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Pictorial

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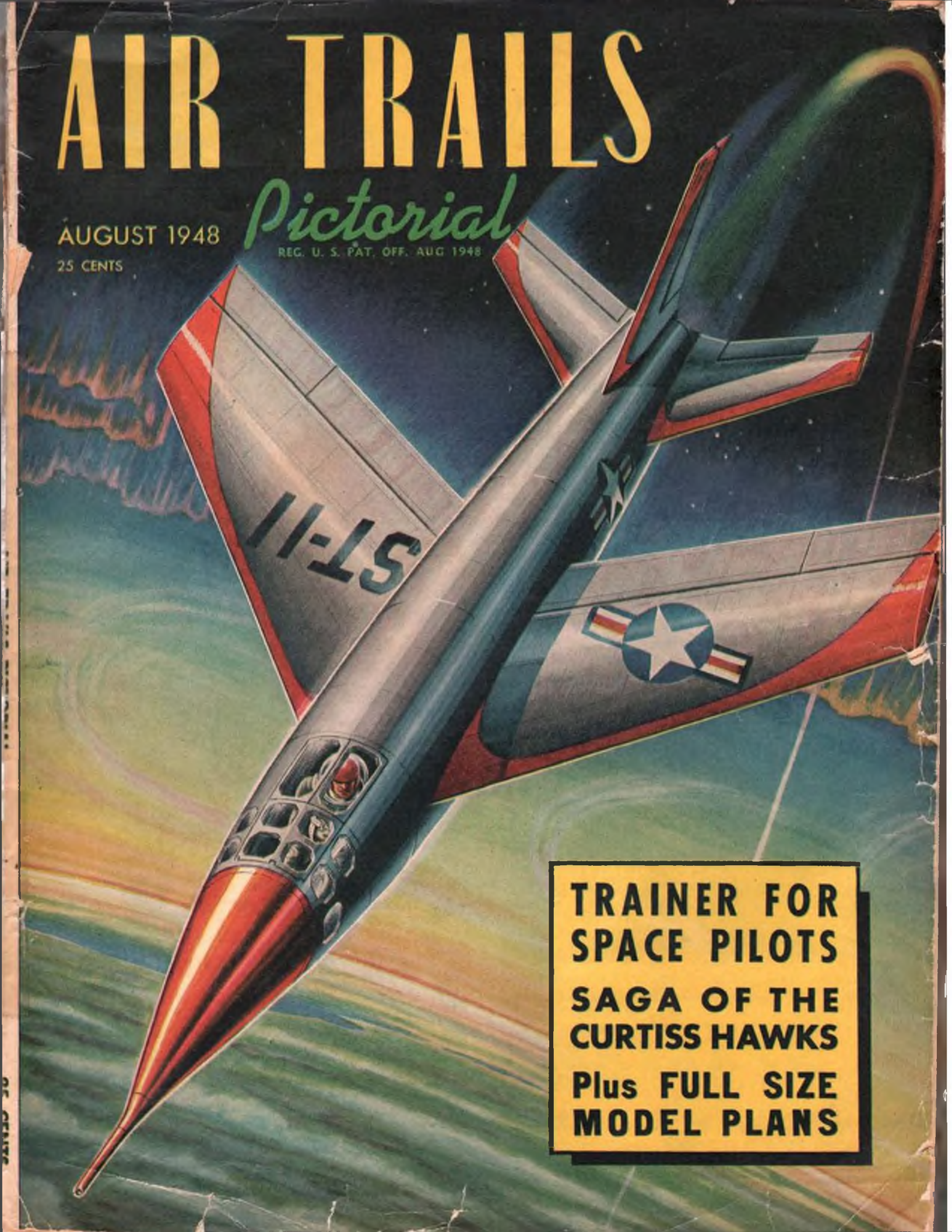

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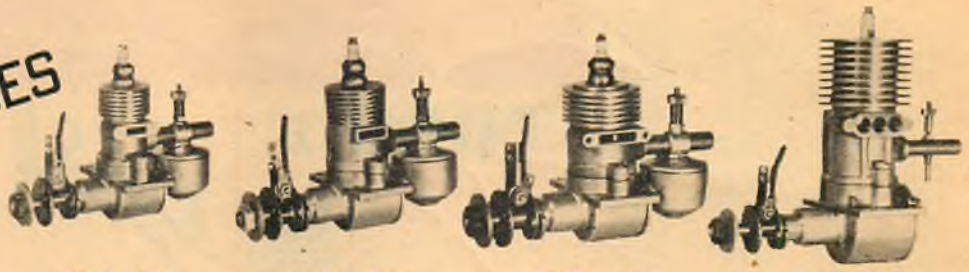

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Displacement	.199	.299	.350	.610
Bore	.66	.812	.880	1.00
Stroke	.562	.562	.562	.777
Horsepower	1/7	1/6	1/5	1/4
RPM	7,500	8,000	8,500	9,000
Propeller	8"	10"	11"	12"
Weight (ozs.)	4	4½	4½	9

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SEND FOR YOURS TODAY!!

Bill Barnes Booster

Sirs:

For years now I've been reading *Air Trails* avidly with growing interest. All of its articles, the editorials and model topics have been pored over and digested.

As an artist the illustrations have interested me, especially the air stories featuring Bill Barnes. Though he is no longer a feature of yours I followed him for a great length of time, reading my first *Air Trails* in 1935. His run-in with the "enemy" using his own atom bomb in the Mediterranean I remember well—all the way up to when Bill constructed his famous "Charger."

JOSEPH BOUCHER

Milwaukee, Wis.

Dethermalizer Credit

Sirs:

The article by Michael J. LaTorre (March, '48) regarding the use of dethermalizers on models to comply with the new rules was fine, but after reading it one is at a loss to decide if this is the idea of Mr. LaTorre or someone else.

If I remember correctly Carl Goldberg proposed a dethermalizer sometime around late 1941 and presented it to the public the following year. The casual reader may well get the impression that LaTorre was the inventor of the dethermalizer described although too modest to attach his name thereto.

FRANK SMITH

Chicago, Ill.

● Let credit be given where credit is due. The Goldberg dethermalizer paved the way for many of today's variations. *Air Trails* did not intend to present Mr. LaTorre as the inventor, nor did he lay claim to such fame.

Learned via A.T.

Sirs:

In answer to Christo Russo's letter: I'm a solid model fan and please give us more. I work and don't have too much time, so I build them from *A.T.P.'s* fine plans.

I've followed *Air Trails* from as far back as 1936. I enjoyed the stories of Bill Barnes and learned most of what I know about aviation from *Air Trails*.

During the war I was an instructor in aircraft identification and at present collect aircraft pictures. I can't tell you how very important this magazine is to me.

FRANK DUSAS

Shreveport, La.

P.S. How about a solid of the B-36 bomber?

● You'll have a B-36 solid in the next issue, Mr. D.

Seaplane Take-offs

Sirs:

As this is my first experience in expressing my views to a magazine, I must admit I feel rather self conscious. However, your article on seaplane flying is misinformed. Most of it gets by, but your method of take-off—#$&*!!!

The only thing that can cause porpoising on take-off or landing is insufficient back pressure. That business of trying to fly the plane against its bucking motion is as wrong as "instinctive sense of timing" on take-off. Any relaxation of back pressure, let alone pushing of the stick forward, will aggravate the porpoising.

I can prove to you at the North Long Beach seaplane base that the proper amount of back pressure held steadily will prevent porpoising, and also stop it in any stage—in anything from a Cub to a Widgeon.

As for knowing when to lift the plane off—it's better if you don't know. A proper take-off requires only back pressure at the initial power thrust (and this only serves to preserve the prop), then relaxed stick until the airplane reaches its highest nose position and then settles down on the step. As the nose comes down, a little back pressure will hold it in the one and only step position, from which the airplane leaves the water all by itself.

The above method pertains to average wind and water conditions. High winds, swells, minimum power, and other adverse or unusual conditions require different techniques for maximum performance even though the above mentioned procedure will produce good results under any conditions.

WILLIAM HORWITT

Baldwin, N. Y.

● We suggest Mr. Horwitt re-read the article and see if he's not concerned about the how-not-to-fly-a-seaplane section. However, any and all comments are welcomed on the subject.

Channel Wing

Sirs:

I agree wholeheartedly with the editors concerning the June issue and Mr. Custer's channel wing. It is marvelous and it is the missing link in aviation. But your artist's conception of a single-engined channel plane shocked me to my roots. It would have no lateral stability at low speeds (below the velocity at which the wing sections could support the craft's weight) since the center of lift of the channel is about a foot or so beneath the center of gravity of the plane. In fact, it would be decidedly unstable and can be compared to balancing a pencil on its point. Am I right or am I right?

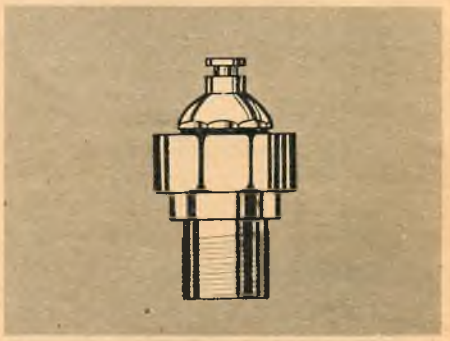
HERBERT M. FRIED

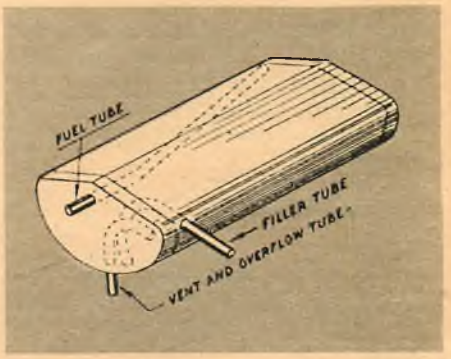
Forest Hills, N. Y.

● Mr. Fried, we don't want to say that you could be wrong or that you could be wrong, but the artist's drawing was checked with great care and okayed by officials of the National Aircraft Corp., the concern building a 4-place channel wing plane.

Showcase

● **Hot motors at low price** is not an admission of dealing in stolen goods, but rather the happy announcement many dealers are making these days that Ohlsson and Rice's (Emory at Grande Vista, Los Angeles, Calif.) new glow plug equipped rotary valve engines are in stock. Pictured here is the brand new "23" priced at $9.95 with plug, less tank. Engines are adaptable for ignition. ● **Hot stuff is "Hot Spot"** glow plugs made by Darwin Products Co. (2430 Elmwood Place, Ann Arbor, Michigan). Plugs come in five different versions to fit all size, various compression engines. Adapters for "V" plug size heads available. Only 1½ volts required to heat ignition element. Smaller glow plugs sell for 80¢ each; larger for 95¢. Exceptional performance claimed for No. 4 Hot Spot with Liquid Dynamite fuel. ● **Two-faced is the Conqueror,** designed by Wakefield champ Dick Korda, and manufactured by Berkeley Models Inc. (140 Greenpoint Ave., Brooklyn 22, N. Y.). It's a two-in-one kit which makes up into a fuselage or stick type competition craft with interchangeable wing and tail surfaces. Wing span is 36 inches; wing has area of 100 square inches. Free wheeling propeller furnished in kit which sells for $1. Everything but rubber and liquids. ● **Is half a moon better than none?** It's even better than a full moon according to Bob Roberts (110 W. 7th Ave., Gary, Ind.). As proof he offers his "Rite Pitch" Half-Moon stunt tanks which are designed to give maximum performance for control-line stunt and speed models, free-flight jobs, even race cars and boats. Available in three sizes each 1 inch high, 1¾ inch wide: 2¼ inch long; 2¾ inch long; 3¼ inch long. ● **Inexpensive reflex** is Ansco's "Rediflex" which takes twelve 2¼-square-inch pictures on roll of 620 film and sells for $14.70 including tax. Flash unit is available as accessory. Brilliant reflecting type finder and folding metal light shield makes subject easy to see. Hinged back and swing-out retainers make film loading a cinch. Twin-element taking lens gives sharper pictures, eliminates distortion.





MODEL-HOBBY ITEMS—SOME OLD, SOME NEW—TO PLEASE THE DISCERNING HOBBYIST. ALL ITEMS AVAILABLE AT MOST DEALERS, UNLESS OTHERWISE NOTED. WHEN ORDERING TELL 'EM YOU SAW IT IN "THE SHOWCASE." SPECIFICATIONS AND PRICES ARE CHECKED CAREFULLY, BUT ARE SUBJECT TO CHANGE

● **Jets a minute, friend,** we want to tell you about the new Dyna-Streak kit for powering by the Dyna-jet Red Head engine offered by Jetco Models Co. (312 Fairlawn Ave., Mansfield, Ohio). Costs $7.95 and has folded, spot welded aluminum wing, stamped aluminum stabilizer, aluminum boom, formed aluminum top shell which eliminates need for asbestos insulation. Total assembled weight approx. 2 lbs., 7 oz. ● **Racy stuff** indeed is "Gad-Jet" racer distributed by National Model Distributors (2516 N. Greenview Ave., Chicago). It's a completely finished miniature racing car for powering by the Herkimer CO_2 engine or in pure jet fashion by carbon dioxide cartridges. With CO_2 engine installed, ready to run, $6.95; with jet tube clip for cartridge operation, ready to run, $1.50. Unassembled, unpainted car, $1. ● **New look for '48** is apt description Enterprise Model Aircraft and Supply Co. (90-03 Liberty Ave., Ozone Park, N. Y.) gives to its "Pirate" control-line model. Kit sells for $3.95 and builds into 40 inch wing span low-wing semi-scale stunt-sport model of 285 sq. in. wing area. Takes engines from .23 to .65. Has shown up well in competition. Animated plans contain instructions for adding night flying accessories ● **Submersible sub** is what Westlake Model Co. (456 East 21st St., Erie, Pa.) offers these days. Outfit has a kit out for making a 26-inch operating scale model of the U.S. Submarine "Tarpon." Spring motor provides motive power permitting submerged runs of 50 feet or surface operation for 90 seconds on single winding. Kit for operating model, $12.50; display model kit with everything but motor, $7.50. ● **This should click with camera fans,** speaking of Universal's new Roamer I bellows-type camera. Selling for $29.75 it features coated Achromat lens, focuses from 5 ft. to infinity and has durable grain-satin finish aluminum combination exterior. Takes either 120 or 620 film. Shutter is automatic self-cocking. Built-in cable release and flash synchronizer. It all adds up to large size negatives with pocket size compactness.

Showcase

● **Come up close, folks!** The new Morton Reflex Magni-far telephoto lens does just that with distant subjects. Designed for use with cameras having non-interchangeable lens fronts, such as Argus Reflex, Automatic Rollieflex, Rolliecord, Ciroflex, Ansco Reflex, Kodak Reflex, Zeiss Super Ikonta B, Eastman Medalist, similar cameras. Information from Morton Co., 86 S. 6th St., Minneapolis 2, Minn. ● **Model builders work bench** with storage bin for material 3 feet long and a magazine rack for your copies of *Air Trails* is the deal available from California Maid Hobbycrafts (443½ E. St. James St., San Jose, Calif.). "The Compakto" is available as a finished, varnished affair for $24.95, or in knock-down kit shape requiring only a hammer and screw driver for assembly at $18.50. Prices are F.O.B., San Jose. ● **Compensation to be employed** between your engine and fuel tank is the 65¢ "Compensator" put out by Snafu, Box 1948, Hollywood 28, Calif. Idea behind gimmick is to provide constant flow of fuel to motor during the most violent maneuvers which helps keep glow plug equipped powerplants running at peak performance. To get smooth, steady power install it flat directly opposite needle valve. Weighs ½ ounce. ● **Oil's well** that starts off right and it'll end well, too, says Sportco Products (4817 Frankford Ave., Philadelphia 24, Pa.) referring, of course, to its Castor Oil Lubricator now available in 4 oz. bottles for 35¢. It's a pure, refined, heavy base castor oil for added lubrication to methanol base fuels or in original formulas. Sportco also offers "Super Glow," "Super Atomic" and "Super Duper" fuels. ● **Bounding main business** is what Marine Model Co., Inc. (Halesite, L. I., N. Y.) does. Concern's latest kit for the "Lightning Junior" proves it. It's a sleek sailboat with colored, waterproof vinylite sails completely finished. Kit priced at $4.95 has die-cut balsa wood hull ready for assembly. Over-all length is 18 inches; height, 30¾ inches; beam, 6¼ inches. Now's a good time to try your hand at sailing.

Arden engineering SCORES 2 NEW HITS

The sensational performance of Arden Engines have established new A.M.A. records in all categories of class A control line flying . . . and the highest official 3-flight average ever recorded in class A free flight.

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Facilitate better streamlining by permitting complete cowling of Arden engines. Stacks may be trimmed to conform to contour of fuselage. Sturdily made of aluminum and easily attached.

No. A-1350 for Arden .099 engines **35c**

No. B-2350 for Arden .199 engines **45c**

ARDEN BATTERY CONNECTING CORD KIT

Ideal for use with Arden Glow Plug. Includes 3 feet of double cord of 18 gauge stranded wire with oil and gasoline resistant plastic insulation, 2 crocodile clips, 2 wire banding clips and 6 battery terminal clips.

No. E-7002, Kit ready for assembly **35c**

ARDEN GLOW PLUGS

Permit ready conversion from spark ignition to Glow Plug ignition . . . eliminate spark plug, batteries, coil, condenser, engine timer, wiring, and resultant ignition troubles . . . result in easier starting and greater engine H.P. output.

ARDEN GLOW PLUG and ADAPTER PRICES

For Arden and other engines with same diameter plug opening and same thickness of head—

No. E-8001 S (short), $\frac{1}{4}$" x 32 T.P.I.
Length of threaded section 5 32" ea. **85c**

For engines with same diameter plug opening but with thicker head than Arden—

No. 8020 L (long), $\frac{1}{4}$" x 32 T.P.I.
Length of threaded section 7 32" ea. **85c**

Glow Plug Adapter, for Class C engines with $\frac{3}{8}$" x 24 T.P.I. plug opening, permitting use of long Arden Glow Plugs.

No. 8015, fabricated of aluminum with copper-asbestos gasket ea. **25c**

ARDEN ENGINE PRICES

Catalog No.		
1-P-099	.099 engine with plain bearing crankshaft	**$12.50**
1-B-099	.099 engine with ball bearing crankshaft	**15.50**
1-B-199	.199 engine with ball bearing crankshaft	**18.50**

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DEVELOPMENT HIGHLIGHTS

● The McDonnell XF-85 parasite fighter built for AF to be carried in bomb bay of B-36. Powered by Westinghouse J-34 jet engine developing 3,000 lbs. of thrust.

● The Sedan, Aeronca's entry in the four-place personal plane field. Span 37' 6", engine 145 hp Continental, speed 120 mph.

● Chance Vought XF6U-1 Navy fighter now has an afterburner to increase thrust. Rear of fuselage modified for device.

● Arsenal 0-101 French two-place research plane. Observer sits ahead of pilot. Engine 495 hp Renault, speed 280 mph.

● Navy's experimental patrol boat Martin XP5M-1 features long after-body hull for landing and take-off in rougher sea.

● Italian SIAI Marchetti SM 93 dive bomber developed at close of war. Pilot lies prone. Top speed 337 mph, wing span 27'.

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Air Notes

By John Forney Rudy

AVIATION TODAY AND TOMORROW

PRODUCTION FACILITIES PREPARED: Emergency preparations in aviation are increasing, although in many respects quietly and without much ballyhoo. The latter is being left to Congressional committees.

Four aircraft plants, and others may have followed by this time, have been returned to standby status by the AF. They are ready to go into almost instant military production--in case. Although private manufacturing will go on in the plants, AF is making certain that the plants will be maintained in such a way as to minimize delays if the facilities are needed in a hurry.

AIRCRAFT CENSUS: The lightplane you fly, the passenger transport you ride in, or the cargo plane that carries your freight, all have been studied already for possible utilization when and if necessary for an emergency. The Armed Forces determined not to be caught napping; they plan to know exactly what is available, where it is, and how it can be used.

BIG FIELD BUSINESS: Military aviation isn't losing any time preparing for a possible transition from a 'cold' to a 'hot' war, although the developments are more closely guarded. Right now strategic airfields to take care of B-36's and even larger planes are being built or existing ports improved throughout the nation and world.

To mention a few: Eglin Field, Fla., Limestone, Me., Rapid City, S. D., and an undisclosed number in Alaska, Okinawa, the Philippines, Guam, Iceland, Newfoundland, North Africa and even Greece.

SERVICE RESEARCH: Military aviation and research are being stepped up. Larger aircraft than the B-36 are on their way; faster jets than the P-84 will be announced when the military gives the nod; dropping 1,500 and more fully equipped troops by parachute in one operation is becoming commonplace; pilot training is increasing; aviation researchers have a dozen new developments and devices up their sleeves which would astound those who think they follow aviation closely.

HERE, FIDO! The first commercial airport to use fire in large quantity to dispel fog will be the Los Angeles Airport. By the end of the year nearly 400 burners will be installed, costing about $1,000,000, expected to save airlines many millions in preventing delays in schedules, cancelled flights and the frustrations of disappointed travellers.

PARA-CARTON: A new emergency carton for dropping supplies without parachutes, may make its appearance commercially in the near future. The carton has side panels which flap open wing-like when it is tossed from the plane, allowing the carton to twirl like a top or like a leaf as it falls to the ground.

HOW TO FLY AND EAT: The industrial uses to which non-scheduled commercial flying is being put is one of the most amazing developments, and perhaps heartening, in aviation. Latest Government survey shows more than 100 different flying 'jobs', of which nearly 60 are classified as major enterprises.

Here's a few of the more unique new ones: knocking ripe fruit from trees; determining snowfall and water levels; rainmaking; mineral prospecting; loudspeaker advertising (yes, they can shout commercials at you from the skies now and you can't turn them off); transporting dynamite, and anti-frost agitation.

SAFETY RECORD: Stall warning indicators of the Safeflight type have been installed in more than 4,000 planes, from two-place trainers to jet fighters. And here's the record: no plane equipped with such an indicator has been reported on a stall or spin accident report form.

HEARD ALONG THE AIRWAYS: The most powerful turboprop gas turbine engine yet built, the Flader XT-33-1, to develop 7,500 hp or more, will be in production soon.... Skyway No. 2 has been sanctioned from Seattle to Boston and the 40-mile wide strip will be airmarked during the summer.... Largest prop now made, a 16½-ft. diameter Hamilton Standard, will be installed on Boeing Stratocruisers.

ON INSTRUMENTS: Design characteristics on aircraft instruments must be improved if many of the so-called 'pilot errors' are to be eliminated. Such pointed advice is the result of tests by Air Materiel Command.

Among the commonest errors reported in the tests were reversal errors in which the interpretation of an instrument such as the artificial horizon was reversed, with the result that pilot action aggravated rather than corrected an undesirable condition. Another, misinterpreting multi-revolution instruments such as the altimeter. Still other errors included mistaking one instrument for another, and difficulty in locating an instrument due to an unfamiliar arrangement of instruments on the panel.

Air Notes – AVIATION TODAY AND TOMORROW

STATIC STUFF: Long range radio transmission improvement may be expected from current research work. The Navy is sending specially equipped rockets into the ionosphere to gather heretofore unobtainable information as to the effects of atmosphere at this height on radio transmission. The Navy feels that when causes for disturbances are found, devices can be invented or existing radio equipment improved to eliminate the effects.

BETTER FIRE FIGHTING: Research and studies of actual fire fighting experience now show that the newest aircraft fire fighting techniques must embody a combination of foam, fog-foam and carbon dioxide to extinguish fires. In addition, the number of crash firemen can be reduced if the fewer fire fighters receive increased training, and the techniques of maintaining and operating fire fighting equipment are improved.

PRIVATE FLYING GO-PIPES? A turbojet engine is now being developed from a supercharger that may ultimately find use in the lightplane field. West Engineering of California is working on the conversion development which is expected to produce a 175-lb. engine with sufficient thrust to fly a four-place transport 250 mph at cruising speed for a range of 450-500 miles. It is believed such conversions might sell for about $1200.

SAYS WHO? SAYS MY GRAPH! Tropical hurricanes and other severe weather disturbances may be tracked down accurately in the future with the use of seismographs (now used to detect earthquakes), without hazarding weather reconnaissance by planes near the eye of the storm. The Navy's research into this field holds great promise of success.

ATOMIC-AGE AIRWAY: An all-weather electronic airways program and an early warning radar network enveloping the nation may result in requests for a billion or more dollars in Government appropriations when the new Congress meets in January. Plans for both the civil airways program and radar network are pretty well completed, although little has or may be said about the radar warning system.

The airways system would better the present one by at least 50%, and upon completion could handle a fleet of 100,000 planes, made up of about 55,000 private aircraft, 10,000 transports and 35,000 military planes.

Biggest hitch is that to develop, install, and bring to full operation such a system may take more than 10 years. Then there is the problem of whether the new Congress will be in an aviation spending mood, and the problem of administration of the system, since each agency (CAA, Air Force, Navy and commercial operators) wants to carry out its own segment of the plan.

SEEDING BY AIR: Agriculture and sanitation may offer the commercial lightplane its biggest use of all, particularly in reseeding vast areas of depleted range land, and for effective and inexpensive control of insect ridden areas. The use of the plane for these activities is growing enormously.

In Idaho, more than 20,000 acres of burned-over land were reseeded by aerial pellets. Tests show that while the plane did a good job, improvements must be made in pelletizing (surrounding the seed with native earth and fertilizer) equipment and materials.

Revegetation of denuded range areas, comprising more than 150,000,000 acres, is one of the major problems confronting the Government. Experts admit that unless speedy, low-cost airplane techniques can be used, it may take hundreds of years to accomplish the job by on-the-ground methods. Thus the potential for plane use in this field is almost boundless.

QUICK, HENRY! Nearly 50,000 acres of infested forest lands in New England, Eastern New York and part of Pennsylvania, have been sprayed effectively from the air to help rid the area of the devastating insect pest, the Gypsy Moth. In Florida and other States plane spraying is playing a vital part in insect control, eradication, and prevention. But the surface has hardly been scratched.

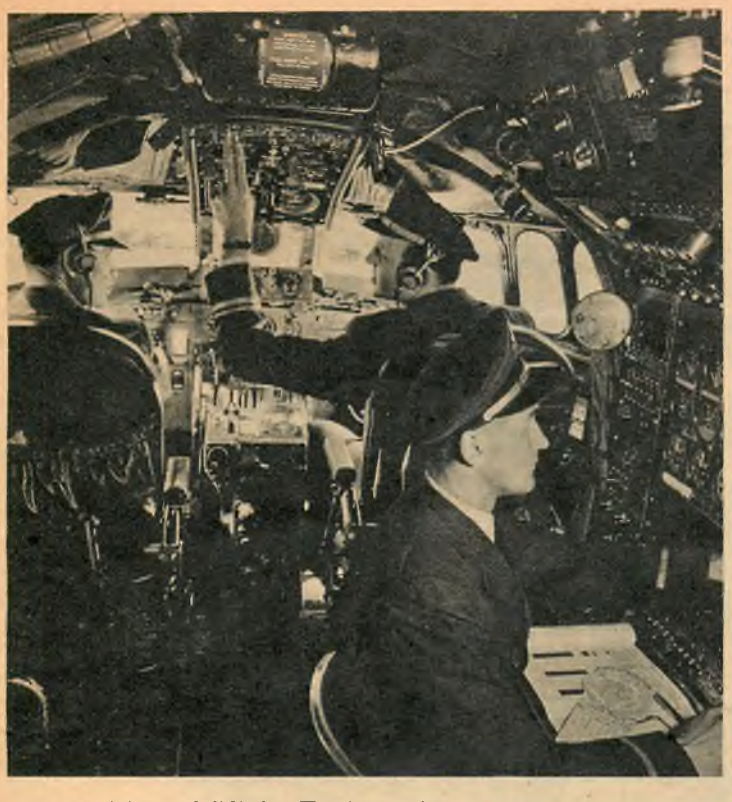
JAY-CEE'S PROGRAM: What may give private flying, and all aviation for that matter, its biggest boost for many a year is the present nationwide air age education promotion underway by the Junior Chambers of Commerce.

The project is an ambitious one and includes: an institute program for school teachers; the supplying of adequate and up-to-date teaching materials; sponsorship of model airplane clubs; airmarking, and supplying aviation information kits.

ANY H_2O TODAY, MISTER? First commercial rainmaking firm, Weath-Air, has been organized at Flagstaff, Ariz. The firm will use B-25's and TBM's to seed clouds over parched farmlands with dry ice and burning charcoal.

BORDER TO BORDER FLYING: Another new skyway for lightplanes has been approved and may get underway for airmarking soon. It will start at the Canadian border at Pembina, N.D. and continue to the Mexican border at Laredo and Brownsville, Tex.

To be known as Skyway 11, it is intended to be only for visual flying, and is expected to provide a well marked airway 40 miles wide for private pilots.



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If you have no previous aviation experience, a first step in preparing for Flight Engineering is to obtain your Aircraft and Engine (A. & E.) Mechanics Training. A license in A. & E. Mechanics is not only required by most airlines for their Flight Engineers, but it also opens up outstanding opportunities in airline maintenance, aircraft plant production, foreign airline service and many other fields, including the operation of your own maintenance base on one of the world's thousands of airports.

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AIR TRAILS
AUGUST 1948

Space Trainer

HOW WILL WE TRAIN SPACE PILOTS FOR THE DAY INTERPLANETARY TRAVEL? THIS MAY BE THE ANSWER

BY DAVID A. ANDERTON

SOONER or later, one man in this country will be living an adventure such as no man ever had before, and traveling into realms where none has ever been. His adventure will make world history, and will end once and for all the centuries of speculation on whether or not his exploration was possible. He will be the first space ship pilot in the world.

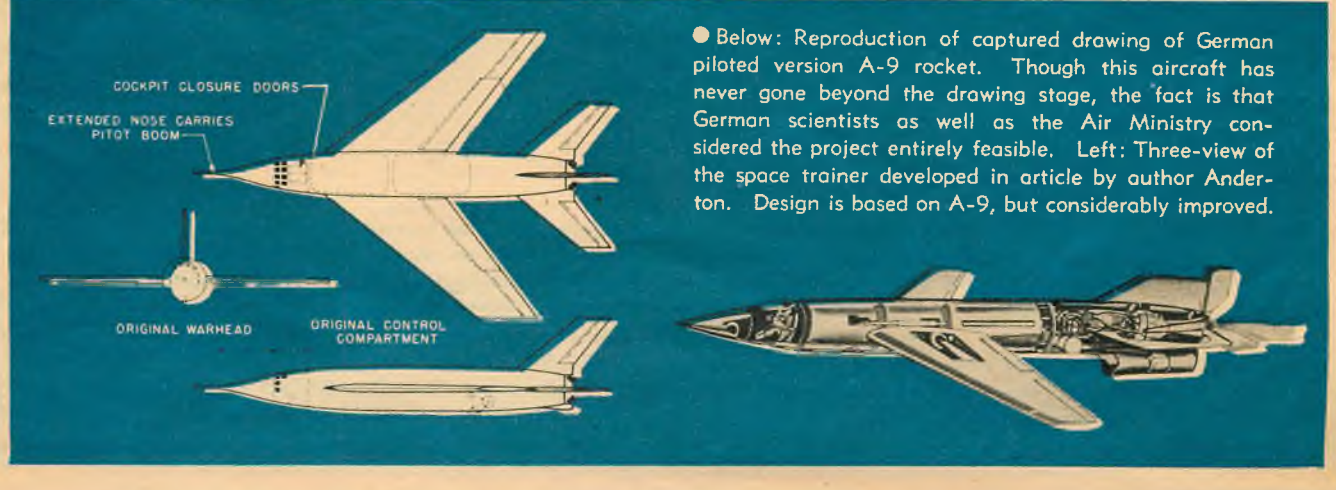
Behind him, and behind his first flight, will lie years of training and study. With him he will carry the end results of research and experimentation in metallurgy, chemistry, and aeroballistics, the countless flights of scale models, the ear-splitting roar of rocket motor tests, the reams of figure-covered papers and tables and forms, and days and nights of riveting and welding and tightening fittings.

It is perfectly feasible right now to begin a program of pilot training which would culminate in the first man-carrying flight into outer space. Starting today, a pilot could spend about five years in learning the technology of flight at high speeds and altitudes and temperatures, until his response to any emergency would be instinctive. And five years from now, if the space ship were available, he could pilot it into the black void outside the earth's denser atmosphere, the first man to do so.

There exist today, in one form or another, all the devices, airframes, mechanisms and basic knowledge to train a space ship pilot. The only item lacking is the space ship itself—there is none, as a complete unit, at this time. But given the time and the money, we could produce one, and it could be ready when the pilot was.

The problem of training a pilot raises an interesting question. Should we train a human being or build a robot? The idea of a human pilot, in these days of push-button ones, does seem rather stupid at first. Surely a box of wiring and tubes and motors can be built more easily, trained more cheaply, and be less affected by the rigors of an unknown flight than a human pilot. The robot is relatively impervious to heat and cold, high accelerations, lack of oxygen, low pressures, changes in visual acuity—all the things that the human body is not yet conditioned against. The robot can be fitted into an obscure corner of the structure, in a cramped space where there is no light or elbow room. It can be in one place, or in several, scattered all over the ship. It can literally be in many places at once: up in the nose, reading the instruments; back in the tail, watching the rocket flame for signs of poor combustion; out on the wing, gaging its deflections under load. These are good reasons for selecting a mechanical-electronic brain to pilot the first space ship.

There is, however, one big reason for selecting a human pilot rather than a machine. There is no more perfect a mechanism than a man. His mental setup is such that, confronted with an unusual situation, he can

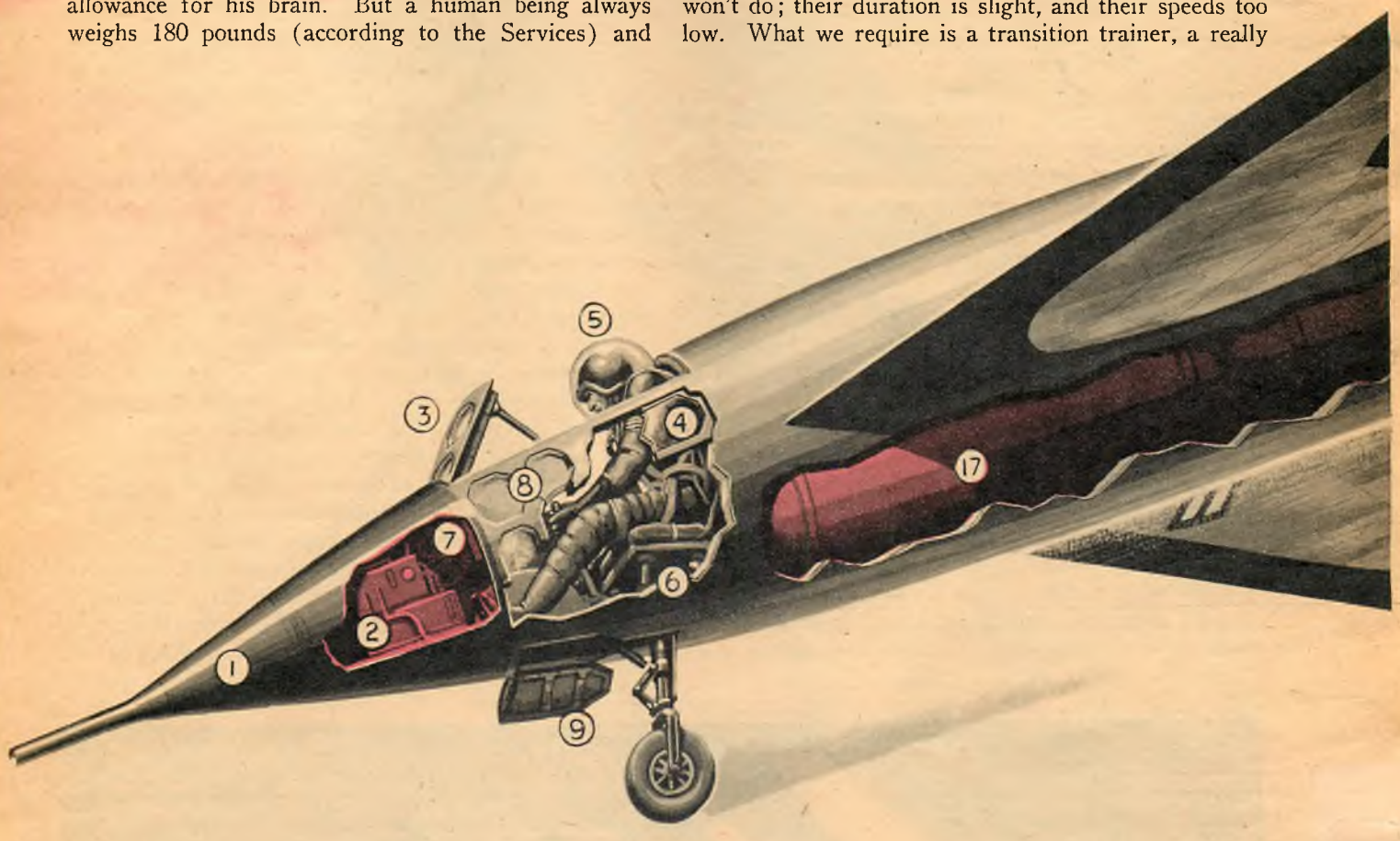


● Below: Reproduction of captured drawing of German piloted version A-9 rocket. Though this aircraft has never gone beyond the drawing stage, the fact is that German scientists as well as the Air Ministry considered the project entirely feasible. Left: Three-view of the space trainer developed in article by author Anderton. Design is based on A-9, but considerably improved.

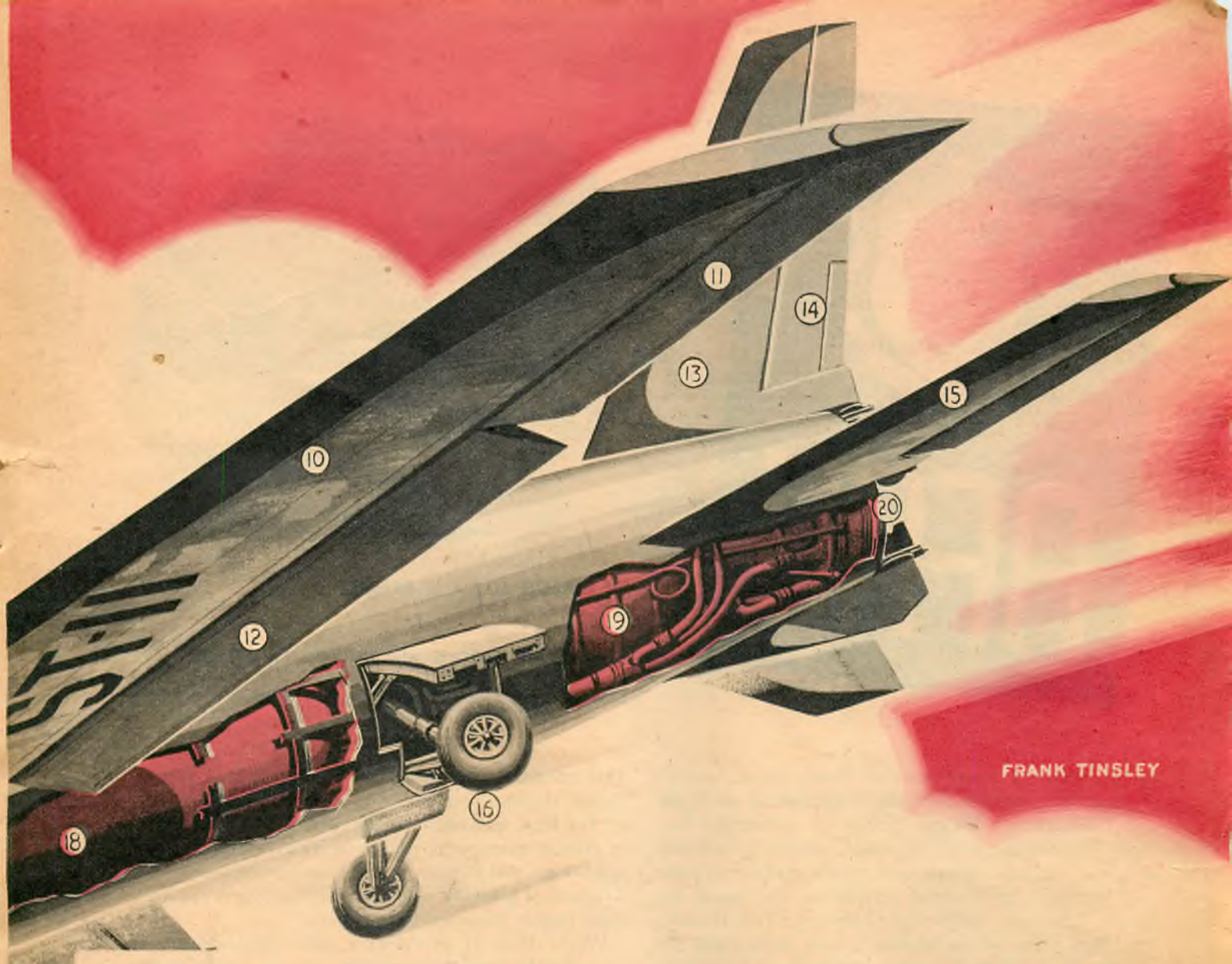
think, and in many cases, do something about it. Here the robot fails. For a machine can react only to the stimuli that it was designed to react to. Even though it is possible to synthesize the five senses, it is impossible to design into a given robot all the possible circuits of reaction to the myriad tangible things in the world. A mechanical brain could tell, by visual observation of the flame characteristics, that combustion was poor. A second part of the brain could then alter the fuel and oxidizer rates until this had been improved, whereupon the first section could observe that the combustion was now correct. A robot pilot could also detect a change in temperature of the outer shell of the rocket motor, or the body of the ship, and increase the flow of coolant to compensate for it. The human pilot also could do these things—a little slower, perhaps. But the unalterable fact is that every time you decide to have the robot do one more thing, his brain must get larger; another set of controls must be added, another circuit wired in. The capacity of the robot pilot is limited by the weight allowance for his brain. But a human being always weighs 180 pounds (according to the Services) and his brain 55 ounces, no matter how much additional training is crowded into it.

Perhaps the best choice to make right now is a combination of the two. Automatic control and data recording, for example, can be better handled by the robot. Let it also pilot the ship under conditions of flight where a human being would be fatigued or even fighting for consciousness. But for the tricky portions of the flight, and particularly those which call for the exercise of judgment, the human pilot is irreplaceable. Our only problem is to train both of them so that they become acquainted with the capabilities and limitations of each other, and learn to depend upon the other's best qualities.

Having the pilot, we require the space ship. In a few years, the genuine article will be available, but suppose we want to start a program of pilot training right now—where is there available a rocket-propelled, supersonic airplane that will serve the need? Both of the Services have experimental supersonic craft, but they won't do; their duration is slight, and their speeds too low. What we require is a transition trainer, a really



● **CUTAWAY OF SPACE TRAINER.** 1: Nose compartment for recording instruments. 2: Cockpit refrigerator. 3: Flush hatch tilts up to become windshield in landing. 4: After-sections of hatch slide sideways beneath skin. 5: Pilot sits with head above cockpit for better vision when landing. 6: Telescopic seat, raised for landing. 7: Flight instrument panel. 8: Portholes for vision at altitude. 9: Nose wheel retracts into well between pilot's feet. 10: Wings of supersonic section, swept back within turbulence angle. 11: Aileron locked for rocket flight, freed for glide. 12: Flap lowered for landing. 13: Vertical fin swept back. 14: Narrow-chord rudder with trimming surface. 15: Horizontal stabilizer swept back. 16: Landing wheels retract into engine compartment. 17: Fuel tank with 8,400 lbs. of 75% ethyl-alcohol solution in water. 18: Oxidizer tank with 10,620 lbs. of liquid oxygen. 19: Rocket engine—weight, 1,975 lbs.; thrust, 58,000 to 64,000 lbs.; speed, about 3,600 mph. 20: Four expendable jet deflectors in rocket stream provide directional control when rocket engine is in operation.



fast flying ship to teach the space ship pilot the tricks of the trade in something close to the actual conditions he will encounter. We still lack that trainer as a tangible aircraft, but the Germans had one—the A9.

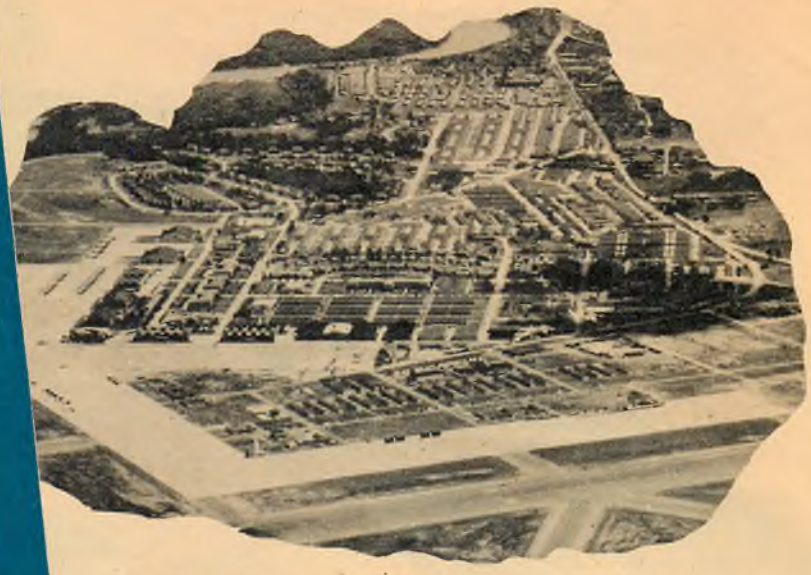
Ninth in the series of rocket weapons developed at the *Heeresversuchsanstalt Peenemünde,* the A9 was more or less a standard A4 with wings attached to the body about halfway back. (The A4 is, of course, more familiarly known as the V-2 long-range rocket.) Early in their development program, the Germans realized the need for extending the range of the A4 so that the dispersed British industry could be hammered more effectively. It was a natural idea to fasten some sort of wings on the A4 and operate it as a glider. Such a relatively simple expedient could well double its effective range, and provide the solution the High Command was seeking.

Think a little more about the A9—what does it remind you of? Basically, it is still an artillery rocket, but those wings and controllable tail surfaces and the glider principle make you think of an airplane, don't they? And suppose there were a glassed-in cockpit up forward; wouldn't the deception be complete? Well, the idea is not original, because the Germans thought of it, too. They felt that a cockpit could be provided near the nose, and that enough equipment to make the pilot reasonably comfortable could be included. Further, it should be possible for him to land the glider when the fuel was exhausted.

