

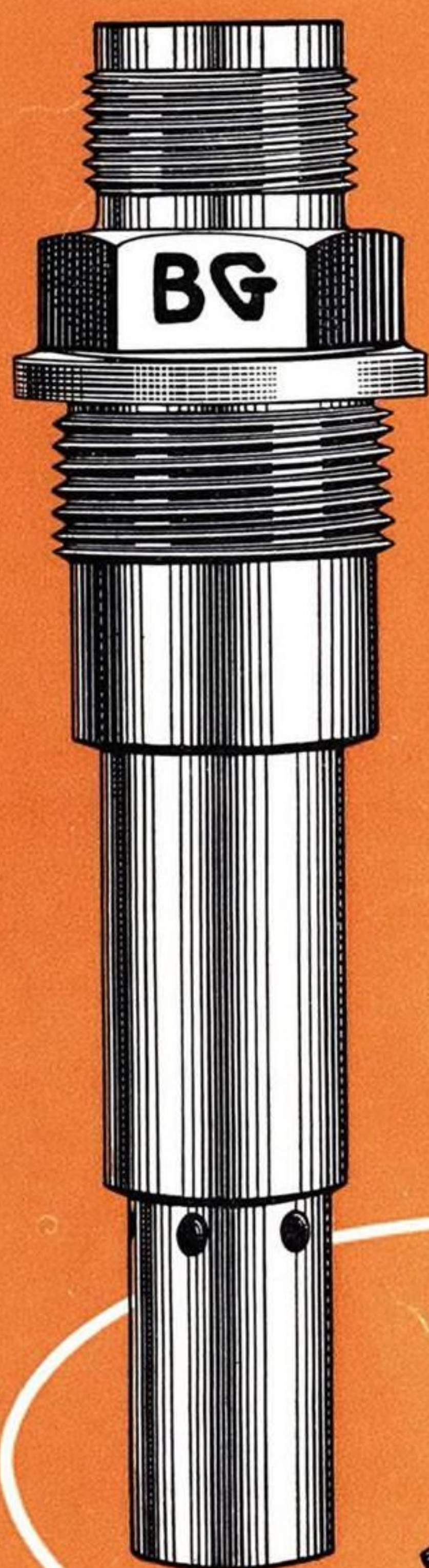
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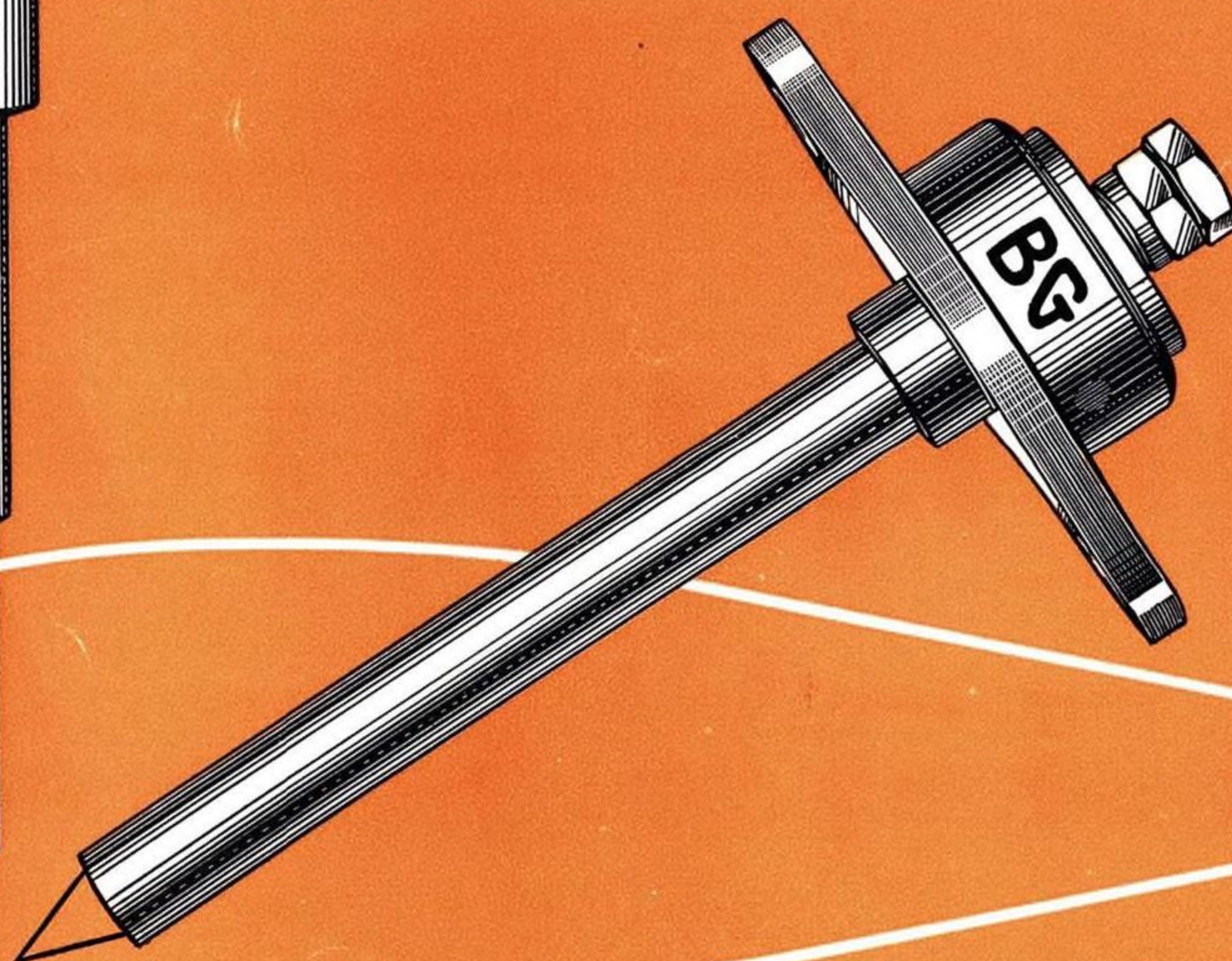
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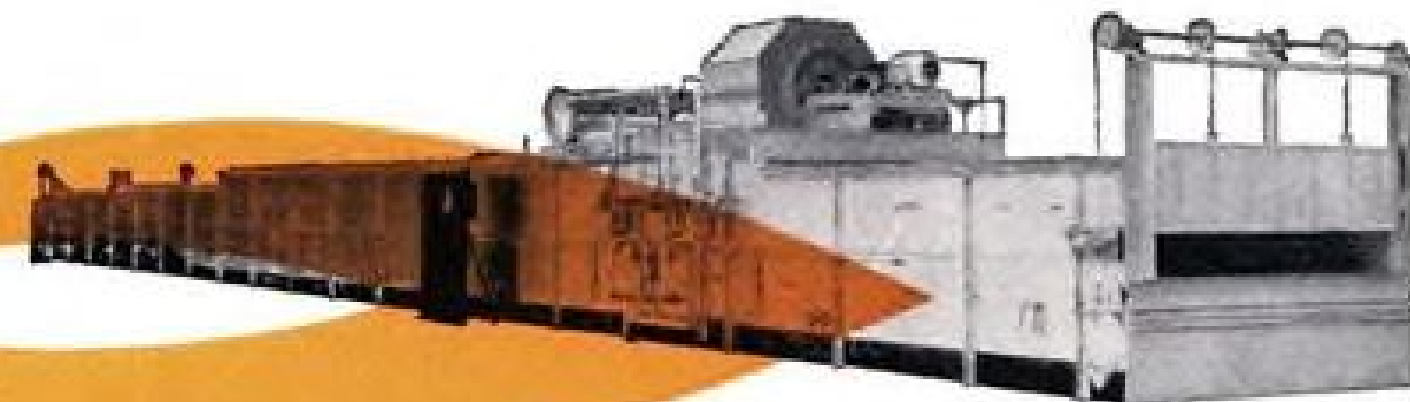
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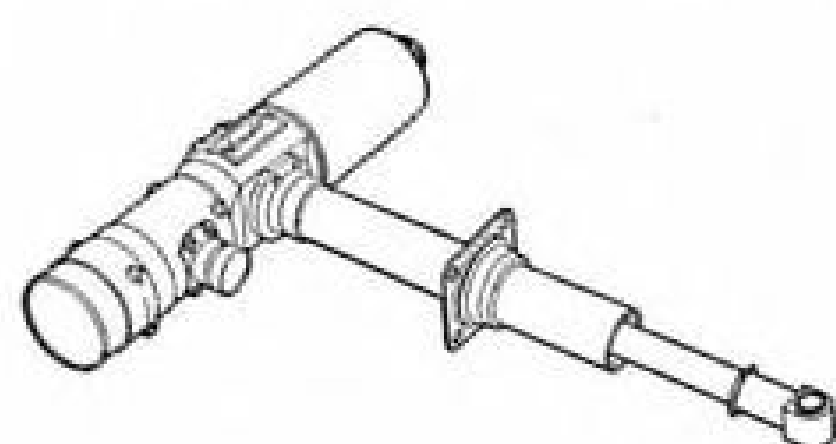
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Aviation Week

Volume 59

August 3, 1953

Number 5

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TRAIL-BLAZER OF THE STRATOSPHERE!



Wiley Post,

the beloved one-eyed Oklahoman, seemed to have many of the prairie qualities of the man with whom he died, Will Rogers. Wiley Post was the first man to fly around the world alone . . . the first man to fly around twice. He was an early student of high altitude jet streams and he worked tirelessly to promote his theory that "the air lanes of the future will be charted through the stratosphere."

PHILLIPS Petroleum Company sponsored many of Wiley Post's experimental stratosphere flights during the mid-thirties. For his high flying, a rubberized fabric "space suit" was used by Post to protect him from the dangerous effects of high altitudes. Shown here are Post (left) and Will D. Parker, Manager of Phillips Petroleum Company's Aviation Division, standing beside Post's plane "The Winnie Mae," examining the inflated suit in preparation for one of the high altitude flights. On the extreme right is Guy Ball, parachute expert.



THE LATEST high altitude pressure suit, shown above, was developed for the U. S. Navy by B. F. Goodrich Company. For the first time pilots can now abandon jet or rocket aircraft in outer space atmospheres. Life can be safeguarded as high as 100,000 feet in the new high altitude suit, designed to inflate automatically to survival pressures should a plane's pressurized system fail. This innovation in outer space attire stems directly from that first "space suit" worn by Wiley Post—and made for him by B. F. Goodrich.

● Virtually every phase of American industry has had a hand in the remarkable progress and growth that aviation has undergone. In the field of aviation fuels and lubricants Phillips Petroleum Company has been, and continues to be, a major contributor.

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NEWS DIGEST

Domestic

Failure of the left wing flap mechanism caused the R7V-1 Turbo Compound Navy transport crash July 7 near Chestertown, Md. Investigators of Civil Aeronautics Board, the Navy and Lockheed Aircraft, builder of the R7V-1, discovered from the crash debris that the left wing flap was fully retracted, the other wing flap was 97% extended when the big ship crashed. "In such condition," CAB ruled, "the plane became uncontrollable."

Pratt & Whitney's T34 turboprops are going into seven airplanes of three West Coast manufacturers, five for the Air Force and two for the Navy. Orders recently have been confirmed for two Boeing C-97 transports to use the engines, in addition to four Lockheed Super Constellations—two each for USAF and Navy—and the Douglas C-124B. Other turboprop airplanes, which cannot be specified yet because of security, also will be powered by the engines.

General Electric Co. is reported to be building a large company-financed facility at Evendale, Ohio, for development and test of jet engine components. The new laboratory probably will be completed this year. Installations also will provide facilities for study of various factors related to jet operations.

Two USAF B-47s set separate unofficial speed records last week. One Stratojet streaked 2,925 mi. from Limestone AFB, Me., to Fairford, England, in 4 hr. 45 min., averaging 616 mph. and breaking a previous B-47 mark of 5 hr. 22 min. The other six-jet bomber flew from Goose Bay, Labrador to Fairford in 4 hr. 14 min., setting an average of 611 mph.

Colonial-Eastern Air Lines merger—fought by National Airlines' rival claim to merge with Colonial—is up for final decision by CAB and the White House, following last week's oral arguments before the Board.

Turboprop Vickers Viscounts operated by Trans-Canada Air Lines will be equipped with cabin pressure regulator systems produced by AiResearch Manufacturing Co., Los Angeles, the first U. S. firm to manufacture parts for the British transport. Each system will include a new controller that combines a differential pressure control, rate-of-change and cabin pressure selectors in one box designed for installation on the cockpit instrument panel.



New Version of British Research Delta

First photo of Boulton Paul P.111A jet-powered research plane, which is designed to fly at near-sonic speeds. It has a Rolls-Royce Nene centrifugal-flow turbojet. The P.111A is a modified P.111 fitted with four rectangularly shaped air brakes equally spaced around the fuselage. Nose-mounted project-

ing pressure head for picking up flight test data also is part of the P.111A modification. Internal improvements have been made. The P.111A is scheduled to appear next September at the Society of British Aircraft Constructors' display at Farnborough, England.

Aeroquip Corp. has filed suit in Federal Court, Cleveland, Ohio, against the Weatherhead Co. of Cleveland, alleging infringements of four different patents relating to detachable, reusable fittings for flexible hose lines, used extensively on military and commercial aircraft. Aeroquip says it has manufactured and sold products worth more than \$50 million sales value under the four patents, not including sales of Aeroquip licensees.

Magnetic memory device has been developed by Remington Rand's Engineering Research Div., New York, in connection with CAA's plans to create a new overall U. S. air traffic system. The device electronically stores flight plans and compares them with ones already filed. It is expected to be ready for test and evaluation this fall.

Walter G. Whitman, formerly acting head of the Research and Development Board, is filling the post of special assistant to the Secretary of Defense for research and development until Secretary Wilson makes the appointment, expected shortly. Willard F. Rockwell is working as the Secretary's special assistant for munitions, a job formerly performed by the Munitions Board.

Financial

Boeing Airplane Co., Seattle, reports net profits for the first six months of this

year rose to \$9,178,473 from \$5,877,875 a year ago. Sales were \$418,989,387, compared with \$309,368,607.

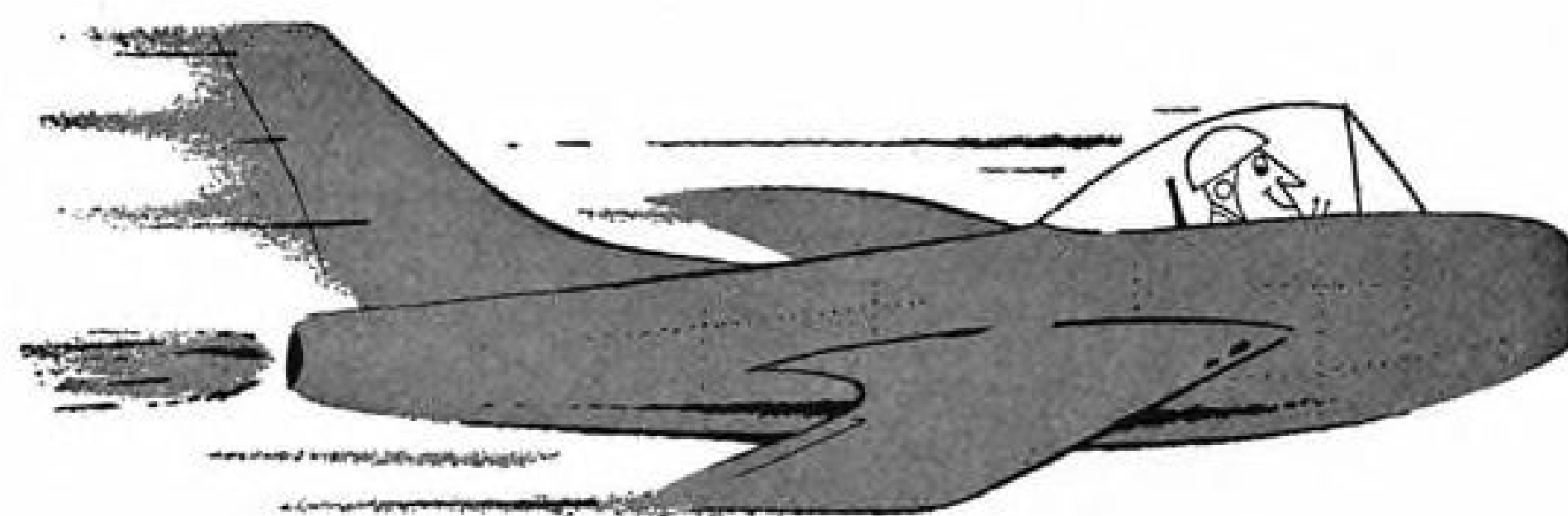
Republic Aviation Corp., Farmingdale, N. Y., made a net income during the first half of 1953 totaling \$3,739,300, a 42% increase over \$2,626,225 for the corresponding period last year. Sales amounted to \$188,299,571, compared with \$134,526,415. Backlog reached a total of \$1,055,697,415.

Trans World Airlines net income climbed 21% during the first six months of this year to \$2,633,196 from \$2,177,701 for the same period of 1952. Operating revenues were \$90,161,364, compared with \$71,716,660.

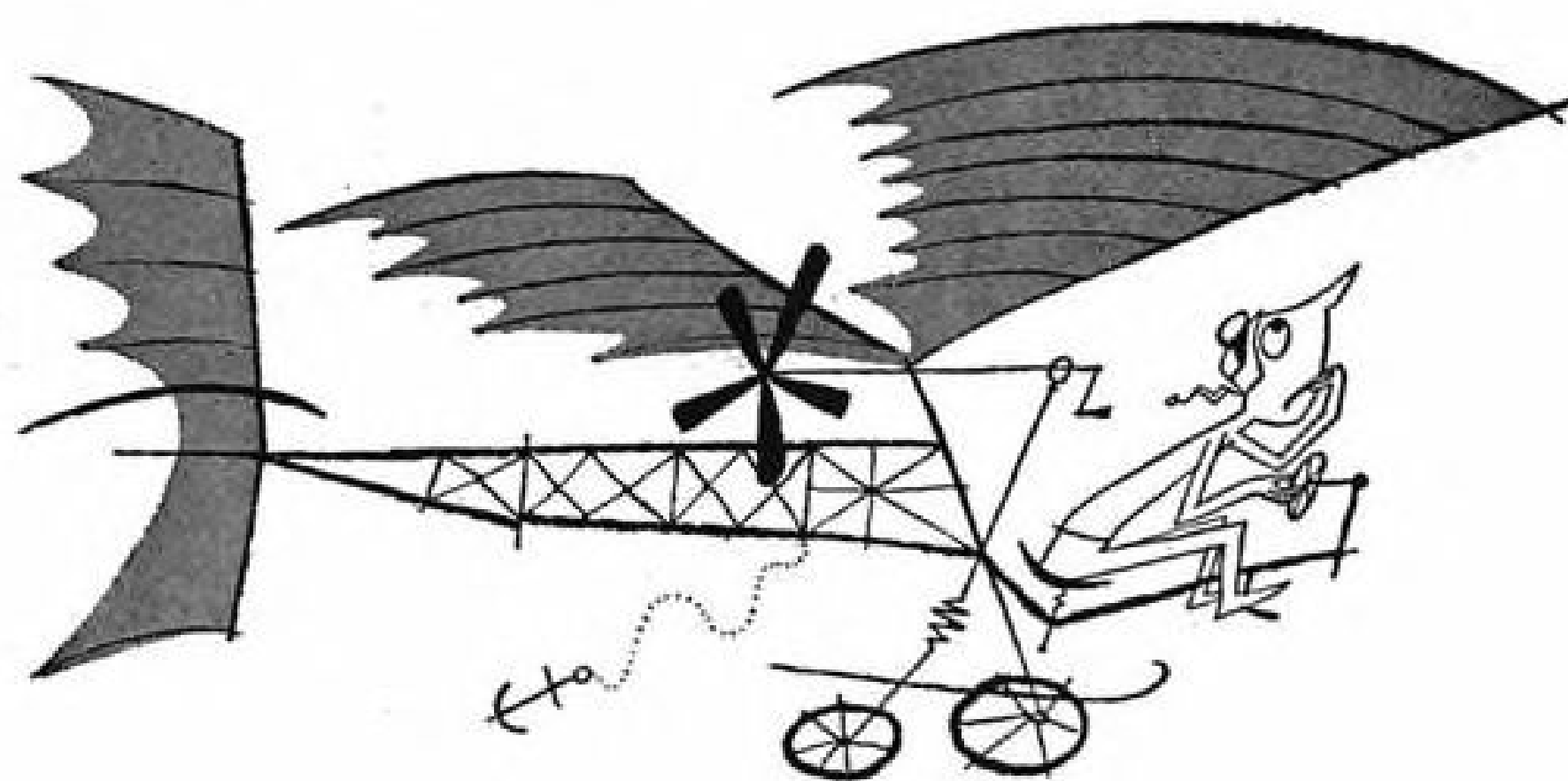
International

Experimental jet convertiplane will be produced by Fairey Aviation Co., London, under a contract awarded by the British Ministry of Supply. The 40-50 seat intercity transport will be lifted by tip-driven jet rotors, powered in forward flight by twin Napier Eland turboprops.

BOAC Comet took off safely Jan. 24 from the 3,600-ft. runway at Bombay's Juhu Airport, where the jet transport landed by mistake eight days earlier (AVIATION WEEK July 27, p. 16), and landed at Santa Cruz International Airport two miles away.



THERE'S A BIG DIFFERENCE

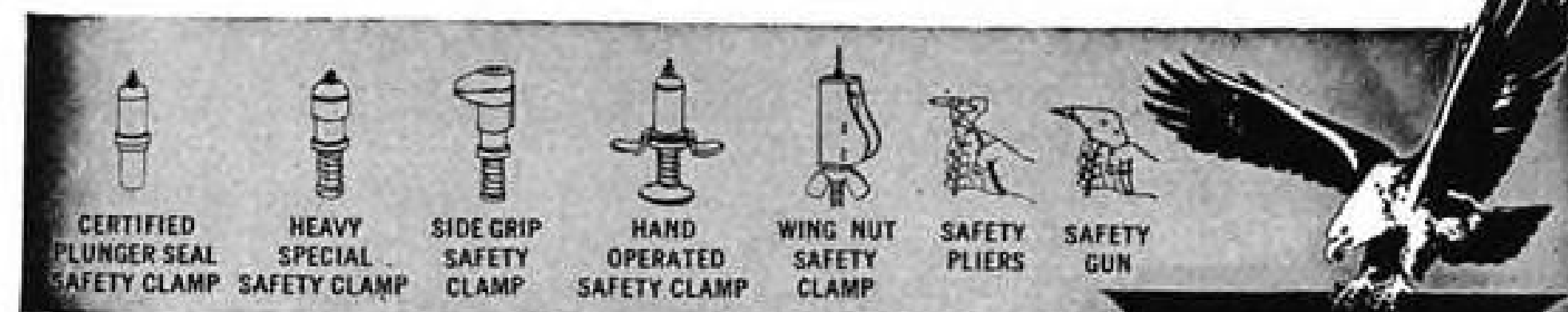


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The Aviation Week

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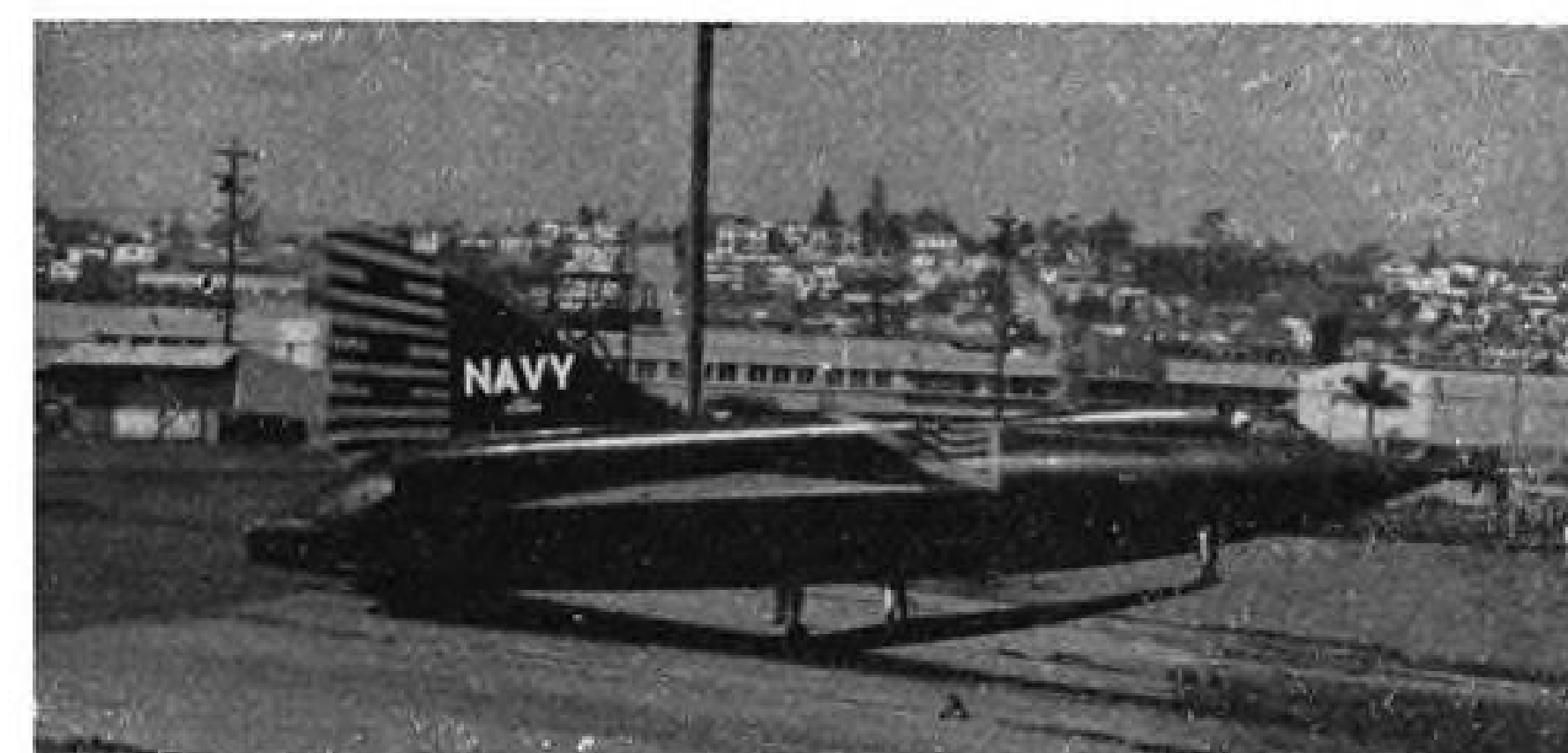


SEA DART TAKEOFF

Planing across San Diego Bay on hydro-skis, Convair's new XF2Y-1 Sea Dart delta-wing Navy fighter takes off on its first public flight (Aviation Week July 27, p. 19). Exclusive sequence below shows plane's features.

Convair XF2Y-1 Sea Dart Put Through Paces

(Other Sea Dart photos, see page 15)



1 Looking like a giant bug, the XF2Y-1 taxis down the ramp. A small wheel is at the end of each hydro-ski and another wheel under the tail.



4 Sea Dart moves back up ramp under its own power after flight show. Dark strip on lower side of fuselage indicates port hydro-ski well.



2 XF2Y-1 enters San Diego Bay, which adjoins Convair plant. Thin, buoyant wing does not carry fuel. Later models may have wing tanks.



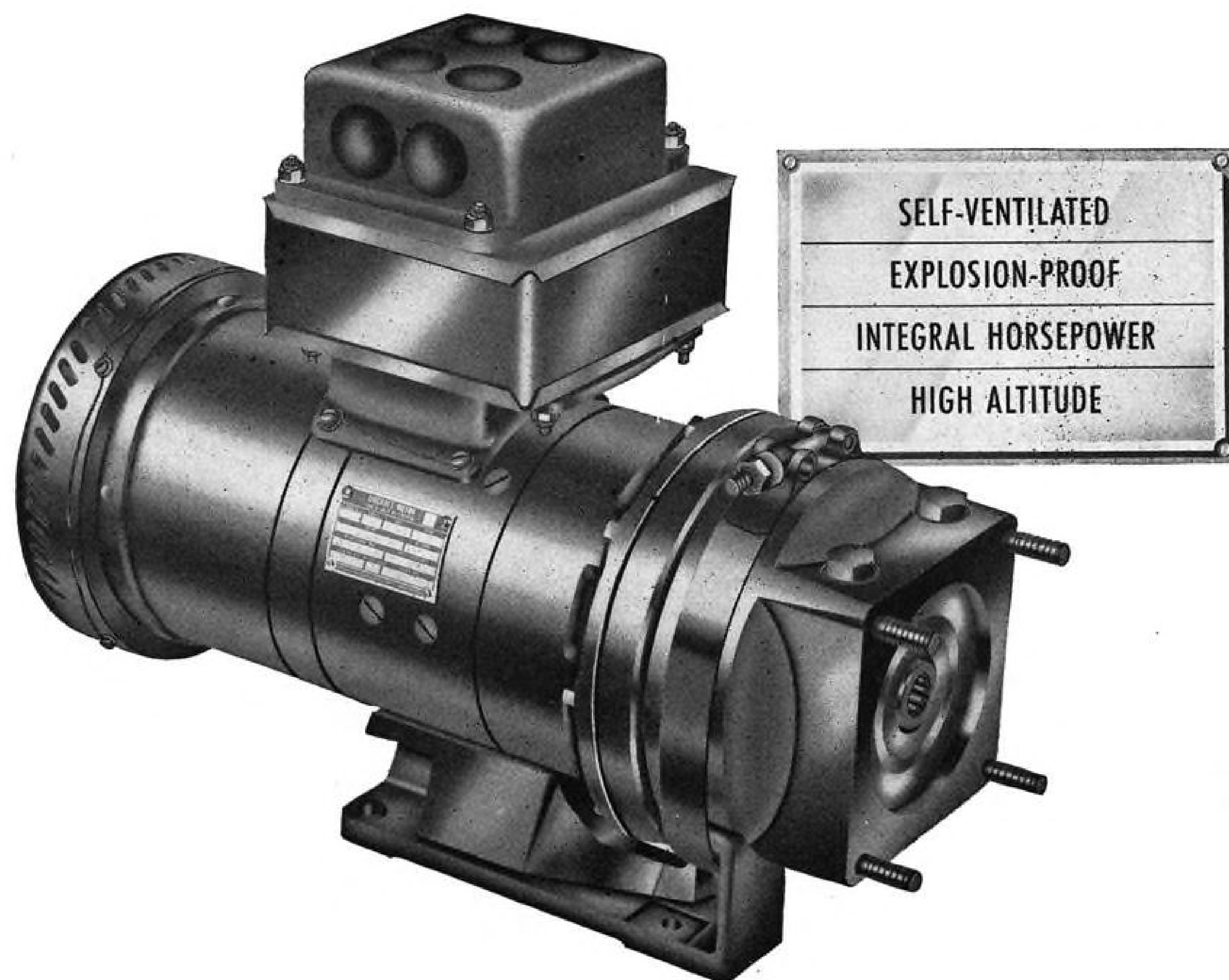
5 Hydro-ski wheels can be seen (arrow) in this view. Craft's large size, for a fighter, is apparent when compared with nearby ground personnel.



3 Riding low in the water as it taxis at low speed, the seaplane fighter's two J34 Westinghouse axial-flow jets kick up spray. Engines have afterburners.



6 Undergoing inspection, plane sits atop ramp with clam-shell canopy open (arrow). Convair has a limited production contract for Sea Dart.



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WHO'S WHERE

In the Front Office

William E. Douglas, father of the founder of Douglas Aircraft Co., Donald W. Douglas, has retired from the Santa Monica, Calif., firm's board. New directors: Donald W. Douglas, Jr., vice president-military sales; Nat Paschall, vice president-commercial sales, and Stanley G. Welsh, member of the New York Stock Exchange.

F. E. Amon has been appointed vice president-sales of Parker Aircraft Co., Los Angeles. Other changes: R. J. Trivison, vice president-manufacturing, and Warner B. McCarthy, secretary treasurer.

Changes

George S. Garrard, formerly of CAA's Powerplant Engineering Div., has joined Aircraft Industries Assn. as secretary of the Engine, Propeller and Rocket Technical Committee.

James W. Wilder is new chief of quality control for Flight Refueling, Inc., Danbury, Conn. William Terry has become assistant administrative engineer.

John Konrad has been promoted to chief test pilot of United Aircraft Corp.'s Chance Vought Div., Dallas. Forbes Mann is new chief of military sales.

Mal B. Freeburg, U.S. air carrier authority, has joined Japan Air Lines as a consultant.

H. Orville Varty has resigned as chief architect of CAA's Office of Airports to join the Miami, Fla., architectural firm of Steward & Skinner.

Beatrice Aitchison has been appointed director of transportation research of the Post Office Department's Bureau of Transportation.

Thomas L. Brown, Jr., onetime chief of USAF's press branch at the Pentagon, has become information officer for the Radio Technical Commission for Aeronautics.

Donald W. McDonald is new assistant manager of public relations and advertising for Air France's North, Central American and Caribbean Div.

James B. Qualters, former research and development officer at Wright-Patterson AFB, has been appointed plant manager of Townsend Co.'s Chicago plant.

Honors & Elections

Charles F. Horne, former Civil Aeronautics Administrator and recently appointed manager of Convair's Pomona, Calif., Div., has resigned as vice chairman of the Radio Technical Commission for Aeronautics. John S. Anderson, president of Aeronautical Radio, Inc., has been elected to complete Horne's unexpired term ending Sept. 30, 1954.

Walter U. Wheeler, assistant comptroller for Glenn L. Martin Co., Baltimore; W. G. Gisel, comptroller for Bell Aircraft Corp., Buffalo, N. Y., and M. A. Kavanaugh, assistant treasurer-controller for Douglas Aircraft Co., have been elected members of Controllers Institute of America.

INDUSTRY OBSERVER

► Douglas X-3 is scheduled to get two Westinghouse J46 engines that are expected to boost the power of the needle-nose supersonic research craft sufficiently to smash the unofficial speed and altitude records of the Douglas Skyrocket by a sizable margin. The X-3 has made only six flights to date.

► Convair's hydro-ski XF2Y-1 Navy jet fighter is going into the shop at San Diego for repairs to its flight test nose boom before continuing tests. Charles Richborg, who has been flying a Lockheed T-33 chase plane with the hydro-ski jet in earlier trials, is expected to take over the water-based fighter's test flights from Sam Shannon, who takes over a new classified assignment—not the tests of the new Convair delta-wing XF-102.

► Complaints from Southern California residents about sonic "booms" have caused aircraft manufacturers to order their test pilots to stop diving planes through the sonic barrier over populated areas. An industry meeting at which the order was agreed also produced agreement from engineers present that more knowledge is needed about the causes and effects of the "booms."

► Douglas Navy XF4D-1 Skyray, now powered with a Pratt & Whitney J57 jet engine, made an unscheduled stop at Albuquerque, N. M., before it completed a transcontinental trip to Patuxent River Naval Air Test Center. Stop was attributed to unspecified mechanical trouble.

► One reason USAF has been cautious about releasing photographs of the new North American supersonic YF-100 jet fighter is the unconventional control arrangement of the plane.

► Navy is giving Douglas designer Ed Heinemann a chance to prove his simplicity theories in the new Douglas A4D jet attack plane, which has won the nickname of "Heinemann's Hotrod" around the El Segundo plant. Work is starting at El Segundo on the prototype of this small, stripped-down and simplified plane.

► Capt. Eddie Rickenbacker has been talking to Convair about buying some jet transports for Eastern Air Lines. He learned, among other things, that Convair is planning a swept wing rather than a delta wing for its subsonic jet airliner.

► De Havilland Propellers, Ltd., has completed a licensing agreement with United Aircraft Corp. for manufacturing the Hamilton Standard cold-air conditioning unit for highspeed jet aircraft cockpits and for its sale for use in British planes in the British Commonwealth and other countries. Agreement involves two units, one for fighters, one for large jets. The refrigeration unit is necessary to relieve cockpit temperatures which get up to 190F at 600 mph., much higher as the speed increases.

► British Overseas Airways and the French Union Aeromarine de Transport have received clearance to operate the Ghost turbojet engines in their de Havilland Comets for 600 hr. between overhauls. BOAC now is running service tests on a batch of Ghost engines for further extension of the overhaul interval to 750 hr. The 600-hr. period at Comet speed is the equivalent of flying 10 times around the world, or the distance to the moon.

► Aero Medical Assn. scientists are proposing development of a new-type cockpit warning device to "wake up" a pilot experiencing "target fixation" or other types of over-concentration on a particular flight problem or control, while neglecting other items on his checklist.

► AiResearch Aviation Service Co. has completed special modifications on two Convair-Liner 340s for the Arabian American Oil Co. The planes will be used as combination passenger-cargo carriers for the firm's African operations to supplement its transocean services with DC-6Bs and Constellations.

Washington Roundup

143-Wing USAF After All?

A significant hint has been dropped that the Administration is thinking, tentatively at least, in terms of a 143-wing USAF after all—with "when" the key issue.

Sen. Leverett Saltonstall, chairman of the Senate Armed Services Committee and a key Administration senator, observed: "It is my understanding that there is to be an interim Air Force of 120 wings, with an ultimate goal, determined problematically for 1957, of a greater number, presumably 143 wings . . . but it isn't clear whether this is to be reached in 1956, 1957, or 1958."

Talbott's Outlook

Here are some trends new Air Secretary Harold Talbott favors in the USAF program:

- Automobile plants should be phased out of the aircraft picture as production levels off. Talbott feels that aircraft firms have the know-how to continue pioneering in the field and should have sufficient orders to sustain economic operations.
- There should be a "go slower" policy on putting planes into production. This would cut down wastage involved in rushing types out of the development stage prematurely.
- Liaison should be increased between Air Materiel Command and Research and Development Command. Talbott believes there is a big area for improvement here. But a merger of AMC and R & D commands is not in the picture, he reports.

Bricker: New Key Man

Sen. John Bricker, who takes over as chairman of Senate Commerce Committee (which handles all commercial aviation matters) as a result of the death of Sen. Charles W. Tobey, has concentrated on railroad legislation in his committee activity. His only active role in the aviation picture, so far, has been severe criticism of Civil Aeronautics Administration for its air safety management last year.

In voting, Bricker has sided with the scheduled industry:

- He opposed a move to make certificated freight carriers, as well as mail carriers, eligible for subsidies.
- He endorsed long-term subsidy contracts for airlines so they might plan operations ahead.
- He opposed a move to set "cost" as the yardstick for international mail pay instead of the much higher Universal Postal Union rate of \$1.91 a ton-mile.

