



Bob Toft. Has won a second in gas, first in rubber at Nationals.

1939 STOUT TROPHY WINNER

This model's 36-minute flight won the Stout Trophy and qualified the builder as captain of the American Moffett team.

BY BOB TOFT

THIS is a typical American model. It was finished at five o'clock in the morning, a few hours before it won first place in the Minneapolis Model Aero Club's eliminations for the Nationals. It won for the builder an all-expense air-lines trip to Detroit, where he gained the Stout Trophy. The 12¾-minute average of three flights that the model hung up was one of the outstanding marks of the contest. The model is extremely simple, and the inclusion of full-size parts in the plans should make every beginner reach instinctively for his favorite razor.

CONSTRUCTION

Fuselage. A plan view of the fuselage should be drawn up. All measurements are given on the plans, but any not supplied may be had by multiplying the size of the part on the plan by four, the plans being one-quarter full size. Two sides of the fuselage should be built simultaneously to insure duplicate shapes, and after the cement has dried they should be removed from the drawing and checked. If one or both of the fuselage sides has warped out of line, insert one or two diagonals in the proper places to straighten it out. The two fuselage sides should be connected at the extreme rear and the cross braces added. If rubber bands are stretched around the fuselage after two opposite braces have been added, the next two may be cemented in without waiting for the last set to dry. The landing gear is bent to shape and embedded between the full-size gussets given on the drawing. After the nose and tail ends of the fuselage have been filled in with 1/16" sheet balsa, the corners of the longerons are sanded slightly round and the fuselage covered with tissue.

Wings. After nineteen ribs have been cut from 1/16" balsa, bamboo wing tips are bent to the outline shown on the full-size plate. After assembling the entire wing, the bottom spar, leading, and trailing edges should be cracked slightly for dihedral. The top spar and sheet covering will have to be cut out a little to provide the necessary gap to be taken up by the wing when the tips are raised. When covering, make sure that the wing does not warp. If the shrinking of the tissue after it has dried causes a warp, it can be removed by holding the wing in the proper position while doping.

Tail. The stabilizer is made in much the same manner as the wing, and it also should be free from warps. After it has been assembled and covered, cement it to the tail plug at the proper angle, a small incidence block being cemented under the leading edge. The incidence block should be slightly more than 1/8" thick. The rudder is flat, having been built up from 1/8" square and 1/8 x 3/8". When cementing the rudder to the top of the stabilizer, offset it slightly, as the model is intended to fly in large circles.

The wing mount and nose plugs are illustrated in detail. Be sure to brace the tail plug securely, and the cross pieces it is cemented to should form a T section.

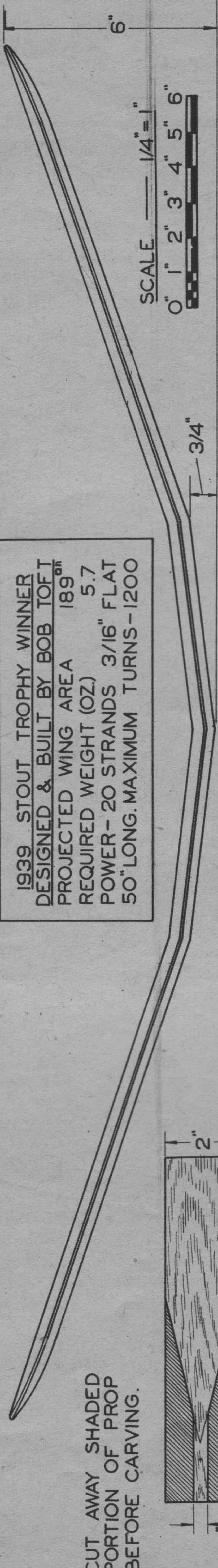
Propeller is carved from a medium-hard 2 x 2 x 9¾" block and should be doped and then sanded with successively finer grades of sandpaper. After the hinge parts have been carefully cut and bent to shape, they are cemented to the prop in the proper position and bound with thread. Three or four coats of cement should follow on the bound portions to insure long use with little fraying or wear. The counterweight should be oversize, so that it may be trimmed down to balance. In cutting the prop at the point at which it folds, a very fine jig or scroll saw will not rip the wood excessively. In positioning the prop for folding, the nose plug should be inserted so that the stop is in such a position that the prop folds flat against the left upper fuselage side (looking from the rear).

The motor used in the original was composed of twenty strands of 3/16" rubber, 50" long. A good grade of lubricant should be used, and it is necessary to employ rubber tubing on the prop hook and rear hook. (Turn to page 57)

1939 STOUT TROPHY WINNER



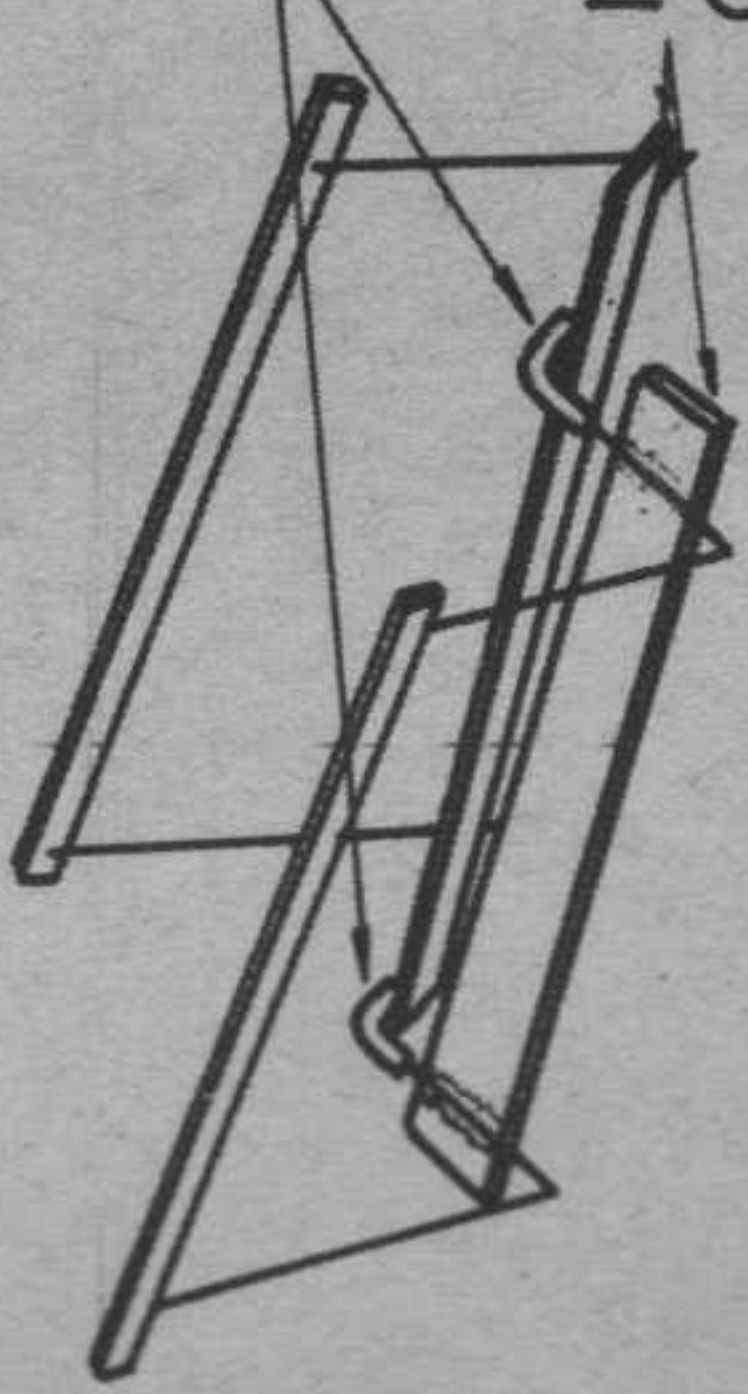
1939 STOUT TROPHY WINNER
DESIGNED & BUILT BY BOB TOFT
PROJECTED WING AREA 189^{sq}
REQUIRED WEIGHT (OZ) 5.7
POWER - 20 STRANDS 3/16" FLAT
50" LONG. MAXIMUM TURNS - 1200



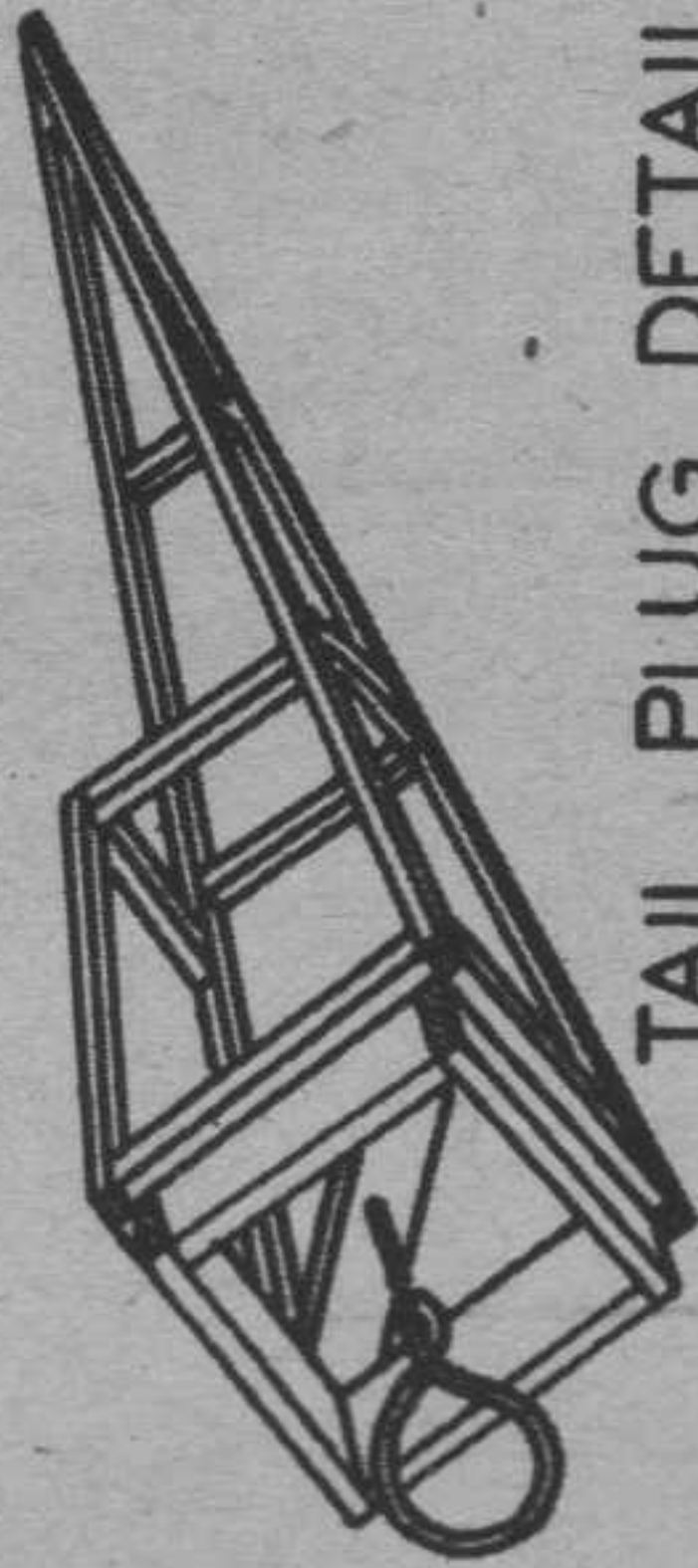
CUT AWAY SHADED
PORTION OF PROP
BEFORE CARVING.



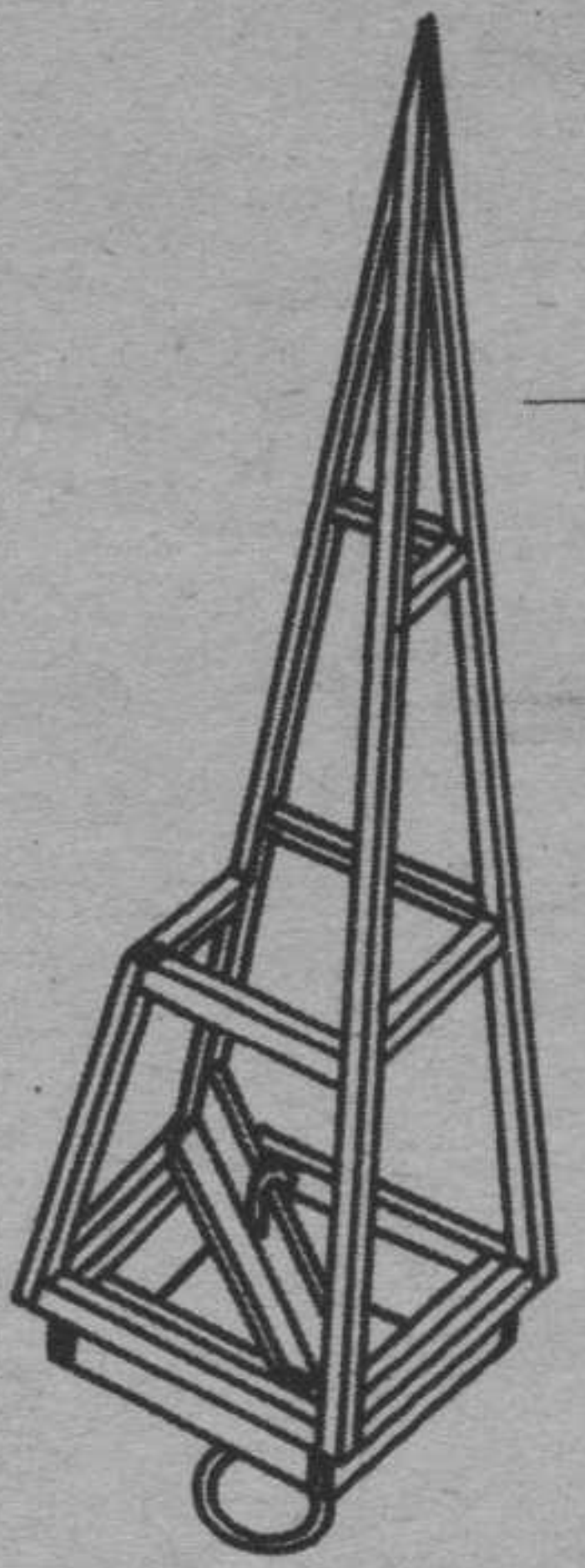
MAXIMUM UNDERCAMBER SHOULD BE 1/4"



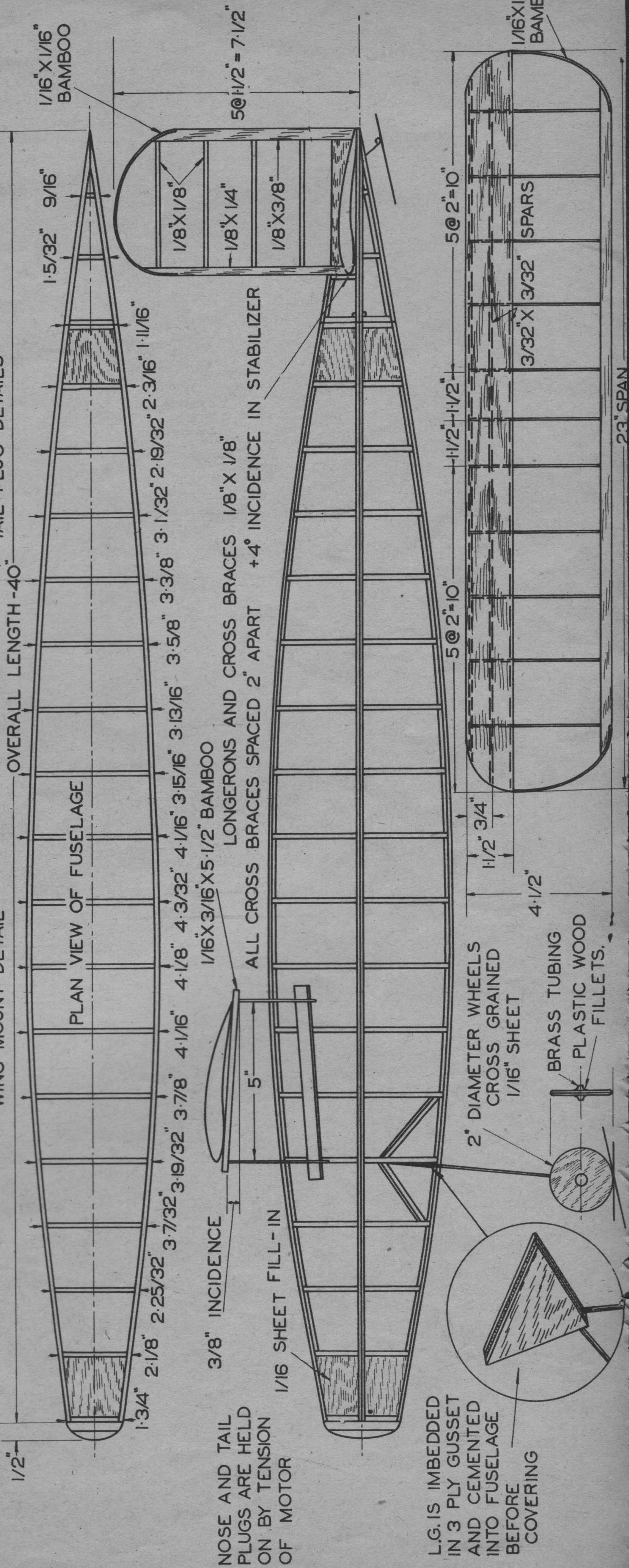
SHORT LENGTH OF
RUBBER TUBING TO
PROTECT FUSELAGE
1/16" X 3/4" X 6" STRIPS
CEMENTED TO WIRE



WING MOUNT DETAIL



TAIL PLUG DETAILS



NOSE AND TAIL
PLUGS ARE HELD
ON BY TENSION
OF MOTOR

L.G.IS IMBEDDED
IN 3 PLY GUSSET
AND CEMENTED
INTO FUSELAGE
BEFORE
COVERING

2" DIAMETER WHEELS
CROSS GRAINED
1/16" SHEET

BRASS TUBING
— PLASTIC WOOD
— FILLETS

1/16"X3/16"X5-1/2" BAMBOO

LONGERONS AND CROSS BRACES 1/8" X 1/8"
ALL CROSS BRACES SPACED 2" APART +4° INCIDENCE

3/8" INCIDENCE

1/16 SHEET FILL-IN

PLAN VIEW OF FUSELAGE

OVERALL LENGTH - 40"

TAIL PLUG DETAILS

SCALE — 1/4" = 1'

A vertical ruler with markings from 0 to 6 inches. The markings are in inches, with the 0 mark at the bottom and the 6 mark at the top. The ruler is used to indicate the height of the object being measured.

