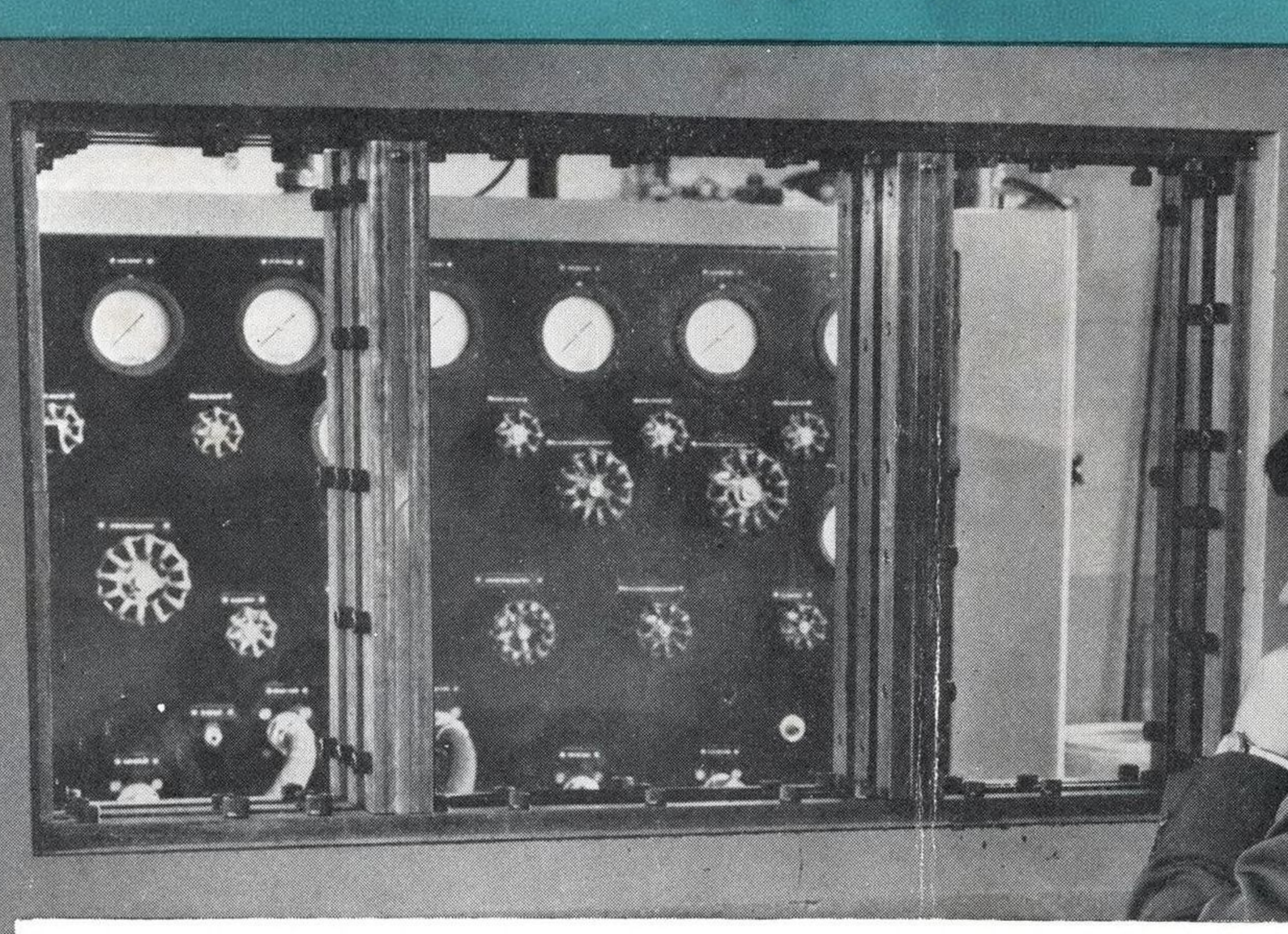
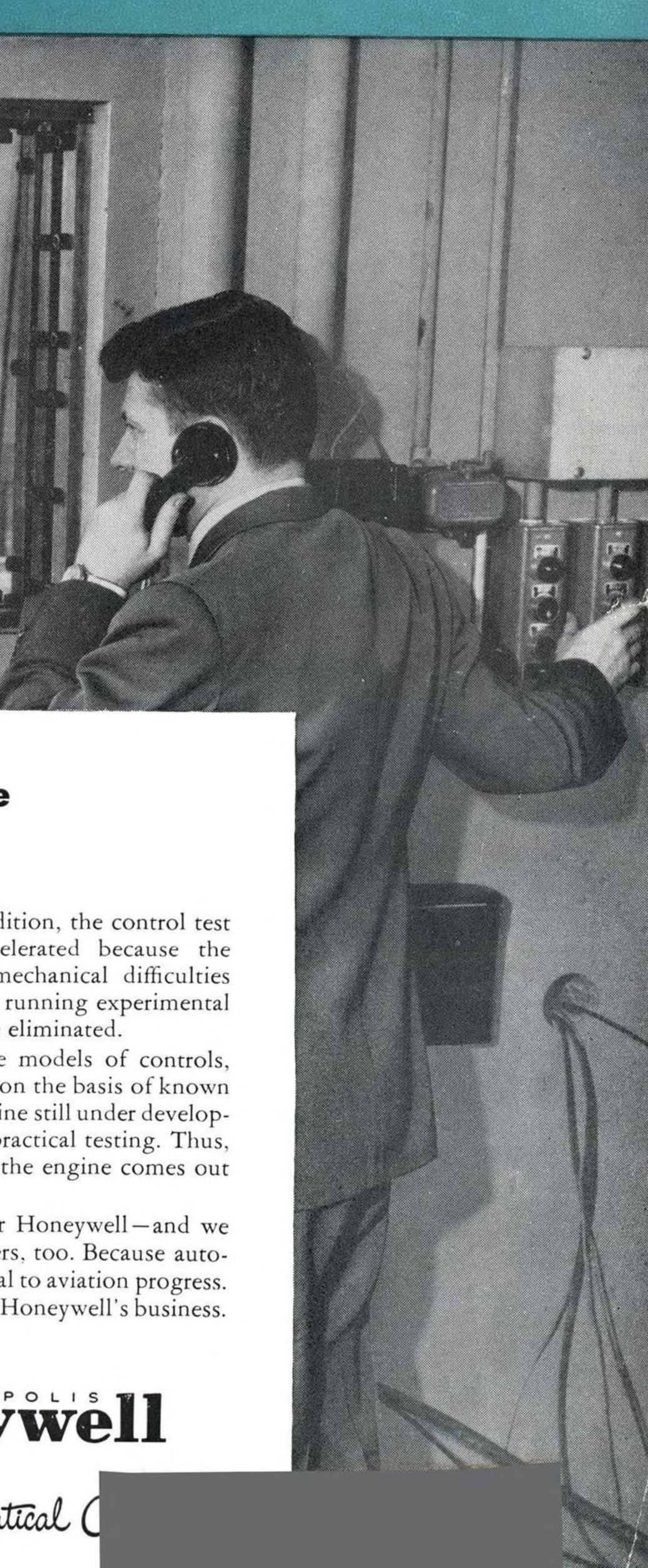
AVIATION WEEK

APRIL 6, 1953

A McGRAW-HILL PUBLICATION

50 CENTS





Testing controls for a jet engine that doesn't exist—yet

Question:

How is it possible to design automatic controls for a jet engine that's still under development—hundreds of miles away?

Answer:

Through the combined facilities of the new Honeywell Jet Engine Control Laboratory and Honeywell's analog computing equipment.

The controls are set up on the test bench shown here and receive the mechanical equivalent of electrical signals sent from the remotely located analog computer acting as engine simulator. In response, the automatic controls operate actuators which control fuel flow and open and close a simulated tail cone or exhaust nozzle.

These procedures make possible tests in engine operating regimes not attainable in the average test cell utilizing an actual engine. This means that the effects of altitude, flight speed, and inlet temperature can all be evaluated over their entire range. In addition, the control test program is greatly accelerated because the delays resulting from mechanical difficulties normally encountered in running experimental engine test programs are eliminated.

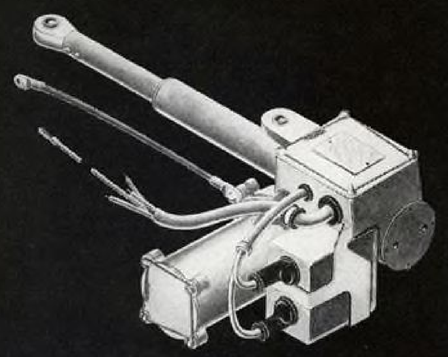
In this way prototype models of controls, designed by Honeywell on the basis of known characteristics of a jet engine still under development, are given tough, practical testing. Thus, they can be ready when the engine comes out of design.

It's another "first" for Honeywell—and we expect there will be others, too. Because automatic controls are essential to aviation progress. And automatic control is Honeywell's business.

MINNEAPOLIS **Honeywell**

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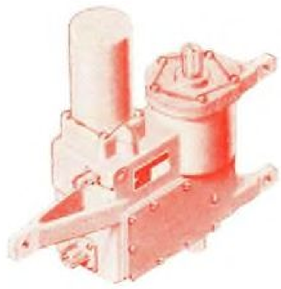
Aeronautical C



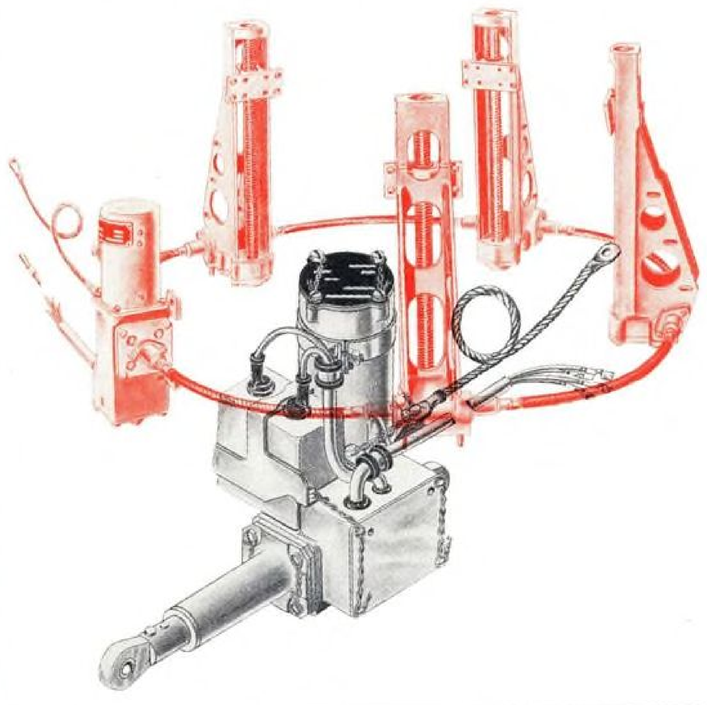


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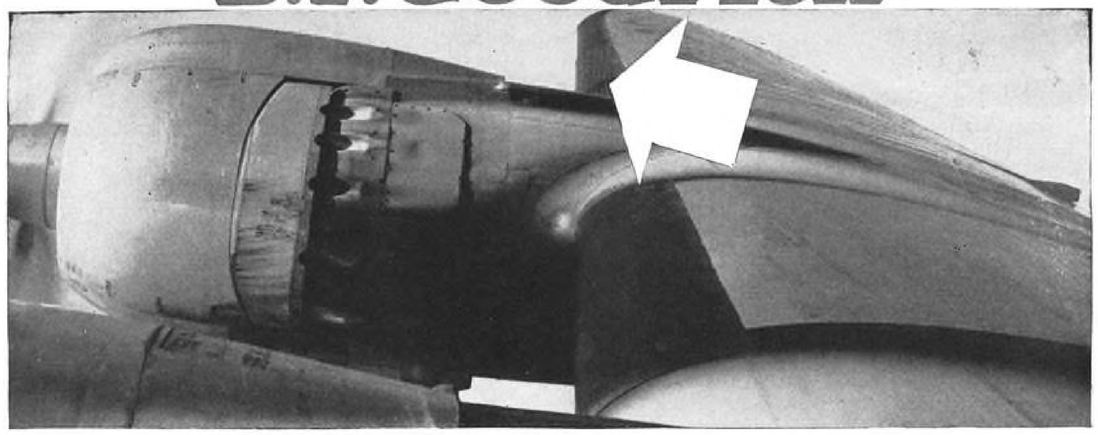
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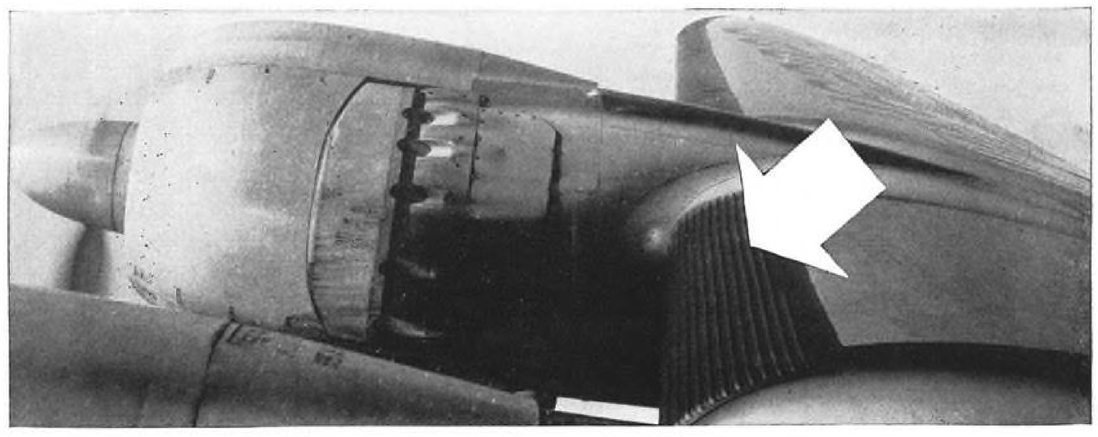
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Aviation Week

Volume 58 — April 6, 1953 — Number 14

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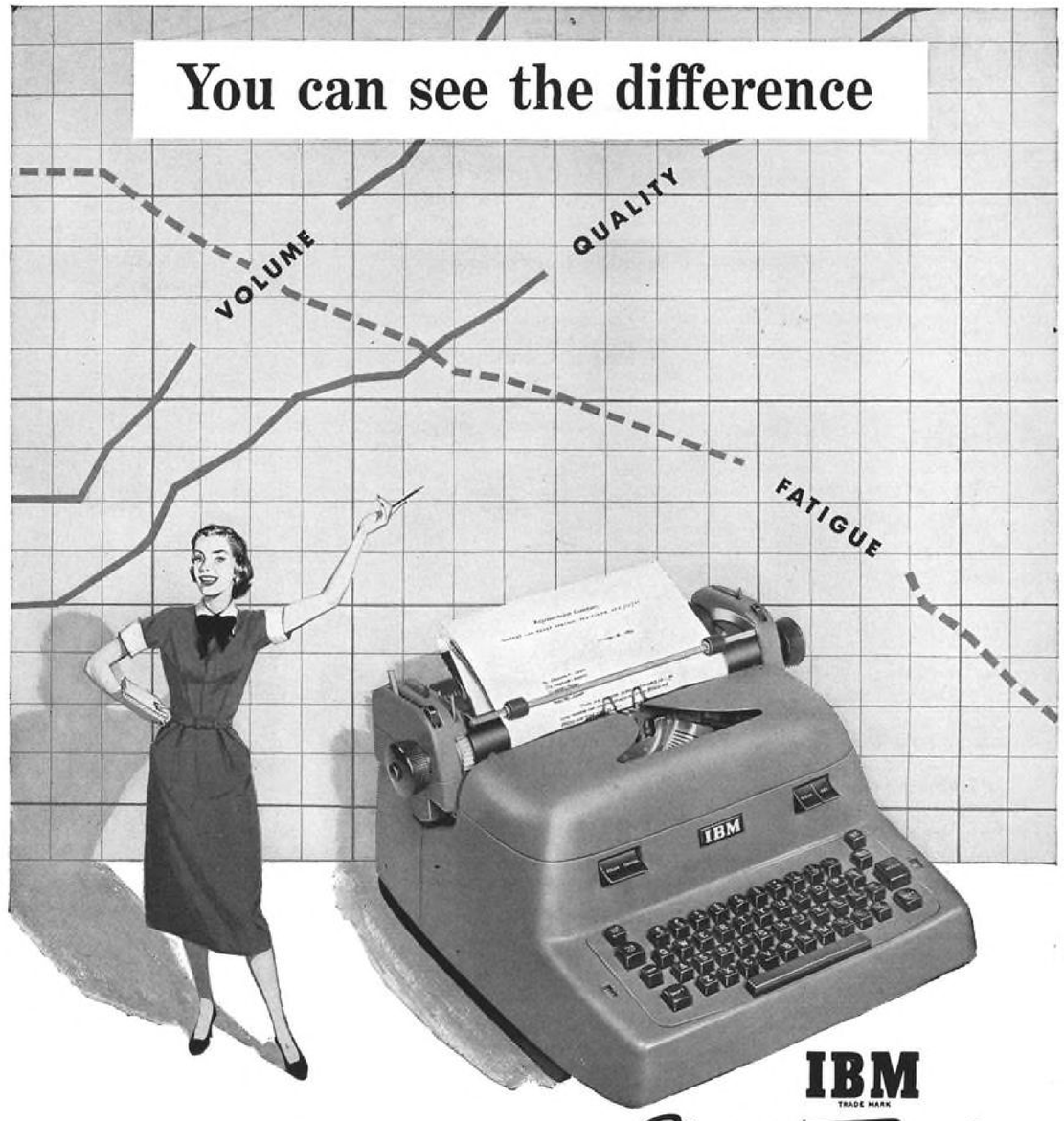
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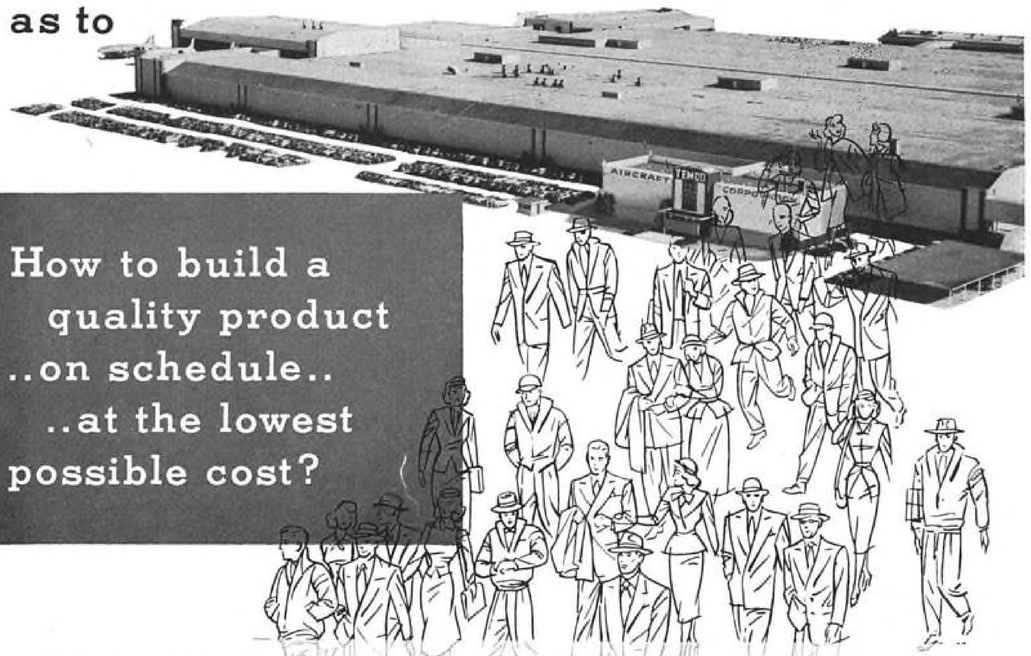
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NEWS DIGEST

Domestic

Polish MiG-15 that was flown to Denmark in a dramatic escape through the Iron Curtain Mar. 5 was returned Mar. 21 on the Polish ship Dunajec.

Atom-powered aircraft project's ground testing facilities are scheduled for start of construction this month at Idaho Falls, Idaho, under a $4,583,028 contract awarded by the Atomic Energy Commission to Utah Construction Co., Salt Lake City.

Airports are legitimate business and nearby residents must put up with aircraft engine noise, according to a ruling handed down recently by a California superior court in an abatement suit that closed Turlock (Calif.) Airpark five years ago.

Field artillery carriages will be produced by Goodyear Aircraft Corp., Akron, Ohio, under a contract recently awarded the aviation manufacturer by Army's Artillery Branch, Office of Chief of Ordnance.

Convair-Liner 340 production will extend through the greater part of next year at Consolidated Vultee Aircraft Corp.'s San Diego Division because of orders that have boosted estimated total output of the twin-engine transports to 239.

Hawaiian Airlines Convair-Liner recently flew from San Francisco to Honolulu in 9 hr. 42 min., compared to a Philippine Airlines' DC-6B's route time of 9 hr. 37 min.

Clinton Havill, 60-year-old Curtiss-Wright Corp. research engineer, died Mar. 26 at South Orange, N. J.

Research and development laboratory of Rheem Manufacturing Co.'s Aircraft Division recently received its third prime government contract, boosting the Whittier, Calif., lab's backlog to more than $1 million. At Downey, Calif., Rheem's Aircraft Division reports Westinghouse Electric Corp. has sent a letter of intent for production of J40 jet engine parts.

Kaman Aircraft Corp. hired its 1,000th employe last week.

Doman LZ-5 helicopters will be manufactured in Japan under a contract between the Danbury, Conn., corporation and James W. Boswell Co., an affiliate of Fuji Industry Co., Nakajima.



JAMES HENDERSON DOUGLAS, JR., 53, right, is seen as he was sworn in as new Undersecretary of the Air Force at the Pentagon Mar. 3. Administering the oath is AF Assistant Secretary H. Lee White, and witnessing the ceremony is Secretary of Defense Charles E. Wilson, former General Motors president. Douglas, a former director of American Airlines, was once chief of staff of the Air Transport Command.

Aviation Service Division of Spartan Aircraft Co. is the new name of Spartan Aero Repair, Tulsa, Okla.

George Buckley, 53, Eastern U. S. sales executive of BOAC, died in New York Mar. 23.

Financial

Temco Aircraft Corp., Dallas, reported last week that sales since the firm was founded seven years ago through 1952 totaled $131,365,000; business accepted during the seven-year period added up to more than $400 million.

Chicago & Southern Air Lines net income for 1952 totaled $1,338,510, compared to $1,130,959 the previous year. Operating revenues were $18,859,070, a 16% gain over 1951.

Western Air Lines net income dropped to $1,232,114 last year from the 1951 total of $1,389,300; operating revenues added up to $18,595,063, a 14.2% increase over the previous year.

Continental Air Lines reports a net income of $590,037 was earned last year, a 54% increase over 1951's $383,849. Operating revenues totaled $10,024,662, compared with operating expenses of $9,442,093.

Northwest Airlines operating revenues last February totaled $3,661,429, an increase of nearly $350,000 from revenues during the same month last year of $3,311,753. Net loss for the month was $254,461, compared with the February 1952 loss of $383,278.

Los Angeles Airways, Inc., scheduled helicopter airline, reports a net loss during 1952 of $28,800; operating revenues totaled $460,666 from a temporary mail rate and operating expenses added up to $481,189.

International

KLM Royal Dutch Airlines earned a gross profit last year of approximately $3,166,169, compared with $2,770,459, in 1952.

Airline traffic transactions put through International Air Transport Assn's London clearing house totaled $17,278,000 last January, a $1,572,000 increase over January 1952 traffic.

Fatality-free safety record was set last year by Australian domestic airlines, flying more than 1.8 million passengers over a total of 40 million miles without a single fatal accident.

Mark 2 Canberras are being delivered by English Electric to the Venezuela air force, the first export of the jet bombers outside of the British Empire.

Rio de Janeiro's Galeao International Airport is lengthening its main landing runway to more than 10,000 ft., paving the way for jet airliner operations.

For your convenience we've filed our catalog in the

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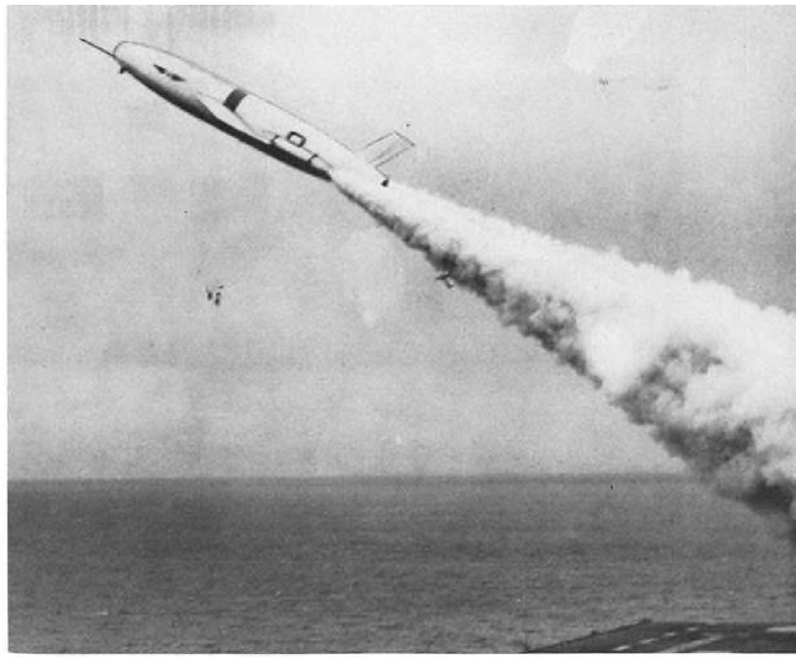
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Regulus Shoots Skyward

Chance Vought's Regulus, surface-to-surface missile developed for the Navy's Bureau of Aeronautics, is the second "wonder weapon" to come out from under the security blanket during recent A days (see p. 15). Now entering production at Dallas, Tex., Regulus typifies conventional aircraft ideas, modified by Vought's experience with the Cutlass tail-less scheme.

Regulus is revealed as a sweptwing, tail-less aircraft powered by a turbojet and boosted to flight speed by a pair of solid-propellant rockets. Launcher is basically a simple beam that provides support and initial direction.

In pictures of land-based flights (left), note deflected control surfaces, the long unbilical cord for transmitting electrical power or signals and what appears to be a ventral fin not shown on the missiles fired at sea (right).

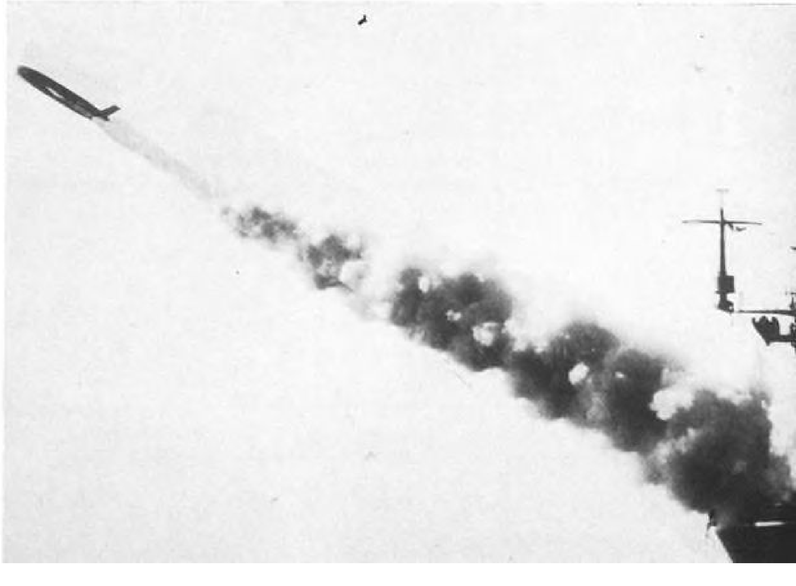
Pitch control apparently comes from movable surface inboard on wing, roll control from ailerons outboard.

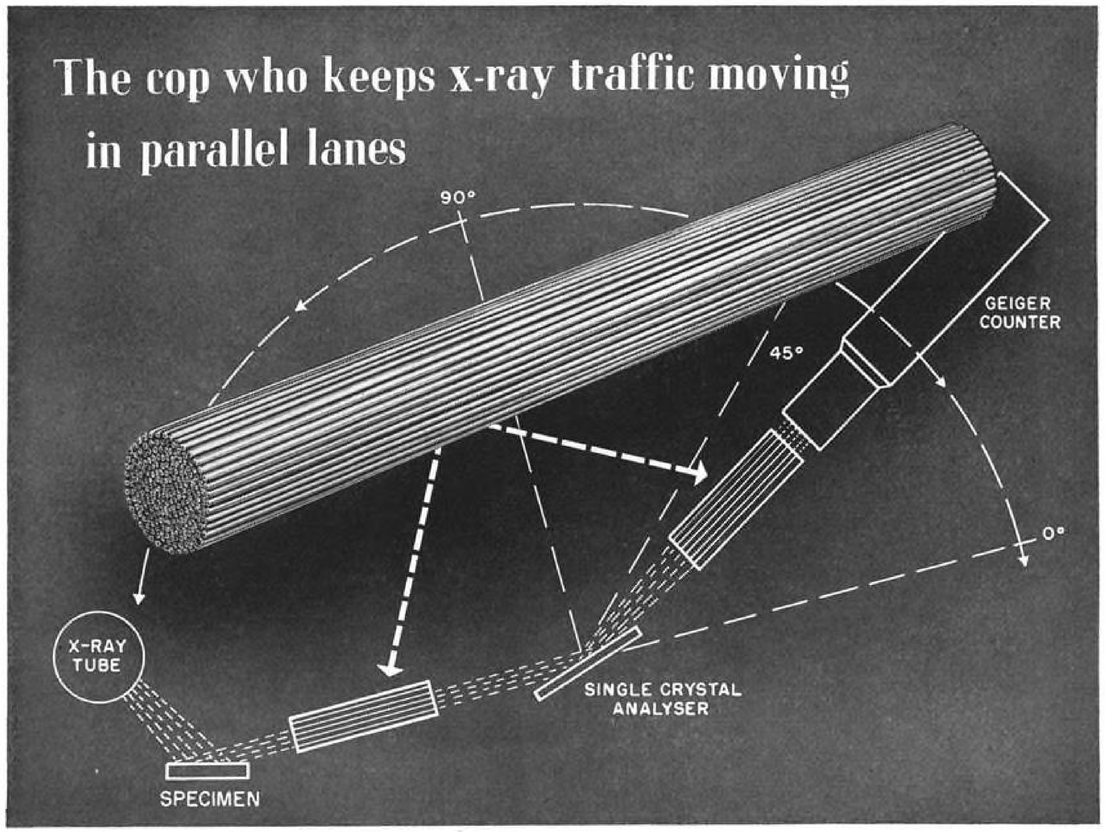
Temporary landing gear can be fitted for recovery of test rounds, which are controlled by equipment similar to drone-control gear.

Basic simplicity of configuration hints at design for low-cost production, possible featuring Vought's metalite balsa-alloy sandwich construction.

The Regulus program has been underway at Vought since 1947. First flight of a test vehicle was made in 1950.







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WHO'S WHERE

In the Front Office

Lt. Gen. William E. Kepner (USAF Ret.) joined Bell Aircraft Corp., Buffalo, N. Y., Apr. 1 and is expected to be elected executive vice president this week.

William B. Bergen has been elected vice-president-operations of Glenn L. Martin Co., Baltimore, and **E. G. Uhl** is the new vice president-chief engineer.

Howard M. Rix has been appointed vice president and general manager of Cooper Precision Products, Los Angeles.

Thorbjorn Madsen has been named vice president-production of the Scale Division, John Chatillon & Sons, New York.

John J. Fluck is new general manager of North American Aviation's Fresno, Calif., plant. **L. S. Wait** has been appointed assistant to vice president Alex Burton, Los Angeles.

C. A. Hodgins, former executive director of the Airlines Negotiating Conference, has joined Glover Associates, Inc., New York and Chicago, as senior associate.

Changes

Leo G. Jacques, president Motor Products Corp., Detroit; **Albert F. Tegen,** president General Public Utilities Corp., New York; **Albert J. Weatherhead, Jr.,** president Weatherhead Co., Cleveland, and **Wheelock Whitney,** director Truax-Traer Coal Co., Chicago, have been nominated for election May 18 as directors of Northwest Airlines.

Francis J. Gaffney has been appointed engineering director of the Guided Missiles Division, Fairchild Engine and Airplane Corp., Wyandanch, N. Y.

Leo Botwin has joined Ketay Manufacturing Corp., New York, as director of systems engineering.

William D. Hammond has been promoted to assistant secretary of Lockheed Aircraft Service-International, New York.

J. E. Leonard is new Helicopter Division manager for Cessna Aircraft Co., Wichita.

Oliver E. Rodgers has been named chief engineer of the Jet Engine Division, Packard Motor Car Co., Detroit.

George J. McHugh has been named sales manager of TACA International Airlines.

Bruce T. Dayton has been named South American representative for Douglas Aircraft Co., Santa Monica, Calif.

Jacques Elsner has been named research engineering manager of Air France. Other appointments recently announced by the French carrier are **Jean Ponsot,** Canadian representative, and **Peter B. Mellon,** interline and agency manager.

Cyrus A. Poole, guided missile and wind-tunnel engineering consultant, has joined James-Pond-Clark, Pasadena, Calif., as chief engineer.

INDUSTRY OBSERVER

► **Navy plans virtually to eliminate a $250-million production program scheduled for the Grumman Jaguar (F10F) transonic carrier-based fighter. Originally planned for the new Peconic River, N. Y. plant (Aviation Week Mar. 30, p. 42), Jaguar production probably will be reduced to a small service test quantity that will permit tactical evaluation of the many new features incorporated in this radical new fighter, including variable-sweep wings and aerodynamically balanced highspeed control system.**

► Lockheed's first commercial Super Constellation powered by Wright R3350 Turbo-Compound engines is beginning its CAA certification tests. The plane is eventually earmarked for KLM airline.

► **Navy has withdrawn its two Lockheed R6V Constitutions from active service due to the difficulties of maintaining a spare parts program and adequate maintenance. Navy concluded that further operation of the two double-decker 92-ton transports would be uneconomical. The two Constitutions have been placed in standby storage pending final disposition. The planes originally were ordered for Pan American Airways but the contract was taken over by the Navy during World War II.**

► First tubeless tires developed for aircraft use by B. F. Goodrich Co. have successfully passed preliminary flight tests on Navy carrier-based aircraft. Grumman's sweptwing Cougar (F9F-6) equipped with the tires completed 54 catapult shots, 115 normal takeoffs, 73 arrested landings and 90 normal landings before any signs of serious wear developed.

► **Westinghouse is developing a new high-intensity runway lighting system for USAF aimed at keeping individual light installations almost flush with the runway. Reason for the new system is the width of outrigger landing gear wheels near the wingtips of the B-47 and B-52 strategic jet bombers that makes raised installations a landing hazard. USAF tests on the outrigger landing gears show that they can override bulges that have a maximum rise of one inch in three horizontal feet.**

► Bell plans to substitute General Electric J47 turbojet for the lower-powered Allison J35 in its X-5 variable-sweep transonic research plane to boost its speed to sonic performance.

► **Royal Air Force plans to go slow in building its radical new bomber designs—the delta Avro Vulcan and the crescent-wing Handley Page Victor. Initial orders for these two types are for service test quantities only with large production orders awaiting evaluation of the service test models. Meanwhile, RAF is heavily committed to the Gloster delta Javelin night fighter, with large production orders already placed.**

► USAF is planning to use Martin Matador missiles as target drones for test operations of its anti-aircraft missiles. The Matador, powered by an Allison J33 turbojet, is still in the subsonic speed range.

► **Navy anti-submarine warfare tacticians believe the helicopter still is a long way from assuming a practical role in ASW operations. Increased reliability, range and load-carrying capacity are needed before the helicopter will be really useful in ASW tactics. Current ASW maneuvers in the Caribbean had nothing more modern than a Piasecki HRP with skin stripped from the fuselage to make possible a larger payload.**

► Wright Aeronautical is developing a pair of turboprops based on the basic Sapphire axial-flow design—the T47 and T49. Both are aimed at the 10,000-eshp. class and are running experimentally at Wood-Ridge, N. J. Neither engine has been selected for an airframe project yet.

► **Lockheed's F-94C Starfire all-weather interceptor has been flying regularly past the speed of sound. The combination of its straight but extremely thin wing and the 9,000 lb. thrust from the Pratt & Whitney J48 turbojet with afterburner have pushed the Starfire's airspeed up to Mach 1.05.**

Washington Roundup

Budget Cutting

National Security Council, up to now pretty much a fifth wheel, has been vitalized.

• It was the council that directed Defense Secretary Charles Wilson a few weeks back to apply a $4-billion cut to the $45-billion defense expenditures contemplated in the Truman budget for 1953 fiscal year and report what the effect would be. Wilson probably will apply the cut about equally to the three services.

• The council also is expected to direct a cutback of several billion dollars in the $41 billion in new defense money proposed in the Truman budget.

Meanwhile, Congress is waiting on the Administration.

• Both House and Senate Appropriations Subcommittees on Defense are postponing hearings until Wilson's revised budget is ready, which will probably be in a few weeks.

• Senate Minority Leader Lyndon Johnson and Sen. Stuart Symington, both viewed as Democratic presidential possibilities, will challenge the Administration if it cuts too deeply into defense money. Both senators are staking their political futures on a strong defense plank.

• Symington, who launched the Air Force on the road to becoming the dominant service as its first Secretary, is aiming as a senator to take an impartial view of the three services.

Defense Shakeup

Wheels will start turning promptly in Congress on reorganization of Defense Department when the Administration's recommendations are made Apr. 30.

All indications are that sweeping authority for the Secretary of Defense will be proposed.

