

AVIATION WEEK

DEC. 10, 1951

50 CENTS

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Phantom view showing general arrangement of Northrop Scorpion F-89 interceptor

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Bullet-sealing fuel tanks and PLIOCEL wing tanks—both by Goodyear—give extra-long range to the Scorpion, the U.S.A.F.'s newest all-weather interceptor.

Because of the extremely thin wing section of this twin-jet aircraft, twelve bantamweight PLIOCEL tanks made by Goodyear are used to take advantage of every available nook and cranny—providing maximum fuel capacity with minimum weight. Folding easily for installation in small apertures, these specially-treated bladder cells of gastight nylon fabric actually outlast heavier metal containers!

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Aviation Week



Member



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valve uses no organic sealing device. In closing the valve, the convoluted rim compresses, insuring seal. It operates efficiently under 225 psi and at temperatures up to 850 degrees F. Valves of this unique design can be as large as 7 inches in diameter and stand pressure loads up to two tons. AiResearch supplies the means to operate them electrically, pneumatically or manually.

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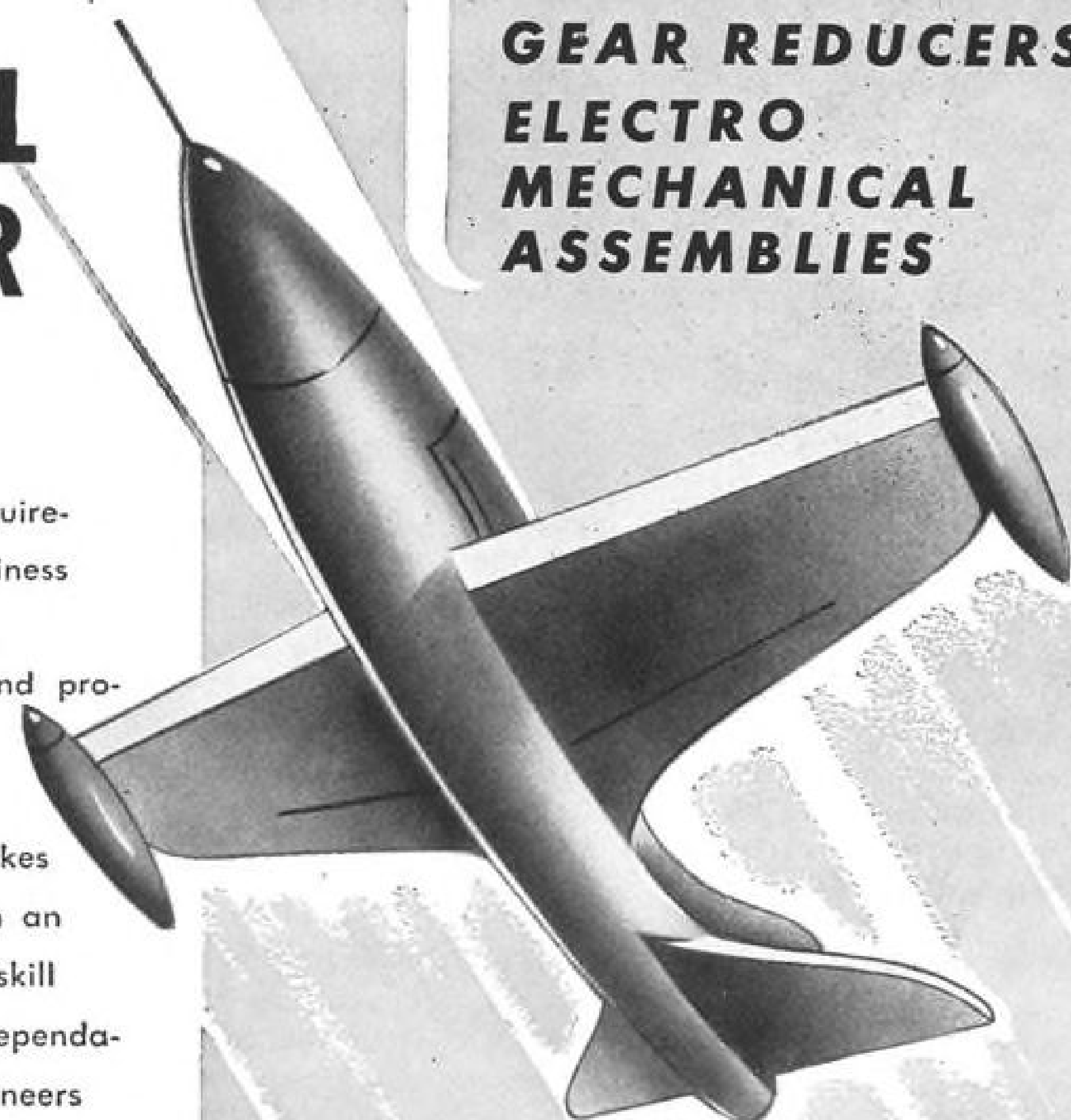




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NEWS DIGEST

DOMESTIC

Super Connie has been certified by CAA for immediate passenger operations and will be placed into service this month by EAL between New York, Chicago and Florida. The big transport went through its CAA trials in ten weeks, is guaranteed for 116,000-lb. maximum takeoff weight, has a 327-mph. cruise speed at 21,500 ft. and can get off with three engines over a 50-ft. obstacle from a 5,400-ft. runway.

Personal and executive plane shipments, one-to-ten-place, by six companies during October came to 115 aircraft valued at \$708,000.

Civil aircraft shipments during August totaled 170 planes valued at \$5.5 million with an airframe weight of 272,800 lb. Backlogs at the end of the month came to 647 planes of 3,000 lb. and over. In August, 391 engines aggregating 149,500 hp. were delivered. Plane plant employment was 322,068 and engine plants employed 71,293.

CAB, in approving Railway Express Agency contract with 33 airlines until Dec. 31, 1952, hits the pact as "monopoly" in the handling of air express, but says disapproval now, in face of lack of alternate facilities, would be blow to national defense.

Starfire is the name approved for the Lockheed F-94 all-weather fighter.

UAL DC-3 crashed three miles northeast of the Rocky Mountain Arsenal, near Derby, Colo., on Dec. 4, during a training flight, killing pilot-captain and two trainees aboard.

Spartan Aircraft Co., Tulsa, is negotiating with Reynolds Metals Co. and the government in an effort to open an aluminum plant in Kansas, according to an attorney for Spartan.

Wellwood E. Beall, Boeing Aircraft Co. vice president-engineering and sales, has been elected president of the Institute of the Aeronautical Sciences for 1952, succeeding L. B. Richardson, director of research and development of Fairchild Engine & Airplane Corp.

EAL DC-3 collided with a Civil Air Patrol Piper L-4 on Nov. 27 but landed safely at Ocala, Fla. The Piper crashed, killing its sole occupant.

AMC office shift has moved Aircraft Production Resources Agency from

Wright-Patterson AFB's Area B to Building 262 at Area A, according to Col. Kern D. Metzger, APRA director. Move will help make more room for Research & Development Command at Area B.

FINANCIAL

Northwest Airlines reports a \$3,331,321 net profit before provision for income taxes for the first ten months of 1951 compared with a loss of \$255,876 for the same period last year. Operating revenue at Nov. 1 this year totaled \$41,213,805, compared with revenue for the same 1950 period of \$39,777,809.

Seaboard & Western Airlines reports net earnings of \$542,092 on operating revenues of \$8,165,242 for the nine months ending Sept. 30 after provision for federal income and excess profits taxes.

Northrop Aircraft has declared a 25-cent dividend on common stock payable Dec. 22 to shareholders of record on Dec. 10. Net profit for the quarter ending Oct. 31 came to \$528,102 after providing for estimated federal income and excess profit taxes.

Pioneer Air Lines is paying a 30-cents-per-share dividend on Dec. 10 to holders of record Dec. 1. PAL's net income after taxes for the first nine months of this year totaled \$89,563, compared with \$72,875 after taxes for the same period last year.

INTERNATIONAL

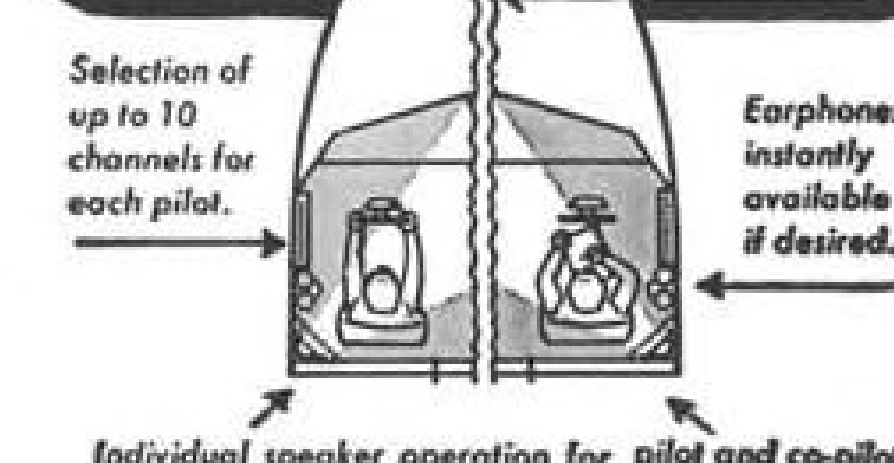
USAF's first African base opened for operations with arrival of six Convair B-36s flying nonstop from Carswell AFB, Tex. to Sidi Slimane, French Morocco. The new base, about 50 miles northeast of Casablanca, is one of five bases built for USAF on the continent.

International airline traffic transactions settled through the IATA Clearing House, London, total \$120,432,000 for the first nine months of 1951, with cumulative offset ratio for the period being 86.2%.

Lineas Unidas C-54 crashed on takeoff from San Luis, Mexico, Nov. 29, killing at least 13 and injuring 7. After cattle on the airfield had delayed landing of plane, pilot attempted takeoff in darkness and reportedly hit a hole or a fence post.

Air-India International reportedly is negotiating with Lockheed Aircraft for two Super Connies seating 60.

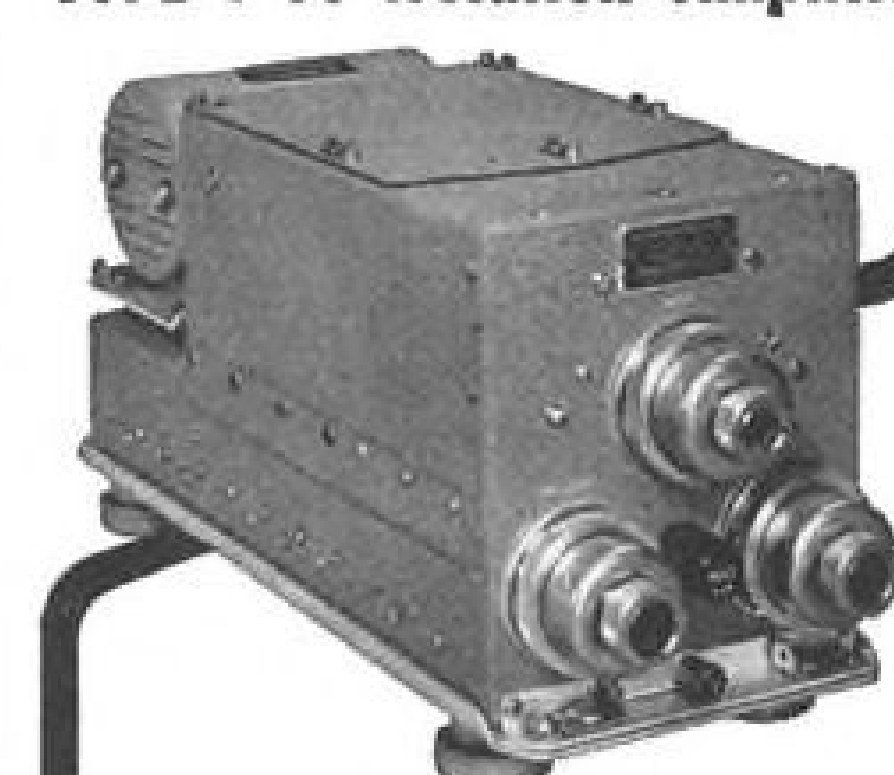
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AVIATION CALENDAR

Dec. 11—Lecture, "Supersonic Flows Involving Separation," at meeting of the Institute of the Aeronautical Sciences, New York Section, Engineering Societies Bldg., New York.

Dec. 12—Luncheon-Forum, "Air Traffic Control of Tomorrow—Pushbutton Airways," Wings Club, Biltmore, Hotel, New York.

Dec. 17—Wright Day Dinner of Aero Club of Washington, Hotel Statler, Washington, D. C.

Dec. 17—Wright Brothers Lecture, sponsored by the Institute of the Aeronautical Sciences, U. S. Chamber of Commerce Auditorium, Washington, D. C. 3 pm.

Dec. 17—Wright Memorial Luncheon, principal speaker, Major Alexander P. de Seversky, Hotel Carolinian, Nags Head, North Carolina.

Dec. 19—Wright Brothers Lecture (repeat), NACA Auditorium, Lewis Flight Propulsion Lab, Cleveland.

Dec. 21—Wright Brothers Lecture (repeat), IAS Western Hq. Bldg., Los Angeles.

Jan. 5-6, 1952—Annual Miami Air Show, sponsored by the Florida Air Pilots Assn., Opa Locka Airport, Florida.

Jan. 6-8—Annual Cessna Distributors Meeting, Allis Hotel, Wichita, Kansas.

Jan. 28-Feb. 1—20th Annual Meeting, the Institute of the Aeronautical Sciences, Astor Hotel, New York.

Jan. 29-31—114th National Meeting of the American Meteorological Society, Roosevelt Hotel, New York.

Feb. 7—Meeting of Society of Automotive Engineers, Igor I. Sikorsky will speak on helicopter progress. Brass Rail Restaurant, 5 Ave near 43 St., New York.

Feb. 7-8—Regional Meeting of Instrument Society of America, Power Plant Symposium, Hotel Statler, New York.

March 3-6—Institute of Radio Engineers, Waldorf-Astoria Hotel & Grand Central Palace, New York.

March 17-19—Second Midwestern Conference on Fluid Mechanics, to be held at Ohio State University.

March 17-22—American Society of Tool Engineers, International Amphitheater, Chicago, Ill.

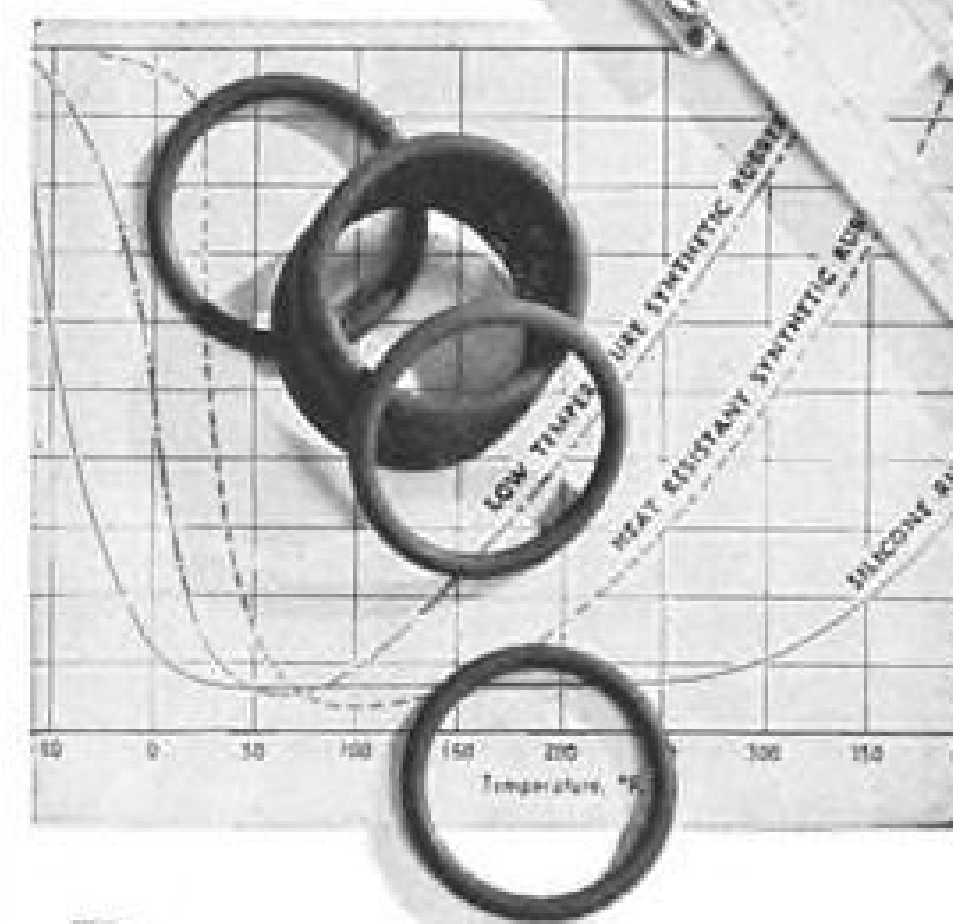
April 21-24—National Aeronautic Meeting and Aircraft Engineering Display, Society of Automotive Engineers, Hotel Statler, New York.

June 23-27—American Society for Testing Materials' 50th Anniversary Meeting, Statler and New Yorker Hotels, New York.

PICTURE CREDITS

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NEW ROYAL NAVY FLAT-TOP—HMS Eagle, big, new 800-ft. carrier for the Royal Navy, weighs 36,800 long tons and can carry 100 aircraft. Eagle roughly compares with U. S. Essex-class flat-tops. Royal Navy's present carrier strength is seven ships, plans call for 18.



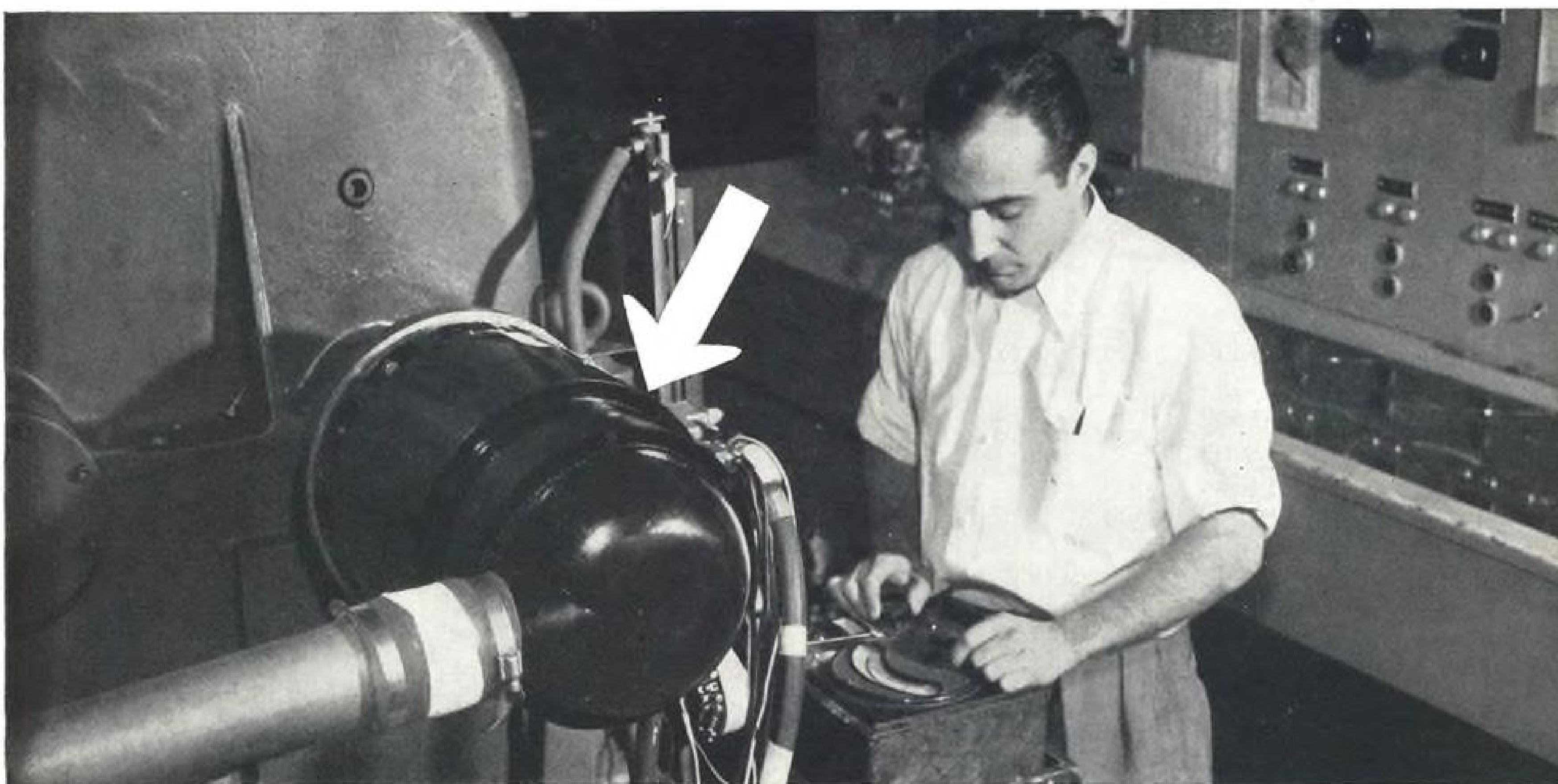
FOUGAS DUET—Two recent Fougas designs built in France for different purposes are the CM-101-R transport (left) and the Bemaux III light research plane (right). Former carries 14 passengers, has two 580-hp. Sncma piston engines and two auxiliary Turbomeca Pimene jets of 485-lb. thrust, arranged in tandem pairs in each engine nacelle. Gross weight is 18,982 lb., empty weight 13,825 lb. Gemeaux III is a two-place light plane with a single 740-lb.-thrust Turbomeca Marboire turbojet between the twin fuselages.

Foreign News In Pictures

MOSCOW AIR TERMINAL—Passenger waiting room, reminiscent of U. S. railroad stations, of the Central Airport serving Moscow is depicted in this view just released to Aviation Week by the Russian photo agency, Sovfoto. The caption which accompanied the picture said it was taken at the opening of "the summer flying season." Large map of the Soviet air transport system adorns the wall over the doorways.

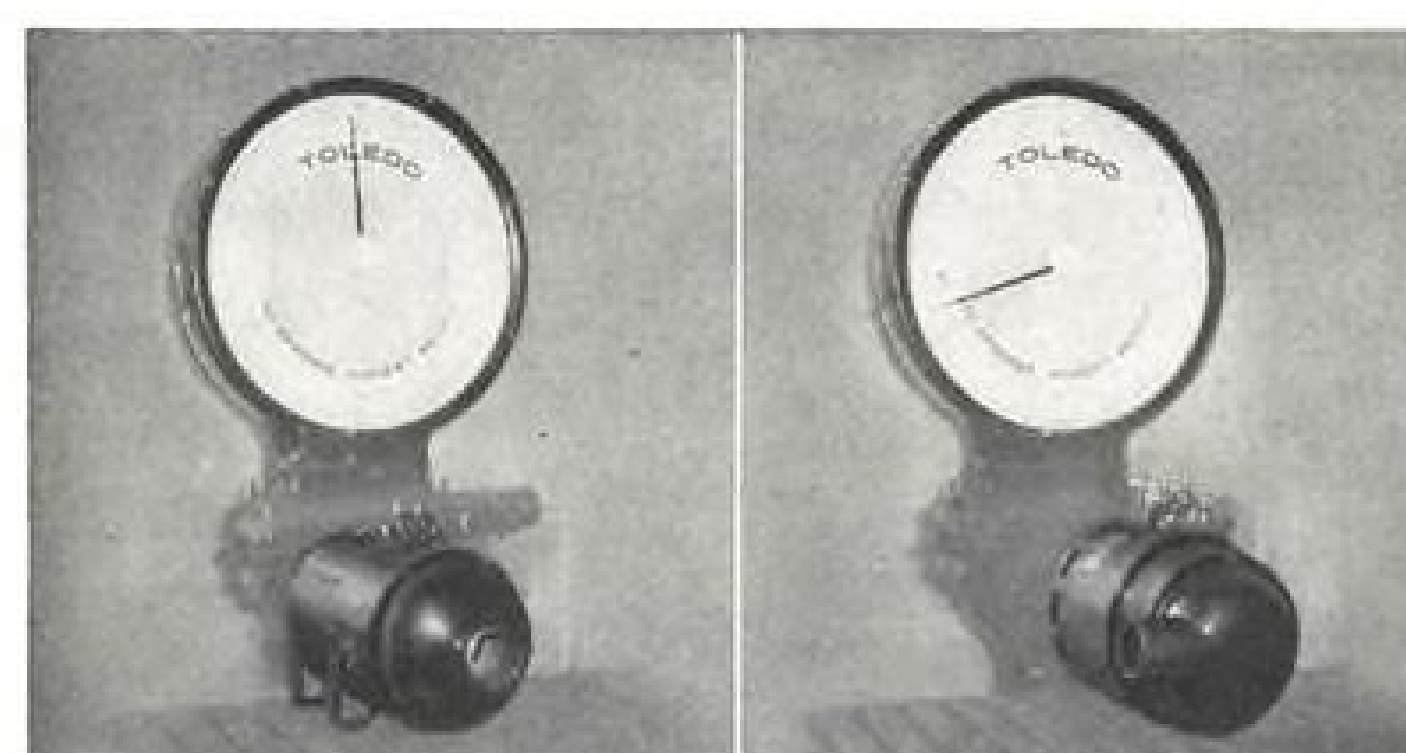


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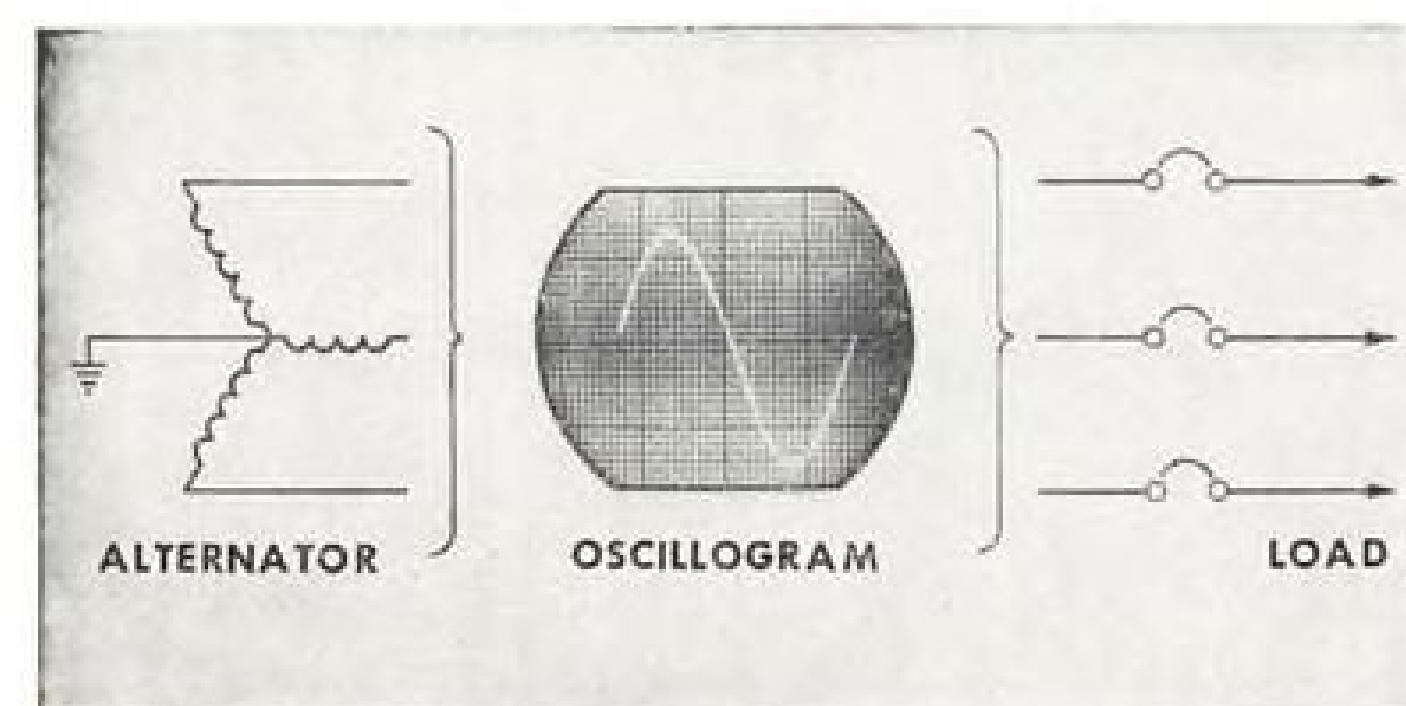
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WHO'S WHERE

In the Front Office

Jerry A. Mathews, Jr. has been appointed vice president-manufacturing with Edo Corp., College Point, L. I., N. Y. He previously had been factory manager since early 1948. Mathews had four years of anti-sub duty with the Navy in World War II.

L. E. Osborne has been named to the new post of executive vice president-defense products for Westinghouse Electric Corp. and Tom Turner, vice president-labor relations, assumes Osborne's former manufacturing duties in addition to his present job.

Charles E. McGee, public relations manager for Pan American World Airways' Atlantic division, has been elected a vice president of Mel Adams & Associates, New York, succeeding James S. Hart, retired.

Changes

Brig. Gen. Tom C. Rivers (ret.) has been designated manager of the General Electric's new Advanced Electronics Center at Cornell University, Ithaca, N. Y.

W. Kenneth Houpt has been promoted to sales manager of the Wright Aeronautical division of Curtiss-Wright Corp.

Cecil R. Barlow has been made head of contract administration and plant services of Norden Instruments, Inc., Milford, Conn.

Henry J. Hamm has been appointed sales manager of Lear, Inc.'s Aircraft Radio division.

William H. Baines has been designated factory superintendent with Stanley Aviation Corp., Buffalo, N. Y.

W. A. Tweedie, former Temco chief industrial engineer, has been named factory manager of Luscombe Airplane Corp., Temco subsidiary, Garland, Tex.

Theodore W. Wilkins has been designated assistant commercial sales manager of Lockheed Aircraft Service, Inc.

Robert L. Johnston has joined Prewitt Aircraft Co., Clifton Heights, Pa., to manage the firm's manufacturing activities.

Routt A. Bryant, Jr. has been made manager of plant engineering for Convair's Guided Missile division, Pomona, Calif.

Gene T. Neudeck has been appointed sales manager of Young Radiator Co.'s Automotive and Aeronautical Products division.

M. W. (Kip) Tuttle has been designated director of military relations for Radioplane Co., Van Nuys, Calif.

Jasper F. Burt has been promoted by Glenn L. Martin Co. to divisional superintendent in charge of operations at Plant 2, Middle River, Md.

Albert W. Garland has been named director of purchasing for Aircraft Engine and Parts Corp., N. Y., and Donald E. Donovan is the company's new regional director at Washington, D. C.

Victor T. Raeburn has been made manager of public relations and advertising department for Air France's North American and Caribbean division.

INDUSTRY OBSERVER

► Royal Canadian Air Force is ordering two de Havilland Comets for special long-range operations and for training exercises in high-altitude interceptions. Canada's home-grown jet transports, Avro's Jetliner, is not considered suitable for work planned with Comet.

► Rapidly mounting USAF interest in the new Pratt & Whitney J-57 turbojet has given rise to speculation in Detroit that the Chrysler program to build Pratt & Whitney's lower-powered J-48 engines at a new plant in early construction stage at Mt. Clemens, Mich., may be reshuffled to become a second source of J-57s.

► New outgrowth of the CAA-sponsored AG-1 agricultural spray plane developed at Texas A&M College by Fred Weick, is the Ohio Project, a program to develop a new type agricultural airplane from a Piper J-3 Cub with a Lycoming engine. Engineers of the Ohio Agricultural Aviation Research Foundation are working on it at Grimes Manufacturing Co., Urbana, Ohio, where airport and facilities are provided by the company. The engineers gave the AG-1 a six-day inspection, and have complete blueprints for it. They will seek to incorporate as many as possible of its features in their project. Piper Aircraft Corp. donated the airplane and engine, McCauley Corp. is contributing a propeller, Shelby Tube Co. is providing tubing and Crash Injury Research of Cornell Medical College has been invited to consult on safety features.

► First volume results of Canadair Ltd.'s F-86E Sabre jet fighter production have gone into service with the RCAF in Britain. The Canadian Cougar Squadron 410, equipped with North American Aviation-designed planes, will be augmented soon by two additional squadrons to form the 1st Fighter Wing RCAF in Britain. Eventual plans call for an air group of 11 RCAF squadrons, presumably mostly fighters, to be stationed in Britain along with British and USAF fighter and bomber wings there. The first 48 Canadair-built Sabres were delivered by the British carrier Magnificent.

► Glenn L. Martin probably won't produce any B-51 bombers as such, but is planning on incorporating some of the radical three-jet bomber's best features into a forthcoming development of the British Canberra, which may be designated the B-57B. The B-51 includes such features as variable incidence wings, bicycle landing gear with outrigger wheels at wingtips, all-moveable horizontal tail at top of vertical stabilizer, etc.

► Crews of the Royal Australian Air Force are ferrying Lockheed Neptune long-range patrol bombers across the Pacific from California. First two have arrived in Richmond, New South Wales, and others of the P2V type will follow, reversing the 1946 path taken by the Truculent Turtle, famous U. S. Navy P2V-1 plane, which set the still-current world non-stop distance record of 11,228.915 mi. from Perth, Australia, to Columbus, Ohio.

► French-made Nene jet engines may be used to power the first Canadair-built T-33 jet trainer planes, until Rolls-Royce production of the Nenes gets started at the new plant Rolls-Royce is building at Montreal. Canadair, Ltd., will soon be in production on the Lockheed-designed T-33s at Montreal to fill an order for 575. The French Nenes, built under Rolls-Royce license by Hispano-Suiza, are understood to be available for the Canadian program.

► Experimental fabrication has started at Douglas on assemblies of the first C-124B turboprop cargo transport, scheduled for delivery in 1953. Approval of mockup, including flight deck, pods and main landing gear changes, is near completion. First contract calls for one ship, powered by Pratt & Whitney YT-34-1 turboprop engines of 5,500-6,000 hp. each, turning Curtiss propellers. Pressurized flight deck will permit operations to 25,000 ft., while the cargo compartment will remain unpressurized.

► Modernization of a windtunnel at Cornell University's Aeronautical Laboratory for tests at supersonic speeds will be financed by USAF as part of a \$1.5-million USAF program to expand testing facilities there for military aviation research projects.

Washington Roundup

Procurement Czar?

Support for a military procurement "czar" to "scissor through red tape" and get first things done first is building up to a point that has the services worried.

Antagonistic to "outside interference," the services want to run their own shows separately, are dead set against the proposal.

The threat that it may come to pass, though, is spurring Army, Navy and Air Force to streamline procurement—or at least make overtures.

Navy's Secretary Dan Kimball, putting Navy flatly on record against the "czar" plan, is urging contractors to make recommendations "as to the type of organization or operation that will produce the most effective and efficient supply system."

► His Comment:

"The Navy is opposed to the concept of a fourth service of supply or a ministry of supply, on the basis that more effective and efficient supply operations result from each of the three services maintaining and operating its own supply system. This policy conforms to the current Department of Defense policy but there are some who are aggressively pursuing a campaign for a change."

The alternate proposals, spelled out by Sen. Lyndon Johnson's Senate Preparedness Committee, that are gaining top-level consideration in Washington:

- **Empower Munitions Board** chairman, John D. Small, to act as czar. Munitions Board's other three members, the undersecretaries of the three services, Johnson's committee objected, are simply partisans for their own services.

- **Establish an Undersecretary of Defense** as procurement czar. This is less likely. But if it's done, Small would likely be given the post.

Some aircraft manufacturers like the idea of a "czar" to prod aircraft and engine production. They feel that under unification the services are now bending too far backwards to avert rivalry.

But the industry isn't likely to push the czar plan and pit itself against the services.

Congress vs. Wilson

The issue between Defense Mobilization Director Charles Wilson and the influential Senate Preparedness Committee is this:

- **Then Senate committee** wants top priority to go to the production of airplanes and other end-items to build up a "minimum" military strength in-being in short order. The military, with responsibility to meet aggression, sees eye to eye with the Senate group on this score.

- **But Administration's mobilization plan** gives priority to basic industrial expansion. It puts less emphasis on getting planes off the production lines for a striking force, more emphasis on electric power and aluminum expansion to build the base for aircraft production.

Administration way is the less painful but takes longer to get a force-in-being. It staves off squeezing materials out of the civilian economy for guns now, assures that when military production gets into full swing, in about a year, there'll be plenty of materials for both guns and butter.

But Johnson's committee will keep hounding Wilson to shift more emphasis to end-item output. Members are perturbed at the postponement of the "target date" for achievement of a "minimum" military force in-being.

Mid-1952 was originally the deadline for a 95-wing USAF in-being. Now, aircraft manufacturing won't reach peak output for the program until 1953.

Replies made by Wilson to the Committee's criticism of lagging aircraft output:

- **Aircraft, other defense requirements get "first call."** "We have given them practically everything that is needed for them to meet their schedule. We are not short of any airplanes . . . as a result of materials that have gone into civilian production."

- **Materials future: dim.** "But I think we are going to have increasing difficulty (fulfilling aircraft and other defense materials requirements) simply because the military requirements are now coming to a point for the production contemplated in the near future where the requirements . . . will be right up to the very limit of our supply—specifically in nickel for an alloy for aircraft engines."

- **Bottleneck now: design:** Design of complicated machine tools, "which we discovered the need for only in the last six months," is what's slowing down tooling-up of aircraft capacity and holding down production.

- **Butter and guns:** "I believe we can, with some minor changes, get the defense job done, and, at the same time, be able to maintain the existing civilian production."

National Transport Policy Shelved

A national transportation policy—variously called "unified control of transportation," "coordination of transportation" and the like—is on the shelf, indefinitely.

Whatever the name, it implies a single authority over all forms of transportation—which air transport industry unalterably opposes.

There's a schism in the ranks of the two most powerful advocates of a "National Transportation Policy."

- **Commerce Secretary Charles Sawyer** is largely responsible for the establishment of an Undersecretary of Commerce for Transportation to direct and coordinate CAB and ICC. But railroad interests, as well as air transport and Congress, have already registered such opposition to interference in the regulatory agencies by a political appointee that the Transportation Undersecretary's office hasn't and isn't likely to fulfill its original purpose.

- **Well-financed Transportation Association of America**, organized several years ago to mobilize nationwide public support for a single regulatory agency, has apparently decided that now isn't the time to flare up an airline-railroad fight. Word passed on to airline officials is that TAA's policy board, won't even consider the single regulatory proposal.

Service Schools: Extermination?

Private flight and aircraft mechanic schools—aside from the few with USAF contracts to train flying cadets at USAF bases—are fighting for survival.

The number of civilian flight schools already is down to 1,716 from 3,287 in mid-1948; the 45 private A and E schools, with 87% of enrollees on the GI program which was cut off last July, are faced with wholesale shutdowns.

An ROTC program, permitting hundreds of ROTC colleges to contract for flight training is the only bright hope for the civilian flight schools; but this won't be inaugurated until September, 1952.

—Katherine Johnsen

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Army Sets New Plans to Operate Aircraft

- **So far, ground forces and AF agree only on plane operations; procurement roles still uncertain.**
- **But with weight limitation on its buying removed, Army now can firm up plans for what it needs.**
- **And high on its list of desirable types is a small, fast, plane to kill off enemy observation craft.**

New expansion plans for much heavier emphasis on Army aviation in the combat zone are being firmed up at the Pentagon and in the field. Meanwhile regulations formalizing the recent Army-Air Force agreement canceling weight limitations on Army aircraft are making the rounds through staff agencies for the necessary time-consuming coordination.

Both services are reluctant to interpret, even unofficially, what the Finletter-Pace memo agreement means to Army until it has been thoroughly sifted down by the working levels of both services and marked in "officialese".

- **Restrictions—**Air Force states, nevertheless—and Army concurs—that Army will remain dependent upon USAF for major airlift and tactical support. Army will still be restrained from procurement of aircraft in such large numbers that they infringe upon USAF roles and missions.

The restriction which previously barred Army from procurement of fixed-wing aircraft weighing more than 2,500 lb. and rotary-wing aircraft weighing more than 4,000 lb. were canceled by USAF Secretary Finletter and Army Secretary Pace the last week in October (AVIATION WEEK, Nov. 5, p. 17).

At the present time, Army is operating a considerable quantity of fixed-wing aircraft and a large number of rotary-wing aircraft. The ratio of fixed-wings to the helicopters in Army units is probably on a scale of 3-1, Army states.

By type, the following aircraft are now in operation by Army:

Fixed-Wing Aircraft

- **Cessna L-19.** A two-place liaison aircraft in combat use as "air observation posts" to adjust artillery fire. It is also in use by operations and intelligence agencies as well as in infantry regiments for reconnaissance and observation.

headquarters. This aircraft is used only in Korea and Europe and will be phased out as soon as normal attrition takes its toll.

- **Cessna LC-126.** Also a general purpose light transport similar in utility to the L-17, it has replaced the L-17 in continental U.S. Considered by Army as an interim aircraft, it will not be purchased in quantity. It is also scheduled for phase-out as soon as newer types can replace it.

- **De Havilland "Beaver" L-20.** Popular with both Army and Air Force for light utility, the plane can transport litter patients and considerably more cargo than the L-17 or the LC-126. This aircraft is replacing the L-17 in Korea at the present time and has been ordered by the Army in large numbers for future delivery.

- **Beech Twin Bonanza L-23.** Army's first twin-engine transport is somewhat larger than the L-20. This plane is scheduled for administrative transport of high-ranking Army officers.

So far, only five have been purchased for test purposes but Army will order a considerable number for 1952 and 1953 delivery and subsequent assignment to army and corps headquarters only. The plane will not be purchased in sufficient quantity for assignment to units as low as division level.

Helicopters

- **Bell H-13D.** The only helicopter presently on Army combat duty in Korea, it is presently assigned to many Army units down to and including infantry regiment levels for use in evacuation, wire-laying, reconnaissance, message carrying and supply drops.

The H-13D is also used by Army's helicopter detachments now assigned to mobile surgical hospitals for evacuation of the seriously wounded.

- **Hiller H-23.** Is in use generally for the same purpose as the H-13D except that none are in use in Korea. H-23 is being sent to the U. S. Army in Europe and is in use in continental U. S.

Army aviation sources report they are having an exceedingly difficult time in obtaining Piasecki H-21 and Sikorsky H-19 cargo helicopters, although they claim orders were placed in some cases far in advance of either Air Force or Navy for Marines or Coast Guard.

- **Hit Delays—**There is considerable speculation among Army procurement

Ocean Fare Pact

A trans-Atlantic roundtrip coach fare of \$417 during the off-season from November through March was agreed upon last week by North Atlantic Traffic Conference of the International Air Transport Assn. meeting in Nice, France.

The April-through-October coach fare will be \$270 one-way, \$486 roundtrip. The service is scheduled to begin May 1, 1952. Agreement by the eleven airlines concerned came after eight days of conferences.

Pan American World Airways, chief exponent of the ocean coach service, immediately announced that starting May 1 it would operate four roundtrips weekly with 82-passenger Douglas DC-6B aircraft. PAA originally had argued for a \$225-\$250 one-way (\$405-\$450 roundtrip) coach fare.

planners that because Army is dependent upon Air Force for physical procurement of aircraft that there is a tendency to delay Army procurement behind USAF purchase.

Army aviation experts are emphatic that they are neither seeking to encroach upon USAF's ground support missions with respect to aircraft design or utilization nor are they contemplating such a move. But some Army authorities are nevertheless becoming increasingly concerned with USAF's apparent unconcern for need of "cub-killer" aircraft.

These experts believe that Air Force experience in Korea with difficulties in downing slow-flying enemy air observers should point up the necessity. There are no plans now under way by Air Force to combat this certain menace if all-out war occurs, they say.

What Army Needs

What is needed in this field, Army says (based on Korean experience), is a highly maneuverable, light, armed aircraft possessing a top speed of around 225 mph. for low-altitude work. The plane should be capable of rough-field operation and possess short takeoff and landing characteristics.

► **Helicopter Companies**—At the present time, Army has a few helicopter companies for test purpose. Their size will undoubtedly vary to meet the Army needs and requirement of the users. At present they consist of 23 copters to the company.

Army plans to use helicopters in these "transportation" companies much in the same manner that its Transportation Corps utilizes trucks in company strength. Mission of such companies would be to provide short-haul air transport to expedite tactical and logistical support in forward combat areas.

Large helicopters, Army sources believe, will not be used for evacuation purposes because Korean experience has proved the light utility helicopter as best for front-line operation.

► **Important Step**—Army feels that entrance of the Transportation Corps into air transport is an important step forward for Army aviation and will not in any way transgress upon present troop-carrying missions of the Air Force. The Army's emphasis is placed on the phrase "in the combat zone," and the cargo helicopter use will be more or less restricted to that area.

For example, the Air Force would move troops into its most forward bases—the troops would then be battle-equipped by Army; organized into combat units and moved directly by Army helicopter to assembly areas.

The saving of time, money and physical energy on the part of the fighting soldier, Army feels, is obvious.

Financial Crisis Hits Martin

Shortage of working capital sends company in search of new money from either government or private sources.

By Ben S. Lee

Despite a backlog, mostly military, of over \$400 million, the Glenn L. Martin Co. is suffering from an acute shortage of ready cash. During the next three weeks it will have to decide upon one of three courses of action:

• **Private capital.** The company is seeking new private financing. While the company has run considerably into the red during the last 18 months, it remains exceedingly attractive to investment interests, because of its military backlog and extremely favorable tax position.

• **Government finance.** Martin may seek new government financing to assure its ability to deliver military orders of Navy flying boats, USAF's B-57A Canberra jet bomber, guided missiles such as the Matador, Viking and others, plus considerable electronic manufacture.

• **Receivership.** To offset its losses which have approximated \$18 million in nine months, reorganization and recapitalization through receivership may be necessary.

All three financial programs have strings attached which are being examined carefully by its corporate experts. One of these will be in effect by Dec. 31, Aviation Week has been informed.

During early stages of the present negotiations there have been proposals that other aircraft manufacturers, including Republic Aviation, Grumman and Convair effect a "rescue" by taking over some Martin contracts and move in on a portion of Martin's facilities. Neither Martin nor the military services have favored the plan from personnel morale and business prestige points of view.

► **RFC Financing**—Private capital, both company and government sources hasten to qualify—does not preclude buying into the Martin company by companies presently outside the aircraft industry. This may indicate the possibility that a major automobile manufacturer with both dollars and production capabilities may move into the major aircraft industry.

Even more discouraging was the fact that company books at the beginning of this quarter showed only a \$6,621,000 cash balance against a \$26-million debt. Prime debtor—RFC—was owed \$14,410,000.

Examination by Martin corporate officials indicated that the RFC would be unlikely to extend further credit under Section 4A of RFC lending provisions.

