass, electrically heated for anti-icing, and the three windows directly forward of pilot are "birdproof," capable of sustaining pressures up to 30

A page of service tips for private flyers and fixed-base operators



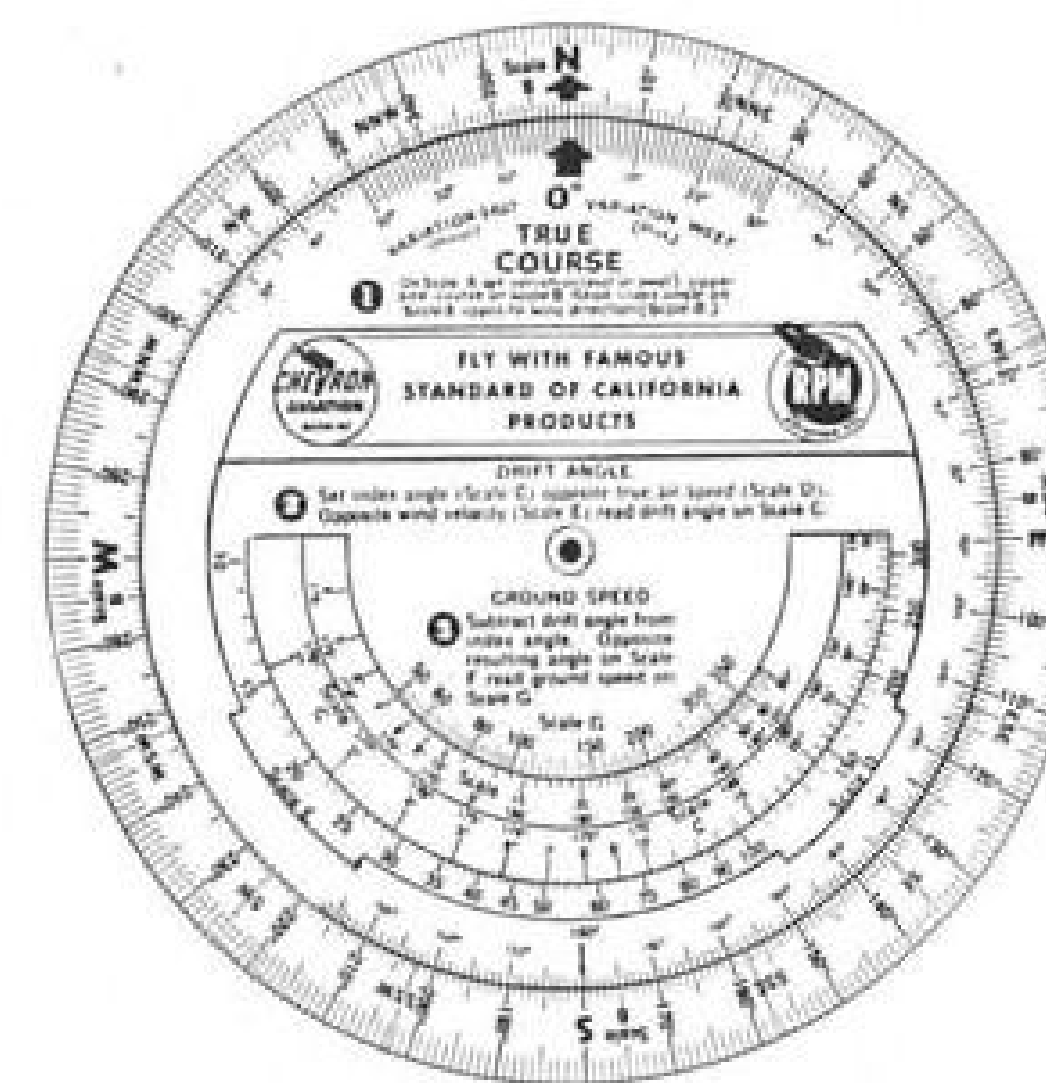
Take a tip from the Queen of the Sky

Yes, it's the Boeing Stratocruiser. Cruising at 340 mph (14,000 hp) and carrying 80 passengers, this marvel of aerodynamic design proved itself in many months of rigorous testing. In recent CAA Proof and Reliability Testing of the Boeing Stratocruiser, covering

over 200 hours of flying under a wide variety of conditions, RPM Aviation Oil was used exclusively! So to get the best aviation oil for *your* plane, follow the lead of the great Boeing Airplane Company which selected RPM Aviation Oil for use in their *entire commercial production!*

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Instrument panels (top left) hinge out or are removable for easy servicing. Flush astral window (top right) is sealed to structure. Lounge (bottom left) on Stratocruiser for PAA seats 14 comfortably. Five louvers in galley door (bottom right) open to hold five trays.

psi. Balance of the 19 windows are single pane plastics defogged by individual hot air outlets.

Normal provision is made for a five-man flight crew, with an extra seat to pilot's left for an observer. This chair pivots so that it may be swung out of the way of the pilot when he is entering or leaving his position. All seats are adjustable for height and position, while pilot's and copilot seats are also adjustable for reclining and incorporate folding and arm and head rests. Foot rests also are provided for each pilot to use during flights on automatic pilot.

Steering control, located to the left of the pilot, controls angular movement of the nose wheel by hydraulic action for taxiing and ground maneuvers. It may also be used to aid in overcoming crosswinds during landings and takeoffs at low speeds when the rudder is less effective. Parking brake is located on the steering column.

► **Instrumentation, Lighting**—Pilot's instrument panel is located just below the normal eye level, allowing unobstructed ground visibility as near as 30 to 40 ft.

directly forward of the plane. This is particularly advantageous on instrument let-down because of the minimum deviation of the line of sight between instrument and contact when breaking through an overcast. Flight instruments are arranged to reduce fatigue, with a minimum of eye movement required for reference to instruments. Instrument panel includes a new Boeing-designed fuel control panel incorporating a fuel flow diagram.

A flat-surfaced astral window, clamped in place and sealed with rubber, replaces the navigator's bubble-type astrodome. Its structure consists of two layers of glass with a layer of transparent plastic between.

To improve crew's night vision, the plane is equipped with "red and white" cockpit lighting. A white light, used at sunset to reduce glare, is gradually changed to red for night flying. As dawn approaches, the red lighting gives way to white. Radio operator and navigator get light to meet their special requirements. If pilot or copilot has need to visit them, he can turn their lights from

white to red for duration of the visit, thus maintaining the "night accommodation" of his eyes.

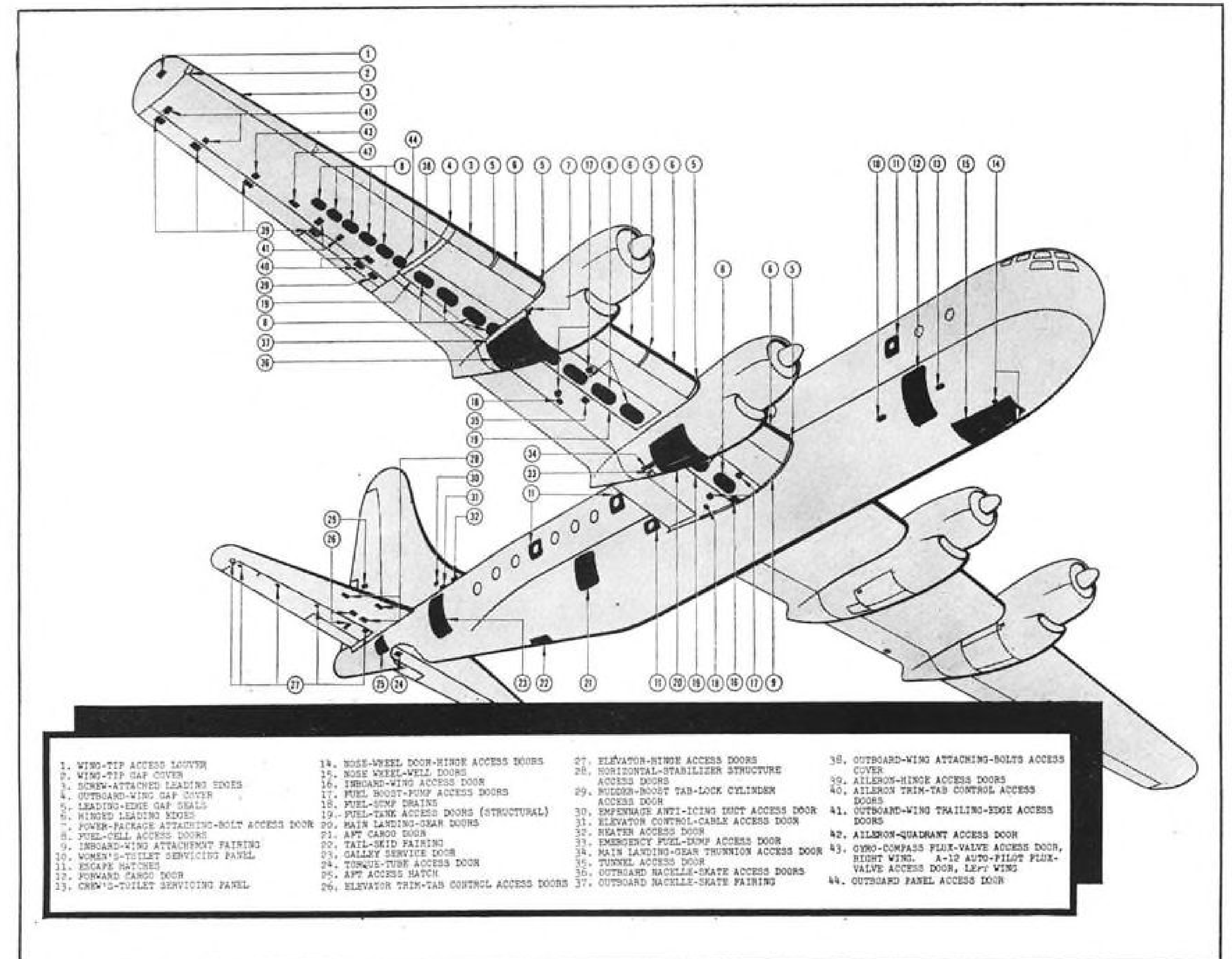
Passageways in the cockpit area are illuminated by red lights to maintain the eye's accommodation to outside darkness.

Crew enters the flight deck through a hatch from the lower forward cargo hold, thus do not have to go through the main cabin.

► **Safety Stressed**—Extremely high cruising speed enables the plane to complete schedules well within the period of forecastable weather.

The plane is designed to withstand even higher load factors than the CAA rules specify, and exceeds in all respects the Civil Air Regulations for control at takeoff speed with one engine dead.

The rudder system allows greater ease of control through a power boost installation and automatic transfer to a spring tab control in case of hydraulic failure. An important safety feature is provided in that failure of any spring in the system will not result in any inadvertent control movement.



Maintenance and servicing facilities are emphasized in Stratocruiser with numerous access panels, both outside and inside craft. Openings are located to give reach to equipment by shortest possible path.

To overcome customary lag between rudder pedal action and movement of rudder, an accumulator is installed in the tail near the boost control valve. Pressure to operate the boost thus is tapped directly from the accumulator and not from the pressure lines. The boost is capable of moving the rudder 20 deg. per sec. with virtually no lag.

While many boost systems have tended to oscillate when disturbed by air gusts or abrupt movements of pilot's controls, Boeing has eliminated this by making the boost responsive only to pilot's controls, and not to air pressure on the rudder, and by eliminating the "flat spot" or lost motion of the boost control valve.

A fire-detecting system is provided for each power package installation, baggage compartments and heater compartments. The detector and extinguishing system features a unified control for stopping the engine and discharging the CO₂. The bottles for the engines and most of the combustion heaters are in the main wheel wells, where they can be inspected from the outside through

"tell tales" which change color if the bottle has been discharged.

Use of a Boeing-designed, ball-bearing type, actuating unit makes possible retraction of the landing gear in nine seconds, an important safety factor because it enables the pilot to "clean-up" his airplane immediately after takeoff, making possible a faster climb-out. Each engine develops 3500 hp. at takeoff with water injection.

The reverse pitch feature of the Curtiss Electric or Hamilton Standard propellers permits quick stops even on icy fields and also enables the Stratocruiser to back up if necessary. In test landings at 100,000-lb. loadings, the plane has been brought to a full stop in as little as 1200 ft. The props can be reversed only when at least one shock strut is fully compressed.

For night landings, a 600w. sealed-beam light faired into the under surface of each wing gives brilliant illumination directly ahead.

Other safety features include thermal anti-icing of wings and empennage, with dual sources of heat; dual tires on the

nose gear as well as on the main gear; 11 separate sources of electrical supply for the basic flight requirements; large area of the vertical fin, making possible "hands off" flight with even two engines cut out, and sufficient to allow easy pilot control even in case of engine failure at takeoff.

► **Freight Accommodations**—Cargo compartments, on the lower deck, have a normal capacity of 8000 lb. Each has its own loading door, with sills at truck-bed height, thus permitting direct loading and unloading.

Rear compartment, intended primarily for baggage, has 305 cu. ft. and a loading door 60x30 in. Integral steps in the door, which lets down to ground level, provide entrance. The door can be opened from either side; from within, by undoing a safety latch and pressing a button. A red light glows at the flight engineers' station until all doors are closed.

Main forward cargo hold has a volume of 820 cu. ft. Its loading door, also with integral steps, measures about 66 x 44-in.