Airline Investigations

General Accounting Office staff investigators are ploughing through Civil Aeronautics Board records, as a start for GAO's review of airline subsidies. It was a GAO investigation a few years ago that touched off congressional ire at shipping subsidies and finally resulted in abolition of the independent Maritime Commission and transfer of its functions to Commerce Department. But airline spokesman Stuart Tipton, Air Transport Assn.'s counsel, reports that airlines are unconcerned, feeling CAB has erred on the side of "too little" in allowing airline profits.

Sen. John Cooper, who heads the Commerce subcommittee making a thorough review of air transport law, has backed legislation during his service on the Hill which would hold down mail pay to the scheduled lines. He is co-sponsor of the Kennedy bill, vigorously opposed by the scheduled industry, which would set cost-of-service as the yardstick for determining both domestic and international pay and make it possible for Congress to vote subsidies to airlines, up or down, each year.

Edward Sweeney, who has handled all staff work on aviation for the Commerce Committee for the past few years, probably will participate in the Cooper subcommittee's work. Nonskeds, who feel Sweeney has strategized for the scheduled industry, were pleased at the appointment of Frank Keenan as Cooper subcommittee staff man by the recently deceased Sen. Tobey.

R & D Investigation

Controversy between Senate Appropriations Committeemen, led by Sen. Homer Ferguson, and Air Force over whether "field aces" or top scientists and engineers should direct the research and development program is developing. The senators are now looking into the "complete" background of all key officers in the command.

USAF thinks field officers with administrative ability, aware first-hand of staff requirements, with the assistance of staffs of scientists and engineers, offer the best direction. Maj. Gen. Donald Yates put it: "It has been shown in the past that allowing research and development to be controlled completely by highly technical, highly scientific personnel tends to build toward complexity, tends to build toward more and more development which will complicate and does not take sufficient consideration of operational requirements of the field operating forces."

But senators dissent on tight military control. Ferguson commented that there is a difference between the military telling the scientists what they want and the military actually operating a half-billion-dollar-a-year research program.

Wilson Public Relations

Defense Secretary Charles Wilson's public relations program seems to be to not have any. The Secretary reported to inquiring congressmen: "I am trying to set a good example personally . . . I have not made any statements on any subject other than routine business. . . . On that, I just put out a simple statement."

The policy, however, is running into opposition in some congressional quarters. The Secretary declined to inform Sen. Margaret Chase Smith whether the Army had any atomic cannon in Western Europe on grounds it would "involve disclosing top-secret information that would endanger the national security." Subsequently, a routine Army release disclosed that there were none, and an irritated Sen. Smith took to the Senate floor with this observation:

"For some time now I have had serious doubt about the manner in which security was being invoked by the Defense Department as between legitimate cause and mere desire not to answer some inquiries. My experience in this instance has certainly done nothing to lessen that doubt. In fact, it has enhanced the suspicion."

—Katherine Johnsen

AVIATION WEEK

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Post-Korea Industry Outlook:

Military Plane Production to Remain High

- Defense goals will stand against new Red threats.

- But additional cutbacks are forecast for 1955.

No further immediate cutbacks in the already-trimmed-down budget for U.S. air power in fiscal 1954 were anticipated last week as a result of the Korean truce.

Informed Washington sources forecast that the \$5 billion allocated for Air Force and Navy Aviation hardware would stand without change. One explanation is that the paring back of the 1954 defense budget had been made in anticipation of the Korean truce.

Realistically, however, the outlook for the 1955 defense budget is for additional cutbacks for both Air Force and Navy Air, if the Korean truce and armistice continue in effect and no new aggression problems arise elsewhere.

► **Korean Combat Records**—Meanwhile, Far East Air Forces tallied an impressive air superiority margin over Communist planes in the Korean Theater. In the opinion of many strategists, FEAF's work in pinning down enemy planes and the effective ground support of U.S. troops made the difference that led to the armistice.

FEAF's record book for three years, one month and one day of the Korean conflict up to midnight July 26, showed 835,462 sorties flown with a tally of 1,018 enemy aircraft destroyed, including 838 MiG-15s. In addition, 177 other enemy planes, including 149 MiG-15s, probably were destroyed. A total of 1,027 more planes, including 936 MiG-15s, were damaged.

► **Our Losses**—In contrast, USAF losses reported by FEAF for the same period were 434 jets, including only 84 from air-to-air combat, 258 from ground fire and 93 from other causes, and 366 propeller aircraft, including 21 from air-to-air, 285 from ground fire, and 60 from other causes. In addition, 117 U.S. Marine shore-based planes were lost as were 82 other planes of other U.N. nations.

FEAF reported its bombers and ground-support planes destroyed 1,107 bridges, 890 locomotives and 81,897 supply vehicles.

► **Navy Report**—Navy and Marine aircraft flew a total of 272,052 sorties, the

Boxscore in Korea

On the eve of cease fire in Korea (midnight July 26) Far East Air Forces reported the following score for the 37-month air war with Communist planes:

	Destroyed	Probably destroyed	Damaged	Total
Communists total.....	1,018	177	1,027	2,222
MiG-15	838	149	936	1,923
	Air-to-air	Ground fire	Other	Total
USAF and attached units total losses..	110	676	213	999
Jet	83	258	93	434
Piston	21	285	60	366
USAF total	104	543	153	800
USMC (shore-based).....	0	79	38	117
Other UN planes.....	6	54	22	82

Navy announced, and suffered total losses of 554 planes, including four lost in air-to-air combat. Complete score of Navy kills on Communist planes was not available. Among best known are the first MiG-15 shot down by a Navy pilot Nov. 9, 1950; the five kills made by a Marine Corsair pilot on Communist night intruder planes, and the kills made by Navy Douglas F3D night interceptor jets, escorting B-29s against MiG-15 attacks.

Most Navy missions were low-level ground-support and interdiction flights, and they delivered 176,321 tons of bombs, 273,403 rockets and 71,654,000 rounds of ammunition.

► **Wilson Statement**—Most authoritative key to the future of air power defense spending was a statement by Defense Secretary Charles Erwin Wilson, immediately following announcement of the truce agreement:

"We cannot expect any important reduction in defense spending in the near future as a consequence of the truce."

"Manufacturers, producers, suppliers and workers need have no concern regarding an abrupt cancellation of contracts for military equipment, supplies and services as a result of the truce in Korea. The continuing needs of the Department of Defense, including the military assistance program, are such that current production plans will be continued until such time as an orderly production plan can be worked out that will take into account the changed Korean requirements."

Wilson warned that the end of fight-

ing in Korea does not mean the end of the threat from Communist imperialism.

"This truce, therefore, must not result in any letdown in our determination to complete the buildup of our defenses and to maintain them as long as need be. We must not be misled into the same demobilization which followed World War I and II. . . . The Department of Defense intends to move forward towards its objective of constantly increasing the effective strength of all our military services," he added.

► **Quantico Meeting**—Another signpost as to future defense spending, however, came from Wilson's three-day Department of Defense conference last weekend at Quantico, Va., attended by top civilian and military personnel from all three services, and visited by President Eisenhower.

Forecasts were that lower draft calls and some new cuts in defense spending would be in order if a real truce became effective. Savings of \$750 million to a billion may be achieved next year as a result of the truce, Assistant Defense Secretary (Controller) Wilfred J. McNeil said.

Much of this saving, however, is expected in reduction of ammunition expenditure and attrition of combat equipment, elimination of combat pay, reduction of transportation costs, and in holding down Navy cruising expenses. This does not include possible savings by curtailment of equipment programs below present planned levels.

► **3 Million Men**—The Administration's program calls for keeping the three mili-

tary services at a strength totaling more than three million men until international tensions are relaxed. Some Washington sources predicted that whatever military manpower cuts are made they would not be at the expense of the Air Force, which already has been trimmed down severely personnel-wise although it is continuing to expand toward the projected 143-wing level.

► **Talbott Message**—Air Force Secretary Harold E. Talbott sent a message to the Far East Air Forces voicing "appreciation to each member of the command for the tremendous part you have played in driving the Communist aggressors from Southern Korea and making them want a cease fire."

"While you carried the fight to the aggressors with more than three quarters of a million separate flights, our own surface forces enjoyed almost complete freedom from enemy air attack," he added.

Talbott pointed out the need for continued vigilance in Korea and along the Pacific frontier, citing the more than 2,000 planes in the North Korean air force backed up by more than 5,000 additional Soviet Russian planes deployed in the Far East and the Siberian bases from which Russian bombers could operate against Japan and the U.S.

► **Air Bases**—Meanwhile, aviation observers expressed concern that the truce is opening the way for construction and rehabilitation of airfields in North Korea "for civilian use." It is pointed out that there is virtually no requirement for civilian aviation in North Korea, that this will give the Communists opportunity to prepare the airfields for staging MiG-15 fighter attacks against South Korea in the event hostilities are resumed. It will permit MiGs to be flown from fields within 22 airline miles of Seoul.

Objection is also being made to the fact that USAF planes will not be able to fly over North Korea after the armistice, so that a Communist surprise offensive could be prepared in North Korea with no U.S. air intelligence of its staging.

Prospects for immediate cutbacks in bombs, shells, rockets, and other munitions are modified by the fact that U. S. is considerably behind schedule in shipment of munitions to its Allies in Western Europe. Plans already are being made to shift ammunition shipments destined for Korea to Europe. Another factor is that ammunition stocks in this country are low and will require buildup to a more satisfactory level before the production slows down appreciably. This will take two to three months.

► **Operational Cost**—An Air Force operational figure of \$530 million a year for the Korean combat offers little prospect for major savings, observers point out.

Final Air Victory

Capt. Ralph S. Parr, Jr., Sabre pilot from Apple Valley, Calif., was credited with shooting down the last Communist plane of the Korean war, a twin-engine Russian-built IL-12 transport, 10 hours before the cease fire became effective. It was Parr's 10th victory in Korea, all the others being MiG-15s. First reports that the transport carried Communist truce officials were discredited later.

A considerable portion of the support costs of wings now stationed in Korea goes on, peace or war. And while combat attrition has been higher than normal operational attrition in peacetime the costs of operating an Air Force necessary as insurance against a new outbreak in Korea still bulks large.

Tiger-Slick Merger Forecast for 1953

Merger of the two major U. S. all-cargo airlines appears likely by the year-end, despite a month's delay granted by Civil Aeronautics Board examiner F. Merritt Ruhlen for CAB staff to file briefs. Flying Tiger Line-Slick Airways joint brief for their merger was filed last week.

Examiner Ruhlen has Board orders to finish his initial opinion as soon as possible after receipt of the CAB staff brief Aug. 24. Merger agreement of Tiger-Slick set Oct. 1 as deadline for full CAB approval. Observers say the Board cannot meet that deadline now, but the carriers say that a delay of reasonable time beyond that date is acceptable.

► **Little Opposition**—All recent merger applications have gone through CAB proceedings in record time, and the Tiger-Slick merger appears set to get similar expedited attention.

The recent examiner hearing lasted only 3½ days. Only opposition came from American Airlines and United Air Lines. TWA appeared but filed no exhibits and delivered no cross-examination. Eastern was an intervenor, but failed to appear at the hearing. Northwest and Continental asked right of intervention but filed no exhibits and did not appear at the hearing.

► **CAB Staff Uncommitted**—Counsel for CAB Bureau of Air Operations has not revealed the staff's position, if any, on the merger. Counsel asked and won a one-month delay in filing a brief because of "the heavy workload of bureau counsel and . . . the fact that all material that the parties agreed to furnish after the close of hearing has not been submitted."

Bureau director Gordon Bain says the staff is wrestling with the three big transcontinental route cases, several local service airline renewals, the question of renewing existing aircoach fares expiring Dec. 31, and a number of other current issues.

► **Want Financial Stability**—Tiger and Slick compete with all the major certificated airlines of the U. S., but lack their passenger-mail-express support. They have grown without it, but cite potential advantages from merger—mainly substantial reduction of overhead—that would help them compete more effectively with the airlines with access to all types of air-carrier business.

In fiscal 1952, Flying Tigers got almost half its revenues on the Pacific airlift of \$22 million total, \$9 million was Pacific, \$8 million other contract services and \$5 million common-carriage airfreight. Net profit was \$1.5 million.

In calendar 1952, Slick Airways reports that it grossed \$11 million from common-carriage transportation and \$4 million on other services, but reported a half-million net loss for the year.

A Tiger director says his company soon will report substantial profits for fiscal 1953, largely on contracts, and developments in the mill. Flying Tiger Line recently won renewal of its big Navy transcontinental supply contract.

Newark Airport Opens \$8.5-Million Terminal

Port of New York Authority officially opened a new \$8.5-million airline terminal building at Newark (N.J.) Airport last week. It incorporates these features:

- All airline ticket counters are adjacent to the plane ramp. Airline crews, operations and briefing rooms are along the arcades leading to aircraft.

- Main building can be converted quickly and inexpensively into a maintenance hangar large enough to house three Boeing Stratocruisers. Lobby has 500-ft. clear span and 166-ft. width. Additional 50 ft. is available on the end.

The dedication also included scheduled showing of 27 modern and historical commercial planes, including a sample of virtually every airline transport currently used by U. S. carriers.

AF Bills Canadair

Jacqueline Cochran's use of Edwards Air Force Base, Calif. when she recently racked up several speed records will be billed to Canadair, Ltd.

Miss Cochran flew a Canadair-built F-86E during the flights and was "checked out" prior to her Sabre flights in an Air Force T-33 jet trainer.

USAF did not divulge what the cost of using its facilities would be.

Wilson Wins USAF Cutback Fight

Senate approves \$5-billion cut, kills two amendments to restore a total of \$450 million to 1954 budget.

The congressional victory for Defense Secretary Charles Wilson's \$5-billion slash in Air Force's 1954 fiscal budget was complete when the Senate, after long but one-sided debate, approved it.

Gen. Hoyt Vandenberg's proposal to restore \$1.4 billion of the Wilson slash, beaten by a sweeping 161-to-230 in the House, was not even put forth for a test in the Senate. USAF proponents, instead, pushed two other proposals, but were defeated on both scores:

- An amendment to add \$400 million for purchase of 200 B-47s was defeated, 38-to-55. It was sponsored by nine Democratic members of the Appropriations Committee, giving it a Democratic political flavor: Sens. Burnet Maybank, Richard Russell, Pat McCarran, Dennis Chavez, Carl Hayden, Lister Hill, Harley Kilgore, John McClellan, and Warren Magnuson. The vote in favor of the proposal, aside from Independent Sen. Wayne Morse, was solidly

Democratic. Eight Democrats joined Republicans in the opposition.

The case in favor of the \$400 million, led by Sen. Stuart Symington, former USAF Secretary, was weakened by the fact that Vandenberg hadn't recommended it and B-47 production already is financed for a long future period. Vandenberg's proposal recommended \$353 million in procurement funds for support and airlift planes, putting this ahead of the B-47 procurement.

- A proposal by Sen. Hayden to add \$50 million to increase the pilot training rate from the current 7,200 a year to 12,000 was defeated, 41-to-48. On this, too, the roll call generally followed political lines: One Republican, Sen. John Cooper, joined Democrats in support; six Democrats joined the Republican opposition.

USAF testimony was that an increase in the 7,200-a-year rate was in step with the 120-wing interim program, and that

an increase in the rate would put it out of balance.

- On a third Senate showdown, a proposal to bar preferential treatment in the letting of defense contracts to labor-surplus and economic-distress areas was maintained on this, the vote generally followed an area pattern even by economy senators like Michigan's Republican Sen. Homer Ferguson.

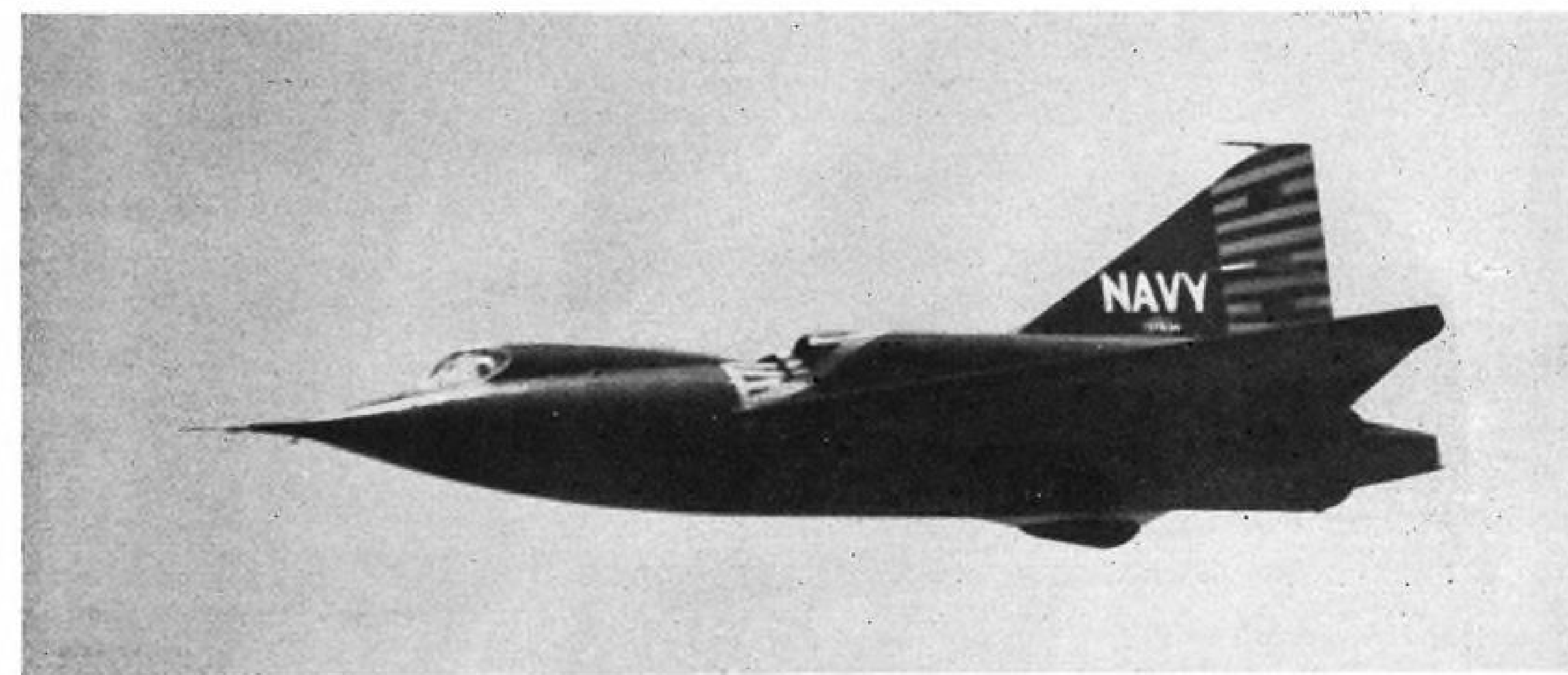
► **At Issue**—Only a few points were at issue on the \$34-billion defense bill:

- The Senate approved a \$475-million USAF allocation for research and development, as recommended by Wilson—\$35 million over the House figure.

- The Senate approved \$1,394 million for Navy procurement of aircraft and related materiel. This was \$6 million below the Wilson estimate, but \$15 million more than the House allowed.

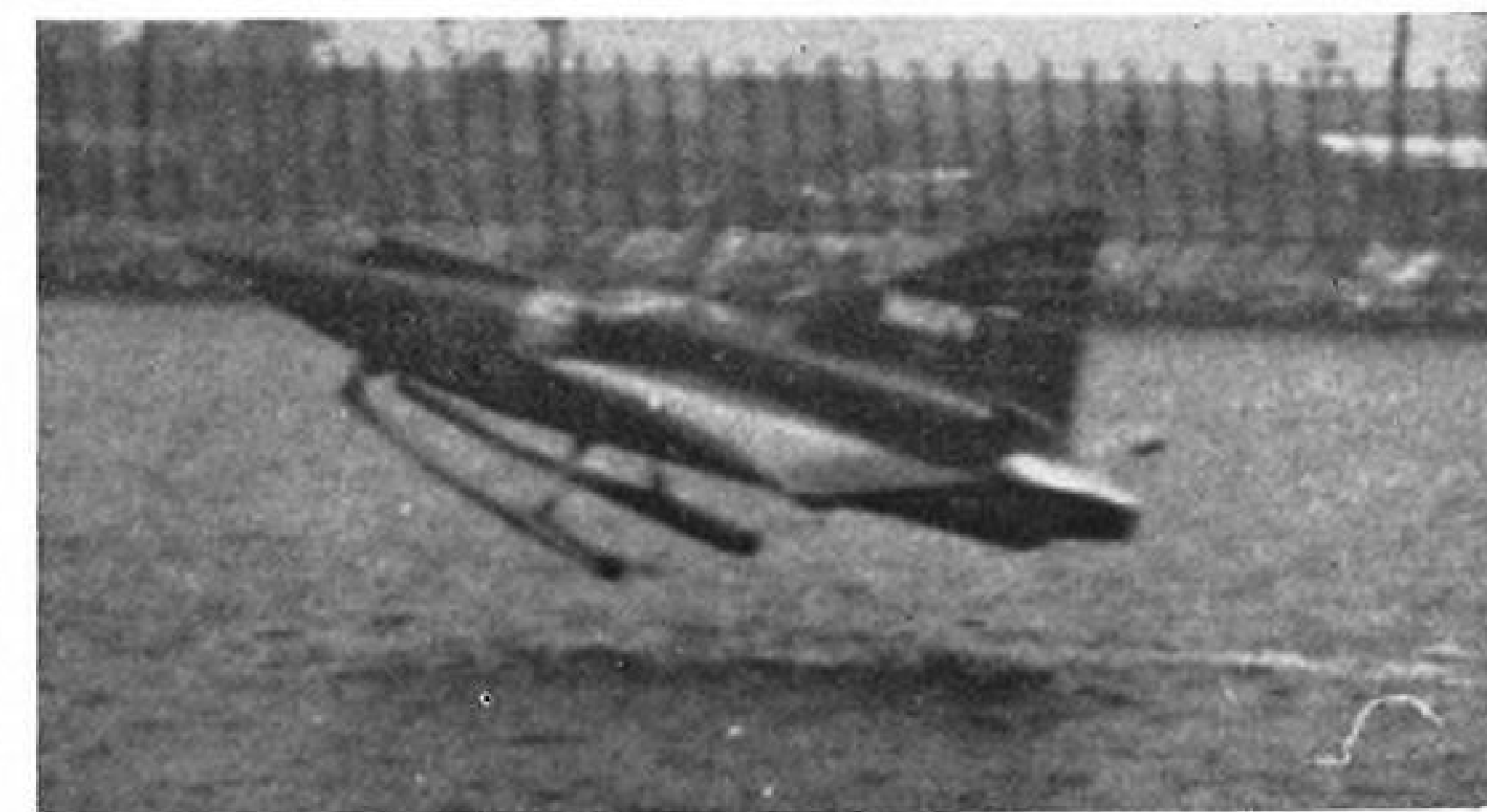
- The Senate allowed only \$250 million for building up a stockpile of machine tools and production facilities—half the \$500-million Wilson estimate which was approved by the House.

- The plan to ban the use of defense contracts to solve labor surplus and other local economic distress problems was also at issue. The House did not write in the ban.



SEA DART IN ACTION

First in-flight view of new Convair Sea Dart shows the craft's clean lines with novel hydro-ski landing gear retracted. View of Navy delta-wing fighter (right) shows the XF2Y-1's bug-like aspect as it prepares to touch down in San Diego Bay. Convair designers report that the plane's 60-deg.-swept delta wing has a low drag rise through the transonic range, good stability throughout and positive control. Hydro-skis appear to have a flat planing surface with oleo shock strut mounted approximately three-quarters of the way back. XF2Y-1 has been designed to take off and land even in four-foot seas and from snow and ice. (Action photo sequence of Sea Dart is on page 9).



First Martin B-57A Makes Initial Flight

Martin's twin-jet B-57A night intruder bomber took to the air for 46 minutes July 20 on its first flight. Company officials called the flight "successful."

Powered by two J65 Wright Sapphire engines built by Buick Division of General Motors Corp., the light interdiction bomber is being built by Glenn L. Martin Co. on a licensee agreement with English Electric Co., Ltd. The B-57A is a modified version of English Electric's Canberra bomber.

The first flight came just 10 days before the B-57 was scheduled to undergo an official flight acceptance test by Air Force at Middle River, Md., Martin's airfield.

► **Two Produced**—A two-man crew, O. E. (Pat) Tibbs and George (Rod) Rodney, Martin flight test directors, tested the bomber in its initial flight. They also will be at the controls during the Air Force flight.

Two B-57As have been produced by Martin thus far. They are the regular night intruder bomber which Air Force will use, if accepted, in its tactical wings. Successive models coming off the line at Baltimore will be training, photo reconnaissance and radar search models. Production is ahead of schedule.

Big advantage of the B-57 over the Canberra is said to be a better power-weight ratio of the Martin version.

Sayen Charges Some Pilots Flying 14 Hr.

Charging that some pilots of military contract carrier planes are flying as much as 14 hours without rest, Clarence N. Sayen, president of Air Line Pilots Assn., last week asked CAB to stop waiving its regulatory limits on the contract carriers.

Sayen pointed out that Special Regulation 367, authorizing the CAA administrator to permit the contract carriers to deviate from standard Civil Air Regulations 40, 41, 42, 45 and 61, has been renewed twice since its first enactment July 28, 1950, and is again up for renewal Aug. 1.

Standard limit for domestic air carriers calls for pilots to fly not more than eight hours without a rest period. International regulations permit two pilots plus a third relief man to fly up to 12 hours.

Sayen says that the waiver now granted permits a two-pilot crew to fly "practically indefinitely."

He urges it be stopped, to prevent the double standard of safety that now exists. If the waiver were eliminated, it

would mean including a third relief pilot in the crew. He asks for public hearings, if there is any intention of granting renewal of the special regulation.

Reds Claim Germans Plan Supersonic Craft

(McGraw-Hill World News)

The official Russian press has renewed its attack on revival of the aircraft industry in West Germany with the assertion that designer Willy Messerschmitt already is laying plans for production of supersonic aircraft.

The publication New Times said that Messerschmitt disclosed a three-stage program for a new German aircraft industry at a meeting of the Rhein-Ruhr-Klub, an association of Dusseldorf industrialists. First stage would include building of training planes of older types under license from friendly countries. Second stage would embrace construction of modern twin-engine and four-engine transports "based on the experience gained by Germany up to the end of World War II." Building of supersonic aircraft would be the final stage.

New Times asserted that actually a fourth stage of German aircraft production is planned—construction of planes equipped to carry German-manufactured atom bombs.



LAST THUNDERJET

The final Republic Thunderjet fighter-bomber to be built, No. 4457, is turned over to USAF Col. Kenneth Garrett by Republic Aviation Corp.'s president, Mundy I. Peale (left), at Farmingdale, N. Y. In background is the Thunderjet's successor on the company's production lines, the new sweptwing F-84F Thunderstreak. Thunderjets are serving the USAF and 15 Allied air forces. The last Thunderjet is the F-84G model.

MacCready is Champ At Glider Meet

Dr. Paul MacCready of Pasadena, Calif., has been named U. S. gliding and soaring champion for the third time, following computation of results of the 20th National Soaring Contest at Harris Hill, Elmira, N. Y., July 7-16. MacCready scored a total of 1,889 points.

Second place was won by Stanley Smith, Lyndonville, N. Y., with 1,677 points and third place was given to Paul Schweizer, vice president of Schweizer Aircraft Corp., Elmira, with 1,574. Steve Bennis of E. Orange, N. J. took fourth place with 1,506 points, and fifth went to Cmdr. G. C. N. Goodhart, England, 1,279 points. New women's champion is Elizabeth Woodward, Riderwood, Md.

The first, third and fourth place winners all flew the new Schweizer 1-23D all-metal sailplane, the production version of the 1-23B and 1-23C. Smith piloted a Schweizer 1-23 and Goodhart flew a Laister-Kaufmann.

Navy Air Chief Visits Carrier Antietam

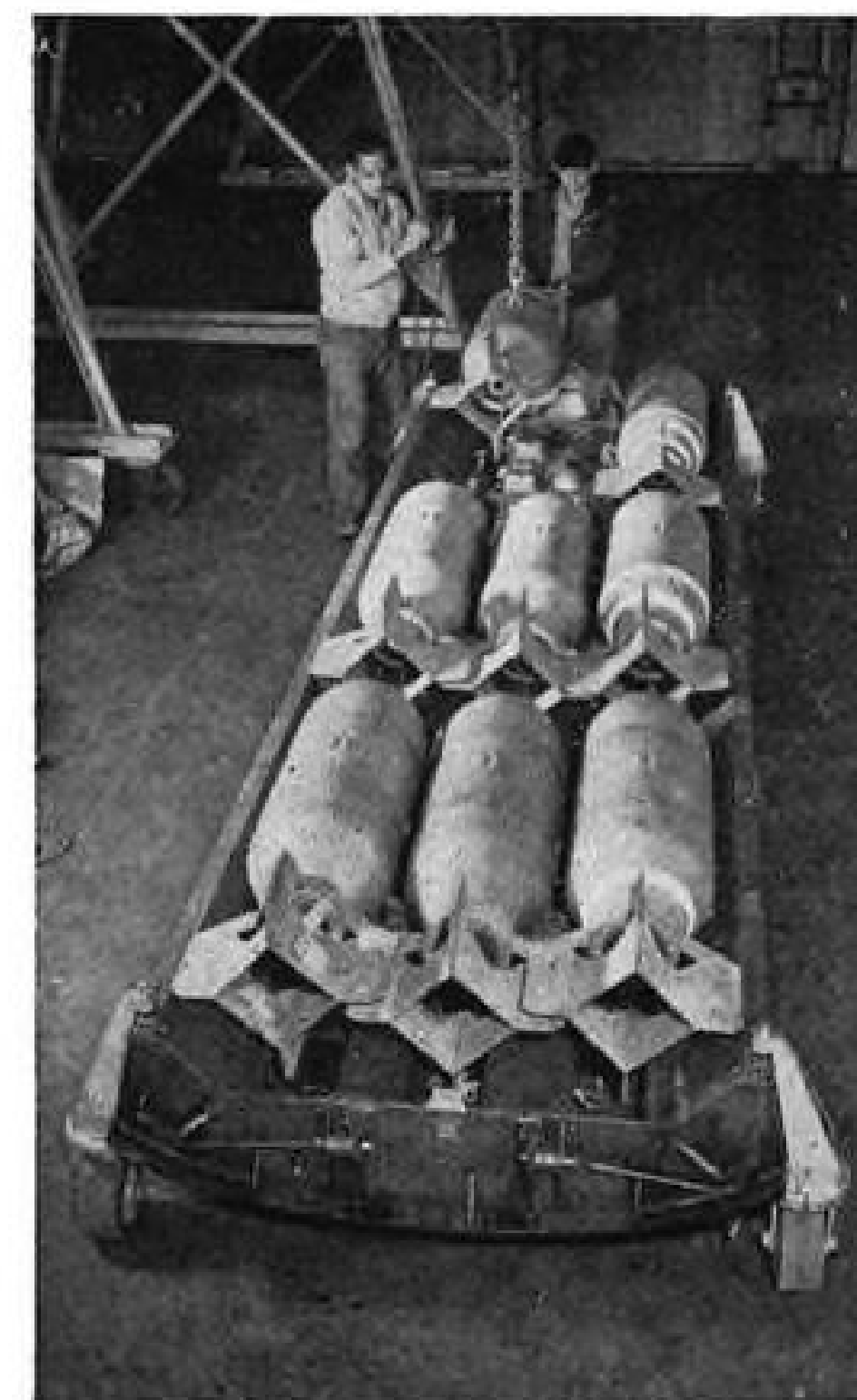
Day before he was sworn in as Navy's new Assistant Secretary for Air, James H. Smith, Jr. was flown down to the canted-deck carrier, USS Antietam, lying off Norfolk. It was the Secretary's first view of a carrier since his Navy service during World War II.

The Essex-class carrier arrived at the Virginia base July 22 following "highly successful" collaborative operations with the Royal Navy off Portsmouth, England, Navy spokesmen said.

Antietam, first carrier converted to canted-deck concept at a cost of \$1 million, is slated for further trials to determine if conversion is practicable. USS Forrestal (AVIATION WEEK Nov. 24, 1952, p. 18) is the first carrier being originally built with two canted decks. It is about one-quarter finished at present.

S-56 Has 5-Blade Rotor

Sikorsky Aircraft's new large S-56 twin-engine helicopter, contrary to some industry reports on the subject, will use the single-main-rotor-plus-tail-rotor configuration, characteristic of earlier Sikorsky machines. The large main rotor will have five blades. The smaller tail rotor will be conventional two-blade design operating in a vertical plane and will not carry any of the load. A reference to the helicopter in AVIATION WEEK (July 13, p. 25) quoting these reports, erroneously stated that the S-56 had two five-blade rotors.



LOADING rotatable bomb door prior to wheeling away for attachment to bomber.



ROTARY BOMB DOOR is shown approximately three-fourths of the way through the 180-deg. turn the device makes to place it into position so the bombs can be released.

New Bomb Bay

- Pivoting door permits fast run over target.
- Off-plane missile loading is feature of the device.

Jet bombers may be able to maintain high speeds while performing accurate bombing runs as a result of Glenn L. Martin Co.'s new rotary bomb-bay door development.

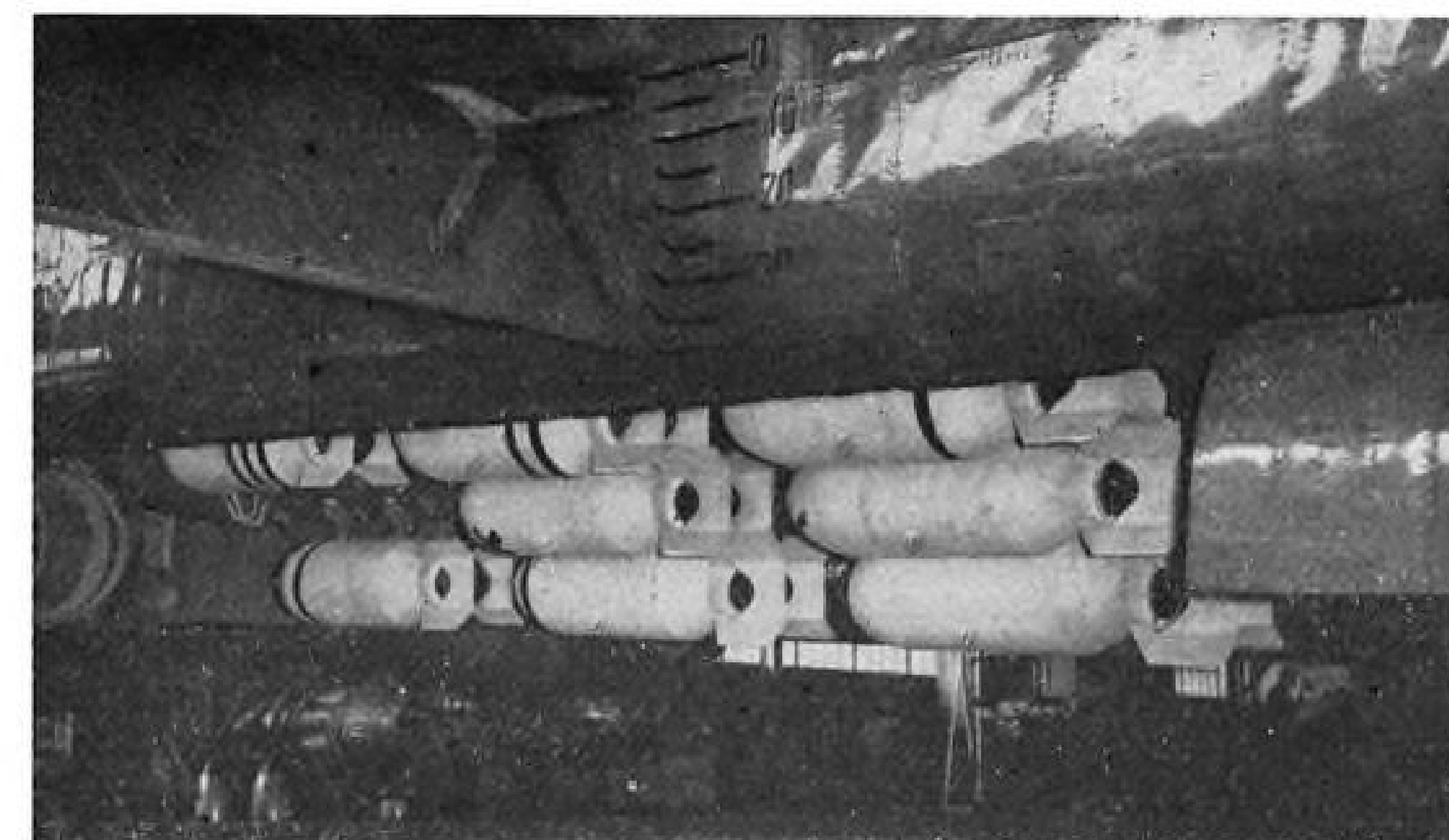
The Martin XB-51 has been fitted with the new door to test what may be the answer to high-level, highspeed bombing.

The new combat device is pre-loaded with bombs or rockets and fitted into the bomb-bay. Over target, the door is rotated 180 deg., placing the missiles in position to be dropped.

