

AVIATION WEEK

OCT. 15, 1951

50 CENTS

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Aviation Week



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Volume 55

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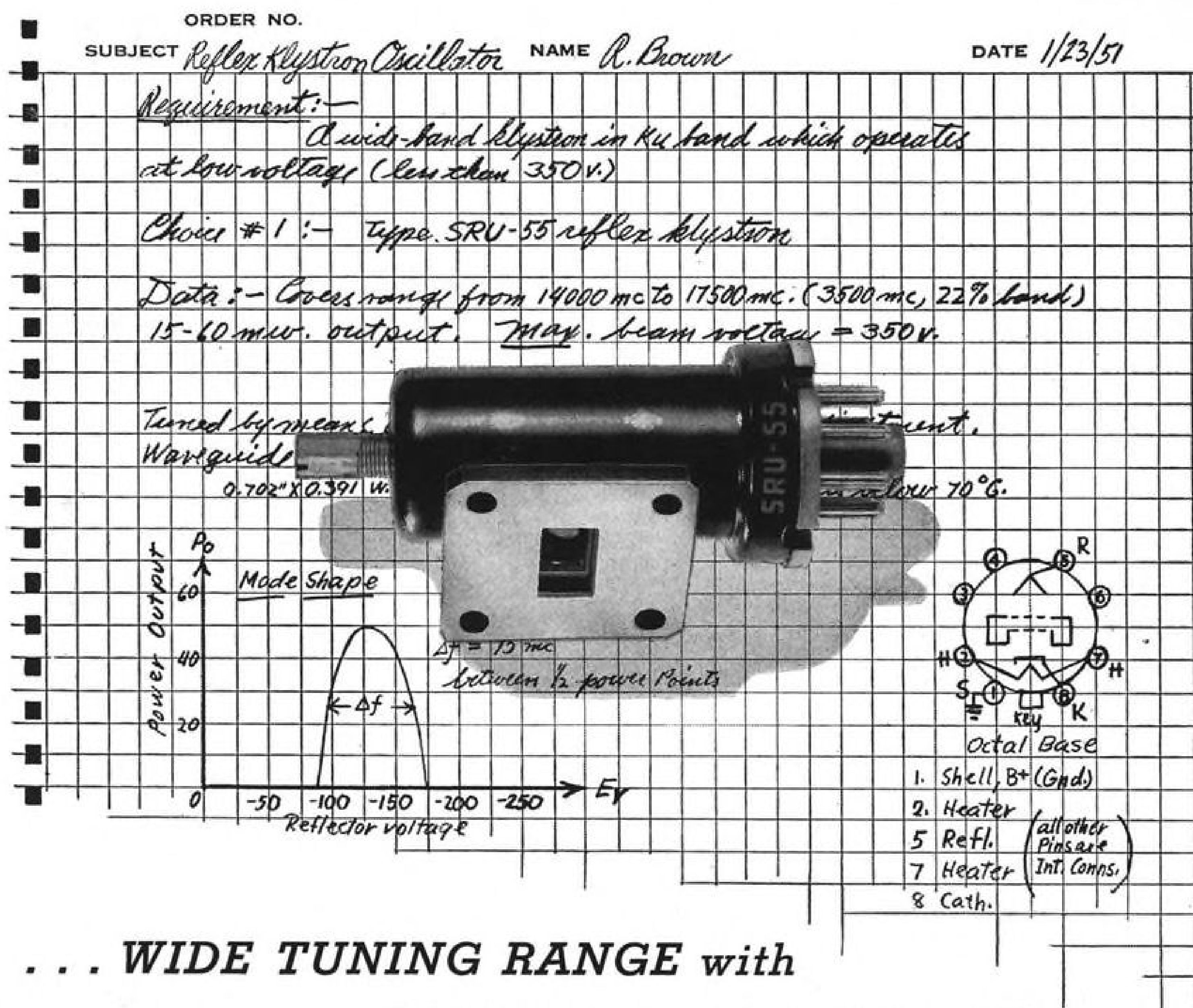
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NEWS DIGEST

DOMESTIC

Shipments of complete civil aircraft in July totaled 207, worth \$6.4 million and weighing 360,200 lb., a decrease of 20% in number and 10% in value compared with July, 1950. Engine shipments aggregated 164,200 hp. valued at \$2 million. Employment in aircraft manufacturing plants was 312,863, a 5% gain over June. Engine plane employment jumped to 68,914, a 4% rise over June.

Lt. Gen. George E. Stratmeyer will return from Japan in November, to retire after 36 years of service. He relinquished command in the Far East Air Force after suffering a heart attack.

Republic F-84G in-flight refueling fighter-bombers are being picked up and ferried to USAF wings by Air Force pilots. The G is the first production fighter equipped for single-point mid-air refueling.

USAF has curtailed use of F-84 Thunderjets in Europe because of a critical shortage of spare parts, according to an Air Force spokesman.

Boeing Airplane Co. was denied Supreme Court review of its unsuccessful suit for \$9-million damages from two unions for alleged violation of a 1946 no-strike agreement.

Douglas R6D Liftmaster has entered Navy service with delivery of the first big four-engine transport to Air Transport Squadron Three. Douglas Santa Monica plant has a quantity order from Navy for the Liftmasters, designated commercially as DC-6A.

Col. A. D. Tuttle, United Air Lines medical director since 1937 and commandant of the Army School of Aviation Medicine, 1933-37, died Oct. 6 at Chicago, age 71. He pioneered application of military medical research to commercial aviation and was a leading authority on aviation medicine.

Ernest J. Vogt, 40, well-known in the rocket propulsion field, died in a Colorado Springs, Colo., hospital. He was recently named by the American Rocket Society as one of five men in the U. S. who had done most in rocket development.

Return of about half the 1,900 striking workers at Pratt & Whitney Aircraft's Southington plant has enabled the company's East Hartford plant to

go to a 5-day week from the 2 1/2-day-per-week operation necessitated by stoppage of shipments from Southington. Employees joining the back-to-work move at Southington will work a 60-hr. week.

FINANCIAL

Convair reports income, after provision for taxes, of \$5,922,941 for the nine months ended Aug. 31. This compares with \$5,536,311 for the same period of 1950, when no tax provision was required, but \$2,200,000 of suspended profits on prior years' work was brought into income. Unfilled orders were \$750 million. A quarterly dividend of 35 cents a share was authorized, payable Nov. 23 to holders of record Nov. 13.

Flying Tiger Line has declared 5% preferred stock dividend, worth \$1.65 a share, to holders of common stock on record Oct. 12.

Mid-Continent Airlines reports profit of \$130,293 or 31 cents a share for the first eight months of the year. Company's trunk routes brought in \$186,765, while local service route showed a net loss of \$56,472.

Western Air Lines has authorized a 25-cent dividend payable Nov. 15 to stockholders of record Nov. 1. This is the line's second dividend this year.

Air Associates, Inc., is declaring a first quarterly dividend of 15 cents per share on preferred stock and will continue the dividend on common at 10 cents per share. These will be paid Oct. 15 to holders as of Oct. 8.

Solar Aircraft Co. has voted a 22.5-cent dividend on preferred stock payable Nov. 15 to holders as of Oct. 31.

Jack & Heintz, Inc. will pay a dividend of 15 cents per share of common stock on Nov. 1 to holders of record on Oct. 12, the company's first dividend.

INTERNATIONAL

Hawker Siddeley Group is converting one of its plants, now building prefabricated housing, to produce the Armstrong Siddeley Sapphire jet engine.

Canadian government aviation orders for the first two weeks of August totaled \$4,611,300, including a \$1,547,000 order to Canadair Ltd., Montreal, for aircraft repairs. Northwest Industries Ltd., Edmonton, has received orders for \$1,692,000 for similar work.

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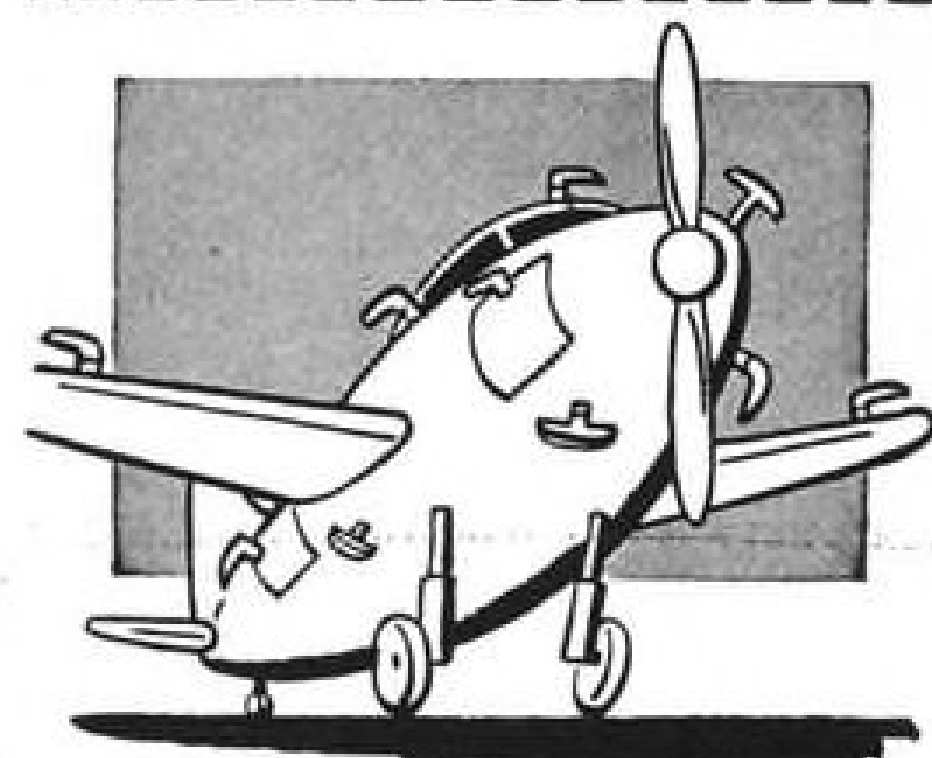
AVIATION CALENDAR

- Oct. 15-18—Society for Non-Destructive Testing, eleventh annual meeting, with symposium on jet engines parts inspection, Hotel Detroit, Detroit.
- Oct. 16-17—Fourth annual New York State conference on airport development and operations, 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. 19—Meeting of the New York section of the American Rocket Society, including a talk, Failures in the V-2 Program, by Dr. Porter of General Electric, 29 W. 39 St., N. Y. 18, N. Y.
- Oct. 19-20—Meeting of the Engineers Council for Professional Development, Hotel Statler, Boston, Mass. For information write: Miss Elsie Murray, 33 W. 39 St., N. Y. 18, N. Y.
- Oct. 22-24—National Electronics Conference & Exhibition, Edgewater Beach Hotel, Chicago, Ill.
- Oct. 24-25—1951 annual convention of the National Assn. of State Aviation Officials, Arizona Inn, Tucson, Ariz.
- Oct. 29-30—Air Industry & Transport Assn. of Canada, annual general meeting, Seignior Club, Montebello, Quebec.
- Oct. 29-31—National transportation meeting of Society of Automotive Engineers, Hotel Knickerbocker, Chicago.
- Oct. 30-Nov. 16—Fifth Air Transportation Institute conducted by The American University, Washington, D. C.
- Oct. 31-Nov. 1—Society of Automotive Engineers, fuels and lubricants meeting, Drake Hotel, Chicago.
- Nov. 7—Annual Wings Club Dinner, Waldorf-Astoria, New York.
- Nov. 8-9—Seventh annual national conference on industrial hydraulics, sponsored by the graduate school of Illinois School of Technology and Armour Research Foundation, Sherman Hotel, Chicago.
- Nov. 16—Annual business meeting of the American Rocket Society, 29 W. 39 St., N. Y. 18, N. Y.
- Nov. 28-30—National convention of the American Rocket Society, Atlantic City, N. Y.
- Nov. 30-Dec. 5—Meeting of the American Society of Mechanical Engineers, Chalfonte Haddon Hall, Atlantic City, N. J. For information write: Ernest Hartford, 39 W. 39 St., N. Y. 18, N. Y.
- Dec. 4-5—Transport aircraft hydraulic accessory and system conference, sponsored by Vickers Incorporated, Hotel Sheraton, Detroit.

PICTURE CREDITS

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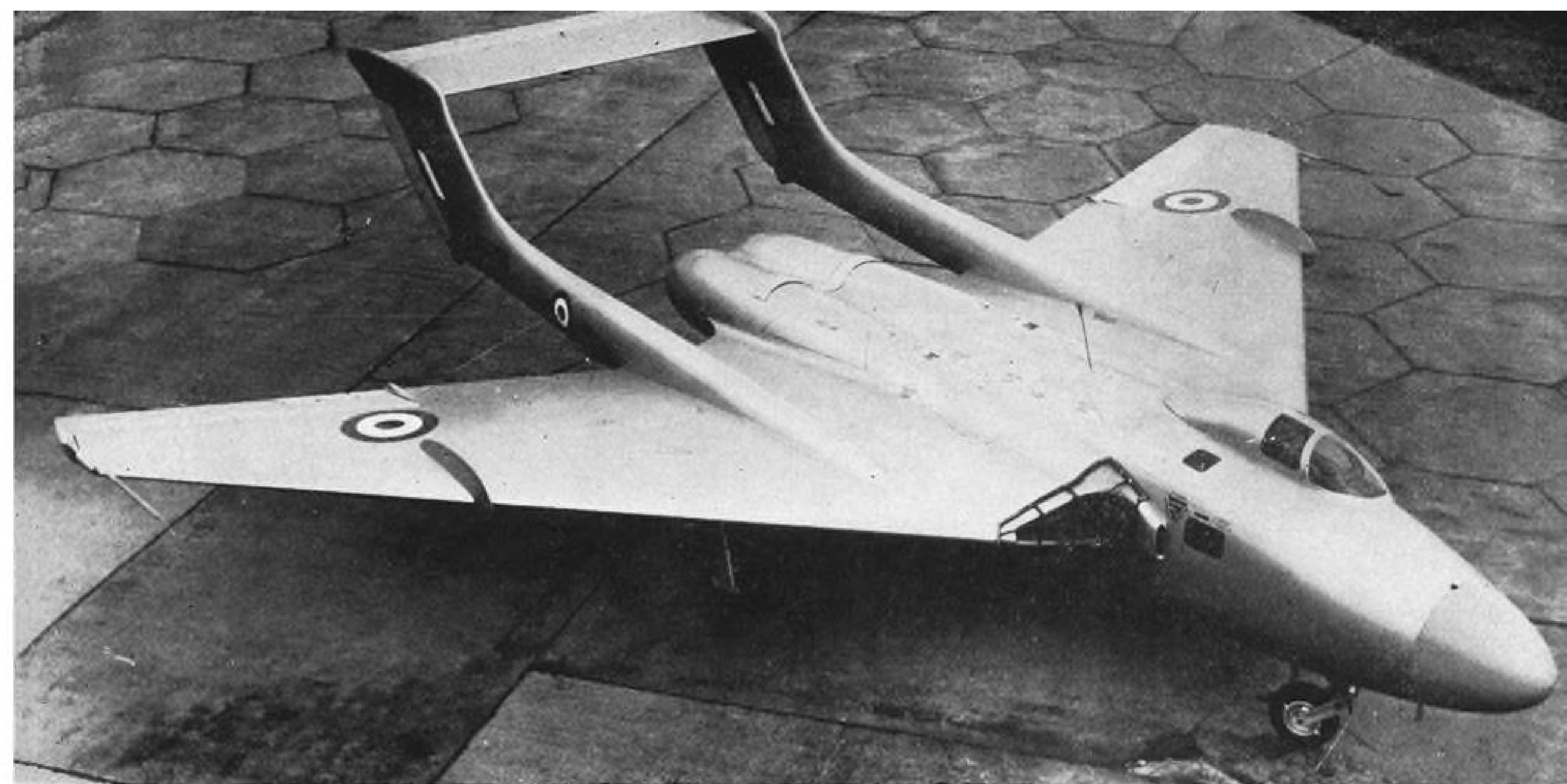


REPRESENTATIVES

Robert North
338 Simmons Ave.
Webster Grove, Mo.

George E. Harris
Municipal Airport
Wichita, Kansas

AVIATION WEEK, October 15, 1951



NEW DH TWIN-JET FIGHTER—First photo of de Havilland's new DH 110 all-weather interceptor fitted with two Rolls-

Royce Avon jets mounted side by side. Points of interest include sharply swept wings and tail, former having "fences," nose

radome, offset pilot's cockpit, leaving room for radarman to sit near him. Wings and horizontal tail appear of very thin section.

Picture Highlights Of the Week

MUSTANG CARRIES TWO—Famed World War II North American Mustang following conversion by Texas Engineering & Mfg. Co. to seat two in tandem for use as high-speed instrument trainer. Temco is delivering a number of these modified Mustangs, redesignated TF-51D, to USAF Training Command.



SMOKE-LAYING SCORPION—Northrop F-89A Scorpion, paced by an F-80, lays a protective screen from its two M-10 underwing smoke tanks.

GROUND SUPPORT CORSAIR—Vought AU-1 is latest of long Corsair series, has P&W R-2800-83W single-stage engine.





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WHO'S WHERE

In the Front Office

Alvin P. Adams has been named a vice president of Pan American World Airways, assuming duties and responsibilities of Adm. John H. Towers, who is due to reach retirement age shortly. Adams formerly headed his own aviation management consultant firm, previously was president of Western Air Express, now Western Air Lines.

Arnold K. Brown has been appointed president and director of Transducer Corp. of Boston, electronic subsidiary of American Machine & Foundry Co. His new post will be supplementary to his duties as executive vice president of the parent firm. Brown formerly was vice president of Browne & Sharpe.

John A. Collings has been designated executive vice president of Trans World Airlines and will combine his new duties with his position as vice president-operations, which he has held since 1942. In other top level TWA moves, Gordon L. Gilmore, who has been with the carrier since 1946, has been made vice president-public relations and David W. Harris, with TWA since 1947, has been elected vice president-industrial relations.

Changes

A. B. Scoles, formerly with Aerojet, has been appointed resident administrator of Convair's Guided Missile division. . . . Claude N. Monson has been named manager of the AiResearch Manufacturing Co. of Los Angeles, also retaining his other post as treasurer of the Garrett Corp. of Los Angeles.

Trevor H. Clark, formerly of Federal Telecommunications Laboratories, has been designated director of Southwest Research Institute's division of military research and development. . . . Don Young has been named service manager for Aeroproducts division of General Motors. . . . F. I. Goodrich succeeds the late W. H. Wallace as general manager of Eaton Manufacturing Co.'s Spring division. E. H. Lindeman became assistant general manager in charge of Leaf Springs and H. H. Clark has been promoted to assistant general manager in charge of Coil Springs.

Glenn B. Warren has been appointed general manager of General Electric's new Turbine division as part of a move by GE forming six new operating divisions including the majority of the departments which constituted the former Large Apparatus and Small Apparatus divisions. James M. Crawford is the new general manager of the Motor and Generator division. Francis E. Fairman, Jr., has been named general manager of the Transformer and Allied Products division. George E. Burens is general manager of the Switchgear and Control division. Harold E. Strang has been designated general manager of the Measurements and Industrial Products division and William C. Wichman has been appointed general manager of the Component Products division.

INDUSTRY OBSERVER

This week's column was written by AVIATION WEEK engineering writer David A. Anderton from observation at the Society of British Aircraft Constructors twelfth annual show at Farnborough, England.

► Most widely known secret in British aviation circles is armament of new jet fighters such as Hawker P.1067 and Supermarine 508—a quartette of 30mm. cannon developed from the wartime German MK (for Motor-kanonen) 108. Major improvement in the armament has been in increased rate of fire.

► Hint of failure record is seen in current modification of canopies for Vickers Supermarine Attacker, first jet fighter in squadron service with the Royal Navy. Modification changes all-clear, double-thick sandwich design to a small-paned enclosure with after half of dural.

► Progress on Bristol 175 turboprop airliner (the Britannia) points toward a flight date of late 1952. Interior arrangement of the craft, which is roughly the size of the Stratocruiser but with less capacity, has yet to be finalized.

► The Avro Ashton, high-altitude flying test-bed, was shown at Farnborough with a section of the cabin completely fitted with seats and accessories for testing passenger comfort at different pressure levels.

► Continued British interest in flexible decks and undercarriageless fighters for naval aircraft was highlighted by the rubber mat landing of a de Havilland Sea Vampire one morning of the SBAC display. After two runs, the Vampire hooked on the third and dropped to the rubber mat heavily. Deceleration was reported as 3G, but looked like much more.

► De Havilland Comet, Ghost-powered, is scheduled to go into service on the London-Johannesburg run for BOAC, stopping at Cairo, Entebbe and Livingstone. Later Avon-powered Comet will be able to make the same run with stop only at Dakar.

► Airspeed Ambassador, just recently on trial passenger service between London and Paris for British European Airways, has been transferred to carrying freight. Since Ambassador is not designed as a freighter, speculation is that the shift in task is temporary until cabin heating and ventilating system bugs are removed. On early flights, passengers sweltered in tropical atmosphere of 85-deg. temperature.

► Bristol Sycamore helicopters, single-rotor, 4-5 passenger jobs, have been grounded temporarily pending elimination of clutch troubles. Grounding also delays development of Bristol 173 twin-rotored copter which uses Sycamore rotor head.

► The Marcel Dassault Mystere, sweptwing prototype French fighter, has been flown at speeds very close to sonic. Currently powered by a Hispano-built Nene, the Mystere is slated to receive the French Atar 101 turbojet of increased thrust. Informed sources say that the Mystere will reach supersonic speed with the new engine.

► The Sud-Ouest 4000, French twin-jet bomber of promising design, is unable to complete early stages of flight testing because of lack of funds for operations. Prospects are that the plane will be in the air again after January, which date will mark the beginning of the next French fiscal year.

► Estimates of Red air force strength in Europe vary from the value of 8,000 given by Arthur Henderson, British Secretary of State for Air, to a French air force estimate of 15,000 to 18,000. This figure is reported as tactical aircraft only, does not include any of the bomber forces situated in Russia.

Washington Roundup

140-Wing USAF?

First boost in USAF's build-up to 140 wings by 1954 faces an up hill fight within the Administration.

Joint Chiefs of Staff have approved the expansion beyond the present target of 95 fully manned wings by late next year.

The proposal is now before the Security Council—dominated by the heads of civilian departments and agencies.

The Council's concern centers on its cost—and the havoc the extra spending might play on the economy. It would shoot the current fiscal year outlay for USAF close to the \$30-billion mark; the total defense bill up to \$70 billion—over five times the \$13 billion spent two years ago.

Rep. George Mahon, chairman of the defense appropriation subcommittee, voiced qualms in a speech on the floor:

"Before approval can be given the accelerated program, it is necessary to consider whether or not industry and labor can provide the materials. . . . There are also very grave fiscal considerations which must be weighed carefully . . . before decision is reached on the magnitude of the new air power program."

Counterbalancing the inclination to caution in putting "guns" ahead of "butter" are new intelligence reports of the massing of greater enemy air power in the Korean theater.

Last week, though, the Administration wouldn't even say "maybe" to air power expansion.

- **Congress was set to okay** a \$5-billion "national emergency fund" to "broaden the base" for a build-up of Naval air and USAF beyond the present goals of a 14-carrier Naval force and a 95-wing USAF, and to provide funds to let contracts at the turn of the year to keep the two arms manned at this present target strength with up-to-date aircraft after mid-1953. Defense Secretary Robert Lovett recommended the \$5 billion. He explained that it wouldn't be a committal to bigger air power build-ups, just lay the groundwork. The Senate voted the fund. The House was ready to go along.

- **But the President said no.**

- **The outcome:** Congress voted \$1-billion additional for plane buying anyway: \$667 million for USAF, \$333 million for Navy. A big slice will go for electronics equipment—some of which now requires longer lead time for production than that which is required for airframes or even engines.

- **This means:** no time will be lost in the building up of air power—if the President early in the year gives the green light to the 140-wing program and the some \$6 or \$7 billion additional outlay USAF will need to implement it. The services wouldn't have obligated the \$5 billion before January even if that amount had been voted them.

USAF: The Major Defense Arm

Moneywise, the Air Force, only four years an independent service, is now the major arm of defense. The current 1952 fiscal year military budget as approved by Congress divides the funds: USAF, \$20.6 billion; Army \$19.9 billion; Navy, \$15.9 billion.

It will take about two years to translate the funds into strength in being.

Vandenberg vs. Fechteler

USAF's Chief of Staff, Gen. Hoyt Vandenberg, and new Chief of Naval Operations, Adm. William Fechteler, have different ideas on the role of the foot soldier in a coming war.

Fechteler expects the doughboy to hold the key to victory; Vandenberg foresees tactical aviation, equipped with "baby" A-bombs, holding out the promise of victory for radically out-numbered allied ground troops.

- **Fechteler's viewpoint:** "Neither the great improvements of the past nor those of the foreseeable future will alter the basic military truth that all arms are auxiliary to the foot soldier. 'The man who walks on the ground' remains and will remain the controlling factor in forcing an enemy to do our will. His arms will remain basically what they are today. The support he needs will be rendered with devices basically as they are today."

- **Vandenberg's outlook:** "We stand on the threshold of immense and fateful developments. If it was a truism before to say that air power armed with conventional weapons held the key to the ground battle, it can now be predicted with reasonable confidence that air power plentifully armed with atomic weapons may, through the precision bombing of retardation points, prevent the massing of the huge aggregations that brought on the bloody slaughters of the past."

Boyle Aviation Accounts

The law business sold by Democratic National Committee's Chairman, William Boyle to his partner, Max Siskind for \$150,000, when Boyle changed his status from unpaid to paid executive vice chairman of Democratic National Committee early in 1949 included (according to Siskind's report):

- **United Air Lines.** Valuation, estimated by Boyle and Siskind: \$30,000. The account involved controversy with War Assets Administration over leasing arrangements for part of the former Tucker plant in Chicago. The outcome: A settlement was worked out with Jess Larson, then head of the WAA legal staff, now Defense Materials Administrator, but only \$15,000 in fees collected. Tom Davis, now Assistant Secretary of Commerce, was United's Washington representative at the time the account was handled by Boyle.

- **Trans-Caribbean Airlines.** Valuation: \$1,000. The account involved a dispute with WAA over surplus planes. The outcome: Settled to the company's satisfaction and \$1,000 fee collected.

Things to Watch For

- **No more regular flight pay** for airmen assigned to desk jobs—just intermittent pay for intermittent flying sufficient to maintain proficiency.

The new law provides no pay to personnel "whose actual assigned duties do not involve operational or training flights." Its congressional authors passed on this official explanation of the law's intent: "to make certain that officers and airmen shall not be permitted to draw flight pay except for flights on specific orders for operational or training flights, including such flights as are necessary to maintain the proficiency of administrative personnel." They estimate a saving of \$100 million annually.

—Katherine Johnsen

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Unrealistic Aircraft Schedules Face Cuts

- **Planners take new look at engine production and find they have more planes coming than engines.**
- **And, anyway, if present schedules are met, civilian production would really feel the pinch.**
- **So military schedules will be keyed to the engine output, but civil aircraft will take big slash.**

By Alexander McSurely

New reduced schedules for U. S. military aircraft production, based on a re-appraisal of how many powerplants can actually be supplied for the airframes, are due for announcement in less than two weeks.

Washington aviation circles were humming last week with reports of the extent of the expected cutbacks in schedules, and what planes and powerplants they would affect.

AVIATION WEEK learned that the revised engine schedules had already been determined for the first quarter, 1952, and that revised aircraft schedules, based on the engines available, would be announced to airframe manufacturers shortly.

- **Plant by Plant**—Two major jet engine producers, Allison and General Electric, were reported as meeting their schedules better than most of their competitors. Strikes have seriously interfered with production at Curtiss-Wright. Pratt & Whitney Aircraft has not been able to keep pace with the increases in production scheduled for it as a result of its strike situation, although it is still maintaining a good production rate on both jets and piston engines.

Westinghouse Aviation Gas Turbine division is reportedly behind schedule, due at least partially to the effect of the Kansas City floods on its jet engine plant there. The new Westinghouse J-40 is also reported behind schedule, to the extent that other makes of engines have been flown in some of the new Navy fighters which were scheduled to be powered by this engine.

As previously reported in AVIATION WEEK's roundup story on forthcoming automotive production, (Sept. 24, 1951 issue) there will be no substantial aid from the automobile manufacturers' jet engine program for many months.

Net result of the engine picture means that present military aircraft pro-

duction schedules in many cases are not realistic, the Office of Defense Mobilization and the Defense Department have decided.

A strong factor in the urge to cut schedules to so called "realistic" levels is the heavy pressure on the Defense Production Administration from the civilian industries which are more and more feeling the pinch of materials restrictions as military production starts to grow.

- **Where the Axe Falls**—Where will the cuts in airframe schedules fall? The Defense Department is trying to decide that question right now. But the best available guide to the forthcoming cuts is to study the types of engines which power the various aircraft.

It looks as if airframes powered by the fairly standard Allison J-33s and J-35s and the General Electric J-47s and probably the Pratt & Whitney J-48s which are coming out in fairly good numbers, will not suffer. As a matter of fact, USAF wants to accelerate schedules for such planes as the North American F-86s, Lockheed F-94s, Northrop F-89s, Boeing B-47s and Convair B-36s, all of which use some of these engines, as rapidly as is possible.

Curtiss-Wright's piston engines as

well as their jets are reported falling behind on production due to the strike. So airplanes using the Wright R-3350s and smaller Wright piston engines may experience schedule reduction as well.

At least one of the engine manufacturers (Allison) ran into an attempt to cut back some of its materials requirements at Defense Production Administration. The attempted cut was stopped by appeal, but it again raised the question of how far the new "open season" on military aircraft requirements can be carried in an effort to take care of civilian industry materials requirements.

- **May Not Be So Bad**—Informed sources say that the overall curtailments of aircraft schedules will not be nearly as drastic as industry fears. But the fact remains that schedules originally called for are going to be cut, and some of them sharply.

Whether the decision to chop existing schedules had any connection with the resignation of John A. McCone, USAF Undersecretary, is a question being asked around Washington. McCone had assumed considerable personal responsibility for the schedules which are now being chopped, and felt that the industry would be able to catch up and meet them in most cases. It is not believed that he looked with any favor on the proposed cutbacks of the program which he had fathered.

The cutbacks have been hinted at repeatedly in recent speeches of Manly Fleischmann, DPA Administrator and Defense Mobilizer Charles E. Wilson, who have made references to "a more realistic viewpoint on production schedules" and to hints that the civilian production can only be cut so far, and still kept alive.

DPA Moves Against Civil Aircraft Makers

Defense Production Administration has re-affirmed cuts of 11 to 39% in materials for civil aircraft production and military aircraft components makers, first reported in AVIATION WEEK Oct. 8, p. 70.

Outlook now is for one last-ditch fight in the DPA Program Adjustments Committee, with odds loaded against civil aviation by a stiff DPA staff report.

But Aircraft Production Board Chairman Harold (Bill) Boyer says he wants transport production continued.

So the top policy crisis on importance

of civil transports in mobilization is still a-building.

DPA staff's theories in making the 11 to 39% cuts in first-quarter aircraft allotments are:

- **Civil transports** and other aircraft aren't essential enough to escape heavy cuts in the shortage-ridden period ahead, DPA staff believes.

- **Civil aircraft allotments** requested by NPA Aircraft division are reportedly higher than other estimates of their requirements submitted by the Civil Aeronautics Administration's Aviation

Defense Requirements Office. DPA says if CAA figures are so much lower than NPA's, then DPA will take an even lower figure and see how it all works out.

DPA is out to stop "inventory building" by aircraft components users and manufacturers. So it slashes the components makers' estimates of requirements, too, as well as the civil aviation requirements. Some 95% of the aircraft components designated "B products" under NPA authority are for military planes.

• **Military needs** over-ride civil for scarce materials, DPA says. So the cuts previously reported will be mostly taken out of civil aircraft requirements. That is the DPA plan. Some of the cuts, however, will be passed on to military components. This is "so as not to stop all civil aircraft production." Military transports are on the same assembly lines as civil, and will be affected also by DPA's actions.

Gilpatric Succeeds McCone in AF Post

Resignation of John A. McCone as Undersecretary of Air Force and nomination of Roswell L. Gilpatric to succeed him have been announced by President Truman.

McCone is returning to Los Angeles to reenter private business. The 45-year-old Gilpatric, former New York attorney, has been serving as Assistant Secretary of Air Force since last April, with the assignment of formulating and supervising procurement policies of the USAF.

► **"Magna Carta"**—McCone's departure breaks up the team which first went into operation on the President's Air Policy Commission in 1947 and 1948. Thomas Knight Finletter, chairman of the commission and McCone, as one of its members, were generally credited with the major roles in preparing the commission's report, since generally regarded as a kind of Magna Carta for air power.

When Finletter was named Air Force Secretary in April, 1950, he promptly sought McCone as his undersecretary.

► **First Line**—McCone took over the task of supervising the rebuilding of the U. S. aircraft industry for military plane production to support the USAF as the nation's first line of defense. Tip-off to the fact that McCone has been preparing to relinquish his job was the increasing responsibility for procurement has been going to Gilpatric in recent months.

Gilpatric was born in Brooklyn and was graduated from Yale University Law School in 1931. Admitted to the bar in 1932, he became a member of the law firm of Cravath, Swaine and Wood.

► **Contract Expert**—During World War II, Gilpatric was counsel for corporations in war production and was concerned chiefly with the legal aspects of matters dealing with the financing of emergency plant facilities, and renegotiation and contract termination procedures.

McCone is returning to Los Angeles as chairman of the board of both the Joshua Hendy Corp. and the Pacific Far East Line, Inc. In 1937, McCone,

a former member of Consolidated Steel, formed the Bechtol-McCone-Parsons Corp., Los Angeles, to engage in design, engineering and construction of process plants, refineries and power plants. One of the major programs undertaken by that firm was construction of the modification center at Birmingham, Ala., for modification of B-24s and B-29s in World War II. It was one of the largest Air Force modification centers at that time.

Probers Eye AMC Procurement

Gen. Rawlings demands internal soul-searching as gratuity charges result in several resignations.

Dayton, Ohio—Air Materiel Command announcement that several key personnel had resigned in face of accusations of irregularities in procurement resulted in demands for further investigation and dismissal of others who might have violated regulations.

An Air Force spokesman said contracts involved amounted to millions of dollars, but there was no immediate indication of the scope of the alleged irregularities.

Extent of dismissals resulting from alleged violations of procurement regulations will depend completely on the range of promised investigations.

If the probers delve down to the "cigar-luncheon-cocktail" level — and such "gratuities" are banned by AMC regulations—the buying staff will be skeletonized almost overnight.

If, however, the probing centers around major irregularities such as revealed in two recent announcements by AMC, the dismissal mortality rate in the buying sections will be held to a minimum.

That is the general consensus here in face of:

- A threatened congressional investigation headed by Sen. Estes Kefauver after the Senate adjourns, and,
- An internal soul-searching by AMC as demanded by Lt. Gen. E. W. Rawlings, newly-appointed commanding general.

Evidence in the cases thus far unearthed has been turned over to the Department of Justice for possible prosecution.

► **Morale**—Meanwhile, refusal to identify individuals involved in dismissals is creating a morale problem within the Procurement division, charged with processing approximately \$16 billion worth of contracts during the current fiscal year.

The current wave of dismissals—and "shotgun" resignations—stems from a regulation which provides buyers may not accept gratuities from contractors, present or potential. "Gratuities" are

Naming Names

Air Materiel Command has released the identities of three persons involved in alleged procurement irregularities:

• **R. G. (George) Hollifield**, former employe in the Aero Medical Laboratory at Wright Air Development Center.

• **Luther Kratz**, former electronics buyer in the procurement division, Air Materiel Command.

• **Fred L. Bridges**, manufacturer's representative of Washington, D. C. Bridges is being sued for \$342.92 by Biltmore Hotel of Dayton for non-payment for a dinner he pitched for "high procurement officials." (Brig. Gen. Phillips W. Smith, chief of the procurement division, was supposed to attend, but was out of town on the date of the dinner.)

AMC also has announced barring two salesmen from doing business with the Air Force because of violations of procurement regulations. Named were **Sol Berke**, representing the Guild Products Co. of Newport, Ky., and **Don Bridges**, representing the Manufacturers Introductory Service, Inc., Dayton.

defined as favors from contractors or their representatives and range from actual cash gifts down through luncheons, entertainment and hotel accommodations.

While at least one of the seven cases brought to light currently involves an employee in the Wright Air Development Center, it has been turned over to AMC for investigation because it pertains to procurement which is vested in AMC.

► **AF View**—In a prepared statement,

which he issued, Gen. Rawlings declared:

"We in the Air Force have a sacred obligation to build up the defenses of the United States as quickly and surely as possible. Any man or woman who violates the standards of the Air Force, and thus hinders our procurement program, will be separated from his or her Air Force connection immediately.

"The Air Force has rigid rules against military personnel, or civilians employed by the military, accepting gifts, gratuities or performing their duties in any irregular manner.

"However, in any operation involving thousands of people and billions of dollars, a very few will try to make money by any means. I have informed everyone in my command to be on a sharp lookout for such individuals. Our system of detecting and preventing misconduct is good and we are constantly seeking to improve it. But no matter how perfect our checks may be, some offenders may go undetected for a short time.

"We have suspended several civilian employees lately for irregularities. Several others have resigned when they knew they were under investigation. Their numbers are infinitesimal when compared to the thousands of people in our command who are doing an honest, tireless and effective job for their country. Thank God, we have so many of these latter."

Among the cases cited in the statement which was issued by the general are:

- **Dismissal**—One civilian who admitted discrepancies in dealings with a contractor.
- **Suspension**—One civilian for six months and transfer to another job outside procurement for the same reason stated.
- **Resignation**—A buyer of survival equipment who admitted receiving gratuities; a buyer of electronic equipment who admitted making specification changes to limit bidding to a favored few firms; a supervisor who admitted accepting gifts and resigned the next day to accept employment with an old line contractor.

Others include one instance in which a contractor had a contract canceled because of erroneous statements by his representative.

All manufacturers' representatives are compelled to sign a statement that they will not offer gifts to Air Force personnel.

Failure to so sign could lead to barring of the representative in question from the base.

Violation of affidavit terms makes possible cancellation of the contract with the buyer involved, certain other penalties and barring the representative from the base.

New Aviation Engine Plant for Chevrolet

Chevrolet division of General Motors moved still farther into the aircraft engine production program last week with announcement of plans to build a new aviation engine plant with 1 million sq. ft. capacity at Flint, Mich., for production of parts and subassemblies of Wright R-3350 engines.

These will be assembled at the Chevrolet Tonawanda, N. Y. plant site, where approximately 3 million sq. ft. of additional plant area is being assigned to the project. Seven other Chevrolet plants already have received production assignments for components of the engines and additional assignments are planned.

Construction of the Flint plant and of a million sq. ft. addition to the Tonawanda plant are due for completion in about a year.

Chevrolet will build both the Wright

R-3350-26W piston engine rated at 2700 hp. and the R-3350-30W compound turbo-piston engine, rated at 3500 hp. under contracts for the Air Force and the Navy.

Stepping up of the Chevrolet plant capacity for the R-3350 production indicates a still larger emphasis on the big engine, which powers such planes as the Fairchild C-119, Lockheed P2V and the Douglas AD-1. The Chevrolet R-3350 production will be in addition to that already underway at the Wright Aeronautical Corp., original developer of the engine, at Wood Ridge, N. J.

USAF Appointment

Brig. Gen. Ralph P. Swofford, Jr., has been appointed commandant of USAF's Institute of Technology at Wright-Patterson AFB, replacing Brig. Gen. Leighton L. Davis, who will become chief of armament, Air Research and Development Command, at Baltimore, Md.



BUCKAROO WITH A KICK

Temco's new T-35 Buckaroo trainer, weighing only 1,975 lb. fully loaded, carries ten 2.75-in. rockets, two 30-cal. machine guns with 100 rounds of ammunition each, elec-

tric gunsight and 16-mm. gun camera. Speed range is 52-128 mph. to combine slow-flight advantages for liaison with high speed for strafing and target marking runs.

Boost for Bell

• Court scores rulings of renegotiators, revenueurs.

• Firm gets \$2.2 million in cost-plus-fixed-fee suit.

Bell Aircraft Corp. has won a \$2.2-million legal victory in the U. S. Court of Claims in Washington which may serve as an important legal precedent to other military aircraft contractors. The judgment, actually for \$2,286,819, was awarded as reimbursable items in four cost-plus-fixed-fee contracts for manufacture of World War II P-39 Airacobra fighter planes. It represented experimental and development expenses of \$1,035,918 and production tooling costs of \$1,250,901, which it was claimed had not otherwise been recovered.

The four cost-plus-fixed-fee contracts had totalled \$307.8 million in costs, plus \$14 million in fixed fees specified, and represented orders for 10,162 planes and spares.

► One Dissented—Three of the judges ruled for Bell to recover the full amount awarded, a fourth would have disallowed \$986,000 of the award, while the fifth judge dissented and would have dismissed the plaintiff's petition.

But what is significant as a procurement law precedent is this:

The three-judge majority finds essentially that Bell had intended to amortize all of the costs sued for on its earlier fixed price contracts but had been prevented from doing this by rulings of the Bureau of internal revenue and the renegotiation authorities of the government.

They had "insisted that such an allocation improperly reduced plaintiff's actual profits on its fixed price contracts," the court finds. It was after this that Bell re-allocated the costs to all P-39 production including CPFF contracts, even though some of the costs had been incurred before the CPFF contracts were started. And the judgment evidences the court's approval of such a cost allocation procedure.

► Back to Pushers—In an 80-page fact-finding and judgment, the court traces the intricate procurement negotiations of Bell and the U. S. Army Air Corps, starting back in 1936, with the contract to build the now forgotten twin-engine pusher multi-place fighter, the XFM-1 Airacuda.

Three other experimental fixed-price contracts followed—for the first Airacobra P-39 in 1937, then for a service test quantity of 13 YFM-1 and YFM-1A Airacudas, and finally with the Navy for a single XFL-1 Airabonita, a

carrier fighter version of the Airacobra.

The court's findings listed as "basic principles of design and fabrication" which were developed in experimental contract work and later incorporated into the P-39 production models, such items as:

- Installation and successful operation of a liquid-cooled Allison engine.
- Extension of the drive shaft.
- Successful air intake wing ducts.
- Successful anti-shimmy dampener for nosegear.
- Successful installation of 37-mm. repeating cannon.
- Flush riveting with high strength aluminum alloy skin, specified for the XFM-1.
- Heavy-duty landing gear and noseover beam developed for the Navy Airabonita and later incorporated in P-39s.

Production tooling for the P-39 which could not be used in the re-tooling ordered for the later Bell P-63 Kingcobra, was scrapped after the P-39 model was discontinued in April, 1944.

(Air Corps records show that Bell delivered approximately 9,000 Airacobra P-39s, plus spares, including approximately 5,000 that went to Russia on lend-lease and had contracted to make an additional 810 British Model P-400s which were essentially similar. Some British planes were delivered and others were taken over by the U. S. Army Air Corps, some of which were used in the Pacific.

