

# AVIATION WEEK

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AUG. 29, 1949

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. . . NEWARK . . . NEW YORK International . . . NEW YORK  
La Guardia . . . PHILADELPHIA International . . . PHOENIX  
. . . RALEIGH-DURHAM . . . ST. JOSEPH, MO. (ordered)  
. . . ST. LOUIS . . . SALT LAKE CITY . . . WORCESTER  
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Defroster blower motor  
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# AVIATION WEEK

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## \$40,000,000 NUT

To U.S. airlines, bad weather still makes up a large part of the 'nut' (operating expense). How large a nut? "The commercial airlines, operating about 1,000 aircraft, will lose approximately \$40,000,000 (in 1948) due to air traffic congestion, delays, flight cancellations and schedule unreliability."

(Congressional Aviation Policy Board Report, 1948)

Seasonal declines, non-sked competition, low airmail subsidies, and labor costs are often cited as causes of airline deficits. But bad weather is still commercial aviation's costliest problem. Once the Airlines master weather, most of their navigational—and financial—troubles will be over. And GCA is the one navigational aid that masters bad weather.

GCA is airport radar that shows a CAVU picture in all weather of all flight operations within a 30-mile radius of the tower. Each aircraft's position—its distance, altitude and bearing—is clearly and accurately visible on GCA's radar Search Scope. With GCA, tower control now has an even better view of flight operations than tower personnel formerly had on clear weather days.

GCA is the fail-safe solution to the chief operational problems caused by bad weather: holding stacks, landing and takeoff integration, turn-backs and safety-climbs, and rogue aircraft.

Unstacking aircraft in IFR conditions is greatly and safely speeded by GCA. Planes are called out of stacks at 3 mile space intervals instead of 10 minute time intervals. Traffic congestion is never allowed to develop.

Landings and takeoffs can be closely integrated. With exact knowledge of each aircraft's position, tower GCA can coordinate landings and takeoffs with clear weather speed and safety. Flights now take off and land on time.

Turn-backs and safety-climbs for departing aircraft in IFR weather, another cause of delay and expense, is unnecessary with GCA. Advised by radio of their relative position to other aircraft, departing planes immediately proceed "on course."

When a rogue aircraft threatens, GCA's high-powered

Search Scope immediately picks up its position and the tower brings the rogue under control. Thus GCA eliminates danger of collisions and the time-consuming cost of dispersing all other aircraft until the rogue is safely isolated.

In GCA's first winter (1947-1948) of operation at LaGuardia Airport in New York, the following improvements were noted: "During the winter period 1946-47, there were 3,877 scheduled flights cancelled or unable to land... 4,582 delayed... at LaGuardia due to traffic congestion. In the same period one year later (1947-48), there were NO cancellations caused by air traffic congestion... only 555 flights delayed."

"The average time per aircraft delayed at LaGuardia was reduced during the year from 33 minutes to 11 minutes. The airport capacity at LaGuardia was increased from 10 planes in and out per hour in 1947 to 30 per hour in 1948." (ATA)

True, GCA was not the *only* navigation aid at LaGuardia; but GCA was the *new* navigation aid added in 1948.

GCA's record proves its competence as a fail-safe, reliable navigation aid. It is the Airlines' answer to the costly effects of weather. By seeking an expanded use of GCA, U. S. Airlines can *save* the greater part of that \$40,000,000 every year. And they can sell more business than they can handle by consistently offering flights "always on schedule with safety."



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CLEVELAND, SEPTEMBER 3, 4, 5



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FOR THE AVIATION INDUSTRY

## THE AVIATION WEEK

### Outlook for Military Aviation — A Staff Report

WASHINGTON—

It is two years since the first warm glow of enthusiasm was generated over post-war air policy by the President's Air Policy Commission and the Joint Congressional Air Policy Board. Two years ago these two groups provided a chart for the post-war air world on which a sound course for American airpower was laid.

It is now time to look back over that chart and measure our progress against the course these groups so carefully mapped. The picture is not encouraging. Main concern of these policy groups was with military aviation—the new first line of American defense—and it is that picture that is now the darkest.

The yardstick established by these policy groups called for top priority in the National Defense Department for airpower with a backbone of 70 Regular Air Force combat groups backed by a smaller Naval carrier force and adequate Reserve and National Guard air groups. This force would require an annual aircraft production rate of about 63 million airframe pounds with about \$3.3 billion in new contract authority for aircraft procurement.

Thanks to strong bi-partisan backing in both House and Senate, a good start was made on this program by the 80th Congress with record peace-time appropriations for airpower for fiscal 1949.

The Air Force was able to begin the build-up to 70 groups and reached a strength of 59 groups by Jan. 1, 1949. Naval Aviation was able to continue its modernization program aimed at staffing existing carriers with jet fighters and longer-ranged attack planes.

However this program was carried out over the strong opposition of President Truman and the Bureau of the Budget.

That opposition did not diminish after the President's amazing political triumph last November. The 81st Congress was presented with a defense budget that split \$15 billion into three equal slices for Air Force, Army and Navy. This budget cut the Air Force back to 48 combat groups; eliminated Naval aircraft research funds; and cut military aircraft procurement back to \$2.3 billion and 34 million airframe pounds.

In addition the White House, represented by the Budget Bureau, has fought the 70-group Air Force authorization bill at every turn through its tortuous legislative path. When it was apparent that the bill's progress could not be stopped, Budget Bureau shifted tactics to emasculating the bill by eliminating its key provision on aircraft procurement and combat strength.

Thanks to Carl Vinson (D., Ga.), powerful chairman of the House Armed Services Committee, this attempt to crumble the foundations of American airpower has not gone unchallenged. Vinson led the House in open revolt against the President's airpower budget, adding \$800 million, largely for procurement, to bring procurement for fiscal 1950 up to \$2.9 billion and 55 million airframe pounds. This would give the Air Force 57 combat groups and begins to approach the \$3.3 billion and 63 million airframe pound standard set by the air policy studies as a minimum program for national security. The President's influence is apparently stronger in the Senate where it appears likely that a cut in the House airpower budget will be voted.

However, Vinson has not given up the fight. Repeatedly during the House Armed Services Committee investigation of the B-36,

Vinson has cheered the airpower advocates with his announced determination to "have another shot at that bill" and restore the \$800 million cut anticipated from the Senate. AVIATION WEEK has surveyed the key members of this crucial House committee and can report that Vinson's strategy to restore the cut is sound and has an excellent chance to succeed. If he is successful, not only the Air Force and aircraft industry will owe him and his aides a tremendous vote of thanks but also the people of the United States, whose security and future depend on how well our air policy is implemented.

But the fight will not be over with the fiscal 1950 budget. Already AVIATION WEEK has forecast further cutbacks in airpower slated for the fiscal 1951 budget now in preparation by the National Defense Department. This is the budget that will not officially see the light of day before Congress for another six months. It is apparent now that President Truman is still determined to cut back the Air Force to 48 groups and force another struggle on Capitol Hill to see that our first line of defense gets first priority in the defense budget.

After its strenuous efforts to state its case before the air policy groups of two years ago, the aircraft industry has relaxed, confident that its battle for airpower second to none was won. This is simply not true as the events of the past year clearly indicate. It is clearly evident that the industry must wake up to the fact that many of the key points advocated by the policy groups are still languishing for lack of proper support.

It is obvious that, despite volumes of eloquent testimony to the contrary by men speaking out of their bitter experience in the last war, the executive branch of this government is still not convinced of the acute need for giving airpower the top priority in the defense structure.

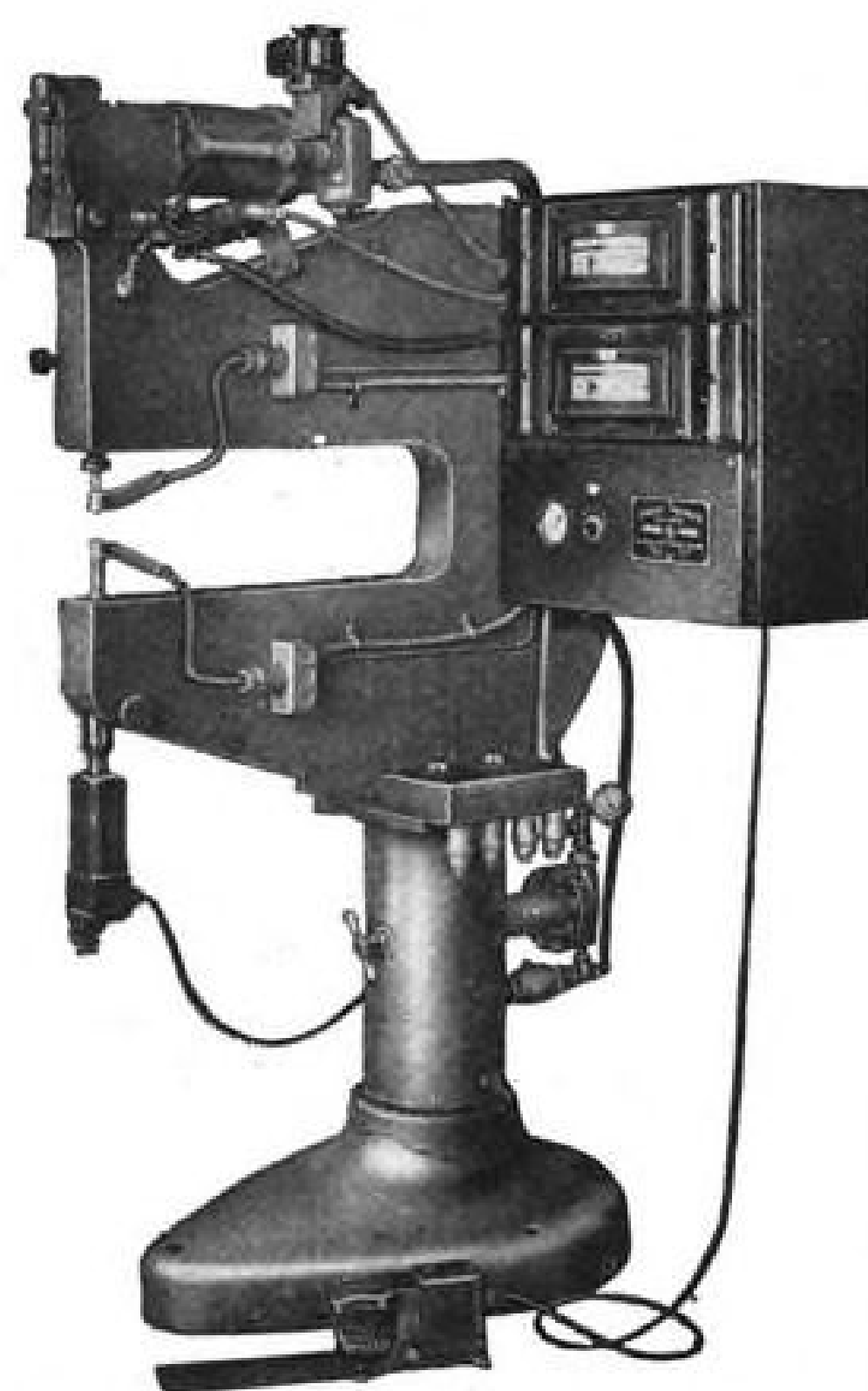
It is clear now that if an adequate Air Force is needed during the mid 1950's, it must be ordered now. It seems clear that a policy that boosts airpower appropriations every time the Russian pressure is applied and slashes them every time the Kremlin decides to relax will produce a demoralized and poorly trained Air Force and chaos in the aircraft industry upon which it is dependent for modern equipment.

It is clear to keen industry observers here that you cannot meet an emergency like the Berlin airlift with squadrons of transports on order and that you cannot meet an international crisis with inter-continental atom bombers that are on the drawing board instead of on the flight line manned by trained crews.

Unless the first line of defense is manned and ready, the second and third lines are useless. This is the lesson that the Truman administration and its false-economy minded experts have not yet learned.

Air Secretary Symington has aptly stated that airpower is everybody's business. Men wise in the ways of Washington warn that it is up to the aircraft industry to wake this country up to what is happening to our first line of defense. It must be made clear that it is not just the concern of an industry looking for government contracts, but the vital concern of every one of the 140 million Americans whose safety and future can be assured only under a cloud of air supremacy.





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## AVIATION CALENDAR

- Aug. 29-Sept. 1—Aeromedical Assn., annual meeting, Statler Hotel, N. Y.  
Sept. 1-7—International conference of Federation Aeronautique Internationale, Wade-Park Manor, Cleveland, Ohio.  
Sept. 3-5—1949 National Air Races, Cleveland, Ohio.  
Sept. 3-5—21st annual meeting, Early Birds, Cleveland.  
Sept. 6-8—Annual spark plug and ignition conference, sponsored by Champion Spark Plug Co., Hotel Secor, Toledo, Ohio.  
Sept. 7-11—10th Society of British Aircraft Constructors flying display and exhibition, Farnborough Airfield, Hampshire, England.  
Sept. 9-12—Clinic on maintenance of industrial instruments, Instrument Society of America, Statler Hotel, St. Louis.  
Sept. 11—Dedication, Quincy, Ill., municipal airport.  
Sept. 12-16—13th anniversary meeting, International Air Transport Assn. The Hague, Holland.  
Sept. 12-16—Fourth national instrument conference and exhibit, sponsored by The Instrument Society of America, Kiel Auditorium, St. Louis.  
Sept. 14-15—82nd eastern division meeting of NASC, New York City.  
Sept. 17-18—Aircraft Owners and Pilots Assn. annual summer round-up flight and tenth anniversary celebration, Rehoboth Beach, Del.  
Sept. 18-20—International Northwest Aviation Council convention, Spokane, Wash.  
Sept. 22-23—ARC-CAA-CAB transport meeting on CAR 4b policies and interpretations, Hotel Statler, Washington, D. C.  
Sept. 26-28—National Electronics Conference, Edgewater Beach Hotel, Chicago.  
Sept. 27-30—1949 fall meeting, American Society of Mechanical Engineers, Hotel Lawrence, Erie, Pa.  
Oct. 3-8—Twentieth anniversary meeting, Ninety-Nines, Waldorf-Astoria, New York.  
Oct. 5-8—SAE national aeronautic meeting and aircraft engineering display, Biltmore Hotel, Los Angeles.  
Oct. 7-8—American Air Mail Society, exhibition and convention, Edgewater Beach Hotel, Chicago.  
Oct. 12-15—Air Reserve Assn. convention Long Beach, Calif.  
Oct. 13-15—1949 conference on airport management and operations, sponsored by University of Oklahoma and Southern Flight magazine, Norman, Okla.  
Oct. 17—36th NASC steering committee meeting, Dayton, O.  
Oct. 18-19—6th NAS council meeting, Wright-Patterson AFB, Dayton, O.  
Oct. 30—Third annual San Francisco Air Fair, sponsored by Junior Chamber of Commerce, San Francisco Airport.

## PICTURE CREDITS

12—Los Angeles Times; 13—NAA (top left), Wide World (top center, lower left), Boeing (lower right); 18, 19, 20—McGraw-Hill World News; 21—Radio Frequency Laboratories, Inc.; 31—British Combine (top), McGraw-Hill World News.

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## NEWS DIGEST

### DOMESTIC

Helicopters, Inc., Stratford, Conn., will sell at auction to the highest bidder, its five-place Model J co-axial experimental helicopter, along with additional units and parts, and designs, engineering plans, data and patent rights. Company cites as reason for sale a lack of sufficient working capital to carry the development through CAA commercial license state.

Southwest Airways aircraft have been approved by CAA for landings at Arcata, Calif., with 100-ft. ceilings. Previously, the lowest allowable ceiling had been 200 ft. New ceiling is based on the effective fog penetration power of high intensity landing lights at Arcata.

Personal aircraft exports of four-placers and under for July totaled 31, valued at \$102,108, according to the Aircraft Industries Assn. Totals, from 10 reporting companies, compare with 47 planes valued at \$187,075 for the previous month.

John A. (Al) Williams, 53, wartime military contracts chief for Curtiss-Wright at Buffalo, was found dead near his summer home in Elma, N. Y. He had recently been associated with Frederic Flader, Inc., but left that firm a few months ago.

Southern Airways, Birmingham, Ala., has received CAB approval for a \$120,000 loan application pending before the Reconstruction Finance Corp.

Helicopter mail service in the Chicago area has been inaugurated by Helicopter Air Service, Inc., which will shuttle air mail from the airport to the main post office and deliver air mail to more than 40 Chicago suburbs.

North American Aviation, Inc., has received an order for 27 remanufactured T-6 Texan trainers from the Chilean Air Force. The planes will be produced at NAA's Downey, Calif., plant. Contract also provides for kits to modernize T-6s now used by Chilean aviation cadets.

CAB has denied authorization to Resort Airlines and American Air Export and Import Co. (AAXICO) to conduct all-expense escorted tours between various cities and resort areas in the U. S. CAB said that while facilities for escorted tours serve a useful public service, "it has not been satisfactorily demonstrated that such purpose cannot be met by the presently certificated carriers and routes."

Air Force has abolished the Directorate of Training and Requirements in the office of the Deputy Chief of Staff. Operations, and reestablished both the training division and the requirements division on directorate levels.

Late entry of Betty Skelton, National Women's Acrobatic Flying Champion, in the Women's AT-6 Race at the Cleveland National Air Races Labor Day weekend brought the entry-list up to six and insured that the race would be held.

### FINANCIAL

Curtiss-Wright reported a consolidated net loss of \$1,149,445 for the three months ended June 30, 1949, with consolidated net sales for the quarter totaling \$32,394,841. For six months ended June 30, 1949, consolidated net loss was \$1,909,309, and sales were \$59,908,638. Unfilled orders on hand amounts to \$137.5 million as of June 30, 1949, compared with \$146 million at March 31, 1949.

Bendix Aviation Corp. said its strike at South Bend, Ind., was chiefly responsible for the loss of \$176,269 reported for the quarter ended June 30. For the nine months ending June 30, consolidated net income amounted to \$4,967,129.

United Aircraft Corp. reported a net income for six months ended June 30 of \$3,595,421, after taxes, compared with a net of \$5,743,731 for first six months of 1948. Earnings for first quarter 1949 were \$1,206,831, and \$2,388,590 for the second quarter. Total shipments for first six months of 1949 amounted to \$106,423,344, compared to \$109,449,644 for same period 1948.

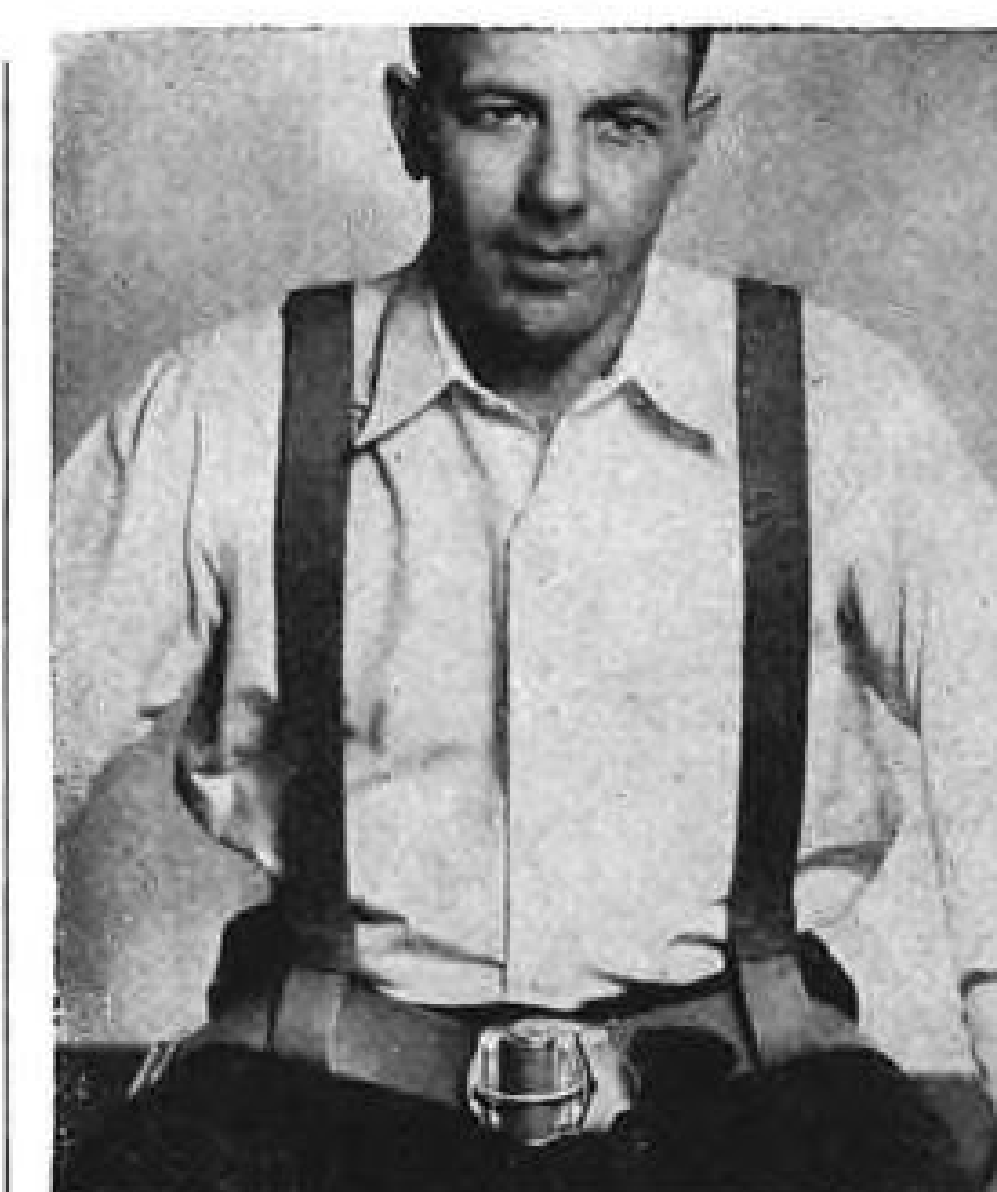
Stewart Warner Corp. sales for the first six months of 1949 were \$27,875,957, compared with \$37,869,584 for the same period in 1948. Net profit for first six months of 1949 was \$796,564.

### INTERNATIONAL

British European Airways C-47, enroute to Manchester, England, from Belfast, Ireland, crashed 10 ft. from the top of a 1300-ft. mountainside, killing 24 of its 32 occupants. The crash occurred 13 miles northeast of Manchester, while the plane was making an instrument approach in a heavy mist.

Chilean National Airlines has announced the purchase of six de Havilland Dove airliners for inland routes. The aircraft are expected to be shipped in September.