Meanwhile, the Joint Chiefs of Staff, aiming to stave off an extensive cutback in authority of the military, have agreed on these changes:

• Let the Secretary of Defense decide disagreements between the services after a full presentation of the issues. Criticism of the present procedure under which the Chiefs thrash out issues and reach some sort of agreement among themselves is that it invites log-rolling.

• Strengthen the Secretary's administrative staff. But the Chiefs don't want the Secretary to have a military staff for independent military advice, as proposed by former Secretary Robert Lovett.

Other organizational changes in prospect:

• Abolish the Munitions Board. Its authority to dictate to the services on all aspects of procurement and production probably will revert to the Secretary. Lovett delegated the authority to the board.

• Abolish National Security Resources Board.

• Continue Office of Defense Mobilization to administer the tax amortization and production incentive programs and standby controls. It probably will take over NSRB's long-range planning functions and Munition Board's stockpiling functions.

• Transfer National Production Authority's activities to the Commerce Department June 30.

Air Defense

Air defense program, now receiving high-level review at the Pentagon, is saturated with seeds of conflict which are likely to prolong any serious consideration many months.

• Navy and Air Force are balking at over-emphasis on defense. They want prime emphasis on offensive striking forces.

• Navy wants more emphasis on anti-submarine defense. Navy men think the likelihood of an attack on the mainland by missiles and rockets fired from subs is far greater than by a long-range air attack. They point out that Russia has given top priority to subs and a comparatively low priority to development of strategic air, concentrating instead on tactical air.

• Army is edging in on Air Force's air defense mission with its guided missile battalions.

Army Plane Buying

Army has started lifting its sights on aircraft procurement.

At the beginning of the year, Army estimated it would obligate only $72 million for the current fiscal year, which ends July 1.

Now, it has earmarked $102 million for aircraft procurement for the year.

About $80 million of the total have been obligated so far, leaving $22 million for contracting over the coming three months.

Eggs, Beans and Peanuts

There will be much talk of airline subsidies in Congress again this year.

House Appropriations Committee plans to highlight the fact that one reason for Post Office's deficit is subsidies paid to airlines. For the first time this year the committee will be able to point to the exact amount of mail pay that's subsidy.

But fears of some airlines that Congress might cut subsidy funds do not appear well founded.

Chairman Gordon Canfield of the Appropriations Subcommittee on Post Office takes the position that, under the 1938 Civil Aeronautics Act, Congress is obligated to provide funds to cover mail payments approved by CAB.

Here is how airline subsidies look beside other government subsidies:

• Last fiscal (1952) year, the subsidy on just three crops —eggs, dry edible beans and peanuts—was almost double the mail subsidy for the entire domestic air system. The government lost $29.4 million on its egg purchases and disposals, $15.4 million on beans, and $8.7 million on peanuts—a total of $53.5 million. Total subsidy for domestic air carriers for the year: $26 million.

• The $40-million operating differential subsidy to shipping last year was less than the $45.3-million subsidy to international air carriers, but the shipping subsidy is increasing. For fiscal 1953, it is estimated the shipping subsidy will reach $46 million, compared with an international air subsidy of $44.9 million. By fiscal 1954, the estimated shipping subsidy of $50 million to $55 million will compare with the estimated international air subsidy of $46 million.

Since the end of World War II, the shipping industry also has received a total $40-million construction differential subsidy.

—Katherine Johnsen

AVIATION WEEK VOL. 58, NO. 14 APRIL 6, 1953

Odlum Relinquishing Control of Convair

- **General Dynamics to buy Atlas-held stock.**
- **Price: $8.7 million and 20,000 shares in G. D.**



Floyd B. Odlum



John Jay Hopkins

An $8.7-million cash transaction and an exchange of stock will shift control of Consolidated Vultee from Atlas Corp. to General Dynamics Corp.

The deal is to be completed in May. Through it, General Dynamics will acquire from Atlas a 400,000-share block of Convair stock, largest single holding in one of the nation's foremost plane manufacturers.

Purchaser is the fast-rising parent of Canadair Ltd. Atlas, the seller, has held the majority interest in Consolidated Vultee Aircraft Corp. since 1947. Contract for the sale has been signed, but it awaits approval of General Dynamic and Atlas stockholders.

►**Significance**—Observers saw these implications: General Dynamics, which has been getting deep into the U. S. Navy's atomic energy program, now can participate in USAF's atomic-powered aircraft program, for which Convair is building an airframe.

It also has taken another large stride into the aircraft manufacturing picture, this time encompassing original design and engineering as well as production.

Atlas Corp. is an investment firm whose traditional specialty has been helping promising companies facing financial or management difficulties. When the current transaction is completed, Atlas still will hold 30,300 Convair shares in its investment portfolio —making it the second largest single stockholder. It will also have 20,000 shares of General Dynamics Corp. stock, which with the $8.7 million cash constitute the full purchase price for the Convair stock.

The 400,000 shares that will change hands represent 17% of Convair stock outstanding. That and the 30,300 shares Atlas retains are part of approximately 2,400,000 common shares.

►**The Men**—There was no immediate indication that John Jay Hopkins, 59-year-old General Dynamics president, would make any drastic changes in the Convair team organized by Atlas president Floyd B. Odlum. This team saw Convair change from a struggling company in 1947 that had lost $16.7 million the year before to one which showed a $10.4-million profit for 1952.

Hopkins emphasized that he contemplated no changes in Convair operating management or continuity of policy. Convair president Gen. Joseph T. McNarney, who has been in on the negotiations, said he welcomed the new current transaction "wholeheartedly."

But some changes were expected in the West Coast manufacturer's board of directors. For one, Hopkins will replace Odlum as Convair's chairman and the board will be increased to 18 from its present membership of 12, with emphasis anticipated on General Dynamics appointees. Odlum likely will remain a board member.

Odlum's decision to dispose of the heavy Convair holdings, a friend said, was difficult because of his personal interest in aviation.

►**Diversification**—General Dynamics has been diversifying its holdings under Hopkins' leadership, and a high official in the company hinted to AVIATION WEEK that more acquisitions are in prospect—moves that would broaden its base beyond aircraft and nucleonics.

There are three major subsidiaries:

• **The original firm,** now Electro Dynamic Division of Bayonne, N. J., specializes in electric motors for military and industrial use.

• **Electric Boat Division,** Groton, Conn. is involved in the Navy program for atomic-powered submarines and is building two such craft, the Nautilus and Sea Wolf.

• **Canadair** occupies about 2.25 million sq. ft. of fabrication and assembly area at Montreal, employing nearly 10,000 on manufacture under license of North American F-86E Sabre jet fighter, the Lockheed T-33 jet trainer and Beech T-36A twin-engine trainer.

Hopkins has been instrumental in founding a little-known General Dynamics subsidiary, General Atomic Corp. A company spokesman said it would engage in studies of industrial application of atomic energy and nuclear fission—presumably when the time is ripe for such research and development. Attention will go to those portions of the new prime movers "between the reactor and the propeller."

►**Effect on Canadair**—Canadair, under the new Convair-General Dynamics hookup, will have a ready-made U. S. source of aircraft designs. A key factor is Canadair's policy decision to do no design development of its own. It prefers to act as prime contractor for planes designed elsewhere.

Observers were quick to note the possibility of Canadian production of USAF's F-102 delta-wing interceptor and Navy's XF2Y-1, delta-wing flying boat fighter, particularly adaptable to Arctic defense problems.

Both Atlas and General Dynamics have headquarters in New York City. Convair has its biggest plants at San Diego and Fort Worth; Canadair people already have been at San Diego. Explorations in connection with the transaction have been going on for about six months.

CPA Comet Took Off Nose High

Jet crash at Karachi blamed on excessive nose-up attitude, same cause of BOAC Rome accident.

(McGraw-Hill World News)

London—Crash of the Canadian Pacific Airlines Comet 1A last month at Karachi, Pakistan, resulted from "excessive nose-up attitude," the identical cause of the British Overseas Airways Corp. Comet accident at Rome last October, AVIATION WEEK has learned from authoritative sources.

While the official Pakistani report of the CPA accident which killed 11 persons, including five de Havilland technicians, was expected momentarily last week, various authoritative sources gave this general outline of the findings:

At the time of the Karachi crash, normal Comet drill still was for pilot to lift his nosewheel at the start of runup, well before he had built up speed. Reason: It was felt that retracting a nosewheel (which is not braked) when it is spinning at roughly 100 mph. (takeoff speed) might cause a considerable judder (jar and shudder) and possibly minor damage when it moved inside the wheel bay.

► **DH View**—But the Rome and Karachi incidents proved that taking off at night or in low visibility under that procedure prevented the pilot from getting an easy picture of his angle of attack. De Havilland, maker of the Comet, however, contended (as reflected in the BOAC manual for Comet pilots) that an excessively great angle of attack would be prevented by the fact that to achieve it the pilot had to make a thoroughly unnatural backward pull on the stick. After the Rome accident, this point was brought to attention of CPA pilots.

Still at Karachi, as at Rome, an excessively great angle of attack on takeoff caused a crash. In both cases at a point during takeoff the tail hit the ground. In such a position, drag of the Comet's big wing and relatively larger flaps is more than enough to prevent the engines from building up the necessary speed.

At Rome, the pilot abandoned his takeoff when he saw this situation was preventing him from building up speed. He had his undercarriage up (he actually was airborne for a few seconds) and scraped to a stop on his belly within the bounds of Rome's Ciampino airport. His engines were off, his fire prevention apparatus fully activated. His aircraft was a total loss, but all his passengers escaped without a scratch.

► **Overshot Runway**—The CPA pilot faced with the same situation at Karachi, although he was never airborne, decided to try and make good his takeoff. He made his decision when the aircraft was perhaps half-way down the 7,000-ft. runway. He overshot the end of the runway and some 750 ft. of overrun. At this point, with his oleos extended, indicating he was nearly airborne, he straddled a series of low concrete blocks marking the airport boundary. He missed them all. But a fraction of a second later, his starboard suspension hit a low brick culvert wall. With throttles full open, it was all over in a flash of explosion.

The case for pilot error had best be left for the official report. It is understood that the aircraft was carrying 5,000 extra gallons of fuel, which probably would have meant a legal overload if the aircraft had been on a scheduled service. But in any case, the identical root causes of the Rome and Karachi crashes indicate that both de Havilland and the British Air Registration Board will treat the matter as more than pilot error.

► **New Procedure**—In fact, official Comet drill already has been changed. Comet pilots now must keep their nosewheels on the ground until airspeed is built up. This way, the pilot can feel his angle of attack through the controls—at least he can feel when the nosewheel leaves the ground.

Chances are, though, that the ultimate requirement will be for a stall warning on all Comets. This is likely to be prescribed in the form of a tail bumper or probe.

Both de Havilland and ARB deny that an instrument—some sort of artificial horizon—is called for. ARB claims its pilot can take Comets off blindfolded—and have done so—relying only on the co-pilot's verbal reading of speed and rpm. indicators and on the feel of the nosewheel through the controls. Some argue that the stipulation requiring the pilot to keep his nosewheel on the ground should be adequate protection in itself against further mishaps such as Rome and Karachi.



NEW BELL COPTER TESTED

New Bell 47G, prototype of H-13G Air Force and Army are getting beginning in June, takes on a load of litter patients during a simulated civil defense exercise at Olney, Md. The 47G features numerous improvements over previous Model 47s, including a synchronized elevator (pointed out by arrow near tail). Working in conjunction with rotor tilt, this device permits a 40% increase in former permissible center of gravity travel and also allows hands-off flight for considerable periods of time.

$100-Million Airport Aid Cut From Budget

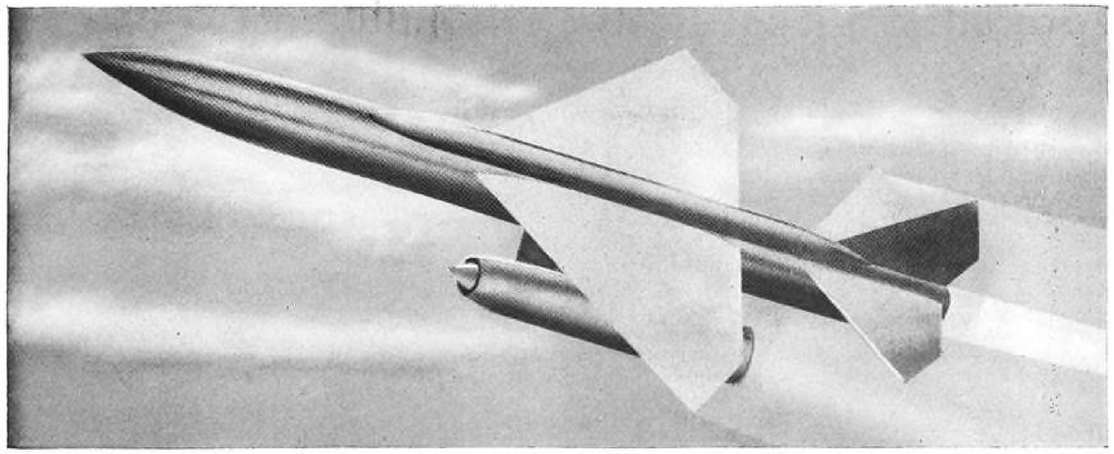
Department of Commerce action withholding funds for all new federal-aid airport projects in the 1954 fiscal year budget will cancel more than $100 million in airfield expenditures throughout the U. S., it was estimated last week.

Decision to withhold the funds for a "re-evaluation of the role of the federal government in assisting in airport financing" was announced by Robert B. Murray, Jr., Undersecretary of Commerce for Transportation, at the recent Kansas City Congress of Civil Aviation Conferences.

Civil Aeronautics Administration sources in Washington said the Murray statement was being interpreted to mean that the only funds to be sought in the budget were those earmarked to payoff projects under construction.

Murray said congressional committees had asked on three separate occasions for a re-evaluation of the airport program and the scrutiny of the record showed "evidence of weakness in administration and incidents of waste."

When the Airport Act was passed in 1946, authorizing $500 million in federal aid funds to local airport sponsors such as cities and counties, there were forecasts of great numbers of private planes, he said, but no growth of such magnitude has taken place.



BOEING BOMARC is supersonic anti-aircraft missile with rocket and ramjet engines, is only pursuit missile which banks in turns.

Military Takes Wraps Off Three Missiles

The Pentagon erupted in a rush of guided missile news last week as top Defense Department officials prepared to make their annual budget-justification trek to Capitol Hill.

These missiles made news:

- **Chance Vought Regulus,** a surface-to-surface missile developed under auspices of the Navy's Bureau of Aeronautics.
- **Douglas Nike** anti-aircraft missile sponsored by Army ordnance.
- **Boeing Bomarc** anti-aircraft missile sponsored by U. S. Air Force.

Navy said the Regulus program which began in 1947 had reached the point where Vought was going into quantity production on the missile and a specially modified submarine has been commissioned to launch the Regulus at sea. AVIATION WEEK has reported that the Navy has given Vought $40 million.

Regulus is essentially a sweptwing pilotless fighter aircraft powered by auxiliary rockets for takeoff and a turbojet for cruise flight. It can carry an atomic warhead and deliver it over a range of several hundred miles at supersonic speed.

The Regulus is equipped with drone-type guidance for flight testing. When fitted with temporary landing gear it can be successfully recovered. When used as a tactical missile it is equipped with long-range guidance devices.

Navy also revealed that the snorkel submarine Tunny had been modified with launching equipment and an external tank to carry and fire the Regulus at sea. The modified Tunny was recommissioned last month and became the first Navy vessel to be fully combat-equipped for missile work. Early submarines have been modified for experimental missile work.

The Regulus has been test fired off the USS Norton Sound, a guided missile test ship, the aircraft carrier USS Princeton and from shore installations at the Navy's Guided Missile Test Center, which is located at Pt. Mugu, Calif.

Regulus is about 30 ft. long and made its first test flight in 1950 at Edwards AFB.

When word circulated around the Pentagon that Navy was about to release information and pictures on Regulus, Army Secretary R. T. Stevens hastily issued a statement announcing that U. S. cities would soon be defended by Army guided missile battalions which would be equipped with the Douglas-built Nike.

The Nike missile has been effective against B-17 drones operating under test conditions at altitudes of 30,000 ft. and speeds of about 220 knots. Its capabilities against modern jet aircraft traveling at sonic speed and altitudes up to 50,000 ft. are still unproved.

Army had a special congressional briefing on the Nike and is planning a press junket to White Sands, N. M. where it plans to shoot down more drone B-17s for the edification of the press.

At the same time USAF inadvertently let slip a drawing of its Bomarc anti-aircraft missiles developed by Boeing Airplane Co. as a result of its original work with the GAPA project.

The Bomarc drawing was included in an unclassified publication on handling of air traffic during military emergencies distributed by the Air Defense Command Headquarters at Colorado Springs, Colo. The cover of the publication bore the notation, "Permission to reproduce in whole or in part any material appearing in this publication is hereby granted."

The Bowmarc is propelled by a combination of rocket and ramjet power and is supersonic. It is designed for ground launching against aircraft.

Jet Cutback

A cutback and stretchout involving more than $100 million worth of General Electric J47-25 turbojets earmarked for the Boeing B-47 Stratojet production program has been ordered by the Air Force.

The cutback hits GE licensees—Studebaker at South Bend, Ind., and Packard at Detroit. Planned production for both test programs has been reduced by 33% and is scheduled to phase out during 1954. The cutback is reported to have canceled 2,000 engines.

Stretchout hits General Electric's Evendale, Ohio, plant where the main J47 production program is now concentrated. There will be no reduction in the total of GE-produced J47s. Production rate will be retarded and total production will be stretched over a longer period than previously planned.

USAF production planners say the reduction in the B-47 engine program was the result of General Electric's development program to increase durability of the J47 series. USAF expects to get twice the service life from the—24 series that it did from earlier J47 models. Consequently, fewer engines will be needed for the B-47 program. No cutback is currently contemplated for B-47 airframes.

Aircraft Profits at Postwar High

And Lockheed, Republic, Fairchild and Curtiss-Wright report backlogs totaling approximately $4 billion.

Four more large aircraft manufacturers last week joined the growing list of aviation firms reporting record postwar profits, sales and backlogs for 1952. Backlog of the four firms, Lockheed, Republic, Fairchild, and Curtiss-Wright, is approximately $4 billion, with Lockheed holding the lion's share, $1.6 billion.

Although the industry virtually has completed its expansion under the limited emergency program following Korea (AVIATION WEEK Mar. 30, p. 13), Air Force this year is expected to go beyond the 100-wing mark in its buildup to a 143-wing force and production will continue at peak levels throughout 1953.

Supported by approximately 61,000 subcontractors and suppliers, aircraft manufacturers are producing about 1,000 military planes a month. Most critical problem facing manufacturers is shortage of engines.

Following are summaries of the latest industry annual reports.

Lockheed Aircraft Corp.

Lockheed president Robert E. Gross reported a net profit of $9,058,000, compared with $5,793,000 for 1951. Sales totaled $438,122,000, almost double the $237,230,000 for 1951. Firm backlog increased 64% to $1,608,669,000 for 1952, compared with $970,435,000 in 1951. An additional $331,682,000 was also in process of contract negotiation, boosting the current backlog to approximately $2 billion.

USAF orders accounted for 57% of the backlog with the Navy contributing 35% and the remaining 8% from commercial customers. Firm backlog is split among Lockheed's divisions as follows: California, $1,095,680,000; Georgia, $485,398,000, and Lockheed Aircraft Service, Inc., $27,591,000. Also included in the firm backlog are $122,032,000 in orders for 70 Super Constellations, spares and parts from 11 commercial airlines.

Lockheed's future prospects are based on the following projects reported by president Gross:

• **Jet airliners.** Gross reported that Lockheed has spent nearly $1 million on jet transport engineering studies and believes that "1953 will certainly see important decisions in the American commercial jet transport field."

• **Super Constellations.** Turboprop version of the Constellation powered by four P&WA T34 engines is scheduled to fly before the end of 1953. Lockheed believes turboprop conversions will "provide the means of extending the life of the Constellation series for many more years."

• **C-130.** Construction of two prototypes powered by four Allison T38 turboprops is underway at Burbank while engineering and tooling for production are well along at Marietta.

• **Supersonic fighters.** Several supersonic fighter projects are in the development mill at Lockheed, including a lightweight day superiority fighter and delta-wing designs.

• **Patrol bombers.** A new high-performance version of the P2V Neptune series is in the advanced development stage.

• **Jet trainers.** Lockheed is developing new jet trainer types aimed at eventually replacing its T-33 series, now the standard jet trainer for USAF, Navy, Marines and the air forces of nine other countries.

• **Rocket and ramjet development projects.**

► **Expansion**—During 1952 Lockheed's employment increased to 47,750 persons working in 11,098,000 sq. ft. of plant area. New facilities planned include:

• Electronics and production flight test facility at Marietta, Ga. (242,000 sq. ft.).

• New assembly facility for radar picket versions of the Constellation at Burbank (176,000 sq. ft.).

• Final assembly building, maintenance and service facility and production flight test hangar at Palmdale (176,000 sq. ft.).

• Icing windtunnel for testing aircraft components under icing conditions.

• Engine test laboratory.

• Addition of $500,000 in computing equipment for engineering work.

► **Production**—Lockheed's current production program is based on the following projects:

• F-94C Starfire all-weather interceptor is in full production and initial deliveries have been made to USAF combat units. Further development of Starfire armament and radar systems is under way.

• P2V Neptune patrol bomber series has the P2V-5 in full production with special ASW and mine-layer version (P2V-6), which is just coming into production.

• Constellation design is being built as a commercial transport powered by Wright Turbo-Compound piston engines, as a military transport, and as an early-warning radar picket plane.

• Jet trainers are still in production for USAF and Navy.

• B-47 Stratojet: the Marietta (Ga.) Division completed its B-29 modernization programs during 1952 and began production of the B-47 Stratojet under license from Bocing. B-47 production and modification is expected to continue at Marietta for several years.

Lockheed is one of the few aircraft manufacturers not yet heavily engaged in guided missile work. Negotiations have been opened with Hughes Aircraft Co., exploring the possibilities of acquiring the extensive missile and electronics facilities and contracts of Hughes.

The purchase of Hughes by Lockheed would provide the latter with a firm entry into the two key new fields of avionic and guided missile development but latest reports indicated that differences over sale price were still blocking the deal.

Republic Aviation Corp.

Record production of combat jet aircraft at Republic Aviation Corp.'s Farmingdale, N. Y., plant in 1952 produced highest sales and profits in the company's history, president Mundy I. Peale reported.

Republic's backlog of unfilled orders totaled more than $1 billion at the start of this year, Peale said, and net income after federal taxes was $8,096,001, representing about 2% of the $412,235,008 sales total. Current backlog is estimated at $1,113 million.

► **New Peak**—The corporation said it will concentrate on production of the new F-84F Thunderstreak this year, after F-84G Thunderjet assembly lines are halted next June.

Combat jet aircraft output—highest in the Western world for the second consecutive year—will be increased to a new peak under defense schedules put into effect at the start of the Korean War.

Republic's president also reported:

• **Newer-type** fighter and fighter-bomber aircraft "will be manufactured in quantity in the period 1953-55" under production contracts already received by the corporation.

• **Guided missile** research will be increased this year.

► **New Fighters**—"Our research into advanced models of piloted aircraft, which will be the eventual successors of present production types, continues unabated," Peale said. "Development contracts now being carried out for the Air Force include work on still other new fighter planes for which we anticipate additional orders."

He did not elaborate on the new aircraft or their status, but informed industry observers said the planes probably are the delta-wing F-103 and F-105 fighter-bomber.

► **Production Drop**—Peale said he expects unit production to fall off this year at Republic because of the shift from F-84Gs to F-84Fs.



THUNDERSTREAK assembly line shapes up as Republic moves to boost jet fighter output.

But he predicted sales and earnings for 1953 would at least equal 1952's.

► **Laboratory Construction**—Republic continued to expand development and production facilities during 1952, and new test laboratories for design of air weapons already are in operation.

Peale said the company spent $750,000 for new laboratory construction and equipment, "including what is believed to be the most complete static test jig in private operation in the country."

Employment expanded during 1952 to 22,000 workers, boosting Republic's payroll to more than $110 million for the year.

Fairchild

Fairchild Engine and Airplane Corp. president R. S. Boutelle reports 1952 production pushed sales and profits to all-time highs, and forecasts even greater output this year and in 1954, "unless there are sharp changes in the defense procurement program."

The Hagerstown, Md., corporation's backlog of unfilled orders totaled $335 million Mar. 12, increasing from $310 million reported at the end of 1952, Boutelle said.

Gross 1952 earnings after federal income taxes were $3,148,621 from sales of $141,642,703, compared with $2,222,130 earned on sales of $74,978,802 in 1951. Earnings before taxes added up to $10,464,871.

► **Aircraft Division**—Fairchild reported that development of conventional and advanced-design aircraft are being carried out, and production of "several" of the new planes was predicted within the next few years. No details of the new projects were given.

In other plane production, Fairchild:

• **Continued experiments** with the XC-120 Pack Plane and designed, built and tested a new lightweight, roadable, detachable fuselage for the prototype airframe.

• **Tested the C-119H,** an improved version of the Flying Boxcar designed for production in two- or four-engine configuration.

• **Signed agreements** to produce aircraft developed by Royal Netherlands Aircraft Factories Fokker, Amsterdam, Netherlands.

► **Engine Division**—Fairchild disclosed its engine division is taking over new facilities at Mineola, N. Y., for production of new equipment under a $44-million government contract. But "details cannot be disclosed for reasons of national security," the corporation said.

The new project will be in addition to start of plans last year for a 25-ton midget submarine and construction of a prototype vessel for the Navy.

Fairchild last year continued also pilot line delivery of the J44 monocoque turbojet engine (which will power the Ryan Firebee drone), increased output of major components of General Electric's J47 jet powerplant and continued production of the V-32-D-2 airborne auxiliary engine for the Air Force.

► **Guided Missiles Division**—A prime contract from Navy's Bureau of Ordnance for development of an undisclosed type of guided missile will account for a substantial portion of 1953 production in this division, Fairchild reported.

In addition to missile contracts, the division received an order for development of devices to be used in training radar operations for Navy all-weather jet fighters.

Deliveries of the Lark missile were completed last year, the corporation said, and production has been halted.

► **Stratos Division**—New Stratos products produced by Fairchild in 1952 included an air-moisture separator to prevent fogging in jet aircraft cockpits, air-turbine-operated fuel transfer pump and several models of cockpit refrigeration packages.

► **Expansion**—The corporation reported initial loans made last year under a $25-million V-loan agreement are being used to finance defense production contracts.

The engine division expanded its Farmingdale and Valley Stream, N. Y., operations last year and four months ago leased two new buildings at Mineola.

Major additions were built at the aircraft division's assembly plant at Hagerstown, Md., and a new building constructed for Fairchild's executive offices is scheduled to be occupied this month.

Curtiss-Wright Corp.

A profit of $9 million net after taxes was reported by Curtiss-Wright Corp. in the 1952 annual report of Roy T. Hurley, chairman and president. An increase of more than $2 million was shown over the net profit of 1951.

Hurley said sales for the year totaled $326.1 million, nearly doubling 1951 sales of $176.6 million. Backlog of unfilled orders was reported as $730.5 million as of last December 31, compared with $533.2 million at the end of 1951. The current backlog plus scheduled production under letter contracts

totals over $1 billion. Additional business is under negotiation.

The Wright Aeronautical Division now employs more than 20,000.

A new turboprop engine, ramjet development and intensive work on the British-designed Olympus (J67) turbojet were principal development projects reported, while the R3350 Turbo-Compound engine and the J65 Sapphire axial-flow jet were the principal production items.

Propeller developments, with designs for turbine propeller outputs up to 20,000 hp., are going forward at the propeller division, Caldwell, N. J. The new hot-extrusion method of forming hollow steel blades is being used.

Other C-W aviation production:

- Increasing sales of electronic flight simulators and duplicators to airlines for pilot training, with orders from United Air Lines, TWA and Air France.
- Licensing British and Canadian firms to produce the simulators.

Executive Salaries Of Air Firms Listed

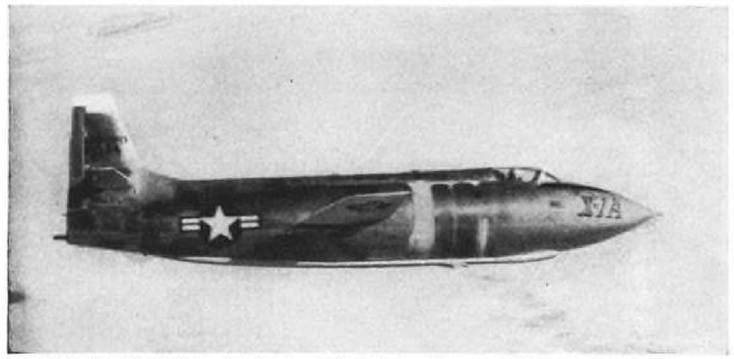
Douglas Aircraft Co. paid its president, Donald W. Douglas, $134,755 during 1952, an executive salaries report filed with the Securities & Exchange Commission reveals.

Of the $574,494 paid all Douglas officers and directors during the year, F. W. Conant, senior vice president, received $69,147; Frederick E. Hines, vice president and tax counselor, received $27,133, and Arthur E. Raymond, vice president, was paid $61,127.

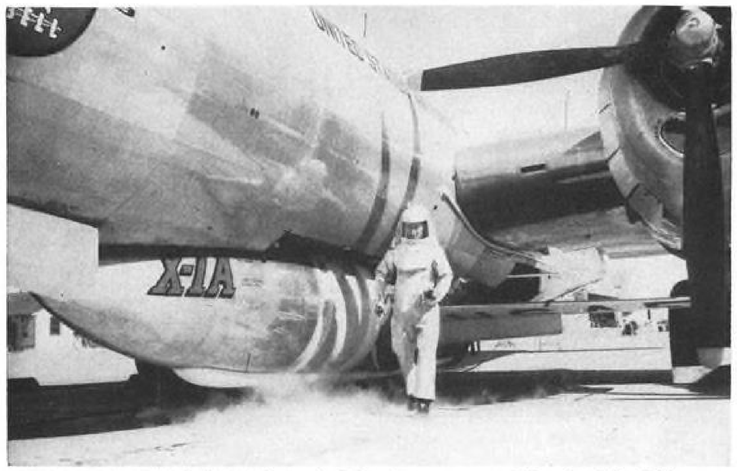
Consolidated Vultee Aircraft Corp. reports it paid president Joseph T. McNarney $50,735 during 1952. Convair paid out $504,165 to its directors and officers. Of that amount, La Motte T. Cohu, who resigned as president during the year to become vice chairman of the board, received $45,000; Robert B. Watts, vice president and general counsel, received $38,000, and W. C. Rockefeller, executive assistant to the president, was paid $35,000.

Curtiss-Wright Corp. paid Roy T. Hurley, chairman and president, $129,531 during 1952. J. F. McCarthy, vice president for finance received $71,722, and Edward M. Powers, vice president for engineering, received $46,622. Total paid all directors and officers of the corporation was $496,781. Included in Curtiss' salaries were installments on 1951 and 1952 awards of incentive compensation.

Western Airlines Inc. reported to SEC it paid Terrell C. Drinkwater, president, $40,962 for his services during 1952. Stanley R. Shatto, vice president for operations, received $25,085. Total paid Western directors and officers was $175,013.



FIRST FLIGHT VIEW of stub-winged X-1A being flown by Bell test pilot Ziegler.



UNDER B-29 BELLY, X-1A is being fueled prior to a test at Edwards AFB, Calif.



ON THE GROUND the silvery plane shows X-1 parentage. Note raised cockpit canopy.

Supersonic X-1A Begins Tests

The Bell X-1A, latest in the famed X-1 supersonic research plane series, has started its flight test program at Edwards AFB, Edwards, Calif. Piloting the stub-winged rocket-powered craft is Jean L. (Skip) Ziegler, chief of flight research for Bell Aircraft Corp., Buffalo, N. Y.

The X-1A differs slightly from the earlier X-1, first airplane to exceed Mach. 1 (Aviation Week Dec. 22, 1947). It is slightly larger and is designed to incorporate a turbine-driven fuel pump. Powerplant, as in the X-1, is a 6,000-lb.-thrust four-cylinder Reaction Motors rocket unit.

It can be distinguished from the X-1 by the raised cockpit canopy which fairs into the vertical fin. X-1s have a flush cockpit canopy.

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WEIGHT

POWER



Greater output per pound is the constant objective of the aircraft designer. EEMCO serves this goal by turning out new electric motors with increased power, decreased weight and all the required operating characteristics. This tough new lightweight for driving a compressor was built to the latest Army and Navy specifications. Operating on 27 volts D.C., it provides 3 horsepower under continuous duty at sea level, 2½ h.p. at 50,000 feet with duty cycle of ½ hour on—½ hour off. It weighs only 13½ pounds with integral gear box of 2¾ to 1 reduction.

Doubled plant capacity and new facilities enable EEMCO to keep pace with the growing need for these specialized designs. Today EEMCO motors and actuators are found on virtually all U. S. Aircraft.

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Pennsalt Cleaner A-27 is a granular material—dry, free-flowing, and dust-free. Its special formulation provides maximum detergency and free rinsing—yet it will not attack or stain the aluminum.

A-27 has an outstanding ability to *thoroughly* remove tough soils, including red and black marking inks, finger marks, cutting oils, and other shop grime. It rinses quickly and completely, *even if it is allowed to dry on the work, and it will not streak or stain.*

Pennsalt Cleaner A-27 is highly recommended for cleaning aluminum sheet stock prior to anodizing, chromatizing, phosphatizing, or other surface treatment. *And note this:* even though A-27 gives vastly superior results, it costs the same or less than other makes of aluminum cleaners!

This great new product is part of a complete aluminum "package" Pennsalt now offers to fabricators. To help you use these materials with maximum efficiency, Pennsalt's Metal Processing Service fieldmen will be happy to apply their experience to your operation.

For information about Cleaner A-27, or any of the products in the Pennsalt aluminum "package", write to: Metal Processing Service, Pennsylvania Salt Manufacturing Company, *East:* 280 Widener Building, Philadelphia 7, Pa. *West:* Woolsey Building, 2168 Shattuck Ave., Berkeley 4, Calif.

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The Pennsalt Aluminum "Package"

Pennsalt Cleaner AE-16. A new, non-scaling, non-sludging etchant. Produces exceptionally uniform etch. Rinses free. Can be cleaned from tank with stream of water.

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Pennsalt Cleaner MC-1®. An unusually economical general purpose cleaner and deoxidizer.

Pennsalt Cleaner EC-51®. A non-staining, organic-type emulsion cleaner.

Pennsalt Cleaner EC-54®. An emulsion cleaner which will not boil off, evaporate, or flash at use temperatures.

*Trademark of PSM Co.

Braniff Officials List Salaries and Holdings

Braniff Airways officials' salaries, bonuses and stockholdings reported to CAB for 1952 changed little from last year. President Tom E. Braniff's controlling interest dropped from 28% to 21%, mostly because total outstanding stock was increased by merger with Mid-Continent.

Braniff also reduced his holdings from 275,224 shares to 269,524 shares, the company report revealed.

Officers' and directors' compensation and stockholdings as reported for 1952 are as follows (with 1951 figures in parentheses where a change occurred in 1952):

T. E. Braniff, president, salary $30,000 and bonuses and indirect compensation $3,369, and he owns 269,524 shares (275,224) common stock; C. E. Beard, executive vice president, salary $28,125 ($27,000) and bonuses and indirect compensation $2,275 ($2,190), owns 100 shares; R. C. Shrader, vice-president, salary $11,875 ($19,000) and bonuses and indirect compensation $1,475 ($1,991), owns 1,200 shares; J. W. Miller, vice president (1952), salary $10,762 and bonuses and indirect compensation $588, owns 1,206 shares; C. G. Adams, secretary-treasurer, salary $19,750 ($19,000) and bonuses and indirect compensation $1,784 ($1,728), owns 1,900 shares; O. W. Crane, assistant treasurer, salary $9,900 ($9,450) and bonuses and indirect compensation $735 ($701), owns 100 shares; R. L. Barrier, assistant secretary, salary $8,220 ($7,905) and bonuses and indirect compensation $505 ($482).

Persons other than directors, officers and employes receiving compensation for personal services in excess of $10,000 reported included only the firm of Whiteford, Hart, Carmody, & Wilson, Washington, D. C., counsel, $45,000 ($36,000).

Directors: Ferdinand Eberstadt, chairman of the board, fees $350, ($250) owns 100 shares common; Roger J. Whiteford, fees $350 ($250) owns 150 shares; Fred Jones, fees $1,100 ($250), owns 1,000 shares; George Butler, fees $600 ($500), owns 5,000 shares; William A. Blakeley, owns 26,005 shares; Thomas F. Ryan, fees $100, owns 53,329 shares; E. C. Eppley, fees $100, owns 5,000 shares; T. N. Law, fees $100, owns 100 shares; Milton McGreevy, fees $100, owns 500 shares; G. D. Murdock, fees $100, owns 1,400 shares; H. C. Thurman—deceased—salary $6,875.

Owners of 5% or more of outstanding capital stock as of Dec. 31, 1952, are reported as: the Braniff Foundation, 81,889 shares (71,589), 6% (7%) of total; T. E. Braniff 269,524 shares (275,224), 21% (28%); and T. F. Ryan III 59,995 shares, 4%.

Options: of the 45,000 shares of $2.50 par common stock options available at $11⅛ per share, expiring Jan. 9, 1955, here are option holders: T. E. Braniff, 25,000 shares; C. E. Beard, 5,000 shares; R. C. Shrader, 5,000 shares; C. G. Adams, 5,000 shares; and H. C. Thurman—deceased—heirs hold option until Aug. 22 this year for 5,000 shares.