Insofar as is known, the Germans only did paper studies on the piloted A9. They never did get to build one. Let's see if it appears feasible to modify the German A9 to serve our purpose.

Fortunately, a lot of the "dog" work has already been done by the Germans in their work on the A4. The basic design is good, and the firings at White Sands plus the tactical use of the weapon in World War II have proven it further. The powerplant and its fuel and control systems have been tested statically and in flight. The aerodynamic shape is an efficient one for speeds on the order of five times that of sound. It remains to design the wing, and provide space for the pilots and the equipment needed for flights into the black sky 100 miles up.

Designing and selecting the wing for a space ship trainer is not the relatively simple task it is for a low-flying fighter or transport craft. In the first place, too many variables are involved, and too little has been previously done, to permit the writing of any sets of tentative design specifications which (*Turn to page* 101)



AFAU

BY MAJOR JOHN L. FRISBEE

AT THE AIR FORCE'S AIR UNIVERSITY OFFICERS ARE TAUGHT HOW TO MAINTAIN PEACE THROUGH STRENGTH

THE GREAT universities of Europe and America have for centuries been the fountainhead of Western Civilization. Either directly or indirectly, they have fostered the body of social, economic, political, religious, and scientific thought which combine to make ours the most enlightened civilization the world has known. Oxford, Cambridge, Harvard, Yale, Princeton, the Sorbonne are names known throughout the world. These institutions have exerted an immeasurable effect upon the course of our society.

Yet, in the United States there is today an almost unknown university which may do more than all the traditional seats of learning to decide whether Western Civilization shall survive. From this university will probably come no new developments in social, economic, or political thought. Its contribution will lie in a different direction—in the development of that strength which America must have to resist successfully the inroads of totalitarianism. This institution is the Air University of the United States Air Force at Maxwell Field, Alabama.

The Air University was organized in response to the vastly multiplied and increasingly complex responsibilities inherited by Air Force leaders as a result of recent military, economic, and scientific developments—developments which have expanded the scope of military affairs far beyond the limits of the battlefield. Let us consider some of these responsibilities.

During the past thirty years we have witnessed a revolution in the science of warfare. For many years war had been the province of professional armies, buttressed in time of emergency by a large body of civilian soldiers. With World War I, however, warfare started to become a coordinated effort of the entire nation. This transition was completed during World War II. Today, if peace breaks down, each nation must mobilize for total war not only its citizen soldiers but also its civilian manpower, communications, transportation, agriculture, and its natural and financial resources. The direction of a totally mobilized national structure must come largely from military sources.

World War II produced another development of deep significance—the emergence of air power as the predominant force in modern warfare. It is quite logical to assume that the ascendent military element—air power—will exert controlling influence in the direction of any war in the foreseeable future.

● General Eisenhower and General Muir S. Fairchild, first Commander of Air University, discuss educational problems.

Another outgrowth of the recent war lies in the creation of super weapons such as the atomic bomb and bacteriological warfare—weapons literally capable of exterminating all life on this planet. They have injected into warfare a whole set of moral problems that did not confront the military commander of a generation back. And air power is the agency best equipped to exploit these weapons should they ever have to be used.

Developments of the past decade in long-range aircraft, radar, and jet propulsion have made air power a truly global force. As such, it is the only military force which can hope to preserve world peace by posing a threat of immediate reprisal against a potential aggressor nation. With this global responsibility have come operational and logistical problems of a new order. A completely new set of military concepts has been forced upon our planners and strategists, concepts which are still in the exploratory stage.

Military power has always been a potent instrument of national policy, for a nation's foreign policy is nothing more than a balance between her external aims and her ability to enforce those aims. The extreme mobility of air power makes it admirably suited to such a supporting role. Therefore, Air Force leaders should be prepared to advise and assist in the formulation of a policy which they may be called upon to uphold.

Finally, air power has replaced sea power as our first line of defense. In any future war, the United States will be the initial target, and attack will undoubtedly come from the skies. Defense against such an attack lies almost entirely in the hands of the Air Force. Unless we have an alert, highly trained air force "in-being," ready to go into action in a matter of minutes rather than months, our defense will inevitably be a Pearl Harbor defense.

The new responsibilities which military and scientific evolution have placed upon the Air Force are staggering. The problems involved touch every facet of our social structure. Directors of a total (*Turn to page 97*)

CORRECTION

A sub-heading in the article entitled, "The 'Flying Wing' School" in the June issue of AIR TRAILS might have led our readers to believe that we were singling out one institute as the best aviation school in the country. There are too many fine aviation training institutions throughout the nation for AIR TRAILS to single out any specific one as the best. Among the many, many advantages in this great country of ours is that there are so many fine institutions of learning in all fields — those aeronautical institutions you find mentioned or advertised in AIR TRAILS are not only the oldest but those we can whole-heartedly recommend.

—THE EDITORS

● Many professional civilian educators from leading colleges and universities are on Air University's staff. Here Dr. M. L. Miller points to results of using visual aids for training.

● A large percentage of students at Air University are rated pilots who must maintain flying skill in operational aircraft.

PYLON ARTIST

BY JOHN L. MacKENZIE

CAREFUL PLANNING AND PREPARATIONS, PLUS DETERMINATION, ARE PREREQUISITES FOR RACING. COOK CLELAND HAD THEM ALL

FIRST came "Speed" Holman, then it was Lowell Bayles, followed by Jimmy Doolittle, Jimmy Wedell and Roscoe Turner. These were the men who won the Thompson Trophy race in its early days. We say men, but to the starry-eyed kids who hung around the airports in those days, these colorful flyers were more in the class of Superman. No doubt, every one of those youngsters has day-dreamed himself into the cockpit of a Gee Bee, a Laird or a Wedell-Williams, but it would have been too great a flight of fancy to expect that any one of them would ever actually have his own name inscribed alongside the immortals of that famous trophy. You can be sure that Cook Cleland was no different in that respect from those other boys who flocked to Cleveland Airport during the air races. He was right there among the railbirds whenever a hot racing job came in. And like the rest, he lived, ate and slept aviation for the duration of the meet.

But Cook had the stuff it takes to make dreams a reality—patience, perseverance, and the wisdom to begin the climb up the ladder of achievement by recognizing opportunities as they presented themselves. Cleland built and flew model airplanes, just as so many others of us have done. In so doing he not only learned the fundamentals of flight, but acquired an inherent love of all things pertaining to flying. Success stories of men who began their aviation careers in the field of model aeronautics are becoming more commonplace every day. But in Cook Cleland we have an alumnus who has completed the spectacular climb to the top by winning the world's premier speed classic.

Cook first came to Cleveland some thirty-one years ago via Doc Stork's air service. The Air Races came to his home town in 1929, when he was twelve. The big name pilots, classy airplanes and the spectacular show were enough to stir the imagination of any normal red-blooded young fellow. But when this big air meet was booked to return to Cleveland for a number of succeeding years, the Cleland boy was in his glory.

Along about that time young Cook got into the Lafayette Escadrille, one of the city's first model clubs, sponsored by a local department store. He cut his eye teeth, so to speak, on a model of the (*Turn to page 78*)

● Former Navy pilot, now airport operator, Cook Cleland was determined to win the coveted Thompson race, and did.

● Cleland's winning plane, the F2G Corsair, specially rebuilt for the race. One of modifications was FG-1 tail.

THE SAGA OF THE CURTISS HAWKS

BY PETER M. BOWERS

THE CURTISS HAWK WAS FOR FIFTEEN YEARS THE BACKBONE OF U. S. MILITARY AVIATION

● XPW-8, three of which were delivered to the Army in 1923. First production models were called PW-8; 25 were built. Had tunnel radiators under fuselage instead of wing skin radiators of XPW-8's. Were capable of top speed of 178 mph.

● P-1 prototype came from XPW-8A which was fitted with a tapered, single-bay wing. Navy's version of P-1 was designated F6C-1. 15 P-1's and six F6C-1's were ordered. Navy modified theirs to make them suitable for deck landing.

ALTHOUGH they never fired a shot in the defense of U. S. territory, the Curtiss Hawk series of biplanes is nevertheless one of the most famous ever produced, either in peace or war. Introduced in 1923 as the XPW-8 it attracted worldwide attention through the transcontinental flights of Lt. Russell Maughan.

The PW-8 was adopted as a standard pursuit plane by the Air Service and a modification of it, the XPW-B, served as a prototype of the Army's P-1 and Navy's F6C-1 of 1925. These were the first planes actually to carry the name "Hawk."

The Hawks owe their origin to the fact that both Army and Navy encouraged the development of pure racing aircraft in the years immediately following World War I. The experience gained with the Curtiss R-6 and R-8 Army racers, and the Navy CR's, R2C, and R3C series, was incorporated in the three XPW-8's (experimental pursuit, water-cooled) which were delivered to the Army. Their wing skin radiators were a direct development of the service racers, while the 435-hp Curtiss D-12 engine was patterned after the twelve-cylinder, 400-hp Kirkham introduced in 1918, and improved by the gruelling demands of the post-war racers. Armament consisted of one .30 cal. and one .50 cal. machine gun, or two .30's firing through the propeller. This remained standard armament for U. S. fighters until the debut of the Curtiss P-36C in 1938.

In all there were 656 Hawk biplanes built, exclusive of conversions. 273 were for the Army, 132 for the Navy and 251 for commercial and export markets.

● Army's first P-1 was modified for 1926 National Air Races by replacing Curtiss D-12 engine with inverted air-cooled Allison-Liberty, reconverting it later to a flying test bed for air-cooled 480-hp Wright. Plane redesignated XP-17.

● The AT-5, another trainer version of the Hawk, powered by a 220-hp Wright Whirlwind. Eventually all AT-4's and 5's were reconverted to standard fighters by installing the Curtiss D-12. AT-4's became P-1D's, and AT-5's were designated P-1E's.

● F6C-3 converted to a seaplane racer. This particular plane was powered by a hopped-up engine and later equipped with cleaned-up landing gear and a radiator mounted below the fuselage, behind the engine. Was 4th in '29 National Races.

● XP-3A, with 410-hp Wasp, originally slated to be XP-3 powered by a Cyclone. Engine proved unsuitable. A later XP-3A carrying 1928 serial numbers was used for experiments with engine cowls. Other P-3A's were fitted with Townend ring cowl.

● Most radical Hawk modification was XF6C-6, flown by Capt. Page of the Marine Corps in '30 National Air Races. It was cleanest entry in Thompson Race but unfortunately crashed on 17th lap, killing Page. Ship converted from F6C-3 #7147.

● Navy F6C-4's, similar to the air-cooled P-3A's except for being fitted with propeller spinners. One F6C-4 was powered by a 420-hp inverted air-cooled V-770 Ranger, and one powered by a 525-hp Hornet. This plane was designated as the F6C-5.

● The XAT-4 was a P-1A powered by a 180-hp Wright-Hispano. Tested as an advanced trainer. Another P-1A was powered by a 600-hp Conqueror, designated XP-6A, and slated for racing. The Army ordered forty AT-4's for training purposes.

● Five P-5's were ordered by the Army in 1927 for high altitude work. Structurally identical to the P-1A's, they were a result of turbo-supercharger tests conducted on P-2's. P-5's, though slower than P-1A's, attained 166 mph at 25,000 ft.

● XP-6B, converted from P-1C and powered by a 600-hp Curtiss Conqueror. Flown by Capt. Hoyt from New York to Alaska in 38 hours in '28. Another P-1C had wing skin radiators, a third used for experiments with prestone cooling.

● XP-23 was the last Army biplane Hawk. Converted from a P-6E, it had a metal monococque fuselage, cantilever tail surfaces, was equipped with turbo-supercharger. P-6E contract completed Christmas, 1933. Many were still in service in '41.

● Hawk 1A designation was assigned to commercial and export model developed from basic P-6 powered by a Wright Cyclone and known as YP-20. Numerous Hawk 1A's bought by foreign governments. Most famous of all was Al Williams' Gulfhawk.

● Navy XF11C-1, powered by Wright 1510 engine, 600 hp. Designation later changed to XBFC-1 under Navy's multiple purpose classification and plane was classed as bomber-fighter able to carry 500 lbs. of bombs under either wings or fuselage.

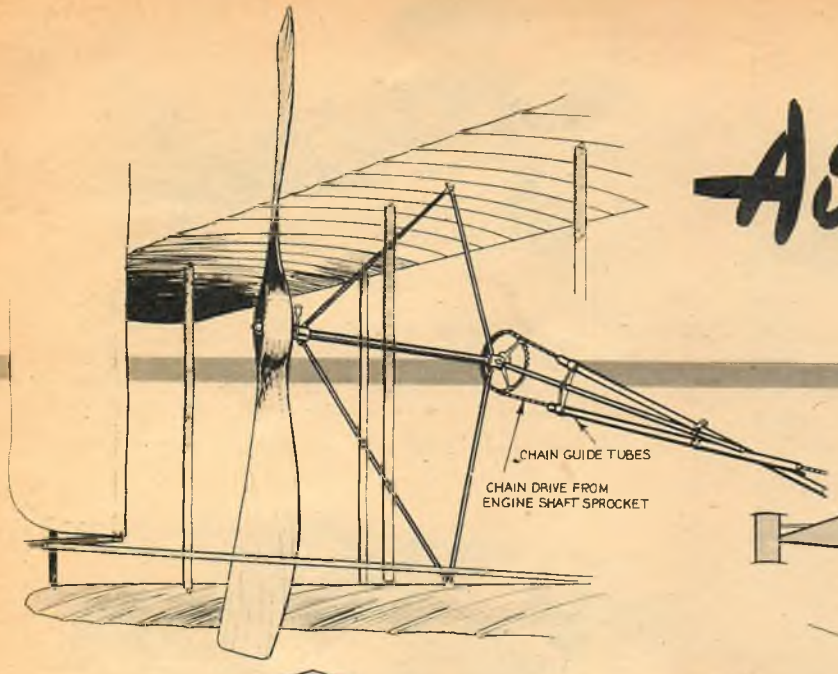
● The XP-6H was first production P-6E with four extra .30 cal. machine guns installed in wings. P-6E started out as XP-22, which was development of P-6A with entirely new nose and single strut landing gear. Became most famous of Hawk series.

●BFC-2 was the designation given to the F11C-2, 26 of which were ordered. One model of F11C-2 was converted to XF11C-3 by modifying the nose and fitting plane with retractable landing gear. This modification raised plane's top speed to 216 mph.

● XP-6F, equipped with turbo-supercharger and cockpit canopy. The Conqueror engine developed 675 hp. The plane was 6 mph slower than the P-6E at sea level, but at 15,000 ft. it topped 220 mph, the fastest of Army or Navy Hawks at that time.

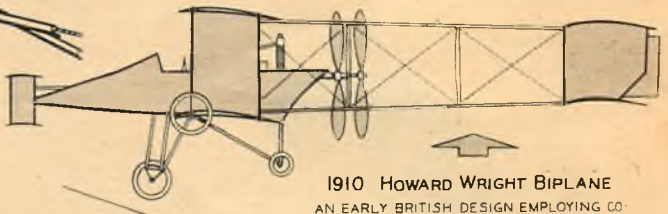
● Navy's last series of Hawk, the BF2C-1, 28 of which were ordered. Model was further developed and built for export under designation of Hawk III and IV. Total number of Hawk biplanes built for Navy: 132. Last Hawk IV sold to Argentina.

Air Progress



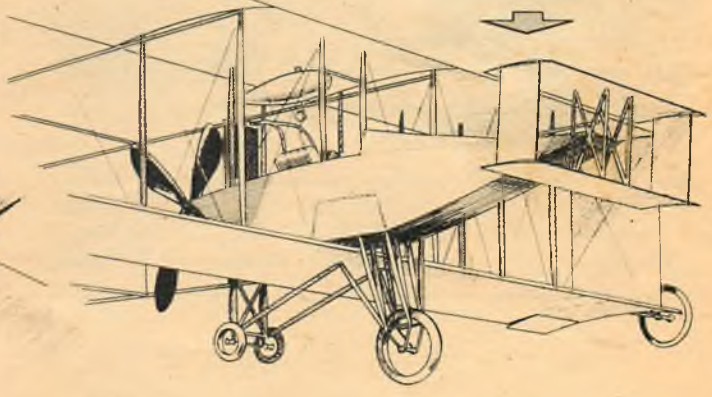
1903 WRIGHT BROS. BIPLANE

DETAIL OF PORT PROPELLER INSTALLATION SHOWING CROSSED CHAIN DRIVE EMPLOYED TO OBTAIN COUNTER-ROTATION. STARBOARD PROP HAD STRAIGHT CHAIN DRIVE



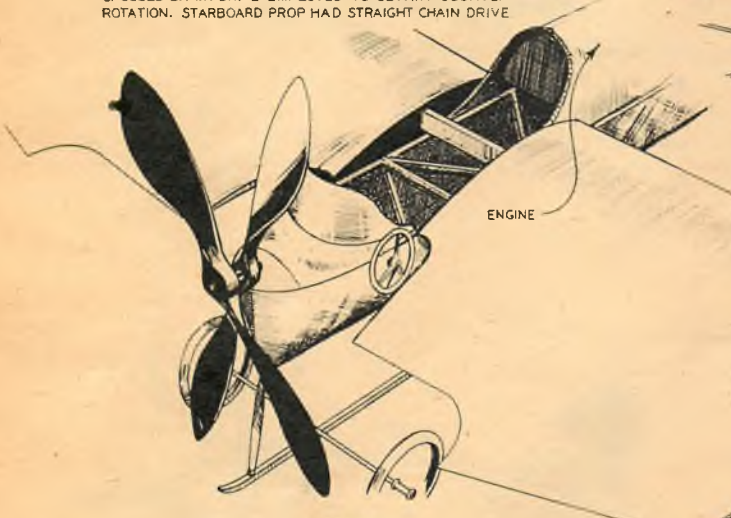
1910 HOWARD WRIGHT BIPLANE

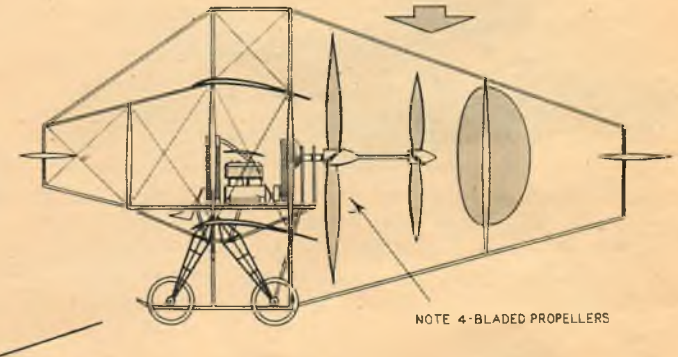
AN EARLY BRITISH DESIGN EMPLOYING CO-AXIAL CONTRA-ROTATING PROPELLERS.



1910 PIGGOT BIPLANE

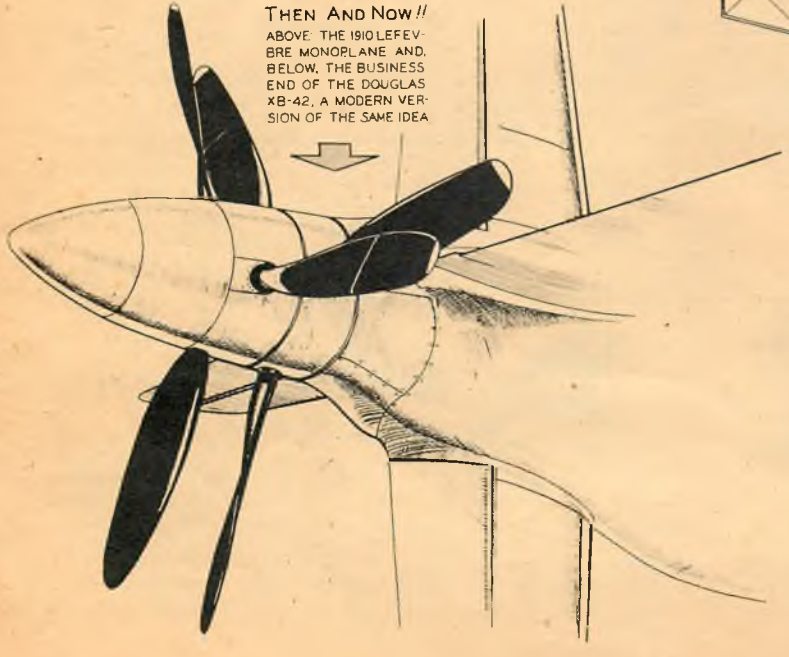
ANOTHER EARLY DESIGN FOR COAXIAL CONTRA-ROTATING PROPELLERS.





THEN AND NOW!!

ABOVE: THE 1910 LEFEVBRE MONOPLANE AND, BELOW, THE BUSINESS END OF THE DOUGLAS XB-42, A MODERN VERSION OF THE SAME IDEA

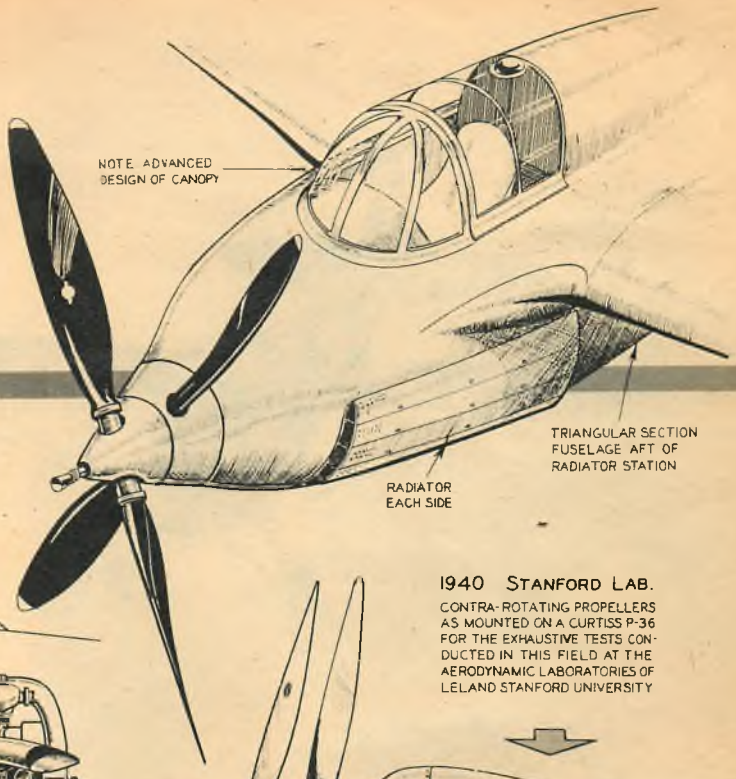


Strange as it may seem neither counter rotating nor coaxial propellers represent anything new in aviation design but were the subjects of close attention by even the earliest aeronautical designers. The Wright Brothers employed counter rotating (though not coaxial) propellers in the first successful heavier-than-air flight, and genuine co-axial propellers appeared as early as 1910.

First to revive the coaxial, contra-rotating prop in recent years was the brilliant Anglo-Dutch designer, Koolhoven. His remarkable little fighter, produced around 1936, was so little troubled with

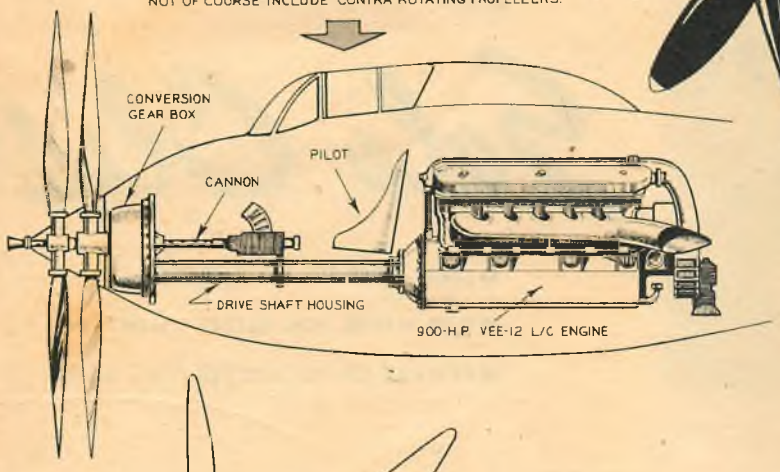
Development of Counter Rotating and Coaxial-Type Propellers

BY DOUGLAS ROLFE



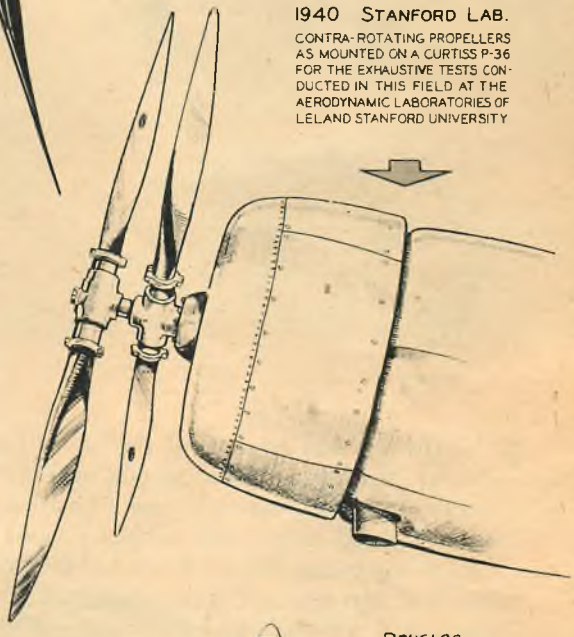
1936 KOOLHOVEN FK-55

THIS TRIM LITTLE FIGHTER, THE CREATION OF ONE OF THE WORLD'S TOP AIRPLANE DESIGNERS, SUGGESTS THE MUCH LATER BELL AIRCOBRA THOUGH THE LATTER DESIGN DID NOT OF COURSE INCLUDE CONTRA-ROTATING PROPELLERS.



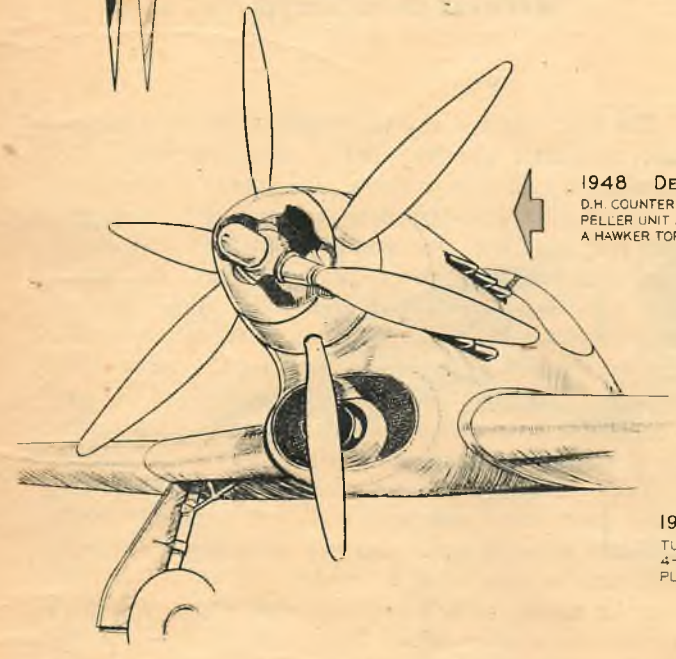
1940 STANFORD LAB.

CONTRA-ROTATING PROPELLERS AS MOUNTED ON A CURTISS P-36 FOR THE EXHAUSTIVE TESTS CONDUCTED IN THIS FIELD AT THE AERODYNAMIC LABORATORIES OF LELAND STANFORD UNIVERSITY



1948 DE HAVILLAND

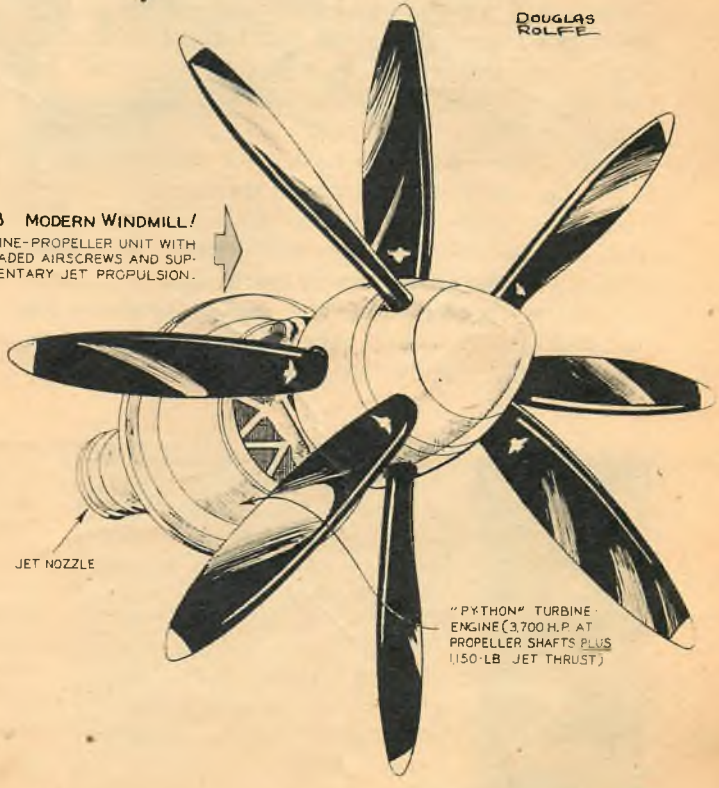
D.H. COUNTER-ROTATING PROPELLER UNIT AS MOUNTED ON A HAWKER TORNADO-VULTURE



DOUGLAS ROLFE

1948 MODERN WINDMILL!

TURBINE-PROPELLER UNIT WITH 4-BLADED AIRSCREWS AND SUPPLEMENTARY JET PROPULSION.



problems of torque that even conventional ailerons proved unnecessary and lateral control was maintained by wing slots or a species of spoilers. Interest in the U.S. in the coaxial prop probably dates from the Army tests conducted at the Aerodynamic Laboratory of Leland Stanford University.

Coaxial, contra-rotating propellers offer slower and much more efficient propeller speeds. The turbine-propeller-jet combination is likely to become more common on large airliners since it is the logical step between conventional propellered aircraft and pure jet propulsion.

AIR TRAILS Solo Club

- **FIRST-TIME-UP PASSENGERS**
- **CAP WINGS FOR GLIDER PILOTS**
- **BEWARE OF HELICOPTER TAIL ROTOR**

FOR the last few sessions of the Solo Club we have had an item on our mind to talk over with you but it has been crowded out each time. Last evening some friends dropped in and this subject popped up again.

One of my guests said he'd just had his first airplane ride a few days ago and never again, thank you. Another agreed with him that once was enough, and the arguments began. It seemed that both of these chaps (big rugged characters, one a decorated veteran) had had the daylights scared out of them on their very first trip aloft.

Both of them had been invited for this first ride by chaps who had just been granted their private licenses. Yes, they could now carry passengers and really show someone just how "hot" they really were. As a result aviation lost two (and probably more) darn good potential rooters for the cause and instead produced two "bad-will ambassadors" very busily having nothing further to do with the "darn fool stuff."

The first ride for any passenger is the most important, no matter who the pilot or what the plane. Remember, it's all new to them. Of course you are now a veteran pilot with darn near seventy-five hours logged and just too "hot" for straight and level and gentle turns, but your first-time-up passenger isn't. He's probably nervous as all get-out even if he thinks you are marvelous, his hands are sweaty and his stomach muscles are all tied up trying to level off the plane when it banks. This is a new sensation to him and the way you handle it can make or break a potential future pilot, or at least an air-minded citizen.

Take off gently and smoothly, climb gradually and make your turns wide and with a minimum of bank. Tell him ahead of time what you are going to do so he will have an idea what to expect. When you fly him over his house (as he'll probably want you to do) don't circle it in a steep bank. That will do things to the inner ear and the interior of the plane, (*Turn to page* 109)

HOW TO BECOME A SOLO CLUB MEMBER

This club is open only to those who have actually soloed a heavier-than-air craft, either powered or motorless. It does not matter where or when the flight was made. Applicants must furnish the membership committee with a satisfactory proof of their qualification for acceptance. There are no dues. Once a member, always a member.

To obtain sterling silver Solo Club wings and life membership card, send coupon, with 50¢, to Solo Club Membership Committee, Air Trails Pictorial, Box 489, Elizabeth, N. J.

Proof of qualifications as a Solo Club Member:

1. CAA Airman Certificate, number and rating.....
2. F.A.I. license and number.....
3. Evidence of: Service in Army, Navy air forces, either as a rated pilot or having received flight training including solo time (attach).

Applicant..... Age.....

Street..... City or Town..... State.....

HOW TO GO MAD IN EIGHT MINUTES

BY BOB ARENTZ

HOW'S your airport traffic pattern technique lately? Is it sharp, efficient, safe, and sure? Or are you one of those guys who tunes his receiver on the wrong station and sits up there in a slow airplane calling the tower again and again from 15 miles out?

It's done regularly. Every day in a busy tower some character starts the old refrain: "Hipswitch Tower, Hipswitch Tower, this is Applecrate, NC zero zero Charley, over."

The tower operator, at the time, happens to be flashing a red light at a NORDO trainer who is about to scramble another guy's empennage; has just cleared a DC-4 for take-off, is simultaneously giving a flight of five P-51's instructions for making their initial approach at one thousand feet, is jockeying two hot telephones, one from the weather bureau and the other providing airways clearance for the Douglas, but still finds time to cut in quickly and say, "NC zero zero Charley, this is Hipswitch Tower."

Now it's almost a cinch that if Charley's receiver is functioning and properly tuned, any time the tower can hear him he should be able to hear the powerful tower transmission.

But this guy, zero zero Charley, doesn't quite understand little things like that. He apparently figures the controller is either asleep or watching through the field glasses while some blonde chick gets aboard an airliner.

So after five seconds, here it comes again. "Hipswitch Tower, Hipswitch Tower, this is Applecrate zero zero Charley." This time, repeating very emphatically, to indicate his displeasure at such a flagrant example of bureaucratic inefficiency, "zero zero Charley for landing instructions. *Over!*"

This last is snarled with a delicate restraint to indicate that his patience uses up rapidly and he wants that tower controller to get wise to the fact that there's an airplane somewhere near the airport.

Another voice has started competition with Charley. "Denver Tower, Den . . . oh no! Er, Hipswitch Tower, this is Zipper oh oh Mike, over."

The controller, meanwhile, has just finished giving airways to the Douglas, which either of the two pilots calling could have heard if they had been tuned in; adds a quick transmission to the flight of five P-51's now three miles south on initial approach to warn them about the no-radio trainer that still hasn't seen the red light nor quite been able to make up his mind which runway to land on against it; but he slips in a quick call, "oh oh Mike, stand by a moment," and repeats, "zero zero Charley, this is Hipswitch Tower, read you loud and clear."

Then the NORDO trainer sees the light and starts to climb out as though he were going to circle the field in an intelligent manner, so the controller gives the other light ship an okay to continue his final approach for landing on runway three-one, and advises the flight of five P-51's that disaster has been thwarted and they are okay to land three-four, the wind (*Turn to page 94*)

We Fly THE STINSON STATION WAGON

BY WILLIAM WINTER

ABILITY TO CARRY PASSENGERS OR CARGO GIVES INCREASED UTILITY TO STINSON'S STATION WAGON FOR 1948

THERE are two big reasons for the present excitement in the four-place lightplane field. One is the fact that the two-place market is supersaturated; the other is a seven-letter word that spells Stinson. Since V-J day, or whenever it was that their assembly line was born, Stinson has sold close to 5,000 airplanes. Whereas other fine airplanes, the Navion for example, ran into some pretty rough weather saleswise (before Ryan took it over), the steel-tube and fabric Stinson has led the four-place field a merry chase.

These greener pastures are attracting a lot of people who sell airplanes to make a living. Already keen, competition will get tougher, what with the "reborn" Navion, the Cessna, the Luscombe, and Aeronca, to name a few, being added to ships like the Bonanza and the Stinson. Who will go hungry when the pie is sliced so minutely is hard to say. One thing is reasonably sure, however—Stinson should get their share.

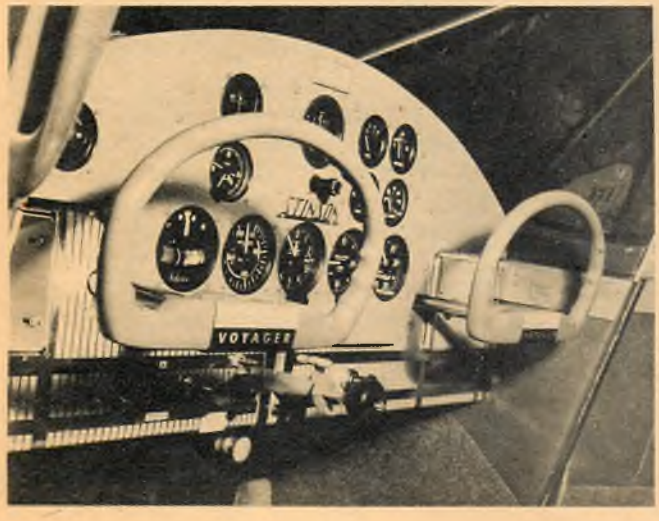
This is hardly a risky prediction. Over twenty years ago the writer had his first look at a Stinson cabin job, a biplane, at the old Teterboro Airport. Of course, Consolidated-Vultee, the Stinson of today, is a far cry from the Stinson of yesteryear, and Eddie Stinson is all but forgotten except for the perpetuation of his name on these fast-selling aircraft. But there is a long, unbroken line of reputable Stinson airplanes, from that archaic biplane, through various monoplanes like the Reliants, down to the "105," the "150," and now the "165." What *does* Stinson have?

"We have taken into consideration the fact," sales manager William H. Klenke will tell you about the 1948 Voyager and Station Wagon, "that an average owner wants nothing radical or complicated. He expects improvements from year to year, but primarily he wants a useful vehicle of transportation that he can fly for both business and pleasure." Stinson turns out a ship with few frills and one that has a benevolent tolerance of run-of-the-mill piloting.

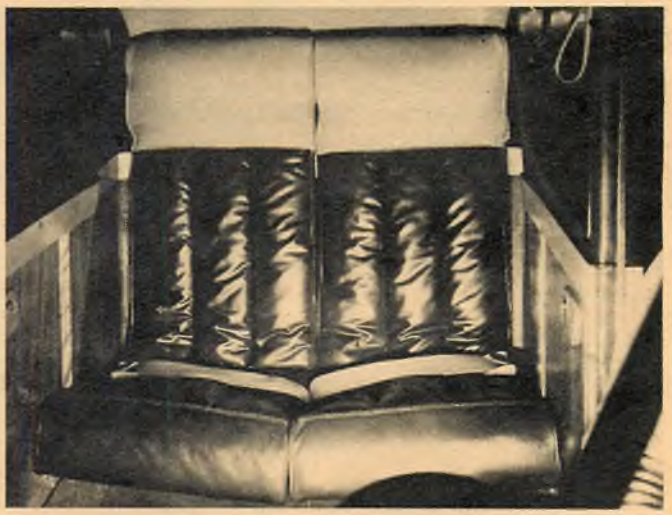
When we had a try at the first post-war Stinson demonstrator a couple of years ago, our log book looked about as exciting as a new diary. We were still bouncing around as a student. Nevertheless, things went so well in the Stinson that the demonstrator pilot asked us if we would like to land it. After the Cubs, the Stinson had such good visibility over the nose that you pulled back on the wheel until the ground looked normal, which put the ship in a nose-high attitude, wallowing from side to side during the approach. Still the pilot didn't take over until time to flare out, when he dumped the "stick" to pick up a little speed. Now there are a lot of airplanes you cannot abuse that way, if you want to become an old pilot. The Stinson won't spin. You can pick up a wing with an aileron, when you shouldn't, instead of fumbling into one of those out-the-bottom stalls and spins.

Our check ride in the 1948 Stinson Station Wagon was taken at Armonk, in Westchester County, N. Y., a rather cramped field with a sharp bump in the middle

● The Stinson can be equipped with this special instrument panel for blind flying. Manufactured by Robinson Aviation.



● Comfortable rear seats of the Station Wagon. The plane is sound-proofed, and air-conditioned by controlled ventilation.



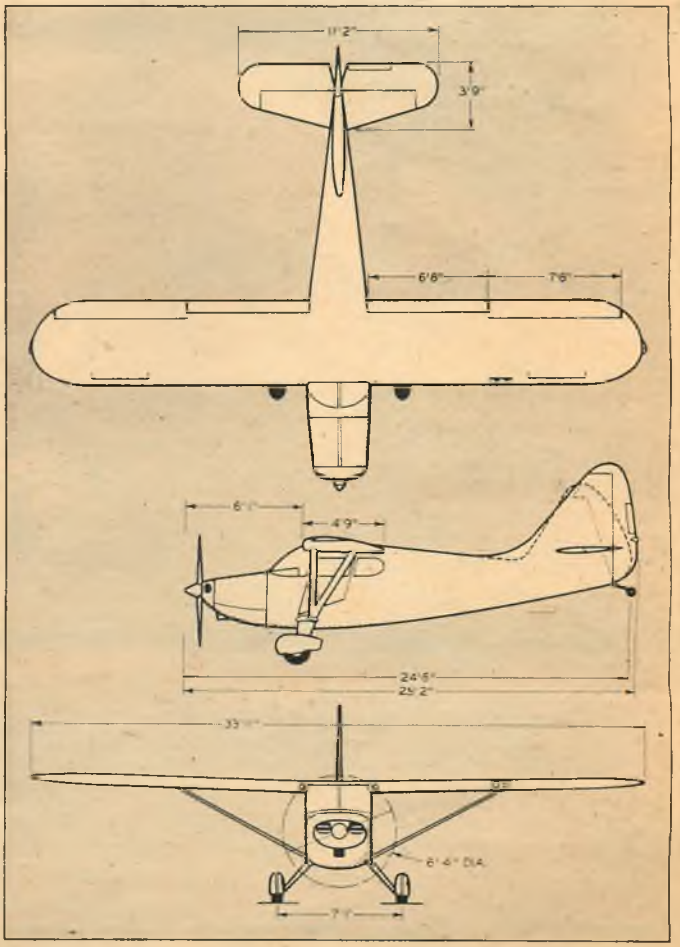
● The 1948 Stinson has a greater load-carrying capacity, is considerably roomier, has longer range and improved performance.

and buildings and trees cluttering the approaches. Dust and a 90-degree cross-wind didn't help the demonstration. But we've had worse ones on smooth concrete runways with the "simple" little two-seaters.

Watching the demonstration ship shooting landings with potential cash customers, we were quite impressed with the looks of the 1948 job. That bigger-than-ever all-metal vertical tail is an eye catcher. There was a time when manufacturers believed in skimpy surfaces to save weight but these days some designers wisely concede that we aren't all hot rock (*Turn to page* 104)

● With seats removed the plane becomes a cargo carrier with a capacity of 552 lbs. Slings are provided to secure cargo. Transformation is about as quick and easy as in automobile.

● Only noticeable difference between '47 and '48 Stinsons is greater rudder area. Dotted outline is that of older model.



AIR TRAILS Air Pix PHOTO COMPETITION

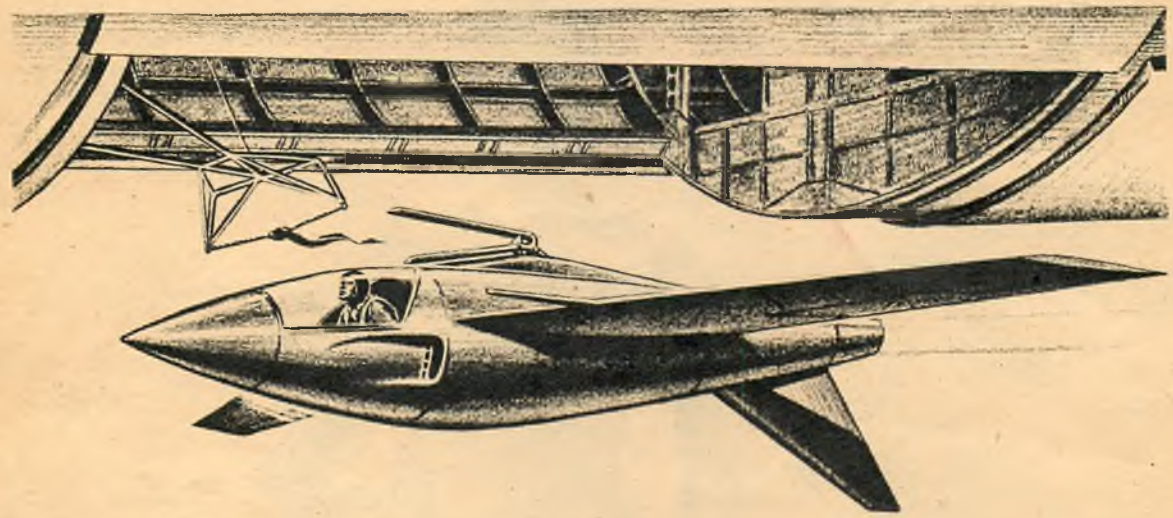
CONTEST RULES

● This competition is open to all photographers, both commercial and amateur. No distinction is made between classes. A standard payment of $10 will be made upon publication to those whose photographs are accepted. Entries may be concerned with any phase of aviation or aeromodeling. Prints should be well wrapped and protected by cardboard and must be accompanied by name and address of photographer plus full data on subject, camera and film used, exposure, lens setting, and conditions under which the picture was made. Give details concerning equipment used for enlargement, and other information. Air Trails cannot enter into correspondence concerning contributions nor accept responsibility for entries. Entries cannot be returned unless accompanied by postage.

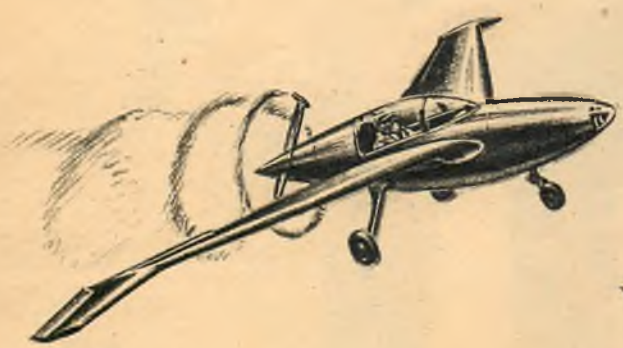
● "Air Racer" by Harold Martin, Carle Place, N. Y., is title given to this splendid picture of Thompson Trophy winner No. 84, a Bell P-39 Special piloted by Alvin "Tex" Johnson, test pilot for Bell. Photo was made at Cleveland Airport with a Speed Graphic using K2 filter and Super Pan Press Type B cut film. Exposure was 1/500 at f/6.3. Printed on Defender Varigam with Omega Type B enlarger. Picture shot at edge of runway.