The court's fact findings showed that Bell had received fixed-price contracts for 966 Airacobras from the U. S. Army for \$37.5 million and for the 810 British P-400s for \$33.8 million. After the last Army fixed-price contract, dated June 5, 1941, later P-39 contracts were on a cost-plus-fixed-fee basis, as were the subsequent P-63 contracts.

Original cost of the three Bell prototypes as paid under their experimental contracts was:

- Airacuda FM-1, \$390,300
- Airacobra P-39 \$245,880
- Airabonita FL-1 \$245,000

But on the service test quantity of 13 of the multi-place fighters, including three with tricycle gear modification, Bell was paid a unit price of \$243,000, \$3,168,000 or slightly less than the unit price for the Airacobra prototype.

Difference between these pre-world War II prices and those paid for today's first-line fighters is indicated in recent Navy testimony before Congress setting the value of a single jet fighter in production at approximately \$1 million.

F-94s Sent to Otis

Lockheed F-94 all-weather fighters have been assigned to Otis AFB, Mass., joining those at McGuire AFB, N. J., in the air defense of the New York and Boston areas.

Wright Says Strike Halted Work on J-65

The situation at the strike-bound Wright Aeronautical Corp.'s Wood-Ridge and Garfield, N. J., plants last week was still confused.

The battle between the company and the union—Amalgamated Local 669 UAW CIO—has pretty much resolved itself to an exchange of views in newspaper advertisements.

Wright Aero published in a New Jersey newspaper a letter to Curtiss-Wright Corp., the parent company, from Local 669. This stated:

"... It is common knowledge that the production of the J-65 engine was not nearly ready to begin when the strike started. It is also common knowledge that production of this engine could not possibly get under way within the next three or four months. Anyone who has any connection with the Wright Aeronautical Corporation knows that this engine has not left the experimental department."

To dispute this contention and clear the air on the actual production status of the J-65, Wright Aero opened its Wood-Ridge plant to a press group. Here's what the company had to show:

- The first of five pre-mass production engines was unveiled. This was represented to be about 85% completed. The compressor rotor and the turbine wheels were not installed but were on hand for assembly. Some accessories were mounted—throttling control, acceleration control, fuel control, oil tank and vibrator ignition units.
- Parts for the other four engines (except sheet metal parts) also were claimed to be on hand. Actual parts for the engines could be seen all over the area where the first engine was displayed.
- The J-65 program is on schedule, according to Wright officials. The company was given the go-ahead sign by the Air Force last December and the first engine would have been completely assembled well within the year anticipated, and the first "production" engine would have followed very soon thereafter, possibly before the end of the year. This might still be done, apparently, but the indefiniteness of the strike clouds the production status.

► According to Plan—It must be understood (and Wright officials emphasized this) that these first five J-65s are as planned—pre-mass production units. Their purpose is to prove out assembly stands, tooling, process and conversion sheet, etc. These are "trial run" engines, but any one or all of them might make the transition to the actual production article—depending on how they check out.

In any event, Wright Aero officials

claim that J-65s will be ready for installation when the airplanes need them.

The planes obviously are meant to be the Martin B-57A (Canberra) and the Republic F-84F.

Ward Heads AF's Heavy Press Project

Appointment of J. Carlton Ward, former president of Fairchild Engine and Airplane Corp., to the post of coordinator of the Air Force's \$210-million program for construction of heavy forging and extrusion presses has placed new emphasis on speedup of this program.

It is understood that the total program calls for some 20 presses to be built and that five of these are already contracted for. Ward has called for an airframe industry survey to determine what priority should be put on the construction of the remaining presses programmed.

Indications are that the U. S. aircraft industry production engineers have now generally accepted the forging press program as an important step forward in shaping and forming the heavier materials used in today's and tomorrow's aircraft and missiles.

With the pressure for a go-ahead on the program, it is expected to move out of the experimental phase, as rapidly as bottlenecks in connection with production of the presses will permit such a move.

Four Stars for Three Generals

Three Air Force lieutenant generals, Cannon, Le May and Chidlaw, were nominated last week by President Truman to the rank of full general. They are the commanders of Tactical Air, Strategic Air and Air Defense Commands.

Confirmation of the three promotions to four-star rank will bring the total number of Air Force four-star ranks to six. The other three are Generals Hoyt S. Vandenberg, Chief of Staff; Nathan F. Twining, Vice Chief of Staff; and Joseph T. McNarney, chairman of Defense Department's Defense Management Committee.

General H. K. Cannon, who was born in Salt Lake City, Utah, in 1892 is commanding general of the Tactical Air Command at Langley AFB, Va.; Curtiss Le May, born in 1906, is commanding general of the Strategic Air Command at Omaha, Neb.; and General Benjamin W. Chidlaw was born in Cleves, Ohio, in 1900, is commanding general of the Air Defense Command at Ent AFB, Colo.

We Have a 700-Group USAF

Here's why you may be confused about all this newspaper talk about wings and groups comprising the Air Force structure.

Back in years prior to 1948 an AAF combat group was housed, fed and maintained by an air base commander. The combat group was a tenant and the air base commander was the landlord. When the combat group moved to another base, it acquired the housekeeping facilities of the new landlord. It was always unwieldy because there was a split command and responsibility between the combat group commander and the air base commander.

When the Air Force became an autonomous department Sept. 18, 1948, structure of the USAF was reorganized. A wing base plan was adopted so that each combat group would be a completely self-sustaining organization. To accomplish this, Air Force supplied each combat group (containing all combat aircraft) with its own housekeeping groups. These are a maintenance and supply group; an air base group; and a medical group.

Thus, today, reference to any one of the 95 wings coming into full strength means one combat group plus three supporting groups. With this type of organization, any of the 95 wings if fully manned with three supporting organizations may be moved in its entirety to any point in the world ready for action.

Air Force is striving mightily to implant the word "wing" in the minds of Congress and the public in place of the old word "groups." But even the Air Force confuses itself when thinking in terms of groups. By way of explanation, the

Air Force actually now has a total of some 700 (Editor's note: That's right, 700) groups. These include such other-than-combat organizations as air depot, pilot training, service, utility, air transport, guided missile training groups and hundreds of others of specialized nature.

► Personnel Strength—When you count noses in the Air Force structure, unless you're inside the Pentagon, you really get confused because of the varying sizes of the USAF wing. In the first place, more men are required to crew, maintain, and fly a bomber than a fighter. But on the other hand there are far more planes in a fighter wing than in a bomber wing.

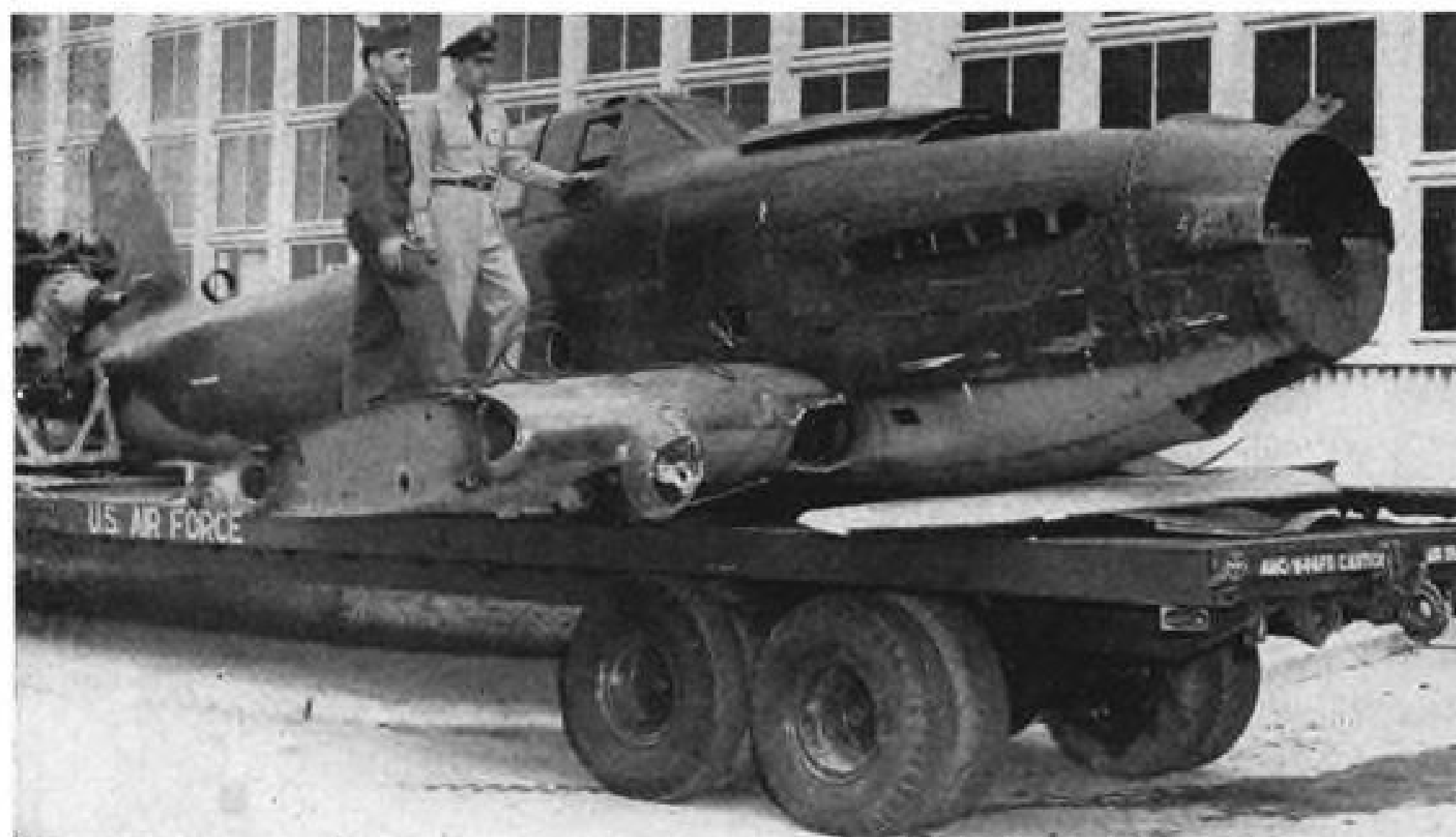
Most of the Air Force wings have been manned in peacetime strengths. These are now converting to what USAF terms "readiness" strength, and for the most part these strengths are classified. War strength figures are maximum capacity and Air Force permits their disclosure in round numbers.

In some instances conversion from peacetime to war strength may include addition of another squadron of combat aircraft. So in the personnel column in the accompanying tabulation, jumps of about 1,000 from peacetime strength to wartime strength usually indicate addition of another squadron. Current tables of planes comprising USAF strength are based upon peacetime levels. In the readiness period, for the most part aircraft strength remains the same, but in computing war strengths add 1 to the number of squadrons and one-third to the number of planes per combat group.

Air Force Strength

Type of Aircraft	Personnel		Number of Planes	
	Peace	War	Per Squadron	Per Group
Heavy bomber (B-36).....	3,100	*	10	30
Medium Bomber (B-50, B-47)...	2,300	4,200	10	30**
Light bomber (B-26, B-57)....	1,600	2,800	16	48
Troop carrier, heavy (C-124)....	1,900	3,500	12	36
Troop carrier, medium (C-119, C-123)	1,600	2,400	16	48
Fighter (F-84, F-86).....	1,600	2,300	25	75
All-weather fighter (F-89, F-94) 1,500		2,100	12	36
Tactical recon (RF-80, RF-84)..	1,600	2,400	18	54
Strategic recon (RB-50, RB-36)..	3,000	4,200	12	36
Liaison (L-5, L-19, H-5).....	Varies	Varies	16	0
Tow target (B-26, B-45).....	Varies	Varies	9	0
Rescue (SA-16, SB-29, SB-17)..	Varies	Varies	36	0

* Classified.
** Some medium bomb groups are comprised of 45 planes to a group plus 20 tankers.



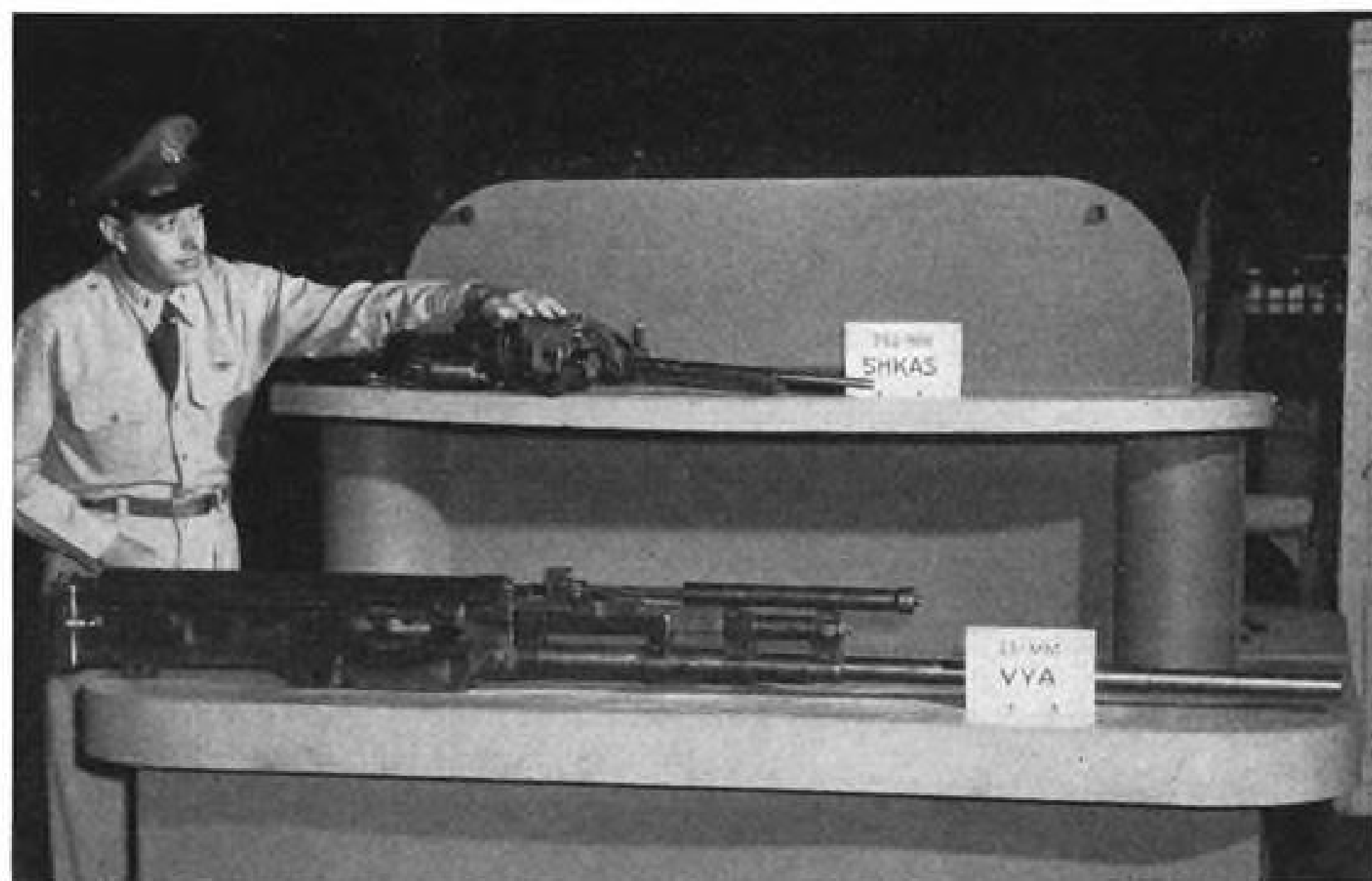
RUSSIAN-BUILT IL-10 close support and reconnaissance aircraft captured in Korea is shown stripped down outside the ATIC building at Wright-Patterson AFB where it will undergo close study by experts.



WING SECTION of a YAK-11 shot down over Korea is inspected. Although only a trainer gun mounts were provided in plane.



UNIFORMS of North Korean or Communist Chinese also are being given close inspection. Tags are GI inspired.



ARMAMENT removed from Russian IL-10 by ATIC included the 7.62 Shkas on top rack and the 23 mm Vya, below. One of each model is mounted in either wing of the two-seater support aircraft.

AF Studies Captured Russian Equipment

Dayton, O.—More effective fire power is the dominating factor in United Nations successes in air battles against Russian-built fighters over Korea.

That's a logical conclusion after analysis of equipment captured in Korea and flown to Wright-Patterson AFB for detailed analysis by experts operating under direction of Air Technical Intelligence Center.

Nerve center of ATIC operations is Building 89 at this Air Force base and it is here that military aircraft component specialists delve into performance of captured equipment to make their evaluations which, in turn, are

matched against capabilities of our aerial equipment.

Carefully-screened visitors won't find complete enemy aircraft on the premises. Rather, they find minor units or bits and pieces of enemy aircraft which are being subjected to exhaustive testing to ascertain strong and weak points.

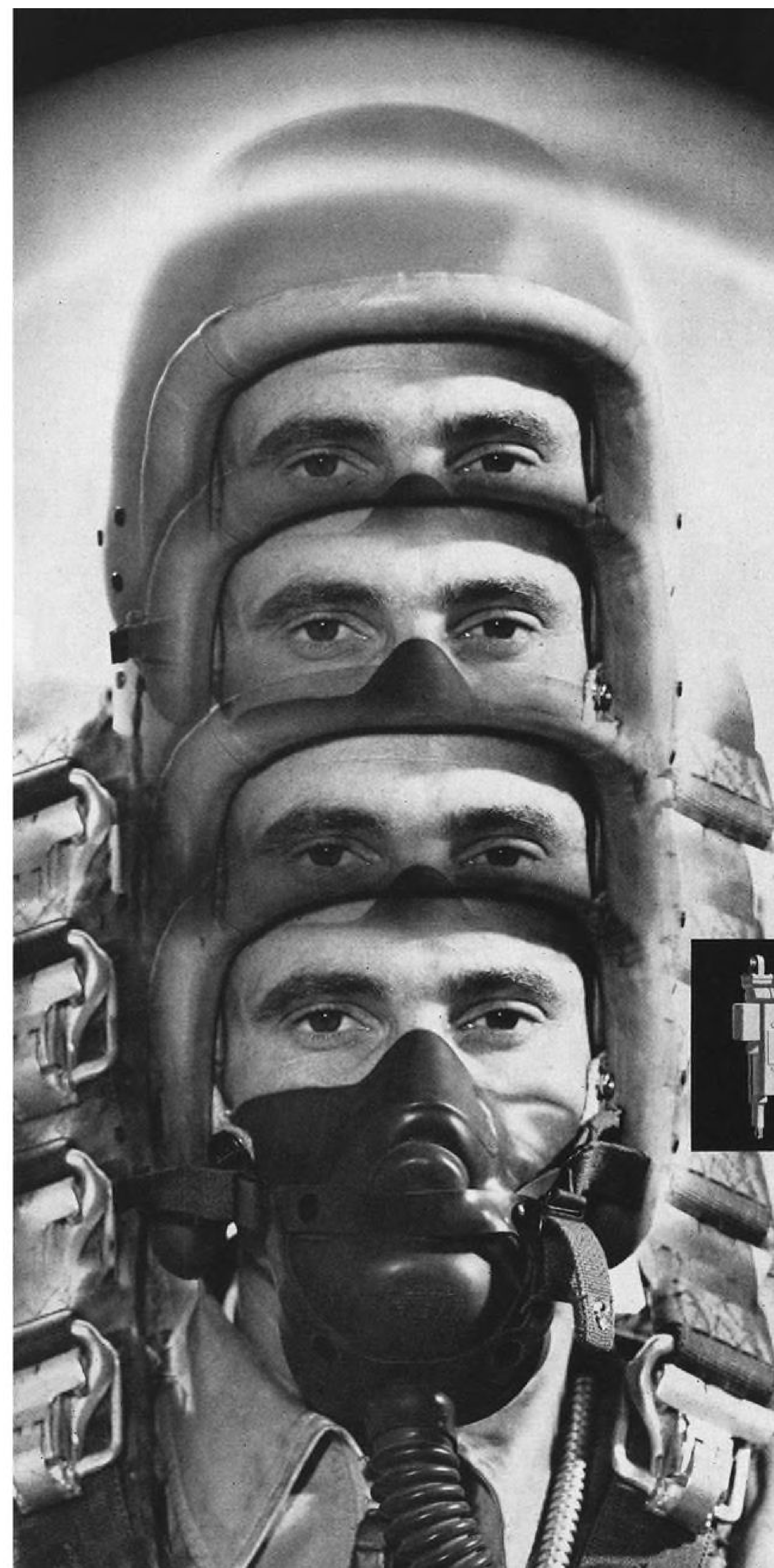
Take the IL-10, for instance. It is a Russian two-seater close support and reconnaissance plane salvaged in Korea and the source of much illuminating information on the trends taken by Russian aircraft designers. It carries two Vya 23 mm guns, one in each wing and a smaller Shkas 7.62 mm gun in each wing. The former is a bit heavier

than our .50 caliber machine gun—but nowhere near its rate of fire power.

The rear gunner in this two-seater also has a 12.7 mm machine gun mounted in the rear turret.

A MiG-15, the YAK-11 are among the hundred tons of captured enemy equipment sent to ATIC from Korea. Major assemblies are taken apart to see what makes them tick by specialists under the direction of Col. Harold E. Watson, the chief.

Col. Watson and his staff are silent on their findings. But the results of these tests are passed along to industry and, where applicable, to our tactical forces.



"Up, Please"

TODAY'S JET PILOTS merely flick a switch to move up or down in the cockpit. Hand-cranking steals sonic seconds...had to be washed out of jet aircraft.

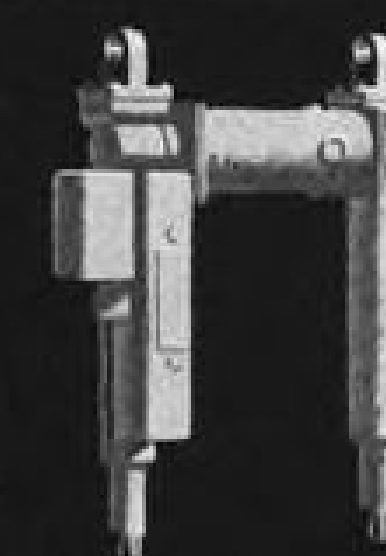
GILFILLAN'S JOB: mass produce fast a push-button elevator to raise and lower the pilot seat for Lockheed's F-94 All-Weather Interceptors and T-33 Two-Place Jets.

IMPORTANT? Vital! Safe landing and taxiing, accurate gun-firing, easy reach of controls and instruments depend on pilot position. Jet speeds and complex cockpits demand quick, easy seat adjustment.

Gilfillan developed and designed a pilot seat elevator to "impossible" specifications in record time. Weight: 7 lbs. Performance: lift 350 lbs. 5 inches in 5 seconds, operate at 72 below zero.

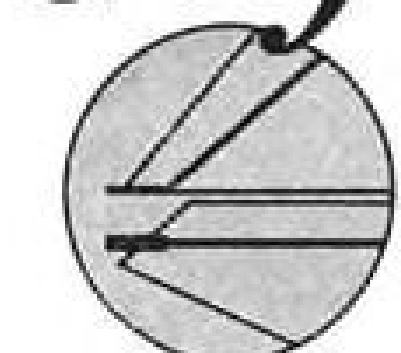
TODAY, Gilfillan is mass-producing pilot elevators in jet time. New thinking for new problems is S.O.P. at Gilfillan. For forty years Gilfillan has been following through from "impossible" developments to mass production.

This type of thinking backed by proven results makes Gilfillan, pioneer of GCA Radar Landing Systems, a production leader in precision electronic and aircraft equipment.



Gilfillan's push-button pilot seat elevators are now being installed on Lockheed's F-94 All-Weather Interceptors and T-33 Two-Place Jet Trainers.

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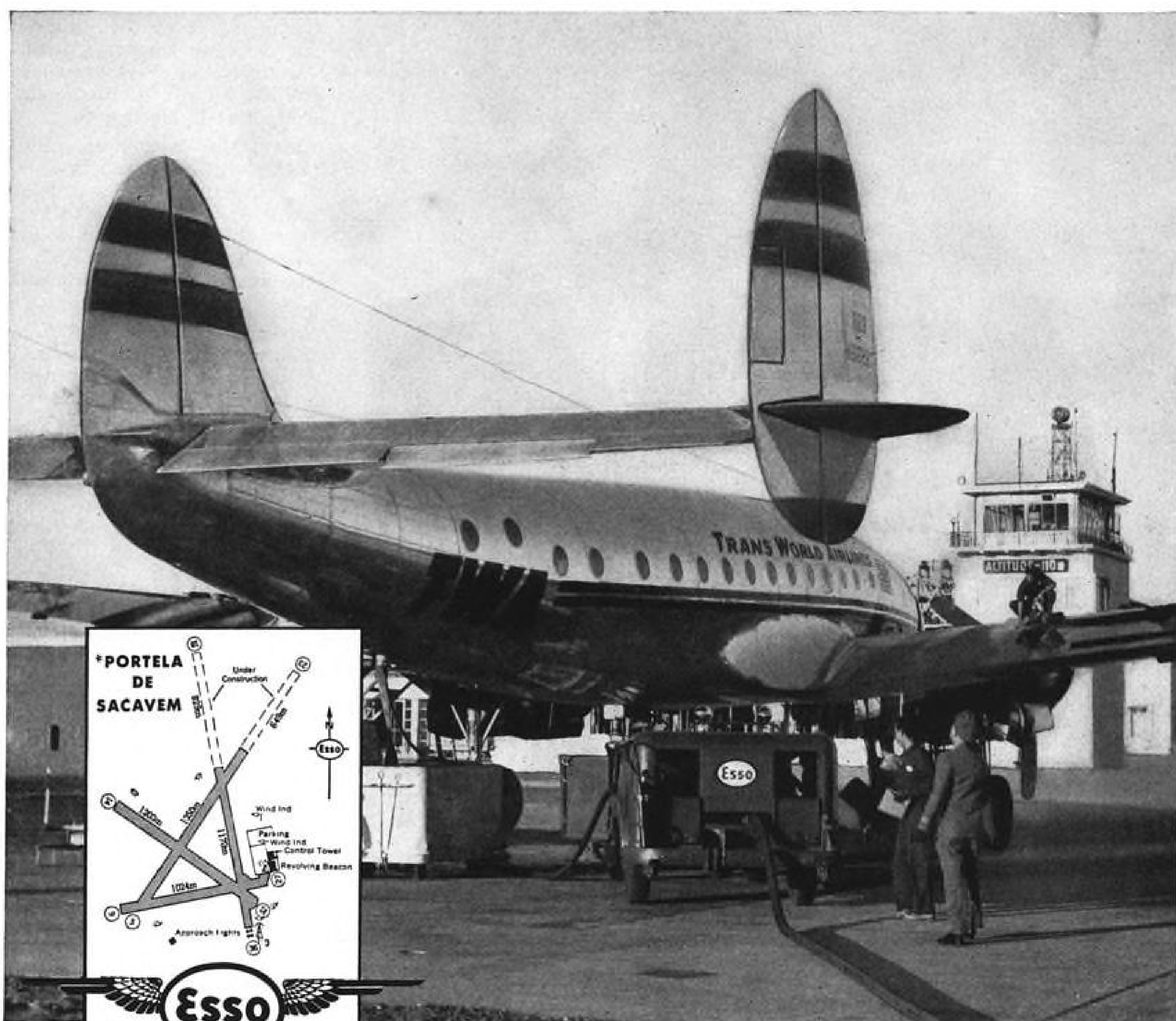


The ancient city of Lisbon has been a principal port for centuries, located where the Tagus River meets the Atlantic. But many of today's travelers and traders make use of the excellent facilities of Portela de Sacavem Airport, now in process of being greatly enlarged.

Aircraft owners and operators rely on Esso Aviation Products here, close to Lisbon's outskirts, as elsewhere along the airways of the world. These products have been developed by research which goes steadily ahead working out newer and better means of meeting the needs of modern aviation.

The Esso winged oval symbolizes petroleum products of uniform, controlled quality backed by more than 42 years of aviation experience.

*At Portela de Sacavem Airport, as at Santa Maria Airport, Azores, the marketer of Esso Aviation Products is Esso Standard Portugal, Inc.



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(PHOTOGRAPH COURTESY OF TRANS WORLD AIRLINES)

PRODUCTION ENGINEERING

"The Well Tempered Aircraft"

Under that title, Arthur E. Raymond, vice president-engineering, Douglas Aircraft Co., delivered the 39th Wilbur Wright Memorial Lecture before the Royal Aeronautical Society in London Sept. 10.

Because of Raymond's leadership among engineers (which has brought him, among other honors, membership on the National Advisory Committee for Aeronautics), this lecture may reflect the self-examination going on in the engineering fraternity in this time of great change in aeronautics. It is also the most thorough approach to the problems of constructing today's aircraft made by a recognized authority in recent months. AVIATION WEEK therefore is publishing in this and subsequent installments the major portion of the lecture.



Arthur E. Raymond

seen through—but rather the enthusiasm that comes from the conviction that the project is sound, worthwhile, and due to succeed.

This is a point where allusion must be made again to the Wright Brothers. Confidence and the courage that results from it are fundamental and essential.

► **Adequate Financing**—Confidence must be transmitted to others, and among the first who must be convinced are those who put money into the project. Whether this backing is from the government, is private, or a combination of both, it must be adequate to carry through the inevitable times of discouragement.

It is often easier to build a prototype than it is to put it into production. There are many reasons for this but one of the most important is that the aircraft can never be proved a success until its development period is behind it, or until several machines have been in operation for some time. On the other hand, until its success has been reasonably established, it is difficult to get people to buy it. There is an interdependence between sales and aircraft-in-being that makes it difficult to have one without the other. As G. R. Edwards has so aptly said, "A wavering customer is often comforted by a piece of ironmongery—it helps him to make up his mind."

It so happens, also, that the greatest need for funds tends to come at the time when troubles are most likely, that is, during the early production period.

► **Facilities**—Many a successful aircraft was built under great physical handicaps and it certainly cannot be proved that good working conditions are imperative. The human spirit often triumphs over obstacles but that fact is not necessarily a good excuse for having them.

On the whole, more efficient work will certainly be done if factory and drawing office layout is right, if there is adequate space per man, and if the lighting, temperature control, ventilation, and freedom from noise or distraction, meet certain standards. The design area should also be close to the loft, the test laboratories, the mockup, and the experimental manufacturing area.

► **Organization**—The supply of properly trained and experienced personnel is not enough to meet the demand; the work of every man must be made to count to maximum degree. Given a certain selection of available individuals, two factors of organization which affect out-

Eight 'Musts' for Production

• It's not very difficult to build an airplane—even a radical airplane—and make it fly. But it's not a successful airplane unless there's a need for it.

• And after the need is determined and met, there is still another factor: the well-tempered aircraft has both quality and suitability of design.

The task today in the field of aircraft design is to produce a large number of good aircraft with the least expenditure of cost and time. The resources of Great Britain and the United States are limited and must be used as effectively as possible. By good aircraft are meant aircraft that contribute more to society than they cost. Such aircraft normally have long production lives. They also have what might be called "design excellence," something that can only result from proper blending of accurate, impartial technical analysis with judgment and common sense, the same practical approach used by the Wright Brothers 48 years ago.

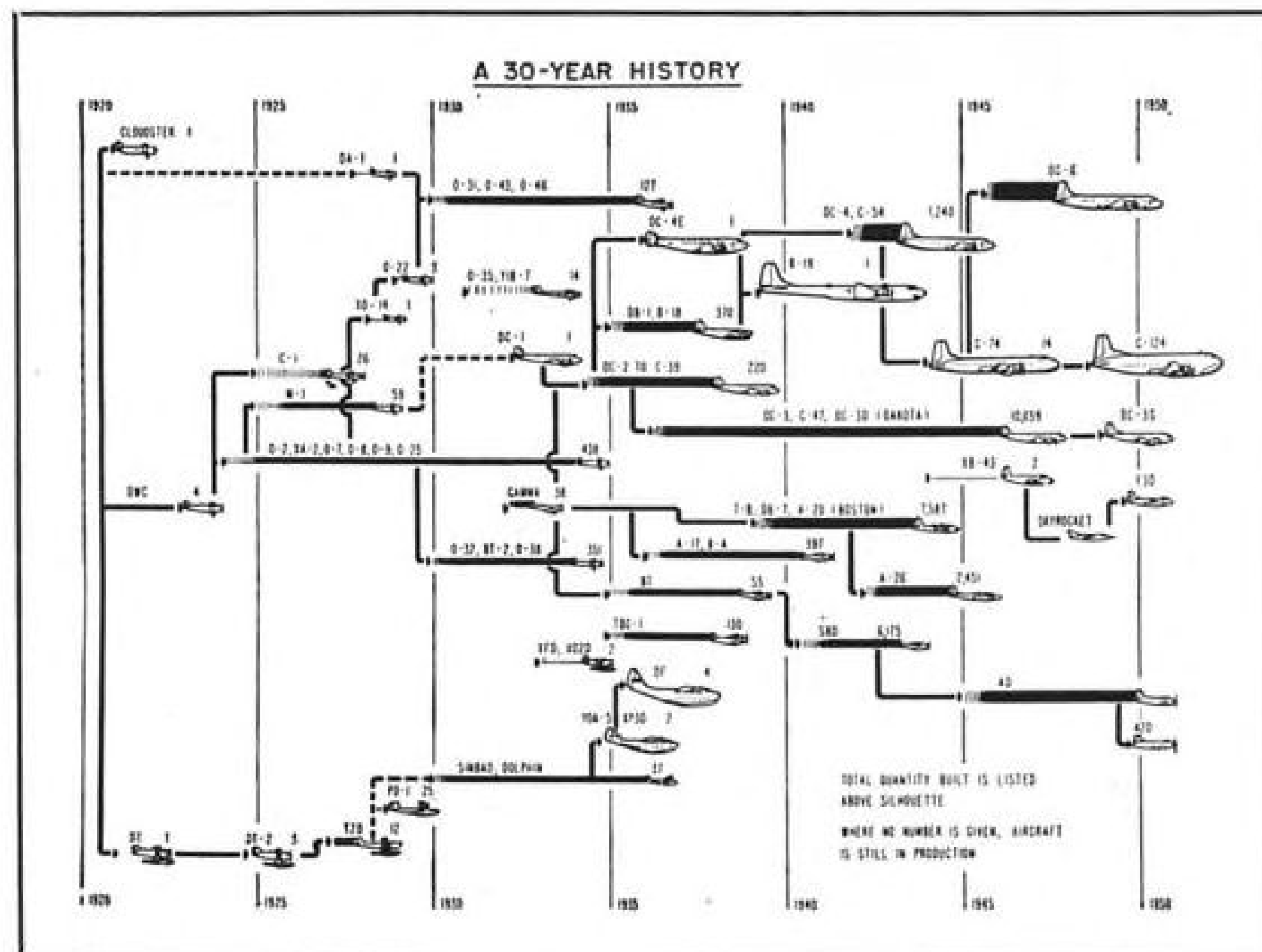
In attacking this subject certain fundamental elements are listed. These may not be all-inclusive but they appear to be essential to the production of operationally useful aircraft:

• Proper environment—the work should be carried on in an atmosphere conducive to efficiency.

- Good initial choice, based on sound specifications.
 - Excellence of detail design.
 - Thorough development—the "debugging" process.
 - Follow-through—indoctrination and assistance of operating personnel.
 - Thorough exploitation—the existence of the aircraft must be made known to those who have a need for it and all the ways in which it may be used must be explored.
 - Correct succession—properly timed introduction of a new model.
 - Adaptiveness—ability to cope with the unexpected.
- These fundamental elements are now considered in turn.

1. Proper Environment

► **Confidence**—The thing above all else that makes a project go is the enthusiasm of its backers; not false enthusiasm put on for effect—sooner or later this is



put are the attitude and spirit of the workers and the formal relationship between them, the so-called organization chart. Again, spirit counts for so much that it often prevails over poor organization form, but why force it to do so?

In the design organization—and the same thing holds true elsewhere—two types of coordination must be provided for, coordination by specialty and by project. Heated arguments have been held as to whether a specialty or group system is better or worse than a project system, but it seems to make little difference which is used; they will both work. The important thing is that one or the other form of coordination be given preference when it comes to administrative authority and that it be clearly understood by everyone where this preference lies. No man can serve two masters.

On the other hand, he can do so if they are his masters for two sufficiently separate or different things. For example, a form of organization has been tried with success in which some supervisors are given two assistants, each with line authority. The chief engineer may have an administrative assistant and a design assistant, each supreme over the drawing office in his particular field. Or a specialty head may have a research assistant and a production assistant.

Concurrent with the great elaboration of aircraft design has come a narrowing of the horizons of many of the designers. It is usually impossible to maintain the same conditions as used to apply 20 or more years ago, when a man was thoroughly versed in one field and competent in many others, and when the designer often did his own stress analysis and weight estimation and followed his design intimately

through all phases of manufacture and test. This narrowing takes away much of the feeling of identity between a man and his work—the day of the specialist is here, perhaps even more in the U. S. than in Great Britain. But if it is believed to be important to keep universality alive, much can be done towards that end. Certain men can be given more general assignments, others can be moved about from time to time, and a greater opportunity can be afforded to designers to see for themselves the products of their brain in operation.

Everything possible should be done also to ensure that the engineer and designer on the one hand, and those who will manufacture and use the aircraft on the other, understand and consider each other's viewpoint.

► **Customer Relations**—The contract and the aircraft specification, constituting the written agreement between producer and user, can be of assistance in clarifying the role of each and setting forth what is to be done, or they can be a straitjacket within which constructive movement is almost impossible—it all depends on how they are written. Attempts to define everything and to provide for every eventuality are bound to fail, but oral agreements are equally unworkable. Clear and simple understandings must be the objective with a reasonable degree of leeway for detail compromise as the project goes along. Where large organizations, such as the government and military services, are involved, things tend to become stereotyped and the individual cannot do much, but often improvements can be made by combining forces and going after them in concert.

The written word must be supplemented by many personal contacts. These fall into two categories, both of

them subject to abuse, but both very helpful if used properly. The first of these is what might be called concurrent liaison, the joint focusing upon design problems, as they occur, of the viewpoints of manufacturer and operator, and of sub-groups within the sphere of each. The second, or liaison after-the-fact, is the inspection and acceptance process. The first tends to prevent mistakes and the second to correct such as inevitably occur.

These are what seem to be chief among the environmental factors. In sum-total they do much to determine the atmosphere in which a project is carried out and its chances of success. Through them all runs the common thread of joint dedication to a common task, which cannot possibly come about unless those engaged in the task believe in it, love it, and have, as already said, a justified confidence in it.

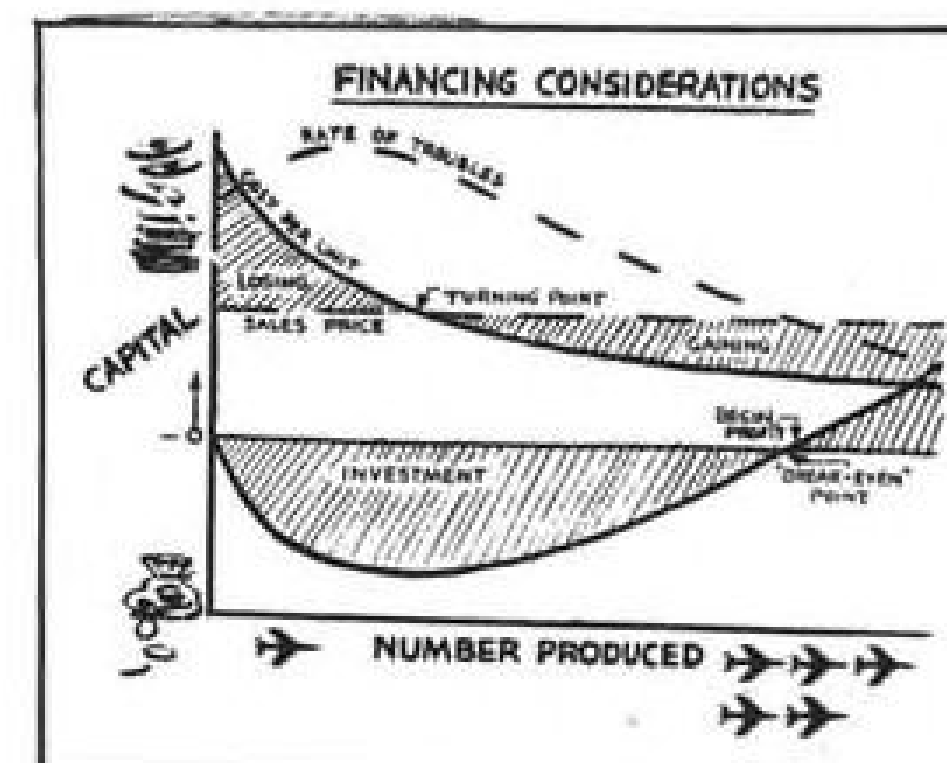
2. Good Initial Choice

A few years ago there was a moving picture which used to be introduced at otherwise dull technical sessions in the U. S. to liven the proceedings. It was called "Design Oddities" and was a compilation of newsreel shots of aircraft of unusual appearance that had gathered in the files over a number of years. There were square wings, circular wings, wings like a doughnut with a hole in the center, multicellular wings, bat wings, and so on.

Looking at this picture was encouraging, for it was visual proof of the old adage that even a kitchen stove could be made to fly if it had enough power. But these were inventor's aircraft—museum pieces—and none of them had any future but to amuse. There was a tendency to ask, "Why in the world did that fellow ever start to build that in the first place? What made him think it was a good idea?"

► **Does It Fill a Need?**—These are extreme cases, but all those who have any considerable experience in aircraft design can look back over the years and find examples for which they were responsible which raise the same questions. The only answer is that it did seem a good idea to someone at the time. Someone in government or from within the military or civil operators or in industry became convinced that there was a need for such a machine. He marshalled a few arguments, convinced someone else, and the ball was rolling.

As it gathered momentum, arguments in favor were highlighted, arguments against were stepped on, personal pride became involved, people became committed, and sober analysis of pros and cons became impossible. The project went ahead, the aircraft was designed, built, and flown—usually rather



successfully—and then what happened? Nothing. Because nobody really wanted it, or because the wanters wanted something else more. Obviously a project will be doomed from the start if it does not fill a real need.

► **Foresight**—There are two sides to this question of deciding what to build; one is what is needed, the other is what is possible—what should be built vs. what can be built. These have to be considered separately and in relation to each other if the choice is to be a good one. The establishment of a sound realistic set of military requirements, for example, is a high art demanding the pooling of experience, analytical skill, and judgment of people with widely varying background.