1/16" X 1/16"
BAMBOO

1.5/32" 9/16"

$$50 \times 1\frac{1}{2} = 75$$

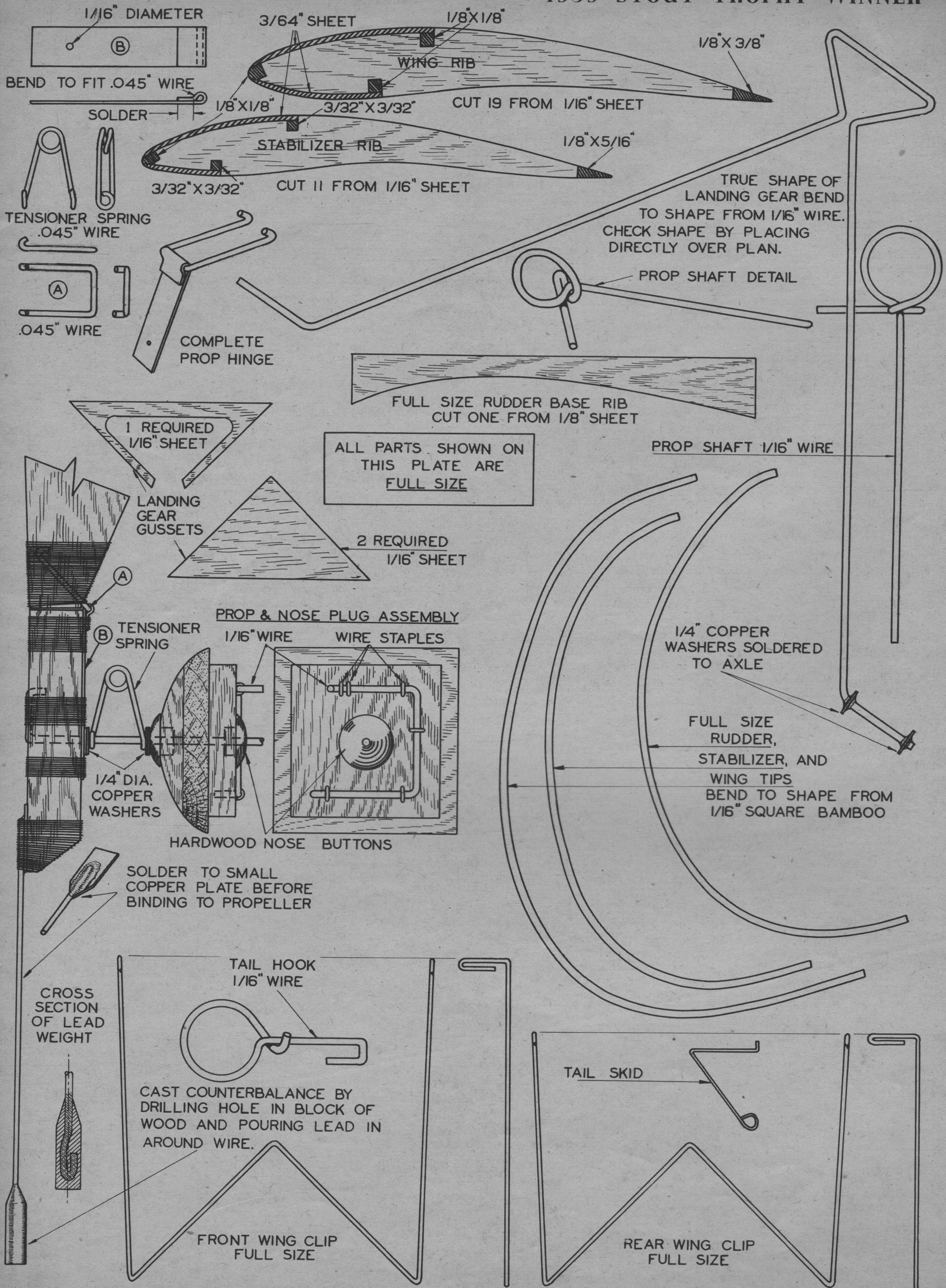
1/16"X1/16"
BAMBOO

5 @ 2" = 10"

SPARS

23" SPAN

1939 STOUT TROPHY WINNER



JUNIOR

n.a.a.

NEWS

PREPARED BY WILLIAM R. ENYART, Sec. N.A.A.

N. A. C. A. HIRES MODEL BUILDERS

THE nation's No. 1 group for aeronautical research, the National Advisory Committee for Aeronautics, recently held a civil service examination to secure the services of experienced model aircraft builders at its Langley Field, Virginia, headquarters.

The examination was restricted to young fellows from the fourth civil service district, which includes the District of Columbia, West Virginia, Virginia, Maryland and North Carolina. An optional qualifying requirement called for participation in official model meets, and the N. A. A. Model Division headquarters was swamped with requests from model builders for evidence of their entry in sanctioned competitions. There was also a last-minute rush to enter contests before the filing date for application papers rolled round.

It is hoped that future civil service examinations for the position of model aircraft builders at Langley Field will be extended to include more area than the fourth civil service district. It is anticipated that because of the present plans to establish a Western research center for the N. A. C. A. and the meeting of the Academy of Model Aeronautics scheduled for Langley Field in November, that the civil service commissioners will come to recognize the fact that model builders are also active in other sections of the country. Keep an eye on these columns; news of future examinations will be relayed on as soon as received.

SMILES IN SKYWRITING

The printed newsheet *Skywriting*, which is the official publication of the Milwaukee (Wisconsin) N. A. A. Model Chapters, has some very humorous notes occasionally sandwiched between its more important and always interesting news articles. Several that the Model Division has chuckled over:

PROP VERBS

Two blades on the prop are worth one in the hand.
Many brave parts are asleep on the heap.

Then the editors of the publication received a most informative letter from an anonymous local flier who wrote:

Dear sir,

I seen in yr. paper where this here fellow Vik Krueger is supposed to have flun the first gas model in Milwaukee and vicinity. Mr. Editor, it seems to me you sure got took in on that yarn, on account of a gas job was flun by me about 20 yrs. before Vik ever flun any model a-tall.

My gas job was pretty big, but not too streamlined. It was hand launched on its 1st flite, and it clum strait up like I ain't seen no gas model climb yet. I don't know where it landed, exactly, on acct. it made an out-of-site flite.

My gas job was all red. It was bought one Sunday afternoon for me in 1913 by my pop, and was lost the same day. It cost 10c. Pop was awful sore when he found out I had flun it and lost it.

Mr. Editor, I hope this here letter will put you strait abt. who flun the 1st gas job around here.

COMING CONTESTS

A usual failing with contest directors (those hard-working chaps who receive so little praise) is to delay requesting sanctions for model-plane meets until it is too late to include a notice of their contests in these columns in *Air Trails*. However, we take off our hat to L. B. Bush of Omaha. So enthusiastic was he and the Omaha *World-Herald* after their first combined annual gas contest this summer, application was made and granted for the following meet:

Omaha, Nebraska. July 21, 1940 (rain date, July 28th). Second Annual Midwest Gas Model Airplane Contest at Benson Park. Trophies, cash and merchandise. Write: L. B. Bush, 610 Redick Tower Building, Omaha, for entry blanks.

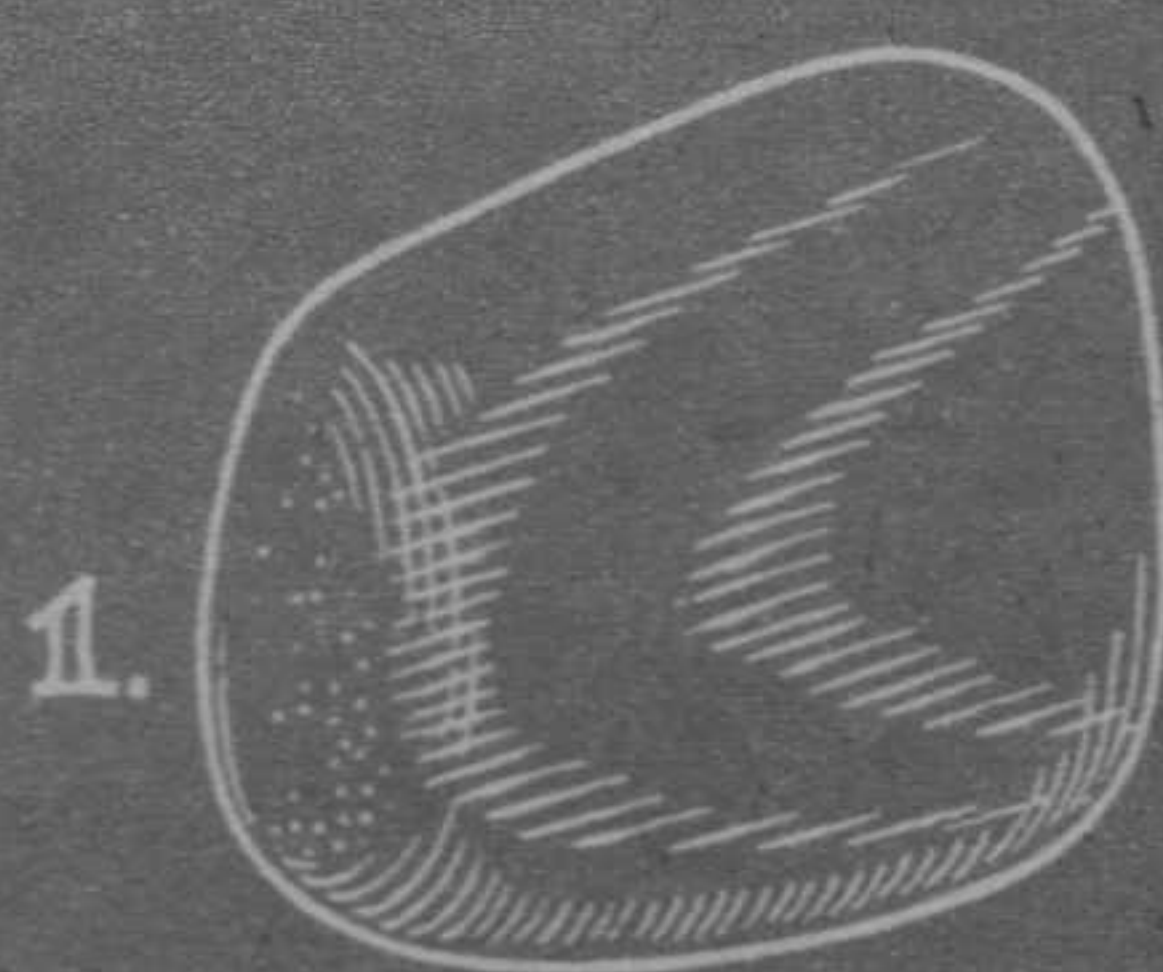
Now back to the present, we list meets for:

Boston, Massachusetts. Indoor meets by Jordan Marsh-Boston Traveler Junior Aviation League in State South Armory, Irvington Street, Back Bay, Boston, Massachusetts. From 9:30 a. m. to 12:30 p. m. on the following Saturdays: November 18th; December 2nd; December 16th. Everything but gas, says Gunnar Munnick, contest director. Write him at 101 Alstead Street, Quincy, Massachusetts, for full information. This organization will also (Turn to page 59)