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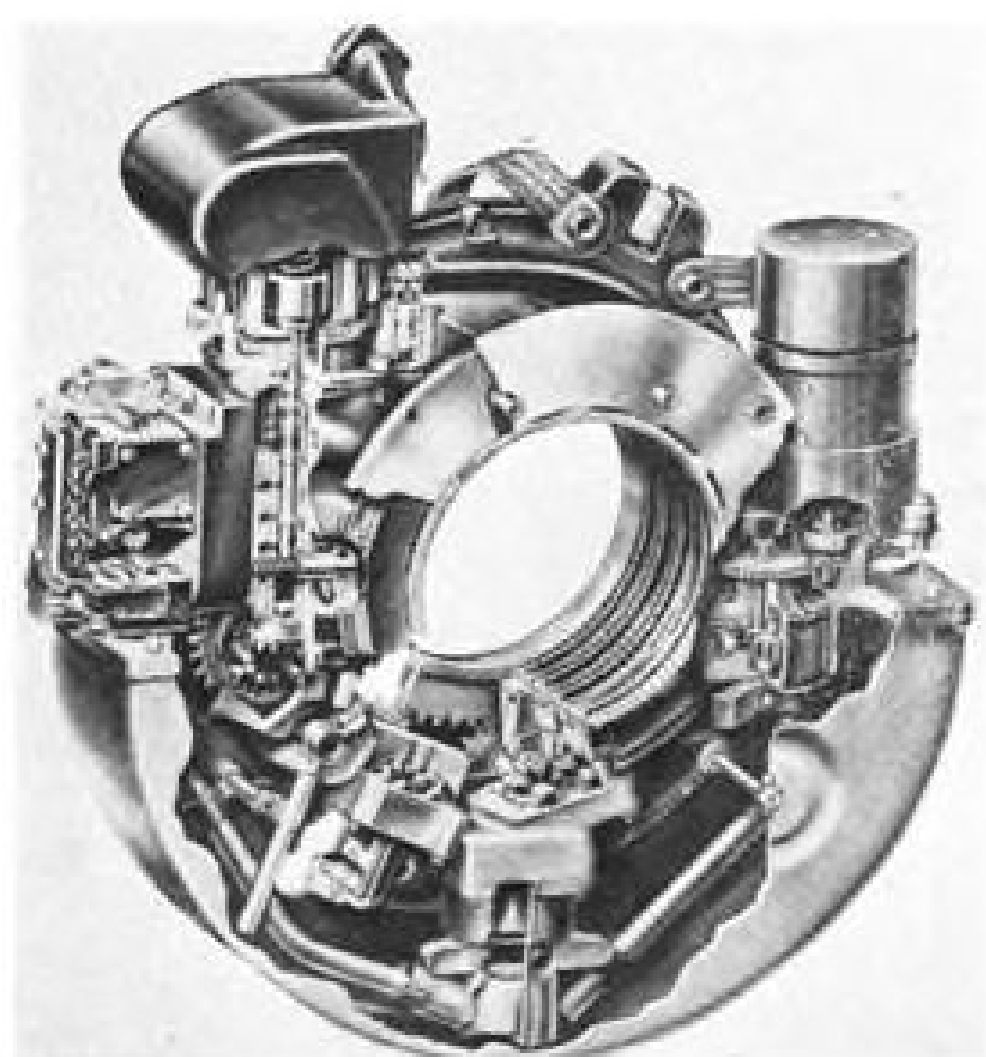
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Self-Contained Oil Control Assembly for Propellers

An integral oil control assembly for Hydromatic propellers—concentrating in a single unit all fundamental operating functions of the prop. together with its oil supply—is now being delivered by United Aircraft Corp.'s Hamilton Standard division for incorporation on military craft.

Applicable where propeller operation using engine oil may not be desirable, the installation will permit use of a fluid medium suitable primarily for the prop. Containing larger capacity pumps and operating with lighter oil, the device is reported to allow utilization of propellers having larger, wider blades for higher power absorption and greater thrust.

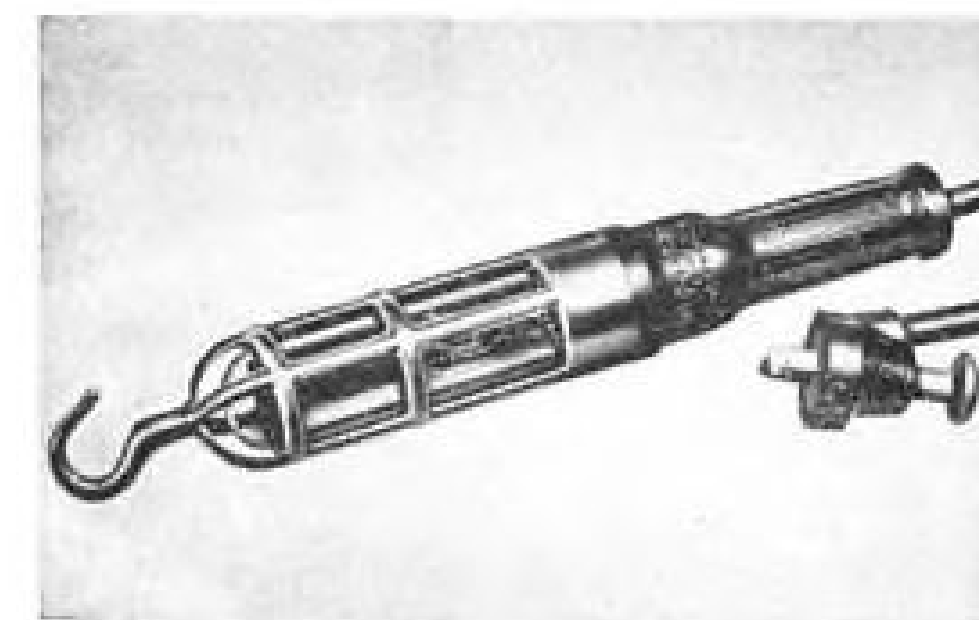
The new assembly comprises a complete accessory unit and oil tank mounted in a compact section at the rear of the hub. Included are hydraulic pumps, governor, auxiliary motor for feathering and reversing, and control valves.

Aircraft on which the assembly will be installed include the Boeing C-97 Stratofreighter, Fairchild C-119 and R4Q (Navy) Packets, Douglas C-124 Globemaster, Grumman SA-16 and JR2F (Navy) Albatross, and Chase C-123.

NEW AVIATION PRODUCTS

Remote Control Hoist

Electronically controlled hoist made by Yale & Towne Mfg. Co., Phila., Pa., for operating across expansive plant areas, over high-temperature equipment, and along rails extending out over plant yards, is intended to eliminate use of long electric control cables. Electronic transmitter plugged into plant power lines supplies energy and receiver operates hoist. For hoist control, there are five dynatron tubes, or, if desired, other type of audio frequency generators, each of which generates one audio control frequency to cause operation of one particular hoist motion.



Rugged Auxiliary Light

New extension hand-light "Neogard," is made by Neoline, Inc., 124 West 4th St., Los Angeles 13, Calif. Since all surface areas are made of non-metallic materials, device is sparkproof and need for ground is eliminated. Lamp guard, made of high impact material, throws off red glow when lighted, to serve as safety signal. For additional safety, phosphorescent unit is available that will glow several hours after light is extinguished. Special triple seal assures waterproof characteristic and permits safe use in underwater operation. Pyrex lamp is resistant to welding spatters and sub-zero weather, and tungsten filament is heavy-braced for rough handling. Handle and heavy-duty cord (25, 50 and 100-ft. lengths) are made of Neoprene. Plug may be locked fast into outlet. Diameter is 1 1/2 in., length is 12 1/2 in., weight is 4 1/2 oz.

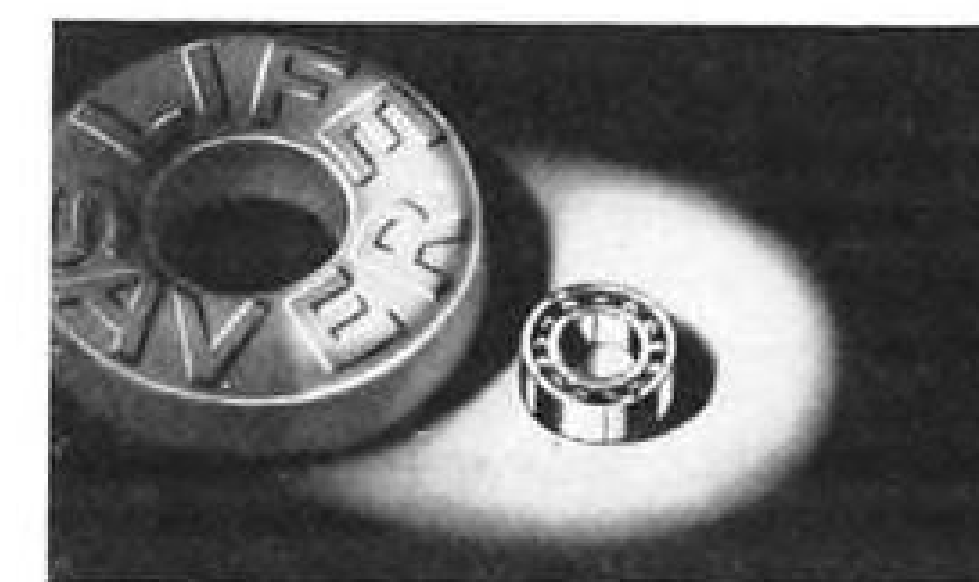


Does Airport Odd Jobs

Utility tractor for all-year airport work on small and large fields is offered by Beaver Tractor Co., Stratford, Conn. Equipped with various attachments, unit can be used for plowing snow, hauling trailers or aircraft, cutting large or small areas with either single or gang lawn mowers, grading and miscellaneous airport jobs. Tractor weighs 429 lb. empty, and is reported economical to operate (2 gal. of gas for 7 hr. use). It functions in reverse as well as forward, has changeable rear wheel tread, and Timken roller and Oilite bearings. Rear end transmission unit runs in oil.

High-Heat Nut

New self-locking nut, designed to withstand sustained temperatures of 550 F., is stated to be easily removed after exposure to such heat without seizing of nut and bolt or galling of bolt threads. Made by Elastic Stop Nut Corp. of America, Union, N. J., unit's elastic deflection built into the locking beam makes possible interchangeable re-use because locking torque is assured within the tolerance range of Class 3 bolts.

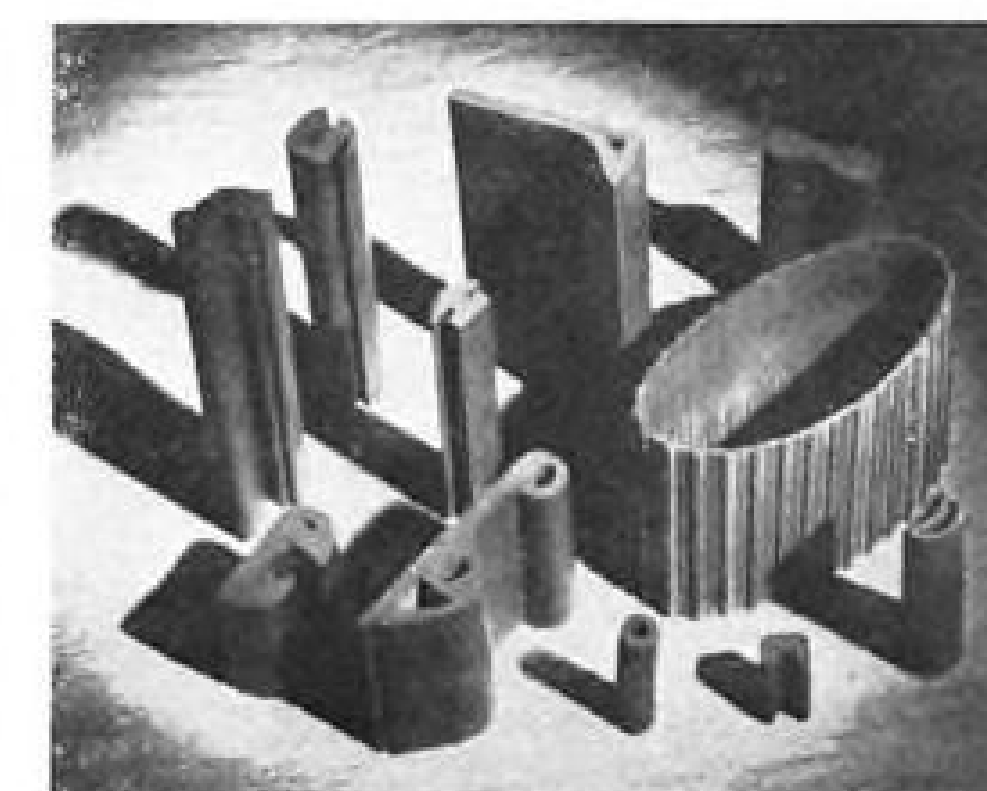


Miniature Ball Bearing

For small installations such as electric motors, cam followers, and aviation instruments, ball bearing with extremely convenient bore to o.d. relation is made by Miniature Precision Bearings, Inc., Keene, N. H. Accepting 1/4-in. shaft, unit needs only 1/4-in. housing bringing space requirements well within what is possible with a plain bearing or bushing, but affording all the advantages of anti-friction operation. Type is full race radial with fifteen 1-mm. balls, surfaces are precision finished, and tolerances are ABEC 5. Device is offered in both chrome alloy bearing steel (SAE 52100) and 440 stainless and in weight of 4 gram.

Non-extrusion Ring Packing

Designed for general aircraft reciprocating and static hydraulic service, ring packing, intended to eliminate damaging effect of extrusion of packing material into clearance space between mating parts, is marketed by Greene, Tweed & Co., North Wales, Pa., as Palmetto G-T Ring. Device consists of resilient ring of synthetic rubber in T-section backed up or supported on each side by two non-extrusion ring retainers or guards, split and made of laminated phenolic material. When operating pressure is increased, flange of ring expands radially against non-extrusion rings, holding them in contact with the surface of cylinder or piston rod. Packing may be used in systems where the temperature range is from -70 to 250 F. and is claimed not to leak or fail over extended operation with pressures from 0 to 3000 psi. Laboratory tests have been at 10,000 psi. Only application not suited for these ring packings is system employing continuous rotary motion.



Low-Temp Rubber Compound

New synthetic, a butaprene-based rubber compound, offered by Stalwart Rubber Co., 179 Northfield Road, Bedford, Ohio, is represented as specially suitable for numerous applications in which rubber must withstand very low temperatures for prolonged periods of time and still retain flexible qualities, as in aircraft installations. Material is stated to withstand effects of temperatures as low as -50 F. It has permanent set of 4 percent, specific gravity of 1.25; durometer hardness of 55, and remains unaffected by dilute acids, alkalis, petroleum products, hydrocarbons, and solvents. Another feature is resistance to oxidation at high temperatures. Compound can be extruded into channels; lathe-cut or punched into gaskets, washers, and grommets; and molded to shape. It's stated that special additives can adapt it for almost any required application (certain compounds will withstand extreme weathering, impact, and compression) and elongation can be "fixed" to meet individual specifications.

FINANCIAL

Equipment Trust as Financing Aid

Some legal questions resolved, other obstacles to plan remain; ICAO lauded for work on recognition of rights.

With the problem of acquiring new aircraft becoming more acute for an increasing number of airlines, the removal of all impediments to the necessary financing for such equipment becomes a paramount necessity.

Perhaps the greatest potential aid in this respect is the wider utilization of equipment trusts as an instrument of airline finance.

In many instances, existing top-heavy capital structures preclude any other form of financing but the equipment trust device. Certainly, if this financing medium were used at the outset in many instances, it is highly probable that the industry as a whole would have emerged through its transition period in sounder condition.

► **Equipment Trust**—The equipment

trust device has fully demonstrated its attractiveness in railroad financing. The principle of "pay-as-you-go" which underlies this type of paper is time-tested and has survived numerous crises in railroad reorganizations. The fact that it has held up very well has made the equipment trust an attractive instrument even in times when railroad credit was at low ebb.

Secured by the actual rolling stock, the equipment trust has survived many financial difficulties.

The air transport industry could not apply this same financing device during its early development, due to various legal complications.

At one time, an equipment trust trustee could be held liable as owner of the aircraft if it were involved in an

accident. Further, in the recent past there was no satisfactory method of recording interests in engines and spare parts.

