

AVIATION WEEK

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FEB. 5, 1951

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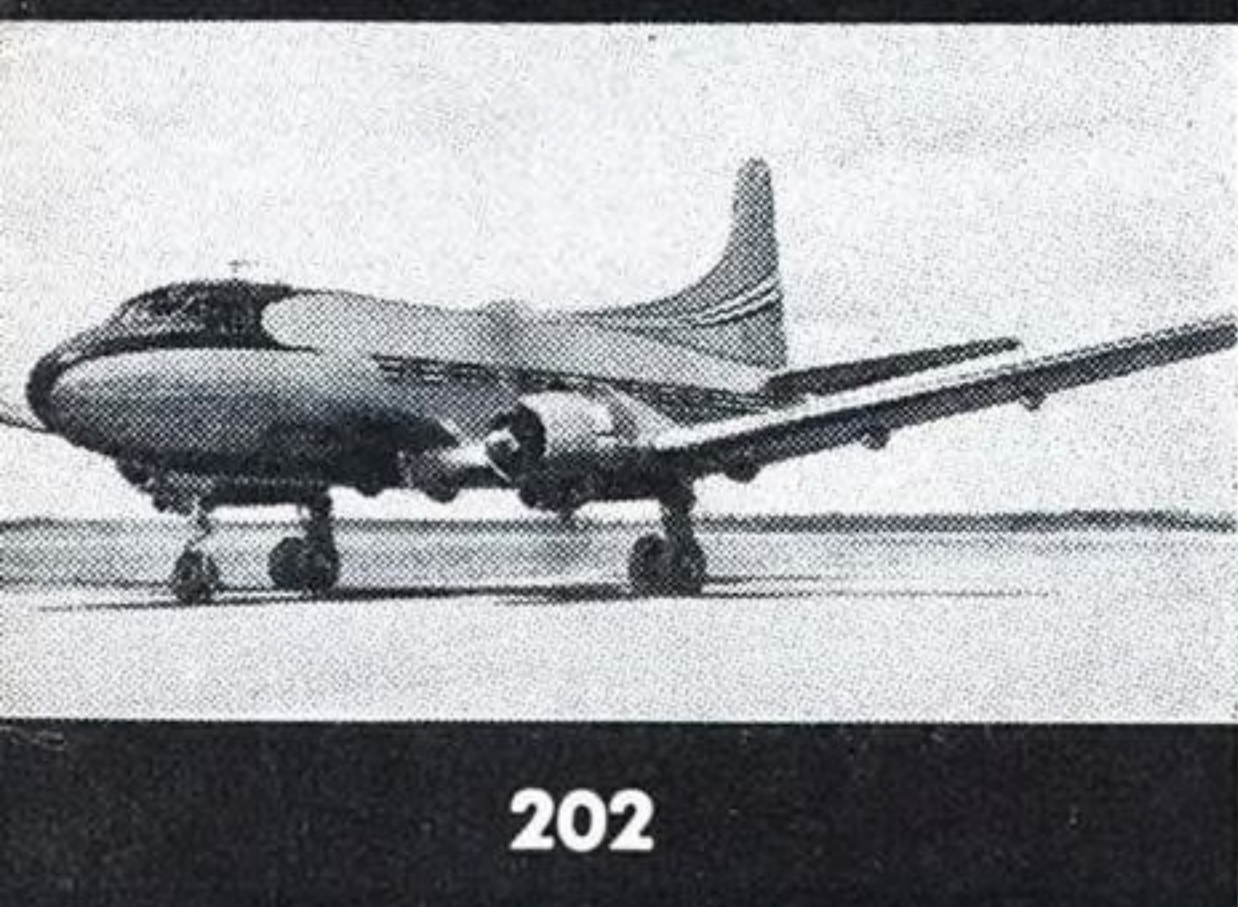
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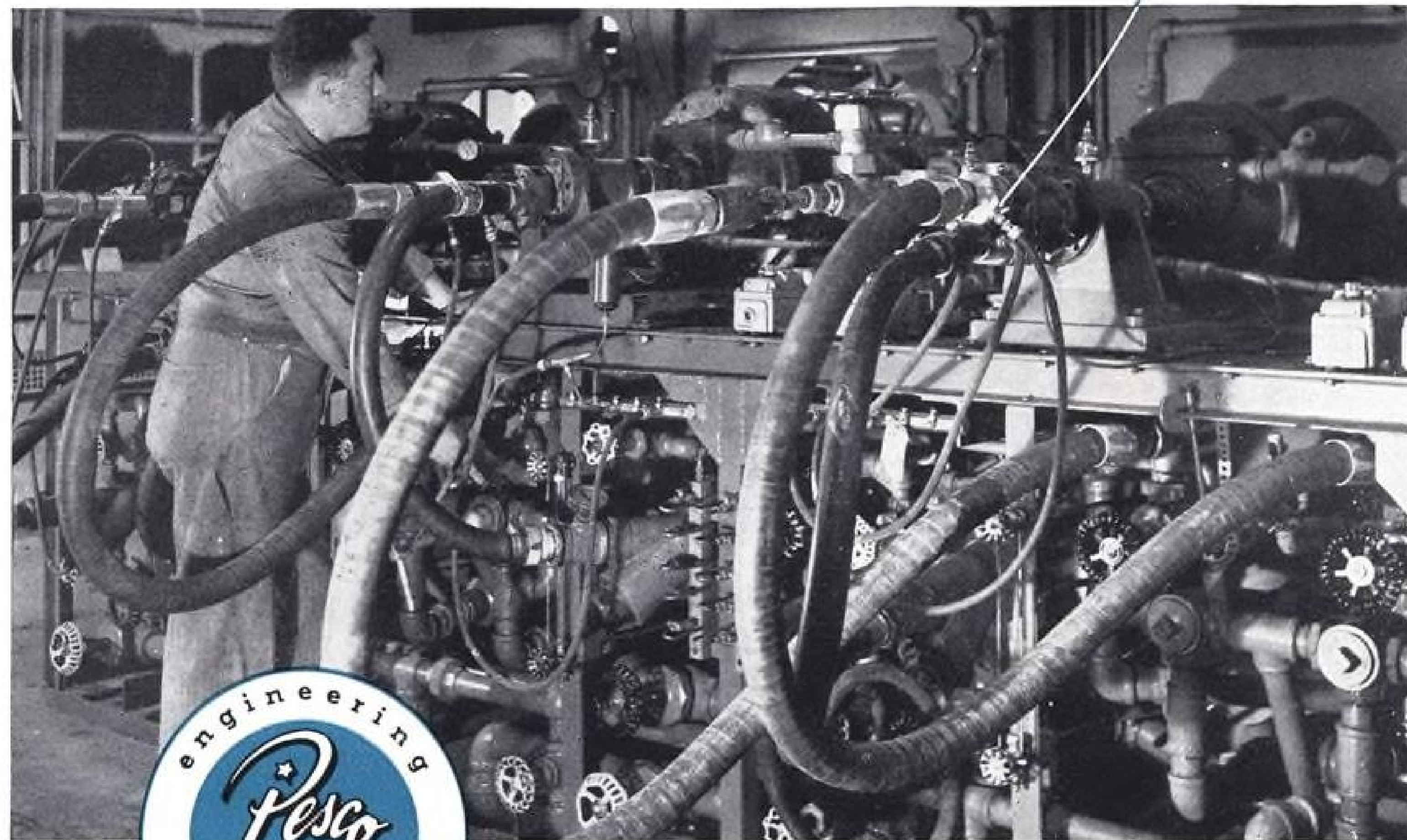
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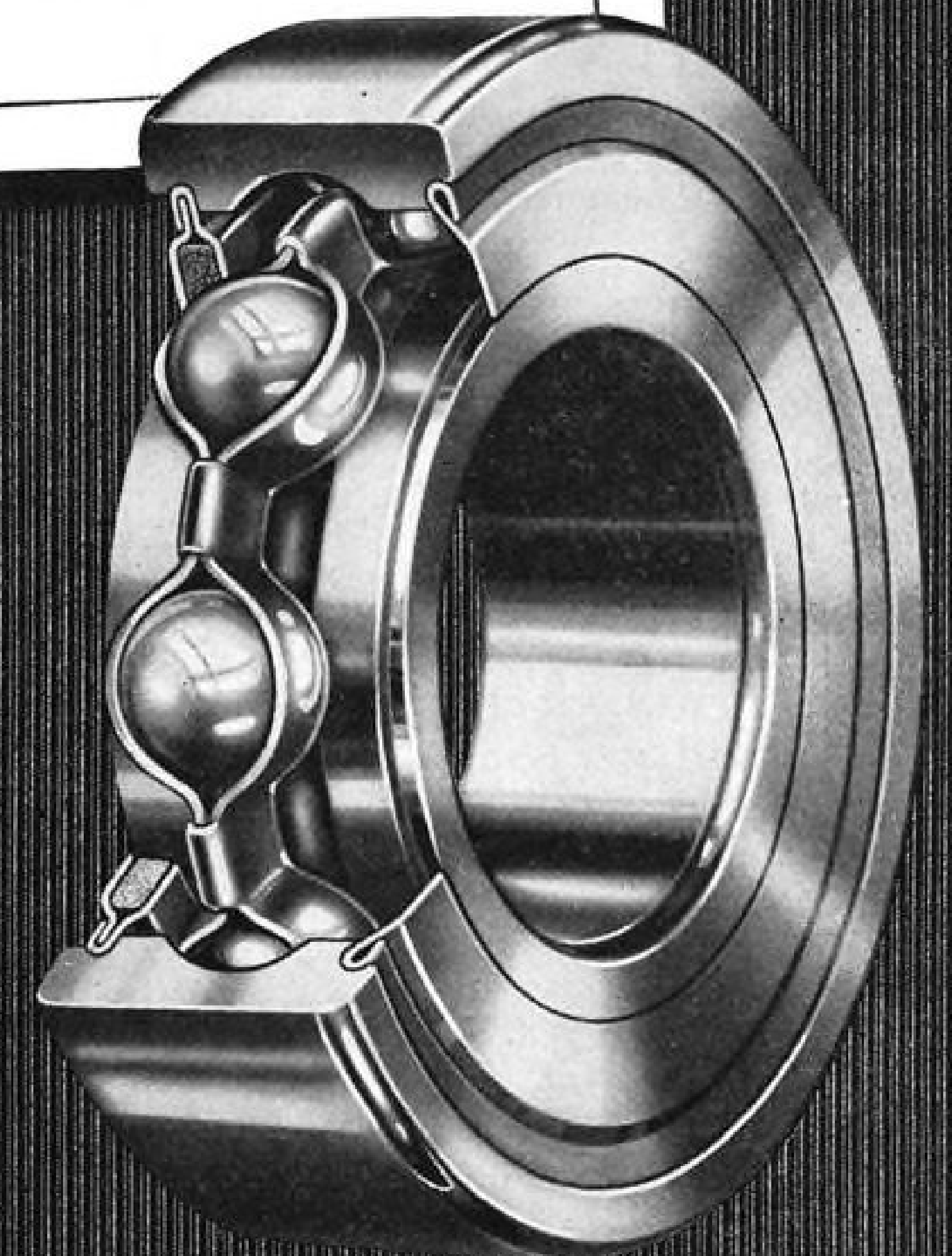
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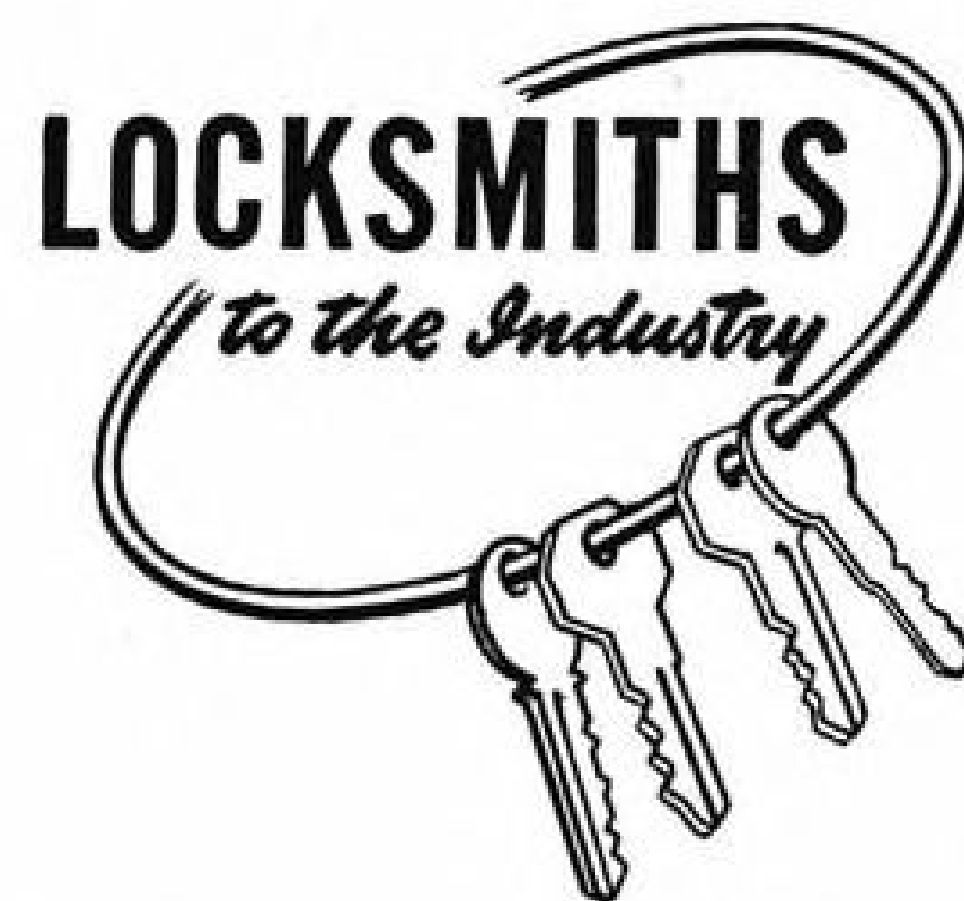
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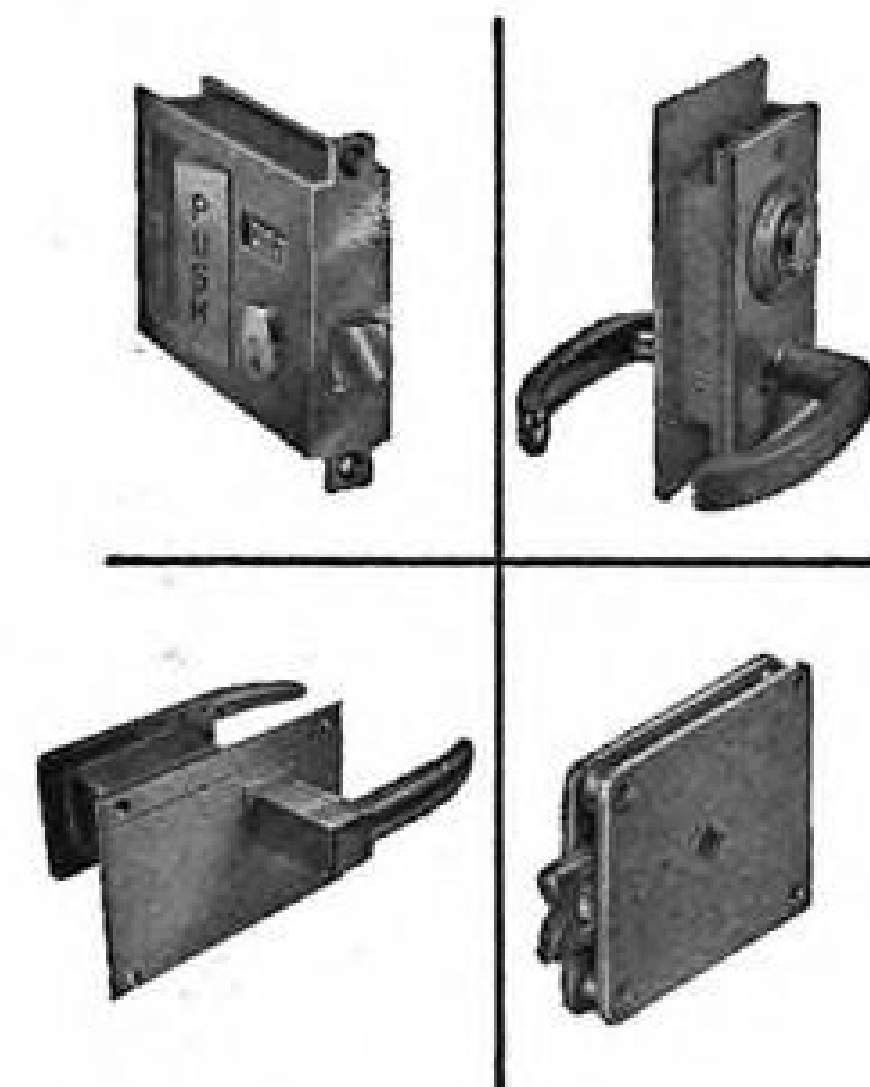
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Aviation Week



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Volume 54

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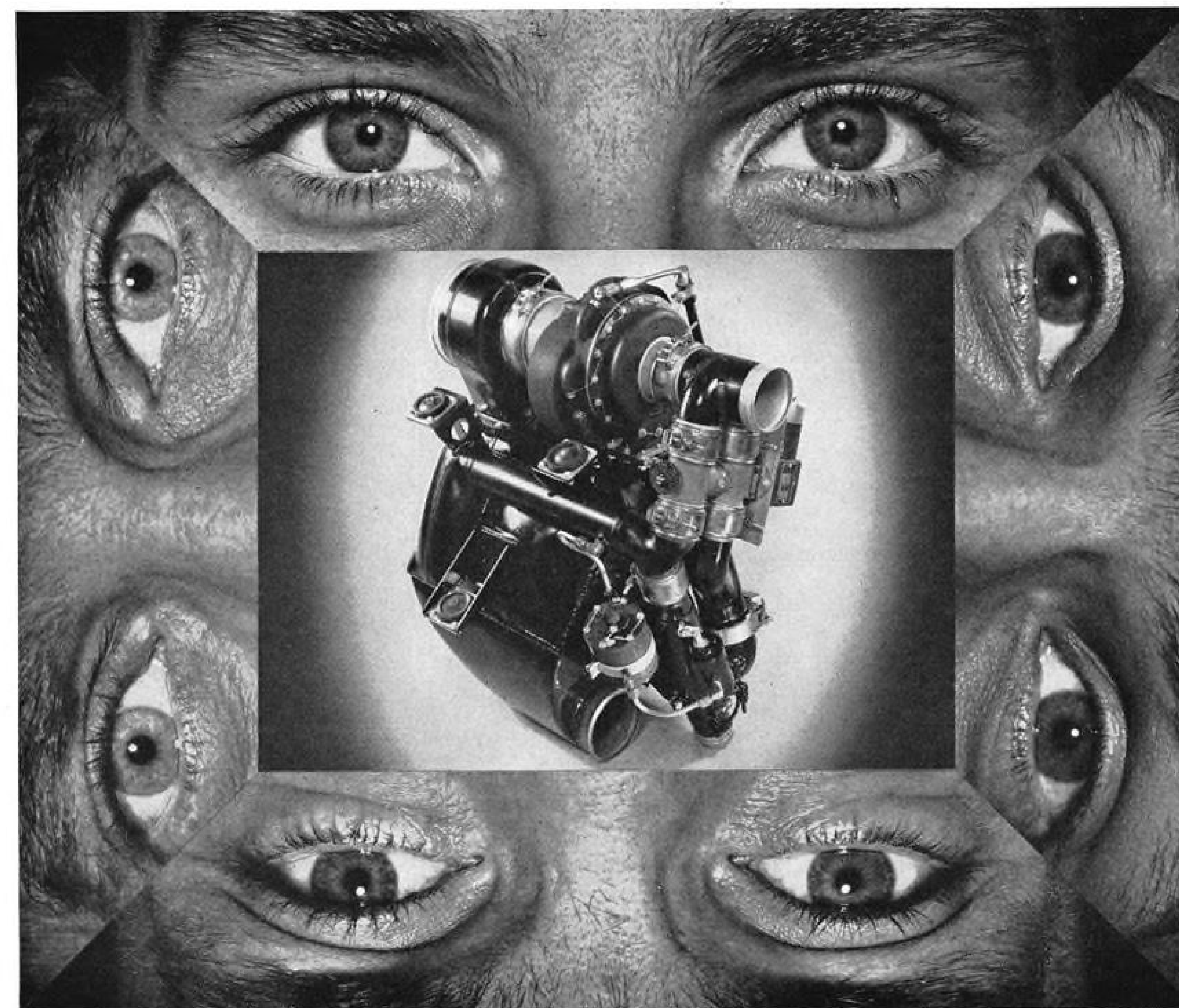
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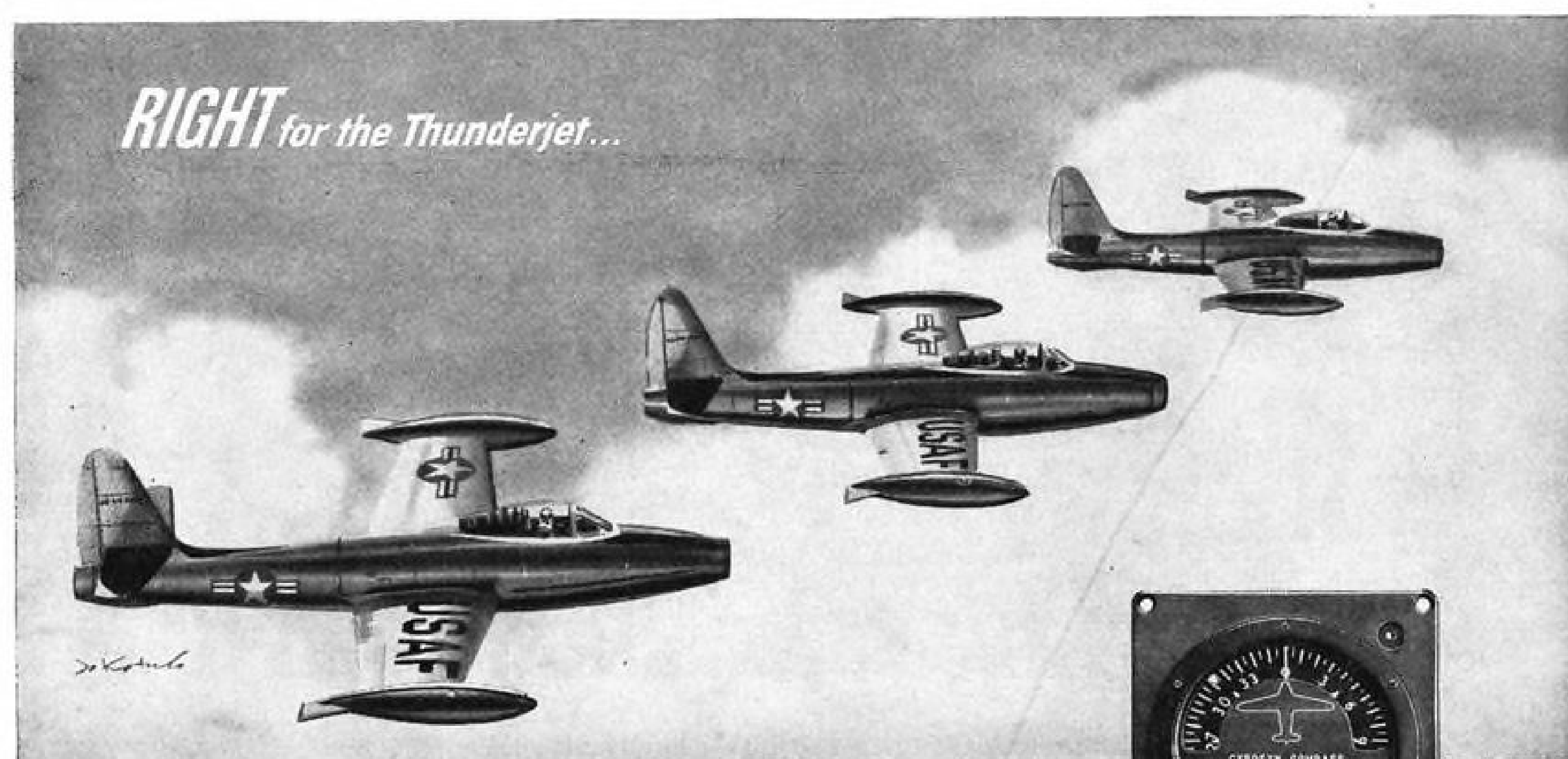
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NEWS DIGEST

DOMESTIC

Shipments of 294 two-to-ten-place personal and executive planes by ten companies during December showed increase over preceding month's 228 by 11 manufacturers. There were 200 four-place-and-over planes shipped during December and 94 two-placers, with a total value of \$2,130,000 figured at the manufacturers' net billing price. November's value was \$1,428,000. The total for 1950 came to 3386 planes worth \$19,157,000, compared to 3362 worth \$14,324,000 sold in 1949. Shipments last year consisted of 1055 one-and-two-placers and 2331 four-to-ten place.

Capt. Don S. Gentile, leading USAF ace in Europe during World War II, was killed when the Lockheed T-33 jet trainer he was piloting crashed near Andrews AFB, Md. An enlisted man flying with him on the routine proficiency flight also was killed. Gentile was credited with knocking down 19 planes and destroying another six on the ground. He was attached to USAF headquarters in Washington in 1949 and then assigned to study at the University of Maryland.

Six Convair B-36s which visited England made a nonstop return flight to Carswell AFB, Tex., in 30 hr. 16 min. The flight abroad had included a stop at Limestone, Me.

Lightplanes exported in 1950 were valued at \$2,252,793, an increase over the previous year's \$2,207,361—probably due to rise in manufacturing and export costs, since the number exported last year (415) had dropped from 1949's 488. Over half (292 planes) went to Latin America, with Brazil, the big purchaser, taking 160 valued at \$658,732. Not included in the totals are sales to Alaska and Puerto Rico of 29 planes worth \$110,508.

Kaiser-Frazer Corp. has announced the appointment of Ralph H. Isbrandt, former chief chassis engineer of the automotive division, as chief engineer in charge of aircraft. Isbrandt, born in Milwaukee, was vice president and general manager of Firestone Rubber Co.'s aircraft division at Willow Grove, Pa. prior to joining the Kaiser-Frazer Corp. four years ago. He also has been associated with A. O. Smith Co., Willys-Overland, Buick and Nash.

Twelve British business experts are studying Kelly AFB maintenance and

supply methods as part of a six-weeks tour of U. S. plants under ECA sponsorship. The group will investigate systems used here to train highly skilled industrial workers.

CAA announces that the Fourth Annual Fourth Region Non-Scheduled Operators Conference, scheduled for Mar. 5-7, 1951, has been canceled for "various and sundry reasons."

FINANCIAL

Douglas Aircraft has declared an extra dividend of \$1.25 per capital share in addition to the regular quarterly payment of \$1.25 per share payable Feb. 28 to stockholders of record Feb. 7.

Luscombe Airplane Corp. stockholders authorized issuance of 5000 shares of 5.5 percent cumulative sinking fund preferred stock with a par value of \$100 per share. The preferred would be used to retire a note held by Texas Engineering & Mfg. Co., thus releasing a mortgage held by Temco on the Luscombe property. A new mortgage note is being arranged with a Dallas investment banker to supply Luscombe with additional working capital.

Waco Aircraft Co., during the fiscal year ended Sept. 30, 1950, had net sales of \$509,684, with net profit of \$39,463 after provision for depreciation. Part of the sales net represents government transactions subject to redetermination.

Aeroquip Corp. has declared a regular quarterly dividend of 5 cents on the firm's common stock payable Feb. 15 to stockholders of record Feb. 1.

INTERNATIONAL

Canadian government defense contracts for the last half of December, 1950, show orders by the government's Canadian Commercial Corp. for aircraft equipment totaling \$4,012,000. Biggest orders were to de Havilland Aircraft of Canada for overhaul and spares, \$1,318,389; to Irving Air Chute, Ltd., for chutes, \$984,386; and to A. V. Roe Canada for maintenance, \$900,759.

Britain and India are negotiating a bilateral air agreement involving Air-India International, which is 49 percent Indian government-owned.

GCA equipment will be installed at Congonhas Airport, Sao Paulo, Brazil. Bendix Aviation Corp. will manufacture the equipment, which is scheduled to be in place by the end of this year.

WHEREVER YOU GO
WHATEVER YOU FLY



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TO MEET YOUR
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VHF COMMUNICATION and LF NAVIGATION SYSTEMS

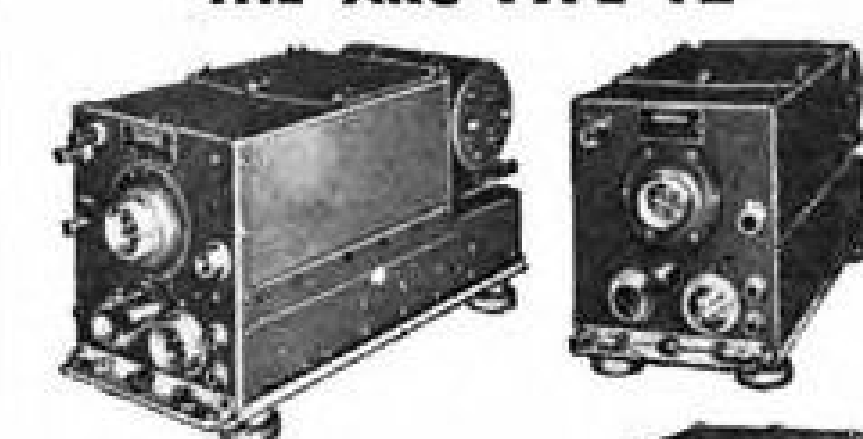
THE ARC TYPE 11A

Meets your basic navigation and communication needs. Provides for VHF transmission, LF range reception and rotatable loop navigation.

THE ARC TYPE 17

Adds two-way VHF communication. System includes tunable VHF receiver and a five-channel, crystal controlled VHF transmitter. As many as four of these transmitters may be installed providing up to 20 channels.

THE ARC TYPE 12



Gives you the combined advantages of the type 11A and the Type 17 systems. You get two-way VHF communication and LF range reception, as well as rotatable loop navigation.

Ask about ARC Type 15B Omni-range equipment and ARC's 10-channel Type F11 Isolation Amplifier. Write for all the details.

All units of these systems are type certified by the CAA. Installations for both single and multi-engine planes are made only by authorized agencies.



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SIDELIGHTS

Military

Now vacant post of chief, Air Force division of National Guard Bureau, won't be filled very soon. Official reason: "Bulk of the Air Guard has been ordered into federal service." Actually, there's a behind-the-scenes fight by the Bureau to keep the Air National Guard under its direct control . . . Largest single piece of cargo flown across the Pacific by MATS was an 1800-lb. outer wing panel of a C-54 which was loaded aboard a Boeing C-97A and hauled to Haneda, Japan, within 72 hours after receipt of order . . . New deferment policy for civilian components of the armed forces will be issued this month and will take into consideration the reservists' civilian occupations in determining recall classifications.

Industry

Kaiser-Frazer Corp. is moving its Washington offices to the new Cafritz Bldg.—right next door to the Washington offices of Fairchild Engine & Airplane Corp. in the same building . . . Curtiss-Wright's licensing of other manufacturers to build its engines is a complete switch from World War II practice when the corporation refused to license. Strong supporter of the new C-W policy is Finance Vice President J. F. McCarthy, who during the war was finance chairman of United Aircraft Corp., leading exponent of the licensing system . . . Manufacturing personnel dealing with materials allocations are finding marked similarities between conservation orders now being issued and those of World War II; they find they can use all over again their wartime protests.