So the company took its problem to its cognizant service agency—the Navy.

Navy agreed to an immediate \$3-million extensions of its guaranteed "V"-loan to Martin which, together with an additional \$3.5 million will carry the company through Dec. 31.

Odd facets in the financial crisis facing Martin are:

• That investment bankers and other private lenders are more than willing to give them a hand out of their predicament.

• The company will continue to do business in the same old stand—industry, government and private capital all agree on that point.

• Officially RFC is not cognizant of Martin's financial straits since the company is current on all phases of repayment of its loan and interest thereon. The company has not made formal application to RFC for new credit.

► **Backlog Inviting**—Major lending agencies such as Mellon National Bank and Trust Co. of Pittsburgh, Chase National Bank of New York, National City Bank of New York and the Baltimore National Bank are presently considering a plan for considerable reinvestment of funds at Martin as are several other private agencies.

All are aware of Martin's large military backlog, which includes sizeable contracts from the Navy, and USAF's recent evidence of confidence in the Martin company through its B-57 Canberra jet bomber and Matador guided missile contracts with the company.

In addition, a favorable factor tax-wise to prospective investors is that the company may carry forward losses which would provide substantial exemptions from federal taxes incurred on future profits.

Main problem facing the company is decision as to what it will do with commercial contracts for the costly 4-0-4 transport.

Airlines involved have been approached with a proposal of an upped cost on deliveries of the 4-0-4 as a temporary expedient. As production of the 4-0-4 and military craft are stepped up during the next calendar year, Martin has proposed that it would and could repay the airlines the cost differential.

So far, it is understood that Trans World and Eastern Air Lines have turned a deaf ear to the proposal, stating they are unable to obtain additional credit to put into their 4-0-4 purchases.

► **Could Help**—Conferences with Navy, Air Force, and Defense Production Ad-

ministration officials have indicated that the services could order additional funds through DPA. These funds would be provided to Martin by RFC on order from DPA. Problem here, however, is that if the services press DPA for RFC funds to Martin, the company might have to cancel its commercial business.

Reason for this situation: if the services did not insist upon cancellation of commercial contracts, they would in effect be subsidizing the company's commercial sales.

An alternative facing the company is investment of further capital by private channels which would enable it to remain solvent long enough to begin profiting from its military backlog of some \$400 million-plus during calendar 1952 and thereafter.

If new capital were drawn into the

company from these sources, Martin might be able to deliver under its contract to commercial buyers and subsequently absorb losses on commercial sales in military profits.

► **Management Problem**—Still further consideration in this connection, of course, is management. Just what effect new capital might have on present Martin management is as yet unknown but most qualified government and industry sources expect that there would be changes in top-echelon Martin management.

If Martin were forced into receivership, it is possible that its commercial contracts would be cancelled. Those commercial creditors could seek redress through the courts but final outcome of their suit might be small in dollars and certainly would not deliver any aircraft.

If Martin were forced to follow this course, it would certainly be assured of quick government money in order to assure delivery of needed military materiel, but it probably would face an immediate deterioration of key personnel.

► **Anybody's Guess**—The latter is what the military fear most. The Martin company, despite its present financial difficulties, possesses a fine engineering, research and electronics team along with supporting staffs.

The outcome at Martin is at present anybody's guess. Best odds are that there will be a reorganization of top management; that there will be a modification on price of the 4-0-4; and that any new money into the Martin company will probably be a joint effort of private capital and military service financing.



British Launch New Delta-Wing Fighter

(McGraw-Hill World News)

London—The world's first twin-jet delta-wing fighter—the Gloster GA5—blasted off its home runway at Moreton Valence Nov. 26 for an initial flight of 35 min.

The new delta, powered by a brace of Armstrong Siddeley Sapphire turbojets, is an all-weather day and night fighter built to the same specifications as the recent de Havilland 110 (AVIATION WEEK Oct. 15, p. 9). The Royal Air Force will compare performances of the two fighters before placing any quantity orders.

► **The Designers**—First flight of the

GA5 was under the hand of Sqdn. Ldr. W. A. Waterton, chief pilot for Gloster. Design of the delta fighter was the responsibility of Richard Walker who worked under the direction of George Carter, designer of the first British jet job, the Gloster E.28/39.

The GA5 is a Hawker-Siddeley group venture. Prime responsibility for the airframe went to Gloster Aircraft Co., Ltd. Engines were Armstrong Siddeley's Sapphires, rated at better than 7,000-lb. thrust each. And A. V. Roe & Co., Ltd. at Manchester contributed the basic research on the aerodynamics and flight performance of

delta-wing craft with their 707 series of flying triangles.

► **Modern Meteor**—Gloster's attitude is that the GA5 is basically a good shape which will take any foreseeable powerplant the future can produce. In this respect, the company considers the GA5 as a modern Meteor, which has been built since the war in a variety of forms and with thrust more than double the powerplants which were originally installed.

As is customary with new planes just off the secret list, performance and specifications are not available. And the single photograph adds little to the basic descriptions of the aircraft.

Air Coach Snag

• **Airline heads opposed to CAB expansion policy.**

• **But nonsked advocates were not at session.**

Civil Aeronautics Board appears to have lost round one in its try to make certificated airlines greatly expand air coach service.

The Board called a closed-door meeting of the airlines presidents, asked them what they thought of a proposed CAB policy statement promising much-expanded air coach service by the regular certificated airlines.

► **Push Expansion**—The airline chiefs seemed to oppose most points they were asked to comment on.

But CAB may come out with its pol-

icy statement anyway, promising the U.S. public the Board will push air coach expansion.

Right now the only definitely scheduled coach expansion by a certificated airline is American Airlines' plan to add two DC-6 coaches in April and another in June.

One official who attended the closed-door meeting between CAB and the certificated airlines says the airline response to the CAB behest was, in effect: "We're doing well as is, let's not rock the boat."

And the president of a top airline asked afterward: "Just what did they ask us definitely to do anyway?" The answer from his associate was: "Hold another meeting soon."

Some of the questions CAB asked its leading airlines were:

• **Should coach fares come down next April, when the present 4½ cent fare schedule expires?** Answer was: No.

• **Should daylight coach be expanded**

by CAB's lifting present daytime restrictions of most coach routes? Answer: Mostly No.

• **Should more coach service be provided by off-hours utilization of first-class airliners?** Answer: Mostly No. But some local service operators asked CAB if they might not try. CAB said it would investigate.

Some 20 airline leaders attended the meeting. About ten took active part in the discussion.

The certificated airlines were invited, but not the nonscheduled airlines operating under CAB exemption as large irregular carriers.

Because of this, Air Coach Transport Assn. President Amos Heacock, after conferring with some of the nonsked association members, fired off a telegram to CAB Chairman Nyrop asking him to cancel his closed meeting or else invite a representative of the public. Said Heacock:

"Excluded from this meeting is the

public and the entire independent airline industry which originated, fostered and developed low-cost air transportation, in spite of unremitting CAB opposition and constant harassment by the Board and the subsidized carriers.

"The holding of this secret meeting is positive proof that either the Board is dictated to by subsidized carriers or that at best it must receive the stamp of approval of these carriers. Regulation of American air transportation by secret conclave . . . is contrary to the statement of ethics of the CAB. . . ."

► **Other Questions**—Among other questions reported by CAB Chairman Nyrop as discussed at the meeting were:

• **Seating density** of air coach planes.

• **Services to passengers** on coach flights.

On this there was agreement. No free meals, but coffee, tea or milk.

Another meeting is expected soon.

CAB is now faced with its promise that regular airlines would eliminate all public convenience and necessity for certification of any new specialized air coach lines. Yet only American Airlines has promised to help do so.

CAB would like to put out a more definite promise of regular air coach service for the non-wealthy U.S. public, but at its first request to the airlines to back it up CAB appears to have hit strong resistance to "experimenting" now.

Some observers say CAB may come out with its coach expansion promise anyway. CAB's economic staff is heavily sold on air coach expansion now, as are all the five members.

► **Their logic is this:**

If you increase seating one-third, and cut fares one-quarter, your yield per flight is the same if your load factor is the same—much higher if the law of supply and demand works.

Board also is sensitive about the fact that the CAB-subsidized airlines generally serve only the well-to-do, while the nonskeds expect to fly about one million middle and low-income persons a billion miles in '51 without mail pay.

One example of how CAB feels on this was the case of United Air Lines this summer: Before CAB released its denial of applications of nonskeds to fly regular transcontinental flights to San Francisco and Los Angeles this fall, CAB felt it had to get regular airline flying San Francisco-New York coach service.

► **Full Loads**—Otherwise denial of public convenience and necessity for such service by another airline would appear paradoxical, as these nonskeds were carrying full loads of civilians and soldiers.

United scheduled one daily DC-4 flight, starting this fall. But United still maintains it won't pay—doesn't promote its service the way DC-6 coach competitor American and Constellation coach competitor TWA do.



NEW ADMA PRESIDENT George W. Jalonick III (center) admires watch presented to retiring President Robert W. Richardson (right) while G. B. Van Dusen looks on.

Civil Air Equipment Needs Cited

ADMA conference urges non-air carriers to show their 'essentiality' in the defense picture.

Relief for scores of smaller manufacturers of aviation equipment caught in the critical materials squeeze may be in sight.

As the ninth annual meeting of the Aviation Distributors and Manufacturers Assn. in New York broke up, new President George W. Jalonick III and several other spokesmen for the organization headed for Washington last week at the invitation of the Civil Aeronautics Administration to work out a program to aid the manufacturers and distributors of parts and equipment for corporation-owned aircraft, agricultural planes and other vital non-air carrier planes.

► **Boast from Members**—The larger manufacturers of equipment who are members of ADMA, such as Bendix Aviation Corp., have entry to government priorities planners through the Aircraft Industries Assn. and industry advisory committee representatives. Until Jalonick's huddle last week with CCA—which acts as claimant agency for non-air carrier plane users—the "essentiality" of most non-air carrier flying had been generally acknowledged by Washington officials, who did nothing however, to guarantee continued manufacture of parts for non-military, non-airline planes.

How slow government has been to realize the essential character of most non-air carrier plane use was pointed up by Joseph T. Genting, manager of AIA's Personal Aircraft Council, who reminded the ADMA members that it took nearly a year to obtain priorities for materials to manufacture civil light-planes.

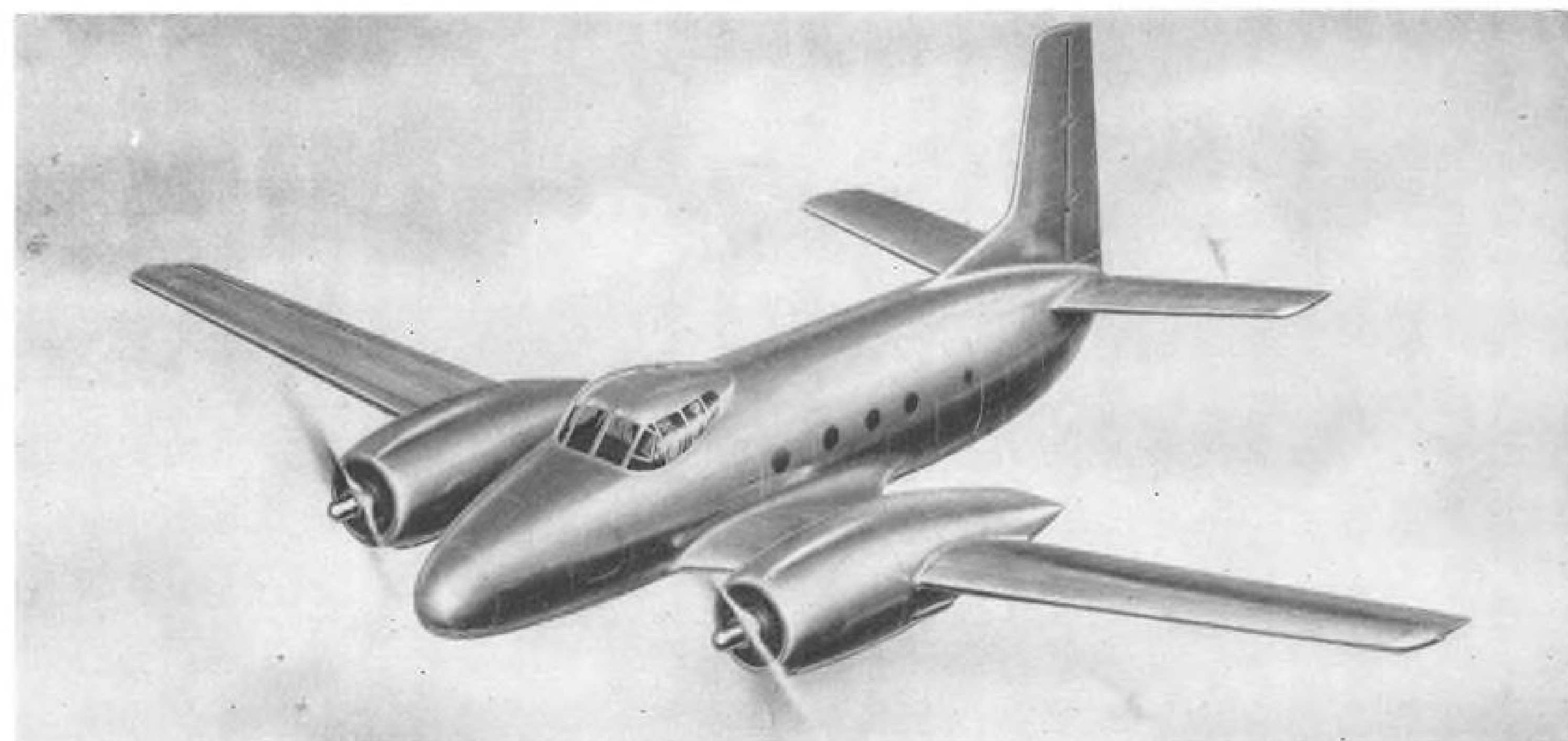
► **Press Their Case**—But priorities for materials for complete aircraft do not necessarily help the small manufacturer and his distributor. ADMA members attending the meetings at New York's Waldorf-Astoria Hotel agreed they would have to become far more active in pressing their case to the government if relief from future materials shortages was to be obtained.

Up to now, because of the small quantities generally involved, most manufacturers have been able to find substitutes for critical materials. One oxygen manufacturer, for example, has replaced brass for knobs with enameled steel.

The growing need for civil aircraft equipment manufacturers and their distributors to establish the essentiality of their role in the defense picture was an ever-recurring topic at the ADMA meeting.

► **Tie to Defense**—Private flying for pleasure definitely ranked low in discussion value; the more than 100 representatives of parts makers and their suppliers saw their big civil non-carrier aircraft market as comprising the corporation aircraft owner and the agricultural flyer. They agreed that if the fixed-base operator was to survive this period he must become allied with these and other tied-to-defense schemes, such as the Air Force's contract flying school program.

Distributors were encouraged by the continuing realism of manufacturers' discount policies, particularly those that encourage large purchasers to deal with the distributor and not with the manu-



PERFORMANCE OF BEECH T-36 advanced trainer-transport should show margin over World War II Twin Beech AT-7/UC-45.

Air Force Reveals Beech T-36 Details

First details disclosed on the new Beech T-36 advanced trainer-transport, which will be built both by Beech and Canadair, Ltd., show that USAF has moved considerably forward in requirements and performance from the little Twin Beech advanced trainer and utility cargo plane of World War II, most commonly designated AT-7 and UC-45.

The new T-36 will have a cruising speed of over 300 mph. with some unofficial reports indicating a top speed equal to that of World War II piston engine fighters, presumably close to 400 mph. This compares with a 220-mph. speed quoted for the UC-45.

Here is how other performance data and specifications estimated for the new T-36 compare with those of the World War II UC-45.

• **Powerplants.** Two Pratt & Whitney R-2800s of 2300-hp. takeoff rating, compared to two Pratt & Whitney Wasp Jr. of 450 hp. each.

• **Takeoff gross weight.** Over 25,000 lb. compared to 7,850 lb.

• **Service ceiling.** 34,000 ft. compared to 27,000 ft.

• **Wingspan.** 70 ft. compared to 47 ft. 8 inches.

• **Fuselage length.** 52 ft. 2 in. compared to 34 ft. 3 in.

The new T-36 is designed for a combat radius of over 650 mi., while in some conditions the older plane had a range of 900 mi. or more.

The T-36 is designed for a crew of four, as a navigation or pilot trainer with three students and an instructor. As a transport, it will have a crew of two, and will have seats for 12 passengers.

A U. S. aircraft inspection board of eight members, headed by Maj. Gen. K. P. McNaughton pointed out that the full scale prototype mockup was ready four months after assignment of production of the airplane to Beech.

facturer. Aircraft fleet operators are being less successful in bypassing the supplier to get his discount on their purchasing.

► **Better Trainer**—Indications of plane shortages at this early date were also discussed. One distributor of twin-engine executive planes described how he had sold three planes sight unseen and wasn't even getting his first plane until January.

A USAF contract flying school operator disclosed that although his school was initially scheduled to get 164 T-6 Texans, Air Force cut the number back to 126.

It was felt too, that the T-6 wasn't the most suitable plane for basic training—a lighter, simpler type would be far more desirable, but apparently wasn't available.

Distributors were disturbed by Beverly (Bevo) E. Howard's disclosure that since the Air Force put the contract training schools on a cost-plus-fixed-fee basis, he has had to obtain his material through requisition to the USAF, where previously he had purchased through normal channels.

The new policy obviously cuts the local vendor out of the procurement picture on this project. Distributors felt that they could provide more efficient, quicker service at a lower cost to the taxpayer, but Howard replied that Air Force believes its mass purchasing power offsets disadvantages going with red tape and resultant delays.

► **Training**—Howard's contract calls for him to supply 475 cadets, including trainees from eight Allied countries, with pre-flight, academic and basic training. Link instruction, and housing and feeding.

To handle the job, his school at Spence Field, Moultrie, Ga., employs 800, including 140 flight and 35 Link and academic instructors. Air Force supplies the planes, Links and spares.

At present, there are nine contractors supplying basic training to Air Force cadets, and AF maintains a similar facility to provide a yardstick for measuring comparative efficiency and costs.

The contractors feel that they do as good a job as the Air Force in training at a far lower cost and think they could take over jet-pilot training as well.

► **New Officers**—In addition to the election of Jalonick of Southwest Airmotive Corp., Dallas, as president, succeeding Robert W. Richardson of the Good-year Tire & Rubber Co., Lawrence F. Zygmunt, of General Aircraft Supply Corp., Detroit, was named to fill Jalonick's former vice presidential post, and L. W. Trees of the Scintilla Magneto division of Bendix Aviation Corp., Sidney, N. Y., was re-elected a vice president.

Four new directors were chosen: Carl A. Carlsen, Air Associates, Inc.,

Teterboro, N. J.; Frank L. Hine, Airwork Corp., Millville, N. J.; D. H. Hollowell, Continental Motors Corp., Muskegon, Mich.; and D. S. Tilden, Eclipse-Pioneer Division of Bendix Aviation Corp., Teterboro, N. J.

Noise Killer

• **Aero Sonic test slated in N. Y. area next month.**

• **Muffler to go on C-46's P&W R-2800 engines.**

Flight demonstration of a new engine muffler designed to deaden noise of large transport aircraft is slated to be held in the New York area before aviation and city officials some time next month.

But chances of putting the show in the spectacular class by flying low over the heart of New York City faded last week due to possible risks involved.

► **C-46 Test Bed**—The muffler is to be installed on the Pratt & Whitney R-2800 engines powering a C-46 operated by Meteor Air Transport, a contract carrier operating from Teterboro Air Terminal. Meteor is testing the muffler in cooperation with the developer, Aero Sonic Corp., 92 Congress St., Brooklyn, N. Y.

Another version of the muffler already has been tested successfully for mechanical operation on a DC-3 transport owned by Meteor (AVIATION WEEK Sept. 17, p. 38).

In the demonstration two planes will be used, one with mufflers installed, and the other without. The demonstration flights probably will be held at Teterboro or some other locality in the New York area where they can be conducted safely.

Aero Sonic has suggested the trials take place over the Port of New York Authority Bldg. in downtown Manhattan. But Civil Aeronautics Administration and Port Authority officials point out a waiver in city and CAA regulations would be required to do this. They express doubt one would be granted when the demonstration can be conducted elsewhere with less danger.

► **So Quiet**—An engineer at Meteor told AVIATION WEEK that with mufflers installed on the carrier's DC-3, he has to open the outside door of his office to hear noise, while he could hear it plainly with the door shut before mufflers were installed.

Modifications to reduce length of the DC-3 muffler, which previously extended considerably beyond the exhaust pipe, have been completed and tests are progressing satisfactorily, says Meteor.

If Aero Sonic manages to turn out a production version of the prototype that passes all CAA requirements and cuts noise efficiently, the firm may be able to adapt the device to many of the major airline transports now flying. Some planes using P&W R-2800 engines are the Douglas DC-6, Convair 240 and 340 and the Martin 2-0-2 and 4-0-4. Designer of the muffler is Eddie D. LaTulippe, Aero Sonic's chief engineer. The company president is T. L. Carras.

Officials of the National Advisory Committee of Aeronautics, Aircraft Industries Assn., Bureau of Standards, Aircraft Owners and Pilots Assn., Civil Aeronautics Administration, the Port of New York Authority, airline executives and other interested groups are expected to be in attendance at the demonstration.

Contract Hearings To Start in Capital

Public hearings on "favoritism, kickbacks, and possible fraud" in the letting of contracts at Wright-Patterson Air Force Base will be held in Washington, D. C. by the Senate Preparedness Subcommittee on Dec. 19, 20, and 21, according to a "reasonably firm" decision of the group, headed by Sen. Lyndon Johnson.

The subcommittee had previously considered holding the hearings at Dayton.

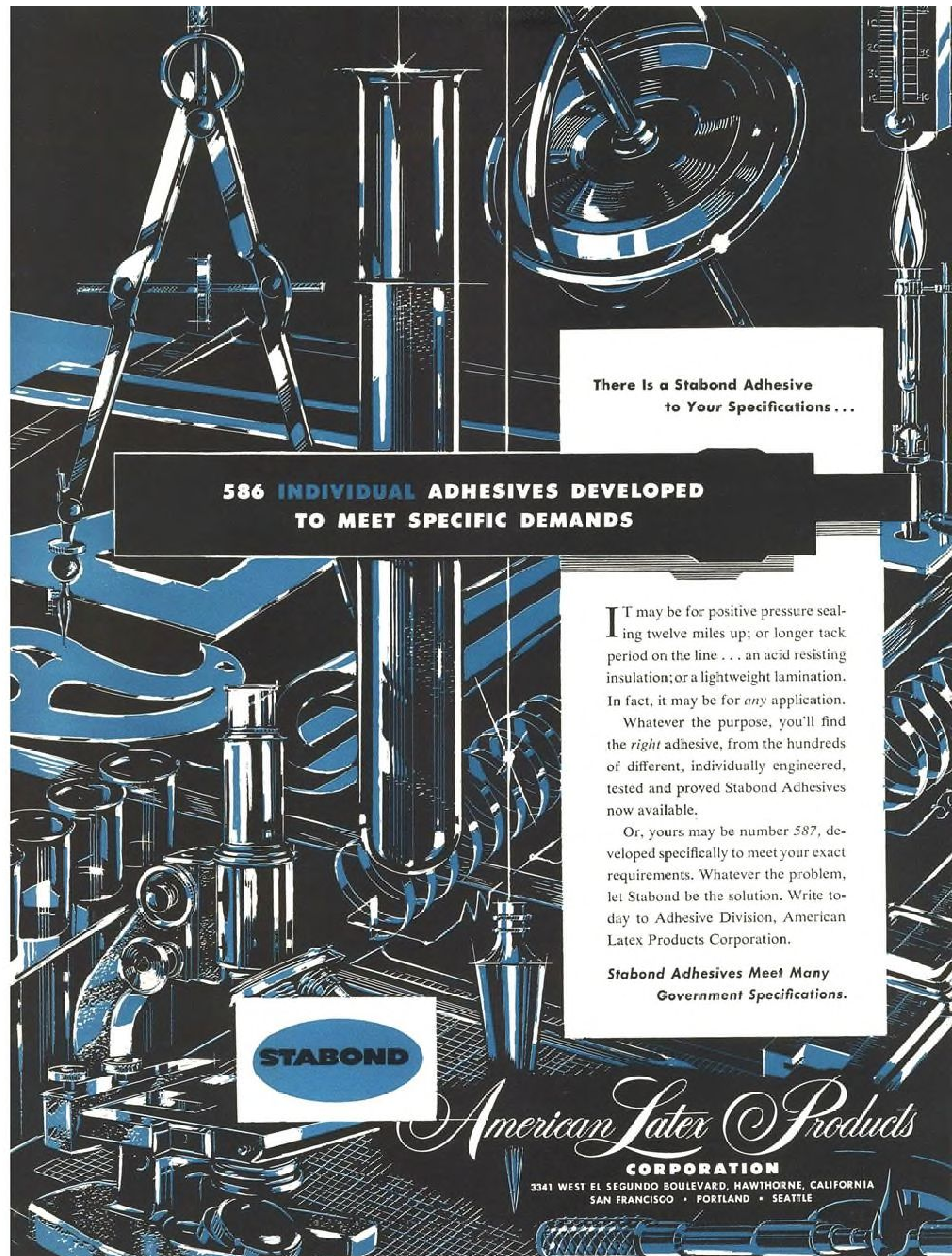
Johnson will return from Texas and several other members of the subcommittee are also expected to come to the capital from their home states for the hearings.

It isn't expected that any top Air Force names will figure in the three days' scheduled hearings. But a spokesman for the committee said: "These hearings might be considered basic. What they disclose will determine where we go. Most of all, we want to determine whether the Air Force has taken proper action to eliminate creditable procurement practices."

30 Areas List Plant Dispersal Programs

More than 30 U. S. local industrial areas, including many important aircraft centers have started their own plant dispersal programs in response to National Security Resources Board appeals.

The broad outlines of planning for national industrial dispersal still remain essentially the same as in the original NSRB program announcement (AVIATION WEEK Sept. 3 p. 14). The plan still calls for dispersal of new industry and expanding industry—not for moving established industry.



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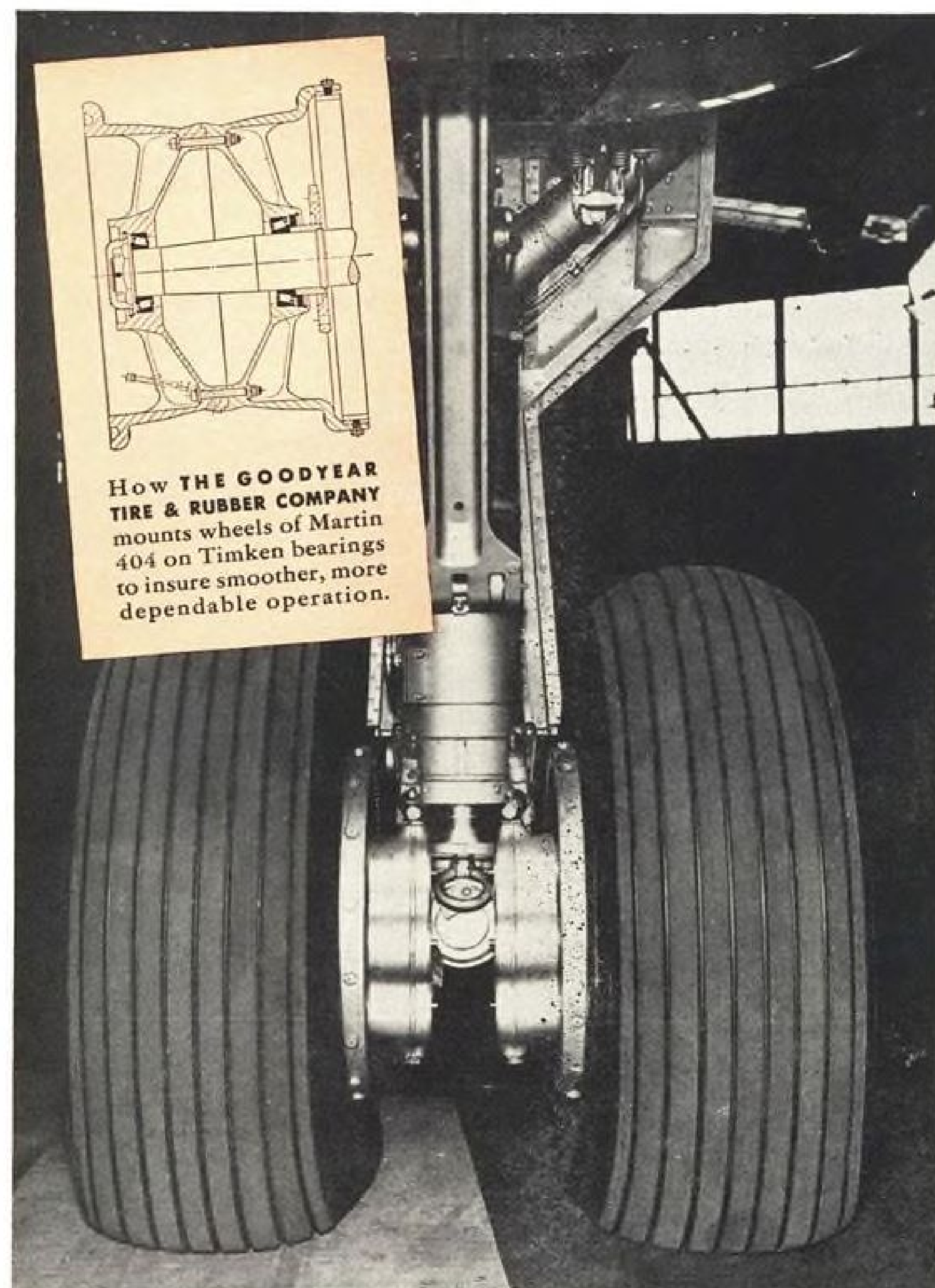
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FINANCIAL

Comparative Airline Results (Third Quarter 1950 & 1951)

CARRIER	GROSS REVENUES		Per- cent In- crease	NET OPERATING INCOME		Per- cent In- crease
	Quarter Ended Sept. 30: 1951	1950		Quarter Ended Sept. 30: 1951	1950	
	(\$000 omitted)			(\$000 omitted)		
American	\$45,216	\$35,559	27.2	\$8,998	\$8,194(A)	9.8
Braniff	6,457	5,585	15.6	864	744	16.1
Capital	10,774	8,073	33.4	1,488	918	62.0
C&S	4,560	3,253	40.2	846	405	109.0
Colonial	1,978	1,798	10.2	186(A)	154	20.8
Delta	6,032	4,544	32.6	1,112	352	216.0
Eastern	22,964	17,577	30.6	3,330	302	1,002.6
Northwest	14,607	14,194	2.8	2,970	2,775	7.0
TWA	40,627	35,014	16.0	8,095	6,876	17.6
United	36,922	31,239	18.1	7,158	7,591	-5.7
Western	3,973	4,171	-4.9	1,091	889	22.6

Notes—(A): As adjusted

—: Decrease.

SOURCE: CAB reports and company statements.

Trunks Show Continued Strength

While airline nine-month gross is up only 30% over 1950, net incomes soar 130% during the period.

Airline earning power continues to manifest strong growth, but is beginning to assume mixed tendencies.

► **Leverage Effect**—The leverage power in airline operations is self-evident.

While gross income for the first nine months of 1951 is up only 30% over the same 1950 period, net operating income rose by 130%.

Based on final nine-month reports, even after heavy tax accruals largely taken in the third quarter, many airlines reported increases in net income ranging from 50% to more than 100% over the nine months ended Sept. 30, 1950.

Heavy tax accruals and other charges appearing in airline third-quarter reports have had a tendency slightly to distort the true character of earnings for that period. A number of carriers, in publicly reporting results, have merely presented statements for the cumulative nine-month period ended Sept. 30, 1951. This has made immediate comparison of the current third quarter with the like 1950 period impossible.

As a consequence, the excellent earnings of the first six months of this year, in a number of instances, combined with the operations of the third quarter, have tended to create the impression that the average gains indicated were also prevalent in recent months. Such is not the case as an

analysis of the figures quickly indicates.

To afford a far more representative picture of real earning power in recent months, operations for the third quarter have been "isolated" in respect to gross revenues and net operating income before taxes. These results, with comparisons for the 1950 September quarter, are presented in the accompanying table.

► **Qualifications**—A number of important qualifications temper these findings. The seasonal characteristic plays an important role in most instances. Certain operating charges recorded in one quarter may properly belong, in part or whole, to other periods. While taxes are excluded in measuring profitability, actually they are of prime concern to management and investment sources in evaluating final results.

However, to indicate earning power entirely within the control of management, net operating income before taxes is used here as a convenient guidepost.

• **American**—Leading the industry from the standpoint of volume in gross and net operating income is American Airlines. This carrier, however, has a number of major adjustments in its accounts which have a major impact on the results shown in the comparative nine-month report released publicly.

The company revealed total gross revenues of \$120.2 million for the nine

months ended Sept. 30, 1951, up almost 41% over the same period a year ago. The third-quarter increase, however, was 27.2%. In its comparative public statement, the company indicated net operating income, before taxes, of \$25.4 million for the first nine months of 1951, a gain of 97.5% over the revised 1950 figure of \$12.8 million. On an adjusted basis, however, the gain in net operating income for the third quarter of the year was only 9.8%.

Among the adjustments made by American was restatement of 1950 results to include the loss on the liquidation of American Overseas Airlines (\$922,000) among the charges for that period. Previously, this loss was charged to surplus.

In keeping with more conservative accounting practices among corporate managers in recent times, there has been a tendency to charge current operations rather than surplus with non-recurring items. However, by now including this extraordinary charge among last year's operating expenses, a true picture of the company's earning power at that time is not presented. The accompanying table excludes the AOA loss in the 1950 period.

The CAB decision on mail rates also necessitated company adjustment of 1950 accounts. Provision for income taxes for the nine months ended Sept. 30, 1950, has now been increased from \$6,140,000 to \$6,790,000.

• **United**, in its publicly released report shows the total results of operations for the nine-month and third-quarter periods separately. The only carrier to show a decrease in net operating income for the current third quarter, United is believed to have been hard hit by a series of crashes which may have necessitated extraordinary charges.

• **Western**—While Western's gross revenues declined during the third quarter due to a 15-day strike, its net operating income was up. This increase resulted primarily from the profit realized from the sale of fixed assets.

• **Eastern**—The best showing in the third quarter belongs to Eastern. While its gross revenues for this period were up only 30.6%, its net operating income increased from \$302,000 over ten-fold to \$3,330,000. The relatively low 1950 base, of course, makes for an exaggerated percentage gain. The fact remains, however, that the third quarter is traditionally Eastern's low point. This year the company experienced sustained profitable operations in a normally off-season period.

This demonstrates the effective workings of leverage on airline earnings once the break-even point is passed.

—Selig Altschul

AERONAUTICAL ENGINEERING

Britain's Turboprop Flying Boat Unveiled

● First of three Princesses still lacking engines.

● And original role changed from civil to military.

(McGraw-Hill World News)

Cowes, Isle of Wight, England—The Princess had a coming-out party here recently, marking her debut into the outside world, away from the shelter of the home where she was born and raised to adolescence. She's a big girl now—too big for her construction hangar.

So Saunders-Roe Ltd. moved her out of the hangar and onto the apron at the waterfront for her final finishing. There she will sit until next May or so, when she is scheduled for first flight.

The Princess is the first of three being built by Saunders-Roe for the RAF's Transport Command.

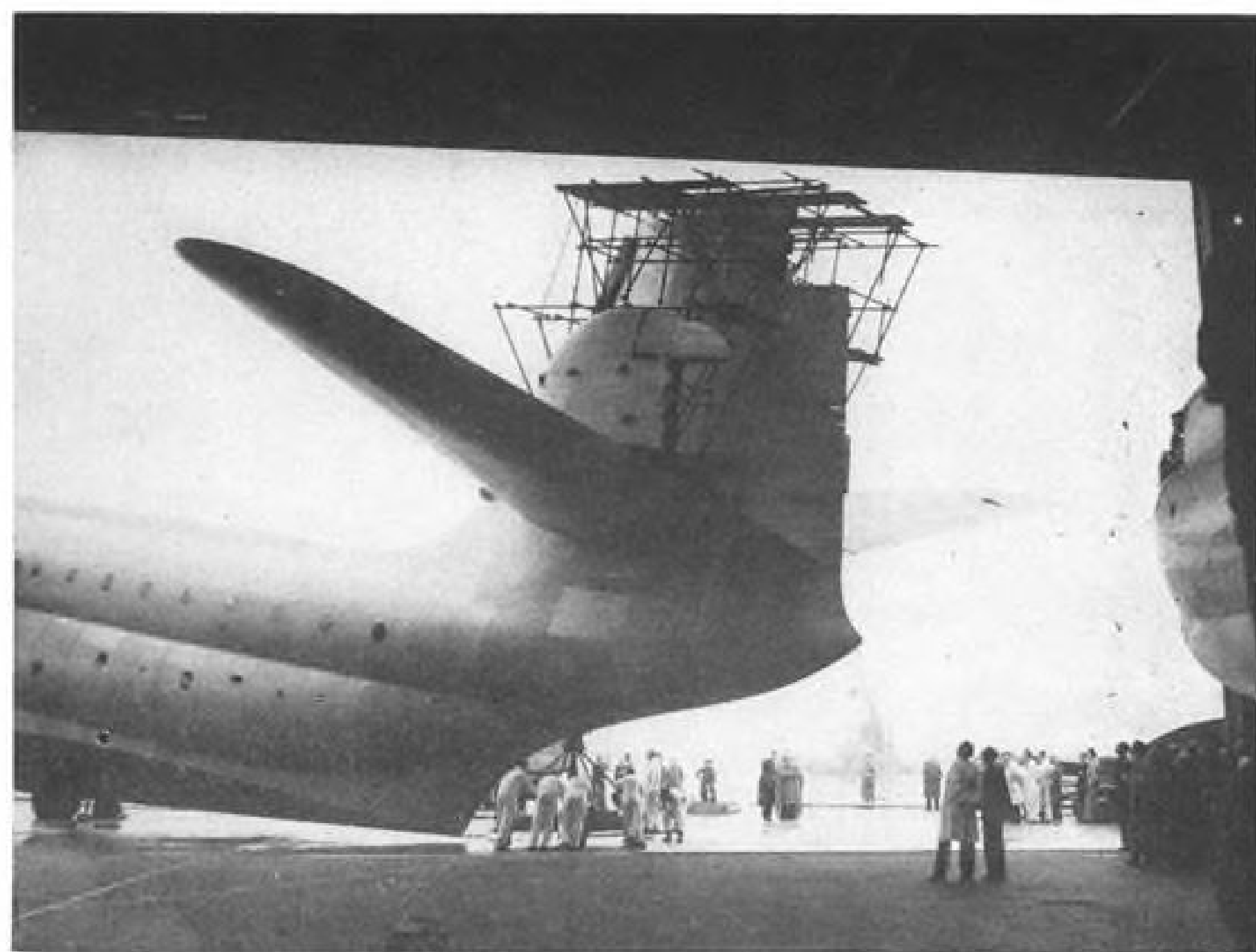
She's a ten-engine turboprop flying boat of about 150 tons gross weight. And she's been the subject of many a heated argument in British parliamentary and aeronautical circles. (For one argument in favor of her, see "Princess—Milestone or Millstone?" AVIATION WEEK May 22, 1950, p. 19.)

► No Newcomer—The Princess is now pushing six years old. The British Ministry of Supply ordered these craft for British Overseas Airways Corp. in 1946. They were intended for non-stop service between London and New York with 105 passengers.

Later it was decided not to try for BOAC's North Atlantic run, but to use the big boats on British South American Airways routes across the South Atlantic. Then BSAA was absorbed by BOAC, and the Princesses were temporarily out of a job.

Saunders-Roe continued work on the craft, and the bill, which had been originally estimated at around \$8 million, increased with time. (It now is somewhere around \$20 million, and work is by no means completed.)

In the meantime, rearmament had set in, and after a brief period of rumor and counter-rumor, it was officially announced that the three Princesses remaining on order were to be completed and turned over to Transport Command. The luxury interiors were to be forgotten and 200 troops and their



TAIL DOWN, huge 150-ton Princess leaves her hangar on Isle of Wight, and . . .



NOSE UP, she emerges majestically onto flight apron with aid of beaching gear.

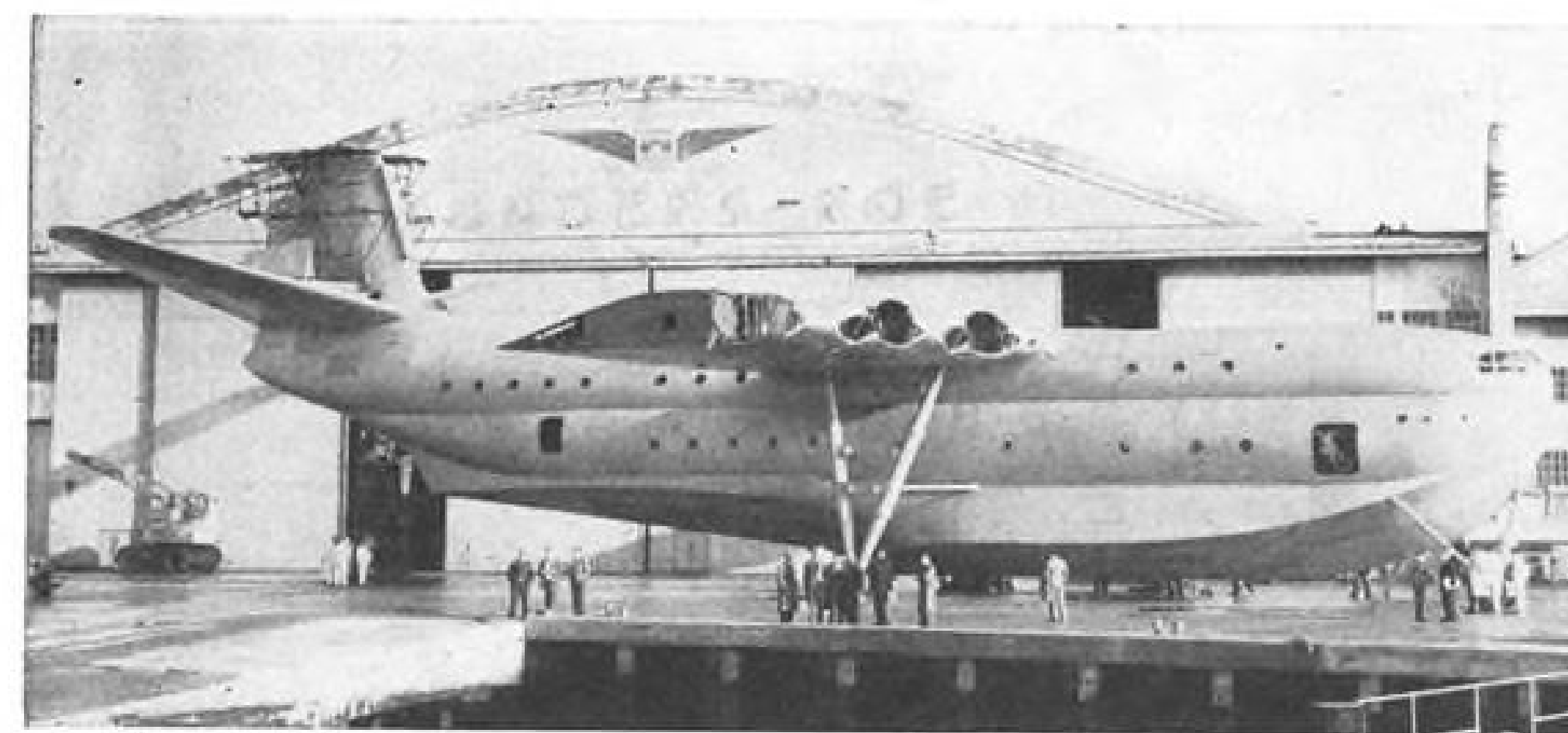
equipment were to be hauled around in less-luxurious surroundings.

The current expectation is that the Princesses will be able to carry their complements of troops a distance of 3,500 miles, including allowances for takeoff, climb, diversion and stacking. A typical trip might be to Australia in somewhat under 50 hr. Cruising speed of the big boats is about 380 mph.

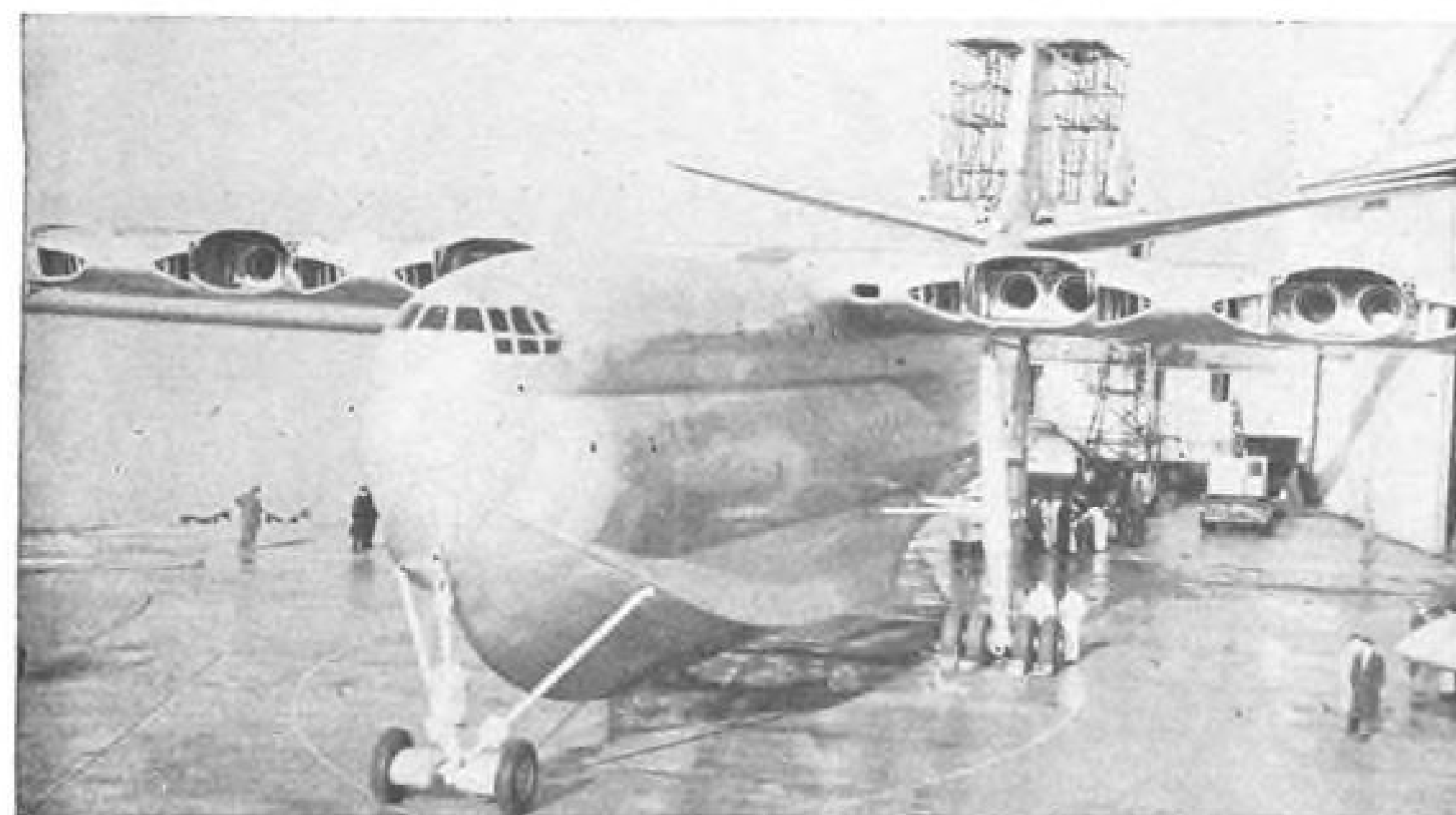
► Exodus—It wasn't easy to get the Princess out of the hangar and onto

the apron. In the first place, she was too tall, even with part of the vertical tail still unattached. In the second place, she was facing in the wrong direction.