► **Obstacles Removed**—Largely as a result of recommendations advanced by the Congressional Aviation Policy Board, both of these legal obstacles were removed by the last Congress.

More formidable is the clarification of the legal question of ownership of mortgaged airline property in bankruptcy. Under existing conditions, a secured creditor can not legally repossess operating property immediately. While the Congressional Aviation Policy Board recommendation to adjust this problem was presented to the Congress, it was found that the enactment of such necessary provisions would necessitate a complete overhaul of co-related railroad legislation.

To facilitate the necessary banking safeguards, it is believed that revision of the Bankruptcy Act may be necessary. This will no doubt be attempted at the present session of Congress.

► **Changes Evident**—The effect of such changes as have been accomplished is evident. The leasing plan sponsored by Convair would have been virtually impossible were it not for clarification achieved in respect to recording engines and spare parts and the elimination of

potential liability on the part of trustees in event of accident of the secured aircraft.

All the equipment trust device can hope to accomplish is to afford the airlines with greater flexibility in their financing programs. It is no cure-all and, fundamentally, the individual credit of the borrowing airline will remain the key determination.

A far-reaching constructive attempt to lend this flexibility to the airlines is present in the International Civil Aviation Organization's approved Convention on the International Recognition of Rights of Aircraft. Under the leadership of Russell B. Adams, Civil Aeronautics Board member and chief U. S. delegate to the ICAO Assembly, the draft convention on the recognition of aircraft rights was endorsed by 20 signatory countries.

► **Ratification Needed**—However, to implement this convention, it now becomes necessary for each country to ratify this action of the ICAO Assembly. A determined attempt will be made at the present session of Congress to approve and sustain the U. S. delegation's action of last June.

It is the hope of the constructive elements of the aviation and banking groups that the Congress will ratify this action. The public has little apprecia-

tion of the sheer magnitude of the achievement accomplished by the U. S. delegation in obtaining a uniform measure of agreement among 20 countries on the approved draft convention.

This writer, as the first secretary of the Interdepartmental Committee on Facilitation of Civil Aviation, recalls the difficulty in obtaining agreement among a number of diverse agencies so that a united U. S. position could be presented before the ICAO Assembly. Certainly, the molding among government departments of U. S. views on the international recognition of aircraft must have been an equally torturous process. And after this has been achieved, to obtain agreement among 20 countries represents an accomplishment.

► **Basic Difficulty**—This becomes even more impressive when it is realized that for 22 years international lawyers have failed to reconcile conflicting national law on the subject. One of the basic difficulties was that many nations with legal systems based on Roman law do not have anything comparable to the English concept of the chattel mortgage.

This has been a major bar to banks and aircraft builders seeking a form of security for loans to plane purchasers which would rank as high as a first mortgage no matter where the plane.

In many countries, under existing statutes, tax liens and attachments arising from indebtedness of an operator for supplies and other kinds of claims may take priority over a mortgage.

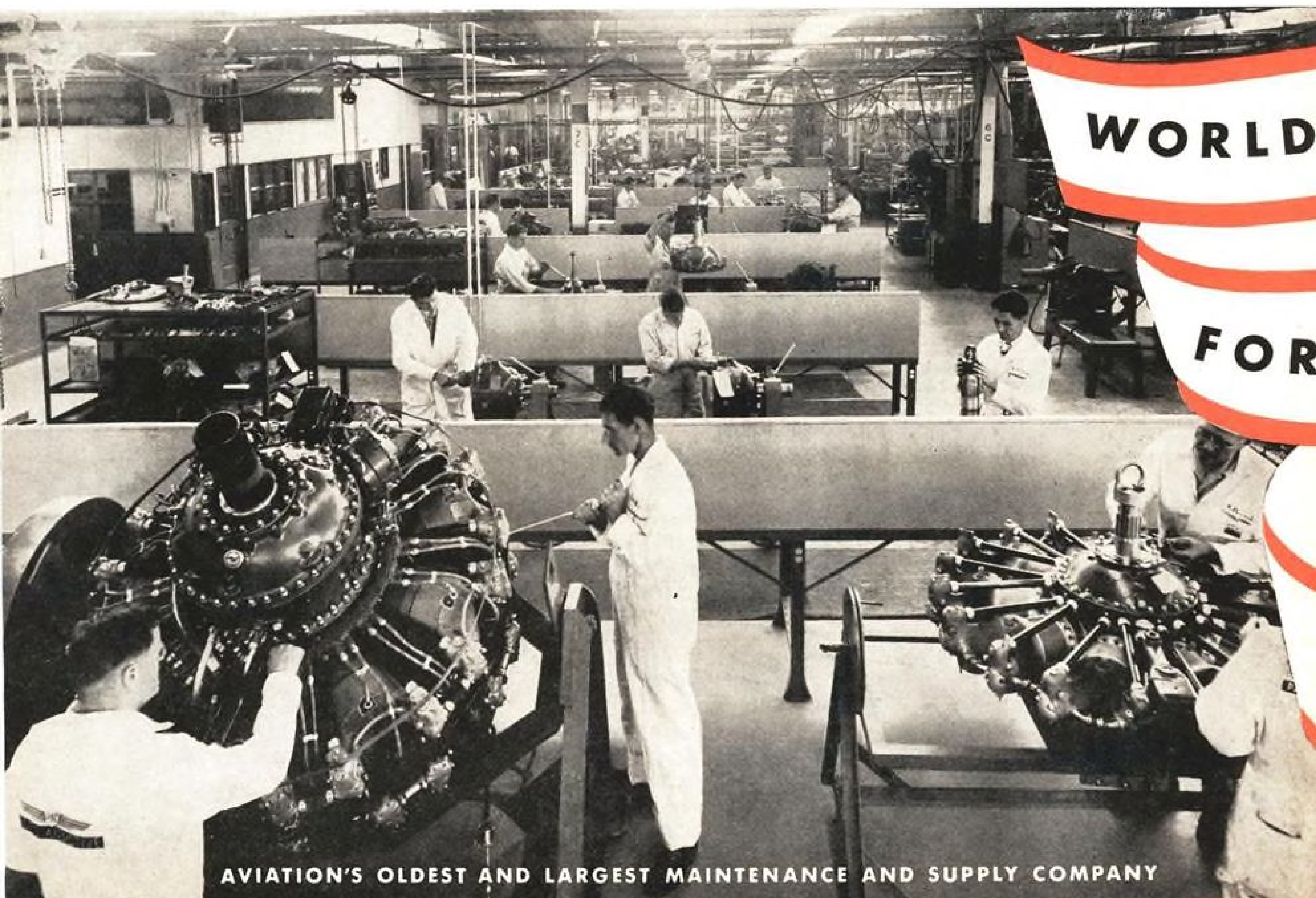
The approved convention establishes the principle that property rights including mortgages, constituted in accordance with the law of one contracting state, shall be recognized in all other contracting states as having priority over all other claims on a plane or its operator. An exception is made for claims arising out of salvage operations or expenses incurred for action found indispensable to the preservation of the aircraft.

► **Compromise Spirit**—The fact that agreement was reached by 20 countries is indicative of the spirit of compromise which must have prevailed.

While the convention will be limited to those countries approving the agreement, a significant area of the world is included and is bound to be extended.

For this reason, it becomes very important for Congress to approve this proposed convention. It is known that many other countries are inclined to follow the U. S. lead in such aviation matters. A major impetus to the early ratification by other nations is bound to follow quick U. S. approval.

—Selig Altschul



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AVIATION WEEK, January 10, 1949

SALES AND SERVICE



New Wing Ups Cessna 170 Performance

Price increased \$500
on improved model of
popular four-placer.

By Alexander McSurely

The new 1949 Model 170 Cessna four-placer with an all-metal wing will be priced at \$5995 flyaway Wichita, Cessna Aircraft Co. announced at a meeting of the company's distributors this weekend.

Designed to cruise at over 120 mph. with four passengers, full fuel load and 100 lb. of baggage, the plane has a range at this speed and under those conditions of well over 500 miles, the manufacturer states. Top speed is quoted at over 140 mph. and landing speed at 45 mph.

► **Price Increase**—By replacing the fabric-covered metal structure wing used on last year's 170, Cessna has put its best selling model of 1948 in a definitely advantageous position for 1949, and with a price increase of only \$500.

Latest figures available show Cessna sold 684 of the 170s in the first 11 months of 1948. Considering the plane was not introduced until December 1947, and that only a few were sold in the first months of 1948, the Cessna Model 170 was definitely the best accepted four-placer of the year.

(The Stinson Voyager on the basis of 11 months figures led the 170 in total planes shipped for the year, with 801. This was due to larger Voyager shipments in the early part of 1948 before the Model 170 "caught on.")

► **Same Span**—The new tapered all-metal



Tapered planform of new all-metal wing and new rounded dorsal fin (above) mark 1949 Model 170. New single lift strut attached to wing is shown below. Craft is designed to

cruise at over 120 mph., land at 45 mph. Range of the Model 170 is over 500 miles. It is powered by Continental C-145 engine.



AVIATION WEEK, January 10, 1949

SALES & SERVICE

35

BRIEFING FOR DEALERS & DISTRIBUTORS

SHORTER CROSSWIND TAKEOFFS—An NACA investigation of crosswind gear plane performance with a two-place Piper Cub shows that the swivelling-gear plane uses less runway for takeoff with side winds than in calm air.

The research agency reported to CAA, which had asked for the investigation, that the light plane used 75 ft. less runway on takeoff with side winds of 11.4 to 19.3 mph. than it did with virtually calm air conditions of 0.6 to 2.3 mph. With a 40 mph. takeoff speed and with the side wind averaging 16.4 mph., the reduction in takeoff amounted to 24 percent (75 ft.). At a higher takeoff speed of 50 mph., the reduction in takeoff was 22 percent.

CAA officials say that the test establishes the one unproved factor of the length of runway required for single-runway airstrips, indicating that length need be no greater because of this condition. Indication is that CAA will push vigorously to minimize multiple-direction runway construction at new airports. John Geisse, consultant for CAA, says that as long as multiple runways do not intersect, they could be used simultaneously regardless of wind direction, by planes with crosswind gear.

BONANZA CHARTER SERVICE—Charter service with Beech four-place Bonanzas is available from 65 Beech dealers and distributors in 34 states, the manufacturer has announced. Bonanza rentals to qualified pilots are available from 42 of these same dealers and distributors.

COMMUNITY AIRPORT PLANNING—A new CAA publication "Economic Character of Communities," is designed to show the types of information needed in planning an airport for a community, in addition to the mere population of a community.

Briefly, the publication presents a new means of market research in the field of airport planning, showing how to analyze the manner in which people of a given community earn their livelihood, the extent toward which movement and travel enters into that community's economic life, the amount of earnings, the way earnings are spent, and other similar factors.

The research method, CAA states, has been tested in approximately 160 city surveys, and is made available as a guide to community airport planners. The study shows generally that communities which are marketing centers or are institutional in character (with large government or educational centers) have higher airline passenger potential, higher per capita indexes of registered aircraft, and higher average pounds of airmail dispatched per capita, than do communities with major industrial interests, or a balance between industry and marketing.

FLAME RESISTANT FINISH—Monsanto Chemical Co. has announced it is making its Skylac flame-resistant aircraft finishes available to the private airplane field. The finishes were developed for commercial airlines, and approximately three-fourths of U. S. domestic airlines have standardized on Skylac interior or exterior lacquers.

The manufacturer states that the lacquer's resistance to flame is superior to that of any similar commercially available material. Cost of doping a light plane with Skylac is reported comparable to that of conventional nitrocellulose base dopes because fewer coats of Skylac are required for a satisfactory tautening and protective coating.

MORE ON PIPER-STINSON—Approximately 300 Stinson dealers will be added to the 1300-man Piper dealer organization as a result of the recent purchase of Stinson division of Consolidated Vultee Corp. by Piper Aircraft Corp. (Aviation Week, Dec. 6, 1948).

President William T. Piper says the 1949 Piper line will include four two-place models and four different four-place models from the two-place 65 hp. Vagabond listed at \$2010 to the Stinson Flying Station Wagon listed at \$6484. Piper definitely will continue manufacture of the Stinson planes it was stated, after tools, jigs and other equipment are transferred to Lock Haven from Wayne, Mich.

—ALEXANDER MCSURELY

wing has the same span (36 ft.) and the same wing area (175 sq. ft.) as the old fabric-covered wing. NACA airfoil 2412 is used. A single lift strut replaces the old double strut arrangement.

Wing chord is 64 in. constant from wingroot to strut attachment and 44½ in. outboard to wingtip.

A larger rounded dorsal fin similar to that used on the larger Models 190 and 195 is used on the new 170, giving improved directional stability. Elevator control system has been redesigned to reduce control loads at landing, and aileron control is reported more sensitive than on last year's model.

Increased flap area, and greater down travel (to 50 percent) has improved glide control in the whole range of approaches, the manufacturer states. A new positive flap control system is designed to prevent flaps from being blown down while the airplane is parked.

Weight empty is reported just under 1200 lb., slightly less than last year's weight empty. Gross weight is 2200 lb. Fuel capacity has been increased slightly to 42 gal. A new gravity fuel system eliminates fuel pump installation.

► **Same Engine**—Plane is powered by the Continental C-145 engine rated at 145 hp. for takeoff. The engine, which was new last year with the airplane, has been subjected to several minor modifications which have added materially to its serviceability. These include, the plane company states: sturdier crankcase gaskets, improved camshaft less subject to wear, and new wrist pin plugs.

Interior of the fuselage has been sprayed with a sound-proofing material which lowers the cabin decibel rating noticeably. Seats have been restyled for improved comfort, and a new cabin upholstery of wool fabrics and leather trim is offered.

► **In Production**—The new four-placer is already in production, and the entire distributor and dealer organization is expected to receive demonstrators within the next few weeks.