● "Stunt Champ" by Bev Smith, Tenafly, N. J., is late afternoon shot of Dave Slagle, twice national control-line stunting champion (1946-47). Young Mr. Slagle was posed on a stone wall about 3 ft. above ground to get both sun on subject and darkened sky background. Super Ikonta "B" bellows type camera used, Super XX film with K2 filter. Shot at f/11, 1/200. Practically all the 2¼-inch square negative used for enlargement.

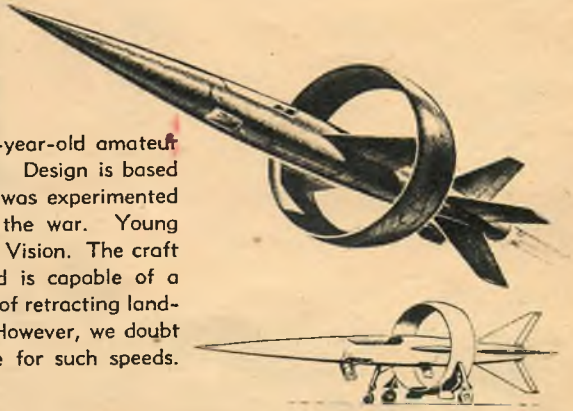
Airmen of Vision
DESIGN COMPETITION



● First place winner (an amateur entrant) is Don Longmire of Gardena, Calif., who came up with a parasite fighter, right on the heels of the Air Force announcement of the McDonnell XF-85. Longmire uses a flying-wing configuration with fuselage for the location of a ram-jet engine and prone pilot. Projected speed is 1000 mph. This is too optimistic and impractical, as the exceptionally high speed of the parasite will create considerable difficulty in recovering the plane by the mother ship. The ram-jet engine itself is not sufficiently flexible in operation to permit the fine throttling necessary for hooking on to the bomber. However, this very interesting design warrants consideration, and is in keeping with modern military trends.



● Designed by amateur Phil Graham of Arlington, Va., this flying wing airplane features a single bladed jet-prop. The jet unit constitutes the powerplant of the aircraft. Fuel into the jet is fed through hollow prop blade. This type of powerplant has been experimented with by the NACA and shows great promise, as it has all the advantages of propeller-driven craft without any of its problems, such as torque.



● Circular wing plane by 15-year-old amateur V. L. Modeland of Boone, Ia. Design is based on guided missile Roc which was experimented with by the services during the war. Young Modeland is a true Airman of Vision. The craft employs a rocket engine and is capable of a speed of 1000 mph. Method of retracting landing gear is quite ingenious. However, we doubt that circular wing is suitable for such speeds.

[See Rules on Page 84]

Bojo

BY HENRY NELSON

THIS EASILY BUILT CONTROL-LINE BIPLANE IS A FINE SPORT MODEL AND PERFORMS WELL IN STUNT EVENTS

HERE is "Bojo," the acrobatic bipe. A model that looks like a real plane and flies like a demon.

It was designed expressly for stunt flying and simplicity of construction. If you want a model that has looks and good flying characteristics you'll find the "Bojo" bipe is what you are looking for. The original model is powered by a Forster .29 engine. Most Class B engines can be used to fly this model. I believe a McCoy .29 glow plug operation would fly it to perfection. If a larger engine is to be used be sure to strengthen nose of ship. This plane handles very well and is a good trainer for beginners. The expert will find the "Bojo" a dream ship.

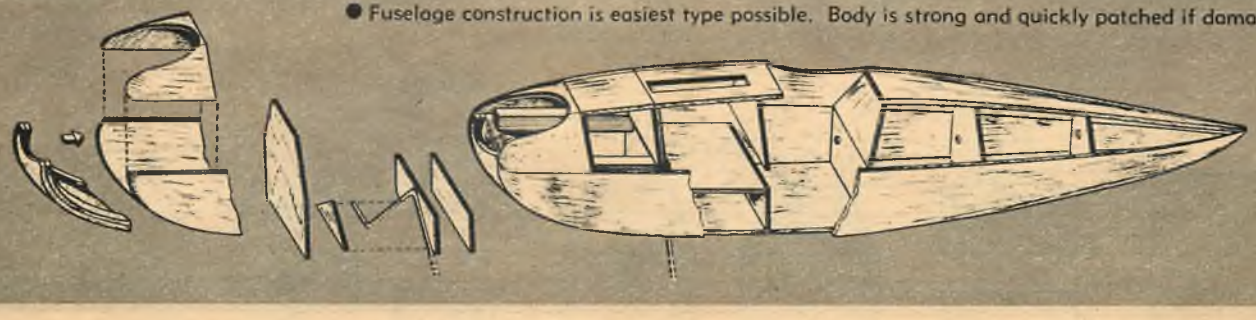
Start by cutting out lower fuselage side of 1/8" medium hard sheet balsa. Cut motor mount bulkheads making sure they will fit engine used. Bulkhead #2B is made from 1/8" plywood. Cement motor mount solidly and squarely in position. While this is drying cut remaining bulkheads as shown. Cement fuselage sides to motor mount bulkheads holding the fuselage up side down on flat surface. Place remaining bulkheads working towards tail end of fuselage. Make sure all joints are strongly cemented. Glue remaining bulkheads to top of bottom bulkheads corresponding to drawing. Bend wire landing gear to shape using 1/8" wire. Mount landing gear using plywood reinforcement as shown. It is very important that this joint be cemented extremely strong. If ignition is used, note position of coil, condenser, switch batteries. If glow plug is used, disregard, as plane should balance properly without ignition installed.

Stabilizer must be inserted and working with your favorite control at this time. The stabilizer movement is 35 degrees up and 35 degrees down.

Glue top sheet to bulkheads. Next glue sides to top half of fuselage. Wing mount is constructed in the 3-ply manner using 1/4" balsa as center piece and 1/16" sides. Note the way the grain runs. Fuselage top is cut for 3/8" opening as shown on drawing. Mount is securely cemented in position making sure that the wing is glued at zero degrees.

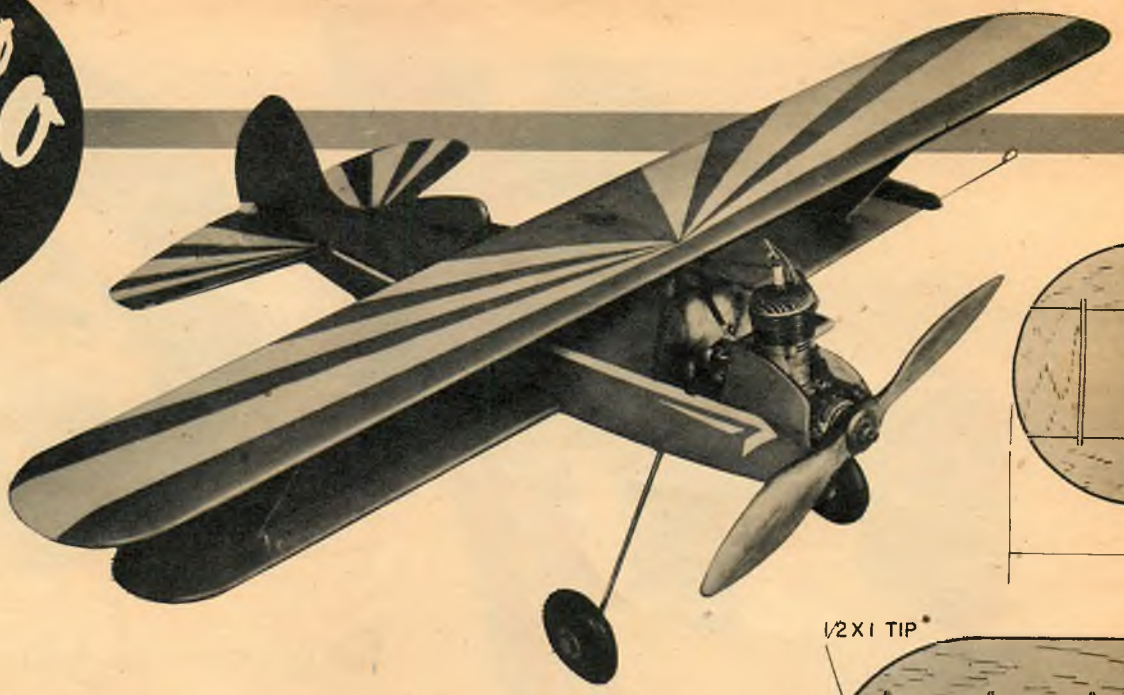
Make hatch, using bulkheads 1B and 2A cut to fit particular engine used. This is for engines having needle valve and gas tank protruding past bulkhead 1. A piece of crinoline is cemented as shown on drawing to act as hinge. The other side is held together by dress snaps. A Maeco tank is installed between bulkheads 1C and 2B.

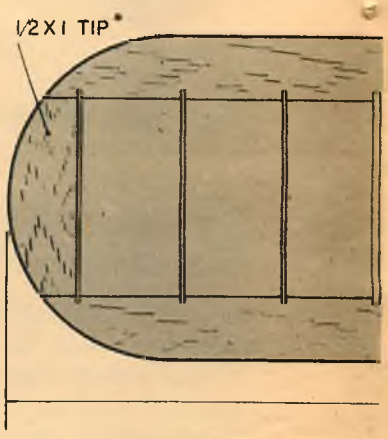
(Turn to page 118)

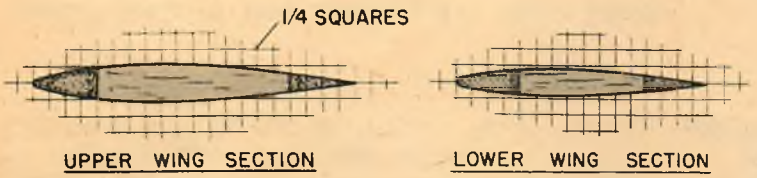


● Fuselage construction is easiest type possible. Body is strong and quickly patched if damaged.

Bojo

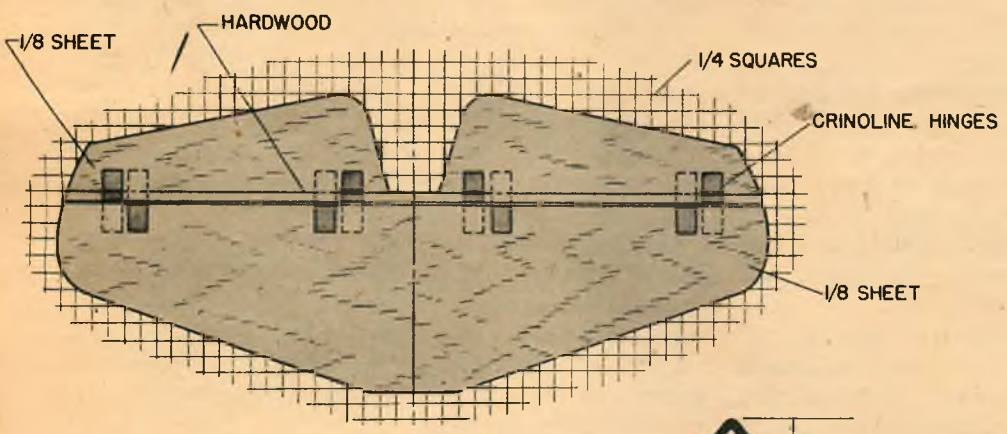


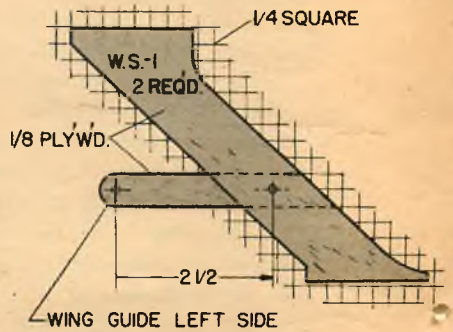


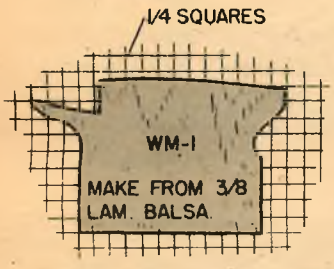


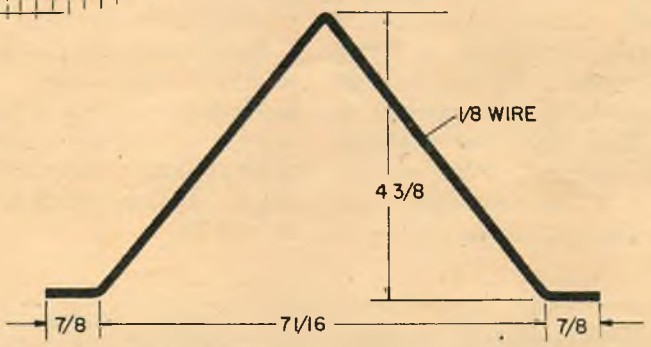
UPPER WING SECTION

LOWER WING SECTION



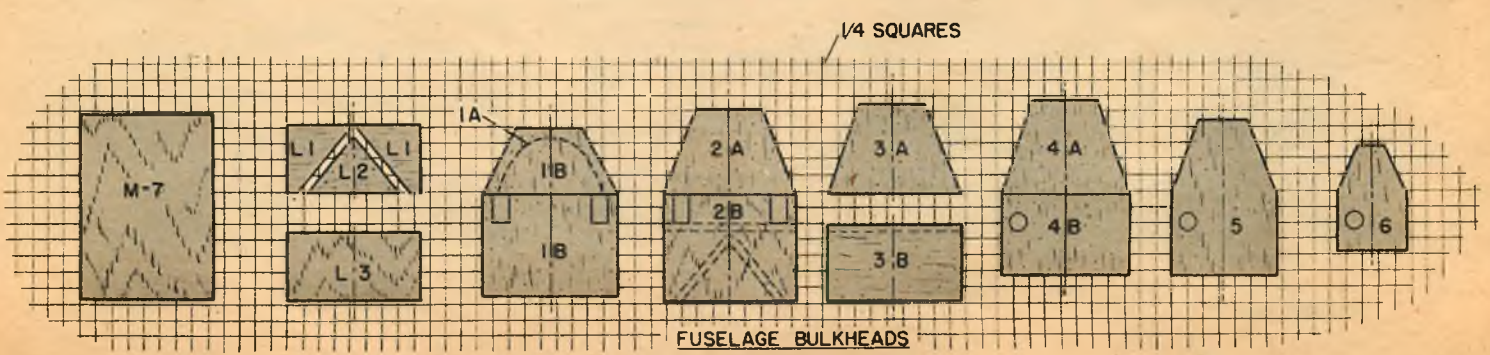






LANDING GEAR

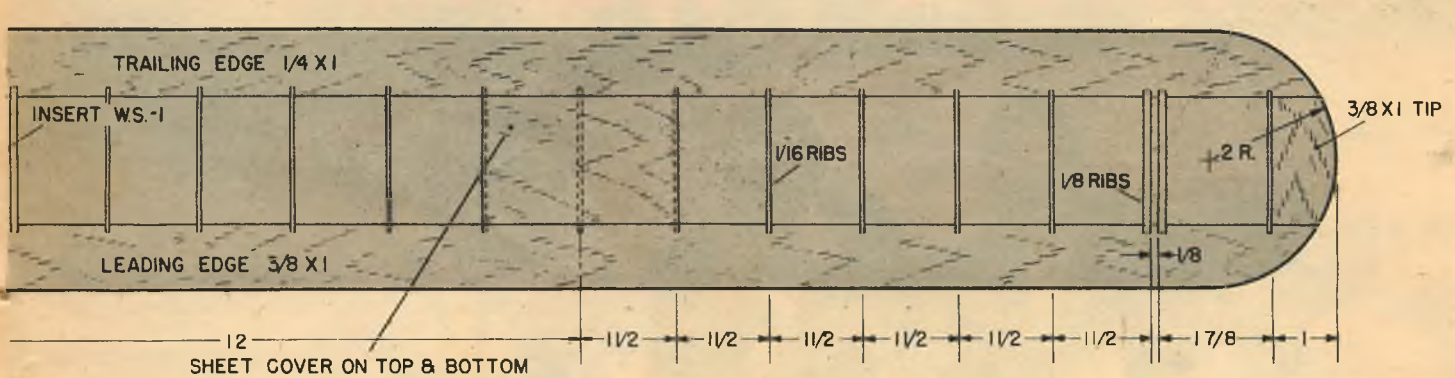
NOTE:
BULKHEADS M7 - L3 - 2B
ARE 1/8 PLYWOOD.
ALL OTHER BULKHEADS
ARE 1/8 BALSA.

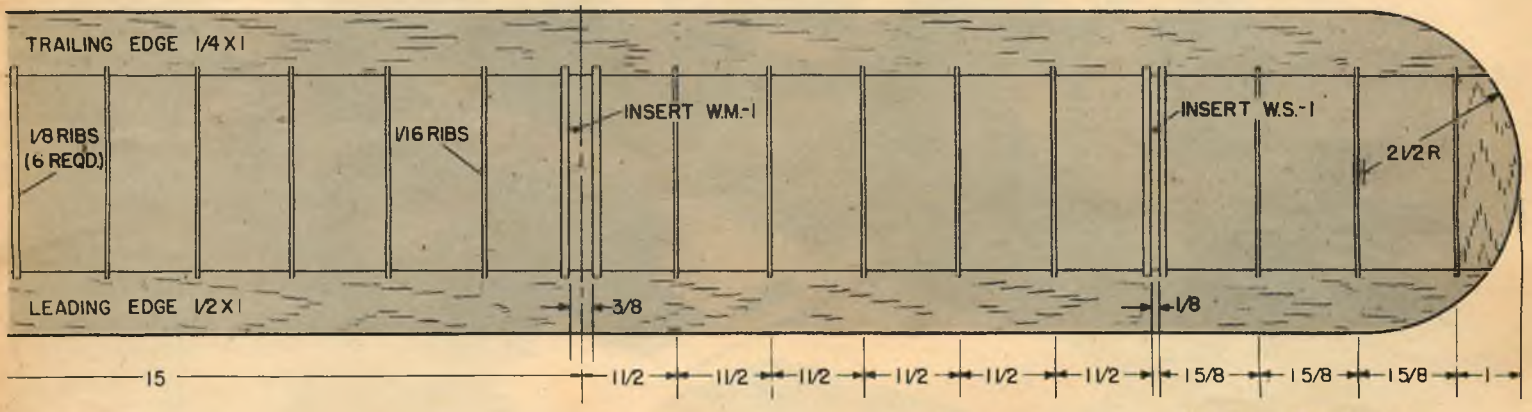


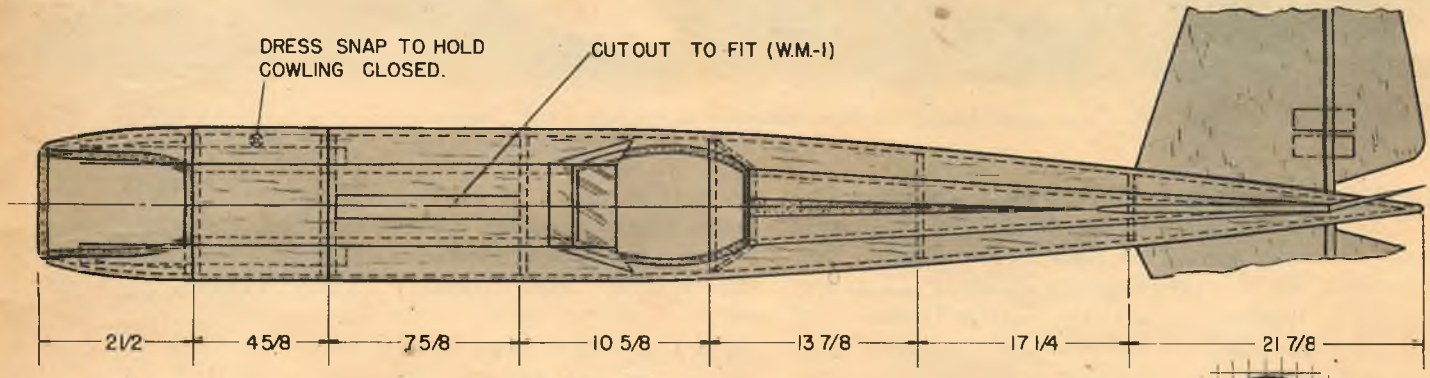
FUSELAGE BULKHEADS

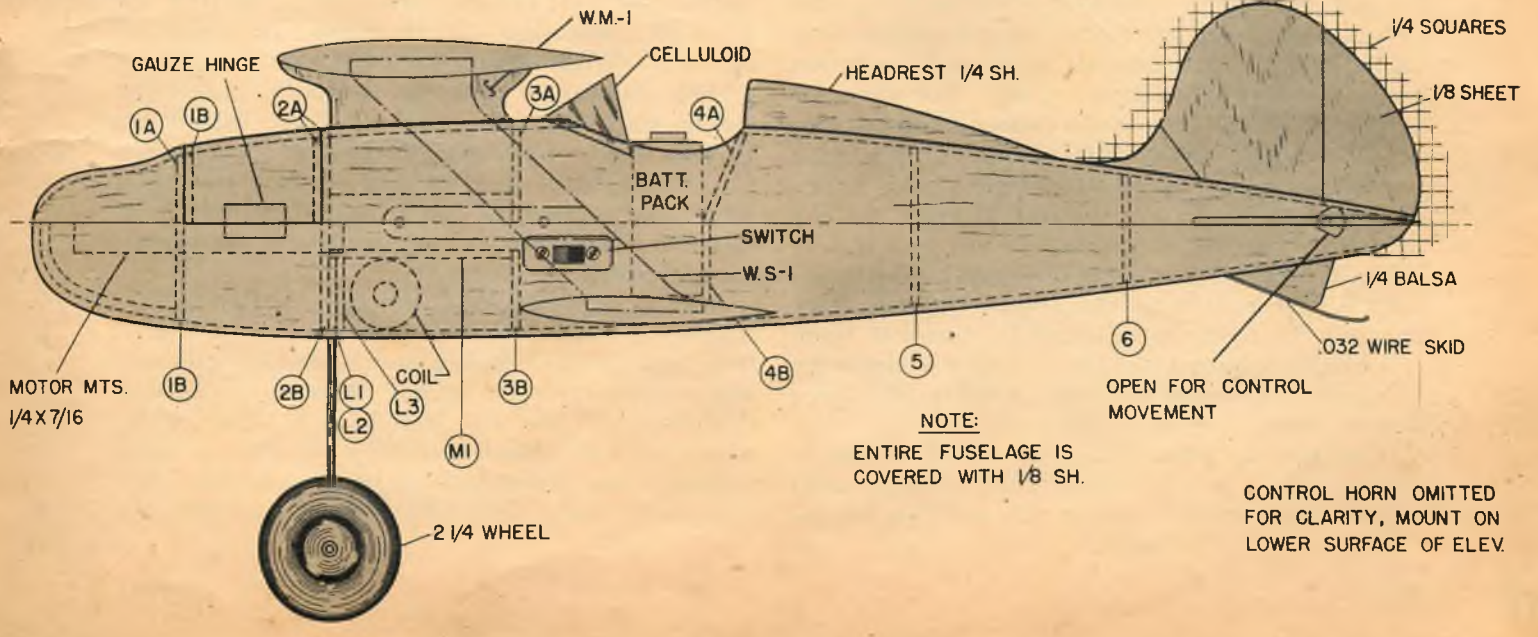
FULL SIZE PLANS OF BOJO YOURS FOR ONLY 35¢ IF YOU USE THE COUPON ON PAGE 96—

AND ALONG WITH "BOJO" YOU GET WORKING DRAWINGS OF THREE OTHER MODELS. SEND ORDER TODAY.









Model Matters

● Benny Brady, left, and J. C. Yates, right, flew at Northrop Aeronautical Institute show. Kenneth Wood, H. C. Orwick watch.

STUDDED with such bright stars as oldtimers Bob Cahill and Joe Dallaire, the Sky Guys, of Detroit, Mich., recently elected as their new president, Don Lapworth; for vice-president, Joe Dallaire; and, as secretary and treasurer respectively, Gordon Hastings and Ed Naudzius. Ed, you will recall, once took the Moffett and, we seem to remember, a first in flying scale with a beautiful Rearwin rubber job at a Chicago Nats. A good deal for adding interest in any club is a project for the members to handle as a group. For theirs, the Sky Guys have just completed a club trailer so that they can hit the out-of-town meets. Scheduled is a hydro meet for September 12 and a free-flight gas and rubber set-to on October 3. For the past 11 years, the Sky Guys have awarded a perpetual trophy to any Guy (that's capitalized, you lower-case guys) who turned in the longest flight in the club's spring and fall meets. This year the Lieutenant Richard W. Bancroft Memorial Trophy is being added for the Guy who makes the most points throughout the year. Address: Sky Guys, 9830 Wyoming, Detroit 4, Mich.

When screwier things happen they will happen in Fresno, Calif. At the February 29 FGMAC meet, Francis "Jack Rabbit" Stewart was watching his gas job glide in when a big ole Jack bounded out of a bush just in time to be conked between his rabbit ears. Outside of a fur-clogged Bantam, no damage was done to ship or beast. Then Norman "Tailless" Peterson, of Stockton, stepped up to test-launch his howling free-flight. Ten violent loops later his model landed bruised but unbusted. He had forgotten to put on the tail! To top it off, "Motorless" Martin brought his ships, but no motor. When experts do this, it must be a screwy contest. But just to prove that somebody did fly right side up, Earl Ford took A with 12:13 and Dick Beggs B, with 11:53. Now that's the kind of a contest we like. Ain't heard anything like it since free-flight wings used to blow off the ground at Hadley Field (Eastern States) and sail out of sight in the mighty Joisey thermals.

After a recent FGMAC contest a farmer bitterly complained that unidentified characters had cut a wire fence so a car could chase a model. The car went one way and the cattle the other. Other more dignified characters used the wire strands as a ladder, while some chilly Californians tore down the posts to make warming fires. Reminds us of several occasions when some dumb bunny free-flighter would burn his ship

in disgust and turn a good meet into a field fire exhibition. Guys like these should be tossed out on their solid heads. Free-flight has enough no-field headaches as is. We sincerely suggest that every club draft legislation to discipline or ban members whose conduct is judged harmful to the club and to model building. Any comment?

When a local hobby dealer donated a complete radio-control outfit—motor, plane, and equipment—to the Williamsport, Pa., Gas Model Club, the boys knew what to do about it. Club members just about have ready for a flight the Forster "99"-powered, Super Buccaneer, with a Good Brothers radio unit. Seems to us that radio-control makes a mighty interesting project, especially for smaller clubs, and might be financed by building up a special fund. With 45 members, the Williamsport Gas Model Club has a local exhibit and plans a U-Control meet for June. New officers: Vernon Hester, pres.; Bill Colville, vice-pres.; Ken Foley, sec.; Lynn Santschi, ass. sec.; James Stove, treas.; Norma Carr, ass. treas. Address: Williamsport Gas Model Club, c/o Ferd D. Page, Jr., 437 E. Church Street.

In the May issue we reported the four items requisite for a truly successful club as listed by Al Hummel, Wichita Hy-Flyers, as: Have a Club, Have a Program Committee, Have a Plan for the Committee to follow, and Specific Program Suggestions. Now we want to point out a prize example of good programing as demonstrated by the Norwood Society of Model Engineers, Norwood, Mass.

"During the winter," says Ted Alexander, of the Engineers, "we had our meetings at the Norwood Junior High School, and our members have been entertained and informed by moving pictures, guest speakers, and demonstrations of various kinds of models. Recently, we held Open House Night, and invited the townspeople to attend a free display of club work. The response was really terrific.

"Amazing as it seems, we allowed our visitors to examine the models and handle them, and we had nothing damaged or stolen during the evening. We were made constantly aware of the changed opinion of the visitors who had thought our models 'toys' and went away with the realization that our work was soundly engineered and worthy of any adult's serious attention."

Fellows, this certainly points the way for getting municipal co-operation. A town that appreciates what the modelers are doing and stand for is more apt to co-operate on such matters as flying sites, rather than shrug us off as a precocious bunch of pests. Try an Open House Night and *invite some special guests,* too.

This Norwood outfit is really on the beam. Last month we reported their adoption of the Leicester (England) Model Aero Club, with whom they have been exchanging information and ideas. On April 18, an international meet was to be held between the two clubs with results exchanged by mail. Clubs that belly-ache about having nothing to do could well afford to take a cue from this Bay State crowd. (*Turn to page* 112)

● Hoosier Capitoliners (Indianapolis, Ind.) members Cecil Barker, Homer Brown, Woody Kennedy. Trio won club meet.

● Revamped Ohlsson 23 Knight Twister by Harlan Tegt, Dallas. Shot on Verichrome with Ciro-flex, f/11 at 1/50.

● Arden ignition .099 powered FW-190 built by Ed Callahan, Chandler, Okla. Carved balsa; numerous coats of dope.

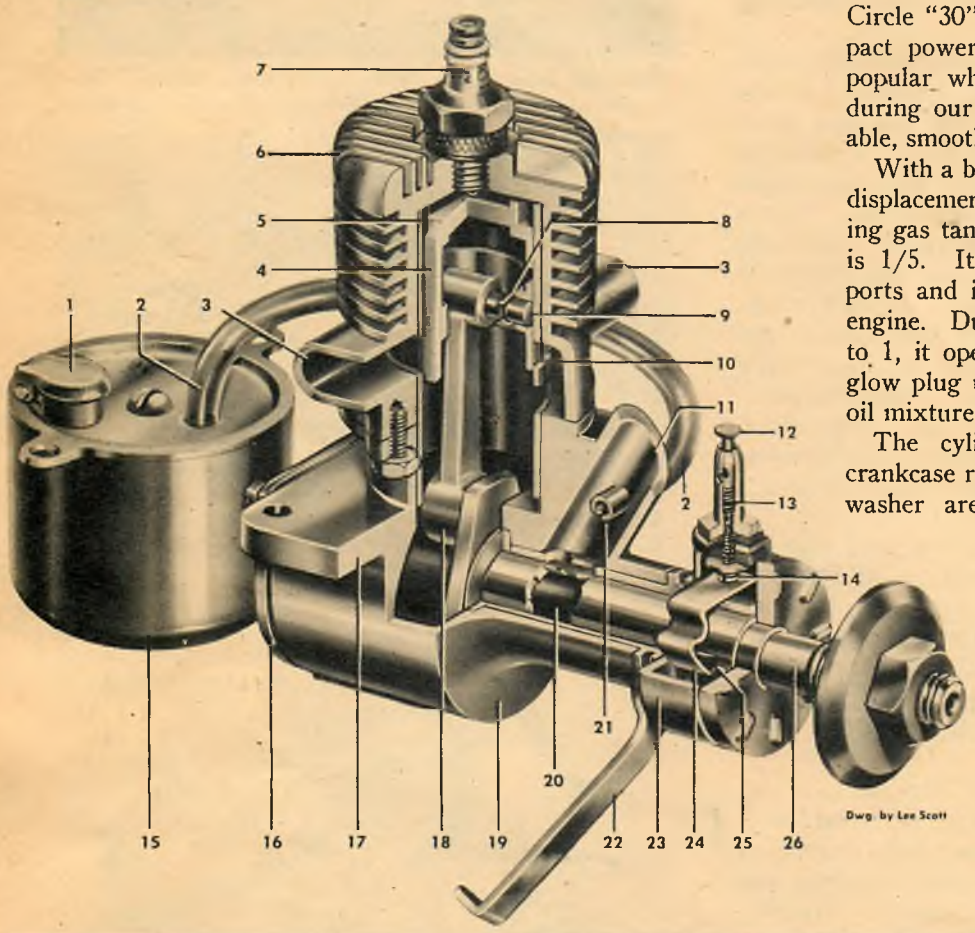
● Canadian championship trophy offered by Royal Canadian Flying Clubs Assoc. Canadian Nats at Toronto on June 26.

INSIDE STUFF: CIRCLE "30"

A NEW entry into the field of miniature gasoline engines is the Circle "30." It is manufactured by the Laskin Manufacturing Co., of Baltimore, Maryland, and was designed by Gene Laskin, formerly an NACA research and development powerplant engineer. The Circle "30" is an exceptionally light and compact powerplant and should prove extremely popular when it becomes better known. All during our tests we found it to be a dependable, smooth running engine, very easy to start.

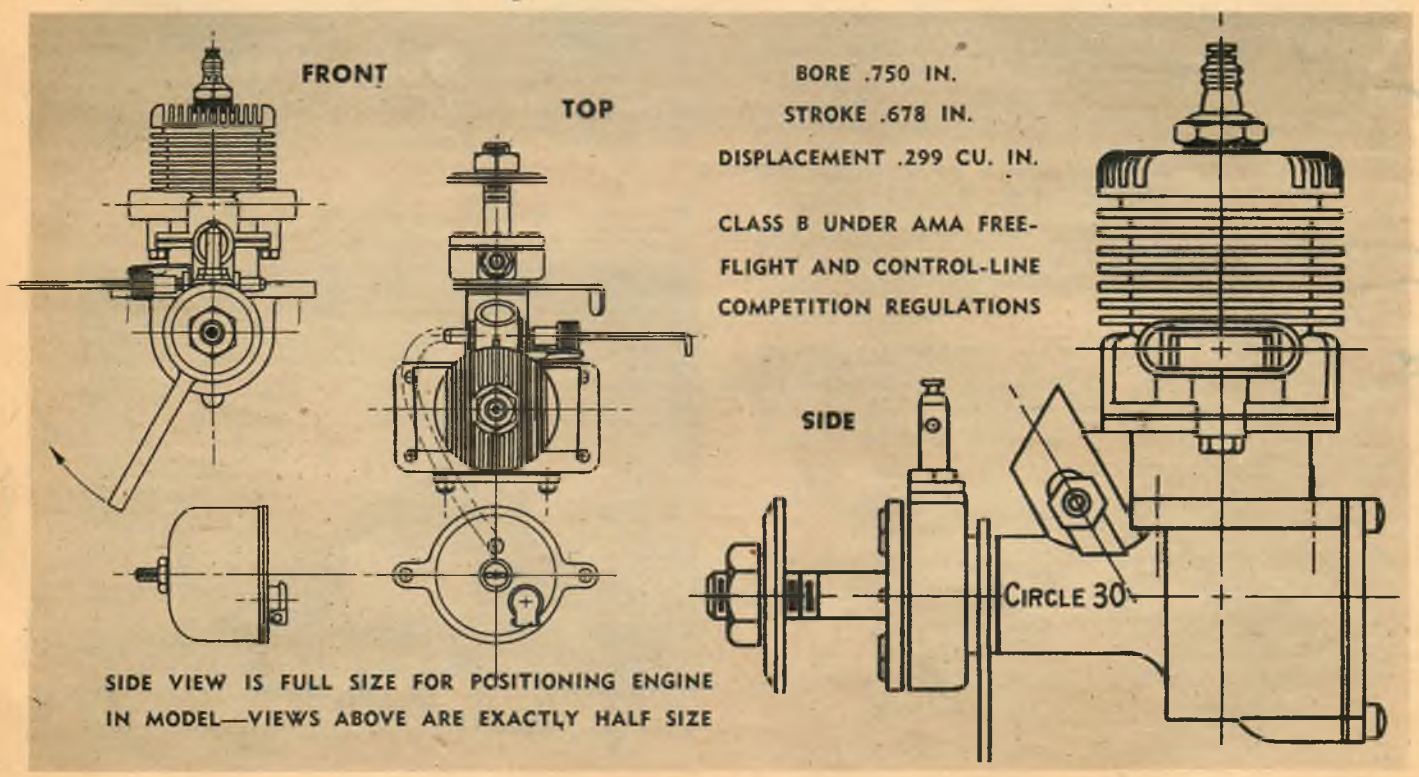
With a bore of .750 and a stroke of .678, the displacement is .299. The bare weight, including gas tank, is only 6 oz. Rated horsepower is 1/5. It features twin intake and exhaust ports and is a crankshaft rotary-type, 2-cycle engine. Due to its high compression ratio, 9.5 to 1, it operates equally well with ignition or glow plug using a regular 3 to 1 gasoline and oil mixture.

The cylinder, crankcase, connecting rod, crankcase rear cover plate, and propeller thrust washer are aluminum alloy (*Turn to page* 108)



KEY TO NUMBERS

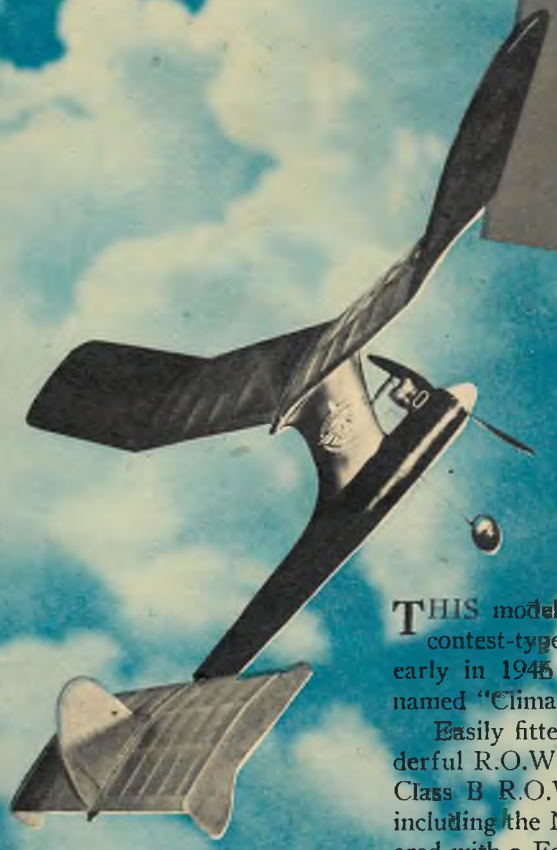
1—Filler cap. 2—Fuel line. 3—Exhaust stack. 4—Piston. 5—Cylinder sleeve. 6—Cylinder head. 7—Spark plug. 8—Spring retainer. 9—Wrist pin. 10—Intake bypass. 11—Intake. 12—Push button (for solderless wire connection). 13—Spring. 14—Timer points. 15—Fuel tank. 16—Back cover. 17—Mounting Flange. 18—Connecting rod. 19—Crankcase. 20—Rotary valve. 21—Needle valve body. 22—Timer arm. 23—Timer housing. 24—Cam follower. 25—Cam. 26—Crankshaft.



NEW RULE FREE-FLIGHT CLIMAX

BY CHARLES FOLK

HOLDER OF BOTH CLASS B FREE-FLIGHT LAND AND SEAPLANE RECORDS, SHIP TAKES EITHER DELONG OR FORSTER ENGINE

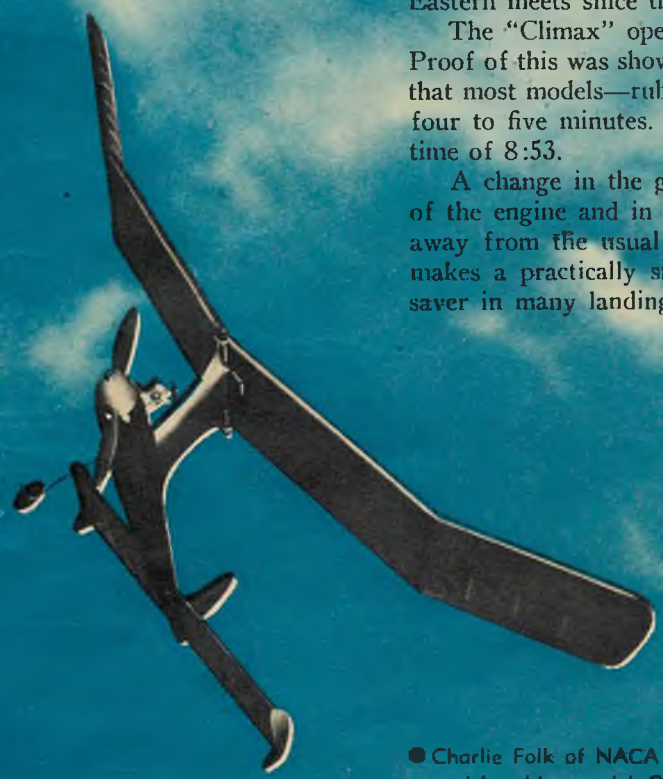


THIS model is a result of several years' experience in building and flying contest-type pylon models. The first of this particular design was flown early in 1946 and because of its outstanding flight characteristics was aptly named "Climax."

Easily fitted with floats of the three-float type, the "Climax" makes a wonderful R.O.W. contender. It holds the present AMA National record in Open Class B R.O.W. The original model placed in the first three meets entered, including the New York Mirror Meet, even though it weighed 35 ounces. Powered with a Forster .305, a second "Climax" placed in Class C at the '46 Philly Flying Circus against the field of larger ships. Both ships have placed in many Eastern meets since then.

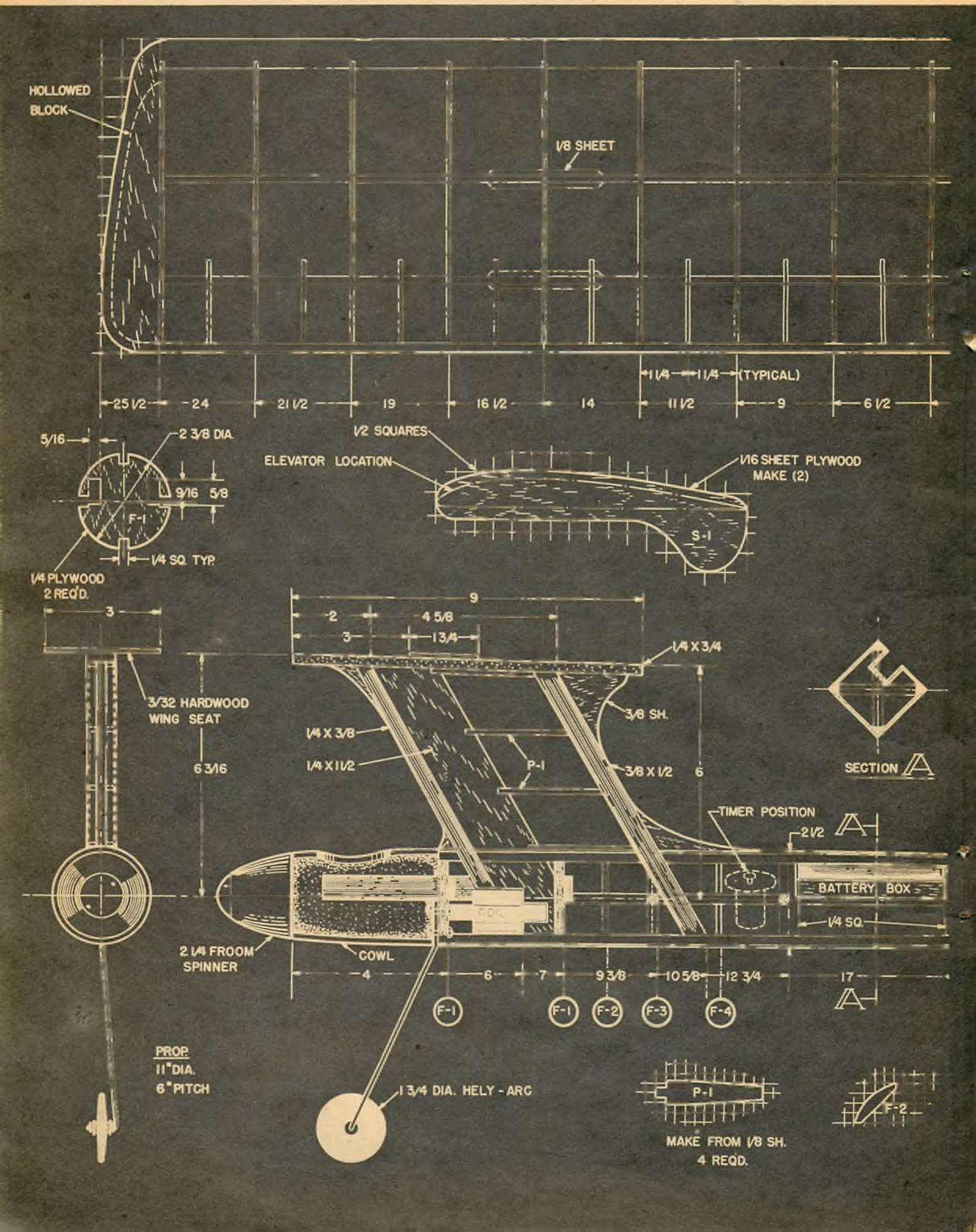
The "Climax" operates as well in windy areas as in moderate conditions. Proof of this was shown at the '47 Richmond, Va., meet, where it was so windy that most models—rubber, gas, and towline gliders—were going out of sight in four to five minutes. The "Climax" made the high flight of the day with a time of 8:53.

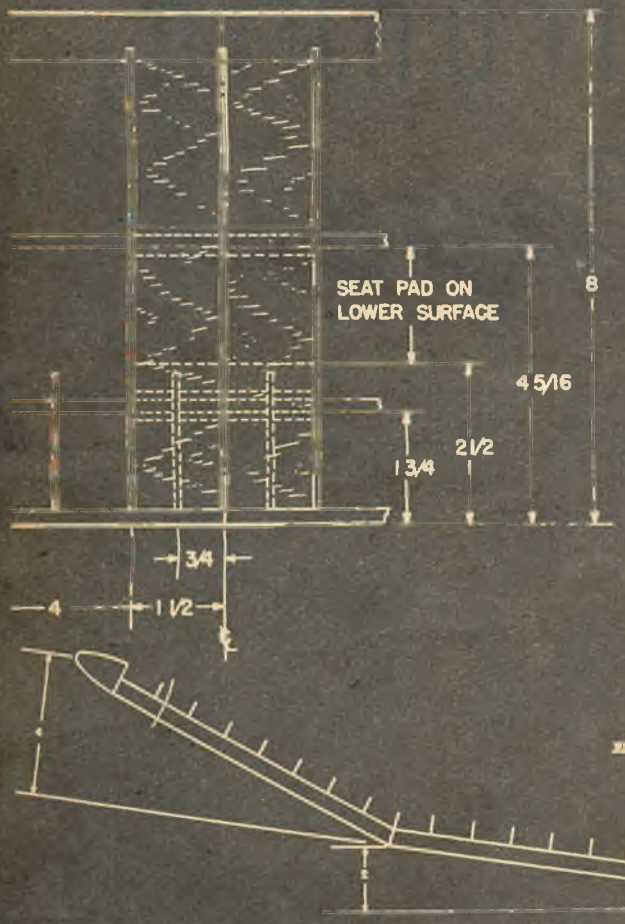
A change in the general run of pylon fuselages was made in the cowling of the engine and in fairing the nose into a 2¼" Froom spinner. This gets away from the usual flat plate area in front, adds to the stream-lining, and makes a practically smash-proof fuselage. The spinner also acts as a prop-saver in many landings. Utilizing a large lifting stab, short (Turn to page 80)

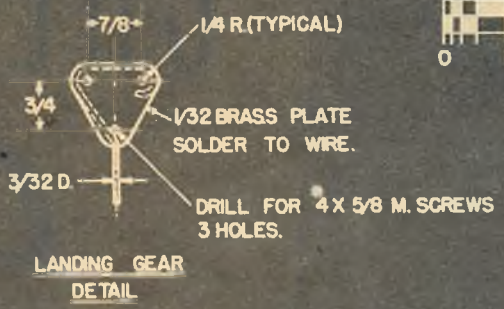


● Charlie Folk of NACA and his record-breaking model. On first 6 flights in '48 ship did better than 1 hour total time. Full size plans are available from Air Trails for "Climax"—see notice, page 96.