Karachi Airport in Pakistan has been fitted with a new approach and runway light system, first of its kind at an Asian airport. General Electric handled the \$180,000 contract which consisted of 18 low-intensity red approach lights, 36 high-intensity white approach lights, six sodium crossbar lights, 96 high-intensity contact lights, runway threshold lights and taxi track lights.



## RUSCO for Safety Belts

Here is another example of Rusco Research, a shoulder strap for every Rusco Safety Belt.

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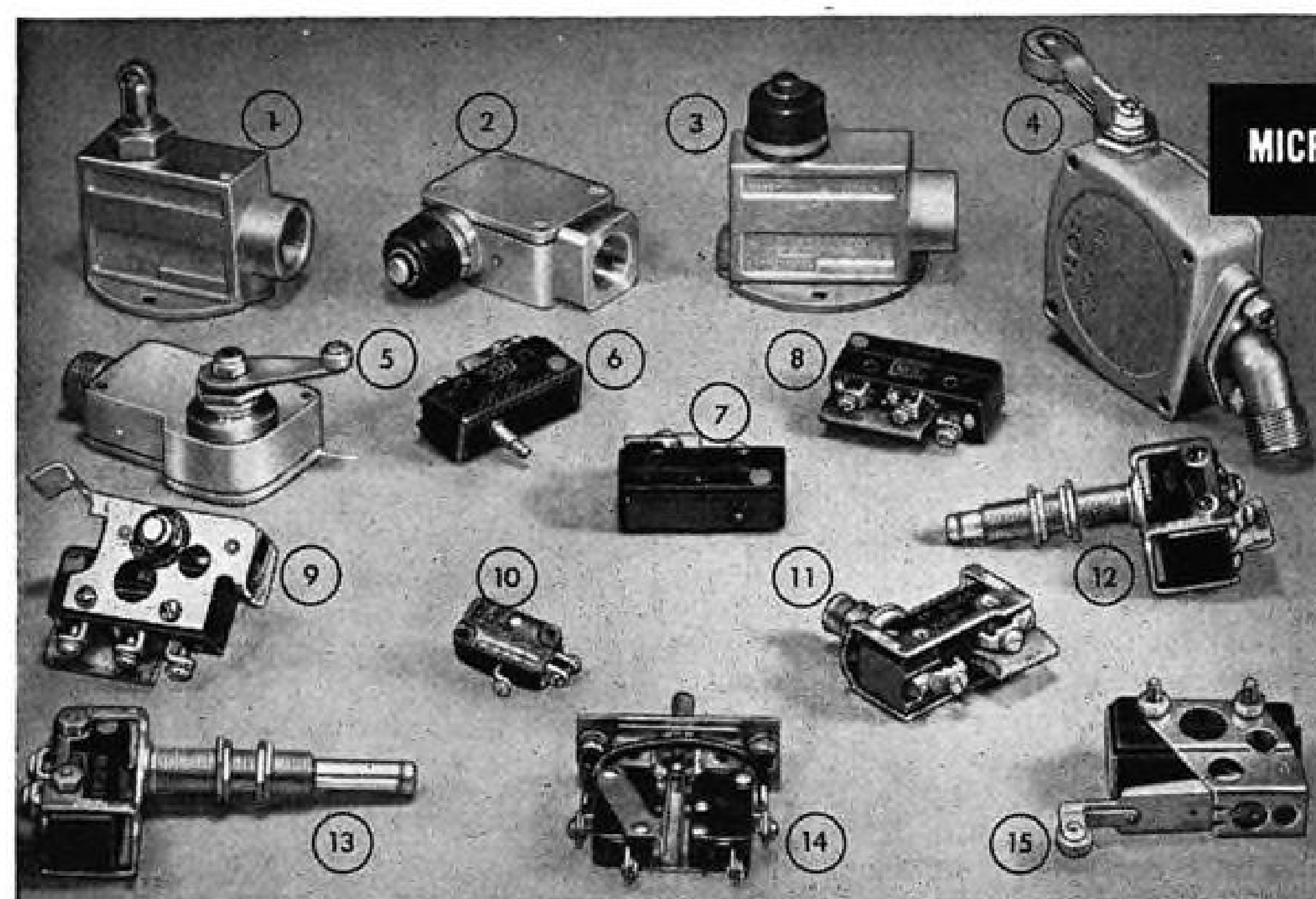
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Conforms to **AN3170-1**. Designed for use with basic switch (MICRO BZ-R31) which conforms to **AN3210-1**.

- 10** Small, high capacity switch (MICRO V3-1). Conforms to **AN3234-1**.

- 11** Actuator bracket (MICRO MB2731A). Conforms to **AN3166-1**. Designed for use with basic switch (MICRO BZ-R31) which conforms to **AN3210-1**.

- 12** Actuator bracket (MICRO MC2711B). Designed to conform to **AN3168-1**. For use with basic switch (MICRO BZ-R31) which conforms to **AN3210-1**.

- 13** Actuator bracket (MICRO MC7711). Conforms to **AN3167-1**. For use with basic switch (MICRO BZ-R31) which conforms to **AN3210-1**.

- 14** Manually operated momentary-contact, three-position switch with toggle-type actuator (MICRO 1AT1). Designed to conform to **AN3235-1**. Unit contains two switches.

- 15** Roller lever actuator bracket (MICRO AD5721R). Conforms to **AN3169-1**. For use with basic switch (MICRO BZ-R31) which conforms to **AN3210-1**.

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## WHO'S WHERE

### Wilson Resigns from AIA

Public controversy between the Air Force and Navy likely will get a new and well-informed voice this fall with publication of the autobiography of Eugene E. Wilson, who has resigned as chairman of the board of governors of the Aircraft Industries Assn. in order to be free to express his own ideas on "current aviation controversies."

Wilson, former Naval officer and onetime president of United Aircraft Corp., served as AIA's chairman since 1943. He points out that the "armed forces have been torn by bitter jurisdictional disputes" while the association he headed had to remain neutral as both sides were customers of the manufacturers.

Wilson resigned because his book, "Slipstream," "might not please all elements of the aeronautic establishment."

Wilson long has been one of the industry's prominent spokesmen and in his letter of resignation expressed the belief "that the best interests of the association membership will be served by my resignation." No action has been taken on his successor, who probably will be elected at the next AIA board meeting in December.

### In the Front Office

In one of a number of important aviation executive changes, Charles L. Gallo has been elected president of Air Express International. He was formerly vp-traffic of TACA and general sales manager of TWA.

J. Kenneth Hull is the new president of Lockheed Aircraft Service, Inc., succeeding Cyril Chappellet, who continues as chairman of the board. Hull's old post of vice president and general manager has been discontinued. Marc Worst, LAS vp-operations, was elected to the board.

Thomas B. Moule has been made vice president in charge of domestic sales for Plomb Tool Co., Los Angeles. He's been with Plomb since 1944, most recently as sales manager.

Victor E. Bertrandias has resigned as vice president and director of foreign sales of Douglas Aircraft Co. A longtime executive at Douglas, Bertrandias resigned as a vice president once before, to serve with the Air Forces in World War II. He came out of the war a major general.

I. M. Laddon, former vp-engineering at Convair, has been elected to the board of Menasco Mfg. Co., along with Charles T. Leigh, another retired Convair vp. Laddon still is a director of Convair, and Leigh serves in the same capacity for Solar Aircraft. Kenneth P. Bowen has been named assistant vice president of Northrop Aircraft, Inc. Working in the office of B. G. Reed, vp-production, he will assist in planning and supervising production of the F-89 Scorpion and C-125 Raider. Lycoming's general manager, S. B. Withington, has been elected a vice president of AVCO Mfg. Corp., the parent concern of the engine-building division which now is known as the Lycoming-Spencer division.

## INDUSTRY OBSERVER

(This week's column is devoted to the observations of an AVIATION WEEK editor who traveled with the House Armed Services Subcommittee during its trip to the West Coast to take testimony on the B-36 investigation.)

► Donald Douglas, president of Douglas Aircraft Co. can be credited with a large assist if the House Armed Services Committee makes some constructive recommendations for congressional action to smooth out the operations of the aircraft industry. Washington rumors had labeled Douglas as one of the disgruntled manufacturers chafing under USAF procurement policies. Committee Counsel Joseph B. Keenan had a long private session with Douglas in Santa Monica seeking to determine the nature of Douglas' supposed gripes. Douglas convinced Keenan that the B-36 program had little to do with the very real long range problems facing the aircraft industry and did a masterful job in outlining those problems. Keenan and committee members now feel that one of the constructive jobs the Armed Services Committee can do as a result of the B-36 investigation is to recommend some congressional action to insure a stable, technically superior and sufficiently large aircraft industry operated by private companies.

► Northrop Aircraft, Inc., hopes to produce an intercontinental bomber version of the Flying Wing. J. K. Northrop told the House investigators that the present airframe of the B-49 jet Flying Wing mated to the Northrop turboprop (turboprop engine) is expected to produce a 10,000-mi. bomber capable of carrying 10,000 lb. bomb load. Northrop did not specifically state that this version of the Flying Wing would be faster than the B-36D with jet pods, but implied that he expected it to outspeed the latest in B-36 development. Experimental prototype of the turboprop engine has been completed. Final version of this turboprop is expected to produce about 10,000 hp.

► Charles A. Lindbergh, consultant for United Aircraft Corp. and USAF, was credited by retired USAF commander Gen. H. H. (Hap) Arnold with instigating the 1939 Army Air Corps modification program aimed at making U. S. aircraft combat-worthy.

► Arnold told AVIATION WEEK in San Francisco recently that this program was begun in 1939 shortly after Lindbergh had furnished the Air Corps with its first extensive data on the combat capabilities of European aircraft. The aircraft modification program, which grew to tremendous proportions during the war, was begun along the lines suggested by Lindbergh's data which indicated European superiority, particularly in fighter planes.

► Gen. Arnold added an interesting footnote to aviation history with his description of the first and only time he over-ruled Air Materiel Command's recommendations on aircraft procurement. Arnold told the Armed Services Subcommittee in San Francisco that while he and Gen. Carl A. Spaatz were visiting the North American plant at Inglewood, Calif., in 1941 they saw a production line of NA-72 fighters being built for the British who called them Apaches.

► Spaatz who was then preparing to organize the 8th Air Force in England, told Arnold: "That's the plane I want." AMC had turned the plane down. Arnold told Spaatz: "If that's what you really want you'll get it." He over-ruled AMC and ordered North American to produce an American version of the Apache which became the Mustang (P-51) generally conceded to be the best all-around fighter of World War II. Arnold told the subcommittee: "I was never sorry for that decision."





JOHN K. NORTHROP (lower right) talks of mergers at LA hearing held by Reps. Walsh, Rivers, Price, Anderson, Johnson and Norblad.

## Industry Leaders Tell Merger Plan Details

**Symington not mentioned in negotiations,  
West Coast officials inform B-36 probers.**

By Robert Hotz

LOS ANGELES—Testimony by six top West Coast aircraft industry executives flatly contradicted "ugly rumors," aired in Congress by Rep. James Van Zandt (R., Pa.) regarding alleged plans of Air Secretary W. Stuart Symington to head a gigantic aircraft combine supposed to be created through politically-pressured mergers.

The executives testified in the California State Building before a subcommittee of the House Armed Services Committee headed by Rep. Melvin Price (D., Ill.) and were cross-examined by the committee's special counsel Joseph Keenan.

The House subcommittee is investigating charges of irregularity in U. S. Air Force procurement of the Convair B-36 intercontinental bomber contained in a nine page anonymous letter circulated in Congress and a speech made by Van Zandt on the House floor last May 27.

Aircraft leaders who testified at the hearing were:

- William M. Allen, president of Boeing Airplane Co.
- Donald Douglas, president and chairman of the board of Douglas Aircraft Co.
- Oliver P. Echols, chairman of the

board of Northrop Aviation Inc.

- Robert Gross, president of Lockheed Aircraft Corp.
- J. H. (Dutch) Kindelberger, president of North American Aviation, Inc.
- J. K. Northrop, president of Northrop Aviation Inc.

They agreed on four key issues raised by the subcommittee.

- Symington was never mentioned in all of the numerous post-war aircraft merger discussions as a possibility to head any of the proposed merger combines.
- The proposed mergers were strictly business deals in which neither Symington nor the Air Force figured in the negotiations.
- Technical competition makes the ups and downs of individual aircraft com-

### Letter Writer Revealed

Cedric Worth, special assistant to Navy undersecretary Dan A. Kimball, last week admitted that he was the author of the "anonymous letter" which led to the B-36 investigation.

Worth, called to testify before the committee by Chairman Carl Vinson (D., Ga.), said he gave one copy of the "memorandum" to Rep. C. B. Deane (D., N. C.) and another copy to Glenn L. Martin, Baltimore aircraft manufacturer. Martin was one of his sources of information for the memorandum, he testified. Martin, he said, passed on his copy of the memorandum to Sen. Millard Tydings (D., Md.), chairman of the Senate Armed Services Committee.

Some information used in preparation of the document, Worth said, came from two Navy officers, Lieut. Ingram of the Office of Naval Operations and Cmdr. Tom Davies, pilot of the truculent Turtle (P2V) on its 11,239-mi. record flight from Australia to Ohio.

The anonymous document was also delivered to Rep. James Van Zandt (R., Pa.) by Worth during a conference in the Capitol rotunda. Worth testified that he had told Dan Kimball, Navy undersecretary, about five days before testifying that he had written the anonymous document. Worth also said he had talked with Harold Mosier about the document. Mosier is the Washington representative of the Glenn L. Martin Co. Worth said Glenn L. Martin had personally requested a copy of the anonymous memo.



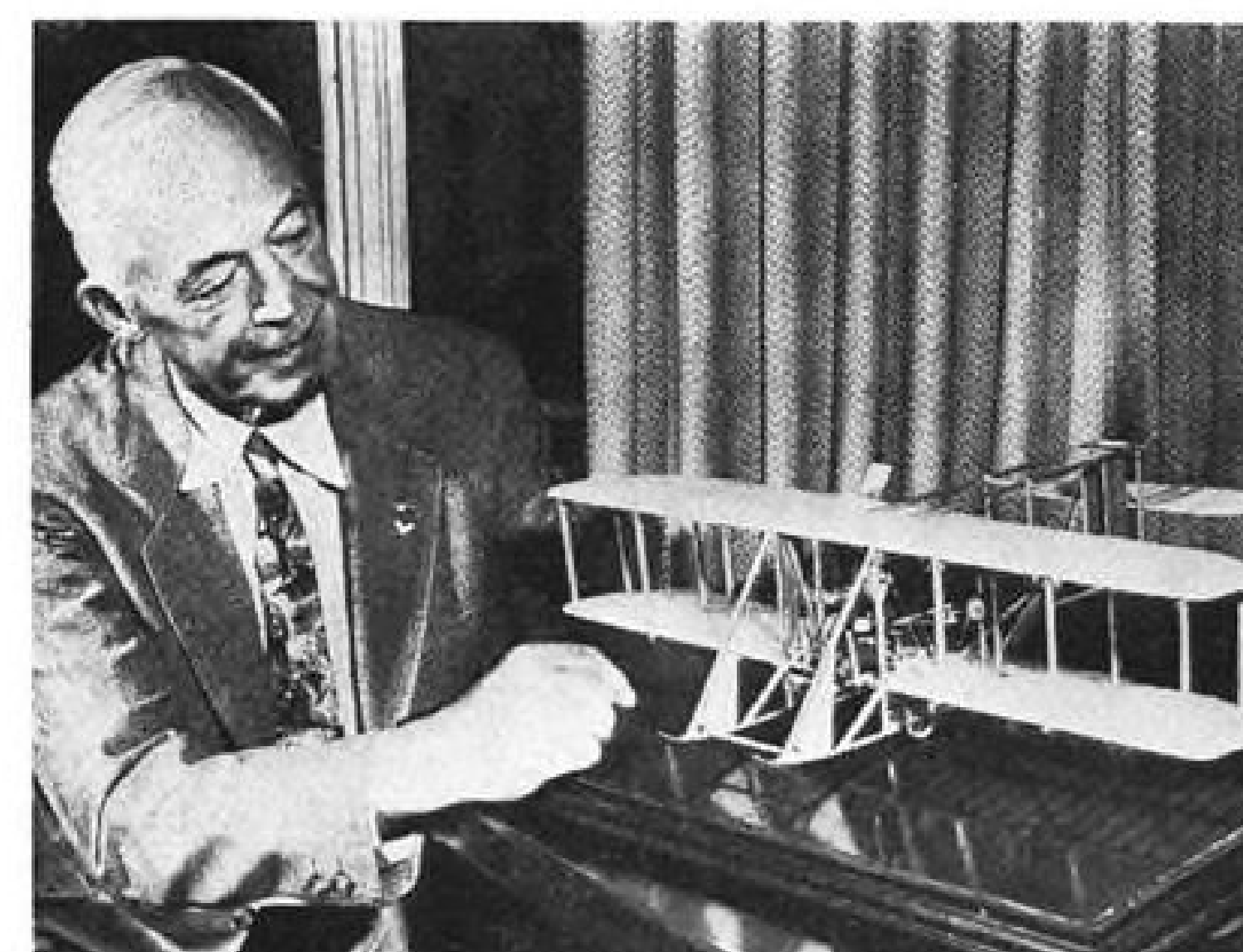
KINDELBERGER wouldn't merge . . .



DOUGLAS wasn't asked to, and . . .



GROSS would never buy only 20 percent.



HAP ARNOLD: Country should point with pride to the B-36.



ALLEN: Boeing had no surplus of top management personnel.

panies extremely sharp but overall USAF procurement policies are generally fair and there is no evidence of political influence or favoritism in major airframe and engine contract awards.

• **Strong endorsement of the integrity** of the USAF High Command with particular emphasis on the unshakable independence of Gen. George Churchill Kenney.

► **Wolfe Testimony**—The group also heard from Col. Frank C. Wolfe, retired Wright Field armament laboratory chief, and brother of Air Materiel Command's procurement chief Maj. Gen. K. B. Wolfe. The anonymous letter charged that Col. Wolfe had renegotiated a contract with Emerson Electric Co. on defective aircraft gun turrets that has saved a \$20 million loss for the company. Symington was formerly president of Emerson before entering government service in 1945.

Col. Wolfe testified that he had been paid between \$15,000 and \$20,000 by Emerson Electric Co. during

1944 and 1945 as an armament consultant after his retirement from the Air Force in Nov. 1944 for physical disability caused by heart disease. He said he had arranged his employment by Emerson with Symington, then firm president and three other Emerson officials. Wolfe said he had similar arrangements with other wartime aircraft armament manufacturers and that all these consulting deals, including Emerson Electric, were concluded at the end of the war.

► **No Renegotiations**—He testified that he had never done any contract renegotiation for the Air Force, and the AF obviously had not renegotiated Emerson Electric Co. wartime contract. Wolfe said he now had his own firm in Los Angeles that did sub-contracting and consulting work for major airframe manufacturers specializing in gas tank sealing compounds and landing gear components.

The anonymous letter also charged that Wolfe was living in a house at

146 S. McCarty Dr. in Beverly Hills that was a bargain at \$85,000. Wolfe said he paid \$50 a month ceiling rent for a six-room apartment at that address and had briefly owned the building in a swap with a retired Navy captain friend for a \$35,000 ranch Wolfe owns near San Diego. Wolfe said the temporary swap was arranged to provide him with a place to live in Los Angeles. He said he bought the San Diego Ranch land for \$2800 and has put in about \$35,000 in improvements including an unfinished home.

► **Hear Arnold**—After hearing Gen. H. H. Arnold, retired USAF commander in San Francisco, the committee resumed hearings in Washington early last week quizzing individual members of the USAF Senior Officers Board—Gen. Muir Fairchild, Gen. Joseph T. McNarney, Lieut. Gen. Lauris Norstad, and Lieut. Gen. H. A. (Pinky) Craig. Individual committee members indicated they no longer had any doubt of the falsity of the charges against



Symington and USAF procurement policies.

Present committee plans indicate it will follow the advice given by Gen. Arnold and refrain from trying to evaluate the roles of the Army, Air Force and Navy in the national defense structure. Arnold warned them to leave these matters to the Joint Chiefs of Staff since Congress would have to devote 365 days a year to defense matters if it took over JCS functions. This will permit the investigation to wind up with the identification of the anonymous letter writers.

► **Partners Wanted**—West Coast manufacturers testifying on proposed aircraft company mergers painted a post-war picture in which Curtiss-Wright and Convair were constantly trying to find a willing partner with which to combine. Six principal merger negotiations were outlined. They were:

• **North American-Convair.** North American president Kindelberger told the subcommittee that he had been approached by Floyd Odium in March, 1948, regarding a possible merger with Convair.

"My answer was no," Kindelberger told the subcommittee. "There was no further discussion. Symington was not mentioned. I was given to understand I would head the merged firms."

• **Northrop-Convair.** Oliver P. Echols, retired USAF major general who now heads the Northrop board, testified his first intimation of the proposed Northrop-Convair merger came from Symington in August, 1948. Echols said he told Symington and USAF undersecretary Arthur Barrows that he was considering an offer from Northrop. Symington asked if Echols had talked to Odium and suggested that since he hadn't, it "might be interesting."

Echols then had a three-hour talk with Odium regarding the proposed merger. Odium said he had made Northrop a merger offer because of the B-49 jet Flying Wing production program then scheduled for the government-owned plant operated by Convair at Ft. Worth.

"Odium said he thought it was better not to have two companies in one plant and that it was better to merge," Echols testified.

► **Talk It Over**—Odium recommended that Echols talk the merger over with John Northrop if he were seriously considering going with Northrop's firm and indicated Echols would head the Northrop-Convair combine. Echols said he was in no position to offer advice then since at that time he had no money in either firm. He said he preferred that the decision be reached without him.

Shortly thereafter the Northrop board of directors voted against the merger. Much later (April, 1949) the

B-49 production contract was cancelled and, according to Echols, the prime reason for the merger ceased to exist.

► **McNarney Letter**—J. K. Northrop testified that the sub-contracting of B-49 production was first broached to him in June 1948, in a letter from AMC head, Gen. McNarney who pointed out that the Northrop Hawthorne, Calif., plant was not adequate to produce the quantities of jet Flying Wings then contemplated for the future (about 230 a year). McNarney wrote that USAF wished to consider methods by which the government-owned Convair plant at Ft. Worth could be used.

Northrop said that he had planned to build three B-49s per month at Hawthorne, and when USAF indicated it might want to turn out 15 per month it was obvious that other plant facilities would be needed.