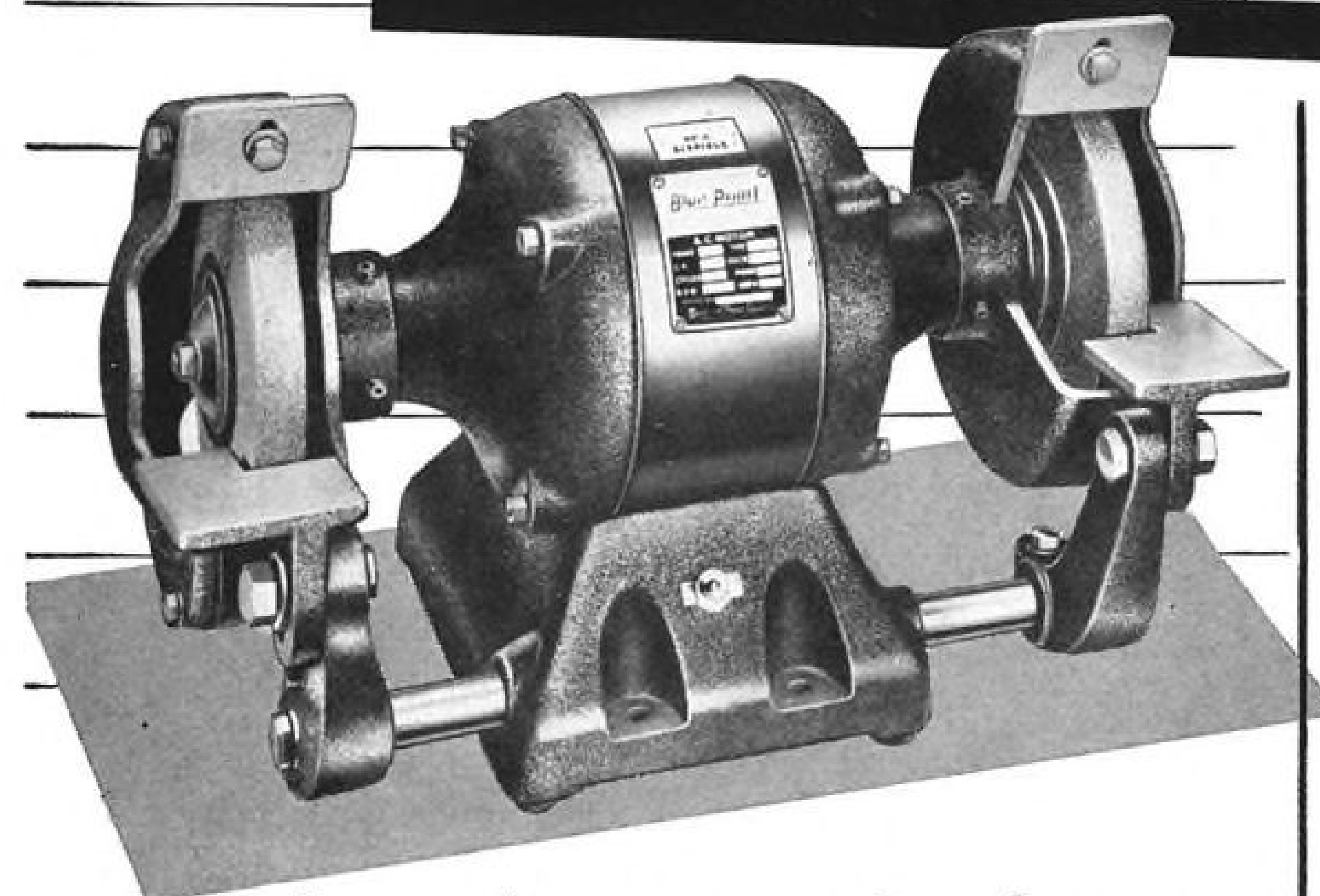
While detailed announcement on other Cessna 1949 models has not yet been made, they are expected to include again the two-place models 120 (with 85 hp. engine) and 140 with 90 hp. engine, and the large four-to-five place models 190, with 240 hp. Continental, and 195, with 300 hp. Jacobs engine.

Although the manufacturer has sought to design its entire postwar line to make as many components as possible interchangeable from one model to another, the new 170 wing is not adaptable to the large 190 and 195s which use a full cantilever all-metal wing.

The 1949 two-place models are expected to continue with the same fabric-covered metal construction wing used for the 1948 models, at least for the time being.

Snap-on Bench Grinders

with the famous *Blue Point* Trade Mark



... have the construction features for smooth, powerful operation ...

COMPLETELY ENCLOSED MOTOR: Super-powered, precision-balanced motors enclosed to prevent dirt, grit, etc. from entering.

BALL BEARING CONSTRUCTION: Oversize, grease sealed ball bearings used throughout, assure smooth motor operation.

LARGE RUGGED BASE: Rubber feet provide solid mounting free from vibration. Recessed bolt openings for permanent mounting.

INDUCTION RUN MOTOR: Develops less heat in the windings — more desirable for continuous operation.

STURDY TOOL RESTS: Adjustable for any type of work with ample take-up for wheel wear.

LARGE WHEEL GUARDS: Allow use of special shape grinding wheels or wire brushes. Guards fitted with chip breakers.

BELL TYPE CONSTRUCTION: Provides full clearance so that long straight pieces may be ground across the face of the machine.

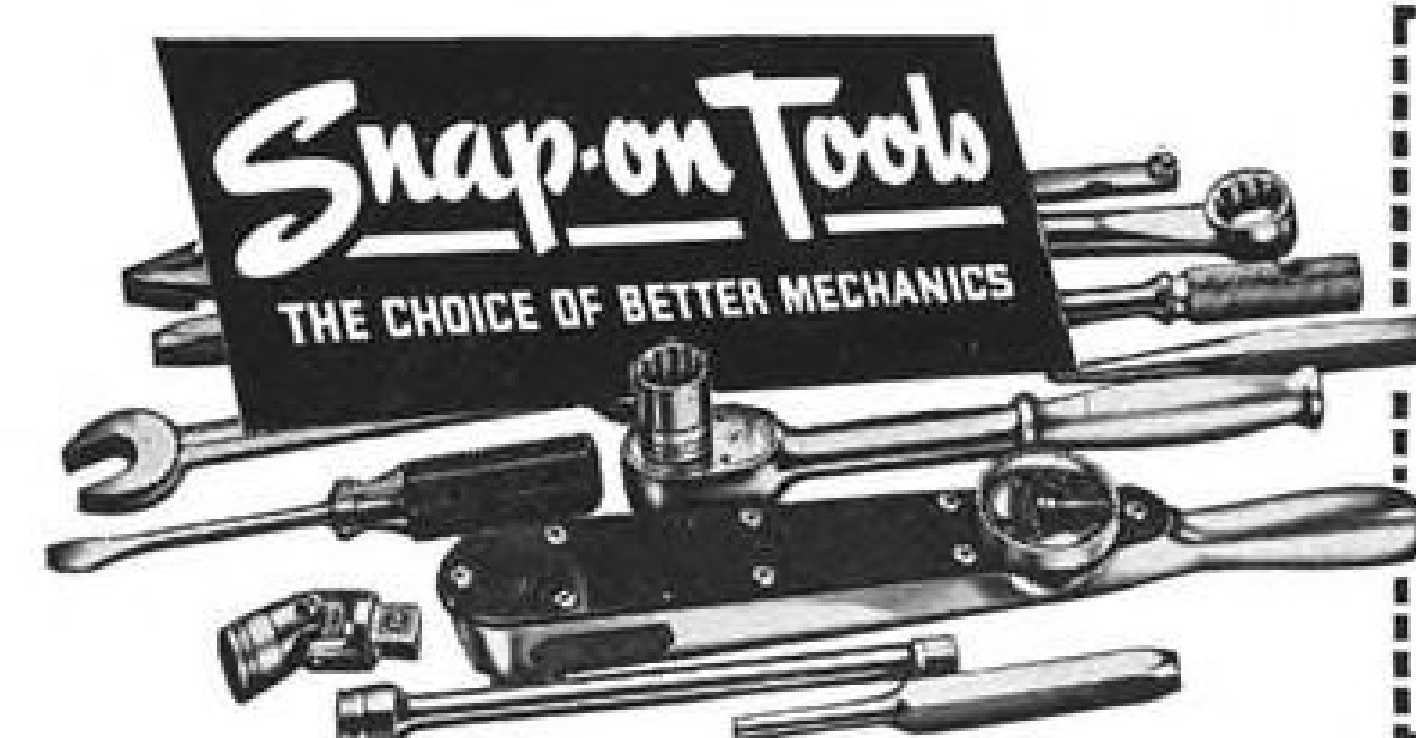
CAPACITOR START MOTOR: Uses low starting current . . . actually less than 15 amps. are consumed.

VOLTAGE: Standard models of the ½ H.P. and 1½ H.P. grinder require 110 Volts, 50/60 cycle AC current. Standard 1 H.P. grinder takes 220 Volts, 50/60 cycle AC current. Special voltage models available.

SNAP-ON TOOLS CORPORATION

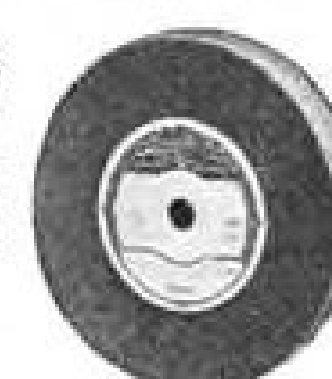
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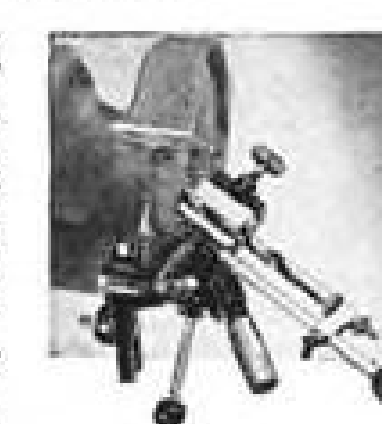
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Who was First?



WHO WAS FIRST to apply the age-old principle used by the Indians in building birch-bark canoes, to the development of "stressed-skin" fuselage construction? Answer: First smooth "stressed-skin" monocoque fuselage patent was issued to F. E. Lundy in 1926.



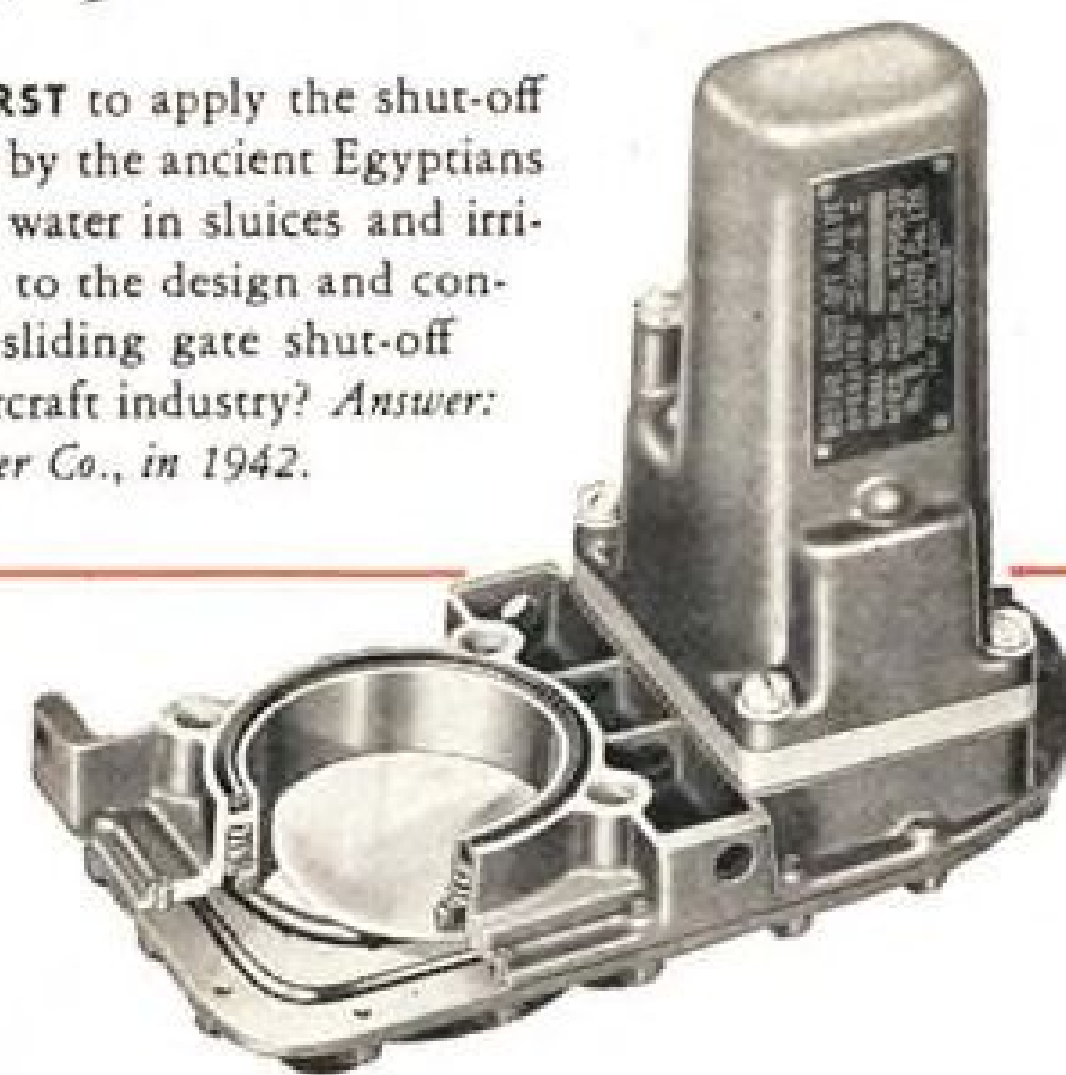
WHO WAS FIRST to apply the natural laws of flight used by birds to develop a scientific approach to the possibilities of human flight? Answer: Leonardo da Vinci, the famous Italian scientist, is credited with the first study of birds to determine the ratio of wing area to flight load.



WHO WAS FIRST to apply Newton's third law—"for every action there is an equal and opposite reaction"—to the design and construction of a jet-propelled airplane? Answer: The first jet-propelled airplane was designed by Campini and flown near Milan, Italy in 1940.



WHO WAS FIRST to apply the shut-off principle used by the ancient Egyptians for control of water in sluices and irrigation ditches, to the design and construction of a sliding gate shut-off valve for the aircraft industry? Answer: Wm. R. Whittaker Co., in 1942.



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AIR TRANSPORT

Preliminary Traffic and Financial Results Certificated Domestic Trunklines

Traffic	1947	1948
Revenue passenger miles.....	6,010,627,000	5,800,100,000
Mail ton-miles	32,878,825	37,226,000
Express ton-miles	28,533,362	30,452,000
Freight ton-miles	35,213,590	68,760,000
Excess baggage ton-miles.....	6,874,178	6,740,000
Total revenue ton-miles.....	683,359,449	700,015,000
Revenues		
Passenger	\$303,193,782	\$327,977,000
Mail	23,325,630	37,257,000*
Express	10,530,408	9,880,000
Freight	8,357,837	13,635,000
Excess baggage		3,808,000
All other	7,082,710	2,677,000
Total operating revenues.....	\$352,490,367	\$395,234,000*
Operating Expenses	\$373,390,471	\$407,173,000
Net Operating Income.....	-\$20,900,004	-\$11,939,000*
Selected Ratios		
Passenger load factor.....	65.7%	58.3%
Revenue ton-mile load factor.....	57.0%	52.0%
Receipts per revenue passenger mile.....	5.04¢	5.65¢
Receipts per mail ton-mile.....	70.9¢	100.0¢*
Receipts per express ton-mile.....	36.9¢	32.4¢
Receipts per freight ton-mile.....	24.0¢	19.8¢
Receipts per revenue ton-mile.....	51.2¢	56.5¢
Expenses per revenue ton-mile.....	54.2¢	58.2¢

(*) Does not include retroactive mail pay awarded National Airlines, Northwest Airlines, Capital Airlines and Western-Inland Air Lines in recent CAB orders. If taken into account, these payments would probably increase total mail pay and operating revenues by about \$5 million, effecting a corresponding reduction in estimated losses for 1948.
Note: 1948 estimates are based on complete official reports for nine months, preliminary figures for October and estimates for November and December.