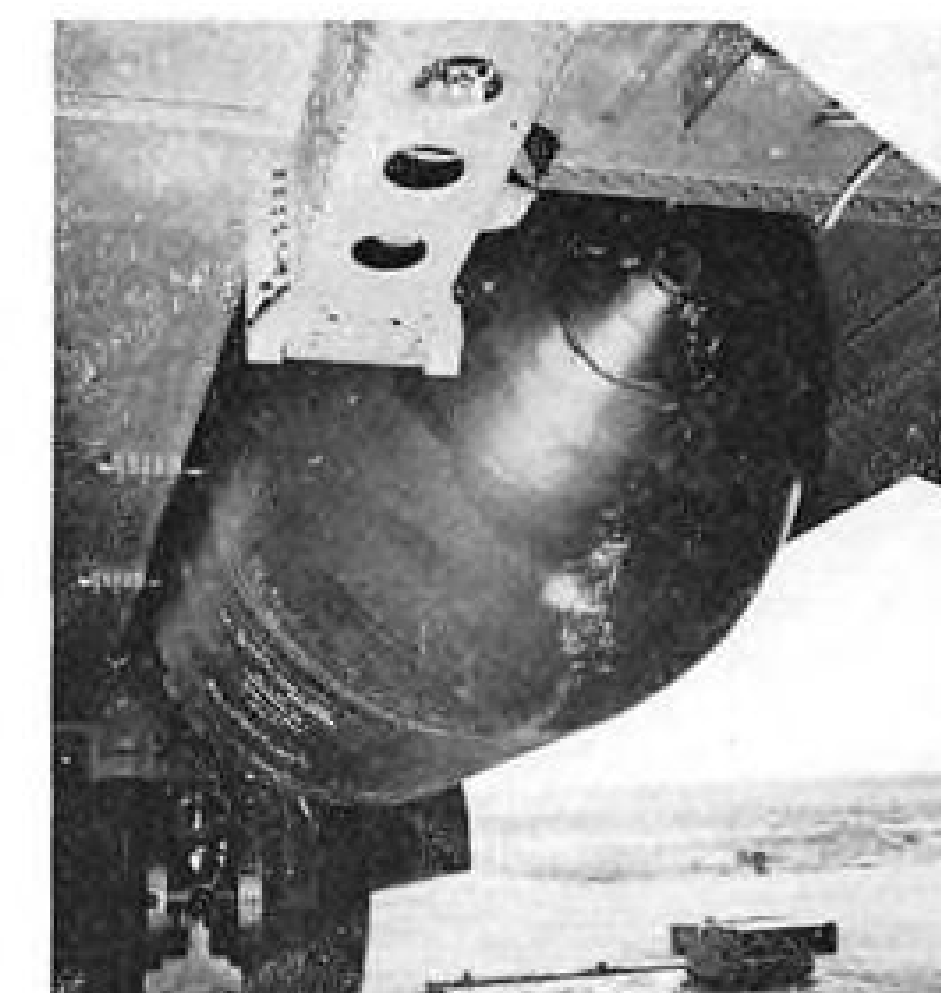
► **No Buffeting**—This decreases air drag experienced with bomb-bay doors in conventional bombers. With the new rotary door, there is no yawning gap in the bottom of the fuselage in which the airstream can play weird tricks. Except for the time involved in opening and closing the door there is no opening in the fuselage.

Big advantage is that no buffeting is experienced and thus there is no need to slow down the airplane to obtain the required stable platform for bombing. By keeping the aircraft at top speed, it is not so vulnerable to enemy fighters and anti-aircraft fire.

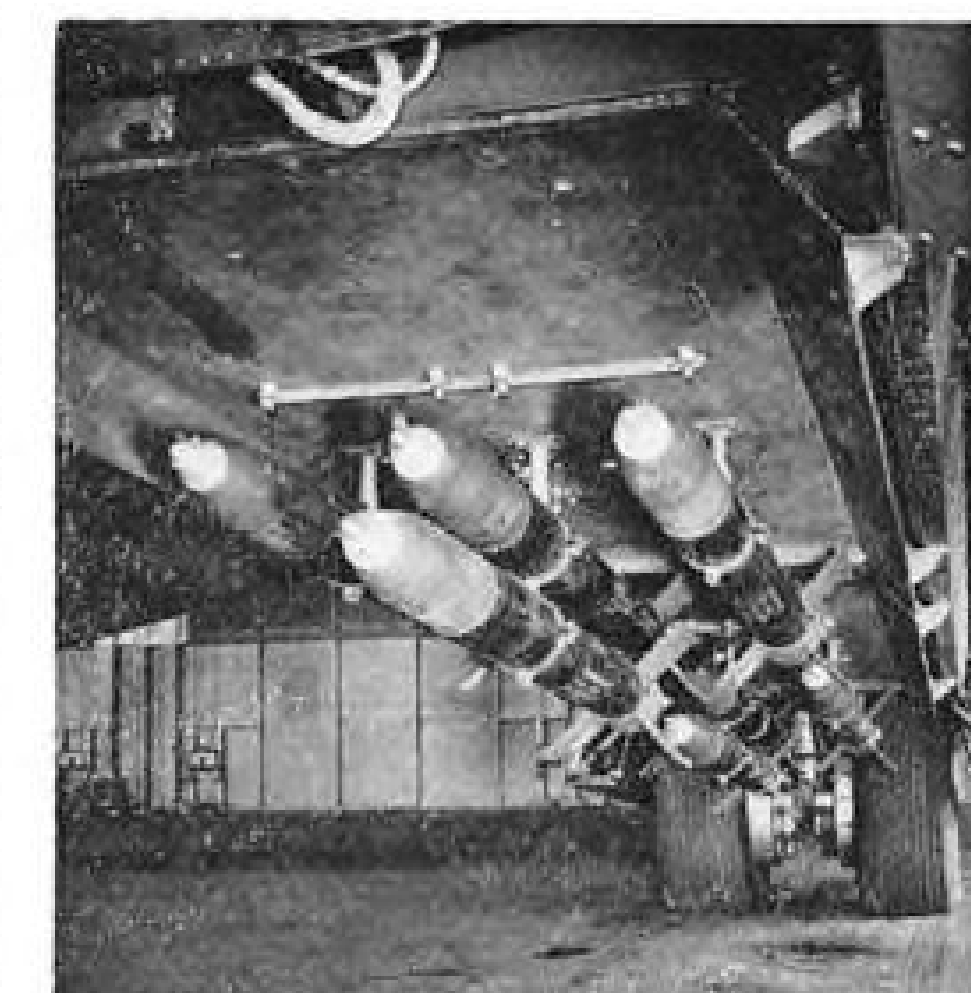
The Martin rotary bomb door turns



SIDE VIEW of rotating bomb door loaded with missiles attached to Martin XB-51 three-jet USAF tactical support bomber. Here the door has not completed its 180-deg. turn.



TWO-TON BOMB is carried externally, other bombs are on door's reverse side.



ROCKET CLUSTERS also can be fitted. Door is fixed here in firing position.

over rapidly. When in operating position, the bombs are externally carried, thus eliminating the hazard of a loose bomb in an open bay.

Tumbling, which usually occurs except with all but very large bombs, is prevented by two air-actuated plungers which "kick out" each bomb or cluster into the airstream in a normal dropping position. The drag air load at the time of release holds the bomb on a radius arm until it is below the fuselage. Possibility of striking the nose of the bomb behind as it falls out is thus eliminated.

► **Block-Busters**—Werner Buchal and Albert T. Woollens, Martin armament engineers, conceived and developed the door. It was patented by Martin in November 1950. The device will undergo months of testing before it is considered for installation in present jet bombers.

The bomb door is adaptable to both rockets and bombs of any size up to 4,000-lb. block-busters. If block-busters are used, two can be carried externally on the bottom of the door. When these are dropped, door is revolved so bombs which have been carried internally can be released.

Latter-type bomb takes a "B"-type door which bulges out of the bottom of the fuselage so the bomb can be completely carried internally. The "A"-type door is not as large but will accommodate all but the biggest-type bombs.

► **Loading**—Out of the airplane, the rotary door is mounted on wheels, loaded, chocked and fused. Wheeled beneath the plane, it is then hoisted into position by using three standard bomb hoists. It is fitted into place so it can be revolved on trunnions at the front and rear ends. Electrical connections are made to the airplane's releasing circuits; the door is rotated to insure

Speed Record

A Navy ferry pilot, in the course of a day's business, recently set a cross-country speed record. But because it was inadvertent and not officially timed by National Aeronautic Assn., it won't be counted.

Lt. Cmdr. George H. Whisler, Jr., pilot with Ferry Squadron 31, Norfolk, Va., flew from Norfolk to San Diego, Calif. and return in 11 hr. 20 min. Total elapsed time between breakfast in Norfolk that morning and dinner back in Norfolk that evening was 14 hr.

Whisler delivered a Grumman F9F-6 Cougar to San Diego, picked up a Douglas F3D-2 Skyknight and flew it back to his home base to discover to his surprise that he had achieved a record. Total air mileage: 4,930 miles.

that all bombs are secure and then closed for flight.

Time for removing a dead door and replacing a live one is short.

Riddle Reorganizes Top Management

New management last week moved in to revamp Riddle Airlines, airfreight carrier operating New York-San Juan and Miami-San Juan schedules.

William R. Boyd, former president of Florida-based nonsked All-American Airways, brought in a new team to succeed short-term Riddle president Jean Helvey. Helvey succeeded John Riddle as president three months ago.

► **Finances**—Riddle's balance sheet of

May 31 reveals negative working capital of \$139,000 (excess of current liabilities over assets).

An earned surplus deficit of \$219,000 indicates the steady attrition of small monthly losses eating into net capitalization (capital stock equity less the earned surplus deficit) was \$201,000 as of May 31.

However, Riddle had no long-term debt as of May 31 and has been showing small profits on its operations in some periods. The company earned \$22,000 during the first quarter, lost \$21,000 in May.

For the 12 months ended May 31, Riddle lost \$12,000 on operating revenues of \$1,871,000, of which \$1,649,000 was scheduled airfreight revenue.

► **New Team**—Moving in with Boyd is vice president P. H. Mann, formerly of nonsked American Air Transport; treasurer D. G. Bash, formerly with National Airlines, and secretary A. H. McClean.

Directors now include Boyd, Mann and McClean, and Fletcher Godfrey, W. H. Cauley, George Martin, J. A. Perkins and Benjamin Turner.

► **Route Applications**—Riddle got its present U.S.-Puerto Rico routes from Civil Aeronautics Board in 1951. The cargo carrier recently applied for several new routes.

They include:

- U.S.-Venezuela, from Miami, New Orleans and Houston via Central America and northern South America points.
- Florida-California, via many intermediate cities.
- San Juan-Trinidad.

Earlier route applications on file:

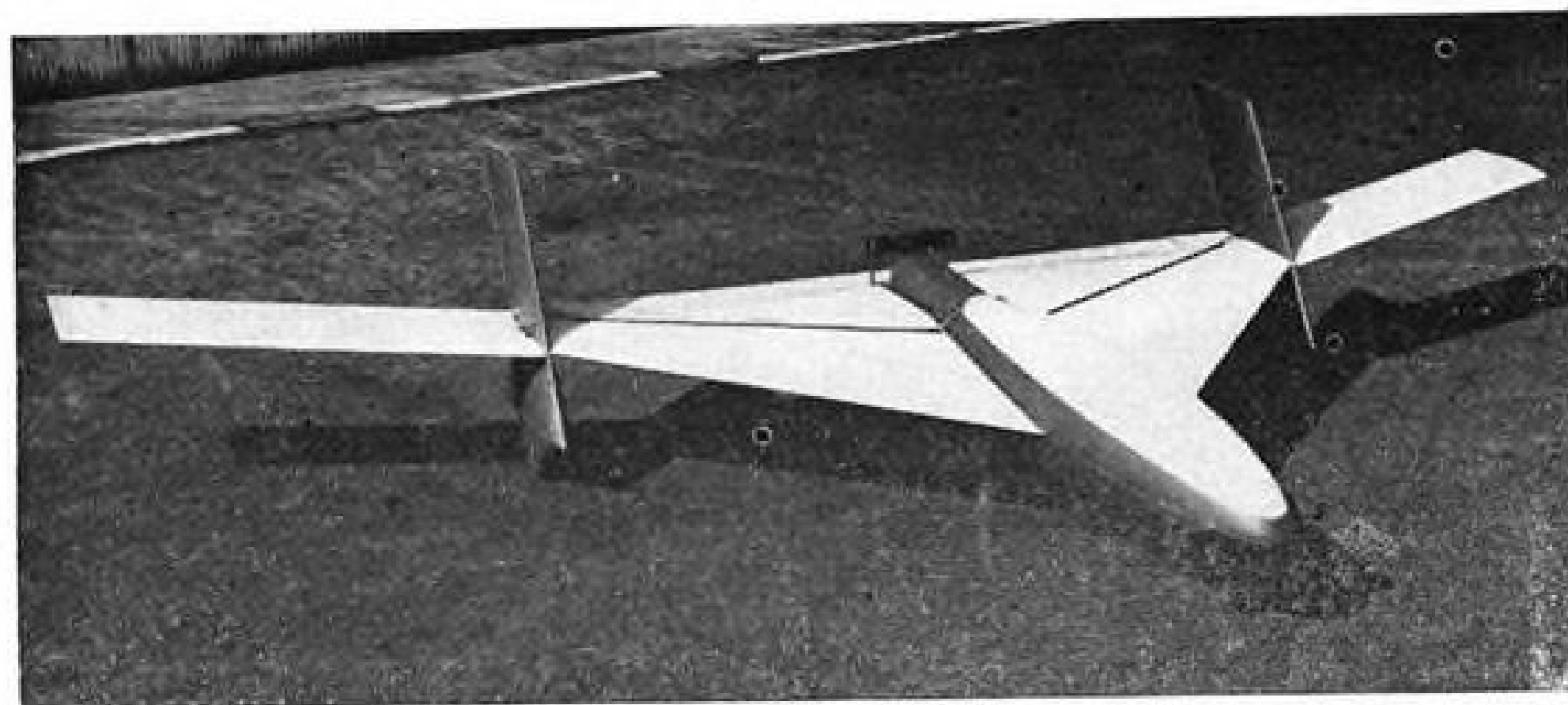
- U.S.-Brazil-Argentina.
- Northeast-Gulf States, via certificated routes of U.S. Airlines—another airfreight company.

Supercharger Vapor Fills Connie Cabin

Failure of a cabin supercharger in a Trans World Airlines' Lockheed 749A Constellation shortly after takeoff July 22 filled the plane's cabin with atomized oil vapor resembling smoke, AVIATION WEEK has learned.

The transport had taken off from New York's Idlewild International Airport for Europe and was at 14,000 ft. over Montauk Point, N. Y. when the incident occurred.

Because there was no indication on the temperature gages as to which of the two AiResearch superchargers was at fault, the crew disconnected both and the cabin cleared of vapor. The plane made a normal landing at Idlewild. Cause of the failure is being investigated.



BRITISH TEST 'FLYING WING' TARGET

Designed to give jet pilots gunnery practice at high speeds, this 25-ft.-span tow target is being tested in England. Built by Air Service Training, Ltd., Hamble, Southampton, it features all-metal stressed-skin construction filled with a plastic resin that provides strength in place of normal structural mem-

bers. Note the sharply swept inner portions of the wing and the constant chord outer sections, twin fins and fixed tricycle landing gear. The target has an air brake, seen extended at the upper rear of its fuselage. It also is fitted with a parachute to assist landing after release from the tow plane.



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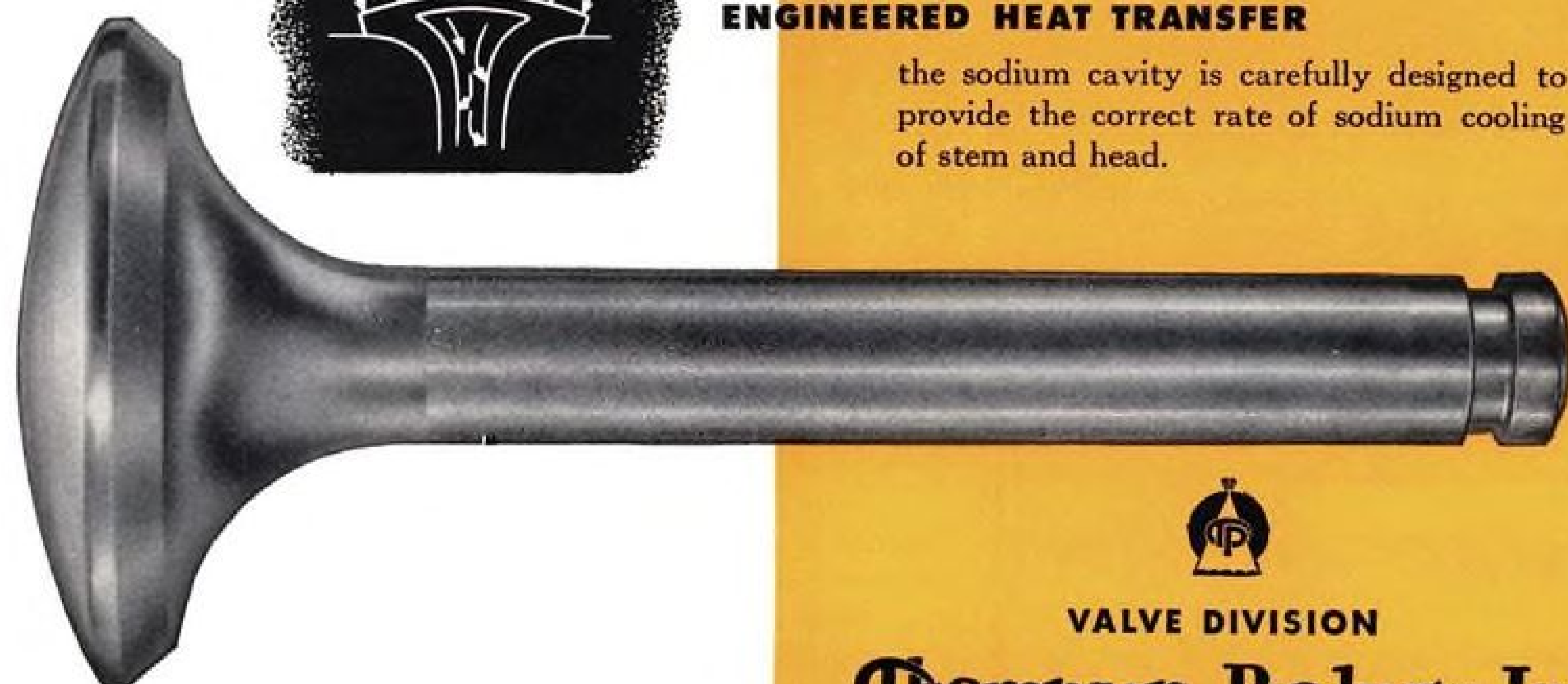
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CESSNA 170'S V-BELTS are still usable after more than 800 hours running time.

Belt-Drive Prop Ups Cessna Climb

Considerable reduction in engine noise and vibration and a noticeable improvement in performance of a Cessna 170 have been recorded by Cessna pilots during service testing of a V-belt propeller drive fitted to a 145-hp. Continental engine in the personal plane.

The modification includes fitting the Cessna with a 92-in. McCauley propeller having 70-deg. pitch. The 170's standard prop is 76 inches. The shaft was offset to allow use of the larger prop without sacrificing ground clearance.

During a series of sawtooth climbs by Cessna pilots, the belt-driven 170 showed a 12% increase in climb performance compared with conventionally powered sister planes. Further improvement in flight characteristics can be expected using a propeller specifically tailored to the job, Cessna notes.

Eight synthetic fiber V-belts are used, $\frac{3}{8}$ -in. wide, $\frac{7}{8}$ -in. thick and 41 in. long. The large multi-groove propeller pulley is 9 in. in diameter and the driver pulley is 6 in. in diameter. Belt tension is maintained by adjusting a simple mechanism which permits the prop pulley to be moved in relation to the crankshaft pulley.

More than 1,000 hr. of service testing was carried out on the propeller drive system. Stationary test bed trials of 150-hr. included a 25-hr. full throttle run, after which Continental Motors received a type certificate for the installation from Civil Aeronautics Administration.

The belt-driven propeller program was conceived by C. A. Hulsemann, manager of the Landing Gear and In-

dustrial Brake Departments of Good-year Tire & Rubber Co.'s Aviation Products Div. The program was set into motion following consultation with James Kinnucan, Continental Motors vice president; Tom Salter, vice president-engineering for Cessna; and Sid Gamsu, vice president of McCauley Propeller Co.

Nonskeds Gain Favor In Fight With CAB

Non-certificated airlines got increasing congressional support last month in their fight against the CAB policy of revoking their licenses for operating scheduled services.

Speeches from the floor by Sens. John Sparkman, Wayne Morse and Thomas Hennings and by Rep. Craig Hosmer hit the Board's enforcement of regulations allegedly restricting nonsked business by administrative fiat, without right of adjudicatory hearing. And they hit the Board's alleged piling of one regulation on top of another in direct moves to stop their expanding business competitive with certificated lines.

Main inspirations of these speeches: • **North American Airlines**, biggest domestic nonsked, fought back at CAB, which is pushing enforcement action against NAA for doing business, in effect, as a scheduled, certificated airline. The large nonsked had won a temporary stay order against the CAB proceeding, issued by the Federal District Court in Washington.

• **Sen. Edward Thye**, Small Business Committee chairman, wrote CAB asking it to "defer any further steps in processing of economic enforcement proceedings until after our report has been submitted (within a few weeks) and the Board has had a chance to consider it."

► **Congressmen Speak**—Excerpts of congressional criticism:

• **Sen. Sparkman**, speaking of CAB action against six major nonskeds: "It strikes me as particularly significant that these carriers, the successful ones, ones who have demonstrated their efficiency and their ability to serve the public convenience and necessity, are just the ones singled out by the CAB for punishment."

• **Sen. Morse**, after saying CAB concocted the regulations to prevent successful independent airline operation: "It would be impossible for any operator to fly large aircraft on the basis of irregularity and infrequency and still maintain any kind of adequate public service." He added: "The CAB knows this better than anyone else, yet it has designed a series of snares, traps, tightropes, and pitfalls in the guise of economic regulations . . . so arbitrary and divisive that carriers have been com-



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Long-stem Bayonet Type, used with AN4076 fitting, is similar in construction to the cylinder-head type except probe is $3\frac{3}{8}$ inches longer, for special applications.

In addition to those illustrated, we manufacture bulbs for special applications to individual specifications.

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Airmail Rates

Airlines' hopes to hold the price of airmail at 6 cents an ounce rose last month as Postmaster General Arthur Summerfield's move to raise both air and first-class mail one cent hit rough going in Congress.

Republicans of the House Post Office Committee tried to block consideration of Summerfield's postal rate increase until next January.

Meanwhile, Air Transport Assn. reported airmail volume has increased less than 1% so far this year, whereas it almost doubled from 1950 to 1952. Implication may be that an increase in airmail rates now might reduce volume and hence fail to yield the \$15-million revenue increase anticipated by Post Office.

In the first five months of this year, domestic trunklines hauled 28.6 ton-miles of airmail, compared with 28.4 a year ago and 17.4 three years ago.

pelled to violate them in order to stay in business."

• **Sen. Hennings**, after receiving letters from North American Airlines employees and customers in his home state of Missouri: "I must say, on the basis of considerable evidence referred to by the senator from Alabama (Sparkman) and on the basis of the questions which he raised in his speech . . . I am compelled to express great concern over the administration of the Civil Aeronautics Act by the Civil Aeronautics Board."

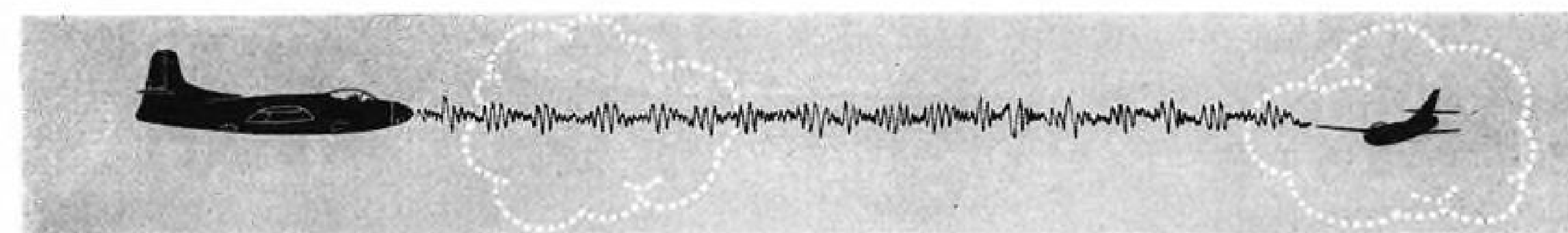
• **Rep. Hosmer**, speaking of CAB action against North American and against California flower growers to cut air-freight costs by consolidating their cargoes: "It seems to me that the CAB's actions in these cases are examples of an administrative agency assuming powers and prerogatives beyond that intended by Congress."

T35 Costs

Air Force reported to Senate Appropriations Committee that \$26.3 million was spent in development and production of the Curtiss-Wright T35 turboprop engine. The project was canceled after delivery of only 17 engines, USAF said, "in order to conserve funds since the Air Force decided to rely on Navy developments in this area and since developments . . . indicated even higher performance engines were required."

Radar eyes see in darkness, storm, or fog

to lock this twin-jet fighter on its prey . . .



—the Douglas F3D Skyknight

Out of Korea come new reports of the Douglas F3D Skyknight in action, downing Migs for the United States Marine Corps during advanced night and foul weather operations.

Designed for the U. S. Navy, the all-weather Skyknight flies at near-sonic

speeds, operates from aircraft carriers as well as small advanced airfields. A side-by-side seating arrangement of pilot and radar operator results in closer combat teamwork—permits Skyknight's modern radar search and fire control equipment to be operated with maximum efficiency

when against marauding enemy planes.

Performance of F3D Skyknight in action is another example of Douglas leadership in aviation. Planes that can be produced in quantity to fly faster and farther with a bigger payload are a basic rule of Douglas design.



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JAL to Start Pacific Flights This Winter

Japan Air Lines plans to start trans-
Pacific DC-6B service next winter in
competition with Pan American, North-
west, Philippine and Canadian Pacific
airlines.

Transocean Air Lines crews will op-
erate the flights. United Air Lines is
concluding an agreement with JAL to
handle food service and maintenance
on West Coast end of Tokyo-San Fran-
cisco route. UAL also will train stew-
ardesses for the new airline.

JAL now has 1 billion yen (\$2,770,-
000) capitalization—partly through con-
troversial merger contracts with former
rival groups. Another billion yen will
be contributed by the Japanese gov-
ernment.

►How It Started—JAL itself was set
up by government merger of various
interests two years ago and has flown
domestic service since. Northwest and
Transocean operations and mainte-
nance contracts helped get JAL started
and Transocean still operates JAL
flights under contract.

Rival groups reportedly merged with
JAL:

• Osaka Shosen shipping interests
(OSK) have a contingent operating
contract with California Eastern Air-
ways.

• Iino Kaiun shipping interests (IKK).

►Control in Dispute—A financial-po-
litical battle apparently rages over how
much participation each group does
and/or will have in the merged com-
pany. JAL executive director Yoshito
Kojima told a San Francisco press con-
ference that company stockholders
have 880 million yen, OSK 50, and
IKK 40. Another JAL source reported
holdings of 920, 50 and 30 million yen
respectively.

A source close to the OSK inter-
ests said that group does or shortly
will have effective control with 400 mil-
lion of the billion-yen capitalization,
while IKK will hold 100 million, and
35 individual JAL stockholders will
share the remaining 500 million yen.

Some observers speculated that part
of the disputed claims stemmed from
desire to manipulate stock market
values, while others said the main rea-
son was that relative participation by



B-47 CARGO SPACE

Prior to flight of the 306th Bomb Wing
from MacDill AFB, Fla. to England (Avia-
tion Week June 15, p. 7), the B-47 airmen
surveyed their planes to determine where
they could stow needed spare parts and
other equipment. Photos above and at right
show what they worked out. Top picture
shows an extra engine nose cone being
lashed down in the plane's Rato compart-
ment, which has been cleared of rocket
brackets and other equipment. Photo (right)
depicts how B-47 external fuel tank was fixed
up to take cargo. Two access doors were
cut in the side. Plywood flooring has been
fitted and tiedown rings may be seen at-
tached to the lower portions of the formers.
This fuel tank revision was not used on the
hop to Britain. Some Stratojets carried spare
engines and other materiel in bomb bays.



the three groups is still unsettled.

►Would Copy IATA Group—Kojima
representing JAL management, said
"for fares, rates and safety regulations,
we will follow the International Air
'Transport Assn. standards."

But, he added, "we confidently hope
that... fares will be substantially low-
ered as from April 1954, to cope with
the recent trend of air travel—more
passengers at less travel costs."

JAL plans to open its main U. S.
office at San Francisco and a branch
office in Honolulu. Company plans
to start two Tokyo-San Francisco flights
a week on or about Nov. 1, with a fleet
of three Douglas DC-6Bs. First Douglas
was slated for delivery the end of last
month.

JAL will start Tokyo-Okinawa service
at the same time, and plans to start
San Francisco-Sao Paulo service soon
thereafter.

Japan Air Lines says its fleet (now
six DC-4s) will be increased to seven
Douglas DC-4s, seven Douglas DC-6
types, three de Havilland Herons and
two de Havilland jet Comet 2s.

Lean Board Budget May Curb Staff Study

Civil Aeronautics Board must cut
\$90,000 from its present annual level
of activity—almost all in staff salaries.

Both House and Senate slashed
\$50,000 from last year's CAB budget of
\$3.8 million. The Board must pare an
additional \$40,000, amount of the
general salaries increase due to pro-
motions from fiscal 1953 to 1954. That
leaves a \$90,000 gap.

CAB plans to make the cuts quickly
to avoid overspending its budget in
the early months of the new fiscal year
that started July 1.

A few Board members talk of
eliminating some staff study and anal-
ysis. One member says there are more
statistics being prepared than there are
persons to digest and act upon what-
ever significance the figures may have.

Philippine Air Lines Cuts Group Fares

(McGraw-Hill World News)

Manila—Philippine Air Lines has in-
augurated a group travel plan on its
domestic routes whereby a party of five
leaving together from the same point
of departure to the same destination re-
ceives a 20% discount on roundtrip
tickets. The idea replaces the "family
fare" plan used by the carrier during
July-September for some years.

The group travel plan is effective only
on Tuesdays, Wednesdays and Thurs-
days, the traditionally slack periods in
Philippine traffic.

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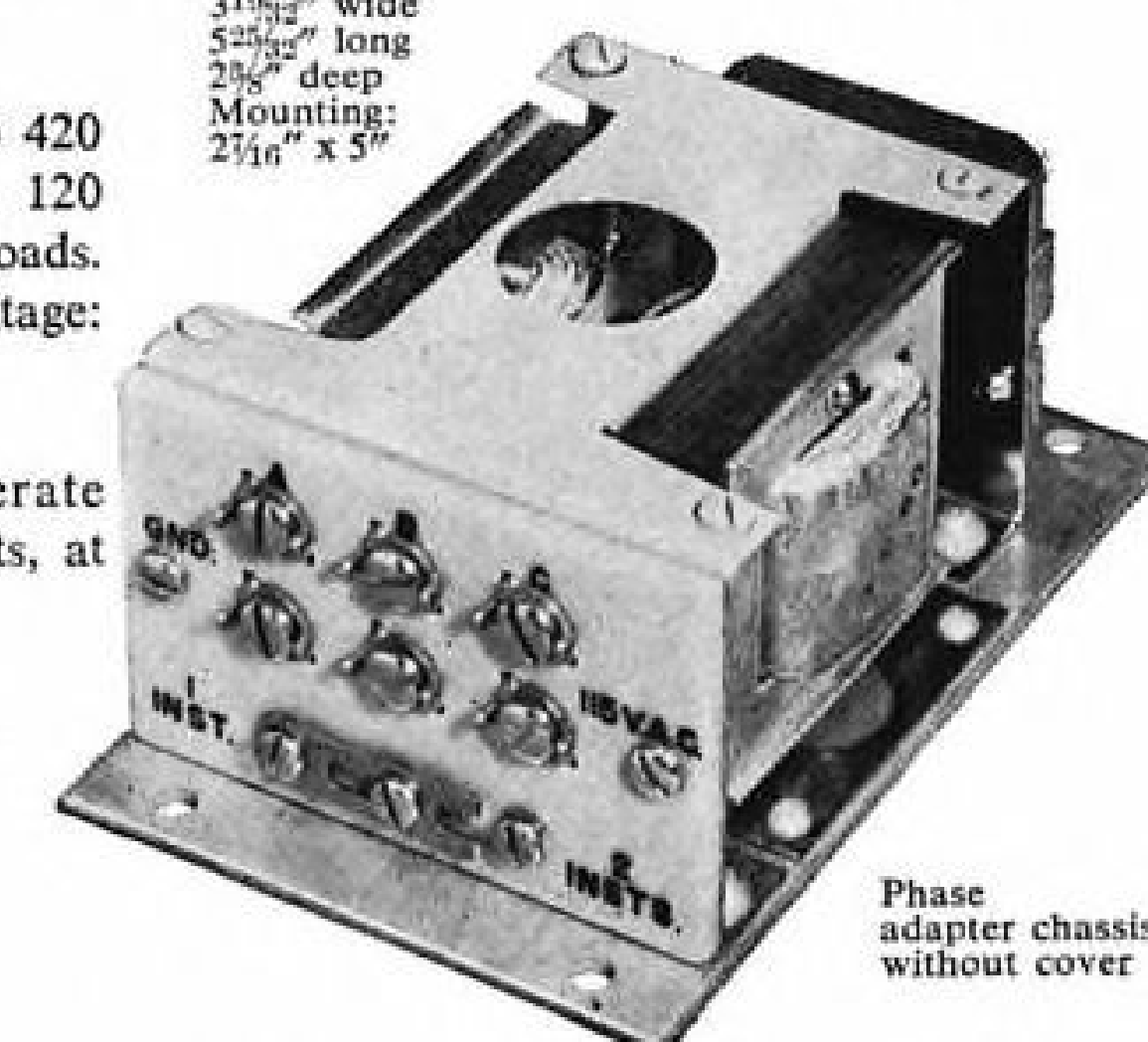
Will operate either one or two—GE
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Attitude Gyro, Gyrosyn Compass,
Roll Stabilizer or Pitch Stabilizer (with
starting loads up to 125 VA)

Input—110 to 120 volts. 380 to 420
cycles. Single phase. Output—120
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1000 volts RMS.

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from -60°C to +71°C ambients, at
altitudes up to 50,000 feet.

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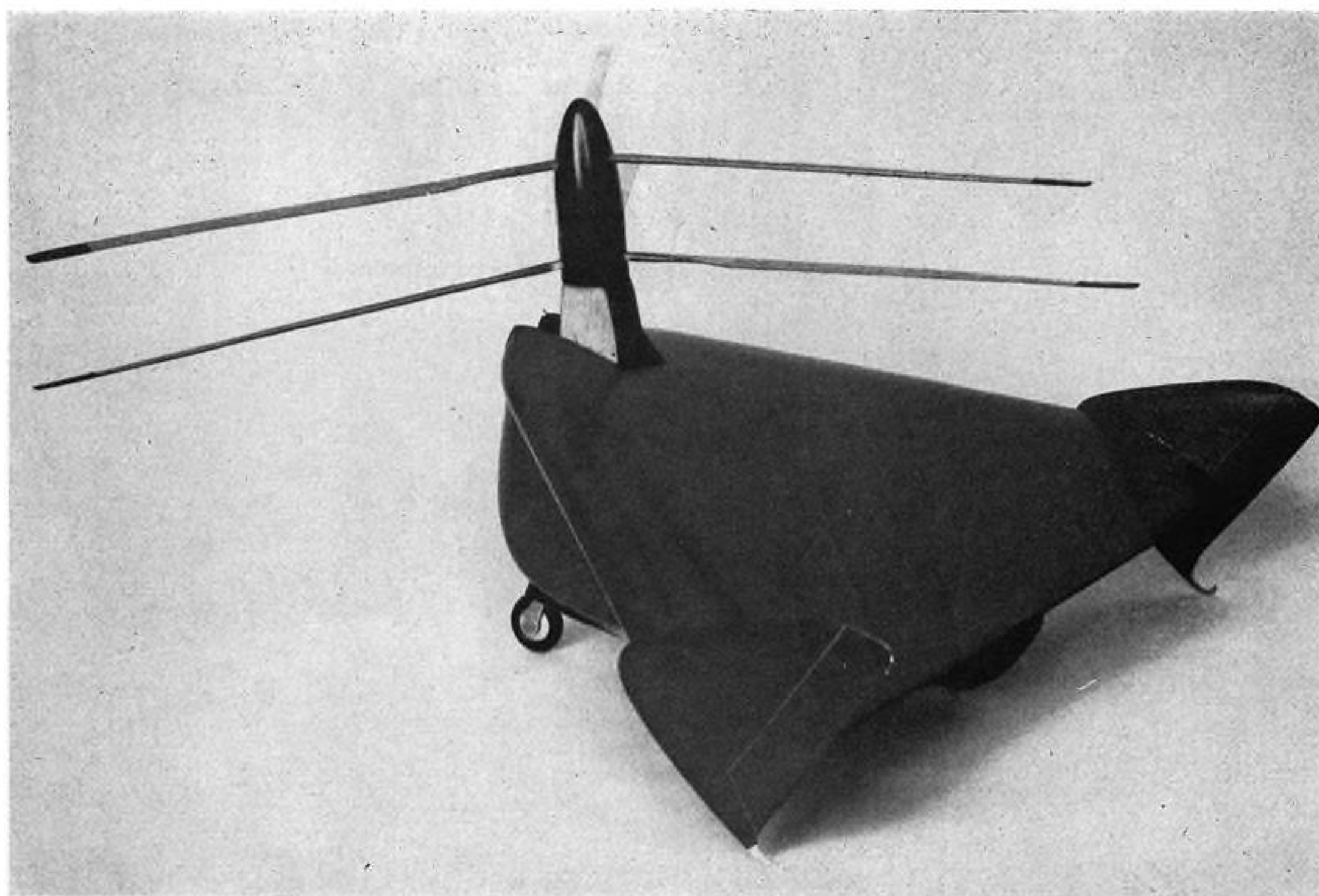
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Delta Convertiplane May Hit 700 Mph.

Radical craft mounts large coaxial propeller-rotor that swings from horizontal to vertical position.

By William J. Coughlin

Los Angeles—An unusual delta-wing convertiplane is under private development by a group of California engineers, who predict that the prototype—now under construction—will be ready for test flight this year.

The convertiplane will employ a large coaxial propeller-rotor mounted at the nose, which can be swung from a horizontal to vertical position as the craft shifts from vertical to forward motion.

The development group is headed by Franklin A. Dobson, in charge of structural research and development for guided missiles in the aerophysics lab of North American Aviation. Dobson formerly was chief engineer for the Helicopter Div. of Aeronautical Products, Inc., Detroit, and project engineer in charge of Waco Aircraft's wartime glider program. He worked as assistant chief engineer at Brooks and Perkins, fabricators of magnesium air-

craft parts, prior to joining North American.

► **Proven Principles**—The prototype under construction will be a two-place craft powered by two McCulloch 4318 target engines, developing 70 hp. each. Delta wing and the unusual propeller shift will be the distinguishing features of the Dobson convertiplane.

"Although radical in appearance, our aircraft is based on proven engineering principles," Dobson says. "It shows a new and simple way to combine the vertical takeoff of the helicopter with the high performance of the airplane."

► **Private Project**—Dobson has applied for patents on the design—a private project not sponsored by North American, although most of the design group are NAA employees.

The designers expect the prototype to achieve a maximum speed of approximately 172 mph. in level flight, a maximum climb of 1,950 ft./min.

Although the Dobson convertiplane

is designed principally as a civil aircraft, Dobson says one design study has indicated that a military version of the unique craft might be capable of a top speed of more than 700 mph.

Speed is limited only by available power once the propeller is in the forward position, he asserts.

