

AVIATION WEEK

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JULY 16, 1951

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A fast lens catches a GRUMMAN GUARDIAN in mid-air close-up. Two versions of this carrier-based plane work together to protect ships of the U.S. Navy from submarine attack. Some GUARDIANS carry powerful detection devices. When these "hunters" locate an undersea enemy, more heavily armed, bomb-carrying GUARDIANS, like the one shown here, come in for the "kill."

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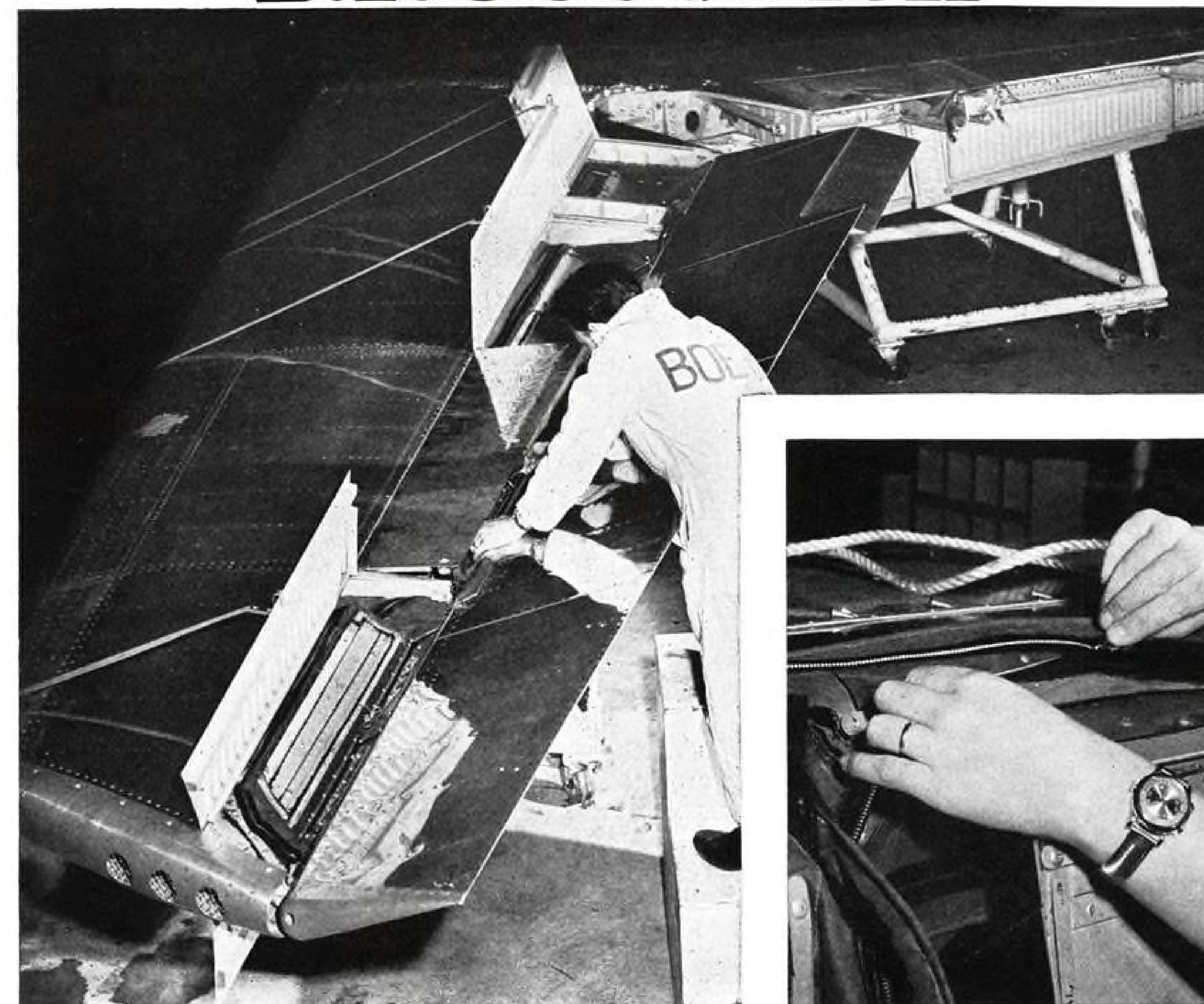


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Aviation Week



Member



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TWA

22 YEARS

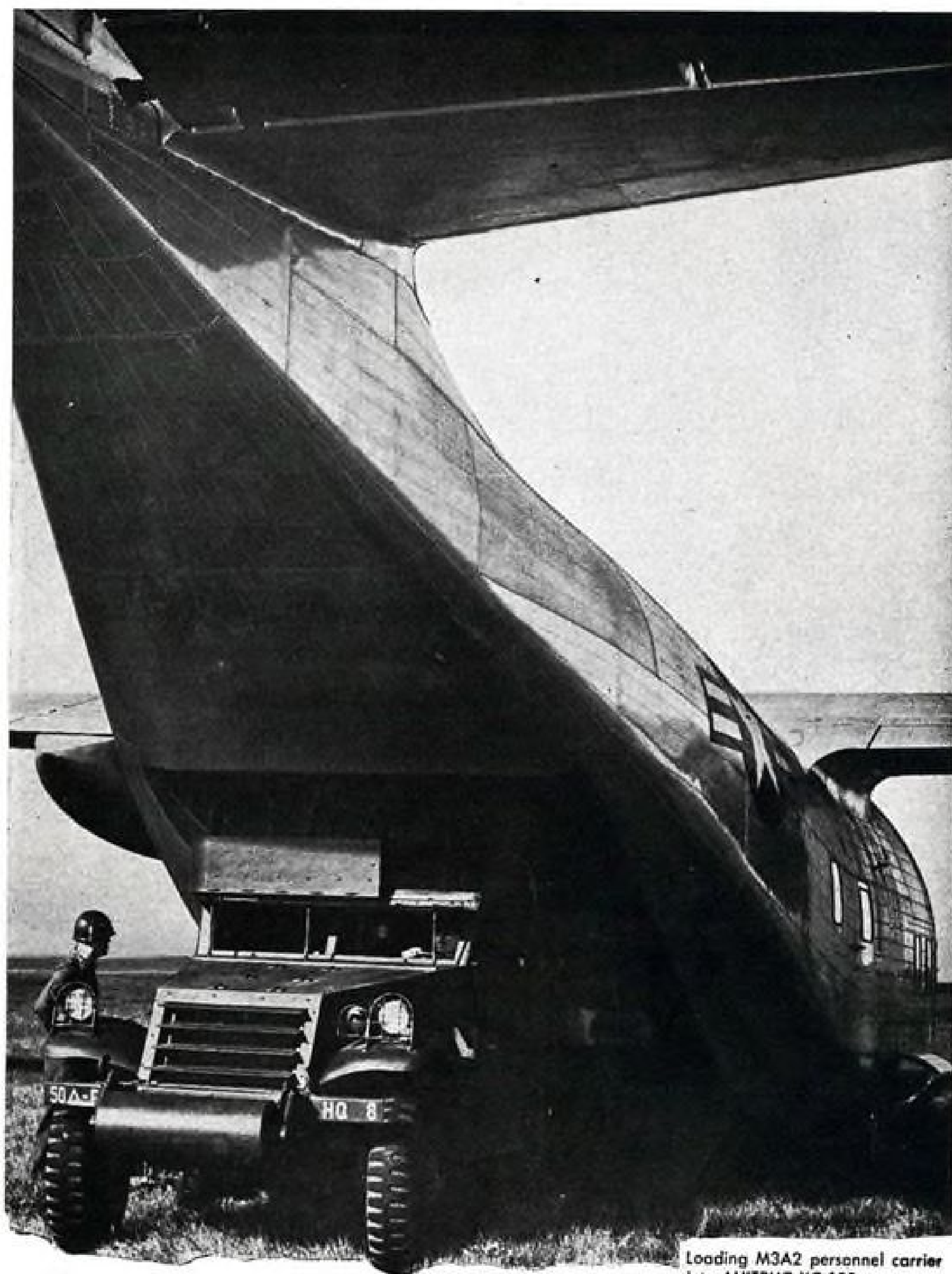
FAFNIR

Twenty-two years ago next month, TWA inaugurated the first transcontinental air passenger service. Those were the Ford tri-motor tin goose days . . . remember? Today, its service is trans-world; its equipment includes luxurious, all-sleeper Constellations. Fafnir has been a TWA supplier from the start . . . providing ball bearings for original equipment and replacement. Good bearings aren't the sole answer to this relationship. Equally important is the Fafnir attitude and aptitude, a way of looking at bearings from the user's viewpoint and an aptitude gained from more than twenty years' specialization in aircraft ball bearings. The Fafnir Bearing Company, New Britain, Connecticut.

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Loading M3A2 personnel carrier into AVTRUC XC-123.

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SIDELIGHTS

No More XC-99s

Implication is incorrect in Charles Wilson's quarterly report to the President that the successor to the Douglas C-124 would be Consolidated-Vultee's XC-99, the transport version of the B-36. Wilson had asked USAF for a run-down on its latest plane types. In compliance, USAF ran in the XC-99 along with the rest of its stable. Air Force spokesmen say "No further production of the XC-99 is contemplated." Same is true of Republic XF-91 rocket & jet interceptor.

Those 'Underground Runways'

The current report that Navy is operating AJ-1 aircraft from "underground runways" in North Africa is labeled false by Navy officials. Navy tells AVIATION WEEK it has only one base—Port Lyautey—on the North African coast. It's possible the rumor arose following a recent fire in an underground ammunition storage facility in that vicinity.

Air Force Roundup

USAF has awarded Convair a new contract for further modification and overhaul of B-36s. The contract, covering conversion of A & B series to D was begun in 1950 and will continue through 1952. . . . A new survey shows 47% of USAF regular officers are college graduates, in contrast to Navy with 87% and Army with 71%. . . . USAF planes lost from all causes since Korean hostilities began total 246; enemy planes destroyed or damaged, 391, of which 128 were destroyed on the ground. Far East Air Force has flown 223,000 sorties during 53 weeks of combat covered in the report. . . . Air Force expenditures—which reflect equipment deliveries and personnel strength in being—almost doubled over the past year. Treasury Secretary Snyder reported USAF expenditures of \$6.237 billion for the 1951 fiscal year, ended July 1, compared with \$3.506 billion for the 1950 fiscal year. . . . The XB-36 will soon be inactivated. The big bomber prototype is now on a tour, landing at USAF bases to test runway and taxi-strip loading capabilities. After the tour, it will be grounded at a school to train ground crews. . . . USAF procurement has a critical shortage of inspectors and seeks civilian inspection people for Chicago, South Bend, Milwaukee, Indianapolis, Minneapolis and St. Louis, for radio & electronics, fuel & lubricants, tool and gages. Contact Mid-central Air Procurement District Office, Chicago.

The Press

Western Flying magazine changes its name to Western Aviation with the July issue. . . . V. E. Ehrenclou, owner and manager of Occidental Publishing Co., Los Angeles, which publishes Western Aviation and other magazines, died June 20. . . . Curtis (Continued on page 84)

AVIATION WEEK, July 16, 1951

NEWS DIGEST

DOMESTIC

Ryan Aeronautical Corp. has been awarded a subcontract by Douglas Aircraft to build a small number of complete rocket motors for a surface-to-surface missile being developed by the latter for Army ordnance.

Big. Gen. Donald F. Stace, commanding general of the Western Air Procurement District in Los Angeles, has applied for retirement from active duty. He will be succeeded by Brig. Gen. William M. Morgan, Deputy Commander of the Western Air Defense Force. Stace twice headed the USAF's western purchasing organization; first in 1940, then on his return from the Pacific theater in 1950.

Army-Air Force maneuvers at Ft. Bragg and Camp Mackall, N. C., between Aug. 13-Sept. 2 will involve more than 100,000 troops and approximately 400 planes. Designated Southern Pine, the exercise is planned to be the largest postwar U.S. military training mission in numbers of men since World War II.

National soaring mark of 367 mi. was set by Richard Johnson at the 18th National Soaring Contest, at Harris Hill, Elmira, N. Y. Johnson kept his RJ-5 single-seater aloft for eight hours and bettered the previous record by 42 mi.

Los Angeles Airways' third copter crash, second in three weeks, has resulted in LAA grounding all its rotary-wing craft until the crash is investigated. The mail service Sikorsky S-51 hit the ground near Pomona, Calif., killing CAA inspector Wyman Ellis who was flying the craft and injuring LAA pilot John Deblauw. Previous crackup occurred on takeoff when tail rotor failed. Damage to blades and rotor head is being repaired.

Huge aircraft maintenance depot, to cost approximately \$62 million, is planned by the USAF for Lancaster, Pa. The new depot, which will employ up to 10,000, will have a runway capable of handling all planes now being used or projected, according to a USAF spokesman. It will augment the present Olmstead AFB, about 25 mi. distant.

P&W R-2000-9, fitted to a MATS C-54 recently set a mark of 1,400 flying hours between overhauls without any sign of breakdown. The normal time for this engine is 1,200 hr. the engine

was flown under temperatures ranging from 120 deg. F. to below zero, and was subjected to infiltrating sand and salt water.

Civil Aeronautics Board plans to appeal recent Washington, D. C. district court ruling preventing CAB from restricting the number of trips made monthly by certain nonskeds to three a month between major cities and eight a month between pairs of other cities. CAB will now take the ruling before the Circuit Court of Appeals, and postpone the effective date of its ruling until after the outcome of its new appeal.

Defense Production Administration has declared the auxiliary air station at El Centro, Calif., a critical area for defense housing. The El Centro housing shortage was caused by transfer of more than 1,000 military and civilian personnel from Wright-Patterson AFB. El Centro Air Station is designated as a joint parachute test center.

FINANCIAL

Mid-Continent Airlines has reported a net profit of \$24,511 for May, after provision for taxes. Operating revenues were \$838,786, up 27.7 percent over May, 1950. Net profit for the first five months of 1951 was \$60,493, against \$109,869 for the same period last year. Loss on the carrier's local service route, not in operation during the 1950 period, was blamed.

Pan American World Airways declared a dividend of 25 cents a share, payable Aug. 6 to holders of record July 30. This is the first dividend this year, previous one in the amount of 50 cents being paid Dec. 12, 1950.

INTERNATIONAL

George Geoffrey Smith, MBE, a director of the Associated Iliffe Press and of Iliffe & Sons, and managing editor of the many Iliffe Publications—including Flight magazine, for which he was probably best known—died at his home in Radlett, England, June 29. He was 67. Smith was also well known for his book, Gas Turbines and Jet Propulsion, first published in 1942.

Canadian Pacific Airlines has purchased three DC-6Bs from Douglas Aircraft for its trans-Pacific operations to Australia and Japan. The DC-6Bs are scheduled to replace Canadair DC-4M North Stars sold to Trans-Canada Airlines.

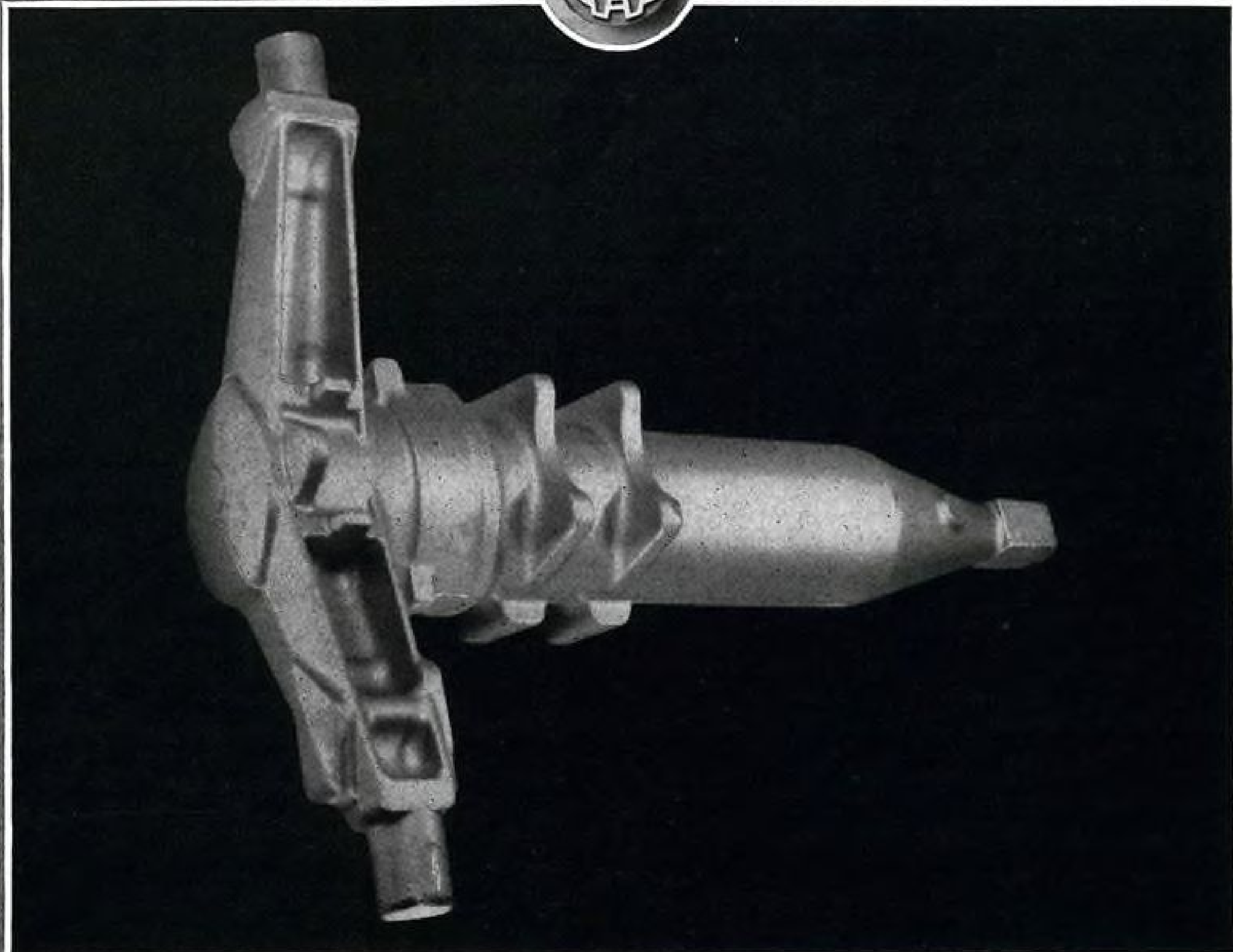
GOOD READING FOR GOOD BUYING

A complete listing of Airborne's products for the aviation industry—ROTORette, Lineator, Rotorac and TrimTrol electro-mechanical actuators and ANGLgear right-angle bevel gear drive units—appears in the I.A.S. "1951 AERONAUTICAL ENGINEERING CATALOG." It will pay you to examine closely the curves, wiring diagrams and working drawings of these units which meet AN specifications and which are used on many modern planes.

An extra copy of this informative insert is yours on request.



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WHO'S WHERE

In the Front Office

Harry S. White has been appointed vice president-traffic and sales for Southwest Airways. White is a director of the carrier and also is on the board of the Aeronautical Training Society.

Harold A. Olsen has been named vice president-traffic and sales for Pacific Northern Airlines. A veteran of 18 years in air transport, Olsen held administrative posts with American Airlines and Capital before taking the position of general traffic and sales manager for PNA in 1947.

Raymond D. Atchley has been designated vice president-engineering of Midwestern Geophysical Laboratory, Tulsa. He was formerly on the staff of the dynamic analysis and control laboratory at Massachusetts Institute of Technology, where he had been engaged for the past five years in the design of hydraulic servo components and instruments for the MIT three-axis flight simulator as well as the missile project Meteor. Donald G. O'Brien has been named chief engineer.

Changes

P. N. Jansen, consultant to Air Materiel Command, has been retained by Boeing Airplane Co. as full-time consultant on production matters. His first assignment is at the Wichita division.

William A. Sredenschek has been designated manager of materials and purchasing for General Electric Co. A. T. Chandonnet has been appointed manager of GE's Lynn (Mass.) Turbine division and William V. O'Brien has been named manager of the firm's Apparatus Marketing division. O'Brien succeeds Chester H. Lang who now heads GE's public relations organization.

Robert Irwin and John F. Kennedy have been named superintendents of two plants to make parts for Buick Motor division's Wright J-65 Sapphire jet engine which the division will build under license. Irwin will be assigned to the plant fabricating aluminum and magnesium parts for the J-65, and Kennedy will work at the facility handling steel and iron parts machining and making of subassemblies.

Richard Girvin has been placed in charge of a new communications and electronics department set up by Los Angeles Airways, Inc. He was previously assistant superintendent-communications for Southwest Airways.

J. L. Fechter has been named assistant division manager of Convair's San Diego division.

H. L. Roberts has been appointed manager of the new regional office of the Air Transport Assn., at Ft. Worth, Tex.

Hans E. Lasker has been appointed works manager for Kaman Aircraft Corp., and Frank A. Bandholtz, Jr., has been named chief cost estimator.

Jack R. Bach, is new industry planning assistant in the western regional office of the AIA. Frank S. Ruwe has been put in charge of the industrial relations department.

INDUSTRY OBSERVER

► Chase Aircraft Co., XC-123 crashed during takeoff at Eglin AFB, Fla., following completion of recent long-range rescue competition trials between that plane, the Fairchild C-119 and a Douglas Super DC-3. Motion pictures taken of the plane during takeoff showed that the left Pratt and Whitney R-2800 failed just after the plane became airborne. The pilot was killed.

► Large scale military transport production pattern for next several years has been crystalized by Pentagon planners: assault—Chase C-123; medium troop and cargo—Fairchild C-119; long-range freight and personnel—Douglas DC-6A and Lockheed Super Constellation 1049; strategic heavy—Douglas C-124; aerial tanker—Boeing KC-97; all-purpose transport—Lockheed L-206.

► New-type transports on order and available for military conversion in an emergency by U. S. and allied foreign carriers are approximately as follows: 100 Douglas DC-6As and Bs; 50 Constellation 749As and 1049s; 100 Martin 4-0-4s and 100 Convair 340s.

► The Rotax of Canada Ltd., subsidiary of a British firm, has completed a \$90,000 property purchase from the city of Toronto for the building site of a \$2-million aircraft precision instrument manufacturing plant. Construction is expected to take 18 months.

► Boeing Airplane Co. is moving four departments—B-50 fuselage structures; B-50 and C-97 wing structures; major subassembly and machine assembly—from its Seattle Plant 2 to Renton, Wash., to make room for contemplated B-52 production. The move involves shift of approximately 1,300 employes and completes the switch of B-50 and C-97 assembly work to Renton.

► North American Aviation's digital differential analyzer, built by Computer Research Corp., is being installed aboard one of the company's aircraft to determine answers to electromechanical problems encountered during flight testing of guided missile components. Ground tests have proven the machine infallible under varying conditions of altitude, temperature and aircraft-type vibration.

► Quantity deliveries of Sweden's own jet fighter, the Saab-29 "flying barrel" have furnished the F 13 day-fighter wing of Norkoepping with replacements for its de Havilland Vampires. The F 13 wing was the first Swedish unit to fly the Vampires, back in 1946.

► First photo of the Tu-10, swept-tail light jet bomber of the Red air force, shows the installation of wingtip tanks. Size is small—approximately two tip chords in length. Aircraft is in squadron service throughout the Red zone of Germany, and appears frequently over Berlin.

► Curtiss-Wright Corp. has entered into agreement to purchase Buffalo Stainless Casting Corp., Buffalo, N. Y., subject to ratification of latter company's stockholders who will meet July 19. If deal is made, C-W management will move in fast and set up plant for manufacture of compressor blades, probably under a new C-W division. Blade process under consideration is a "shell" technique in which mold is sprayed with plastic to give very precise, low-cost product.

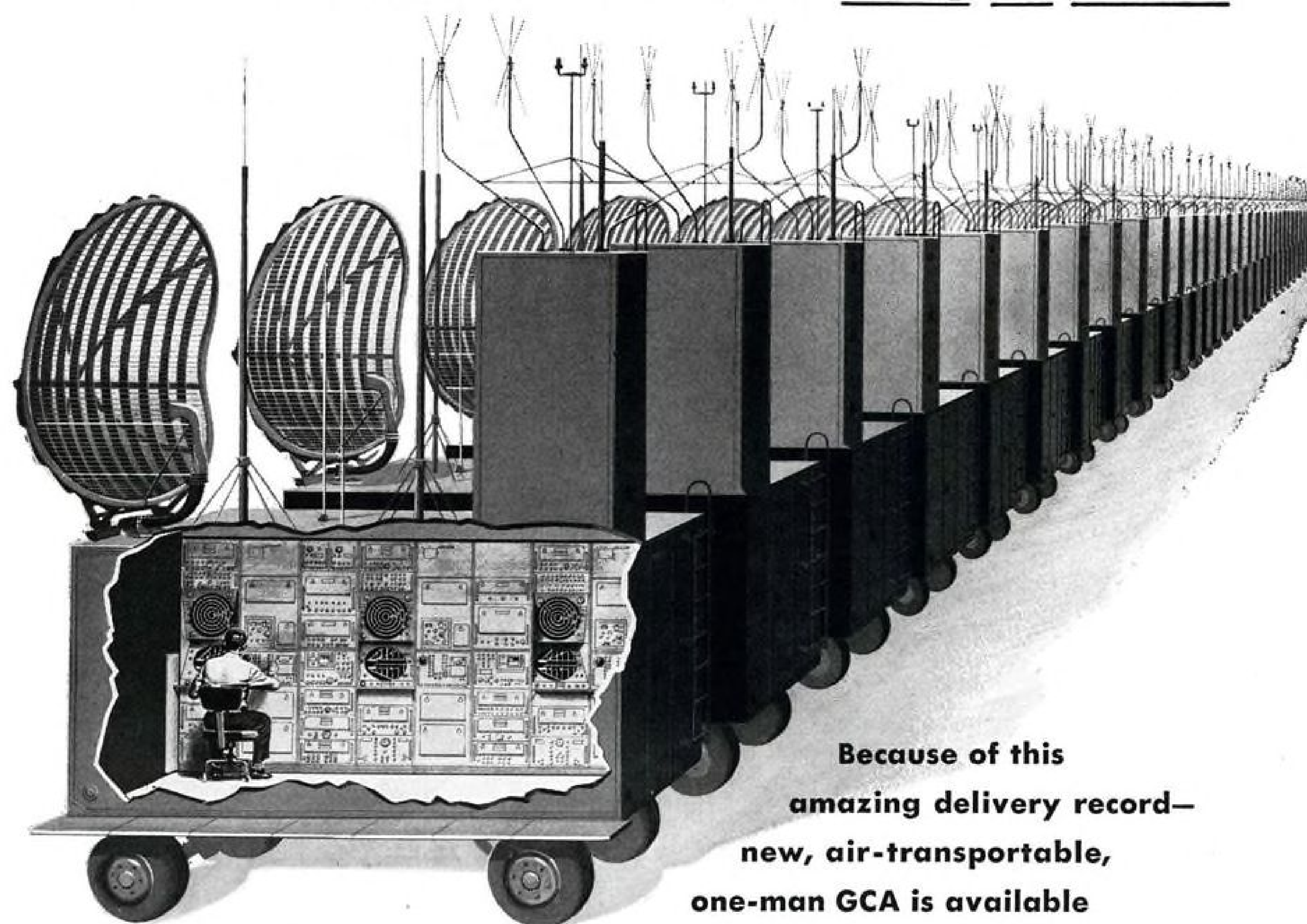
► Purchase of a Convair 340 is being weighed by Curtiss-Wright for purpose of using the aircraft as a test vehicle for its Turbo-Compound R-3350.

► Prototype YB-47C Stratojet will make its first flight late this year. Power will be furnished by four Allison J-35-A-23s instead of the six jets used in the B-47B.

► Douglas X-3, Air Force's new supersonic research craft, is being readied for flight in mid-autumn. Craft uses a double-wedge airfoil section. Reported design performance is 2,250 mph. at nearly 300,000 ft. altitude.

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LOS ANGELES, CALIFORNIA

AVIATION WEEK

VOL. 55, NO. 3

JULY 16, 1951

Truce May Slow, But Not Halt Production

- Korean peace may bring cut in military budget now before Congress, but air buildup will continue.
- Present backlogs stay the same, and that means a high level of business for some time to come.
- Delivery dates may be pushed back, but still output for rest of this year will go on much as scheduled.

Prospects of a truce in the Korean war last week stirred Defense Department officials to quick action to ward off a threatened cut in military appropriations.

Government and industry air officials had no worries about any immediate cutbacks in production; that isn't in the cards.

Production may be slowed down—but not this year. That would not be a cutback. Production would continue to build up, but at a slower rate.

And any cut in the fiscal 1952 military budget—now before Congress—would still leave the manufacturing industry glutted with orders. Backlogs of the 15 leading companies are estimated to total \$7.6 billion (page 69). This assures good business for several years.

But the sore spot is this:

At the very time negotiators in Kaesong were dickering for a truce, Air Force and Navy were asking the Joint Chiefs of Staff to approve proposed requests for more money for fiscal 1953, which begins July 1, 1952.

► **Air Force Aims**—USAF wants its present goal of a 95-wing force by July 1952 lifted to 120 wings by July the following year. But it would settle for a more modest boost sooner to 110 wings. The 120-wing plan would require \$5 billion more than the \$19.8 billion allowed by the Administration for the 1952 fiscal year to achieve a fully manned 95-wing force by July 1952, and require about \$29 billion during the 1953 fiscal year.

As of now, this is out. There's no likelihood of increasing the \$60-billion military budget this fiscal year. At best, JCS will approve a build-up to 110 wings during the 1953 fiscal year.

The Navy wants its present goal of 15 carrier wings by July 1952 raised to 18-20 wings by July 1953. The Navy's expansion has been the most modest of the three services. It has emphasized the de-mothballing and re-

commissioning of ships. Now Navy wants the aircraft to equip them.

The hubbub in Washington last week over possible cuts in defense appropriations was founded on precedent. The Administration and Congress have blown hot and cold on the military with each new shift in the international winds since the end of World War II.

► **Strength for Diplomacy**—In public speeches and testimony before Congress, Defense Department spokesmen from Secretary George Marshall down the line have taken the offensive to avert military fund cuts and a let-down in the defense program. Defense Mobilizer Charles E. Wilson summed it up in his radio-television speech: "You cannot win diplomatic victories against an enemy of this kind unless our diplomats are backed up by strength."

Talk on Capitol Hill provoked that and other warnings. The \$60-billion 1952 fiscal year budget was still bogged down in the House Appropriations Committee, and reporters heard mutterings of a \$5 to \$10-billion slash.

A cut even of that proportion wouldn't mean a reduction in striking power goals, Congressmen hastily point out. But it would mean a postponement of the achievement of those goals. As Rep. George Mahon, chairman of the Military Appropriations Subcommittee, points out: "Right now, it's a question of how fast, rather than how far."

The two add up to the same thing, in the opinion of observers. A slower rate of build-up means a reduced force in being at a given date—which was exactly Wilson's point.

► **Wilson Report**—Still and all, Wilson's second quarterly report to the President on "Meeting Defense Goals" gave the Congressmen a talking point. As has been apparent to industry analysts for some time, aircraft production has not been building up as fast as civilian

mobilizers wanted it to. Wilson's report spelled it out:

"Deliveries are currently about two-thirds higher than a year ago. For the most part, this increase reflects the expansion of the air forces that was already planned before Korea, plus whatever speed-up could be achieved in plants that were in operation at that time..."

"Present schedules call for tripling the current rate of deliveries in the next 12 months or so, which is a big increase but still somewhat short of targets set by the President when he proclaimed the national emergency." At that time, the President called for a five-fold increase.

In a way, this admission is a grim triumph for the Air Force, which all along has been unhappy about the philosophy of building a "base of production" rather than giving the go-ahead signal for volume production in existing plants.

► **Aircraft Slump**—Military aircraft production for the first quarter of this year slumped badly—to such a low point in fact, that military planners vetoed release of military airframe-weight production figures because of their possible international political effect.

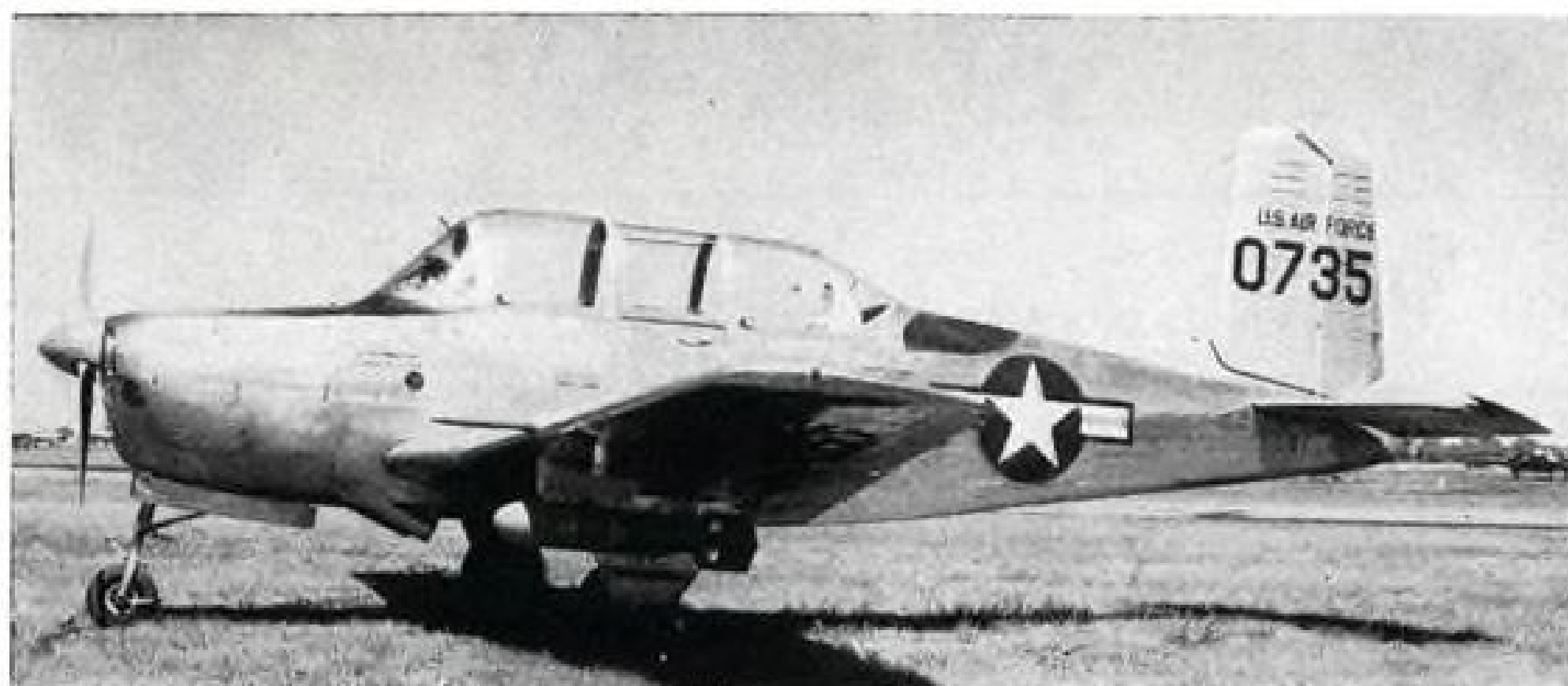
Since then, the build-up has started in earnest and it is still possible for production this year to triple last year's output.

The key point in the Korean truce situation is that no matter what happens, the effect on production this year will be slight—or none at all.

There are some grounds to believe that many Air Force people would not be too unhappy if a Korean settlement resulted in a slower pace of production. It would enable them to go back to their preferred way of procurement: thorough testing, and modification after modification to keep up with the rapidly changing technology and operational demands.

► **No Letdown**—The thing observers were remembering last week was that Air Force plans for its build-up were framed before the Korean War began. The reason was simple.

Secretary Thomas K. Finletter highlighted it in a television interview last week. Three times he emphasized the importance of the strategic air arm. This, plus Administration warnings against a letdown made it seem certain production would not be pared back to pre-Korean status.



Beech Shows Armed T-34 Trainer

Prelude to a new evaluation of the Beech T-34 and Temco T-35 against North American's World War II T-6 began in Washington last week with a two-pronged demonstration by the Beech Aircraft Co., to sell light plane training economy of the T-34 to USAF and potentialities of the plane as a "cub-killer" to the Army.

The Beech single-engine basic-primary trainer put in its appearance at Washington armed with two .30-caliber machine guns and six rockets, three under each wing. Alternate weapon arrangement is attachment of two 150-lb. bombs in place of the rockets or use of both in combination.

The single-engine pilot-trainer competition, which gets under way next month, narrowed to two entries recently when Fairchild Engine and Airplane Corp. announced that its T-31 version of the Navy XNQ-one-time winner of a single-engine trainer competition would not be entered. The T-31 had been ordered in quantity by Air Force two years ago but the contract was later canceled.

► **Background**—The new trainer competition is a modified revival of the joint trainer competition conducted in August last year at Randolph AFB, Tex. between the presently competing planes and the Fairchild T-31. At that time, the three entries were to be flown by AF pilot-students during the standard basic training curriculum. The students' prowess was to be correlated with the particular plane flown in comparison with data previously compiled on the T-6. The same pattern was to be followed later in the year by Navy and then joint recommendations for a new set of trainer specifications would be evolved by the two services.

War in Korea upset the timetable and forced shelving of plans to produce the ideal training plane suitable to both services. Instead, Air Force ordered North American, already in heavy production with the T-28 to begin conversion of stored T-6 trainers, to "G" series. Many of the former wartime

trainers were already undergoing conversion to meet stepped-up pilot training schedules.

At last count, USAF had 2,000 T-6 aircraft. Contracts for modification of 700 to G series were authorized out of fiscal 1949 funds. Modifications included: rebuilding the Pratt & Whitney 1340 engine; metal covered ailerons and rudder; installation of single-pane safety glass canopy windows; new brakes and steerable tail-wheel; new instrument panel; 2 wing fuel cells; and square-tip prop blades instead of round tips.

► **Disagreement**—Big problem unresolved by Air Force in its cancellation of the Randolph evaluation was two conflicting training views: Whether to train fledgling pilots first in light aircraft and then advance them to heavier planes as training progressed; or, to start them immediately in heavier planes such as the T-6 and its later counterpart, the North American T-28.

There is a widely expanding conviction among those responsible for pilot training that it is far more economical to begin initial flight training in light aircraft. The fledgling, it is claimed, solos in shorter time and less cost to the government in the light plane. Therefore, he is easier to train after transition to heavier aircraft.

To the advocates of "the old school" immediate training in heavier planes is best. They claim that while it takes longer to train the student in the beginning because he flies a heavier plane, he acquires a more thorough grounding in pilot technique just because of the trainer's greater weight and power.

► **Cub-Killer**—Side issue under examination by Air Force and Army is potentialities of liaison-type aircraft for armed reconnaissance work in forward combat areas. Army, about 18 months ago, issued a requirement for development of armor for liaison aircraft to fill a dual front-line mission of long-range artillery spotting and light ground-support.

Air Force paid little more than lip service to this requirement, pointing out that ground support was still an opera-

tion for which it was responsible and that light armament for such aircraft was impractical. The requirement was shelved.

A few months ago in "unofficial" tests at Ft. Sill, Okla. (AVIATION WEEK Mar. 19) Army tried mounting machine guns and light bombs on an L-5 with good results.

► **Red Havoc**—Several weeks ago in Korea, a Red China plane, said to have been of World War I vintage, played havoc with United Nations troops and communications. Air Force pilots in jet fighters and in slower piston-engine fighters and bombers were unable to intercept the tiny, lumbering enemy plane weaving, in and out, low over U. N. lines. Finally, after several days, the interloper was shot down, but only after an expensive and elaborate trap was plotted by both ground and air.

As a result of this recognition of the logic of the Army requirement for light-plane armament, Air Force is cautiously reexamining the issue. At the present time, according to an Air Force source, there is no money set up for the project. But the prospects are good that there will be shortly, he said.

Meanwhile Army brass has been examining the Beech T-34 in Washington and it is scheduled to be shown at Ft. Monroe, headquarters of Army Field Forces and later at Ft. Bragg, headquarters of the airborne center and finally at Ft. Sill, Army's artillery center. Rapidly growing interest in the cub-killer augurs well for the Beech company, now spending its own money on the project. In the words of an Army source, "Beech is getting in there first with the most."

► **High Favor**—Air Force is mum on the subject of the T-34 as a cub-killer at the present time but the plane is enjoying high favor of top USAF brass.

Low-winged configuration of the T-34 is clean and conventional. Outstanding recognition feature of the plane is its high, large canopy. With full instrumentation and radio, the student pilot can do either partial or full instrument work. Another feature of the T-34 is that the rear-seat occupant has enough overhead room to raise the seat to a level above that of the forward seat. These same features make the plane completely adaptable to the Army requirement, it was said.

Wing span of the T-34 is 32 ft. 9½ in.; overall length, 25 ft. 10½ in.; height on tricycle landing gear is 9 ft. 7 in.; takeoff gross weight is 2,750 lb.

Powerplant of the T-34 is a Continental E-225-8 engine, driving an all-metal constant-speed Beech propeller. The plane can clear a 50 ft. obstacle on takeoff in 918 ft. and land over a 50 ft. obstacle in 820 ft. (Design analysis of the T-34 was presented in AVIATION WEEK Aug. 28, 1950.)

Buying Change

New procurement rule lets small firms bid on negotiated contracts.

An important new directive has paved the way for giving small businesses a much bigger share of total USAF procurement. The means: Modification of the negotiated contracts setup—by which USAF has been doing by far the bulk of its buying—to bring the small firms into the picture.

Ever since last December, when military procurement agencies went on an emergency basis and negotiated the bulk of orders with firms they knew from experience could get "thar fustest with the mostest," small business has been screaming that (1) They haven't been able to find out what the government wanted and, (2) they usually couldn't even get enough information on what had been bought on this basis so that they could try to get work from the contract winners.

Of course, there still were contracts being put out on an advertised competitive basis, but these were small in comparison with the negotiated type. Also, the defense agencies, led by USAF, started the "subcontracting clinic" to get small business into the effort—but their continued plaint was that they wanted to get in as primes, that subcontracting had not yet hit its stride.

► **How It Works**—Under the new directive, which follows up a Munitions Board requirement on all services, the small business specialist at Wright Field—hub of all USAF procurement—can now review Air Force purchase requirements to determine which orders can be channeled to small firms. He then forwards these recommendations to the contracting officer, and is also authorized to sit in on meetings of boards of contract awards and review committees where he can press these recommendations.

By means of this chain the small companies will be worked into the negotiated contracts method of procurement.

Here, briefly, is how it works:

Pretty soon, Wright Field will send out to all its procurement offices Request for Proposals, which will be posted on bulletin boards in each office's small business section. All RFP's that is, covering negotiated contracts of \$10,000 and over.