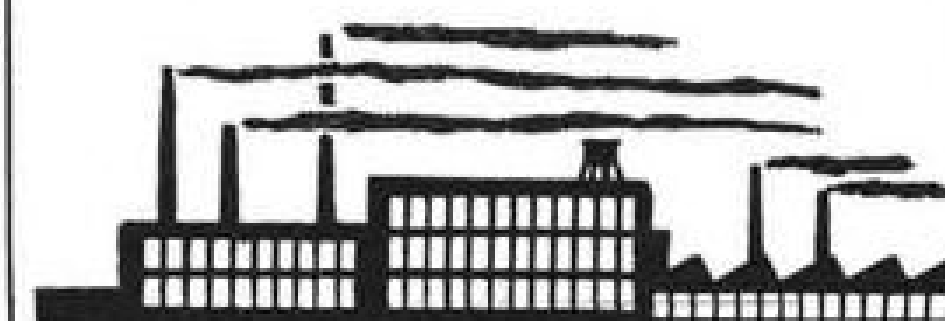
The kind of fighter needed five years from now depends not only upon the materials, engines, radar, and armament that will be available by that time, but also upon the characteristics of enemy bombers and fighters then, and the tactics they will employ. It depends, moreover, on the amount of money which can be spent on fighters in relation to what is spent on other things. It depends on how good other methods of defense, such as missiles, will be by that time.

In other words, it depends not only upon the fighter itself but upon the whole defense system of which the fighter is part. The same can be said or any other military aircraft.

► **Systems Analysis**—Consequently, in recent years there has grown up a technique of initial choice which has come to be termed "Systems Analysis"—to study analytically and as a whole the military task to be performed, integrate the aircraft into that task, and establish the major characteristics of the aircraft that will best do the job. At least, that is the aim of Systems Analysis. It usually falls short because of the impossibility of setting up the task with accuracy and because, therefore, initial assumptions must be made on a weak foundation.

The great danger of Systems Analysis is that it may be taken as a complete substitute for the exercise of intuitive judgment. No matter how accurately or extensively a mathematical analysis is done, its conclusions can be no better

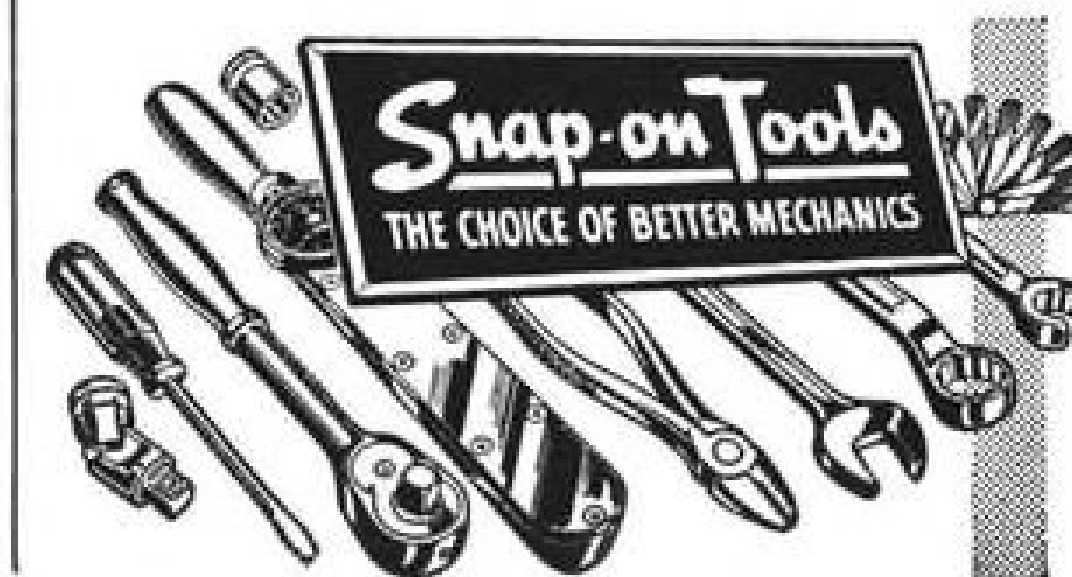
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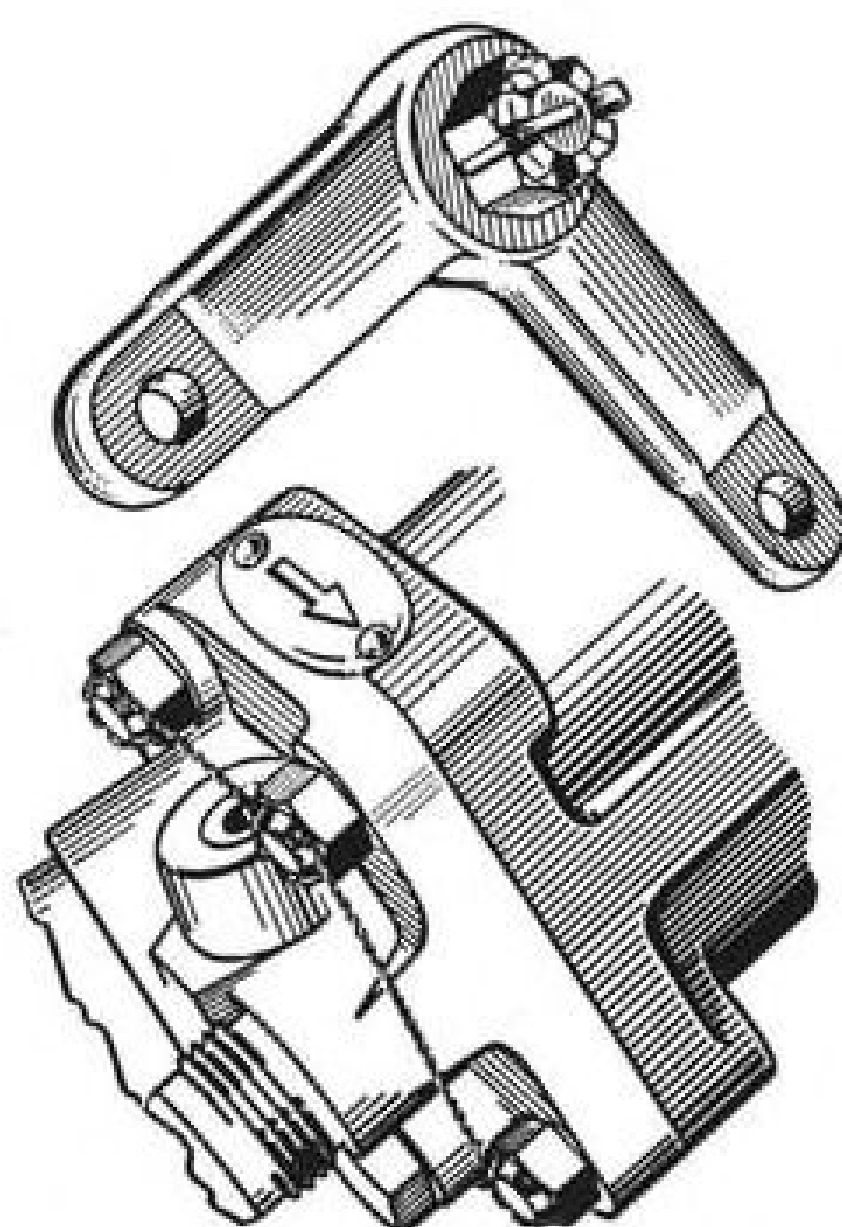


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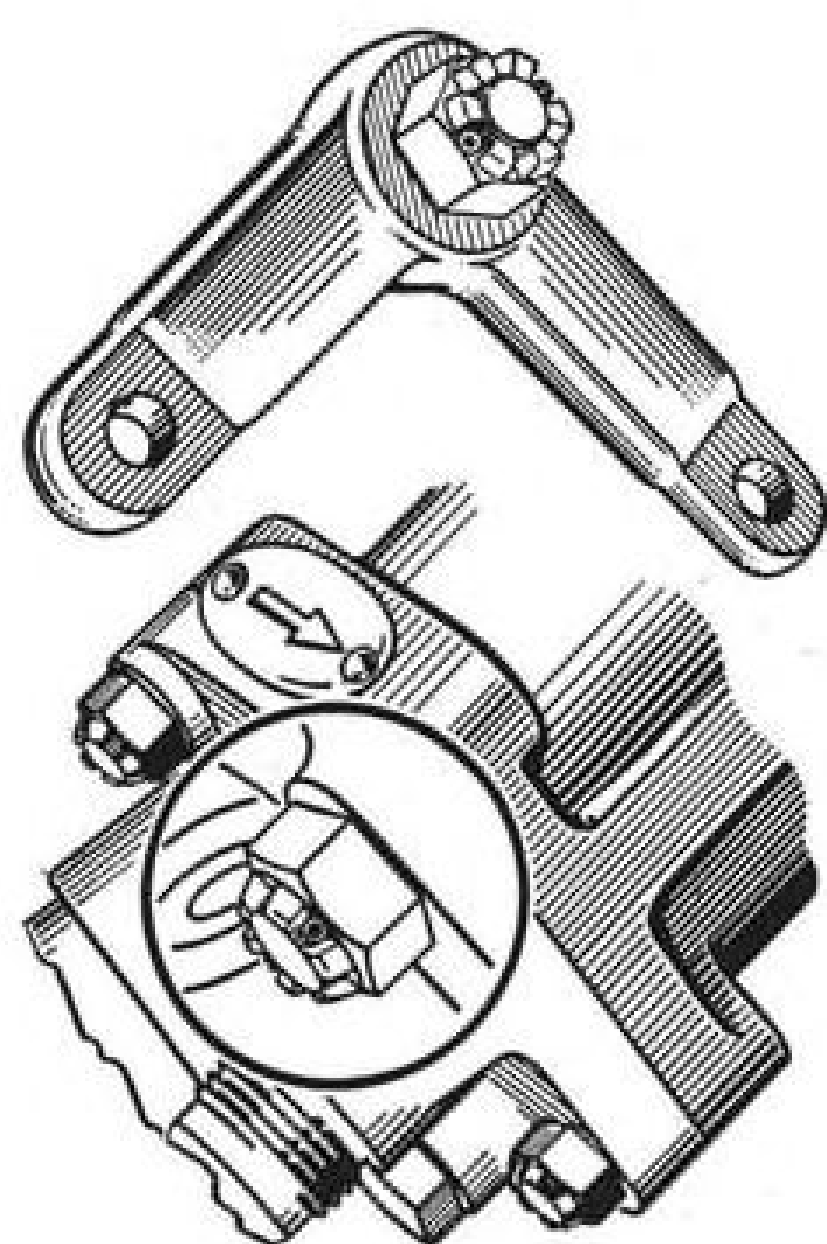
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Fastener Problem of the Month

PROBLEM: Applications like the illustrated castellated nut fasteners which specify the use of secondary fastening devices such as cotter pins or safety wire, present production engineers with the problem of time consuming, expensive assembly operations. Furthermore, a safety wired unit is difficult to replace in the field; while cotter pins frequently break in service with resulting nut loosening a possibility, as well as damage to other moving parts of the engine from the cotter fragments.



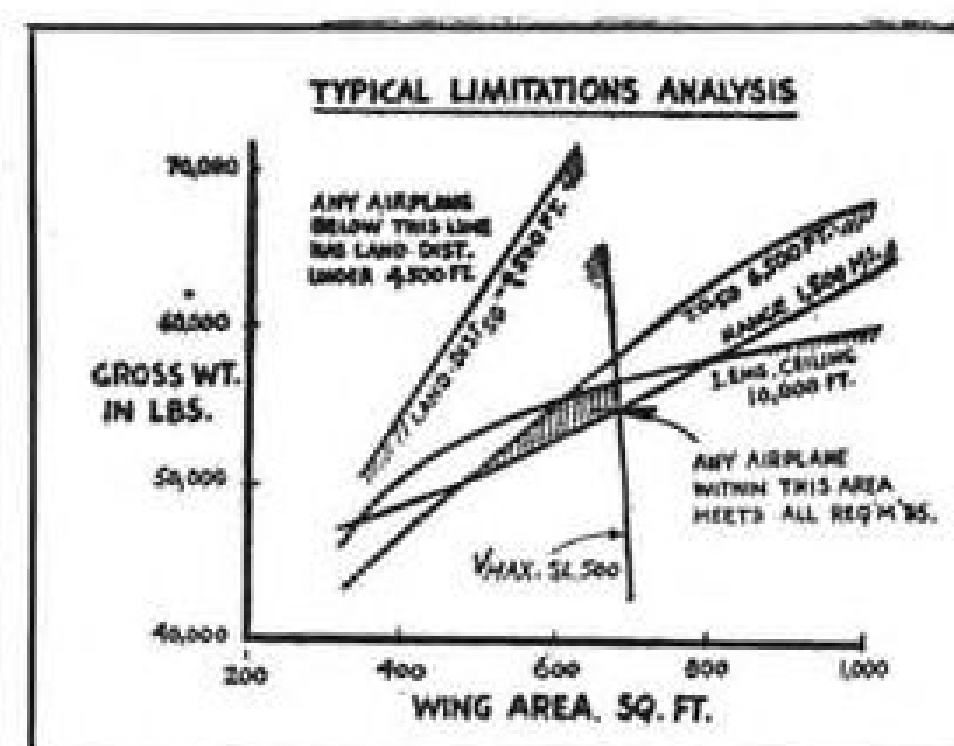
SOLUTION: Self-locking Rollpins offer a simple and economical replacement for safety wire and cotter pins. Rollpins are inserted quickly and conveniently with a hammer or hydraulic press. They fit flush with the hex faces of the nut, leaving no exposed ends to break off or tear hands. Slotted tubular steel construction of Rollpins provides up to 35 times longer life than equivalent diameter cotter pins — plus a vibration-proof fit against the walls of standard drilled holes. Not only is installation faster but the Rollpin can be readily removed with a pin punch — can be used over and over again.



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than its original assumptions were. The great value of Systems Analysis lies in the fact that it reduces some of the elements of the problem to precise terms and thereby makes the rest more manageable by the processes of expert opinion. As time goes on, experience with this technique will improve and extend it, as did Operations Analysis during the Second World War.

► **Limitations Analysis**—That part of the problem of initial choice which has to do with determining what is technically feasible, is often called "Limitations Analysis." One of its end points is a graph on which is plotted, against gross weight and wing area, for a given set of curves of various constant performance characteristics. There results a shaded area which defines the combinations of gross weight and wing area, for a given aircraft configuration, that have performances better than certain prescribed values.

These graphs may be prepared for several configurations and thus may assist in choosing between them. Sometimes it is found that the proposed minimum performances have been set too high, in which case there is no shaded area at all. Assuming there is one, discreet values of wing area and gross weight are usually chosen with an eye to the possibilities they present for future growth of the design.

Limitations Analysis is really a partial definition of what is commonly called "the state of the art," the level reached by the constantly rising progress curve. An aircraft designed in such a way as not to take reasonable advantage of the state of the art is handicapped competitively; one designed too far in advance of it, with too much optimistic anticipation, runs into the dangers inherent in all pioneering efforts.

Aircraft design has progressed in a series of pioneering jumps, combined with a large number of relatively unspectacular evolutionary improvements. Certainly the Wright Brothers pioneered. So did many others to whom a great deal is owed. At the same time it must be admitted that the pioneer has not always been successful in producing large quantities of operationally useful aircraft. He often has to concentrate so

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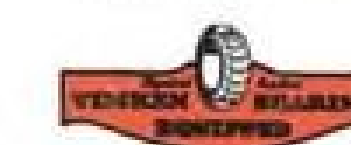
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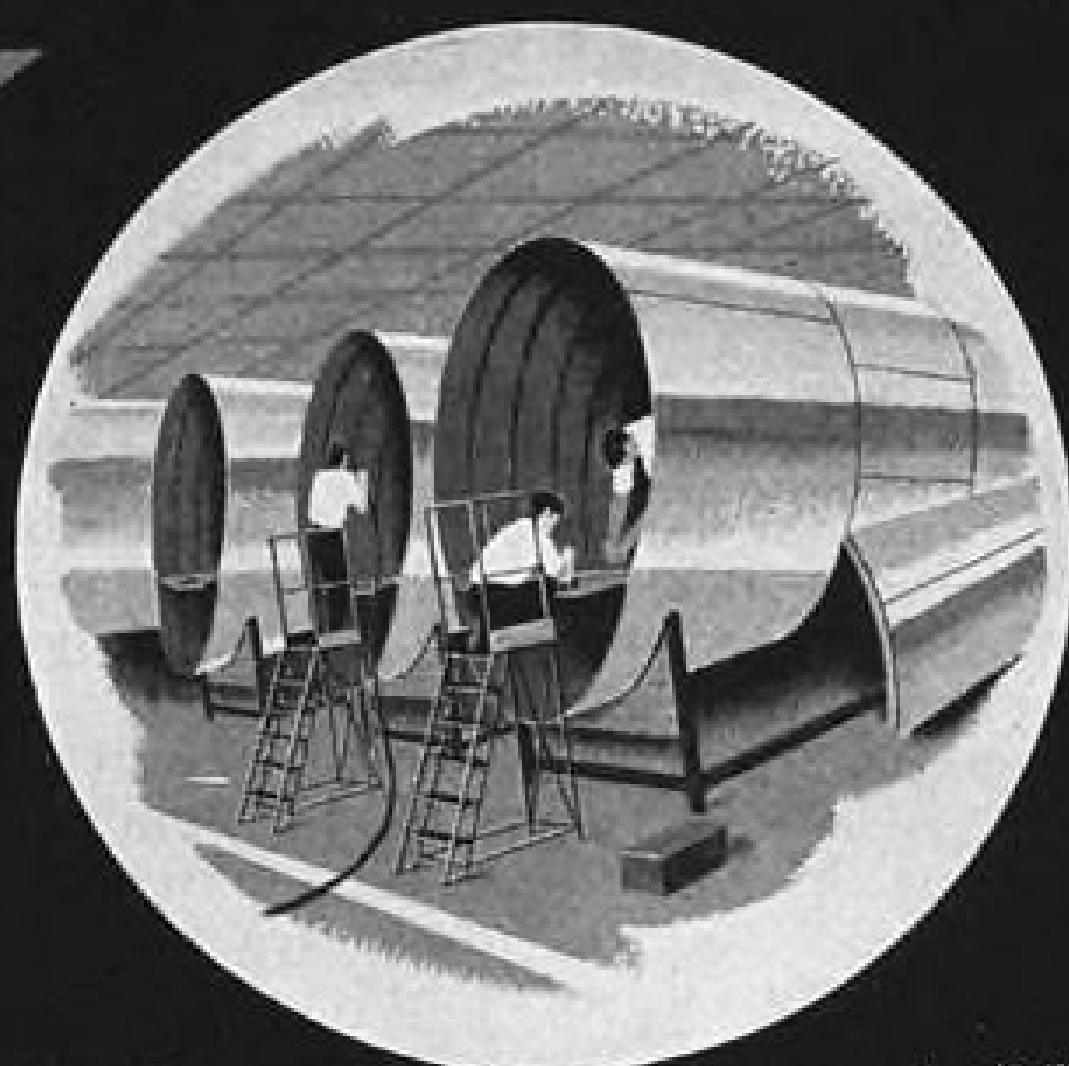
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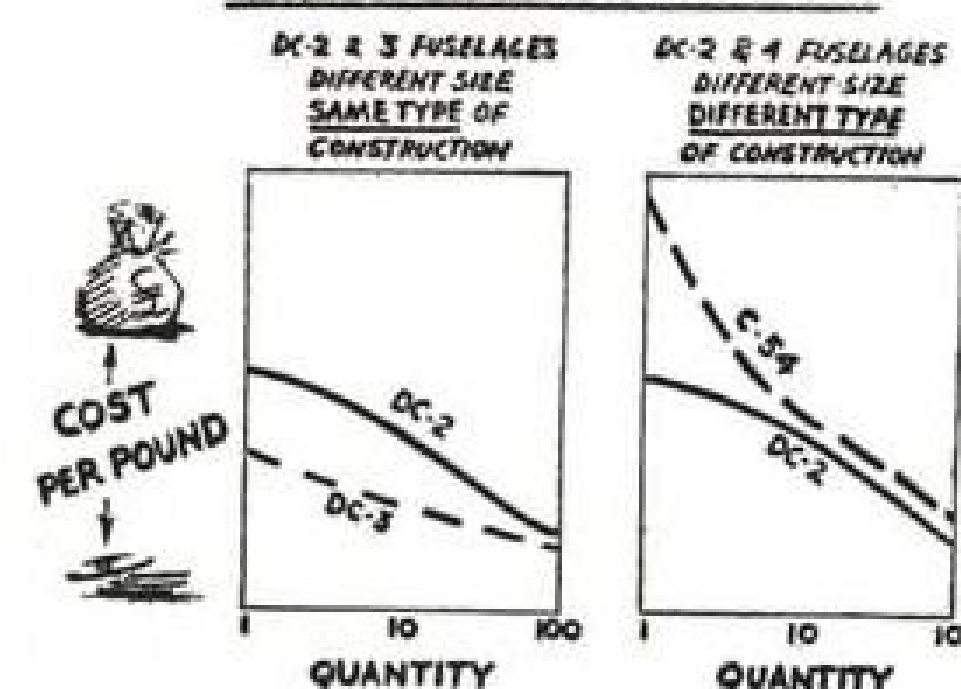


Pilotless Aircraft
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EFFECT OF "CARRY-OVER" ON COST



hard on the problem of doing the job at all that he is not able to do it as well as he himself might on a second attempt—or as someone else who has been watching his struggles may do before the pioneer has had time to recover his physical and financial strength.

► **Carry-Over**—This does not necessarily mean that design should not be in advance of the state of the art but it does indicate the importance of keeping one's eyes open to the resulting dangers. If, instead of aiming too high, a conservative approach is adopted, a number of advantages become immediately apparent. Experience with past designs can be carried over into the new one with little or no change. The assurance of having a design which will require little development often makes it possible to start production before the prototype has been tested, thus shortening the elapsed time before the aircraft comes into the market.

With civil transport aircraft, near conventionality makes passenger acceptance more sure and makes operators more willing to order while the aircraft is in the blueprint stage—and the manufacturer more willing to accept such orders.

All of these things make it appear more attractive to do what has been done before but in a slightly different way, rather than to branch out into something new. On the other hand, such an attitude carried to extremes stifles progress and, since there are many adventurous spirits in this business and always will be, it leads to being overrun. On the whole, "carry-over" has such a great effect on aircraft cost that it must be retained as a nucleus around which a few pioneering electrons revolve.

► **Questions Posed**—Doubling the number of aircraft produced cuts their unit cost by about 20%. Since versatility extends the market and makes a given budget go farther, there is a continual temptation to combine two or more requirements into one multi-purpose design. If the requirements are sufficiently similar this can be done satisfactorily; if they are too far apart, the result is a product which really satisfies no one. Particularly is it true of civil transports that unless the market is extensive, the unit cost will be too high

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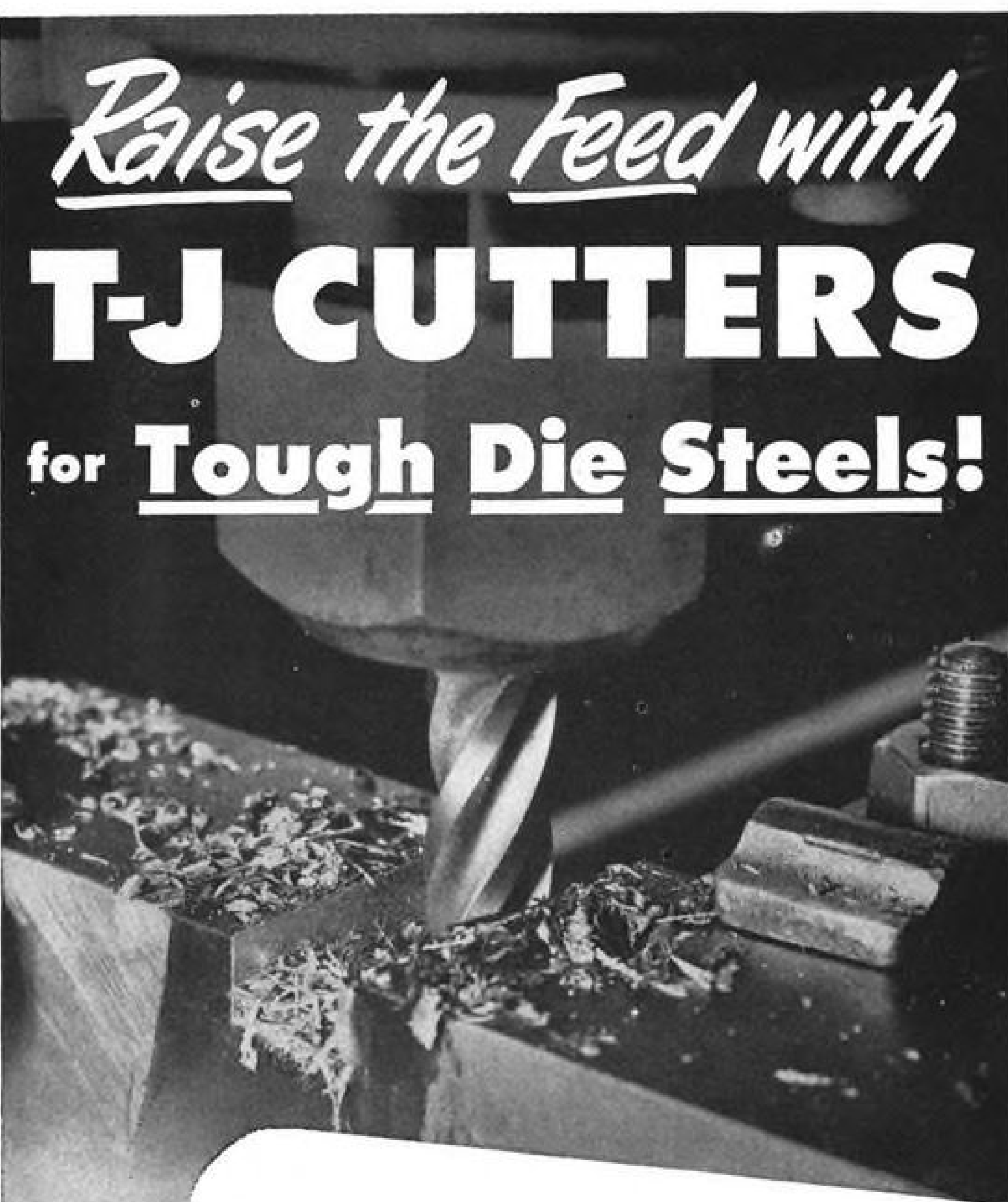
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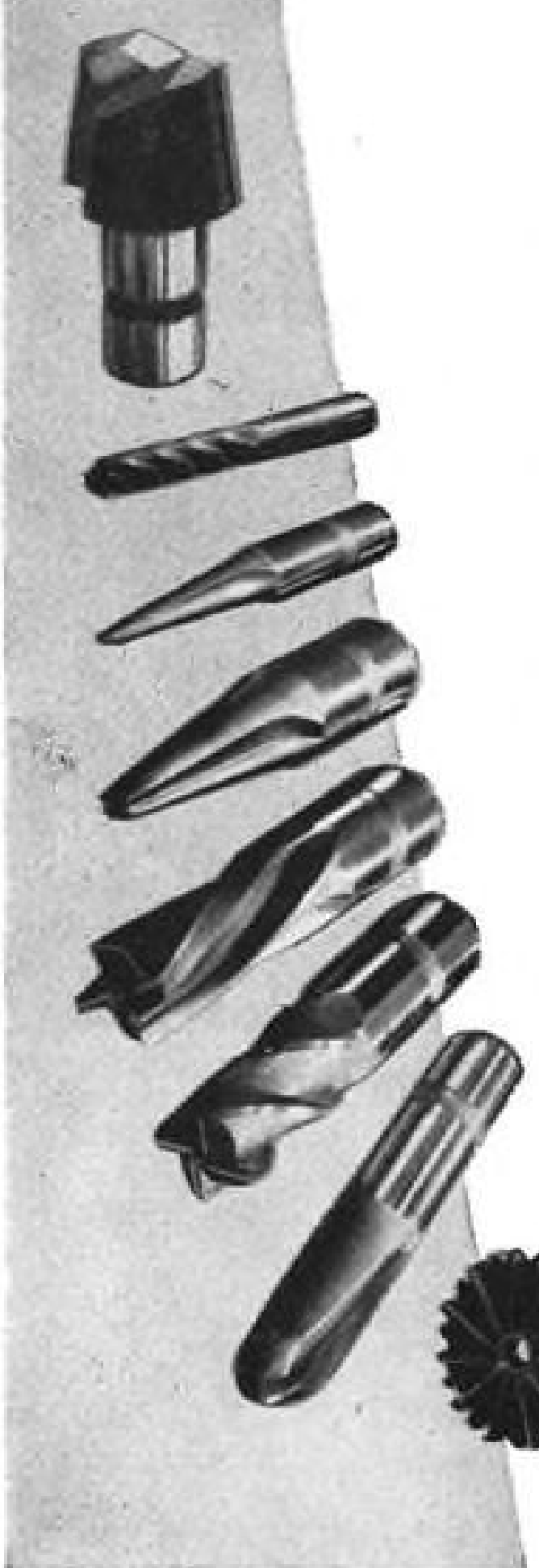
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Increase the output of your machines... and *reduce costs*... with T-J Die Sinking Milling Cutters! They're extra sturdy—you can raise the feed! These cutters made from a standard, extremely high grade steel... properly machined... scientifically heat-treated and accurately ground. This means *more work between grinds*... easier cutting... less breakage... long cutter life! Wide range of T-J standard styles and sizes... ready for your tough jobs! Send for new catalog 150. The Tomkins-Johnson Co., Jackson, Mich.

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to be borne; too great a degree of specialization cannot be supported.

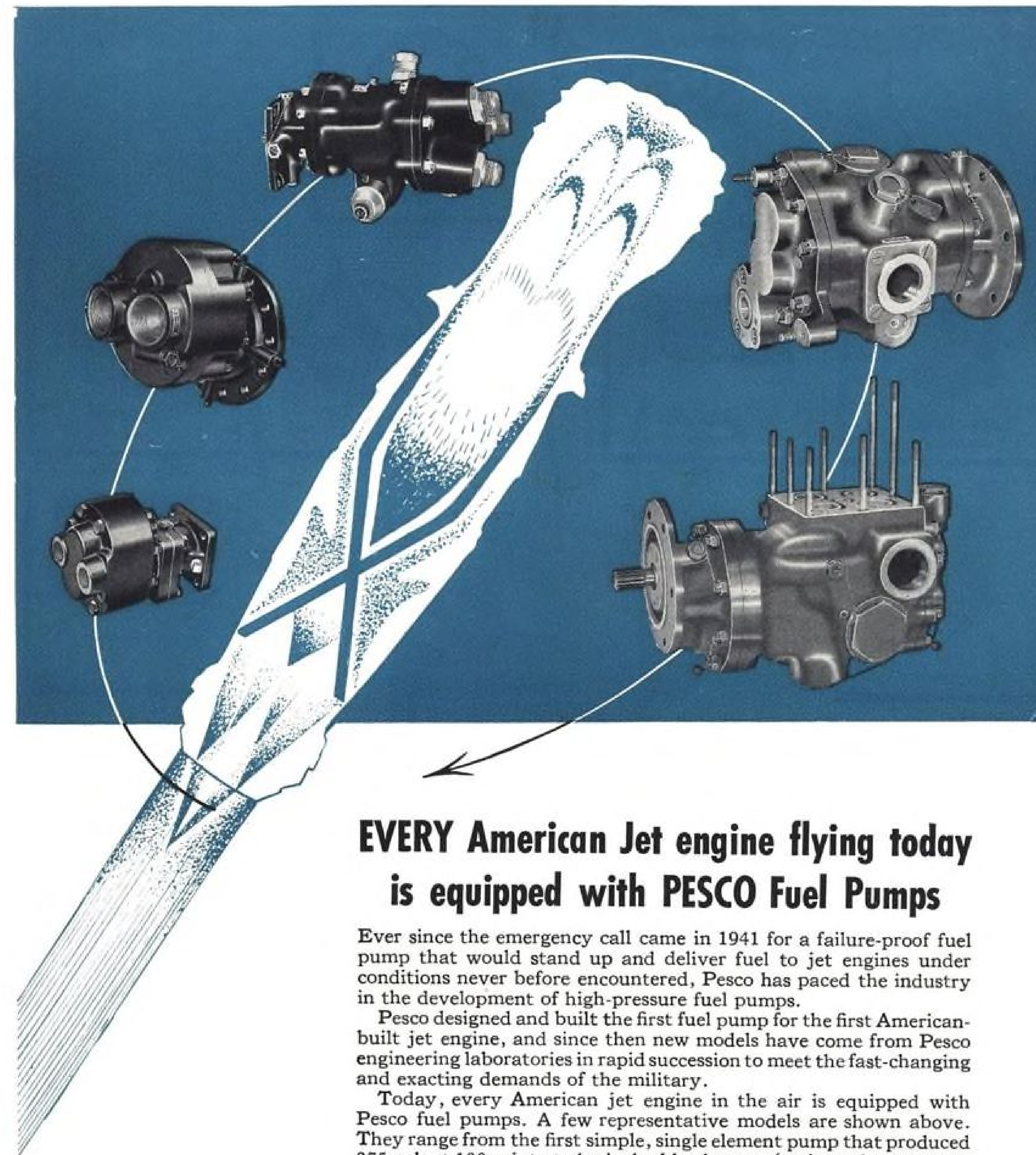
The designer has to ask himself several rather searching questions before reaching a final decision to go ahead with a project. Not only does he have to assure himself that there is a bona fide need for the kind of aircraft he can produce, but he has to ask, "Is there any alternate aircraft already in existence that might be more cheaply and easily modified to meet this requirement and will my new design be sufficiently superior to justify itself? What is my competitor doing? Is he so entrenched that it will be extremely difficult, if not impossible, to make headway against him? On the other hand, has he been established in the field so long that he is, perhaps, growing complacent? Should he have brought out a new model some time ago and failed to do so, thus giving me an opening?"

The designer also has to make a careful assessment of the availability, by the time he needs them, of adequately developed engines, propellers (if any), and other equipment. There is also a place for gliders, but only for gliders that were designed as such from the start. Designing and building an aircraft in these days of specialization is much like cooking a party dinner—everything must be ready to come off the stove at the same time.

► **Eye Ahead**—A sound choice is made more difficult cause of the element of forecasting or prophecy that enters into it. It is important to look forward to the day, perhaps four or five years ahead, when the proposed aircraft can actually be in service in large numbers and to try to foresee what kind of airplane will actually be needed at that time.

It is possible to cite many instances where insufficient attention to this element of prophecy (perhaps merely an unimaginative adherence to current thinking) has resulted in an abortive product. It is equally possible to cite cases where a particularly clever reading of the future, due to unusual awareness of what is going on at the grass roots, has produced an aircraft which seemed to have little initial backing but which ultimately had a long and illustrious history.

The aircraft designer, civil or military, works to a set of rules established by the certificating or procuring agency, which might be called "general design specifications." As the years go by, these detailed requirements of a general nature become more voluminous and can be the cause of inferior design. They can impede progress and increase cost greatly. If the designer fails to work hand-in-hand with the proper authorities towards the improvement of these general requirements, he is failing to give attention to one of the ex-



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

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

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

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

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

Why not call Pesco today.

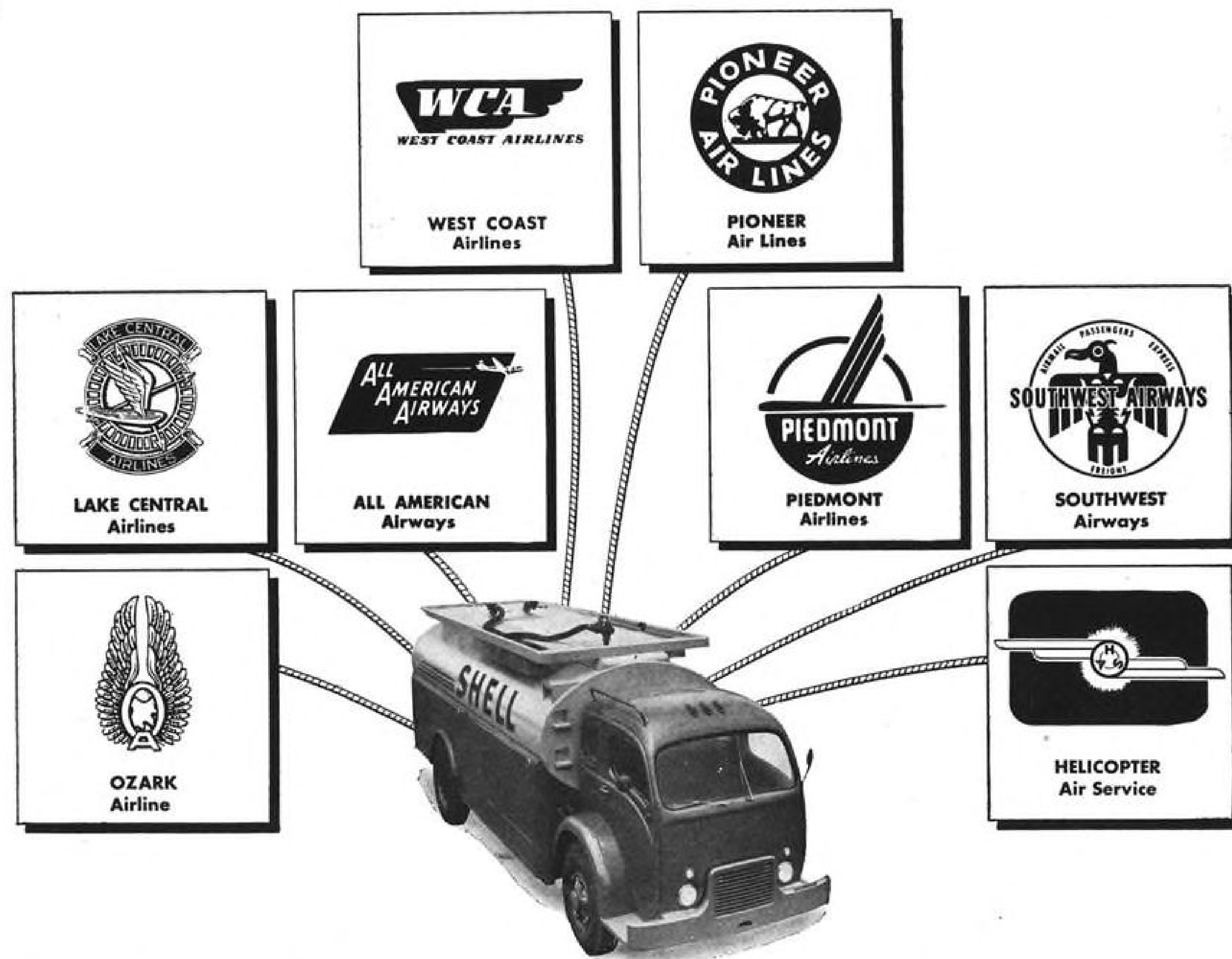


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tremely important elements of good design.

► **Suitability Prime**—Superimposed upon the general specifications are the type specifications, which cover items special to a particular kind of aircraft, and model specifications, which define a particular aircraft of that type. The tendency nowadays in some quarters, and it is a good one if not carried to excess, is towards type requirements that state the problem rather than specify exactly how it is to be solved—that is, towards objective specifications. This has come about partly as a reaction against the rigidity of design which has crept into specifications, and partly as a result of increasing attention to the aircraft as part of an operating system designed to do a certain job.

On the subject of initial choice, many a project has been doomed from the start because it was ill-conceived. And, parenthetically, some well-chosen ones have failed because they were improperly executed. Thus there is the twin criteria of a well-tempered aircraft—suitability and quality. One without the other is insufficient, but entirely possible; both are necessary for success.

Suitability comes first and is fundamental. No matter how high the quality, if the design is not suitable for its purpose it will fail. For example, an M.G. Midget is no doubt a high quality automobile, but its suitability as a hearse is poor.

NEXT: Details of design.

High Speed Flight Test Instrument

A new flight test instrument—the Aerohead Pickup—to measure pitch, yaw, ram pressure and static pressure up to a Mach number of 3 is being produced by G. M. Giannini & Co., Inc., 254 W. Colorado St., Pasadena 1, Calif.

The pickup, about 10 inches long in the larger of two models which are available, is basically a bullet-shaped headpiece with four highly swept fins to maintain weathercock stability. The fin and head assembly swivel on a universal joint to face into the relative wind at all times.

Model 2519D measures pitch and yaw angles up to 20 deg. within an accuracy of 0.2 deg.

Model 25112 is like 2519D with the addition of a pitot-static tube mounted at the nose. Ram pressure and static pressure are transmitted through the universal mounting with less than a 1% error to pressure pickups.

Both models have high natural frequency, both are suitable for installation as the leading portion of a spike antenna, and both have 0 = 5 v. dc. potentiometric output.



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Vibration Control Engineers

AVIATION WEEK, October 15, 1951

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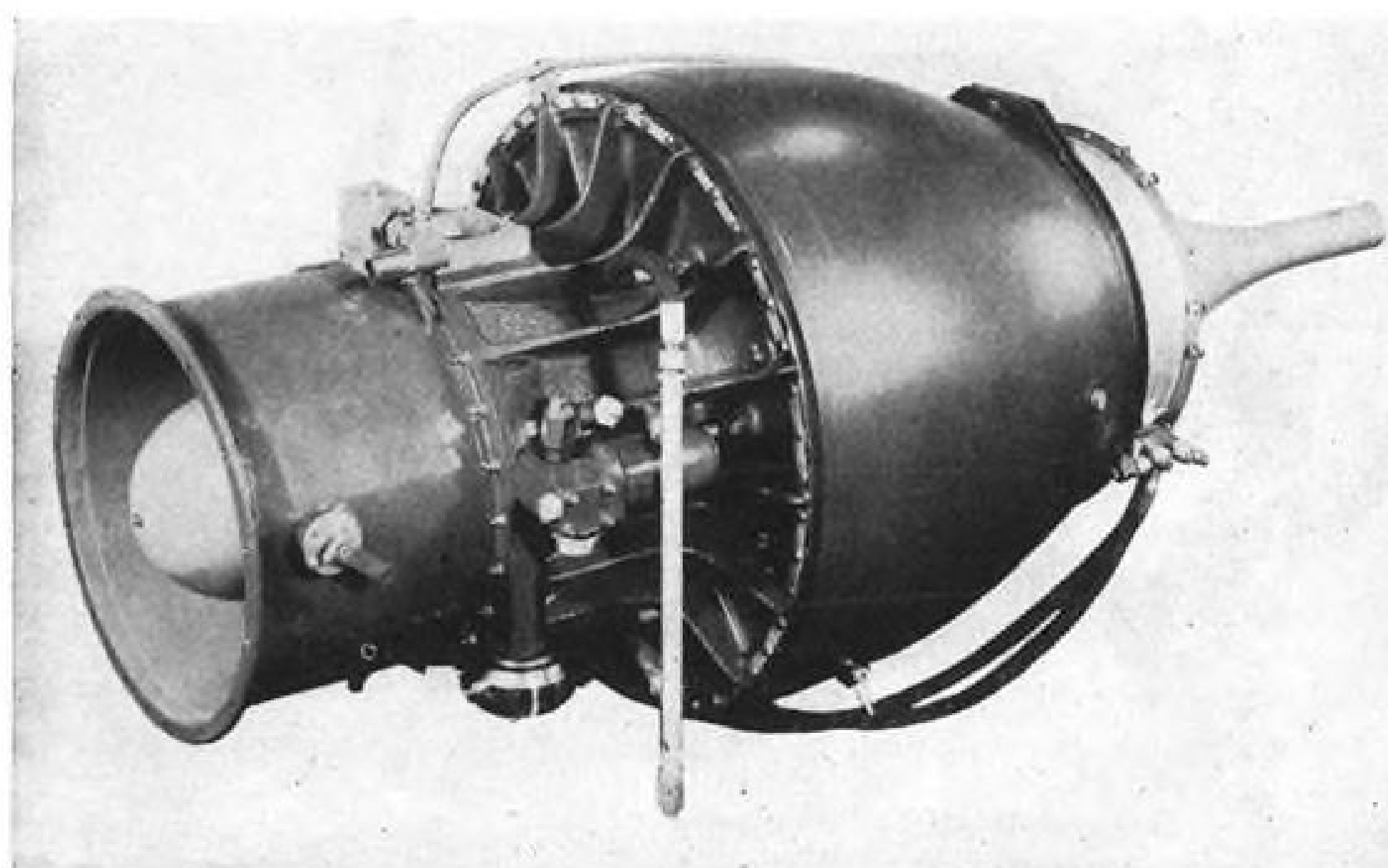


Meet current AN specifications
and have C.A.A. approval.