New Rule Free-Flight: Class B CLIMAX

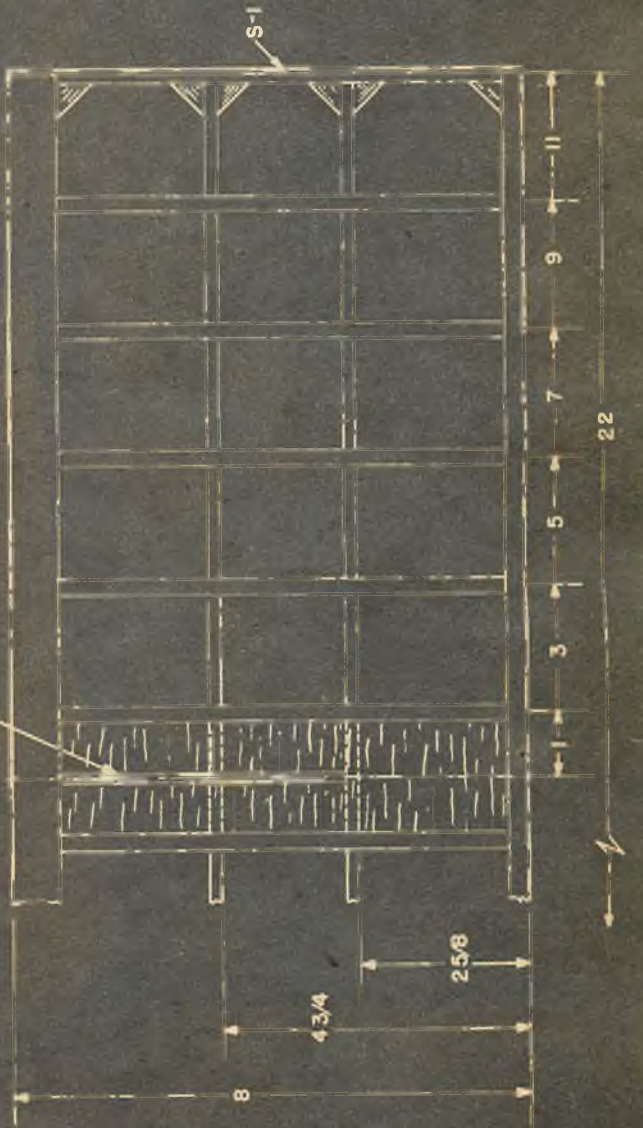






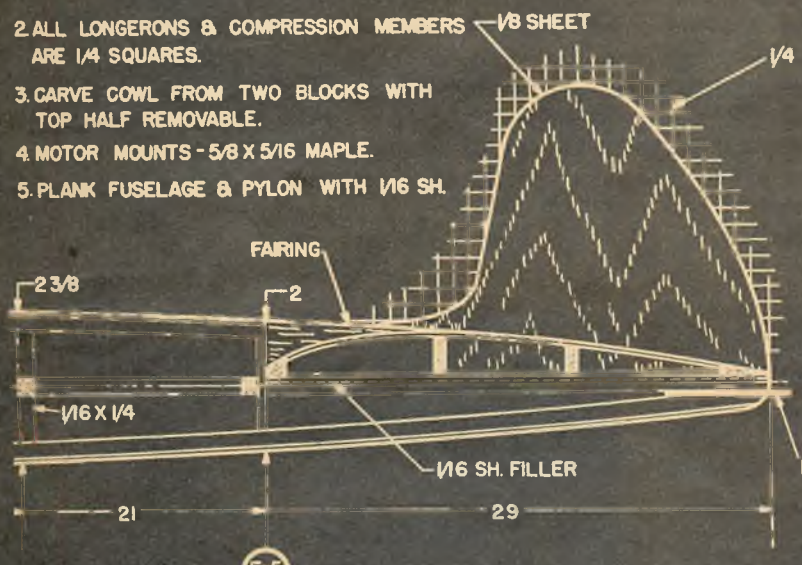
LANDING GEAR DETAIL

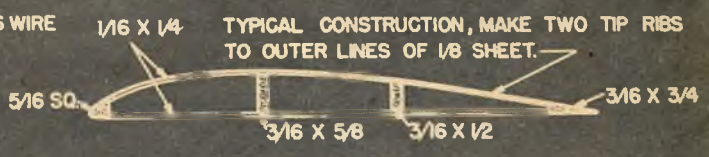
NOTE:
PLANK STAB. ON TOP & BOTTOM AND WING ON TOP ONLY WITH 1/16 SHEET AT CENTER SECTION.



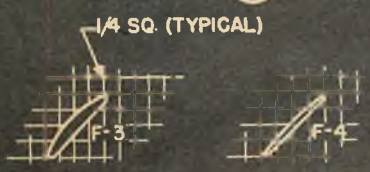
GENERAL NOTES

1. USE BALSA THROUGHOUT, EXCEPT WHERE OTHERWISE NOTED.
2. ALL LONGERONS & COMPRESSION MEMBERS ARE 1/4 SQUARES.
3. CARVE COWL FROM TWO BLOCKS WITH TOP HALF REMOVABLE.
4. MOTOR MOUNTS - 5/8 X 5/16 MAPLE.
5. PLANK FUSELAGE & PYLON WITH 1/16 SH.





ELEVATOR SECTION



MAKE FROM 1/8 SH.
4 REQ'D. OF EACH

MAKE FROM 1/8 SH.
1 REQD.

WING SECTION

● Bill Butler, Inglewood, and his r.c. Thermic 100. Two pound sailplane is towed to 100 ft., then guided by radio.

CALIFORNIA *Capers*

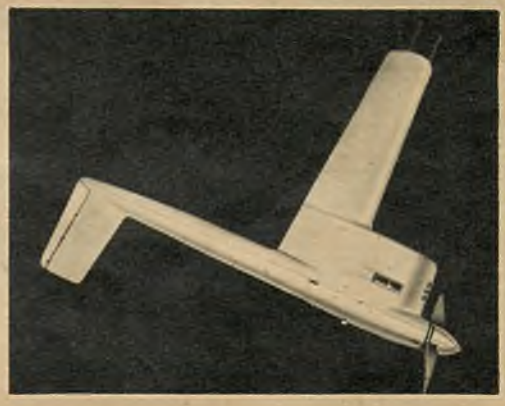
TO SHOW what's new and novel in the way of gas-powered craft the Los Angeles Aeromodelers threw a record trials party recently at their Rosecrans Field model-port. While it certainly isn't the best place in the world to fly from—you must admit the Aeromodelers deserve a lot of credit for the way they keep trying. In the end the wind blew everybody off the field, but not before a number of exciting events had transpired.

The day started out nice enough, and with the host of name flyers and industry people on hand, it was evident that something was up. We spotted Tom Dooling of Dooling Brothers, Bert Devere and Charlie Miller of Duro-Matic, Irwin Ohlsson, Marvin Erwin, Frank Greene, Johnny Davis, Phil Babcock, and the boys from the Fox Company. It certainly looked like someone had something up their sleeves.

At first no one paid much attention to three lads who were not known to many of the local boys, but we noticed that they were wearing caps marked "Alameda." One of the trio, Charles W. Mathews, had taken first in Class VI Speed, in the East-West. This should have been the tip-off that these boys didn't travel nearly 500 miles for nothing! When they unwrapped their ships nothing too unusual was noticed, except that they were all using counterbalanced, single-bladed props. All good "rubber" men have experimented for years with single-bladed props, with some success—but in speed, that was "out of the question!" We talked at some length with the three. Mathews was flying Class VI, using a Hornet, and E. W. Huth and Herman Shiman were using McCoy 49's. The ships were alike. (*Turn to page* 76)

HATS OFF TO THE BOYS ON THE WEST COAST

● For a long time it has been the custom of contestants in other sections of the country to look down long noses at the California contingent and pass off meet victories and record holdings as something brought about by 11 months of fairly good flying weather. This pictorial pretty much dispels such inane viewpoints since it demonstrates that the West Coasters still continue to lead in the "what's new" department. No one can look at these ships and claim that California lags in any respect. Note the one-bladed prop on a record-breaking model, the two-way radio-control unit, the sidewinders, the assymetrical experiment. Westerners, we salute you.



● Glenn F. Crist of Modesto designed this Fox-59-powered "Oh, Yeah." Has done 150 mph.

● Charles W. Mathews, Alameda, set record of 150.57 with his Hornet-powered ship. Length, 19"; span, 18"; 26¾ oz.

● Don Neuberger, Long Beach, works on Ed Sharp's "Invader 60" all-metal model powered by McCoy engine. Real ziperoo.

● Steve Stephens, L.A., ties down his Stinson Reliant. He recently finished a Burgess Waco for powering by M-5 engine.

● While the b.f. competes, this comely pair from Long Beach watches over the equipment. Oh, for more helpers like these.

● Richard E. Schumacher of Burbank with "Rudervator" r.c. job he and Herb Owbridge built. Bill Rhodes developed idea.

● Gerald McDonald and Harold Tye, both of L.A., put the match to their "Gem Hat," with a glow plug McCoy 60.

● Edward J. Sharp's all-aluminum job for McCoy engine now in Duramatic kit form.

● Lt. (USN) Ed Baker's Class D Hassad ship with supersonic airfoil; span, 19½".

● "Mad Missile" by Joe Havlik, Pacific Beach, has Fox 59 with extension shaft.

Champmaker

EX-NATIONAL CHAMP HANK STRUCK HAS DESIGNED THIS MODEL TO HELP YOU DEVELOP SKILL IN CONTEST FLYING. CONSTRUCTION IS SIMPLE

BY HENRY STRUCK

CONTESTS are won through flying skill—knowing how to get the most out of your ship. "Champmaker" is an instrument to develop this skill. Ultra-simple construction slashes time spent at the work bench to a minimum, and light-weight, sturdy structure cushions the frame-shattering effects of maladjustments.

The selection of a wing and tail section with perfectly straight undercamber permits rapid assembly directly on a flat surface, assuring warp-free surfaces, and eliminates the need to stick the covering to each rib. Easily installed false ribs maintain the camber of the leading edge and add an eye-pleasing detail.

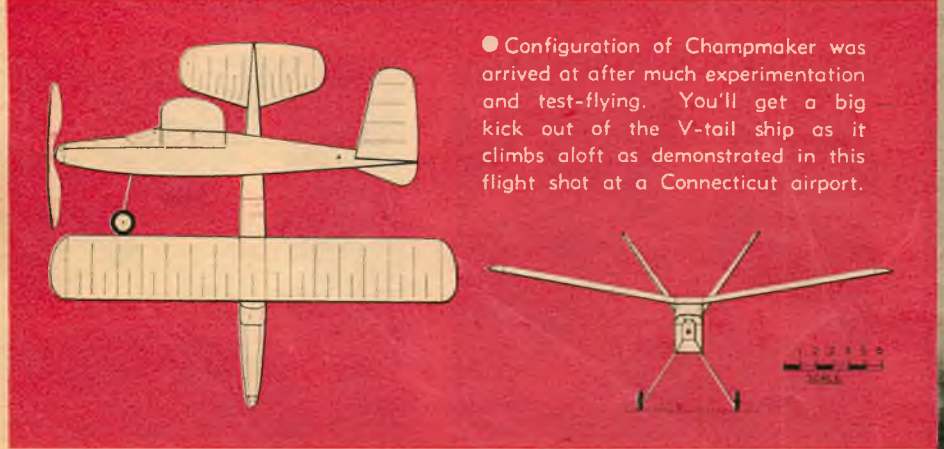
Many V-tail designs have been unsuccessful due to failure to employ sufficient dihedral and area in the tail surfaces. An angle of 55 degrees on each panel was found necessary to produce proper stability.

In performance "Champmaker" matches its bigger contest brothers, turning in frequent still air flights of 2½ minutes—enough to tax the bounds of the average small field with which most modelers have to content themselves.

To reduce the wide variety of material sizes often required, the entire airframe is designed of ⅛" sq. stock and 1/16" sheet. The only exception is a strip of ⅛" x ⅜" triangular stock for the wing trailing edge.

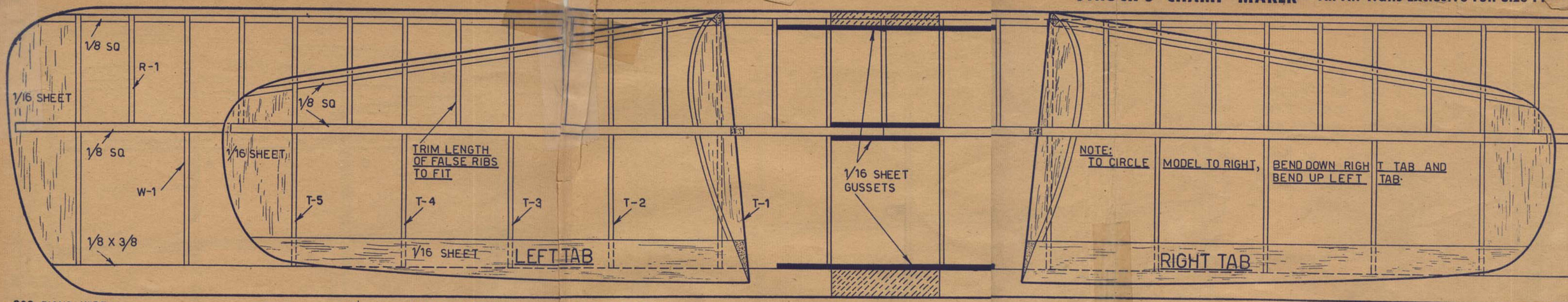
The plans are drawn actual size. Merely remove them from the magazine and scotch tape them to a smooth flat board. Tape a sheet of wax paper over the drawing to protect it from excess cement.

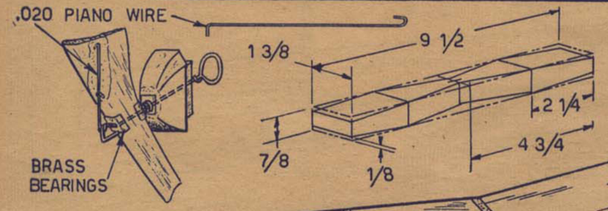
The fuselage sides are built together, one atop the other. Pin the longerons on the plan and fit the cross-pieces between them in pairs. Use (*Turn to page* 85)



● Configuration of Champmaker was arrived at after much experimentation and test-flying. You'll get a big kick out of the V-tail ship as it climbs aloft as demonstrated in this flight shot at a Connecticut airport.

STRUCK'S CHAMP MAKER — An Air Trails Exclusive Full Size Plan





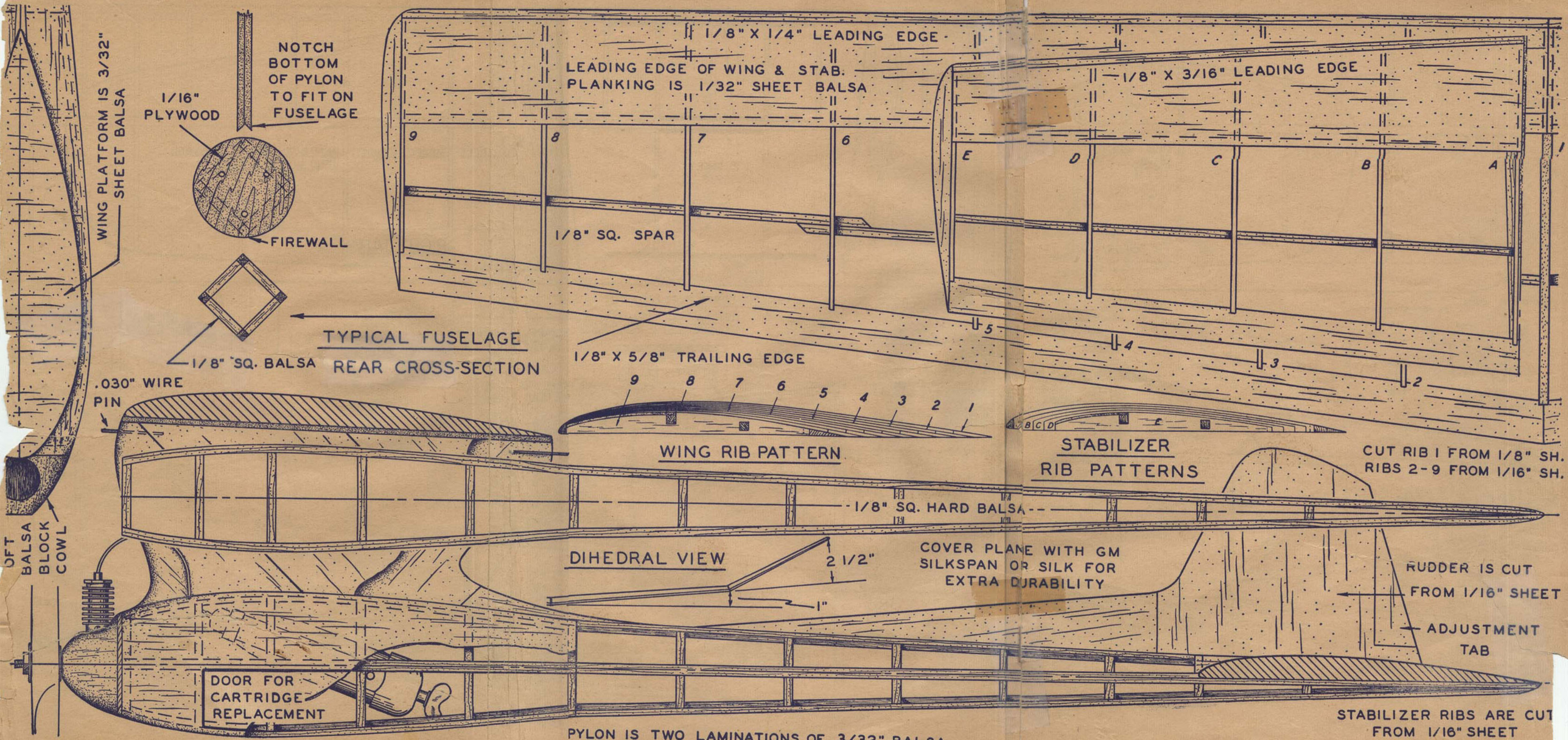
NOTE: BLOCK UP EACH TIP 2 IN., CEMENT SHADED LEADING AND TRAILING EDGES IN PLACE. CUT AWAY CENTER RIBS, AND REINFORCE WITH 1/16 SHEET.

28 1/2 x 3/4 strips for 30

.16 = 5/32 - 16
.20 = 1/8 - 16

STRUCK

McCULLOUGH'S CO_2 — An Air Trails Exclusive Full Size Plan Feature



"PIXIE"

THIS CARBON DIOXIDE ENDURANCE PLANE OFFERS ALL THE FUN OF FREE-FLIGHT GAS FLYING AT A LOW COST

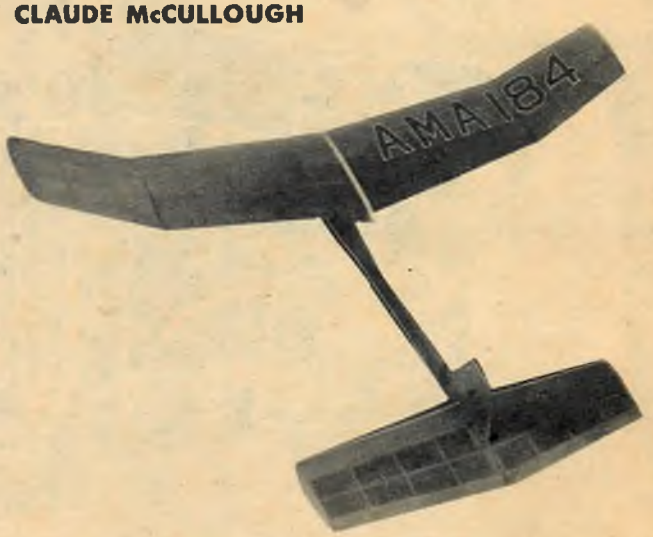
BY CLAUDE McCULLOUGH

THE appearance of the Herkimer CO_2 motor on the market is an event in modeling history as significant as the first gas model flight and the introduction of U-Control. Nothing in years has so captivated the fancy of balsa fans. With the packaged, clean power source and trouble-free operation you can fly all day without sweat, or strain, or grease on your best pants.

The "Pixie" was developed shortly after this year's meeting of the Mid-States Model Aeronautical Association at K. C. when some of the enthusiasm exuded by AMA prexy C. O. Wright, son Bob, and other CO_2-sters rubbed off on me. It's been proven stable and easy to fly and its 4½-ounce weight and low-drag wing section give a high climb and a flat, floating glide. You'll find it ideal for either sport or contest work.

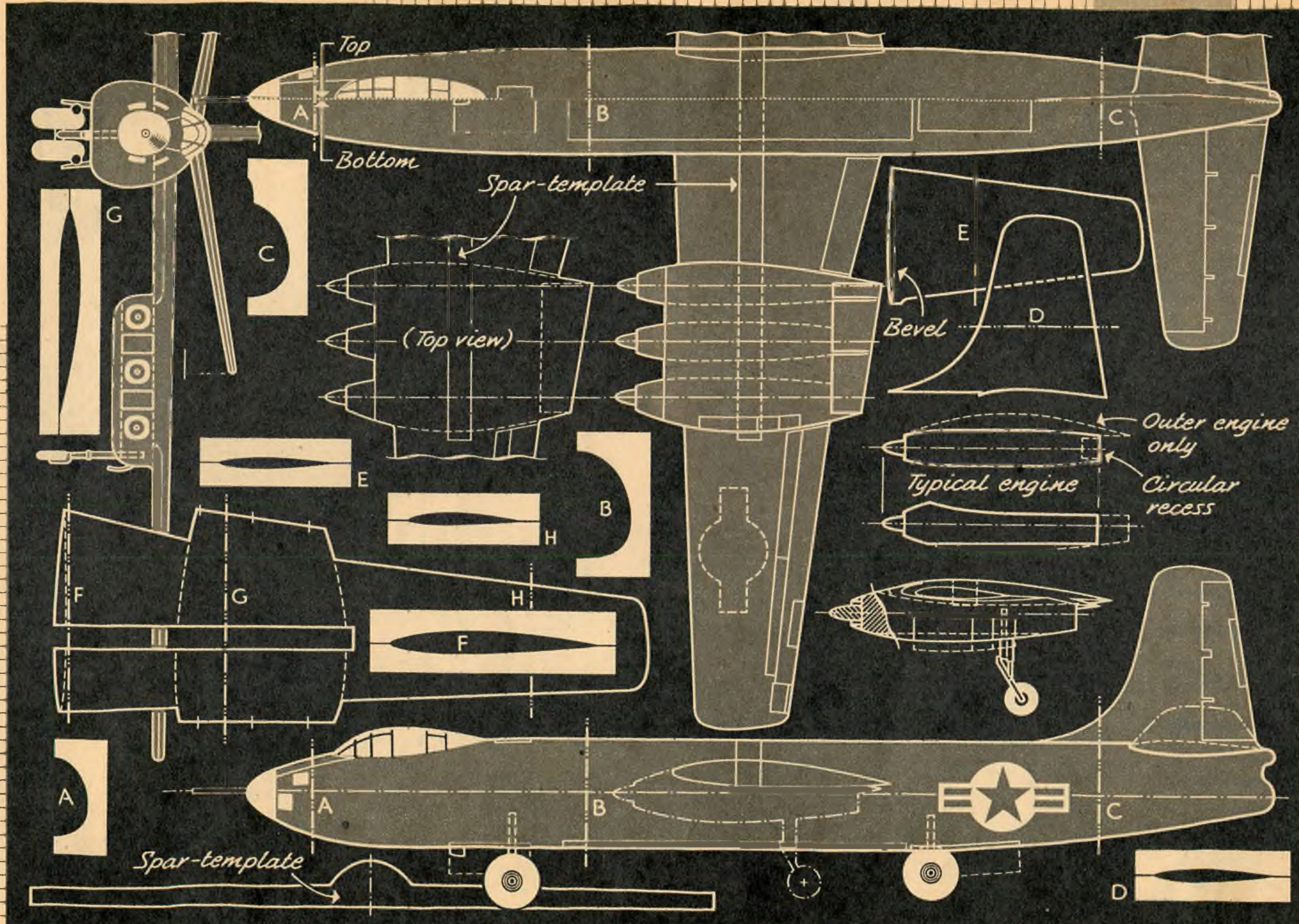
Of great importance in obtaining peak performance is getting efficient use from the CO_2 cartridge. A great deal of possible motor run may be lost in the motor and cartridge from "refrigerating." For this reason the motor fins should not be cowled in—heat is absorbed from the air passing through them. Many methods have been tried to keep the cartridge warm during the run, from immersing it in water to wrapping it with chemically impregnated cloth. One of the boys used carbide around the cartridge; the sweat from the cartridge during the run is supposed to set the carbide to burbling and producing heat. Most such methods are either sloppy or downright dangerous and all are bothersome. So if you are inventively inclined, see if you can lick the problem of keeping the cartridge from losing heat. But keep in mind that heating above body temperature is not only against AMA regulations but like striking matches on a box of TNT. Adding heat is not necessary—just keep it from losing heat and you're set for longer and higher flights.

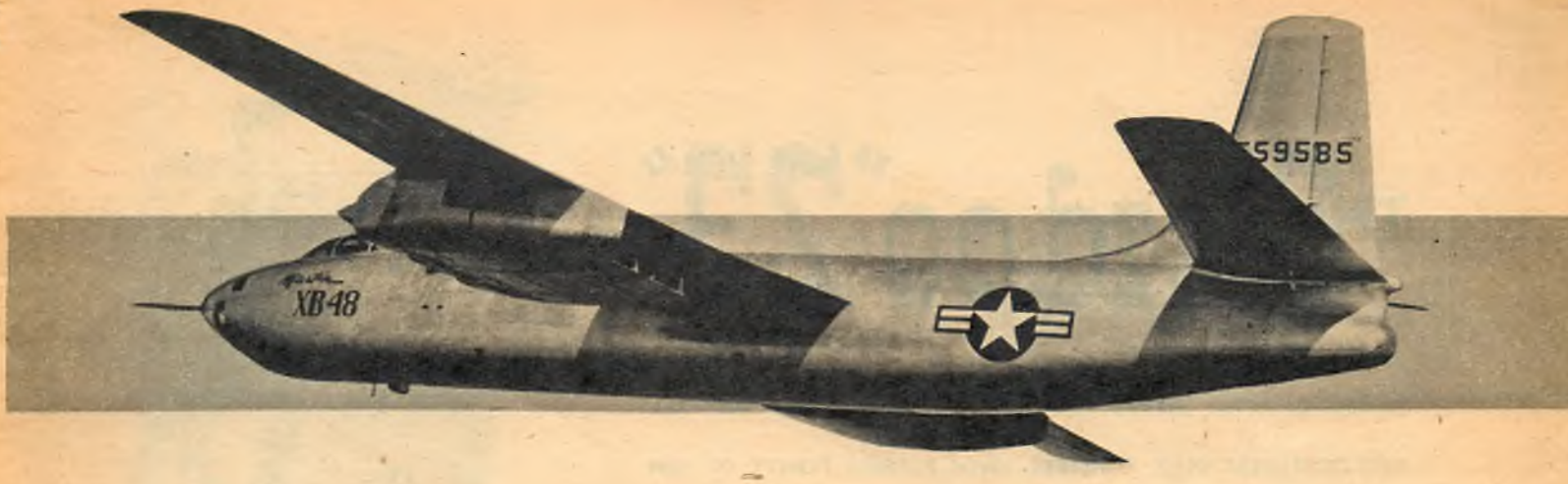
President Wright and company have figured out a daisy of a revision on the motor in an effort to produce a longer run. The idea is to reduce the volume of the cylinder and cut down on the amount of charge taken on each stroke. It has been pretty well established that you get more efficient use of the cartridge from a fairly long run instead of a setting that gives a short high speed run. So the nub on the top of the piston was filed down and the cylinder screwed down. Normally, screwing down the cylinder makes the nub raise the ball valve higher, admitting a larger charge and giving a fast, short run. But the filing down of the nub doesn't allow the ball to rise as high and the run is not decreased—the charge (*Turn to page 77*)



● Sweeping, graceful lines of "Pixie" make it a model you'll be as proud of for appearance as for performance.

● Engine run is increased by "Wright" system of internal engine changes, used successfully by Mid-States Mod. Aero. Ass.


Top
Bottom
Spar-template
(Top view)
Bevel
Outer engine only
Typical engine
Circular recess
Spar-template
A
B
C
D
E
F
G
H



Solid Stuff: MARTIN XB-48 JET BOMBER

IN RESPONSE TO MANY REQUESTS HERE ARE PLANS FOR ONE OF AMERICA'S LATEST HEAVY BOMBERS

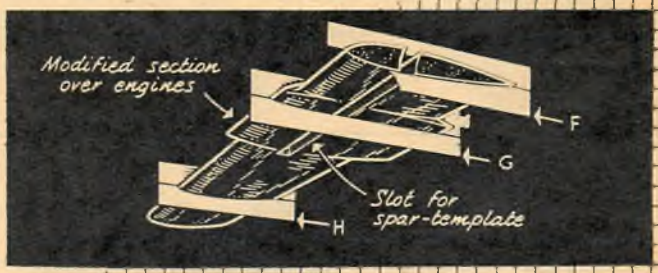
BY H. A. THOMAS

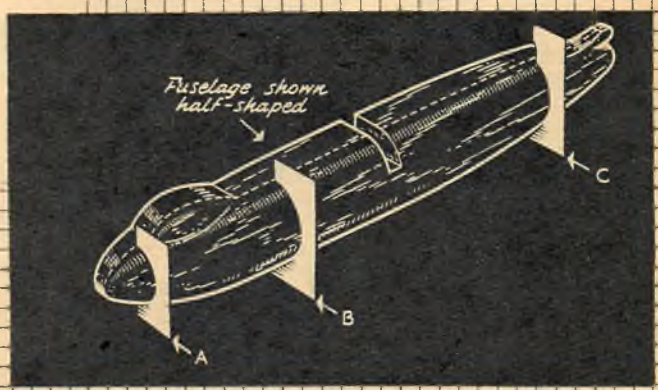
ONLY a few short years ago B-17's and B-24's were flying their missions at a leisurely 200-mile-per-hour speed. Today Army jet bombers are flying near 500 miles per hour. The new Martin XB-48, recently test-flown, typifies this trend and its lines and proportions, which now appear so odd, will soon become familiar. Though classified as experimental, it warrants inclusion in your solid model fleet as one of the first multiple-jet, high speed, super-bombers.

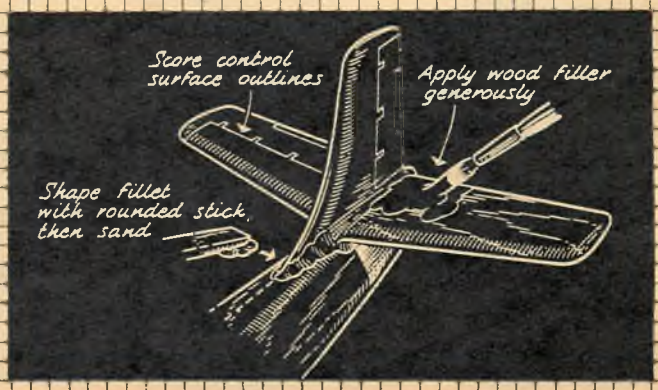
The XB-48 spans 108 feet, and its cigar-shaped fuselage is 85 feet long. A cluster of three General Electric J-35 gas turbine engines is mounted well out on each wing panel. Thrust totals 24,000 pounds! Spoiler-type ailerons permit nearly full span flaps to be employed and the wing is of thin section without dihedral. Most unusual feature is the bicycle landing gear developed by Martin. Two pairs of dual wheels, the front pair steerable, retract into the fuselage and outrigger wheels fold into the outer engine nacelles.

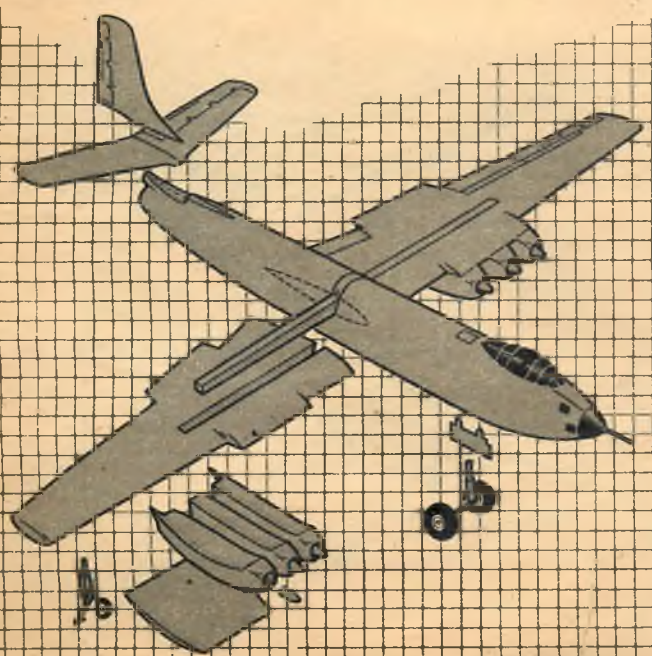
The AAF lists the XB-48's speed as over 480 mph and its bomb load as over ten tons. Empty weight of the airplane is said to be 58,500 pounds.

Scale of the model plans presented on the adjoining page are $\frac{3}{32}$ inch per foot. Enlarge- (*Turn to page 76*)









THE Skidoo "23"

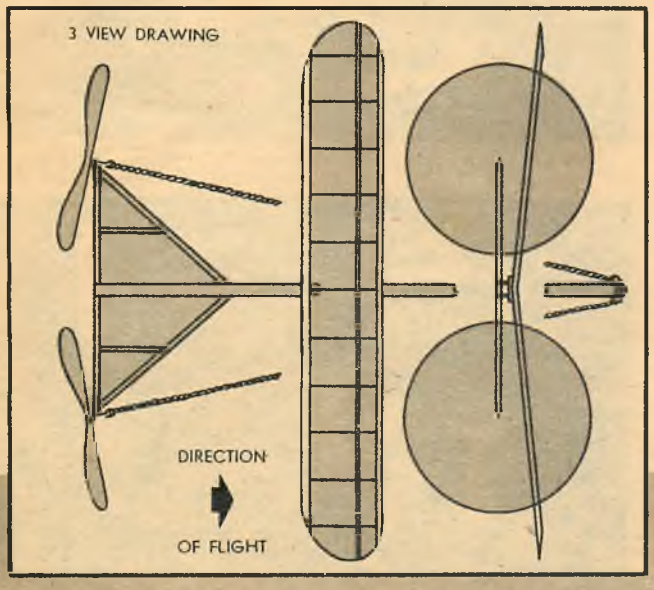
BY WILLIAM WINTER

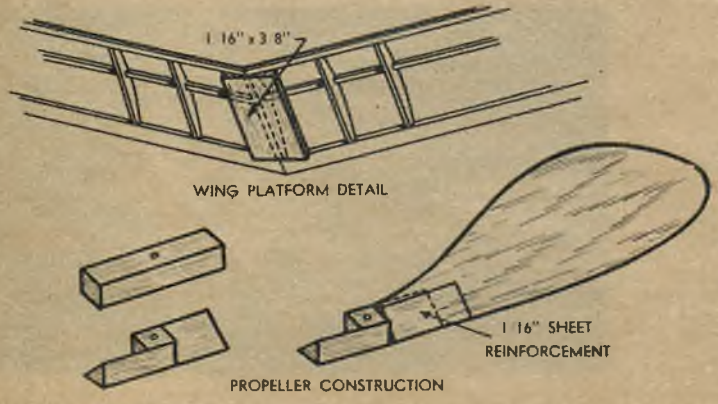
SHADES OF 1910! HERE'S YOUR CHANCE TO FIND OUT WHY ALL THE OLDTIMERS STILL CONSIDER TWIN PUSHERS PLENTY OF FUN

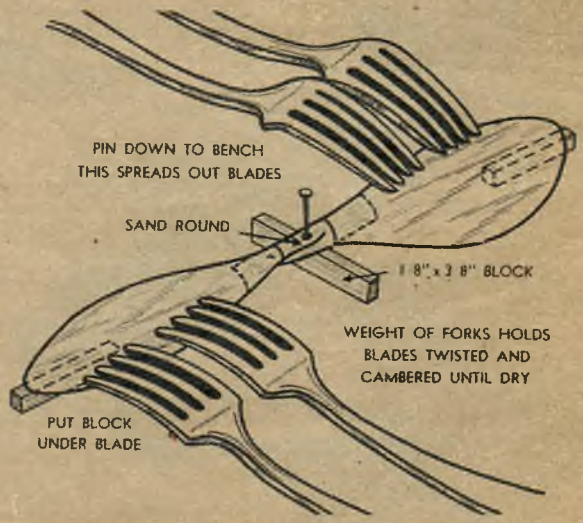
THE twin-pusher is one of the oldest of all model types, going back to shortly after the turn of the century. For nearly thirty years this now-unusual type was the contest king-pin. Its two long rubber motors and twin propellers gave it the highest possible ratio of weight of its powerplants to total weight of the airplane, and an unusually long propeller run. The result was a fantastic rate of climb to an immense altitude under power; if glide was poor, that hardly mattered. Most twin pushers were distinguished by their A-frames, but an occasional design for all-round flying had the simple configuration of the ship you see in these plans.

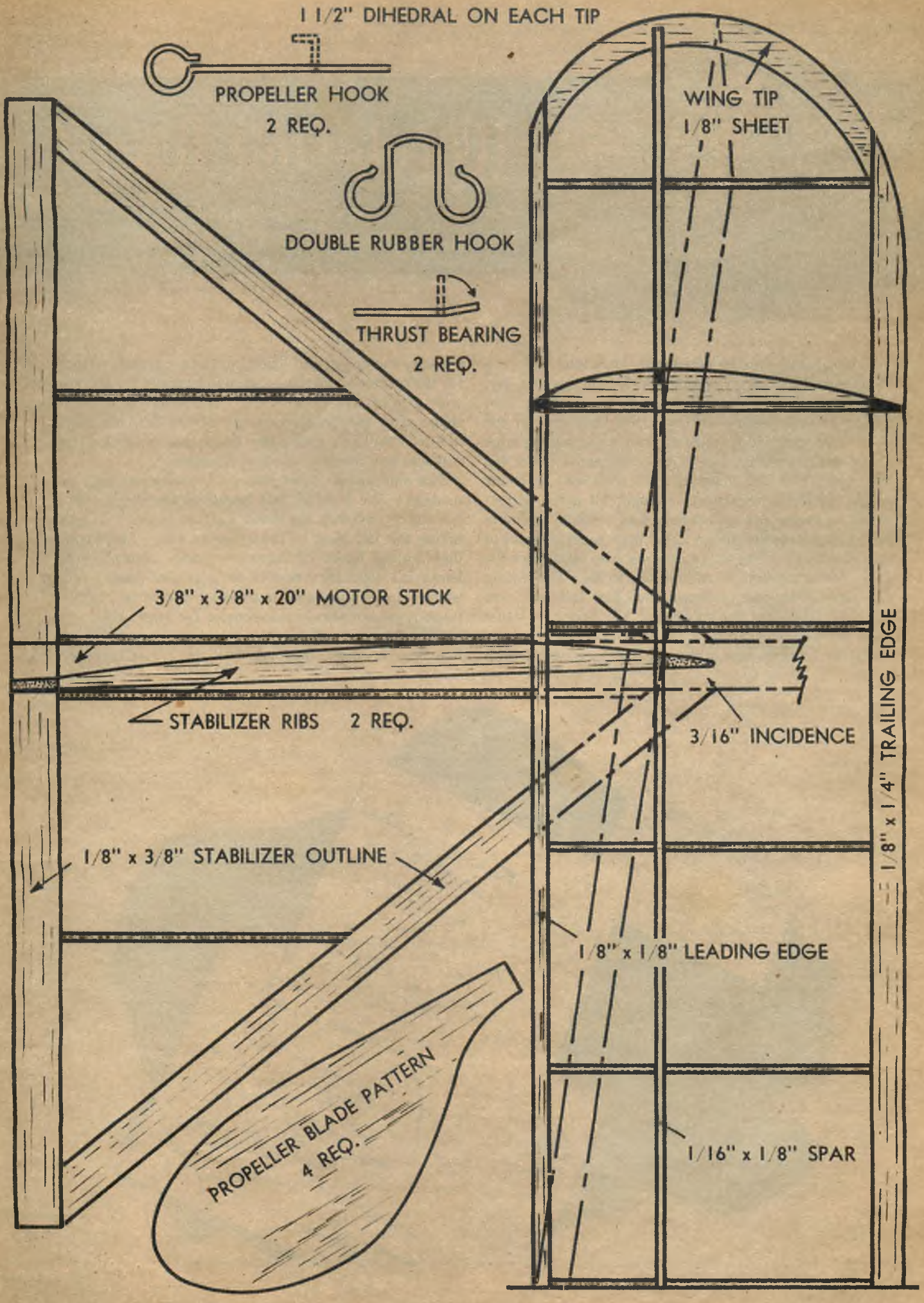
Long before we were born—and that is a fair time ago!—Ideal was manufacturing a Cecil Paoli racer with twin fibre props. About 20 years ago a company we seem to remember as "Mosquito" produced some interesting rubber-model kits, one of which we have tried to imitate in miniature in this article. While those old full-size twins were a handful to wind and launch, this roughly half-size model can be wound by hand one motor at a time and launched with no great difficulty. Its odd appearance makes it look like a racing duck in flight. If you should want to put a winder to it, you'll see what we mean by performance, even if this odd fellow is a midget!

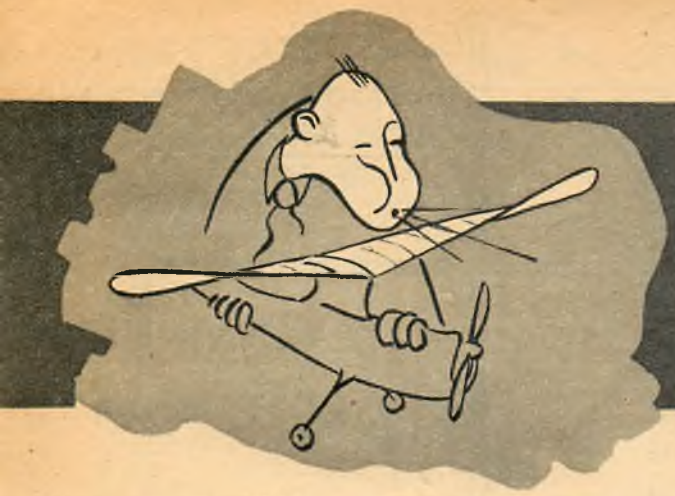
For the motorstick select a nice white-looking piece of 3/8" square balsa of medium grade. Try to pick a piece that is not mushy and weak, and one that is not rock hard and just as heavy. Sand this stick smooth with fine sandpaper, slightly rounding all the corners. Taper the front or hook end very, very slightly, and round the tip bluntly. At the other or rear end of the stick, cut a notch big enough for the 1/8" x 3/8" stabilizer spar. Now bend the double rubber hook from 1/32" wire and attach the hook (*Turn to page 91*)








1 1/2" DIHEDRAL ON EACH TIP
PROPELLER HOOK
2 REQ.
DOUBLE RUBBER HOOK
THRUST BEARING
2 REQ.
WING TIP
1/8" SHEET
3/8" x 3/8" x 20" MOTOR STICK
STABILIZER RIBS 2 REQ.
3/16" INCIDENCE
1/8" x 1/4" TRAILING EDGE
1/8" x 3/8" STABILIZER OUTLINE
1/8" x 1/8" LEADING EDGE
PROPELLER BLADE PATTERN
4 REQ.
1/16" x 1/8" SPAR



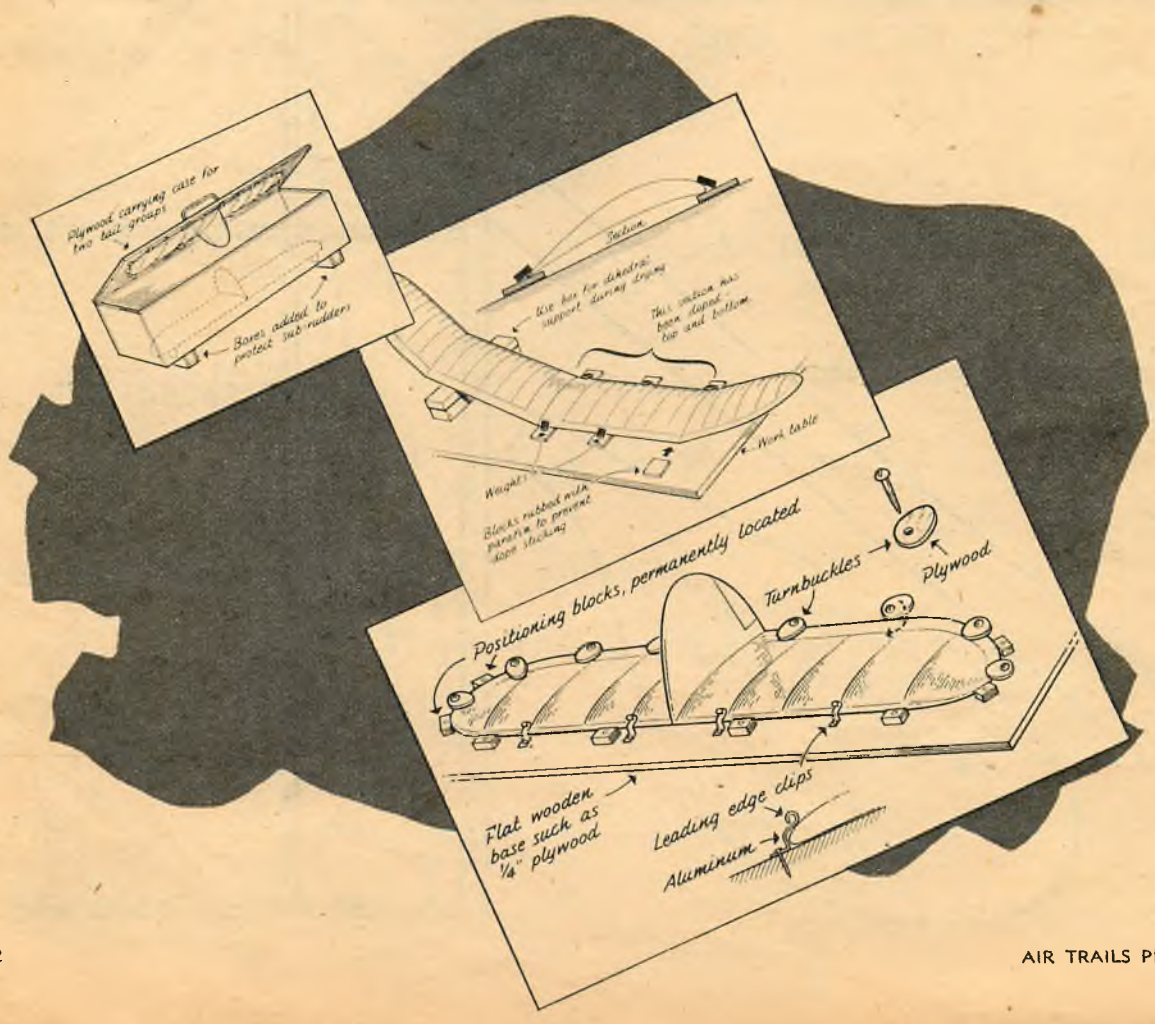
Watch that Warp!

