MODEL AIRPLANE NEWS

FEBRUARY 1955 — 35 CENTS

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by Arthur Heinrich

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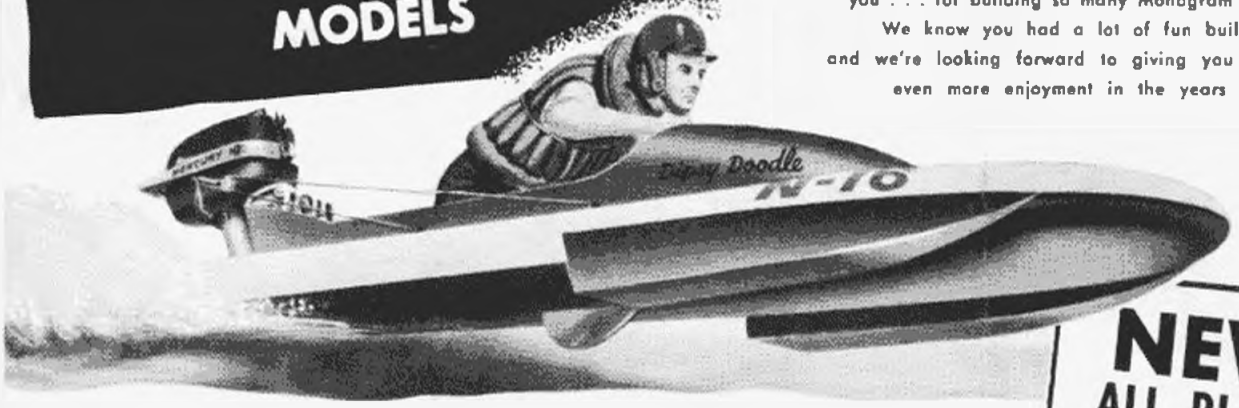

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MODEL AIRPLANE NEWS

26th Year of Publication

FEBRUARY 1955 Vol. LII—No. 2

CONTENTS

JAY P. CLEVELAND, President and Publisher
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Contributing Editors: Peter Chinn (England), Don Grout, Ed Lorenz, Ted Martin, Bruce Wennerstrom, Harry Williamson

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Editorial and Business offices: 551 Fifth Ave., New York 17, N. Y. Published monthly by Air Age, Inc., 1140 East West Highway, Silver Spring, Maryland. Jay P. Cleveland, President and Treasurer; Y. P. Johnson, Vice Pres.; G. E. Johnson, Sec. Entered as second class matter Feb. 1951 at the post office at Silver Spring, Md., under the act of March 3, 1879. Additional entry at New York, N. Y.

Price 35c per copy in U. S. Subscription Prices—U. S. and possessions: 1 yr. $3.50; 2 yrs. $5.50; 3 yrs. $7.50; Canada: 1 yr. $4.00; All other countries: 1 yr. $5.00. Payment from all countries except Canada must be in U. S. funds. Change of Address — Send to MODEL AIRPLANE NEWS, Subscription Department, 551 Fifth Avenue, New York 17, New York, at least one month before the date of the issue with which it is to take effect. Send old address with the new, enclosing if possible your address label or copy. The Post Office will not forward copies unless you provide extra postage. Duplicate issues cannot be sent.

Printed in U.S.A.

by William Winter

Speed, so help us, is making a comeback! A MAN survey shows the nitro burners have climbed about half way up the popularity scale. You have to credit Texas for this one. Every time the Lone Stars fly, a flock of records tumble and, boy, does the news get around! Leo Holliday's MAN articles have helped plenty. In fact, we've been kept busy dissuading 12-year-olds from trying Quick Sixties.

Perhaps, it's time again to talk about safety. Our own conviction is that speed should not be flown by anyone who is not in a position to benefit from advice and help of experienced fliers. Line attachment and mechanical detail are vastly more critical and important than they are with that profile stunt model we all toss around in fun. (The AMA rules booklet includes a page of detailed illustrations on lines, wrappings, etc. and MAN expects to publish an authoritative coverage by speed spokesman Leo Holliday.) For now we'd like to quote Leo on rules:

"The rules for 1955-56 suggest a back door approach by disqualifying the flier when his ship breaks loose," Leo begins. "This isn't a good answer. The fellows who break loose aren't the Jim Clems, Tommy Bakers, Frank Stones and Bob Elliotts, but just poor Joe Modelbuilder who really doesn't know what he has on the end of the string.

"Sometimes it is just faulty lines, but other times it is the design itself. The expert's ship is designed to fly with neutral control except on take-off and landing. A ship is pull-tested at neutral. A job that is hitting 150 mph or better with full down on the lines is flying on one .016 line! Anyone flying a ship that is not inherently stable will have to alternate his controls throughout the flight."

Incidentally, Bob Lutker's ship that won the world speed championship in its class in the FAI meet in Holland was a Quick .29 (Quick .60, MAN, May '54) and, flying mono-line, Holliday, teamed with Jim Clem (*Continued on page 6*)

PLANE ON THE COVER

The most talked about of Britain's jet-powered bomber trio, the Avro Vulcan (the others being the Handley-Page Victor and Vickers Valiant) features the delta planform, favored by the British. Convoyed by a Gloster Javelin in Jo Kotula's imaginative painting, the Vulcan spans 99 ft., is 97 ft. 1 in. long, is powered by four Bristol Olympus turbojets. Top speed is in excess of 600 mph. Range, of course, is great. American bombers favor the more highly loaded, high aspect ratio wings, exemplified by the Boeing B-47 Stratojet. Vulcan an A-bomber.

NEXT MONTH'S COVER

One of the greatest of Kotula's renderings of historic aircraft is the Douglas M-4 mail plane. This true-to-life scene shows the open-cockpit biplane over bleak terrain, but in sight of the airport (at last!) as the last rays of sun fade away. The M-4 was powered with a 400 hp Liberty engine, one of the heritages of the first World War. Speed, 145 mph. It was only 25 years ago.

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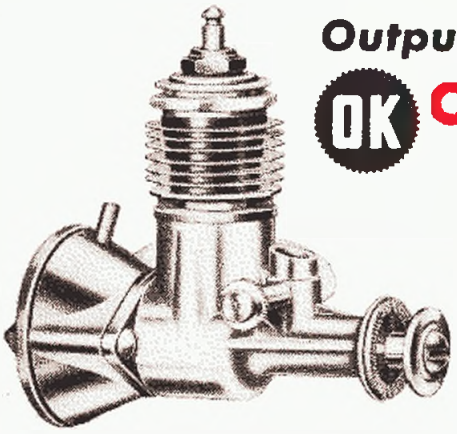

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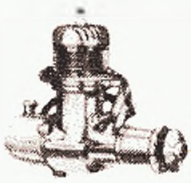

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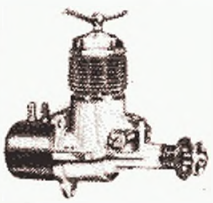

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MAN at Work

(Continued from page 2)

and Sam Beasley, set the fastest time ever made. Let him tell you:

"I flew as a team with Jim Clem and Sam Beasley yesterday in order to get their McCoy .60 ship in the air. Jim has cracked it up three times in the process of trying to get an official on it. As a result, the ship has been named the Monster. Once he was pulled out of the pylon and thrown flat on his back (Southwesterns) with the only thing that stopped the ship from breaking loose being the safety thong that is standard with the mono-line speed handle. To continue with the story—I flew the ship yesterday and it hit 168.10 mph—record trials wow. Six watches were on the flight and all were within tenth of a second. The slowest was 166-plus mph and the two fastest watches were within 1/100 sec. apart. Just to satisfy the model world, we flew it again and got a lean run but did 161-plus mph; still bettering the old record by over 1 mph.

"The weather was bad for records and we think it would have done a little better if it hadn't been raining just a little. The temp. was right, though—70°. (McCoy .60, 9 x 12 [stock] Tornado; This Is It fuel with oil added. Very nice, clean ship."

• • •

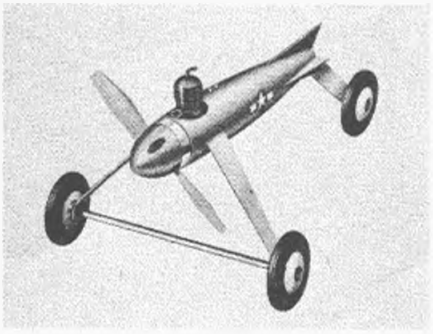
Topped off a mad month of modeling with three flights in the fog of a .29-powered Lazy Bones (three-year-old Miller receiver!). Ceiling about 75 ft., visibility no more than 200. Steep figure eights. Began the month with a Royal Rudder Bug kit. Filled in windshield area with 1/4 sheet, gusseted copiously. Put a two-wheel gear, a la Schumacher (rubber shock, pivoting struts) and North American two-tuber. Idled a new RK-61 for five hours to get sensitivity but with the new long life to these things, who cares? Webra .15 Diesel on a 10 x 3-1/2 Top Flite. But haste makes waste and the trailing edge hooked down. So put on a wing from Frank Zaic's wing and stab kit. Flight is fast and flat for the power—very fortunate combination. Finally, after six good flights one morn, engine conked out, hit a foundation. Outside of a bent shaft on the Webra and a badly broken receiver, no damage. Someone calculated the ship hit at 19 G's. Tests afterward showed that the receiver would have weighed over 4 lb. at that force; it compressed a foam pad mounting to 1/8 in., then jumped back 3-3/8 in., enough to meet a forward-moving escapement. Can't speak highly enough of the Zaic wing-stab kits, for had no idea. Selected wood, accurate die-cutting, sound design, and a really fine airfoil for RC.

Then a Jim Walker Firecat, assembled by one of the small fry. Any Jim Walker kit is news. Modeldom waited impatiently to see what Jim would do with an all-out stunter; his Fireball has been around since before World War II and is still a good airplane, which gives the idea. The Firecat kit is an adventure and no fooling. Although it is highly prefabbed, experienced hands will quickly note that the underlying theme is lightness. Lightness counts when you wring them out. The D-shaped leading edges are cut out; the profile is slim, not wasting wood, but adequately strong through its design. The wheels add virtually no weight. Advanced features in assembly abound, so we'll mention just a couple. Tying the center of the wing together is a die-cut piece of plywood, that insures line-up and, at the same time, provides the bellcrank mount. The center rib is made up of two pieces, top and bottom. This rib really is a block, cut to rib section, and channeled out top and bottom to take the upper and lower sections of the split fuselage. So you cement in the plywood, cement on the top and bottom center rib, then

(Continued on page 52)

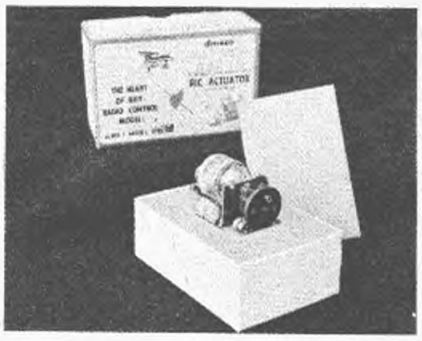
TRADE SHOW

MONTHLY REVIEW OF NEW PRODUCTS, OTHER INTERESTING ITEMS WORTH ATTENTION



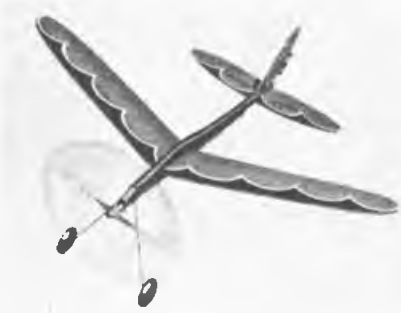
▸ *Rocket Racer:* New McCoy Products Company Racer (8509 Higuera St., Culver City, Calif.), termed the "Nike" after its prototype, the guided missile. Propelled by a new McCoy .049 Diesel beam mount engine, the "Nike" runs from 10 to 50 mph depending on the variable compression. List $9.95.

▸ *Trainee:* One of the most successful trainer U-control models of all time, recently reissued by Top Flite Models, Inc. (2639 S. Wabash Ave., Chicago 16, Ill.), designed for .23 to .49 engines. Wing span is 30 in.; length, 26 in. Flies itself with elevator disconnected. Fully prefabricated kit at $3.95.



▸ *Multi-Servo:* Produced by deBolt Model Engineering (Williamsville, N. Y.), line of motor-driven actuators for radio control models offers large driving force, low battery consumption, eliminates rubber bands. Torque, 1/2 lb. Four models offer usual variety controls, in price $10.95 to $14.95.

▸ *Jim Walker Pursuit:* Motor of contest rubber, free-wheeling prop, among features of 79¢ ready-to-fly plane. (A-J Aircraft Co., 1166 N. E. 31st Ave., Portland, Ore.) Crash-



proof bearing eliminates bent shafts. Balloon type plastic wheels, unbreakable plastic prop. Trim tab rudder. Cambered, swept-back wing, preformed dihedral. Good take-offs, long flights, from a free wheeling prop

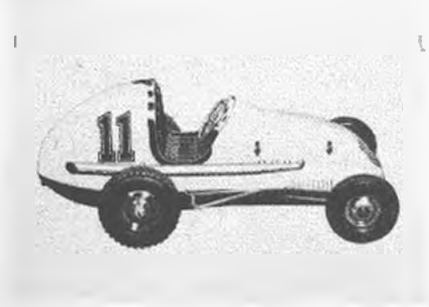
▸ *Super Half Pint Racer:* Nine-inch long, direct drive racer for the small bore engines, by Scientific Model Airplane Co. (113 Monroe St., Newark 5, N. J.), retails for $2.95.

Two-tone painted molded body, machined brass flywheel, realistic racing type rubber wheels. Hits speeds up to 40 mph on any smooth surface. Featured are new type "lock-type" push nuts on the axle. No gears.

▸ *RC Cessna 170:* Huge two-inch scale, six ft. span model by Berkeley Model Supplies (West Hempstead, N. Y.) should be scale model to end all scale models. Includes pre-

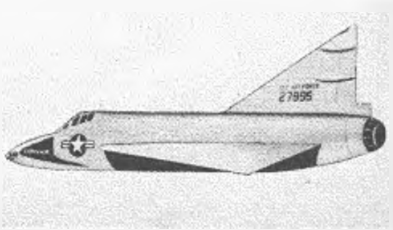
fabbed leading edges, die-cut parts, authentic full color decals. Designed by Henry Struck, it takes engines from .25 to .35. The Cessna type metal gear is formed. Large cabin. Good for single or multi-control. Price: $9.95.

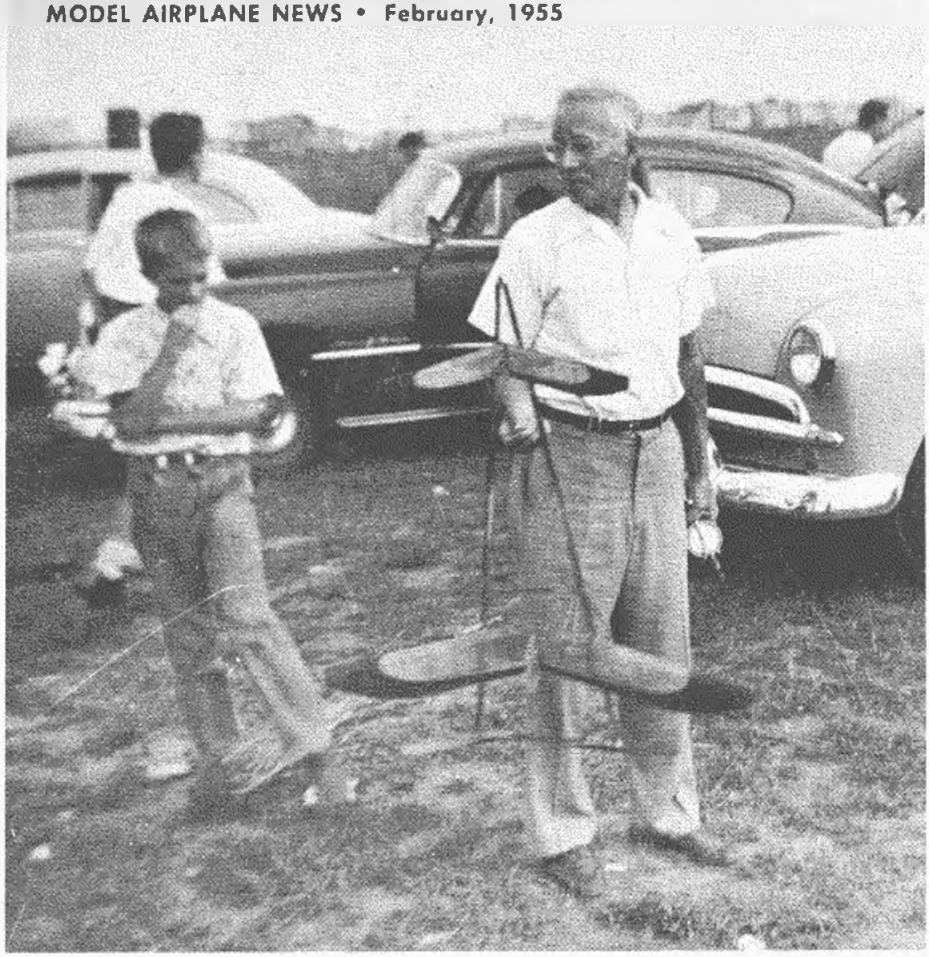
▸ *Offie Midget Racer:* Manufactured by Cheminol Corp. (Rivera, Calif., Middletown, Del.), the O & R race car has fully enclosed .29, especially designed for car use. Finished in solid or two-tone combinations of red, yellow, black or white baked enamel, car has six in. wheel base. List: $24.95.



▸ *Rubbing Compound:* For good smooth finish and bright shine, that dope job should be rubbed. Produced by Pactra Chemical Co. (1213 N. Highland Ave., Los Angeles 38, Calif.). Aero Gloss rubbing compound comes in can like shoe polish, costs 40¢. Compound actually is an ultra-fine abrasive.

▸ *Jetex F-102:* For jet scale fans, new Convair delta fighter by American Telasco, Ltd. (Huntington, N. Y.) is powered by Jetex 50b engine. Die-cut balsa wood, complete assembly and flying directions. Plane, engine, fuel, one box, for $1.95. Deltas have a large degree of stability, stall resistance.





In this recent photo, Mr. Heinrich was holding one of his most famous twin pushers, dating back to 1925. The quizzical look on Junior's face was registered because other ships on field were RC craft.

My 52 Years of Modeling

by Arthur Heinrich

Most of the "old timers" credit their inspiration to Lindbergh. It was one of the Wrights who inspired this still active model builder to sketch his first dream ship in the winter of 1903. What followed is a fascinating tale.

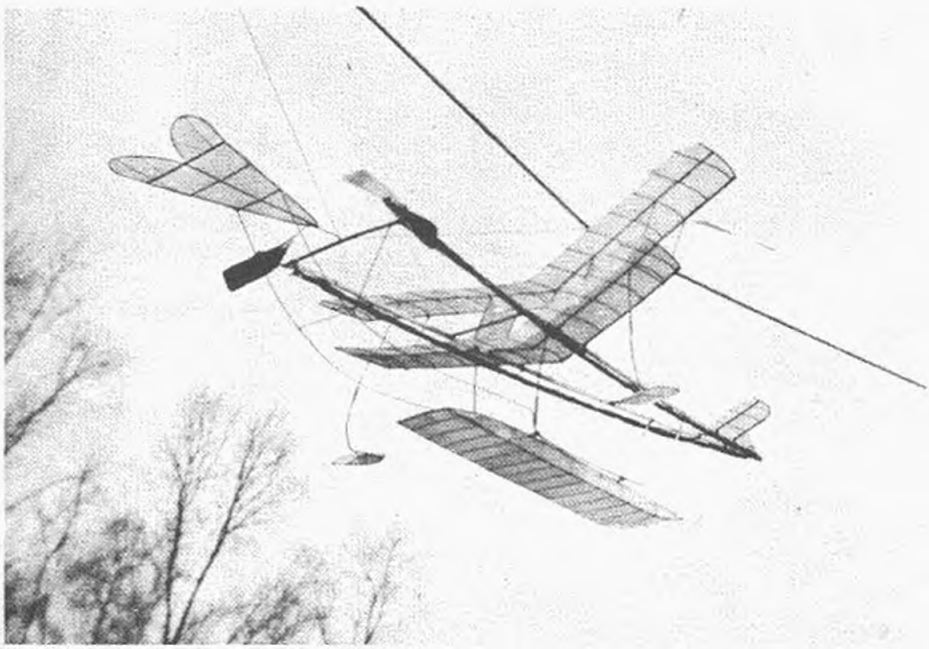
▼

In the December, 1953 issue of MODEL AIRPLANE NEWS, I read with great deal of interest the article on the first Mulvihill Trophy contest, written by my good friend, Christy Magrath. It brough back many pleasant memories of the old times and the old time contest days in which there were not too many rules and regulations and in which the old twin pushers predominated. All models and types flew on an equal footing with each other and let the best man and plane win.

I competed in the second, third, fifth and sixth Mulvihill contests, flying twin pushers of my own design. I am primarily, I guess, a twin pusher man and to this day, there is no plane I get more kick out of flying than a twin pusher. Incidentally, I claim to be the oldest still-active model builder and flier in the country—if not in the world; that is to say, in number of successive years. I built my first model plane in 1903 and I still get as much fun and satisfaction out of flying models as anyone; my interest has never failed and I get out and fly whenever I can.

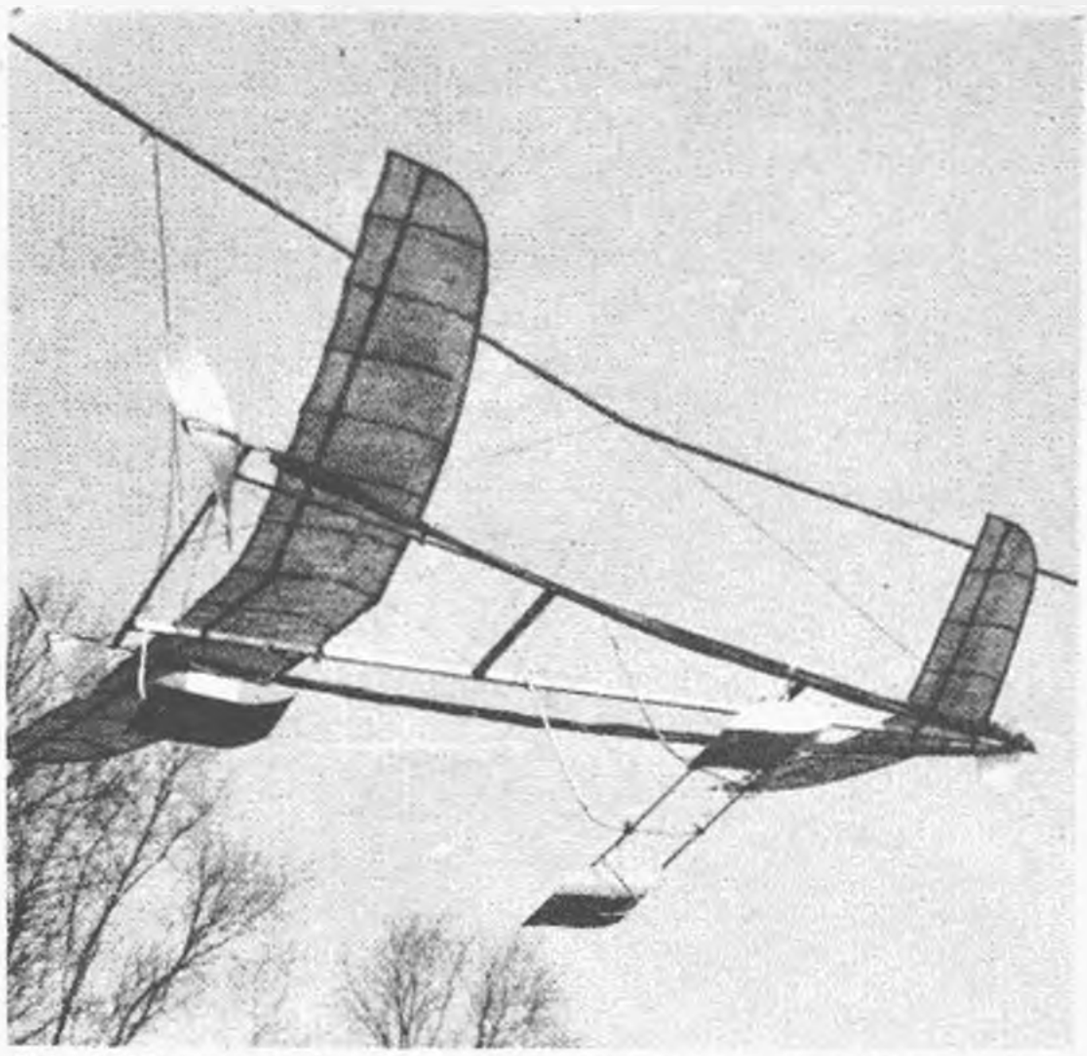
The first model plane I ever saw fly for a period of one minute or more was a contest twin pusher designed and built by George A. Page, Jr., one of the first model airplane boys. This was a large plane built up on a hollow main frame of white pine; the wings were single covered with rice paper over heat-bent bamboo ribs. It had a large pair of high pitch carved balsa propellers and was a beautiful flier. When George came with my brother and me to learn to fly in 1912, and learned that I was very much interested in model aviation, he brought this model out with him one day and flew it for me. It made a most beautiful flight of 70 seconds and landed in the top of an oak tree, at which point I climbed to the rescue, worked out toward the outside of the limbs and sent it on a glide to the ground.

In 1895 or thereabouts, my people moved from Brooklyn, N. Y., where my brother and I were born, to a small farm in North Merrick, Long Island, N. Y. There were very few people living near us and no other kids for us to play with. Consequently, we became very much interested in the things around us—the



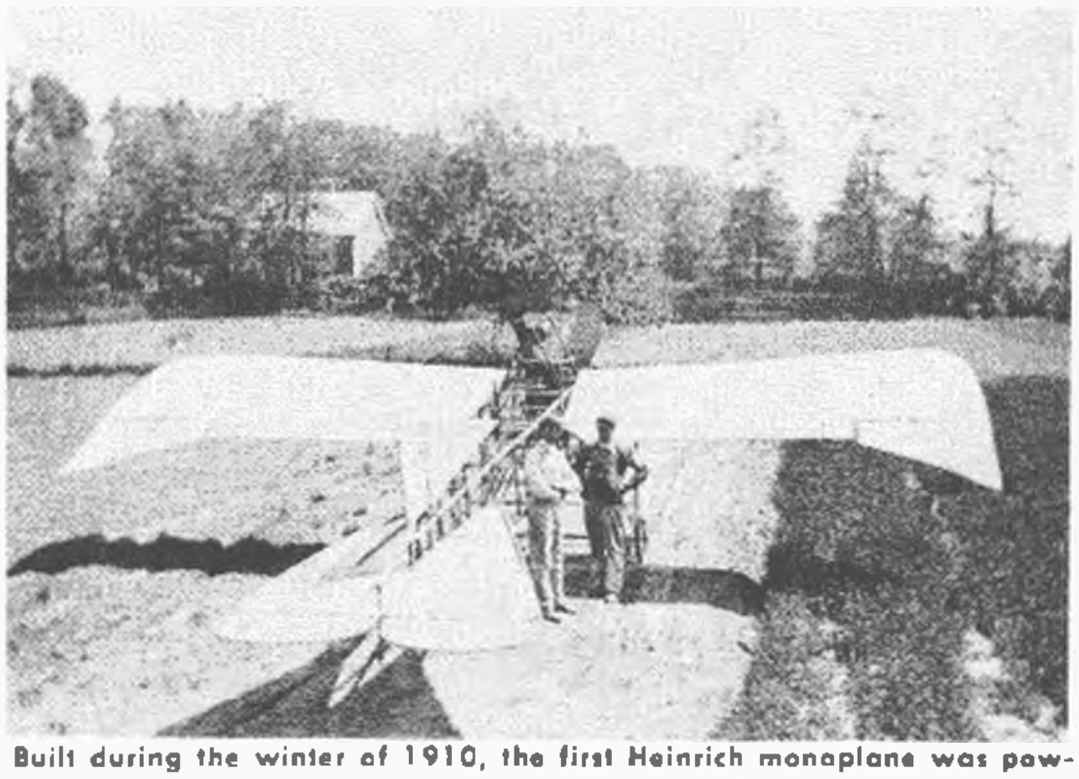
Experimental 1918 model by author was successful flier. Covering was China silk on one side only, given one coat of white shellac, as was the pontoon. Purpose was to test variations in hulls, floats.

Heinrich Heron, just before 1926 Mulvihill contest. His models had the highest strength ratio of any in country at that time, bore bird names.



This 1918 twin pusher had two front floats, one rear. Short skids on front floats were to aid take-offs from ice. Props appear bent wood.

The author in one of the home-built airplanes built with his brother. Heinrich turned to models in order to find out how to design real ships.



Built during the winter of 1910, the first Heinrich monoplane was powered with an Emerson marine motor. Bert Heinrich, left, and the author.

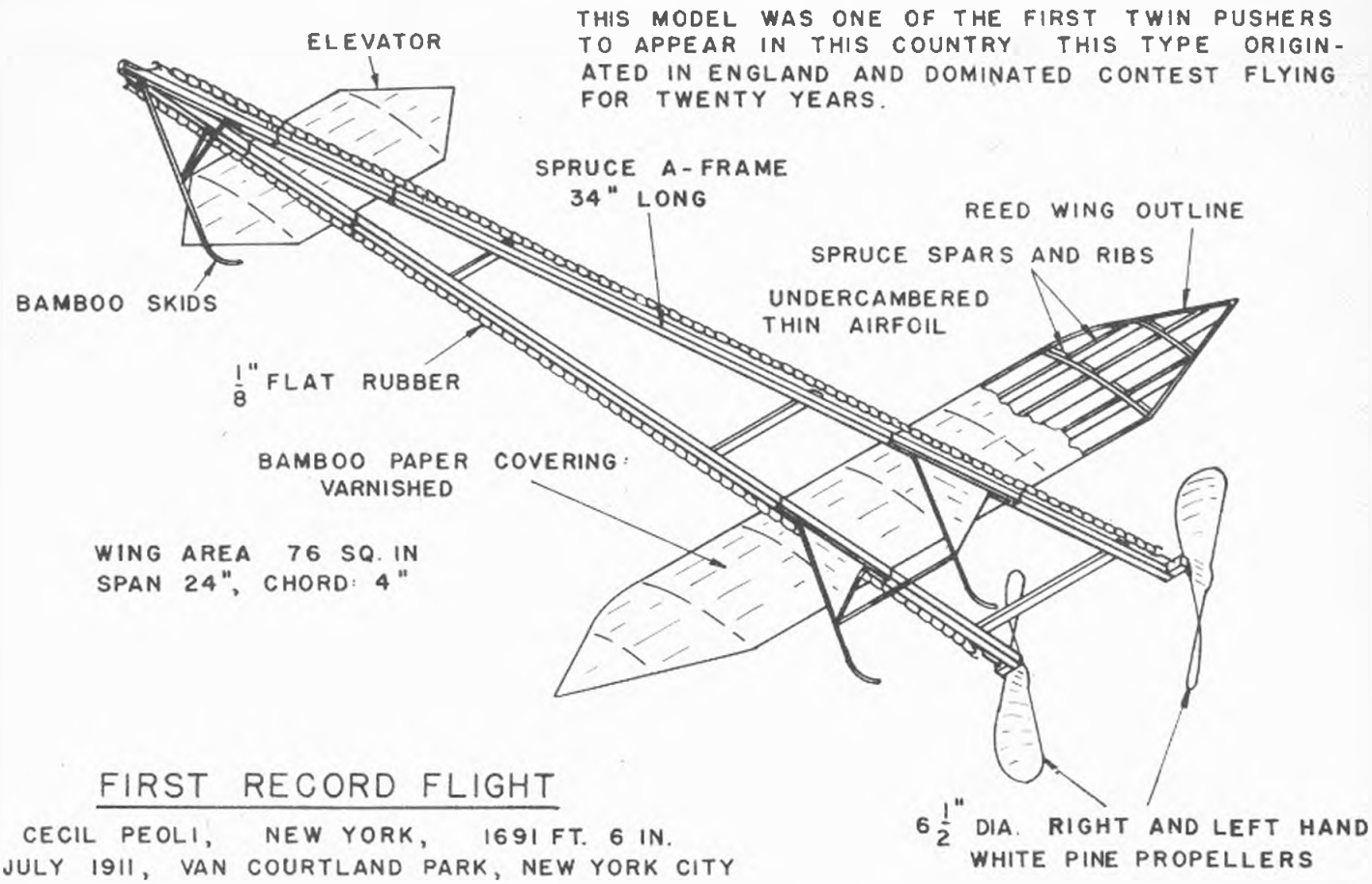
After 1910 plane flew, the Heinrich's built this 28-30 hp 1911 ship. Its big achievement was ability to carry a passenger. Carved own props.

plants, trees, flowers and the wild life—with which we came in constant contact. We were particularly fascinated by the birds, primarily because they could fly through the air. Because we had no one to play with, I believe, was one reason why my brother and I learned to make things for ourselves at a much younger age than most of the kids today. But I do not want to forget for one moment the interest and assistance our father gave us and to him we owe a very great debt of gratitude, for he taught and encouraged us in everything we tried to do: how to handle tools and make our own toys, etc., so that we were able, at an early stage in life, to do many things for ourselves. When I look back and think of what we did when we were very young kids, it does not seem at all to be very unusual.

Well, as I said, we were very much interested in bird flight and spent a great deal of time watching birds on the wing and trying to figure out how it was possible for a body as heavy as a bird's to be able to pass through the air without falling. One day, Brother and I got the idea that we could make a pair of wings and fly. We built a pair of frames of young hickory sticks cut out of the woods and covered them with strong paper on the bottom side. The butt ends we held under our arm pits with our arms extended as far down the top side as we could reach, where we grasped a hand piece in such a manner as to enable us to flap the wings

MODELS THAT MADE HISTORY

BY J. L. MACKENZIE



One of the more spectacular record makers and contemporary of Heinrich models was Cecil Peoli, on market 'til 1929. Drawing, J. L. MacKenzie.

up and down (Brother was almost eight years of age at this time and I near ten). It was a good try, but, of course, did not work.