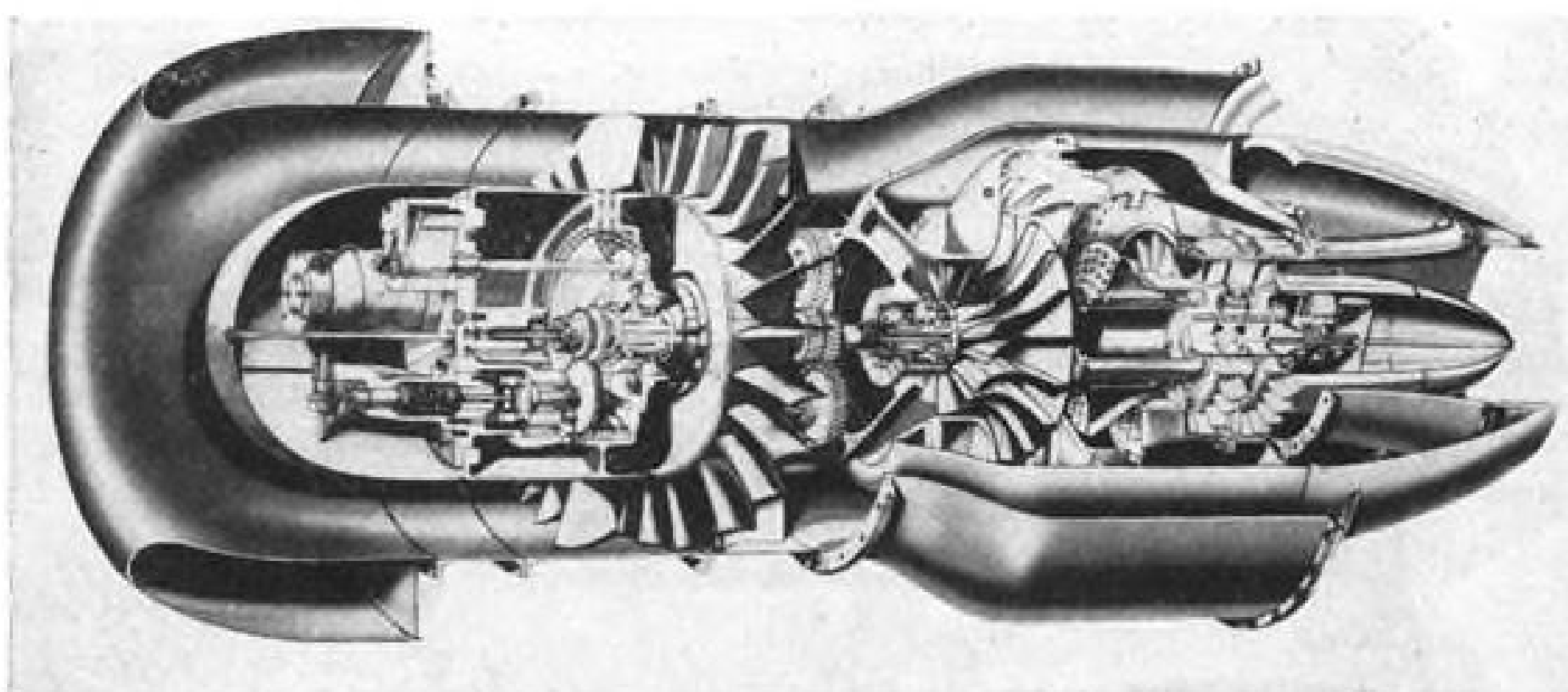
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MARBORE JET TURBINE, capable of maximum 880 lb. thrust for light craft, and . . .



ASPIN DUCTED FAN are two of nine French engines to be built by Continental.

French Turbines Enter U.S. Field

Manufacturing rights to 9 small engines acquired by Continental; foresee commercial, military use.

The potential position of small gas turbines in the U. S. aviation field has been given a sharp boost with the introduction of a group of nine new units comprising four basic designs.

These are not experimental types, but extensively tested powerplants ready for production.

Manufacturing rights to the gas turbines have been acquired by Continental Motors Corp. from France's Societe Turbomeca, which developed the units under sponsorship of the French Air Ministry (AVIATION WEEK Sept. 17, p. 18).

Continental, with its wide experience in the small engine field, should be able to push use of the newly acquired gas turbines into a broad field of application—both military and commercial.

Immediate prospects for the turbines naturally favor the military—in guided missiles, copters, target planes, utility aircraft and compressor applications. But Continental sees their extension

into the commercial market for increasing the utility of medium-size aircraft and specialized industrial equipment.

Continental reports these advantages for the new engines:

- Makeup uses no critical metals such as columbium, cobalt or tungsten.
- Likelihood of longer life than piston engines, when operated under proper conditions. This projected service span is based on exhaustive tests in France, Continental says.
- Small size in relation to power—a factor to promote use in aircraft and in ground installations involving portability and space limitations.
- High power-to-weight ratio.
- High degree of interchangeability for basic parts of various models, simplifying manufacturing and maintenance problems.

► **Ducted Fan Design**—One of the new engines—the Aspin II—is a ducted fan configuration. Power from the turbine is absorbed by a row of blading (fan)

UP THERE WITH THE BIG NAMES . . . CHAPTER NUMBER 7



SKYDROL plies American skies with the Flagship Fleet of A.A.

High in the skies over the United States, Canada and Mexico, passengers and crews travel in greater safety via the Flagship Fleet of American Airlines because Monsanto Skydrol is used in cabin superchargers.

Skydrol, Monsanto's fire-resistant-type hydraulic fluid, now serves every domestic airline flying DC-6's. Many planes carry Skydrol throughout the hydraulic systems as well as in the superchargers.

Skydrol brings greater safety to passengers, crews and planes in the air and on the ground. In addition, Skydrol means greater economy because its high lubricity reduces wear on working parts of hydraulic systems.

Investigate the safety and economy possibilities Skydrol offers you. For details and a copy of the booklet, "More Safety in the Air with Monsanto's Skydrol" write MONSANTO CHEMICAL COMPANY, Organic Chemicals Division, 1700 South Second Street, St. Louis 4, Missouri.

Monsanto Skydrol Offers These Advantages

SKYDROL is fire-resistant—exceeds the non-flammability requirements of Aeronautical Material Specification 3150.

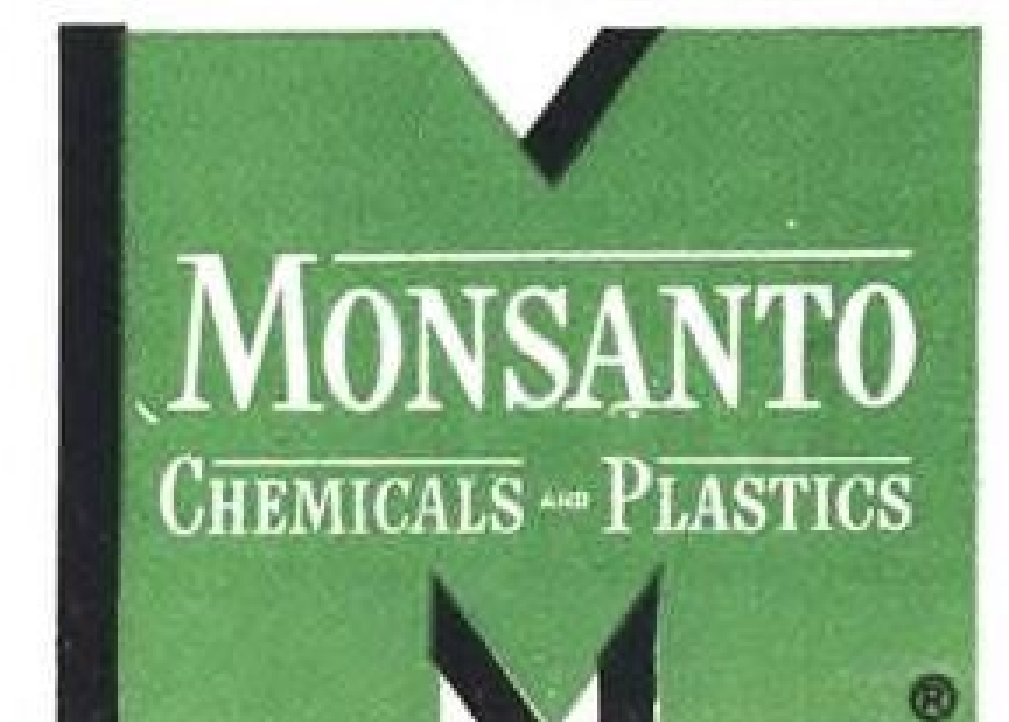
SKYDROL is a proved superior lubricant. In most critical cases, lubricity is more than double that of other hydraulic fluids.

SKYDROL is stable at required operating temperatures and pressures.

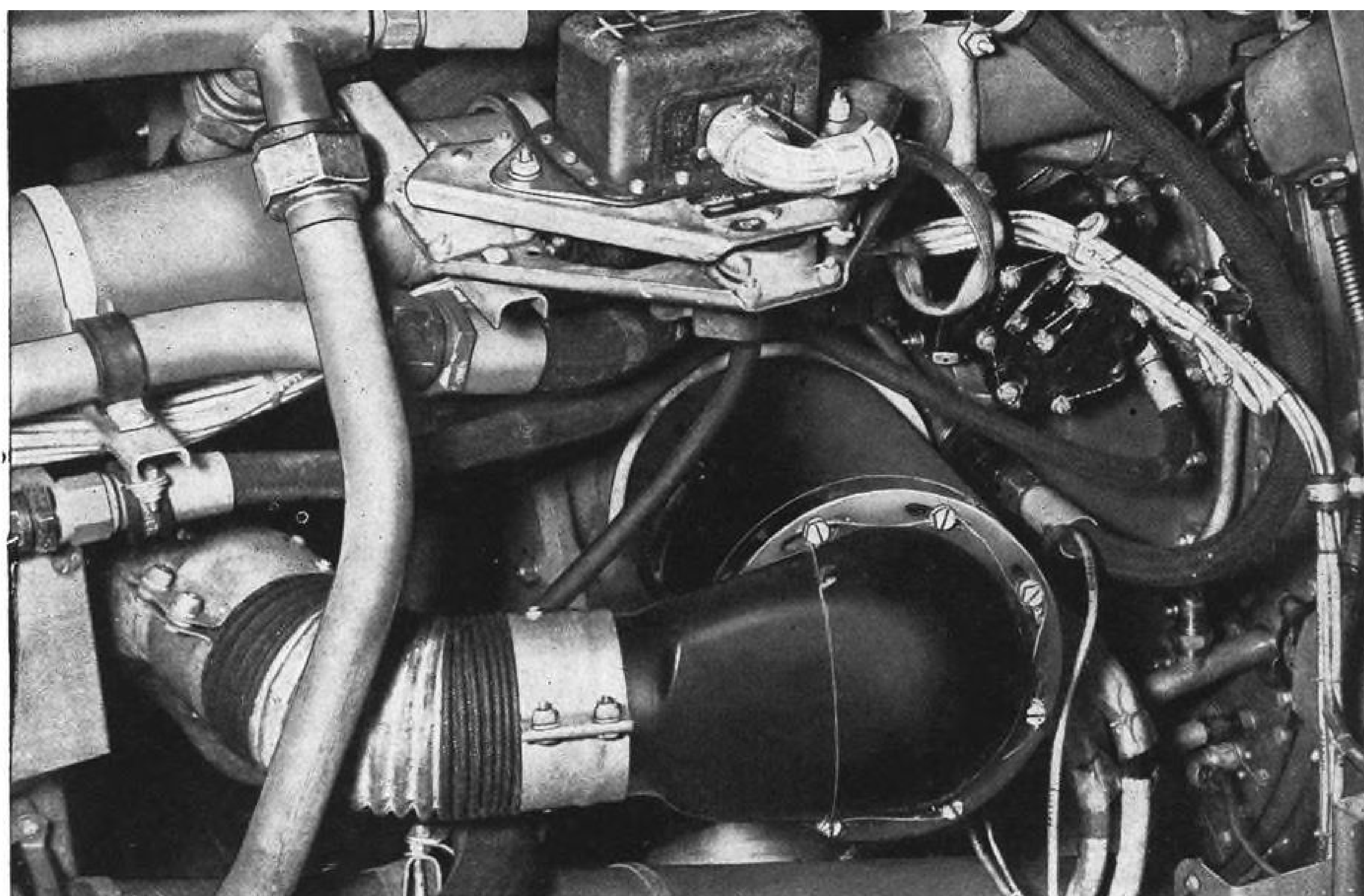
SKYDROL is noncorrosive to aircraft metals and alloys.

SKYDROL is nontoxic—does not require special handling or protective clothing.

Skydrol: Reg. U. S. Pat. Off.

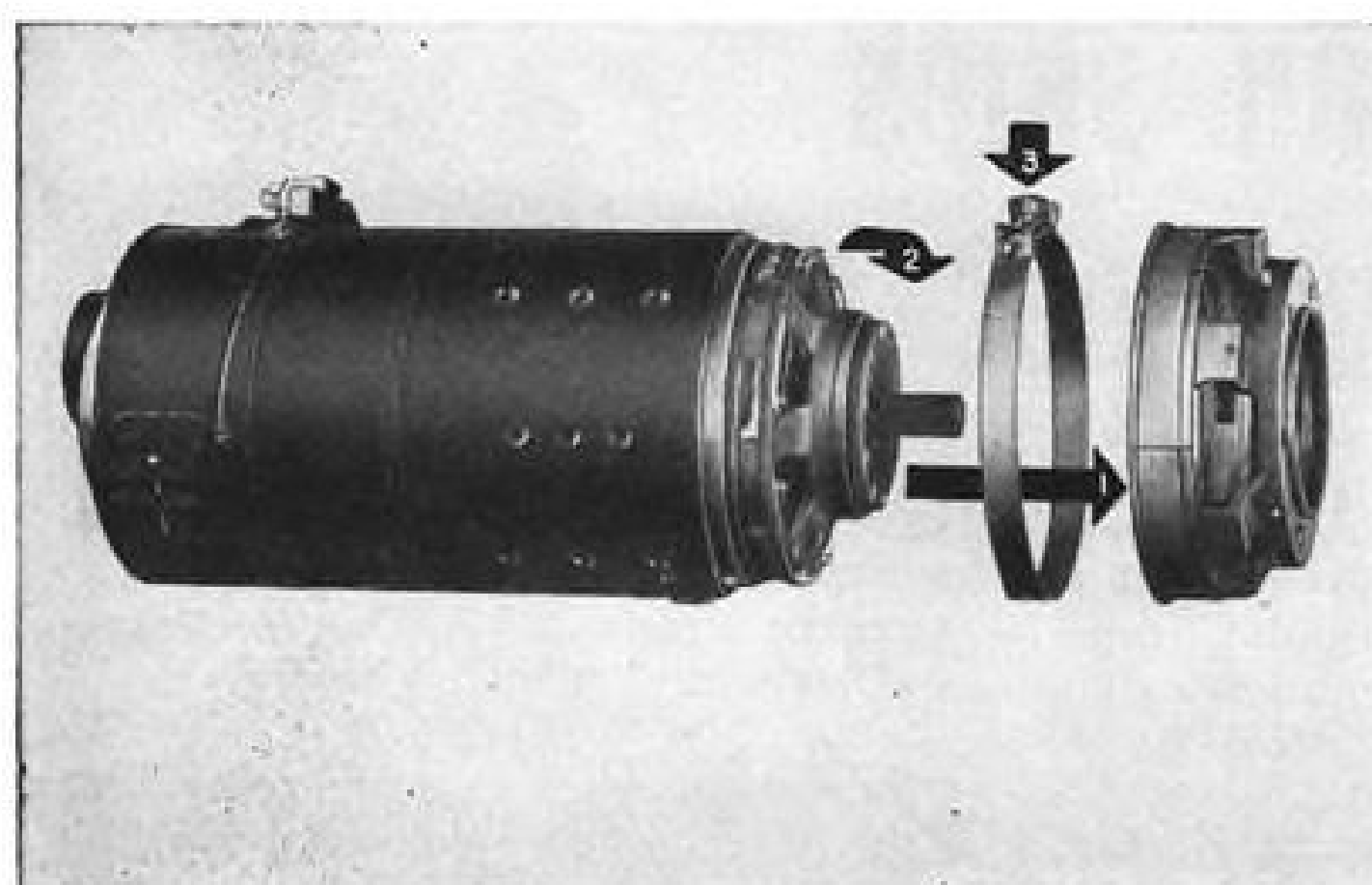


SERVING INDUSTRY . . . WHICH SERVES MANKIND



IN THE NEWS

NEW GENERATOR MOUNT SAVES TIME AND MONEY



Simple as one, two, three! 1. Fit generator into slots of mounting ring (permanently mounted on your engine), 2. engage by a slight turn, 3. adjust and tighten clamp ring. The QAD mount can be supplied to fit any G-E aircraft generator. Simple, inexpensive, light weight, the new mounting can be used to mount a generator on piston engines or a starter-generator on jet engines.

This snake pit is a mechanic's nightmare when it comes to removing a generator for routine maintenance. General Electric's new, QAD (quick attach-detach) generator mount eliminates the need for universal joints in mechanics' elbows. Generator replacement time is cut from hours to minutes. The QAD has been selected as an industry standard—for hard-to-get-at installations—by a joint Air Force-Navy committee. It is interchangeable with present generators of equivalent rating.



One man can replace a generator where two were required before, in a fraction of the time. No special tools required . . . no blind fumbling. And, this time and money saving device may be added to your fleet gradually—as ships come in for overhaul. For further information, call your General Electric aviation specialist or write, **General Electric Company, Schenectady 5, New York.**

Quality equipment for aircraft

GENERAL ELECTRIC

210-30

located in a circumferential duct extending from the air intake to the rear of the engine. The air moved by the fan is pushed aft to a discharge opening. Thus, the engine is a turbojet arrangement with a supplemental set of cut down propeller blades.

Characteristics of the engine are between those of a turboprop and turbojet. For a given fuel flow, thrust is substantially higher under static conditions than a turbojet, but lower than a turboprop. At high flight speeds the condition is reversed, the ducted fan developing more thrust than the turboprop, but somewhat less than the pure jet.

The British and the Germans did early work on the ducted fan design. Theory of the configuration previously was revealed in *AVIATION WEEK* (July 11, 1949, p. 23).

Continental says that when installed in a 4-place aircraft with other characteristics about the same as present airplanes of that type, the ducted fan engine will make possible a cruising speed of about 300 mph. as compared with about 170 mph. at present. (Obviously, the airframe would have to be designed to take this higher speed.)

The Aspin II's takeoff rating is 794 lb. thrust. Weight is 300 lb.

► **Others Announced**—Another of the engines is the Artouste I, affording 280 hp. and weighing 185 lb.—about half as much as a piston engine of comparable output, Continental says.

Others in the series are the Palas with a thrust of 330 lb., and the Marbore II, pushing out 880 lb. Fuel consumption and weight of these jets is reported by Continental to be "comparable to those of the very largest military turbines."

These two units are slanted especially for aircraft in the 400-500 mph. class, such as target airplanes. And they would also be applicable as booster units for assisting at takeoff and climb for bombers and transports where extra load is required or with takeoff from high-altitude fields, reports Continental.


The Palouste turbine is another unit, functioning as an air compressor, putting out 2.3 lb./sec. at 50 psi. It can be used for starting large jets, for jet-type copter rotor drives, and for portable heating systems, as well as for operation of air power tools.

► **Remainder**—In addition to these units, others of the family, though not reported by Continental, are believed to be the Aspin I, another ducted fan with takeoff rating of 460 lb. thrust and a weight of about 275 lb.; the Artouste II, a shaft turbine of 400 hp., weighing 200 lb.; the Pimene jet, with 242 lb. thrust and a weight of 118 lb.; and the Pimedon, another air generator putting out 1.3 lb. of air/sec. at 50 psi.

Initial production of the Turbomeca engines will be handled by the Continental subsidiary—Continental Aviation

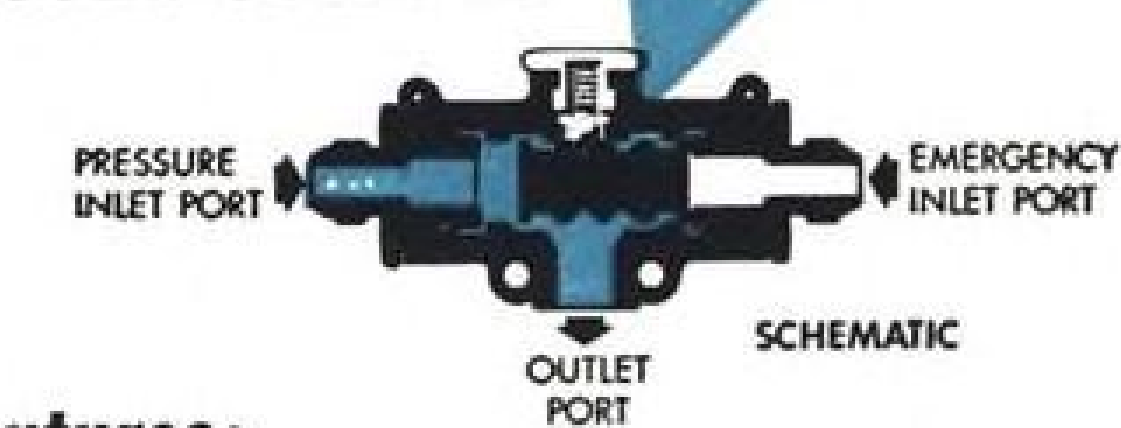
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AN 3000 AND
1500 PSI HYDRAULIC
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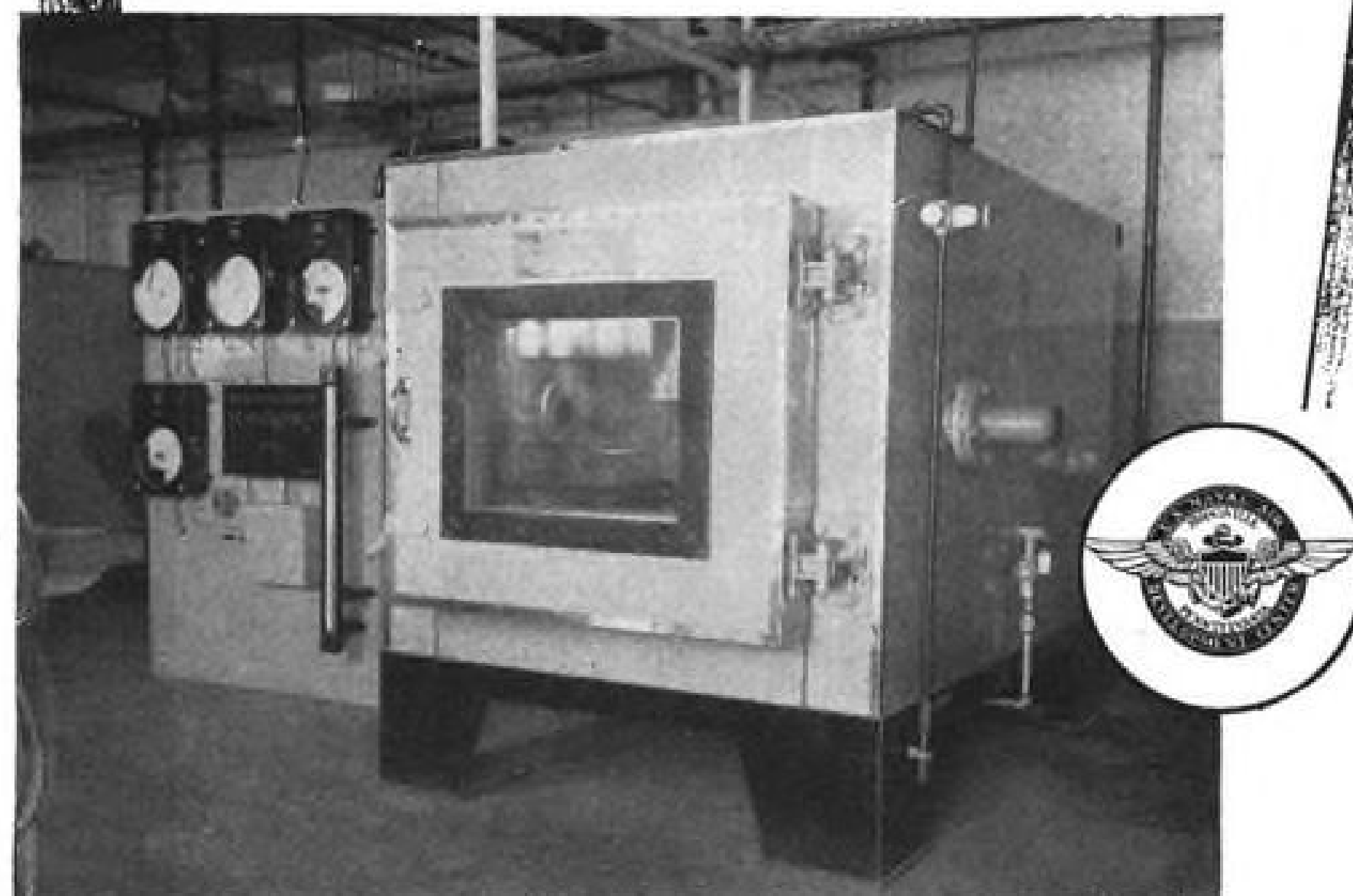
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CANADIAN REP.: RAILWAY & POWER ENGINEERING CORPORATION, LIMITED

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takes its
ENVIRONMENTAL TEST PROBLEMS
to **Tenney**



Maximum flexibility, efficiency, dependability—those are essentials of test-chamber design for military research use. And those are the qualities engineered into the Tenney Test Chamber recently installed at the U. S. Naval Air Development Center, Johnsville, Pa., for environmental testing of aircraft components.

Specifications: Altitude to 80,000 feet; humidity, 20% to 95%; temperature, -100° F. to +200° F.; any temperature-altitude conditions simultaneously; automatic program cycling control with minimum elapsed time for obtaining all extreme conditions.

For all types of testing—development, research, specification, and production—a Tenney-engineered chamber will meet your requirements. For testing under all degrees of humidity, at all altitudes and temperatures, a Tenney-built test chamber assures complete dependability and precisely controlled test data. Automatic cycling, indicating, and/or recording systems to your specifications, if desired.

For further information without obligation, write Tenney Engineering, Inc., Dept. G, 26 Avenue B, Newark 5, New Jersey.

Test Chamber Design for Every Industrial Use



Manufacturers of Automatic Temperature, Humidity, and Pressure Control Equipment

and Engineering Corp., which is expanding its organization.

Meanwhile, the arrangement with Turbomeca calls for continuing cooperation in future development work.

Another Turbomeca gas turbine—a 140-hp. unit—is also slated for manufacture in this country. This engine—the Oredon—will be built by Fairchild Engine and Airplane Corp.'s Stratos division, under licensing agreement with the French company. (AVIATION WEEK, Aug. 27, p. 51).

Subcontracts Build Cessna's Backlog

While Cessna Aircraft Co. now has orders for more than 2,000 of its L-19 Birdog Army liaison planes, its other military subcontracting business represents a larger part of the current backlog of \$80 million, the Wichita manufacturer announced last week.

Other orders include: some \$16 million from Lockheed for assemblies of aft fuselages and tails of Lockheed F-94 interceptors and T-33 jet trainers at Cessna's Prospect plant; an undisclosed substantial order for tail assemblies for the six-jet Boeing B-47B bomber, for delivery across the airport from Cessna to the Boeing Wichita plant; and major components for the new Republic F-84F sweptwing jet fighter which General Motors Corp. will build at Kansas City. These components will be built at Cessna's enlarged Hutchinson, Kan., plant.

Meanwhile Cessna continues to make commercial four-place Model 170 airplanes at the rate of two a day, while the majority of its larger Model 190 series production is now going to the Army with the designation LC-126C. Yet another source of business is in Cessna's production of hydraulic equipment for farm implement companies.

Arrangement of a V-loan credit agreement of \$10 million has recently been completed to cover expansion in facilities (resulting in an overall addition of 47% more floor space) and for working capital.

NAA Subcontracts

Some 4,600 outside firms collect approximately 50% of every contract dollar given North American Aviation, Inc., by way of subcontracting and furnishing goods, supplies and services.

With a backlog over \$510 million in military aircraft, NAA estimates that approximately 150,000 men and women in the Los Angeles area directly benefit through its outside buying. NAA itself employs 24,100 people in its Los Angeles area plants, 7,500 at its Columbus, Ohio division, and is preparing to open new facilities at Fresno, Calif.

Deep-Drawn in 2 DRAWS

with
ADVANCE TOOLING

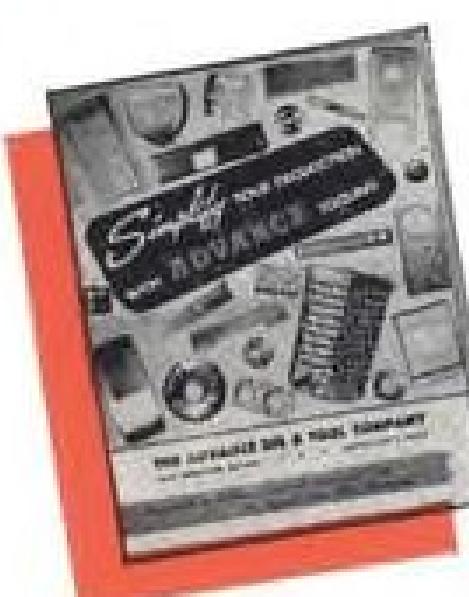


Depth Bomb part drawn with Advance Dies from 31 1/2" steel blank.

THIS DIFFICULT STAMPING SIMPLIFIED BY NEW ADVANCE TOOLING METHOD

Here's another example of ADVANCE tooling ingenuity. The problem: This depth bomb tail piece deep-drawn to the dimensions shown above . . . in just two draws . . . from a 14-gauge steel blank. Similar pieces were formerly produced with five or six draws, or by butt-welding two halves.

Advance tooling techniques met the requirements — with dies that produced the part in two draws as specified. Advance can help you with your difficult drawing and stamping problems . . . and save you time and money in your processing operations. Our engineers and our completely equipped die plant are ready to serve you. Consult us — or write for complete information.



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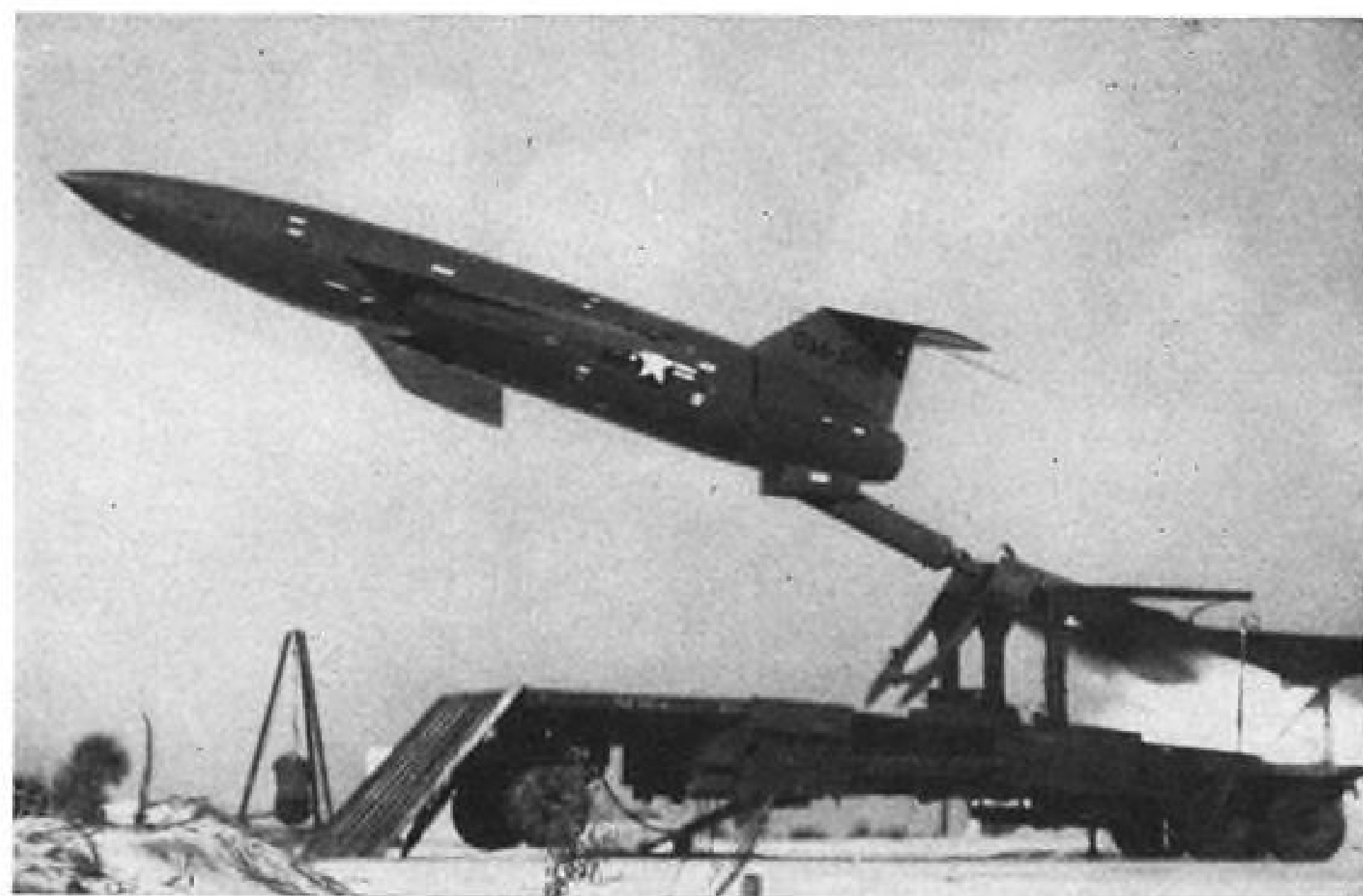
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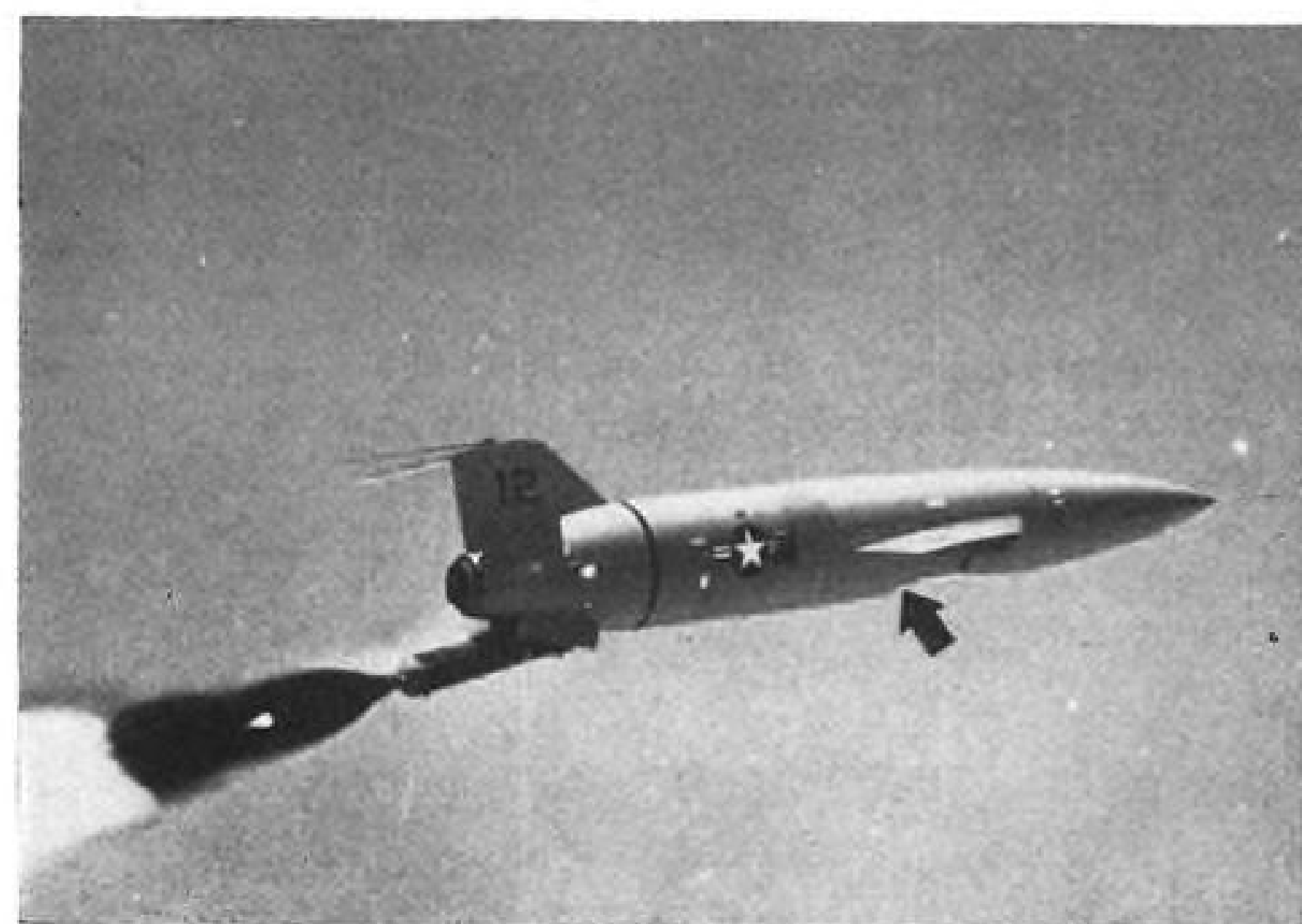
MARTIN MATADOR AF's B-61 missile, is poised on truck launching cradle. Weapon is about 30 ft. long, has thin swept wing. Basic power is supplied by Allison jet, but initial push is by RATO unit (arrow) as . . .

Firing the AF's First Missile In Service Use

Story on Air Force Missile Test
Center begins on page 43.



MISSILE BLASTS off its perch at angle controlled by hydraulic adjustment on launching cradle, for flight. In initial speed range . . .



ROCKET CONTINUES push and turbojet is still inoperative (arrow indicates its air intake). Power expended . . .



ROCKET FALLS away, with fairing doors (arrow) beginning to close and turbojet taking over.