► **Meeting Held**—AMC indicated it was up to Northrop and Convair to work out a method for producing B-49s at Ft. Worth and suggested a joint meeting for that purpose. This meeting was held in Los Angeles July 16, 1948, with Odium; John Northrop; LaMotte T. Cohu, Convair president; Claude Monson, Northrop general manager; Richard Millar, Northrop board chairman; Symington; and Gens. McNarney and K. B. Wolfe present.

Agreement was reached that the best solution would be for Northrop to sub-contract part of B-49 production to Convair at Ft. Worth. John Northrop said it was not an ideal solution from his point of view but "the best under the circumstances," and not unreasonable. Convair and Northrop negotiated profit distribution on the B-49 without USAF representatives. Plan was to build the first two of the original order of 30 RB-49s at Hawthorne and the other 28 at Ft. Worth.

► **Some Pressure**—"No company gladly gives up the manufacture of its own product," John Northrop told the subcommittee. "But it was a logical solution to a difficult problem. Obviously there was some pressure on Northrop but it was not in any sense improper."

John Northrop testified that he and Odium were still good friends and that Odium had assisted in financing Northrop Aviation Inc. when it was organized 10 years ago but later withdrew his capital. He said Symington was never mentioned as the head of the Northrop-Convair combine.

• **Boeing-Curtiss-Wright.** Boeing president Allen testified that he was approached in Nov. 1948 regarding a proposed merger of Boeing and Curtiss-Wright Corp. Guy Vaughn, then C-W board chairman phoned Allen in Seattle and asked him if he would see Paul Shields, a C-W director and New York financier. Allen said Shields came to Seattle and they discussed the possi-

bility of a Curtiss-Boeing merger.

"I told Shields I didn't look on the proposal favorably," Allen told the subcommittee. "Shields said it was Curtiss-Wright's desire to secure some top management personnel. I told him there was no surplus of top management at Boeing and I did not favor absentee management. I also questioned the advisability of combining an airframe firm with one whose primary product was engines."

► **Allen to Head**—Allen said Shields indicated that he (Allen) would head the proposed combine and that Symington was never discussed for any post with either firm. Allen said he suggested Shields talk to Douglas or Kindelberger if he was interested in combining with another airframe manufacturer. Nothing came of the Shields-Allen talk.

• **Lockheed-Curtiss-Wright.** Robert E. Gross, president of Lockheed Aircraft Corp., testified that he was approached by Guy Vaughn, president of Curtiss-Wright Corp., shortly after the end of the war in 1945 relative to a merger of the two firms.

Gross said he investigated the possibilities but rejected the proposal largely because of the complicated capital structure of Curtiss-Wright, particularly the profits and rights of the Class A stock in liquidation and sale. Shields took part in these negotiations.

Gross said he concluded the merger was unfeasible and took the initiative in withdrawing from it. He said Symington was never mentioned for a post in the merged group. Gross said it was understood that he would head the combine.

• **Lockheed-Convair.** Gross also described in detail the series of negotiations between Lockheed and two different owners of Convair regarding merger.

First overtures were made in the spring of 1946 by the Aviation Corp. headed by Victor Emanuel. AVCO owned about 20 percent of Convair's stock and had working control of the corporation. AVCO approached Gross with a proposition that Lockheed take over its interest in Convair. Gross said he made a detailed exploration of this possibility with Emanuel, Irving Babcock, AVCO president; and John Hertz, an AVCO director. Odium did not figure in these discussions and Gross did not know him at that time.

► **Merger Abandoned**—During the summer of 1946 the merger was proceeding favorably when it was suddenly abandoned. This was due to three factors, according to Gross:

• **Preliminary information** that the U. S. Attorney General would not view the merger favorably from an anti-trust viewpoint.

• **Both company's securities** were fluctuating in an "unsympathetic" manner

making the merger financially unfeasible.

• **Convair had grave doubts** as to the eventual survival of Lockheed because of the grounding of all Constellation transports by the CAB.

► **Purely Business**—Gross said the proposed merger was a purely business deal and had nothing to do with politics. When the business angles became unfavorable the merger was abandoned.

In Sept. 1948 (about three months after USAF had decided to continue the B-36 production program) Odium approached Gross with an offer to sell his stock in Convair, the Lockheed president related.

## Congressional Roundup

# 70-Group Plan Nearer Approval

Senate, House committees press action on important military aviation measures; civil bill passes.

Some key aviation measures are progressing rapidly through Congress toward becoming law. These include:

► **70-Group USAF Authorization**—Legislation setting an authorized strength for the Air Force of 502,000 personnel and 24,000 aircraft (or 225,000 airframe tons), necessary to sustain a 70-group program, has been approved by the Senate Armed Services Committee, where it was stalled for several months after passing the House. The Senate committee made four changes in the House-approved bill:

• **It endorsed the 70-group program**, but deleted language specifying a strength of "70 . . . groups and 22 separate . . . squadrons, supplemented by 61 . . . reserve groups." Senate committee said there should be no fixed ceiling on USAF.

• **It struck out a provision** authorizing the purchase of 5200 new planes annually, explaining that procurement should be determined on a year-to-year basis by the congressional appropriations committees. The House bill would permit procurement funds to remain available for obligation over the four years succeeding the year for which they were appropriated. (Funds for research and development, technical equipment, and public works would remain available until expended.)

• **Reduced authorized regular commissioned officers** from 27,500 to 22,400.

• **Barred the Air Force's using funds** for prototype aircraft primarily designed for commercial use.

► **Wind-Tunnel Program**—Legislation authorizing \$311 million to implement the \$1,100-million wind-tunnel program blue-printed in the so-called Unitary Plan of the Department of De-

► **Odium Offer**—Gross said he did not pursue these discussions because he would never buy "only 20 percent of anything" and did not consider that Odium's Atlas Corp. had adequate control of Convair. Gross said the proposition was that Odium and Atlas Corp. wanted to get out of Convair and that Gross would take over their interest and control of Convair. Again Symington was not mentioned in the discussions.

Gross testified he owned 30,000 shares of Lockheed stock; 25,000 shares of Menasco Mfg. Co. stock; and once had owned 100 shares of Convair stock which he later sold.

► **No Douglas Merger**—Donald Douglas testified he had never been approached by anybody regarding a merger with Douglas Aircraft Co. But that he had heard rumors of the various post-war merger discussions in the industry.

Gen. H. H. Arnold told the subcommittee that he had personally congratulated Symington when he learned of the USAF decision to go ahead with the B-36 production program.

► **Fine Plane**—"The B-36 is a fine airplane and the country should be proud of it," he said. "No other country in the world has a bomber that can compare with it in range, bomb load and speed."

• **Lake Denmark, N. J., aeronautical rocket laboratory**, \$7 million.

► **Guided Missile Test Range**—House Appropriations Committee has approved \$5 million to start construction on a 3000-mi.-range guided missile testing center, based at Cape Canaveral, Fla., and extending into the Atlantic, with control facilities in the Bahamas. The committee has also authorized the Secretary of Defense to transfer (from whatever funds might be available) \$5 million additional for the project and \$2.5 million to sustain the Boeing surface-to-air (GAPA) missile project. The limited area at White Sands, N. Mex., is inadequate for long-range missiles which will be ready for testing by the end of the year, according to USAF. Total cost of the Florida center, originally estimated at \$75 million, is now set at \$55 million.

► **Air Star Routes**—Congress has approved and sent to the White House, legislation authorizing the Post Office Department to contract for air star route services by competitive bidding.

The department plans to inaugurate services (for transport of all classes of mail) in the Puget Sound and Great Lakes regions and certain mountainous areas unsuited to surface transportation over the next year. Under the legislation, air star routes paralleling certificated airline routes are barred. CAB is given 30 days to consider proposed routes, and authority to veto them.

► **Pay Boosts for Aviation Officials**—Legislation passed by the House and approved by the Senate Committee on Post Office and Civil Service would boost the annual salaries of top government aviation officials, as follows: Secretary for Air, from \$15,000 to \$25,000; Under Secretary for Air, from \$10,000 to \$20,000; Assistant Secretary for Air, \$10,000 to \$15,000; CAB Chairman, \$12,000 to \$16,000; CAB members, \$11,500 to \$16,000; Director, NACA, \$10,330 to \$16,000. The Senate committee disapproved raising the Civil Aeronautics Administrator's salary from \$12,000 to \$15,000 as recommended by the House.



## Closed-Course Jet Race at Cleveland

Closed-course jet racing in the United States will be revived by U.S. Air Force pilots flying North American Sabre (F-86) sweptwing fighters at the 1949 National Air Races to be held in Cleveland, Sept. 3-5.

A quartet of Sabres will compete in the jet division of the Thompson Trophy Race sponsored by Thompson Products Corp. of Cleveland. The F-86A currently holds the world speed record at 670 mph. Last closed-course U.S. jet race was in the 1947 Jet Thompson when six USAF pilots flying Lockheed Shooting Stars (F-80) put on a hair-raising performance that caused structural damage to the planes from excessive forces building up around the pylon turns.

► **New Course**—The Thompson Trophy course has been modified from four to seven pylons to decrease the steepness of the turns required. Laps will remain at 15 miles with the total race cut from 300 to 225 miles. The British have been racing their latest jet fighters and experimental planes around a 20-mile course at their national air races. The 1949 event was won by the Hawker P-1040 hitting 562 mph. on one lap.

Other USAF jet racing will include:

- **Republic Thunderjets (F-84)** in the jet division of the Bendix Cross-Country Race from Muroc AFB to Cleveland, sponsored by Bendix Aviation Corp.
- **Lockheed Shooting Stars (F-80C)** in the Allison jet dash between Cleveland and Indianapolis, sponsored by Allison division of General Motors Corp.

Navy jet racing will include:

- **McDonnell Banshees (F-2H-2)** in a race from a Navy carrier at sea off New York to Cleveland, sponsored by the American Steel & Wire Corp. of Cleveland.
- **Grumman Panthers (F9F)** and Banshees in a rate-of-climb race sponsored by Westinghouse Electric Corp.

An international flavor will be added to the piston division of both the Thompson and Bendix races by a British Spitfire Mark 14 to be flown in the Thompson by an RCAF pilot and a de Havilland Mosquito to be flown by a British airline pilot in the Bendix.

► **Corsairs Back**—Most of the old favorites are entered in the 1949 Thompson including Anson Johnson, 1948 winner with an F-51; Cook Cleland and Richard Becker who finished one-two in 1947 with Goodyear F2G Corsairs; Ron Puckett, former Navy pilot, who also has an F2G; Charles Tucker, Northrop test pilot, with his clip-wing P-63; Jimmy Harp, NACA jet technician, with a special F-39; and a spe-

## Odom to Race

New favorite entry in the Bendix Race from Rosamond Dry Lake, Calif., to Cleveland, Sept. 3, is William Odom, round-the-world flyer, sponsored by Jacqueline Cochran, pre-war Bendix Race winner. Odom's last-minute entry is the more formidable in that he will fly the widely-publicized "Be-guine" P-51 modified by J. D. Reed, of Houston, with wing-tip radiators, and purchased by Miss Cochran from Reed for Odom to fly. The Beguine has been described by Reed as the fastest piston-engine plane in the world.

cial F-51 modified by J. D. Reed of Houston, Tex., at a reputed cost of \$100,000.

The Bendix piston division will feature a race-horse start from Rosemont Lake in California that will provide a more interesting finish at Cleveland where the first plane over the line will be the winner.

► **Goodyear Change**—Goodyear Trophy course has been shortened from two miles to a mile and three-quarters with six pylons instead of four. Extra pylon will be located midway on the short sides of the course to provide better guidance on the turns. Straightaway will be 3320 ft. with 650 ft. between the pylons at each end.

## Frye Sues Northrop, Claims Raider Idea

Public controversy over conception of the Northrop Raider was brought to light in the \$265,000 suit being pressed by Jack Frye, former Transcontinental & Western Air president, against La-Motte T. Cohu and Northrop Aircraft, Inc. (AVIATION WEEK, Aug. 22).

The suit charges Cohu and Northrop with failure to give Frye credit for conceiving the aircraft and neglect in paying him an alleged prearranged royalty on manufacture of the planes.

► **Origin**—Frye claims that Cohu came to him near the end of the war and asked his opinion on a transport craft which Northrop could build for postwar business. Frye said he outlined the characteristics of the Pioneer to Cohu, who became interested, and he then provided Cohu with basic drawings of the craft. When it was in the mockup stage, according to Frye, he and Cohu entered into agreement concerning royalties and providing that Frye was to receive public credit for conception of the craft.

Northrop, however, in its 1948 annual report, called the Raider "an outgrowth of the Pioneer which Northrop

developed shortly after the end of the war."

The royalty agreement, Frye told AVIATION WEEK, was agreed to by Cohu when the latter was chairman of Northrop, and was to be 1 percent on the first 60 aircraft manufactured and 1½ percent thereafter. It covered all aircraft except those manufactured for TWA and its affiliated companies.

► **Background**—Later, Frye claims, Cohu said he did not think it was to be a royalty agreement, but a sales agreement, with the 1 percent commission to Frye on Northrop Raiders (then the Pioneer) that he personally sold. Frye told AVIATION WEEK that "this was absurd." He said he had previously refused an offer from Robert Gross, Lockheed Aircraft Corp. president, of \$1 million if Frye could sell 14 Constellations.

In the suit, Frye claims \$165,000 for back royalties and \$100,000 as personal damage. USAF currently has 23 Raiders on order from Northrop.

## Strikes Off

A two-year agreement that possibly will set a pattern for the entire industry has been signed between Lockheed Aircraft Corp. and International Assn. of Machinists Local 727. Lockheed still has to settle with 750 technical workers, members of the aircraft chapter of the Engineers and Architects Assn.

IAM last week was about to settle with the Douglas Santa Monica and El Segundo plants. Only holdouts: UAW-CIO locals still deadlocked with Douglas' Long Beach plant and three North American Aviation, Inc., plants.

But, all in all, the threat of crippling strikes on the West Coast has been averted.

► **IAM Happy**—Lockheed's 13-point proposal was accepted by IAM whose local president, John Snider, told AVIATION WEEK "we've got a good contract, a contract we can live with, good for both the company and the union."

The contract: 10-cent hourly increase in rate ranges, both minimum and maximum; 5-cent hourly blanket increase effective Aug. 22; 5-cent per hour merit increase to be granted in 16 weeks by joint company-union review board.

Probably highest job classification adjustment was 10 cents hourly for some structural assemblymen. Fringe items included a 5-cent boost in leadmen's bonus to 15 cents hourly, unlimited accumulation of sick leave and seniority assurances affecting 75 percent of Lockheed's personnel.

► **NAA Talks Delayed**—North American-UAW-CIO talks hadn't reached wage issues yet, but no strike could be called until Sept. 11, because of dispute notice filed with the U. S. Conciliation Service.

# FINANCIAL

## Leverage Keynotes Airline Gains

Improved dependability pushes carriers past break-even point, enhancing gains. Tax credits aid upsurge.

Airline traffic and earnings have shown considerable resiliency during the second quarter of this year to reverse a sharp downward trend in effect for the industry as a whole.

The liquidation of deficit results for the first quarter by second quarter operations and the rapid accumulation of earnings, have been most cheering to the industry and to investment supporters.

► **Leverage**—The startling comeback is a reflection of the working of the leverage phenomenon. Once a break-even point is reached, at least 90 percent of all additional revenues generally flow through to net.

The recent operating history of United Air Lines clearly illustrates the magical effects of leverage on earnings.

After a net loss of \$3,411,200 suffered by United in the current first quarter, the company chalked up a record-breaking net income of \$3,058,338 in the second quarter to reduce the loss, before tax adjustments, to \$352,862 at the midyear mark.

This recovery assumes added significance when it is realized that about \$2.3 million in operating profits were earned in the month of June alone.

What happens when leverage is set in motion during an upward trend in earnings is highlighted by a comparison of April and June operations as reported by United. During April, the company flew more than 105 million revenue passenger miles with an average load factor of 67.6 percent. This accounted for total passenger revenues of \$6,015,000 and a net operating profit of \$119,000 for that month. In June, the company flew a total of about 146 million revenue passenger miles at an average load factor of 81.5 percent, which led to total passenger revenues of \$8,345,000 and a net operating profit of \$2.3 million. In other words, while gross passenger revenues increased about 37 percent, the net operating profit soared more than 1900 percent.

Based on preliminary estimates of July traffic, which was about 5 percent below that of June, net earnings were placed at around \$1 million. This further illustrates the much wider fluctuation in net income as contrasted with that in gross revenues.

► **Deficits Slashed**—This recent upsurge

in earnings has even exceeded the best expectations of United's management. In November, 1948, President William A. Patterson declared that the company would be required to go out and raise \$10.5 million in new funds to complete its projected expansion program.

Aided by the interim mail payment awarded by the Civil Aeronautics Board in February, 1949, together with improved operations, the management in May, 1949, allowed that it would then need but \$2.5 million in additional financing to complete its previously contemplated expansion program. Now, thanks to recent months' earnings, United will manage to pay for its existing equipment acquisition program without recourse to any financing.

An extreme case of leverage in operation is also afforded by the results as reported by Northwest Airlines. This carrier had a net loss of \$787,474 for the year 1948 and a net profit of \$430,915 for the first half of 1949. However, this reversal really made itself felt in June when on a gross of about \$4 million, a net income in excess of \$1 million was realized.

TWA is demonstrating strong recuperative powers. For the first six months of this year, total operating revenues hit \$51,124,308 as compared with \$45,842,778 for the like 1948 period. In more specific terms, consolidated net income for the second quarter reached \$3,626,443 which contrasted with losses of \$3,264,536 during the first quarter. Current operations are even more impressive when it is realized that mail revenues for the domestic system were actually more than \$1 million less during the current year over 1948.

► **Several Factors**—The excellent airline performance has been attributed to a series of factors which include increased safety, improved dependability of schedules, more intensive sales promotion, special traffic stimulants in the form of family plans, excursion fares and air coach services and increasing utilization of airlines by business to jack up declining sales trends.

The industry, however, may feel some temporary effect from accidents not of its own making. The series of accidents by irregular carriers and the fluke crash caused by a Navy plane ramming an

Eastern Air Lines transport are disturbing to those who were on the verge of taking their first trip by air. It is this untapped market which the airlines seek to add to their growth factor.

► **Tax Cushions**—Current first half earnings were also materially helped by tax credits. In other words, most airlines were not required to pay any federal tax imposts on recent earnings. These tax credits provided a cushion which permitted the carriers involved to retain the bulk of earnings developed.

American Airlines, for example, which showed net income of \$3,758,430 for the second quarter, had to provide for only \$90,000 in federal income taxes. In other words, the carrier was able to apply the carry-forward provisions of the tax laws to offset current income, for the most part, with 1948 losses. It is obvious, moreover, that for the rest of 1949, American will be faced with the prospect of paying the full federal tax of 38 percent.

Eastern Air Lines, which has been the most consistent in earnings among the carriers has, of course, been forced to pay the full tax impost right along. This carrier showed net income, after taxes, of \$850,298 for the second quarter of this year. Such earnings would have been materially higher were it not for the taxes as well as the ultra-conservative accounting practices pursued by the company's management.

The leverage phenomenon will continue to impart substantial earnings if traffic is maintained at high levels. It must be realized, however, that the exhaustion of tax credits, in most instances, will take an approximate 38 percent bite out of all current earnings to be reported. This factor may have a tendency to slow down the sharp acceleration of earnings which began to appear during the second quarter.

► **Fixed-Cost Problems**—It is probable, however, that the industry is more concerned with leverage operating in reverse. This condition was responsible for mounting deficits in the post-war transition period. Operating on thin profit margins, an air carrier's resources can rapidly be diminished with a sharply falling traffic curve.

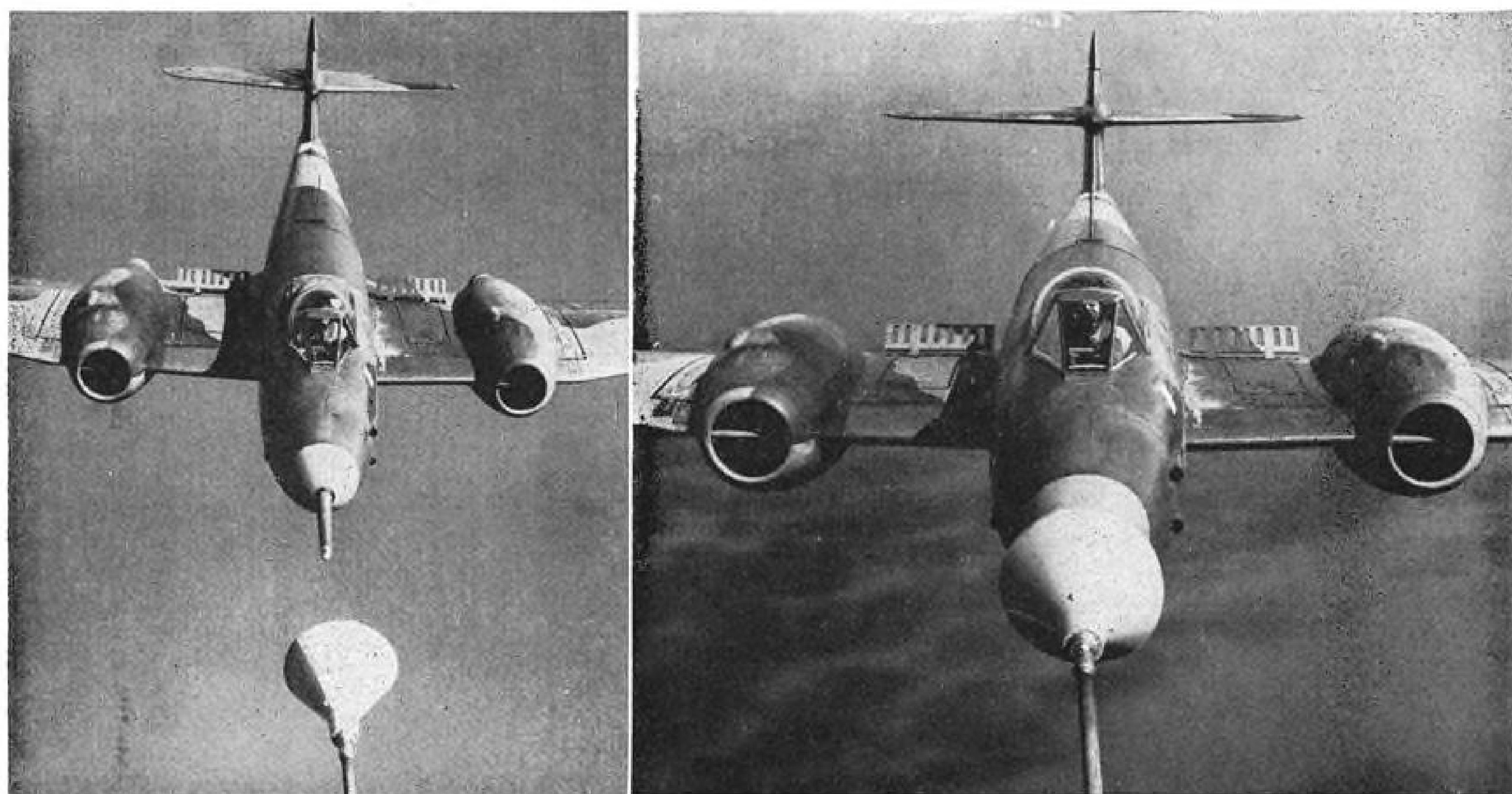
There is no mystery to the fact that the bulk of airline operating costs are of a fixed nature and do not readily lend themselves to any material cutbacks in periods of declining business.