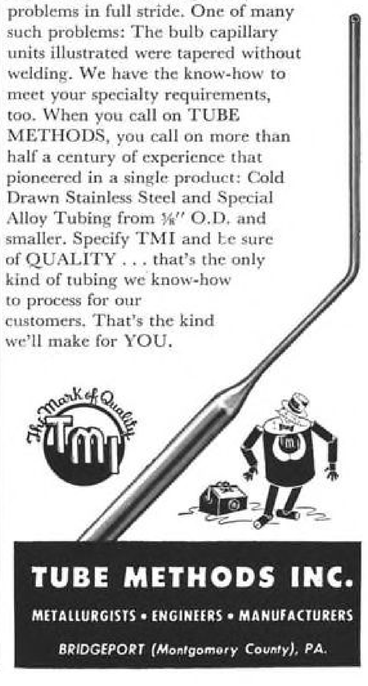
FIRST COLOMBIAN COPTER

Here is the first photo of a small homemade helicopter designed and built by Antonio Saldarriaga of Medellin, Colombia. Initial flight tests of the craft are reported to have been satisfactory. The craft is powered by a 125-hp. engine. Main rotor is approximately 27 ft. diameter. Inventor claims it is the first helicopter made in his country. He has spent some $16,000 on its design and construction.



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Top CAA, CAB Jobs Put Before Congress

Members of Congress are eyeing 94 top-paying Civil Aeronautics Board and Civil Aeronautics Administration positions exempt from competitive civil service and available for filling by appointment.

These are in addition to the Civil Arconautics Administrator and five CAB members, who are appointed by the President and confirmed by the Senate.

Most of the 94 positions now are filled by incumbents with civil service status, but this is not a requirement.

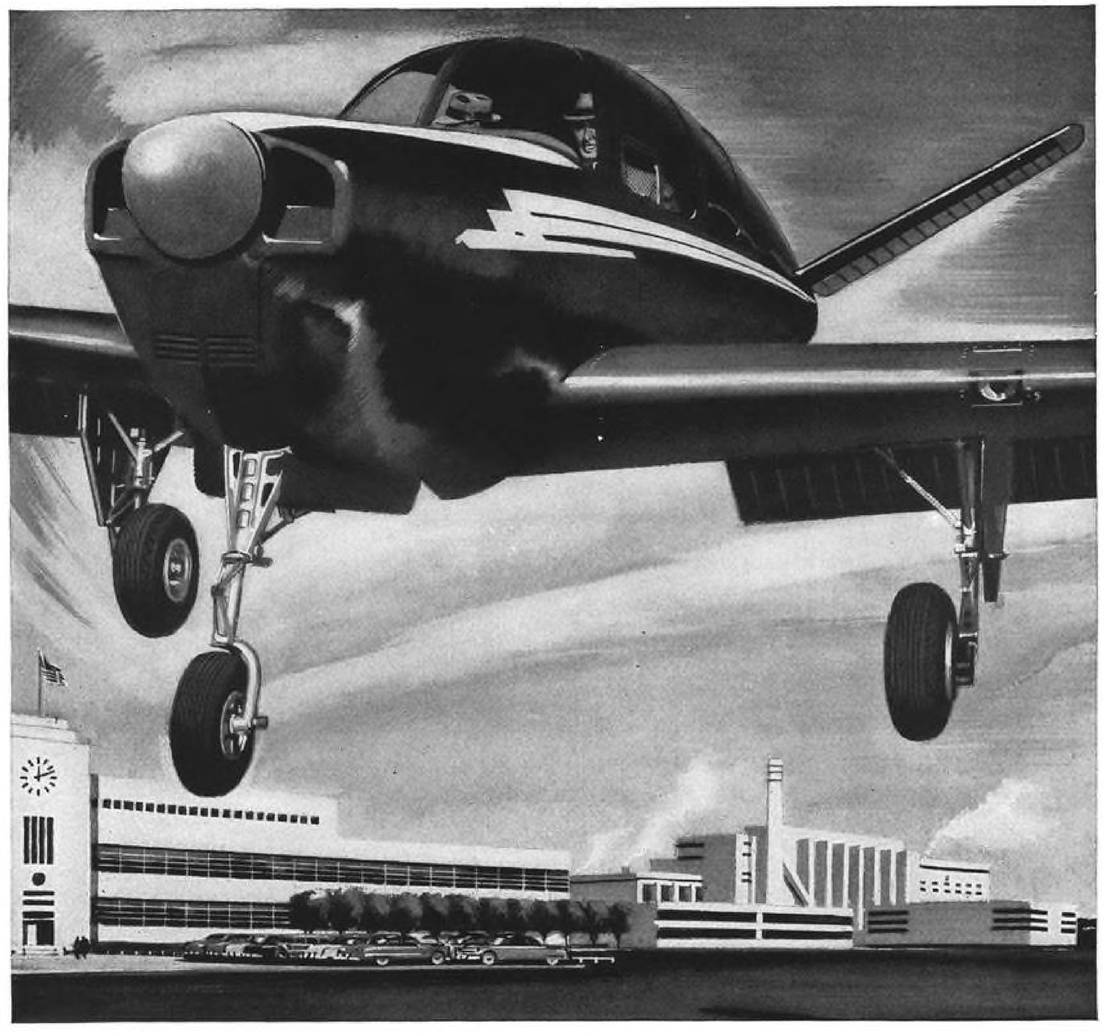
The positions are listed in a 450-page report by the Civil Service Commission, requested by the Senate's committee on post office and civil service, apparently for two main purposes:

- To ascertain second- and third-tier jobs held by carry-overs from the Democratic administration, who might be out of sympathy with the new administration and possibly might hamper execution of its policies.
- To let members of Congress know of positions in their home states that might be available for appointments recommended by them. For the convenience of members, positions are listed by states instead of departments and agencies. This makes it readily apparent to members the possible jobs for appointment in home territory.

Aside from 13 regional CAA jobs, the CAA and CAB posts are in Washington. Notation is made as to which are considered policymaking positions.

Here is a listing of the jobs in the Senate report (with asterisk indicating positions considered confidential or policy-determining):

Position	Salary	Number of Positions
Civil Aeronautics Board (Washington):		
Executive director*	$13,000	1
Assistant to member*	10,800	5
Confidential assistant to chairman*	4,620	1
Office of Enforcement:		
Trial attorney	10,800	1
Trial attorney	9,600	1
Trial attorney	8,630	2
Trial attorney	7,040	1
Trial attorney	5,940	2
Trial attorney	5,060	1
Bureau of Air Operations:		
Director*	12,000	1
General attorney	9,600	1
Trial attorney	8,360	3
Trial attorney	7,040	5
Trial attorney	5,940	3
Trial attorney	5,060	5
Bureau of Safety Regulation:		
Director*	10,800	1
Bureau of Safety Investigation:		
Director*	10,800	1
Office of Administration:		
Secretary of Board*	10,800	1
Office of General Counsel:		
General counsel*	12,000	1
Associate general counsel	10,800	1
Attorney-adviser	10,800	2
Trial attorney	10,800	1
General attorney	9,600	3
Attorney-adviser	9,600	1
Trial attorney	9,600	1



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You may say this is an unusual man, using unique methods. Just the opposite. Thousands of executives use Beechcrafts daily in just such fashion. They profit from anytime mobility of action, cut travel-time as much as 75 per cent, are away from their desks *less*, see their families *more*. For typical costs and operating data, call your Beechcraft distributor or write:

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GREATER DEPENDABILITY
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Designed for highest performance under extreme environmental conditions, Barber-Colman electro-mechanical rotary or linear actuators are available with ratings up to 500 pound inches torque or 250 pounds thrust. Versatility of basic designs affords a simple solution to most application problems encountered. Consult your nearest Barber-Colman engineering office.

write for information on BARBER-COLMAN ACTUATORS

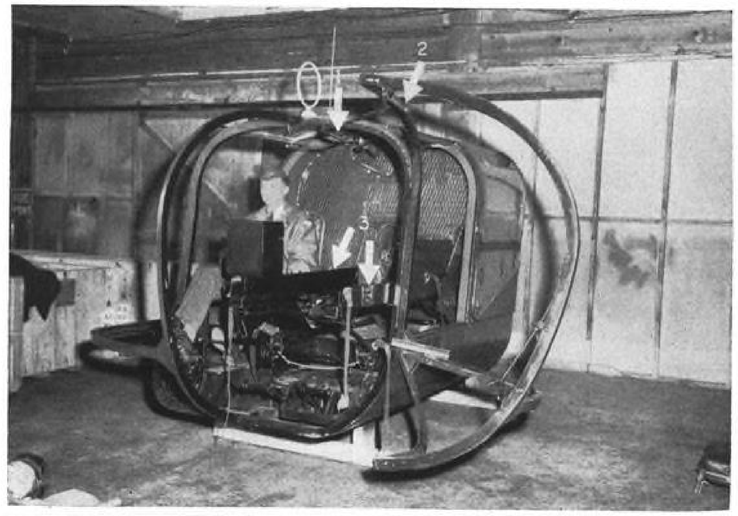
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Attorney-adviser	8,360	1
Trial attorney	8,360	2
Legislative attorney	8,360	1
Attorney-adviser	7,040	3
Attorney-adviser	5,060	1
General attorney	4,205	4
Bureau of Hearing Examiners:		
Attorney-adviser	8,360	1
Attorney editor	5,060	1
Civil Aeronautics Administration (Washington):		
General counsel	10,800	1
Deputy general counsel	10,800	1
Trial attorney	9,600	1
Trial attorney	9,360	1
Trial attorney	7,040	1
Trial attorney	5,940	1
Trial attorney	5,060	1
Trial attorney	4,205	1
Attorney adviser	9,600	3
Attorney adviser	8,360	3
Attorney adviser	7,040	3
Attorney adviser	5,940	2
General attorney	8,360	1
Legislative attorney	7,040	1
Civil Aeronautics Administration (Regional):		
New York:		
Regional attorney	9,600	1
Attorney	8,360	1
Trial attorney	7,040	1
Atlanta:		
Regional attorney	9,600	1
Attorney	8,360	1
Chicago:		
Regional attorney	9,600	1
Deputy attorney	8,360	1
Kansas City:		
Regional attorney	10,200	1
Deputy	8,560	1
Los Angeles:		
Regional attorney	10,200	1
Attorney	8,560	1
Seattle:		
Regional attorney	9,600	1
Attorney	8,360	1





KAMAN HTK-1 AMBULANCE

Two photos of the Kaman HTK-1 ambulance mockup currently being demonstrated to the armed forces. Top photo shows how half the nose bubble can be swung open to facilitate loading and unloading of litters. Numbered details are: 1. opening and closure handle; 2. bubble unlock handle and, 3. supports for litters in load position. These Kaman-designed-and-built litter supports can be swung rearward and secured against the cabin wall when not needed. The firm has carried out flight tests with an HTK having gross loads similar to those imposed by the litter installation.



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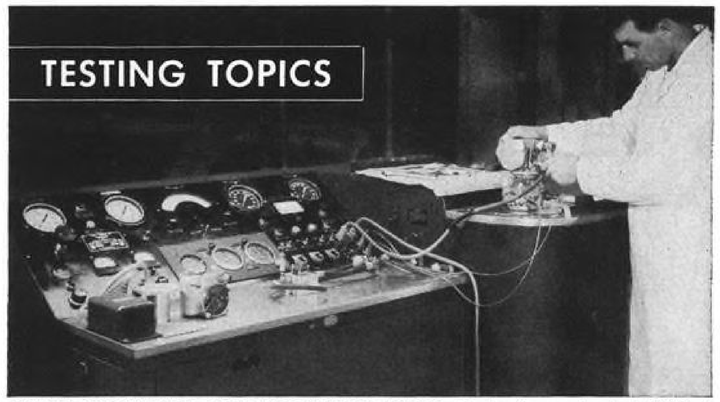
WHEELER

SOUND POWERED *electric*
TELEPHONES & HANDSETS

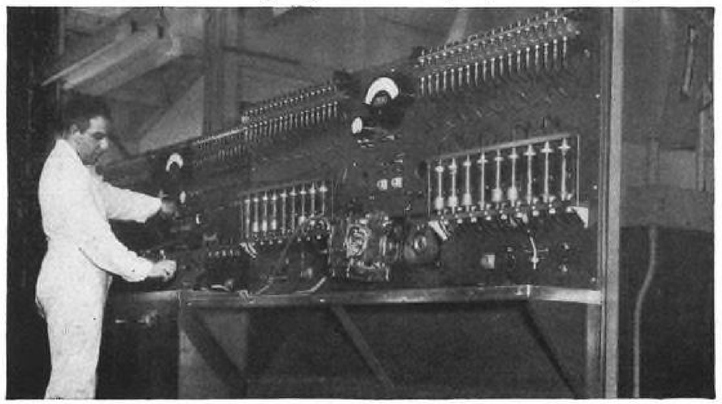
There are any number of ways in which you can use Wheeler Sound Powered Electric Telephone Handsets and intercom systems for added convenience, time-saving, and safety in your operations. The most practical adjunct to regular telephone or intercom service to relieve overloaded switchboards, and to provide immediate contact with up to 12 locations on a direct private-wire basis. It is also the ideal emergency phone set-up, completely independent of outside power sources. Having NO BATTERIES or other replaceable parts, it is always DEPENDABLY ready for service, regardless of long periods of inactivity. Developed, built, and guaranteed by a division of The Sperry Corporation to highest quality standards, yet remarkably low in cost. Write direct for information.

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GREER PROPELLER GOVERNOR TEST STAND checks the mechanical "IQ" of the brains behind the performance of hydromatic constant speed propellers. This machine will test double acting, single or double capacity and reversible governors.



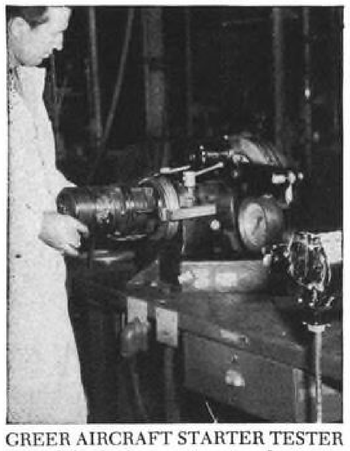
GREER HI-LO MAGNETO TEST STAND, above, tests both high and low tension magnetos, distributors, and coils of Pratt & Whitney and Wright Aircraft engines.

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CAB Asks for More Enforcement Power

Civil Aeronautics Board has asked Congress for power to levy civil penalties for violations of economic regulations.

This was one of four amendments to the Civil Aeronautics Act the Board has asked Congress to make. At present, CAB says, "the only penalties provided are criminal penalties, which can be imposed only for knowing and wilful violation."

The three other amendments proposed by the Board would:

• **Cut international red tape.** CAB asks the right to grant exemptions to foreign airlines for special flights in the U. S. Now they must go through formal notice, hearing and approval by the President for even the simplest individual flight. This tends "to make foreign governments place reciprocally burdensome conditions on our carriers operating abroad," CAB says.

• **Cut 80% of contract filing.** Civil Aerounautics Act requires that airlines file contracts between carriers, causing a continuous flood of paperwork for airlines and CAB. The Board must approve each contract individually. CAB says 80% can be eliminated.

• **Reduce CAB member vacancies.** The Board seconds a Hoover Commission recommendation that regulatory commissioners and board members stay in office after expiration of their terms until their successors are appointed and qualified. Says CAB: "Occasionally the vacancy is not filled for some time and the productive capacity of the Board is bound to suffer."

Transocean Expands U.S.-Hawaii Service

Transocean Air Lines plans to open Hilo, Hawaii, as a new terminal for promotion of "exclusive" and "direct" service to the Hawaiian Islands, formerly served only through the more distant port of Honolulu, Oahu.

Transocean, large nonscheduled carrier, has given coach service from the U. S. to Honolulu for some time but recently was faced with competition from Pan American World Airways, which started Stratocruiser coach service last fall. United Air Lines also plans coach service to Honolulu. Transocean will continue flights to Honolulu but aims to boost Hilo service.

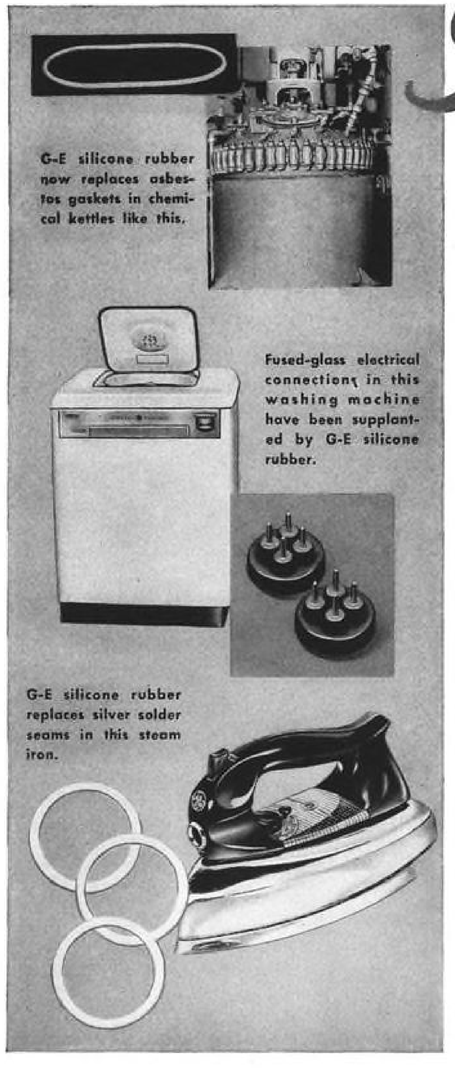
The carrier has filed an "open-jaw" fare, setting up the same rates to Hilo as those charged on Honolulu flights. This means Transocean would absorb cost of transferring passengers to Honolulu or Hilo, depending on where the flights terminate.

LOOKING FOR – STRETCHY SOLDER?

RUBBERY GLASS? RESILIENT ASBESTOS?

Investigate

SILICONE RUBBER

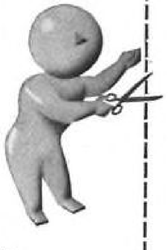


Have you a materials problem? Perhaps you're presently using materials such as glass, asbestos, solder, mica or graphite to join, resist chemical attack or insulate an assembly—particularly at high or low temperatures. But, could you reduce replacement or assembly costs, improve the design or lengthen the life of your product if these common materials were *resilient?*

Rubber is resilient, but ordinarily you wouldn't think of rubber for use at high or low temperatures. General Electric silicone rubber, however, remains *flexible* at temperature extremes, is chemically resistant and dielectrically strong. That's why it is being used to replace—and improve upon—many common engineering materials. You can see a few examples on this page.

FREE BOOKLET GIVES MORE FACTS

Find out more about the many possibilities G-E silicone rubber offers you. Write for your copy of "Imagineering with Silicone Rubber." This informative booklet suggests how *you* can put G-E silicone rubber profitably to work in *your* business.



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Please send me your new free booklet "Imagineering with Silicone Rubber." I am interested in G-E silicone rubber for:

( ) Seals and gaskets
( ) Wire and cable insulation
( ) Tapes and cloths
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GENERAL ELECTRIC



TOMORROW'S AIRCRAFT: *One step closer*

Reducing weight while increasing structural strength

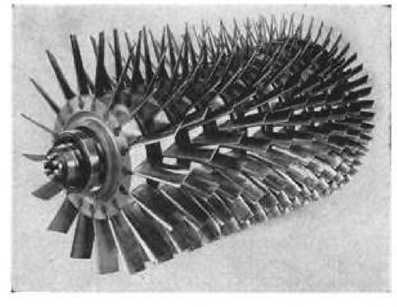
New miracles with alloys are today overcoming one of the greatest problems that ever confronted the aviation industry . . . *ever-increasing plane weight*. As faster and faster speeds were demanded, larger and more powerful engines required, stronger and heavier airplanes became necessary. But Westinghouse engineers had foreseen the difficulties that increases in body and engine weight would bring . . . and their years of metallurgical research and plastic studies had the answers—Titanium and Micarta.

After successfully introducing the use of Titanium for jet engine parts, Westinghouse engineers doubled their efforts to further its application. Today, a saving of over 200 pounds has been made possible in the weight of each engine. Still further savings are being attested with alloys of this miracle metal that boasts greater tensile strength, up to 750° F, than even stainless steel.

At the same time that Westinghouse was unfolding the merits of Titanium to the aviation world, their manufacture of Micarta plane parts was proving almost equally valuable in reducing weight, while increasing structural strength. Research on this "lighter-than-aluminum" material and on its further use, other than items such as pulleys, cams, structural members and assemblies, continues without a stop.

Reducing weight and increasing structural strength with these new materials are but two of the hundreds of aviation developments under way in Westinghouse plants and laboratories the country over. Every day some new product, engine or material from one of the plants is announced . . . some new record is set . . . some new goal achieved. Every day more and more eyes are turning to the name Westinghouse for promise of tomorrow's faster, safer, more economical air transportation. Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pennsylvania.

J-91006



Use of Titanium in jet engine compressors like this, allows reduction in weight while increasing the structural strength.

THE SCOPE OF WESTINGHOUSE IN AVIATION

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Turbojet Engines, Fire Control, Radar, Autopilots, Communication Equipment and Electrical Systems.

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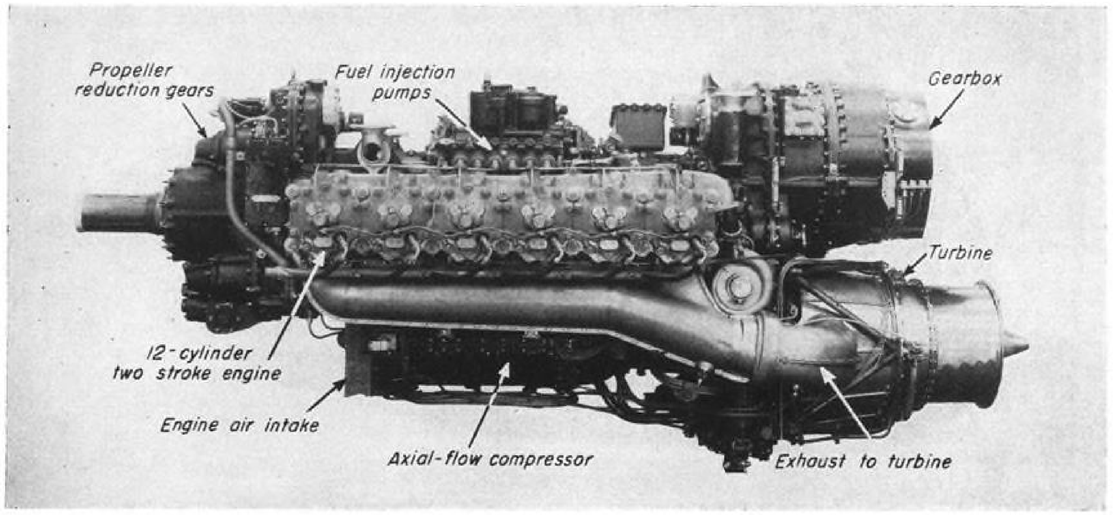
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Transformers, Rectifiers, Instruments, Gyro-motors, Temperature Control Panels, Generating Equipment and System Control, Circuit Breakers, Contactors, Motors, Actuators and Hoists, Electronic Tubes, Magamps*, Micarta®.

*Trademark

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Westinghouse



NAPIER NOMAD NNM 6 version of combined gas turbine-diesel engine develops more than 3,000 ehp. Intake air enters axial-flow compressor and passes to cylinders. Exhaust discharges through turbine. Power of diesel unit and excess from gas turbine are coupled mechanically through gearbox to drive propeller shaft. The NNM 6 drives a single shaft. Older NNM 3 version drove contra props.

New Nomad's Fuel Appetite Is Small

Napier claims that redesigned diesel-turbine engine burns one-third of a pound of fuel per hp.-hr.

Extremely low fuel consumption is the major design claim of the "new" Napier Nomad NNM 6 compound diesel-gas turbine engine.

Redesigned completely from the first of the type shown at Farnborough in 1951 (AVIATION WEEK Oct. 8, 1951, p. 14), this latest British engine burns about one-third of a pound of fuel per hp.-hr., says Napier.

Power output to the single propeller is 3,135 equiv. hp., from a package which weighs in at 3,580 lb. The overall length is a little under 10 feet.

► **Basic Cycle**—The Nomad is a different kind of internal combustion engine. It is also a different kind of gas turbine.

Napier's design aim was to get an engine which would have the lowest possible fuel consumption under all conditions. To do this, a two-stroke diesel engine was compounded with a gas turbine; the power output was harnessed through gearing to drive a propeller.

Using the diesel and gas turbine means that a wide variety of fuels can be burned in the engine; diesel fuel, kerosene and low-quality gasoline are listed as possibilities.

High compression and expansion ratios, made possible by this marriage of diesel and gas turbine, account for the low fuel consumption of the unit.

► **Mechanically**—Nomad is based on a valveless, two-stroke diesel engine. To this is coupled an axial-flow compressor on a common shaft with a multi-stage exhaust turbine. The power of the two basic units is transferred to a single-rotation propeller shaft through reduction gearing.

Air for the unit is taken in ahead of the axial-flow compressor, passed through that unit, and fed to the cylinders of the diesel engine. The exhaust gases from the diesel pass through the multi-stage turbine on their way out.

The power that the propeller gets is largely from the crankshaft of the diesel section, plus residual power mechanically transmitted from the turbine.

► **Earlier Model**—The present version of the Nomad has been considerably refined from the first unit shown in 1951. In that engine, intake air went first through an axial and then through a centrifugal compressor, then into the cylinders. Exhaust from the cylinders drove a turbine which was mechanically connected to the axial-flow compressor. The centrifugal compressor was gear-driven from the engine.

Power from these units drove counter-rotating propellers through gearing; each half of the prop system rotated independently.

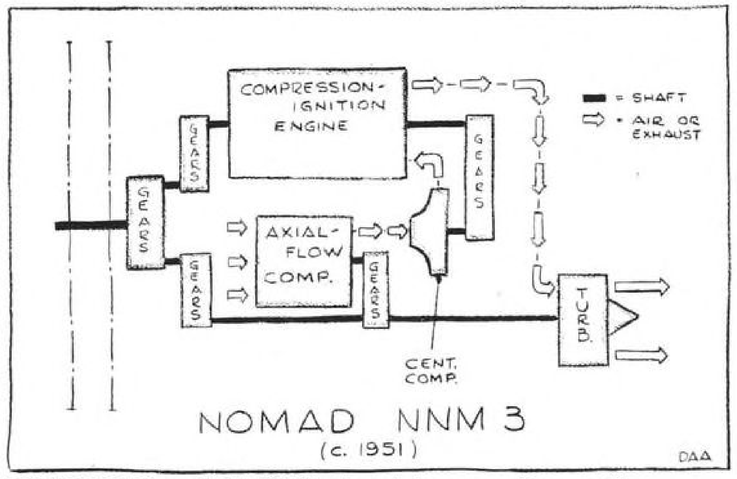
In the early Nomad the exhaust turbine drove the axial-flow compressor and the front half of the prop unit; the engine crankshaft drove the centrifugal compressor and the rear prop.

In the new Nomad, the compressor is driven by the exhaust turbine; the single-rotation prop gets power mechanically from gas turbine and diesel units.

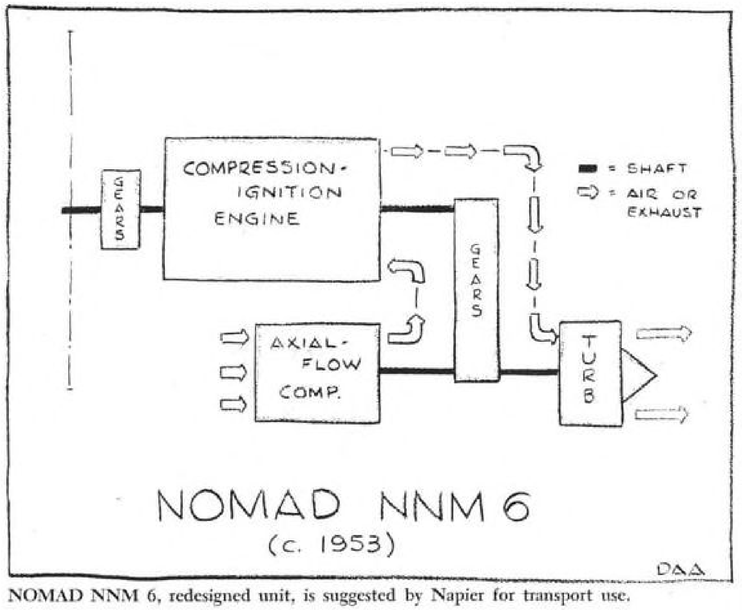
► **For Comparison**—Napier has prepared a lengthy argument for the Nomad in its latest form, based on calculations made for three hypothetical airplanes. In this trio, one is powered by four turbojets of 10,000-lb. thrust each, and weighs about 153,000 lb. A second is powered by four turboprop units of 3,780 chp. each at takeoff, and weighs 140,000 lb. The third is the Nomad version using four engines and weighing 123,500 lb.

Common feature of the three proposals is that the same payload is carried for a still-air range of 2,860 statute miles.

Those familiar with British aircraft will have no difficulty seeing that the "hypothetical" turboprop design is exactly the Bristol Britannia and the turbojet craft is just a little heavier and larger and more powerful than the Comet 3, as described in official—and current—figures.



NOMAD NNM 3, unveiled at 1951 Farnborough show, powered two propellers.



NOMAD NNM 6, redesigned unit, is suggested by Napier for transport use.

In studying these comparisons, it is well to remember that the firm of D. Napier & Son, Ltd., has a definite stake in the future of the Nomad.

Note also that the comparison is made with turbojet and turboprop aircraft, and that there is no hypothetical piston-engined or turbo-compounded piston-engined craft considered.

► **Weight and Cost**—The first factors considered by Napier are airplane weights and costs. Napier makes the point that the low fuel consumption of the Nomad gives a smaller airplane for the same payload. Since aircraft cost is about proportional to equipped airframe weight, therefore the smaller airplane is going to be cheaper.

Napier says that fuel cost is the biggest single item in direct operating costs of an airplane. Thus the lower the fuel consumption, and the cheaper the fuel used, the lower the direct operating cost.

The figures quoted by the British engine firm give 35% of the direct operating cost to fuel costs for a turbojet airplane. In the case of the turboprop design, this drops to about 28%. With a Nomad-powered airplane burning aviation kerosene the value is about 22%, dropping to about 17% if diesel fuel is burned.

Direct operating costs per flying hour for the run of 3,150-statute mi. from London to Bahrein in the Persian Gulf are calculated for reduced payloads, because the distance is greater than the basic range of 2,860 mi. The Nomad-powered plane shows exactly half the operating cost of the turbojet craft

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AIRCRAFT DATA SHEET

	NOMAD	PROP-TURBINE	TURBO-JET
TAKE-OFF POWER	12,540 E.H.P.	15,120 E.H.P.	40,000 LB. THRUST
SPAN, FT.	132	140	123.5
WING AREA (GROSS) SQ. FT.	1840	2050	2185
ASPECT RATIO	9.5	9.5	7.0
LENGTH (OVERALL) FT.	114	114	114
FUSELAGE DIAMETER FT.	12	12	12
VOLUMETRIC CAPACITY PAYLOAD LB.	25,000	25,000	25,000
AIRCRAFT BASIC EQUIPPED WEIGHT LB.	71,000	70,000	70,370
AIRCRAFT ALL-UP WEIGHT LB.	123,500	140,000	153,000



NAPIER STUDY compares Nomad-powered, turboprop and turbojet transports.

($350 against $700 per hour).

► **Fuel Reserves**—For the London-Bahrein run, Napier says that the fuel reserves on the Nomad-powered plane would be only 14% of the capacity payload, as compared to 24% for the turboprop plane and 37% for the turbojet plane being considered.

Total fuel to be carried by the Nomad transport would be about 29,000 lb. compared to a 62,000-lb. value for the turbojet transport and 48,000 lb. for the turboprop job. Cost would be directly proportional, unless the Nomads were run on diesel fuel, thus further reducing the Nomad fuel cost.

► **Range Advantages**—Napier agrees that long range is a desirable attribute to build into an airplane. It permits regular operation in the face of head winds and weather conditions. It helps open a much greater number of bases that can be reached with a given payload. It means no need for maintenance and operations at intermediate landing points.

So Napier says that the cumulative effect of these factors is to tend to neutralize the speed advantage one airplane may have over another if the latter has the range necessary to cover the distance in one hop. (This is a reference to the difference between the speeds of pure-jet types such as the Comet and the slower speeds of any possible Nomad-powered transport.)

As its example, Napier uses the London-to-New York flight, and starts by saying that no jet-engined civil transport yet constructed is capable of flying this leg nonstop regularly during the winter months.

So with the necessary intermediate stop, "the pure-jet aeroplane completes the journey from London to New York in 10 hours elapsed time, whereas the Nomad-powered aeroplane, which can fly nonstop but whose cruising speed is

An Open Letter to Executives in charge of...

AIRFRAME Manufacturing







This message is addressed to the executives responsible for airframe assembly or fabrication who have a production problem involving such things as cowlings, wing tips, wheel doors, fairings, air-scoops & ducting, seats, ailerons, flaps, trim tabs, dorsal fins, elevators, rudders or related jobs. We operate a fine, modern and completely equipped plant for aluminum metal forming and fabrication of aircraft parts and assemblies. Our equipment and facilities include:

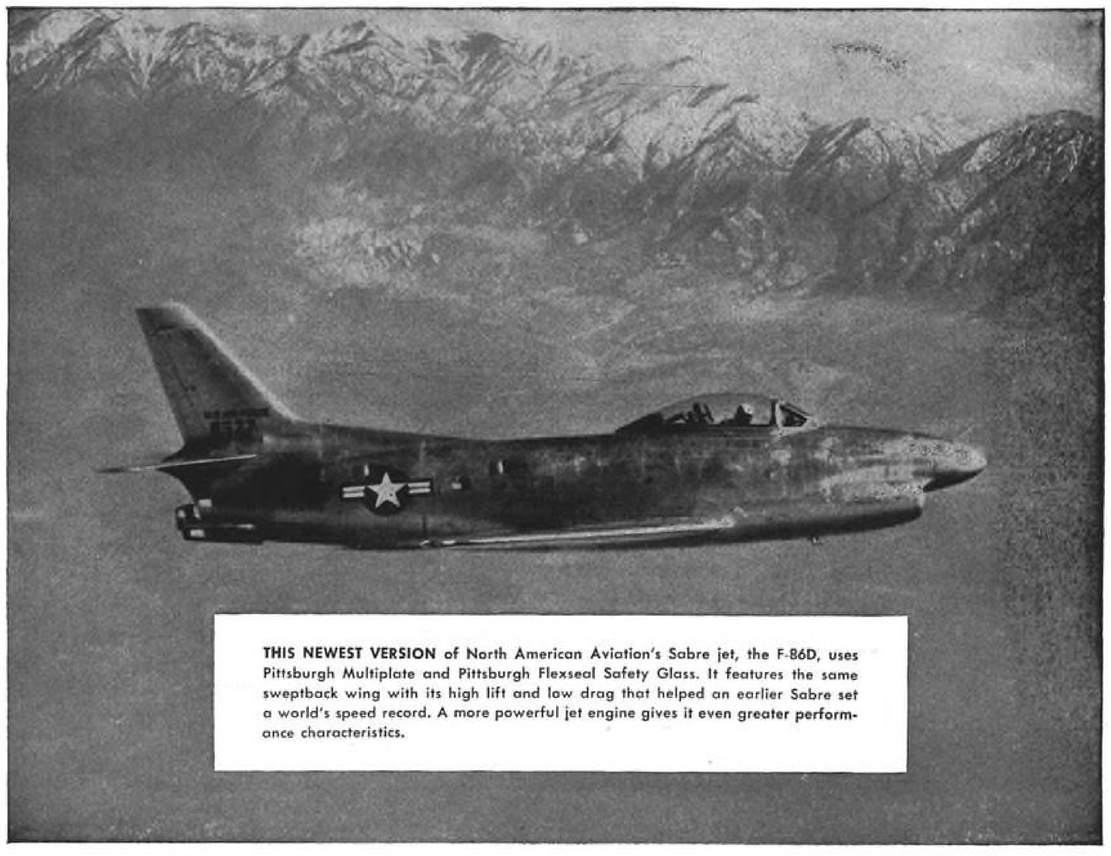
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6. Aluminum Heat Treat
7. Painting & Finishing
8. Complete tool making Facilities
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   c. Aircraft Dies & Hard Tools

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Bent *FLEXSEAL* Safety Glass solves difficult optical problem on North American's newest Sabre jet



THIS NEWEST VERSION of North American Aviation's Sabre jet, the F-86D, uses Pittsburgh Multiplate and Pittsburgh Flexseal Safety Glass. It features the same sweptback wing with its high lift and low drag that helped an earlier Sabre set a world's speed record. A more powerful jet engine gives it even greater performance characteristics.

NORTH AMERICAN AVIATION'S new F-86D Sabre jet features even greater speeds and higher altitudes than its Sabre predecessors. These performance improvements presented a difficult optical problem that Pittsburgh engineers helped to solve.

To give the pilot the greatest possible freedom from vision distortion, Pittsburgh engineers designed special bent panels of Pittsburgh Flexseal Safety Glass for the openings to the right and left of the windshield. This glass-and-plastic lamination has the stamina to stand up under the speeds and altitudes at which this plane operates.

The windshield of the Sabre makes use of Pittsburgh Multiplate Safety Glass, a bullet-resisting, gunsight reflector-type glass.

Manufacturers of the nation's first-line military and commercial planes bring their glass and glazing problems to Pittsburgh. They know they'll receive competent design assistance as well as the finest Safety Glass that modern research and manufacturing methods can produce. We invite your inquiries, too. Pittsburgh Plate Glass Company, Room 3190, 632 Duquesne Way, Pittsburgh 22, Pennsylvania.