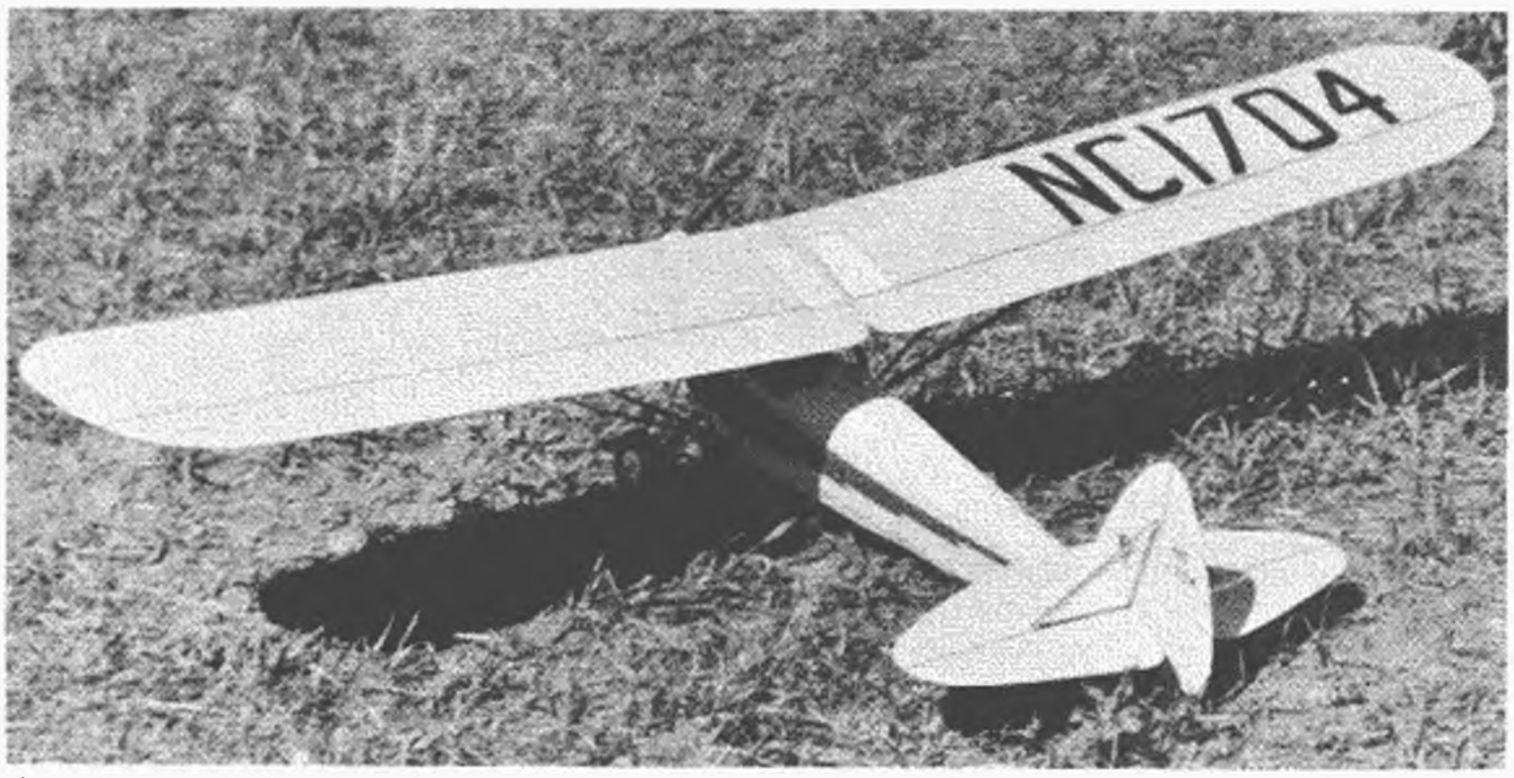
As there was no school in our section of the country, Father bought a small farm in Baldwin, Long Island, where I still live and here, at the ages of eight and ten, my brother and I went to school for the first time. Here we became so interested in school and other kids to play with that we almost forgot about flying, but not for long, for we soon began making flying wedges of paper along with the other kids, to fly around the school room. This revived our interest all over again and we began to do some more thinking, this time around a flying machine which would take us aloft with it. In the winter of 1903 I was kicked on the side of the head by a young horse and, while laid up in the house, I started to build my idea of what an airplane should be like. This, of course, in model form. These models were powerless gliders. I was further stimulated by learning of the experiments of the Wright brothers. Later, when I could go out of doors, I made a skyrocket to power one of these models but the rocket blew up, scattering my model all over the yard. I gave up this source of power and started to use rubber bands looped together to drive a very crude paper-covered, paddle-like propeller, such as was used by Professor S. P. Langley and others. Later. Brother and I learned how to carve propellers and I really got my models to fly. My first models were along the lines of what was to be our first full size machine and with these I experimented and tried to learn as much as possible in regard to making a full size plane that would fly. When I started in, I had to find out for myself just where the bulk of the weight, or center of gravity, has to be placed in a plane to bring about a balance while in the air and have it fly, for at that time, there was nothing in books or papers to help one, such as there is today.

After a lot of experimenting, I thought I could build a large size model and put a 1-1/2 hp single cylinder marine motor in it and let it take off and fly. This model had a 10 ft. wing span and 70 sq. ft. area. Brother helped me install the motor and make a propeller, but there was not enough power delivered from this crude propeller to pull the plane fast enough for a take-off and we gave up the motor idea. A short time later, we flew this model on a long rope in a high wind, having first taken the motor out. After a while it crashed, but we were so well pleased with what we had learned from it, and so much encouraged, that we decided to build a full size plane.

In the winter of 1909 we started to build our first plane. This was a monoplane (as well as the next three types which followed it), as we believed this was the best form for a plane to have. Later on, when the (*Continued on page 45*)

Real plane or model? Can't tell, eh? Only the cylinder head of the inverted engine is the tip-off. Wings and struts detach; are fly-off.

THE HEATH PARASOL



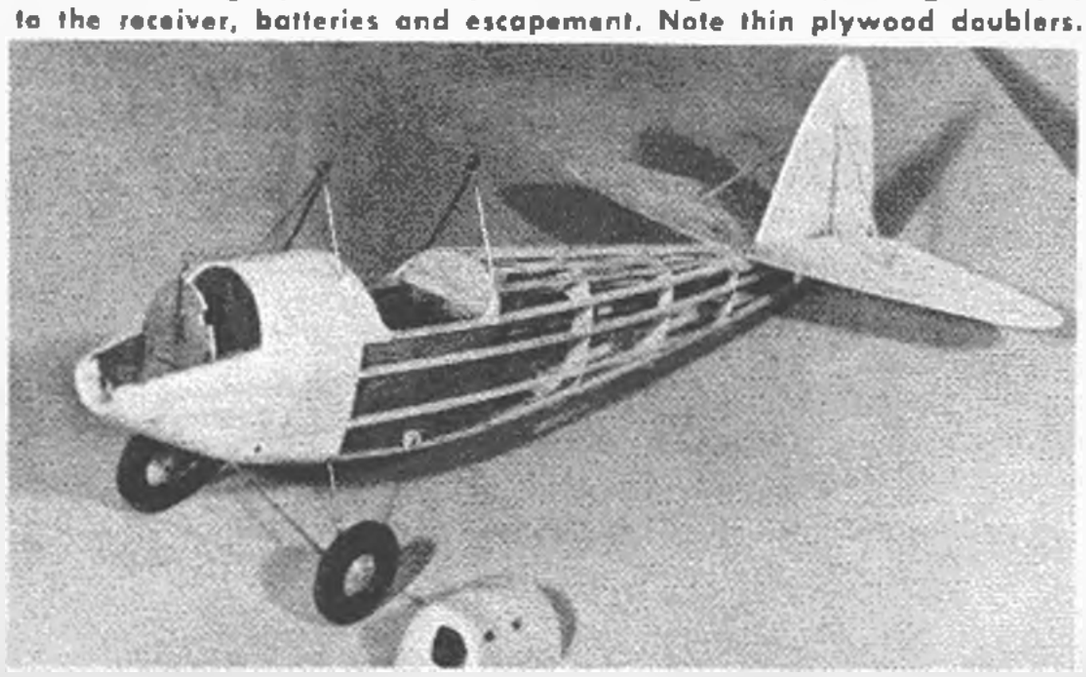
Sometimes scale has its advantages; here, the long wing of the Heath produces smooth turns and nice recoveries. The weight including the .099 engine is just 40 oz., ideal for RC original design.

Candid camera catches the author busily engaged with replacement of escapement rubber.

by ED YULKE

Most famous sport plane of its day, this open cockpit ship makes good scale RC or, with .075's, an unusual free flight subject. Sturdy as well.

Structural design provides easy access to engine and, through cockpit, to the receiver, batteries and escapement. Note thin plywood doublers.

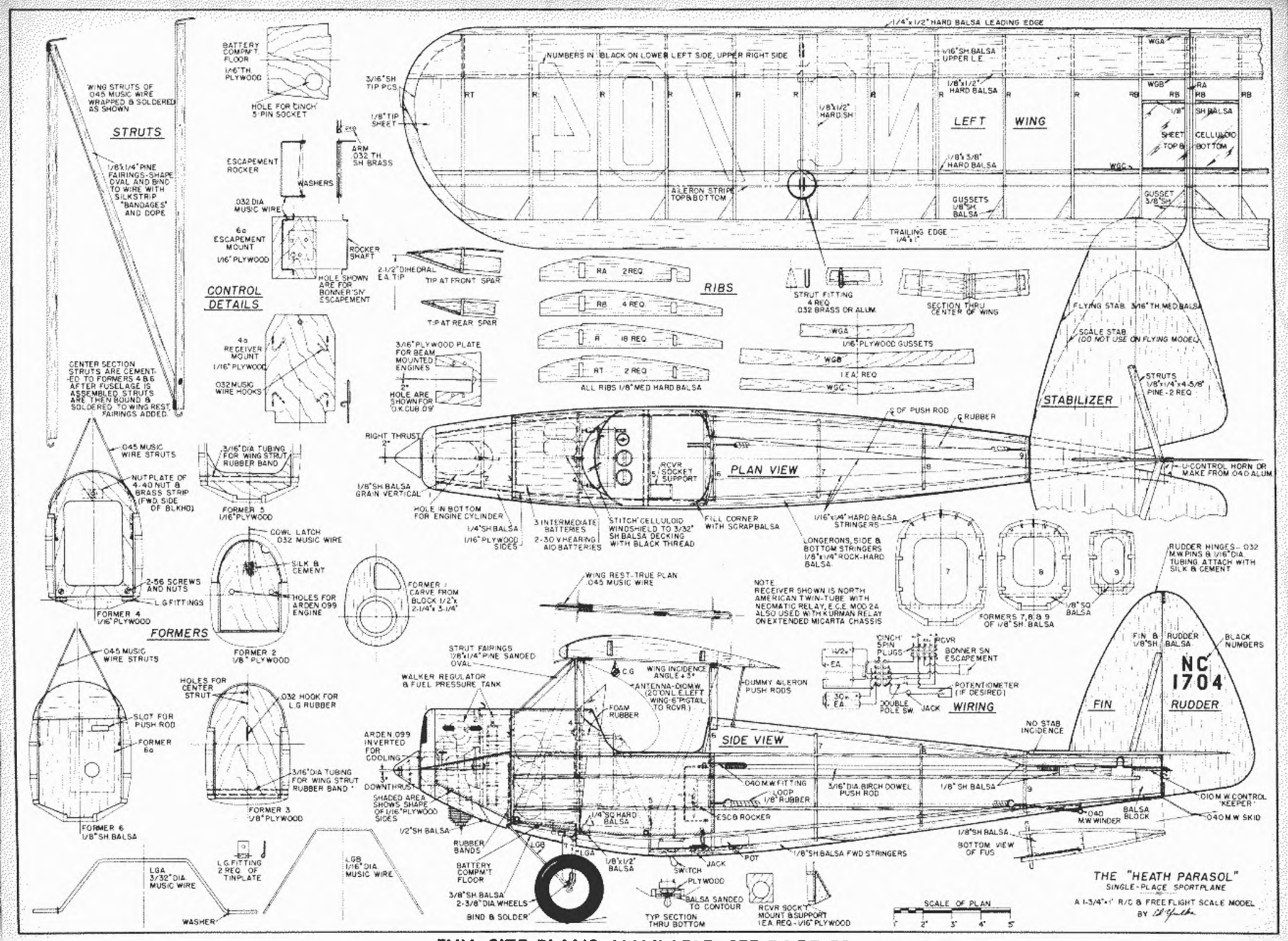


▶ The Heath Parasol RC model shown here represents the realization of a long dream for the writer—the first "real" *flying* scale model in 27 years of modeling. Rubber flying scale meant either thin, analine dye dope for a finish, most details left off, or too heavy a model to fly properly. Half-A flying scale still left too much to be desired: the writer has a heavy hand with a paint brush!

The Heath shown here, with four coats of fuelproof colored dope and all details, including faired music wire struts, weighs just 40 oz. With an .099 engine this is just 400 oz. per cu. in. power loading and the 17 oz. wing loading means she has enough "solidity" in the air to make a practical ship for a bit of breeze: she won't blow away.

The Heath has a smooth turn because of the long wing. good recovery stability stemming from low CG, yet good maneuverability through a generously sized rudder—in this case, the *scale rudder!* The Heath will turn in a mean precision pattern on its rudder-only control and is able to do a few of the aerobatics.

We refuse to state that the construction is simple. No RC model is simple to build, even from (*Continued on page 48*)

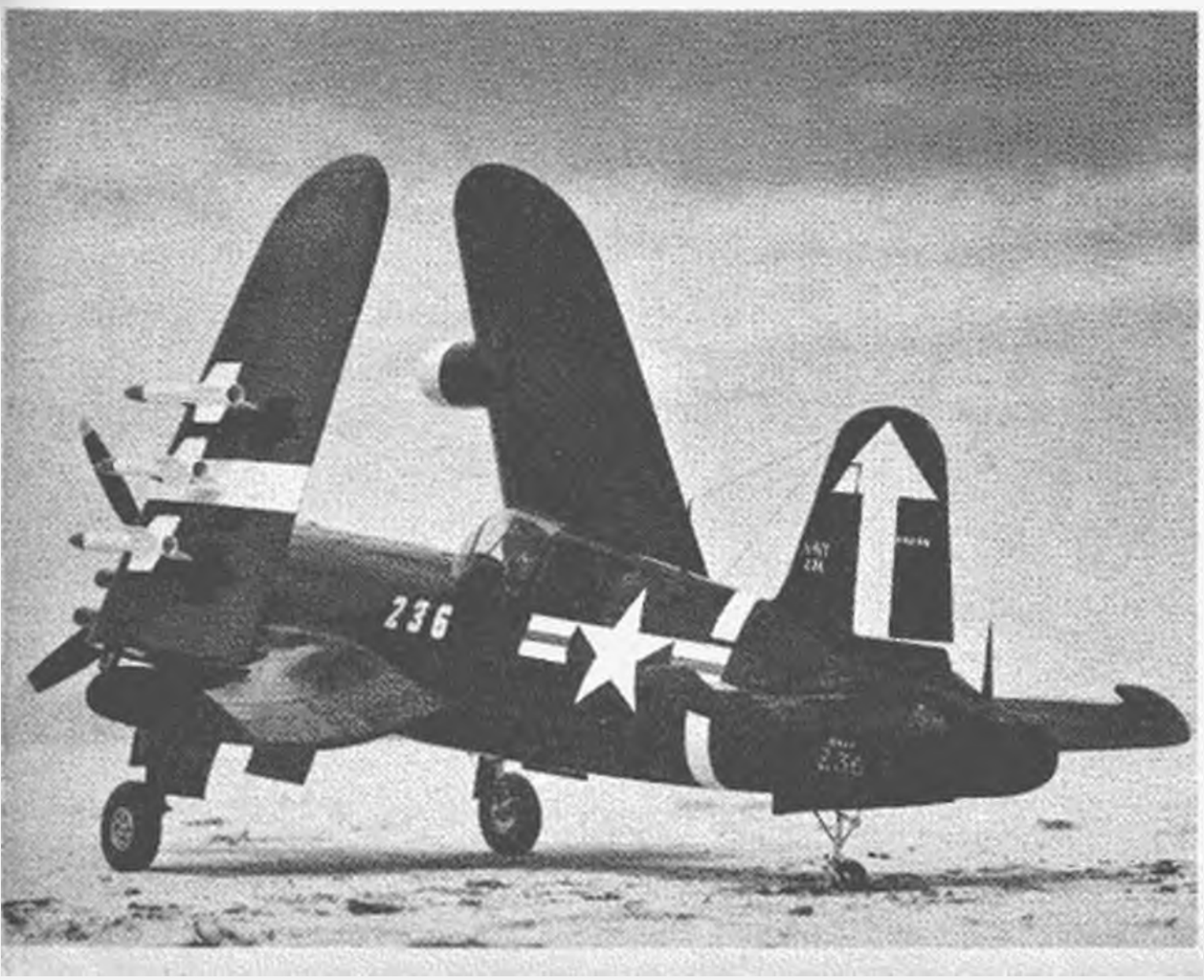


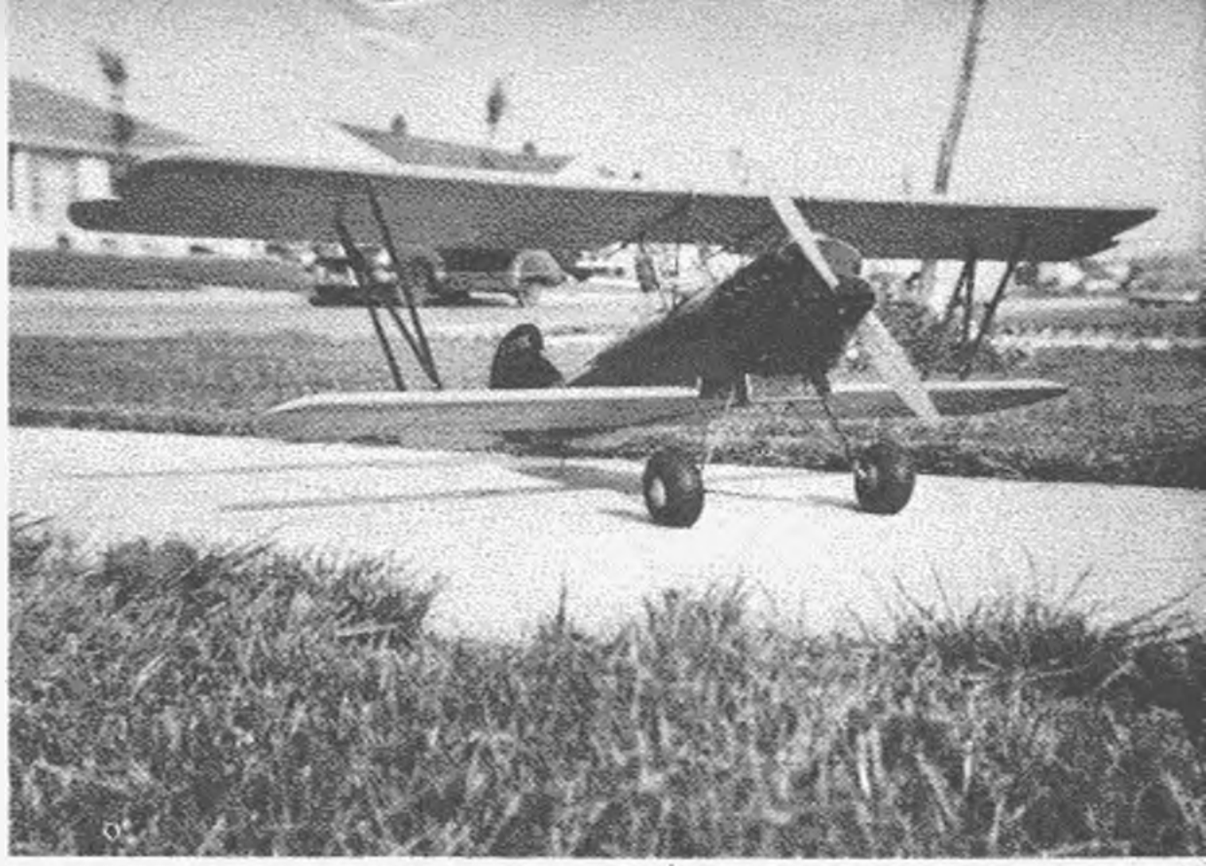
FULL SIZE PLANS AVAILABLE. SEE PAGE 50.

Six months of work went into this Vought F4U-5N Corsair by Noal Hess, Salt Lake City. Wing span is 54 in., weight 7 lb., power, an Orwick .64.

Truly incredible job done by Hess is indicated by such details as fully retractable gear powered by HO gauge locomotor. They rotate 1/4 turn.

Wings of Hess Corsair fold, lock down. Finish Air Tec enamel, over auto primer undercoat. Oleo shock struts work, so does the scissor on gear.

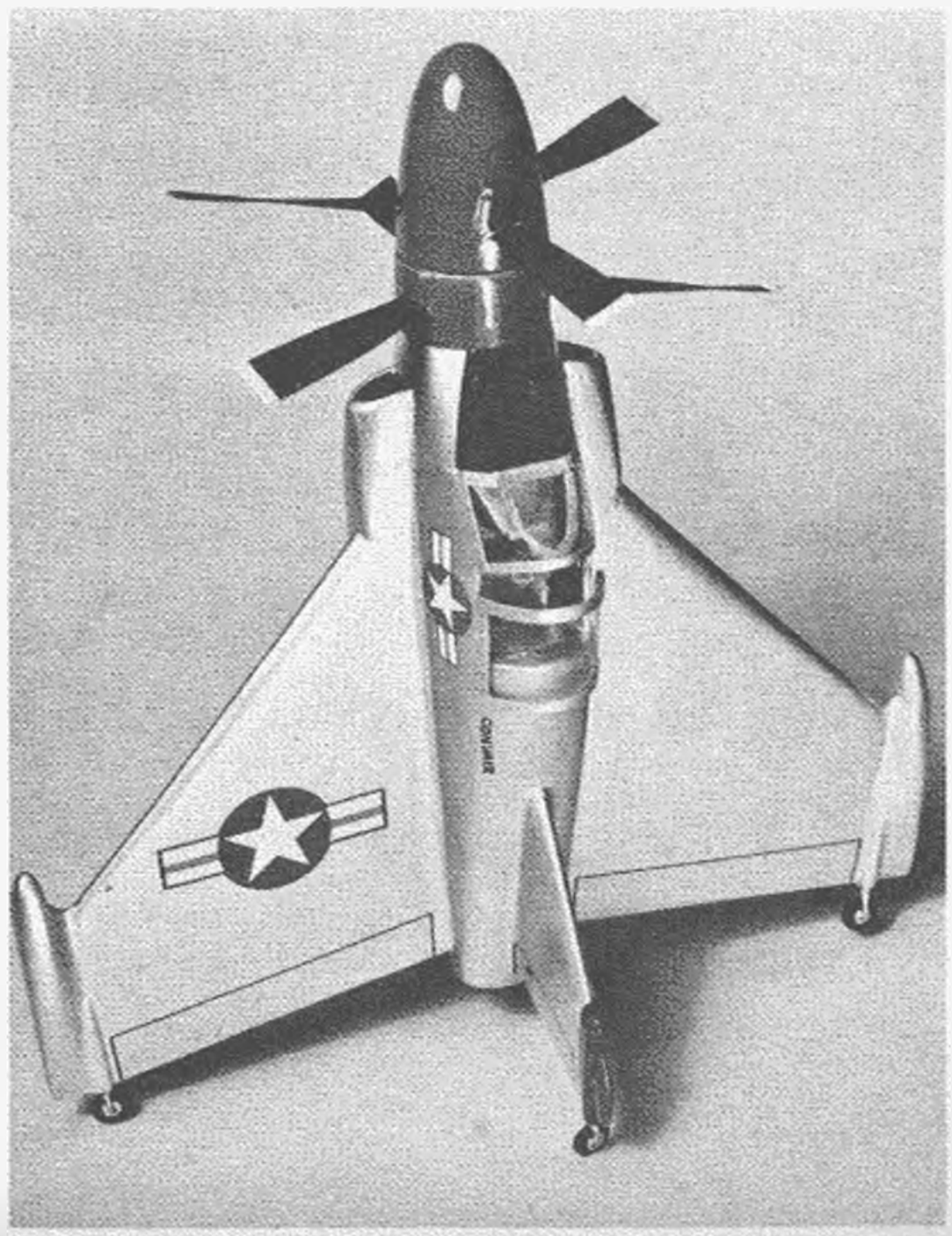




OX-5 powered detailed controlline model of old Travel Air was made Nieto plans (MAN, Nov. '53) by O. G. Bolstar, Oak Lawn, Ill. K & B .29.

Very successful Wakefield by Carl Hermes, Arlington, Texas, under both old, new rules, Swedish Isaacson .06 airfoil and geodetic construction.

Below—Last May, Ed Chavez wanted to be first with VTO model pic in MAN. That he is! Model a Convair XFY-1, made from his own plans. Real!

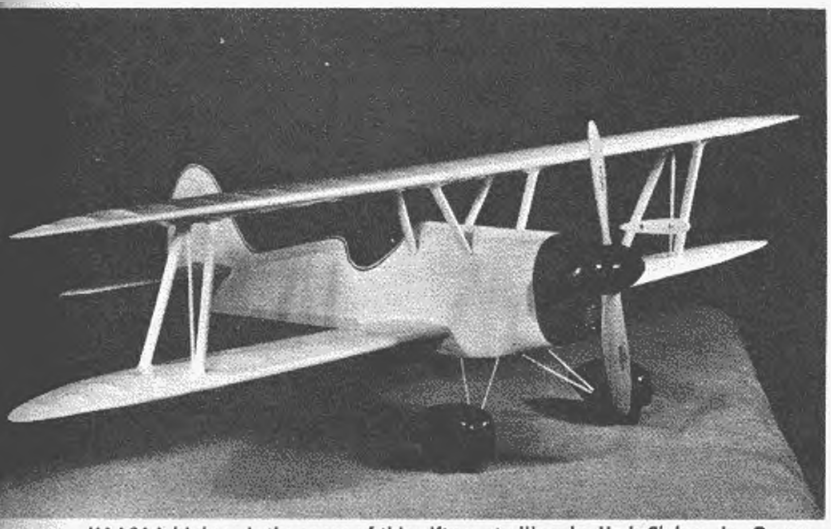


AIR WAYS

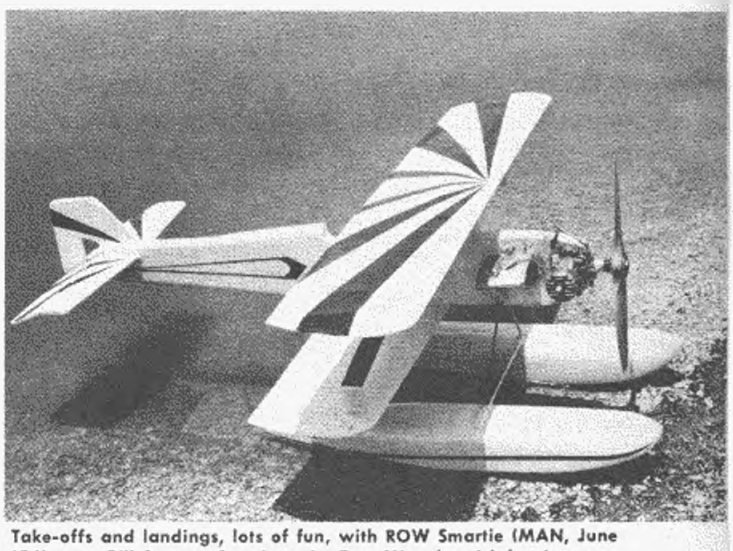
▼

How's that old enthusiasm? Should pep up after inspecting this batch of reader-built jobs. Any pix of yours?

Lt. Francis Nixon, Phoenix, Ariz., won first in flying scale, Far East Model Airplane Contest, Japan, with seven-ft., nine lb. B-50.

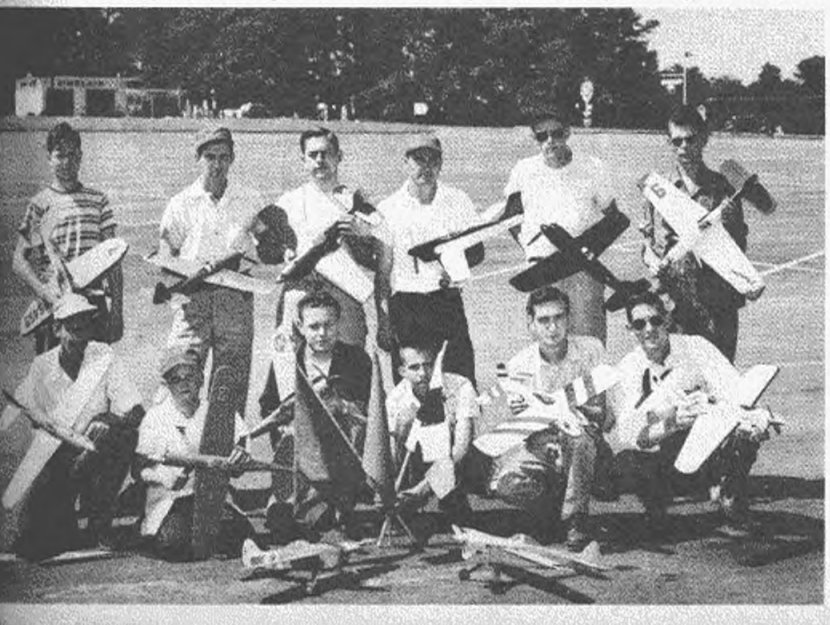


HAASAA biplane is the name of this nifty controlliner by Herb Clukey, Jr., Owensboro, Ky. Pronounced HAW-SAW, states Herb. Sporty looking crate, we'd say.

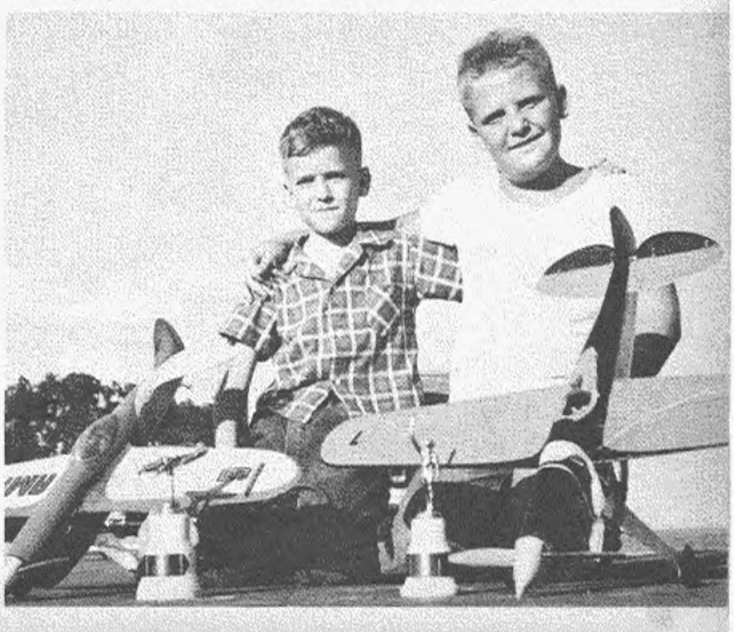


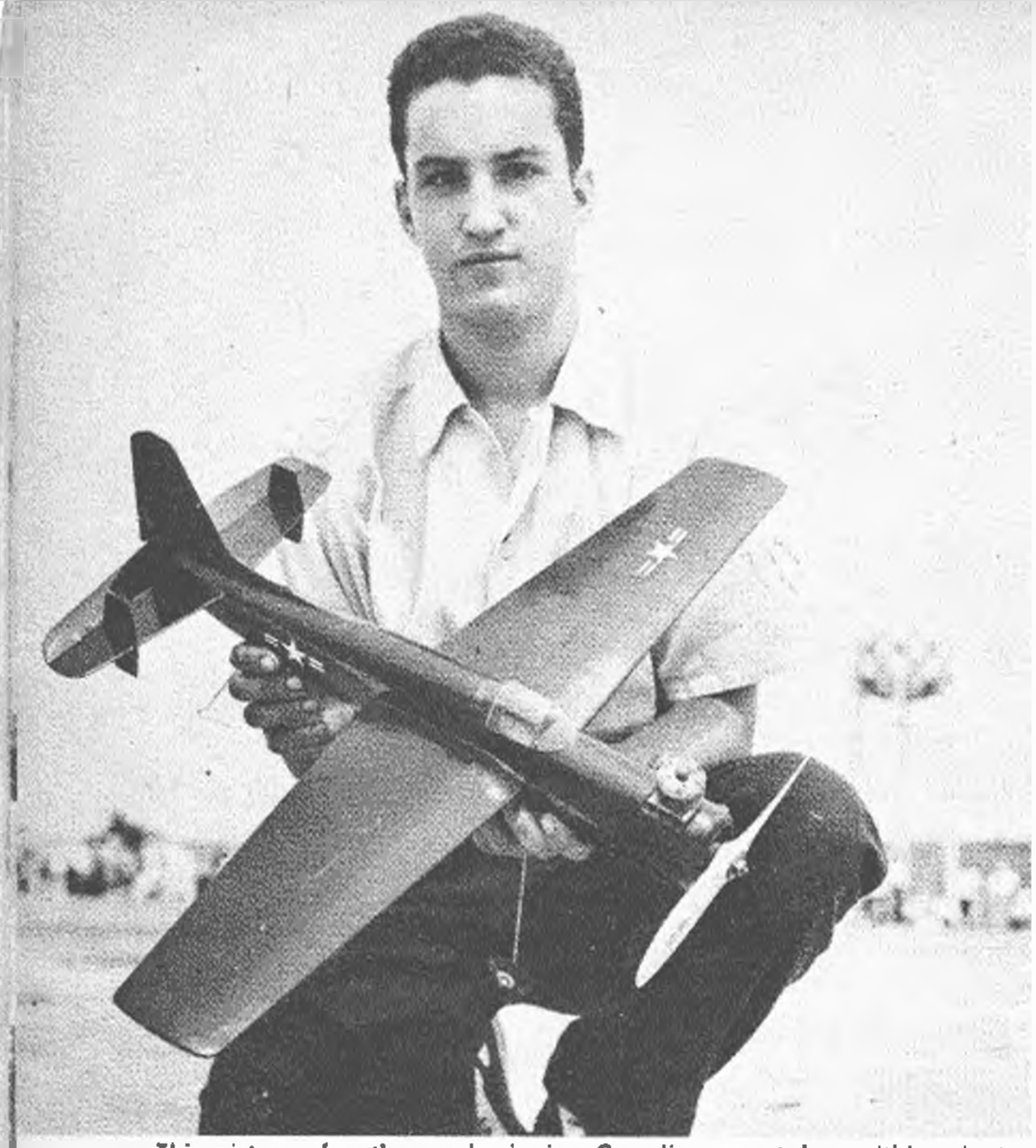
Take-offs and landings, lots of fun, with ROW Smartie (MAN, June '54), says Bill Strawn, San Antonio, Tex. Mite sluggish but it stunts.

Atlanta Team Race Club, kneeling, L to R: Alden, M. Hinsley, Shardin, Potate, Hoke, Hunt; standing, L to R: White, Carpenter, Allen, A. Hinsley, Gautt Fuller.