From Round-About

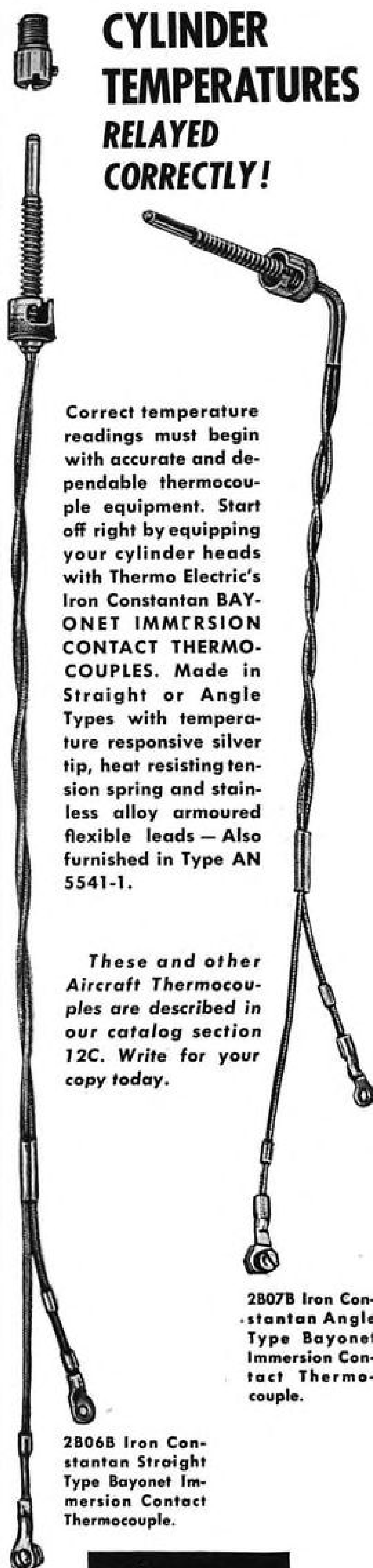
An aviation executives' club for Washingtonians, government and industry—if support is pledged—will open rooms in the plush new Du Pont Plaza Hotel. PAA's Cone is mainspring . . . American Airlines Flagship Admirals will soon have a new haven at Washington National Airport; old one was closed during the war to make room for offices . . . French Air magazine Ascendance reports the first woman copter pilot, a Mlle. Andre, a physician and health service official in Indo-China.

Those 'Saucers'

Aero Club of New England asks USAF to reopen its inquiry into "flying saucers" and other mystery craft. Meanwhile, the AP from Kansas City described Mid-Continent Pilot Larry Vinther's vision of a strange plane about 1½ times the size of a B-29, with long, slender fuselage, long straight wings set further forward than a B-29's. There were no engine mountings on wings, no exhaust glow, no pods visible. Co-pilot James F. Bachmeier and one of their 11 passengers also saw it, near Sioux City, Ia., evening of Jan. 20.

(Calendar and picture credits are on p. 51)

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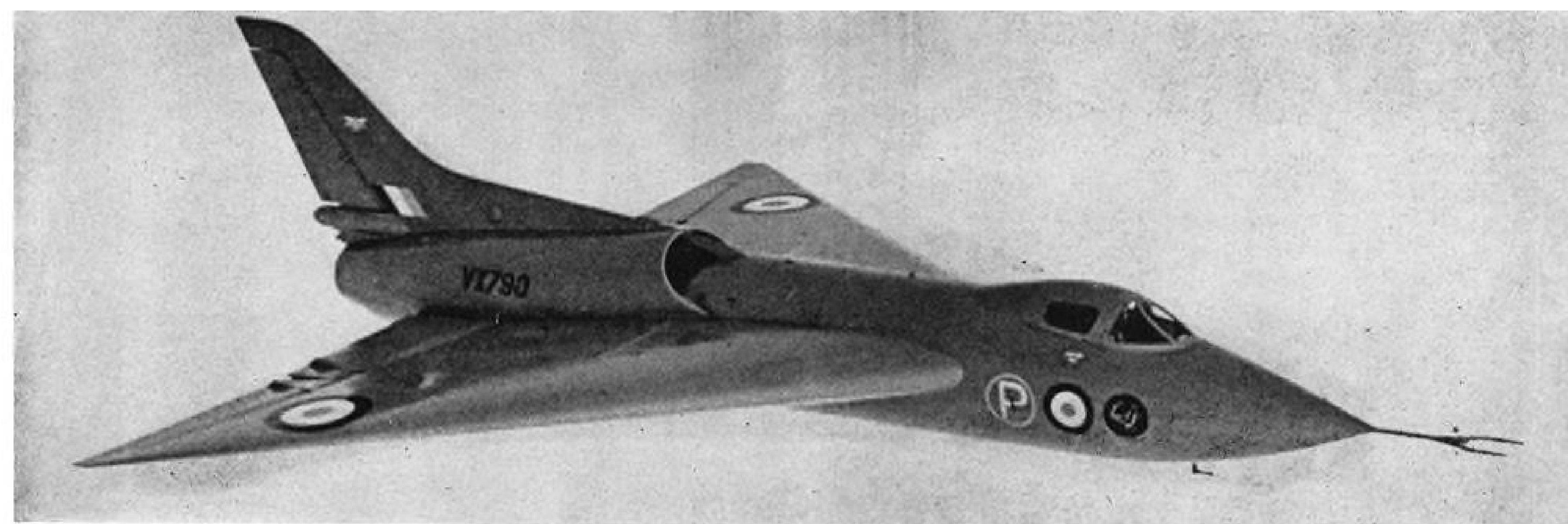
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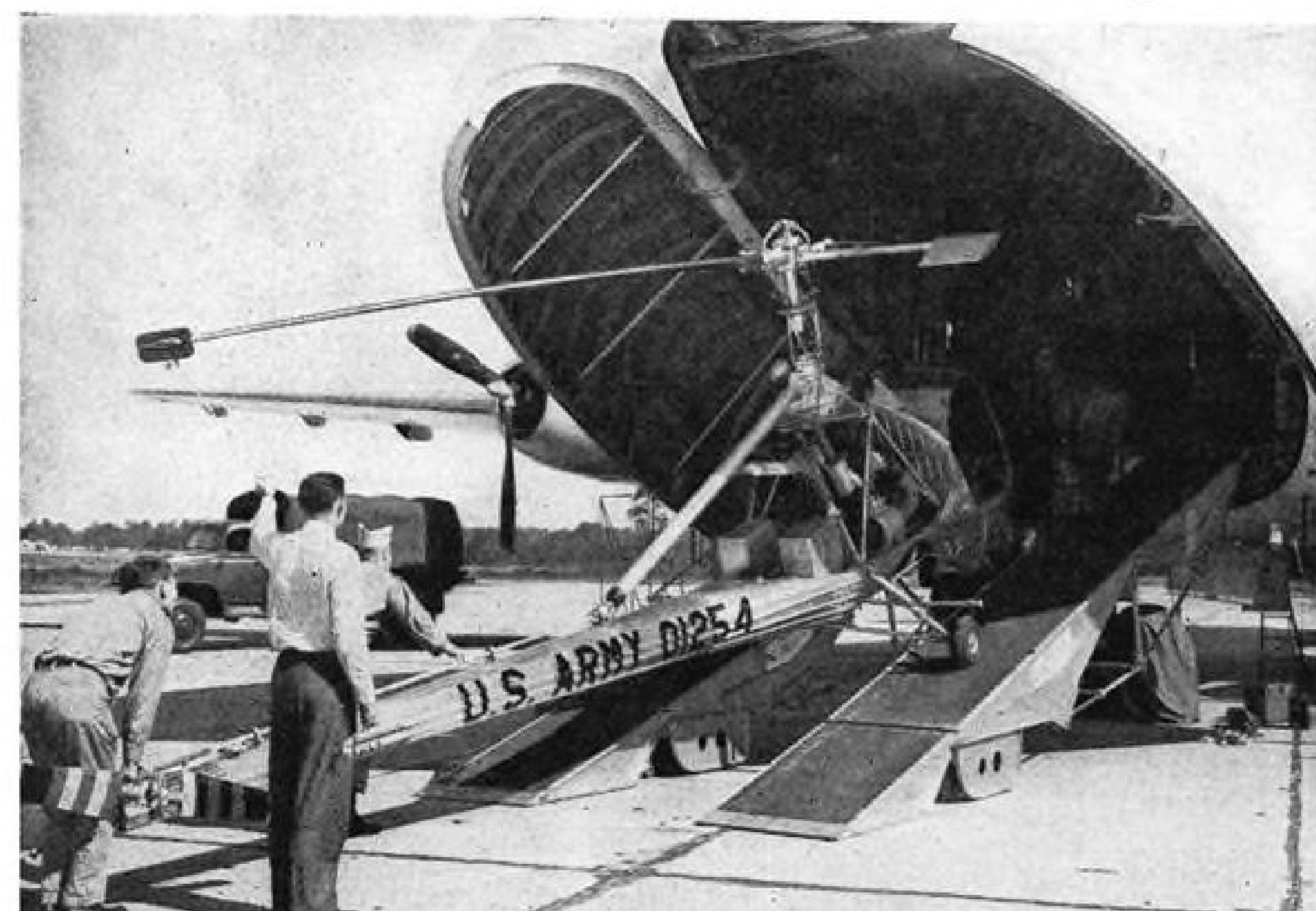
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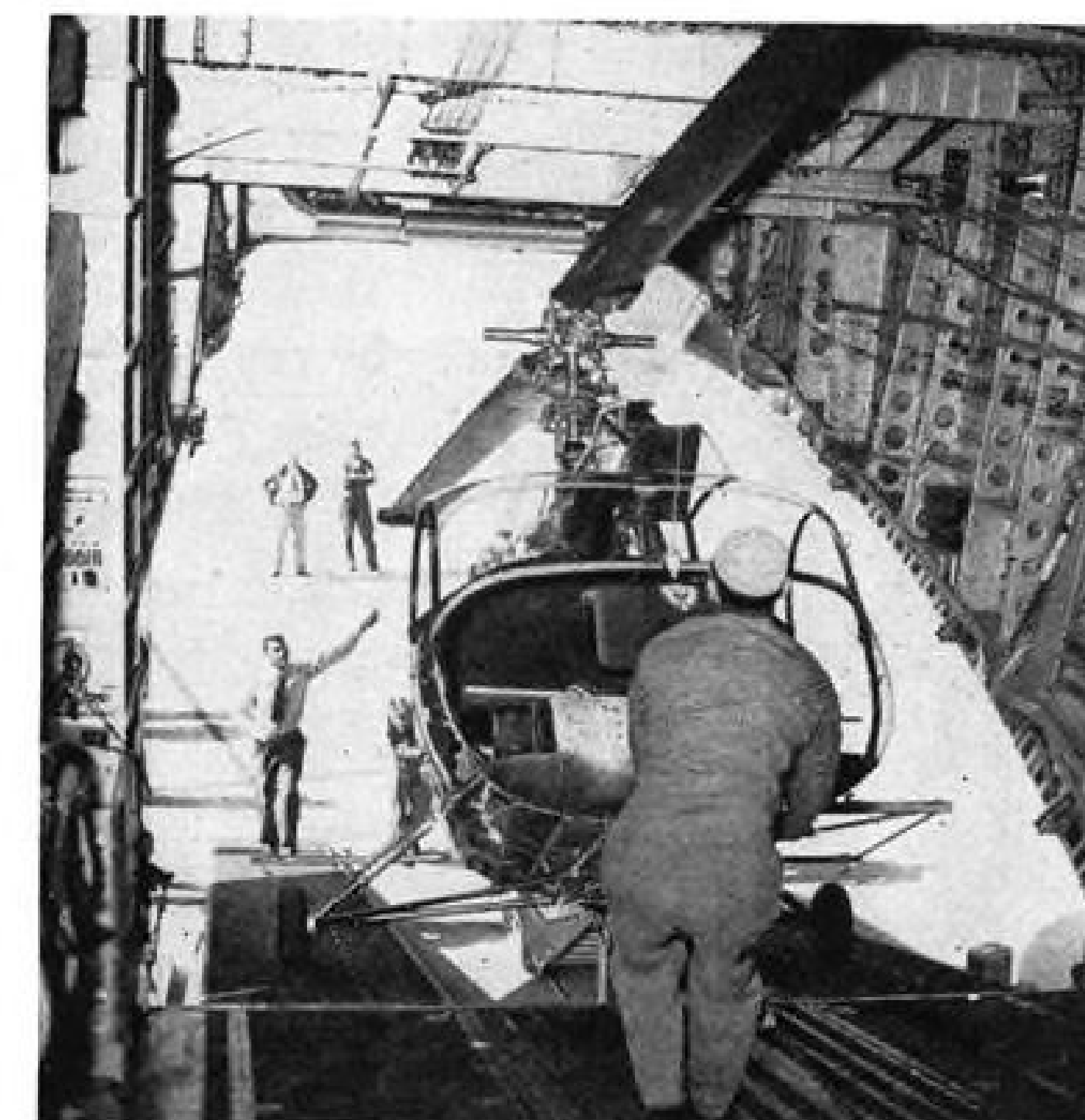
NEW JERSEY



TRACTABLE TRIANGLE—Flight tests of the Avro 707B research plane have included over 100 landings and takeoffs, also high-rate-of-roll trials. In the speed range tested, no adverse characteristics were reported. Pilot R. J. Falk says it is "easy and pleasant to fly."



HILLER STOWAWAY—Army Field Forces' Hiller YH-23 copter is placed aboard a big Douglas C-124A Globemaster 2 during trials at Ft. Bragg. Rotors could be removed for air shipping. On order are a number of H-23As having cyclic control stick mounted on floor.



Aviation News Picture Highlights



VARIABLE-PITCH ANCESTOR—This historic variable-pitch prop developed and built by Dr. William F. Durand in 1918 in conjunction with the late Prof. Everett P. Lesley at Stanford University has been donated by Dr. Durand to the Air Museum at the Smithsonian Institution. The 91-yr.-old dean of American aero engineers is seen looking over his prophetic handiwork prior to donating it to the Washington museum.

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WHO'S WHERE

In the Front Office

Donald W. Douglas, Jr., has been promoted to vice president-military sales for Douglas Aircraft Co., while retaining his position as testing operations director; Harry Woodhead has been named vice president in charge of the newly reactivated Tulsa division. Douglas, 33, has held a variety of technical and administrative positions since he joined the concern in 1939. Woodhead, wartime head of Convair, joined Douglas in 1948. He became general manager of the Tulsa division when it was recently set up.

Dean Hammond has been appointed vice president in charge of engineering for Kaiser-Frazer. He will direct the technical side of the company's Fairchild C-119C production for the USAF as well as automotive development at Willow Run. Hammond is particularly known for his development of the Hammond Y tricycle-landing-gear two-place personal plane in the mid-30s. He joined K-F in 1944 and became chief engineer in early 1947.

Changes

Rear Adm. Hugh H. Goodwin has been named to succeed Rear Adm. John P. Whitney as Vice Commander of MATS. Whitney is being assigned to sea duty.

Joseph V. Miccio has been named general manager of Curtiss-Wright's newly formed Electronics division which will consolidate all the company's work in this field, including remote pilots, engine and propeller controls, guided missiles, recording equipment and related equipment as well as electronic trainers. Harry E. LeRoy, of the Propeller division, has been named works manager of the new set-up, and Ward D. Davis has been made sales and field service manager.

Fred J. Baum has been named Dayton representative for Northrop Aircraft. . . . Joseph A. Despres has joined the Engineering and Production division of Airborne Instruments Laboratory as administrative assistant. . . . Howard E. Sagers has been appointed superintendent of Bendix Radio Plant 2 at Baltimore and Wilmer T. Spicer has been named chief engineer of maintenance services at the Radio division. . . . Harvey Gerwig has joined Weston Hydraulics, Ltd., N. Hollywood, Calif., as chief design engineer. . . . Theodore A. Smith has been appointed assistant general manager of RCA Engineering Products department.

Honors and Elections

John Green and James Kay have been elected to the board of directors of A. V. Roe & Co., Ltd. Green joined the firm in 1921 and became controller general (engineering) in 1946. Kay has been executive assistant to the managing director of Avro Manchester since 1947.

INDUSTRY OBSERVER

► Watch the new Westinghouse J-40 jet engine as one of the most important powerplants in forthcoming procurement programs. The first U.S. engine to be announced in the approximately 10,000-lb. thrust class (with afterburner) fits into several Navy programs. Douglas plans it for two new planes—its fast-climbing night fighter interceptor, the F4D, successor to the F3D, and for its A3D attack plane, next in line after the turboprop A2D. The J-40 also will probably replace the smaller Westinghouse J-34 engines in a later sweptwing version of the McDonnell F2H Phantom to be known as the F3H.

► Fairchild Aircraft's C-119C cargo and assault transport is slated to become the C-47 of the new emergency (Douglas built more than 9000 of the C-47s in World War II). With the Wright compound R-3350 engine slated as the powerplant for the C-119C, this probably explains why the Navy has designated Hudson Motor Car Co. as an alternate source for the R-3350s.

► U. S. Army liaison plane experts have about decided they would like to standardize on the Cessna L-19 and the de Havilland Beaver for liaison craft. After those planes, they will probably follow the Marine Corps trend toward replacement of fixed-wing liaison planes with small helicopters.

► The jet-powered Hughes Aircraft XH-17 helicopter, recently rolled out again to resume ground tests at Culver City, will probably undergo about three months of such tests and other tethered tests, before it makes its first flight. The big rotorcraft is now fully repaired from the extensive damage suffered when it cracked up last June in earlier tie-down flights.

► Navy's additional orders for Chance Vought F4U-5 Corsair fighter bombers are a tipoff that the seagoing air arm is not putting all its eggs in one basket with the jet fighters just yet. It is keeping some piston-engine aircraft on order for specialized missions such as the close-support work in which the Corsair has distinguished itself in Korea. The F4U-5 is the only piston-engine fighter now in production, although several other World War II fighters are still in use, and are being reinforced by additional quantities withdrawn from storage.

► Key Washington materials man for aircraft companies to know in the National Production Authority is Nigel H. Bell, newly appointed director of NPA's Light Metals division, charged with NPA aluminum and magnesium supply and distribution programs. Bell occupied a similar post for War Production Board in World War II, later was special assistant to Administrator of War Assets Administration, most recently has been vice president of Sterling Windows, Inc., New York.

► Avro Canada's new jet engine factory for production of the Orenda turbojet engine is expected to be in operation by the end of 1951 at Malton. Orenda will be used as powerplant for Avro CF-100 night fighter and for the Canadian-built North American F-86s which Canadair Ltd. is constructing. Avro officials estimate that the present employee force of 5000 will be doubled within 18 months.

► British sources say that the extra takeoff boost given to the Convair B-36Ds by the additional four jet engines in pods at the wing tips, plus reverse pitch propellers on their six piston engines for short landings, and their four-wheeled main landing gears, give the superbombers an edge in short-field performance over Boeing B-29s now in service in Britain, despite the much larger size of the Convairs.

► Steep climb made by the McDonnell Banshee F2H-2 after being catapulted from a carrier is part of standard takeoff technique. The plane is so clean that pilots have to climb it very steeply after catapulting in order to avoid exceeding a speed of 150 knots, the maximum at which wheels can be retracted. By the quick pull-up, pilots can slow the speed until they get their wheels up.

Washington Roundup

If War Doesn't Come

By the end of 1952, the "target" date set by the Joint Chiefs of Staff for war readiness, the military will be faced with these two problems, if war doesn't come.

- **Surpluses.** There will be a year's reserve of planes and other hardware on hand, Mobilization Director Charles E. Wilson says, rapidly becoming obsolescent. Opposition will be strong to the wastage of scrapping, or sale at giveaway prices.

- **Research and development.** The U. S. will be behind in development of new weapons for a war five or ten years off. This is because of the present policy of concentrating almost exclusively on short-range projects that hold prospect for military applicability by 1952 or shortly after.

Naval Air Build-up

Navy now has three 45,000-ton Midway-type carriers and eight 27,000-ton Essex-type carriers in commission for its fleet backbone. Another Essex-class ship is being converted. The Third Supplemental, scheduled to go to Congress soon, will have funds for conversion of six more—to make a Naval air fleet of 18 large attack carriers.

ATA Changes Mind

Congress approved legislation last year cutting out the 15-percent transportation tax for servicemen traveling on furlough, in return for the railroads' offer of reduced furlough rates. Then Air Transport Assn. showed little interest in the proposition. But furlough travel now looms as major business, and ATA now belatedly is interested (see page 47).

Lovett's Future

If and when Secretary of Defense George Marshall retires, Undersecretary Robert Lovett won't step up to become Secretary—without a second thought by the White House. It goes back to Lovett's reported description of the President in a letter written during the 1948 campaign which found its way to the hands of former Democratic National Chairman, J. Howard McGrath. According to politicians, Lovett referred to the then aspirant for the Presidency as "an ex-bankrupt tie salesman."

International Air Support

Sen. Pat McCarran seeks to kill two birds with one stone in providing government support of international air service and government support for the development of prototypes of new planes. This bill would authorize operational differential subsidies and construction differential subsidies. The government would foot the difference between higher U. S. costs and foreign costs. This parallels the present program for international shipping.

International carriers would be paid a "service" mail rate of \$2.86 a ton-mile—the prevailing Universal Postal Union rate. This is more than the average of \$2.44 for TWA, \$2.62 for PAA, and \$2.66 for Northwest by the year ending Oct. 1, 1949. It is less than the \$84 averaged by Braniff and the \$113 by Chicago & Southern for the same period.

PAA's Juan Trippe favors the McCarran plan. He recommended it during Senate hearings three years ago.

ATA's executive vice president, Robert Ramspeck, who was a key congressional figure in writing the 1936 Merchant Marine Act which put shipping on the "differential" basis, is now non-committal.

But count on TWA to fight the plan as "too tough" on the taxpayers.

Fight for the Marines

Navy is holding Marine Corps strength down, but Congress wants it stepped up to four divisions with 24 war-strength air squadrons. This is what Marine Commandant Gen. Clifton Cates says he needs for war readiness. Thirty-nine senators and sixty representatives have introduced bills directing this.

After the Korean outbreak last June, Joint Chiefs of Staff reluctantly okayed a boost in Marine aviation strength from the 12 squadrons originally programmed to 18. House Armed Services Committee promptly and unanimously endorsed 26 squadrons. After Communist China launched its offensive, the Joint Chiefs of Staff upped the ceiling to 21. But in the Second Supplemental defense appropriation, the top command allowed the Marine Corps only enough funds for 18 squadrons, with only 7 at full war-strength. At hearings, Cates objected to senators.

During the Johnson "economy" era at the Department of Defense, when the Army and Air Force continually voted down the Navy on the Joint Chiefs of Staff, Navy joined in a push to put the Marine Commandant on JCS. But now that the three services are given what they ask for to perform their missions, Navy has withdrawn from the Marine push.

Snail's Pace

The "emergency" defense build-up program still remains in the paper-and-talk stage.

This is the program that will be implemented by funds in a Third Supplemental defense appropriation for this fiscal year and the 1952 fiscal year appropriation. Congress is impatiently awaiting requests for the two appropriations, which will probably come in one package.

But the outlook is that they won't arrive in Congress for at least another month.

This is the status of the "emergency" plan for a rapid mobilization to war readiness by the end of 1952: Joint Chiefs of Staff hope to complete action on it in two weeks and have it before the Secretary of Defense by Feb. 19. Budget Bureau review will take another couple of weeks. Sometime in March it will reach Congress. Legislative procedure will slow down action, despite a determination for speed. It will probably be late March or April before the "emergency" program gets underway in the production lines.

Meanwhile, the country is on the pre-emergency program drawn up before the Reds turned the tide in Korea.

Research Hold-Back

Stepped-up "emergency" research and development programs of Naval aviation and Air Force, ready to go since the beginning of the year, are being held back while the Joint Chiefs of Staff complete the over-all build-up program.

Research and development officers consider the delay serious.

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How NPA Plans to Allocate Materials

Program will follow World War II lines but with a provision for civilian planes.

By Alexander McSurely

Pattern for government control of three basic metals used in the aircraft industry—aluminum, steel and copper—took more definite shape last week at the National Production Authority.

Outlook now is for the controls program to be ready to start July 1, but the broad outlines of materials requirements for all the nation's production of hard goods involving these materials are expected to be clear as early as Mar. 15.

Kits of instructions to government claimant agencies which will be responsible for the many materials allocations programs have already been distributed. The two government units which will be primarily in charge of materials allocations for aircraft production, military and civil, are now moving to total up their needs for the calendar year 1951, by quarters. They are:

- **Aircraft Production Resources Agency, at Wright-Patterson AFB, successor to the World War II Aircraft Scheduling Unit.**

- **Office of Aviation Defense Requirements, CAA, which had no counterpart in World War II, because of the virtually complete stoppage of production of civil aviation equipment.**

- **CMP—According to Walter C. Skuce, staff assistant to the NPA administrator, the new materials control program is being developed along lines similar to the Controlled Materials Plan which he headed in World War II.**

As it affects the aviation industry, the controls operated for military will be much the same. But the additional controlled materials planning for some civil aircraft, which has resulted from the increasing importance of civil aviation in the total national transportation plan, will be considerably different.

C. R. Gaillard, head of the OADR, last week went to Dayton for a conference with the APRA organization to determine overall procedures for scheduling of aircraft materials requirements.

Assignment of APRA at Dayton is to schedule materials for the production of military and essential civil aircraft. Assignment of OADR at Washington is to collect applications from claimant agencies for defense-rated orders for es-

sentia civil aircraft and their maintenance requirements and to issue the appropriate DOs for these aircraft and their maintenance needs.

The APRA office includes representatives of Army and Navy as well as Air Force, and will have a full-time director chosen by vote of the three service representatives. As in World War II, the heavy load of making decisions as to urgency of the several aircraft programs, and selecting which are to be made "crash" programs and which are to have lesser priority, will be borne in large measure by this office.

Meanwhile Skuce disclosed that NPA is conducting a spot survey of major metal-consuming plants. This is expected to provide an accurate measure of materials going into virtually all metal products. This survey is designed to measure the current impact of the mobilization program on U. S. industry, and to provide a guide as to future availability of materials and how they should be distributed.

- **How It Would Work**—Broad thinking behind the developing plans to slap controls on steel, copper and aluminum is this:

Controls of these three metals will effectively govern all important hard goods production in the U. S. As long as they are being allocated for defense and defense-supporting programs, the other materials can be controlled with relative ease, within a framework of conservation orders, such as that recently limiting the use of copper.

Washington aviation industry spokesmen last week viewed the developing materials control plan as essential for continuing rise of aircraft production both for military and civil needs.

Without such controls, the five-fold multiplication of production called for by President Truman has little chance for success under the present DO system, observers feel. Objection is that only part of present production of materials and components is assigned under DOs, and if the supplier has already filled his DO quota for a given month, additional DO priorities are worthless until the following month.

- **Claimant Agencies**—Key claimant agencies within government which will

have responsibility for materials affecting aviation interests include:

- **Petroleum Administration for Defense.**

- **Department of Defense, which is responsible for programs of aircraft, guided missiles, electronics and communications, supplies and equipment, military construction and stockpiling.**

- **Economic Cooperation Administration, for mutual defense aid aviation programs.**

- **Atomic Energy Commission, for atomic-powered aircraft programs.**

- **CAA, for civilian-type airframes, engines, propellers and accessories, communications, airports, and maintenance, repair and operating supplies.**

- **CAB, for carrier airframes, engines, propellers and accessories, and maintenance and repair equipment and operating supplies.**

- **Federal Communications Commission, for non-military government communications equipment and private communications equipment, and MRO supplies.**

The new operating bureau for NPA, called Bureau of Industry Operations, headed by Deputy NPA Administrator H. B. McCoy, will also act as a major claimant agency for a wide variety of production items which will be required in aviation's expanded production program.

Sample items for which BIO will be claimant agency: machine tools and accessories, electric motors and generators, compressors and pumps, construction machinery, building materials, bolts, nuts, rivets, etc. (not aluminum); metal-cutting tools, and metal-working equipment not otherwise classified, laboratory research material and experimental products.

- **What They Ask**—Forms sent out to the various claimant agencies by NPA, ask each agency for the following information:

- **A list of the programs for which they are responsible as claimants, including possible additions:**

- **Figures for each program by quarters, on dollar level, delivery schedules for selected major items, phased requirements for steel, copper and aluminum.**

The agencies are asked to report separately construction requirements in support of their programs, not including power equipment, machine tools and special equipment.

Procuring claimant agencies, such as

Department of Defense, for aircraft and missiles, etc., are asked to establish their program levels for requirements on the basis of appropriations for 1951 and budgeted appropriations requests for 1952, with adjustments if any should be necessary.

Non-procuring claimant agencies—such as CAA and CAB—for civil aircraft, are asked to determine their program levels on the basis of 1950 levels, but to take into account that some deterioration of civilian economy standards must be expected, to support the increased defense program. (CAA and CAB procurement of civil aircraft and equipment is such a small part of the total that for practical purposes in this field, these agencies can be considered non-procuring.)

► **Significant Omission?**—An interesting and perhaps significant omission of most aircraft items is found in the list of selected major items for which NPA has asked that quarterly schedules be submitted.

A check of the list shows that it carries electronics requirements in detail as the first item on the list. But there is no provision for aircraft or aircraft parts in the transportation section, which is confined to such items as passenger cars, trucks, motor coaches, locomotives and parts, railroad and street cars, trackless trolleys, and motorcycles. And the only other items, except for electronics, to be found in the selected list with direct aircraft application are tetra-ethyl lead (for aviation gasoline) and aircraft tires.

One unofficial interpretation of the omission is that air carrier requirements, which have been called essential by the Department of Defense, are considered lumped with defense requirements. If this is the way the planning goes, it doesn't look good for the chances of other civil aviation, such as agricultural planes and nonscheduled business planes and training aircraft under the new program. There is no place for them evident in the new kits for program requirements issued by NPA. And, unless the air carrier requirements are considered lumped with other defense aircraft requirements, there is no place for them in the kits, either.

For Materials Control Planner Skuce, the new program is an old story. He helped set up the World War II Controlled Materials Plan beginning in 1942. And forms used in the new kits to list materials requirements closely resemble materials requirement forms of the World War II era.

Washington reports are that Skuce will probably move with his organization over to Defense Production Administration, when that agency takes more definite form before July, and will run the new controls plan, if it is put in force, for DPA.



AEROPRODUCTS DIVISION of General Motors is doubling its Vandalia, O., plant to accommodate new propeller business from the Air Force and Navy. Bulk of new business is for the four-bladed props for the Fairchild

C-119C. Enlarged plant will have more than 500,000 sq. ft. and be completely air-conditioned. At peak production, employment is expected to be 4000. Aeroproducts division's labor force is now around 1600.

Our Expanding Industry . . .

Chance Vought Aircraft division of United Aircraft Corp. has new Navy orders for a "substantial" quantity of additional F4U Corsair fighters, probably the F4U-5 and -5N night fighter.

Lockheed Aircraft Corp. has received increased orders for its F-94 all-weather jet fighter, which will sharply increase output and push backlog to about \$450 million.

Bell Aircraft Corp. is negotiating a lease on the government-owned section of the former Curtiss-Wright Kenmore Ave. plant in Buffalo to get more space for both offices and manufacturing.

Sperry Gyroscope Co. has received an order from Piasecki Helicopter Corp. for A-12 autopilots for installation in the HUP-1. Order is believed to total nearly \$2 million.

Pacific division, Bendix Aviation Corp. is expanding into another building near its North Hollywood main office to handle increased work from the Navy.

Packard Motor Co. will build General Electric J-47 jet engines at

its Detroit factory, AF has announced.

Hudson Motor Car Co. will produce Wright R-3350 engines in "the Detroit area" under a Navy contract. But some of the engines may be used to power the Fairchild C-119C of the Air Force.