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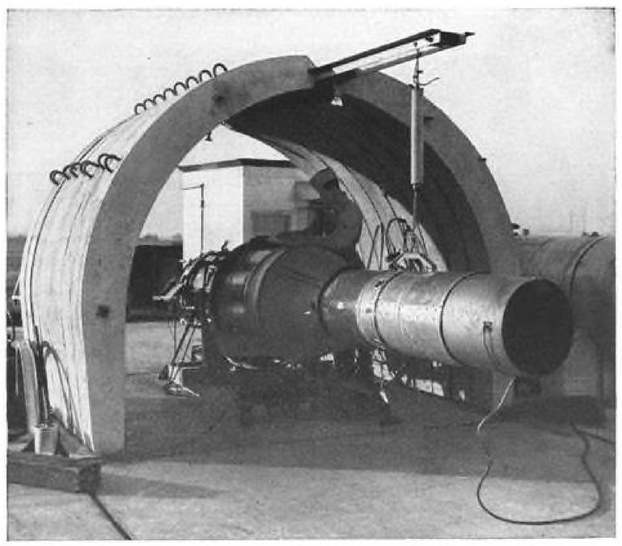


KOREA—G-E service engineer and North American Aviation field engineer inspect General Electric J47 at Air Force base in Korea. G-E tech reps maintain close contact with engines in the field, provide technical assistance, and perform a variety of trouble shooting jobs.

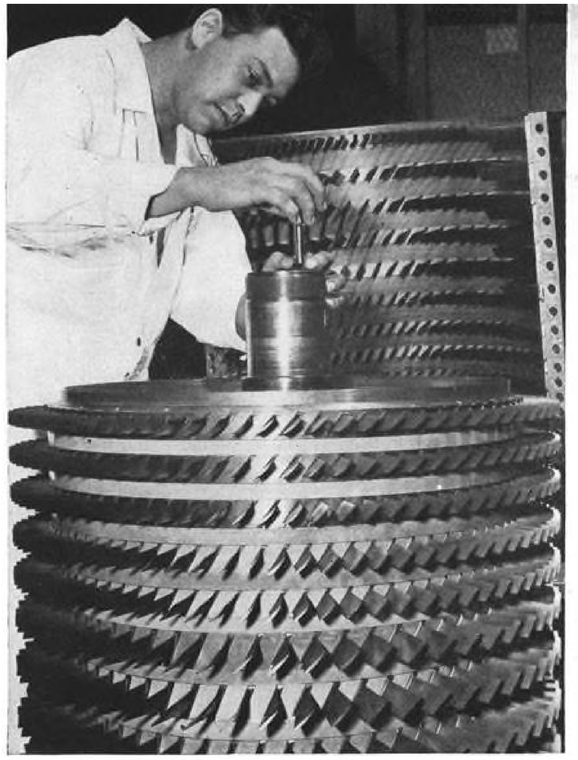
WORLD-WIDE JET SERVICE



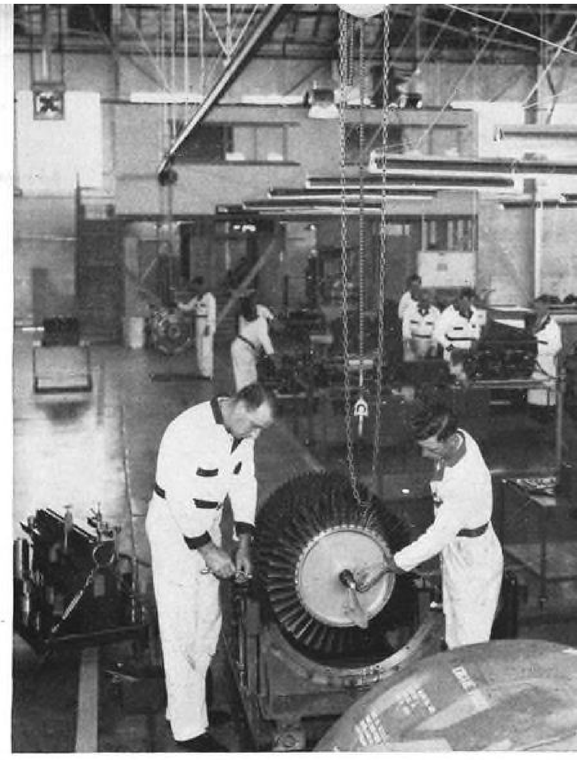
ENGLAND—First of G.E.'s overseas service outposts for turbojets, England is today the service center for G-E engines in NATO aircraft.



JAPAN—Test stand for turbojets at Johnson Air Force Base, Japan, is one of many installations where G-E service is available.



LOS ANGELES—Completely equipped General Electric modification shop services G-E turbojets on West Coast. Above, technician makes a micrometer measurement of compressor rotor shaft.



STROTHER FIELD—Former Air Force base has been converted into modern General Electric shop for G-E turbojets and has facilities to handle any type of engine modification.

ENGINEERING...

Assures Optimum Performance At All Times For G-E Turbojets

ANYWHERE IN THE WORLD a G-E turbojet is in use, a representative of General Electric's world-wide service organization is on the spot to assure peak engine performance. Highly trained technical representatives assist and supervise servicing of G-E jet engines regardless of where the engines may be. This close contact in the field also allows the technical representatives to keep factory engineers informed of engine performance in the field.

OVERSEAS, G.E.'s technical representatives are active in Korea, England, Germany, Puerto Rico, and Alaska. More service outposts will be set up as needed—not only for military jets, but for commercial jets as well.

STATESIDE SERVICE to G-E turbojets goes on at two completely equipped modification shops at Los Angeles and Strother Field, Kansas. Technical representatives at 65 locations . . . USAF bases and other key operational centers . . . complete a coast-to-coast service network that brings G-E engineering within easy reach of G-E jet engine users.

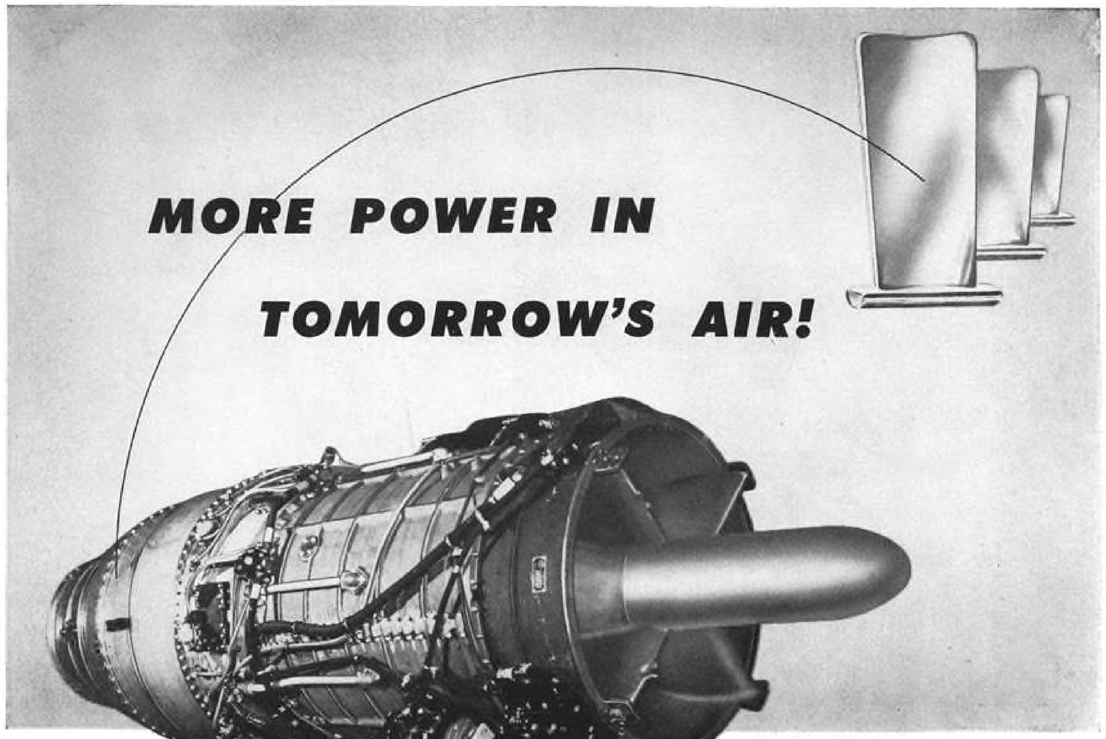
COMBAT ENGINES, along with some from U.S. bases, are now being shipped back in limited quantities to G.E.'s Evendale, Ohio jet center, near Cincinnati. There a section of the plant is currently gearing up to overhaul veteran engines and put them back on the flight line. General Electric Company, Schenectady 5, New York. 230-9



CINCINNATI—Overhaul of combat and stateside engines within G.E.'s Evendale, Ohio jet center lets design engineers study veteran engines first hand.

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J-65 SAPPHIRE
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WITH UTICA BLADES



The Republic F-84-F Thunderstreak powered with Curtiss-Wright *Sapphire* outperforms any airplane in its class—in speed, range, hitting power . . . in every way.



Speed of a fighter plus a heavy bomb-load—that's the new Martin built B-57 twin jet bomber which will be powered with Curtiss-Wright *Sapphire* engines.

Twenty-five percent more powerful than jets it is replacing—that's the story on the great new *Sapphire* engine. And here's the *inside* story . . .

Deep down in the heart of this *Sapphire* engine are turbine blades forged and finished by UTICA. They're spinning like crazy in a thundering hurricane of swirling gases. These UTICA blades, precisely forged —accurate to a thousandth—harness this blast of gases into a giant propulsive power that drives some of the world's best high-performance aircraft!

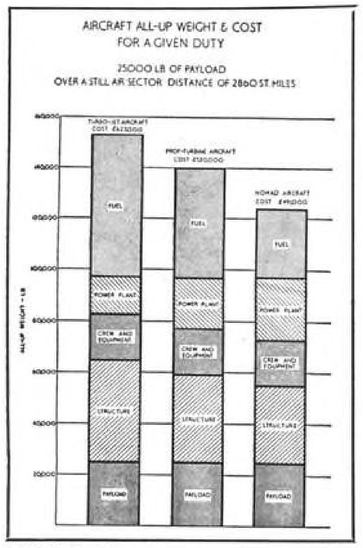
We're very proud that Curtiss-Wright picked us to supply turbine and compressor blades for the *Sapphire* engine. UTICA jet blades are but one sample of the exacting precision forgings made possible by our 57 years of forging experience . . . teamed with finest modern equipment . . . backed by UTICA's continuous drive for ever finer quality.

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MAKERS OF THE FAMOUS UTICA LINE OF DROP FORGED PLIERS AND ADJUSTABLE WRENCHES



NOMAD plane for a given duty would be lightest, cost least, Napier says.

180 mph. less, only takes 11.7 hours."

►**Landing Problems**—Continuing its case against the turbojet transport, Napier says that the current ICAO requirement for landing distance is already proving critical for jet transports.

But by using reverse-thrust, and by counting on the increased drag—in the landing configuration—of the Nomad-powered transport, the landing run can be reduced. Furthermore, says the firm, the advantage of the propeller-driven airplane (lighter and smaller than the jet of equivalent payload) will permit reduced weather minimums.

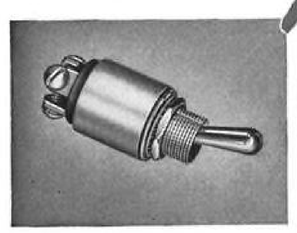
Napier shows a chart of required runway length plotted against the percentage of takeoff weight (it is assumed that this latter term refers to the same landing weight, although nowhere does the firm make it clear). There is a catch to such a chart; you must not compare unequal planes on the basis of landing weights which are equal percentages of gross weights. In other words, for the case of the turbojet transport, the landing weight is a considerably lesser percentage of the airplane gross than it is in the case of the Nomad-powered plane.

On a true comparative basis, therefore, the landing weight of the turbojet transport figures to be about 66% of the gross, and for the Nomad transport, the landing weight is about 81%. (These figures are based on the gross weights specified by Napier, less fuel burned for the London-Bahrein run. Fuel reserves were included in landing weights.)

Required runway length, from the Napier chart, is then about 2,300 yards for the turbojet transport and about

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T1000 Designed for MIL-S-6745 uses

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New



Miniature "Push-Push" and Rotary Types J100 and R1000

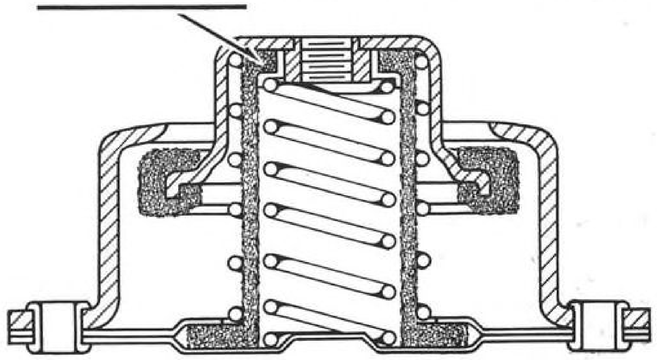
Compactness, light weight and maximum durability characterize these unique Hetherington switches. Widely used for aircraft seat light control, the Series J100 "push-push" switch utilizes a sturdy cam-roller design operated by a positive escapement-type push-button action and is readily adaptable to many uses. The Series R1000 switch is a rotary action unit with indicator knob. Both types operate on either 28 v.d.c. or 115 v.a.c. 60 cycles current. Rated 20 amperes resistive.
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FINE PUSH-BUTTON AND SNAP-ACTION TYPES
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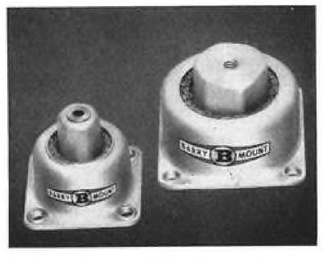
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- High isolation efficiency — meets latest government specifications (JAN-C-172A, etc.) — gives your equipment maximum protection.
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Compare these unit isolators with any others — by making your own tests, or on the basis of full details contained in Barry Product Bulletin 531. Your free copy will be mailed on request.

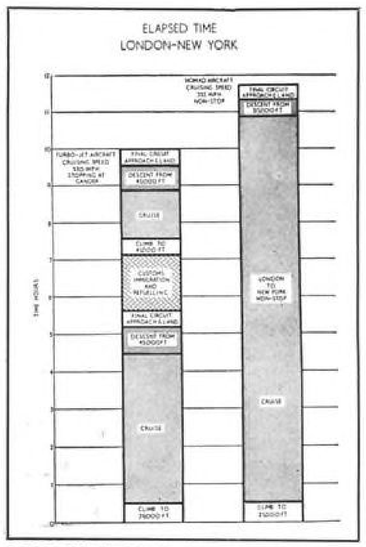
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LONGER RANGE of Nomad plane would minimize its lower speed, Napier says.

1,700 yards for the Nomad plane.

▶ **Temperature**—Napier says that the Nomad is much less sensitive to temperature effects than either the turbojet or turboprop engine. For a rise in ambient temperature of 15C (27F), the Nomad loses 2½% of its equivalent horsepower against about 9% for turbojet and turboprop.

Loss of horsepower shows seriously in increased takeoff distance. For a typical condition of standard atmosphere-plus-36F (which would correspond roughly to the so-called summer days used as criteria in this country), turboprop and turbojet engines show about a 25% increase in takeoff distance against the Nomad's 15%. Takeoff distance, as used here, is based on one engine failure at the critical point.

▶ **Constant Gross**—These comparisons have been based on aircraft of the same payload and range capability. Napier has extended its comparison to aircraft of the same gross weight—140,000 lb.—operating routes between London-New York and London-Bahrein.

For the former route, the Nomad transport could carry about 95 passengers against about 28 for the turbojet craft. To Bahrein, the Nomad plane could carry about 110 against the turbojet's 75.

▶ **Nomad Applications**—Uses for this Nomad have not been specified at the moment. There is no lack of conjecture, however.

Flight tests are likely to be made toward the end of this year in a converted Avro Shackleton, with a possible eye towards installation in these craft for extremely long-range reconnaissance.

Transport Command's Blackburn Beverly freighters could also use the

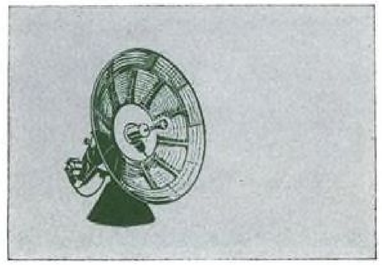
Tongues with the speed of light . . .

Tongues with the speed of light
Challenge all things in flight
And search the good and evil in the dark

And when the echo's heard
Ears grip the electric word
And measure the hidden journey of a spark

And the ear becomes an eye
Over the sea and high
As falcons climb and man shall stand aware

Of approaching foe or friend
Beyond the horizon's bend
And in the darkness he shall meet them there.



Radar— from "Stars and Atoms HAVE NO SIZE", by A. M. SULLIVAN (*by permission*).

Since 1935, we have specialized in the development and manufacture of systems and components for gunfire and missile control, navigation, bombing, radar, electronic countermeasures, and ammunition and bomb handling.

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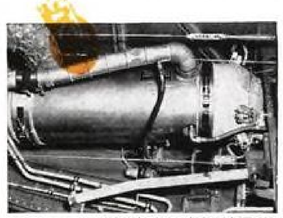
heat for the HUP and the "Work Horse," too

Piasecki helicopters are in the news performing rescue operations as well as a variety of other tasks. Note-worthy feature of the HUP-2 is a hydraulic hoist which can pick up as much as 400 pounds of cargo, or bring a litter into the cabin. Rescue work particularly, requires dependable cockpit and cabin heat. This and other heating requirements are met in full with Janitrol heaters: V-25s aboard the HUP models, S-25s for the H-25, and S-200s on the H-21 "Work Horse."

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V-25 HEATER INSTALLATION



S-200 HEATER INSTALLATION

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engine, according to British sources.

It has also been suggested by Dr. A. E. Russell of Bristol that the Nomad could power reconnaissance versions of the Britannia to be built in Canada.

British European Airways plans to convert eight of its Elizabethans to Nomad-powered freighters.

So the pattern of possible use is clear for the Nomad—in airplanes where range and payload capacity are the most desirable attributes.

There is one factor to consider, though. If all of the uses outlined above should materialize, the total engine order would be upwards of 300, counting spares and early pre-production engines. Napier has a small production facility by American, or even by British standards.

It has taken the firm only two years to show its redesigned Nomad, a time lapse which is about par for the course. The firm has always been known as a high-grade development shop. Its test will be in the way it produces the new Nomads.—DAA

Aircraft Industry Gets Steady Flow of Nickel

The aircraft industry is having no trouble getting enough nickel to maintain present production schedules since National Production Authority set up the aircraft high-temperature alloy section in Washington early this year.

Despite a world shortage of nickel, the industry is obtaining a steady flow of the metal vital to aircraft production, although Aircraft Industries Assn. reports there is no surplus. NPA's new division, which allocates all high-temperature alloy metals such as nickel, is using a new distribution procedure to get the raw material directly from the source to the manufacturer in an even flow.

► **Distribution**—Previously, industry obtained nickel on a more or less catch-as-catch-can basis. The old problem of obtaining nickel was caused by distribution rather than world shortage, according to AIA. Now that the distribution problem apparently has been solved, the reported shortage has no effect on the aircraft industry.

Major part of nickel allotted the military is eaten up by the aviation industry and the Atomic Energy Commission. Most of that going to aircraft industries is used by engine manufacturers, who employ the tough, heat-resistant metal in alloy form in turbine wheels, blades, combustion chamber burners, burner liners and afterburners of turbojet engines.

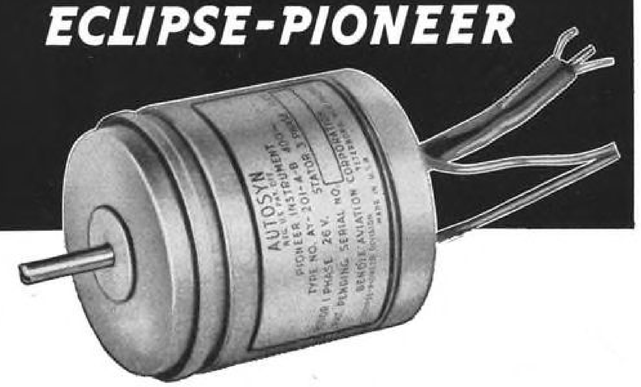
About 660 lb. of nickel goes into a 6,000-lb. thrust jet engine. Some engines require as much as 2,400 lb. of pure nickel in alloys. Generally, the

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For more than 18 years, Eclipse-Pioneer has been a leader in the development and production of high precision synchros for use in automatic control circuits of aircraft, marine and other industrial applications. Today, thanks to this long experience and specialization, Eclipse-Pioneer has available a complete line of standard (1.431" dia. X 1.631" lg.) and Pygmy (0.937" dia. X 1.278" lg.) Autosyn synchros of unmatched precision. Furthermore, current production quantities and techniques have reduced cost to a new low. For either present or future requirements, it will pay you to investigate Eclipse-Pioneer high precision at the new low cost.

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	Type Number	Input Voltage Nominal Excitation	Input Current Milliamperes	Input Power Watts	Input Impedance Ohms	Stator Output Voltages Line to Line	Rotor Resistance (DC) Ohms	Stator Resistance (DC) Ohms	Maximum Error Spread Minutes
Transmitters	AY201-1	26V, 400~, 1 ph.	225	1.25	25+j115	11.8	9.5	3.5	15
	AY201-4	26V, 400~, 1 ph.	100	0.45	45+j225	11.8	16.0	6.7	20
Receivers	AY201-2	26V, 400~, 1 ph.	100	0.45	45+j225	11.8	16.0	6.7	45
Control Transformers	AY201-3	From Trans. Autosyn	Dependent Upon Circuit Design				42.0	10.8	15
	AY201-5	From Trans. Autosyn	Dependent Upon Circuit Design				250.0	63.0	15
Resolvers	AY221-3	26V, 400~, 1 ph.	60	0.35	108+j425	11.8	53.0	12.5	20
	AY241-5	1V, 30~, 1 ph.	3.7	—	240+j130	0.34	239.0	180.0	40
Differentials	AY231-3	From Trans. Autosyn	Dependent Upon Circuit Design				14.0	10.8	20

**Also includes High Frequency Resolvers designed for use up to 100KC (AY251-24)

AY-500 (PYGMY) SERIES

Transmitters	AY503-4	26V, 400~, 1 ph.	235	2.2	45+j100	11.8	25.0	10.5	24
Receivers	AY503-2	26V, 400~, 1 ph.	235	2.2	45+j100	11.8	23.0	10.5	90
Control Transformers	AY503-3	From Trans. Autosyn	Dependent Upon Circuit Design				170.0	45.0	24
	AY503-5	From Trans. Autosyn	Dependent Upon Circuit Design				550.0	188.0	30
Resolvers	AY523-3	26V, 400~, 1 ph.	45	0.5	290+j490	11.8	210.0	42.0	30
	AY543-5	26V, 400~, 1 ph.	9	0.1	900+j2200	11.8	560.0	165.0	30
Differentials	AY533-3	From Trans. Autosyn	Dependent Upon Circuit Design				45.0	93.0	30

For detailed information, write to Dept. H.

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Dept. 10, Engineering Personnel Office
Los Angeles International Airport
Los Angeles 45, Calif.; Columbus 16, Ohio

North American Has Built More Airplanes Than Any Other Company In The World

higher the thrust of an engine, the more nickel required.

► **Defense Needs**—Research is continuing in an effort to discover a more accessible metal with the peculiar qualities of nickel.

While defense production uses up most of the available supply of nickel, there will be little for civilian production. Before the Korean war, the U.S. used approximately 100,000 short-tons of nickel annually. Since Korea, nickel production has been stepped up about 10%. A nickel survey, made by the President's materials policy commission just prior to the Korean outbreak, determined that the U.S. would require 150,000 tons of nickel annually by 1975.

Design Tests Speeded

A graphic platter for recording multiple strain gage data in tests on aircraft structures, has been announced by Gilmore Industries, Inc., Cleveland.

The equipment is finding widening application in speeding design testing at reduced cost and manpower, the company reports.

It provides rapidly printed data helpful in preventing failure of expensive test pieces when peak stresses are reached. By using four of these units, stress at 192 points can be recorded in one minute for rapid scanning by the engineer. Gage reading or transposition errors are eliminated.

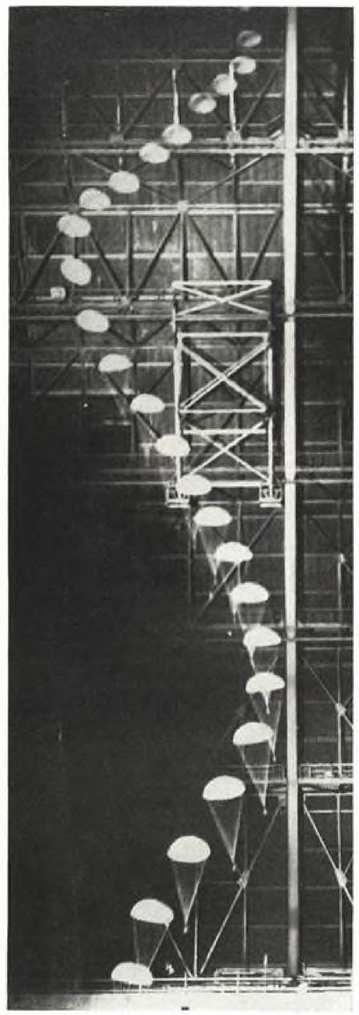
Dots and numerals are printed on a 12-in. chart by a strip-chart instrument. Graphs, 5x5 in., arranged side by side on the paper and staggered on 3-in. centers, plot the percent load on vertical axes against the strain on horizontal axes.

BH

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SHOOTING THE CHUTE

This photographic study of a parachute in free-fall inside the Goodyear airship dock will be used to determine drag and stability characteristics of chutes. Goodyear Aircraft's research engineers have been drop-testing late models of military and civilian chutes from the ceiling of this 250-ft. high shed. In addition to having unusual height and floor space for the tests, the building is free of wind currents. Goodyear is doing the work under contract with the Equipment Laboratory, Wright Air Development Center, Wright-Patterson AFB, Ohio.

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Constructed with the same care as our aircraft temperature indicators, these pyrometers bring "aircraft quality" to the test engineer.



MODEL 58PY, above, has been used extensively by leading motor car manufacturers for road testing on the "Proving Grounds" — where performance counts. Housed in rectangular bakelite case, has 6" hand drawn scale and is fully compensated for ambient temperature. Made in ranges listed below, with suitable thermocouple materials.



MODEL 23B, left above, has same type movement as our aircraft pyrometers. Housed in flanged, 4" round, bakelite case for panel mounting.

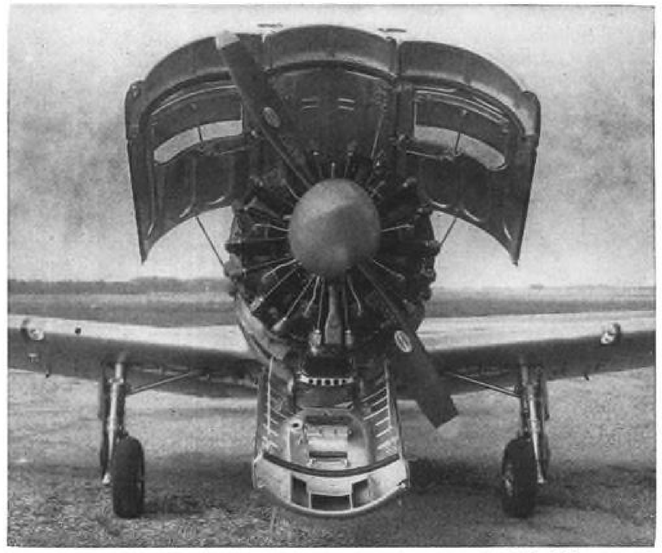
MODEL 20B, right above, has same 3" steel case and same movement as our aircraft panel indicators. Both are fully cold-end compensated and available in standard ranges listed, with suitable thermocouple materials.

STANDARD RANGES—All Models
FAHRENHEIT
Zero to 400, 600, 800, 1000, 1200, 1600, 1800, 2000 and 2500.
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Aviation Week Picture Brief



RADIAL P&WA R1340-S1H1 engine cowl on Macchi M.B. 232 opens in two sections. Tie rods maintain cowl in open position.

Italians Cowl New Trainers

Two-place Macchi M.B. 323 was designed to meet Italian Air Force requirements for a new basic trainer. Grossing 5,500 lb., its top speed is 236 mph. and initial climb is 1,435 fpm. Upper portion of cowl is three-piece hinged unit.

Ambrosini S.7 basic trainer was built on firm's own initiative to enter Italian Air Force competition. Of all-wood construction, it weighs approximately 3,000 lb., has top speed of about 170 mph. and climbs at about 1,000 fpm.



INLINE DH Gipsy Queen 70 powerplant cowling of Ambrosini S.7 needs no tools for unlatching. Cowl is four-section petal type.



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FINANCIAL

UAC Profits Reach All-Time High

Actual profit margin is down from 1951, but this is more than made up by greatly increased sales.

United Aircraft Corp. racked up a net income of $17,809,391 last year—higher than the previous peak of $17.1 million in 1942 and nearly 25% better than 1951's net of $14,266,867. This came to $5.18 per common share in 1952, compared with $4.06 a share in 1951 (AVIATION WEEK Mar. 30, p. 13).

UAC's annual report for 1952 reveals gross sales and revenues of $668.5 million, up 60% over the $418.6 million reported for 1951. Only twice in the company's history, were sales higher than last year. In 1943 and 1944, $734.1 million and $743.8 million respectively were reported.

The increased number of common shares now outstanding, largely as a result of the 20% stock dividend in 1951, reduced per share earnings to $5.18 in 1952 as compared to $5.24 on net earnings of $16.7 million in 1941. (The preferred stock was not issued until 1942 and did not create a prior charge on the common stock until that year.)

▶ **Profit Ratio Down**—United Aircraft's net profit margin of 2.7% on sales was in line with the industry's 1952 average experience. The company's comparable profit margins were 3.4% in 1951 and 4.9% in 1950. The substantial gain in sales last year more than compensated for the slight decline in profit margins.

The company's 1952 earnings performance was particularly outstanding in view of the absorption of special costs of moving and plant rearrangements incident to inaugurating operations in the new Pratt & Whitney Aircraft facilities in the West Hartford area. Also continuing were tooling-up and related costs peculiar to expanding volume operations.

The ability to control expenses and maintain a satisfactory rate of profitability despite these special added cost factors can be seen in the pre-tax profit margin of 7.8% in 1952 and compared with 7.5% in 1951.

Federal income taxes (including $7.5 million of excess profits taxes) aggregated $33.6 million last year, contrasted with adjusted net taxes of $16,990,000 in 1951. It appears that United Aircraft's top tax bracket last year was around 65%, far short of the maximum 82% prevailing for most aircraft companies.

▶ **Dividends Steady**—Dividends paid to stockholders during 1952 continued in the same conservative pattern of previous years. Cash disbursements of $2.00 per share on the common stock were made in 1952, the same as for 1951, compared with an adjusted $1.67 annually the three previous years.

Dividend payments to the common stockholders represented less than 39% of last year's reported earnings. This is a smaller percentage distributed to stockholders than the recent average prevailing in the aircraft industry.

United Aircraft, however, has maintained the policy of stability in dividend payments despite fluctuating earnings in past years. The regular $5.00 per share dividend was paid on the company's preferred stock last year, maintaining an unbroken record.

Operations at high levels appear assured for 1953 and beyond. New orders received last year more than exceeded deliveries. As a result, backlog of business represented by contracts, orders, and letters of intent aggregated $1,460 million at the 1952 year-end compared with $1,300 million a year earlier.

▶ **Plant Reinvestment**—The company continues to maintain a healthy financial position. While net working capital at Dec. 31, 1952, was down to $67.6 million from $80.5 million at the 1951 year-end, it is adequate for the company's present scale of operations. This reduction in working capital reflects the material expenditures for the acquisition and construction of new facilities.

United Aircraft affords an excellent example of the degree in which earnings are reinvested in new plant and facilities, making for a stronger aircraft industry. In fact, this "ploughing back" of earnings into the property may account for the relatively lower rate of dividend disbursements to stockholders by the company.

At the 1952 year-end the gross property account of United Aircraft stood at $143.8 million, reflecting an increase of $30.7 million during the year. After full allowance for depreciation and amortization, net fixed assets were valued at $72.8 million at the 1952 year-end as contrasted with $50.9 million in 1951.

It is interesting to observe the extent of added plant facilities paid for out of earnings by United Aircraft in the post-war period. At Dec. 31, 1946, the gross fixed asset accounts, representing land, buildings, machinery, etc., were valued at but $43.5 million. This increased more than $100 million in the subsequent six years. (The net value, after depreciation, was $7.9 million at the 1946 year-end, indicating a gain of almost $65 million on this basis during the following six year period.) Most of the additional acquisitions took place in the last three years.

▶ **More Plant Area**—Expenditures in 1952 related primarily to the completion of new plants and additions to existing facilities. All told, this involved almost 2 million sq. ft. of additional floor area. The principal expansion was represented by added plant areas made available for the Pratt & Whitney Aircraft Division. Hamilton-Standard and Sikorsky Aircraft also augmented their manufacturing space.

Substantially all additions to fixed assets during 1952 and 1951 are covered under certificates of necessity for rapid amortization at a rate of 75% of cost over a five-year period for tax purposes. Amortization in excess of depreciation at regular rates charged to income in 1952 was $3,793,599. (This accounted for the jump to $11.6 million in total depreciation and amortization charges in 1952 compared to almost $7 million in 1951.) These charges serve to build up a strong asset position and make for an advantageous situation during a period of high taxation.

▶ **Government Aid**—It is also noteworthy that the greater portion of the machinery and equipment required to increase the company's capacity is being furnished by the government through facilities contracts. Such contracts provide for use by United Aircraft and its subcontractors approximately $190 million of machinery and equipment, of which $77 million had been made available by Dec. 31, 1952.

To facilitate its financial requirements, United Aircraft has an open line of credit of $60 million against which only $20 million was outstanding at the 1952 year-end. Considerable assistance was also provided through progress payments of $114.2 million from the U. S. Government against inventories totaling $215.3 million.

After consideration of the preferred stock, United Aircraft showed a net book value of $36.79 per share on the 3,192,247 shares outstanding at the 1952 year-end. This compared with a $33.62 per share a year earlier.

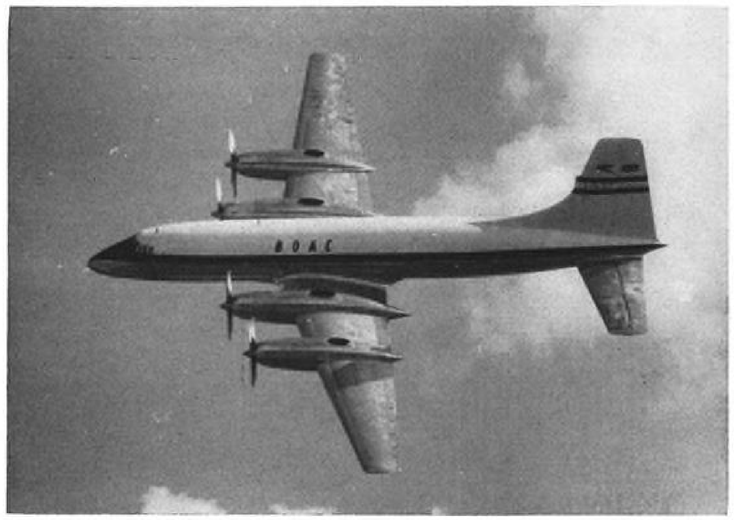
▶ **Research Progress**—Not shown on the company's balance sheet but among its strongest assets is its research and engineering activity. The annual report notes that UAC's research department performed 25% more work in 1952.

These research activities are the attributes of progressive enterprises and make for a strong aircraft industry.

—Selig Altschul



Aircraft Makers Study Use of Redux



BRISTOL BRITANNIA saves considerable weight through use of Redux bonding.



CHANCE VOUGHT CUTLASS applications include double-curvature components.



DE HAVILLAND has used Redux extensively in the Heron (above), Dove, Comet.

- **British have made wide use of bonding method.**
- **Now U. S. manufacturers show growing interest.**

By Irving Stone

The use of adhesives instead of rivets for joining parts of primary aircraft structures is claimed to give lighter structural weight, improved aerodynamic cleanliness, tighter makeup and production savings.

The British aircraft industry has made wide use of one such adhesive, Redux, to reap these advantages, and in this country, Chance Vought has incorporated Redux bonding in the makeup of its F7U Cutlass.

Other companies in the U. S. are experimenting with the adhesive, evaluating it in the light of experience here and abroad. Interest is reported in Redux for missiles applications, both in skin and honeycomb make-up.

In the helicopter field, important possibilities are seen in construction of metal rotor blades.

Leading exponent of the Redux method of assembly is Dr. N. A. de Bruyne, manager and technical director of Ciba's Aero Research Ltd., Duxford, England.

De Bruyne recently completed a 15,000-mi. tour of the U. S. and Canada, giving first-hand information to airframe builders, government agencies and educational institutions on the advantages of Redux.

▶ **Wide Coverage**—Organizations visited by de Bruyne included Chance Vought, Dallas section of the Institute of the Aeronautical Sciences, Convair, Douglas, North American Aviation, Lockheed, Northrop, Boeing, Republic, Grumman, Fairchild, Martin, U. S. Bureau of Standards, Navy Bureau of Aeronautics, Prewitt, Aluminum Co. of America.

Also visited were Piasecki, McDonnell, Parsons Corp., Goodyear, Air Materiel Command at Wright-Patterson AFB, Sikorsky, Bell, Kelly AFB, Massachusetts Institute of Technology, and Case Institute of Technology.

Canadian facilities covered were A. V. Roe, de Havilland and Canadair.

A keen interest in Redux is reported to have been shown in practically all of these organizations.

▶ Comet Top Example—De Bruyne

UNDISTORTED VIEW for a BOMBER'S BOSS



Actual in-flight photo taken from cockpit of B-47 bomber.

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Whether the job is one of building a vital component such as a transparent enclosure, radar, wheel or brake—or a complete aircraft—Goodyear stands out as one of America's most versatile aircraft manufacturers.

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Goodyear Aircraft Corporation, Department 194,
Akron 15, Ohio.