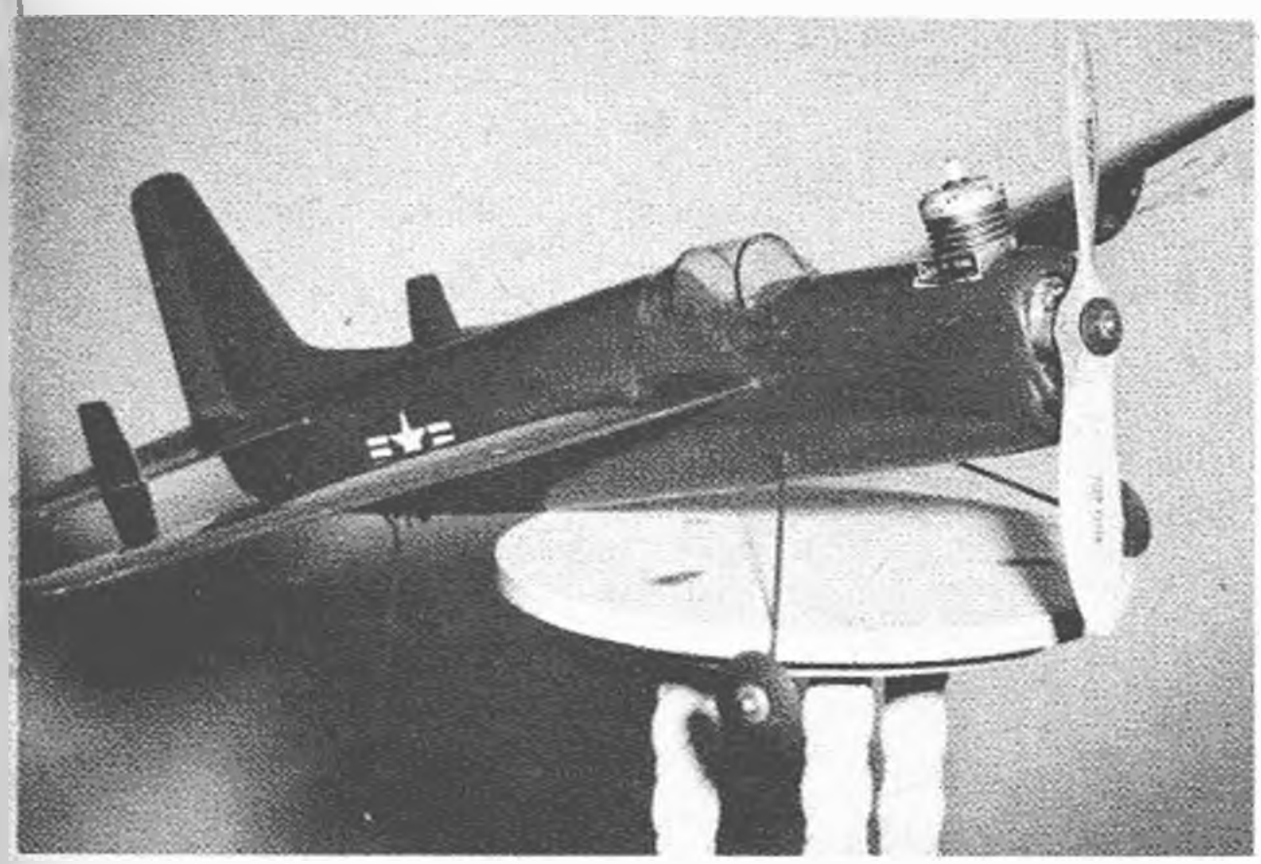


Even the youngsters go for team racing! Atlanta Club member Tom Aldred, Jr., won feature with a Quest; Michael Hinsley, consolation.



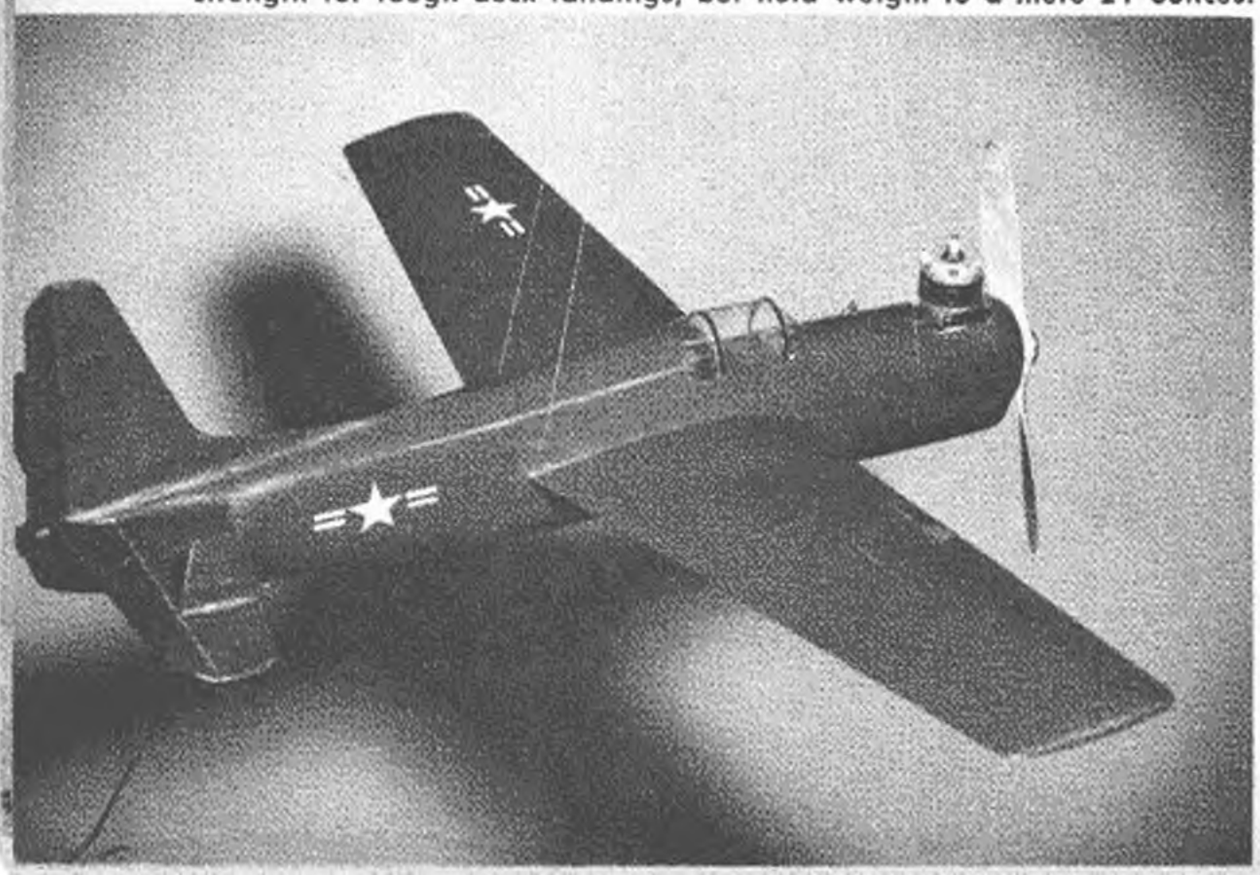


This picture of author and winning Guardian was taken within minutes of the 1954 Nationals flight. Model ran up 394 points in '53, 417 in '54.



With the same area as team racer (125 sq. in.) and a Fox .35 with venturi clapper for two-speed, ship had top of 73 mph and a low of 25 mph.

All-wood fuselage and tail surfaces, combined with sparless wing, give strength for rough deck landings, but hold weight to a mere 21 ounces.



GUARDIAN

1954 NATIONALS WINNER

by DAVE DOMIZI

Winning ways — 1953-54 Nats included — prove small size, light weight, simplicity of this Grumman Guardian revolutionized the Carrier Event.

Are you tired of building the same type of airplane all year long? If you'd like to fly in an interesting event that's really a challenge, try carrier deck. For those of you who are interested, let's take a look at the rules.

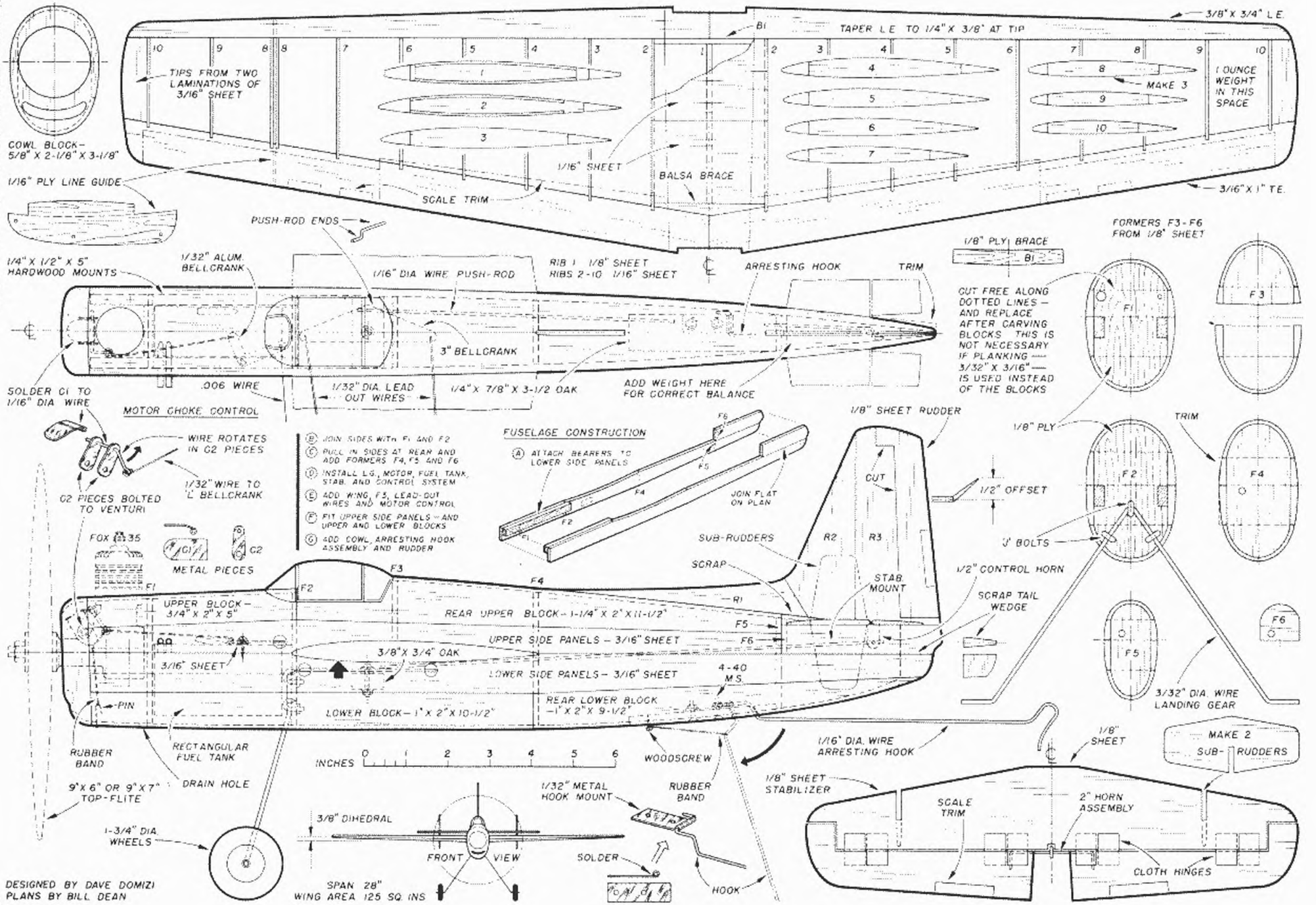
First, if you have a replica of a Naval aircraft, you receive 100 points. Your model is timed from the moment it is released on the carrier deck for seven high speed laps. For each mile per hour attained, one point is awarded. Then, you slow your model down for low speed. After you signal the judges, they time your model for seven low speed laps. You are then given three points for each mile per hour difference between your high and low speed. Then, after you've landed on the deck without nosing over, you gain an additional 100 points. If you goof—nose over, that is—you are given only 50 points for landing. For those of you who haven't seen a carrier deck, they are 44 ft. long and 8 ft. wide, and are curved to the circle.

In looking through plans of suitable aircraft, I came across three-views of a Grumman Guardian. This was the answer. Here was a plane that adapted itself perfectly to controlline flying. The nose and tail moment arms are the proper length, the wing is tapered, and it has plenty of scale dihedral.

The first problem that came up was the proper size to build the model. After seeing several large models beaten by small, fast, planes, I decided to make the model as small as possible without ruining the low speed. As a first effort, 150 sq. in. was decided upon, with a Fox .35 in mind as power. The construction was an even bigger problem. This model would have to be light for good low speed, yet strong and tough for the beating it would take in landing on the carrier deck. Also, it would have to be easy to repair in case it was damaged. The original model weighed 23 oz. and flew perfectly without any changes at all. The only time it was damaged was when one of the members of our family stepped on it. Its best flight in competition came at the 1953 Nats when it totaled 394 points.

Because of the improvements that other contestants were making in their models, I could see that a new plane was necessary if I wished to win again in 1954. Looking over the rules, it became evident that the best way to achieve a higher score was to increase my high speed. If this could be done, I could gain points for high speed and for speed difference. For this reason, wing area on the new model was to be reduced to 125 sq. in., the size of a team racer! My only hope to save the low speed was to reduce the weight of the model and retain the model's inherent stability. Construction was kept the same on the new model, but the wood in the fuselage and tail assemblies was kept lighter. By these changes, weight was kept to 21 oz.

At the 1954 Nationals, the model, (*Continued on page 36*)



FULL SIZE PLANS AVAILABLE. SEE PAGE 50.

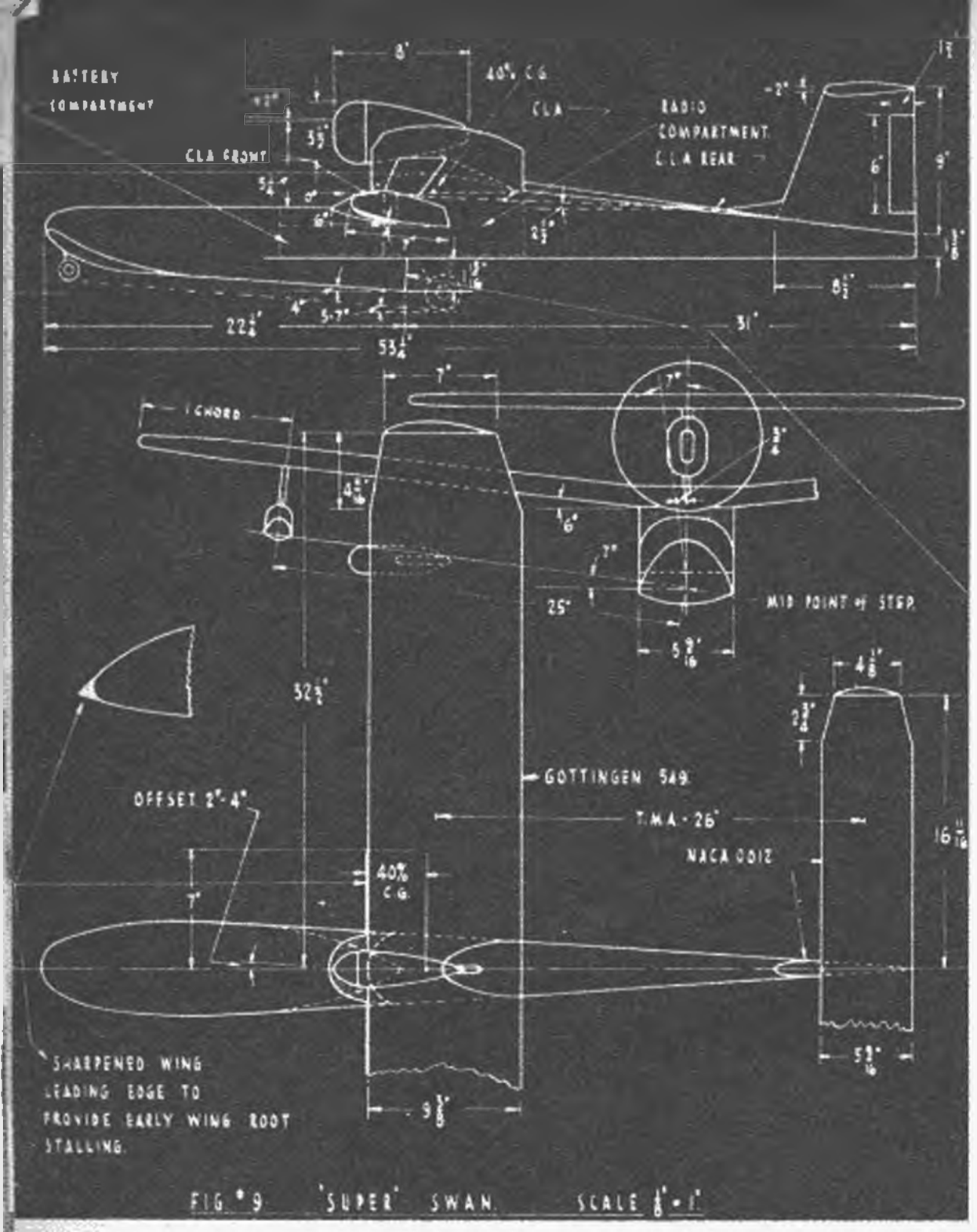


FIG. 9 'SUPER' SWAN SCALE $\frac{1}{8}$" = 1"

FACTS... about Flying boats

by A. G. LENNON

▼

Good flights are more than a matter of placing the plane on the water, engine screaming, and letting go. Like any other kind of model, the flying boat design has its tricks.

A Willard-designed Pelican (MAN, December '52) as built by Paul Strauss. Has done a lot of flying on an .049 Space Bug. The wing span is 44 in.

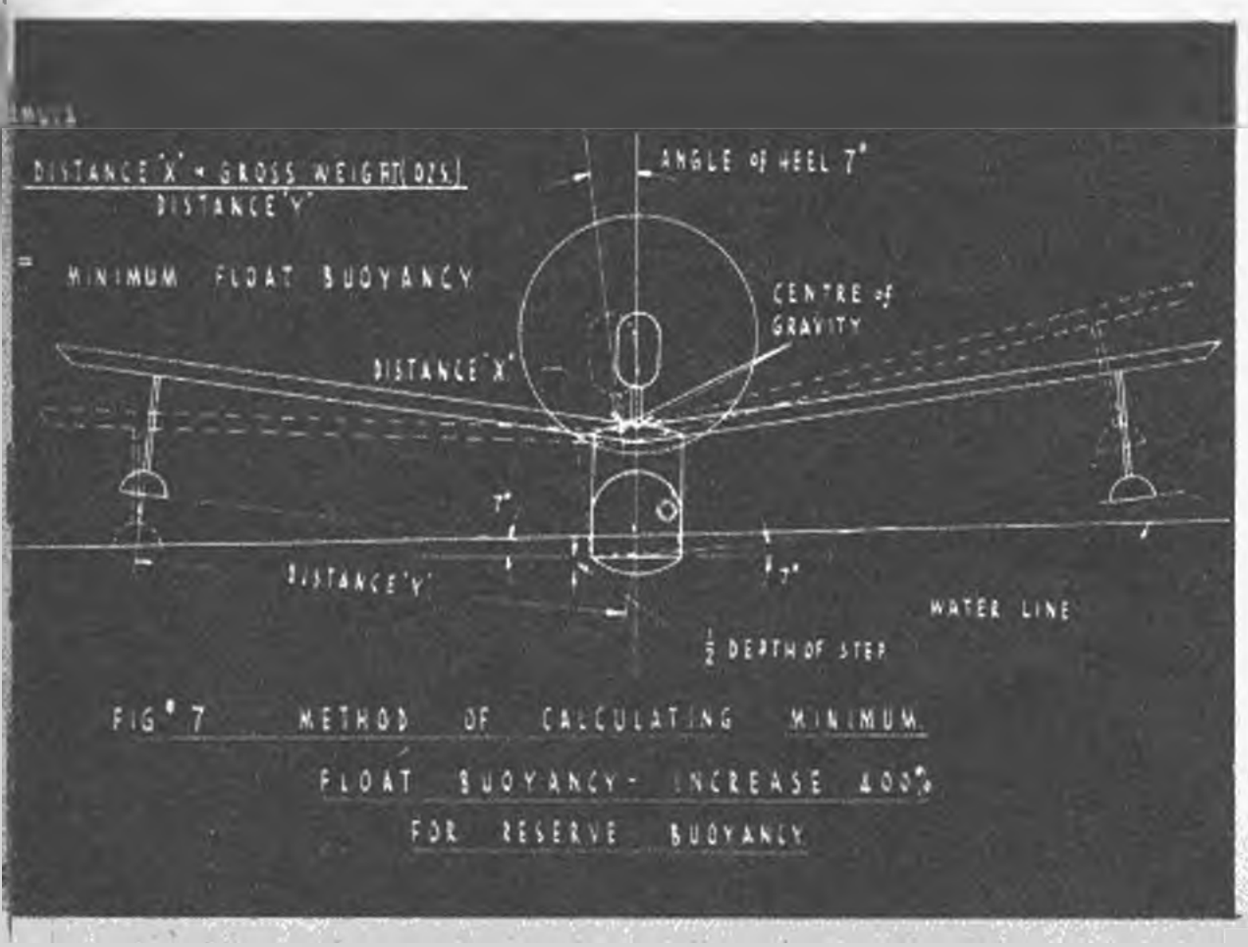


FIG. 7 METHOD OF CALCULATING MINIMUM FLOAT BUOYANCY - INCREASE 400% FOR RESERVE BUOYANCY

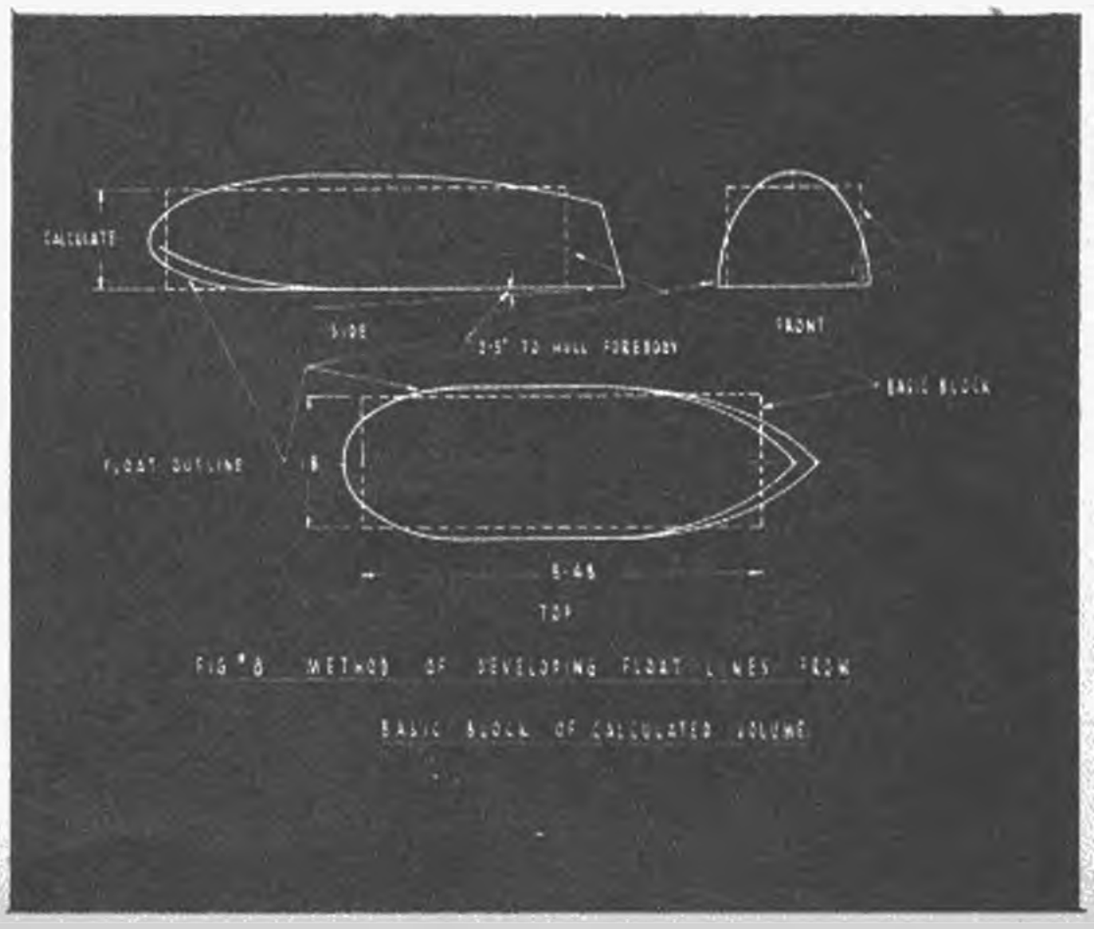


FIG. 8 METHOD OF DEVELOPING FLOAT LINES FROM BASIC BLOCK OF CALCULATED VOLUME

IN THE preceding part of this article we dealt with the subject of hull design. However, no discussion of this nature would be complete without considering the problem of lateral stability, both at rest on the water and during take-off.

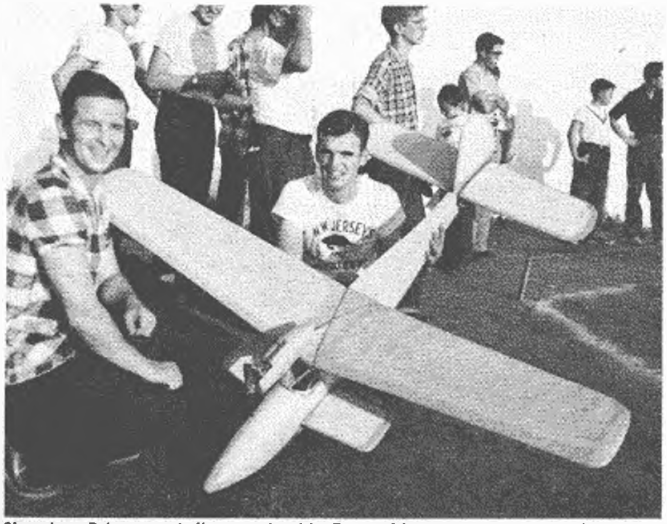
There exists a wider divergence of opinion regarding the relative merits of sponsons versus wing floats. Sponsons certainly are more rugged, but to provide sufficient buoyance in view of their closeness to the hull centerline, they must be large and, consequently, are heavy and have high air drag. Wing floats, either close in or near the wing tip, have far less drag and weigh less since, being farther away from the hull, smaller volume gives the same stability. Their position relative to the hull is far less critical than for sponsons, since the latter, if too low, give too much water drag and, if too high, don't stabilize adequately.

Wing tip float disadvantages are increased vulnerability to damage and, at low speeds, dragging on the water on one side or the other, causing water looping. However, by keeping their supporting struts short by mounting the wing directly atop the hull and making both floats and struts sturdy in construction, the first objection can be overcome.

Dragging one wing tip float (the left) is most often caused by motor torque at low speeds before the wings come into play. Modelwise, this can be corrected both by offsetting the thrust line to the right so that there is a lateral component opposing torque or by use of a small weight in the wing tip of the right hand (when viewed from the rear) wing. This latter corrective factor has the secondary advantage of causing the model to glide in a gentle circle to the right.

My own personal preference, after much consideration, is for wing-tip floats. The following gives the factors to be considered in their design.

Typical Half-A powered flying boat. Author favors tip floats, rather than the more frequently seen sponsons. His three-view, herewith, is tops.



Showing Privateer influence is this Torp .32 powered, 6-1/2 ft. flying boat, also Paul Strauss. Had 30-odd good flights with earlier gull wing.

The first consideration is that they provide sufficient buoyancy for adequate stability when the model is sitting on the water, with sufficient reserve buoyancy to overcome cross winds that can lift the high wing tip and cause the opposite wing and float to submerge or even capsize the model.

Secondly, the underwater or planing surfaces should be large enough in area and set at sufficient angle relative to the hull to cause the float to recover quickly when disturbing forces cause the aircraft to heel.

Thirdly, the floats must be of good aerodynamic shape to give low air resistance. Modelwise, this usually means giving free run to one's own particular preference after a study of full scale practice, and then just hoping for the best.

Let's consider the buoyancy angle. Refer to Fig. 7. When the model heels sidewise because the CG is above the center of buoyancy, the CG is displaced laterally from the vertical centerline. The distance "X" of this displacement in inches multiplied by the weight of the model in ounces gives the unbalancing moment in inch-ounces. Since the best practice is to set the wing tip floats so that a line drawn from the hull at a point half the depth of the step from the bottom to the wing tip float bottom is 7° to the horizontal, the maximum angle of heel should not exceed 7° by very much.

The correcting force is, of course, the buoyancy of the float in ounces, multiplied by the distance from the float centerline to the hull centerline. Dividing this distance "Y" in inches into the unbalancing moment gives the minimum buoyancy required in ounces. Dividing this in turn by .58, which is the weight of a cubic inch of water in ounces, gives the minimum displacement of the float. Multiply this by four to give 300 per cent reserve buoyancy to overcome wind heeling loads.

Next to design the float so that it will have this buoyancy yet meet our other requirements. The author uses a simple "home made" method for obtaining a float of the correct volume. First layout a rectangular block which will have approximately the size in cubic inches required to give the calculated buoyancy (see Fig. 8).

Beam loadings for the wing tip float should be 50 per cent that of the hull beam loading, the weight basis being the weight of the water displaced by the float when submerged.

For example, say the total displacement of the float is 6 cu. in. or 3.33 oz. with the 300 per cent reserve buoyancy included. If the hull beam loading is 4 oz. to the inch, the float loading should be 50 per cent of this, i.e., 2 oz. to the inch; the float beam would then be 3.33÷2 or 1.65 in. Adjusting this figure to the nearest 1/8 in. gives 1-5/8 in. beam.

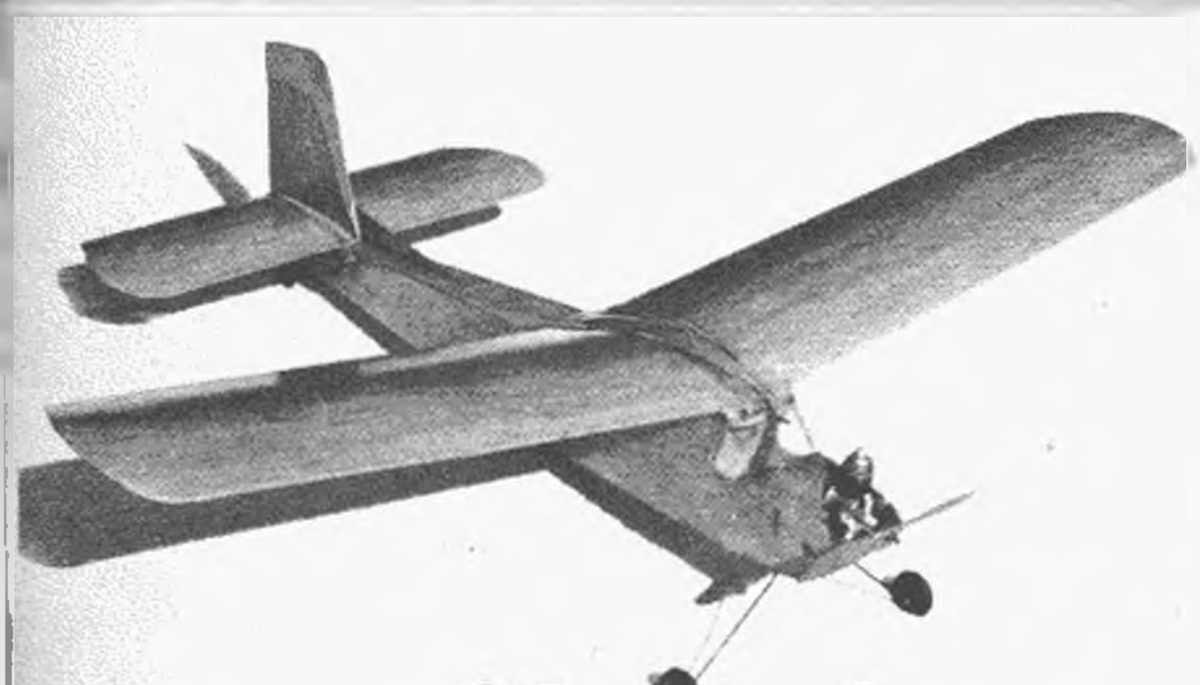
The aforementioned block should be approximately three to four times the beam in length. The cubic inch displacement divided by length and beam will give depth.

Then draw the outline of the float and, in this rectangular block, taking care that, where the lines enter into the block, a corresponding portion outside the block makes up for the loss in volume (Fig. 8). Working to these proportions and using float outlines of your own taste, the design of the float is easy.

Note that a flat bottom here is just as important as for the hull. Further, I can see no justification for lateral steps on wing tip floats. My own thought is that, if the outline and proportions of your wing tip float are similar to the forebody portion of the hull as illustrated in Fig. 5 (preceding article), you can't go too far wrong.

Regarding the float setting, as previously mentioned, the float bottom should be set at an angle of 2 to 3° to the hull forebody to promote rapid recovery. Also, when viewed from the front (Fig. 7), the bottom of the float should be set at such an angle that it rests on the previously mentioned line drawn at 7° to the horizontal from hull centerline to the wing float. This insures that, when the model heels, the bottom of the float will be level with the water surface; otherwise, it would behave like one side (*Continued on page 50*)

If you'll forgive the repetition, Sharpie is sharp looking little buggy. . Model shown here has been flown successfully on .02's, .039's, .049's.



Sharpie

By KEN WILLARD

An all-balsa free flight model for Half-A engines. Proved performance makes it an ideal sport job and, incidentally, for beginners.

The basic idea underlying the design of Sharpie was to come up with a sport flier that would be very simple to build, yet have pleasing lines and good performance. The all-balsa construction certainly makes it simple enough, and the curved sheet wing, already proven on the Pelican, gives very satisfactory climb and glide characteristics. The added feature of the tapered trailing edge, which results in built-in washout, makes a very stable arrangement. As for appearance, it speaks for itself, and the name came from the remark of a friend, who, on seeing the model for the first time, remarked: "That's a real sharpie!" The name struck.