► **Bid Kit**—If a manufacturer sees something on the board he thinks he can handle, he can request to be shown the bid kit, available at the office, containing detailed drawings (including blueprints if necessary) and all specifications covering the item. This will enable him

to decide whether he can take the job and how to figure his bid. He then submits the bid to Air Materiel Command, Wright Field. If it is accepted, the regional office will then survey his facilities to see if he can fulfill the contract.

It may be that he is incapable of taking on the entire job; if so, AMC is authorized to split the award among several bidders.

Although the directive became effective July 2, don't rush down to your regional USAF procurement office and expect to find its small business bulletin boards covered with requests for proposals. It hasn't happened—yet. Bear in mind that the Air Force has only recently concluded one fiscal year, is just beginning another and it takes a little time to get things rolling again. It all hinges on Wright Field getting the money from Congress to buy.

► **Further Aid to Subs**—Another way this new setup can aid small firms is to help in getting them more information on what USAF is buying.

The only information made available on negotiated contract winners is merely a synopsis of the awards, which give scant data on the material being purchased.

Since these local offices now will get bid kits along with the RFP's, the USAF small business reps can, with some checking, dig out the original bid kits that covered those contracts and lay out all the necessary specifications and drawings for study on the spot by the small firm. Then, it can determine what if anything it could make on subcontract. It can then get in touch with the prime and try for a subcontract.

► **Previous Method**—Of course, the prescribed routine previously was for the sub to contact the prime for business, but there have been complaints that the primes have been too sketchy in their correspondence, with the result that the potential sub got too little detailed tech data of the kind he needed. This was understandable in some respects; it would be a big job for a prime to make up drawings and specs in sufficient quantity.

It would help the regional office a lot if the synopsis could be coded to indicate which contracts had been handled on a negotiated basis. Regional people feel this shouldn't be too difficult to do, and it would really simplify their job of tracing back to the original bid kits.

Admittedly, the new system of spreading the negotiated bidding is going to cost the U. S. taxpayer more, but the Air Force feels it is the best way to rapidly broaden the industrial base necessary to provide large production should an even greater effort be needed in a hurry. And the pressure put on Congress by small business to get a larger share of defense production has also been a factor in bringing it about.

UAL-Pilot Dispute Still in Mediation

White House and National Mediation Board continued working cautiously, but hard, last week to bring United Air Lines management and pilots together. The thorny two-year dispute broke out last month in a full fledged ten-day strike that ended with pilots returning to work only under threat of government seizure.

The matter has apparently become a top government concern, although the pilots are back on the job on everything except the new big Douglas DC-6Bs recently delivered to United. These, the pilots still refuse to fly; they are using this as the symbol of their main contention—that they should work less hours flight time on larger, faster, more complex equipment. They also demand some limit on ground duty time.

Discussions were moved to Washington. And not only the National Mediation Board members were sitting in on the effort to bring the parties together: NMB Executive Secretary Thomas Bickers was pitching in along with Mediator John Murray.

► **Side Issues**—But at least three events drew red herrings across the trail of understanding, the vital ingredient of mediation and peaceful settlement:

• **Pilot union dissension** was reported hot (AVIATION WEEK July 9). A pilot executive board meeting in Chicago last week reportedly considered deposing David Behncke from the presidency of the Air Line Pilots Assn.

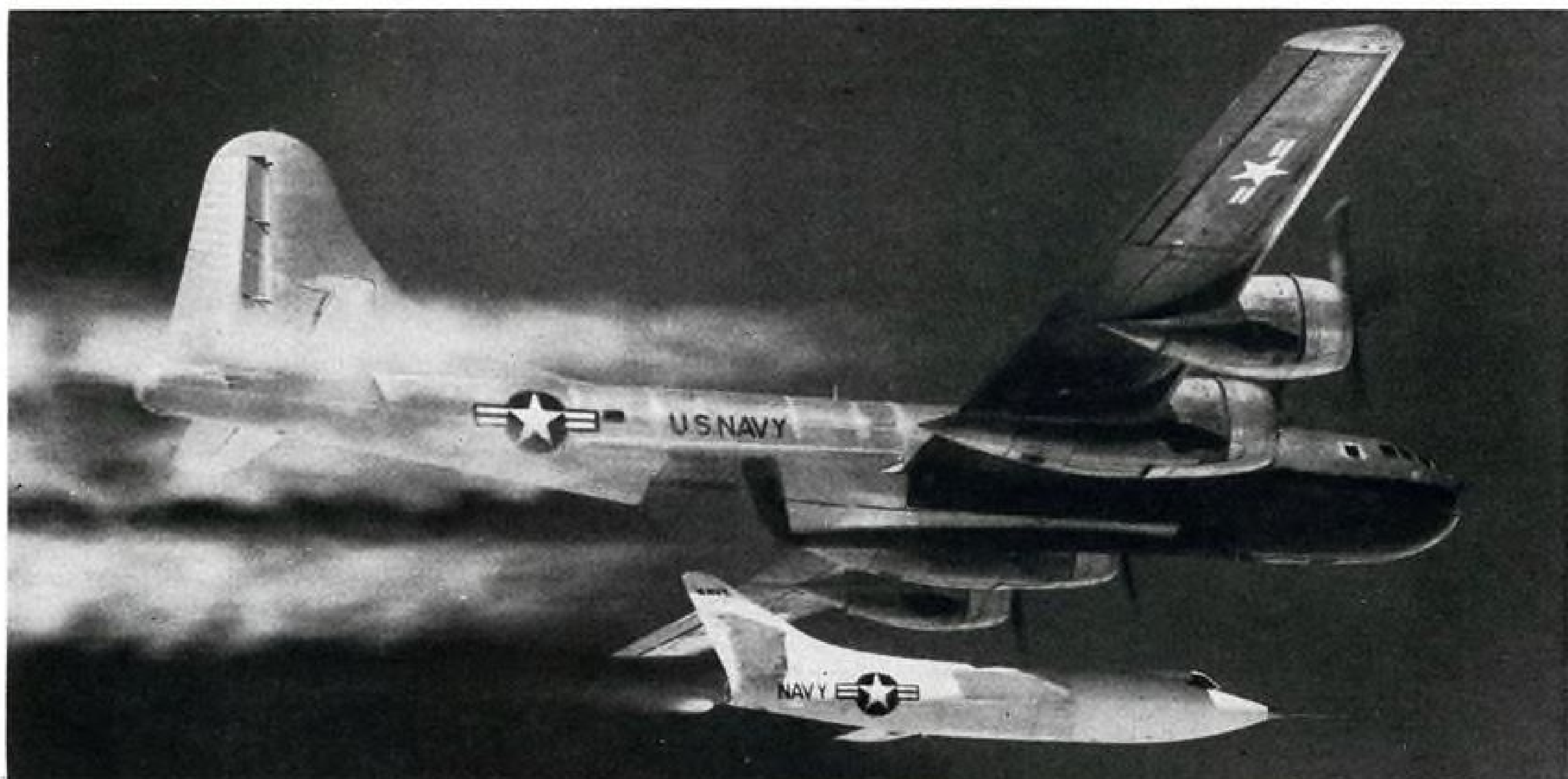
• **Government seizure threat** put the pilots in a poor bargaining position, making them balky. A seizure threat takes away the pilots' big pride and strength—the right to walk off a job.

• **By not flying the DC-6B** the pilots nevertheless continued to strike back at the airline; the refusal to fly the "B," though only a miniature strike, cost the airline a pretty penny each day.

Early in the week, the mediators were still talking to management and pilots separately—not bringing them face to face. This is the early procedure in mediation—until the mediators think they have some possible basis for settlement to offer.

► **Why Seizure**—Meanwhile, pilots of American Airlines joined United Air Lines pilots in outspoken resentment of the Presidential seizure threat. American pilots' long dispute with their airline is parallel with the United case.

There was some pilot alarm last week over reports the military might confiscate the struck DC-6Bs of United, but an official Air Force spokesman told AVIATION WEEK he had been in on the seizure preparations from the start and there was no mention of taking a single type of equipment.



Douglas Skyrocket—Highest and Fastest

The supersonic region has been further explored by the record-breaking flight of the Douglas D-558-II Skyrocket June 11. Navy and Douglas Aircraft Co. have claimed the world speed and altitude records for a piloted plane as one by-product of the Skyrocket's performance.

In addition, the flights suggest that aircraft designers will soon have more data to extend the curves of supersonic knowledge obtained from the pioneering dashes of the Bell X-1.

For security reasons, no official figures were given for the flight. But the X-1 has been credited with a high speed of approximately Mach 1.45 (960 mph.) at 61,000 ft., and a Navy representative at Douglas' El Segundo, Calif., plant

stated that the Skyrocket had flown "considerably" beyond those marks. Pilot on the flight was Bill Bridgeman, 34-year-old Douglas pilot.

Informed quarters at the Pentagon speculated that the plane had approximated Mach 2 at an altitude of 72,000 ft. Mach 2 at that height would be about 1,324 mph.

► **Flight Details**—In a press conference at Edwards AFB, location of the record-breaking flight, Bridgeman gave some of the details. The Skyrocket, whose turbojet engine and associated systems had been removed to increase the propellant capacity for the rocket engine, was carried aloft to 35,000 ft. in the belly of a B-29 mother ship. After the drop, Bridgeman waited about six sec-

onds before starting the rocket engine.

Climb to altitude (wide open and at a 45-deg. angle) was begun 51 sec. after Bridgeman started the engine. "I just put it up at 45 degrees and hung on until I reached my altitude, then pushed over and looked for the lake before I got too far away from home."

With the plane still accelerating at the pushover, and with about 15 percent (of three tons total) of fuel left, Bridgeman began the high-speed run.

The Skyrocket passed smoothly through sonic speed and continued to handle easily during its supersonic trial. Powered flight continued for about three minutes, during which Bridgeman said he was too busy flying to look around much. "It was practically an instrument

flight." His only impression of the sky color was that it was dark.

Somewhat less than 20 min. after the drop, Bridgeman greased the plane onto the runway at Edwards, dead-stick and at about 170 mph.

► **Changes Made**—The Navy Department said that in November, 1949, it had been decided that high-altitude research at supersonic speed would be more valuable in its research program. As a result, the turbojet engine was removed from the plane to allow more space for propellant for the rocket engine.

E. H. Heinemann, chief engineer of Douglas El Segundo, said that the decision to abandon the turbojet was made because "the more powerful turbojet engines we had expected to bring the Skyrocket to peak performance didn't materialize."

This change logically meant also abandoning the early scheme of ground takeoff of the D-558-II. So the Navy converted a B-29 to a mother plane. In that change, the fuselage section at the bomb bay was considerably modified, and in addition, a large section was chewed out aft of the bomb bay. A heavy external reinforcing stringer was attached just above the cutout to transfer the bending loads across the cutout.

In the Skyrocket, removal of the turbojet and ancillaries meant approximately doubling the propellant capacity for the rocket.

The powerplant used for the record-breaker was a Reaction Motors, Inc., LRS-RM-6 rocket engine. This is basically the same engine that powered the Bell X-1, but minor changes have been made to increase reliability and producibility of the engine.

With the turbojet out of the way, some fuselage cleanup was possible. The inlet scoops were closed over and so was the exhaust nozzle which has discharged through the fuselage aft belly.

No dimensional changes occurred, but there was a slight weight decrease to about 15,000 lb. at launch.

► **Special Suit**—For the flights, Bridgeman wore a new type of pressure suit which can be automatically inflated and airconditioned to maintain body temperature and normal pressure. Details of the suit were not discussed, but one novel feature was the inclusion of a small windshield wiper inside the heavy plexiglas facepiece.

In commenting on the future phases of these flight trials, a Navy spokesman told AVIATION WEEK that the Skyrocket has been pushed just about as far as it can be. But he also said that there is one more trick that the Navy has up its sleeve to squeeze the last bit of performance out of the Skyrocket. The B-29 will, he said, be fitted with rocket fuel tanks to top off the Skyrocket tanks. This is necessary because considerable

fuel is lost by evaporation in getting the ship to launching altitude, and records can be a matter of extra seconds of powered flight.

After completion of the tests with topping, the Navy turns the Skyrocket over to the NACA for its evaluation program. Currently, NACA is flying one Skyrocket of the turbojet-rocket type in stability and control research.

SEC Lists Aviation Stock Transactions

A total of 6,872 shares of Thompson Products, Inc., common stock was purchased by officers and directors of the company, through the exercise of rights for common stock which they held. Securities and Exchange Commission's latest survey shows.

• Thompson Products transactions according to the SEC survey, were: Harry D. Bubb, officer, purchased 24, making a total holding of 216 shares; William H. Chamberlain, purchased 30 through exercise of options, and an additional 70, making a total holding of 340 shares; Lee M. Clegg, purchased 750 for a total holding of 6,750 shares; A. T. Colwell, officer, purchased 360 making a total holding of 3,240; James H. Coolidge, officer, purchased 600, making a total holding of 5,400 shares; Frederick C. Crawford, officer, purchased 2,448, making a total holding of 21,322; Sam H. Emerson, director, purchased 336, making a total of 3,024 shares; Matthew P. Graham, officer, purchased 238, making a total holding of 2,146; Edgar A. Hahn, director, purchased 63, making a total holding of 567 shares; S. Livingston Mather, director, purchased 1,620, making a total holding of 14,580; M. E. Price, officer, purchased 30, making a total holding of 270 shares; L. W. Reeves, purchased 13 making a total holding of 115 shares; and J. D. Wright, officer, purchased 310 making a total holding of 2,790 shares; R. S. Livingstone, officer sold 100, leaving a total holding of 1,800 shares.

Other transactions by aviation officials reported recently:

• Alaska Airlines, Inc.: E. S. Hudson, officer, receipt of 5 common shares, total holding.

• Boeing Airplane Co.: Frederick B. Collins, officer, sale of 31 common shares, leaving a total holding of 300 shares.

• Capital Airlines, Inc.: Harold Benjamin Clark, director, sale of 200 common shares, total holding.

• Colonial Airlines, Inc.: Sigmund Janas, president, sale of 9,000 capital shares, leaving a total holding of 7,538 shares.

• Consolidated Vultee Aircraft Corp.: G. T. Bovee, officer, sale of 400 common shares, leaving a total holding of 1,800 shares.

• Curtiss-Wright Corp.: Joseph F. McCarthy, vice president, purchase of 500 common shares, making a total holding of 1,000 shares.

• Glenn L. Martin Co.: William L. Ruttig, officer, purchase of 100 common shares, making a total hold of 121 shares.

• Northwest Airlines, Inc.: Malcolm S. Mackay, officer, purchase of 200 common shares, making a total holding of 1,200 shares.

• Pan American World Airways, Inc.: Henry H. Berke, officer, sale of 200 capital shares, leaving a total holding of 418 shares; Robert G. Ferguson, officer, sale of 71 capital shares, leaving a total holding of 600 shares; Andre A. Priester, officer, sale of 500 capital shares, leaving a total holding of 4,304 shares.

• Piper Aircraft Corp.: William Thomas Piper, president, sale of 3,100 common shares, leaving a total holding of 143,156 shares; Norman J. Greene, director, purchase of 1,000 common shares, total holding.

• Ryan Aeronautical Co.: T. Claude Ryan,

president, purchase of 200 common shares, making a total holding of 48,681 shares.

• United Air Lines, Inc.: Russel F. Ahrens, officer, sale of 100 common shares, leaving a total holding of 1,202 shares; Curtis Barkes, officer, sale of 100 common shares, leaving a total holding of 651 shares; Gardner Cowles, Jr., purchase of 800 common shares, indirectly held through Register and Tribune Co., making a total holding of 3,100 shares.

• United Aircraft Products: E. L. Ladd, officer, purchase of 100 common shares, total holding.

• Western Airlines, Inc.: I. W. Burnham, 2nd, director, sale of 3,500 common shares, held through Burnham and Co., leaving a total holding of 12,000 shares; Arthur F. Kelly, sale of 74 common shares, total holding.

Cornell Lab Steps Up Research Work

The Cornell Aeronautical Laboratory, Inc., Buffalo, N. Y., reports that in the next 12 months it expects to double its pre-Korean outbreak business.

Dr. Theodore P. Wright, president of the Buffalo laboratory, and vice president of research at Cornell University, said the Korean conflict and national mobilization effort lifted the annual volume of business completed in the fiscal year ended June 30 to \$4.5 million. This compared with \$3.6 million in the previous 12-month period.

More than 95 percent of the laboratory's work has to do with research and development projects for the armed forces, Atomic Energy Commission and other government agencies. The dollar volume of research business to be completed by the laboratory in the next year is expected to be \$6.5 million.

Wright disclosed that the Buffalo laboratory is working on 130 different research projects.

Because most of laboratory's research is "classified", Wright said only that the laboratory conducts considerable research and development involving "guided missiles, armament, special project instrumentation, and a capacity schedule of windtunnel testing and flight-testing."

CAA, CAB Budgets Slashed in House

House Appropriations Committee slashed 1952 fiscal year budget for Civil Aeronautics Administration and Civil Aeronautics Board: The \$200 million recommended for CAA was clipped by \$40 million to \$160 million. Construction programs were hit hardest: The \$37 million requested for air navigation was trimmed back to \$20 million; \$54 million asked for Air Force construction was shaved down to \$36 million.

The \$3.9 million proposed for CAB was trimmed to \$3.5 million.

The House committee turned down CAA's bid for \$600,000 to initiate a prototype testing program.

French Show Progress in Civil Planes

Advanced design of lightplanes offers best chance for leadership.

By Ross Hazeltine
(McGraw-Hill World News)

Paris—French-built light planes, including some of the world's smallest jets, stole the show at the Nineteenth International Air Salon in Paris.

Although military planes dominated in numbers both at the vast exhibition hall in the Grand Palace and at the flying demonstration at Le Bourget field (AVIATION WEEK July 9, p. 17), visitors crowded thickest about the light craft—planes meant just for pleasure and convenience.

► **Claim to Fame**—French ingenuity in design gave them plenty to admire and talk about. It is in the field of light planes, especially light pleasure craft, that France puts forward any claims to world leadership.

Four of the new French light planes were particularly outstanding. The SIPA 200, a tiny jet-propelled two-seater that can be sold for \$12,000 to \$15,000, was the top attraction among sport planes.

The SIPA 200 is powered by a Turbomeca Pallas turbojet with 353-lb. thrust and has a maximum speed of 267 mph. It cruises at 236 mph. The plane's ceiling is 26,250 ft., and its range is between 310 and 372 miles.

Dimensions: wingspan 23.6 ft.; length 16.8 ft.; height 5.8 ft.; weight empty 636 lb.; weight loaded and carrying two persons 1,390 lb. The plane has a retractable tricycle landing gear. It is of all-metal construction.

► **Strange Designs**—Among other interesting small planes were:

• **Fouga Cyclope II**, another jet half-pint, was designed for acrobatic flying. Its makers claim it can be used both in basic and advanced flight training. The Cyclope is a midwing monoplane powered by a Turbomeca Pallas turbojet. It made its first flight Apr. 28, 1951.

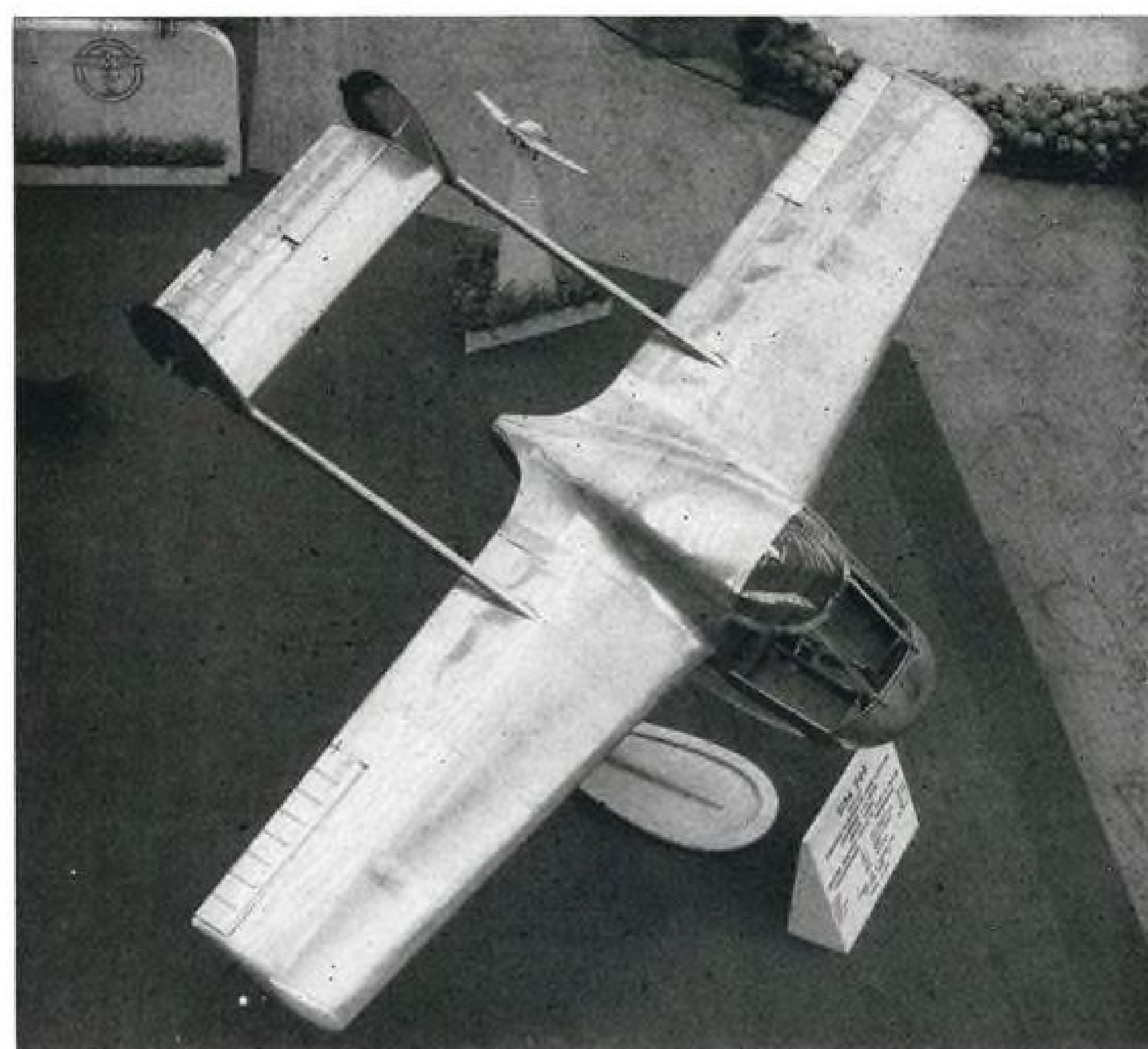
Its maximum speed is 217 mph., and its initial rate of climb is 1,574 fpm. Dimensions: span 29 ft.; length 22 ft.; height 5 ft. 10 in.; weight empty 944 lb.; weight loaded 1,371 lb.; ceiling 29,527 ft.; range 187 mi.

• **Fouga Gemeaux I** basically is just two Cyclope II planes joined together by a central wing section. Equipment and controls are the same in both cockpits so that either engine can operate separately.

The Gemeaux is designed to answer the requirements of a two-seat airframe for jet engine tests and special experiments. Its maximum speed is 205 mph.,



LIGHTPLANES DOMINATED the scene at the 19th Paris Air Salon.



SIPA 200.



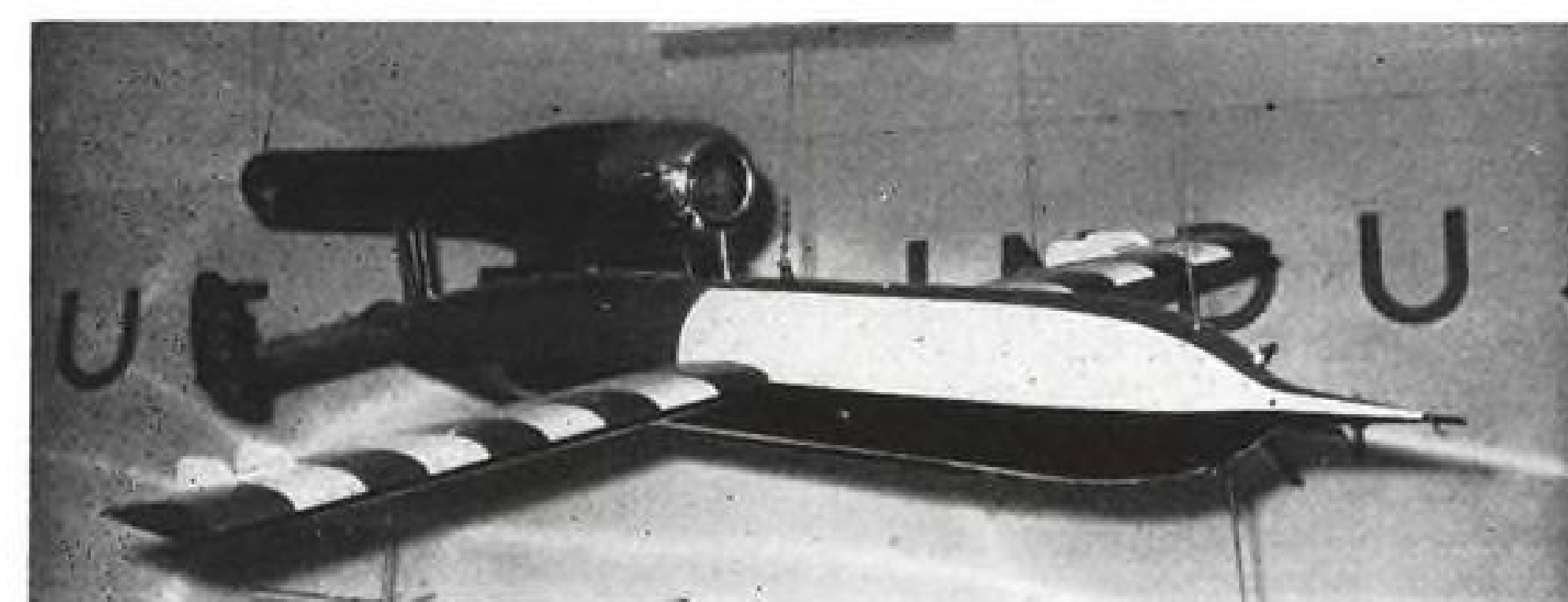
Hurel Dubois HD 10



SE 3120



Fouga Cyclope II



Arsenal 5501



Nord 2501

its initial rate of climb is 1,083 fpm.; ceiling 31,168 ft.; range 187 mi.

The plane has fixed four-wheel landing gear. It made its first flight Mar. 7, 1951. Dimensions: span 35 ft., 8 in.; length 22 ft.; height 6 ft., 6 in.; weight empty 1,595 lb.; weight loaded 2,381 lb.

• **Hurel Dubois HD 10** is an experimental aircraft with a long, very narrow wing that has been under test since its first flight Aug. 5, 1948. Its makers say the HD 10's high aspect ratio wing (35.2) braced by lift struts gives a lift-drag ratio higher than that of a cantilever wing of the same span and area.

Hurel Dubois claims the wing design improves flying properties and enables the plane to carry 30 to 40 percent greater weight with the same power and at the same cruising speed as planes with conventional wings. The company now is building a medium cargo plane utilizing the same principle.

The HD 10 is powered by a Praga 75-hp. engine. Its maximum speed is 158.5 mph. It is equipped with retractable tricycle landing gear. Dimensions: span 39 ft., 4 in.; length 16 ft. 10 in.; width of wing 15.75 in.; wing area 48.0 sq. ft.; weight empty 837.8 lb.; weight loaded 1,146.4 lb.; wing loading 23.74 lb./sq. ft.; power loading 15 lb./hp.

► **Target Plane**—In a far corner of the exhibition hall the French Air Arsenal exhibited for the first time its new pulse-jet, radio-controlled target plane, the Arsenal 5501. The target plane can be launched either from a 39-ft. catapult or from a piggy-back position on a plane in flight. It is controlled in flight by radio and by a gyroscopic stabilizer. It lands by means of a parachute aided by two brake rockets set off by a proximity fuse to assist in absorbing the landing shock.

The Arsenal 5501 can climb to 13,000 ft. in nine minutes and reach a maximum speed of 340 mph. at that altitude. It can stay in the air about 45 minutes. Its ceiling is 19,500 ft., and it can be controlled by radio to a maximum range of 31.25 mi.

Dimensions: span 14 ft., 1 in.; length 19 ft., 6 in.; height 5 ft., 2 in.; total weight 1,452 lb.

► **Transports**—In the field of transport aircraft, the French aviation industry showed off five planes. All five have been thoroughly tested and now are being produced in series.

The biggest of the group is the SE 2010 Armagnac, a four-engine monster designed for trans-Atlantic service. Fifteen Armagnacs have been ordered, and the first eight are scheduled to be delivered to Air France at the beginning of 1952.

• **Armagnac** can carry a maximum payload of 18 tons at a cruising speed of 280 mph. Its range with a full payload

is 1,250 mi. With a load of only six tons, its range is 4,040 mi. The plane can carry 84 first-class passengers or 160 third-class passengers. It is powered by Pratt and Whitney engines of 3,500 hp. each.

Dimensions: span 159 ft., 1 in.; length 128 ft., 9 in.; height 42 ft., 7 in.; weight empty 84,070 lb.

• **Breguet 76 "Deux Ponts"** (double decker) was designed to carry cargo or passengers over distances of approximately 1,500 mi. Its fuselage is divided into two decks to give it a very large carrying capacity. Built in three versions, it can carry a total of 106 passengers on both decks, or 59 passengers on the upper deck and eight to ten tons of freight on the lower, or a maximum total cargo load of 15 tons on both decks.

The plane is powered by four Pratt and Whitney R-2800 CA 18 engines of 2,400 hp. each. Fifteen Breguet "Deux Ponts" are under construction. Air France expects to put the first of them into service in the near future. Dimensions: span 141 ft., 1 in.; length 97 ft., 3 in.; height 31 ft.; weight empty 55,903 lb. Its cruising speed is 230 mph.

• **SO 30 P Bretagne** is a two-engine medium transport that already is in service on Air Maroc and Air Algerie lines. Fifteen of the planes have been produced to date and another 25 are on order or under construction.

The later models of the Bretagne are powered by Pratt and Whitney R-2800 CA 18 engines that give it a cruising speed of 267 mph. at 16,404 ft. The plane's maximum range at 56 percent of takeoff power is 1,392 mi., and it can carry 8,818.5 lb.; payload 620 miles at 56 percent of full power.

Dimensions: span 88 ft., 2 in.; length 62 ft., 2 in.; weight empty 29,994 lb.; takeoff weight 42,990 lb.

An experimental version of the Bretagne has been fitted with Hispano Nene turbojet engines. This plane, the SO 30 Nene, made its first flight on Mar. 15, 1951. Its performance has not yet been made public.

• **Nord 2501** is a two-engine military transport powered by Bristol Hercules engines of 2,040 hp. each. A total of 160 has been ordered for the French Air Force. Because of its high wing and tail, the plane is easily loaded from trucks. It carries 946 gallons of fuel in the central section of the wing, and its range with a load of 11,684 lb. is 932 mi. Its maximum speed is 274 mph., and its cruising speed 208 mph.

Dimensions: span 105 ft., 7 in.; length 62 ft., 8 in.; height 20 ft., 6 in.; weight empty 12 tons; total weight 20 tons.

• **Marcel Dassault MD 315** is a two-engine military transport of which 300 have been produced or are on order.

Three French military liaison squadrons already are equipped with this type of plane.

The MD 315 is a low wing monoplane with twin tail fins. Its maximum speed is 236 mph., and its cruising speed 186 mph. Its range is 755 mi. It is powered by SNECMA 12-S engines and carries ten passengers. Dimensions: span 69 ft.; length 42 ft.; height 15 ft.; weight empty 9,369 lb.; total weight 12,865 lb.

► **Helicopters**—Visitors to the exhibition in the Grand Palace this year could travel to the flying show at Le Bourget field by helicopter from an improvised helicopter terminal at the Gare des Invalides, just across the Seine from the exhibition hall. And at Le Bourget on July 1 they saw in flight what the French claim is the world's first jet-propelled helicopter, the SO 1120 Ariel III.

The Ariel III is powered by a Turbomeco Artouste turbine giving 272 hp. Its rotor is driven by combustion chambers at the tips of the blades. Compressed air is fed through the hollow rotor blades to the combustion chambers where fuel is injected.

It has a maximum speed of 112 mph. and a cruising speed of 84 mph. Ceiling is 9,514 ft. and service ceiling 11,811 ft. Fitted with two seats it can fly at 56 mph. for a period of two hours and 45 minutes.

The Ariel III, one of the proudest achievements of the French aviation industry, stood squarely in the center of the exhibition hall. Two other French helicopters—the SE 3120 and the two rotor Breguet DR III—also were on display. The only American or British planes in the Grand Palace were helicopters—the Bell 47 D1 and the Bristol 171 Mark III.

Undoubtedly the prominence of helicopters in the Paris show was partly due to the fact that helicopters are among the easiest and most interesting aircraft to display indoors. But visitors came away with the impression that the emphasis on helicopters this year was also a clue to the future of aviation—a future in which the ungainly but extremely useful helicopter could be expected to play an important part.

Navy Names Kaman In Gas-Turbine Test

Kaman Aircraft Corp., Windsor Locks, Conn., is named winner of a Navy competition for development engineering studies utilizing the gas-turbine engine as power plant for helicopters.

Kaman, whose proposal was adjudged as the most comprehensive among those entered by several major helicopter companies, will conduct its research tests

using the Boeing developed 502-2 gas turbine as a helicopter engine.

The Boeing 502-2 is a small propeller-jet engine developed from the original Boeing 500 turbojet engine. The 502-2 weighs 184 lb.; has a single-stage compressor and two-stage turbine with a geared propeller-drive. The engine develops 200 shaft hp.; is 42 in. long; has a diameter of 22 in.; and a frontal area of 2.2 sq. ft.

Navy announced that it has also been testing the Boeing engine for possible adaptation as a high-speed boat power plant. The Boeing Co., meanwhile, has been roadtesting the engine in a large trailer truck as possible replacement for the conventional diesel engine.

The gas turbine has been under considerable study by all three military services because of inherent engine plant simplicity. Navy lists advantages of the gas turbine over the conventional piston engine for use in helicopters because of mechanical simplification and field maintenance; lack of centrifugal clutch and cooling fan; considerable savings in weight; and ability to operate on kerosene as well as with high octane gasoline.

Kaman has been awarded approximately \$100,000 for its gas turbine engineering program.

Four Awards End Basic Pilot Program

Recent awards of four additional civilian flight school contracts by USAF for basic pilot training complete the present program of nine school contracts, but unsuccessful bids will be kept on file at AMC for future reference, in event of additional expansion.

Four new schools will be opened by successful bidders as follows:

Anderson Air Activities, Milwaukee, at Malden, Aug. 21.

Aviation Associates and Southern Airways, both of Atlanta, at Bainbridge, Ga., Aug. 21.

Darr Aero Tech, Inc., Chicago, at Marana, Ariz., Oct. 2.

Serv-Air Inc., Raleigh, N. C., at Kinston, N. C., Nov. 9.

Four schools previously announced are already in operation as follows:

At Greenville (Miss.) AFB, Graham Aviation Co., Butler, Pa.

At Columbus (Miss.) AFB, California Eastern Airways, Inc., Oakland, Cal.

At Spence Field, Moultrie, Ga., Hawthorne Flying Service, Charleston, S. C.

At Bartow Field, Fla., Garner Aviation Co., Richmond, Va.

The ninth school will be opened July 9, at Hondo, Texas, by Texas Aviation Industries, San Antonio.

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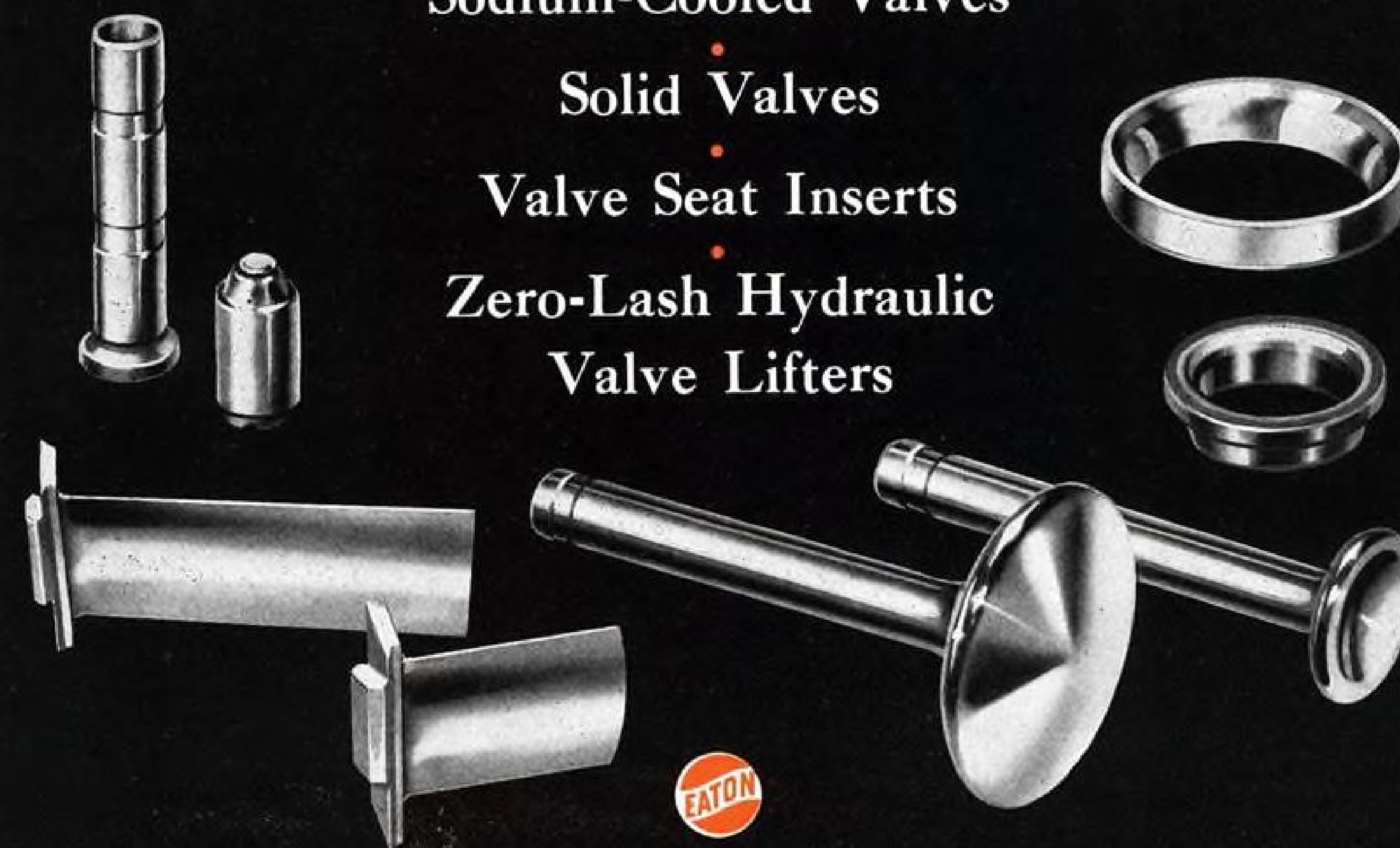
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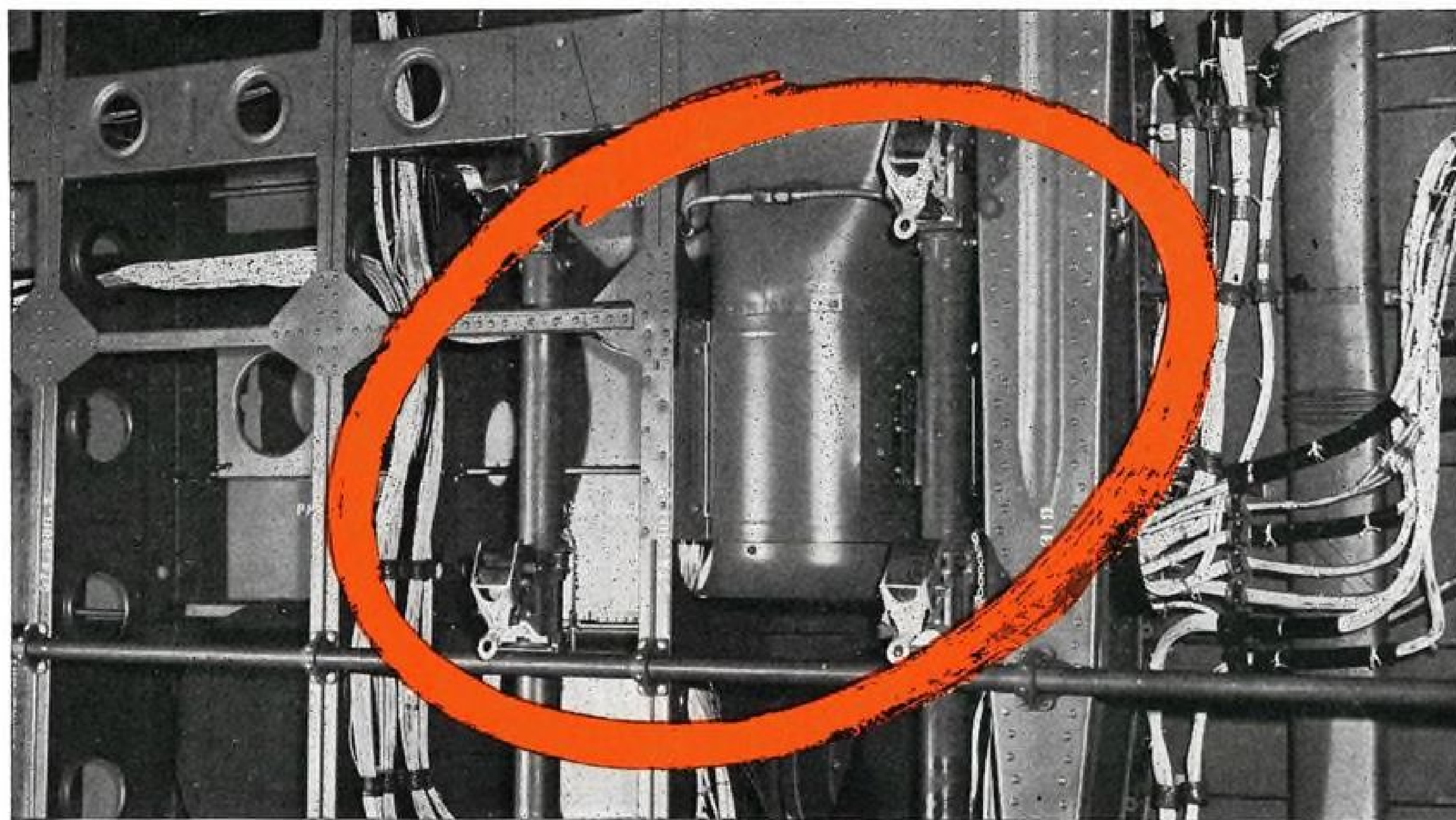
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● Joy designs and builds each fan to the exact requirements for which it is intended. Each fan, therefore, is custom-engineered for highest efficiency. For many purposes stock fans can be supplied from the extensive line already designed. Both single and two-stage units available. Optional features include straight or flared inlets, beaded or flanged connections, radio noise-filters, anodization, and cooled motors where required.

