

AVIATION WEEK

DEC. 19, 1949

A MCGRAW-HILL PUBLICATION

Birmingham

turns on L-M High Intensity Lights

on all three runways

With the Mayor as official host to federal, state, and local authorities, nearly ten thousand people attended the dedication of the new L-M High Intensity Lighting installation at Birmingham, Alabama Municipal Airport.

Lights are the latest controllable beam type, with up to 180,000 beam candlepower—more than any other runway unit now known. They are approved

under CAA specification L-818. Airline captains report seeing them from 70 miles away. Their ability to penetrate Birmingham's frequent smogs should substantially increase airport traffic. For full information on lighting for large or small airports, ask the L-M Field Engineer, or write Line Material, Airport Lighting Division, East Stroudsburg, Pennsylvania.



LINE MATERIAL...Airport

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Westinghouse



J-34 TURBOJETS

power the McDonnell XF88 "Voodoo"

The XF88... Air Force fighter... is the latest to join the ranks of McDonnell jet planes for the U. S. armed forces. Like its fore-runners... the McDonnell FH-1, "Phantom", the F2H "Banshee", and the XF85 "Goblin"... the XF88 is powered by Westinghouse Turbojet Engines.

We are honored to supply the power plants for these outstanding new planes... welcome additions to the rapidly growing family of Westinghouse-powered planes for the U.S. military services.

J-50496



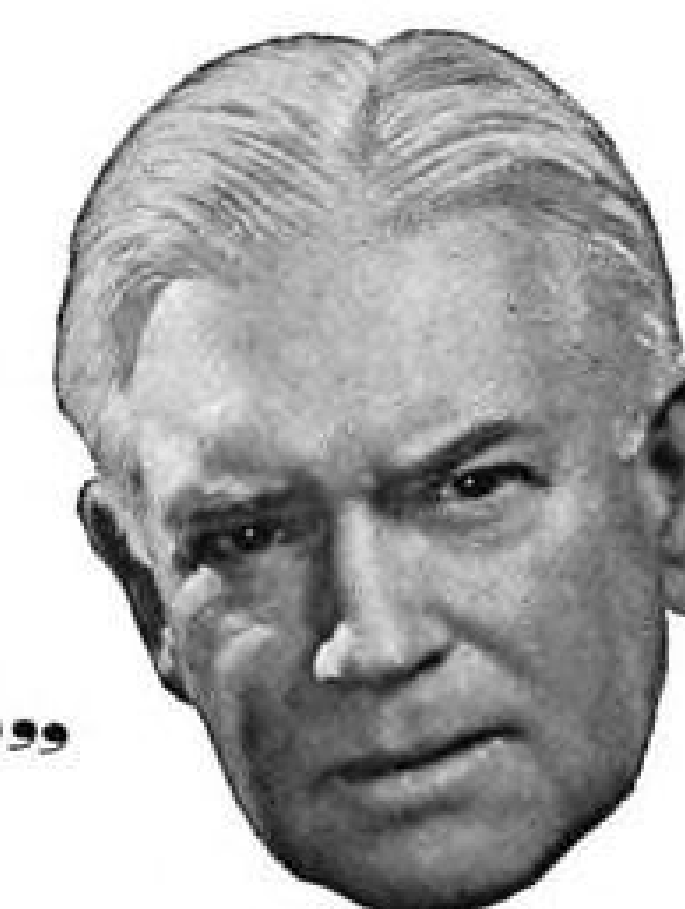
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AVIATION
GAS TURBINES



"Monochloromonobromomethane?"



"Chloromonobromomethane?"



"Bromochloromethane?"

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it's C-B**

— and Kidde is the place to get it!

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C-B is a colorless liquid that does not decompose while stored. Its freezing

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Trenton 2, New Jersey.

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Aviation Week

Volume 51

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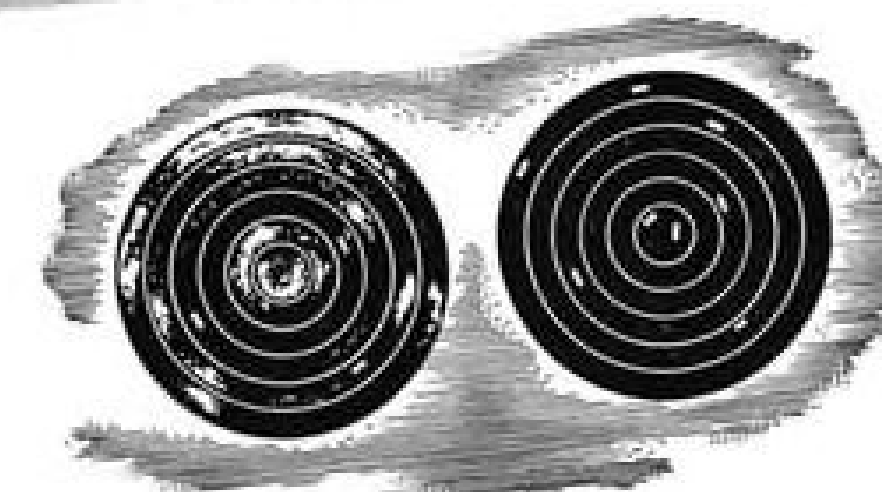
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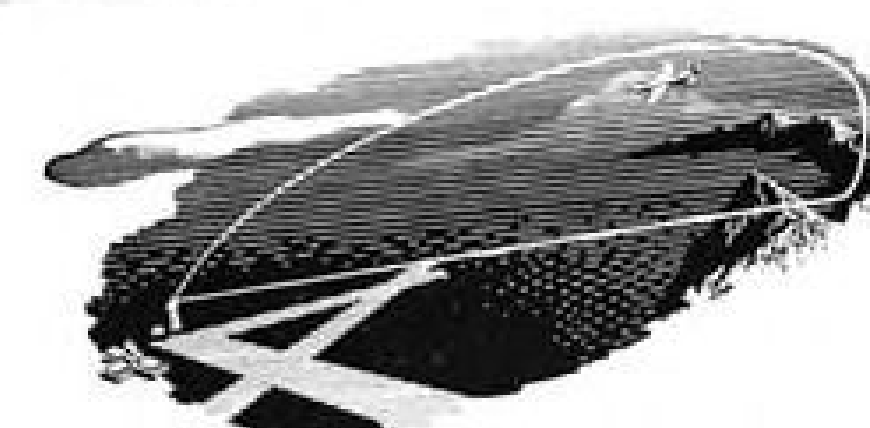
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AVIATION WEEK, December 19, 1949

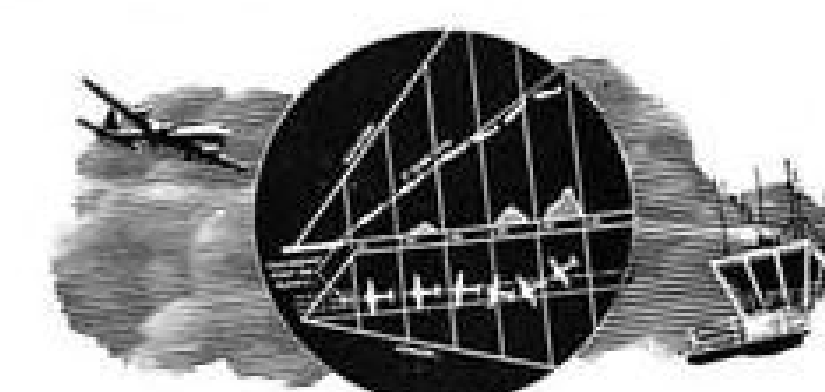
ONLY Gilfillan GCA HAS THESE FEATURES



MTI Gilfillan's Moving Target Indicator eliminates "ground clutter." Tracking and identifying aircraft no longer requires the tedious concentration of a special radar operator. Exact bearing and range of aircraft are now seen instantly by all control tower personnel. Only Gilfillan has produced a reliable, drift-free, range-selectable MTI.



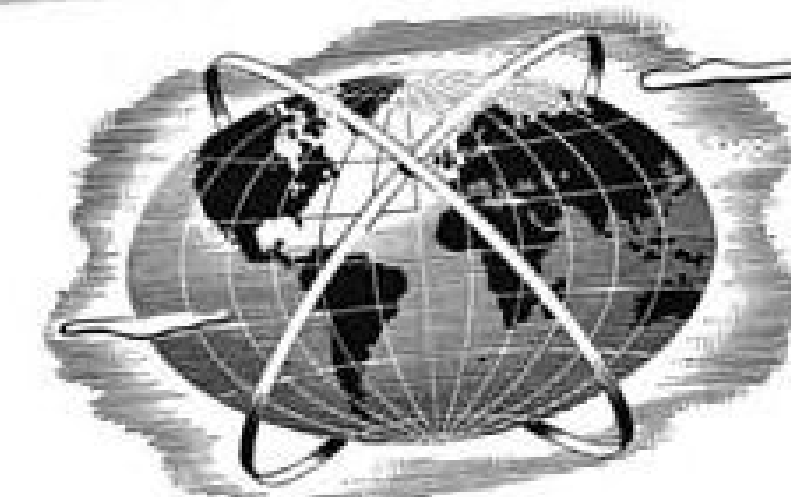
HIGH-POWERED SEARCH
New Gilfillan GCA extends search coverage to 10,000 feet altitude over a 30-mile radius. Early GCA was limited to solid surveillance 18 miles out and 4,000 feet up. This seven-fold increase of original GCA coverage is a Gilfillan "bonus," vital to air traffic control.



AZEL SCOPE Gilfillan's three-dimensional Azel Scope changed GCA from a five-man to a simplified one-man operation. Now the exact position of approaching aircraft is seen clearly and accurately in three dimensions—altitude, azimuth and range. The Azel Scope is an exclusive Gilfillan feature.



TOWER CONSOLE Gilfillan's desk-size, one-man GCA console is in startling contrast to the 22-ton, five-man wartime trailer. By removing the radar data to the control tower, air traffic personnel now have accurate plane position information instantly available. Consolidation of all GCA features into a compact console is an exclusive Gilfillan improvement.



WORLD-WIDE SERVICE
Eighty Gilfillan factory-trained experts supervise GCA operation and maintenance throughout the world. Gilfillan GCA schools also train personnel of the CAA, the USAF, and the RCAF. Supervising all phases of GCA at airports the world over is an exclusive Gilfillan service.

Gilfillan
GCA LOS ANGELES

Ryan Aeronautical Company presents

"SUCCESS STORY"

Walter Balch, Airplane Service Manager (center) and Charles J. Therrien, Customer Service Supervisor stand by as a Ryan Navion is gassed up — with Texaco, of course.



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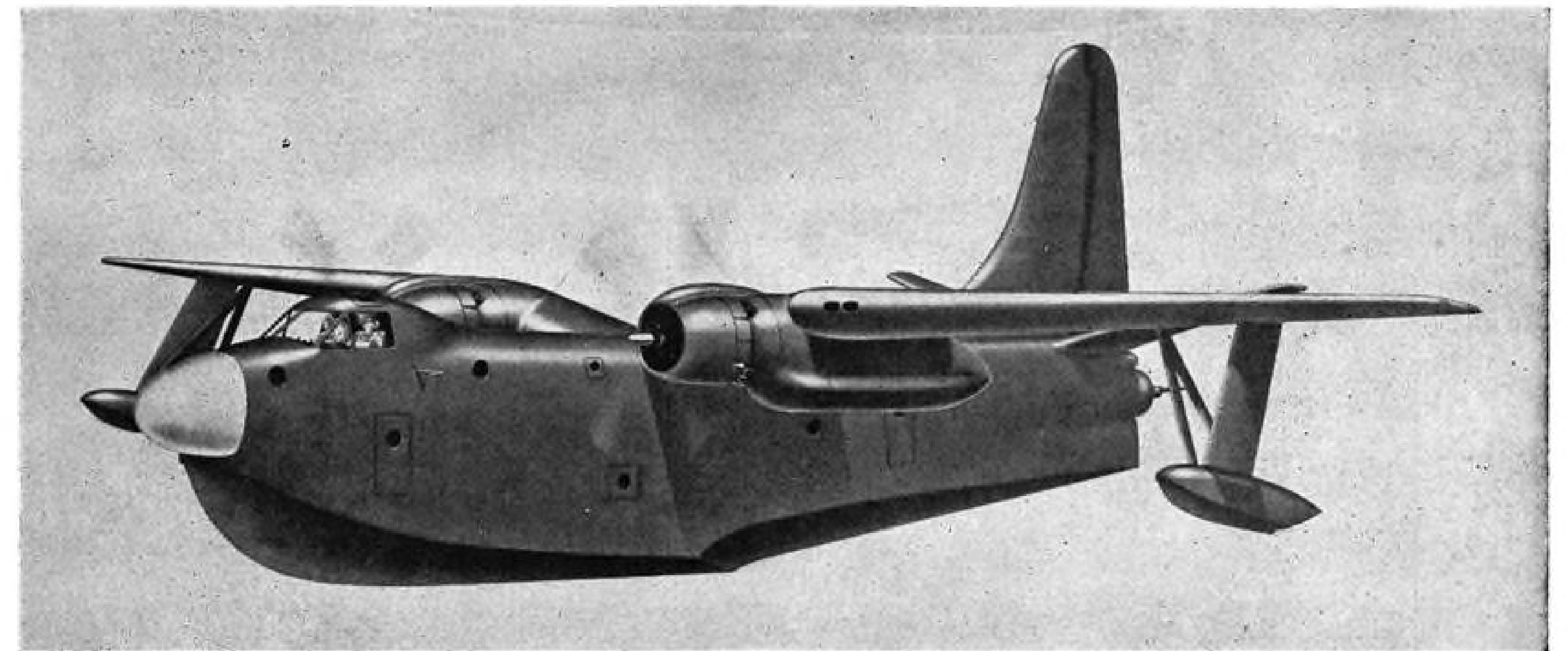


TEXACO Lubricants and Fuels

FOR THE AVIATION INDUSTRY

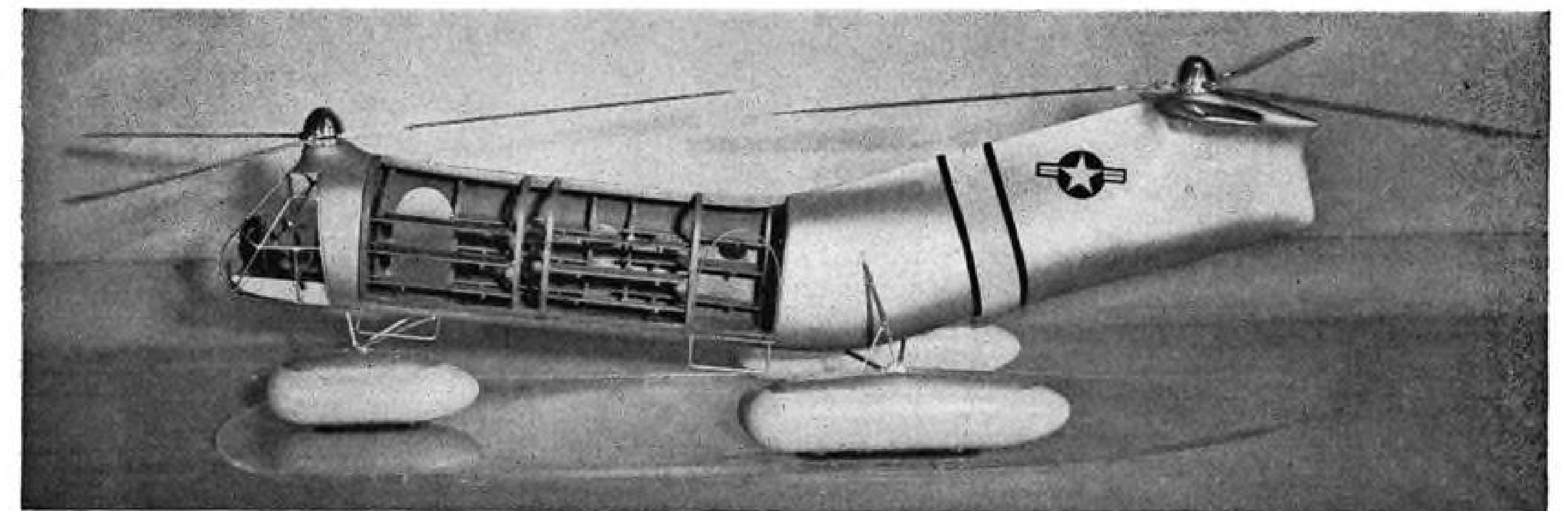
TEXACO STAR THEATRE presents MILTON BERLE on television every Tuesday night. METROPOLITAN OPERA broadcasts every Saturday afternoon.

New Planes in the News . . .



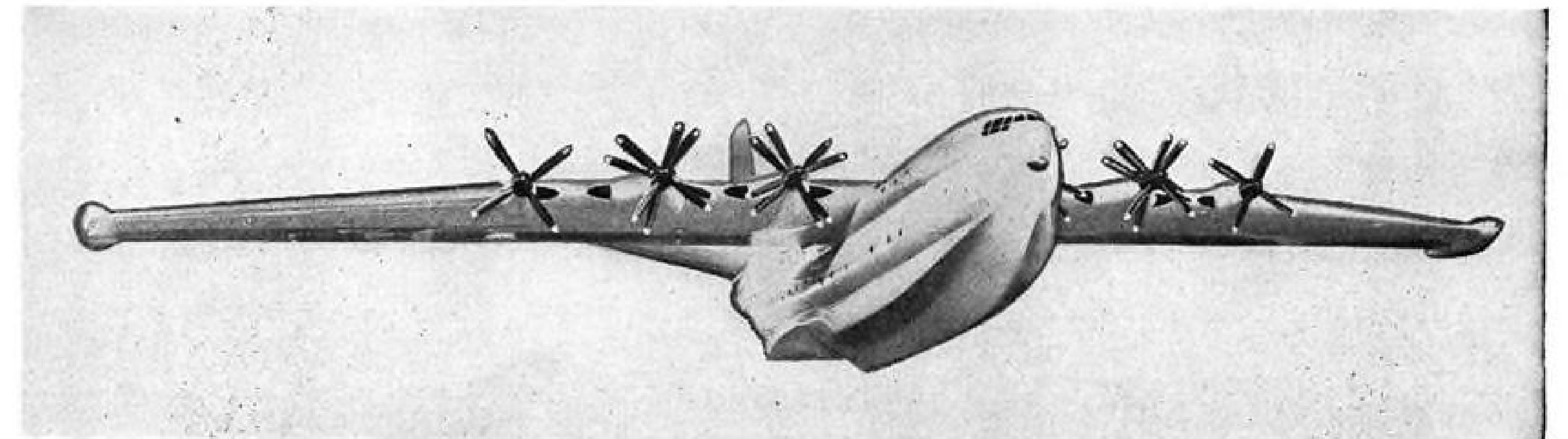
MARTIN: P5M-1 has been awarded initial production contract by the Navy for an undisclosed number. The craft is intended for anti-submarine warfare, but can also be

utilized as a cargo or general utility plane. Gull wings, tall single tail and long afterbody are distinguishing features. Powered by two Wright R-3350s, the P5M will have a crew of seven.



PIASECKI: PD-22 model reveals unique interior layout permitting carrying 12 standard AF or Stokes litters, all of which can be loaded in flight. The craft is designed

for Arctic rescue of bomber crews. Fitted with seats, the PD-22 can carry 15 fully equipped troops. Craft is fitted with 600-hp. P&W R-1340 engine, but can also take Wright R-1300 or R-1820.



SARO: Princess will be Britain's largest commercial flying boat. This model shows craft's basic design features. Plane is to be powered by ten Bristol Proteus turboprops, with eight engines

mounted in pairs to turn eight-blade contra-rotating props. Two engines will be mounted separately outboard of the twin installations. Design gross weight is 315,000 lb.

In production
for the
latest
aircraft...



- 1 Trim Tab** Tab Actuator with Filter and Transmitter designed for installation in the leading edge where it can serve as mass balance. **ZERO BACKLASH** at output shaft permits operating tab with simple link to obtain varying mechanical advantage increasing with load.
- 2 Lineator** Linear Actuator with Filter and Transmitter operating loads to 1500 pounds with low basic weight. Static capacity over 5000 pounds. Performance characteristics variable to suit application.
- 3 ROTORAC** Right Angle type with Filter and Transmitter for driving screw jacks or flex shafts. Typical rating 15 inch pounds at 60 R.P.M. on 3 minutes out of 15 duty cycle. Higher ratings depending upon application.
- 4 Servo Systems** Incorporating our electromechanical equipment to obtain synchronizing or positioning effects from any type of signal for automatic operation or for manual control eliminating indicators.
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AVIATION CALENDAR

Jan. 9-13—Annual meeting and engineering display, Society of Automotive Engineers, Hotel Book-Cadillac, Detroit.

Jan. 10-27—Fourth annual Air Transportation Institute, conducted by American University in cooperation with CAA and ATA, Washington, D. C.

Jan. 13-15—All American Air Maneuvers, Miami.

Jan. 16-17—Miami-Havana Air Cruise for private planes, conducted by Florida Air Pilots' Assn.

Jan. 16-19—Plant Maintenance Show, sponsored by American Society of Mechanical Engineers and the Society for the Advancement of Management, Cleveland Auditorium, Cleveland.

Jan. 17—38th annual dinner of the Traffic Club of Philadelphia, Benjamin Franklin Hotel, Philadelphia.

Jan. 17-19—University of Illinois second annual Custom Spray Operators school, Urbana, Ill.

Jan. 23—IAS annual Honors Night dinner, Hotel Astor, New York, N. Y.

Jan. 23-26—IAS 18th annual meeting, technical sessions, Hotel Astor, New York, N. Y.

Jan. 24—Ninth session, ICAO Council Montreal.

Feb. 18-26—National Sportsmen's Show, Grand Central Palace, New York, N. Y.

Feb. 27-Mar. 3—Spring meeting, American Society for Testing Materials, Hotel William Penn, Pittsburgh.

Mar. 6-9—47th annual meeting, American Road Builders' Assn., Netherlands Plaza Hotel, Cincinnati.

Mar. 24—Fifth annual flight propulsion meeting, sponsored by the Institute of the Aeronautical Sciences, Carter Hotel, Cleveland.

Mar. 28-31—National Plastics Exposition, sponsored by Society of the Plastics Industry, Navy Pier, Chicago.

Apr. 4-6—Engineering and Maintenance conference, Air Transport Assn., Hotel Continental, Kansas City.

Apr. 4-8—National Production Exposition, sponsored by the Chicago Technical Societies Council, Stevens Hotel, Chicago.

Apr. 16-20—Annual business meeting, American Assn. of Airport Executives, Neil House Hotel, Columbus, Ohio.

Apr. 17-19—1950 aeronautic meeting, Society of Automotive Engineers, Hotel Statler, New York City.

May 5-6—Midwestern conference on fluid dynamics and the national meeting of the American Physical Society, fluid dynamics division, University of Illinois, Urbana.

June 26-30—53rd annual meeting, American Society for Testing Materials, ninth exhibit of testing apparatus and related equipment, Chalfonte-Haddon Hall, Atlantic City, N. J.

PICTURE CREDITS

7—(top) Glenn L. Martin Co., (center) Piasecki Helicopter Corp., (bottom) Flight; 14—Convair; 15—INP; 28—North American Aviation, Inc.; 39—Beech Aircraft Corp.; 42—(top) CAB.

NEWS DIGEST

DOMESTIC

Wright Aeronautical Corp. has received two military orders totaling more than \$12,250,000 for three types of Cyclone engines. Larger order, nearly \$10 million, is from Navy for 2700-hp. Cyclone 18 R-3350-26W and 3250-hp. turbo-Cyclone R-3350-30W engines, for use in the AD and P2V series attack and patrol planes respectively. Second order, from USAF, is for an unspecified number of 1425-hp. Cyclone 9HD engines for the Grumman SA-16. Air Force order totals nearly \$2,250,000.

Muroc Air Force Base has been renamed Edwards Air Force Base in honor of Capt. Glenn W. Edwards, killed in the crash of an experimental YB-49 Flying Wing in June, 1948. Also renamed: Shreveport Quartermaster Depot, now Slack Air Force Depot, honoring Maj. J. Stewart Slack, Jr., killed over Japan.

Capital Airlines DC-3 crashed into the Potomac River while making an ILS approach to Washington National Airport. Pilot, copilot and two passengers were killed, and 19 persons were rescued. Fatalities in scheduled domestic airline accidents this year now number 91 passengers and 11 crew personnel.

A California Arrow Airways DC-3 crashed and burned near Vallejo, Calif., killing all nine occupants. Accident occurred about three miles from an airport, during a rainstorm.

Port of New York Authority last week closed Newark Airport to fighter-type aircraft traffic, following a similar move by the Authority at LaGuardia and New York International Airports (AVIATION WEEK, Nov. 28). Regulation does not apply to F-47s, AT-6s and B-26s which, according to the Port Authority, the New Jersey National Guard "insists on operating" under terms of a 50-yr. lease at Newark, signed in 1928.

Personal aircraft shipments during October by nine companies totaled 208, including 163 four-placers and 45 two-placers, according to the Personal Aircraft Council of AIA. Total dollar value was \$948,000, compared to shipments by 10 companies the previous month of 268 aircraft valued at \$1,136,000. Total 1949 shipments through October number 3106 aircraft valued at \$13,083,000.

Under a new policy adopted by the Army, Navy and Air Force, storage space at military installations may be rented to private interests for emergency use when adequate commercial space is not available, and when its lease will

not interfere with military operations. Rental charges, according to the Department of Defense, will be based on comparable commercial rates in the area.

Civil Aeronautics Board has set Jan. 9 as the tentative date for a hearing on application to provide helicopter service in the New York City metropolitan area (AVIATION WEEK Nov. 7). Hearing was originally set for Dec. 5. Seven applications are involved: Air Commuting Inc., Metropolitan Aviation Corp., New York Helicopter Corp., New York Airways, Inc., Air Industries, Inc., Interurban Airways, Inc., and Asbury Park-New York Transit Corp. Site of the hearing, according to CAB will "most likely" be in Washington.

Civil Aeronautics Board last week initiated public hearings in Dallas, Tex., to determine the cause of the American Airlines DC-6 crash at Love Field.

FINANCIAL

Cessna Aircraft Co., for the fiscal year ended Sept. 30, 1949, reported net sales of \$12,738,433, of which \$6,560,370 came from aircraft sales and \$6,178,063 from sale of non-aviation products. Net earnings for the period totaled \$299,936.

Bell Aircraft Corp. reported a profit of \$49,045 for the nine months ending Sept. 30, 1948. Sales and income during the period totaled \$8,184,158. Bell showed a net loss of \$412,531 for the same period in 1948.

INTERNATIONAL

A DC-3 operated by Real, crashed near Sao Paulo, Brazil, killing 18. It was the first fatal accident for the Brazilian carrier.

Germans are replacing American civilian personnel as traffic control operators at four airfields in the U.S. Zone of Germany. Berlin and Frankfurt will continue to be operated by military personnel.

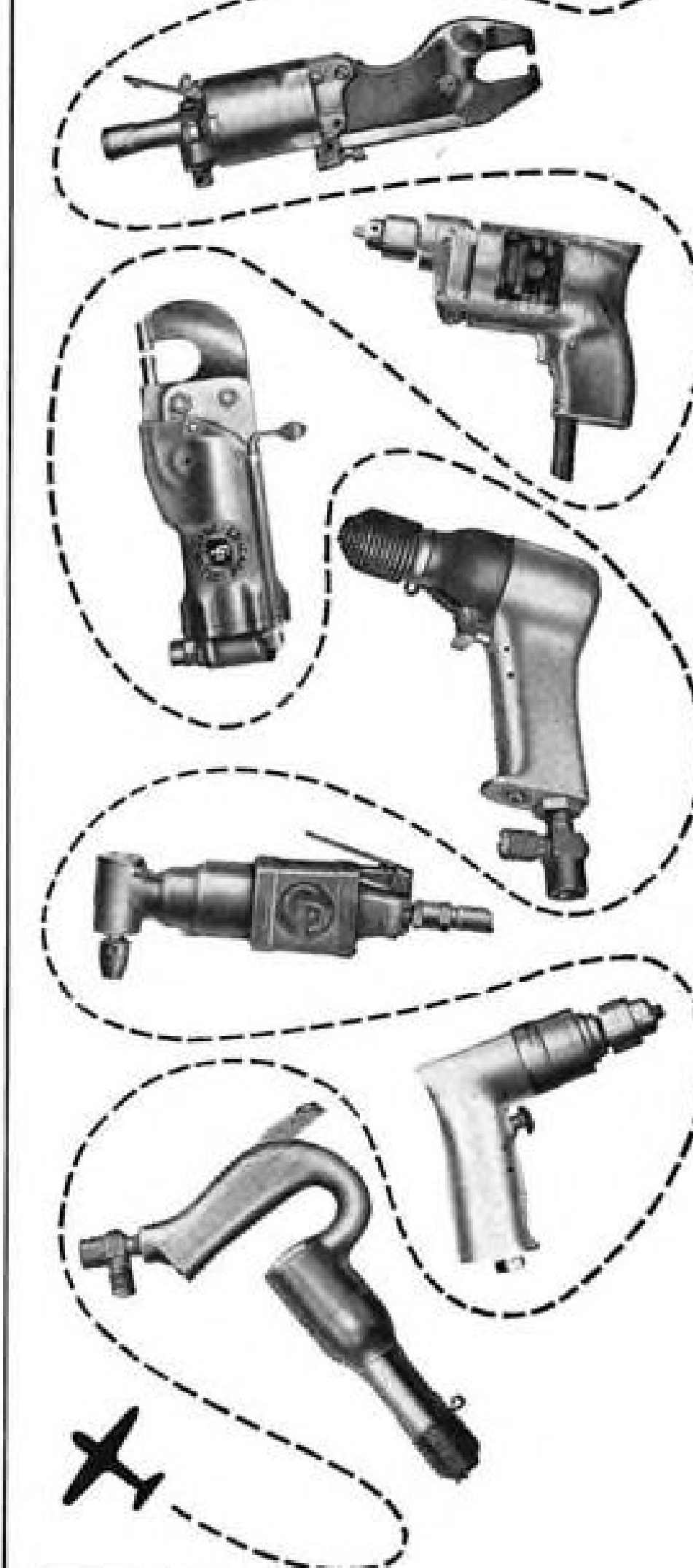
Vasp-Aerovias Brasil airline has purchased five Convair-Liners from Consolidated Vultee, the first Brazilian carrier to use the aircraft. Vasp, which flies only inside Brazil, recently acquired Aerovias Brasil, which has routes to the U.S.