Jacobs Aircraft Engine Co. has built up a backlog of \$3.5 million on engine contracts from the Air Force and subcontracts from Bendix, Fairchild, GE, Pratt & Whitney, Curtiss-Wright, Republic and Sperry.

Pacific Airmotive Corp. has received Air Force letter of intent amounting to \$4.6 million for overhaul of four-engine cargo-transport planes. Work will be done at the Chino, Calif., plant, where peak employment will be 1200.

Aerojet Engineering Corp. is building a \$6-million plant near Sacramento, Calif., for production of solid propellant fuel for rockets. Company expects to be operating in its new facility this summer, building up to peak labor force of 2500 at a later date.

date approximately 800 trainees at once.

Trainees will attend school for a minimum of two weeks, six days a week, and will specialize in work to which they will be assigned. The school will be concerned almost entirely with the training of hourly rated employees.

During World War II, P&W conducted training courses for more than 27,000 of its employees.

P&W to Open School To Train Employees

Pratt & Whitney Aircraft will open a school Mar. 1 in Hartford to train new employees in an effort to meet accelerated production schedules of the company. The school will occupy about 50,000 sq. ft. of floor space and will accommo-



AEROPRODUCTS PROPELLERS, such as will be used on the new version of the Packet, are being tested on a C-119B furnished by AF.

New C-119 Changes Engines and Props

Use of Wright engines and external fuel cells highlight latest Packet.

Mass-production version of the Fairchild C-119 to be built by Fairchild Aircraft at Hagerstown, Md., and Kaiser-Frazer at Willow Run, Mich., will be the new C-119C assault-type transport.

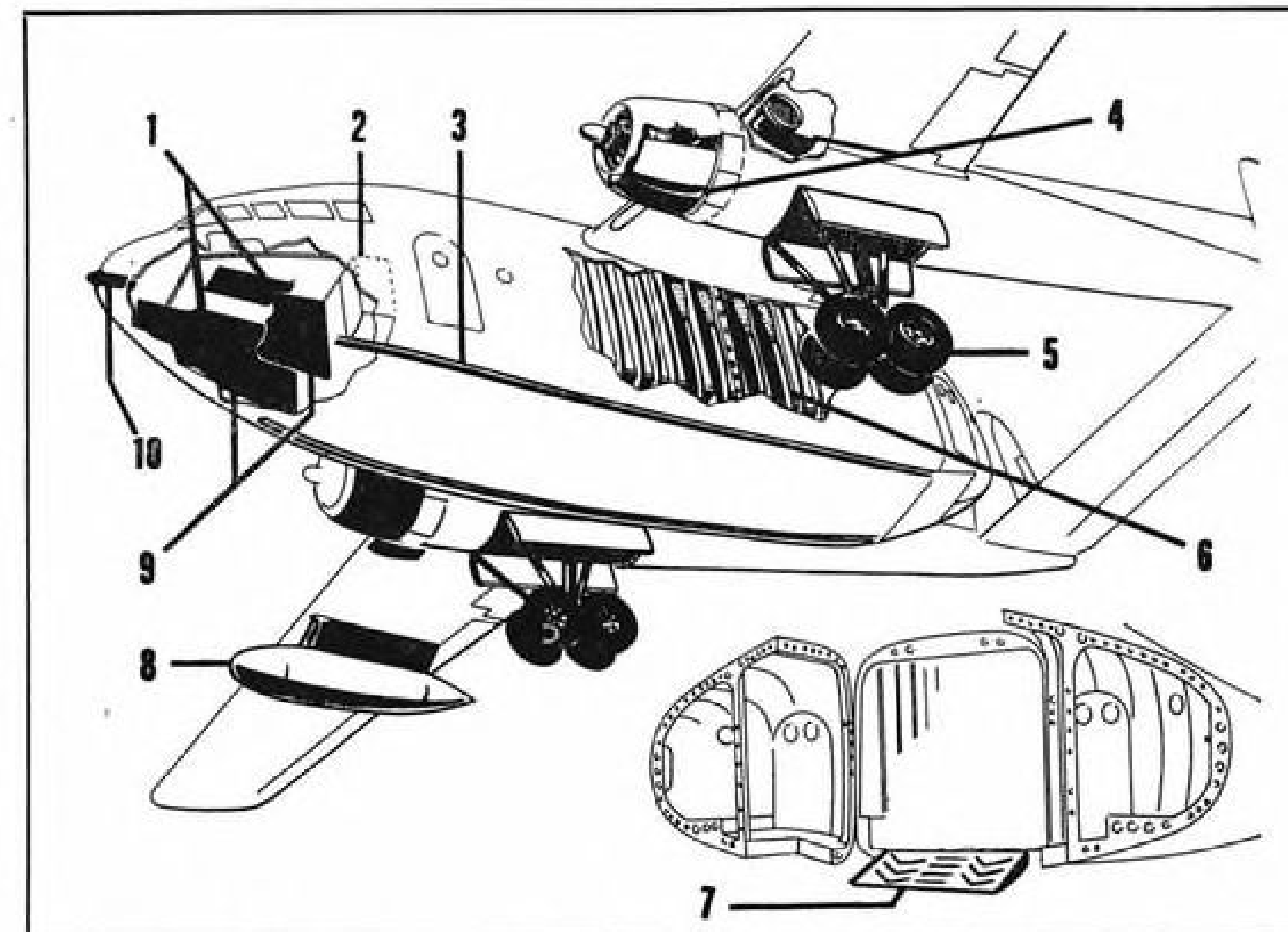
The major production version will be equipped with new powerplants and propellers, compounded Wright R-3350 engines rated at 3250 hp., instead of the Pratt and Whitney R-4360 engines. It will use Aeroproducts four-bladed props instead of the Hamilton Standard propellers used in the earlier C-119B version now in service.

Airframe in the C-119C remains essentially the same in overall configuration, but includes numerous improvements such as dorsal fins on the tail booms, redesigned flap and aileron systems, four-wheel "trucks" landing gears, and external jettisonable wing-tip tanks.

► **Early Production**—The new assault Packet will go into production in changeover version as rapidly as possible, early in 1952. Planned production thus far programmed is scheduled to reach a peak of 200 planes per month to meet heavy USAF, Navy, and U. S. Mutual Defense Assistance Program requirements. This production will comprise the total volume presently contemplated of both the Fairchild Hagerstown facility and the Kaiser-Frazer Willow Run facility, it was learned.

Engine to be used in C-119C is designated R3350-30WA and is rated at 3250 hp. (dry) for takeoff. It weighs 3408 lb. dry. This compares with the Pratt & Whitney R-4360-20 engine now used in the C-119B, rated for take-off at 3250 hp. (dry) or 3500 hp. with water injection. Weight of the R-4360-20 is 3505 lb. dry.

Rate of climb with compounded R-3350 engines is 930 fpm. Service ceiling with two engines will be 22,900



NEW FEATURES of the C-119C: 1. Ground fire protection for crew; 2. emergency exit for normal bail-out; 3. crash-protection chutes; 4. engine and oil cooler ground fire protection; 5. truck-type landing gear; 6. crash protection for cargo compartment; 7. integral ramp; 8. droppable external fuel tanks; 9. crash protection for crew; 10. flight tow assembly.

ft.; with one engine inoperative 5000 ft. Cruising speed is estimated at 135 knots. Normal range is 650 mi.

Initial takeoff gross weight of the C-119C with a 21,400-lb. payload is 69,300 lb. With no cargo and half fuel, weight is 44,800 lb. Maximum ferry range is 2600 mi. Maximum fuel capacity is 2900 gal.

► **Airframe Modification**—General configuration is unchanged but the silhouette is altered somewhat with two new elongated dorsal fins designed to improve directional stability. The fins rise just aft of the trailing edge of the wing, and structurally the fins strengthen the tail booms of the plane. The flap and aileron systems are also redesigned for reduced landing and take-off distances, as well as increased lateral control.

These improvements are direct results of lessons learned during the recent as-

sault transport competition at Eglin AFB, Fla.

One of the unique design improvements incorporated in the C-119C is externally carried jettisonable fuel tanks. This means that for combat operations the plane will use no internal tanks. The external tanks are protected by a self-sealing blanket and incorporate internal purging features.

Carrying the fuel in external, droppable tanks reduces target area in combat to a minimum. The tanks are mounted under each outer wing panel and are jettisonable by the pilot if, for example, a crash is unavoidable in an assault operation.

In addition the C-119C also will be equipped with provision for towing the aircraft; an escape chute located near the crew compartment for emergency egress when the cargo compartment is congested with cargo. A recessed ladder

is built in the emergency escape chute. **► Removable Armor**—Other features include armor protection against small arms fire for the crew, powerplant and vital accessory areas. Armor can be easily removed when not required to permit greater payload.

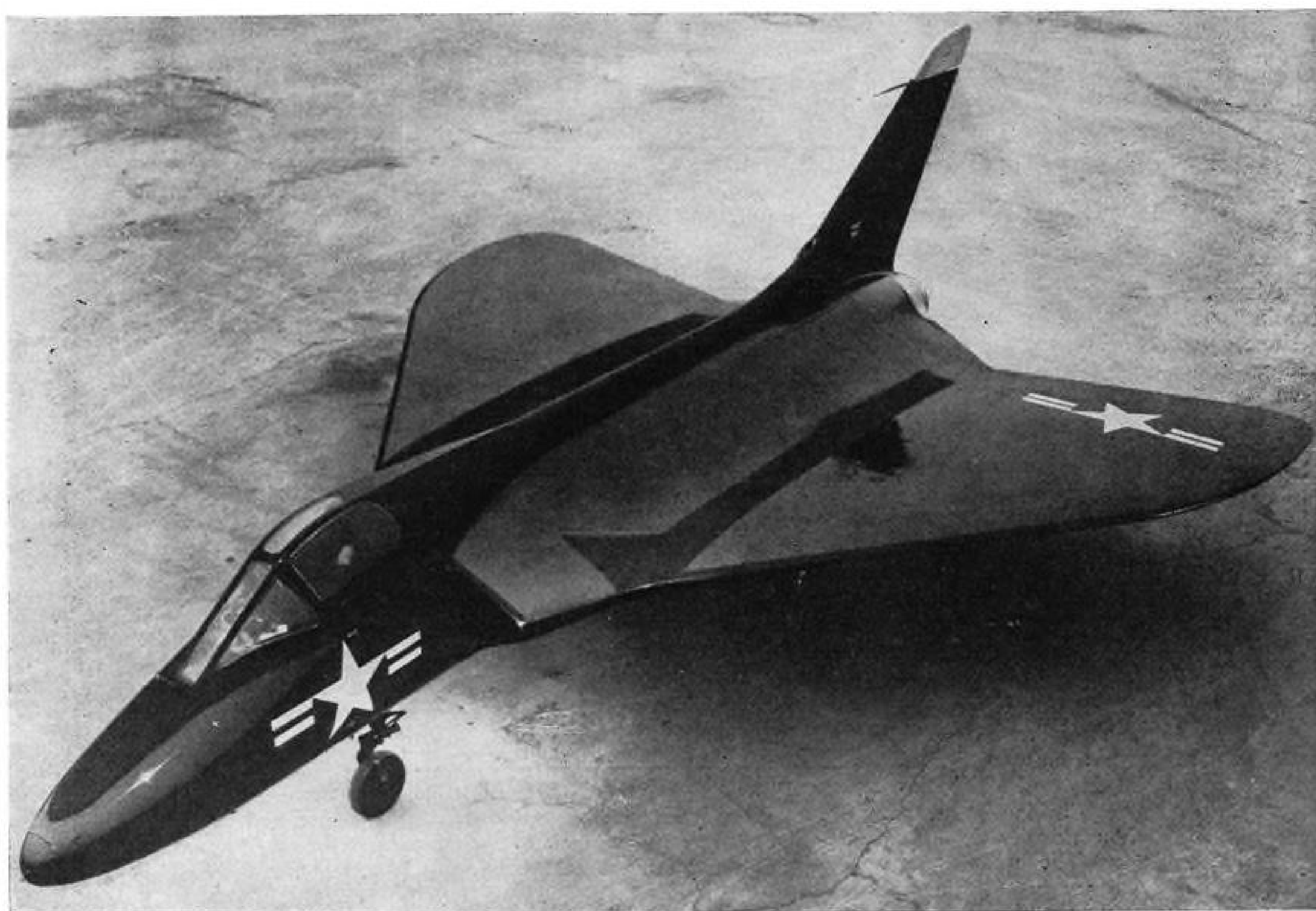
Bulkheads in fuselage sides are reinforced for greater strength. These columns stiffen the sides of the fuselage bulkheads against bending and insure adequate protection for personnel or equipment during ditching or wheels

up landings. Structural skids or "chine strips" have been added externally to the fuselage bottom to provide directional stability on snow, ice and mud in the event of a wheels-up landing.

Landing gear of the C-119C is greatly improved over that of the "B" version. Using the new four-wheel truck-type gear, the C-119C will be able to operate from fields presently marginal for the C-119B. Specifically the new truck-type gear permits operation in fields with a soil Modulus K factor as low

as 65. (K factor of natural soil subgrade is 100.) This achieves about the lowest footprint of any military transport currently in production.

The new gear also has an auxiliary braking system utilizing compressed air bottles for emergency operation. Normal braking power is provided by landing flaps, a reduced landing speed, and reversible pitch propellers. The C-119C will be able to land over a 50-ft. obstacle with brakes plus reversing in 1370 ft.



Navy Reveals Fast-Climbing XF4D

The U. S. Navy's latest and most radical interceptor, the Douglas XF4D, made its first flight at Edwards AFB, Muroc, Calif., on Jan. 23, 1951.

The tiny craft, designed for catapult takeoff and rapid climb, seems more like a missile than an airplane. And in fact, it may indicate the beginning of the transition from conventional piloted aircraft to pilotless ones.

It is logical to think so, because today's aircraft fly on the edge of human capabilities and endurance, and tomorrow's missiles aren't here yet. And so, an in-between weapon, such as the XF4D might be, is also logical, because it combines the features of both.

► Modified Delta—Basic configuration

of the XF4D is a well-modified Delta wing. The leading apex of the Delta has been distorted to take in air and to allow room for a fuselage for the pilot, and the trailing edge has been faired around the engine outlet.

Cockpit and forward part of the fuselage seem perfectly conventional, as does the tricycle landing gear which is fitted.

Only photos available have been extensively retouched to eliminate actual outlines of control surfaces, but some observations are possible anyway.

► Folding Wings—It's a safe bet, for instance, that the wings fold upwards, resulting in a neat package only the height of the vertical fin. The fold joint

shows faintly at the outboard edge of the wingwalk.

Probably both full-span leading-edge flaps and partial-span trailing-edge flaps are fitted. Fuel is likely stored in the thick wing root fillet; there is little obvious room anywhere else.

Powerplant is a single jet engine, probably the Westinghouse J-40, although it is not impossible that two axial-flow engines are installed one above the other.

Cockpit design is patterned after that of the A2D Skyshark. Forward of the cockpit there are a couple of skin joints which seem to indicate that the main armament is in the nose; access would appear to be through lifting hoods.

TOTAL Life Years Lost

per 100,000,000 passenger miles

through Injury
through Death



Passenger
CARS & TAXIS

PASSENGER Life Years lost

per 100,000,000 passenger miles

through Injury
through Death



Passenger
CARS & TAXIS

New Yardstick for Transportation Safety

Economic consultant proposes an improved method of reporting statistics to indicate loss of productive life.

By Rudolf Modley

On several recent occasions AVIATION WEEK has been taking its readers along on some exploratory flights over the little-known land of safety statistics. On some such editorial flights readers were shown some lofty peaks of railroad accidents which had hitherto been known to only a few professional explorers in the Interstate Commerce Commission. But passengers must have been most impressed with the dense fog that seems to hang permanently over the area.

Upon their returns from their flights they must have wondered how it was possible for the railroads to talk so much about a subject on which our knowledge is so limited. And they must have wondered if some way could not be found to let the people know how safe or unsafe our transportation system really is. Because it is only on the basis of facts—and all the facts—that we can direct our major efforts into the most urgent problems and learn to do better.

► Your Chances: Good—The yardstick most commonly applied today in measuring aviation accidents is the number of passenger deaths per 100 million passenger miles. If we say that the accident death rate for scheduled domestic airlines is 1 passenger death per 100 million passenger miles, we mean that you, if you were to take a trip today, could fly 100 million miles in a scheduled airliner until your statistical chance to be killed came up.

If you were to take a plane that flew at a speed of 250 miles per hour you could keep flying constantly for 45 years and 8 months. With life expect-

ancy what it is today in this country you would probably die of old age in your plane long before the chance for accidental death would come up.

But the fact that this yardstick gives us an indication that it is quite safe to fly in a scheduled airliner still does not make this yardstick a good one. Here is what's wrong with it:

► Bent Yardstick—First, it measures passenger deaths only. This is a good measure of your own safety if YOU want to take a trip. But from the point of view of the nation you are not the only important person; other people, who are not passengers, are just as important. And the fact that YOU get there safely but that others got killed in getting you there must taken into account. And it helps to remember that YOU or your child may be one of the "others."

We thus come to the following conclusion: From the point of view of the passenger-to-be, the number of passenger deaths is important. From an over-all viewpoint, ALL deaths are important. This includes the deaths of pedestrians, employees (except drivers and pilots, who are counted as passengers), trespassers, and others killed by trains, planes, cars and buses.

We shall see that there are other objections against the presently used yardstick of passenger deaths per passenger mile. But even if there were no other ones, it is high time that newspapers, magazines, educators and administrators talked about the overall safety of planes vs. trains and automobiles. The least they could do is to talk about both overall AND passenger safety.

Second, the yardstick measures deaths only. It completely ignores injuries. This would not be too serious if all means of transportation had about the same number (and the same severity) of injuries for each accident. But this is not the case: 46,141 people were killed by trains in the years 1940 to 1949. But 474,747, or more than 10 times as many, were injured!

The ratio is very different for scheduled domestic airlines: in the same years 851 were killed but only 447 injured. Instead of a ratio of 10 injured for each death in railroad accidents (including auto-train collisions) we find a ratio of only about one injured for every two deaths in scheduled airline accidents. This shows how unfair it is to ignore injuries, comparing only deaths.

► Total Loss—The commonly used yardstick of passenger deaths per 100 million passenger miles is therefore misleading because it is limited to Passengers and to Deaths. To be meaningful it would have to show the total loss to the entire nation due to deaths and injuries from transport accidents.

And now the question is: What can we do about it?

The answer is: Plenty.

Fortunately, a lot of work has been done in other fields which shows a way to a solution.

For quite some time leaders in the medical profession have been concerned about the shortcomings in our method of measuring death. Death as such is not avoidable; premature death may be avoidable. Measurement of nothing but the fact that a death has occurred is therefore less meaningful than the measurement of how much life-time has been lost prematurely. An 80-year-old man dying from heart disease and a 12-year-old boy run over

by a car are each counted as one death under the presently used method. But the normal life expectancy of each of the two differed widely at the time of their death.

► **New Reckoning**—To overcome this shortcoming, the American Medical Assn., undertook a study* to compare death rates from various causes of death with the number of life-years and the number of work-years lost through them. The results were startling.

Under the old system of counting deaths without regard to the age of the person dying, the death-rate in 1945 from heart diseases was four and a half times as high as the death rate from accidents. Yet, when the loss of prematurely lost life-years was calculated the ratio was narrowed to 2 to 1. And when the number of work-years lost was counted, accidents moved into the first rank as the foremost killer in the nation.

The explanation lies in the average ages at death in 1945—age 68 for heart and age 46 for accidents. The corresponding average future life-times were 11 and 26 years, respectively.

AMA considered at the time the preparation of a parallel study to figure out the cost in life-years and in work-years of disabling illnesses and injuries. Nothing has as yet been published by the AMA on this subject. Limited data in this field are available from other studies.

► **True Impact**—The effect of this improved measurement of death and disablement can not be overestimated. Not only do we begin to see the true impact of accidents on our national well-being; we also have, for the first time, a method by which we can measure death and accidental injuries with the same yardstick—namely life-years lost through them.

By adding the loss of life-years through accidental death to the loss through accidental injury we obtain a complete measure of the impact of any cause of accident—be it industrial, home, transport, or other. The following example, based entirely on assumed figures, will demonstrate the progress which appears in sight:

OLD METHOD

(All figures are assumed and do not represent actual accident experience)

Per 100 million passenger miles	Scheduled domestic airlines	Railroads (incl. auto-train collision)
Number of passenger deaths...	1.0	.2
Number of passengers injured...	.4	2.1
Number of total deaths	1.1	2.5
Number of all persons injured.....	.5	20.6

* Bureau of Medical Economic Research of the American Medical Assn., Bureau Bulletin Number 64, 1948.

Inasmuch as deaths and injuries can not be added together, no valid comparison can be made between the two methods of transportation. If additional means of transportation are brought into the picture, the difficulty of making comparisons increases.

NEW METHOD

(All figures are assumed and do not represent actual accident experience)

Per 100 million passenger miles	Scheduled domestic airlines	Railroads (incl. auto-train collision)
Life-years lost through passenger deaths...	30.1	8.0
Life-years lost through passenger injuries...	.1	.8
Total passenger life-years lost	30.2	8.8
Life-years lost—all persons—deaths ...	30.2	72.3
Life-years lost—all persons—injuries ..	.1	7.5
Total life-years lost—all persons	30.3	79.8

Death and injuries can now be added together because they are measured in the effect they have in depriving those involved in the accident of life-years. All types of transportation accidents can be compared in this relatively simple way. Use of this new method would make it possible for all the people concerned with—and about—transport safety to concentrate on the truly important issues to make travel safer.

Much work remains to be done before the new method can be applied correctly. The problems are too numerous and too complicated to be enumerated here. But this work may safely be left to the experts in such organizations as the National Safety Council, the Automotive Safety Foundation, and the Flight Safety Foundation.

AF Commits 99.6% Of Fiscal '51 Funds

Moving rapidly toward build-up to a 95-group structure, USAF has already committed 99.6 percent—approximately \$2.75 billion of all available aircraft procurement funds for fiscal 1951, AF Secretary T. K. Finletter has disclosed.

Secy. Finletter stated that almost 100 percent of available aircraft procurement funds for fiscal 1951 First and Second Supplemental, as well as regular appropriations, have been committed to definite aircraft procurement programs.

Of that amount, he said, 90.4 percent of total aircraft procurement funds, thus far available, have been legally obligated through letters of intent and through instruments of contract.

In further delineation of USAF funds utilization, Finletter declared that approximately 90.4 percent of all USAF

procurement funds (aircraft as well as other)—approximately \$9.25 billion—had been committed. Approximately 61.4 percent of this amount has been legally obligated, he said.

► **Northrop F-89**—In reference to queries concerning USAF's all-weather fighter capabilities, the Secretary declared: We have now gotten the "bugs" out of the F-89 Scorpion, and the plane is now in accelerated production. The F-89 is better than existing all-weather fighters such as the Lockheed F-94, and it will gradually replace or augment current all-weather aircraft.

► **Canberra B-2**—If the English Electric Co. Canberra B-2 bomber is used by USAF, Finletter said, it will probably be used operationally as an all-weather intruder much in the same manner as are B-26 bombers in Korea today.

If Air Force buys the Canberra, present plans are that the Glenn L. Martin Co., Baltimore, Md., will build the aircraft. This does not mean, Finletter said, that the Martin XB-51 has been dropped. Air Force intends to carry out accelerated development of the XB-51. The present Canberra is better, however, for night intruder missions than the XB-51, he declared.

► **Boeing XB-52**—Indications are, Finletter said, that the Boeing XB-52 is a fine plane. Two X models are being constructed and it is hoped to fly one this year.

Finletter emphasized faith of the USAF in maintaining status quo of the strategic air arm, but insisted that strategic air power was not being exploited at the expense of tactical air power.

"I believe," Finletter stated, "that the Strategic Air Command is the great deterrent—and must continue to be—against attack on us and the free world." The tactical and air defense force of this nation, he said, would not go into battle until war came—hence, the emphasis now on Strategic, not Tactical Air Command, as a war deterrent.

Lessons of Korea, plus the making available of more funds for general AF build-up, will permit more emphasis on tactical air power, Finletter said.

Measure Sets Up Three Air Commands

Three major commands—Air Defense, Strategic Air, Tactical Air—would be established by statute in legislation slated for early enactment.

The Secretary of the Air Force is authorized to establish additional commands as he sees fit.

The measure, for the first time since the U. S. Army Signal Corps bought the first plane from the Wright brothers in 1909, spells out in law USAF's functions and organization, with allowance for administrative flexibility.

10 reasons why your best bet in bearings is TIMKEN®

1 Rib of cone maintains roller alignment, prevents skewing, assures maximum bearing capacity.

2 Generous radius permits greater shaft strength.

3 Available in 26 different types.

4 Precision manufactured. Available with runout tolerance of only seventy-five millionths of an inch (.000075").

5 Soft steel cage separates rollers, prevents scuffing.

6 Case-hardened surfaces resist wear.

7 Micro-inch surface finish makes friction negligible.

8 Available in 5850 sizes.

9 Made from Timken fine alloy steel for long bearing life.

10 Tough inner core resists shock.

OTHER tapered roller bearings may look like Timken® bearings. But there is no other tapered roller bearing which gives you as many important advantages as you get with Timken.

Ten of these advantages are listed above. They all stem from the fact that the Timken Company is the foremost producer of tapered roller bearings and leads in (1) advanced design, (2) precision manufacture, (3) rigid quality control, (4) special analysis steels.

Be sure that every tapered roller bearing you use

carries the name "Timken", the trade-mark of The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".

TIMKEN
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TAPERED ROLLER BEARINGS



NOT JUST A BALL NOT JUST A ROLLER THE TIMKEN TAPERED ROLLER BEARING TAKES RADIAL AND THRUST LOADS OR ANY COMBINATION

PRODUCTION

Auto Firms Get Expansion Money

Ford Motor and Kaiser-Frazer sign AF contracts for facilities to produce aircraft engines and planes.

Negotiated contracts totaling over \$60.5 million were awarded by the Air Force in the week ending Jan. 19.

Nearly half the total went to Ford Motor Co. (\$14.7 million) for facilities to produce engines, and Kaiser-Frazer Corp. (\$10 million) for plane production facilities. Plans call for Ford to make Pratt & Whitney Wasp Major R-4360s, and K-F to build Fairchild C-119s and Lockheed P2V fuselage sections.

Other large contracts went to Convair (\$6.5 million) and North American Aviation (\$7.8 million).

A. C. Spark Plug div., Flint, Mich., spark plugs, Cl. 03H, \$4,251,260.

Aeroquip Corp., Jackson, Mich., aircraft hardware, Cl. 04A, \$46,800.

Air Associates, Inc., Teterboro, N. J., aircraft hardware, Cl. 04A, \$88,035.

Aircooled Motors, Inc., Syracuse, N. Y., spare parts for engines used in aircraft, Cl. 02P, \$31,400.

American Fixture & Mfg. Co., St. Louis, Mo., tables, dining hall, Cl. 40A, \$317,418.

Aviators Clothing Co., Inc., Beacon, N. Y., jackets, air crew and flying, Cl. 13A, \$532,901.

Beech Aircraft Corp., Wichita, Kansas, kits of material necessary for installation of a landing gear control switch on aircraft, Cl. 01H, \$75,000.

Bendix Products div., Bendix Aviation Corp., South Bend, Indiana, wheel and brake assemblies, Cl. 03B, \$131,349.

Biederman Motors Corp., Cincinnati, maintenance parts for engines, Cl. 19C, \$125,969.

G. S. Blakeslee & Co., Cicero, Ill., degreaser, vapor type, Cl. 17A, \$33,074.

Consolidated-Vultee Aircraft Corp., Ft. Worth, Texas, kits and miscellaneous modernization modification parts for aircrafts, Cl. 01B, \$100,000.

Consolidated-Vultee Corp., San Diego, spare parts for aircraft, Cl. 01B, \$6,500,000.

Continental Motors Corp., Muskegon, Michigan, emergency spare parts for maintenance of aircraft, Cl. 02C, \$60,000.

Diamond Alkali Co., Cleveland, liquid, fire extinguisher, Cl. 24, \$53,186.

Division Lead Co., Chicago, lead solder, Cl. 23A, \$192,022.

Douglas Aircraft Co., Inc., Santa Monica, kits, seat attaching, Cl. 01D, \$25,864; kits, fire prevention modification, Cl. 01D, \$43,674.

Fairchild Aircraft div., Fairchild Engine & Airplane Corp., Hagerstown, Maryland, kits for parts necessary for revision to landing gear, Cl. 01R, \$123,314; mobile training units, Cl. 01R, \$100,000.

Fairchild Camera & Instrument Corp.,

Jamaica, N. Y., signal generators, Cl. 16J, \$337,145.

Flight Refueling Inc., Danbury, Conn., spare parts for refueling systems, Cl. 03N, \$100,000.

Ford Motor Co., Detroit, facilities for production of engines, \$14,700,000.

Franklin Machine Products Co., New York, N. Y., drum assembly, lead assembly, line assembly, weight flag for tow target, Cl. 28B, \$76,925.

F. S. & W. W. Hirsch Fire Apparatus, Yankee Motor Bodies Corp., div., Los Angeles, tester instrument case, Cl. 17C, \$33,187.

Gaveco Laboratories, Inc., New York, N. Y., exciter regulators, Cl. 03C, \$107,856. General Aniline & Film, Binghamton, N. Y., Ozalid printmasters, Cl. 10B, \$203,076.

General Electric Corp., Schenectady, spare parts for superchargers, Cl. 03E, \$1,122,141.

General Marine Co., St. Joseph, Mo., parachute folding tables, Cl. 17A, \$44,319.

General Motors Corp., Allison div., Indianapolis, Ind., roller bearings for turbo jet engines, Cl. 04D, \$30,050.

Gillfillan Brothers, Inc., Los Angeles, azel indicator equipment, Cl. 16C, \$4,529,818.

B. F. Goodrich Co., Akron, O., wheel assembly, Cl. 03B, \$61,499; wheel assembly, main landings, Cl. 03B, two contracts, \$686,000; \$116,000.

Great Lakes Mfg. Co., Hammond, Ind., dining hall chairs, Cl. 40A, \$233,887.

Hammarlund Mfg. Co., Inc., New York, N. Y., receivers, Cl. 16E, \$259,505.

R. M. Hollingshead Corp., Camden, N. J., liquid, fire extinguisher, Cl. 24, \$252,273.

Jack & Heintz Prec. Industries, Cleveland, generator, electric tachometer, Cl. 05D, \$85,861; inverters, Cl. 03C, \$36,223; inverters, Cl. 03C, \$229,487.

Johnson Fare Box Co., Bowser, Inc., Chicago, chargers, gun, Cl. 11E, \$918,011.

Kaiser-Frazer Corp., Willow Run, Michigan, facilities for production of airplanes, \$10,000,000.

Walter Kidde & Co., Inc., Belleville, N. J., transfer unit, carbon dioxide, Cl. 17A, \$36,404.

Kollsman Instrument Corp., Elmhurst, N. Y., indicators, Cl. 05D, \$39,912.

Lanagan & Hoke, Inc., Philadelphia, tester assembly, Cl. 17C, \$83,530.

William Lapedes & Sons, Inc., Dayton, shirt, flying, wool, Cl. 13A, \$223,106.

Lear, Inc., Grand Rapids, Michigan, spare parts for actuators, Cl. 03C, \$26,474.

Lewis Engineering Co., Naugatuck, Conn., temperature indicators, Cl. 05D, \$43,325; electric thermometer, tester, Cl. 17C, \$55,041.

Lockheed Aircraft Corp., Burbank, retrofit kits, Cl. 01L, \$238,900; repair of airplanes, Cl. 01L, \$25,290; kits, retrofit, Cl. 01L, \$797,500.