**On tough sealing
jobs like this . . .**

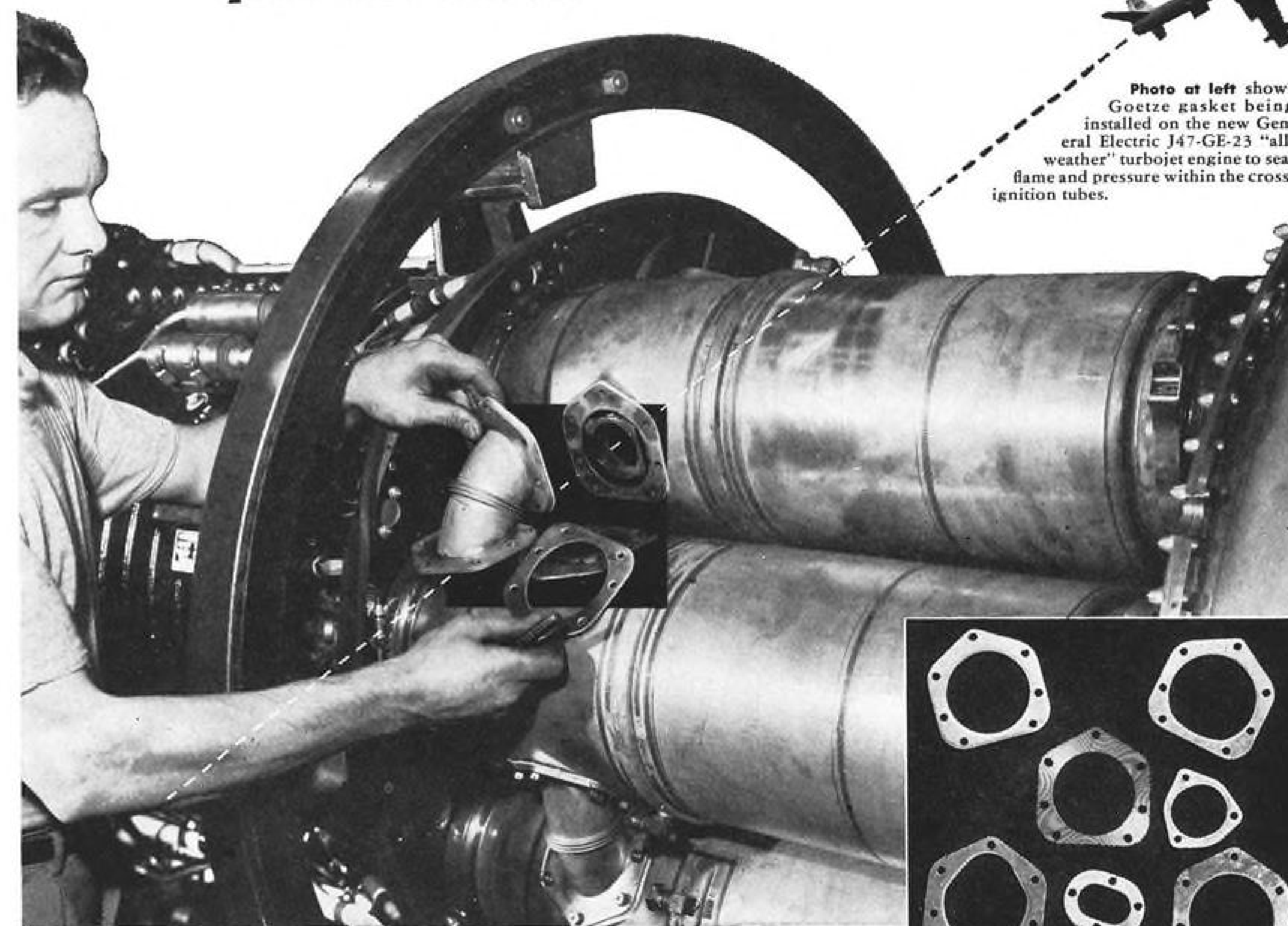
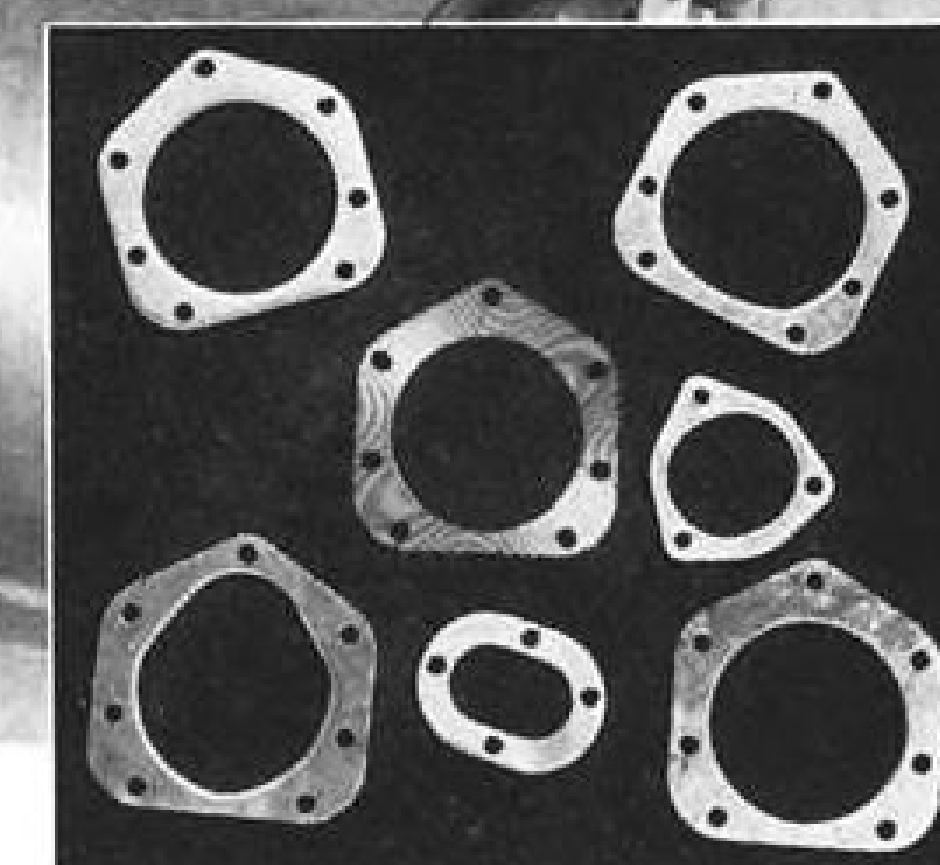


Photo at left shows Goetze gasket being installed on the new General Electric J47-GE-23 "all-weather" turbojet engine to seal flame and pressure within the cross-ignition tubes.



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

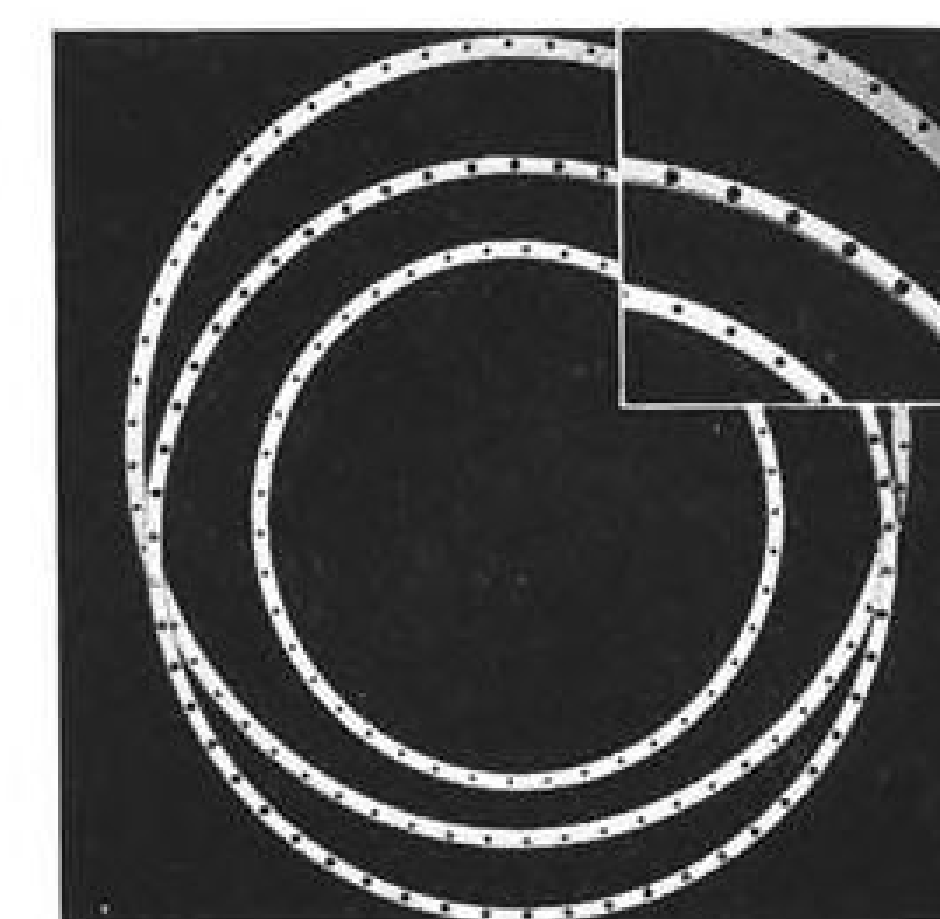
J-M Goetze Gaskets guard against critical flame and pressure leakage

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

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

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

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



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



Johns-Manville

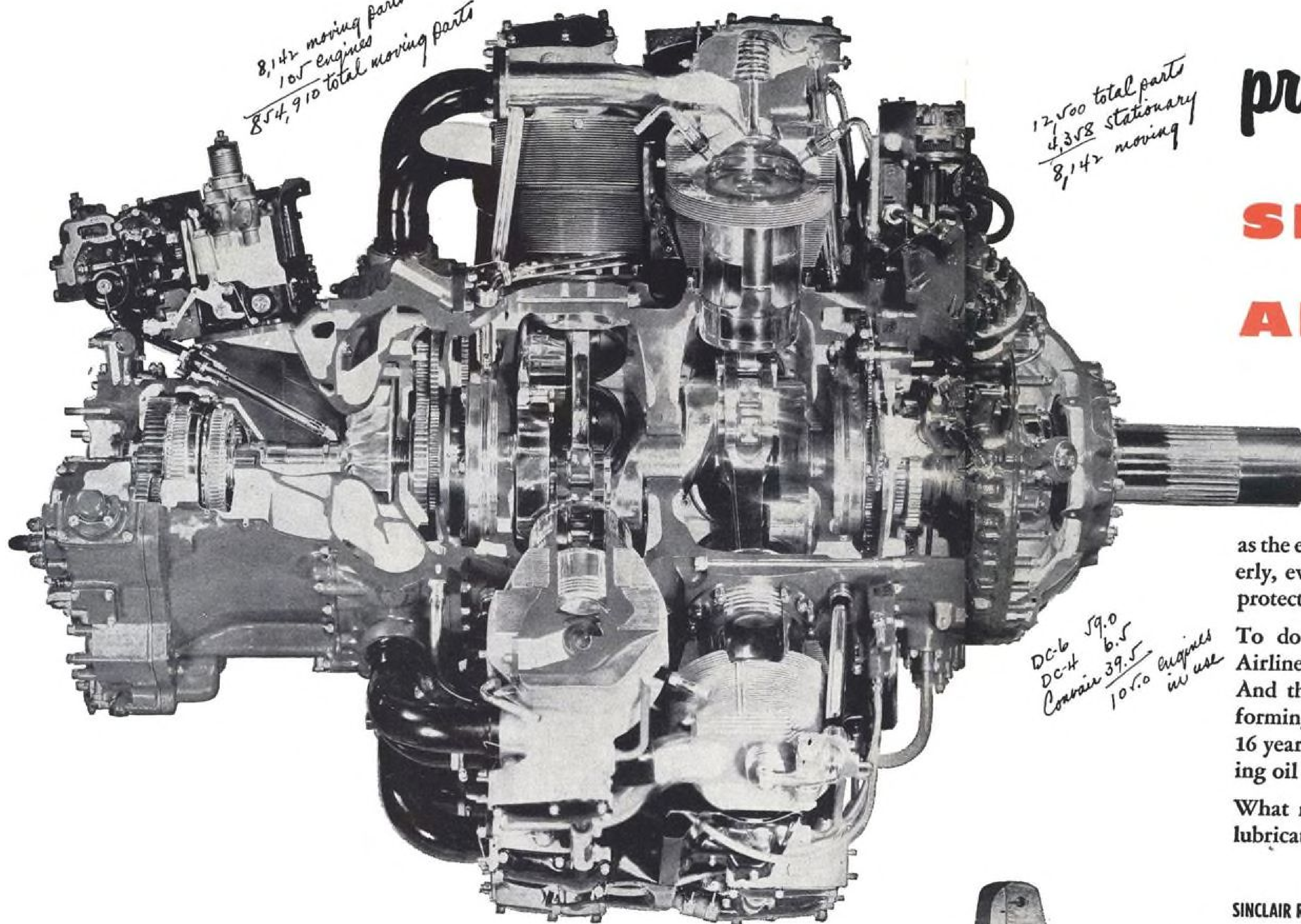
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*8,142 moving parts
105 engines
854,910 total moving parts*



*12,500 total parts
4,358 stationary
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In each of the huge Pratt & Whitney engines that power the Convairs and DC-6's of American Airlines' Flagship Fleet, there are an estimated 7,642 vital parts that are constantly on the move as the engine roars along. For these engines to operate properly, every one of these moving parts must be completely protected from friction and heat with a dependable oil.

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*DC-6 59.0
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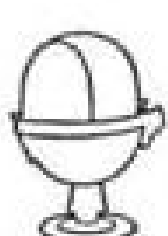
L-M has been in the airport lighting business for many years. Its engineers know lighting. More important, they know what the pilot must see, and do, when he is coming in for a landing. The aviation problems of a runway lighting system are as important as the electrical and the optical problems.

L-M has an extensive staff of field and headquarters engineers who are familiar with airport lighting problems and requirements and whose services are available to you.

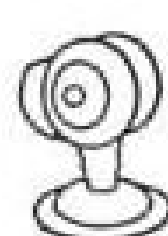
The service includes analysis of the problem, planning, consultation, specifying of equipment that will meet the requirements and come within the budget; checking of the installation; and instruction of your personnel to assure efficient, economical operation of the lighting.

LINE MATERIAL... Airport Lighting

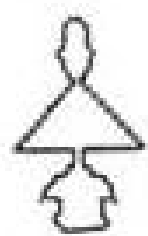
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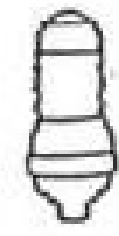
L-M high intensity unit with fixed focus, type L 819.



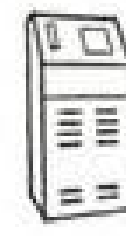
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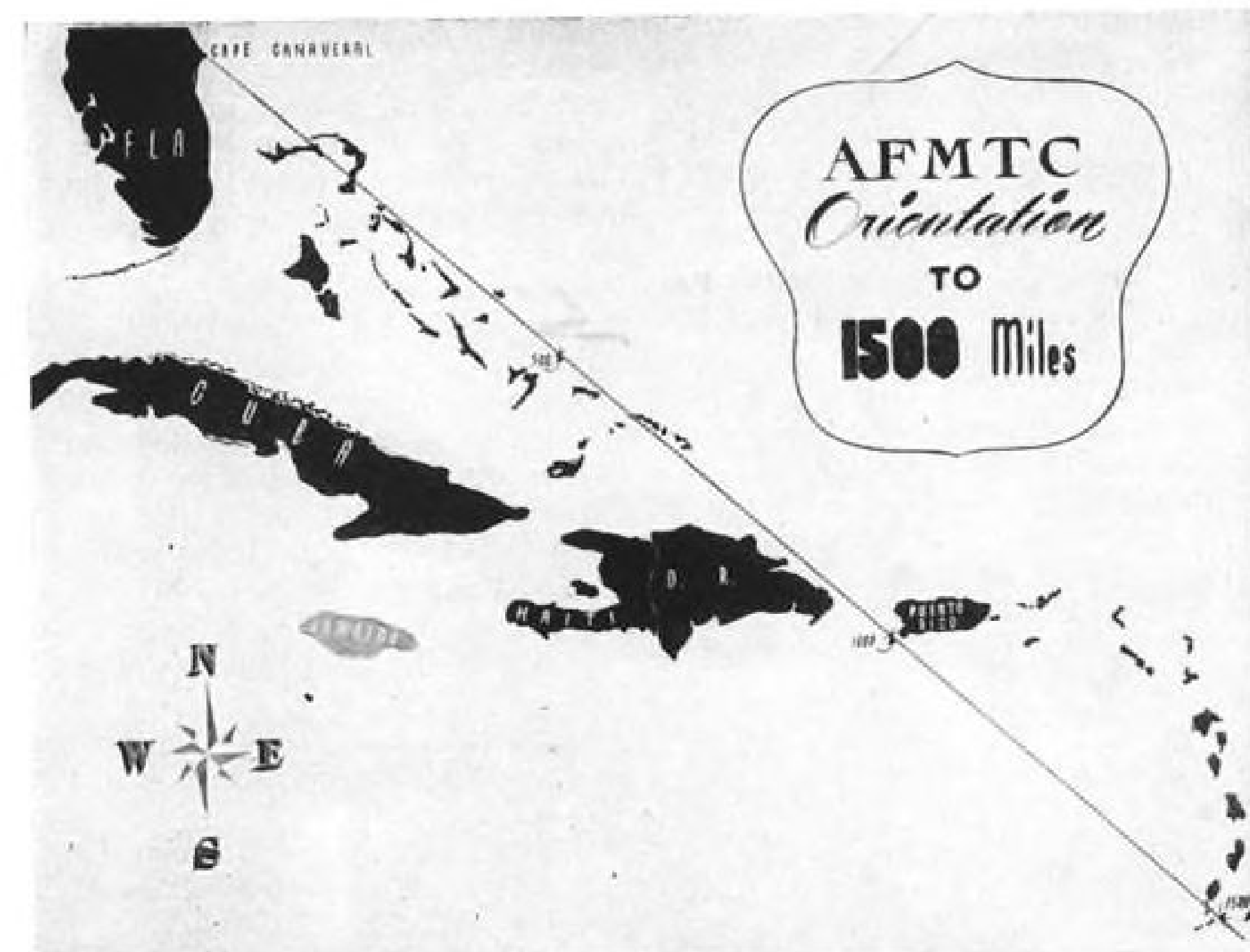
L-M marker and obstruction lights, single or double.



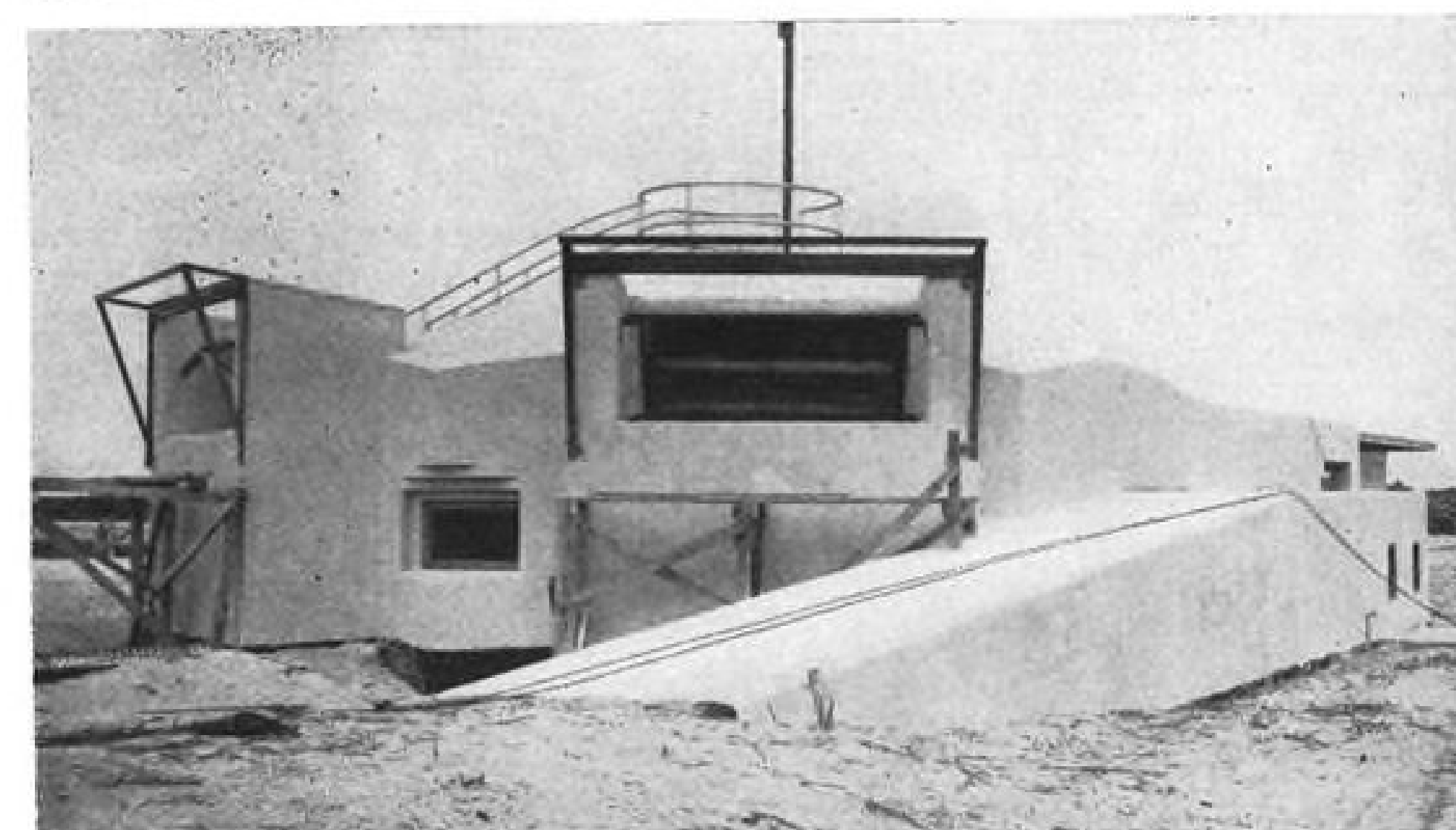
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SOUTHEAST ACROSS THE ATLANTIC, missiles roar from Florida, directed from . . .



CONCRETE BLOCKHOUSE housing instrumentation and men who record results.

Where Services Test Missiles

Building of range to fire new weapons is farther along than the development of the missiles to use it.

Three years ago, the Joint Long Range Proving Ground was established at Banana River, Fla. By this time next year, the range should be complete out to its current 1,000 mi. limit. Then the only problem will be getting a missile able to use the range capacity.

One year ago, a group of disappointed newspapermen, technicians, military and civilians watched the first missile firing fizzle. It was a test of an Army Ordnance-GE-Douglas Bumper round.

► **Current Status**—Recently, AVIATION WEEK sent a correspondent to the proving ground—recently redesignated

as the Air Force Missile Test Center—to investigate the current status of the range. His report sounded somewhat like the words of the hypothetical engineer with the hypothetical 1,000,000-hp. engine—"Now that we've got it, what are we going to do with it?"

The firings now being made by Glenn L. Martin Co. crews with the Martin Matador utilize only a smallish portion of the range's capabilities. And Boeing, waiting to make tests, is interested in anti-aircraft missiles, hardly the type to require more than visual distances.

Apparently this is one of the few cases in aeronautical history when test

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facilities have been more-or-less ready ahead of the articles to be tested.

► **Still Joint Operation**—Although the Air Force has supervisory control of the range, it's still very much a joint project. It is dedicated entirely to in-flight testing of developed missiles—there are no research or development facilities at the base. And regardless of the contractor or his service customer, he can use the base and its facilities for test flights.

Operation and construction is a study of service cooperation, too. The Navy's Bureau of Yards and Docks is constructing the down-range instru-

ment stations. A Navy man has charge of range clearance before firings; an Army representative has flight control responsibility. Coast and Geodetic Survey has charge of the precise orientation of the missile course.

► **Range Description**—The Air Force Missile Test Center includes the former Naval Air Station at Banana River and the missile launching site at Cape Canaveral.

The range fans out to the southeast over an area of about 100,000 sq. mi. Its present limit is set at about 1,000 mi., just beyond the southwestern tip of Puerto Rico.

With the present flight line, almost a due southeast course, the maximum range limit is over 3,000 mi. But if the range course can be elevated a few degrees to the east, then the flight line can be extended to 5,000 mi. into the South Atlantic.

When construction is completed by the middle of 1952, the range will have eight operating sub-divisions (OSD) between launching site and range limit. These OSDs are essentially instrumentation stations. The first is at the Cape Canaveral site, and the others are at Point Jupiter, Fla., Grand Bahama Bank, Eleuthera, San Salvador, Mayaguana and Grand Turk islands, plus another on the west coast of Puerto Rico.

Eleuthera, at mid-range, will be the biggest. It is now operating on a limited basis.

Each OSD will be manned by a complement of 80 to 100 when completely staffed.

► **Launching Site**—Cape Canaveral is about 18 mi. north of the Banana River station. The launching site itself is a closely guarded area of 12,000 acres of palmetto and sand on a strip of off-shore land about 11 mi. from the Florida mainland.

A concrete blockhouse has been erected by the AF to house instrumentation and observers. It is connected by tunnels to a 100-ft. square launching pad that will soon be duplicated to permit firing of two missiles in rapid sequence.

Constant-course plotting is used to give the range officer continuous information on missile position, speed and distance. If the course limits are approached during flight, the missile can be destroyed by the In-Flight Safety Officer. Once the missile is in the air, it's his baby.

He can destroy it by radio command, either cutting off fuel or setting off an explosive charge. Or if he should remove his hand from the control, a dead-man switch gives the signal and destroys the missile.

Aside from construction of down-range stations, biggest headache for the Air Force now is public education. Residents of the area, fishermen and sportsmen have not taken kindly to the idea of living and working under (so they visualize) a covering veil of roaring missiles. So the AF is sending officers on a swing through the Bahamas to point out the necessity for the range, to explain the firings and the elaborate precautions and safety features.

With this problem solved, and the OSDs complete, AF and the other services will be able to concentrate on the problems of firing about 100 missiles per year. It is hoped that this stage can be reached fairly soon.

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NACA Reports

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► Turbulence-Intensity Measurements in a Jet of Air Issuing From a Long Tube (TN 2361)—by Barney H. Little, Jr. and Stafford W. Wilbur.

The purpose of this report is to obtain quantitative turbulence data in order to correlate flame-propagation velocities with local turbulence intensity. Data are presented for a subsonic jet with fully developed turbulence flow issuing from a pipe. By mounting this pipe concentrically with a larger pipe, and by maintaining the maximum velocity in the resulting annulus equal to the mean velocity in the inner pipe, boundary conditions were determined. Four conclusions were drawn from this investigation:

- Turbulence in the jet was not isotropic.
- There was no systematic variation with Reynolds number for the ratio of the longitudinal turbulence velocity to local mean velocity at pipe exit.
- There was no consistent variation in the ratio of radial turbulence velocity to local mean velocity with Reynolds number at any station.
- Near the pipe center line, both longitudinal and radial turbulence intensities were constant from the pipe exit to a distance 5 diameters from the exit.

► General Plastic Behavior and Approximate Solutions of Rotating Disc in Strain-Hardening Range (TN 2367)—by M. H. Lee Wu.

Basis of this report is the necessity of calculating the distribution of stresses and strains in a turbine or compressor rotor. The particular method presented here differs from earlier approaches to the problem in that the additional complication of body forces is considered. A partly linearized solution is obtained, based on the deformation theory of plasticity and considering finite strains. For a given material and a given maximum strain, stresses and strains of the problem can be obtained by simple multiplication using the tables shown in this technical note.

An approximate method is also given for calculating stresses by using strains obtained from the ideally plastic material and the tensile true-stress-strain curve of the material. Numerical examples are calculated by two methods and agree very well with the exact solution based on deformation theory.

USAF CONTRACTS

Following is a list of recent USAF contracts announced by Air Materiel Command.

Consolidated Vultee Aircraft Corp., Ft. Worth, Tex., development of resealing materials for integral fuel tanks, \$100,000; machinery and equipment, over \$250,000.

Dallas Aviation School, Dallas, Training of 300 AF military personnel in airplane and engine mechanics training, over \$250,000.

Douglas Aircraft Co., Inc., Long Beach, Calif., facilities for production of C-124 airplanes, over \$250,000; spare parts for aircraft, Cl. O1D, over \$250,000.

Dow Chemical Co., Midland, Mich., industrial facilities for the production of magnesium castings, over \$250,000.

Eclipse-Pioneer div., Bendix Aviation Corp., Teterboro, N. J., direct cranking starters, Cl. 03C, 631 ea., \$222,402; generators, Cl. 19A, over \$250,000.

Fairchild Aircraft div., Fairchild Engine & Airplane Corp., Hagerstown, Md., repair of miscellaneous GFP on "Call", \$50,000.

Farrand Optical Co., New York, facilities for production of mounted optics for Y-4 bombsight periscopes, \$95,000.

Ford Motor Co., Dearborn, Mich., industrial facilities for production of B-47 wing sets, over \$250,000.

General Motors Corp., Saginaw Steering Gear div., Saginaw, Mich., machinery and equipment, over \$250,000.

Goodrich, B. F. Co., Akron, de-icer shoes, Cl. O1D, over \$250,000.

Heintz Mfg. Co., Philadelphia, facilities for sheet metal subassemblies for J-47 engines, \$214,000.

International Business Machines Corp., Dayton, rental, additional shift rental and installation charges of International Business Machines electric tabulation equipment, over \$250,000.

Jack & Heintz Precision Industries, Inc., Cleveland, Inverters, Cl. 04C, 872 ea., \$72,263.

LaMar Aero Supply Corp., Clinton, Okla., indicator, Cl. 05C, 4,000 ea., \$87,040.

Lear Inc., Grand Rapids, Mich., maintenance data, Cl. 30, \$31,064; maintenance data, Cl. 30, \$193,041.

Leland Electric Co., Dayton, inverters, Cl. 03C, over \$250,000.

Lockheed Aircraft Corp., Burbank, F-94 training parts, tools, equipment, over \$250,000.

Lowell O. West Lumber Sales, Sacramento, lumber handling services necessary to storage and distribution of lumber for Air Force, over \$250,000.

Pacific Airmotor Corp., Burbank, C-54 maintenance inspection, over \$250,000.

Paragon Electric Co., Two Rivers, Wis., fuse arcing solenoid, Cl. 11B, 18,972 ea., \$50,465.

Radio Corp. of America, RCA Victor div., Camden, N. J., shoran radar equipment, Cl. 11A, \$200,000.

Republic Aviation Corp., Farmingdale, L. I., N. Y., machinery and equipment, over \$250,000.

Robertshaw-Fulton Controls Co., Greensburg, Pa., indicator, airspeed, Cl. 05C, 100 ea., \$100,000.

Sikorsky Aircraft div., United Aircraft Corp., Bridgeport, Conn., service and materials to overhaul 25 each sets of metal rotor blades, \$30,000.

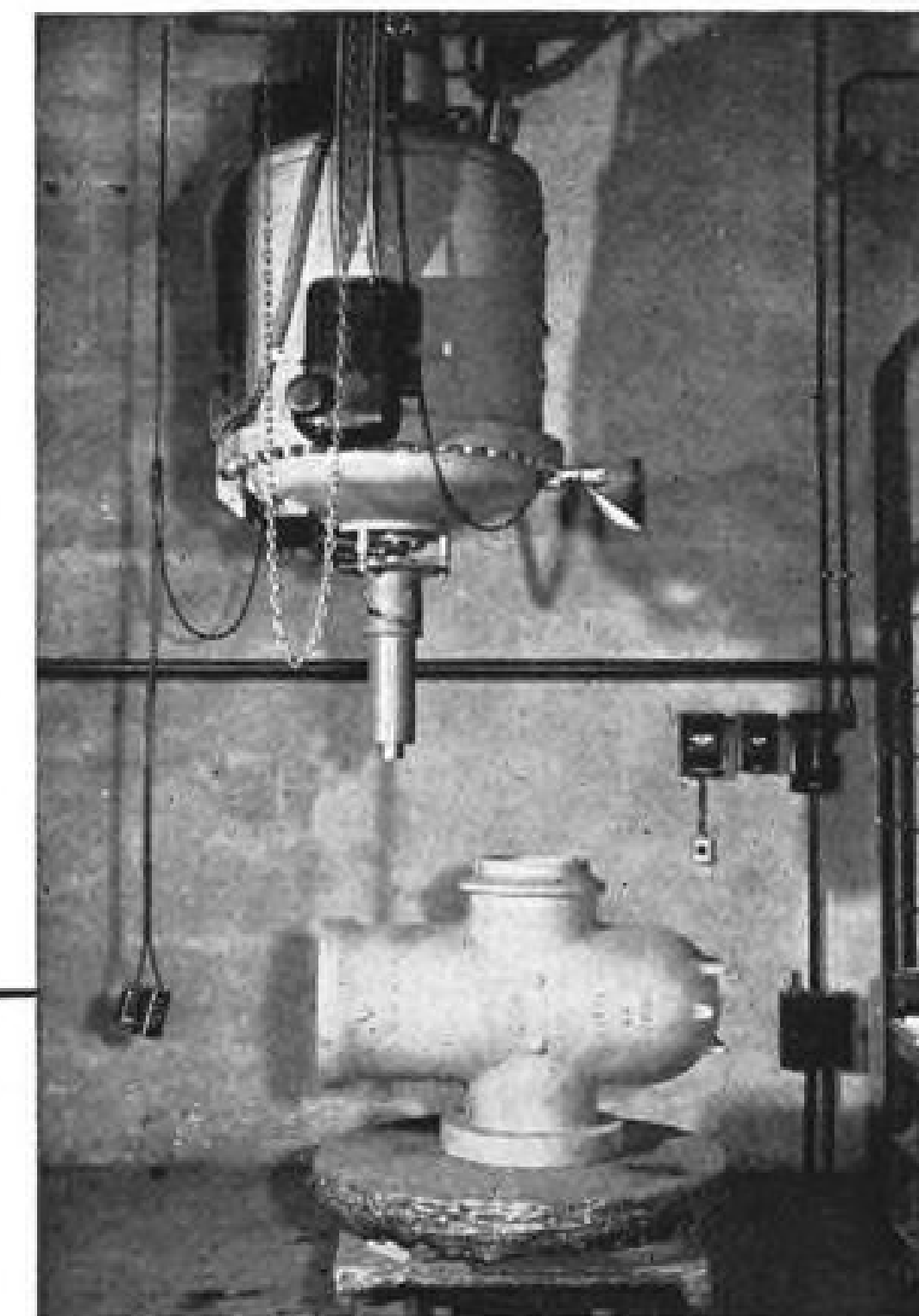
Southern Airways School, Bainbridge, Ga., operation of Bainbridge Air Base for basic pilot training, over \$250,000.

Summers Gyroscope Co., Santa Monica, development of dynamic flight test table, \$50,000.

Ternstedt div., General Motors Corp., Detroit, indicators and transmitters, Cl. 05 D, 900 ea., \$79,386.

Texas Engineering & Mfg. Co., Inc., Dallas, C-54 maintenance inspection, over \$250,000.

Wright Aeronautical Corp., Woodridge, N. J., engines, spare parts, & tools, Cl. 02, over \$250,000.



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EQUIPMENT

New Anti-Fouling Sparkplug

Boeing claims 'first significant change in 30 years' meets all aircraft piston engine needs today.

A major advance in sparkplug design, promising to overcome many shortcomings and greatly increase life and dependability of these parts, is seen in a new "anti-fouling" plug—developed by a firm not even in the business.

The honors, if the plug proves out competitively, go to Boeing Airplane Co. and one of its service engineers, Gilbert F. Wright, who developed the basic design as a sideline. Boeing took on further development last year and believes the result represents the "first significant sparkplug design change in 30 years." The company plans to turn the new design over to a sparkplug manufacturer for production and presently is sounding out leading firms in this field.

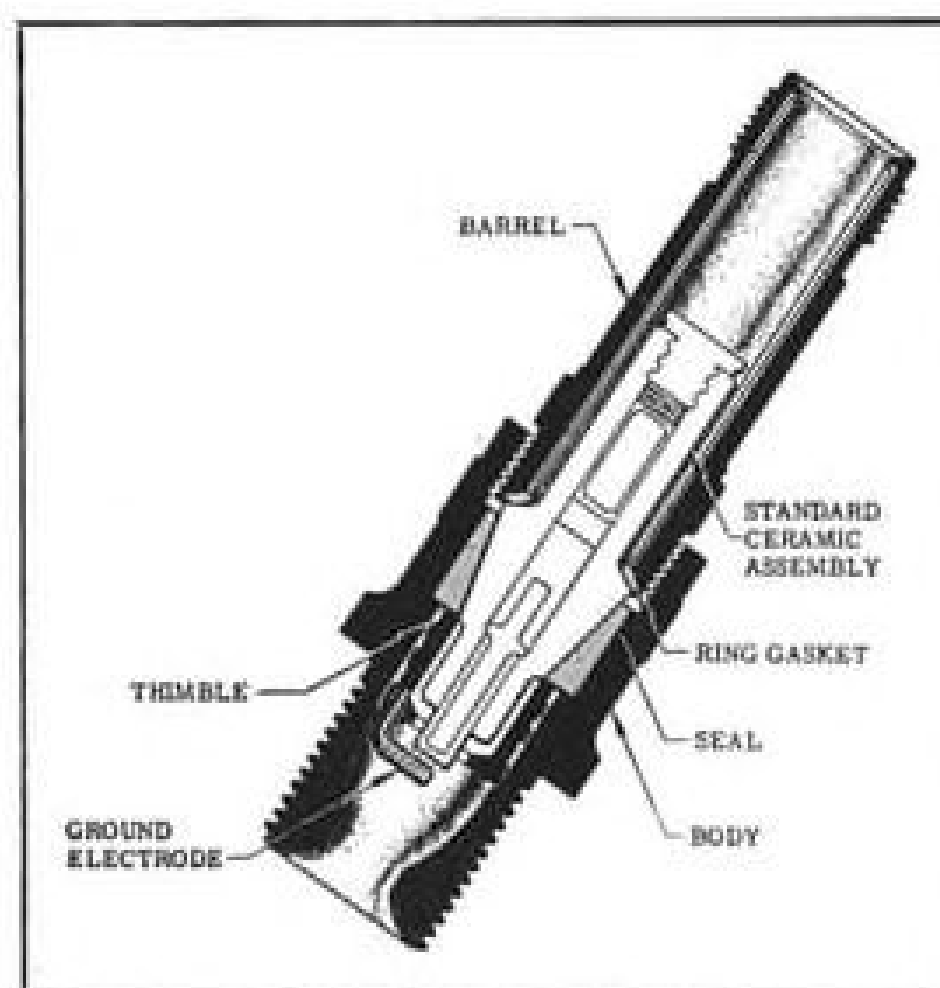
► **Lightplanes, Too—Payoff** from a manufacturing and procurement standpoint is that a single model of this plug meets all aircraft piston engine needs, Boeing stresses, eliminating scores of different models now required. Tests show it can be used in lightplane engines as well as those powering military planes. Reason is that the plug has a much wider heat range than present types and performs satisfactorily both in "hot" and "cold" running engines, the company explains.

Essentially the new part is designed to give better protection to electrodes from wear and tear in the cylinder, prevent carbon buildup, insure more precise control of heat on critical elements and raise combustion efficiency.

Electrodes in this plug don't project directly into the cylinder, as in other types. Instead, they are recessed within the plug's structure in a "pre-combustion" chamber. The chamber, a venturi-shaped affair, opens into the cylinder and shields the points and other critical elements from the ravages of heat, erosion and fouling. Configuration of the chamber is such that it produces a jet-like flame that spurts out from the plug with the explosion well developed by the time it reaches the cylinder.

This will serve to produce more complete and uniform burning of the fuel, says Boeing, and to "purge" the plug chamber of carbon.

► **Longer Life**—Certain design wrinkles, centering around the thimble (shown), permit the plug to dissipate heat more



rapidly than other types, say the developers. This and the features already mentioned overcome a dilemma common to present plugs. To prevent fouling, they must be hot, but for long-life they should be cooler operating. By the combination of features in the new plug, both anti-fouling characteristics and resistance to breakdown are raised markedly, service tests indicate.

Besides long-life and anti-fouling advantages, these features give the plug

a higher pre-ignition rating, result in improved starting, smoother and slower idling, and smoother, more rapid acceleration with no increase in fuel consumption, says Boeing.

Boeing points out the idea of recessing points in the plug has been tried before, but designers always "... had to sacrifice power and performance because of the lack of proper design relationships." The firm simply says it has succeeded in retaining high performance while giving better protection to the plug "... by controlling heat dissipation and the point of ignition for maximum efficiency."

► **Performance**—Some test results: In a total of more than 60,000 mi. of service tests in various makes of old cars with engines in poor condition, standard plugs fouled in 150 to 170 mi., while there were no signs of fouling after 4,000 mi. with the new plug. Other trials indicate the plug runs 20 deg. cooler under normal conditions and reduces exhaust gas temperatures by as much as 25 deg. In service tests in a Pratt & Whitney R-2800 engine under extreme fouling conditions (fuel contained five times the normal amount of lead), the Boeing plug continuously operated for 70 hr. while the best plugs on the market failed within 22 hr. Other tests showed the same plug adaptable to maximum power conditions in the P&W 3500-hp. Wasp Major and to small engines in lightplanes. The new plug can go two octane numbers lower than other plugs and still retain the same knock-rating as the others, tests at Standard Oil Co.'s laboratory in Richmond, Calif., have indicated.

Why American Likes Its DC-6s

Recent \$35-million order was based on AA's experience: high speed, heavy loads, few maintenance problems.

Tulsa—Greater speed and ability to carry heavier loads over a longer range with a minimum of maintenance difficulties have sold American Airlines on its new Douglas DC-6B fleet.

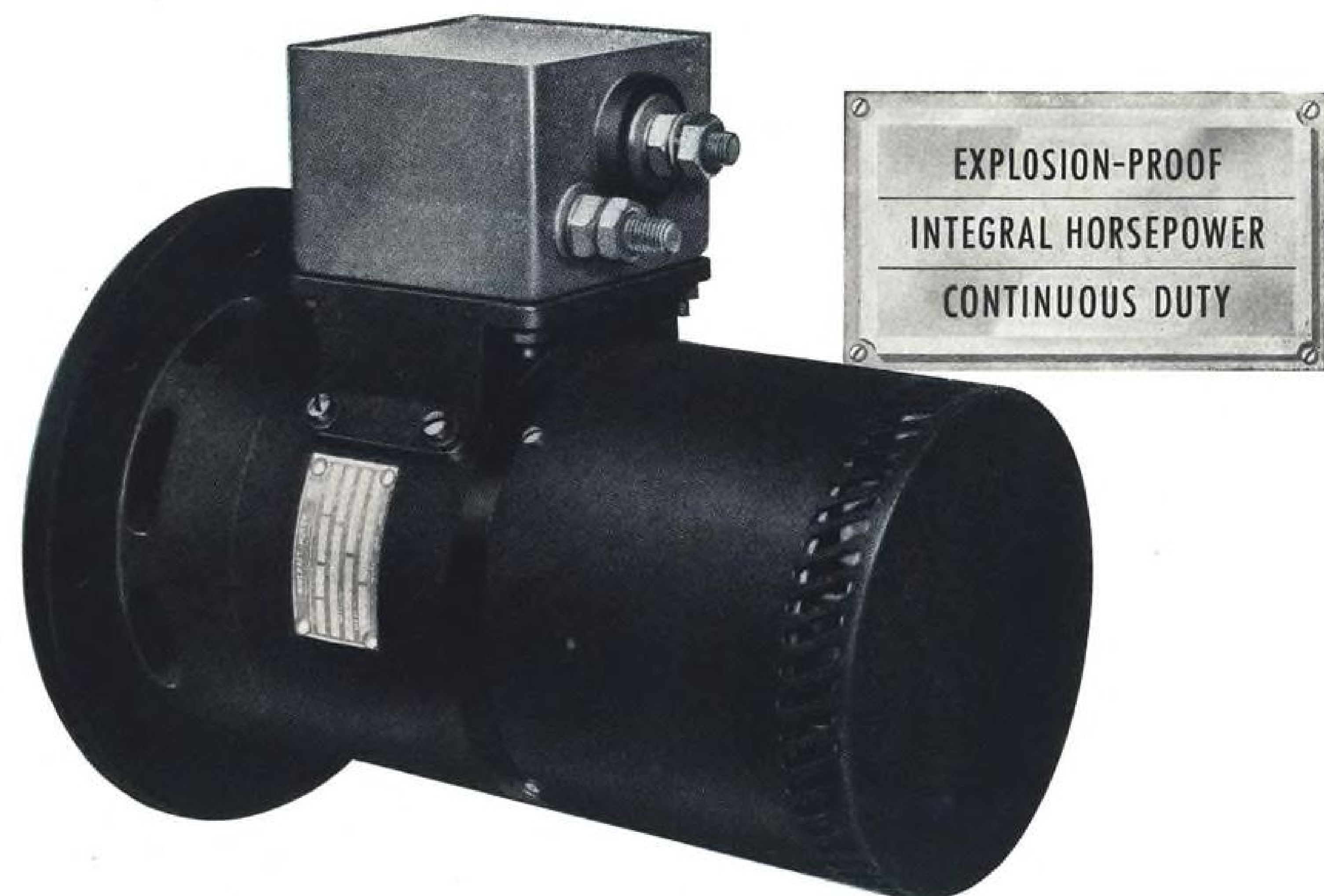
These factors, proven on the company's transcontinental routes at an average daily utilization of 9 hr. 40 min., were the reasons American recently decided to spend some \$35 million for 24 more DC-6Bs and six DC-6A freighters which it will begin to put into service in 1953. One spokesman for the carrier said: "No other plane was even considered."