BY C. O. WRIGHT
PRESIDENT, ACADEMY OF MODEL AERONAUTICS

IT IS always fun to arrive the afternoon before a meet and join in the testing for the contest next day. Supporters of different adjusting theories will be seen pitting practice against theory. For that stall in the glide Gene may add a sixteenth under the trailing edge of the wing, Val may put "a thin sixteenth" under the leading edge of the elevator, while Bob may shift the weight forward. Strangely enough, all three adjustments may come out with satisfactory results. As more power is added, the dream ships may zoom upward to the delight of owners and spectators who pronounce the glides perfect with thermal holding circles. The testing may proceed beyond sundown when dew falls, to cover not only Dixie but the models of the hopefuls. Just short of complete darkness the last model is generally recovered from its nest in the tall wet grass, wiped with a greasy motor rag and loaded in the car trunk. Ready for the contest tomorrow—yes, maybe ready for tragedy with a tight spin in with the warp so nicely dried to shape after the "water doping" of the dew the night before. Builders eventually learn that wing and tail surfaces are, like the weather, changeable.

Not only moisture but sun is a Gremlin pursuing the modeler. We have all had beautiful first flights on a hot sultry day with the ships lost for hours in a field taking the full blast of the noonday sun. The second flight, after hours of exposure under nature's head lamp, far too often results in a power crash. The warps, almost inevitable under such conditions, unfortunately do not always compensate for each other.

While warps will probably always beset modelers like fleas do dogs, they can both be (*Turn to page 87*)



BY VAL A. LUCE

- **PRECISION FLYING PRECISE STUFF**
- **P.G.M.A. POINT SYSTEM FOR CHAMP**
- **CONTROL-LINE TRAINERS**

AS THOSE of you who are constant readers will have guessed by this time, an attempt has been made at the beginning of the column each month to present a general picture of each of the various types of models, together with the problems peculiar to each, so that the modeler who "specializes" will have a better understanding of the other fellow's worries. This, we hope, will lead to a cessation of hostilities and to the burying of the hatchet—and we don't mean in the other fellow's head, either!

Precision flight, for example, has a great many more problems than are apparent to the untrained eye. Note well the use of that term "precision," rather than "stunt." An examination of the rules for competition in this category drawn up by Chairman Dick Schumacher of the AMA Precision Acrobatic Committee, shows that "precision" is by far the more apt term. Complete control as well as intense concentration are needed for every fraction of a second of the 8 minutes allotted for each flight.

The design of precision models also has its trick problems. There's a logical reason for those "squarish" wings seen on precision jobs. Since the ship should be capable of inverted flight, a symmetrical airfoil is used. However, a symmetrical airfoil must have a positive angle of attack in order to provide lift. The greater the wing area, the less this angle need be in order to obtain sufficient lift to support the model in flight; hence the rectangular wing outline, which provides the most area for a given span. With such a wing, the ship need not be "mushed" around the circle with its nose in the air in order to obtain level flight either upright or inverted. Precision flight at comparatively high speed is also no accident, since lift increases geometrically with the speed; that is, doubling the speed produces four times the lift, increasing the speed by 50% results in 2¼ times the lift, and so on.

When a good design has been finally worked out, many hours of practice flying are needed to obtain that flawless performance exhibited by experts such as Saftig, Yates, Palmer and Slagle. They make it look easy, but if you don't think it's tough just try it!

Albert E. Foerster is a guy with determination. Mr. Foerster, who lives at 3437 North 24th Street, Milwaukee, Wis., headed for his beloved (*Turn to page* 115)

A DAY IN THE LIFE OF A MODEL

● Contemplation, expectation and sorrow might be the titles given to these pictures. Above you see Kasimir Bidas, Richmond Hill, N.Y. (center) working on his 10 ft. free-flight. Below: John Jagusiak gets it away. Finally, result of a whip stall at 100 ft. altitude.

OFFICIAL

A.M.A. NEWS

REPORT FROM WASHINGTON

BY RUSSELL W. NICHOLS — EXECUTIVE DIRECTOR, ACADEMY OF MODEL AERONAUTICS

● WAKEFIELD MEET SET! ● LADIES AUXILIARY WORKING HARD ● GREENE'S NEW POINT SYSTEM FOR NATS

THE 1948 Wakefield Trophy International Team competition will be held in the Akron-Cleveland (Ohio) area on August 26 and 27. The first day will be set aside for contestants' orientation and test-flying, with official flights taking place on the second day.

A committee of experts under the leadership of AMA V.P. "Red" Hillegas and 1939 Wakefield winner Dick Korda is making a final inspection of three or four potential sites for the contest. There being a number of excellent fields available in that vicinity, interested Wakefield flyers are given every assurance that the site is being selected entirely from the standpoint of the contestant.

As in the past, qualifications for the Wakefield team will be held in conjunction with the Nationals. Dick Korda has a position on the team by virtue of his previous victory, and will be joined by the next five highest scoring contestants in the Wakefield qualification event.

The Wakefield competition will be sponsored by the Akron and Cleveland Women's Chapters of the National Aeronautic Association with the cooperation of other groups in that area.

As additional details are available, they will be distributed by AMA Headquarters. Any questions may be directed to the Academy or to "Red" Hillegas, 7804 St. Clair Ave., Cleveland 3, Ohio.

As August approaches, every indication points to the best Nationals ever. Official information bulletins and entry blanks can be obtained from the Contest Manager, Legion Memorial Building, Olathe, Kansas, or from AMA Headquarters. In our last column we mentioned that housing would be available for the entire contest to male contestants and helpers on the Olathe Naval Air Station itself for 25¢ (linen charge). We have received a correction on this from Navy officials. The charge will be 35¢, not 25¢.

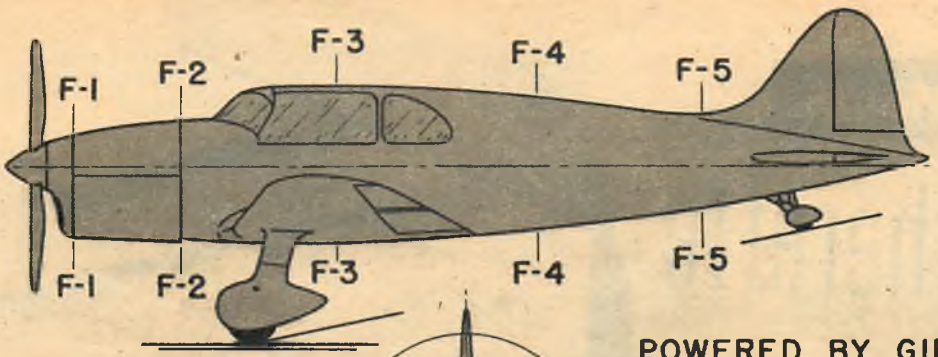
Auxiliary Aids Modelers: Effective proof that model aviation is not the interest of men and boys alone, as some people think, is the work of a group of 15 women who have organized, under the leadership of Mrs. John W. Hillegas of Cleveland, a Ladies' Auxiliary of the Academy of Model Aeronautics. These 15 women, scattered across the country in a dozen different states from New York to California, are engaged in the promotion of model aviation and "help for the model builder where help is needed."

Mrs. Hillegas, a long-time supporter of aero modeling, is vice-president of the Cleveland Women's National Aeronautic Association chapter and co-chairman of that group's junior activities committee, which has been extremely active in model aviation promotion in the Cleveland area.

Joining her on the new auxiliary are the following air-model-minded ladies: Mrs. Ray Acord, Hawthorne, Calif.; Mrs. Frances Herbert, White Plains, N. Y.; Mrs. Robert L. Place, Beecher City, Ill.; Mrs. Robert Flinn, Pittsburgh, Pa.; Miss Ethel Conn, Des Moines, Ia.; Mrs. Doris Yulke, Hempstead, L. I., N. Y.; Mrs. Harold Stoffer, Indianapolis, Ind.; Mrs. Edna Hartnett, Yuma, Ariz.; Mrs. Florence Scrivner, Minneapolis, Minn.; Mrs. Glen Williamson, Anderson, Ind.; Mrs. Dorothy Hein, Fond du Lac, Wis.; Mrs. Fern Douglas, Salt Lake City, Utah; Mrs. Don Griffin, Topeka, Kan.; Mrs. C. H. Byfield, Indianapolis, Ind.

Each one of these auxiliary members desires to help model builders in her city. This help may be in the promotion of model meets, aiding builders to find model clubs which they can join, putting new boys in touch with experienced modelers from whom (*Turn to page* 83)

● Gathered around the Washington, D.C. conference table of the Academy of Model Aeronautics are (left to right): Willis C. Brown, aviation specialist for U.S. Office of Education and first AMA president; Ray "Glow Plug" Arden, noted engine designer; Carl A. Hopkins, director of VFW model plane program; C. O. Wright, Academy president; Val A. "Dope Can" Luce (standing), AMA Technical Director; and Al Lewis of Air Trails. Meeting was one of many President Wright has been calling in various sections of the country with leaders.



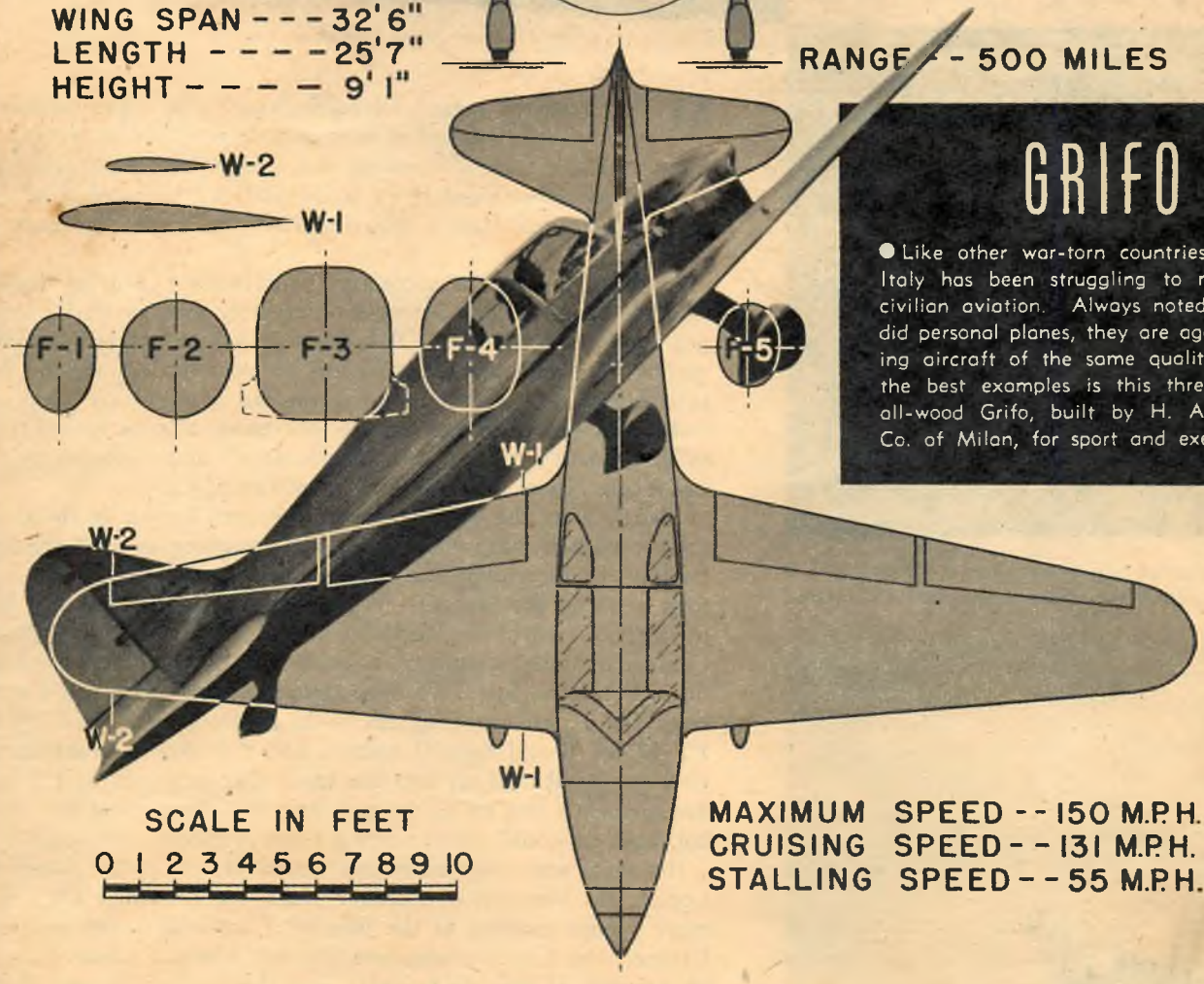
POWERED BY GIPSY
"MAJOR" S-1 OF 130 H.P.

WING SPAN - - - 32'6"
LENGTH - - - - 25'7"
HEIGHT - - - - 9'1"

RANGE - - 500 MILES

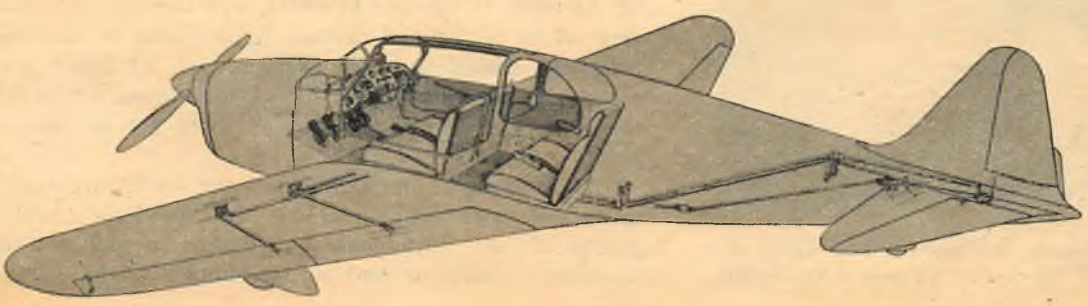
GRIFO

● Like other war-torn countries of Europe Italy has been struggling to resurrect its civilian aviation. Always noted for splendid personal planes, they are again producing aircraft of the same quality. One of the best examples is this three-passenger all-wood Grifo, built by H. Ambrosini & Co. of Milan, for sport and executive use.



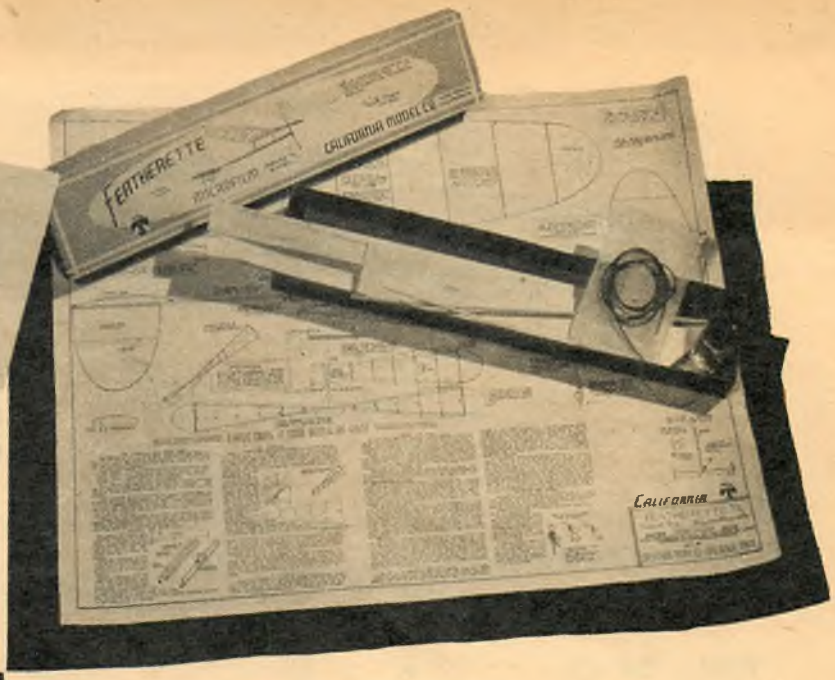
SCALE IN FEET
0 1 2 3 4 5 6 7 8 9 10

MAXIMUM SPEED - - 150 M.P.H.
CRUISING SPEED - - 131 M.P.H.
STALLING SPEED - - 55 M.P.H.

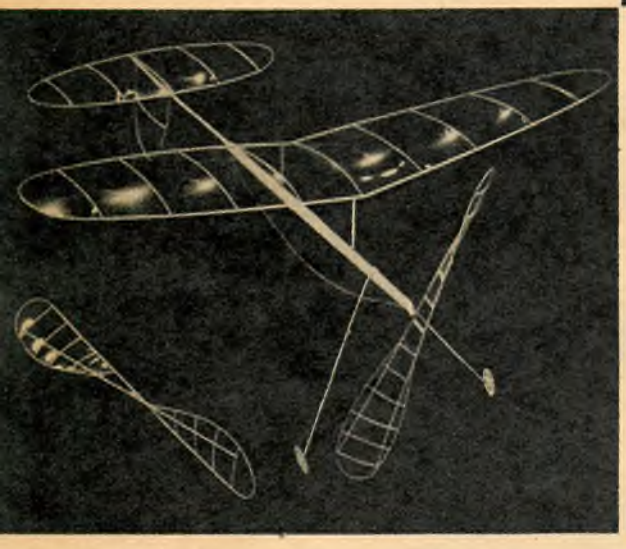


Kit of the Month

featherette



STRICTLY BEGINNER'S STUFF YET A MODEL THAT HAS CLOCKED TWELVE MINUTES UNDER A 96-FOOT CEILING



● Performance with this Class B indoor R.O.G. is excellent—.034-ounce version flew 15 minutes.

● Frank Greene, well known West Coast designer, and the first of his simple kit models.

MOST modelers regard kit manufacturers as super-capitalists who breakfast in bed at noon and devote their afternoons to the pleasurable task of counting the money they make from the sale of their kits—those fancy boxes full of wood and plans and paper which pour from a whirring assembly line at the touch of a button.

Actually, the typical successful manufacturer worries himself bald in the precarious business of creating kits which he hopes will meet your approval. This long drawn out process of converting ideas into thousands of kits on your dealers' shelves is a fascinating story with as many variations as there are manufacturers and kits. Few kits have as interesting a story behind them as this month's subject, the "Featherette," manufactured by the California Model Company, of Long Beach, Calif.

Shortly after the war, Frank Greene, well known on the Coast for his work in many phases of model designing, came to the conclusion that designing on a royalty basis was a lot less attractive than working for himself. Together with Bill Baker, who was turning out control-line hardware and fuel tanks, he took over the California Model Company, a going concern that had produced three U-Control kits. To keep things moving until Frank's pet ideas for a post-war program could be ironed out, a Fairchild PT-19 for B and light C motors, and the Skeeter stunt-trainer were produced. To say that the trade was surprised by the new management's first kit of the new line, is putting it mildly. Who but madmen would manufacture a Class A indoor stick model?

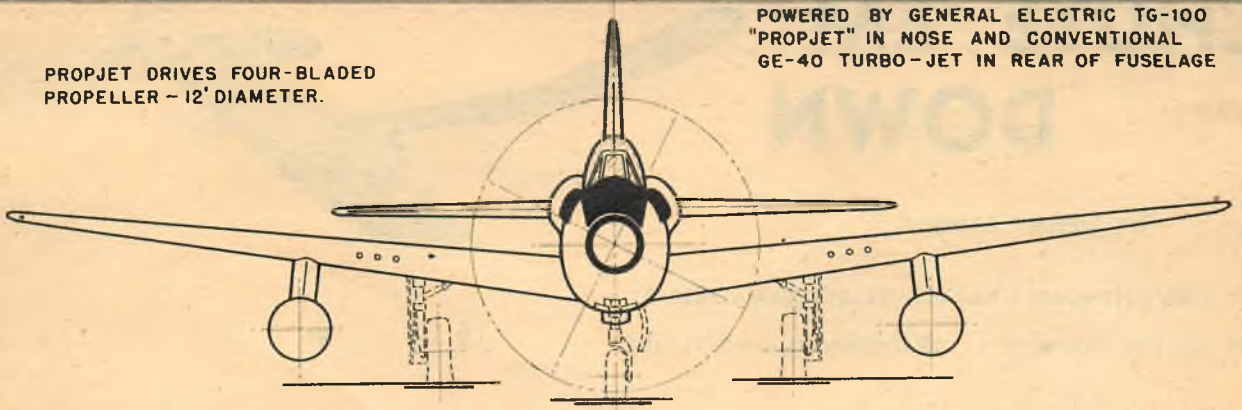
But there was a method in this "madness." With the American Legion, the Veterans of Foreign Wars, the Exchange Club, and other groups nibbling at the idea of a national model program, Greene, who keenly remembers the old Airplane Model League of America of the late twenties, and the Junior Birdmen three-ring circus of the mid-thirties, figured that at least one of these programs should pay off. To his way of thinking the indoor phase was the widest open, the models the easiest to produce, and the time was ripe. Inasmuch as there are no indoor kits this seems commendable logic.

But thinking is not doing and the doing, ironically, involved more and more thinking. How big should the model be? As a matter of fact, how *would* you design an indoor model for the beginner? Well, it had to be simple. And, (*Turn to page* 89)

CONSOLIDATED VULTEE XP-81

PROPJET DRIVES FOUR-BLADED PROPELLER – 12' DIAMETER.

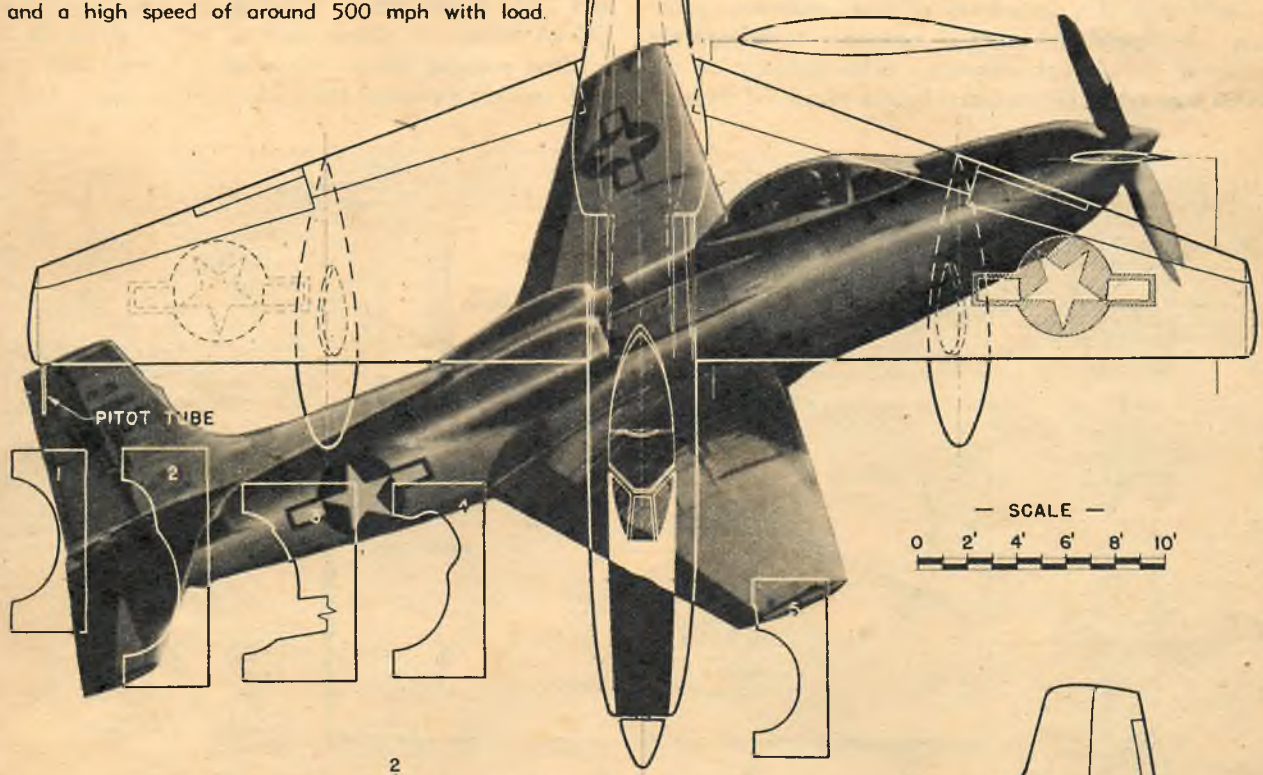
POWERED BY GENERAL ELECTRIC TG-100 "PROPJET" IN NOSE AND CONVENTIONAL GE-40 TURBO-JET IN REAR OF FUSELAGE



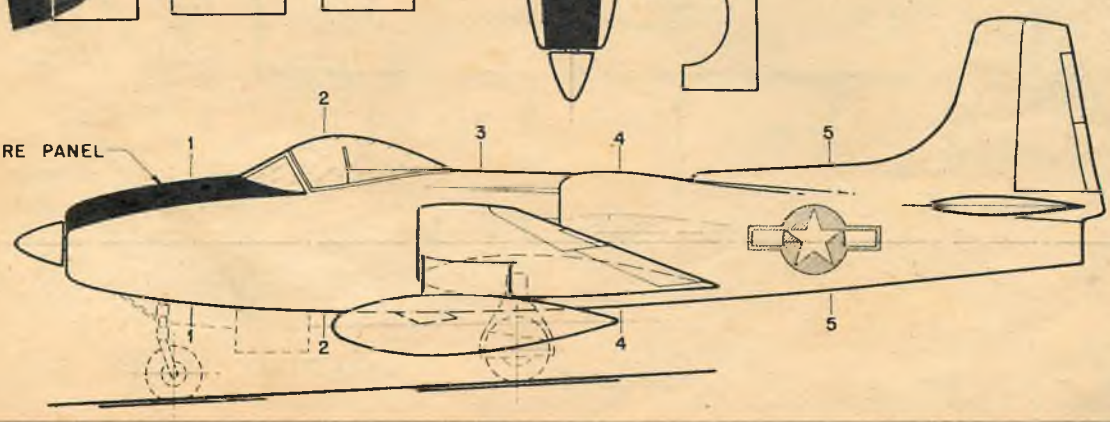
TOP SPEED – – OVER 500 M.P.H.
GROSS WEIGHT – – 19,500 LB.

WING SPAN – – – 50' 6"
OVERALL LENGTH – 44' 8"
HEIGHT (3 PT.) – – 13' 6"

● The XP-81 was the first U.S. airplane to use a turbine powerplant to drive a propeller. The aircraft was originally scheduled to act as an escort for B-29's and was designed to have an operating range of 1,500 miles, a combat ceiling of 37,000 ft., and a high speed of around 500 mph with load.



— SCALE —
0 2' 4' 6' 8' 10'



CHUTE 'EM DOWN

BY HENRY STRUCK

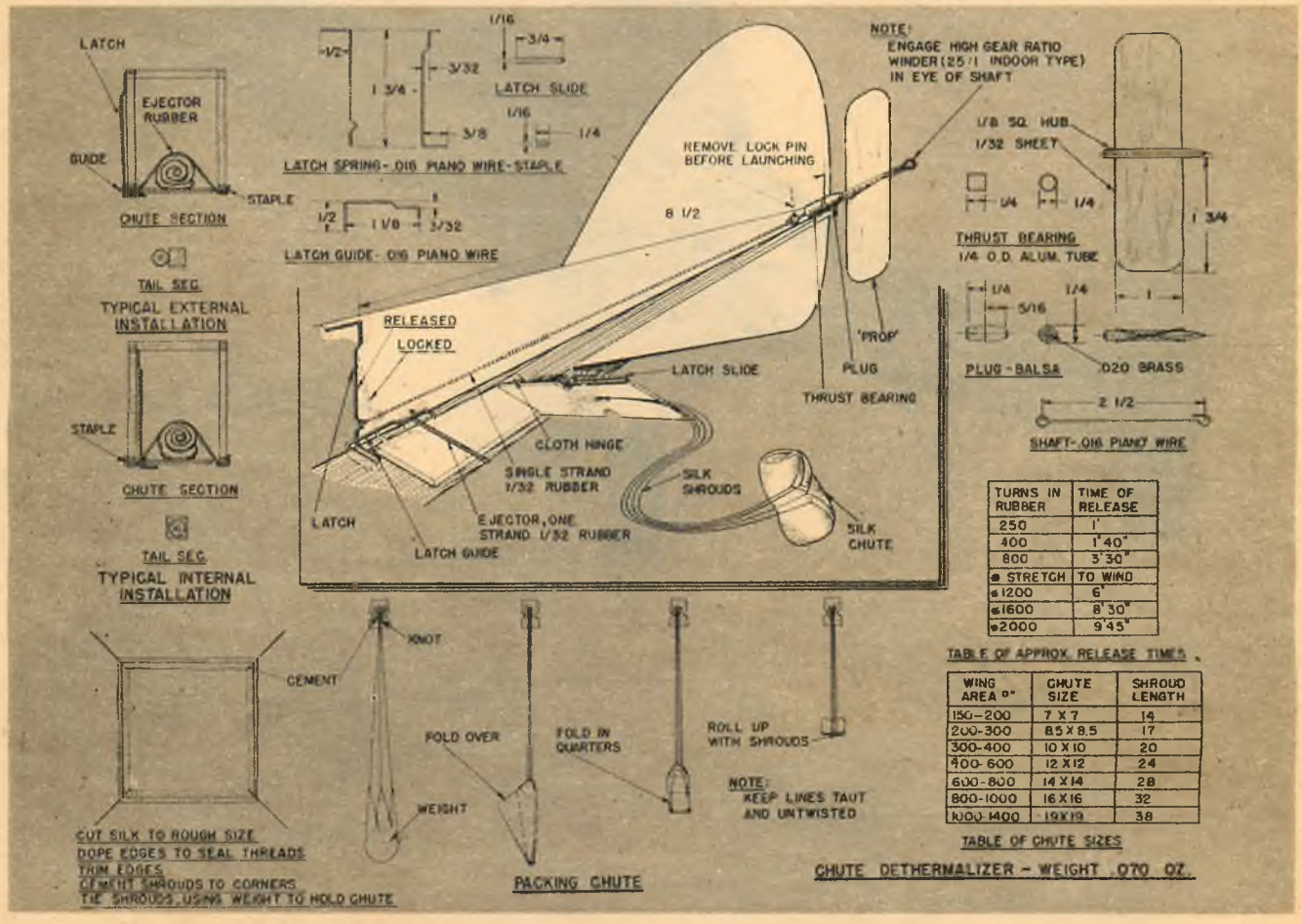
TRY THIS DEPENDABLE PARACHUTE DETHERMALIZER BY ONE OF THE COUNTRY'S TOP DESIGNERS AND FLYERS

UNDER the new rules greater emphasis than ever is placed upon consistent performance. Timing of the model ceases at ten minutes in the air. The total time of three or less official flights determines the duration. All flights in each event must be made with the same model. How times have changed! Not too long ago our problem was simply to get 'em up, and to keep 'em up. But now we need a way of getting 'em down. Many a flyer, lamenting a thermal riding ship, has heard unsympathetic fellows shout, "Shoot it down." Well, this dethermalizer will "chute it down!"

The design of a dethermalizer poses numerous problems. A dependable timer is necessary to release the device at the proper moment. The stability of the model should not be impaired by the means of increasing its sinking speed. The mechanism must be simple and light, especially for rubber-powered models.

Air timers are rather difficult to adjust for long runs, and clockworks are heavy and expensive. After much pondering, the slowly paddling indoor model propeller provided an inspiration. Obviously light in weight, the time can be accurately determined by the number of turns put in the rubber. The difference in tension between the wound and unwound rubber provides the action needed to trigger the device.

Drag, the old enemy, is only too willing to go to work and force a ship down. During the war the Army's CG-4A transport gliders had to be set down in the smallest possible fields. Experience proved that even with spoilers extended the glide angle (*Turn to page 74*)



TURNS IN RUBBER	TIME OF RELEASE
250	1'
400	1'40"
800	3'30"
● STRETCH	TO WIND
●1200	6'
●1600	8'30"
●2000	9'45"

TABLE OF APPROX. RELEASE TIMES

WING AREA °	CHUTE SIZE	SHROUD LENGTH
150-200	7 X 7	14
200-300	8.5 X 8.5	17
300-400	10 X 10	20
400-600	12 X 12	24
600-800	14 X 14	28
800-1000	16 X 16	32
1000-1400	19 X 19	38

TABLE OF CHUTE SIZES

CONTROL-LINE Taylorcraft

BY TED VOGEL

THIS CONTROL-LINE FLYING SCALE MODEL IS JUST THE JOB FOR THOSE SMALL CLASS A ENGINES—KNOWN AS THE A/2 CATEGORY

SOME years ago someone suggested a line of "flying solids." Now, thanks to U-Control, you can fly anything with wings on, including solids. Of course, if we must split hairs, this neat little replica of the experimental four-place Taylorcraft is not truly solid, for its fuselage is partially hollowed out.

The wing span is a bit over twenty inches, which is small indeed for a powered flying-scale model. To achieve this novelty size we used the Mite Diesel. The problem of engineering a powerplant into such a little model is acute but it can be done without marring the outlines of the nose if you are careful. The installation is so compact that the rear of the tank barely misses the bellcrank!

We won't bore you with familiar construction details, but will discuss some of the special features so you won't scratch your head when you reach them.

The fuselage is made from two soft balsa blocks 11¼" long, 2¼" wide and respectively 1¼" and 1½" thick. These blocks should be glued together lightly while being carved and shaped to the outside dimensions and contours, after which the blocks are separated and hollowed out according to the lines shown on the plans. Inasmuch as the drawings are full size we suggest tracing patterns from the plans. When completed the two parts of the fuselage are held together by two dress snaps and a long ⅛" diameter bolt which runs down through the upper half and through a nut which is glued in position under the plywood engine mount.

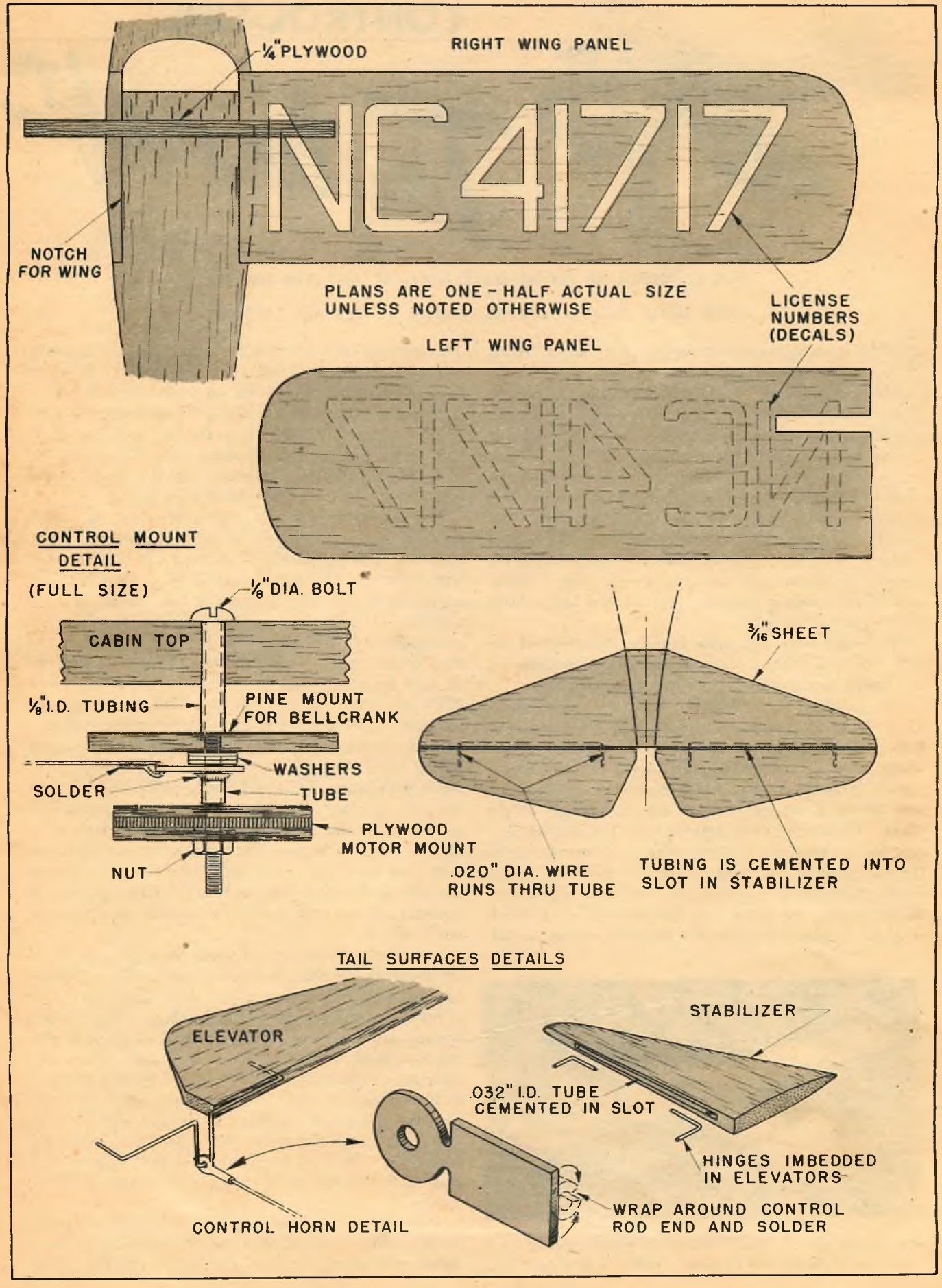
● Have you got an Atom, .099 Vivell Diesel, Mite or other small motor? Double size of plans. Triple size for Class B & C.

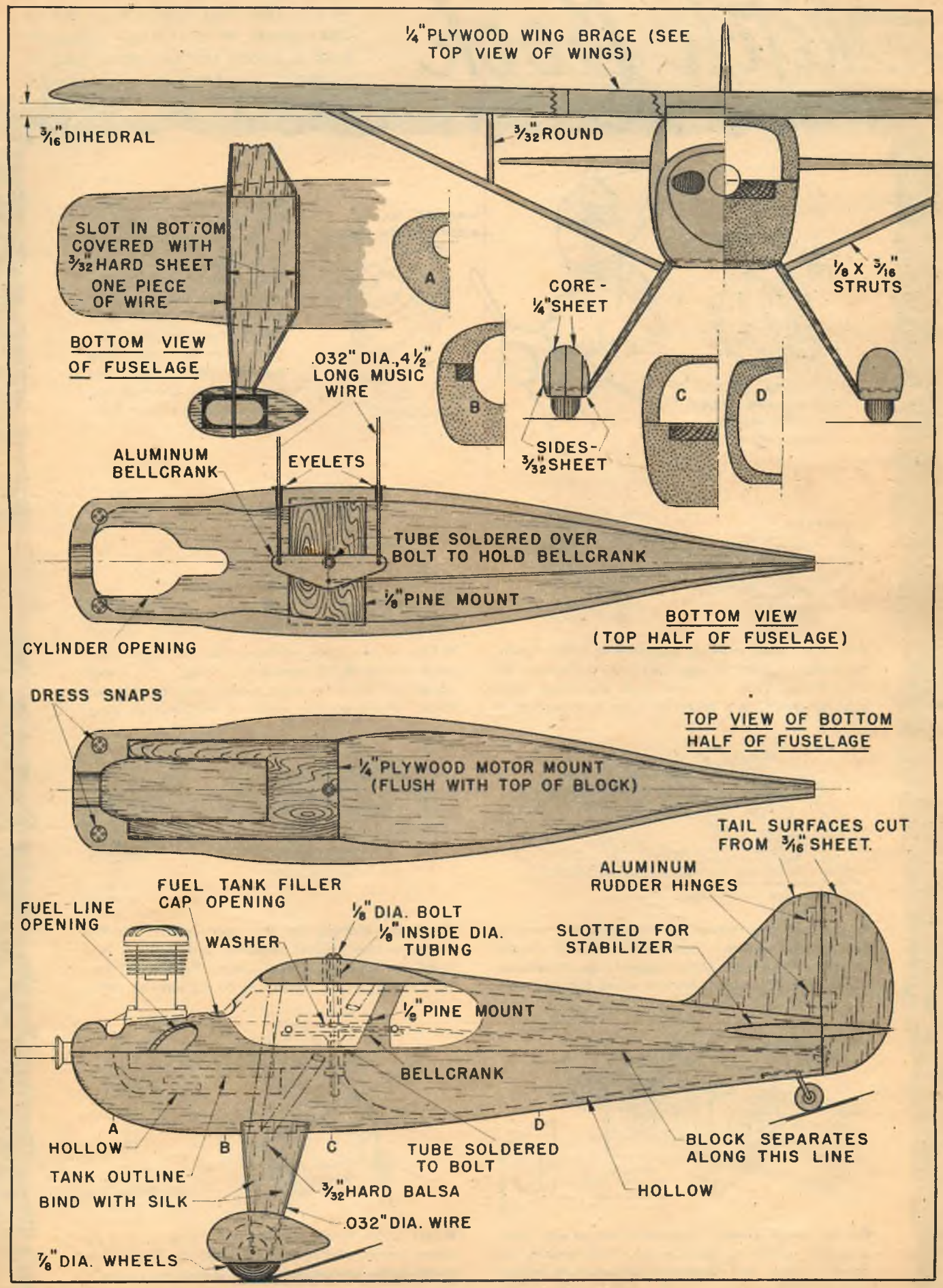
This hold-on bolt also runs through a ⅛" inside diameter tube on which the bellcrank is mounted. A crosspiece of ⅛" pine supports the tube and bellcrank. This is shown clearly in the view looking up at the top half of the fuselage. Washers keep the bellcrank from rubbing on the pine mount. A short piece of tubing slides over the bolt under the bellcrank and is soldered to the bolt to hold the crank permanently in place.

The engine mount is a sturdy piece of ¼" thick plywood recessed into and fitted flush with the top of the lower fuselage block. The mount is held in place with cement. There is a special trick to getting the engine to fit and still permit the two blocks to come together. We disconnected the tank and needle valve assemblies. If the large hole for the cylinder is cut first in the upper block, the two fuselage halves can be held together with the engine in place while you study and mark the spots on the wood that have to be removed to get at the tank, accommodate the fuel line, and the needle valve. For the feed hole we suggest boring a hole through the block then gradually enlarging it with larger drills and finally sandpaper wrapped around a pencil. Use the sandpaper and pencil idea to cut the groove across the nose for the needle valve and the end of the fuel line. Note that the feed line runs over the front of the block, then through a slot in the side of the block, and back to the tank. It may be necessary to force the line down from its usual position but it will fit.

Something should be said about the mounting of the landing gear, the wing panels, and the stabilizer. In the case of the landing gear, a ⅛" deep slot 1 1/16" wide is cut across the bottom of the fuselage. The finished landing gear assembly is simply held in place in this slot by a hard piece of ⅛" thick sheet balsa generously cemented. The wing panels fit square against the sides of the fuselage and into special grooves which will have to be cut with a razor blade or sharp model knife. Note that a ¼" wide slot is cut across the cabin roof; the special ¼" thick plywood wing support will fit into this notch and into slots cut in each of the two wing panels.