► **Smooth Transition**—One of the main design problems centered on the unusual gearing necessary to permit swinging of the propeller shaft around the transverse axis from vertical to horizontal position.

Dobson prefers to withhold details of the solution pending flight test of the prototype, but it involves a series of belts as well as a gear box.

Twin rotors, each with three rigidly mounted blades, will be used. Collective, cyclic and differential pitch controls may be provided (although a commercial design calls for no pitch or cyclic controls). Connected with conventional airplane controls, these are expected to allow smooth transition between vertical and forward flight conditions.

► **Critical Conversion**—In operation,

Dobson Convertiplane

- Gross weight.....1,100 lb.
- Empty weight.....660 lb.
- Useful load
440 lb. (20 gal. fuel; 2 men
@ 160 lb.)

- Wing area.....112.5 sq. ft.
- Wing loading.....9.78 psf.
- Aspect ratio.....2.0

- Rotor diameter.....16 ft.
- Rotor area.....201 sq. ft.
- Disk loading.....5.47 psf.

- Horsepower
120 rated, 144 emergency
- Power loading.....9.16

- Maximum speed, level flight,
rated power...172 mph.
- Maximum speed, level flight,
emergency power...187 mph.

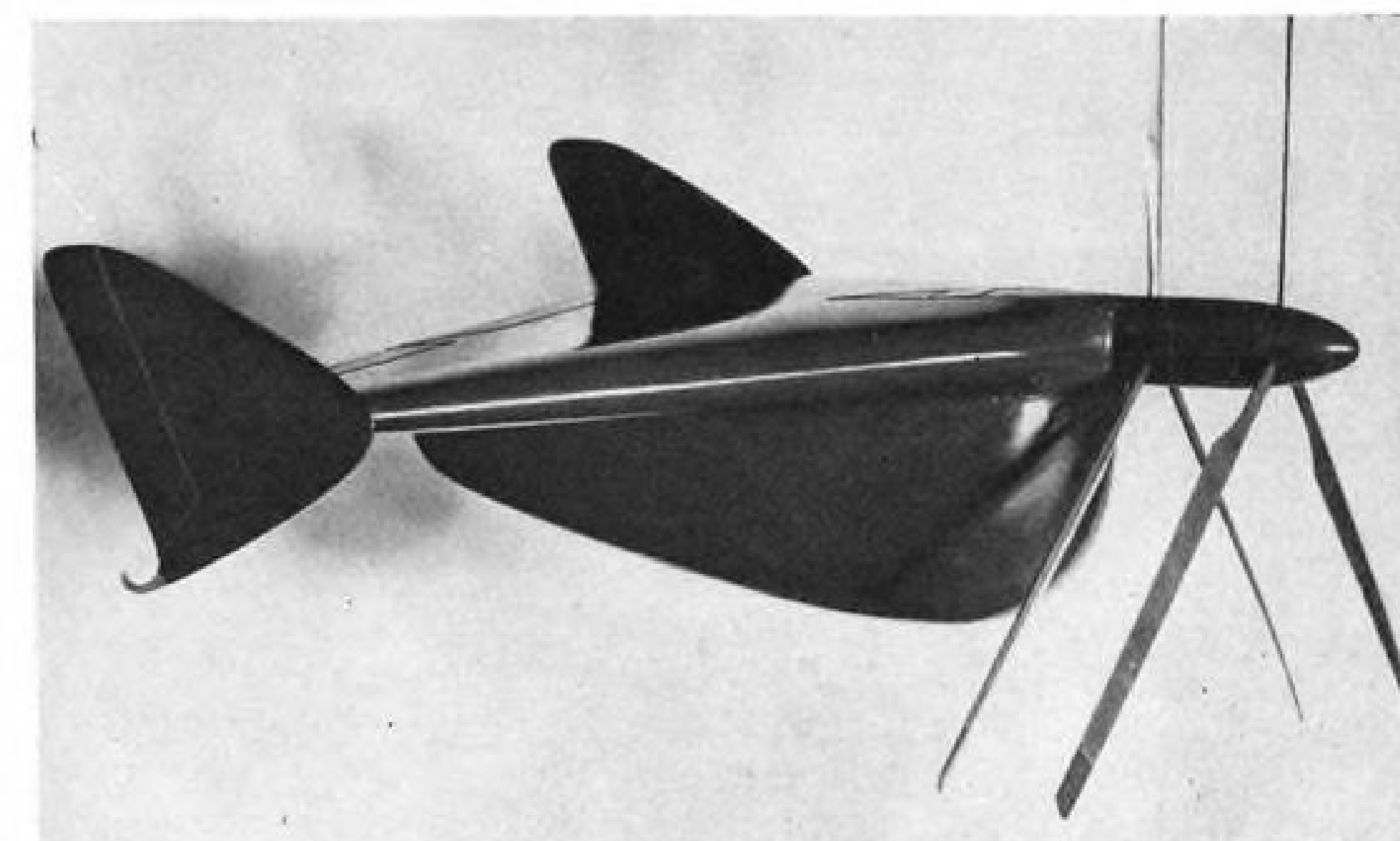
- Maximum climb...1950 ft./min.
- Speed for max climb...60 mph.
- Power required to hover...97 hp.
- Min. power required...42 hp.
- Endurance.....2.84 hr.
- Range.....225 mi.
- Min. sinking speed,
power off...21.2 ft./sec.

the Dobson convertiplane is expected to work like this: with the rotor shaft in vertical position, the craft will take off at a high angle of attack as power applied to the rotors lifts the front of the ship. The craft will pivot about skids until the center of gravity is below the rotor and then will begin its vertical climb. When sufficient altitude is attained, the propeller is swung forward while the craft accelerates until the wing can support the entire weight.

Although the combination of a delta wing and a conventional helicopter rotor proved unstable during this critical period of converting from helicopter to airplane flight, Dobson and engineers working with him believe the rotor, as developed, will overcome this difficulty.

With the propeller swung forward ahead of the point of the wing, the clean design is expected to give low drag and high efficiency at cruising speeds. When landing, takeoff procedure is reversed: propeller swings back until forward speed is arrested, and a vertical descent is made. Airspeed on landing is estimated at 20 mph.

"The delta wing used is efficient at high speeds and stable up to high angles of attack," Dobson says. "In the low speed range, where the delta would



SCALE MODEL of convertiplane shows propeller-rotor position during forward flight.

be inefficient, the rotor provides efficient operation and high rates of climb.

"The method of takeoff, in which the wing is tilted up to a high angle with the ground, minimizes interference with the rotor downwash. However, when resting on the ground, the aircraft has a low, stable center of gravity which gives maximum safety in landing."

► **Designed for Safety**—The slowly rotating propellers are expected to result in quiet, smooth operation. Occupants of the craft are located in a fuselage below the wing in normal seated position. An earlier experimental design called for a single prone pilot but was rejected in favor of the two-place prototype.

Dobson cites as an important safety feature the fact that all parts of the aircraft are clear of the plane of rotation of the blades at all times.

Landing gear consists of skids at the wing tips and two swiveling wheels at the front on long-travel oleos. The gear, using heavy rubber shock absorbers, telescopes into the fuselage. Stabilizing wing skids are expected to give a wide base to prevent overturning. Swiveling nose wheel will straighten out the craft during a ride-drift landing.

Dobson says safe power-off landings can be made with both the wing and the rotor contributing lift for a 21.2 ft./sec. minimum sinking speed.

The design group expects the prototype to maintain flight on either of its two engines.

► **225-mi. Range**—Vertical stabilizing surfaces and rudders are located at the wing tips. Pitch and roll control comes from elevons connected to a conventional control stick.

Wingspan of the prototype is to be 15 ft. with an overall length of 13 ft. 9 in. Rotor blade diameter is 16 ft. Height of the craft will be 6 ft.

3 in. Specifications calls for a 20-gal. fuel load, giving a 225-mi. range and 2.84-hr. endurance. Empty weight is expected to be 660 lb.

The delta wing, with its long root chord, acts as the main structural member of the fuselage. Engines and rotor gears are mounted in the wing.

► **Driveway Landing**—Dobson says the design effort has been concentrated on a model for the private owner, combining small size and rugged construction with safety, ease of operation and simple maintenance.

"Although the present model is designed for safe operation and simplicity rather than maximum performance," Dobson says, "it will have a cruising speed considerably higher than most of the two-place ships now on the market." The convertiplane will be small enough for the owner to land on his driveway and park in the garage, he adds.

Military versions under consideration include a high-speed four-place Army personnel transport and a two-place Air Force reconnaissance type. Dobson says the military has expressed interest but has advised him to build a prototype before seeking contracts.

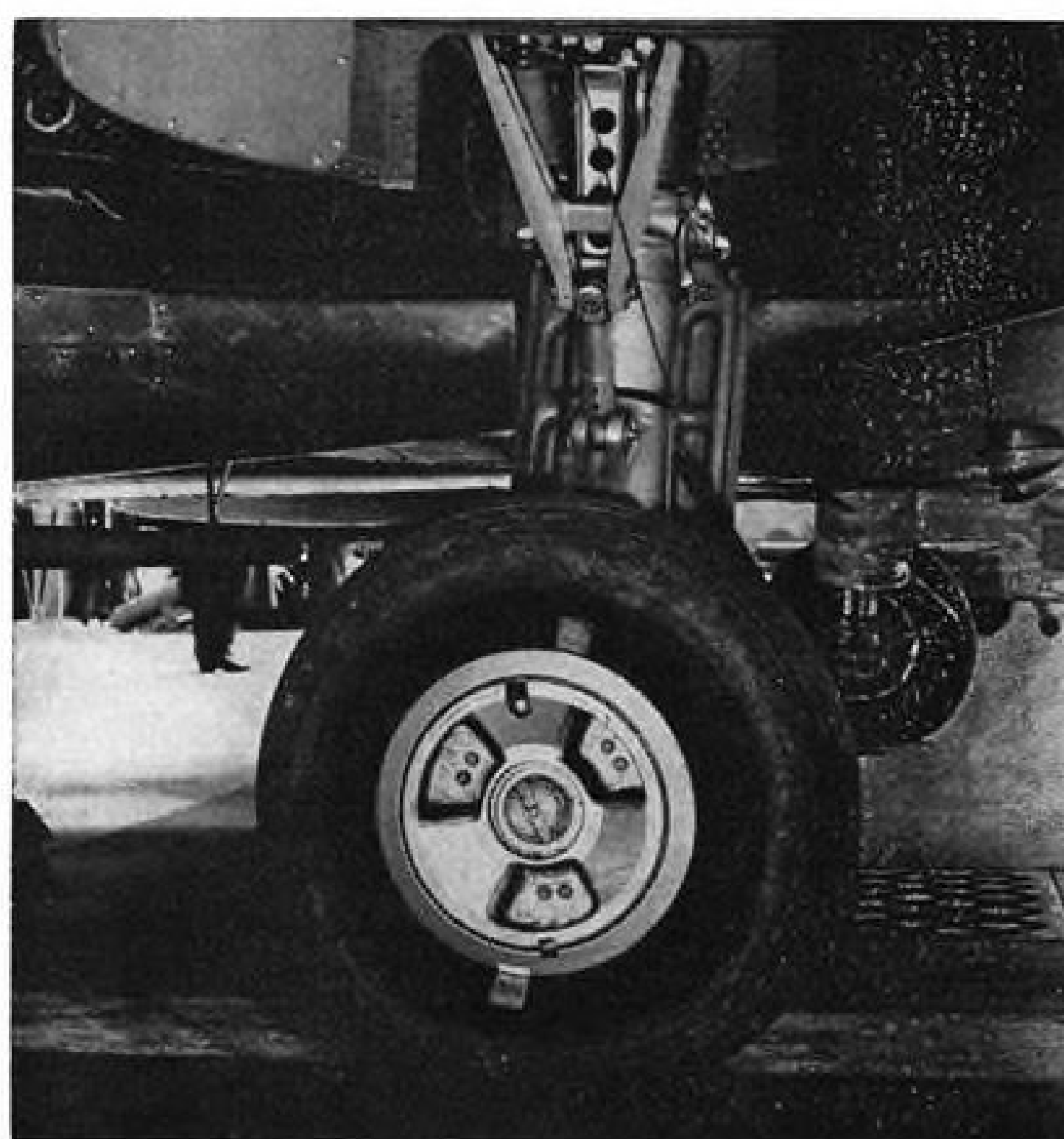
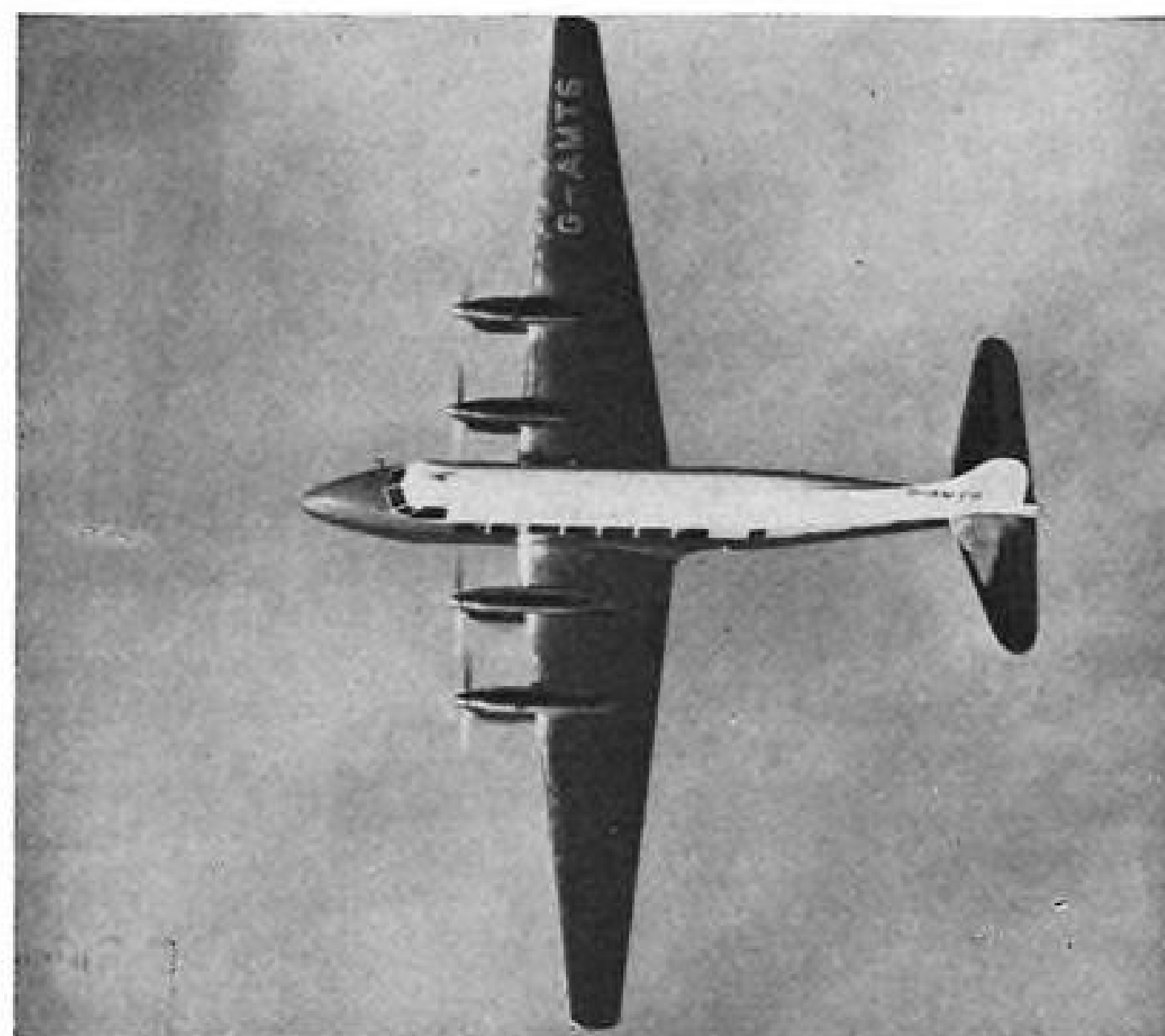
► **Prototype Progress**—Work on the prototype now is underway. The gear box is 75% complete, wing is half-built and the fuselage is "under construction," according to Dobson. The prototype will have a wooden wing with a steel tubing fuselage. If it is successful, late models may use plastics in large quantity.

Majority of the mechanical design on the convertiplane is being done by Hiram Sibley, an engineer in the rocket motor development lab at North American. Aerodynamics of the craft is the problem of John Guthrie, supervisor of aerodynamics at the North American aerophysics lab.



Retractable Gear Raises Heron 2 Speed 20 Mph.

Encouraged by the success of the twin-engine Dove in the U. S., de Havilland will send to this country this fall a demonstrator of the plane's latest successor—the Heron Series 2. This plane, a four-engine transport, incorporates retractable landing gear (not fitted in the Heron 1) which raises cruise speed by 20 mph. First group of the Heron 2s to be manufactured have been earmarked for the U. S. market. Considerable interest has been evidenced for an executive model of the plane (\$160,000 fully equipped), it is reported. The Series 2 will show to better advantage than the Series 1 on the longer stages, DH says, where the saving in fuel from lower drag will more than balance extra weight (165 lb.) of the retractable gear. At 8,000 ft., recommended cruise speed will be 185 mph., compared with 165 mph. for the Series 1. Both retractable gear and brakes are pneumatically powered.



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PAINSTAKINGLY produced to be optically perfect—the cockpit canopy on the new Republic F-84F Thunderstreak jet assures the pilot there will be no distortion in his line of vision.

Big reason for this is the manner in which Goodyear Aircraft builds these canopies—an especially noteworthy achievement because they are the first double-walled canopies produced in America.

And being double walled, with an airspace between the two shells to prevent fogging and internal frosting, these canopies have to be doubly perfect.

Free blown of Plexiglas II,* each canopy is checked both dimensionally and optically, against the grid board shown above.

The complete F-84F canopy assembly includes acrylic

windshield side panels and forward turtle deck panels—also fabricated by Goodyear Aircraft, where complete facilities are available for design, research, stress analysis, testing and production of any size or type of transparent enclosures, and their attaching metal structures.

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PRODUCTION

Experts Learn to Live With Titanium

- SAE reveals progress so far, problems ahead.
- Tight supply is forecast through next three years.

Industry experts who have worked extensively with titanium as a structural material took a close look at the metal recently.

This group—representatives of titanium producers, airframe and engine constructors, researchers and metallurgists—met at the Production Forum of the Society of Automotive Engineers' National Aeronautic Meeting in New York. The wide field of operations they covered encompassed raw material considerations down to detailed shop procedures for working the metal.

Panel* and group discussion brought out the following information on where progress with titanium now stands and what problems lie ahead:

Availability

- **WHAT** is the production picture for titanium now and for the next few years?

Rem-Cru Titanium, Inc., is now melting 16 tons of titanium ingots per week. Within a year, this rate will be increased to 10 tons per day.

Titanium Metals Corp. is producing up to 4 tons of titanium per day at present and expects to be at 10 tons per day this summer. The nation's sponge capacity in 1954 is planned to be 7,000 tons, made up of 10 tons per day each from Titanium Metals and du Pont. Authorization of a plant capacity of 22,000 tons per year in 1955 is being discussed. Expected actual production of sponge is 1,980 tons for 1953, 5,000 tons for 1954, and 12,000 tons for 1955.

- **HOW** tight is the titanium supply now and what can be expected in the next few years?

All of the companies appear to be pretty well booked through 1953. It



NORTH AMERICAN AVIATION used 100 lb. of titanium in each FJ-2 Fury airframe.

looks as though titanium availability will continue tight through 1956. Air Force requirements alone could take up most of the titanium produced, and two U. S. jet engine manufacturers could use the entire output. Evaluation quantities are, however, available for both defense and non-defense items.

- **WHAT** is the proportion of alloyed to unalloyed grades produced?

This proportion has been increasing all along. At this time, Rem-Cru is the only alloy sheet producer and is making equal amounts of alloyed and unalloyed sheet. About 75 to 85% of bars and forgings are alloyed. Ratio of sheet to bar is 1:1 for Rem-Cru and 1:3 for Titanium Metals.

- **WHAT** are the chances for price reduction in titanium?

It is anticipated there will be a price reduction early next year after sponge production goes up and more scrap is remelted. Until very recently, scrap could not be remelted, but Titanium Metals announced that it is now remelting its own revert scrap in the form of 1,000-lb. ingots containing from 70-100% scrap. At present it intends to use only its own revert scrap.

Rem-Cru is incorporating up to 10% remelt material in regular production, expects to increase this. Amount of unusable scrap reflects directly on the cost of fabricated forms.

Applications

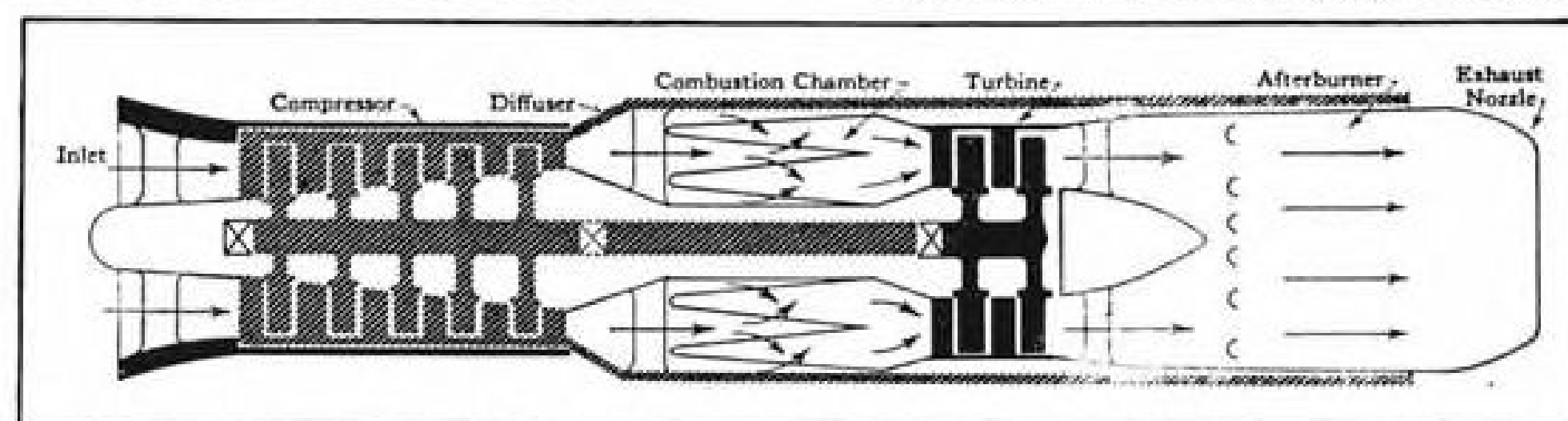
- **WHERE** is titanium being used in jet engines?

It is being used chiefly in the compressor, as disks and blading. It is also planned for use in sheet metal parts, such as combustion chamber liners, etc. The sheet metal liner is of welded construction and has to be made of an alloy estimated to require 120,000 psi. yield strength at room temperature and 60,000 psi. at 600F.

Current titanium alloy sheet in production does not meet the requirement of being ductile in the welded condition, but an experimental all-alpha titanium alloy, Rem-Cru's RC A-110, now in pilot production, meets this requirement as well as the 60,000-psi. yield at 600F.

- **WHAT** wheel materials are titanium alloys replacing?

Included in this category are cold-



JET ENGINE cutaway indicates where titanium (shaded) has been used or investigated.

* W. L. Finlay, research manager, Rem-Cru Titanium, Inc.; Robert Jaffee (panel secretary), supervising metallurgist, Battelle Memorial Institute; W. S. Hazelton, metallurgical engineer, Westinghouse Electric Corp.'s Aircraft Gas Turbine Division; L. D. Jaffee, chief, physical metallurgy section, Watertown Arsenal Laboratory; Paul Maynard, material and process engineer, North American Aviation, Inc.; R. J. Bullock, development engineer, Wyman-Gordon Co.



Nineteen hundred and fifty-three marks man's first half-century of powered, heavier-than-air flight. Fifty years ago, on December 17, 1903 the Wright Brothers successfully built and flew a 12 horsepower biplane. For 12 historic seconds Orville Wright took the controls over Kitty Hawk.


Their flight plan was "progress"...

What made this flight possible?

It was the way Wilbur and Orville Wright approached the problem. The Wright Brothers succeeded because they studied the basic principles of flight, then built a flying machine to fit these specifications. Their pioneering has made possible better and better flying machines, including today's jets. Their flight plan was truly "progress."

Esso Standard Oil Company supplied the fuel for the Wright Brothers' first successful flight. Since then, Esso Aviation Products have kept constant pace with aviation's rapid progress—the latest example being the recently announced Esso Turbo

Oil 15. This oil is currently approved for the Pratt and Whitney Aircraft J-57 jet engine and the Curtiss-Wright J-65 Sapphire jet engine.



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to be obtained. In addition to using a copper or inert gas backup, the trailing edge of the welding electrode must have provision for gas shielding so the solidification takes place under inert gas.

• **WHAT are the factors in chamber versus open-arc welding?**

Use of a welding chamber filled with inert gas could be justified in certain cases: First, in welding research investigations or in learning how to weld titanium, an atmosphere chamber with rubber-glove inserts is extremely helpful. Second, in welding complex assemblies or in fillet welding, where the shielding problem is difficult, welding in chambers is justified. One recent installation for such welding has an atmosphere room which the welder enters with suitable respiratory equipment. However, most production welding could be done in the open, using a gas-shielded arc, if proper precautions were taken.

• **WHAT is the effect of post-weld heat treatments?**

It is indicated stabilizing-type anneals can improve the ductility of some alpha-beta alloy welds. In some alloys, such heat-treatment can be very effective. For example, using the post-weld heat treatment consisting of heating to 1,350F, furnace cooling to 1,150F,

and water-quenching, welds in Ti-2Mo-4Cr alloy made with high-purity sponge can be improved from no ductility to 60% RA and 40 ft.-lb. impact at room temperature. The strength of the weld metal so treated is 108,000 psi.

• **WHAT is the effect of contaminants in welding atmosphere?**

The inert gas must be of high purity to obtain uncontaminated welds. Tolerances have not been completely established, but humidity must be less than 5%, nitrogen and oxygen less than 1% (this is purity of the welding atmosphere—not that in the gas tank before welding). Some argon is reported to be water-pumped—a product to be avoided.

• **CAN welded titanium be fabricated?**

Yes—all welded titanium tubing is cold drawn, as much as 38% reduction in a single pass. Flaring of welded titanium must be done hot, however.

• **ARE continuous welding processes, such as Aircomatic, possible?**

Yes. Wire, both in unalloyed and alloyed grades, is available. The wire should be pickled before use.

Metal Removing

• **WHAT causes grinding cracks?**

The causes are not known definitely, but it is believed alloys susceptible to heat treatment are more prone to such cracking.

• **ARE grinding cracks more serious in titanium alloys than in steel?**

Yes. Titanium alloys seem to be more prone to cracking, and more care must be taken to prevent cracking in grinding. Use of elevated-temperature grinding is helpful in avoiding cracking, but the procedure is not practical in all plants.

• **WHAT are developments in precision grinding?**

Generally, it has been found that slow speeds of 1,800-2,500 sfm. and additives like rust inhibitors (KNO₃) or soluble oils aid greatly. However, standard grinding equipment is set for speeds of about 6000 sfm. and the wheel manufacturers have wheels and coolants which work under these conditions. Dry grinding is definitely bad, and the use of water cooling is almost as bad if efficient grinding is to be done. Snagging is usually done dry, however.

• **WHAT machining operations are used on a disk?**

The forged disks are turned, holes are drilled and reamed, grooves are broached. No serious machining problems are being encountered, but some trouble still is being found with holes less than 1/4 in. in diameter and with some milling operations. Broaching no longer gives trouble, since the use of carbide insert broaches and CO₂ cooling were adopted. Tool life is no longer a problem. Carbide tools are required for machining the alloys. Roughing cuts are made at 40-65 sfm. and finishing cuts at 125-250 sfm.

For each disk, rough turning requires 12 hr. and finished turning 27 hr.—20% more turning time than for an 18-8 disk. A 200-lb. forged disk becomes a finished disk weighing about 50 lb.

• **HOW does machining of titanium alloys compare with stainless?**

Taking a work-hardened 18-8 disk as a specific example, a disk of the Ti-Fe-Cr alloy (TI-150A) is about as easy to machine, and one made of Ti-Al-Mn alloy (RC-130B) is slightly easier.

The early difficulties were chiefly associated with alloys that had high carbon content. So long as the current alloys contain less than .25% C, they offer no particular difficulty. In machining bearing housings, which are thin walled, titanium alloys are preferred to 18-8, because they warp less.

Heat Treatment

• **WHAT are stabilizing heat treatments of titanium alloys?**

Most treatments used so far have been to soften titanium alloys, not to

harden them. For alpha-beta alloys, the so-called stabilizing heat treatments are used to render the alloys stable against hardening and embrittling during service at elevated temperature or as post-weld heat treatment to eliminate transformation hardening as a result of rapid cooling from welding.

The aim of stabilization is to perform the transformation of beta phase to massive alpha as completely as possible.

This means that the transformation to massive alpha must be completed at as low a temperature as possible. Stabilization is done by isothermal holding at 1,100-1,300F. or by initially heating at the higher temperatures to obtain an initial two-phase structure of massive alpha and unstable beta phases, and by slow cooling to 1,000-1,200F. to complete the rejection of massive alpha.

• **WHAT can be done to harden titanium alloys by heat treatment?**

Quench-hardening heat treatment appears to be ruled out because of insufficient hardening and excessive embrittlement. Age-hardening heat treatment based on instability of the beta phase offers good possibilities. The aging process must be kept under control.

The most practical way to do this is through an alpha-beta solution treatment through which the stability of the beta phase is unbalanced to the proper amount and then to age-harden the unstable beta-phase component at lower temperatures.

These heat treatments are in development and it is not known how controllable they are from heat to heat. It is predicted that by next year practical benefits will be derived from such heat treatment.

• **WHAT ABOUT heat treatment by induction?**

Surface hardening of heat treatable alpha-beta alloys by induction has been done. Hardnesses of 40-45 R_c have been obtained.

—Irving Stone

AIA Compiles List Of Aircraft Metals

A listing of nearly 2,000 different types and sizes of metals involved in today's aviation activity has been compiled as a cost-saving measure by the Aircraft Industries Assn.'s National Aircraft Standards Committee. The compilation is intended for use by aircraft-metals warehouses.

The list—reported to have reduced the number of items that distributors and aircraft manufacturers are required to carry—was drawn up with industry collaboration to standardize on most-used materials, with specs, hardness,

finish and size chosen to obtain best use from the minimum number of types and forms.

The catalog, Aircraft Metals Stock List, 1953, may be obtained from the National Standards Association, 527 Washington Loan & Trust Bldg., Washington 4, D. C. Price per copy (in lots of one to four) is 50¢, with lower prices for larger quantities.

Japanese Jet Engines

(McGraw-Hill World News)

Tokyo—The Japan Jet Engine Co. has been established by three Japanese firms

and is scheduled to start designing aircraft turbojet powerplants by September.

Founders of the new company are Ishikawajima Heavy Industries, Fuji Industries and Ruji Precision Industries. Capitalization of the new venture is estimated at 160 million yen (approximately \$448,000).

Application has been made to the Japanese government for subsidy to help develop the company during the next two years.

Following engine design and tests, the new firm will dissolve and production will be handled by the parent companies.



WINGS FOR THE B-57

Wings for the Martin B-57 Flight Intruder—Air Force version of the English Electric Canberra bomber—are now being shipped from Kaiser Metal Products, Inc.'s Bristol, Pa., plant to Martin's Baltimore facilities where the airfoils are mated with the fuselage in the final assembly line. Photo taken in KMP plant shows wing's long, twin nacelles which will house Wright's

J65 Sapphire. KMP's contract for engineering, tooling and production of the wing was signed late in 1951. Company erected a 140,000-sq. ft. facility and tooled the plant for the job. KMP has subcontracted fabricated parts to 150 different manufacturers, who supply more than 1,000 items for the B-57 wings. The B-57A made its first flight July 20.

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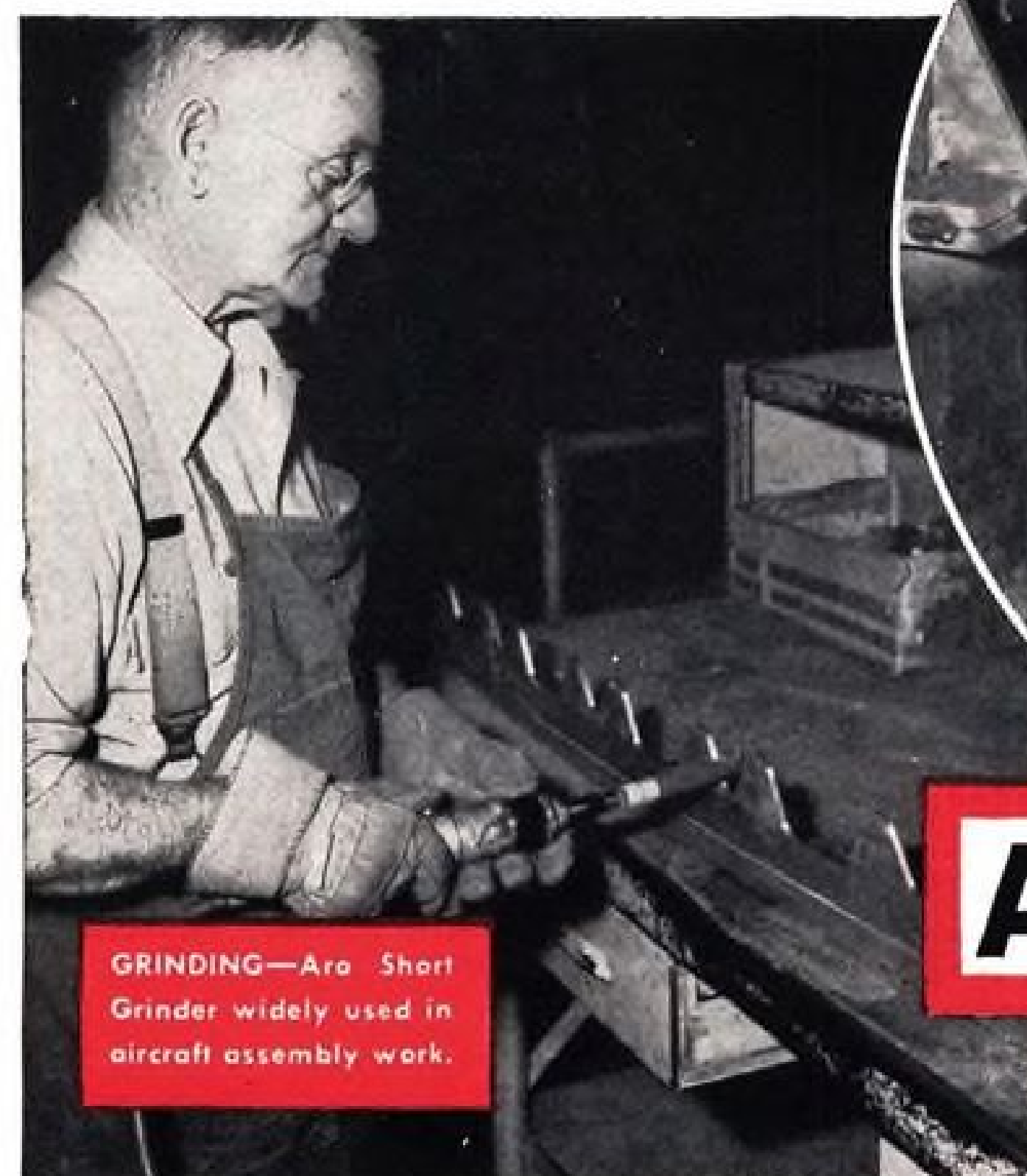
DRILLING—Mr. Kenneth Hall, Tool Engineer at Douglas, Long Beach, inspects operation of Aro Right Angle Drill for close-corner work.

These are typical of hundreds of assembly jobs performed by ARO Air Tools in the Douglas Aircraft plant at Long Beach, Calif.—to meet demands for *high speed, efficient* production!

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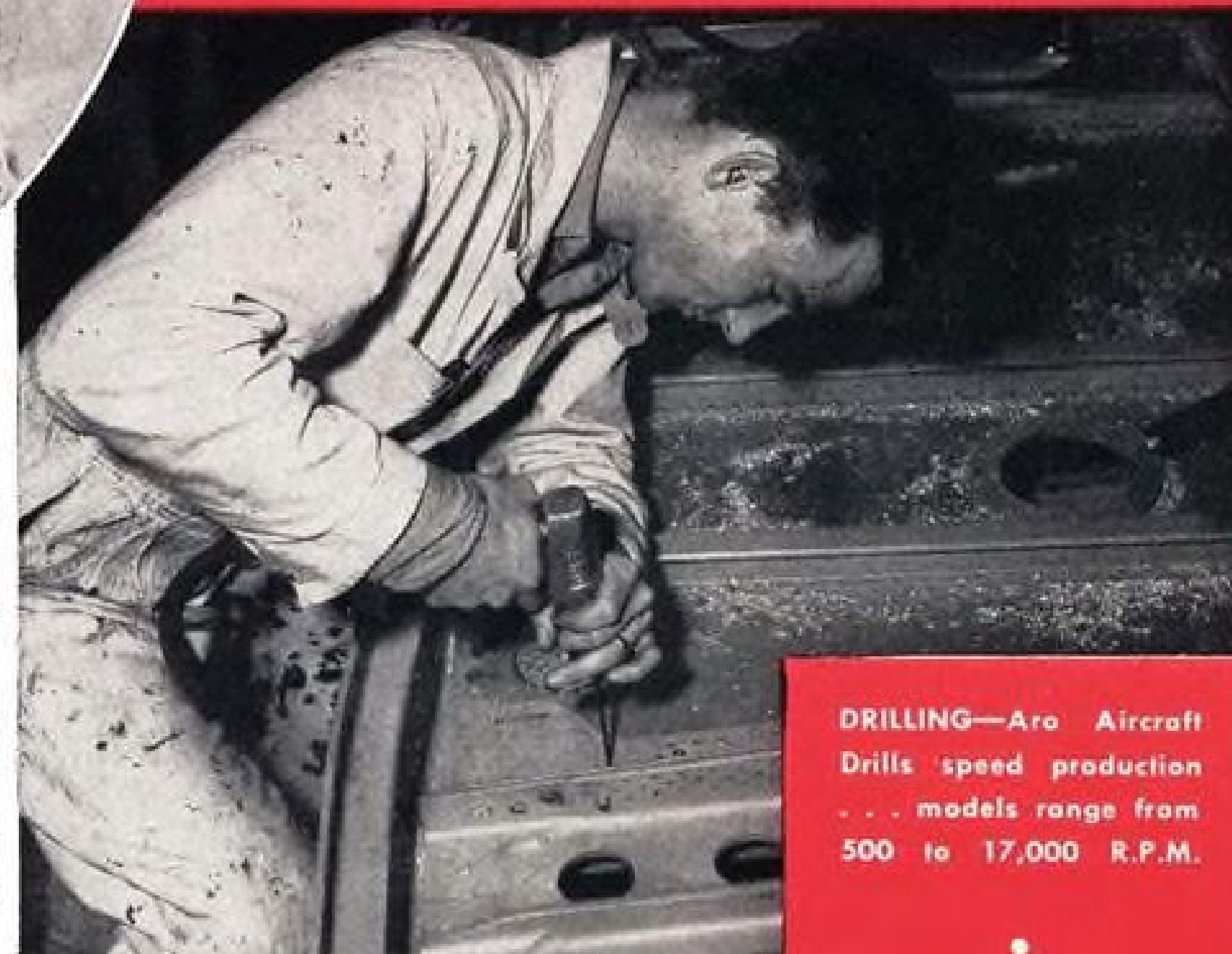
In Canada: Aro Equipment of Canada, Ltd., Toronto, Ont.