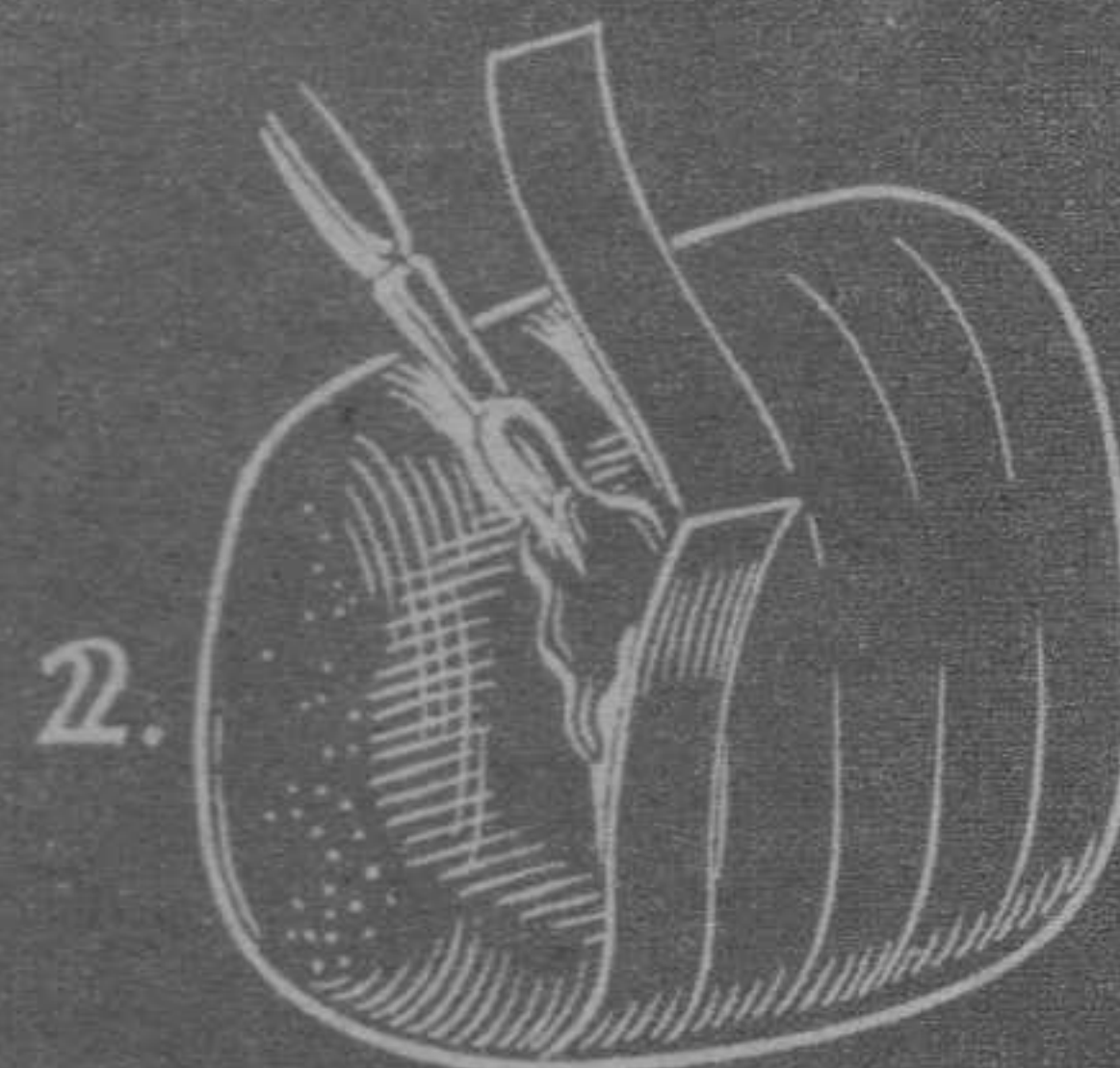
BAMBOO PAPER MOTOR COWL

light - streamlined - inexpensive

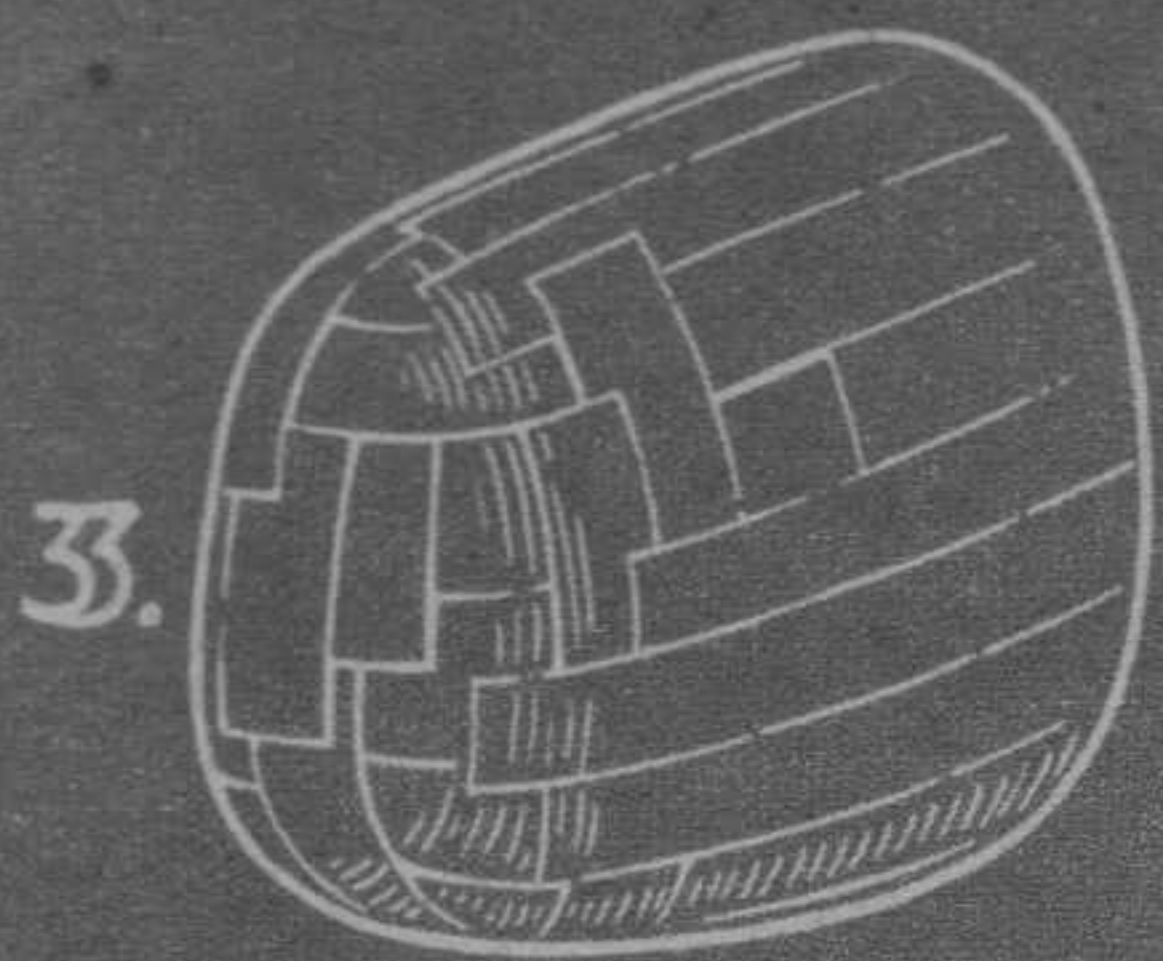
(Thanks - S. R. Jackman)



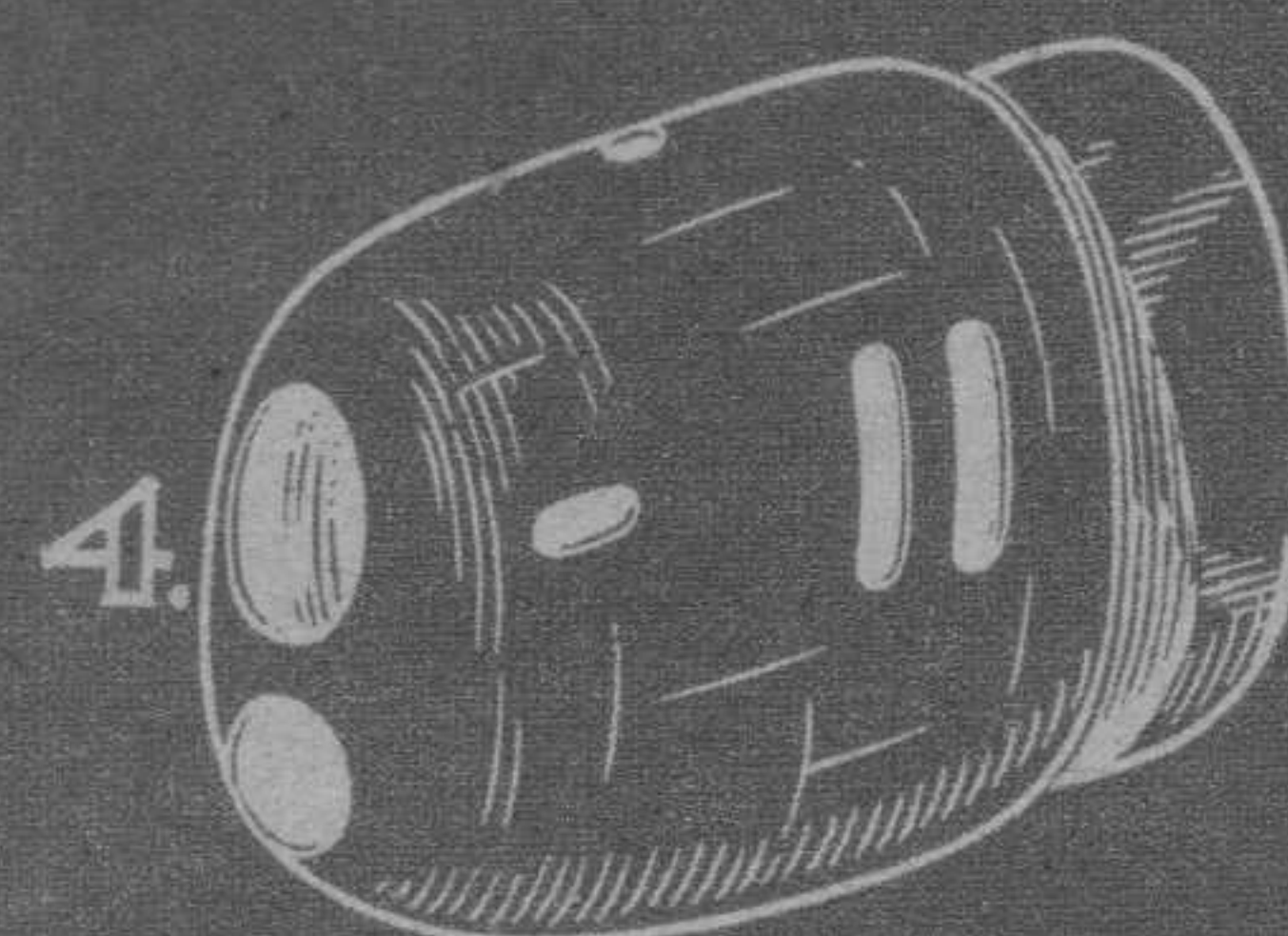
1. Balsa form - shaped $\frac{1}{32}$ " undersize and waxed.



2. Bamboo paper strips doped over form.



3. Alternate directions and vary widths as necessary - Dope on 6 complete layers



4. Remove form-mark and cut out necessary openings.

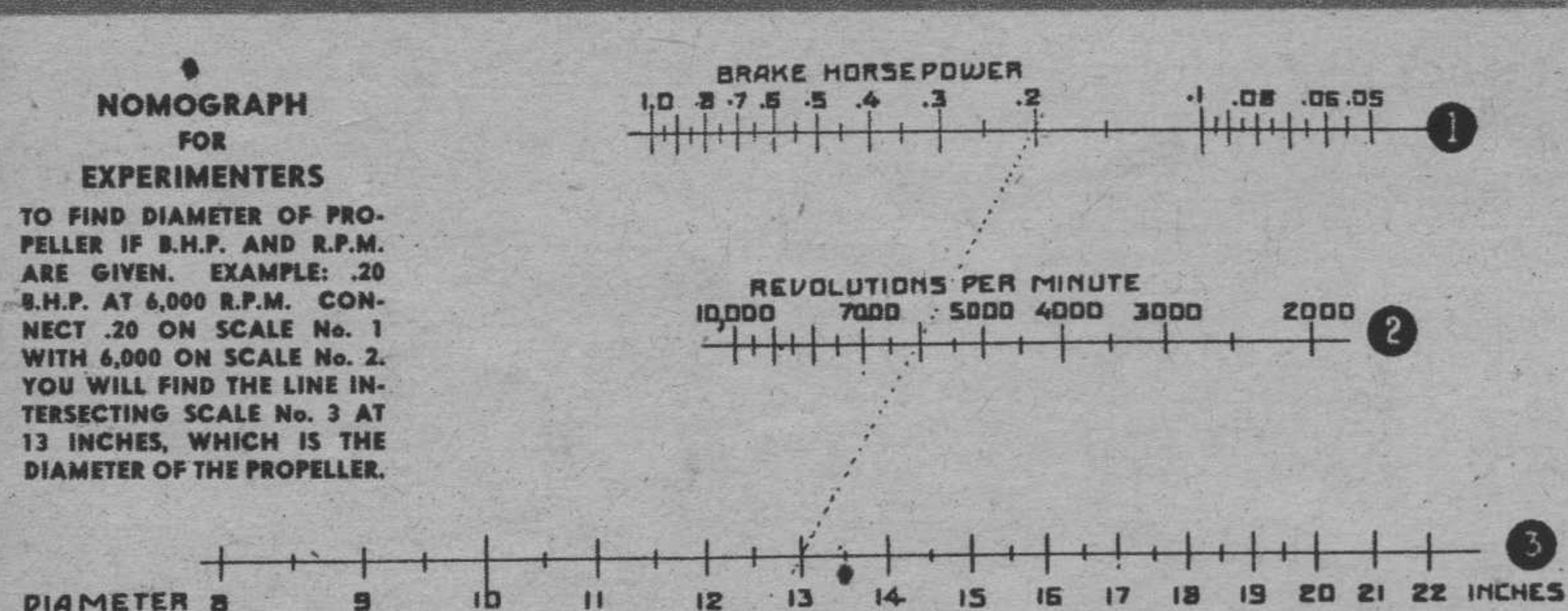
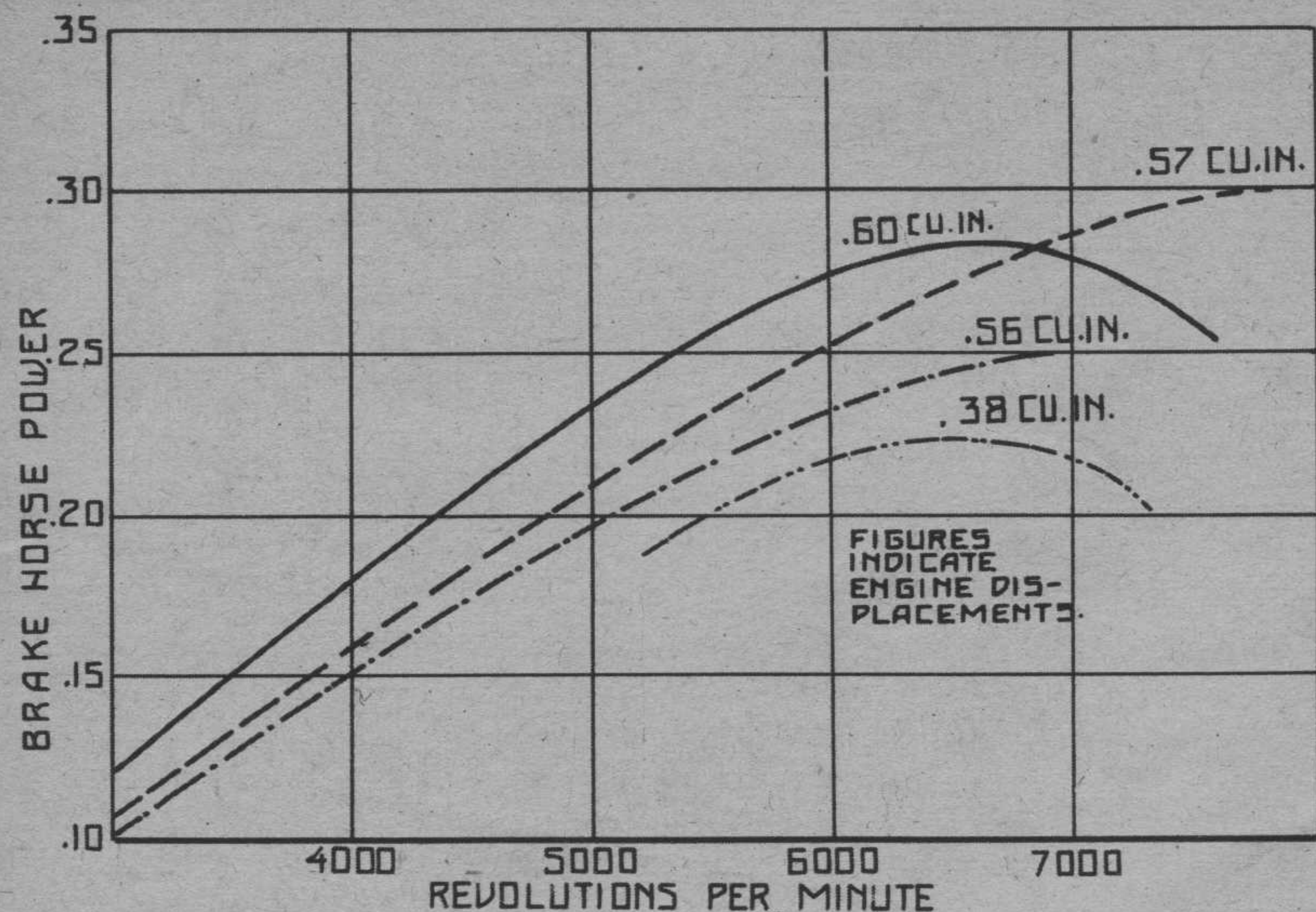


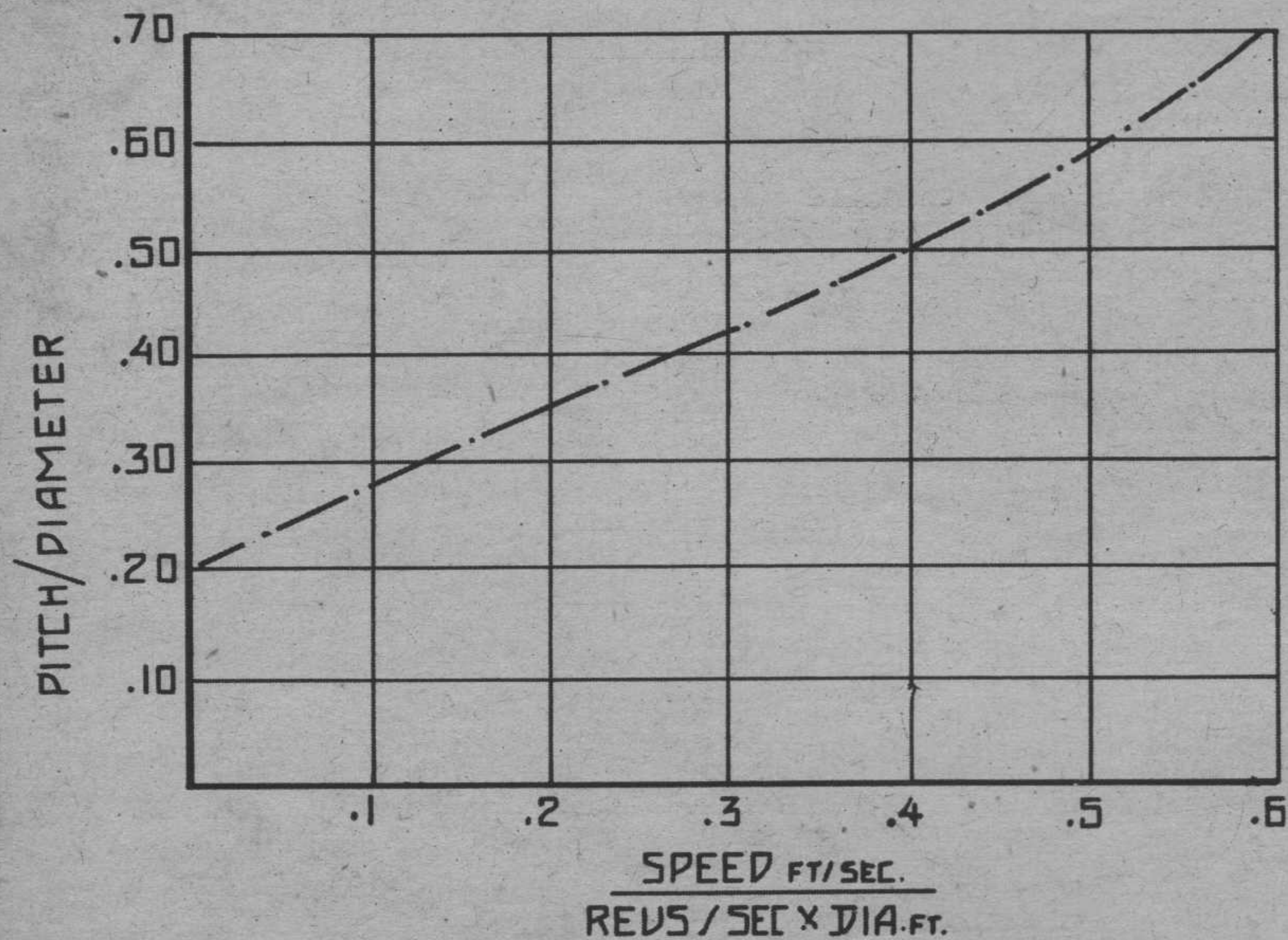
TABLE FOR SELECTING DIAMETER AND PITCH OF PROPELLER
FIRST FIGURE INDICATES DIAMETER, SECOND FIGURE PITCH OF PROPELLER