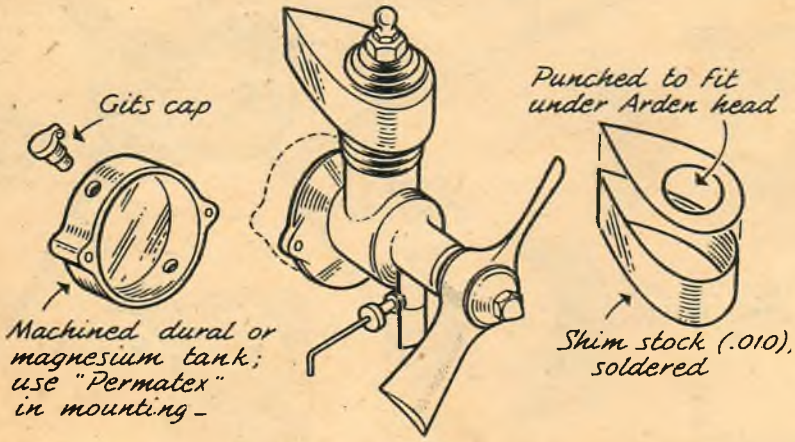
The wing and tail surfaces are made as on any solid model. However, note that the rudder and fin are separated and joined by two aluminum (*Turn to page 86*)


¼" PLYWOOD
RIGHT WING PANEL
NC4171
NOTCH FOR WING
PLANS ARE ONE-HALF ACTUAL SIZE UNLESS NOTED OTHERWISE
LICENSE NUMBERS (DECALS)
LEFT WING PANEL
CONTROL MOUNT DETAIL
(FULL SIZE)
⅛" DIA. BOLT
CABIN TOP
⅛" I.D. TUBING
PINE MOUNT FOR BELLCRANK
WASHERS
SOLDER
TUBE
PLYWOOD MOTOR MOUNT
NUT
3/16" SHEET
.020" DIA. WIRE RUNS THRU TUBE
TUBING IS CEMENTED INTO SLOT IN STABILIZER
TAIL SURFACES DETAILS
ELEVATOR
STABILIZER
.032" I.D. TUBE CEMENTED IN SLOT
HINGES IMBEDDED IN ELEVATORS
CONTROL HORN DETAIL
WRAP AROUND CONTROL ROD END AND SOLDER

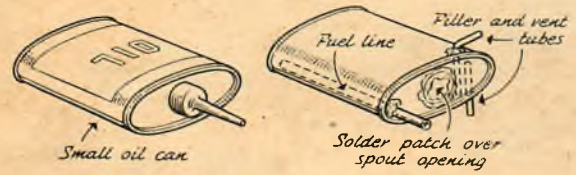

¼" PLYWOOD WING BRACE (SEE TOP VIEW OF WINGS)
3/16" DIHEDRAL
3/32" ROUND
SLOT IN BOTTOM COVERED WITH 3/32" HARD SHEET
ONE PIECE OF WIRE
BOTTOM VIEW OF FUSELAGE
A
B
C
D
CORE - ¼" SHEET
SIDES - 3/32" SHEET
1/8 X 3/16" STRUTS
.032" DIA., 4½" LONG MUSIC WIRE
ALUMINUM BELLCRANK
EYELETS
TUBE SOLDERED OVER BOLT TO HOLD BELLCRANK
⅛" PINE MOUNT
CYLINDER OPENING
BOTTOM VIEW (TOP HALF OF FUSELAGE)
DRESS SNAPS
TOP VIEW OF BOTTOM HALF OF FUSELAGE
¼" PLYWOOD MOTOR MOUNT (FLUSH WITH TOP OF BLOCK)
TAIL SURFACES CUT FROM 3/16" SHEET.
ALUMINUM RUDDER HINGES
FUEL TANK FILLER CAP OPENING
FUEL LINE OPENING
⅛" DIA. BOLT
⅛" INSIDE DIA. TUBING
WASHER
SLOTTED FOR STABILIZER
⅛" PINE MOUNT
BELLCRANK
A
HOLLOW
B
C
D
TUBE SOLDERED TO BOLT
BLOCK SEPARATES ALONG THIS LINE
TANK OUTLINE
BIND WITH SILK
3/32" HARD BALSA
.032" DIA. WIRE
HOLLOW
⅞" DIA. WHEELS

Sketch Book

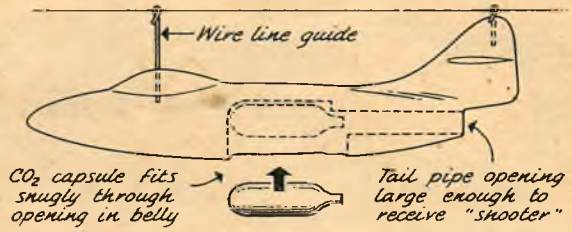
HAVE YOU DEVELOPED SOMETHING NEW IN CONSTRUCTION, CONTROL, OR FLYING THAT MIGHT INTEREST OTHER MODELERS? SEND A ROUGH SKETCH—WE'LL REDRAW IT AND PAY $2 FOR EACH ONE ACCEPTED



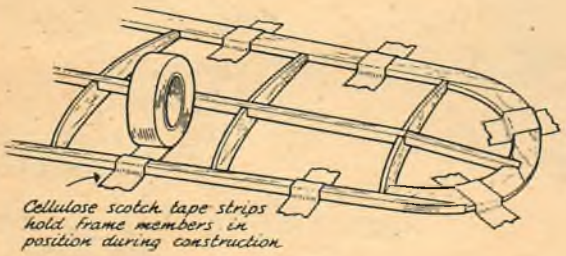
● Arden antics by Charlie Folk, Hampton, Va. (designer of free-flight "Climax" in this issue) include a shim stock heater-fairing for improved glow plug operation and a machined dural tank fitting between crankcase and firewall. Mr. Folk currently holds several national records and has long been a leading contest flyer.



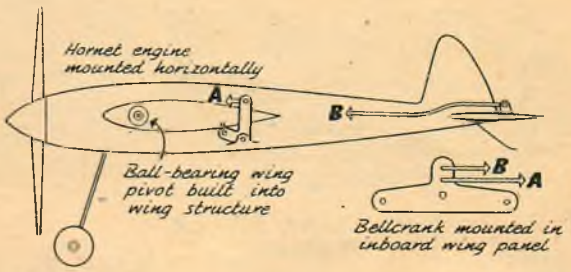
● Ordinary small oilcan is suggested by Arthur Smith, Bradenton, Fla., as an ideal fuel tank, particularly for stunt flying. Brass or copper leads are added, spout opening sealed. Any other ideas for different tanks?



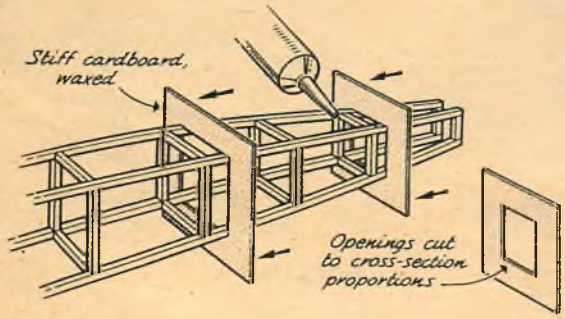
● Kenneth Morris, San Antonio, Tex., arranged internal mounting of CO_2 capsule for "flying" solid models on a line. Most jet scale models may be adapted. Hooks should parallel angle of incidence in wing.



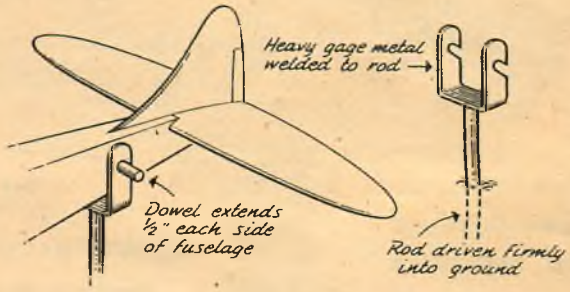
● Why push pins through the framework of a wing or fuselage and weaken or split small members? Donald Macphee, Worcester, Mass., suggests use of cellulose "Scotch Tape" instead, finds it works fast and well.



● A Rube Goldberg idea that really works: Variable incidence stunt model designed and flown ("and how!" he says) by David Corley, Texarkana, Tex. With Hornet engine model hits 80 yet turns on dime.



● Brian Powell, Toronto, Canada, comes up with clever idea for assembling fuselage sides and keeping the corners square. Stiff cardboards are waxed to prevent cement from sticking. Idea speeds building time.



● Solo rubber model winding and flying is done by James Sexton, McKenzie, Tenn. Metallic "helper" is driven firmly into ground; model is thus held securely during winding by rear dowel. Use heavy dowel.

"We'll dream on these snaps... come December!"

Good snaps indeed bring back good times! And how easy to get them... when you use Kodak Verichrome Film. You press the button... it does the rest. That's why it's America's favorite film, by far.

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Kodak Film

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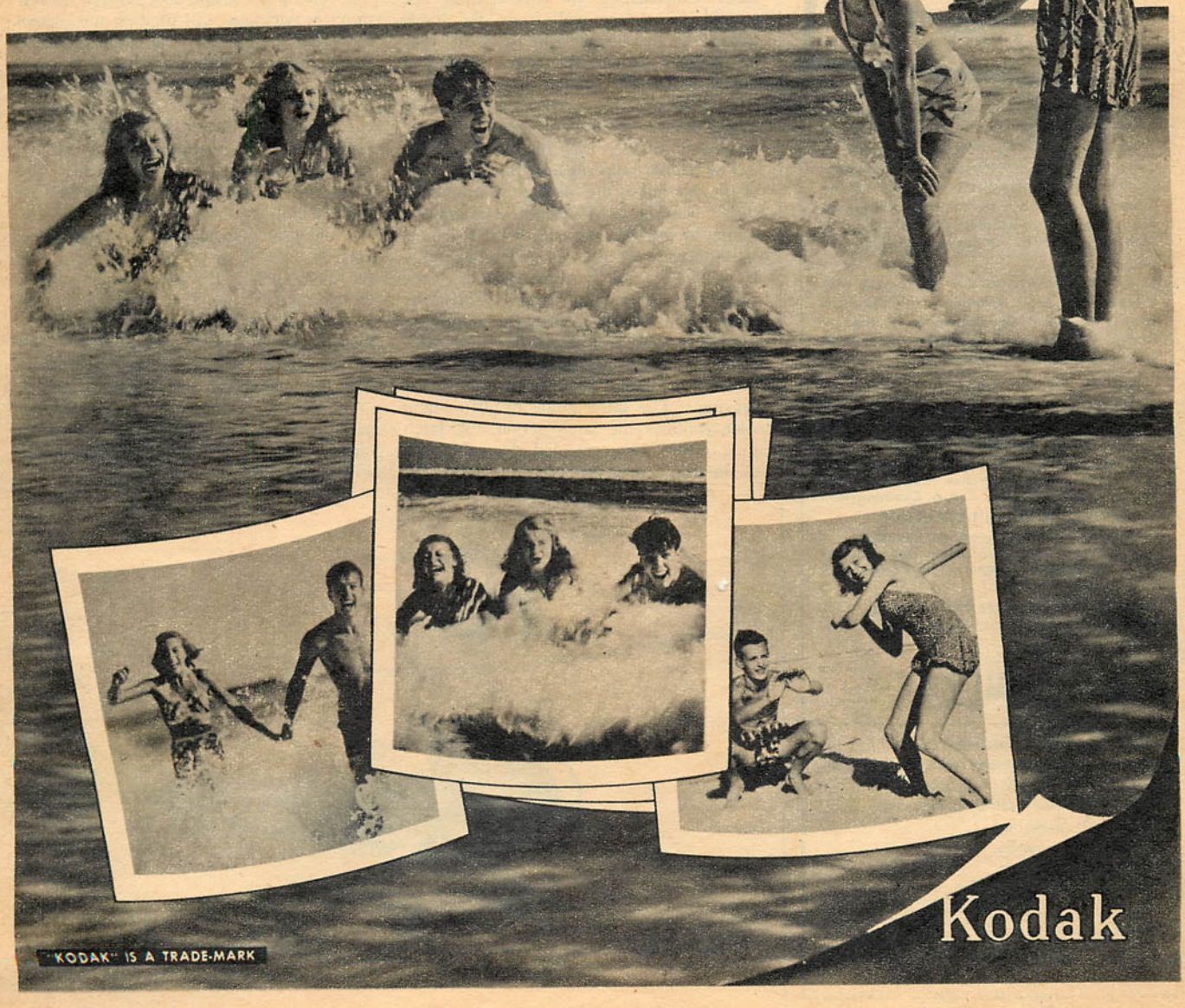


"KODAK" IS A TRADE-MARK

Kodak

CHUTE 'EM DOWN

(*Continued from page 68*)

was still too shallow. A small chute was installed in the tail, accomplishing the steep glide with high sinking speed.

To test the timer and chute design combination a flat gliding Wakefield model was chosen. Excellent results were obtained, with the sinking speed increased about three times, forcing the model through most thermals. On this model the total weight of the timer, chute and installation was only .070 oz., a small fraction of the weight of the conventional timer alone. While rotating, the pitch of the propeller virtually eliminates any drag. No effect was found on the performance and stability of the model while the timer was operating. Upon release of the chute the ship merely descends at a steeper angle.

The unit illustrated is a simple external installation as used on the test ship. A little modification will make it possible to install the system entirely within the fuselage. The timer may be identical for all sizes of models, but the correct chute size should be determined from the table given. Chutes larger than 10" x 10" may be hemmed around the edges instead of doped as for the smaller sizes. Heavier shroud lines of course are required for the larger chutes. Either silk or nylon thread and fabric may be used for material.

The paddle prop must be mounted clear of the tail end of the fuselage. Cement the thrust bearing, a ¼" length of aluminum tubing at the extreme end of the fuselage. Withdrawal of the propeller assembly from the bearing permits stretching the rubber for maximum winds. Form the latch spring of .016 piano wire, modifying it slightly to fit your particular ship. Cement the upper end to the fuselage side, locating it about 8½" from the thrust bearing. The latch guide of .016 piano wire confines the latch action. A latch slide of .016 wire cemented along the edge of the trap door is necessary for consistent triggering, preventing the latch from jamming in the soft balsa. A strip of 1/32" x 1/30" T-56 rubber placed, not stretched, across the hatch opening solves the problem of throwing chute clear of fuselage.

The propeller is built of blades of 1/32" sheet balsa cemented to a ⅛" sq. hub. Shape a plug of ¼" round balsa to fit snugly inside the thrust bearing. Drill a 1/16" hole through the plug and cement washers of .020 brass sheet to each end. Form the propeller shaft of .016 piano wire. Slip the shaft through the plug, add a couple of small washers, and force it through the hub. Bend the end into a loop for winding.

Tie a single strand of 1/32" x 1/30" rubber to the latch and to the prop shaft with a couple of half hitches. Check the operation of the installation. Adjust the position of the latch spring so that it just clears the end of the trap door when the rubber is unwound. Wind the propeller about 200 times by hand. The latch should travel over the trap door, and lock it closed. Releasing the propeller will allow the latch to move slowly back and spring the trap open.

Examine the chute carefully to be sure the edges are free of fuzz that may foul it and prevent full opening. Pack carefully keeping the lines taut and untwisted. Do not roll up the chute too tightly. A few practice packings will develop the correct technique. Note that the chute is loaded in the fuselage with the ends of the roll facing front and rear, and the ejector band over the middle.

In preparing for flight a regular procedure should be established. Wind the propeller the required number of turns, for the length of run desired. Use a winder with a high gear ratio to speed winding. An old alarm clock can be easily converted. Attach a crank to the shaft of the main spring gear and a winding hook to the shaft of the third gear. Lock the propeller with a pin pushed through the loop of the shaft into the fuselage. Wind up the rubber motor or start the engine. Pull the locking pin and launch the model.

As the ship climbs away you'll see the patient little prop ticking off the seconds faithfully until the time when your model will be literally 'dragged' down.

"Step on it, Alec, we're over a swamp!"

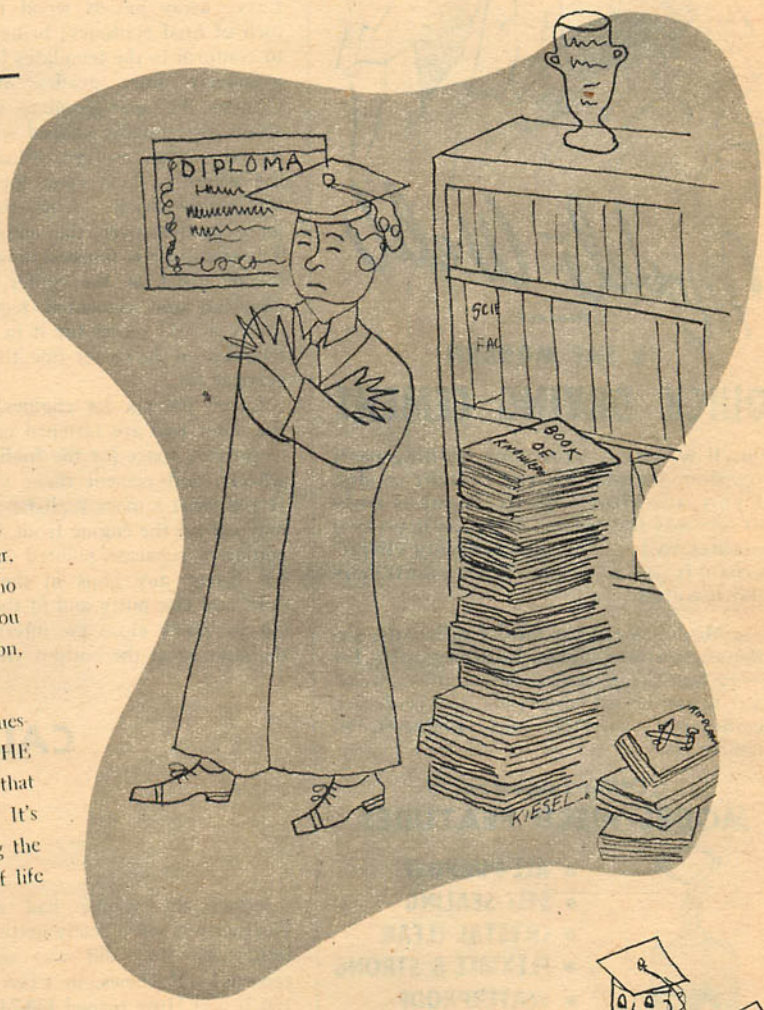
think you know all the answers?

test yourself on these—

WHAT TURNS AN AIRPLANE?
RUDDER, you say.....
WRONG, it's the WING!

WHAT IS THE SPEED CONTROL?
THROTTLE, you say.....
WRONG: it's the ELEVATORS!

WHAT IS THE UP AND DOWN CONTROL OF AN AIRPLANE?
ELEVATORS, you say.....
WRONG, it's the THROTTLE!



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MARTIN XB-48 JET BOMBER

(*Continued from page 59*)

ment by photostating may be done at nominal cost if you prefer a larger model.

Begin by transfering the fuselage side pattern outline to a medium balsa block and bandsawing it out, then trace on the top view pattern and saw it to outline. Carve away excess wood to within 1/16 inch of final contours; bring the surfaces to conform to the templates by use of progressively finer grades of sandpaper. Cement the spar-template in place and attach the roughly shaped wing halves to it and to the fuselage. Final shaping of the wings is done after the joints have thoroughly dried. Note the change in wing section over the engine positions. The stabilizer is finished in one piece then is cut apart at the center, beveled for dihedral, and cemented together again. Carve a "V" recess for it in the fuselage, mount it on the center-line, then attach the vertical fin.

Carve the six jet engines, noting that the outer two are fattened on the outside to provide space for the folding outrigger wheels, and cement them to the wings. If you want a more realistic air inlet, you may cut off the engine front and hollow it, adding a separate pointed "nose" within it. Cover any gaps in the joints with dope and talc putty and fit the balsa sheet covers which close the intervals between the engines at the bottom. Round off the edges neatly and sand the protruding wing trailing edges to thin lines.

Before adding a priming coat of clear dope, go over all surfaces with fine sandpaper and fill any blemishes with dope-talc putty. The control surface outlines may be marked and scored either with a well-pointed hard lead pencil or some bluntly-tapered carving tool—a razor blade makes too thin a line. Next apply two generous coats of filler of the brand or type you prefer, sand this down nearly to wood surface, then apply a third coat. Use emery paper in progressively finer grades for final surface smoothing. Score the control surface outlines again.

You may build up the landing gear of paper clip wire struts with paper wrapping to simulate the gear assemblies. Wheels may be plastic or rubber if you can find the proper sizes, or they may be shaped of balsa. Landing gear doors are of sheet aluminum with tabs for forcing into the fuselage and engine nacelles for attachment.

Spray or paint a number of thin coats of aluminum model dope over the entire model. Then mask off the cockpit, the nose and the anti-glare panel with scotch tape and paint them flat black. Tires, air intakes and outlets, and the interiors of the landing gear wells are also painted flat black.

CALIFORNIA CAPERS

(*Continued from page 48*)

When the smoke had cleared, the Northerners were really getting the attention. All they did was set two new records! Mathews, in Class VI, turned 150.57 and Huth turned 138.74 in Class V. Shiman had a little tough luck and did not do so good. Mathews told us they did some work on their engines: enlarging the by-pass, changing the timing on the back plate, and enlarging the venturi; but all the boys were inclined to give the single-bladed prop much of the credit. The ships are a little smaller than usual, but handled very well. The boys took their bows and congratulations with much modesty, and are a credit to their club, the Alameda Aeromodelers.

Bert Devere, of Duro-Matic, thinks we should also have a "Manufacturer's Class" and not allow a manufacturer or one of his employees to compete in any contest, or accept prizes. He feels that it is all right to show new merchandise, or demonstrate a speed job, but not to compete with your customers.

Eddie and Joe Havlik came up from San Diego with one of the most beautiful models we have ever seen. It is really something out of Buck Rogers' dreams. But Joe tells us that it is designed on sound aerodynamic principles. But it was too windy to risk flying the job. However, if the ship does well, look for a trend in this direction.

One of the weirdest jobs yet seen, was the "One-Half" by Glenn Crist, of Modesto. It was one-half wing, one-half stabilizer, no rudder, side winder mounted.

Irwin Ohlsson, of Ohlsson & Rice, tells us that his company is seriously considering a good-will flight to Mexico in the company's DC-3. The plan calls for taking a number of the top flight boys and visiting all of the large cities of Mexico, putting on demonstration flights, teaching model building, and otherwise helping our Latin American neighbors to learn how much fun it is to fly models.

The Thermal Thumbers, the National Team Champs, are doing a great thing for the kids. They will put on a series of three contests for juniors under fourteen, and seniors fourteen through seventeen. Hand launched and towline gliders. The nice thing is that they will not compete, but just assist and teach the kids. No solicitation for prizes or trophies; the club is furnishing everything.

"PIXIE"

(*Continued from page 57*)

being discharged into a smaller volume of cylinder. Careful balancing of the filing and adjustment are necessary, of course, but it should improve the long run characteristics greatly. Remember, though, there is no backing up on a deal like this. Once done you can't set the engine for short, fast runs—so pick your speed first.

Since we must first have a plane to test out these ingenious devices on, perhaps we'd better start by enlarging the plans to a working drawing. This will be quickly accomplished by use of the scale ruler provided on the plan. Read the dimensions with it directly.

The fuselage is of diamond shape and built around the main frame layout. Build two sides, one on top of the other, and connect with crosspieces of the same size to form a square. The pylon of two layers of 3/32" balsa is notched and cemented to the fuselage main frame. The 3/32" sheet wing platform is cemented to the pylon and wire pins are added to serve as attachment points for the wing rubber bands. Add the round 1/16" plywood firewall, drilled with motor mounting holes. Fill in the fuselage planked section with soft balsa and sand down from a round section at the firewall to a diamond at the rear of the planking.

Cut out a door in the planking for access to the cartridge holder. This is hinged with a strip of cloth. The cartridge should be arranged so that it tilts upward. If you get it tilted downward just after starting the run, the liquid CO_2 will run into the cylinder, "freezing" the piston. This can act as an automatic stop switch in case of a spiral dive due to maladjustment, cutting off the motor when the nose drops.

The elevator and wing are of simple construction. Full size wing and elevator rib patterns are given on the plan. The spars are all 1/8" square balsa. It is suggested that you do not revise the position of the rear spars in the ribs, even though it is tedious cutting the holes instead of just cutting notches in the bottom. This is to prevent the covering from becoming attached to the spars and thereby minimizing the chance of warping.

The leading edge of the wing and elevator are planked with 1/32" sheet balsa. Pick this wood carefully for firmness and clear graining so that it will not be distorted by the covering when it is doped. Wing and elevator tips are made from scrap soft balsa.

The original ship was covered with silk and has proven to be very durable. However it should be stressed that covering so light a framework with silk requires a great deal of patience. It must be put on with just enough tautness to dope up without wrinkling—any more will pull the framework out of line. Doping cannot be done in the usual whole-side-of-the-barn fashion. Dope only two rib sections wide around the wing and elevator at a time and allow to dry before doping the next double section. This avoids the over-all pulls which twist the entire wing out of line.

We'd like to point out that since the plans were drawn it has been found that a better balance of power flight and glide is more easily obtained if the stabilizer is set at a *negative* angle of 2 degrees instead of the zero degrees shown. The ship is balanced at 65-75% of the wing chord and the adjustment tab set for a bank to taper the stall it will show on a straight glide into a floating, thermal-grabbing glide. The original flew best when adjusted for a right circle under power and a left circle in the glide—as do most pylon-type ships. With this setup you'll probably need a little right thrust to overcome the effect of the left rudder.

There is some debate between CO_2-sters about whether a low pitch or high pitch prop is best. Rather than go out on this ticklish limb, I'll suggest that you try both. Personally I lean toward the low pitch side because of a preference for a snappy climb which you cannot get with the higher pitch props. But under some conditions you might get longer duration but less altitude with a high pitch. At any rate, the CO_2 situation in regard to motor duration and power output is far from being as static as you might expect it to be considering that everyone uses the same power source.

When the chips are down, the decision will go to whoever has figured out the proper combination of motor setting and adjustment, cartridge efficiency, and prop.

PYLON ARTIST

(Continued from page 26)

Curtiss Hawk, the Army's first-line pursuit plane. In addition to modeling, Cleland was a scouting enthusiast. A tribute to his all-around ability and perseverance is the fact that he rose through all the grades of the Boy Scouts to attain the coveted Eagle Scout rank.

Before the war, flying lessons were expensive and aviation jobs were not available to the untrained. Enlistment in the nation's air services was very limited, with two years of college a basic requirement for pilot training. The aviation game was a hard one to break into. But Cook Cleland was used to doing things the hard way. He went on to college, studying mechanical engineering at the University of Missouri, until in 1940 he qualified for entrance in the Naval Air Service. And it was on July 16, 1941, that Cleland won his wings at last at Pensacola.

Uncle Sam had footed the bill for the best flight training available anywhere in the world. But he hadn't done so for nothing. He now needed the services of his young officers because of an incident that occurred at Pearl Harbor. The ensuing four years were momentous and yet tragic. But the men who came through it all became the finest flyers this world has ever seen. Cook Cleland served three and one-half years as a dive-bomber pilot, operating principally from the old Wasp and new Lexington. His combat record includes a Japanese carrier sunk and three enemy aircraft destroyed. He was wounded when the Wasp was sunk off Guadalcanal in 1942. His re-assignment to the Lexington took him into most of the major battles of the Pacific. Cleland had attained the rank of Lieutenant Commander by the war's end. His decorations include the Navy Cross, the Air Medal with five gold stars, the Purple Heart and a presidential unit citation.

His last year in the Navy probably played the most important part in Cook Cleland's future. After his sea duty, he was assigned to the Patuxent River Naval Air Station as a test pilot. Here he flew all experimental and development aircraft in the Navy's hands at the time. He also tested captured German and Japanese types. And it was at Patuxent that Cook had his first crack at the big new Corsair F2G, a Goodyear Aircraft development of the famous Vought design. This plane and its engine in particular were a major test project of his. The F2G is the most powerful single-engine aircraft ever built, carrying the 28-cylinder Pratt & Whitney R-4360 Major of 3,500 hp. The many hours Cleland spent in testing both the ship and the engine gave him a thorough knowledge of this flying powerhouse. And this knowledge placed him at the top in air racing.

Two weeks after V-J Day, Cook Cleland was back in civvies. On January 1, 1946, the Cook Cleland Airport at Willoughby, Ohio, opened for business. The young flyer had taken on the responsibilities of married life during his term of service in the Navy, so he had to establish himself on a firm financial basis in civilian life. Furthermore, Cook had staked everything on a flying career in the past, so it was only logical that it must be his future.

You would be justified in calling it a snap judgment that put the ex-naval pilot into the first post-war Thompson Trophy race. The Navy was putting on an aerial demonstration over Cleveland's lake front during a summer civic celebration. Charles Tracy, aviation editor of one of the local papers, turned to Cleland as a group of Corsairs rocket-bombed a target in the lake. "Cook, what do you suppose an F4U could do in the Thompson?" Cook didn't know, but he'd find out!

In two months' time a herculean task was performed. Corsairs weren't available to civilians, but Cleland went to work and had the Navy declare one surplus. For $1,250 he acquired $86,000 worth of airplane. In the hangar of his own little flying field, he stripped off everything that wasn't absolutely needed: wing folding mechanism, radio, lights, armor, flap mechanism, arrester hook, and so on. Additional work was done in Akron at the Goodyear plant where the ship had been built. Two days before the Thompson Race the final paint job was dry.

Cook had originally figured to win that race. But he reckoned without one factor. His plans were built on the supposition that the pre-war race course of fifteen mile perimeter would be used. This old course combined pilot skill, the plane's turning ability and straightaway speed in about equal proportions. But the race officials laid out a new rectangle thirty miles around with two of the legs measuring ten miles on the straightaway. All-out speed immediately became the all-important factor. Against the liquid-cooled jobs, the cream-colored Corsair was no match in this type of race. Cook put on a real show at the pylons, but lost headway on every 10-mile stretch.

Finishing in sixth place netted Cleland just enough money to break even on his expenses for that 1946 event. But the experience gained could not be measured in dollars and cents. Uppermost in that determined young man's mind was the

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desire to fly in the race the next year, but this time to fly an airplane that would really be the one to beat.

It was no accident or break of luck that brought victory and the Thompson Trophy to Cook Cleland in '47. It was careful planning, detailed preparation and hard work that made him the odds-on favorite to win, even before the starter's flag went down. This Cleveland boy left nothing to chance. Still keeping his faith in naval aircraft for pylon racing, he also knew that superior horsepower was the basic requirement for the Thompson. There was only one plane that fitted into the picture as far as Cook was concerned, the F2G, which he remembered so well.

Back to Washington again, up to his neck in the red tape of having these planes declared as surplus, went our now veteran racing pilot. The problem was a real nut to crack, but Cook came home with three of the big jobs. This time there was to be none of that "all your eggs in one basket" stuff. All three would carry the Cleland colors in the big race!

One of the planes was sent for alterations to the Vought-Sikorsky plant. The second was turned over to a group of the Goodyear Aircraft engineers and mechanics who had built it. The third had to be taken care of by the boys at the little Cook Cleland Airport. All this work, of course, constituted a major financial undertaking, and consequently everything Cleland had was mortgaged to see the thing through.

A comprehensive rebuilding job was done on the first two ships. This included clipped wings, smaller vertical stabilizer and rudder, a special air scoop on the upper cowling and addition of several tanks for fuel and water injection systems. All combat and radio equipment and several other mechanisms were removed. The wing flaps, too, were removed and carefully fared over! Each was equipped with a Hamilton Standard Hydramatic four-bladed propeller using special thin racing blades. As a result, the planes were identical in performance, showing a top speed of 445 mph at sea level and a landing speed of 116! The Vought job retained its original Navy blue color with the addition of a blue and white checker-board design on the cowling and white striping on the wings and fuselage. It bore the racing number 74. The Goodyear craft was white with red trim and numbered 94.

Early plans included a try at the Bendix Transcontinental Derby, but subsequent calculations showed that the big Corsairs hadn't enough superiority over the Mustangs in this type of flying to justify the additional expense. So all attention was focused on the Thompson. Cook selected No. 74 for his own personal use. Richard Becker and Tony Janazzo, two other ex-Navy flyers from Cleveland, were engaged to handle the second and third ships respectively.

The break that had gone against Cleland in the '46 race turned in his favor in '47. This time the officials decided that the Thompson should consist of twenty laps of a fifteen mile, four-sided course. That meant eighty pylon turns in the race,

an ideal situation for the shipboard fighters with their large wing area.

Thirty-three entries were filed for the big race. But the starting field was limited to the twelve planes showing the highest speed in a two lap qualifying run around the course. Cook and Becker turned in 401.787 and 400.941 mph respectively, the highest speeds registered! Their closest competitor was Paul Penrose in a red hot P51-H at 390.948. Janazzo's plane was definitely slower, 372.417 mph, and closely matched by Ron Puckett, who also had managed to acquire one of the super Corsairs. Their special factory revamping and racing propellers gave the two fast jobs a decided superiority.

The race itself, of course, is now history, but its highlights will be long remembered by spectators and participants alike. The spectacular but dangerous mass take-off with its mad scramble for position at the first pylon, Cook Cleland's gradual acceleration as he worked his way from fourth to first place in three laps with Becker following like a shadow, the crashes and forced landings which plagued the race as the other contestants pushed their engines beyond the limits of mechanical endurance in trying to catch Cook—these featured the fastest of all Thompson Trophy races.

The Corsairs definitely proved the soundness of Cleland's faith in their superiority. Cook's average speed for the 300 miles was 396.131 mph, a new international closed course record. His fastest lap of 404 also constituted an international record. It is interesting to note that whereas the Navy allows the type of engine used in this ship to be run at 3,000 hp for maximum periods of three minutes only, Cook ran his at 4,000 hp for 48 minutes!

But it would be too much to expect no bugs to show up. Sure enough, Becker's ship blew off five exhaust stacks in the 300-mile grind. Monoxide fumes in the cockpit caused him to throttle back toward the end of the race, almost losing second place. This difficulty undoubtedly explains the mysterious death of Tony Janazzo, who crashed in the seventh lap with his engine apparently functioning perfectly.

Cook Cleland's victory netted him, in addition to the coveted Thompson Trophy, $16,000 for first place, $1500 in lap prizes (at $100 a lap), and the Allegheny-Ludlum Award, with its accompanying $2000. The Allegheny-Ludlum Award is made only when a new Thompson speed record is established. Becker's second place brought in $8,000, plus a $100 lap prize. An additional 10% bonus from the Kendall Oil Company brought the total up to $30,360 for the team. It would have been a glorious day for the Cleland group, had it not been for the tragedy which befell its third member.

To the oldtimers, victory in the Thompson was the climax of a racing career. Jimmy Doolittle and several of the others retired from active competition after that accomplishment. But to Cook Cleland this is a good beginning. In fact, he stands out as the leading contender for the 1948 event.

Cook has definitely not forgotten the ladder by which he rose. This new racing champion has become the year's outstanding personality in the promotion of model building activities in the northern Ohio area.

Out at the little Cook Cleland Airport is a man who always has time in his busy life for the kids on whom aviation's future depends. He believes in lending encouragement to all of them, for who can tell which one may some day have his own name engraved on the Thompson Trophy alongside that of Cook Cleland.

CLIMAX

(Continued from page 45)

tail moment arm, and a medium small rudder the "Climax" has the best flight pattern possible for contest work. Under power the model will R.O.G. beautifully, heading up and to the right immediately after release, and will continue to spiral upwards until the motor cuts, when it will change to a flat turning glide without loss of altitude. Full info on the uncanny flight arrangement is given later with flight adjustment tips.

Many short cuts in building time are given in the following instructions. Read them carefully before starting construction of your "Climax."

From dimensions on the drawings, lay out the fuselage profile on your work bench. This should only take a few minutes as the longerons are symmetrical about the fuselage center-line. Note that the forward pylon upright is longer than the aft upright, providing for 3/16" positive incidence in wing. All horizontal dimensions are given from rear of spinner. Pin down the top and bottom ¼" sq. longerons over the layout. Successive models used ¼" x ½" rear pylon upright instead of size shown on plan for simplicity. If you do this thin down pylon rib P-1 trailing edge to ¼".

Cement the compression members in at stations 12¾ and 17. Notch the upper longeron for the pylon uprights and cement them in place. Take up the frame at this point and locate the ¼" plywood formers and former F-4 as indicated.

Next slide the hardwood motor mounts in place. The ear overlapping the mounts on the plywood formers may be removed and cemented in place after the mounts are located, if so desired. When a motor other than the Delong "30" is used, be sure to re-plot position of motor mounts on the firewall so they will be in such a position as to bring the motor shaft on

the fuse center-line. A Forster .29 or .305 cowls in much easier because of more room above the mounting lugs. When using a Delong the tank must be shortened about 3/16". This may be accomplished with a hacksaw if a lathe is not available. After sawing, file the edge flat and clean the tank well before replacing it.

Complete the pylon leading-edge by cementing 1/4" x 1 1/2" sheet to both sides of upright, lapping it over both the top and bottom longerons. Trim top of uprights for good flush joint with the 1/4" x 3/4" pylon top, cementing this next. Note the pylon top is long enough to clear the wing 1/2" at each end so that wooden or wire pins are not necessary to hold the wing rubber. Leave the pylon at this stage and install the landing gear according to the drawing, or use your favorite installation method.

The next step may seem a little premature at this stage of construction, but will save headaches later. Cut away the forward pylon upright to accommodate the spark coil, cementing it flush with rear of firewall. The high tension wire goes into the pylon and out the leading edge at spark plug height. Use a paper condenser with stranded leads, placing it above the coil. Complete the entire wiring job, soldering all joints, and leaving wires to the battery box and timer long, so they may be cut off to proper length later. Solder ground wire to one of two brass plates which retain the motor mounting screws. Solder screw heads to plates on underside of motor mounts. After the wiring is completed, with the exception of timer and battery box, put on both side longerons with cross braces between them of the same length as the upright cross braces (compression members).

Cut out formers F-1, F-2, and F-3, making four of each, and cement them in place. Place the 1/16" x 1/4" strips between the longerons, forming the diamond shape for the rear of fuse. Plank both top sides, using medium soft 1/16" x 2" sheet balsa. Pull planking down well on all edges, using pins to hold it in position. Pulled down properly, it should fair in nicely from the perfect circle in front to the diamond shape of the aft section.

Construct a battery box from 1/16" plywood with inside dimensions of 9/16" square by 4 1/2" long. Use a sheet brass plate in each end of battery box and a small compression spring on the negative end, which should be toward the rear of fuse. Most hardware stores carry an assortment of springs from which can be chosen a few good battery box springs. Cement the battery box and Austin timer in place next, cut off excess wiring to proper length, and solder these connections. Plank both bottom sides. Put in filler sheet between side longerons to finish stabilizer saddle.

Complete the pylon by inserting the four ribs, P-1, and planking over them with 1/16" sheet. Cement the wing seat on pylon top and reinforce with a strip of crinoline or heavy fabric across the seat. Use balsa fairings under both sides of wing seat. Pylon fairings go on next, then the cowling. Carve the cowling from balsa blocks, carefully fairing it in with the 2 1/4" Froom spinner. Bottom half is ce-

mented on permanently. The top half may be made in one piece, slipping down over the motor and held down with large dress snaps, or may be made like the original ship, with two halves of the top hinged to the motor mounts at the outer edges.

Trim all fairings down, giving the pylon a good streamline shape. Sand entire fuse, filling in any bad spots with a good wood filler. Talcum powder and dope does the job nicely. Cover the fuse with silk. If silk is not available use the next best thing, nylon or Silkspan. A good filler for the silk pores is Proxylin (glazing putty), which may be purchased at any paint or hardware store, and will thin out with dope thinner. Use about two coats of this or some other good filler, sanding well after each coat. Use 3 or 4 coats of colored dope, sanding after each with #320 wet-or-dry paper. Put on a finish coat and rub it down with #500 wet-or-dry paper keeping paper wet with water while using. Do not dope spinner as it will become scratched and the dope will peel. Be sure to use the dural backing plate that comes with the spinner. When finished you should have a beautiful fuselage which will stand a terrific beating and will weigh enough to bring the ship up to the required power loading without adding unnecessary extra weight.

The wing is very simple and should go together with a minimum of effort as there are no elliptical tips to plot and build and all ribs are the same. The false ribs give a smooth airflow over the wing as there is no sag in the covering between ribs. Use ¾" Jasco trailing edge stock and notch to accommodate the rib trailing edge. Carve the tips from soft balsa blocks and hollow them out, or carve them completely away on the bottom. Cement the ⅜" sheet wing seat pad between the inboard ribs at the center section to match the wing seat on the pylon. Cement 1/16" sheet balsa between the first ribs on the top only. Wing is covered with dyed Silkspan. (A 15¢ package of Pagoda Red Tintex will dye a dozen sheets beautifully. Follow dying instructions on the package.)

The stabilizer construction is practically warp-proof, an important factor for a ship using a large lifting tail. Using a 22" leading and trailing edge, pin them down to give an 8" chord. Connect them with 1/16" x ¼" strips with a 2" spacing between them and a ⅛" sheet rib at each end. Cement the spars on top of strips next, and bend the same size strips over the spars to form the airfoil section. Hold them down with pins while cement is setting. Cut end plates from 1/16" plywood and cement to end ribs. Plank top and bottom of center section, and cut a ⅛" wide slot in the top to accommodate the rudder which slides through and is cemented to the bottom sheeting and the spars.

Use ⅛" sheet balsa for the rudder. Be sure to make a good workable tab, using soft iron or copper wire for hinges. Holding the complete tail assembly to the fuse with rubber or pins, carve a balsa fairing block flush with fuselage.

The "Climax" should balance near the wing trailing edge with all equipment placed properly. Test glide the ship on a calm day in high grass, if possible. Cock the stab up just a little to the right to give the ship a flat right turn. Eliminate stalling tendency, if bad, by shimming under the stab leading edge. Glide your ship until you are well satisfied with the results; it will pay off later.

Set the timer for 7 to 10 seconds when you are ready for powered flights. Lean the motor down to where it just breaks into two-cycling with a low timer position for the first few hops, gradually increasing the power, if no spinning characteristics develop. Spinning in to the right is eliminated by a little left tab, if needed. The ship should climb and glide to the right. When the climb is good and a slight stall is noted in the glide tighten up the turn by cocking up the stab to the right more.

The glide should have a very tight and very flat circle, in fact the tail should skid around slightly in the turn. That is the secret of the amazing glide which can be had with the "Climax." The speed of the ship is at a minimum with the surfaces almost stalled. It will bounce around on any slight thermal or updraft, and will stick in the smallest thermal over the field, while the ordinary model will glide right through the thermal getting very little benefit of the rise, if any. If the glide of the "Climax" were straightened out, a violent stall might appear. Of course, with other adjustment this could be eliminated—but for the best in contest performance keep the glide slow and flat.

Don't underestimate the power of adjustment in cocking that stabilizer. Once the technique is mastered you will have no trouble climbing and gliding your ships in the same direction without having them wind in under power. In using this arrangement there will be no dip when the engine cuts, as the ship will just swing around on the wing tip and level out.

A word of caution—when increasing the motor run to 15 or 20 seconds use low power again until you are sure the ship won't develop a winding tendency with the longer runs. If it does, give it just a little more left tab. To retain the original flight pattern then it may be necessary to raise the stab a little more to the right. Above all, keep your "Climax" skidding around in tight circles in the glide.

"No! No! Don't ever dust this table!"

REPORT FROM WASHINGTON

(*Continued from page 64*)

they can learn, and so on. If there are problems which the local auxiliary member cannot answer, she refers the matter to Mrs. Hillegas or to Russell W. Nichols, director of the AMA.

Mrs. Hillegas has invited her Women's Auxiliary members to attend the National Model Airplane Meet in Olathe, Kan., August 3-8, and has notified them of the NAA convention in Minneapolis in June.

Point System for National Champ Proposed: Frank Greene, chairman of the Control-Line Speed Advisory Committee and an active West Coast modeler, sent in a proposed point system recently for selecting individual champions at the Nationals. The system, which has received the approval of the California Association of Model Clubs, is with a few minor revisions the same as that used at the All Western Open last June. A complete description of it would consume more space than we have here, but it is based, generally speaking, on the assumption that a champion modeler is one who can build and fly a variety of models successfully. As in the past, the categories to be used in deciding individual champions (there will be Junior, Senior and Open champions this year) are those in which national records are recognized. Events are divided into five groups, and in addition to points being given down to tenth place, "bonus" points would be given for official flights made in more than one of the groups. In order to prevent a contestant from piling up a high point score in one group, the California modelers voted to restrict the contestant's total points within a group to his best effort in that group. While this system tends to favor the all-around flyer, says the Association, the recommendation is also made that there be no wide variation between the prizes given the individual champ and those given the "specialists" who clean up in one group. Excellence with one type of model comes only as the result of painstaking practice and experiment for which, they say, there should be a fitting reward.

Greater Pull Test: Since the start of the 1948 contest season, control-line speed records have been constantly climbing. Both in gas and jet categories the records have been broken and rebroken.

As speeds increase, the Academy is receiving all too frequent notice that control-lines, connections, and control mechanisms have been failing. These failures are increasing at an alarming rate despite the almost universal application of the 20 G pull-test.

In accordance with the procedure established by the AMA Contest Board last season, no changes can be made in the rules until next fall when necessary revisions will be considered for 1949. Therefore, while it is not contemplated that the 20 G pull-test will be revised this year, it is important that all contest directors realize the increasing danger in connection with control-line failures.

By applying the standard centrifugal force formula to the official control-line lengths, a 20 G pull occurs at 110 mph in Class A, 125 mph in Class B, 133 mph in Class C and 144 mph in Class D. The official national records for Class B, Class C and Class D are already in excess of these speeds. Even in Class A, the official record of 107.5 mph prompts us to predict that this class too will exceed the 110 mph figure. Contest Board Chairman Walt Good urges that contest directors voluntarily use a 25 G pull-test for the remainder of the 1948 season.

It might be well to point out that a pull-test of the lines alone is not sufficient since any control mechanism within the ship which is subjected to pull during the flight of the model is of equal importance in the prevention of accidents.

Safety in Control-Flying: Hank Cole of Tacoma, Wash., points out in a letter to AMA that there are a number of speed jobs which are built with a limited bell crank movement. This means that when full up- or down-control is applied to the model in flight, the entire pull of the

model is carried by one line. Hank continues, "Assuming that this condition exists under 21.6 G and .001 for each 3 ounces, my slide rule says that the applied stress is 515,000 psi (pounds per square inch), which exceeds the tensile stress of the wire. Then, too, some model builders have their jobs towing out and so add a little more pull to the lines, and if on top of this you consider the stress put on the lines by whipping a heavy job up to speed, ouch!"

Another point is his observation that an improper method of attaching fuselage halves may allow the lower half with the engine to fly off. Hank adds that he saw this happen on a "49" job doing well over 100 mph and was a near casualty himself.

As a final thought Hank wrote, "Maybe the pull-test weakens the connections and the vibration does the rest. In any event, I would feel a lot safer around the speed circle if the safety factor of lines was increased. The suggestion of 25 G is a step in the right direction, and just to be on the safe side, I would be in favor of Frank Greene's .001 for each 2 ounces."