Marine Aircraft Corp., Ft. Worth, Texas, free fall type lifeboats, Cl. 19D, \$187,092.

Marquardt Aircraft, Van Nuys, Calif., analyzers, Cl. 17C, \$28,512.

Mastercraft Metals, Inc., Dayton, Kentucky, specialized equipment for Photographic Laboratory, \$30,658.

Maxson Engr. Co., div., W. L. Maxson Corp., New York, N. Y., amplifiers, Cl. 05F, \$35,042.

Miller Steel Co., Kokomo, Ind., low carbon, low alloy steel sheet, Cl. 23A, \$383,899.

Minneapolis-Honeywell Regulator Co., Minneapolis, spare parts for turbo regulator systems, Cl. 03E, \$517,243; gyro directional stabilizers, Cl. 05F, \$25,712.

New Idea, div., AVCO Mfg. Corp., Coldwater, Ohio, trailer and storage rack, Cl. 19A, \$99,852.

North American Aviation, Los Angeles, modification of and furnishing kits, \$107,385; model airplanes and related equipment, Cl. 01M, \$7,748,458.

Northern Radio Co., Inc., New York, N. Y., variable master oscillators, \$51,681.

Optimus Equipment Co., Matawan, N. J., degreaser, vapor type, Cl. 17A, \$39,538.

Pacific div., Bendix Aviation, N. Hollywood, Calif., spare parts, Cl. 03C, \$48,648; hydraulic valves, Cl. 03I, \$25,322.

Phipps Products Corp., Boston, liquid, fire extinguisher, Cl. 24, \$165,885.

Polaroid Corp., Cambridge, Mass., magazine for aerial cameras, \$46,000.

Porter-Cable Machine Co., Syracuse, N. Y., portable electric saws, Cl. 17A, \$28,009.

Recordak Corp., Washington, D. C., enlarger, reader, camera-microfilm, Cl. 10B, \$177,635.

Reed Products, Inc., Milwaukee, aircrew trousers, Cl. 13A, \$446,588.

Rockwell Mfg. Co., Pittsburgh, maintenance parts for fuel servicing trailer and trucks, Cl. 19C, \$36,818.

Royal Electric, Inc., Jamestown, Ohio, inverters, Cl. 03C, \$435,632.

Schwein Engr. Co., Los Angeles, indicators, Cl. 04C, \$30,452; miscellaneous spare parts for indicators, Cl. 05E, \$35,375.

Singer Sewing Machine Co., New York, N. Y., sewing machines, Cl. 17A, \$191,601.

Sperry Gyroscope, Sperry Corp., Great Neck, L. I., N. Y., spare parts for radar range calibration, Cl. 11A, \$50,113.

Standard Products, Inc., Wichita, Kansas, overhaul, modification and winterization of driftmeters, Cl. 05A, \$151,200.

Super Electric Co., Jersey City, N. J., antenna leading coil, Cl. 16A, \$161,379.

Tru-Fit Trousers, Traverse City, Michigan, flying trousers, Cl. 13A, \$235,876.

Vinco Corp., Detroit, machinery and equipment, \$120,000.

Virtue Bros. Mfg. Co., Los Angeles, dining hall chairs, Cl. 40A, \$239,233.

Wickes Engr. & Contr. Co., Camden, N. J., air control towers, Cl. 16E, \$160,000.

Wilson Mechanical Instrument Co., New York, N. Y., hardness testers, Cl. 17C, \$60,265.

USAF Awards

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

ABSTRACTS

For 181 drafting machines (51-448):

Companies sharing: Service Blue Print Co., Dayton, on a bid of \$9534.40; Charles Bruning Co., Chicago, on a bid of \$1342. and Bowen & Co., Inc., Bethesda, Md., on a bid of \$14,970.

For 75 steel trolleys (51-728):

National Screw & Mfg. Co., Chester Holst div., Lisbon, O., on a bid of \$3814.50.

For cable (51-896):

Federal Telephone & Radio Corp., Clifton, N. J., on a bid of \$14,950.

For connector plugs (51-510):

Companies sharing: Kings Electronics Co., Inc., Brooklyn, on a bid of \$10,261.50; Minneapolis-Honeywell Regulator Co., Minneapolis, on a bid of \$4070; American Phenolic Corp., Chicago, on a bid of \$1080; Howard B. Jones div., Cinch Mfg. Corp., Chicago, on a bid of \$1640.40; U. S. Radio & Television Supplies, Inc., Chicago, on a bid of \$231. and Roflan Co., Everett, Mass., on a bid of \$3210.

For connector—receptacles (51-511):

Companies sharing: Howard B. Jones div., Cinch Mfg. Corp., Chicago, on a bid of \$807.20; Eugene G. Wile, Philadelphia, on a bid of \$2920; Kings Electronics Co., Inc., Brooklyn, on a bid of \$711; Waltham Horological Corp., Waltham, Mass., on a bid of \$1500, and Westinghouse Electric Supply Co., Dayton, on a bid of \$1361.

For toggle switches (51-580):

Companies sharing: Arrowhead Rubber Co., Downey, Calif., on a bid of \$2460, and Herbach & Rademan, Inc., Philadelphia, on a bid of \$20,890.38.

For inverters (51-690):

Royal Electric, Inc., Jamestown, O., on a bid of \$435,632.40.

For connector caps and plugs (51-705):

Companies sharing: Avon Electrical Supplies, Inc., Jamaica, N. Y., on a bid of \$2580; General Electric Supply Corp., Dayton, on a bid of \$14,138.72; American Phenolic Corp., Chicago, on a bid of \$2308.71, and Tensor Electric Development Co., Inc., Brooklyn, on a bid of \$110.

For connector plugs (51-706):

Companies sharing: Howard B. Jones div., Cinch Mfg. Corp., Chicago, on a bid of \$465; American Phenolic Corp., Chicago, on a bid of \$5994; Brentwood Radios Inc., New York, on a bid of \$4100; Ohio Processing & Sales Co., Dayton, on a bid of \$3930; U. S. Radio & Television Supplies, Inc., Chicago, on a bid of \$609.50, and Herman H. Smith, Inc., Brooklyn, on a bid of \$855.

For connectors, jacks (51-750):

Companies sharing: Westinghouse Electric Supply Co., Dayton, on a bid of \$1360; Kings Electronics Co., Inc., Brooklyn, on a bid of \$5704; American Phenolic Corp., Chicago, on a bid of \$1260; Continental Electronics, Ltd., Brooklyn, on a bid of \$2640; Peerless Radio Dist., Inc., Jamaica, N. Y., on a bid of \$845.30, and Concord Radio Corp., Chicago, on a bid of \$619.93.

For plotting tables (51-769):

Dayton Aircraft Products, Inc., Dayton, on a bid of \$4097.35.

For solder (51-826):

Division Lead Co., Chicago, on a bid of \$192,022.50.

For bronze casting (51-856):

Companies sharing: Riverside Metal Co., Riverside, N. J., on a bid of \$1261.68, National Bearing div., American Brake Shoe Co., St. Louis, on a bid of \$3348.

For connector plugs (51-877):

Cannon Electric Development Co., Los Angeles, on a bid of \$11,500.90.

For indicator (51-912):

D. C. Cooper Co., Chicago, on a bid of \$406,000.

For 2500 turbosuperchargers (51-922):

Companies sharing: Milton J. Wershov Co., Los Angeles, on a bid of \$63,750, and Marquardt Aircraft Co., Van Nuys, Calif., on a bid of \$19,580.

For connector plugs (51-965):

Cannon Electric Development Co., div. of Cannon Mfg. Corp., Los Angeles, on a bid of \$40,161.50.

For connector receptacles (51-969):

Cannon Electric Development Co., div. of Cannon Mfg. Corp., Los Angeles, on a bid of \$37,861.60.

For connectors (51-968):

Cannon Electric Development Co., div. of Cannon Mfg. Corp., Los Angeles, on a bid of \$24,840.40.

For connector plugs (51-970):

Cannon Electric Development Co., div. of Cannon Mfg. Corp., Los Angeles, on a bid of \$47,350.

For connector plugs (51-1045):

Cannon Electric Development Co., div. of Cannon Mfg. Corp., Los Angeles, on a bid of \$13,904.60.

For pneumatic riveters (51-1032):

Chicago Pneumatic Tool Co., Detroit, on a bid of \$10,200.

For 130 propeller assemblies (51-1065):

Aviation Activities Co., Grand Prairie, Tex., on a bid of \$57,200.

For one tension tester (51-1253):

American Machine & Metals Inc., Riehle Testing Machines div., East Moline, Ill., on a bid of \$3200.

For ring sets (51-1468):

Companies sharing: Henderson Bros., Sacramento, Calif., on a bid of \$53.20, and York Supply Co., Dayton, on a bid of \$3071.

For photographic timers (51-581):

Morse Instrument Co., Hudson, O., on a bid of \$135,359.37.

For aircraft hardware (51-631):

Companies sharing: Air Associates, Inc., Teterboro, on a bid of \$120,240; Thomas Associates, Los Angeles, on a bid of \$20,732.50; Lee D. Thompson, dba J. D. Tool & Engr. Co., Dallas, Tex., on a bid of \$7150; Westinghouse Electric Corp., Dayton, on a bid of \$78,250; American Chain & Cable Co., Detroit, on a bid of \$6250; J. Pedersen Mfg. Co., Bridgeport, Conn., on a bid of \$17,187.50, and Ruland Mfg. Co., Watertown, Mass., on a bid of \$3720.

For printers (51-810):

Morse Instrument Co., Hudson, O., on a bid of \$72,976.80.

For 400 trunnion assemblies (51-827):

Republie Engineering & Mfg. Co., St. Paul, Minn., on a bid of \$12,348.

For 24 turntable assemblies (51-1012):

Haines Designed Products Corp., Dayton, on a bid of \$2950.08.

For 31 chargers (51-1050):

Allen Electric & Equipment Co., Kalamazoo, on a bid of \$4806.55.

For jic fuselages (51-1132):

Radioplane Co., Van Nuys, Calif., on a bid of \$15,173.55.

For indicators (51-215):

Schwien Engineering Co., Los Angeles, on a bid of \$11,347.86.

For airspeed indicators (51-284):

Kollsman Instrument div., Square D Co., Elmhurst, N. Y., on a bid of \$52,364.

For scale kits (51-254):

Companies sharing: Fairbanks, Morse & Co., Cincinnati, on a bid of \$1390; Aircraft Products Co., Clifton Heights, Pa., on a bid of \$9310; Akeley Camera and Instrument Corp., New York, on a bid of \$2730; Mansfield & Green, Cleveland, on a bid of \$2234.26; Telectro Industries Corp., Long Island City, N. Y., on a bid of \$5600, and Schaffer Air Industries, Inc., Long Island City, N. Y., on a bid of \$2380.

For fixed capacitors (51-262):

Companies sharing: Tobe Deutschmann Corp., Norwood, Mass., on a bid of \$5284, and Herbach & Rademan, Inc., Philadelphia, on a bid of \$1798.20.

For envelope assemblies (51-553):

Companies sharing: S. S. White Dental Mfg. Co., New York, on a bid of \$10,851.78; S. Buchsbaum & Co., Chicago, on a bid of \$13,078.10; Shellmar Products Corp., Mt. Vernon, O., on a bid of \$317,786.08; Vanant Products Inc., Tomah, Wis., on a bid of \$575,426.52; Kennedy Car Liner & Bag Co., Shelbyville, Ind., on a bid of \$18,292.26;

United Mineral & Chemical Corp., New York, on a bid of \$107,508.43; Milprint Inc., Milwaukee, on a bid of \$70,720.90; Acme Backing Corp., Brooklyn, on a bid of \$111,625; Floyd A. Holes Co., Bedford, O., on a bid of \$59,000; Armour & Co., Curled Hair div., Alliance, O., on a bid of \$22,500; Lord Mfg. Co., Erie, Pa., on a bid of \$10,841.46; Ideal Rubber Co., Brooklyn, on a bid of \$4200.84, and Presstite Engineering Co., St. Louis, on a bid of \$30,944.80.

For indicators and transmitters (51-652):

Companies sharing: Eclipse-Pioneer div., Bendix Aviation Corp., Teterboro, on a bid of \$433,109.42, and United States Gauge div. of American Machine & Metals, Inc., Sellersville, Pa., on a bid of \$7225.25.

For elastic exerciser cord (51-812):

Companies sharing: Ansonia Mills Inc., Ansonia, Conn., on a bid of \$22,847.56, and Thomas Taylor & Sons, Hudson, Mass., on a bid of \$7629.

For connector plugs (51-790):

Companies sharing: Graybar Electric Co., Inc., Dayton, on a bid of \$498.40; Peerless Radio Distributors, Inc., Jamaica, N. Y., on a bid of \$1256.80, and Howard B. Jones div., Cinch Mfg. Corp., Chicago, on a bid of \$1710.

For tester assemblies (51-1024):

Companies sharing: Lewis Engineering Co., Naugatuck, Conn., on a bid of \$55,041.12, and Laird Engineering Co., Charleston, W. Va., on a bid of \$9213.60.

For honing and lapping machines (51-1086):

C. Allen Fulmer Co., Cincinnati, on a bid of \$11,960.

For mixer amplifier (51-370):

Companies sharing: Eltron, Inc., Jackson, Mich., on a bid of \$145,849.80, and Dynamic Electronics, New York, Inc., New York, on a bid of \$16,422.84.

For portable saws (51-868):

Porter-Cable Machine Co., Syracuse, N. Y., on a bid of \$28,009.75.

For dolly assemblies (51-591):

Riley Steel Products Co., Cicero, Ill., on a bid of \$24,099.40.

For aircraft hardware (51-570):

Companies sharing: Dumont Aviation & Supply Co., Long Beach, Calif., on a bid of \$372; George K. Garrett Co., Inc., Philadelphia, on a bid of \$1402.50; H. K. Metal Craft Mfg. Co., New York, on a bid of \$317.50; Airborne Equipment Ltd., div. of Carruthers & Fernandez Inc., Santa Monica, Calif., on a bid of \$6465, and Aero Supply Mfg. Co., Inc., Corry, Pa., on a bid of \$3652.50.

For ethylene glycol pumps (51-1022):

Wikel & Cornelious, Inc., Rep. for Goulds Pumps, Inc., Seneca Falls, N. Y., on a bid of \$2995.

For drill presses (51-865):

Companies sharing: E. A. Kinsey Co., Cincinnati, on a bid of \$10,794, and Motch & Merryweather Machinery Co., Cleveland, on a bid of \$65,433.

For steel wire (51-257):

Page Steel & Wire div., American Chain & Cable Co., Inc., Monessen, Pa., on a bid of \$51,056.13.

For clips (51-1030):

Companies sharing: General Metals Corp., Adel div., Huntington Plant, Huntington, W. Va., on a bid of \$4454; J. Pedersen Mfg. Co., Bridgeport, Conn., on a bid of \$1810, and Thomas Associates, Los Angeles, on a bid of \$9446.

For 1727 oven assemblies (51-252):

Canfield Mfg. Co., Grand Haven, Mich., on a bid of \$95,554.08.

For tester assemblies (51-889):



21-piece Ferret Set includes Ratchet, Speeder, Sliding Bar, Nut-Spinner, 3 Extension Bars, Universal Joint and 13 sockets, 1/4" to 3/4". Many other combinations to choose from.

● An injection carburetor (like many another aircraft assembly) is no job to service with bulky tools. Hours are worth too much to be wasted! Notice how that Snap-on Ferret ratchet and extension-bar reach in to snug up hidden nuts and cap screws. These streamlined Ferrets, with slim 3/8" square drive, are available in a wide variety of socket sizes and types, plus special attachments and adapters. They're favorites with aircraft mechanics! Ferret units are of fine alloy steel, heat-treated to amazing toughness. Aircraft production and maintenance executives: write for data on Snap-on tools of special design, in quantity runs.

*Snap-on is the trademark of Snap-on Tools Corporation.

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C-W, P&WA Set Up Training Programs

Two of this country's biggest and oldest companies—Pratt & Whitney and Curtiss-Wright—are taking steps to ensure themselves of sufficient skilled shop workers and supervisory personnel for the time when U.S. aviation production lines get really rolling in the biggest effort since World War II.

Pratt & Whitney is refurbishing a four-story building in Hartford to supplement its training department at the E. Hartford plant. Scheduled to start operations soon, the new facility will accommodate between 600-800 trainees at a time, with a two-week minimum curriculum for each on a six-day basis. The school will handle hourly rated employees, including new men and present personnel being upgraded to jobs requiring additional training. The faculty will number about 80. During the war P&WA conducted courses for over 27,000 of its employees—about half in machine tool operations.

Curtiss-Wright is setting up a new project called the C-W Educational Institute to update its men in the latest developments in turbine and piston engines, props and flight simulators. The program is being offered initially to Wright engine and Curtiss Propeller personnel, will later be extended to the company's other divisions.

First on the agenda is a series of 60 lectures on the machinability of metals based on the USAF Machinability Report. The lectures will be given weekly preceding or following the regular shifts at C-W's two North Jersey plants, and will include movies, slides and actual machine demonstrations.

PRODUCTION BRIEFING

► **AiResearch Aviation Service Co.**, Los Angeles, executive aircraft interior specialists, has current backlog of about \$600,000, with major portion covering interior rework of DC-3s.

► **Lycoming-Spencer Div.**, Avco Manufacturing Corp., is training groups of bomber maintenance unit personnel in the servicing of aircraft portable generating units. Course is being given at Lycoming's Williamsport, Penn. plant and in the Williamsport Technical Institute.

► **Boeing Airplane Company**, Seattle, Wash., is building 18,000 power transmission line suspension clamps for the Bonneville Power Administration of Portland, Ore. Clamps, designed by Boeing engineers, are made of aluminum and are corona-free.



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Test 3 at our expense...you'll find every New Microtomic Drawing Pencil **IDENTICAL** to every other one of the same degree! Eberhard Faber's newly-developed quality controls make it positive!

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NEW DUSK GRAY, selected by hundreds of draftsmen as the least distracting, most distinctive drawing pencil color. New 'bull's-eye' degree marking on 3 sides—always in sight!

LESS SMUDGE on your tracings, because New Microtomic lines leave fewer loose, smearable particles! New Hi-Density Wood-clinched leads—stronger, tougher, slower wearing!

CLEARER PRINTS, because Microtomic's new **HI-DENSITY** lines are exceptionally opaque to the actinic rays of high-speed 'printers'. Result...dead-white lines, without feathering or blurry edges!

New Dynamic Balance
Lead Holder...try one!



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Electric, Fuel and Oil
Equipment and other
vital components for
tomorrow's aircraft.

Convair's Ft. Worth B-36D Line In Action



A group of giant Convair B-36D and RB-36D intercontinental bombers and reconnaissance planes get the final touches at Ft. Worth, Tex., prior to roll-out and flight test. Note how the planes are turned askew so their 230-ft. wings will fit in the 200-ft. wide assembly bay. The plane in the foreground is the reconnaissance version fitted with over a dozen cameras and special radar mapping equipment. Workers will jack up the nose prior to moving the plane since the top of the rudder protrudes between rafters. Clean appearance of assembly shop is noteworthy.

Emphasizing the underslung twin-jet pod beneath a B-36D wing, this view shows technicians working on another bomber's nose cannon turret. Both bomb bays are open. Addition of the jet pods containing GE J-47 engines of about 5000 lb. thrust to the B-36's six 3500-hp. P&W Wasp Majors has boosted the plane's over-the-target speed to 436 mph. All earlier B-36s are being returned to Convair for installation of the jets and, along with other modifications, will be similar to present models. Points of interest in this photo include retracted jet air inlet doors and the single sway brace strut. USAF has placed orders for a newer version, the B-36F having 3800-hp. Wasp Majors.



Its nose jacked high, an RB-36D is ready to be pulled off the end of the assembly line. Production of such large craft poses many new problems in making good use of available space and moving them through the various processes. Jacking is necessary so that the huge plane's 47-ft. high tail can be lowered sufficiently to clear the roof trusses. Although the nose has been raised well over six feet, the thrust line of the jet engines still appears to be quite parallel to the floor level. This view also affords a good look at the open forward bomb bay.

FINANCIAL

AAL Gaining Financial Strength

Underwriters' analysis of American's growth outlines factors that contributed to present firm position.

Substantial improvement in the financial condition of American Airlines, Inc., is reflected by recent events. The company accomplished material reduction in its funded debt through the purchase of \$5,950,000 principal amount of its 3 percent debentures, late in 1950. With the \$4,050,000 it had acquired about a year ago, this made a total of \$10 million of these debentures purchased as of Dec. 31, 1950, serving to reduce the original issue to \$30 million outstanding as of that date. This action anticipates sinking fund requirements well into 1958.

The reduction of one-fourth of the company's debt structure is not only a significant milestone in American's financial history but is a fitting tribute to private enterprise as supported in the best traditions of the investment banking community.

► **Funds Raised**—In June, 1946, American raised approximately \$80 million publicly through \$40 million in debentures and \$40 million in preferred stock. These issues were underwritten by an investment banking syndicate headed by Kidder, Peabody & Co. The debentures were offered to the public at an initial price of 102, but a declining market caught this issue in a down-draft and the marketing was far from successful to the underwriters.

But American received its full proceeds under the firm commitment of the underwriters, who fulfilled their obligation and sought no refuge in a government "bail-out" through a Reconstruction Finance Corp. loan or similar devices.

Subsequently, these debentures sold down as low as 67. With improving credit and the strong retirement program, current quotations for this issue are around par, or 100.

The fact remains that it was this firm underwriting which made it possible for American to obtain the capital funds necessary to embark upon its ambitious equipment program in 1946. This played a key part in enabling the company to command a dominant competitive position in the postwar period by being the first air carrier to complete the installation of an all-modern passenger air fleet.

These events now make particularly timely a report currently being released

by Kidder, Peabody & Co. analyzing the "Strategic Position of the Air Transport Industry with Special Emphasis on American Airlines, Inc." This 22-page study highlights the favorable position of the airline group in our present economy as a fitting backdrop to American's stated role "as having among the greatest potentialities in earning power with the attachment of minimum risks."

► **Coach Factor**—In appraising the strong growth characteristics of the air transport industry, this study notes that for the first eight months of 1950, air travel was equal to 84 percent of Pullman traffic. The observation is advanced that if present trends persist, air travel will not only equal but may well surpass the level of Pullman traffic this year.

Aggressive merchandising of air travel, as represented by coach services and other promotional fares, is given credit for the substantial airline gains. The report notes: "Coach services, obviously, have opened up new traffic vistas for the airlines, and may well represent an important key to broader future markets. . . . Sufficient experience has been obtained . . . to prepare this promotional device for greater utilization when the need for such a traffic stimulant arises."

The Kidder, Peabody study details a number of significant and interesting phases in the development progress of American Airlines. For example, the New York Central and the Pennsylvania are reported as the only two railroads now exceeding American in the amount of annual passenger revenues generated.

► **Financially Strong**—American's current financial position is represented to be the strongest it has ever been. As of Sept. 30, 1950, its working capital was reported in excess of \$21,725,000. This compared with only \$8,760,000 at June 30, 1947, "an uncomfortably low point". The improvement of about \$12,965,000 in working capital does not begin to reflect the full extent of American's financial recovery during the period of three years and three months.

In addition to the net working capital gain, the carrier's provision for special flight equipment fund, net gain in op-

erating property and equipment, net gain in investments in subsidiaries and the purchase of sinking fund debentures bring the total gross financial recovery to \$44,165,000 for the period. After allowing for the funds provided through the increase in unearned transportation revenues, the net financial gain is \$42,710,000.

Further gains are detailed for the 1950 fourth quarter and are tied in with the proceeds received from the sale of American's interest in AOA, together with the funds expended for debenture acquisitions and certain capital expenditures.

► **Competitive Position**—The Kidder, Peabody report analyses American's competitive position as a result of its modern air transport fleet. Among other things, American's flight equipment was recently estimated to have a replacement cost of some \$151 million. As of Sept. 30, 1950, giving effect to depreciation write-offs, this equipment was carried on the books at \$44,960,268, or less than one-third of replacement costs.

The modern aircraft fleet of American is represented to give that carrier improved efficiency and reduced operating costs. By standardizing on two basic transport types, the DC-6 and Convair, utilization of only one type engine, the Pratt & Whitney R-2800, has also been facilitated.

► **Passenger Effect**—The impact on American's 1950 earnings due to sustained passenger volumes prevailing during the fourth quarter is readily evident through the quarterly analysis for the last two years. Net income before taxes for the 1950 final period is estimated by Kidder, Peabody at \$7 million, or almost seven times the comparable results for the 1949 like quarter. This is responsible for the estimated \$20,458,822 net income before taxes for 1950. The leverage factor on airline earnings is readily apparent when it is realized that net earnings, before taxes, more than doubled in 1950 while revenue passenger miles gained an estimated 15 percent during the same time.

The report implies that American was subject to an excess profits tax during the second half of 1950. Giving effect to such provision, American's net earnings for 1950 are estimated at all time peak of over \$10 million. After preferred dividend requirements, this is equivalent to about \$1.35 per common share as compared with only 79 cents per common share for 1949.

The report concludes with an exposition of American's operations as having the lowest cost in the industry, with a likelihood that its excellent equipment position will help maintain this distinction during 1951.

—Selig Altschul



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AERONAUTICAL ENGINEERING

Avionics Highlights IAS Annual Meet

Record number of allied-science organizations join in presenting problem solutions in aeronautics.

The 19th annual meeting of the Institute of the Aeronautical Sciences brought together a broad field of scientists and engineers to exchange latest available information on major phases of aviation.

Three fundamentals spotlighted by the sessions (Jan. 29–Feb. 1) were:

- Expanding role of avionics.
- Growing cognizance of safety in aviation.
- Increasing interdependence of aeronautics and allied fields.

Out of a total of 11 subject headings covering 42 presentations, almost one full day of the four-day sessions was devoted to "electronics in aviation," a discussion division appearing for the first time in an annual meeting program of the IAS. Four papers, followed by a symposium on all-weather flying, comprised the Institute's avionics discussion offering.

Another new discussion heading was "flight safety," emphasizing the increasing recognition of this characteristic as an intangible but integral part of aircraft design and operation. Last year it was merely part of the air transport presentations.

And established was a new high in the number of aviation or related-science organizations participating with the IAS at one of its annual meetings. Sponsoring presentations of specialized knowledge in their particular fields were: American Meteorological Society, Cornell's Daniel and Florence Guggenheim Aviation Safety Center, Institute of Radio Engineers, Institute of Navigation, and American Helicopter Society.

Greatest emphasis was placed on aerodynamics, with four presentations allocated to each of three phases—general, supersonic and hypersonic.

Aeroelasticity, which appeared for the first time last year as a program heading, was given the same weight this year, with three papers delivered.

Flight propulsion problems, last year limited to a symposium, emerged at this annual meeting as a separate category, covering three timely subjects.

Here are summaries of some of the papers delivered at this 19th annual meeting. Others will be briefed in succeeding issues of AVIATION WEEK.

ROTATING WING AIRCRAFT

► **Dynamic Effects in Rotor Blade Bending**—A. H. Flax, Head, Aerodynamics Research Dept., and L. Goland, Associate Research Engineer, Cornell Aeronautical Laboratory, Inc.

The problem of helicopter rotor blade bending moments for the case in which the blade is near resonance with one of the periodic aerodynamic forcing harmonics is considered. The additional inertia and aerodynamic damping forces due to blade bending deflection are included in the general equations for blade bending.

Two methods of analysis are presented: The first is a tabular solution of the differential equation, while the second is an approximate method based on the use of an amplification factor on the static bending moment of the blade. The tabular procedure is rather laborious and time-consuming, while the amplification factor method is relatively simple. Comparison of results obtained by the two methods for a typical case indicates fairly good agreement.

► **H-5 Rotor Blade Ice-Control Project**—Edward F. Katzenberger, Chief Design Engineer, Sikorsky Aircraft division, United Aircraft Corp.

While this paper has particular reference to design, construction, and test of an experimental rotor blade ice-control system for the H-5 helicopter, the method of analysis developed for determining the parameters of the system is generally applicable to the design of rotor hot air deicing and anti-icing systems.

Scope of the H-5 icing project included: heat-transfer analysis; detail design of the system; construction of the components and installation on an H-5 aircraft, together with test instrumentation; 10 hours flight and ground test; and correlation of flight-test data with method of analysis. Analysis employed was a straightforward application to the rotor blade of methods of airfoil heat-transfer analysis developed by NACA and AMC.

Good agreement was obtained for dry air, and the analysis was extended to wet air conditions that, however, were outside the scope of the test program and will form the next phase.

► **Desirable Longitudinal Flying Qualities for Helicopter and Means to Achieve Them**—F. B. Gustafson, Aeronautical Research Scientist, Langley Aeronautical Laboratory, NACA.

Tentative longitudinal flying-qualities requirements for helicopters based largely on pilot observations and measured stability and control characteristics for several single-rotor copters are given. It was found that pilots are influenced by details of the time history

of normal acceleration following control displacement.

Various means that have been tried or suggested for achieving desirable characteristics are outlined. Experimental results (obtained while varying the characteristics to establish the requirements) showing the effectiveness of two such means are presented. These are, increasing the stability with angle of attack by means of a horizontal tail; and increasing the damping in pitch of the helicopter by artificial means.

It is shown that the characteristics can be varied from unsatisfactory to satisfactory by either means. The effect on initial control response to making the tail surface move with the cyclic pitch control is also demonstrated.

It is pointed out that the best design practice may, in general, be to use several of the methods discussed in combination with one another, rather than relying solely on one method.

► **A Tested Solution to the Problem of Helicopter Stability and Automatic Control**—E. G. Vanderlip and Donald N. Meyers, Research and Development Department, Piasecki Helicopter Corp., and P. Halpert, Engineering Dept. Head for Flight Control, Sperry Gyroscope Co.

The general problem of stability and control of helicopters is discussed, emphasizing the characteristics desired in a stabilizing device and why an automatic pilot was chosen. The principles of operation of the A-12 Gyropilot and its installation in a XHJP-1 Helicopter are described. Recordings of actual flight performance are given showing how the aircraft is successfully stabilized.

FLIGHT PROPULSION

► **Practical Aspects of Turbojets in Transport Aircraft**—R. T. Holland and E. L. Auyer, Aircraft Gas Turbine division, General Electric Co.

Performance factors of particular importance to turbine-engine operators are presented. A discussion is given of rating methods as applied to commercial operation. Effects of air extraction, nonstandard temperatures, altitude, humidity, and variation between engines are described. Operational methods, such as idling conditions for descent, windmilling, acceleration characteristics, and engine shutdown in flight for cruise control are discussed.

Major operational factors that affect maintenance costs are evaluated, and recommended operational methods are outlined. Recent flight experience on accelerated service tests is used as a basis for some of the conclusions. A description is given of typical inspections required, with data on time and man-hours, in the light of fast turn-around requirements.

Anticipated ground-equipment requirements are discussed. Installation design considerations are treated from the points of

view of cost, safety, performance, noise control, and other factors.

► **The Effect of Changes in Altitude on the Controlled Behavior of a Gas-Turbine Engine**—S. C. Himmel and Richard P. Krebs, Lewis Flight Propulsion Laboratory, NACA.

This paper presents a theory of the change in engine response with altitude, which has been derived independently by several analysts, together with some experimental data corroborating these analyses. The data show that response of the engine at any altitude may be computed from measurements made at sea level.

Sea-level and altitude transient behavior of an engine operating under a proposed control is studied with the aid of an electronic analog computer, to illustrate the effect of the changes in engine dynamics with altitude. From these studies, it appears necessary to use compensation to vary the gain and time variant parameters of the control loops with altitude if satisfactory performance is to be obtained.

► **Application of Rocket Power to Aircraft**—H. R. Moles, Chief Engineer, Reaction Motors, Inc.