*Plexiglas is a trade-mark of Rohm & Haas Co., Phila., Pa.

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In addition to fabricating plastics, Goodyear Aircraft has many opportunities in research, design development and production of **AIRPLANES • AIRSHIPS • HELICOPTERS • GUIDED MISSILES • ELECTRONIC COMPUTERS • AIRCRAFT COMPONENTS • GUIDANCE SYSTEMS • REINFORCED PLASTICS • BONDED SANDWICH STRUCTURES • RADAR STRUCTURES and many others.** *Submit a brief resumé of your qualifications and experience, or write us today for an application blank and further information. Address: Dr. K. Arnstein, Vice President of Engineering, GOODYEAR AIRCRAFT CORPORATION, Akron 15, Ohio.*

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FOR REAL HELP TO SMALL BUSINESS

It is ironic that one of the first jobs of the Eisenhower administration, so widely, and erroneously, tagged as a "big business" administration, must be to go to the relief of small business. This is necessary because the preceding administration, while continually proclaiming its tender regard for small business, actually impaired gravely the ability of small business to carry on successfully. This it did in the necessary haste of devising an emergency tax program to finance rearmament and the Korean War. Now the new administration must revise this tax structure to give small business a chance to make its key contribution to an expanding American economy.

How Taxes Hurt Small Business

Since the outbreak of the Korean War, small business has been handicapped by two principal features of the emergency tax program:

1) Many small firms are unable to retain enough of their earnings to provide for expansion because these earnings are drastically limited by the excess profits tax.

2) Small companies have received a very small share of the tax concessions allowed by the federal government to encourage construction of defense facilities.

A small business that succeeds and hence grows is particularly hard hit by the excess profits tax. That tax, of course, applies to corporations having a net income of more than $25,000 per year. It results in taking up to 82 cents on every dollar of profit that the company earns above what is called an "excess profits credit." For most small companies the credit depends on what was earned in 1946-49. This creates an element of gamble and discrimination in determining the amount of tax to be paid. Time has proved that it is impossible to select a base period for the tax that is fair to all companies. A young company starting in 1946-49 is peculiarly vulnerable, as its earnings in that period were necessarily low. Even on modest earnings today, it would pay a high excess profits tax.

It is true that Congress wrote into the excess profits tax law provisions to lessen the impact of the tax on growing companies. However, none of these provisions in practice has given much relief to small business.

"Relief" Provisions Give Little Relief

Small firms rely almost entirely on retained earnings to provide funds for improving their plants and equipment. They get very little help from the provisions (1) that no more than 70 per cent of total profits can be taxed away, (2) that additional earnings are allowed on an increase of invested capital or (3) that growing companies are allowed a rate of return on capital equal to the industry average.

Most large firms can obtain additional funds in the securities market. But small firms find it difficult to increase their capital by selling securities, since investors generally prefer the stocks or bonds of nationally known and seasoned companies. Few small companies, therefore, can reduce their tax burdens by increasing their invested capital, and few can meet their needs for equity capital if their rates of profit are no higher than those of the leading companies which generally set the average profit.

Small business has been equally at a disadvantage in the matter of accelerated depreciation for tax purposes. The government has encouraged a great expansion of our industrial plant, despite the very high rate of taxation on corporate earnings, by granting certificates of accelerated amortization on new plants built to support the defense program. These certificates allow business to charge off the cost of defense plants at a rapid rate. This decreases the earnings that are subject to taxes, and so increases the part of the earnings that may be retained in the business.

Growth is Stifled

But most of these tax concessions have been made to large firms especially equipped to handle the complex problems of defense production. Of the $12 billion of new facilities so far approved for fast amortization, only 11 per cent are for companies with less than 500 employees, although the share of such companies in the normal civilian business is about 30 per cent. In only 2 of 12 industries studied by the Small Defense Plants Administration were small firms receiving what was estimated to be a fair share of the total tax amortization awarded.

Because they are unable either to retain enough earnings after taxes or to step up their depreciation allowances, most small firms are unable to keep up in the race to expand and modernize plant capacity. The Small Defense Plants Administrator, in his report to Congress, emphasized that small companies have been unable to do their full part in the defense program for lack of capital.

The Council of State Chambers of Commerce recently published an eight-state survey showing widespread cutbacks of plans for new plants by small and medium-sized companies. According to this report, "high federal taxes enacted since the beginning of the Korean War appear to be placing an effective brake on the rate of industrial expansion in all the states surveyed and probably in the 48 states generally . . . It is principally the small and medium-sized companies whose growth is being stifled."

Some Ways to Help

The first step to relieve small companies should be to free them from the excess profits tax. The nation as a whole would be far better off if the excess profits tax were allowed to die as scheduled on June 30, since the tax promotes waste as it stifles incentives. It is quite possible, however, that the politics of tax reduction, as opposed to the economics, will prevent the elimination of the tax during 1953.

If the tax is extended, provision should be made for a much broader exemption to smaller corporations. If net income up to $100,000 a year, which in these days still constitutes small business, were exempted from the tax, the loss of revenue to the government would be about $175 million. This relatively small amount could easily be offset by an increase in employment and incomes if small business is freed from its financial strait jacket and allowed to expand. Careful attention should be given also to the possibilities of allowing a higher rate of return on the first $1 million of capital (roughly the amount it takes to provide 100 jobs) and of making special accelerated depreciation allowances to smaller firms. This is a matter so important that we shall return to it in a future editorial.

Relief for small business—relief from a financial paralysis that has kept it from playing its dynamic part as a growth element in our economy—would do much to give the lie to the notion that the Eisenhower administration is a "big business" operation. Much more important, it would be a long stride toward releasing the dynamic energies of many small businesses and businessmen to forward a continuing and expanding prosperity.

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feels that the American airframe industry generally has not extended the adhesive bonding process far enough into the field of primary structures.

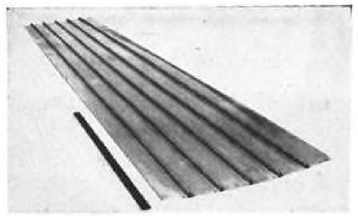
To make best use of Redux, it is best to design from scratch for this type of construction. But existing designs could benefit by its use in some applications, de Bruyne says.

Now that the American aircraft industry is more conscious of jet transports, it may be that those manufacturers who have such transport designs on the boards will take a close look at adhesive bonding applications in the Comet, where Redux has been used extensively. Considerable weight is reported to have been saved in Comet applications.

More important, de Bruyne says, is the follow-up savings in operating costs as a result of cutting excess weight.

► **Early Use**—Redux got its start in the de Havilland Hornet—a wood-and-metal plane. The adhesive bonding was mostly in wood-to-wood applications, but there also was some metal-to-metal bonding. Important applications in the Hornet were in the wing-folding joint reinforcement and in the main spar.

The metal-to-metal bonding in the DH Dove included the attachment of stringers to skin in the wing and fuselage. About 470 Doves have been produced to date, as well as about 30 Herons, using Redux.



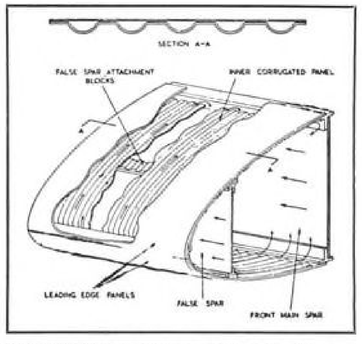
COMET fuselage panel with stringers Reduxed to skin. Panel is made up flat, then formed to fuselage contour. Reduxed panel takes about ½ hr. to produce. Rivet saving is considerable.

► **Comet Data**—The Comet introduced new areas for metal-to-metal bonding. Some of the panels incorporating Redux in stringer-skin combinations have double curvature—in the fuselage nose and rear sections.

Emphasizing production economies, de Bruyne points out that in one fuselage application where the stringers are Reduxed to the skin, the panel measures 23 ft. long by 30 in. wide and accommodates 5 rows of stringers. This panel can be produced in one-half hour, he says.

Using rivets, the stringers—hat sections—would normally take a row of fasteners on each flange at about 1-in. pitch. Total rivets used for stringer-to-skin connection here would be about 2,760. To drive these in the time required to apply the stringers with Redux would require a rate of more than 90 rivets per minute, de Bruyne says. In addition to this, drilling for rivet holes and other work would be required.

Spanwise stringers also are bonded to wing skin, even through the tank area. Stiffeners on the false spar and ribs in the tank are attached with Redux. It is reported that no leakage has been experienced. De Bruyne says that tests made before Comet use showed that Redux withstands indefinite immersion



BRITANNIA'S wing leading edge has corrugated inner panel attached to skin with Redux for stiff assembly. Anti-icing air passes through corrugations.

Facts and figures!..



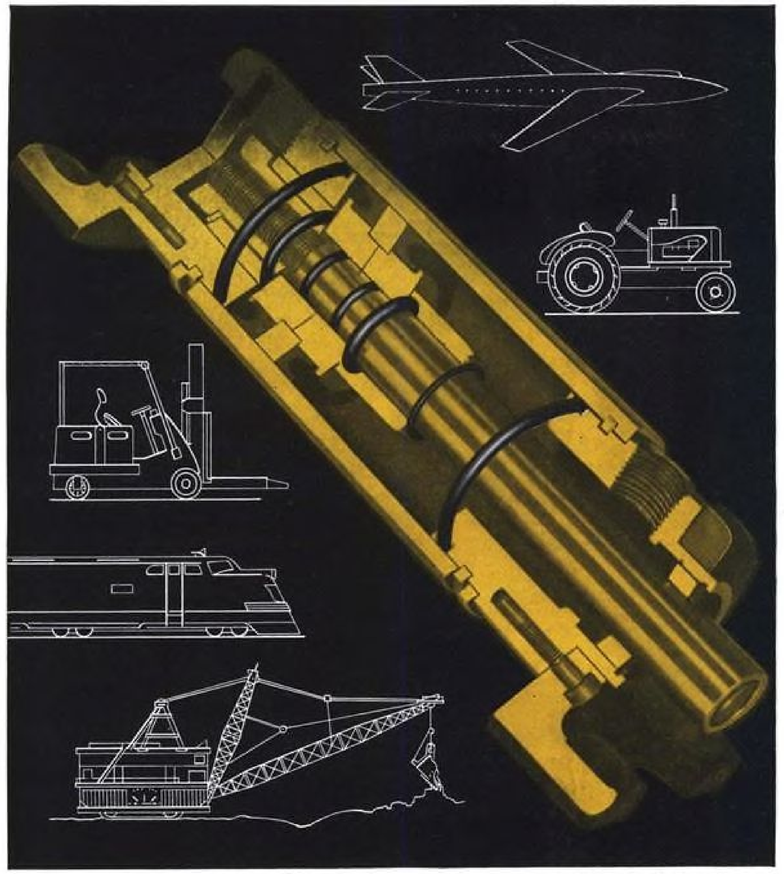
Figure:

Nancy Boyd's peek-a-boo April raincoat proves at least two points: Dallas rain falleth (if and when it falleth) gently and mistily like an angel's kiss, and Nancy Boyd looks great in a peek-a-boo raincoat. Also, since it has taken Southwest Airmotive 21 years to fully bloom its best, we can't for the life of us figure out how Nancy got so lovely in only 16 summers. She's 5' 4", with brown hair and brown eyes. It all adds up to 110 pretty pounds.

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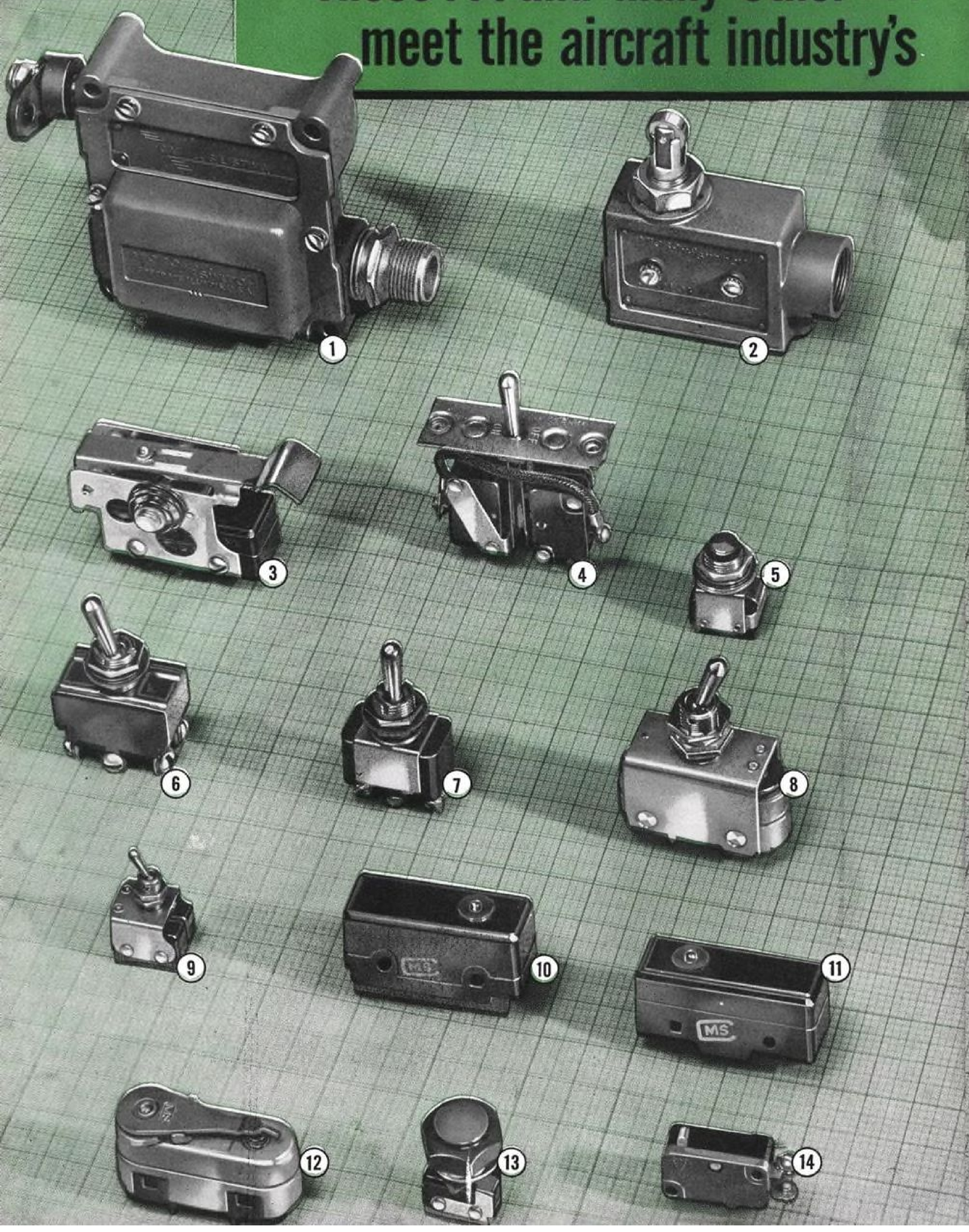
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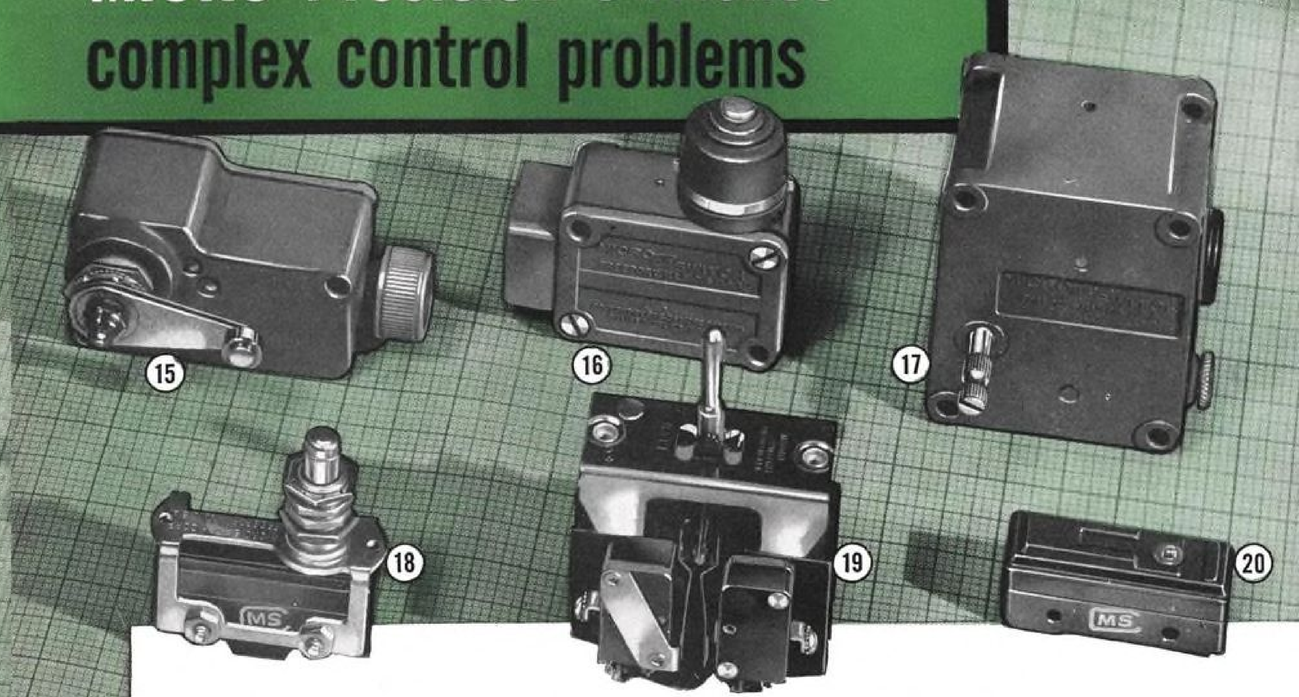
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2 Roller plunger type switch operated by cams or slides. Meets AN3218-1 and MIL-S-6744 specifications.

3 Switch actuator for use with single switch units. Button on side returns switch to "off" position while actuator lever remains depressed.

4 One of many two-switch assemblies with toggle actuation. Unit shown is AN3235-1.

5 Push button switch assembly with panel mounting, to actuate one or two single-pole double-throw subminiature switches.

6 One of the many standard "AN" type double-pole double-throw toggle switches available in many circuit arrangements.

7 An "AN" type single-pole double-throw toggle switch. Available with several circuit arrangements.

8 A special panel mount toggle switch assembly with a hermetically sealed switch unit as shown in Figure 12.

9 Ultra small toggle assembly with two single-pole double-throw subminiature switch units. Designed for small space requirements.

10 Smallest precision double-pole double-throw snap-action switch in its field. Can be enclosed in any one of many available protective enclosures, or may be used in a wide variety of switch-actuators.

11 Standard AN3210-1 single-pole double-throw switch, also available enclosed in many protective housings and switch-actuators.

12 The first precision hermetically sealed single-pole double-throw switching unit designed to meet the complexities of altitudes encountered in aircraft circuit control. Switch-actuators and enclosures are also available for this basic switch unit.

13 Sealed panel mount push button assembly. The single-pole double-throw subminiature switch is mounted in a bracket which is detachable to permit mounting of the push button assembly in the panel.

14 Small single-pole double-throw V3 type precision snap-action switch conforming to AN3234-1 specifications. Enclosed in a wide variety of switch-actuators and housings.

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16 This housing is designed for one or two V3 type switches. Sealed plunger actuator.

17 Light weight rugged housing for one or two hermetically sealed switch units of the type shown in Figure 12.

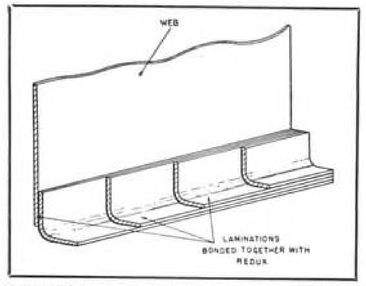
18 One of the many types of switch-actuators for use with basic switches such as the type shown in Figure 11. Panel mounting design.

19 A typical switch assembly of multiple banks of V3 type switches. Toggle actuator.

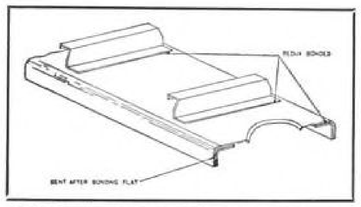
20 Special non-polarized precision switch unit for high d-c loads. Contains permanent magnet to blow arc away from contacts.

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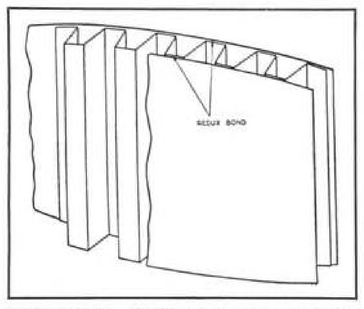
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FOKKER-developed spar employs Redux-bonded laminations, which increase toward spar root end (right).



ANOTHER SPAR SCHEME: Web top and bottom are bent to form a spar cap, which is reinforced by additional laminations. Stiffeners are Reduxed to the web.



BRITANNIA USES this wing interspar tank rib of corrugated sandwich bonded with Redux. This affords smooth wall for bag-type of fuel cell.

in kerosene and high aromatic fuels.

Another area where the bonding is applied is on the wheel-well wall. Here angle caps and vertical stiffeners are Reduxed to the web.

Window frames also are bonded to the Comet's fuselage skin.

For the expanded Comet program, many additional steam-heated presses, specifically for Redux bonding operations, are scheduled to be installed to boost the production rate.

▶ **Britannia, Too**—The Bristol Britannia makes less extensive use of Redux than does the Comet. This is attributed to the fact that the plane was well along in the development stage before the full possibilities of the adhesive were realized by Bristol. However, it is reported that considerable weight has been saved in the Britannia through the use of the adhesive process.

The material is used in the corrugated sandwich of the wing ribs. The specific weight of the Redux-bonded sandwich is reported as 1.2 lb./sq. ft. of area against 1.5 lb./sq. ft. for a conventional riveted rib.

Another application is in a wing bulkhead with edges laminated with Redux to permit weight economy in the main panel area, while allowing loads to be taken through the reinforced edges—a scheme used on the Britsol Barbazon.

The Britannia uses Redux-bonded leading edge skins. The corrugated inner panels (around which hot air is passed for anti-icing) are bonded to the inner surface of the leading edge.

▶ **Other Uses**—Chances are that these civil uses have attracted the attention of the military for possible use in British combat planes, but nothing has been published on such applications.

Fokker is using Redux in spar build-up applications to achieve the equivalent of a taper. Several laminations of metal are bonded in a right-angle mold, the laminations gradually increasing to take up the increase in bending moment as the root end is reached.

Fokker's use of Redux is not the only application of the material on the Continent. Airframe manufacturers in other European countries also are reported using the adhesive in primary structures.

▶ **Cutlass Applications**—In the American field, Chance Vought is reported to have exploited to the fullest the adhesive bond in structures. CV has applied Redux in Cutlass wing and fuselage applications, which have included double-curvature components.

The material has been used for bonding aluminum to aluminum, magnesium to aluminum, and for aluminum to balsa wood in Chance Vought's Metalite honeycomb.

▶ **Processing**—Main capital cost for the Redux-bonding process is said to be the steam-heated hydraulic presses. De Bruyne claims that an appreciably lower curing temperature (276F) is normally used than with other adhesive bonding, this heat being attained with steam pressures of 50-60 psi. De Bruyne claims that appreciably higher temperatures tend to introduce distortion and affect metal physical characteristics.

Redux is seen as having more validity in large aircraft than possibly in small planes such as fighters. But even with small planes, de Bruyne says, the material is recommended by quick-production considerations, the need for smooth surfaces and integral fuel tank tightness.

▶ **Characteristics**—De Bruyne claims that for the same weight of stiffened-skin panel, a Redux-bonded assembly gives about 20% gain in compressive strength.

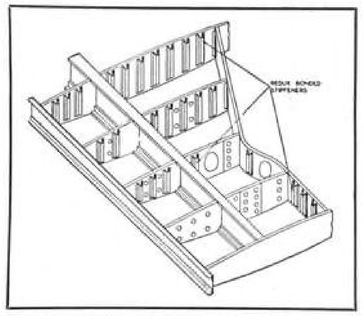
In lap joints, Redux bonding permits joints of 100% efficiency in tensile shear—at least in sheets up to ⅛-in. thick—compared with a maximum of about 65% for a riveted equivalent, he says.

Tests made at The Netherlands' NLL (Nationaal Luchtvaartlaboratorium) show that Redux joints of the same overlap as riveted lap joints have a fatigue life greatly exceeding those of the riveted assembly.

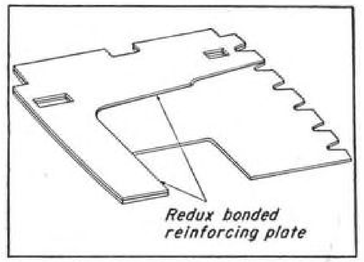
Fatigue tests on compression panels showed failure only in the skin in typical Reduxed stringer-skin combinations after 4.2 million cycles at 60% of the static failing load. The bond did not fail, de Bruyne claims.

With a 20-min. cure, Redux appears to be suitable from a heat-resistant standpoint for use with aircraft speeds up to about Mach 15, he says. Greater heat-resistance in Redux bonds may be obtained through longer curing.

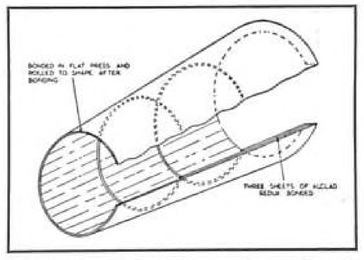
In this country, Redux is being marketed by Ciba Co., Inc.'s Plastic Divi-



WING FUEL TANK area of Comet incoporates Redux-bonded stiffeners.



WING BULKHEAD in Britannia and Brabazon have bonded-edge lamination.



BRISTOL COPTER fuselage skin is strengthened by Redux. Panel is made flat, then formed to circular shape.

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sion, 627 Greenwich St., New York. Michael Scales, de Bruyne's associate in Aero Research Ltd., who came over with him for the recent nationwide tour, has remained here at Ciba as technical advisor on adhesive applications.

Spectrometer Speeds C-119 Alloys Check

Quality-testing of metals for the C-119 Flying Boxcar is being speeded with a new, direct-reading spectrometer at Fairchild Aircraft's plant in Hagerstown, Md. The spectrometer uses simultaneous electronic, optical and mechanical operations to get an instantaneous reading of the percentage of each chemical element in metal. This check is necessary for hardness, corrosion-resistance and strength-control.

Fairchild's spectrometer handles metals having five different matrices or alloy bases—aluminum, brass, stainless steel, magnesium and low alloy steels. Rods, bars, plate, sheet, tubes, billets, extrusions and forgings can be checked with equal facility.

As a stock control device, the equipment has facilitated acceptance and stocking of materials. Analyses that took from four to eight hours are now done in five minutes.

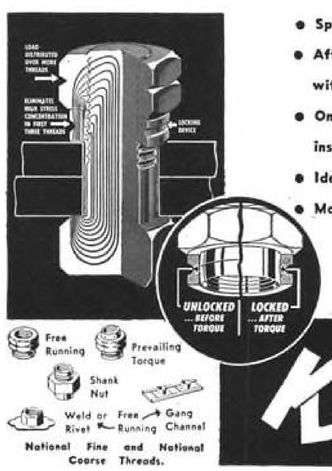
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PRODUCTION BRIEFING

▶ **Precision Rubber Products (Canada) Ltd.,** has been established in a 14,000-sq. ft. plant at Ste. Therese, de Blainville, Quebec, to provide Canada's aircraft industry and services with O-rings and Dyna-Seal packings. Sales office is located at 10 McNab St., South Room 205, Bruce Building, Hamilton, Ont. The American parent firm is located in Dayton, Ohio.

▶ **Parmenter-Townsend Co. Ltd.,** is a new holding company jointly formed by Townsend Co., New Brighton, Pa., and Parmenter & Bullock Mfg. Co., Gananoque, Ont., to provide an exchange of products, machines and methods. Townsend makes rivets, nails, locknuts, tubular rivets, sheet metal screws and Cherry blind rivets; the Canadian firm produces tubular and solid rivets, rivet setting machines, cold-formed products.

▶ **Pianoforte Supplies Ltd.,** Roade, North Hampton, England, has been granted an exclusive license to make and distribute flush latches and hinges designed by Hartwell Aviation Supply Co., Los Angeles, Calif.

▶ **Soreng Products Corp.,** has acquired ownership of Soreng Mfg. Corp., Schiller Park, Ill., and Sampsel Time Control, Inc., Spring Valley, Ill., which make products for aviation, automotive and appliance industries. The new firm's headquarters will be in Schiller Park.

▶ **Lindberg Engineering Co.,** Chicago, Ill., has a new 12,000-sq. ft. plant at 11937 South Regentview Ave., Downey, Calif., to make industrial heat treating furnaces and other products for West Coast aircraft and other industries.

▶ **Marquardt Aircraft Co.,** Van Nuys, Calif., has broken ground for an engineering and office building as part of a $250,000 expansion program. The firm's backlog at Jan. 31 totaled some $14 million.

▶ **Solar Aircraft Co.,** San Diego, Calif., is constructing a 7,500-sq. ft. facility for production of small gas turbines. Completion is slated for May 1.

▶ **Flexible Tubing Corp.,** Guilford, Conn., has been awarded a $300,000 contract by USAF for Spiratube flexible tubing capable of operation at low temperatures for ground preheating of aircraft cockpits and engines.

▶ **G. M. Giannini & Co., Inc.,** plans to build a 24,000-sq. ft. plant at 55 N. Vernon, Pasadena, Calif., to handle precision instrument assembly.

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Navy Contracts

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

General Electric Co., 1405 Locust St., Philadelphia 2, indicator, tachometer for various aircraft, 639 ea., $88,023.

Stratos Div., Fairchild Engine & Airplane Corp., Bayshore, L. I., N. Y., services & material to overhaul cockpit cooling system components, $50,000.

Goodyear Aircraft Co., Akron, envelopes, airship, ZP2K type, $2,609,655.

Glidden Co., 11001 Madison Ave., Cleveland 2, lacquer, cellulose nitrate, $52,816.

Sherwin-Williams Co., 325 N. Broad St., Philadelphia 7, lacquer, cellulose nitrate, $50,970.

Cook Paint & Varnish, 3301 Bourke Ave., Detroit 21, lacquer, cellulose nitrate, $37,241.

Whittaker Co., Ltd., William R., 915 N. Citrus Ave., Los Angeles 38, valve assemblies, $25,473.

Western Felt Works, 4115 Ogden Ave., Chicago, wool felt, $29,513.

Ryan Aeronautical Co., Lindbergh Field, San Diego 12, stack assemblies, $30,371.

Goodrich Co., B. F., 500 S. Main St., Akron 18, wheel assemblies, $300,801.

Andrew Corp., 363 E. 75th St., Chicago 19, dehydrators, $26,228.

Eclipse-Pioneer Div., Bendix Aviation Corp., Teterboro, N. J., test equipment, $32,716.

Glidden Co., Third & Bern Sts., Reading, Pa., paint, 14,000 gal., $37,940.

Bristol Co., Waterbury 20, Conn., controller, 86 ea., $45,327.

A. C. Spark Plug Div., General Motors Corp., Flint 2, Mich., spark plugs, $80,170.

Lear, Inc., 110 Ionia Ave., N. W., Grand Rapids 2, Mich., actuator, 143 ea., $91,911.

North American Aviation, Inc., Fresno, Calif., maintenance parts for SNJ aircraft, $120,694.

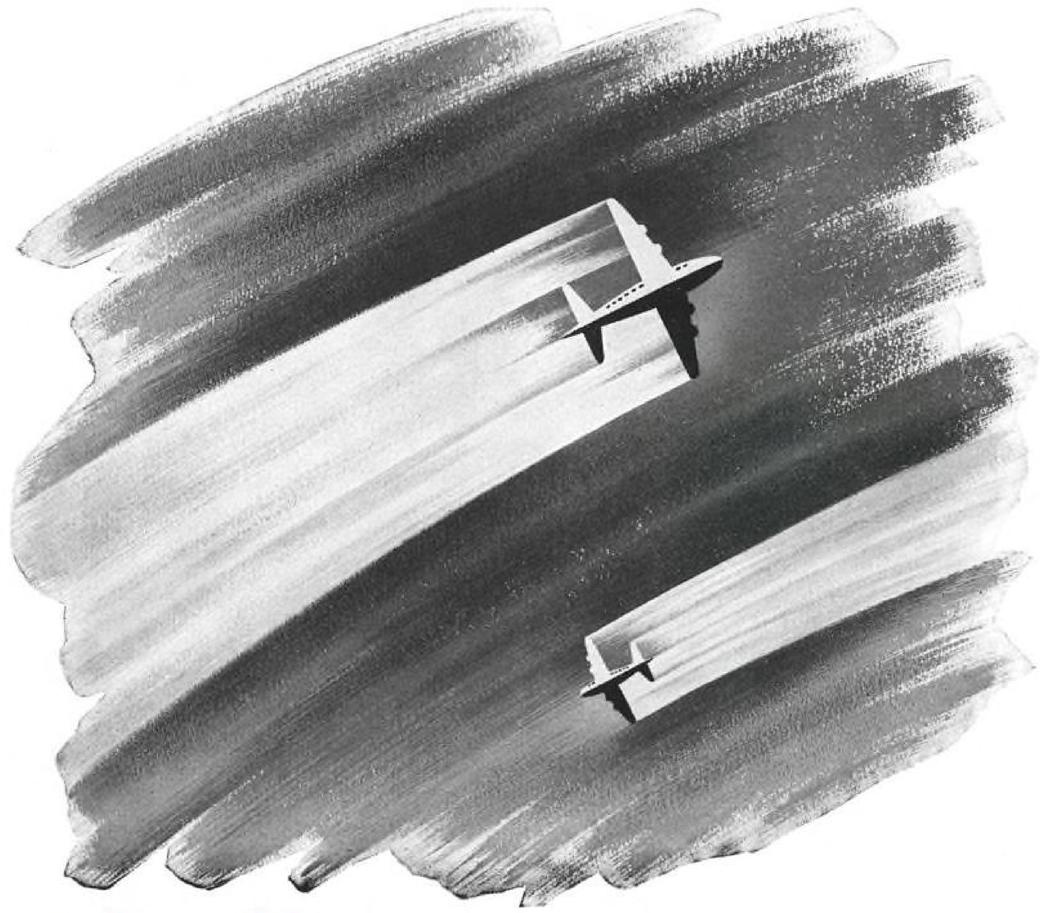
American Phenolic, 1830 S. 54th Ave., Chicago 50, plugs, $66,924.

Fast Writeoffs

Accelerated tax amortization for manufacturers expanding their defense facilities is granted by the government in the form of certificates of necessity.

In the following list of recent certificates, company name is given, followed by product or service, cost of construction deemed necessary for defense expansion, and the percentage of the expansion cost allowed for fast writeoff. Fast writeoff permits property to be depreciated in five years.

- **Ronson Art Metal Works, Inc.,** Newark, N. J., aircraft parts, $4,205, 65%.
- **Congoleum-Nairn Inc.,** Kearny, N. J., aircraft parts, $40,086, 65%.
- **New York Air Brake Co.,** Watertown, N. Y., aircraft components, $277,605, 60%.
- **Fairchild Engine & Airplane Corp.,** Farmingdale, L. I., N. Y., aircraft parts, $5,599, 65%.
- **Fairchild Engine & Airplane Corp.,** Bay Shore, L. I., N. Y., aircraft parts, $93,360, 65%.
- **Advance Control Corp.,** Buffalo, N. Y., machining operations on aircraft parts, $192,430, 50%.
- **Hetherington, Inc.,** Sharon Hill, Pa., aircraft parts, 15,222, 70%.
- **Chicago & Southern Air Lines, Inc.,** Memphis, air transportation, $6,985,417, 80%.
- **Howard Plating Industries, Inc.,** Royal Oak, Mich., machining of ordnance and aircraft parts, $11,732, 70%.
- **Shakespeare Co.,** Kalamazoo, aircraft parts, $10,234, 70%.
- **Farm Tools, Inc.,** Cleveland, aircraft parts, $21,290, 70%.



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Meter Measures Fuel Flow in Pounds

- **Unit gauges jet's mass rate instead of volume.**
- **The device's measuring error is less than 1%.**

A new eight-pound mass flowmeter, developed by Gavco Corp. of New York, will make it possible for a jet pilot to know his fuel consumption rate in all-important pounds-per-hour instead of in less significant gallons-per-hour. As a mass flowmeter, the device reportedly measures with an error of less than one percent, but it can also operate as a volumetric flowmeter with a reported error of less than one-half of one percent.

The new device's ability to handle a wide variety of liquids of different densities also makes it attractive for use in rocket and jet engine test facilities.

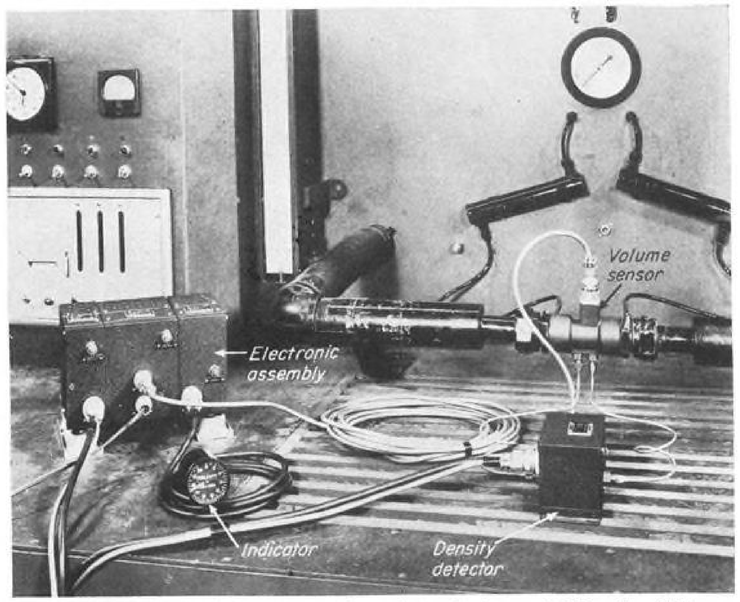
▶**The Need**—When fuel quantity and rate of fuel consumption are measured by volume rather than by mass, a jet pilot has trouble estimating his remaining range. Jet fuel density can vary as much as 10% between batches of fuel and any single batch can vary another 10% due to in-flight temperature changes.