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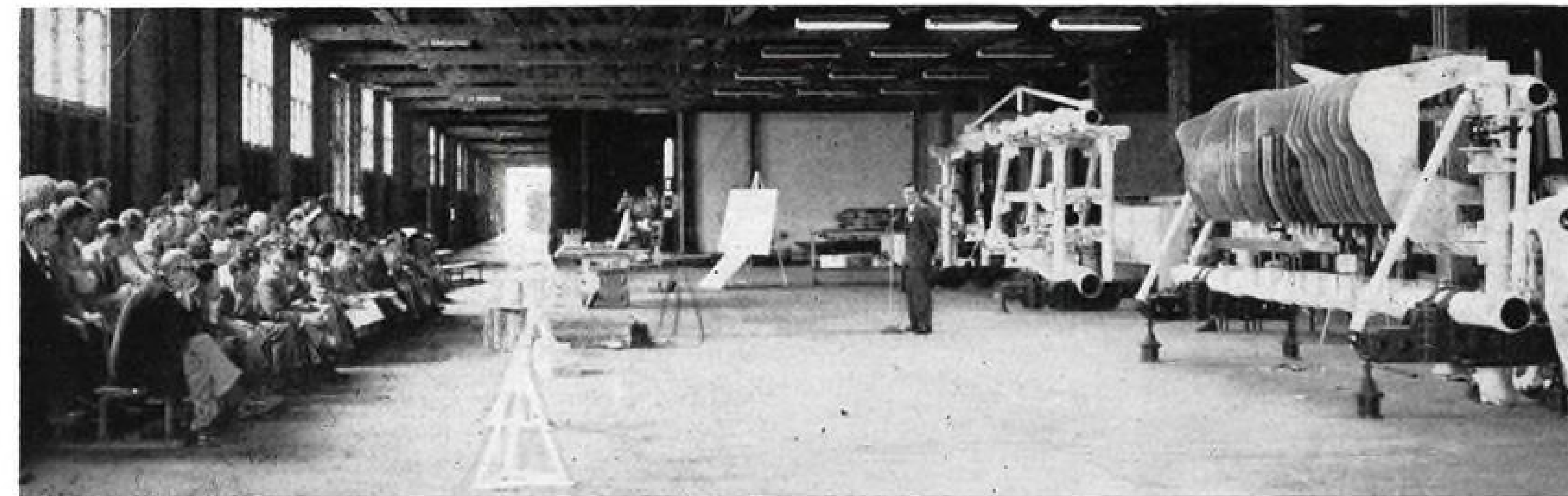
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PRODUCTION



FIXTURES ASSEMBLED in background, airframe manufacturers' representatives listen to explanation of new production technique.

Industry Views, Approves Optical Tooling

Demonstration of Republic method results in broad acceptance of principle, but differences on details.

By Thomas M. Self

Republic Aviation Corp. demonstrated its optical looking methods at the 882nd Air Force Specialized Depot in Maywood, Calif., during a four-day industry-wide show, and this is what it proved:

- The aircraft industry is universally agreed that there is a real future in optics to establish the basic reference line; but aircraft manufacturers want to experiment with their own ideas in working from the optical reference line—whether it be a collimator, optical positioner, auto-reflection, or whatever.
- Manufacturers consider the application of optics to tooling still in the embryonic stage. They showed no inclination to "buy" the Republic system where alignment points are set by the Universal Optical Positioner. Nor did they go much for the clamp type castings, an accessory which both Republic and the Air Force hold dear to their hearts. The tooling engineers concluded casting-type jigs do not have sufficient advantages for their adoption at this time.

► **Big Turn-Out**—The industry-wide demonstration was nevertheless an important victory for optical tooling. More than 200 tooling representatives from 32 companies attended, plus a considerable number of armed forces representatives. (The industry-wide demonstration replaced the originally scheduled exhibits at the Lockheed and North American factories.)

This overwhelming interest greatly pleased the Air Force. It expects to get

much more "follow through" from the companies now than it did from an Air Force demonstration six months ago.

One of the clearest summations of industry feeling on optical tooling was made by Steve Bean, chief tooling engineer at Lockheed Aircraft Corp. (Lockheed, like Boeing, has been working on its own method of optical tooling for about a year).

Bean told AVIATION WEEK, "We believe all possibilities of optical tooling haven't been explored yet. We are working with an optical line of sight, the same as Republic. But we work from that line of sight a little differently. It is too early to narrow down the approaches to the problem."

Commenting on the Republic system, Bean said he thought the optical positioner is fine if you are going to use poured connecting fittings. Lockheed does not.

► **Plus & Minus**—Concerning castings, he said Lockheed has analyzed cost and weight data and has studied all the advantages and disadvantages of standardization and disassembly and found the advantages do not outweigh the disadvantages. Lockheed still prefers welded structures.

He enlarged on this. In all respects except salvage, he said, welded structures are equal or superior. Castings give you about 100 percent salvage compared to 75 percent for welded structures. But on the other hand, you don't tie up as much money in welded structures. Furthermore, you aren't limited in size of pipe. Lockheed used standard fittings in the last war, Bean said, but couldn't

get them once and had to buy oil well pipe.

As for portability, you can build welded structures which can be taken apart. Lockheed is doing this now. They can be moved just as readily and reassembled accurately without difficulty and without mechanical fittings at every joint.

Even jigs that weren't designed for breaking can be cut apart and reassembled. You do it by building a mechanical joint before cutting, using precision rings with accurate spacers. North American did this on AJ-1 jigs sent to Columbus.

► **The Important Thing**—Adolph Kastelowitz, Republic's chief tool designer, said in summation at the end of the conference: "The important thing is to use optics to set measurements. Optics should be used to set the standards. Beyond that, the little tricks all give you a good job. It is a question which is more speedier, more effective for you."

E. J. Schneider of Engis Equipment Co., Chicago, told AVIATION WEEK: "I don't think any of the substitutes for Republic's positioner are going to surpass it. All of them (the manufacturers) say they are going to make one, but I don't think they can."

► **The Money Angle**—Manufacturers were very cost-conscious regarding clamp castings. Kastelowitz replied that cost data is difficult to judge. But he observed that you couldn't write the cost off in a one-time use of castings. Nor would it be practical for one company to go into castings extensively. It would have to be industry-wide so that manufacturing costs of the castings could be brought down and one manu-

(Continued on page 24)

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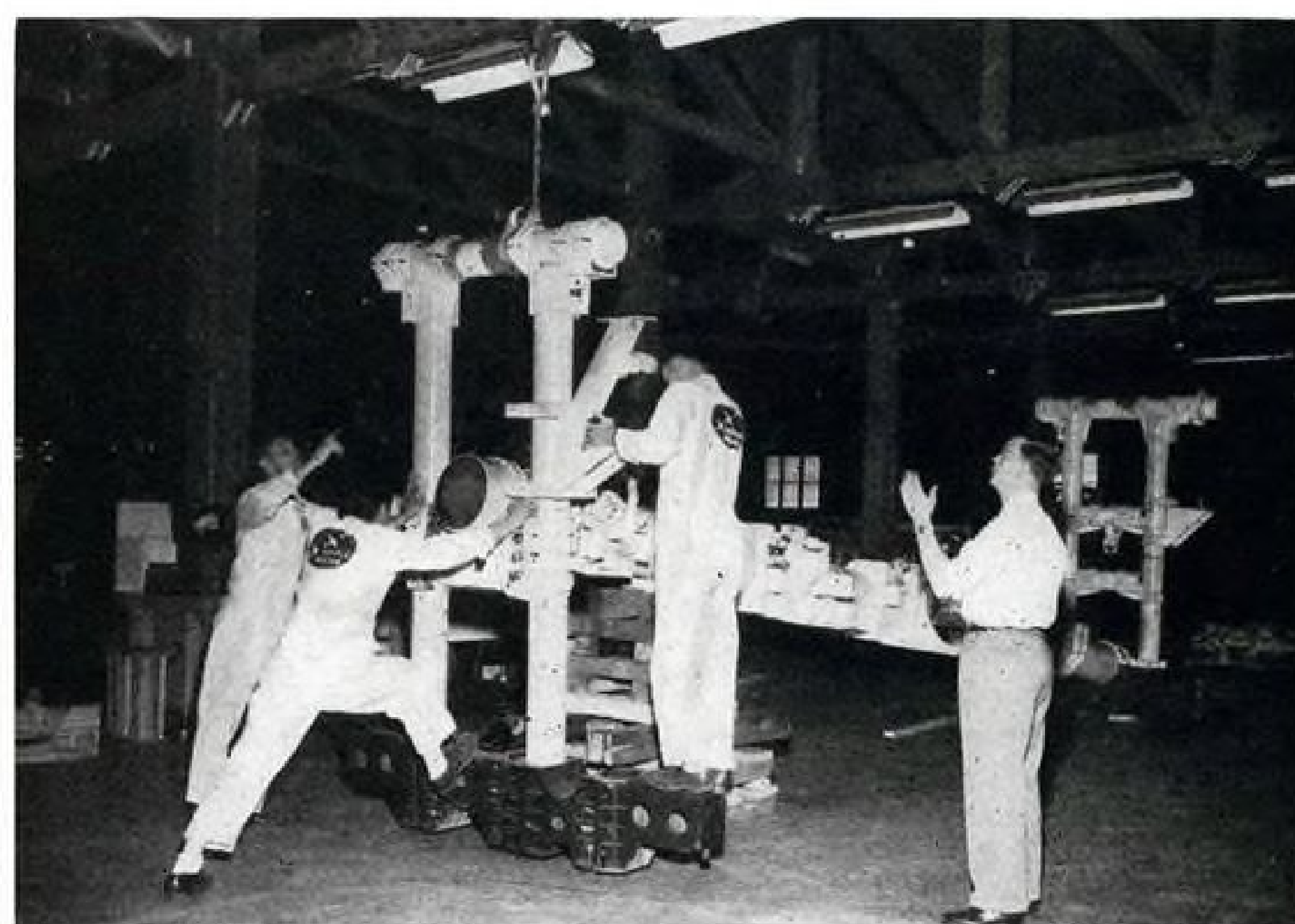
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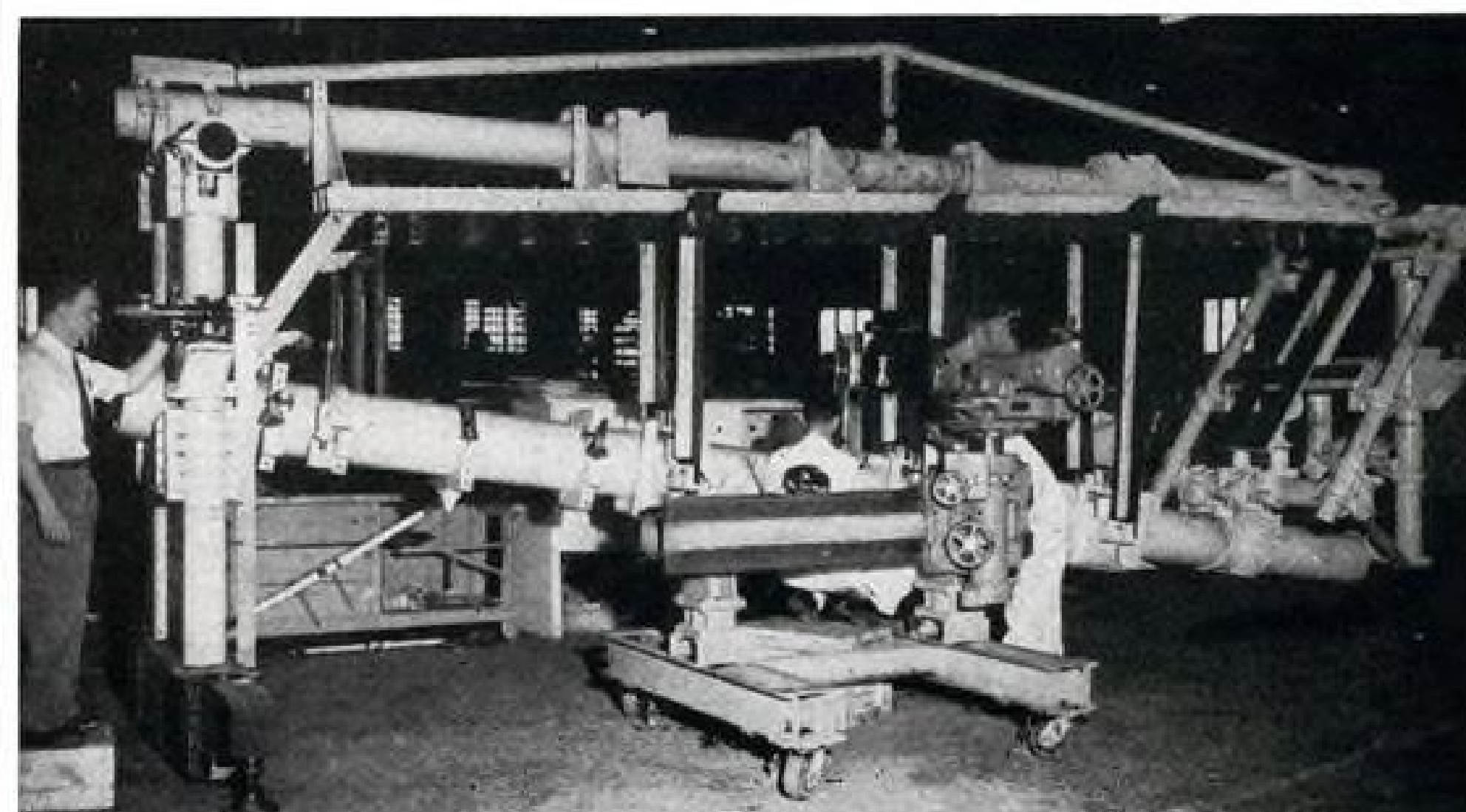
Optical Tooling From Coast to Coast . . .



UNLOADED FROM C-119 flown from Republic's plant in New York, fixture is . . .



SET UP in AF Depot at Maywood, Calif. First frame member goes in place, then . . .



REFERENCE LINE is sighted so assembly in California will duplicate that in New York.



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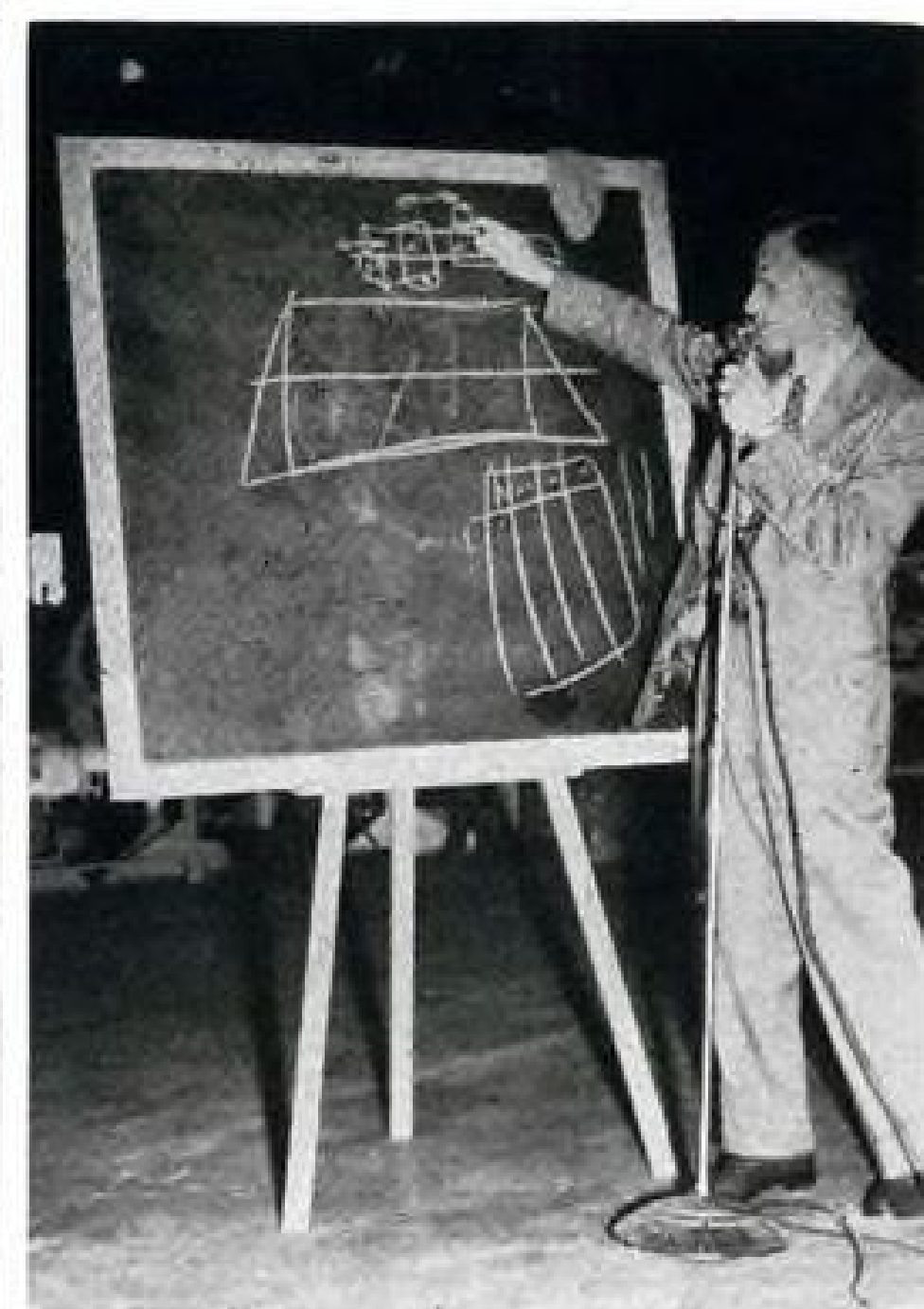
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KASTELOWITZ: The principle is the thing.

facturer wouldn't have to carry big stocks.

Kastelowitz said Republic wasn't using castings exclusively, but that castings make up good fixtures and fast; they help tool design and they help standardization.

► **Variations**—Manufacturers, generally, were pretty well sold on the Taylor-Hobson and other British optical equipment. But they all have different methods of setting vertical measurements and measuring lineal distances:

- **North American** thinks it might combine optics with its own positioning bars to obtain lineal measurements.

- **McDonnell Aircraft Corp.** is working out a method of using accurately measured cubes in place of the positioner to obtain measurements off the reference line.

- **Lockheed Aircraft Corp.** uses its auto-reflection and flash back target arrangement to set fittings perpendicular to a line of sight. Lockheed claims the use of auto-reflection is a valuable asset to optical tooling because of the very great accuracy that can be obtained, the ease and speed with which good results may be produced and the very small size of the auto-reflection mirror button makes it applicable in so many places that are inaccessible to the T-H collimator, or other means of locating to eliminate displacement and tilt.

Lockheed uses a physio-optical method to check distances along the basic line of sight. This is Lockheed's newest development, following experimentation with extended inside micrometer, physical projection from a tooling bar, linear station layout on the jig frame and linear station pin hole locations on the jig frame.

The system combines physical means

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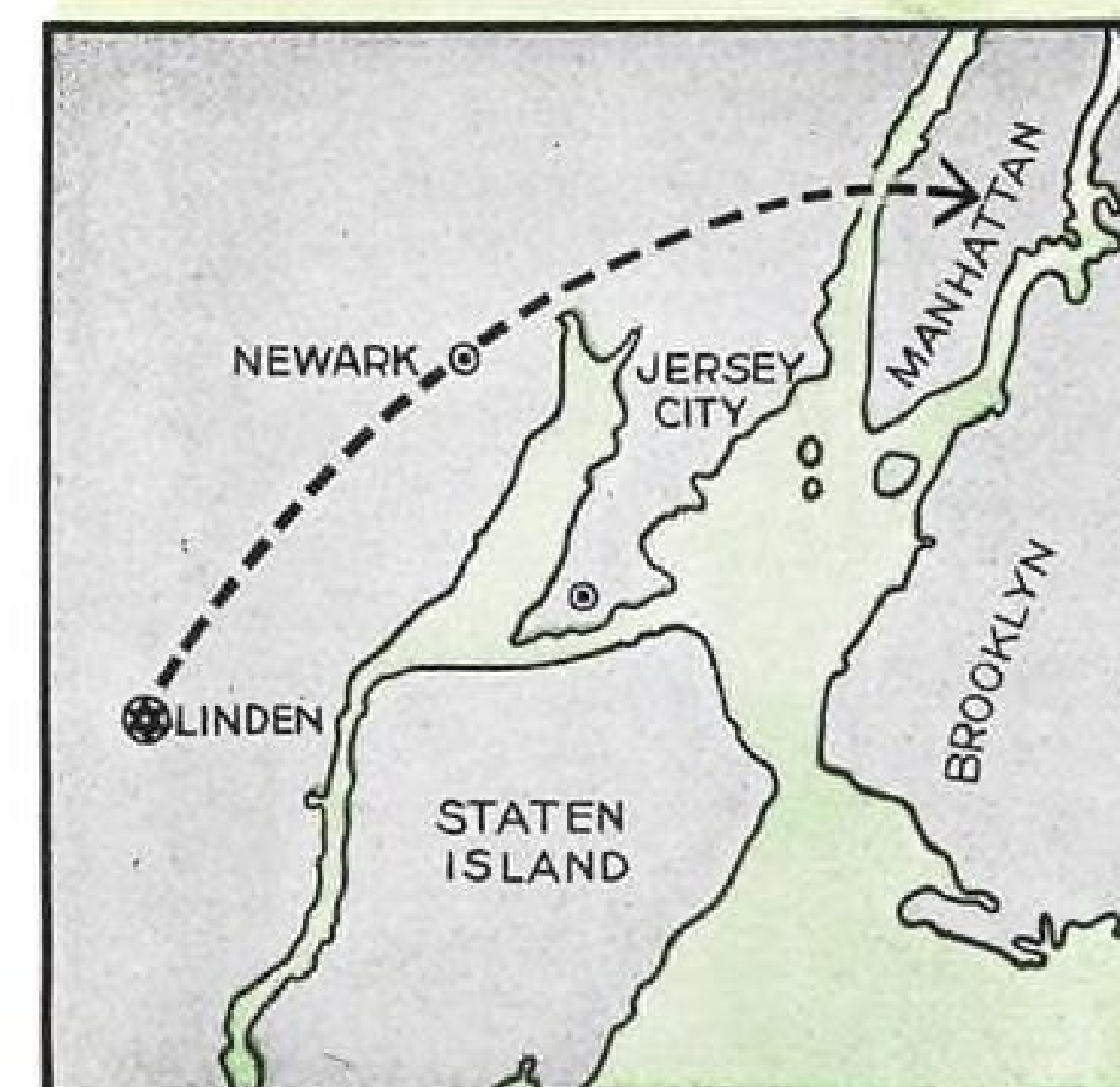
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PLEXIGLAS canopy, nose and windows on the Boeing B-47A. Canopy, nearly 8 feet long, is laminated; windows are PLEXIGLAS II.* Fabrication by Goodyear Aircraft Company.

*Meets Army - Navy Material Specification MIL-P-5425.

From its use as a landing light cover on the nose of a globe-circling plane, to a position as aviation's standard material for transparent enclosures and windows—PLEXIGLAS has kept pace with the industry's rapid growth.

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PLEXIGLAS landing light cover on nose of Howard Hughes' globe-girdling Lockheed 14. Hughes' record-breaking flight broadened dramatically the field of aircraft design and performance.

and optical instruments to determine measurement of length. Lockheed combines use of a pentagonal prism in an optical square with a precision bar. Holes are drilled accurately at five-inch intervals on the bar and projected optically to the jig.

The use of the penta prism allows for a great deal more latitude in aligning the optical square to a line of sight without incurring any appreciable error, Lockheed says. In other words, the "setup error" using a triangular prism instrument is compounded by the distances involved; but the error of setup of a pentagonal instrument is the same at two feet as at 40 feet.

► **Thoughts for Blending**—There was considerable interest in the Lockheed system. Many tooling engineers thought they might be able to combine some of its best points with the Republic and their own particular tooling tricks, particularly the use of the penta prism in connection with a precision bar. They were also excited about Lockheed's simple methods in developing optical applications without expensive or complicated equipment. One example is Lockheed's use of a flash back target instead of a collimator.

It was conceded that the difficulty in the Lockheed system is getting accurate penta prisms.

A common complaint about optics generally was that they do not help you out on distance measurement. Some of the above paragraphs tell of approaches taken to the problems by manufacturers. One other solution said to be in the works is a precision steel tape held under constant tension.

► **The Tooling View**—Here are some comments by tooling people present at the Air Force demonstrations.

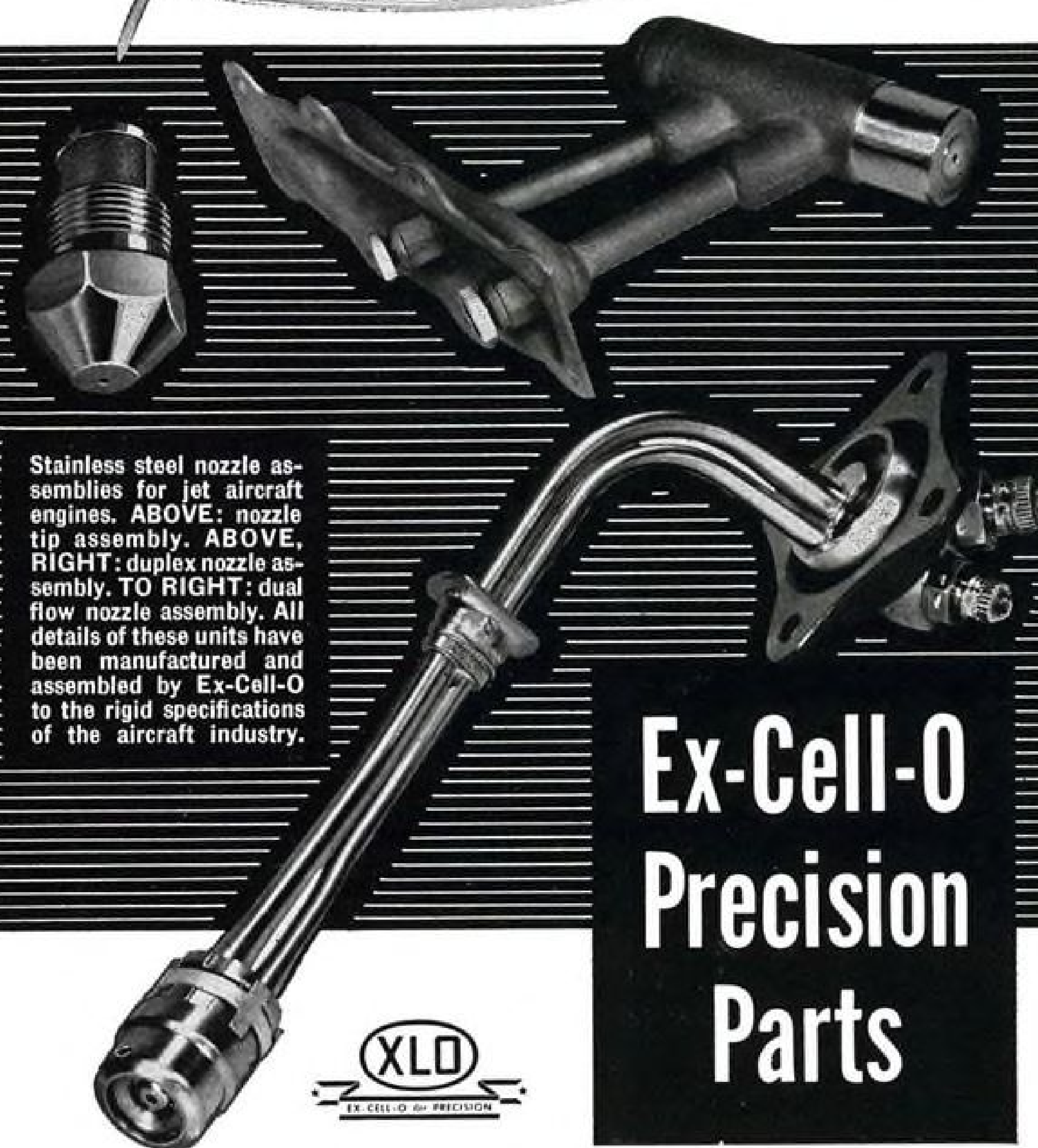
Latham Pollock, tooling superintendent at North American, said, "We are really just observing today. Optics is brand new to us. It (the Republic system) certainly gives a good reliable baseline; it seems ideal for jigs like the F-95 and bigger. But the Universal Optical Positioner is just one way to work in measurements."

Pollock went on to say that the main thing the manufacturers will consider in adopting optical tooling is the cost. He pointed out the Air Force is not going to allow any more money for optical tooling. Therefore any system of optical tooling must be competitive in costs. "Nobody wants to spend more for tooling than he has to. You can't sell tools."

Another North American spokesman said his company "was not ready to endorse the Republic system as the ultimate in tooling."

A representative from McDonnell said that on a new contract his company is building two separate sets of tooling, one for optics and one conventional so as not to hold up production.

FOR MAXIMUM
JET POWER



Stainless steel nozzle assemblies for jet aircraft engines. ABOVE: nozzle tip assembly. ABOVE, RIGHT: duplex nozzle assembly. TO RIGHT: dual flow nozzle assembly. All details of these units have been manufactured and assembled by Ex-Cell-O to the rigid specifications of the aircraft industry.

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Equipment will come from Engis. Tooling engineers in Boeing, Seattle, are understood to favor the use of optics for all production rather than merely for experimental alignment of wing joining jigs as at Wichita.

Boeing, Lockheed, and Douglas are all buying optical equipment to build the B-47.

A tooling engineer who asked not to be quoted said he was in favor of optical tooling but was unable to "sell the front office."

►Frank Words—Comment was quite outspoken on the Republic jigs with clamp-type castings—"Too high off the floor"; "We can weld cheaper"; and "It is too big." Another tooling representative said, "The Germans used clamps because they didn't have the pipe to cut up; but we do and we aren't ready to adopt the casting system yet."

People who answered the AMC questionnaire weren't quite so brutal.

And there were additional plaudits for the Republic system, too. Several engineers thought the Republic system goes farthest in establishing a line and an angle and holding it in space.

►Repair Uses—The possibilities of optical tooling to set up repair jigs for stressed skin aircraft was advanced by William Collins of the Sacramento Air Materiel Area. Collins said SAMA has had trouble holding to the fantastic tolerances required for stressed skin aircraft. He noted that when the specifications say you must rebuild a wing with one degree wash in and one degree wash out, you have to hit it or the ship won't fly.

He gave an example. Recently SAMA got a damaged F-84 wing. The repair shop took off the skin, section by section, straightened it on a Gurley, holding to .020 plus or minus. When it was finally put together it was twisted and out $\frac{1}{8}$ -inch in one dimension. No pilot would fly it. Collins said they could have saved manpower if the repair jig had been optically aligned.

Collins said he sees the need for an optical tooling structure which can be set up as a rework jig in two working days.

He pointed out, too, that whereas manufacturers wouldn't release production fixtures to repair wings, they or the maintenance depots could set up a proper repair jig using optical tooling.

Optical tooling was also put forth as a valuable aid in avionics. Precision radar requires phenomenal tolerances in alignment which would be aided by optical tooling.

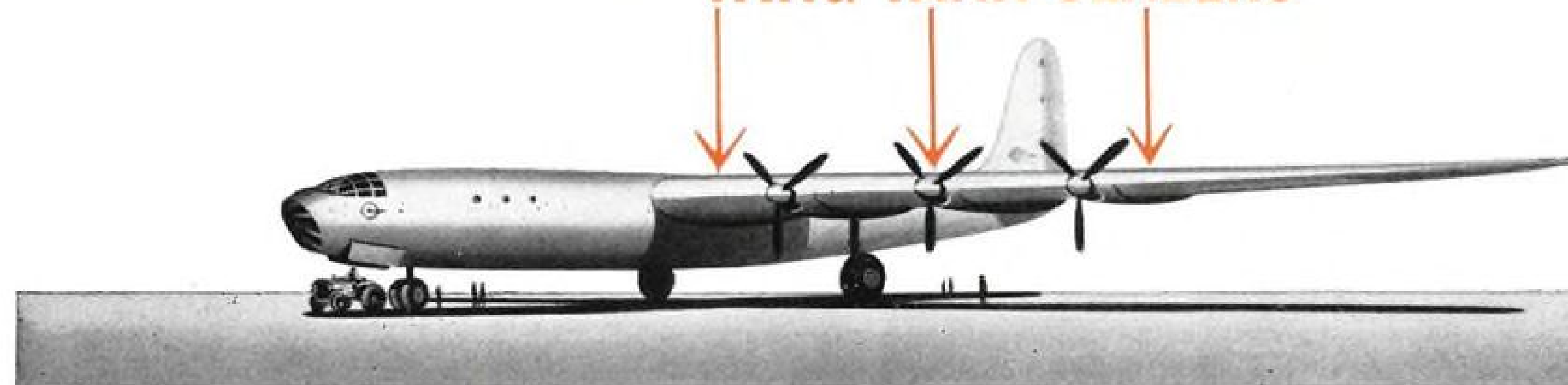
►AMC Questionnaire—Though response was weak to the AMC questionnaire on clamp type fixtures and optical tooling, a summary of the reaction might prove interesting.

• Nearly everyone agreed that past experience has shown the need for design-

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ing fixtures which are easily moved around.

- On the accessibility to clamp type fixtures, the answers were divided this way: adequate working area, yes 22, no 5; normal access to parts in fixtures, yes 24, no 7; allow for normal removal of assembly, yes 25, no 2.
- Seventeen said demonstrations and other information received to date satisfied them on the rigidity of the fixture structure; eleven said they were not satisfied.
- The majority answering the questionnaire said they thought clamp castings had potential value in experimental, repair, or small quantity production.

- Only a few saw use of clamp castings in medium production (up to 50 applications a month). Not one saw a potential use for clamp castings in large production (over 50 applications a month). All questions were based on the assumption that castings were readily available.
- On the reuse value of pipe and castings when aircraft models change, 16 appraised the reuse value high, 7 medium, 6 low.
- Manufacturers said they were planning optical applications to tooling of the following model aircraft: F2H-3, F-86, F-84, B-36, P2V, B-47, F-94, and T-33.
- They saw no size or dimensional fix-

Martin MB-2 Bomber of the type used by Billy Mitchell to sink the battleships off the Virginia Capes in the early '20's.

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ture limitations imposed by optical equipment, and the maximum dimensional limitation listed was 75 ft. Other limitations on fixture size cited were the power of optics and size of target.

- Only one person thought present experience with optics indicated masters could be completely eliminated. The majority thought they could be partially eliminated. One commented that there will always be applications for masters.
- Another comment was that small fixtures are easier to set up by conventional methods. Another thought optical tooling would end straight hinge lines.

(Kastelowitz admitted it pays in some cases to make small master tools. But he insisted the Universal Optical Positioner should be used to check and maintain and reproduce masters.)

- A majority, 17, thought that the present use of optics would not eliminate the use of master plasters, patterns, or dummies; seven thought optics might eliminate their use about 20 percent.
- The answers were about equally divided on the relative costs of masters versus optics on three hypothetical projects: 1. to set hole patterns of wing joints; 2. small inspection covers and doors; and 3. fuselage and wing attach angle butt joints.
- There was even division on whether learning time in designing fixtures of optical systems is relatively high or low. One comment was that high-caliber tool designers can pick it up fast. The majority felt that lower skills could not be used effectively on fixtures incorporating optics.

The last question AMC asked was which phases it should explore in future developments of aircraft tooling. Answers were: conservation of critical materials, standard castings, interchangeability, substitutes for lineal measurement, standard terminology, jigs for one-shot spot welding, methods for forming titanium.

► **Smallest Detail**—The extent of the interest in applications of optical tooling was evidenced in the attention to such details as the low-melting point materials used to encase fixture attaching parts. (Everyone uses Cerro matrix or Cerrotrue.) Kastelowitz suggested running a tube from the melting pot to the castings to be fixed to save trouble in dipping from the melting pot. But McDonnell's chief tooling engineer, Hesskamp, doesn't think it will work. If the metal sets the least bit it will freeze up and block. McDonnell is using a new pot with a petcock and is going to put heat on the petcock. Kastelowitz said there was a question how Cerrotrue would stand up, but McDonnell reports it is standing up very well.

Some time savings reported on optical tooling were these:

Boeing figures that by using optics to align jigs it can save 1,500 hours on

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MODEL 49B, 1 7/8" case to AND 10403
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MODEL 76B dual, 2 3/4" case to AND 10401
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MODEL 17B



MODEL 49B



MODEL 76B

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a job that would ordinarily take 4,500 to 5,000 hours.

Lockheed reported it used only 87 hours to locate two trim bars by the optical and auto-reflection method. On an identical jig, 140 hours were spent locating by conventional methods. This does not give a true picture however because considerable learning time is included. Lockheed set the second bar in 24 hours.

► **AIA Standards**—After the four-day conference, the optical tooling panel of the manufacturing methods committee of the Aircraft Industries Assn. met and adopted some minimum standards to be used in optical tooling. The panel agreed to investigate further such aspects of optical tooling as distance measuring equipment and auto reflection.

Western members of AIA had previously agreed to go in the same direction on optical tooling, and at this meeting the eastern representatives agreed to follow the same standards.

They standardized on these minimum accessories only: the diameter of the target and the outside diameter of the telescope. This is so they can interchange jigs. For example, if Boeing sent Douglas a jig which was aligned optically Douglas could put its own telescopes in the same position on the jig and align.

AIA members by no means agreed to any system of optical tooling. They intend to keep ingenuity and flexibility in development.

Boeing, Northrop, Chance-Vought, Convair, Republic, Lockheed, Martin, North American, and Douglas were represented on the panel. Charles Glasgow, chief tooling engineer of Douglas, was chairman.

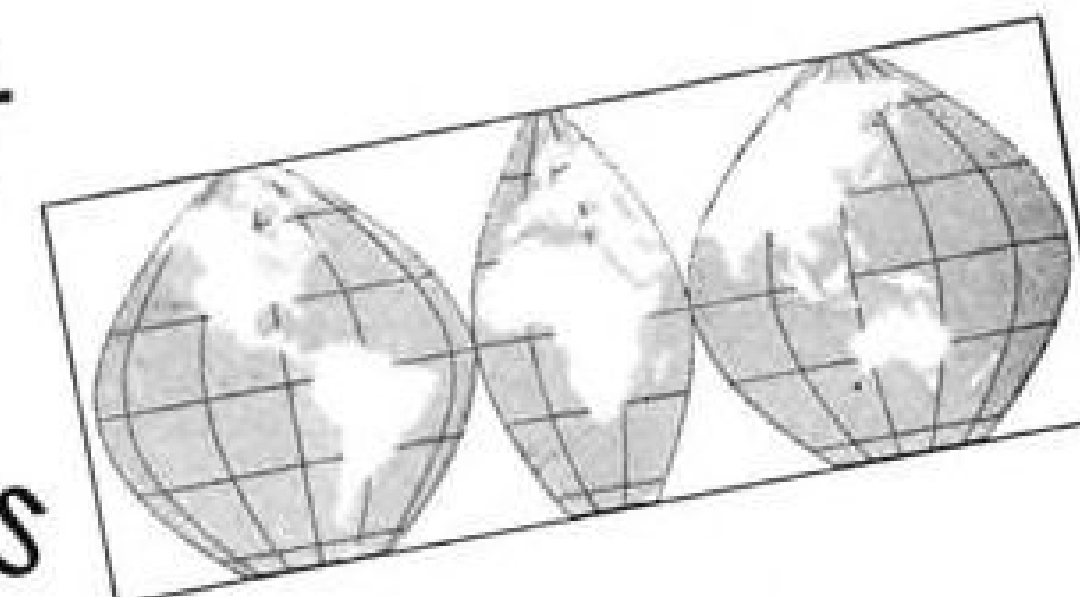
► **Reassembly Time**—The actual reassembly demonstration at Maywood went as scheduled. A summary of times in manhours used on the Lockheed F-94 and the North American F86-D structures was:

	North Lockheed	American
Design time	950	1822
Fabrication time	2391	3997
Breakdown and skidding	21	80
Re-assembly	31	75

These are development hours. The figures would be substantially reduced by complete familiarization of personnel with the Republic method of fixture construction. Reassembly hours might be increased, however. For reasons of expediency, a tolerance of plus or minus .010 was held in the demonstration. (Accuracy depends on time use in setting up, and vice versa).

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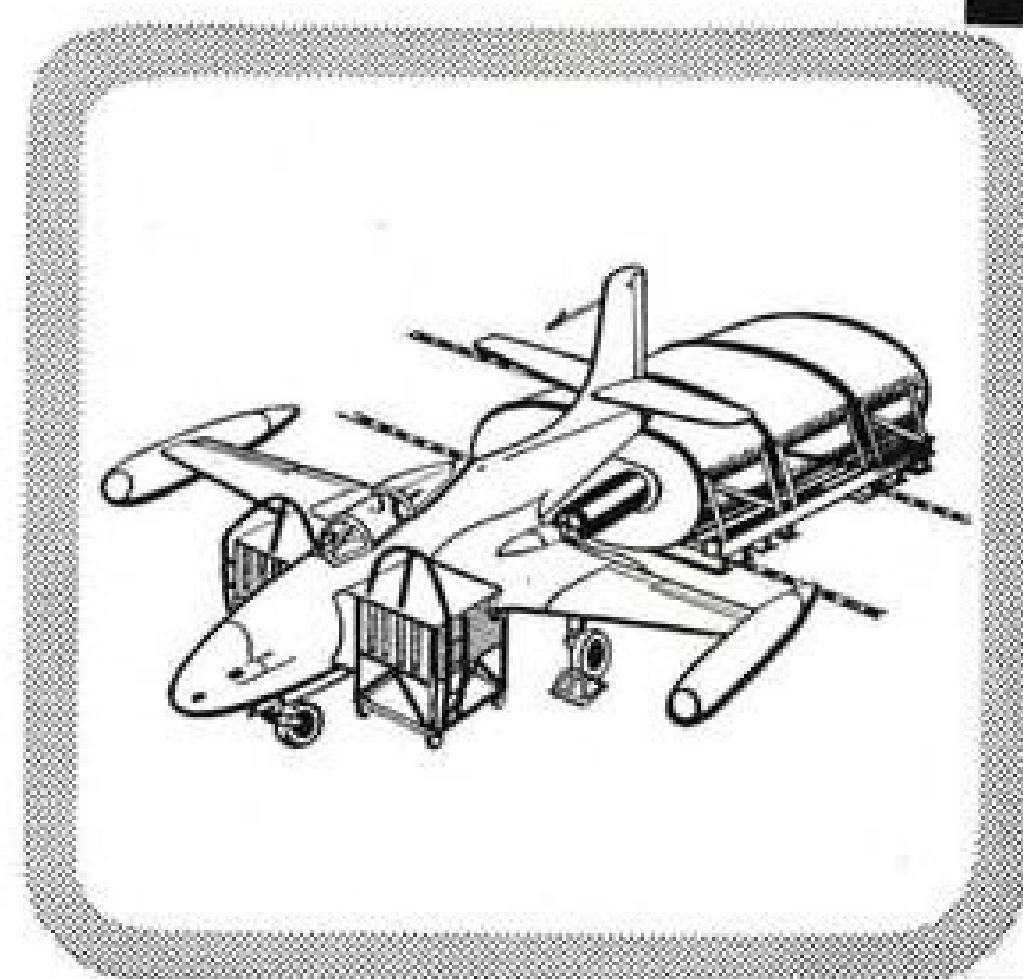
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AVIONICS

Design Trends in Buried Antennas

With more and more avionics using more and more antennas, engineers devise intriguing installations.