The reversal of the deficit trend for the industry, as a whole, with the replacement of substantial earnings thus far recorded this year, has, in any event, added badly needed fat to the corporate bodies of the airlines. Certainly, these added resources may permit the group to withstand in far better condition any declines that may develop in traffic levels.

—Selig Altschul



# AERONAUTICAL ENGINEERING



METEOR APPROACHES, probe aimed for . . . CONTACT with cone on hose trailed from tanker. After connection . . .

## Jet Fighter Refueled Via New Technique

Meteor pilot maneuvers nose probe into tanker hose cone for automatic connection. Breakaway simple.

By F. R. Brewster  
(McGraw-Hill World News)

London—American Air Force observers, as well as aviation officials here, are greatly impressed with the possibilities indicated by British experiments in air-refueling jet-powered fighters.

Early this month, these experiments came to a dramatic climax when a Gloster Meteor was successfully refueled 10 times during a continuous 12-hour flight over England's south coast. The flight, incidentally, set a new endurance record for jet-powered aircraft.

Although duration of flight, and not maximum range, was the point being demonstrated, the mileage flown by the Meteor on its long run was equal to about 3600 mi. (computed at the average speed of 300 mph.), or better than the distance from London to New York.

► **U. S. Observers Participate**—Previously, the technique had been demonstrated to General Carroll, of Air Materiel Command, Wright Field. And Col. David Schilling and Col. G. Bradley, of the U. S. Air Attache's staff in

London, flew the Meteor during dummy approaches. Their report (while obviously confidential) is understood to be quite commendatory.

In addition to those by the American Air Force observers, "dry-run" approaches in the Meteor have been flown by experts from RAF Fighter Command and from Boscombe Down, the Ministry of Supply's Flight Experimental Station, as well as Geoffrey Tyson, chief test pilot of Saunders-Roe Ltd. (makers of the S.R. A/1 jet-powered flying-boat fighter).

► **Technique's Possibilities**—Refueling of jet-fighters in flight could mean, of course, greatly increased range on escort missions accompanying long-range bombers. It might also permit fighters to remain aloft for much longer periods in defending against invading bombers.

Possibilities of the technique for increasing the range of jet-airliners like the Comet, too, are obvious.

Up to the present time, however, the Air Ministry has not been seriously considering the use of in-flight refueling for RAF jet-fighters. There appears to be a considerable opinion that such a measure would have very little prac-

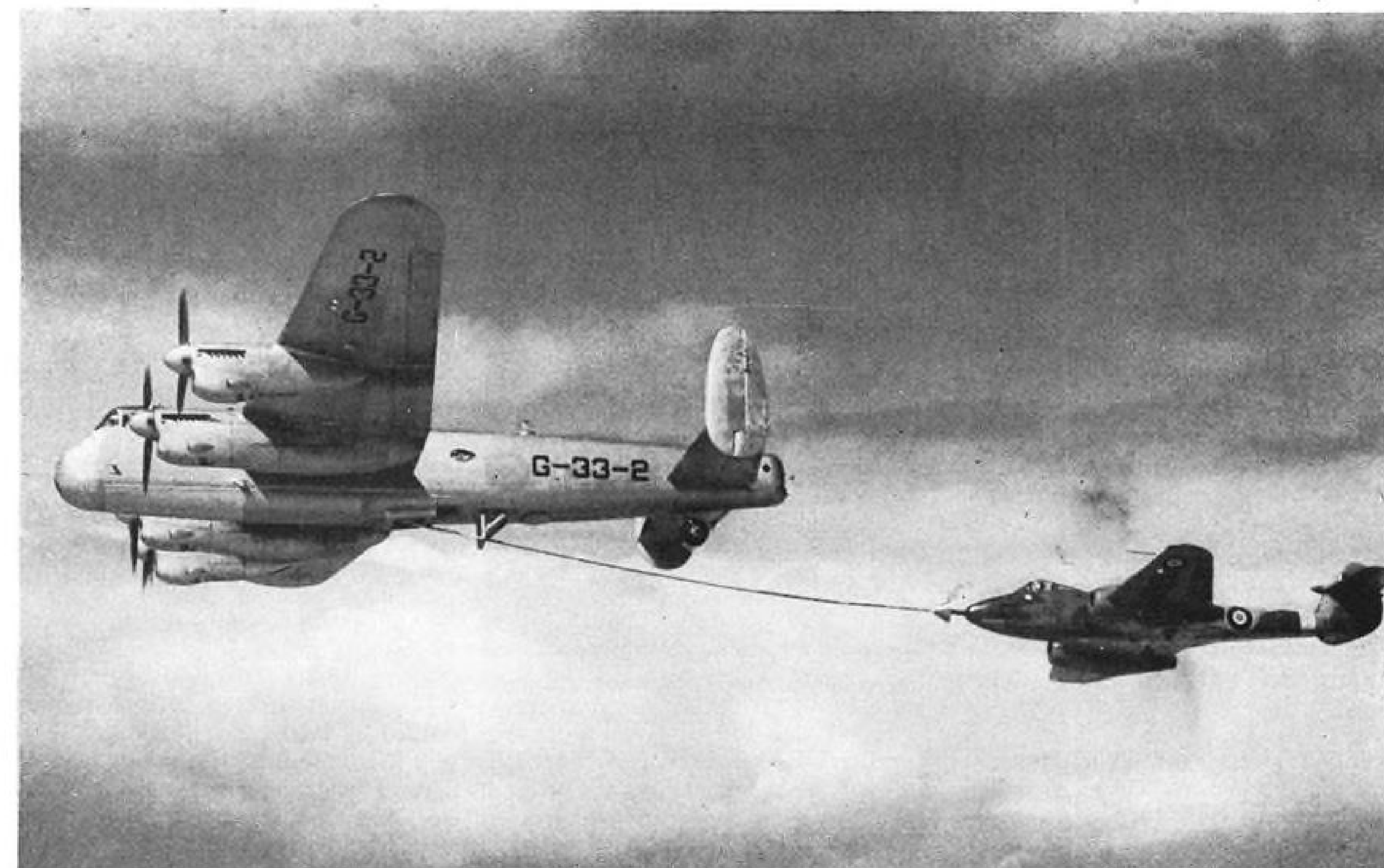
tical value in a sky criss-crossed with enemy fighters or thronged with enemy bombers.

► **Private Undertaking**—The experiments in refueling jet-fighters which culminated in the recent endurance-flight have been conducted wholly as a private venture by Flight Refueling Ltd., Sir Alan Cobham's organization, which has been a pioneer—and the chief gadfly to officialdom—in this field.

Two years ago this company carried out a long series of demonstrations of flight-refueling of civil transport planes over the North Atlantic—first with BSAA over the Azores, during the summer of 1947, later with BOAC west of Shannon and east of Gander.

This carried forward prewar demonstrations begun in 1939 when Short flying-boats of Imperial Airways were refueled over the North Atlantic by tankers based on Shannon, and with other demonstrations conducted over the Channel immediately after the war.

► **Endurance Flight**—Duration in flight of the Meteor (a single-seat fighter powered by two Rolls-Royce Derwent turbojets) is normally considerably less than two hours. P. C. ("Pat") Hornidge took this particular Meteor aloft from Tarrant Rushton airfield, near Bournemouth, at 5:20 a.m. and stayed there until 5:23 p.m.



FUEL IS TRANSFERRED at 300 gpm. Fighter slow-down was via dive brakes because flaps, normally used, were inoperative.

"It was a bit boring," he said. "I took a book along to read, but the weather got so bad that I had to keep my eye on the instruments most of the time."

"I really got fed up about the end of ten hours, and the sight of the tanker coming in to refuel me helped to relieve the monotony."

And that's how routine a job it was. Ten times during the flight—roughly every 65 minutes—the Lancaster tanker, piloted by T. C. ("Tommy") Marks, of Flight Refueling Ltd. rendezvoused with the Meteor and gave it a fresh gulp of fuel.

► **Contact Details**—Refuelings took place about 6000 ft., with the two planes flying at about 190 mph. (the Meteor's top speed is close to 600 mph.). The fighter's dive flaps were fully extended to assist the pilot in maintaining full control at this speed.

Each contact took between 1½ and 2 min. Altogether about 2500 gal. of fuel (paraffin, it's called here; in U. S. it's called kerosene) were transferred during the flight. The Lancaster tanker, remaining aloft between refuelings, had to land twice to take on more fuel.

Last three hours of the flight were made during rain in extremely poor visibility, and the last two contacts were made in cloud. Flight Refueling Ltd. was prepared for this condition, too, and radio and radar contact was

maintained throughout. For the latter purpose, the company had developed a special adaptation of the radar-transponder unit (Eureka) of the Rebecca radar-beacon system. This was carried in the fighter plane and enabled the tanker's crew to keep constant touch with the Meteor up to a maximum range of 100 mi. Hence, rendezvous were generally very simple.

To verify the endurance-record, an official of the Royal Aero Club was present during the flight.

► **Technique Used**—Previous British refuelings in-flight have involved transport planes, with the fuel being passed from tanker to receiver through a hose which was hauled aboard the receiver and coupled by hand into the receiver's fuel piping system.

With transport planes, crew were available for this purpose.

But with a single-seat fighter, the process had to be made fully automatic and the coupling-up as simple as possible.

Flight Refueling Ltd. worked up special equipment for this operation, which can be seen clearly in the accompanying photographs.

The Lancaster tanker trails a short length of flexible rubber hose which has a metal cone fitted to the end.

The receiving fighter, which comes up close behind the tanker, carries a pencil-shaped hollow tube, like a probe, in its nose.

Maneuvering some 15 ft. behind the tanker and just below its tail, the fighter pilot guides the probe forward into the cone—like a bee coming up to suck the honey from a flower—ramming gently until it locks firmly in place.

► **Clamping Mechanism**—This installation is in the cone—an arrangement of three toggles latching over an annular groove in the probe. A forward thrust of 5 lb. (easily given by the fighter when making contact) is sufficient to seat these toggles and lock the cone firmly on the probe. A rubber ring in the cone's seat seals the joint. Once made, the joint takes a 300-lb. pull to break.

For refueling fighters, the hose is trailed full of fuel. (In the demonstrations with transport planes in 1947 and 1948, the hose was empty until contact was made and coupling-up was completed).

When the joint is complete, the fighter pilot (from his cockpit) operates a valve in the end of the probe, which opens the channel to his fuel tanks, and at the same time opens a valve in the cone, thus completing the pathway.

► **Fuel Transfer**—The hose is reeled out from the belly of the tanker from a spring-loaded drum affording automatic take-up of any slack in the hose. After contact is made, the fighter-pilot flies forward another four feet (equal to one revolution of the drum). At this





REFUELING PROBE on Meteor, nose cowling removed, showing hose connection to tanks.

point, a green light flashes automatically in the tanker's cockpit, signalling the refueling crew to switch on the fuel pumps.

While taking fuel, the fighter pilot keeps station on the tanker. Normally, he will fly forward to have some leeway in maneuvering while he is taking on fuel.

Fuel flows from tanker to fighter at the rate of about 300 gpm., until the fighter's tanks are topped off full, when another device switches off the tanker's refueling pumps automatically.

In the endurance flight, about 250 gal. were taken each contact. The Meteor's two tanks each hold about 325 gal.

► **Contact Broken**—Breakaway is a simple matter. The fighter pilot eases back until the hose has been pulled out to its fixed limit—65 ft. At this point the reel is automatically checked and

the drum locked when two pawls fall into place in notches on the drum's hub.

When the fighter plane falls back still farther it exerts sufficient pull to break the toggle connection.

In the present experiments, the hose was not flushed. This departed somewhat from the procedure used in the trials over the North Atlantic, when methyl bromide was discharged into the fuel line at the moment of breakaway to quench any sparks touched off by static electricity.

With paraffin fuel, of course, the danger of fire is less than with gasoline. Flight Refueling technicians, however, say that they will probably introduce some form of flushing into the technique later. For this purpose they favor the use of an inert gas like nitrogen as being non-corrosive and less soluble than carbon dioxide.

## Wider Use Seen For Air Refueling

By Irving Stone

Fresh from successful British trials of air refueling a jet fighter, Sir Alan J. Cobham, chairman and managing director of Flight Refuelling Ltd., recently told an aviation press conference in New York that the economic, safety, and time-saving aspects of this air-supply technique are the solution to long flights of civil as well as military aircraft.

He said: "I see in flight refueling a method whereby civil aviation can be made to pay, can be made safe and relieved from unnecessary landings under trying conditions, and can be helped to operate on schedule at bad times of the year."

Elaborating on the application of the refueling method to military craft, Cobham said that reaction of U. S. military observers in the recent Meteor experiments "was terrific—most enthusiastic."

► **Three At Once**—He said that the technique could be used to simultaneously accommodate three fighters to be supplied from one tanker—probably with hose units trailed from the wing tips and the fuselage.

Cobham doesn't believe a flushing agent is mandatory to top off the fueling operation, and he feels that it's safer to refuel in mid-air than on the ground. Static potential difference between planes is neutralized on contact.

Work is progressing on a system to allow refueling at 600 gpm., cutting down actual contact time between tanker and receiver.

Icing conditions aloft are no problem. Cobham explained that the mechanism in the tanker's hose cone was protected against freezing by a "boot" installation.

► **Probes Would Vary**—The probe configuration on the Meteor is not contemplated as a standard installation. Each craft would call for its own arrangement and probably very few would use the nose probe. It could be installed along the wings or fuselage.

Cobham told AVIATION WEEK that contrary to some reports, the British Ministry of Supply "is very much enthused" about the refueling technique but they have no new bomber on which to apply the method. If any indifference existed, he explained, it was to the old method of refueling as formerly used with transports. This procedure, with trailing hose from both craft might offer difficulties in military applications.

► **"Flying Tanker"**—Stressing advantages of flight refueling for civil aircraft, he likened the present-day large transport to a "flying tanker" which, incidentally, carries few passengers—a colossal plane with comparatively little payload.

Cobham feels that the desire today is to fly nonstop, because intermediate stops are bound to develop hitches—in landing, takeoff, and varying weather conditions. It is his opinion that the only way to make aviation pay on the North Atlantic run is to have rapid, frequent nonstop flights between New York and London. A number of smaller planes utilizing the refueling technique, he says, is the more feasible approach.

Cobham offered this example:

"Let us project a nonstop flight between London and New York. Allowances must be made for a 60-mi. headwind, bad weather, time for letdown procedures, a possible stack-up at the destination, and other contingencies. Assuming we want to carry 100 passengers, it will necessitate that we build an airplane with a gross weight at take-off of 250,000 to 300,000 lb. About 30 percent of that weight will be gasoline and only 4 percent useful payload."

"However, if we plan to refuel that aircraft twice in flight, the all-up weight at takeoff could be 120,000 lb. or less than half the weight of the unrefueled aircraft. It could be operated at one-third the cost and, I am convinced, could be constructed at less than one-third the cost."

He is convinced that flight refueling will become commonplace in the next few years.

The American counterpart of the British organization is Flight Refueling, Inc., located at Danbury, Conn.

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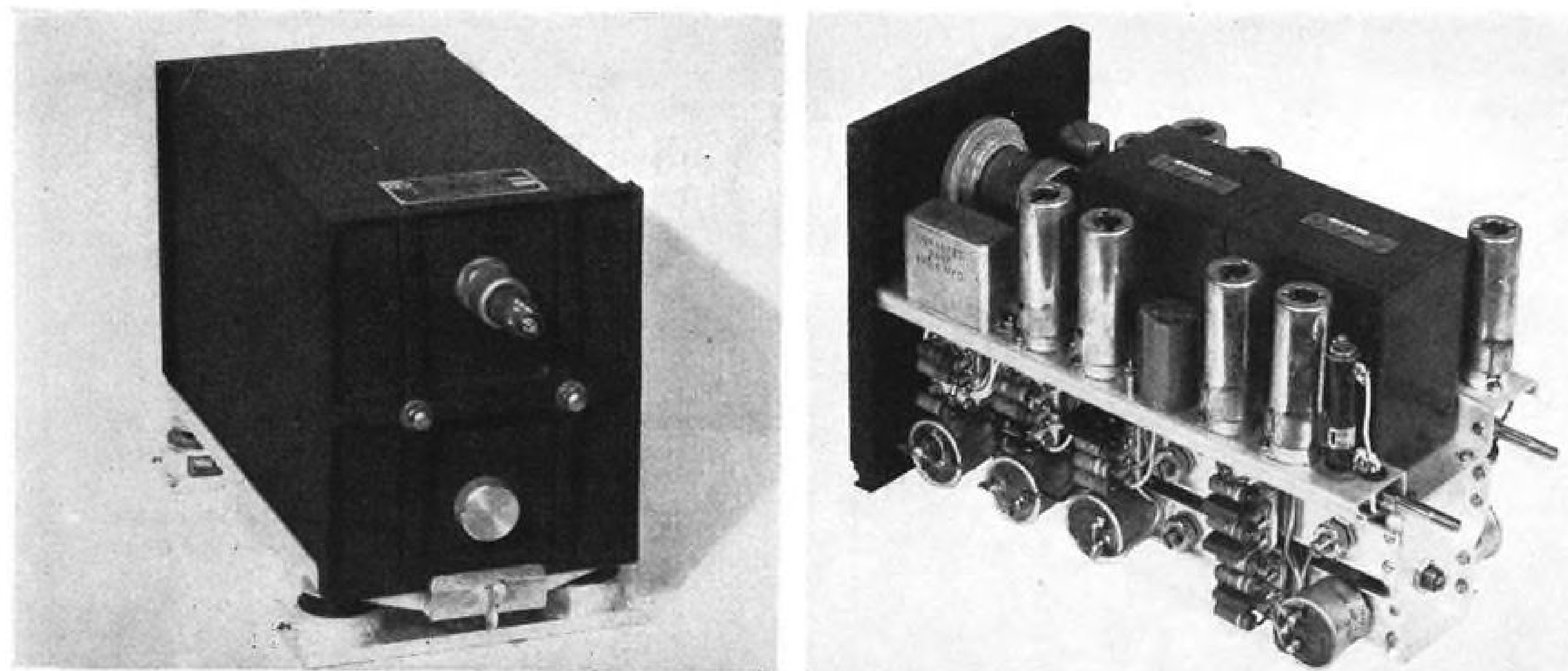
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Left photo shows Model 265 radio telegraph printer terminal shock-mounted in pressurized case. Right photo: Internal makeup of unit.

## Lightweight Air-to-Ground Teletype Unit

New terminal is automatic, weighs only 15 lb. and is pressurized. Advantages seen over voice messages.

A telegraph printer terminal, permitting air-to-ground printed communication via radio, is being placed on the commercial market for the first time by Radio Frequency Laboratories, Inc., Boonton, N. J.

The new terminal, Model 265, weighs only 15 lb. with shock-mounted base, is pressurized for service up to 50,000 ft., and is completely automatic. It is a long way in weight from the 70 to 160-lb. units which have kept radio telegraph tied to the ground or a vessel.

Device is the signal-converting link between Model 31 Teletype sending-receiver printer (developed for Navy aircraft) and voice-modulated aircraft radio receiver and transmitter.

The terminal simply is plugged to the radio headset and microphone jacks to provide automatic, printed communication from air to ground and vice versa. When voice communication is desired, the unit is disconnected, and the microphone and headset plugged-back into radio.

**Advantages Reported**—According to the maker, the unit permits improved air-to-ground weather reporting and gives more reliable communication than voice or code, since it eliminates possible mistakes of hearing or decoding.

In flight tests, it is reported to have operated successfully with a signal-plus-noise to noise ratio of more than 1:1. This means that printed communication was continued under conditions where voice would have been prohibited or greatly limited.

The company believes another advan-

tage is that personnel can be more quickly trained to proficiently operate a teletypewriter than code key. It states that one of the many uses of the system by airlines would be a radio telegraph service to passengers aloft.

It also is pointed out that a disinterested communications expert expressed the opinion to AVIATION WEEK that, taking all factors into consideration, teletype is a faster, more efficient communication medium from an overall operational standpoint than code.

The unit is represented to be equally reliable for mobile service on the ground or for fixed-base operations where large printers of the page, tape or perforator type are used.

The Air Force reportedly has experimented with the terminal for weather service in Alaska, and the Navy has put it through operational tests on the Eastern Seaboard.

**Operational Details**—The terminal operates on audio frequencies of 500 and 700 cycles respectively. For transmitting a printed message, it converts electrical impulses from the printed into the two frequencies for modulation of the transmitter.

In receiving, it converts the two frequencies coming from the receiver into timed and spaced electrical impulses required to operate the printer.

Special tune and energy circuits automatically switch from "transmit" to "receive" four seconds after the operator takes his hands off the teletype keyboard. This time lapse is provided in the event operator momentarily pauses

while sending a message.

The terminal automatically switches from "receive" to "transmit" the instant the printer keyboard is touched—provided no message is coming in.

**General Makeup**—The terminal mechanism is contained in a pressurized cast-magnesium case sealed at both ends by gaskets. On one end (shown) is a capsule to remove moisture trapped inside the unit during assembly. The other end mounts a slug having 15 connections.

Internal mechanical design and components conform to AN specifications. Electrical parts such as filters, transformers, chokes, condensers, etc., are all hermetically sealed. Dimensions of the device are  $5\frac{1}{2} \times 6\frac{1}{2} \times 10\frac{1}{2}$  in.

The company states that the unit can be set to frequencies other than 500 and 700 cycles, and reports that it already has another unit of the same weight for 2275 and 2475 cycles.

First radio telegraph terminal for aircraft to be successfully produced by Radio Frequency Laboratories was a 27 lb.-model developed for the Navy in 1946. A 22 lb.-unit soon followed, but the company did not place its product on the general market until the present 15-lb. model was developed.

## Engineers Develop Fog-Making Device

A tank which manufactures fog under controlled laboratory conditions has been developed at the University of California.