This explains why military jets have been switching to gravimetric float-type gages to measure fuel quantity in pounds rather than gallons. However, it has only been recently that industry has solved the problem of measuring mass flow rate.

Another recent entrant in the field is General Electric, whose mass flowmeter is scheduled for use on the B-47. Control Engineering Corp., Norwood, Mass., recently announced a mass flowmeter that is insensitive to volume, density and other factors that affect meter readings (Aviation Week Mar. 30, p. 69). W. L. Maxson, New York, reportedly has a new flowmeter under development.

▶**Gavco Approach**—Gavco's approach to the mass flow rate problem is to measure simultaneously and continuously the volumetric flow rate and the density of the liquid, and then to combine the two electronically to obtain mass flow rate. The Gavco design was originally conceived and developed by Howard Cole, Jr., and Del Olson, who operate the C-O Engineering Co., a consulting engineering firm.

Cole was formerly an instrumentation engineer with Wright Aeronautical and chief instrument engineer with Reaction Motors, where he worked on flow measuring problems. Olson also worked at Wright Aero, was a project engineer at Reaction Motors, and later chief development engineer for Marotta Engineering Co.



FOUR BASIC UNITS of Gavco meter, shown in test hookup, weigh less than 8 lb.

When Gavco purchased the flowmeter rights, Cole and Olson joined the company on a consulting basis to continue the development.

▶**Interesting Features**—Interesting design and construction features of the new Gavco flowmeter include:

- **Versatility.** Inherent versatility of the system, and use of building-block type construction, permits it to measure mass and/or volumetric flow rate, as well as totalized flow rate from several sources, or total flow quantity, if desired.
- **Wide flow range.** System can handle a 60:1 range of flow rates (for example, 1,000 to 60,000 lb./hr.) without loss of accuracy, Gavco says.
- **Low pressure drop.** A 1¼-in. dia. sensing element reportedly has less than one pound per square inch pressure drop at 20,000 lb./hr. flow rate when the liquid is jet engine fuel.
- **Responsive.** System responds promptly to changes in fuel density.

▶**How It Operates**—A typical Gavco airborne system might consist of:

- **Sensing element,** which measures volumetric flow rate.
- **Density detector,** which measures liquid density.
- **Panel indicator,** which presents mass flow rate information in pounds per hour to pilot.
- **Integrator-amplifier,** which combines volumetric flow and density signals to form mass flow rate signal for indicator.

A small impeller in the sensing element generates electrical pulses at a rate determined by impeller speed which is in turn proportional to volumetric flow rate of the fuel or liquid. A continuous sample of the fluid flowing through the sensing element is extracted, passed through the density detector, and returned to the sensing element upstream of the impeller.

In this way, the density of the fluid is being determined at almost the same instant as it is passing through the impeller measuring volumetric flow.

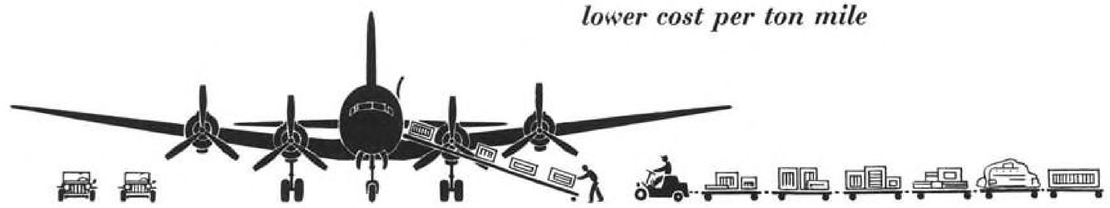
▶**Under Wraps**—Gavco is not talking about what takes place inside the important little black box called the density detector until it determines whether the military services want to classify the information. (The device's uncertain security status stems from its having been developed with private funds.)

It is known that the density detector

5,000 cubic feet of cargo space...

300 m.p.h. cruising speed...

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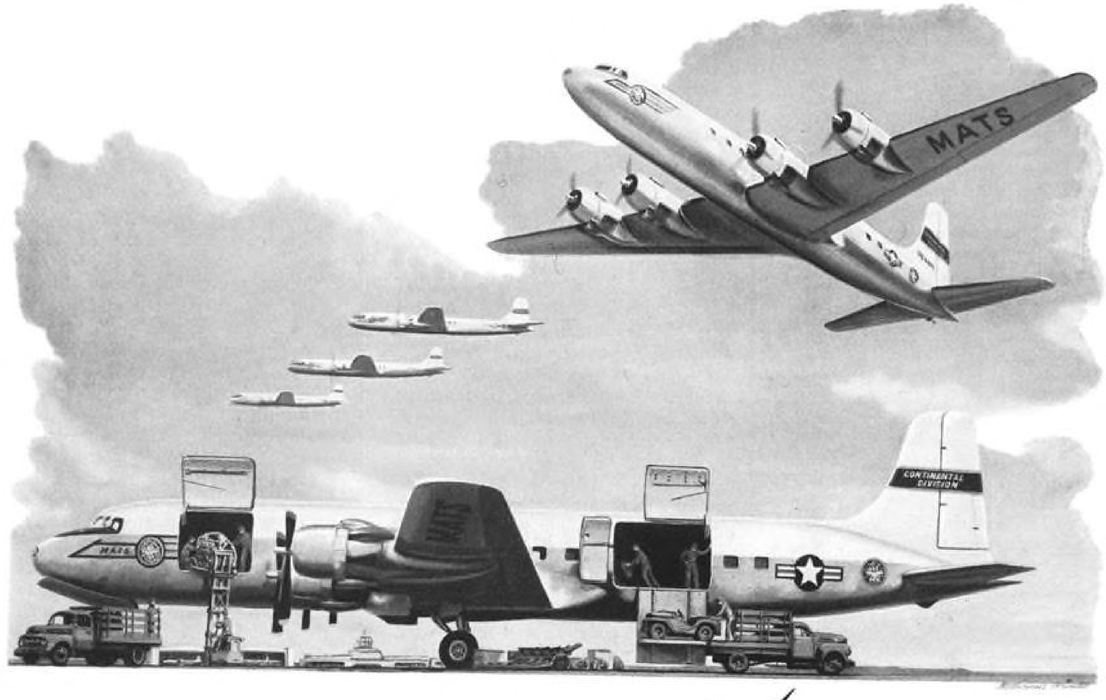


___the Douglas Liftmaster

Flying for the Air Force as C-118A and for the Navy as R6D, the Douglas Liftmaster delivers 14-ton payloads 2850 miles non-stop—at the lowest cost.

Outside, Liftmaster shows the same aerodynamic lines as its commercial counterpart, the DC-6A. Inside, there's room for 28,700 pounds of mixed freight. Large front and rear doors service cargo compartments. A self-powered loading elevator lifts 4,000 pounds from truck bed height to cabin floor level . . . fits either door. Through this combination of speed and utility, Liftmaster achieves the ultimate in long-range, low-cost transportation of military matériel.

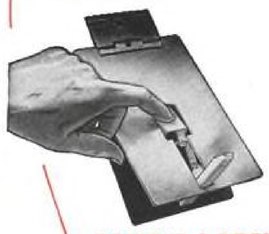
Performance of the Liftmaster is further proof of Douglas leadership in aviation. Planes, produced in quantity *to fly faster and farther with a bigger payload*, are a basic rule of Douglas design.



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FLUSH LATCHES AND HINGES

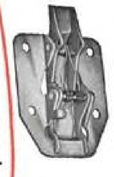
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contains a type of tuning fork whose natural frequency is determined by the density of the fluid sample. The density detector output signal is an a.c. voltage whose frequency is proportional to fluid sample density.

Inside the flowmeter integrator-amplifier, the volumetric flow rate pulses are used to trigger a multivibrator whose "dwell time" (conducting time) is controlled by the density detector signal frequency. Thus the average current output of the multivibrator, per unit time, is proportional to mass flow rate.

This current is fed into a capacitor shunted with a discharge resistor. The resulting voltage across the capacitor is proportional to mass flow rate.

► **Servo-Driven Indicator**—Gavco uses a null-balance servo-driven panel indicator to convert the capacitor voltage into mass flow rate information for the pilot. Among other advantages, this technique permits Gavco to provide an expanded (non-linear) scale on the panel indicator, if desired.

The standard 2-in. dia. indicator case contains a small d.c. motor which drives through a self-compensating friction train to position the indicating pointer and follow-up potentiometer.

In operation, the motor continuously positions the potentiometer shaft (and instrument pointer) to cancel out the voltage generated across the previously mentioned capacitor. The indicator motor is powered from two small thyratrons, operating push-pull.

► **Building Block Construction**—The Gavco flowmeter integrator-amplifier shows considerable ingenuity from a packaging and construction standpoint. It is made up of several separate chassis: an integrator (and power supply) unit, a density compensator unit, a panel indicator drive (servo amplifier) unit, and a quantity totalizer unit, if desired.

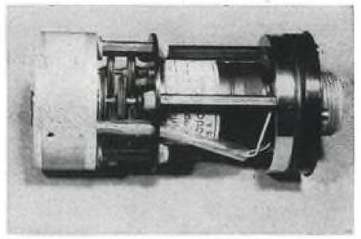
If a single mass flow rate system is required, three units are used and electrically mated by quick-disconnect connectors on the side of each unit. The individual chassis are fastened together with through-bolts.

If, on the other hand, only volumetric flow rate is wanted, the density compensator and its corresponding avionic chassis are not required.

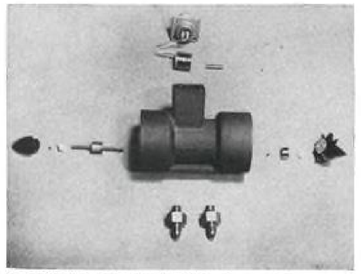
Or, if it is possible to use a simple galvanometer type of instrument for indicating flow rate, the panel indicator drive chassis is not needed.

If totalized flow, from the start of a mission, is desired, another small amplifier unit and a Veeder counter can be added.

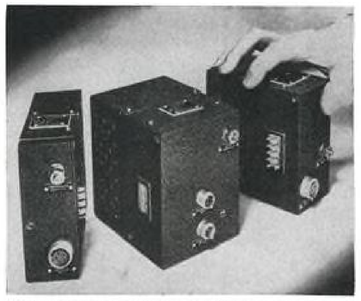
Gavco has constructed individual amplifiers on fiber cards with tube sockets mounted on shafts supported from the edge of the card. The position of each component has been carefully chosen so that resistor and capacitor pigtails provide nearly all of the interconnections, without adding wiring.



INDICATOR is null-balanced, servo-driven.



SENSING ELEMENT is inverted venturi.



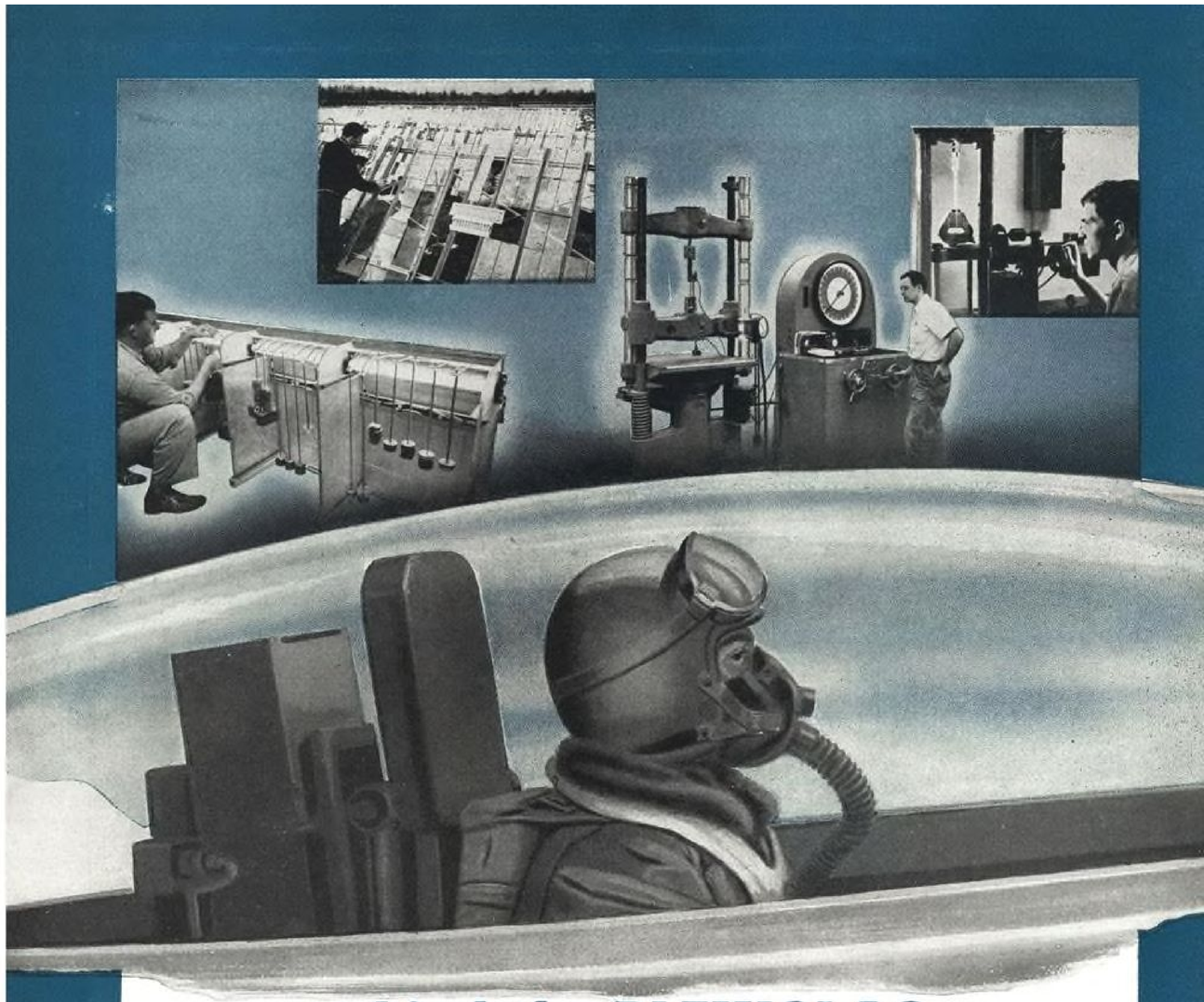
INTEGRATOR-AMPLIFIER uses plug-in, building-block construction for versatility.

Total power consumption of a single mass flow system runs about 75 va. of 115-v. 400-cps. power. The unit can also be designed for 60-cps. operation.

► **Sensing Element**—Howard Cole attributes the sensing element's low pressure drop to the use of an efficient inverted-venturi-shaped impeller with twisted blades. Another factor is the low-voltage pulse-type of output signal generated without drawing appreciable power from the liquid stream.

Pulses are generated in a stationary coil by a soft iron armature attached to the impeller. The armature completes a path through the coil for lines of force developed by a permanent magnet. When the impeller rotates, air gaps equally spaced around the armature periphery cause abrupt changes in the number of lines of force linking the coil, thereby generating signal pulses.

Although the impeller obtains radial



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	Number Complete Inc. Key	Capacity	Thread Back	Taper Back	DIMENSIONS Length Open	DIMENSIONS Length Closed	DIMENSIONS Dia.	List Price Com. Unit Inc., Key
THREAD BACK LIGHT DUTY	1A	0–¼"	⅜"–24		1 7/16"	1 29/32"	1 3/16"	4.95
	5B	5/64–½"	½"–20		2 7/16"	3 1/16"	1 13/16"	6.95
	5D	5/64–½"	⅜"–16		2 7/16"	3 1/16"	1 13/16"	6.95
	6B	0–½"	½"–20		2 23/32"	3 9/16"	1 15/16"	7.50
	6D	0–½"	⅜"–16		2 23/32"	3 9/16"	1 15/16"	7.50
TAPER BACK LIGHT DUTY	1T1	0–¼"		No. 1	1 9/16"	1 29/32"	1 3/16"	4.95
	5T33	5/64–½"		No. 33	2 1/2"	3 1/16"	1 13/16"	6.95
	6T2	0–½"		No. 2	2 11/16"	3 1/2"	1 15/16"	7.50
	6T33	0–½"		No. 33	2 11/16"	3 1/2"	1 15/16"	7.50
THREAD BACK MEDIUM DUTY	4A	0–¼"	⅜"–24		1 23/32"	2 5/32"	1 5/16"	5.20
	4B	0–¼"	½"–20		1 3/4"	2 3/16"	1 5/16"	5.20
	4C	0–¼"	½"–24		1 3/4"	2 3/16"	1 5/16"	5.20
	3A	0–⅜"	⅜"–24		2 7/16"	3 1/16"	1 13/16"	6.30
	3B	0–⅜"	½"–20		2 7/16"	3 1/16"	1 13/16"	6.30
	3D	0–⅜"	⅜"–16		2 7/16"	3 1/16"	1 13/16"	6.30
TAPER BACK MEDIUM DUTY	4T1	0–¼"		No. 1	1 23/32"	2 5/32"	1 5/16"	5.20
	4T2	0–¼"		No. 2 (short)	1 25/32"	2 7/32"	1 5/16"	5.20
	3T2	0–⅜"		No. 2	2 3/8"	3 1/16"	1 13/16"	6.30

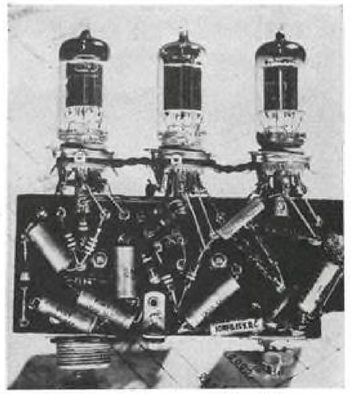
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THE CHUCK THAT LIVES UP TO ITS NAME . . . SUPREME



DESIGN simplicity shown in wiring.

support from two nylon bushings, it actually rides on a thin film of liquid injected through a orifice, from liquid passing through the sensing element. Impeller thrust bearings (single balls) are provided to permit the sensing element to be operated in any mounting position.

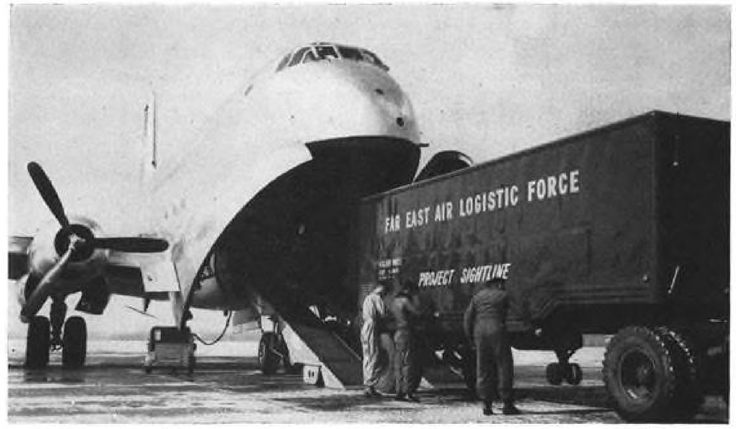
► **Industry Reaction**—Gavco reports that several aircraft manufacturers are interested in the new flowmeter and that a developmental model is being submitted to the USAF's Wright Air Development Center in Dayton for evaluation.

A Republic Aviation engineer who had seen the Gavco system told AVIATION WEEK: "This is the type of instrument we've been needing." The engineer then expressed some concern over the fact that the Gavco system uses 13 vacuum tubes, many of them dual tubes. Gavco has, however, used tube types which are available in the new "ruggedized," long-life construction.

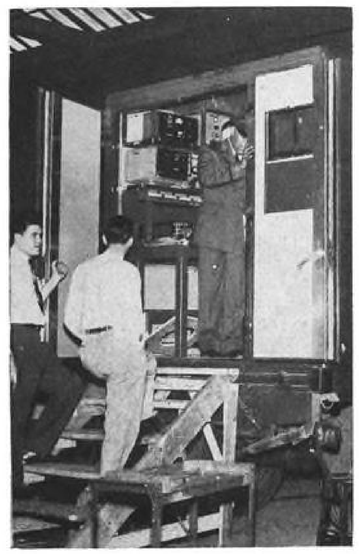
Whether the increased accuracy and extreme flexibility of the new Gavco flowmetering system more than offset objections to adding a few more vacuum tubes to military aircraft is a question that the aviation industry and the military will answer in the coming months.

Junction Rectifier

A new series of tiny, hermetically sealed diffused-junction-type germanium rectifiers for use in computers and magnetic amplifier circuits has been announced by General Electric. Peak inverse voltages range from 100 to 400 v. and d.c. output currents (into resistive load) range from 75 to 500 ma. Full load voltage drop is 0.5 to 0.7. All ratings are for ambient temperatures up to 55C, a limiting factor for some avionics applications. Additional information is available from Dept. N-13, Inquiry Section, GE Electronics division, Syracuse, N. Y.



Flying Avionics Maintenance Shop



A completely equipped maintenance shop, housed in this 26-ft. trailer, has been airlifted to Korea where it will be flown together with a team of specialists to various USAF bases for repair of complex computing gunsights and associated range-radar used in the F-84 and F-86. USAF's Air Materiel Command estimates that 60-80% of the equipments previously returned to the U. S. for repair can now be fixed in Korea in the new airborne shop. Resulting savings in packing, shipping, and handling costs will average about $180 per equipment, AMC estimates. Even more important, speeded-up repair will cut USAF requirements for spare equipments. Although similar flying workshops were used in World War II, AMC says the new trailer is the first "roving" unit designed for specialized maintenance. AMC stresses that this flying repair shop and a second unit slated for Europe, both built at Gentile Air Force depot in Dayton, will supplement rather than replace existing field maintenance facilities.

FILTER CENTER

► **New Bendix Computer Plant**—Newly formed Bendix Computer Division of Bendix Aviation expects to move soon into its new $175,000 plant in the Los Angeles area. Plant will produce automatic digital computers.

► **Indoor Antenna Pattern Range**—Dorne and Margolin of Westbury, N. Y., is developing an indoor range for measuring antenna radiation patterns of scale model airplanes. Present outdoor ranges are subject to uncontrolled environment and require relatively large supports for airplane models to prevent swaying in the wind. By moving indoors, D&M will be able to use extremely small model supports, better simulating actual airplane conditions. Major problem involved in designing indoor range is to eliminate reflection of RF energy from surrounding walls.

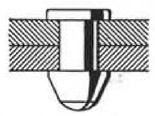
► **Predicting Tube Life**—Signal Corps is conducting life tests on 15,000 12AU7 vacuum tubes in search for method of predicting tube life after only 24 or 48 hours of testing instead of having to operate the tube for 1,000 or 5,000 hours. Signal Corps spokesmen say they expect to be able to accelerate life tests by at least a 30:1 factor.

► **Safety Beacon Shortcomings**—Recent evaluation of an airborne safety beacon (radar transponder) in the New York area showed that the beacon was frequently unable to reply to airport surveillance radar because it had been "cap-

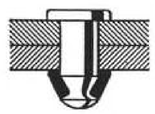


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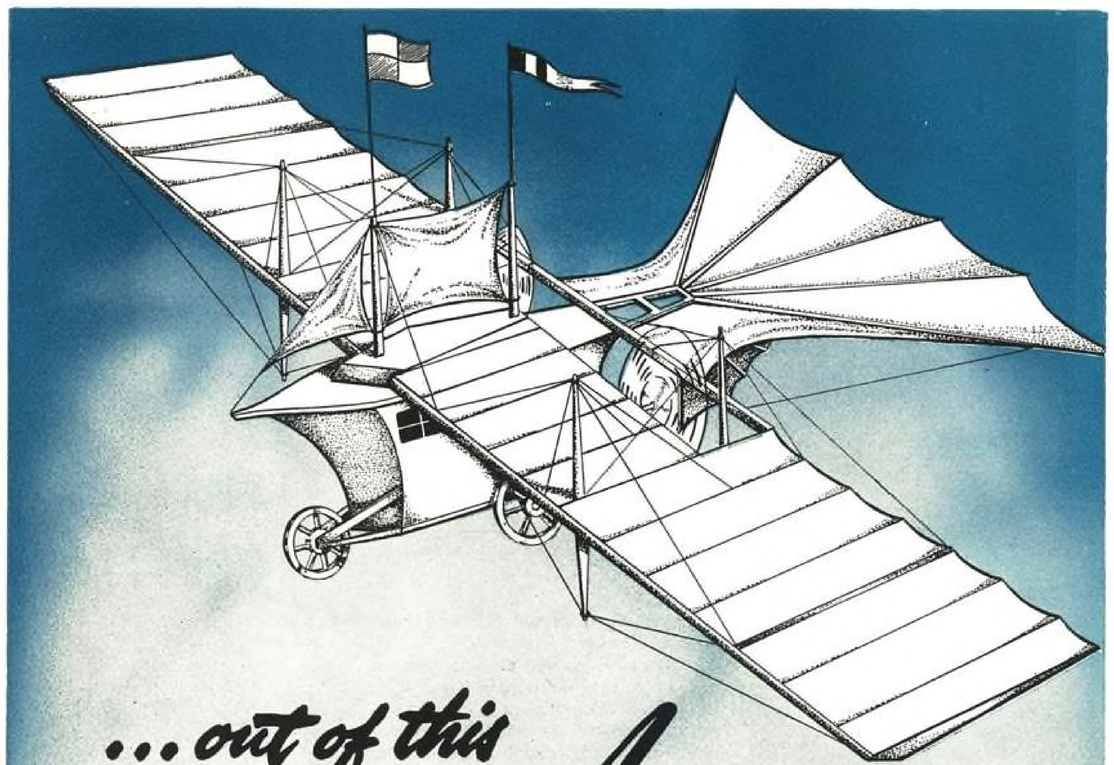
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tured" by a more powerful military ground radar. Evaluation report was prepared by Airborne Instrument Lab, Mineola, N. Y., for the Air Navigation Development Board.

► **GE Tube Warehouse for L. A.**—General Electric will build a new warehouse for vacuum tubes in Los Angeles to meet growing needs of West Coast electronics and aircraft industry. GE estimates it will sell 70% more vacuum tubes in the Far West in 1954 than it did in 1951.

► **No Exciter**—The small auxiliary engine-driven alternators with which the new Gavco Corp. Model 13RG-B voltage regulator is used do not have built-in exciters as reported in AVIATION WEEK Mar. 9, 1953, p. 38. The Gavco regulator operates by directly supplying and controlling the current flowing in the alternator field windings.

► **Icing Computer Shown**—An electric analog computer developed by the University of Michigan for calculating ice formation on airplane wings got its first public demonstration in Ann Arbor on Mar. 30 during a four-day course on icing problems and de-icing systems. University of Michigan is performing icing research under USAF contract.

► **RTCA Transmitter Specs Available**—Minimum performance standards for airborne radio communications transmitting equipment operating in the 1.5-to-30-mc. frequency range have been prepared by Special Committee 58 of the Radio Technical Commission For Aeronautics. The standards, Paper 14-53/DO-48, are available at 30 cents per copy from the RTCA Secretariat, 1724 "F" St., N.W., Washington 25, D. C.



BEE-SIZE CONNECTOR

New "bee-size" coaxial connector and cable can be used for radar IF strips or antenna coupling units operating at frequencies up to 1,000 mc., according to its maker, Microdot div. of Felts Corp. Cable is rated at 600 v. rms., has 50-ohm characteristic impedance, will operate at —55 to 150C and is treated to reduce self-generated noise. (1826 Fremont Ave., South Pasadena, Calif.)

► **New Technical Bulletins:**

• **Small tubular capacitors** using full foil-paper and metal- case construction, available in several temperature-operating ranges, are described in bulletin. (Aerovox Corp., New Bedford, Mass.)

• **Highspeed sampling switches** for use in airborne telemetering and available with sampling rates of from one revolution per day to 100 per second, with as many as 240 electrical contacts per stage, are described in four-page brochure. (Applied Science Corp. of Princeton, P. O. Box 44, Princeton, N. J.)

• **Permanent magnet motors** with "completely symmetrical armature windings" which give higher efficiency, better commutation and less radio noise, according to the manufacturer, are described in new folder. Motors for 28-v. d.c. operation are available with output of 9 to 65 millihorsepower, depending on duty cycle. (Barber-Colman, Rockford, Ill.)

• **Hermetic seal connectors,** for use in relays, tachometers and other hermetically sealed instruments, are designed to meet MIL-C-5105 spec on vibration and thermal shock; described in new KH-1 bulletin. (Cannon Electric Co., 3209 Humboldt St., Los Angeles 31, Calif.)

• **Tantalum capacitors,** tiny electrolytics ranging from 1.5 to 30 microfarads, with working voltages up to 125 v. d.c. and capable of operating between —55C and 85C are described in Bulletin 6.100. (Fansteel Metallurgical Corp., No. Chicago, Ill.) —PK



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AI-11072, Army-Navy type UG-21D/U. improved type N plug for use with RG-8, 9, 9A, 10/U cables. Weatherproof. Teflon insert, neoprene mating seal gasket, silicon rubber cable clamp gasket.



AI-11070, Army-Navy type UG-154/U, type LC plug for use with RG-17, 18/U cables. Weatherproof. Silicon rubber gaskets.



AI-11032, Army-Navy type UG-37A/U, high voltage pulse receptacle pressurized. Ceramic insert, neoprene rubber gaskets.



AI-11022, special type BNC high voltage plug. Mates only with high voltage receptacles and jacks, for use with RG-59/U cable. Weatherproof. Teflon insert. Neoprene rubber gaskets.



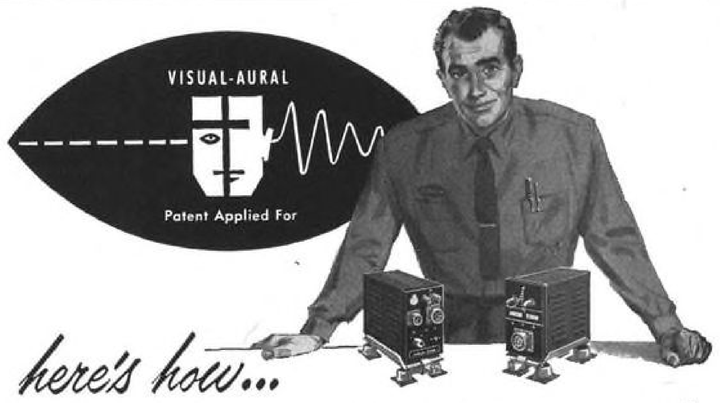
AI-11006, Army-Navy type UG-355/U Klystron Coupler. Weatherproof. Styrene Copolymer and linen base bakelite inserts. For use with klystron tube 726C.



AI-11030, Army-Navy type UG-306/U, type BNC right angle adapter. One male, one female end. Weatherproof. Teflon inserts. Neoprene rubber gasket.

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WHAT'S NEW

New Books

Power Plants for Aircraft, by Joseph Liston, professor of aeronautical engineering, Purdue University, 577 pages, published by McGraw-Hill Book Co., Inc., 330 W. 42nd St., New York, N. Y., $8.50.

This analysis is intended to serve as a text and reference work for seniors and graduate student beginners in aeronautical and mechanical engineering. The treatment proceeds on fundamental principles, the subject is concisely presented and makes extensive use of illustrations, mainly diagrams and charts, which are keyed to the text to round out the discussions. Review questions and problems are also included.

The book considers fundamentals of piston engines, turbojets, turboprops, ramjets, rockets and potential nuclear types. It is broken down into sections dealing with basic requirements of powerplants, utilization of available energy, fuels, charge handling, cylinder and burner phenomena, performance, turbine engine characteristics and structural and mechanical factors.—IS

Pioneering in Aeronautics includes brief biographical sketches of 24 recipients of the Daniel Guggenheim Medal from 1929 through 1952 to top U.S. and foreign aviation figures. This publication is available from the Board of Award, Daniel Guggenheim Medal, 29 W. 39th St., N.Y.C.: $1 for the paper-bound edition or $2 for the cloth-bound version, plus 25 cents to cover mailing.

New Publications

Airport Planning is a 59-page illustrated booklet designed to guide local and national public officials concerned with planning airfields in orderly development to assure maximum benefits. Price 30 cents. Write Government Printing Office, Washington, D. C.

Solar Blast, 25th Anniversary issue, commemorates the history of the Solar Aircraft Co., San Diego, Calif. The illustrated 63-page publication also shows the firm's current progress in manifolds, gas turbines, ceramics and stainless steel components fabrication.

Available for distribution are **AN and NAS specification standards,** including a service that will supply new prints and revisions as they become available. Write Air-World Publications, 1913 W. Ninth St., Los Angeles 6.

Proceedings of the 16th Annual Time and Motion Study and Management Clinic, sponsored by the Industrial Management Society Nov. 5-7, Sheraton Hotel, Chicago, are now available including complete transcripts of talks. Price for 168-page publication is $4. Write Industrial Management Society, 35 E. Wacker Drive, Chicago 1.

New Frontiers is a new twice-yearly house organ being published by the Garrett Corp. First issue includes articles on pressure pattern flying, executive aircraft and economics of pressurized flight by airlines. Write The Garrett Corp., 9851 Sepulveda Blvd., Los Angeles 45.

Annual report of Armour Research Foundation of Illinois Institute of Technology covers work being done in more than 40 different fields, including titanium, electronics, instrumentation and powerplants, among others. Write the Foundation at 35 W. 33d St., Chicago 16.

New Addresses

General Electric Co. has opened a new Aviation Division office at 207 Post Office Building, Midwest City, Okla., to maintain close liaison with USAF maintenance and supply groups in the Oklahoma City area. J. P. McLain will manage the office assisted by R. J. Bentson and C. L. Cotton.

Ciba Co., Inc., has set up a sales and technical service unit to take care of sales and information concerning Araldite plastics at 325 W. Huron St., Chicago 10, Ill. Joseph B. Durra is in charge.

Robert Hewitt Associates is a new consulting firm to handle twin-engine executive aircraft business, with temporary quarters at 315 North Murray Ave., Ridgewood, N. J. The firm is conducting a survey to determine the potentials and requirements for a proposed twin-engine business plane. Hewitt has sold all his stock interest and resigned as president of Mallard Air Services, Inc., Teterboro Airport, N. J., and Mallard Industries, Inc., Bridgeport, Conn. D. A. Peterson, formerly production conversion plant manager for Mallard Industries, has joined Robert Hewitt Associates.

Irving Air Chute Co. has moved its main offices from Buffalo, N. Y., to Lexington, Ky. The Irving plant in Buffalo is still active.

Telling the Market

A 32-page **brochure** detailing aluminum, glass fabric, stainless steel and cotton fabric honeycomb core for sandwich construction is available from Hexcel Products Co., 951 61st St., Oakland 8, Calif.

Brochure describing products and services for sealing bolts, studs, rivets, AN fittings, access doors, hatch covers, flanges and electric terminals is avail-



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For floor plan diagrams, exhibit space contracts, ticket information and complete details write—Benjamin T. Franklin, General Manager, **NATIONAL AIRCRAFT SHOW, 400 Union Commerce Bldg., Cleveland 14, Ohio.**

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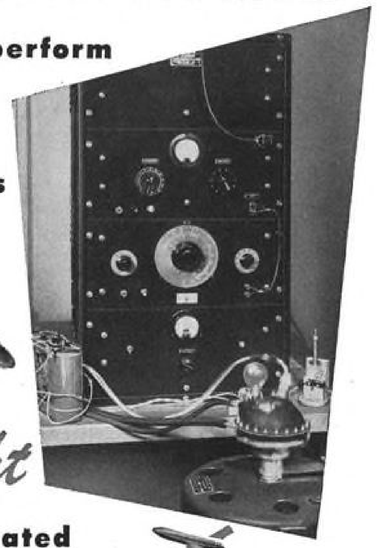
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GLENDALE 2, CALIF. — Forsnas Engineering Co., 1102 W. Glenoaks Blvd.
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able from Franklin C. Wolfe Co., Inc., 3644 Eastham Drive, Culver City, Calif.

Chilling for alloy steel heat treatment, metal stabilization, gas dehydration and parts and material testing is covered in brochure from Sub-Zero Products Co., Cincinnati 29, Ohio.

Bandsaw and drill lubricators developed by Convair are described in bulletin, Elf Lubricators, available from Aviation Lubricants Co., San Diego, Calif.

Molded and Extruded Parts of Natural and Synthetic Rubber with charts keying rubber and synthetic rubber compounds and relative properties of the two substances may be obtained by writing Tyer Rubber Co., Andover, Mass.

Detailed **technical data** on Class H silicone electrical insulation is included in booklet available from Dow Corning Corp., Midland, Mich.

Carbon steel specifications can be identified quickly on a new chart showing chemical analysis for each of 60 Army, Navy, aeronautical and federal requirements. Also listed are specified forms (sheets, bars, etc.) and nearest corresponding SAE, AISI and AMS type numbers. Write Peter A. Frasse & Co., Inc., 17 Grand St., N. Y. 13, N. Y.

Hydraulic presses, including straight-side, post-type, double-action, gap-frame, horn-type and special models, are described in 24-page catalog available from Verson Allsteel Press Co., 9311 S. Kenwood Ave., Chicago 19, Ill.