ENGINE	WEIGHT		1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0	5.5	6.0	6.5	7 and over	
BROWN			13	12	14	10	14	10	14	8	14	8	14	8	14	6
BANTAM	9	8	9	8	10	8	10	6	10	6	11	6				
BRAT	9	8	9	8	9	8	9	6	9	6	10	6	10	6		
CYCLONE "BABY"			13	10	13	8	13	8	13	8	13	8	12	10	12	8
DENNYMITE			13	12	13	10	13	10	13	8	13	8	13	8	13	6
ELF	10	8	10	8	10	6	10	6	11	6	11	6				
FORSTER				16	12	16	12	16	12	16	10	16	10	16	10	18
GWIN AERO			12	12	10	12	10	12	8	12	8	12	8	12	6	13
ATWOOD HI-SPEED	12	8	12	8	12	8	12	8	12	6	12	6	12	6	12	6
HUSKY	10	8	10	8	10	6	10	6	11	6	11	6	11	6		
MADEWELL MITE	11	8	11	8	11	8	11	6	11	6	11	6	12	6		
M. & M.			12	8	12	8	12	8	11	8	11	8	11	8		
OHLSOON GOLD SEAL			13	10	13	10	13	8	13	8	13	8	13	8	13	6
OHLSOON "23"	11	8	11	8	11	8	11	8	11	6	11	6	11	6	11	6
HERKIMER O-K			13	12	14	10	14	10	14	8	14	8	14	8	14	6
PEE-WEE	9	8	10	8	10	6	10	6	10	6	10	6				
SYNCRON "ACE"			13	10	13	10	13	10	13	8	13	8	13	8	13	6
SYNCRON "BEE"	9	8	9	8	9	6	9	6	10	6						
TROJAN	10	8	10	8	10	6	10	6	10	6	11	6	11	6	11	6

Choosing the Right Gas Prop

BY RAOUL J. HOFFMAN

AND BOB ROBERTS



Whether you prefer finished propellers or like to puzzle out and carve your own, you will find this article full of the things you did not know before. Propeller design looks mighty technical but it is something we all could easily know. If you want to know what makes some props more efficient than others, what diameter or pitch to use, what to look for in selecting a prop that is best suited for your particular job, this authentic discussion contains valuable dope. Of course, a formula now and then slips into any article in design. But there is no reason why formulas should be derived when understandable ones exist and can be applied with accuracy to your ship and its propeller. And so, the authors, authorities on the subject, have soft-pedaled mathematics. The charts do all the necessary dirty work.

THE British Short-Mayo pick-a-back airplanes were the inspiration for the R. O. G.-glider combination presented in this article. As you'll remember, the full-scale pick-a-back consisted of the four-engined seaplane *Mercury* which perched atop the flying boat *Maia* and was released after the composite aircraft had lifted the *Mercury* with a heavier load than she could have managed alone.

Our own combination serves a somewhat similar purpose, in that the R. O. G. carries the glider to a much higher altitude than the glider could attain alone after hand or catapult launching. When the power of the R. O. G. is exhausted, the glider is released, and each component goes its own way from then on.

Construction was purposely made very simple so that full attention could be paid to the adjustment of the release spring. Both the glider and the R. O. G. also perform very well alone.

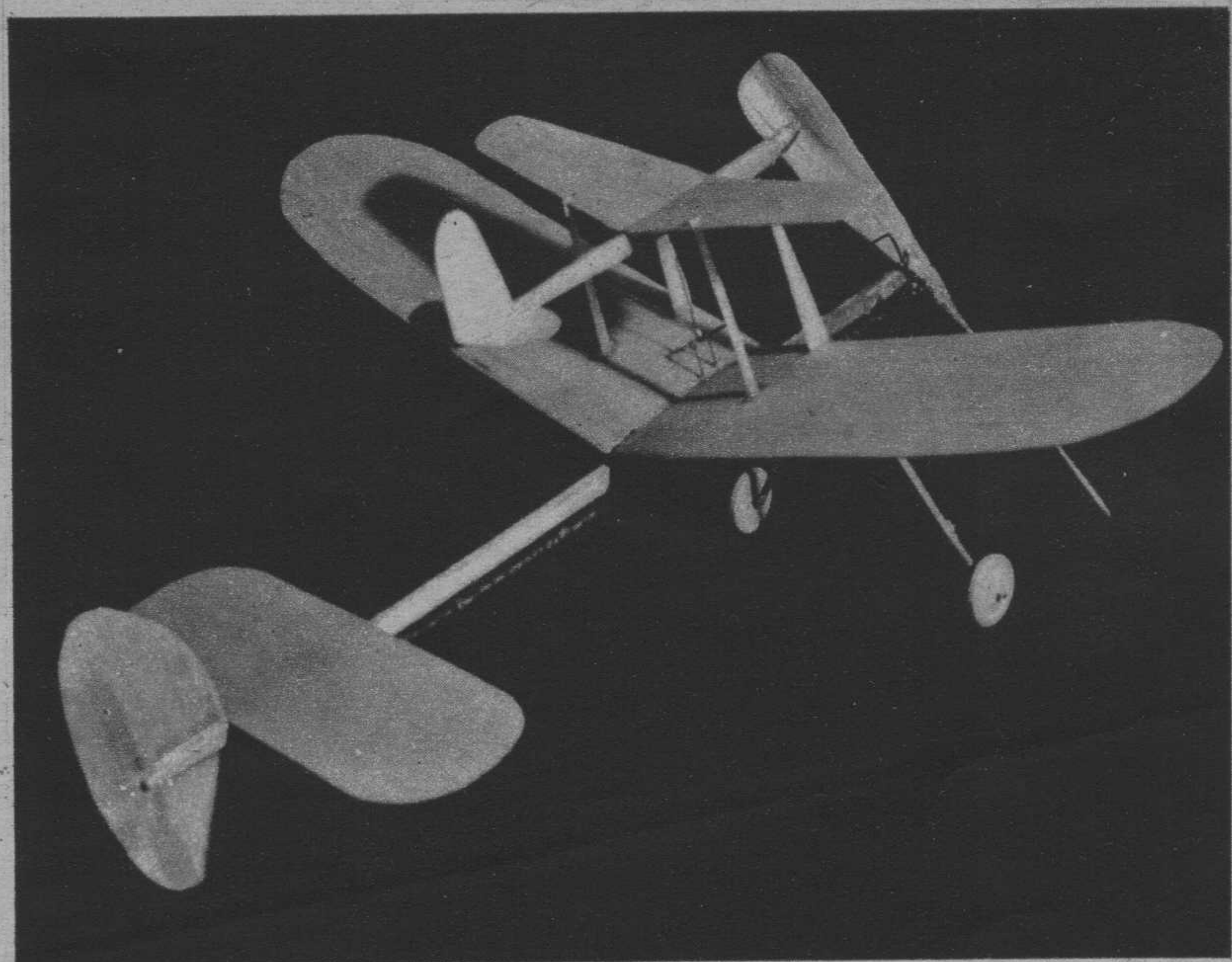
GLIDER

The glider can be assembled in a few minutes from scraps. The wings have about a half inch dihedral at the tips. The wire release hook should be about right to balance the glider; if the model dives, warp the trailing edge of the stabilizer up; if it stalls, add clay to the nose.

R. O. G.

Cut the R. O. G. wing and tail from $\frac{1}{32}$ " sheet balsa and sand the parts smooth. The wing is made in one piece, as is the stabilizer.

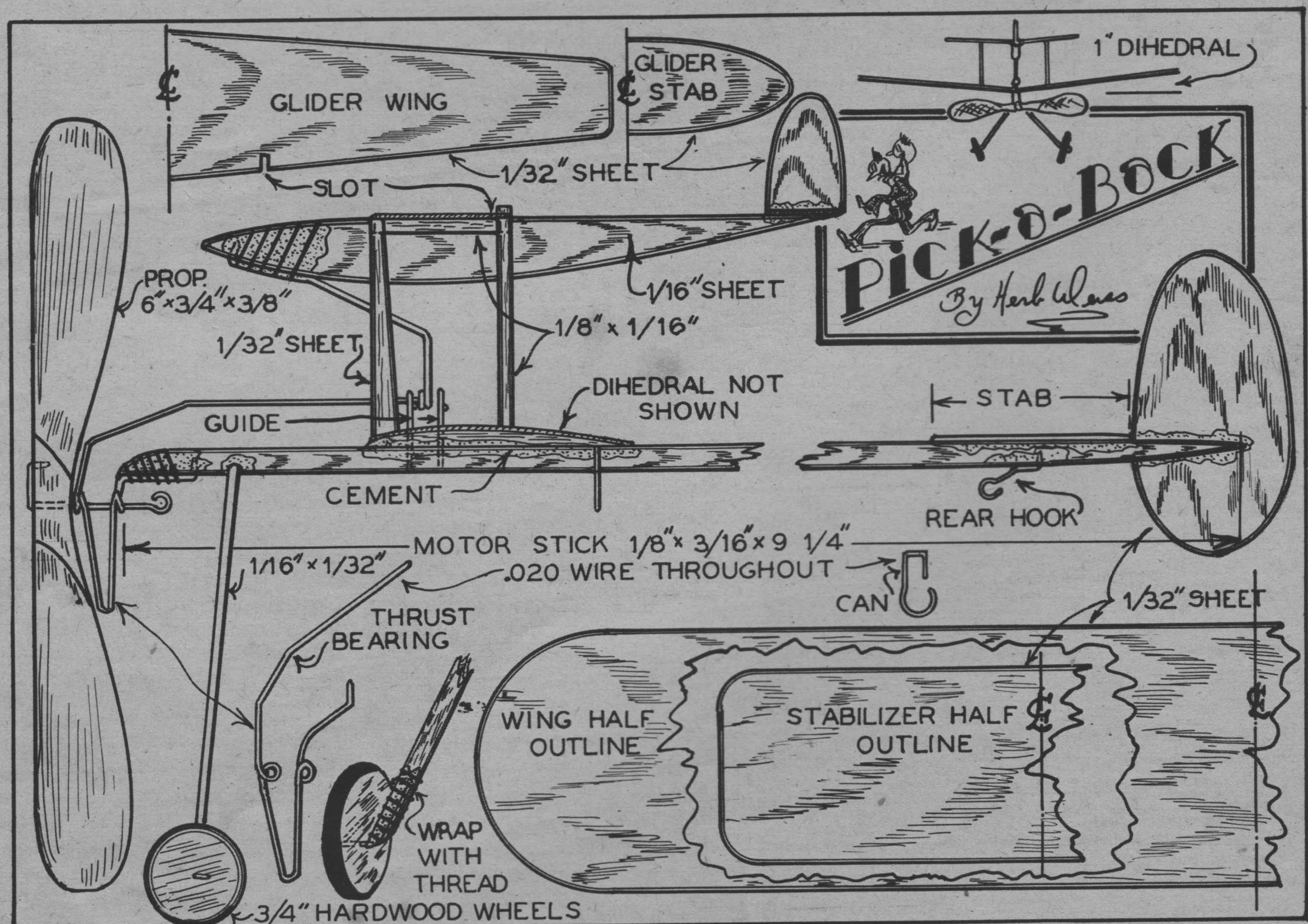
The motor stick is $\frac{1}{8} \times \frac{3}{16}$ " hard balsa. Cement the tail surfaces in place. (Turn to page 65)

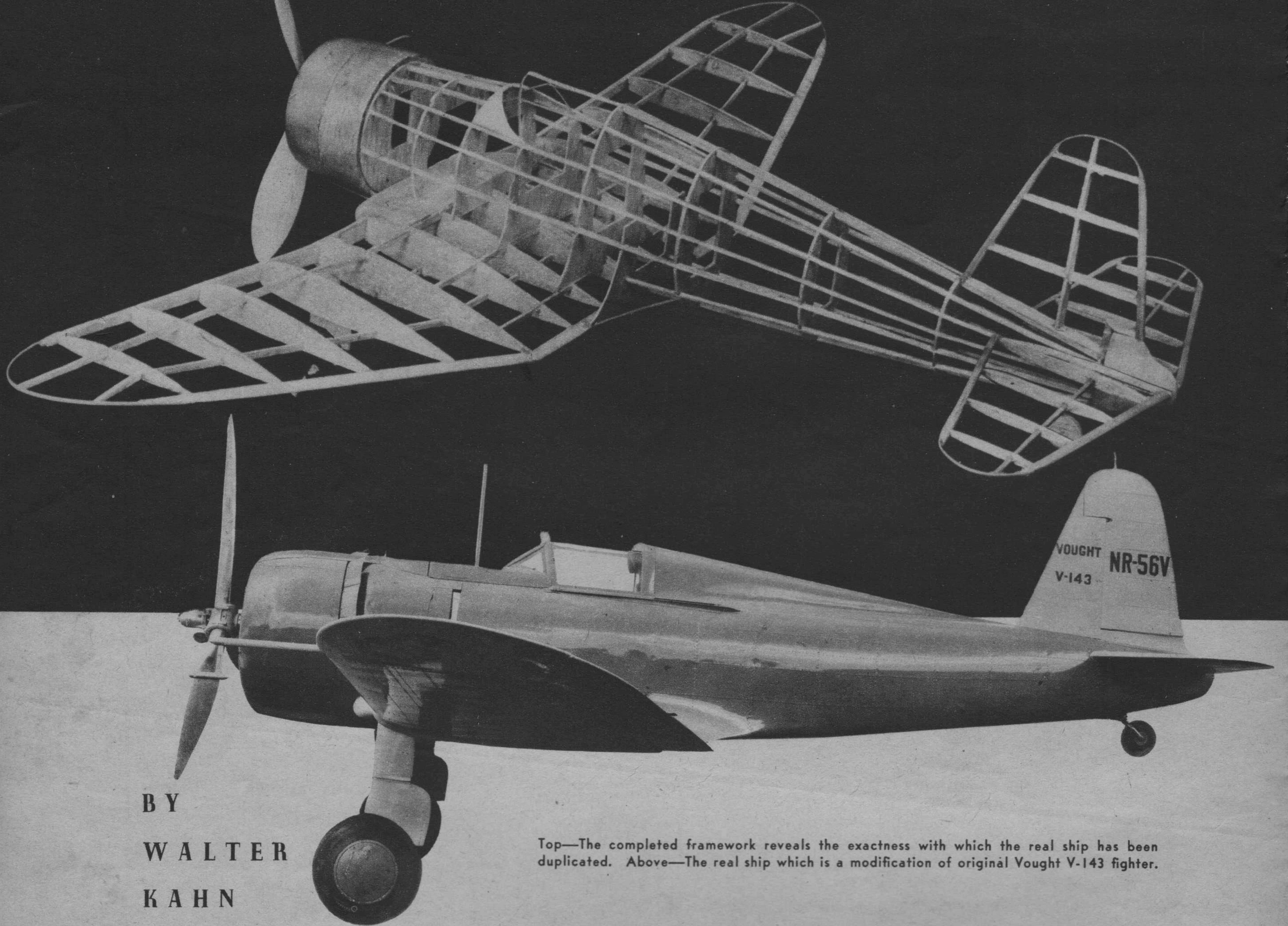


PICK-A-BACK

BY HERBERT K. WEISS

The glider cuts loose to soar on its own.





BY

WALTER
KAHN

Top—The completed framework reveals the exactness with which the real ship has been duplicated. Above—The real ship which is a modification of original Vought V-143 fighter.

DESIGNED to conform with the United States army specifications and listed by the manufacturer, Chance Vought, as an export model, the V-143 is a challenge to any other ship within its class. Capable of doing close to three hundred miles per hour, the V-143 is easily maneuvered and can ably defend itself.

The construction of the model is simple, entailing only the primary steps of model-aircraft building. Before attempting to build the model it is advisable to read and thoroughly digest the directions. By doing this, costly mistakes will be avoided.