Engineers believe that research with



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GENERAL MANAGER, Engineering



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the unit eventually will lead to knowledge of how to prevent or disperse fog at airports. They are working on the theory that says the nature and causes of fog first must be determined before this can be achieved. The tank was developed when natural fog was found too elusive for research purposes.

► **Imitate Nature**—The "fog machine" is designed to produce air pressure and temperature changes corresponding to natural processes which result in various radiation, advection, and pressure types of fog. It is essentially a double-walled container, equipped with windows for observation and photography, into which cold or warm moist air can be introduced from a connecting vapor cell. The air can be cooled or heated by circulation of warm or cold water in the tank jacket. Advection fog, for example, can be generated by sudden mixing of warm saturated air from the vapor cell with a cool air mass in the fog tank. Pressure can be alternated by closing or opening an outlet valve while continuing the supply from the vapor tank. For "smog" studies, smoke or dust particles can be introduced from a connecting container equipped with a blower.

► **Can Permit Fog Studies**—According to D. M. Finch, project supervisor, very little is known about the actual physical characteristics of fog. Now that successful artificial production has been achieved, photomicrographic and other techniques can be used to gather accurate data on particle size, density, water content, temperature, dust content, composition, etc.

While the ultimate objective of the project is fog dispersal, Finch points out that knowledge gained from these studies will have valuable applications in other fields. One military use is obscuration of objects with a fog screen.

Accurate measurement of light transmission from headlights, aircraft beacons, railroad and highway signals also can be made.

The project was begun in 1945 with Navy funds which were discontinued at the end of the war. Research now is sponsored by the University's Institute of Transportation and Traffic Engineering.

## ENGINEERING FORUM

### Ailerons, Too!

Apparently the Russians can't even keep their lies straight. In the July 29 issue of USSR Information Bulletin, one Maj. Gen. Vassili Moskovsky expounds on the daredevil flying of one Alexander Mozhaisky in 1882 and credits him with invention of the aileron in 1877 "thirty years ahead of Farman, who is unde-

servedly given credit for it." (Will friends of Glen Curtiss please rise!) But then the General trips himself up by offering: "The function of ailerons is to give an upward and downward course to the machine."

And speaking of Mozhaisky reminds us of a drawing of his supposed 1882 machine standing resplendently poised for its first flight, with wires running from each upper surface to a pylon atop the fuselage, but no lift wires underneath. Perhaps the Russians are too modest to admit the earliest use of wire in compression!—RMcL

### Slipstick Slip?

Concerning the remarks of H. C. M. in the Aug. 1 Engineering Forum, pertaining to the fuel consumption of the tailpipe afterburner, can you tell us who is "so wrapped up in the fine points," Mr. McLarren or H. C. M.?

According to our calculations, the only way we can get H. C. M.'s answer is to take a most un-engineering approach and neglect to convert pounds to gallons.

L. H. C.

### For Data Exchange

What's happened to the technical writing output of engineers in the Industry? There was a time when you could thumb through the pages of our widely circulated aviation periodicals and take your choice of articles on which were the names of personnel representing the gamut of aircraft constructors and researchers.

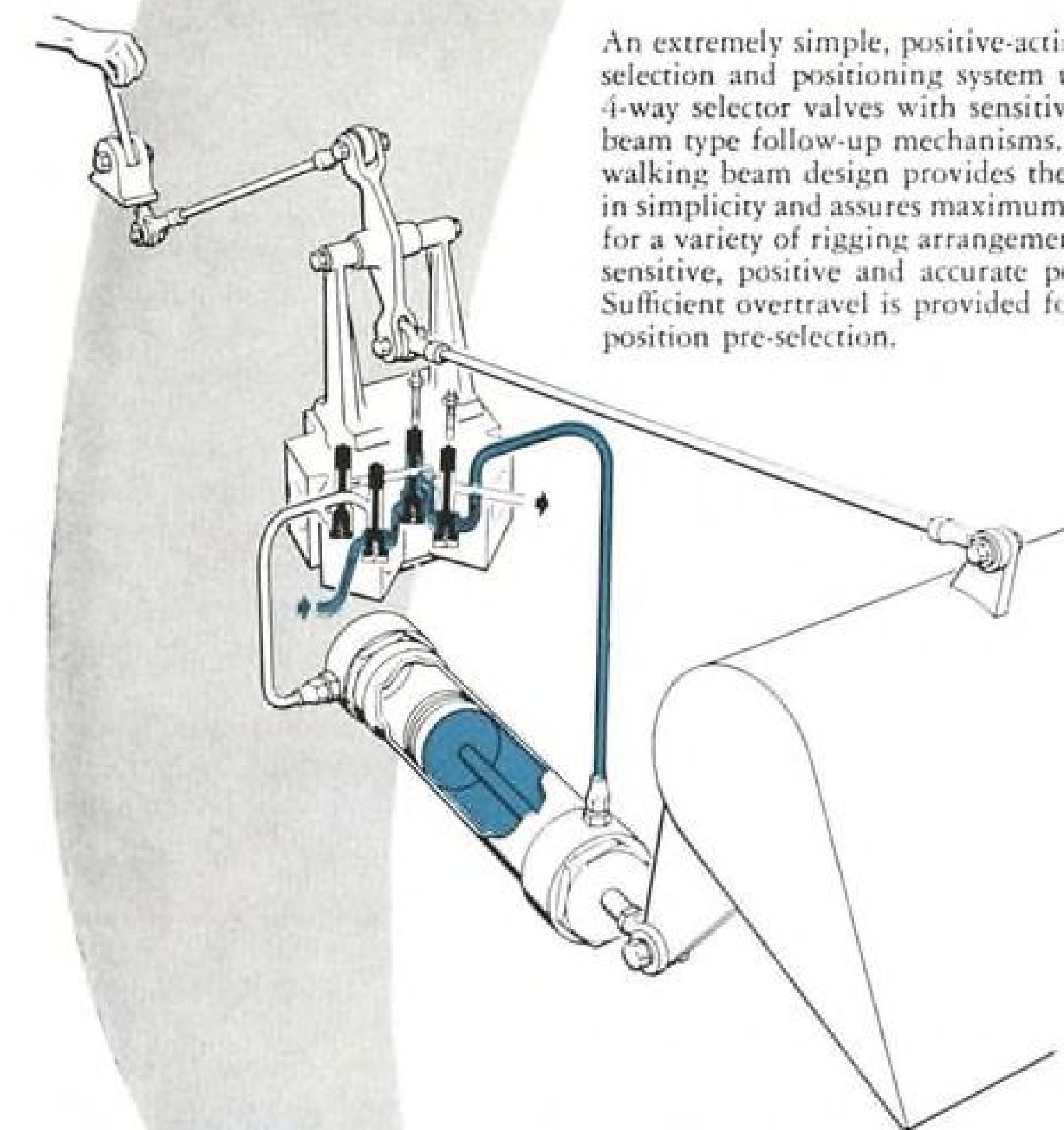
It's a sad commentary on the pride we take in our aeronautical accomplishments when the host of engineers connected with our imposing force of air frame manufacturers, engine and equipment builders, research organizations and others in the field apparently don't think their endeavors are worth talking about. Or could it be because of a sense of smugness?

Frequently, an engineer won't write unless he gets the prod from his company, and it would seem that the latter is falling down on the job if it doesn't encourage its personnel to publicize achievements, when this is permissible. No company's engineers know so much that they have no need for knowledge of what their counterparts in other companies are doing—and how they are doing it.

Let's have a continuing interchange of data and methods while these can be of mutual value to engineers—not when this information is ancient history.)

T.E.S.

# ADEL POSITION CONTROL 4-WAY SELECTOR VALVES



An extremely simple, positive-acting pre-selection and positioning system utilizing 4-way selector valves with sensitive walking beam type follow-up mechanisms. The walking beam design provides the utmost in simplicity and assures maximum flexibility for a variety of rigging arrangements with sensitive, positive and accurate positioning. Sufficient overtravel is provided for position pre-selection.

#21089 Capacity: 1.2 gpm Tube Size: 1/4" Weight: 1.1 lbs.



#14159 Capacity: 6 gpm Tube Size: 1/2" Weight: 2.0 lbs.



#14830 Capacity: 16 gpm Tube Size: 1/2" Weight: 3.3 lbs.

Direct inquiries to  
Adel Engineering Service.

**ADEL**

ADEL PRECISION PRODUCTS CORP. BURBANK, CALIF. • HUNTINGTON, W. VA.

CANADIAN REP.: RAILWAY & POWER ENGINEERING CORPORATION, LIMITED



# NEW AVIATION PRODUCTS

## Resin Coatings Combat Corrosion

Airline maintenance personnel are currently testing an anti-corrosion coating which, though used by the building trades for many years, has only recently found an application in the aviation field.

This product, "Nukemite," is made by the Nukem Products Corp., Buffalo 20, N. Y., and is a solution of inert resins. It is available in three types:

- **No. 24:** Immune to vegetable and paraffin based oils and up to 20 percent concentration of commercial acids.

It does not require a primer or a final coat, has strong adhesion and resistance to corrosion. Since it contains no oils it will not saponify when exposed to alkaline substances.

- **No. 35:** Immune to high concentrations of mineral acids and their salts including sulphuric, hydrochloric, hydrofluoric, nitric, chromic, lactic, oleic, etc.

It is unaffected by strong alkalis, oils, gasoline, turpentine, alcohol and other solvents in the aliphatic hydrocarbon group.

This type will withstand continuous temperatures of 140 F.

- **No. 40:** Has basically the same properties as No. 35 and will withstand constant temperatures ranging from -50 to 150 F.

Both Nos. 35 and 40 should be used only after the application of a special primer coat.

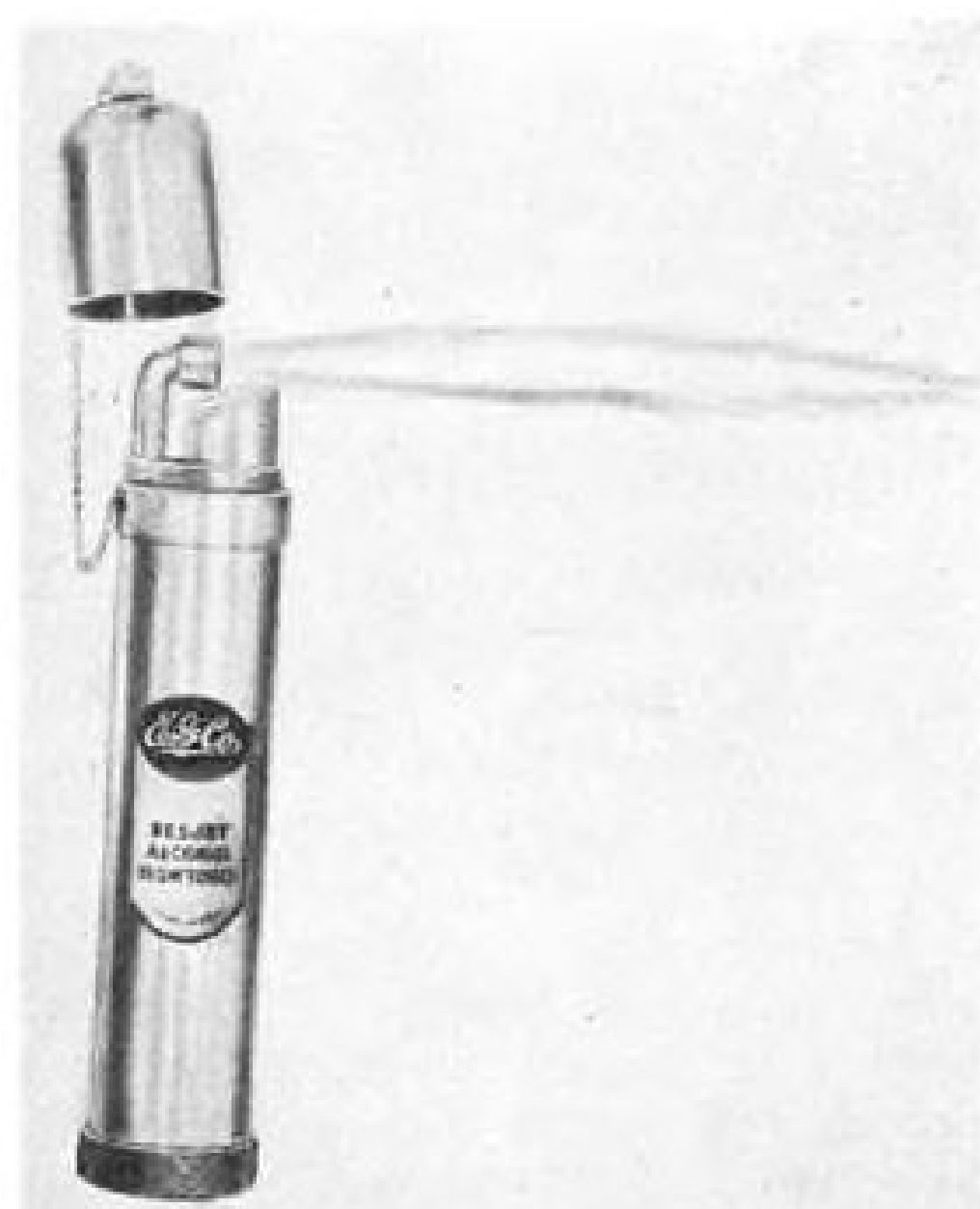
All of these forms of "Nukemite" resemble paint in that they may be applied by brush or spray gun. They are available in a wide range of colors, including black and aluminum.

At least one large U. S. airline has obtained excellent results with "Nukemite" No. 40 as a protection against corrosion occasioned by battery acid and also by urine. Damage from the latter often is more extensive and difficult to combat than that resulting from battery acid.

Service tests indicate that not only do these products afford effective protection against corrosion, but they are also extremely durable.—G. C.

to all four wheels to eliminate jerking, uneven pulling or loss of traction.

With 90-in. wheelbase and 14.00x20, 12-ply tires, unit has turning radius of only 18 ft. It is provided with a ballast and equipment box and can be fitted with reversible blade snow plow. Tug can maintain 12,000 lb. drawbar pull at 3 mph. Maximum speed is 40 mph.



## Small Blow Torch

"Besjet" pocket-size blow torch, offered by Emil Greiner Co., 20-26 N. Moore St., New York City, N. Y., is stated to perform as efficiently as standard units.

Completely automatic, device uses denatured alcohol and requires no pumping or priming. It will provide 6-in. 1800 F. flame in 10 sec. after lighting. Made of leak-proof brass construction, unit will operate for approximately 1½ hr. Weight is 10 oz., length 7¼ in.

## Protective Coating

Synthetic rubber cement, "H-511 Ubabond," developed by Union Bay State Chemical Co., Cambridge, Mass., is represented to permit pre-cementing of many materials. With product, pre-cemented surfaces can be joined together at later period, on assembly line or after shipping, without loss of adhesion efficiency.

Adhesive dries in 15-30 min. at room temperature, permitting handling of surfaces. Parts finally are joined by heating under infra-red, steam, dry heat, or by brushing or spraying solvent on pre-cemented areas.

Cement will join these materials, among others—fabrics, leather, glass, synthetic rubber, vinyl copolymer resins, butyral resins, phenolic resins, paper, wood, Pliofilm, steel, aluminum and tinfoil.

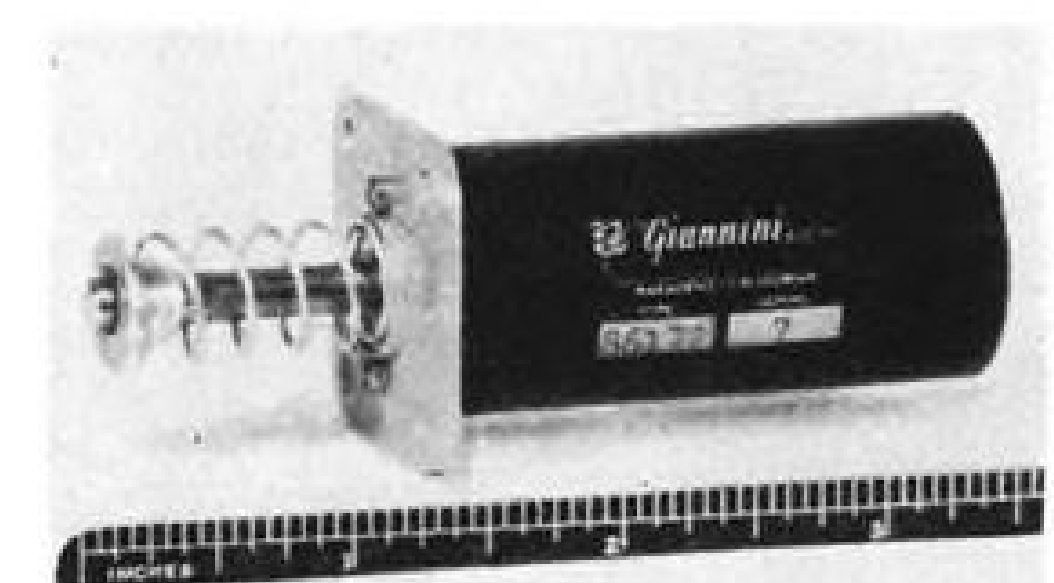
"runaway" unit is put back into operation.

Developed by Pierce Governor Co., Anderson, Ind., device must be reset manually before equipment it protects can be re-started. Micro-switch feature is available on company's direct drive and cable driven governors. Also supplied is governor with mercury arc switch having same performance, but designed for operations involving fire hazards.



## Utility Vehicle

Capable of towing large commercial transports, such as Stratocruisers, on soft or slippery ground, and adaptable for removing snow on airport aprons, Four-Point, positive-drive airplane tug, Model FZMA, is offered by Walter Motor Truck Co., 1001-19 Irving Ave., Ridgewood, Long Island, N. Y. It is designed to provide effective pulling power



## Dual Potentiometer

"Rectipot" dual rectilinear potentiometer, produced by G. M. Giannini & Co., Springfield, N. J., incorporates two parallel straight-line resistance units, each with its own contacting brush. In this way, resistance windings are electrically independent but mechanically connected.

Device measures 1 in. in diameter; length depends on stroke, which may vary from ¼-2½ in. unit may be wound for resistances of 1000-10,000 ohms.

## Protects Motors

Designed to turn-off motor or other electrically energized equipment when a pre-determined speed limit has been exceeded, micro-switch centrifugal governor is recommended by maker for situations where investigation or corrective measures must be instituted before

# PRODUCTION

## AMC-Industry Simplify Contracts

Basic interpretations evolved on certain legal clauses promise less necessity for further negotiation.

By Alexander McSurely

A new arrangement designed to slash legal red tape in Air Force negotiated procurement contracts while preserving essential safeguards for both parties eventually is expected to make important savings in time and money for contractor, government and the ultimate paymaster, the taxpayer.

Air Materiel Command, USAF procurement organization, calls the new contracting arrangement a "basic agreement" contract. Some of the contractors call it a "master" contract.

► **Standard Clauses**—But the idea under either name is to get agreement between the contractor and the government once-and-for-all on certain standard contract clauses, so that there is no longer something for negotiation in each procurement contract which comes up between that particular manufacturer and the Air Force.

There are some 38 of these clauses and they vary from one contract to another because different manufacturer's legal departments put varying interpretations on how much they wish to concede to the government.

► **Early Signers**—Partial returns from an AVIATION WEEK industry survey show that several big aviation contractors with the Air Force have already had a "meeting of legal minds" with the Air Force and have completed basic agreement contracts. From now on, these will be considered a part of each contract signed by that company, binding on both the contractor and USAF, but will not be subject to renegotiation as formerly. Result is expected to be greatly reduced paper work, quicker completion of individual contracts, and a consequent speedup in the involved processes of USAF procurement.

Curtiss-Wright Propeller division and Wright Aeronautical Corp., divisions of Curtiss-Wright Corp., were among the first to sign basic agreements with the USAF.

Ryan Aeronautical Co., another early signer, reports that the new arrangement is expected to "make for great efficiency all around when completely effective."

► **Management Approves**—Sperry Corp. officials report that they have signed a fixed price basic agreement contract and

are soon to complete a cost-plus-fixed-price basic agreement. Sperry management is "strongly for" the new plan.

Several other manufacturers replying to AVIATION WEEK's inquiry indicate that they are now negotiating on the basic agreement and are nearing completion.

► **Patent Rights**—One primary subject of difference in contract negotiations has been on patent rights. Companies which have spent considerable sums developing new processes or inventions are not eager to turn these over to the USAF for general industry use. On the other hand USAF feels that it has financed many of the new developments and inventions through its contracts. The fine line between what the company should retain and what the USAF is entitled to throw open to general use is subject of frequent legal discussion, and any company which can pin this down in an acceptable basic agreement, has saved itself future legal headaches.

While the basic agreements are binding indefinitely, they are subject to cancellation in 30 days notice either by the government or the contractor. Also, provision is made for negotiating supple-

mentary basic agreements if desired, and for revision of the agreements by mutual consent in the event that Congress changes laws governing armed services procurement.

► **Lower Printing Costs**—Air Materiel Command foresees appreciable savings in printing costs, manpower and paper under the new plan.

One complete new contract made subject to a basic agreement is only two pages long, with a three-paragraph reference to the basic agreement, description of the item to be supplied, designs per unit and delivery schedule. This represents a minimum reduction of 21 pages formerly required to list the "boiler plate" or standard clauses. Since 70 contract forms are necessary to cover all technicalities, this single contract means a savings of 1330 pages of printing cost.

► **Sections A and B**—The basic agreements are usually in two sections: A, which includes the standard clauses complying with general procurement laws and regulations, and B, which contains provisions pertaining to the individual contractor.

Under Section B would be provisions for price revisions, renegotiating, reports and refund of excess profits, patents, copyrights, partial payments, special reproduction rights, specifications, and delivery.

► **"Boiler Plate"**—Under Section A would be included such provisions as definitions, changes, inspection, delays, damages, payments, officials not to benefit, covenant against contingent fees, disputes, Buy American act, general patent rights, general delivery and packaging instructions, furnishing of



## PIRATE ASSEMBLY IN DALLAS

A production Vought F6U-1 Pirate is seen here in final assembly on the company's newly established production line at Grand Prairie, near Dallas. Of the two lines that

are now in operation, one turns out Pirates, the other, F4U-5 Corsairs. Note Pirate's easily accessible nose section, also extended fuselage dive brakes aft of wing trailing edge.



government property and liability therefore, anti-discrimination, sub-contracts and sub-contract articles, inspection and audit of books, taxes, notice of labor disputes, assignments of rights, security requirements and various labor provisions.

Brig. Gen. Horace A. Shepard, AMC procurement division chief, points out that the basic agreement arrangement will be used primarily with the principal Air Force contractors, companies which normally make several contracts with the USAF in each fiscal year. Most companies approached thus far have indicated they favor the system.