Publications Received

- **My Brother Bill,** by Ruth Mitchell, published by Harcourt, Brace and Co., 383 Madison Ave., New York 17, N. Y., 1953, $4.00. An account of the life of Billy Mitchell and his controversial role in the development of the Air Force.
- **A Pilot's Meteorology,** by Charles Graham Halpine, published by D. Van Nostrand Co., Inc., 250 Fourth Ave., New York 3, N. Y., 1953, $5.00 Meteorology and its practical application to flight, navigation and weather forecasting.
- **Servomechanism Analysis,** by George J. Thaler and Robert G. Brown, published by McGraw-Hill Book Co., Inc., 330 W. 42nd St., New York 36, N. Y., 1953, $7.50. Presents essentials of mathematical theory of servomechanisms for senior or graduate engineering student.
- **Aircraft Structural Mechanics,** by Franz R. Steinbacher and Robert G. Brown, published by Pitman Publishing Corp., 2 W. 45th St., New York, N. Y., 1952, $6.50. Material has been selected for engineering students in preparation for their first professional degree.
- **Radio and Radar Technique,** by A. T. Starr, published by Pitman Publishing Corp., 2 W. 45th St., New York, N. Y., 1953, $15.00. The essentials of modern knowledge of radio and radar.

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EQUIPMENT

Capital Evaluates Safety Lights

Tests of three different types of anti-collision units near completion; decision is expected soon.

By George L. Christian

Washington, D. C.—Capital Airlines is actively engaged in a program evaluating high-intensity safety lights for commercial transport aircraft. Three types of anti-collision lights have been tested and a company decision is not far off on the equipment best suited for the purpose.

▶ **Room for Improvement**—The inadequacy of currently installed wingtip, tail and top-and-bottom fuselage position lights is becoming of increasing concern to airlines as speeds of aircraft rise and expanding traffic crowds the airlanes more and more.

The problem of spotting a light and instantly identifying it as belonging to an aircraft is very real, especially when approaching large, well-illuminated metropolitan areas. Bad weather aggravates the difficulty, as does the inadequate cockpit vision of many modern airliners.

▶ **Three on Test**—The three types of lights Capital has been investigating are:

• **Ace Foundry Co.** This firm's product has alternating lenses of 20, 30, and 60 deg. rotating on a central axis. Effect of the three rotating lens settings is that of a blinking light visible over 120 degrees (60 deg. to either side of the unit's centerline). The light has undergone preliminary testing installed in the nose of a Capital Constellation.

Pilots at first did not like the way the lights reflected on clouds and found the 1,000-rpm. speed of rotation excessive. But they gradually withdrew their objections as they became used to the lights, Capital officials report. The light has since been removed to be slowed down to approximately 200 rpm.

It will be re-installed shortly for further evaluation, Richard Smith, Capital's development technician, told AVIATION WEEK.

The Ace light uses a 250-watt bulb shining through the variable lens. Capital has also been testing the unit with an amber bulb, cutting the light's intensity by one-fourth. Red may be used; this would cut intensity by three-quarters, but the light can afford such a cut because of the 250-watt bulb, according to Capital engineers. The complete unit weighs about 3½ lb., has a 7-in. diameter and 3½-in. depth.

Ace supplied Capital with the original light plus six additional units at no cost unless Capital should decide to keep them. Although the light is not in production, Ace can start supplying it three months after an order is placed, according to Capital.



GRIMES light shines on double reflector.



FEDERAL unit was tested on DC-4.

Because the unit would be flush-mounted on the airplane, several lights would be needed, possibly in the nose, on the vertical fin (or fins), and/or top and bottom of the fuselage.

• **Grimes Manufacturing Co.** Grimes' lights have already been installed by United Air Lines on the vertical fintips of its aircraft. Capital expects to install a test light on the fintip of one of its DC-4s shortly.

The light contains a 100-watt bulb shining vertically on a double reflector which is rotated at 40 rpm. by a small electric motor. Speed can be increased to 180 rpm. One reflector gives off a beam 5 deg. above and below the horizontal, the other 20 deg. above and below.

Advantage of this light is that it is in full production, according to Capital. But its field is not as large as the Ace unit's.

Capital engineers say that both the Grimes and Ace lights have a nominal range of about 20 miles in a reasonably clear, dark night. This is in contrast to a 4-6 mi. range for currently used position lights under similar operating conditions.

• **Federal Enterprise Co.** provided the third unit that Capital has been testing.

One of this company's lights is mounted experimentally on a DC-4. The light, which weighs some 9 lb., is designed for use on police cars. Capital says that because of the light's weight it will probably be removed when the other units are ready.

Aircraft Trade Show Plans Move Ahead

Major airlines, equipment manufacturers, oil firms and airport constructors are among the companies expected to be represented at the second annual International Aviation Trade Show to be held June 9–11 at the Hotel Statler, New York. A number of firms have already signed up for exhibition space, the show's managers report.

Plans for the exhibit, including arrangements for technical sessions, are being formulated by an advisory board whose membership includes Charles F. Horne, former CAA Administrator; A. R. Williams, A. V. Roe Canada, Ltd.; Carl L. Stanke, Esso Export Corp.; M. S. Chappell, Dade Bros.; Stanley Maxwell, REF Mfg. Co.; Ansel E. Talbert, New York Herald Tribune aviation writer and former head of the Aviation Writers Assn.; Prof. Gene Kropf, Parks College of Aeronautics; and airline representatives, including Eastern and Trans World. Other members are to be named to the board in coming weeks.

The show will represent the biggest exhibit of aviation products, materials and services ever held in this country, predicts E. P. Connolly, president of Aircraft Trade Shows, Inc. Connolly expects attendance and number of exhibits to be much greater than at last year's show.

Headquarters of Aircraft Trade Shows, Inc., is at the Hotel McAlpin, Broadway at 34th St., New York 1, N. Y.



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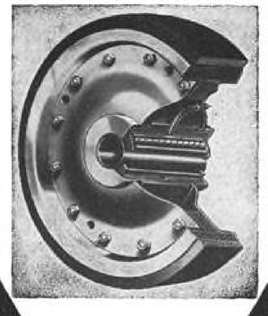


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Welding Jig

A Heliarc welding jig originally developed and tested for dairy equipment and other industrial processes is finding uses in making of bombs and components for aircraft and guided missiles.

Said to provide stronger, smoother welds which require less grinding and finishing, the machine employs a tungsten electrode in an accurately timed atmosphere of inert gas.

The end opening or gap feature is said to be practical for welding longitudinal seams of any formed item, with ready removal of the shape. The machine may be converted to spot-welding to produce a weld that can withstand a pressure of 300-900 psi.

McHale Mfg. Co., 3200-3220 E. Mines Ave., Los Angeles 23, Calif.

New Engine Oil Is Pre-Ignition-Proof

A newly compounded oil designed to reduce pre-ignition in light aircraft engines has been announced by Standard Oil Co. of California. The product, RPM Aviation Oil, is said by Standard to be completely pre-ignition-proof. It is expected to help increase overhaul intervals for engines in personal and executive craft, by permitting greater engine cleanliness, less wear and smoother running.

Exhaustive testing by the developer, California Research Corp., subsidiary of the oil firm, has shown the oil will not cause pre-ignition under conditions more severe than those encountered in actual service, Standard says.

RPM has undergone service trials for the past 2½ years in 36 planes, powered by most of the widely used light aircraft engines. It also has been tested successfully in 450-hp. engines used in crop dusting where high output and high temperature conditions are met.

Standard Oil Co. of California, 225 Bush St., San Francisco 20.

Twister Speeds Safety Wiring

Safety wiring of aircraft equipment now can be done in one-third the time previously required with a new wire twister, according to its manufacturer, Ralph C. Robinson Co.

At one large Air Force base where R4360 engines are overhauled, use of the special twisting pliers saves $140 per engine—enough to buy eight of the tools—Robinson says.

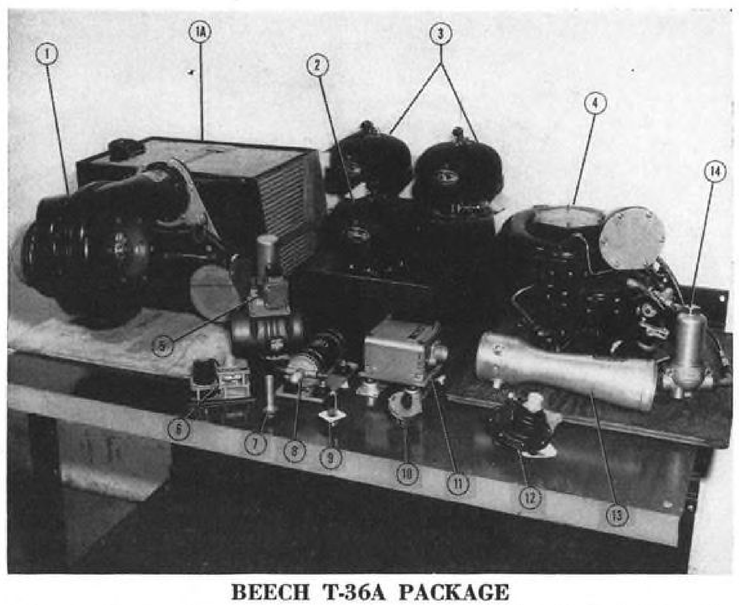
Operation of the device is simple: Wire is gripped in plier jaws; center sleeve slides down to lock handles; knob is pulled, spinning pliers to give a uniform twist to the safety wire. Squeezing the handles releases center sleeve and opens plier jaws.

Robinson makes the twister in two sizes:

- **12-inch,** for assembly-line work, costs $19.50, or $18.50 in lots of a dozen or more.
- **9-inch,** for bench work, costs $18.50, or $17.50 in dozen lots.

The tools may be used as pliers or wire cutters, as well as twisters.

Ralph C. Robinson Co., P. O. Box 494, North Sacramento 15, Calif.



BEECH T-36A PACKAGE

What goes into a modern aircraft to keep it pressurized and cool? Here are the major components for the pressurization and cooling system made by Stratos Div. of Fairchild Engine & Airplane Corp. for the Beech T-36A trainer-transport: (1) air cycle machine, Model B50-3; (1A) dual heat exchanger; (2) cabin safety valve; (3) cabin pressure regulators; (4) cabin supercharger, Model S50-3; (5) modulating (mixing) valve; (6) temperature sensor relay; (7) outside air temperature sensor; (8) pressure ratio controller; (9) duct temperature sensor; (10) temperature control rheostat; (11) control box (avionic "brain" controlling temperature and pressure); (12) pressure warning light switch; (13) flow control venturi; (14) micronic supercharger oil filter.

Simple Tool Repairs Tank Filler Necks

A simple refacer for milling damaged fuel tank filler necks in place cuts to less than an hour a job which formerly took 33 hours. The old method required removal of the tank from the aircraft for replacement of the filler neck.

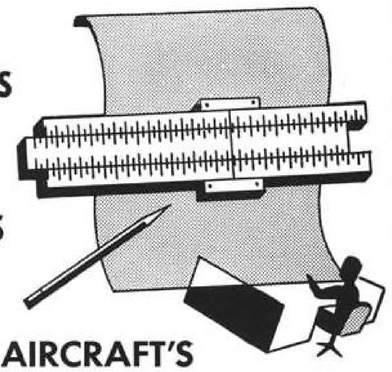
The tool was developed by Martin E. Anthonson, Mohawk Airlines' welder, when it became apparent that refueling hose nozzles were constantly damaging and gouging filler necks. The resulting imperfect fit between fuel tank cap gasket and seat could permit fuel leak-

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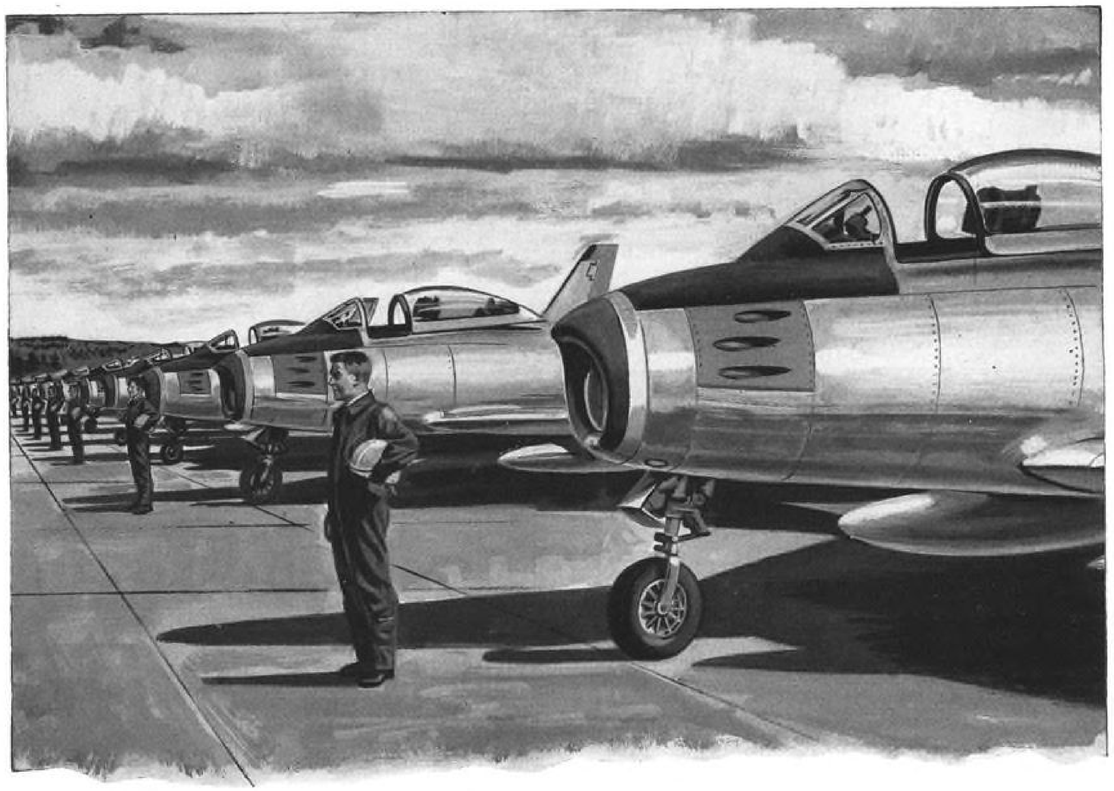
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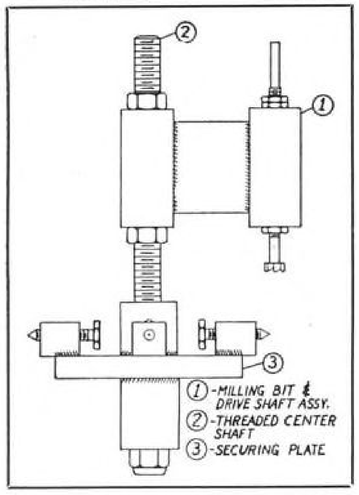
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age with its attendant fire hazard, or entrance of water and other foreign material into fuel tanks, a possible cause of engine failure.

The refacer, built in 16 hours out of materials costing four dollars, mills a new smooth surface on the filler neck. The tool is secured in the filler neck by four alignment bolts. A pneumatic motor (to avoid possibility of sparks near fuel) drives the milling bit through a chuck attached to an arm which rotates around a threaded center shaft.

Two oil-covered plates catch the chips which are removed by a vacuum system.

Vibration Isolators

Improved wire mesh vibration isolators for aircraft component shock mounting have load bearing springs which prevent packing of damping material and loss of efficiency. Barry Corp., 700 Pleasant St., Watertown 72, Mass., makes them.

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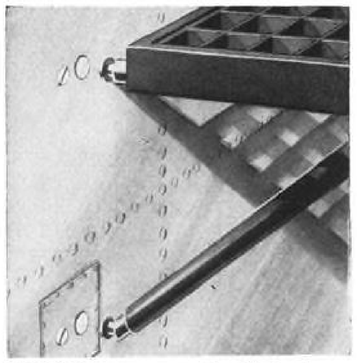
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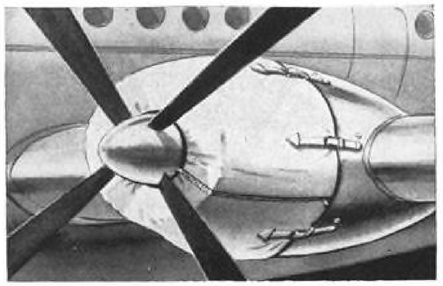
NEW AVIATION PRODUCTS



TYLOC fasteners support work stands.



FDC-1040 web gear handles heavy cargo.





ENGINE COVERS of Martin P5M Marlin flying boats will use Tyloc fasteners.

Plug-In Stands to Speed Servicing

Servicing of tall tail sections or other hard-to-get-at parts of aircraft may be made easier with a new recently announced plug-in set-up.

The system depends on a simple fastener called the Ty-Loc. This is a pushbutton locking device that can be mounted flush to the skin and reinforced as necessary from the inside. Patents are held by Frank Davis, airfreight equipment specialist and president of Davis Aircraft Products, Inc., New York.

▶ **Portable Platforms**—With the Ty-Loc, a lightweight ladder or work platform could be plugged in where needed for speedy inspection of maintenance. The ladders or platforms could be carried with the plane, so that provision of work stands would be no problem, even if the plane had to be serviced in a primitive location. This could prove a lifesaver in flying boat operations.

The Glenn L. Martin Co. plans to include the Ty-Loc set-up in the P5M Marlin flying boat to give steadier footing during sea loading and provide safer mooring of small boats alongside the aircraft.

In addition to ladders and scaffolding, the Ty-Loc can be used to secure engine and wing covers and for tieing down the plane; inside, for locking cargo rings or seats to the floor—quickly converting to either use. The part is made in several types and sizes, some for pressurized cabins, others beefed up to take 10,000-lb. cargo loads.

There is no other fastener on the market that can match the Ty-Loc as a skin fastener, Davis says. And he regards it as an improvement over other types available for cargo or seat locking. It locks more positively, he claims, is easier to install and is less apt to become clogged with dirt.

▶ **Drill and Fill**—All that is required to install Ty-Lok is to drill a circular hole for which a template is supplied and rivet the unit in place. This leaves a flat plate that may project as little as ⅛ in. from the floor.

Other fasteners often require odd-shaped holes, Davis notes. But Ty-Lok models to fit these holes, where they exist, are available.

The fastener takes a standard AN male stud with a locking flange. On insertion, this depresses a flush button which moves out of the way to allow

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For more detailed information on 3M's Quick Repair Sealant Kit, its preparation and application . . . for additional information on other 3M products made for the aircraft industry, consult with your 3M sales representative. There's one located near your plant. Call him in, or write directly to 3M, Dept. 114, 411 Piquette Avenue, Detroit 2, Michigan.

3M COMPANY



1 Use the spatula to stir the accelerator (small jar) to a creamy paste.



2 Scrape ALL the contents of the small jar into the large jar (sealant).



3 Mix the accelerator and the sealant in the larger jar with the spatula.



4 To obtain uniform dispersion, stir for approximately 15 minutes.



5 Sealant may readily be applied to a surface that is chemically clean.



6 Sealant must be topcoated. 3M's EC-776R fills Spec. MIL-S-8343.

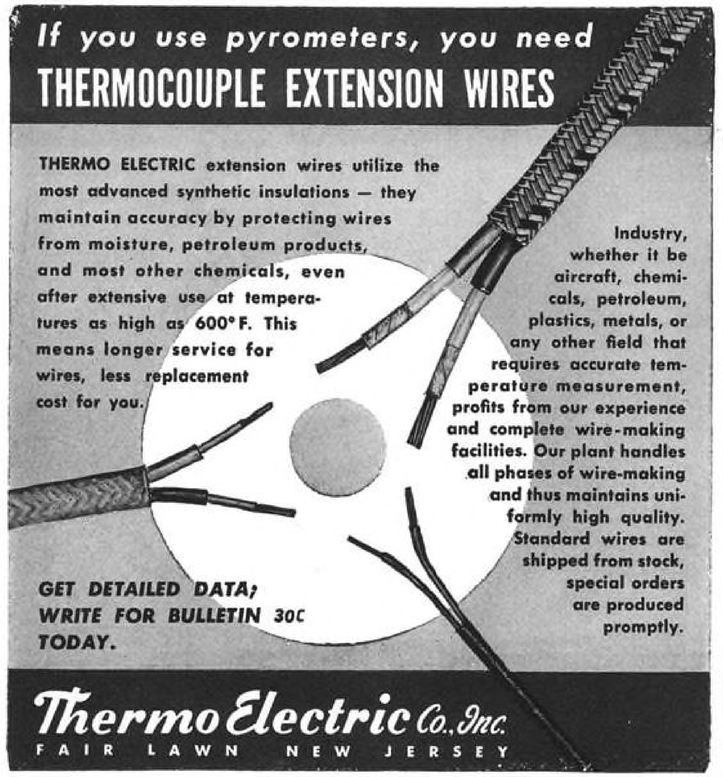
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movement of a lock screw. The screw is held at the lock position by a spring detent within the fastener. The Ty-Loc can be designed with an automatic snap lock if desired, Davis says.

► **Other Irons**—Davis is also pushing an all-purpose tie-down strap, the FDC-1040 heavy web gear which is claimed to allow greater standardization of cargo-handling equipment. This gear is said to be light enough in weight to justify its use with light cargo and strong enough to handle all but the heaviest loads. It is a 3½-lb. adjustable strap assembly, 15 ft. long and end-fitted for attachment to cargo rings. Rated for loads up to 10,000 lb., it replaces the standard 2-lb. light-duty AIA gear (2,000-lb. capacity), cable gear (5,000-lb.), and light chain (10,000-lb.). Chain segments are supplied in the FDC kit, to be used where webbing otherwise would be damaged, as over sharp metal projections.

Davis believes he can improve this gear to handle loads up to 20,000 lb., replacing heavy chain in many cases.

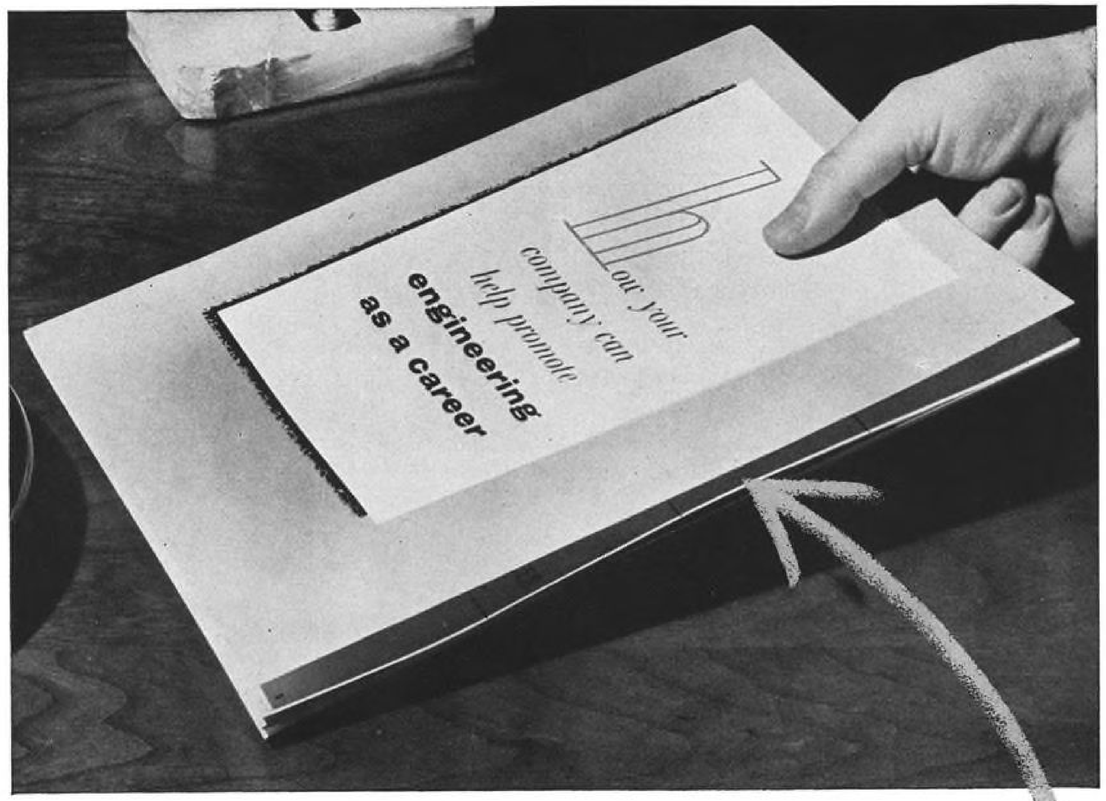
Some other new products being produced by Davis Aircraft:

• **Single-hand, quick-disconnect** seat belt for 20G loads, with a latch-type buckle providing metal-to-metal contact, instead of metal-to-webbing, and a simply operated reeve take-up adjustment. Now being supplied to the Navy, the unit is being groomed for com-



FUEL TANK CLEANERS

Dressed for danger, maintenance workers at Tinker AFB, Oklahoma City, prepare to descend into 25,000-gal. underground fuel tank to wash it down. To avoid sparks, men use cleaning tools of copper or brass. Workers wear masks with air supplied through hoses connected to a blower above ground. Maskfones, giving two-way communication between men in tank and foreman on the surface, get power for operation from vibration of speaker's voice, according to maker, Mine Safety Appliances Co., Pittsburgh.



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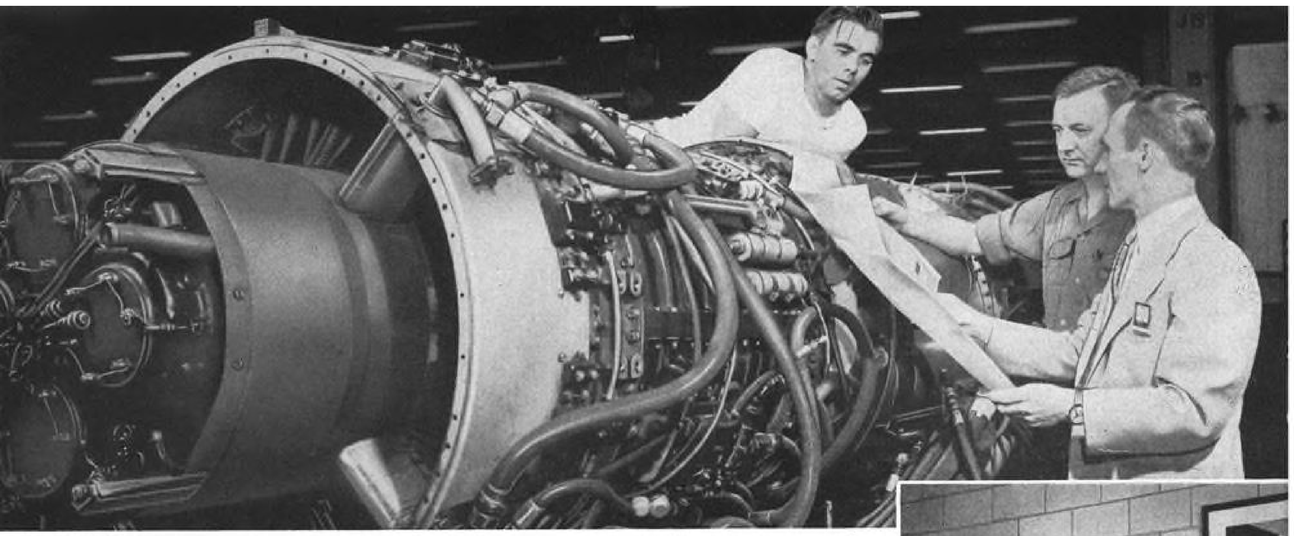
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JET EXPERT — Ray Small, right, an Engine Project Manager, keeps close contact with his engineering personnel and with the engines that he is responsible for from development and testing through production and delivery.

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Positions are available at West Lynn, Mass. and Cincinnati, Ohio. Please do not apply if your best skills are being used for vital defense work. Send your resume to: Technical and Supervisory Personnel, Aircraft Gas Turbine Division, Dept. A.

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YOUNG VETERAN — Starting as a Test Engineer in the company's training program in 1940, Mr. Small has made a rapid climb in the company's Aircraft Gas Turbine Division, so that today, he holds a responsible position as a Project Manager, guiding the development of Boeing B-47 jet engines.



STRATEGIC BOMBER — Six G-E jets power this Boeing B-47 medium bomber, which recently set a new speed record from Hawaii to the United States.

mercial use. Detachable fittings allow webbing to be removed quickly.

• **Improved quick disconnect** for fighter pilot shoulder and seat harness, designed to prevent shifting of belt and quicker release.

• **Elevator crane** for cargo loading or engine hoisting. It costs less than $1,000 and is capable of raising a 3-ton load. Employing only two booms and all-magnesium extrusions, it can be knocked down into nine pieces for air-freighting.



Steel Finisher

A sanding tool for finishing steel parts whose surface tolerances will not permit them to be deburred by conventional tumbling methods is being supplied to aircraft manufacturers by Merit Products, Inc. One user of the finisher is McDonnell Aircraft Co., the maker reports.

The tool is designed to work off burrs without gouging or flattening critical areas. It consists of a disk holder with strips of abrasive cloth projecting about its periphery. Brushes back up the abrasive cloth and help mold it to intricate shapes.

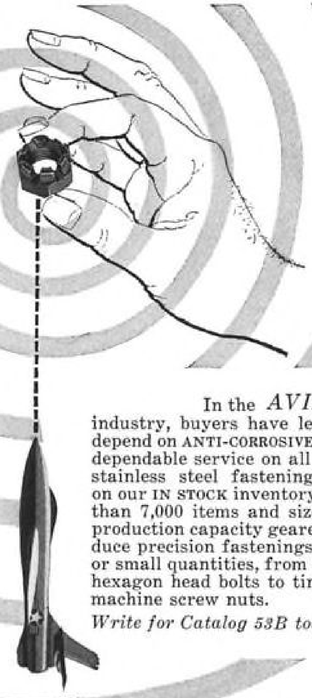
The tool can be fastened to a drill press or other machine with a rotating shaft. Sanding cloth can be fed out of a magazine in the disk holder as it is needed by turning a knob on the unit.

Merit Products, Inc., 4023 Irving Pl., Culver City, Calif.

Product Literature

A bulletin (103-35) describing a new five-way **drilling and tapping machine** for jet engine housings has been released by Modern Industrial Engineering Co., 1430 Birwood Ave., Detroit 4, Mich. . . . South Bend Lathe's new time- and labor-saving **12-speed lathe** is featured, along with prices and specifications, in a two-color pamphlet (5302) available from the firm at 425 E. Madison St., South Bend, Ind. . . . Literature and illustrations describing a line of **miniature speed changers** weighing only 6 oz. that is used in aircraft and guided missiles is available in Bulletin 99 from Metron Instrument Co., 432 Lincoln St., Denver 9, Colo.

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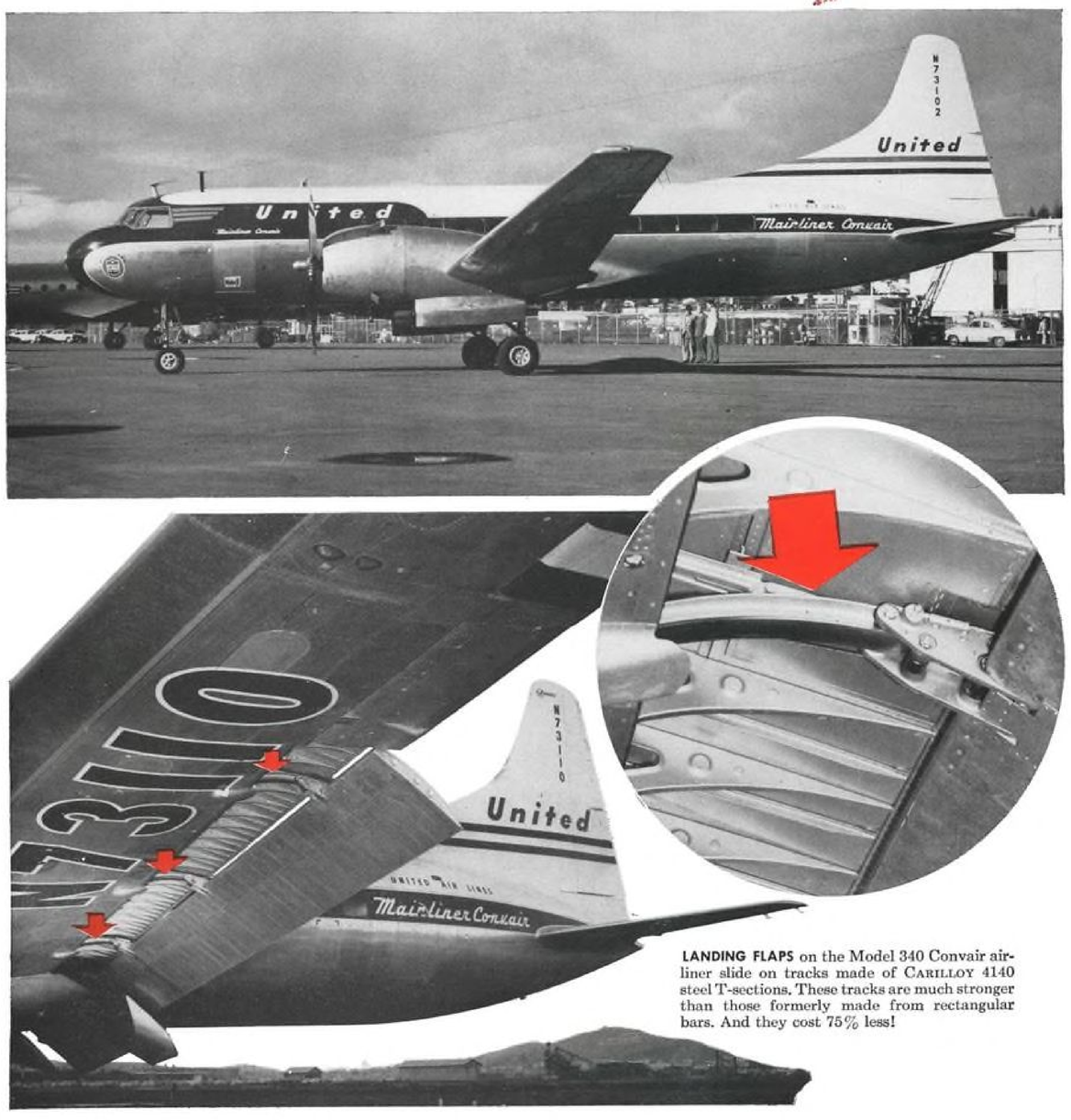
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RIGHT, the same flap track in front of the CARILLOY T-section that cuts scrap loss 60%.

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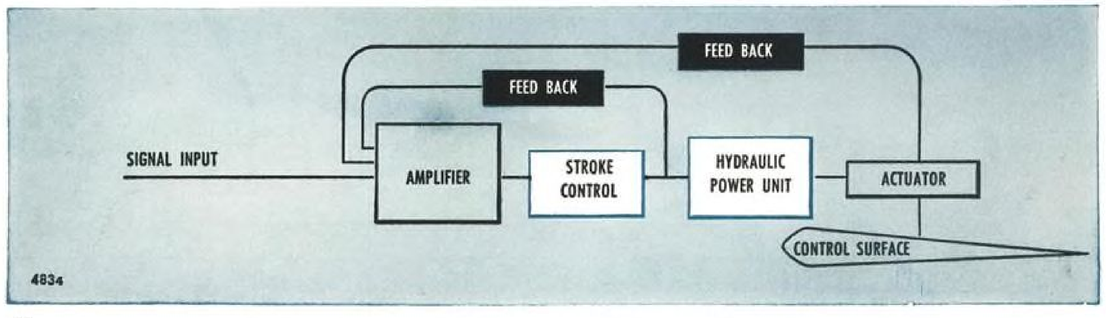
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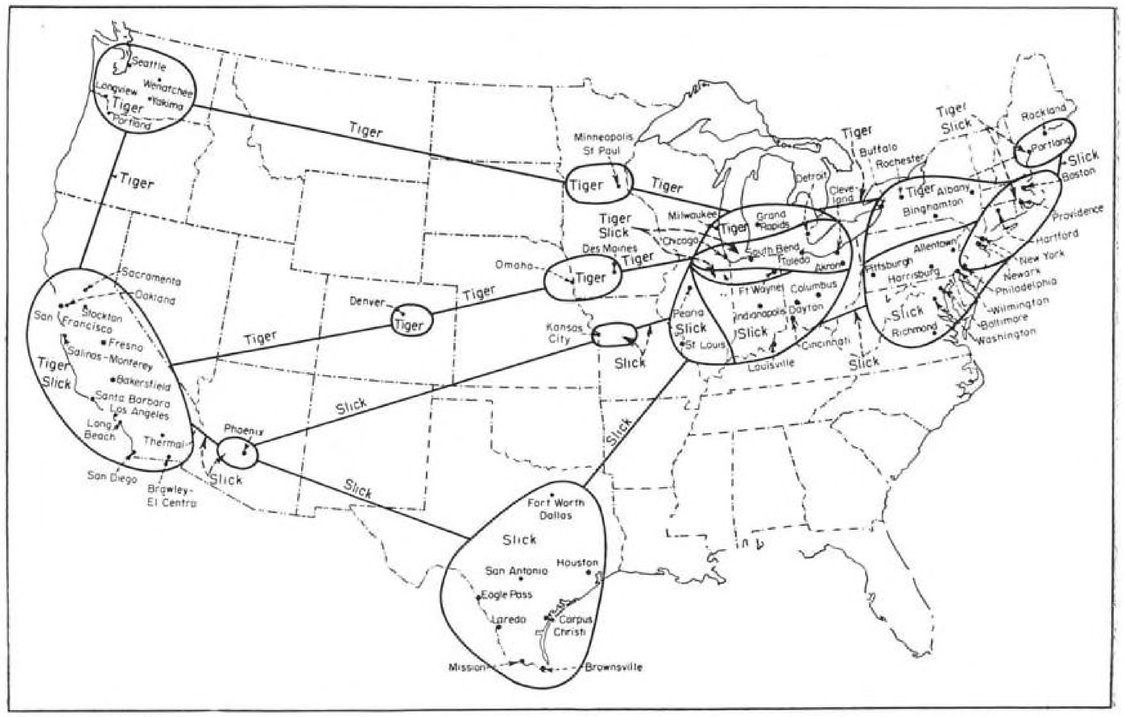
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ROUTE PATTERNS now approved for Flying Tigers and Slick blanket major industrial areas of U. S. except for Southeast.