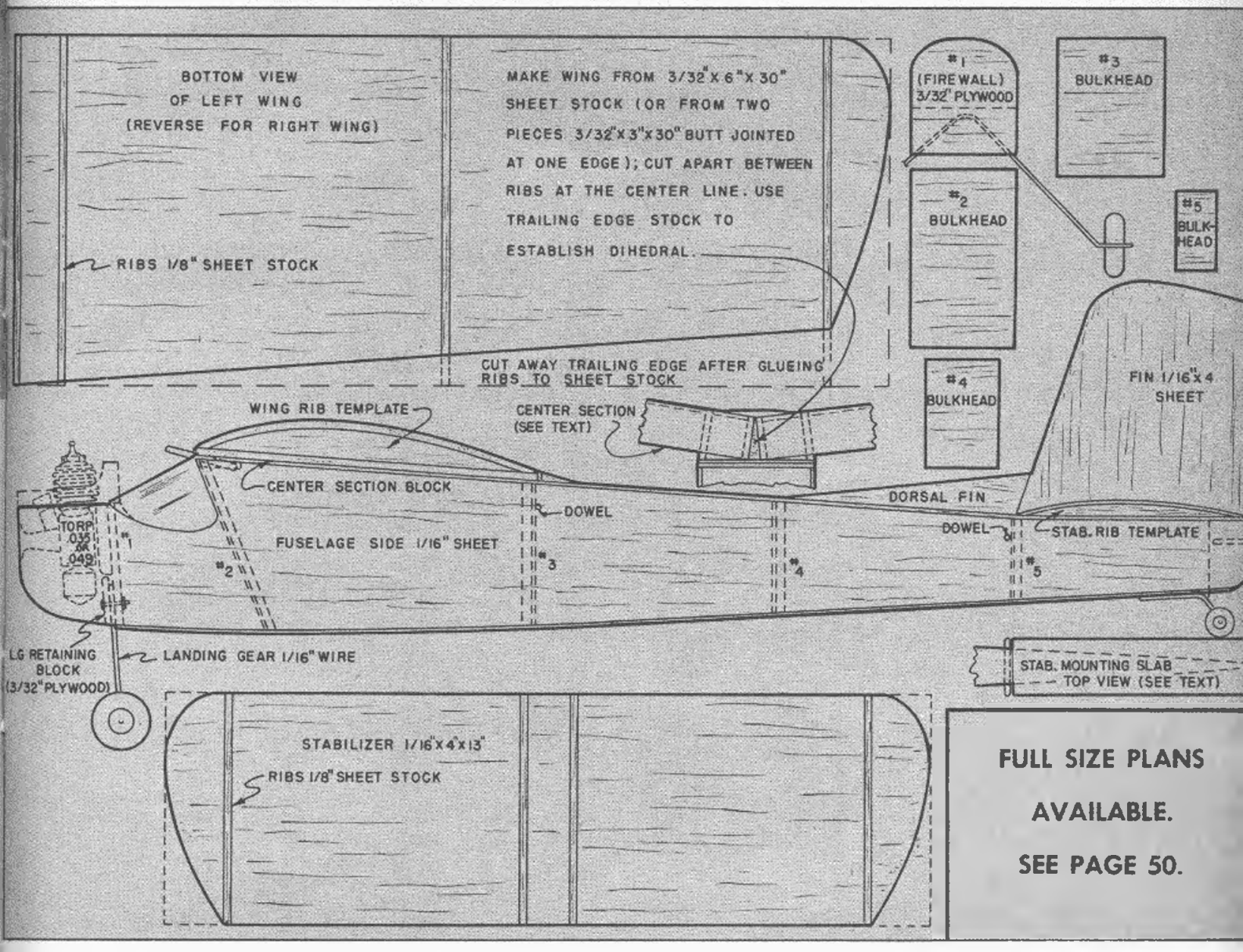
Another friend, Bill Glick, liked the lines and performance so much that we scaled up the plans and he built an RC version, which has proved equally successful. The only change in layout was a reduction in the fin area relative to wing area.

Construction of Sharpie is so easy that a brief study of the plans is about all the instruction that is needed. The following short outline may clear up one or two points on procedure for the beginner.

Fuselage

Note how the bulkheads are alined by cementing 1/8 x 1/8 strips to the fuselage sides, then cementing the bulkheads in place adjacent to the strips. This also assures a stronger bulkhead than if the bulkhead were simply butt-cemented to the sides.

One big advantage of the simple, single surface sheet balsa wing is the automatic washout at tips, resulting from the tapered planform of wing.



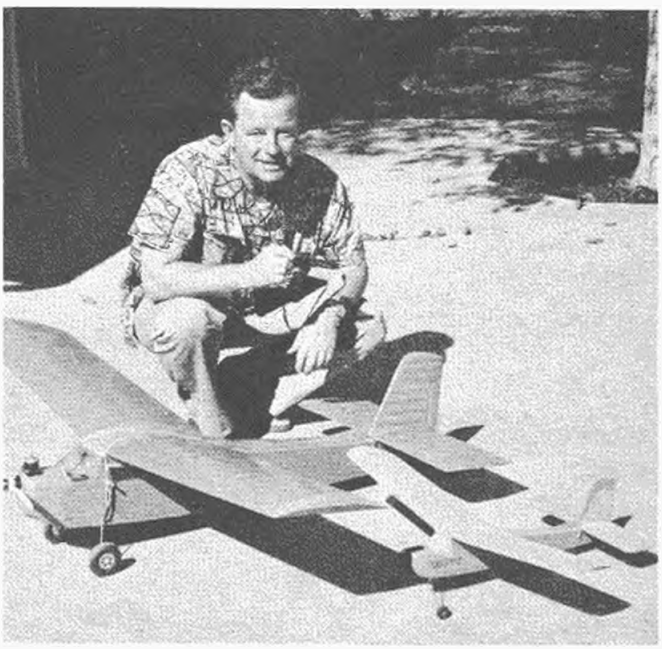
FULL SIZE PLANS AVAILABLE. SEE PAGE 50.

To assure good alinement, cement the firewall in place first, after the 1/8 x 1/8 strips are all cemented to the sides, and cement the tails of the fuselage sides together, carefully alining the sides so no right or left thrust is built in on the firewall. Add the remaining bulkheads after the firewall and fuselage tail cement joints are dry. Cover the top and bottom with 1/16 in. sheet, grain running crosswise, and where the stabilizer sets on the fuselage, extend the top covering out 1/2 in. on either side of the center line to make a 1 x 4 in. stab platform.

Forward of the cabin, wet the top of the fuselage sides (which are cut along the dotted line on the plans) and bend over until they meet, then cement in place. This forms a very simple engine cowl. Add the windshield, wing mounting dowels, and landing gear, and the fuselage is ready for finishing.

Wing

If your hobby shop can't supply 3/32 in. flat stock in 6 in. width, cement two pieces of 3/32 x 3 x 15 in. together, with a butt-joint at the edge, for each wing panel, or use one piece, 30 in. long, and cut down the center line after the ribs have been cemented. Use medium light balsa. Mark the location of the ribs on the wing panels. (*Continued on page 37*)

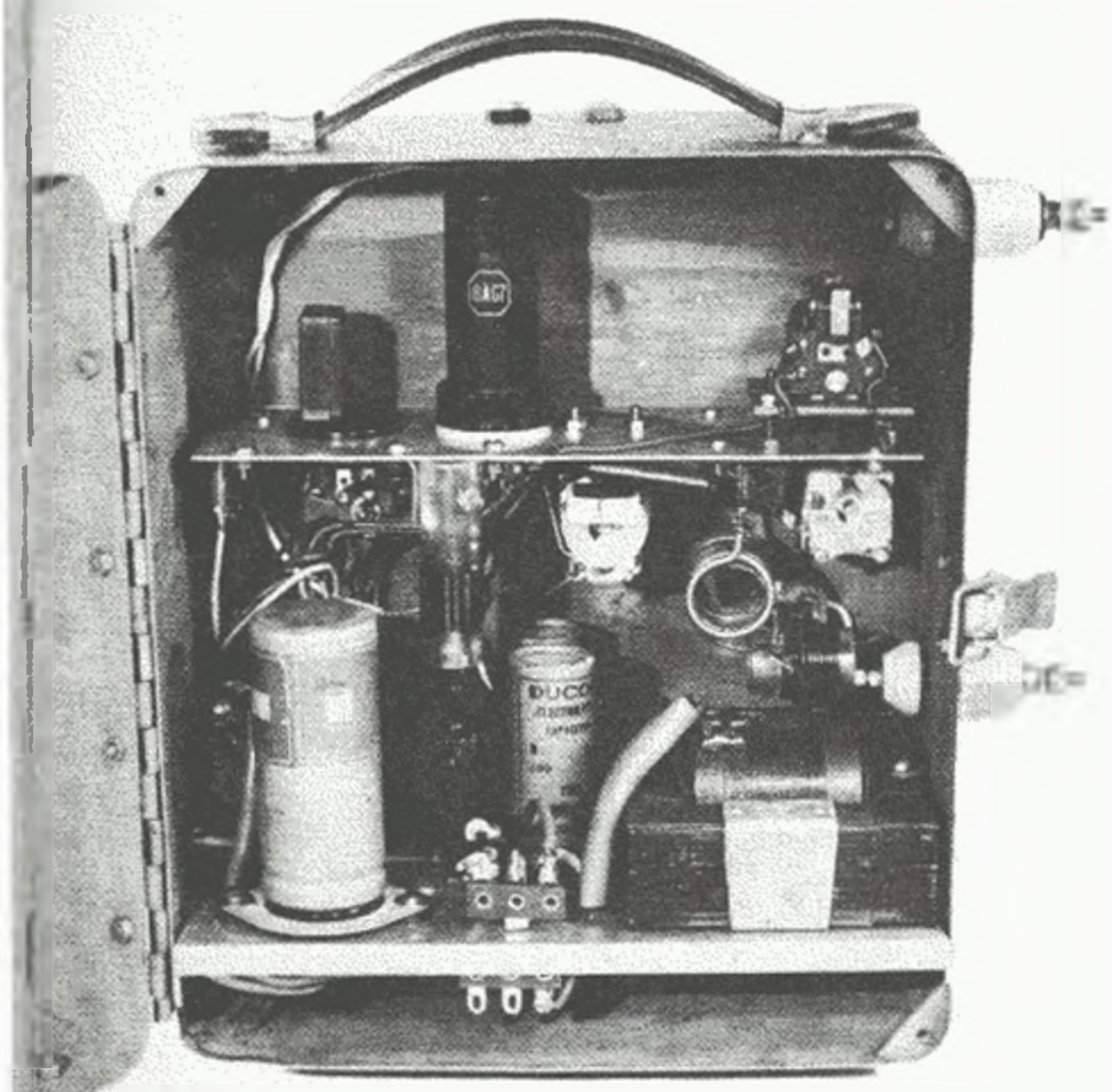


Ken Willard with RC version, by Bill Glick. Small Sharpie at the right.

Dale Root flying while Jim Smith, with Rockwood Live Wire Sr., Arden .19, looks on. Red silk on transmitter antenna makes a corking wind sack.

Radio Control News

By E. J. LORENZ



Different from most transmitters, but conventional circuit, stability, feature a unit designed by Gil Miles, Australia. Schematic on the right.

Tips on soldering, applications of Ohm's Law for parts selection, new transmitter, Bonner's latest two-speed, new items, club news, and points west.

Gil Miles sends info on a transmitter used in the wide open spaces of New South Wales, Australia. Fig. 1 is the schematic. While different from most of the RC transmitters, this is a rather conventional circuit which performs quite well and has good stability. We'd suggest something like this for an endurance flight, as outlined under *Club News*. The British frequency of 27.120 mc is used, although the identical circuit and component values could be used on 27.255 mc if the crystal frequency is changed to 6,814 kc. Tank circuit L_1 is tuned to the crystal frequency of 6,814 kc and tank circuit L_2 is tuned to 27.255 mc. This outfit looks very neat and well planned.

Remember how we remind you to follow the manufacturers' instructions on sets and actuators? The latest *snafu* was with regard to the use of a deBolt servo. After flying a Live Wire Trainer with a standard escapement, one flier went to a deBolt servo *without* reducing rudder area or movement. Needless to say, the model was extremely overcontrolled before the rudder area and movement was reduced about one half.

With constant newcomers into RC work and the increase in kit building, we'd like to take up a little space on what is usually considered a matter-of-fact subject. Here are a few suggestions on the proper techniques in obtaining good reliable soldered connections. The soldering iron must be capable of heating the work to soldering temperature. For general hook-up work we suggest the Ungar pencil iron with a 35 watt tip. While the 35 W Ungar iron is sufficient for component wiring, a 100 watt iron should be used for chassis work, etc. Be sure the tip is properly "dressed"; that is, all pits and corroded surfaces smoothed out with a file, as in Fig. 2. Too sharp a tip will not hold the heat and too shallow a tip will not allow access to cramped quarters. After the iron is hot, the tip should be cleaned with steel wool or emery cloth. Immediately "tin" the iron tip with rosin core solder. This is done by melting the solder in the area shown in Fig. 2 and by wiping it occasionally on a piece of steel wool. During soldering, the tip of the iron *must* be kept free of burnt rosin and scale and excess solder. This can also be accomplished by an occasional wipe on the steel wool. Use only a good grade of rosin core solder, preferably a 60/40 grade (60 per cent tin—40 per cent lead). Ersin Multicore or Alpha, as supplied by Ace Radio Control, Electronic

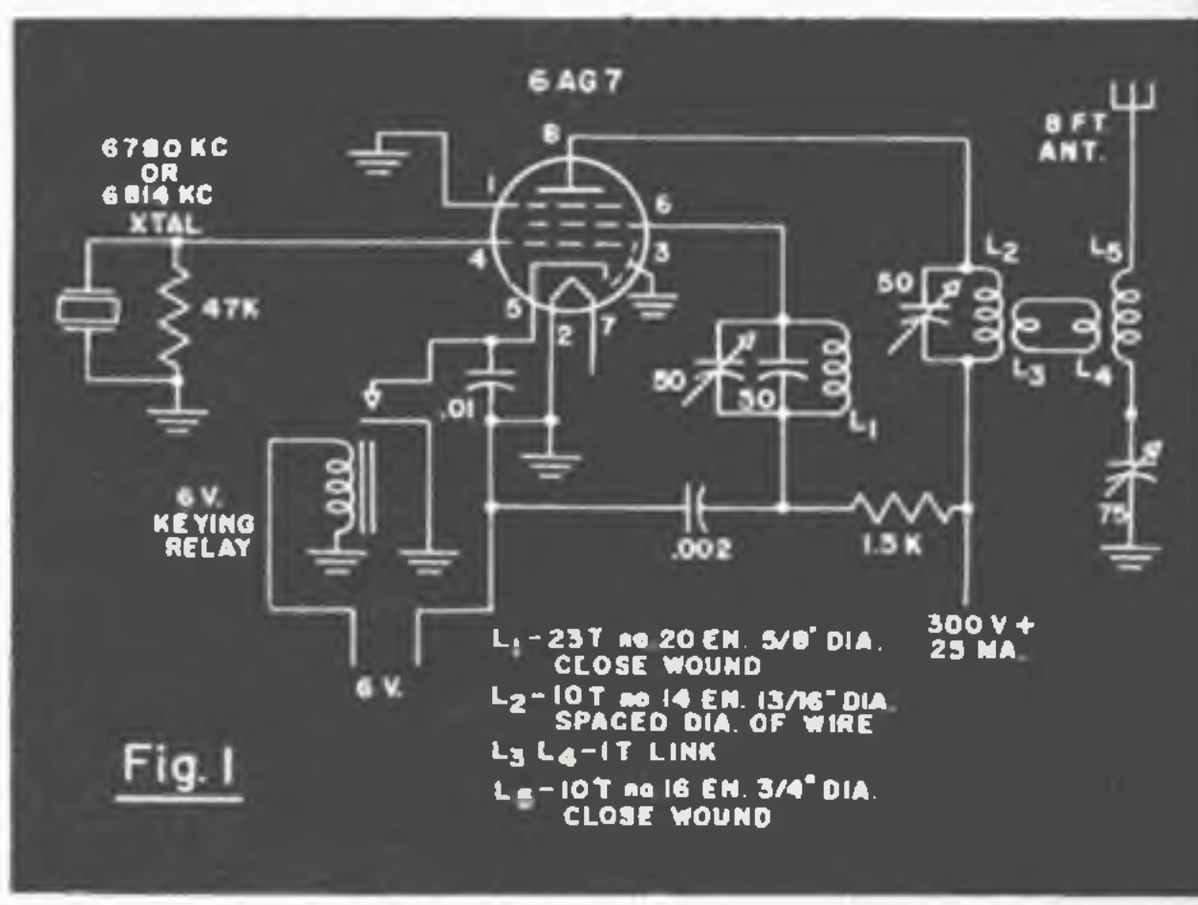


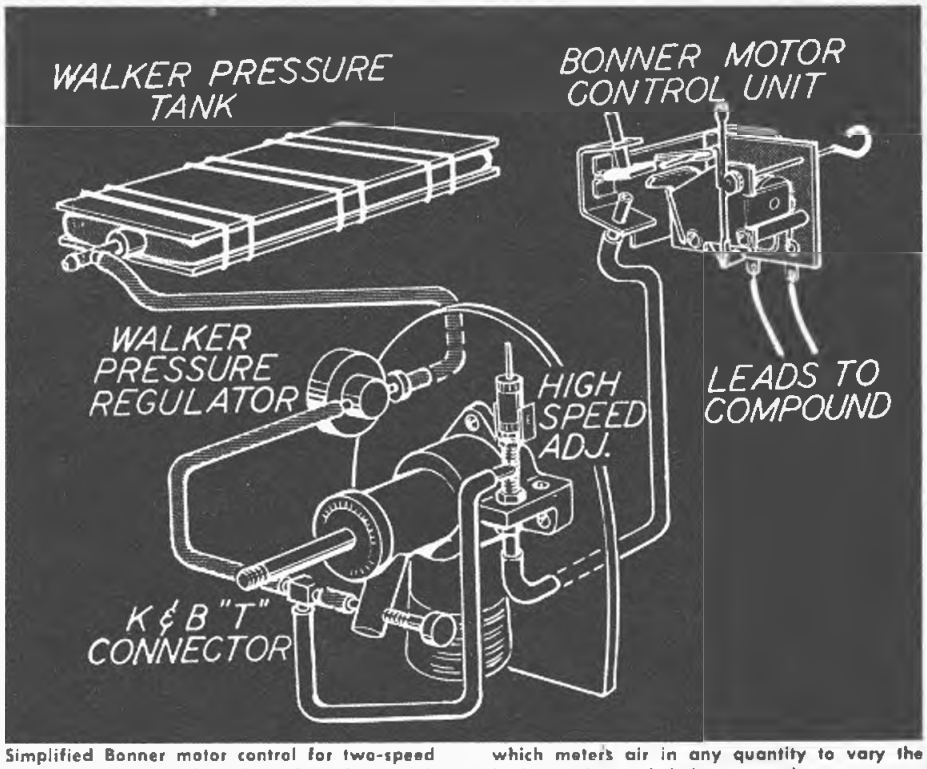
Fig. 1

Specialties or other radio supply houses, should be used. When making the solder joint, apply the hot iron to the work and allow it to get hot enough to melt the solder when it is applied. *Do not* apply solder to the iron and then attempt to transfer it to the work. Doing this will burn away the rosin and "wetting" of the joint, with solder, may be impossible.

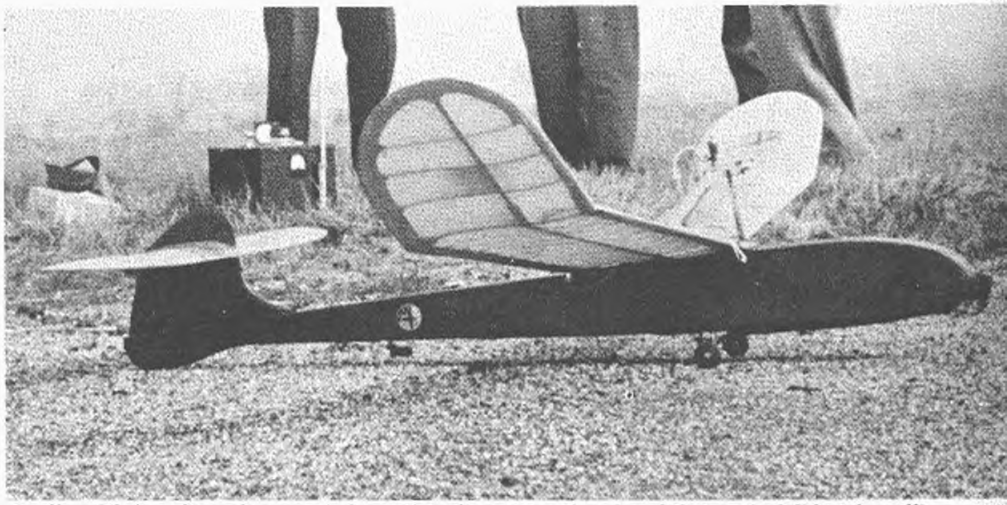
When soldering to a printed circuit pattern, apply heat to the component lead first, until it is hot enough to melt the solder, and then allow the solder to flow onto the printed circuit pattern. *Do not* apply a hot iron directly to the copper foil for more than a second or two as this will destroy the bond and the pattern will raise from the board. Simple? Yes! A neat solder joint is simple if you'll just follow the summary of rules:

(1) Keep the iron tip "dressed" to size and properly tinned and clean; (2) Apply heat to the connection and bring it close to the melting point of the solder before applying the solder; (3) *Don't* use acid core solder or corrosive paste fluxes. If you prefer a paste flux, dissolve a little crushed rosin in denatured alcohol and then mix into some vaseline; (4) *Don't* attempt to transfer solder from the iron to an untinned or previously unsoldered joint; (5) *Don't* move the connection while the solder is cooling. This will produce a "cold" joint which is mechanically weak and may produce a high resistance joint electrically. A little practice on scraps of wire will enable you to turn out better looking and more reliable soldered connections. It is quite possible, when soldering landing gears or other pieces employing music wire, that a regular soldering paste or acid will have to be used. After soldering, clean the connection well with soapy water and alcohol to prevent corrosion. Also clean the iron tip well on steel wool and retin the surface.

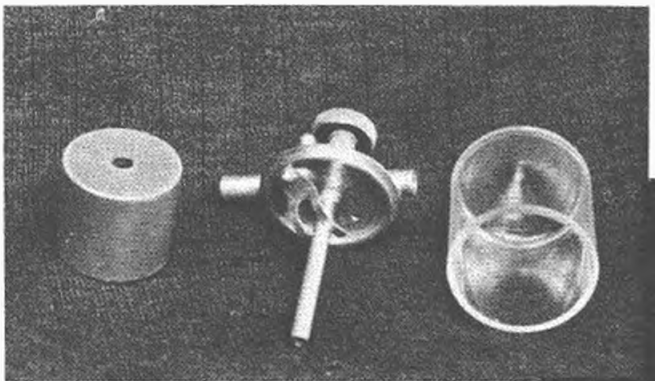
Since the explanation of Ohm's Law and wattage, which has been given in this column in the past few months, we've had inquiries as to just how to apply this knowledge. The most common inquiry is how to figure the size of a dropping resistor when using a certain filament tube on a higher-than-rated voltage. We shall take a 3D6 tube, which operates (the filament) on 1-1/2 volts and draws 220 ma, and find the size of resistor needed to operate the filament from a 6 volt supply. The formula for resistance is $R = E \div I$, with E in volts and I in amperes. The amount of voltage we want to drop by the resistor is 6—1-1/2 or 4-1/2 volts. The current drawn is .220 amps. Therefore, $R = 4\text{-}1/2 \div .220$ or $R = 20.4$. In this case then we would use a 20 ohm resistor to drop the 6 volts down to 1-1/2 volts for the (*Continued on page 42*)



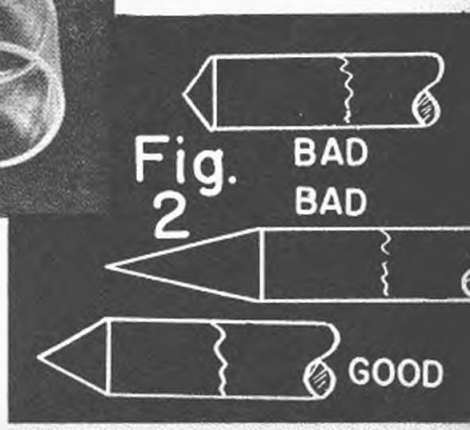
Simplified Bonner motor control for two-speed eliminates two needle valves through venturi, double pressure tanks, double regulators, etc. New feature is high speed adjustment valve which meters air in any quantity to vary the high speed revs. It is important that motor control unit be located above the fuel level line. Always start engine in low speed. Details in text.



Geoffrey Pike's radio endurance airplane. Note the comparative size of that engine! Ship takes off!



Tank for Pike's ship held 8 ounces fuel. Float carburetor, shown, weighed 8 grains. Float of .001 copper.

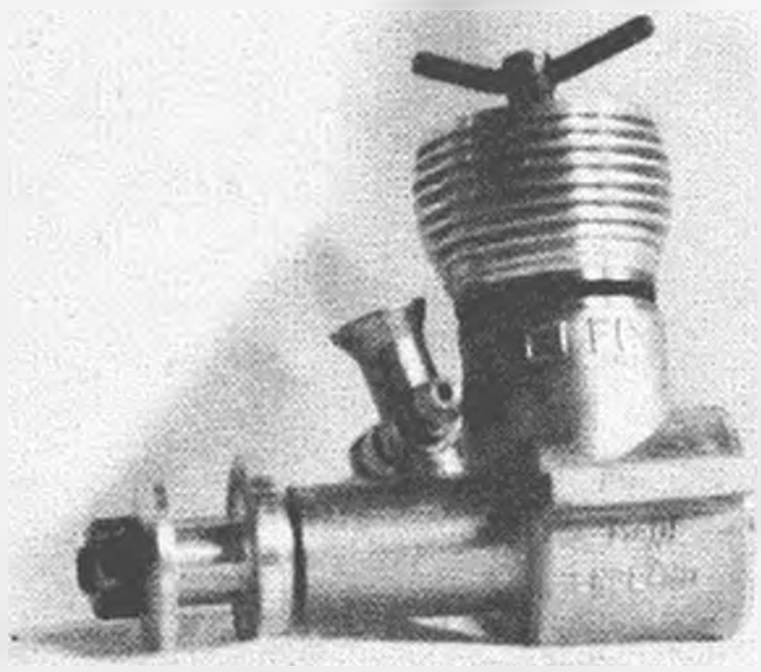


Right—Good, bad soldering irons, and how to use in technical topics. Radio only as good as soldering.

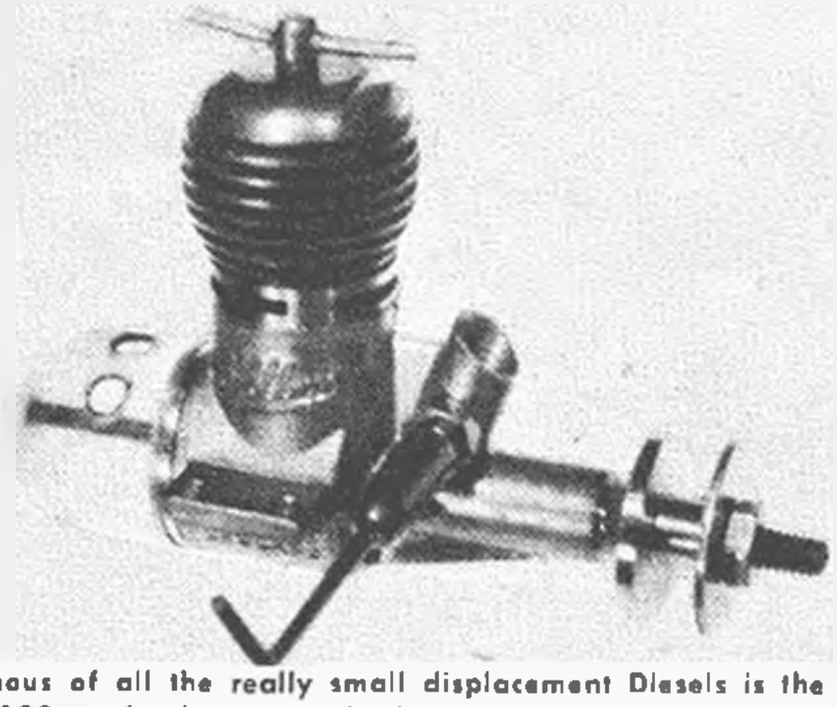
Import Review...

A round-up of some of the sample foreign engines submitted for try-outs, and available in this country. Others to be covered.

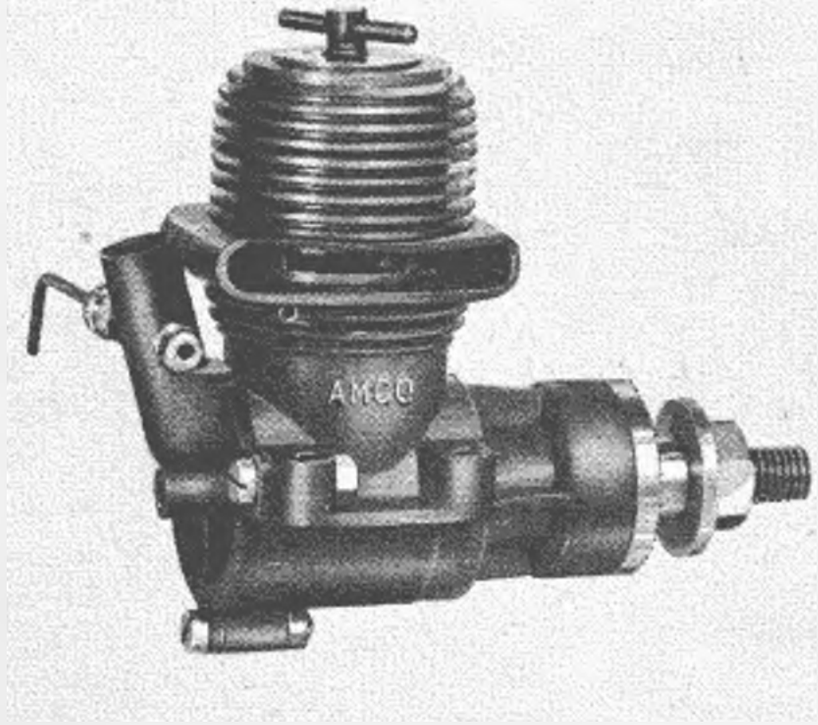
by E. C. MARTIN



One of the highest revving Diesels in current production is the well known Elfin 1.49. Interesting feature is successful elimination of gaskets.



Most famous of all the really small displacement Diesels is the Allbon Dart at .033 cc. It almost equals the larger and heavier .049 Diesels.



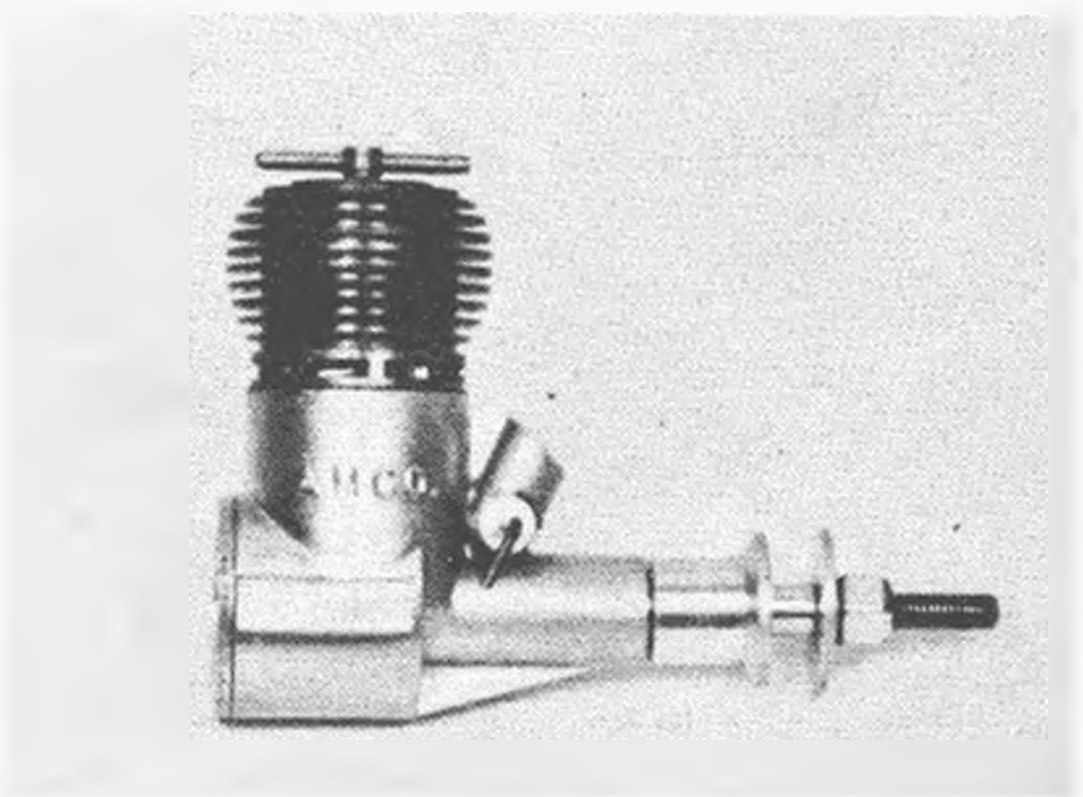
World renowned at .20 cc displacement is compact Amco, double ball bearing, with rear venturi. By coincidence engines shown all British.

▸ Since there are so many overseas engines more or less available, the limitations of space prohibit complete coverage and in fairness to all, these and following reports are therefore confined to those imports which are regularly advertised and available from stock.

However, before getting down to details, there are a few points which may help owners of the rarer breeds which have no distributor or parts service in this country. On either the box label or instruction leaflet you will find the names and addresses of the manufacturer and the home distributor. If you require parts, write to the manufacturer directly, quoting part names and numbers exactly as listed in the leaflet. Enclose a post office money order to the amount required in the currency of the country to which you are writing. (The post office official will convert the values for you.) Enclose your full address without abbreviations. Be brief and specific and avoid long conversational letters and irrelevant questions. His time is as valuable as yours, and he may shelve your communication with consequent delay for you.

If you consider it necessary to return the engine for service, again deal directly with the manufacturer, but, if possible, it is wiser to obtain the parts and do the job yourself. When sending the engine, pack it securely. In some countries the handling may be a trifle rough. Enclose a note, not a letter, headed: "Engine Returned to Manufacturer for Repair." Give very brief details such as "complete overhaul required," "seized up after five minutes," "leaking crankcase casting." If the fault lies with the manufacturer, which would normally be the only reason for returning the engine, he will repair it free of charge. Otherwise, try to ascertain what parts will be required and send a money order to that value, under separate cover, and thus avoid the annoyance and delay of extra correspondence. Put your full address in block capitals at the bottom of the note, and always bear in mind that handwriting and even the alphabet differ considerably in other parts of the world. Type if possible.