Did Carriers Make Money in 1948?

Overall industry result depends on final mail rates; feeders and flag carriers seem sure to show profit.

With the aid of sharp gains reported by international operators and the feederlines, U. S. certificated carriers handled more traffic and did a larger dollar volume of business in 1948 than ever before.

And when final mail rates are set by the Civil Aeronautics Board, last year may prove to be a profitable one for the industry as a whole.

► **Record Ton-Mile Volume**—The Air Transport Assn. estimates that all U. S. certificated carriers—domestic and international trunklines and the feeders—flew a record 963,294,674 revenue ton miles of passengers, mail and cargo in 1948, compared to 926,484,273 in 1947. Revenue passenger miles declined from 7,867,138,000 in 1947 to about 7,768,786,000 last year. But increased freight, express and mail business boosted the overall ton-mile figure to the new peak.

Operating revenues for the industry as

a whole climbed from \$569,940,600 in 1947 to an estimated \$643,541,849 last year, a gain of 13 percent, or more than \$73 million. Operating expenses rose from \$591,741,861 to about \$650,277,263, up more than \$58 million, or 10 percent.

Passenger traffic accounted for about 77.37 percent of the certificated airlines' operating revenue in 1948. Mail contributed 15.5 percent and cargo (freight and express) 7.13 percent.

► **Losses Tumble**—Tentative figures show that net operating losses for the entire industry tumbled from an all-time high of \$21,801,160 in 1947 to around \$6,735,364 in 1948. The ATA calculations for 1948 do not include recent retroactive mail pay increases for National Airlines, Northwest Airlines, Capital Airlines, Colonial Airlines, Western Air Lines and Inland Air Lines.

The domestic trunklines' estimated

operating loss for 1948 has been placed at \$11,939,000, against \$20,900,004 in 1947. But, ATA explains, last year's deficit may have been cut by \$5 million through CAB's latest mail pay decisions.

When final mail rates are set for both domestic and international operators, the tentative \$6,735,364 industry-wide operating deficit for 1948 may be wiped out completely. Even without further adjustments, U.S.-flag international operators as a group and the feederlines as a group should show operating profits for 1948.

► **Passenger Business Off**—The 1.3 percent decline last year in revenue passenger miles flown by all U. S. certificated carriers was accounted for entirely by a slump in the domestic trunklines' passenger business. From 6,010,627,000 revenue passenger miles in 1947, domestic trunkline traffic fell to about 5,800,100,000 passenger miles last year, down 3.5 percent.

By contrast, revenue passenger miles flown by American flag international and overseas carriers rose 4 percent from an estimated 1,810,092,000 in 1947 to 1,885,000,000 in 1948. Feederlines flew an estimated 83,686,000 revenue passenger miles last year, up sharply from the 46,419,000 reported in 1947.

► **Fare Hikes Boost Revenue**—Despite the overall passenger traffic decline, passenger revenue gained about 7 percent. This was due primarily to fare increases which lifted receipts per domestic passenger mile flown from 5.04 cents in 1947 to 5.65 cents in 1948. International fares rose very slightly from 7.77 cents a passenger mile in 1947 to 7.80 cents last year.

Average passenger load factor for the domestic trunklines in 1948 was around 58.3 percent, down from 65.7 percent in 1947. International passenger load factors also declined from 61.9 percent in 1947 to 57.5 percent last year.

► **Freight Paces Gains**—In 1948 as in 1947, the greatest traffic increases took place in the cargo field.

The domestic trunklines flew about 68,760,000 freight ton miles in 1948 compared to 35,213,590 in 1947, while express ton miles rose from 28,533,362 to about 30,452,000.

American flag carriers' freight ton miles soared from 2,095,899 in 1947 to 5,785,000 in 1948. International express traffic increased from 30,794,846 ton miles in 1947 to 39,705,000 last year.

► **Mail Tonnage Increases**—Aided by inauguration of parcel post service, mail ton miles flown by the domestic trunklines jumped from 32,878,825 in 1947 to 37,226,000 in 1948. Similarly, U. S. mail ton miles flown internationally by American carriers climbed from 12,567,060 in 1947 to 15,570,000 last year.

Domestically, receipts per mail ton

Preliminary Traffic and Financial Results

International and Overseas American Flag Carriers

Traffic	1947	1948
Revenue passenger miles	1,810,092,000	1,885,000,000
U. S. mail ton-miles	12,567,060	15,570,000
Foreign mail ton-miles	2,932,384	2,740,000
Express ton-miles	30,794,846	39,705,000
Freight ton-miles	2,095,899	5,785,000
Total revenue ton-miles	238,443,134	254,600,000
Revenues		
Passenger	\$140,652,112	\$147,030,000
Express	16,837,513	19,455,000
Freight	688,762	1,189,000
Excess Baggage	4,387,936	4,564,000
U. S. Mail	32,299,889	47,710,000
Foreign Mail	8,524,989	7,014,000
All Other	5,628,326	6,000,000
Total operating revenues	\$209,609,530	\$232,962,000
Operating Expenses	\$209,293,531	\$229,140,000
Net Operating Income	—\$284,000	\$3,822,000
Selected Ratios		
Passenger load factor	61.9	57.5
Revenue ton-mile load factor	57.1	56.5
Passenger mile receipts	7.77¢	7.80¢
Express ton-mile receipts	54.68¢	49.00¢
Freight ton-mile receipts	32.86¢	20.50¢
Foreign mail ton-mile receipts	290.72¢	256.00¢
U. S. mail ton-mile receipts	257.02¢	300.00¢
Total revenue ton-mile receipts	87.70¢	91.50¢
Revenue ton-mile operating expense	87.80¢	90.00¢

Note: Traffic, revenue and expenses for final quarter of 1948 were estimated. Final profit for year will depend importantly on permanent mail payments as yet undetermined.

mile flown by the trunklines rose from 70.9 cents in 1947 to around \$1 in 1948, and the latter figure may be increased substantially by CAB decisions. In contrast, the domestic trunklines received only 19.8 cents per freight ton mile flown in 1948, down from the 24 cents reported in 1947; and express ton mile receipts dropped from 36.9 cents in 1947 to 32.4 cents last year.

CAL To Start Skycoach Service

Continental Air Lines plans to board the skycoach bandwagon.

President Robert F. Six has announced his company will ask CAB approval this week for a \$20 fare covering "no-meals, no-frills" nonstop DC-3 service between Denver and Kansas City. If the request is approved, service will start Feb. 15.

The \$20 skycoach fare compares with almost \$16 for one-way rail coach transportation between Denver and Kansas City and nearly \$28 for first-class rail accommodations with lower berth. Present air fare is \$31.70.

► **Night Flights Only**—Continental's 21-passenger DC-3 coach flights would leave Denver at 2:45 am. and arrive in Kansas City at 6:57 am. A similar schedule would leave Kansas City at 11:55 pm. and arrive in Denver at 2:25

am. Rail transportation between the two points varies between 11 and 19 hr.

CAL's action followed closely on the heels of TWA's proposal to inaugurate Kansas City-Los Angeles skycoach service starting Jan. 12 (AVIATION WEEK, Jan. 3). The proposed four-cents-a-mile TWA coach tariff has been protested by United Air Lines, and CAB has refused special tariff permission for inauguration of the low-cost operation on Jan. 12. Consequently TWA's skycoach service cannot begin until February.

Last October, TWA sought to attract more traffic to its DC-3 flights by offering systemwide roundtrip reductions of 15 percent on this type of equipment; but United, Mid-Continent and Capital Airlines protested. CAB suspended the tariff pending an investigation.

► **Mid-Continent Slash**—United also has protested Mid-Continent's proposal to offer a special low fare on regularly-scheduled daily flights between Kansas City and St. Louis. The new rate would be \$9.95 for the 229-mile flight, against the present fare of \$14.15. The slash was to have become effective Jan. 12, but CAB refusal to grant special tariff permission postpones the move until next month.

Meanwhile, Northwest Airlines has inaugurated thrice-weekly DC-4 coach service between Seattle and Anchorage, Alaska. One-way fare on the combination-passenger-cargo craft is \$70, compared with the regular \$92 first-class winter

rate. NWA's proposed Washington, D. C., to Minneapolis skycoach tariff was withdrawn by the carrier (AVIATION WEEK, Jan. 3).

Flying Tigers Report Peak Fourth Quarter

The Flying Tiger Line, pioneer all-cargo carrier, finished 1948 with an upsurge in traffic and earnings.

President Robert W. Prescott said the company's business hit a new peak in October and that December traffic apparently was even better. The carrier, which has been recommended for a CAB certificate, has had operating profits since July and net profits throughout the fourth quarter of 1948.

"Our record since July, when the Civil Aeronautics Board put a floor under freight rates, proves the soundness of the tariff structure," said Prescott. "Before the Board revised the rates all of us were flying freight at substantial losses. But the cutthroat competition brought about by the efforts of certain interests to put independent airfreight carriers out of business has now been stopped, with the result that the industry is on its way toward making a profitable and useful contribution to the nation's air transport system."

Prescott said Flying Tiger operating revenues aggregated about \$200,000 in October, up 21 percent over September and 130 percent above last January. Freight ton miles flown this year should more than double 1947's total of 5,654,000. The company lost about \$250,000 during the first half of 1948.

On Sept. 30 the Tigers had six DC-4s, three DC-3s and 269 employees, including 28 pilots and copilots. Equipment has been leased on a number of occasions to nonscheduled transcontinental passenger carriers.

AOA '48 Profit Tops \$1 Million

American Overseas Airlines earned an indicated profit of over a million dollars during 1948 and transported more than one-fifth of all North Atlantic air passengers.

The earnings estimate is predicated on a \$1,145,000 profit for the first eleven months of 1948 before year-end adjustments and determination of final mail rates.

On trans-Atlantic operations, AOA flew 71,000 passengers in 1948, an increase of 11.6 percent over 1947. Cargo totaled 2,215,800 lb., up 31.1 percent, and mail 1,161,150 lb., up 16.9 percent over the previous year. An additional 13,780 passengers were carried between Frankfurt and blockaded Berlin, to-

gether with nearly 3000 tons of cargo and 122 tons of mail.

Eastbound, AOA flew 21.3 percent of the total air passenger traffic over the North Atlantic during the first eleven months of 1948, and its westbound share was 23.3 percent. An application for approval of merger with Pan American Airways is pending before CAB (AVIATION WEEK, Dec. 20), but AOA officials say the move is not affecting their company's current operations.

Lump Sum Offered As Back Mail Pay

More than a million dollars in retroactive mail pay is in prospect for Western Air Lines and its subsidiary, Inland Air Lines.

The Civil Aeronautics Board has offered Western lump sum mail pay aggregating \$4,252,000 (14.2 cents a plane mile) for the period May 1, 1944, to Dec. 31, 1948. This would give WAL \$975,000 more mail pay for the period than it had received under its former rates and would enable the carrier to show a 7 percent net profit on its recognized investment for the 56-month period.

► **Excess Profits Offset**—In figuring Western's retroactive rates, CAB offset profits of more than 7 percent earned by the company from May 1, 1944, to November, 1945, against the overall losses incurred during the following three years. Had WAL waited until the end of 1945 to file its petition for more mail pay, it could have kept the "excess" profits earned during the previous year and a half.

Also cutting down Western's mail pay need was the net profit of \$794,000 earned by the carrier on the sale of its Denver-Los Angeles route 68 to United Air Lines in September, 1947. WAL sold the link for \$3,750,000.

► **Incentive Mail Rate**—For the period starting Jan. 1, 1949, Western has been offered a sliding scale incentive mail rate hitched to its passenger load factor. The carrier would get 33 cents a plane mile maximum mail pay each month that its passenger load factor was below 55 percent. CAB estimates the company would break even under the new formula with slightly less than a 50 percent load factor.

For each 1 percent increase in WAL's passenger load factor above 54.99 percent, the maximum base mail rate will be decreased by 1.40 cents a plane mile. The minimum base mail rate of 8.40 cents a mile will be applicable when the load factor is 72 percent or higher.

CAB estimates that Western would earn about 7 percent net profit on its investment at a 55 percent load factor. With a 70 percent load factor, despite

the lower mail rate, it could earn an estimated 14.7 percent profit. But with a 50 percent load factor the net profit would be only 1.4 percent since the higher mail rate would not balance the lower passenger income.

► **Lump Sum Offered**—Inland Air Lines was offered lump sum mail pay of \$1,099,000 (27 cents a plane mile) for the period Mar. 28, 1947, to Dec. 31, 1948. This would give Inland \$75,000 more revenue than it received under the previous formula and yield the carrier a 7 percent net profit for the 21-month period.

Starting Jan. 1, 1949, Inland would receive a sliding scale incentive rate formula providing a maximum of 34.20 cents a plane mile each month that the company's load factor falls below 51 percent. With a 70 percent load factor, Inland would receive only 18.20 cents a plane mile mail pay but would earn about 15.2 percent net profit on its investment. Regardless of the maximum mail rate received, Inland like Western, would probably lose money during future months when its passenger load factor drops below 50 percent.

CAB believes Western will receive about \$1,590,000 mail pay annually in the future under its formula. Inland will receive an estimated \$610,000 annually.

AA: No More DC-3s, DC-4s After March

C. R. Smith, American Airlines board chairman, believes his company will have a profitable year in 1949 if a reasonable level of general business activity is maintained and if mail rates are increased to reflect postwar costs.

In a year-end summary of 1948 results, Smith disclosed that the last of American's DC-3 and DC-4 passenger planes will have been retired by the end of March, being replaced with DC-6s and Convair-Liners. AA is presently operating 50 DC-6s and 48 Convair-Liners. All 75 Convairs on order will have been delivered by late spring.

► **French Buy DC-4s**—American recently sold 10 DC-4s (C-54Bs) to the French government for about \$1,500,000, Economic Cooperation Administration funds being used in the purchase. DC-4s have also been sold to KLM Royal Dutch Airlines and Transocean Air Lines, but a number of others are still on the block.

Smith said that American may have made a profit in the fourth quarter. Earnings were also shown in the second and third quarters, but these were insufficient to wipe out a \$5,168,394 first quarter deficit. Loss for the first nine months was \$3,998,593.