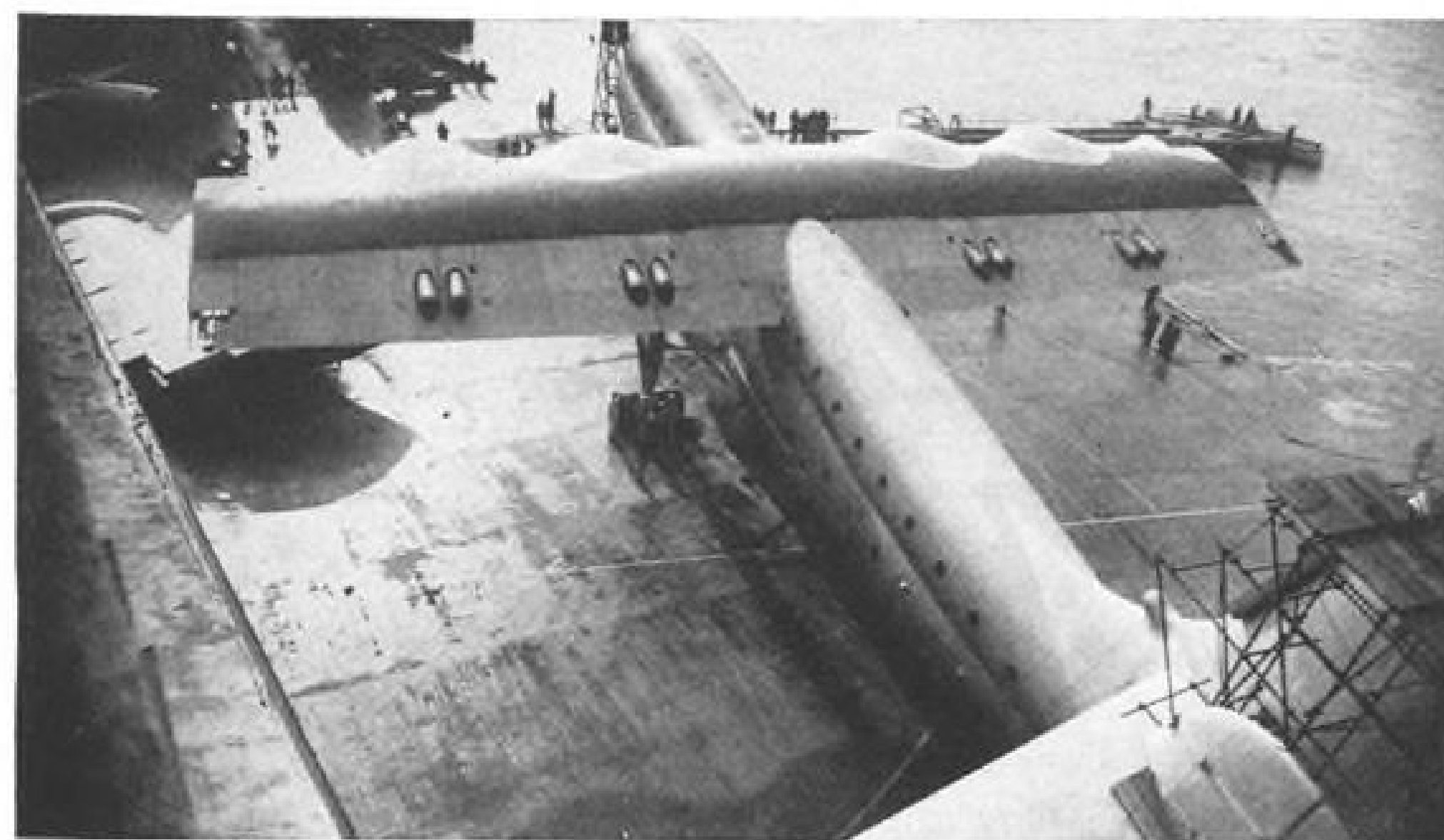
So Saunders-Roe technicians pumped 3,000 gal. of water into 15 tanks located on the main deck for ballasting during flight trials. These tanks were far enough aft to produce a tail-down moment around the main wheels of the beaching gear.



SIDE VIEW shows two-deck arrangement and overall size of the Princess, while . . .



FRONT VIEW reveals inboard layout for coupled-pair Proteus turboprop engines, and . . .



TOP VIEW looks down on wing arrangement. Wing-ends, engines will be installed later.

The nose went up about 9 deg. above level, and the huge craft was winched out of the hangar.

Then water was pumped into the bow tanks until the plane regained an even keel.

After the Princess was outside the hangar, she was turned around so that when fitting is complete, she can be launched in the manner of a boat, backwards down a slipway.

► Next Steps—The outer wing panels, tip floats and the remainder of the fin already have been completed. These will be attached next.

With those tasks out of the way, Saunders-Roe will install the ten Bristol Proteus turboprop powerplants, delayed deliveries of which have been holding up the project. Only one coupled unit and two single ones are currently on hand; the Princess needs three more

coupled units, plus spares for each aircraft.

Bristol Aeroplane Co. Ltd. has accumulated over 8,000 test hours on the Proteus. But in spite of this formidable amount of test time, delivery delays continue to push the Princess further behind schedule.

Removal of the first Princess from the hangar means that the second can take its place in the center of the assembly area. Saunders-Roe has scheduled the delivery of the three craft at six-month intervals.

► Specifications—The Princess has a wingspan of 219 ft. 6 in. with floats retracted into their place at the wingtip. Overall length is 148 ft.; total height to tip of fin is 55 ft. 9 in.

The pressurized, double-bubble hull of the giant boat is the largest metal structure ever built for an aircraft. Some interesting statistics show that it contains 2½ mi. of longerons and stringers, 2½ acres of light alloy plate, 3 million rivets and 40 mi. of electric cable.

Wing area of the craft is about 5,000 sq. ft. Gross weight is currently pegged at 315,000 lb., which gives a wing loading of about 63 psf.

Ten engines are arranged in four coupled pairs and two single outboard units. Propellers are de Havilland make of 16 ft. 6 in. diameter. Fuel load is 117,450 lb. of kerosene carried in four integral tanks in the wing.

All control surfaces are operated by an electric-hydraulic system.

Aero Grads Low On Salary Scale

Starting salaries for at least one group of aeronautical engineering graduates of the 1951 class are the lowest of any engineering group.

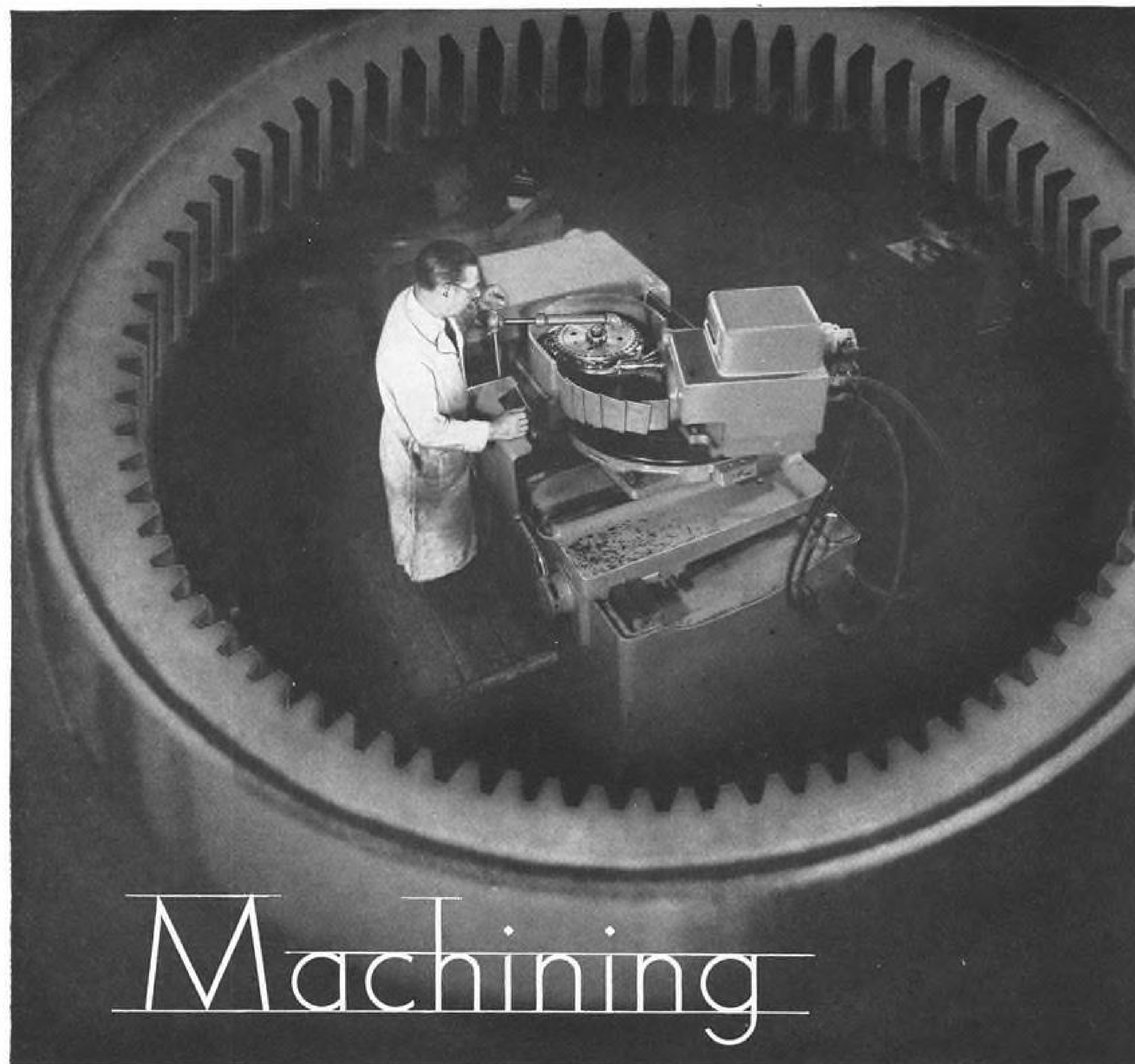
Increase in salary from the 1950 level was next-to-lowest for the aeros, and only about one-fifth that of the highest increase.

These facts are from a survey conducted by New York University's College of Engineering and reported by John A. Hill, director of student personnel and admissions at the college.

Last September the College mailed questionnaires to the 329 graduates of its day divisions asking for information about the type of job, the salary, how the job was obtained, and whether or not it was satisfactory. Replies were received from 66% of the group.

Average starting salary for the class is \$301 per month compared to \$260 per month for 1950 graduates. The current trend is that starting salaries continue to rise after a slight increase in 1950 which followed almost constant levels in 1948 and 1949.

Highest starting rate was reported by the civil engineering grads. Their



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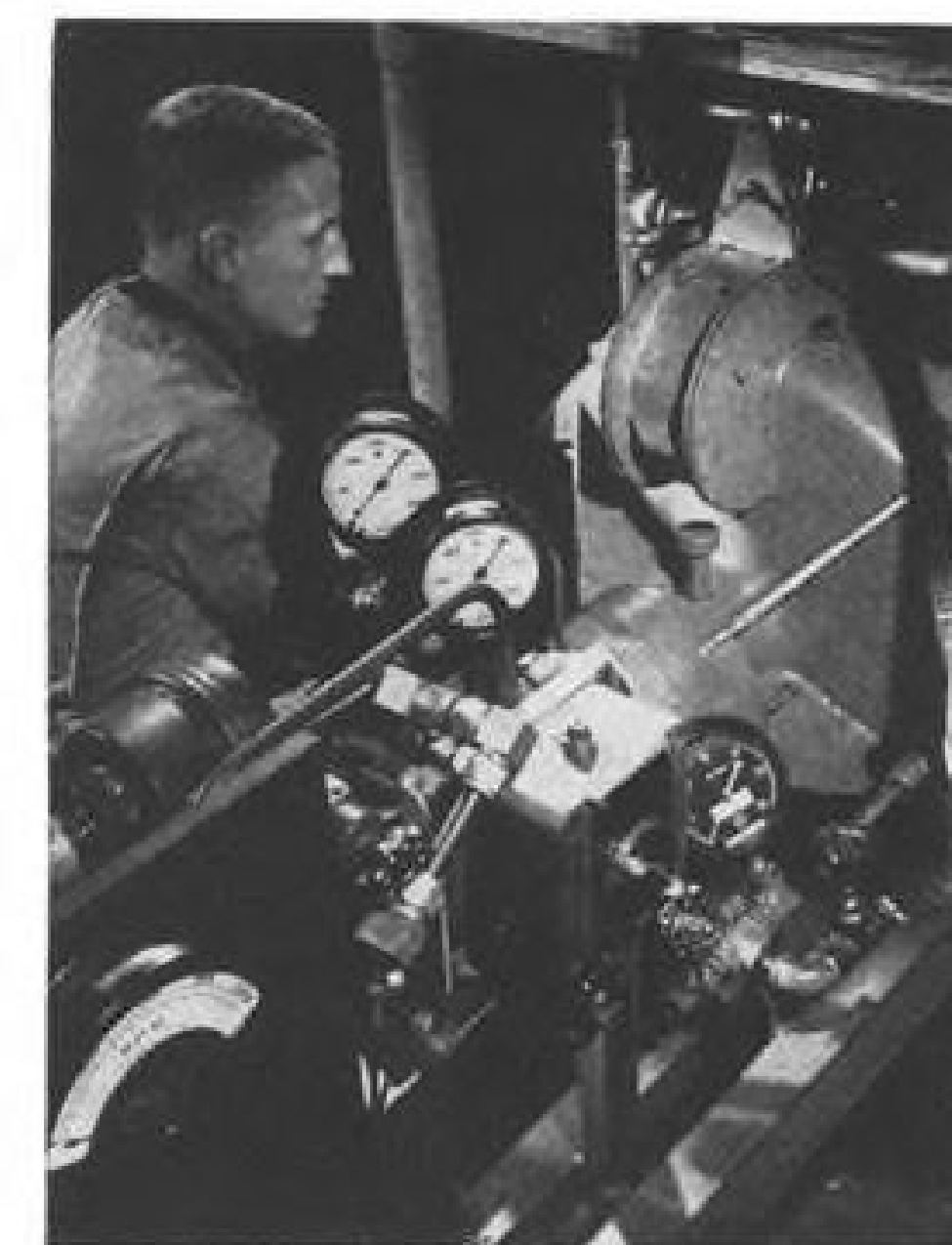
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level was \$313 per month, a gain of 18.5% over the 1950 salary. Next in line were industrial engineers, with \$309 per month and top increase of 27.6% from 1950. Following were mechanical (\$308), chemical (\$306), electrical (\$288) and at the bottom, aeronautical with \$287 per month.

The majority (58%) of the class was employed within the New York metropolitan area. Private industry acquired 72% of the graduates, with only 16% going to government. The remainder either went into active duty with the armed services (9%) or did graduate work (3%).

(The spread between civil and aeronautical engineering salaries is about 9% or some \$300 per year. In the metropolitan area, such an amount pays three or four months' rent for an average engineer's family.)



New Camera Shoots 100,000 Frames/Sec.

More precise resolution of highspeed phenomena is indicated with a new ultra-fast camera developed as a research tool.

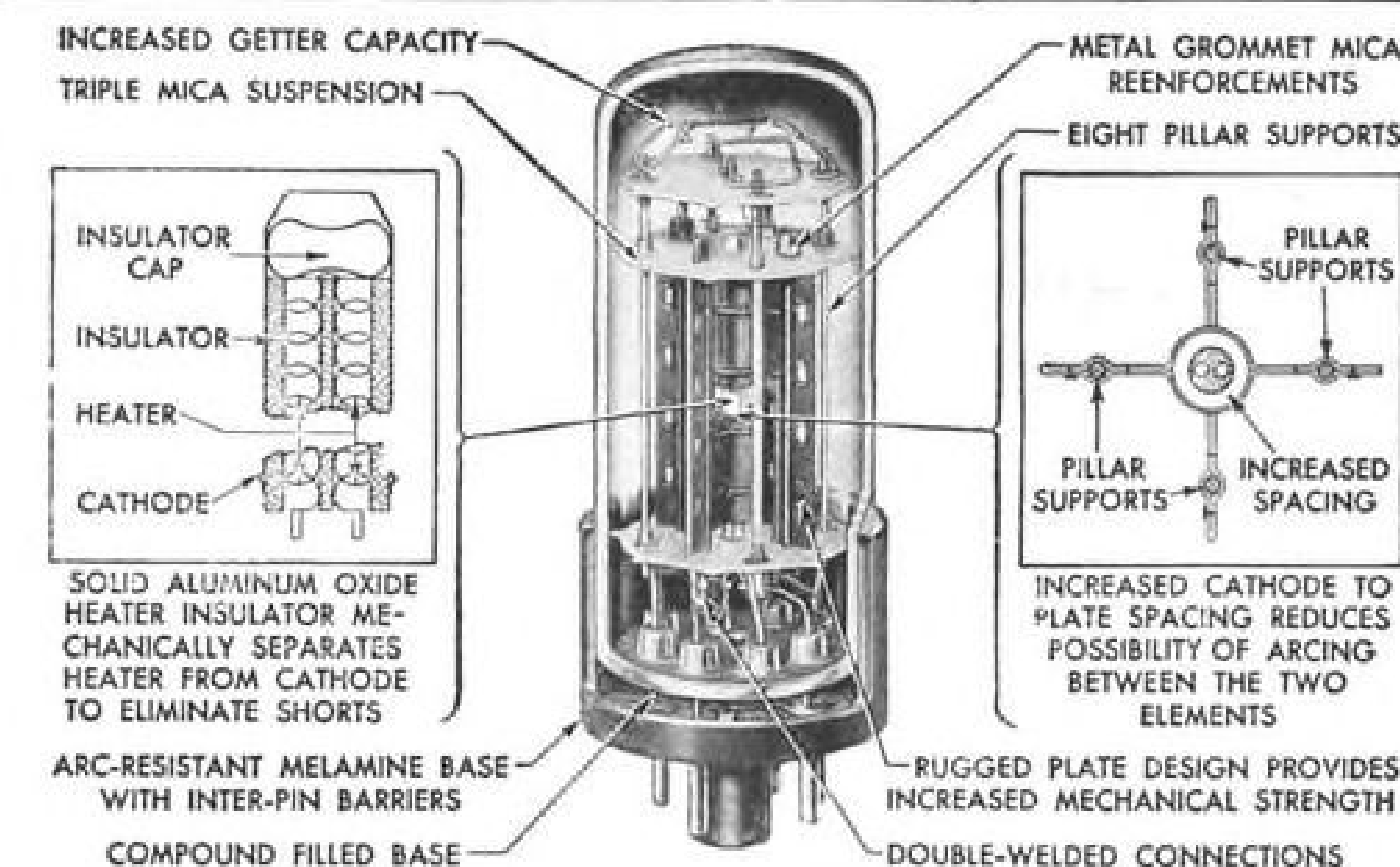
Introduced by Battelle Memorial Institute, the camera was designed by Battelle technologists C. D. Miller and Arthur Scharf, and is reported to be a modification of a scheme developed by Miller when he was with the National Advisory Committee for Aeronautics.

It will take pictures at 100,000 frames/sec. and resolves 30 to 40 lines per millimeter on 8mm. film. Effective lens openings can be made as large as f/2. A series of 500 frames can be projected as a motion picture immediately after development without reprinting and re-registering of frames.

All pictures are taken through the same lens, avoiding distortion of objects from frame to frame as when several lenses are used.

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below. All of these tubes are exhausted on a special automatic exhausting machine capable of extra high evacuation, and are aged under full operating and vibration conditions for a period of 50 hours. In addition to the tubes described above, Eclipse-Pioneer also manufactures special purpose tubes in the following categories: gas-filled control tubes, Klystron tubes, spark gaps, temperature tubes and voltage regulator tubes.

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Heater Current	0.6 amps.	0.285 amps.	1.2 amps.	0.80 amps.
Peak Inverse Voltage	1375 v. (max.)	1375 v. (max.)	1375 v. (max.)	1250 v. (max.)
Peak Plate Current (per plate)	270 ma. (max.)	270 ma. (max.)	270 ma. (max.)	230 ma. (max.)
D-C Heater-Cathode Potential	450 v. (max.)	450 v. (max.)	450 v. (max.)	400 v. (max.)
Cathode Heating Time	1 min.	1 min.	1 min.	45 sec.
Total Effective Plate Supply Impedance	150 ohms (min.)	150 ohms (min.)	150 ohms (min.)	150 ohms (min.)

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NEW crosswind gear on Cessna 140 is checked by John Geisse, developer. Note wheel at right turned at outward angle, can't turn inward.

Geisse Crosswind Gear Approved

CAA approval of the new crosswind landing gear developed by John H. Geisse, veteran exponent of single-runway airports and swivel gears gives a further boost to this type of aircraft accessory, which eventually may become standard equipment on most aircraft with slow landing speeds.

While some Air Force engineers contend that the higher landing speeds of jet aircraft minimize the effect of crosswinds in landings, Geisse does not agree. He says the forces of crosswinds put an even heavier load on the gear at high landing speeds and recommends the gear as a safety factor for all landings.

► **Better Ground Control**—The Geisse gear, in its present form, is designed for a two-place Cessna 140. It weighs about eight lbs. per wheel, but production model is expected to weigh about four, and is designed for quick installation with one wrench on the springsteel, single strut landing gear on Cessna planes.

In a recent demonstration at Washington-Virginia Airport, near Washington, D. C., Geisse taxied the plane in a series of violent ground circling maneuvers that showed high degree of control possible with the gear.

The Geisse device is based on the principal of a "barn-door hinge," with the addition of a spring to pull the hinge back to closed position to center the wheel when crosswind forces are not affecting it. The hinge arrangement means that either wheel can swivel outward.

But neither can turn inward, contrary to arrangement of earlier swivelling crosswind gear developments.

The new feature considerably improves handling characteristics of a

plane so equipped on the ground, as compared to earlier gears, Geisse states.

► **Ends Ground Loops**—The inventor, who was an early advocate of roadable aircraft and a consultant on private flying to CAA for several years, has been demonstrating his prototype gear to military and civil aviation engineers. He is looking toward use of the simple gear on Army liaison planes as the first probable production order.

CAA test pilots, putting the gear through its paces for airworthiness approval, stated that it practically eliminated the possibility of ground loops on the Cessna on which it was installed, and that landings in crosswinds of 90 deg. were safely accomplished.

"Two important savings are made possible by the crosswind gear," Charles



FRONT view of "barn-door hinge" swivelling device, with small spring in front of hinge to snap wheel back to regular tracking position for takeoff.

F. Horne, Administrator of Civil Aeronautics, summarized.

"It practically eliminates the costly damage caused by ground loops due to landings in a crosswind, where a wing tip is broken, and it makes possible the CAA's policy of building single-strip airports."

"Thus the airplane operator and the taxpayer benefit by this development, and we look forward to the time when all airplanes are equipped with this helpful feature. Mr. Geisse has made a real contribution in making his gear simple and inexpensive."

Douglas Streamlines Rolling Mill Setup

Santa Monica—More efficiency, better control, higher production are being realized in the re-vamped setup of Douglas Aircraft Co.'s plant rolls section. And an indirect, though important, dividend is the freeing of sorely needed space in the main fabricating building.

Douglas production engineers have gathered the various activities of the rolls section and compacted them into a centralized operation. Previously, forms from the 10-stage Yoder rolling machines in the main building traveled about 200 yd. to a degreaser in the building's basement, then back to the main floor to the nitrate heat-treat tank, quench tank, Hufford stretch-leveler and aging operation.

► **Production Boost**—About a dozen tote boxes were required, and these cluttered the main fabricating floor. Time for movement of formed sections from heat-treat to quench tank was excessive for best control of properties, and production rate was slow.

Now, the operations are streamlined for short progressive steps in one building. And production has been boosted about 3 to 4 times—with a smaller shop force.

Strip sheetmetal stock for the Yoder rolls are handily stored adjacent to the machine. The formed parts come off the rolls directly onto an inclined conveyor to the degreaser and then into the adjacent dryer.

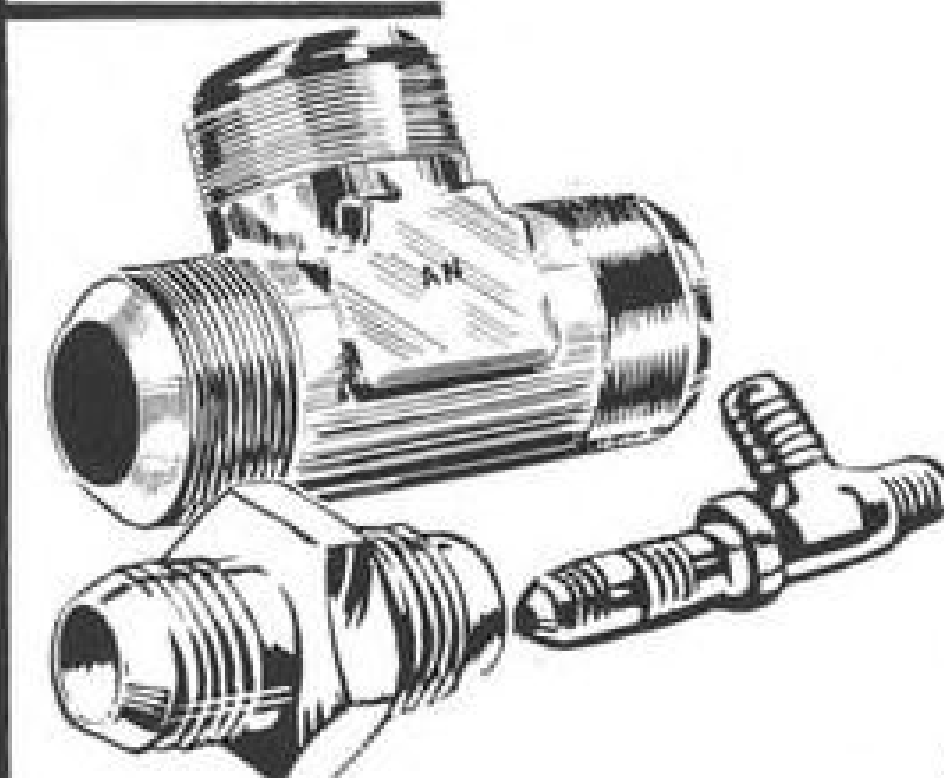
► **Time-Saver**—From the dryer it is but a short step to the nitrate tank for heat-treating. Transfer of material to the quench and cleaning tank, which almost abuts the heat-treat tank, is accomplished with an overhead crane in a fast 6 to 7 sec. for good quench timing.

Next short step is about 25 ft. directly opposite to the Hufford stretch-leveler, then to the nearby aging oven or straight out of the shop (after application of identification stamp), depending on the type of material.

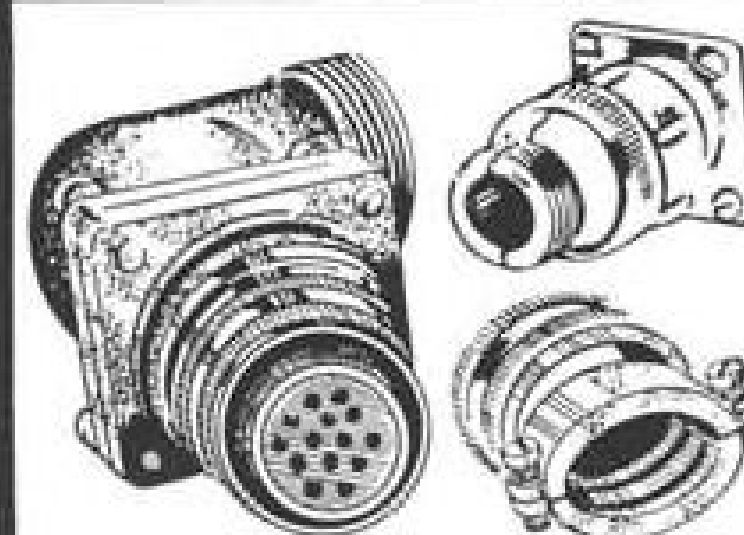
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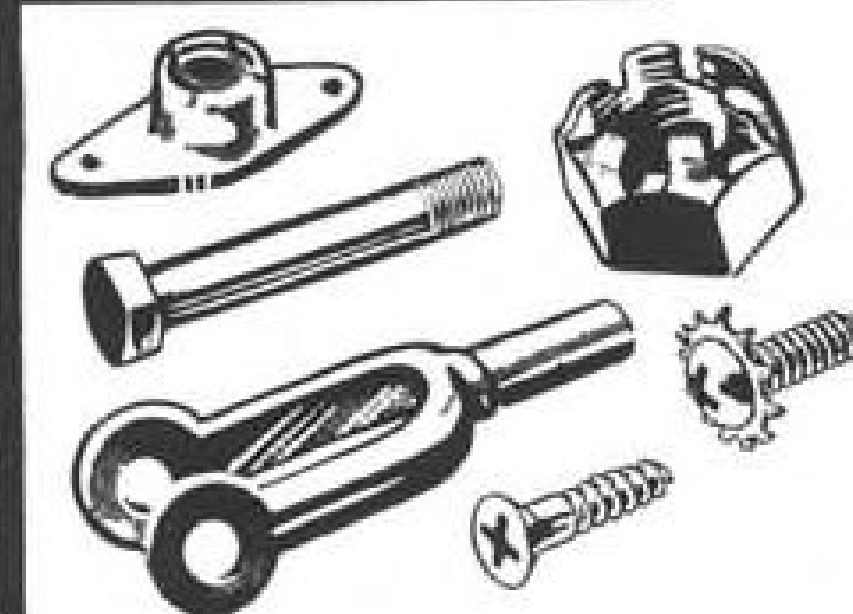
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Fittings



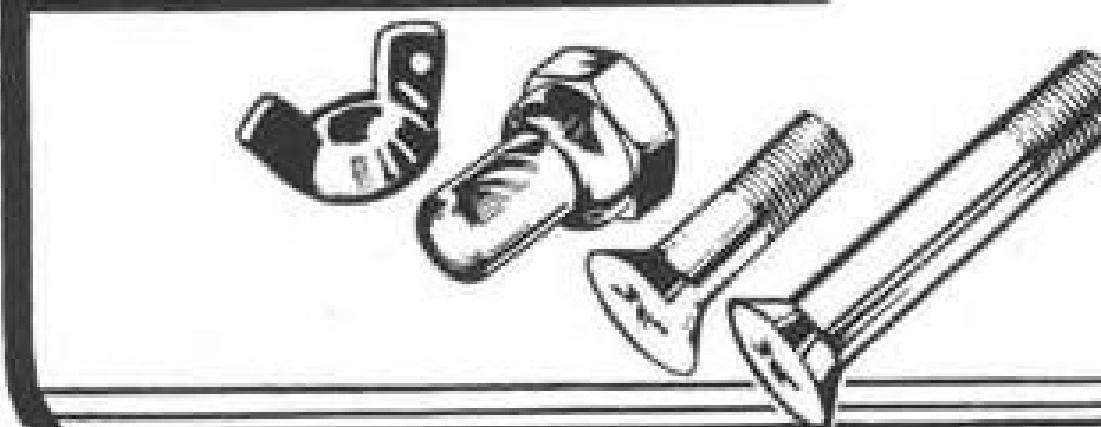
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For over a quarter century, Wittek has specialized in hose clamps, devoting craftsmen's skills to producing hose clamps of uniform accuracy in clamping action combined with superior physical strength, for dependable leak-proof hose connections. This experience is yours when you place your aircraft hose clamp requirements with us.



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Made of stainless steel and utilizing the Wittek Floating Bridge. Tested and proved for dependable service on all types of aircraft applications. Long accepted as the standard of the industry.

**WITTEK WWD
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Made of stainless steel and available in all standard aircraft sizes. Also furnished in diameters up to 12" for duct and other special applications. Permits easy installation when hose is in place.



Meet current AN specifications
and have C.A.A. approval.

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HOSE CLAMPS 
MANUFACTURING CO.
4308 West 24th Place, Chicago 23, Illinois

WADC Tunnels

- Six units are operating at Wright-Patterson.
- And they are available to defense contractors.

Dayton-Wright-Patterson AFB has reminded defense contractors that six windtunnels are at their disposal at the Wright Air Development Center.

The tunnels range from a 5-ft.-diameter unit, in which tests can be made up to 250-mph. ground speed at sea level conditions, so the 6-in. two-dimensional supersonic tunnel, capable of simulating air speeds up to 2,000 mph. at sea level conditions.

All tunnels are available to National Military Establishment contractors who need aerodynamic data not generally known in the aviation or allied industries.

► **Five-Ft. Tunnel**—A general purpose, low-speed, closed return atmospheric

unit used primarily to determine landing and takeoff characteristics of aircraft and missiles. Models of about 2-ft. span are tested by drawing air into the chamber by use of a 1,000-hp. fan.

Room surrounding the unit serves as a stagnation region, with temperature control maintained by normal air leakage into the room from outside.

Tunnel also is used for testing air-foil-shaped antennas, angle of attack indicators and other research probing devices.

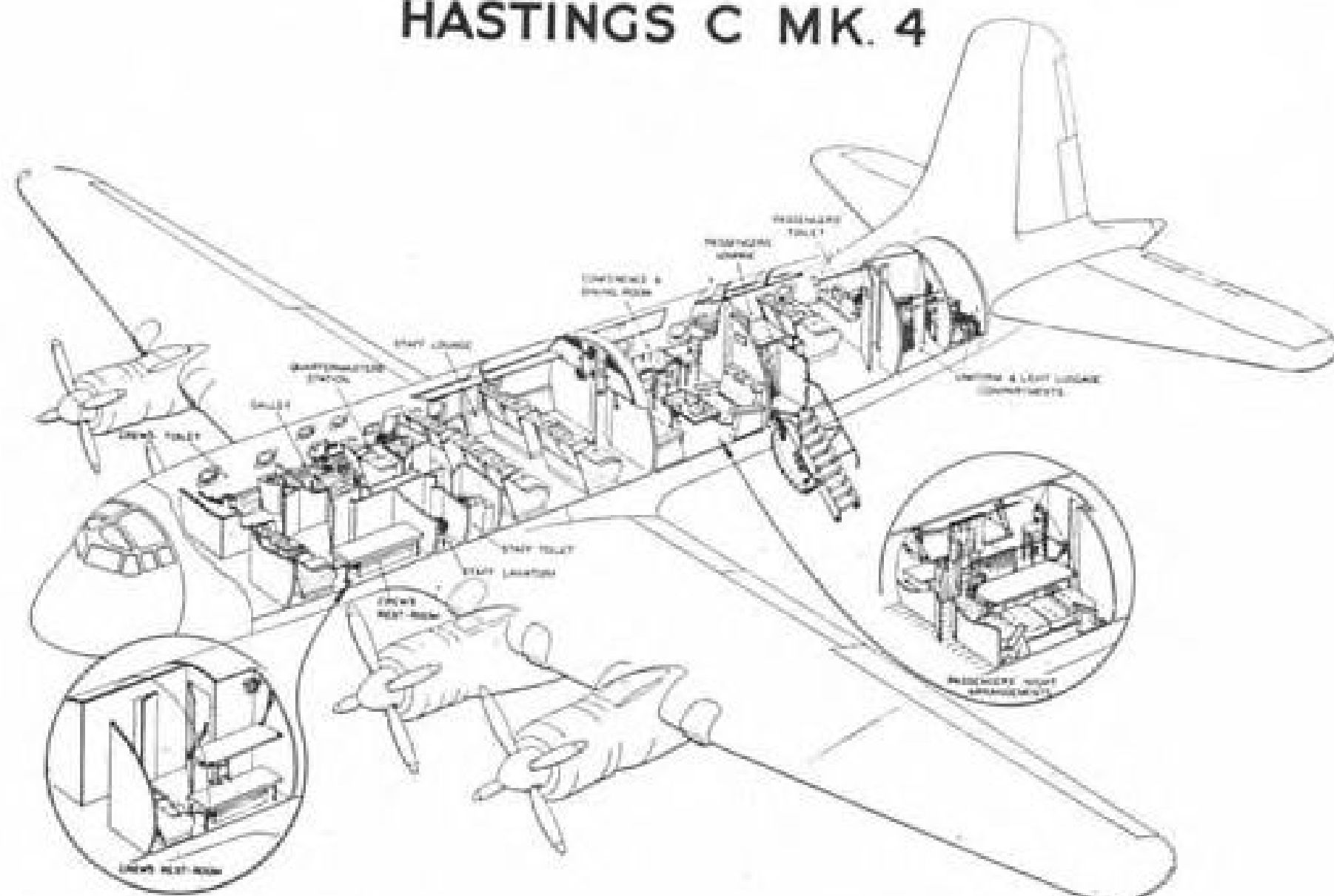
► **Twenty-Ft. Tunnel**—This closed return atmospheric tunnel is used primarily on large scale models of missiles and aircraft or components, ranging up to 14-ft. wing span.

Data up to air speeds of 450 mph. may be obtained. Powered models, such as turbojet and pulsejet installations of aircraft, also can be tested in this tunnel.

Unit utilizes an overhead mechanical balance and support system. The forces are transferred through a three-point suspension system to a frame work, from which the six component forces



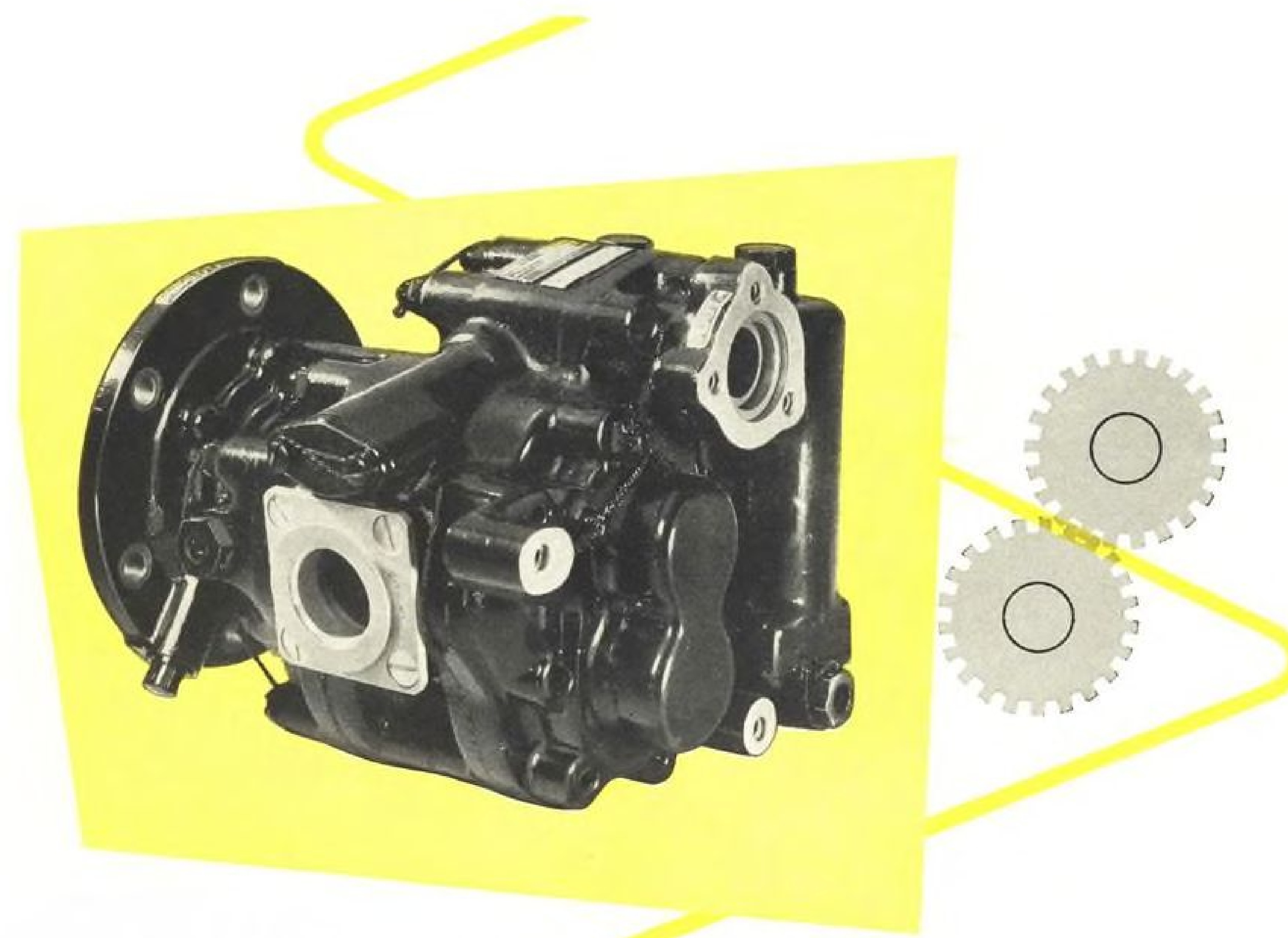
HASTINGS C MK. 4



VIP VERSION OF HANDLEY PAGE HASTINGS

A quartet of these special military transports is being built by Handley Page Ltd. for carriage of VIPs by RAF Transport Command. Based on the standard Hastings II, the four are equipped with permanent

special interior fittings, including aft-facing seats. Craft has 3,500-mi. nonstop range at 240 mph. on less than half takeoff power. First unit was delivered recently after 7,000-mi. flight from Britain to the Near East.



Geared to pump longer at higher pressures . . .

THOMPSON GEAR PUMPS

New in the full line of Thompson service-proved pumps, the Thompson Gear Pump fully meets today's requirements for a dependable high-pressure fuel pump for jets.

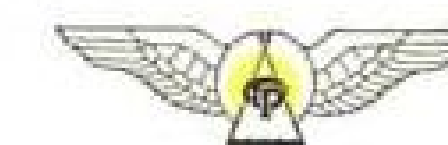
Pressures up to 800 psi. are handled by the Thompson Gear Pump. Extra-close tolerance in the pumping chamber assures positive action and high efficiency, helps maintain required pressures.

In all Thompson Pumps, the combination of experience, engineering, and workmanship helps protect their world-wide reputation for dependability and low-cost maintenance.

May we tell you more about the Thompson Gear Pump . . . or any other pumps in the Thompson line?

Typical Thompson dual element Gear Pump Model rated at 38 GPM and 600 psi. at 3600 RPM.

Pump is designed for use with all military fuels over temperature range of -65° F. to +165° F.



ACCESSORIES DIVISION

Thompson Products, Inc.

EUCLID, OHIO

YOU CAN COUNT ON THOMPSON FOR ENGINEERING LEADERSHIP



Mindful of the lightweight efficiency and trouble-free performance of Hartman reverse current cut-outs and other d-c devices in military and civil aircraft, Jack & Heintz called on Hartman to supply vital

relays for the J&H GC-18 control panel installed in the Stratojet.

Each of the aircraft's six generators is protected and regulated by an individual GC-18 control panel equipped with five Hartman relays:

- (1) **Differential-Voltage and Reverse-Current Relay**—Connects generator to bus when generator voltage exceeds battery voltage; disconnects generator from bus upon reversal of current.
- (2) **Ground Fault Relay**—Senses ground fault; when fault exceeds set value, relay de-energizes generator.
- (3) **Overvoltage Selector Relay**—Senses load current to detect generator producing overvoltage and automatically sets its overvoltage relay to trip at lower voltage than other five relays.
- (4) **Equalizer Relay**—Disconnects regulator equalizing circuit from equalizer bus to avoid pulling system voltage down when generator is inoperative.
- (5) **Overvoltage Relay**—Senses overvoltage and cuts out generator. Relay has inverse time characteristics to prevent nuisance trips.
- (6) **Contact and Dropout Relay (Not Shown)**—Located in fuselage near main bus, six of these compact units, each controlled by a GC-18 panel, connect and disconnect generators from bus during both starting and generating conditions.

Typical of Hartman design and manufacture, relays in the B-47 are just a few of the many d-c devices engineered for the aircraft industry. Whenever your problem involves d-c controls, turn it over to Hartman

where it will receive prompt attention . . . where it will be analyzed and engineered with an efficiency that comes from nearly half a century of specialization.

A-2628

the Hartman Electrical Mfg. co.
MANSFIELD, OHIO

and moments are transferred to scales and thence to recording equipment.

There is 40,000 hp. available for this tunnel. Air exchange is utilized in order to maintain constant tunnel temperature.

Future plans call for increasing availability of unit to speeds approaching Mach 0.9.

► **Ten-Ft. Tunnel**—This is a transonic facility with 10-ft. test section and is powered by two 20,000-hp. motors which allow "choking" velocities over a pressure range from $\frac{1}{4}$ to nearly two atmospheres.

By manipulation of the test section "walls" it is possible to extend testing range to give velocities into the low supersonic range, reaching up to Mach 1.18.

Models up to 4-ft. wing span can be tested, using sting-mounted strain gauge, internal balance systems or utilizing a mechanical balance on wall-mounted installations.

► **6" X 6" Tunnel**—This is a two-dimensional supersonic facility with replaceable nozzle inserts to test at Mach 1.75, 2.00 and 2.75, over a pressure level range of from one-quarter to two atmospheres.

Additional inserts are on order to extend both ends of range. A flexible nozzle which will allow continuous variation in Mach number to about 3.0 will be available later.

Air stream is generated by a 12-stage axial-flow compressor driven by a 1,000-hp. motor. Both Schlieren (qualitative) and interferometer (quantitative) methods are available to study shock wave formations about models at these supersonic velocities.

► **2' X 2' Tunnel**—This is similar to the 6" X 6" unit, except that its greater size permits more realistic developmental work because it can handle larger models.

Facility at present has only one set of nozzle inserts, for Mach 2.3, but additional nozzle blocks are being built which will allow velocities of Mach 1.9, 2.0 and 2.5 conditions.

At present, only Schlieren photography is being used for flow analysis.