There are now 11 DC-6Bs of AA's original order in service, with six more in process of delivery, and they have successfully piled up over 12,000 hr. of flight time. Although still considered in

the shaking down stages, the craft have gone into service smoothly, according to W. E. Spearman, assistant manager of service engineering. Because the B is a semi-new—not a completely new—plane, AA personnel have experienced little difficulty in servicing and maintaining it.

But experience with its earlier DC-6s has prompted the carrier to install some innovations in its DC-6Bs.

► **Cabin Conditioning**—The improved air conditioning system, particularly in the lounge, now permits passengers to smoke cigars and pipes, thus departing from the long-established ruling among U. S. carriers limiting smoking to cigarettes only. The lounge table has been removed because this facility encouraged card games, which limited the



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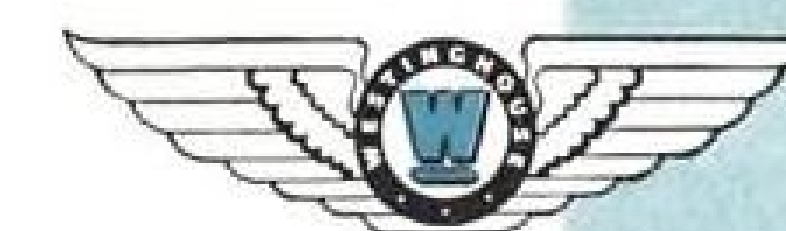
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lounge's use to those passengers playing and did not give more people a chance to change their seats.

Humidifiers have been removed from the air conditioning system since they have been deemed unnecessary.

AA is considering installation of the new Douglas high-capacity cabin superchargers which will be available within a year, according to Spearman. These blowers will increase air output from 1,100 cu. ft. a minute to 1,760. The B's present cabin supercharger system uses Skydrol, which AA says has the advantages of fire resistant qualities and improved lubricity making for longer moving parts life.

► **Cabin and Furnishings**—Improvements have been made in the wash water layout to eliminate freezing difficulties. These include: extensive use of rubber hose, routing of lines through the fuselage interior, electrical blanket heaters at the water outlet. Also, water tanks have better valving and are made of heavier material to prevent collapse.

An increase in service life of toilet facility components is foreseen through use of heavier, standard seats and fixtures. Illuminated signs outside each rest room indicate whether they are occupied or vacant and identifying silhouettes on each door have lessened confusion.

AvTrim is used for the cabin interiors instead of gabardine, making for easier cleaning and longer life.

► **Seating Arrangements**—American's DC-6s accommodate 52 passengers and have a large cargo compartment forward. It is not planned to convert that space for seating passengers.

► **Capacity Growing**—Some idea of how American is expanding its seating and cargo capacity may be appreciated in comparing present and future capacities. With the 11 DC-6Bs the carrier is now operating, total seat capacity for its entire fleet comes to 6,352 and cargo capacity to 493,000 lb. When the carrier has its entire DC-6B fleet in operation, sometime in 1953, seating will jump to 7,912, if no further equipment is purchased.

This figure, however, may be altered in other ways—for instance, if AA should convert further planes to high-density air coach service. It now has four 70-passenger DC-6s flying and it is understood it would like to convert four more as soon as the planes can be spared from their normal runs.

AA's cargo capacity now runs to some 477,000 lb.—the six DC-6Bs still due, the 24 on order, plus the six DC-6As on order, could raise this another 402,000 lb.

Landing weight on the DC-6B is 85,000 lb., an increase of 10,000 lb. over the DC-6. Takeoff weight increased from 91,300 lb. to 100,000 lb.

Refinement of the P&W R-2800-

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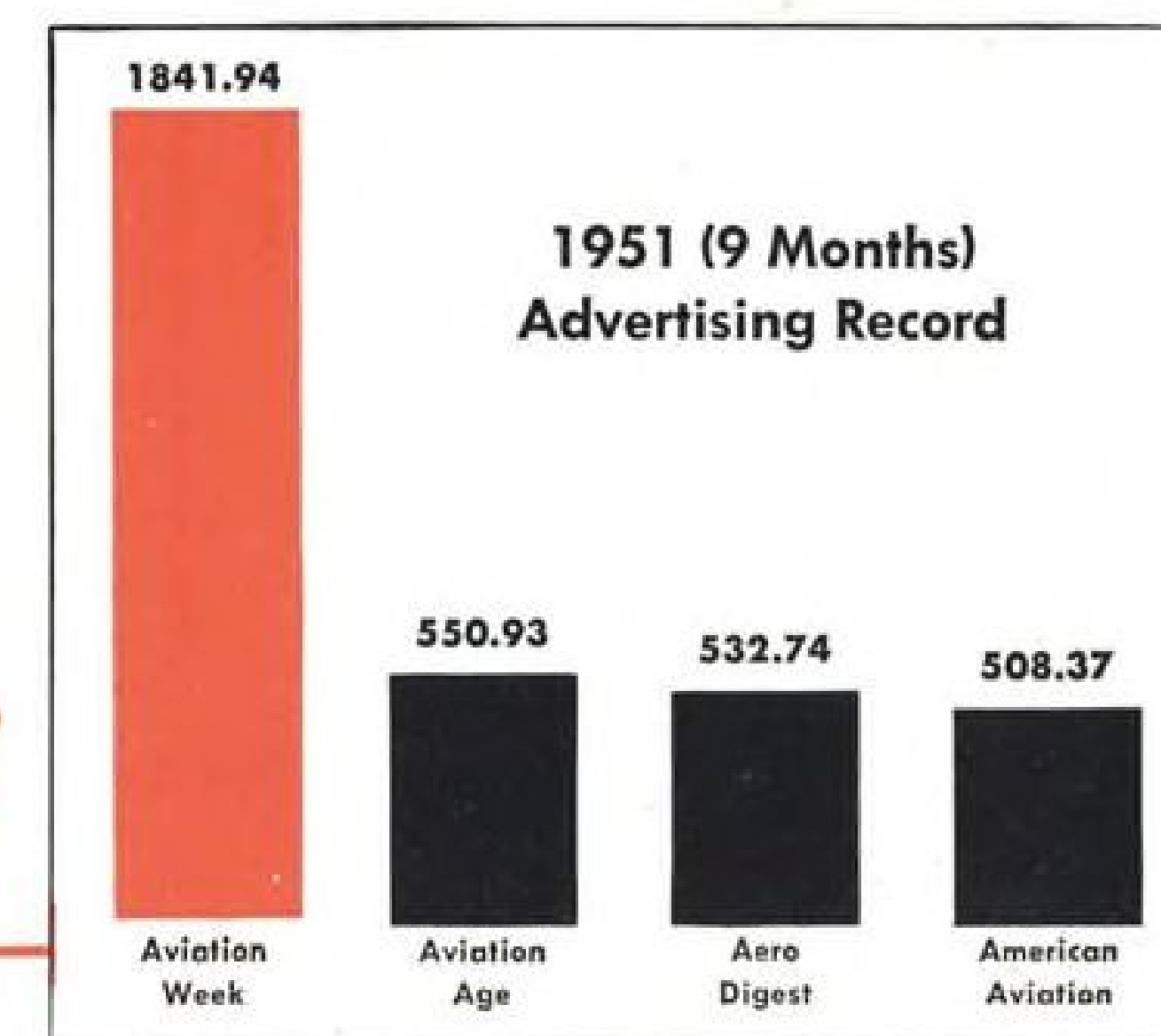
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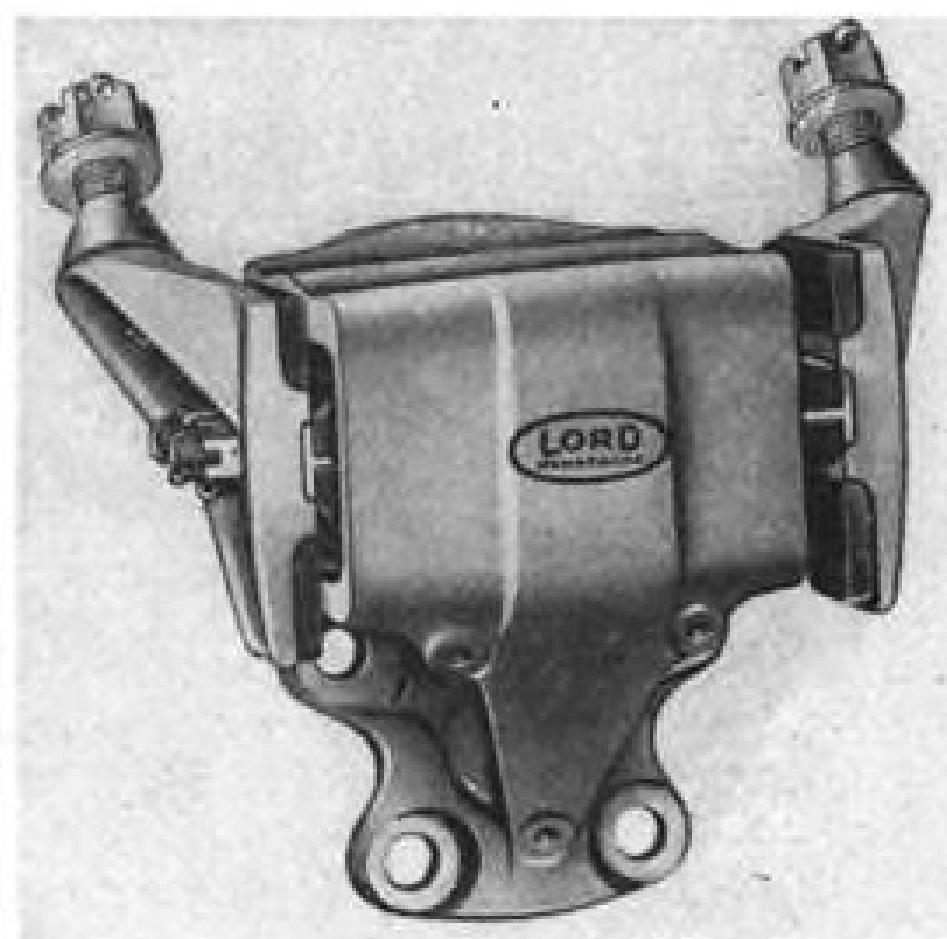
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CB16 engines, primarily in the superchargers, allows AAL to pull 100 hp. more from each engine at cruise power. This increases cruise speed about 10 mph. over the Six.

All engines are equipped with Hamilton Standard propellers and Scintilla low tension ignition systems.



New Engine Mount

A new design Dynafocal aircraft engine mount has been developed by the Lord Manufacturing Co. It will be standard equipment on the 1049 Super Constellation, according to the manufacturer.

The unit, designated MR-41, employs entirely new structural shapes. The maker claims these advantages:

- **Lightweight construction** saves 16 lb. per aircraft on the Super Connie.
- **Low natural frequencies** of the mount make it possible to absorb a very high percentage of engine vibration. The high efficiency of the suspension should result in improved vibration characteristics of the aircraft, increasing passenger comfort, reducing crew fatigue on long flights and lowering the dynamic stresses imposed on the plane's structure.

• **Simpler manufacture**, involving a considerable reduction in number of parts, will ease maintenance and reduce spare parts inventory.

• **High damping** of improved snubbers in each mount will prevent metal-to-metal bottoming during periods of abnormal stress.

Basic design features of the MR-41 mount have been thoroughly proved by other engine suspensions developed for military use, according to Lord.

Autopilot Lends Hand in Fire

Lear Inc.'s L-5 autopilot and approach coupler were put to the test during a recent flight involving the company's Lockheed Lodestar.

During a demonstration flight for a group of USAF pilots, the right engine

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Type PTS portable traffic signal is a small lightweight searchlight that can be held by the operator and aimed at the plane which he wishes to signal. It is readily visible either by day or night for sufficient distance to control traffic approaching an airport.

The signal is equipped with two handles. The rear pistol grip handle has a switch that can be used to turn on the light or to signal in Morse code as

desired. The front handle controls the color screens and enables the operator to readily transmit a white, red, or green signal. The front sight is of Lucite and is so designed that the sight itself becomes luminous and shows the color of the signal which is being projected. The brilliancy of the sight can be controlled by means of a simple shutter.

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Designing and building compact, light and efficient equipment for cooling and pressurizing aircraft is a Stratos specialty. Typical of Stratos creative engineering is the air cycle cooling unit which conditions the air for the crew of the Boeing B-47. Weighing less than 45 pounds it delivers 60 pounds of minus 3 degree Fahrenheit air per minute. Like other Stratos equipment it can be relied on to give long and trouble-free service. Stratos cooling units with air flow capacities ranging from 12 pound/min to 90 pound/min are standard equipment in many combat aircraft of the Navy and the Air Force.

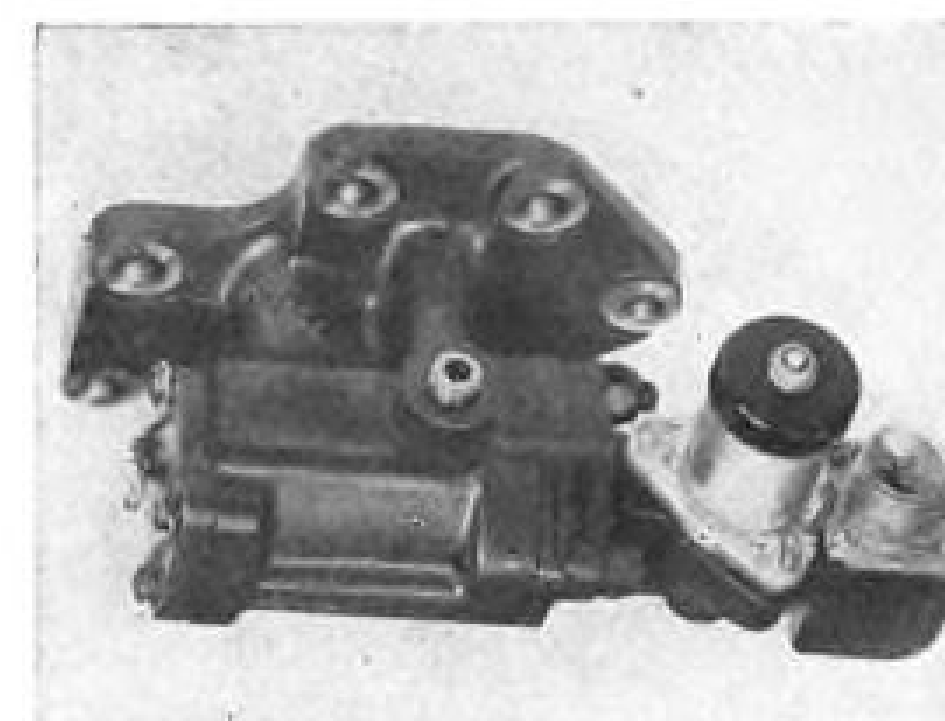
Stratos units, engineered to the precise requirements of the installation, are now in use in such typical military aircraft as the McDonnell F2H2, Douglas XA2D, the North American YF93A and such commercial aircraft as the Convair 240 and the Lockheed Constellation.

Those who build and equip the nation's top aircraft know that good engineering comes in small packages—

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Fairchild Engine Div. and Guided Missiles Div., Farmingdale, N. Y.

caught fire while the plane was making a final approach under control of the autopilot-approach coupler team. Even with the loss of one engine, the "autopilot took over and made a perfect landing," according to Ed Conklin, Lear pilot at the controls. He added that that, in having his "hands and mind free to fight the fire" was instrumental in getting the aircraft down without injury to the passengers and little damage to the plane.



Blower Clutch Selector Valve

A new, electrically operated blower clutch selector valve (above) for 2-speed engine supercharger control has been put on the market by Adel division, General Motors Corp.

Manufacturer says of the 2-position unit that mechanical linkages and adjustments are eliminated; high blower position is actuated by engine oil pressure; device is spring-loaded to fail-safe, low blower position; valve is light, simply constructed and inexpensive.

Address: 10777 Van Owen Street, Burbank, Calif.

Sleeperette Seat

Another new aircraft seat is going into production.

This one, developed jointly by Aero-therm and Pan American World Airways, is, according to the airline, the first seat to be designed as a sleeperette seat from the ground up, then adapted to regular seat purposes, rather than the reverse.

PAA engineers said that Aero-therm designed, developed, tested and delivered a prototype seat in three months.

The seat offers, according to PAA, comfort, serviceability, light weight and good appearance.

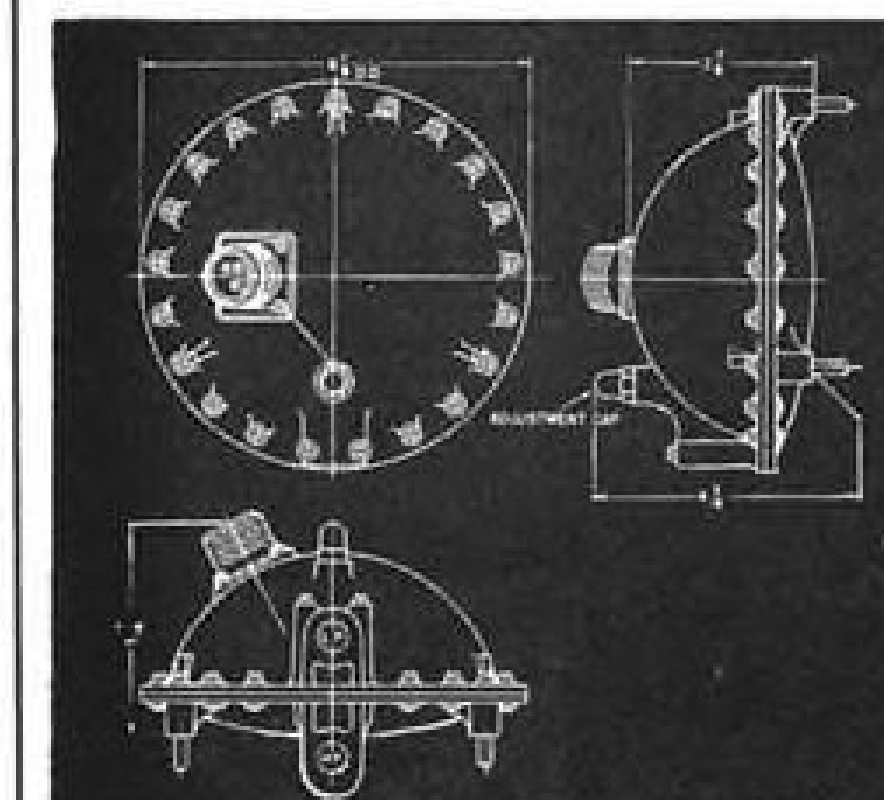
The seat has a telescoping center arm rest. This permits a passenger to avail himself of both seats when possible without having to dispose of a removable arm rest.

It will be possible to replace small, detail parts instead of major assemblies. This should reduce maintenance of the seat.

Called the Model 441-2, the seat is

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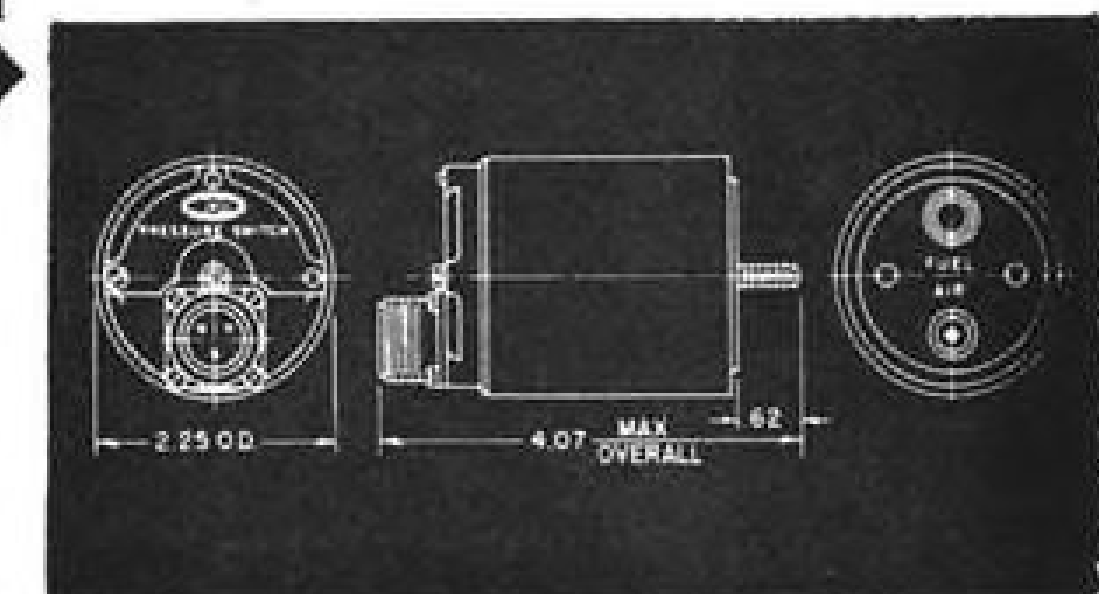


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Complies with A.F. environmental specification 41065-B
Over 80 different types designed and produced



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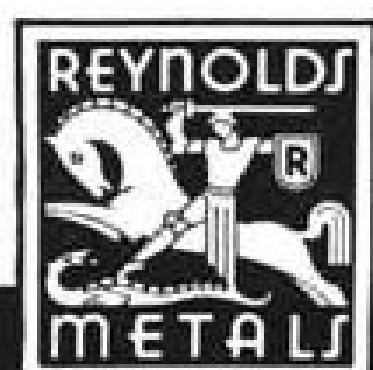
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equipped with a two-position foot rest, a two-position leg rest and a food-writing table.

The seat can recline to 65 deg. as a sleeperette, can be limited to 45 deg. in a day plane installation and has a normal position of 17 deg. The back may be folded full forward to about the horizontal position to facilitate handling and reduce obstruction in the cabin if plane is used on a combined passenger-cargo flight.

Foam rubber is used all around and provisions have been made to mount the seats on the tracks PanAm uses in its planes to speed conversion from one seating arrangement to another. Seat is stressed for 10Gs.

Reflector Paint Speeds Output

White paint applied to the plant floor at service stations beneath the B-29 bomb bays being modified at Lockheed Aircraft's Marietta, Ga., plant, reflects four times as much overhead lighting as before and has made need for rigging extension lights on cords unnecessary.

The paint is Speed-Rex, containing a resin called Devran, having properties of fast drying, good adhesion, and resistance to many solvents and abrasion. A hard wax is applied over the paint to protect the white surface and make cleaning easier.

Previously considerable difficulty was experienced in rigging the extension lights and it required a good deal of the worker's time. Now the plant's overhead fluorescent lighting does a double-duty job.

Spark Advance Gives PAA Fuel Savings

Spark advance on Pan American World Airways Pratt & Whitney R-4360 engines (used on the Boeing Stratocruiser) is saving the airline money, its engineers told AVIATION WEEK.

The spark advance, used during cruise, went from 20 deg. before top dead center to 25 deg., then to 28 deg. At the 28-deg. setting, PAA estimates that maximum fuel consumption economies can reach 3%. This amounts to about a 1,350-lb. weight saving on an Atlantic crossing.

Corollary advantages of the system are reduction of exhaust temperatures by as much as 30 C and the temperature reduction's beneficial effect on the turbosuperchargers.

At one point the airline hardly got 400 hr. out of the unit. They are now up to a 900-hr. overhaul period.

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NEW AVIATION PRODUCTS



New-Tread Tire

Evaluation tests of the Thompson "Extra-Landings Tread," an aircraft tire embodying a new tread design aimed at giving longer life, are being made by several western airlines on DC-3, DC-4 and DC-6 planes, according to Thompson Aircraft Tire Corp.

The tread consists of a series of staggered slots, spaced to carry heavy loads and provide proper displacement of the tread-rubber when the tire deflects at ground contact.

According to Thompson engineers, the new slotted design "eliminates groove cracking prevalent in several brands of straight-rib tires and makes practically impossible the 'throwing' of the center ribs" that has occurred with some tires—the result of poor adhesion of the original tread-rubber to casing.

The tread slots are tapered in depth to reduce chances of picking up rocks and other objects. The new tire handles and steers like straight-rib types and does not lose its resistance to side slipage when taxiing and turning on wet runways and ramps, the firm says.

Thompson Aircraft Tire Corp., 18th and Minnesota Sts., San Francisco.

frequencies in the 108-132 mc. band, has been placed on the market by Radio Apparatus Corp.

The set, Model AR1, can be connected to an a.c. or d.c. power source. It permits all tower instructions to incoming and outgoing aircraft to be received by anyone concerned with takeoff and landing activity of private, commercial or military planes, says the maker. The unit is encased in a black, plastic cabinet, measures 7x6x10 in. and weighs 7½ lb.

Radio Apparatus Corp., 310 Fountain Sq. Bldg., Indianapolis.

Plane Cover Fabric

Production of Aeron 26, a tough, plastic-coated fabric developed expressly for use on aircraft, has been announced by Flexfirm Products.

This modern plane fabric, coated by a Nylon-base compound, can be used as external covering for wings, nose, fuselage and other surfaces, says Flexfirm. It is suitable for many phases of aircraft construction, the company adds. Aeron 26 is said to be lightweight, has high tensile and tear strength and can withstand temperature from -80 to 200 F.

Flexfirm Products, El Monte, Calif.



40G Seat Fitting

A new attachment fitting for use on seats and litters in aircraft, capable of handling loads up to 40 G and with easy locking and unlocking features, has been placed on the aviation equipment counter by Gordon D. Brown & Assoc.

The fitting, a close-coupled device consisting of jaws actuated by a collar, is designed to secure seats to the aircraft by gripping, in bulldog fashion, standard AN 7516 studs in the floor. Locking jaws are positively locked or unlocked simply by sliding the collar up or down. And to facilitate placement or removal of the seat, the jaws stay open as long as the collar remains in the unlocked



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A VHF receiver, resembling outwardly a conventional home radio set, which can be used to monitor aircraft

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(up) position. Fitting is designed so a vertical motion can be used to install or remove seats. Since the bottom of the part is free of protrusions, floor isn't damaged if the seat is dragged over it. Gordon D. Brown & Assoc., 407 K Commercial Center St., Beverly Hills, Calif.

Decked Up Switches

New shorting-type rotary switches, having up to 30 positions and designed for watertight mounting, have been placed on the market by United States Instrument Corp.

The switches, Type JA, 16-, 24-, or 30-position, represent an advance in design over shorting (make before break) rotary switches US formerly produced and meet rigid government specifications, the company reports.

A typical unit carries a large number of contact points on multiple decks, each deck being a self-contained, self-aligning part that can be quickly removed and replaced. Two decks are standard on a single switch, but more can be added if desired. Switches are sealed for watertight mounting by "O" rings on both shaft and mounting bushing, are built to withstand severe vibration and shock and effects of tropical salt spray.

United States Instrument Corp., 409 Broad St., Summit, N. J.

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Avionic equipment can be tested and serviced in the plane with the Universal Power Supply. It operates d.c. equipment from a.c. lines, providing continuously variable source of filtered power, 0-28v., d.c. Electro Products Laboratories, Inc., 4501 N. Ravenswood Ave., Chicago, Ill.

"Limited Budget Laboratory" has assortment of measuring tools and instruments calculated to meet parts inspection needs of small subcontractors taking defense orders. George Scherr Co., Inc., 200 Lafayette St., New York 12.

Condensing filter for compressed air lines condenses and separates moisture from air then passes air through Fiberglass filter cartridge. Pressure is not appreciably reduced, filter lasts for years and only maintenance is draining to eliminate water and oil, says maker. Air-Line Engineering Co., 4758 Warner Rd., Cleveland, Ohio.

Thread Broaches, for cutting left hand threads, now are available in standard stock sizes. These tools, designed to generate a threaded hole by a true broaching action, are said to be less subject to breaking than conventional taps because of low torque required to form thread. Shearcut Tool Co., P. O. Box 746, Reseda, Calif.

Fenwal **DYNAMIC** fire and over-heat detectors widely used on turbo-jet planes

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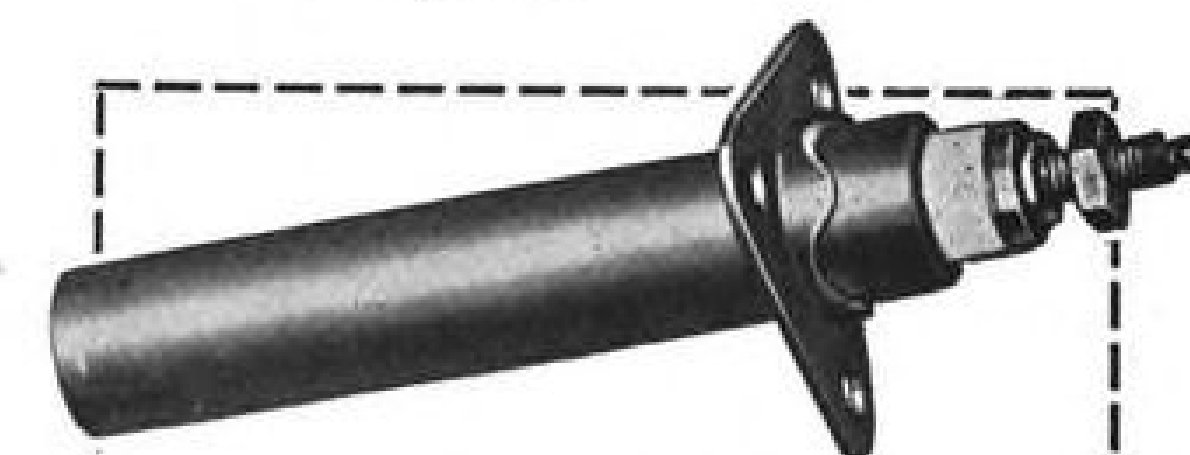
Fenwal Detectors are easily installed — single terminal allows no errors of connection. Units are shock and vibration proof. For complete details on how they can be made to meet your specifications, write us direct. Fenwal, Incorporated, 1210 Pleasant Street, Ashland, Massachusetts. 111 South Burlington Ave., Los Angeles 4, Cal.



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FIRE AND OVER-HEAT DETECTOR.
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Fenwal THERMOSWITCH Aircraft Heater Controls

can be used as control units or limit switches for cabin and de-icer heaters.



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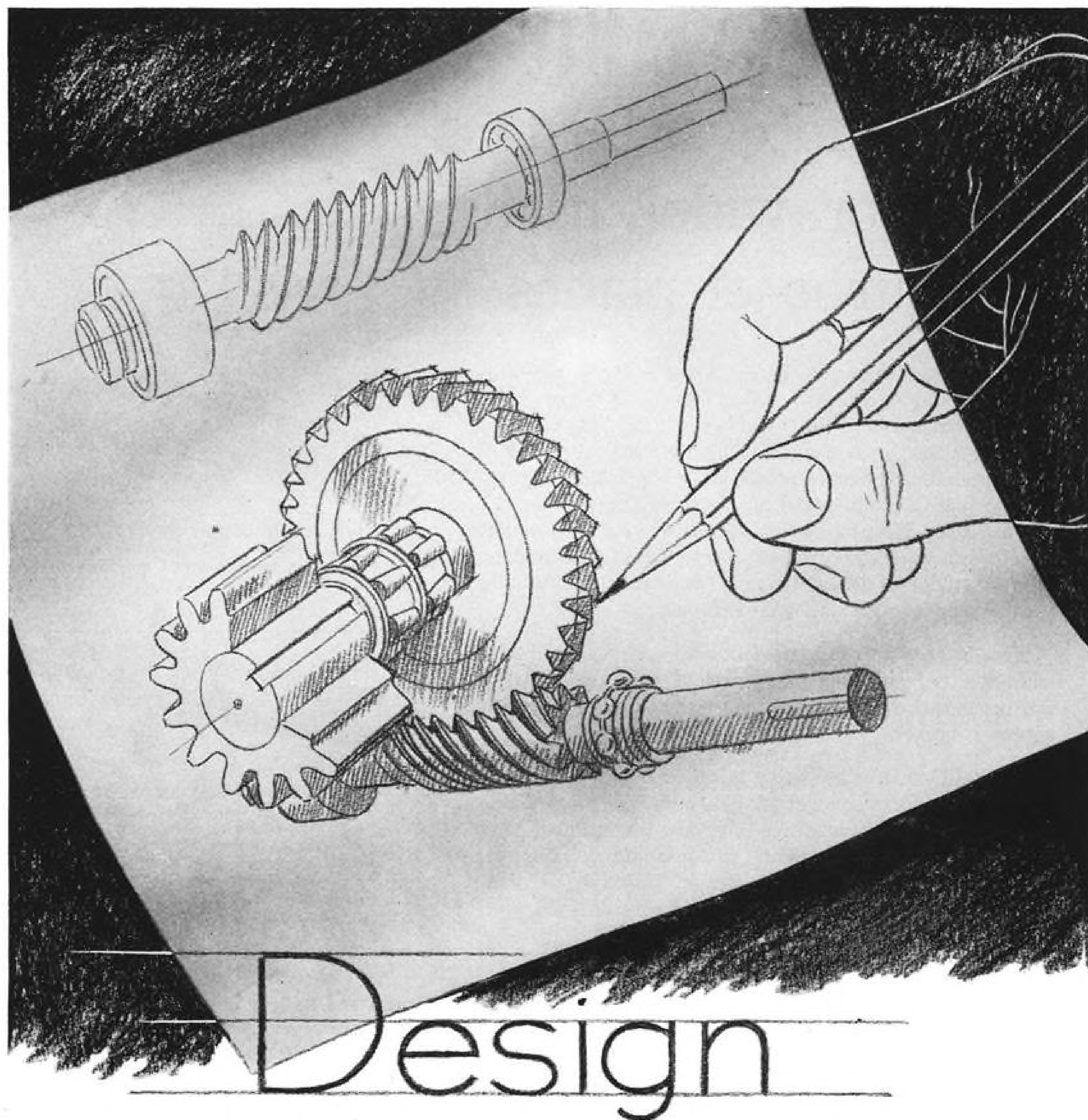
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FINANCIAL

Why the Merger Hearing?

• CAB long has wanted to spur "desirable" combines, but the hitch is that it has no power to force any line to merge against its will.

• So it opens the Delta-Northeast case to all comers, hoping one will come up with a practical proposal. Odds are the proceeding will be long—and fruitless.

An ambitious attempt to spark "desirable" airline consolidations is in the making in the Civil Aeronautics Board proceeding entitled the "New England-Southern States Merger Investigation." This feature presentation promises to include an all-star cast of all air carriers serving the East Coast. This will permit at least nine trunk airlines and all six local service lines to get into the act.

In a broad sense, this current proceeding stems from the merger proposal filed more than a year ago by Delta and Northeast. As these two carriers do not connect, their proposal has been viewed as a subterfuge to gain additional mileage and a long sought entry by Delta into New York. It appears that the CAB did not view this proposal very seriously but used it as a vehicle to broaden an investigation of the air transport network serving the East Coast.

It is important to note that this entire proceeding is nothing more than an investigation. The Board simply does not have the power to compel airlines to merge. This has been recognized and so stated by CAB itself.

The Board can, however, through various means, prod airlines to consolidate. Control over the award of mail compensation is a powerful weapon in this respect but the Board has been most reluctant to apply it in this manner. Further, the threat of duplicating route mileage can also be applied as a lever but has not been so utilized.

► **Merger Hash**—The Board is now entertaining the possibility of a merger or consolidation of National with Colonial and/or Northeast. Also being reviewed is the combining of Delta with portions of the routes of Capital and Northeast and/or Colonial in such fashion as to permit single-carrier service from Delta's system to New England.

It becomes apparent that Eastern and American would be most directly concerned with any or all of the above possibilities and may be expected to

interpose their views on the subject.

To make the investigation more interesting, it has been reported that a group has been attempting to effect a Northwest-Capital combination. This could facilitate the easement of Capital Routes Nos. 55 and 51 in the cause of a new north-south trunk carrier by providing a major link from Atlanta to New York but of little consequence in a new transcontinental pattern. This, in turn, could cause United and TWA to make representations.

Obviously any proposed scrambling of the route pattern along the East Coast is going to affect all of the local service lines in the area. This will automatically make All-American, Lake Central, Piedmont, Robinson, Southern, and Wiggins proceeding participants.

► **Everybody in the Act**—Of course, the various communities served may be expected to have definite views as to how any changed air service pattern may affect their localities. In addition to the assorted chambers of commerce, congressmen throughout the board area affected will undoubtedly speak up.

With this background of involved and conflicting interests it is self-evident that any merger or consolidation will have a tortuous course to pursue even under the most favorable circumstances.

As repeatedly emphasized in this space, the atmosphere surrounding certificated airline life simply is not conducive to voluntary mergers. The free play of economic forces is not permitted to operate in the regulated air transport industry. This circumstance removes a compelling force or a real incentive to desirable consolidations.

Refuge can always be taken in the provision of the Civil Aeronautics Act of 1938 which entitles a permanently certificated carrier to sufficient mail pay, under stated conditions, to make past, present and future operations whole.

Moreover, the economic climate at present does not lend itself to mergers. With all carriers enjoying peak earnings, the natural tendency is to preserve the

status quo of the individual lines by their separate managements. When many of the air carriers were experiencing financial difficulties, mergers could have had a more receptive response.

At first glance, it may appear that a Northeast-Colonial combine may be easy to arrange. Certainly with a changed management at Colonial, a desire for consolidation may exist under reasonable circumstances. However, even in this seemingly relatively simple case, there are many complications.

Assume management at Colonial consents to a deal. Stockholder approval will then be required. Will stockholders who paid \$10 per share and higher approve an arrangement which may have an immediate exchange equivalent of around \$5 or \$6 per share? Most likely not. Colonial's book value is less than \$5 per share, and CAB, by past decisions, is unlikely to sanction a price by purchase or exchange materially in excess of book value. Without stockholder approval no merger or consolidation is possible.

Ironically enough, CAB approval remains the biggest obstacle to any merger or consolidation.

Board approval is required of any consolidation merger, lease, operating contract or acquisition of control of any certificated carrier. The Board must find that such proposed arrangement is in the public interest before it can become effective. The law directs the Board not to approve any arrangement which would "result in creating a monopoly . . . or jeopardize another air carrier not a party to the agreement."

► **Don't Hurt Anyone**—It is this threat of impairing the interests of "another air carrier" which can prove troublesome.

For this reason while the Board is quite concerned with strengthening the airline route pattern, it may be circumscribed by the law in implementing its objectives. The history of past merger attempts shows the repeated difficulties in effecting consolidations (AVIATION WEEK, July 23, 1951, p. 18).

At the pre-hearing conference held last month on the "New England-Southern States Merger Investigation," a wide magnitude of conflicting viewpoints were reported. At least one or more additional pre-hearing conferences appear indicated even before an agenda for the "investigation" can be agreed upon.

Despite the great hopes and desires for mergers and consolidations expressed by the CAB and the carriers, no quick accomplishment in this direction may be expected.

In fact, this proceeding may have one of the longest runs in CAB history. And when it is all over the identity and route pattern of the existing carriers will most likely remain virtually unchanged.

—Selig Altschul

AIR TRANSPORT

The Trouble With Stalls . . .

Four of the last 14 scheduled airline fatal crashes are attributable to inadvertent stall of the airplane by the pilot. Following is a summary of these crashes and the unofficial remarks of a CAB accident investigator on the cause.

The Conditions:	The Accident:	The Cause:
Washington instrument approach, Dec. 12, 1949	Capital Airlines DC-3 crashed in river, six fatalities.	"Definitely caused by stall, followed by spin."
Sioux City instrument approach, Mar. 2, 1951	Mid-Continent Airlines DC-3, crashed after missed approach, fifteen fatalities.	"Possibly due to stall."
Ft. Wayne frontal storm, Apr. 28, 1951	United Air Lines DC-3, spun in during approach, eleven fatalities.	"Stall, followed by spin."
San Francisco Bay training flight, Sept. 12, 1951	United Air Lines Strato-cruiser, plunged in bay, three fatalities.	"Probably stalled, if wing description proves correct."

How Much Stall Warning?

- **Manufacturers oppose CAB proposal which would require indicators on some new transports.**
- **Safe Flight's 'Stick Shaker' warning comes to fore, but draws fire from some pilot quarters.**

Civil Aeronautics Board officials this week face up to the ticklish decision of what to do about the stall warning clause in a proposed new regulation—with the certain knowledge that transport plane manufacturers are likely to disagree with almost any new version of the clause.

The clause would require stall warning indicators to be installed on the new Super Constellations, Convair-Liners and other new transports if they do not give clear aerodynamic stall warning at least 7% about stall speed. (The still unofficial Civil Aeronautics Board proposal appeared in AVIATION WEEK Sept. 17, p. 44.)

► **How Much Warning?**—Nub of the clash of manufacturers vs. pilots and the Civil Aeronautics Administration-proposed stall warning clause is: How much "stall warning" should a plane give the pilot before the stall begins. Put another way, how much warning should a distracted pilot get to avoid inadvertently flying into a stall?

The expensive or fatal stall still happens in airline operation. It comes whenever a distracted pilot lets the plane slow down too much or he pulls

back on the control too much for whatever speed or altitude he has. Landing gear collapse and consequent major damage are frequent result of stall in landing. Fatal accidents happen when stall of the plane occurs higher off the ground.

Last month, CAA proposed in a preliminary draft of a revised stall regulation, installation of warning devices on certain new transports. That proposal has pushed the Safe Flight Instrument Corp., of White Plains, N. Y., leading manufacturer of stall warning indicators, right into the foreground of the coming discussion on the revision.

Except for an installation of its earlier buzzer type stall indicators on some Convair 240s, Safe Flight has not had much market for its device in the transport field heretofore. But it currently is deep in bigger and more lucrative programs for stick shaker indicators for Navy, USAF, British RAF, and France. And it has thousands of its buzzer stall indicators in operation successfully on light planes.

At the recent informal review of Civil Air Regulations, manufacturers and airlines and Air Line Pilots Assn. represen-

tatives all agreed on most causes of a revised stall regulation.

► **No Specific Figure**—But the pilots asked clear stall warning at least 7% above stall speed; manufacturers said no, arguing the wording merely should require "sufficient" stall warning, not a specific figure. CAA backed the pilots, and wrote a proposed regulation for tryout—specifying clear stall warning at least 7% above stall speed.

Then CAA's Aircraft Engineering Flight Test branch chief Ray B. Maloy went to Burbank to see how the prototype Lockheed Super Constellation would fare under the new stall regulations proposal.

The new big plane gives clear stall warning all right, he reports, but only about 4% above stall speed in some normal conditions. However, Maloy found it hard to pull back on the control to slow the plane past that last 4% safety margin. So, he tentatively finds some merit in the Lockheed plea that this warning is "sufficient" even though it is short of a 7% speed margin.

Meanwhile, demand for installation of the latest Safe Flight prestall warning device has increased at Pan American World Airways, following the first demonstration of the "stick shaker" warning to transport people two weeks ago at New York International Airport. Boeing may start a test installation on the Stratocruiser this month in co-operation with Pan American for evaluation.