CONSTRUCTION

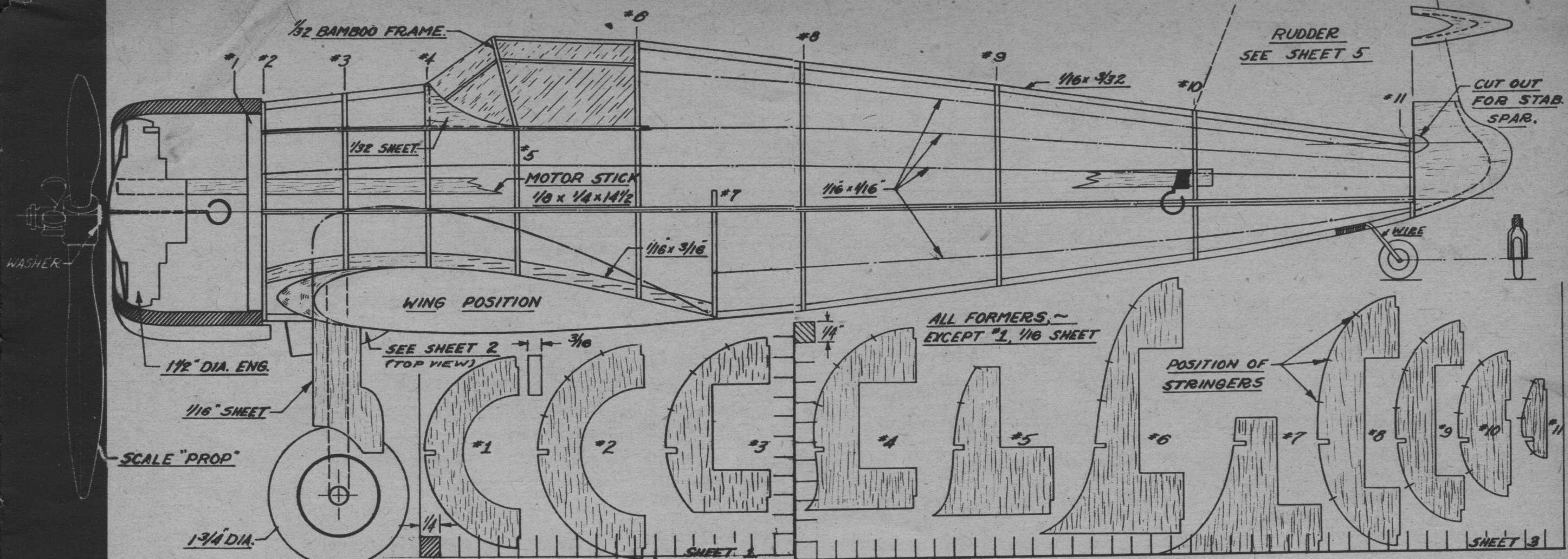
Fuselage may either be constructed in two halves or else with complete bulkheads. The bulkheads are, all except #1, cut from $\frac{1}{16}$ " sheet with the grain running vertically. In cutting out the bulkheads only the four main notches need be cut. The position of the intermediate stringers should be marked. This procedure is suggested to enable proper alignment of the stringers. After the four main stringers are secured in place

the notches for the intermediate stringers are cut with a sliver of a two-edged razor.

The complete cockpit cover frame is made from $\frac{1}{32}$ " square bamboo. This frame is covered with a sheet of celluloid. The portion between #4 and #5 is covered with $\frac{1}{32}$ " sheet, and made to fit as shown on the top and side view.

The tail block is cut to the shape shown on 3. It is hollowed out to as thin a wall thickness as possible. The wood for the tail block must be the lightest obtainable. The block is not cemented in place until the stabilizer is secured.

Wing construction follows the same general procedure for building most model wings. The wing is constructed in one panel. Because of this it is necessary to trace the half of the wing shown and use it as the other half. The complete layout of half the wing is gotten by connecting Sheet 2 with Sheet 4. The ribs are all cut from $\frac{1}{16}$ " sheet. The wing is constructed on the plan itself with the various parts held in place by pins until the cement has set. As the wing is tapered, both top and front, it is necessary to taper the leading edge and spars accord-



Plans are half scale. Draw in squares over formers and ribs and then double to make templates. Top and front views are one-quarter scale.

ingly. It is suggested that the parts first be roughly shaped and glued in place. After the wing is removed from the plan the parts are then sanded to a smooth finish. The wing tips are of bamboo and can best be formed over a flame. If desired they can be wound with thread at the leading and trailing edges.

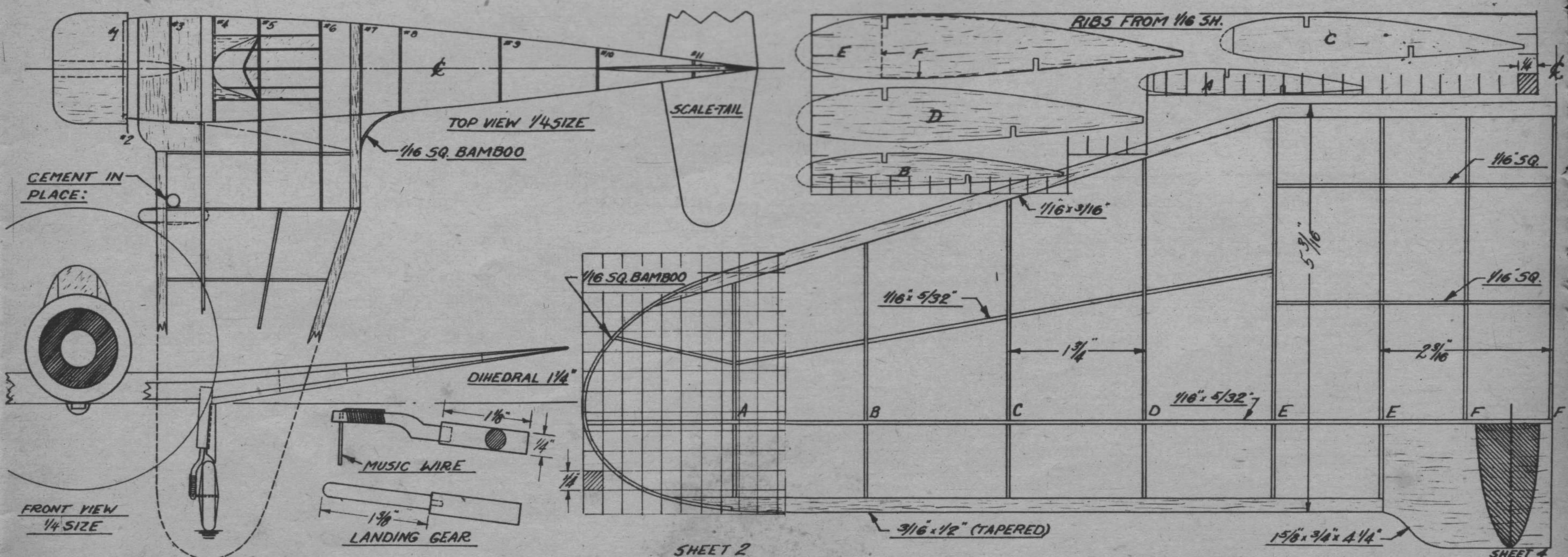
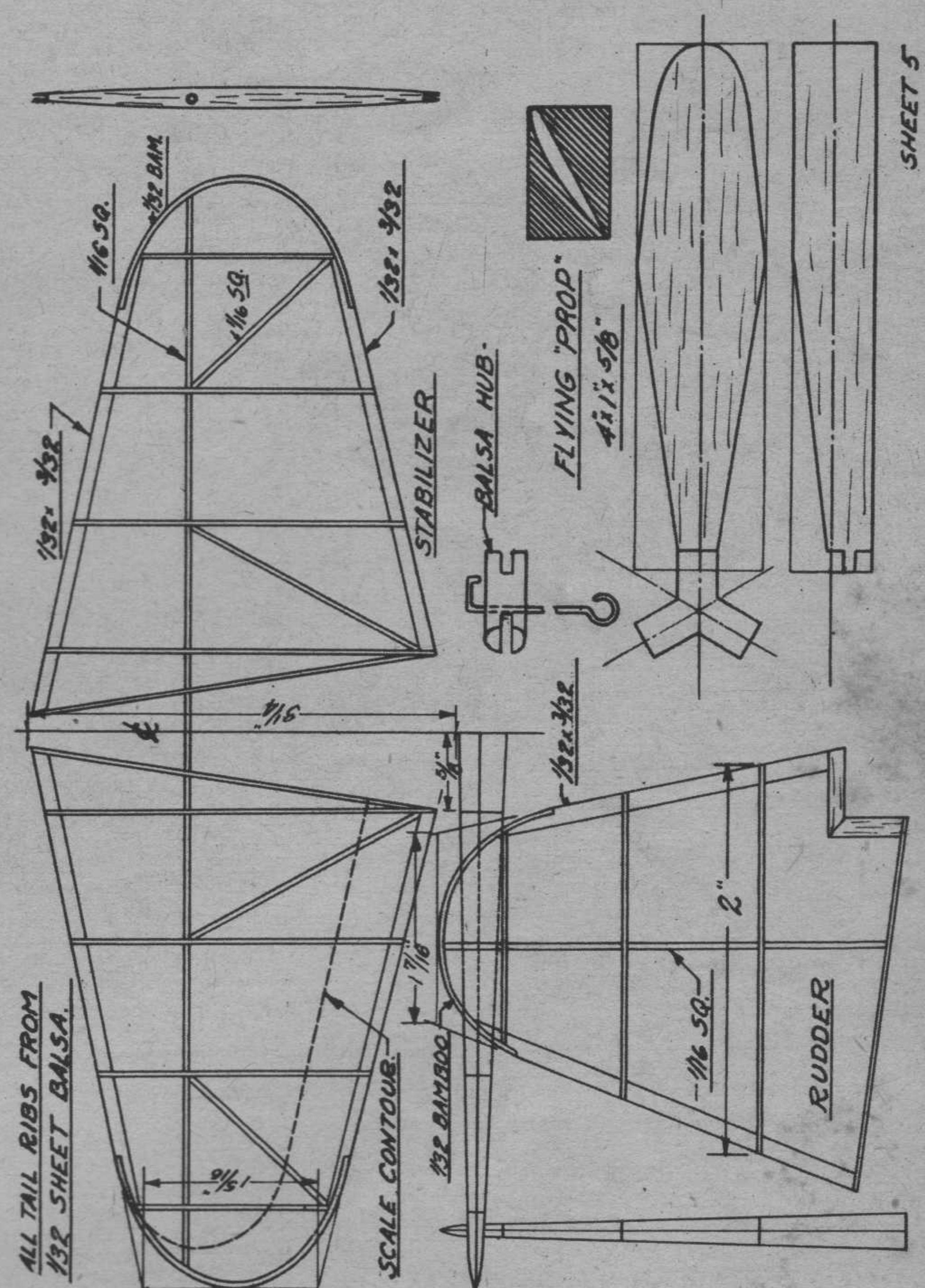
Special attention should be given to the center block. The block is not hollowed out as the bulk is required to balance the completed model. The cross-sectional shape is shown on the plan. It follows that of the wing section, except it is extended farther forward of the leading edge.

After the wing is completed, the outer wing panels are broken at the point of the solid center block to form the $1\frac{1}{4}$ " dihedral. The joints are reglued.

Tail surfaces. The construction of both the rudder and stabilizer is like that of the wing. It is important that the lightest balsa wood be used in its construction. (Due to the large moment arm of the model a heavy tail will throw it out of complete balance.) The spars used are $\frac{1}{16}$ " balsa rounded and are made to run through the ribs as shown. The ribs of the tail are first cut roughly to a streamline shape. After the tail is completed they are sanded smoothly. The tips are of bamboo. The bamboo used should not be greater than $\frac{1}{32}$ " square.

Landing gear construction is extremely simple, as it consists entirely of a single strut attached to the wing as shown. The shape of the strut is shown on Sheet 2. The strut is made in two parts and attached by inserting the lower part into the top. The axle is a piece of music wire bent to the shape shown; it is glued and wound with thread for security. The side cover of the strut is cut from $\frac{1}{16}$ " sheet balsa and cemented to the strut.

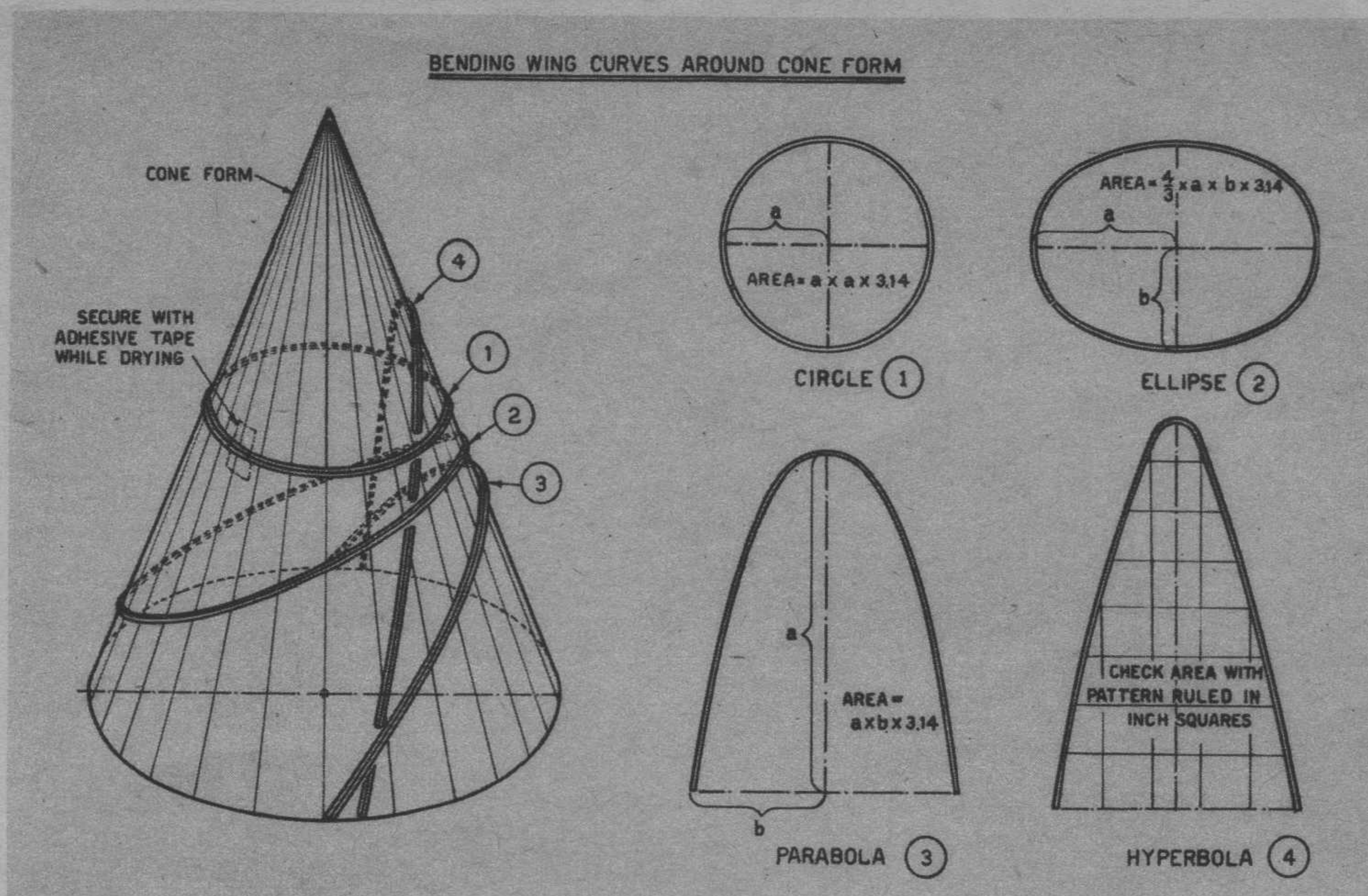
Cowl shape is shown on Sheet 1. It is hollowed out (Turn to page 64)



NEW CURVES

BY ROY
MARQUARDT

A time-saver for in-
door model builders.



MOST of us dislike the chore of bending circular and elliptical wing tips. Even more irksome is the task of plotting shapes and cutting patterns around which to bend the tips. The method suggested here offers a short cut without detracting from the pleasant appearance of a well-shaped wing tip.

All of the commonly used shapes—circle, ellipse, parabola, and hyperbola—are shapes formed by the intersection of a plain surface and a circular cone. Look at the illustration and you'll see that a straight cut across the cone forms a

circle; a cut parallel to a side, a parabola; perpendicular to the base, a hyperbola; and cutting the cone in any other direction forms an ellipse.