Finally, always affix a Customs declaration to the package and again write "Engine Returned (*Continued on page* 38)



Popularity of double BB Amco abroad led to cheaper plain bearing version for free flighters. This version has an impressive power-to-weight.

design detail Wheel Pants

By H. A. Williamson

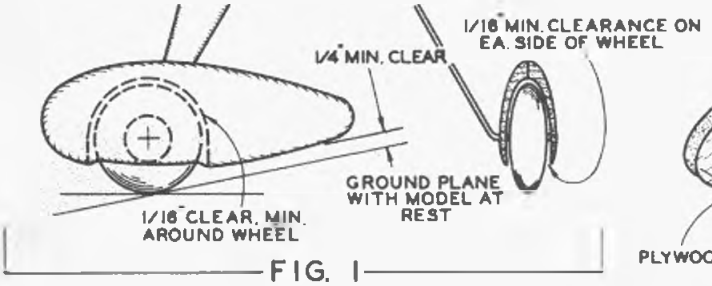


FIG. 1

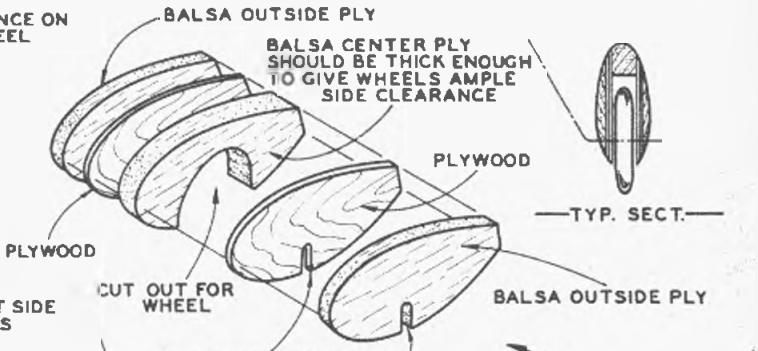


FIG. 2

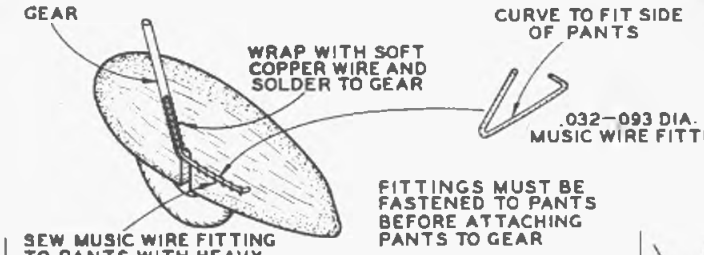


FIG. 4

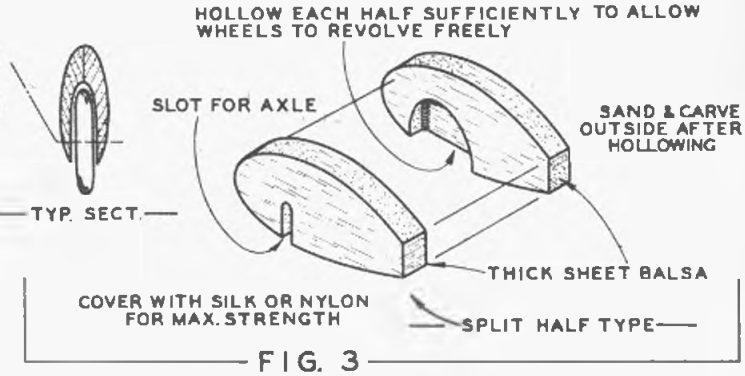


FIG. 3

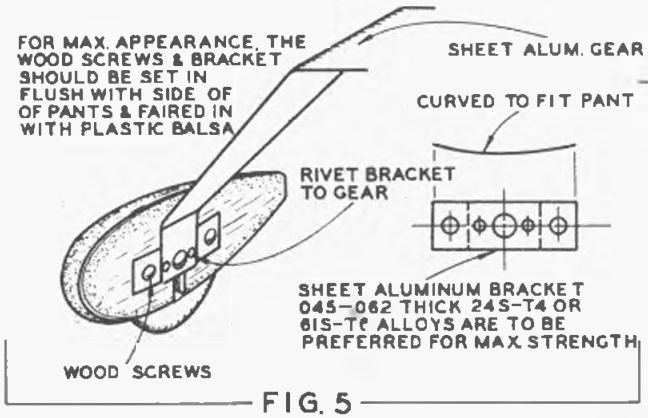


FIG. 5

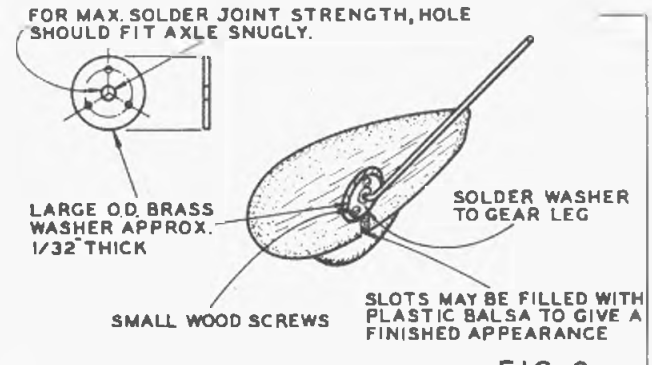
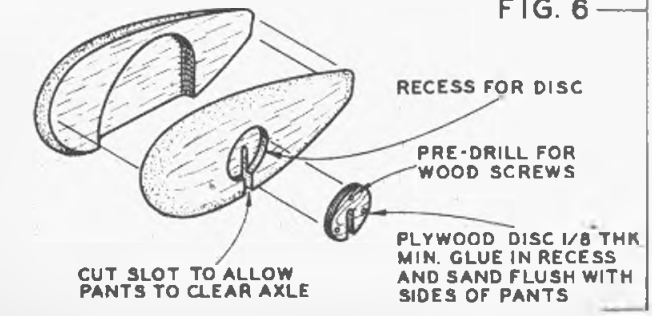


FIG. 6



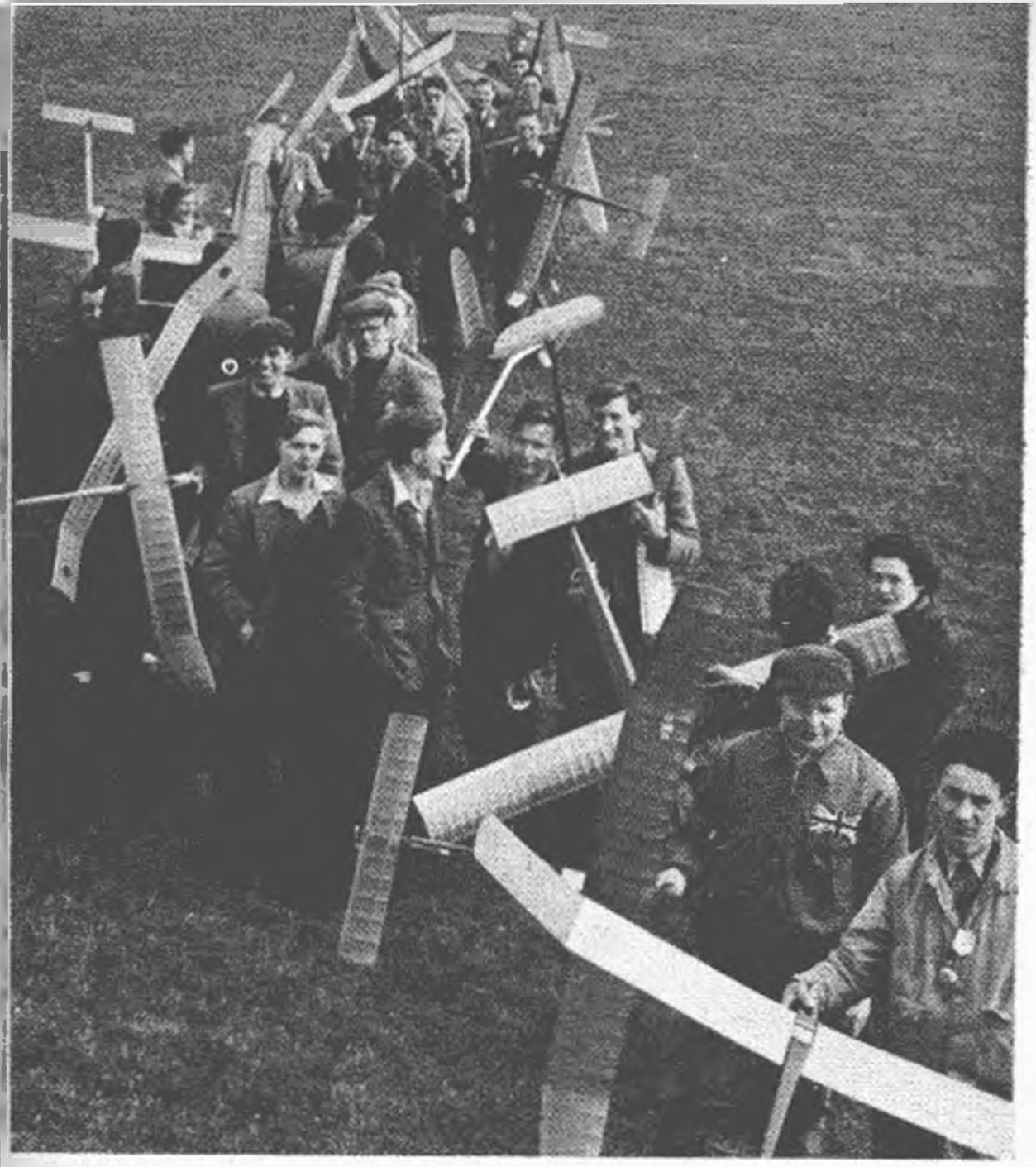
▶ In the accompanying sketches we have shown the two most popular types of wheel pants construction: the laminated type in Fig. 2 and the hollowed-out, split-half type as in Fig. 3. Choice of either type is largely up to the individual. The laminated type is perhaps stronger and might, therefore, be selected for use on team racers, where strength and dependable operation are of paramount interest.

Regardless of the type construction you may select, or even if commercially available sheet metal pants are used, the minimum operating clearances, shown in Fig. 1, should be kept in mind. There will be instances, of course, as in the case of some scale models, where this will not be practical or possible, but for the general run of models, it will eliminate wheel jamming and reduce unnecessary scrapes and scars.

Figs. 4, 5 and 6 illustrate several practical means of attaching the pants to the gear, a detail that has unfortunately been overlooked in many designs.

All of the methods shown here have one thing in common: they permit the wheels to be permanently soldered to the axles, with the pants being attached afterward. The attachment type shown in Fig. 4 offers some flexibility in the wire, an advantage in a hard landing, while the remaining methods shown in Figs. 5 and 6 permit the pants to be readily removed under extremely rough take-off conditions, so take yer cherce!

If any of the readers have any ideas about future subjects for Design Detail, why not drop a line to MAN and we will see what can be noodled up?



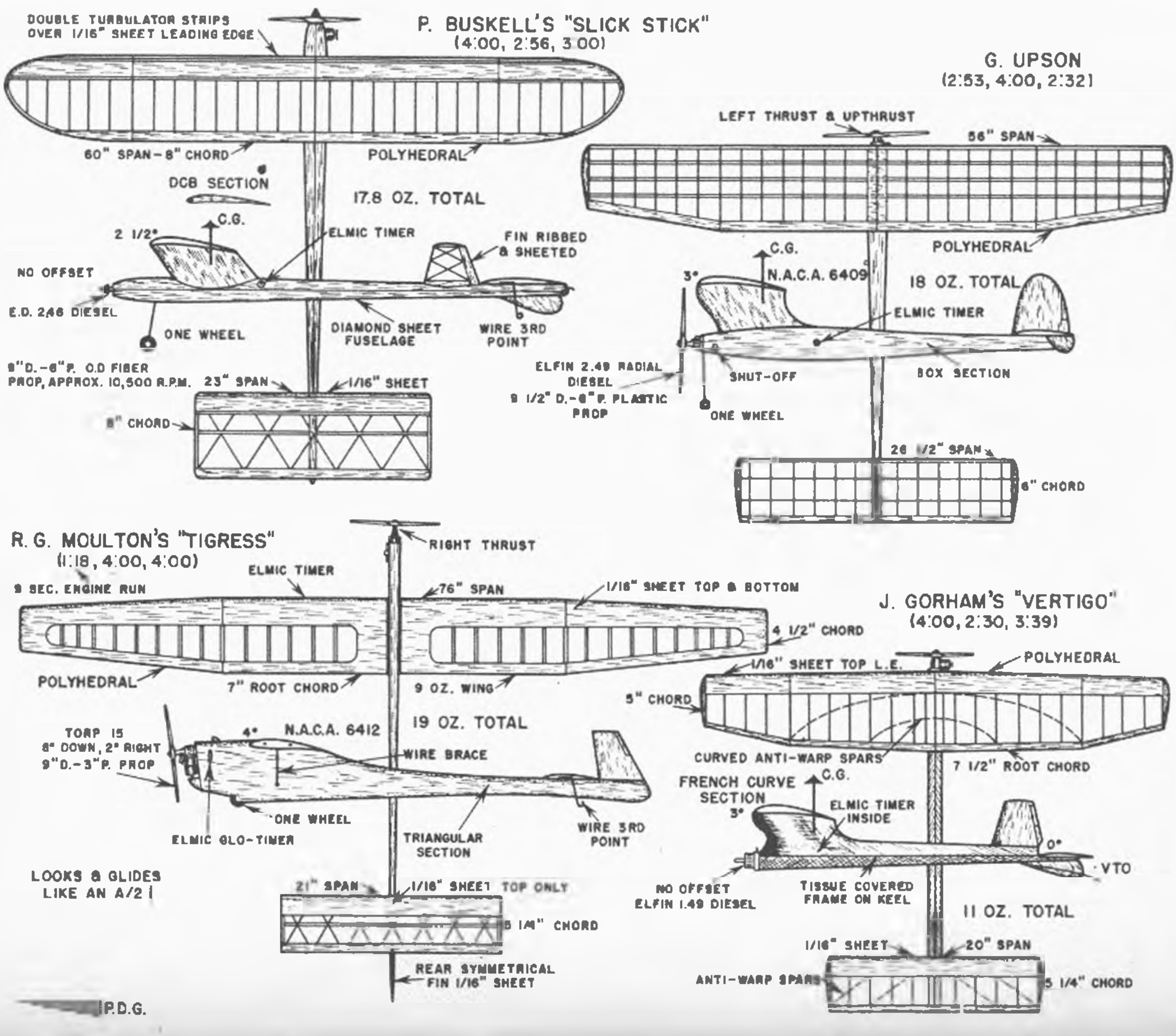
By RON MOULTON

Combining Nordic, Wakefield, FAI Gas, world's biggest eliminations for international team competition take place in Olde Merrie England.

BRITAIN'S BEST

Trials and Eliminations could not be better named, for if there is a tougher, more exacting process of International team selection, we have yet to hear of it. The British start the year before the final event. Last September, contests were held on the five three-minute basis as a first elim; and then again in early '54, a repeat event for each class was held on a three four-minute flight basis. From scores in these closely fought contests, each domestic area within the British Society of Model Aeronautical Engineers was allowed to nominate the top 25 per cent for forwarding into the final "Trials," and so at RAF Station Wittering in Leicestershire, they had the toughest of all meetings to pick the top 12 on May 22 and 23. Wittering is the kind of field a B-36 could use for shooting landings.

Power began the meet. Great was the speculation of the Torp .15 performers and Silvio Lanfranchi made a great show



with his 480 in. wing job that floated through the glide. Diesels were going up faster on smaller ships. Norman Marcus flew 350 sq. in. wings on an Elfin 2.49 and Tom Smith not much more with swept-forward tapered wings and a ferocious Oliver Tiger, the epitome of all fast Diesels. But glide was beginning to count in the second round and the fast sinkers began to lose their grip. Risers hooked at about 300 ft. altitude were good to hold that height for at least five miles of drift. In the end Silvio's Torp job (after a de Hogan) held top listing but, as a Swiss National, he cannot fly for GB, so from second to fifth form the team. First glider flights ran off in dead air that evening.

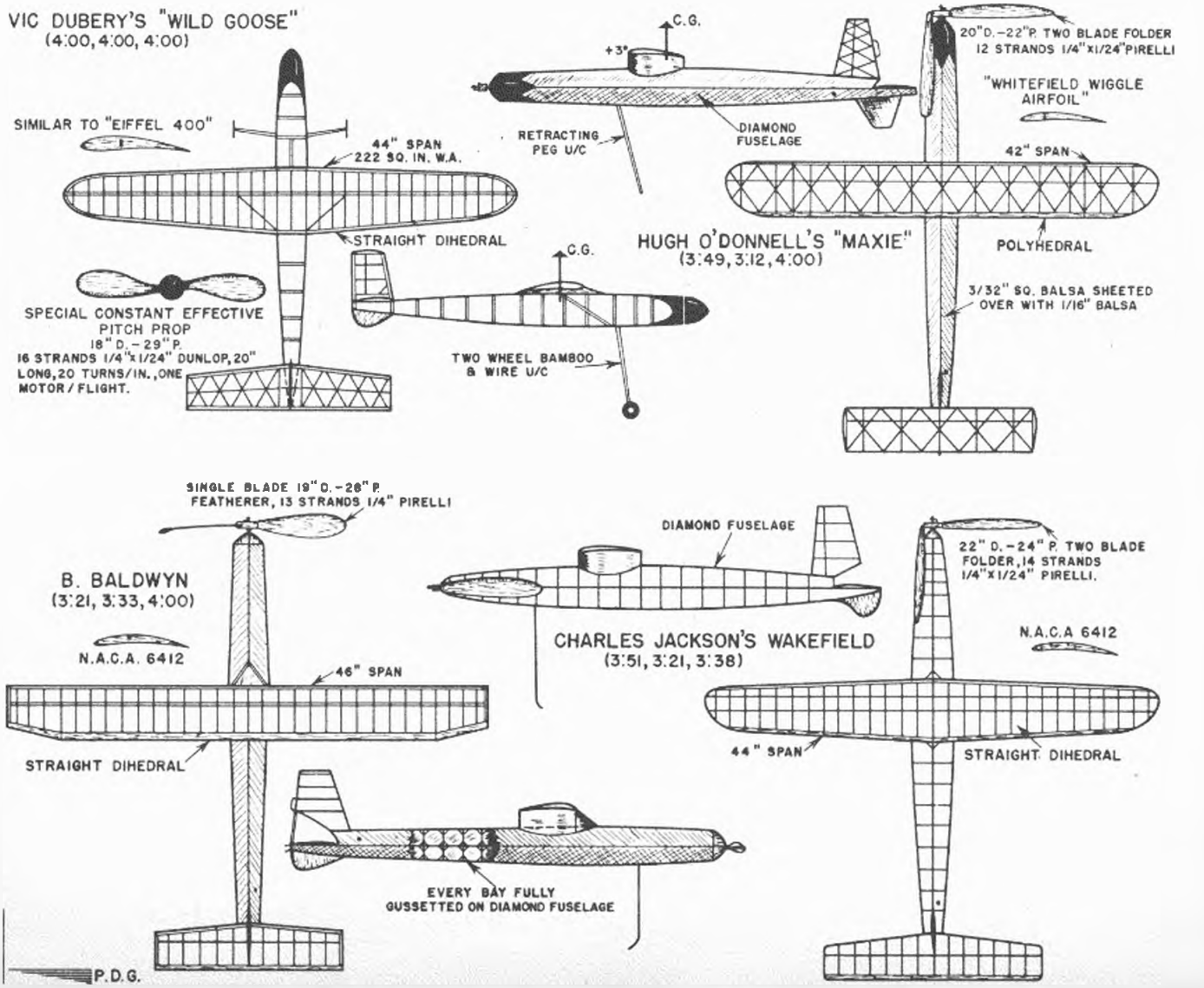
What does an A-2 do from 164 ft. of altitude? Well, first you have to get the altitude, and that's not everyone's qualification; but assuming we get top height, the top time we have been expecting to hope for is 2:20. Yet, such was the quality of the hundred or more Nordics at Wittering, and so high the general standard of flying, that 2:30, even three minutes, became a reality. Work out that sink rate and you'll see that to lose 164 ft. in 150 seconds you have a mighty fine glider in your hands.

Second day dawned with an ominous raincloud hovering ten-tenths above and little hope for a high time. Yet the first model to snap its auto-rudder at the release of the line went slap bang into a great big riser, and four minutes became the order of the day. Anyone who failed to catch a bump this round was plain unlucky for it was beginning to lift at little more than 100 ft. and you just had to tow to find it, so it was the next and final round which became the decider, so much so in fact that it was critical that one get a max to make certain of a place. Those who wound up in the team four, and right down to seventh, all had the models to find weak lift and hold it in gradually failing conditions.

In modeling history we know of no other event more closely fought, more revealing in high standard, for the leaders' times were 10:31, 10:31, 10:29 and 10:27, and we should mention brothers Hugh and John O'Donnell at fifth and sixth with 10:06 and 10:01.

An so to Wakefield and the controversial thought: "Has it lost its old prestige, this time-honored event, with the '54 rule changes?" The answer is a "no," for after Power and Glider, the rubber jobs held a seemingly magical influence and, though smallest in numbers at this tri-contest meet, the Wakefield held the stand for interest. They really get up there, these new 2.8 oz. of rubber power, and many of the early dissenters were nodding approval at the fine times that were raised. In fact, from the first 12 placings, there's scarcely a man who could not make five three-minutes under top contest pressure, and so to pick the first four meant a few disappointments.

Maestro Ted Evans, holding court, as he is always forced to, by virtue of his unbelievably high standards of model-making, can be quoted as answering "don't" to a query from Vic Dubery, the winner, when he asked if it would be worth his while to go streamline and monocoque. Ted should know—his model is a masterpiece; but it missed the team by 25 seconds and five places. Vic Dubery's winner is an oldie, vintage '51, and well trimmed to zip up on 16 tight strands of Dunlop 20 in. long. Rubber is just new and used once only for such an event with 20 turns per inch. END



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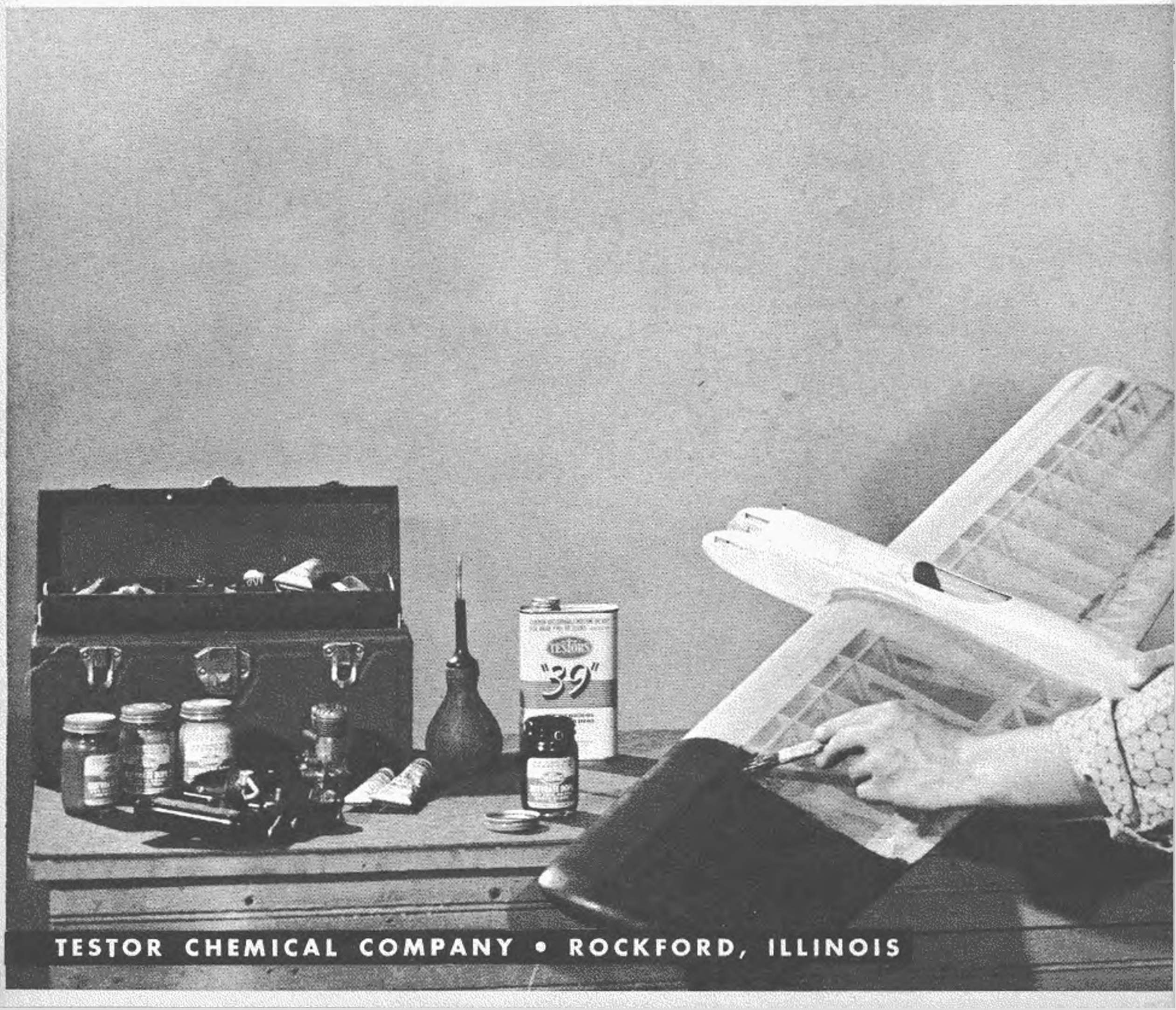

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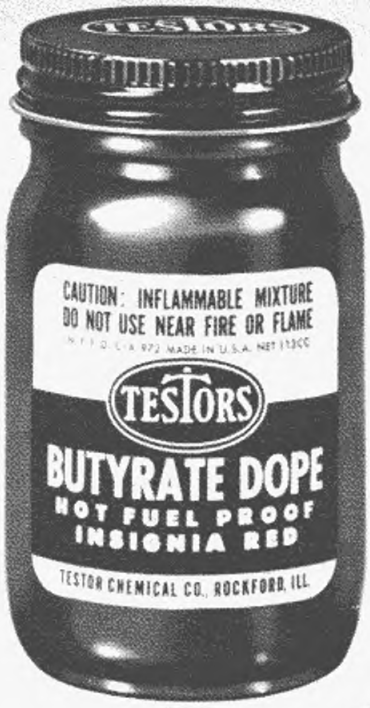

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Flash News

Many developments push back the air frontier -- this monthly report will keep you in the know.

▼

Lockheed Aircraft has completed preliminary design of a supersonic jet transport which can cruise at Mach 2 over sufficient range to provide service between Chicago and Los Angeles. Decision to enter the supersonic jet transport field was made to provide a substantial technical jump over the Boeing 707 and other current jet transports.

American Airlines' president C. R. Smith has asked Douglas, Lockheed and Convair for design studies of a replacement for the Convair Liner. American wants a turboprop transport carrying 50 or more passengers at a cruising speed of 325-350 mph. The four-engine airliner must operate more economically than current piston-powered transports and must be ready for service in 1958.

Cessna XT-37, light twin-jet trainer, has completed initial test flights and performs beautifully, according to company test pilot Robert Hagan. The new trainer is powered by a side-by-side pair of Continental J69 turbojet engines, license-built versions of the French Marbore jet developing 920 lb. of thrust each. The sleek, squat trainer features side-by-side seating of instructor and student. It has a 33 ft. span, is 27 ft. long and weighs 5,600 lb. fully loaded. Top speed is 393 mph and it has a range of 935 miles.

Boeing Wichita has completed B-47 Stratojet No. 1,000 and is still going strong. The 1,000th airplane marked the thirty-third month that Boeing Wichita has been exactly on schedule with deliveries. The Air Force revealed that in addition to this production, Boeing-Wichita is modifying previously delivered B-47 bombers to bring them up to date. Modifications include removal of the fixed RATO installation and substitution of an external "horsecollar" of 33 RATO units for assisted take-off. The modified swept-wing bombers will also receive a 20 mm cannon tail turret, replacing the .50-cal. machine gun turrets previously installed.

Air Force has designated the new Boeing 717 Jet Stratotanker the KC-135. The tanker version of the new 707 Jet Stratocruiser is scheduled for limited initial production to serve as high-speed, high-altitude refueler for bombers and fighters of the Strategic Air Command. Meanwhile, Air Force is holding a design competition for a more advanced jet tanker with greater capacity than the KC-135. More than a dozen designs have been entered by major aircraft companies, including Boeing.

The long-awaited decision in the one-man helicopter competition by the Navy Bureau of Aeronautics contains not one but three winners: Hiller, Kellett and Gyrodyne. There were 15 entries in the competition to develop a tiny helicopter machine which either straps to the shoulders or permits one man to sit in a simple framework. No quantity production order is involved in the decision but each of the companies will develop and test its individual design against a future evaluation for a production order.

Boeing has completed installation of the two Wright T49 turboprop engines in the B-47D version, after two years of delay. Ground tests are now being conducted prior to first flight. The turboprop engines replace the two inboard double-engine pods used on the standard bomber. The outboard single-engine pods, containing a General Electric J47 turbojet in each, are retained as a safety feature. Boeing is also completing installation of four Pratt & Whitney T34 turboprop engines in two KC-97 Stratofreighter cargo planes and first flight is scheduled.

Wartime "window," the shower of metallic foil which appears on a radar screen as a flight of aircraft, is still a first-class tactical weapon in the electronic war and the Boeing B-47E bomber contains a chute on the side of the fuselage just back of the wings for its mid-air distribution. The material is made by the Johnston Foil Co., St. Louis, Mo. and the Cochran Foil Co., Louisville, Ky.

The Air Force has assigned the enormously-successful Pratt & Whitney J57 turbojet engine to the first group of Convair B-58 Hustler bombers to expedite delivery. Subsequent production models will use the General Electric J79 turbojet engine, still undergoing test. The big, delta-wing Hustler is powered by four jet engines mounted in familiar pods under the wing.

The mystery of the British de Havilland Comet tragedies has been

(cont. on page 51)

FOR
.19 TO .29
ENGINES

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FULL STUNT MODEL

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A SEMI-SCALE AIR RACER
WITH TOP STUNT PERFORMANCE
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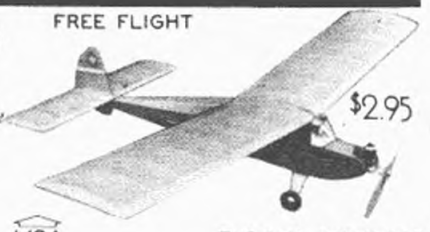

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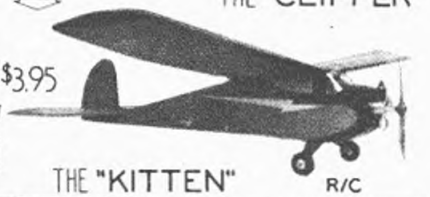

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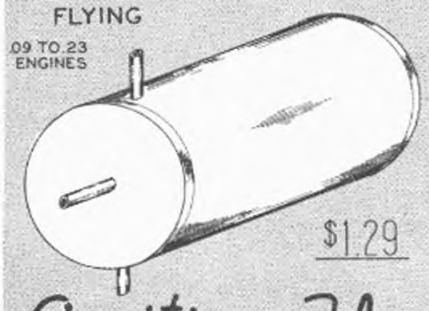

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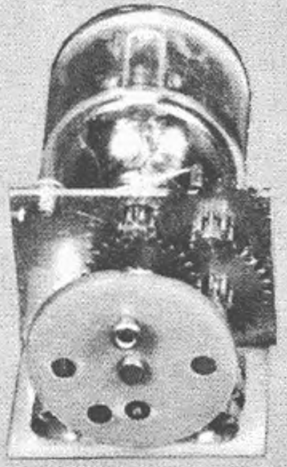

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FOREIGN NOTES

A monthly world-wide round-up of technical developments, designs, significant industrial products.

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Russian International Championships

"East is east and west is west . . ." Thus, in 1954, while officially recognized FAI World Championship events held in U.S.A., Denmark and Holland, were ignored by countries in the Soviet sphere of influence, these same countries gathered together in Moscow for their own international championships. The results are an interesting commentary on model performance east of the Iron Curtain.

Eight countries were represented: Soviet Russia, Ukraine, Poland, Czechoslovakia, Hungary, Eastern Germany, Bulgaria and Rumania. Points scoring events were free flight gas, rubber, towline glider, speed and jet speed, and the eight-man Czechoslovak team led by Z. Husicka proved easy winners by taking no less than four first places in five events. Soviet Russia provided no winners at all, but gained two seconds and two thirds to place second to Czechoslovakia in the inter-country championship.

Free flight events were run to FAI 5-flight x 3-min. rules. In FF gas, Spulak of Czechoslovakia totaled 839 secs out of a possible 900, including two maximums and a lowest time only 26 secs short of a max. Second man was Radoczi of Hungary. Less consistent, his fourth flight, after three consecutive maxes, was only 58 secs, but he pulled up on his last flight with 2:37. Third was Leimert, representing the East German Republic. Fourth was Botvinov of Ukraine, followed by Topadze (USSR), Benedek (Rumania), Bury (Poland) and Dzondzorov (Bulgaria).

In the rubber event there were good performances by Niestoj of Poland with 873 secs, followed by Matvejev of the Soviet Union with 849 and Nasonov of Ukraine with 847—creditable performances by any standard. Remaining places were filled, in order, by Hungary, East Germany, Czechoslovakia, Rumania and Bulgaria. In the towline glider event, Hajek of Czechoslovakia was only 15 secs short of a 5 x 3 min. total, with the Ukraine and Soviet Union close behind. Then followed Rumania, Hungary, East Germany, Bulgaria and Poland.