Special Control-Line Rules Ready: Under the guidance of Chairman Dick Schumacher of Burbank, Calif., the Precision Acrobatic Committee has completed preparation of rules covering control-line categories other than speed. Other members of the committee include: Roy Mayes of Berkley, Calif., Charles Hollinger of Seattle, Wash., Val Sherrard of Topeka, Kan., and Ted Schindler of Hampton, Va. Every effort has been made by the committee to develop a scoring system which is both simple and fair. Wherever possible, the accumulation of flying points in these categories is based on a mathematical or factual method rather than simply judgment by a group of judges.

Special Event Offered For Nationals: Negotiations are under way with the managers of the Nationals for a new and special event to be held for the first time this year. The event is being offered by Pan American World Airways and is to be known as the "PAA-Load Event." While there is nothing particularly new in the idea of holding a payload event, the application of the idea by Dallas B. Sherman, PAA Operations Representative, is not only interesting but offers a challenge to the designing and creative ability of model builders in this country.

The event will be for free-flight models and will be limited to Juniors and Seniors (flyers under 21 years of age) in Class B only, .20 to .30 cu. in. displacement.

Dallas Sherman, himself a model builder from way back, has worked out a set of special rules for the event. Though for the most part they will conform to the regular AMA free-flight rules, a few additional requirements have been added. Chief among these will be the rule allowing each contestant three flight attempts. The best single official flight of these three will be recorded as the official time. The models must R.O.G. Each launching of the ship for take-off will be considered an official attempt. The engine run will be 20 seconds, as usual.

The requirements for the payload itself are unique in that they require each model to carry two weights of one half pound each. These weights will be in the form of a simulated pilot and co-pilot with bodies of 3" x 3" x 1" surmounted by 1" squares on top of the figures simulating the head. While the figures must be securely held in the model during flight, it is required that they be removable from the model in normal fashion. That is, if the model is a cabin type it must be possible for the figures to be put in place through a door or latch similar to a full scale aircraft. The "bodies" may be placed side by side or in tandem and the model may be either a cabin type or canopy enclosure type. A normal range of "vision" must be provided for the pilots.

This year's prizes will consist of: 1st place, $500 value; 2nd place, $250 value; 3rd place, $100 value. The first 10 flyers qualifying in the event will receive qualifying prizes of $25 cash each.

For info, write to Education Director, Pan American World Airways, 2819 Bridge Plaza North, Long Island City, N. Y.

Air Trails

AIRMEN OF VISION DESIGN COMPETITION

(*See page 38*)

In response to many requests *Air Trails* has opened its columns to model builders and full scale airplane designers who are interested in presenting simplified plans for aircraft of the future.

There will be no formal rules or regulations governing the competition other than the following:

1. Three-view sketches of the proposed aircraft will be required. These sketches may be of any size convenient for handling except that they must not be less than 8½ by 11 inches for the entire three views.

2. Sketches may be submitted in pencil or as inked drawings. If possible sketches of the complete airplane preferably in three-quarter front and/or rear position should be included.

3. If any entrant wishes he may submit photos of a completed model of his proposed design.

4. Each entry must be accompanied by information concerning the type of power plant(s) utilized, together with estimated performance, dimensions and explanations of any unusual features.

5. Entries will not be returned and for that reason those participating in the competition should make certain that they retain copies of all material sent to this publication.

6. Because of the large number of entries anticipated, the editors cannot entef into correspondence concerning designs submitted.

Designs may be of any type within the realm of reason: commercial aircraft, military planes —both small pursuit craft and large bombers and troop transports, planes for the private flyer and single-place sporting craft.

Entries will be divided into professional and amateur classes. A professional entrant is one who earns his or her living or works part time in any of the many places of the full size aircraft business. Amateurs are all others including model builders, private pilots and the individual generally interested in aviation. Each entrant must classify himself. Additional data as to age, occupation or schooling, and aspirations will be welcomed.

The best entry each month will be prepared for publication by recognized aviation illustrators. An award of $25.00 will be presented to the individual whose entry is judged by the editors as the most practical or of the greatest significance. Awards of $5.00 will go to runners-up.

An annual trophy award will be made for the outstanding design of the year.

CHAMPMAKER

(*Continued from page 50*)

plenty of cement on all joints. Remove the sides when dry and slip a razor blade between the strips to separate them. Pin the flat, cabin portion of the sides on the top view, and install the cross-pieces in this section. Check the structure carefully to be sure it is square. When dry, pull the nose and tail ends together and fit the remaining cross-pieces. Build up the nose fairing of 1/16" sheet formers F-1, F-2, F-3. Add the windshield former F-6 between the upper longerons. Fit the dowel pin mounts, F-4, in the rear of the fuselage.

Form the landing gear of .040 piano wire to the full size pattern given. Cut out two landing gear clamping formers, F-5. Install the first former against the back of the fourth upright. Attach the landing gear to it with several coats of cement. When dry, add the second former. Slip a pair of 1¼"-diam. hardwood wheels on the gear and bend over the projecting ends of the axles.

The nose plug is carved of a single block of balsa ¾" x ⅞" x 1⅜" with the grain running parallel to the ¾" dimension. Make a cut with a coping saw ¼" from one end, about 3/16" deep on the sides and bottom, and 5/16" deep on the top. Split away the material, almost to the depth of these cuts, and fit the resulting plug snugly into the nose of the fuselage. Using knife and sandpaper shape the nosing to blend smoothly with the lines of the fuselage. Drill a 3/32" hole through the nosing.

The propeller is carved of a block of medium balsa ⅞" x 1⅜" x 9½" laid out as shown on the plan. Drill a 1/16" hole at the center. Use a very sharp knife and coarse sandpaper to work the prop down to rough form. Shape the blades to an airfoil section undercambering the back about 3/32". For maximum efficiency the section should be quite thin, about 3/32" thick at the widest part of the blade. Make the hub ¼" wide and ½" deep.

Form the propeller shaft of .040 piano wire, leaving the looped end to be bent after installation. Bend up four bearings from scraps of .020 thick brass. Punch or drill them with a bit of sharpened .049 piano wire and remove any resulting burrs with a file. Drive a bearing into each face of the nose block. Insert the shaft and check the angle carefully while the nose block is in place. Apply several coats of cement to the bearings to anchor them securely. Note that the nosing is removable and not cemented in the fuselage.

Cement the other bearings on each face of the propeller hub. Form the free wheeling latch of .020 piano wire. Looking at the propeller from the front, locate the latch so that when engaged a right angle is formed between the prop shaft and the latch wire. Push the spur into the prop and press a small staple, formed of a bent pin, over the latch wire. Apply several coats of cement to hold the wire securely.

Slip the prop shaft in place, using three washers between propeller and plug, and form the looped end.

Cut all the ribs of 1/16" soft sheet balsa —16 of W-1, 23 of R-1, and two each of T-1, T-2, T-3, T-4, and T-5. Shape the wing trailing edge of 1/8" x 3/8" to a wedge section. Pin the trailing edge to the plan, set the tip and center ribs in place, and pin the leading edge of 1/8" sq. against the ribs. Add the remaining ribs and the 1/16" sheet balsa tips. Install the 1/8" sq. spar and fit the false ribs. Block up each tip two inches for dihedral. Cement the shaded sections of leading and trailing edge in place. Join the spars with gussets of 1/16" sheet. When dry, cut away the ends of the center ribs to receive the gussets reinforcing the leading and trailing edge joints.

The tail surfaces are assembled in identical fashion. The angle of the root rib should be carefully duplicated to assure the correct setting when the tail is installed. Check the angle of the spar and root rib with the template provided. Block up each tip 5 3/4" and join the spars with former F-7 of 1/16" sheet. Fit 1/16" sheet between the root ribs, from the spar to the trailing edge.

Sandpaper the entire framework carefully to remove any bumps that might spoil the covering. Reinforce the rib and trailing edge junctions with extra coats of cement to resist the pull of the covering.

Cover the model with light-weight tissue, using as little dope as possible to stack the covering in place. The grain of the paper should be run lengthwise on all surfaces. Leave the small panel directly under the dowel rubber pin uncovered for access to the motor. Spray lightly with water, and when dry apply two coats of thin dope.

Cut a piece of thin celluloid to the approximate size of the windshield. Pin it in place and score the exact outline of the windshield with a razor blade. Remove the celluloid and bend along the scored lines to snap off the excess. Replace the windshield using the pin holes as guides. Carefully run a little cement around the edges of the windshield to hold it in place. Form four small wing attachment hooks of bent pins and cement to fuselage. Install the tail fin F-8 of 1/16" sheet.

Locate the tail assembly at the angle shown on the fuselage side view. Hold it in place with a couple of dabs of cement until the setting has been confirmed by test. Attach the wing with a pair of light rubber bands. Make up the rubber motor of a strip of T-56 3/16" flat brown rubber 8' 3" long. Tie the ends together securely with a square knot and loop into six strands. Lubricate the rubber with a solution of equal parts of green soap and glycerine, wiping off any excess. Hang one end of the motor on the prop shaft and draw the strands through the fuselage with a length of string. Fix the motor in the rear of the fuselage with a 1/8" dowel pin.

When flying, balance the model, shifting the wing till the center of gravity is 1 5/8" from the leading edge. Hand launch the model into a glide, pointing the nose down slightly when it is released. Try numerous glides to get the feel of the ship. If it persists in diving, check the setting of the tail and raise the trailing edge if necessary. Correct any stalling tendency by lowering the trailing edge of the tail. Bend the left tab *up* and the right tab *down* to produce a gentle turn to the *right*. Do not be afraid of cracking the tabs as the paper covering will allow the tabs to be formed without damage.

Engage the free wheeling latch and wind the propeller about 150 times. Hand launch the model gently into the wind. It should climb in a large right circle. Adjust the size of the circle under power by tilting the thrust line in the direction desired. If the model stalls, tilt the thrust line down. Use small slivers 1/64" to 1/32" thick between the nose block and the front of the fuselage to get the correct angle.

When "Champmaker" is performing to your satisfaction, hook a winder to the propeller shaft, pull out the rubber about five times its length and pack in the turns. Under the enthusiasm of the 800 turns possible, "Champmaker" will streak into the blue and settle down to a long cruise.

CONTROL-LINE TAYLORCRAFT

(Continued from page 69)

hinges to permit adjustments of the rudder. Three-sixteenths inch thick soft sheet balsa is used and both surfaces (vertical and horizontal) tapered toward the tips.

The landing gear is made from one continuous piece of 1/32" wire with both landing legs filled in with 3/32" hard sheet. Each leg is wrapped with silk or thin linen and doped. This is necessary to keep the wood from popping out from between the wires. The wheel pants are conventional, being laminated from two pieces of 1/4" sheet and two pieces of 3/32" sheet as shown. Make a blank first, then shape to the outside contours. Be sure the wheels turn freely.

One interesting feature of our little Taylorcraft is that the fuselage sides, being solid and an appreciable distance from the center-line of the ship, serve as the guide plate for the lines. Two eyelets are inserted and glued through the fuselage sides at the marked positions. Extend two lengths of music wire (1/32" diameter) from the bellcrank, through the eyelets, and a few inches out from the fuselage sides. Solder the bent-over ends of the wire where is fastens through the bellcrank holes, and bend loops in the outer ends of the wires. These loops are soldered; the control-lines attach to the loops.

The finishing of the model consists of a good sanding, followed, if possible, by a filler coat and then three coats of colored dope. Sand lightly with fine paper between each coat.

WATCH THAT WARP!

(*Continued from page 62*)

guarded against and generally exterminated. The first thing is to try for a "warp-proof" wing and elevator when building the ship. Of the two it is far more serious when a warp comes in the elevator because of the leverage of the tail moment arm.

Balsa for wing and elevator should be selected with care. With the new rules we need not compromise too much with weight. Hard balsa should be used for trailing edges, and they may best be built up. For example, if the thickness of the edge is 3/16" it is wise to laminate strips of 1/8" and 1/16" rather than to use one 3/16" strip. Leading edges and tips should always be laminated for strength and rigidity. It is a mistake to bend a single strip piece to the leading edge curve even though the piece is wetted. Better practice is to use two strips glued to shape as they are placed against rib fronts and tip edge.

In assembling surfaces, ribs and spars should not be forced in place and cemented under strain. A warp will almost surely result unless the wing and elevator parts "fall" together without pressure being necessary for alignment. Cap strips on ribs tend to hold the leading and trailing edges in correct position. Fillets at the junction of ribs and trailing edge are helpful. When air space appears between ribs and spars it is wise to fill these with scrap balsa and not a hunk of cement as the cement draws over a long period and may warp the surface. If sheeting is used on leading edges a few drops of castor oil added to the cement will retard setting and tend to prevent the cement from becoming brittle.

It is wise to build the wing and elevator surfaces on a flat bench and allow at least one night for the setting of the cement. Dihedral angles must be carefully measured with proper alignment of surfaces, and hefty fillets are desirable.

Most warps are due to the covering material, the way it is applied and finished. Except for very large C and D gas and radio-control it is advised that silk and Silkspan be avoided on wings and elevators as these covering materials draw too much. They are desirable for fuselages but not for wings and elevators. A symmetrical section presents fewer warp problems as the top and bottom coverings pull at the same angles. Flat and undercamber sections have different tension *pulls on* the surfaces so lightweight covering is desirable. Rubber model tissue (Jap if possible) is recommended even for the hottest jobs in Gas A, B, and even C.

The covering should be applied evenly with grain of the paper lengthwise—center to tip of the wing and elevator. Avoid drawing the paper tighter at one place than at another. After a ship has been adjusted it is generally better to patch even up to half the surface after damage

rather than to recover, as the characteristics of the surface may be altered and readjustment of the ship probably becomes necessary following a complete recovering.

After covering, of course the surfaces must be "water-doped," by spraying water at room temperature. The extra careful builder will weight the surfaces down on a flat table to insure against warps. Covering that is water-doped will not stick if the bench is covered with newspaper. With dope, of course, the story is different. Don't attempt to weight a doped wing or elevator directly on a flat surface but use ¼" thick blocks as shown in the drawing. These blocks can be made of box lumber about ¼" x 3" x 4" and the part of each block that is to be in contact with the doped part should be rubbed with wax. An old white candle will do.

Most wings and tails have too much dope applied, with the result that warps are invited in the sun. Commercial dope is generally too thick and should be thinned as much as one-half dope to one-half thinner. Two, and certainly not over three, coats of thin dope is enough. Go easy on the elevator. On very small ships let it go with one coat. Color should be in the paper itself. Colored dope is more susceptible to warping than clear dope, and the smart builder will avoid using colored dope on flying surfaces.

Dope and weight down a panel at a time and give plenty of time for drying. Dope the underside of the panel first and then the top. Place on the bench with the waxed blocks placed slightly under the leading and trailing edges and put appropriate weights over the edges on the blocks as shown. Lead blocks such as printing shops use are handy.

It is good insurance to build carrying cases or boxes for elevators. These can be made to protect the tails and prevent their warping, both at home and on the field. Two tails can be carried in each case. The drawing is self explanatory. When a model collects dew or rain, all that is needed is to place the tail in the rack. If sun warps the elevator, water-dope and strap down in the case for a while. This can be done on the field.

If the wing and elevator have been built, covered, and doped as described, warps can be removed over night by water-doping the surfaces and weighting the panel down on a flat surface. Water-doping the elevator and placing it in its rack will simplify removing warps from elevators.

If the builder is especially ambitious, a wing rack following the dihedral in the wing can be built to hold the wing in shape the same as the rack holds the elevator. Matthew Mitchell of Lawrence, Kan., Chairman of the Kansas Legion Model Committee, has such a wing rack, as well as tail rack, for a Goldberg Sailplane. It paid off last year with Matt collecting first place hardware at every meet he entered. (Yes, I wuz there, Elmer, trailing Matt.) The Cyclone-powered job flew the same always, because warps were kept out of the wing and sail surfaces. Matt Mitchell watches the warps. When all builders do likewise there will be more happiness and more ships intact following each contest.

FEATHERETTE

(*Continued from page 66*)

Greene being Greene, it had to do more than just fly. It would have to shine even when crudely built. It must be coverable with one section of microfilm. After some experimentation the 60-square inch size was hit upon. But why 60 square inches of wing area?

"The standard Class A size," states Greene, "is too tricky to adjust, and will not fly well when overweight, and 1/32-inch rubber was not available. The size limits for classes in rubber were set at a time when the development of the science was immature. More often than not, a model of slightly different size will prove more efficient. This is due to the fact that, in scaling up or down, the areas are squared while the dimensions are cubed. Unfortunately, the average model builder is imbued with the notion at an early age that he must build to the limits, and seldom outgrows the idea.

"For example," Frank continues, "one hundred square inches is the limit for Class B, and an indoor contest model of that size must be flown on 5/64-inch rubber for maximum duration. Actually, a model of around 80 square inches will outfly it when powered with 1/16-inch rubber! Consequently, the comparatively small size of the 'Featherette' is not as much of a handicap as it seems."

Greene is a rugged individualist in his thinking. To his mind, high-pressure merchandising and the concept that model airplanes can compete with toys are all wet. He disagrees with the trade demand for pre-carved and ready-built kits and purposely has turned his back on this market. It isn't surprising therefore to find that the "Featherette" is the first in a series of kits which he hopes will train the beginner and eventually lead him to designing his own models. Considering that people who design their own models do not buy kits, this is an extraordinary philosophy for a manufacturer.

To some people, the beginners' model is an unappealing, ugly-lined airplane that can fly. To Greene, it is a model that will fly well when badly built (within limits) and will perform with the finest when well constructed and properly flown. On his "Featherette" plan he has printed directions that stress information, hints, and tips on building and flying as helpful short cuts to successful modeling. The problem of writing these instructions was twofold.

"We not only must make the directions so a ten-year-old boy can understand," explains Greene, "but we must also make them so clear Dad can understand. The average youngster can figure out most of the features and build a fair model. But if the old man lends a hand, it's just like homework. The answers are all wrong!"

To put the "Featherette" to the acid test, Greene built one that weighed .034 of an ounce and flew 15 minutes on a single strand of 3/32-inch rubber. He has one

Join us at the Editor's Round Table

Here's your chance to evaluate the effectiveness of articles, plans and stories in this issue of Air Trails. By rating the material appearing you will enable the editorial staff to give you the type of article you find most interesting.

There are 32 different features listed below on the ballot-coupon. Indicate the one you like by placing "1" after its listing, "2" after second most interesting—and so on up and down the list until you allot #32 to the least interesting.

---Detach-and-Mail---

Editor's Round Table
AIR TRAILS
122 East 42nd Street
New York 17, N. Y.

Here is how I rate the material in the August, 1948 issue of Air Trails:

	Rating
Development Highlights	....
Saga of the Curtiss Hawks	....
How to Go Mad in 8 Minutes	....
We Fly the Stinson	....
Airmen of Vision	....
California Capers	....
Watch that Warp	....
Report from Washington	....

Letters column	....	Climax	....
Showcase	....	Champmaker	....
Air Notes	....	Pixie	....
Space Trainer	....	Martin XB-48	....
AFAU	....	Skidoo "23"	....
Pylon Artist	....	Dope Can	....
Air Progress	....	Grifo	....
Solo Club	....	Featherette	....
Photo Salon	....	XP-81	....
Bojo Bipe	....	Chute 'em Down	....
Model Matters	....	Taylorcraft	....
Circle "30"	....	Sketchbook	....

Name.....

Address.....

City..... State.....

(You need not sign this if you do not so desire)

that weighs .026 which he hopes will break 20 minutes, definitely championship time for such a small model. Going to the other extreme, he has tested one "Featherette" that weighed in at the staggering weight for an indoor model of .065. Made from hard balsa, this beefy ship still ticked off from five to six minutes.

The "Featherette" is designed to fly at this great weight. Its loop of 1/16-inch rubber, and its ten-inch diameter, 18-inch pitch prop, will fly the ship no matter how heavy it is built. If the builder does a good job he will find that duration can be increased—as instructions tell—by switching to a single strand of 3/32-inch flat rubber. From there on he can experiment with props of various pitches and shapes.

Even a kit as simple as an indoor stick model presents its hurdles in manufacturing. In this case it was microfilm. The Tricresyl Phosphate is seldom used these days by paint manufacturers, who prefer castor oil. After some scrounging around, Greene found one paint factory which had this ingredient, and had not thought of listing it for sale. Greene got it!

This particular solution he considers ideal. It is fairly thick, which helps the tyro lift the film off the water without much practice. Thin film is pointless, thinks Greene, because the extreme light weight of .0015 ounce per 100 square inches offers little chance for weight saving in covering. Moreover, thin film courts disaster in collisions or in rough handling. But the addition of a little thinner does produce beautiful blue and deep golden tints. One special ingredient makes this film harder to dissolve after drying. Greene has used Glacial Acetic Acid and Acetone as trimming mediums with ease, when the fumes of either would dissolve ordinary film.

As the first in the line, the "Featherette" was to have been followed by a Wakefield job, but problems in making the prop hardware have held it up. The second kit is to be another 60 square-inch ship, this time a little fuselage model with die-cut sides and machine-made propeller. Special instructions will stress adjustments with both incidence and thrust line. Called the "Chicadee," this model will weigh one ounce, complete with rubber, a pretty low weight for a 22-inch cabin model.

The Greene-Baker outfit is building a balsa-prop cutting machine, whose output will go both to the industry and into the company's own products. One of these special items will be larger-sized one-blader prop kits with all fittings and shaft.

If it took courage and determination to produce anything so radical as a 65¢ indoor kit in these days of ten-buck flying machines, Greene manages to be well pleased with himself. He feels happy when the beginner can build and fly the "Featherette." That it can be done was adequately proved one Sunday afternoon when Pop Robbers, well known coast leader and expert, told Greene, "It would have done your heart good to see those beginners flying "Featherettes" at the Cow Palace contest. A half dozen of them were up knocking the rafters (96-foot ceiling), and those kids were doing 10 and 12 minutes."

A more substantial pat on the back came from the Veterans of Foreign Wars who had informed Greene that the "Featherette" had been selected as one in their series of models.

"Anything else now besides a tune up?"

SKIDOO "23"

(Continued from page 60)

to the stick with thread binding and cement. Glue and temporarily pin the stabilizer spar in place. This piece had best be a fairly firm grade of wood, as should the stabilizer leading edge. When the stabilizer spar has dried firmly in place, add the leading edge pieces, and put the ribs in place.

It is vital to note two things at this point. The leading edge pieces are not glued to the motorstick flush with its bottom as was the stabilizer spar, but are raised slightly—to the middle of the stick, to be exact—to provide 3/16" positive incidence (this can be rough, but do get some incidence!). The other essential point is that the center ribs of the stabilizer are slightly curved like an airfoil section to develop lift. In designing this ship we tried to carry some of the weight with the big stabilizer to permit moving the wing forward; you will note that the center of gravity marked on the plan is well back on the wing, almost to the trailing edge. The big center ribs of the stabilizer are cut from 1/16" sheet (very soft), and the outer ribs are merely pieces of 1/16" x 1/8" strip. When the stabilizer is in place, trim the rear of the motorstick to match. Find two heavy grade thrust bearings and bend them as shown on the plan; notch the stabilizer spar and glue the bearings in the notches.

The wing is quite ordinary. In fact we suggest using it on some small cabin model as well! It consists of a 1/8" square leading edge, a 1/8" x 1/4" trailing edge, 1/16" sheet ribs, and a 1/16" x 1/8" spar. Tips are one-piece 1/8" sheet with the grain running chord-wise, or from leading edge to trailing edge. Pin the edges onto the plan, cut out the ribs and cement them in place one by one. What we always do is cut the ribs a little too long, then pin them together in a bundle and sand them so that they are exactly alike. We don't bother with the spar notches until later, although the notch position should be clearly marked with a soft pencil. Pin and cement the tip pieces in position. When this portion of the wing is dry, install the spar. We always cut the notches as we go, fitting the spar in place without glue. Then we take out the spar, and put a bit of cement in each notch. Finally, the spar is put back in place. Note the small piece of 1/16" x 1/8" strip that runs from the top of the last rib down to the sheet-balsa wing tip to help brace it in position against the pull of the covering.

To put dihedral in the wing, leave the wing on the plan, cut a small wedge-shaped notch in the top of the trailing edge and the leading edge at the center. Cut the spar right through where it meets the center wing rib. Now lift one side of the wing—don't mind breaking the edges at the center!—until it is 3" off the board, and then put a block of wood under it to

hold it in position. (Some builders prefer to pin down the center of the wing, and raise each tip half of this amount, or in this case 1½".) Glue the wing where the edges have broken, trim the excess wood off the spar at the center of the wing, and glue the end of this spar firmly against the rib. When the wing is done, trim the trailing edge to a triangular cross section with a keen razor blade. Smooth all the joints with sandpaper, and round the leading edge, and the edges of the wing tip. Finally, cut away about 1/16" off the bottom of the center rib and glue in place a piece of 1/16" x 1/8" balsa (you can cut this from a piece of sheet) as shown on the plan. This piece of wood helps the wing to rest evenly on the motorstick.

For covering use rubber-model tissue. Green or orange looks good. Be sure that the grain runs spanwise and not chordwise, for this helps to keep the wing from warping. To cover, dope the end of the piece of tissue (you should have four pieces of tissue for the wing, one for each panel, top and bottom) to the center rib. When it is stuck in place, dope the other end to the last rib and pull the paper tight while it dries. Then dope down the leading and trailing edges, one at a time, pulling the paper tight as you do so. Try to keep the dope from running beyond the very edges of the paper! It matters little whether you do the top or bottom first. It may help to use smaller pieces for the wing tips. Cover the top and bottom of the stabilizer. Dip a piece of cotton in water and wipe the paper lightly until it is moist all over. When this dries, give the surfaces a coat of dope that has been "cut" or thinned down.

The hardest part of rubber models, we think, are the props. We have worked out a fairly easy-to-make pair of sheet balsa props. The real easy thing, naturally, is to set sheet balsa blades in notches cut in a hub block of balsa. Frankly, if you'll pardon the expression, we think such props smell. They don't have the proper pitch, or camber, and break if you sneeze at them. Our props are just a little harder to make, but they work far better, are stronger.

As the sketches show, you cut out two hub blocks from pieces of 1/4" square strip. Note how the ends of each hub block are slanted. Now cut out four propeller blades from a full cut of 1/16" sheet balsa, using the template given on the plan. Cement each blade in place on the hubs, making sure that one prop is "backwards" or lefthand. Cement a small piece of 1/16" sheet—as shown—behind each blade at the hub for a reinforcement. When dry, soak the props in hot water for at least twenty minutes. Now you can work some camber into the blades by pressing and bending them with the fingers. Don't overdo it, for even wet wood will split if you go too far. Wrap some thread around the blades to hold the camber, if you wish. Since these props are rather high-pitched at this point, try to twist each blade to a slightly flatter angle. Here is a good tip: Pin each prop to the bench by driving the pin through the shaft hole, forcing the prop close to the bench so that the blades must bend out of position. Now balance the

tines of some forks on the props as shown in the sketch. When the wood has dried, blades will have proper pitch and camber.

The final operation is to trim the sheet balsa blades with a razor blade until the leading edges are round and the trailing edges slanted or more pointed. Make believe that each blade must have a very thin airfoil section or rib section, like a wing. (Props work because the whirling blades are in effect small wings, only their "lift," being developed forward, is called "thrust.") Any corners that stick out around the hub should be trimmed off, and the final sanding of the propellers should make the hub seem as if it were carved with the blades from a block. You can see the joints, of course, but the surface should be smooth and properly curved. Balance the props on a pin, by sanding down the heavy blade, until the prop will come to rest when spun, with the blades balanced like a seesaw. If you can't get them balanced cut off a part of a pin and insert it in the wood on the light side. On our props we put a band of cement on the back sides of the blades to strengthen them against splitting and to help hold the proper amount of camber. Slide a washer over the shaft and glue a washer in against the front face of the hub. Put two loose washers on each shaft.

The completed propellers and the motorstick can be given a coat of clear dope to make them smooth. The two prop shafts are bent from 1/32" music wire. Power is four strands of 1/8" x 1/20" brown rubber for each motor. Note that the rubber hook part of the shaft is in "front" of the prop, and not behind it.

Glue a 1/16"-thick incidence block under the leading edge of the wing. Strap the wing in place with a rubber band as shown in the sketch. The position of the wing should be the same as on the plan, although you may have to move it a little forward or backward on your ship to achieve the proper trim. Mark this position on the motorstick. Be sure that the wing is on the top and not the bottom of the motorstick, for as you'll recall we have a lifting stabilizer and we can't have it lifting downward! Hold the ship by the stick back of the wing and glide it while kneeling close to the ground. Use a smooth, not sudden or hard toss with the nose pointed at the ground about 15 feet away. If the ship stalls, or tends to climb (even if it dives after that climb), move the wing back slightly. If the ship dives, move the wing forward. Once you have a good balance, wind each motor about 75 turns and launch the ship straight ahead. Don't throw it into a stall!

How do you launch a twin-pusher? You take a prop in each hand, stand behind the model, pointing it forward and releasing the props as you gently toss the ship forward. Make any further corrections by shifting the wings. It is hard to say what direction the ship will turn; that depends on the relative efficiency of the props, and on any wing warps.

While we used four strands of 1/8" x 1/20" T-56 U.S. brown rubber for each motor, this can be cut down by experience for indoor sport flying.

HOW TO GO MAD IN 8 MINUTES

(*Continued from page 33*)

now northwest five. The receiver garbles slightly and he hears something akin to this: "Hiptower, zero-switch, fifty-ones initial oh oh Mike for landing on zero Charley."

The light ship lands and clears in the east-west to the intersection of three-four and has to be cleared across quickly, so that transmission cuts out another call from either Mike or Charley while the controller phones the DC-4 departure to traffic control and advises army operations that the P-51's are in the pattern.

Charley calls again as the outside telephone line rings and a sweet young voice asks, "Can you tell me what the weather will be like Sunday?"

The operator says, "zero zero Charley, this is Hipswitch Tower. You'll have to call the weather bureau, lady; the number is 2-1756. Oh oh Mike, stand by. Light aircraft on the ramp cleared to taxi on the ramp for take-off runway three-one, the wind is north six. Zero zero Charley do you read Hipswitch Tower now?"

However, action has taken place upstairs and a voice *very* annoyed comes in to say, "Hipswitch Tower, this is Zipper oh oh Mike, not Charley, oh oh Mike, a blue Zipper. We are a mile south of the field and want landing instructions." The tone implies the addition of "you dough-head."

Lo and behold! The Zipper pilot finally got his receiver tuned in—just in time to get Charley's answer, which he immediately attributes to a stupid mistake on the controller's part, who was probably reading a dime novel and didn't hear what he said the first five times.

For a moment Charley's plaintive voice is silent, so the tower says, "Oh oh Mike, Hipswitch Tower. Your position reported one mile south of field, caution on five P-51's now on base leg, cleared to continue approach for landing straight in on runway three-one, wind calm at present, indicated northwest." He adds, "P-51's cleared to land."

Mike says something, the flight commander says "Roger" and Charley says, "Hipswitch Tower, Hipswitch Tower, this is Applecrate NC zero zero Charley, for landing instructions. *Over!*"

Now, tower controllers are human, all private pilot opinions to the contrary, so this one pauses a moment at this time to say a few words of benediction which he hopes will invoke the spirit of some temporarily unoccupied saint to lend Charley a hand in twisting the knob on his radio receiver.

The P-51's are singing in single file on final, the first man already nearing the south boundary.

The controller takes a careful look beyond them. If Mike was only one mile south he should be in plain sight. But he is nowhere to be seen. That means

he is either landing at some other airport within radio range, was five miles south, instead of one, or—here the controller, being a very suspicious guy, thanks to pilots like Mike and Charley, makes a quick one-eighty and looks north. There on a low, downwind, final approach, directly into traffic is a blue Zipper coming over the north boundary.

"Oh oh Mike" he says as distinctly as he can while suppressing a scream, "pull up and go around! Do not land! The runway is three-one to the northwest."

Mike has seen the fighter about then, gets the message at the same time, and executes a blood-curdling low speed chandelle that shudders sickeningly on top, and begins what may eventually become a left hand traffic pattern around the field.

"You cleared me straight in!" he declares in an injured tone, highly indignant and scared sillier than normal.

The controller is prevented from replying to this bon mot by the process of saying a few more words privately to God and by the added distraction of two phones ringing simultaneously.

He takes the outside line first and says sharply,. "Stand by." The other phone is airways traffic business and he has to start copying data the instant he picks it up. That completed, he gets on the outside phone. "CAA control tower, McNutt speaking."

A gruff voice larded with the background of a beer-joint juke box asks, "Is Maizie there?"

The radio loud speaker pounds his outside ear. "Hipswitch Tower, United eight-oh-five, approaching Antelope Island at four-seven, eight thousand feet VFR."

The controller says, "No, Maizie isn't here. Zero zero Charley, stand by. United eight-zero-five, Hipswitch Tower, Approaching Antelope four-seven at eight thousand VFR, cleared to enter left traffic pattern runway three-four, wind northwest three, altimeter three zero zero seven. For your information eight zero four just departed Hipswitch northbound at four-one, climbing on the north leg."

"Roger, Tower. Runway three-four. We have the other Douglas in sight. United eight-oh-five."

The controller says, "Light aircraft entering traffic west of the field this is Hipswitch Tower. You are cleared to enter left traffic to land runway three-one." (This is a lightplane from the practice area and hasn't been involved up to this time.) The other trainer which taxied from the ramp is through with his run-up by now and turns around to face the tower and see what the hell the delay is. The tower says, "Light aircraft cleared for take-off, runway three-four."

Mike butts in again. "Oh oh Mike entering downwind leg."

"Oh oh Mike, you'll be number two to land, follow a light aircraft now on base leg, runway three-one to the northwest."

"Negative Tower," says the receiver, "not oh oh Mike, this is Applecrate NC zero zero Charley and we haven't even entered the pattern yet. We want landing instructions."

The controller says, "Zero zero Charley,

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what is your present position?"

Charley is really huffy now. He finally tried fiddling with the tuning knobs on his radio and is wondering how that dumb cluck in the tower managed to ball him up so badly.

"Zero zero Charley is two miles northwest at 5,300 feet, for landing instructions, over."

Just before the controller can reply the receiver squawks. "Hipswitch Tower, this is oh oh Mike on base leg, gear down and locked, what is your altimeter setting please?"

McNutt takes the bit in his teeth. "OhohMikeclearedtoland, threeone. Zero zero Charley northwest of the field, clear to enter traffic from the west, a left traffic pattern plan your landing three-one to the northwest, the wind is now northwest four."

While saying this he has spotted a light ship coming in at pattern altitude from the southwest. "Aircraft southwest of the field, this is Hipswitch Tower, acknowledge. Roger. Caution on the Applecrate now entering downwind leg. You will be number two to land, runway three-one." The trainer wiggles its wings.

Mike is on the ground but landed past the east-west intersection which is one-third mile down the field from the south end of the runway. He has parked in the middle of the runway asking which way to taxi while the tower's transmitter had the receiving circuit closed. Now he gets cleared back the east shoulder of the diagonal to the east-west runway, crossing the north-south to reach the ramp.

He comes in fast, taxiing like an Indianapolis Speedway veteran towards the north-south intersection.

The controller is about to clear him when that nasty old suspicious nature gets him again. Zero zero Charley has been ominously silent for half a minute now.

He makes a quick check on the Applecrate. Here's Charley, hotter than a two dollar pistol, 85 indicated, tail high, over the boundary lights and positively committed to landing on runway three-four.

The controller yelps, "Oh oh Mike, hold clear of the north-south, caution on a red Applecrate landing on the wrong runway."

But Mike has sensitive ears and has taken off his headphones.

The controller makes a movement towards the crash emergency phone, but gives up and lays his head down on the top of his desk with his eyes shut tight and once more starts discussing things with God.

All is quiet for a long time.

Then a transmitter clicks out in the ether and a calm, good natured voice from a guy called Gil, says, "United five-oh-eight on long base leg." Having heard the other transmissions there is an element of sympathetic humor in his voice as he asks, "Do we still use three-four?"

The controller raises his head. Mike is at the gas pit intact. Charley is taxiing straight back down the middle of the runway, but almost to the intersection where he will clear in plenty of time for the DC-4. The other two light ships have shot their landings on three-one and taken off again.

The controller says, "Runway three-four, five-zero-eight, the wind is now calm, indicating northwest."

"Roger, three-four, United five-oh-eight."

Again all is quiet until the outside phone rings again. He picks it up. A cheery voice says, "This is United Press. Anything going on out there?"

"Nope," he replies dully, "nothing going on. All quiet on the western front." He starts groping weakly for a cigarette, still holding the phone to his head.

Suddenly an hysterical laugh sounds in the startled news-reporter's ear. The controller has just looked north again to see the NORDO trainer landing downwind on the army ramp between two rows of P-51's. He had forgotten all about it.

AFAU

(*Continued from page 25*)

war must possess an understanding of society in its totality—an understanding of the problems of labor and management, of the effects of economics upon war and of war upon economies, of political systems and philosophies, of national cultures and psychologies, of the role of science in peace and war, of the relationship between social and military institutions.

This does not imply that military leaders must have a deep knowledge of all these things; that would be neither possible nor desirable. They must always look to the civilian world for advice in non-military matters. But advice which is not understood is worse than wasted.

An understanding of the problems which we have discussed cannot be achieved intuitively. It may be gained only through continuous and well-directed study in a system of formal education. For that purpose, the Air University was formed in the fall of 1945.

According to rumor, General Spaatz once observed that if he were to be known for but one achievement of his military career, he would want that achievement to be the founding of the Air University. The story is probably true, for he chose as the first Commanding General of the University a man pre-eminently qualified by experience and temperament for the role, Major General Muir S. Fairchild.

The assignments which served to qualify General Fairchild for his command also served to keep him out of the public eye. He spent the war years on the War Department General Staff as Director of Military Requirements, and as a member of the Joint Strategic Survey Committee

of the Joint Chiefs of Staff. He was one of President Roosevelt's staff at Quebec and later acted as a military advisor at the Dumbarton Oaks and the San Francisco conferences. He has been nominated by President Truman for the position of Vice Chief of Staff of the Air Force and for promotion to the rank of General.

The present Commanding General of the Air University is Major General Robert W. Harper, former chief of the Air Transport Command, who succeeded Fairchild on May 17, 1948.

The organization of the Air University was facilitated by the fact that the Air Force never before had an educational system of its own. As an integral part of the Army, the Air Force sent its officers to ground force schools with the one exception of the old Air Corps Tactical School, which was reluctantly abandoned in 1939. In many ways, it was easier to start from scratch than to rebuild on an outmoded foundation.

It was obvious at the outset that, although the Air Force possessed many officers with tactical and technical know-how, it had almost no educators. The sensible course was, therefore, to look to the field of civilian education.

Educational problems seem to fall into two categories—policy planning, and day-to-day operation. The Air University has shown excellent discrimination in the selection of a distinguished Board of Visitors to assist in long-range planning. The Board, headed by Dr. Robert L. Stearns, President of the University of Colorado, includes Dr. Isaiah Bowman, President of Johns Hopkins; Dr. Karl T. Compton, President of Massachusetts Institute of Technology; Dr. Clarence Dykstra, Provost of the University of California; Dr. Willard E. Givens, Executive Secretary of the National Educational Association of the United States; Dr. Raymond Paty, Chancellor of the University System of Georgia; Mr. Elliott Dunlap Smith, Provost of Carnegie Institute of Technology; Dr. Francis T. Spaulding, Commissioner of Education of the State of New York; Dr. George D. Stoddard, President of the University of Illinois; Dr. John W. Studebaker, U. S. Commissioner of Education; and Dr. George F. Zook, President of the American Council on Education.

For guidance and supervision in instructor training, test construction, visual aids, oral and written expression, and curriculum organization, the Air University has set up a permanent Educational Advisory Staff composed of fifteen professional educators selected from leading colleges and universities. This staff has proved invaluable to the operation of the University system.

The philosophy of the entire University centers on this one cardinal point: *Military forces exist primarily to preserve peace.* Only when a just peace becomes impossible does the military turn to its secondary task—that of restoring peace. Our military leaders must then be prepared to wage war skillfully and wisely, or defeat may well write the closing chapter in the history of America or indeed of civilization itself.

The Air University is composed of five schools which fall into two distinct groups —general duty schools and specialized schools. The latter, important as they are to Air Force operations, enter only briefly into this discussion for they are engaged in training specialists and not the roundly educated commander whose decisive responsibilities are of such vital importance.

The Air Special Staff School at Craig Field, Alabama, presents courses in military management, inspection, and communications. The organization of this school is flexible, allowing for frequent changes in its curriculum to meet the changing needs of the Air Force. Several additional courses are being planned for the coming school year. In the School of Aviation Medicine at Randolph Field, Texas, air evacuation nurses, medical technicians, and flight surgeons are trained, and an extensive program of aero-medical research carried on.

The heart of the Air University, however, lies in its three general duty schools, for it is here that the Arnolds, Mitchells, Andrews, and Spaatz' of the future will be trained. These schools represent progressive stages in a coordinated educational program.

Junior member of the group is the Air Tactical School at Tyndall Field, Florida. All Regular Air Force officers will attend this school between their second and sixth years of service. It is dedicated to grounding young officers in the tactics and techniques of aerial warfare and in the many subsidiary activities required to support combat groups—activities such as administration, supply, combat intelligence, communications, and maintenance of equipment.

The Air Command and Staff School at Maxwell Field is the intermediate school of the University system. The upper sixty percent of Air Tactical School graduates will enter this school before their twelfth year of service, to be trained as group and wing commanders and staff officers. Here the emphasis begins to shift from purely military matters to what might be termed "general military education," that is, instruction in the practical aspects of international relations, industrial and manpower mobilization, geopolitics, economics, and an appreciation of scientific developments.

Well over half the curriculum is devoted to military subjects on a considerably higher level than that of the Tactical School. Strategic target selection, psychological and Arctic warfare, employment of large air units, and logistics begin to take their place in the intricate pattern of air operations.

The senior school of the Air University is the Air War College, also located at Maxwell Field. Here an exceedingly narrow line is drawn between instructor and student, for little actual instruction takes place. Military and civilian authorities are called upon to discuss with students the broad aspects of air warfare. With background information gained from these discussions and that accumulated during their twelve to twenty years of service, the students sit down in seminar groups to thresh out solutions to such problems as

"air defense of the United States," "logistic support of air operations," and "intelligence requirements for national security." There is no military problem of this magnitude which is not extensively involved with the civilian world.

The Air War College is a sort of earn-as-you-learn institution. Plans, evaluations, and concepts evolved by the students are carefully reviewed by the Air Force's top planners in Washington. The school is, in effect, an auxiliary planning staff for Air Force Headquarters.

Military subjects are taught in all the schools by officer instructors, and each school has strong Army and Naval Departments staffed by officers from those services. General instruction, on the other hand, is presented largely by guest lecturers. A sampling of the more than 200 guest-lecturers who appeared before Air Command and Staff School and Air War College students last year would include such names as General Eisenhower; Field Marshall Viscount Montgomery; General Spaatz; Dr. William Y. Elliott of Harvard; George F. Kennan; Professor Bernard Brodie of Yale; George F. Gant, TVA Personnel Director; Chester L. Barnard, President of New Jersey Bell Telephone Company; Secretary of Interior J. A. Krug; C. R. Smith, President of American Airlines; Dr. George Gamow, the nuclear physicist; J. H. Kindleberger, President of North American Aviation; Hanson Baldwin, and Alexander Seversky.

The Air University will not work educational miracles, nor will it produce the philosopher leaders of Platonic idealism which, perhaps, is what the world needs today. It will, however, most certainly give to its students a better preparation for the grave responsibilities confronting them than any system of military education we have known before.

General Fairchild has epitomized the purpose of the University in these words: "Should the Air University succeed in educating and producing such planners and future leaders that they may design an Air Force so adequate that it need never be used, we shall have completely fulfilled our mission."

No, this University will not produce political philosophers, social planners, economists, or scientists. To insure that the universities of Europe and America continue to educate such men in a free, liberal, and peaceful society—that is the mission of the Air University.

"He hasn't got lock jaw, Ma. He just ate my airplane glue."

SPACE TRAINER

(*Continued from page 23*)

so often practically design the aircraft for the engineer. And unexpected conditions exist because of the extremes in altitude and speed and temperature and pressure.

For instance, the maximum air loads on our trainer may occur in the thinnest air, at high altitudes, rather than in the denser levels near the ground. This is because the air loads depend on the dynamic pressure, which is the product of the air density and the square of the flight velocity. At the great heights attained by the trainer, the air density will be low indeed, but the speeds involved will be very large, and so will the dynamic pressure. This means virtually a point-to-point investigation of the flight path of the trainer to determine the condition of critical air loads combined with inertia loads. There is also the question of the selection of materials for the structure; it is well known that the temperatures at the surface of the skin will be very high, even if the trainer descends as slowly as possible through the lower atmosphere. Probably the only material that will stand up under the excessive temperatures to be expected in the long glide at supersonic speeds will be stainless steel. It may even be necessary to refrigerate the leading edge of the knife-sharp wing to keep the temperature down. And think about the difference in temperature between the leading edge and the trailing edge of the wing—the expansion and contraction of the spar fittings will cause uneven load distribution into the fuselage. All in all, it seems like a nasty job to try, but let's go ahead and tackle the basic problems now.

First, the wing area has to be selected; its size will be determined by the desired landing speed and the lift coefficient available. Suppose we place an upper limit of 100 miles per hour on the landing speed; that figure represents a reasonable value and will be quite safe for operation on very long runways, or the surface of a dry lake such as Muroc. On the matter of lift coefficient, we make use of some of the many tunnel tests made by the Germans on the sweptback wing designs they considered for their advanced fighters. They were able to show consistent values of about 1.0 for a lift coefficient, with flaps down. This is a very severe limitation for trainer design, because the average airplane gets almost twice that with flaps, and more with the power on, because of the lift due to the slipstream. But using these figures, and the equation for lift, we get a design wing loading of 25.6 pounds per sq. ft.

Next we have to guess the weight of the complete A9, or our trainer version of it, in the landing condition. The empty A4 weighed about 9000 pounds, including a one-ton warhead. Of course, we don't need the warhead, but we will put back its equivalent in the weight of the wings, and perhaps another thousand pounds or so of equipment, landing gear, pilots and con-

trols. And to allow for weight increases, which always occur, another thousand pounds would not be amiss. Our first weight guesstimate is therefore 11,000 pounds, about the size of the average fighter plane. And this weight, with the wing loading selected in the previous paragraph, fixes the wing area at 430 square feet. This area must now be used in the most effective way, aerodynamically and structurally.