Large non-recurring expenses—princi-

pally the cost of training and other items incident to introduction of new aircraft types—affected American's earnings during 1948. Requirement for these expenditures will be reduced substantially in 1949, Smith said, with consequent beneficial effects on potential profits.

Cargo Volume Up For PAA Division

Pan American Airways' Latin American division is looking retrospectively on 1948 as its greatest year of accomplishment.

Aided by the addition of ten C-46s leased from the Air Force, the division boosted its cargo volume to record levels. Passenger volume declined slightly, but LAD's unblemished postwar safety record was continued.

► **Exports Predominate**—Cargo flown during 1948 aggregated around 28,471,422 lb., against 26,002,000 lb. in 1947. Airborne exports to Latin America exceeded imports almost ten to one, but this unbalanced picture was changing somewhat at year-end.

During the fall, tons of lightweight sisal products—handbags, sandals and belts—were flown to the U. S. from Caribbean countries. With the C-46 fleet in service, a start was made toward adding such items as bananas, coffee, mahogany products and minerals to the northbound cargo flow.

► **New Items Handled**—Encouraged by lower commodity rates and more convenient schedules, southbound shippers sent dozens of new items south in volume over LAD last year. Shipments from Miami to Barranquilla and Bogota, Colombia, alone included 2950 gas ranges and 2084 gas water heaters weighing 500,000 lb. and 280,000 lb. of automobile and truck parts.

PAA's Latin American division carried about 668,662 passengers in 1948, slightly under the record of 719,964 passengers flown in 1947. The decline was attributed to abnormal conditions in Latin America—a dollar shortage, devaluation of currency, political unrest and increased operations by both foreign and U. S.-flag competitors.

► **More Mail Pay Sought**—Increased operating costs make additional mail pay necessary for its Latin American division, according to PAA. During the six-month period between Apr. 1, 1948, and Sept. 30, 1948, the Latin American division received about \$1,008,424 in mail pay (equal to 6.5 cents a plane mile) whereas it needed \$3,081,335 to break even.

LAD wants 21.4 cents a plane mile mail pay for the period Apr. 1, 1948, to Sept. 30, and 24 cents a mile thereafter to prevent dissipation of capital

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needed to finance payments on its 20 Boeing Stratocruisers. PAA told the Civil Aeronautics Board that Latin American governments have reduced the rates they pay Latin American division for mail carriage.

Wage Increase

Pan American Airways and the Transport Workers Union (CIO) have signed a new contract providing 10 cents an hour wage increases for 4000 ground crew personnel throughout the country.

PAA estimated the pact would increase its payroll by \$1 million in 1949. It raises the average hourly wage from \$1.49 to \$1.59.

The contract runs for one year from Jan. 1, and agreement was reached after the union had threatened to strike. Majority of employees covered are at Pan American installations in New York, Miami, New Orleans, Houston, Brownsville, Los Angeles, San Francisco and Seattle.

AAA Plans Move

All American Airways, Wilmington, Del., plans to move its offices and operational headquarters to National Airport, Washington, D. C., on Jan. 15 and hopes to activate its conventional feeder routes around Feb. 15.

Since 1939 the company has conducted its mail and express pickup services on five links radiating out of Pittsburgh while maintaining general offices in Wilmington. AAA in February, 1948, was designated for 1550 miles of feeder routes in the same general Middle Atlantic area now covered by the pickup operation.

In selecting All American to operate

the feeder system, CAB said the new service could not be inaugurated until duplicating pickup routes were modified, suspended or abandoned. A CAB examiner last fall recommended indefinite suspension of the pickup links (AVIATION WEEK, Oct. 4), and a Board decision in the case is expected to be imminent.

AAA plans to activate its Washington-Pittsburgh route first, using specially-modified 24-passenger DC-3s. Other segments of the feeder system are to be opened at three-week intervals thereafter.

Record Year for MCA

Mid-Continent Airlines carried more passengers more miles in 1948 than in any previous year, but President J. W. Miller reports that mounting costs probably will prevent the company from showing a profit.

Upwards of 310,000 passengers boarded Mid-Continent's DC-3s last year, compared with 269,189 in 1947. Freight ton miles totaled about 275,223, up 143 percent over 1947, while express ton mileage was around 191,000, up more than 25 percent in comparison to the previous year.

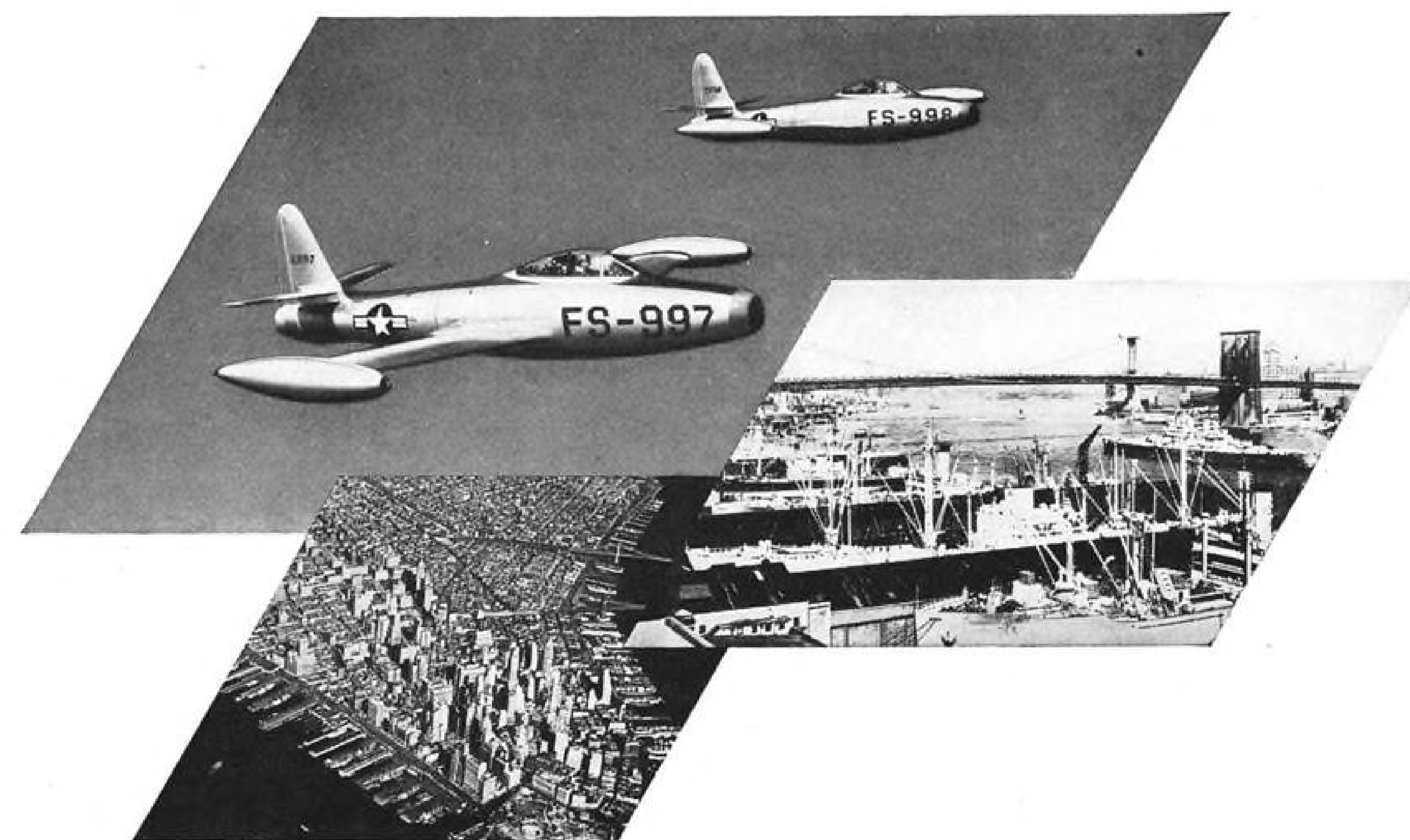
Loss for the first 11 months of 1948 was \$23,852, against a profit of \$81,671 for the same 1947 period. Although MCA has operated a Tulsa-Houston route since February, 1947, its reported revenues and earnings to date do not take into account the amount the company is entitled to for mail transportation over this link. Besides setting mail pay for the Tulsa-Houston service, CAB also must act on an application for higher mail rates over Mid-Continent's entire system.



OPEN HOUSE AT BOSTON

More than 35,000 persons jammed Logan International Airport last month as American Airlines held open house to introduce its new Convair-Liners, which recently started service between Boston and New York. Nearly 700 persons took air tours over Greater Boston, and thousands more filed through a Convair-Liner that was open for inspection. So many persons stormed the

AA ticket counter to make reservations for the \$2.50 sightseeing flights that extra police had to be called. In addition to the Convair, two DC-3s and a DC-4 were pressed into service to accommodate those wishing to make a flight. To the left of the Convair-Liner shown above is an American Airlines DC-4 airfreighter, which also was open for inspection.



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heavy industries which turn out everything from cotter pins to high speed bearings. All are in turn part of the treasure trove whose

safety is assured only through the growing acceptance by the American people

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Nonsked Business Is Taking GIs Home

Viking Airlines, largest of the transcontinental nonscheduled passenger carriers, is devoting much of its capacity to transportation of military personnel, according to R. R. Hart, president.

The company's eight DC-3s are currently carrying soldiers on "charter flights" out of Lackland Army Air Base, San Antonio; Wichita Falls, Tex.; Camp Stoneman, Calif., and the San Diego Navy base. Viking has flown as many as 150 men daily from southwestern military establishments to their homes on both the east and west coasts.

► **Irregular Trips Continue**—"In one day recently," Hart declared, "we carried 54 men to New York and an additional 42 to San Francisco from the San Antonio base alone." The company does not plan to discontinue its irregular transcontinental \$99 service operated through New York travel agencies, since these flights keep Viking planes full on return trips.

Other transcontinental nonskeds, including Airline Transport Carriers, Inc., Burbank, Calif., have been flying furloughed or discharged military personnel from their bases to their homes. Meteor Air Transport, which uses its four DC-3s primarily to carry cargo between Detroit, Philadelphia and Teterboro, N. J., flies a number of service personnel westward out of Camp Kilmer, N. J. It also has a contract to carry back to Detroit drivers of new buses, trucks and taxicabs who have delivered the vehicles in the New York area.

Much of Meteor's eastbound cargo consists of material for Ford Motor Co. assembly lines. Meteor recently indicated to CAB investigators that the certificated airlines had made little effort to tap the military traffic originating at Camp Kilmer.

ATA Budget

An economy-minded board of directors has approved a 30 percent cut in the Air Transport Assn.'s 1949 budget and has turned down a proposed long-range advertising program.

The across-the-board budget reduction eased through with little opposition and was in line with recommendations made late in November by ATA's finance committee (AVIATION WEEK, Dec. 6). The rejected advertising program, backed by ATA's traffic conference, provided for ATA expenditure of between \$500,000 and \$750,000 annually for at least three to five years (AVIATION WEEK, Nov. 22).

All ATA officers were reelected. New directors are J. H. Carmichael, president of Capital Airlines; T. E. Braniff, president of Braniff Airways, and Robert M.

Love, president of All American Airways. They succeed Croil Hunter, Northwest Airlines president and general manager; T. C. Drinkwater, Western Air Lines president, and Robert J. Smith, Pioneer Air Lines president.

Empire Asks Change

Empire Air Lines, northwest feeder operator, wants a change in the certificate provision which requires it to land at each intermediate point regardless of whether the station has any traffic to be enplaned or deplaned. The carrier told CAB it can achieve economies if it is permitted to fly over points which have no mail, passengers or property for the flight. The Empire plane would be in a position to land at each point to take aboard any last minute traffic, thus insuring the community against any real loss of service.

Pacific Facilities

Approval of a \$3,667,055 construction program for the improvement of air facilities in the Pacific has been announced by the Civil Aeronautics Administration in Honolulu.

The money will be used for the construction of new facilities, purchase and installation of radio equipment and modification of existing equipment.

Air Express Service

(McGraw-Hill World News)

MELBOURNE—Trans Australia Airlines has introduced an air express packet service to meet the demand for immediate handling of small parcels by every passenger flight. Special bags to receive the express packets are provided at TAA's offices and close 15 minutes before departure of each passenger bus to the airport. Packet service will cost twice the ordinary freight rate.

Choice of "Tracks"

Northwest Airlines will have its choice of eight all-weather "tracks" on its route between the Pacific Northwest and Alaska, according to Frank Judd, western regional vice president.

The area is one of the best for pressure pattern flying, making use of favorable winds moving clockwise around high pressure areas, Judd said. At least one will always provide a tail wind, he believes.

Ryan Reappointed

President Truman last week requested Senate confirmation for his reappointment of CAB Vice Chairman Oswald Ryan to a new six-year term. A Republican, Ryan has been a Board member since 1938.



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Increase Airplane Revenue

In winter, many new sources of income from Ski-plane operations are possible. Organized hunting, fishing, skiing, sleighing and other winter sporting events, will add new flying pleasure and stimulate enthusiasm for year around flying.

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Go to businessmen in your community. Analyze their personnel travel requirements. Tell them how an airplane will economically, safely and conveniently handle transportation of personnel at low cost and minimum travel time.

Increase Airplane Rentals

Don't let snow stop winter flying operations. Equip your planes with skis and make winter flying hours turn in a profit. Stimulate winter flying interest among students, pilots, sportsmen, businessmen, salesmen, field servicemen, etc. who do not own their airplane. Encourage more charter trips for sales, service, emergency deliveries.

When heavy snowfalls stop other means of transportation, you can get there with airplanes equipped with Federal skis.

Increase Student Training

There are more good flying hours in winter, for airplanes equipped with skis than in summer for airplanes equipped with wheels. Encourage and promote student flying through the winter months, when other outdoor activities are minimized. Organize social groups among high schools, colleges and business concerns. Have them meet socially at the airport. By providing entertainment facilities, you can stimulate interest in winter flying. A few meetings and demonstrations of the fun of flying in the winter on skis will keep your planes flying profitably throughout the winter.

Increase Flying Safety

Federal Skis are low cost insurance. Almost any area large enough to land an airplane is a safe and satisfactory landing field in winter for ski equipped aircraft.

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Port Authority Suit Deadline Postponed

Port of New York Authority, scheduled to appear in court last week to answer the airlines' suit over leases at New York International Airport (Idlewild), did not have to show up after all.

The 20-day time limit provided to answer the action expired Jan. 3 and the port agency was expected to appear then at the latest. But an agreement by the eight suing airlines and the Authority has extended the action deadline up to Jan. 24.

Meanwhile, a group headed by Howard S. Cullman, chairman of the agency, journeyed to Albany late last month to present its side of the story to Gov. Thomas E. Dewey.

It asked the governor to use his influence in forestalling any legislative action which might affect the Authority's immunity from suit—at least until the airline dispute is settled. Dewey is said to believe in the general principle that all public agencies should be subject to suit.