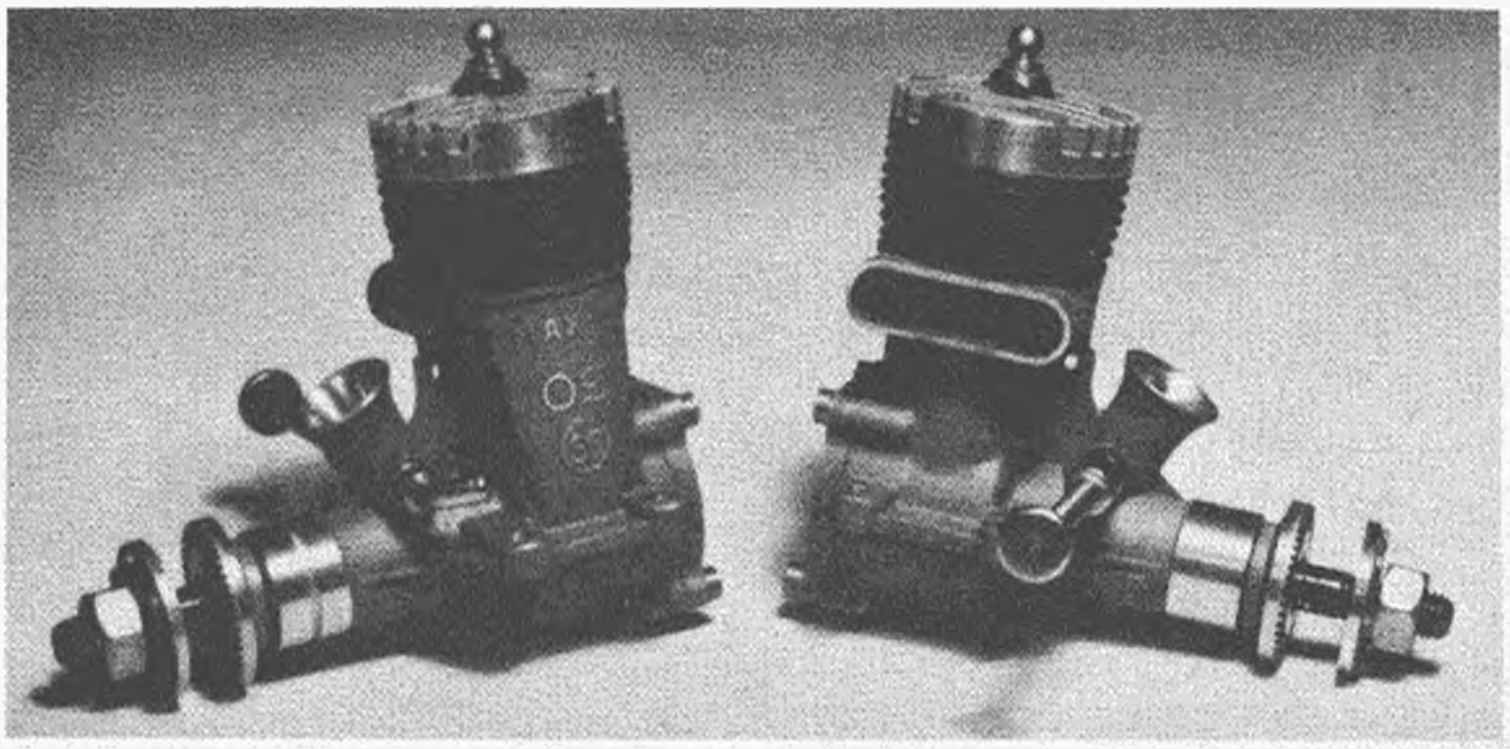
The controlline speed event was limited to 5 cc (.30 cu. in.) Three flights were allowed each contestant, the best figure being used to determine placings. In this, Zatocil of Czechoslovakia turned in 200 km/hr. (124.27 mph) to win, followed by Egervary of Hungary with 197 km/hr. (122.41 mph) and Gajevski of the USSR with 195 km/hr. (121.17 mph. Demjanenko (Ukraine) returned 185 km/hr. (114.95 mph) after which there was a big drop in the remaining places, all of which were below 80 mph.

In the jet class, Czech expert Josef Sladky achieved 232 km/hr. (144.16 mph) to beat narrowly Russia's Ivanikov's 230 km/hr. (142.91 mph). Horvath of Hungary reached 222 km/hr. (137.94 mph) and Moldovjana (Rumania) 209 km/hr. (129.87 mph).

Final team placings were: 1. Czechoslovakia, 2. USSR, 3. Hungary, 4. Ukraine, 5. Poland, 6. Rumania, 7. East Germany, 8. Bulgaria.

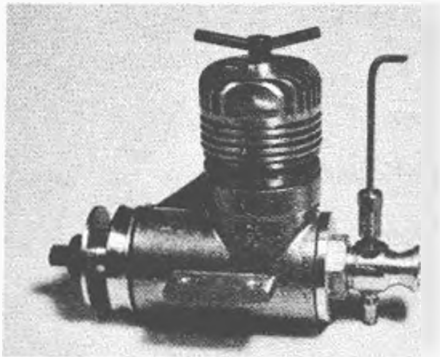
British Reed-Valve Diesel Tested

Last month we mentioned a new Elfin



New Japanese O.S. Max-1 engines, made in .29 and .35 displacements, attractive and well built.

design: the reed-valve, twin-ball-bearing type BR Diesel. Since that time we have been testing two examples of the .09 cu. in. BR 1.49 model. This motor replaces the previous shaft rotary valve Elfin 1.49 and it is more powerful than this favored contest motor or any .099 cu. in. glow plug engine, though weight is much more: nearly 4 oz. Starting was extremely easy on the first engine tested but more critical on the second example. Suspecting a difference in compression seal as the cause, rather than the new induction system, we switched backplate assemblies and retested the two motors. Results effectively exonerated reed-valve system. A further test was to run motors at various speeds for 30 minutes nonstop. Valves withstood this well. As expected, the Elfin BR showed better torque at low speeds than previous shaft valve model.



World's first production reed-valve Diesel, the British Elfin .09. That's really rugged case.

Czepa on Nordic A.2

Austria's Oskar Czepa, noted free flight designer and 1951 World Glider Champion, tells us that he has been experimenting with aspect ratios on A.2 class towliners. Aiming at the greater lift to drag values of high aspect ratios, Czepa produced models having aspect ratios of up to 24 : 1. In dead calm air he reports fantastic flights with these, but says that performance fell off 20 per cent in the slightest wind because of inadequate lateral stability. Czepa thinks that it is practicable to use aspect ratios of up to a maximum of 17 : 1 and still cope with average windy conditions.

New Japanese O.S. Motors

A couple of good looking motors have lately reached us from the Ogawa Model Manufacturing Co. in Japan, makers of the well known O.S. range. These new jobs, known as the Max-1 .35 and Max-1 .29, are entirely new designs and differ appreciably from the earlier O.S. .29 with its radial porting. The Max-1 jobs are more closely modeled on current American design practice, being of the two-port type with baffle piston. Crankcases are cleanly diecast with a pleasing matt gray finish. Cylinders have integral machined fins and are held down by two long through bolts. Each motor is provided with (*Continued on page* 52)

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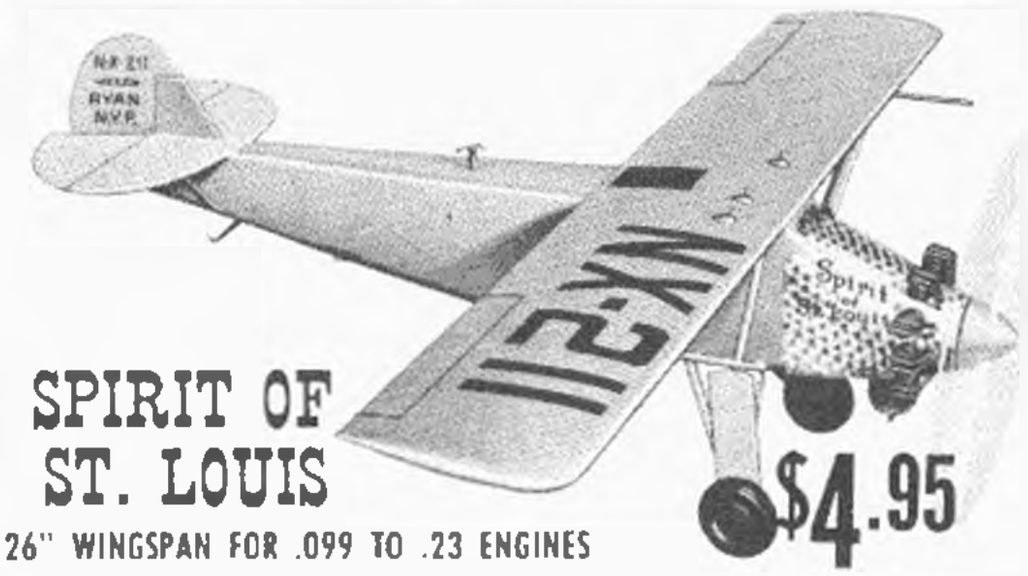

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F-82 Twin Mustang $2.95

SPAN: 18" For .035 to .074 Eng. No. Amer. fighter model powers with 1 or 2 engines. Prefabbed, with 2 carved fuselages, 2 cowls.

LITTLE MUSTANG $1.95

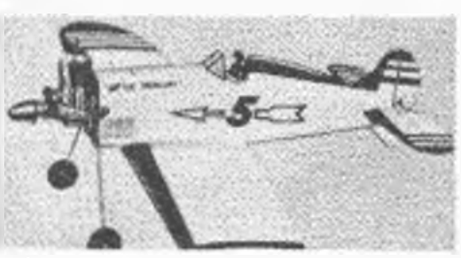
SPAN: 18" For .020 to .074 Eng. Famous escort fighter model. Completely prefabbed. Features carved balsa fuselage, formed balsa wing.

LITTLE SABRE $1.95

SPAN: 18" For .020 to .074 Eng. In honor of the F-86 (Sabre Jet). U-Control model. All parts cut and shaped for easy assembly.

LITTLE STINKER $2.50

SPAN: 14" For .020 to .074 Eng. Betty Skelton's (PITT'S SPECIAL) championship stunt flyer. Highly colorful . . . all prefabbed model.



LITTLE MERCURY $1.50

SPAN: 18" For .039 to .074 Eng. Carved fuselage model, an excellent U-Control flyer. It's completely prefabbed. A cinch to assemble.

WACO CABIN $1.50

For .020 to .049 Engines

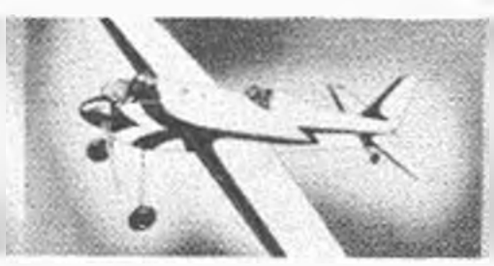
Imagine! This carved fuselage bi-plane "beauty" for only $1.50. It's semi-scale. Prefabbed for U-Control.

MONOCOUPE 90A $1.50

SPAN: 18" For .035 to .074 Eng. Scale model of America's favorite private plane. Prefabbed kit includes carved balsa fuselage, formed cowl.

LITTLE BIPE $1.50

SPAN: 16" For .020 to .074 Eng. Carved balsa fuselage bi-plane . . . prefabbed for easy assembly. It's control-line. A real value!



SPORT RACER $1.50

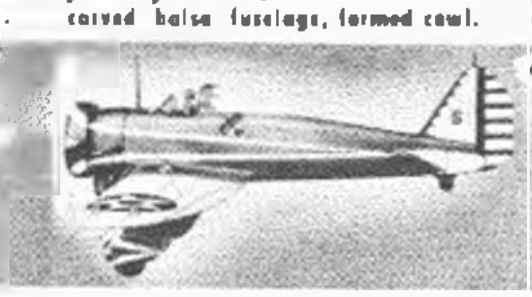
SPAN: 18" For .020 to .074 Eng. A good U-Control performer at a remarkably low price. Completely prefabbed kit. Easy to assemble.

LITTLE DEVIL $1.50

SPAN: 18" For .020 to .074 Eng. An economically priced U-Control model. Prefabbed parts include: formed balsa fuselage & wing, etc.

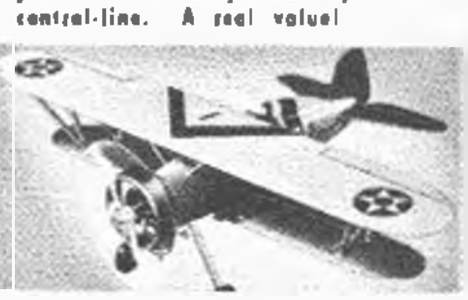
BEECHCRAFT "17" $2.95

SPAN: 16" For .045 to .099 Eng. U-Control, prefabbed model has carved balsa fuselage, formed balsa wings, metal cowl, etc., etc.



BOEING P-26A $2.95

SPAN: 18" For .020 to .074 Eng. An excellent control-line flyer. Prefabricated kit is complete in every detail . . . all parts finished.

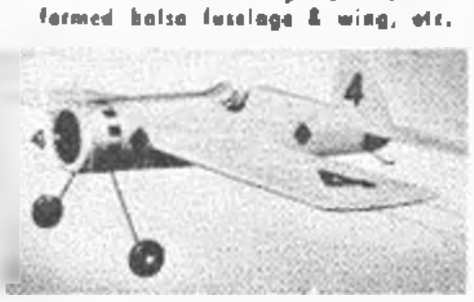


BOEING F4B-4 $2.95

SPAN: 17½" For .020 to .074 Eng. Brand new deluxe U-Control model 100% complete with carved balsa fuselage, wings, etc. A real "honey".

CURTISS HAWK $2.95

SPAN: 17½" For .020 to .074 Eng. Deluxe U-Control model. 100% complete - with carved balsa fuselage, wings, etc. Easy to assemble.

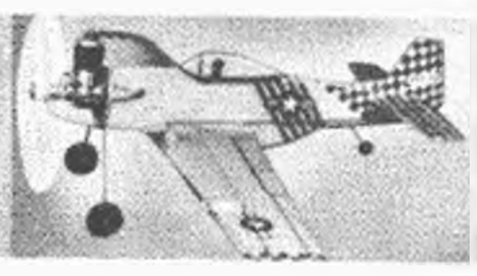


BEL AIR $2.95

SPAN: 18" For .039 to .099 Eng. A control-line flyer that's loaded with flying thrills. Prefabbed model has all parts finished.

F-86 SABRE & F-51 MUSTANG -- Both for $1.50

Our sensational 2-in-1 kit. Contains two complete, realistic profile models. Both control-line flyers take .020 to .074 engines . . . both have 18" wingspans. Not one, but two complete models . . . make and fly both . . . for only $1.50.



AMERICAN BOY $1.00

SPAN: 18" For .020 to .074 Eng. Our U-Control trainer . . . the biggest dollars worth of model airplane in the world. 100% complete.

DREAM BOAT $1.95

"½A" Eng., CO_2, or Elec. Motors Our exclusive aeronautical fin and rudder design. Prefabbed model has 12" carved balsa hull, etc., etc.

LITTLE ACE $1.95

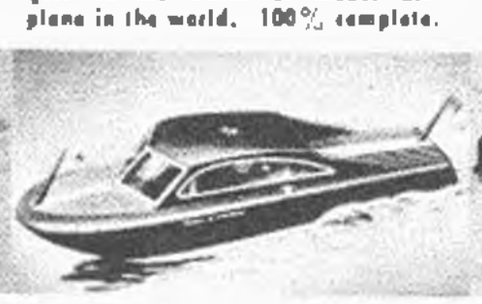
SPAN: 18" For .049 to .099 Eng. For team racing or sport flying. Kit is 100% complete with formed fuselage & wing, metal cowl, etc.

LITTLE BUCKEYE $1.95

"½A" Eng., Jetex, Elec. Motors New, low cost speedboat thriller. Completely prefabbed, 12" carved balsa hull, brass metal fittings, etc.

BUCKEYE JR. $3.50

LENGTH: 14" For .020 to .074 Eng. A "beaut" of a speedboat. Prefabbed model is 100% complete—carved balsa hull, brass fittings.



Buckeye Jr. Cabin $3.95

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SCIENTIFIC MODEL AIRPLANE CO., 113 M2 MONROE ST., NEWARK 5, N. J.

Guardian

(*Continued from page* 16)

on its first official flight, had a high speed of 73 mph and a low speed of 25 mph for a total of 417 points, and for the second year in a row topped all contestants. One of the big factors in this was the ability of the model to fly smoothly at low speed in windy weather. This makes the model ideal for carrier deck, as anyone should be able to fly it with success.

In designing the model, I decided to use a sparless wing for simplicity. The fuselage was made in the crutch and block manner so that it could be made quickly and yet have the strength needed to withstand the punishment of repeated landings on the carrier deck.

Construction of the model is quite easy. The wing needs no explanation, as it is sparless. One ounce of weight should be added to the outside wing tip. In the original model a piece of plywood wrapped with thin solder was cemented between the last two ribs. A solid piece of lead may be glued in, if you wish, but this is not recommended. If you desire a really tough model, it is best that the wing be covered with silk. This is not absolutely necessary, as Silkspan or any fairly heavy tissue will hold up well.

The tail surfaces are sheet balsa and require only a little time to build. The fuselage construction is important and should be done well. The motor mounts should be cemented solidly to the lower side panels, and while these are drying, the formers should be cut out. The lower side panels should then be cemented to formers F1 and F2. After this has dried sufficiently, the remaining formers (except for F4) should be added, and the fuselage joined at the rear. The next step is to mount the landing gear, motor, fuel tank, stab, bellcrank mount and control system.

The wing, which should now be covered and clear doped, is installed next so that lead-out wires from the bellcrank may be installed. The motor speed control is installed next. The construction of this is very important as it is the key to having a winning airplane. It is a choke control and must work smoothly. The choke plate, made of tin can material, should be soldered to the 1/16 wire choke control arm. This wire runs through two pieces of heavier sheet metal which are held in place by the needle valve body. The motor control bellcrank, mounted next, should be elevated by a riser about 3/16 in. high, so that it clears the gas tank. A piece of wire runs from the motor control bellcrank to the choke control arm and should be adjusted so that, when the third line is pulled as far as possible, the motor is completely choked. A piece of cloth should be wrapped around and cemented to the choke plate. This has been found to give better result than an unwrapped plate. A rubber band fastened to the choke control arm and a hook in the bottom of the fuselage holds the choke open while the third line is not being pulled. Former F3 and the upper side panels are added next, and are followed by the fuselage blocks. The upper and lower projecting portions of the formers are cut free and the side profile shaped blocks are lightly cemented in place. After carving and sanding to shape, remove the blocks and hollow out to obtain a 3/32 in. wall thickness. Replace formers and recement blocks in position. An alternative and simpler method of covering the top and bottom is by planking with 3/32 x 3/16 in. strips.

The arresting gear mount should next be cemented solidly into the lower fuselage block. It should be made of hardwood or heavy plywood. The arresting gear hook shown in the plans is longer than necessary for contest work. Leave it at the length shown until you feel that you have mastered landings on the carrier deck. It should then be shortened 2 in. to prevent possible nose-overs when landing on the carrier deck. A small rubber band should be used to keep the hook down, once the plane is airborne. The nose block and the rudder are added next, and then the entire airplane is finished without the canopy in place. A good practice to follow in finishing your plane is to dope the model with thin, hot, fuelproof, clear dope. The plane should be sanded lightly after each coat of dope. This should continue until the pores are filled and the model shines. The plane should then be painted with enough thin, colored, hot, fuelproof dope to cover it well.

Then, either rub down the model well with the rubbing compound and wax it, or give it a final coat of thin clear dope. Either method will produce a beautiful shiny finish which will add considerably to the strength of the airplane. The canopy is left to your preference. If you cannot obtain a suitable one at a model shop, one can be made from sheet celluloid, which is quite satisfactory.

Before flying the model, one very important thing must be done. Enough weight must be added to the rear of the fuselage to make the model balance one to one and one-fourth inches behind the leading edge of the wing (indicated by heavy black arrow on plan). Without this weight, the model is too nose-heavy to fly well at low speeds.

When a Fox .35 is used, the weight needed is usually 1-1/2 to 2-1/2 oz. A 9-6 or 9-7 Top Flite propeller has been most successful.

The Fox .35 in this model has been proven very satisfactory. However, any engine from .19 to .35 displacement should provide the necessary power for a contest winning airplane. The third line should be kept thin so that it has very little line drag. A line of .006 is very good. If line drag becomes too

great, the third line may partially choke the engine on your high speed laps. The model should be easy to control and stable at all speeds. If you have trouble, look for warps and check your balance point. Landings on the carrier deck are quite easy, after a little practice. The engine control used has proved reliable and effective. END

Sharpie

(*Continued from page 21*)

To curve the sheet stock over the ribs, several methods may be employed. Simplest method is first to cement the second rib in from the wingtip to the sheet stock, holding the two together with clothespins at the leading and trailing edges and pinning the rib to the sheet stock at any point where the sheet stock may tend to lift away from the rib. Then repeat with the rest of the ribs. When using this method, there is danger of twisting the panel slightly because of variations in the wood. Care must be used to assure that the leading and trailing edges are parallel after the ribs are mounted. A safer but somewhat longer way is to lay the ribs in place, run a bead of slow drying cement along the rib tops and then pin the sheet stock to the ribs and also to the table top along the leading and trailing edges. When dry, cut the spot cement points loose. This method assures the alinement of the leading and trailing edges. At the center section, cement the two center ribs together with a piece of 3/4 x 3/16 x 6 in. trailing edge stock in between. This automatically forms the right dihedral. Trim the excess away on top and add a 3/4 x 3/32 x 6 in. cap strip over the joint with grain along the wing. You now have a wing with 6 in. chord and 30 in span. Cut away the trailing edge, tapering the chord from 6 in at the center to 5 in. at the tip rib, and trim the bottoms of the ribs to fit. This not only tapers the wing, but gives tip washout.

Add 1/8 x 1/8 x 6 in. strips to the bottom of the two ribs which line up with the top of the cabin sides. Block sand so the bottoms are level with the center ribs; then cover bottom of the center section with 1/16 in. sheet. Add 1/8 x 1/4 in. end plates to leading and trailing edges of center for appearance, if desired.

Tail Surface

Make the horizontal tail surface just as you made one wing panel, without tapering the trailing edge. Cut the vertical fin from 1/16 in. sheet stock to shape.

Sand all surfaces smooth. Corners can be rounded, slightly. Dope with one thin coat of clear dope. Sand again, dope again, and sand again. Choose your color scheme. It can be applied either with colored dope or colored Japanese tissue. If you use tissue, dope it on, then apply at least two more coats of thin dope. Fuelproof the entire model.

Adjusting and Flying

In adjusting Sharpie for flight, I used my favorite method of mounting an Infant .02 for low power tests, then replacing it with a Torp .035 and finally a Torp .049. This is made so easy by the fact that all three engines have the same mounting arrangement.

You will note from the photos that I added some fin area after the first flights of the prototype. The additional area improved the directional stability at the relatively low speeds which result from use of a highly cambered single surface wing. We took the added area off when designing the radio version.

You'll find that Sharpie has no bad habits, and is very easy to adjust merely by shifting the whole tail section to aline the fin for a steady turn. You may have to add weight to the nose or tail to balance the model, depending on your selection of wood, and add depending on which engine you use. END

Import Review

(*Continued from page 24*)

to Manufacturer for Repair" clearly on the outside. Failure to do this will often entail months of delay. A special entry procedure for repairs is provided in most countries and, officialdom being what it is, departure from Customs requirements means indefinite delay. On the Customs declaration under the column headed: "Description of Goods" should be entered: "damaged model engine." Do not use the word "toy." Under the heading "Value" put the fair value for a damaged motor, not the purchase price.

If the address of an export agent is quoted on the literature which comes with the engine, or if the engine is regularly advertised by an American firm, it is fair to assume that there is an import agent and parts service in this country, and all the foregoing trouble can be avoided by locating and dealing with him.

Handled in the correct manner, an overseas repair will take six weeks at the most, usually a month. By using Air Mail and prepaid return Air Mail where possible, the engine can be back in one week, although the cost is usually prohibitive.

There are a number of parts on any foreign engine which can be satisfactorily replaced by domestic products, and it is fortunate that most of them are those which most often get damaged. Suitable spraybar and needle units can invariably be found and the judicious use of a small file will bring them to the exact sizes required. The points to watch are the spraybar diameter and correct location of the jet hole. Most small English engines employ two BA prop nuts and washers. An almost exact replacement is No. 10-32. The same thread is also popularly used for compression screws. Various small screws for tank retention, backplate, and cylinder head attachment can be replaced by slightly larger domestic sizes after retapping the holes, and satisfactory joint gaskets can either be found or easily made. Substitute conrods can usually be found or satisfactorily made from dural stock and wrist pins invariably come in stock drill rod sizes.

Elfin 1.49 (.091) Diesel

Directly descended from the Elfin 1.8, the engine which, more than any other, put U-control on the map in England, the 1.49 was designed by Frank Ellis, one of the earliest Diesel pioneers in that country.

As the second production Diesel in the world to feature ultra-short stroke (.503 in. bore, .460 in. stroke) with a weight of 2.5 oz., it has set new performance standards for its size and is one of the highest revving Diesels in current production.

Construction is very rugged, while still appearing compact and neat, with an over-all height considerably less than that of equivalent domestic engines.

A pressure diecast aluminum crankcase with integral cast iron bushed main bearing, and heavy four point beam mounting lugs is sealed with a screwed-in machined aluminum rear cover. A nickel-chrome steel cylinder with Arden type radial porting screws into the crankcase, and a machined aluminum cylinder head screws over the top. Compression is controlled by a very well fitted honed contrapiston and is adjusted by a two-pronged screw.

The nickel-chrome steel crankshaft is a full 5/16 in. diameter, and selectively fitted by individual honing of the cast iron bushing. An extremely heavy duralumin conrod with 3/16 in. dia. big end and 1/8 in. dia. wrist pin is coupled to a machined and selectively fitted cast iron piston. Drive is conveyed through a knurled aluminum prop driver secured by mating tapers. The threaded shaft projects sufficiently for the heaviest props, and mounts an aluminum washer and 3/16

in. (2 BA) hex. nut. Carburetion is by conventional spraybar and needle valve of sturdy construction, and long trumpet mouthed intake of moderate diameter which is supplemented by sub-piston induction. No gaskets are used on this engine, all joints being metal to metal machined faces. An annoying fault with the engine tested was far too much crankshaft endplay, and liability to rear cover damage in the mildest crash. A suitable spacing washer would easily rectify this. Performance is the high bhp at high rpm type with slightly less torque than usual for a Diesel, which puts it in direct competition with glow engines as regards suitable applications.

International Hobbies, 4920 Idlewilde Lane, S. E., Albuquerque, N. M.

Allbon Dart (Series II) .033 Diesel

Something of a sensation at its introduction in 1950, the neat little Dart became one of those engines that every British modeler wanted, and its reliability and good manners inspired a rash of special kit designs, props, and other accessories. The moral was obvious and many competitors soon appeared from other manufacturers. However, the sound design and reputation of the Dart have earned it a place apart, and in its present Series 2 version, it is .033 cu. in. of pure pleasure.

Of similar basic layout to the Elfin, with almost identical metallurgical specifications, it is, like many offerings from across the ditch, extremely rugged for its displacement. Although only two thirds of an .049, it nevertheless, for a weight of 1 oz., has the vital dimensions of the heaviest domestic Half-A Diesel and almost the same performance, which points up the value of rigidity in compression ignition engines.

Quality and workmanship are exemplary throughout and several years of normal use can be expected. (We have used three of them for four years). Starting is not as easy as with most full Half-A Diesels, owing to the smaller amount of fuel per stroke, but once mastered the Dart is dead reliable to start and seldom requires needle adjustment. A low compression setting for starting, about a quarter turn below best running position, gives happiest results on the recommended fuel, plus a really snappy finger flip. A tip to remember with Diesels is, the smaller the engine, the harder and faster you flip. This is because the smaller the bore, the greater the relative cylinder wall area to conduct away compression heat. Therefore, more flip—more heat to make up for it.

An unusual bypass porting, which could be basically described as modified Brebeck type, and an improved piston design are the main differences from the Series 1 version, which had Arden type porting and a most intricate two-piece piston held together by a screw. These changes appeared in 1951 when manufacturing rights changed hands, but apart from this, and the addition of a 3-1/2 minute rear mounted transparent tank, the Dart design has proved its worth over five busy years.

The disproportionately large prop driver seems more reasonable when an 8 x 4 prop is found to be turning 8,000 rpm.

The entire Allbon range comprising the minute .009 cu. in. Bambi, the Dart, .06 Spitfire and the .09 Javelin, founder of the range, is handled by *American Telasco, Ltd., 166 Spring Rd., Huntington, N. Y.*, along with a complete range of spares and accessories, including water cooling conversion equipment for the two larger engines.

Amco BB 3.5 (.2005) Diesel

Introduced early in 1951, the ball bearing version of the well established plain bearing Amco 3.5, marked a further step in the development of British Diesels. One of the

(*Continued on page* 42)

New Authentic Scale Models

CHRIS-CRAFT 21' MONTEREY

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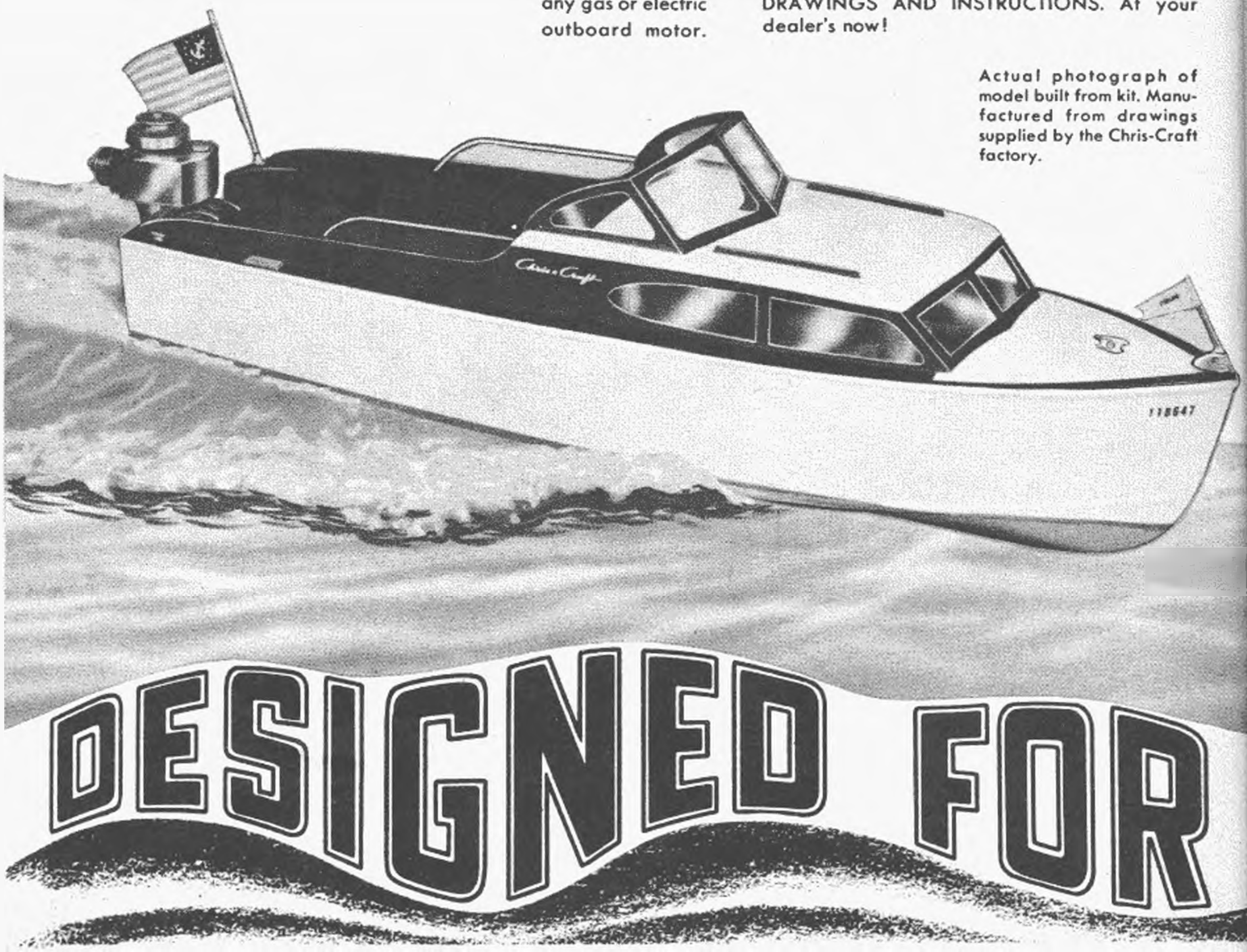

Actual photograph of model built from kit. Manufactured from drawings supplied by the Chris-Craft factory.

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SE 5	C-6	5.95
Ryan S-T	C-7	5.95
Fokker D-VII	C-8	5.95
Corsair F4U-1	C-9	5.95
Ring Master	S-1	2.95
F-51 Mustang	S-2	2.95
Yak-9	S-3	2.95
Space Master, Jr.	S-4	2.25
Ring Master, Jr.	S-5	1.95
R. C. Piper Tri-Pacer	FS-1	10.95

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Higgins 17' Speedster	B-2	4.95
Chris-Craft 47' Buccaneer	B-3	7.95
Century Resorter '20'	B-4	3.25
Century Sea Maid '20'	B-5	2.95
Chris-Craft 32' Cruiser	B-6M	9.95
Deluxe 34-pc. scale marine fitting set for Kit B-6M	B-6F	3.50
Chris-Craft 50' Catalina	B-7M	11.95
Deluxe 66-pc. scale marine fitting set for Kit B-7M	B-7F	4.95
Century Sea Maid '20'	B-8M	7.95
Deluxe 35-pc. scale marine fitting set for Kit B-8M	B-8F	3.95
Higgins 26' Express Cruiser	B-9	3.95
Harco '40' Deluxe Cabin Cruiser	B-10M	10.95
Deluxe 64-pc. scale marine fitting set for Kit B-10M	B-10F	4.50
Chris-Craft 63' Motor Yacht	B-11M	18.95
Deluxe 108-pc. scale marine fitting set for Kit B-11M	B-11F	7.50
Sea Dart	B-12	3.95

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Actual photograph of model built from kit. Manufactured from plans supplied by the Cessna Aircraft Corp.

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main reasons for starting difficulties with larger engines of this type is the excessive friction set up in the bearings at the moment of firing and impeding the flywheel action of the propeller in its job of carrying the piston up to the next firing point. Hence the circumstances where a series of pops are obtained by flicking without getting an actual start. The addition of ball bearings to the original engine, consequently, produced a far easier starting and smoother running engine, and considerably less finger hazard on small speed props. It also resulted in a cooler crankcase and higher charging efficiency with a little more power. To this solid basis for high rpm a disc rotary induction system was added, with timing which not only improved breathing but also flexibility and torque. A more rigid crankshaft and cylinder fixing, sturdier mounting lugs, incorporating provision for radial attachment with keyed nuts, an accessible rear intake, and curved exhaust stacks to suit speed cowls were added, and together with heavier conrod and wrist pin and lighter piston, resulted in the BB 3.5. Contest successes and test reports quickly created a demand which far exceeded the supply, and defense contracts caused the original manufacturers to cease production after making only a few thousand units. Now, at long last, the BB has settled down to steady production in the hands of a different manufacturer and supplies and parts are readily available. Construction is based on sound, rather than revolutionary, principles with a pressure diecast crankcase incorporating both ball bearing housings, and exhaust stacks, with heavy webs at all points of stress.

The radial ported cylinder liner screws into the case, and is also threaded at the top to receive an anodized aluminum head which screws down against the upper face of the exhaust stacks to provide a locknut action for the liner. The lightweight cast iron piston is selectively fitted to the hardened and polished bore, and is connected to the dural rod by a 3/16 in. dia. tubular wrist pin. Machined from nickel chrome steel, the 3/8 in. dia. crankshaft is ground all over, and features a keyway for prop driver location. A non-metallic disc rotor is driven by a crankpin extension, and revolves on a hardened pin press fitted in the rear cover which incorporates the centrally upswept air intake. A dural spraybar with two jet holes and extended needle of conventional design is located in a position for efficient fuel feed from a bearer mounted stunt tank. The heavily knurled dural prop driver is designed to exclude dust from the outer ball bearing, and has a 3/8 in. dia. prop locating boss. A dural washer and 1/4 hex. nut complete the assembly.

Performance is consistent and spectacular, with .34 bhp available on small props, and unusual pulling power on larger types. Economical fuel consumption has earned the BB many team racing successes, while its ability to maintain steady power through violent maneuvers makes it a popular stunt motor. Scale fans also like it for the extreme compactness and easily accessible intake.