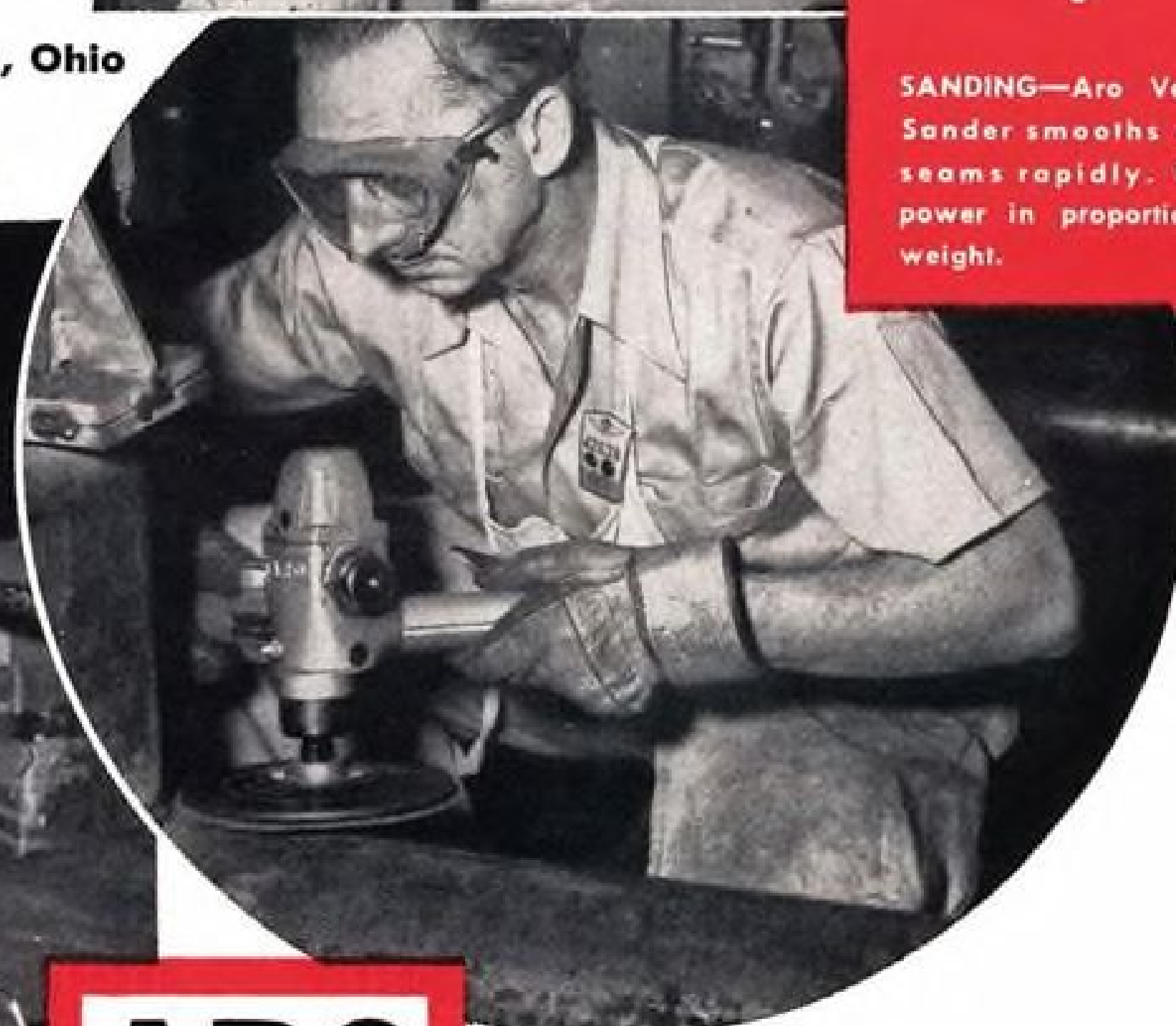
GRINDING—Aro Short Grinder widely used in aircraft assembly work.

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Aviation Week Picture Brief



FRONT VIEW of Payen P.A.49 shows experimental plane's delta wing and jet-engine air inlets on either side of fuselage.

French Delta Shown at Paris

The tiny P.A.49, which made its public debut at the Paris Air Show, is the latest product of French aircraft designer N. R. Payen, who has been turning out unconventional designs around the delta wing for approximately 20 years.

The new Payen P.A.49 is a lighter version of a similar layout proposed to the French Air Ministry in 1948 as a light fighter.

Of all-wood construction, including covering, the P.A.49 spans some 17 ft. and is approximately 9 ft. long. Wing sweep reportedly is 70 deg. Powerplant is a single Turbomeca Palas of approximately 350-lb. thrust fed from air inlets in the leading edges of the thick wings. Another version of the craft, planned

as a light trainer, is designed to take an 880-lb. thrust Turbomeca Marbore.

The P.A.49 has completed its windtunnel test program. Design data show a top speed of 250 mph. and a landing speed of 43 mph. Maximum lift reportedly is obtained at an angle of incidence of about 40 deg.

Fuel capacity provides for approximately one-hour's flight duration and auxiliary tankage can be installed.

One of Payen's early designs, which flew in the middle 1930s, was a small racer powered by a 400-hp. Gnome-Rhone. In addition to a sharply swept delta main wing, it had a horizontal tail mounted ahead of the wing, canard fashion.



PROFILE shows how cockpit faired into vertical tail. Landing gear has main wheel under fuselage. No balancing outriggers are visible.

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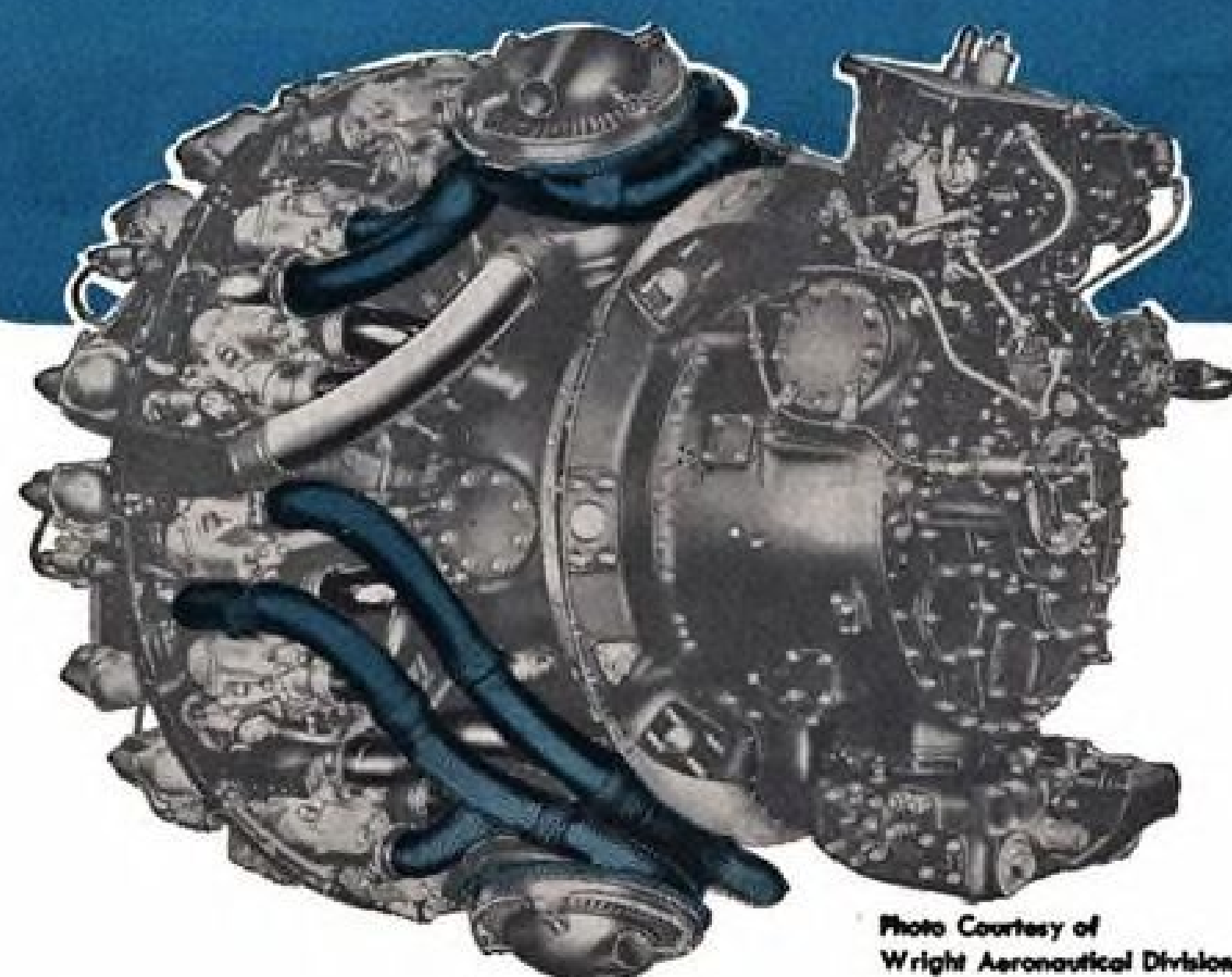


Photo Courtesy of
Wright Aeronautical Division

The old saying "A chain is no stronger than its weakest link" might easily be the axiom of aircraft design. No unit of the compound reciprocating engine is more significant for its efficient service than the lowly exhaust pipe.

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Navy Contracts

The following contracts were announced recently by the Navy's Aviation Supply Office, 700 Robbins Ave., Philadelphia 11.

Aero Supply Mfg. Co., Inc., 611 West Main St., Corry, Pa., oil valve, 30 ea., \$28,036.

AiResearch Mfg. Co., Div. of Garrett Corp., 9851-9951, Sepulveda Blvd., Los Angeles, tubes used on coolers for various aircraft, 937,000 ea., \$25,920.

Barber-Colman Co., Rockford, Ill., actuator for F3D-2 aircraft, 94 ea., \$52,062.

Bendix Aviation Corp., Pacific Div., 11600 Sherman Way, North Hollywood, Calif., hydraulic cylindrical accumulators for P2V-5, -6 aircraft, 392 ea., \$71,024; actuators, 199 ea., \$64,634.

Boonton Radio Corp., Intervale Road, Boonton, N. J., meter for testing radio & radar equipment, 33 ea., \$25,340.

Breeze Corps., 41 South Sixth St., Newark 7, N. J., lead assys. for aircraft engines, 18,700 ea., \$92,565; lead assys. for var. aircraft, \$52,382.

D. L. Auld Co., East Fifth Ave. & Fifth St., Columbus 1, Ohio, reel, 21,747 ea., \$129,537.

General Metals Corp., Adel Div., 10777 Van Owen St., Burbank, Calif., valve assy., 80 ea., \$43,791.

General Radio Corp., 275 Massachusetts Ave., Cambridge 39, Mass., spare parts for meter and crystal set and sound analyzer, \$33,104.

Glidden Co., 11001 Madison Ave., Cleveland 2, Ohio, lacquer, 40,000 qt., \$29,200; lacquer, 80,016 qt., \$58,412.

Hickok Electrical Instrument Co., 10514 Dupont Ave., Cleveland 8, tube tester, 200 ea., \$65,330.

Houdaille-Hershey Corp., Houde Engineering Div., 537 E. Delavan Ave., Buffalo, N. Y., damper assy. for F9F-6, -6P, -7 aircraft, 190 ea., \$154,925.

Kollsman Instrument Corp., 80-08 45th Ave., Elmhurst 73, N. Y., maintenance parts for various instruments, \$29,926.

Maine Specialty Co., 98 Exchange St., Portland 3, connectors, wire rope, \$204,360.

Polarad Electronics Corp., 100 Metropolitan Ave., Brooklyn 11, N. Y., radio test set, \$262,385.



NO SAFETY GOGGLES?

Machine shop workers at Lockheed Aircraft Corp. are wearing this special plastic apron for protection against flying metal particles from highspeed milling and cutting machines. Apron is a laminated glass cloth-polyester resin unit about 1/4 in. thick, weighs less than 3 lb. High-impact-resistance shield was developed by Lockheed safety engineers, is manufactured under license for commercial use by B. F. McDonald Co., Los Angeles. Did the model remove her safety goggles just for the photo?

AVIONICS

EXAMPLES OF ELAPSED TIME SAVED BY USE OF IBM-CPC'S

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25 WEEKS

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F-89A FUSELAGE

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17 WEEKS

402-604

F-89D AFT. FUS.

2

4 DESK CALC.

10 WEEKS

402-604

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F-89D MOMENT
OF INERTIA

8 2 DESK CALC.

13 WEEKS

DYNAMICS:

F-89 DYNAMIC LGD.

8 3 DESK CALC.

13 WEEKS

MATRIX ROOTS AND
MODAL COLUMNS

0

3 TO 1 RATIO

CHART prepared by Northrop shows typical savings that can be effected by use of IBM Card-Programmed Calculator

Northrop Pioneers Computer Technique

Faster solutions result when engineers work directly with machines, depend less on mathematicians.

By Philip Klass

Hawthorne, Calif.—Northrop Aircraft has stripped away the veil of mystery which usually surrounds automatic computers and keeps engineers at a respectful distance, forcing them to work through "mathematician-middlemen."

The Northrop computing center operates on the theory that engineers who understand the computer as well as the problem to be solved are best equipped to run engineering problems on automatic computers.

Company experience shows that this engineer-computer familiarity increases the usefulness of the machines and frequently produces engineer-suggested

changes in computer design. For example, the original design of the Card-Programmed Calculator produced by International Business Machines Corp. was developed at Northrop, according to L. A. Ohlinger, chief of the company's computing services.

► **Mathematicians as Middlemen**—Ever since the first big automatic computers, mathematicians have served as middlemen between the engineer and the computer.

Only mathematicians understood the machines' strange binary number system and their unconventional round-about methods of computation.

When an engineer had a problem for the computer, he "brought it to the

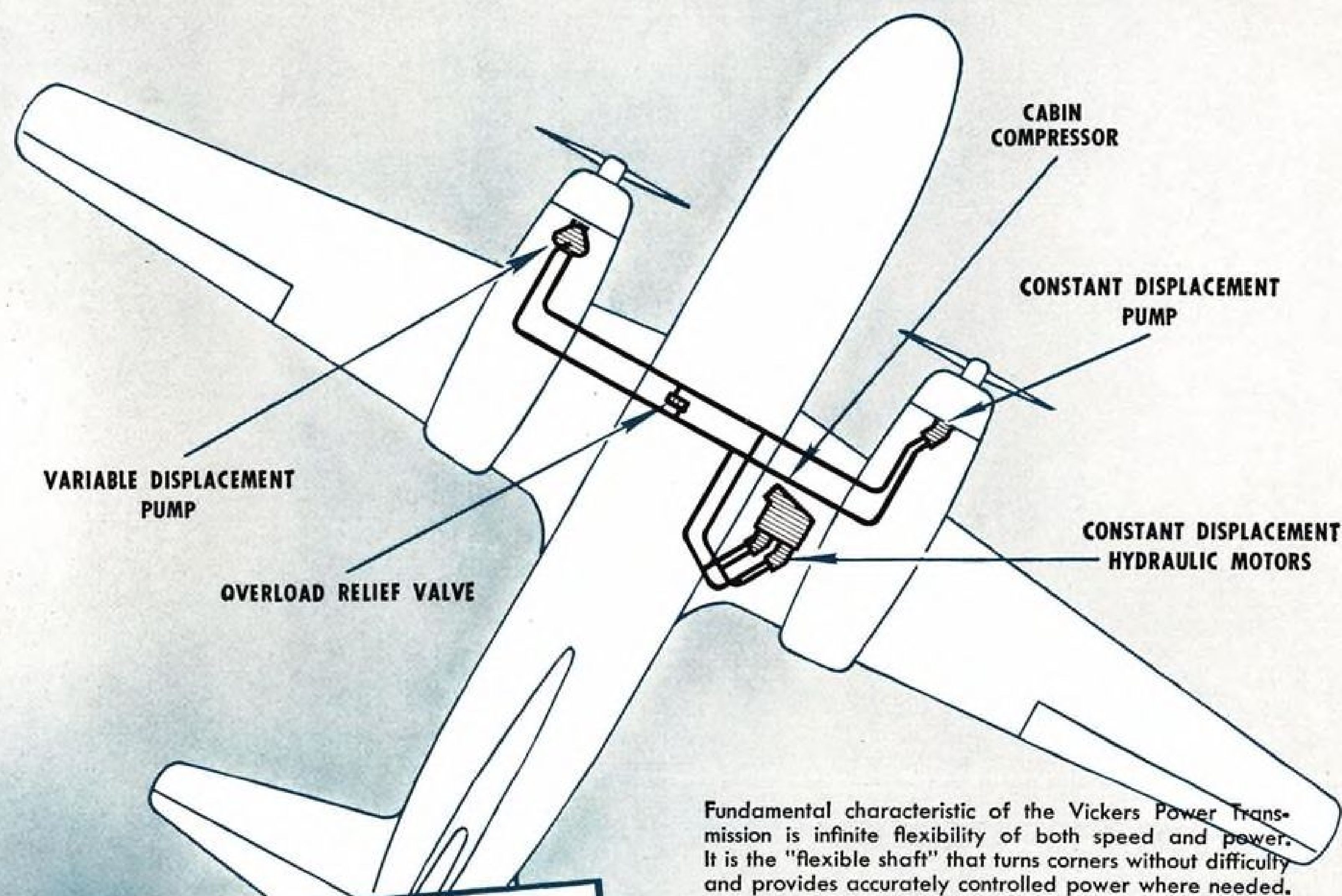
shrine of the computing deity and humbly asked the guardians of the portals for help." This is how Ohlinger describes the procedure originally used at Northrop and generally used elsewhere today.

If the problem was one the computer could handle, the engineer left it with the mathematicians and retired to his desk. Some days, weeks or months later, the engineer was called back to receive his answer. The solution might show a new design approach was required, involving another problem for the computer and another long wait.

These delays were not the fault of the mathematicians. Programming a problem for a computer is a time-consuming process and this resulted in poor computer utilization and large backlogs of computer work. It was little wonder many engineers were re-

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An example of the advantages of this flexibility is the drive components for the cabin compressor on Model 240 CONVAIR-LINERS. There are numerous other applications where it is desirable to transmit power to a point remote from the power source and provide selective variable speed or constant speed. These applications are easy with Vickers Transmissions.

The Model 240 CONVAIR-LINERS also use Vickers Hydraulic Pumps and Controls for the 3000 psi main hydraulic system. In Vickers complete line of aircraft hydraulic equipment, you will find a combination to meet your control or drive needs exactly. Write for your copy of report No. 725, "Hydraulic Drives for Aircraft."

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Congratulations
to Trans-Australia Airlines



TAA is the first Airline to accumulate more than 10,000 flight hours on each of their fleet of five CONVAIR 240's. Vickers Inc. is proud to have contributed to this record. In addition to providing the accessories for the main hydraulic system, a Vickers hydraulic drive is used for the cabin compressor. TAA recently reported that flights are flown pressurized more than 97% of the time and that hydraulic problems are insignificant.

6448

luctant to take their problems to the "computing shrines."

► **Getting Engineers Into the Act**—Northrop has changed all this by making computer experts of two engineers from each of its five major engineering departments: aerodynamics, stress and structures, thermodynamics, missile guidance, and servomechanisms. These "computing coordinators" remain members of their original engineering groups despite the fact they work at desks in the computing center. Northrop wants its computing coordinators to remain specialists in their own engineering fields and to be so recognized by their fellow engineers.

The coordinator's task is to seek problems within his engineering group and to encourage his co-workers to set up their engineering problems in a form adaptable to computer techniques.

► **The Resident Staff**—The computing center has a 55-man resident staff of mathematicians, engineers, technicians and operators.

The mathematicians and engineers, called "computing analysts," help the coordinators plan problems to fit them to the existing machines as well as adapting the computers to handle specialized problems. The computing analysts can frequently suggest ways to eliminate many of the step-by-step intermediate solutions, thereby speeding solution time and cutting computation costs, Ohlinger says.

► **Open-Door Policy**—The resident staff at Northrop's computing center will set up and run problems if so requested. However, the center has what Ohlinger calls an "open-door policy" which encourages the computing coordinators (engineers) to set up and run their own problems.

There are important advantages to having the problem run by engineers who know its physical implications and significance, Ohlinger points out.

For example, an engineer who closely follows the intermediate stages of computer work may decide that the basic engineering approach under analysis is not practical and that there is no point in continuing with the problem solution. Or the engineer may spot a physical inconsistency in an intermediate solution which indicates an error in setting up the problem.

► **How It Began**—Four years ago Northrop had its eyes opened to the fact that engineers who use and understand computing equipment can frequently improve its basic design. Two Northrop men, G. J. Toben and W. W. Woodbury, both engineers, developed a means whereby IBM punch-card calculators could be interconnected and programmed to perform any desired sequence of operations without human attention or intervention.

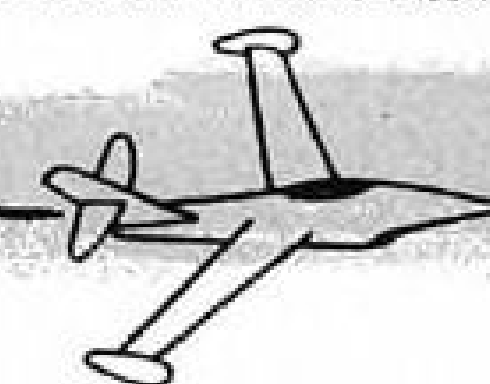
This Northrop-developed scheme

(Advertisement)

Valve Talk

for WM. R. WHITTAKER CO., Ltd.

by Marvin Miles,
Senior Member, Aviation Writers Assn.



How does one write a tribute to aviation in a few short lines? How can any medium relate the unbelievable half-century from Kitty Hawk to the esoteric realm of intercontinental guided missiles — portray the vast impact of the air world today — or guess accurately on tomorrow?

Perhaps the most logical way for me, a reporter, to eulogize the air age is to tell about it as I've lived it, in a "remember when" style.

My own recollections go back only to World War I when as a youngster I listened avidly as the older boys described — with impressive sound effects — the exploits of Rickenbacker and Luke, Bishop, Fonk, Guynes, Richtofen and the other knights who jousting in the world's first air battles.

I can still see the barnstormers and the wing-walkers, thrill to my first ride in a Jenny when the pilot cocked the ship up in a tight bank to send me cringing against the up-side of the cockpit. I remember rushing out of a schoolroom to see the first 'round-the-world flyers... staring unbelievably at the gargantuan bulk of a Ford trimotor... watching with envy as an air mail pilot took an open cockpit ship off a grassy field at midnight, a long cigar jutting from his mouth.

A thousand memories come flooding back, not in sequence, of course, for memories are invariably anachronous—

There was the famed Southern Cross, silent and unattended, for a young enthusiast to worship, the rugged little Hawk fighters of yesteryear, the aircraft carrier Langley in port with her toylike craft on deck, the remarkable flight of the Question Mark, stories of the dawn-to-dusk hop and the polar explorations, the lithe sports planes; Travelair, Waco, Swallow, Thunderbird, Alexander Eagle-rock; the Hawaii derby, the hoarding of a starred insignia from a cracked-up DH-4.

Then, of course, there was Lindbergh, whom I never saw until he rode through town in a blizzard of paper snow. And later the dirigibles that lazied across the sky like great silver whales... and a ride in a four-engine Fokker, the largest plane that could possibly fly.

But my interest was really flamed by regular day-to-day attendance at two National Air Races — the Sea Hawks, the Musketeers, the many daredevils, the outside loops, the pylon-turning races, the roaring formations, the pilots

everywhere in romantic helmet and goggles. Nor did seeing a fatal crash dampen my enthusiasm, except possibly for a moment when a chill enveloped me in the silence that followed the rising cloud of dust.

During World War II and in more recent years I have managed to edge a little closer to the actual history-makers, to learn something of the imagination and the skill and the work that lies behind the gleaming transports, the fighters

and the bombers. I have seen the scientists in their labs, the engineers bending over their boards, listened to the staccato chaos of the assembly lines, covered some of the first flights beginning with the mighty B-19 — and marveled at the organization and the abilities that can accomplish these miracles.

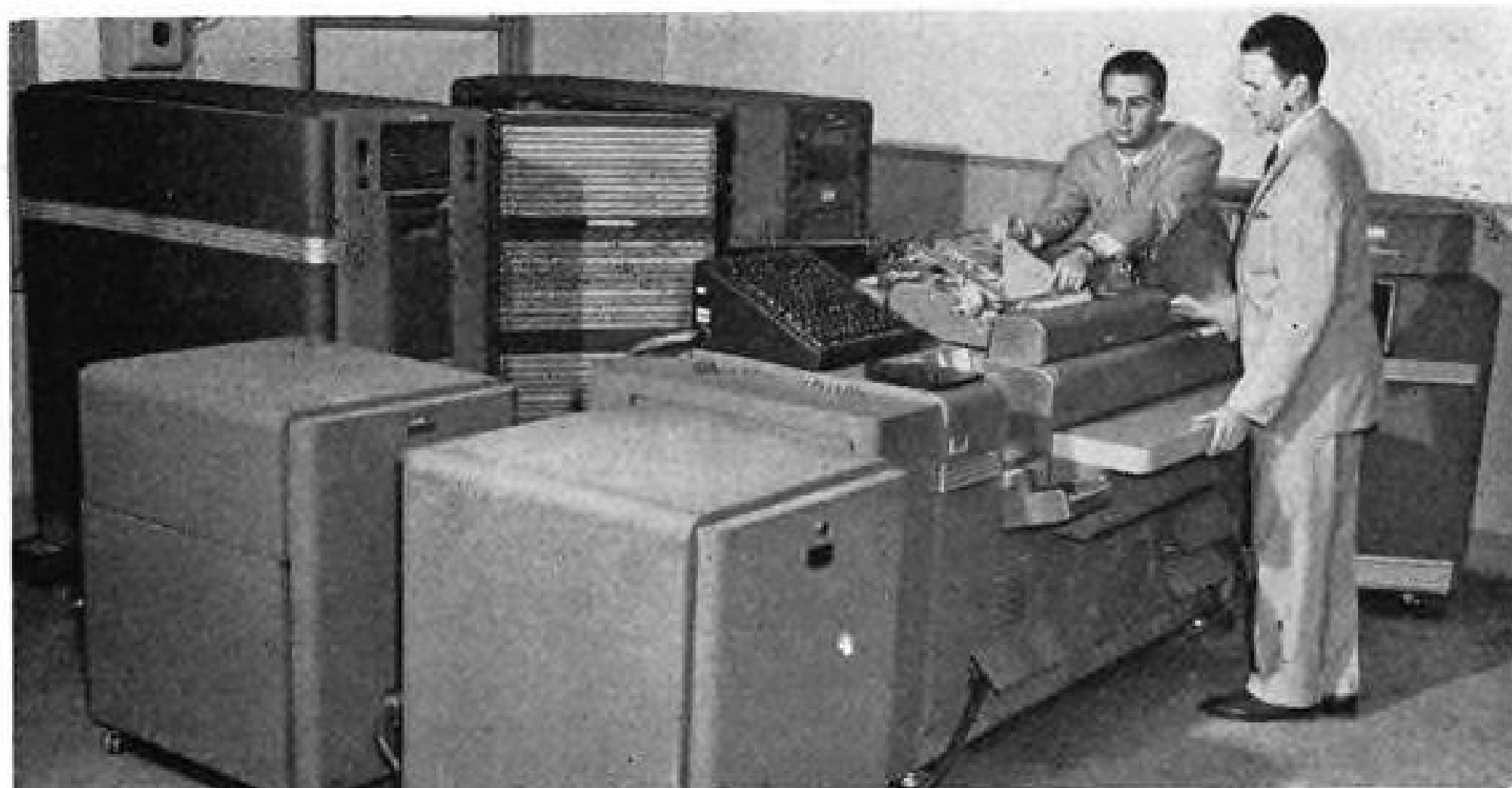
I use the word "marveled" advisedly. I wish I might have been able to substitute "appreciated," but who can really appreciate accomplishment unless he has had a part in the struggles, the worry and the exhaustion that make such accomplishment possible?

You can fly in a jet fighter, a helicopter, a superb transport, or a 10-engine bomber, see a missile streak off toward the sun, but you'll never really understand the enormous achievement of their existence without having been part of the industry that created them.

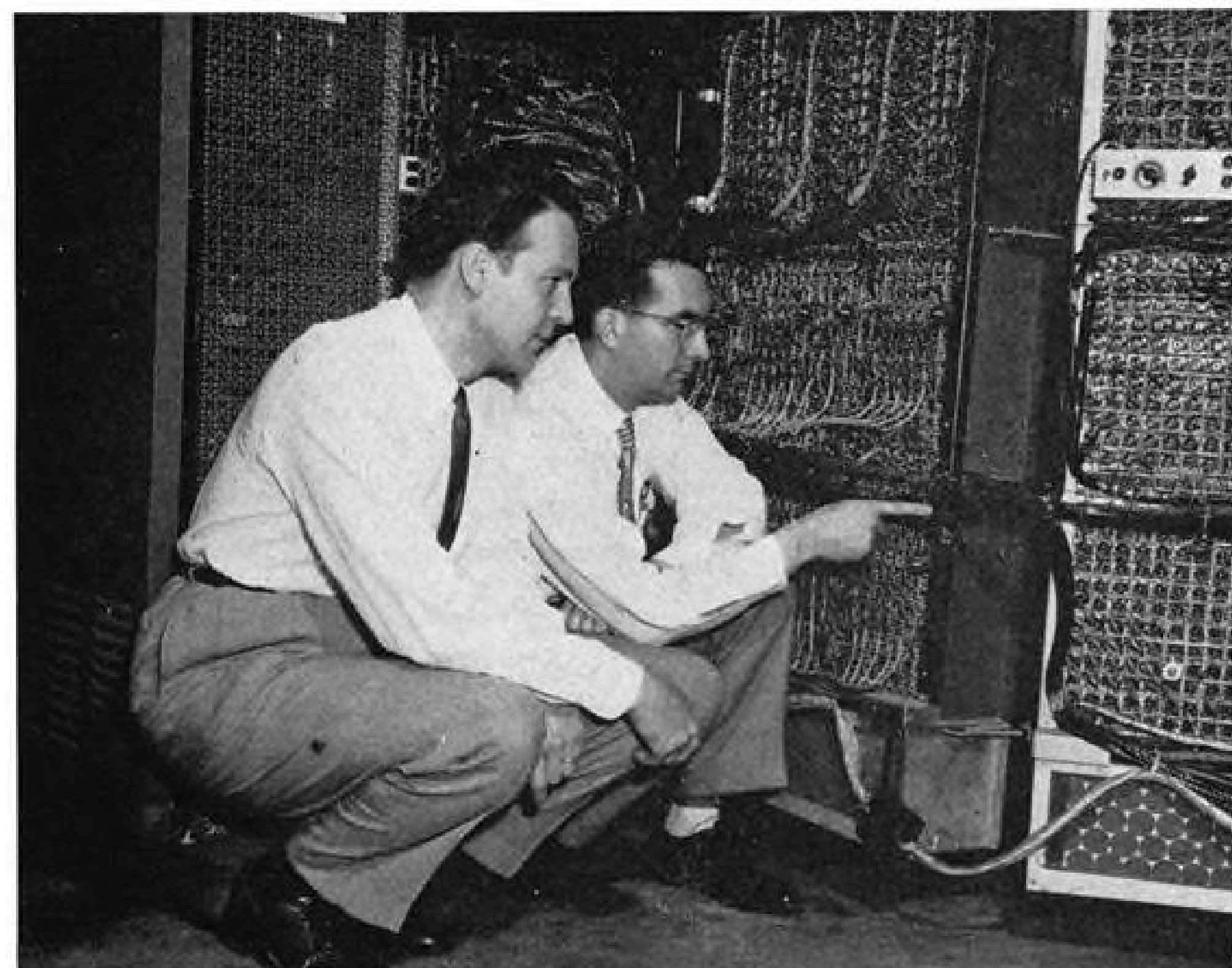
Nor will you really appreciate the skill of the pilots and crews — both military and civilian — who fly and maintain our aircraft until you yourself have some part of those skills and those responsibilities.

Covering aviation is a great privilege, an opportunity to see a small portion of its historic chapters from a front row seat. But to me — and to others in the audience — it brings a great humbleness in the face of men who create... men who fly... men whose lives and lineage can be dated back, in a sense, to origin at Kitty Hawk on December 17, 1903.

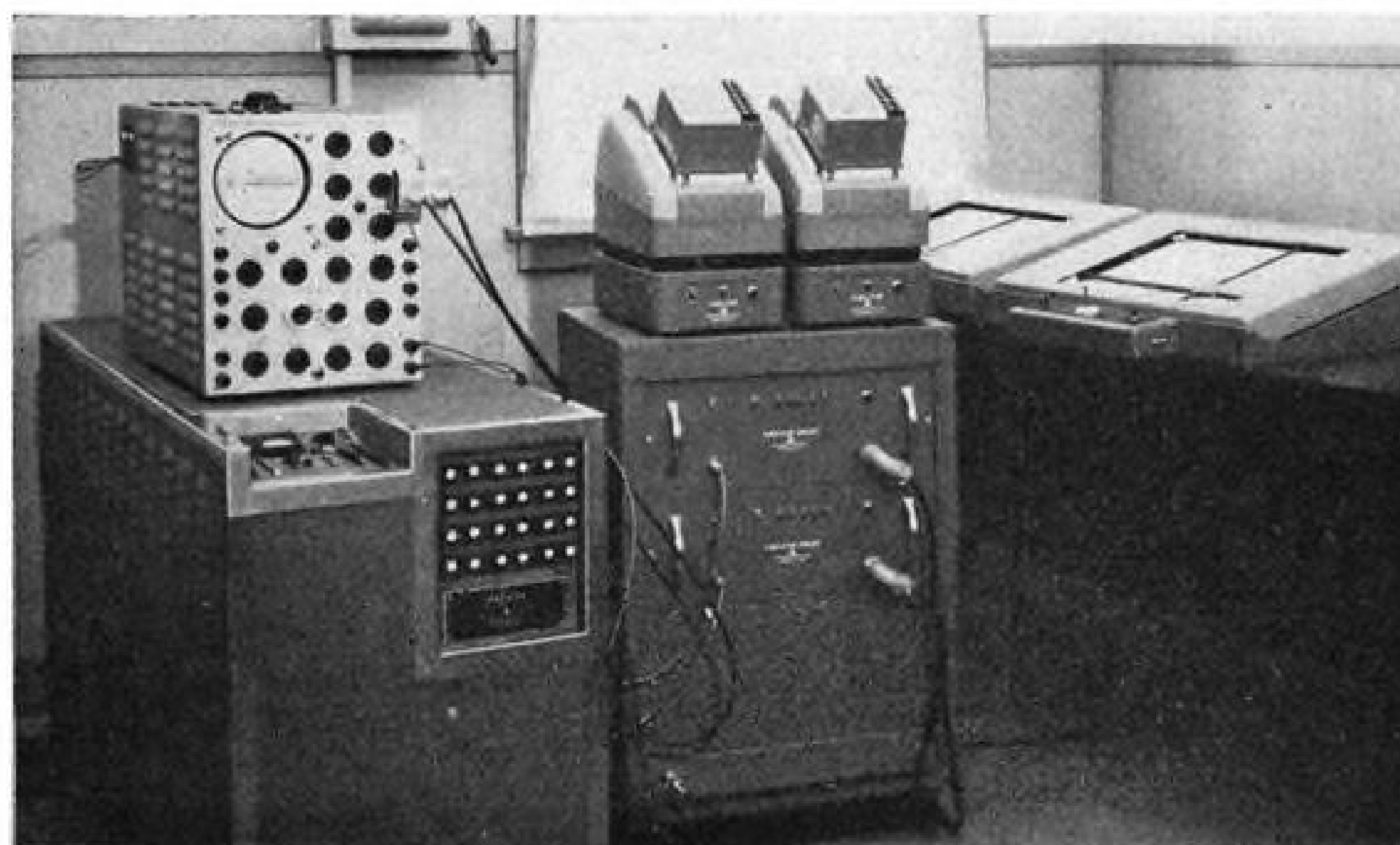




NORTHROP'S "SUPER C" combines two C-P-Cs to increase computing speed by . . .



INTERCONNECTING number-transferring channels to double electronic storage.



MADDIDA, a Northrop design, has an accuracy of one part in 100 million.

gave the IBM calculators the ability to exercise what is called "logical choice." That is, the calculator is able to examine the results of its previous calculations to determine how it should proceed in solving the problem. This combination of programmed operations and logical choice greatly increased the versatility of the IBM machines and their output, Ohlinger says.

IBM recognized the merit of the Northrop idea, built a prototype machine, and flew it out to Northrop for test and evaluation. Out of this has come the present IBM Card-Programmed Calculator (C-P-C).

► **The Payoff**—Northrop found that the increased speed and versatility of C-P-C made it possible to take on a great many more engineering problems. For example, many of the problems involved in airframe design are so complex engineers previously had to be content to solve one or two individual cases and extrapolate from these results, Ohlinger says.

With the new C-P-C, many more cases can be solved in the same time to provide enough data to bracket the entire design region, according to Ohlinger.

"The beauty of this new engineering tool was that it was relatively simple to operate and could be handled directly by engineers," Ohlinger says. In addition, the cost of C-P-C is well within the reach of the average engineering budget, he adds.

► **New Northrop Developments**—More recently, Northrop engineers have devised a means of increasing the output of C-P-C by a factor of 4 to 15 in most problems, and by a factor of 50 to 100 in special problems. This increased output raises overall equipment costs by only a third, Ohlinger says.