► **Vertical Tunnel**—This facility has a 12-ft.-diameter vertical test section, with air generated by a fan at top of tunnel and circulated around the outside of the test section shell to the bottom of tunnel. Air then passes up through a honeycomb straightener before entering test section.

This unit is used primarily to test recovery characteristics of spinning models constructed dynamically similar to prototype bombs or aircraft. Movies are taken of descent of the free falling, spinning models and notes made of recovery characteristics. Net catches falling models.

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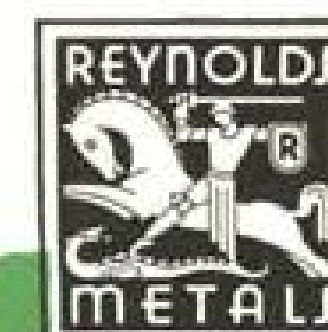
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Reynolds Aluminum Fabrication Service offers extensive facilities to produce airframe parts in any stage of completion ranging from flat blanks to finished units ready for assembly. Every pound of aluminum which you buy in finished parts is completely usable . . . no scrap loss. You realize important savings in scrap handling, shipping, storage space, work space and manpower. In addition, there's no capital tie-up on scrap aluminum in transit and in inventory. Reduction of this idle aluminum will help relieve today's shortage.

Quotations on airframe parts can be furnished to your drawings and specifications. For complete information on how Reynolds Fabrication Service can help in your program, write for booklet, "Pounds of Parts Instead of Pounds of Metal". Or call the Reynolds office listed under "Aluminum" in your classified telephone directory. Reynolds Metals Company, Parts Division, 2059 South Ninth Street, Louisville, Ky.



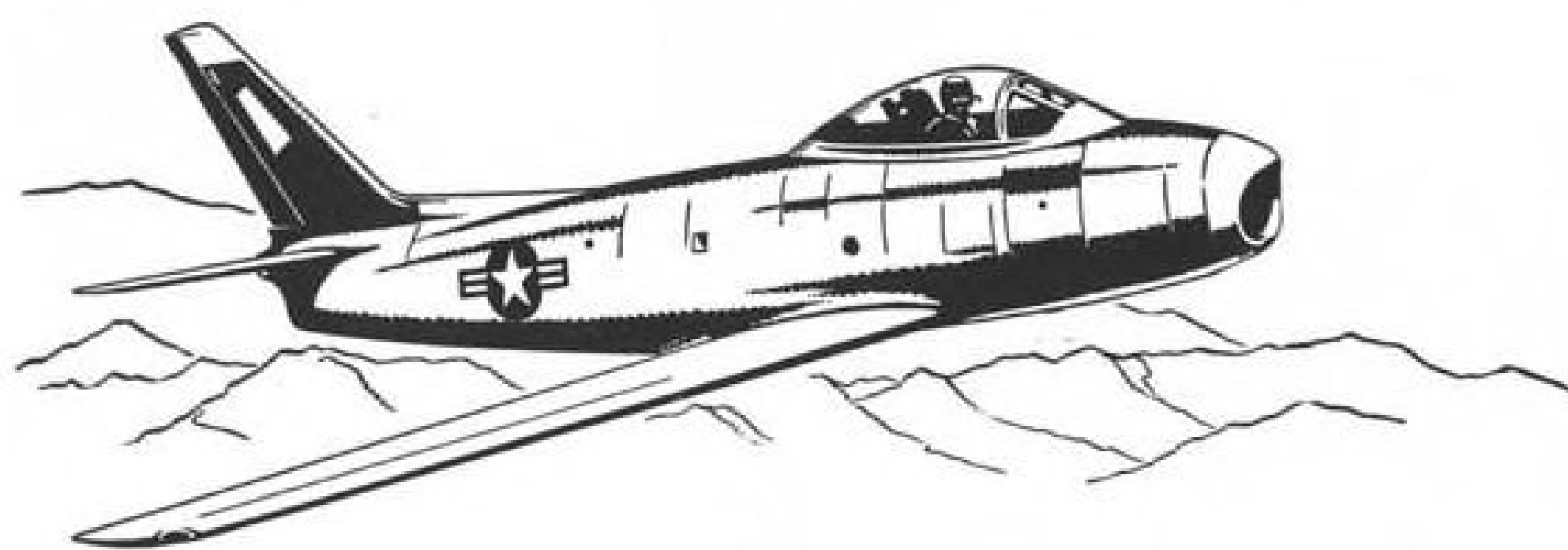
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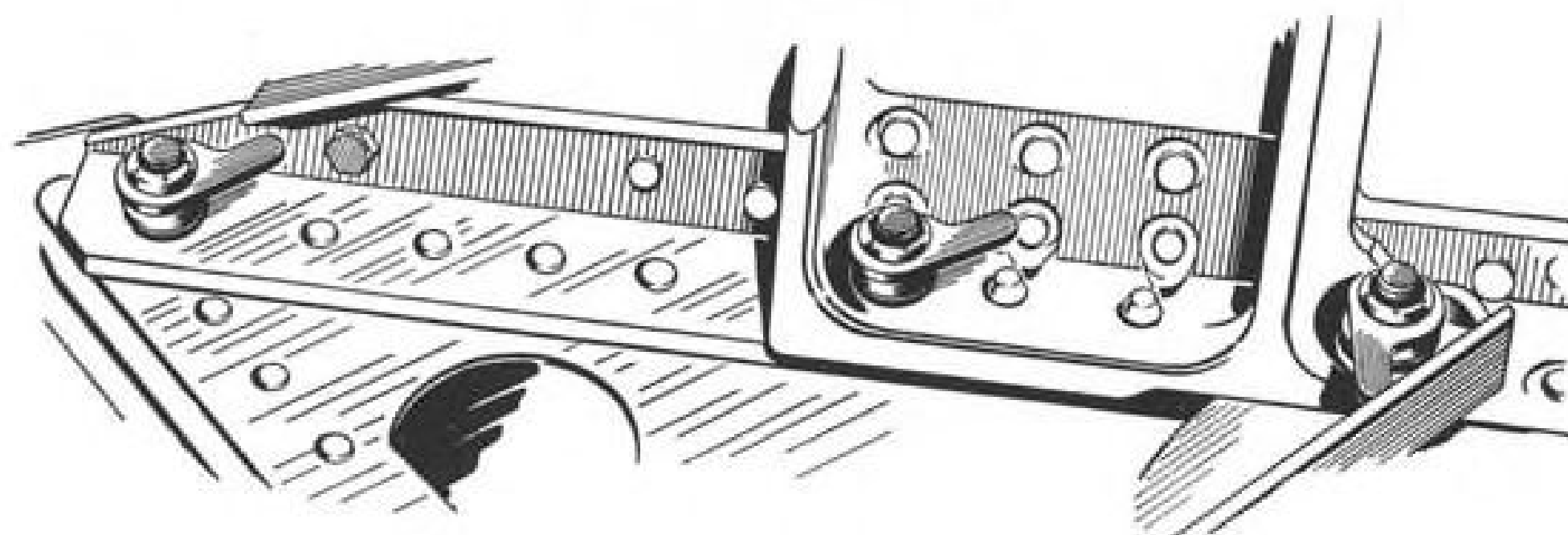
(Advertisement)

Fastener Problem of the Month

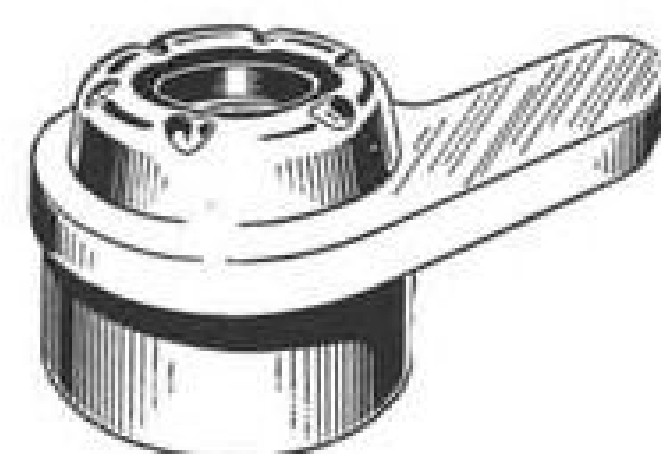
DECEMBER, 1951



PROBLEM: The machine guns on the USAF F86 Sabrejet are mounted in a "closed out" position. The mounting forgings are in the form of bathtub fittings, to which the guns were to be attached with bolts and AN365-624 hexagon nuts. Because these nuts had to be installed from inside the fuselage and were located deep within the fittings, the assembly job presented obvious difficulties. Furthermore, under combat conditions the bolts and nuts were required to be checked for re-torquing periodically, and analysis revealed that with the type of fasteners originally considered, the maintenance operation would require 14 man hours.



SOLUTION: Since there was not sufficient clearance on the mounting structure to accommodate anchor nuts, spline nuts, or other standard types of self-locking nuts, N.A.A. engineers in cooperation with ESNA engineers solved the problem by designing NUT TYPE S1571-064. A lug, capable of withstanding 430 inch pounds, was made as an integral part of the nut; it acts as a wrench against the side of the structure. This lug is located above the center of the nut to overcome "climbing" up the forging's fillet. To take care of an increase in bolt loading the nut was designed with a minimum breaking strength of 185,000 PSI. This ESNA-developed nut cuts re-torquing time from 14 man hours to 15 minutes and saves considerable original assembly time.



ESNA TYPE S1571-064

DO YOU HAVE a critical, time consuming assembly and maintenance fastening problem which might be solved with a self-holding Elastic Stop Nut? For information on this and other ESNA vibration-proof fasteners consult your local ESNA specialist, or write Elastic Stop Nut Corporation of America, 2330 Vauxhall Road, Union, N. J.

AF Medicos Bring Space Down to Earth

Man has already flown under the conditions existing in outer space, says Dr. Hubertus Strughold of the Air Force School of Aviation Medicine. It is not necessary to fly at astronomical heights to find those conditions, nor is it necessary to approach the moon in order to reach a region of zero gravity.

Dr. Strughold's views are in a paper published with three associates—Drs. Heinz Haber, Fritz Haber and Konrad J. K. Buettner—in the current issue of the *Journal of Aviation Medicine*. The article, "Where Does Space Begin?" establishes a new and different set of definitions for space.

► **Functional Area—Space**, says Dr. Strughold, is a functional area which exists wherever certain conditions are obtained. And zero gravity is possible anywhere above the earth's surface.

The four scientists divide the atmosphere's properties into three categories.

These provide:

- **Environment** comfortable for man (including air and climate).
- **Filtration of cosmic rays and radiation** from the sun, and meteors.
- **Lift for aircraft.**

The first of these properties disappears about ten miles up. At this altitude, man in an unpressurized environment has about 13 sec. to act before he loses consciousness. And he has no more or less, regardless of how much further he goes into space. At an altitude of 12½ mi., the body fluids boil if the body is exposed to the low ambient pressure. They will also boil at any higher level.

► **Radiation**—The second category of properties, that of filtration, shows variations within the class. At about 13 mi. above the earth, cosmic particles are already felt with nearly their full effect and at 18 mi., ultraviolet and other solar radiations exert ten times the malignant power that they show at sea level.

They do little more damage at any greater distance from the earth. Meteors begin to cause serious trouble at about 70 mi. and continue to be troublemakers on out to the stars.

So from a functional point of view, space begins about 10 mi. up and at 70 mi. is very nearly absolute.

Zero gravity is not a function of the boundary between the gravitational field of the earth and any other heavenly body.

Instead, it occurs as the result of complex relationships between gravity, inertia, thrust, lift and drag. Even within the earth's atmosphere, weightlessness has been experienced by

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"...and still Champion!"

This is a yarn about an airplane—specifically, a Chance Vought F4U-4 Corsair fighter bomber affectionately dubbed "Old Number 24".

When she was shiny and new, she went into combat with a Marine fighter squadron flying against the enemy in Okinawa, near the end of World War II.

By all rights, Number 24's duty should have come to a close there when victory came. But instead she was shipped back to the U.S. and put in "mothballs."

When war broke in Korea, she shed her cocoon and answered the call again. And by chance she was picked to serve aboard a carrier with her old squadron.

One day last winter she headed off the carrier for the mainland of Korea, as usual—only this trip marked her 150th mission.

By and large it was a fairly routine day—her

napalm bombs set a warehouse flaming at Asong-ni . . . her 50-calibers strafed enemy troops dug in on a hill at Onjin . . . her bombs and rockets demolished three more warehouses at Suejari . . . and she topped off her 150th mission by strafing an enemy supply line along a highway.

Durable "Old Number 24" got hit a few times, as she had before, but overnight she was patched up, ready to go again.

There is no moral to this story except that it shows, better than anything else, *that nothing can beat a sound design and good workmanship.*

"Old Number 24," with her long service and versatility, is typical of the Corsair—which has followed up a brilliant record in World War II with an equally impressive performance under entirely new and extremely difficult conditions in Korea.

Chance Vought Aircraft • DALLAS, TEXAS
ONE OF THE FOUR DIVISIONS OF UNITED AIRCRAFT CORPORATION

pilots for intervals up to 45 sec.

So Dr. Strughold and his associates have concluded that there is no well-defined borderline between the atmosphere and space. And the implication of that conclusion is that man is now flying in space, or under conditions which are the same as those expected to be encountered on interplanetary trips.

Device Takes Notes On Missile Tests

A miniature recording oscillograph, developed specifically for a guided missile test program, has been added to the family of oscillographs built by Consolidated Engineering Corp., 300 N. Sierra Madre Villa, Pasadena 8, Calif.

This tiny unit measures only 5 in. square by 8 in. long, and weighs 11½ lb. fully loaded with film and its complement of nine galvanometers. It's made of two ribbed, stress-relieved aluminum castings which clamp together on a heavy center plate.

One casting is the magazine, and contains recording material and the complete record-drive system, including the motor.

The other section is the oscillograph and contains the galvanometer block and galvanometers, light source, optical system, electrical input connections, and the unit's damping-resistor assemblies.

The present recording medium is Kodak Verichrome film in 40-ft. lengths and 3½ in. wide. Standard Kodak spools are used; loading is simple and requires no complex threading.

Record drive system is completely gear-driven and will provide positive record speed during accelerations as high as 25G in any direction. Nominal record speed is one in. per sec., but it can be changed if desired.

New Attack Opens on Engineer Shortage

The campaign is being stepped up to lick the engineering manpower shortage.

The Engineering Manpower Commission of the Engineers Joint Council is designating more than 400 local representatives in the 48 states and Canada to impress on the people the seriousness of this shortage. The campaign will be aimed at getting fullest government, industrial and military usage of engineers; increasing the student enrollment in engineering schools; and getting more sympathetic draft board consideration of the problem.

Representatives include top educators, executives, industrialists, engineering consultants and privately employed engineers.

A handsomely appointed case of the finest leather especially designed to match the meticulously engineered AVIOX. The beautiful AVIOX assures complete comfort and safety for up to four passengers at higher, smoother, more economical altitudes—with no permanent weight penalty.



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- No installation costs, of course.
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- Simple directions, easy to follow—are included.
- Operated in flight by pilot, or passengers.
- Portable, the Aviox is not permanently fastened in the aircraft. It is treated as luggage, therefore, C.A.A. Weight and Balance data is not required.

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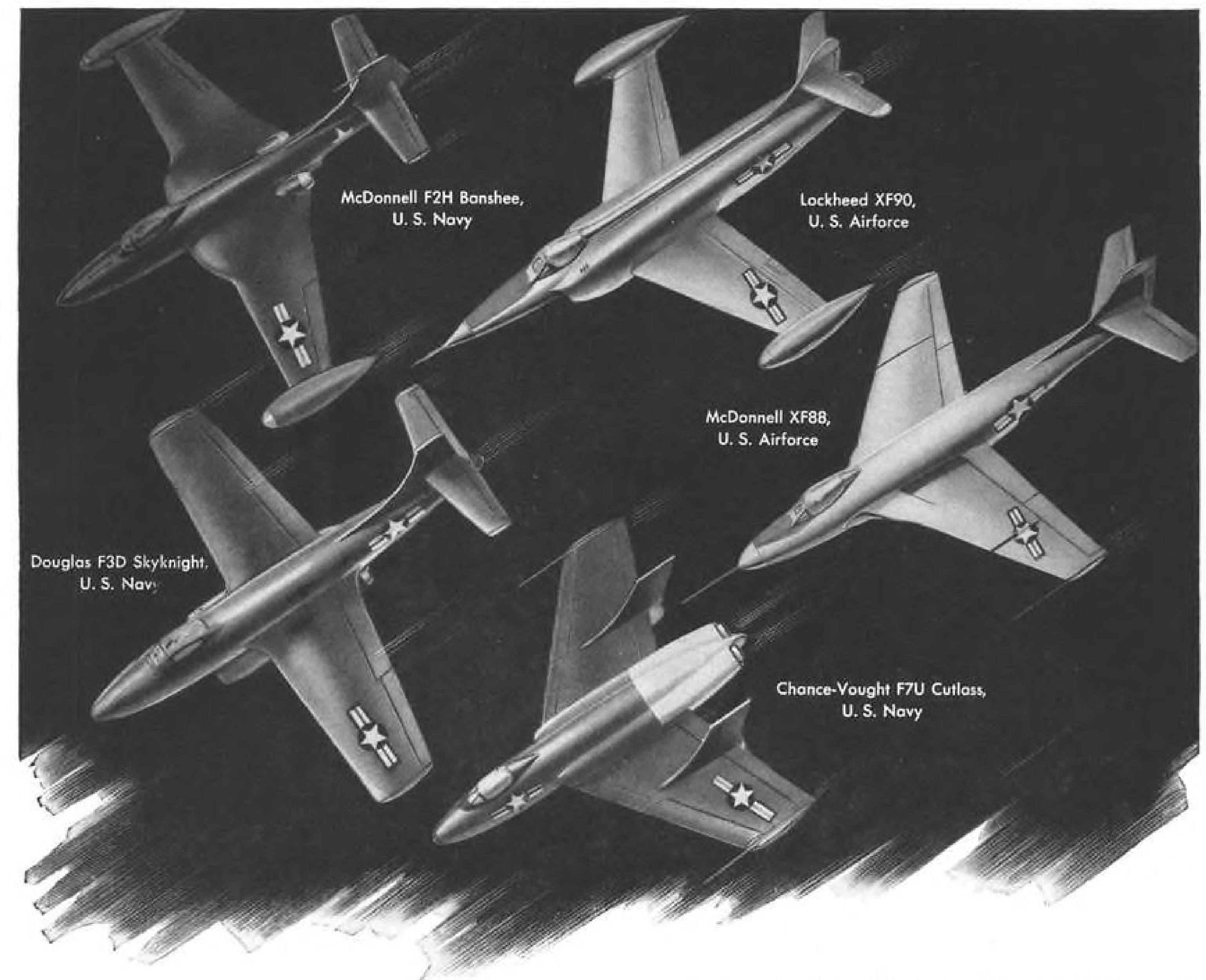
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All of these first-line fighters combine flashing speed with top dependability—characteristics that mark them as outstanding military aircraft. Significantly, each is powered by two Westinghouse turbojet engines.

In addition to the already famous J34, Westinghouse research and engineering skill has developed the J46 and the J40, big brother of the Westinghouse jet engine family and the most powerful turbojet engine known to be in production anywhere.

Look for Westinghouse to continue to power the outstanding military aircraft of the future. Look to Westinghouse for constant progress in the development of more powerful and more reliable turbojet engines.

J-54010

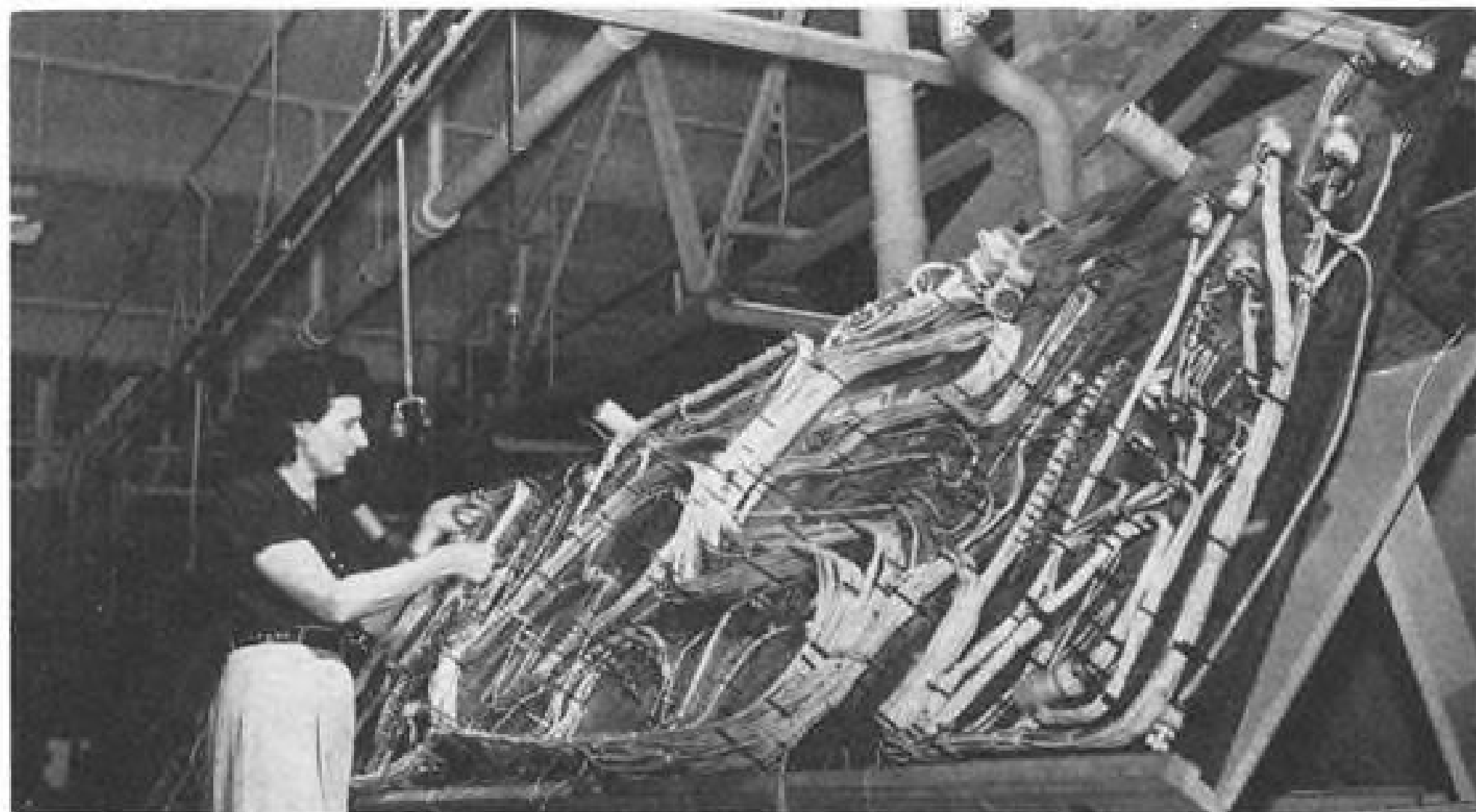


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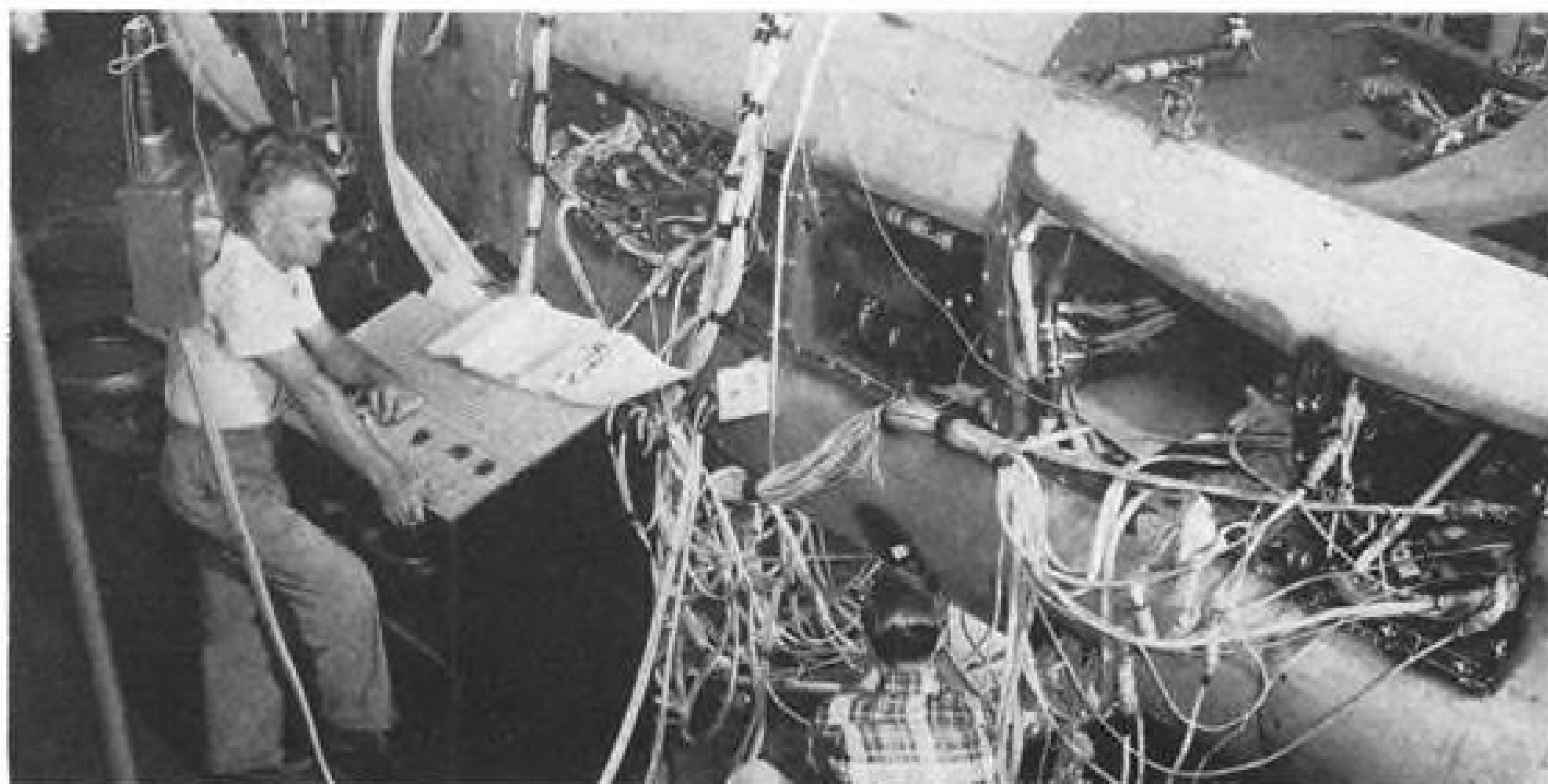
NAA Reveals Improved Test Methods



COMPLEX wiring such as this electrical harness for F-86 Sabre are tested on . . .



CONTINUITY CHECKER, with each post representing an electrical circuit, while . . .



LARGE CHECKER at side of plane tests harnesses as they are being installed.

- Maze of wiring checked on new contact post panels.
- Refrigerator snifter finds flaws in fuel lines.

By Irving Stone

Los Angeles—Exacting operational requirements of today's fast and high-flying jets call for new and precise production-line checks.

At North American Aviation, Inc., these production-testing techniques cover all types of aircraft installations and range from simple inspections to procedures involving the use of equipment costing as much as \$40,000.

This may seem expensive for equipment used solely for checking, but NAA's production trouble-shooters say they soon save this equipment cost many times over in manpower and material expenditures.

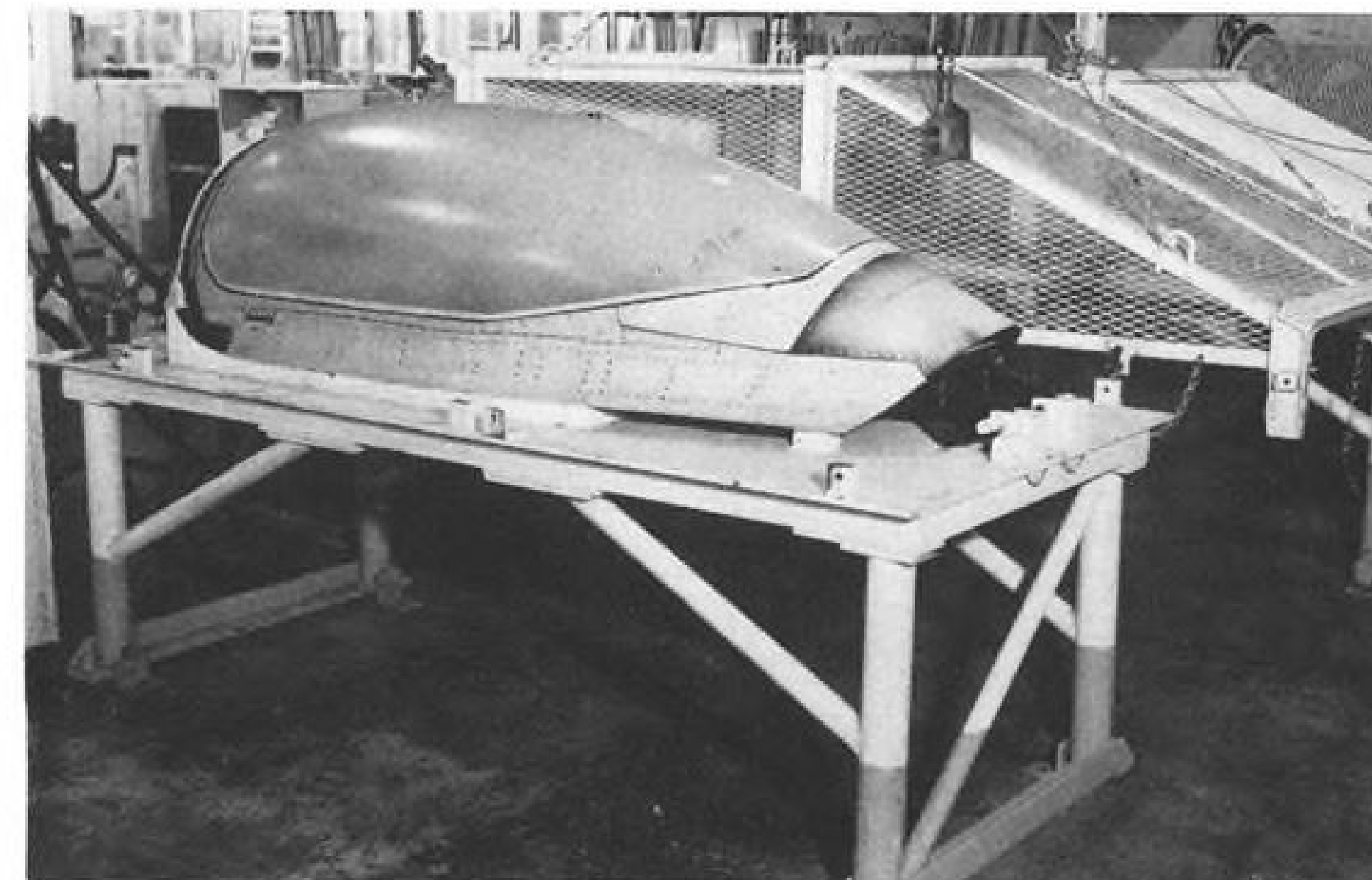
► **Home-Brewed**—Much of this testing equipment was conceived and developed in NAA's production-engineering setup. In some instances these home-made checkers also are elaborate because they are specially tailored for a specific production-line headache, but NAA technicians are convinced they have justified themselves.

One example of how production details have increased is the maze of wiring crowded into a present-day fighter—5,500 ft. of this "spaghetti" as against a mere 500 ft. in World War II fighters, say NAA engineers.

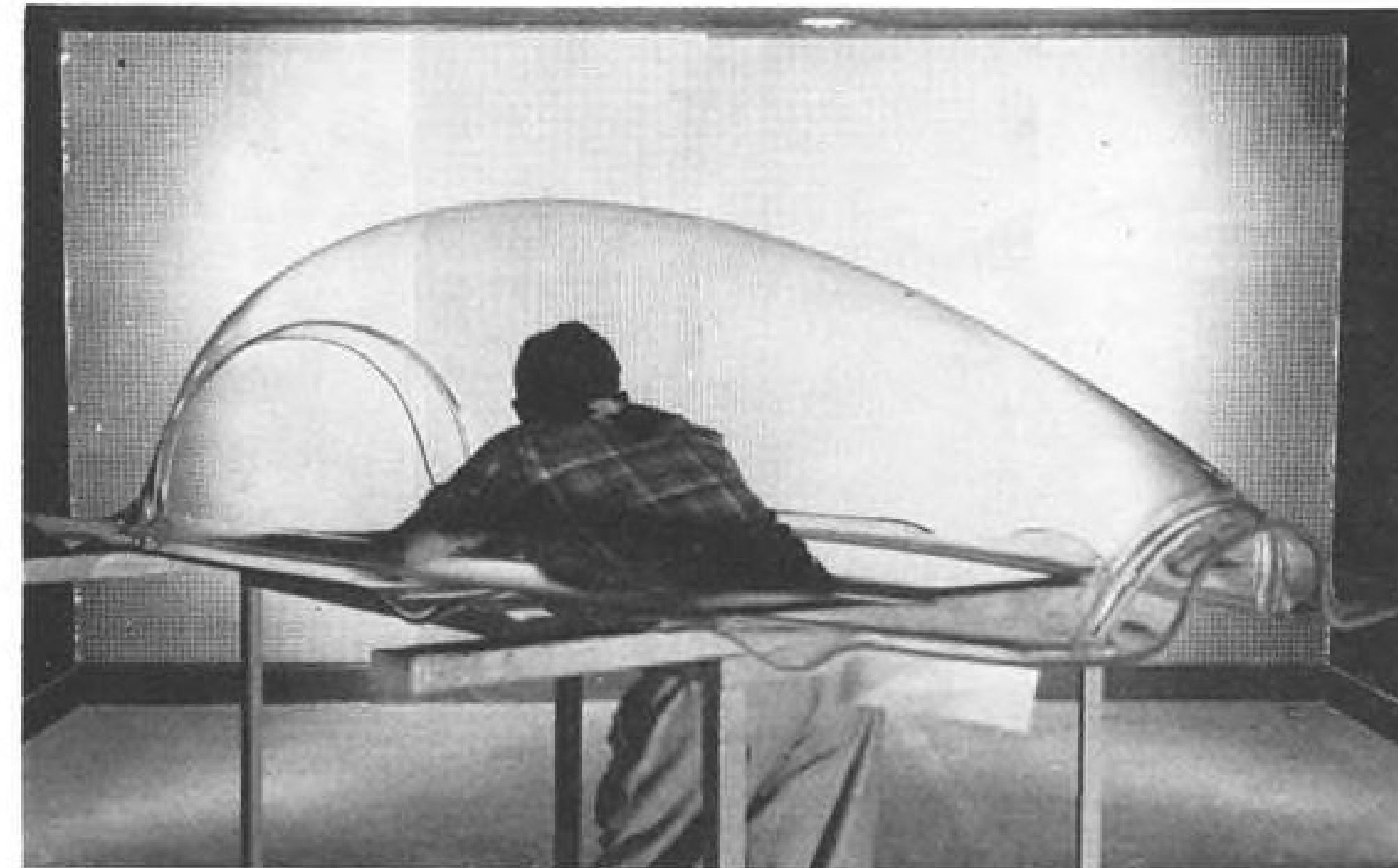
It wasn't feasible to follow this mass of circuits with the old-style bug-light, so NAA engineers developed special panels for quick, pin-point testing all along the line—practically from the first wire of the harness bundle to the complete installation in the ship.

The new panels are centralized total-group continuity checkers decked with a white plastic face studded with rows of contacts posts. Above each post is a translucent circular area with a number corresponding to the particular circuit, and under the circle is a light.

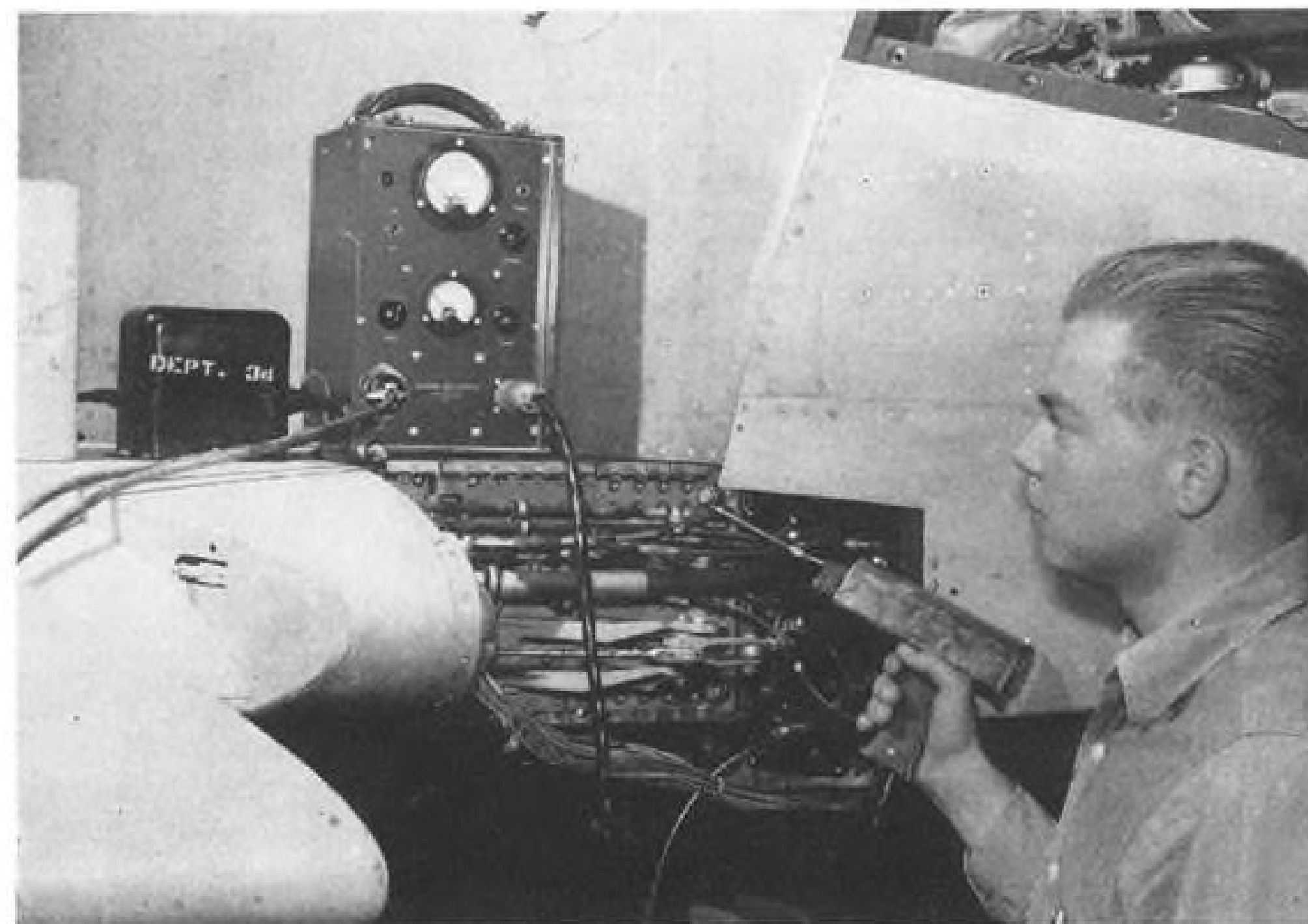
► **Speed for Complexity**—These panels are made in various sizes—some with just a few circuits, others with as many as 200-300. But checking with this device is simple, regardless of the number of circuits. The inspector quickly runs a probe along the posts



CANOPIES are tested under pressure comparable to flight on this fixture, and . . .

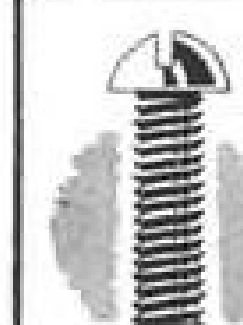


DISTORTIONS are sought both by personal view and through eyes of camera.

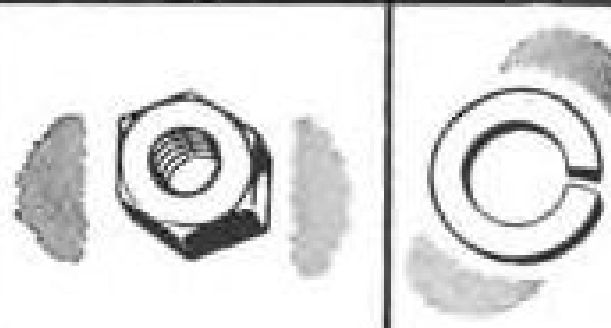
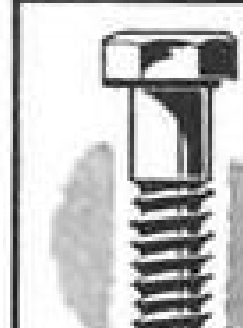


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Features low thermal mass giving fast thermal response and has the ability to withstand extreme under or overshoots of temperature. Performance proven by thousands of hours flight time on America's outstanding military aircraft. A precision thermal control manufactured to the most exacting standards of instrumentation. AMC approved. Write for complete data; inquiries on special problems invited.

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MODEL NO. 1460-4
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RF PERFORMANCE CHARACTERISTICS

- * Frequency range up to 11,000 Mc./Sec.
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- * Motor driven actuator rating: 24-28 V.D.C.

TRANSCO has the complete answer to coaxial RF switching problems at radar frequencies. Available is a complete and outstanding line of these switches for the most critical aircraft applications requiring efficient performance under extreme temperature and shock conditions. Here is streamlined compactness for simplified, economical installations and unsurpassed performance. They are precision built to military specifications and are specified by many leading aircraft manufacturers.

Write for complete engineering specifications and counsel.

TRANSCO PRODUCTS, INC.

DESIGNERS & MANUFACTURERS OF MECHANICAL & ELECTRONIC AIRCRAFT EQUIPMENT

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and the lights and numbers tell him the situation at a glance—it's as easy as streaking a finger over a piano keyboard.

If the circuit is operative, the light comes on over the post. If there is an "open," no light shows. If the circuit is wired into a wrong terminal, a light other than the one for the particular post will show.

And a "short" will be indicated by separately placed lights.

Used for a pre-check in the build-up of wiring assemblies, perhaps four different panels are employed until the harness is complete.

Used on the production line for checking circuits already installed in the plane, the panel may be the table portion of a portable cabinet or hung on a bracket alongside the ship so it won't take up cockpit space while the inside man hooks the continuity terminals to the plane's circuits.

Hundreds of these continuity check panels are required to cover the ship's complete circuits.

► **Tight Canopies**—Another painstaking production test is a pressure cycling and leak run for aircraft canopies before they are installed. Each canopy is sealed to a fixture simulating a cockpit deck. Forward part of the canopy is sealed with a bulkhead, similar to the plane's windscreen, carrying the flow lines of an automatic pressure cycling machine. The canopy is caged for safety.

Air is put into the canopy at a pressure about 1.3 that of normal pressurization and then dumped. This pressure cycle is repeated about 100 times. Then, with the canopy at normal flying pressure and the cage removed, the inspector checks for large leaks with a stethoscope, noting the leakage rate on the cabin pressurization machine's flowmeter. Required sealing is done with a rubber-composition material (access to canopy interior is through fixture manhole), and this is followed by a curing period.

The canopy is again checked with the pressurization machine's flowmeter and if the cfm. leakage is still unacceptable, further sealing is done. When the leakage rate is acceptable, the pressure cycling run is repeated and the rate checked again, with the stethoscope employed to pick out the largest leakage areas.

This pretty much resolves itself to a repetitious affair, but canopies are costly and sealing is vital in today's high-speed, high-flying planes.

► **Canopy Vision Check**—NAA also gives its canopies an optical illusion check to insure that there will be no substantial distortion of pilot's vision. The optical quality standard is spe-

(Continued on p. 46)

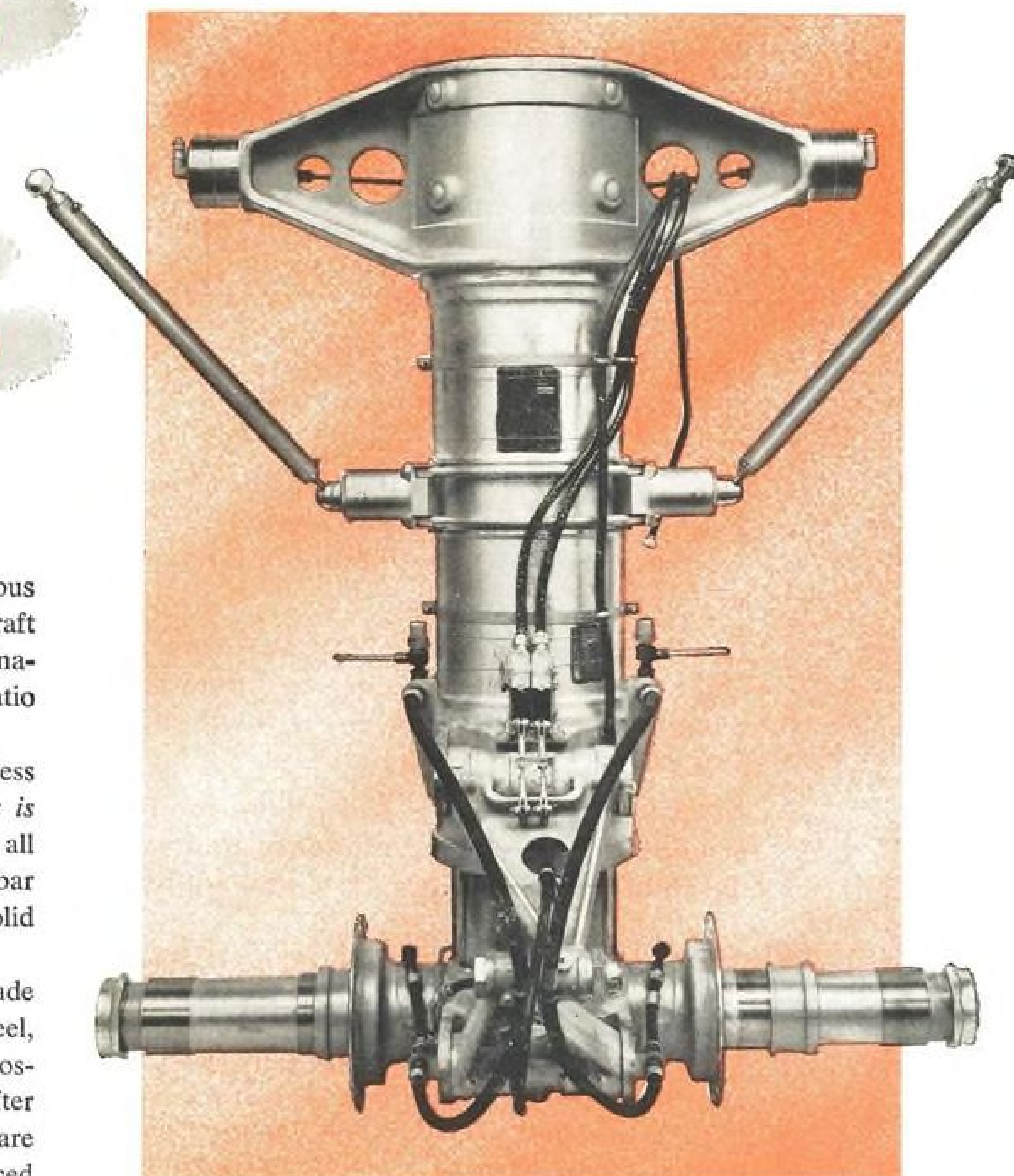
Landing gear for 185,000 lb. bomber

uses **SHELBY** AIRCRAFT TUBING

for high strength

low weight

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► In this main leg aerol for a famous bomber, Shelby Seamless Aircraft Tubing offers the perfect combination of a high strength-to-weight ratio plus easy fabrication.