The demonstration and discussion two weeks ago was attended by: Pan-Am system's manager Robert Blake in New York, representing vice president and chief engineer Andre Priester; PanAm flight operations superintendent Scott Flower; Capt. W. W. Moss of Air Line Pilots Assn. and Pan-Am; CAA first region aircraft division chief Herbert M. Toomey; Boeing Airplane representative at Pan American, R. Harlan.

No U. S. transport manufacturer previously has made an airline installation of this latest stick shaker stall warning device. However, the prestall stick shaker warner now is standard equipment on Navy jet fighter models. And a very recent Air Force evaluation report on a new jet plane indicates Air Force satisfaction with the device. Air Force also is evaluating it on a C-47 transport and an F-51 Mustang. Meanwhile Safe Flight is planning to build a plant in England to make the same instruments for the RAF and other sterling area buyers. The French have contracted for installation of the Safe Flight device on the big transport SE 2010.

► **Safe Flight Prestall Warner**—Safe Flight's latest prestall warner is a further development of its wing lift-coefficient

detector vane and "stick-shaker" pilot indicator. This installation is fully adjustable. The warning margin above stall speed is adjustable. And the stick shaking device also is adjustable to almost any degree and type of classic stall indication desired.

Prime ingredients of the simple installation are: 1. Thumbnail-sized vane of stainless steel under wing's leading edge, carefully located where the airflow "stagnation point" will provide desired warning of approach of wing's maximum lift coefficient. 2. Small housing around the control column containing tiny eccentric weight motor that buffets the stick on signal from the wing's vane detector.

Adjustable features of the new device permit tailoring of both the stall ratio and the warning indication to plane type and operator's preference.

The stick can be set to waggle slow and hard by increasing the unbalanced weight in the shaker. The tempo of the buffet can be increased by increasing power to the motor.

The new vane installation is manually adjustable. To calibrate the stall warning ratio of the vane detector, a jeweler's screwdriver is used to turn the calibrator; the adjustment reads on two dials. After final adjustment, the dial settings are logged.

► **Advantages**—Basic advantages are two: • **Aerodynamic principle** of the airflow stagnation point as the true index of lift coefficient is a long-used aerodynamic rule. The vane is located so as to trip at any pre-set stall warning ratio, regardless of gross load, attitude or airspeed. Even changes in wing flaps and power are automatically compensated for within one knot of airspeed range, when proper installation is made.

• **Stick-shaker** is a good stall indicator psychologically. Stick buffeting is the classic stall warning taught pilots by both training and experience. And it does not depend on warning lights or horns, used elsewhere in the cockpit to warn of other potential perils, such as a wheels-up landing. Furthermore, the sensory warning direct to the pilot's hand causes quick, positive corrective action.

► **Earlier Complaints**—Earliest models of the prestall warner used warning light and horn instead of stick shaker. It worked well in simple cockpits, and it's operating on thousands of planes now. But complaints came from Air Force and an airline because their planes already had warning lights and horns for other purposes. They said another horn-light set for stall warning might confuse the pilot.

Standing Navy specification of new planes calls for prestall warning at 5 to 15% above stall. Since jet planes seldom give adequate natural prestall warning, manufacturers installed arti-

cial stall warners. Navy and the manufacturers have adopted the safer flight stick shaker.

At the latest advanced Navy type evaluation, the Safe Flight won out over competitive other-type designs of Minneapolis Honeywell, Specialties, Inc., and Kollsman Instrument Corp.

Navy reports mechanical reliability of the instrument has been good.

But some Navy pilots object to the stick shaker, because they like to get even slower in their approach than the pre-set safety margin that triggers the shaker. Then the shaker bothers them. But this is an individual preference. Navy reports coming back from the fleet to Bureau of Aeronautics in Washington show that many pilots say the instrument improves safety and speed control.

Individual pilot complaints of stall margin settings on a particular plane are answered in the latest version of the device by its calibration dials. If someone changes the factory calibration for test or other purposes, it can now be reset to standard calibration by re-setting the dials to factory logged reading.

► **New Speed Control Device**—A slightly more comprehensive installation now gives automatic speed control as well as stall warning. For landing approach speed control, pilot merely brackets two indications instead of staying above one. It works this way: As pilot slows down to the pre-set desirable speed zone for landing approach a light goes on. He tries to stay in this speed zone, keeping the light on. If he slows too much, the stick shaker goes on, warning him he's too slow. If he speeds up too much, the light goes off. He eases off a bit and the light burns steady. This speed control feature requires two vanes instead of one. But

it's just as simple as the plain stall warning installation. Production model passed final evaluation tests this summer.

► **Automatic Training**—One advantage of a stall warning device is in pilot training. The more a pilot uses it, the more accurate his own instinctive judgment becomes. CAA tests show individual airline and other pilots vary widely in their private estimates of safe approach and takeoff speeds, and even the same pilot varies a lot on separate flights. Reason is pilots never know just where the stall would be because they cannot test it and practice judging it except on occasional high altitude test flights. But CAA tests show use of stall indicators quickly sharpen the pilot's own attitude-speed judgment and prestall perception.

► **Weight and Cost**—Average transport installation of the entire stick shaker and prestall detector would weigh about two pounds. That includes details such as the de-icer element inside the detector unit.

Cost varies from \$260 to \$400 per plane on Safe Flight's prestall contracts with Navy and others.

Safe Flight estimates that it would pay for itself once over on every Stratocruiser flight. Reason is that Stratocruiser loses about 1,000 pounds payload due to requirements under present CAA certification that wing spoilers be installed. Despite the spoilers, the Stratocruiser still gives prestall warning only two knots above stall speed in some conditions, and considerably less than 7% above stall speed in most conditions. Removal of the spoilers in favor of a 2-lb., \$400 prestall warner would pay for itself many times over as well as give the pilot any desired stall warning, observers believe. That is why Boeing and Pan-Am want to start test installation this month.

Heacock Again Heads Nonskeds Campaign

The nonsked airlines have decided to continue the same bulldog campaign for the right to operate that they have since forming their Air Coach Transport Assn. a year ago. They re-elected outspoken, tenacious Amos Heacock to be chief industry spokesman as president of ACTA.

Doing this, they reasoned that even though Heacock's techniques have upset a few potential friends in the quasi-judicial CAB and Congress, his General Grant tactics have been followed by:

- **Pentagon's** throwing open its gates for military defense contracts to nonskeds on equal basis with the subsidized certificated airlines.
- **Senate's** Small Business (Sparkman) Committee direct and finally victorious



Amos E. Heacock

What CAB Allows for Service and Subsidy

This is Civil Aeronautics Board's calculation as to the amount of mail pay to domestic carriers that will be earmarked as "subsidy" under the service mail pay rates established by the Board on Sept. 30 (AVIATION WEEK Oct. 8, p. 68). Figures in thousands of dollars.

	1951 FISCAL YEAR		1952 FISCAL YEAR		1953 FISCAL YEAR	
	Service Mail Pay	Subsidy	Service Mail Pay	Subsidy	Service Mail Pay	Subsidy
GROUP I: 45 Cents A Ton-Mile						
American.....	\$5,620	\$1,020	\$6,165	.....	\$6,635	.....
Eastern.....	2,435	467	2,700	.....	2,930	.....
TWA.....	4,823	901	4,940	.....	5,140	.....
United.....	6,592	1,253	7,700	.....	8,290	.....
Northwest.....	.....	1,130	\$1,670	.....	1,243	\$257
Total, Group I.....	\$19,470	\$3,641	\$22,635	\$1,670	\$24,238	\$257
GROUP II: 53 Cents A Ton-Mile						
Braniff.....	\$782	\$956	\$835	\$765	\$918	\$582
Capital.....	942	1,610	1,007	503	1,109	391
Chicago & Southern	342	1,036	366	884	403	797
Delta.....	800	507	853	347	939	161
National.....	444	1,269	475	.....	520	.....
Northwest.....	1,246	3,558	.....	.....	.....	.....
Western.....	598	340	638	262	702	148
Total, Group II.....	\$5,154	\$9,276	\$4,174	\$2,851	\$4,591	\$2,079
GROUP III: 75 Cents A Ton-Mile						
Colonial.....	\$78	\$1,139	\$83	\$917	\$92	\$858
Continental.....	191	1,236	205	1,095	226	1,024
Inland.....	139	559	148	527	162	488
Mid-Continent.....	296	1,496	320	1,730	352	1,648
Northeast.....	104	1,496	113	1,387	124	1,276
Piedmont.....	.....	.....	.....	.....	53	947
Pioneer.....	.....	.....	83	907	92	908
Total, Group III.....	\$808	\$5,926	\$952	\$6,623	\$1,101	\$7,149
GROUP IV: 91 Cents A Ton-Mile						
Piedmont.....	\$54	\$1,160	\$58	\$992	.....	.....
Pioneer.....	94	1,064	.....	.....	.....	.....
Robinson.....	24	524	25	585	\$27	\$563
Southwest.....	47	782	50	780	56	754
Total, Group IV.....	\$219	\$3,630	\$133	\$2,357	\$83	\$1,317
GROUP V: \$1.48 A Ton-Mile						
All American.....	\$73	\$1,784	\$78	\$1,502	\$86	\$1,414
GROUP VI: \$2.58 A Ton-Mile						
Central.....	.....	.....	\$52	\$1,348	\$57	\$1,243
Lake Central.....	\$28	\$453	.....	.....	.....	.....
Ozark.....	31	758	.....	.....	.....	.....
Southern.....	188	1,087	.....	.....	.....	.....
Total, Group VI.....	\$247	\$2,298	\$52	\$1,348	\$57	\$1,243
GROUP VII: \$7.26 A Ton-Mile						
Central.....	\$138	\$642	.....	.....	.....	.....
Mid-West.....	94	380	\$102	\$298	\$109	\$291
Wiggins.....	15	231	15	290	15	285
Total, Group VII.....	\$247	\$1,253	\$117	\$588	\$124	\$576
GRAND TOTAL, Excluding Helicopter Service.....						
	\$26,576	\$34,565	\$28,739	\$27,786	\$30,941	\$24,134
VII HELICOPTER GROUP						
Helicopter Air Service.....	\$363	.....	\$415	.....	\$400	.....
Los Angeles Airways.....	430	.....	445	.....	445	.....
Total, Helicopters..	\$793	.....	\$860	.....	\$845	.....
GRAND TOTAL, Including Helicopter Service.....						
	\$27,369	\$34,565	\$29,599	\$27,786	\$31,786	\$24,134

fight to get the CAB to grant a hearing on the future and some present easing of its former administrative "death sentence" to the nonsked industry.

• **Business boom** for the unsubsidized nonskeds in both military and civilian transport this year.

► **ACTA Officers Elected**—The general 1951 membership meeting of the Air Coach Transport Assn. also elected a board of officers, all of them operating nonsked airline officers; listed along with their operating company affiliation these men are: President (re-elected), Amos E. Heacock of Air Transport Associates, Inc., Seattle; first vice president (re-elected), I. E. Hermann, of Great Lakes Airlines, Burbank; second vice president, Robert Duff, of Miami Airlines, Miami; secretary, Ed Daly, of World Airways, New York; treasurer,

H. B. Robinson, of Peninsular Air Transport, Miami.

Meanwhile the membership went into organization problems. Among the resolutions was one to re-urge members to standardize ticket fares, instead of succumbing to agent or other inducements to cut prices below economic levels; and they adopted a uniform baggage handling system involving colored baggage checks. They told their board to keep fighting irresponsible ticket agencies.

They resolved to continue urging legislation to provide funds for the military to lease planes for airline operation.

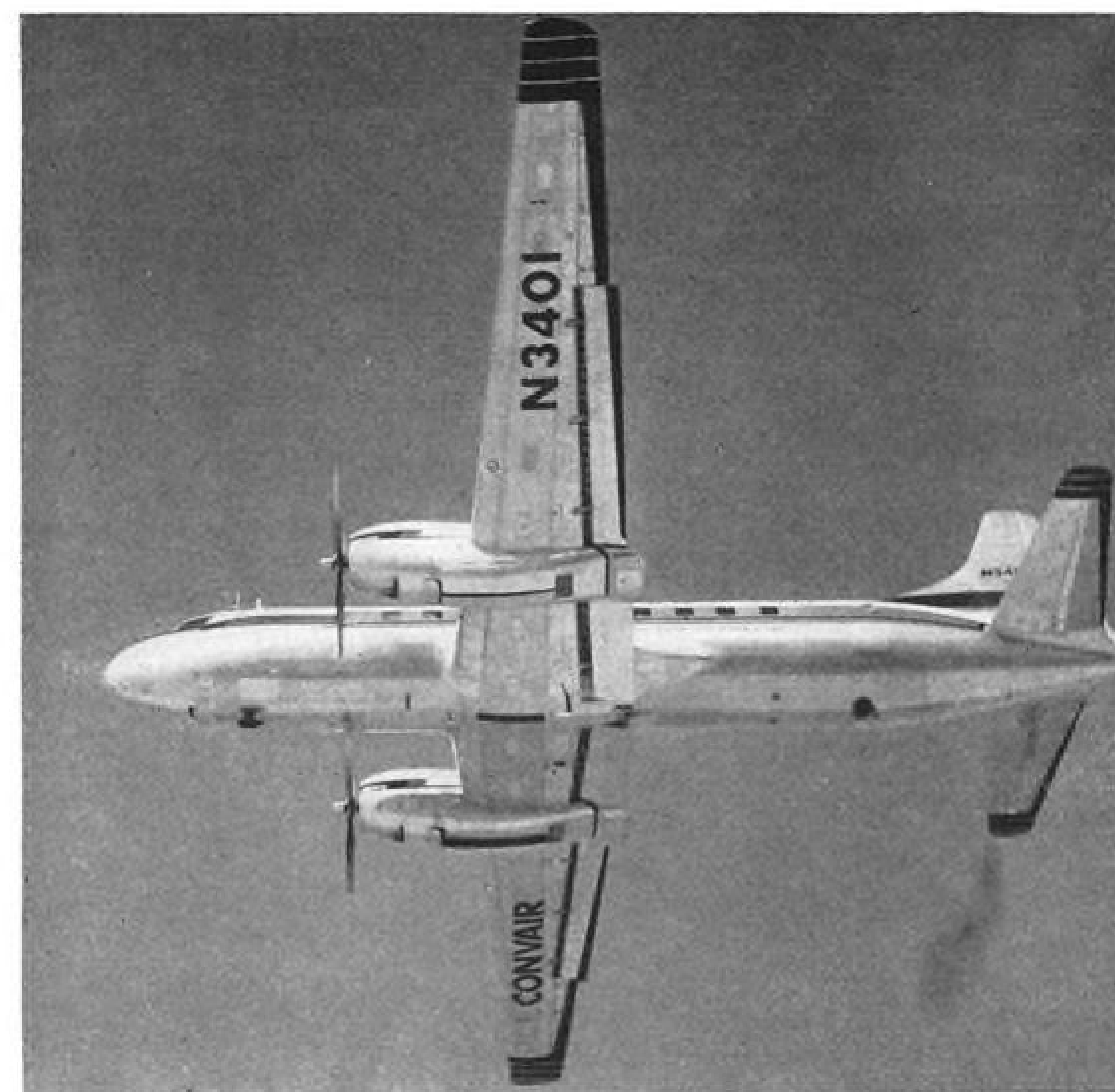
► **Letter to Truman**—Membership also approved a letter which Heacock sent to President Truman. It urges that the President intervene with CAB for fair and defense-minded treatment of non-

subsidized nonsked transport industry.

The membership backed Heacock in his fight to recover the right to go on operating his Seattle-Alaska airline, now under CAB sentence to be put out of business for flying too many trips a month to Alaska with fresh foods, other freight and passengers.

Then Heacock issued a statement. Included in it were such lines as:

"We have proved to the military that on the longer distances our transportation service cost the government less than rail, even without figuring the value of the men's time. A \$500 million defense market is open for us to sell—at a cost reduction to the government . . . mobilization of aircraft in numbers as high as 22 planes for single movements of returnees from Korea is already being effected as routine."



CONVAIR 340 shows flap arrangement on first flight, while across the country . . .



MARTIN 40-4 is certificated by CAA. Martin President C. C. Pearson, left receives certificate from CAA Deputy Administrator F. B. Lee with CAA's director of air safety, Ernest Hensley, and Martin chief engineer W. B. Bergen look on.

Progress Made on Twin Engines

First two U. S. postwar twin-engine commercial transport planes, the 44-passenger Convair-Liner 340 and the 40-passenger Martin 40-4, are moving nearer service on the nation's airlines.

Martin recently was awarded a type certificate by the Civil Aeronautics Administration for its twin-engine liner, orders for which now total 101—60 for Eastern Air Lines and 41 for Trans World Airlines. Two also are on order for the Coast Guard.

Meanwhile, the maiden flight of Convair's first 340 was described as "excellent in every way." The 340 will be the largest twin-engine transport in service in this country. More than 100 are on order, with United Air Lines, which has contracted for 40, slated to get the first production model in 1952. Other airlines which have placed their order for 340s: Delta, Braniff, Mid-Continent, Northeast, Hawaiian, Philippine and Continental.

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SHORTLINES

► Aer Lingus will charge lowest cross-channel fares of postwar era starting Oct. 21, continuing company trend to "bring its services ultimately in reach of the entire community," firm says.

► Aero Club of Washington elected as its new president Edwin E. Slaterry, Jr., chief of CAB public information, succeeding Donald D. Webster.

► Air Coach Transport Assn. is changing its subtitle—ACTA "National Trade Association of Independent Air Coach Lines"; change is from "nonscheduled airlines" to "independent air coach lines."

► Air Transport Assn. meteorological committee has elected J. A. Browne its new chairman; he is manager of meteorology for TWA.

► Alaska Airlines has CAB show-cause order for temporary mail rate raise to \$1.25 a mile effective June 30, 1951, with \$3,216,000 back pay Jan. 1, 1947, to June 30, 1951.

► All-American Airways has appointed

Paul West, Jr., as new public relations director, following switch by J. Robert Rowley from that position to join PR staff of Fairchild Aircraft division. West comes from the Associated Press.

► American Airlines is reported converting six more DC-6s to high-density seating air coaches this fall.

► British European Airways is increasing most of its fares this week, with London-Paris fare up 5% to 15 pounds, 6 shillings.

► Civil Aeronautics Board top staff man believes CAB will not define further Economic Regulation 291 for nonscheduled operations—will not set definite frequency limits on flights—during the investigation of the nonscheduled problem. Part 291 will stand as is and each operator will be judged individually and warning followed by enforcement proceedings started if he appears to violate the regulation. . . . Reports are that CAB is extending its accident investigation conclusions as to probable cause from usual "pilot error" to a determination of the basic cause—i.e. what caused the pilot error? This could mean implied recommendations as to changes in cockpit layout, operations, etc. . . . CAB has extended deadline for airmen to get identification cards to Dec. 15. . . . Has contracted publication of its airport-to-airport mileage and airline route book to Air Traffic & Service Corp. of Washington, D. C.

► Civil Aeronautics Administration and ATA are urging Collins Radio Co. and others to make earlier-than-scheduled delivery of voice-identifiers to replace the old dot-dash-dot code identifiers on airways ranges and markers. Reason: mis-identification of navigation aids is now recognized as a safety hazard (AVIATION WEEK Sept. 10, p. 65). . . . Still plans formal switchover or chart, NAV information, and operations to nautical miles from statute miles July 1 next year. Installation of distance measuring equipment makes that timing imperative. . . . CAA program to combine traffic control tower and communications offices and personnel will apply only in "non-congested areas." Idea is to minimize effect of trained manpower drain caused by entry into military service.

► Commerce Transportation Office. Undersecretary Delos Rentzel awaits enough money authorization to rebuild and expand his transport mobilization office into an operating department, now the general mobilization plan is ready (NSRB program). Maj. Gen. Donald H. Connolly and some other Rentzel mobilization temporary assistants have returned to former duties

now their basic planning meets with approval.

► Defense Production Administration expects to issue a further moratorium on processing accelerated amortization applications. American and Trans World are test cases awaiting first decision on an airline industry application. . . . DPA expects some easing in supply of structural steel and aluminum by late next year, which should aid heavily cut back airline and airport construction. But copper shortage is said to be semi-permanent.

► Economic Stabilization Agency has appointed a Railroad and Airline Wage Board under Chairman Nelson Bortz, former chief of industrial relations division of the Bureau of Labor Statistics. The board handles wage stabilization for rail and air, replacing the temporary panel of William M. Leiserson that took care of 82 cases this summer.

► Frontier Airlines has CAB certificate renewal to Mar. 31, 1955.

► Northwest Airlines announces lease of 12 Martin 2-0-2 transports to Transocean Air Lines for domestic military charter operations. Transocean is increasing seating capacity from 36 to 40-44. Transocean earlier bought three NWA 2-0-2s.

► Pan American World Airways still threatens a physical block against any link up of Pan American-Grace Airways and National Airlines by interchange New York-Buenos Aires via Miami and Balboa. PanAm leases the Balboa-Miami route to Panagra—says it will refuse use of the route by Panagra on any National interchange. Thus, PanAm holds one trump card, anyway, to force its plan for Eastern-Pan American interchange via eastern South America, Braniff-National via Western—both converging at Buenos Aires and Sao Paulo.

► Trans World Airlines has CAB show-cause order for international mail pay reduction to 77 cents a seat mile effective July 1, 1951.

► U. S. Airlines, scheduled air freight carrier, has appointed Mel Adams and Associates of New York to direct its public relations.

► Western Air Lines has declared a 25-cent dividend to common stockholders as of record Nov. 1. "Forecast of potential earnings for balance of the year," plus 1951 record to date, warranted the payment, the directors say. This is Western's second 25-cent dividend this year.

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Leighton Collins, Editor of Air Facts,

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

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INDIVIDUAL EMPLOYMENT WANTED advertising rate is one-half of above rate, payable in advance.

PROPOSALS \$1.20 a line an insertion.

NEW ADVERTISEMENTS received Thursday will appear in the issue mailed the following Friday subject to limitations of space available

INFORMATION
BOX NUMBERS in care of any of our New York, Chicago or San Francisco offices count 1 line additional in undisplayed ads.

DISCOUNT of 10% if full payment is made in advance for four consecutive insertions of undisplayed ads (not including proposals).

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The advertising rate is \$12.50 per inch for all advertising appearing on other than a contract basis. Contract rates quoted on request.

AN ADVERTISING INCH is measured 7/8 inch vertically on one column, 3 columns—30 inches to a page.

A. W.

CHANCE VUGHT AIRCRAFT

builder and designer of the "Cutlass" and "Corsair," has openings for top level technical personnel in electronics and aerophysics for supervisory positions in long range development and design programs on piloted and pilotless aircraft. Reliability supervisor—to supervise the establishment and maintenance of optimum reliability of electronic and controls systems. Requires degree in electrical engineering, advanced studies in mathematics plus 7 to 8 years related experience. Guidance supervisor—to direct a group in the analysis, design and development of electronic guidance systems for pilotless aircraft. Requires special knowledge of guidance, design and control problems. Requires M. S. in electrical engineering with 7 to 8 years related experience. Aerophysics supervisor and aerophysics project engineers—to direct a group in the analysis and solution of problems establishing requirements and specifications for electronic and control systems in relation to aircraft performance. Requires intensive knowledge of physics, mathematics, aeronautical engineering and highly specialized knowledge in the field of automatic controls. Equivalent to Ph.D. and 5 to 8 years related experience. Excellent salaries and working conditions. Housing readily available in Dallas area. Liberal moving allowance. Submit resume of education and technical experience to engineering personnel office.

Chance Vought Aircraft Division
UNITED AIRCRAFT CORPORATION

P. O. Box 5907

Dallas, Texas

WANTED: "2ND INCOME PEOPLE—DRAFTSMEN AND OTHERS CAN ADD TO INCOME BY SELLING THIS AND OTHER ITEMS OF KEEN INTEREST TO PROFESSION IN SPARE TIME.

Twin Cutter
CUTS TYPE STRIPS FOR PASTINGS, CUTS OFFSET NEGATIVES FOR STRIP INS THAT REGISTER, LIGHT ALUMINUM HANDLE OVER ALL SIZE 6 1/4 IN. \$3.50
UNIFORM STRIPS ADJUSTABLE BLADES CUTS UP TO 1/2" STRIPS

Send \$3.50 for sample and catalogue sheets showing many other time-saving items.
SALESMEN: This is your opportunity to sell fast-moving items on commission basis. Write for literature.

PAUL HOGAN, Sales Director

MARK SPECIALTY CO.

183 St. Paul St. Rochester 4, N. Y.

ELECTRONIC AND ELECTRICAL ENGINEERS

One electronics instrumentation engineer with degree in EE or Physics, preferably some graduate study, and 5 years minimum experience, for permanent position in charge of electronics lab. associated with our aero. engineering laboratories. Also some openings for electrical engineers with less experience. Sal. commensurate with experience. Liberal employee benefits. Housing not a pressing problem. Submit details of edu. and experience to

UNIVERSITY OF MINNESOTA
Department of Aeronautical Engineering Laboratory
Rosemount, Minnesota

WANTED BALL AND ROLLER BEARINGS

SMALL OR LARGE LOTS
New and Unused

Phone Republic 2-9153
RUART SALES COMPANY
4617 W. Adams Blvd., Los Angeles 16, Calif.

WANTED-AIRCRAFT PARTS

Will buy AN hardware, fittings, AN electrical connectors, switches, etc. Send complete details at once.

AIRCRAFT DIVISION:
MANUEL T. FINE & CO.
7001 Santa Monica Blvd. Los Angeles 38, Calif.

PROJECT ENGINEERS

STRATOS DIVISION

FAIRCHILD ENGINE & AIRCRAFT CORP.
Farmingdale, Long Island, N. Y.

Requires a senior development engineer for their Project Group. Should have extensive development and test experience in the gas turbine or allied field.

Extremely interesting work with small compressors and turbines, including gas turbines, on the development of air-cycle cooling equipment and controls for major military & civilian aircraft.

Applicants should have a first class technical and practical background in thermodynamics, fluid mechanics and heat transfer with a decided preference for development work.

New Plant under construction, is ideally located on the south shore of Long Island.

Apply in writing to the Personnel Department enclosing a resume of your previous experience.

Box AW 1683 221 W. 41 Street, N. Y.

UNUSUAL OPPORTUNITIES

can be found each week in the

SEARCHLIGHT SECTION of AVIATION WEEK

LOCKHEED AIRCRAFT CORPORATION

Georgia Division
Marietta, Georgia

Excellent opportunities for key positions in long range production program

CAN YOU QUALIFY?

FLIGHT TEST ENGINEER

College degree, preferably in aeronautical engineering experience. Exceptional opening for qualified person with administrative and supervisory ability.

RESEARCH ENGINEER

Outstanding opportunity for man with Master's or Doctor's degree and 4 years actual experience in aircraft research and laboratory. Must have administrative ability.

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"A" and "B"

Must have aircraft design experience (structural, electrical & power plant.)

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Must be familiar with IBM timekeeping system. Experience with large industrial payroll of several thousand employees essential. Accounting training or experience helpful.

Enjoy North Georgia's healthful year-round climate and famous scenic beauty . . . only 8 miles from Atlanta

Write TODAY to

Mr. Frank J. Johnson
Employment Manager
LOCKHEED AIRCRAFT CORP.
594 1/2 Peachtree St. N.E.
Atlanta, Georgia

ENGINEERS



Goodyear Aircraft Corporation, one of the oldest aircraft development organizations in the field, now offers unusual opportunities to engineers, both experienced and recent graduates, in all branches of aircraft design and development.

In addition to manufacturing airplanes and airships, Goodyear Aircraft builds a number of vital aircraft components as well as guided missiles, radar and other material for the defense program. The diversification of products, beyond purely defense needs, at Goodyear Aircraft, has resulted in an unusually stable and progressive organization throughout post war years.

Salaried positions with accompanying liberal employee benefits and bonus for extended work week are open to

AERONAUTICAL MECHANICAL CIVIL

ELECTRICAL ELECTRONICS INDUSTRIAL

ENGINEERS

for **DESIGN AND DEVELOPMENT**

AIR FRAME STRUCTURE LANDING GEAR AND HYDRAULICS
EQUIPMENT AND POWER PLANT INSTALLATIONS
ELECTRONIC AND ELECTRICAL SYSTEMS
WHEELS AND BRAKES MECHANICAL COMPONENTS

Personnel are needed in the following classifications:

DESIGNERS DRAFTSMEN
PHYSICISTS MATHEMATICIANS
DEVELOPMENT ENGINEERS TOOL ENGINEERS
STRESS AND WEIGHT ANALYSTS

Previous experience and formal education desirable. However, applicants without formal education but with equivalent practical experience in other engineering fields will be given consideration.

You are invited to investigate these opportunities by submitting a resume of your qualifications and experience or by simply sending for an application either of which will be given prompt and serious consideration.

Address all correspondence to
Mr. C. G. Jones, Salary Personnel Department

GOOD YEAR AIRCRAFT CORPORATION

AKRON 15, OHIO

CURTISS-WRIGHT CORPORATION
PROPELLER DIVISION... offers Long-Term
Career Opportunities
for Experienced**DESIGN
ENGINEERS**
and Recent
**ENGINEERING
GRADUATES**

Aeronautical, mechanical, electrical and metallurgical engineers combine their efforts to form the teams responsible for the creative engineering necessary to produce Curtiss-Wright's electric and turboelectric propellers.

Academic training of the junior engineer combined with the technical knowledge and experience of the senior engineer are merged to form a well balanced engineering organization.

The forgings, castings, cams, gears, hydraulic and electrical mechanisms comprising a propeller provide a diversity of problems so that the engineer finds ample opportunity to continue the development of his skill.

Activities in engineering cover:

1. NEW SOLUTIONS TO DESIGN PROBLEMS. *Creative Design and Development of Mechanisms that are a Departure from Current Designs.*
2. DEVELOPMENTS IN EXISTING DESIGNS. *Modifications in Current Designs to meet Changing Service Requirements and Increase the Life of the Product.*
3. THEORETICAL ANALYSES. *Advanced studies in the field of Aerodynamics and Experimental Stress Analysis as Applied to Propellers being proposed for Advance Models of Aircraft.*

PLANT LOCATION—Northern New Jersey, 25 miles west of N. Y. C.—on State Highway 6. Employees live in pleasant residential towns within a radius of ten miles from plant. Nearby colleges offer graduate night courses for employees wishing to continue academic work.

Send a resume to J. W. Long, Administrative Engineer, AW-10, Propeller Division, Curtiss-Wright Corporation, Caldwell, N. J.

GENERAL MOTORS
NEEDS MEN
IN THE
**JET AIRCRAFT
PROGRAM**MECHANICAL ENGINEERS
ELECTRICAL ENGINEERS
STRESS ANALYSTS
TOOL EXPEDITERS
TOOL DESIGNERS
TOOL ROOM FOREMEN

SEND FULL DETAILS OF EXPERIENCE AND PERSONAL DATA TO

B. M. BUCKLEY
BUICK - OLDSMOBILE - PONTIAC
ASSEMBLY DIVISION**GENERAL MOTORS
CORPORATION**
KANSAS CITY, KANSAS**MECHANICAL
STRESS ANALYSTS**Unusual opportunities for
important analytical work
on **HELICOPTER** transmission
systemsALSO
many openings for qualified
Mechanical & Structural**DESIGNERS
DRAFTSMEN
CHECKERS
LOFTSMEN**

Send detailed resume to

Personnel Manager
KAMAN AIRCRAFT CORP.
WINDSOR LOCKS, CONN.**THREE FAIRCHILD TWIN ENGINE****Photographic Aircraft**

Equipped with Fairchild K-17 mapping cameras. Experienced pilot photographers available for work in South America. For rent on flying hour basis or will furnish aircraft and pilot photographer on shares with party who has mapping contract.

AEROPHOTOS
Culver 5369 Box 395, Rochester, N. Y.**AVAILABLE
AERONAUTICAL ENGINEER**

Will consider a position with aggressive company where he can apply his extensive experience to the fullest extent.

Doctor of Engineering. Background includes Top Level Engineering Positions With Leading Companies in the Aircraft Industry. Has Developed Commercial and Military Airplanes and Aircraft Components. Considerable Shop and Airline Maintenance Experience.

PW-2124, Aviation Week
330 W. 42 St., New York 18, N. Y.**AVAILABLE
Electronics Sales Manager**

Thoroughly experienced sales and advertising manager of small very successful Cleveland manufacturer of electronic test equipment, aircraft antennas and filters. Six years experience handling all phases of Air Force and Buair contracts. Age 41, married. Will relocate.

PW-2190, Aviation Week
330 W. 42 St., New York 18, N. Y.

REPLIES (Box No.): Address to office nearest you
NEW YORK: 330 W. 42nd St. (18)
CHICAGO: 520 N. Michigan Ave. (11)
SAN FRANCISCO: 68 Post St. (4)

POSITIONS WANTED

EXECUTIVE PILOT—presently employed as chief pilot for large industrial corporation. Company forced to liquidate aviation department. Have complete pilot ratings plus 4000 accident-free hours. Air Corps veteran, 28 years old, married, perfect health. No preference as to location. Excellent references. PW-2036, Aviation Week.

PILOT MECHANIC, capable. Recent amphibian experience-commercial-instrument rating, SBL multi-engine land & sea ratings. A&E mech. ground instructor will get fit. instrs. rating. Parks Air College Grad. B.S. Deg. 27, married. Flying 10 yrs-superintendent of construction 6 yrs. Available now domestic or over seas, excellent references. May invest. F. T. Epton, 901 Maple, Evanston, Ill.

SELLING OPPORTUNITY WANTED

SALESMAN calling on aircraft companies and suppliers, desires aircraft fittings line for the West Coast area. 20 years experience selling parts. Box 11, Los Angeles 35, Preuss Station, Calif.

FOR SALE

Beechcraft D-18S—Fully equipped with de-icers, anti-icers, ARC-VHF radio, 80 gallon nose tank, 3 chairs and one 3-place couch. Engines R-985 AN-14B, having 230 and 400 hours S.O.H. Spare zero time S.O.H. AN-14B engines included. Excellent condition, ready immediate operation. Asking price, \$42,500. Call or write William C. Wold Associates, 516 Fifth Ave., New York 18, N. Y.

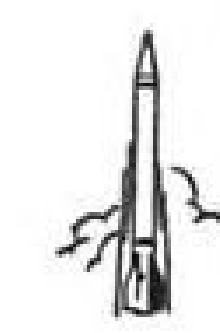
Douglas C-47 Airliner 4792 TT P&W 1830-92 Port 349 Stbd 37 TSO Airline radio full De-icing No Corrosion. American Aircraft Corp. HA-8-0279 Teterboro, N. J.

Lockheed Lodestar N-25601 Model 18-07 Mid-Continent Airliner very clean. Low time since overhaul. American Aircraft Corp. HA-8-0279 Teterboro, N. J.

AIRCRAFT ENGINEERSYou may choose Airplane, Helicopter,
Missile, or Propulsion Work

Openings exist which will challenge your creative ability in Stress Analysis, Flutter Analysis, Aerodynamics, Thermodynamics, Servomechanisms, and Design. Top starting pay . . . rapid advancement based on individual merit . . . liberal employee benefits . . . cost-of-living bonus . . . bonus for extended work week.

Send postcard, letter, or wire for application to:

MCDONNELL *Aircraft Corporation*
Manufacturers of AIRPLANES AND HELICOPTERS • ST. LOUIS 3, MO

Rockets



Missiles



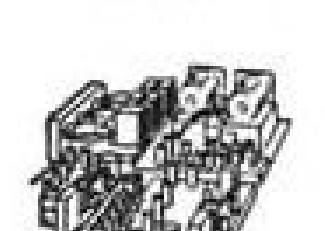
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Guidance Systems

VARIETY
SPICES THE LIFE OF
ENGINEERS
WORKING WITH
*Martin***Needed Now!
Structures
Engineers**

Openings in all classifications—wide variety of progressive projects.

**Aerodynamics
Engineers**

Two to six years' experience. Aerodynamic testing, design and development.

Martin has the greatest diversity of projects of any aircraft company in the East. Offers greater opportunities for development, career positions for qualified engineers. Submit strictly confidential resume outlining qualifications in detail. Personal interviews arranged.

THE GLENN L. MARTIN CO.
Personnel Dept. • Baltimore 3, Md.**STRESS ANALYST AND
LAYOUT ENGINEERS**

for military aircraft engineering in small expanding company.

ANDERSON, GREENWOOD & CO.
Municipal Airport, Houston 17, Texas**AC SPARK PLUG
DIVISION
of
GENERAL MOTORS
CORPORATION****PRECISION INSTRUMENT PLANT**

Positions now available for highest caliber personnel in the field of airborne automatic, electro-mechanical control equipment.

**MECHANICAL DESIGN ENGINEERS
ELECTRONIC ENGINEERS
SERVO ENGINEERS
JUNIOR ENGINEERS**

New and expanding division of an established firm with 20 years of successful experience in the instrument field. Work involved deals with the manufacture and development of highly complex equipment of the most advanced type.

Write or Apply

AC Spark Plug Division
GENERAL MOTORS CORPORATION
1925 E. Kenilworth Place
Milwaukee 2, Wisconsin**"AIRLINE RADIO OPERATORS"**

Several for Trans Pacific Operations
FCC and CAA Licenses required
Reply full details Personnel Manager
CALIFORNIA EASTERN AIRWAYS
Oakland Municipal Airport, Oakland, California

**CIVIL PROJECT
ENGINEER
And
CHIEF TEST
ENGINEER**

To work with a small select group of Engineers on aircraft pumps and accessories.

CHIEF PROJECT ENGINEER to be in complete charge of Engineering Department and supervise basic designs of aircraft, fuel, vacuum, hydraulic and air pumps. Capable of advancing to Assistant Chief Engineer.

CHIEF TEST ENGINEER to be in complete charge of Experimental Test Laboratory, supervise testing, write test reports, etc. Prior experience in the aircraft pump field essential. Must be Engineering graduate. Must have had supervisory experience. Submit personal history including education, work experience, and references to our Assistant Chief Engineer. Write in confidence.

LEAR, INCORPORATED
Romec Division, Elyria, Ohio Phone 2271**PRATT & WHITNEY
Complete Overhaul Tools**

GENERAL OVERSEAS AIRLINES
Newark Airport Newark, N. J.
Phone Market 2-0963

AIRCRAFT FOR SALE

7 F51 (Four D's, 3 C's)
2 P40 (1N, 1E)
5 T6 (3A, 2 SNJ-4)
3 FM2 (Grumman "Wildcat")
3 F47G ("Thunderbolt")
1 TP39Q (Dual Controls)

ENGINES:

1 1340AN1 NTS Navy OH
1 985AN1 NTS Navy OH

PARTS:

15 T6 PROPS, OHC
75 T6 Oil Coolers, New
50 Sets T6 Gear, OHC
15 LH, 10RH T6 Wings

PLUS—Largest stock in U. S. of T6, F51, B25 parts. We are not brokers. We own and have for inspection the above aircraft and parts.

HARDWICK AIRCRAFT CO.

Pasadena-Rosemead Airport
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As a leading supplier we offer a complete line of

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- FLIGHT & NAVIGATION INSTRUMENTS
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Write for complete listings

All Instruments May Be Purchased
C.A.A. Certified

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INSTRUMENT ASSOCIATES

363 Great Neck Rd., Great Neck, N.Y.
Tele: Great Neck 4-1147

2—DOUGLAS C-47A CARGO 24 Volt—92
ENGINES

1—EXECUTIVE INTERIOR LODESTAR
Zero time throughout since overhaul and
modification.

for details:

STONNELL & HOLLADAY
National Airport Washington, D. C.
Phone STerling 5753

FOR SALE USED AIRCRAFT

LANDSEAIRE EXECUTIVE AMPHIBIAN Converted PBY5A

AIRFRAME—Since Conversion 478:44 hrs.
ENGINES—P & W 1830-75's 139:33 "
L/H—Since New 229:11 "
R/H—Since New
Price \$135,000

BEECHCRAFT (Converted AT-11)

AIRFRAME—Since Conversion 1374:45 hrs.
ENGINES—P & W R955AN1 141:40 "
L/H—Since Overhaul 141:40 "
R/H—Since Overhaul
Overhaul and relicensing
completed in our own shops
Price \$22,000

GRUMMAN GOOSE (G21A)

AIRFRAME—Since Conversion 302:15 hrs.
ENGINES—P & W R955AN1 302:15 "
L/H—Since Overhaul 302:15 "
R/H—Since Overhaul 302:15 "
PROPELLERS—Hamilton Standard Hydromatic
Electrically Actuated Landing Gear
80 Gallons of Extra Fuel in Floats
Price \$60,000

SOUTHERN CALIFORNIA AIRCRAFT CORPORATION

Box 267, Ontario, California

1—C-54 with "B" Panels disassembled—complete

GENERAL OVERSEAS AIRLINES
Newark Airport Newark, N. J.
Phone Market 2-0963

CRITICAL CARBURETOR PARTS BARGAINS DIAPHRAGMS

(New and in perfect condition)

394589\$1.25
394646\$2.25
399300E\$3.00
399301E\$3.50

Large Inventory

Bendix Stromberg Parts

Advise Requirements

M.O. or Check With Order Please
Add 10% For P.P. We Will Adjust With 3¢
Stamps

EDRAND AVIATION COMPANY

6111 Twelfth Ave. South Tel. Lander 7871
Seattle 8, Washington

EXECUTIVE LOCKHEED LODESTAR DELUXE TWO LOUNGE INTERIOR

Seats nine people plus cabin
attendant.

FLORIDA TRADING CO., INC.

Box 55, Int'l. Airport
Miami, 48, Florida
Phone: 88-6228

4 LOCKHEED MARK III HUDSONS

Equipped for aerial photography. Time
since overhaul of aircraft and engines
from 9 to 256 hrs. Department of Trans-
port licenses valid for one year. Wright
R1820 G205A Engines. Spares from 3 dis-
mantled Hudsons. Write:

ARCTIC AIRLINES LIMITED

#7 Hangar, Municipal Airport
Edmonton, Alberta, Canada

LATE MODEL TWIN BEECHCRAFT

Owned by large industrial corporation.
Would like to sell with experienced crew.
Ship in perfect condition. Superbly
equipped for all-weather executive trans-
portation. Reasonably priced.

FS-2087, Aviation Week

330 W. 42 St., New York 18, N. Y.

For Sale—AIRCRAFT PARTS

West Coast's largest stock of Douglas, Constella-
tion, AT6, P51, and C46 parts; P&W, Wright en-
gine parts and accessories. Complete stock AN
hardware, fittings, electrical parts, and special cus-
tomer machined parts.

Complete catalog upon request

COLLINS ENGINEERING COMPANY
9050 Washington Blvd. Culver City, Calif.

Instrument & Electrical Equipment

We have a large stock of instruments. A few are
listed below:
23,500 AN6021-1 Oxygen Pressure Ind.
4,000 AN6023-1 Oxygen Flow Ind.
6,300 AN571-4 Hydraulic Press. Ind.
Dual Miniature Autosyn Indicators (Eclipse type
6800 and 6058)
Dual Autosyn Indicators & Transmitters, Ac-
celerometers, Altimeters, Cylinder Head Temp Gages
B-9 and B-11, Electric Engine Gages and many
others.