► **Bare Essentials**—A tremendous saving is realized in confining negotiations to bare essentials involved in each specific procurement. "Procurement division buyers can limit discussions to specifications, quantity, price and delivery," Shepard said.

It is estimated that eventually as many as 80 basic agreements will be completed eventually with principal Air Force contractors covering a large percentage of total Air Force negotiated contract business.

## Fire Resistant Coat Ups Tank Safety

A self-sealing aircraft fuel tank filled with high-octane gasoline failed to explode or even start to burn after being blasted by 2000 F. flames for 5-10 min. in a demonstration held recently at Floyd Bennett Field, N. Y. Flames were baffled by a new five-resistant coating developed by B. F. Goodrich, which had been applied to the tank with a brush just before the test. It dried quickly and is stated to be relatively light.

To highlight the new materials effectiveness, an uncoated tank of identical construction was subjected to the same treatment. It ignited immediately, and within a few minutes, disintegrated with its fuel load into a shapeless mass of flames and smoke.

While the Navy would not disclose specifically what the coating contains, it is reported to have a cement base and to be partly compounded of a chemical rubber.

The new compound is aimed at resisting flame and heat long enough to permit a safe landing, and allow fire-fighters to extinguish the blaze without endangering themselves or other planes. Commercial application is possible.

In preliminary tests at Akron, Ohio, coated aluminum tanks were flame-tested at 1800-2000 F. for 28 min. without burning. Uncoated aluminum cells disintegrated in 2 min. when exposed to the same temperatures. Holes were burned through wartime tanks in slighting over a minute at 1800 F.

## 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: MCPPS72.

### ABSTRACTS

**For bag assemblies, gloves & helmets (49-3320):**

Companies sharing—Knight Leather Products, Inc., Boston, on a bid of \$16,133.04; Baerco Postman Corp., Gloversville, N. Y., on a bid of \$3026.20; Joseph Bugel-eisen Co., Detroit, on a bid of \$4408.86; Sigmund Elsner Co., Red Bank, N. J., on a bid of \$125,622.20, and Reed Products, Inc., Milwaukee, on a bid of \$212,016.04.

**For printing services (49-2500):**

Art Guild Bindery, Inc., Cincinnati, on a bid of \$8500.

**For fertilizer (49-1198):**

Summers Fertilizer Co., Inc., Baltimore, on a bid of \$108,208.80.

**For aluminum alloy sheets (49-1255):**

Reynolds Metals Co., Louisville, on a bid of \$167,001.45.

**For aircraft cameras (49-1882):**

Consolidated Radio Products Co., Chicago, on a bid of \$265,100.85.

**For assorted hardware (49-2102):**

Companies sharing—Tubing Seal Cap, Inc., Los Angeles, on a bid of \$997.50; Weatherhead Co., Cleveland, on a bid of \$2248.30; Raybould Coupling Co., Greenwich, on a bid of \$1952; Pacific Piston Ring Co., Los Angeles, on a bid of \$11,565; Parker Appliance Co., Cleveland, on a bid of \$1012; Deutsch Co., Los Angeles, on a bid of \$11,013.40; Heli-Coll Corp., Long Island City, on a bid of \$116.60; Rosan Inc., South Gate, Calif., on a bid of \$15; Delron Co., Inc., Los Angeles, on a bid of \$67,900; S. S. White Dental Mfg. Co., New York, on a bid of \$2494; Tinnerman Products, Inc., Cleveland, on a bid of \$2172.45, and

Dzus Fastener Co., Inc., Babylon, N. Y., on a bid of \$21.06.

**For 63 filing cabinets (49-2437):**

Multiplex Display Fixture Co., St. Louis, on a bid of \$3111.

**For motor generators (49-1760):**

Ideal Electric & Mfg. Co., Mansfield, O., on a bid of \$204,180.

**For 25 stand assemblies (49-188):**

Rockwell Engineering Co., Blue Island, Ill., on a bid of \$32,250.

**For art work (49-2233):**

Companies sharing—Roy Bernard Co., Inc., New York, on a bid of \$95,000; H. L. Yoh Co., Inc., Philadelphia, on a bid of \$95,000; Ferd Prucher Studio, Detroit, on a bid of \$65,000; New Center Studios, Inc., Detroit, on a bid of \$95,000; Brown Art Studio, Detroit, on a bid of \$95,000; Kling Studios, Inc., Chicago, on a bid of \$95,000; Vogue-Wright Studios, Inc., Chicago, on a bid of \$95,000; Grant Jacoby Studios, Chicago, on a bid of \$95,000; Scott Engineering Service Co., Dayton, on a bid of \$40,000; Sales Engineering & Training Co., St. Louis, on a bid of \$50,000; Aviation Sales Corp., Los Angeles, on a bid of \$10,000; Jackson & Moreland, Boston, on a bid of \$20,000, and Walter Sabel Studios, Chicago, on a bid of \$95,000.

**For typesetting services (49-2234):**

Companies sharing—Birmingham Eccentric, Birmingham, Mich., on a bid of \$50,000; Detroit Typesetting Co., Detroit, on a bid of \$95,000; Michigan Typesetting Co., Detroit, on a bid of \$95,000; Laurel Process Co., Inc., New York, on a bid of \$95,000; Monsen-Chicago, Inc., Chicago, on a bid of \$95,000; American Typesetting Corp., Chicago, on a bid of \$95,000; Chicago Composition Inc., Chicago, on a bid of \$95,000; Probert Typesetting Co., Dayton, on a bid of \$95,000; Dayton Linotyping Co., Dayton, on a bid of \$75,000; J. W. Ford Co., Cincinnati, on a bid of \$95,000; Westerville Press, Westerville, O., on a bid of \$50,000; Superior Typesetting Co., St. Louis, on a bid of \$95,000, and Craftsman Type, Inc., Dayton, on a bid of \$25,000.

**For indicator assemblies (49-2474):**

Eclor, Inc., Chicago, on a bid of \$366,236.60.

**For 175 propeller assemblies (49-2394):**

Canadian Commercial Corp., Ottawa, Canada, on a bid of \$105,825.

**For bolts, ferrules, nuts, etc. (49-2409):**

Companies sharing—Aero Supply Mfg. Co., Inc., Corry, Pa., on a bid of \$7367.75; Standard Pressed Steel Co., Jenkintown, Pa., on a bid of \$969; Breeze Corp., Inc., Newark, N. J., on a bid of \$385; Boots Aircraft Nut Corp., Stamford, Conn., on a bid of \$1225; Weatherhead Co., Cleveland, on a bid of \$1170.85; Aircraft Fitting Co., Cleveland, on a bid of \$1388.80; Dzus Fastener Co., Inc., Babylon, N. Y., on a bid of \$3887.29; Air Associates, Inc., Teterboro, on a bid of \$7246; Monadnock Mills, San Leandro, Calif., on a bid of \$898.30, and American Chain & Cable Co., Inc., Detroit, on a bid of \$2638.61.

## Naval Aviation Awards

Navy Department has announced award of contracts for the following aviation items:

**For electrical connectors for rockets, Mk 10, Mod 3:**

Courtney Mfg. Co., Knox, Pa., for \$501,600.

**For servo motors, Mk 7, Mod 0:**

The A. C. Gilbert Co., New Haven, Conn., for \$114,350.

**For semi-trailer, aircraft fueling:**

Empire Trailer Corp., Tampa, Fla., for \$509,250.

**For aviation gasoline and lubricating oil:**

Socony-Vacuum Oil Co., N. Y., for \$80,109.48.

**For aviation fuel:**

Union Oil Co. of Calif., Los Angeles, for \$753,375; Edgington Oil Refinery, Los Angeles, for \$51,750.

## SALES & SERVICE

### 'Better Deal' for GI Flight Trainees

Congress approves and sends to President legislation expected to hike enrollments by half in next 12 months.

By Alexander McSurely

Recent congressional action is likely to result in a marked upswing—as much as 50 to 60 percent—in GI flight training enrollments by next summer. Some southern flight school operators who have year-round good flying weather will be in a position to cash in more immediately on this new business.

Only thing yet needed to open the way to a better deal for veterans who want to learn to fly is the expected approval of President Truman on the Independent Offices Appropriation Bill, containing a compromise amendment passed by both houses affecting flight training.

► **Shrunk Program**—The GI flight training program has shrunk far below its peak days of the summer of 1948, when at one time nearly 200,000 veterans were learning to fly.

Any hopes that this peak or a near approach to it will again be reached in the present program are over-optimistic.

VA records showed 36,745 veterans were enrolled in flight courses as of June 30, 1949. Breakdown of the total showed the following distribution:

- Elementary (private) course, 4,738;
- Commercial, 29,519;
- Flight instructor, 917;
- Instrument rating, 364;
- Air transport pilot, 66;
- Glider, 2;
- Others not classified, 879.

► **Schools Closed**—Comparable CAA statistics for approved aviation schools show how the drop in flight training, attributed largely to the opposition by VA top officials to flight courses, has affected the aviation training industry.

Approved flight schools numbered 1561, July 1, 1949, as compared to 1944 on July 1, 1948. Combined flight and ground schools had dropped to 985 from 1151 and ground schools to 129 from 192. Total aviation schools CAA-approved had dropped to 2675 from 3287. CAA points out that not all these schools are known to have closed, but that some may still be operating although below CAA standards for approval.

Unofficial reports indicate that a steady attrition of additional schools has continued since July 1, and indica-

tions are that others will fold this winter, before they can benefit from the new amendment.

► **Approve 61 Percent**—VA records say that 61 percent of the veterans applying for flight training from July 1, 1948, to June 30, 1949, had their requests granted without challenge. Presumably the other 39 percent were finally turned down or became tired of VA red tape and did not push their cases through to a conclusion. But this does not indicate how many other applicants were discouraged from making application by the known unfavorable attitude taken by VA officials toward flight training, and the efforts of VA counselors to steer prospective flight students into other types of training.

► **Supporting Affidavits**—The new compromise amendment provides in effect that the veteran wishing to fly shall submit proof that "the training will be useful to him in connection with earning a livelihood" in the form of his own affidavit supported by "corroborating affidavits by two competent disinterested persons."

A year ago, Congress attempted to exclude vocational flight training from a ban enacted on avocational and recreational training for veterans. But the legislation then adopted failed to protect flight training, because VA elected to do its own interpretation of "vocational."

The VA interpretations resulted in the 61 percent acceptance record previously cited.

► **Additional Requirement**—The new compromise amendment is a watered-down version of an amendment originally introduced by Sen. Elmer Thomas (D., Okla.) which required the veteran to supply proof of his own affidavit. In the compromise in House and Senate committee conference the additional requirement of the two supporting affidavits by disinterested persons was added.

Another clause in the amendment as finally passed provides that funds shall not be expended from this appropriation for a course "in an institution which has been in operation for a period of less than one year immediately prior to the date of enrollment in such course unless such enrollment was prior to the date of this act."

► **No New Schools**—This clause is expected to prevent establishment of any new schools, aviation or non-aviation, for the purpose of "cashing in" on VA education or training programs.

Effect of this clause is expected to be that existing flight schools will not need to fear any new competition for whatever additional GI flight training enrollments are made under authorization of the new amendment.

► **Thomas Statement**—In final arguments before the compromise amendment was adopted Sen. Thomas stated:

"I did not agree until I had to, in order to get something in behalf of the veterans, that they would have to have two affidavits that they were honest, sincere and worthy to be enrolled in a flight training course. That was the best we could get. I hope the amendment will be agreed to, but I want to apologize to every veteran in America for the fact that Congress is imposing upon them something which is not imposed upon anyone else in the United States."

Analysis of the new legislation should not overlook the fact that all flight training allowable under it must still be vocational and for use in the veteran's future business, and that the door is still closed to training for "sport" flying which has no relation to the veteran's future occupation.

This fact in itself will hold down the total enrollments considerably from what they were in the peak days of 1947-1948 when no such limitation was in effect.

## Oregon Plans Low-Cost Strips

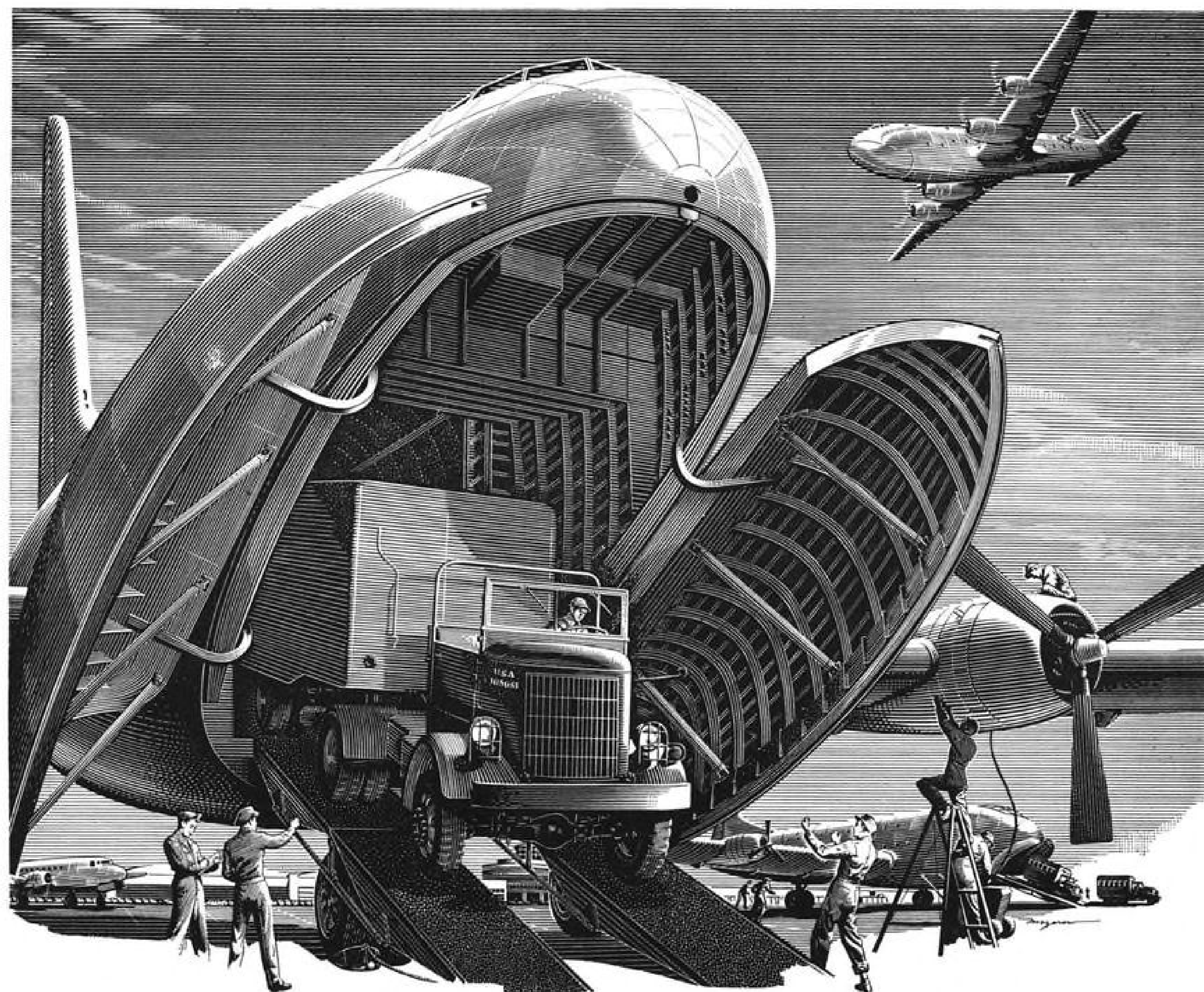
Oregon is experimenting in the construction of small landing strips to accommodate privately owned planes in sparsely settled areas and to provide access to recreational spots in mountains or at the seashore.

Three such strips have been authorized by the State Board of Aeronautics on recommendation of a committee of pilots.

One will be at Straton, located in a farming community, another at Paulina in central Oregon, and a third at Weconda beach on the Pacific shore. If they prove of value, more will be authorized.

W. M. Bartlett, director of the state board, said that, with cooperation of local agencies, cost of a practical, usable strip can be as low as \$250. The strips will be constructed at small cost on land donated or made available on long time lease from public bodies. Grading work will be done at cost by state, county or city crews. The strips will be 1500 to 2000-ft. long and 75 to 100-ft. wide.





## How Douglas is helping to meet the GROWING CRISIS IN AIR TRANSPORT

Military strategists fully recognize the vital role that air transport will play in future operations.

They realize that tomorrow's transports must be larger, faster, more versatile.

This is why the Air Force has ordered a fleet of new-type cargo planes—the Douglas C-124A.

- Towering 48 feet above the ground, this giant transport will fly loads up to 50,000 lbs. a distance of 1,200 miles and return to base without refueling.

- Reversible-pitch propellers and wing-length brake flaps will enable the C-124A to take off and land from medium-size air fields.

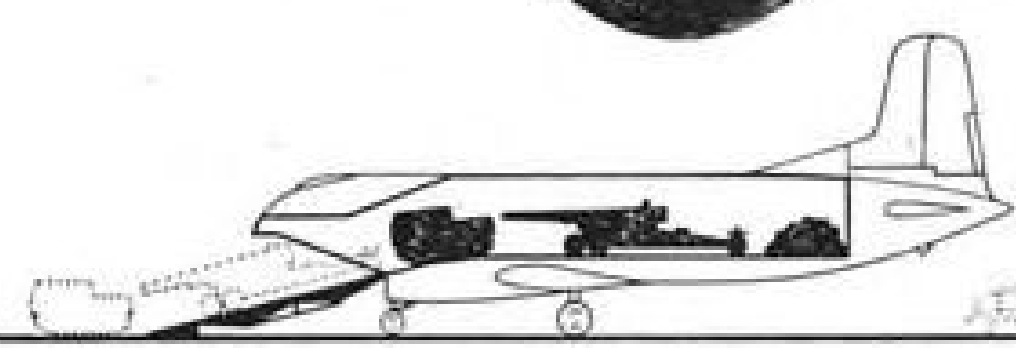
- Unique clamshell loading doors and self-contained ramp make it the only transport where heavy field equipment can drive directly on or off the plane.

Designed to support and supply global operations, the C-124A carries on the quarter-century Douglas tradition of building dependable aircraft—always ready—whatever the job, wherever the mission.

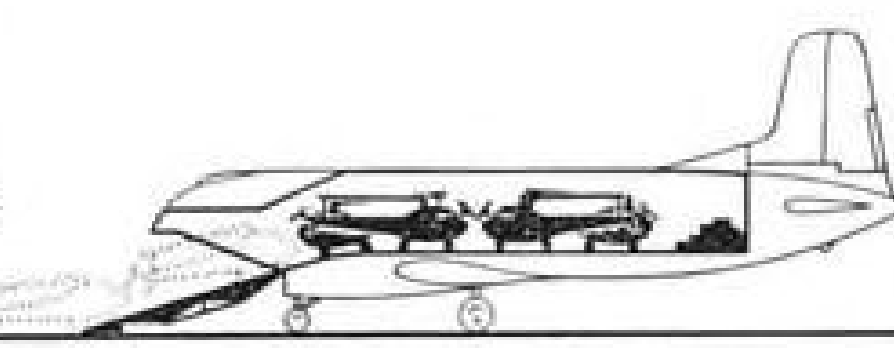
LONG BEACH PLANT OF DOUGLAS AIRCRAFT COMPANY, INC.



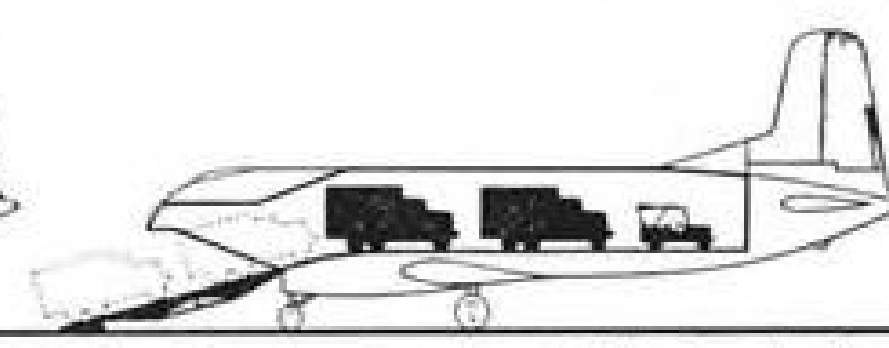
SERVING MANKIND AROUND THE WORLD



50,000 lb. payload: 8-inch M1 gun on M2 wagon, 3 men, misc. equipment.



50,000 lb. payload: 4 helicopters, 30 men, misc. equipment.



50,000 lb. payload: 2 fully loaded 2½ ton trucks, 6 men, misc. equipment.

## AIR TRANSPORT



MAMBA-MARATHON'S unattractive jet-pipe fairings are displayed above otherwise very clean engine nacelles. Installation apparently was dictated by wings being too thin to enclose the pipes. Third British turboprop liner to fly, 22-seat Mamba-Marathon is smaller than . . .



ARMSTRONG WHITWORTH 31-passenger Apollo with four Mambas. Gross weight of the pressurized craft is 39,500 lb. and it is designed to cruise at 305 mph. at 20,000 ft. Total freight capacity is given as 430 cu. ft.

## U. S. Airlines to Buy British?

Sen. Johnson tells of plan to purchase foreign craft; hits American complacency in jet-transport design.

Great Britain's energetic world-wide campaign to sell its new jet and turbo-prop transports is strengthening congressional belief that U. S. plane manufacturers and military officials are too complacent over the foreign threat to American leadership in commercial aviation.

Senator Edwin Johnson (D., Colo.), chairman of the Senate Interstate and Foreign Commerce Committee, last week told AVIATION WEEK he had been informed that "several U. S. airline presidents have arranged to purchase British jet transports during the next three years." He said developments in the British jet field call for prompt and decisive action by the U. S.

► Three-Year Lead—"Once the world

air routes are taken over by sterling bloc countries with their lower wages it will be difficult for American carriers to recapture supremacy without increased government subsidies," Johnson warned. "It is the three-year lead the British have grasped while we have marked time and pondered the economic efficiency of jets that may lose this country's predominance in civil air transport."

"The longer we wait (to develop new transport designs) the harder it will be to overcome the British advantage."

On the long international routes, high-speed jet transports will certainly capture the world's air trade as soon as they are technically and econom-

ically feasible, Johnson continued. "The U. S. has the basic scientific knowledge coupled with extensive experience with jet engines in military aircraft, but there is no substitute for applying this scientific knowledge in the construction of commercial transports of advanced design."