When you use Shelby Seamless Aircraft Tubing the basic shape is already made. Yet this tubing has all the strength of machined solid bar stock, and is as sound as a solid forging.

The billets, which have been made from the finest quality forging steel, are minutely inspected for any possible surface irregularity, and after being thoroughly conditioned are brought to a forging heat and pierced into a hollow tube—"Walls Without Welds"—of uniform wall strength throughout the entire tube.

This very operation is the supreme test. Only steel exceptionally clean and homogeneous throughout will pierce properly and produce a sound

uniform tube wall. Such steel offers the further advantage of good forming and machining properties where this work is required on the finished part.

Shelby Seamless Aircraft Tubing

is made in a wide range of analyses, shapes, sizes and finishes to meet every aircraft need. For more information write National Tube Company, 525 William Penn Place, Pittsburgh 30, Pennsylvania.

NATIONAL TUBE COMPANY, PITTSBURGH, PA.

(Tubing Specialties Division)

COLUMBIA STEEL COMPANY, SAN FRANCISCO, PACIFIC COAST DISTRIBUTORS • UNITED STATES STEEL EXPORT COMPANY, NEW YORK



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ACP
PROCESSES

Alodine®

PROTECTS ALUMINUM
ANCHORS THE PAINT FINISH

MEETS GOVERNMENT SPECIFICATIONS
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MIL-S-5002 16E4 (Ships)
AN-F-20 U.S.A. 72-53 (See AN-F-20)
AN-C-170 (See MIL-C-5541)

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ALODIZING is an electro-less protective surface conversion process for bonding paint to aluminum and protecting the metal.

Tough, durable ALODIZED surfaces are obtained easily and rapidly by immersion, brushing, or spraying in a multi-stage power washer.

ALODINE amorphous phosphate coatings provide extra paint permanence and extra durability for aluminum parts and products.

BRUSH "ALODINE" PROTECTS ALUMINUM IN THE FIELD, SHOP, OR HANGAR

Brush ALODINE is easily applied in a simple brush-on or flow coat process to large assemblies and surfaces—airplanes, trucks, trailers, boats, housing, building siding, railway cars, bridges, etc.—that are too bulky or too remote to be conveniently treated in tanks or a multi-stage power spray washer. The cleaning and coating chemicals for Brush ALODIZING are shipped in bulk or in the convenient Brush ALODINE Chemical Kit No. 1. This Kit contains enough chemicals to treat about 1,000 square feet of surface and is an ideal package for use at airfields of commercial airlines or of the Armed Services anywhere.

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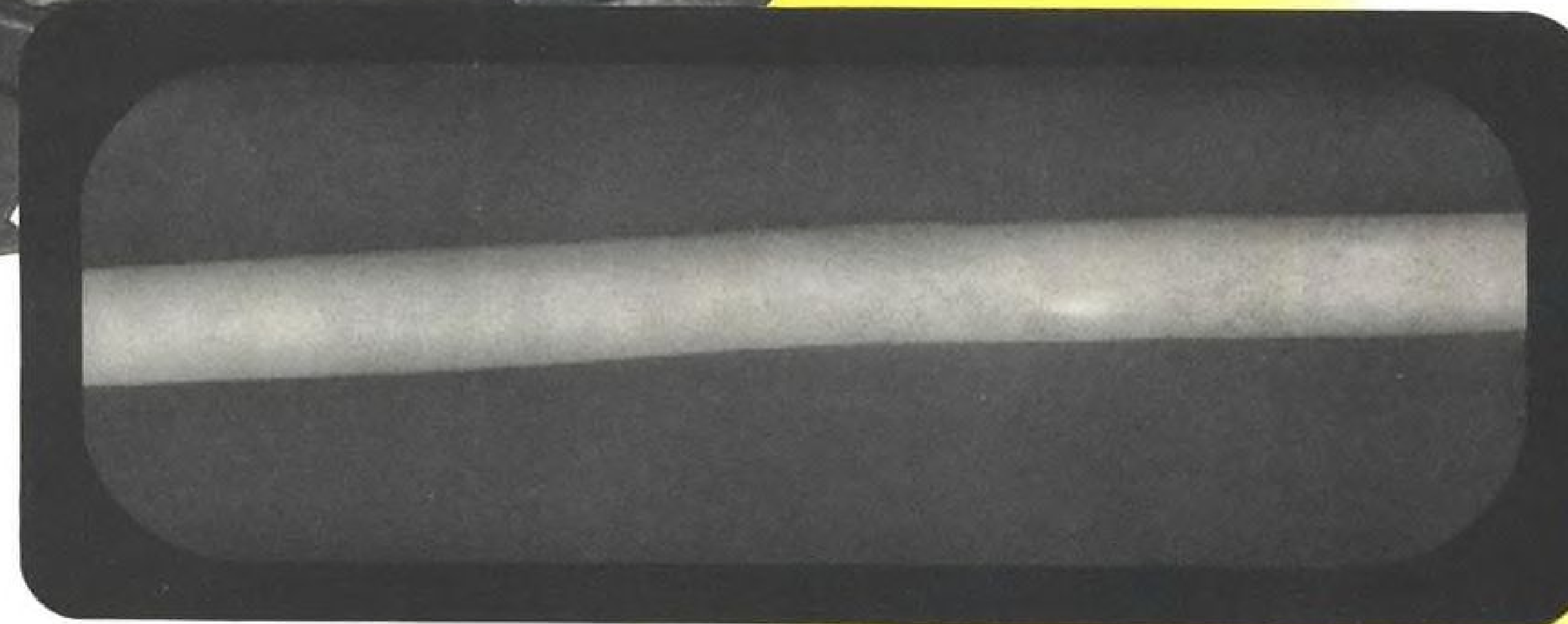
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Its work was critical...

Radiography proved its welds sound



THIS welded sphere was made to do a vital job in an important project. The welded girth seam had to be sound. What's more, the engineers had to know it was sound.

That called for radiography. For radiography would reveal any serious lack of fusion or gas porosities. It would prove the soundness of the weld.

This is one reason radiography has opened new fields to welders. It is the reason welding has become accepted even in making pressure vessels.

If you would like to discuss the ways radiography can help increase your business and build a reputation for high-quality work, get in touch with your x-ray dealer.

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another important function of photography

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TRADE-MARK

What's behind Eastern's

DOUBLE DEPENDABILITY

A look behind the scenes at Eastern Air Line's great maintenance base reveals why Eastern lays such stress on "Double Dependability."

There, you will find that Eastern takes extra pains, extra steps throughout its overhaul operations, to make doubly sure its planes perform properly.

And Eastern's deep concern for safety applies in its choice of engine lubricants, too.

For this critical element, Eastern relies, exclusively, upon Sinclair Aircraft Oil.

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Aircraft Oil for

DOUBLE DEPENDABILITY

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NIGHT AND DAY —Each of Eastern's planes returns about once a week to the huge maintenance base in Miami for a thorough check-up. Every important part of each plane is checked over carefully.



ONLY EASTERN DOES THIS —Here parts of the fuel injector are remeasured by the Electrolimit Gauge. Parts must fit with tolerances between 90 and 110 millionths of an inch!



500 MAN-HOURS are spent on each major engine overhaul—many more hours than standard requirements. This is part of Eastern's Double Dependability.



DOUBLY DEPENDABLE LUBRICATION —Eastern demands reliability in its lubrication, too. Only Sinclair Aircraft Oil is used, for less wear, less heat and lowered maintenance costs.

(Continued from p. 40)
cified by the Air Force test pilot at the plant.

Here's how NAA performs the optical check: A test fixture supports the transparent enclosure together with a place for the inspector to sit in approximately the location of the average pilot in the cockpit. The check board is a large, white plywood panel marked off with 1-in.-square black grid lines.

From the inside of the canopy the observer checks distortion of the grid lines. If the vision afforded is acceptable a camera is mounted inside the canopy at the observer's eye-level and

records the grid appearance for reference. Obviously, different pilots will experience varying distortion, depending upon their height above the seat. In the event of complaints, the camera record will show that the specified standard was met.

► **Sniffing for Leaks**—It's an expensive repair job if a fuel cell leak is discovered after the system is closed in. NAA inspectors weren't satisfied with their castile soap-water-air check because it wasn't sensitive enough to show up minute leaks. Some of this small seepage was increased from installation hookup stress and required considerable work to correct the condition.

For better leakage control, NAA switched to a detector originally designed by General Electric Co. for checking refrigeration equipment. This "snifter" will pick up an exceedingly small leak and is so effective that NAA already has nine of them in service. These cost about \$545 each, NAA says, but their cost was quickly balanced by manhour savings.

The detector is used on self-sealing and bladder-type cells, for leaks in the bag, vent, entrance and flow fittings, and attach lines.

For an air source the NAA-developed Helometer is used, a revolving disk and needle arrangement recording the pressure drop. Before the Helometer is hooked up, a teaspoonful of carbon-tetrachloride is poured in. Evaporation is rapid and the air and gas mixture is fed to the test setup.

The cell is maintained at a specific pressure for 15 min., and at the end of this period the recording needle should describe a complete circle on the disk if the cell is good.

If a pressure drop shows, the GE snifter is used. Action of the gas mixture from the fuel cell is drawn across a transducer wire by blower operation and the unit is so sensitive, says NAA, that it will detect a leak as small as 1/100 oz. in a year.

These are but a few procedures in NAA's extensive check scheme. With present design trends pressing manufacturing for extreme accuracy and parts reliability, pre-proving will increase even more and make production-testing an inseparable phase of mass production.

Do Planes Really Cost More Today?

An effective and revealing picture-story of cost comparison of today's and 1944-45 similar-type aircraft is included in a new Lockheed Aircraft Corp. report to its 24,500 employees.

This unusual study, answering questions that have been posed throughout the industry and among taxpayers, points out that there would be only 5% cost-difference between today's 600-mph. jet interceptor and its World War II counterpart, if production rates and other factors were considered.

► **Cost Factors**—Lockheed compares the famed P-38 with the new F-94, placing the cost of the P-38 at about \$100,000 as against a \$250,000 average figure for the F-94s thus far produced. Acceleration of production to the P-38 rate would trim the latter figure to \$150,000, says Lockheed, and adjustment for dollar depreciation would drop the cost to \$105,000—a 5% difference.

In addition to reduced volume and

higher material costs and wages, the report cites other cost-boosting factors—increasingly complex designing and tooling requirements, larger machines for fabrication of larger parts, more difficult assembly procedures resulting from greater use of aircraft equipment.

Today's 70,000-lb. P2V is supposed to perform a mission comparable to that of the 17,500-lb., 1940 Hudson bomber; the P2V has 5,393 lb. of electronic equipment, compared to 916 lb. in the 1944 Ventura patrol plane.

► **Typical Plane**—Another enlightening comparison shows that the first experimental P-38 cost \$612,000, as against \$5,091,000 for the experimental F-90.

And price of the F-94's radar equals the P-38's airframe cost.

Under economies of mass production, the report estimates that a "typical" plane could be priced at \$100,000 for 100, \$78,900 for 200, \$57,300 for 500 and \$44,800 for 1,000.



AIR pressure forces oil through tube to router head on this new router-oiler system.

Pressure Oiler Cuts Router Manhours

Less machine time per operation and new cutter life are the dividends from a simple pressure-oiler attachment for a tilt-table router. Texas Engineering & Manufacturing Co., Inc., reports that this machine attachment has cut man-hour router time by about 12½% and boosted cutter life 100%.

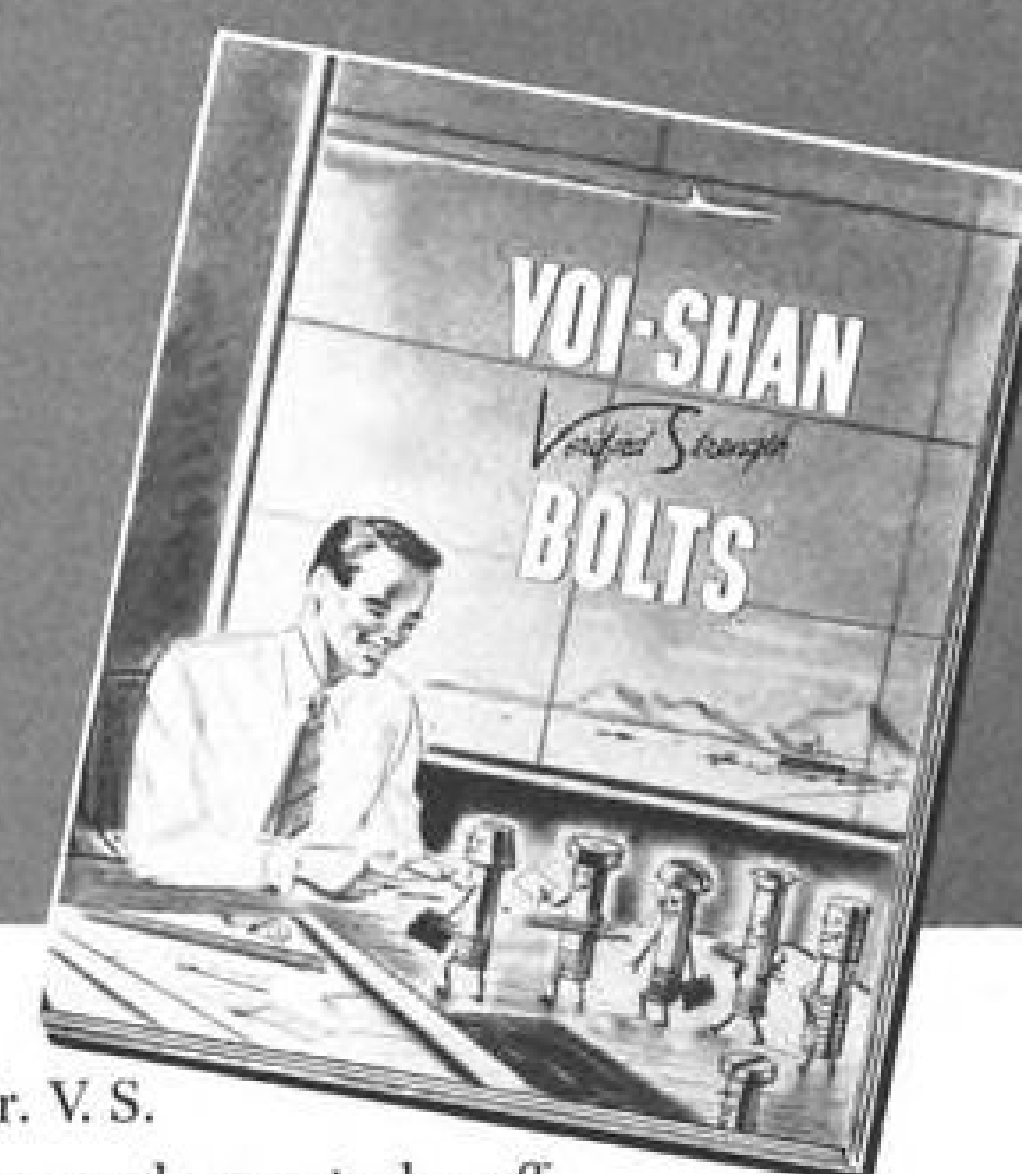
Developed by Temco's George W. Holcombe, the new addition gives cleaner cuts and lowers burring time. A one-quart container with oil adjustment valve is connected to a piece of tubing leading to the router head. Pressure is supplied by a compressed air line hooked to a regulator and an automatic cutoff valve. Cost to fit router with the device—including materials and labor—is under \$35.

Mr. V. S. Fastener Presents:



THE BIOGRAPHY OF A BOLT

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Fastener announces a new manual soon to be off the press...a genuinely informative aid, designed with YOU in mind. Not just another piece of printed matter, this new VOI-SHAN booklet, in simple language and easily understandable style, graphically depicts the story of aircraft bolts. Every step in precision manufacture is detailed, along with a wealth of helpful information for Purchasing Agent or Engineer.

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Stronger, cheaper than twist-wire "gimmicks"—more stable—have higher Q, greater insulation resistance and higher breakdown voltage.

Stackpole electronic components are sold only to original equipment manufacturers—not as replacement parts.

Electronic Components Division
STACKPOLE CARBON COMPANY
ST. MARYS, PA.

Announcing the **CONTINENTAL-TURBOMECA** Family of **GAS TURBINE ENGINES**



Continental Motors, pioneer in power for business and utility aircraft, announces another major pioneering step—its purchase of the exclusive United States manufacturing rights to a series of gas turbine models developed by the Societe Turbomeca, under sponsorship of the French Air Ministry.

The agreement with Turbomeca, climaxing months of technical work, testing and negotiation, in this country and in France, brings to the United States a far broader and more diversified line of turbines, in the 200-to-1,100 h.p. range, than has been available heretofore. Characteristics forecasting their widespread use include:

Small size and low weight in relation to power.

Adaptability to all fuels, including those of low grade.

Long life expectancy due to simplicity of design.

Minimum use of critically scarce materials in their manufacture.

A high degree of parts interchangeability among various models.

Versatility. Useful power is delivered in any of four different ways.

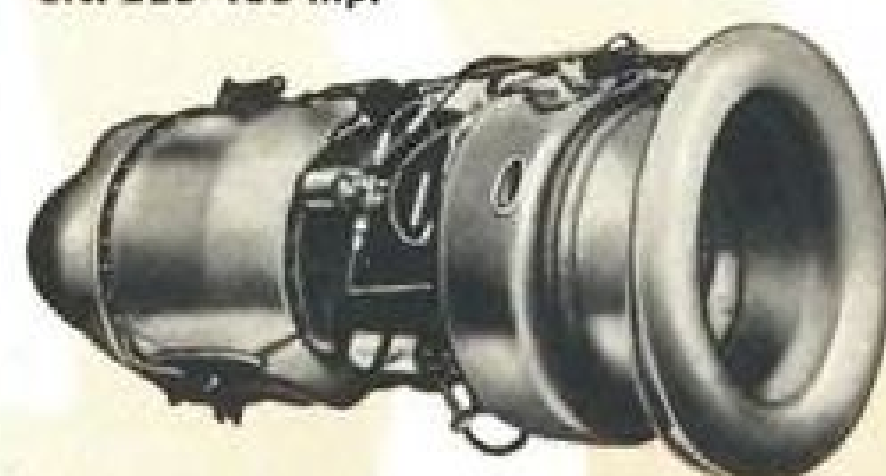
Continental Motors sees this Continental-Turbomeca family of engines as supplementing, rather than displacing, power plants of conventional design. The four basic models and their variations are expected to find wide acceptance, not only in military applications, but in many commercial fields as well.



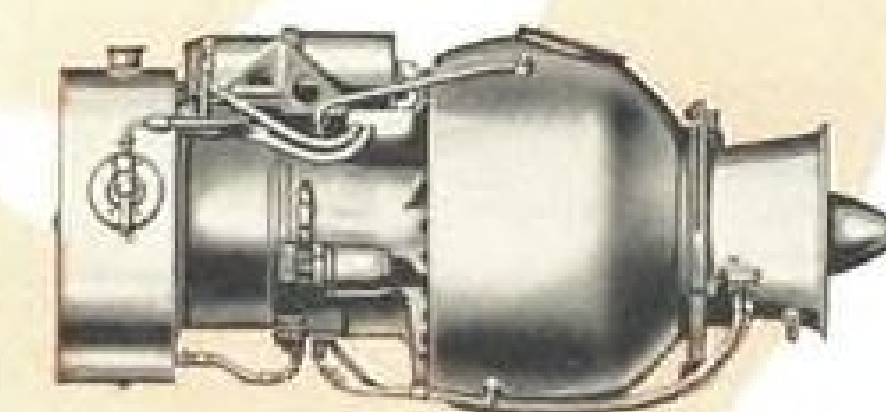
JET POWER for target and trainer aircraft or as booster power on bombers and transports. 300-900 lbs. thrust.



SHAFT POWER especially suited for helicopters, utility aircraft, electric generators, etc. 225-400 h.p.



DUCTED FANS with wide potential utility as means of increasing speeds of small and medium-sized military and civilian utility aircraft. 500-800 lbs. thrust.



AIR COMPRESSOR supplying up to 2,000 cu. ft. of air per minute at 50 psi. Useful as starter for large aircraft turbines, as portable heater, or for operating pneumatic tools, particularly where lightness and compactness are required.

The Continental-Turbomeca family of gas turbines has been exhaustively tested in actual use. Plans for manufacture soon will be announced. Meanwhile, inquiries are welcomed. Please address Continental Motors Corporation, 1500 Algonquin Avenue, Detroit 14, Michigan—Attention Mr. Whitney Collins.

Continental Motors Corporation
DETROIT AND MUSKEGON, MICHIGAN

Renegotiation Board Ready for Business

The U. S. aviation industry is watching closely the new independent Renegotiation Board, which is now organizing to go into business.

It will lay down broad policy, may also take over the operational end of renegotiation. One of the major questions for the Board: what contracts are to be subject to renegotiation. The law gives wide latitude, providing that not only military contracts, but also any contracts relating to the defense effort be open to reconsideration to scale down profits.

The four Board members named so far are:

John T. Koehler, chairman. Former Assistant Secretary of Navy, he was proposed by the Navy.

Frank Roberts, former head of the old Military Renegotiation Policy and Review Board; recommended by the Air Force.

John Hubbard Joss, former counsel of War Assets Administration, later special assistant to Jess Larsen, General Services Administrator.

Lawrence E. Hartwig, former chairman of the Contract Appeals Board of General Services Administration, on which he served for more than five years.

It is the Army's prerogative to propose the fifth member, not yet nominated.

Australia to Make Avon Jet Engines

(McGraw-Hill World News)

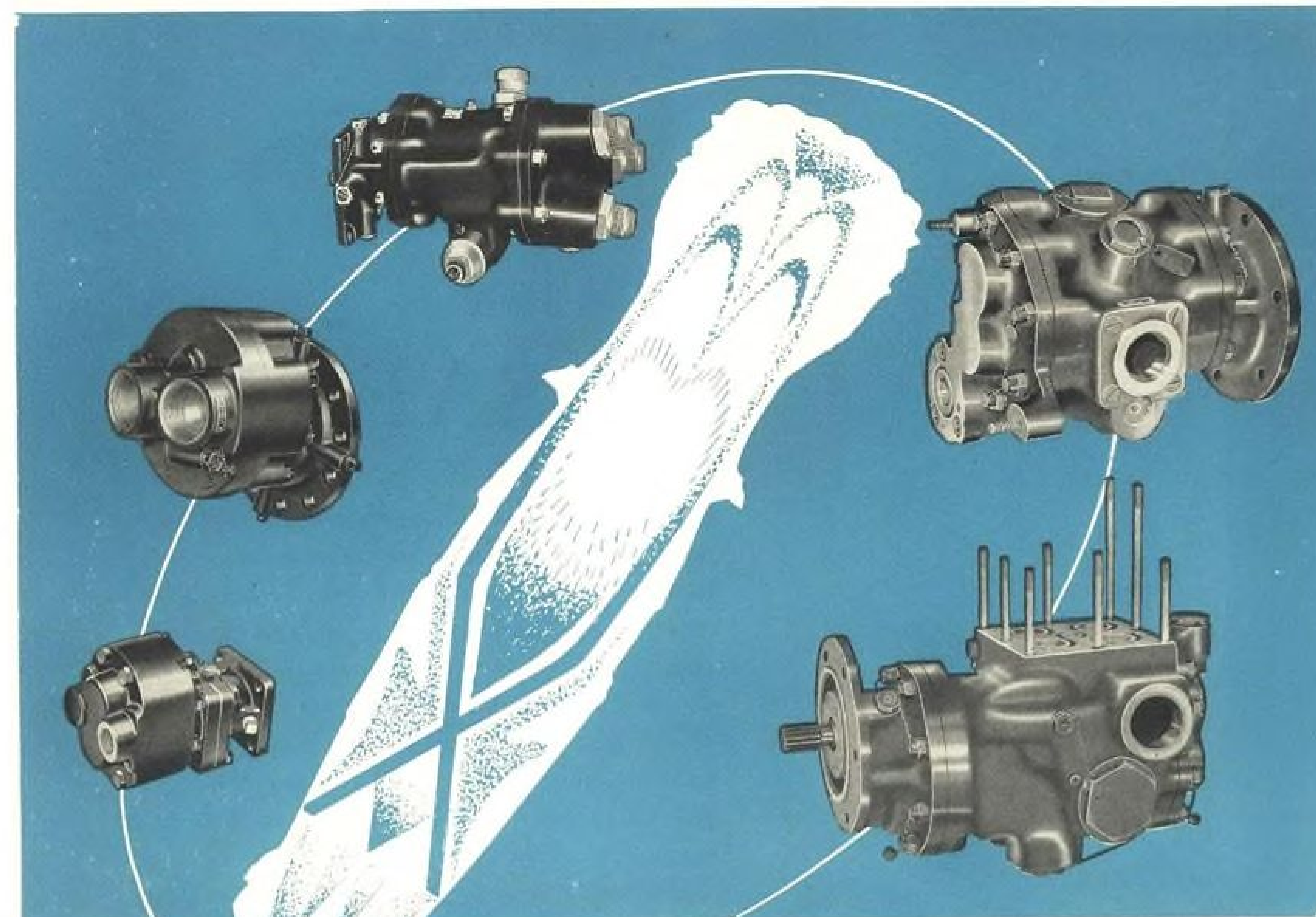
Melbourne—North American Sabre fighters and English Electric Canberra bombers to be made and assembled in Australia will be powered by Australian-built Rolls-Royce jet engines, which the government will make at Commonwealth Aircraft Corp.'s plant, Fishermen's Bend, Victoria.

The plant has already started to tool up for output of the axial-flow engines. And it is further learned that a second plant in New South Wales may later also build these powerplants.

The Sabre and Canberra are expected to start coming off the lines near the end of next year.

Recondition B-29s

Lockheed Aircraft Service, Inc., has been granted a \$1-million-plus contract to demothball an undisclosed number of Boeing B-29 bombers at Pyote, Tex., and prepare the planes for flight to Lockheed Aircraft Corp.'s overhaul facility at Marietta, Ga.



EVERY American Jet engine flying today is equipped with PESCO Fuel Pumps

Ever since the emergency call came in 1941 for a failure-proof fuel pump that would stand up and deliver fuel to jet engines under conditions never before encountered, Pesco has paced the industry in the development of high-pressure fuel pumps.

Pesco designed and built the first fuel pump for the first American-built jet engine, and since then new models have come from Pesco engineering laboratories in rapid succession to meet the fast-changing and exacting demands of the military.

Today, every American jet engine in the air is equipped with Pesco fuel pumps. A few representative models are shown above. They range from the first simple, single element pump that produced 275 gph at 100 psi, to today's double element (main and emergency pump in a single housing) pump that delivers nearly 2000 gph at 1200 psi.

Setting the pace for jet engine fuel pump development is only one of Pesco's important contributions to safer, faster, more dependable aircraft. It is experience that can be of real help to you.

Why not call Pesco today.



PRODUCTS DIVISION

BORG-WARNER CORPORATION

24700 NORTH MILES ROAD

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First in SAFETY

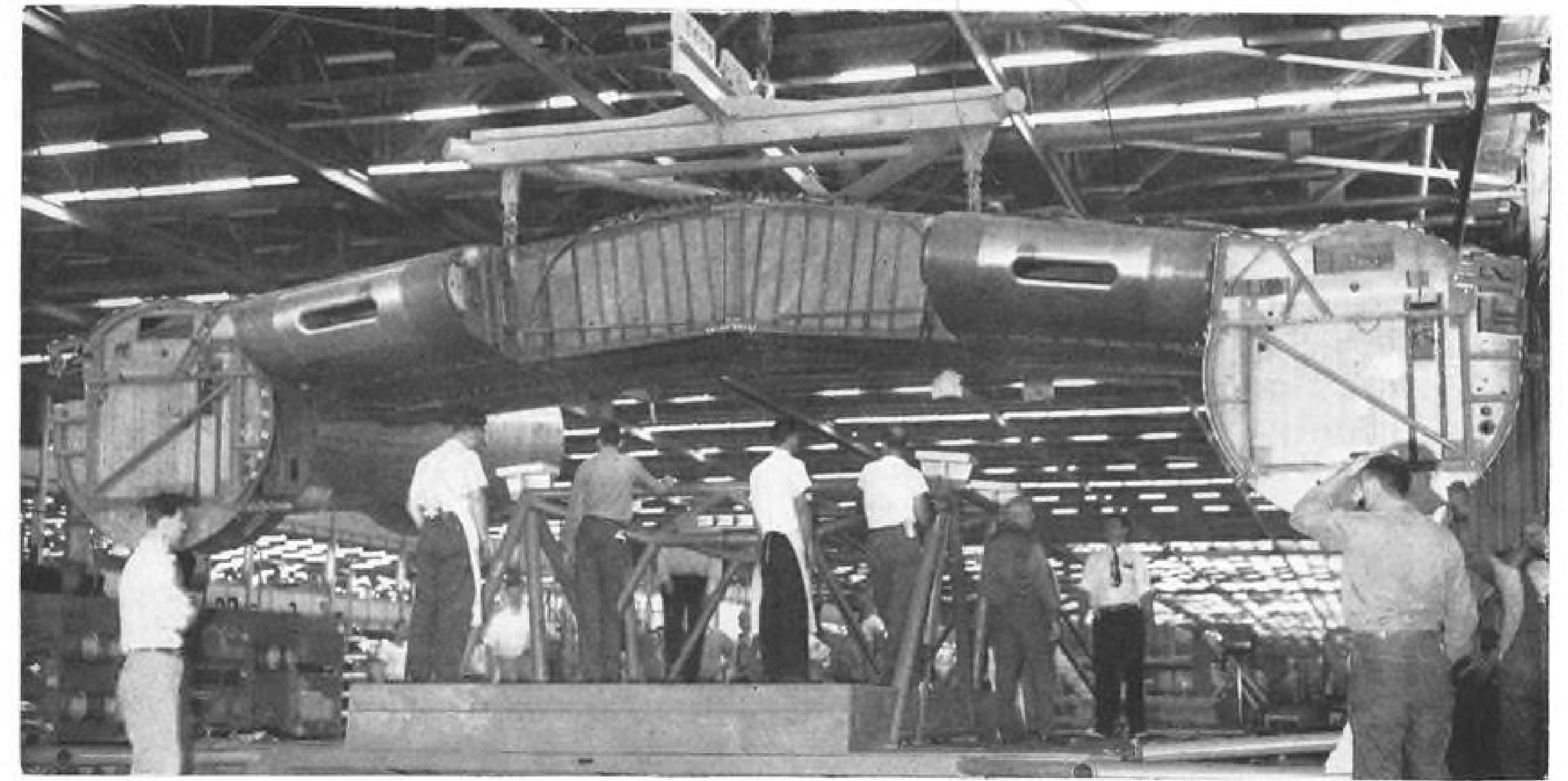
Getting urgently needed equipment and supplies to troops in difficult terrain has always been a decisive factor in warfare. Stanley Switlik and other pioneer parachute manufacturers reasoned that the materials could be dropped with properly designed parachutes. Then began the experiments with cloth and design from which grew today's cargo chutes. Thanks to this research and development, it is now possible to safely drop delicate equipment, medical supplies, food and other materials.

Another *first* through research for greater safety.



SWITLIK
PARACHUTE COMPANY, INC.

LALOR AND HANCOCK STREETS, TRENTON, NEW JERSEY, U. S. A.



C-119C WING SECTION, weighing 2,300 lb. with engine nacelles attached, is lifted off its assembly jig, taken by crane and . . .

The Mating of K-F's First C-119 Packet

• Willow Run moving along on Fairchild transport.

• But huge plant is still making 1,000 cars daily.

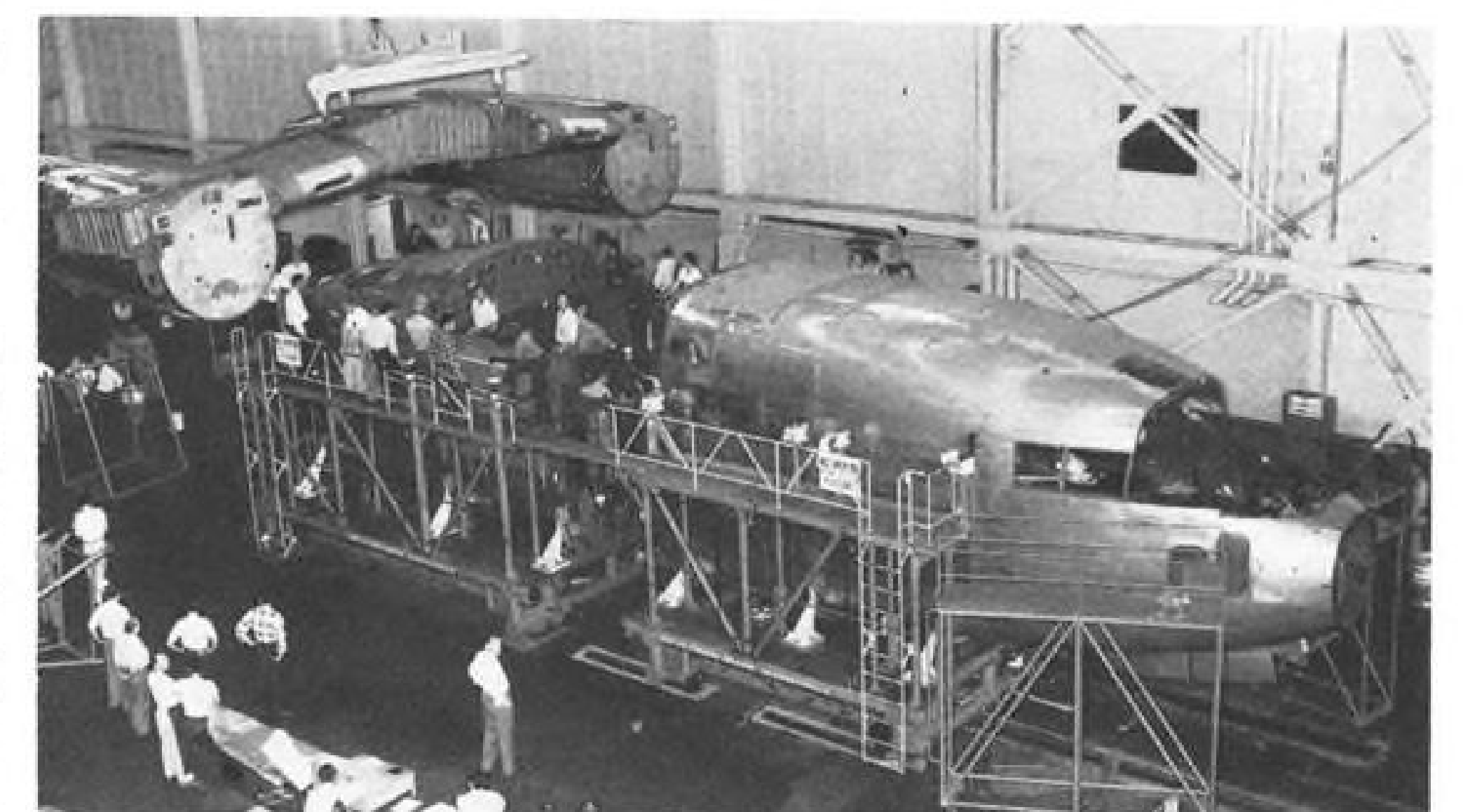
Henry Kaiser again is building cargo ships for defense—but this time the ships have wings, the methods and materials are a lot different. This photo sequence shows a climactic moment at the Kaiser-Frazer Willow Run plant, where the company is preparing for volume output of the Fairchild-designed C-119C Packet. Pictured is mating of complex wing center section and fuselage of K-F's No. 1 Packet.

As yet, K-F is still producing autos at the huge facility at the rate of 1,000 cars a day, but plans next year to take on a second cargo plane assignment—the Chase C-123 Avitruc.

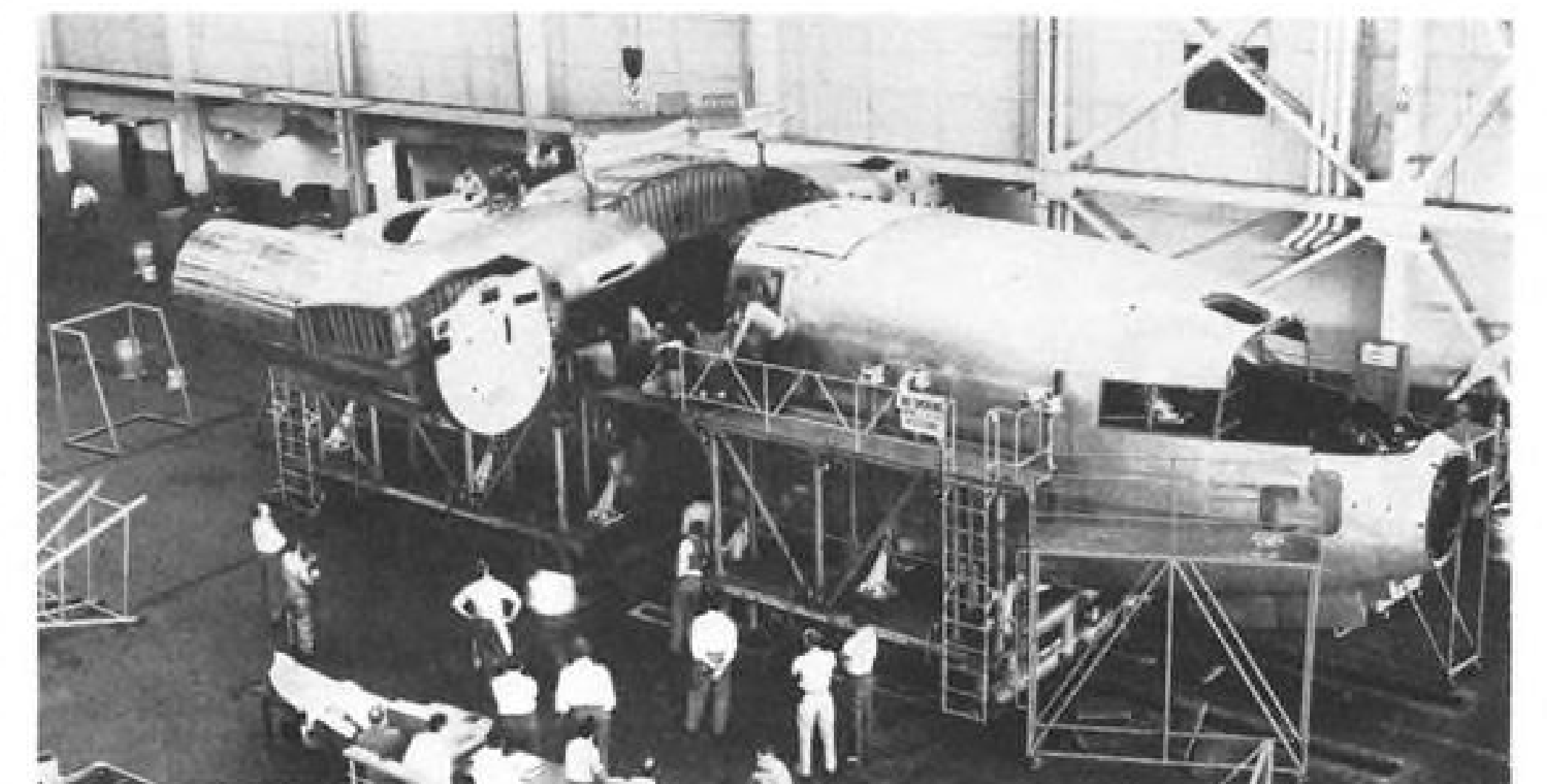
Other K-F plants are building Wright R-1300 aircraft engines (Detroit and Dowagiac); Lockheed P2V Neptune components (Oakland); a factory at Richmond, Calif., is being prepared to make Boeing B-52A jet bomber parts.

In all, the company has 2,315,000 sq. ft. of manufacturing space working for defense and about 8,000 workers engaged on various projects. Employment is expected to climb to 20,000 in six months, and to over 25,000 within a year.

Some 2,000 outside firms are handling K-F contracts on a prime and sub-contractor basis.



MANEUVERED into position above its corresponding fuselage, then lowered . . .



ONTO NO. 1 AIRPLANE mid-section. Forward cabin has not yet been attached.

Look To The Sky For Your Market

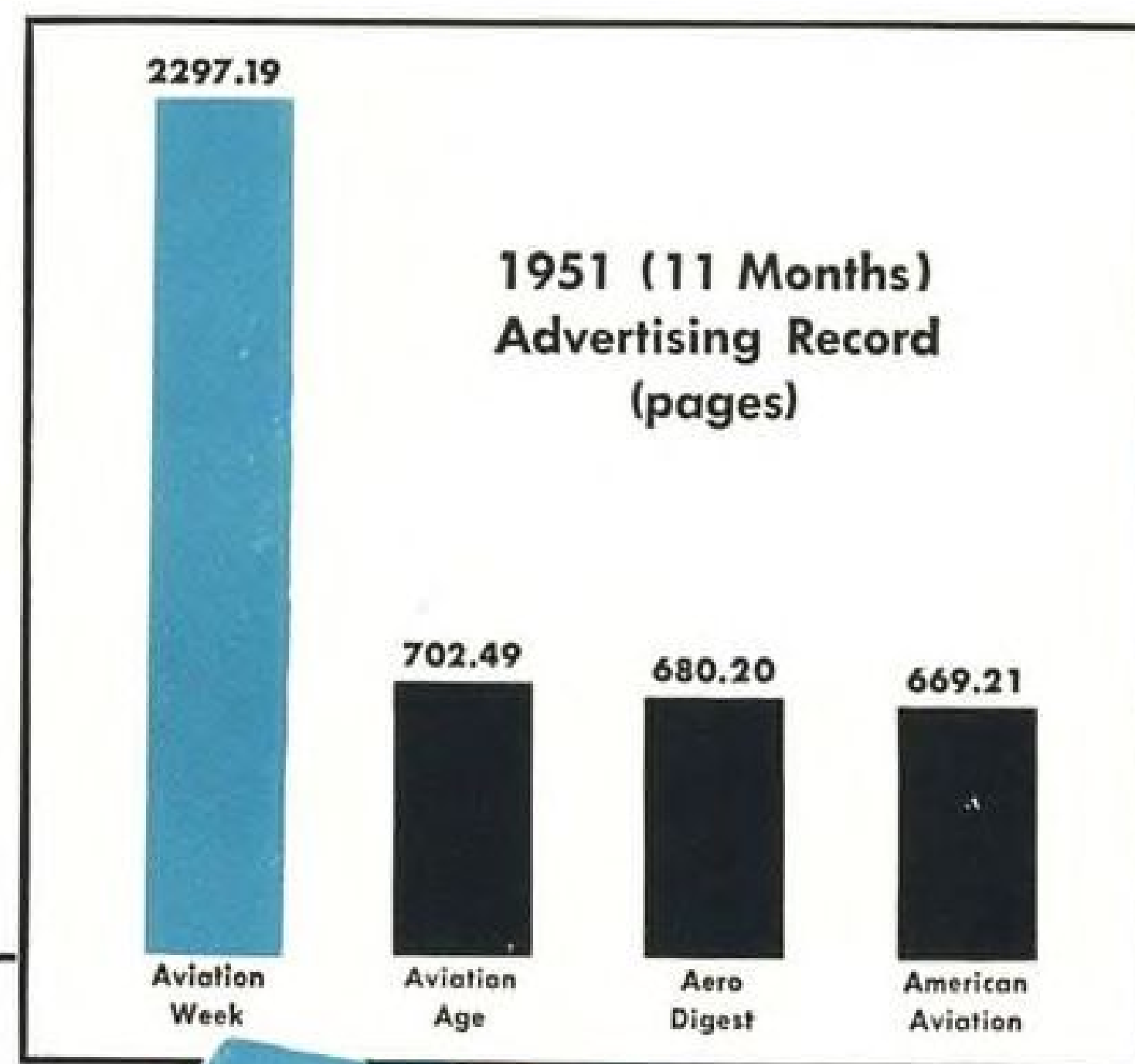


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OUR EXPANDING INDUSTRY

Airwork Corp., Millville, N. J., has doubled its production of Pratt & Whitney aircraft engines in the past six months and is joining Plants 1 and 2 to create additional working area. A new compressor building has been completed and a second Schramm compressor installed. . . .

Allison division of General Motors, Indianapolis, will build ten jet engine test stands, replacing those destroyed in an explosion last summer, will also put up a 125,000-sq. ft. building for fabrication and assembly of experimental engines. . . .

American Standard Products Co., Hartford, Conn., plans to build a 180,000-sq. ft. aircraft engine parts plant. . . .

Coleman Motors Corp., Littleton, Colo., has delivered the first of a \$9.5-million USAF order for B-36 towing tractors. Schedules call for delivery of 30 units in November, 40 in December, and 50 a month until completion of the order. The firm employs 300 and is building a 50x250-ft. addition to its plant. . . .

Consolidated Vultee Aircraft Corp., San Diego, Calif., is hiring Canadian and British layout designers in order to meet production demands. At Ft. Worth, engineering personnel are moving into a new \$650,000 test laboratory, with equipment in the 45,000-sq. ft. unit expected to be installed this year. . . .

Foote Bros. Gear & Machine Corp., Chicago, backlog has gone to \$25 million. Aircraft gears are more than half the firm's total output. . . .

Intercontinental Mfg. Co., Garland, Tex., has leased Brady (Tex.) Airport, acquiring 250,000 sq. ft. of floor space. The firm makes parts for Convair, Vought, Boeing and Martin, expects to hire an additional 500-1,000 workers for the Brady facility. . . .

Iron Fireman Mfg. Co., Portland, Ore., has received a large contract for electronic devices from Hughes Aircraft Co., necessitating increase in its working force. . . .

Luscombe Airplane Corp., Garland, Tex., has received a letter of intent from Convair-Ft. Worth to build B-36 rudders. Luscombe now is producing B-36 elevators and door assemblies for Convair.