This paper deals with the application of rocket power to past, present, and future aircraft, limited to liquid-propellant rockets for man-occupied aircraft.

A typical installation is described, and various types of rocket powerplants are discussed. Propellant combinations, consumptions, feed systems, and possible means of increasing the storage time are presented. Factors that should be considered during the installation and operation of a rocket powerplant as they pertain to the airplane and crew are listed for future consideration.

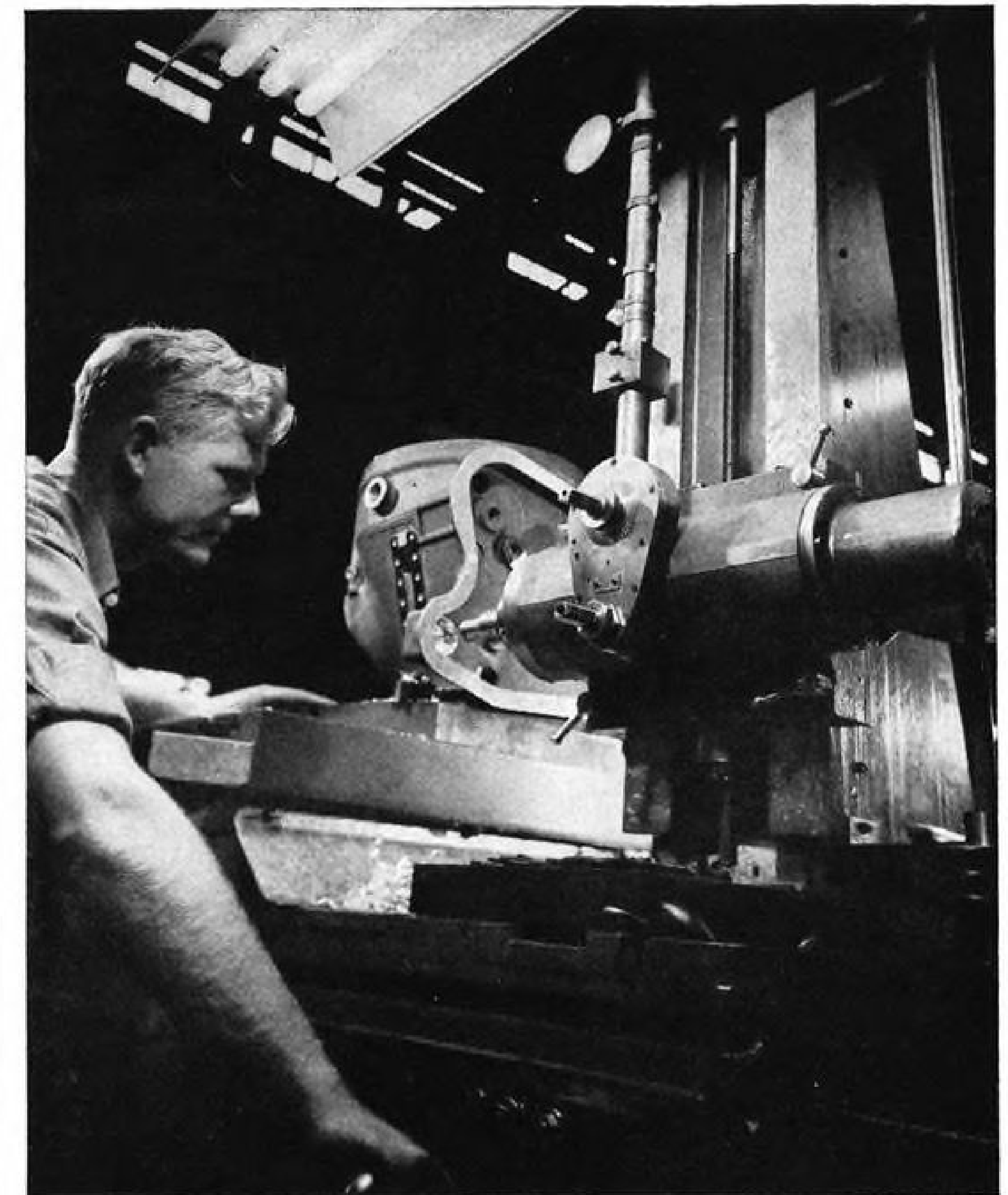
Some of the advantages of a rocket powerplant are pointed out: low weight, small cross section, high thrust-to-weight ratio, and a high rate of thrust build-up. General characteristics are given for a rocket-powered interceptor aircraft that could be built today.

► **A Theory of the Direct and Inverse Problems of Compressible Flow Past Cascade of Arbitrary Airfoils**—Chung-Hua Wu and Curtis A. Brown, Lewis Flight Propulsion Laboratory, NACA.

A new approach to the inverse and direct problems of compressible flow past cascade of arbitrary airfoils is presented. The close relation between the shapes of the mean line of the blade and mean stream line in the channel and that between the variations in channel width and specific mass flow on the mean stream line are utilized.

In the inverse problem, with the inlet and exit angles, with a desirable blade thickness distribution, and with either a desirable mean line of blade or the rate of turning of the mean stream line chosen, the flow along the mean stream line is properly determined and easily extended out along the pitch direction. The blade boundaries are then determined from the inlet mass flow and best velocity distribution over the blade.

For a quick approximate solution of the direct problem, the same process is used with one or more adjustments to get the right blade shape. The solution obtained in this manner can also be used to give a good starting value for a more accurate solution by either relaxation or matrix technique, which also are briefly described.



This picture* does not equal 10,000 words

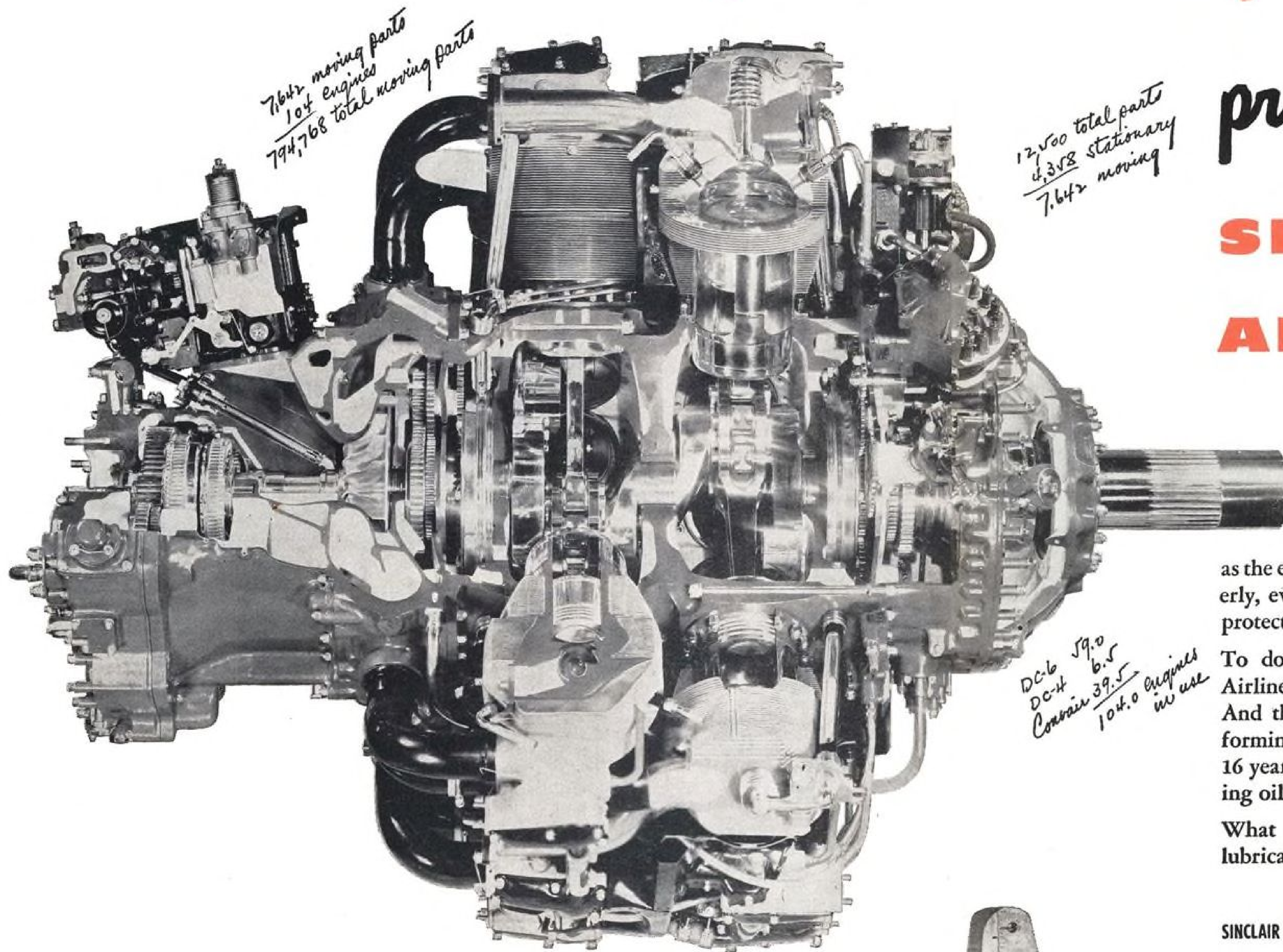
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The customary assumption of a linear relation between pressure and specific volume is not required in this approach, and the computation involved is also much simpler and quicker.

The theory is illustrated with solutions of both inverse and direct problems of compressible flow past typical turbine and compressor blades. The results are compared with experimental data. The merits of this approach are clearly seen from these examples. The method is directly applicable to two-dimensional flow in axial turbomachines and can be extended to radial and mixed-flow turbomachines.

GENERAL AERODYNAMICS

► **Simplified Design Comparisons of Axial Compressors**—Frank L. Wattendorf, Deputy Chief Scientific Advisor, Air Engineering Development Division, Hq., USAF.

Reported is a continuation of studies initiated in 1944 regarding potential improvements of turbojet propulsion systems for supersonic flight, as suggested originally by Dr. Theodore von Karman.

Simplified design comparisons of axial compressors with particular emphasis on the attainment of a high rate of mass flow per unit frontal area are discussed. This feature is important not only in the application of turbojets to the propulsion of supersonic aircraft, but also in the study of future potential requirements for jet engine component testing and for application to the design of more compact compressor systems for wind tunnels such as those at the Arnold Engineering Development Center.

A comparison is made of some aspects of axial compressor design for accommodating a high rate of mass flow. In particular, the influence of hub ratio and axial Mach number on the stage pressure ratio based on assumed limitations of all relative and absolute Mach numbers is given for compressor types designed according to various principles such as free vortex flow, rigid body prerotation, and arbitrary distributions of rotor work.

The important relationship between maximum temperature rise and mass flow ratio is derived for several compressor types so that a general qualitative picture is given of the influence of compressor type on the relationship between temperature rise and mass flow ratio. This study represents a qualitative method of comparing compressor types and refers to the inlet stage alone, which is usually critical for mass flow.

► **On the Stability of Two-Dimensional Laminar Jet Flow of Gas**—S. I. Pai, Research Associate, Institute for Fluid Dynamics and Applied Mathematics, University of Maryland.

The stability of two-dimensional laminar jet-type flow both of an incompressible and of a compressible fluid has been investigated by the method of small perturbations. Both the symmetrical and anti-symmetrical disturbances are investigated separately.

In case of incompressible fluid, the solutions of neutral stable disturbances in an inviscid fluid are first obtained. Then the cases of viscous fluid are analyzed. Both the symmetrical and the antisymmetrical disturbances are unstable for large Reynolds numbers, but the region of instability of symmetrical disturbances lies inside that of the anti-symmetrical one. The general shape

of the neutral stable wave number against Reynolds number curve of the jet-type is different from that of the velocity profile of ordinary boundary-layer flow or Poiseuille flow.

First, the effect of viscosity on the neutral stable disturbance in inviscid fluid is always stabilizing for jet-type flow. Second, when the wave number tends to zero and the Reynolds number is large, the jet-type flow is always unstable. Hence, for the upper branch of the neutral stable wave number against Reynolds number curve, wave number increases with Reynolds number, and there is no lower branch of this neutral stable curve for the jet-type flow.

In case of compressible fluid, the asymptotic behavior of the solutions at infinity is discussed. The neutral stable disturbances in an inviscid fluid are first investigated, and the cases of viscous fluid are analyzed. There is some similarity between the solutions of the case of compressible fluid and those of the case of incompressible fluid.

So far as laminar stability is concerned, an important difference exists between the case of supersonic and subsonic disturbances relative to the velocity of the surrounding stream of the jet. The amplitude of the subsonic disturbance dies out rapidly with the distance from the axis of the jet. The neutral subsonic disturbances determine the limits of stability of the jet flow. The neutral supersonic disturbances are actually progressive sound waves whose wave length and phase velocity are completely arbitrary and which have no significance for stability of the jet flow.

When the Mach number of the maximum velocity of the jet relative to the velocity of surrounding stream is high enough, the jet-type flow tends to be stable with respect to small disturbances.

► **An Acoustic Theory of Airflow**—R. A. Shaw, Principal Scientific Officer, United Kingdom Ministry of Supply, British Joint Services Mission, Washington, D. C.

The theory proposes to explain some of the disturbance features of real flow on the basis of the flow being in vibration. It suggests that disturbance centers in a field of flow may react together, interchanging pulses that travel through the field at the local speed of sound relative to the flow. The travel times of these pulses determine frequencies that are characteristic of the flow. The geometry of the boundaries, flow pattern, and Mach number may favor certain frequencies, and the disturbance system may be chosen because it fits these frequencies.

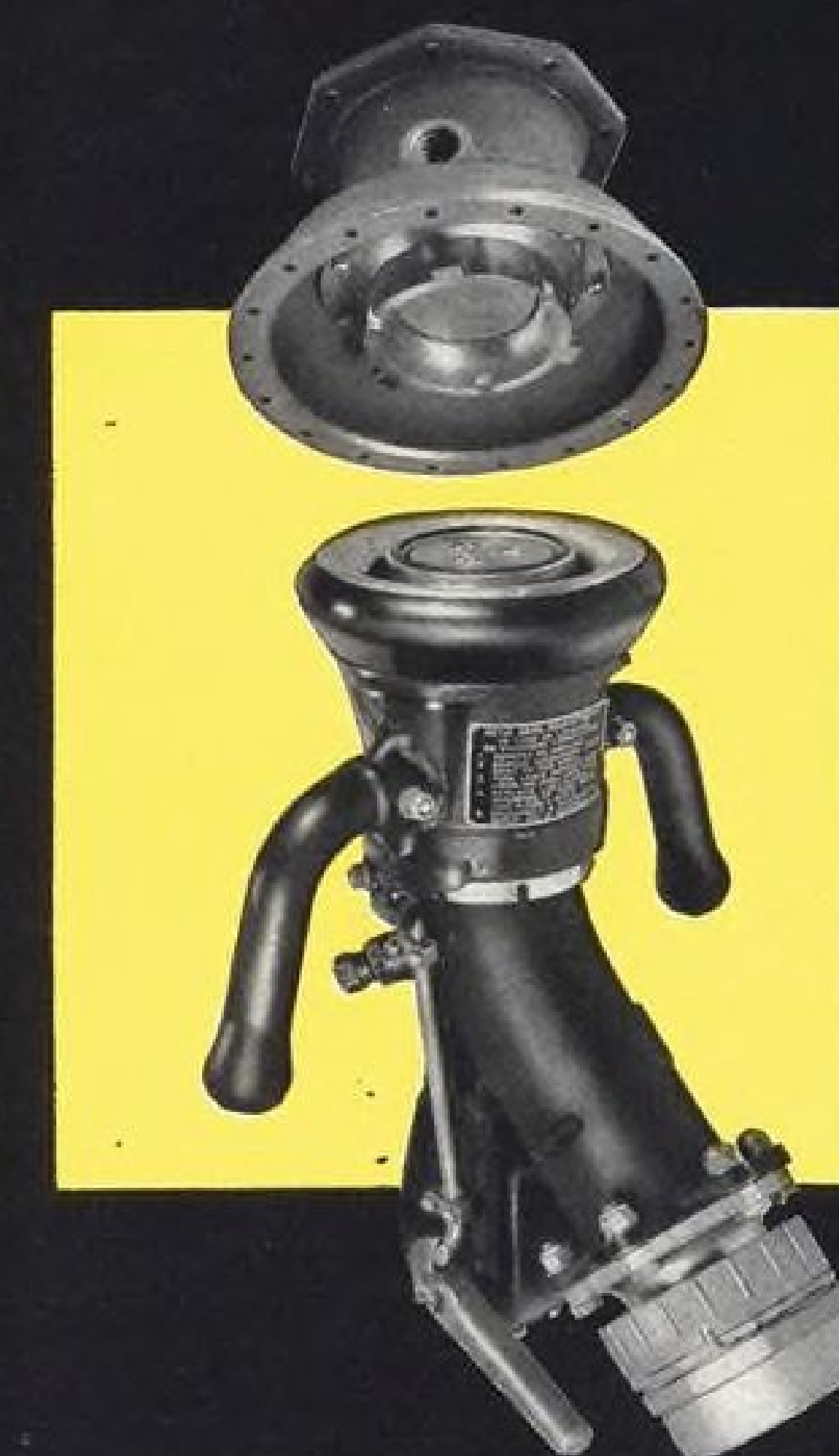
The theory originated from the analysis of some transonic airfoil results in which separation and transition points and shock-wave positions appeared to be located on this basis.

It has been applied successfully to determine the shedding frequency of the eddies from a circular cylinder and the scale of the cylinder wake. Initial experiments on an airfoil at low subsonic speeds have shown that acoustic vibration of the flow at the predicted frequencies can occur.

► **A Review of the 8-Meter Modane Wind-Tunnel**—Robert Crawford, Captain, USAF, U. S. Observer at Modane, France.

This paper encompasses the salient features of the French efforts during the current reconstruction in the French-Italian

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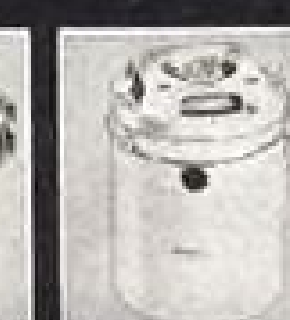
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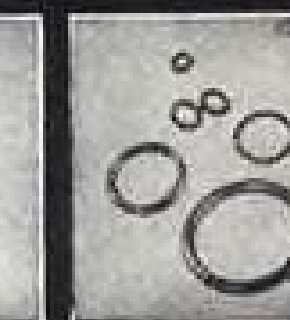


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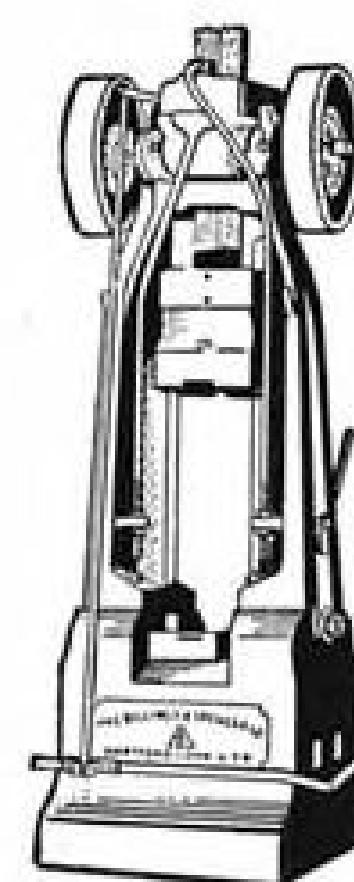
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Alps of the former German 8m. transonic wind tunnel. A review of the preliminary aerodynamic consideration as set forth by the original German designs is included; in addition, a detailed analysis of the hydraulic system that makes available a source of over 120,000 hp. is explained.

The unusual arrangement of the penstock and the gallery supplying the water head from the main glacier-fed reservoir 2800 ft. above the level of the wind tunnel is also discussed. The various procedures and techniques exercised by the French engineers in determining the initial calibrations and check-out of this facility are of special interest to compare with current American methods. Aside from the fundamental data and the generalized information, this paper also contains, for the first time, an overall review of one of the foremost wind-tunnel establishments.

SUPERSONIC AERODYNAMICS

► Damping in Pitch of Bodies of Revolution at Supersonic Speed—C. B. Smith, Project Engineer, and Beverly J. Beane, Analytical Engineer, Research Department, United Aircraft Corp.

The Karman-Moore-Tsien solutions for the steady forces on bodies of revolution at supersonic speeds are extended to obtain a solution for the damping in pitch of such bodies. Both the direct forces on the body and the associated upwash field about it are defined. Solutions of the limiting and step-by-step type are presented.

This analysis indicates that the body of a supersonic-type missile or aircraft may contribute a damping moment equal to, or greater than, that of the wings and stabilizing surfaces. The relative increase in the damping contribution of the body over that at low speed is due partly to the relative increase in size of the body, partly to the increase in fineness ratio, and partly to the large exit area present at the tail of most supersonic-type bodies.

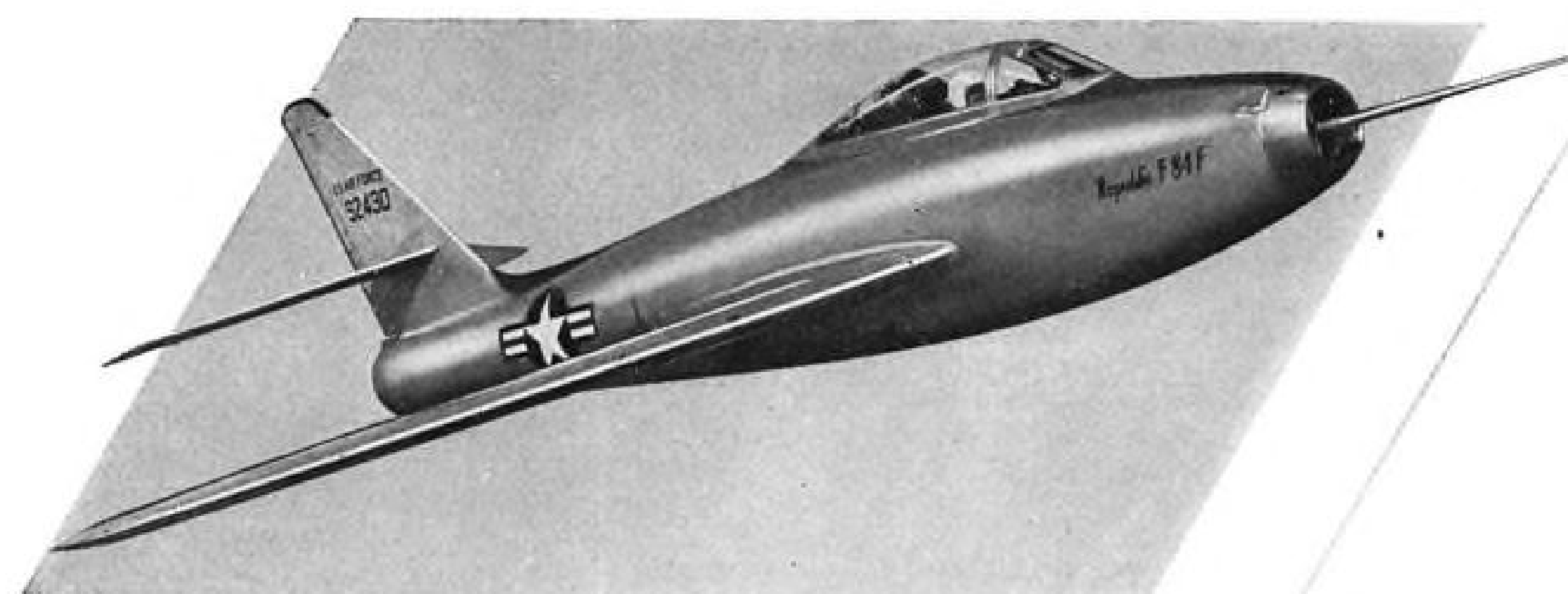
It is found that blunt bodies with no boat-tailing have the most damping. It is further shown that the induced upwash about a pitching body increases the damping contribution of the attached wings and stabilizing surfaces. It is felt that, in view of their relative size, these damping moments should be included in dynamic stability and control analyses of supersonic missiles and aircraft.

► The Lift Distribution on Low-Aspect-Ratio Wings at Subsonic Speeds—H. R. Lawrence, Assistant Head, Aerodynamic Research department, Cornell Aeronautical Laboratory, Inc.

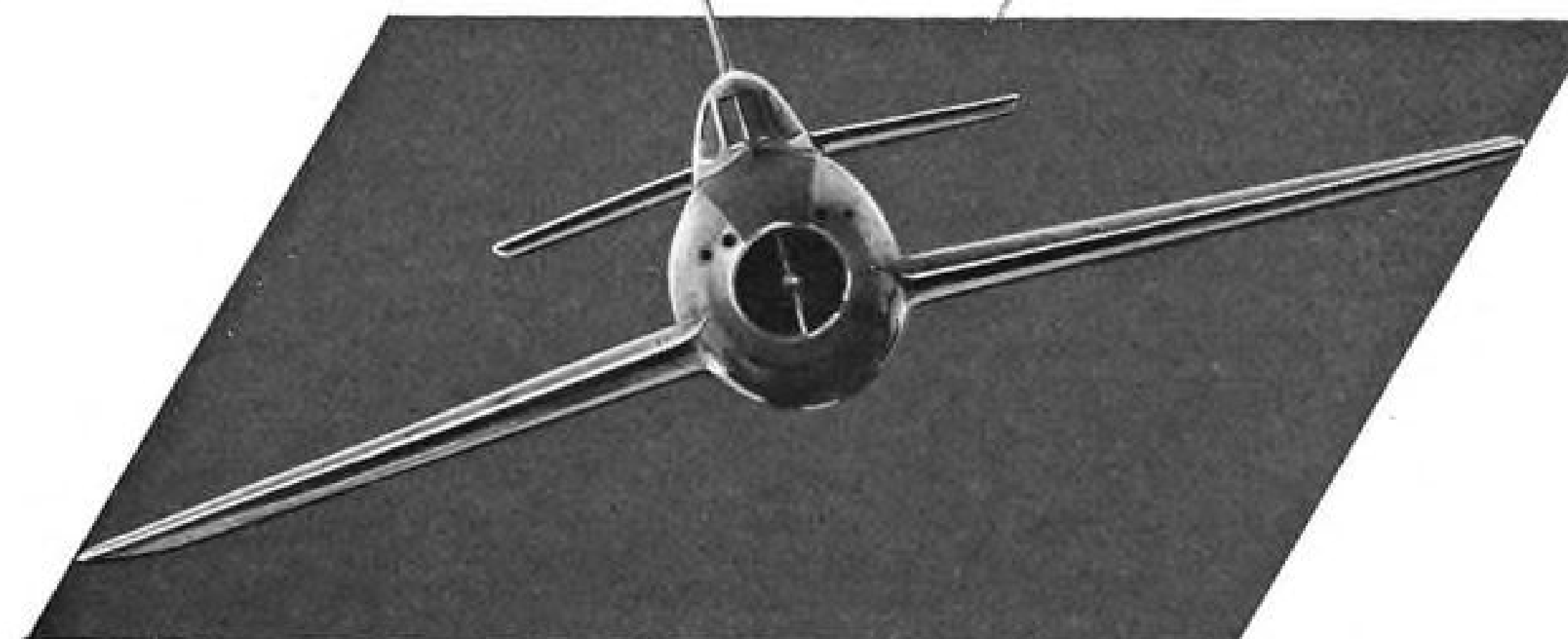
A systematic procedure is developed for obtaining a set of approximate integral equations from the linearized theory of a lifting surface in a steady incompressible flow. Application of this procedure leads to the well-known integral equations of Prandtl, Weissinger, and Jones and to a new integral equation for the chordwise lift distribution. This integral equation is shown to be a chordwise analog of the Weissinger theory for the spanwise lift distribution.

A method for solving the integral equation is developed and applied to the computation of the lift coefficient, center of pressure and damping in roll for rectangular and triangular planforms over the aspect ratio range 0 to 40. The results are found to be in agreement with the available data.

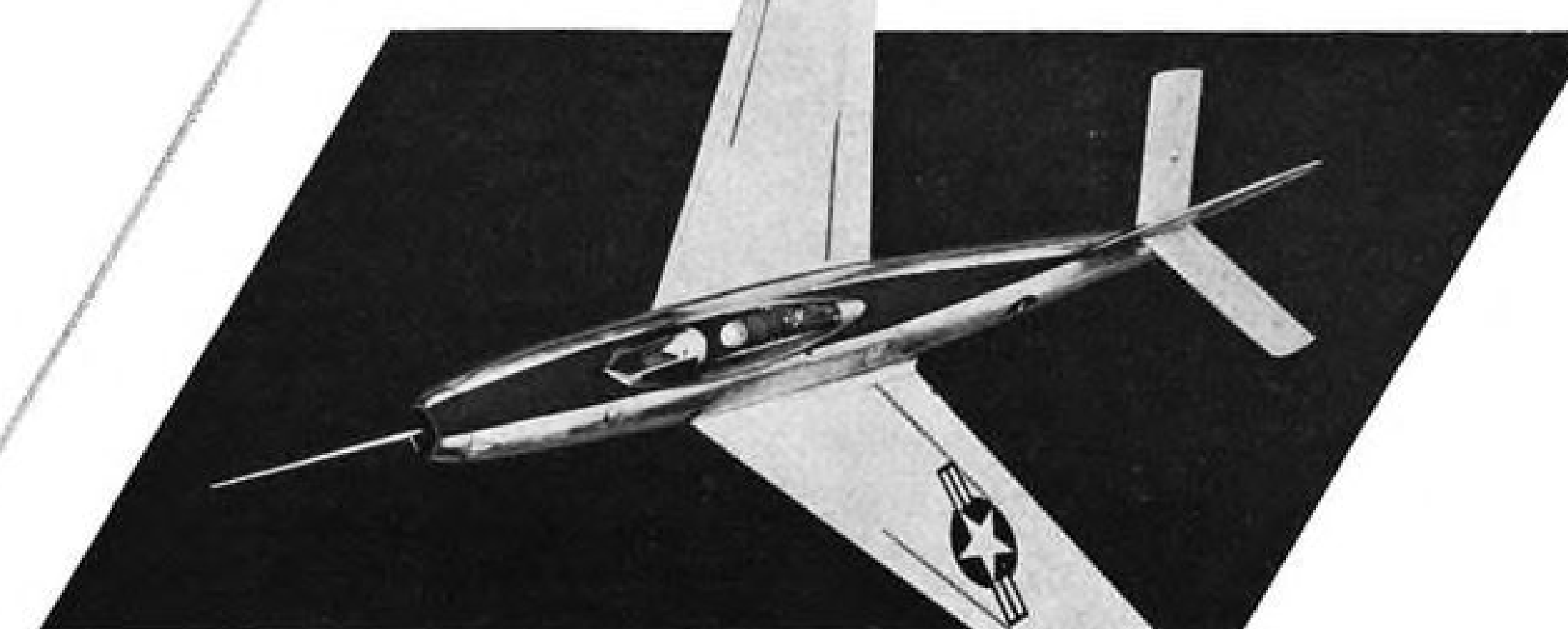
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► **A Limiting Case for Missile Rolling Moments**—Ernest W. Graham, Consultant in Aerodynamics, Santa Monica Plant, Douglas Aircraft Co., Inc.

Linearized missile rolling moments are studied for the limiting case in which an infinite number of wings are symmetrically arranged around a circular cylinder. This case is simple to analyze and is physically interesting for comparison with wing systems that have large interference effects. The analysis is independent of Mach number and of the longitudinal shape of the wing system.

It is suggested that for rolling moments this limiting case provides a useful comparison with nonplanar wing arrangements, many of which are difficult to analyze.