► Military Program Sought—The senator said he was at a loss to understand the reluctance of military authorities to press for a positive program to meet their transport requirements as determined by the Joint Chiefs of Staff. He noted that loss of commercial sales would make domestic plane builders all the more dependent on day-by-day support of the military "which dares not permit the aircraft manufacturing industry to collapse."

Johnson recalled that due to neglect and lack of planning the U. S. Merchant Marine was in deplorable condition prior to World War II. He predicted that without the ability to compete on equal terms with foreign carriers our international air fleet will deteriorate similarly.

► Commandeering Hit — "There is strong belief in Congress that the military cannot again safely take over the planes of U. S. domestic airlines, causing disruption of mobilization and production," Johnson declared. "Weakening the airlines in a national emergency by commandeering 25-50 percent of their planes would be an act of desperation."

The Commerce Committee chairman wants the National Military Establishment to estimate the number of aircraft of a type suitable for com-



mercial use that would be required by the armed services on M-day. A way should be found, the senator declared, to develop a fleet of surplus aircraft operated by the airlines which could be converted immediately to military use in wartime without denuding the commercial air transportation system.

► **Manufacturers' Problem**—Johnson thinks the military shows some lack of understanding regarding the proposed aircraft prototype program. But he is equally concerned over the lack of interest by U.S. plane builders in the development of advanced transports suitable for feeder, medium-range and long-haul operations.

"Manufacturers have spent huge sums designing and tooling up for present models, and they do not want to go to a new design until they have recovered their heavy investment."

► **British Salesmen Busy**—The senator's call for action coincided with a prediction by the South Pacific representative of the British Hawker Siddeley Combine that "Australia will replace her present American commercial aircraft with British jet airliners within five years." The Hawker Siddeley official added pointedly that the shift to British jets "of which a wide selection will be available" would result in substantial dollar savings.

Previously, CAA administrator Delos W. Rentzel in testimony before Johnson's committee asserted that British turboprop transports such as

the Vickers-Armstrong Viscount, Armstrong Whitworth Apollo and Handley-Page Mamba-Marathon would find favor among foreign buyers because they can be bought with pounds instead of dollars.

Rentzel compared the turboprop craft with the Convair-Liner and Martin 2-O-2. He said that besides the dollar factor and certain over-all performance advantages, the British ships are almost completely vibration-free (permitting lower maintenance costs).

"But I do not believe these (British turboprop) transports will find a ready market in the United States, nor do I believe production capacity will permit export of these aircraft from Britain before 1952 or early 1953," Rentzel continued. "Although no price has been fixed for these planes, they are expected to sell for between \$600,000 and \$800,000 pounds delivered with complete instrumentation. This is about one-third more than the average sales price of the Convair-Liner or Martin 2-O-2 to day."

► **U. S. Position Examined**—Rentzel told the Senate committee that "we in this country have, of course, not stood still," despite the fact that no U.S. aircraft manufacturer is engaged in actual construction of a jet or turboprop transport intended primarily for civil air carrier operations. He noted that some U.S. companies are engaged in making design studies of such planes.

"At present," Rentzel declared, "We are advised that Consolidated Vultee

has done some work toward installation of turboprop engines in its Convair-Liner; and that Lockheed is making studies of possible installation of turboprop units in the 93-ton XR60-1 Constitution, which was built for the Navy.

► **Military Planes Eyed**—"Some of the aircraft being procured by the armed services may have potential civil use. One example is the Navy's Constitution which was designed in accordance with the transport category requirements of Civil Air Regulations Part 4. Another is the turboprop Navy patrol boat, the P5Y, now nearing completion by Consolidated Vultee.

"Northrop has a jet-powered version of its Flying Wing which it is estimated can carry a 30,000-lb. cargo load at 532 mph."

The CAA chief said aircraft engineers have estimated it will take about five to eight years from the letting of the contract to production of a fully-tested and completely certificated jet-powered transport for civil use. He noted that CAA already has certificated for civilian use two turbojet engines, one manufactured by Allison and the other by Pratt & Whitney.

## Prop Reversal Causes NEA Crash

Engineers last week were studying safer propeller reversal controls as a result of a Northeast Airlines in-flight propeller reversal, the third such instance reported by airlines in recent months, but the first with serious results.

An NEA Convair-Liner crashed on the runway at Portland, Me., Municipal Airport and was destroyed, but without loss of life to either passengers or crew.

Previous instances of prop reversal in the air have occurred to an American Airlines Convair-Liner and a United Air Lines DC-6 (AVIATION WEEK, June 6, July 25). Propellers of two different manufacturers have been involved.

Prop reversal on the NEA plane occurred when it was about 15-20 feet off the ground approaching for a landing. It crashed and burned, but investigators reportedly found that the throttle levers were in the normal reverse position, indicating that the propellers performed properly.

Preliminary indications last week were that the NEA reversal, like the other incidents, could be traced to malfunctioning of the electric locking devices, rather than the propeller system itself.

► **System**—Failure of the locking mechanism on the control quadrant would have permitted the pilot inadvertently to pull the throttles all the way back into reverse when throttling back for a landing. The solenoid-operated locks are designed to stop the throttle from

moving into reverse while the plane is in flight.

When the plane touches the ground, the locks move out of the way, permitting the throttles to be moved freely into the reverse position. Locks are electrically actuated by a micro-switch circuit which is closed by the telescoping action of the landing gear oleos.

► **AA Cause**—AA found that prop reversal in its craft was caused by a sticking solenoid lock. The plunger in the solenoid was bent and would not move up to block throttle movement. UAL's malfunction was caused by a missing stud which permitted the landing gear-actuated micro-switch to close in flight and electrically open the solenoid lock on the quadrant.

On the basis of these two minor incidents, observers feel that once the lock mechanism fails it is very easy for the pilot accidentally to reverse the props. On the Boeing Stratocruiser, throttles still have to be pulled upwards to travel into reverse, as an added precaution against accidental reversal.

## Service-Subsidy Bill Unlikely to Pass

Chances for enactment this year of legislation requiring separation of "service" mail pay from airline subsidy remain dim, but Sen. Edwin Johnson (D., Colo.) will push for Senate passage before Congress goes home.

Last week, Johnson, chairman of the Senate Interstate and Foreign Commerce Committee, introduced a new bill.

Endorsed by the Commerce Department and the Budget Bureau, representing the President, it directs CAB to make a study looking to the establishment of "service" mail pay rates for routes in the domestic and overseas system.

► **Effective Next Year**—The rates would become effective July 1, 1950, or, if the Board study is not completed by then, would be retroactive to that date. CAB has vigorously opposed the setting of an effective date.

After hearings, CAB would establish subsidy payments necessary to sustain routes vital to the commerce and national defense. These payments would be made from funds appropriated to the Board, instead of from Post Office funds.

CAB is directed to study the "feasibility and wisdom" of establishing by law the principle that U. S. international carriers receive mail pay at the same rates paid by the U. S. to foreign carriers for similar service, plus a subsidy to compensate for differences in wage rates and safety standards and "additional subsidies where required in the national interest."

## IATA Reaches 30

Seventy airline members of the International Air Transport Assn. last week marked the 30th anniversary of IATA by carrying on routine operations over more than half a million miles of routes, according to Sir William P. Hildred, director general.

Hildred cited annual passenger load increase on world airlines of from 3500 to 20 million, and an increase in miles flown of from 600,000 to 1 billion, within the past 30 years.

Between 1919 and 1949, Hildred said, air transport speed and reliability has tripled, its safety quotient has been multiplied by 25, and its cost to the public has been cut by seven-eighths.

## TWA Faces Ouster From Fairfax Base

Air Force has indicated it will not renew Trans World Airline's lease at Fairfax Airport, Kansas City, where the carrier, with 451 employes, now has overhaul facilities and main headquarters.

TWA along with the U. S. Chamber of Commerce and representatives of Kansas City, Kans., and Kansas City, Mo., are fighting the move which would make Fairfax an Air Reserve training base.

John A. Collings, TWA vice president-operations, estimates the carrier's annual payroll in Kansas City is \$23 million. Company purchases reach \$6 million per year. Collings says the order, if it goes into effect, will mean reducing personnel to less than 300. It will also mean TWA "loses a lot of know-how, because many employes, who are settled in Kansas City and like it here, will stay and find other jobs."

The carrier would also be faced with the problem of finding another location as ideal to its needs as Kansas City. Collings says TWA accomplishes considerable saving by consolidating domestic and overseas maintenance at the base, in addition to routing in planes for overhaul on regular passenger runs.

Air passenger service into Kansas City would not be affected, he said, since TWA would continue to keep it as a passenger point.

## Colonial Files Suit To Stop TCA

Colonial Airlines has sought the aid of the federal courts in its fight to prevent Trans-Canada Airlines from operating a competitive Montreal-New York route.

In a suit filed in Washington this month, Colonial contested the constitutionality of the foreign air carrier per-

mit sections of the Civil Aeronautics Act; charged that the U. S.-Canadian air transport agreement concluded last June is invalid; and asserted that granting of U. S. routes to TCA violates the anti-trust laws. The American carrier said its vested property rights in the New York-Montreal route are being taken away without due process of law by virtue of a conspiracy by CAB members.

► **Diversion Feared**—CAB member Russell B. Adams headed the U. S. delegation which negotiated the agreement giving Canada rights to designate a carrier to operate the Montreal-New York route and other links. Colonial's president, Sigmund Janas, has said the pact would mean diversion of \$1 million annually in revenues from his company.

The Colonial suit describes government-owned TCA as an "alien monopoly" controlled by Canadian National Railway.

## Family Fare

United Air Lines, American Airlines and other domestic carriers offering the first-of-the-week family fare plan want to extend it to Mar. 31, 1950. The tariffs are now due to expire Sept. 30.

In announcing that it would ask the Civil Aeronautics Board for an extension, UAL reported that 40,000 families have taken advantage of its special group rates in the past eight months. Under the plan the head of a family, paying full fare, can take his wife and children on flights at half-fare on Mondays, Tuesdays or Wednesdays, the period when traffic is normally light.

## Capital's Coach Gains Trim Mail Pay Need

Air coach has earned a minimum average net profit of \$30,000 monthly for Capital Airlines since the low-cost service was inaugurated last November, according to president J. H. Carmichael.

Replying to intimations that four-cents-a-mile service is economically unsound, Carmichael told the Civil Aeronautics Board and the Senate Interstate and Foreign Commerce Committee that the operation was a money-maker both on an added cost and fully allocated cost basis. The off-hour flights are definitely reducing Capital's dependence on mail pay, Carmichael declared.

The \$30,000 monthly air coach profit was shown after the service absorbed its full share of all costs, Capital explained. On an added cost basis, the average monthly profit has been over \$115,000.

► **Traffic Analyzed**—Between Nov. 4, 1948, and July 31, 1949, Capital carried 83,323 coach passengers 44,235,000 revenue passenger-miles with an average load factor of 76 percent. During this



SPANISH SPOKEN HERE

Main ticket office for Pan American Airway's Puerto Rico flights is this ticket office, located in the heart of New York's Puerto Rican district, in the Bronx. Opened last year, and staffed by Spanish-speaking reservation agents, the office accounts for the largest

part of N. Y. Puerto Rico bookings. Interior was designed by PAA's Pamela Drake, in charge of decorating ticket offices and waiting rooms for the airline. Station manager is Manuel Collazzo. Window displays advertise PAA's \$75 fare to the island.



nine-month period, the carrier grossed \$1,752,408 from the cut-rate passenger service.

Cargo receipts (express and freight) aggregated \$87,277, bringing total non-mail revenues to \$1,839,685. Overall expense on a fully allocated cost basis was \$1,564,315.

Included in the expense was about \$200,000 worth of advertising from which the company derived benefits far beyond its application to strictly coach service. But even with this promotional cost burden, Capital reported \$275,370 net profit during the first nine months of its four-cents-a-mile operation without any assistance from mail pay.

► **Added Cost Results**—Carmichael pointed out that had Capital not operated any coach services it would still have had the recurring expense of ticket offices, salaries and wages of employees, depreciation, etc. "Admittedly, we have had additional cost items such as crews, gasoline, advertising and a few more personnel, but considering our experience in the light of the added expenses we have made a \$1,042,661 profit on coach operations (\$115,000 a month)."

Capital claims that even on a fully allocated cost basis it has shown a net profit on coach service every month except November, 1948. In June, it earned \$95,715 on an allocated cost

basis. Since the company's operating profit for the first half or 1949 was \$345,000, air coach apparently was a major factor in putting Capital in the black.

► **Mail Pay Cut**—High load factors on air coach have raised Capital's overall load factor and reduced its mail pay. The carrier has a sliding scale mail rate which drops as the passenger load factor increases.

Carmichael estimated that only three to five million people bought the 14 million tickets sold by the domestic airlines last year. He said these five million people are a pitifully small segment of the 150 million U. S. population and demonstrate what actually is wrong with the airlines—failure to sell to the masses.

A recent CAB survey showed that 18.5 percent of the company's air coach passengers were making their first commercial plane flight, and that of these "first riders" 86 percent said they would not have used regular air service if coach had not been available.

## Two More Nonskeds Under Official Fire

Nonscheduled operators are continuing to feel the weight of the Civil Aeronautics Board's "big stick" for allegedly flying more frequently and regularly than the law allows.

The Board has ordered Mt. McKinley Airways, Anchorage, Alaska, to show cause why its letter of registration as a large irregular carrier should not be revoked for "knowing and wilful violations of the Civil Aeronautics Act. Headed by Jack Scavenius, Mt. McKinley is one of the best-known uncertificated passenger and cargo carriers on the Alaska-Seattle route.

CAB originally instituted enforcement proceedings against Mt. McKinley over a year ago. In April of this year, the company was ordered to cease and desist from operating its DC-3s in regular service between Seattle and Anchorage. The Board alleges that Mt. McKinley has continued to fly the U. S.-Alaska route regularly since last April's order.

► **Florida Carrier Hit**—Meanwhile, a CAB examiner has recommended that the Board issue a cease and desist order against American Air Transport and Flight School, Miami Springs, Fla. The company is accused of operating regular flights between New York, Miami and San Juan, Puerto Rico, in violation of the nonscheduled exemption, and of charging fares less than that specified in tariffs filed with the Board.

The examiner rejected AAT's contention that CAB lacked economic jurisdiction over the company's opera-

tions because they were not in common carriage. AAT argued that it did not offer its services to the public but rather to its travel agents who, as independent contractors, leased the carrier's planes.

Other developments in the nonscheduled field:

- **Associated Airways**, Burbank, Calif., (formerly Airplane Charter by Mercer) was slated to start West Coast to Hawaii flights this month with one-way fare of \$109 and \$199 roundtrip. DC-4s and crews are supplied by The Flying Tiger Line. Certificated companies charge \$160 one-way and \$288 roundtrip. Another nonsked, Airline Transport Carriers, Burbank, has proposed a \$99 West Coast-Honolulu fare.

- **Arrow Airlines** has installed television equipment on its transcontinental DC-4 flights.

- **Transocean Air Lines** recently flew back to San Francisco and Seattle the 1200 salmon fishermen it carried to Alaska during June.

- **Robin Airways** has increased the frequency of its cut-rate intrastate Oakland-Los Angeles flights to four round-trips daily. California Arrow, another uncertificated carrier, has increased its Sacramento-Oakland-Los Angeles DC-3 service.

## New Fare Structure Proposed by NWA

A radical new three-level passenger fare structure, based on types of equipment used and service rendered, has been proposed by Northwest Airlines.

The four-cents-a-mile fare for coach service and six-cent rate for Stratocruiser flights would be continued. But tickets on regular DC-4 and Martin 2-O-2 schedules would be only five cents a mile, compared to the present six cents.

► **October Target Date**—NWA plans to apply formally to CAB for the new fare structure on Sept. 1. Effective date of the tariff—if the Board approves—would be Oct. 1. Actual service at the proposed rates would start Oct. 15.

Under the tariff differentials, Stratocruiser fare between New York and Seattle would be \$157.85; Martin 2-O-2 and DC-4 rate would be \$131.55; and coach tickets \$97. The three fare levels would be known as classes one, two and three, respectively.

► **Protests Expected**—Standard (class two) fares of about five cents a mile would be about 17 percent lower than the general fare level of the air transport industry.

NWA President Croil Hunter outlined his three-class passenger service ideas in his annual report to stockholders several months ago (AVIATION WEEK, Apr. 25). He said diversified operations to meet the needs of mass

use of air transportation would be Northwest's main objective during the coming year.

► **New Stratocruiser Service**—Filing of the new tariff on Sept. 1 will coincide with inauguration of NWA's nine-hour transcontinental Stratocruiser flights. During the past month the new planes have been in service on the 400-mile Chicago-Twin Cities link.

United Air Lines already has complained to CAB that NWA's coast-to-coast Stratocruiser operation will hurt UAL traffic. As a result, United has requested permission to operate from Chicago to Seattle nonstop. It is now required to make a stop at Denver,

Colo., or some other intermediate point.

According to UAL, use of Stratocruisers would give Northwest a 3 hr. 10 min. time advantage on transcontinental flights from New York to Seattle. This could enable NWA to divert 40 percent of United's through traffic on the route unless the nonstop authorization is granted, UAL officials declared.

## SHORTLINES

► **China National Aviation Corp.**—Recently suspended all operations after the Hong Kong government requisitioned its

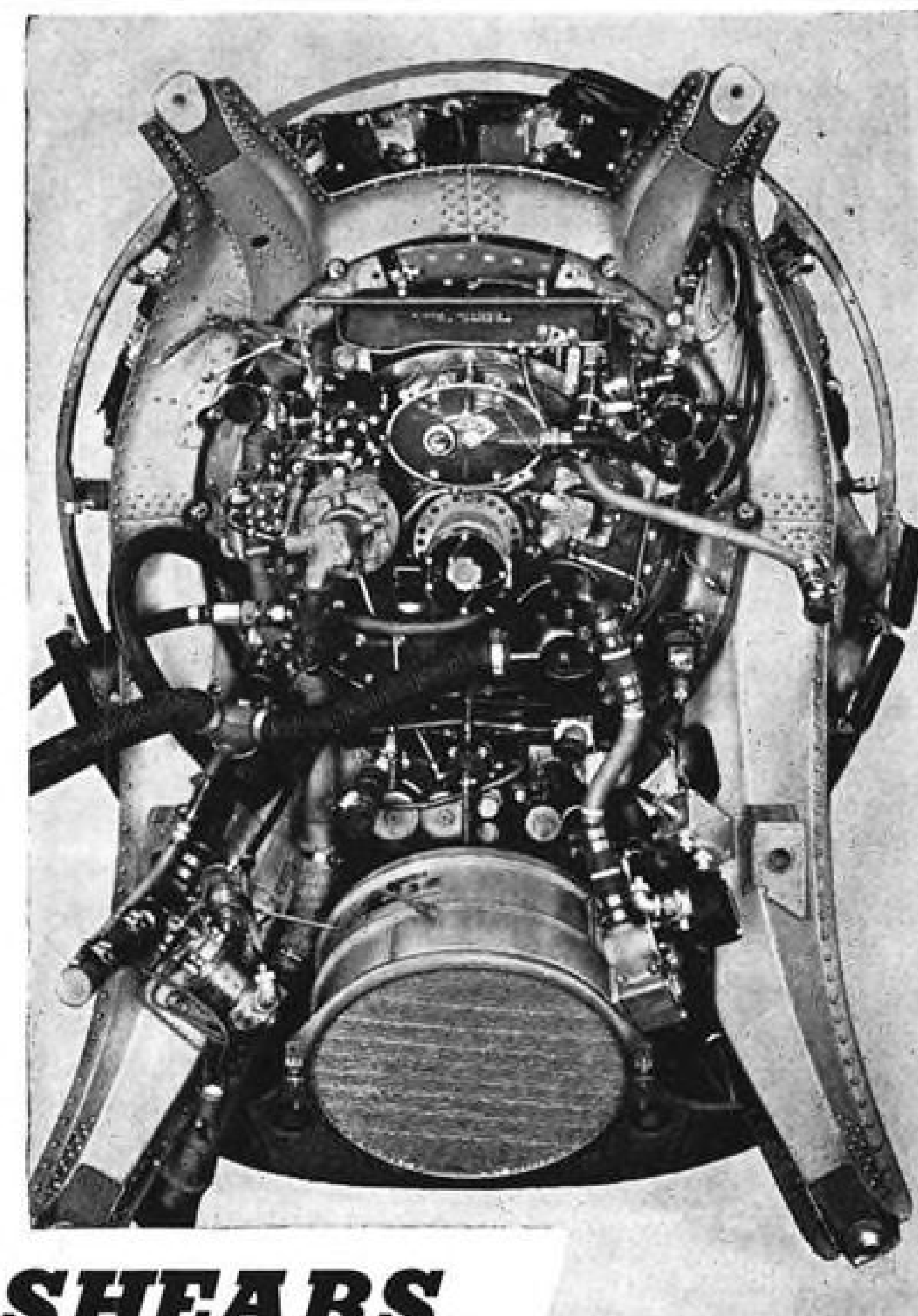
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shops at Kaitak Airport. Company later resumed flights when it received a three-weeks grace period to take its maintenance plant from the field. Officials of the British crown colony said the seizure was a defense measure to expand RAF facilities. CNAC has about 56 planes. The company is owned 20 percent by Pan American Airways and 80 percent by the Chinese government.

► **Continental**—Reports that for every dollar of transportation sold on its own system it sells 68 cents worth on connecting airlines. CAL feeds to connecting carriers 43 percent more dollar transportation than it receives in return.

► **Linea Aeropostal Venezolana**—A CAB examiner has recommended that the carrier be issued a foreign air carrier permit to operate between Maiquetia (Caracas), Venezuela, and Miami, Fla., via Havana, Cuba; and between Maiquetia and Montreal, Canada, via Havana and New York for an 18-month period. A government-owned company, LAV now operates thrice-weekly service between Caracas and New York via Havana with Constellations.

► **Northeast**—Carried 6595 more passengers in July than in the same month last year.

► **Pan American**—Company's petition for an exemption to operate over the Great Circle route from the West Coast to the Orient has been denied by CAB.

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Northwest Airlines, which makes the Great Circle run via the Aleutians, opposed PAA's application. At present, Pan American operates to the Orient via Hawaii, Midway, Wake and Guam.

► **Robinson**—Has contracted to handle all American Airways' reservations and station services at Buffalo, N. Y., Municipal Airport.

► **Seaboard & Western**—Reports west-bound trans-Atlantic freight volume was at a record high in July and was more nearly in balance with eastbound shipments than at any time in the company's 27-month history. Westbound carriage in July was up 150 percent over the same month last year and equal to 72 percent of the eastbound total. S&W flew 2,381,834 freight ton miles between the U. S., Europe and the Middle East in first-half 1949, up 44.5 percent over the same period last year.