What Northrop has done is to add a second electronic computer, Type 604 or 605, and interconnect it with the existing electronic computer, to double the internal storage of "memory" capacity of the system.

Credit for this idea, which Northrop dubs its "Super C," goes to Rex Rice, Jr., a former computing coordinator now assistant chief of computing services. "This development came as a result of an engineer's familiarity with the equipment through actual use. It is doubtful if it would have occurred if the engineer had had to work solely through mathematicians or computer operators," Ohlinger says.

► **New Programming Techniques**. Ohlinger also credits Rice with developing new internal programming techniques which have cut down some problem solution times from 15 hours on the old un-programmed calculator to three minutes on the latest Model II Card-Programmed Calculator. The techniques are used to speed computation

on section properties, shear flows, and normal stresses in multicellular wings for aircraft.

Northrop is constantly improving its problem programming techniques, Ohlinger says. However, when a problem cannot be juggled to fit existing machines, Northrop doesn't hesitate to alter the machine or to design new equipment to handle the problem.

► **Computing Facilities**—Northrop's computing center can boast one of the country's largest collections of computers, including:

- Four Card-Programmed Calculators.
- One Super-C.
- One Binac, very high speed digital computer on bailment from the USAF.
- Five Noracs, Northrop analog computers.
- Two Reacs, Reeves analog computers.
- Two Boacs, Boeing Airplane Co. analog computers.
- Six Nallacs, Northrop analog computers developed by and named for their L. L. Nalley.
- Two Maddidas, Northrop-developed digital differential analyzers.

Northrop expects to replace Binac soon with a new computer which Ohlinger calls "Newac," built by an undisclosed manufacturer. Ohlinger expects Newac to turn out much more work than Binac, despite its lower internal computing speed and pulse rate. Binac's very high pulse rate (4 mc.) has raised many maintenance problems, Ohlinger says, and its small memory and slow input-output speed limit its usefulness.

► **Training Ground**—Northrop's computing center serves as a training ground for personnel from industrial and military computing centers, Ohlinger says. Northrop also receives many requests to perform outside work which it takes on when its own heavy internal work load permits.

Computer Research Corp., a growing producer of small digital computers, got its start at the Northrop computing center. The five men who formed the company three years ago came from Northrop where they had developed the Maddida computer.

► **Future**—Ohlinger would like to see computer designers and manufacturers work more closely with computer users in shaping new computer designs. However, engineers must learn more about the machines and their use if they are to be able to provide wise counsel, Ohlinger thinks.

"Computing equipment will have a far more profound effect (from a constructive point of view) upon our everyday life and upon our industrial and sociological development than atomic energy," Ohlinger expects. He sees a bright future for the big electronic brains and makes these predictions:

- Inventory and production control by

automatic computers within five to 10 years.

- **Automatic factories** in many industries within 15 years.

• **Automatic management**. Automatic factories plus financial and budgeting operations, billing and payment, by computers within 20-25 years.

Ten years ago these predictions would have been called "science fiction." Ten years from now, we may look back on them as being far too conservative.

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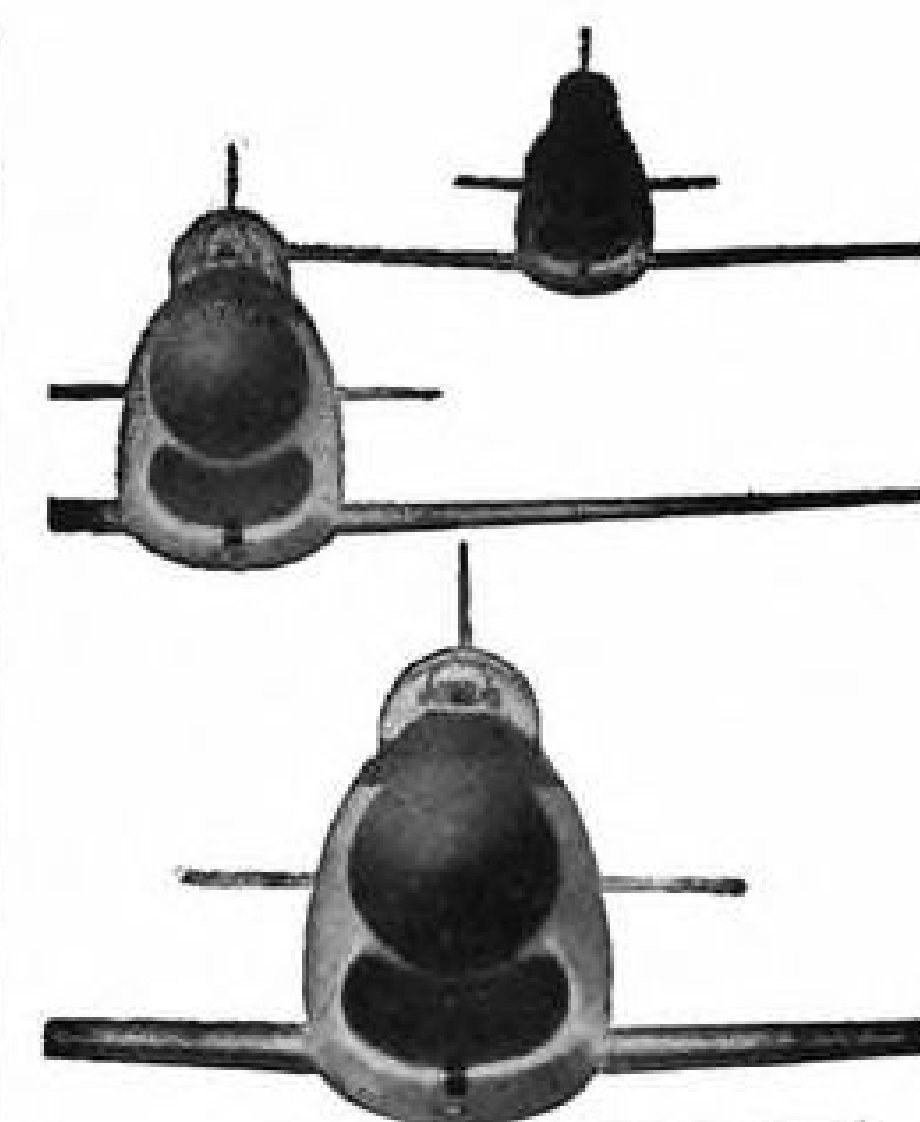
► **GE Developing Helicopter Damper**—General Electric is developing a pitch and roll damper system for trial on a Piasecki helicopter. Object is to determine whether a lightweight damper system can provide a helicopter with fixed-wing aircraft stability and eliminate the need for heavier autopilots. The damper is being developed in GE's Aeronautic and Ordnance Systems division.

► **Interceptor Trainers**—USAF B-25s are being outfitted at Hughes Aircraft with interceptor fire control systems. The B-25s will be used to train Air Force interceptor radar operators and pilots without tying up F-86Ds, F-89Ds and F-94Cs.

► **New Lightplane Autopilot**—A single-axis autopilot is under development at Summers Gyroscope Co. of Santa Monica, Calif., which the company says will maintain a lightplane on a desired heading or level in pitch attitude. Heart of the new autopilot will be an integrating rate gyro arrangement which provides both rate and displacement signals. Summers, which produces thousands of autopilots for small target drones, estimates that the autopilot should sell for approximately \$5-600 per axis.

► **New Navy Autopilot**—Navy BuAer's new advanced fighter-type P-4 autopilot, the result of a four-year development at Eclipse-Pioneer Division of Bendix Aviation, is currently undergoing flight tests.

► **Artificial Stability**—Cornell Aeronautical Lab is working on six major projects in the field of avionic yaw and pitch dampers to provide improved airplane stability. One of these is a damper for stabilizing long-period (phugoid) oscillations of jets at high altitudes. Improved stability, through artificial means, is considered very important for all-weather aircraft to enable pilot to devote full attention to combat duties. —PK



Engineers — PICK A WINNER

The Engineering Department which designed the Sabre and other headline-making military airplanes has openings for engineers—experienced in aircraft, recent engineering grads, or men from other fields with adaptable experience. Long-term military projects and twenty-five years of continuous expansion underwrite your future at North American. Current openings in:

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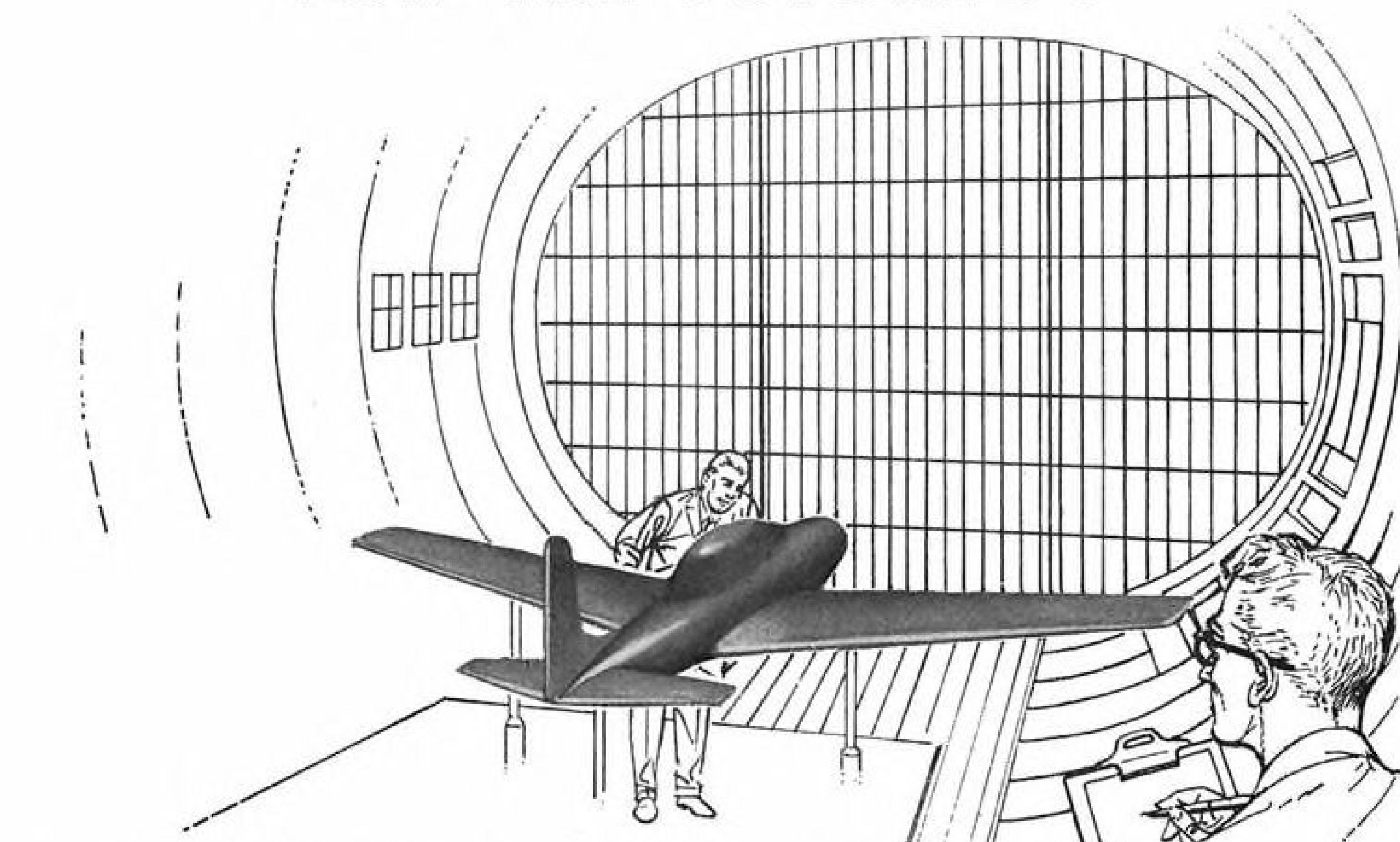
North American Aviation, Inc.

DEPT. 10, ENGINEERING PERSONNEL OFFICE
LOS ANGELES INTERNATIONAL AIRPORT
LOS ANGELES 45, CALIFORNIA
or
COLUMBUS 16, OHIO

NORTH AMERICAN HAS BUILT MORE AIRPLANES
THAN ANY OTHER COMPANY IN THE WORLD

Designing

FOR THE FUTURE . .



DESIGNING FOR LOW COST

TEMCO's expanding engineering staff approaches the complex problems of military aircraft design with thorough *cost-consciousness* . . . cost-consciousness toward original production, as well as operation and maintenance. TEMCO design is guided by the company philosophy to "build a quality product . . . on schedule . . . at the lowest possible cost." A good example of this creative foresight is a current TEMCO trainer design. It has wingtip extensions that make it possible for the trainer to be used in *two* stages of training instead of one.

Already recognized for its record low-cost *production*, TEMCO Aircraft Corporation is building for the future with cost-conscious *design*.



DALLAS, TEXAS

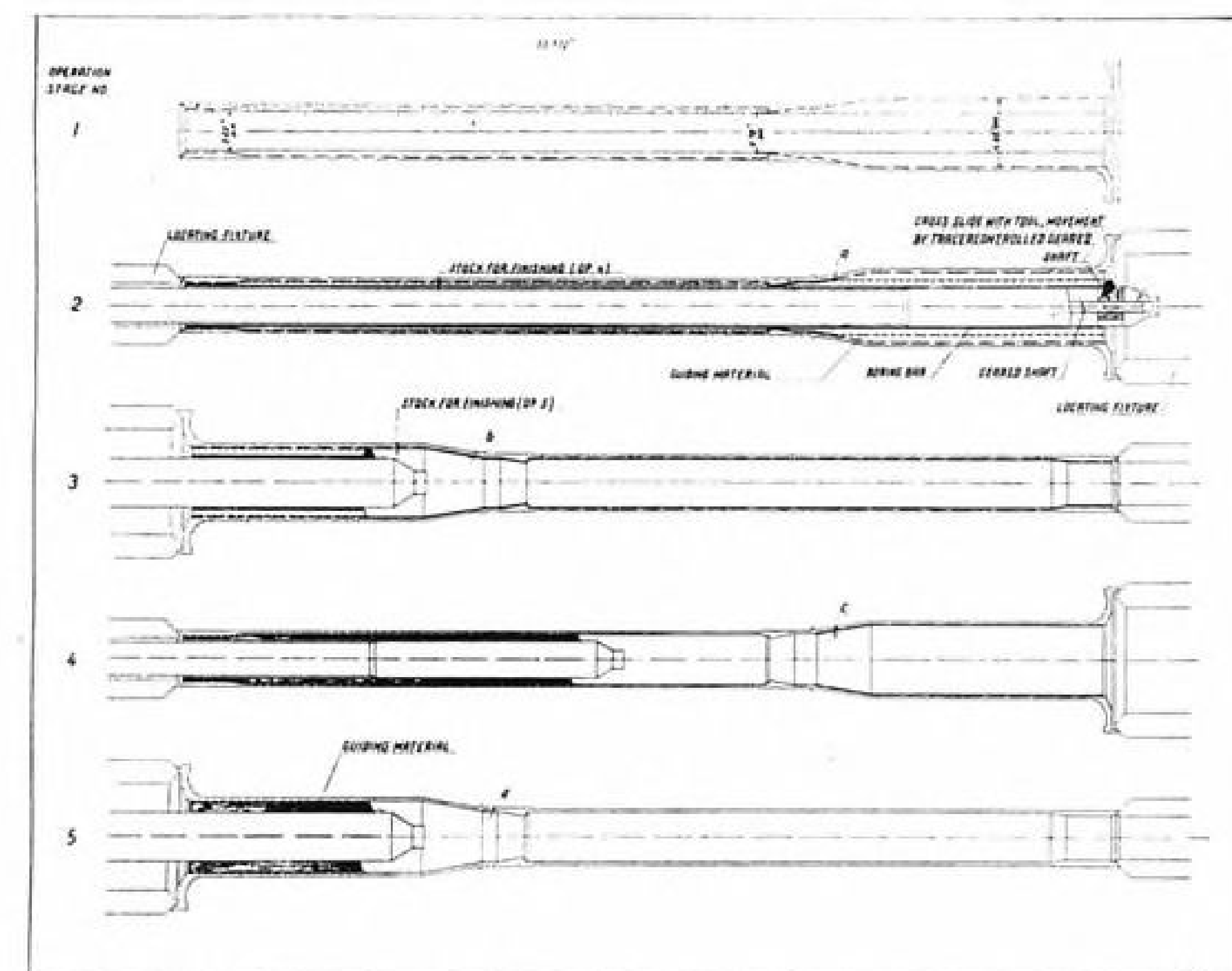
Plants at:

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NEW AVIATION PRODUCTS



MACHINING a jet engine shaft on Alfing H/F 1000 shown in schematic diagram. Dotted line (Stages 1 and 2) indicate metal to be removed by the German boring machine.

Boring Tool Improves Accuracy

Wider latitude in design of jet engine shafts, rocket tubes and similar components requiring intricately profiled internal bores is claimed possible with a German boring machine which employs a unique means of steadying the boring bar within the component.

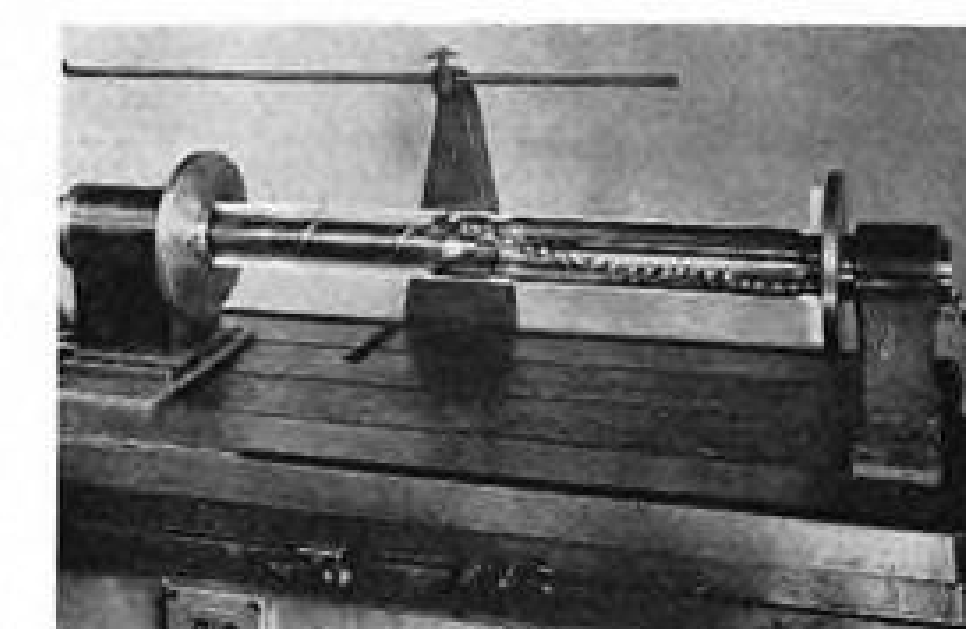
The equipment, developed by Nabefabrik Alfing A. G., is the descendant of a machine used by the Germans in manufacture of jet engine shafts during World War II, according to its U. S. distributor, Morey Machinery Co., Inc. It is being used by Armstrong Siddeley and other British firms. The Russians also picked up an early model after the German defeat, the company reports.

► **Long Bores**—The machine can produce shafts of longer one-piece construction and can tackle boring jobs engineers generally must "design around," Morey says. It avoids the need of piecing together components from shorter sections and bolting. It can make repeated passes within the shaft and fine-profile almost any contour within the reach of the cutting tool arm. Work is to very close tolerances, according to Morey, and a shaft is produced which is said to be better balanced, lighter in weight and stronger. Moreover, the machine is said to do the job faster and at lower cost.

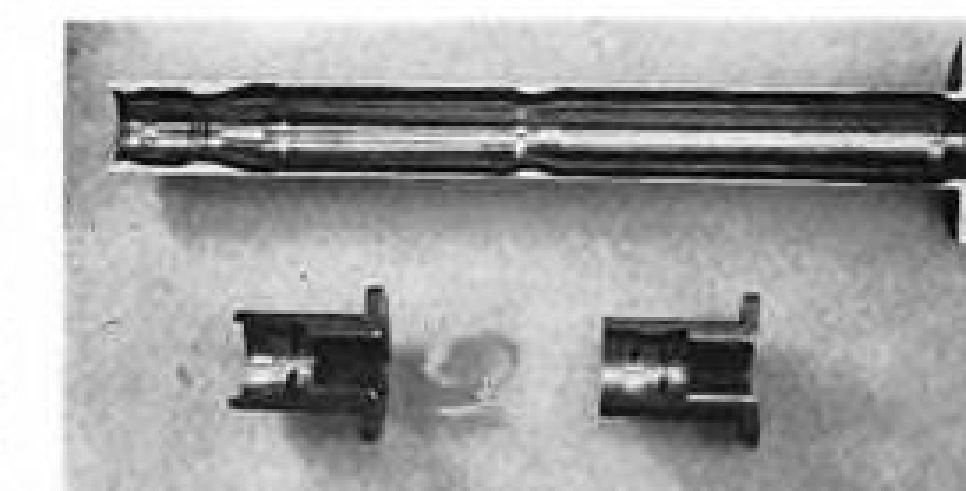
Another plus factor cited for the equipment: It can get into smaller shaft

openings, since the cutting tool retracts within the bar. For purposes of strength, shaft openings usually are smaller than the interior to be hollowed out, the company notes. The present machine has a stroke of 96 in. but could be adapted to handle longer shafts, Morey says.

► **Bar Support**—The key to the tool's



CUTAWAY shows ejection of metal from shaft through open end during operation.



INTERNAL PROFILES are machined to a fine finish by Alfing boring machine.

performance is the novel method used in centering and supporting the boring bar within the component to be worked. Support is given the bar along its entire length—right up to the edge of the cutting tool. Support is always present regardless of irregularities and contour variations of the interior surface on which the bearing must rest.

Lack of support is one of the severe limitations of internal boring under conventional methods, Morey notes. For example, one method is to center and support the boring bar by means of a bit or bushing. But the bushing must have a smooth surface to ride over. This can be used for rifling concentric grooves or for one pass of the machine in cutting out an irregular contour. But it is said to allow no second pass.

► **Plastic Matrix**—Repeated passes can be made with the German machine through reusable plastic, or matrix, which serves as the bearing. The plastic is poured into the already roughly hollowed shaft, leaving only a hole (concentric with the outer diameter) big enough to permit entrance of the boring bar. The plastic is applied by a special machine and hardens in five to 10 seconds.

A fixture centers the work and permits accurate placement of a sizing bar (same size as the boring bar) around which the plastic or matrix is poured (see schematic, stage 1). The sizing bar is removed, leaving a hole large enough to accommodate the boring bar with the cutting tool retracted (stage 2). Thus, a bearing is provided along the boring bar's entire length, virtually eliminating deflection. A main bearing on the machine gives additional support outside the component.

To machine, the bar revolves and turns the cutting tool while a carriage moves the component shaft along its longitudinal axis, enabling the cutter to trace a profile the length of the shaft in one stroke. As the cutter proceeds, it cuts away the matrix support as it machines the part. The tool nibbles away its own bearing, but always leaves support for the bar right up to its tip (stage 3).

Metal chips and matrix are washed out by high-pressure coolant which spirals in a groove around the outside of the bar and sprays out at the cutting tool. Chip removal by this means is said to be an improvement over some methods currently used and provides a clean surface that permits finer finishing, Morey says. The positive support given the boring bar enables the machine to take full advantage of tungsten carbide cutting tools, the company notes.

After a pass, more matrix can be poured into the shaft and the process repeated. Contours can be arrived at gradually by repeated passes, permitting

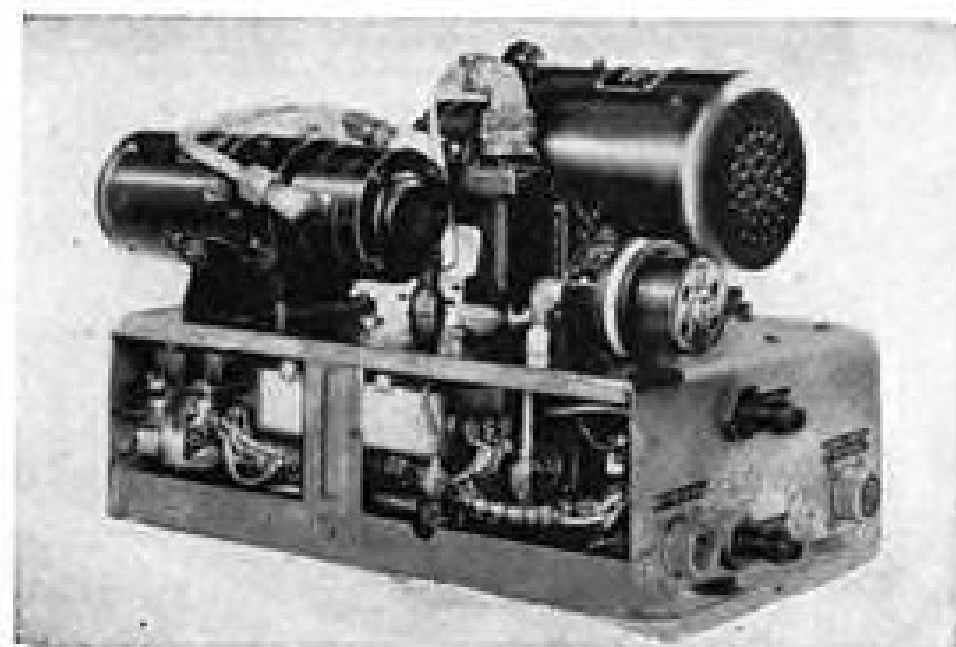
high accuracy. For this reason, a deep bite on the first pass (the last one with machines using a bushing to support the boring bar) is not necessary.

The machine moves the component shaft along its longitudinal axis, drawing it away from the boring bar which rotates the cutting tool. The latter is extended to the work or retracted by hydraulically actuated shaft within the boring bar.

► **Template Control**—Movement of the cutting tool is in direct proportion to that of a slide valve in contact with a profile template. The slide valve meters fluid to both sides of a piston. Movement of the piston in one direction causes the drive shaft to extend the cutting tool, in the other direction, to retract it.

With component reversed to original position, final pass is made on narrow end (Stage 4—black lines indicate matrix support remaining). After shaft has been reversed again to its secondary position, the final pass is made on the large end (Stage 5).

Morey believes this machine, or something very similar, with its high-accuracy, minimum-deflection characteristics, must eventually be adopted by American jet engine manufacturers if the increasingly high-performance demands on jet engine components are to be met.



Radar Pressure Kit Supplies Two Systems

Lear's Romec Div. has developed a Hi-Lo pressurizing kit for radar with a common inlet and air pumps but designed to provide separate pressures to two distinct systems.

Air to the common inlet of the equipment, Model RR-9370, is dehydrated and passed directly to two pumps hooked in series. From there, the pressure line divides, one pipe directing oil- and moisture-free air to the high-pressure outlet, the other to the low-pressure side.

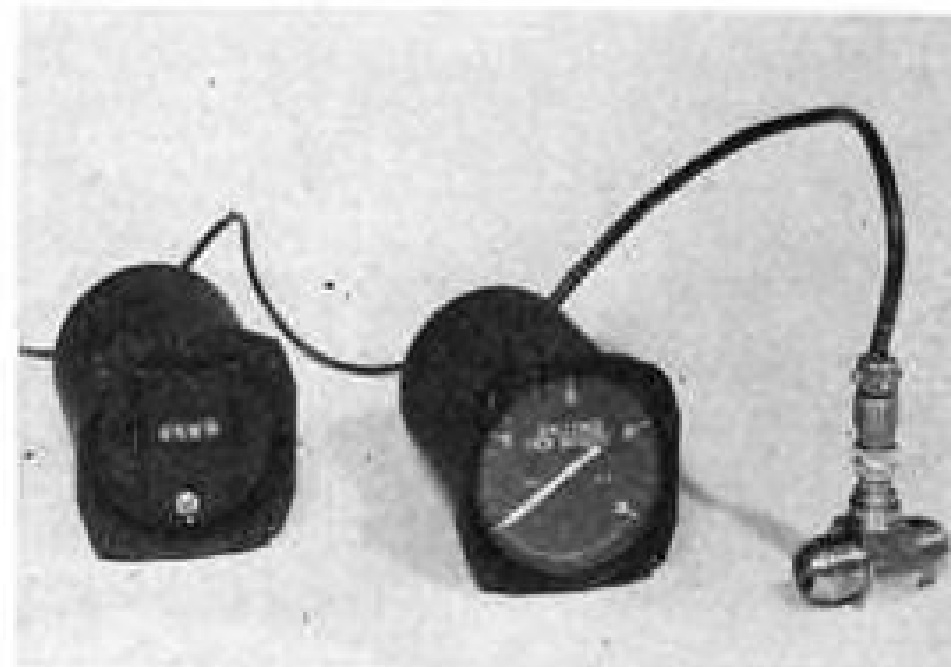
The 15-lb. unit satisfies high-pressure needs through a combination of absolute pressure switches, a relay and a solenoid valve. The solenoid is energized by current controlled by the former units and opens or closes the air line to the low-pressure side. A signal

switch warns of excessive pressure drops.

Pressures are 43-47 psi. absolute for one outlet, 13-17 psi. for the other.

The equipment is capable of pressurizing a 1 cu. ft. container to 43-47 psi. in 10 min. or less in an ambient pressure of 20 in. Hg. absolute and with a leakage of 15 cu. in. min. The two air pumps employed are 1/5 and 1/15 hp., 27 v. d.c. models.

Romec Div., Lear, Inc., Elyria, O.



Light Avionic Flowmeter Uses Few Vacuum Tubes

A new flowmeter system for aircraft weighs only 5 lb. and consists of only two indicators with standard 3½-in. dial faces and a small sensing unit. It has been placed on the market by Potter Aeronautical Co.

Most of the tubes used in previous systems have been eliminated, the company says, through use of magnetic amplifiers. The four tubes remaining are operated well within their capacities for maximum rated life. The magnetic circuitry makes for greater simplicity and ruggedness, the firm states.

The complete system consists of a flow sensing element, flow rate indicator (reading in either pounds or gal./min.) and a totalizer indicating unit. The latter two components are mounted on the instrument panel in standard 3½-in. case, four inches deep.

The flow sensing element produces an a.c. output, with frequency proportional to flow. The element used can be any standard Potter rotating-vane unit widely used for aviation test and research work. Sensing elements are available with capacities as low as 0.1 gpm. and as high as several thousand.

The flow rate indicator electronically converts the a.c. signal from the flow sensing element to a proportional d.c. output which is measured and indicated as rate of flow. It can be used with the totalizer or as an independent unit.

The totalizer, built to the same dimensions as the flow rate indicator, registers the total number of output pulses produced by the flow sensing element, divided by a factor of 32. The indicated reading is multiplied by a constant factor to obtain volume of flow.

Systems are available for operation

on either 400-c., 115-v. a.c., or 24 v. d.c. power. Cost, exclusive of the Flow Sensing Element, is \$850. The rate indicator is priced separately at \$450.

Potter Aeronautical Co., 87 Academy St., Newark 2, N. J.

New Hydraulic Valve Automatically Bleeds Air

Manual bleeding of hydraulic systems to remove air is said to be eliminated with use of a new automatic self-bleeding valve to appear soon on the market.

The valve was developed by Milton Adler, Brooklyn, N. Y., who expects it to bring greater safety and accuracy to hydraulic system operation and reduce maintenance.

The valve is connected adjacent to the entrance port of the hydraulic cylinder. Two valves, therefore, are required for every double-acting cylinder and one for every single-acting unit. Only one valve is needed for hydraulic brake systems, Adler says. The new device is to be made for all standard size hydraulic lines and in all pressure ranges.

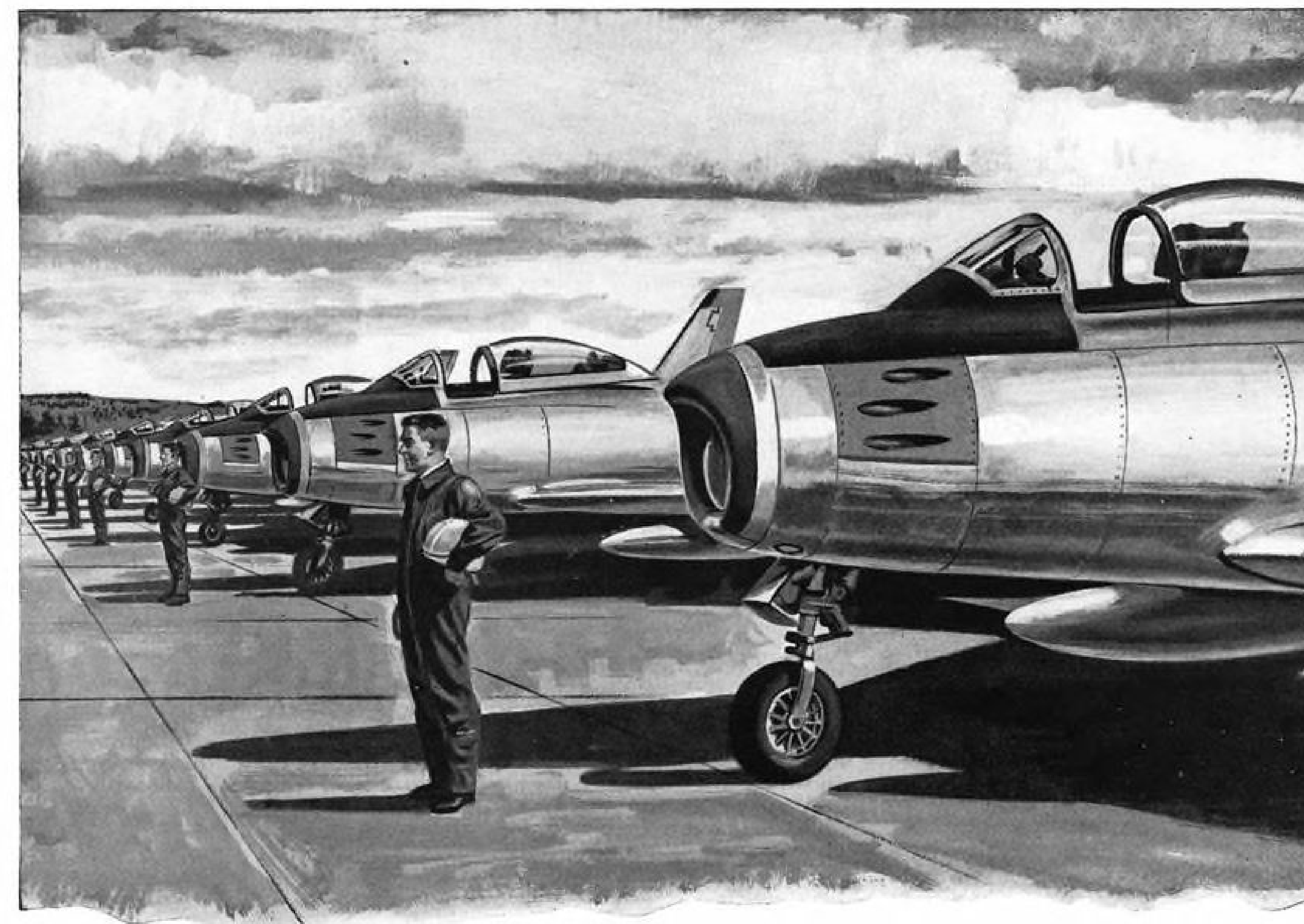
Milton Adler, 3857 Kings Highway, Brooklyn 34, N. Y.

ALSO ON THE MARKET

Color applicator for machinery, instrument, clock and television dials is bench-type, hand-operated, but also can be furnished in foot-, power- and motor-driven models. It uses synthetic rubber printing die molded to match the numbers, letters and design of the dial. Bonded to a metal plate, the die is readily removable, replaceable and adjustable. Printing speeds of 20-50 dials/minute can be obtained it is claimed.—Acromark Co., 305 Morrell St., Elizabeth 4, N. J.

Suction and discharge hose for all kinds of petroleum products is reinforced with two layers of braided rayon cord plus a helix of high tensile spring steel wire, the layers separated by one of rubber friction to reduce internal chafing. Available in 1½-in. to 3-in. inside diameter sizes.—Quaker Rubber Corp., Division of H. K. Porter Co., Inc., Philadelphia, Pa.

Miniature gage pressure potentiometers for remote measurement of hydraulic and pneumatic pressure in aircraft and guided missiles have ¼-watt output, are actuated by flexure of Bourdon tube which moves wiper arm on wire-wound resistance element. They weigh 2 oz., have 0.4% resolution and are available in ranges from 0-100 psi. to 0-5,000 psi.—Bourns Laboratories, 6135 Magnolia Ave., Riverside, Calif.



"On Time" Deliveries COUNT — AT CANADAIR

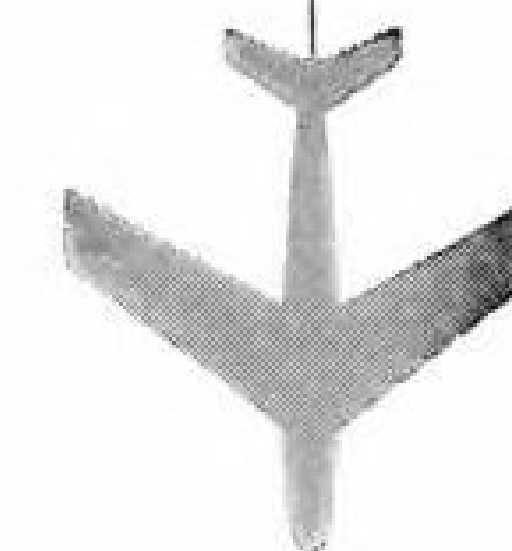
On time production of aircraft . . . the on time delivery to customers . . . that's what counts at Canadair . . . that's the international reputation Canadair has established.

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THIS FELLOW IS TRAINED IN YOUR BUSINESS. His main duty is to travel the country — and world — penetrating the plants, laboratories and management councils . . . reporting back to you every significant innovation in technology, selling tactics, management strategy. He functions as your all-seeing, all-hearing, all-reporting business communications system.

THE MAN WE MEAN IS A COMPOSITE of the editorial staff of this magazine. For, obviously, no one individual could ever accomplish such a vast business news job. It's the result of many qualified men of diversified and specialized talents.

AND, THERE'S ANOTHER SIDE TO THIS "COMPOSITE MAN," another complete news service which complements the editorial section of this magazine — the advertising pages. It's been said that in a business publication the editorial pages tell "how they do it"—"they" being all the industry's front line of innovators and improvers — and the advertising pages tell "with what." Each issue unfolds an industrial exposition before you—giving a ready panorama of up-to-date tools, materials, equipment.