We offer choice items from our electrical inventory:
Circuit Breakers: AN3160, AN3161, Spencer
D4751-1, D4751-2, D4750-2 and many others.
Relays: AN3316-1, B9A, 3GT872C1A and many
others.
Inverters: 115V 3 phase 400 cycle Leland Elect.
(similar to AN3531-1).
Lights: AN-3050-5-7 & -8 (Also other types).

R. E. WHITE & ASSOCIATES
6919 San Fernando Road
Rockwell 9-1191 Glendale, Calif.

LOCKHEED VENTURA

Priced for Executive Conversion. Dual Controls,
250 hours airframe time. R-2800-31 engines—13
hours since major.

Complete C.A.A. Approved Engineering
for EXECUTIVE CONVERSION

Airsearch Aviation Service Company
Los Angeles International Airport

PRATT & WHITNEY 50724 VALVES CERTIFIED

GENERAL OVERSEAS AIRLINES
Newark Airport Newark, N. J.
Phone Market 2-0963

NEW
Guaranteed Rebuilt
MOTORS-GENERATORS-CONTROLS
NOW IN STOCK
We buy surplus equipment
L.J. LAND Inc.
Box 756 Reading-3 Pa.

IMPORTANT! Many items in this group have not been listed in previous ads!

One of America's largest stocks of UNUSED

AIRCRAFT PARTS

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

ELECTRONIC COMPONENTS

Quantity	Part No.	Description
7	RTA-1B	Transceiver
35	RA10-DB	Receiver
20	TA-12B	Transmitter
150	DA-1F	Dynamotor

PRATT AND WHITNEY AIRCRAFT ENGINE PARTS

Quantity	Part No.	Description
166	1045A	Bearing
300	3506	Flange
814	8988	Flange
22	35814	Blower Ass'y
182	46400E	Rod Ass'y
30	48346	Liner
53	48362	Cylinder
175	48363	Shaft
56	48392	Sump
390	48461	Gear
78	76236	Gear
1178	84289	Bearing
113	84487	Housing
77	84591C	Nose Housing
200	48350-D	Crankcase Ass'y
200	84083	Cylinder
100	84084	Cylinder
200	84085	Cylinder

**HUGE STOCKS OF ALL
TYPES AN HARDWARE
NEW—UNUSED. WRITE
FOR DETAILED LISTINGS.**

AIRCRAFT BEARINGS

Quantity	Part No.
18000	K3L-2
8600	K3L-R48
4000	KF4
3000	KF4H
30000	KP4R16-2
3300	KSF5
17000	BC5W11
28000	KS6A
34600	NR6L12
7000	38KD4
6600	RE3MR3
5000	F35-14

LEAR ACTUATORS AND

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

ACCUMULATORS

Quantity	Part No.	Mfg.
280	AN6203-1	Vickers
53	AN6203-3	Bendix-10"-1500 P.S.I.

LIGHT ASSEMBLIES

Quantity	Part No.	Mfg.
2000	AN3096-4	Grimes (Amber)
800	AN3096-5	Grimes (Red)
380	AN3096-6	Grimes (Green)

VALVES

Quantity	Part No.	Mfg.
478	D9530	Adel
233	D9530	Adel
428	D9560-2	Adel
744	D10044	Adel
2200	AN4078-1	United Aircraft (Oil Dilution)
98	572-3A	Eclipse
244	D10051	Adel

BLOWERS

Quantity	Part No.	Mfg.
25	U702-15	Joy
16	125J-6	Dynamic Air Eng.
43	458-AA-6C	Dynamic Air Eng.
24	8861G-6C	Dynamic Air Eng.

OIL COOLER ASSEMBLIES

Quantity	Part No.	Description
45	AN4103-2	Brass (Valve # U4785)
38	18597-2	Aluminum (Width 8") (Length 9")

PUMPS

Quantity	Part No.	Description
230	MF9-713-15A	Vickers Hydraulic
90	AN6102-1(8818-2)	Adel Fuel
160	3E492E	Pesco Fuel
700	TFD 8600	Thompson Fuel Booster
125	D7818	Adel Anti-icer
170	2P771-A	Pesco Fuel Booster
250	AN4014	Erie Meter Wobble (D-3)
300	1H260-K & KA	Pesco Hydraulic

INSTRUMENTS

Quantity	Part No.	Description
22	AN5531-1	G. E. Tach. Generator
1000	AN5780-2	G. E. Wheel & Flap Position Indicator
400	AN5780-2	Same as above
1000	AN62-65B	U. S. Gauge Air Pressure Gauge
16	76819	Lewis Eng. Cyl. Head Temp.
10	4682	Lewis Eng. Air Temp. Ind.
31	47821	Lewis Eng. Temperature Ind.
12	47822	Lewis Eng. Temperature Ind.
20	47823	Lewis Eng. Temperature Ind.
36	47824	Lewis Eng. Temperature Ind.
10	7622	Lewis Eng. Air Temp. Ind.
11	7684	Lewis Eng. Temperature Ind.
20	77C4	Lewis Eng. Temperature Ind.
21	77C5	Lewis Eng. Temperature Ind.
85	727TY79Z2	Weston Left Wing Anti-icing
88	727TY73Z2	Weston Right Wing Anti-icing
83	727TY74Z2	Weston Tail Anti-icing
11	2227-11D-3A	Eclipse Dual Tachometer
22	8DJ-29-AA	G. E. Indicator (Cowl Flap)
45	254BK-6-052	Kollsman Differential Pressure Ga.
25	906-6-011	Kollsman Dual Altimeter and Differential Pres- sure Ga.
8	14601-1G-B1	Eclipse Altitude Gyro
22	15100-1B	Eclipse Pitch Trim Ind.
10	20000-8A-14	Eclipse Magnesym Position Ind.
23	20100-11C-4-A1	Eclipse Magnesym Wing Flap Ind.
40	23000-2A	Eclipse Position Transmitter
25	46N2	Jaeger 24 Hour Clock

MISCELLANEOUS COMPONENTS

Quantity	Part No.	Description
83	A4934	Delco Motor
50	RBD2220	Holtzer Cabot DC Motor
49	FD65-5	Diehl Motor
47	FD65-6	Diehl Motor
116	A371205	Dumore Motor
780	A371206	Dumore Motor
115	P4CA2A	Parker Primer
80	AN3213-1	Scintilla Ignition Switch
568	A-9 (94-32226)	Nasco Ignition Switch
687	RS-2	Mallory Selector Box
90	JH950-R	Jack & Heintz Starter Motor
492	S-841 (94-32253)	Electronic Labs Box
8	FA122	Wallace & Tiernan Flasher
1000	13018-A	Bendix Interphone Box
140	K14949E	Marquette Windshield Wiper Kit
73	3123-3A	Eclipse Warning Unit
188	EYLC-2334	Barber-Colman Control
11	12086-1C	Eclipse Amplifier
174	450-0	Skinner Gasoline Filter
250	558-1A	Eclipse Oil Separator
100	564-2A	Eclipse Generator (NEA-3A)
100	716-3A	Eclipse Controller Pedestal (A-12)
5	656536-421	Sperry Detector
37	117-47	Edison Horn
89	318	Edwards Heater (200000 BTU)
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COCKPIT VIEWPOINT

By Capt. R. C. Robson



The Noise Nuisance

The rhythmic roar of a high-powered aircraft engine which delights the aeronaut does not, unfortunately, have the same effect on the general public. Noise from our modern airplanes has already caused headaches in New York, Boston and, more recently, Washington. Indications are that the problem will magnify with time and become the concern of all of aviation.

A typical illustration was the case at New York's LaGuardia Field. Residents of nearby Flushing were particularly annoyed at the heavy air traffic overhead. They claimed that aircraft disturbed the peace, reduced real estate values and were a public nuisance. Local newspapers and politicians made much of the situation and soon New York City police were patrolling the area in helicopters. Subsequently a summons was issued to an airline pilot for low flying. The episode was more of a test case than anything else, and though it proved nothing it did cause much ill will.

► **More Campaigns Likely**—Several factors may cause the number of these "anti-noise" campaigns to increase. Airplanes are becoming more numerous, especially multi-engine ships, and the engines themselves are growing more powerful. Before long jets will be added to the civil aviation picture to provide a "cosmic roar."

Municipal airports, originally located near the outskirts of most cities, in effect have been moved into the suburbs by the real estate boom of recent years. As new and larger airports are built an increasing number of cities will be effected. The problem could become nationwide.

Some aspects of this situation smack of the Keystone Comics to aviation people. City ordinances governing power reductions, rates of descent and the like appear ludicrous. But such is not the case. If the average citizen feels that his peace is being disturbed, then all branches of aviation must work towards a solution acceptable to that citizen.

► **What Industry Can Do**—Industry would do well to start its own anti-noise campaign. Such a program could include:

- Educating the public on what aircraft can and cannot do.
- Working with local real estate and zoning commissions on the establishment of traffic patterns.
- Meeting with the local press and officials to discuss the situation.
- Taking steps to prevent the problem from arising elsewhere.

Pilots of course must do everything possible to reduce noise. Maintain maximum altitude over cities, reduce power as soon as practical on take-off and avoid residential areas. All these things will help.

The most obvious place for action on this matter is, of course, in the design of aircraft. There is no reason why a "silence factor" should not be included in original specifications. Automobile manufacturers were obliged to muffle their creations many years ago for obvious reasons. Aircraft designers can no longer presume that they are exempt from this obligation—for the same obvious reasons.

An anti-noise program might well be carried out through the Regional Airspace Committees of the Air Coordination Committee. All aviation groups can be represented there and the subject properly falls within their domain.

Finally it should be remembered that the railroads aroused public ire with poor service, obsolete equipment and dirt. Aviation cannot afford the stigma of a noise nuisance. If the problem is not attacked vigorously we may be confronted by a host of state and municipal regulations enforced by hostile officials. This is not the way to make friends and increase business.

WHAT'S NEW

New Books

Insect Control by Chemicals, by A. W. A. Brown. Published by John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, N. Y., 817 pages, including index, price \$12.50.

Anyone interested in a really comprehensive study of the make-up of chemicals used to destroy pests will find this book answering their need. Professor Brown, whose experience included directing the Canadian Forest Insect Survey for that government, and work with the Directorate of Chemical Warfare, goes into the subject with considerable scientific detail.

The chapter directly applicable to aviation discusses various types of planes from the Cub to twin-engine transport models, gives specifications on the numerous types of spraying and dusting equipment used and their efficacy. Illustrated. **EJB.**

Testing of Measuring Equipment, by Ralph W. Smith, National Bureau of Standards Handbook 45. Available from the U.S. Government Printing Office, Washington 25, D. C., 205 pages, \$1.25.

This manual is intended for weights and measures officials, but is also of interest to commercial and industrial testing organizations. Recommending in general the minimum requirements of testing procedures, the handbook is based on specifications codes, tolerance and regulations for commercial devices as adopted by the National Conference on Weights and Measures and suggested by NBS for the states.

Telling the Market

Two comprehensive studies have been compiled by the University of California, one on the **Financial Aspects of California Airports Served by Scheduled Air Carriers**, the other dealing with **The Use of California Airports Served by Scheduled Air Carriers as Related to Passengers' Homes and Origins**. Numerous charts and maps are included. Write Robert Horonjeff, Institute of Transportation and Traffic Engineering, University of California, Berkeley 4, Calif.

Data on high temperature applications of metals and alloys is being made available by the Development and Research division of International Nickel Co., Inc., through its files, which cover service records and results of plant and laboratory tests. To facilitate queries, Inco has prepared a work sheet questionnaire, obtainable from the company at 67 Wall St., N. Y. 5, N. Y.

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EDITORIAL

Security & Ultimate Confusion

For four years on this page AVIATION WEEK has been reporting and deploring the steady trend toward more and more starvation of U. S. Government news. Always, the alibi for censorship has been "national security."

All loyal Americans, including us, believe in helping maintain national security. But we have pointed out innumerable examples of unnecessary, capricious, overzealous withholding of facts from the American people. And we expect to continue doing so.

The most recent maze of pronouncement, counter-pronouncement, amplifications and interpretations on the subject of what the President thinks can be safely printed and what cannot rivals any of the experiences of Alice in Wonderland. But these weird machinations are neither funny nor ingenious products of the keen, creative mind of a Carroll. These most recent ridiculous goings on were set in motion by the President of these United States.

No other incident or series of incidents mirrors more revealingly the unbelievable confusion and inadequacy in at least one high place in Washington. So does it reflect the distorted attitude toward the press and the strange concept of public information.

The flurry began with an executive order released by the President Sept. 24. In announcing it, Mr. Truman claimed the American people "have a fundamental right to information about their government, and there is no element of censorship, either direct or indirect, in this order."

But then he revealed that the purpose of the order was to permit every agency in the Executive Branch to clamp security classifications on any material it originates which it deems to be "security information," unauthorized disclosure of which "would or could harm, tend to impair, or otherwise threaten the security of the nation." He urged agencies not to classify data unless "necessary," but he left the way open for any civil service underling without previous experience in classification to slap a restriction on any paper whatsoever.

As the Washington Post said so well, the so-called security agencies—which formerly alone classified material—"have abused their classification powers notoriously—as, for instance, in the State Department's putting a 'restricted' stamp on a catalogue of names and

hotel addresses of the delegates at the Japanese Peace Treaty Conference in San Francisco." The Post said further that "the non-security agencies . . . would be likely to abuse the power conferred on them by the President even more grievously."

In a press conference later, the President defended his order in the usual manner and became so eloquently enmeshed in the subject that at one time he was claiming that "patriotic publishers" should not even publish material that his own official government spokesmen had released. It was not long after the conference that the President's press secretary issued a statement to "clarify" Mr. Truman's views on security information.

"Mr. Short's 'clarification' quite reversed the trend and much of the text of Mr. Truman's stern lecture . . . and it supplied no rule of thumb whereby in every instance responsible and qualified officials can be distinguished from those who are not," the New York Times decided, under the by-line of its chief Washington correspondent, Arthur Krock.

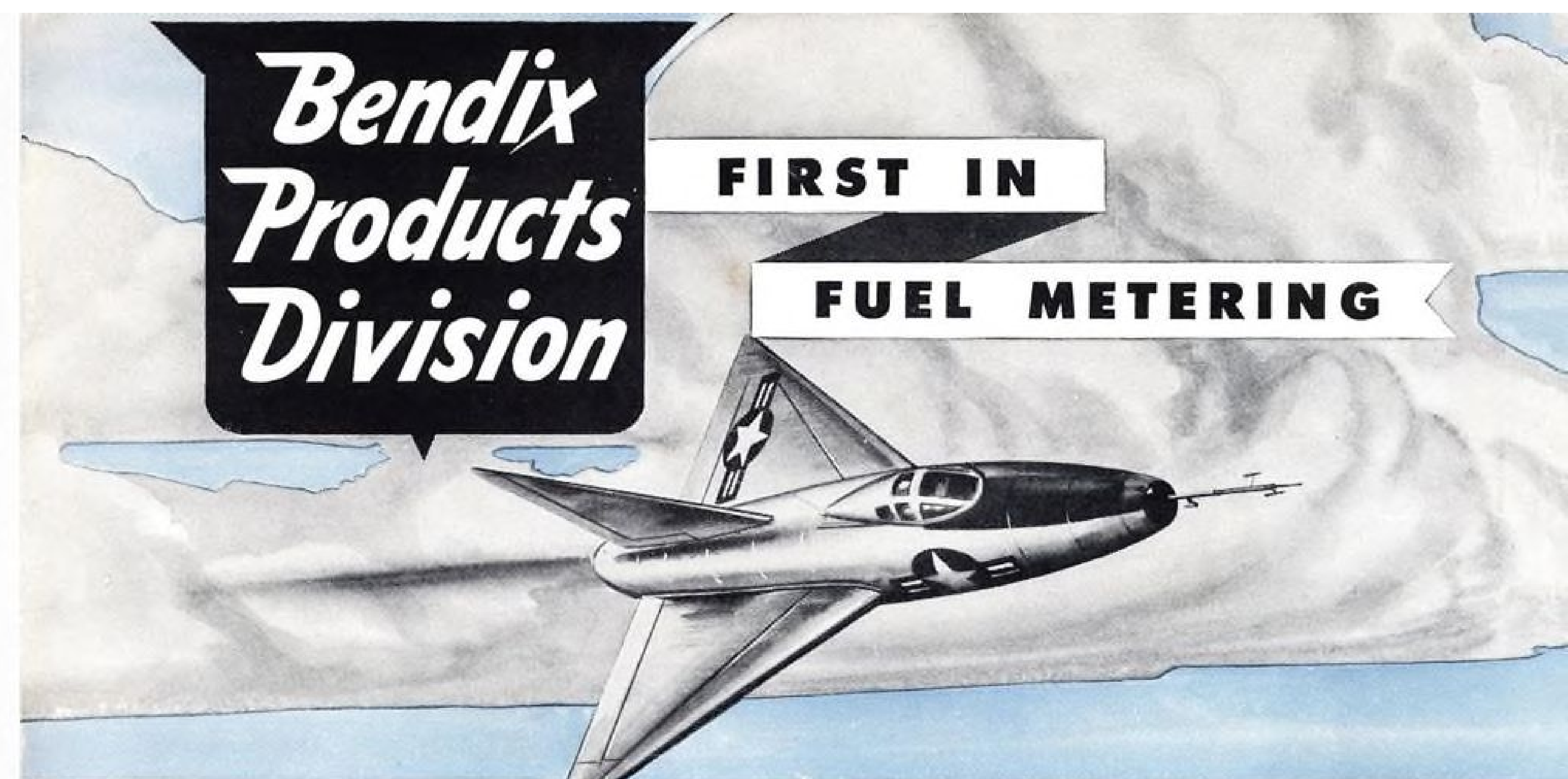
"Mr. Truman's tongue-lashing . . . is very difficult to explain or even understand," Mr. Krock said. He referred to the President's "new and bizarre concept of the duty of the press," (that it use its own conscience and not act necessarily upon approval of official government statements).

The only bright ray an optimist can see now is the hope that finally the press and public have been alerted to positive and united action that will force this administration to back-track from its indefensible executive order.

Freedom of information has been nibbled at since the Roosevelt era, but so insidiously and imperceptibly that it has failed to arouse more than sporadic cries from a relatively few worried observers. This dramatic and almost unbelievable bumbling of the President's may be what we needed, after all, to make us all demand more information from our government and get it.

On our part, AVIATION WEEK will be watching the civilian aviation agencies closely for any untoward excuses to withhold legitimate, non-secret information under the new executive order after it goes into effect late this month. We shall report to you such instances with names, places and dates.

—Robert H. Wood



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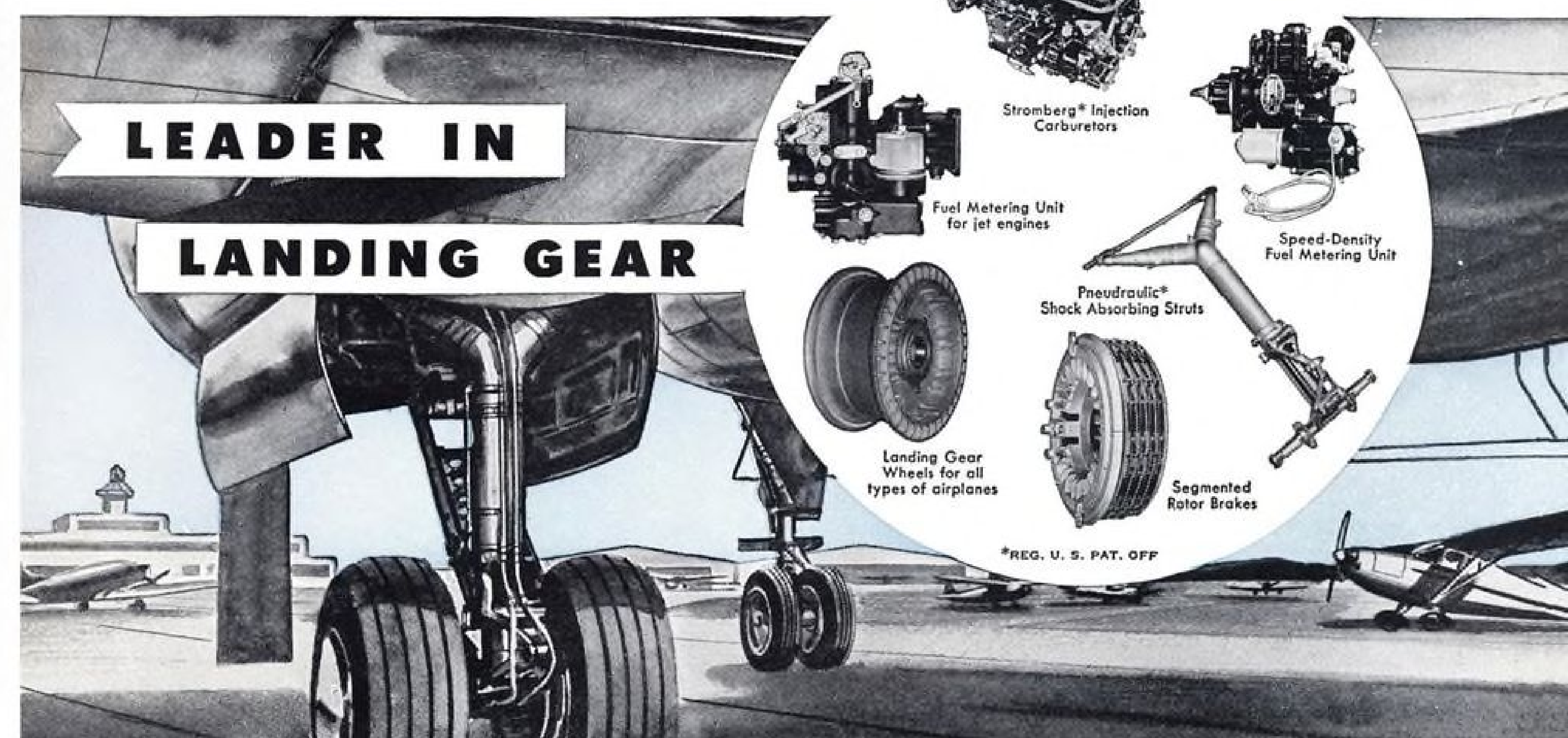
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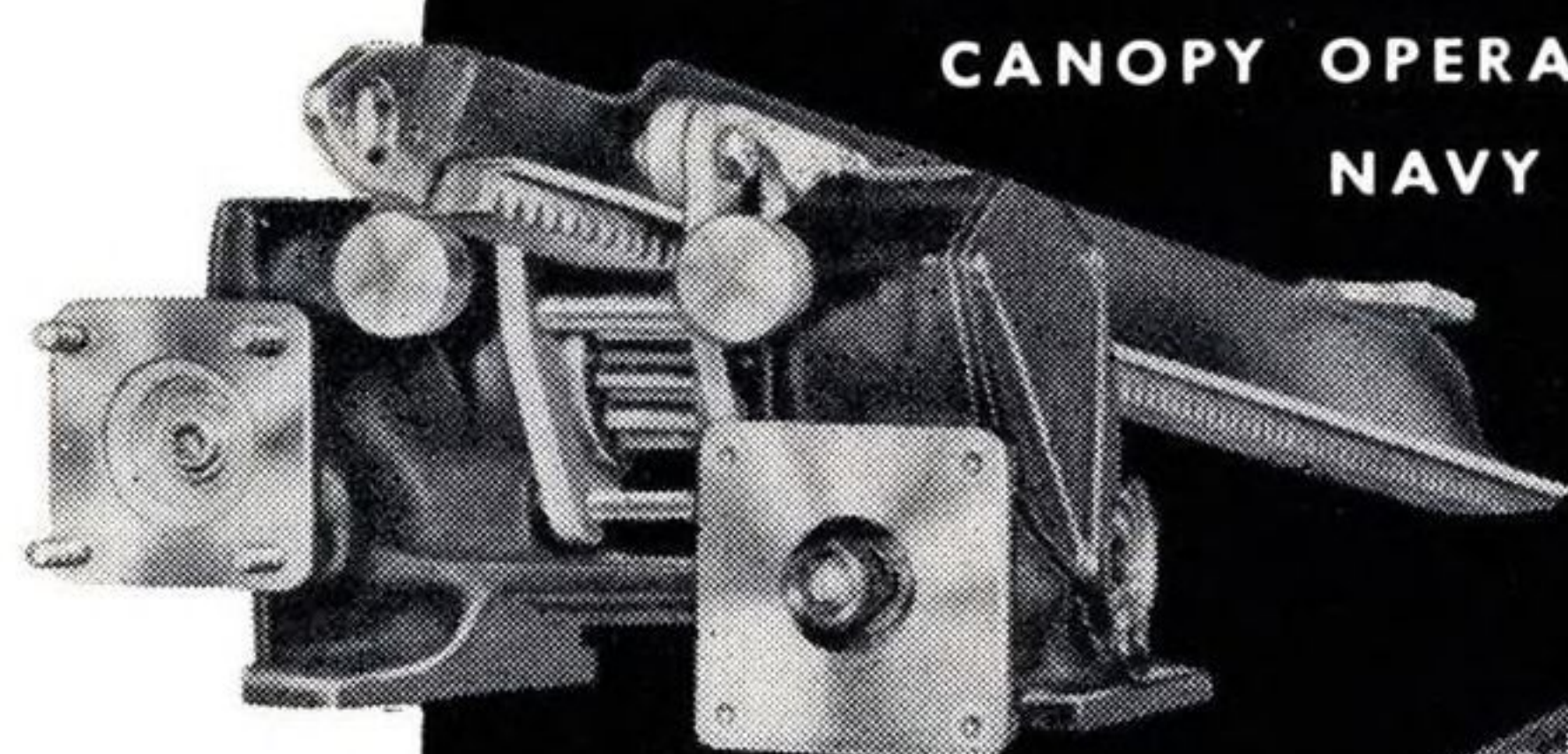
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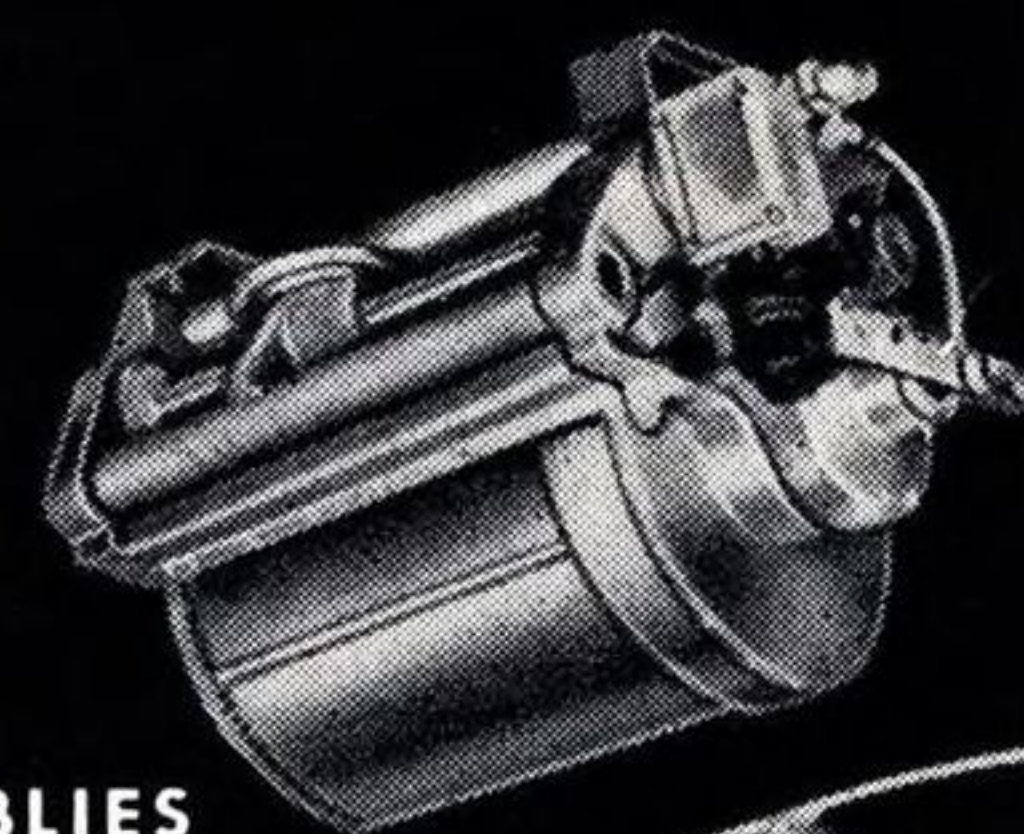




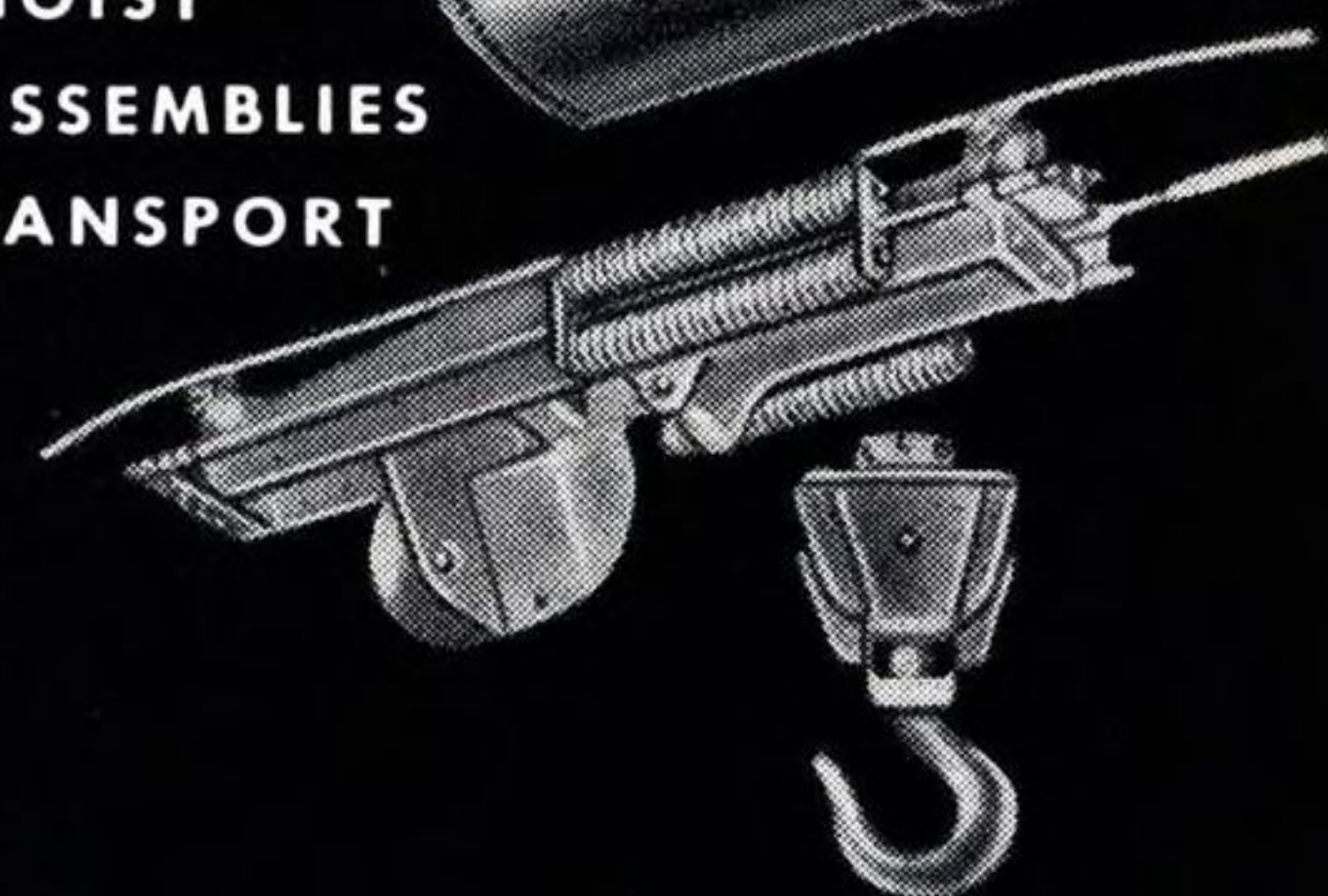
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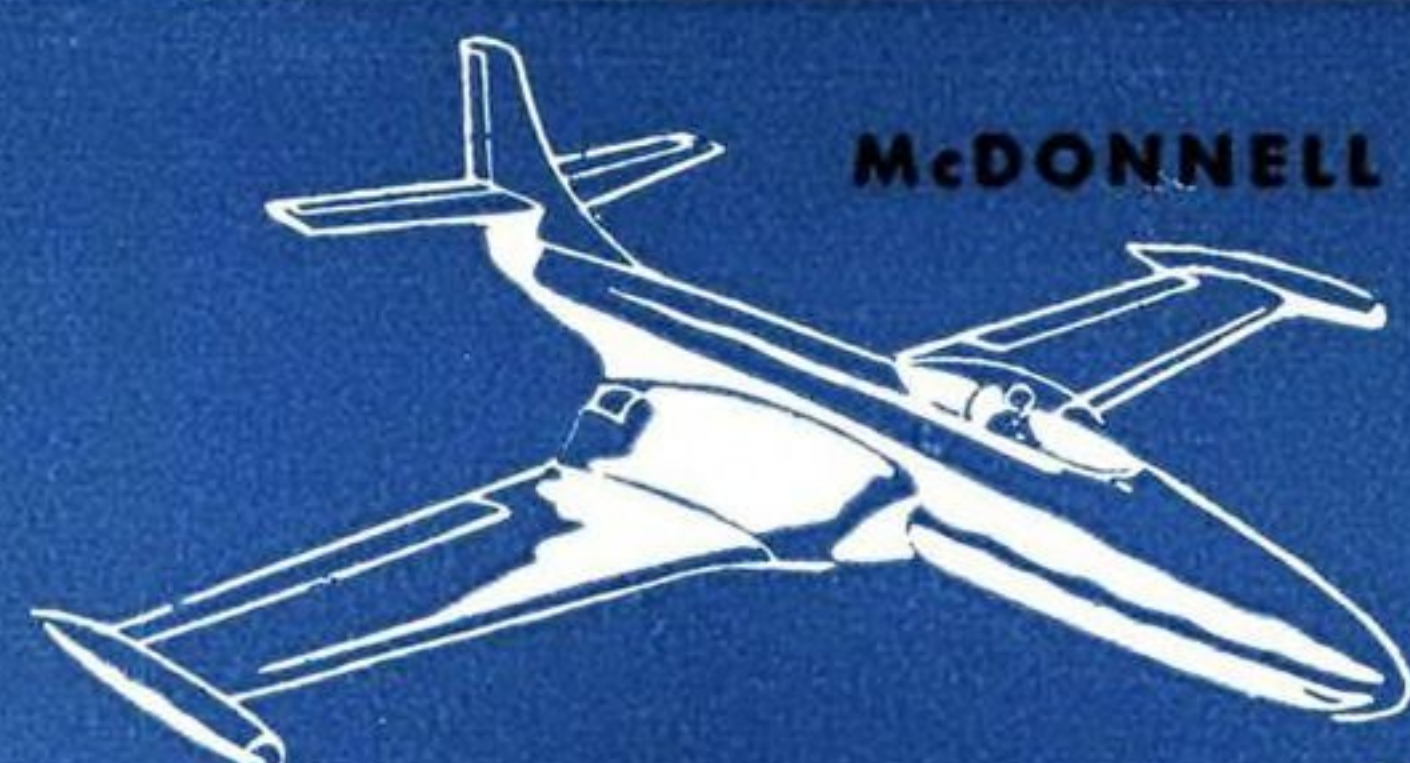
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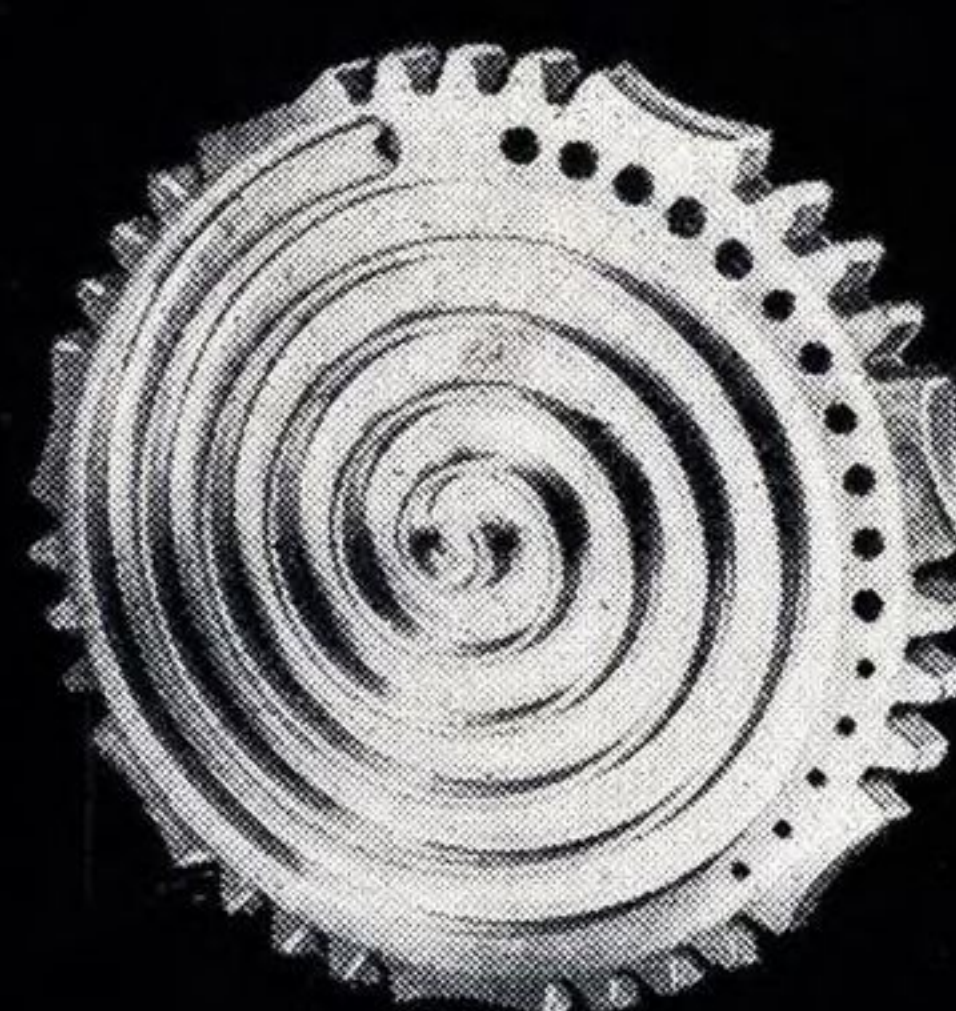
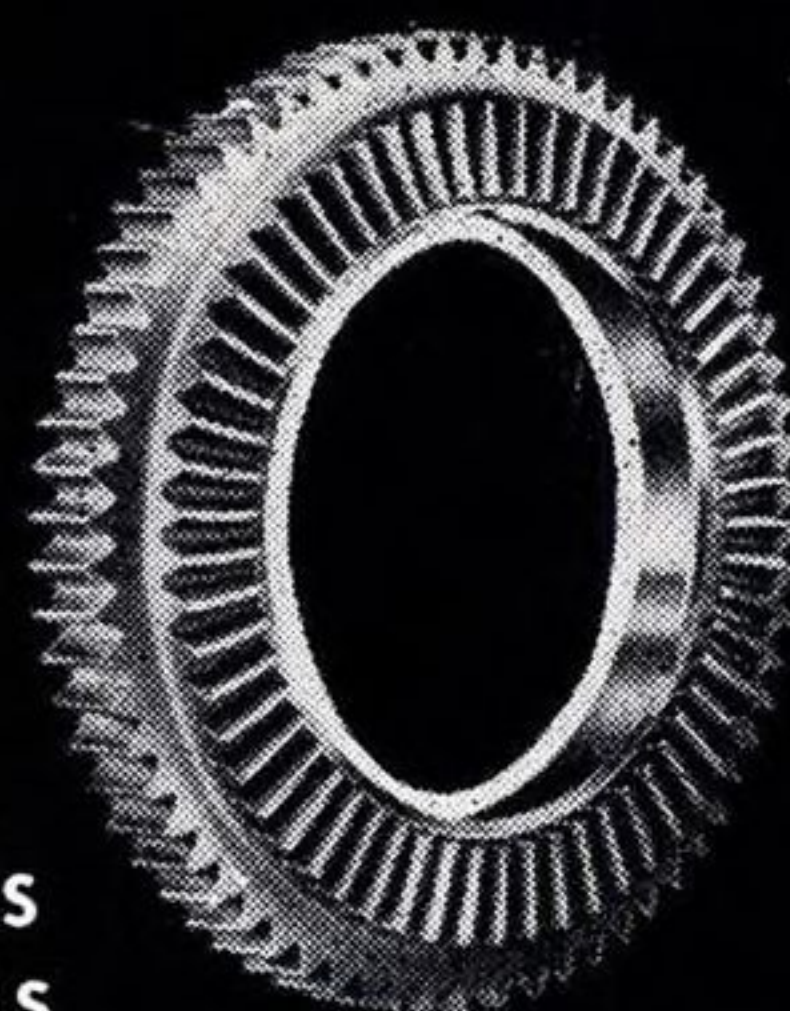
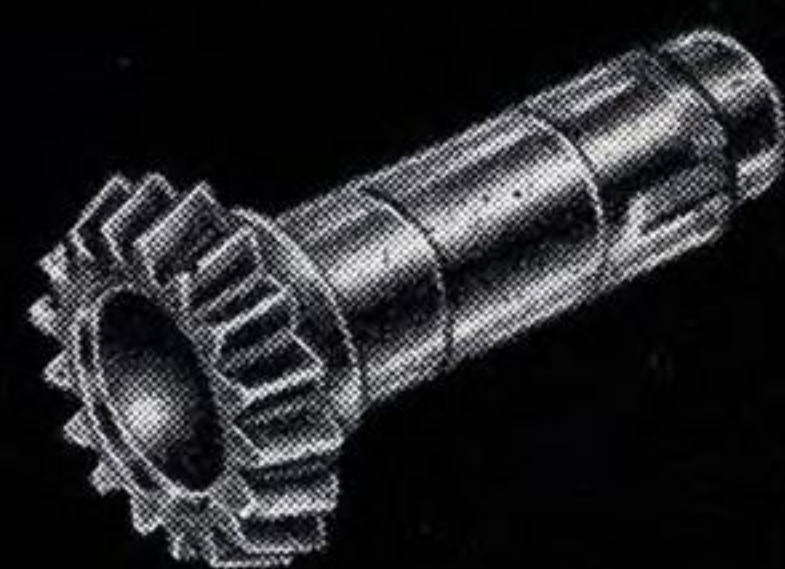
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