CAB Approval Forecast in Cargo Merger

- **Flying Tiger-Slick consolidation appears assured of early sanction by the Board and stockholders.**
- **New carrier would fly nearly half of all domestic air cargo in U. S., equaling freight total of 114 airlines.**

By Lee Moore

One all-cargo airline will fly about half the nation's domestic airfreight if Civil Aeronautics Board approves the Flying Tiger Line contract to buy Slick Airways.

CAB may show some qualms in approving this proposed consolidation of airfreight routes to all the major markets except the Southeast, but most Washington observers forecast Board approval before the Oct. 1 deadline set in the Slick-Tiger merger agreement. Competition between the two freight lines had threatened to weaken long-run chances of both to stand up to other competitors—the combination passenger-mail-freight lines.

Industry observers expect stockholders to approve the consolidation in May or June. Slick probably will vote first, because it is a more closely held corporation. Assuming the price is reasonable, shareholders probably will view the merger as strengthening their investment.

▶ **Simple Logic**—Flying Tiger president Robert W. Prescott told AVIATION WEEK the merger is simple logic: The two cargo carriers will be stronger together than in competition.

"We have enough trouble fighting subsidized competition without fighting each other," he said. "Both companies are in good condition, but we think we can do a better job both for the public and our stockholders by merging."

Both Prescott and Slick president Thomas L. Grace said they believe "CAB will probably go along with the move."

Highlights of the merger agreement:

• **Tiger** will buy out Slick, issuing the cargo line's stockholders a half share of Flying Tiger common plus one share of a new $10 par, 5½% convertible preferred stock. Company will finance this exchange by issuing 225,000 more common shares and 450,000 shares of a new series convertible preferred with rights equal to those of Tiger's currently outstanding 99,112 shares of series A 5% preferred.

• **Tiger president Prescott** will continue as chief executive. Slick's board chairman, Earl F. Slick, Grace and three others of that airline's directors will join the new board.

• **Combined board** will include all nine Flying Tiger directors, five of Slick's 14 directors (Grace, Slick, Samuel R. Mulbank, Lewis Moorman, Jr., and James H. Smith) and William B. Miller, Slick's general counsel who is with the



Thomas L. Grace



Robert W. Prescott

Washington firm of Steptoe and Johnson.

• **Company name** will be that of the surviving corporation—the Flying Tiger Line, Inc. But Slick will continue doing business under its own name, too, to keep goodwill already vested in it.

• **Freight volume** of the combined company will about equal total freight ton-miles of all 14 of the combination passenger-cargo domestic trunklines. Slick and Flying Tigers carried about 100 million ton-miles last year.

• **Business volume** of the combined carriers now runs $45-50 million annually. Capitalization would be about $13 million.

• **Company fleet** would total 67 planes, which the companies claim is "more than five times the size of any other cargo fleet." Fleet would be 11 DC-6As, 10 DC-4s, and 45 C-46s.

• **Dividends** will not be paid on common stock nor will capitalization be changed during the waiting period.

• **Slick** may not sell any more of its DC-6As. Slick has sold two DC-6As and will keep the other four. Flying Tiger has seven DC-6As scheduled for delivery the second half of this year.

• **Employe integration** is under study, and the companies will submit to CAB a plan giving "appropriate recognition of employe seniority rights." Observers expect no reduction of flight personnel, but some firing of station and perhaps sales personnel is predicted at cities already served by both carriers. Maintenance integration should be simplified, eliminating some personnel, as both carriers already operate from Burbank. Slick also has an overhaul shop at San Antonio, Tex.

► **Financial Condition**—Driving force behind this merger proposal is the weakening influence of the two carriers' recent cut-throat competition. Flying Tigers underbid Slick last year on renewal of its biggest contract, scheduled Navy supply depot cargo service. The Tigers, largely because of their Pacific airlift contract, had the greater financial power.

Slick broke about even on its transport operations last year. The company showed approximately $400,000 net profit because of capital gain on sale of its first DC-6A. Tigers, on the other hand, report net operating income of $1.5 million.

But both have been pinched by rising costs. Tigers and Slick recently applied for a raise in their cargo charter rate to 85 cents a mile but withdrew the request after a Navy complaint. Slick, however, has won CAB approval of individual tariff increases recently and is expected to announce further increases (temporarily suspended by CAB) next month. A year ago, there was an across-the-board 10% hike in their regular tariffs.

Both carriers have had trouble financing new equipment. Instead of keeping and operating all their first new planes, the cargo lines sold some at a profit to improve their capital positions. Tigers also recently bought 13 C-46s from Civil Air Transport, immediately resold 12 of them.

Since Dec. 31, Slick has borrowed $1.3 million under its credit agreement with Bankers Trust Co., secured by two DC-6As scheduled for delivery last winter. On Mar. 20, Slick sold one of those DC-6As for $1,482,900 to C. Itoh & Co., which purchased the plane for Japan Airlines. From the $650,000 capital gain on the deal, Slick reduced the Bankers Trust debt $300,000. On the second DC-6A delivered in March, the company planned to borrow another $611,000 from Bankers Trust.

Here is why CAB may approve the merger within the six months before Oct. 1.:

• **Tariffs** may be held down by the Flying Tiger-Slick merger. CAB seeks minimum economic rates, yet the all-cargo carriers have been forced to raise rates gradually since 1951 because of rising costs. Because they had high load factors to start with, cargo airlines had only two ways to lower unit costs: cut overhead or buy modern planes. Their competition, without subsidy, has made financing new equipment difficult. Merger would strengthen their financial setup and reduce overhead.

• **Service** would be strengthened but would not dominate passenger-carrying competitors. This is the main CAB yardstick for merger approval. Will the proposed merger strengthen service of the merged companies more than it hurts competitors?

With the combination passenger-mail-express-freight carriers, freight is the lowest paying sideline. But their CAB-certificated rights to haul cargo are just as complete as those of the all-cargo lines. So observers believe Tiger and Slick's trunkline competitors will have difficulty showing that the merger would injure them. American Airlines, for instance, already has cargo rights in almost every big market of the Slick-Tiger combination.

• **CAB policy**, recently repeated by chairman Oswald Ryan before the House Interstate and Foreign Commerce Committee, calls for approval of mergers that offer to cut costs and strengthen service without undue harm to competitors.

Passenger-freight airlines are expected to oppose the merger, citing the possibility that if airfreight grows to a booming, highly profitable business—as Slick and Tiger have often predicted—then one company might dominate it.

Record Transocean Air Travel Booked

Record trans-Atlantic air travel had been booked on Trans World Airlines and Pan American World Airways transports by last week, start of the second season of ocean aircoach. Ticket sales were far ahead of last year's all-time high trans-Atlantic airline travel.

The airlines—anticipating a boom demand (Aviation Week Mar. 16, p. 12)—required almost immediate deposit followed by early full payment to confirm reservations.

• TWA bookings for April are 160% higher than a year ago, May 60% and June 105%.

• Pan American reports its April-June bookings are just about full. Ticket sales did not increase as much as TWA's, because Pan American hasn't added so many flights. PAA already had its new DC-6B coach fleet available last year.

Pan American says mid-summer eastbound bookings are much heavier than last summer.

Frontier Reports '52 Salaries, Holdings

Frontier Airlines report to the Civil Aeronautics Board on salaries and stockholdings for 1952 shows no substantial changes were made by the Rocky Mountain local service carrier from the previous year.

President H. S. Darr's $24,000 salary was the same as 1951, and the controlling 48% interest of Darr Aero Tech in Frontier dropped only 1%.

Here are officials' 1952 salaries and holdings, with 1951 figures shown in parenthesis where a change had occurred:

H. S. Darr, president, salary $24,000, shares 3,300; C. A. Myhre, executive vice president and treasurer, salary $11,800 ($10,416), shares 160; R. M. Wilson, vice president-operations, salary $10,900 ($10,000), shares 100,080; E. N. Levin, secretary, no salary, shares 163,743; E. W. Sexton, assistant treasurer, salary $5,175 ($4,350); J. W. Wagner, assistant secretary, salary $4,185; L. P. Blatter, comptroller, salary $4,200.

Directors: officers Darr, Levin, Wilson and Myhre, plus: G. C. Taylor, no shares; Walter Walker, no shares; F. W. Bonfils, no shares; D. E. Webb, shares 750; W. Felton, no shares; L. W. Linville, shares 800 (500); E. B. Slocum, no shares; and L. E. Leverone, shares 5,000.

Owners of 5% or more of outstanding capital stock at Dec. 31, 1952, are reported as: Darr Aero Tech, Tucson, Ariz., shares 391,145 (396,147), 48% (49%) of total; E. N. Levin, shares 163,743, 20%, and R. M. Wilson, shares 100,080, 12%.

Air Cargo Facilities Expanded at Newark

Newark Airport is slated to become the major air cargo center in the metropolitan New York area, capable of handling an estimated 200,000 tons-plus in 1965, says Joseph M. Byrne, Jr., Port of New York Authority vice chairman.

The big field also is being developed to take care of 50% of the transcontinental flights entering or leaving the port district. A 300% gain in passengers handled over 1951's one million is contemplated for 1965, rising to about 4.5 million in 1980, Bryne says.

To do this job, PNYA nearly has doubled the field's acreage from 1,400 acres to about 2,300 acres, approximately four times the size of La Guardia Airport. A new runway system is to be constructed, capable of handling planes up to 150,000 lb. gross weight and a peak-hour traffic capacity of 120 landings and takeoffs.

Braniff Profit and Loss

(Reported to CAB)

	1952	1951
Domestic Trunk:		
Operating revenues *	$22,822,491	$17,763,677
Operating expenses	21,519,151	15,409,296
Net oper. income	1,303,340	2,354,381
Net nonoper. income	613,692	106,788
Income tax	none	876,000
Net Profit	**1,917,032**	**1,585,169**
Local Service:		
Net before tax	(−114,911)	.....
Int'l and Overseas:		
Operating revenues *	8,778,264	7,592,795
Operating expenses	10,109,101	7,708,387
Net oper. income	(−1,330,837)	(−115,592)
Net nonoper. income	(−206,144)	(−131,687)
Income tax	none	none
Net Loss	(−1,536,981)	(−247,280)
Total system (1952 reported only)		
Net before tax	265,140	
Income tax	none	
Net Profit	**265,140**	
Earned Surplus:		
Balance Dec. 31, 1951	2,442,496	
Net profit	265,140	
Adjustments	1,031,577	
Reserves change	none	
Dividends	none	
Balance Dec. 31, 1952	**3,739,213**	

*1952 revenues include U. S. mail pay as follows: $2,033,219 international, $897,274 domestic, and $4,164 local service.

Braniff Asks Big Subsidy Boost

Braniff Airways has asked Civil Aeronautics Board to grant it $2.5 million more subsidy in a new temporary international mail rate covering the last five years. This is a supplementary, emergency-type request and is in addition to three other Braniff mail rate cases now in process at CAB.

The four mail rate cases:

• **The new retroactive** request for a higher temporary international rate. Braniff asks for not less than $2.5 million more than the company already has received.

• **Final international** mail rate, past and future. Any temporary extra grant made by CAB on Braniff's temporary rate will offset part of the final increase granted.

• **Final domestic** mail rate, retroactive to last Nov. 9. The company has told CAB it will accept a non-subsidy rate of 53 cents a ton-mile for the period Oct. 1, 1951, through Nov. 9, 1952.

• **Higher future domestic** final mail rate. Braniff recently told the Board it would need more than the current 53-cent domestic rate because of its merger with the less-profitable Mid-Continent Airlines last Aug. 15.

Braniff's profit-and-loss statement, just filed at CAB, shows why Braniff is so anxious to get subsidy increases on both its international and domestic routes.

Net operating income on its domestic trunk routes in 1952 dropped $1 million from a year ago to $1,303,340, including only 45 days' operation of Mid-Continent.

International loss of $1.5 million on temporary mail pay cut Braniff's total 1952 net profit to $265,140, compared with $1,377,889 the year before. And the 1951 figure was after paying $1.5 million income tax, whereas the quarter-million 1952 figure includes no income tax.

► **Local Service Route**—Braniff says the Mid-Continent routes would require more than a 53-cent-per-ton-mile rate even if the company did not have MCA's separate local service route, which Braniff reports lost $115,000 in the 45 days since the merger. CAB refuses to grant a separate mail rate for that local service operation. Braniff has tried to sell it, but a spokesman says it has received no satisfactory offer.

So here is the way Washington observers believe Braniff's mail rates

should shape up as the Board settles the four separate proceedings:

- **Temporary international mail** pay will be increased retroactively to near the "not less than $2.5 million" the company requests.
- **Final international** rate also will be higher than the present temporary, loss-producing rate.
- **Retroactive domestic rate** will be the same 53 cents the company now gets under the temporary CAB order.
- **Future domestic rate** probably will be slightly higher than the current 53-cent rate.

SHORTLINES

► **Delta Air Lines** has CAB permission to give free transportation to representatives of Convair, Pratt & Whitney, Hamilton Standard, and AiResearch Aviation Service Co. for technical observation of its new Convairs. . . . Has decided with the merging Chicago & Southern Airlines management to issue C&S stockholders 5½% convertible debentures at $21 face value, derived from the C&S Dec. 31 book value of $15.34 a share.

► **Hawaiian Airlines** has answered Trans-Pacific Airlines' criticism of its Convair conversion from DC-3s by asserting that the average flight length for Convairs will be 140 mi., compared to a 120-mi. average on the Convair routes of American Airlines.

► **Lake Central Airlines** temporary mail pay is set by CAB at $1,764,321 from Nov. 12, 1949, to Oct. 31, 1952, or about 58¼ cents a plane mile. Rate after Nov. 1 is set at an effective rate of about 87¼ cents a mile.

► **Pakistan** reports Orient Airways flew 1,739,038 ton-miles and Crescent Air Transport 1,647,407 ton-miles the last quarter of 1952.

► **Pioneer Air Lines** reports its 36-passenger Martin 2-0-2s averaged 14¼ passengers a mile in 1952. In 1951, its 24-seat DC-3s averaged 10¾ passengers a mile. PAL's remaining DC-3s carried 11 passengers a mile in 1952, only 2% more than a year ago. Pioneer president R. J. Smith says, "This is definite proof that Pioneer had reached the saturation point with the DC-3." He adds, "We could not have made any gains if we had continued to provide our service with the pre-war DC."

► **Trans-Pacific Airlines** (The Aloha Airline) reports 1952 traffic gained 26% from 1951 to a total of 1,805,759 passenger-miles.

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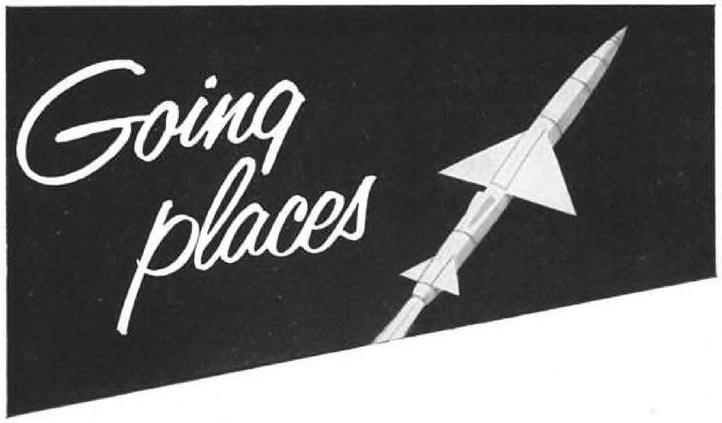
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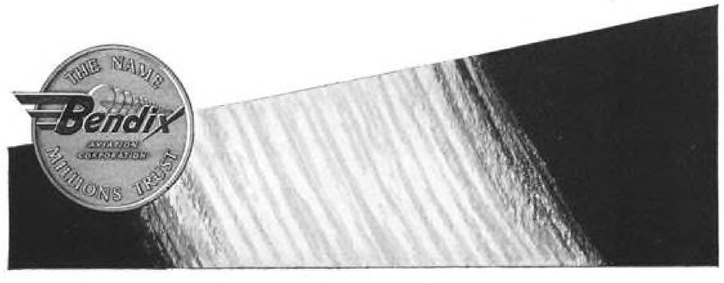
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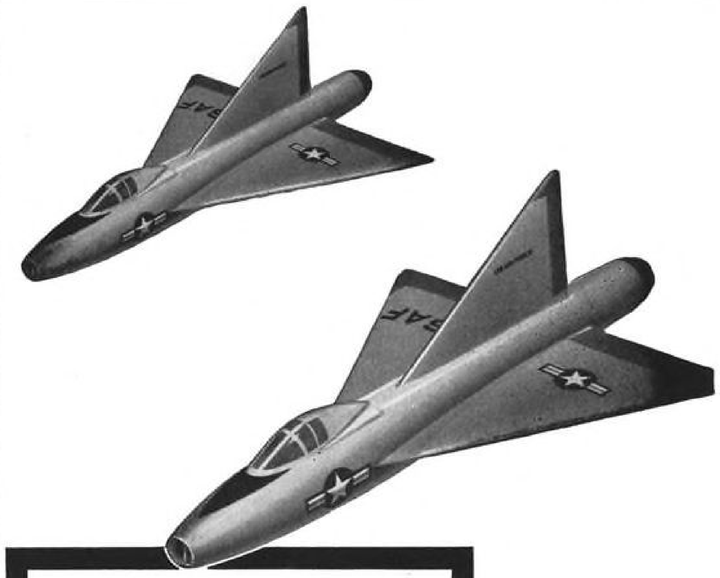
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11	2227-11-D3A	Eclipse	Tachometer
75	1416-12E	Eclipse	Starter
100	716-3A	Eclipse	Generator (NEA-3A)
384	564-2A	Eclipse	Oil Separator
71	828TY13Z2	Weston	Oil Temp. Indicator
40	119862	Weston	Carb. Air Temp. Indicator
400	AN5780-2	Weston	Wheel & Flap Position Indicator
1000	AN5780-2	G.E.	Wheel & Flap Position Indicator
40	828TY12Z2	Weston	Dual Carb. Temp. Gauge
11	727TY70Z2	Weston	Air Temp. Ind.
85	727TY72Z2	Weston	Air Temp. Gauge
88	727TY73Z2	Weston	Air Temp. Gauge
83	727TY74Z2	Weston	Air Temp. Gauge
10	728-40Z2	Weston	Air Temp. Gauge
21	8DJ29AAY	G.E.	Cowl Flap Ind.
22	77C5	Lewis	Carb. Air Temp.
16	76B19	Lewis	Cyl. Head Temp.
23	77C3	Lewis	Oil Temp. Gauge
13	77C4	Lewis	Oil Temp. Ind.
30	47B21	Lewis	Free Air Temp.
33	47B22	Lewis	Air Temp. Gauge
28	47B23	Lewis	Air Temp. Gauge
54	47B24	Lewis	Air Temp. Gauge
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SO THEY TELL US

(Aviation Week's staff, the largest in aviation journalism, talks to scores of important people in aviation during the preparation of each issue. Here are news briefs compiled from sources in New York, Washington and abroad.—Ed.)

INDUSTRY

Press relations shakeup at **Glenn L. Martin**, with Barney Capehart expected to take over. Well-known aviation reporter C. B. Allen leaves the New York Herald Tribune, also joining Martin. **Sikorsky** hopes to get gross increased on S-55 from 6,835 lb. to 7,200 in May. . . . **Bellanca**, pioneer aircraft firm, is out of the plane business and is subcontracting parts, etc. . . . No **Fulton** Airphibians have been built since the original prototype which was certificated; some time ago a lease contract for seven Airphibians was made with CAA, with first delivery originally scheduled at the Kansas City office of CAA some weeks ago. Since Fulton purchased the Goodyear Duck wing, however, he has been working on certification tests on a model with this major revision.

MILITARY SERVICES

Navy says an unofficial altitude record for helicopters was set by a **Piasecki** HUP-2 of Helicopter Squadron 1, which hit 16,150 ft. near Ream Field, Calif. . . . A CAA engineer says USAF is flirting with the idea of trying to get CAA certification for the C-82A so it can try leasing a surplus fleet of more than 100 that it has in Europe and elsewhere. . . . USAF says five plane types can carry **"nuclear devices"**: B-36, B-45, B-47, B-50 and F-84G. . . . The Arctic expert, **Col. Bernt Balchen**, says there is no general movement of Russians to the Arctic.

MISCELLANY

Noted in a magazine ad the day of the triple train wreck in Ohio: "You're on the safe side when you go **Pullman**." . . . The Colliers article Mar. 21, "Safety Gadgets—Do They Kill Our Fighter Pilots?" raised blood pressure of many in USAF, Navy & industry who had hand in developing automatic computing sights and range radar, now doing outstanding job in Korea. . . . Similar, but better, article also ran in **Look**. . . . Everybody in aviation will miss **Steadham (Steady) Acker** at this year's Birmingham air carnival. He died recently: H. T. (Hank) Cross, manager of the local municipal airport, is this year's director, writes Hayden Stone, chairman.

SAFETY

There is some opinion in safety circles that the next big step in commercial airline safety may be increasing **survival rate** rather than any major reduction in accidents.

PRESS

Chilton Publishing Co.'s monthly, formerly called Automotive & Aviation Industries, has removed the word "aviation" from its title. . . . Alex McSurely of Aviation Week is a member of the Operations Advisory Board of the International Aviation Exposition in Detroit. . . . William Coughlin is winding up another stint in Korea & Japan for Aviation Week, before returning to Los Angeles as Pacific Coast editor. He also wrote a feature article for Harper's magazine for March.

TRANSPORT

The **Northwest** leasing of Eastern equipment, announced recently, involves one Super Connie after June 1. . . . The Chicago Tribune story that Northwest is readying plans to buy 20 new transports is called "preposterous" by financial people. Five or six ships is considered a more realistic figure. . . . The **United Air Lines-CAB** fracas over DC-4 coaches is quietly settled. UAL is carving more exits per ship and will use 64 seats, with no more than two abreast, in a new arrangement. . . . **Convair 340** front doors have come open in flight in one Braniff and two UAL incidents. United is working with Convair in a design change program. . . . **United** on Apr. 26 starts a new commuter flight each way between New York & Chicago for men only, in a decision reached at a sales meeting in Denver. It's an attempt to get more business commuters. The ads suggest the male deposit his wife on another flight that leaves the same time! . . . A CAA reader notes that "at present a person can't go into the **nonsked** business using transports over 12,500 lb., but he can buy one of those revoked letters of exemption." (It is true that CAB from time to time reinstates letters that have been taken over by new owners, and CAA issues new operating certificates.)

FROM ENGLAND

What airline would Britain's jet transport builders most like to sell? Both de Havilland and Vickers answer without hesitation—KLM. The British see KLM as the key to the European market—Sabena, Swissair, SAS and maybe the new Lufthansa, according to Nat McKitterick, our London correspondent.

SPECIAL SERVICES

Amazing growth of spraying & dusting operations is shown by a CAA Seattle announcement that there are 938 such planes in only four states—Idaho, Montana, Oregon and Washington. Aerial surveys, fire patrols and other industrial uses kept another 515 planes busy in 1952.

AVIATION CALENDAR

Apr. 11—Montana Pilots Assn. annual convention, Florence Hotel, Missoula, Mont.

Apr. 15-16—First annual engineering management conference, Management Division of The American Society of Mechanical Engineers, Rackham Bldg., Detroit.

Apr. 20-23—Aeronautic Production Forum, National Aeronautic Meeting and Aircraft Engineering display (SAE), Hotel Governor Clinton and Hotel Statler, New York.

Apr. 20-May 2—Annual Conference of Technical Committee, International Air Transport Assn., Caribe Hilton Hotel, San Juan, Puerto Rico. Helicopter Symposium will be a principal feature.

Apr. 21-24—SAE Committee A-6, Aircraft Hydraulic and Pneumatic Equipment meeting, Governor Clinton Hotel, New York, N. Y.

Apr. 25-May 2—First annual National Transcontinental Handicap Air Cruise for private planes of 300 hp. or less, Philadelphia to Palm Springs, Calif., sponsored by Philadelphia Junior Chamber of Commerce.

Apr. 27-28—Iowa Thermodynamics Symposium, State University of Iowa, Iowa City. Theme will be thermodynamic problems encountered in studies of jet engines and rockets.

Apr. 29-May 1—1953 Electronics Components Symposium (AIEE-IRE), Shakespeare Club, Pasadena, Calif.

May 6-7—Second annual Skylady Derby, sponsored by Women's National Aeronautical Assn., sanctioned by NAA and conducted under FAI rules. From Fort Smith, Ark., to Memphis, St. Louis, Kansas City and return to Fort Smith. WNAA's twenty-fourth annual convention will follow at Fort Smith.

May 11-13—National Conference on Airborne Electronics, Dayton Biltmore Hotel, Dayton, O.

May 14-16—American Helicopter Society Forum, Mayflower Hotel, Washington, D. C.

May 16—Armed Forces Day, open house programs at local USAF, Navy, Army, Marine and Coast Guard installations.

May 18-22—Fifth National Materials Handling Exposition, Convention Hall, Philadelphia.

May 18-22—Aviation Seminar, National Fire Protection Assn. annual meeting, Palmer House, Chicago.

May 19-22—Annual convention Aviation Writers Assn., Ft. Worth, Tex.

May 20-22—IAS, AIEE, ISA and IRE joint National Telemetering Conference, Edgewater Beach Hotel, Chicago, Ill.

June 11-13—Fifth annual All-Women International Air Race, Weeland, Ont., to New Smyrna Beach, Fla., sponsored by Ninety-Nines, Inc.

June 17-19—Mid-year meeting of Aviation Distributors and Manufacturers Assn., Chateau Lake Louise, Alberta, Canada.

July 15-16—IAS Annual Summer Meeting, Honors Dinner. IAS Building, Los Angeles, Calif.

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

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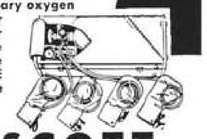
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EDITORIAL

No Military Jet Transports?

It is startling and hardly a reason for pride to note that the Royal Canadian Air Force, operating on a budget that is infinitesimal alongside that of our own United States Air Force, already is taking delivery on the first of two Comet jet transports.

So far, the USAF has yet to announce even an order, although we Americans pride ourselves on leading the world in both military and civil air transportation. We have the largest military and commercial air transport fleets and we are flying by far the largest commercial and military airlifts.

It is to the credit of the Military Air Transport Service that it is on record, conceding the need for military jet carriers, however.

"The advance of engineering will compel us to adopt the jet transport for our personnel operations," said Col. Francis C. Gideon, MATS Director of Operations.

Despite the currently effective top-brass instructions from the White House to slice government expenses, it seems to us that the inevitability of buying, flight-testing and operating military jet transport planes justifies immediate action.

Careful selection of one or two ultra-modern and efficient prototypes that would offer maximum advantages to both MATS and the major commercial airlines would advance our national interests and cut the cost to all.

It should not be difficult for the military services, whose one overpowering obligation in peace is to plan for war, to realize that a commercial jet airliner fleet —in being—offering speeds of well over 500 mph., would be a powerful arm of the Air Force's own airlift in emergency, available within a few hours.

The objectives, after all, are identical: to advance the nation, in peace and war.

Merger Beats Begging

We are sorry to see the world's two largest airfreight carriers merge. Since 1946 we have reported in our news columns the courageous and strenuous battles of Slick and the Flying Tigers—as well as campaigns of other veterans who later fell by the wayside.

Furthermore, we campaigned editorially on this page for years for the right of some of these airfreight petitioners—specifically Slick and the Tigers—to get their chance to show the public what they could do.

Less than a half-dozen finally got that chance, after several years of immensely expensive battering at the government's door.

But for financial reasons detailed elsewhere in this issue, these two leaders have agreed on merger proceedings, to become the nation's fifth largest domestic airline, based on 1952 traffic volumes.

We are sorry for those who will lose jobs. We are proponents of competition and we feel that two big freight companies may have fought harder than one for future business, with the shipping public benefiting.

But even the single freighter remaining—provided Civil Aeronautics Board sanctions the merger—will still buck hefty competition from the passenger lines.

The brightest part of the picture is that both of these managements, symbols of private enterprise, preferred to merge rather than forsake their original philosophy of rugged independence and come begging to Uncle Sam for taxpayers' money in the form of subsidy.

We wish the new company luck—plenty of it. We hope its new strength will bring more and better airfreight service to the public, economically.

The confidence many of us have in the soundness of airfreight's future may be borne out even sooner than most of us had expected.

How to Publicize Your Company

Executives in aviation are always asking us how to get their firms mentioned in AVIATION WEEK. It's easy if the editors feel that what you are doing is important and interesting to a very sizable number of our readers. Just tell us.

Most companies—even those with public relations departments—fail to take full advantage of services business magazines offer. Without obligation to print, we'd like to hear about you.

Remember—if your item is not printed—that editors of business magazines have the responsibility of deciding what they believe their readers value most. The fact that about 60% of all of our subscribers renew their subscriptions (the highest percentage in our field) is some evidence that we are more than half right in our judgment. So that after years of experience, we are more inclined to depend on our own judgment or that of our staff than that of an executive who may be more interested in getting a "plug" published than in giving out information that other businessmen or engineers will want or need to know.

If you believe your company is doing something very worthwhile, or offering a useful service or product, or has solved a tough problem that others also must face, drop us a line. But it **must** interest many readers—not just a few. Before you go to too much trouble, why not tell us briefly the amount and kind of information you have available.

You will receive a letter from us as soon as we can discuss your information with our department editors. We will then tell you frankly whether we feel it is worth your while to write us more fully. You don't need a publicity man to drop us a line—although an experienced press relations man can be helpful.

Write to the Editor of AVIATION WEEK, 330 West 42nd St., New York 36, N. Y., tell us also how you like the magazine and how we could improve its helpfulness to you in your work.

—Robert H. Wood



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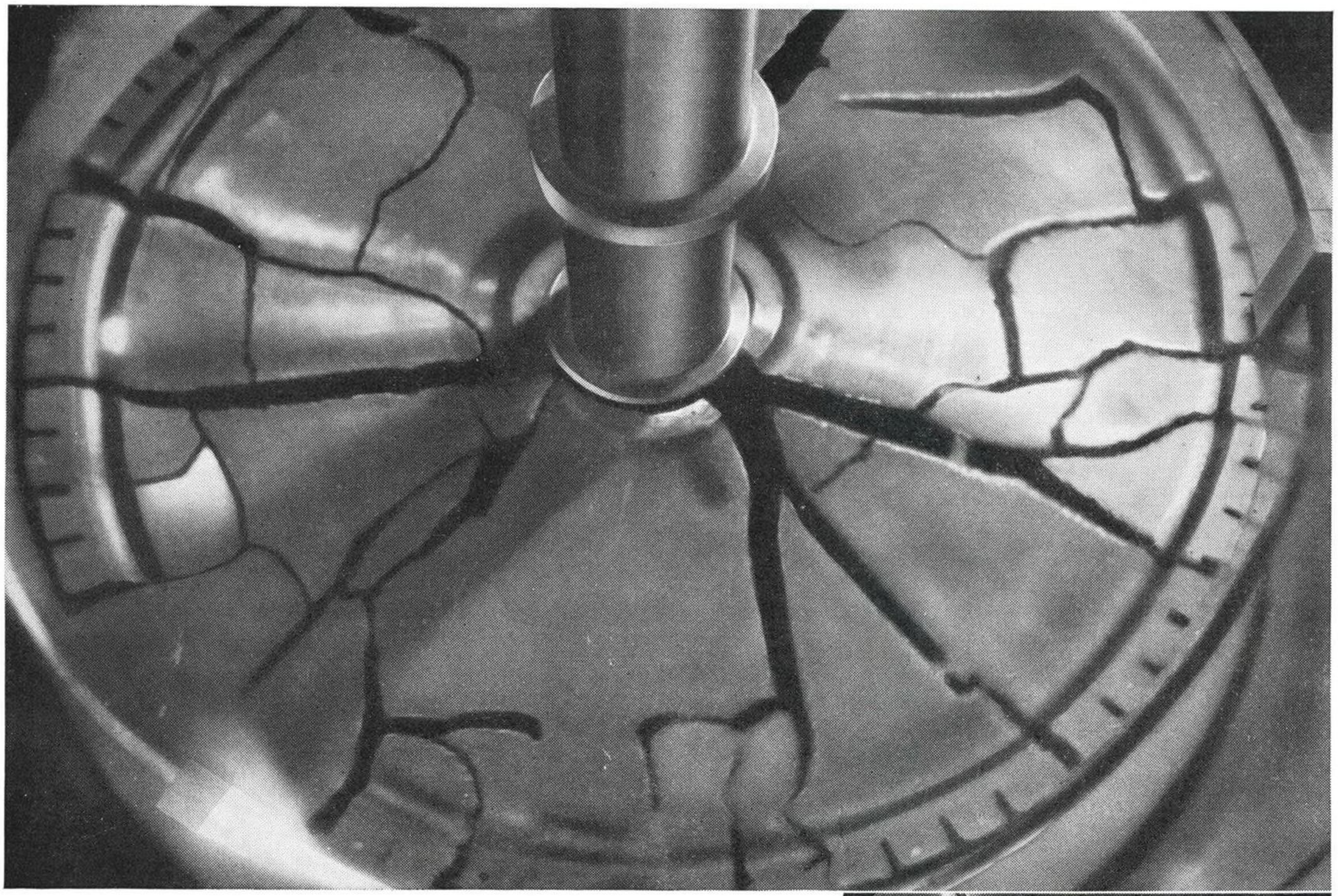
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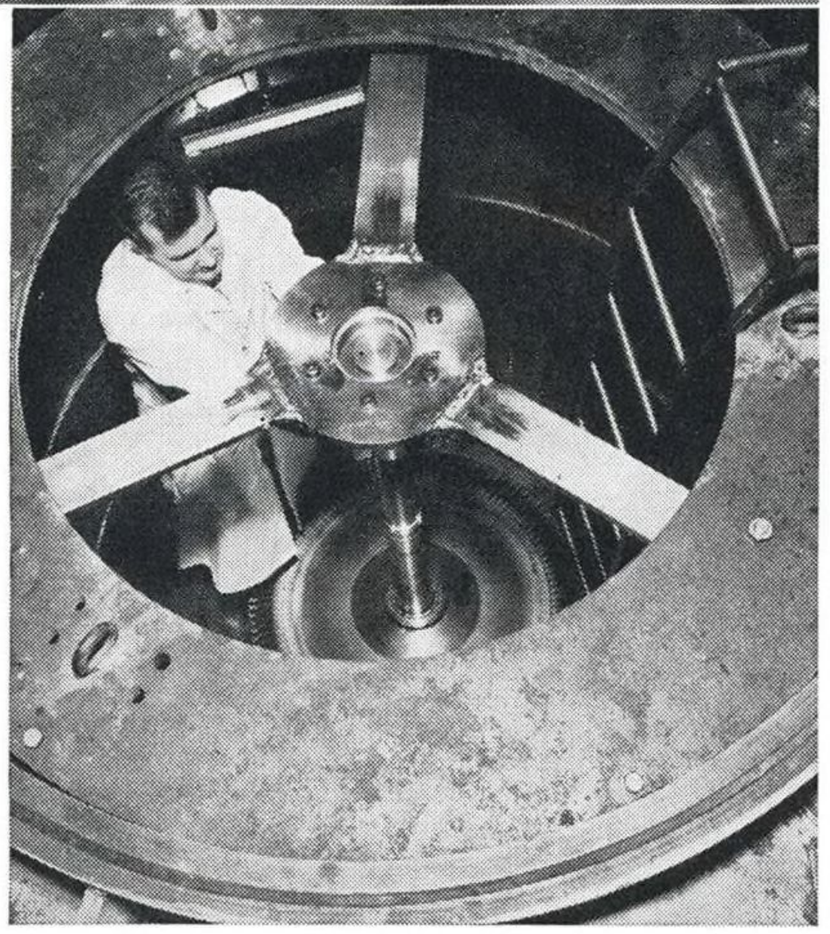
ANOTHER REASON ALLISON LEADS IN THE AIR



We burst this wheel to prove its strength

You are looking at a photograph of a jet engine titanium compressor wheel being deliberately disintegrated by Allison engineers in a super-high-speed test. First, our engineers spun the wheel at the highest rpm the test machine could produce—and it would not burst. Then they cut a notch in the hub and the wheel "let go" at 22,000 rpm—5,000 rpm higher than the strongest steel wheel could stand. This picture taken at 2-millionths of a second showed our engineers the action at the instant the wheel burst.

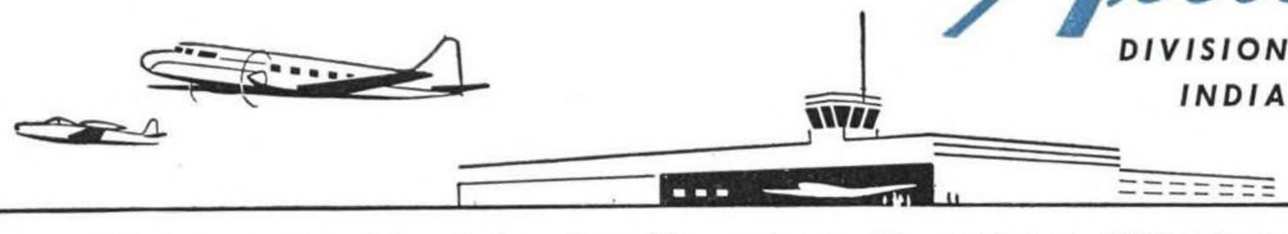
Tests like this aren't new—but this one served to show that the new higher-strength, lighter-weight titanium alloy wheel has a safety margin of many thousands more rpm than would ever be experienced in actual flight. Careful testing like this forecasts tomorrow's successful application of new metallurgical developments—typical of the continuous pioneering which maintains the leadership for Allison engines in the air.



Allison turbine wheels also are spun at overspeeds for proof of quality in production as well as for laboratory development.

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