Belgium has been licensed by Rolls-Royce to manufacture Derwent turbo-jet engines. Fokker has already been licensed to manufacture the Gloster Meteor IV airframe, so now the Benelux countries will be able to make the complete fighter themselves instead of drawing on British stocks.



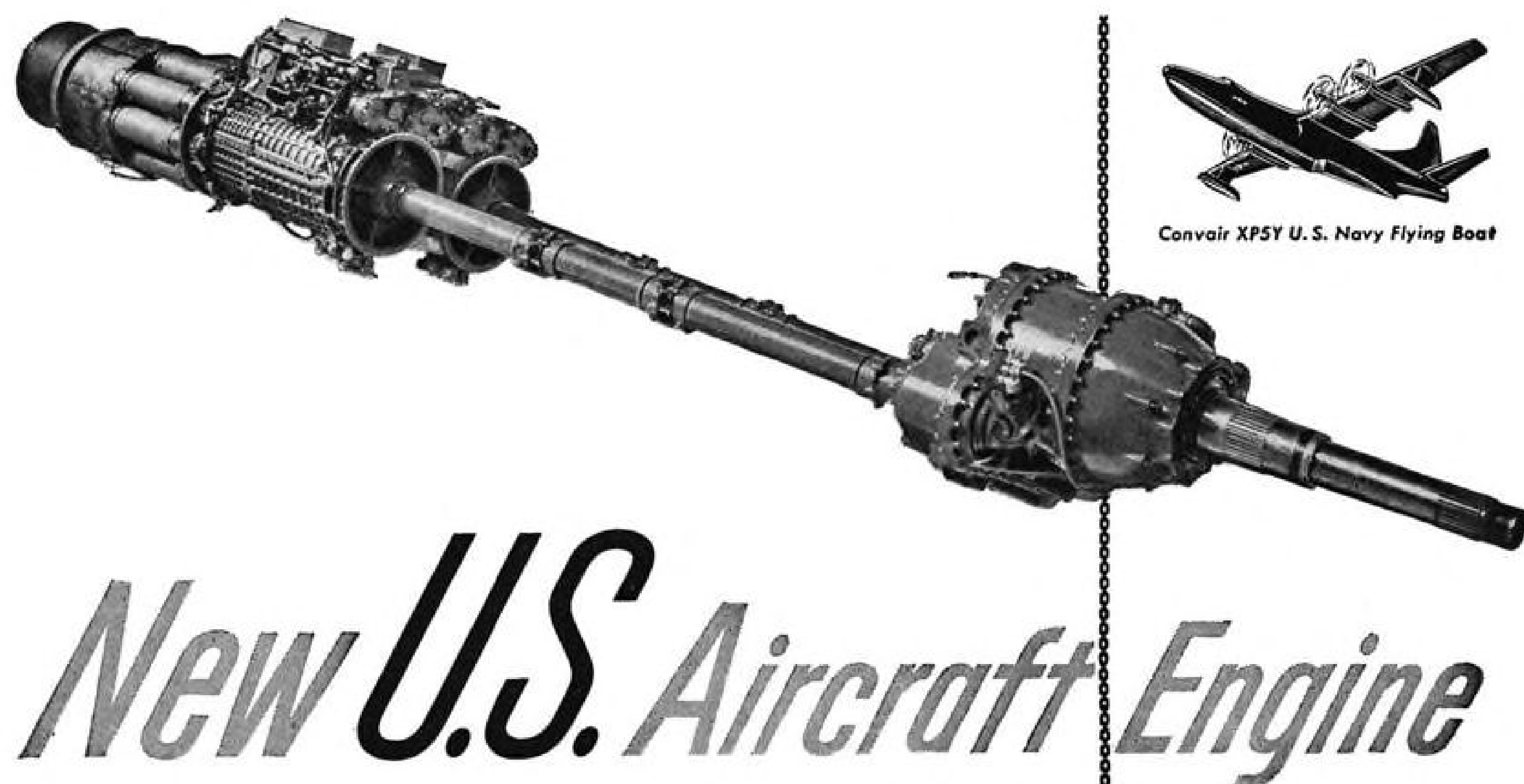
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Convair XP5Y U.S. Navy Flying Boat

New U.S. Aircraft Engine

Navy sponsors most powerful propeller-type engine ever cleared for flight!

A new American aircraft engine—the most advanced type in the world—is now revealed by the U.S. Navy. It's the new Allison XT40 turbo-prop which develops more horsepower per pound of weight, with good fuel economy, than any propeller-type engine ever built by any nation. The engine currently is rated at 5500 horsepower.

The new Allison turbo-prop will enable any propeller-driven aircraft—for the military services or commercial airlines—to fly faster and carry increased pay loads over longer distances at higher altitudes.

This outstanding performance is accomplished through the engine's high power, small size and light weight. Yet, fuel economy comparable to the best present-day commercial engines is retained.

Horsepower-to-weight ratio, including extension shafting and reduction gear, is double that of our best present-day reciprocating engines—actually more than two horsepower per pound of engine weight.

The new Allison XT40, consisting of two super-powered gas turbines, achieves these important results through high-compression ratio and the flexibility of the twin power plant.

By outperforming reciprocating engines now in use, this new turbo-prop engine becomes a highly valuable stablemate for the turbo-jet engines which power today's very high speed military airplanes. Both these turbine-type engines use the same low-grade, readily available fuel; they do not need high-octane aviation gasoline.

The ease and flexibility of installation of this type engine are demonstrated by its first application in the Navy XP5Y Convair flying boat. Designers can utilize this compact, more powerful engine in all types of aircraft—both military and commercial—to gain improved range and performance.

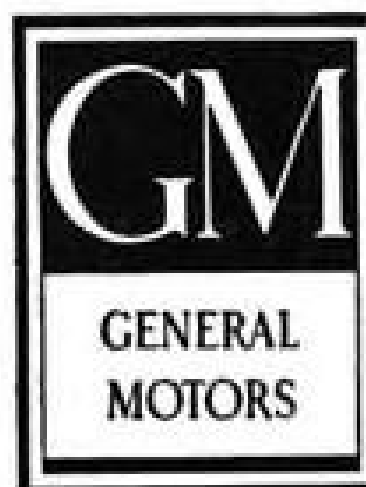
Once more Allison, a world leader in aircraft engine development and production, has made an outstanding contribution to help keep America first in the air.



ALLISON XT40
TURBO-PROP

Compare the small size of this engine, developing 5500 horsepower, with the man in the photograph above

Allison
DIVISION OF
INDIANAPOLIS, INDIANA



Builder of the famous J33 and J35 turbo-jet aircraft engines

WHO'S WHERE

Changes

► **New Appointments**—Luria Engineering Corp. has named Milton A. Karp chief engineer, with headquarters at the company's plant in Bethlehem, Pa. He was formerly chief engineer for Ellis Wing Taylor, industrial designers. . . . J. Malcolm Smith is the new assistant to W. A. Patterson, president of United Air Lines, succeeding T. W. S. Davis, now Assistant Secretary of Commerce. He will be based in Washington. . . . Aircraft Engineering and Maintenance Co. has appointed Carl J. Crane director of research. . . . Robert Jerrett, Jr. is with McKinsey & Co. as a marketing consultant. He was a research fellow at Harvard School of Business Administration, where he worked on "Airline Competition."

Robert M. Pool is accounting associate with Leigh Fisher & Associates. . . . Air Vice Marshal Alan Ferrier has been appointed Assistant Secretary General for Air Navigation of the International Civil Aviation Organization. He is currently a member of the Canadian Air Transport Board. . . . W. G. McDowell has been appointed Burbank division manager for Pacific Airmotive Corp.

► **Sales Shifts**—Don M. Parker is now general sales manager for Piper Aircraft Corp. . . . William Lukens is general sales manager at R. M. Hollingshead Corp. . . . Hanson-Van Winkle-Munning Co. has made these sales shifts: P. R. Lyons, formerly Ohio district manager, is now manager of electrical sales; Martvig J. Moll has become manager of conveyor sales; Irving A. Gemmell is assistant manager of conveyor sales; Wilfred G. Cryderman is now in the Cleveland office; Gordon R. Lyons has been named sales rep in Dayton.

► **PubRel Post**—Mrs. Margaret Kerr Boylan has been appointed manager of public relations for Northeast Airlines in Washington. Previously, she had been a special NEA rep in New York and Boston.

► **Resigned**—David Shawe, vice president and assistant to the publisher of American Aviation Publications, has resigned. He had been a company officer since 1947, and was chairman of the editorial board until July 15, when he became publisher's assistant.

► **Retirement**—Robert Warren Green, director of purchases and traffic for Champion Spark Plug Co.'s ceramic division, retires the end of this month.

Elections and Honors

Ansul Chemical Co. elected Robert C. Hood president, replacing his brother, F. James Hood, who died suddenly Nov. 10. . . . Pacific Airmotive Corp. elected two new members of its board of directors: Laurance H. Cooper, vp. and general manager, and J. O. Cornette, treasurer and controller.

Dr. Nicholas J. Hoff, professor of aeronautical engineering at Brooklyn Polytechnic Institute, has received the medal of the Swedish Society of Engineers, the third aeronautical scientist to get the award in 15 years.

INDUSTRY OBSERVER

► Canadian Pacific Airlines has purchased two de Havilland Comet turbojet transports, bringing the total now on order up to 18. CPA paid the equivalent of about \$1,250,000 apiece for its two Comets. The airline plans to use them on its trans-Pacific routes from Vancouver to Australia. CPA is now authorized to make a fueling stop at San Francisco on its route to Hawaii.

► Several airlines are interested in a 105-passenger air coach version of the Boeing Stratocruiser. By dispensing with interior frills demanded by airlines for deluxe Stratocruisers, Boeing could offer the air coach version at a lower price. Pan American Airways is still interested in trans-Atlantic air coach service despite CAB's current frowning on such proposals.

► Eastern Airlines is conducting final negotiations with the Glenn L. Martin Co. for a substantial number of revised model 2-0-2 transports. The new version of the 2-0-2 will be specially tailored to meet Eastern's needs. It will be pressurized; add 39 inches to the fuselage, permitting four more seats; and will be powered by a late model Pratt & Whitney R-2800 engine. The empennage will be revised; more cell-type wing fuel tanks added for increased range and the craft will have a slightly heavier gross weight than the 39,000 lb. now authorized for the Northwest Airlines version of the 2-0-2. Eastern plans to use about 30 of the new model 2-0-2s to replace its 51 DC-3s now in operation.

► Night fighter version of the British Electric EEC-1 Canberra two-man light bomber is under development with production on both bomber and night fighter versions expected to start early in 1950. The Canberra is powered with two 7500-lb. Rolls Royce Avon turbojets and has great fuel capacity, and remarkable maneuverability. It is favored over the de Havilland D. H. 113 night fighter Vampire prototype, on account of range.

► Two new 85-hp. pushers in the Goodyear-Continental midget plane category are now flying and one of these may make its debut at the Continental races at Miami. One is the PAR Special, developed at St. Louis by George A. Owl and other Parks Air College alumni working at McDonnell Aircraft Corp. Plane made a dead stick landing without damage after a power failure on its first flight. The other is the Schroeder (Rochester, N. Y.) Dragontail, with "Mixmaster" design, 7-ft. extension shaft to propeller behind tail, bicycle landing gear, virtually faired into bottom of fuselage, and other refinements. Dragontail has been rebuilt after a crackup on takeoff for second flight last fall, and is expected to fly at Miami.

► General Electric's current two B-29 laboratory planes at Schenectady, N. Y. are the fifth and sixth of that type that GE has used on loan from the USAF. One tests the new B-36 armament system, and the other is a flying test bed for the GE J-47 turbojet engine lowered through the bomb bay.

► Texas Engineering & Manufacturing Co. is converting an Army cargo-type C-54 to a 44-passenger airliner for Colonial Airlines, at a cost of approximately \$200,000. Delivery is expected early in 1950. Conversion includes complete overhaul and sealing of all integral fuel tanks.

► Fairey Aviation Co. is using a new construction method on its British Model 17 anti-submarine plane with Double Mamba propjet. New method involves putting together the outside skin of the airplane in envelope jigs before inside structure is fitted in, reversing usual procedure of attaching skin last, after structure is completed. Fairey claims unprecedented accuracy of construction and complete interchangeability of parts under new method, expects to use it in all subsequent types.

► Pan American Airways has decided to equip its fleet of 14 Lockheed 049 Constellations with Stratos cabin superchargers. Funds for the purchase have been included in the airline's new budget, although order had not definitely been placed last week. PAA pioneered commercial use of Stratos superchargers in its 749 Constellations (sold last week to Air France), and it was partly on the basis of PAA's experience that American Airlines bought Stratos for its Convair-Liners (AVIATION WEEK, Nov. 21). Eastern Air Lines and TWA are understood to be specifying Stratos blowers in any new twin-engine planes they buy.

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Vol. 51, No. 25

AVIATION WEEK

Dec. 19, 1949

Plane Type	President's Budget (48-Group)	Minimum Program (After Johnson cut)	Interim Program
Boeing B-47	75	75	82
Convair B-36	51	47	34
Lockheed F-94	178	125	188
Northrop F-89	38	27	27
Republic F-84E	0	0	120
North American F-86A....	300	250	111
North American F-86D....	0	0	122
Douglas C-124A	54	36	36
Boeing C-97A	22	14	14
Fairchild C-119	69	53	53
Northrop C-125B	25	0	0
or Chase C-122			
Lockheed T-33	110	80	*135
North American T-28....	125	85	125
Convair T-29	39	12	12
Fairchild T-31	100	0	0
Grumman SA-16	30	11	11
Total	1335	815	*1070

* 10 for U. S. Navy

Three Steps in Plane Buying

**Officers' board to draw up third and perhaps final
revise of 1950 AF aircraft procurement schedule.**

U. S. Air Force Senior Officers Board will meet shortly to draw up a final aircraft procurement schedule for fiscal 1950. The program now in preparation will be the third major revision of the schedule planned for fiscal 1950 aircraft procurement.

Previous programs:

• The President Truman budget program presented to Congress last January calling for \$1.4 billion for buying 1335 new aircraft plus a small quantity of helicopters. This is commonly known as the 48-group program.

• The USAF minimum program (AVIATION WEEK, Dec. 12) based on cuts below the President's budget ordered by Defense Secretary Louis A. Johnson as part of his widely advertised economy program in the National Military Establishment. This minimum program authorized \$1.1 billion for aircraft procurement—a cut of \$300 million and 520 planes below the 48-group program. Manufacturers included in this minimum program were so notified to facilitate planning their 1950 and 1951 production schedules.

• The USAF interim program which,

until mid-December, represented USAF plans for its first firm buying schedule out of fiscal 1950 funds. This called for committing about \$1 billion in fiscal 1950 procurement funds for 1070 new aircraft including 10 Lockheed T-33 trainers which were to be purchased for the Navy.

Now the interim program has been abandoned and a new program is being drawn that will represent, according to USAF sources, "substantial changes" from the interim program listed in column three of the adjoining table. The new program will not include any eventual disposition of about \$500 million in additional procurement funds voted by Congress but impounded by the President to hold USAF to a maximum strength of 48 combat groups plus 11 separate squadrons.

► 32 Modern Groups—However indications are that if USAF is held to the \$1.1 billion procurement schedule imposed by Johnson it will actually get sufficient new aircraft to equip only 32 groups with modern, post-war planes, and that the remaining 16 groups will be operated with World War II sur-

plus types. The original Air Force program supported by Congress in fiscal 1949 and 1950 called for a total of 67 combat groups of which 48 would be modernized and 19 equipped with surplus Boeing B-29 bombers, North American F-82S night fighters and Douglas C-54 transports.

Among the new models that are likely to figure in the revised procurement schedule to be considered by the Senior Officers Board are:

• Convair B-36F. This model will be built in both bomber and strategic reconnaissance versions. Main feature will be the use of a new type Pratt & Whitney VDT engine scheduled to deliver a maximum of over 4000 hp.

• North American F-86D. This is an all-weather fighter version of the basic F-86 design. It has an airborne search radar in the nose with engine air inlets below the nose radome. It is powered by a General Electric J-47 turbojet.

• North American F-93. This is a penetration fighter version of the basic F-86 design and was formerly called the F-86C. It has a pointed nose and flush engine air inlets on the fuselage. It is powered by a Pratt & Whitney J-48 turbojet. Prototypes of both the F-86D and F-93 are scheduled to fly before the end of December.

• Lockheed F-94B. This is a new version of the Lockheed F-94 night fighter series and is powered by a Pratt & Whitney J-48 turbojet. Prototype is now flying.

► Release Delayed—USAF had planned to announce the interim program in a press release but clearance of the release was delayed by the National Military Establishment Public Relations Director William Frye until a co-ordinated release on USAF, Navy and Army plane procurement could be prepared. Navy objected strongly to releasing any form of aircraft procurement information for fiscal 1950 and NME officials were unable to agree as to the type of procurement information to be released.

There will be no official release of USAF fiscal 1950 procurement plans until after the Senior Officers Board submits its recommendations to Gen. Hoyt S. Vandenberg, USAF chief of staff. Present Board members include Gen. Muir S. Fairchild, vice-chief of staff; Lieut. Gen. K. B. Wolfe, deputy for materiel; Lieut. Gen. Benjamin Chidlaw, head of the Air Materiel Command; and Lieut. Gen. Lauris Norstad, deputy for operations.

CAA Plans Simplified Certification

CAA's proposal gives personal plane manufacturers this choice: Certify the craft yourself, or let us do it.

By Alexander McSurely

A new CAA plan for personal aircraft manufacturers wishing to assume the responsibility of certifying their own aircraft has been approved by CAA Administrator Del Rentzel. It is expected to be put in force very soon.

The plan, developed as a common sense compromise solution to one of the most serious problems of the manufacturers of small aircraft—which has been a sore spot for years in CAA-industry relations—offers the plane maker two alternatives:

- A manufacturer can apply to CAA for delegation of authority to certify his own new aircraft, and if accepted as qualified and responsible, can do his own certification.

- Manufacturers who do not wish to assume this responsibility can continue certifying their new models under CAA supervision, as at the present time.

The new arrangement is limited to manufacturers of aircraft in a class weighing less than 5000 lb. and carrying five passengers or less. A manufacturer who is eligible to take advantage of the alternate plan must have previously successfully designed and obtained a CAA type certificate for an airplane in this class and must also have produced a series airplane of the type under a CAA production certificate.

- **Warranty Policy**—A company which gets CAA approval to do its own certifi-

ication is then authorized to do its own engineering design and investigation of its airplane types. And when it warrants to CAA that the type design complies with Civil Air Regulation Part 3 governing personal aircraft requirements, and with published interpretations of that part which have mandatory force, CAA will issue a type certificate.

Following this, when the manufacturer warrants to CAA that he has fulfilled all the requirements for a production certificate for this type of plane, CAA will issue a production certificate to him for the production of this plane, or add the type to his existing production certificate.

- **Technical File**—A manufacturer who gets this authorization is required to maintain an up-to-date technical file, covering the type certificated. If the manufacturer goes out of business this file is to be turned over to CAA which will then assume engineering supervision of any service difficulties.

If investigation by CAA of any service difficulties indicates that the airplanes certificated by a manufacturer do not conform to the requirements as warranted, and the non-conformity is serious, the manufacturer's certification privileges under the new plan will be withdrawn, until he re-establishes his eligibility. CAA may take action before CAB to revoke his type and production certificates.

Manufacturer is expected to make

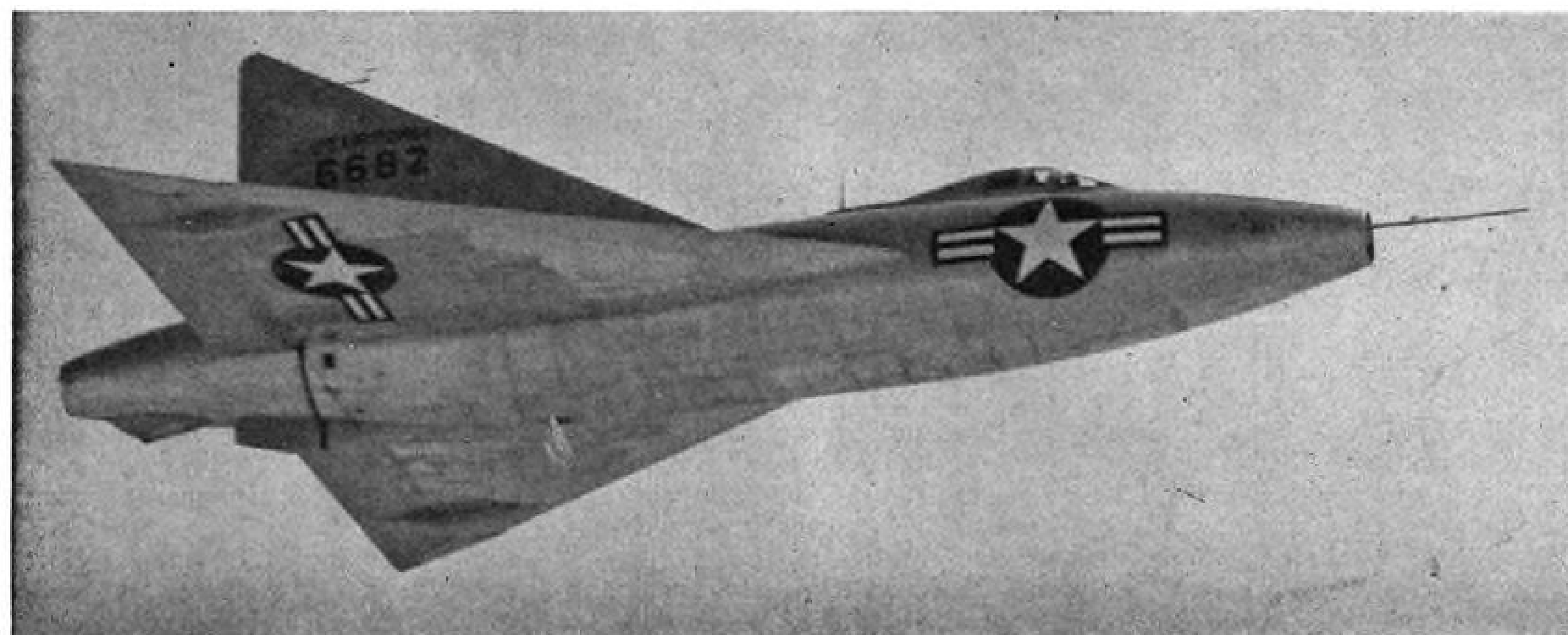
available to CAA on request for inspection, his technical data file, aircraft equipment, plant facilities, and procedures on which he has reported, under this plan.

- **Washington Review**—The CAA Aircraft division, Office of Aviation Safety, in Washington, is charged with reviewing manufacturers' applications to qualify under the new plan, and with issuance of type and production certificates and any airworthiness directives necessary relating to types of airplanes included in the new plan. These matters will be handled "through the appropriate regional office" under direction of the Washington office.

- **Questions Raised**—Proposal to let the maker of an airplane back up his investment in development with his own warranty has been the subject of much pro-and-con between CAA and various segments of industry. Recently it boiled down to such questions as whether CAA should delegate a single individual in a company, or the company as a whole to do the certification.

The two aviation advisory groups of 1947, the Finletter Commission appointed by President Truman and the Congressional Air Policy Board, recommended in substance that the personal plane maker be given more leeway. T. P. Wright, predecessor of Rentzel as administrator, advocated certification by industry, but was unable to get an agreement among the manufacturers as to whether they would accept it or not.

The new plan will let qualified manufacturers stand behind their own products. Those manufacturers who aren't ready to take on the new procedures can still get the full CAA previous type of certification.



NEW VIEW OF FUTURE

New flight photo of the Convair XF-92A, first U. S. delta wing plane to take the air, shows the vertical fin area below the wing and the stall vanes near each wingtip to

prevent spanwise flow of air. The XF-92A is being used to gather data for design of a new delta wing interceptor by Convair. Douglas Aircraft Co. also has a delta wing

fighter design (XF4D) in the mill for the Navy. Many engineers believe that the delta wing configuration is the most promising for supersonic fighter-type aircraft.

- **Small Builders**—Effect of the new arrangement on the major established companies who want to use it will doubtless be beneficial. How it will work out with the small organizations who are developing less orthodox aircraft is not so clearly apparent.

Last summer the Helio Corp., builder of the radical slow-flying Heliplane prototype designed by Prof. Otto Koppen of Massachusetts Institute of Technology, made a decision to shelve the two-place Heliplane as a result of failure to agree with CAA on certification procedures for the airplane.

- **Airphibian Problems**—Similarly, Robert E. Fulton, builder of the radical Airphibian combination automobile and airplane, was reported as having serious difficulties in his CAA certification. Because he had not demonstrated part of the stress analysis program in a conventional manner, he had to do it all over with a strain gauge setup.

The most radical personal plane to get into mass production, the two-control spinproof Ercoupe, had its share of certification problems in its experimental days. Fred Weick's policy of taking his problems directly to the top-level of CAA undoubtedly obviated a number of other difficulties.

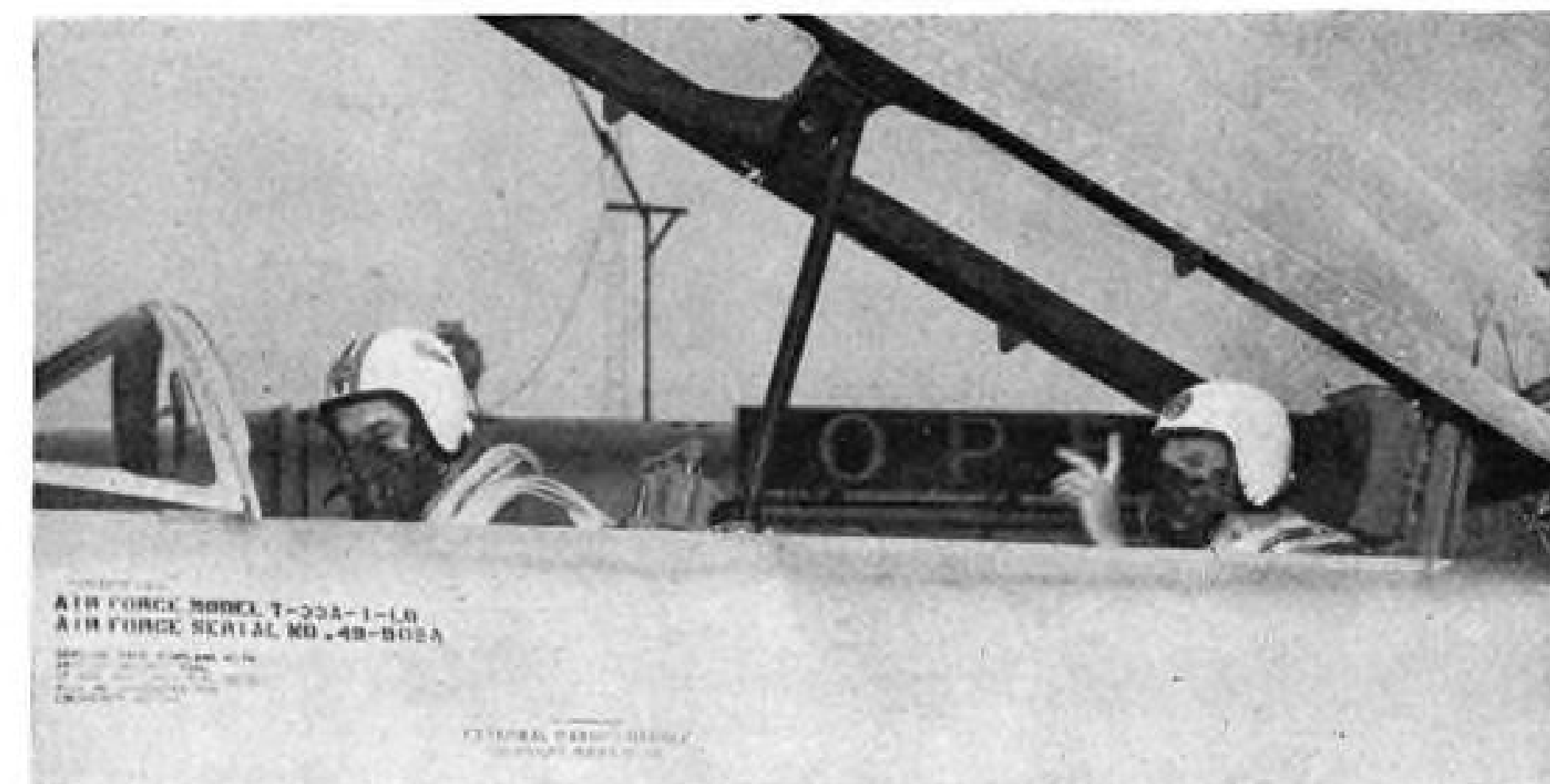
- **Regulation Reform**—A variety of views are found on how much farther reform of current requirements for small airplanes should go.

John T. Griffin, president of the Massachusetts Aviation Trades Assn., recently urged that Civil Air Regulations Part 3 "which freezes and hampers engineering advances should be immediately thrown out the window. Instead, CAA should issue a certificate based solely upon the airplane's ability in flight to meet minimum safe control and performance characteristics, including the ability to withstand dive tests and other structure flight test procedures in flight."

- **Engineer's View**—On the other hand, many competent aircraft engineers will contend that any procedure to judge an airplane solely by flight test, can be the most expensive way of proving its performance, and that stress analysis, static tests, etc., contribute vital information which is difficult, or in many cases impossible to derive from flight testing alone.