SUCH A "MAN" IS ON YOUR PAYROLL. Be sure to "listen" regularly and carefully to the practical business information he gathers.



McGraw-Hill PUBLICATIONS

AIR TRANSPORT

Nonsked Crashes Keep CAB Probers Busy

- Irregulars have bad year as skeds set safety record.
- Non-airline accidents run about the same as 1952.

By Lee Moore

Civil Aeronautics Board's 26 field investigators are as busy this year as last, despite record scheduled airline safety during the first seven months of 1953 (AVIATION WEEK July 20, p. 79). Reasons: Nonsked airline crashes increased during the period, non-airline flying accidents ran about the same as a year ago.

Another factor is that while air safety per mile flown generally continues to improve, increased amount of flying and faster planes tend to keep total number of serious accidents about the same.

► **Work Load**—However, CAB's Accident Investigation Bureau chief, William Andrews, has cut field offices from 19 to 10 since 1946, field investigators from approximately 35 to 26, and total bureau personnel from 110 to 90. Experience, improved investigation technique and faster personnel transportation have heightened CAB field efficiency.

Peak investigative load of all time across the U. S. was 1947 when the short-lived postwar boom in private flying produced 9,253 accidents, compared with 3,807 in 1951 and 3,657 in 1952.

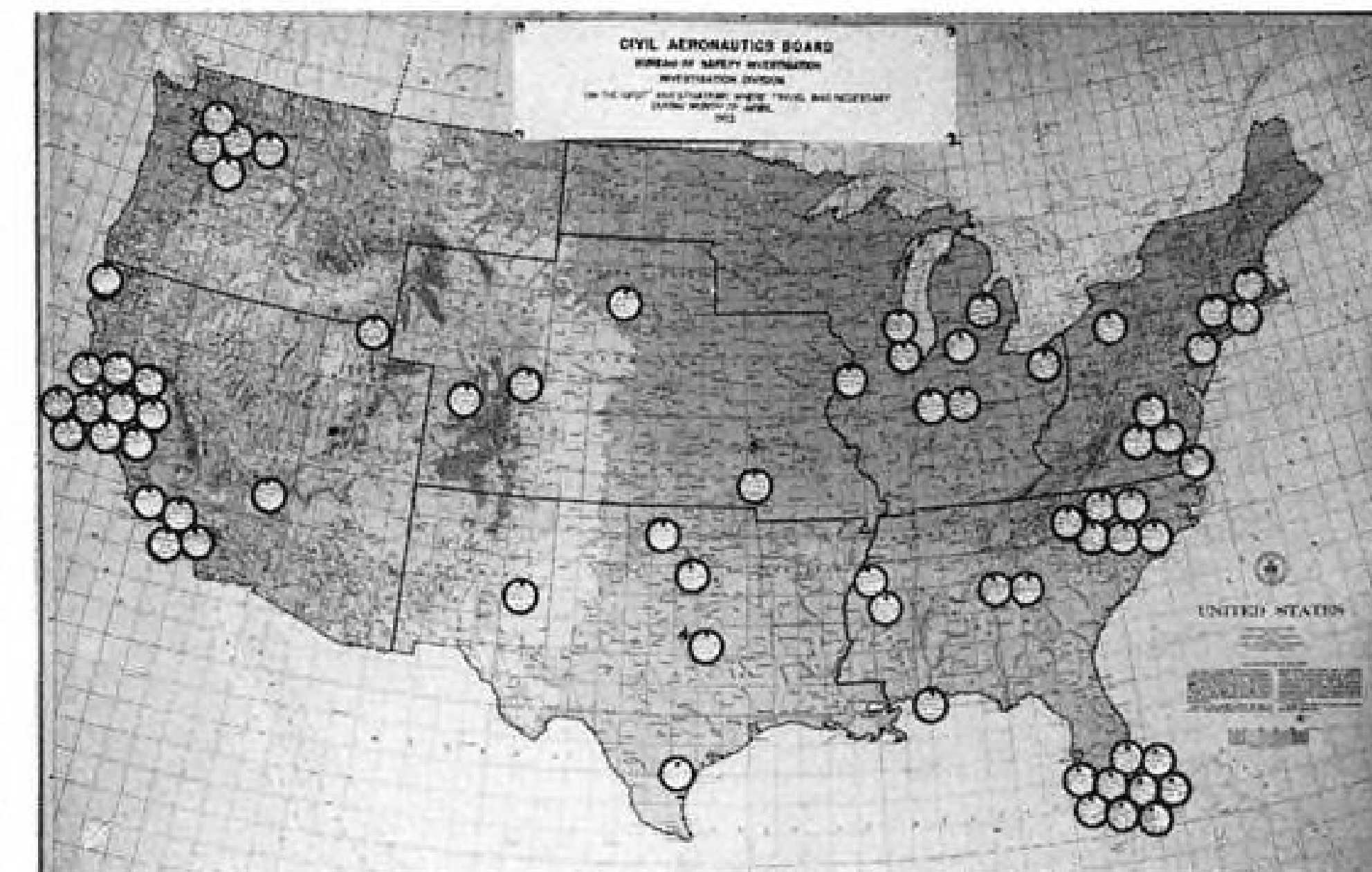
Some CAB members, trying to cut their fiscal 1954 budget, recently proposed closing field offices, sending investigators to jobs from one central office instead. But insiders say the plan appears to be dead now, although the Board has not made a final ruling.

► **1953 Record**—Here is the statistical run-down of 1953 safety record to date, compiled from Air Transport Assn., CAB and National Business Aircraft Assn. statistics:

- **Schedule lines'** passenger-fatality rate dropped from calendar 1952's record low of .9 to a new low of .35 for fiscal 1953. Flying activity gained about 25%.

- **Nonskeds** had a creditable safety record of two fatalities per 100 million miles in calendar 1952 but are estimated at seven in fiscal 1953. Another disaster this July promises to hold their calendar 1953 accident statistics at a higher level.

- **Non-airline fliers'** serious accidents requiring investigation ran about the same as a year ago, but minor accidents



KEEPING TABS on field investigators probing plane accidents, this map in CAB chief investigator James Payton's Washington office shows whereabouts of 26 men making on-the-spot investigations of 68 airline and lightplane mishaps during a typical month.

declined. Activity of business and crop-duster flying gained about 15%, while private flying (no statistics available) probably stayed about even, industry sources estimate.

Here are highlights of airline accidents so far this year, as revealed by information available at CAB in Washington:

Fatal Crashes

► **Scheduled Airlines**—Circumstances of fatal accidents of certificated airlines on passenger flights this year:

- **Gulf of Mexico**, National Airlines DC-6 Feb. 14. Forty-six fatalities, no survivors. The plane entered a violent storm over the Gulf and crashed. Navy and Coast Guard salvaged a wing at a distance from main wreckage.

Wing-break is at Bureau of Standards in Washington for analysis, which may reveal whether cause was metal fatigue, material defect, water impact or wing gust load that caused structural failure in flight.

- **San Francisco Bay**, Western Air Lines DC-6B Apr. 20. Nine fatalities, one survivor. Plane started on the short San Francisco-Oakland hop with trans-bay clearance that permits such flights at a minimum of 500 ft.

Reported ceilings were higher than 500, but rescue helicopters reported zero visibility above 300 ft. The survivor reports that the plane appeared to be flying perfectly but struck the water.

- **Marshall, Tex.**, Delta Air Lines DC-3 May 17. Nineteen fatalities, one survivor. Plane was seen to enter a local thunderstorm before it crashed.

Fatal accidents of certificated airlines on non-revenue flights:

- **Los Angeles**, Western Air Lines DC-3 test flight after major overhaul June 30. One fatality, two survivors. On takeoff, the plane dragged its right wing 100 ft. The right wheel broke off and a prop blade snapped on the runway and sliced through the plane, killing Western's chief inspector. Plane cartwheeled, turned over and burned. Evidence indicated that aileron cables were crossed in overhaul, causing reverse control reaction.

- **Des Moines, Ia.**, Resort Airlines C-46 delivery flight May 22. Two fatalities, no survivors. Severe thunderstorms were in the area. Evidence indicates that the left stabilizer, right wing and vertical fin failed in flight.

► **Cargo Airlines**—Air cargo crashes that involved fatalities:

- **Issaquah, Wash.**, Flying Tiger Line C-54 ferry flight Jan. 7. Seven fatalities, no survivors. Approaching Boeing Field, Seattle, the cargo plane departed from instrument proper approach pattern and hit a mountain 11 mi. from the Seattle range station.

- **Granby, Conn.**, Slick Airways C-46 Mar. 4. Two fatalities. Approaching Bradley Field on an ADF instrument approach, pilot reported over the outer marker. Plane hit trees and ground con-

siderably left of course between the outer marker and the airport.

Evidence indicates there was no mechanical trouble. Ceiling was indefinite, with obscurement at 500 ft. Visibility was one and a half mi., with rain and fog.

► **Nonsked Airlines**—Fatal contract and other passenger accidents of irregular carriers:

• **Fish Haven, Ida.**, Associated Air Transport C-46 military contract Jan. 7. Forty-one fatalities, no survivors. En route from Seattle to Cheyenne over rugged mountains, the plane reported routine cruising at 13,000 ft. Ceiling was 8,000 ft. The C-46 hit a mountain above 8,000 ft.

Investigation indicated that the plane hit in a highspeed dive, but no evidence of mechanical malfunction was found.

• **Alvarado, Calif.**, Transocean Air Lines DC-4 military contract Mar. 20. Thirty-five fatalities, no survivors. Plane last reported at 3,500 ft. on instruments near Oakland. But almost immediately thereafter, witnesses two mi. from place of reporting saw the plane "falling" with wings almost vertical and nose high, as in a violent slip. It crashed nearby.

No evidence has been found to indicate what caused the DC-4 to "fall out" of the cloud layer in this attitude.

• **Selleck, Wash.**, Miami Airlines DC-3 Apr. 14. Seven fatalities, 18 survivors. En route from Spokane to Seattle over rugged terrain, plane reported losing one engine and encountering icing conditions. At last contact, the transport

was down to 4,500 ft. and losing altitude fast.

Evidence indicates the other engine was burned out by the time the plane hit. Evidence also shows that both powerplants and plugs were maintained improperly.

• **Near Wake Island**, Transocean Air Lines DC-6B contract flight July 12. Fifty-eight probable fatalities, no known survivors. En route from Wake to Honolulu, plane made a routine report 300 mi. east of the island while cruising at 320 knots at 15,000 ft. between cloud layers. No emergency report ever was received. Flights in the area reported thunderstorms. Bodies recovered showed evidence of violent impact, but no signs of fire (contrary to early press reports).

CAB awaits arrival in Japan of Japanese fishing fleets located in that part of the ocean at the time. If there were no eyewitnesses, the boats still may report on severity of thunderstorms in the area and produce other evidence with possible direct bearing on the case.

Nonsked fatal accidents on non-revenue flights:

• **Near Selleck, Wash.**, American Air Transport C-46 Apr. 23. Two fatalities, two survivors. Approaching Seattle from Cheyenne, the plane got clearance from air traffic control to cross the Hobart fan marker at 8,000 ft., then cross over to Seattle at 4,000 ft. But the pilot repeated his instructions with erroneous interpretation—4,000 ft. over Hobart. ATC replied "negative, negative," and repeated back the correct

clearance. It was not acknowledged.

C-46 hit the top of a wooded ridge at approximately 4,000 ft., 14 mi. east-southeast of Hobart fan marker—just a half-mile from the scene of an earlier Miami Airlines DC-3 crash.

• **St. Louis, Meteor Air Transport DC-3** May 24. Six fatalities, one survivor. Approaching St. Louis from Teterboro, N. J., pilot was cleared for an ILS approach to Lambert Field. One minute later he reported loss of one engine. This was the last radio contact.

Tower operators saw the plane come in low over the airport in a left turn and disappear beyond the eastern edge. The DC-3 crashed 2,000 ft. from the North-South runway, just off the airport. All four tanks contained fuel. Ceiling was 400 ft., visibility three mi.

Non-Fatal Crashes

While fatal airline accidents capture headlines, CAB investigators are probing numerous non-fatal airline and non-airline crashes, mostly light planes.

Here is the year's tally of airlines' non-fatal accidents reported to CAB in Washington:

► **Scheduled Airline Crashes:**

Colonial DC-4 en route to Bermuda Jan. 25 suffered lightning damage, and crew vision was impaired for several minutes. No injuries.

Northeast Convair 240 landing at La Guardia Airport Feb. 6 dropped in from approximately 100 ft. after a propeller went into flat or reverse pitch. The crash washed out the plane, but



TOP U. S. AIRMEN MEET TO DISCUSS AIRPORT NOISE

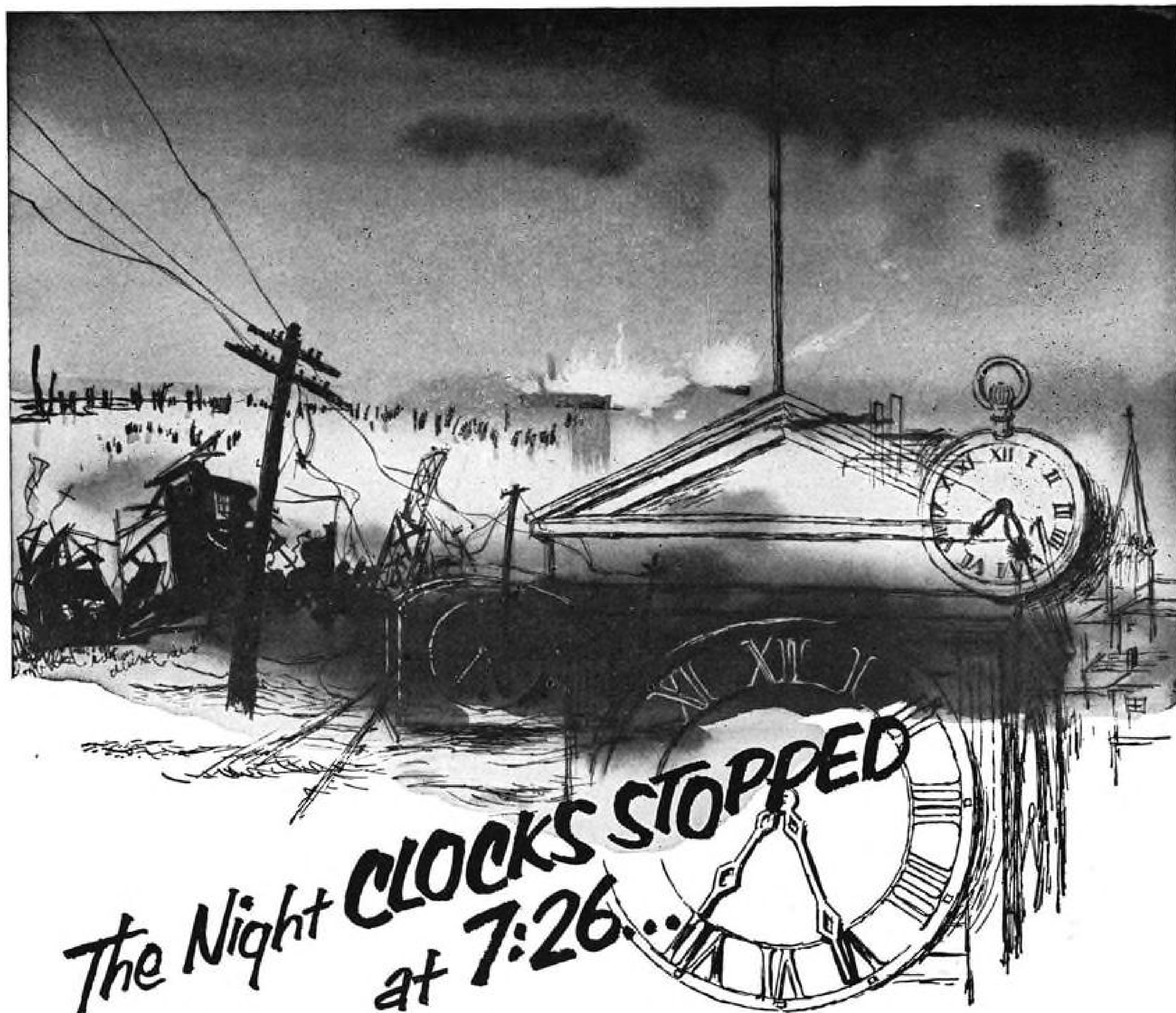
Top officials of the National Aviation Noise Reduction Committee are seen during a recent meeting in Washington, D. C., where they discussed accelerated transport climb procedure being tried in the New York area. The new technique (Aviation Week July 13, p. 96) shows considerable promise of reducing noise nuisance, they were told. Shown seated, left to right: Clarence Sayen, president Air Line Pilots Assn.; Adm. DeWitt

Ramsey, president Aircraft Industries Assn.; CAA Administrator Fred B. Lee, committee chairman; Adm. Charles E. Rosendahl, executive director of National Air Transport Coordinating Committee; Adm. Emory S. Land, president Air Transport Assn. Standing, left to right: Col. J. J. McCabe, USAF; Allan Dallas, ATA; George Prill, Air Coach Transport Assn.; S. H. Rolle, chief of powerplant branch, CAA; V. G. Mellquist, AIA;

Larry Cates, ALPA; M. William Numbers, CAA powerplant branch; Albert J. Forte, assistant to CAA administrator; J. D. Smith, ALPA; Randy H. Hamilton, American Municipal Assn.; Paul Betters, U. S. Conference of Mayors; Capt. H. P. Badger, USN; J. B. Hartranft, Jr., Aircraft Owners and Pilots Assn. Also participating in the meeting was C. C. Thompson, executive secretary of Airport Operators Council.

In designing and fabricating parts, components and products for the Aviation Industry, we must often employ extraordinarily complex procedures . . . But the prime element in all of those procedures can be stated in one very simple word—"PRECISION!"

THE STEEL PRODUCTS ENGINEERING CO.
Precision in Aviation since 1914
SPRINGFIELD, OHIO



Some 9,500 people were in South Amboy, N.J., that drizzly evening in 1950. At the waterfront, longshoremen were transferring the last of 12 freight cars of ammunition to lighters that would carry it to a waiting vessel in Raritan Bay.

But the City Hall clock never got to 7:27—and the freighter's deadly cargo never got loaded. Explosions shattered windows over a

radius of 12 miles; and hundreds of people looked at their arms and legs and saw that flying daggers of glass had stabbed them.

At dawn, 312 of the injured had been counted.

★ ★ ★

Such disasters have happened many times before in America. They could happen again. And if they do—and when they do—there must be blood plasma on hand to take care

of the injured. For blood saves lives!

But blood cannot be mined or manufactured. It must come from the veins of healthy men and women. Men and women who feel concern for a suffering neighbor. So give blood—now! Whether your blood goes for Civil Defense needs, to a combat area, or to a local hospital—this priceless, painless gift will some day save an American life!



**Give
Blood
Now**

**CALL YOUR
RED CROSS TODAY!**
National Blood Program

Business Executives!

✓ Check These Questions!

If you can answer "yes" to most of them, you—and your company—are doing a needed job for the National Blood Program.

☐ Have you given your employees time off to make blood donations?

☐ Do you have a Blood Donor Honor Roll in your company?

☐ Have you set up a list of volunteers so that efficient plans can be made for scheduling donors?

☐ Have you arranged to have a Bloodmobile make regular visits?

☐ Has your management endorsed the local Blood Donor Program?

☐ Have you informed employees of your company's plan of co-operation?

☐ Was this information given through Plant Bulletin or House Magazine?

☐ Has your company given any recognition to donors?

☐ Have you conducted a Donor Pledge Campaign in your company?

Remember, as long as a single pint of blood may mean the difference between life and death for any American... the need for blood is urgent!

there were no injuries. Test runups failed to reveal what happened to prop control circuits.

Eastern Air Lines Super Constellation made an erratic approach to Chicago Mar. 3, landed fast three-fourths down the runway, skipped and veered off. No injuries.

United DC-3 hit severe turbulence while letting down to Reno Mar. 10. Hostess was thrown to the ceiling twice and suffered severe injury. All aboard who were injured had removed or loosened their safety belts despite the fact that the "fasten seat belt" sign was on throughout the flight.

Trans World Airlines Martin 4-0-4 was landing at Wheeling, W. Va., May 8 when the left landing gear oleo drag strut fork failed. During landing roll the gear collapsed rearward. No injuries.

Braniff Airways DC-4 was landing at Dallas May 15 with the No. 4 engine feathered. Landing appeared normal, witnesses said, but the plane rolled beyond the end of the 5,400-ft. runway and crashed through a fence. No injuries.

United Convair 340 nose gear collapsed at Des Moines June 9. Nose and props were damaged. No injuries.

Pan American World Airways DC-6B, landing at Lisbon, Portugal, May 1 in rough air, hit a mound of clay 10 ft. short of the runway. No report on damage.

UAL DC-6 was cruising normally in clear, stable air near Battle Mountain, Nev., April 17, when it hit a sharp, short series of strong turbulence. Seat belt sign was off because no turbulence was anticipated, causing one serious and 19 minor passenger injuries.

American Airlines DC-6 was cruising in rough air near Wilkes-Barre, Pa., Apr. 26 when a passenger failed to return to her seat and fasten belt as requested by the hostess. The passenger was thrown by an air bump and suffered serious injury.

American Convair 240 was cruising in rough air near Joliet, Ill., four days later, when an almost identical accident occurred. Passenger did not fasten her safety belt as requested and was injured when a bump tossed her from her seat.

United DC-3 at Newark June 22. No report.

American Convair 240 was taking off from Ypsilanti, Mich., June 24 when the left engine supercharger failed. It smoked badly, and the supercharger warning light went on in the cockpit when plane had 25 ft. of altitude. Pilot cut the power and belly-landed straight ahead. No injuries.

Air Cargo Express C-46, preparing to land at Annette Island, Alaska, Jan. 8, had failure of the hydraulic system on

the left engine. Pilot got the landing gear down but could not lock it. Left gear gradually collapsed after landing. Hydraulic system was found to be completely severed, and the safety lock for the left main landing gear was jammed in the open position. No injuries.

General Airways DC-3 landed at Miles City, Mont., Feb. 15 with snow and ice on the runway and a light snow was falling. Pilot touched down 1,100 ft. from runway end, tried to ground loop to stop but skittered sideways into a ditch. No injuries.

Coastal Cargo C-46 landed at Battle Creek, Mich., Apr. 25 on wet runway, overshot and rolled through a fence. No injuries.

Argonaut Airways C-46 made a long landing at Louisville, Ky., May 4 on a wet runway, skidded off sideways and nosed up in the mud. No injuries.

Air Transport Associates C-46 accident at Columbus, Ga., June 16. No report other than minor injuries to two crew members, three passengers.

► **Nonsked Non-Revenue Flights:**

All-American Airways C-46, landing at Cheyenne Jan. 1, struck a grade just before the runway. Plane bounced hard; shock broke the right wing, and the plane rolled over. Wind with gusts to 30 mph. was blowing from the right. Two crewmen suffered minor injury.

Argonaut C-46 at San Antonio, Tex., June 19. No report except that there was no injury.

Capitol Airways Beech 35 switched to auxiliary fuel tank near Winslow, Ind., June 15 and the engine quit. Pilot made a wheels-up landing in a small field and hit a tree. No injuries.

► **Cargo Lines:**

Aerovias Sud Americana C-46 approached St. Petersburg, Fla., Mar. 30, overshot the runway and gunned the good engine for a go-round with flaps

in 1948 and 1952 to a minimum of about 100 in 1951.

Dr. Warner sums up: "Prophecies have sometimes been made that the delivery of aircraft on order would leave the airlines expensively over-equipped."

The ICAO chief concludes. "It has not happened, and apparently delivery of new aircraft has substantially kept pace with the growth of demand."

ICAO estimates that there were more than 400 transports valued at more than \$400 million on firm order at the end of 1952 for delivery 1953-56, while about 1,000 planes were delivered 1946-52 to ICAO members.

down. Plane reportedly stalled, crashed into the woods and burned. It was loaded to a gross of 44,300 lb., 700 lb. under the maximum allowed. No one was injured.

Slick C-46 at Albuquerque, June 18. No report other than three crew members and two passengers suffered minor injuries.

Flying Tiger C-46 at Boston, June 26. No report other than substantial plane damage but no injuries.

California Eastern DC-4, en route to Honolulu with cargo the night of Mar. 27, lost the No. 3 and then No. 4 engines and turned back toward San Francisco. Pilot reported he could not maintain altitude. He ditched at sea. The three crew members and one passenger were rescued, uninjured.

Evidence indicates that the pilot's ditching job was "skillful" but that he might have made it back by air if he had used the recommended power and airspeed settings and had dumped cargo and fuel before it was too late for these procedures to save the plane.

Dorval Airport Plans 15-Year Expansion

A new \$4-million terminal will be the first step in the Canadian government's planned 15-year expansion plan for Dorval Airport, Montreal, where the bulk of Canada's trans-Atlantic air traffic is handled.

Domestic and overseas services will be combined in the new three-story structure that will be six times the size of the present terminal. A two-story loading ramp adjoining the new building will have parking space for 60 planes. A separate airfreight terminal also is planned, as well as additional hangars and runways.

El Al Maps \$6-Million Expansion Program

- Line marks bulk of funds for four-engine craft.
- Airline unsubsidized but government controlled.

Between one and three million dollars in American private capital will be sought soon by El Al Israel Airlines as part of the young carrier's contemplated \$6-million expansion program.

The bulk of these funds will be committed to purchase modern four-engine equipment. Both the Lockheed L-1049 Super Constellation and the Douglas DC-6B are under study.

El Al, operating over a network stretching from New York to Johannesburg, owns three L-049 Constellations and four Curtiss C-46 Commandos. (The 049s are being converted to longer-range 149 models.)

► **Big Transports Needed**—No new twin-engine equipment is likely to be bought for at least two or three years, officials say, but the problem of additional big transports has become pressing. The carrier's deputy managing director, Yoel Palgi, has been commuting between Tel Aviv, New York and Los Angeles in recent months, handling preliminary negotiations.

Despite reports in February that top management also was considering Comet 3s, it seems clear El Al only recently has licked its maintenance problems with piston-powered aircraft and is unlikely to initiate an extended and expensive program to retrain Lydda ground crews for jet operation.

Nearly 70% of the carrier's maintenance is done now at Lydda by Israeli mechanics working under 60 veteran U.S., British and South African technicians. Even more is scheduled for the home field when Intercontinental Airways of Burbank, Calif., has finished construction of a complete \$3-million overhaul base for the Israeli government. It will service El Al, the Israeli air force and foreign carriers using Lydda.

► **Buy or Rent**—Both foreign technical advisors and the Israeli commercial directors have agreed on the desirability of Super Constellations, with two or three planes as a minimum order. El Al has two years' experience with Constellations, it has some stocks of Connie parts, as well as low-cost unused B-29 engines being converted for use on the L-049s by addition of blowers.

El Al also is considering buying or renting DC-6s. The final decision on additional planes depends on price, terms of payment, and acquisition of foreign capital.



CONVERSION of El Al's 049 Connies, like one above, to longer-range 149 is underway.

► **Money Matters**—The Israeli operator does not have the hard currency to finance new transports, and the government has been slow to approve a \$3-million loan requested earlier this year. The carrier is unsubsidized, but the government has guaranteed a \$1.5-million loan secured from the Chase National Bank and due for payment by the end of this year.

Some \$600,000 actually will be paid by the government, with El Al scheduled to repay the government between 1954 and 1958. El Al's earnings of hard currency go for gasoline, spare parts, foreign technicians, and installments on this loan.

The company, incorporated in Israel with share capital of \$6 million—£2 million Israel—is in fact under control of the government which holds the two "founder's shares" worth £1,000 each. Their value is nominal—the shares carry direction of major policy.

An additional £1,057,000 in ordinary shares have been issued, and the Ministry of Finance owns £607,000 worth. The steamship company, Zim, holds £250,000, the Jewish Agency some £150,000, and the General Confederation of Labor (Histadrut) £50,000.

► **El Al Personnel**—Senior El Al executive is its managing director, Louis A. Pincus, who had been an attorney in Johannesburg. He also was legal advisor to the Ministry of Transport on Jerusalem and played a key role in negotiation of bilateral agreements for international exchange of landing rights. He came to El Al in 1950, and since June 1952 has been managing director of the airline and director general of civil aviation services in the Ministry of Transport. Running five offices in Tel Aviv, Lydda Airport and Jerusalem, he is busy with both government and carrier problems.

Directly under Pincus are deputy managing director Palgi, paratrooper veteran and author; vice president for

commercial affairs Abraham Rwykind, a lawyer with business experience; Milton Lang, who came to Israel with Jim Wooten's Near East Air Transport and is now under contract as director of production for El Al; legal advisor Lionel Cooper; and "elder statesman" Herbert Cranke, another Johannesburg attorney.

Cranke had been head of Universal Air Services, a DC-3 operation carrying men and supplies from South African Zionists to war-torn Palestine in 1948. He now oversees European services from London and advises on high policy.

Two other influential executives are South African maintenance chief Curly Wimbourne and passenger service supervisor David Bar-Nes, an ex-Dutch lawyer and KLM man.

► **No Land Links**—The Israeli carrier began operations to Europe in 1949 after the young government's November 1948 decision that a country surrounded by hostile powers could not depend on foreign airlines. All services had ended abruptly when Arab forces neared Lydda, leaving the Jewish population cut off from the outside world. Israel has no road or rail links with any other country, and has worked hard to develop air and sea services.

Ten foreign carriers now use Lydda, in addition to El Al. The Israelis began scheduled DC-4 operations with Lydda-Paris flights in July 1949, and by the end of 1950 offered regular service to Nicosia, Istanbul, Athens, Rome, Zurich, Paris, London and New York, as well as Khartoum, Nairobi and Johannesburg. Proceeds from the DC-4s helped pay for the three used Connies put into operation in 1951 and 1952.

The Israeli carrier feels it has come a long way in three years, and the management now understands most of the principal problems of the airline business.

► **Israeli Staff**—While 75% of the 350

employees in 1949 were non-Israeli, today only 110 of the 1,030 on the staff are foreigners. Fifty of these are on the air crew. All cabin personnel are Israeli, many of them trained by an ex-United Air Lines stewardess.

As the Israeli ground crews, flying personnel and cabin staffs perfect their performance, El Al expects costs to decline and operating efficiency to steady. Connie utilization is nearly eight hours a day, and the 1952 system load factor was between 60% and 67%.

► **Business Good**—All the airlines serving Israel have found the traffic generally good and profitable, despite the currency problem. Should the pound become convertible, El Al will face increased competition as the other lines step up frequencies.

If the Israeli carrier gets the money for new transports, these planes probably will be used to increase service on existing routes.

El Al reports it is doing well on the North Atlantic and has very high loads in Europe. It is an all-coach operation, as the Israelis cannot run both types of service with their limited equipment.

There is some chance new routes may be added. In January plans for service to Teheran were announced and it is known that Palgi has been examining revenue and traffic projections for a line through India to Tokyo.

This policy decision also will influence potential investors, as some conservative observers contend such expansion would be over-extension. Finally, there is the problem of how much policy power the American investors will get with their shares.

► **Other Irons**—El Al is installing auxiliary jet units in its five C-46s. The pods, developed for El Al by Dr. Erich Schatzki, use Turbomeca Marbore 2 engines to increase takeoff load of the C-46 by 10,000 lb.

El Al plans to sell the installation to others for \$25,000 (AVIATION WEEK July 27, p. 74).

CAB ORDERS

(Week of July 20-26)

GRANTED:

Northwest and Western airlines permission to serve both Portland and Seattle on the same flight. Board denied United's request to serve those cities direct from Spokane.

Intervention in Ozark Air Lines certificate renewal case by about 75 airlines, cities, chambers of commerce and aviation commissions.

APPROVED:

Routine inter-airline agreements between groups of air carriers.

Alaska Airlines final mail rate proposed in previous show-cause order for U. S.-Alaska

service. This is estimated at \$1,296,000, of which \$87,076 is subsidy. Post Office objected to CAB's use of an operating margin instead of return on investment to measure fair profit, but the Board decided to approve the order.

Acquisition of control by Transocean Air Lines of Aircraft Engine & Maintenance Co., Oakland Aircraft Engine Service Co. and Western Sky Industries. CAB approved interlocking directorships of TAL president Orvis M. Nelson, TAL vice president R. T. Elmore, TAL vice president D. F. Johnson and TAL Director W. E. Rhoades in the other companies.

DENIED:

Eastern Air Lines coach fares to Boston for another three months. Board suspended Eastern's Boston rates filed Apr. 24 because they included first-class fares on Boston-New York segment. Investigation wasn't complete by July 24, so CAB extended its suspension to Oct. 22.

Latin America airfreight applications filed by other airlines for consolidation in Skytrain Airways' reopened case. Board finished case but deferred decision on Skytrain fitness a year ago. Riddle Airlines, Southern Air Transport and Aerovias Sud Americana asked consolidation in the reopened case, but CAB ruled that the issue be kept narrowed to its original question of Skytrain fitness.

Seven Cargo Lines Want Atlantic Routes

More airfreight service and competition on the already-competitive trans-Atlantic run is a sure thing for early next year.

Non-subsidized British cargo carrier Airwork, Ltd., starts hearings before Civil Aeronautics Board this week as a necessary formality before inauguration of London-New York service under its British certificate. Meanwhile, six U.S. applicants for similar certificates submit briefs to a CAB examiner the end of this month, seven years after the original petition.

► **Approval Is Certain**—Airwork seeks American capital to help expand its already-substantial operation. It now operates 14 British passenger and freight planes and two DC-3s on contract, scheduled and freight operation to Africa, Near East and Orient. CAB approval of this carrier's entry to the U.S. market is considered certain because the U.S.-British bilateral air agreement forbids restriction as to number of carriers serving either country.

Washington observers expect Airwork's inauguration of trans-Atlantic airfreight schedules to assure CAB and Presidential approval of similar service by at least one U. S. applicant.

► **Board Reasoning**—CAB does not subsidize cargo operations of certificated passenger lines on some major longhaul routes. CAB staff therefore has recommended that the Board not subsidize Pan American and TWA trans-Atlantic

cargo service. CAB reasoning: If independent carriers can make a profit on such service without subsidy, so can passenger lines.

C-46 Crash-Lands After Losing Engine

Nonsked C-46 with one dead engine crash-landed in a wheat field near Cheyenne, Wyo. (altitude 6,150 ft.), shortly after takeoff July 23.

None of the 35 passengers, all Korea war veterans, and crew of three was hurt, but the plane suffered substantial damage. The Economy Airways (New York) plane was bound from Seattle to Fort Jackson, S. C., via Cheyenne. It developed engine trouble shortly after taking off from Cheyenne. Pilot was unable to make it back to the airport and made a forced landing about five miles from Cheyenne.

This was the fourth nonsked plane to crash in the Pacific Northwest and northern Rocky Mountains area this year. The other accidents were fatal (Fish Haven, Ida., and two near Sellick, Wash.). There is a concentration of nonsked flights moving military personnel over the area because of Korea war embarkation and debarkation at Seattle.

Portland, Seattle Get New Air Service

Portland and Seattle were slated to get more air service last week following Civil Aeronautics Board route grants to Northwest and Western Air Lines.

The Board turned down another application by United Air Lines, which sought authority for direct service to those cities from Spokane without the presently required intermediate stop.

Northwest may now serve Portland and Seattle as co-terminals on the same transcontinental hop, and may also give local shuttle service.

Western is granted the same right of shuttle service between the two cities. Western previously was hampered by restrictions on flights serving both Portland and Seattle.

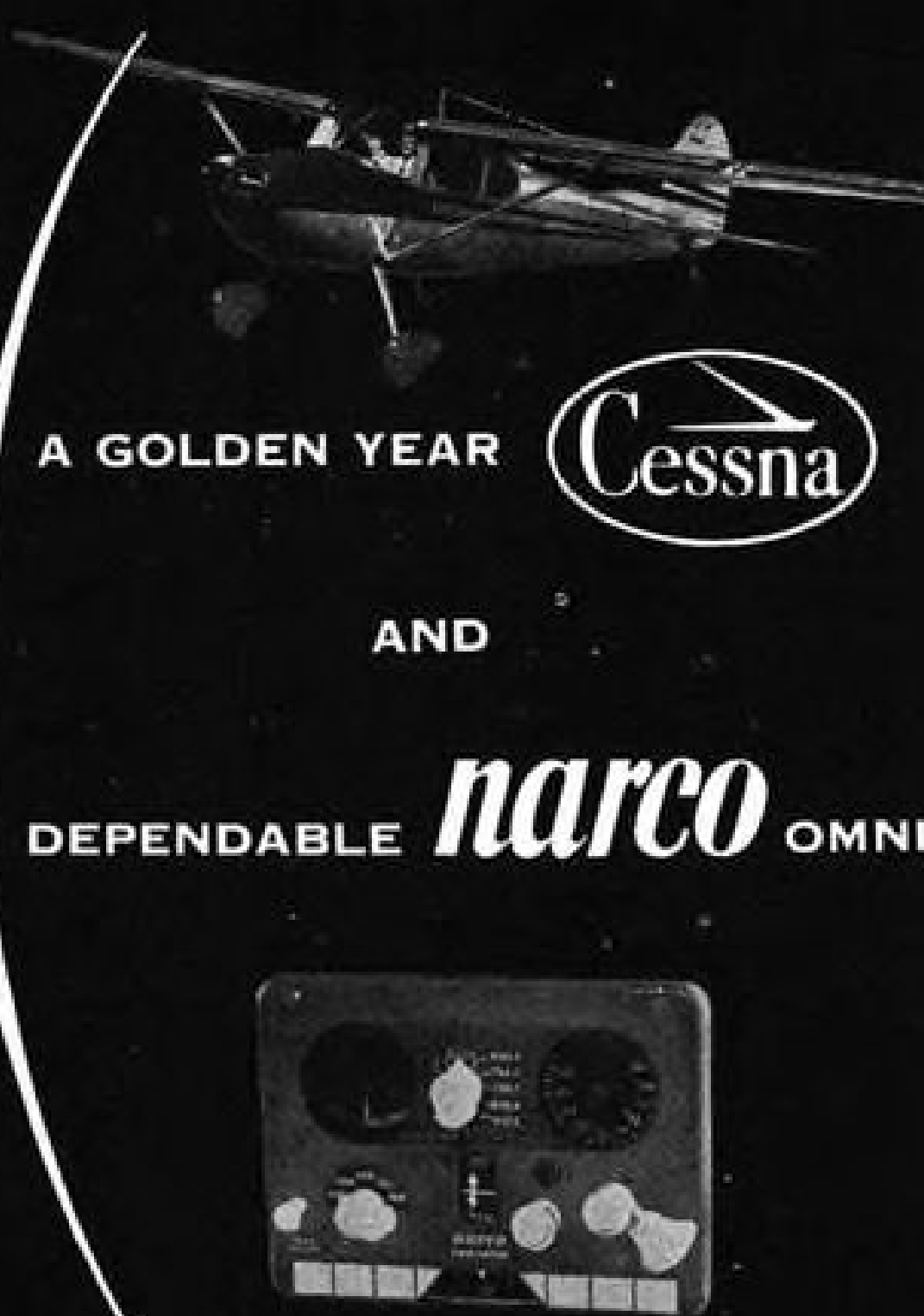
PAA Affiliate Buys Taca de Honduras

Tegucigalpa, Honduras—Pan American World Airways affiliate here, Servicio Aereo de Honduras, S. A. (Sahsa) has purchased Taca de Honduras, S. A.