The aerodynamics of rocket missile wing design are complicated—so much so that the only way to be sure of a design is to build and test-fly it. Lacking either of these facilities, and being only interested in preliminary ideas anyway, it should be easy for us to philosophize a way out of the difficulties. We know, for instance, that at subsonic speeds, there is little concern over the problems of wing design; thousands of shapes have been tested and flown and measured, and we feel quite secure in the knowledge of their behaviour. But the subsonic speed range will be of interest only just after take-off and before and during the landing. It is therefore of not too great importance. At the other end of the scale, adequate supersonic theory has existed for some time. If the only problem were the selection of a wing for supersonic flight, that too would be relatively simple. But to design a wing which will cover the speed range from zero to five thousand feet per second is no cinch. It means perhaps that one compromises by selecting a shape which does the best job in the worst spot. The worst spot is, right now, the trans-sonic range, the range referred to in awed tones as the "stone wall of compressibility," a speed range bounded by about 0.8 times the speed of sound on the low side and 1.2 times on the high.

The current trend in trans-sonic wing design is to use a lot of sweepback. The reason for this is primarily to get the leading edge of the wing aft of the Mach cone, a surface of flow discontinuity whose vertex angle is defined by the speed of the aircraft relative to the speed of sound, or in other words, the Mach number. At Mach number of 1.0, or the speed of sound, this vertex angle is 90°, which means that the leading edge of the wing should lie downstream of a 45° line drawn through the intersection of the wing root and the fuselage. Suppose that 45° sweepback is selected for the 50% chord line of the wing; that will give a greater than 45° sweep to the leading edge (if the wing is tapered, and it is going to be) and tend to minimize the troubles in the trans-sonic range.

Using high aspect ratios is not the help at supersonic speeds that it is at the low cruising speeds of modern aircraft. There are several good reasons for selecting a small value of aspect ratio; probably the most important is the reduction in span of the wings. This tends to make the wing stronger for a given air loading, or, for a given set of loading conditions, a low-aspect ratio wing will be lighter than a high-aspect ratio one, all other things being equal. Right now a reasonable choice seems to be about 3.0. With this value and the previously determined area of 430 square feet, the rest of the wing dimensions can be calculated, if a taper ratio is assumed. Some available German data indicate that a low value of the taper ratio is beneficial in reducing some of the poor stalling characteristics of highly-swept wings. For this design, a value of 2:1 is chosen. The wing will then have a span of about 36 feet, a root chord at the body center-line of 15.9 feet and a tip chord of half that, or 7.95 feet.

And now begins the familiar merry-go-round of weights and the design selection of the remaining components. The next step is to estimate the weights of the wing and the rest of the parts, add them all up and see how closely they agree with the assumed value of 11,000 pounds used in the first trial.

The weight of the wing will be determined by the load factor as well as a lot of other things. The load factor for design will be difficult to evaluate, because without going into a lot of detail, one can't be sure of the worst condition of flight. A common value for fighter design is 8g, that is, the vertical load assumed to act on the aircraft in the worst condition of flight is eight times the gross weight of the whole airplane. If a factor of safety is included, a design load factor of 12g results. Using some wing weight data found in a standard textbook, we find that the wing should weigh about 2300 pounds, if it were built in the usual aircraft practice, and with aluminum alloy. But that can't be done; stainless steel must be used, and that material has a higher strength-weight ratio than the 24ST aluminum alloy for which the weight data were collected. Actually then, the stainless steel wing will weigh about 87% as much as the equivalent dural one, or about 2000 pounds.

There will be, of course, flaps and ailerons on the wings. For the time being, their areas are estimated by the usual methods of aircraft design, hoping that later wind-tunnel tests will bear out the validity of the selection. In like manner, it is assumed that their weights are included in the gross weight of the wing. And here is a good place to make it understood that although a great many of these components are "guessed" into being, the final detailed arrangements must inevitably depend on the results of the wind-tunnel tests. And although there are probably some tests already available for the A9, it will still be necessary to make many more stability and control runs to determine the action of the control surfaces at all angles of attack and in combination with roll and yaw angles. These tests are part and parcel of the design of any aircraft, be it for 100 mph or 4000 mph, and can never be eliminated.

It is pretty well established that there should be a type of landing gear, and at present probably only the conventional wheeled type should be considered. A skid has the disadvantage of unsteerability on the ground, and even if a take-off carriage were used, it seems that a single landing would ruin the structure for good. Unless it were decided to expend the airframe with each flight, it should be most worthwhile to carry the dead weight of the gear

along. It is possible to cheat a little here, though, and only design the wheels, tires and struts for the light landing condition of the trainer. It will probably prove easiest to launch from a sort of firing table or ramp or track, so that the gear would not be used to support the loaded weight of the A9. Therefore, the landing gear can be chosen for the landing weight of the aircraft. Again using a standard text, the weight of the tricycle gear comes out 820 pounds.

There are many more details that are not apparent at first glance; details that increase weight, that add complexity, that cause trouble. For example, there will be several auxiliary devices that require power; the landing gear operation, the flaps, the control boosts, the air conditioning and G-suit for the pilot, emergency jettisoning of the cockpit—all must be included. Although the average airplane has a supply of power, either hydraulic or electric, there is no power supply in the A9 that can be tapped for the full length of the flight. It might be possible to let a small turbine wheel protrude into the jet for power while the motor is running, but after cut-off, the turbine slows down and becomes useless. There is also a considerable difference in pressure between the impact pressure measured at the nose and the static pressure of the airstream. It would be possible to use this to run a compressed air engine, but only as long as an adequate pressure differential were maintained. It seems to be most likely that power will have to be supplied from some constant source. Suppose that we say that the easiest way to avoid the addition of different fuels, or extra batteries, or other complexities, is to include a tiny rocket motor driving a small turbine and operating off the regular fuel system. The turbine will drive a generator and the generator will furnish electrical power to drive motors and pumps for the rest of the systems, be they electric or hydraulic.

Claustrophobia is a very real fear for many people, and pilots are no exceptions. Therefore, the inclusion of a few windows is a necessity. But of what can they be made? Plastics—at least the ones that are now used in aircraft—are obviously out. Even the 616-mph speed of the Gloster "Meteor" causes heat distortion on its plastic hood. The ability to withstand high temperatures is a necessary property of the window material. In addition, the loads tending to burst the glass will be high, so that the individual panes must be small and thick to withstand these loads. But if the thickness is too great, distortion of an image viewed at an incident angle begins to appear.

Well, how about some optical system of lenses and mirrors, arranged like a periscope? Would it be difficult to build in hemispherical coverage of the forward field of view? The answer to this one can't be given too definitely right now; in the first place, no such system has been either built or tried, to the best of current knowledge; in the second place, the pilot might feel just as uncomfortable as if he were closed in completely. There are a lot of answers needed here before adequate

vision can be assured for the pilot. But there is one saving possibility. Since the landing speed will be subsonic and the pilot's visibility forward is of primary importance there, it should be possible to build an extendible cockpit or seat which would lift the pilot above the contour of the rocket's body. This will increase the drag somewhat in the landing condition, but that will not be too important in the speed range for approach and landing.

The problems of air conditioning and insulation are not insurmountable; the work done on cabin supercharging, ventilation and heating during the war should pay off here. In the cockpit layout of the trainer, space has been provided between the aft bulkhead and the pilot's seat. This will contain a four-inch-thick blanket of insulation, as will the entire structure surrounding the cockpit. The only problem will be that of keeping the pilot cool, because the temperatures generated by friction in the boundary layer of the A9 in its dash through space will be very high. Although in the A4 the warhead could probably take several hundred degrees before detonation, our pilot can not. Perhaps a mere insulating blanket would not serve, and there must be a cooling medium circulated between the double walls of the cockpit. In such a case, the pilot would have to be sealed off and like it—otherwise the windows might melt down into his lap!

Adding up some of the weights estimated so far shows that the wings, landing gear and pilot weigh 3,000 pounds. That leaves 1,000 pounds for all the equipment, controls, powerplant for auxiliary power, air conditioning and cooling, and optical system. This is probably a fairly good figure for the weight of all those items, and so it can be rather safely said that a piloted A9 could be built and equipped for about 11,000 pounds weight, not counting fuel.

Well, there's the start. We have taken the basic features of the first real space ship and roughed in an idea or two. We've come up with a trial form for a piloted transition trainer. This one is for the pilot who wants something really hot to fly, something that will test his skill and judgment to the utmost, something that will hand out a new challenge on every flight—until the day when he finally closes the door that seals him in a space ship, ready for his flight toward the stars.

WE FLY THE STINSON

(Continued from page 35)

pilots. This particular ship was a nice shiny blue. The poop sheet calls it "Riviera Blue, trimmed with Diana Cream." The ship did seem to get airborne with impressively short take-off runs, while we watched, with the well-muffled 165-hp Franklin and that little prop making a very distinctive "Stinson hum."

Consolidated-Vultee, incidentally, is partial to professionally designed interiors done by Henry Dreyfus, the widely known industrial designer. Dreyfus did a good job on the Voyager and Station Wagon. The interiors are maroon and gray with "stain finish" metal trim and accessories. The most unusual, but obvious trick on the Station Wagon was—you've guessed it—the station wagon motif. The inside of the rear of the cabin, below the window line, is done in two-tone plywood and vinyl-covered seats and doors. On both models the rear seats are removable; the Voyager then can carry 350 pounds of baggage or cargo, and the Station Wagon an appropriate 640 pounds. The rear cabin floor on this version is stressed to take loads up to 90 pounds per square foot. Convenient tie-downs are provided. A generous 100-pound capacity baggage compartment is behind the cabin. Prices f.a.f. (fly away factory) are $5,889 for the Voyager and $5,989 for the Station Wagon. These price tags won't set hour-a-week pilots to drooling, but as airplane prices go, they are on the reasonable side.

The Stinson is one of the most comfortable airplanes it has been our pleasure to ride in. Sitting in the "hammock type" rear seats (in suspension, not appearance!) you ride as smoothly across the field as you would in an expensive automobile. There is plenty of leg room up front. Getting in from the left or pilot's side, you place your left foot on the step which is attached to the fuselage and not the landing gear strut. This observation may be of no import, but we like this better than the step on the strut, which sometimes produces a mild version of the split when you try to get your other leg into the cabin. The backs of the front seats fold forward to facilitate entry to the rear. The interior is neatly fitted out and uncluttered.

Stinson somehow manages to create an impression of simplicity with their instrument panels. The standard panel startles you, for the airplane looks as "empty" as any lightplane. For easily over-awed auto-conscious people like the writer this is a good sales point. The inevitable switches and buttons are cleverly minimized (though easily reached) along the silver-colored "control panel" that runs along the lower portion of the panel proper. Our demonstrator, however, had all the gismos necessary for blind flying.

Across the panel in the center are, from left to right: air-speed, altimeter, turn-and-bank, vertical speed indicator, tachometer. Above the turn-and-bank, on the panel's center-line, is the compass and below it the clock. A lower row of smaller faces includes the oil pressure, oil temperature, and, in front of the "co-pilot," the fuel-gage and ammeter. By flipping a convenient switch you can get a reading for either or both of the 25-gallon wing tanks. Along the very bottom of the panel, left to right, are the parking brake knob, master switch (and landing

streamlined low-wingers, but for a high-wing cabin job of this power a 130 mph cruise at 83% throttle at 5,000 feet is pretty decent performance. Cruising at 2,600 rpm sounds busy and you throttle back to 2,500 rpm where you imagine the engine sounds best. In level flight you again note the comfort of the airplane, a feeling heightened by the excellent visibility, particularly over the nose. The more you can see ahead and down, the more you can enjoy cross-country. The cabin is both well heated and ventilated. Through that scoop under the nose comes a flow of fresh air, which enters the cabin through two inlets in the firewall, and a grate in the cabin floor in front of the rear seats. Each inlet is individually adjustable. By pulling out the cabin heat button, this flow of air can be heated as desired. Increased ventilation on hot days can be had by four airliner type vents: [illegible]orward at the top of the cabin on each side of the windshield, and two more in the rear, one for each window.

The Stinson is quite pleasant to fly. It behaves nicely on turns, seeming to coordinate automatically for you. The controls are effective, but not overly sensitive, and respond smoothly. If you have flown anything with a wheel before, this is not a hard airplane to fly. In stalls, slow flight, etc., it is miles ahead of most others. Stinson has been safety conscious for years.

Any lightplane worth its salt, should stall smoothly, not falling off abruptly on either wing, or dropping the nose through the horizon with a breathless swish. Most of the new jobs will hold a nose-high attitude with the stick or wheel in your stomach. Usually, they vary only in the degree with which the nose moves gently up and down with a mild rocking motion. They simply sink until you ease forward the controls. Not many of them, though, will give you aileron control right up to and beyond the stall. The Stinson is one of these. You can hold it nose-high and rock the wheel back and forth, with full response of the ailerons.

Fully loaded the Stinson stalls out at 64.5 mph with flaps up, and 61.5 with flaps down. At a gross of 2,000 pounds, it is 59 mph with flaps up and 56 with them down. Everyone won't agree, but personally we'd prefer a few miles less cruise and, likewise, a few miles less landing speed. It isn't so much the speed at which you touch down that we are thinking of, but more of the speed at which you skim the earth waiting to get the wheels on. You know how an airplane seems to cover the ground on a small field landing. However, Stinson claims this ship will stop within 260 feet and we have seen good pilots land it in parking lots. The slower an airplane lands, the safer it is in forced landings in small areas.

All Stinson demonstrator pilots love to show you slow flight. You slow the airplane down until flaps can be lowered, then use power to sustain altitude. This feature comes in handy if you run into diminishing visibility. You do have to remember to give it the gun when you bring up the flaps, for any ship with effec-

tive flaps like this one will settle when you bring them up.

The aileron effectiveness through the stall is a major factor in Stinson's safety record. There is a growing realization that accidental stalls and spins usually occur when the pilot is flying slowly, low down, forcing the ship to turn more sharply by using rudder, and holding crossed controls in an effort to keep the bank from steepening. A gust that tips the ship toward the low wing sometimes fools the pilot into a quick movement of the ailerons in an effort to bring up the low wing. Many a ship will stall, and spin out the bottom when this happens, due to the added drag of the down aileron. By the use of the wing-tip or letter-box slot, Stinson provides an aileron effectiveness that largely, if not entirely, removes this danger.

This in itself is wonderful insurance, but the designers have carried their safety thinking even further. Because the rudder is limited in movement, Stinson is spin resistant.

Although Stinson has taken the bite out of the controls, you are not aware of the difference. You can slip or do anything else necessary in routine flying. We do recall that on the "105" you did have a little trouble getting enough rudder to hold the nose on the runway in a steep forward slip. Bringing the wing up slightly relieved this situation. While we didn't have the opportunity for trying this on the "165," we do think that the amount of vertical tail on these newer models might obviate this characteristic.

The most significant thing about the approach and landing characteristics of the Stinson are those marvelously effective flaps. There are three positions, off, take-off, and full or landing. With full flaps you can put the nose well down, aiming at your spot with a normal glide speed of 80 mph. When we were checked out on Stinsons we were taught to flare out, then hold the ship off until it lost flying speed and settled on. It will drop what seems like a few feet, if you are high, and stay on. The landing gear is quite soft. We like the steep accurate approach you get with the Stinson when flaps are down.

If you have been flying Cubs, say, where the average landing is made by breaking and slowing the glide, rather than flaring out close to the ground, the above technique may not appeal to you. In our case, whenever we slowed a Stinson with flaps down we were bothered by the feeling of slow flying close to the ground. In calm air or a moderate wind this was no problem but, frankly, we don't like to break the glide and gradually settle with nose high in gusty, windy weather. Instructors, though, usually are reluctant to have students use a flare-out type of landing, being afraid that you might hit wheels first without the tail wheel being on the ground for added control over the landing roll. The Stinson, we've found, has good directional control on the ground.

When you start your approach in the Stinson, you wait until it slows up to that 88 or less mph. You'll find there is a good deal of trimming to be done, between power-off and power-on and between flaps off and on. We found that it helps to crank back just a little too much when compensating for flaps down; for just before touching down there may be a fair load on the wheel as you bring it back.

What do we think about the Stinson? Though conservative, nice to fly, it is not necessarily an old man's airplane. It is good looking, well built, easy to fly, and safe. If you like high wing cabin jobs, why say more?

CIRCLE "30"

(*Continued from page 44*)

die-cast. The cylinder liner is made of Meehanite, and has six milled ports. The liner is shrunk into the cylinder casting and then microhoned for extremely smooth surface finish.

The piston is machined from an alloy steel, hard chrome finished, and lapped to extremely smooth surface finish.

The connecting rod has a phosphorous bronze bearing pressed into the crankpin end. The bearing is microhoned for precision fit to the crankpin. The wrist pin is made of alloy steel, hardened and ground. It is held in place by two retaining springs.

The crankshaft is machined from the solid out of special analysis steel, hardened, ground, and hard chrome finished. The crankcase main bearing is machined of phosphorous bronze, microhoned to size. In addition to the main bearing there is also a thrust bearing which is machined of steel, hardened, and surface ground on both sides.

The breaker points are of the fully enclosed variety making use of two springs of different lengths which entirely eliminate any signs of high-speed flutter. A novel but very efficient spring-loaded connector is used at the stationary point which makes it impossible to change the point gap accidentally while tightening nuts such as are commonly used on many other engines. However, if this connector is in the way for cowling purposes, it is easily removed and two 4-40 nuts may be substituted for it.

The fuel tank is aluminum and is not directly connected to the engine, but mounting flanges have been provided so its installation is simple. A clear fuel line is also provided which is a big help in checking engine feed.

On Strobotac tests, our test engine turned up 10,700 rpm, using an 11-inch, low-pitch, Flo-torque prop. Using a 9-inch diam., 8-inch pitch, Rite Pitch prop, it turned up 10,400 rpm. With an 8-inch diam., 10-inch pitch, X-Cell prop, it turned up 10,600 rpm.

SOLO CLUB

(*Continued from page 32*)

as you'll find out. Many a first-flighter has climbed out of the plane, thanked the pilot, and then sworn a mighty oath to keep his dad-blamed feet right smack on the ground from that moment on, thanks to the desire of the brand new private ticket holder to show off his great and wondrous talent.

Don't Give Your Plane a Bad Reputation: It's usually the guy or gal flying a plane that makes or breaks a layman's opinion of that aircraft. Let's not give our pet plane a bad reputation through showing off. How often do we hear: "Did you see that blankity blank airplane (which can be anything from a Cub to a twin-engine Beech) flying too darn low over the church this morning!" or "Why don't those darn Cubs stop flying over the playground!" (anything smaller than a Constellation is a Cub to some folks). You never hear: "Did you see that darn fool *in* that lightplane practicing stalls right over the ball park full of people?"

Remember its *you* in the plane, doing the fool things, that give aviation a bad reputation. Any self-respecting aircraft will fly straight and level if you leave it alone. Once in a while, however, an aircraft has too much to contend with and, no matter how good, puts on a sorry show. Just last week we saw an example of that.

We were invited to go along on a demonstration flight of a brand new twin-engine transport designed to replace the veteran DC-3. It is a fine ship with better than five miles a minute top speed, a service ceiling of nearly six miles, plenty of comfort for the forty passengers and plenty of new gadgets including reversible propellers. The plane got off to a bad demonstration through no fault of its own.

To begin with, as we sat at La Guardia Field, the cute little hostess turned on the heat instead of the air conditioning and within minutes the cabin was nearly a hundred and ten in the shade. Then just to really break down our morale the cabin pressurization unit started up and forty pairs of ear drums began to pop like bubble gum, before we had left the taxi strip. Between the heat and the pressure it was too much for some of the passengers and the hostess was kept busy passing out towels to mop dripping faces and spinning buttons to shut off the Mojave desert weather. Once off the ground it began to cool off and catch up with the pressure but we still had one thing more to put up with.

The landing of the ship was to include a demonstration of the reversible props in conjunction with the brakes, to show just how quickly we could stop. To function, the props must be slowed down, reversed in pitch, and then revved up again to pull backwards. As we came in for the landing the propellers slowed down OK, but the starboard pinwheel went one better—it quit entirely just after we touched down (the first time) and didn't start

until we were almost at the waiting ramp. Outside of these it was a good ride and a good chance to see a fine airplane in action, but you can see what a ship has to contend with sometimes.

How One Flying Club Operates: One of the longest and most interesting letters in a long while comes in from Charles F. Coleman, Jr. of Wilmington, Del. Member Coleman is president of the Del-Air Flying Club composed of ten members who fly the club ship, a Piper Super Cruiser. He is also a very active member of the Delaware Wing of Civil Air Patrol. He used to be an old model builder but gave it up when he first soloed a full size job. He says he is going back to model building as soon as his three boys get old enough to "bury their noses in *Air Trails Pictorial*, razor blades, glue and balsa wood." Don't know of a better place for youngsters to stick their snoots when you come to think of it. Mr. Coleman is 100% for flying clubs and has organized four of them. The way his Del-Air Flying Club operates is efficient and has cut the cost of flying for its members by fifty percent.

There are ten members who each put in an "initiation fee" of $100, which gave them the down payment for the plane plus a couple of hundred left over for the treasury. They figured out what the monthly operating costs would be: installment on the plane, $130 a month, or $13 per member; monthly dues, $50, or $5 a member; maintenance fees, $30, or $3 a member; tie-down fee, $10, or $1 each. Total is $220 a month, or $22 per month per member. There is no hourly rate for flying the ship. The fuel tank is full when you take off and you fill it when you land. Mr. Coleman, a licensed A & E mechanic for Trans World Airline in Wilmington, does the ship maintenance for free. Each member of the club is assigned a certain part of the club ship and is responsible to the club president for the condition and airworthiness of that part.

All of the members fly by appointment so there is never any bickering about who has the ship, and once every ten weeks every member is entitled to a two-day and one-night cross-country. The plane is equipped with dual landing lights, CAA-approved flares, and two-way radio, so the ship is qualified for night operation both locally and cross-country. In operation almost a half year now with out any scratches to either the members or Super Cruiser, they plan to purchase a second plane.

As this is the fourth successful club Mr. Coleman has organized (the others are still going strong) it seems like a mighty good program of operation. With all expenses, including complete insurance coverage for $100 initiation fee plus $22 a month, it *must* be a well run club. Nice to hear from you, Mr. Coleman. Thanks for the kind words about the membership drive of the Civil Air Patrol which we are all in favor of, and best of luck to you and the Del-Air Flying Club.

Every Member Get a Member: To make it easy for you to invite all your friends who are qualified to join the Solo Club, separate membership applications have

been prepared which are yours for the asking. Just drop a note to Solo Club Membership Committee, Box 489, Elizabeth, N. J., telling us how many applications you'd like to have.

Incidentally, every member of the Solo Club should consider himself or herself a committee-of-one to issue membership invitations to those eligible.

Fire Towers to be Marked for You: What the CAA won't think of next for the private pilot! Now they are going to mark all the thousands of fire towers and lookout stations of the U. S. Forest Service. The marking of the buildings, most of them in dangerous terrain in our 167 National Forests, is already underway. Most of the 179 towers and lookout stations in the mountainous areas of Pennsylvania have already been marked. Each roof bears the state abbreviation and a code number to give you the exact location of that tower. This information will appear upon aeronautical charts in the future.

Glider Pilots May Now Wear Cap Wings: Many of you Solo Club members are glider pilots and so the following information will interest you. During the war when CAP was young we suggested to Major Kendall Hoyt, AAF, of Nat. Headquarters, that licensed glider pilots be permitted to wear the CAP pilot wings. This suggestion was approved and it appeared in the handbook of the Civil Air Patrol published recently in the South. Within the last few months new regulations for CAP pilots were issued by National Headquarters with no mention of glider pilots. I contacted NHQ and pointed out the old ruling as well as the fact that Air Force pilots of motorless craft were permitted to wear wings with a "G" super-imposed.

We have a letter from Lt. Col. James W. Wray, Jr., USAF, enclosing a new regulation permitting CAP members licensed by the CAA as glider pilots to wear CAP pilot wings with a silver "G" super-imposed.

That Dangerous Tail Rotor on Helicopters: Kenneth Bloom, from Williamsport, Pa., writes to say that he has been flying helicopters for almost three years and has yet to hear anyone warning about those tail or anti-torque props on the rear of helicopters. Let's do it right now.

Mr. Bloom points out that his worry is based upon his own experience and says: "If I sound like Mr. Milquetoast it is because I've seen what they can do to a person, and it isn't pretty." He says to stay away from the back of any helicopter unless you have business there, and if you must approach an "egg beater" do it from the front or side. "Incidentally," he concludes, "I had a kid run through the tail rotor about one second after it had stopped here at Williamsport. It made me wonder if he was related to the one you mentioned in your column who strolled through the idling prop, round trip."

That's all the room we have this chinsession. So many interesting letters come in we cannot use them all at once. Don't be impatient if it is a couple of issues before some of them appear. We can only use a few of them but we try to pick those that will be of the greatest value to the greatest number of members.

MODEL MATTERS

(Continued from page 43)

Address: Norwood Society of Model Engineers, c/o Ted Alexander, 185 Elm Street, Dedham, Mass.

The Linden Story: Here's a club whose fine record should inspire other famous outfits to tell us their story. One of the oldest groups in the East, the Linden Model Aircraft Club was organized in 1935 and now has a membership of 82, including such stalwarts as Leon "9-G" Shulman, Frank McElwee, and Bob Tucker, National Open Stunt winner. Weekly meetings are held in the old City Hall, just off Route 1, in Linden, N. J. LMAC's bright competitive record goes back to the good old days of rubber and glider. In 1938 the club sponsored the first annual New Jersey State Rubber Championship, and has held this meet every year since then. When gas came along, Linden continued to garner its share of wins. Last year members began to toy around with crude stunt ships and a series of models resulted that were a threat at all Jersey contests. In fact, Tucker's first at Minneapolis, and Shulman's fifth, indicated that "toying" was done at a furious pace. Holding its own in speed, too, Linden has a promising speed duo in the "Stag Racing Team," of Harry Stanton and Slim Macig. With such diversified interests and little groups within their membership, the boys have been keeping their powder dry for the season just under way. Linden's membership books never close, so we advise interested Jerseyites to contact Frank Krysiak, Linden Recreational Commission, Old City Hall, Wood Avenue, Linden, N. J.

Airport: The Worcester (Mass.) Model Plane Club was to have climaxed, on May 23, a drive to raise $5,000 for the purchase of their own model airport. It was the old story of nowhere-to-fly. But its a story with a new twist, for the average age of this Worcester gang is way, way down, there being one gas, and two junior divisions who make small planes. The junior groups make up 80% of the club's 70-member strength which runs from seven to 17 years of age. At present U-Control flying goes on in Boynton Park but all other sites for small free-flying models have been jinxed with neighborhood complaints about noise. But enuf is enuf, said the boys, and decided to buy their own field rather than expect anyone's favor. As we go to press, the outcome of the Airport Fund raising campaign is not known, but a two-column picture of Judge Carl Wahlstrom contributing to the drive and a healthy write-up in the city paper augurs well.

This Worcester club is unusual in more ways than one. It meets three times a week in the cafeteria of the Worcester Moulded Plastics Co. Henry Chicoine, founder and advisor, and proprietor of the Hobby Den, serves as treasurer and takes charge of the Wednesday night meeting of

the Junior division. Robert Welch is secretary and wields the gavel at gas division meetings on Friday. Leonard Hardy, chairman of the Airport Fund campaign, is in charge of Monday junior division meetings. Franklin Crevier, president, is 16 years old, and Ken Connor, vice-pres., is 13. Second vice-pres., Tom Chicoine, is 11.

New Clubs: That model building is going places in '48 is being confirmed by the large number of new clubs each month that wish their names added to the *Air Trails* Club roster. A sampling of this month's new correspondents: The Valois Thermal Chasers, Montreal, have started with a nucleus of five members but expect to expand rapidly to 35 members. Not at all timid because of their number, this quintet had planned a control contest for May 24, at Valois. Write G. W. Fry, Room 17, 204 Hospital Street, Montreal, Quebec, Canada. . . . A. H. Tiso, sponsor of a newly organized nucleus of the Westchester Aeronuts, 123 Fourth Avenue, Mt. Vernon, N. Y., states that this keystone group will provide guidance for the larger group that makes up the membership. The reorganization actually amounts to a breakdown into senior and junior groups. Its a sure sign of progress, this increasing awareness of the juniors. Club has backing of the local Exchange Club. A permanent flying site is being sought and an active summer flying campaign is planned. Sal Batteglia, pres., Ed Seegmuller, vice-pres.; Art Skinner, sec.

Bristol Aeromodeleers, recently organized as part of the Bucks County, Pa., Model Federation, has 30 active members in first three months. Aeromodeleers have use of a whole flying field, a break for free-flighters as well as the "yo-yo" boys. The Aeromodeleers are sponsored by the Exchange Club—have you noted how many Exchange Clubs serve as sponsors? Bristol is planning a big seasonal meet. Write Harry Stephens, sec., Aeromodeleers, Box 5, Bristol, Pa. Clarence Wells is pres., Robert Winslow, vice-pres., and Harry Brown, treas. . . . Now a year old and reporting for the first time, the Strato Streaks of Irvington, in Indianapolis, Ind., has a ten-man membership. Sponsored by the Lions Club, the Streaks go in for displays in store windows, the latest being an exhibition of entries (models not human) in the recent club contest. A club paper is published each month, and in May a membership drive was scheduled to get under way. Write Bob Hudson (sergeant at arms), 66 North Ritter, Indianapolis 19, Ind. Robert Kruse is pres., George King, vice-pres., William Wurster, sec., and Roy Austin, treas.

Club Briefs: T. W. Gilligan, publicity manager, Westfield Aeronauts, 6 Lozier Avenue, Westfield, Mass., advises that U-Control, scale and stunt contest to be held June 13. Small entrance fee. Club holds weekly flying trials at Barnes Airport or Westport Municipal Field. Meets every two weeks on Tuesday evenings at seven in the Westfield Public Library. American Legion Post #124 is live-wire sponsor with special committee for modeling. . . . "Skyscraper News," published monthly by Florida Association of Model Clubs, reports that six out of 17 Florida clubs

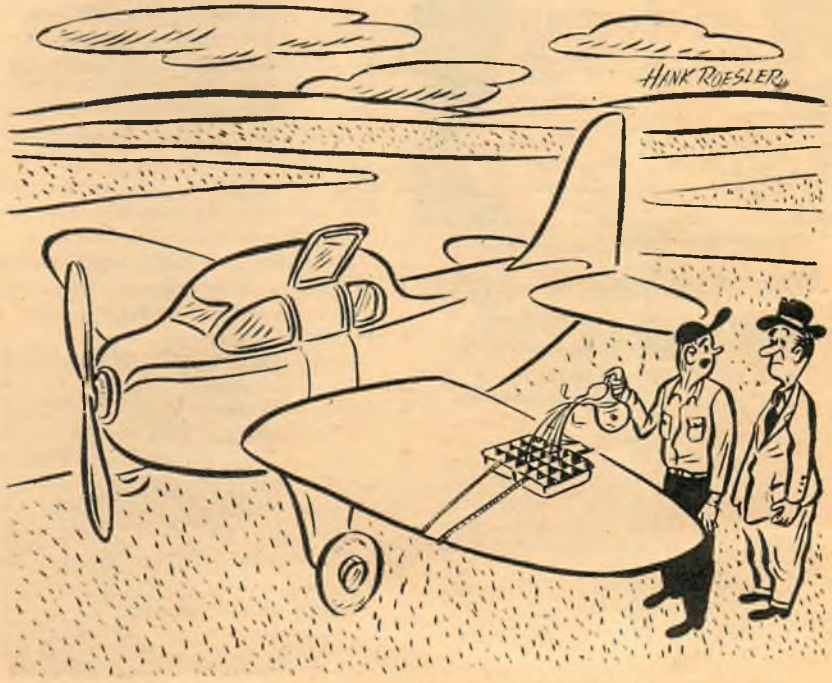
are now members. Floridans write Don Warner, Box 1581, Lakeland, Fla. . . . Results of Bakersfield Gas Model Airplane Association Tenth Annual Free-Flight Contest, April 4, show interesting comparison of Expert and Novice breakdown. Though times were high, the novices held their own right down the line in both Class A and B, and Class C & D. For instance, Allen Trainor, Los Angeles, topped expert A & B with 30 minutes, but Bob Spencer, Bakersfield, a novice, hit 27:2. In Class C & D it was Earl Ford, Coalinga, 24 minutes, and for the novices, Daryl Shepard, Los Angeles, 24:22. Offhand, it looks to us as if the novices had the better of it in Class A & B down to 10th, and held their own in Class C & D. What does this prove?

Vineland, N. J., Aeronauts announce Ninth Annual Model Airplane Contest for June 20 (rain date, June 27). Vineland Chapter of Exchange is backing the show financially and physically, according to the modelers. Boys had held back on contacting any outfit as big as Exchange but report happy results. The Vineland Exchange set up committees paralleling similar committees in model club and the two work closely together. Millville Municipal Airport is site of contest. . . . William Korr, Tiger Products, says Nitroparrafin ban was lifted. Though this happened in January we mention it for benefit of clubs that may have missed the news. . . . Sacramento Model Research Association a new Cal club. . . . Hawkeye Model Air Olympics, Chamber of Commerce, Des Moines, Iowa, announces contest for nationwide entry with $2,000 prizes. Free-flight, U-Control, radio-control, jet. . . . Billy Robinson, sec.-treas., Lake Charles Aeromodeliers, Y.M.C.A., Lake Charles, La., holding second annual control-line contest June 20. Sport and precision, stunt, beauty, scale speed, and sport jet. Organized two years ago, club is still growing and will welcome new members.

Boston Balsa Bees, 61A Franklin Street, Allston 34, Mass., holding a third annual birthday party at which movies will be shown. . . . Thermal Thumbers, Los Angeles, steamrollered all wings of Los Angeles Aero Modelers in recent round of Inter-wing Contest Series by piling up 2,099½ points to Flight Masters second-place 1039½ points. Other seven wings finished in various places in the leader's dust. New round began May 2. Contests are held in free-flight, U-Control, indoor, outdoor, rubber and glider; all held on different dates. Thermal Thumbers are national champs, which explains. . . . S. R. Walton, High Point Model Masters, 1302 Tryon Street, High Point, N. C., announces North Carolina State Championship Free-Flight Contest for June 20 (rain date, June 27). Big event is award of Carter Allen (Memorial) Trophy for North Carolina resident who makes most points. . . . According to Morris Malthby, the Flying Bisons, 95 Mariemont Avenue, Buffalo, N. Y., winter U-Control went on at 65th State Armory with times up to 120-132 mph in B, C, and D. Stunt, sport, or speed flown during three-hour morning periods on Sundays. Glow plugs and flying wings mark Buffalo progress.

Never underestimate the power of a woman. From Oakland Cloud Dusters' paper, quoting Pop Robbers: "This business of Mom's flying leaves me worried. First I worry over her releasing it right, then I worry over her finding it, then I worry wondering if she'll ever shut up about losing it."

New Comet: Late flash from the industry has it that Comet is back in the swim under the general managership of Sam Goldenberg. New name is Comet Model Hobby Craft, Inc. The name Comet was famed among contest goers for its many top-flight free-flight and control-line designs. If Comet continues the good work that was done in the past, you'll have plenty of supporters, Sam.



"Are you sure it'll ice up? I'm throwing a party tonight."

DOPE CAN

(Continued from page 63)

work bench as soon as Uncle Sam gave him his discharge. However, he dislikes having the thrill of flying his creations come second hand, so to speak. You see, Mr. Foerster has a limited field of action due to the wheelchair in which he must spend the rest of his life because of gun shot wounds which caused paralysis of both legs. He therefore writes to ask if we know of the existence of a practical remote-control pylon which he could use. We've already referred him to Jim Walker, but are sure that many of you have worked on this problem. Any ideas or suggestions will be gratefully received.

From Miroslav Herber comes a plea for model material. Mr. Herber, whose address is Praha XVII—Jinonice, Soubezna II—438, Czechoslovakia, writes that despite recent political changes in his country there appears to be no hope for an early resumption of the flow of model supplies. As many of us here discovered during the past war, we soon arrive at a point where cardboard and hardwood just can't do the job in place of balsa. The latter, it seems, is the principal missing item, and Mr. Herber assures us that those American modelers who are kind and generous enough to send even a small supply will receive the sincere, heartfelt thanks of all the modelers in his area.

On a scale of one inch to the foot and weighing a tremendous ten pounds, the B-26 job of Al Cattadoris, of Utica, N. Y., is truly a work of art. Al wisely chose to power his ship with two easy-starting Ohlsson "60's," which operate from a fuel tank in the wing. From what we can see in the snapshot Al sent us, the ship appears to have a beautiful finish. Many would be hesitant about flying such a masterpiece, but not Al, who reports that speed is about 55 mph, and that the flights are as beautiful as the ship. A snapshot, which we are afraid is a little too much over-exposed to reproduce, also shows a twin-rudder speed job powered by a Dyna Jet.

Ronald Carter likes us and we have four closely written pages to prove it. Covering each section of a recent issue in order, Mr. Carter tells us how swell he thinks the publication is. We're in there trying hard all the time. It sure makes the entire staff feel good to know that our efforts are appreciated. Thanks, Mr. Carter!

A simple, effective point system has been devised by Abe Adler of the Philadelphia Gas Model Association for determining the winner of their club championship trophies which are awarded on a year-round basis. Points made in any club contest are obtained by dividing the individual's total time for the day by the highest total time for the day and multiplying the result by 100. In order to provide an incentive for all club members to get out and fly, 25 additional points are

given for showing up with a ship and entering, even though no flights are made.

His recent acquisition of an Ohlsson "23" started R. L. Foreman on a search through his old copies of *Air Trails* for a suitable control-line job. In the 1944 "Annual" he found plans for the "Tethered Trainer," which proves that he is no green hand at modeling. However, his past activity has been confined to gliders and rubber models, so that he has a number of completely new problems to solve. It seems that he is the only modeler in Inverness, in Quebec Province up in Canada, so that he is completely on his own. We are listing his questions and our answers here, since it is probable that there are many beginners faced with the same puzzlers.

His first question is concerned with the size of the wheels. The answer to this one is dependent mainly upon the type of surface from which he is to fly. If the surface is smooth, 1½-inch wheels can be used, but if the ship is to be flown from, say, grass we would suggest using 2-inch wheels. Whether the wheels used are solid rubber or inflatable is a matter of personal preference. An 8-8 prop is suggested for that "23." Such a prop will permit the engine to turn over faster, at the same time providing sufficient flying speed to prevent flight lines from slackening.

Control lines should be about 42 feet to start with. Length can be increased when a sufficient degree of flying skill has been attained. The diameter of the wire is dependent upon the total weight of the ship. In this connection, the AMA rule of .001 for each three ounces of the model's weight is a good one to follow. In any event, lines should not be smaller than .008. The push rod from the bell crank to the elevator should be of sufficient size so that no bending occurs during operation. For this reason, a diameter of about .049 should do nicely.

Control-line models are classified according to the engine used, irrespective of the size of the model. Class A engines range from 0 to .200 cubic inches piston displacement; Class B, .201 to .300; Class C, .301 to .500; Class D, .501 to .650.

From time to time, requests are received for materials which might be used as subject matter for school courses in aviation education. Typical of such requests is that received from Felix Rothschild, who directs the Demonstration School at Kirksville, Mo. Realizing the need of an inclusive list of sources of such materials, the Civil Aeronautics Administration in Washington has done an admirable piece of work along these lines. It is therefore suggested that Mr. Rothschild and others with similar problems write for the list which was prepared by Doctors Mehrens and Tuttle of the CAA staff. The address is: U. S. Department of Commerce, Civil Aeronautics Administration, Office of Aviation Training, A-145, Washington 25, D. C.

A very interesting question comes in from Eugene L. Moore of Cedar Rapids, Iowa. Mr. Moore read Hank Cole's fine article on the location of the center of gravity in the December issue, and wonders whether 25% of the average chord of wing and stabilizer should be added together or taken separately. Since the moment arm varies with different models, these two points cannot be taken separately. He also wants to know whether or not this method could be applied to biplanes, since he has a Beechcraft. As we remember, both upper and lower wings have the same outline and area. Since the ship is a control-line model, it should balance at the same point as does its full scale big brother; that is, at 25% of the average chord. To obtain the proper balance point along the chord of the lower wing, measure the distance the upper wing is set back from the lower; that is, measure the distance from leading edge to leading edge seen when looking directly down on the ship. Half this distance plus 25% of the chord of either wing should be measured aft of the leading edge of the lower wing. The resulting point will be the correct C.G. location.

Some guys have all the luck! Harry Stephens, who is secretary of the Aeromodeleers of Bristol, Pa., writes that his gang not only has the use of an entire airfield every Sunday but is negotiating for the use of a workshop complete with metal and woodworking machinery. In spite of our plea that those with fields let us know how they did it, Harry left out this little detail. We're not so dumb, though! Right in the middle of the club's insignia we see the symbol for the Exchange Club. With chapters of the Exchange Club scattered throughout the country, and with Exchange having supported model aviation longer than any other organization of its kind, it is suggested that those of you who are looking for a place to fly get in touch with the local chapter. Since your local Exchange Club is made up of prominent businessmen in your community, doors are open to it which you might not even know about. We can definitely say, though, that you will be given every opportunity to state your case, and that if there's any possible solution to your problem Exchange knows the way to get an answer as well or better than any other group.

Daniel S. Weinberg wants to know whether or not permission is needed from Jim Walker to use the control system on which he holds the patent when using it in models built from magazine plans. He also mentions the possibility of paying a fee. This is a question which has been asked us on quite a number of occasions, although not in the column, so there are probably quite a number who are similarly puzzled. The payment of any fee to Jim applies only to those models which you might manufacture and sell, not to those you build and fly yourself. The basic purpose of a patent is to prevent the other fellow from making money with your invention.

From the pictures sent us by Forrest Jones of Seattle, Wash., it appears that there is such a thing as getting too good a finish on a model. This apparently loony statement has its basis in what we believe to be the truth, however. The ship itself had ten coats of white dope sprayed on, with four coats of black being used for trim. The job was then rubbed

down with the same type of rubbing compound used on automobiles, with the result that Forrest reports that you can literally see yourself in it. Pride prompted him to send in some pictures of this Class B speed job, which even has the wheels of the dolly decorated. The ship was placed in brilliant sunlight, and the glare from the gleaming white surface was so strong that although the pictures appear to be in focus the ship actually looks a little fuzzy. It's a beautiful ship though, and if finish means anything it should fly like a million bucks.

Harold de Montfort wants to build a scale job of the Bell XS-1 and power it with rockets just like the big ship. He wants to know how much thrust is needed and how to control it, so that the ship won't drop like a rock when the rocket is burned out. Our suggestions, in order, run something like this: (a) make the ship as light as possible, (b) fireproof it well, (c) control power by slanting the rocket slightly downward in the ship so that the tail end is above the horizontal, (d) *be careful.* To his request for plans we must answer that we have none available. It is suggested, though, that he write directly to Bell Aircraft Corp., P. O. Box #1, Buffalo 5, N. Y.

George Florman has been trying to find a ¼-32 tap for V-2 or V-3 plug. We are quite sure that Greenfield Tap and Die, of Greenfield, Mass., makes a variety of taps in this size. Probably the local hardware store can order one for him. Be sure to specify the material to be tapped and ask for a Class 3 or better fit to make sure there are no compression leaks around the threads.

Mr. Florman also suggests a possible answer to the question asked by Allen Mortimer in the May issue as to the mysterious layers of tissue and foil which Mr. Mortimer found on a dump. To reader Florman, this sounds like an unrolled radio condenser.

One of the most interesting letters we've received on the subject of incandescent plugs comes from Harold Bornstein of Long Beach, N. Y. It seems that before the May issue of *Air Trails* was published, Harold had already successfully run his Atom with one of these plugs, and was therefore quite surprised to see that the manufacturer advised against it. Anyone familiar with the design of this particular engine knows that one of its major features is a sub-piston, around which the fuel is by-passed into the upper cylinder. The engine's power depends on the sub-piston seating perfectly against the main piston head, and unless the fuel used is matched to the engine there's a strong probability that misfiring will occur, thus throwing the sub-piston all out of whack. Apparently, Harold was just lucky in choosing the fuel mixture that happened to be right for the Atom compression ratio. Additional evidence that this is probably the case is found in Harold's letter, which reports that another make of engine wouldn't even pop with the same fuel and plug. The reason for this is that the two engines don't have the same compression ratio, and the fuel that worked

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While every precaution is taken to insure accuracy, we cannot guarantee against the possibility of an occasional change or omission in the preparation of this August, 1948, index.

for one will not work for the other.

Organizations who plan to run contests and who would like to see them announced in these pages would do well to imitate the Nap-Air-Villains, of Naperville, Ill. In order to receive sufficient publicity for their free-flight meet to be held September 6, they notified us well ahead of time—5 months, to be exact—so that we can list it here. We understand that in addition to mentioning coming contests in the magazine, provided sufficient advance notice is given, *Air Trails* is to be in a position to give its readers an additional service: that of furnishing them for free a list of forthcoming meets. All that's necessary is that the request be accompanied by a stamped, self-addressed envelope.

To get back to the Naperville contest, free-flight gas will be in three classes: .0—.20; .20—.45; and .45—1.0. In addition, combined stick and cabin rubber, CO_2 and hand-launched glider events will be run off as well. Prizes look good, with trophies for first place in CO_2 and glider, with medals for second and third. Bob Clemens, club secretary, tells us that the meet will not be AMA sanctioned. We hope that the displacement limits for the three classes in free-flight gas will appear in big type on contest announcements, since they are called Classes A, B, and C, and that departures from the AMA standard rules are also clearly stated. This would go far to minimize the possibility of a contestant's traveling a great distance to the meet only to find that his ship which has a chance under the standard rules would be "out in the cold" because of some special local regulation.

P. R. Leclerc of Henniker, N. H., is referred to the remarks given above relative to the operation of engines on incandescent plugs. From his report that the engine stops running as soon as the battery is disconnected, it appears that not enough heat is built up to keep the plug glowing. For this reason, it is suggested that he add a little nitro methane or nitro ethane to his fuel mixture. Just how much to add depends upon a great number of things, so we suggest that the addition be made a little bit at a time, with a record being kept of proportions. Once the right mixture is found, larger quantities of fuel can be prepared.

BOJO

(*Continued from page 39*)

At this point install engine to note how engine will fit in plane. Cut two pieces as noted in drawing for strengthening 3/8" planking that is fitted to nose of plane. Do not install engine cowling until engine has been installed. It is advisable, if glow plug is used to use a paint that is resistant to glow plug fuel, before tank or engine is installed to inside fuselage compartment.

If ignition is used, dope inside of tail and engine compartments so that they are oilproof. Engine can now be mounted and engine cowling glued in position. Fuselage