Griffin charged, in a paper read at the NATA meeting in New Orleans, that the hindrance of existing regulations and certification procedures was making it possible for CAA to move into the field of nationalization of the personal plane industry. He cited the agricultural plane prototype being developed at Texas A & M College, financed by CAA and the Department of Agriculture, as an example of government competition with private enterprise.

He pointed to a proposed agricultural



SECRETARY TAKES A BACK SEAT

In the rear seat of a Lockheed T-33 USAF jet trainer, Air Force Secretary W. Stuart Symington recently flew from Washington

to New York in less than 30 minutes. Pilot was Col. David Schilling, who four times flew jet planes across the Atlantic.

plane development of the Helio Corp., which was to have been service-tested in the fall of 1949, prior to building a larger production model in 1950, as a plane adversely affected by restrictions and by the government-financed plane project.

- **NASAO Report**—Crocker Snow, Massachusetts aeronautics director, also apparently impressed by the Heliplane difficulties, made a report as chairman of the research and development committee of the National Assn. of State Aviation Officials urging that group to recommend revision of CAR relating to personal airplane design, to remove the "near stranglehold upon the unfortunate aeronautical pioneer."

A program recommended by CAA in the T. P. Wright administration calls for changing existing CAR Parts 3 and

4 to eliminate the personal aircraft category from each, and establishment of a new Part 5 which would re-define the personal aircraft category, giving the administrator authority to adopt a specification prepared by industrial engineers, establish approved firms based on experience and do a limited amount of flight testing as needed for issuance of a type certificate.

- **"Not Desirable"**—A recommendation has been made to Administrator Rentzel by his staff, that rewriting CAR applicable to personal aircraft does not appear "too desirable at the present time."

Another recommendation from the Personal Aircraft Council of Aircraft Industries Assn. asks for a new regulation applicable to aircraft under 5000 lb., to be reviewed annually for changes.

AIA Sets New Prototype Policy

It asks that existing U. S. agency administer plan to buy first models of turbine and cargo planes.

Principal U. S. aircraft manufacturers have agreed upon the need for "government action to protect U. S. leadership in air transportation."

Previous industry differences of opinion on the question of government financing of gas turbine-powered air transports merged into an apparent solid front in the statement by DeWitt C. Ramsey, Aircraft Industry Assn. president, following the AIA board of governors meeting at Santa Barbara, Calif.

Said Ramsey: "Aircraft manufacturers would prefer to continue to deal directly with the airline operators in the purchase of both prototype and production aircraft. However in view of the cost of developing turbine-powered airliners and cargo

aircraft, estimated at many millions of dollars, this does not seem to be presently practical.

"Accordingly the industry recommends that the government embark upon a program of purchasing prototypes of advanced type aircraft. We feel that such a program should be administered by an existing government agency."

The Ramsey statement called for:

- Means to facilitate the sale of the aircraft after the prototypes are developed.
- Making accessible to our designers, by the U. S. government, additional technical data concerning turbine military and civil craft.

- **Experimental operations** within the country of turbine-powered military aircraft converted for cargo and mail.

► **Hot Discussion**—Ramsey's statement was significant as a crystallization of air-frame makers' sentiment on a question which has been subject of hot discussion by individual companies and in an industry-wide policy committee.

It was significant also as an indication that the former Navy admiral who now heads AIA is beginning to take a more forceful leadership of the association. It was known that he was exerting strong pressure to get industry agreement on its position prior to the reconvening of Congress in January.

► **New Bureaucracy**—Opposition to setting up a new government agency to handle the prototype sponsorship, represents general aviation opinion that a new bureaucracy such as proposed in some of the legislation in the last session would be less satisfactory than to have the program handled by existing military agencies, or if that fails, by civil agencies.

LaMotte Cohu, Convair president and chairman of the West Coast Aircraft Manufacturers; and J. S. McDonnell, president of the company bearing his name, and East Coast Manufacturers chairman, were elected vice-presidents of the board of governors.

► **Board Changes**—Other changes in board of governors membership:

• **D. W. R. Morgan**, vice president, aviation gas turbine division, Westinghouse Electric Corp., was added to the board.

• **C. C. Pearson**, president, Glenn L. Martin Co., replaced Harry T. Rowland, former executive vice-president of the Martin Co.

• **Roy T. Hurley**, president, Curtiss Wright Corp. replaced Robert L. Earle, Curtiss Wright vice president.

• **Richard S. Boutelle**, president Fairchild Engine & Airplane Corp., replaced J. Carlton Ward, former Fairchild board chairman.

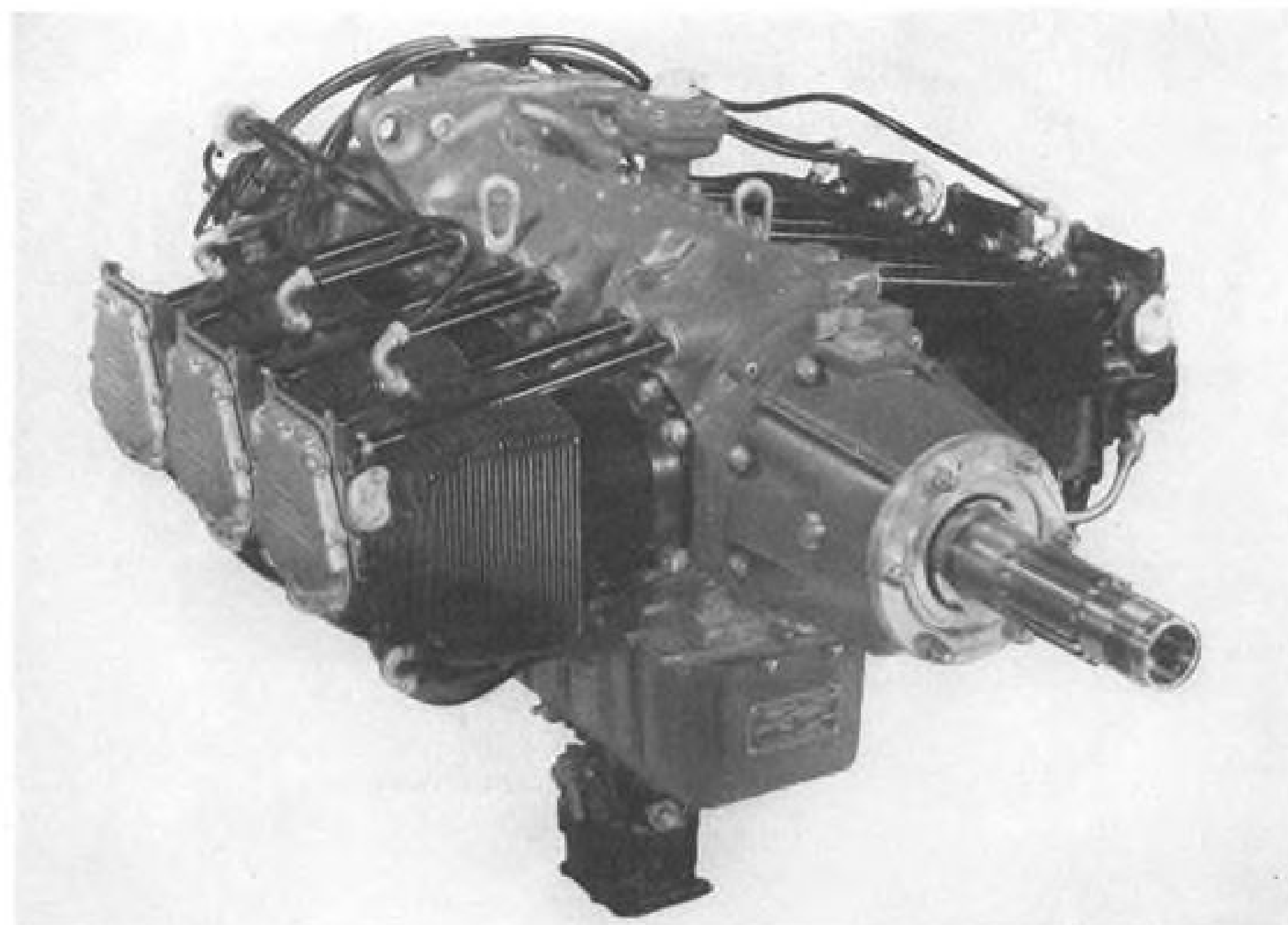
• **Walter H. Beech**, president of Beech Aircraft Corp., replaced C. J. Reese, president of Continental Motors Corp., as lightplane manufacturers' representative on the board, as a result of his succeeding Reese as president of AIA's Personal Aircraft Council.

PAA Sells Connies

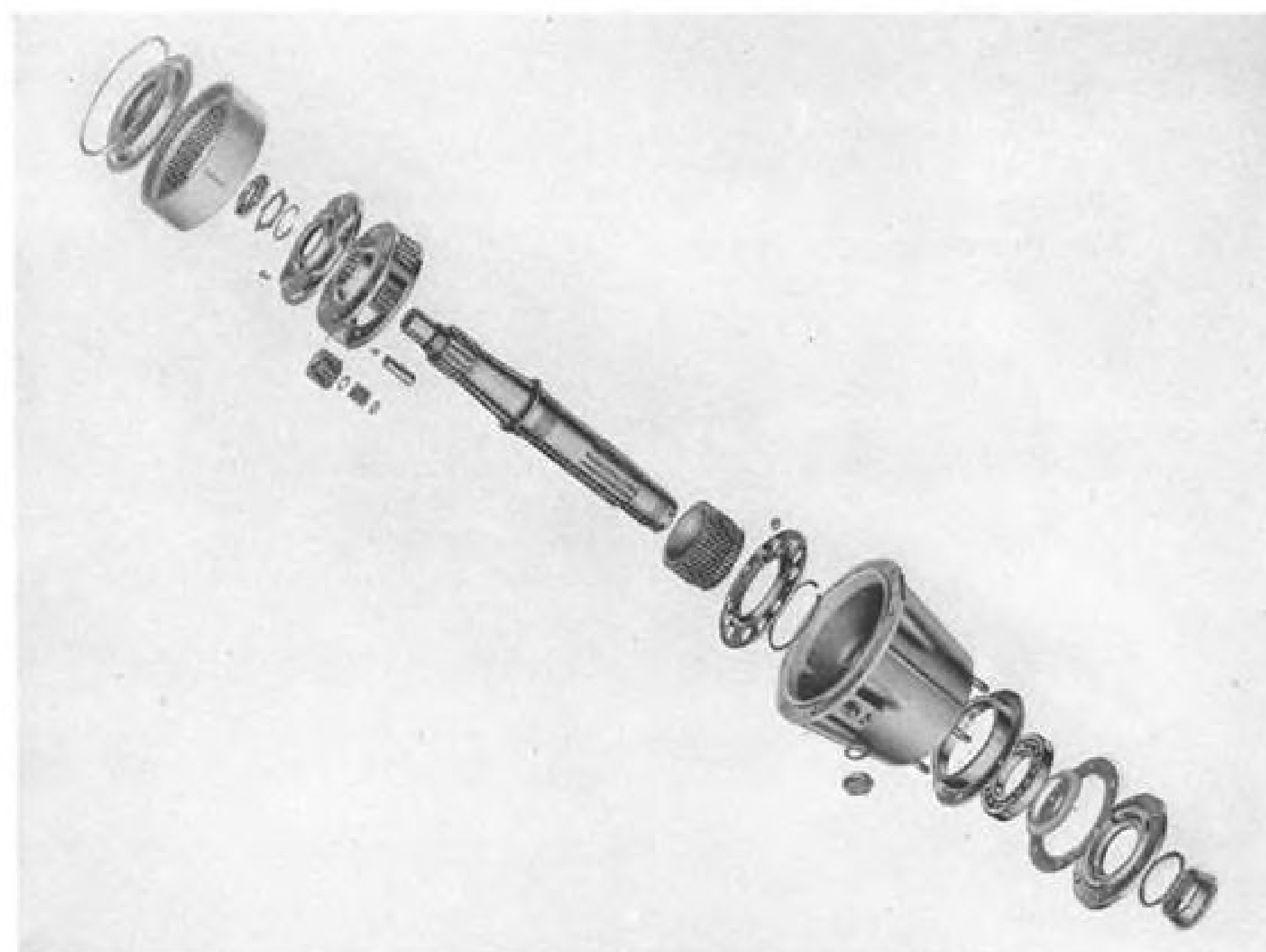
Air France has purchased four Lockheed L-749 Constellations from Pan American Airways, bringing the foreign flag carrier's fleet of 749s to 19.

PAA had purchased the Constellations in June 1947, as interim craft pending delivery of its Stratocruiser fleet. Boeing is now finishing up its order of 20 Stratocruisers for PAA.

Air France will perform some modifications on the craft, including installation of Curtiss propellers to replace Hamilton Standards, which are currently being used.



LYCOMING is first in field with low-power geared engine using special lightweight . . .



REDUCTION GEAR which steps down 3400 crankshaft rpm. to 2180 propeller rpm.

Geared Engine for Lightplanes

Combination of a fast-turning engine crankshaft and a slow-turning propeller, long used in transport-type aircraft and in helicopters, is coming rapidly into the small airplane field with three principal manufacturers in the small-engine market preparing entries fitted with reduction gears to keep down propeller rpm.

• **Lycoming-Spencer division**, AVCO Manufacturing Corp., Williamsport, Pa., is first in the field, with its GO-435 series geared engines, developing 260 hp. at takeoff with 3400 rpm. on the crankshaft and 2180 rpm. on the pro-

peller. (Lycoming now has geared engines in four, six, and eight-cylinder models, ranging from 160 to 400 hp.)

• **Continental Motors Corp.**, Muskegon, is developing a reduction gear version of the widely used E-185 six-cylinder engine, to be closely competitive with the Lycoming powerplant when it goes into production.

• **Aircooled Motors**, Syracuse, N. Y., has a geared-engine version under development of the 500 cu. in. engine originally developed for the Republic Seabee, expected to produce 250 to 275 hp. at slow propeller speed.

The new Lycoming production engines going into the new Beech Twin Bonanza, and the Ryan Super Navion (AVIATION WEEK, Nov. 28), are developed from the wartime Lycoming O-435 engine which produced 190 hp. without reduction gear. It was used to power the Stinson L-5 liaison planes, nearly 3000 of which were procured by Army Air Forces in World War II, and some of which are still in service use.

First use of a reduction gear on the engine was on some Navy GO-435s developed for use in target drone planes built by the Naval Aircraft Factory, Philadelphia.

The production GO-435 for civilian use has CAA Type Certificate No. 228.

Three major advantages of the geared engine over direct-drive engines are pointed out by S. B. Withington, Lycoming-Spencer manager:

- **Increased propeller efficiency** at lower speeds.
- **Increased power and engine efficiency.**
- **Reduced noise level of the propeller.**

The Lycoming engine is being produced in two models, GO-435A2 with automotive-type accessories, and the more expensive GO-435C2 with aircraft type accessories. The C2 version includes the A-N accessory case and A-N-type Eclipse starter and generator.

The maximum takeoff rating of 260 hp. is for two min. duration. Normal continuous power rating is 240 hp. at 3000 shaft rpm.

Propeller drive ratio is 77:120. Other specifications: bore, 4 $\frac{1}{8}$ in.; stroke, 3 $\frac{7}{8}$ in.; displacement, 434 cu. in.; compression ratio, 7.3:1; fuel 91/98 octane; engine weight, dry, with starter and generator, 460 lb.; without starter and generator, 432 lb.; overall length of the C2 model is 39.57 in.; overall length of the A2 is 40.71 in.

Convertaplane

Its success depends on using blades as both rotors and propellers.

PHILADELPHIA—Growing acceptance of the convertaplane as a practical aircraft was in strong evidence here at the First Convertible Aircraft Congress, sponsored jointly by the Philadelphia sections of the Institute of the Aeronautical Sciences and American Helicopter Society.

The all-day session featured technical discussions of the convertaplane problem and presented innumerable possible solutions. The meeting was arranged and conducted by E. Burke Wilford, pioneer gyroplane producer and a leading advocate of the convertible aircraft.

Navy Asks Bids On Constitution

The Navy's two 180-passenger Lockheed Constitution transports have been officially offered to commercial interests (AVIATION WEEK, Dec. 12).

Bids for five-year leases on the 92-ton craft are being requested from scheduled and large non-scheduled airlines by the Navy's Bureau of Aeronautics. Navy has used the planes on transcontinental cargo and passenger runs. The Military Air Transport Service, which had first call on the Constitutions, said it had no present use for the ships.

► **Budget Cut**—Reduced military budgets do not permit continued operation of the Constitutions by the Navy. If the planes cannot be leased they will be stored at Litchfield Park, Ariz.

Any commercial carrier leasing the Constitutions will have to arrange with CAA to certificate the planes for civilian passenger use.

► **Advantages**—Basically an aircraft which rises vertically as a helicopter, and flies horizontally as a conventional fixed-wing aircraft, the convertaplane offers solution to the inherent speed limitation of the helicopter. Engineers at the congress foresaw speeds of greater than 400 mph. for the type, although others believe its best speed range lies in the 150-250-mph. bracket.

Several configurations of the new type were urged by the speakers, ranging from conventional aircraft with auxiliary rotors for vertical flight, to helicopters which heel over 90 deg. in flight and operate their rotors as propellers. Basic design problem of the latter remains the obtaining of satisfactory efficiency from blades used both as propeller and rotor.

► **Interim Type**—Dr. K. Hohenemser believes that an immediate "interim" type consisting of a conventional helicopter with small fixed wings would unload the rotor enough to permit much higher speeds in level flight without the necessity for rotor retraction. Dr. Anton Flettner, famous trim tab inventor and now head of his own company in the U. S., suggests the addition to conventional aircraft of rotors mounted at the ends of booms attached to the wings.

His arrangement would place the rotor downwash clear of the aircraft fixed surfaces. In level flight his two-bladed rotors would be aligned with the booms to create minimum drag. He

also proposes the use of rocket power for the helicopter portion of the flight, since this would require only a few seconds and thereby minimize the inefficiency of the rocket.

► **Rotor Mounting**—Lloyd Leonard proposes a true convertaplane with rotors mounted below the cabin, possible ramjet or pulsejet rotor power, and mid-air conversion of the rotor to a propeller by rolling the airplane through 90 deg. Charles Zimmerman, creator of the Vought "Flying Pancake", favors further development of this low-aspect-ratio design because of its inherent ability to fly vertically or horizontally at will. Both designers isolated the problem of propeller-rotor efficiency as a major research project.

► **Navy Demands**—Cold water was thrown on the possibility of immediate Navy Department support of convertaplane development by Lt. Comdr. William Knapp, Bureau of Aeronautics, supported by Rear Adm. C. M. Bolster, Bureau of Research and Development chief, both of whom demand that a convertaplane demonstrate performance comparable to existing aircraft, plus the ability to rise vertically, before genuine Navy interest would be warranted.

Roland Rohlf, personal flying specialist, CAA Region 1, also insisted that the success of the convertaplane as a solution to the present personal flying impasse hinged on its ability to make flying more natural for the average citizen.

Evidence that the aerodynamic problems of the convertaplane are not insoluble was furnished by Robert L. Lichten, Bell Aircraft Corp., who provided a model demonstration and motion pictures of experiments by Art Young which demonstrated clearly that a rotor has no difficulty in changing from vertical flight to forward propulsion.

Dutch Reconsider

(McGraw-Hill World News)

AMSTERDAM—After considerable discussion, the Dutch Government has reconsidered its decision of a few weeks ago not to grant support to an independent Dutch aircraft industry (AVIATION WEEK, Nov. 21). It has now decided to grant such support in behalf of the development of a Dutch type aircraft.

As a result of this change of mind, Fokker Aircraft Co., which already has had to resign itself to mere construction under license and to repair work, will be given fresh life. The announced dismissal of 200 employees of the construction department has therefore now been withdrawn. It is expected that Fokker will concentrate on construction of a jet civil aircraft.

FINANCIAL

CAB vs. Air Carrier Certificate

New trans-Atlantic policy seen undermining franchises and setting precedent that could boomerang.

The value of an airline certificate of public convenience and necessity has been placed in doubt by recent Civil Aeronautics Board action. The Board announced a policy welcoming applications from certificated and large irregular carriers to conduct special trans-Atlantic services from June 1 to Sept. 30, 1950.

Commendable as its motive may be in facilitating air travel to Europe next year, this Board move serves to undermine the franchise quality advanced to promote stability among the certificated airlines.

One of the main virtues of the Civil Aeronautics Act of 1938, designed to end the chaotic regulatory procedures previously existing, was the authorization of certificates of public convenience and necessity to be issued to air carriers permitting the transportation of persons, mail and property.

► **Franchise Value**—These franchises represent a legal "right-of-way" in the sky and are the backbone of an ordered development of the nation's airline network as well as routes to foreign countries. Railroads, busses, truck carriers and other public utilities, all operating under some regulatory franchise, have shown varying degrees of continuing progress and growth. The absence of this system of franchises would place these groups in economic jungles with consequent damage to the public and private enterprise.

It is against this background that the Board's recent actions must be viewed. Forecasts indicate that air traffic to Europe next year will be unusually heavy because of the Catholic Holy Year, currency devaluation in various European countries and continuing demand for travel resulting from the unsettled postwar period.

This atmosphere attracts pressures for special charter and various supplementary flights regardless of existing services. Transcontinental & Western Air, Inc. is the only certificated U. S. air carrier with an authorized direct route to Rome.

► **TWA's Development**—At considerable effort and expense, TWA has attempted to develop a strong, efficient international airline network, in accordance with its certificate. Toward this development, substantial U. S. govern-

ment assistance, in the form of mail compensation, has also been poured. The airline has been well aware of the 1950 traffic potentialities to Rome and has devoted an extensive promotional effort toward this end. TWA ordered additional equipment and facilities to service the heavy travel demands of next year.

A real danger now exists that if an uncontrolled number of cut-rate charter flights are created to compete with TWA, dilution of traffic may be so great as to impair seriously its earnings.

TWA has no monopoly in authorized services to Rome. Both Air France and KLM also serve Rome in their route patterns originating from New York. American Overseas Airlines and Pan American Airways reach key European gateways where connecting lines fly to Italy.

The first serious deviation in this authorized trans-Atlantic air pattern is likely to come from the proposed charter service to be operated by Pan American in association with Felix Roma, a travel agency formed in Italy last year. Under this proposal, Pan American would operate eight round-trips a month between the United States and Rome during 1950.

► **PAA to Benefit**—This CAB action, of course, stands to benefit Pan American by augmenting its regular trans-Atlantic revenues by these special charter flights. However, this same approach may some day boomerang against Pan American.

For example, Pan American's Latin American operations have been very profitable and have been susceptible to peak traffic demands. The time may come when another U. S. carrier may declare that in order to meet special conditions it has arranged a series of charter flights to supplement the authorized Pan American service. Once the security of a certificate of public convenience and necessity is impaired in one instance, it takes very little effort to make further inroads elsewhere.

Even greater dangers are involved in the Board's open invitation to virtually all air carriers to run charter flights to Rome during the peak traffic period from June 1, 1950 to Sept. 30, 1950. During this interim, Pan American has indicated that it would like to run one charter trip daily to Rome. Presumably,

these charter trips would be augmented by other carriers to an unknown degree. All such applications must be filed before Mar. 1, 1950.

► **Jones Disagrees**—In a vigorous dissent, CAB member Harold A. Jones, highlights the dangers in the current Board policy (see page 41).

The question is asked: "For who would travel to Europe in the winter time at special rates if they can travel in the summer time at even lower special rates?" In out-spoken terms, the CAB member disputes the Board majority's contention that these group cut-fares will not be subsidized. The losses caused by the diversion of off-season traffic will eventually come out of the public purse, according to Mr. Jones. Further, considerable doubt is cast upon the legality of the so-called exemptions authorizing the charter flights.

As present regulations do not permit irregular carriers to carry passengers between nations, Mr. Jones questions the Board's ability to authorize such carriage by administrative fiat.

In support of his position, the dissenting Board member declared: "A travel agency soliciting and booking passengers in international travel is an indirect carrier and as such it cannot engage in such business without authority from the Board after an adjudication deciding it is in the public interest. The question arises as to the legality of a combination of an unauthorized indirect carrier and a direct carrier to conduct international carriage of passengers . . . The 'exemptions' will not be in the long-term public interest, no matter how popular the present demand may be."

► **Route Security**—"The paramount public interest is the creation and maintenance of a strong international air transport system for the benefit of all our people. The foundation of such a system is security of route."

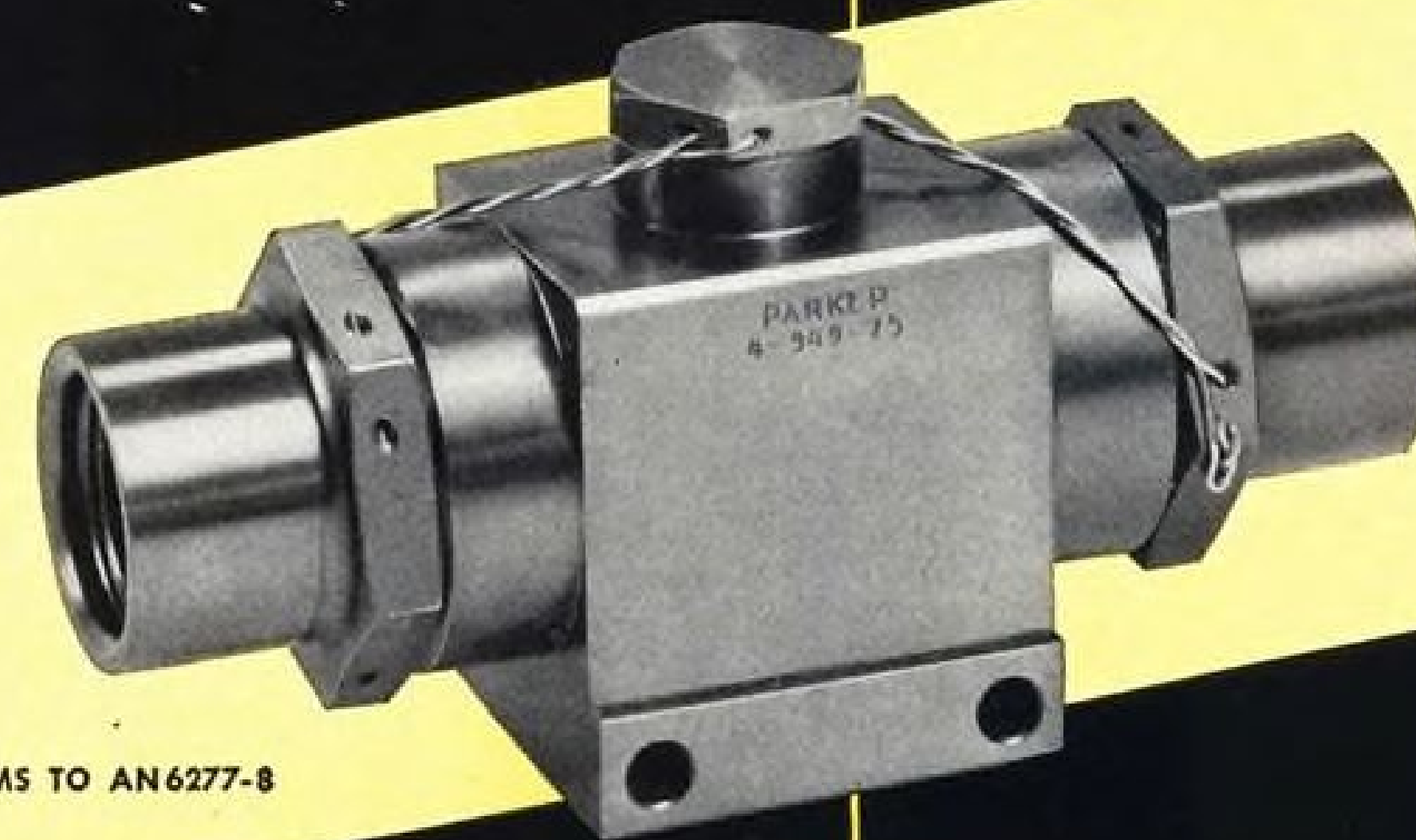
"By the misuse of the words 'charter or special service' in the Act it (the Board) purports to conjure up a thing never intended by Congress, and in fact a thing by Congress sought to be avoided—a hybrid airline, half travel agency and half air carrier, which may obtain a license to fly any route, any time, subject only to the administrative beneficence of the Board."

There is little doubt that the CAB's trans-Atlantic air policy for 1950 promises to develop as one of the most controversial ever issued by that agency. The administrative procedures require separate hearings on each charter application. In each instance, as approval is granted, the door to unregulated airline competition will be opened wider and wider. As the dangers of this policy become more evident, any effort to turn back will become difficult if not impossible.

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AERONAUTICAL ENGINEERING

Wing Divergence: Danger in Fast Flight

Flexibility of airfoil structure creates grave stability, control and structural problems for plane designer.

By Robert McLaren

Prior to the past few years, aerodynamic and structural design of aircraft assumed a rigid structure. Not only did this assumption greatly simplify calculations, but it was a reasonable one on the basis of aircraft speeds then common and in view of the materials and structural techniques then in use. As a result of these two conditions, loads were low and structural rigidity high.

Structural stiffness and structural strength are closely but not integrally linked. Consider, for example, two wings with identical maximum allowable stress values but wide variation in flexibility. The rigid wing will support this allowable load with only a slight deflection. The flexible wing will support this same load but must deflect through a substantial distance to do so.

► **Stiffness Importance**—Relationship between structural strength and structural stiffness is quite close up to some value of the load determined by a wide variety of conditions. After this value is exceeded, the two characteristics diverge rapidly. Since the loads on early aircraft were usually below this value, design purely for strength provided a structure sufficiently inflexible to be considered a rigid body.

Recent trends in aircraft design, however, have moved the problem far beyond this value of the load so that structural stiffness has now become, in some designs, the basic structural design criterion, with strength actually a secondary consideration. This is true in the case of high-speed aircraft which feature thin wings and high structural loadings.

► **Aileron Reversal**—One of the early serious results of the assumption of structural rigidity was the phenomenon of control reversal, particularly aileron reversal, since the wing has normally displayed greater flexibility than the stabilizer, because of its greater aspect ratio.