Of course, it's not practicable to cut the cone every time you want a different shape. But the tips can simply be bent by bending the wood around the outside surface of the cone to form any desired shape. All bent pieces—tips, entire rudders, elevators, and fuselage formers—can be soaked until pliable, bent around the cone, secured with adhesive tape, and allowed to dry. (Drying can be speeded by (Turn to page 57)

PAINTING GAS MODEL LICENSES

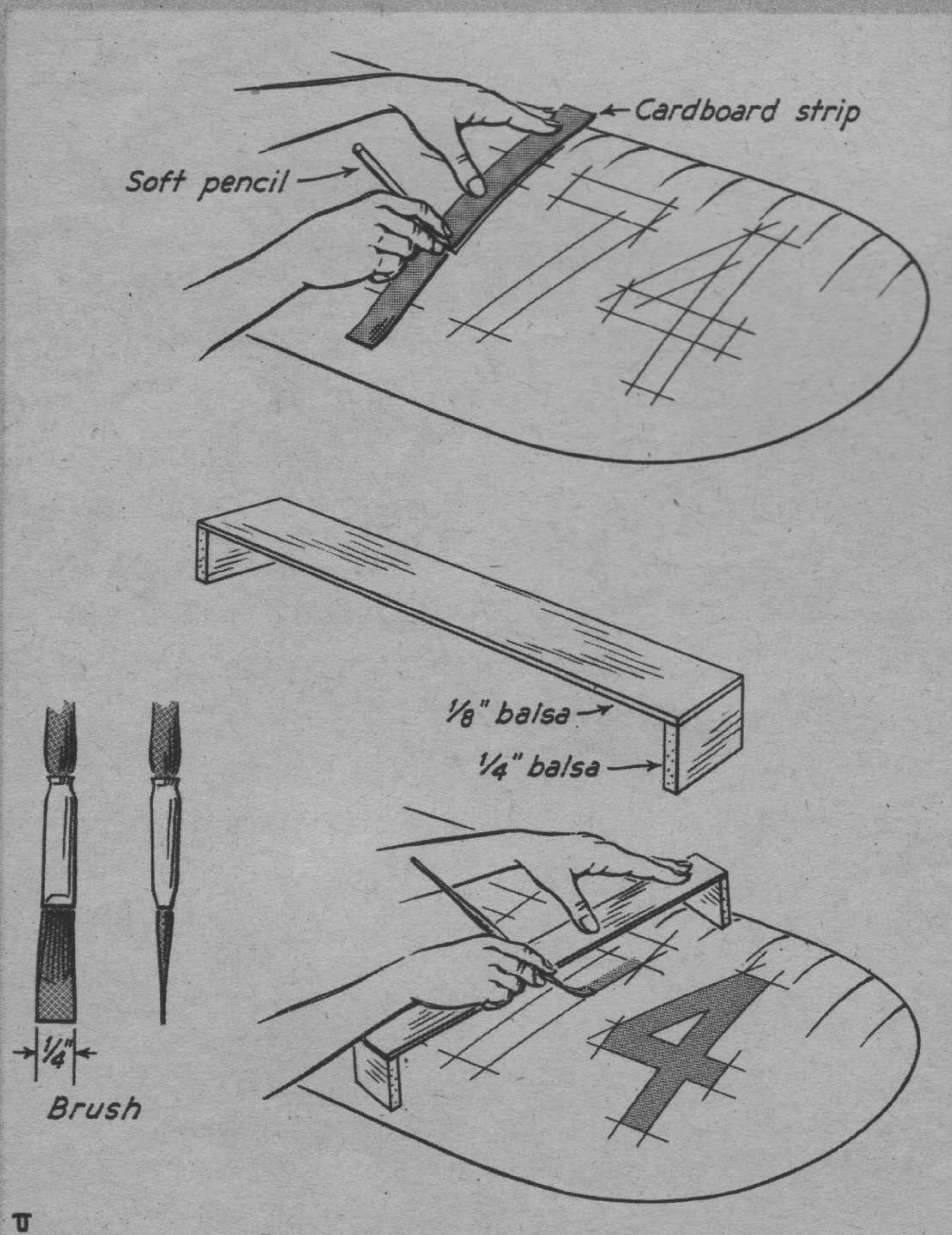
BY H. A. THOMAS

Don't spoil a neat job with shoddy
lettering. Here's a clever trick.

THAT part of the N. A. A. regulations which requires license numbers to be prominently displayed on gas models has no doubt caused its share of grief among gas-model builders who happen not to be artistically inclined. The beautiful, and expensive, decal transfers which come with your N. A. A. membership card are extremely difficult to duplicate neatly.

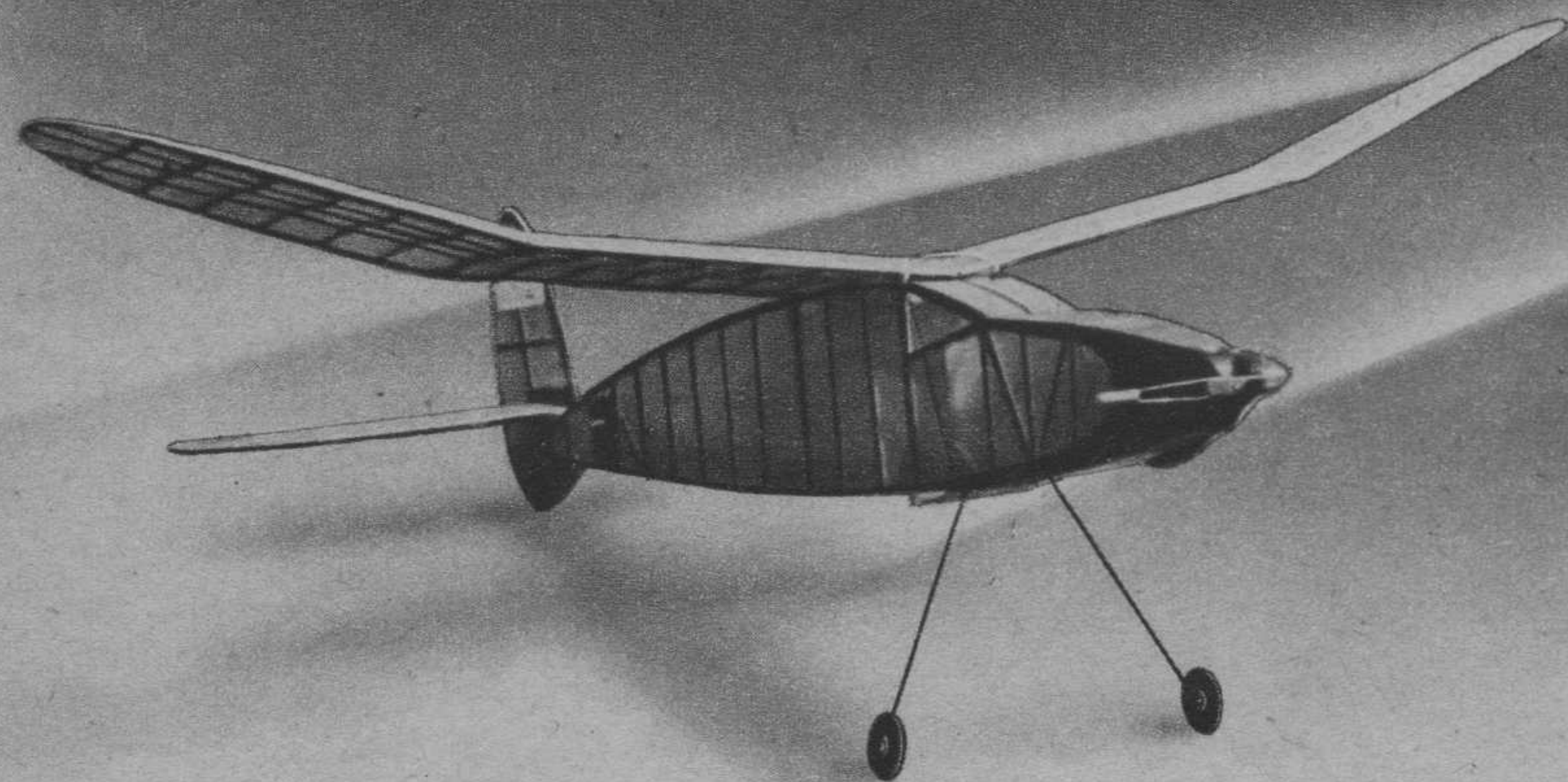
One successful way of lettering the numerals is to use masking tape. This is quite tedious and requires a good deal of skill in applying the tape. Another way that is much simpler and quicker is shown in the accompanying drawing. Since the type of numerals suggested by the N. A. A. are composed of straight lines entirely, and since all parts of the letters are of constant width, a strip of cardboard of proper width can be used to make a soft-pencil layout on the wing. By simply holding the strip in the various positions and drawing on both sides of it, the letters can be very easily formed.

The balsa guide is merely to afford a straight edge along which the brush can be drawn in straight strokes. A flat, flexible brush of one-fourth-inch width is recommended. It is best to use lacquer of (Turn to page 53)



KORDA'S *Wakefield* INTERNATIONAL CHAMPIONSHIP WINNER

New
World's Record
43 Minutes, 29 Seconds
**AUGUST 6,
1939**



... a **MEGOW KIT**
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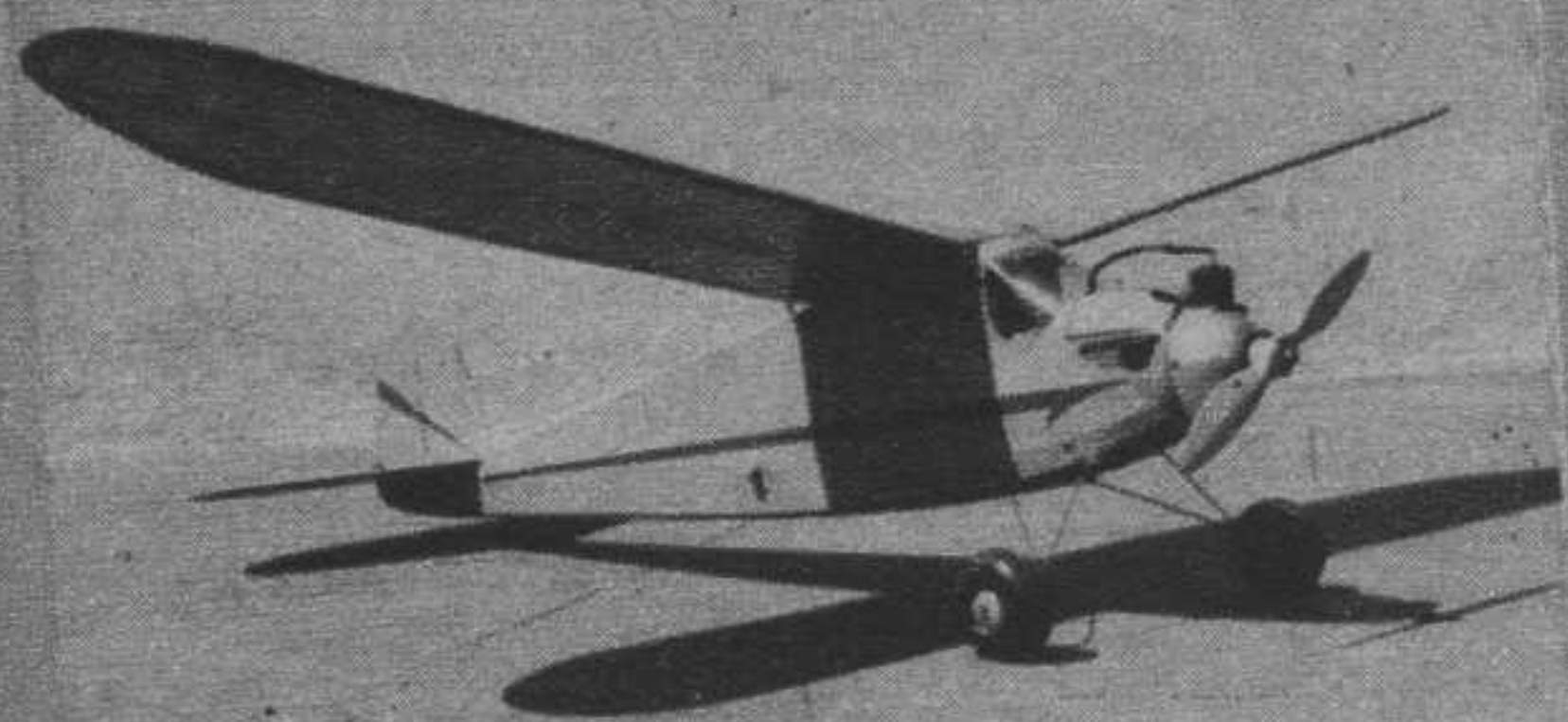
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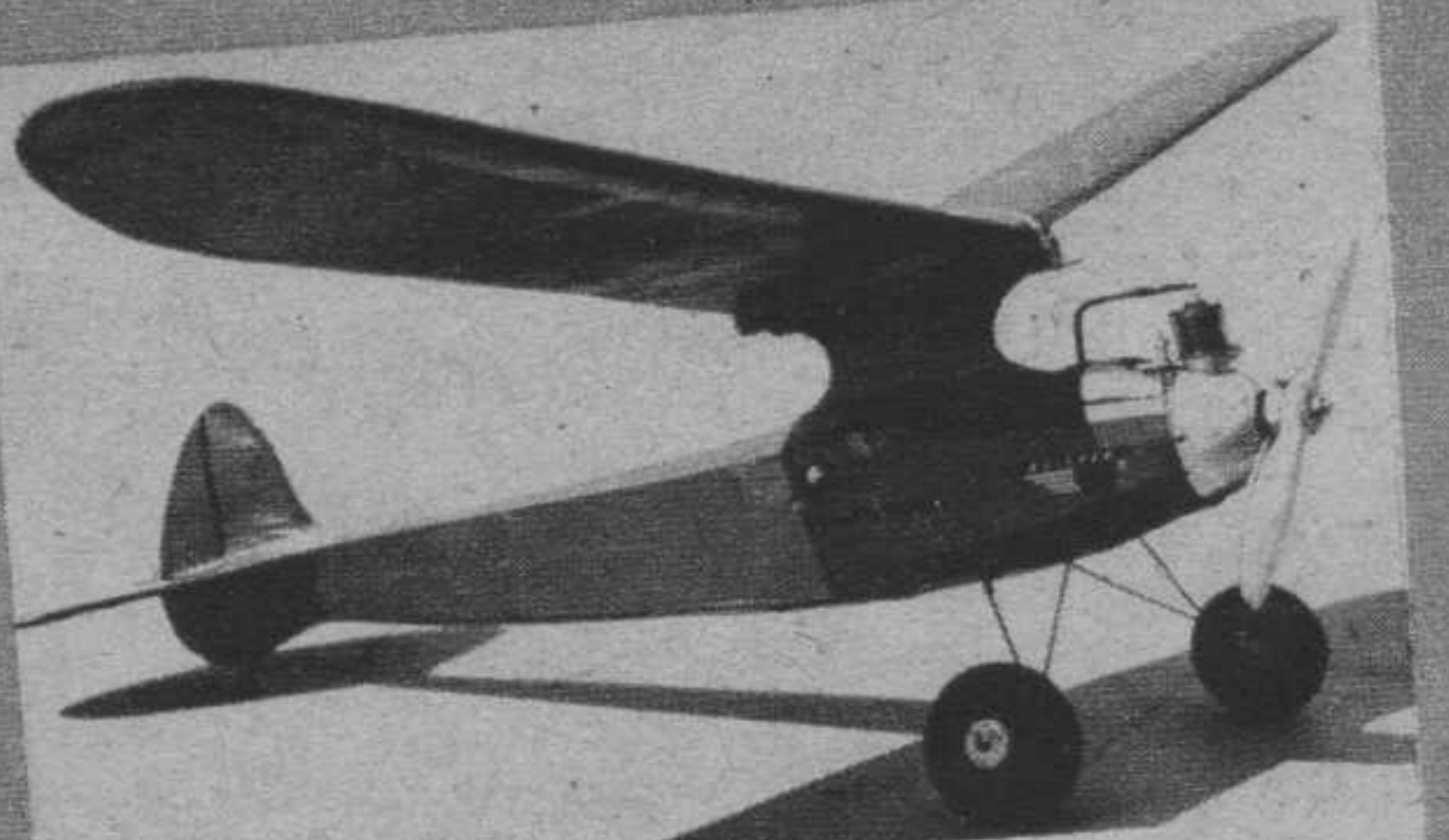
SAY FELLOWS: BUILD ANY ONE OF THESE THREE SHIPS SHOWN BELOW AND YOU WILL KNOW WHY, IN SIX SHORT YEARS MODEL-CRAFT HAS GROWN TO BE THE LARGEST MODEL SUPPLY



HOUSE WEST OF THE MISSISSIPPI.
Barney



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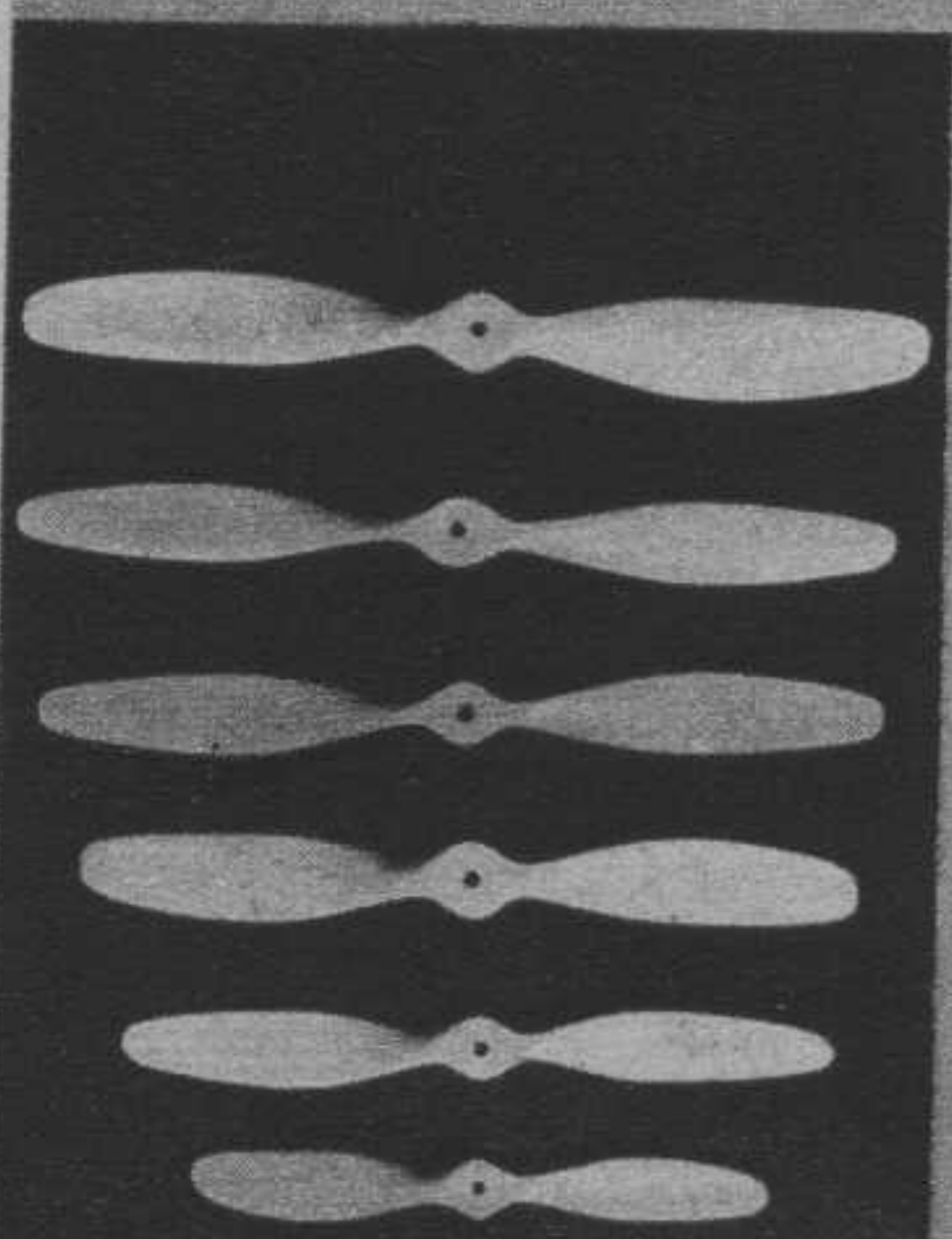
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(Continued from page 24)

used ship," Al said quickly. "if that's too much."