Rapid increases in the amount of airborne avionic equipment have produced many changes in the appearance of fast aircraft since the second World War. The first tendency was to "Christmas-tree" the aircraft by hanging antennas externally wherever space could be found.

But jet aircraft speeds imposed new structural loadings on external antennas, to say nothing of the overall configuration drag increase. More and more, designers began searching for ways to make a stronger, lower-drag antenna.

They found the answer in the submerged (or suppressed) antenna, where the entire radiating or receiving surface is enclosed within the contour of the aircraft. Progress in this new avionics design field has been rapid. And some of the advances were told recently at the second airborne electronics conference of the Institute of Radio Engineers.

Following is a roundup of some of the significant points made by several authors in papers presented at the conference. Taken together, they present a basic approach to the understanding and practice of submerged antenna design.

► **Basic Trio**—Avionic systems in aircraft have three basic duties to perform. These can be subdivided further by definition and function:

• **Communications.** There are two sub-groups here, long-range (liaison) and short-range (command). Long-range communications are generally of the air-to-ground type; short-range are either air-to-air, such as in combat formations, or air-to-ground, such as in ground-controlled interceptions.

• **Navigation.** There are two sub-groups here also, terrestrial reference systems and target reference systems. The former is generally a long-range navigational aid of moderate accuracy, such as Loran. The latter is short-range, precision system typified by bomb-aiming radar or target homing systems.

• **Target acquisition.** This heading would include all systems which locate and vector the aircraft to a specific target such as an enemy plane or a friendly aircraft carrier.

► **Frequency Range**—The frequency range for systems which has been developed in the classes above varies from 80 kc/s to 30,000 mc/s. For convenience, this entire spectrum is divided

into low, medium-high and ultra-high frequencies. This division, incidentally, is not a standard one in which the band width is marked by "x" cycles at the low end and "y" cycles at the high end. Rather, it makes the division by a comparison of the dimensions of the airframe and the wavelength.

In this manner, low frequency covers the range where the maximum airplane dimensions are small compared to the operating wavelength. At medium-high frequencies, wavelength and airframe dimensions are comparable. And at ultra-high frequencies, airframe dimensions are large compared with the operating wavelength.

► **Low Frequency**—The primary use of low-frequency systems is found in intermediate and long-distance navigational aids: Loran, radio range and automatic radio compass. Vertical polarization is universally used to avoid the large ground attenuation common to horizontally polarized fields.

Such vertically polarized, low-frequency transmissions give strong ground-wave signals out to distances of several hundred miles. There is the drawback that in tropical and temperate regions, the atmospheric static level is high at these frequencies.

The magnitude of the noise level due to atmospheric static is such that increasing the effective height of a receiving antenna does not improve the signal-to-noise ratio. This implies that a short antenna gives performance almost equivalent to a very long one; in typical cases, antenna lengths of one or two meters are satisfactory.

Airborne, low-frequency antennas radiate like an elementary dipole. Consequently, the design problem becomes one of getting the proper orientation of the radiation pattern so that an effective useful height component is obtained for vertical polarization.

In the case of the trailing-wire antenna, for example, the drag of the wire causes it to trail at a very small angle with the horizon at current flight speeds. At 300 knots, the angle is somewhat less than 4 deg. This means that the standard Air Force trailing antenna of 200-ft. length shows an effective height for vertical polarization of only about two meters.

► **MHF Problems**—This band is taken to be from about 2 to 24 mc/s for typical aircraft. One characteristic of



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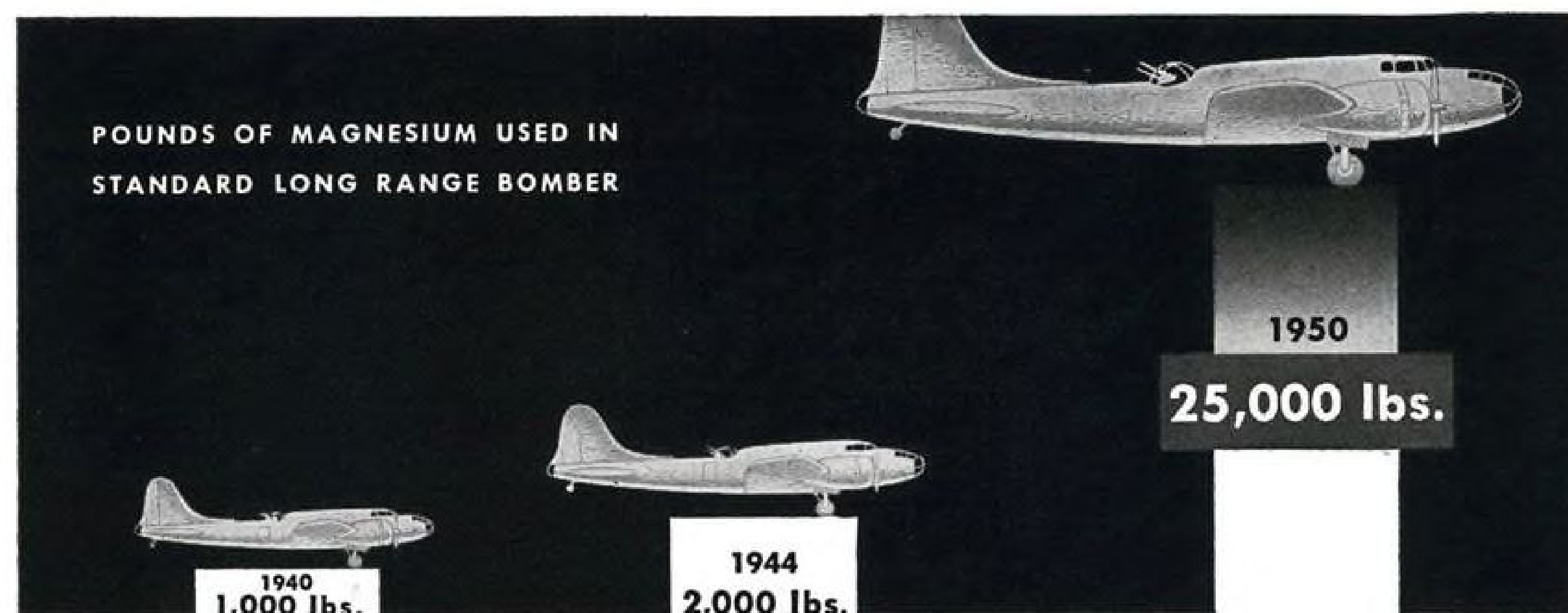
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these systems is that distances between aircraft and distant installation range from 200 to 1,500 mi. Thus, the ground wave signal is insignificant as compared to the signal transmitted by way of the ionosphere.

Polarization of the receiving antenna or the radiating field is unimportant, since signals in this frequency range undergo a violent and unstable rotation of polarization when they are reflected from the ionosphere.

One measure of the antenna system efficiency in the medium-high frequency range is the product of radiation efficiency (ratio of power radiated, within the range of useful vertical angles, to total power radiated) and power transfer efficiency (ratio of power radiated to power developed in transmitter output tank circuit). Radiation efficiencies range from 50 to 60 percent at lower frequencies, to 20 percent at the higher; power transfer efficiencies can be extremely low, even less than 10 percent. Generally, then, the antenna system efficiency ranges from 5 to 15 percent for typical wire antenna systems on aircraft.

► **Ultra-High Frequency**—Typical systems operating at these frequencies would include command communications, ILS, DME, VOR, radar beacon and absolute altimeter. Propagation distance is limited to line-of-sight, which in the case of air-to-air communications can be as great as 500 mi., and for ground-to-air from 250 to 300 mi.

UHF reception is affected by interference phenomena from multi-path propagation. This interference is between the reflected ground wave and the direct wave from the transmitting antenna, and amounts to a diffracted pattern in a vertical plane. Consequently, a plane flying toward a ground station from a great distance will receive a signal level that rises and then fades into noise cyclically as the range decreases.

In the air-to-air case, a similar effect occurs, complicated by a dynamic effect. If two planes close on each other at a high rate of speed while communicating, the dynamic interference between direct and reflected signals produces both phase and amplitude modulation of the carrier. These modulation frequencies can be in the audio range, and thus produce a high noise level on the desired modulation.

Circular polarization and highly directive antennas have been suggested as means to avoid this interference of UHF signals, but both systems have limitations.

► **Speed a Problem**—In addition to these propagation characteristics, which seem to be inherent in the antenna systems, airplane speeds have posed a new set of problems. For instance, no 600-mph. jet craft will trail a 200-ft. wire antenna.

Nor will it use any exposed masts or wire antennas to create additional drag.

Consequently, there has been much interest in and increasing use of, suppressed antennas, where the antenna is completely submerged within the airplane contour.

One of the most useful sections of the airplane for the location of these antennas is the vertical tail. This surface can be used to act as an antenna (as in the case of Loran equipment) or to mount other antennas for UHF systems.

In one particular installation tailored to a modified Douglas C-54D, the upper seven feet of vertical tail was electrically insulated from the rest of the structure by a six-in. gap. All the structural elements in this insulating section were replaced by parts of Fiberglas cloth bonded with a special resin.

In this system, the insulated section of the vertical surface was used as the antenna for liaison communication, both transmitting and receiving, and for Loran reception. The UHF systems antennas all operated at above 100 mc/s and were in the form of slots or flush-mounted radiators located in the upper surface of the fin.

► **Fin-Cap Antenna**—In the case of the Boeing B-47 Stratojet, it was necessary to develop a flush Loran antenna which could be integrated into the airframe without major redesign of any parts.

Investigation of several possible configurations for the antenna led to selection of the plastic fin tip section. Basis for the decision was two-fold: First, the area was available and could be adapted with only minor revisions; Second, measurements on a full-scale airplane showed that there were very high field gradients around the tip of the vertical fin. There was an expected advantage in using the increased field at this point to reduce the size of the antenna.

Development proceeded with the final design evolving from a cut-and-try procedure, aimed at optimizing antenna capacity and effective height without appreciably affecting the VOR antenna performance. (It was necessary for the Loran antenna to share the fin cap with the VOR antenna.)

Final configuration of the antenna is an inverted "L" with the loading section made of an aluminum shell molded into the Fiberglas cap. A phosphor-bronze down-lead completes the assembly. Physical dimensions of the antenna are 68 in. by 13 in. Effective antenna height was one meter.

One concern of the designers was the precipitation static influence on antenna performance. This was because the antenna is located in an area of high electrical stress. But the same factors that control static discharge have increased antenna effectiveness,

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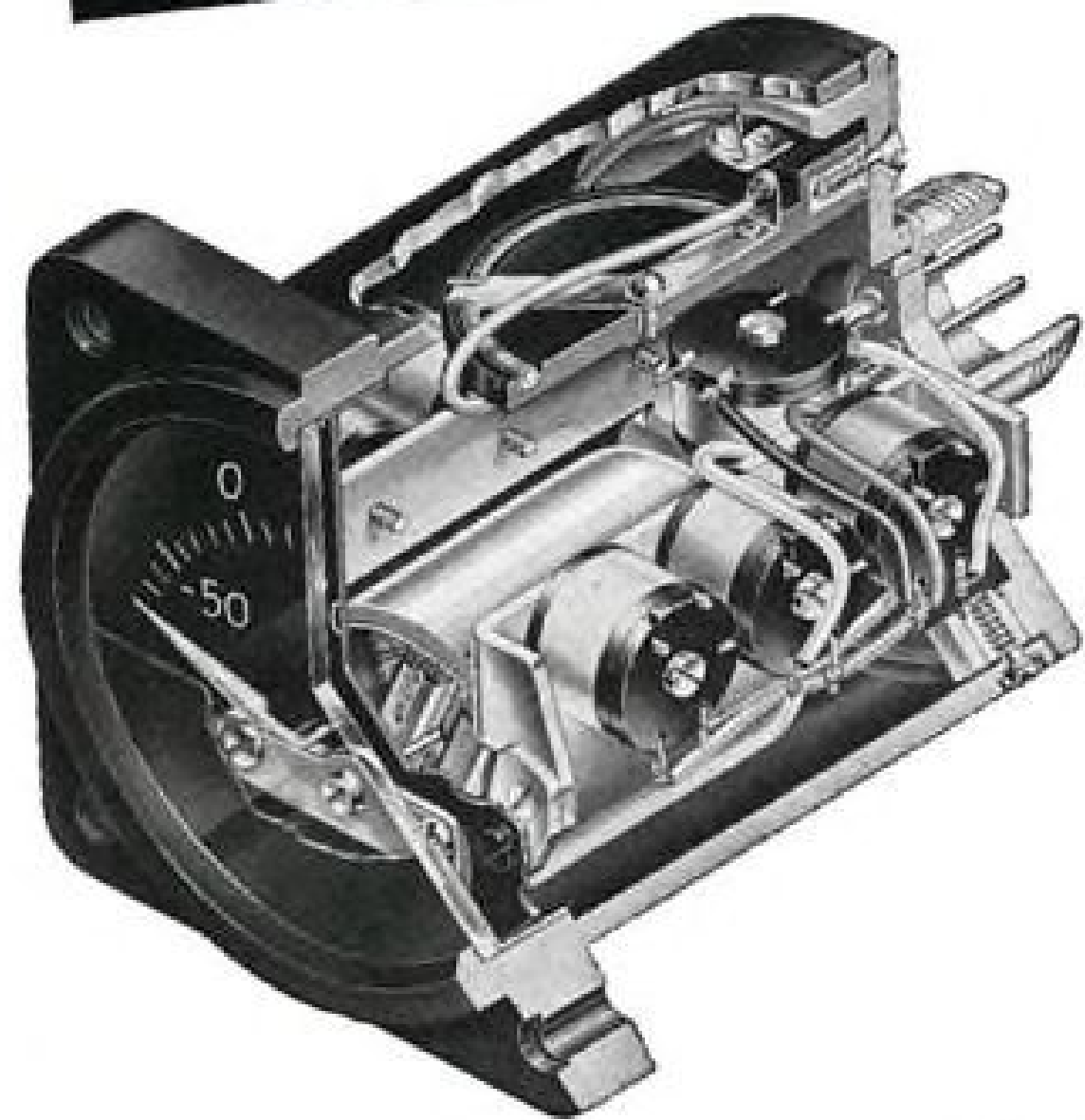
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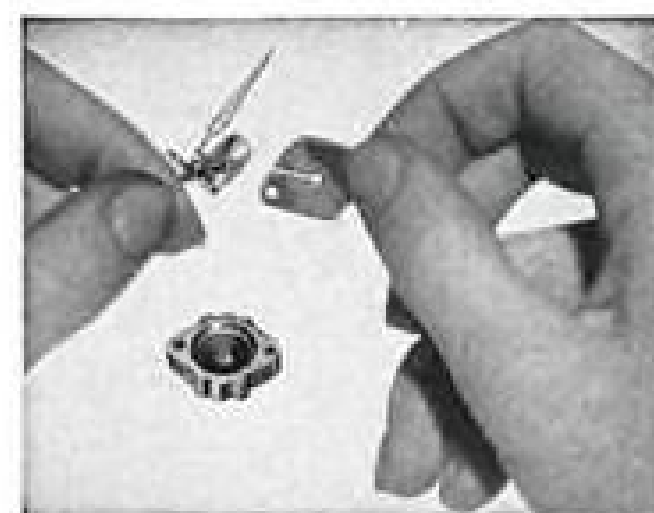
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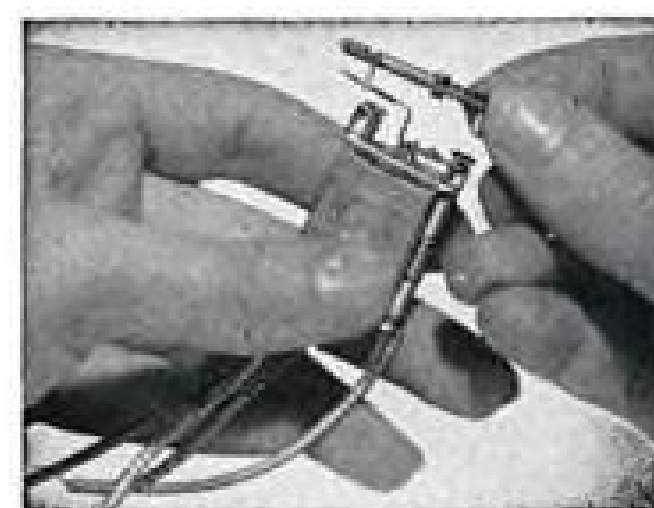
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and so it is anticipated that the signal-to-noise ratio will be equivalent to other locations on the airplane. In addition, the fin cap has been treated with a conducting paint to prevent charging of the plastic with respect to the aircraft.

► **Wing-Tip Antenna**—One of North American's jet fighters (presumably a modified F-86) was the subject of a development program which evolved an omnidirectional range antenna built into the left wing tip. Some previous flight tests on a light plane had shown that such an antenna provided adequate reception and was less susceptible to ignition noise.

Of course, the antenna had to be light in weight and have assembly and fabrication techniques adaptable to production. A further requirement was that the design be such that the antenna could be assembled on a line basis without post-assembly tuning adjustments.

A radiation pattern study was made, using a one-tenth scale model of the plane. Model was made of wood, with an undercoat of zinc sprayed on. The finish coat was copper.

This model study showed that the installation gave a relatively omnidirectional pattern; subsequently, a full-scale mockup of the left wing was built. The mockup extended about $1\frac{1}{2}$ wavelengths from the antenna. It was made of wood beams covered with terne plate with soldered joints.

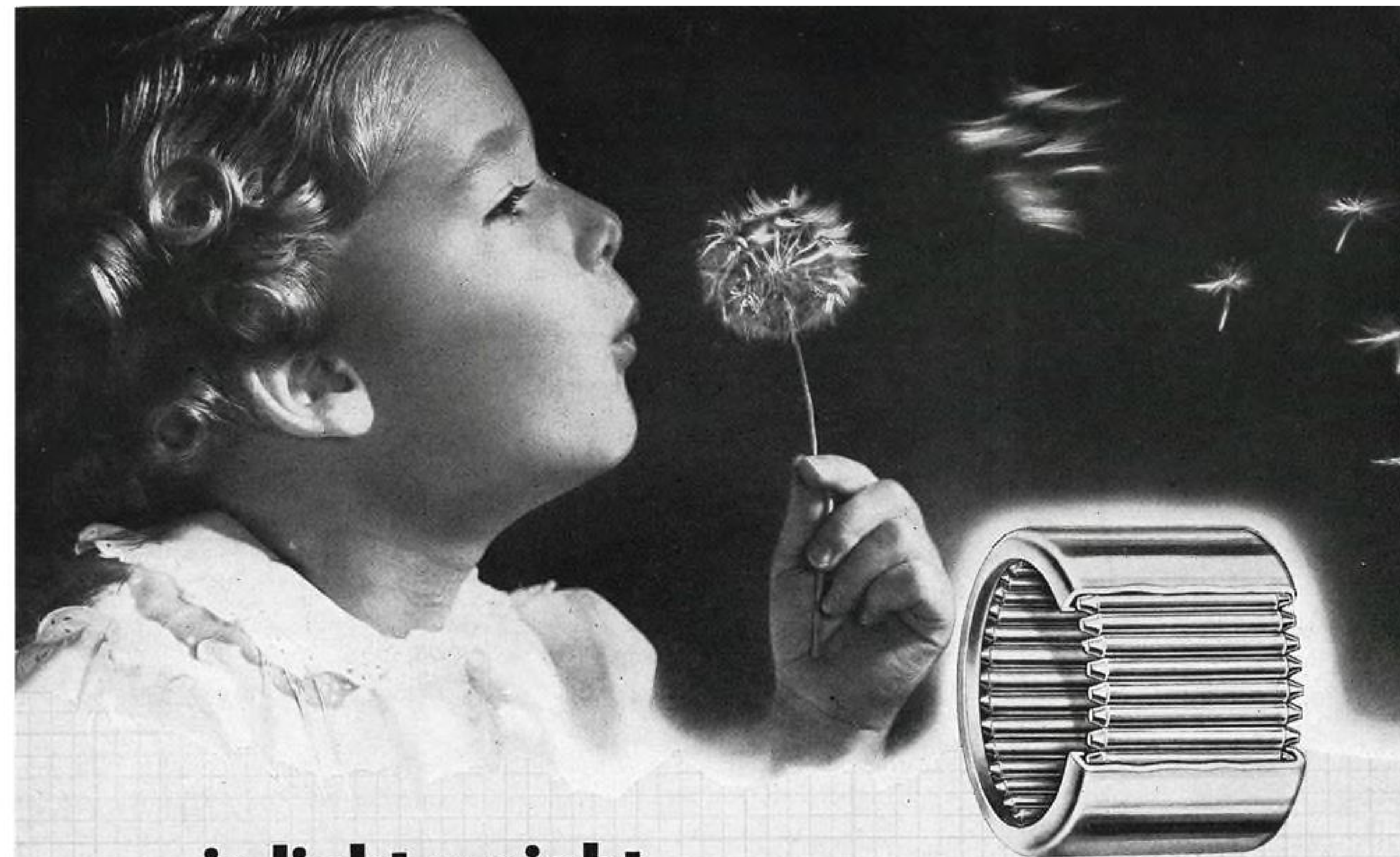
Numerous models of a shunt-fed element were investigated; tubing, flat strip and bar stock were among those tried. The final choice was a flat strip of 24 SO aluminum alloy. A plastic support was used near the aft end of the radiating element, and the capacity loading of this support and the Fiberglass rib made it possible to shorten the antenna several inches.

► **Duct-Lip Antenna**—Another installation of a submerged antenna on a North American jet fighter was developed around a glide-path antenna. Investigations were made of a cavity antenna located in the leading edge of the air inlet lower lip.

Same design requirements of weight, fabrication and no post-assembly tuning held for this antenna as for the wing-tip antenna. And again, model and full-scale tests were made along the development road.

Experimental steps in the antenna design were made which included the fabrication of a half-cylinder cavity resonator and one semi-elliptical shaped. After experiments with these, one prototype antenna was constructed which was found to be very similar in electrical properties to the developed experimental antenna.

After the cavity resonator has been mounted in the lip, a Fiberglass cover is placed over the cavity opening and



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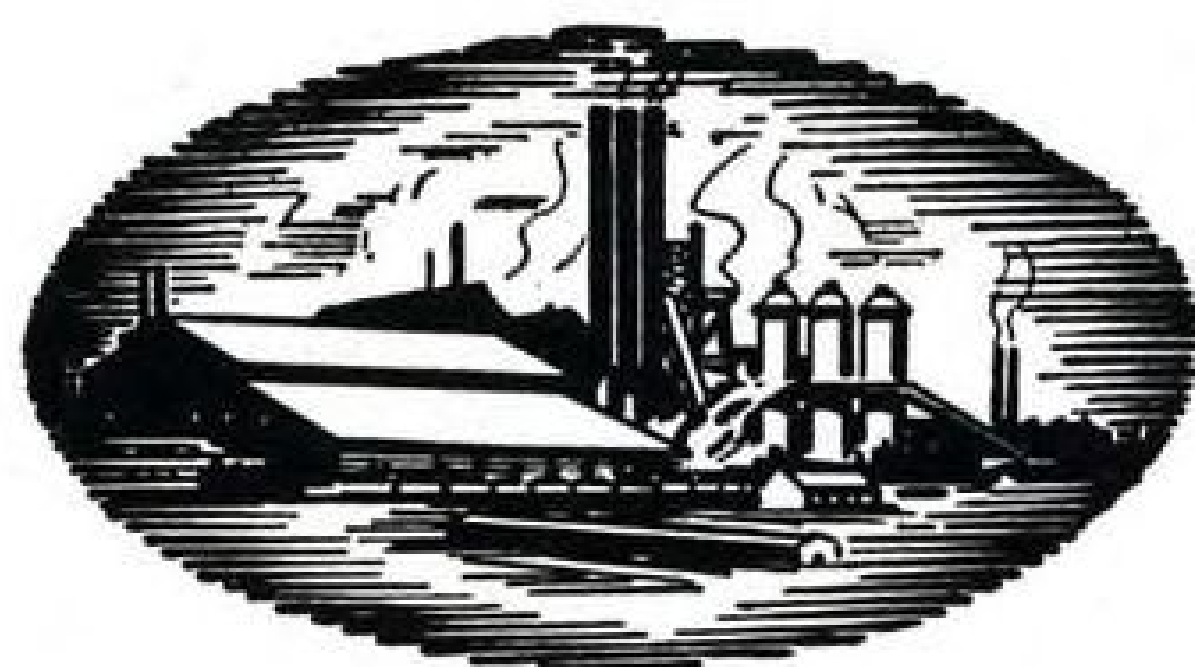
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fastened to the skin of the aircraft. This cover has a slight capacity shunting effect, and the prototype antenna was designed for best results with a Fiberglass cover $\frac{1}{8}$ in. thick.

The final model of the glide path cavity and Fiberglass cover was built by NAA using aircraft production techniques. The cover is a molded part, and is sprayed with Gaco compound to reduce erosion of the surface.

These typical examples represent current-day thinking and practice in the field of antenna design for high-speed aircraft. Such advanced craft as the de Havilland Comet and the Avro Jetliner have completely suppressed antenna systems. And these kinds of antennas will become more and more familiar to the aircraft designers as airplane speeds go higher and as avionic equipment increases in scope and number.

The above report is based on a group of papers presented at the second annual airborne electronics conference of the Institute of Radio Engineers recently held at Dayton, Ohio. Included in the group were:

"Systems Considerations in Aircraft Antenna Design," by John V. N. Granger;

"Vertical Stabilizer Antenna System for Multiple Operation," by R. DeLiban, J. T. Bolljahn, A. R. Ellis and D. R. Scheuch;

"Fin Cap Zero-Drag Loran Antenna," by Gerald Weinstein;

"A Wing Tip Omnidirectional Range Antenna for a Jet Fighter Aircraft," by James O. Martin;

"A Glide Path Cavity Antenna for a Jet Fighter Aircraft," by Louis E. Raburn.

Fault-Finder Spots Electrical Defects

A. V. Roe Canada Ltd.'s Jetliner will be equipped with a fault analyzer for spotting defects in the craft's ac. electrical system.

When a fault occurs in an aircraft ac. system it is usually difficult to determine whether it is due to an overload, overvoltage or voltage failure. Frequently this results in a system being switched off when only a minor fault has occurred and has not rendered it unserviceable.

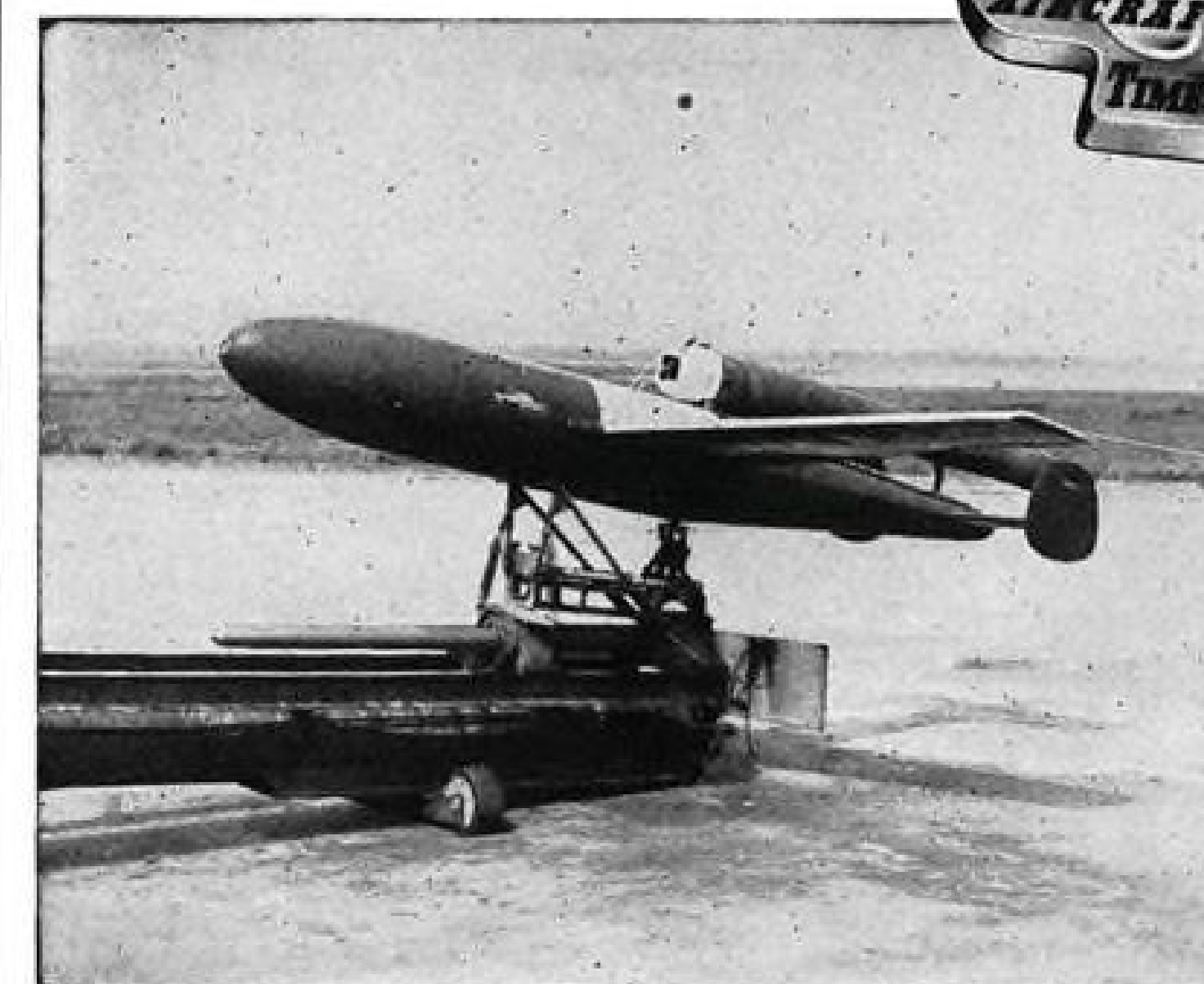
With the fault analyzer the flight engineer or ground crew can quickly spot the nature and location of the fault, assess its significance and take measures to isolate or repair the defect or ignore it, as conditions require.

Arrangement of the analyzer includes a group of warning lamps on the flight engineer's panel, each lamp indicating the nature of the fault and in which phase of the alternator it has occurred.

If the voltage drops unduly in one of the circuits, it causes de-energization of a relay connected from the affected phase line to ground. This causes a set of contacts to close, lighting the appropriate light.

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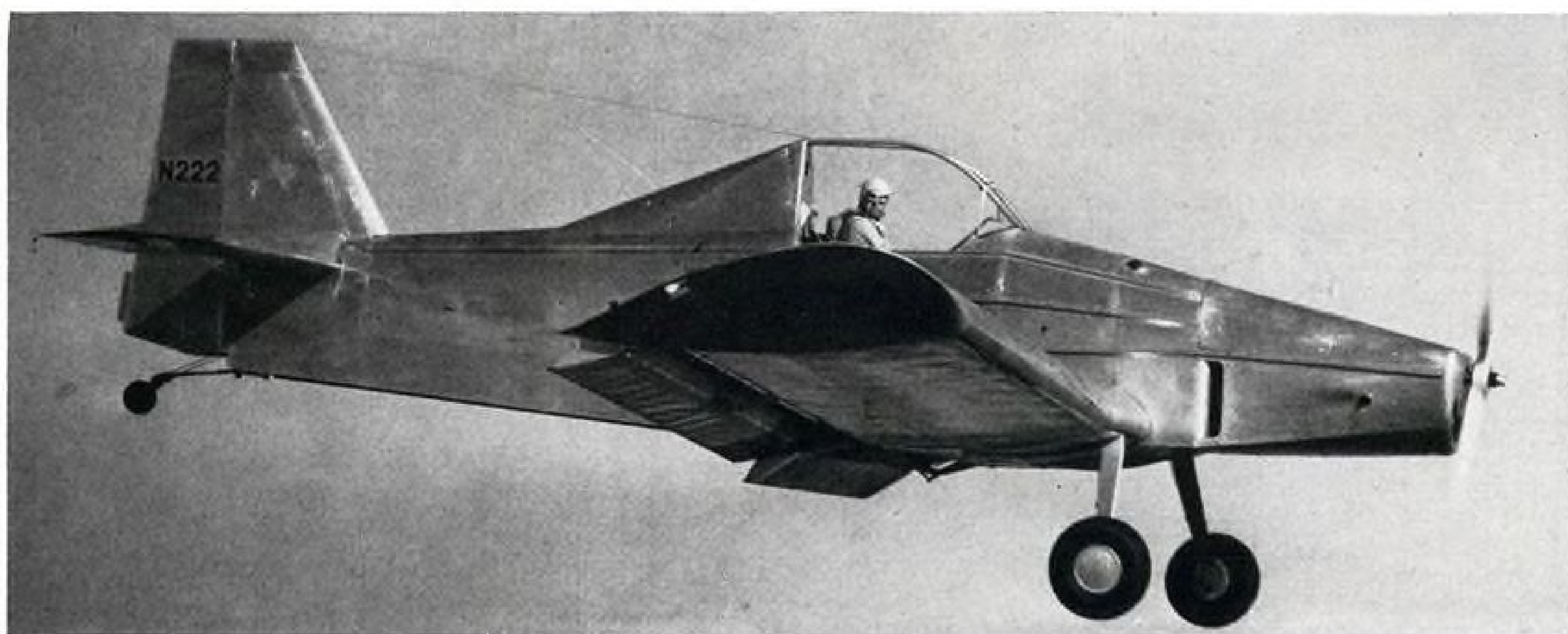
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SPRAY EQUIPMENT which, running full span of wing, gives maximum distribution. Dusting equipment will fit behind engine.

Agricultural Plane Shows Unique Features

CAA-sponsored craft is being widely demonstrated in hope manufacturers will adopt its patent-free devices.

Manufacturers and agricultural groups are now getting a chance to evaluate the new Ag-1 prototype "flying tractor." This is the first plane ever designed and built exclusively for super-safe and efficient crop control flying.

Civil Aeronautics Administration, which sponsored its development, hopes to get manufacturers to build at least part of the special features of this plane into a model of their own. There are no patents on the design features of the plane, and manufacturers are urged to lift any or all ideas from it.

CAA paid \$50,000 to Texas A & M Personal Aircraft Research Center to design and build the plane, in response

to industry and flying farmer demand.

Outstanding characteristics, observed at a recent Washington demonstration before government and industry officials, were its extreme safety, pilot visibility, controllability and farm utility.

► **Safety First**—Outstanding feature of the Ag-1 is built-in safety at every angle. It's a flying padded cell, relatively speaking. Unlike a cell, though, the cockpit of this plane gives exceptional visibility in every direction—especially forward, where it counts most. Collisions with objects accounted for over half the fatal duster accident last year (see table, p. 47).

And slow-flight control built into this

plane with full-wing-length slotted flap and slot-lip aileron is another big inherent safety factor. Stalls accounted for 15 of the total 45 fatal duster accidents last year.

► **Pilot's Protection**—Structural safety features include adjustable pilot seat that will stand a 40G shock. Shoulder harness reel leaves the pilot free to lean forward while working, yet at the start of a negative acceleration forecasting a crash an impact gadget reels in on the shoulder harness so the pilot's body will not fly forward and strike part of the cockpit.

The plane's nose is long and is stiffened by external and internal bracing. Guide tubes over the cockpit will pass a phone wire over the pilot's head, and a cable stretched from cockpit crash bar to the top of the vertical fin will pass

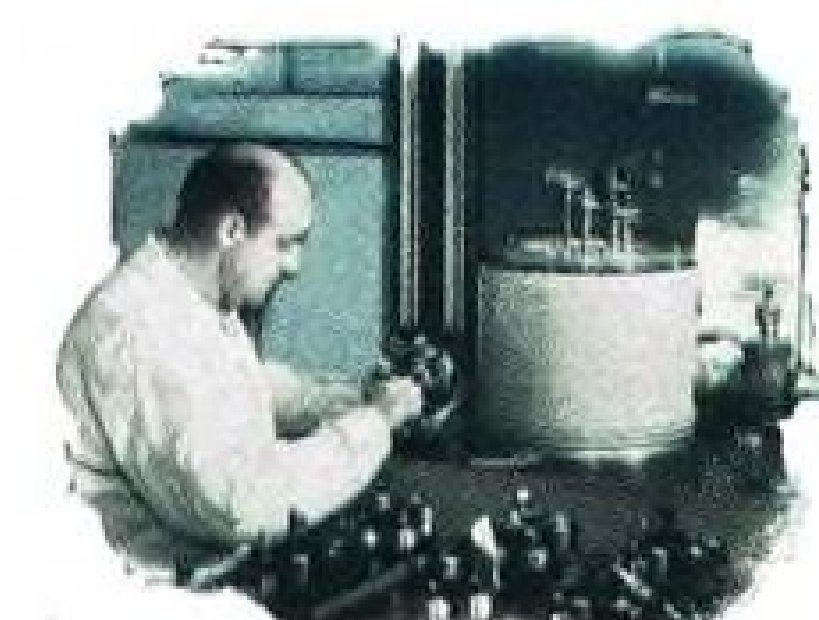


Commercial airliner, Air Force transport or private carrier; safety, efficiency and economy are vital factors.

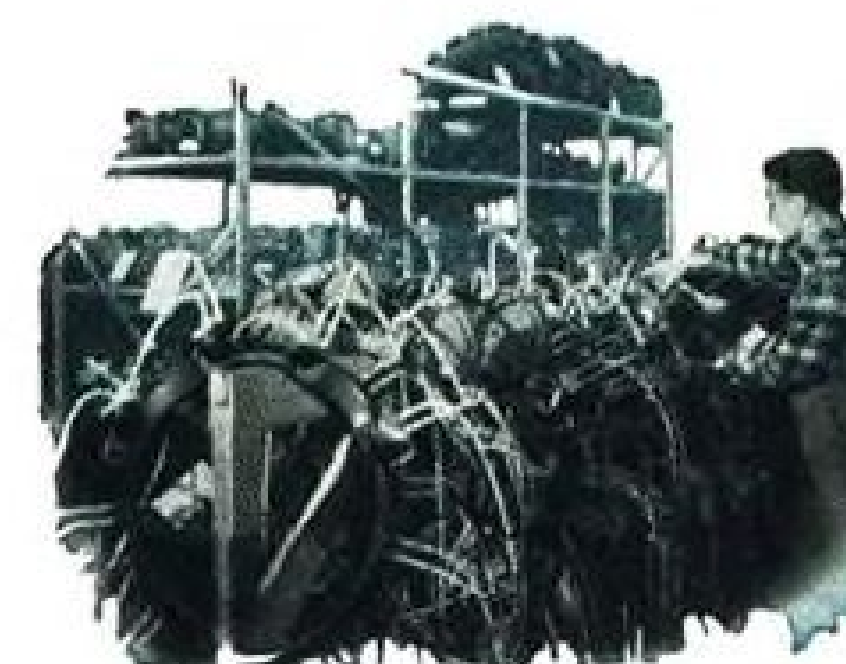
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ENGINE OVERHAUL is one of PAC's major operations. We pull 'em down and put 'em back quickly and efficiently.



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THE STRUCTURE of Pacific Airmotive activity is composed of four basic divisions, Engine Overhaul, Airframe Overhaul, Manufacturing and Parts Distribution. Each division is under the supervision of, and operated by, the most highly skilled and experienced men. Twenty-year service is not unusual among PAC craftsmen. The rapid growth the entire PAC organization has shown during the past years proves that its services and facilities are highly regarded by the entire aircraft industry. Quality of PAC engine overhaul has repeatedly extended the time between overhauls . . . increasing efficiency and profits for many Pacific Airmotive clients.

And, of course, PAC is the first and largest distributor of Pratt & Whitney Engine parts in the world! Also, scores of other leading parts manufacturers are represented by Pacific Airmotive. PAC activity in the airframe overhaul field over a period of many years has resulted in facilities to handle aircraft from the smallest private ship to the large troop carriers. An example is the vast reconversion and modification program on F-51 fighters and C-54 military cargo carriers undertaken for the Air Force. PAC manufactured pressurization equipment is found as an integral part in 90% of all modern fighters and pressurized commercial transport craft.