Assume, for example, that the aileron is deflected down. This creates an increase in lift over the wing panel through an increase in the angle-of-attack. The increased load on the

Second In Series

This is the second in a series of more detailed analyses of special aeroelastic problems summarized in an introductory article appearing in AVIATION WEEK, May 30, 1949.¹ The first of the series appeared in AVIATION WEEK, Sept. 19, 1949,² and dealt with gust loadings and their effect on aircraft life expectancy.

aileron, however, produces a torque on the wing about its elastic axis, which tends to decrease the angle of attack and, therefore, the lift. Thus, there is set in motion two conflicting actions on the wing.

Amount of this torque depends upon the lift generated by the deflected aileron and, in turn, on the square of the aircraft velocity. Resistance of the wing to this torque is provided by its structural stiffness and is, therefore, independent of the airplane speed.

It is apparent that there exists a velocity at which the attempt of the aileron to increase the angle-of-attack is just matched by the attempt of the stiffness to decrease the angle-of-attack. At this speed, further movement of the aileron produces no increase in lift and may, in fact, produce a decrease in lift, or the reverse of that intended by the pilot. This velocity, therefore, is termed the "aileron reversal speed" and is a function of the wing structural stiffness.³ Aileron reversal speed is high for a stiff wing, low for a flexible wing.

► **Divergence Speed**—The wing itself, with or without aileron action, may be subjected to this same phenomenon. For example, as the angle-of-attack is decreased and the aircraft velocity increases, the center-of-pressure moves aft, resulting in a torque about the wing elastic axis.

This torque produces a deflection of the trailing edge upward which, in turn, further reduces the angle of attack and moves the center-of-pressure farther to the rear.

Since, as stated previously, this aerodynamic torque increases as the square of the speed while the resistance of the structure is some fixed value, there exists a speed at which both effects balance. A further increase in the speed will result in further deflection of the wing surface until structural failure occurs.

This speed is termed "divergence speed" and refers to the wing itself, as distinct from "aileron reversal speed." For obvious reasons, the two phenomena are closely connected.

► **History**—The theoretical possibility of control reversal or divergence due to wing twist was recognized as early as 1926 by Hans Reissner in Germany⁴ and was given further comprehensive treatment by Cox and Pugsley in England in 1932.⁵ By 1937 these problems were the subject of extensive experimental and mathematical work in Japan, Italy, Germany and England.⁶

While U. S. engineers followed these reports closely, the problem remained largely one of theoretical interest, since it had not yet become of serious practical importance. As always, other problems had to be clarified first before such refinements became of value.

For example, such mathematical treatments were of little interest in the absence of accurate methods of predicting control surface characteristics or of specifying satisfactory flying qualities of aircraft. It was impossible to detect deficiencies in aircraft control until methods were available to tell the engineer and the pilot what such control characteristics "ought to be."

► **NACA Work**—First comprehensive treatment of the moments developed by the wings when the airplane is disturbed from steady flight was published in April, 1938, by the NACA.⁷ This report provided theoretical stability and control characteristics of wings with various amounts of taper and twist and thus made possible the prediction of such characteristics in the design stage.

It is interesting to note that in this classic report "the secondary influence of distortion . . . is neglected."

Simultaneously, the NACA Langley Laboratory had been investigating the flying qualities of a variety of aircraft to establish design requirements, or what the airplane "ought to be" from the viewpoint of safety and comfort.

First report of this activity was issued in April, 1941, and was confined

to an examination of the aileron control characteristics of 28 different aircraft configurations.⁸ By comparing results of these test flights with theoretical values obtained from Ref. 7, it was found that "aileron effectiveness developed in flight may be considerably less than that theoretically predicted . . . presumably because of wing twisting . . ."

The NACA, therefore, initiated an investigation of the discrepancy between theoretical and actual values of control effectiveness in a desire to adapt its wind tunnel results more directly to aircraft design by the manufacturer. Results of this comprehensive analysis appeared in October, 1943, and suggested that an empirical constant of 0.80 be used to account for the various factors contributing to the reduction of rolling effectiveness in flight.⁹

While this simple correction factor has proved accurate for low values of Mach number and, consequently, low values of wing deflection, it was apparent that an accurate method of predicting the effect of wing twist on aileron effectiveness was needed.

► **Harmon's Method**—Such a method was developed by January, 1944, by Sidney M. Harmon of the NACA Langley Laboratory.¹⁰ Although its complexity prevents mathematical treatment here, a graphic representation of its accuracy and its indication of the profound effect of wing twist under aerodynamic load on the rolling effectiveness of a typical fighter plane is shown in Figs. 1, 2 and 3. Fig. 1 is a plot of the calculated rolling effectiveness of a Republic P-47C Thunderbolt fighter when its wing is assumed rigid and when the method of the report is used to determine the effect of aerodynamic twist. A more graphic indication of such effects is shown in Fig. 2, in which the ratio of rolling effectiveness of the flexible wing to that of the rigid wing is plotted against indicated airspeed. These figures indicate that the effect of wing flexibility at an indicated airspeed of 400 mph. is to reduce rolling effectiveness from 0.00343 to 0.00239, or more than 30 percent. Aileron reversal occurs at an indicated speed of 545 mph.

► **Flight Test Proving**—To test the accuracy of the theory, a full-scale Republic P-47C fighter was subjected to extensive flight tests to determine its actual rolling effectiveness. Results of these trials are shown as test points in Fig. 3.

Curve A is the calculated rolling effectiveness of the airplane assuming a rigid wing.

Curve B is the calculated rolling effectiveness using the newly developed method.

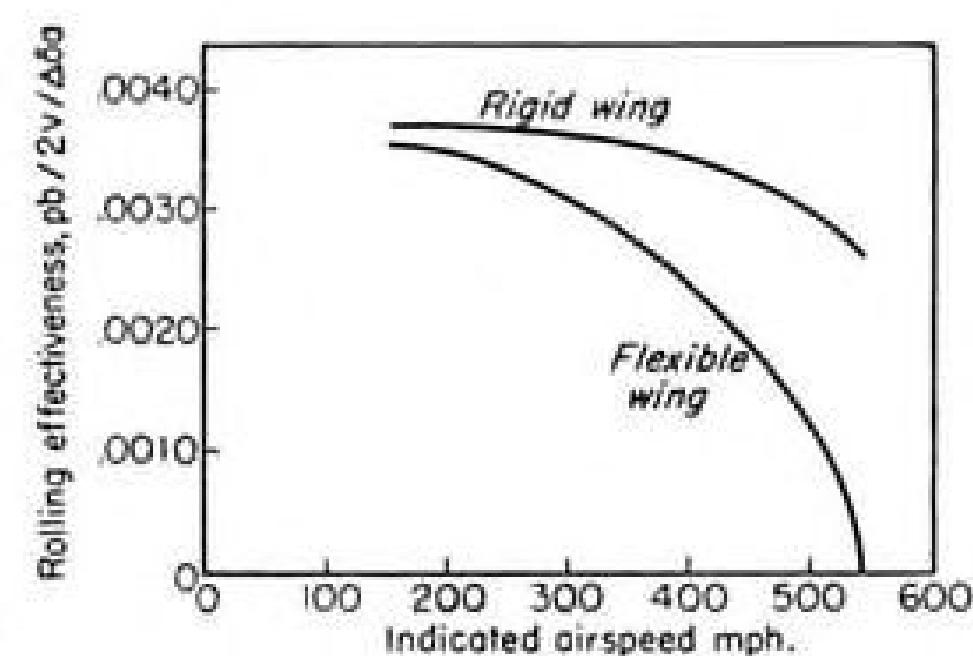


Fig. 1 Calculated rolling effectiveness of P-47C airplane (Ref. 10)

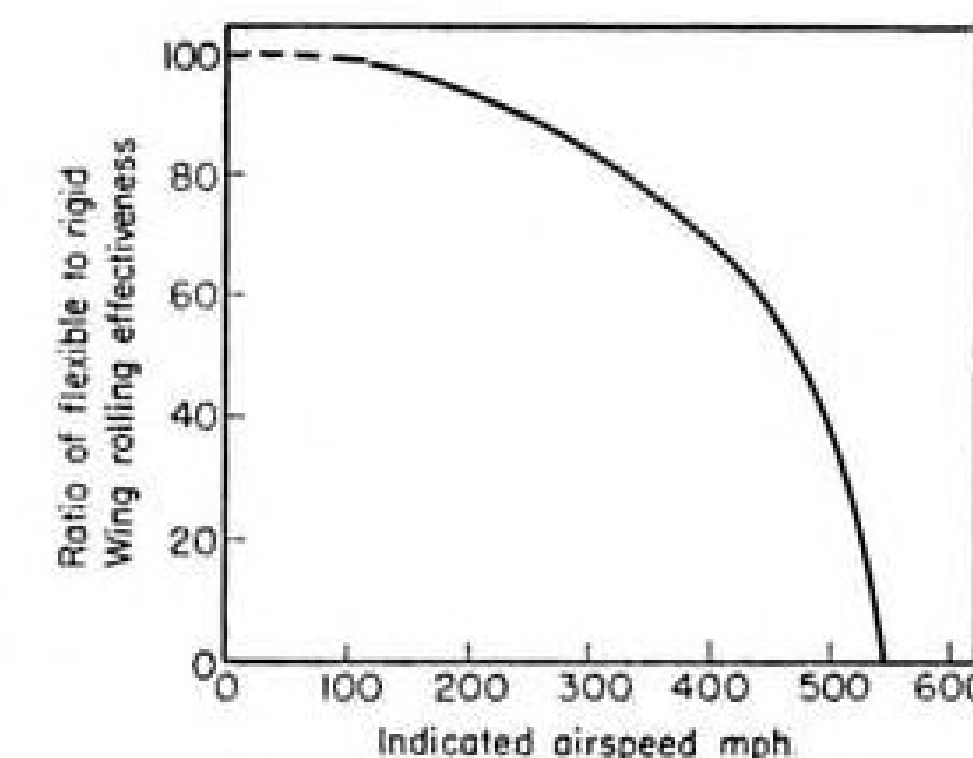


Fig. 2 Ratio of rolling effectiveness of flexible wing to that of rigid wing

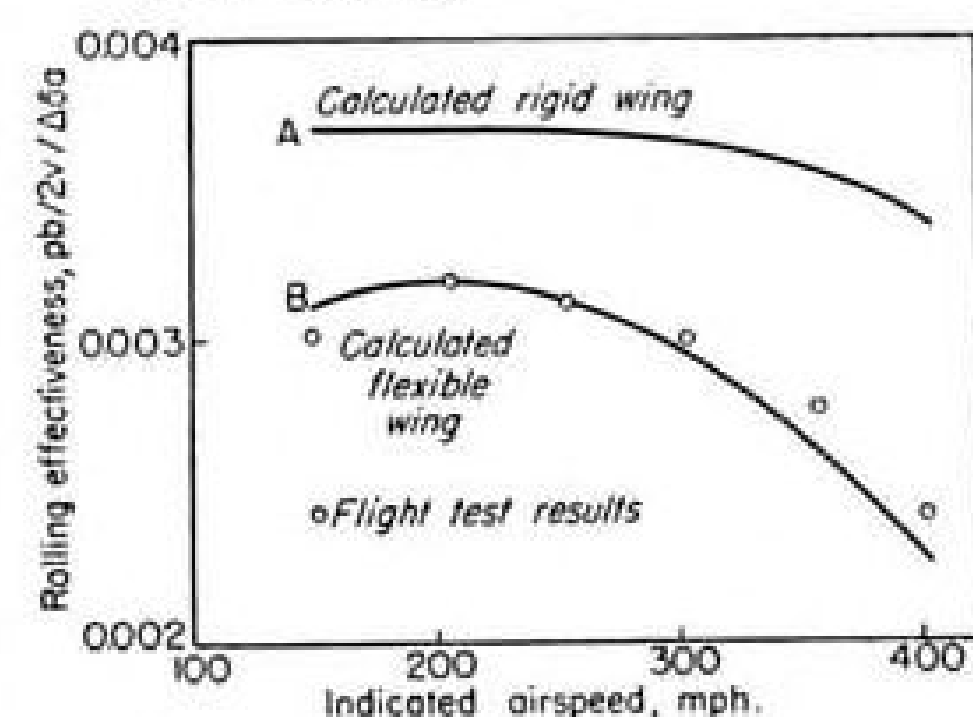


Fig. 3 Comparison of calculated rolling effectiveness with P-47C flight test results (Ref. 10)

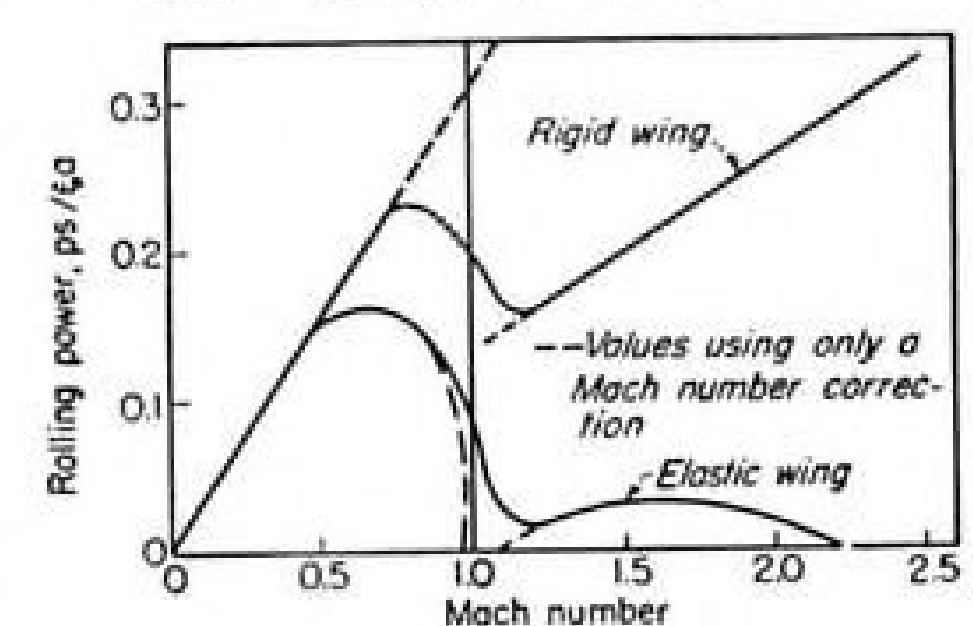


Fig. 4 Effect of Mach number correction to calculated rolling power of elliptical wing (Ref. 17)

Close agreement between Curve B and the flight test points indicates the accuracy of the method.

► **Charts Developed**—The war years, which witnessed rapid increases in aircraft speed, losses in control effectiveness through wing flexibility and increased demands for control effectiveness, produced a number of methods for computation of aileron reversal and divergence speeds.^{11 to 15}

These methods differ mainly in the combination of assumptions used and the degree of exactness attempted. It

was to reduce the labor required in such computations that a series of charts was developed by the NACA Langley Laboratory, which greatly reduced the time necessary for calculation.¹⁶

While these charts do not produce the high order of accuracy available in some of the other methods, their accuracy has proved wholly useable, while saving hundreds of man-hours.

► **Rolling Power**—Effect of compressibility on rolling power of wings is generally similar to its effect on the lift and drag coefficients, since the rolling power and the effect of twist are determined by the aerodynamic characteristics of the wing. Fig. 4 is a plot of rolling power vs. Mach number for an elliptical wing.¹⁷

As is customary, the faired curve through the sonic regime is an arbitrary evaluation based upon experience with other parameters, since neither theoretical nor experimental results are available in this region.

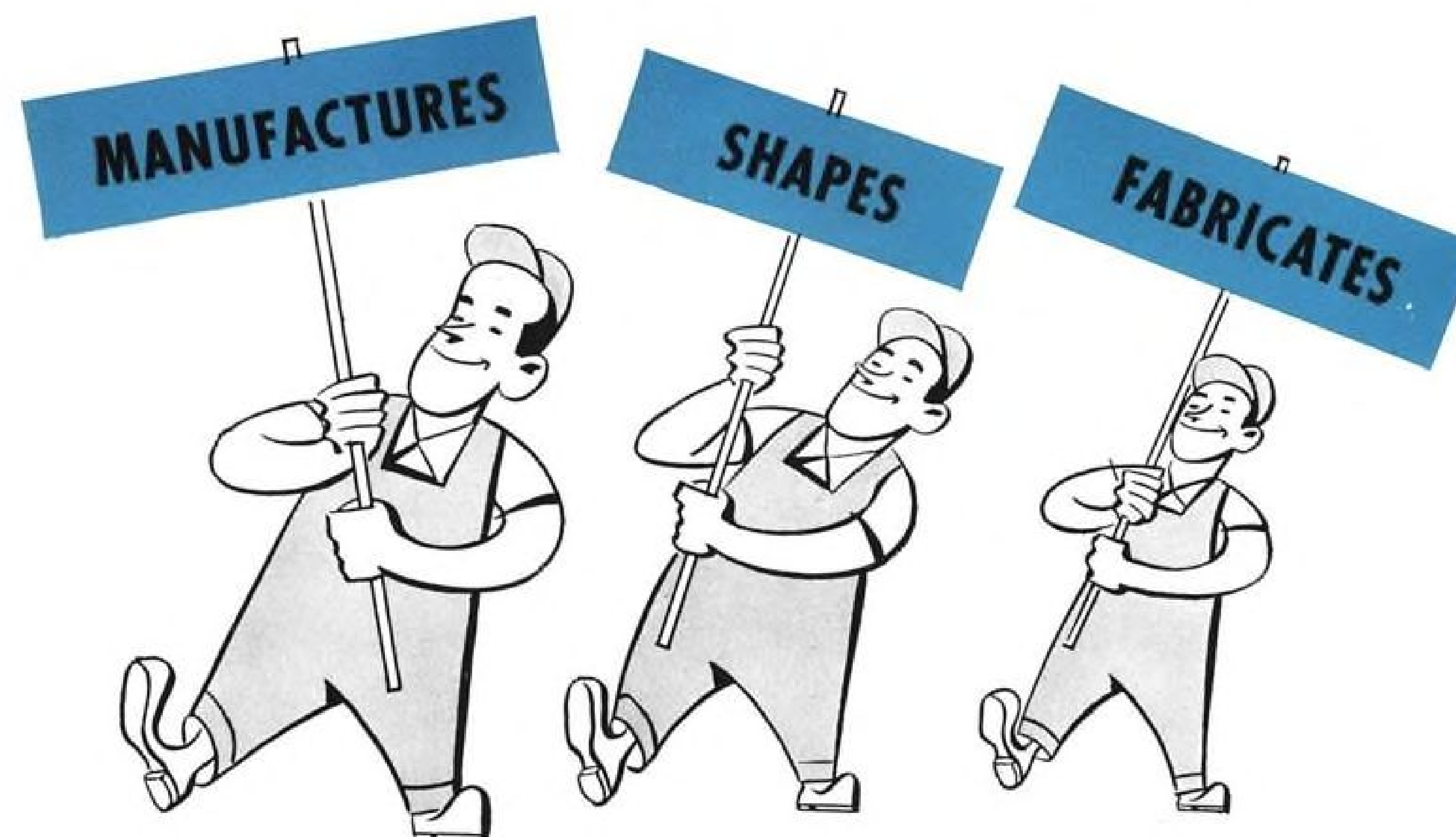
It will be seen that for both the case of the rigid wing and the elastic wing there is a substantial loss in rolling power in the transonic zone and, whereas the rigid wing case ultimately equals its subsonic value above Mach number 1.7, the rolling power of the elastic wing never approaches its subsonic value in the supersonic regime and actually falls to zero at a Mach number slightly greater than 2. An important value is that lying just beyond Mach number one, at which point the rolling power of the wing examined falls dangerously low. A reduction of only 10 percent in the stiffness of this wing would result in zero rolling power and prevent the airplane from responding to its aileron at supersonic speed.

However, the stiffness required for response at a given Mach number falls off quite rapidly with altitude and if supersonic flight is confined, in this case, to an altitude greater than 30,000 ft., the airplane could be rolled satisfactorily with a stiffness value only one-third that necessary at sea level. This consideration explains, in part, the extremely high altitude nature of the early supersonic research aircraft flight test program.

► **Sweep Factors**—Use of wing sweep complicates the problem. In the unswept case (considered throughout the foregoing) only torsional stiffness has been considered, since wing bending has little or no effect on wing pressure distribution.

The swept wing, however, introduces the additional problem of wing bending stiffness, for deflection of the wing tips produces a progressive incidence change along the wing resulting in an angle-of-attack change and, conse-

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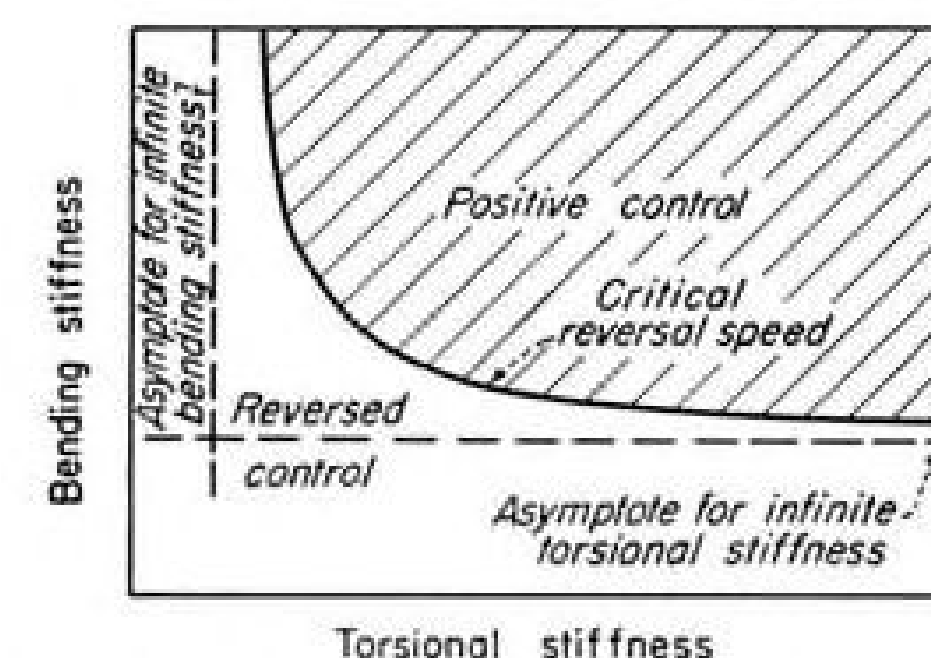


Fig. 5 Relationship between bending and torsional stiffness of swept wing for given reversal speed (Ref. 17)

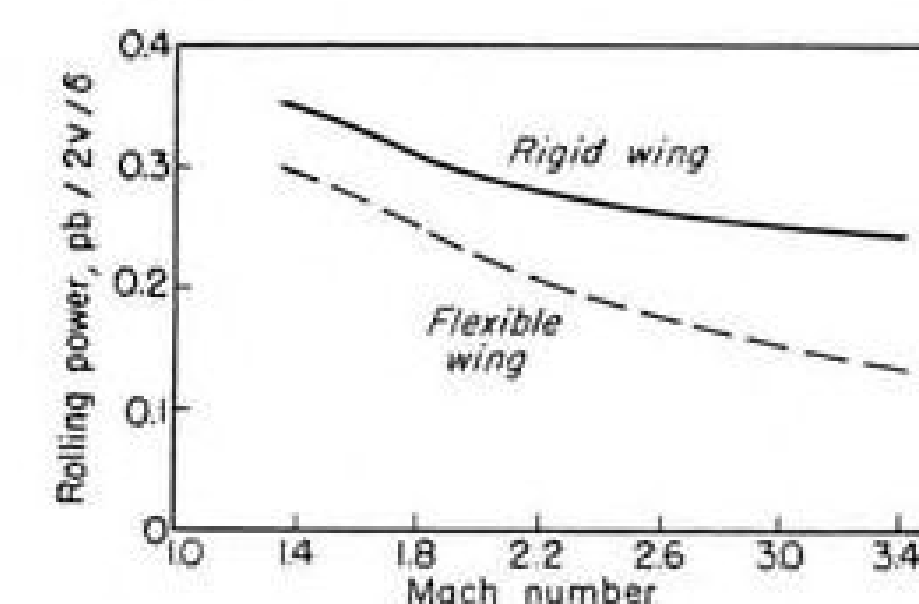


Fig. 6 Effect of supersonic speed on rolling power of rigid and flexible wings (Ref. 19)

quently, a lift redistribution.

Thus, in the case of aileron movement at the tip of a swept wing, the aileron load results in bending deflection which produces a wing twist. As in the unswept case, this twist is opposed by the wing bending stiffness and a speed is reached at which aileron reversal and wing divergence occurs as a result of bending deflection only.

If we now add the effect of wing torsion it becomes obvious that the reversal speed due to bending is lowered. Thus, in the swept wing, the reversal speed is a function of both bending and torsional stiffness. This relationship is plotted in Fig. 5, which indicates that for a given value of either bending or torsional stiffness, there is a value of the other required in order that positive lateral control be assured.

There is another feature of the swept wing, however, which tends to minimize its susceptibility to divergence. The divergence speed of a wing is determined largely by the disposition of the aerodynamic and flexural axes; the closer together these two axes lie the lower the critical speed. Since, in general, the use of sweepback tends to move the elastic axis rearward, this distance tends to increase and, therefore, to increase the divergence speed.

Calculations indicate that in some cases wings with sweepback beyond a fairly low value cannot diverge.¹⁸ This consideration is of considerable importance in the transonic and supersonic case, since the flow changes associated with passage through the transonic regime moves the aerodynamic center of the wing from the quarter-chord to the half-chord point, resulting in the loca-

tion of the elastic axis forward of the aerodynamic center, under which conditions divergence is impossible.

► **Supersonics**—For the case of supersonic flight, pressure changes created by aileron deflection cannot propagate forward to redistribute the pressure of the entire chord. As a result, the loads must be accommodated by the aileron itself, resulting in greater torsional moments about the wing elastic axis and, therefore, greater wing deflection. Hence, aileron effectiveness and, consequently, rolling power of a wing in supersonic flight is comparatively low.

It follows that supersonic ailerons

must be extremely strong, have large areas and large angles of deflection. The loss of effectiveness of rolling power with Mach number is shown in Fig. 6, which is a plot of data from Ref. 19, and Fig. 7, plotted from Ref. 20. This case differs from Fig. 4 in that the latter was obtained by using the Prandtl-Glauert correction to the subsonic calculation, whereas Figs. 6 and 7 are obtained on the basis of supersonic wave drag considerations.

► **Empennage Distortion**—Thus far we have considered only the case of a flexible wing-aileron combination but these same considerations apply with

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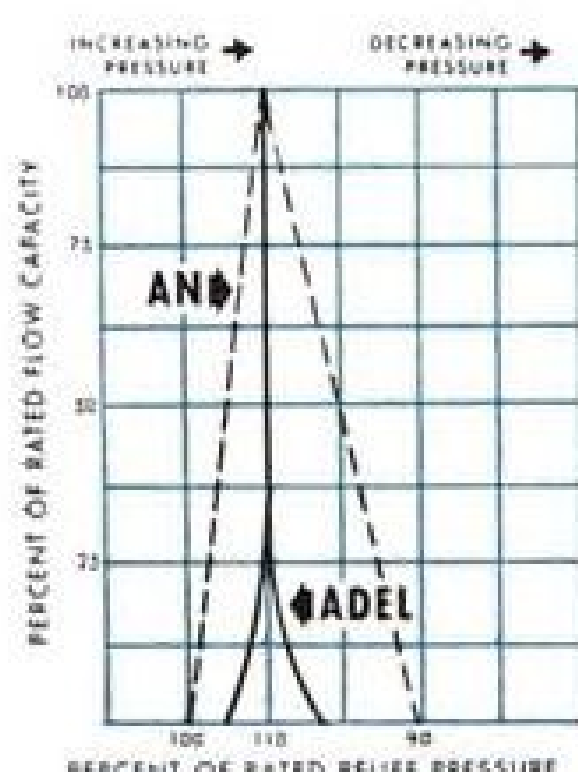
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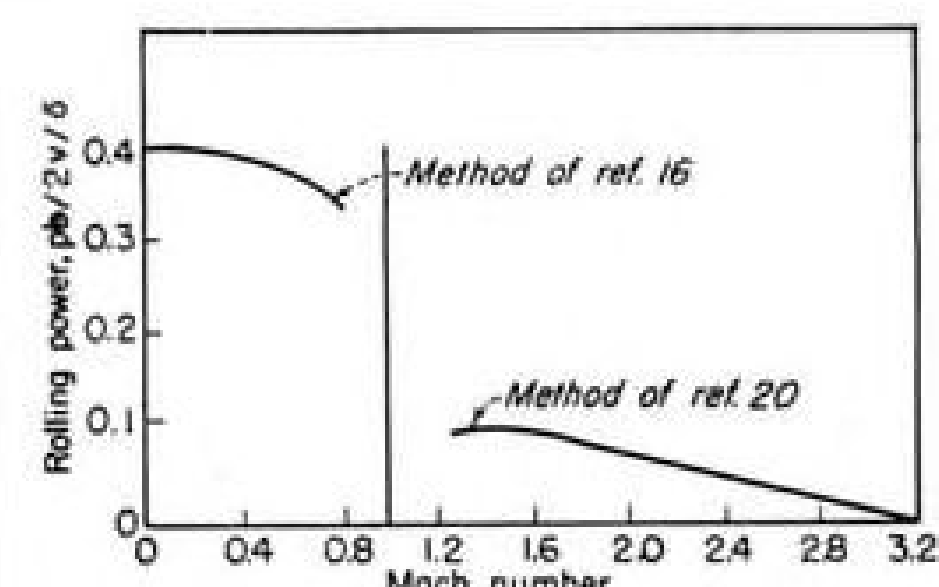


Fig. 7 Calculated effect of Mach number on rolling power of hypothetical flexible wing (Ref. 20)

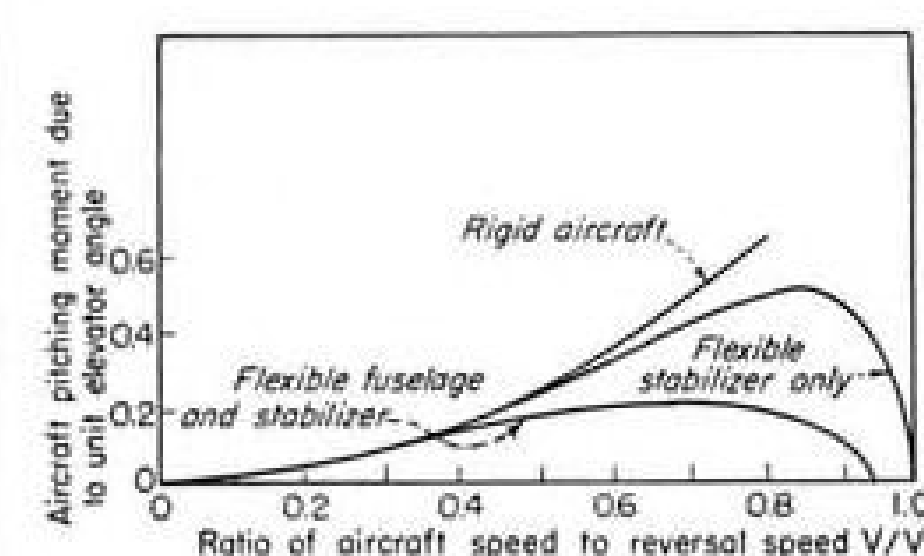


Fig. 8 Contribution of stabilizer and fuselage flexibility to loss of elevator effectiveness at various speeds (Ref. 17)

even greater severity to the problem of empennage flexibility and elevator loss-of-control. This case is considerably more complex from the analytical point-of-view because of the many additional modes of deformation.