The port agency's problems were aired in a closed conference in the executive chambers. The group went to Albany, Dewey said, "to lay the facts before me concerning their trouble with the airlines."

Reportedly, when asked if the Authority had made specific requests for action by the New York State Legislature in 1949, Dewey replied that they had "asked for nothing . . . just wanted me to know the facts. They want nothing done until the present controversy is settled."

Dewey indicated that he had made no commitments to the Port of New York agency.

Besides Cullman, those at the meeting were Authority Commissioners Bayard F. Pope, S. Sloan Colt, and Charles S. Hamilton, Jr. Others were Austin J. Tobin, executive director of the Authority, and Leander I. Sheely, its general counsel.

Reorganize Airlines

(McGraw-Hill World News)

BOMBAY, India—A drastic reorganization of the Indian airline industry is on the books for 1949. Although passenger-mile and ton-mile figures have been steadily increasing in the past two years, they have been hiding an extremely bad situation which includes the following factors:

- Of nine operating companies only one, Air-India, has been able to show a profit.
- Of the 13,000 route-miles being flown

only some 7000 is considered productive of profit.

• All the airlines have been operating under one-year renewable licenses. This has prohibited sound long-range planning.

Since the Indian government is strongly opposed to subsidies, because of its financial limitations, the only way out appears to be an amalgamation of many of the existing companies.

► **Action Ahead**—This development is indicated strongly by announcement that the licensing board will act this spring to extend long-term licenses to financially and technically sound companies, and the licensing board will move to eliminate "wasteful and unhealthy competition."

Industry circles state frankly that this latter step must include mergers, for their studies show that three or four airlines using hardly more than half the 191 aircraft now in service could handle the same traffic as is now being moved. And the slashes in duplication of planes, aircrew and maintenance facilities would put the whole industry into the black for the first time.

SHORTLINES

► **Braniff**—Has instituted a first-of-the-week family travel plan providing for half-fare tickets on Mondays, Tuesdays and Wednesdays. . . . Assistant Chief Pilot W. R. Walner has been selected to re-examine and qualify for flight duty all National Airlines DC-6 pilots who returned to work following settlement of the recent ALPA strike against National Airlines.

► **Capital**—Has accepted a CAB offer providing (A) \$3,150,000 additional temporary mail pay for the period Jan. 14, 1947, to Dec. 31, 1948; and (B) higher temporary mail rates which were scheduled to start Jan. 1, 1949 (AVIATION WEEK, Jan. 3).

► **Colonial**—Has accepted a CAB offer providing \$52,000 additional mail pay for the period Apr. 15 to Dec. 18, 1946, and \$629,000 additional for the period Dec. 19, 1946, to Apr. 30, 1948 (AVIATION WEEK, Jan. 3).

► **Continental**—Has asked CAB authorization to start service between Denver, Colo., and Casper, Wyo., via Cheyenne and Newcastle, Wyo. Carrier says the need for additional transportation to the Casper-Newcastle area has increased because of oil exploration and development activity.

► **Hawaiian Airlines**—U. S. Department of Justice has filed a civil anti-trust suit against Inter-Island Steam Navigation Co., seeking to force the shipping firm

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to dispose of its controlling stock interest in HAL, the only certificated air carrier operating between the Hawaiian Islands.

► **Pan American**—Has inaugurated half-hour Sunday sightseeing flights from Miami International Airport. Tickets for the DC-4 and Convair-Liner hops are \$3.45. . . . PAA has signed an agreement with British European Airways whereby any Pan American sales office in the U. S. will be able to confirm space immediately on BEA's flights from London to Paris, Amsterdam, Geneva, Copenhagen, Stockholm, Marseilles, Rome and Athens.

► **Pioneer**—Has adopted the first-of-the-week family half-fare plan.

► **Slick**—W. B. Langmore has resigned as vice president-administration and treasurer but will remain on the board of directors. David R. Stewart succeeds Langmore as treasurer of the freight carrier.

► **Trans-Canada**—Expects to increase the capacity of the three DC-3s used on the Vancouver-Seattle run from 21 to 28 passengers. Modification is to be completed by spring.

► **TWA**—Will inaugurate service to Zurich, Switzerland, on Jan. 17. . . . Company has accepted a CAB offer increasing mail pay on the international division by \$2,512,000 for the first 11 months of 1948.

► **United**—Mail and freight volume hit an all-time high during the first two weeks of December. Parcel post soared to about 30 percent of the mail ton miles flown by UAL.

CAB SCHEDULE

Jan. 10—Oral argument in Continental Air Lines route consolidation case. (Docket 576 et al.)

Jan. 10—Hearing in Florida Airways certificate renewal case. (Docket 3511)

Jan. 10—Hearing on TWA's complaint against Pan American Airways' Saudi Arabian service. (Docket 3264)

Jan. 12—Oral argument on Pan American Airways' Miami-San Juan-St. Thomas fares. (Docket 3274)

Jan. 24—Hearing in Milwaukee-Chicago-New York service case. (Docket 1789 et al.)

Jan. 24—Hearing on Board's Investigation of National Airlines route transfer. (Docket 3500)

Jan. 25—Hearing on Western Air Lines-Arizona Airways San Diego-Yuma route transfer. (Docket 3440)

Jan. 31—Hearing on additional service to Puerto Rico. (Docket 2123 et al.)

Jan. 31—Hearing on TWA's complaint against Seaboard & Western Airlines. Postponed from Jan. 10. (Docket 3346)

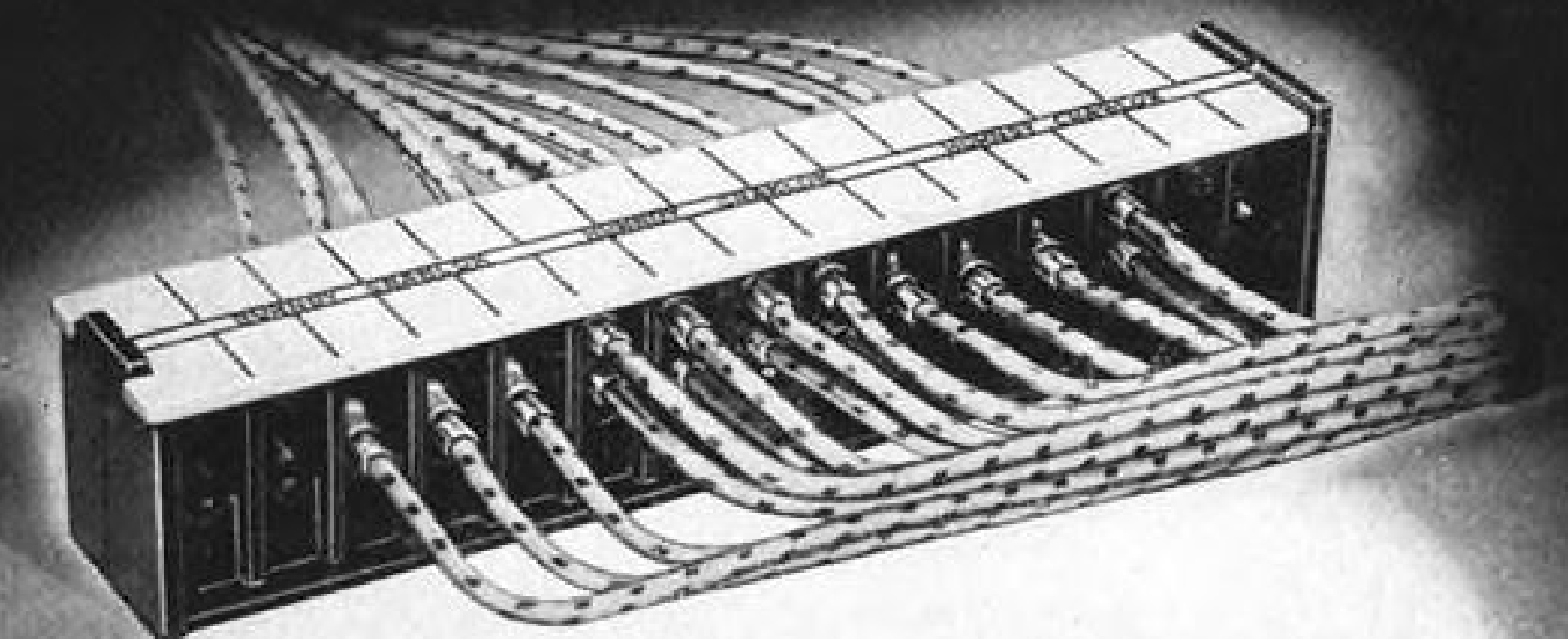
Feb. 2—Hearing on Board's enforcement proceeding against Transocean Air Lines. (Docket 3244)

Feb. 8—Hearing on Florida trunkline service. (Docket 2215 et al.)

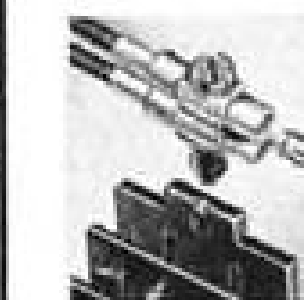
Feb. 14—Hearing on Board's enforcement proceeding against Nats Air Transportation Service. (Docket 3456)

Feb. 16—Hearing in reopened Mississippi Valley and southeastern states cases. (Dockets 548 and 501 et al.)

NEW-fast-action terminal block-

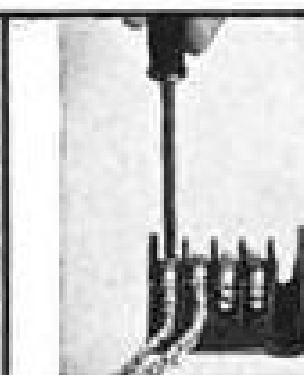


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LETTERS

Comment on 'Flying Wing'

The article by Bob McLaren in the Dec. 20 issue on "the wing" conveys some impressions that may be misleading.

To compare "the wing" and the conventional, a more rational method involves a design comparison assuming that the conventional craft has the same degree of stability as "the wing." If we do this, available published information (latest in NACA TN 1649) indicates that for a negligible drag advantage (difficult to realize practically at present), "the wing" offers longer take-off and a limited c.g. range. This method of analysis of course neglects the fact that none of the services are happy to accept stability, such as "the wing" offers.

As to that wonderful 50 percent advantage in the parasite drag coefficient, I hope your readers continued reading to find out that "the wing" usually ends up with more wing area. The observations concerning range then fall apart, because the thing that pays off in Breguet's formula is the ratio of lift to drag.

After looking at the slender fuselages of our newest aircraft, I wonder if the drag of such bodies is not more than matched by "the wing's" added area, wing twist, and sweepback (this increment was neglected in the article with respect to range). If tail surfaces come up for discussion, one look at those four large fins on the B-49 is convincing.

The weight ratio of "the wing" was proclaimed superior. This is somewhat questionable—I can think of several conventional craft that are better. It seems possible that the complicated control system of "the wing" is partially responsible.

Please do not get me wrong—I have long been interested in "the wing." I just think it is wise to be truthful and practical about the configuration. Future development may point to some real advantages, but we should not kid ourselves in the meantime.

HUGH L. HANSON
2877 S. Buchanan St.
Arlington, Va.

Comment On a Story

The story in the Nov. 29 AVIATION WEEK on the XF7U-1 was first rate . . . Thanks for an excellent job . . .

KEITH BAKER, Public Relations Mgr.
Chance Vought Aircraft Division
United Aircraft Corp.
Dallas, Texas

Everyone in the Engineering Dept. to whom I have spoken has had nice things to say about your article (on the XF7U-1). Generally speaking, all of us at Chance Vought think you did a fine job . . .

WINTHROP BRUBAKER,
Public Relations Dept.
Chance Vought Aircraft Division
United Aircraft Corp.
Stratford, Conn.

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(Continued on opposite page)

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(Continued from page 50)

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STRICTLY PERSONAL



CAPITAL CLEARS UP A BIG MYSTERY—We have just learned that the picture above created quite a stir in certain airline radio communications circles after it ran recently in AVIATION WEEK. As soon as William T. Carnes, Jr., TWA's superintendent of radio engineering, saw it, he wrote his friend at Capital, C. P. Blackman, supervisor of radio electrical engineering, as follows:

Dear Blackie: The christening of the Capital skycoach flight on page 48 of AVIATION WEEK Nov. 15 has aroused considerable discussion regarding the object held by the actress supposedly doing the christening.

From where we are standing, it looks very much like a 3 or 5-inch cathode ray tube, and if she really used such an object, the observers must have gotten a big "bang" out of the proceedings.

Inasmuch as the use of this object for the actual christening would be very unlikely because of the hazard involved to the innocent bystanders, we have tried to reason what might have been behind this particular photo.

One of the engineers proposed that the object was an Erlenmeyer flask; however, a frantic search through the catalogs failed to disclose any such flasks with necks as long as the one in the picture.

We then tentatively accepted the possibility of its being a cathode ray tube and our reasoning went something like this:

The photo was obviously posed either because of failure on the part of the photographer to properly catch the actual christening or for other reasons. Thus, we reasoned that they were up against the problem of what to use in the photo after the actual christening had destroyed the original bottle.

From here we can go two ways in our reasoning. The first proposal was that inasmuch as no champagne bottle was available, they frantically searched the hangars for a likely object and some helpful radio mechanic offered to remove the cathode ray tube from the shop test equipment as a likely object.

Here we come up against the hard, cold facts that even in the most uncivilized portions of the world (even in Washington) coke bottles should not be completely unobtainable. Therefore, the use of a cathode ray tube as a matter of necessity seemed very unlikely.

At this point, we reasoned back in the other direction and decided the most logical answer was that some enterprising publicity man jumped at the opportunity of using the cathode ray tube as a teaser in the photo knowing thousands would notice this object and write the editor inquiring what connection a cathode ray tube has with an airline christening.

This would afford an excellent opportunity for Capital to re-issue the same photograph with an explanation that the cathode ray tube is very obviously associated with the television receiver installation in Capital's fleet, which ought to be good for publicity.

This conclusion is supported by the fact that the article accompanying the photograph completely passes over the details of the actual christening, which is an unheard of thing in airline publicity stories. . . .

At any rate . . . we came to the conclusion that if this were a publicity deal we should suggest that your publicity people use a small bottle bearing the word "nitro-glycerin" which would be very appropriate for christening the Night Hawk. . . . With all kidding aside . . . we should like to know what the real story is on the photograph. . . . We must admit that it has served its purpose in arousing interest in the skycoach service. . . .

The answer went forthwith, from W. S. Smoot, Capital radio-electrical project engineer, since Blackman recently left Capital for Aeronautical Radio, Inc. Says Smoot:

We were much amused at your musings. The object is a cathode ray tube. The photographer dug it up as a prop to symbolize "Miss Television." The young lady did not smash it over the nose of the ship. We did not participate in the ceremony and, like you, knew nothing of it until the magazine appeared on my desk in the Monday morning mail.