NACA Advisors

Appointments for 1951 include wide range of industry leaders.

More than 400 men have been named members of the 27 technical committees and subcommittees of the National Advisory Committee for Aeronautics for the current year.

Dr. J. C. Hunsaker, NACA chairman who made the announcement, stated that these appointments were especially important because they call for added service to the nation in a time of national emergency.

The appointees were, as always, selected because of their recognized leadership, experience and technical abilities in their special fields. They serve without compensation.

Responsibilities of the subcommittee members include: Advising on problems relating to the assigned technical field; reviewing the progress of research at NACA and other laboratories; recommending research projects; and assisting in research program coordination.

Although the status of these committees is that of advisory groups, the competence and prestige of the members makes adoption of their suggestion almost certain.

Chairmen of technical committees for 1951 are:

- **Aerodynamics:** Dr. T. P. Wright, Vice President for Research, Cornell University.
- **Powerplants for aircraft:** R. M. Hazen, Director of Engineering, Allison division of General Motors Corp.
- **Aircraft construction:** Dr. A. E. Raymond, Vice President, Engineering, Douglas Aircraft Co.
- **Operating problems:** William Littlewood, Vice President, Engineering, American Airlines, Inc.
- **Industry consulting:** D. L. Wallace,

President and General Manager, Cessna Aircraft Co.

Chairmen for the technical subcommittees are:

Fluid mechanics: Dr. C. B. Millikan, Director, Daniel Guggenheim Aeronautical Laboratory, California Institute of Technology.

High-speed aerodynamics: J. G. Lee, Asst. Director of Research, United Aircraft Corp.

Stability and control: Capt. W. S. Diehl, Bureau of Aeronautics, U. S. Navy.

Internal flow: P. A. Colman, Chief Aerodynamics Engineer, Lockheed Aircraft Corp.

Propellers for aircraft: T. B. Rhines, Chief Development Engineer, Hamilton Standard Propellers division, United Aircraft Corp.

Seaplanes: Grover Loening, Washington.

Helicopters: R. H. Prewitt, Prewitt Aircraft Co.

Upper atmosphere: Dr. Harry Wexler, Chief, Scientific Services division, U. S. Weather Bureau.

Aircraft fuels: Dr. J. Bennett Hill, Manager, Development division, Sun Oil Co.

Combustion: Dr. Bernard Lewis, Chief, Explosives Branch, Bureau of Mines.

Lubrication and wear: E. M. Phillips, Aircraft Gas Turbine Division, General Electric Co.

Compressors and turbines: Prof. H. W. Emmons, Harvard University.

Engine performance and operation: A. H. Redding, Flow Research section, Aviation Gas Turbine division, Westinghouse Electric Corp.

Heat-resisting materials: A. W. F. Green, Chief Metallurgist, Allison Division, GMC.

Rocket engines: Dr. M. J. Zucrow, Prof. of Jet Propulsion, School of Aeronautics, Purdue University.

Aircraft structures: Dr. C. R. Strang, Douglas Aircraft Co.

Aircraft loads: Dr. George Snyder, Staff Engineer, Structures, Boeing Airplane Co.

Vibration and flutter: Prof. R. L. Bisplinghoff, Associate Prof., Aeronautical Engineering, Massachusetts Institute of Technology.

Aircraft structural materials: E. H. Dix, Jr., Assistant Director of Research, Aluminum Research Laboratories, Aluminum Company of America.

Meteorological problems: Dr. F. W. Reichelderfer, Chief, U. S. Weather Bureau.

Icing problems: A. A. Brown, Installation Engineering Laboratory, Pratt & Whitney Aircraft division, United Aircraft Corp.

Aircraft fire prevention: R. D. Kelly, Superintendent of Technical Development, United Air Lines, Inc.

EQUIPMENT



Eastern Air Lines' extensive overhaul facility.

EAL's Ideal: Safety, Simplicity

Tight liaison between engineering and maintenance evident at airline's Miami main overhaul base.

By George L. Christian

Miami—"Give me sledge hammer engineering..." Captain Eddie Rickenbacker admonished his engineers.

Eastern Air Lines' president does not want complicated gadgetry on his planes and many a fancy bit of circuitry has been replaced by manual controls—simple and rugged.

A visit to EAL's main overhaul base at Miami showed how Rickenbacker's philosophy of simplicity permeated through engineering, overhaul shops and flight line. Engineering releases are short and to the point. In every shop are ingenious machines, tools or fixtures, designed by employees and built of odds and ends, which save time and labor for a particular job (and usually earned the inventors a cash bonus). The closest sort of liaison prevails between engineering and maintenance departments.

R. B. Ault, EAL's chief maintenance engineer, gave an example of EAL's effort to keep modifications simple:

The ventilating and combustion air scoop on the airlines' DC-3s, located on the upper forward section of the fuselage, iced up readily. Ice accretion would soon block the combustion air intake and the heater became inoperative. Schedule delays resulted.

Eastern's engineers tried electrically operated de-icing boots, but determined that the DC-3 was too power critical for that type of installation.

They decided to install a streamlined mast in front of the air scoop. Most of the ice would impinge on it, keeping the scoop free. Not only was it effective, but it was cheap to make,

light in weight and required no maintenance. Configuration was selected after tests in the B. F. Goodrich refrigerated wind tunnel in Akron.

The shields are installed a few inches in front of the air scoop on the fuselage skin. They are held in place with six screws, five in key hole slots, the sixth in a straight slot. This allows maintenance mechanics to loosen the screws, slide the assembly forward and rotate it out of the way of heater ground operation check equipment when necessary. The whole operation takes a matter of minutes.

An added precaution to avoid duct icing was relocation of the air intake further down the ventilating air line, almost at the heater mouth where surrounding heat would make icing almost impossible.

Additional modifications in process or recently completed by EAL:

• **Stick installation** in the outer wing panel fuel tank of DC-4s. Filler neck is so located on these aircraft that when fuel quantity is ascertained by stick, amount of gas remaining can be determined from full to 350 gal. but not below that quantity.

A recent EAL engineering release provided for a fleet-wide modification to install a dip stick midway in the tank, between wing stations 533 and 542. This permits accurate measurement of the remaining 350 gal. of fuel.

• **Constellation Speedpak** rear hook inspection doors have been cut into the rear part of the Speedpaks so that visual inspection may be made to determine that the aft Speedpak hooks are properly engaged with spindle in the fuselage when the unit is in the hoisted position.

This is an added safety feature of EAL's Speedpak operation.

• **Hot cup safety** thermostatic installation. EAL uses conventional plug-in hot cups in its galleys to heat soup and other liquids. Occasionally, cabin personnel would forget them and overheating and damaged wiring resulted.

A thermostatic (Fenwal No. 30,000-19) has been installed to open the hot cup circuit automatically should overheating start. The circuit cannot be re-energized until sufficient cooling has taken place. The modification includes a simple lever arm which prys the hot cup plug away from the receptacle, eliminating the necessity of tugging on a stubborn hot cup. It will be installed on EAL's entire fleet, including newly purchased 1049s and 4-0-4s.

• **Exhaust stack ceramic coating.** Certain portions of Constellation exhaust collector rings were critical because flame impingement caused burn-through.

Eastern sent two critical sections to the South Wind division of Stewart-Warner Corp., Indianapolis, to be ceramic-coated inside and out.

Exact figures are not available, but the results were so favorable that the airline is sending four entire sets of newly purchased Constellation jet stacks for a complete ceramic coating job. If the results are as good as on the two experimental sets, exhaust assemblies of the entire fleet will receive the ceramic treatment.

Ault said that the cost was about \$100 per engine.

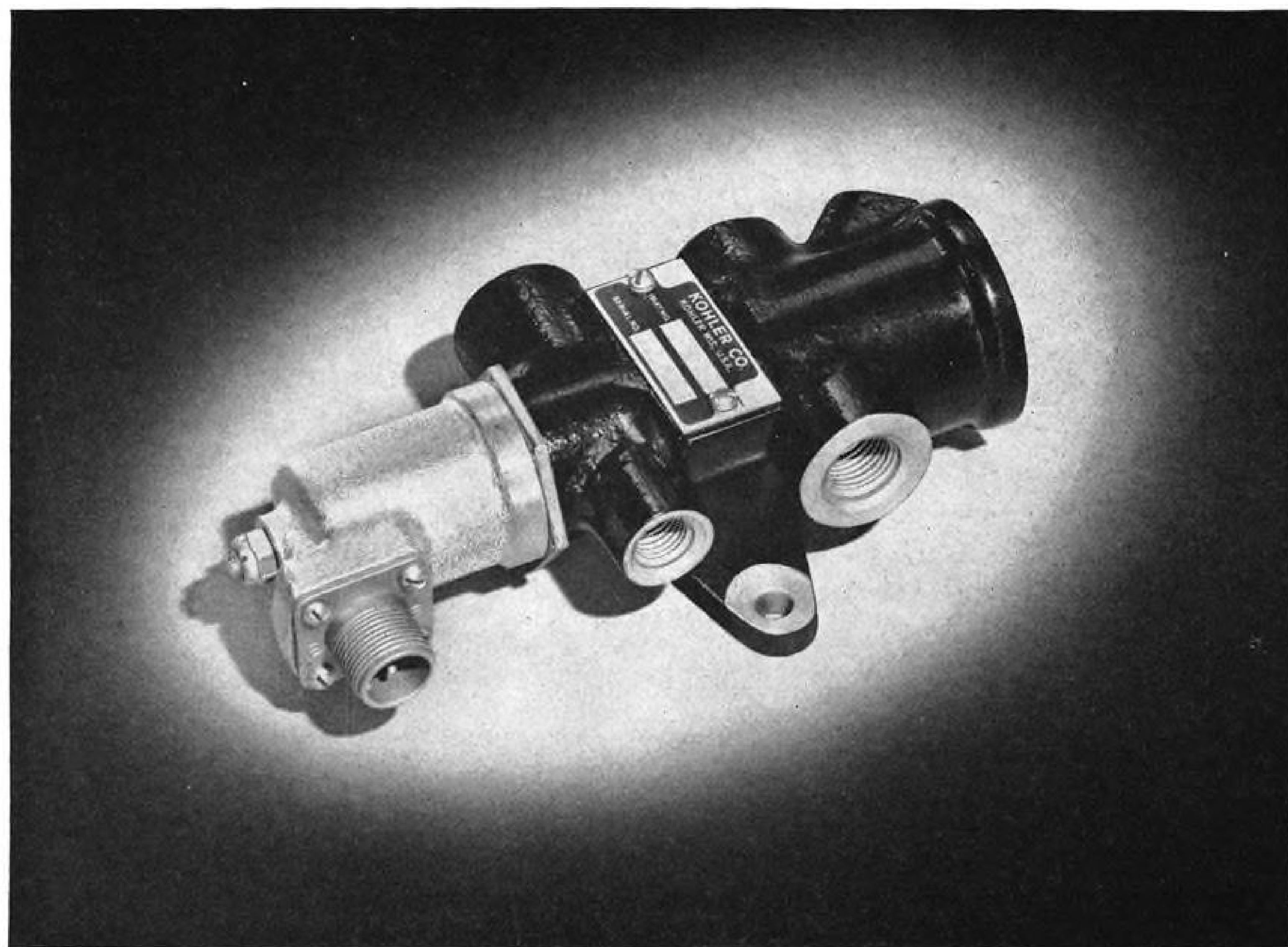
• **Stretching brake life.** EAL is reversing the metals used for the carriers and pistons of the Bendix brake used on its Connies.

Originally the carrier was magnesium and the piston aluminum. The magnesium part wore badly and was expensive to replace. The piston being cheap and easy to replace will now be made of magnesium, the carrier of aluminum. Further to prolong the life of the carrier, it will be sent to the Glenn L. Martin Co. to receive a "Hardcoat" treatment which will give the piece an extremely hard surface.

• **Improve de-fogging** of Constellation cockpit side windows. This engineering release of Jan. 10, 1951, provides for blowing warm air on the window panels in question.

Service tests determined that the side windows could be adequately de-fogged and defrosted by adding a deflector to direct the air flow properly over the panels.

An important step to observe is: "loosen the interior trim under the



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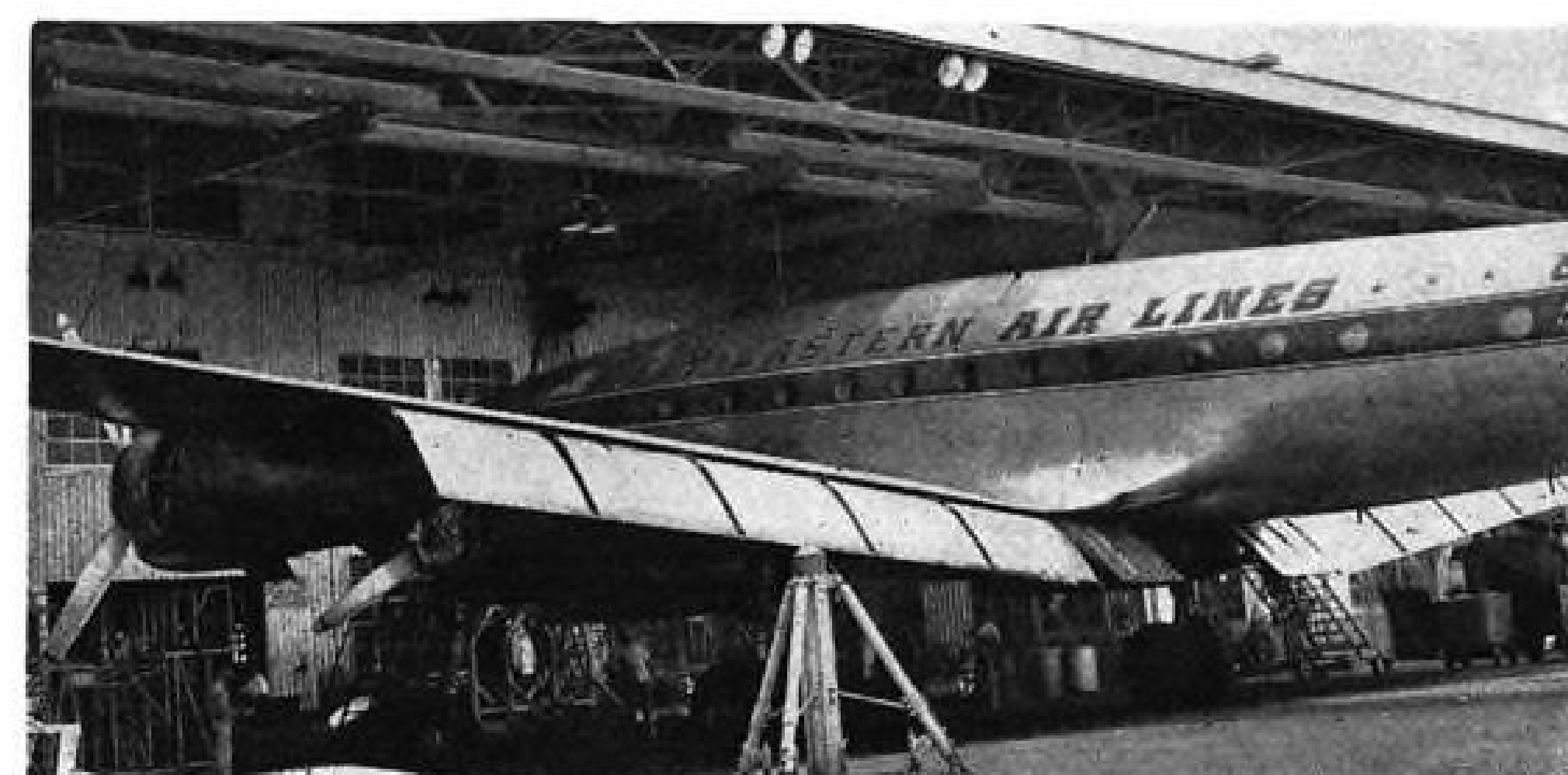
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Constellation being overhauled in open air dock.

cockpit windows and inspect to see that all of the box beam lightening hole patches are securely in position. If this is not accomplished the windshield de-fogging air will not be directed to the windows."

- **Wing strengthener.** An EAL mechanic, C. S. Duke, devised a method of installing a reinforcement web in the wing of DC-4s which eliminated the necessity of removing the outer wing panels as called for in Douglas Service Bulletin DC-4 No. 44. The object of the bulletin was to increase the zero fuel weight of many series of DC-4s to 59,000 lb. Duke's idea saved the airline 120 manhours on each of the 12 DC-4s affected.

A visit to the various overhaul shops at the base, under the guidance of Virgil Owens, special assistant, maintenance department, revealed interesting labor-saving devices originated by alert maintenance personnel. Here are some examples:

- **Flexible line cutter.** The company's mechanics in the hydraulic shop worked up a neat flex line cutter. Controlled by a discarded four-way hydraulic selector valve, the rig bends the hose slightly at the point to be cut to prevent the toothless steel cutting wheel from seizing on the sides of the hose as the blade cuts through.

The steel wheel is an improvement over the previously used abrasive cutter, the foreman claimed, since it virtually eliminated smoke and the disagreeable smell of burning rubber.

- **Reducing brake maintenance.** The brake shop rivets together the spacers and insulator used in DC-4 Goodyear multiple disc brakes. Result is a more rigid assembly, less disc warpage and a two-thirds reduction in brake disc maintenance.

Another simple labor- and brake-saving device was a home-made honer for brake piston walls.

The machine cuts away scoring of the piston walls by removing an average of .0025 in. on each side. This is sufficient to smooth out the surfaces and

permits the airline to rework the unit three times before the piston wall thickness becomes critical. Prior to the development of this machine, the company said it was only able to rework the part twice because machining out the piston cavity removed more metal than the honing method.

- **Instrument lighting.** T. M. Templeman, foreman, instrument shop, showed this writer an artificial horizon on which he had mounted a plastic cover over the face. By shining light on the edge, the instrument was perfectly illuminated, and light spillage was reduced to a minimum. Although somewhat similar systems are now in use (on Connies, for example), none seems quite as effective as Templeman's.

Eclipse-Pioneer engineers say they made up several instruments using the "Templeman Lighting System", but never put it into mass production.

- **Altimeter bellows exerciser.** R. Woolsey, technical foreman, explained a new device developed in the instrument shop, called an "Altimeter Bellows Exerciser."

When the bellows are compensated for temperature variations, they are subjected to extremes of +150 to -40 deg. F. After this treatment, the bellows tend to stiffen.

The exerciser consists of an altimeter diaphragm used to control the pressure of air to the bellows being treated. A Microswitch, solenoid and air valve alternately connect up to 16 bellows to a vacuum chamber, then to atmospheric pressure. The exercising bellows are submitted to a cycle equivalent to going from 100 to 29,900 ft. every 5 min. for 24 hr.

- **Pressure transmitter tester.** The instrument shop worked up an oil and fuel pressure transmitter dead weight tester which has reduced the time required to test these units (magnasyn) from 3 hr. to 35 min. Also incorporated is a provision designed to keep the weights from flying off if excessive pressure is applied.

- **Long lasting instruments.** EAL has

installed an Eclipse Pioneer model 3906 electric turn and bank indicator as an auxiliary instrument for service test on a Constellation. "The unit has never been off the ship and is giving perfect service after 5000 consecutive hours of operation," say EAL engineers.

Similarly a Sperry H-5 horizon has operated 2500 hr. with only periodic inspections but no overhaul.

Growing Pneumatics

Field Attracts PAC

Pacific Airmotive Corp. is putting increasing emphasis on development and manufacture of pneumatic aircraft parts. This policy is the result of the widespread use of a pneumatic safety valve first produced by the West Coast company over two years ago, and the promising future unfolding for this field.

Since early 1949 the firm has produced a total of 26 basic items of pressurization control equipment for aircraft—placing it squarely in the aircraft components manufacturing field. Until then, PAC's activities were restricted to overhaul work and development and manufacture of production and maintenance equipment.

The company says the first pneumatic component produced, the safety valve, now is used on 95 percent of the pressurized planes in this country.

This unit, which limits maximum air pressure in the cabin, originally was designed by Accessories Mfg. and Engineering Co. PAC, attracted by the potentialities of a pneumatic valve that would perform the functions then being handled by mechanical or electrical dump, automatic pressure relief and vacuum relief valves, acquired from AEMCO all rights to the unit plus engineering personnel of the firm to help produce it. PAC's manufacturing division, under direction of Richard D. Maystead, has been responsible for development and production of the valve and other pneumatic equipment following it.

► **Service Equipment**—PAC also is continuing development and manufacture of production and maintenance equipment and has maintained an extensive overhaul service. It has developed over 80 items of test and service equipment for engines and accessories and eight for propeller work. Besides this, the firm also offers the service of engineering airbases, complete with propeller, engine and accessory shops. Experience in this field includes planning and equipping installations for Iberian Airlines in Spain, CATC in China and the American-Arabian Oil Co. in Arabia.

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NEW AVIATION PRODUCTS



CB Extinguisher

A portable fire extinguisher for aircraft, designed to make use of liquid chlorobromomethane (CB) agent recently adopted by the Air Force, has been developed by Stop-Fire, Inc.

The unit has a one-quart capacity and is capable of directing a high pressure stream of CB a distance of 30 ft. from any "operable" angle. The company says it has received AF approval recently for use in all types of military craft. AF last year, after extensive research, revised its aircraft fire extinguishing specification to permit use of CB agent only. (AVIATION WEEK July 3, p. 31).

According to Stop-Fire, the extinguisher, Type A-20, is effective on Class A, B, and C fires. A feature is a patented safety lock that makes it impossible to discharge the extinguisher accidentally, yet can be quickly released to permit squeezing of the pistol-type grip.

The extinguisher is recharged by unscrewing the pressure head, filling with one quart of CB, replacing the head and then adding air from a standard air chuck to a pressure of 150 psi.

A flexible syphon permits the extinguisher to be discharged from any "operable" angle. When the extinguisher is held in the horizontal position, for example, the syphon "flops" to the side of the reservoir to pick up fluid.

The unit is supported by a special bracket with a toggle clasp, permitting it to be removed by one hand and operated by the same hand. The rubber-cushioned bracket is designed to protect the extinguisher from vibration and conforms to rigid military specifications, the firm says. The A-20 is built to operate through a temperature range of -65 to 160 F. Normal discharge time at 70 F. is 27 seconds. Address: 125 Ashland Place, Brooklyn, N. Y.

Light Flasher for L-19

A compact "Blink-R" light flasher, model BR G-1, measuring about half the size of its predecessor, Model BR-12F, has been adopted as standard equipment, on L-19 liaison planes, according to the distributor, Van Dusen Aircraft Supplies.

The device weighs only 13 oz., produces a flashing rate of between 45 and 60 cycles/min. and is fully shielded to prevent radio interference. A failure in the mechanism causes the lights to automatically switch to a "steady-on" condition, while the pilot has a choice of either steady or flashing lights through operation of a three-position toggle switch located on the instrument panel.

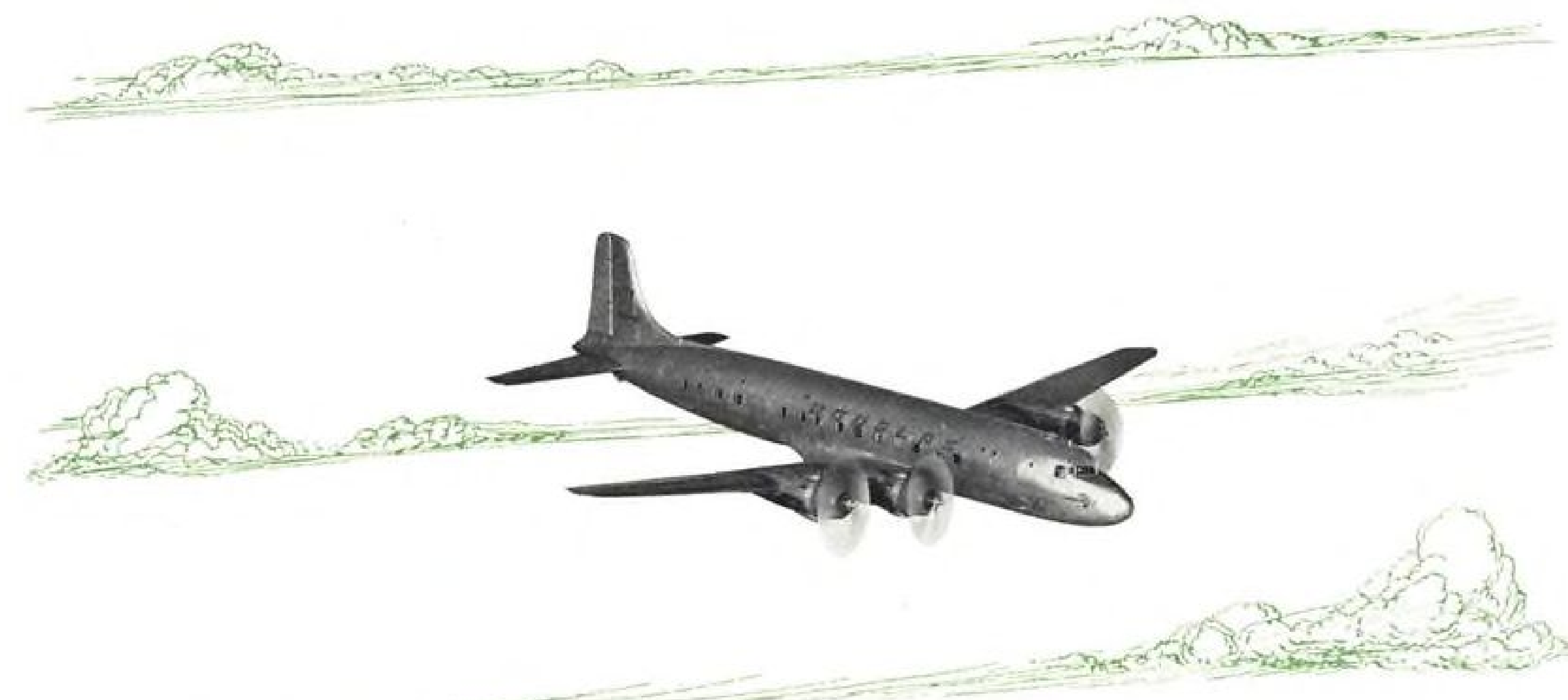
The BR G-1 operates on 12 or 24v. d.c. electrical systems, has a capacity of 6 amperes and measures 3 x 3½ x 2 in. It is manufactured for the distributor by Airlectron, Inc., Caldwell, N. J. and is available from Van Dusen Supplies, Eastern Division, Inc., Teterboro Air Terminal, Teterboro, N. J.

ALSO ON THE MARKET

Sandblast cabinet permits cleaning tools, pistons, valves and other small parts with various abrasives; can be placed on bench and connected to 110v. a.c. power and compressed air line for operation. It measures 14 x 17 in., is provided with rubber sleeves, dust bag, etc. Made by W. W. Sly Mfg. Co., 4700 Train Ave., Cleveland 2, Ohio.

Electronic recorder for quick, accurate measuring of temperature of rotors in large electric generators can be used by plants generating much of their own power. Helps operators avoid overloads, maintain equipment at high levels of dependability and safety during peak-capacity operations. Made by Brown Instruments division, Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.

Low cost, compact tube bending machine, designed for left or right hand operation, is powered by 2-hp. motor, has capacity of 1¼ in. o.d. x No. 16 B.W.G. steel tubing. Single lever operates bending arm and dies can be removed quickly from spring clips. Measuring 21 x 34 x 78 in., machine, Model 800, is made by Wallace Supplies Mfg. Co., 1300 Diversey Pky., Chicago 14, Ill.



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For more information on Skydrol, send for a copy of the booklet, "More Safety in the Air with Monsanto's Skydrol." MONSANTO CHEMICAL COMPANY, Organic Chemicals Division, 1700 South Second Street, St. Louis 4, Missouri.

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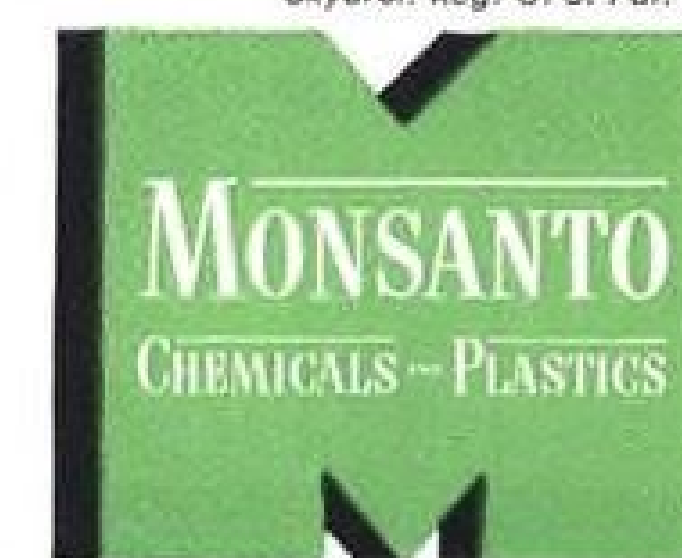
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MEETING the changing needs of the aircraft industry has long been an important factor in Pittsburgh's continuing development program.

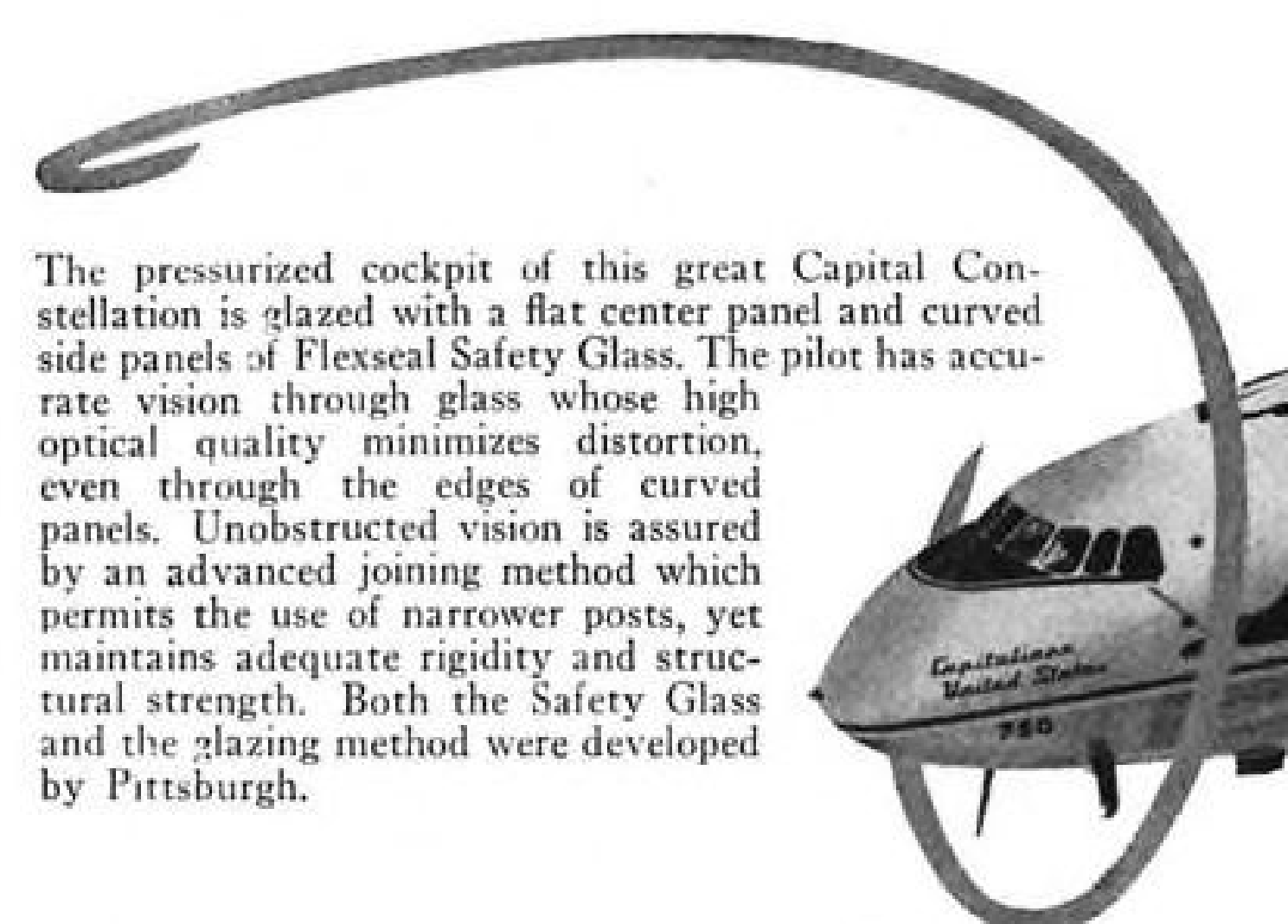
Improved Safety Glasses and glazing techniques have produced windshields that provide better vision, greater comfort and safety for pilots. Glass of improved optical quality, in wide clear windows, provides passengers with ample light for reading or handiwork, thus contributes to flying pleasure.