In the case of empennage distortion, we must consider stabilizer twist and rotation, fuselage bending, elevator twist and panel deformation. These distortions may result from stabilizer lift, stabilizer pitching moment or elevator pressure distribution.

Fig. 8 illustrates the contribution of stabilizer flexibility and combination fuselage-stabilizer flexibility to a reduction in aircraft pitching moment due to unit elevator angle movement. This figure shows the large effect of fuselage flexibility on the reduction in control effectiveness. Even at half reversal speed the amount of control obtainable is only about half that which would result from a rigid fuselage and stabilizer.

The foregoing has illustrated the serious adverse effects of structural flexibility on control effectiveness, particularly at high speeds where the loads are high.

And high-speed aircraft design has dictated the use of thin wing and tail surfaces, which is anomalous to the achievement of structural stiffness. The latter is most easily obtained by large moments of inertia of structural elements, which require employment of spar depth.

Therefore, it follows that the aerodynamic and structural requirements for high-speed flight are antagonistic and require careful compromise for practical solution.

Fortunately, as has been shown, there are now available effective analytical methods for the determination of control effectiveness of flexible struc-

tures.²¹ Such methods permit more accurate design through the elimination of excessive control configurations. It is now possible for the designer to provide the degree of control required by the customer. It is the latter on whom the greatest responsibility now falls, since he must choose the degree of structural stiffness required, with its adverse effect on the weight and cost of the airplane and, therefore, its performance and economy.

References

1. Aeroelasticity: A New Science. AVIATION WEEK, May 30, 1949.
2. Gust Loads Challenge Aircraft Designers. AVIATION WEEK, Sept. 19, 1949.
3. Rosenberg, Reinhardt: Loss in Aileron Effectiveness Because of Wing Twist and Considerations Regarding the Internal-Pressure Balanced Aileron. IAS Jour. Aero. Sc., Jan., 1944.
4. Reissner, H.: Neuere Probleme aus der Flugzeugstatik. Zeitschrift fuer Flugtechnik und Motorluftschiffahrt, 1926.
5. Cox, H. Roxbee and Pugsley, A. G.: Theory of Loss of Lateral Control Due to Wing Twisting. R. & M. 1506, Oct., 1932.
6. Pugsley, A. G.: Control Surface and Wing Stability Problems. Jour. R. Ae. S., Nov., 1937.
7. Pearson, Henry A. and Jones, Robert T.: Theoretical Stability and Control Characteristics of Wings with Various Amounts of Taper and Twist. NACA Report 635, April 19, 1938.
8. Gilruth, R. R. and Turner, W. N.: Lateral Control Required for Satisfactory Flying Qualities Based on Flight Tests of Numerous Airplanes. NACA Report 715, April 18, 1941.
9. Kayten, Gerald G.: Analysis of Wind-Tunnel Stability and Control Tests in Terms of Flying Qualities of Full-Scale Airplanes. NACA Advance Restricted Report, Oct., 1943. (NACA Wartime Report L-322).
10. Harmon, Sidney M.: Determination of the Effect of Wing Flexibility on Lateral Maneuverability and a Comparison of Calculated Rolling Effectiveness with Flight Results. NACA Advance Restricted Report 4A28, Jan., 1944. (NACA Wartime Report L-525).
11. Shornick, Louis H.: The Computation of the Critical Speeds of Aileron Reversal, Wing Torsional Divergence and Wing-Aileron Divergence. MR No. ENG-M-51/VF18, Materiel Center, Army Air Forces, Dec. 19, 1942.
12. Horton, W. H.: Critical Reversal Speed. Aircraft Engineering, Nov., 1943.
13. Victory, Mary: The Calculation of Aileron Reversal Speed. Rep. No. S.M.E. 3279, British R.A.E., 1944.
14. Grinstead, F.: The Effect of Compressibility on the Estimation of Aileron Reversal Speed. Rep. No. S.M.E. 3192, British R.A.E., 1942.
15. Boccia, Walter: The Elastic Twist of Straight Wings. CADO Technical Data Digest, Oct. 15, 1949.
16. Pearson, Henry A. and Aiken, William S., Jr.: Charts for the Determination of Wing Torsional Stiffness Required for Specified Rolling Characteristics or Aileron Reversal Speed. NACA Report 799, Nov. 9, 1944.
17. Collar, A. R.: Aeroelastic Problems at High Speed. Jour. R.Ae. S., Jan., 1947.
18. Diederich, Franklin W. and Budiansky, Bernard: Divergence of Swept Wings. NACA Technical Note 1680, August, 1948.
19. Tucker, Warren A. and Nelson, Robert L.: The Flexible Rectangular Wing in Roll at Supersonic Flight Speeds. NACA Technical Note 1769, December, 1948.
20. Tucker, Warren A. and Nelson, Robert L.: The Effect of Torsional Flexibility on the Rolling Characteristics at Supersonic Speeds of Tapered Unswept Wings. NACA Technical Note 1890, June, 1949.
21. Collar, A. R. and Broadbent, E. G.: The Rolling Power of an Elastic Wing. R. & M. 2186, Oct., 1945.

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SOLVES MANY REMOTE CONTROL PROBLEMS

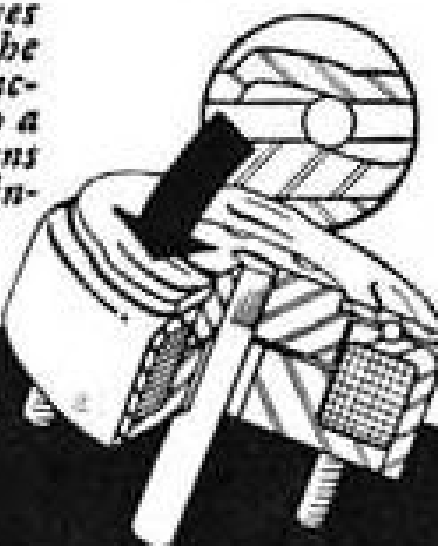
The many production applications of Leduc Rotary Solenoids vary from the dependable, snap-action tripping of airborne bomb releases to the actuation of rugged, hydraulic valves in heavy duty materials handling equipment.

Five Leduc Rotary Solenoid models are manufactured. Diameters range from 1 1/8 to 3 3/8 inches. Predetermined rotation up to 95° can be engineered to suit your product's requirements. Starting torques for 45° stroke range from 1/4 pound-inches to 50 pound-inches.

We supply to quantity users and solicit the opportunity to be of assistance in engineering a Leduc Rotary Solenoid to meet your product's requirements.

MODEL NO.	2	5	6	7	8
Diameter	1 1/8"	1 7/8"	2 1/4"	2 3/4"	3 3/8"
Torque lb./inches	1/4	5	10	25	50
Weight lbs.	1/8	1/2	1	2 1/4	4 1/4

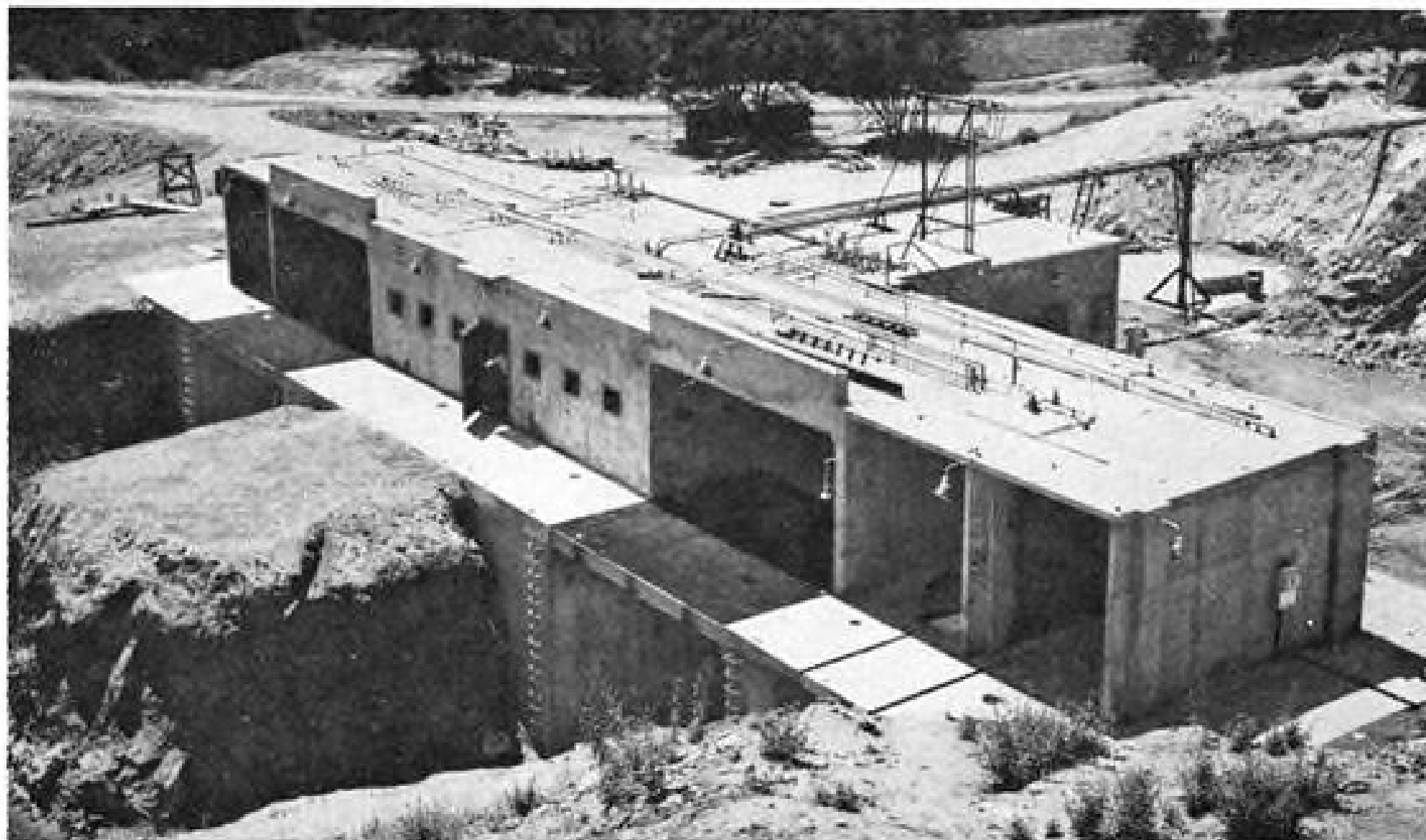
Magnetic action moves the armature along the solenoid axis. This action is converted into a rotary motion by means of ball bearings on inclined races.



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Blockhouse will shelter engineers viewing powerful rocket motors under test.

NAA Builds Huge Propulsion Lab

Private test facility to prove company-developed rocket motors and components for use in guided missiles.

A complete research station for testing and evaluating rocket motors and their components, stated to be the most thorough installation of its kind within the aircraft industry, is being constructed by North American Aviation in the rugged Santa Susana mountains near Los Angeles.

Still "classified," NAA's Aerophysics Field Laboratory will be composed of three principal units: a service building, a components test laboratory, and a motor test area.

For more than three years the company's engineers have been doing research and test on rocket motors. For two of these years this work has been done in temporary firing facilities. Activation of the new lab will greatly facilitate progress on developing these propulsion systems for the guided missiles program.

► **Service Building**—This unit has been finished and engineers are already working in its offices, instrument test and equipment development laboratories. The structure is 60 x 210 ft. and also contains a machine shop and a high bay area where complete propulsion systems can be assembled in a vertical position prior to being taken to the test area.

► **Components Test**—The components of NAA motors and propulsion systems built at Downey will be tested in the components test lab. Test cells for proving steam generators and turbo pumps face a steep, rocky slope. One cell will contain an 800-hp. 1750-rpm. electric motor producing 1000-hp. for short duration to operate components under observation. These test pits are



This tower will house motors being tested. Flames will be retained in 75-ft. pit.

17 ft. deep, 10 ft. high and vary from 10 to 14 ft. in width. They are protected by thick concrete. Observation windows are triple thicknesses of 2-in. glass.

► **Motor Test Area**—Rocket motors of 300 to 3000-lb. thrust will be tested in the propulsion test control center, having 20 by 20-ft. firing pits, a work shop, and propellant storage facilities.

Prior to test, the complete propulsion system with propellants and all controls will be calibrated within a preparation tower. Then a shipyard gantry crane will pick up the motor, move it along a 120-ft. railway to the main test tower and lower it into the

structure. Engineers working on five specially designed and constructed platforms around the 40-ft. tower will make final installation tests.

Once the installation is completed and recording instruments in place, the engineers will take refuge within a blockhouse having 18-in.-thick reinforced concrete walls, 500 ft. from the tower. The blockhouse will contain 27 racks of electronic recording equipment and 70-odd instruments for measuring temperatures, pressures, forces and flows.

At the test tower, with working platforms rotated against the tower away from the propulsion system cage, television cameras will record the activity on the spot. The motor flames will roar down a 75-ft. flame pit toward an 8-ft. thick concrete pad.

The Santa Susana site, first discovered by aerial photo survey, is a 4000-ft long, 500-ft. wide bowl-shaped valley, rimmed by 200-ft. rock ledges.

Navy's New Tunnel Opens At MIT

Recent dedication of the Naval Supersonic Laboratory at the Massachusetts Institute of Technology marked the opening of the largest faster-than-sound wind tunnel to be operated by an American university.

Designed to develop speeds up to 3000 mph., the new tunnel and lab building represent an investment of \$2,600,000. At the dedication ceremonies attended by leading scientists, Navy and government officials, it was described by Rear Admiral A. G. Noble, chief of the Navy Bureau of Ordnance, as "the most advanced design in our present thinking."

The tunnel will be used for testing scale models of supersonic missiles and components, and for research to obtain basic aeroballistic information. Investigations also will be aimed at improving piloted and automatically-guided type aircraft.

The test section—large for a supersonic tunnel—measures 3 sq. ft. (18 x 24 in.). Air density can be changed to duplicate various altitude conditions, and since the installation is capable of sustained high-speed operation, it is suitable for studying problems requiring equilibrium conditions. Instrumentation includes a balance to measure air reaction on the models and an optical system to show visually the shock waves and flow patterns.

The tunnel proper is a huge, closed-steel channel, through which very dry air is circulated by two four-staged centrifugal compressors, electrically driven by motors producing a total of 10,000

hp. Heat generated by the compressors is removed by two large coolers which draw about 3000 gpm. of water from the nearby Charles River.

The laboratory will be under the administration of MIT's department of aeronautical engineering headed by Prof. Jerome C. Hunsaker. Design of the wind tunnel, balance system and other instrumentation were under the direction of Prof. John R. Markham, director of the laboratory.

Jet Power Lowers Wind Tunnel Cost

By utilizing a turbojet as a wind tunnel power source, a British aircraft builder has been able to construct a private tunnel at a cost said to be far below that of a conventional test facility.

English Electric Co., designers of sleek Canberra jet-powered bomber, developed the novel wind tunnel to aid in the necessary research on their bomber project.

Power plant is a Rolls-Royce Nene turbojet rated at 5000 lb. static thrust. An open cycle tunnel system is used, i.e., air enters one end of the tunnel and is exhausted at the opposite end. A venturi-shaped ejector is mounted around the Nene tailpipe so that the jet exhaust induces a flow of air through the ejector.

► **Operation**—Air is drawn in through a fine-mesh screen at the tunnel entrance and moves downstream past the tunnel throat. The turbojet engine is mounted in a nacelle a short distance downstream of the throat. About one-third of the air goes into the compressor inlet and two-thirds passes through an annular passage around the engine and thence through the ejector and out the tunnel exhaust.

The tunnel has a free Mach number of 0.9 at the throat but this is reduced to about 0.85 with a test model in place.

English Electric Co. hopes shortly to increase this operating speed to supersonic by suitable throat modifications, utilizing the same engine.

Humidity control is obtained by ducting a portion of the turbojet exhaust air around to mix with the incoming fresh air. By thus heating the inlet air, its humidity is lowered and condensation troubles reduced.

The English Electric installation is extremely compact, the entire equipment being contained in a wartime reciprocating engine test cell 60 x 34 x 18 ft. and cost only a few thousand pounds. Two other British aircraft companies are constructing similar tunnels, based on the unique design developed by English Electric.

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Jet, Piston Plane Aids Shell Research

A program to study performance of jet fuels under actual flight conditions, in the first jet-equipped research plane to be operated by any petroleum company, has been announced by the Shell Oil Co. (AVIATION WEEK, June 27).

A converted B-26 type bomber, the plane is equipped with two Pratt & Whitney R 2800-83 engines, and a General Electric J-31 turbojet installed in the fuselage. The craft was acquired by Shell from the Air Force and now is being fitted with analytical and record-

ing instruments at Oakland, Calif.

Test devices installed in the plane will provide detailed information on performance of fuels and lubricants on both piston and jet engines. A complexity of thermocouples will be employed to measure cylinder temperatures of the oil and fuel. A Sperry engine-analyzer, with a screen similar to that on a radar set, will enable engineers to study operation of each cylinder. Other test-aids will be an oil-flow measuring device which continually records the quantity of the oil circulating through the engine, and an instrument for checking the volume of blow-by gases in the crankcase as an indication of the

performance of the lubricating oil in the regions of the pistons, rings and cylinders.

Instrumentation is arranged so that a minimum of visual readings has to be recorded while plane is in the air. A camera, mounted in front of the panel, photographs gages, dials, at regular intervals. And a recording potentiometer registers other data on a tape. After flight, data are transcribed on special forms for analysis.

A pilot, mechanic, research engineer and instrument man will be permanently assigned to the craft. Overall direction of research will be in the hands of a steering committee headed by Jimmy Doolittle, Shell Oil vice-president.

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Spring and Solenoid Insure Hoist Safety

New device at Solar Aircraft's San Diego plant increases the safety factor of lifting equipment by preventing overloads to within 5 percent of its maximum lifting capacity. Developed by Tooling Superintendent Wally Marrow, the mechanism comprises a heavy-duty spring contained in a steel housing mounting a solenoid.

When the hoist picks up a load the spring compresses, and so long as the weight does not exceed the maximum capacity of the hoist the electrical circuit remains closed. When this maximum load is exceeded, the spring compresses fully, actuates the solenoid to open the circuit, stopping the up-travel and applying the brake. At this point the only circuit which will operate is that controlling the down-travel.

The safety device was designed for use on a two-ton Shepard-Niles hoist, but hoists or cranes of greater capacities can be equipped similarly by increasing the size of the spring and calibrating it to the maximum safe load limit of the equipment.

PRODUCTION



PRETI P.110 four-placer is of all-wood construction and is powered by a 140-hp. Alfa Romeo. Gross weight is about 2200 lb., top speed about 170 mph., and range is 621 mi.



MACCHI MB.320 is new Italian 6-place light transport powered by two 185-hp. Continentals. Of all-metal construction, craft is said to have top speed of about 200 mph.

Jet Deal Sparks Italy's Comeback

DH license will aid firms that have been struggling to survive. Few new planes are being tested.

Following successful conclusion of an agreement permitting manufacture of British jet-propelled aircraft and jet engines in Italy under license (AVIATION WEEK, Oct. 31), a new Italian company has been formed to carry out the project. The organization is known as the Italiana Commissionaria Materialiale Aeronautico Roma (SICMAR), with capital subscribed in equal parts by Macchi, Alfa Romeo, Fiat, and Ambrosini.

Chairman of the board will be the president of the Associazione Imprese Aeronautiche and board of directors will be made up of two officers representing the Ministry of Aeronautic Defense, and two representatives of each of the subscribers.

SICMAR will sign the contracts with de Havilland covering the Vampire fighter and Goblin turbojet engines. Aircraft will be produced by Fiat at Turin and Macchi at Varese, with spare

parts and accessories to be made by Ambrosini at Passigano. Engines will be made by Fiat, Turin and Alfa Romeo at Milan.

► **Industry in Poor Shape**—The licensing agreement with Britain has been an encouraging event for Italy's aviation industry, for recovery since the war has been largely retarded by political indecision and the country's bad financial state. Some established firms have closed down, and some of those still surviving have converted a large part of their facilities to other than aviation items.

Here's how the individual factories are making out:

• **Breda** is still flight testing its large four-engine airliner, Zappata's BZ.308 55-80 seater. A new design is Pittoni's BP.471, an 18-passenger high-wing monoplane powered by two Isotta Fraschini R.C.40 in-line engines of approximately 800 hp. each. The craft has a

blunt nose like the Boeing Stratocruiser. The B.P.471 is expected to make its first flight soon.

• **Savoia-Marchetti** is producing the four-engine 30-passenger SM.95, and has turned out the prototype S.M.102, a small eight-place low-wing transport powered by two 500-hp. Ranger engines.

• **Ambrosini** is turning out the S.7 military trainer. This is a low-wing two-place tandem craft with conventional retractable landing gear, and can be powered by either the 225-hp. Alfa Romeo or a 380-hp. DH Gipsy Queen. One of the company's new designs is the P.512, a high-wing cargo plane powered by two 225-hp. Alfa Romeos. Landing gear is conventional fixed type.

• **Fiat** is producing the G.212 26-34 passenger airliner, the two-place G.46 trainer, and several models of the G.59 trainer powered by the Rolls-Royce Merlin.

• **Macchi** is turning out the two-place MB.308 lightplane with fixed tricycle gear—also available with floats—and powered by an 85-hp. Continental. Top speed is about 125 mph. The company is also testing a new design, the MB.320 (illustrated).

• **Caproni** shut down soon after completing flight tests on the interesting CA.193 light transport. This was a 5-6 place low midwing monoplane powered by two 310-hp. pusher in-line engines. Twin rudders and tricycle gear were other features.

• **CANT**, another famed manufacturer, builder of a number of large record-breaking aircraft, is stated to have definitely given up aviation production.

► **Air Force Weak**—The Italian air force consists of between 300-400 surplus planes received from the U. S. and Britain, including Spitfires, P-51s, and a few P-38s. Some 50 twin-Beechcrafts are used for navigation training.

► **Airline Activity**—The ECA approval of \$4.5 million to LAI (Linee Aeree Italiane) for purchase of 3 four-engine American transports (AVIATION WEEK, Nov. 28, 1949), is said to have caused tension among the other Italian airline operators, ALI (Avio Linee Italiane) and Ali Flotte-Riunite-LATI (Linee Aeree Transcontinentali Italiane). Forty percent of both LAI and ALI's capital is foreign; held by TWA and BEA respectively. Ali Flotte-Riunite-LATI is all-Italian, with capital subscribed by the government and Fiat.

ALI and Ali Flotte-Riunite-LATI also applied for loans to purchase new equipment, but while ALI's loan is said to at least have approval of the local ECA mission, the native-owned company's bid is still being held up for consideration. Some dissatisfaction has appeared in the Italian press to the effect that the Italian-owned line is being left out in the cold.

PRODUCTION BRIEFING

► **Lear, Inc.**, Grand Rapids, Mich., is tooling for quantity production of Type F-5 autopilots and Model 5000-E vertical gyro indicating systems after receiving Air Force orders for these units totaling \$1,417,617. Autopilots are scheduled for installation in Northrop F-89 fighters, while gyro indicator systems—also known as remote reading artificial horizons—will be used in the B-36 bomber.

► **AiResearch Mfg. Co.**, Los Angeles, announced receipt of \$2,500,000 in production orders for aircraft accessories during six weeks beginning Oct. 1. New business—\$1 million of which is for electrical actuators—comes from about 40 different customers and is for 52 types of aircraft. It includes cabin pressure controls and turbine refrigeration units for 100 Canadair jet fighters, heat exchangers, electronic temperature and cabin pressure controls, etc., all involving about 10,000 individual units. AiResearch backlog on Nov. 15 was \$13.5 million.

► **Texas Engineering & Mfg. Co., Inc.**, Dallas, has obtained a \$140,000 contract from the Brazilian government to rehabilitate and overhaul six C-47s. Brazil makes the ninth foreign country for which Temco has rehabilitated military and transport aircraft. The firm also has received a contract from American Airlines to recondition and modify 300 hot food storage cabinets used in the carrier's DC-6s, and has just completed work on a prototype cold storage locker for American.

► **Kaman Aircraft Corp.**, Windsor Locks, Conn., has received its first Navy order for helicopters and spare parts, to be delivered in 1950. Including an additional helicopter research contract with the Navy, the firm has a military backlog of \$106,000.

► **Pratt & Whitney Aircraft division**, United Aircraft Corp., East Hartford, Conn., has delivered over 4000 Wasp Major engines since 1943. The company also reveals, that during the first nine months of this year, lost-time accidents per million man-hours worked at its plants dropped to 3.6. This compares to 9.5 in 1947, 5.6 in 1948, and to a national average of 6.5 for all aircraft engine makers for the year so far. P&W's sister division, Sikorsky Aircraft, has delivered its 200th helicopter of the S-51 series, bringing to nearly 700, the total number of copters built by the firm.

► **United Aircraft Corp.'s** Hamilton Standard division is in production on a new reversing Hydromatic propeller designed especially for the 107,000-lb. version of the Lockheed L-749A Constel-

lation. All Connies now on order or in service with American flag carriers will be Hamilton Standard equipped, according to the manufacturer.

► **Aero Corp.** is converting five Catalina flying boats for KLM Royal Dutch Airlines. The former Navy PBVs are being worked over at Atlanta Municipal Airport. First Catalina, recently delivered, accommodates 18 passengers.

► **Aircraft Components, Inc.**, has opened an aircraft hardware and accessories showroom and general office on the Twin Cities Airport at Benton Harbor, Mich. While most of the company's business is mail order, it has set

up the display room to satisfy "fly-in" customers.

► **Lockheed Aircraft Service, Inc.**, has obtained a contract to inspect, test and overhaul all instruments and airframe accessories on Stratocruisers operated by American Overseas Airlines. Work will be performed in LAS shops at MacArthur Airport, Sayville, Long Island, N. Y.

► **Canadair, Ltd.**, Montreal, reported it was 6½ months ahead of schedule in a recent delivery of 22 Canadair IV (Argonaut) airliners to British Overseas Airways. The 22 pressurized craft cost BOAC \$18,000,000.

Latest Air Force Bid Awards

Air Materiel Command Procurement Division makes available to AVIATION WEEK the latest bid awards, shown on this page. Requests for further information should be addressed to Contracting Officer, AMC, Wright-Patterson AFB, Dayton, Ohio, attention: MCPSPX72.

ABSTRACTS

For pump and refueling unit assembly (50-187):

Dayton Aircraft Products, Inc., Dayton, on a bid of \$13,771.25.

For 5387 bookcases (50-260):

Companies sharing—Globe Wernicke Co., Washington, D. C., on a bid of \$13,302, and Dayton Blue Print Co., Dayton, on a bid of \$913.

For regulator assemblies (50-324):

Westinghouse Electric Corp., Dayton, on a bid of \$43,795.

For antenna mast assembly (50-343):

S. C. Carter, Jr., Agent, New York, on a bid of \$28,550.

For 13,600 envelope assembly, engine protective (49-1588):

Vanant Products Inc., Tomah, Wis., on a bid of \$122,391.

For hoist assemblies (49-2015):

McGrath and Co., St. Paul, on a bid of \$137,800.

For 16,250 ring-V hydraulic (50-213):

Linear Inc., Philadelphia, on a bid of \$23,846.41.

For regulators (50-227):

Eclipse-Pioneer Div., Bendix Aviation Corp., Teterboro, on a bid of \$27,536.62.

For testers (50-251):

Companies sharing: Jackson Electrical Instrument Co., Dayton, on a bid of \$7004.50, and Telectro Industries Corp., Long Island City, N. Y., on a bid of \$1160.

For relay assemblies (50-30):

Westinghouse Electric Corp., Dayton, on a bid of \$132,043.

For 200 pneumatic mattresses (50-152):

K & W Rubber Co., Delaware, O., on a bid of \$3750.

For 9400 connector assemblies (50-163):

Companies sharing—Raybould Coupling Co., Greenwich, Conn., on a bid of \$425; Industrial Precision Products Co., Chicago, on a bid of \$2400, and Aircraft Fitting Co., Cleveland, on a bid of \$180.