Merger negotiations between the two competitive domestic airlines have been underway for several years.

Jessie Jett, vice president and general manager of Taca de Honduras, bought the feeder from Taca International Air-

The Right Combination



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Atlantic Traffic

Every week approximately 200 transport planes belonging to 12 U. S. and foreign airlines fly the North Atlantic Ocean, Aircraft Industries Assn. reports. The aircraft are part of the total world airline airlift of some 4,000 planes, of which four-fifths were made in the U. S.

The transports have cut New York-London flight time to 11 hr. 45 min.; in 1946, the trip took 17 hr. 35 min. Despite increased speed, airlines boosted trans-Atlantic first-class fares at the peak travel season only \$2 one way (from \$547 to \$549) during the past seven years, according to a survey made by Dr. Edward Warner, president of the council of the International Civil Aviation Organization.

lines when the Waterman Steamship Co. of Mobile, Ala., took control of Taca International. At that time, Waterman sold local Taca subsidiaries in both Honduras and Costa Rica.

PAA now has combined both of these former Taca feeders with their local affiliated lines in Costa Rica and Honduras.

The combined domestic operation in Honduras serves 13 towns and cities in the Republic of Honduras and operates an international service between San Pedro Sula and Belize, British Honduras.

SHORTLINES

► **Allegheny Airlines** reports load factor of 45% the second quarter this year. Schedules were the same. Company reports profit of \$45,000 compared with losses the same period of 1952 and 1951 and profit of \$122 in 1950.

► **Denver area** storm and hail warning system has been extended to airports in a 100-mi. radius. Lowry AFB radar has been plotting dangerous storms since 1946, but a cooperative inter-airport warning system is new.

► **KLM Royal Dutch Airlines** plans the first trans-Atlantic service by Turbo-Compound-powered transport Aug. 15, inauguration date slated for its first Lockheed Super Constellation. KLM also plans to use the planes on Central America and South Africa routes, clipping jet Comet time on the South African route.

► **Pan American World Airways** has borrowed \$25 million from 29 banks for cash commitments on 27 DC-6Bs and 3 DC-6As which are slated to be delivered during the 12 months ending next June 30.

► **Philippine Air Lines** won a one-year extension of its traffic rights into Japan. Since the two nations have signed no peace treaty, they negotiate annual administrative agreements instead of the standing bilateral air agreements which are conventional among ICAO nations.

► **Seaboard & Western** claims a record airlift of the largest single piece of commercial airfreight across the Atlantic. S & W lifted a 16,000-lb. lower section of an oil tanker's stern frame from New York to Milan, Italy, for Socony-Vacuum Oil Co.'s S.S. Sovac Radiant.

► **Southern Airways** predicts record volume of 150,000 passengers this year. Second-quarter profit was \$19,493.

► **Thai Airways Co., Bangkok**, has ordered two Turbo Compound Super Constellations from Lockheed, bringing total orders for this advanced type to "nearly 100." Thai now uses DC-4s between Bangkok and other Orient cities, including Formosa, Hong Kong, and Tokyo. Company plans to extend service to London with Super Connies, Lockheed says.

► **Trans-Canada Air Lines** is the first commercial line to use the Bendix "cerametallic" brake with inorganic lining and steel rotors. TCA says its DC-4M experience to date indicates a service life of 2,000 hr. or 815 landings, compared with 500 hr. or 215 landings with conventional brakes.

► **Transocean Air Lines** will transport 2,000 Moslems 4 million passenger-miles for their annual "Hajj" from Abadan and Teheran to Jedda, plus shuttle service between Jedda and Medina (tomb of Mahomet). Transocean's "Magic Carpet" is slated to run July 27-Sept. 30. . . . Company is using DC-4s temporarily for its air tourist service to Hawaii following the crash of a DC-6 near Wake Island July 11 (AVIATION WEEK July 20, p. 7).

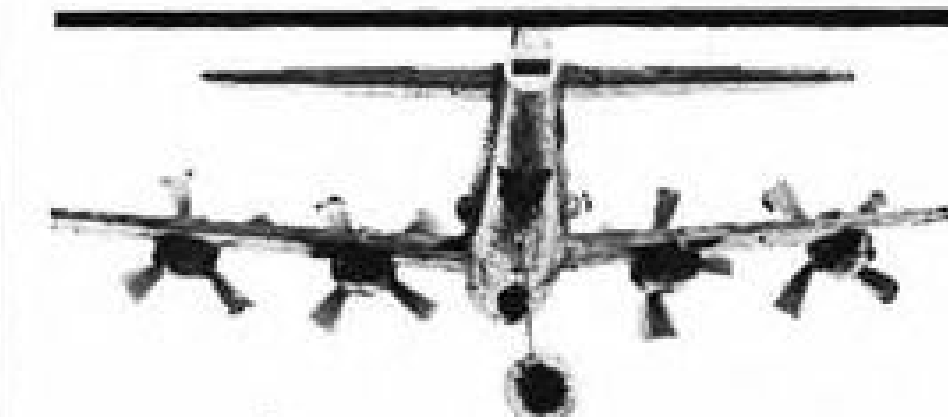
► **United Air Lines** told CAB it will use Douglas DC-7s Los Angeles-Honolulu, cutting time to 7½ to 8 hr. United's fast DC-7 would pose a competitive problem for Stratocruisers and DC-6Bs, now used by Pan American and United. United may convert its luxury Stratocruisers to coach on this route, as Pan American has done, and return the DC-6 coaches to transcontinental service.

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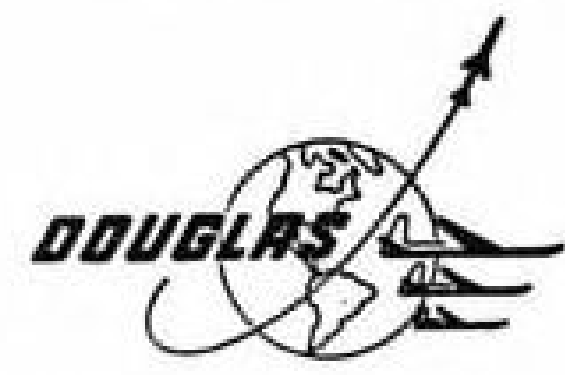
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Stupidity, Bureaucracy or Oversight?

CAR (Civil Air Regulations) Part 40 is the new set of rules covering scheduled air transportation. As yet only partly completed, it is a fine attempt at revising (which was sorely needed) and gathering all pertinent material in one place. The thousands of man-hours spent on this project will generally be beneficial to the industry.

► **Qualification Headache**—It would of course, be positively astounding if a document such as this were to be published error-free. In this sense the latest section of Part 40 is not astounding. The seemingly small matter of "Maintenance of Qualifications" has, contrary to the wishes of the industry, been revamped to produce practically an impossible situation.

The background on this is that an airline pilot cannot simply fly a load of passengers anyplace (legally that is)—he must be "qualified" into the airports where he is to land. This means a visit to each, a practice instrument approach at each, and so forth. Under the old rules this qualification was maintained if, once each 12 months, the pilot flew over the airport.

But not now. Under Part 40, at least every 12 months the pilot must make an actual entry into each regular, alternate and provisional airport into which he is scheduled to fly. Where this is impractical he may substitute an approach in a synthetic trainer.

► **Synthetic Trainer Limitations**—Aside from the bookkeeping problem that is involved here—which is stupendous with present coast-to-coast qualified pilots—this new regulation reveals a startling ignorance on the part of CAB of the limitations of synthetic trainers.

The point they miss is that a synthetic trainer can differentiate only between types of instrument approaches, that is ILS, range, omni, etc., and NOT between two ILS at different locations.

For all practical purposes the ILS is our "standard" approach. Therefore, if a pilot needs to requalify into, say 10 airports, then he will probably do the same thing 10 times. Only names will vary.

► **"Ostrich-izing"**—Obviously an airline pilot is expected to know and be proficient in all types of instrument approaches. But once these are learned, the synthetic trainer loses meaning. An ILS is an ILS no matter where it is located or by what name you call it, and if you can do one you can do all. To say that several hours duplicating one after another, each time changing names, is adding to safety is merely "ostrich-izing."

Actually this procedure adds not one whit to safety. The only practical effects are to penalize airlines and their pilots. Management now has a big bookkeeping problem in recording the legality of each pilot.

Even more important, pilots will not be able to stay legal (again this has nothing to do with safety) into as many airports, and therefore the airline will have a less-flexible operation.

Pilots in turn will suffer: financially because of inability to maintain qualifications, and also through the extra drain on their time off if they are to go through all the requalifying hoopla.

This confusion as to the use of synthetic trainers is, of course, not new. But it would seem that by this stage in the game the capabilities and limitations of these gadgets would be recognized.

► **CAB Off the Beam**—Somewhere inside "the mill," CAB has gone sadly astray on this regulation which, in a sense, controls airline flying. Since nothing is contributed towards safety (and both ATA and ALPA officially argued against such a rule), CAB can only be accused of (1) Stupidity, (2) Bureaucracy, (sometimes synonymous with 1), or (3) Oversight.

We would like to believe that Number 3 is correct.

AVIATION CALENDAR

Aug. 3-8—Fourth annual congress, International Astronautical Federation, Zurich.
Aug. 19-21—Western Electronic Show and Convention, San Francisco.

Aug. 19-24—Seventh International Model Plane Contest, sponsored by Plymouth Motor Corp. at Selfridge AFB and Belle Isle, Detroit.

Aug. 20-23—Air Force Assn. annual convention, Statler Hotel, Washington, D. C.

Aug. 25—Ninth legal committee session, International Civil Aviation Organization, Rio de Janeiro. Meeting will study and revise a draft intended to replace or amend the Warsaw Convention international air law.

Sept. 5-7—National Aircraft Show and 50th anniversary of powered flight, Dayton (Ohio) Municipal Airport.

Sept. 7-13—1953 SBAC Coronation Year Flying Display, Farnborough, England.

Sept. 7-17—Fourth International Aeronautical Conference, joint meeting of RAeS and IAS, London.

Sept. 9-11—Air Safety seminar of Flight Safety Foundation. Probable location: Luxembourg.

Sept. 12-13—Third Wisconsin air pageant, Curtiss-Wright Airport, Milwaukee.

Sept. 19—Canadian National Air Show, sponsored by Toronto Flying Club, Toronto.

Sept. 21-25—Eighth National Instrument Exhibit, Instrument Society of America, Sherman Hotel, Chicago.

Sept. 22-25—1953 meeting of Aircraft Spark Plug and Ignition Conference, Champion Spark Plug Co., Toledo.

Sept. 28-30—Ninth annual meeting, National Electronics Conference, Hotel Sherman, Chicago.

Sept. 29-Oct. 3—National Aeronautics Meeting, Aircraft Engineering Display and Aircraft Production Forum of the Society of Automotive Engineers, Hotel Statler, Los Angeles.

Sept. 30-Oct. 2—Aircraft electric equipment conference, American Institute of Electrical Engineers, Benjamin Franklin Hotel, Seattle.

Sept. 30-Oct. 2—Series of seminars on transonic testing in windtunnels, Purdue University, Lafayette, Ind.

Oct. 1-3—Air Reserve Assn.'s annual convention, Angebilt Hotel, Orlando, Fla.

Oct. 10—England-Christchurch (New Zealand) air race, with speed and transport handicap sections.

Oct. 13-15—Air Transport Assn.'s annual Engineering and Maintenance Conference, Saxony Hotel, Miami Beach, Fla.

Oct. 14-15—Annual airport development and operation conference, sponsored by New York Department of Commerce, Onondaga Hotel, Syracuse, N. Y.

Oct. 28-30—Annual convention of South-eastern Airport Managers' Assn., Marlin Beach Hotel, Ft. Lauderdale, Fla.

Nov. 3-4—1953 Transport Aircraft Hydraulics Conference, sponsored by Vickers, Inc., Hotel Park Shelton, Detroit.

Nov. 4-6—Meeting of Society of Automotive Engineers Committee on Aircraft Hydraulic and Pneumatic Equipment, Statler Hotel, Washington, D. C.

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after you've read
this magazine

... and clipped pertinent ideas,
articles and advertisements for
reference, please do not burn or
throw it away.

Here are two sound reasons
why:

1) Wastepaper can help to swell the funds of your local Boy Scout Troop, your church or other community organization. It gets a good price these days.

2) Whether in magazine form or not, wastepaper helps to fill the increasing need for paper pulp brought on by the mobilization effort.

Collect it. Give it to your favorite organization. Chances are they have scheduled pickups.

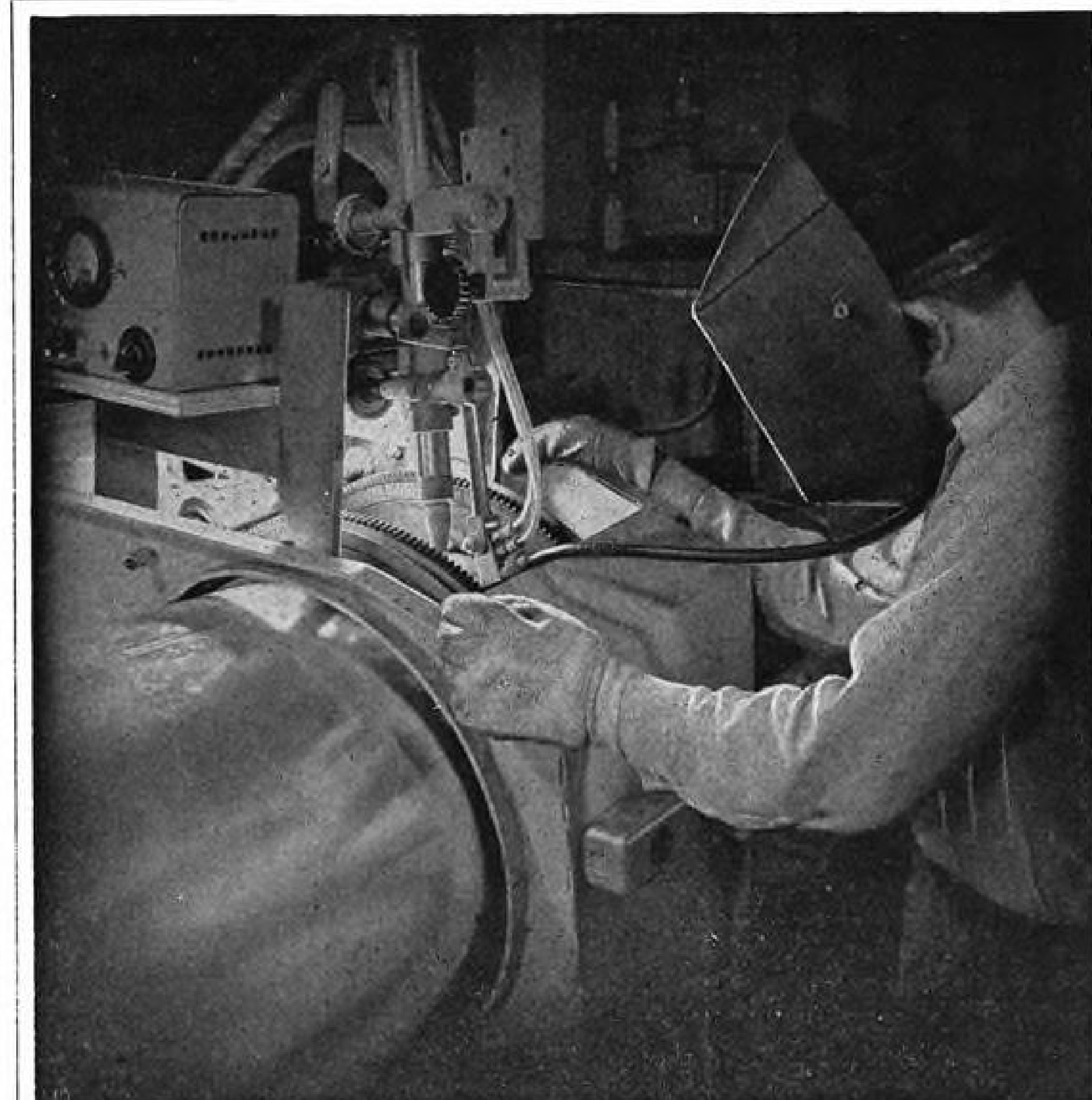
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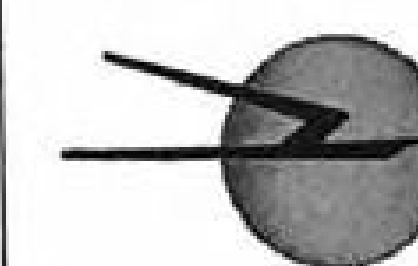
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Pastushin Aviation aluminum jettisonable fuel tanks are increasing range and combat effectiveness of America's front-line aircraft. Modern fabrication methods insure precision production of all Pastushin aircraft components.

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PASTUSHIN CORPORATION
5651 West Century Boulevard • Los Angeles 45, California
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EDITORIAL

'Six Times Safer'

A spokesman for the Association of American Railroads boasts that train travel last year was 6½ times safer than scheduled airlines, despite the all-time safety record of the air transport industry.

The railroads rang up a perfect passenger safety record in 1952—not a passenger killed—and we congratulate them again on a great achievement.

We want the airlines to attain perfection, too. But we submit that the railroader's reference to air safety sounds worse than it is, because in studying both industries' records we are dealing with astronomical passenger-mile totals that cut the average passenger's risk to a minute figure, and we think the American public knows it.

In calendar 1952, for example, the domestic airlines' fatality rate was .38 per 100 million passenger-miles, and in the most recent 12 months period computed (ending June 30) it was .43.

If our industry maintained this latest safety record for the rest of time, it would take the average passenger nearly 2,000 years before he would encounter a fatal accident, even if he made a trans-continental flight every week.

This is a chance most of us will take—even if the railroads continue to proclaim they are several times safer. Who wants more than 2,000 years to live, anyhow, especially if he has to spend most of them on trains!

Unleash Those Airliners!

This will sound like those stories at the dawn of the postwar era, but it must be told again. History is repeating itself in these days of record traffic volumes.

About 40 of us passengers were sitting in a modern twin-engine airliner in Washington the other day, ready to start a nonstop flight to New York.

The pilots were aboard. So were all the passengers. But then attendants began making the rounds, demanding to see our tickets all over again. There was, it seems, one less ticket stub than passengers. It was almost 15 minutes later before we were ready to go.

It's an old story to the industry—these needless delays on the ground—but a curious passenger next to us wondered why the airlines pay thousands of dollars for each extra mile-an-hour cruising speed in new airliners when a \$60-a-week ramp employe still can—and frequently does—add 15 minutes to each passenger's scheduled 70-minute journey.

A 70-minute trip from ramp to ramp between Washington and New York produces an average speed of 184 mph. over this 215-mi. airway. An 85-minute trip cuts the speed to about 152 mph.

What does the passenger care about extra speed in flight if the premium is washed out sitting on the ground waiting to start? As far as he is concerned, his trip started when he entered the airplane and it lasts that much longer than his timetable tells him it will, whether he is in the air or not.

An educational program for ground attendants, includ-

ing a course in counting tickets, should be considerably cheaper than buying a fleet of new airplanes that will travel faster—but only after they are permitted to start.

Genius at Work

Under the headline above, AVIATION WEEK will begin soon to publish reports of interesting, important or unusual activities by companies or individuals in aviation who have not been well publicized in the past.

We have been receiving tips and information from readers since we announced recently that AVIATION WEEK would give publicity to those whose services or products are unusual or outstanding, or which perform unique or especially valuable jobs. Publicity men are not necessary for you to get a worthwhile or interesting story in AVIATION WEEK.

Just remember that such news is most avidly read which is unique, little known, quite different, or reports opportunities for economy, time saving, or new industrial or business possibilities. Your information must be important to many businessmen or technical people—not just a handful.

It's not too late to write us. Here's an opportunity to win publicity for your company. Write to AVIATION WEEK, 330 West 42nd St., New York 36, N. Y.

Novel Viewpoint From Britain

An unconventional British viewpoint on aviation is expressed by a newsletter in England, and copies are being circulated throughout the U. S. aircraft industry.

The newsletter says government subsidies for transport prototype procurement are now as much a part of United Kingdom policy as they have been for military planes.

"With few exceptions, the postwar prototype crop owed their existence to government sponsorship," says Aviation Report. "Whatever may be said about the success of this arrangement, there can be no denying that it has been won at enormous public cost and with no end of mistaken decisions. There is a longish list of ventures that have shown, or seem likely to show, little or no commercial return compared with the tens of millions spent on them—Tudor, Shetland, Solent, Brabazon, Princess, Marathon and Apollo, for example."

The letter points out that in their original prototype configurations, none of the three turbine types, Comet, Viscount and Britannia, settled down thoroughly.

"Well before the Comet 1 was in service, it had been agreed to cut it short and go for the Comet 2; and now, before the Comet 2 is in service, the Comet 3 project is being rushed to provide the enhanced combination of capacity and range."

The publication urges caution in committing millions of pounds more for further advanced designs until "a clearer picture" is available of U. S. manufacturers' plans. "The U. S. profited through watching Britain reveal its hand—now the U. K. in turn may wait for the California specifications to crystallize." —Robert H. Wood



Time-Saver FOR EXECUTIVES

Fast-Thinker FOR PILOTS

■ Sperry's Zero Reader® Flight Director is a "fast-thinking" calculator that saves valuable time for busy executives and relieves pilots of complex mental calculations. That's why more and more progressive corporations—large and small—are equipping their Executive Aircraft with this versatile instrument.

■ The Flight Director not only is used for en route flying but makes the

difficult task of manual approaches on Instrument Landing Systems a routine procedure. Thus, business men are assured of keeping appointments even in rough weather.

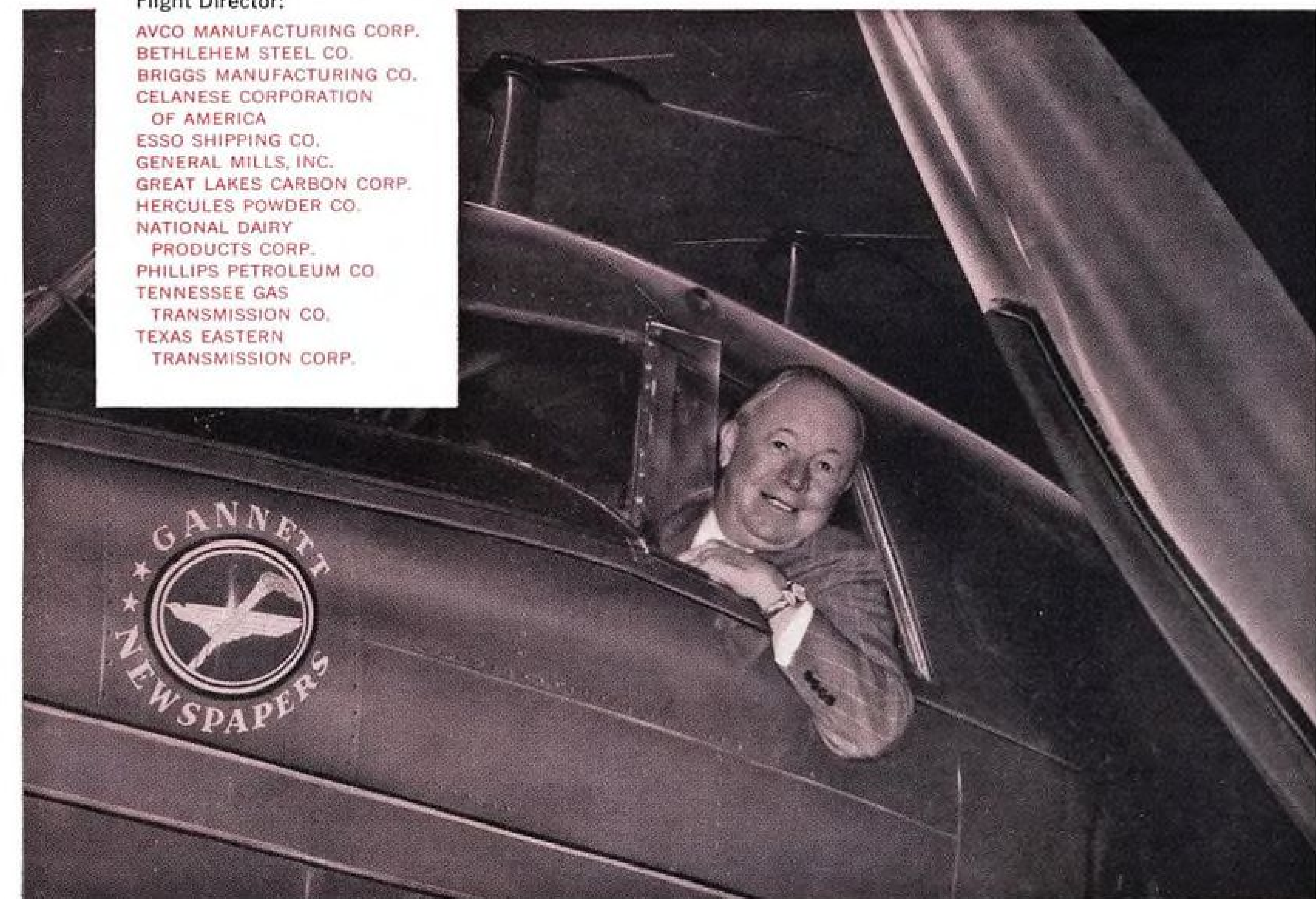
■ The Flight Director utilizes attitude, altitude, heading and radio path signals and combines this information on a simple, two-element indicator. The pilot simply flies "zero," using the same

instrument whether he is leisurely cruising or making landing approaches. This simplified manual control reduces pilot fatigue and permits the pilot to devote more time to other duties.

■ Sperry's Zero Reader Flight Director is widely specified for military and passenger planes as well as for Executive Aircraft. Our nearest district office will be glad to give you complete details.

Representative companies using Sperry Zero Reader Flight Director:

AVCO MANUFACTURING CORP.
BETHLEHEM STEEL CO.
BRIGGS MANUFACTURING CO.
CELANESE CORPORATION
OF AMERICA
ESSO SHIPPING CO.
GENERAL MILLS, INC.
GREAT LAKES CARBON CORP.
HERCULES POWDER CO.
NATIONAL DAIRY
PRODUCTS CORP.
PHILLIPS PETROLEUM CO.
TENNESSEE GAS
TRANSMISSION CO.
TEXAS EASTERN
TRANSMISSION CORP.



Cmdr. Russell Holderman of the Gannett Newspapers, who is celebrating his 40th year as a pilot, is one of the enthusiastic users of the Sperry Zero Reader Flight Director.

SPERRY **GYROSCOPE COMPANY**
DIVISION OF THE SPERRY CORPORATION

GREAT NECK, NEW YORK • CLEVELAND • NEW ORLEANS • BROOKLYN • LOS ANGELES • SEATTLE • SAN FRANCISCO
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elastic stop nuts

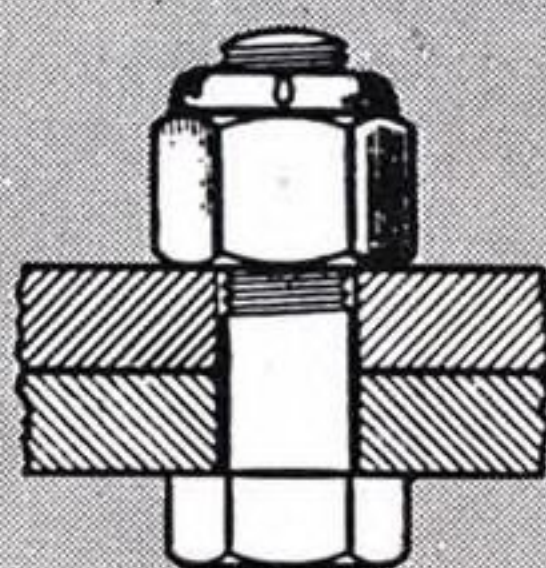
solve all ten
types of problems

Here are ten typical fastening problems. One device, the ELASTIC STOP nut, solves them all—without additional parts or operations. Deliberately undersized in relation to bolt diameter, the red elastic collar grips the bolt with a perfect fit, exerting a continuing self-locking pressure against the threads, and holding the nut securely in place at any point on the bolt. It also provides a tight seal against the bolt threads, which prevents seepage and wear-producing axial play. And because the bolt threads are protected against moisture from without, the nuts are not “frozen” to the bolt by corrosion.

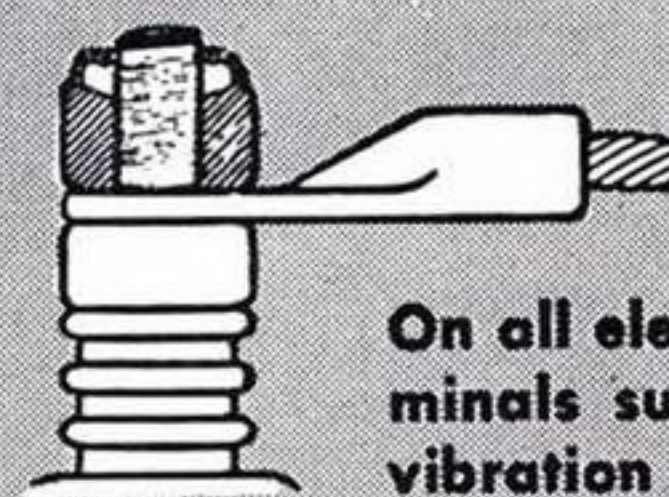
ELASTIC STOP nuts stay tight, right where you put them, in spite of vibration and stress reversals. Yet they are not jammed in place, and can be removed with a wrench and reused many times.

For further information on ESNA self-locking fasteners, mail the coupon below.

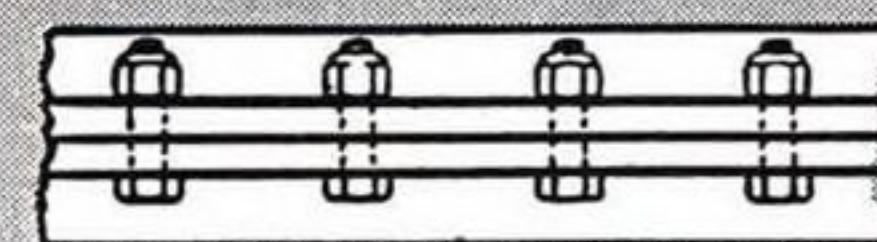
TIGHTENED AGAINST THE WORK



Wherever a vibration or impact proof bolted connection is desired.

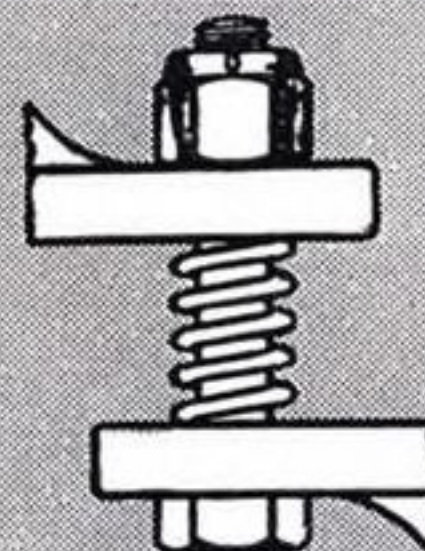


On all electrical terminals subjected to vibration in transit or operation.

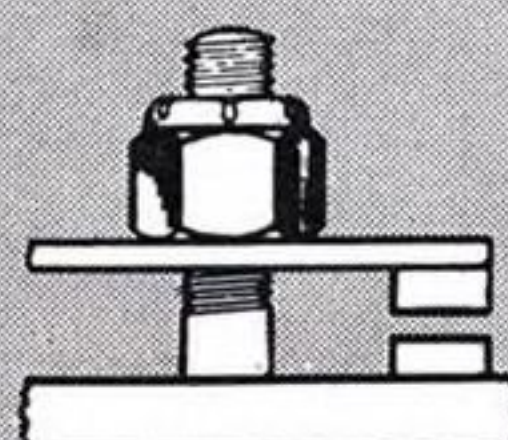


For uniform and precise prestressing of multiple bolt assemblies . . . adjusted by predetermined wrench torques.

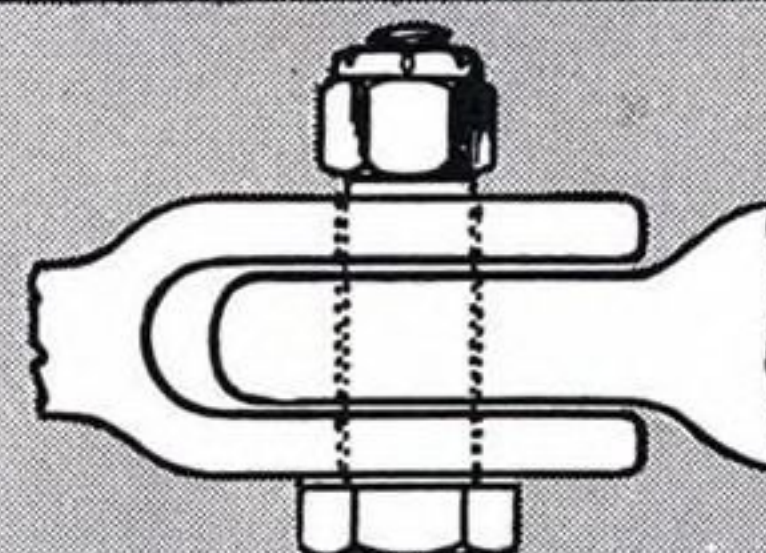
LOCATED ANYWHERE ON THE BOLT



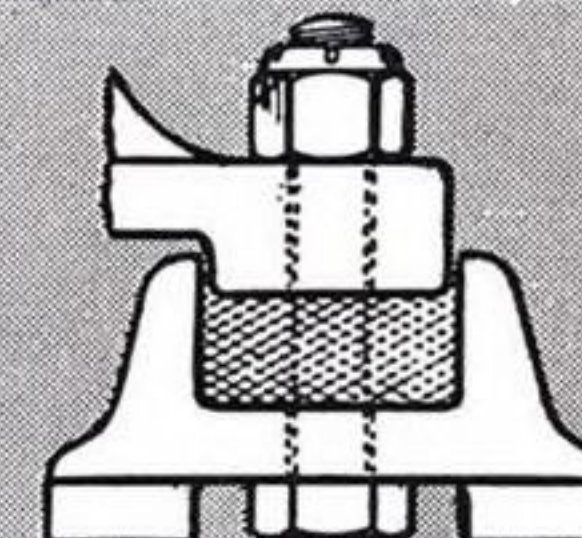
Spring-mounted connections or dynamic balancing, where nut must stay put yet be easily adjusted.



On make-and-break adjustment studs where accurate contact gaps are required.

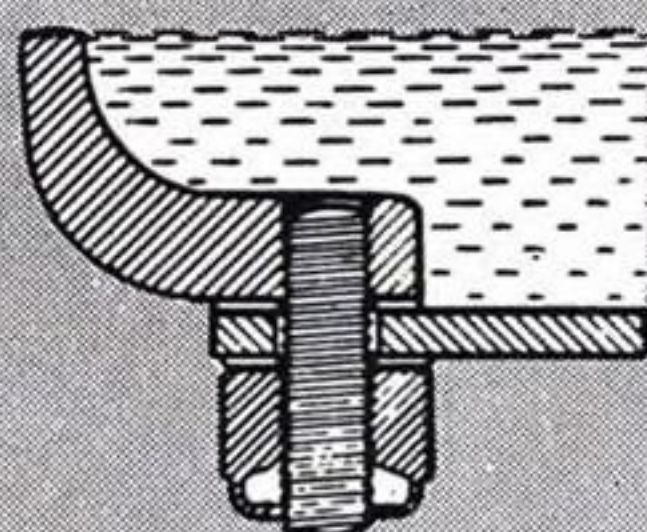


For bolted connections requiring predetermined play.

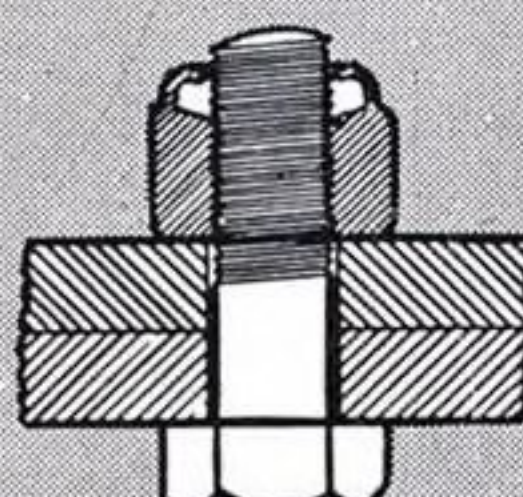


For rubber-insulated and cushion mountings where the nut must not work up or down.

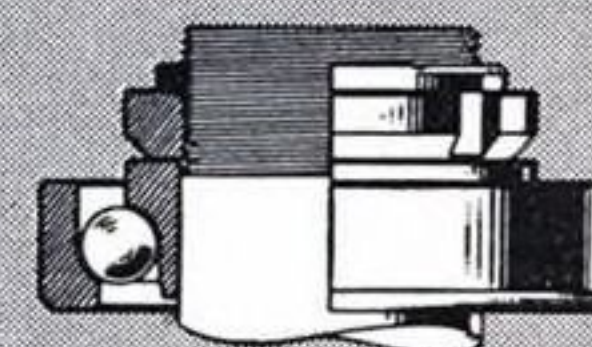
FOR MANY SPECIAL APPLICATIONS



To seal bolt threads where elimination of leakage past stud threads is necessary.



To seal bolt threads where it is necessary to protect them from corroding elements.



To obtain delicate adjustments for applications such as bearing lock-nuts where precise adjustment is essential.

ELASTIC STOP NUT CORPORATION OF AMERICA



Dept. N41-825, Elastic Stop Nut Corporation of America
2330 Vauxhall Road, Union, New Jersey

Please send the following free fastening information

- ☐ Elastic Stop nut bulletin ☐ Here is a drawing of our product. What self-locking fastener would you suggest?
☐ Rollpin bulletin

Name _____ Title _____

Firm _____

Street _____

City _____ Zone _____ State _____