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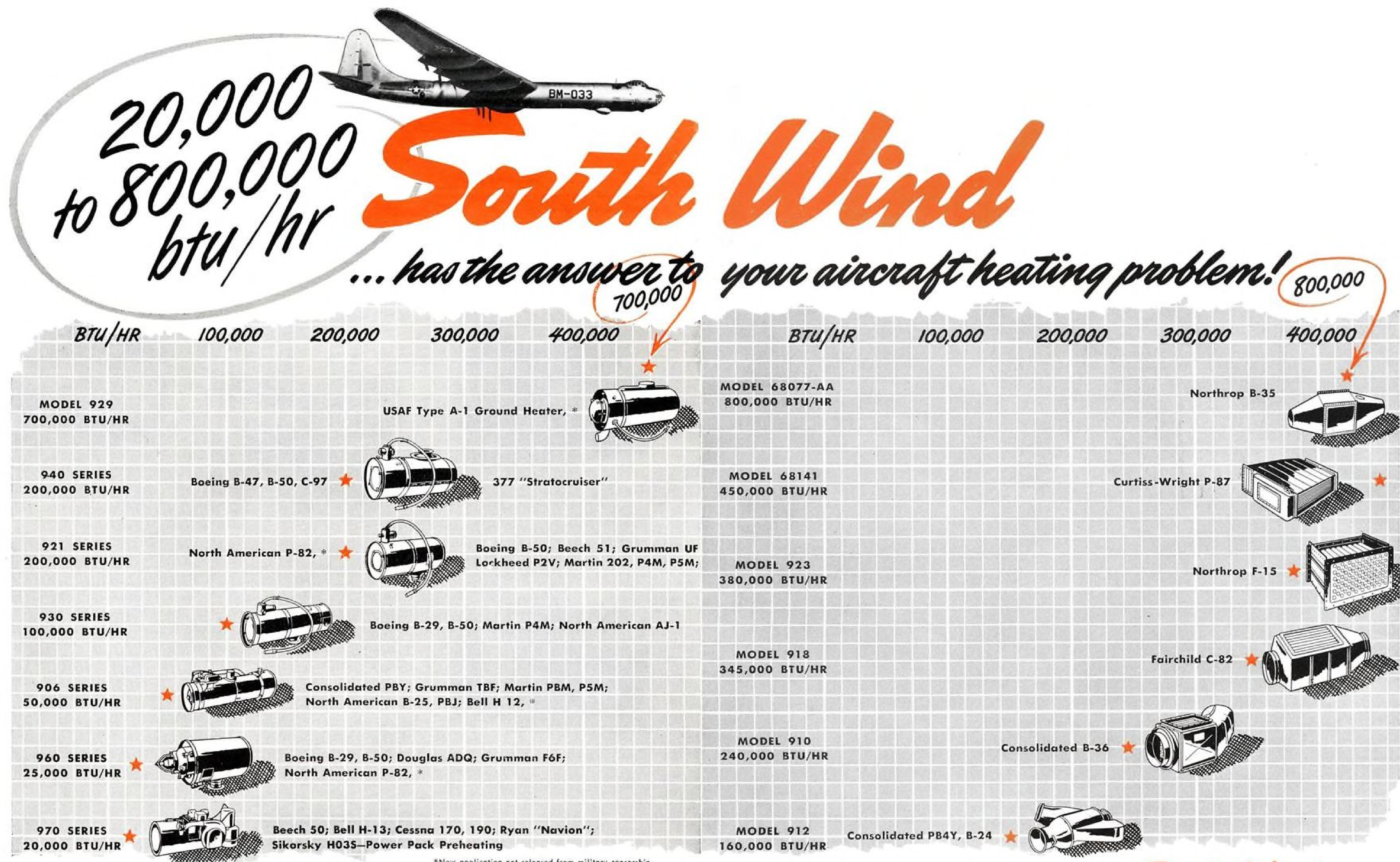
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Agricultural Plane Accidents

(Injuries and Deaths, 1949-1950)

COLLISIONS WITH OBJECTS	1950	1949
Wires, Poles		
Fatal	10	10
Serious	9	12
Minor/None	65	54
Trees		
Fatal	12	6
Serious	6	4
Minor/None	43	24
Buildings		
Fatal
Serious	1
Minor/None	4	4
Fences		
Fatal
Serious	2
Minor/None	17	22
Other Objects		
Fatal	4	1
Serious	3	4
Minor/None	43	56
Stall in Air		
Fatal	15	14
Serious	17	15
Minor/None	54	40
Other Type Mishaps:		
Fatal	4	5
Serious	12	8
Minor/None	119	97
GRAND TOTAL:		
Fatal	45	36
Serious	47	46
Minor/None	345	297

SOURCE: CAB statistical analysis.

Aircraft Damage In Crop Control

	1950	1949
Destroyed	165	138
Substantial	268	237
Minor/None	2	2
TOTAL*	435	377

* Grand totals show two more accidents in both 1949 and 1950 for damage classification than injuries classification.

SOURCE: CAB statistical analysis of commercial non-air carrier accidents.

the phone wire aft without its cutting the fin.

► **Visibility**—The pilot of the AG-1 sits high in an open cockpit. He sees down-

ward in all directions except through the wings. The crash-bar fairing is no wider than his head, so he can comfortably look back to his field before making his turn to return for another pass.

So specialized is this plane in favor of visibility, that the open cockpit is really far too open for comfortable cross-country flight. CAA Ft. Worth aircraft division chief C. W. Von Rosenberg lost his navigation map to the wind while bringing the plane from Texas to Washington for the demonstration.

► **Controllability**—Pilot Von Rosenberg told AVIATION WEEK that the Ag-1 handles beautifully at speeds right down to the stall, flaps up or down. Stall is around 35-40 mph. CAA and other pilots have put it through all "qualitative" evaluation—stall, turn, etc.—but have not yet done meticulous fact-finding on rate of climb, gross load and runaway-length requirements, and other detail operation statistics.

Those will come after the current promotion and evaluation tour. CAA Administrator C. F. Horne says expectations are for early certification of the plane after the tour. The tour will continue about as long as groups ask to see it; CAA will send it anywhere within reason.

The full flap acts also as an aileron. And when flaps are down, the slot-lip aileron takes main control over lateral control. Rosenberg says he has flown the plane with slot-lip aileron only (flap aileron stationary) and had almost too much control. The slot-lip when up acts as a spoiler of lift over the large high-lift flap.

► **Farm Utility**—This plane probably has the fattest wing in use. It holds the spray tanks and equipment—and provides exceptionally high lift at low speed. Spraying system is thus built right in along whole length of wings, giving maximum distribution. The prototype now flying has not yet had its rotary dusting equipment installed. That goes in the accessory section, behind the engine and in front of the pilot.

All-metal construction means long life without hangaring, minimum air-frame maintenance, and safety.

Farm utility is built into this plane in every practical way the designers could do it. That was a principal aim. Safety, visibility and controllability are vital to farm utility.

► **Small-Field Performance**—While CAA has not yet made accurate measurements of takeoff distance required, the plane was designed for takeoff of 1,320 ft. Von Rosenberg says the plane seems to make it in about 1,300 ft. with no wind.

Some observers at the Washington demonstration commented that more power would not be amiss. Present unit

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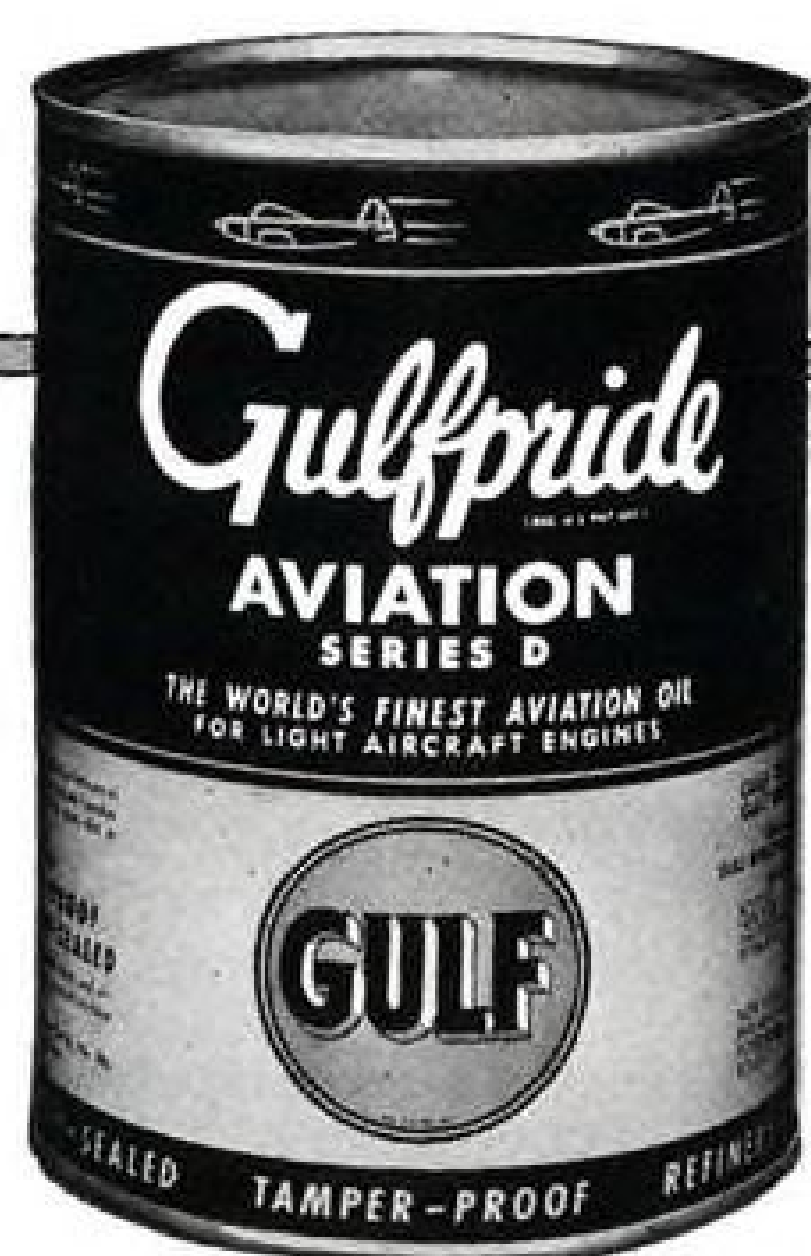
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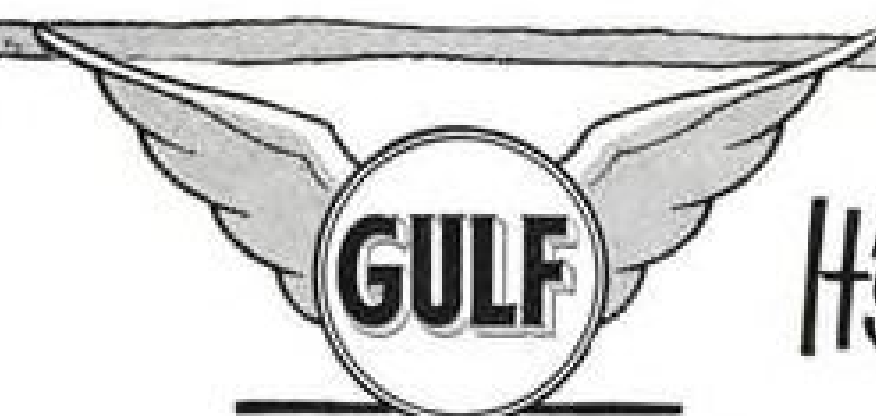
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For radial Aircraft Engines, it's GULF
Aircraft Engine Oil-Series R!

This is a fine quality, non-detergent, straight mineral lubricating oil! It's highly effective in retarding carbon and sludge formations and maintains body at high operating temperatures. Especially recommended for maximum operating periods between overhauls!

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is a 225-hp. engine donated by Continental Motors. While the plane is not "under-powered," many customers of today may want the plane more powerful. Von Rosenberg says that a 260-hp. geared Lycoming would be a good one to get more efficiency on takeoff. Plane will take anything up to the 450-hp. Pratt & Whitney radial which, though definitely not needed, would give the plane Super-Cub take-off and climb.

Icing Protection

Avro Canada's Jetliner icing trials have been conducted with new electrothermal leading edge rubber sheeting that combines anti-icing and de-icing features.

This electrothermal equipment, manufactured by Goodyear Tire & Rubber Co., is erosion-resistant rubber housing resistance elements. A strip along the nose of the leading edge is heated continuously to prevent icing. Intermittent heating is applied to the balance of the rubber sheeting running aft on top and bottom. This cyclic heating permits a small amount of ice accumulation, which is broken loose periodically. The operation is designed to prevent water run-back and freezing on the unprotected aft surfaces of the wing.

file having the least pressure drag for a given auxiliary condition, such as some particular thickness ratio or structural requirement.

To illustrate the theory, calculations are made using the equations of linearized supersonic flow. The results show that:

- Optimum airfoil profiles generally have blunt trailing edges.
- Optimum thickness distribution depends only on one dimensionless parameter involving Mach number, airfoil thickness ratio and base pressure coefficient.

Pressure drag calculated for the optimum profile is compared to that of a biconvex, sharp-trailing-edge profile which satisfies the same structural requirement. The reduction in pressure drag depends on the base pressure parameter and varies from a few percent to as much as 75 percent.

A cautionary note suggests that care be used in applying the quantitative results, since the note is concerned only with pressure drag.

Results can be directly applied if the skin-friction co-efficient is insensitive to small changes in profile shape (such as in turbulent flow at high Reynolds numbers) or if the friction is small compared to pressure drag (such as with thick airfoils). —DAA

NACA Reports

► Development of Magnesium-Cerium Forged Alloys for Elevated-Temperature Service (TN 2325)—by K. Grube, R. Kaiser, L. W. Eastwood, C. M. Schwartz and H. C. Cross.

This note covers the alloy-development phase of the project, which was to include in addition a study correlating composition and structure with resistance to creep. The nominal composition of the recommended alloy is 1.7 percent manganese, 2 percent cerium, 0.25 percent nickel, and the rest magnesium. The alloy should be solution heat-treated at 1,040F.

The developed alloy showed superior properties to previous types, and consequently it was felt that further manufacturing of new alloys would be unnecessary.

NACA sponsored and assisted financially in this study, conducted at the Battelle Memorial Institute. —DAA

► Airfoil Profiles for Minimum Pressure Drag at Supersonic Velocities—General Analysis with Application to Linearized Supersonic Flow (TN 2264)—by Dean R. Chapman.

This interesting note develops the theoretical means for calculating a pro-

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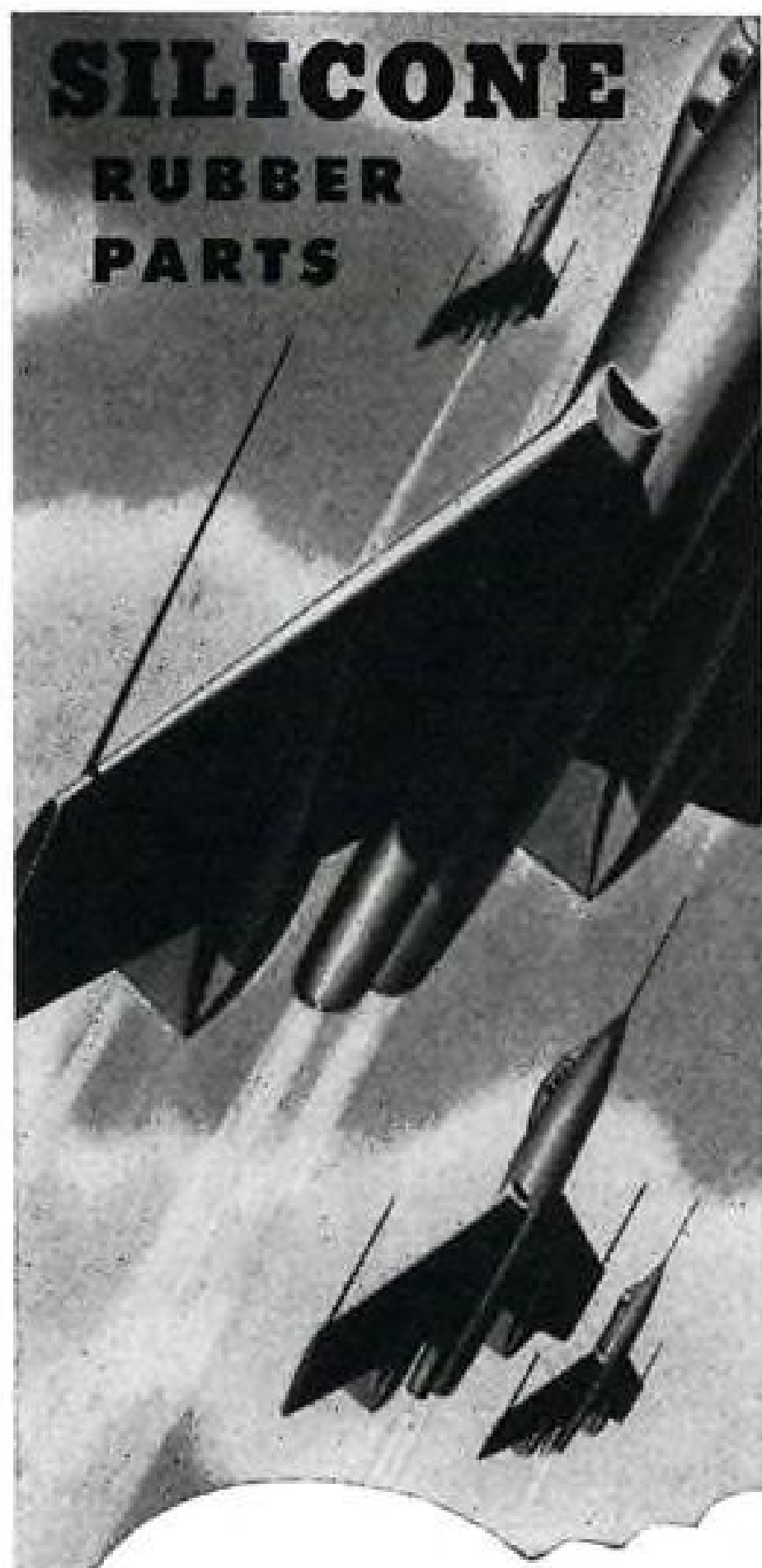
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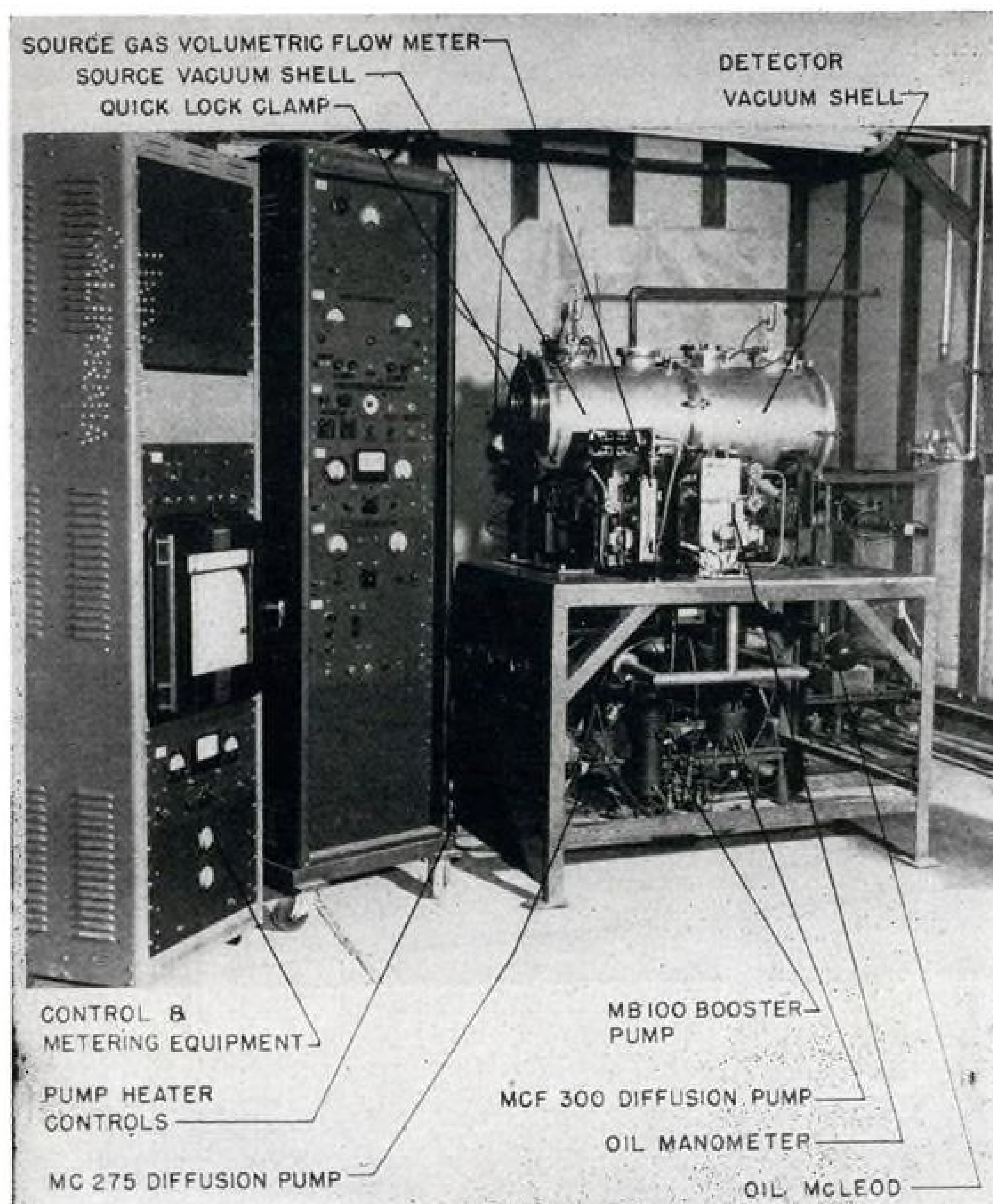
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SUPERAERODYNAMICS, high-altitude flow phenomenon, is studied in this "windtunnel".

New Way to Study Altitude Flow

A new supersonic windtunnel intended to explore the properties of flow at simulated altitudes of 80 to 200 miles has gone into operation at the Berkeley campus of the University of California.

The new test device uses a molecular beam similar to the type used in nuclear research. Speed simulation to date has been limited to a low supersonic value, although greater capabilities have been demonstrated.

Funds from the Office of Naval Research and the Office of Air Research were used to build the tunnel, which was designed to extend the range of the university's low-pressure, supersonic windtunnel, the world's first to be capable of test conditions simulating as high as a 70-mi. altitude.

The main component of the "tunnel" is a stainless steel tube about five feet long and 18 inches diameter. Auxiliary pumps and instruments complete the apparatus.

► By Definition — Supersonic

flows occur at extreme altitudes—of the order of 100 miles—where the air density is very low and the molecular mean free path is large.

The molecular mean free path is the average distance traveled by any molecule between collisions with other molecules. At sea level standard conditions, the mean free path is about three-millionths of an in.; at an altitude of 90 miles, the free path is about 10 ft.

As it happens, an altitude of about 50 miles marks the lower limit of the appearance of supersonic flow; at the 100-mile level, almost any vehicle would be in such flow. A further condition is that the flight Mach number must be greater than the flight Reynolds' number. However, there is no reason why the Mach number couldn't be less than one; in other words, there can be subsonic supersonic flow.

For flight in this regime, the vehicle can be considered to be flying against a molecular beam, in which the effect of collisions between air molecules can



• From pistons to turbines—we continue to advance with the aviation industry. Our production includes substantial commitments for Gear Box Assemblies, Auxiliary Drives, Hydraulic Gear Box Drive Assemblies, and Gear Assemblies for J-47 Jet Engines.

With facilities that produced thousands of reciprocating engines in World War II, we are now manufacturing our own engines, airframe and landing gear components for the military services.



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TEMCO Rated High in Quality Control

All Production Processes, Testing Methods and Laboratories Have Top Rating

Strict administration of Quality Control has played an important part in TEMCO's progress in the engineering and manufacture of aircraft. The procedures, methods, and equipment used at TEMCO all are recognized by the Navy and Air Force, certified by the Government, or licensed by the Civil Aeronautics Administration. Above everything else, the men who use these procedures, methods and equipment, possess the one quality for which there is no substitute—experience. Of all the men now employed in the TEMCO inspection department, more than 47 percent have from 7 to 25 years actual aircraft inspection experience to their credit, while another 32 percent have from 5 to 7 years.

Quality Control Starts With Men in Shop

Hanging on the wall of a TEMCO Production Superintendent's office is a sign which reads:

"Quality Must Be Built Into a Product—It Can't Be Inspected Into It!"

These words could well be called the motto of TEMCO's production departments, for the men in the TEMCO shop know that it is they—the machinists, the riveters, the installers, the assemblers and the men on the sheet metal benches—who are responsible for the ultimate quality of TEMCO products—not the inspectors.

To these men the inspector is important not as a source of quality, but as a guarantee that each part and assembly has the quality which only they—the men who built it—can put into it.

TEMCO Building Major Assemblies for Martin

Work is getting under way at TEMCO on major assemblies for the P5M-1 Marlin Flying Boat manufactured by the Glenn L. Martin Company of Baltimore, Md.

The Marlin is one of the Navy's most modern patrol bombers, a successor to the PBM series made famous during World War II.

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From the time the raw stock entered the TEMCO plant to final flight test as part of a completed airplane, this one forging benefited from eleven different inspections—Receiving, Zygo, Tooling, Machine Shop, Heat Treat, Processing, Paint, Installation, and Final Acceptance by Flight Testing.

Performing the inspections on this one part were inspectors whose cumulative aircraft experience totals 118 years or 245,440 man-hours.

This is not an exception, but a typical example of the strict inspection procedures applied by TEMCO, and the experience which TEMCO has available to insure their proper application.



Texas Engineering and Manufacturing Co., Inc.
DALLAS, TEXAS

be neglected. These molecule-to-molecule collisions occur very seldom compared to collisions between the molecules and the solid body.

► **Tunnel Action**—The supersonic aerodynamics windtunnel acts more like a gun firing molecular bullets.

The stream of molecules is fired into an evacuated chamber from a small furnace which has an opening at one end. The muzzle velocity is determined by the temperature of the furnace; at 1,800F, the speed is 1,800 mph.

A system of slits controls and focuses the molecular beam to strike against model surfaces in the chamber.

Evacuation to the low-density level comparable to rarefied atmosphere takes a week of continuous operation of a three-stage pumping system. Part of this long pumping cycle is attributed to the absorption of air molecules in the metal parts of the tunnel. This reason also accounts for the rejection of rubber as a gasket material; rubber loses up to 30 percent of its volume when placed in a vacuum system.

Special and complex problems in instrumentation are introduced by the operation of a windtunnel whose working pressure is one ten-millionth of sea level pressure. In order to detect pressure differences in such a low-density medium, very sensitive gauges must be used. One electronic detector gauge developed at the project can measure pressure changes of one ten-billionth of a sea level standard atmosphere.

► **Slightly Supersonic**—So far, the tunnel operational speed has been only slightly supersonic—950 mph. is the quoted figure. But it has been demonstrated that speeds of 1,800 mph. can be attained, and the upper range of speed is only limited by the temperature that the source chamber can stand.

The work of developing this new tool was directed by Prof. R. G. Folsom, professor of mechanical engineering; S. A. Schaaf, asst. prof. of engineering science; and G. J. Maslach, supervising engineer. Construction and operation of the tunnel was under the supervision of F. C. Hurlbut, physicist.

Power for Starting

AiResearch Mfg. Co.'s 140-hp. low-pressure air turbine starter has successfully completed Air Force cycling tests.

Reported to be the most powerful air starter ever developed, the 32-lb. unit is said to have enough muscle to turn over turbojets in the 10,000-lb.-thrust class and turboprops in the 8,000-hp. category.



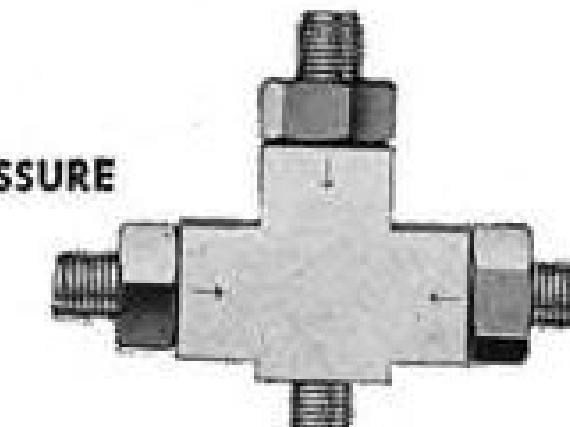
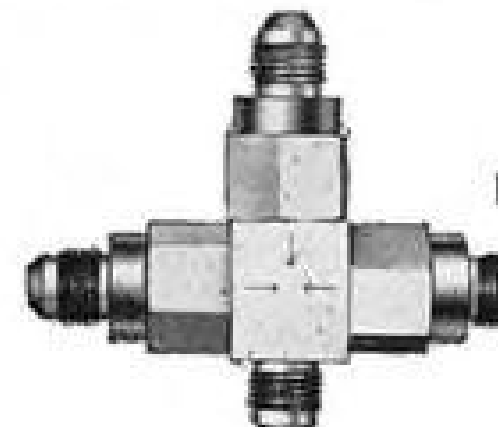


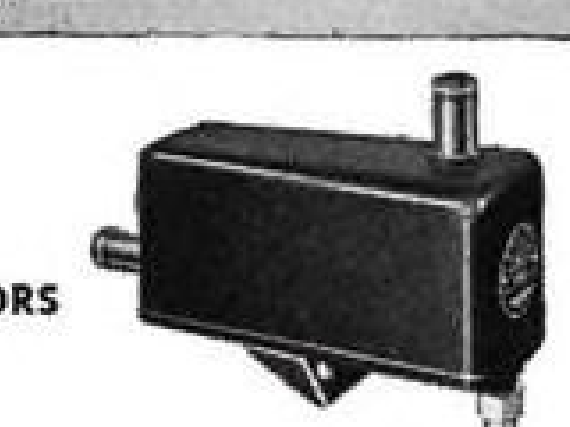

AiResearch says that at the end of the cycling trials—estimated as the equivalent of six months of service on an operational aircraft—horsepower output has dropped less than 1 percent.



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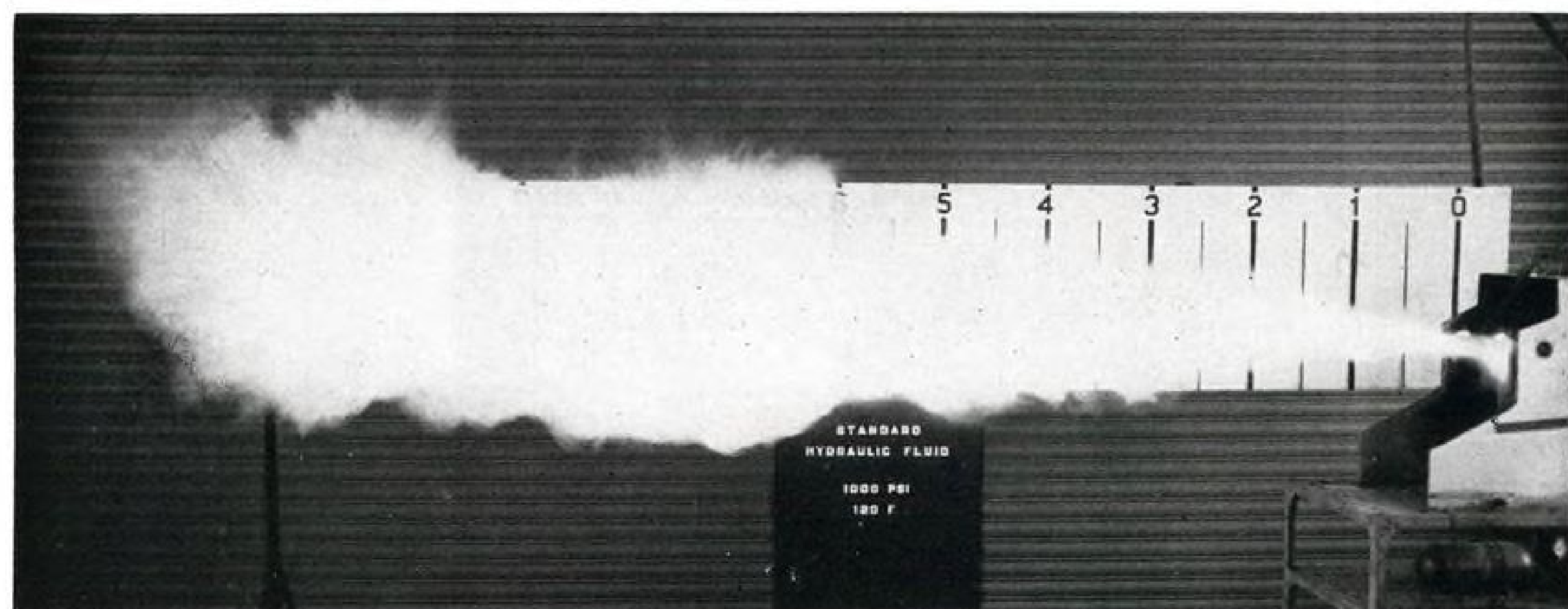
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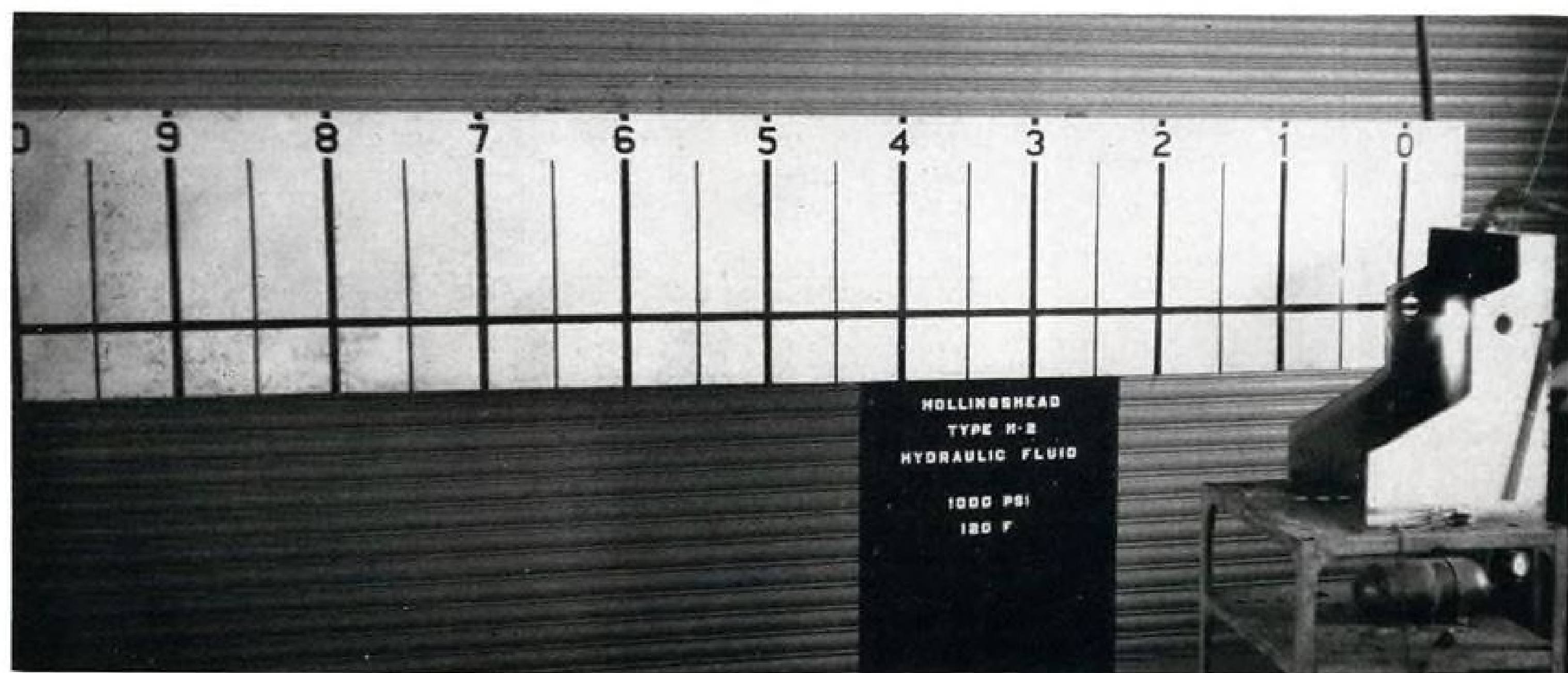
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EQUIPMENT



FLAME shoots out more than ten feet when standard hydraulic fluid is fed under pressure into flame of oxyacetylene torch at right.



NO FLAME results when new hydraulic fluid H-2 is forced under same conditions into same torch. Navy now is using the fluid.

The Hydraulic Fluid That Will NOT Burn

Hollingshead's H-2, being adopted by Navy, is rated by CAA with Flammability Reference Number of 0.

By George L. Christian

Camden, N. J.—A non-flammable hydraulic fluid that can be spurted under high pressure into the 6,300 deg. flame of an oxyacetylene torch without catching fire has been developed by R. M. Hollingshead Corp., and will be used in the hydraulic system of every airplane the Navy owns in significant quantities.

This truly non-flammable fluid, which also has good lubricity and is non-cor-

rosive, is named H-2 and now is being made available for all commercial and military aircraft, says Frederick H. Lee, Jr., Hollingshead sales manager.

► **Will Not Burn**—Here is proof of H-2's non-flammability. A Civil Aeronautics Administration test report states that when H-2 under 3,000 psi. was spurted through an oxyacetylene flame (temp. 6,300 deg. F.), no fire resulted. George W. Haldeman, CAA's Chief, Aircraft Division, gives the fluid a Flammability

Reference Number of 0, based on tests by CAA Technical Development & Evaluation Center, Indianapolis. Practically speaking the fluid has no flash point. Even with all the water boiled off, flash point of the residue is 762 deg. F.

Navy planes now flying are having their hydraulic systems drained, flushed and filled with H-2. Almost all airframes for the Navy now on the production line will have their systems filled with H-2 as will most future Navy craft.

A significant advantage of H-2 is that it does not require changing synthetic rubber seals or leather back-up rings, nor of any other hydraulic system

Suppose for a moment that you found it necessary to choose a surgeon to perform an important operation on you or a member of your family—how would you select the one man in whom you could place such a trust? In all probability you would arrive at your final decision only after a careful check of his background, his qualifications and professional reputation. This same logic can be used as a guide to important decisions in other fields as well. A case in point is your selection of a source for the vital instruments and accessories used in your planes. Look at Eclipse-Pioneer's record in this field. It dates back to the aviation industry's earliest days. Right from the beginning Eclipse-Pioneer has consistently demonstrated its ability to design and manufacture to both military and civil specifications, for experimental as well as operational applications. In addition, Eclipse-Pioneer inaugurated and maintains a system of quality controls so precise they have become literally the standards by which the "standards" are checked. *Bear this in mind, it's worth remembering, for when you choose on the record alone, you will inevitably call on Eclipse-Pioneer.*

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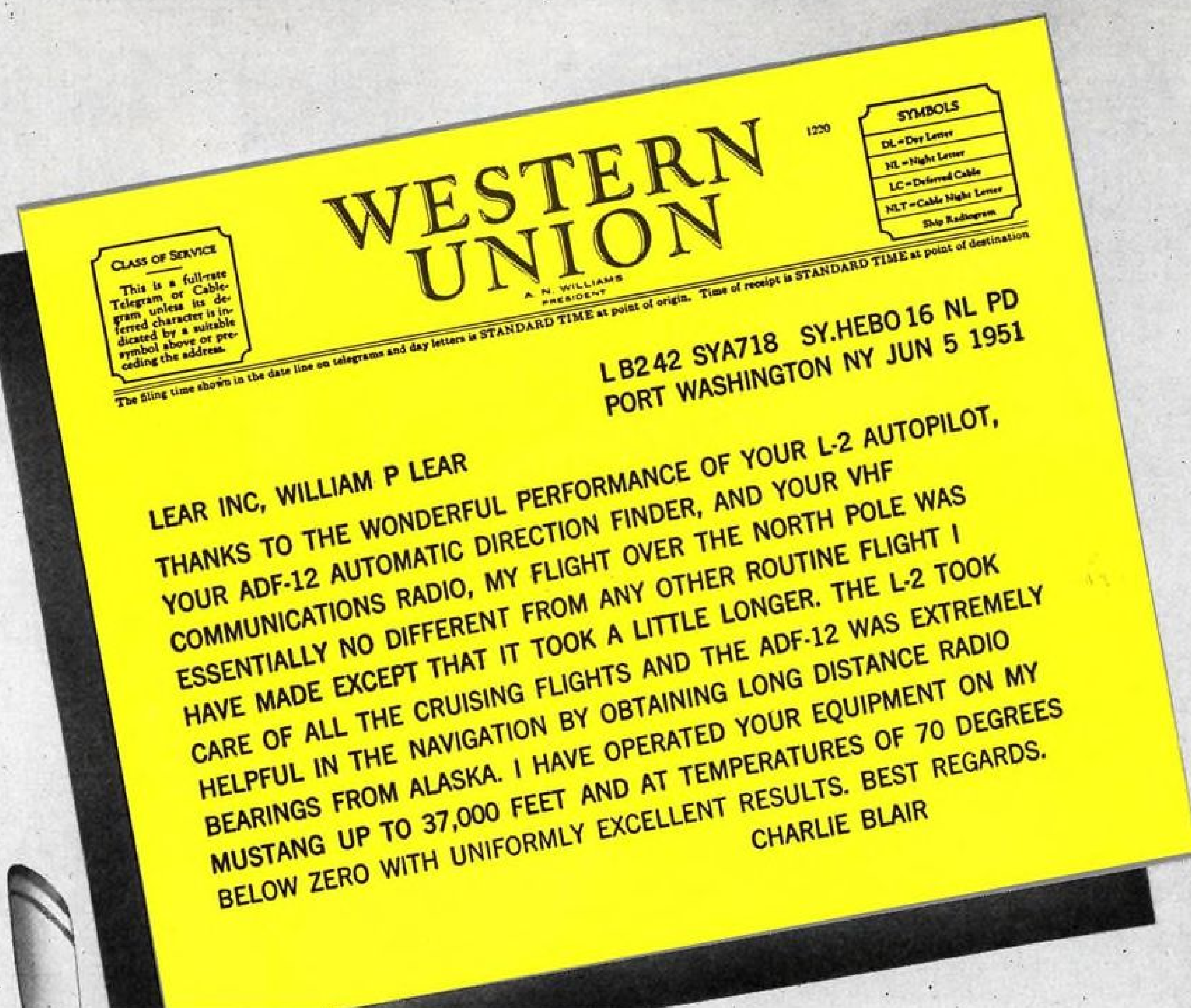
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From Norway to New York via the North Pole with only one stop for gas at Fairbanks, Alaska—6,750 miles in a Mustang F-51 at an average speed of 320 miles per hour—that is the historic and daring achievement of Captain Charles F. Blair, the only man ever to make such a flight solo over the top of the world. In the Arctic regions your magnetic compass is useless, so your radio direction finding aids and automatic pilot become all-important—particularly when you have to go it alone. Captain Blair, Stratocruiser pilot for Pan American World Airways and veteran of 420 Atlantic crossings, knew exactly what the

job called for. Naturally he chose Lear equipment throughout—and he was never more than one minute off his ETA's on the entire flight.

Here is the Lear equipment installed by Captain Blair for his remarkable flight—all this in one already overcrowded F-51! It had to be compact to fit the space—it had to be good to do the job.

- 2 Lear ADF-12 Automatic Direction Finders
- 1 Lear L-2 Automatic Pilot
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- 2 Lear VHF Receivers
- 1 Lear Medium Frequency Receiver
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- 1 Lear Hand-Reel and Trailing Antenna Assembly

LEAR INC. 11916 WEST PICO BLVD., LOS ANGELES 64, CALIFORNIA



Hydraulic Fluid

Some Properties of H-2 Non-flammable Hydraulic Fluid
Approved under Specification MIL-F-7083 (AER)
See Navy (BuAer) Tech. Order 13-51 for Procedures

Flammability: Non-flammable as a spray or liquid. Resistant to direct ignition, after total evaporation of water. Conforms to Specifications MIL-F-7083 (AER).

Flash: No flash; —762° flash of residue.

Evaporation (4 hours @ 160° F.): Residual film remain, oily and not hard or tacky.

Initial Freezing Point: When subjected to a temperature of —60° F. for 6 hours in a kinematic viscometer tube under conditions of intermittent movement, the fluid shows no evidence of crystalline formation.

Low Temperature Stability; (60° F. for 72 hours): White opaque fluid.

Volatility: The component materials are no more volatile than water. Loss of evaporation of as much as 10% of H₂ will not cause precipitation, separation or any radical change in the appearance of the fluid.

Viscosity:
@ 130° F. 10 Centistokes—Minimum
@ —40° F. 350 Centistokes—Maximum
@ —60° F. 1300 Centistokes—Maximum

Shear Stability: No change in viscosity due to shear breakdown.