For adapter assemblies (50-179):

Companies sharing—Pacific Piston Ring Co., Los Angeles, on a bid of \$2390; Raybould Coupling Co., Greenwich, Conn., on a bid of \$620; Weatherhead Co., Cleveland, on a bid of \$195; Twain Tool & Mfg. Co., Chicago, on a bid of \$330; Irvin W. Masters Inc., Burbank, on a bid of \$1784, and Parker Appliance Co., Cleveland, on a bid of \$3559.

For 187,150 sq. ft. synthetic rubber sheets (50-193):

Companies sharing—Armstrong Cork Co., Lancaster, Pa., on a bid of \$75; Anchor Rubber Co., Dayton, on a bid of \$23,523.50; B. F. Goodrich Co., Akron, on a bid of \$25,777.30, and Quaker Rubber Corp., Philadelphia, on a bid of \$4597.82.

For field maintenance shelters (50-258):

Springfield Tent & Awning Co., Springfield, O., on a bid of \$9027.50.

For 5600 bearing balls (50-307):

Companies sharing—Marlin-Rockwell Corp., Jamestown, N. Y., on a bid of \$4715, and New Departure Div., General Motors Corp., Bristol, Conn., on a bid of \$451.

For 181 panelboards (50-315):

Wright & Co., Inc., Worcester, Mass., on a bid of \$3459.50.

For plastic tubing (50-222):

New England Tape Co., Inc., Hudson, Mass., on a bid of \$5109.15.

For hoist assemblies (50-185):

Companies sharing—Wright Hoist Div. of American Chain & Cable Co., York, Pa., on a bid of \$22,050, and Harnischfeger Corp., Milwaukee, on a bid of \$54,435.

For electrically heated tubes (50-216):

Akeley Camera & Instrument Corp., New York, on a bid of \$4409.68.

For cone, clamp assembly (50-235):

Companies sharing—King Co., Batavia, Ill., on a bid of \$1425, and General Tire and Rubber Co., Akron, on a bid of \$6807.84.

For 61,635 sq. ft. matting (50-240):

B. F. Goodrich Co., Akron, on a bid of \$9306.89.

For elbow assemblies (50-249):

L. B. Electric Supply Co., Brooklyn, on a bid of \$7365.60.

For lighting control panels (50-255):

Companies sharing—Crouse-Hinds Co., Syracuse, on a bid of \$13,597.50, Martin Electric Co., Dayton, on a bid of \$424.

For 35,000 sq. ft. cattlehide leather (50-285):

Companies sharing—A. L. Gebhardt Co., Milwaukee, on a bid of \$9549; Caldwell Lace Leather Co., Inc., Auburn, Ky., on a bid of \$2950; and A. C. Lawrence Leather Co., Peabody, Mass., on a bid of \$4495.50.

For class A inverters (50-294):

Jack & Heintz Precision Industries, Inc., Cleveland, on a bid of \$64,610.27.

For aircraft bolts (50-136):

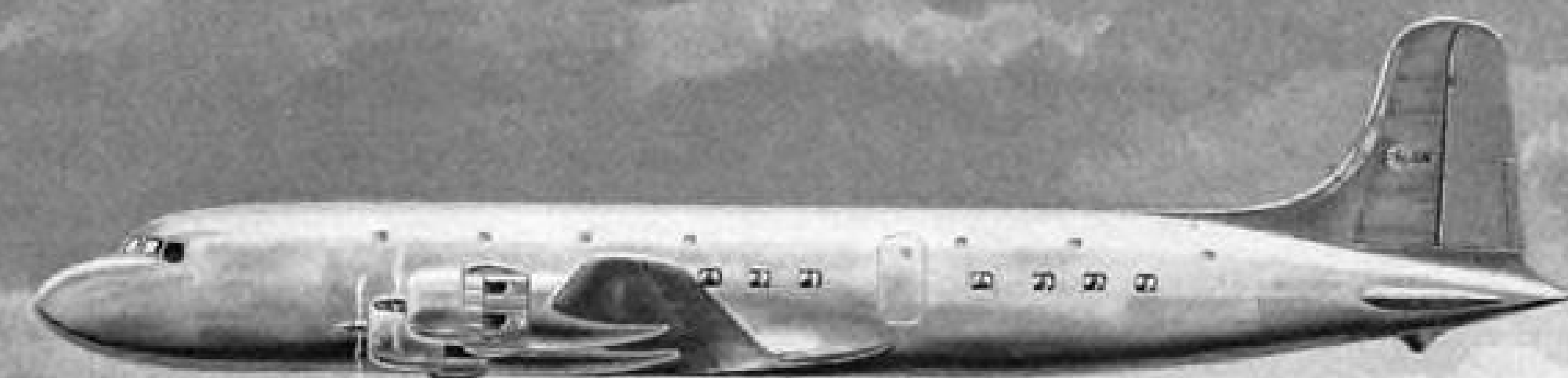
Companies sharing—Etes Manufacturing Co., Rockford, Ill., on a bid of \$2018.54; Aero Bolt and Screw Co., Inc., New York, on a bid of \$1020; Standard Pressed Steel Co., Jenkintown, Pa., on a bid of \$10,115.77; Lamson & Sessions Co., Cleveland, on a bid of \$13,434.60; Rockford Screw Products Co., Rockford, Ill., on a bid of \$3312.52; Ohlson-Empire Div., Ohlson International Corp., Long Island City, N. Y., on a bid of \$655.51; Cooper Precision Products, Los Angeles, on a bid of \$5187.50; Aero Supply Mfg. Co. Inc., Corry, Pa., on a bid of \$12,396, and Aeromatic Products Co., Los Angeles, on a bid of \$7587.50.

For mercerized cotton cloth (50-174):

Wellington Sears Co., New York, on a bid of \$312,621.85.

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LUXURY

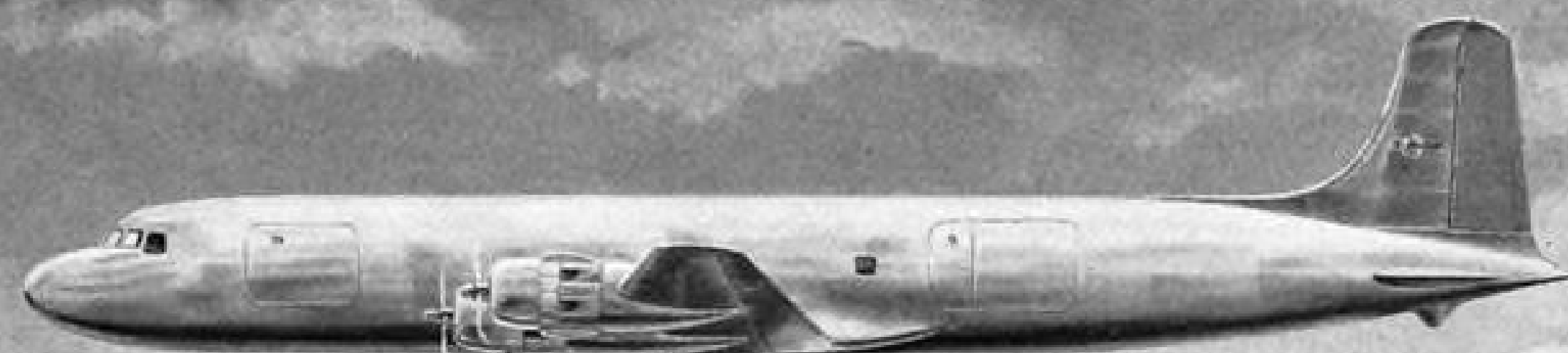


DC-6

MOST POPULAR LUXURY AIR TRANSPORT in service today is the great Douglas DC-6. Ninety-five of these swift, dependable airplanes are now in service on leading domestic airlines. The DC-6 carries more passengers in the U. S. than any other type of aircraft.

Douglas has established an unusual record for fast, reliable service on spare parts and maintenance. Swift, dependable, easy to fly and less costly to maintain—it is no wonder the Douglas DC-6 has achieved prime popularity with both flying public and airlines.

GREATER
PROFIT

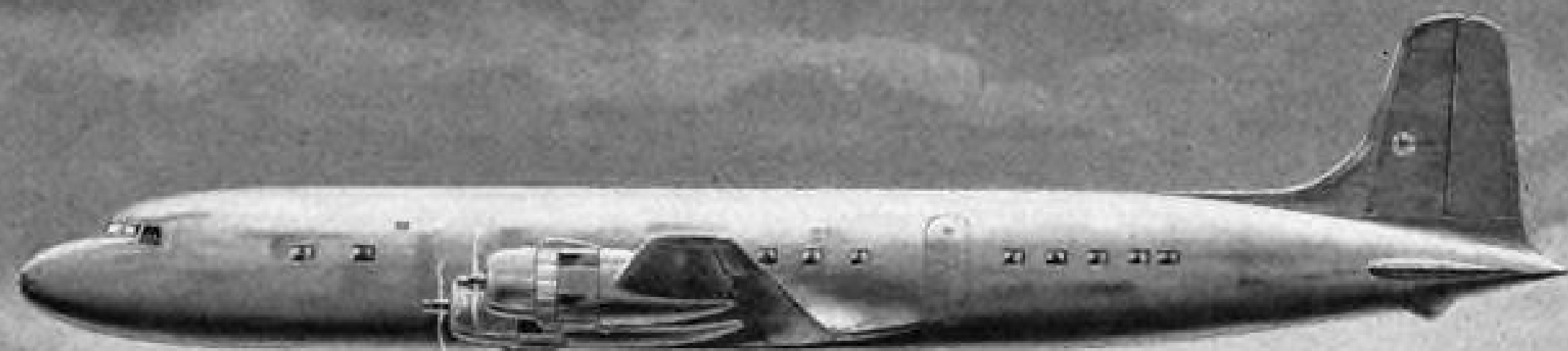


DC-6A

NEW "LIFTMASTER" CARGO TRANSPORT opens new era in the rapidly expanding air cargo field. Currently being exhibited to airline officials, the "Liftmaster" is the first four-engine cargo airplane specifically designed to fill the need for a modern, medium-

size cargo airplane for military and civilian use. In contrast to the Douglas DC-4/C-54, the new DC-6A carries 1/3 more cargo at 1/3 less cost. The DC-6A flies 100 mph faster than the DC-4/C-54—thus making possible overnight transcontinental cargo service.

GREATER
SPEED



DC-6B

THE NEW DC-6B will be the most versatile air transport ever designed. Like the "Liftmaster," it will be 5 feet longer forward of the wing than the DC-6 and will thus accommodate 8 additional passengers in DC-6 luxury. High density models will carry up

to 92 passengers. The over-ocean DC-6B with large galley, coatrooms and lounge will carry 54 passengers in air-conditioned comfort. The 9600 hp developed by the Douglas DC-6B engines will make this the *fastest* non-jet luxury air transport in service.



These Curtiss propeller features are *service-proved*



They have accumulated flying time on leading types of aircraft . . . over all air routes. Curtiss first introduced to service use *automatic synchronization, reverse thrust and hollow steel blades*—three great propeller developments. Each of these features has been *service-proved* on commercial and military aircraft. Each is *daily* adding more flying time. Here are the *service-proved* facts about . . .

1 CURTISS AUTOMATIC SYNCHRONIZATION—It "gears" the speed of all engines electrically under the control of a single cockpit lever . . . eliminates noisy, tiring, off-rhythm engine "beat" . . . assures greater passenger comfort . . . frees flight crew for other duties.

2 CURTISS REVERSE THRUST—It provides the smooth, air-cushioned landing that makes the trip end comfortably for the passenger . . . provides effective braking on wet, icy runways for greater safety. And for more economical operation, Curtiss reverse thrust permits backing and maneuvering without ground assistance . . . reduces brake and tire wear.

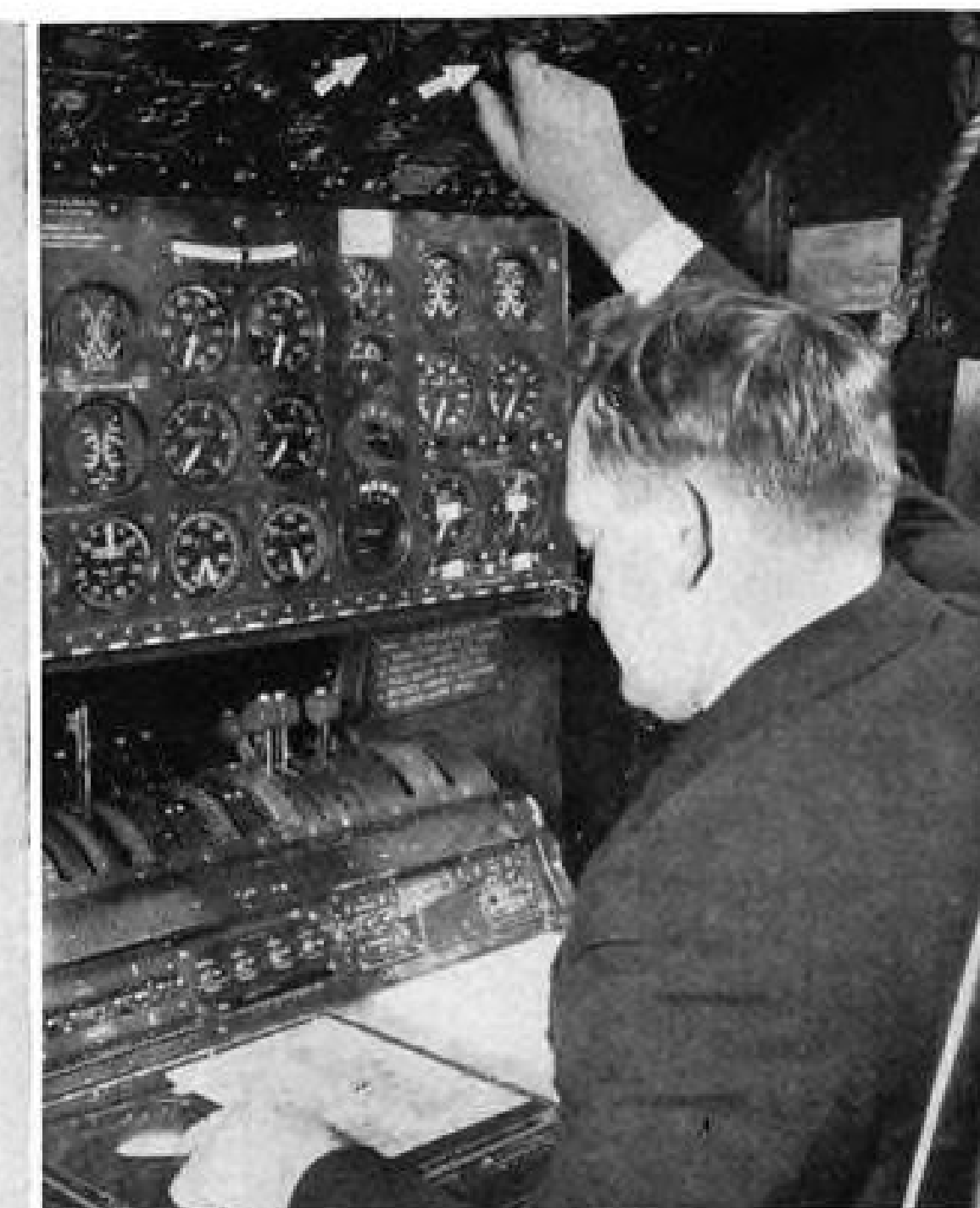
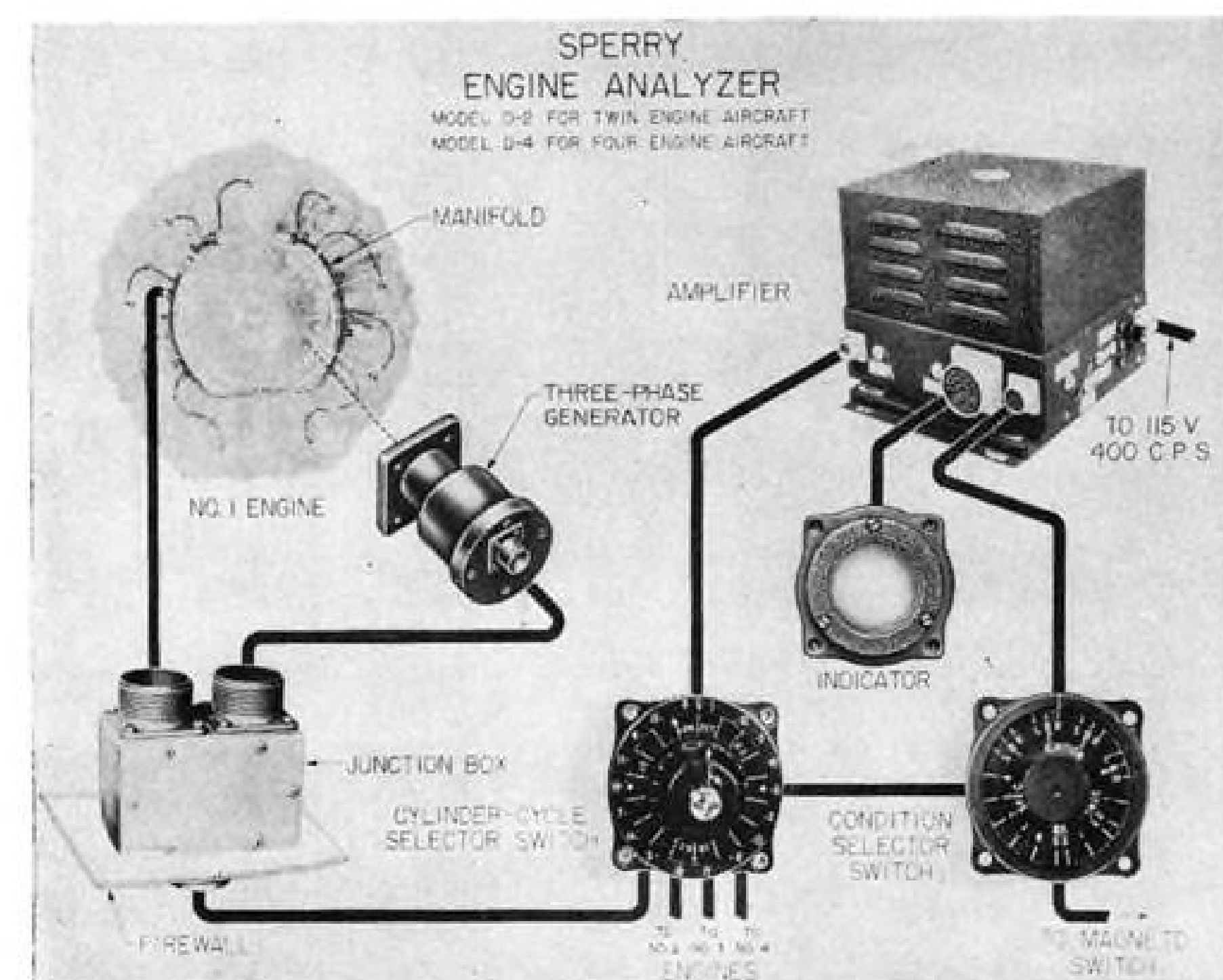
3 CURTISS HOLLOW STEEL BLADES Save money flying or landing. Their strong, tough, hollow steel construction, their precision production by over 100 separate operations assure maximum resistance to erosion or abrasion even under extreme climatic or operating conditions.

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CURTISS ELECTRIC PROPELLERS



NEW AVIATION PRODUCTS



COMPONENTS of analyzer (left), and installation in PAA Constellation (right). Scope is lower left and switches (arrows), above.

Evaluation Report

Engine Analyzer Proved in Service

In only nine months' operation, instrument has helped PAA to cut trouble-shooting time and reduce costs.

Installation of Sperry engine analyzers on its entire fleet of Lockheed Constellations and Boeing Stratocruisers is not yet completed, but Pan American Airways already has found the instrument bettering passenger service, reducing trouble-shooting time and slashing costs.

Initial use has been so favorable that after only nine months of operation it now appears the \$168,000 cost of PAA's 42 units will be amortized in 18 months or less. An evaluation of three months' (June, July, August) experience on Constellations shows why:

- Ignition trouble delays—9:57 hours in 8497 operating hours.
- Possible engine changes avoided during instances of cylinder failure and avoidance of further damage—6. Only one engine change due to cylinder failure.

- Fuel injection troubles spotted with the analyzer—36 times with total delay of 22:58 hours.

- Average number of spark plugs removed per instance of trouble reported fell to 5.5 units from an average of 8

during a nine-month period before installation of the engine analyzer. And June was an abnormal month due to some temporary spark plug difficulty PAA was having. The airline's engineers believe the present average plug removal per instance is about two.

► **Business Build-Up**—Because of Pan Am's successful experience, Sperry Gyroscope Co., Great Neck, N. Y., manufacturer of the instrument, is building up business for the analyzer. American Airlines has one on evaluation in a DC-6; American Overseas is studying it for its Stratocruisers. Braniff is testing the analyzer in a DC-6. Northwest shortly will test it in its Stratocruisers, after using it for some special tests in a Martin 2-O-2. Air Ceylon has an analyzer installed in a DC-4. Shell Oil uses one in its experimental B-26; Bethlehem Steel has one in its executive Lodestar.

The analyzer is just as useful as a ground instrument, either permanently installed in a plane, or in a portable version. The portable version differs little from the airborne installation but,

unlike the flight model, has competition. Bendix-Scintilla also manufactures an ignition analyzer, which originally was designed as a ground aid only and does not make all the other checks performed by the Sperry instrument. PAA uses four Sperry portables at its Miami overhaul base; KLM has four in Amsterdam, CAA has one at Oklahoma City, the French Embassy has ordered one to be shipped to Paris, and Wright Aeronautical and Curtiss Propellers each has one.

The portable analyzer may turn out to be a more salable item than the airborne model. Use of the analyzer in the air almost demands a flight engineer, as neither pilot nor copilot would have the time to devote to checking and interpreting the scope. So that about shuts out twin-engine aircraft and DC-4s not carrying flight engineers.

However, a portable analyzer can still help an airline not employing flight engineers. All that is necessary is for the planes to be wired for the instrument, and the three-phase generator installed. When a flight crew lands and reports trouble, the portable is plugged in and the proper checks made.

► **Time and Money**—The spark plug situation is the most-easily identified saving due to the analyzer. Cost of a plug is about \$3.75 and labor cost of changing it is about half that. Before the analyzer went into service, PAA service crews had to use trial-and-error methods when a flight crew came into

a station and reported a "rough" engine. This generally consisted of changing a complete set of plugs. Time for the job: about two hours.

Now, the analyzer pinpoints the cylinder where ignition is faulty, and the maintenance crew can go right to the spot and change only two plugs. Time for the job: about 20 minutes for rear plugs; 10 minutes for front plugs. **►Plus Factors**—The analyzer was designed to spot ignition and combustion troubles, and unsynchronized magnetos. But by actual use in service, Pan American flight engineers and mechanics have been able to identify many other difficulties. An uncommon pattern on the scope was traced to oil on magneto points. The next time the flight engineer involved saw that same pattern he told the ground crew at the next station that oil was leaking into a magneto and a mystified mechanic found he was right.

There have been other instances of similar nature that all add up to a great plus value for the analyzer. This value is manifested in cutting delays for ground checks. As one PAA engineer says, "How can you measure that in dollars and cents?" You can't, but it is sure that the analyzer has enabled Pan Am to speed up its schedules.

The same engineer says: "Suppose you have a two hour delay at a station in Africa? You won't lose your passengers because there is no other way they can get out. But the next time maybe they won't go by air, or may use another airline."

This plus value is manifested, also, in holding down maintenance bills. The possible avoidance of engine changes in the three-month period is one example. Others are the numerous times flight engineers have noticed on the analyzers indications of incipient troubles before they became pronounced, and were able to take immediate corrective action.

This ability comes only with use of the analyzer. PAA gives its flight engineers and ground crews a two-day course on the analyzer. After that, any trainee is able to spot on the instrument the usual patterns of trouble.

►Development—The analyzer is a result of a successful marriage of Pan American and Sperry engineering talent. In 1938 Sperry started work on a detonation indicator and this led during the war to work on an ignition analyzer. But the end of the war ended that project at Sperry.

All the time, however, Pan American had been following the Sperry work, and John E. Lindbergh, the airline's superintendent of standards and development on the West Coast had been gathering his own ideas for an ignition indicator. He finally completed a mock-up and, as an individual, entered

into an agreement with Sperry. Sperry manufactures the engine analyzer under a license from Lindbergh. (Because of this, Pan American bought its instruments royalty free, getting a slightly lower than normal price, which runs about \$4000 a unit, installed.)

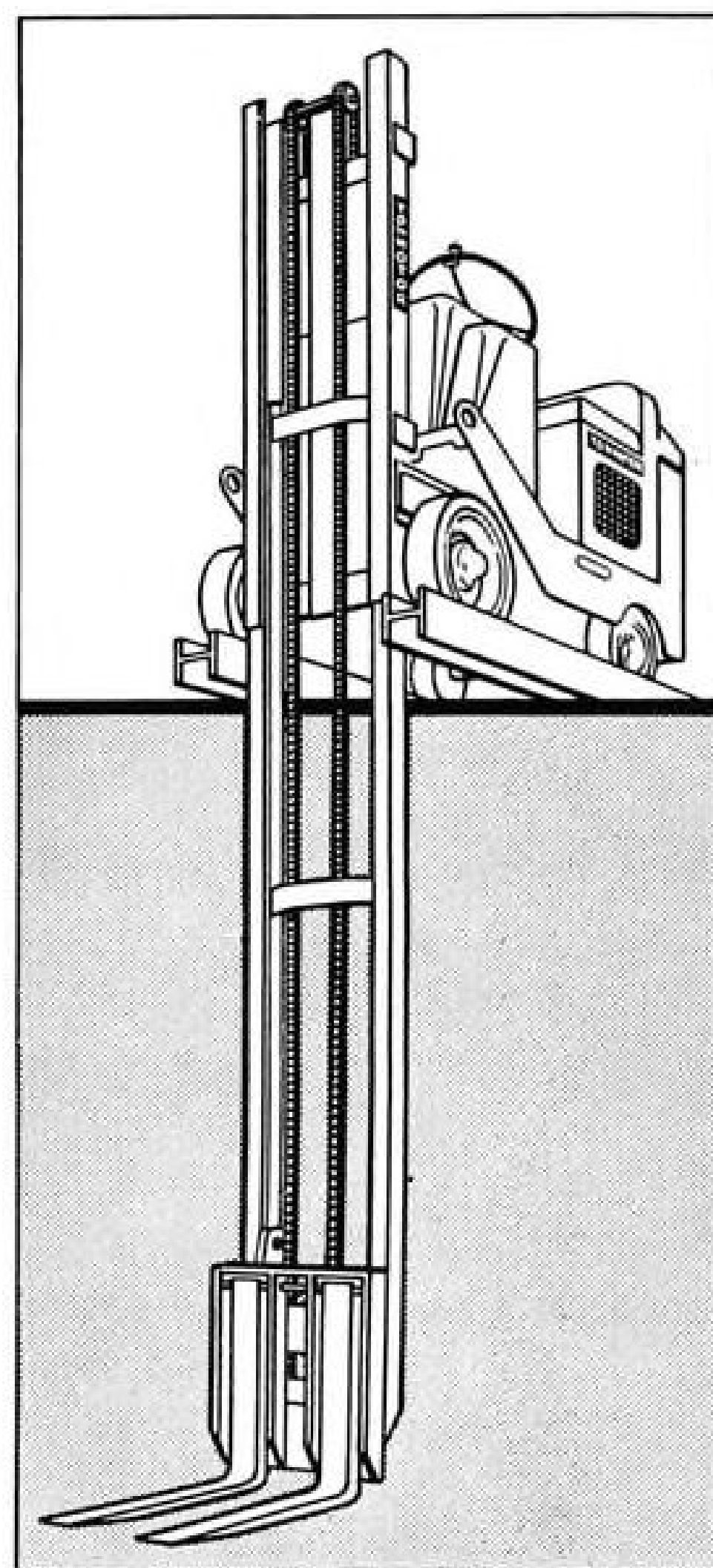
►How It Works—The Sperry engine analyzer consists of five components (AVIATION WEEK, Oct. 20, 1947), with a total weight of 40 lb. in a Constellation and 45 lb. in a Stratocruiser, without cable. (Portable weighs 41.3 lb.) A three-phase generator is mounted on the auxiliary tachometer drive of the engine. An amplifier is located in the cockpit near the F/E station. The cathode-ray oscilloscope is mounted in the flight engineer's panel. And there are two switches—cylinder selector and condition selector—just above the flight engineer's head.

The generator synchronizes the sweep with engine rotation, and triggers the sweep at the beginning of its movement across the scope. Ignition indications are fed from pickups on the magnetos. In theory, combustion indications would be picked up from magnetostriction detectors in the outer walls of each cylinder. PAA, however, has such a pickup on only one cylinder of each engine in the Stratocruisers, and does not use the vibration pickup in the Connies.

With his two switches, the F/E can take a reading on the scope of the complete engine pattern, or narrow it down to individual cylinders on either the left or right magnetos alone, or on both magnetos at once. Patterns on the scope show condition of magnetos, spark plugs, cables, distributors, coils, breaker points, mixture distribution, malfunctioning of injection system and lack of combustion. Usual "trouble patterns" are shorted secondary, small gap, large gap, fouled plug and open secondary.

►Opinions—One foreign airline that studied the analyzer claims it has been scared off temporarily because of excessive maintenance on the instrument. Pan American can't understand that. Its overhaul basis for the various parts of the analyzer is this: amplifier, 1200 hr.; three-phase ("synch") generator, at engine overhaul time; switches, 3600 hr.

Flight engineers and mechanics invariably are suspicious when first introduced to the analyzer. It has gotten a big build-up and they can't believe it is that good. If and when they start to use it, they are convinced. At LaGuardia recently, PAA's chief troubleshooter was telling a visitor about the instrument. "It's a wonderful help in trouble-shooting," he said. And a PAA engineer overhearing the comment remarked, "When a mechanic says that about any electronic gadget it's got to be good."



Towmotor 'Elevator'

For raising and lowering heavy loads between balcony storage areas and first floor production-lines, Towmotor Corp., 1226 E. 152 St., Cleveland 10, Ohio, offers "Elevator" fork lift truck which can reach down from loft to floor levels 8 ft. below to pick up materials.