► **Slick Airways**—Made its first flight as a certificated carrier this month—three and one-half years after it filed application for all-cargo routes. President Earl Slick said: "When we get new 300-mph. equipment, such as the DC-6A, Constellation Airfreighter or Boeing Strato-freighter, we should be able to operate at below surface costs in many cases." Company now operates 21 C-46s.

► **Trans-Australia Airlines**—The government-owned carrier expected to fly its millionth passenger this month, less than three years after starting operations.

► **Transocean**—Has signed a one-year contract with the Navy to transport personnel and materiel between Seattle and the Aleutian chain. A DC-4 has been assigned to the operation.

► **United**—During July operated more than 98 percent of all scheduled flights. Of these, 96 percent departed on time or within 15 minutes of schedule, and 87 percent arrived at their destination within the same time limits.

## CAB SCHEDULE

Aug. 29—Hearing on Trans-Canada Air Lines, application for foreign air carrier permit to operate from Montreal to New York. (Docket 3964)

Sept. 7—Hearing on service to Lake Tahoe. (Docket 3623)

Sept. 12—Hearing on CAB investigation of International Air Transport Assn. Agency resolutions. (Docket 3350)

Sept. 19—Hearing in air freight tariff agreement case. (Docket 2719 et al)

Sept. 19—Hearing on service to Springfield, Mass., through Bradley Field. (Docket 3748)

Sept. 26—Hearing on Seaboard & Western and Transocean Air Lines applications for all-cargo certificates between the U. S., Europe and the Middle East. (Dockets 3041 and 3818)

Sept. 26—Hearing on disposal of Parks Air Lines' feeder routes. (Docket 3965 et al)

Oct. 3—Hearing on Hughes Tool Co. control of TWA. (Docket 2796)

Nov. 14—Hearing in Western-Inland mail rate case. (Docket 2870)

## LETTERS

### New Era in Labor

Your account of the organization of the National Pilots Association in AVIATION WEEK, Aug. 15, was most interesting.

Perhaps this is the happy beginning of an era of amiable relations in the labor field. I am thinking of the day when the NPA, fighting for the rights of its members, may be forced to strike; and of the handshaking and camaraderie with which they will greet the strikebreakers crossing the NPA picket lines—the pickets recognizing themselves on a former day, when they first entered the picture of labor relations.

LOREN V. PETRY,  
TWA Pilot,  
Stony Brook, New York

### Fire Fighting

The article by Neill G. Bennett on crash-fire dangers in June 20 AVIATION WEEK will, I hope, arouse sufficient interest in the study of cut-off switches to initiate an objective program to determine their value. I saw quite a lot of Mr. Bennett when he was over here recently and was very much impressed with his outline of English endeavors to reduce hazards of fire following crash.

It appears wasteful to carry fire extinguishing apparatus many thousands of hours and then not be able to use it in preventing a fire from occurring following a crash. But as Mr. Bennett points out, if this idea is followed it will require marked departures in the present system of installing fire extinguishing apparatus. The bottles would have to be located near the possible source of fire because it would be impractical to depend on long tubes to remain intact after a crash.

JEROME LEDERER, President  
Flight Safety Foundation  
515 Madison Ave.  
New York 22, N. Y.

### Stewardess Contract

I wish to draw your attention to a discrepancy appearing on page 50 of your May 2 issue relating to the recently concluded agreement between our Association and Northwest Airlines for stewardesses and pursers. . . . However, the Northwest domestic stewardesses are rather proud of their top bracket of \$255 in their pay scale. The figure is not \$225 as stated in AVIATION WEEK.

We very much appreciate the frequency with which you publish our releases in your magazine and I would like to take this occasion to thank you.

FRANK J. ALBRIGHT  
Director of Publicity and Public Relations  
Air Line Stewards and Stewardesses Assn.  
3148 West Sixty-Third Street  
Chicago 29, Ill.

(The error was made by the typewriter of one of our correspondents. We regret.—Ed.)

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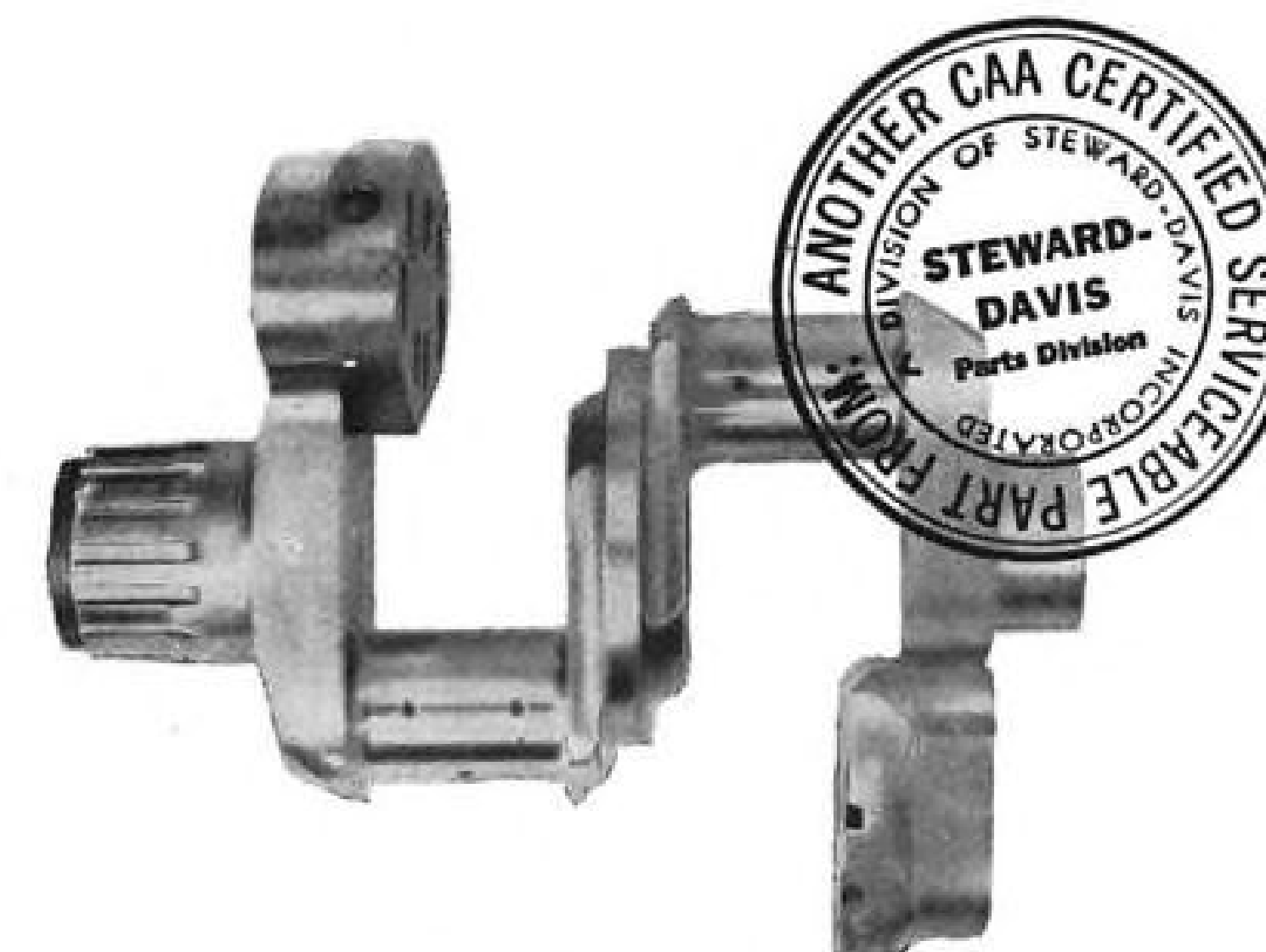
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## WHAT'S NEW

### Trade Literature

"Current Market Report," prepared by AVIATION WEEK Magazine, an 11-page publication issued for the industry, available on request to Research Department, AVIATION WEEK, 330 West 42 St., New York 18, N. Y.

"Flight Tests of an Off-Scheduled Distance Computer," by Francis J. Gross and Hugh Kay, Radio Development division, CAA, available on request to Civil Aeronautics Administration, Washington 25, D. C.

"Catalog 15," a listing of modern instruments for plant and laboratory, available on request to H-B Instrument Co., 2633 Trenton Ave., Philadelphia 25.

"Improvements in Glide Path Transmitters," by C. H. Jackson, Radio Development division, CAA, available on request to Civil Aeronautics Administration, Washington 25, D. C.

Bulletin, describing a portable multi-circuit pyrometer, available on request to Illinois Testing Laboratories, Inc., 420 LaSalle St., Chicago 10.

Catalog, covering pressure regulators, is available on request to Air Reduction, 60 East 42 St., New York 17.

### Books In Preparation

(For more information about the following books, address inquiries to McGraw-Hill Book Co., Inc., 330 West 42 St., New York 18.)

"Slipstream: The Autobiography of an Air Craftsman," by Eugene E. Wilson, winter publication by Whittlesey House, 330 W. 42 St., New York 18.

"Air Transportation: Traffic and Management," by Thomas Wolfe, winter publication.

"The Theory and Design of Gas Turbines and Jet Engines," by E. T. Vincent.

"Aviation Handbook for Aeronautical Engineers," by Leslie E. Neville, Institute of the Aeronautical Sciences.

"Supersonic Aerodynamics," by E. R. C. Miles, Johns Hopkins University.

"Principles of Aerodynamics," by J. H. Dinnell, University of Washington, October publication.

"Engineering Supersonic Aerodynamics," by E. Arthur Bonney, Johns Hopkins University, November publication.

"The Airplane and Its Engine (5th ed.)," by C. H. Chatfield, C. F. Taylor, and S. Ober, Massachusetts Institute of Technology, August publication.

"Theory of Wing Sections," by Ira H. Abbott and A. E. von Doenhoff, August publication.

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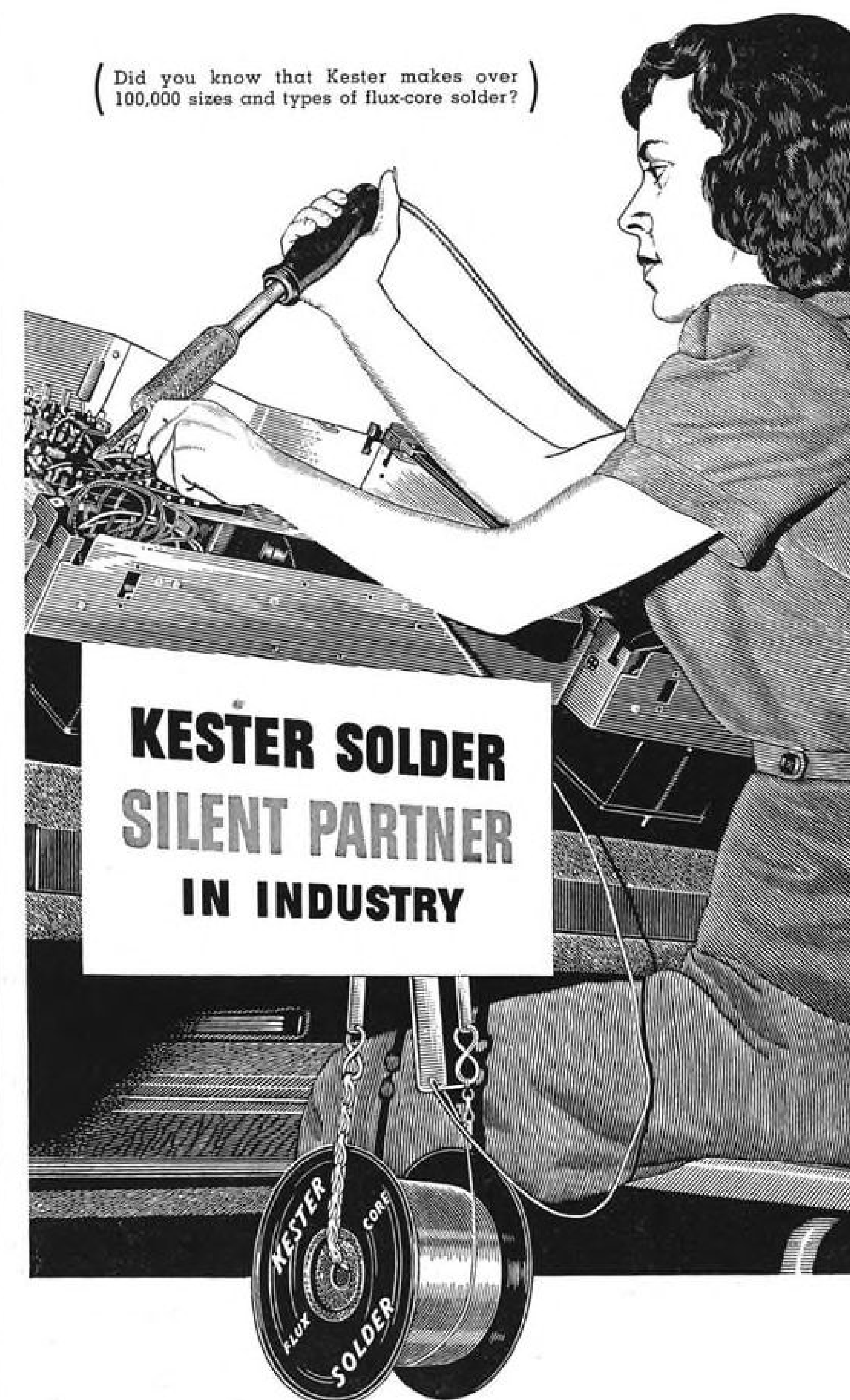
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## EDITORIAL

### The Trend to Mass Air Travel

While skeptics continue to discredit low cost and air coach experiments, the industry discovers new horizons ahead and is amazed at its own performance.

Capital Airlines, the scheduled industry's pioneer in air coach, reports that the experiment, since its inception last November, has earned a minimum net profit of \$30,000 monthly. In June, coach earnings, even on an allocated cost basis, were \$97,715. President Carmichael told the CAB and the Senate Interstate and Foreign Commerce Committee that his coach operation was a money-maker both on an added cost and fully allocated cost basis. Already, Carmichael says, air coach, by increasing load factor, actually has reduced the company's mail pay—money from the taxpayers' pockets.

Carmichael estimates that only three to five million persons bought the 14 million tickets sold by the domestic airlines last year, in his opinion a pitifully small segment of the 150 million U. S. population. This, he believes, is ample demonstration of what is actually wrong with air transportation—failure to sell to the masses. Capital is asking an indefinite extension of its coach service beyond Sept. 30.

Today National Airlines expects to apply to the Civil Aeronautics Board for permission to establish coach fares as part of its conviction that both the carrier and public will gain through so-called mass transportation. National offered excursion fares this spring after a two-year fight which saw it first opposed, then joined, by other air lines. National reports that about 20 percent of its revenues this summer can be traced to excursion rates. Revenues themselves are substantially above the previous year. National also requests permission to institute family fare plans. Neither National nor Eastern heretofore has followed the other major carriers in utilizing the family plan.

"The potential for air transportation is not represented by a single demand curve," National's president Ted Baker wires AVIATION WEEK. "Instead, it is made up of a number of groups whose air travel demands differ. There are some, for example, who will travel by air no matter what the fare. There is another group at a level where a decrease in cost will bring an equally proportionate increase in travel. Finally, there is a level where a further decrease will result in a more than proportional increase in travel. This is the level where mass transportation comes in. It is the level at which National is aiming.

"Airlines are in business because they hold a certificate of public convenience and necessity," Mr. Baker believes. "They can better fulfill the terms of their certificates if they increase their service to the public. And they can increase their service if they make it possible for more people to enjoy the benefits of air transportation.

"It is very true that coach fares in the beginning may require an airline to carry 18 passengers to earn the same revenue that ten would bring under a higher fare. But the public will be better served if lower fares make it possible for the extra eight to fly. And in the long run the carriers themselves will benefit by the increase in traffic which will result from the stimulus that the additional passengers will provide."

National, in its application, proposes to start four-cents-a-mile coach service Oct. 1 using a DC-4 with 48-passenger capacity. After 45 days, the company expects results to prove the feasibility of the rates. It would then modify a DC-4 to seat 70 or more passengers

and use density planes exclusively for coach service after Jan. 1, 1950.

"National believes there is sound basis for a non-luxury, low-rate service over its routes," Mr. Baker told AVIATION WEEK in advance of the filing of his application. "Fully 95 percent of the million and a half people who vacation in Florida during the winter travel to the state by other transportation than the three airlines serving the area. Lowered fares would tap this huge potential."

Still other developments last week pointed to a growing realization in the industry that mass transportation is not only desirable, but profitable.

American, United and other domestic lines offering the first-of-the-week family fare plan want to extend it from the present expiration date of Sept. 30 to Mar. 31, 1950.

Northwest, first scheduled carrier to offer transcontinental coach service, not only urges CAB to permit it to continue this four-cents-a-mile service beyond CAB's arbitrary Sept. 30 deadline. It proposes a revolutionary three-class passenger fare structure based on types of equipment. Stratocruiser fares would be set at six cents. Regular DC-4 and Martin 2-O-2 rates would be five cents instead of the present six cents. Obviously, this proposal will bring spirited protests from other carriers.

As AVIATION WEEK has stated so often editorially, the scheduled airline industry has underestimated both its own possibilities and the public's eagerness to fly. Too long it has basked in the security of guaranteed profits from Uncle Taxpayer. No matter how vociferous the skeptics of mass transportation wail, nothing—not even CAB—can stop the trend to lower fares. No one that we know has painted the air coach picture as the sole answer to the industry's prayer. It does not represent the millenium. No one has contended that there is no place for de luxe service. Coach will not work everywhere, as Mid-Continent Airlines discovered. Certainly it will not work with all the frills we expect in de luxe service. Certainly air coach must make money or it should not be continued. Certainly it will divert traffic from surface carriers, but when did we in aviation set ourselves up as our surface brothers' keeper? Certainly there will be some diversion from the full rate de luxe traffic, but the air coach skeptics for some inexplicable reason refuse to balance against this diversion the fact that every first rider is another potential customer for air travel the rest of his life. The recent CAB survey showed that 18.5 per cent of Capital's coach passengers were making their first commercial plane flight. Of these first customers, 86 percent said they would not have used regular air service if air coach had not been available.

Air coach and other reduced fares must be given a fair chance. Otherwise, the industry may lose for all time an opportunity to ease its dependence on subsidy and eliminate some of the accompanying welter of restrictive bureaucracy and red tape. The future possibilities of this industry are unbelievable. We shall never attain them by maintaining a stand pat attitude, by playing safe. There will be some casualties, assuredly. But a new awakening is sweeping industry. Somewhere ahead, beyond the present limits, but somewhat short of the wildest dreams, there is the answer. We shall never find that answer by blocking all of those who are trying to find it.

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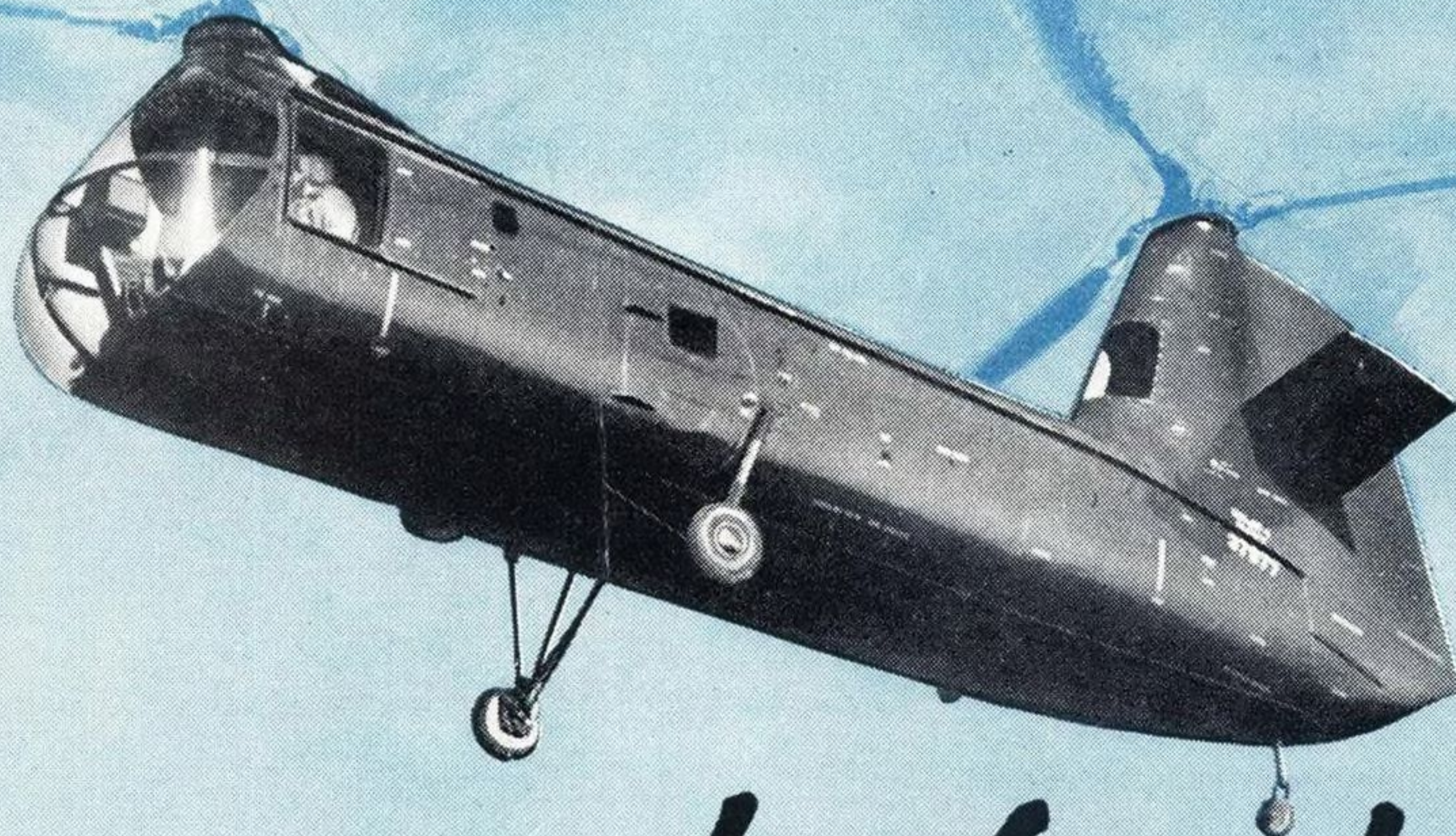
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