With a weight of 5 oz. the BB Amco is a good proposition for those who prefer a little extra quality in construction and performance and are prepared to pay more for it.

The plain bearing 3.5, although neither so smooth nor quite as powerful as the BB, was recently put back into production as the result of a rash of free-flight successes, for which it remains popular owing to its high power/weight ratio. Weighing slightly less than 4 oz. it has much to offer where weight and space are at a premium.
International Hobbies, 4920 *Idlewilde Lane, S. E., Albuquerque, N. M.*

(Additional imported engines will be reviewed next month.—*Editor*) END

Radio Control News

(*Continued from* 23)

filament. We must also calculate the size of the resistor as far as wattage is concerned. The formula for watts in this case is $W = I^2 \times R$ or $W = .220^2 \times 20$ or $W = .9680$. Therefore, we must use a minimum of a 1 watt resistor, two watts being preferred. As another example, we might operate a sub-miniature tube filament rated at .625 volts and drawing 20 ma from a 1.5 volt battery. The voltage difference being .875 volts, we have $R = .875 \div .020$ or $R = 43.7$ ohms, in which case a 43 ohm resistor would be used. The wattage would be $W = I^2 \times R$ or $W = .020^2 \times 43$ or $W = .0172$, in which case a 1/2 watt resistor may be used. For this purpose, 10 per cent resistors, or closer, should be used. We hope these explanations of voltage, resistance and current have opened new avenues of thought for you and have helped you get started on some design work.

Bonner Two-Speed Control: The two-speed system shown here has proven completely satisfactory for glow plug engines. Any standard engine can be used without alteration. The builder simply buys an extra needle valve and the other illustrated parts and he's "in business."

A self-neutralizing escapement or motor control unit is used to open and close the high speed air bleed. It may be placed anywhere in the ship above fuel line level because the system handles only a low volume of air and the pressure drop resulting from long lines is negligible. The vent T should be as close as possible to the engine venturi. This is the only part of the system whose placement is critical.

The extra needle valve provides a positive means of adjusting to the desired rpm's for both high and low speeds. It meters in any desired volume of bleed air for high speed rpm's. The engine needle valve is used to make the desired low speed adjustment. Some glow plug engines do not operate well at low speeds and will not permit an extreme change in rpm's from high to low speed running. An extreme rpm change is desirable for "touch and go" flying, hedge hopping, and so forth.

To make the engine you have run well at low speeds, select a plug which will absorb and retain a larger amount of heat. Also select a fuel which has a broad range of ignition temperature. On especially touchy engines, the head and plug can be made to stay hot enough for good slow speed running by removing some cooling fin area with a file,

To adjust (1) close high speed adjustment fully (screw all the way down); (2) move motor control unit to slow speed position (air bleed closed). Then start engine and adjust engine needle valve for desired low speed rpm's; (3) move motor control unit to high speed position and adjust air bleed needle valve for desired high speed rpm's.

On all subsequent operations, always start the engine with the motor control unit in the slow speed position (air bleed closed). This makes for easier starting and also prevents the possibility of fuel leaking into the plane when the tank is left full.

NEW ITEMS

Although we've mentioned this item before, we think it should be a must for all RC fliers. This is the Broadfield Air-Models (3 Cutler Drive, Ashland, Mass.) RC field box. This is a compact carrying case which opens up to provide no-squat, no-stoop servicing of a plane or starting of the engine. Drawers for all spare parts plus a table top area and adjustable supports for holding the fuselage are the main features of this 7 x 12 x 20 in. box. The legs open up to give a good working height without getting housemaid's knee.

The following items will probably be of interest to the advanced builder and designer:

A sub-miniature snap action switch by Unimax Switch Division, The W. L. Maxon Corp., 460 W. 34th St., New York City; Sub-miniature transformers for audio and transistor use by Texas Instruments Inc., 6000 Lemmon Ave., Dallas, Tex.; The McCoy Electronics Co. of Mt. Holly Springs, Pa. have sub-miniature crystals for 5 to 100 mc operation with either pin connectors or wires for soldering into a circuit. The pin contact model, M-21, plugs into a sub-min socket; An excellent item for that pocket transmitter. Small Motors, Inc., of 2076 Elston Avenue, Chicago, have motors measuring 3/4 x 7/8 x 1-3/8 in. with a 3/32 in. shaft which operate on from 1-1/2 to 28 V and feature a low current consumption. Silver-Zinc batteries, famous for long shelf life and a high flat discharge rate, are produced by American Machine Foundry Co., N. Y. Branch Contract Division, 261 Madison Ave., New York City. The aforementioned components are not cheap but are available to the serious minded designer.

And now something for everyone. The white plastic foam material, usually found in 5 & 10¢ stores and department stores, used for making displays and ornaments, is excellent for shock mounting receivers and batteries. Very, very light in weight, it is easily sawed or cut and carved with a sharp knife. When used as a filler in seaplane floats or hulls, it will provide buoyancy even when the hull has been broken. It may be cemented with regular plastic cements.

Gyro Electronics Co., 325 Canal St., New York City, offers a new sub-miniature closed circuit plug and jack. This outfit eliminates the need for a shorted plug, such as used in the conventional phone plug and jack. The jack at 20¢ and the plug at 25¢ should make this a popular item. They also have the Gyro Audiotone Modulator, complete with batteries and ready for operation at $7.95. In kit form it sells for $3.95 and is suitable for operating non-selective audio tone receivers.

Newx Products Co., Box 643, Union, N. J. has what they claim to be the smallest escapement in the world. It features self-neutralization and positive action of the pawl and escapement arm. We haven't received our unit yet but it appears like something to look into.

Electronic Specialties, 58 Walker St., New York City, offers a good solution to the successful soldering of receivers and transmitters. This is a boxed roll of 60/40 rosin core solder selling for only 29¢. This is a high quality absolutely non-corrosive solder for electrical work. We've seen more pieces of radio equipment fouled up through the use of acid core solder or corrosive paste fluxes. See recommended soldering techniques above.

To supply 110 volts AC field operation for soldering irons, etc., we suggest the use of ATR Inverters or an ATR Shav-Pak. Made by American Television and Radio Co., St. Paul, Minn., the units operate from a 6 or 12 V car battery and produce 60 cycle-110 volt power from 15 watts up, depending on the size of the unit. These units which may also be obtained in department stores, radio supply houses and auto supply stores can be used to furnish power to low power transmitter (Shav-Pak). One main feature of such a unit is to supply power to various pieces of test equipment out on the field. The addition of a rectifier and filter will provide high voltage DC.

Control Research, Box 9, Hampton, Va. has a unique kit for $3.95 which will convert any 0-3 or 0-5 ma DC meter into either a field strength meter or a basic multimeter or a combo FSM/multimeter. Price, complete, is $3.95 and this should enable you to make better use of your meters, which every builder has on hand.

Ace Radio Control, Higginsville, Mo. has a new catalogue out and if there isn't a component or hard-to-get part you're looking for that isn't in it, chances are you will have a mighty hard time finding it. Not only parts and various tubes and relays are listed, but also there are photographs of each kit so you'll see, before you buy, just what you're getting.

In response to considerable demand for filters which, of course, offer the ultimate in multi-channel reliability, Babcock Radio Engineering, Inc. now has available the three-filter block used in the BCR-4 receiver and transmitter at a price of $27 each. The buyer must specify whether the filter block is to be used for transmitter or receiver operation. Write P. O. Box 3097, Van Nuys, Calif.

CLUB NEWS

In the September issue we gave a report on the RC world endurance attempt by Geoffrey D. Pike of Nottingham, England. Unfortunately, we had several incorrect statements. First of all, Mr. Pike did break the Russian-held record by 2 per cent with an FAI-ratified flight of 1 hour, 40 minutes and 35 seconds. Congratulations are in order. The record-breaking plane weighed 3 lb. 6 oz., gross. Secondly, the fuel system did not use a pressure tank and regulator as reported. The 8 oz. capacity celluloid tank used weighed only 3/8 oz. and employed a float chamber fuel feed system. The float (see picture) measured 5/8 x 5/8 in. and was made from .001 in. copper foil. Getting a neat and lightweight soldering job was quite an accomplishment, especially when the finished weight was held to 8 grains. For more information on this unique fuel system, write to Geoffrey D. Pike, 10-1/2 Watcombe Circus, Sherwood, Nottingham, England, good old Robin Hood country. Our apologies for the iniitial inaccuracies.

It seems as though we're always behind the 8-ball on this RC endurance business. As the preceding record of Mr. Pike was written up, we had word that H. L. O'Heffernan, on October 7, 1954, made a most amazing flight —2 hours, 31 minutes and 17 seconds—with the plane being landed only a few yards away from the transmitter. We understand the power was a Mills .08 Diesel. Hope to have details on this English record flight later.

We did some flying with East Park, N. Y. model club around the first of November and some of the results backed up our chat of batteries vs. cold weather in the January issue. Several ships were out of control through low battery capacity on the filament and actuator supply. However, this group of fliers, all brand new to RC flying, are turning in some really terrific flights. Live Wire Trainers and Beams, mostly Diesel-powered by McCoy .09's, with a toss up between Bonner escapements and deBolt servos, and all using two-tube receivers, are proving that there need be no hesitation in newly undertaking radio flying.

John Worth of Control Research reports that the club plane idea, which we mentioned before, is catching on, but good. A Bootstraps is used and all members chip in to keep it in repair and furnish the necessary supplies required. When a member is without a ship during a flying session, he has the use of this one. Also, the dual control set-up, given in an earlier issue, provides instruction flying for the newcomer. Any more clubs doing this?

And now for a little chat on endurance flying. In a late issue of The Flypaper (this paper was mentioned an issue or two ago), Nate Rambo who conducts the RC News gives his ideas on breaking the endurance record. Here they are: a five to six-footer with a tricycle gear, Lorenz receiver and an S. N. escapement or deBolt servo. In view of the new record of 2-1/2 hours, our own

plans would include a 6-8 ft. ship, built on the order of a payload job, powered by a Diesel, our choice in this case the Mills .08. The one we have really puts out and it seems as though the thing runs even on fuel fumes. A three or four wheel gear would be almost a certainty, and the deBolt servo is top choice since it draws no current except to get into a control position. The whole thing as we see it boils down to a plane which will have a very low drain receiver and actuator, to eliminate carrying extra battery weight, and one which will take off with a fuel load of about 20 oz. Take-offs will require a hard surfaced runway about 300-400 ft. long and, while it will have to be checked upon, a slightly declined ramp may help to build up initial take-off speed. It is possible that elevator or dethermalizing equipment may have to be used to compensate for loss of weight toward the end of the flight. This would depend on the weather and where the flight was held. Yardley Silvercells have been used in England for this type of flight although we don't believe them to be absolutely necessary. The transmitter would be operated from a car battery supply or by means of extra capacity batteries. It would also be preferable that a cathode type tube be used in the transmitter. Something similar, or even identical to, Miles' job. Oh yes, don't neglect to select the proper fuel feed system, a la Walker or Pike, perhaps. Let's hear from interested fliers on this subject. Better shoot for a three hour mark and remember that a 2 per cent increase in time is required to break the existing record. Write to the AMA for technical details for this international event.

Dale Root of Root's Hobby Hut, 6036 Telegraph Ave., Oakland, Calif. reports that the Bonner compounds are most popular out that way. Our two-tube transmitter seems to be holding up fairly well for them, too. Dale mentions that all transmitters should be registered at once. The purpose of this is to acquaint the FCC with the fact that there is a possible need for another band. If you've ever been on the field with more than three or four fliers around, you know how hard it is to get into the air with so many using 27 mc. Be sure to get an FCC blank from your dealer when you buy a ready-built transmitter or parts to build one yourself.

A high point of one meeting last October concerned the problem of single and multi-channel control. It was decided to make the break, not on how many surfaces were controlled, but at the relay itself. We have been very much in accord with this division for quite some time. This will leave a wide open path for some inventive genius to come up with a rudder, elevator and engine control all from a single-channel radio receiver. England is going toward this kind of thinking for contest work and we should, too. Let's hear more comments on the subject.

The Golden Eagles Model Airplane Club, 839 Windermere Ave., Drexel Hill, Pa., have inaugurated RC Special Events into their contests. All transmitters are impounded upon arrival at the field, thus making sure of no interference from anyone on the field. Further contest flying is not permitted until the contestant can fly a straight course for 500 ft., and return. Having completed the straight flying plus three consecutive 90° left turns, the flier is permitted to try for the balloon bursting or target bombing event. Balloon altitudes are at 25, 50 and 75 ft. and they must be broken, not merely cut loose. Bombing is done by dropping three bombs (flour bags or any other easily seen marker) either separately or in salvo on a 50 ft. diameter target. Sounds interesting and we'd like to hear of other unusual events of this kind. END

My 52 Years of Modeling

(*Continued from page* 11)

first World War came on, we were more or less forced into the building of military biplanes and, all told, we built three types of biplanes.

In 1912 we formed the Heinrich Aeroplane Co. of Baldwin. While we were building our first plane, I still went right on building and experimenting with models of all kinds. Also, we made experimental kites for study of wind currents, etc., which we flew on a kite string a mile or more in length, as we wanted to learn as much as possible what the winds were doing as high as we could get our kites to go. To go back to the spring of 1910, our plane was ready for its first trial. It was powered with a 4 cyl, 2 cycle marine motor of about 35 to 40 hp. This motor was not very reliable and caused a bad crack-up of our first and also our second planes, in both cases wrecking the propellers. Inasmuch as these propellers cost from $80 to $100 each, I decided to make our own and so made the Heinrich propellers, which were quite different from anything on the market, but flew our first planes very well. In the design of these propellers, the knowledge which I had gained in designing and making model propellers was put into practice in the full scale propellers and it worked out all right. In an attempt to have equal slippage throughout the entire blade length and to have each part of the blade do the utmost amount of work, the blades were of uniform width and pitch right up to the hub; this made a rather odd, board-like looking propeller. Not only did we have to teach ourselves to fly, but we had to teach this plane as well.

Most of the early models I built were made in the interest of full size plane development and a great deal of time was spent in the study of stability, lift, etc. Different curves were tried out as well as wing shapes and arrangements of wings in relation to the rest of the machine. Models were made to rise off the ground under their own power as well as from the water, and a lot of study and work expended in trying different types of pontoons as well as boat hulls. Model plane water flying is a very fascinating sport. Down through the years I have built a large number of model planes, both experimental and contest types, but only three or four of a design other than my own. The design and construction of my twin pushers is both unique and original and never have been tried before as far as I know, in this country or abroad.

These models, I claim, are the lightest, yet the strongest, for their size of any twin pushers ever built. I really believe that I brought the twin pushers a long way ahead, at least in regard to light construction and stability, up to the time when restrictions of all sorts were put on them and they gradually gave place to models of the flying scale types (Wakefield and other).

In the second Mulvihill contest, flown in 1925 at Mitchell Field, Long Island, I flew a twin pusher with a main wing spread of 40 in. It had a 45 in. main frame built up of a balsa core and white pine top and bottom cap strips. This plane was a bit heavy but it flew well and I came in in eighth place. After this contest, I decided to make my planes much lighter and so came up with the idea of a built-up girder (A) frame, of unusual design and unheard of lightness. I thought the frame could be made strong enough to stand the pull and twist of the fully wound motor, but was told by one of our engineers that it could not be done, as it would be too weak. However, it proved to be as I thought and this type of frame worked out okay. I built two of these planes for the 1926 Mulvihill contest held in Philadelphia,

both of 36 in. main frames: one, the Sparrow Hawk, had a flight weight of only 1-1/2 oz. with a motor of four strands of 1/8 in. flat rubber, which could be wound up to 2,000 turns; the other one, the Blue Heron, was 1-3/4 oz. These two planes were the same in every respect, but the Blue Heron had bigger wings and greater surface and required more power to fly it. This latter plane was badly wrecked in the contest when caught in a gust of wind, but I repaired it and it is still flying at this date. After the crack-up of the Blue Heron, I flew the Sparrow Hawk in the contest and placed in fifth position. This contest was run in conjunction with the Sesquicentennial Exposition of Philadelphia.

The wings are more or less conventional but are of the very lightest weight for their size. The main frame, however, is much different from any other twin pusher insofar as light weight and strength are concerned. Instead of a single piece of wood to form each side of the (A) frame which, to be strong enough to take the pull and twist of the fully wound motor without bending, must of necessity be somewhat heavy, the Heinrich main frames are built up of a light top and bottom cap strip spaced apart by balsa braces, from each end of the top and bottom piece where the two pieces are brought together to 1/2 in. apart in the center. The sides are then covered with Japanese tissue paper drawn tight by applying three or four coats of light dope. The frame is then cross-braced by double sets of light braces which are also spaced apart by balsa upright braces. Then, to add sidewise rigidity starting at the first pair of braces, silk threads run from the center of the main frame upright to the opposite similar main frame upright in the next pair of cross braces, and then to the propeller hangers at the rear. These threads are drawn tight and doped with a heavier dope and tied where they cross to form the X in the center of the frame. Under a full wind there is no bend of the frame up or down as the sides of the frame so made form a built-up box girder which will not bend under the normal wind and flight conditions which, of course, would change the angle of incidence of both wings if it took place. There is, however, an alarming bending of the frame sidewise, which does no harm in flight or otherwise. All light twin pushers had to have "cans" to keep the frame from bending up and down. In this type of construction, none are used. However, if a cross thread broke in flight, or the paper on the sides split, the whole structure would collapse on the instant.

A great deal of thought has been given to the inherent stability of these planes for, as every model flier knows, the more stable a model is, the better it will fly. I have always used plenty of dihedral angle and vertical surfaces, such as fins and rudders, both fore and aft, in the case of a twin pusher. I am also a great believer in back swept wings and have used them for a good many years and find that these models fly with much more steadiness and reliability than most. The greater the amount of stability, the longer the plane will stay in the air, and the less the power required to keep it there. I fly all my models on about the absolute minimum of rubber and so can get a greater number of turns in the same length of motor as the diameter of the mass of rubber becomes less. When the weather is not so favorable, I have to add a bit more rubber, which provides more power, but, of course, cuts down on the number of turns. While I do build and fly motor driven models, I prefer to fly rubber powered planes. There is a certain, altogether different, sort of satisfaction in being able to have a rubber driven model fly well. I believe a person must study rubber driven model flying and model be-

havior much more closely to get the best results from a rubber powered model than is required to obtain the same performance in a motor powered one.

In the first place, in a motor powered plane, you start off with a certain power output which, on the whole, remains constant throughout the flight, while in the rubber powered one, at the start of a flight, there is a more or less great power output and torque which tend to climb the model into a stall, which must be taken care of by proper adjustment before the flight starts. This is followed a few seconds later by a more or less constant power curve and a diminishing of torque and here again the model must be adjusted to take care of this condition which, in turn, is followed by a minimum power output until the motor is all wound out. All through the last part of this motor run, the plane must be adjusted to fly level and still remain in the air, and it also requires some pretty fine adjustment to keep your model in the air and get the most out of a rubber motor. I do not, for one moment, mean to imply that there is nothing to flying a motor powered model, for one runs into great difficulty here, too. In all cases, one must study the habits and fancies of each model to get the best results from it and a great deal of time and patience must be spent in calm weather, gliding and adjusting before you attempt to fly.

To the late Cecil Peoli must be given the credit for the birth of the twin pusher type. He designed and flew the first one in public and created such a sensation with it, that he became known all over for this new and sensational type of model. He was the first one to fly a rubber band powered model on a nearly straight line distance of 1,000 ft. This was back around 1907 or 1908, I believe. His model flew low, fast, and most flights were straightaway. He and Percy Pierce, another of the real early model sensations, really put model aviation on the map to stay. I saw both boys many times at the old Mineola flying field, flying their models before large crowds of people who came from far and near on Sundays to see the old time man-carrying planes and fliers on the Aeronautical Society's flying field just outside the Mineola Fair Grounds.

In the early days of model plane contests, distance was the determining factor. The model which flew the greatest distance from starting point to place of landing was the winner, and all sorts of measuring devices were used to measure the flights, ranging from a tape measure to a bicycle wheel on the end of a stick pushed along before a person who acted as the official measurer. This wheel carried a cyclometer and with this the distance could be measured quite accurately and was the best recording device of any used. But, of course, no record could be taken of the distance made in flying in circles, so each contestant endeavored to have his model fly in a straight line as nearly as possible. This method of determining the winner of a contest was soon outgrown and the boys went in for total time in the air, as is done today.

Also along about 1908, or perhaps earlier, as nearly as I can remember, a group of boys interested in model plane building and flying frequented a room in the New York World newspaper building on Park Row, New York City. This was right at the Manhattan entrance to the Brooklyn Bridge. The World sponsored these activities, but as far as I know, this was not an organized club and The World had two nice elderly men open a sort of model airplane supply room. These men (Mr. Uncels and Mr. Durant) obtained and had for sale to the boys at a very nominal price what model plane supplies and materials (such as they were in those early days) they could get together. In this room all the model plane boys met and talked their problems over with Uncels, Durant, and each other. Uncels was not as well off physically as Durant, who was very active and pretty much in evidence at almost all of the model plane meets. It was here that we saw balsa wood for the first time and Uncels and Durant tried to get us interested in its use in the construction of model planes, but it was quite a little time before someone tried it, as we all thought it was too weak, although we were all intrigued by it. I think the first one to use it made a set of propellers for a twin pusher. They were thick and more or less clumsy looking, but still they were lighter than most of the pine and other heavy woods used at this time. Later, a fellow here and there used a piece of balsa now and then in the construction of his model and soon we began to find its real value and model planes changed very much for the better. We used a great deal of split bamboo for ribs, wing tips, rudders, landing gears, etc. Our lightest woods were spruce and pine. We bent our reed and bamboo in hot water and over a flame, also on a firm jig, using both hot water and a flame.

Also, away back there, another great boon to model plane construction came upon the market in the form of a good, quick drying, waterproof cement called Ambroid, and I still use it to this day. This cement was one of the biggest single boosts ever given the model plane builder, not, of course, forgetting balsa wood. Before Ambroid came out, we used to dissolve celluloid in banana oil and acetone. This made a cement similar to Ambroid, but not as good. I sometimes think this gave the Ambroid people the idea.

Later on, about 1910 or so, most of these boys, along with some others, formed a club known as the New York Model Aeroplane Club and held regular meetings in a clothing shop of the parents of one of the boys in New York. Among these, I believe, were such greats as Percy Pierce, Cecil Peoli, George A. Page, Vincent Burnelli, Frank Shoba, Harry Herzog, John Carisi, Andy Surrini and a number of others, all of whom I do not recall at this moment. Also, Armour Selley, who, I believe, was the first one to try out and advocate the use of large, slower turning, high pitch propellers. Most of us turned our props pretty fast and, of course, not quite as long, but we got a good climb in a shorter length of time.

The New York Model Club seems to have been the second club organized. The Chicago Club came first. In mentioning the names of these boys, I know there are a lot more who should be included and I hope I have not committed an injustice to anyone by leaving him out.

Some of these boys were very fine model builders and came up with some very nice, neat models. At the close of one contest, about 1914, Harry Herzog gave me his entry, which I prized very much. It was a beautiful twin pusher, covered with gold beaters' skin, a favorite covering used by the best model builders. This was a transparent thin skin taken from the large intestines of a cow or bull and made a fine air tight and very light covering, somewhat hard to get on straight and smooth and very much subject to weather changes. Herzog was one of the outstanding model builders and fliers of his day.

I like to talk over models and model flying with anyone who is also a model flier, so if any of you sees a feeble little old man who has a wild and crazy look in his eyes and is prevented from chasing after his planes because of infantile old age and a heart condition, just say "hello" and come right up and talk to him. He will be glad to see you. I am generally accompanied by two or three of my faithful old twin pushers, which range in age from 22 to 28 years.

END

The Heath Parasol

(*Continued from page* 12)

a die-cut kit. Construction is conventional, with a few more parts to make, like struts, windshield, and numerals for authenticity.

The writer first tried making the wings in two panels, with dowels in one panel going through "eyes" in the cabane struts and into tubing in the other panel. This knock-off feature was thought to be the berries until it was assembled and the ship picked up by the wing tips. The play in the dowels mating with the tubes threw all the weight (or lift) on the wing struts. We had wanted the struts to be true knock-off: just rubber bands through the fuselage stretched as the wings flexed and no matter how tight they were, one good pull-out of a spiral would have been the end of the Heath.

The set-up shown here has been through a few rough landings and has proven much more practical than two panels. The one-piece wing sits on a flat cabane top runner, is held on with rubber bands that are hardly noticeable on the ship and the struts still "pop out," if required. Actually all the "load" is carried to the plane through the cabane or center-section struts; the wing struts merely stabilize the fuselage on turns and the load, if it can be called that, is in compression. When a wing is low in a turn, the struts push the fuselage out to match the turn.

Internally, the wing is conventional. Simply slip the ribs on the spars, add leading and trailing edges, join the spars and the leading edge with gussets, add the tips and sheeting and you're almost in business. One word of caution at this point: cover the *bottom* of the wing *first*, add the wing strut attachment fittings which are actually U-control hinge halves, then cover the top of the wing. Getting the cement into the wing to hold these parts in place, after covering, becomes a bit difficult. You'll notice that the antenna is shown cemented on the leading edge of the left-hand panel, cemented and doped in place.

Speaking of covering, we definitely recommend against paper covering because of the ease with which it is punctured, even with six or eight coats of dope. Nylon is a bit heavy for this size airplane but we found silk to be ideal (light, modeling silk, not the heavier, "loaded" silks found in textile stores).

The tail surfaces gave us a good deal of trouble at first. Sheet balsa in any grade less than petrified stock will warp with many coats of colored dope. We found it best to let them warp; then, after the parts were completely doped, we steamed them flat. The steam from a kettle will soften the dope and balsa through heat, rather than moisture, as you'd first suspect, and gives you a chance to bend the surfaces to where you want them. On cooling, they stay put. Stubborn warps may require bending past where you want them until cool, then they'll spring back. Try a bit at a time and see how simple it is.

A good grade of sanding sealer and some 400 wet-or-dry paper will give you a good base for colored dope. No clear dope will be needed on the tail if you use sealer, but the rest of the ship should have two or three coats of clear, then two or three thinned-down coats of colored dope. All dope should be fuelproof!

Now that we've built the wing and tail, let's try the fuselage. How do you get the plywood sides inside the longerons? Simple! Lay the longerons down on the plan, with the 1/16 in. thick plywood sides inside them, all pinned in place and run cement along the mating edges. Two coats are best. The rest is a matter of cutting out bulkheads while the cement is drying and starting assembly at the tail. Join the back ends of the longerons together, insert one bulkhead

at a time with light rubber bands to hold the front together and you can work all the way to the back of the cockpit until you have to wait for the cement to dry. Add the plywood bulkheads up forward and the engine mount plate, if you use a beam-mounted engine, and you can start adding the outside balsa blocks as shown. Cut out the upper cowl pieces and cement them in place until the final sanding is completed; the contour matches that way. The cabane struts of 1/16 in. dia. music wire are added before the stringers and sheet balsa decking. Assemble the struts to the fuselage as individual pieces, then bind and solder where shown. Caution—clean the surface of the wires all over with emery paper or a small file before installing them! You'll want the surfaces clean for soldering, also for adding the pine or hard balsa fairings. Once the cabane is built up, with *three coats* of cement where the five ends join bulkheads, add the turtledeck stringers and decking. The side stringers and bottom ones should be left off until the wiring and controls are added.

The landing gear is best added at this point. The fittings are simply bent out of tin-can stock and bolted with two No. 2-56 nuts and bolts to the bulkhead. Hard balsa filler blocks should now be added behind the fittings on each side as shown, to take the rearward load in landing. The landing gear is self-explanatory on the drawings: just be sure to wrap the landing gear joints well, have the wire clean, use a good flux and plenty of heat in soldering. The forward end sits in the groove shown and two loops of 1/8 in. rubber connect it to the hook shown on the bulkhead. With this gear, most of the shock load of a rough landing is taken by the rubber, the gear tending to fold rearward as it strikes something.

The escapement goes in next. Mount it on the thin plywood panel shown, cement the assembly in place and make up the control rod. The tail can be added and everything on the tail is straight and flat. The stabilizer sits on the upper longerons flat and the fin is cemented in place absolutely straight with the centerline of the fuselage. Don't depend on a mark on the stabilizer. Pin a straight strip of balsa to the fin and line the front edge of the strip up with the center strut up forward while the cement is drying. Directional adjustments are made by "bending the bend" in the aft end of the control rod after the first flight with the rudder straight.

Install the socket for the battery pack plug in the battery compartment floor (plywood), using the ring provided to lock it. Make up the receiver socket panel (plywood) for the cockpit and you are ready for wiring. The diagram as shown on the plans is good for almost any single-tube receiver unless you are using a gas-tube job; then, a potentiometer must be provided to adjust the idle current. Mount this aft of the jack as shown dotted. It is cut into the plate circuit as shown dotted on the wiring diagram.

This may surprise you, but the wiring can all be done on the bench, if the battery compartment floor is left out until you wire and the lower rear fairing block (at the landing gear) is left off. We missed this point and wired in the airplane. It's simpler out where you can see what you're soldering.

Slip the battery floor through the bottom of the ship at an angle, drop it flat to where it belongs and cement in place. The wires lay along one of the bottom stringers and at this point it is best to add the lower rear fairing block and the bottom stringers. The rear winding attachment is made up of tubing and music wire and installed as shown on the plans; the tubes for the wing strut rubbers are cemented in place, then the side stringers are installed.

The little "console" for the receiver socket can now be cemented in place and the wires soldered to the escapement. Add the 1/4 in. sheet balsa between the bottom stringers. Holes can be cut for switch, jack and pot (if used). Install there when the cement is dry. We used a North American twin-tube receiver and an ECE "2A" in our ship for various flights.

We installed the wing struts last on the basis that they couldn't be checked until the rest of the ship was assembled. Make the struts out of .045 music wire as shown on the plan and solder together. Before the fairings are added, set the ship up on the bench with the wing held in place with several heavy rubber bands, just as if you were going to fly it. Slip the top ends into the wing fittings, then put a hook on a small piece of .020 music wire as a "threading needle." Hook small rubber bands on the front and rear struts on one side, then pull each band through the tubes in the fuselage to the other side, where they are hooked to the remaining struts. Check now to see that the struts keep the wing level with the fuselage and tail. If something seems out of alinement, check the stabilizer and fuselage first. The fairings are made from hard balsa or soft white pine from a packing crate. Fairings should be attached to the wires by wrapping completely with covering silk around the wire and wood, coating with cement, then just doping and sanding until smooth.

If you are using a radial mounted engine, cut a piece of soft pine 1/8 in. thick to give 2° right thrust and 3° downthrust. We tested our ship with the engine straight and added the shim later, since the engine bolts are readily accessible from the top with the cowl off. On test flying, the engine can be shimmed out with washers until you find what is best for your model and power plant, or you can start with the above figures. The cowling hold-down hook should be made and a slot cut for it in the top of the cowl. This is the simplest type of cowl latch we've come across. The cowl can be taken off or put on with the engine running. Simply press the cowl down to put it on, push the latch forward to lift it off.

Cover and dope the fuselage after checking to make sure that all reinforcement blocks, etc., are in place and the rubber motor for the escapement has been installed. Better check the escapement operation, too, before covering. If the control rod catches anywhere, it's best to find it out and correct it before covering. Two or three coats each of clear and colored dope and you're ready for the best part—trimming the plane. We'd recommend masking and doping all trim in colored fuelproof dope, rather than decals. Hot fuel wreaks havoc with the best of decals, as our tail numbers were wrecked.

The ship can be flown, as ours was, with just the basic color on it, tested and checked, then the surfaces washed down with a rag just dampened in thinner and the details added. Doing this has an advantage, in that if anything must be adjusted in any way, the base color can be matched easily, but patching trim creates all kinds of problems.

The fancy zig-zag color scheme was obtained from the cover of MODEL AIRPLANE NEWS (Dec. '32) done by Stewart Rouse, but instead of red and brown, we used a cream over-all with red struts and trim, black numbers. Since this is a private sport plane, almost any colors can be used, but keep the license number down to four figures and be sure to use "NC"; that was the score back in the early thirties when these ships were flying.

The Heath flew smoothly and "right out of hand" the first flight, much to the amazement of everyone around, including the launchee and the writer who was on the button. The engine was richened until the 8-6 prop was turning over but not very fast, smoke was coming out in gobs and the ship was just "laid on the air." It flew out fairly flat and in a minute or so, when the engine cut, it was all of 75 ft. in the air, all the altitude it could get on that pooped power. Successive flights used more power until now it can be made to climb rather fast, gaining quite a bit of altitude, so the scale bug writing this can enjoy watching the realistic glide. A few times we were so interested in watching the ship, we forgot to pick a landing spot and darned near creamed it.

END

Contest Calendar

FEBRUARY

20—*Phoenix, Ariz.:* Class AAA Fourth Annual Southwestern Regional Meet for free flight gas, outdoor rubber, towline glider, outdoor hand-launched glider, radio control, controlline speed, stunt, combat, free flight flying scale and controlline flying scale. Quentin T. Webster, C. D., 521 E. Camelback Rd., Phoenix, Ariz.

27—*San Diego, Calif.:* Class AA Second Annual Convair Aeromodelers' Half-A Scale Meet. James G. Saftig, C.D., 1560 Froude St., San Diego 7, Calif.

JUNE

12—*Ft. Wayne, Ind.:* Mad Modelers' Meet. Walter A. Krull, C. D., 414 E. Washington Blvd., Ft. Wayne 2, Ind. Pending.

JULY

3—*Chicago:* Class AA Third Annual Chicago Prop Nutz Flying Meet for free flight gas, outdoor hand-launched glider, towline glider and outdoor rubber. Peter J. Sotich, C. D., 3851 W. 62nd Place, Chicago 29.

10—*Joliet, Ill.:* Exchange Club of Joliet Flying Circus. Glenn F. Stearman, C. D., 604 Abe St., Joliet, Ill. Pending.

SEPTEMBER

5—*Far Hills, N. J.:* Class AA Bedminster-Far Hills Lions Club Annual Controlline Meet. C. M. Vanderwaart, C. D., Box 151, Bedminster, N. J. Pending.

FACTS About Flying Boats

(*Continued from page* 19)

of Vee bottom and would lose efficiency. The float strut should be approximately one chord length from the wing tip on a straight wing, or at the dihedral break on a polyhedral wing.

To conclude this article, we give a proposed radio control model flying boat. Outline drawings are shown (Fig. 9) and specifications follow. This model would be suitable for use as a PAA radio controlled flying boat.

A few comments on the unusual features of this boat. Firstly, the T-tail assembly. Mounting the stabilizer atop the rudder simplifies construction compared with the mid-rudder mounting; it improves rudder efficiency and raises the stab well above the water.

Secondly, the sharpened leading edge as shown promotes early stalling at the wing

root and acts in the same manner as wing wash-out. The wing itself may then be made without twist. This feature was used some years ago on the Erco Ercoupe for the same reason, stability at the stall, and was recently advocated for radio controlled models by Harold deBolt.

This design was based on the following loadings: (A) Wing Loading: 12 oz. per sq. ft.; (B) Beam Loading: 9 oz. per in. of beam; (C) Power Loading: 335 oz. per cu. in. of cylinder displacement.