Believed by makers to be one of the first developments of its kind, elevator unit has lifting and lowering capacity of 2000 lb. Full loads can be raised from first floor to 10 in. above balcony level. The mast is held rigidly and does not tilt.

Masking Tape

Pressure sensitive tape, "Mask-All," for general industrial use, is announced by Regal Air Corp., 318 West 39th St., New York 18, N. Y.

Product is reported to have higher-than-average tensile strength, strips off and does not leave any residue, and does not curl.

Other characteristics are reported as: Imperviousness to paint, thinners and moisture; high flexibility and resistance to distortion; ability to take curves easily and withstand baking; and resistance to effects of elements. Material is available in standard sizes.

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DIRECT HARDENED GEARS

The direct hardened steel gear is used to carry heavy tooth loading in applications where resistance to wear and surface compressive stresses is not quite so vital a factor. Here again, the nickel-containing steels develop the required strength more consistently and in heavier sections than carbon steels, and are generally more resistant to shock, fatigue and multi-axial stresses. Distortion resulting from heat treatment may be minimized by using nickel alloy steels and their machinability before final heat treatment is very good.

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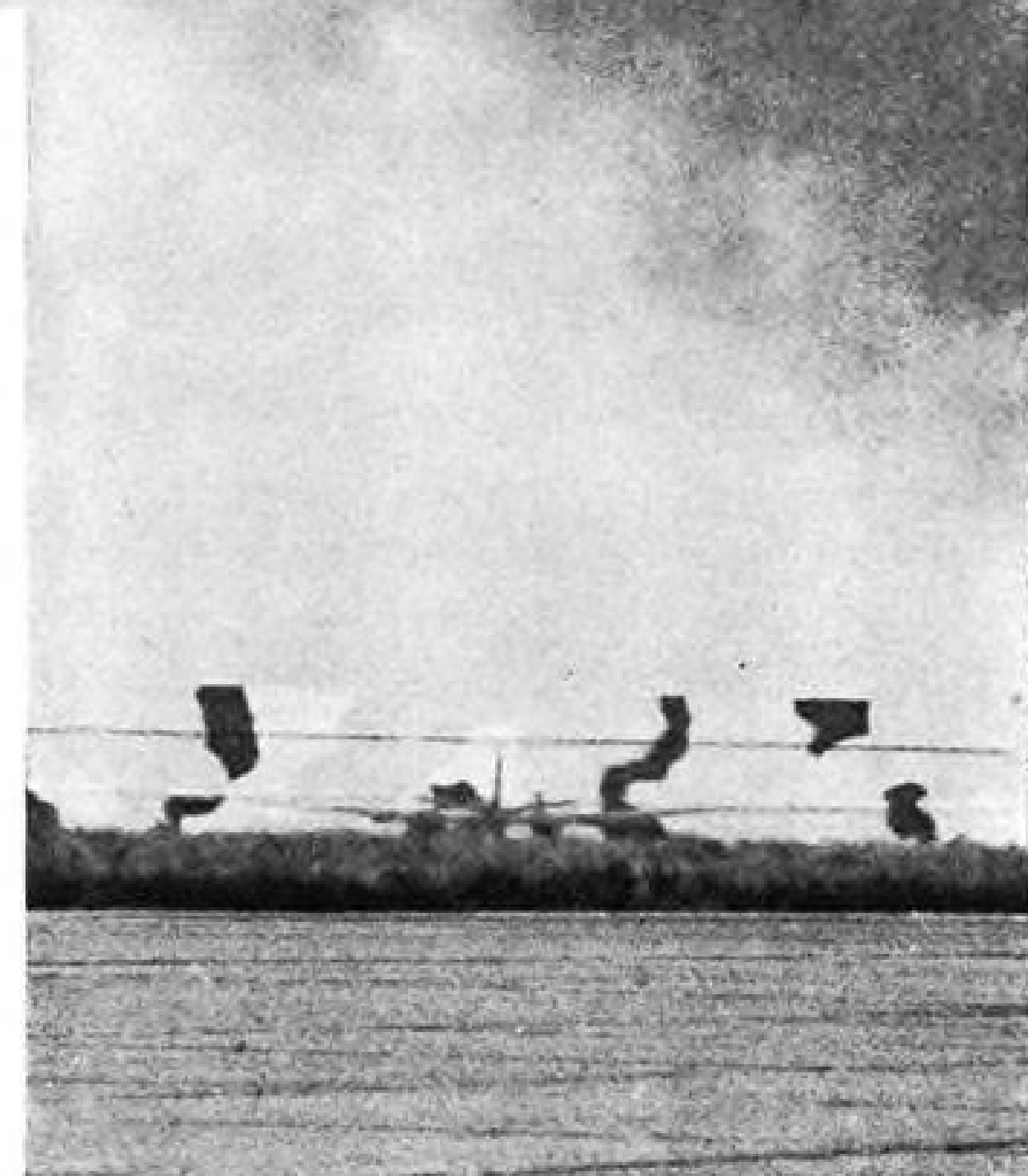
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SALES & SERVICE

Operators Plan Air Taxi Network

Charter services would fill the missing route links between airline-served cities and smaller communities.

Move to co-ordinate the small local air carriers into a national air taxi network, integrated with the scheduled airlines, is expected about the first of the year, under leadership of a new national charter taxi conference composed of the operators.

Joe Garside, president of Wiggins Airways, Norwood, Mass., and vice-president, transportation, for National Aviation Trades Assn., has been asked to direct the planning for the organization of the new conference, which will be independent of NATA, and will work with the Air Traffic Conference in handling details of the complex nation-wide network.

► **Endorse Proposal**—At the recent meeting of the Air Traffic Conference in Chicago, the conference unanimously endorsed a proposal for extending "taxi" or charter service to airline patrons. Previously NATA had unanimously approved the proposal by vote of its operator members at its annual meeting at New Orleans.

Local air transportation services are now registered by CAB in more than a thousand small communities in which there are 2445 registered "small irregular air carriers."

► **Missing Links**—Main economic hope of these small services is in filling in the missing route links between airline terminal cities and the smaller communities in the trade areas surrounding the large cities.

Experimental ticket selling, by a few Midwest fixed-base operators for Mid-Continent Airlines, is being closely watched by the Air Traffic Conference and the operators. Initial reports indicate the trial arrangement has been relatively successful, and probably the airlines will pick the best of the air taxi operators after a trial period, to serve as ticket agents in their communities.

► **Grass Roots Service**—Integration of the small services with the airlines will enable the passenger from a grass roots town to board an air taxi at his community's little Class I airport, and fly to the nearest airline terminal city, to meet the airline's scheduled stop there.

If the customer wants a round trip, his home town air taxi can arrange to meet him at the airline terminal

city at the time of his scheduled arrival and take him home. Or arrangement can be made with another air taxi operator in the terminal city to give him transportation out to his home town airport.

► **Through Tickets**—It is expected that eventually the airline sales office in the big city will sell airline passengers transportation clear to the grass roots town destination, making arrangements at the end of the airline leg of the trip to continue by air taxi.

Success of the entire system depends on the efficiency and safety with which it is set up and operated.

► **Requirements**—Air Traffic Conference has asked, and NATA operators have agreed, that the small irregular air carriers comply with the following requirements, basically the same as those required of regular airlines:

• **Appropriate locations and facilities** and services for promoting air carrier traffic for the scheduled airlines and themselves.

• **Suitable, safe and adequate aircraft**, airports, and other facilities, manned by competent personnel, and main-



NEW PAC HEAD

Walter H. Beech, president and board chairman of Beech Aircraft Corp., succeeds C. J. Reese, president, Continental Motors Corp., as chairman of the Personal Aircraft Council of Aircraft Industries Assn., and as a member of the AIA Board of governors.

tained in accordance with stipulations and codes for safe and sane operations to be determined by the negotiating parties (airline and operator).

• **Observe codes of business ethics** governing relations with the public, between operators and the airlines, and between operators as stipulated by mutual agreement.

• **Surety bonds** must be provided for performance of contract.

• **Adequate liability insurance** must be provided, comparable to that furnished by the regular scheduled airlines for their passengers (\$40,000 maximum coverage per passenger seat).

Amount of time saved in relatively short air taxi hauls between airline terminals and grass root airports offers an attractive sales proposition to the airline passenger, already accustomed to saving time by air travel. In most cases the airline passenger can be carried by air taxi to a hometown destination 50 to 100 miles from the airline terminal airport in virtually the time it would take him to get his baggage downtown to the airline terminal city and get other surface transportation which would take him to his ultimate destination.

M. F. Redfern, executive secretary of the Air Traffic Conference, who has been active in development of the program working with NATA officials for the past two years, has been instructed by the conference to proceed with completing taxi network arrangements for the airlines.

► **Sixty Days**—Some sources expect that some air taxi services may be ready to operate within 60 days if prompt action on formation of the charter taxi conference is taken.

It is probable however, that the operation will not be in very sizeable operation for perhaps six months, and that it will grow slowly, as operators and patrons see its advantages.

The program is set up to attract the more responsible operators, and a fair amount of investment in equipment, promotion, registration, and liability insurance is required which will probably deter the smaller operators from entering it until they can benefit from the experience of some of the better-financed, larger operations.

Brokers Expand

Differences in used aircraft market values in widely separated areas have caused Powers & George, aircraft brokers, to create a mid-western office in Dallas, Tex. Manager of the office will be Harry G. Graybill.

Previously, Powers & George had been handling all listings from New York. Now, the Dallas office will cover used aircraft dealings west of the Mississippi River.

Janitrol goes jet!



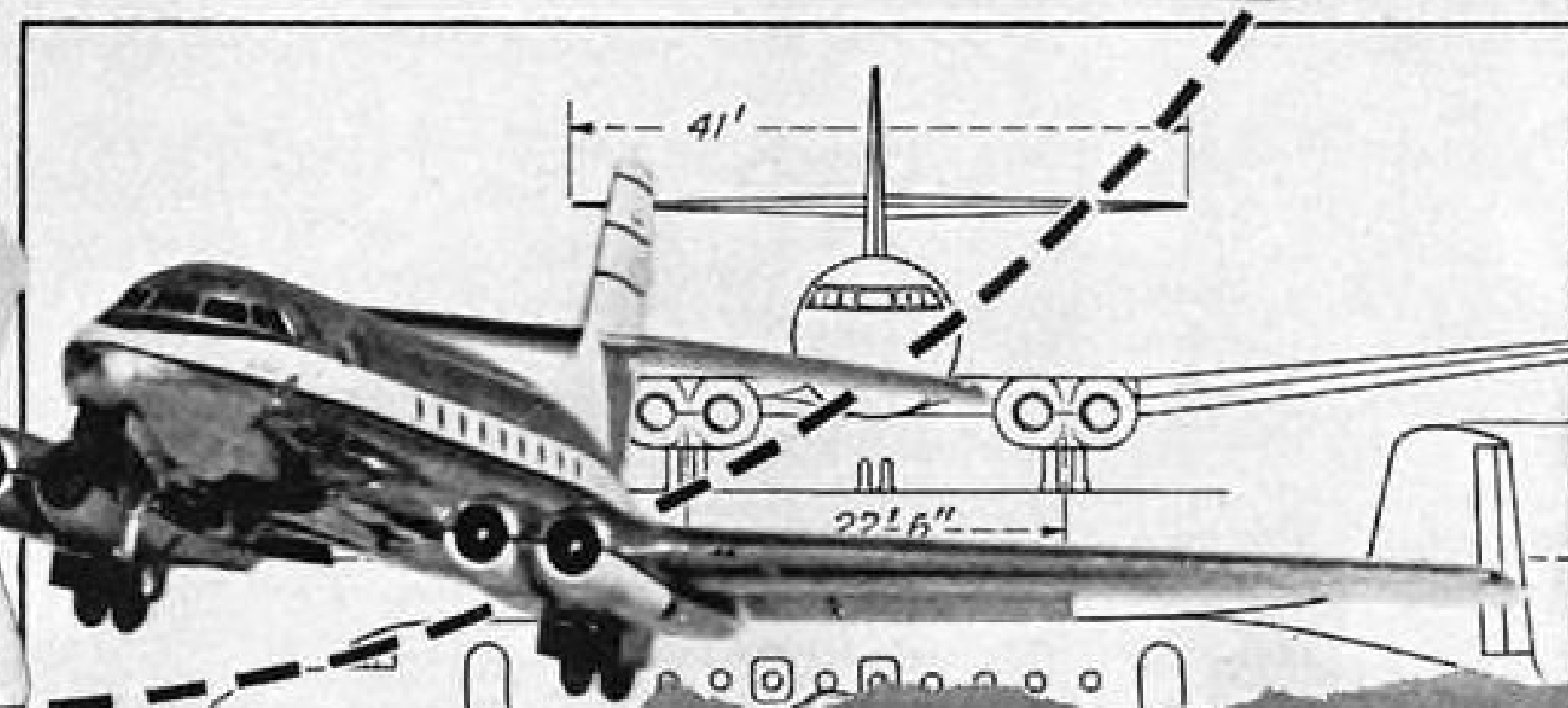
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tom. **Wing**—Since the plane was as a medium for transport, promise has been made between and low-speed characteristics of the aircraft. It is obvious that essential to the aircraft to obtain the best C_L and land performance.

The second factor was a relatively thick airfoil. This gives ample capacity. It is considered to be a high gust re-



Again Janitrol makes important news: The famous Janitrol S-200 combustion heater, rated at 200,000 Btu/hr., furnishes cabin heat for the brilliant new Avro Jetliner, recently flight tested at Malton, Ontario and reported in the October 3 issue of AVIATION WEEK.

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AIR TRANSPORT

CAB Invites Atlantic Charter Bids

Paves way for certificated and nonsked operators to get in on expected '50 travel boom. Jones hits decision.

Scheduled, year-around air coach service across the North Atlantic is likely to remain only a gleam in the eyes of Pan American Airways executives for at least another year.

But there will still be bargains galore in U. S.-Europe air transportation during 1950. And, as a practical matter, some of the special low-fare operations which will abound next year come very close to PAA's tourist-travel objectives.

The Civil Aeronautics Board has declared that because of continued high operating costs neither a reduction in over all trans-Atlantic fares nor establishment of regular trans-Atlantic coach service can yet be justified. It added, however, that some action was necessary to facilitate the flow of American tourist dollars to Europe in accordance with U. S. foreign policy.

Result is a CAB invitation that both certificated carriers and large nonscheduled operators apply for authority to conduct group charter service between the U. S. and Europe next summer, when Holy Year traffic will be at its peak.

The Board will consider applications which are filed before Mar. 1, 1950, and propose trans-Atlantic charter operations between June 1 and Sept. 30, 1950.

Special Excursion Fares—CAB also announced approval of special 15-day roundtrip excursion fares recently proposed by the International Air Transport Assn. in Mexico City. Ten scheduled trans-Atlantic carriers jointly adopted the record low rates which will be effective from Jan. 1 to Mar. 31 and will permit roundtrip travel for only ten percent more than the regular one-way tariff.

Airlines offering the 15-day excursion rates are: Air France, American Overseas Airlines, BOAC, KLM, Pan American Airways, Sabena, Scandinavian Airlines System, Swissair, Trans-Canada Air Lines and TWA.

Under the new 15-day roundtrip tariff, air travel from New York to Amsterdam, Brussels and Paris will cost only \$407, a saving of \$259 as compared with the regular roundtrip fare. New York-London is \$385, a saving of \$245; New York-Rome \$485.40, a saving of \$301.20; New York-Shannon \$353.10, a saving of \$224.70; and New York-

Lisbon \$391.60; a saving of \$249.20.

Since the new rates are not coach fares, a 15-day excursion ticket will entitle a passenger to exactly the same equipment and service as is usually provided by the North Atlantic flag lines.

Nonskeds at Disadvantage—CAB's pronouncement on North Atlantic fare policy in 1950 means tough sledding for uncertificated airlines' request for special exemptions to operate during periods other than between June 1 and Sept. 30. The Board said the certificated carriers appear to have ample capacity with which to handle off-season business.

One independent operator, Seaboard & Western Airlines, has requested CAB permission to carry students and Holy Year pilgrims between the U. S. and Europe throughout 1950 (AVIATION WEEK, Dec. 12).

Among the certificated flag lines, Pan American already has received CAB approval for a charter arrangement with Felix Roma, a Catholic charitable organization, providing for two "tourist-class" DC-4 roundtrips weekly to Rome during off-peak periods next year. Like

other operators, PAA can apply for extension of this authority to include the June 1-Sept. 30 period.

Under the PAA-Felix Roma contract, Holy Year pilgrims will be offered an all-expense \$698 New York-Rome air tour with 10 days in Italy. (Thus the "package" tour will cost nearly \$100 less than the usual rate for air transportation alone.) While Felix Roma also is arranging tours by ship (which require at least a month), emphasis is being placed on air travel.

Firm Commitments Sought—In granting special exemptions for flights next summer, CAB will examine carefully the possible diversion of business from regularly-certificated services. Consideration will be given only to arrangements which have been reduced to writing and involve firm commitments for specific trips and passengers.

Safety compliance record of uncertificated applicants will be a major factor in the granting of exemptions to these carriers. Certificated operators have been warned that any losses resulting from trans-Atlantic charter flights next year will be disallowed for mail rate purposes.

Dissenting Opinion—CAB's policy statement is already under fire in some quarters. TWA, the only U. S. flag line certificated to Rome, and CAB member Harold A. Jones think the Board went too far. Independent operators, on the other hand, feel they may be unduly restricted.

Jones recalled that in November CAB had advised U. S. flag carriers that regular fares across the North Atlantic should be raised by about seven per-

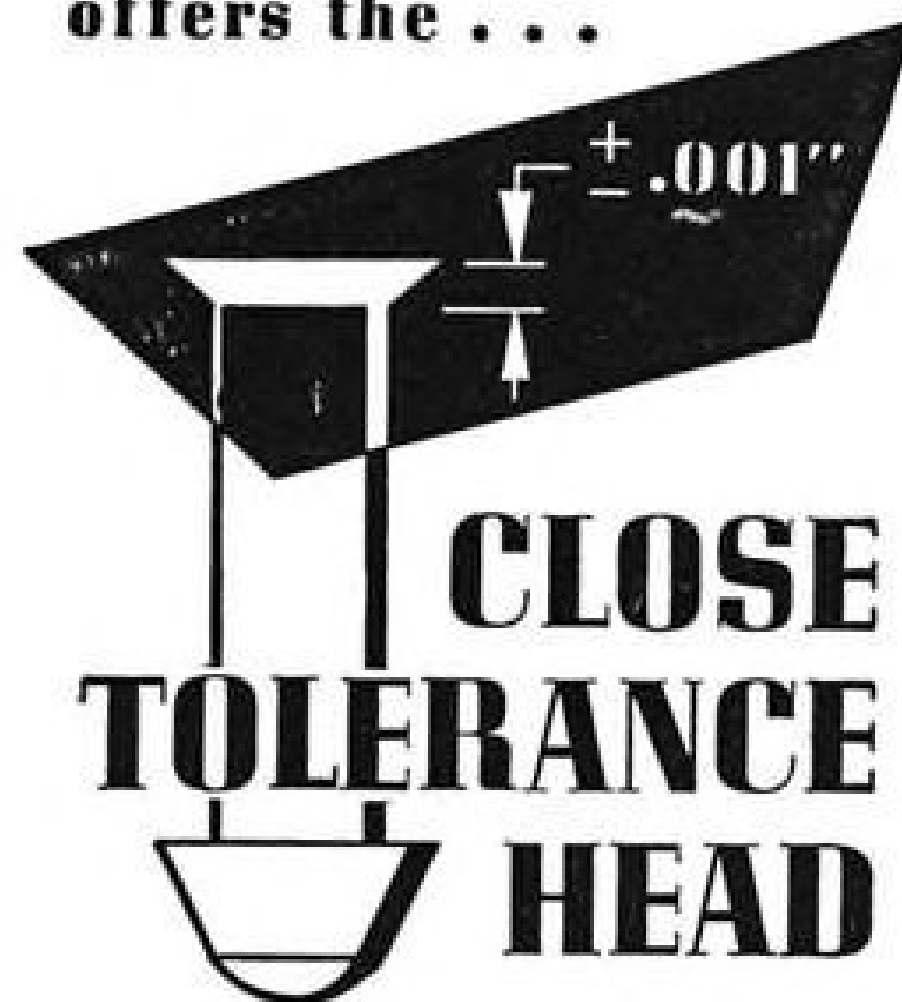


TWA'S NEW AIR COACH

Modification work has been completed on the first of several DC-4s which TWA has fitted with 60 instead of 44 seats for use in transcontinental air coach service starting

Dec. 27. The ships will make one roundtrip daily between New York and Los Angeles dropping down for an intermediate stop at Chicago.

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CAB's Jones: Disguises aside, it's still air coach.

cent. But the airlines, during their Mexico City traffic conference, shunned the suggested regular fare hike while endorsing the special 15-day off-season excursion tariffs which CAB also favored.

According to Jones, CAB's North Atlantic air policy statement for 1950 actually throws the U. S.-Europe route open to low-rate tourist travel on a large scale "no matter how indirect the approach, no matter how the words 'charter' and 'special service' may be construed. The Board obviously intends to hand out exemption permits that will be uneconomic, of doubtful legality and against the public interest."

Jones argued that the special exemptions for group charter flights between June 1 and Sept. 30 will not only divert regular traffic during the summer but also drain away much of the off-season 60-day and 15-day roundtrip excursion business. "For who would travel to

Europe in the winter at special (excursion) rates if they can travel in the summer at even lower special (charter) rates?"

► **Taxpayer to Suffer?**—The CAB dissenter said the Board was yielding unwisely to current popular demand by allowing some carriers to parallel another airline's certificated route through exemptions granted without due process of law. He added that the public, through increased mail pay, will have to make good whatever losses the U. S. flag lines suffer because of the special exemptions—no matter what the CAB majority says.

"I don't question the kind intentions of the majority," Jones declared. "But there is apparent an alarming tendency on the part of the Board to smother to death our air transport system with good intentions such as these."

Baker Boosts Coach, Condemns Nonskeds

Admission of coach transportation to full partnership with higher-priced luxury service would go far toward making the certificated air carriers profitable and independent of government subsidy, according to National Air Lines President G. T. Baker.

He declared that both NAL's recently-instituted four-cents-a-mile DC-4 coach flights and super deluxe "red carpet" DC-6 operations between New York and Miami are paying off.

In his recent speech before the New York Society of Security Analysts (AVIATION WEEK, Dec. 12), Baker attacked irregular operators "who skim the cream from long-haul business during peak seasons and sit back during off-



AIRLINES' TOP BRASS

Presidents of 11 scheduled airlines discussed major phases of their present and future operations at a recent meeting in Chicago sponsored by the Assn. of Commerce & Industry. Shown in front, left to right, are F. M. Higgins, Wisconsin Central; Leverett Lyon, Assn. of Commerce & Industry; E. V.

Rickenbacker, Eastern; and W. A. Patterson, United. In rear are C. E. Woolman, Delta; J. H. Carmichael, Capital; R. S. Damon, TWA; S. A. Stewart, Chicago & Southern; G. R. McGregor, Trans-Canada; C. R. Smith, American; T. E. Braniff, Braniff; and T. H. Reidy, Helicopter Air Service.

traffic periods." He was especially critical of nonscheduled operations with "war-weary" C-46s fitted with 50 or more seats.

The NAL president said the scheduled airlines can't operate such equipment in passenger service. He declared flatly that the C-46 does not have single-engine performance at takeoff.

► **Second to Apply**—Baker noted that National was the second scheduled domestic carrier to seek permission to start coach operations, but added that it had to file tariffs three times before approval. He said NAL's competitors, Eastern and Delta, had fought National's proposed lower excursion fares since 1947 and coach fares since last year.

National's excursion rates, which went into effect last spring, accounted for more than 25 percent of the company's revenues during the off-season summer months. Coach flights, which must leave the New York and Miami terminals between 10 pm. and 1 am., were inaugurated Nov. 1 and already are carrying near-capacity loads.

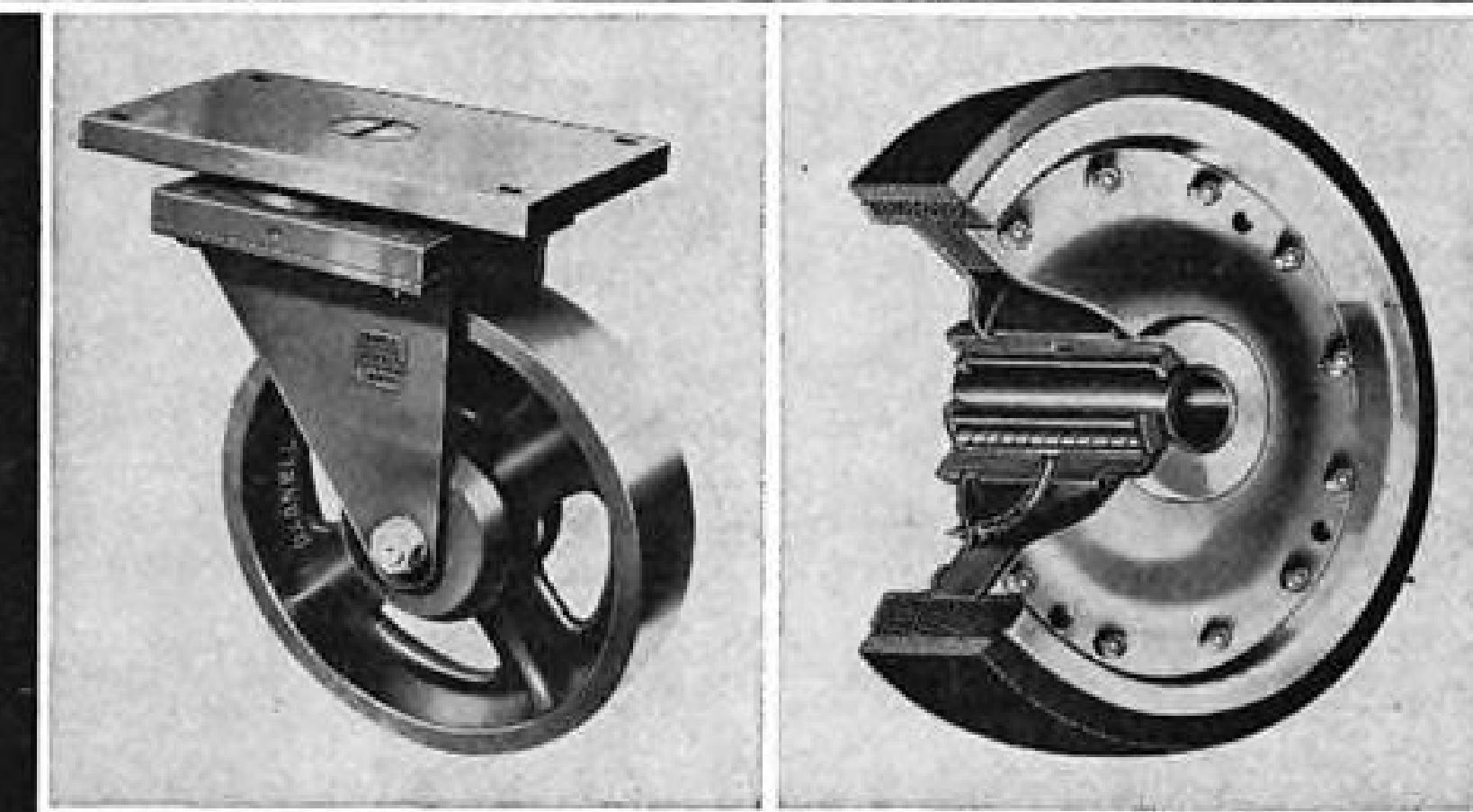
Turning to National's numerous proposed interchange agreements, Baker emphasized that the deals with Pan American Airways and Panagra are in no sense mergers. These interchange agreements, he said, provide that both PAA and Panagra will have a minority interest in National and a minority representation on the board of directors.

► **Two Objectives**—"In proposing this type of arrangement, we had in mind two important objectives. Our stockholders and directors naturally wanted to insure that the present management would keep control. On the other hand, I firmly believe a man's heart is where his money is.

"I wanted to work out a deal whereby both other parties to these transactions (PAA and Panagra) would have some blue chips in the game and would have a real incentive to make these operations a success. But whatever the outcome of the applications pending before CAB, National can make money on its own two feet."

(Eastern Air Lines President E. V. Rickenbacker last summer suggested that the Pan American-National interchange agreement and stock sale was the result of a "squeeze" on Baker by PAA President Juan Trippe. Rickenbacker said PAA attempted to dicker with Eastern on an interchange and then apparently used EAL as a pawn to help close the deal then being negotiated with National.)

Baker said National was preparing to handle more passengers this winter than ever before. In the broad view, he predicted continued improvement in business because of the rapid economic growth of southern states and a shift in tourist traffic to Latin America.