Nowadays, practically all large military and commercial planes are glazed with aircraft type Safety Glasses, transparent laminated plastics, photographic glasses, precision bullet- and bird-resisting glasses and double glazed Safety Glass, all developed by Pittsburgh.

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The entire engineering and production resources

of Pittsburgh Plate Glass Company are always at the disposal of all aircraft manufacturers, large and small. When you are facing involved problems which concern aircraft Safety Glasses and glazing methods, bring them to Pittsburgh for prompt solution. Just write to Pittsburgh Plate Glass Company, 2053-1 Grant Building, Pittsburgh 19, Pa.



The pressurized cockpit of this great Capital Constellation is glazed with a flat center panel and curved side panels of Flexseal Safety Glass. The pilot has accurate vision through glass whose high optical quality minimizes distortion, even through the edges of curved panels. Unobstructed vision is assured by an advanced joining method which permits the use of narrower posts, yet maintains adequate rigidity and structural strength. Both the Safety Glass and the glazing method were developed by Pittsburgh.



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AIR TRANSPORT

Three Month Wait for Priorities

Orders for airline planes will be considered for DO ratings only every quarter except in urgent cases.

Transport plane orders placed since Nov. 1 must wait another month or two for DO priority ratings, unless a strong case of emergency can be proved.

Orders must wait until the next quarter because the mobilization agencies and procedures outlined in AVIATION WEEK Jan. 15 take time to get going.

Priorities progress in the three weeks since then:

- **Procedure is set.** It is the Air Coordinating Committee plan agreed upon three weeks ago.

- **Spare inventories** of transport makers should soon get priority to build up where they are depleted from normal.

- **DO's will be issued quarterly** probably. Thus, the 30 Convair-Liners ordered by United, the 20 ordered by Braniff, and the two ordered by Aramco last month will not get DO priority until about the first of the next quarter—say about Apr. 1.

- **Emergency DO needs** for equipment will get special treatment meanwhile, if the applicant can prove an urgent requirement with national defense aspects.

- **Controlled Materials Plan** will allocate materials and components to the civil as well as military aircraft program sometime after July 1 (see page 13). Program, though subject to revision, will attempt to project essential airline and private aircraft requirements for the next two to four years.

- **Production scheduling unit** at Wright Field, now called Aircraft Production Resources Agency, will be controlling production timing of every piece, part and subassembly on production. How a transport order fares will depend on how APRA and Munitions Board view the immediate specific program on that assembly line and the materials supply. If supplies are adequate, and enough military planes are rolling without a hitch, civil orders should meet no delays.

- **Scheduled airlines**, both foreign and domestic, should have little trouble in getting their orders okayed and delivered in the immediate future. Government spokesmen say the order giving twin-engine aircraft orders full DO priority shows the military considers them an essential military reserve.

- **Other essential civil requirements**, notably crop dusters, should also have

little trouble getting necessary materials.

Civil Aeronautics Administration hopes to get 3000 non-airline planes a year approved as the executive and private plane quota. CAA would allocate this number in accordance with relative importance.

- **Airline parts requirements** quota is \$50 million a quarter, or \$200 million a year. Domestic airlines already have their share pretty well allocated, but Economic Cooperation Administration and Office of International Trade are not going to issue DOs to foreign airlines for spare parts except for emergency needs until all schedules are in and have been thoroughly screened. Then the foreign lines will get their fair share of the \$50-million quota available each quarter.

- **52 Convair-Liners**—Consolidated Vultee last month took order for 30 Convair-Liners for United, 20 for Braniff and two for Arabian American Oil Co. These orders were submitted immediately by Convair to the proper claimant agencies—Civil Aeronautics Board for the domestic airlines and OIT for Aramco. Both type orders are already informally approved by the claimants.

But these orders will probably be held up until a quarterly schedule including all other civil aircraft requirements is readied unless an emergency rush can be shown. That is, the Convair-Liner orders will be consolidated in a quarterly summary application for DO rating unless Convair can show Apr. 1 would be too late for a DO to assure proper lead time on vendor orders.

The preliminary filing for DO by Convair on these orders merely listed customer, contract no., date of contract, type aircraft, quantity, total value, unit delivery dates by months, and value by calendar year and quarter.

But very few vendors or subcontractors are accepting orders without asking for DO ratings. Even with ratings there is often trouble getting deliveries.

The 52 Convairs are slated for delivery in 1952, with a few running over to early 1953. If this delivery schedule will be delayed by waiting to around Apr. 1 for DO priority, then Convair may furnish the claimant agencies with proof—in the form of lead time schedules found necessary to make delivery. Then Convair may get special treat-

ment on its order by expediting its DO claim through the proper channels: claimant, CAA Office of Aviation Defense Requirements, Air Coordinating Committee, National Production Authority, Munitions Board and final check-back through NPA to CAA.

- **Actual Emergency DO Case**—Best current example of emergency expediting of an aviation DO priority order is that of Salmaw & Co.'s order for five Hiller 360 helicopters to fight the cotton leaf worm which is expected to plague Egypt's cotton crop early this summer. Salmaw & Co., a du Pont de Nemours affiliate, has a contract with the Egyptian Ministry of Agriculture to start dusting the cotton crop in May. Annual losses due to the cotton leaf worm in Egypt run from \$90 million to \$150 million. Allowing a month for transporting the helicopters and another month for Hiller's lead time, the order must get its DO rating by March at the latest.

Because the civil aircraft DO screening channels and agencies are just getting set up, Hiller has run into considerable delay in getting a hurry-up DO rating processed. But last week after getting a plea from the Egyptian government to the U.S. State Department, Hiller's representative servicing the contract—Aircraft Supply Corp.—got assurance the five helicopters would get their DO ratings soon.

- **Trouble-Shooting Shortages**—The aircraft section of the Transportation Equipment Division of NPA has the sole job at this time of trouble shooting materials shortages in aircraft and parts production. About two dozen aircraft contract vendors a week call upon NPA to get them materials, mostly aluminum. If the situation cannot be worked out voluntarily, aircraft section chief Albert Matthews gets the aluminum division of NPA to issue a directive allocating enough aluminum to the vendor to meet his delivery schedule.

Ultimately, the aircraft industry will rise above sub-section status in the NPA. After Defense Production Administration gets its plans and allocations ready, it will set up some well-known aircraft man with power in that agency to tend to the industry's needs.

TWA Hiring Drive

TWA has had to go into the labor market in a big way because large-scale mobilization means an unstable labor market. Also record traffic and new plane deliveries mean more personnel are needed in all fields.

TWA has already opened up new jobs at Los Angeles and most other western U.S. cities it serves. All kinds of ground personnel plus flight hostesses, are needed.

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• Source: Aviation Week Research

PAA and EAL Sign Interchange Pact

Pan American World Airways, saying its stock option and interchange agreement with National Airlines was "repudiated" by National, has turned around and signed an interchange with Eastern Air Lines.

This leaves Panagra apparently at odds with its half owner, PanAm. Panagra has asked the Civil Aeronautics Board to approve its National interchange but drop the stock option. So PanAm wants interchange with Eastern, and Panagra with National.

But PanAm says the EAL-PAA agreement can be joined by Panagra up until 30 days after CAB approves the EAL-PAA pact. That means Panagra has a lot of time to decide.

The PAA-EAL interchange would allow utilization of planes for through service, New York-Latin America.

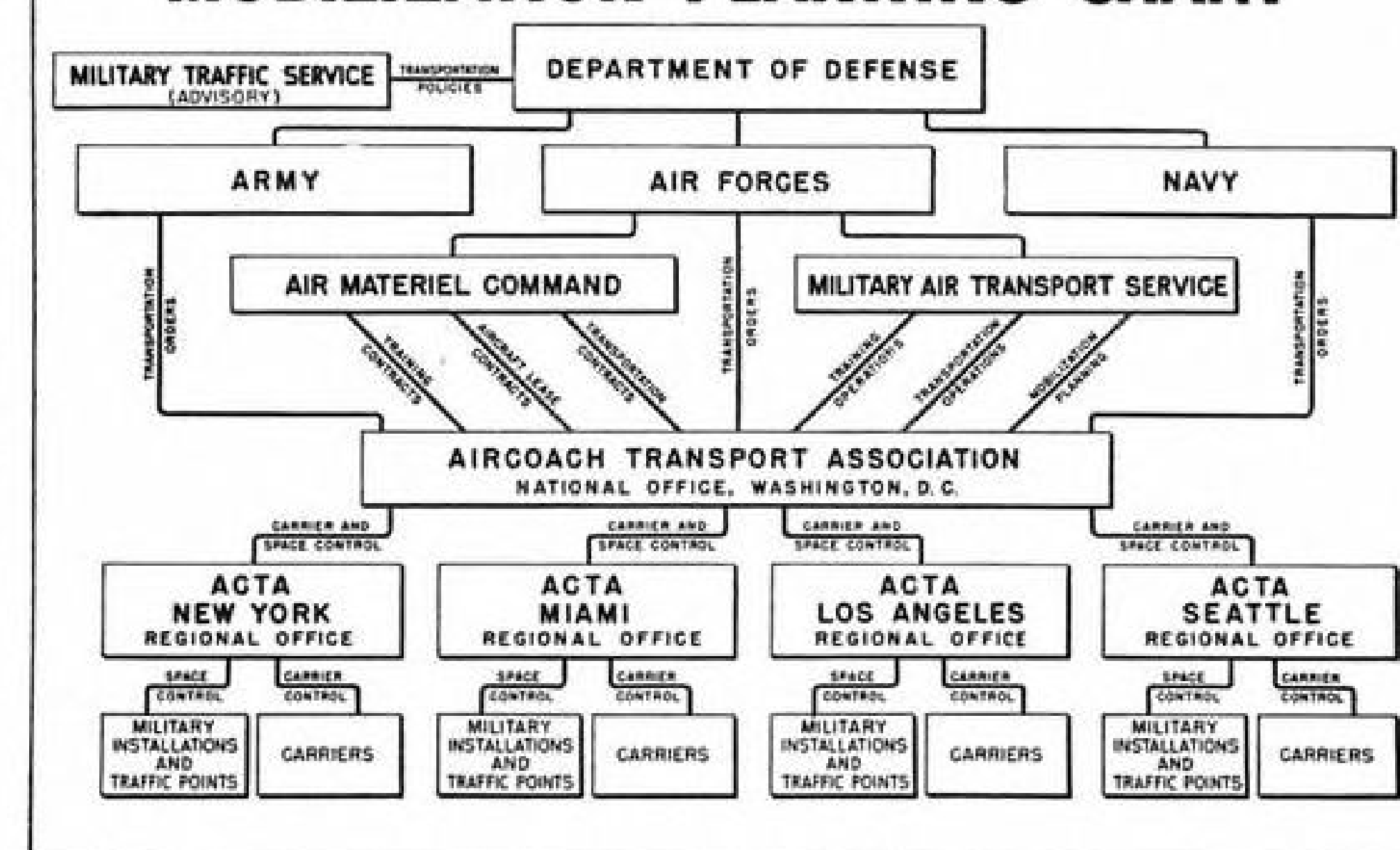
► **Routes**—The interchange is set for nonstop New York-Miami service on Eastern's routes, but more stops such as Washington, Philadelphia and Boston may be added if the parties agree. On PanAm's routes, plans are:

- One roundtrip daily Barranquilla, Colombia and intermediate or more remote points—more flights later if needed.
- Panagra-Pan American "El Interamericano" flight to Canal Zone and points south daily.
- Panagra-Pan American tourist-class flights continue twice weekly.
- Havana flight will be at least one roundtrip daily.

► **Lease Costs**—Here are important cost formulas: direct flight costs will be based on the weighted average cost per total aircraft mile experienced by domestic trunkline operators for each type plane. The same principle applies to direct maintenance of flight equipment, except that in computing the average, carriers farming out a large part of their work to others shall be excluded. Flight equipment depreciation expense is based on weighted average cost per total aircraft mile of domestic carriers for the same planes. But if reported costs are based on a life different from seven years for Constellations and four years for DC-4s, costs shall be adjusted to that basis.

Ground expenses are at one cent per revenue mile. Investment in equipment will be paid by the lessee at the rate of seven percent after normal income tax and surtax. Because of different seating capacity Pan American will reduce the amount per revenue mile on Constellations chargeable to Eastern by 25 percent of the difference in seat mile cost computed on the basis of seats in PAA's planes and when computed on the basis of the lowest number of seats in Eastern planes.

AIRCOACH TRANSPORT ASSOCIATION MOBILIZATION PLANNING CHART



FOUR REGIONAL OFFICES proposed by ACTA for its nonsked mobilization plan.

ACTA Awaits CAB Accreditation

The Air Coach Transport Assn. hopes within a week to be accredited formally by the Civil Aeronautics Board as representative of its nonsked airline members. This will permit the Military Traffic Service of the Defense Department to consider ACTA as representative of the nonskeds at military bases along with the scheduled airlines, which are represented by Air Transport Assn., for getting charter contracts and furlough business.

ACTA has fought an up-hill struggle to bring order and uniform practices to the domestic nonsked industry. It has spent close to \$50,000 provided by member carriers and agencies since its organization last June. It has had considerable success in cleaning up bad advertising by members. General industry discipline is good in Miami and fair in Seattle, but at the other two nonsked havens, New York and Los Angeles, cut-throat practices are still difficult to control.

Recently, members have been getting harder to keep in line, as they see ACTA has been unable to gain a change in CAB exemption policy. They see that they will be put out of business by CAB if they exceed their authority as defined by CAB, which limits "large irregular carriers" to three flights a month between any two large cities. Hence, many nonskeds are now going all out while they await the death sentence, which will probably be imposed when they come up before CAB for individual exemptions.

But a mobilization plan like ACTA's (AVIATION WEEK Jan. 29) may yet save

the industry by giving it military official and furlough travel to and from military installations.

Two reasons Defense may favor some such plan to keep the nonskeds alive: • They are a self-supporting reserve group that has no formal obligations toward the civil economy, hence can be called on by the military without civil repercussions.

• If they go out of business, they will sell a large share of their planes in South America and abroad, reducing the U. S. air transport plane reserve potential.

U. S. Airline Pilots to Fly Jetliner Trials

A. V. Roe Canada Ltd. is letting U. S. airline pilots fly its Jetliner to familiarize them with jet transport flight.

On future Jetliner trial survey runs in this country, Avro will take along a pilot of the airline flying the particular route.

This not only is a good stunt to promote potential-customer relations, but also places the opportunity to judge the Jetliner's flying qualities with airline personnel who can appreciate these characteristics.

► **Miami-New York Trial**—The plan already has been inaugurated. On the Miami-New York hop, Jan. 25, National Airlines' chief pilot, Joe Bailey was at the controls all the way.

The Jetliner ticked off the trip in fast time. From the moment the wheels left the ground at Miami to ar-



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rival over the tower at Idlewild at 20,000 ft., elapsed time was 2 hr. 23 min. After descending into the traffic pattern, the plane landed 13 min. later at LaGuardia.

► **Flight Data**—Cruise was at 35,000 ft. at a true airspeed of 420-443 mph. Overall average airspeed, including climb as well as cruise, was 380 mph. Overall average ground speed, including climb and cruise, was 456 mph. (average tailwind was 76 mph.).

Fuel consumed on the run was 2200 gal.

On the previous run from Toronto, Canada, to Tampa, Fla., Jan. 22, time was 2 hr. 56 min. for the 1130-mi. distance, wheels off to arrival over tower. Fuel consumed was 2400 gal.

On the trip from Tampa to Miami, where the northbound flight began, E. J. Kershaw, National's vice-president in charge of operations was on board.

The Jetliner now is in the hangar at Avro's Malton plant for the 200-hr. inspection.

CAB Okays EAL for N.Y.-Puerto Rico Run

The Civil Aeronautics Board in its first important decision this year granted New York-Puerto Rico service to both

Eastern Air Lines for persons and cargo and Riddle Aviation Co. for cargo only.

More CAB decisions are near, now that Board Chairman Delos Rentzel is settled in his new job, the CAB reorganization blueprint is ready, and mobilization plans are taking shape. Plenty of action is near if the new five-man Board backs the program and policy statement outlined by Rentzel last month (AVIATION WEEK Jan. 22).

CAB granted additional service between Puerto Rico and New York to Eastern and Riddle for a "temporary" period of five years. President Truman approved. Reason given by the Board for its decision to add these services to those already supplied by Pan American World Airways: "The outstanding need . . . is for the movement between the New York area and Puerto Rico of large numbers of people of limited means . . . (and) the dominant need to be met is that for low-cost service."

But although the Board said it was sure Eastern would give most attention to cut-rate transport, Eastern may also compete with Pan American for regular-fare service.

Board member Harold Jones dissented from the majority decision. He sees no need for additional air service between San Juan and New York.

The Board in granting Eastern authority to carry persons, property and mail, New York-San Juan, ordered an investigation "to determine whether the service presently operated by Eastern, Miami-San Juan, should be suspended."

Some important cases that should break open soon are Southern Service to the West; Trans-Texas Airways certificate renewal; New York helicopter service; trans-Atlantic freight case; final decision on back mail pay or debt of Western Airlines, and Inland Airlines; final mail rates for American Airlines, Colonial Airlines, Eastern Airlines, National Airlines, Northeast Airlines, Northwest Airlines, Trans World Airlines, and United Air Lines.

Change Expected in Rail Travel Clause

Airlines may at last get a fair share of business from military travel orders to officers and men after June 30 of this year. Reason is that the new military travel regulations and contracts between the Military Traffic Service and the air, rail, and bus industries will be reworded to eliminate the "rail preference clause" for fiscal 1951-2.

The rail preference clause instructs military agencies to dispatch men by rail, unless other means are cheaper or otherwise required. That clause has prejudiced the decisions of many dispatching agencies—since it tends to

hand the decision to rail in each case, unless there are extraordinary circumstances.

The Military Traffic Service establishes military traffic management policies for the Department of Defense. Director E. G. Plowman and Deputy Director Col. A. G. Viney say there will be a rewriting of the preference clause, as well as other clauses, this year.

Observers see this as another sign of speed-consciousness and flexibility in military operations. It has been stated that at any given time, over one-tenth of the U. S. military force is in transit, and therefore totally ineffective. Thus one-tenth of U. S. fighting strength is at all times useless under past and present systems of transfer for personnel. A tendency toward more use of air transport in military travel will render more military forces effective at any given time.

Cutting out the rail preference clause in military transfer policy means men will probably be dispatched with whatever speed their commanders feel necessary to the best defense.

The policy change may also indicate belief by the military that commercial air transport should get more business with which to grow, and thereby purchase more planes to serve as a defense reserve.

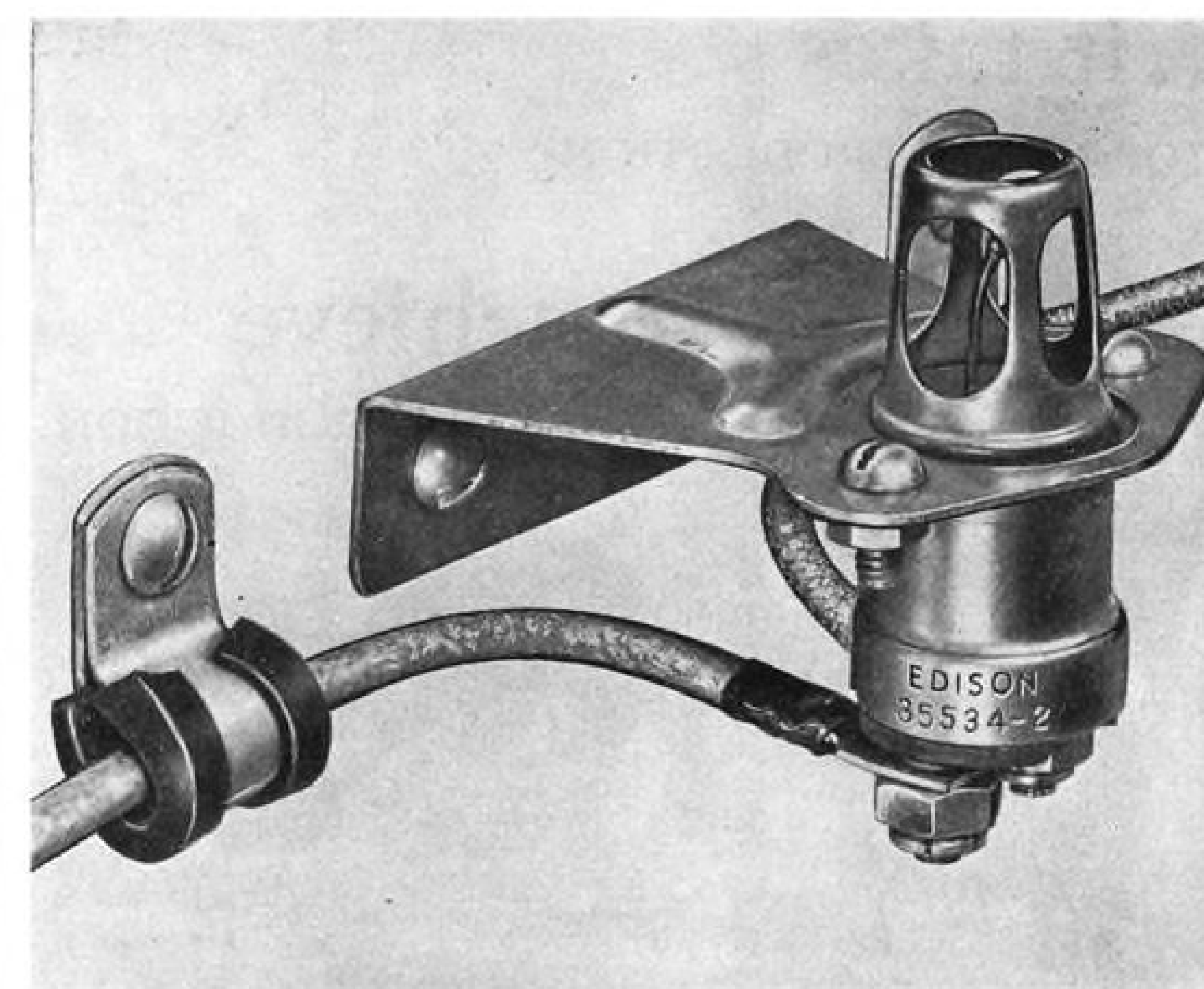
Furlough Air Travel Tax Law Under Fire

Military Traffic Service and Air Transport Assn. may soon get the 15-percent transportation tax taken off airline tickets for furloughed service men. Because of a wrinkle in Public Law 867 passed at the recent short session of Congress, service men on leave must pay the full tax for air travel, but no tax for rail or bus travel.

This law says a service man's round-trip ticket is tax-free only if the cost of that ticket comes to 2.025 cents a mile or less. Plainly, no airline can generally operate at such low cost.

The law went through Congress quietly, as it is the same provision that existed in World War II. But then the airlines were so short of planes they carried only priority travelers, as a rule. They could not provide standing room on their planes as railroads and buses did. But now, with a much larger air transport fleet, and load factors running only 50-80 percent, the military and airlines would profit alike if furloughed service men were given the opportunity to travel by air or surface, as they required.

Under the present setup, neither the service man nor the government nor the defense effort gains from the special proviso forcing airlines alone to charge a 15-percent transportation tax.



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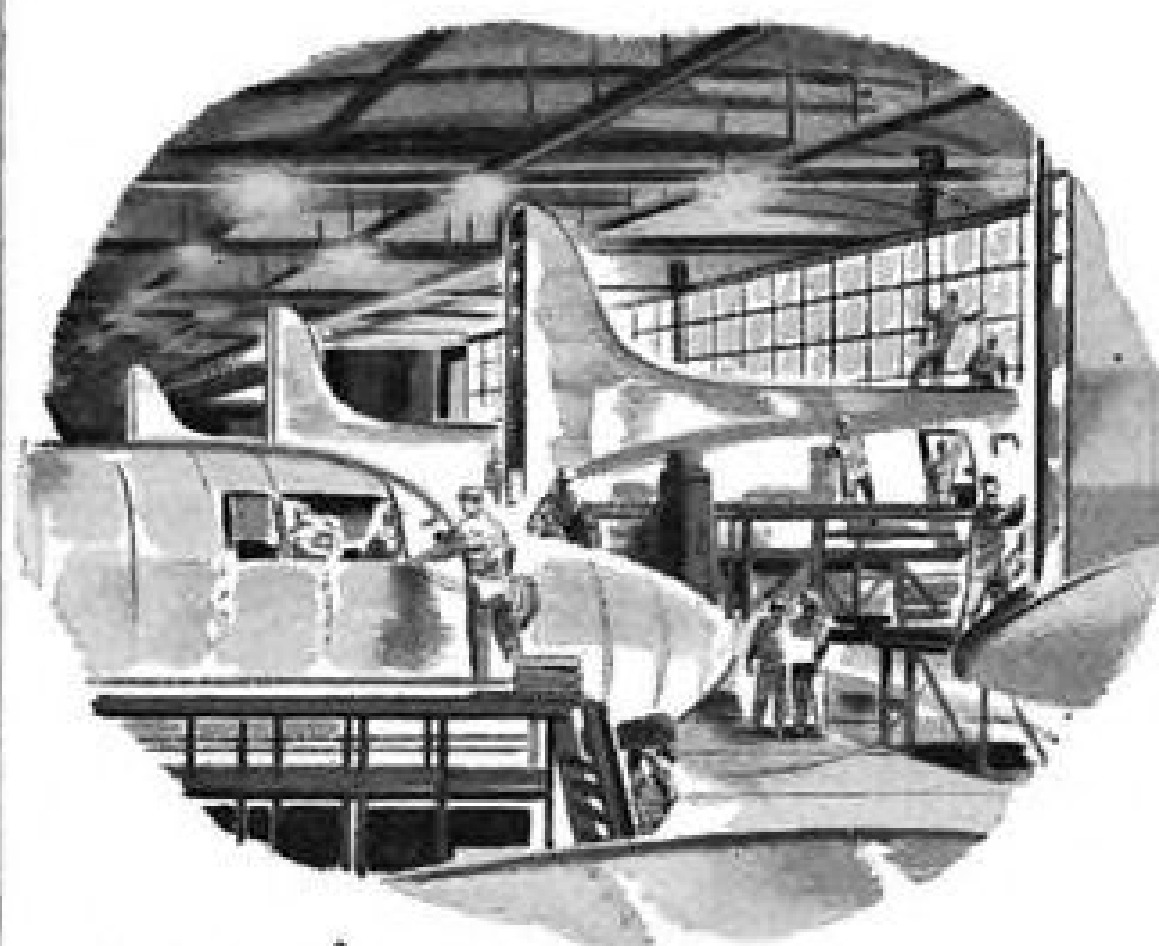
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Customer, Airline Executive Views Jibe

Speed, pressure cabins and less delays—in that order—are the three most important airline service improvements achieved in the past few years, according to a poll of 55 regular air travelers made by R. Dixon Speas, U. S. representative for Avro Canada. Results of the study were presented at the Society of Automotive Engineers' annual meeting in Detroit early last month.

But reduced cancellations and delays jumped to first place as the points needing most improvement, according to these passengers, with higher speed and better terminal facilities following. Of interest was the consistency of these opinions with those of airline vice presidents of sales, who were asked to fill in similar questionnaires.

The passengers expressed their ideas about other aspects of air travel with these typical "write-ins": Need better baggage handling; improve meals—Simplify them, or give them up; on time pleases more people than comfort; need safety devices against weather hazards.

A somewhat similar survey of air cargo shippers and the airline officials showed that both agreed that lower costs and decreased rates were the most important improvement of air cargo service in the past few years. But when queried as to further improvements desired, the shippers came out flatly for further lower rates, while the carrier officials wanted new cargo planes. In other words, the user was merely interested in results—the carrier was considering the means.

Hawaiian Agreement

Hawaiian Airlines has settled with the federal courts in a consent judgment in which Hawaiian and the Inter-Island Steam Navigation Co. agree not to engage in certain "alleged unfair practices."

The consent judgment was a mutually satisfactory agreement between the government and the companies. It was agreed to largely as a precautionary measure, setting up injunctive safeguards against possible future unlawful trade combinations among the firms involved.

Under terms of the judgment the companies are enjoined from "suppressing competition in transportation through agreements among themselves concerning rates and practices," and travel agents may not ask to limit their affiliations and service with competing companies. Also the judgment prohibits agreements with any shipper whereby such shipper agrees to refrain from using the shipping facilities of any common carrier.

SHORTLINES

► **American Airlines**—Carrier claims the hours-distance limitations asked by the Air Line Pilots Assn. for its American pilots will require hiring about 17 percent more pilots to do the same job. Also, theoretical pay for senior pilots would run to about \$25,000. . . . Company is chief intervenor in the Transcontinental Coach Case, up for CAB hearings this month. CAB-American problem: If nonskeds are put out of business, as they probably will be under the present exemption policy, will their planes, especially strategically important DC-4s, be sold abroad to foreign airlines?

► **Bahamas Airways**—BOAC affiliate this month starts operating its second converted 32-seat DC-3, modified by Smith Aircraft Co. The line is negotiating with CAA for permission to operate its converted DC-3s with maximum gross weight of 26,200 lb.

► **British Overseas Airways**—New York-Nassau service of BOAC in December ran a passenger load factor close to 100 percent and an average cargo load of over 1200 lb., the company says.

► **Delta Air Lines**—Company has put out a 60-page guide to Miami, containing 56 photographs.