"Will it be dependable?"

"A ship is checked and adjustments made regularly. I never heard of one wearing out. Maintenance is too strict. I'd recommend a new one if you could afford it because improvements are always being made, and, of course, upkeep is higher on a used plane, but I'll find one with log-books in order, and you'll be satisfied. Come back in a day or two."

He found a secondhand Cub for \$700 that Jimmie liked. A payment of \$400 down left twelve payments of thirty dollars that covered insurance and financing, too. It meant saving, but Jimmie had plenty of practice. Upkeep was zero that first year. The ship was too old to depreciate. Gas and oil, including changes, cost him seventy-six cents an hour. Instruction cost him one dollar and fifty cents an hour until he soloed, and then Al gave him check time free. He tied the plane down behind the hangar, when he wasn't flying. Two hundred solo hours, a commercial and an instructor's licenses were Jimmie's within a year. Midge soloed, too, and was getting in time. One of his brothers soloed.

At the end of the year Jimmie traded his bargain plane for \$600 on one that was three years newer, and time continued to accumulate. Jimmie is now a Bennett instructor, Midge has her private, one of his brothers has a hundred hours, the other has soloed on this second plane. An income of \$1,500 a year minimum, if you want to fly bad enough? Jimmie grins. He leaves out the first clause. It's just how bad you want to fly.

Marvin Everett wanted to fly, but his dad was all washed up. Hadn't he given him money for flying lessons, given him money for an old OX Travelair, given him encouragement? And what happened? Marvin cracked up the lumbering old crate that was admittedly in its dotage, and if he flew again he'd have to earn his own money.

It takes a long time to earn a new airplane, and Marvin had no job. Then at Clinton, N. J., where he lived, a shining airplane at \$1,270 was displayed in front of a theater that was showing an aviation picture. Marvin looked and coveted. He sat down on the base and appointed himself attendant. As people came by, he told them about it. "I won't have a new ship," he explained further, "but I expect to have one of the same kind soon, and I'm taking orders for flying time now."

It sounds incredible to the cautious, but Marvin cut sleep to a few before-dawn hours when not even one straggler was abroad, and by the week end he had sold enough time for a down payment on a used plane.

A farmer leased him a field. He didn't have an instructor's rating, but had figured that in the price he set on lessons, and by the end of the summer, fourteen weeks later, Marvin had turned in the used plane on a new one, and had a Packard be-

sides. Marvin's field, the Northwest Jersey Airport near Clinton, is now one of the most active in the State.

Al Bennett figured in another success story, too. He is famous for his finagling to help penniless kids into the air, and if ever a man needed help it was Al Schachterle. He was out of gas when he wheezed into Hightstown with an old Ford that had seen its better days twelve years before. It looked its age, too, and Al looked more than his. Thin, underfed, flat broke, he had been sleeping in a hangar at Mainline Airport, Paoli, Pa. His wife had gone home to her folks. He hadn't an asset in the world except his few clothes, his rickety car, a pilot's license with instructor's rating that was treated with more consideration than his stomach, and a burning ambition.

Bennett didn't like the idea of giving him gas money outright. Besides, he wouldn't take it. But neither could Bennett see a fellow pilot so down on his luck. He checked him around the field. "How about flying for me a couple of days?" he asked.

The students liked him. Unconsciously, they confirmed Al's good opinion, so when Schachterle thought he could buy a plane with student fees if Al would let him take it to Mainline Airport two days for demonstration, Al said O. K.

He had to work fast. Two days! The garage man who sold him gas for his rattling jellopy found himself practically kidnaped for a demonstration. He bounced to a landing and turned loose of the stick with a sweating hand. His check was practically on its way to Hightstown right then. The iceman was next, and two customers from the garage. The hamburger-wagon man and several others followed, and on Tuesday Schachterle flew back to Bennett with a down payment on a \$1,395 plane. On Friday he landed again at Hightstown. Bennett went out quickly.

"Anything wrong?"

"Wrong?" crowed Schachterle. "Never righter. I don't need terms! I have \$1,100 here in advance fees." He had his wife back home with him, too, and now has three planes at Mainline and a growing business.

Success stories? There's Gordon Cahill, who saved \$300 as a laborer in the DuPont factory at Gibbstown, N. J. He bought a secondhand plane, learned to fly, and swapped it for a newer plane, built up more time, and traded again on a new ship.

Flying clubs have brought both grief and pleasure to their members. Planes are as low as \$995. The largest-selling light plane costs \$1,098, with a down payment of \$416. With ten members the initiation fee is less than \$50, weekly dues around one dollar and sixty-five cents. Flying time, including a pilot wage of one dollar an hour for both solo and dual, runs about two dollars and thirty cents.

It sounds wonderful. It works, and works well, when the director is hard-boiled and everyone is careful both of the plane and his fellow members' feelings. Never will I for-

get, though, my feelings each Sunday as I watched a member in a club into which for a year I had sunk every cent of my spending money. He flew the plane in a number of unorthodox maneuvers. And when one day the motor choked from too much oil and too little gas while upside down, I died thirty deaths before he got it rolled over and down.

In an operator's club, the plane belongs to one person. Like Marvin Everett, he is usually someone who wants to own a plane and can't raise the money. Members pay initiation fees of thirty dollars. Dues are four dollars a month. Flying time costs three dollars an hour. For the operator, advantages are obvious. Initiations bring him a down payment. Dues make monthly payments. Flying time covers operating expenses. Resale of the ship is clear profit.

There are member advantages, too. In a self-owned club, in an accident the pilot involved usually pays the first twenty-five dollars, the rest is prorated. This may be burdensome with a show-off flier—and you don't know your best friend as you think you do until you've watched him fly when his best girl is at the field! In the operator's club, the students, always subject to grounding, are kept in line; but if accidents happen, the owner pays from insurance or maintenance funds assured by lesson charges. Members don't worry about administration, keeping up the plane, overhauling it, or washing it when you'd rather be flying. A hundred hours of flying time costing an average of \$665, cost only \$378, including initiation and a year's dues in an operator's club.

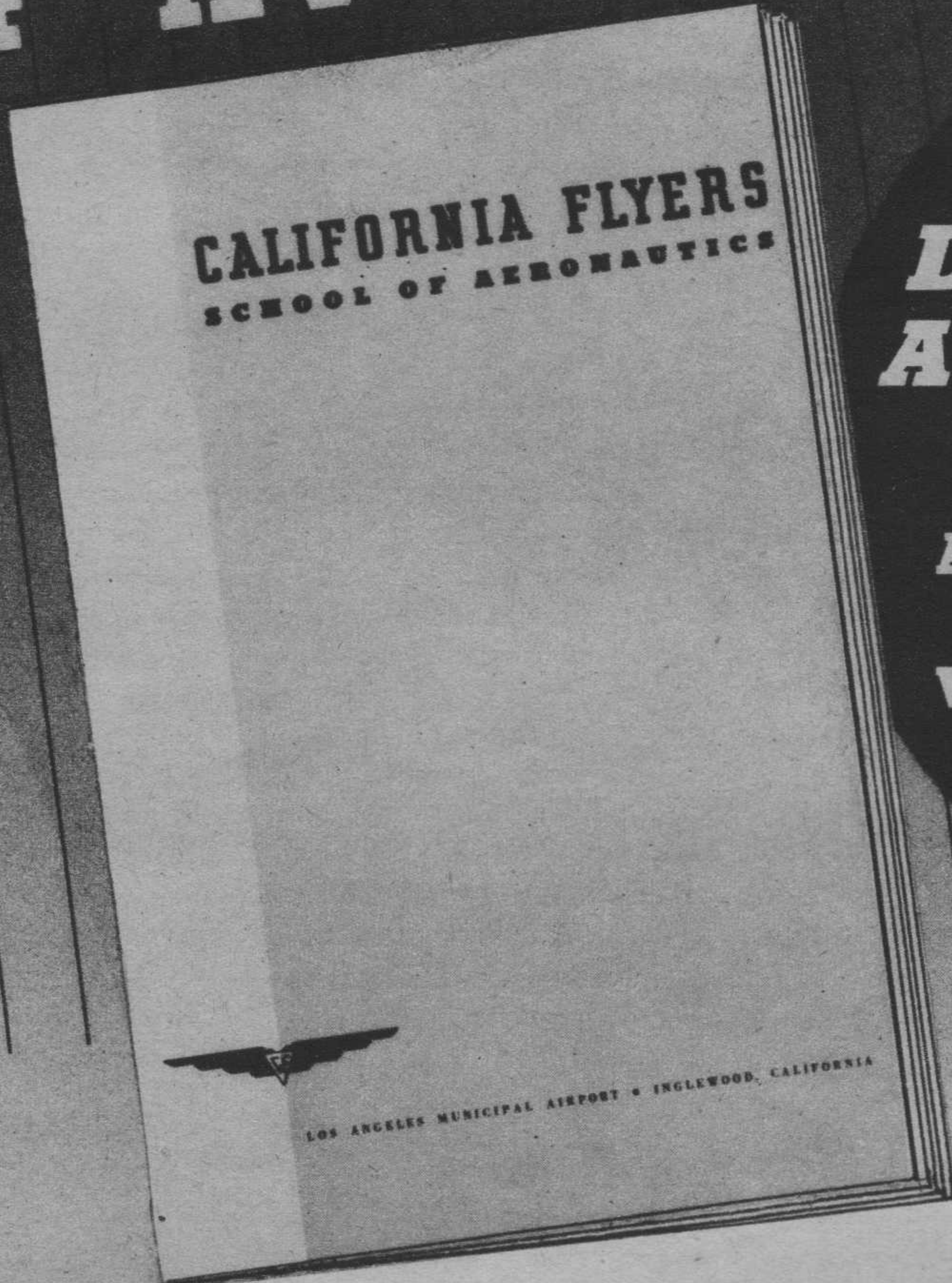
The members have the fun of club events—informal meets, spot-landing contests, solo parties, hangar dances. The ambitious fledgling who wants to start an operator's club will probably find eager members.

The down payment is hardest, but if you've the gumption of sixteen-year-old Bob Mulligan of Bellerose Terrace, N. Y., it isn't too impossible to get flying experience which can sometimes be put up as your share with a partner who may have some cash.

Bob was a model builder, but he said making models was as expensive as flying, so he started saving money for lessons when he was fifteen. His dad got him a job as pin boy in a bowling alley. He worked till two or three a. m., then got up at seven to go to school. On week ends he cad-died at the Garden City Country Club, and worked as order boy in a delicatessen. Two weeks after his sixteenth birthday, he soloed under Sig Uylert at Roosevelt Field. Eleven months later he won his private, the last before the new ruling that private pilots must be eighteen.

He knows all about flying on a shoestring, and sees no reason to worry about owning his plane. That will come later. In the meantime, the shoestring business is booming. Pilots all over America are learning that airplanes can be flown on them—and owned as well.

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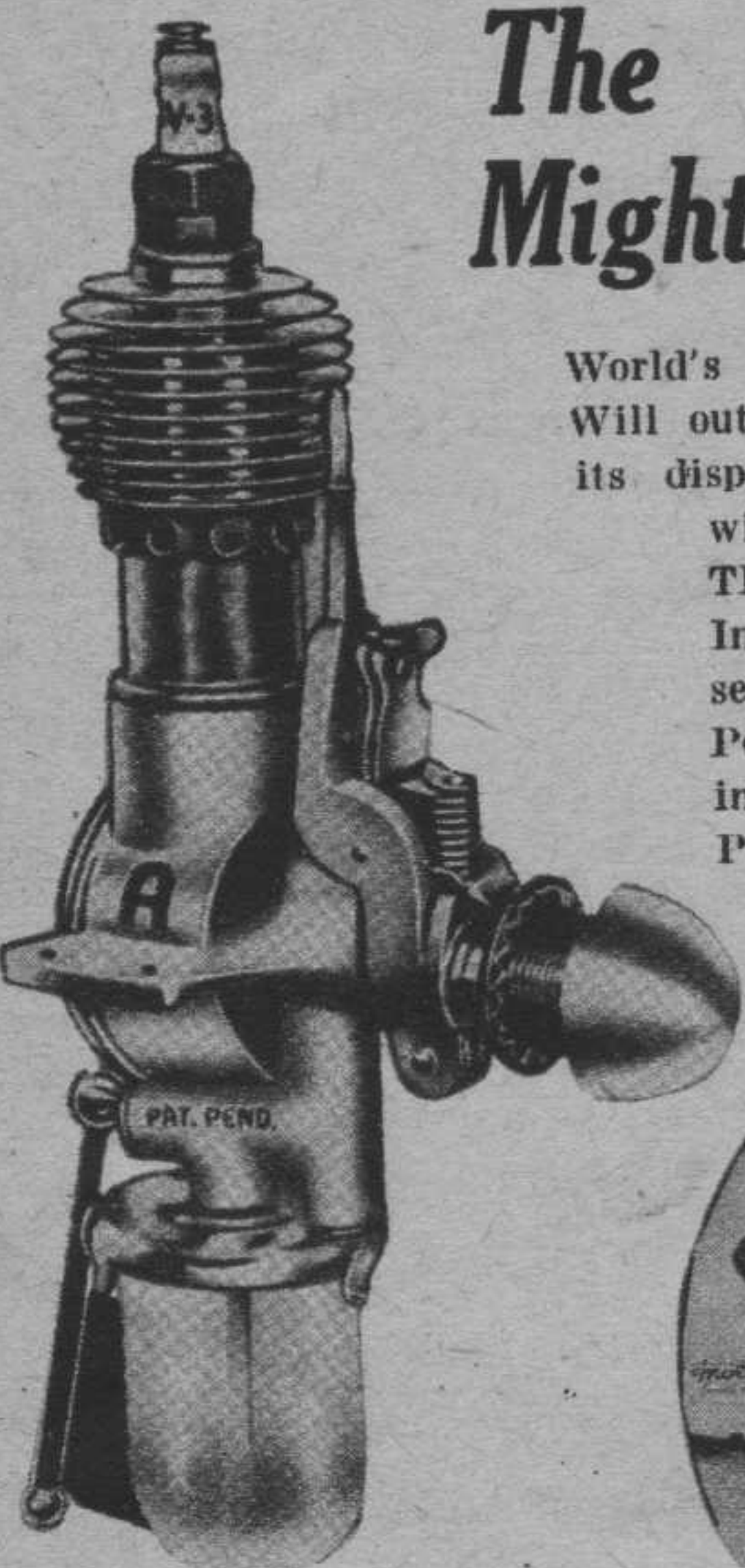
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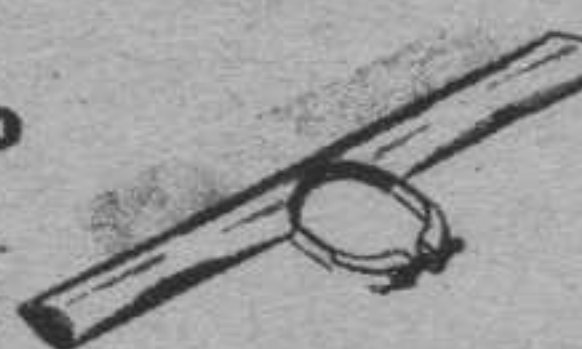


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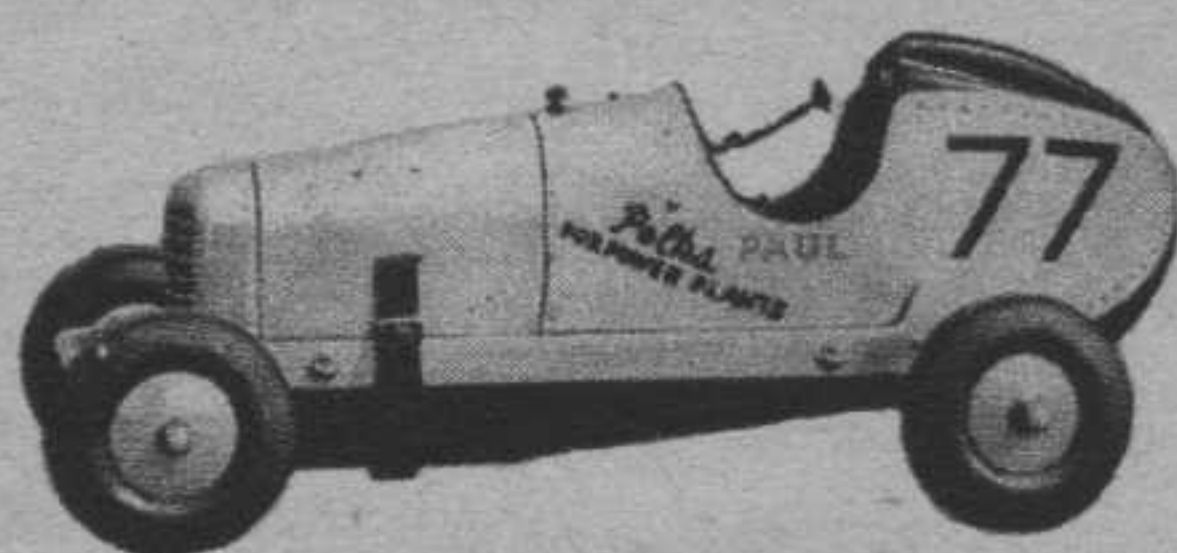
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Kitty Hawk—Where Man First Flew

(Continued from page 25)

they devised what they called "rudders," which they mounted in front of the wing plane. Their "rudders," however, were really elevators, and as such are found on all flying machines in use today. These two developments have, without doubt, made possible the controlled flight of an airplane, for without them control would be virtually nonexistent.