Specific Heat: At 0° F. to 200° F. Average is 0.765.

Co-efficient of Thermal (cubical): 0° F. to 75° F. average 0.00029

Expansion: 75° F. to 200° F. average 0.00039
(ASTM Standard D 176-44 Method A).....0° F. to 200° F. average 0.00036

Toxicity: Non-toxic. Odor: Pleasant.

Moisture: 35% Minimum. Color: Amber-Clear.

Weight per gal. @ 75° F.: 8.935 lbs.

Specific Gravity: 1.10 @ —5° 1.081 @ 60°; 1.062 @ 120°.

Packings, Gaskets and "O" Rings: Use any "O" rings or packings approved under MIL-P-5516. Rubber swell is not accompanied by deterioration or fragmentation. Increased elongation and tensile strength may be expected, as well as a decrease in friction.

components with the possible exception of micron filters which might be cemented with a product soluble in a water-base fluid.

Airframe manufacturers whose Navy aircraft will carry H-2 are: Chance-Vought, Convair, Douglas, Grumman, Lockheed, McDonnell, Glenn L. Martin and North American.

► **No Conversion Problem**—Dr. Vito Esposito of Hollingshead's New Products division said that there was no problem in converting a plane equipped with AN-O-366 fluid to H-2 because 366 is easily emulsified and flushed out of a hydraulic system. Also, the two fluids are compatible in the ratio of 90 percent H-2 to 10 percent 366. (U-4 is also a water base fluid which has now been superseded by H-2.)

Esposito added that converting U-4 hydraulic fluid aircraft is more difficult. Sludge in the form of metallic soaps which exist in U-4-equipped hydraulic systems is so thoroughly scoured off interior surfaces by the detergent action of H-2 that a very thorough job of flushing is necessary. And the filters usually become clogged and have to be changed.

Hollingshead is convinced that H-2 will have strong appeal to commercial

operators. Its lubricity is as good as or superior to AN-O-366, it offers no corrosion problems if properly handled, it has a high viscosity index and has operated well at temperatures below —60 deg., has no shear breakdown, and above all, will not burn.

H-2s high specific heat means that the fluid will transfer heat from moving parts more efficiently than petroleum base fluids.

Cost is in the neighborhood of \$4.00 a gal., but this will be reduced with widespread use. One fire-resistant fluid now coming into wide use costs up to \$12.00 a gal.

► **Development**—H-2 was developed by Hollingshead with the close help and cooperation of the Naval Bureau of Aeronautics. Vickers, Inc. was very helpful in providing pumps and other components used in testing the fluid. H-2 make-up contains 35 percent water, 50 percent ethylene glycol and 15 percent base and inhibiting agents.

Water evaporation has been practically eliminated as a problem because of the hygroscopic nature of the fluid, which causes it to reabsorb any water that might have evaporated. The final product also includes additive materials to inhibit corrosion, both in

SIZE or WEIGHT



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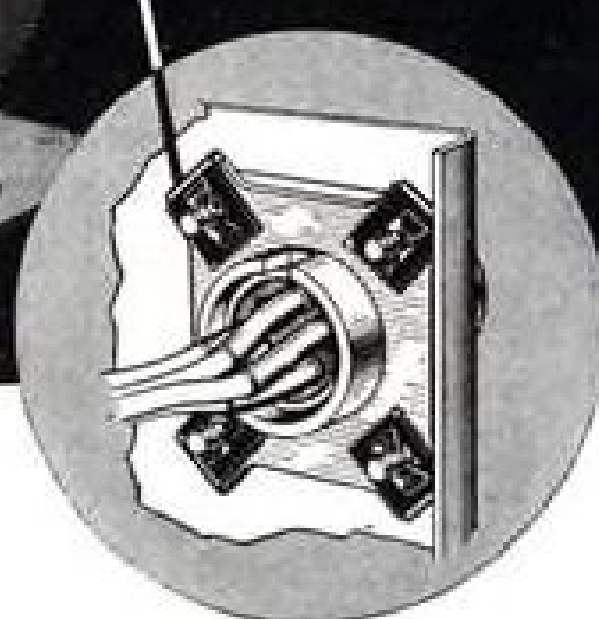
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Cut-away view of Edison Fire Detection Relay Panel, left, shows two SPEED NUT Connector Mounting Rings in position. "U" Type SPEED NUTS, self-retained on 4 corners of ring, line up with screws driven from outside panel. Detail drawing, below, is close-up of assembly.



Thomas A Edison

Cuts Cost In Half with SPEED NUTS®

EDISON specifies SPEED NUTS after cost comparisons reveal 50% savings over other militarily acceptable fastening methods

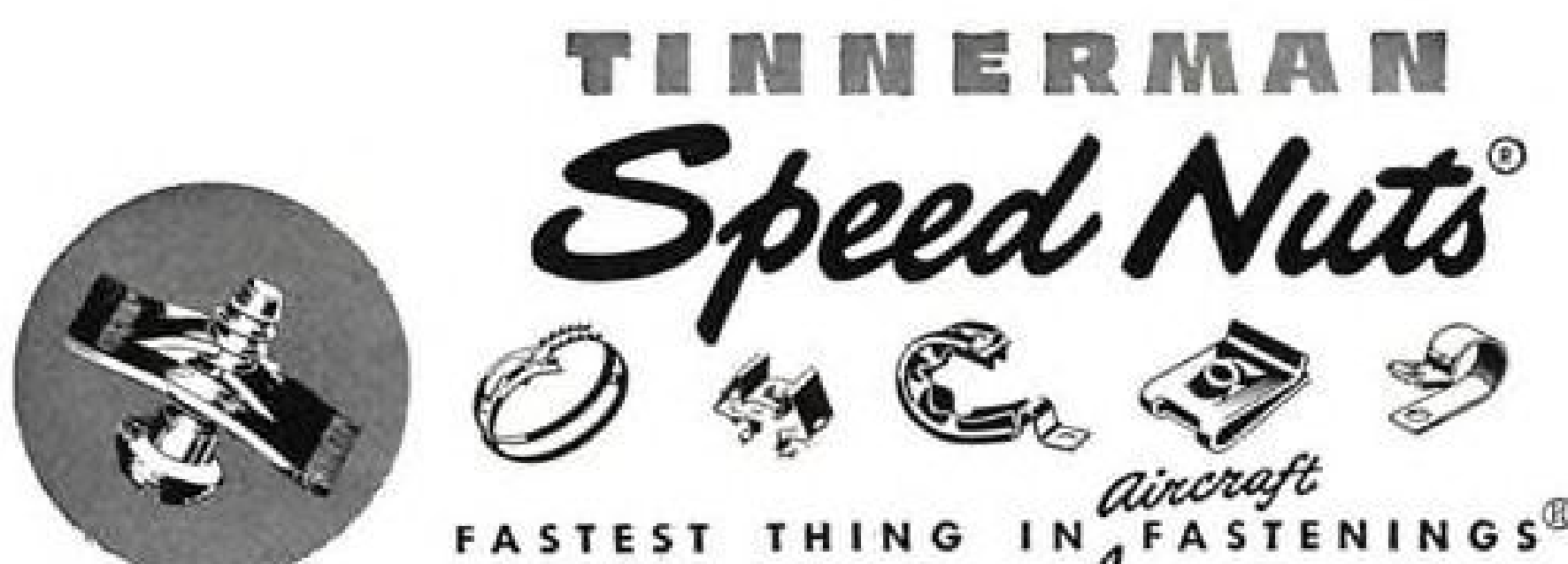
● In the very earliest design stages of their aircraft fire detection relay panel, engineers of Thomas A. Edison, Incorporated, checked various methods of attaching connectors to the panel.

Their requirements were rigid. The fastening means had to be light in weight, resist vibration loosening, provide quick and easy assembly, and be in line on cost. Tinnerman Aircraft Connector Mounting Rings proved to be the only fastener that qualified on all counts. Connectors are quickly

inserted through these mounting rings and the panel.

As for cost, Tinnerman SPEED NUTS turned in the finest record by far! Easily 50% assembly savings over acceptable military substitute fasteners were provided by faster, easier, better SPEED NUTS.

Complex or simple, solving fastening problems is Tinnerman's specialty. New booklet, "A Story of Quality," reveals how we can help you. Write for your copy. TINNEMAN PRODUCTS, INC., Dept. 12, Box 6688, Cleveland 1, Ohio. In Canada: Dominion Fasteners Ltd., Hamilton. Distributor: Air Associates, Inc., Teterboro, New Jersey.



Flammability Rating

Based on the Hexachlorobutadiene Scale

Fluid	Flammability Reference Number
Aviation Gasoline	80
366 Base Stock	72
Kerosene	72
Oil, Aircraft Engine	
No. 2075	70
No. 1120	69
Ucon LB-400-X	65
Ucon 50-HB-280-X	64
Triethylphosphate	61
Skydrol	55
Tricresylphosphate	48
Butyl Tetrachlorophthalate ..	44
Monsanto Santicizer-140 ..	42
Monsanto Formulation	
No. 9	less than 30
Hexachlorobutadiene	0
Hydrolube (U-4)	0
Hollingshead H-2	0
R. P. M. Hydraulic Fluid	0

SOURCE: CAA report "Determination of Ignition Characteristics of Hydraulic Fluids Part II Flammability Reference Scales, Report #142".

the liquid and vapor phase, and to deactivate certain metals to arrest galvanic corrosion which would otherwise exist in the metal-to-metal contacts existing throughout the hydraulic system.

In spite of extensive and exhaustive laboratory testing, it was not until recently that Hollingshead learned what H-2 would do under prolonged service conditions. To date it has been used in Navy AD aircraft for two years and P2Vs for over one year. Lee said that H-2 functioned perfectly in all respects, when proper flushing technique was used.

► What It's Like—Here are some of H-2s characteristics and handling requirements as determined by flight and lab tests:

• Water loss due to evaporation was less than one percent, in a squadron of Naval airplanes operating for more than one year. There is absolutely no separation up to 160 deg. and boiling point is 228 deg.

• Accelerators and antioxidants of synthetic rubber "O" rings were not leached out as a result of continuous submersion in H-2. Being insoluble in the fluid, they were not dispersed but remained undissolved on the surface of the "O" rings.

• To insure complete protection from corrosion, stored parts should be completely submerged in H-2. If this is not feasible, they should be filled with



NEW STANDARD D-C CONTROL PANEL BUILT TO USAF EXHIBIT No. MCREXE22-89A

Here is the new standard d-c control panel. This compact lightweight panel embodies outstanding Westinghouse contributions to the regulation, control, protection and maintenance of d-c aircraft systems.

Many of the built-in features are the result of successful use in other Westinghouse panel designs . . . your guarantee of performance-proved equipment.

The new panel is of the simple plug-in type with a voltage regulator which can be quickly inserted or removed. Vibration and shock insulators are built into the unit around the center of gravity.

Accurate generator selectivity in a multi-generator system prevents hazards of generator over-excitation during overvoltage and overload conditions. Special design in the field relay provides trip-free operation . . . both mechanically and electrically.

For further information, call your nearest Westinghouse Office or write Westinghouse Electric Corporation, Aircraft Department, Lima, O.

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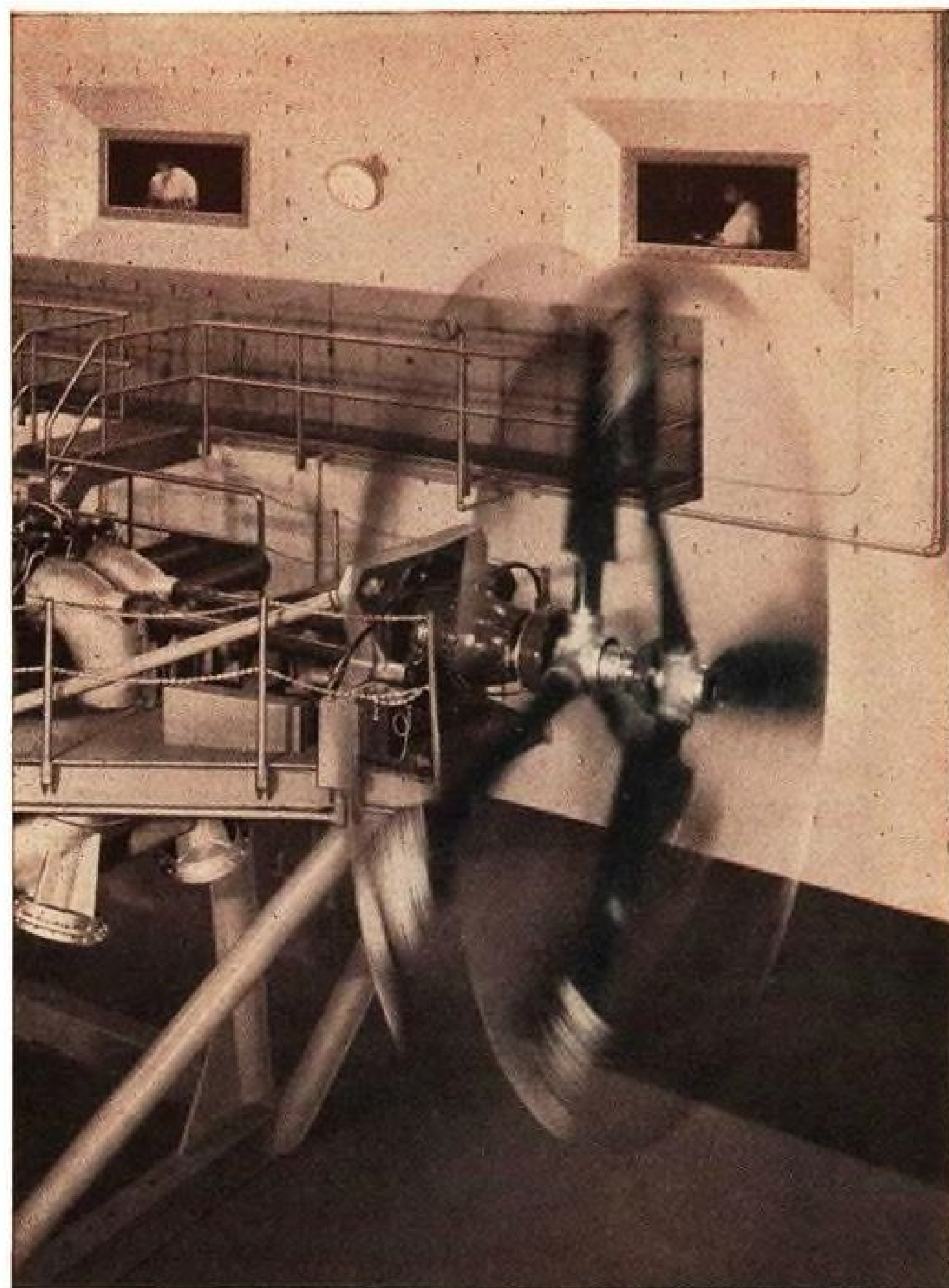
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dynamic turboprop
power!*

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the day of turboprop power!

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opens up a great and new era
when cargo ships, bombers and fighters
will fly at near- or super-sonic speeds.

*And they'll fly with range and performance
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a dream brought to life
on the drawing boards
of the men at Aeroproducts.*



Aeroproducts Propeller installed on Allison T-40 Turboprop

Aeroproducts, working in close contact with the
Navy and Air Force, has pioneered propeller
design for turboprop power... has, by its research
and never-ending experimental work, blazed the
trail of propeller driven supersonic speed for all
others to follow.



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that utilize the full power, the
enormous thrust of the turboprop
engine and Aeroprop combination
—and set wonderful new stand-
ards of aircraft performance.



*Building for today
Designing for tomorrow*

Aeroproducts



AN-O-7 (MIL-F-6083), drip-drained
and plugged. Hollingshead chemists are
working on a storing fluid companion to
H-2 which will be available soon.

- **Care should be taken not to spill H-2** on chromate primers and finishes, the fluid being a fairly good paint softener. If spilled fluid is wiped or rinsed from painted surface within three to four hours, no damage will result. Painted areas can be protected with AN-L-37 lacquer.

- **Storage is no problem** provided fluid is kept in closed containers and is not subjected to unreasonably high temperatures.

- **Pipe sealants and dopes** should not contain metallic constituents such as lead. Such sealants would be dissolved and dispersed throughout the system by H-2, possibly clogging filters and suspension in the fluid could result in damage to moving parts.

- **Precautions should be taken not to contaminate H-2** with ionizable materials. Principal effects of such contamination is reducing the high temperature physical stability, effectiveness of the anti-wear additive and, possibly of the corrosion inhibitors.

- **Inorganic salts and/or acids** which may be contained in leather back-up rings should cause no concern because of the minute quantities compared to the volume of fluid.

- **Numerous tests** exposing a variety of electrical wire coating and insulations to H-2 revealed that the fluid had no deleterious effect on the materials provided they were properly fabricated. Wiring unavoidably exposed to fluid should be vinyl coated.

- **Fluids used to clean parts** exposed to H-2 should not be chlorinated hydrocarbons (carbon tetrachloride, tri-chloroethylene) which would undergo hydrolysis and promote serious corrosion. If parts have been cleaned with these or other chlorinated solvents, they must be immersed in a 5 percent chromic acid bath at 140 deg. F. for 20 min. Stoddard Solvent P-S-661 should be used.

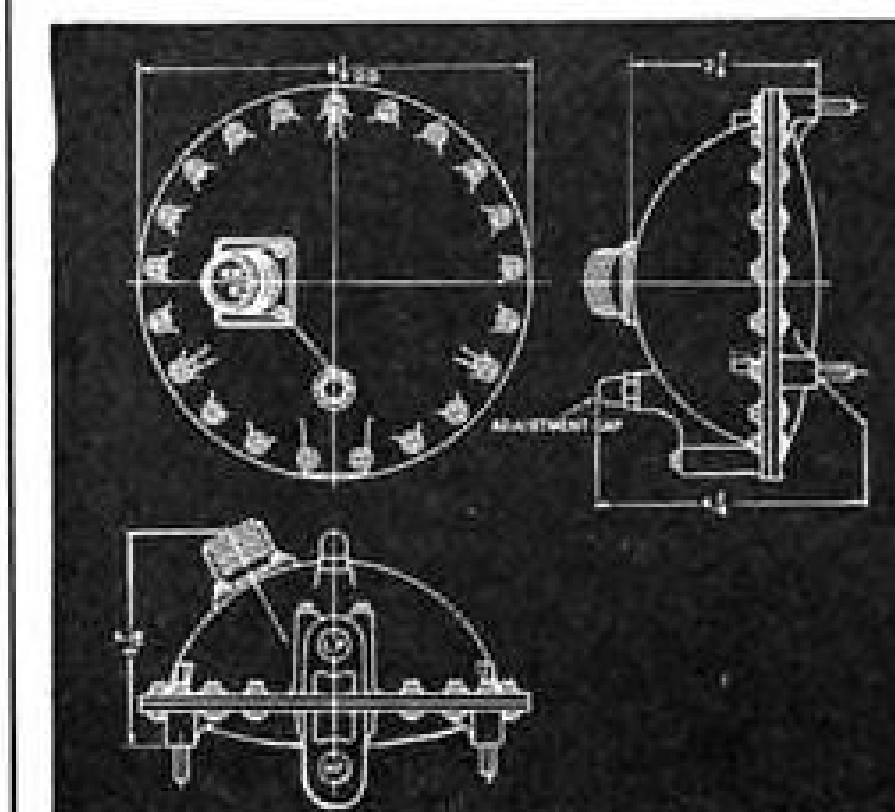
► **Other Products**—Hollingshead produces a variety of products for the aviation industry. Among them: corrosion preventatives, anti-seize compounds, aircraft cleaning products, protective coatings, aluminum polish, paint remover and carbon removal compounds. Met-L-it is a pulverized aluminum filling material, has proved useful to fill over dented leading edges.

Among latest developments are new anti-detonant injection (ADI) fluids for jet engines.

Hollingshead's New Products division, headed by A. E. Moore, is credited with having led the work in the formulation of H-2 non-flammable hydraulic fluid, under the direction and guidance of Dr. Esposito.

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Greater safety for your planes is the goal of every Aerotec designed control. To cover every possible contingency, our instrument specialists have developed hundreds of different types of controls. Below are a few typical examples of Aerotec pressure switches covering a host of applications. Aerotec is supplying thousands of controls of these types to meet today's demands. They are playing an important part in raising the high standards of safety on commercial and military aircraft.

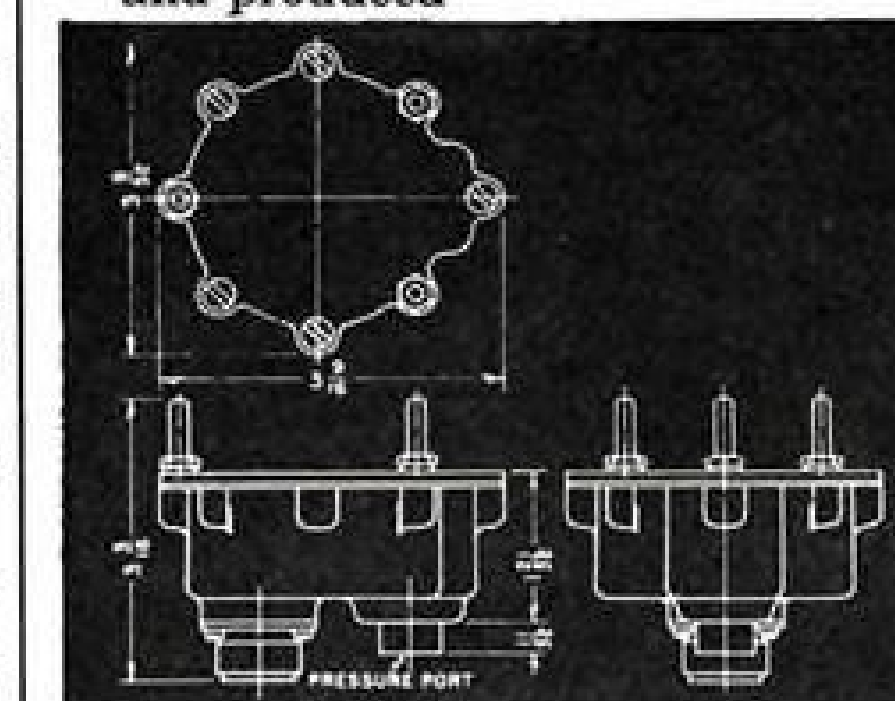


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Differential Type for Ram Air
Sensitivity: $\frac{1}{16}$ " H₂O
Actuating Pressure Range: 1.50" H₂O to 3 psi with differential of 20% of applied pressure
Electrical Rating: 28 VDC 5 Amp. inductive
Complies with A.F. environmental specification 41065-B
For stall and flap warning applications and as safety switch for cabin de-icing heaters.

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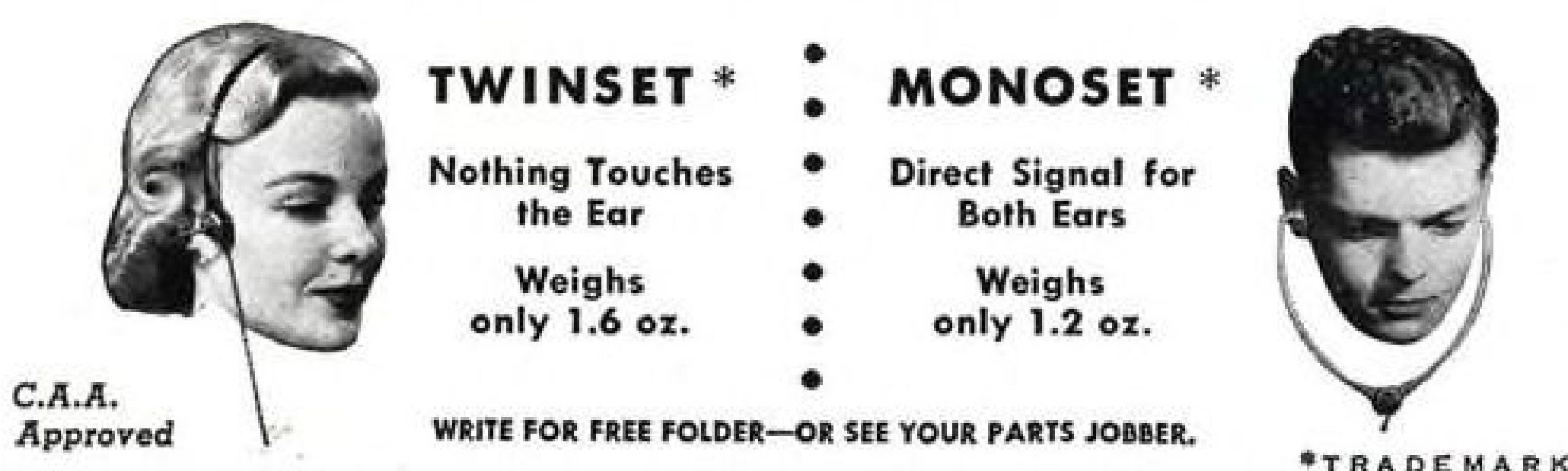
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Tank Stripping

Why one airline kept job at home, and how it did the work.

A case record of one airline that decided to do its own stripping and re-sealing of DC-4 integral fuel tanks is furnished by Braniff International Airways.

R. A. Flume, Braniff Maintenance Engineer, has disclosed to AVIATION WEEK data concerning this tedious but necessary operation which should serve as a useful guide to other carriers faced with the same problem. Following are the most pertinent facts as outlined by Flume.

► **Ground For Decision**—Braniff made its decision, involving its fleet of nine DC-4s, after getting bids from outside firms that varied in the extreme. Two factors bearing on the airline's decision to do the job itself were: plane would not be removed from base for three weeks; and "Group Operations" work could be performed simultaneously with tank work. Also, although an intangible asset, crews would be trained for future gas tank work.

Stripping compound chosen was Turco 2822, (AVIATION WEEK, June 5, 1950, p. 43). This material can be free-rinsed with warm or cold water, is capable of being re-used, is effective on most thiokol and Buna-N types of synthetic sealants, and has very little dissolving action on synthetic rubber. It breaks the bond between sealant and tank resulting in minimum stripper contamination and greater ease in removing sealant residue from the tank.

Factors determining whether spray-on or fill-and-drain methods of stripping would be used were:

- **Spray-on** requires less material (about \$600 per plane) but more man hours. All materials used are expended.
- **Fill-and-drain** requires approximately \$1,200 of material per plane for a fleet of nine. But, during the dwell time (time tanks are filled during which the stripper does its work), personnel could be deployed to do other work required by Group Operation that is going on concurrently.

Braniff chose the fill-and-drain method.

► **Time To Get Ready**—Preparing a plane for stripping is a big job, according to Flume. Outer wing panels have to be removed, exterior lines disconnected, outlets plugged. Tank access doors are replaced with jiffy doors and baffles straddling the doors are removed—the latter expedites rinsing away the stripper.

Stripper is drawn from 1,000 gal.

Fenwal dynamic fire and over-heat detection meets exacting needs of modern aircraft



Jet or propeller driven, there's no risk of overheating without warning when Fenwal Over-Heat Detectors are installed. These detectors are constantly, dependably, accurately on the job.

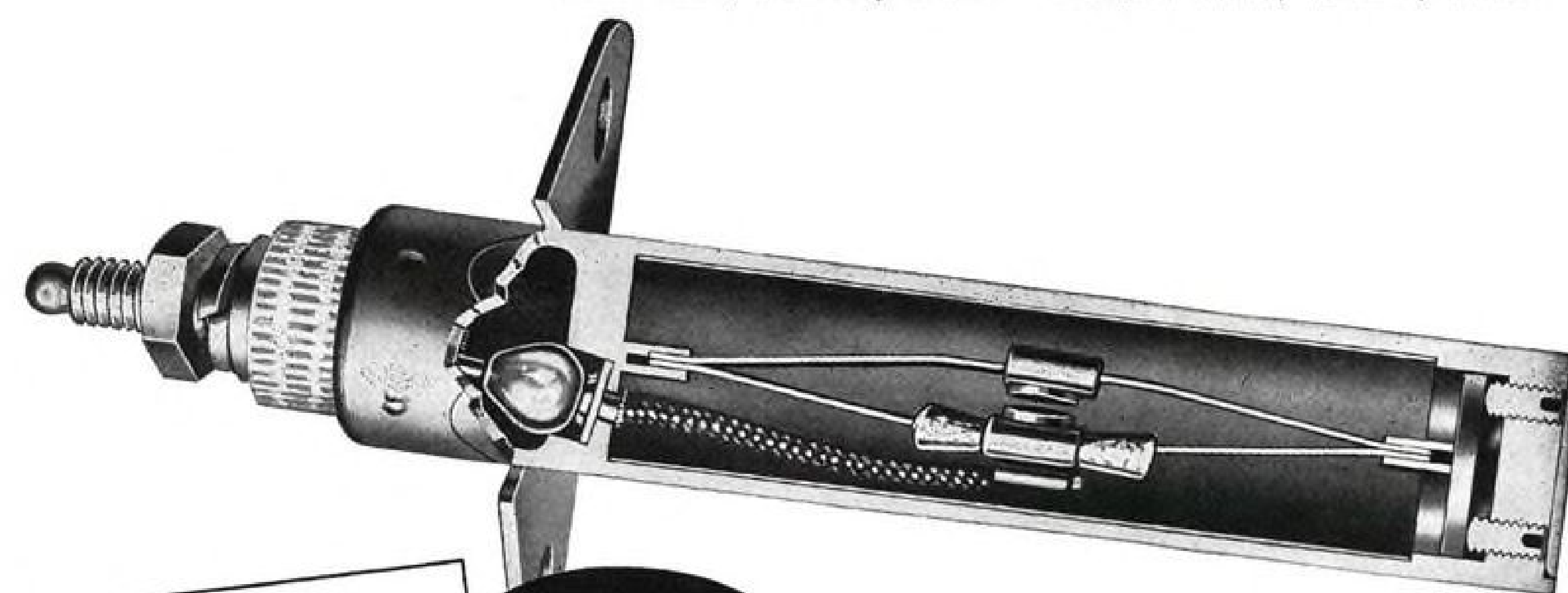
Built to withstand the extremely high and low temperature conditions of modern aircraft, they function only when the air temperature reaches the alarm point. No lag. No false alarms. You get positive, precise operation at the predetermined air temperature point only.

What's more, sensitivity is con-

stant. *Fenwal Detectors cannot be and do not have to be desensitized for varying conditions.*

Hermetically sealed, the Fenwal Fire and Over-Heat Detectors are low in cost, offer no maintenance problem, require no bulky panels, relays or supervisory instrumentation. Easily installed by any competent mechanic. Single terminal allows no errors of connection.

For complete data on how these detectors can be built to meet your particular requirements, write us direct. Fenwal, Inc., 127 Pleasant Street, Ashland, Mass.



THROUGH PROPER SELECTION of alloy metals of shell and strut assembly Fenwal engineers design dynamic fire and over-heat detection for specific aircraft needs. The shell is the temperature-sensitive, activating element. Units comply well within CAA Technical Standard Order C-11 in accordance with the SAE, specifications AS-401.

Fenwal Temperature Control Engineers

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Rusco Seat Belts Put Safety First...



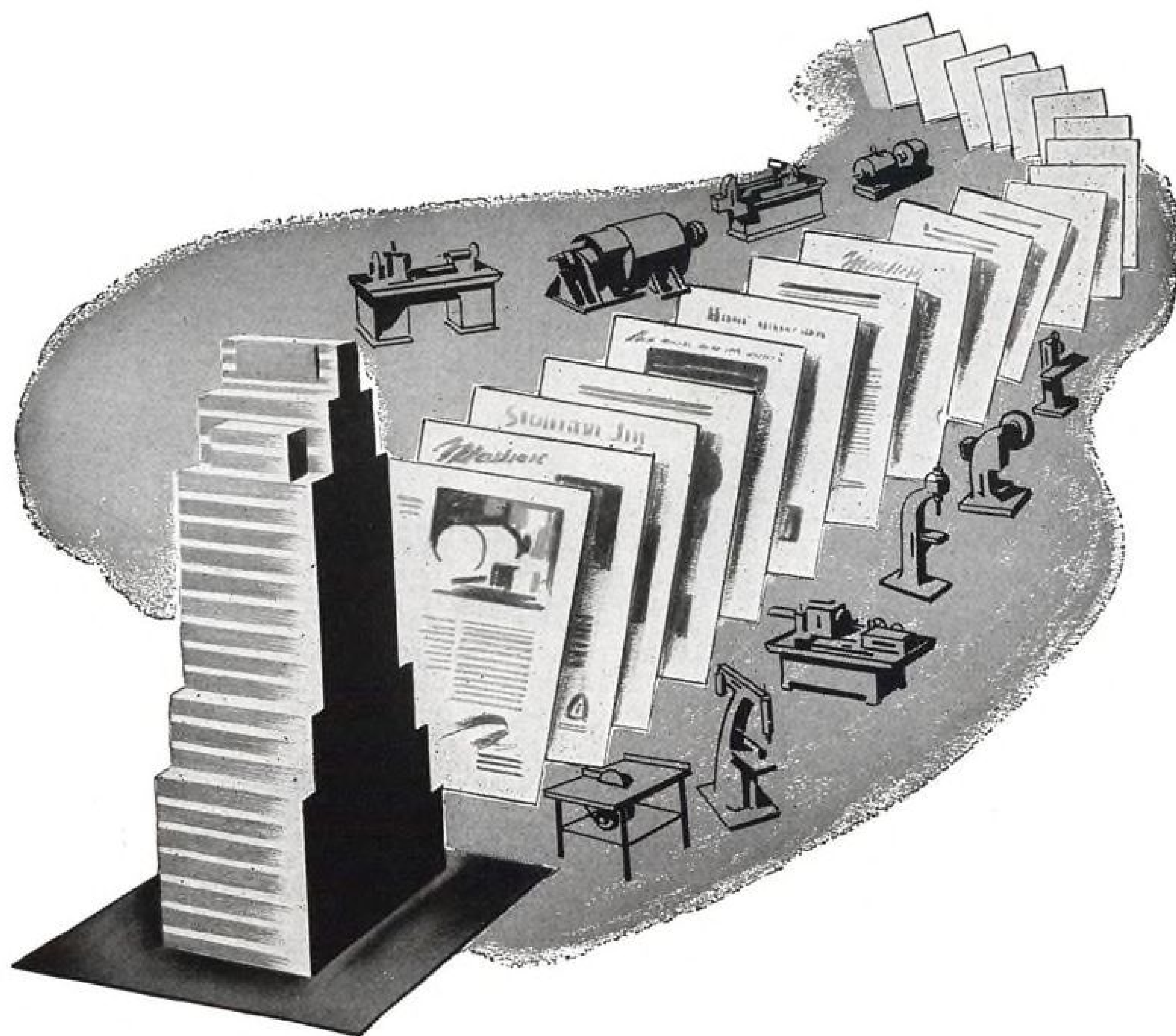
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2. **Dependability** . . . Positive Toggle Grip—Meets C.A.A. Tests.
3. **Simplicity** . . . instantaneous adjustment and release.
4. **Lightness** . . . 50" belt assembly weighs less than a pound.
5. **Foolproof plastic tip** . . . nothing to pull off, nothing to fray.
6. **Shock resistance** . . . no treacherous slipping.

This Rusco Belt is considered "Standard" for light planes. Other Rusco belts for every requirement. See your aircraft supply house or our nearest office.



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storage tanks and pumped through inlets in the jiffy doors; this takes about eight-man hours. Dwell time varies from 36 to 72 hrs. Air-driven impellers within the plane's tanks to agitate the stripper reduce dwell time and greatly improve stripping results.

Tank access doors, submerged in the stripper, are used as control units to determine progress stripper is making in the tank. When they indicate that the job is done, tanks are gravity-drained into storage tanks and wing tanks are rinsed with warm water. If all sealant is not removed, process is repeated until it is.

► **Structure**—Sound structural rework is important. Braniff estimates that about 90 percent of a tank's fuel retention qualities are provided by its rivets and other structural members. It stresses the two-fold gain of permanent, fuel-tight rivets and improved structural strength as the results of good riveting practice.

Installation of a new Douglas Aircraft door landing doubler and a non-stress door cured a chronic leak path between doubler and skin at the door and alleviated the troublesome cracking (and subsequent delays) of existing doublers.

Final cleaning is accomplished with a liquid solvent having a low evaporation rate and application of a phosphatizing compound to slightly etch surfaces on which sealant is to be applied.

If the tanks are mechanically and chemically clean, resealing begins. To facilitate this job, Braniff removes all internal tank baffles.

The airline used Minnesota Mining and Manufacturing Co.'s EC-801 sealant, meticulously applied to all surfaces. Great care was taken to work all air pockets out of the fillets. EC-801 is coated with EC-776 to protect it from detrimental action of fuel. EC-776 also gives good protection against the possibility of corrosion.

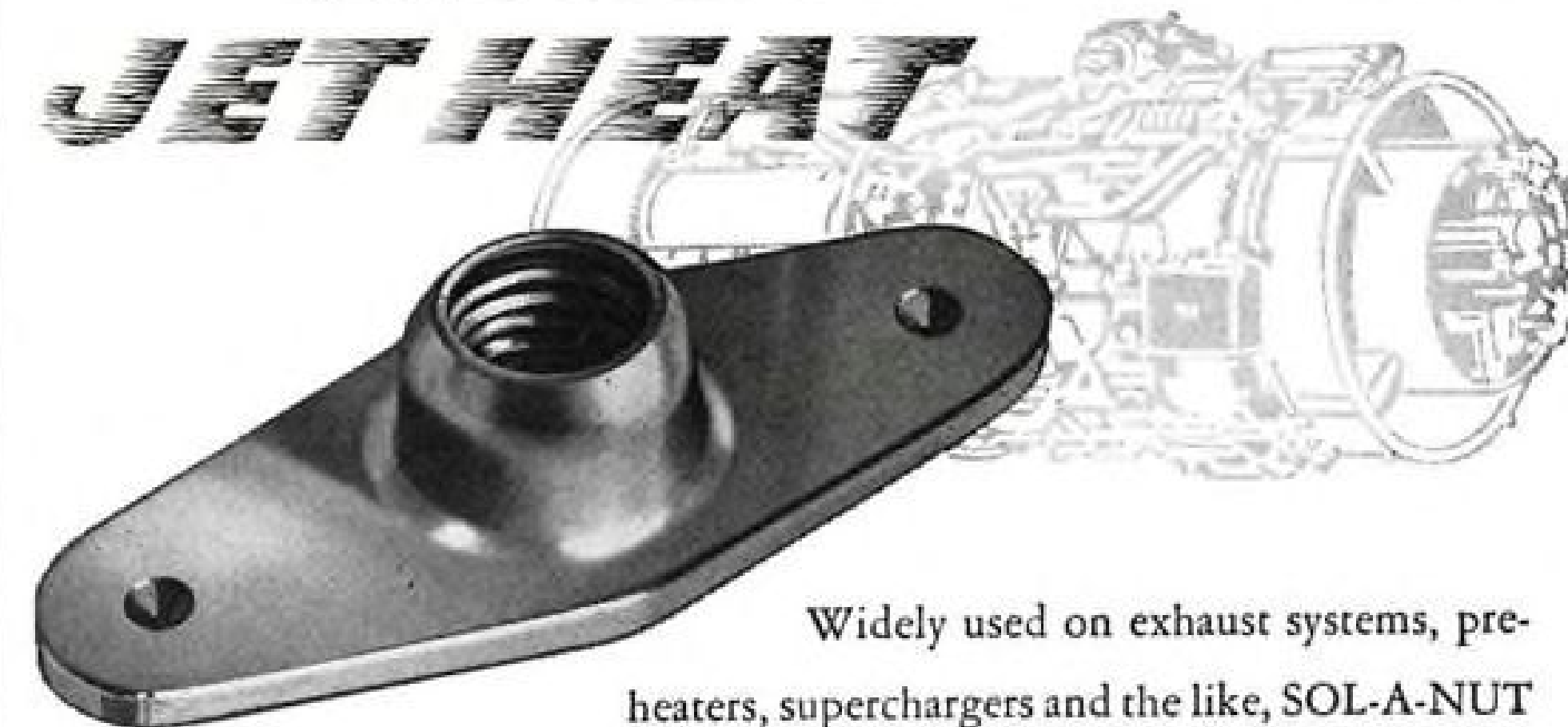
But, prior to its applications, tanks should be pressure-tested at 2.5 lb./sq. in. for 30 min. with no manometer drop to insure a perfectly leak-proof tank.

► **What It Cost**—Braniff estimates its cost for the whole job at \$12,000 per plane for ships without outer wing tanks and \$15,000 for ships with outer tanks.

Cost distribution is approximately one-third each for preparing the plane for stripping, plus actual stripping; structural re-work; and resealing and testing the tanks.

Flume says that Braniff has currently resealed three of its DC-4s. Since resealing, the planes have flown without any leaks being detected. Braniff feels that the investment made in resealing these tanks will certainly be money well spent towards a trouble free fleet of aircraft.