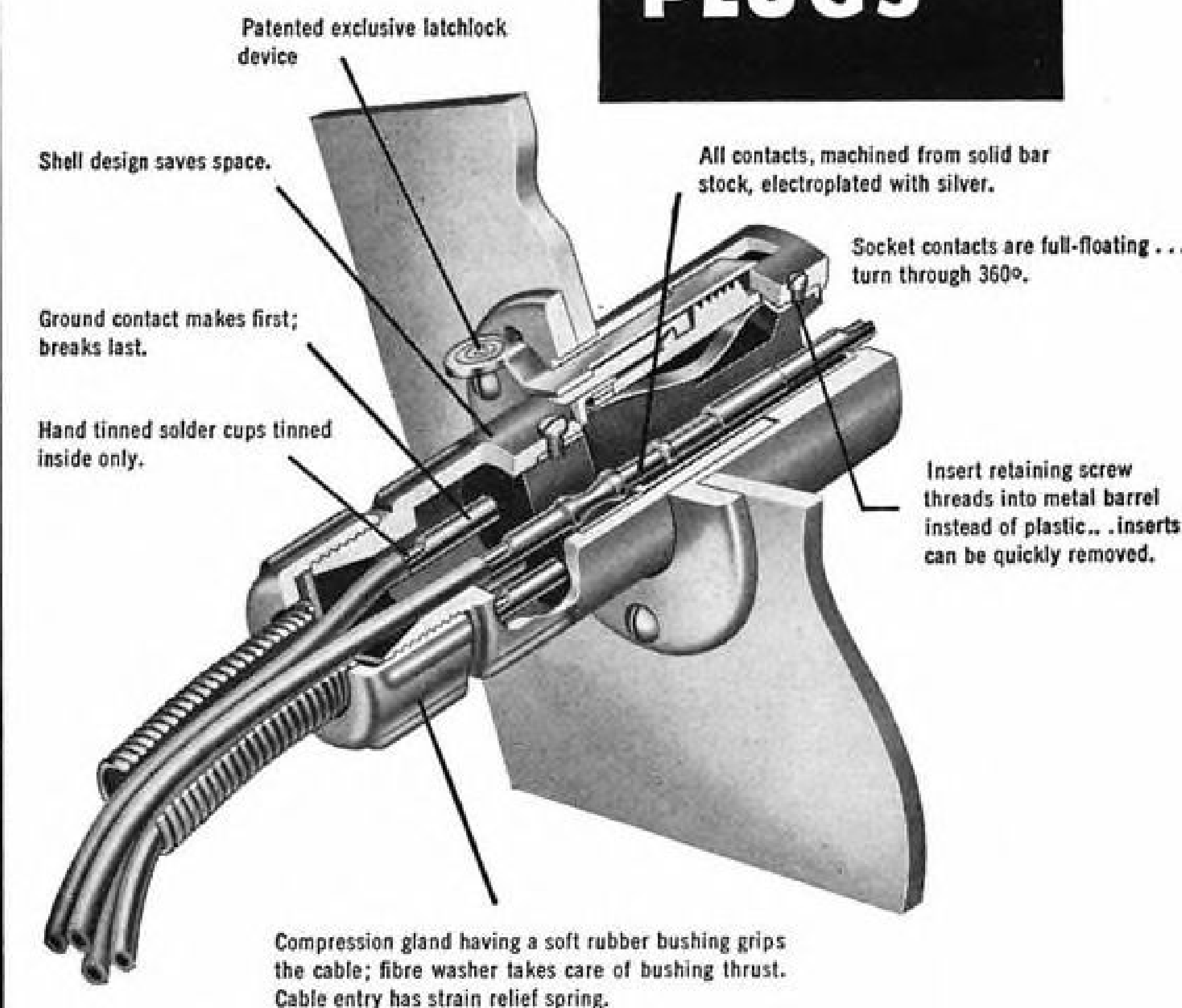
► **Colonial Airlines**—Company has a CAB show-cause order setting final mail rate on the Bermuda run at 66 cents a plane mile. Back pay for Apr. 21, 1948-Mar. 31, 1950 comes to \$372,000, making total mail pay on the service for that period \$998,000. Rate Apr. 1, 1950-Dec. 31, 1951 is to be 52½ cents a plane mile. The old temporary rate was 31 cents. . . . Company has equipped its entire fleet with VOR (visual omnidirectional range). It awaits CAA authorization to use the much-improved navigation system. Continental Air Lines was the first airline to start using the system officially.

► **Continental Air Lines**—Revenue passenger miles in 1950 gained 11 percent to 72,295,724, while passengers flown gained 15 percent to 206,023. Express ton miles gained 17 percent to 114,883, and air freight gained 34 percent to 498,873.

► **KLM Royal Dutch Airlines**—International carrier is balancing expenses with revenues now, although the year 1950 will show a moderate loss, compared with a 1949 loss of \$10.3 million. Ton kilometers for 1950 are 18 percent

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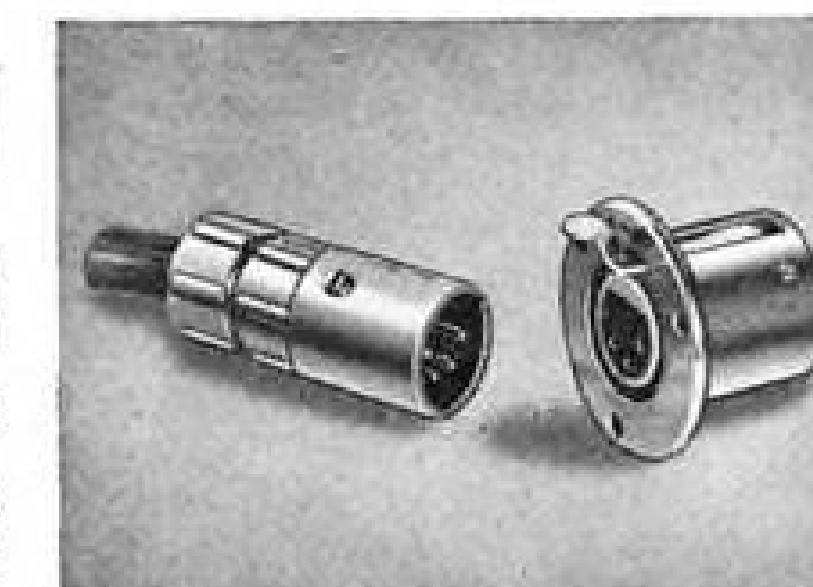
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over the "normal" year 1948. Gross revenue of \$48.6 million compares with \$36 million for 1949 and \$38.2 million for 1948. . . . Capital of the airline is now \$32.6 million, of which \$30.5 million belongs to the Dutch government. . . . Company has five DC-6Bs and five Super Constellations on order for delivery 1952-3. Prepayment has been arranged in the amount of \$5.2 million. . . . Company this week starts its through service from New York to Frankfurt and Munich. . . . Number of employees was reduced 13 percent in 1950.

► **National Airlines**—Company earned a net profit of \$654,458 or 65 cents a share July-December—the first half of its fiscal year. This is after \$785,640 depreciation and \$242,183 income taxes. October-December earnings of \$473,451 are after depreciation of \$413,506 and taxes of \$242,183. First quarter earnings of \$181,007 suffered no income tax, because of earlier losses. December net of \$191,032 compares with December 1949 net of \$12,111. . . . NAL reports traffic dropped slightly for four days after the DC-4 landing crash fatal to seven at Philadelphia in January—then returned to normal. National's load factor, Jan. 1-24, averaged 60 percent, compared with 51 percent a year ago. Passenger miles, 29,450,829, are up 76 percent for the period. Seat miles flown Jan. 1-24 are 49,047,469, up 49 percent.

► **Pan American World Airways**—Gas-burning ranges were the largest single commodity shipment in Pan American's record international cargo volume of more than 15 million lb. through Miami. Daily transport to Colombia alone averages 40 or more gas ranges.

► **Piedmont Aviation**—Feeder has asked CAB to include in its show-cause order on certificate renewal: Route segments Richmond-Knoxville via Lynchburg, Roanoke and Bristol, to be added to Route 87. Piedmont asks CAB to drop American Airlines service to Lynchburg, Roanoke and Bristol.

► **Sabena**—Belgian airline employees in the U. S. have a 5-percent cost-of-living pay raise. . . . Company carried 25 percent more cargo to European, Near East and African points in 1950 than 1949. Total of 220,066 lb. went mostly to Europe, but Belgian Congo and South Africa got a substantial portion.

► **Trans World Airlines**—Will move its international operations from LaGuardia to Idlewild late this spring. . . . Transcontinental operations will continue to go to and from LaGuardia.

AVIATION CALENDAR

Feb. 8-9—Third annual aircraft spraying and dusting short course, University of Minnesota, St. Paul, Minn.

Feb. 11—Louisiana Aviation Trades Assn. meeting, Washington-Youree Hotel, Shreveport.

Feb. 12—Louisiana Aviation Conference, seminar on civil defense, Washington-Youree Hotel, Shreveport.

Feb. 14-18—Annual aviation fiesta, Orlando Municipal Airport, Fla.

Feb. 19-20—Meeting covering agricultural research as related to aviation, sponsored by the Flying Farmers of America, Memphis.

Feb. 23—Air Transport Command five-year reunion. Waldorf Astoria Hotel, New York. For information write E. K. Hastings, resident manager of the hotel.

Mar. 8-9—Eastern regional meeting, Institute of Navigation, Shoreham Hotel, Washington, D. C.

Mar. 12-13—Short course on uses of aerial equipment in agriculture. Purdue University, West Lafayette, Ind.

Mar. 16—Sixth annual flight propulsion meeting, Institute of Aeronautical Sciences, Hotel Carter, Cleveland.

Mar. 19-23—Seventh Western Metal Exposition, Oakland Auditorium and Exposition Hall, Oakland, Calif.

Apr. 24-26—ATA annual engineering and maintenance conference, Hotel Drake, Chicago.

May 12-13—Airlines Medical Directors Assn. eighth annual meeting, Hotel Shirley Savoy, Denver, Colo.

May 13-14—Airline Medical Examiners Assn. fourth annual meeting, Hotel Shirley Savoy, Denver, Colo.

May 14-16—Aero Medical Assn. 22d annual meeting, Hotel Shirley Savoy, Denver, Colo.

May 17-19—Annual convention of the Women's Aeronautical Assn. of the U. S., Little Rock, Ark.

June 11-15—Second annual conference on industrial research, conducted by Columbia University Dept. of Industrial Engineering, New York.

June 15-July 1—International aviation display, Grand Palais and Le Bourget Airport, Paris.

June 18-July 6—Three-week Air Age Institute course, Parks College of Aeronautical Technology of St. Louis University, East St. Louis, Ill.

June 25-29—1951 summer general meeting of the American Institute of Electrical Engineers, Royal York Hotel, Toronto.

Sept. 7-11—Third annual Anglo-American Aeronautical Conference, convened jointly by Royal Aeronautical Society and IAS, Brighton, England.

PICTURE CREDITS

9—(top) McGraw-Hill World News; (bottom) Stanford University; 15—(lower) Fairchild; 16—Douglas; 25—Convair; 37, 39—Eastern Air Lines.

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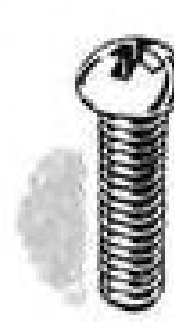
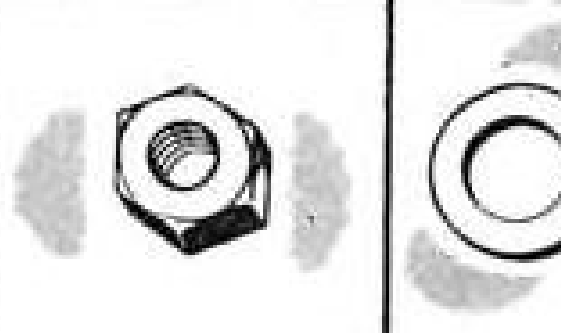
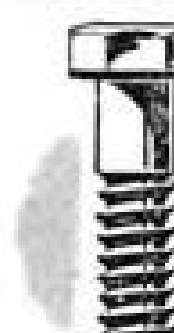
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1276	10759	Bolt
1600	11210	Cover
100	11762	Guide
7	26456-2	Bearing
1157	35787-5	Bushing
2174	35787-10	Bushing
39	35807-8	Stud
814	35814	Blower Assy.
3967	35817	Spring
280	35855	Cap
2446	35924	Washers
4200	35932	Gasket
6	37751	Cover
15	37993	Housing Stud
28	38314	Rod Assy. Comp
20	45213	Cover
182	46400E	Liner
30	48346	Cylinder
1	48347	Cylinder
1475	48360	Bearing
53	48362	Shaft
175	48363	Shaft
3	48388	Sump
100	48389	Fitting
209	48390	Retainer
56	48392	Sump
533	48447	Bushing
107	48457	Adapter
76	48458	Bushing
390	48461	Gear
149	48468	Bearing
90	48468B	Bearing
389	48469	Bearing
470	48470	Bearing
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395	54847	Clamp
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W-8707, Aviation Week
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COCKPIT VIEWPOINT

'BUGS' AT FRIENDSHIP AIRPORT

Friendship International Airport, the new super-duper at Baltimore, has been in operation now for several months. It ranks with the largest and best fields in the country and is a credit to the City of Baltimore. More important perhaps, this airport provides the long runways necessary for operating modern military aircraft and could easily be used for defense of the Capitol area should that become necessary. Several construction "bugs" are beginning to come to light, however, which future airport builders would do well to heed. Taxiway markings and run-up areas are as yet minor items, with runway lights receiving most comment. If the predicted heavy traffic develops, or if it becomes necessary to handle squadrons of military planes, the run-up area and taxi strip bugs may prove to be the most serious.

For some obscure reason, it was originally planned to letter the runways instead of using conventional magnetic heading numerals.

Fortunately the plan was halted in time. There are however, neon indicators around the airport which use the letters.

The system of using magnetic headings for runway designators is as yet unsurpassed and one can only guess as to the reasoning behind any change from this. A runway can be an elusive thing under certain weather conditions. If its direction is known, that provides at least a clue to its whereabouts.

► Downwind Run-up—Also noted is the fact that run-up areas are placed so that ships must run-up downwind. This is an un-good feature for closely cowled engines. And the areas are just large enough for one airliner and a lightplane to occupy at the same time; the taxiways are too narrow to permit passing. Biggest drawback, however, is the fact that any ship running up in these spots will blow his prop wash across the active runway at a critical point for landing traffic. These factors render the run-up areas virtually useless.

Future planners should note that airplanes do not necessarily take off in the order in which they leave the ramp or line up at the end of the runway. If there is not complete flexibility of movement near the end of the runway the efficiency of the airport is greatly reduced. Size of field is not the only factor concerned. Friendship International has more than enough room, yet its present layout can provide serious bottlenecks.

The installation of "directional" runway lights is another weak link. Friendship, being situated several miles beyond the city, is in a territory practically devoid of light. The directional lights, designed as they are to shine along the runway axis, provide no guidance until a plane is very nearly lined up on final approach—or, to put it another way, AFTER the pilot has located the runway. While some measure of illumination is desirable on the runway surface, nevertheless it is anti-climactic. Circling guidance, for locating the runway one wishes to aim for, is definitely the primary requirement.

► Obsolete Approach Light System—Present approach light plans at Baltimore call for the obsolete left side installation, unfortunately. If the new and superior center row were used, this field would be in the "cinch" class during bad weather. Left side lights are just as illogical as a left side localizer on the ILS. By continuing the analogy one could presumably argue for constructing only the left side of the runway!

No essay on Friendship would be complete without a congratulatory note on an outstanding feature of the airport. In this day of high performance airplanes, wind is a vital bit of information for takeoff and landing. Baltimore officials are to be commended on placing several windsocks on the field, one of which is visible from every runway. This is an often overlooked, though vital, installation. More airports should follow suit. Correcting these various faults will help a great deal to make Friendship a better operating airport. Long runways and clear approaches (and the windsocks) have already given it a good headstart in that direction. Airports such as this are not only a boon to commercial aviation but are also a tangible part of our national defense.

—R. C. Robson

("Ace" Robson is an American Airlines captain. His commentary, presenting the viewpoint of a typical airline pilot, was started in AVIATION WEEK Jan. 22. This feature will appear at frequent intervals.—Ed.)

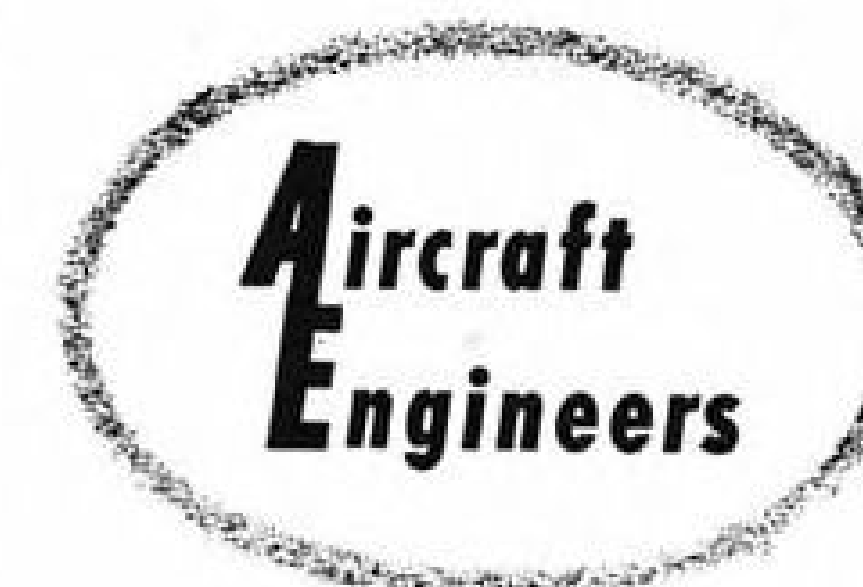
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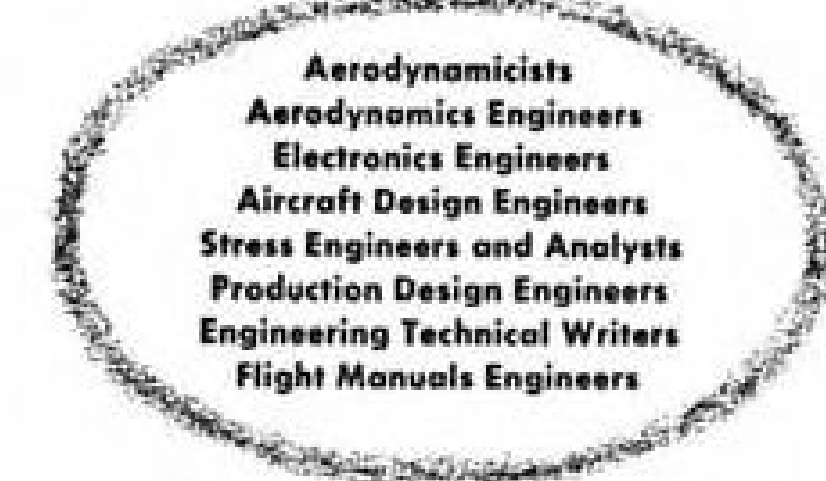


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LETTERS

Insurance Confusion

I was interested in the letter you published concerning Club Insurance. This is, I think, the third time you have publicized a "new" aviation insurance program offered by a relatively new, small, and inexperienced group, yet I cannot recall that you have ever highlighted or publicized the work of the "old timers" in the established aviation insurance markets.

A quick glance at any policy issued by any of the established markets today compared with the policies in force just prior to the war will convince you of the changes, all for the better, that have taken place in the coverage provided. I know too that you must be aware of the safety work sponsored (for insurance interests) that directly and indirectly have contributed so much to the development of aviation.

Yet by presenting only the story of the small specialized groups who aim for the cream of the aviation insurance market you are making the job of the established markets more and more difficult.

Although I am sure you do not mean to do so, I think you are giving the implication that here at last is a market that will write aviation risks at a "reasonable" rate. I certainly do not believe that it is your intention to give such an impression, for in your position you must, and I am sure you do, realize that aviation rates, irrespective of which market you go to, are tied in pretty closely with the actual loss experience.

In pleasure flying, for example, we know that, roughly speaking, one aircraft in fifteen will be involved in an accident, and the amount of damage will be approximately 50 percent of the value of the aircraft. As long as we continue to have that sort of loss experience it is pretty hard to alter materially the present rating structure.

Have you ever noted that each of the markets you have publicized are specializing in only the better class of aviation insurance? They aren't interested in providing coverage for the crop duster, or the factory prototype, or the scheduled and nonscheduled airlines, and all those other classifications which admittedly are extra hazardous or require great capacity but which, nevertheless, must have insurance protection. Don't the established companies, and the men who pioneered those companies rate some credit for taking the bad with the good during the past fifteen years?

Another very interesting point is that each of the particular markets mentioned in AVIATION WEEK has more or less limited their activity to one particular group of pilots. Yet if you were to discuss this underwriting philosophy with those who have been writing Aviation Insurance for any period of time I think you will find that the vast majority agree that the fact that the man belongs to a pilots' club, or is an Elk, or Mohammedan, doesn't necessarily make him a better pilot or the group a better risk. Certainly I don't blame anyone for seeking a lower rate, and if the individual can get it by joining a certain group

I personally don't blame him in the slightest, but in the case of the Aero Club, for example, I cannot help but wonder why membership alone makes one pilot better than another and therefore entitled to a lower rate.

I was somewhat amused at Mr. Crawford's description of the new Hull Coverage they provide with the strong implication that it was something new. It isn't. He deserves credit, however, for describing the old fashioned Participating Policy in a most attractive way! Telling the assured that the company will pay 75 percent of all his losses somehow sounds a lot more attractive than telling the assured that he has to pay 25 percent of all his losses. The actual advantage of a deductible policy over a participating policy, however, is debatable.

Mr. Crawford then goes on to say that the plan has been in operation on a trial basis for slightly over one year, but he doesn't explain that that means his premium income is probably less than 50 percent earned. Before they get too optimistic as to what the future holds, and how their loss ratio is running, they will certainly need more than that rather limited experience to form a decision that will reflect the actual picture.

I am not protesting your mentioning these new programs, but I am protesting that if you are going to give them publicity that it be done on an analytical basis. And instead of doing it for the new markets alone why not give equal publicity to the older established markets who have actually done a tremendous job over the years?

Why not start a regular aviation insurance column? Certainly aviation insurance is one of the major items of expense in any form of aircraft operation, and probably there is more misunderstanding about it than any other phase of aviation.

C. A. WINNER, Manager Aviation Dept.
Cravens, Dargan & Co.
60 Sansome St.
San Francisco.

(Mr. Winner refers to a letter published in AVIATION WEEK Oct. 16, 1950. Even Mr. Winner concedes there is probably "more misunderstanding" about aviation insurance than any other phase of aviation. Why don't the insurance people try to do something about it? Looks to us like a golden opportunity for smart publicity people.

Mr. Winner says the small specialized club insurance efforts "aim for the cream of the aviation insurance market." And he doesn't blame any pilots for seeking lower rates if they can get them. The private pilot may ask why he should help pay the freight for insuring others like crop dusters or factory prototypes or airlines that Mr. Winner says "admittedly are extra hazardous or require great capacity but which, nevertheless, must have insurance protection." The private pilot might ask why he shouldn't pay only for his own category of risk and let the crop duster do the same.

It would appear on the surface that such club insurance plans are trying to do just this. If any have gone bankrupt or fizzled, costing their policy holders losses, we would like to hear about these, to present the other side of the controversy too.

Mr. Winner finds amusement in the club insurance plan's description of its hull coverage which implies this is something new. Mr. Winner says it isn't but says the newcomers deserve credit for describing the old fashioned participating policy in a most attractive way. Maybe here is another public relations lesson to be learned by the old timers. You can't do the best possible selling job of insurance or anything else by confusing your potential customers. Insurance people are notoriously poor at simplification, and communication. Tell it in an attractive way. Insurance departments in aviation publications have been flops because the only writers who thought they understood the subject couldn't write so the readers could understand the writers! We say more power to group insurance plans if they work and pay off. While we're on the subject, we must congratulate Associated Aviation Underwriters on their outstanding accomplishment in simplifying airline passenger trip insurance so you can write out your own policy at a coin vending machine in a couple of minutes at almost any airline terminal in the country.—R.H.W.)

The Ground Link

Your Jan. 8 issue had an interesting article on the use of telemetering equipment to ascertain the pilot's reaction to high altitude ejection seat bail-out.

The airborne equipment was interesting. However, I think that there was a certain technical oversight in the discussion about the equally important ground link used with this telemetering system. It is pointed out that the telemetering ground receiving equipment used at Holloman Air Force Base was a joint design of the Air Materiel Command and our engineering group, officially designated as the AN/GKR-2 telemetering ground receiving equipment.

The AN/GKR-2 telemetering ground receiving equipment, besides being stable, dependable and readily capable of easily and accurately following unstable airborne systems as inevitably occur as necessitated by design compromises due to weight and space limitations, was not only designed for use with the AN/AKT-3, Bendix transmitter, but is also a very versatile unit designed for use with any standardized AM-FM airborne equipment including the RREP-designed AN/AKT-10, 800 series and AN/AKT-5 systems; the AN/AKT-5A, as well as numerous other airborne telemetering assemblies.

M. V. KIEBERT, JR., Manager
Telemetering Division
Raymond Rosen Engineering
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AVIATION WEEK, February 5, 1951

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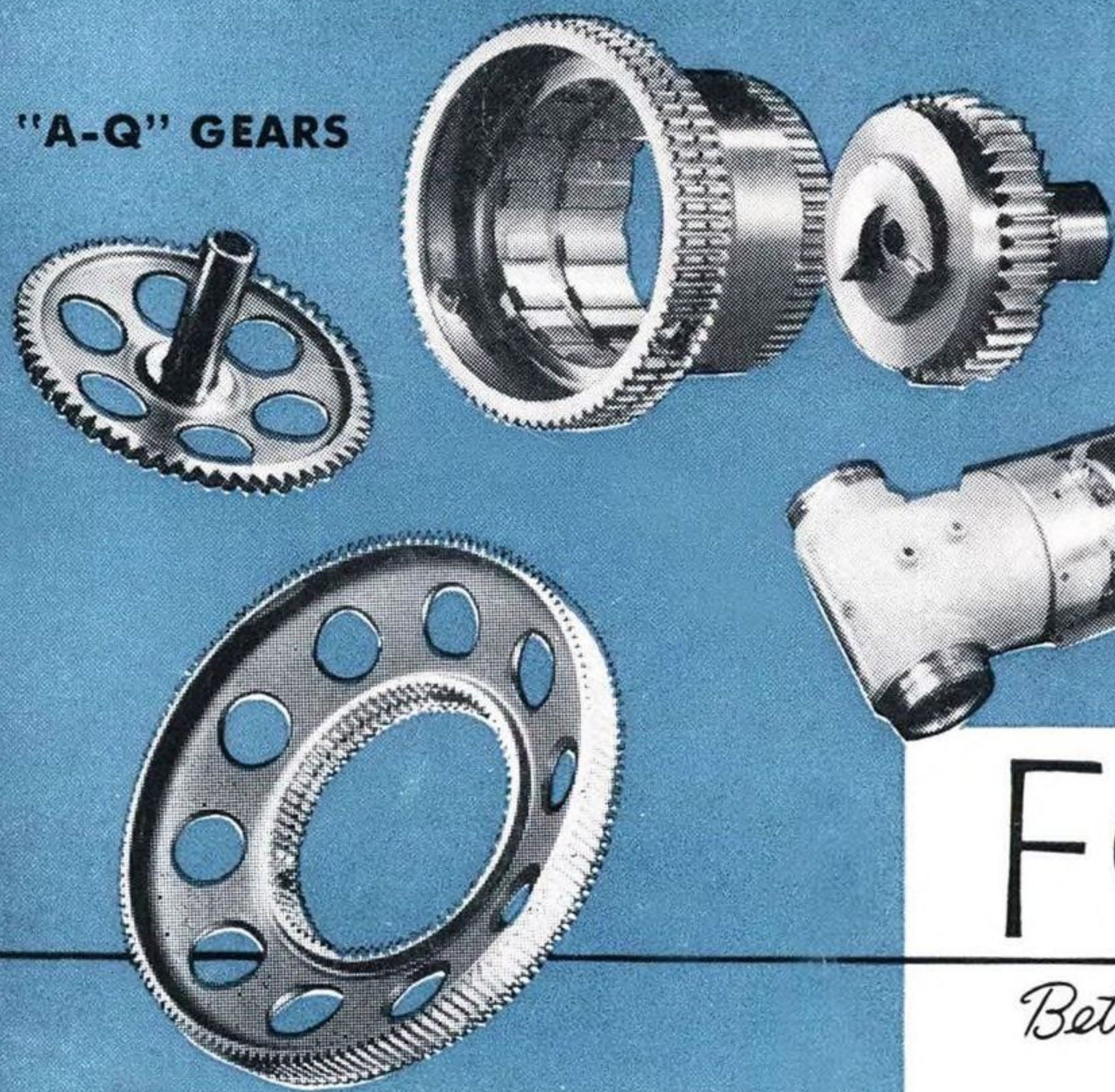
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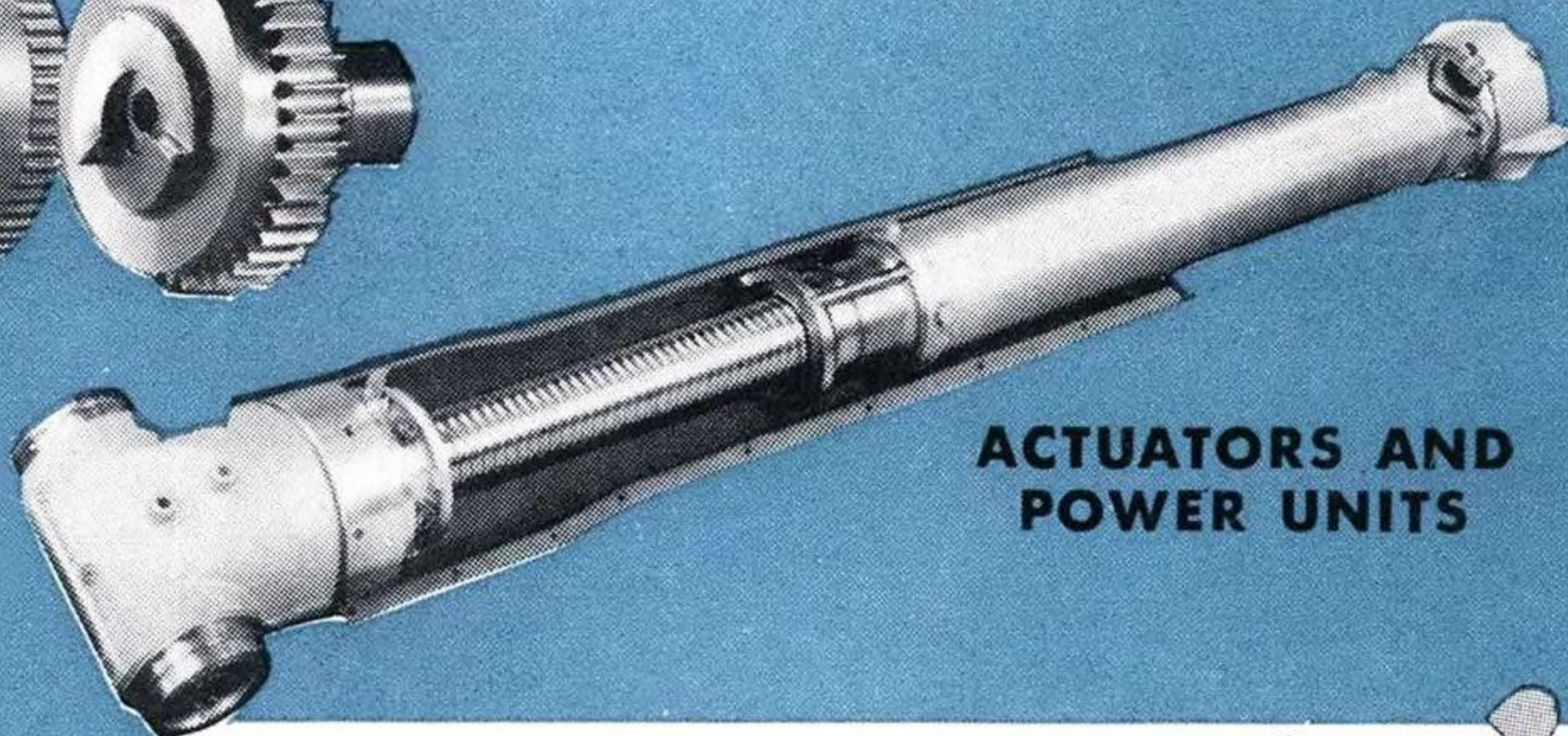
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