Estimated gross weight is composed as follows:

Hull and Integral Rudder	12 oz.
Wing, nacelle, motor, prop plus wing floats	19 oz.
Tailplane	3 oz.
Radio equipment	16 oz.
Total	50 oz.

Areas are as follows: Wing: 600 sq. in.; Tailplane: 180 sq. in. (30 per cent of wing); Rudder: 60 sq. in. (10 per cent of wing).

The motor for this design would be of .015 cu. in. displacement, such as the Cub .149, K & B .15 or any good English Diesel of 2.5 cc displacement. Propeller of 9 in. dia. and 6 in. pitch would be used. Wing tip floats are based on 11 cu. in. displacement at 300 per cent reserve buoyancy. The hull provides a radio compartment approximately 8 in. long, 4 in. wide and 4 in. deep beneath the wing. Ample space for batteries lies in the forebody ahead of the windshield and would be available via a hatch in the forebody deck. Shifting of battery weight would correct CG location.

(The weight estimates for an RC model call for light, careful construction.—*Editor*).

END

Flash News

(*Continued from page* 30)

revealed as fatigue failure in the fuselage structure at the corner of a window. Repeated flexing of the area resulted in a small crack which spread into a fuselage failure. This released the pressure in the cabin and the ensuing explosive decompression resulted in the fuselage's breaking in half at high speed and high altitude. It is generally believed the passengers were literally sucked through the break in mid-air and fell to their deaths. This theory was developed after one of the most exhaustive accident investigations in modern times, including 70 test flights of a *Comet*, the breaking up of nearly 100 dynamic test models and the performance of 5,500 simulated flights by a specially-designed test section of the plane.

The Sikorsky XH-39, gas turbine-powered helicopter, has established a new world's helicopter altitude record of 24,500 ft. This surpasses the former mark of 22,110 ft. held by a Piasecki H-21 *Work Horse*. The XH-39 established a helicopter speed record of 156 mph last August, beating the former mark of 146.763 also held by the H-21. The Sikorsky machine was handled in both tests by Warrant Officer William Western.

Glenn L. Martin Co. has designed a high-speed passenger version of the B-57B medium bomber for use by high-ranking officers in combat. The "combat transport" would permit the transfer of as many as 12 officers in a combat zone at as high speed and altitude as required.

McDonnell Aircraft Corp. has received a Navy contract for $38,700,000 for design and development of a new carrier attack plane. The aircraft will be an entirely new design and bears no resemblance to current McDonnell types, according to company officials. The new attack plane will have all-weather operating characteristics.

A famous name in light aircraft may soon

return with announcement that Monocoupe Aircraft of Florida, Inc. is readying a new four-place twin-engine executive aircraft. Powered by two 150 hp Lycoming engines, the all-metal design features tip-tank location of fuel and is designed to sell for $25,000.

The basic Douglas postwar transport (DC-6/7), instead of gradually growing old, seems destined for even greater fame in the new DC-7C version. Douglas reveals that it has already received orders for 25 of the new transports at an average price of $2,250,000 each. Pan American has bought 15, Scandinavian Airlines System has signed for eight and Swissair will buy at least two. With a 10 ft. wing span increase to house additional fuel, the DC-7C will have an operaing range of more than 4,000 miles while carrying 62 passengers at a cruising speed of 320 mph. First flight of the Seven Seas is scheduled for December, 1955 and first deliveries are due early in 1956.

Foreign Notes

(*Continued from page* 33)

interchangeable carburetor choke-inserts and a useful addition is the hard rubber plugs provided to fit into the intake and exhaust when the motor is not in use.

World C/L Championships in Holland

The United States scored an important win at the 1954 World Controlling Championships, held at the Hague, Holland, when Bob Lutker emerged as champion following his win in Class II speed and second place in stunt. Great Britain achieved the highest team placing among the nine countries represented and the best individual performance was declared in favor of Peter Smith, British team member, who placed in three events. There were four events: Classes I and II speed, stunt and team racing. All events, with the exception of the stunt, were conducted under cover at the big Houtrust Hall.

Three attempts were allowed in speed events. In Class II (5 cc displacement or .30 cu. in.) Lutker achieved 218, 222 and 222 km/hr. His closest rival was Swede Olle Ericsson who turned in 214 and 206 and then, using one of Lutker's props (sporting gesture on the latter's part), equalled the winner's time of 222 km/hr. (137.94 mph) on his last flight. Bob Lutker remained leader on account of his better average. Both men used Dooling .29's. In Class I (2.5 cc or .15 cu. in.), Peter Wright of Great Britain was a clear winner with his well used glow-plugged ED 2.46 model and achieved 180 km/hr. (111.84 mph). He was followed by Yugoslav expert Emil Fresl (K & B Torp. 15) with 168 km/hr. (104.39 mph).

In the stunt event, Bob Lutker, flying a flapped Fox .35 job, was a mere three points behind Belgium's Henri Stouffs. Stouffs used a short moment arm model with a very thick section, low aspect ratio, parallel chord wing and powered by an upright ED 2.46 motor. Peter Smith (G.B.) was third, followed by Vallez (Belgium), Laniot (France) and Wetzel (Germany). The team race, to FAI rules over 10 km, once again proved the pre-eminence to the .15 cu. in. Oliver Tiger in this field. The final was won by Smith (G.B.) in 6:07.3, followed by Janssens (Belgium) and Edmonds (G.B.). Both British boys used Oliver Tigers and the Belgian used an ED 2.46.

Final team placings in the Championships were: 1. Great Britain, 2. Belgium, 3. France, 4. Holland, 5. U.S.A., 6. Germany.

As usual, American speed equipment caused Europeans to gather round and the latest problem is how to find a fuel to equal the This-Is-It mix. Pete Wright, leading 2.5 cc class speed exponent in Europe, tells us that he is already building and planning for next year's World Championship meeting. Four identical models are being built, powered by motors from four different countries: British ED 2.46 (glow conversion), American K & B .15, German Webra Mach I (probably converted to glow) and Italian Super-Tigre G.20S.

New Australian FAI Class Motor

Replacing earlier Sabre Diesel, a new .15 cu. in. Sabre motor is just out in Australia. Coming in the widely adopted FAI free flight class displacement, this should be popular. Motor is clean and weighs 4 oz.

Big Strides by German Engine Manufacturer

In less than four years, the German model engine firm of Bragenitz and Co., which trades under the name of Fein and Modell Technik and produces the well known Webra engines, have become one of the largest model engine manufacturers in Europe. Now equipped with Steinhauser automatic lathes which turn out five times as many parts per shift as their old equipment, their production is now around 500 engines per week but they still have a two month backlog of orders. Acceptance of Webra engines among contest enthusiasts is well illustrated by the fact that, in the FAI .15 cu. in. class event at the German Nationals, 37 out of 45 contestants used Webras, including the winner.

Jetex International Results

Every year, Wilmot-Mansour, Jetex manufacturers, sponsor, in England, an international free flight contest for Jetex-powered models. Winner holds the handsome I.C.I. Trophy and there are about $150 in prizes. Although this year's contest was again won by an Englishman (noted Wakefield flier J. O'Donnell), six of the first eleven places were taken by overseas entrants, including five from Sweden and one from Canada. America and Germany were also represented. Top man O'Donnell used a Jetex 350 motor. M. Torle of Sweden (second) used a Jetmaster 150. The 150 was most popular choice (13 out of 31 entries) followed by the Scorpion 600. Winner's time was 315 secs total for two flights, giving an average power-run to total-flight-time ratio of better than 7 to 1. END

MAN at Work

(*Continued from page* 6)

simply slide the top and bottom fuselage pieces into the rib slots and the whole assembly hangs together. The hinge is stab length, already fastened to two strips of wood; these cement into slots on the back of the stab and front of the flipper and you are in business almost as fast as this was said. Lead-outs are complete: all you do is attach your lines. Not sparing the horses, Jim has a good bellcrank in the kit. For a while, thought this would be the first kit our guinea pigs would put together without an error. But even Jim can't foresee everything; turn a 9 upside down and what do you have? Six, of course. Natch, No. 6 rib is longer than No. 9. You did a wonderful job, Jim, even if someone swiped a Veco .29 from our radio job!

• • •

Then there is Carl Goldberg, the old indoor whiz, the inventor of the Zipper and pioneer of the pylon, and too many other nice things to mention. Carl's been quietly trying things in prefabrication, the Lil Rascal, for example. One of the kids put together Top Flite's new Sabre in 85 minutes. Bill Dean made a bet with the boys at Jasco that he could assemble one in an hour—and lost by five minutes. So the difference between expert and kid is 25 minutes and you can't tell the difference. The fuselages of these jet kits are made up of two half-shells, all formed, notched, etc. Absolutely dumbfounded to find that every notch and seam lines up perfectly. How do you die-cut a shell? Is it done flat, then formed? Frankly, we're awed.

These kits fly well, too, and have realistic plastic molded parts.

• • •

▸ Speaking of kits, did you see the Ford Trimotor by Scalemaster? Well, fasten your safety belt. There's more wood—and good wood, too—in this box than you find in many modern hobby shops. Turned cowl rings. Corrugated aluminum sheets for final covering. Veco airwheels. A bag of labeled plywood pieces that would keep the kindergarten class busy for a rainy day. You've heard of a bag of bolts? Well, there's one here. Two big plan sheets. Looks like the guys know about holding a U-control scale job together, judging by design details. For the builder who likes a project, the scale nut, this is the jack pot. We would suggest, though, that large engine be used. A detailed ship this size has got to weigh something and you don't want it wobbling on the end of the lines, especially on a windy day. The sheet parts are not die cut, but we mention this purposely because MAN at Work (and how about you?) would much prefer to do his own cutting from cleanly printed sheets on a job of this type. Manufacturers can die-cut thick profiles for us and those tough plywood hunks, but sometimes we like to work.

Couple of Kendi Badgers, courtesy Hi Johnson. This is a 6 ft. free flighter, nicely prefabbed. You know what it looks like. Interesting to us is the large amount of built-in left thrust. From hashing things over with Hi for the past several years, know he has strong conviction that left thrust is safest, best way to handle a free flight. He warns you, though, not to try it on a ship that has not been designed for such an adjustment. Left thrust was used by Lud Kading in those amazingly small Half-A jobs (one, The Funster, MAN, June '52) which had such a wonderful performance; also by Joe Wagner in the Veco Dakota. Left thrust has possibilities. Walt Schroder convinced us years ago with the Jersey Javelin that the left power turn, right glide, with S at top during conversion, was the best way to stick around on a windy day.

• • •

▸ Two months age wondered out loud if the dealer was forgetting the real model builder. Maybe nobody cares. Two guys thought the trade was missing the mark; one dealer thought we were. Perhaps the silence is explained by the fact that practically everyone is still beseeching MAN not to include cameras, cars and what-have-you in its contents. Be that as it may, had two nice experiences that indicate some dealers are concerned. Not having seen the column about the dealers, a clerk at America's Hobby Center held up a bottle of rubber lube (of all things) and said that the firm was making a real effort to stock things of interest to the real modeler. And, at Paul Plecan's hobby shop in Levittown, L.I.—almost exactly on the spot (buried now by 10,000 houses) where we used to fly free flight before the war—asked for a certain size trailing edge. Not in stock, so Paul disappears into the backroom (sound of saw) and comes back with the timber in question. Maybe there is hope after all? First plan we ever bought for a magazine was from Paul, almost 20 years ago. You know of any cooperative dealers to mention?

• • •

▸ Forster reviving the old .99. No, it's not a loco, Junior, but a two-speed spark ignition engine. Already famous, regardless of this new lease on life, it was demanded by radio boys and other specialists. Remember when the .99 first appeared, during the 1940 Chicago Nats, if we remember correctly. Tug o' wars at night with Super Cyke jobs—then the hottest big engine in sight. Big old prop chomping away, the Forster .99 dragged the loudly protesting Cykes all over the lot. Here's real torque, reliability and brute power, if that's what you need . . . Free flight model airplane site opened at Sepulveda Control Basin, Van Nuys District, Los Angeles, advises C. Reisman, L. A. Model Hobby Assn. Power and rubber free flight fans, RC'ers encouraged. Eighty acres within 2,000 acres unpopulated area. What's the bus fare? . . . New International Aero Model Competition starting by FAI in 1955. Any modeler, anywhere, able to compete without traveling long distances. Winners chosen by eliminations in their own localities or regions, certified by their National Aero Club. That's all they told us . . . Mirror Meet, 1955, will be held on Armed Forces Day, Floyd Bennett Field, Brooklyn, N. Y.

• • •

▸ On page 11, Nov. '54, a Nationals picture showed Ray Harlan receiving the Paul K. Guillow Trophy. Ray reminds us that he stood in for Al Abrams, Bristol, Pa., who really won the Trophy. The Guillow Memorial Trophy is given for outstanding service to modeling and there's no shortage of people who consider Al a perfect choice.

• • •

▸ Nice letter recently from old friend Duke Fox. He mentioned that in his December MAN ad he goofed in listing his engine as winning Combat in the Nats. Seems that in the natural hurry, hurry of trying to get first place winners in time to meet an ad deadline, his scout erroneously gave him the names of Frank Adams and Miss S. A. Austin "with a Fox." Actually, Duke goes on to relate, his pal Johnny Brodbeck's K & B Torp .35 was used in the winning jobs and he is quite sorry for any confusion that his error may have caused.

ADVT. INDEX, FEBRUARY, 1955

Berkeley's

"1/2 A" FLYING SCALE...

"FAIRCHILD" FIRST IN OPEN AT '53 AND '54 NAT'S.
"AERONCA" FIRST IN SR. '54 NAT'S.

These full One-Inch Scale models have been designed for free-flight flying, and have proven themselves on the contest field. .035 to .049 engines, CO_2 or rubber power is suitable. For controline conversion, .049 to .099 engines are advised. Die-cut balsa parts.

$2.95

$2.95

CESSNA "180"

Cessna's newest light plane, reproduced authentically and in detail. Perfect proportions for free-flight. Full Size Detailed Plans show rubber and controline adaptations. Pre-fabricated construction, Decals, etc.

For .035 to .049 Engines—35" Wingspan
1" Scale—Free-Flight, Rubber or Controline
.049 to .099 Engines for Controline use

"SUPER CADET"

This is the current version of the "Interstate Cadet," many time National's winner. Authentically detailed and structurally re-designed for "½ A" free-flight. Full Size Plans show rubber, controline adaptations, etc.

Free-Flight Gas — Controline — Rubber

Cessna L-19
"BIRD DOG"

.035 to .049 Engines for Free-Flight
.049 to .099 Engines for Controline

In active duty in Korea, this new liaison plane is perfect in proportions for model work. Plans show it as a free-flight "½ A" gas, with details for rubber and controline conversion. Fuelproof decals, die-cut balsa, plywood and celluloid; shaped and notched wing edges; formed gear, etc.

$2.95

$1.95

STINSON SENTINEL "L-5"
33½" Wingspan

This model is a consistant winner at National Meets. It is a commercial version of the Army's "Flying Jeep."

$1.95

STINSON VOYAGER "150"
34" Wingspan

Equipped with wing slots, this authentically detailed model flys with the best. Designs in this series have been chosen for performance.

$1.95

FAIRCHILD 24 "RANCHER"
36½" Wingspan

Largest in the series is the never to be forgotten Fairchild. Stable, strong, detailed, it is ideal for contest experimentation.

$1.95

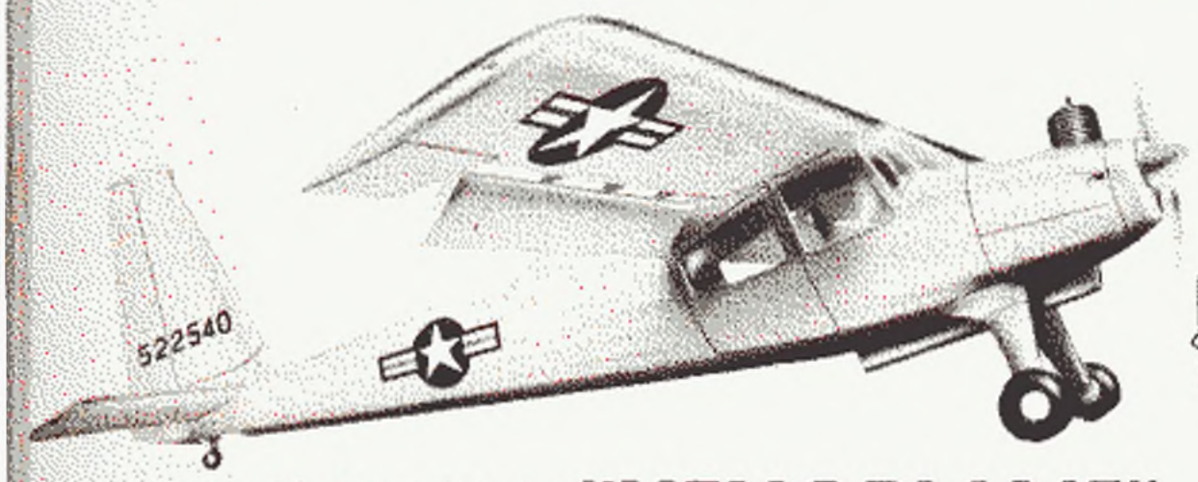
AERONCA SEDAN
34" Wingspan

Featured as a landplane, plans show pontoon details for those desiring the added thrill of water take-offs. Finished model is really spectacular.

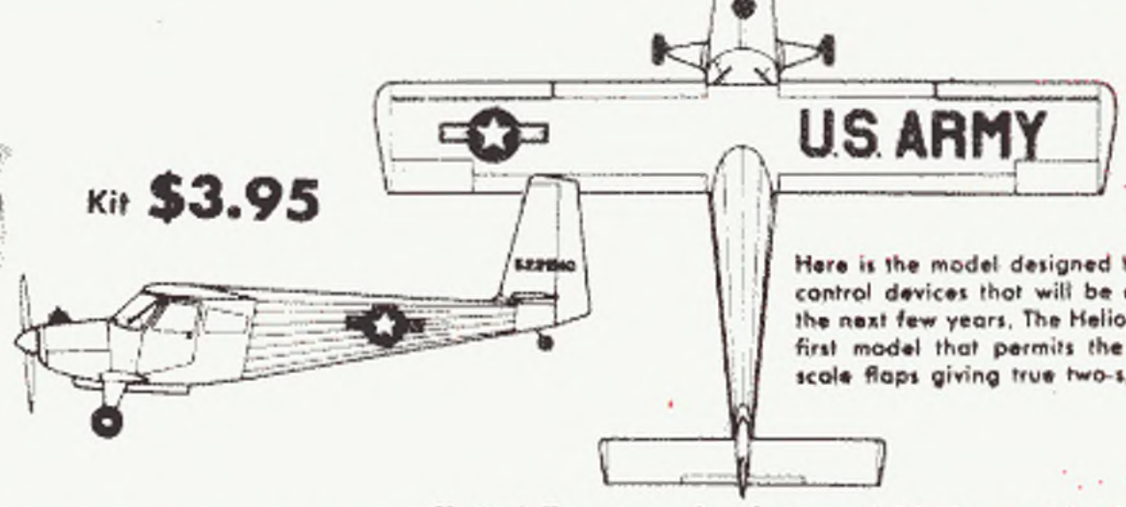
$1.95

CULVER "V"
29" Wingspan

This low-wing sport plane turns in long stable flights. The tricycle landing gear adds realism to landings.



Kit **$3.95**



Army Liaison YL-24 "HELIOPLANE"

Variable Camber Wing for Two-Speed Radio Control Flying!

38¾" Wingspan—1" Scale
For .049 to .14 Engines

Here is the model designed to use radio control devices that will be available in the next few years. The Helioplane is the first model that permits the use of the scale flaps giving true two-speed flight.

Slotted flaps may be depressed 10 degrees for Free-Flight, depressed 25 degrees for slow speed radio control flying; or raised 5 degrees for high speed flight.

buy BERKELEY at your local dealer!

If no local dealer is convenient mail order will be filled by Berkeley Model Supplies, Dept MA, West Hempstead, N. Y. Please include 25¢ packing & postage.

Berkeley's FLYING SCALE Controliners*

AUTHENTIC REPLICAS OF THE WORLD'S MOST FAMOUS AIRCRAFT—

Masterfully Detailed—Highly Pre-Fabricated—Easy-to-Build!

1 Republic **"P-47 THUNDERBOLT"** **$4.95**
For .29 to .65 Engines — 41" Wingspan
Automatic Wing Flaps; Engine Throttle Control

2 North American **"T-28"** **$5.95**
For .23 to .36 Engines — 30" Wingspan
Metal Cowl; Tricycle Gear; Step Keel Alignment

3 North American **"P-51 MUSTANG"** **$5.95**
For .19 to .36 Engines — 37" Wingspan
Retractable Gear; Flaps; Rudder, Elevator Control

4 Grumman **"F-8-F BEARCAT"** **$4.95**
For .29 to .65 Engines — 35" Wingspan

5 Grumman **"GUARDIAN"** Semi-Scale **$5.95**
For .19 to .36 Engines — 53" Wingspan
Metal Cowl; Designed for Stunt and Navy Carrier

6 **"P-40 WARHAWK"** Semi-Scale **$4.95**
For .19 to .35 Engines — 45" Wingspan
Metal Cowl; Stunt Flaps; Flying Tiger Decals

7 Cessna **"195"** **$5.95**
For .19 to .49 Engines — 36" Wingspan
Metal Cowl; Step-Keel Fuselage Construction

8 Curtiss **HAWK "P-6E"** **$4.95**
For .09 to .15 Engines — 24" Wingspan
Metal Cowl; Metal Wheel Pants; Colorful Decals

9 **"SHOESTRING"** **$5.95**
For .14 to .36 Engines — 28" Wingspan
Metal Cowls; Spinner, Wheel Pants; Landing Gear

10 Beech **"T-34A MENTOR"** **$4.95**
For .14 to .29 Engines — 33" Wingspan

11 North American **"AT-6 TEXAN"** **$4.95**
For .19 to .33 Engines — 31" Wingspan
Metal Cowl; Embossed Canopy; Army and Navy Decals

12 North American **"AJ-1 SAVAGE"** **$6.95**
Two .045 to .099 Engines & Jetex — 27" Span
Metal Cowls; Five Wheels, Carved Bodies, Nacelles

13 **"PITT'S SPECIAL"** **$4.95**
For .19 to .33 Engines — 25" Wingspan
Metal Cowl; Metal Wheel Pants, Decal Flare Design

14 **"MINNOW"** Cosmic Wind **$5.95**
For .09 to .36 Engines — 28" Wingspan
Metal Cowls; Spinner, Wheel Pants; Step Keel

Each Kit is Pre-Fabricated and Contains:

- Full Size Detailed Plans
- Die-Cut Balsa and Plywood
- Jim Walker "U-Control"
- Rubber Wheels, Hardware
- Metal Parts as Listed
- Authentic Decals
- Covering Material
- Formed Canopies, or Celluloid as required

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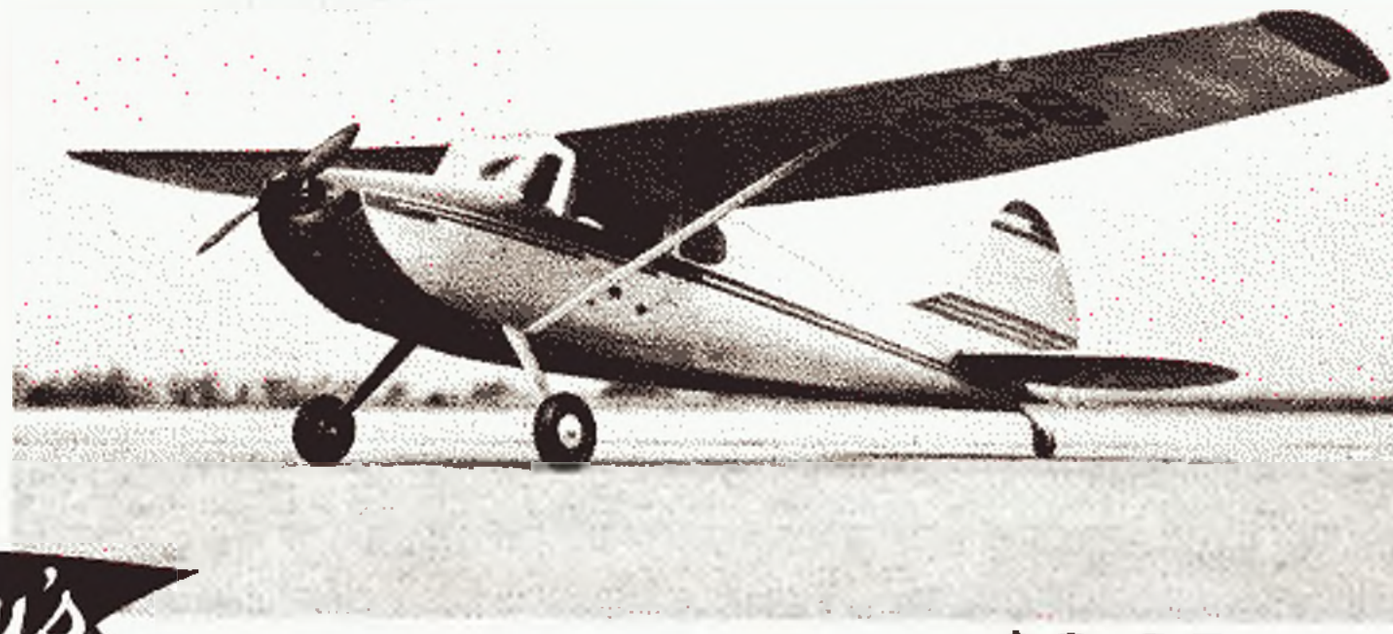
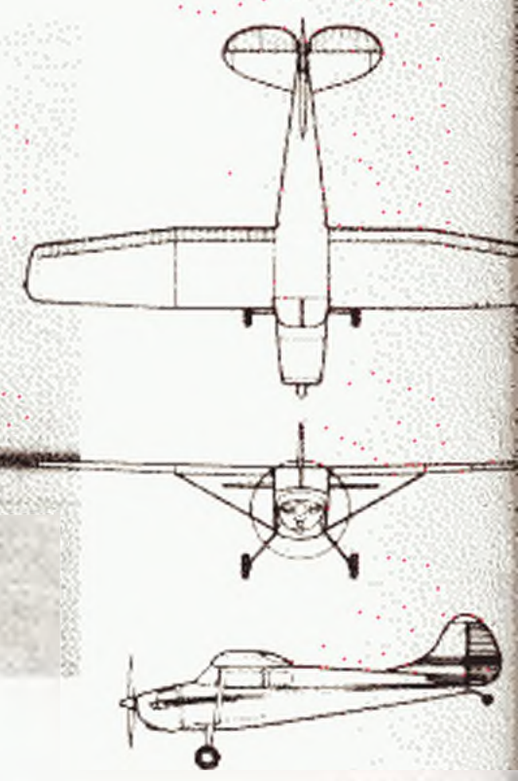
R.C. FLYING SCALE

PRE-FABRICATED KIT INCLUDES:

- Full Size Plans with R.C. and PAA-Load Installation Details
- Sharply Die-Cut Balsa
- Formed Metal Landing Gear
- Hardware
- Covering Material
- Die-Cut Celluloid
- Mahogany Motor Mounts
- Authentic Full Color Decals
- Die-Cut Mahogany Plywood
- Pre-Fabricated Block Balsa
- Selected Strip Balsa
- Pre-Fabricated Wing Edges





Berkeley's

Designed by: Henry Struck

$9.95

CESSNA "170"

For Radio Control — Free-Flight — PAA-Load

For .25 to .35 Engines — 72" Span — 2" Scale

Controlling your "170" by Radio is a thrill you will never forget! Perfect scale, rugged, stable in all attitudes, yet responsive in control with good wind penetration qualities. Gear location is ideal for extended take-off runs, while its larger size makes it less sensitive to turbulent air. A large cabin makes extra radio installations easy.

The plans include a wealth of scale details which will appeal to the master craftsman. Inexperienced builders will find construction simplified by the full size plans, sketches and assembly technique.

Inspect the "170" and its many features at your dealer. Study its design, examine the material, and visualize its performance on the contest field.

R.C. AMPHIBIAN...

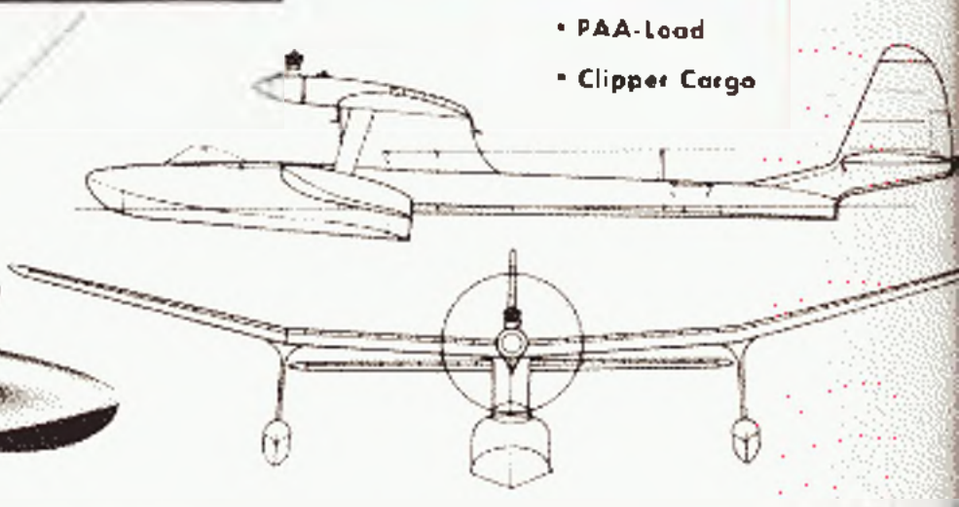
Fly it on Ponds—Rivers—Bays—Lakes or Flying Fields!

Fly it Five Ways:

- Seaplane (R.O.W.)
- Landplane (R.O.G.)
- Radio Control
- PAA-Load
- Clipper Cargo

- Detailed Full Size Plans
- Shaped Leading, Trailing Edges
- Die-Cut Balsa and Plywood
- Celluloid Bubble Canopy
- Metal Ring Cowl
- Hardware, Covering Material
- Selected Strip Balsa

$7.95



Henry Struck's "SEA-CAT"

N.A.C.A. Type Planing Hull Amphibian

For .15 to .25 Engines — 68" Wingspan

Proven performance on the original test models include First International Radio Control Flight, Fourth place in a field of seventy in the Mirror Flying Fair (The first R.C. contest for both Struck and the "Sea-Cat"); First in Radio Control at Screamin' Demons Long Island Sound Hydro Championship, Second in PAA-Load at the same contest, and Precision flights carrying over a pint of fuel at the First "World Model Air Olympics."

First All-Purpose Gas Model

Here is a model design that has been a full thirteen years in development. It's N. A. C. A. Planing Hull design makes water take-offs easy. Its hull is easily accessible for radio control equipment, PAA Dummy Pilot or Clipper Cargo.

27 mc. "SUPER AEROTROL" and Radio Control Accessories!

Combination "Super Aerotrol" TRANSMITTER-RECEIVER Kit (less tubes)	$29.95
"Super Aerotrol" **27mc. RECEIVER Kit** (less tubes)	13.95
"Super Aerotrol" Crystal Controlled **27mc. TRANSMITTER Kit** (less tube)	19.95
Assembled, Ready-to-Operate "Super Aerotrol" **27mc. TRANSMITTER & RECEIVER**	49.95
"Super Aerotrol" **ESCAPEMENT** — Self Neutralizing — Assembled Only	3.95
Super Sensitive Adjustable Contact **RELAY** — 5000 Ohms — Weight — 2 oz.	7.50
0-3 MILLIAMMETER — Manufactured for use with "Super Aerotrol" Receiver	3.50
0-50 MILLIAMMETER — Manufactured for use with "Super Aerotrol" Transmitter	2.75
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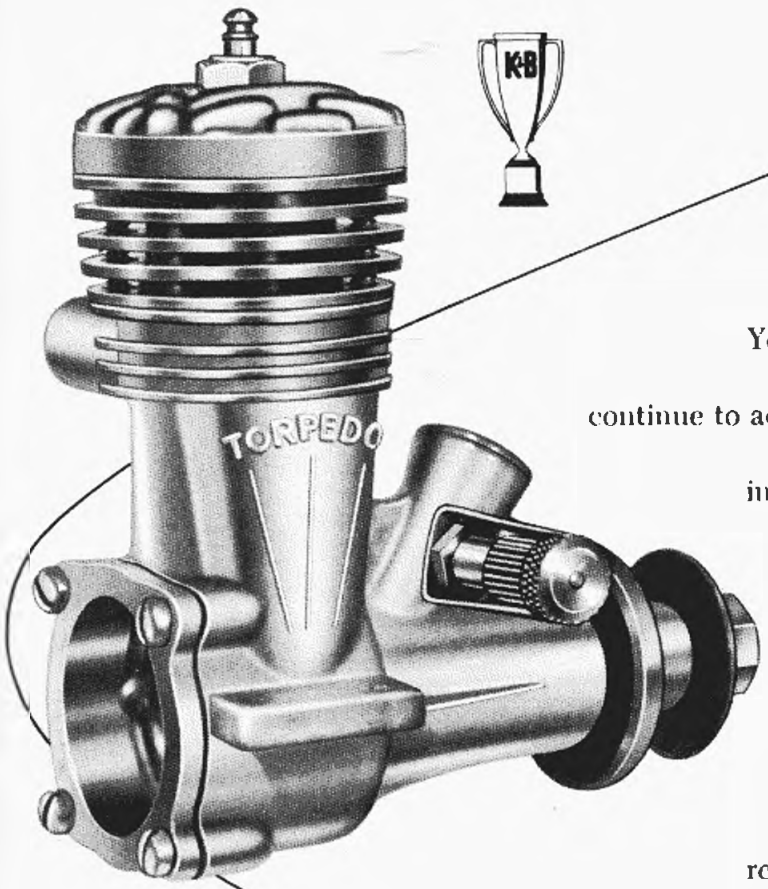

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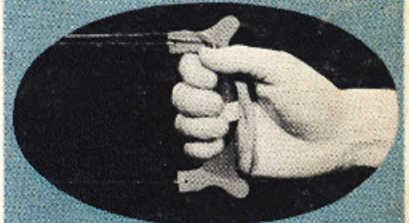
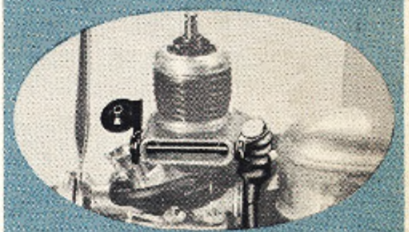


Finger-operated Throttle Control on U-Control Handle



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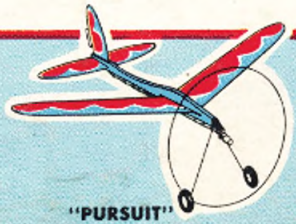

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