ENGINEERS NOTEBOOK

HEATING
SYSTEMS

Photo Courtesy of Industrial Design Laboratories

MARMAN

V-Bands and integral welded flanges
simplify duct coupling on Globemaster

An ideal arrangement for coupling iris control valve in by-pass heating duct of the Douglas C-124 Globemaster II is achieved with a standard Marman V-Band Coupling and integral welded flanges. This is but one example of many diversified applications where standard Marman couplings and flanges provide the right combination of strength, light weight and positive seal, plus production and maintenance advantages of the patented "Quick Coupler Latch."

Save Cost, Time and Weight with Marman
FOR INFORMATION, WRITE DEPT. W-12

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EQUIPMENT

Revamped NWA Maps Maintenance Gains

• And carrier now plans to stick with its 2-0-2s.

• Study of crashes clears the plane, officials say.

By George L. Christian

St. Paul—Northwest Airlines plans to hold on to its 12 remaining Martin 2-0-2s, now serving in the domestic airlift through a lease arrangement with Transocean Air Lines.

The carrier had sold eight of its fleet of 20—five to California Central Airways and three to Transocean Air Lines—after its series of crashes. But a study of the accidents and Trans World Airlines' successful experience with the 2-0-2A (AVIATION WEEK Oct. 1, p.33) have convinced the carrier that the Martin is a good airplane.

NWA pilots' refusal to fly the craft after the crashes (AVIATION WEEK Mar. 19, p.15) was instrumental in deciding the line to sell the fleet. Now Northwest apparently expects the pilots to reverse their stand.

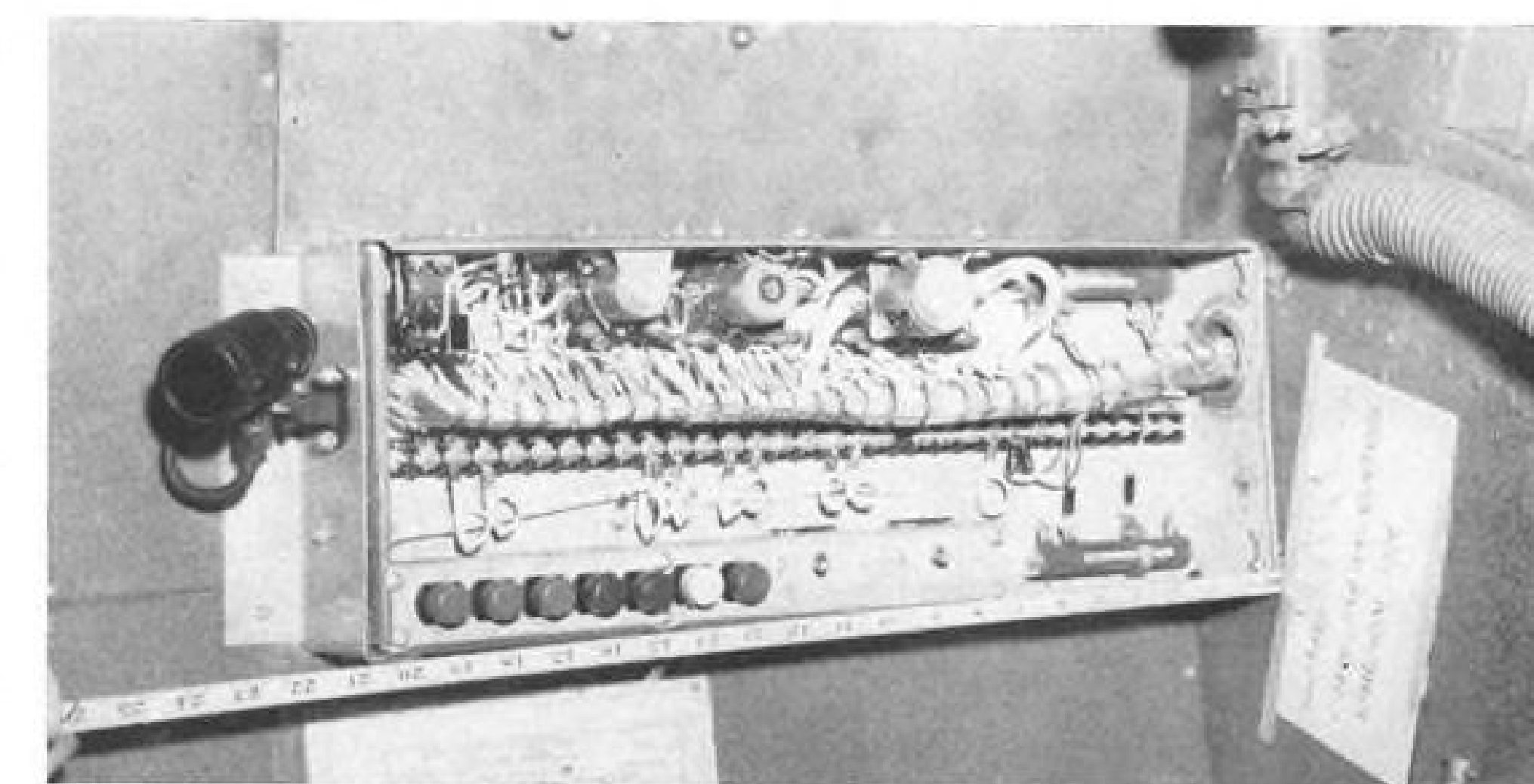
► **Crash Study**—NWA's executive vice president, Malcom S. Mackay, said a detailed study of each 2-0-2 crash had failed to discover any correlation between the aircraft and the accident, except for the wing spar failure at Winona, Wis. This was the main reason, Mackay said, for the line's decision to retain title in the remaining planes.

The tragic series of crashes resulted in a far-reaching reorganization of NWA's operations and maintenance departments. A recent visit to the airline's overhaul headquarters gave firsthand evidence of the revitalizing that is netting an impressive record of clean, efficient maintenance, straightforward flight operation and on-time scheduling.

Don O. Benson, manager of aircraft engineering, reviewed the latest wrinkles in Northwest's engineering department for AVIATION WEEK.

► **Hytrol Anti-Skid**—NWA intends to make a fleetwide installation of Hydro-Aire's anti-skid device, Hytrol, on its ten Boeing Stratocruisers (AVIATION WEEK June 4, p.49).

This decision was reached after more than nine months and some 2,000 hr. of exhaustive service testing. Here is NWA's experience with Hytrol:



TROUBLE TRACER checks operation of DC-4 cabin heater system. If one of the lights (lower left) does not go on, associated circuit is not functioning.

• **No maintenance.** Although the device was checked at regular intervals, it required no maintenance, according to Benson. Not a single part was changed during the entire evaluation program.

• **Sure, short stops.** Several landings made on icy, slick runways indicated that the plane's landing roll with Hytrol compared favorably with landings made on dry concrete runways under ideal conditions without Hytrol. The frozen runway rolls stopped within 50 - 200 ft. of the CAA certificated field length for dry runways, Benson said.

• **Kind to tires.** Although two-thirds of the tires removed from NWA Boeings during the nine-month test period were pulled for flat spots, not a single tire was removed for this reason from the Hytrol-equipped Stratocruiser. The records of the 14 tires used on this aircraft indicate an average life of slightly under 400 hr., unusually uniform wear, and not a single blowout was recorded. And no appreciable scuffing was evident.

The brakes got red hot, but continued to operate satisfactorily.

The entire Hytrol system for the Boeing weighs in at about 111 lb., takes some 96 man hours to install. Benson estimated the cost at \$2,500 per unit, plus \$200 for installation.

Currently, the pilots may disarm the unit at will. Benson hopes this feature will soon be eliminated.

► **Vapor Blast Benefits**—Northwest, one of the first airlines extensively to use Vapor Blast, a liquid honing process, thinks that it does a fine job,

according to C. E. Magnuson, assistant to manager, maintenance division.

Propeller blades that come in to the prop shop for overhaul are cleaned and nicks are ground out. Then comes the Vapor Blast treatment. This eliminates tedious hand buffing and polishing and gives an attractive, grey satin finish to aluminum blades. Magnuson says it moderately stress hardens the blade surface.

He claims it leaves an ideal surface for anti-icer feed shoe application. Also, blade seals seal better on shanks that have been Vapor Blasted, resulting in less leakage trouble.

Time-consuming honing of steel engine cylinder barrels has been eliminated in favor of the liquid honing process done in an automatic machine. The operation is speedier and produces extremely uniform ring-seating surfaces inside the cylinder.

Vapor Blast is used to advantage on a wide variety of engine components, such as intake and exhaust valves and piston pins, to remove corrosion. It also is good for preparing parts for plating.

► **Tail-Down Landing.** NWA is probably the only airline in the world that has an established tail-down landing procedure for tricycle landing gear aircraft spelled out in its operations manual.

This is a result of a 2-0-2 coming in to land at Billings some time ago with nose gear jammed in the up position. The captain asked advice of headquarters.

The airline's engineers figured that

the plane, with excellent CG characteristics, could make a tail-down landing without undue hazard to passengers and crew. The load was shifted rearward to the maximum permissible limits.

The pilot made two passes at the field. On the third pass, he actually touched down the main gear with power on. The plane felt so good that he chopped everything and held the tail on the ground.

The general results were so encouraging (the plane's stable handling characteristics, damage to structure negligible) that tail-down landing procedures were

established for the 2-0-2 and DC-4, and included in the operations manual.

Since its establishment, another 2-0-2 and a DC-4 have been landed according to the plan, with the same success.

► **Engine Conversion**—NWA is going into an extensive two-step conversion of its 63 R-4360 Pratt & Whitney Majors, according to G. R. Luck, supervisor, powerplant engineering.

P&WA will supply the kits, starting in March, 1952, for phase one. This consists of converting the engines from model TSB-3G to R-4360 B-6 (for use with 108-135 octane fuel) and the B-7 (for use with 100-130 octane).

This major conversion changes all parts in the engine except the cylinders, rear and blower cases. It includes installation of low tension ignition systems (which uses four instead of the current seven magnetos).

Second phase, due to start late in 1953, involves replacing the cylinders with newly designed units having an appreciably greater cooling area around the exhaust valve (engine will receive the designation CB-2). This requires a new exhaust system. There is a big question—who is going to manufacture it?

Benson said that P&WA wants Northwest to have them made and to sign a waiver relieving P&WA of any responsibility. NWA does not relish such terms, Benson asserted.

Northwest hopes the modification will give up to 1900 hp. per engine for cruise instead of the current 1675 hp. NWA also looks for greater reliability and an overhaul time greater than the current 900 hr.

► **Other Engine Data**—Benson said NWA is trying to push spark advance up from 20 to 25 deg. before top dead center. Purpose is to obtain greater fuel economy, as Pan American World Airways has done (AVIATION WEEK Oct. 15, p. 57), and lower exhaust temperatures. The latter will result in greatly improved turbosupercharger life.

NWA is happy with flooded rocker boxes. Its engineers said "you could still read the part number at overhaul; before they were all covered with coke."

The combination of Ni-Resist exhaust valve guides and T. P. M. exhaust valves has cut unscheduled cylinder removal rate from 250 per month to about 20.

Contrary to the practice of some other Stratocruiser operators, Northwest does not condone smoky engines. It's bad on public psychology. The carrier is working hard to eliminate the nuisance by changing the main scavenger pump; inspecting for clogged inter-rocker box oil lines; and checking for clogged tappet drain passages.

► **Turbosuperchargers**—The airline is trying to raise turbosupercharger overhaul period from the current "little over 500 hr. with inspections every 85 hr.," said Benson. NWA is conducting the first commercial service test of the dovetail turbo bucket installation.

In this configuration, buckets are cast in pairs and attached to the turbine wheel rim with "Christmas Tree" attachments. At first, single buckets were tried, but there was a problem of making the Christmas Tree small enough. This was licked by making the buckets in pairs. Advantages:

- Stronger bucket material may be used, since welding is eliminated.
- Changing buckets in pairs is now

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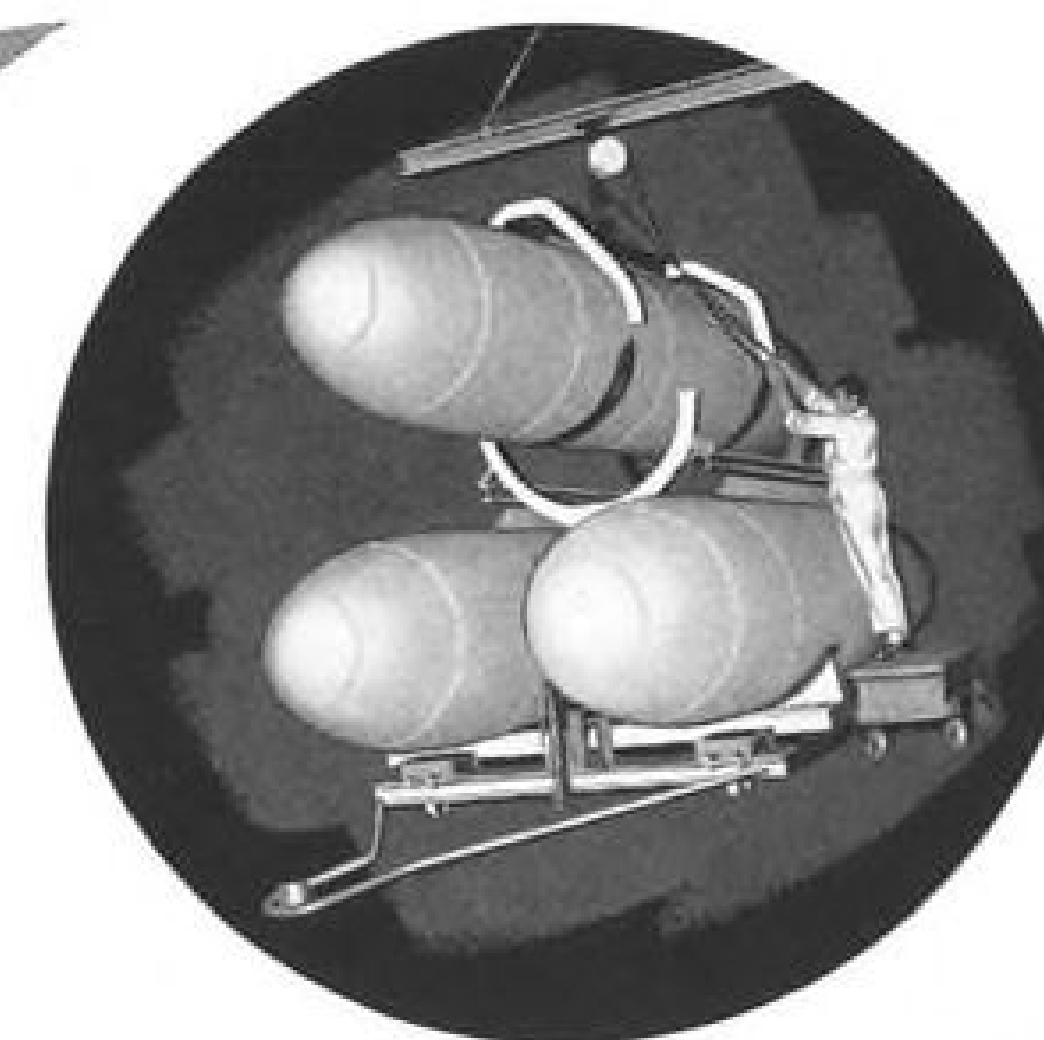
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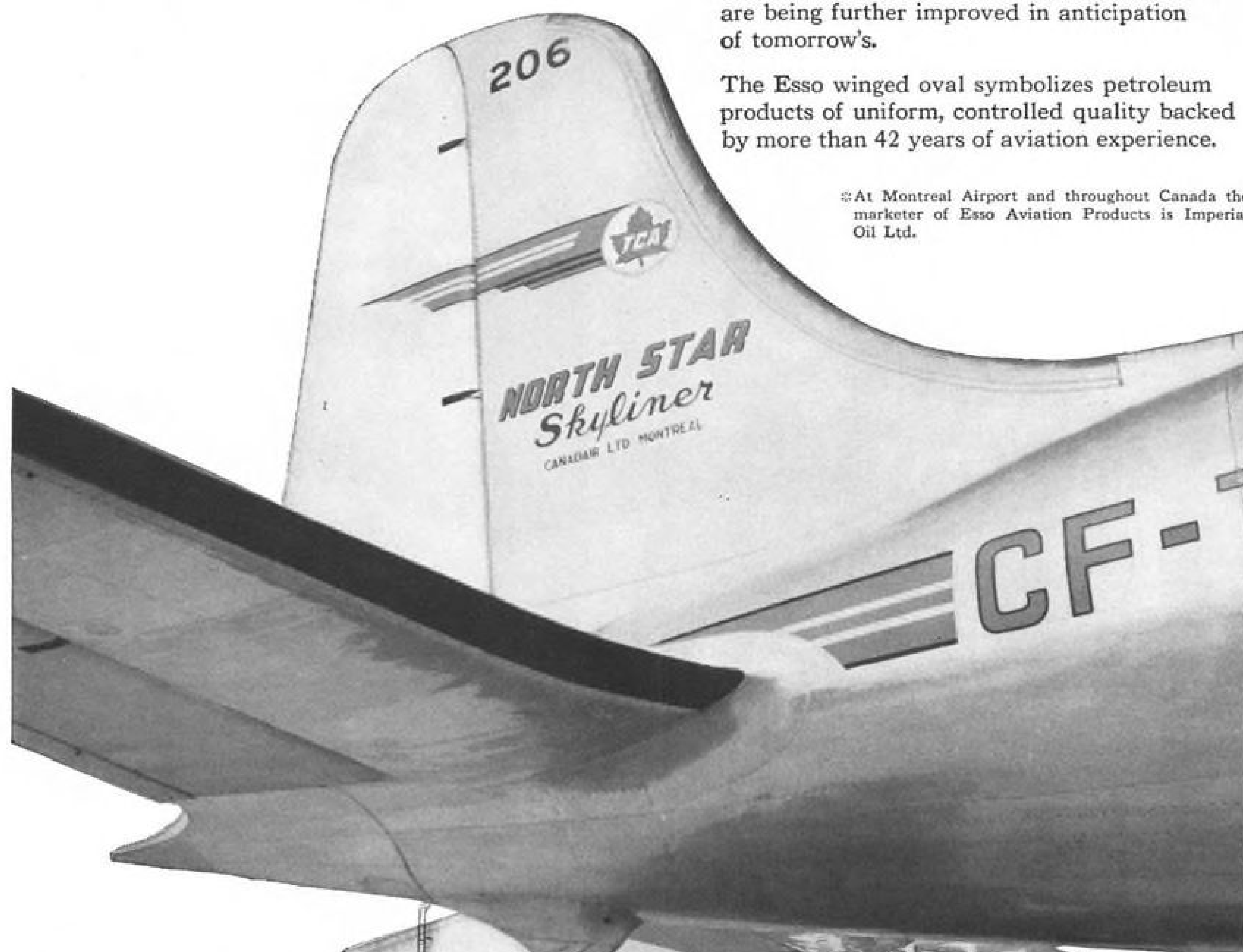
Electronics Research
and Development



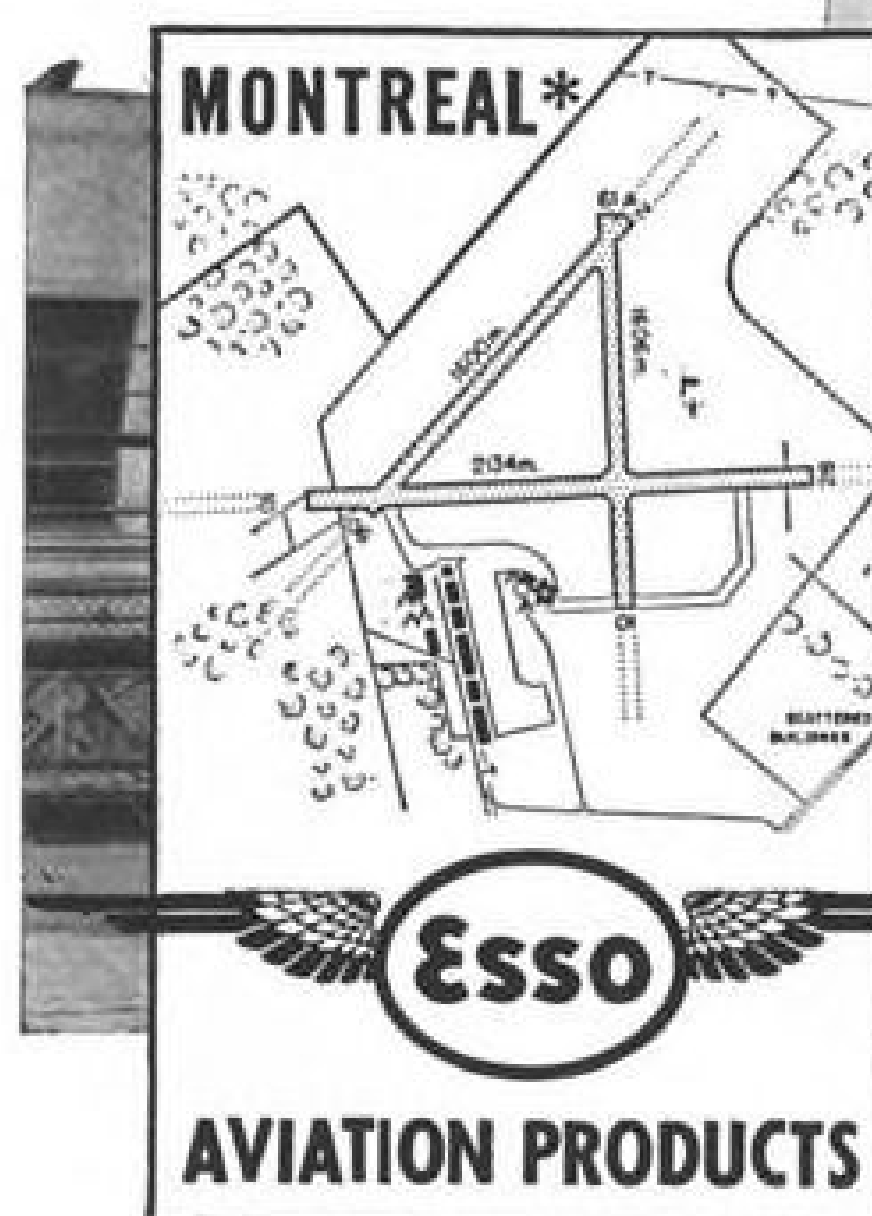
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possible in event of failure, instead of changing the entire wheel assembly. ▶ **Effective Anti-Icer**—Northwest, operating through about as rugged winter weather as any airline in the country, vouches for this method of anti-icing its planes:

Spray them with a solution of 80% propylene or ethylene glycol and 20% water, using an orchard sprayer. Mixture is non-inflammable, odorless and inert, says Benson, and is not unreasonably expensive. Not only is the fluid a good anti-icer while the ship is on the ground, but clings, helps keep the plane clear of ice during and after takeoff.

A Boeing requires about 20 gal. of the mixture.

▶ **Heater Trouble-Shooter**—Northwest has invented and installed an ingenious central trouble-shooting panel for cabin heaters on its fleet of 23 DC-4s (see cut, p. 55).

It includes seven lights, wired in sequence. If any one light does not go on, the panel indicates that trouble exists downstream from that light. Since each bulb refers to a particular circuit in the heater system, the malfunction is quickly fingered. The seven lights are wired into these circuits:

- Power to heater control circuit (green light).
- Duct damper switch operation (green light).
- Ventilating air ram switch action (green light).

• High temperature limit switch functioning (amber light).

• Heat signal amplifier operation (amber light).

• Control relay functioning (white light).

• Ground blower circuit operation (blue light).

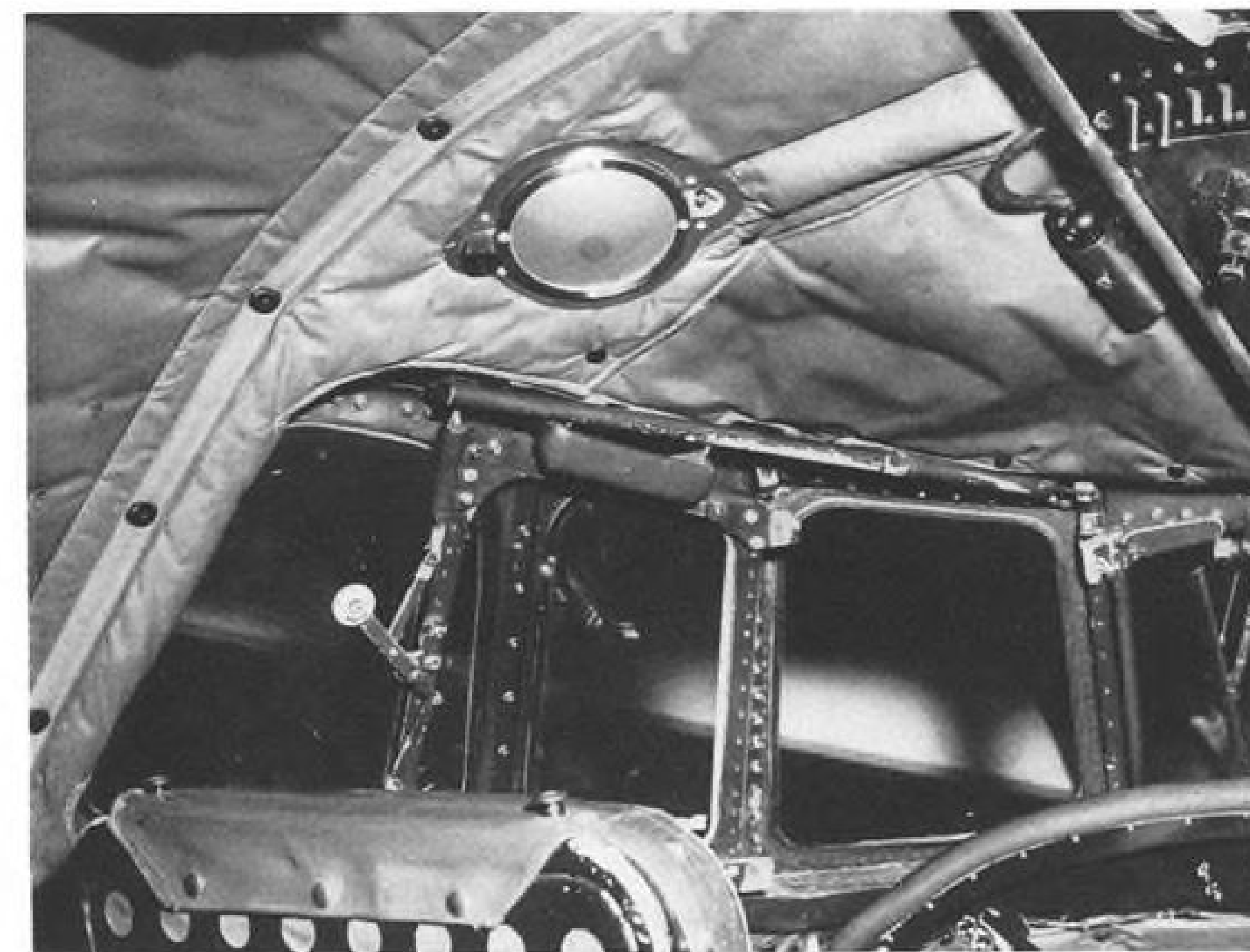
The panel, located in the ceiling of the aircraft directly behind the cockpit, saves much time in troubleshooting heating system complaints, says T. E. Cooper, supervisor, airframe engineering. It is particularly valuable when trouble occurs at line stations, where the unit reduces ground delays.

▶ **NACA Icing Tests**—Because of its wintery routes, Northwest is the ideal airline to run icing tests. And it has been doing a lot of work along this line for the NACA, Benson said.

One instrument used is a rotating disc ice rate meter. The unit consists of an arm projecting from the fuselage at the end of which a slowly rotating metal disc is held edge-wise into the airstream. Ice, gathering on the edge of the disc raises a floating arm, which records the thickness on photographic film. As the disc continues to rotate, a scraper removes the ice and accretion starts all over again.

Benson said that six new-type ice rate meters had been installed on NWA's DC-4s—two on the Orient run planes and four on domestic ships.

The instrument measures the bal-



C&S COCKPIT SPEAKER

New cockpit speaker-amplifier is seen installed above the captain's seat in a Chicago & Southern Constellation. The assembly, recently approved by the CAA, according to C&S, weighs only 2 lb., measures 8½x5x2½ in., and has a 2½w. undistorted

power output. The 5-in. Jensen speaker has a range of 250 to 6,000 cps. Units will give the crews greater comfort by eliminating need for wearing headsets. Earphones will be carried, however, as stand-by equipment in case of speaker-amplifier failure.

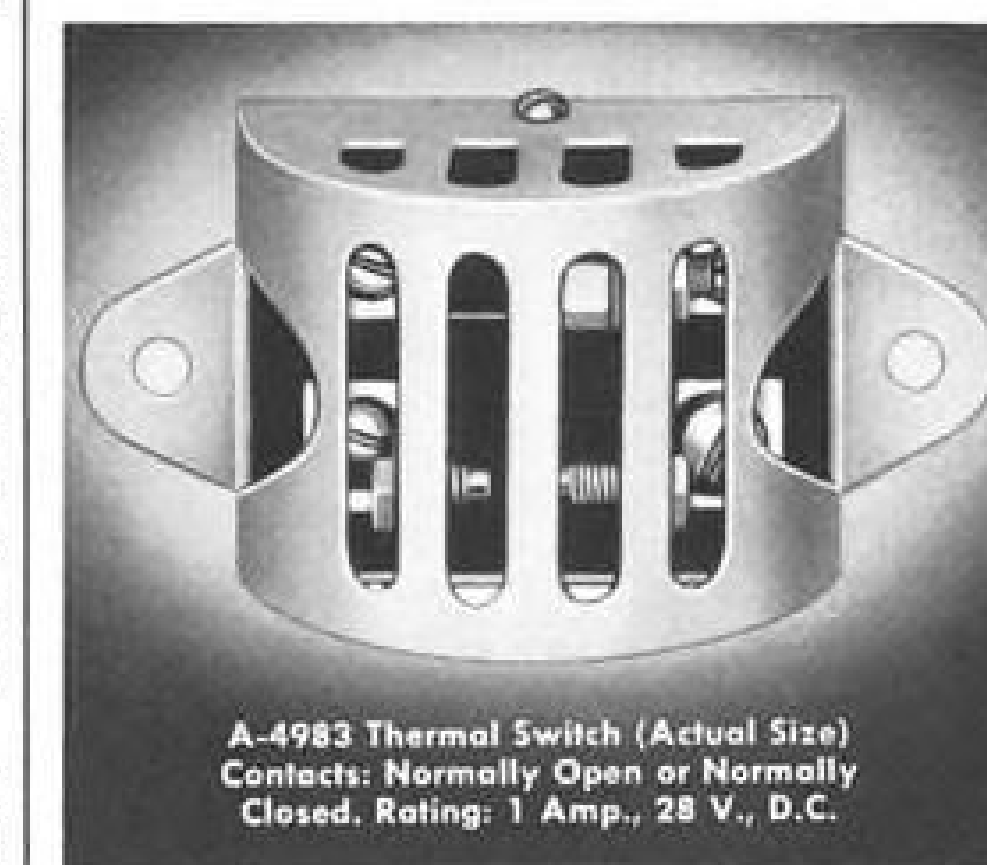
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The snap acting, bimetal element now used in Wilcolator thermal switches is an entirely new basic advancement in thermal blade design.

With normally closed contacts, the contact pressure actually increases right up to the instant the blade snaps and opens the circuit. When contacts are normally open, the blade deflects away from the stationary contact until the moment it snaps and closes the circuit.

This provides more positive snap action and gives added assurance that vibration or shock will not accidentally open or close the circuit. Other snap acting, bimetal blades gradually reduce their contact pressure to zero when contacts are normally closed, and deflect toward the stationary contact when contacts are normally open.

Better sensitivity is obtained with Wilcolator thermal switches because with their open construction the bimetal element is in direct contact with the ambient temperature. Wilcolator thermal switches meet all sand and dust test requirements.

Accuracy is assured, because each unit is factory calibrated and adjusted to required operating temperature.


Small, compact, and light, Wilcolator thermal switches weigh less than 2 ounces. Overall size: 2½" x 1½" x 1".


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ance of pressure between the pitot tube and the "ice collecting unit" of the instrument. This unit consists of a tubular "U" extending into the airstream. Into the base of the U are drilled ten 0.014-in. holes. When these holes ice up, the balance with pitot pressure is disturbed, and a heating element is activated which melts the ice on the collecting unit. Speed of cycling of the heater indicates rate of ice accretion and is recorded on film.

► **Efficient Clean-up**—Magnuson believes Northwest has one of the most efficient and effective parts cleaning set-ups of any airline. Used primarily for engine components, it is also used to a lesser degree in the propeller, sheet metal and accessory shops for the cleaning of parts in those departments.

Parts first pass through a vapor degreaser using a trichlorethylene solution at 185°F. The solution is kept at the proper strength by weekly testing in NWA's chemical laboratory.

The engine parts are shifted to Magnus Agadip tanks containing liquid called Magnus 755 at 140°F. The 755 solution also is checked for strength once a week, changed each 6 months. The parts are finally rinsed in Stoddard solvent. Redistilling saves about 70% of the solvent. Magnuson says that this method of cleaning has largely licked the main problems of removing carbon and graphite deposits.

He finds that NWA's method saves manhours, is rapid in action, is economical, and is flexible, because it can handle either large or small volumes of work with ease.

Magnuson cites these figures for cleaning engines, including grit and Vapor Blasting of cylinders and valves: R-2000, 18 manhours; R-2800, 22 manhours; R-4360, 36 manhours.

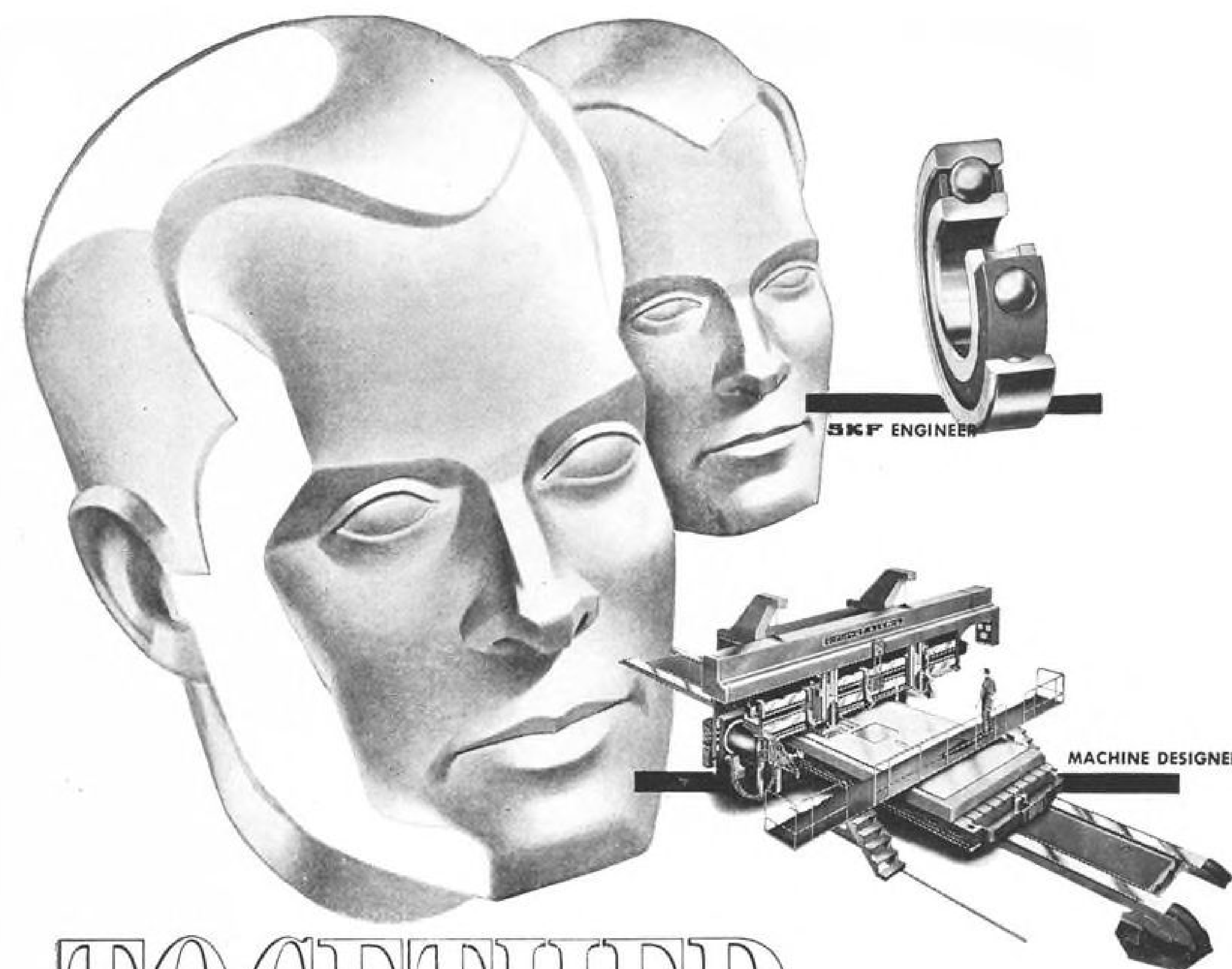
Northwest has acquired a fleet of DC-3s partially to offset the loss of its 2-0-2s. Some were purchased privately, others were traded with California Central Airways.

Officials of the carrier say that they have no immediate plans for the purchase of new, modern, highspeed twin-engine equipment.

TWA 4-0-4s to Have Movable Bulkheads

Kansas City—Trans World Airlines' soon-to-be delivered fleet of Martin 4-0-4s will feature a movable forward bulkhead, say TWA officials.

The partition can be moved rearward three rows of seats. Forward seats may be removed to provide cargo space when loads so dictate. Conversion takes 20 min., according to TWA, and cargo tie-downs have been provided.



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NEW CONVAIR-LINER 340

combines maximum safety and unequalled vision by using Pittsburgh Flexseal Safety Glass



Passenger cabin windows, as well as windshield and adjoining "direct-view" (DV) windows, of the new Convair-Liner 340, combine safety and vision through use of Pittsburgh Flexseal Safety Glass. First deliveries of more than 100 of these high-speed 44-passenger transports will be made to airlines by Consolidated Vultee early in 1952.

WHEN AMERICA's newest twin-engine transport—the new Convair-Liner 340—goes into airline service early in 1952, it will feature laminated glass in every opening. This important contribution to passenger safety and convenience is the result of the combined efforts of the aircraft builder and Pittsburgh Plate Glass Company engineers.

The passenger cabin windows make use of a new and improved offset design of Pittsburgh Flexseal Safety Glass. This tempered glass

and plastic lamination, securely mounted to withstand the demands of high-speed, pressurized operation, gives passengers a clear, "photographic" view of passing scenes.

The windshield and adjoining "direct-view" (DV) windows are Flexseal, too. The windshield is of novel design, permitting installation of the Flexseal Safety Glass from outside the plane. It is bird-resisting and equipped with electrically-heated NESAGlass for unimpaired vision under every flight and weather con-

dition. An offset design makes the Flexseal Glass an integral part of the openable "DV" windows.

The experience of Pittsburgh engineers in glass and glazing methods, together with our research and production facilities are at the disposal of all aircraft manufacturers, large and small. Bring your Safety Glass and glazing problems to Pittsburgh; they'll receive careful attention. Pittsburgh Plate Glass Company, Room 2317-1, Grant Building, Pittsburgh 19, Pennsylvania.



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Hot Air Jets Chase Fog Away

A new, radiant heating system designed to remove snow and ice from runways and disperse fog, has just been patented by Paul L. Geiringer of American Hydrotherm Corp., Long Island City, N. Y., the company has announced.

Using water at 300-400F. under pressures of approximately 250 psi. in pipes about 6-to-8 in. below the surface of the runway, sufficient heat is provided to keep the surface clear under the most adverse conditions of ice and snow, the inventor says.

Geiringer told AVIATION WEEK that about 150 Btu./sq.ft./hr. is required to heat the runway initially, then demand drops to roughly 100 Btu. to maintain sufficient heat.

Geiringer claims that because of the favorable heat transfer properties of high temperature water, pipes may be small in diameter and spaced on wide centers, resulting in considerable savings in metal, insulation, trench requirements and installation costs, compared with other systems.

The inventor says his heating system is "also applicable to other airport surfaces such as taxiways, loading aprons, airport buildings and hangars."

Fog dispersal is achieved by ejecting air jets, heated by the underground hot water pipes, onto the runway. Geiringer estimates that the maximum height of effective fog dispersal with his system is 30 ft.

Successful laboratory tests of the system have been under way at Bethlehem, Pa., for the past two years, and the Navy has expressed considerable interest in his patent, the inventor of the system claims.

British Mobile Unit For Change of Air

A new air mobile conditioning unit, Type R-2000 Trolley, is being quantity-produced by Sir George Godfrey and Partners (Canada) Ltd., Montreal.

An unrevealed number of the units will be supplied to British Overseas Airways Corp. for use along the carrier's routes.

The machine's cooling section can supply 1,860 cfm. of air at 32F when ambient temperature is 120F. It has a heating capacity of 300,000 Btu./hr. For testing cabin leakage rate, it can provide up to 1,500 cfm. free air at pressures up to 12 psi.

The unit is designed to operate at altitudes up to 7,000 ft and in any climate.

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Leighton Collins, Editor of Air Facts, has logged a comprehensive story, "5000 Miles by Omnigator," in Air Facts Magazine. He states, in summary, "A cross-country exploration and study of our elaborate omni-range and ILS facilities reveal that the system is incredibly good and that, for the first time, the small plane owner has something he can rely on in fair weather or foul, high or low, and especially in thunderstorm areas."

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NEW AVIATION PRODUCTS



Big-Plane Weigher

A compact electronic kit for weighing of all but the heaviest aircraft flying today now is being produced by Cox and Stevens Aircraft Corp.

Weighting only 95 lb. itself, the new rig, Type CS-7B, is neatly packaged in a suitcase for convenient handling and can tell weight of military and transport planes pushing the scales to 300,000 lb. It already has been purchased by such firms as Hughes Aircraft, Boeing, and by NACA and Bureau of Standards, the maker reports. Accessories are similar to those in a kit of 150,000-lb. capacity produced by the same firm and widely used in the industry.

The equipment includes three load cells (resistance wire strain gage load pick-ups) each of 100,000-lb. capacity for compression loads. Load cell readings may be taken individually or totalized, depending on circuit design specified. Accuracy is given as 1/20 of one percent throughout the entire weight range of the unit. The set is available with a "Power Pack" for use with 110v.a.c., or 24/28v.d.c. current.

Cox and Stevens Aircraft Corp., Mineola, N. Y.

Tough Plastic Rope

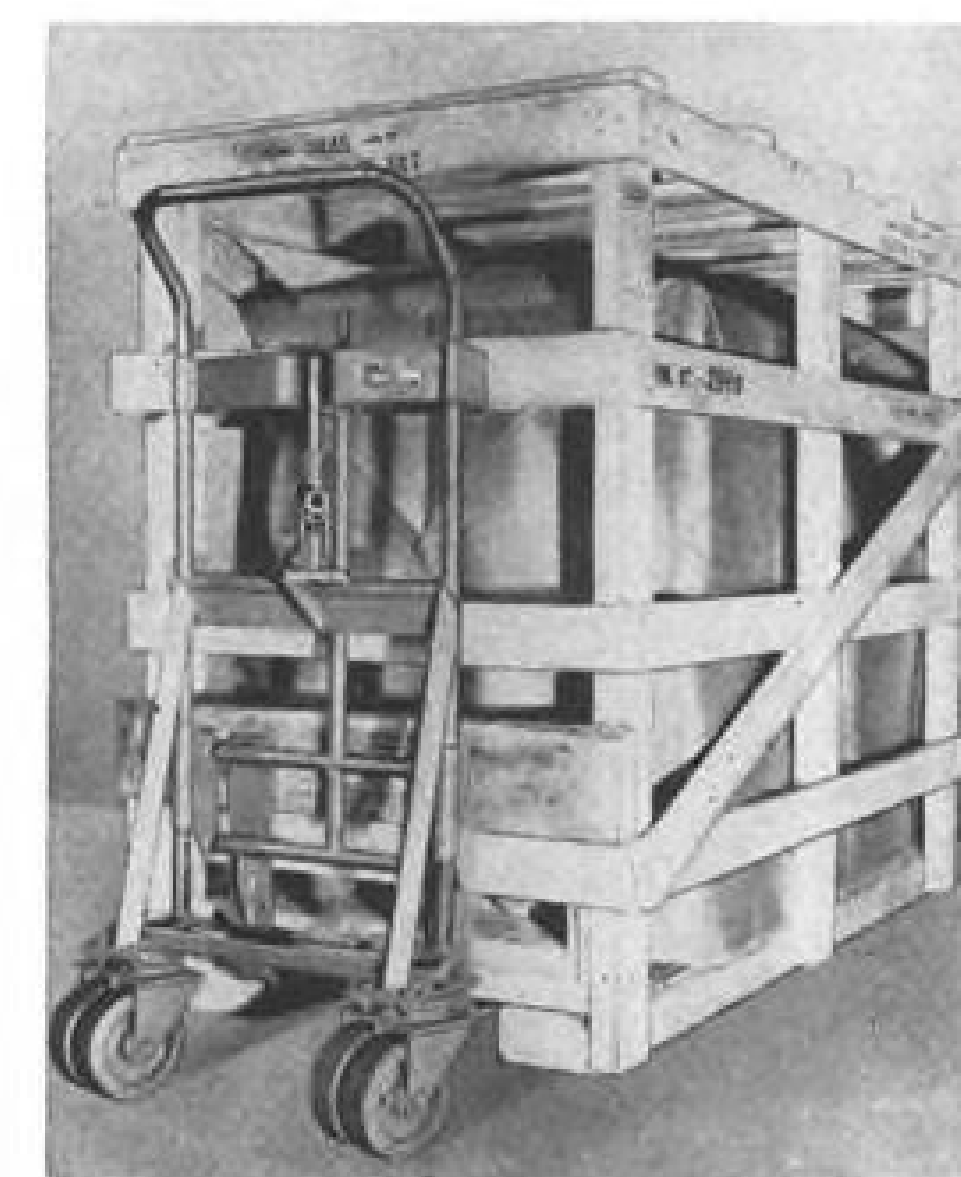
Wide military and civil use is seen for a new Polythene plastic rope which floats, remains flexible down to -60F and weighs less than dry hemp.

The rope, having possible application in aircraft survival gear, towing, etc., has advantages over similar nylon products, according to its maker, Plastic Rope Co., Inc. The Polythene material used is resistant to formic acids and concentrated mineral acids, while nylon is not, says the firm. And specific gravity is .92 compared to 1.09 for nylon.