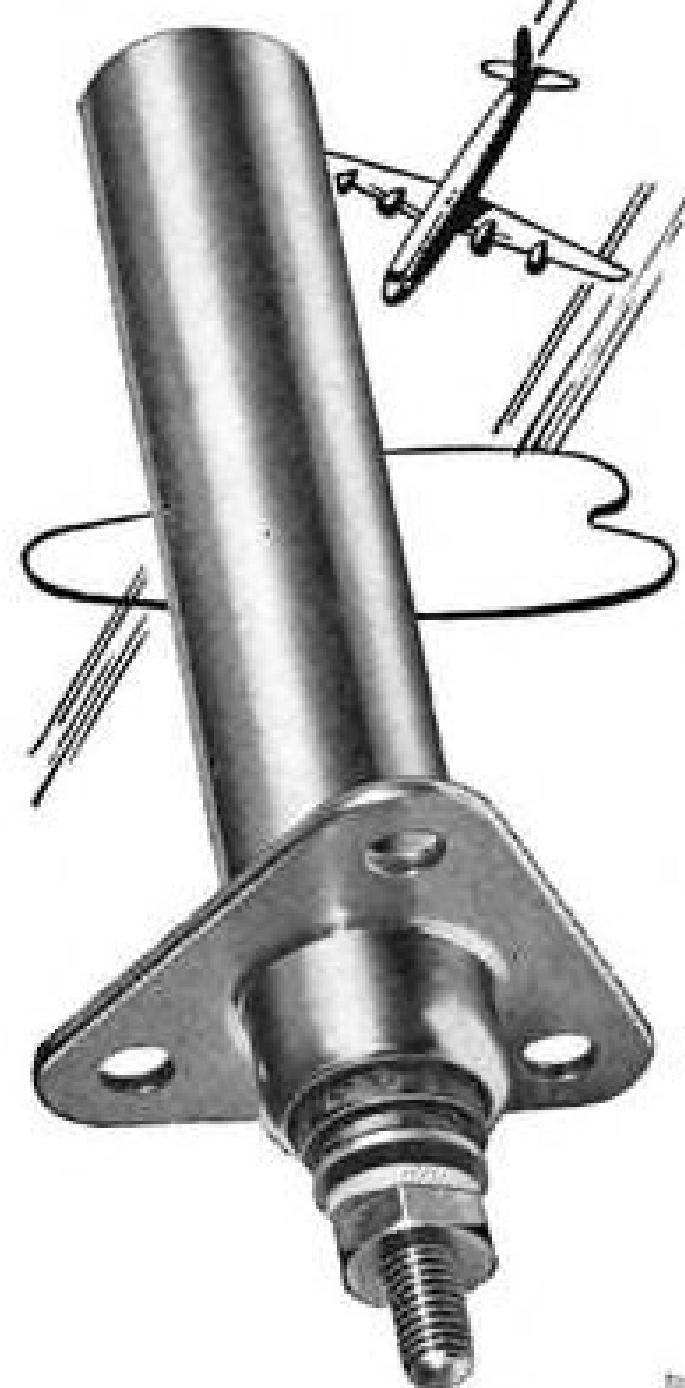
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SENSITIVE... but only to heat

Smith Asks U. S. Aid For Jet Transport

American Airlines President C. R. Smith believes U. S. progress in the commercial jet transport field may be seriously handicapped unless Congress next year authorizes the government to help finance development of the high-speed craft.

Speaking before the Chicago Assn. of Commerce, Smith said he would like to see the development program shared by the Air Force (representing the government) and the airlines, with later participation by the manufacturers. He said the Air Force-airline team is a natural one because of their close cooperation in providing wartime transportation.

► **Avoid Bureaucracy**—The American Airlines president declared it would be difficult to favor a plan to develop jet transports through a committee composed of many government departments in Washington because the best planes are not produced in that fashion. He said we would pass our foreign competitors most readily if responsibility is centralized for the job to be done.

Smith predicted that with a good push behind the development program the U. S. may have jet transports flying on an experimental basis in three or four years. "Within five or six years they can be in transcontinental operation in limited numbers."

British and Canadian developments illustrate the need for putting our own jet transport program on a sounder footing, Smith declared. But he said there should be neither reason for alarm about our relative position nor justification for rushing into construction of jet prototypes.

► **Long-Range Plan**—"Our assignment is to produce not just a jet transport, but the best jet transport. It is evident that this is a long-range undertaking, and the problem should be approached on that basis.

"The time has passed when a new airplane can be said to have economic merit simply because it has superior speed.

"Today, air transportation at 300 mph. is sold at the conventional price. The number of people who will pay a substantial extra fare for speeds greater than 300 mph. is limited indeed."

Only when superior speed can be provided without a corresponding increase in cost, with resultant savings to the public, will the new plane have wide public appeal and become a useful earning vehicle for the air transport operator, Smith declared. He cautioned that the jet plane today is an exceedingly expensive machine to design, build and operate.

Urges Renewal of PAL Franchises

Pioneer Air Lines, the nation's first feeder, will be in business over some of its routes for another five years if the Civil Aeronautics Board adopts the recommendations of Examiner James M. Verner.

Citing cost per revenue ton mile as a good measure of over-all efficiency, Verner noted that Pioneer made the best showing among nine short-haul operators for the year ended last Mar. 31. PAL's expenses per revenue ton mile were about \$1.03; Challenger \$1.88; Empire \$1.49; Florida \$4.56; Monarch \$1.86; Piedmont \$1.57; Southwest \$1.16; Trans-Texas \$2.44; and West Coast \$1.55.

► **Renewals Urged**—Specifically, Verner recommended that Pioneer's franchise for Segments 1 (Houston-Amarillo), 2 (Houston-Dallas) and 3 (Dallas-Midland/Odessa) be renewed for five years; that Segment 5 (Lubbock-Albuquerque) be renewed for one year; that Segment 4 (Amarillo-El Paso) not be renewed; and that the Dallas-Waco-Temple portion of Segment 2 not be extended to Austin.

Turning to other carriers' local operations in the Texas-New Mexico area, Verner said Braniff Airways' service should not be suspended at Waco and Lubbock and its Austin-Houston service should not be restricted; that Continental Air Lines' service should be suspended temporarily at Big Spring, Tex., but not at Las Vegas, N. Mex.; and that American Airlines' service should

be suspended temporarily at Abilene and Big Spring but not at Midland/Odessa.

Airport Aid Curb Echoed by C. of C.

A U. S. Chamber of Commerce committee has lent its support to the growing demand that federal aid to airports be limited to a system of fields used primarily for traffic engaged in interstate commerce.

The Chamber's Transportation and Communication Department committee considered the question of whether federal funds should be confined to single-directional runways on new or existing airports but made no recommendation.

It said that airport buildings should be eligible for federal funds, together with land preparation, runway construction.

Airports should be put on a self-sustaining basis as soon as possible by establishing charges proportionate to their use by the military, commercial carriers and private operators, the committee declared. Subsidies to domestic air carriers, the committee said, should be separate and distinct from payments for transportation of mail.

Suspend D. C. Stop

TWA and American Overseas Airlines have received Civil Aeronautics Board permission to suspend service at Washington, D. C., as a co-terminal



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CROSS-WIND GEAR IN CANADA

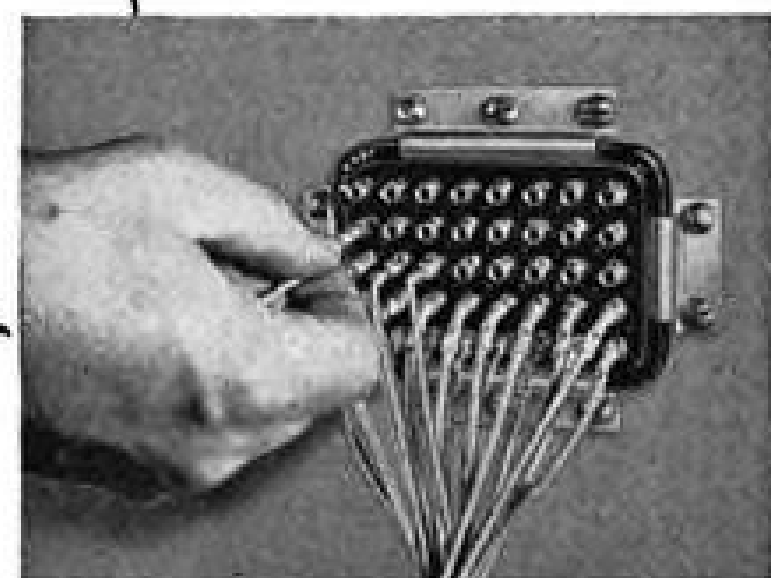
Canadian Pacific Air Lines pilots flying out of Montreal are being trained to use the cross-wind landing gear installed on one of the carrier's DC-3 passenger planes. The device permits the wheels to swivel automatically, like the casters on an office chair, and enables the plane to land or take off without regard to wind direction. Thus the

plane can maintain scheduled operations using one-strip landing fields. Photo shows the port wheel castered at a 15-degree angle, with the starboard wheel in conventional fixed position. CPA says its DC-3 is the first commercial plane in the world on which the cross-wind castering gear has been installed.



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on their respective foreign routes for one year. Action on requests by the two carriers to suspend service similarly at Philadelphia was deferred pending a formal hearing.

In asking the suspensions, TWA and AOA said passenger load factors on their direct international flights to and from Philadelphia and Washington have been uneconomically low. They pointed out that frequent and adequate connecting service from Washington and Philadelphia to New York is available.

Hugh Coburn Heads Air Traffic Group

Election of new officers and recommendations for sales promotion campaigns in 1950 were announced by the Air Traffic Conference of America following its recent annual meeting in Chicago.

Hugh W. Coburn, Mid-Continent Airlines' vice president-traffic, was named president of the group. Other officers forming the executive committee for 1950 are: Walter Sternberg, vice president-traffic, National Airlines, first vice president; and James W. Austin, vice president-traffic & sales, Capital Airlines, second vice president.

► **Recommendations**—The conference unanimously endorsed a plan for coordinating services of the scheduled carriers with small irregular (lightplane) operators in order to extend taxi and charter services to airline patrons. Two recommendations made by the conference to the Air Transport Assn. board of directors call for:

- **Augmented air mail and air parcel post campaign** next year with a proposed \$165,000 expenditure for promotion.
- **Consideration of a general joint advertising campaign** by the industry.

Members of the conference expressed satisfaction with progress under the recent agreement with the armed services calling for increased use of scheduled commercial air transportation by military personnel.

Transport Institute

Fourth annual Air Transportation Institute conducted by American University in cooperation with the Civil Aeronautics Administration and the Air Transport Assn. will be held in Washington, D. C., from Jan. 10-27.

Among the 40 speakers slated to address the institute on air transportation problems: D. W. Rentzel, Civil Aeronautics Administrator; Russell B. Adams, Civil Aeronautics Board member; Maj. Gen. William H. Tunner, Military Air Transport Service; J. H. Carmichael, president, Capital Air-

lines; M. F. Redfern, vice president, Air Transport Assn.; Hervey Law, general superintendent of airports, Port of New York Authority; and C. W. Jacob, vice president, American Airlines. Registration for the institute will be open until Jan. 5.

DC-3 Improvements Speed Ground Stops

Speed-up features on Capital Airlines' modified DC-3 fleet, such as built-in passenger ramps, baggage racks and waist-height cargo doors, have resulted in a monthly saving of 6000 hours of ground time to passengers, according to J. B. Franklin, vice-president in charge of operations.

Franklin said ground time at each station stop formerly averaged around ten minutes, compared to the current six minutes. Last year, no DC-3 stops were less than six minutes, whereas now 35 percent take no more than two minutes. Result is that the terminal-to-terminal speed on some flights has been increased nearly 20 mph.

Capital said passenger loads on routes using the modified DC-3s have increased 20 percent since inauguration of the faster service last spring, and company revenues have risen by as much as \$88,000 monthly over 1948 totals.

Convair Wage Increase

Wage increases ranging upward from 5 cents an hour have been approved in a 2-year pact by Consolidated Vultee Aircraft employees affiliated with Aircraft Machinists Lodge 1125.

The new contract, retroactive to Nov. 29, gives all employees a 5-cent an hour raise and ultimately another 2-cent an hour for all, and additional raises ranging up to 18 cents an hour for workers whose classifications were changed.

It also provides for increased hospital and surgical insurance benefits, and a sick-leave provision for the first time. The contract affects between 4000 and 5000 production and office workers.

Two Unions Merge

Air Line Stewardesses Assn. (Independent) has merged with the Air Line Stewards and Stewardesses Assn., an affiliate of the Air Line Pilots Assn.

Total representation of ALSSA is now over 3500, including 2900 employees represented by ALSSA prior to the merger and 650 formerly represented by ALSA. Added to ALSSA's rolls by the merger are stewardesses of United Air Lines and Western Air Lines, bringing to 16 the total number of carriers with which the association has bargaining rights.

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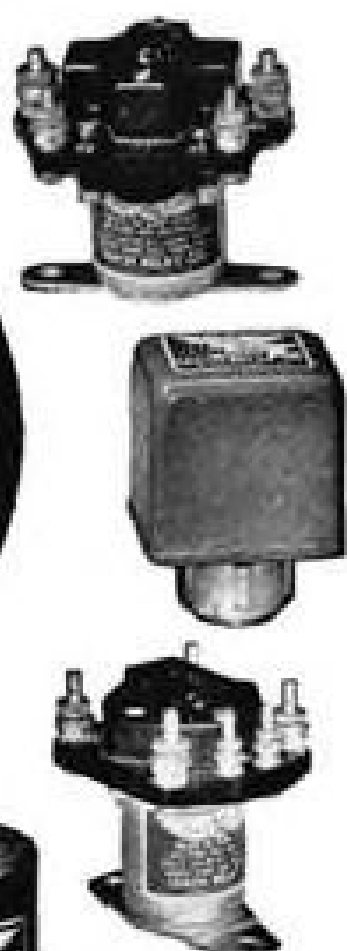


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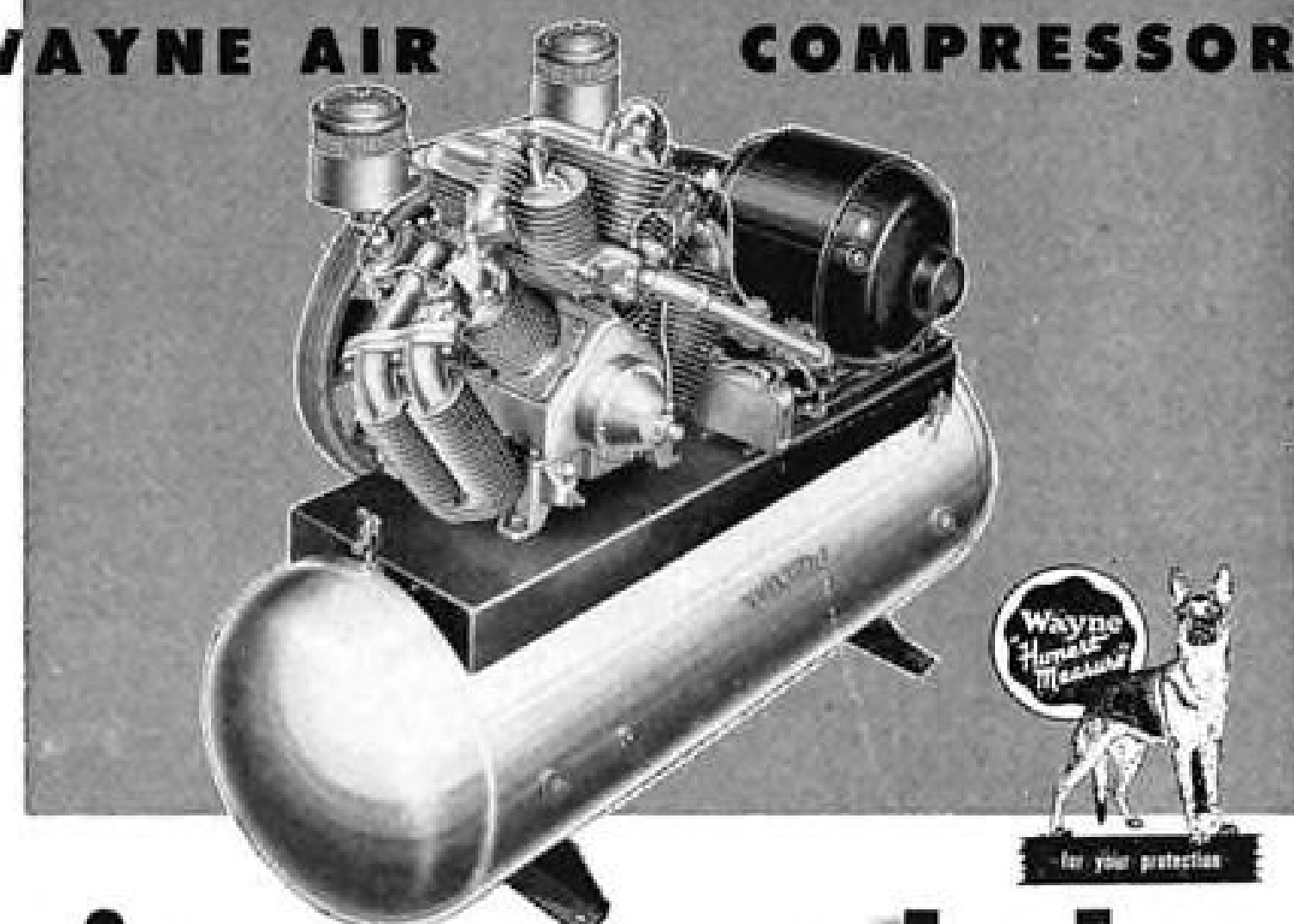


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MCA Plea Denied

Mid-Continent Airlines' application for an alternate route from Kansas City, Mo., to New Orleans via Springfield, Mo.; Little Rock and El Dorado, Ark.; and Monroe and Baton Rouge, La., has been denied by the Civil Aeronautics Board.

MCA now operates between Kansas City and New Orleans by way of Joplin, Mo.; Tulsa and Muskogee, Okla.; Ft. Smith, Ark.; Texarkana, Tex.-Ark.; and Shreveport, La. CAB said Mid-Continent's proposed additional service would compete with the carrier's original route between Kansas City and New Orleans and with services of Delta Air Lines, Eastern Air Lines and Chicago & Southern Air Lines for a limited traffic potential.

SHORTLINES

► **Arrow Airways**—CAB has dismissed the Lomita, Calif., irregular operator's certificate application from the transcontinental coach-type service case.

► **Avianca**—The Colombian carrier, which claims to be the oldest airline in the Western Hemisphere, celebrated its 30th anniversary this month. Company has 3000 employees, 34 transport planes and last year flew 450,000 passengers.

► **CAB**—Has warned that it will deal severely in the future with cases where air carriers permit establishment or maintenance of interlocking relationships without prior Board approval.

► **Colonial**—An official CAB report states that the probable cause of a Colonial DC-3 accident at Burlington, Vt., Airport on Sept. 20, 1948, was the pilot's action in landing too fast and too far down the wet runway following a high approach. The ship overshot the runway and crashed into trees. Plane suffered major damage. A passenger and the stewardess were injured slightly.

► **Delta**—CAB has amended the carrier's certificate to designate Chattanooga, Tenn., as an intermediate point between Knoxville and Atlanta on route 54. Local service between Chattanooga and Knoxville will be prohibited.

► **Eastern**—Has begun the year-round sale of gift travel orders.

► **Northeast**—Showed a \$16,523 operating profit in October, bringing its total for the first ten months of 1949 to \$189,552, against an \$11,233 deficit in the same period last year. Passengers carried during the first ten months of 1949 rose 47,000 over the like 1948 period.

► **Pan American**—Reports November was the busiest month in company history for cargo flying through Miami. . . . PAA, in cooperation with Compania Cubana de Aviacion, Compania

Mexicana de Aviacion, National Airlines and TWA, is offering a 6500-mile excursion across the U. S., through Mexico, Cuba and up the U. S. east coast from Florida for only \$38 more than the regular transcontinental round-trip fare.

► **Pioneer**—Has experienced the best November traffic in its history, carrying 9551 passengers against 8751 in the same month last year. Load factor last month was 39.41 percent.

► **Transocean**—Reports the 200th transport has passed through the overhaul shop of Aircraft Engineering and Maintenance Co., Oakland, a subsidiary. The planes, both Air Force and civilian, were all handled in the past 16 months.

► **TWA**—Has a total of eight DC-3s available for short-notice special and group travel domestically. The ships are based at five different airports.

► **West Coast**—Celebrated its third anniversary this month. Since Dec. 5, 1946, the company has flown 175,000 passengers and has consistently been among the top three feeders in passenger load factor.

CAB SCHEDULE

Dec. 19—Prehearing conference on Mexico City-Miami-Lisbon-Madrid foreign air carrier permit request of Aerovias Guest, S. A. (Docket 3218)

Dec. 19—Prehearing conference on investigation of proposed roundtrip excursion fares of Eastern Air Lines and National Airlines. (Docket 4166)

Dec. 19—Hearing in Florida Airways mail rate case. (Docket 3695)

Dec. 20—Prehearing conference on Honduras-Miami foreign air carrier permit request of Transportes Aereos Nacionales, S. A. (Docket 4022)

Jan. 4—Hearing on transcontinental coach service. (Docket 3397 et al)

Jan. 9—Hearing in New York area helicopter case. (Docket 946 et al)

Jan. 9—Hearing on air freight accumulation, assembly and distribution tariffs. (Docket 1705 et al)

Jan. 9—Hearing on Cuba-Florida foreign air carrier permit case. (Docket 3717 et al)

Jan. 16—Hearing on Nationwide Airlines' application for Michigan routes. (Docket 2832)

Jan. 17—Hearing in National Airlines route transfer case. (Docket 3500)

Jan. 24—Hearing on CAB's enforcement action against Meteor Air Transport. (Docket 4100)

Feb. 6—Hearing in Colonial Airlines mail rate case. (Docket 2724)

Feb. 13—Hearing in West Coast Airlines' certificate renewal case. (Docket 3966)

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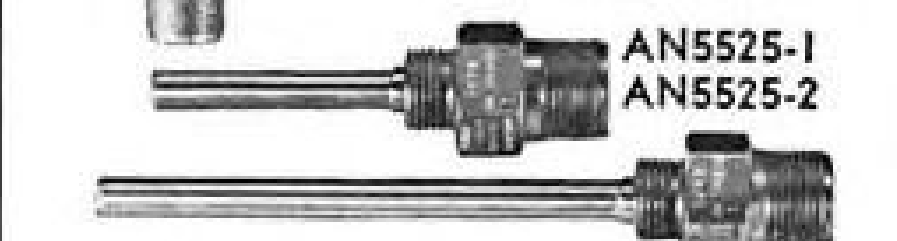


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New Books

"Rocket Propulsion Elements," by George P. Sutton, is a detailed summary of the fundamental elements and technical problems connected with this important field. Described are physical mechanisms and designs of rocket motor systems. Mr. Sutton is supervisor of propulsion development for North American Aviation and draws upon firsthand experience with recent rocket developments.

Included in the text are a method for calculating the theoretical performance a rocket can obtain from any combination of chemical fuels and oxidizing agents, plus performance data of the most important combinations; performance charts and tables, including several on properties of metals at various temperatures; and a description of the technique, equipment, safety precautions, and instruments used in testing rocket motors. Published by John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, N. Y., 294 pages, price \$4.50.

"Irregular Air Carrier Certification and Operation Rules" is a revision of CAA Manual 42 explaining the requirements for irregular operations. The new edition contains all new regulations promulgated by CAB since the original manual was printed. Important among the changes are the provisions which bring certification of pilots for large aircraft and the operational use of the aircraft to a par with requirements for scheduled carriers. Subscribers to the manual will be kept up to date on any further changes by means of supplementary service. Available from the U. S. Government Printing Office, Washington 25, D. C., price \$1.00.

"Airplane Design," ninth edition, by Prof. Karl D. Wood, is a textbook, aimed at engineering students, on airplane layout and preliminary design calculations with emphasis on the economics of design. The author is head of the University of Colorado's aeronautical engineering department. The design material presented is in accordance with the new CAR 3. Printed by the offset process, the book is profusely illustrated with charts, tables and diagrams. Distributed by the University Bookstore, Boulder, Col.

"Hitch Your Wagon," by Clayton Knight and Robert C. Durham is biography of colorful Bernt Balchen, famed polar flyer. Included are his stories of Dick Byrd's trans-Atlantic flight, the polar expeditions of Amundsen, Byrd, and Ellsworth, and hitherto untold tales

of Balchen's adventures during the war. Publication date Dec. 15, by Bell Publishing Co., Drexel Hill, Pa., 375 pages, price \$3.50.

"The Gen. Spaatz Collection" is a general description of papers and records collected by the former chief of staff of USAF during his career and turned over by him to the Library of Congress for preservation. The booklet is available free from: publications section, Library of Congress, Washington 25, D. C.

New Literature

Bulletin 49050 on Line Material Co.'s fixed focus high intensity runway marker light approved under CAA spec. L-819 gives comprehensive description of unit's construction and application including bills of material and schematic and wiring diagrams for multiple and series circuits. Available by writing

company in care of Airport Lighting division, E. Stroudsburg, Penn.

Chart on steel castings is stated to list virtually all general engineering types of steel castings classified as to tensile strengths. Data include indicated engineering and design applications, current specs, and typical specs for essential grade requirements. Ready references give specific yield point, elongation, reduction of area, hardness and impact evaluations, endurance limits, modulus of elasticity, machinability, and types of heat treatments. Write: F. Kermit Donaldson, exec. v.-p., Steel Founders Society of America, 920 Midland Bldg., Cleveland 15, Ohio.

"Consolidated Recording Oscillographs" is bulletin describing multi-channel recording units, including sample records of applications and detailed assembly drawings. Write: Consolidated Engineering Corp., 620 N. Lake Ave., Pasadena 4, Calif.

LETTERS

A Whitaker Statement

This office represents George Guy Whitaker and the Guy Whitaker Co., Inc. We are making reference to your article on page 47 of your issue of Nov. 14, 1949, wherein you set forth, by way of a news item, the allegations of the Dzus Co. to the effect that "Whitaker has allegedly been making and selling fastening devices embodying Dzus patents and imprinted with Dzus trade marks without permission." The item is in the nature of a report as to the contents of the Dzus complaint filed in the United States District Court at Los Angeles.

However for your information George Guy Whitaker and the Guy Whitaker Co., Inc., have not been nor are they now engaged in any manufacturing whatsoever. The sole activity of these defendants has been buying and selling of merchandise, the greater part of which has been surplus commodities. Purchases are made in large lots from many dealers. We understand that most of the items originally were from War Assets. These statements are set forth in the sworn answer of the defendants to the Dzus complaint.

We feel that the article mentioned has done an injustice to George Guy Whitaker and the Guy Whitaker Co., Inc. in that it merely setting forth one side of the controversy, an unfavorable inference is left with the reader as to the defendants.

Other publications, upon being advised of this suit, decided to withhold publication until the defendants had had their day in court. While we did not request such action, we did ask that note be made of the denial of said allegations, including the assertion that these defendants are in no way connected with any manufacturing enterprise or transaction wherein they have

imprinted the trade mark of Dzus or of anyone upon items or products sold by them.

George Guy Whitaker and the Guy Whitaker Co., Inc. have been the subjects of some unfavorable comment because of this article, and undoubtedly have been damaged in the trade. We feel that the same amount of publicity should be given to the allegations of their answer as was given to the allegations of the complaint, and that said item should also be given the same prominence in your magazine. This is a matter of fairness rather than one of legalistic principle.

WILLIAM CRUM
6331 Hollywood Blvd.
Hollywood 28, Calif.

(AVIATION WEEK has no record of having received any previous communication from Whitaker in connection with this case.—Ed.)

Expands Study

You may be interested in one of the results of the listing of my New York University thesis, "The Problems of Public Scepticism and Fear as Related to Air Travel Advertising," in your "What's New" column, July 11, 1949.

As a result of this listing, the thesis was called to the attention of executives of the Flight Safety Foundation; and the Board of Governors of this organization have approved the thesis for publication.

At the moment, I am expanding the study and preparing it to be presented to the faculty of the Graduate School as a Ph.D. dissertation.

HAROLD LITTLEFIELD
86 Irving Avenue
Livingston, N. J.

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EDITORIAL

Is Ethical Competition Too Dull?

We at AVIATION WEEK believe in competition. Even in the aviation magazine field!

Maybe it's naive these days but we also have the quaint idea that aviation publications can compete ethically. And we don't think sound business principles are any different in the publishing business than anywhere else. We somehow like to operate on the basic premise that the best editorial product plus the soundest and smartest sales program wins leadership. That's traditionally American.

So, that is why AVIATION WEEK considers its news and feature pages extremely valuable. They belong to you readers who are paying your good, hard-earned money for a subscription. That is why AVIATION WEEK doesn't run "puffs" and personal build-ups, doesn't politick for favors, isn't always demanding a free ride, and isn't going out of our way to nip at our competitors in print. We like to think we don't need to resort to such tactics, and that quality and facts speak for themselves.

It has been our observation that readers of aviation publications don't get much charge out of bickering between competing editors. They don't seem to be able to wind up much admiration for aviation editors who prostitute their space with harangues at their competitors. That is one publishing formula, however, and it is none of our business how our competitors run their own shows if they think it pays off, and as long as they let us run ours. Our space belongs to you readers who must want to keep yourselves well informed on all the significant developments in aviation.

When AVIATION WEEK has something to say for itself, we say it on the editorial page, just like we are doing now. After all, this is the editor's page, and we are not going to foist a lot of propaganda on you elsewhere. We even bend over backward sometimes and put our letters on this page. We conscientiously believe that what we print is important and right, and not

propaganda for anyone. Furthermore, we admit our errors freely, but they are human and unintentional errors. And in this competitive business he who admits his errors runs great risk of unfair competition from those who do not freely admit theirs, or who err deliberately.

Now why do we bring all of this up for discussion? Because unfortunately there is a tendency (it's definitely by a minority) in the aviation publishing field to publish frequent non-factual and misleading references to other aviation publications, especially in any way which can cast reflections on the competitors' accuracy and integrity. It is not uncommon in our own case, for example, to be quoted on things we never said, and which our discerning readers know we did not say!

We have never tried to bamboozle our readers. We never underestimate their intelligence. We think that petty sniping is recognized by our readers for what it is. Readers, we have found, are pretty good judges of publications. The fact that we have more of them, at twice the price, than any other aviation business magazine, seems pretty effective proof, even though our circulation has been held down for economic reasons to 30,000 ever since we started publication in 1947. And our advertising pages now total more each month than those of the next two magazines combined.

All of this discussion was brought on by one indignant individual who wanted to know if we were going to stay so blamed ethical that our news and feature pages continued to ignore the sniping at our integrity. The answer at the moment is yes. We think readers are not so dumb. We think our rise to circulation and sales leadership in a little more than two years proves the aviation reader is plenty willing to sacrifice a little fireworks in his magazine for factual information. However, if our readers ever start advising us to stop taking this guff and to meet the slander with facts, incident by incident, we'll haul off and let go.

ROBERT H. WOOD



Capt. John W. Bennett
Operations Manager

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