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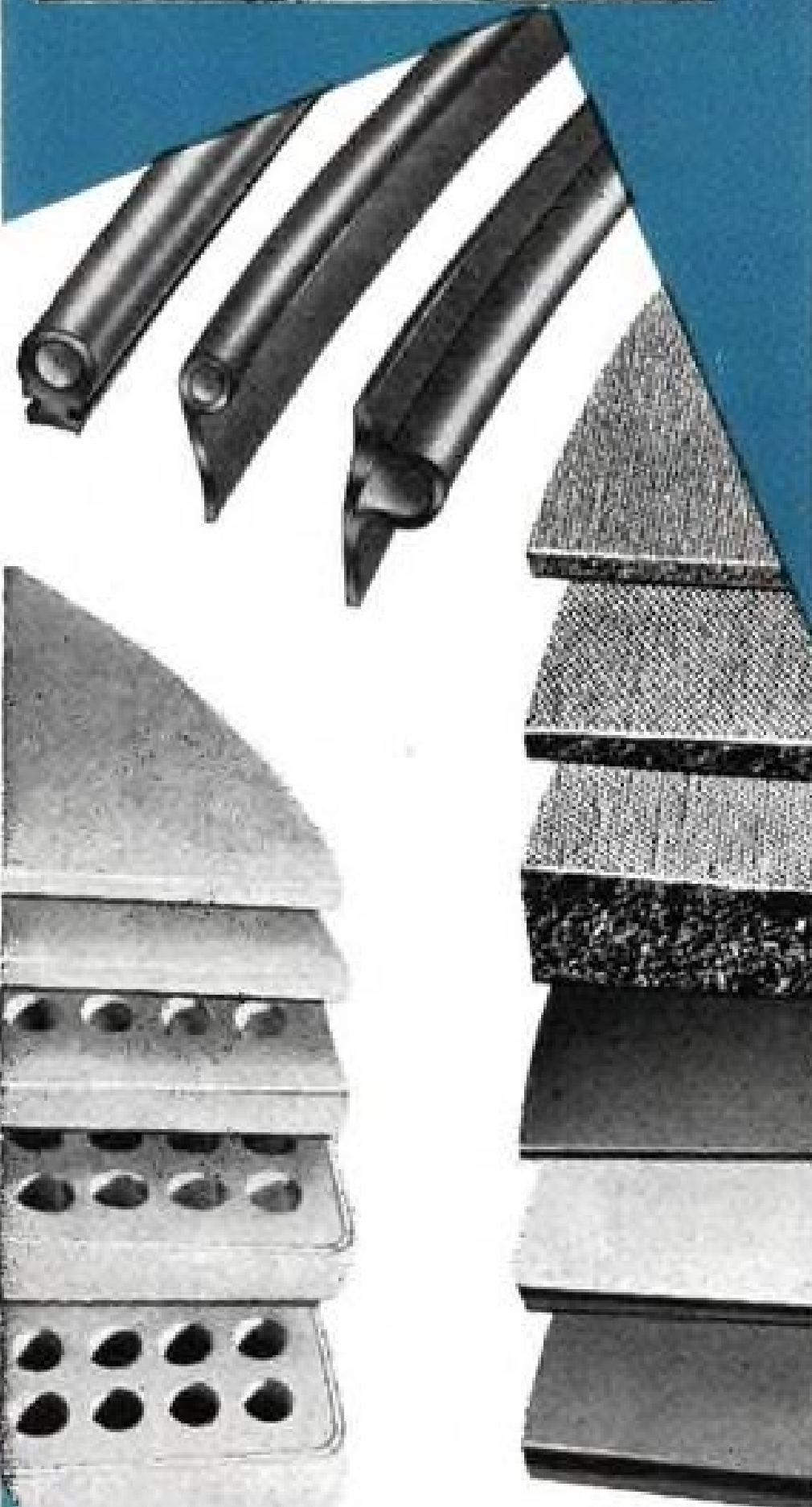


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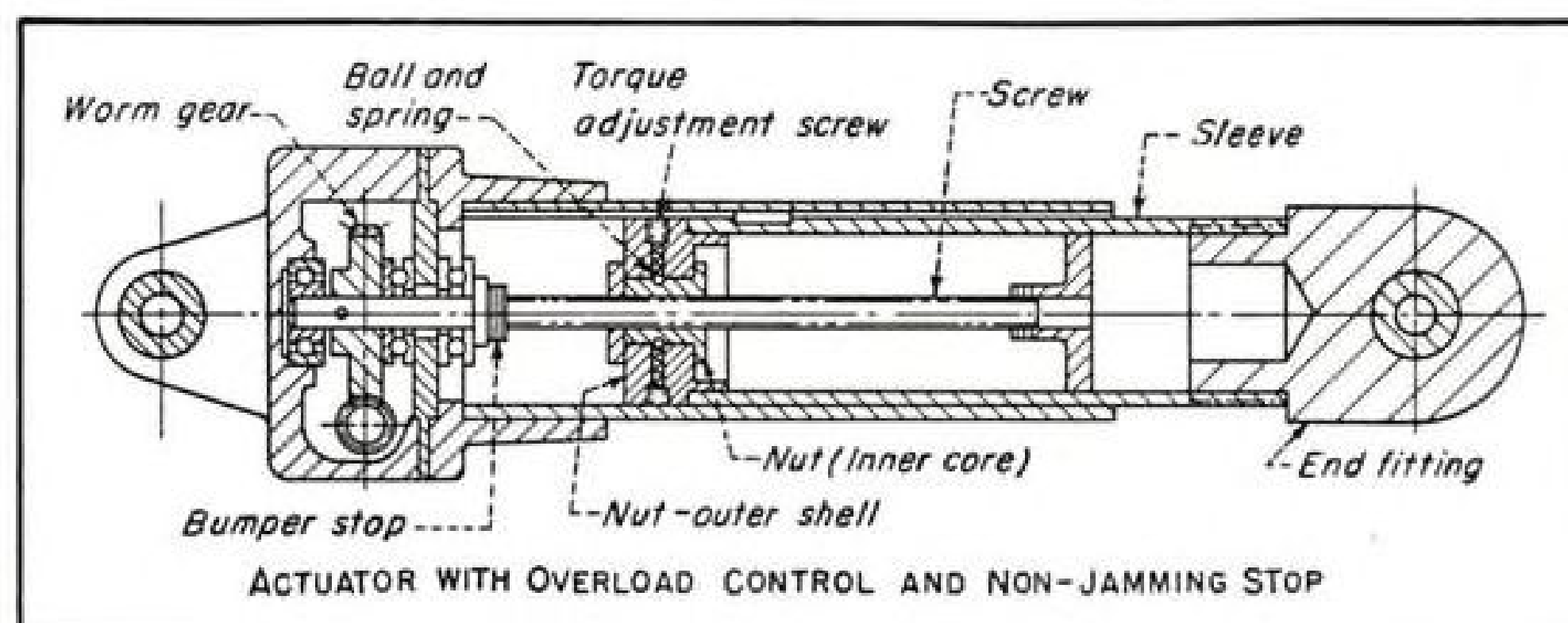
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NEW AVIATION PRODUCTS



Non-Jamming Stop When Limit Switch Fails

A new type of non-jamming stop and overload control designed to prevent damage to electro-mechanical actuators in event of limit switch failure has been developed by the Overload Control Co.

The control is a simple mechanical device integral with actuators marketed by the firm. It adds little to the overall weight of the actuator, according to the maker. Patents are pending.

► **Split Nut**—Essentially, the safety device is an over-riding mechanism (see drawing). It consists of a nut split into two sections—an outer shell and inner core. These normally are locked together by spring-loaded ball bearings (housed in outer shell) pressing into detents in the inner core. Outer shell of the nut is welded to actuator sleeve which mounts the end fitting. Inner core of nut is threaded on the screw which is turned (via worm gear arrangement) by electric motor.

Normally, the complete nut moves back and forth linearly on the turning screw, retracting or extending the sleeve to which it is attached. In either direction of movement, a limit switch normally stops the motor when full travel has been attained.

► **Limit Switch Failure**—This is what

happens if the limit switch fails: The electric motor continues to operate and turn the screw even though full travel has been reached. Something has to "give" somewhere. Ordinarily, without a gadget to "pinch-hit" for the limit switch, a pin would shear or other damage would occur. But in this case, the nut comes to the rescue. It hits the positive stop in the actuator (special bumpers soften the impact). The screw, still turning, wrenches loose the inner core of the nut by forcing ball bearings out of detents. Result: The actuator motor continues to operate, turning the screw with the inner half of the nut. The outer half of the nut remains stationary and no damage occurs. Also, the actuator can be continued in use until the plane reaches the ground and the limit switch is repaired.

Reverse rotation of the screw causes the ball bearings to drop back into the detents and lock the nut together again for normal operation. Spring-loading of the bearings can be adjusted so they release at the specific torque desired. The inner core of the nut is hardened and ground to prevent wear. Address: 260-63 Langston Ave., Glen Oaks, L. I., N. Y.



Small Potentiometer

A two-in-one precision potentiometer, "originally developed to overcome a space and weight problem in

a guided missile," now has been placed on the market for other aviation applications by Electro-Mec Laboratory.

The unit (weighing .79 oz.) has two resistor sections and can be used where an exceedingly small mechanical force must be converted into two equivalent electrical voltages. With current carrying capacities up to 100 milliamperes, it provides two outputs sufficient to operate simultaneously controlling and recording or indicating instruments without amplification. The company points out this latter feature makes possible substantial savings in size, weight and complexity of such installations.

To meet particular needs, the two resistor sections in the potentiometer

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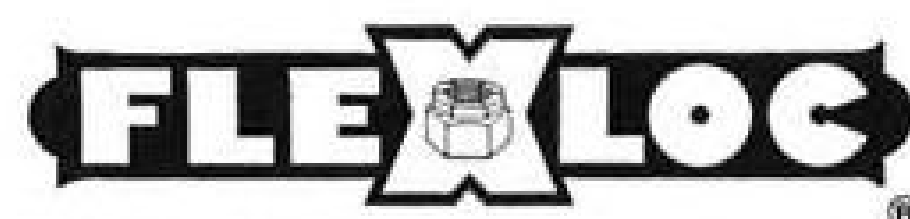


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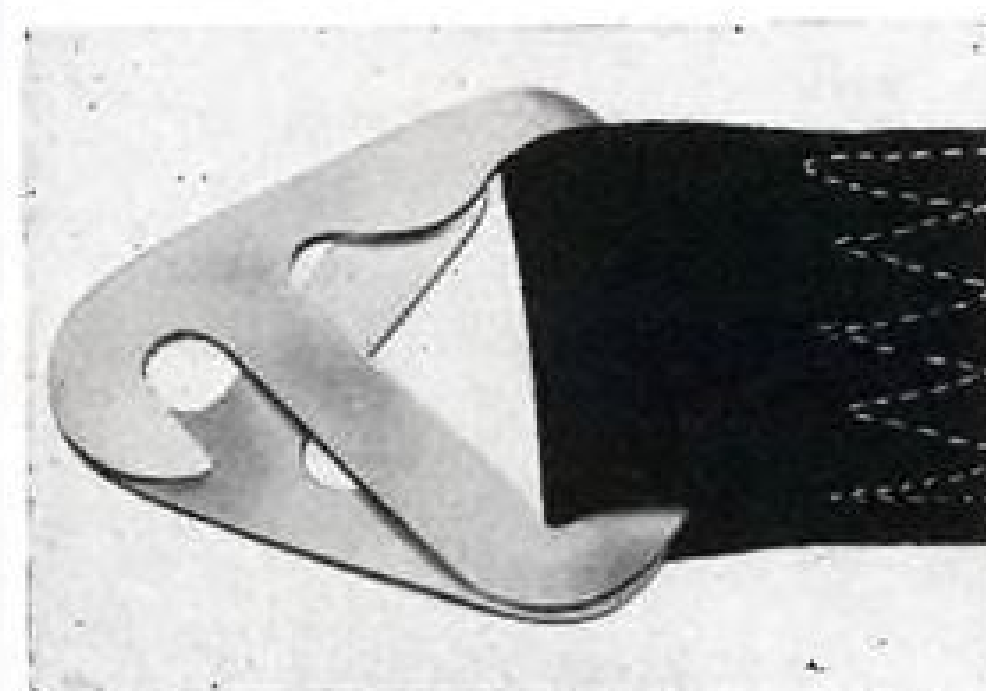


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are offered in values ranging between 50 and 60,000 ohms each with accuracies up to .065 percent. Shaft torque can be as low as .013 oz. in. Satisfactory operation at vibration frequencies up to 425 cps. has been verified by actual flight tests, the company reports.

The potentiometer is about 1 1/2 in. long and 1 1/4 in. diameter and mounts a shaft of .078 in. diameter. Address: 225 Broadway, New York 7.



Attachment Hooks

Seat belts can be quickly attached or removed from seats with new "Brown-Line" attachment hooks marketed by Gordon D. Brown & Associates.

Hooks have no springs or intricate parts, consisting simply of two opposing sections which interlock over attachment pins. Once in position, they are locked by the seat belt webbing. Hooks are heat-treated, cadmium-plated chrome molybdenum steel, ruggedly built to meet new strength requirements of CAATSO C-22, the maker says. Address: 407K Commercial Center St., Beverly Hills, Calif.

ALSO ON THE MARKET

Code bands of metal are automatically stamped and applied to electrical wire leads at rates up to 1,200/hr. with new, electrically-operated wire banding machines. Bands feed into machines in strip form from spools. Made by Aircraft-Marine Products, Inc., 2100 Paxton St., Harrisburg, Pa.

Proportioning device for wetting agents used in fighting fires, simplifies use of agents by directly introducing into hose lines controlled percentage concentrations for any type of fire. Made by Solvoid division of American Marine Paint Co., 311 California St., San Francisco.

PCA-100 penetrating and sealing anti-rust paint can be applied on rusted surfaces, is said to be equally effective in preventing rust on new metal or stopping rust action on metal already corroded. Made by Paint Corp. of America, Fidelity Bldg., Cleveland 14, Ohio.

FINANCIAL

Relative Market Action

Listed Aircraft Common Stocks

Company	1946 High	1951 High	June 30, 1951 Close
Beech*	16	13 3/4	12
Bell	36	30 1/2	25
Boeing	35	56	39 1/2
Convair	34	21 1/2	15 3/8
Curtiss-Wright	12	12 1/2	8 3/4
Douglas*	55	53 1/2	44
Fairchild Engine	8	9	6 1/2
Grumman*	13	27 3/8	20
Lockheed	45	42 1/2	34 1/2
Martin	46	21 3/8	13 1/2
No. American	17	19	13 3/4
Northrop	15	17	11 3/8
Republic	25	16 1/2	11 1/2
United Aircraft*	31	34 1/2	26 3/8

Notes: No adjustments made for cash dividends.
All fractions omitted for 1946 quotations.
* Adjusted for all stock split-ups.

Aircraft Stocks Reflect War News

Market action repeatedly has ignored real conditions governing state of industry as latest moves show.

Despite its record of recent years of sustained growth and earnings, the aircraft group remains clearly labeled in the public mind as a "war baby." This was amply demonstrated by the recent market relapse suffered by aircraft shares as negotiations for a Korean truce developed.

Aircraft equities, by declining sharply, felt the immediate market reflex in anticipating a curtailment of military procurement. This is nothing more than the reverse of market sentiment which existed as the Korean war broke out a year ago.

At that time, aircraft securities were bid up very sharply and continued at high levels into 1951. This is indicated by the accompanying table. It can be seen that the majority of issues shown reached market prices this year surpassing the peak quotations established during 1946. It was in the first postwar year that aircraft shares, for the most part, recorded all-time highs unchallenged until very recently.

► **High Hopes**—The Korean invasion of last June sparked considerable interest in aircraft equities. It was not very long before backlogs were holding out the promise of sustained operations for a number of years to come. It was not unusual for individual companies to show unfilled orders aggregating from

five to ten times the amount of their last annual sales.

Little regard was accorded the element of how much and how orders on the books would be translated into profits. Production problems, tooling-up procedures, excess profits taxation, renegotiation and other deterring elements were given a going-over very lightly as the main emphasis was focused on the new aircraft orders announced almost daily.

In the same manner, the news of a truce in Korea set up illusions of widespread cancellations of aircraft procurement. On sober reflection, this expectation is no more correct than the vision of quick and sharply increased profits which greeted the aircraft group almost a year ago.

Nevertheless, the fact remains that the news from Korea served to put the price of aircraft shares up starting a year ago and was the cause for their recent decline.

This becomes very clear in the accompanying table.

► **Ups and Downs**—Douglas, helped market-wise by a two-for-one stock split, approached its peak quotations of 1946. Its recent decline, marketwise, was nothing more than the adjustment of previous excesses of the Korean stimulation.

Fairchild Engine, North American, Northrop and United Aircraft also represented equities which established all time new peaks in market quotations earlier this year. Their recent adjustments have also been rather abrupt on the downside.

The equities of Beech, Bell and Lockheed just barely reached their 1946 peak quotations during their recent boom. Ironically, the basic position of all three of these companies today is vastly improved over their prevailing condition at the end of World War II.

Grumman established the distinction of bettering its 1946 market quotation long before the Korean incident and remains with the best performance for any aircraft equity. Early this year, the Grumman shares reached a market value of more than double that of the 1946 peak. Moreover, at June 30, 1951, after a sharp decline had set in, Grumman still sold higher than its 1946 peak. It was the only aircraft equity with this distinction. (Boeing's best price prior to 1951 was in 1939 and is now below that level).

What is not generally appreciated is the fact that those companies showing excellent earnings for 1950 did so from bookings that had very little, if anything, to do with awards received as a result of Korea. The orders placed late last year and which were largely inspired by Korean events, would normally begin to show up in deliveries later this year. It is only necessary to view deliveries of the aircraft industry for the 1951 first quarter to appreciate the time element necessary to translate bookings into sales.

► **Slow, Maybe, But Certain**—With tooling up in many instances largely completed, augmented aircraft deliveries should soon be in evidence. Largely due to the delays which beset production programs, the aircraft industry is behind in the original schedules set by the military. This has been convenient for the Department of Defense which may find it desirable to slow down production so as to permit the incorporation of the latest technological designs and avoid a too-rapid build-up of planes that may become obsolete.

But this does not mean that the huge aircraft procurement program is to be scuttled. It is known that the 15 major aircraft companies have prime contracts totaling \$7.6 billion. This group and others will share in a projected \$14 billion in aircraft procurement expected to come from the 1952 budget.

Any slow-down that may eventuate will simply mean that aircraft backlogs will now be spread over a greater period of time. In most instances, this diffusion of business will still leave aircraft companies with indicated volumes of sales at relatively high levels.

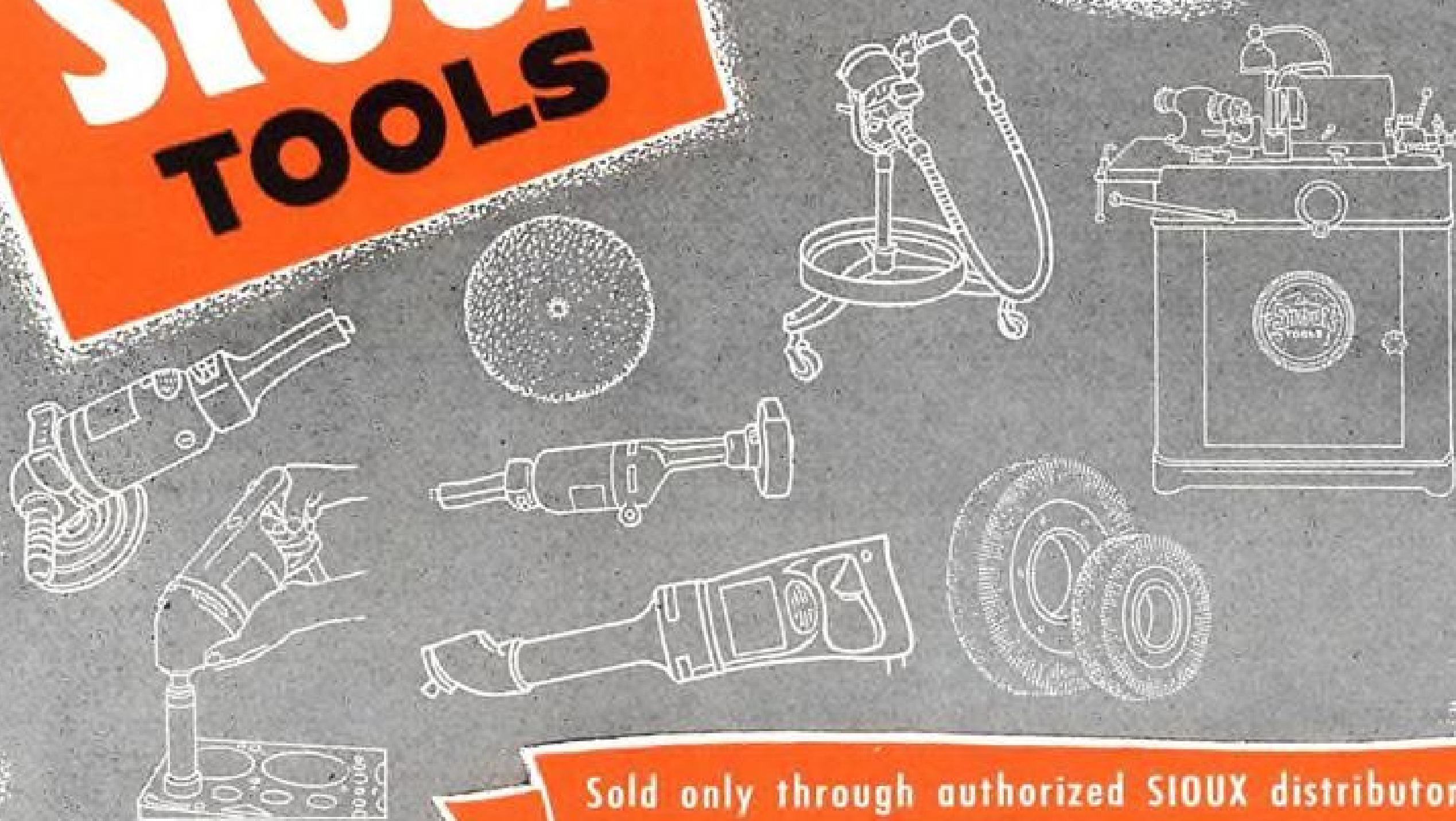
—Selig Altschul

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AIR TRANSPORT



MILITARY TRAVEL, such as these soldiers returning from leave, builds nonsked boom.

Future Looks Better for Nonskeds

Now they can get contracts to fly military personnel, and have found a champion in a Senate committee.

Two events have eased the threat to 55 non-scheduled airlines under business death sentence by Civil Aeronautics Board policy. If it sticks by its past policy, CAB will put them out of business one-by-one, as they come up for individual exemptions, if they have flown over three non-military flights a month—and 98½ percent of them have done so. The two events were:

- **Defense Department** authorized all military transportation officers to contract with the nonskeds for official military travel.
- **The Senate Small Business Committee Report** urged CAB to foster, not kill, the nonsked industry.

These two events followed another temporary windfall for the nonskeds—a court injunction against CAB enforcement of a regulation that would have limited all surviving nonskeds to three flights a month, to take effect this month.

► **Still Time to Die**—But despite these three recent encouragements—one from the military, one from the Senate and one from the federal court—the nonsked airlines still are not assured of fair economic weather even while now doing a business of close to \$100 million a year.

CAB in the past has declared it will revoke the letter of registration of any nonsked that performed route-type operations—defined as more than three trips a month. But the Board's mem-

bers have changed since that policy first was announced.

AVIATION WEEK asked new CAB Chairman Donald Nyrop what he thought of the Senate committee report lambasting the CAB. Nyrop pointed out that, in the first place, he himself had not yet seen the final report; in the second place, from what he heard of the report it failed to point out CAB's problems; and, in the third place, the present five-man Civil Aeronautics Board is a different one from the one that set the three-trips-a-month limitation on nonsked operations.

Only two of the five-man board were in on the original CAB policy formation—Oswald Ryan and Josh Lee. Chairman Nyrop and members Joseph Adams and Chan Gurney joined the Board later.

Ironically, in 1946 the nonsked airline industry was born with official sponsorship. CAB granted all nonskeds a blanket exemption to operate, War Assets Administration urged them to buy war-surplus aircraft at low prices, Veterans Administration and the Reconstruction Finance Corp. made money available, and other administrative agencies helped. Under these government stimuli hundreds of war-veteran pilots got in business as "large irregular carriers".

► **Military Business**—Last month and this, the nonscheduled airlines have been doing more business than ever be-

fore, primarily for these two reasons:

Soldiers on furlough, and the nonskeds' rapid recent progress in promoting air coach travel by middle and low income families. Business is so good now that many nonskeds want to buy more planes. But they can't raise cash. Banks won't lend a dime to a carrier that CAB is officially committed to put out of business.

Air Coach Transport Assn. opened up furlough business for the nonskeds this spring after working since the first of the year to get CAB accreditation. The Military Traffic Service of the Defense Department required this before it would permit nonskeds to have official representatives at military bases, along with scheduled airline, bus and train representatives.

The nonsked furlough operation went into high gear about a month ago, providing furloughed men with charter-type flights direct to an airport near home and back to post again.

The Military Traffic Service told the nonskeds in effect: Do a good job on the furlough flights, and we'll let you in on the official military travel.

In its first month of running furlough operations, the Air Coach Transport Assn. has already received special commendations and letters of thanks from transportation officers of the many camps ACTA flights have served. So now the nonskeds are going to contract for official military travel as well.

► **Official Standing**—Military orders have gone out to all local military transportation officers to contract official travel with the nonsked associations just as they have always done with the associations of the certificated airlines, the railroads and the bus lines.

The military works only through the accredited associations to schedule and contract transportation—not through the individual companies. The Air Coach Transport Assn. was formed by the domestic nonskeds less than a year ago. Another association was formed by the international nonskeds, the Independent Military Air Transport Assn.—IMATA.

The two associations book military passengers for each others' member airlines. ACTA has regional directors with offices at La Guardia Airport, New York; Miami International; Chicago; Junction City, Kan.; San Francisco; and Burbank. ACTA has about 25 bonded military traffic representatives at various camps such as Port of New York, Fort Dix, Camp Kilmer, Fort Devens, and Fort Monmouth in the New York area. Head office of ACTA is in Washington.

The nonskeds plan on much more business growth ahead, especially military. ACTA is now installing teletype circuits to connect all regional offices. And the head office is moving into the

U. S. Nonscheduled Airlines 1950 Operations

Carrier	Revenue Passenger Miles	Cargo Ton Miles	Gross Revenue	CAB Approved or Dis- approved	Carrier	Revenue Passenger Miles	Cargo Ton Miles	Gross Revenue	CAB Approved or Dis- approved
Aero Finance Corp.	9,784,334		355,232	D	Meteor Air Transport, Inc.	291,710	313,685	\$328,812	D
Air America, Inc.	3,772,517		224,172	D	Miami Airlines	16,411,990	970,793	435,075	D
Air Services, Inc.	2,453,717		65,394	NA	Missouri Airways	349,115	60	72,508	D
Air Transport Associates	16,936,771	1,876,194	911,417	D	Modern Air Transport	33,172,988		779,680	D
Airline Transport Carriers	1,403,958		874,527	D	Monarch Air Service	19,395,364	27,787	1,001,833	D
All-American Airways					Nationwide Air Transport	11,821,391	1,214,936	750,616	D
(Miami)	545,344	1,712	19,346	NA	New England Air Express	22,754,687	83,410	741,796	D
American Air Export & Import	20,460	363,180	992,385	D	North American (Oxnard)	129,212,200		3,147,562	D
American Air Transport, Inc.	18,585,970		418,890	D	Ocean Air Tradeways	3,086,212		303,778	D
American Flyers, Inc.	1,820,237	101,051	83,531	A	Overseas National Airways	12,674,000	4,798,000	2,289,727	NA
Artie Pacific, Inc.	31,160	718,463	123,893	D	Pearson Alaska, Inc.	2,841,040		111,247	NA
Argonaut Airways, Corp.	7,883,674	25,855	148,482	D	Peninsular Air Transport	21,686,671		723,188	D
Arnold Air Service	2,586,208	128,446	129,213	D	Quaker City Airways	625,619	366,737	79,577	A
Arrow Airways	46,006,498		969,171	D	Robin Airlines	21,249,834		734,391	D
Associated Air Transport	100,559	59,390	12,079	D	Royal Air Service	1,799,419		68,524	NA
Aviation Corp. of Seattle	11,902,139	72,773	268,271	NA	SSW, Inc.	1,465,321		30,139	A
Blats Airlines, Inc.	2,583,738		72,282	NA	Scott Aero Service (U. S. Aircoach)	7,850,311		337,032	D
Capitol Airways, Inc.	1,213,927	110,765	335,721	A	Seaboard & Western Airlines	46,253,032	9,021,243	5,516,086	D
Central Air Transport	6,393,040		267,132	D	Standard Air Cargo, Inc.	3,306,456	13,500	184,794	A
Continental Charters, Inc.	24,055,465	542,230	872,408	D	Stewart Air Service	1,025,732		90,925	A
Economy Airways, Inc.	12,746,382		190,770	D	Trans-American Airways	22,036,083		725,986	D
Federated Airlines, Inc.	5,248,410		126,890	NA	Trans Caribbean Air Cargo	2,988,700	92,223	681,748	D
Freight Air Inc.	2,301,136		65,348	D	Trans-National Airlines	2,543,264		86,286	D
General Airways, Inc.	2,366,142	689,532	294,588	D	Transocean Air Lines	82,266,434	5,158,668	7,733,790	D
Golden North Airways, Inc.	3,124,364	272,141	930,284	D	Viking Air Lines	31,197,810		832,437	D
Great Lakes Airlines, Inc.	42,147,181		1,204,021	D	World Airways, Inc.	21,704,757	146,843	375,300	D
Hemisphere Air Transport	333,600		10,008	D	Zigler Flying Service	9,110		143,712	D
Johnson Flying Service	41,670	70	299,029	A	Totals	765,187,167	26,869,667	\$39,473,711	
Los Angeles Air Service	18,779,316		901,931	D					

NOTE: Letters A (approved), D (disapproved) and NA (no action) indicate CAB action or examiner's recommendation on a carrier's application for an individual exemption to operate as a common carrier under Part 291 of the Board's Economic Regulations. That action, however, is not final. The carriers have the right of appeal to both the Board and the courts.

Source: Civil Aeronautics Board.

new Wyatt Building now under construction in Washington.

► **How They Ferry Military**—A typical soldier furlough operation by the nonskeds is a World Airways C-46 job early this month. This nonsked flight was booked by an Air Coach Transport Assn. man at Camp Breckenridge, Ky., and dispatched through the ACTA head office in Washington. This flight carried 41 soldiers from Evansville, Ind., near Breckenridge, to their homes in Baltimore and Washington, then picked them up 15 days later and took them direct to their Korea embarkation point at Fort Lawton, Seattle. These men, most of whom had never been in an airplane before, flew home, stayed there 15 days and flew to Seattle—and still came out \$15.67 ahead on their Army travel expense allowance of \$150 for a direct trip from Breckenridge to Seattle. Breckenridge-Washington flight was \$31.33 each, and Washington-Seattle \$103.

Flight hostess service and two free meals were included in the price of the ticket. Meals and flight attendant service are among the strict requirements laid down by the Defense Department for all furlough and official military air travel. On this transcontinental flight, the C-46 crew also included four pilots. Two flew half-way across the country and then the two relief pilots took over. Civil Air Regulations are stricter for nonscheduled airlines than for certi-

fied airlines on many counts. For instance, no nonsked pilot may be on duty—ground and air combined—for more than 16 hours in any 24 hours; there is no on-duty time limit for pilots on certificated airlines.

The nonskeds will be flying more and more of these operations, plus official troop movements from now on.

► **Air Coach Boom**—Meanwhile, nonsked civilian business is booming too. Statistics are slow in coming in on current operations, but all sources quizzed last week said business was better than a year ago.

Biggest domestic nonsked is North American Aircoach, flying ten transcontinental flights a week out of New York. An example of how NAA builds coach business is furnished by its current campaign in Washington, D. C.

NAA believes Washington has a good coast-to-coast coach potential, but at present business is not large enough to warrant origination of a flight there. So NAA buys a Washington-New York ticket on a scheduled airline for a passenger wishing to fly NAA to the West Coast. That ticket costs \$15.41. The NAA New York-West Coast fare is \$101.20, including tax. That brings the Washington traveler's total coach fare to the west coast to \$116.61. American Airlines' Washington-Los Angeles coach fare is \$140.01.

In one recent week, NAA's representative in Washington sold \$4,500

worth of Washington-West Coast tickets via scheduled airline to New York. That practice of feeding the nonsked trunkline by scheduled airline short-haul is a growing one and another way the nonskeds have found to create new air coach markets.

Senate View

Small Business group asks CAB to ease up on nonsked regulation.

The Senate's Small Business Committee last week directed the Civil Aeronautics Board to expand its outlook from the narrow confines of the "luxury" service scheduled airline interest. The Senate committee says CAB should do this to open the way for "a vast expansion of low-cost air coach transportation" by fostering development of nonskeds.

The committee, headed by Sen. John Sparkman, recommended in a report that the Board take these immediate steps to promote nonskeds:

- Rescind its present regulation limiting nonskeds to three and eight round-trip flights monthly between major traffic centers, and authorize "sufficient flights to allow profitable operations."

The committee estimated that 14 to 15 flights monthly between the points

would be the "bare minimum."

- Establish procedures for licensing existing and new irregular carriers to carry on "an unsubsidized second-class or coach-type route service without regard to regularity but limited as to the total allowable flights."

- Encourage consolidation among the present 55 irregulars.

- Stop persecutions of nonskeds for past violations of the Board's regularity and frequency regulation. The committee took issue with the Board's "admitted policy of banishing all large irregulars on the grounds that they are 'willful violators' of a regulation that seems clearly unreasonable."

► **Restricted View**—Calling on CAB to "reassess its whole approach toward air transportation—certainly its restricted view, resulting in the use of subsidy to provide high-cost luxury air service for a small part of the population," the committee declared:

"The operation of the nonscheduled air carriers has demonstrated that there is strong public demand for cheap air transportation on a vastly expanded basis. Far from reaching a saturation point, air coach service apparently has hardly scratched the surface of the potential market."

The committee criticized CAB for paternalism toward the 16 major air carriers, "the same ones that have constituted the air transport industry since the Board was created in 1938," and stated:

"These 16 carriers, being supported and protected by the existing regulatory arrangement, are necessarily in favor of the existing situation. Quite naturally, they oppose the entry on new applicants, particularly such applicants as might profess a willingness to operate without direct government aid of any kind. In view of the Board's responsibility for the route pattern and for the determination of mail pay allowances, it is only reasonable to expect that the five Board members would generally view air transportation problems in very much the same way as they are viewed by members of the industry. In this situation it would be unlikely that CAB would actively foster new and possibly competitive developments in the field of air transportation."

► **Wanted: Daring**—And the committee added, "Should it fail at this point to develop policies toward that end, the Board would, indeed, lend credence to the charge that it is servile to the interests of the certificated airlines and that it lacks the scope and daring required at this moment which sees American aviation standing at the threshold of vastly expanded development and service."

Latest count shows CAB has disapproved and hence threatened to put out the business soon 98½ percent of all

the nonsked operations it has considered (See table p. 72). Carriers disapproved by CAB flew 92,969,086 ton miles of traffic last year; approved carriers flew 1,542,016 ton miles. Of about 55 nonskeds that operated last year, only one sizeable operator remains to be considered by CAB, and it likely will be disapproved.

U. S. Attorney Files Action Against Janas

Colonial Airlines and former president Sigmund Janas, Sr., co-defendants on 40 counts filed by the U. S. attorney for the southern district of New York, were arraigned July 3 in U. S. District Court. Janas pleaded not guilty and was released on \$1,000 bail; the airline got a delay until July 18 to plead, at which time Janas' case will come up.

The charges are mostly for allegedly falsifying and altering reports, accounts, records and memoranda. Another charge is violation of Civil Aeronautics Act provisions on giving free and reduced rate transportation. Punishment for violation of these regulations (such as free transport, failing to file reports, and falsification of reports to CAB) is by fine only (AVIATION WEEK July 2).

Meanwhile, CAB has issued an order to Colonial and its officers to cease and desist from such things as failing and neglecting to keep accounts and records in accordance with Board requirements.

► **Safety Not Involved**—CAB points out that its case against Colonial did not involve safety of operations. It was strictly economic and financial rule.

The Board further points out in a press statement: that the \$75,000 to be paid by Janas to Colonial is "restitution of excessive or improper expenditures of Colonial funds as reflected in the alleged violations of the (Civil Aeronautics) Act by Janas. . . . Acceptance of this provision does not represent an adjudication of the amount or amounts, if any, that may be due or payable to Colonial, nor does it in any way prejudice any rights of Colonial, its stockholders or other interested persons as a result of the alleged activities and practices of Janas. . . . Although the Board could not have ordered restitution after hearing, it considered the offer of restitution . . . appropriate and desirable in effectuating an adjustment of the matter and consistent with the settlement provisions of the Administrative Procedures Act (Section 5(B)).

► **CAB Criticized**—CAB came in for some criticism pegged on the Colonial case by a syndicated Washington columnist, Marquis Childs, who wrote that there is a "cozy relationship become up. However, court sources indicated that it was unlikely that the cases would be tried this summer.

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tween the firm to be regulated and the regulating agency with a convenient movement of employees back and forth between company and agency."

The CAB critic also says "knowledgeable observers . . . believe that Janas would continue to exert the real authority in the company" although he is now not an officer but is a consultant to the new company president—Alfons Landa. ▶ **CAB Answers**—CAB Chairman Donald Nyrop says Janas will not run Colonial Airlines.

Janas is retained at a fee of \$12,000. Company had wanted to keep him as an executive assistant to the president at \$24,000, but the CAB said "nothing doing" on either that title or that salary. The Board later permitted but did not encourage the retaining of Janas as a non-officer consultant at \$12,000 for the time being.

CAB can hold the whip hand over the Janas influence and Janas salary issues as long as Colonial must go to CAB for mail pay.

Engine Pinch Seen Possible Next Year

Heavy demand from both military and airlines for new 2400-hp. Pratt & Whitney R-2800 CB-16 engines could cause a tight supply situation next year on production schedules for the Douglas DC-6B, Convair-Liner 340 and Martin 4-0-4.

But Pratt & Whitney Aircraft says airlines will meet no delays on delivery if Nash Kelvinator starts production on schedule. That's assuming the machine tool bottleneck clears up. Says a P&WA spokesman: "We think we can satisfy demand for the engine next year, if all goes well, but maybe the airframe manufacturers will have some anxious moments."

Nash Kelvinator plans to start R-2800s rolling off the line about July 1 next year—hitting full swing by October.

Pratt & Whitney says the timing will be critical, but barring trouble both military and airline aircraft production requirements for the engine will be filled on time. The expected supply pinch on this engine is partly due to recent military production orders for the Chase assault transport C-123, the new twin-engine Beech pilot trainer T-36 and the Bell anti-submarine helicopter.

▶ **Scheduling Priority**—If, for a while next year, there were not enough engines to go around to all airline and military production schedules, here's what would happen:

The Aircraft Production Resources Agency at Wright Field would look at its aircraft preference list. That is a list showing what order of importance the Munitions Board and APRA attach to each aircraft order.

Perhaps a Convair-Liner and an Air Force Beech trainer rate about even on the list. Then APRA judges who has the greatest need from a national defense point of view. Civil transports are officially designated as strong military assets. Maybe, just for example, the Beech trainer can wait a few weeks without hurting Air Force training schedules. Then Consolidated Vultee can keep the Convair-Liners rolling, and enough engines will reach Beech in time to meet the Air Force requirement, too.

U. S. Airlines Facing Management Change

A big shake-up in management and operations of U.S. Airlines will occur when and if present stockholders approve the financing plan up for vote at their meeting on Tuesday of this week.

Subject to stockholder approval, New York industrialist Charles B. Ripley will get 50 percent ownership of the company. Ripley has been a director of Seaboard & Western but would disassociate himself from every other airline but U.S. when the proposed deal goes through.

▶ **Agreement Terms**—Agreement signed by the U.S. Airlines directors and Ripley calls for Ripley to buy up to \$400,000 in 5-percent debentures of the company and buy 1,500,000 shares of 5-cent-par common stock for \$75,000. The debenture issue would enable the company to pay off about \$300,000 of current liabilities; the \$75,000 new capital from the stock issue would give the company a bare amount of working capital.

Ripley will name a majority of the directors after the deal is consummated.

Financing arrangement calls for exchange of all 1,500,000 shares of \$1-par stock now outstanding for 1,500,000 shares 5-cent-par stock. And another 1,500,000 shares of new stock would be issued to Ripley.

▶ **Balance Sheet**—U.S. Airlines Mar. 31 balance sheet showed an operating deficit of \$3,054,447, and a capital deficit of \$57,602. The company had capital surplus of \$2,996,845 in July of 1946. While operating losses have been cut recently, they have still been running around \$7,000 per month this spring. Ripley hopes to do something about that.

U.S. Airlines in May filed a petition for arrangement with creditors in the U.S. District Court, Southern Florida District. Plans are to pay off the creditors with the new money from the \$3-\$400,000 debenture issue.

The company owns six Curtiss C-46 cargo planes. Certificated air cargo route is Chicago and New York areas to Florida and New Orleans areas.

That's a highly seasonal route structure for air freight. Volume slumps off in the summer months, especially north-bound. Especially seasonal are Florida shipments of flowers, fruits and vegetables.

CAB Sets 45-Cent Big Four Mail Rate

The Big Four airlines—American, Eastern, Trans World and United—must pay back about \$5 million in mail pay received since 1947-48. The Civil Aeronautics Board has finally settled on a reduced permanent mail pay rate.

As CAB announced this, CAB chairman Donald Nyrop told Senate Commerce Committee Chairman Edwin Johnson CAB will separate mail pay and subsidy grants for all domestic airlines within three months.

The new permanent mail rates for the Big Four airlines are 45 cents a ton mile from Jan. 1 this year henceforth, and 63 cents a ton mile to Dec. 31 last year from the date CAB started proceedings to reduce mail rates. The Big Four transport 80 percent of the nation's air mail.

CAB accountants figure this means American Airlines owes \$610,000, Eastern \$578,000, TWA \$2,119,000 and United \$1,658,000—a grand total of \$4,965,000. Of this \$3,400,000 is prior to Dec. 31 of last year and \$1,565 for the first quarter of 1951.

▶ **Plus & Minus**—Effective since March, the Post Office has been paying only 42 cents a ton mile; so based on the final permanent rate of 45 cents, the carriers were considerably overpaid January to March and slightly underpaid since then. Now that the issue is definitely settled at 45 cents, CAB, the company management and investors will at last have a definite figure to go on for a while. The 45 cents is figured as strictly compensatory rate for scheduled delivery of the U.S. air mail by the Big Four airlines.

As to separation of mail pay from subsidy for the other certificated airlines, CAB says it will make a special report to the President and Congress Sept. 30 this year. The report will first allocate mail pay and subsidy "grant" for non-Big Four airlines July 1, 1951 to June 30, 1952, and then the next fiscal year later.

CAB points out, through Nyrop's message to Sen. Johnson, that international carriers are another matter. Another special report from CAB on July 1, 1952, will set forth international mail pay and subsidy for the 1953 fiscal year.

▶ **Congressional Accord**—Nyrop, in his message to Johnson, said CAB already understands that any CAB action "will

be adjusted to be in conformity with such legislation as Congress may enact."

CAB plans to issue a new show-cause order setting the Big Four mail rates as agreed. Nyrop told Johnson that the intervenors in the case had indicated they would not object to the now-agreed rate—45 cents from Jan. 1, 1951, and 63 cents for the earlier period formerly in dispute. Intervenor in the CAB case are the Post Office Department and the big unsubsidized air freight lines, Flying Tiger Line and Slick Airways.

The CAB plan announced to Sen. Johnson would not change the CAB pay determination policy. It would merely earmark what part of it is to be considered compensatory mail pay and what part to be regarded as "grant," or subsidy.

List 4,945 Airports In New CAA Plan

The CAA's revised National Airport Plan sets airport construction and improvement needs at \$661,975,000 for 4,945 locations over the next three years. National defense requirements govern priority on where money should be spent.

Recommended new airport construction calls for 2,288 airports. And CAA is now all-out for single-runway fields instead of multiple runway fields—to get the most from each dollar to be spent.

CAA will henceforth grant federal aid for single-runway airports only, except where traffic is so heavy that two runways are needed to handle traffic simultaneously.

Another new feature of the 1951 national airport plan is that it lists airports by service types: personal, secondary, feeder, trunk, express, continental, intercontinental and intercontinental express.

Depending on use, the CAA now calls an airport by one of those names, and sets the following runway length ranges as deserving federal aid for construction or improvement: personal, 1,500-2,300 feet; secondary, 2,301-3,000 ft; feeder, 3,001-3,500 feet; trunk, 3,501-4,200 feet; express, 4,301-5,000 feet; continental, 5,001-5,900 feet; intercontinental, 5,901-7,000 feet; intercontinental express, 7,001-8,400 feet.