BITS ABOUT PEOPLE—Mary Pauline Perry, who was War Agencies reporter for AVIATION NEWS, has been appointed publicity director of the Washington Evening Star's radio stations, WMAL and WMAL-TV, and of the American Broadcasting Co. in the Capital. Earlier, she was with the Tulsa Tribune, American Aviation, and Variety before establishing her own publicity office.

R. H. W.

WHAT'S NEW

New Books

"Airport Management," by John H. Frederick, professor of transportation, University of Maryland and educational and business management consultant, American Assn. of Airport Executives. 316 pages with illustrations and tabulations. Published by Richard D. Irwin, Inc., Chicago, Ill. Price \$4.

"Civil Air Regulations for Pilots," edited by Charles A. Zweng and Allan C. Zweng. Paper cover, 47 pages, revised to Nov. 1, 1948. Published by Pan American Navigation Service, 12021 Ventura Blvd., N. Hollywood, Calif. Price \$1.

"Design for Welding," published by The James F. Lincoln Arc Welding Foundation. Over 1000 pages, illustrated with photos, drawings, tables and cost data. Bound in semi-flexible simulated leather. Available from The James F. Lincoln Arc Welding Foundation, Cleveland 1, Ohio.

New Films

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Trade Literature

"Bulletin 21-20-63," dealing with "Megger" Insulation Testers, is available upon request to James G. Biddle Co., 1316 Arch St., Philadelphia 7, Pa.

"Eutectic Welder," November-December issue, devoted to the new development of Eutectic in the field of cold cast iron are welding with New Eutectrode 24/49. Available from Eutectic Welding Alloys Corp., 40 Worth St., New York 13, N. Y.

"New Advances in Printed Circuits," proceedings of a symposium on the subject held by the Aeronautical Board's Aircraft Radio and Electronics Committee under the technical supervision of the National Bureau of Standards. 73 pages, 18 chapters, illustrations and tabulations, available from the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C. Price 40 cents per copy.

"Catalog A," containing items of interest to mechanics, with a special section on repair and overhaul of aircraft engines. Available from The L. S. Starrett Co., Athol, Massachusetts.

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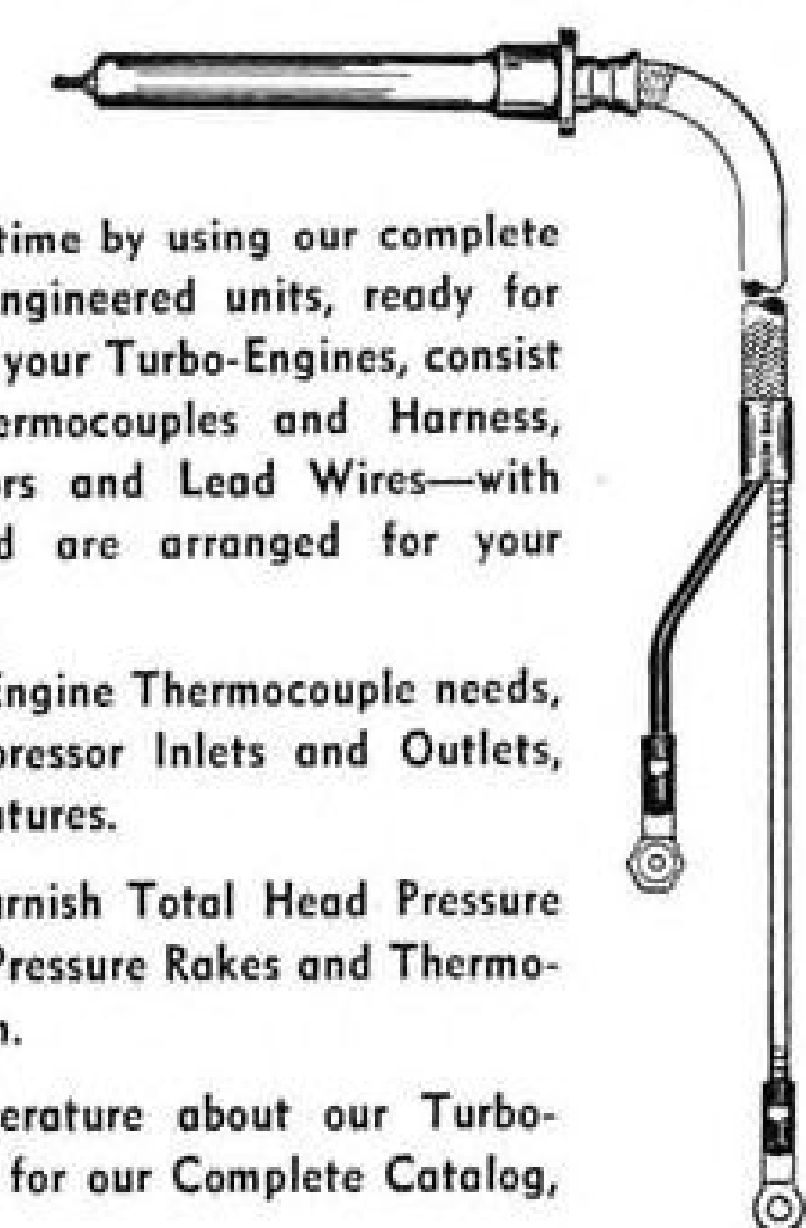
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EDITORIAL

Mr. Truman Discovers GCA For the Airlines

The most carefully protected man in America, the President of the United States, was brought into Washington National Airport Dec. 29 by the ground control approach system.

Thomas E. Breznay, traffic controller, happened to be on duty when the order came to bring in Air Force 6505. No special "expert" was dispatched to take over the GCA for that one job, nor was there unusual or elaborate preparation or added manpower. It was strictly routine and taken as a matter of course by the Air Force, by Lieut. Col. Francis Williams (an ex-American Airlines pilot), and by Harry S. Truman.

But while GCA may be routine in the Air Force, the U. S. Navy, the Royal Air Force, and the Royal Canadian Air Force, it's a routine no U. S. domestic airline has adopted. So thousands of passengers are still being kept on the ground, rerouted, off-loaded, or sent buzzing around in stacked circles during unfavorable weather. Despite the fact that GCA equipment and trained operators are available throughout the 24 hours of every day, coast to coast.

Why? Because the airlines—with one exception—still hold off on requesting GCA approval for daily, routine service. TWA requested and received approval for GCA use at Wilmington in 1947.

The industry's defense seems feeble.

GCA, it is said frequently, is an untried device. That is a feeble answer for several reasons. GCA is in its fourth year of service. Its safety record after thousands of approaches is phenomenal.

According to the Aircraft Owners & Pilots Assn., latest figures on number of GCA approaches in October and November on the Berlin airlift alone are startling. There were 4788 landings "for keeps"; there were 425 landings below minimums of 100-ft. ceiling and quarter mile visibility; there were 2595 practice approaches since GCA is used even in good weather. The number of crashes as result of GCA was zero.

Saying GCA is untried is a feeble answer for the added reason that U. S. flag international carriers use GCA regularly. Pan American pioneered in installing GCA at Gander in 1947, later adding traffic control radar. In the first year it saved three Constellations worth over \$3 million and their cargo of humanity and property. Situated at the end of a long western crossing against headwinds, Gander GCA has pulled in more pilots when they did not have enough fuel to make alternates. On Jan. 2 a Navy GCA brought a BOAC Constellation with 43 passengers and not much fuel into Argentina, Newfoundland, after its alternate was closed by bad weather.

In addition to PAA's Gander station, airlines use American Overseas' GCA in Iceland and at Shannon, and the British GCA at London. So, what is good enough for Pan American, American Overseas, and TWA over the Atlantic would appear to be safe enough for the domestic carriers.

Another frequent retort of the airlines is that CAA has always preferred and recommended ILS. It is true that CAA was a reluctant dragon indeed, in the Stanton era, when it refused even to test GCA. It has put in three sets now, that were given to it by the Air Force, and they function at New York, Chicago and Washington. After a slow start, and some prodding by Gen. Milton Arnold, progressive operations and engineering chief of the Air Transport Assn., the CAA sets are doing good work on tests and service landings. And CAA now waits for industry to act.

Another reason for management's timidity is the publicized,

official opposition of the Air Line Pilots Assn. to GCA. This is frequently based on the contention that GCA "takes authority away from the pilot and gives it to the ground controller." But it is our understanding that the pilot never loses command of his ship, and that he is always free to accept or reject GCA direction, and go elsewhere. And we have heard no loud ALPA protestations about using GCA to bring in harassed trans-Atlantic pilots. Certainly, the pilot is justified in insisting that the ground controller is capable, and understands the pilot's problems; GCA requires skilled men and CAA must be assured of enough of them. But if ALPA uses trans-Atlantic GCA it can hardly justify continued opposition within these borders.

One excuse the airlines cannot use is that their own trade association's operations and engineering department does not approve of expanded GCA usage. As long ago as last August Gen. Arnold sent a memorandum to all airline chief operations executives pleading for action:

CAA-GCA personnel have had considerable training and should be proficient . . . Chicago has an outstanding history in this connection . . .

GCA procedures and phraseology are frequently discussed at joint industry meetings attended by ATA representatives. Other agencies in the aviation industry at these meetings invariably take the position that inasmuch as the scheduled airlines do not utilize GCA domestically as a primary method of instrument approach, the airline industry should be willing to accept the judgment and recommendations of the other agencies.

GCA has proven itself as a satisfactory approach procedure. In view of the fact that we insisted so strongly on the original three installations, it is recommended that the airline industry officially recognize GCA as an acceptable facility in order that they may have a voice in the planning for the future. It is recommended that the airline industry recognize GCA as a "primary method of approach when desired." This would prove of great value to the airlines at the present time, for example, if for some reason the ILS was inoperative . . . this . . . would eliminate the present orphan status of GCA. Even though a huge expenditure is being planned by the CAA for GCA, it still holds no official status with the CAA. If this status cannot be resolved to our satisfaction, then the funds should be diverted to other types of installations that will serve the airlines and be officially recognized . . .

The air transport industry should face these facts.

On the Truman GCA approach, ceiling was 1500 ft., or above minimum, but visibility was below—or $\frac{1}{2}$ mile with haze and fog. According to information obtained by AVIATION WEEK, the pilot, Col. Williams, had just heard that a TWA Connie ahead of him missed the approach on ILS and had to go around again. Col. Williams notified the President he wished to make a GCA approach. The President is understood to have said, sure, but what is it? He was leaving it up to his pilot. After Mr. Truman gave consent, he went up front to watch the procedure.

Information from AOPA reports a Navy transport followed the Truman DC-6 in on GCA, "yet there were at least two airline aircraft holding over Washington at the same time awaiting better weather so they could use the ILS at Washington Airport. And two other airliners passed up Washington, landing their passengers at some other city, to be sent to Washington by train."

We hope to hear no more statements from the airlines that GCA is satisfactory for the military because their personnel and passengers are expendable. Recalling the pre-Roosevelt days when you could not get a United States President into an airplane in perfect weather, we would say that if GCA is safe enough for Mr. Truman it is safe enough for the people. Airlines, please copy.

ROBERT H. WOOD

AVIATION WEEK, January 10, 1949

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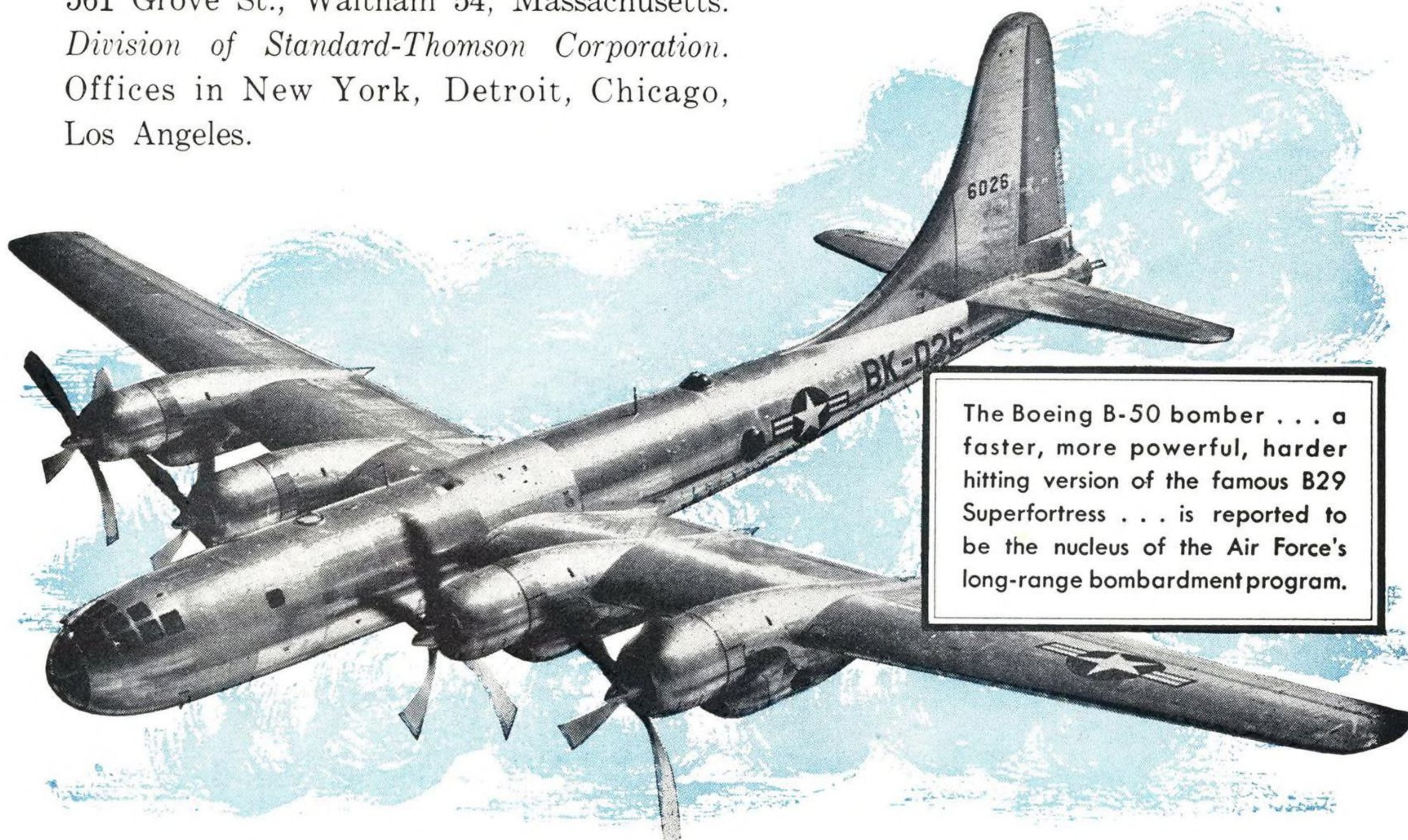
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