The rope has high electrical insulating qualities, can be subjected contin-

uously to temperatures of 212F, is not affected by tropical rot, weathers well and is said to be resistant to any known solvent at normal temperatures. It is slightly elastic to take up shocks and is supplied in diameters from 1/4 to 2 in.

Plastic Rope Co., Inc., Redwood City, Calif.

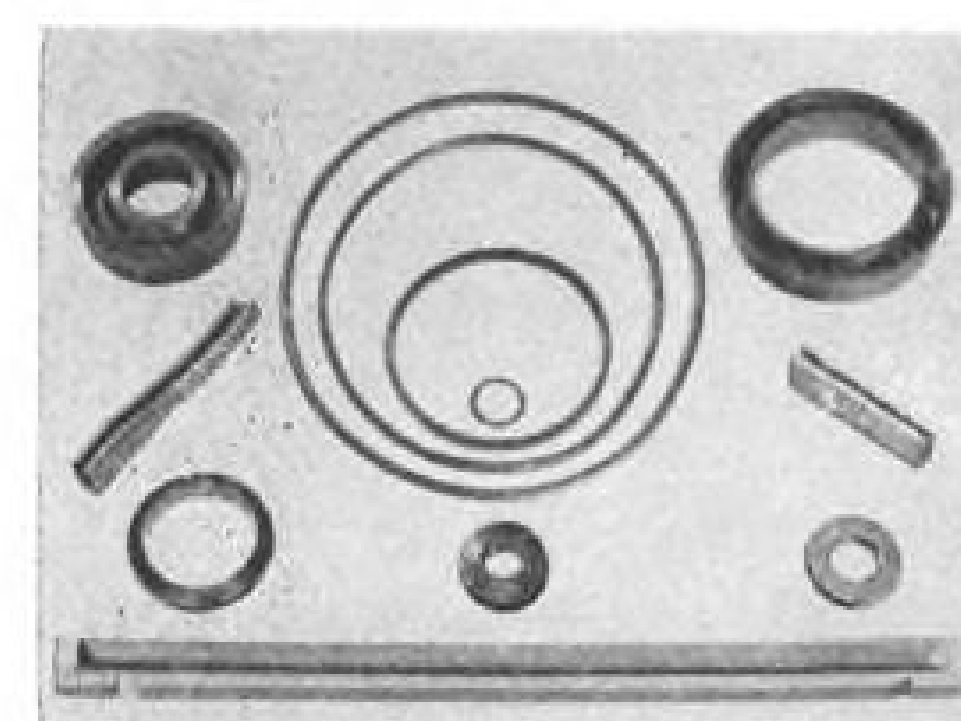


Air Cargo Dolly

"Rol-A-Lift" air freight dollies, designed specifically to reduce stress on plane floors during loading operations, have been placed on the market by Skarnes Engineering & Supply Inc.

Dual rubber tires on these units spread out the load. They also are of larger diameter than normally used with equipment produced by the firm. Like hand trucks, the dollies are used one at each end of the load, in pairs rated for capacities from 500 to 2,000 lb. Larger models for aircraft service are under development to carry loads from 4,000-5,000 lb./pair.

Skarnes Engineering & Supply, Inc., 2905 E. Franklin Ave., Minneapolis 6.



Resistant Rubber

"X 1692," a new rubber compound for packings, bushings, seals, etc., designed to keep swelling and shrinking of these parts at a minimum when used with various oils, has been developed by Acushnet Process Co.

The product gives maximum resist-

Space Savers



Engine Instruments by WESTON

Meet the latest military specifications. Hermetically sealed, and with flanges eliminated to conserve panel space. Quickly mounted by simple clamping method. Available as Temperature Instruments for latest aircraft requirements. Weston Electrical Instrument Corporation, 579 Frelinghuysen Avenue, Newark 5, N. J., manufacturers of Weston and TAGliabue instruments.

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Aircraft Instruments

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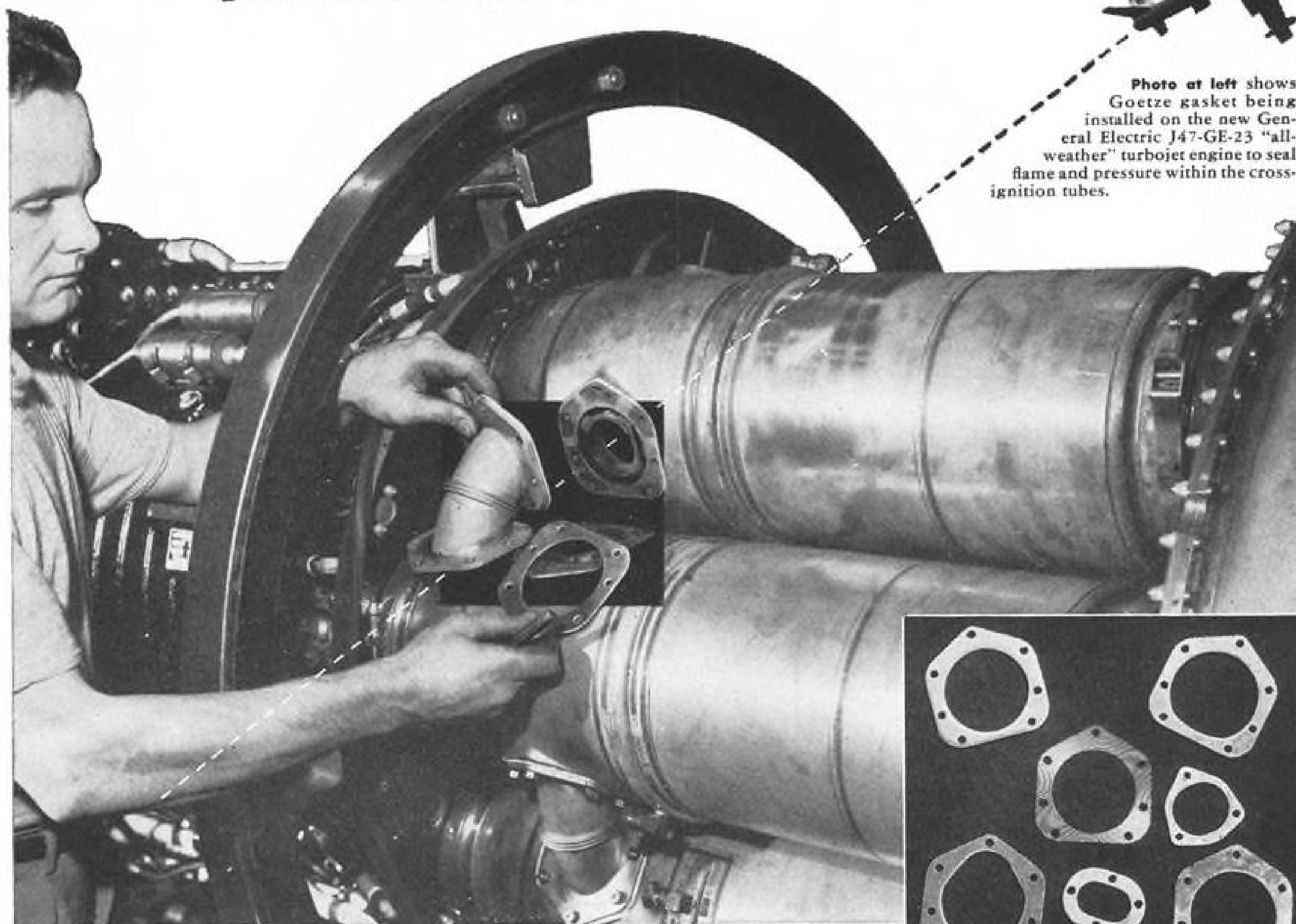
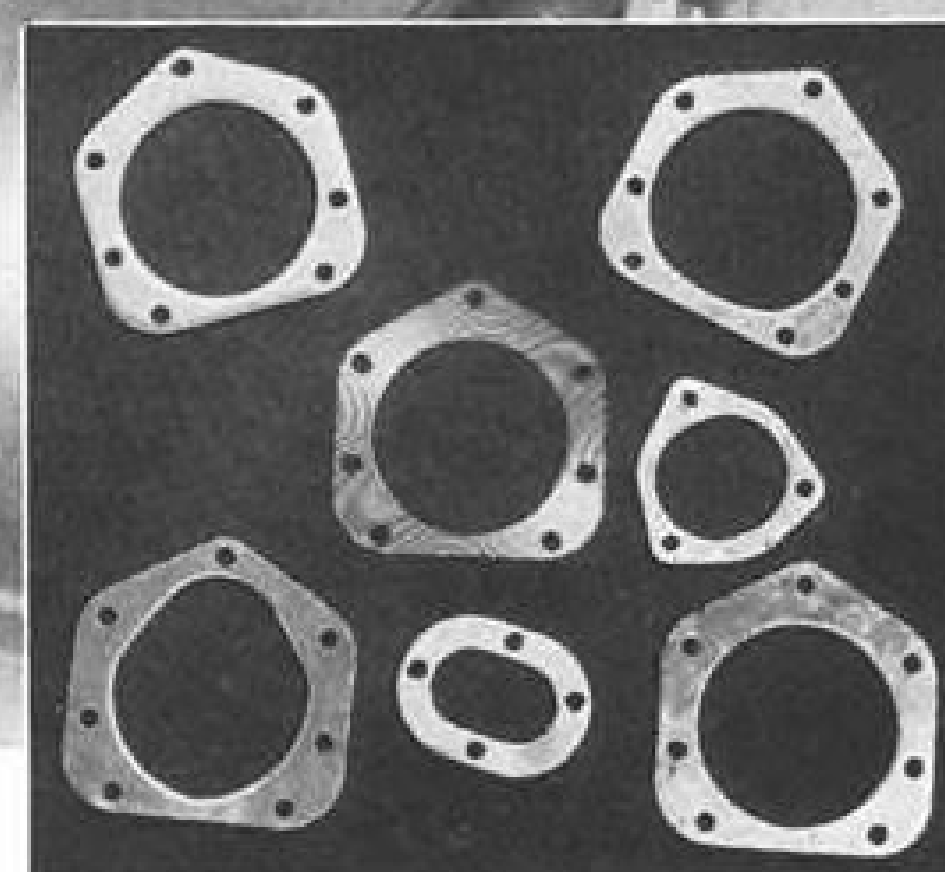
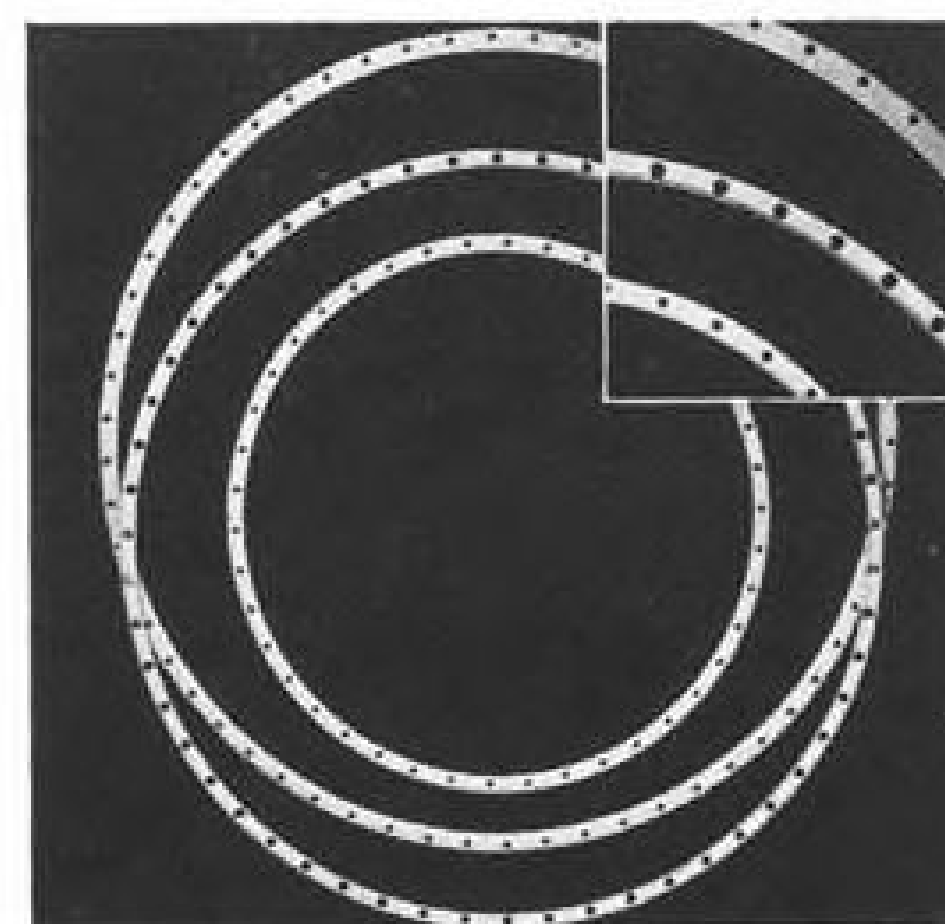


Photo at left shows Goetze gasket being installed on the new General Electric J47-GE-23 "all-weather" turbojet engine to seal flame and pressure within the cross-ignition tubes.



J-M Goetze Gaskets can be fabricated in any shape for sealing cross-ignition tube connections. A few examples are shown here.



For turbine casing flanges J-M Goetze Gaskets provide the resilience required to overcome warpage usually encountered.

J-M Goetze Gaskets guard against critical flame and pressure leakage

Keeping flame and pressure from leaking where cross-ignition tubes connect combustion cans on the new J47-GE-23 "all-weather" turbojet engine is a typical example of the difficult and critical sealing problems that are solved with Goetze custom-crafted metallic gaskets.

The particular Goetze style used for this job is a metal-jacketed asbestos gasket, precision-made to fit tight and stay tight in service. It withstands temperatures to 850F and all operating pressures normally encountered in this type of service. Its flexibility protects against vibration, expansion and contraction.

Like all Goetze gaskets, this style is backed by more than 60 years of Goetze "know-how" that has solved many of industry's most complex sealing problems with gaskets of every design, shape, and size. And it is made on the same modern machines that enable Goetze craftsmen to fill every order with remarkable promptness.

For further information about Johns-Manville Goetze gaskets... and other J-M products for the aviation industry... write for Brochure AV-1A. Address Johns-Manville, Box 290, New York 16, New York. In Canada, write 199 Bay Street, Toronto 1, Ontario.



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ance to swelling in low aniline point oil, and has a minimum shrinkage in high aniline point oil. It is a Buna N compound of 70 Shore "A" durometer. It will not corrode or otherwise damage such metals as aluminum, magnesium or stainless steel.

Acushnet Process Co., New Bedford, Mass.

Airborne Switches

Aircraft switches for use with radio communication and other avionic equipment are being produced by Kulka Electric Mfg. Co., Inc.

The switches, toggle types made in various pole-throw combinations, are built to meet JAN-S-23 specifications. They are designed for use in d.c. and a.c. circuits with frequencies up to 1,600 cps. The units incorporate a single hole for mounting, are encased in Bakelite housings. Various styles with screw terminals or solder lugs are obtainable, and parts are treated to prevent corrosion.

Kulka Electric Mfg. Co., Inc., 633-642 S. Fulton Ave., Mt Vernon, N. Y.

ALSO ON THE MARKET

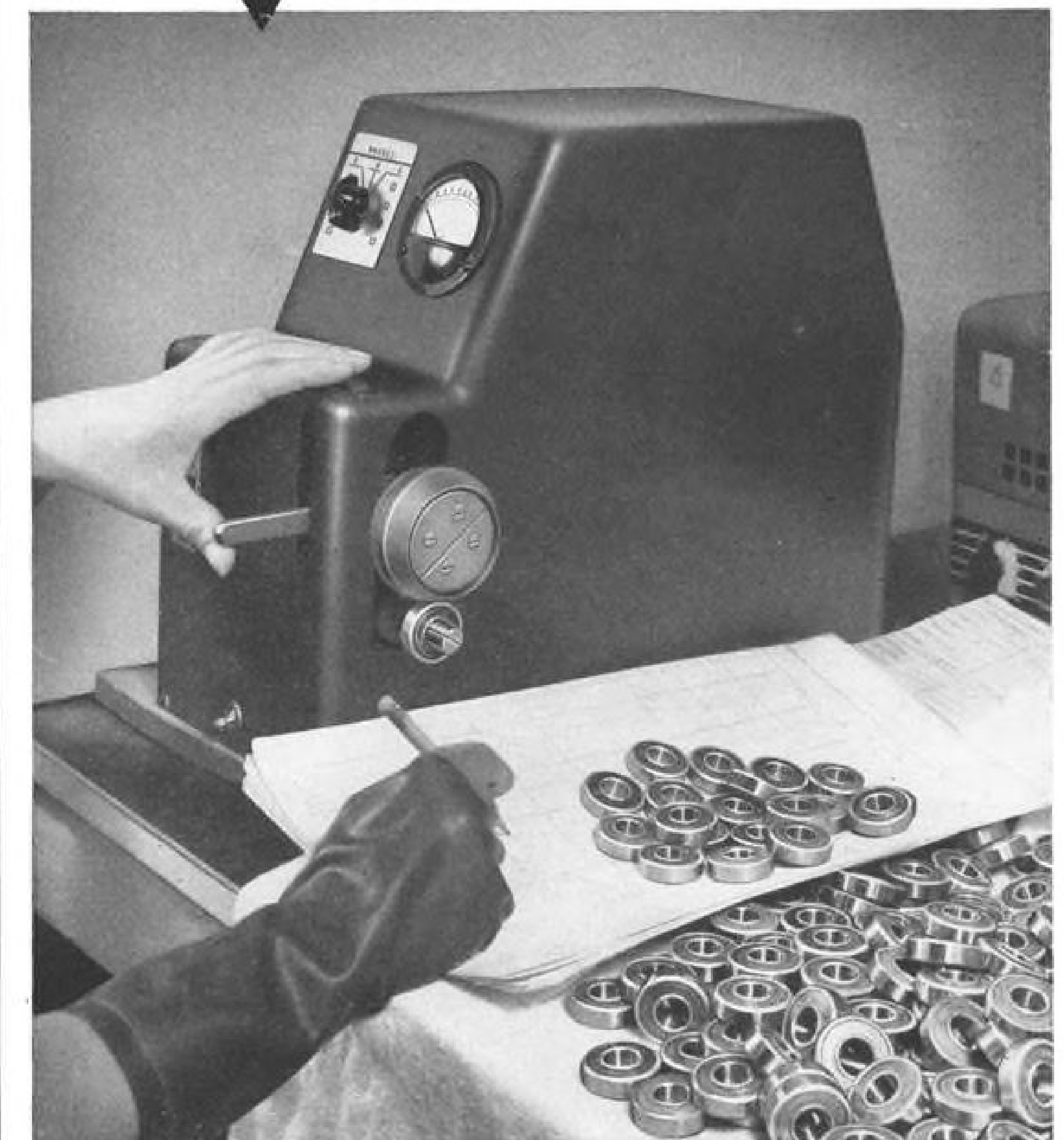
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Quick make or break bimetal disc thermostat for defrost control and/or cycle termination and other applications where moisture beads are a problem is available. Independent bimetal thermal element is designed to eliminate artificial cycling or "jitters." Stevens Mfg. Co., Inc., 69 S. Walnut St., Mansfield, Ohio.

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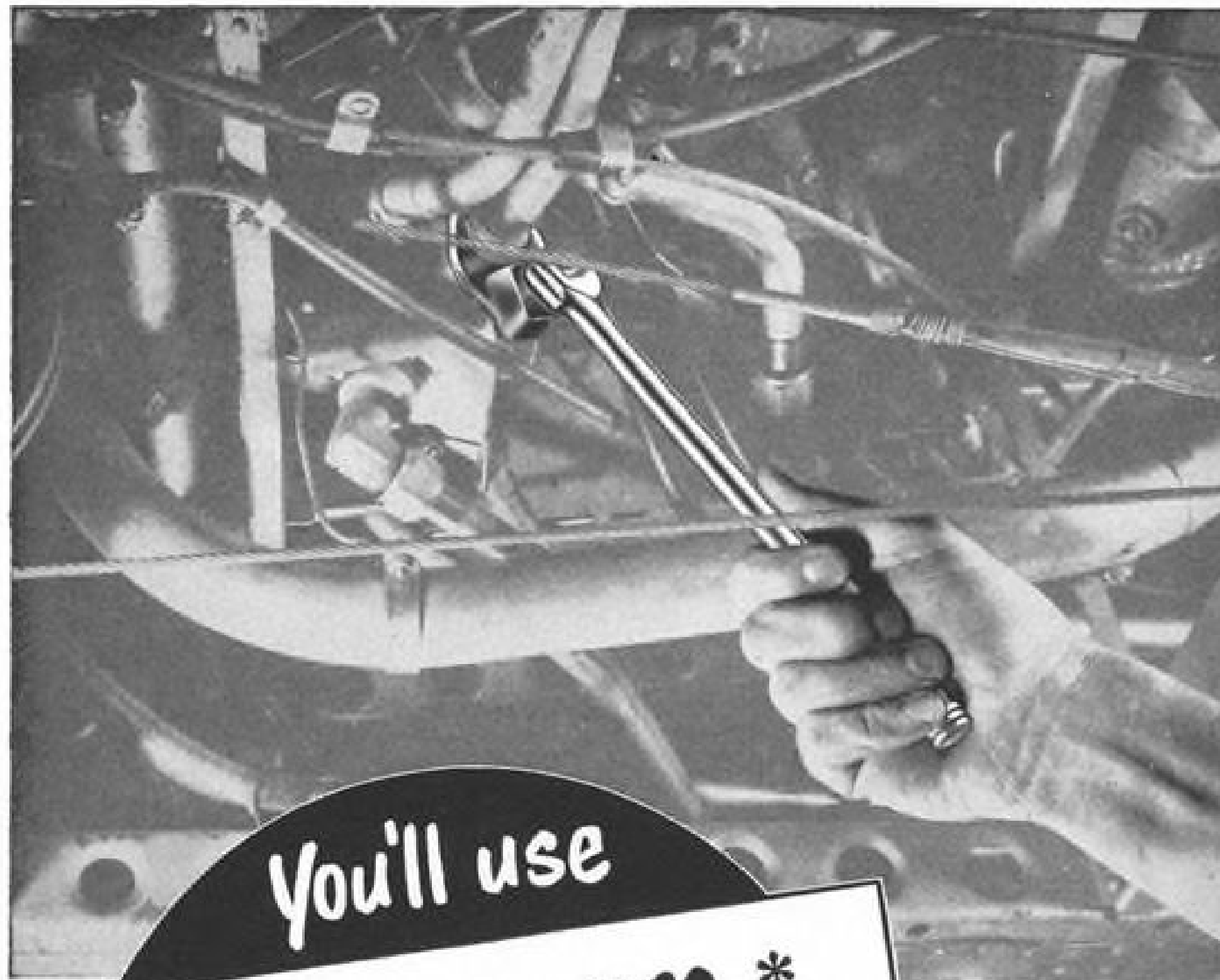


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Above is shown the 21-piece Ferret Standard Set, as packed in KR-281 Metal Box, 19 1/4" x 5 1/2" x 1 1/4". Tools (3 3/8" square drive) consist of: Ratchet, Speeder, Sliding Bar, Nut-Spinner, 3 Extension Bars and Universal Joint, with 13 Sockets, 1/4", 5/16", 3/8", 7/16", 1/2", 5/8", 3/4", 15/16", 1", 1 1/16", 1 1/8", 1 1/4", 1 1/2", 1 5/8", 1 3/4", 2", 2 1/4", 2 1/2", 3", 3 1/2", 4", 5", 6", 8", 10", 12", 15", 18", 20", 24", 28", 32", 36", 40", 48", 56", 64", 72", 80", 96", 112", 128", 144", 160", 176", 192", 208", 224", 240", 256", 272", 288", 304", 320", 336", 352", 368", 384", 400", 416", 432", 448", 464", 480", 496", 512", 528", 544", 560", 576", 592", 608", 624", 640", 656", 672", 688", 704", 720", 736", 752", 768", 784", 800", 816", 832", 848", 864", 880", 896", 912", 928", 944", 960", 976", 992, 1008, 1024, 1040, 1056, 1072, 1088, 1104, 1120, 1136, 1152, 1168, 1184, 1200, 1216, 1232, 1248, 1264, 1280, 1296, 1312, 1328, 1344, 1360, 1376, 1392, 1408, 1424, 1440, 1456, 1472, 1488, 1504, 1520, 1536, 1552, 1568, 1584, 1600, 1616, 1632, 1648, 1664, 1680, 1696, 1712, 1728, 1744, 1760, 1776, 1792, 1808, 1824, 1840, 1856, 1872, 1888, 1904, 1920, 1936, 1952, 1968, 1984, 2000, 2016, 2032, 2048, 2064, 2080, 2096, 2112, 2128, 2144, 2160, 2176, 2192, 2208, 2224, 2240, 2256, 2272, 2288, 2304, 2320, 2336, 2352, 2368, 2384, 2400, 2416, 2432, 2448, 2464, 2480, 2496, 2512, 2528, 2544, 2560, 2576, 2592, 2608, 2624, 2640, 2656, 2672, 2688, 2704, 2720, 2736, 2752, 2768, 2784, 2800, 2816, 2832, 2848, 2864, 2880, 2896, 2912, 2928, 2944, 2960, 2976, 2992, 3008, 3024, 3040, 3056, 3072, 3088, 3104, 3120, 3136, 3152, 3168, 3184, 3200, 3216, 3232, 3248, 3264, 3280, 3296, 3312, 3328, 3344, 3360, 3376, 3392, 3408, 3424, 3440, 3456, 3472, 3488, 3504, 3520, 3536, 3552, 3568, 3584, 3600, 3616, 3632, 3648, 3664, 3680, 3696, 3712, 3728, 3744, 3760, 3776, 3792, 3808, 3824, 3840, 3856, 3872, 3888, 3904, 3920, 3936, 3952, 3968, 3984, 4000, 4016, 4032, 4048, 4064, 4080, 4096, 4112, 4128, 4144, 4160, 4176, 4192, 4208, 4224, 4240, 4256, 4272, 4288, 4304, 4320, 4336, 4352, 4368, 4384, 4400, 4416, 4432, 4448, 4464, 4480, 4496, 4512, 4528, 4544, 4560, 4576, 4592, 4608, 4624, 4640, 4656, 4672, 4688, 4704, 4720, 4736, 4752, 4768, 4784, 4800, 4816, 4832, 4848, 4864, 4880, 4896, 4912, 4928, 4944, 4960, 4976, 4992, 5008, 5024, 5040, 5056, 5072, 5088, 5104, 5120, 5136, 5152, 5168, 5184, 5200, 5216, 5232, 5248, 5264, 5280, 5296, 5312, 5328, 5344, 5360, 5376, 5392, 5408, 5424, 5440, 5456, 5472, 5488, 5504, 5520, 5536, 5552, 5568, 5584, 5600, 5616, 5632, 5648, 5664, 5680, 5696, 5712, 5728, 5744, 5760, 5776, 5792, 5808, 5824, 5840, 5856, 5872, 5888, 5904, 5920, 5936, 5952, 5968, 5984, 6000, 6016, 6032, 6048, 6064, 6080, 6096, 6112, 6128, 6144, 6160, 6176, 6192, 6208, 6224, 6240, 6256, 6272, 6288, 6304, 6320, 6336, 6352, 6368, 6384, 6400, 6416, 6432, 6448, 6464, 6480, 6496, 6512, 6528, 6544, 6560, 6576, 6592, 6608, 6624, 6640, 6656, 6672, 6688, 6704, 6720, 6736, 6752, 6768, 6784, 6800, 6816, 6832, 6848, 6864, 6880, 6896, 6912, 6928, 6944, 6960, 6976, 6992, 7008, 7024, 7040, 7056, 7072, 7088, 7104, 7120, 7136, 7152, 7168, 7184, 7200, 7216, 7232, 7248, 7264, 7280, 7296, 7312, 7328, 7344, 7360, 7376, 7392, 7408, 7424, 7440, 7456, 7472, 7488, 7504, 7520, 7536, 7552, 7568, 7584, 7600, 7616, 7632, 7648, 7664, 7680, 7696, 7712, 7728, 7744, 7760, 7776, 7792, 7808, 7824, 7840, 7856, 7872, 7888, 7904, 7920, 7936, 7952, 7968, 7984, 8000, 8016, 8032, 8048, 8064, 8080, 8096, 8112, 8128, 8144, 8160, 8176, 8192, 8208, 8224, 8240, 8256, 8272, 8288, 8304, 8320, 8336, 8352, 8368, 8384, 8400, 8416, 8432, 8448, 8464, 8480, 8496, 8512, 8528, 8544, 8560, 8576, 8592, 8608, 8624, 8640, 8656, 8672, 8688, 8704, 8720, 8736, 8752, 8768, 8784, 8800, 8816, 8832, 8848, 8864, 8880, 8896, 8912, 8928, 8944, 8960, 8976, 8992, 9008, 9024, 9040, 9056, 9072, 9088, 9104, 9120, 9136, 9152, 9168, 9184, 9200, 9216, 9232, 9248, 9264, 9280, 9296, 9312, 9328, 9344, 9360, 9376, 9392, 9408, 9424, 9440, 9456, 9472, 9488, 9504, 9520, 9536, 9552, 9568, 9584, 9600, 9616, 9632, 9648, 9664, 9680, 9696, 9712, 9728, 9744, 9760, 9776, 9792, 9808, 9824, 9840, 9856, 9872, 9888, 9904, 9920, 9936, 9952, 9968, 9984, 10000.

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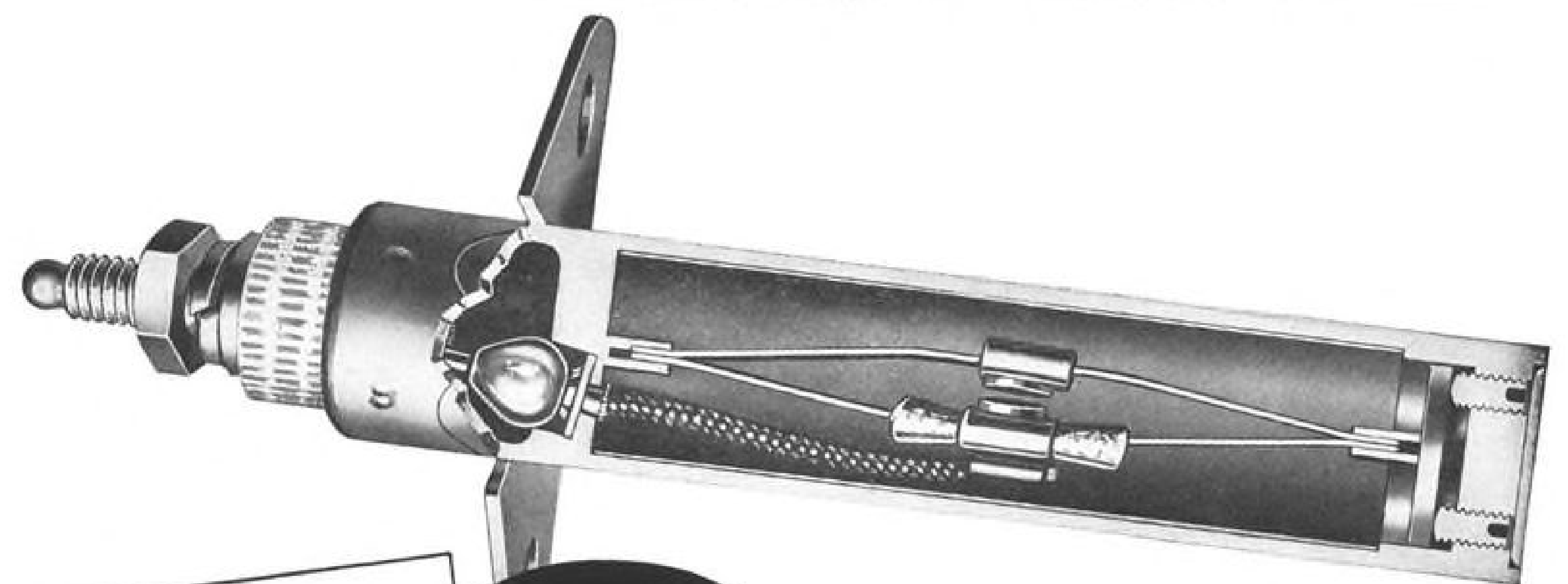
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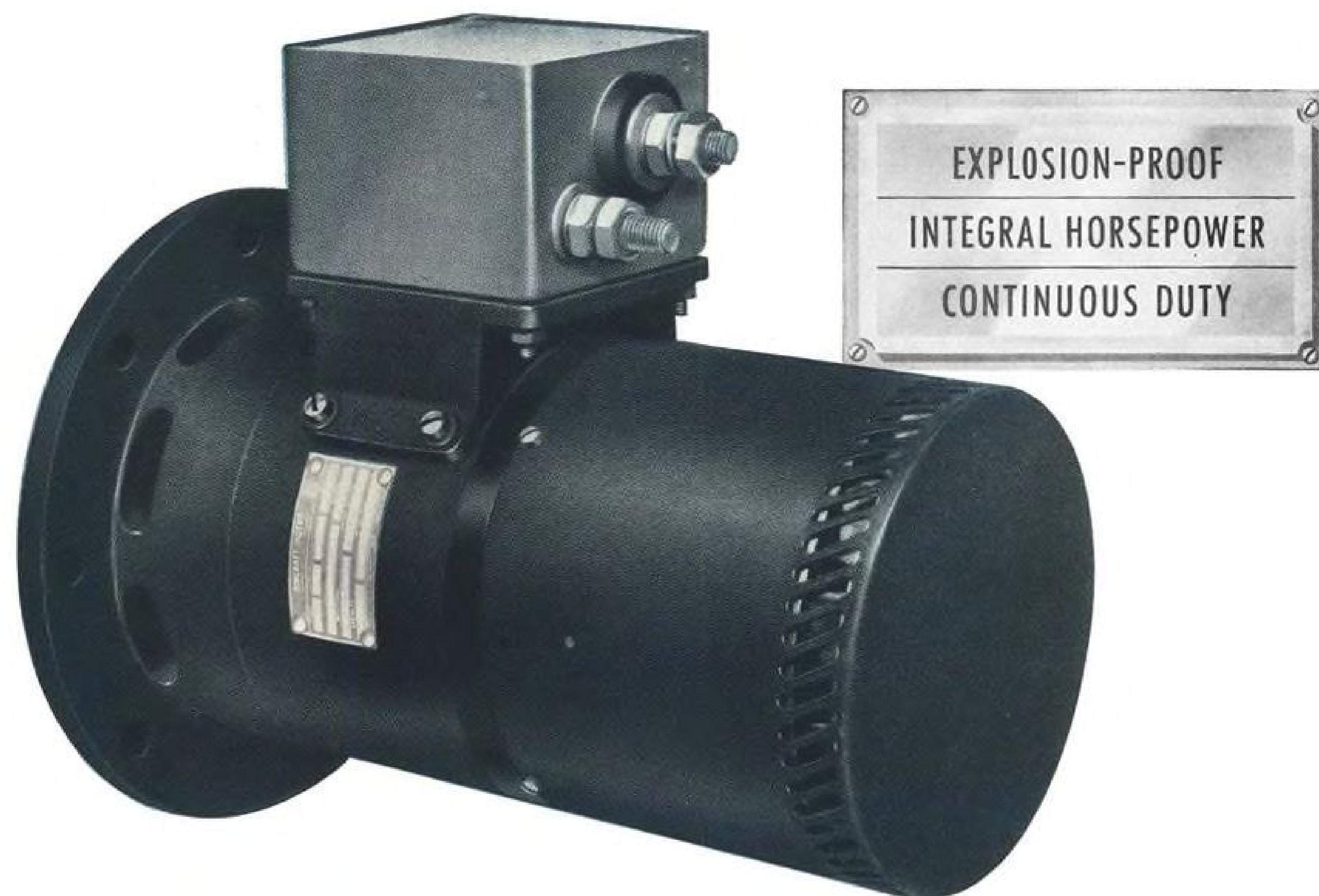
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What It Costs to Run a Modern Transport*

	CONVAIR (Cost per hour)		DOUGLAS (Cost per hour)	
	CV240	CV340	DC-6	DC-6B
Flying operations	\$73.25 ⁽¹⁾	\$75.55 ⁽³⁾	\$111.10 ⁽⁵⁾	\$118.10 ⁽³⁾
Maintenance	28.40 ⁽¹⁾	28.40	44.12 ⁽⁵⁾	44.12
Depreciation	20.87 ⁽²⁾	30.07 ⁽⁴⁾	43.95 ⁽⁶⁾	63.23 ⁽⁷⁾
TOTALS	\$122.52	\$134.02	\$199.17	\$225.45

*Figures compiled by industry sources from CAB records.

(1) Averaged from various CV240 operators.

(2) Based on an average purchase cost of \$450,000 for aircraft and spares and depreciated on the following basis: 8 hr./day utilization, \$390,000 at 7 years and 10% residual value; \$60,000 at 5 years and 10% residual value.

(3) Takes into account higher amount insured.

(4) Based on present purchase cost of approximately \$655,000 for aircraft and spares. \$585,000 at 7 years and 10%, \$70,000 at 5 years and 10%. Utilization 8 hr./day.

(5) Averaged from UAL and AA costs.

(6) Based on an average purchase cost of \$950,000 for aircraft and spares, and depreciated on the following basis: 8 hr./day utilization, \$830,000 at 7 years and 10% residual value; \$120,000 at 5 years and 10%.

(7) Based on purchase price of \$1,380,000 for aircraft and spares \$1,240,000 at 7 years 10% residual, \$140,000 at 5 years and 10%, 8 hr./day.

Costs Per Mile & Per Seat Mile

AVERAGE SEGMENT LENGTH	BLOCK SPEED (MPH)				COST/MILE (CENTS)				COST/SEAT MILE (CENTS)			
	240 ¹	340 ¹	DC-6 ²	DC-6B ²	240	340	DC-6	DC-6B	240 40 seats	340 44 seats	DC-6 51 seats	DC-6B 58 seats
100 mi.	180	180	175	178	68.07	74.46	113.81	126.67	1.70	1.69	2.23	2.18
200	207	205	205	209	59.19	65.38	97.16	107.87	1.48	1.48	1.91	1.86
300	222	221	223	227	55.19	60.64	89.31	99.32	1.38	1.38	1.75	1.71
400	231	230	236	241	53.04	58.27	84.39	93.55	1.33	1.32	1.65	1.61
500	236	235	245	251	51.92	57.03	81.29	89.82	1.30	1.29	1.59	1.55
600	240	239	...	...	51.26	56.07	...	...	1.28	1.27	...	...
700	243	242	...	...	50.42	55.38	...	...	1.33	1.26	...	...
800	246	245	258	265	49.80	54.70	77.20	85.07	1.39	1.26	1.51	1.47
900	248	247	...	...	49.40	54.26	...	...	1.47	1.32	...	...
1000	250	249	262	270	49.01	53.82	76.02	83.50	1.54	1.38	1.49	1.44
1100	251	250	...	...	48.81	53.61	...	...	1.65	1.46	...	...
1200	252	251	265	274	48.62	53.39	75.16	82.28	1.77	1.54	1.47	1.42

(1) 10 mi. headwind, 7 min. maneuver time. (2) 10 mi. headwind, 12 min. maneuver time.

Figures compiled by industry sources from CAB records.

Growing Use Seen for Twin-Engine Planes

• Cost comparison indicates Convair has advantage over DC-6 in carrying under-500-mi. passengers.

• And two-thirds of traffic is in that bracket; but four-engine planes show up better on long hauls.

By F. Lee Moore

Airlines may soon start a third round of twin-engine fleet increases—on top of the 236 Convair 340s and Martin 4-0-4s already ordered.

Here are some current developments that have several airlines making new inquiries at Convair and Martin, and re-projecting their future operating plans and cash requirements.

• Under-500-mile flights are proved to be the market for well over half of all

airline passenger travel, a 271-page traffic survey issued last week by the Air Transport Assn. Research Department shows.

• Shorthaul air coach plans of the Civil Aeronautics Board have airlines studying possibilities, even though most of them oppose trying it right away because shorthaul equipment is limited.

• American Airlines ordered 24 more long-range DC-6Bs this year—but not a single new twin-engine plane. Observers are watching American's dickerings

with Convair. AA wanted to buy more CV 240s, but Convair switched to production of 340s.

• Convair 340 orders went to 136 planes this month as the Dutch ordered 14 on top of the recent National Air Lines order for eight and option for six more. KLM will take six, Garuda Indonesian Airways eight.

• Martin 4-0-4 starts flying scheduled operations for Eastern and TWA next month. A \$2-million publicity campaign will accompany introduction of the plane. Favorable performance may firm up some airline negotiations with Martin, if Martin can promise delivery.

• Demand and profit of airline service seem to be holding up, despite tapering off of early Korea War rush and despite rising taxes.

• CAB national survey of airline traffic

How Far Do Airline Passengers Travel?

Two-thirds of the trips taken on scheduled U. S. airlines are for distances under 500 miles. Figures compiled by Air Transport Assn. and Civil Aeronautics Board show the percent breakdown for various length trips at major terminals.

MILES	New York*	Chicago*	Washington*	All Terminals**
0-99	2%	1%	3%	5%
100-199	24	7	14	23
200-299	19	20	34	19
300-399	8	11	11	11.5
400-499	4	9	8	6.6
500-599	6	4	3	4.5
600-699	2	7	8	4
700-799	10	19	2	4.6
800-899	2	4	1	2
900-999	1	1	7	2
1,000-1,099	2	3	1	..
1,100-1,199	10	5	1	..
1,200-1,299	1	1	1	..
1,300-Up	9	8	6	..
1,000-1,499	..	..	..	12.6
1,500-1,999	..	..	..	2.5
2,000-Up	..	..	..	2.7
Totals	100%	100%	100%	100%

* SOURCE: Air Transport Assn. Research Dept. These are scheduled airlines' composite figures for September, 1948; March, 1949; September, 1949; and March, 1950. They are based on passenger traffic, both inbound and outbound, based on total tickets sold at these terminals.

** SOURCE: CAB Origin and Destination Survey for All Domestic Scheduled Airlines, March, 1950. Figures cover only pairs of cities with 100 or more passengers per month flying between them.

in March of last year reveals that two-thirds of all U. S. domestic airline passengers travel less than 500 miles. And a CAB economist says this will always be true—in fact the trend is for short-haul traffic to increase more than long-haul. (The new ATA survey covers individual cities only—has no national total traffic summary.)

► **Under 300 Miles**—Air Transport Assn.'s just-published survey—"Municipal Air Passenger Traffic Served by U. S. Domestic Trunk and Local Service Carriers"—tells how far U. S. airline passengers fly to and from each U. S. and Canadian city.

Every airline ticket sold in the months September 1948 and 1949 and March 1949 and 1950 is tabulated and interpreted in the survey.

An ATA spokesman comments: "You will note from this study that there is a lot more passenger traffic under 300 miles than is generally realized, and most of the traffic is still between big cities."

Whether airlines are ordering too few shorthaul transports to keep pace with the rising demand is not ascertainable from new transport orders.

► **Here Is Why**—Of the 363 new transport orders approved so far by the Defense Production Administration, 160 are for 4-engine long-range Super Constellations and DC-6Bs and As, 203 are short-range twin-engine Martin 4-0-4s and Convair 340s.

But most of the twin-engine orders are for replacement of pre-war DC-3s, whereas a large proportion the new 4-engine planes ordered are for fleet additions. American has ordered 24 new DC-6Bs, since DPA approved the above program.

To get at the dollars and cents of twin-engine shorter-haul transports vs. 4-engine longhaul transports. AVIATION WEEK assembled a cost comparison of direct seat-mile costs of the Convair vs. the Douglas DC-6, and the CV 340 and DC-6B.

► **Shorthaul vs. Longhaul**—The study is based on official airline reports to the CAB. It indicates that twin-engine planes haul under-500-mile passengers considerably cheaper than 4-engine planes, when comparing existing first-class seating density, engines, contemporary airframe designs, and same daily utilization of the planes.

But between 500 and 700 miles the direct cost advantage of the Convair starts to narrow rapidly, shifting from the 240 to the DC-6 near 800 miles and from the 340 to the DC-6B near 1,000 miles, as computed from first-class seat-in^o density.

Further computations from the cost analysis show that when it comes to high-density air coach seating on short-haul, the 4-engine plane may cost the same, or even less, per seat mile, if the air coach load potential of a particular flight is high enough. But Convair

says on short hauls a coach Convair will keep its substantial cost advantage over a 4-engine coach transport.

Whether shorthaul air coach would be in twin-engine or 4-engine planes would depend largely on the individual circumstances of the airline and the shorthaul route.

Convair says its 240 seating-density can be increased to 56 passengers and keep the same cubic feet of air and square feet of seating area per passenger as the present DC-6 coach (presumably American's 70-passenger coach).

And the Convair 340 can carry 60 passengers and keep the same passenger space and air quota as the coach DC-6, says Convair. Convair would do this by removing the carry-on luggage racks and the cargo compartment, providing other stowage space for luggage.

► **Could Haul 70**—What's more, says Convair, if seat spacing is reduced to that of the contemplated DC-6B coach version (presumably Pan American's 82-passenger coach), the 340 will haul 70 passengers on a run such as New York-Washington.

► **A Good Bit**—A CAB economist says he believes twin-engine coaches will pay on high-density shorthauls, even using the standard Convair density. Load factor is the crucial consideration. But he points out that right now, mobilization and the airline equipment shortage are conspiring to fill up the Convair load factors at first-class fares of 6 cents a mile.