In the three-year-ideal-plan, CAA proposes the following "need" requirements for airports: personal type airports—1,524 new ones and 786 needing improvement; secondary—350 new and 798 improvement; feeders—75 new and 581 improvement; trunk—12 new and 291 improvement; express—3 new and 74 improvement; continental and larger—5 new and 59 improvement. The plan also calls for 304 seaplane bases and 83 heliports.

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CAB Cites Pilot Error In 7 Fatal Crashes

CAB analysis reveals pilot error as the cause of the seven fatal accidents in executive flying last year, killing 54 people. Of the total 34 executive accidents ten planes were totally destroyed and the remaining 24 seriously damaged.

CAB says 23 of the total 34 accidents were pilot error. Of the 138 people in these accidents, 35 were pilots, 12 crew and 91 passengers. Of the 54 fatalities, 43 were passengers.

CAB reconstructs the seven fatal accidents as follows:

- Off course. DC-3 hit a cloud-shrouded mountain top 42 miles off course when pilot started let down. Pilot planned to arrive after dark although knowing no lighting or radio facilities would be available.
- Ice. Grumman Mallard coated with ice crashed on takeoff gaining only 30 feet altitude.
- Stall. Grumman Mallard drifted off runway and hit embankment when pilot pulled up on cross-wind takeoff without adequate flying speed.
- Non-instrument pilot. DC-3 hit cloud-obscured peak near Jackson Lake, Wyo. Pilot did not hold an instrument flight certificate.
- Non-instrument pilot. Cessna 170A crashed in instrument weather. Pilot had no instrument certificate.
- Fog. Twin-engined Beechcraft crashed after takeoff two miles from runway end, apparently trying to return to field. Ceiling was 100 feet, visibility one-half mile in fog.

Who Controls NAL?

The Civil Aeronautics Board, at the behest of Eastern Air Lines and Pan American World Airways, has re-opened the question of whether W. R. Grace & Co. has acquired control of National Airlines. On Mar. 16 the Board set that question down for further procedural steps, after severing it from the National dismemberment case—docket 3500.

CAB says there was plenty of opportunity for the petitioners to be heard on this issue in the old National dismemberment case. And evidence heard to date has been "legally adequate."

But, the Board then says: "In view of the lapse of time since the hearing and the change in the issues . . . in docket No. 3500, the Board as a matter of discretion concludes that it is in the public interest and conducive to the proper dispatch to the Board's business to receive additional evidence in Docket 4839 on the sole question of whether Grace has acquired control of National. . . ."

SHORTLINES

► Air Express International Agency—Set up first international air cargo consolidation service at Chicago. It will save air shippers up to 10 percent on shipments under 100 lb; and up to 37.5 percent on minimum weight shipments according to AEIA. This service from Chicago to foreign destinations comes out of a CAB authorization granted last year. Qualified air freight forwarders are certified as indirect air carriers; they can publish tariffs and rates with the same rights and duties as carriers. Consolidation of air shipments by forwarder yields lower rates to the shippers.

► All American Airways—Retroactive \$937,000 mail pay granted AAA by CAB allowed the company to write off all debt, including \$591,000 remaining from an RFC loan. . . . AAA's temporary certificate comes up for renewal next January. . . . June traffic of All-American was an all-time record—22,269 passengers carried. April-June record of 56,521 passengers is 37 percent over last year.

► British Overseas Airways—BOAC revenue in May topped \$7 million—an all-time high. BOAC Chairman Sir Miles Thomas says, "This is the result of the re-organized sales drive and the coordinated effort of everyone in the sales department." Previous high month was this April's \$6,720,000, and before that it was September, 1950, with \$6,440,000.

► Central Airlines—Central President Keith Kahle figures July traffic will be 33 percent over June, which was 170 percent of a year ago. This is exclusive of military revenue.

► Flying Tiger Line—Has started using hydraulic truck-bed lift equipment at principal intermediate stations—Chicago and Cleveland. The airfreight line says these are both faster and safer than forklifts, and eliminate transloading damage and cost. Trucks are built to airline specifications.

► National Airlines—National's fiscal year ended June 30 shows the following: air coach service doubled over previous fiscal year; total passenger miles of the line up 62 percent to 373,392,000; June traffic up 66 percent over a year ago and 8 percent over May. National credits three prime factors for the exceptional upswing: low-fare services, off-season travel promotion, and equipment interchange operations with other airlines—Capital from the mid-

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west and American-Delta on Southern Trans-continental service.

► Pacific Northern Airlines—Hopes soon to open its recently-certificated route Alaska-Seattle/Portland.

► Pan American World Airways—Has Venezuela's permission to fly New York-Caracas non-stop; this will cut one hour off present schedules between New York and principal cities of Venezuela and Brazil, starting this week. . . . Began promoting round-trip excursions, from \$129 up, between New Orleans and Central American Cities. Rates are 25 percent under regular fares until Sept. 30. Typical rates, 60-day round trip: Guatemala City \$129; San Salvador \$136; Tegucigalpa, Honduras \$151; Managua, Nicaragua \$168; San Jose, Costa Rica \$189.

► Piedmont Airlines—Last month flew 4,407,136 passenger miles—70 percent over June, 1950. Load factor of 57 percent compares with 37 percent a year ago.

► San Francisco Airport—American, TWA and Western plan to put a conveyor belt behind their ticket counter area at San Francisco airport to speed up baggage movement from counter weighing point to baggage truck.

► TALOA Academy of Aeronautics—Opens new courses next week for flight attendants, stewardess, pursers, stewards and other passenger service personnel for airlines throughout the world. Complete course for all kinds of flight attendants is 150 hours over five weeks—night or day. Refresher course for flight personnel is 140 hours over four weeks. TALOA is at Oakland, Calif., and is a subsidiary of Transocean Airlines.

► Trans World Airlines—Flew 194 million revenue passenger miles in June—158 million domestic and 36 million international. Company says it expects to top this all-time record this month. . . . About half of TWA's 11,685 employees are now in the company's one-year-old retirement plan—with over \$3.5 million on deposit. . . . TWA has flown over 10,000 hours on the Korean airlift. Company had five DC-4s on the lift at peak demand, now operates four.

► United Air Lines—Has declared a 75-cent dividend payable July 20 to stockholders of record July 9; this is UAL's second in six months; first was announced Dec. 18.

► Western Air Lines—Revenue passenger miles in May were up 24 percent over a year ago to 23,375,000.



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AVIATION CALENDAR

- July 17-18—European ignition conference, sponsored by Lodge Plugs, Ltd., Savoy Hotel, London, England.
- July 23-24—Fifth annual meeting, University Aviation Assn., University of Florida, Gainesville, Fla.
- July 24-28—Armed Forces Procurement Clinic, Cleveland.
- July 28-29—Dedication of new Oneida County airport, Oneida, N. Y.
- Aug. 6—International air race for the Daily Express Cup, England.
- Aug. 11-19—Eighth annual Michigan aviation week, sponsored by the Aero Club of Michigan.
- Aug. 15-19—Fifth annual all-woman transcontinental air race, sanctioned by the Ninety-Nines, Santa Ana, Calif., to Detroit, Mich.
- Aug. 18-19—National Air Race, Detroit, Detroit-Wayne Major Airport.
- Aug. 22-24—Western convention of Institute of Radio Engineers and Seventh Annual Pacific electronic exhibit.
- Aug. 22-26—International convention of the Ninety-Nines, Mackinac Island, Michigan.
- Aug. 24-26—Fifth annual convention of the Air Force Assn., Ambassador Hotel, Los Angeles, Calif.
- Sept. 3-7—Royal Aeronautical Society-IAS third international aeronautical conference, Brighton, Sussex, England.
- Sept. 10-14—Sixth national instrument conference and exhibit sponsored by the Instrument Society of America, Sam Houston Coliseum, Houston, Tex.
- Sept. 10-16—Seventh annual general meeting of the International Air Transport Assn., Westminster School, London, England. Program includes one-day visit to SBAC Farnborough show.
- Sept. 11-16—Twelfth flying display and exhibition of the Society of British Assn. of Constructors, Farnborough, England.
- Oct. 2-4—Seventh annual aircraft spark plug and ignition conference sponsored by the Champion Spark Plug Co., at Toledo, Ohio.
- Oct. 8-10—Special conference on aircraft electrical applications, sponsored by the Air transportation committee of the American Institute of Electrical Engineers and the Los Angeles section of the Institute, Hollywood Roosevelt Hotel, Hollywood, Calif.
- Oct. 16-17—Fourth annual New York State conference on airport development and operation, sponsored by the N. Y. State Dept. of Commerce, N. Y. Aviation Trades Assn., Assn. of Towns of the State, Conference of Mayors, County Officers' Assn., and the N. Y. State Flying Farmers, Onondaga Hotel, Syracuse, N. Y.
- Oct. 29-30—Air Industries & Transport Assn. of Canada annual general meeting, Seignior Club, Montebello, Quebec.
- Oct. 31-Nov. 1—Society of Automatic Engineers, fuels and lubricants meeting, Drake Hotel, Chicago.

PICTURE CREDITS

14—Douglas Aircraft Co.; 16-17—McGraw-Hill World News; 54—CAA Technical Development Evaluation Center; 84—CAB.

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500	3506	Flange
138	8288	Follower Assy
27953	8427	Screw
1276	10759	Bolt
980	11210	Cover
100	11762	Guide
1157	35787-5	Bushings
2174	35787-10	Bushings
814	35814	Blower Assy.
3967	35817	Spring
980	35855	Cap
2446	35924	Washers
4200	35932	Gasket
22	36759	Rod Assy.
182	46400E	Liner
30	48346	Cylinder
1475	48360	Bearings
53	48362	Shaft
175	48363	Shaft
100	48389	Fitting
209	48390	Retainer
56	48392	Sump
533	48447	Bushings
107	48457	Adapter
390	48461	Gear
149	48468	Bearing
90	48468B	Bearing
389	48469	Bearings
470	48470	Bearing
75000	51506	Plug
395	54847	Clamp
71	57006	Cover
78	76236	Gear
565	81397	Tube
10736	84185	Cover Assy.
261	84235	Pipe
155	84281	Specs
1351	84282	Adapter
1178	84289	Bearing
113	84487	Housing
87	84567-8	Stud
77	84591C	Nose Housing
178	84602	Bracket
30	84702	Shroud
397	84752	Bearing

ELECTRONIC COMPONENTS

Quantity	Part No.	Description
35	RA-10-DB	Receiver
20	TA12B	Transmitter
150	DA-1F	Dynamotor
35	MR-9B	Control Box
9000	45	Bulb
11000	1667	Bulb
1000	987	Bulb
300	AN3135-1	Bulb
97	FT213A	Mount
29	FT293	Mount
80	BX42-7	Dynamotor
61	RTA-1B	Transceiver

MISCELLANEOUS

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Quantity	Part No.	Description
22	AN5531-1	Tachometer Generator
1000	AN 5780-2	G. E. 2CM5ABW Wheel and flap position Indicator. G. E.—indiv. cans
400	AN 5780-2	Weston Model 882-P N111602 Description as above
1500	AW 2-658	U. S. Gauge Air Pressure Gauge (0-2000 lb.)
160	2E-492E	Pesco fuel pumps
700	TFD 8600	Thompson fuel booster pump
125	D-7818	Adel anti-icer pumps
170	2-P-771-A	Pesco fuel pump
250	AN4014	AN4102-1
300	1H260k and KA	Erie Meter Systems D-3 hand wobble pump
478	D9530	Pesco Hydraulic hand pump
233	D9530-2	Adel selector valve
428	D9560-2	Adel selector valve
744	D10044	Adel selector valve
2200	AN 4078-1	37D6210 Solenoid United Aircraft etc.
2000	AN 3095-4	Grimes Light assembly
800	AN 3096-5	Grimes Light assembly
380	AN 3096-6	Grimes Light assembly
175	EE 709-M2	Air associates Motor
115	P4CA2A	Parker Primers
80	AN 3213-1	Scintilla Ignition switch
568	A-9 (94-32226)	Ignition switch
687	RS-2	Mallory Selector boxes
380	AN 6203-1	Vickers Hydraulic Accumulator
88	572-3A	Eclipse Distributor Valve
90	JH-950R	Jack & Heintz Starter Motor for JHS starters
492	S841 (94-32233)	Electric box
12	FA122	Flasher Exterior lights Wallace & Tiernan
1000	13018A	Interphone Box
244	D10051	Selector Valve (Adel)
135	10996A	Instrument Panel for Republic Seabee
144	K14949E	Windshield Wiper: Kit (Marquette Metal Products)
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161	420EC	Lear Actuator
160	420DY	Lear Actuator
195	550AJ	Lear Screw Jack
26	550CD	Lear Screw Jack

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Quantity	Description
341	981280 Cylinder CO ² w/valve
	Wt. Empty 18.5 lbs.
	Wt. of Charge 12.6 lbs.
	Valve number 979453 J
19	M8700368 Cylinder CO ²
	Wt. Empty 5.48 lbs.
	Wt. of Charge 3.69 lbs.
22	982512 Cylinder CO ² w/valve
	Wt. Empty 11.65 lbs.
	Wt. of Charge 7.25 lbs.
	Valve number 979453 J
96	992255 Cylinder CO ² (type 5A—hand fire extinguisher)
	Full wt. 14.3 lbs.
93	923748 Oxygen cylinder (full) w/valve IX4015
	Charges to 1800 PSI
150	982056 Valve
	1-1/2" flare tube threads
150	966129 Solenoid (38 Volts)
225	981591 Gate Valve
	With 3 1-1/2" Flare tube threads
151	870082 (Model A4614) pressure switch
326	982585 Gate Valve with 1-1/4" Flare tube threads

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(Following is the second and last installment of excerpts from Air India's clever booklet written for its passengers. The first installment appeared here May 7.)

VERBOTEN—We've always had a soft spot for fellows who blow things up, preferably when no one expects it, and after "For Whom the Bell Tolls" we'd do anything for a guy with a keg of dynamite. But alas, dooty is dooty, and we cannot permit our passengers to carry in our aircraft anything approaching the inflammable, anything the flash point of which is below a safe margin. Gentlemen who travel armed to the teeth will have to unload and hand over their bullets to the skipper. We realize what this must mean to our Mexican, Hur and Partisan friends, but unfortunately, we have no alternative.

* * * * *

NOT DONE—We have all tasted the bitter sting of parting, but a display of passion on the tarmac is, you will agree, never justified. So we request our more hot-blooded passengers to refrain from staging an orgy prior to the departure of a service. We once saw a cad indulging in shoulder kisses in front of 22 passengers and the Customs Officer, who had to take the afternoon off. Even John Gilbert, you will remember, did not get away with it. He hasn't made a flick for ages, and now in spite of being 60, they give all the old men's parts to fellows like C. Aubrey Smith.

* * * * *

BENEATH THE VEIL—In India some men sport their women-folk, others disguise them as the Ku Klux Klan. We have an open mind on the subject, but if you favor segregation and a mosquito curtain over the head of your beloved, it makes things a little difficult in the cabin of the plane. We have no separate compartment for yashmak'd ladies to frolic in, but if you insist, we can arrange for her to be taken for-ard with the crew, where the skipper, his mate and the radio officer, all God-fearing men, will take good care of her.

* * * * *

THE REED—Being chain-smokers ourselves, with a penchant for the hubble-bubble, it is with regret we announce that no smoking is permitted in our aircraft. . . . Will gentlemen therefore desist from smoking in the aircraft's lavatory. For smoke, like murder will out and your hostess will have the embarrassing duty of thumping on the closet door until you have put out your cigarette.

* * * * *

FEELING BETTER? Under your seat you will find a neat cardboard box, almost too good for the purpose. When you start feeling not so good, pull it out and use it gently and unconcernedly. From the tough ones who never suffer from air sickness, we ask a small favor. When your fellow passenger is a little under the weather, don't regard him with amusement or contempt. Don't gaze fascinated at his green cheeks. Pretend you haven't noticed a thing and when the going is particularly heavy, comment casually on the birth rate or the Balkan situation, without as much as a glance at him. He will realize at once that you are a gentleman and, if he's a lady, it may be a long-term investment.

* * * * *

THE LEAN & HUNGRY LOOK—If your existence on earth is due to large doses of penicillin and our friends the sulfa drugs, studiously avoid the health officer at all airports. The fellow at Colombo is inclined to be particularly conscientious. Armed with the stethoscope he exhibits a desire to prod anything that does not look like a going concern, and in the ruthless fight against mosquito breeding grounds, no owner of a beard is safe from his flit-gun. We trust that ladies and gentlemen who have been sprayed will take it in the right spirit.

* * * * *

A MOMENT FOR PRAYER—Ray Bloomberg, AVIATION WEEK's Seattle correspondent, says a 6 foot, 200-lb. passenger burst into the pilot's compartment of a Wien Alaska Airlines plane 20 minutes out of Fairbanks the other day and said, "Do you believe in God?"

Pilot Don Hulshizer replied that he did. "Then get out of that seat and let God fly," the passenger ordered, lurching at the controls. After a struggle, they got him to an airport where he was jailed.

* * * * *

NO PLANE SHOULD BE WITHOUT ONE—O. K. Stamply, the hydraulics specialist, tells this one about a fellow he knows. It seems the chap had been flying an airplane in which the airspeed and altitude indicators behaved quite erratically in certain maneuvers. The unsatisfactory condition had been eliminated by installing static vents and the gentleman was duly impressed with the value of these accessories. Some time later, the same fellow was discussing an autopilot installation with personnel at the experimental station in Indianapolis and, upon being informed that the altitude control was causing difficulties, he suggested that static vents be installed. When he returned to his office he received a call from the experimental station. Seems they wanted to know just what the heck static vents are. Being a resourceful fellow, the chap asked them to hold the line, went to another phone and called O.K. to find out!

SIDELIGHTS

(Continued from page 6)

Fuller is leaving Flying magazine as editor, with removal of editorial headquarters to New York City. M. H. Froelich will assume titles of assistant publisher and editor. F. D. Walker becomes managing editor. . . . Re-financing will permit publication of all four issues for 1951 of the quarterly, Air Affairs, according to William D. Pardridge, editor, of Clifton, Va. . . . AVIATION WEEK's circulation has risen to about 35,000, a new high.

Deaths

Norman B. Haley, who resigned as treasurer of United Air Lines Aug. 31, 1950, died at his summer home in Minnesota. . . . Mrs. Paul Kollsman, wife of the well-known inventor and founder of Kollsman Instrument Corp., died July 7 in New York City.

People

Rear Adm. Edward C. Ewen, former Naval director of public relations, will leave a sea command and become commander of Fleet Air, Alameda, Cal. . . . Maj. Gen. Louis E. Woods, senior aviator in the Marine Corps, retired June 30. . . . Dr. W. R. Stovall, chief of CAA's Medical Division, became president-elect of the Aero Medical



NEW BOARD: Departure of Civil Aeronautics Board members for the recent local air service seminar at Purdue University furnished an opportunity for the first photo of the full Board since it was re-constituted. First row, left to right, Chan Gurney, Chairman Donald Nyrop; second row, Joseph P. Adams, Vice Chairman Oswald Ryan; top, Josh Lee.

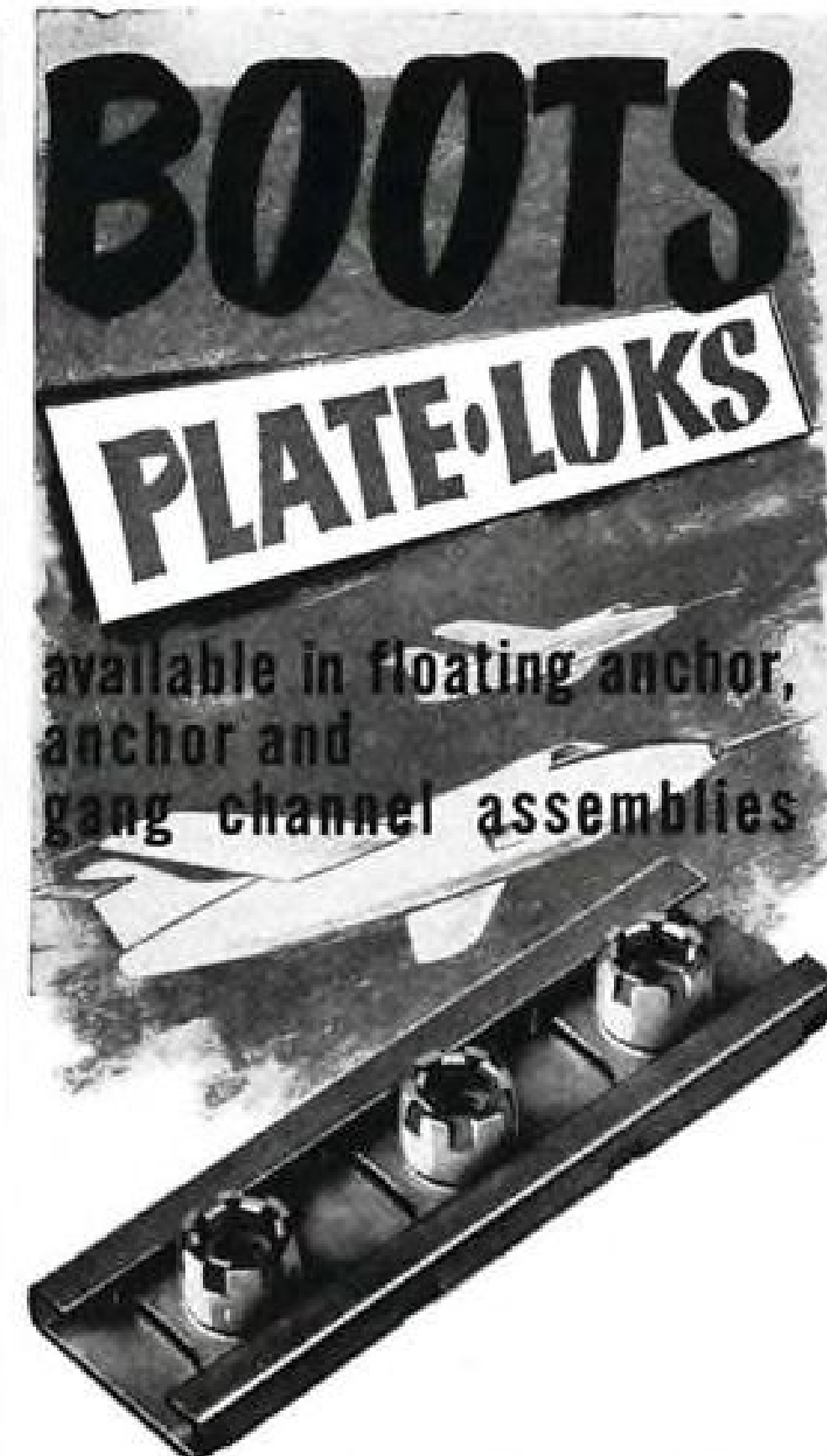
Assn. at its 1951 convention recently. . . . Hayes Dever, secretary & director of public relations of Capital Airlines, becomes chairman of the public relations advisory committee of ATA. . . . Robert Kenney, formerly director of public relations of Fairchild Aircraft division, becomes director of public relations & advertising of Daystrom, Inc., Elizabeth, N. J., the parent company of American Type Founders, and Daystrom firms making furniture, laminates, instruments and electrical equipment.

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BOWER ROLLER BEARING CO. 67 Agency—MacManus, John & Adams, Inc.	PARKER WHITE METAL CO. 35 Agency—Davies & McKinney Adv.
BROOKS & PERKINS, INC. 65 Agency—Holden-Clifford-Flint, Inc.	PIASECKI HELICOPTER CORP. 77 Agency—B. K. Davis & Bro.
CHASE AIRCRAFT CO., INC. 6 Agency—J. Branch Briggs Adv.	ROHM & HAAS COMPANY 26 Agency—John Falkner Arndt & Co., Inc.
CITIES SERVICE OIL CO. 25 Agency—Ellington & Co., Inc.	RUSSELL MFG. COMPANY 62 Agency—Charles W. Hoyt Co., Inc.
DARNELL CORPORATION, LTD. 49 Agency—Rhea Advertising Service	SEARCHLIGHT SECTION 79, 80, 81, 82, 83
DILL MFG. CO., THE 74 Agency—McDaniel, Fisher & Spelman Co.	SERVICE STEEL COMPANY 30 Agency—Claude E. Whipple Adv.
DOW CHEMICAL CO. 36 Agency—MacManus, John & Adams, Inc.	SMITH-MORRIS COMPANY 32 Agency—Holden, Clifford, Flint, Inc.
EATON MANUFACTURING CO. 19 Agency—Clark & Richerd, Inc.	STALWART RUBBER CO., THE 50 Agency—Penn & Hamaker, Inc.
ECLIPSE-PIONEER DIV. OF BENDIX AVIATION CORP. 55 Agency—MacManus, John & Adams, Inc.	STANDARD PRESSED STEEL CO. 68 Agency—R. E. Lorelin Corp.
EDISON, INC., THOMAS A. 38 Agency—Gotham Advertising Co., Inc.	STEWART WARNER CORP. 44, 45 Agency—MacFarland-Aveyard & Co.
EX-CELL-D CORPORATION 27 Agency—Holden-Clifford-Flint, Inc.	SUNDSTRAND MACHINE TOOL CO. Second Cover Agency—Howard H. Monk & Assoc.
FAFNIR BEARING CO., THE 5 Agency—Horton-Noyes Co.	SWEDLOW PLASTICS CO. 46 Agency—Francis D. Gonda Adv.
FAIRCHILD ENGINE & AIRPLANE CORP. Third Cover Agency—Buchanan & Co., Inc.	TEXAS ENGINEERING & MFG. CO. 52 Agency—J. B. Taylor, Incorporated
FENWAL, INCORPORATED 63 Agency—James Thomas Chirurg Co.	TELEX, INCORPORATED 62 Agency—Melamed-Hobbs, Inc.
FLYING TIGER LINES, INC. 57 Agency—Heintz & Co., Inc.	THOMPSON CO., H. I. 37 Agency—Lockwood-Shackelford Co.
GENERAL ELECTRIC COMPANY Fourth Cover Agency—G. M. Basford Co.	TINNERMAN PRODUCTS, INC. 56 Agency—Meldrum & Fawcett, Inc.
GENERAL LABORATORY ASSOCIATES 28 Agency—J. Branch Briggs Adv.	TORRINGTON CO., THE 32 Agency—Hazard Adv. Co.
GIANNINI & CO., Inc., G. M. 78 Agency—Western Adv. Agency, Inc.	TRANSPORT EQUIPMENT CO. 62 Agency—Jayercraft Co.
GILFILLAN BROS. 10 Agency—Erwin; Wassey & Co., Ltd.	WESTINGHOUSE ELECTRIC CORP. 59 Agency—Fuller & Smith & Ross, Inc.
GLIDDEN CO., THE 41 Agency—Meldrum & Fawcett, Inc.	WHITE DENTAL MFG. CO., S. S. 24 Agency—Peterson & Kempner, Inc.
GOODRICH CO., THE B. F. 3 Agency—Batten, Barton, Durstine & Osborn, Inc.	WITTEK MANUFACTURING COMPANY 73 Agency—The Advertising Corp.
GRUMMAN AIRCRAFT ENGINEERING CORP. Front Cover Agency—Charles W. Hoyt Co., Inc.	WYMAN GORDON CO. 8 Agency—John W. Odlin Co., Inc.
GULF OIL CORPORATION 48 Agency—Young & Rubicam, Inc.	
HARTWELL AVIATION SUPPLY CO. 22 Agency—The McCarty Company	
HAYDON COMPANY, A. W. 78 Agency—Cory Snow, Inc.	

AVIATION WEEK, July 16, 1951



GANG CHANNEL
The unique Plate-Lok Nut assembled into straight channels; removable or permanently attached nuts. Standard-length channels in a wide range of nut spacings are available; special lengths and spacings can be supplied to your order.

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LETTERS

Air Force Praise

At a recent meeting of the staff of the 6160th Air Base Wing in Japan, Col. Charles W. Stark, the wing commander, expressed a keen interest in your very excellent publication.

Col. Stark formerly commanded the 8th Fighter-Bomber Wing in Korea and is one of the foremost proponents of tactical air power in the Far East Air Forces. Since his transfer from the 8th to this wing, which is charged with the Air Defense of the Western Islands of Japan, he has made every effort to keep abreast of the latest developments in aviation and finds your magazine an invaluable aid to himself and to his staff.

He is especially interested in the adaptability of jet aircraft for close ground support and has made the Apr. 16 article, "Jets vs. Props," required reading for his staff. In fact, the entire magazine, covering as it does such a wide variety of subjects, has attained semi-official status at this station.

I thought it might interest you to know that FEAF's top flying personnel are deriving such benefit from AVIATION WEEK and I would like to convey to you my personal thanks and, indirectly, those of Col. Stark and the other members of his staff, for a magazine that is devoted to modern aviation and to an air force that is so vitally necessary in these troubled times.

GLORIA K. MILLER-POTTER,
Major, USAF (WAF),
Public Information Officer,
HQ, 6160th Air Base Wing
APO 929

I would like to take this opportunity to extend my personal appreciation for the excellent treatment by AVIATION WEEK of our subcontracting and Small Business programs.

The response to this series has been manifest at this Headquarters and I consider it of special value in keeping the aircraft industry acquainted with our constant efforts in both fields.

Please convey these sentiments to Robert H. Wood, the editor, and William Kroger, who has presented a highly effective portrayal of both activities.

I shall be pleased to discuss this with you personally at some future date after assuming my new duties in Washington.

ORVAL R. COOK,
Major General, USAF
Director, Procurement &
Industrial Planning

(Maj. Gen. Cook is succeeding Lt. Gen. K. B. Wolfe as deputy chief of staff materiel.—Ed.)

From Adm. Land

Congratulations on the subject editorial. (The Railroads' Toll, May 28, 1951). It is about time that the facts be exposed to the public—traveling and non-traveling.

A lot of us like a bit of fiction here and there, but in the serious business of transportation the public is entitled to facts; and you have most ably produced and presented them.

A.T.A. has mimeographed this editorial and sent it to our membership.

On previous occasions you have ably commented upon the fact that the transportation industry might far better concentrate our efforts on serving the public efficiently and economically rather than spend our time and money on criticisms of and advertisements against (many of them unfair and unjust) our competitors.

Our job in transportation is to serve the public and it is more important right now than ever before.

Keep up the good work!

E. S. LAND, President

Air Transport Association of America
1107 Sixteenth St., N.W.
Washington 6, D.C.

From Ordnance

The Ordnance School publishes a monthly digest for ordnance instructors called the Ordnance Instructors Letter. Distribution is limited to military personnel of the U.S. armed forces in the U.S. and abroad. . . . Because of the time element involved, we would appreciate a blanket permission to reprint items from AVIATION WEEK in original or extract form, with credit, when we feel they would have value in ordnance training. . . . Would we be able to borrow, upon request, prints of photographs or copies of drawings for use in the Letter?

A. R. PAULEY, Major Ordnance Corps
The Ordnance School,
Aberdeen Proving Ground, Md.

(AVIATION WEEK does not grant blanket reprint rights to others, but replies promptly to all requests for reprinting individual stories, and frequently gives permission. Address such requests to the editor, AVIATION WEEK, 330 West 42nd St., New York, N. Y.)

Unbiased Stories

I have just read the article on United Air Lines' strike in the July 2 AVIATION WEEK.

The articles appearing in your magazine concerning the labor trouble in the air line industry have been the most fair and unbiased I have seen.

I would like to enlarge a little on the argument presented by the companies and the presidential panel concerning a pilot shortage. There wouldn't be a shortage if the co-pilot job was made worth while.

Hundreds of young pilots would be willing to spend a little money for instrument training, etc., if the job offered a decent wage and wasn't subject to constant furloughs.

If the present negotiations do not provide the co-pilot with a substantial raise plus a reasonable amount of job security, the shortage will be greatly increased because many of the men who are already in the industry will be leaving as fast as they can secure other jobs.

It is very informative to know that on some airlines a co-pilot must work three years before he makes as much as a new flight engineer.

WILBUR ADAMS
211 N. Washington St.
Ypsilanti, Mich.

Praise

. . . The editorial, "Who's Stupid?" (May 7) has been read with a great deal of interest. We would like to have your permission to reproduce the editorial in the next issue of our Traffic Bulletin, it being understood that we will accord your publication proper credit. . . .

THOMAS E. GRADY, Manager
Greater Miami Traffic Assn.
Miami 15, Florida

From a Pilot

As a United Air Lines captain and a very loyal subscriber to AVIATION WEEK, I feel that you are a personal friend. . . . I would like to express sincere appreciation for the unbiased way you present the news of the industry. Your articles concerning the Air Line Pilots Assn. and its activities are written in the same spirit as are your items on the Air Transport Assn. or any other group. . . . Yours is the only magazine that recognizes the fact that there are two sides to every controversy.

CAPT. L. A. SHAVER
337 26th St.
Hermosa Beach, Cal.

From Sir William

For the very reason that I am not an engineer, I wish to congratulate you on David Anderton's first article in his series on atomic propulsion. No subject can, I think, be of greater potential interest to air transportation and none requires as much explanation for the man who must make the final decisions upon it. Mr. Anderton's work should help immeasurably, and I enjoyed reading it.

WILLIAM P. HILDRED,
Director General
International Air Transport Assn.
International Aviation Bldg.
Montreal 3, Canada

(Sir William's letter arrived after first of the four articles appeared)

SPOTLIGHT IN KOREA

CARGO PLANE GUIDES AIR DROP IN STORM

AN AIR BASE IN JAPAN, Jan. 11—Flying Boxcars dropped critically needed supplies to infantrymen in Korea last night during a snow storm so dense one of the big planes had to circle the area for four hours to guide the others to the right place.

The pilot who flew his loaded C-119 from this air base, said he arrived at the designated spot after fighting a heavy snow storm for two hours and dropped his cargo.

With darkness closing in the pilot realized other transports would have a hard time finding the area.

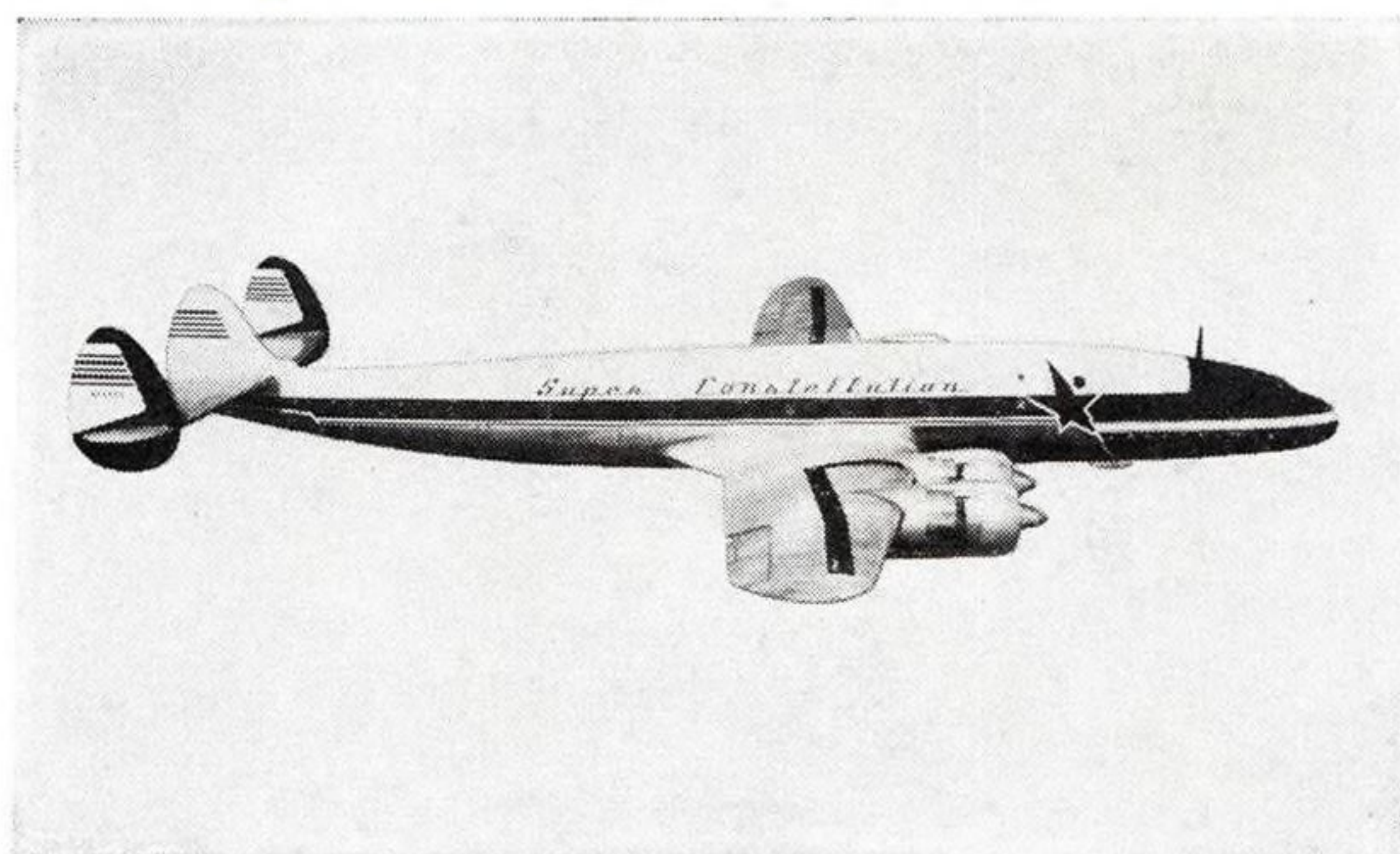
He climbed to 4,000 feet, leveled off and circled. His co-pilot contacted other C-119s en route to the drop zone. As each plane of the 314th Combat Cargo Wing reached the area, the hovering plane flashed on its landing lights. The other planes then swooped down and dropped their cargoes.

Adv. Sp. On 21st Jan. exclaim an air gates o "Wel the A legs his "Id happen "Id the bar "but I to my "I t this su out of Pili shiver 21st room. Burdet Wisco "WH as he with as could stances so bold he add "We like th less

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Aircraft Division
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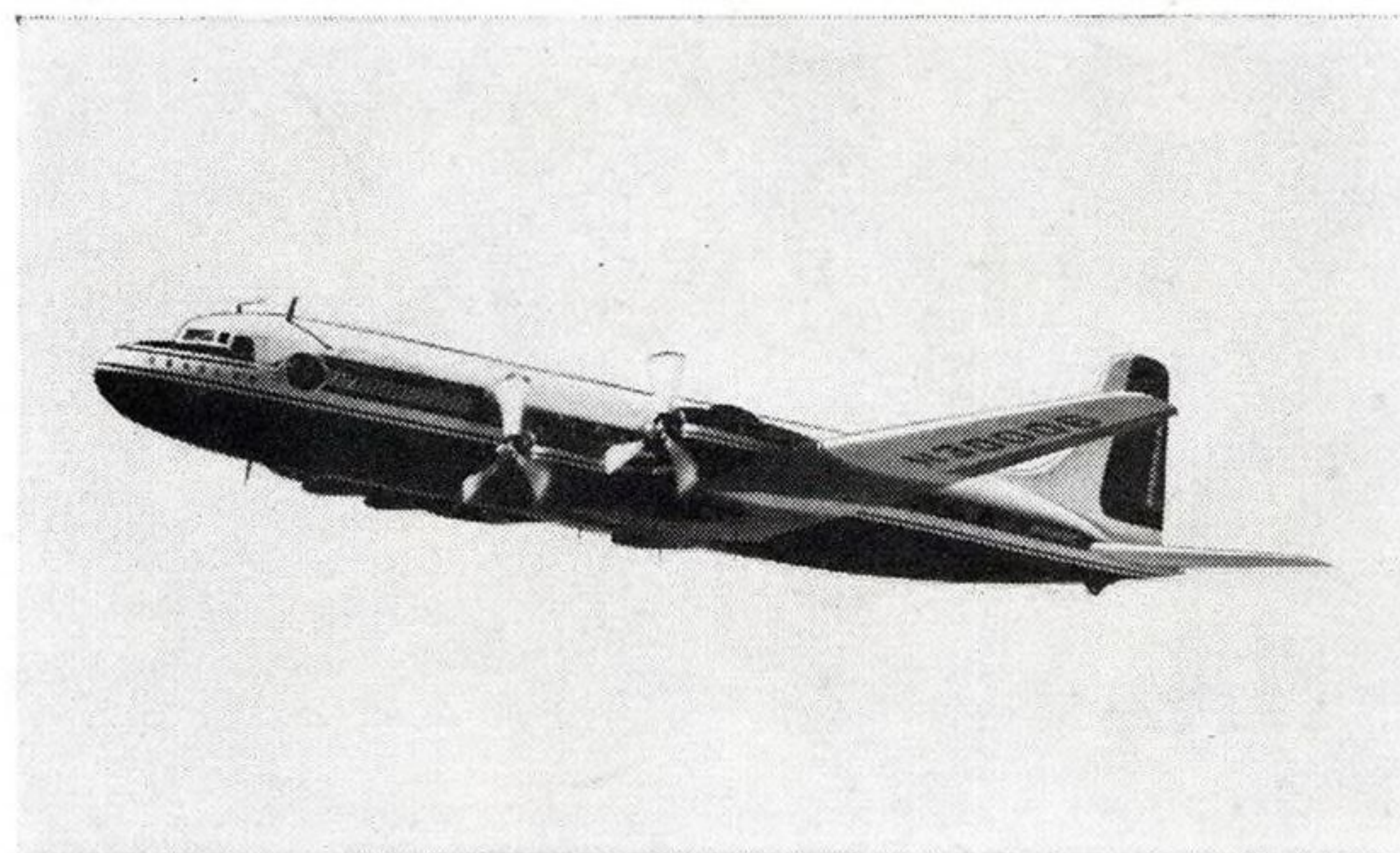
Here's why THE NEWEST AND BIGGEST AIRLINERS ARE BEING EQUIPPED WITH G-E ELECTRICAL SYSTEMS



Lockheed's new model Constellations, and all Super-Connies use General Electric protective systems. G-E provides the fastest possible tripping of overvoltage faults—and freedom from nuisance tripping.



G-E provides the only positive method of isolating a faulty generator without affecting service. That's one reason why all of Pan American's Boeing "Strato" Clippers use G-E systems.



New Douglas DC-6B's being built for Pan American World Airways will be equipped with G-E electrical systems. G-E provides the most complete electrical protective systems ever placed in production for commercial transport-type aircraft.



The country's first turboprop transport—the Convair-Allison Turboline—is equipped with a G-E electrical system. G-E systems are tailor-engineered to give the protection you need for ordinary or special applications.

The list of planes using G-E protective systems is a roll call of today's most popular aircraft. Are your planes listed among them?

One serious fault that damages electrical equipment in just one of your aircraft could cost you more than

G-E protective systems for your entire fleet. Can you afford *not* to investigate?

For more complete information get the new fact-crammed bulletin GEA-5628. Telephone your General Electric aviation specialist or write General Electric Company, Section 210-16, Schenectady 5, New York.

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