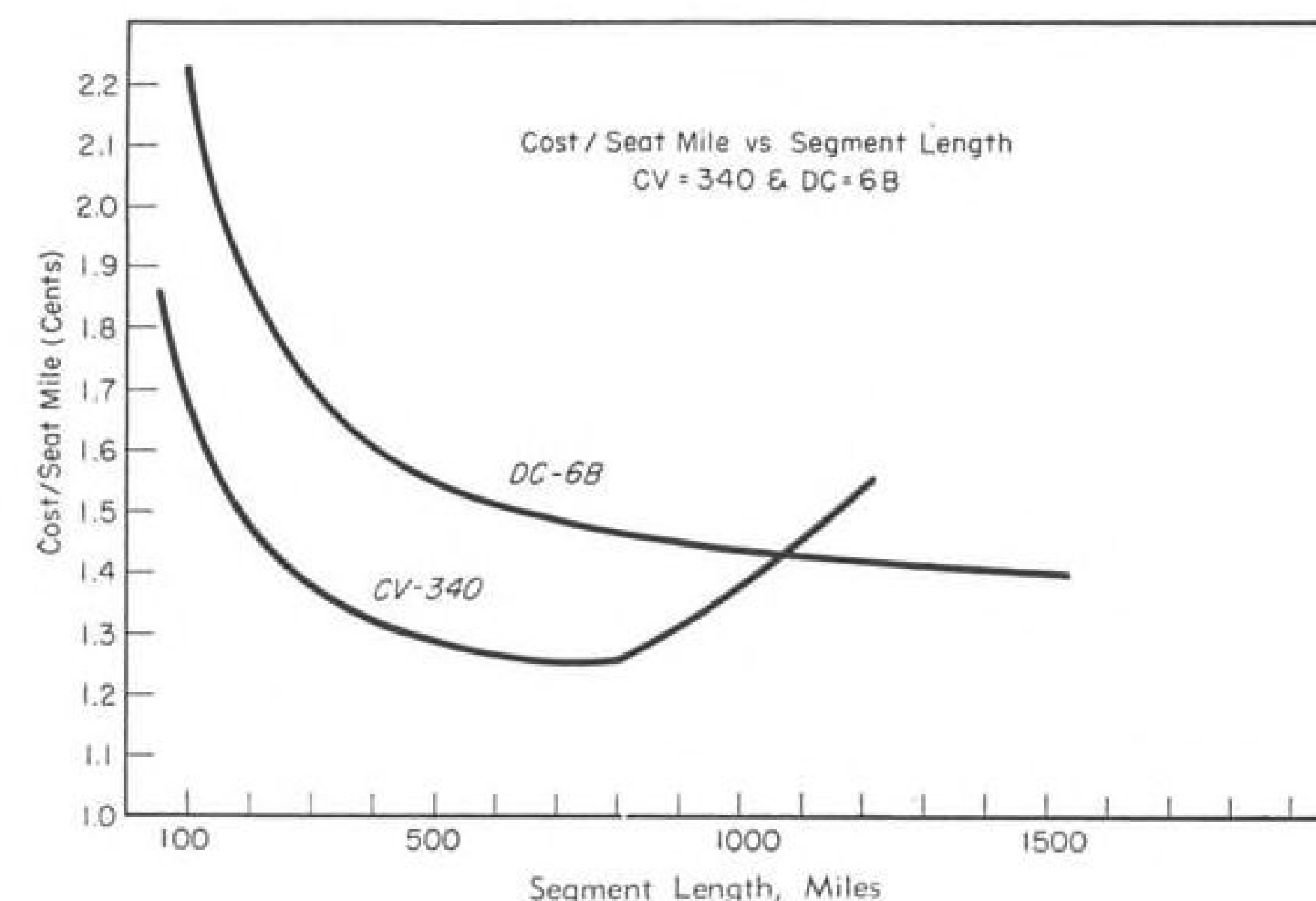
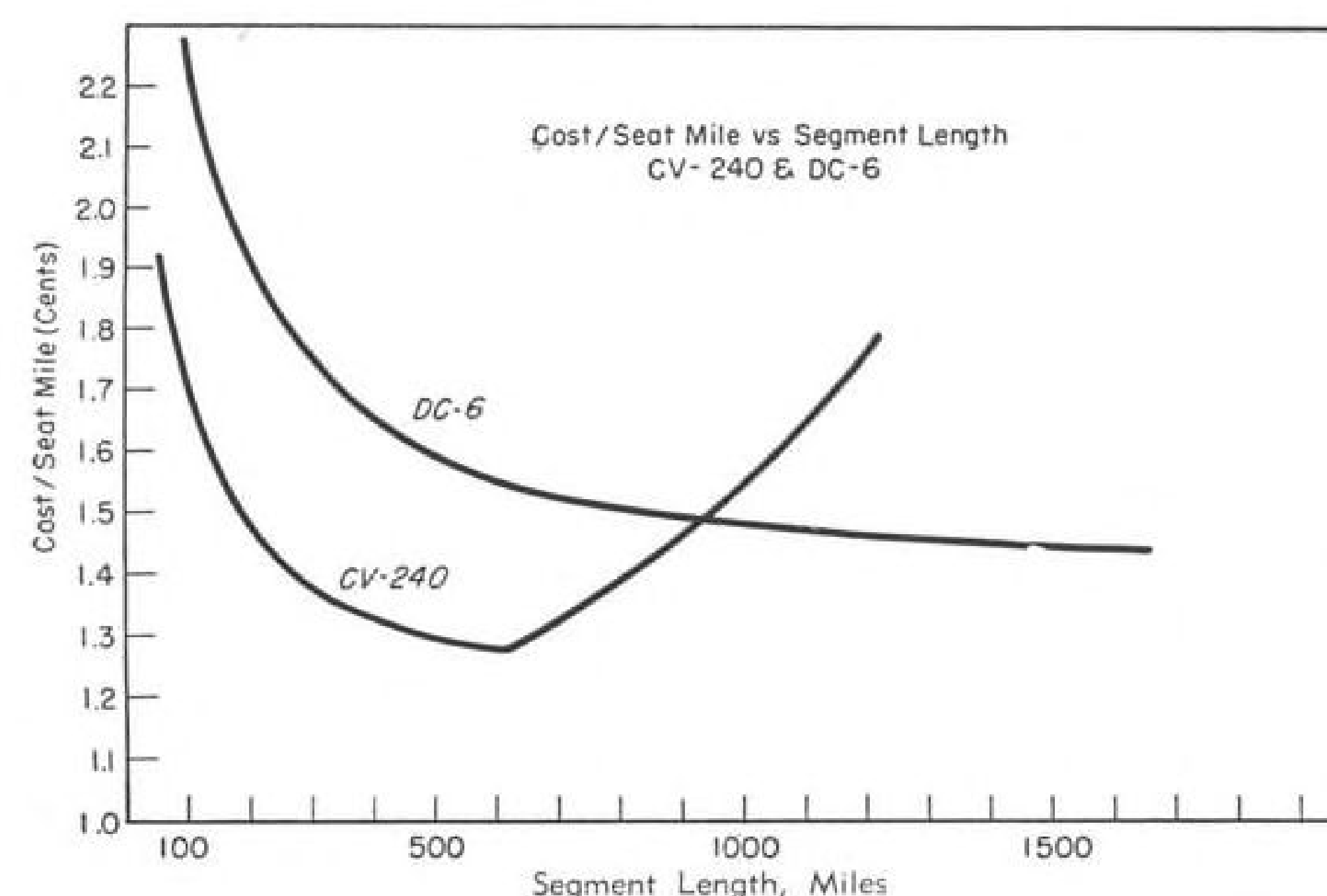
So a twin-engine Convair or Martin coach service may be unnecessary now, he says. But when normal load factors return to first-class service they'll make coach fares on twin-engine planes a good bet on some routes at some hours—to fill out the plane.

For instance, if a Washington-New York Convair 240 were running a 50% load factor (20 passengers) at 6 cents revenue a passenger mile the plane is making only \$1.20 a mile. If a fare reduction to 4½ cents a passenger mile could produce an 80% load factor (32 passengers) the same plane would make \$1.44 mile.

► **Taxicab Problem**—But an American Airlines official says there are only a few routes suitable for such a service right now. Take New York-Washington, he says. On that route the terminal airports are so crowded with air traffic now they're groaning.

The airways and airports of the two cities can't stand much increased traffic and continue to maintain moderately satisfactory on-time performance. Another problem, he points out, is the taxicab and bus fares coming and going. New York-Washington air coach fare is \$11.15 including tax, while the train coach fare is \$8.72.

If you're going from downtown to downtown, you have to add about \$2



more to the existing \$2.43 trainfare advantage; so airport taxis make short-haul air coach still about one-third more expensive than trains on many of the best potential shorthaul air coach routes.

And off-hours utilization of otherwise idle equipment doesn't hold the same promise for shorthaul as longhaul air coach.

Here is why:

• **Using New York-Washington** traffic as an example: If first-class traffic drops off each night at say 8:30, it might be surmised that reduced fares starting at 9:00 would pay through utilizing idle equipment. But, by the time a passenger waited until 9:00, he could have taken the train when he quit work at 5:00.

► **Pays Out West**—Nevertheless, American Airlines, the CAB and other airlines see shorthaul air coach with twin-engine planes coming on certain routes, when economics, plane supply and the

airways situation are right. After all, they point out, the West Coast has had it for years.

On the Los Angeles-San Francisco hop, unsubsidized intra-state carrier California Central has made money on air coach rates even lower than the standard CAB longhaul coach rate of 4½ cents a mile.

Since the shorter haul has by far the biggest airline passenger volume on first-class service, industry observers say it's a sure bet the same pattern would hold on coach service if it were offered. Competition forced it on the West Coast, and good weather and airport facilities make it pay; and Cal Central is using the twin-engine Martin 2-0-2 to do it.

► **Planes on Order**—So the Convairs and Martins have coach market potential, some airline and CAB observers say. But the current backlogs of Martin and Convair for about 230 new twin-engine transports don't reflect any

coach thinking. They're all slated for first class service.

On the other hand, the coach plans of American, Eastern, National, Pan American, TWA and others are reflected in new 4-engine plane orders.

If the airlines planned to start shorthaul coach by 1954, there would be additional twin-engine plane orders today. If 1955 is the date for shorthaul coach expansion, next year is the year for ordering most type plane to do it. ► **Shorthaul Route Pattern**—The ATA survey shows that over 50% of big city travelers fly less than 500-mile distances (both inbound and outbound); with smaller cities two-thirds or more fly less than 500 miles; cities in congested areas where surface transportation is poor also have a preponderance of shorthaul travelers.

Here are tallies of the percent of travelers flying less than 500-mile trips for a number of big cities:

• New York 56%; Chicago 48%; Washington 69%; Atlanta 65%; Dallas 64%; St. Louis 64%; Kansas City 63%; Boston 82% (with 66% under 200 miles); Detroit 61% (with 82% under 600 miles); Buffalo 90% (with 67% under 300 miles); Seattle 50% (with 68% under 700 miles); San Francisco 52% (with 68% under 700 miles); Los Angeles 50%; Shreveport 70%; Indianapolis 73% (with 60% under 300 miles).

One big exception to the rule is Miami, vacationland of far-away northern cities, with only 15% of travel under 500 miles, 16% between 500 and 1,000 miles; but 60% of all travel between 1,000 and 1,200 miles.

These figures refer to number of passengers—not to passenger revenue. It takes two 500-mile flights to equal the business volume of one 1,000-mile flight. And profit margin is higher on the longer flight.

However, there's more business volume potential in the shorter haul—same in air travel as in train, bus and car.

► **About Cost Figures**—Here is how the comparative first-class seat-mile cost data for twin-engined Convairs vs. DC-6s was compiled:

• **Airline-reported costs** for the CV 240 and DC-6 are from CAB files. Direct costs are divided into three main types: flying operations, maintenance and depreciation. To avoid distortion by different daily utilizations of various airlines, eight hours a day utilization of both DC-6s and Convairs was assumed.

• **Then to average segment length**, hourly costs are used, and reduced to cost per mile per segment length by computing from block-to-block speed.

• **Depreciation** on the DC-6 and CV 240 is based on average purchase cost to the airlines. For the new DC-6B and CV 340, depreciation is based on

present prices for the planes, engines and spares.

• **Other adjustments** for the new DC-6B and CV 340 are made from airline cost experience of their predecessors using the following assumptions: Maintenance cost is assumed identical; flying operation cost is increased slightly for higher insurance costs; utilization is assumed the same—eight hours a day.

Result is an estimate of average seat-mile costs for all the airlines using these planes; no one airline would conform exactly, but this is an average.

Since airline operations vary, the cost figures shown here are subject to adjustment for each route and airline operating system. For instance, in the cost data, eight-hour utilization per day is assumed for both twin- and 4-engine planes. But daily utilization of a long-range plane that flies through the night may be higher than a short-hauler twin-engine plane on many routes.

Airline Wage Rules Decided by Board

Airline wage stabilization rules are set in the Railroad and Airline Wage Board action applying the government's cost-of-living and other regulations to the 100,000 employees of the airlines.

It validates the wage actions carriers have taken during the last four months under the self-administering clauses of existing regulations and it permits them to go on self-administering.

Chairman Nelson M. Bortz of the RAWB announces its Regulation Number One, making some 20 existing orders of various stabilization boards applicable to the nation's air carriers and railroads. Former Economic Stabilization Administrator Eric Johnston had

approved the action. He set up the three-member RAWB Sept. 27.

Chief provisions of the RAWB Regulation No. 1:

• **Non-union employees.** Executive, administrative, professional or outside salesmen may get bonus, merit-increase, stock option, stock purchase plan, cost-of-living increase, interplant inequity raises.

• **Other employees.** All other airline employees than classifications above may get merit increases, the 10% "catch-up" formula, cost-of-living increase, tandem adjustments, (one labor group contract tied to another), fringe benefits, bonuses, incentive or piece work plans, interplant inequity raises.

This RAWB regulation is a tentative catch-all put out by the new board as a starter. The board intends to modify and extend it as special airline or rail problems arise that don't fit fairly in the preliminary regulation.

• **The Board.**—The RAWB membership: Nelson M. Bortz, chairman, continuing also as chief of the Industrial Relations division of the Bureau of Labor statistics. He was, during World War II, assistant in charge of wage and salary stabilization with the National Railway Labor Panel.

• **Walter C. Nolte,** member, continuing also as chief of the Litigation Branch, Office of Alien Property, Justice Dept. He worked with Bortz on the RRLP in World War II. He has also served with Presidential emergency boards on air and rail disputes.

• **Francis A. O'Neill, Jr.,** member, and also on National Mediation Board.

Full-time executive director of RAWB is H. Raymond Cluster, who comes from National Labor Relations Board and recently worked with the temporary Emergency Railroad Wage Panel, replaced this Sept. 27 by RAWB.

CAB Sets Seniority Pattern in Mergers

The Civil Aeronautics Board has ordered Pan American to grant full seniority to employees of merged American Overseas Airlines, by a formula set forth by CAB.

The Board majority opinion (Member Joseph P. Adams dissents) states: "Integration of seniority of employees of merging operations should, if possible be left to voluntary agreement or arbitration . . . (but) we are here dealing with a particular situation in which the public interest and the achievement of the policy objectives of the Civil Aeronautics Act require our intervention."

The Board criticizes PanAm, its pilots, and AOA:

"Such action has been made necessary only because of the failure of all concerned to live up to their responsibilities to the public to make reasonable efforts to accommodate their irreconcilable demands and reach a common ground."

• **Seniority Formula.**—CAB sets a simple basic formula for computing employee seniority: Length of service with any of the merged parties sets basic seniority status in the final merger company. In this case, it includes all employees' time with Pan American, American (some 200 American Airlines employees were transferred in the deal), American Overseas Airlines (the merged company, an AA subsidiary), and American Export Airlines (predecessor of AOA).

Special cases are also treated in the CAB order. Former AOA pilots get credit for prior service on commercial scheduled airlines. Former AOA stewardesses with Registered Nurse classification rate purser pay with Pan American as PanAm has no Registered Nurse-stewardess classification.

All seniority rules of the merger laid down by CAB now apply retroactive to Sept. 25, 1950.

CAB Member Adams dissented: • He said CAB does not have authority to impose conditions upon labor groups which neither sought nor opposed a merger. He says the Supreme Court case cited by the majority "did not go as far as the majority seeks to have it go. That decision provided only that the Interstate Commerce Commission could require compensation to be paid by the carrier to employee groups adversely affected. . . ." The case referred to is U.S. vs. Lowden, 308 U.S.N. 238, 1939.

• Assuming CAB did have jurisdiction, Adams dissents on the basis that the pilot seniority should apply only to length of service with the American Export-American Overseas system.

SHORTLINES

► **Airline Cargo Assn.** is a new San Francisco assn. of air cargo business in that area; PanAm cargo superintendent R. F. Maxwell is chairman. Other officers include representatives of Philippine Air Lines, United, TWA and Flying Tiger Line.

► **Air Transport Associates, Inc.,** Seattle-Alaska nonsked, has failed to get the U. S. Court of Appeals, at Washington, D. C., to over-rule the CAB on Pan American's southbound Alaska-Seattle fare approval. The nonsked charged PanAm used subsidy money to lower fare below cost to meet nonsked competition. Court dismissed the appeal on grounds it is CAB's territory; CAB has the fare included in its general fare investigation of the rates in that area.

► **All American Airways** has settled a new wage contract with its pilots. Terms reportedly increase pay about 12% on average. Threatened strike was averted as Mediation Board got the airline and pilots to try once more to avoid "useless" loss to all concerned. Resumed negotiations came to swift settlement.

► **American Airlines** announces a 2-cent hourly cost-of-living wage increase starting next month for 11,000 of its employees, as called for in certain of its wage contracts.

► **Canadian Pacific Air Lines** has purchased three DC-4s.

► **Chicago and Southern Air Lines'** voting trust ended this week. Chairman Carleton Putnam, only voting trustee, remains chairman of the board. All trust certificates are being exchanged for common shares.

► **Colonial Airlines** has had talks with Aerovias Guest director of operations Durston G. Richardson about possible consulting work, but Colonial president Alfons Landa says rumors of Richardson joining the company officially are wrong. . . . Any basic Colonial management changes in the near future would probably only come as a result of merger, Landa says. . . . company has been fined \$10,000 by Canada for violation of foreign exchange control board while under Sigmund Janas' management. Canada says it lost \$32,000 in dollars through Colonial's alleged financial irregularities.

► **Continental Air Lines** has acquired Route 29 stops at Kansas points, Manhattan, Junction City and Ft. Riley in



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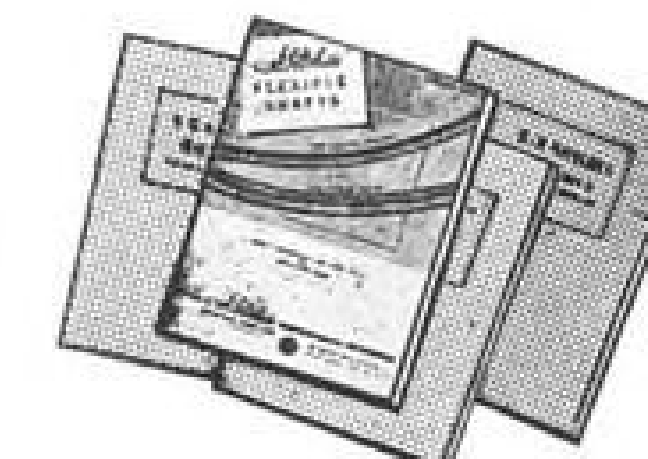
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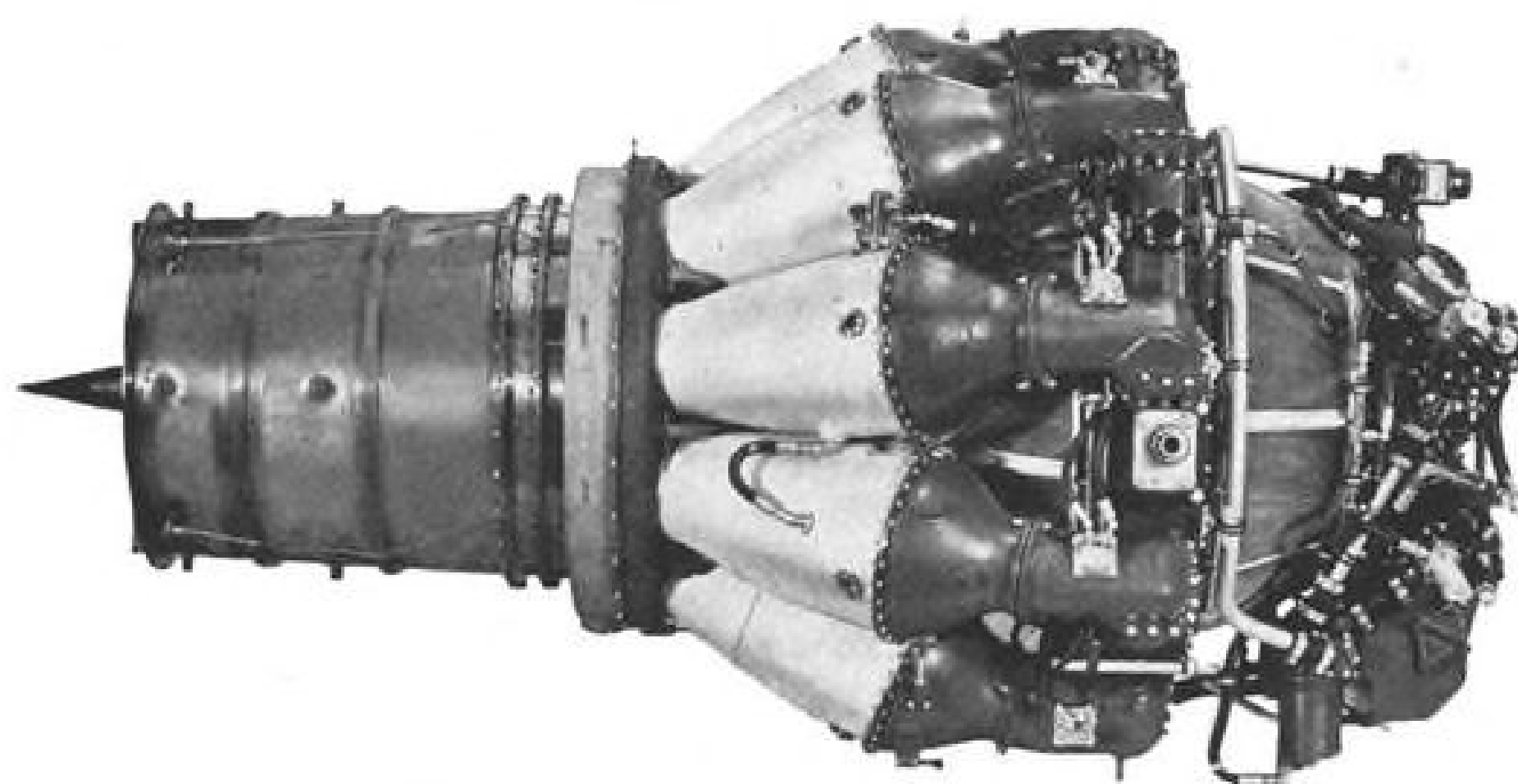


PORTLAND INTERNATIONAL GROWS

Aerial view of the Portland International Airport, Ore., points up runway extension (foreground) which increases length to 8,800 ft., making it the longest commercial runway in the Pacific Northwest. In addition

to the Alaskan nonsked, General Airways the field is also used by Alaska Airlines, Northwest, Pacific Northern, Pan American, United, West Coast and Western airline planes.

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CAB decision denying service to same by Central Airlines and Roscoe Charter Service.

► **Defense Air Transportation Administration (DATA)** set up by retiring Commerce Undersecretary Delos Rentzel has the following chiefs: Paul A. Butler, DATA administrator; Kenneth R. Ferguson, air transport; Carroll K. Faught, Jr., general aviation; CAA Administrator Charles F. Home, airports and airways. Butler is president of Butler Co. and Butler Aviation, a division of the parent company, Chicago.

► **Flying Tiger Line** and other all-cargo services could fly parcel post at cargo rates, about 50% under regular present parcel post cost, says Tiger President Robert W. Prescott. He urges CAB and Post Office to think about trying it.

► **KLM Royal Dutch Airlines** this month starts a new direct air link from Madrid to Manila, Sydney and Tokyo.

► **National Airlines** says its winter service to the South will increase daily seating capacity 39% over last winter. About 25% more departures are scheduled, not counting extra sections.

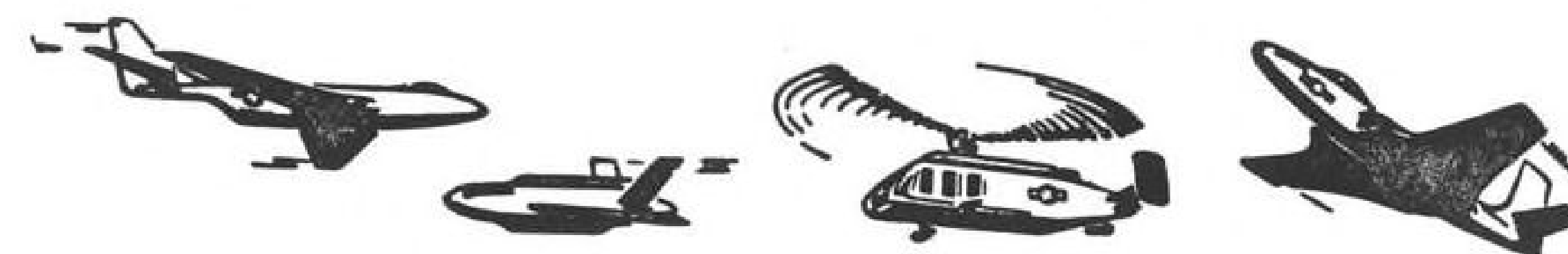
► **Pan American World Airways** plans a trans-Pacific air coach service, after the forthcoming trans-Atlantic service gets going next spring. . . . CAB examiner Richard A. Walsh says PanAm should get CAB permit to serve American Samoa. He estimates a subsidy cost of \$200,000 with the only benefit going to civil government of Samoa, which is under the Interior Dept. . . . Now flies 30 air coach round trips a week New York-San Juan.

► **Piedmont Airlines**, as the lowest-cost certificated local airline, is urging CAB to give it a permanent certificate in the present renewal case on its temporary certificate. CAB's policy has been to renew temporary certificates of the locals—not make them permanent. Piedmont also points out it may soon take over some American Airlines stops, freeing American to fly Richmond-Knoxville while Piedmont serves the local area between.

► **Trans World Airlines** has put its \$525.40 New York-London winter round trip rate in effect until March 31; 18,000 TWA passengers used this off-season two-week trip rate last year—14,000 the year before.

► **United Air Lines** plans to hire 350 more stewardesses next year.

► **West Coast Airlines** reports merger talks with Empire Air Lines as suggested recently by the CAB.



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For further details and inspection contact Mr. Thomas Sim, Director of Sales, Air Carrier Service Corporation. Telegrams—Aircar Washington. Telephone—Executive 5350.

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THE LAST WORD in Safe — Comfortable — Fast Executive Aircraft for your Company

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New PWR 1830-75 Engines	Collins 176-51R VHF	Luxurious Interior
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15—North American T-6 trainers in stock. All airworthy. More available. Some specially equipped for executive use. Will sell as-is, flyaway, or overhauled to specifications desired.

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FS-2606, Aviation Week
520 N. Michigan Ave., Chicago 11, Ill.

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One of America's largest stocks of UNUSED

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We own and offer all parts listed—plus many thousands more—stocked in our Baltimore warehouse!

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90	1685HAR	Holley carburetor
19	1375F	Holley carburetor
407	SF9LN-2	Bendix Scintilla Magneto
	(manufacturer's part No. 10-12453-6 Spec. AN9511)	
42	SF5RN-12	Bendix Scintilla Magneto
	(manufacturer's part No. 10-26170-1)	
185,000	LS4AD1	Sparkplug (Aero)
30,000	LS-659A	Bendix Scintilla Sparkplug

SPECIAL GROUP!

Ideal for tear-down for parts

Quantity	Part No.	Description
328	PD12K10	Stromberg injection carburetor
236	PR48-A1	Stromberg carburetor
29	PR48-A2	Stromberg carburetor
31	PR48-A3	Stromberg carburetor

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Quantity	Part No.	Description
166	1045A	Bearing
500	3506	Flange
130	8288	Followers Ass'y
814	35814	Blower Ass'y
30	48346	Cylinder
53	48362	Shaft
175	48363	Shaft
56	48392	Sump
390	48461	Gear
78	76236	Gear
1178	84289	Bearing
113	84487	Housing
77	84591C	Nose Housing
200	48350-D	Crankcase Ass'y
200	84083	Cylinder
100	84084	Cylinder
200	84085	Cylinder

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TYPES AN HARDWARE
NEW—UNUSED. WRITE
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Quantity	Part No.
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3000	KF4H
30000	KP4R16-2
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28000	KSA
34600	NR6L12
7000	38KD4
6600	RE3MR3
5000	F35-14

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Quantity	Part No.
42	400AJ3
161	420 EC
160	420 DY
26	550 CD
14	550 CG
195	550 CP
104	550 EC

Quantity

Part No.

45

AN4103-2

38

18597-2

230

MF9-713-15A

75

AN6102-1(8818-2)

160

2E492E

700

TFD 8600

125

D7818

170

2P771-A

250

AN4014

300

1H260-K & KA

19

AN5531-1

1000

AN5780-2

400

AW2-65B

1000

76819

16

4682

10

47821

12

47822

30

47823

36

47824

10

7622

11

7684

20

77C4

21

77C5

85

727Y72Z2

88

727Y73Z2

83

727Y74Z2

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2227-11D-3A

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80J-29-AAY

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254BK-6-052

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906-6-011

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14601-1G-B1

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15100-1B

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A371205

780

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P4CA2A

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568

A-9 (94-32226)

687

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90

JH950-R

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13018-A

140

K14949E

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174

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921-B

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981280

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12924-2

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923748

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DW28

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6041H-146A

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0655-D

148

M-2031

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DW47

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DW33

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ASDC2

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U6005-DV5

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UA-3160C

73

UA-6007-CF-DV5

14

UA6009-S-30

11

UA-6012K-S30K

OIL COOLER ASSEMBLIES

Mfg. Description
Clifford Brass (Valve # U4785)
Airesearch Aluminum (Width 8") (Length 9")

PUMPS

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Adel Fuel
Pesco Fuel
Thompson Fuel Booster
Adel Anti-icer
Pesco Fuel Booster
Erie Meter Wobble (D-3)
Pesco Hydraulic

INSTRUMENTS

G. E. Tach. Generator

LETTERS

On Meeting Issues

I liked your editorial Nov. 5, "How About Meeting Issues?" although what both of you editors had to say certainly did not constitute a bouquet to the air transport industry. . . .

Calling the shots the way you see them is sometimes an unpopular pastime but I am convinced that it pays in the end. I know they came without an axe to grind, motivated by an unselfish desire to see our industry progress and not fall into the "good enough for my grandfather" approach which has characterized other forms of transportation.

HAYES DEVER,
Secretary and Director of Public Relations
Capital Airlines
Washington 1, D. C.

I thought your notion of running the editorial from your competitor's pages showed very fine industry spirit.

BERT W. HOLLOWAY,
Director of Advertising Publicity,
Sales Promotion,
Lockheed Aircraft Corp.
Burbank, Calif.

Cockpit Viewpoint

Re: "Cockpit Viewpoint": Is this department to be discontinued? If it is, I would be interested to know the reasons.

I have found the column interesting and constructive, and it earns its space in your fine magazine through reader interest.

OLAF PASSBURG,
Springfield, Mass.

(Capt. Robson's arrangement with AVIATION WEEK is for two or three columns a month, depending upon his time available. Sometimes these appear in consecutive issues; sometimes they are spaced apart. We have no intention of discontinuing this popular feature.—Ed.)

Monsanto's Skydrol

AVIATION WEEK carried the article, "Production 4-0-4 Nears Flight" and we were pleased to see the following statement included:

"Martin engineers say it would be a simple matter to use the new Douglas Skydrol anti-fire hydraulic fluid, if any customer wants to incorporate it, by changing rubber in the system to meet Skydrol requirements."

The name Skydrol is Monsanto's trade name for this hydraulic fluid. It is manufactured and sold by Monsanto Chemical Co. and it is necessary that we protect the name Skydrol at all times.

We are writing you about it so that any future reference to Skydrol in AVIATION WEEK will show it to be a Monsanto material.

H. F. SHATTUCK, Manager of Sales
Functional Fluids
Organic Chemicals Division
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Northeast Airlines FIRST IN NEW ENGLAND SKIES

NEA's Formation

It was probably an ad man's brain storm but Northeast Airlines' recent spread in New York newspapers gave me the chills. It would have been a ticklish job to have even expert airline pilots at the controls of 12 of NEA's 13 transports in a tight formation like this. But with all those pilots, co-pilots and stewardesses on the ground, who's flying those ships? And boy, is that 13th plane busy serving the rest of the system!

R.C.L.

No DC-6A Subsidy

The editorial in the Oct. 29 AVIATION WEEK commenting on the bold foresight of the Flying Tiger Line and its president, Robert W. Prescott, in committing more than \$7 million to the purchase of Douglas DC-6As was, as you may well suspect, received with warm approval in Santa Monica.

The fact that Prescott and Earl Slick elected to back up their faith in the future of air freight by a purchase of Douglas aircraft is, we believe, sufficient praise for the quality and earning capacity of what we know to be a very fine airplane.

That you have seen fit to note editorially of the fact that no governmental subsidy was involved in any phase of this entire transaction from design through final sale is, of course, a source of tremendous satisfaction to us.

A. M. ROCHLEN,
Director of Public Relations
Douglas Aircraft Co., Inc.
Santa Monica, Calif.

As you must know, I had to buy an entirely new set of hats about two sizes larger after reading your nice editorial (Oct. 29). Seriously, I did appreciate the kind words you had for us.

This DC-6 move is the "all or nothing" effort for us. We feel that if we get these

planes in operation . . . we will at last have an anchor on this business.

R. W. PRESCOTT, President
The Flying Tiger Line, Inc.
Lockheed Air Terminal
Burbank, Calif.

WHAT'S NEW

Telling the Market

Brochure describing and illustrating pressurization and temperature control systems for fighter aircraft is available from Pacific Airmotive Corp., 2940 No. Hollywood Way, Burbank, Calif. . . . Stackable single-sideband suppressed-carrier communication system designed for channelizing point-to-point radio communication links is covered in Folder 33B-P, available from the Lenkurt Electric Co., San Carlos, Calif.

The Patushin-developed metal-forming process, said to effect savings of 85% in time and 75% in cost in fabricating droppable fuel tanks, practice bombs and cowlings, tail cone and fuselage skin sections, is described in an illustrated folder available from Patushin Aviation Corp., Dept. A-16, 5651 W. Century Blvd., Los Angeles 45. . . . Historical booklet, colorfully illustrated, dramatizes Western Air Lines' first 25 years of operation. Write WAL's News Bureau, 6060 Avion Dr., P. O. Box 10005, Airport Station, Los Angeles 45.

United 6534 is a special color film portraying aircraft maintenance, flight planning, cockpit procedures, instrument airport approach and other features of a United Air Lines' DC-6 coast-to-coast flight. The film, made especially for the carrier, is 16mm. and runs 30 min. It is available for free showings before interested groups.

Better Form With Marform is a detailed booklet describing metal-forming process, developed by Glenn L. Martin and Hydropress, which offers notable economies in metal parts forming. Write Loewy Construction Co., Inc., 216 E. 49th St., N. Y. 17. . . . Service in Stampings is a 12-page booklet designed to aid stampings purchasers in preparing specifications. It can be obtained from Stampings division, Laminated Shim Co., 85 Union St., Glenbrook, Conn.

Revised edition of Photoelastic Stress Analysis, which details materials, techniques and apparatus, is available from Eastman Kodak Co., Rochester, N. Y.

Publications Received:

- Fellowship of the Air, 1901-1951, by B. J. Hurren, published by Iliffe & Sons, Ltd.
- Handbook of Supersonic Aerodynamics, 2 vols., published by Bureau of Ordnance.

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for

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Long-range military program offers fine chance for establishing career in aircraft while aiding defense effort. Transportation and established training time paid. Salaries commensurate with experience and ability.

Please include summary of education and experience in reply to:

Engineering Personnel Office
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Los Angeles 45, Calif.
or
Columbus 16, Ohio

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EDITORIAL

Voluntary Censorship; An Experiment

AVIATION WEEK today starts a 60-day experiment in limited, voluntary censorship in cooperation with the United States Air Force. For at least a two-month period this magazine will lower its own iron curtain on the Air Force's giant first all-jet super bomber and one of this country's major investments in insurance against red aggression.

We proposed the plan to Secretary Finletter after he authorized the following press statement Nov. 29:

The Boeing XB-52 which has been rolled out of the Boeing Seattle plant is still a classified project. Every effort will be made to protect the security of the aircraft by means of drapes, camouflage and other procedures. In the interest of protecting security, the Air Force is requesting that no attempts be made to photograph the aircraft. When it develops that classified information concerning the exterior of the plane can no longer be kept from potential enemies, security-approved photographs may be made available by the Air Force. Until such time the cooperation of news media is requested so that information regarding the airplane may be kept from any potential enemy as long as possible.

AVIATION WEEK will cease publishing for at least 60 days any unclassified references to the Boeing XB-52 that would indicate progress of construction, tests, production, extent of orders, or any dimensions, specifications, performance or other data, or indications of changes in such data.

The plan is more than a mere decision to print only current data that has been cleared about a single bomber model because we shall print no references, comments, or roundups of information about the XB-52 which AVIATION WEEK or any other publication has even published in the past.

Nor will we quote or paraphrase or report in any detailed manner any technical material which may appear in any medium of communication between now and the expiration of the 60-day trial if such material was not approved for publicity in advance by the Air Force, Department of Defense, or other appropriate U. S. government agency and if such agency still believes further publicity should not be given the report.

Individual decisions will be made on the publicizing of data by members or committees of Congress or responsible government officials.

Nor will we quote or report in any detailed manner technical material about the XB-52 which may appear in foreign publications which consider themselves outside the jurisdiction of U. S. government security regulations, if such material is objected to by our own Air Force. Such foreign news is normally picked up in this country by AVIATION WEEK and others.

However, our staff, our correspondents and our other regular news sources will be instructed to continue sending to the editor—although it will not be printed—all material on the super-bomber which would become available to us in the normal operation of a business and technical aviation magazine and all of our news contacts will be asked to forward to us all clippings, reports, articles and notices of other XB-52 publicity appearing in media other than AVIATION WEEK.

All material which we gather but do not print will be used to help us decide at the end of the experiment whether the effort and results were in proportion and whether we should abandon the plan or continue it with modifications. We hope to make definite suggestions to the Department of Defense, based on day-to-day experience with its current security philosophy.

Obviously, this experiment was inspired by the woeful chaos on security and censorship. The Truman Administration, the press and the public are so unbelievably confused on the public information question that probably many conscientious publications have been perplexed about how to take some kind of constructive action in the current stalemate. Should we print more news or less? And what kind of information or restrictions are desirable?

Outside of the atomic aircraft project, which offers little likelihood of furnishing enough information in the near future to be a fair guinea pig, we believe the XB-52 "global bomber" offers the most important opportunity to isolate a vital segment of the military aviation program which could be used in a simple, realistic experiment under the stresses of actual deadlines and competition from other media.

We congratulate the Air Force's intelligent decision to try to do something first to keep its own secrets about this new warplane before pleading for press cooperation for such secrecy. Too often in the past such requests have been followed by wheeling the newest fighter or bomber into open yards on airports in full view of thousands of passing motorists, airline passengers, and other citizens.

Such stupidity has always worked against the best interests of the country because it never inspired any news service or publication to exert its most energetic efforts toward voluntary censorship. What was the use?

We don't know how many stories we'll be obliged to skip. Nor how many subscribers will disapprove and stray over to our competitors. We don't know how many other editors will scoff at this experiment. But in 60 days we shall find out. The results will be interesting. At least, our editorials will cease complaining about the general censorship confusion while we make at least one effort to do something constructive under our own power. It's worth trying, even if it flops.

—Robert H. Wood

AVIATION WEEK, December 10, 1951

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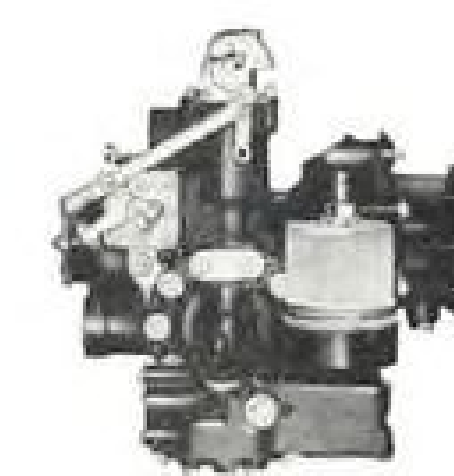
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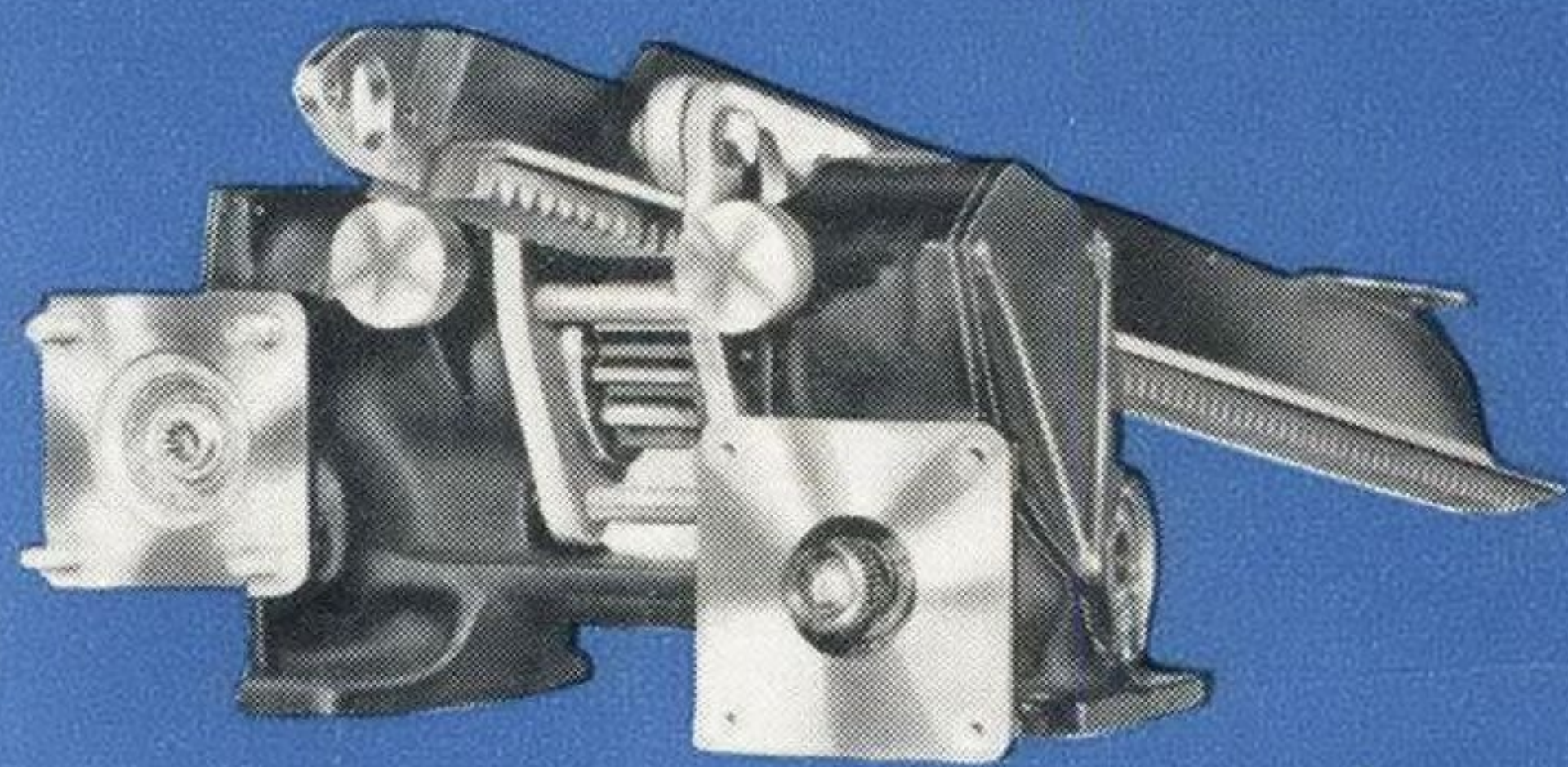
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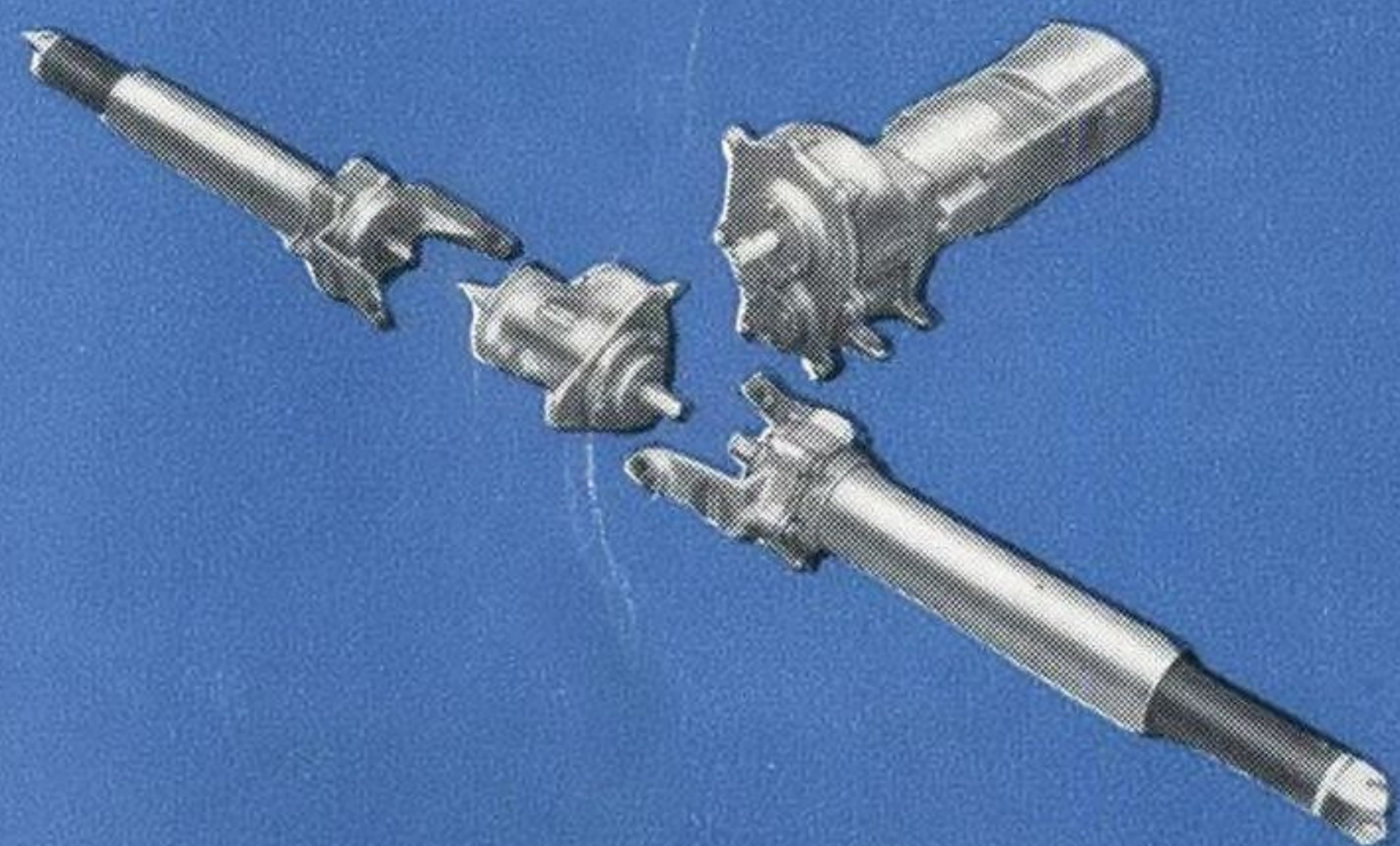


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