Shortly after discovering these principles, the Wrights decided that if they were to try out their ideas under the best conditions possible it would be necessary to go to a region where winds of steady velocity could be found, along with suitable open space near some sort of elevation where they could proceed to put their theories to the test. The United States weather bureau was consulted, and their advice that there was a region in the vicinity of Kitty Hawk, N. C., hard by the sea, where "winds of eighteen miles per hour were almost constantly sweeping across the flat, open beachlands," decided their choice of a location to complete their work.

Accordingly, in the summer of 1900, the brothers brought their glider to the barren coastal section near Kitty Hawk, on the lonesome Carolina "banks." At that time the isolated region on the coast was completely cut off from the mainland by huge sounds, Albemarle and Currituck, and the only means of access was by boat. In such a manner, therefore, they reached Kitty Hawk, where, shortly after their arrival, they began construction of their hangar for holding the glider and for carrying on experimental work connected with it.

As readily admitted by them, their first summer at Kitty Hawk yielded less results than they had hoped for, but by launching their glider down the sandy slopes of the one-hundred-foot-high Kill Devil Hill, the tremendous pile of wind-blown sand just down the beach from their camp, they found out a whole lot of things that they diligently worked on after they returned home to Dayton for the winter.

In 1902, in the autumn, the Wrights came back to Kill Devil Hill again, this time with a brand-new glider and a lot wiser in the ways of flight. In September and October of that year the two brothers made, all told, over a thousand flights in their contraption from the sandy sides of the hill, and damaged their machine only slightly once. Time after time they would land in a little hollow on the beach near the base of Kill Devil Hill, using the tips only of their glider to break the fall in the soft sand.

All during the winter of 1902 and far into the summer of 1903 the Wrights worked on the problem of power for their airplane: a motor and two propellers. To nearly every manufacturer in the country they carried their problem, but none of them had the answer. The motor they finally used was, therefore, a tiny gasoline engine they rebuilt in six weeks' time, and which developed twelve horsepower. Because its power

was four horsepower more than they had figured on receiving after rebuilding the engine, they promptly added about 150 pounds to their glider through strengthening it at doubtful points. All told, their first airplane weighed 605 pounds empty and about 750 pounds with the operator.

The brothers now had a glider they knew could be controlled in the air, a motor light enough and strong enough to power it, and propellers suitable for the task of shoving the craft forward. There remained, therefore, but one thing left to do: Try the combination out and see if it would work. This was late summer, 1903, in Dayton, Ohio.

In the closing days of September, 1903, three months before achievement and glory were destined to be within their grasp, Wilbur and Orville came back to their camp on the sands near Kitty Hawk, in the shadow of Kill Devil Hill.

The days slipped by that fall with great rapidity. Indian summer, with its bluish haze and lazy days, came and went, almost before the brothers realized it, so engrossed were they with their problem. Still they were not ready, and, in early December, winter settled down upon the Outer Banks. On the 14th they made a premature attempt to fly their craft, but it failed to do what was expected of it. For December 17th, therefore, three days hence, they set the date for their ambitious attempt.

Dawn broke that day on a gray, stormy expanse of ocean and deserted beach, and lowering clouds raced overhead, whirled along by a twenty-seven-mile-per-hour wind. The somber, sullen boom of the surf mingled with the shriller, singing cry of the wind as it whipped around the weather-beaten structure which housed the frail machine destined to conquer and explore the heavens. On arising, the brothers looked with misgiving upon the weather outside, but after waiting until ten o'clock for a lull, decided that, despite its disagreeableness, they would make the attempt.

Shortly before, they had signaled their friends down at Kill Devil Hill Coast Guard Station on the beach nearby to come up and act as witnesses, and before long several of the men arrived. These were W. S. Dough, A. D. Etheridge, J. T. Daniels—all living today—and W. C. Brinkley, deceased. A boy, Johnny Moore, was also present.

Preparations for the flight, methodical and unhurried, were carried forward in the face of the unfavorable weather and soon the little forty-foot track of rails that was to serve for the airplane's runway was laid out along a level stretch of sandy beach. Willing hands soon lifted the fragile, boxlike machine from its weather-beaten hangar, and as it stood at the upper end of the runway, swaying and trembling in the near-gale, held only by the slender wire attaching it to the launching weights, its seeming inability successfully to combat the elements was strikingly apparent to the little knot of spectators.

The tiny twelve-horsepower gasoline motor seemed pitifully inadequate to lift the several hundred pounds of machine and pilot into the air; but, with sublime confidence in their creation, the quiet, serious-faced brothers continued their careful scrutiny of the ship and its apparatus. In another moment all seemed to be in readiness, and because Wilbur Wright had been the one to pilot the ship on the first attempt on the 14th, Orville Wright was the one to climb carefully aboard the lower wing and lie there prone.

What happened from this point on is best told in the words of Orville Wright himself:

"After running the motor a few minutes to heat it up, I released the wire that held the machine to the track, and the machine started forward into the wind. Wilbur ran at the side of the machine, holding the wing to balance it on the track. Unlike the start on the 14th, made in a calm, the machine, facing a twenty-seven-mile wind, started very slowly. Wilbur was able to stay with it until it lifted from the track after a forty-foot run. One of the life-saving men snapped the camera for us, taking a picture just as the machine had reached the end of the track and had risen to a height of about two feet.

"The course of the flight up and down was exceedingly erratic, partly due to the irregularity of the air and partly to lack of experience in handling this machine. The control of the front rudder was difficult on ac-

count of its being balanced too near the center. This gave it a tendency to turn itself when started, so that it turned too far on one side and then too far on the other. As a result, the machine would rise suddenly to about ten feet and then as suddenly dart for the ground. A sudden dart when a little over a hundred feet from the end of the track or a little over 120 feet from the point at which it rose into the air, ended the flight. As the velocity of the wind was over thirty-five feet per second and the speed of the machine over the ground against this wind ten, the speed of the machine relative to the air was over forty-five feet per second, and the length of the flight was equivalent to a flight of 450 feet made in calm air. This flight lasted only twelve seconds, but was, nevertheless, the first in the history of the world in which a machine carrying a man had raised itself by its own power into the air in full flight, had sailed forward without reduction of speed and had finally landed at a point as high as that from which it started.

"At twenty minutes past eleven, Wilbur started on the second flight. The course of this flight was much like that of the first flight, very much up and down. The speed over the ground was somewhat faster than that of the first flight, due to the lesser wind. The duration of the flight was less than a second longer than the first, but the distance covered was about seventy-five feet greater.

"Twenty minutes later the third flight started. This one was steadier than the first one an hour before. I was proceeding along pretty well when a sudden gust of wind from the right lifted the machine up twelve to fifteen feet and turned it up sidewise in an alarming manner. It began a lively sliding off to the left. I warped the wings to try to recover the lateral balance, and at the same time pointed the machine down to reach the ground as quickly as possible. The lateral control was more effective than I had imagined, and before I reached the ground the right wing was lower than the left and struck first. The time of this flight was fifteen seconds and the distance over the ground was a little over two hundred feet.

"Wilbur started the fourth and last flight at just twelve o'clock. The first few hundred feet were up and down as before, but by the time three hundred feet had been covered, the machine was under much better control. The course for the next four or five hundred feet had but little undulation. However, when out about eight hundred feet the machine began pitching again and, in one of its starts downward, struck the ground. The distance over the ground was measured and found to be 852 feet; the time of the flight, fifty-nine seconds. The frame supporting the front rudder was badly broken, but the main part of the machine was not injured at all."

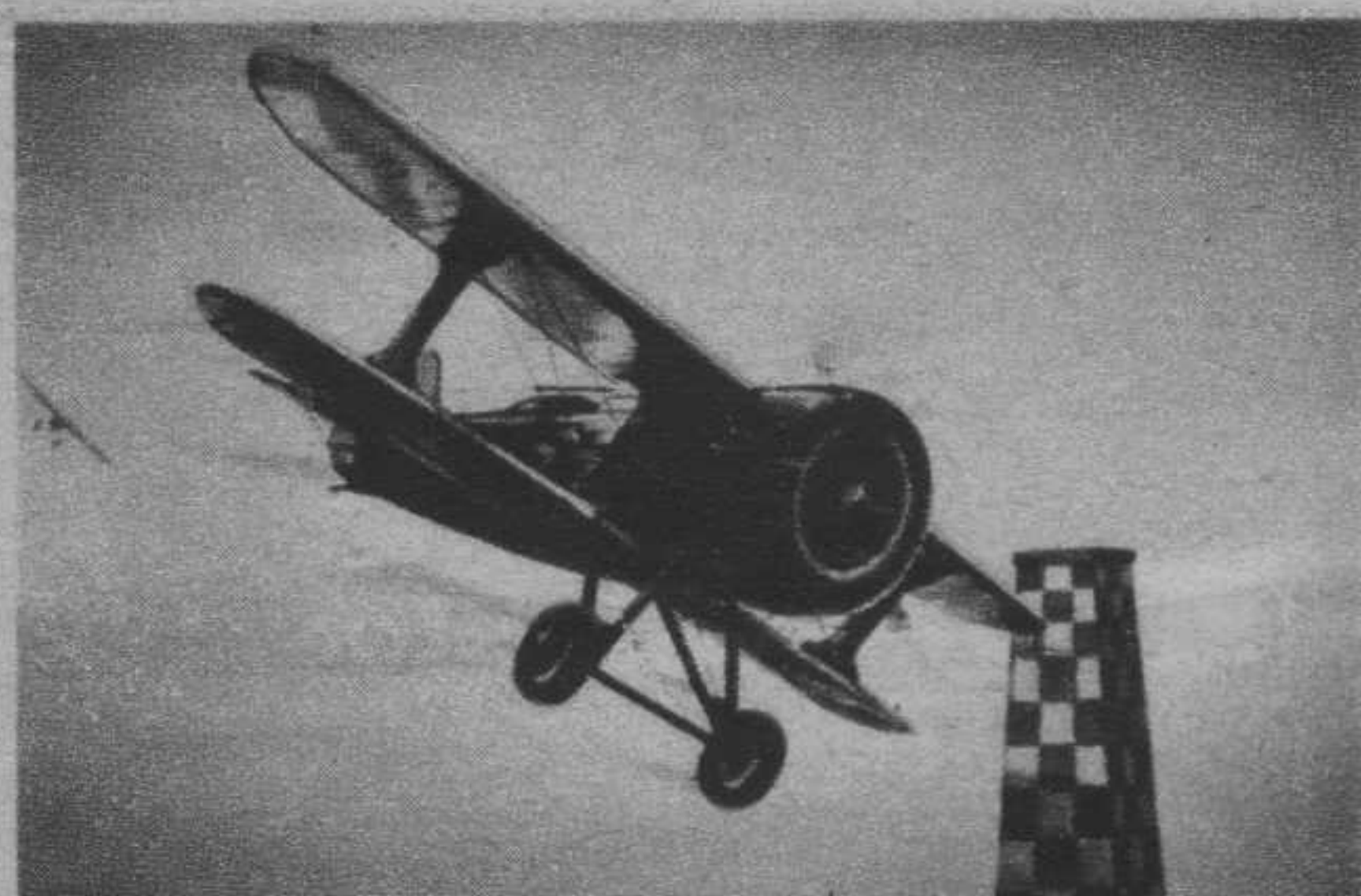
The years drifted inexorably by

since that bleak December day at Kitty Hawk when man first flew, and many people neither knew nor cared that this isolated, barren stretch of coast in North Carolina was the birthplace of aviation.

But in 1927, during August, there met a group of North Carolinians near the scene of the famous experiments of the Wrights who concluded that the government of the United States should take steps to perpetuate the memory of those painstaking and tireless aviation pioneers. Consequently, the Kill Devil Hill Memorial Association was organized, with the end in view of having a suitable monument erected to the spectacular achievement of the Wright brothers.

The plan captured the imagination of Congress, which body appropriated the sum of \$225,000 for the work. The cornerstone was laid on the 17th of December, 1928, on the twenty-fifth anniversary of the first flight of man, and construction was immediately begun on the granite shaft chosen as the memorial.

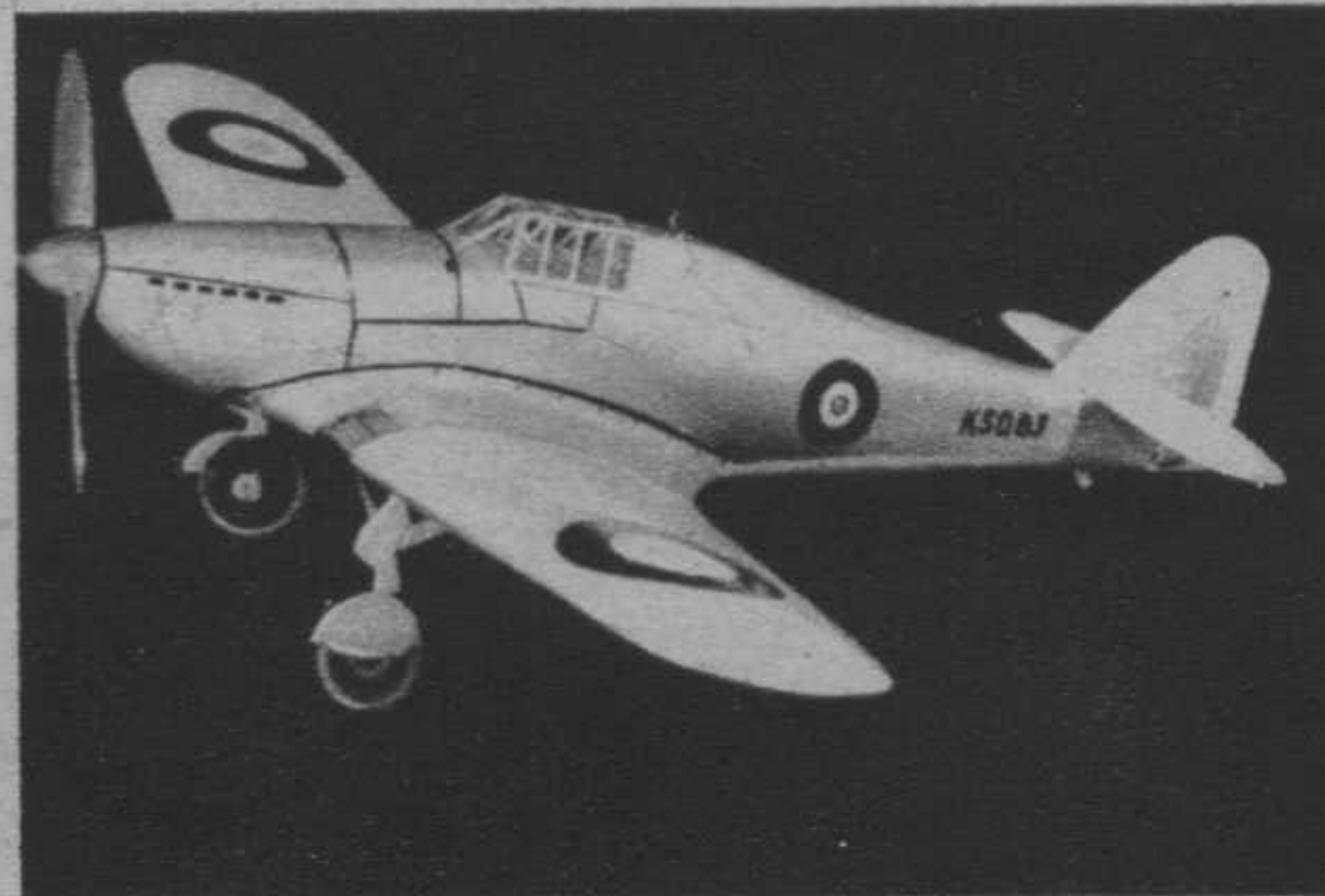
Today, this great memorial, built of granite from the hills of North Carolina, stands atop Kill Devil Hill, the giant sand dune from which so many of the Wrights' glider flights were launched. One hundred and sixty-five feet from the plain at its base the crest of the memorial towers into the sky, an undying tribute to the brothers who lifted man's feet from the earth and set him free to conquer and explore the skies.



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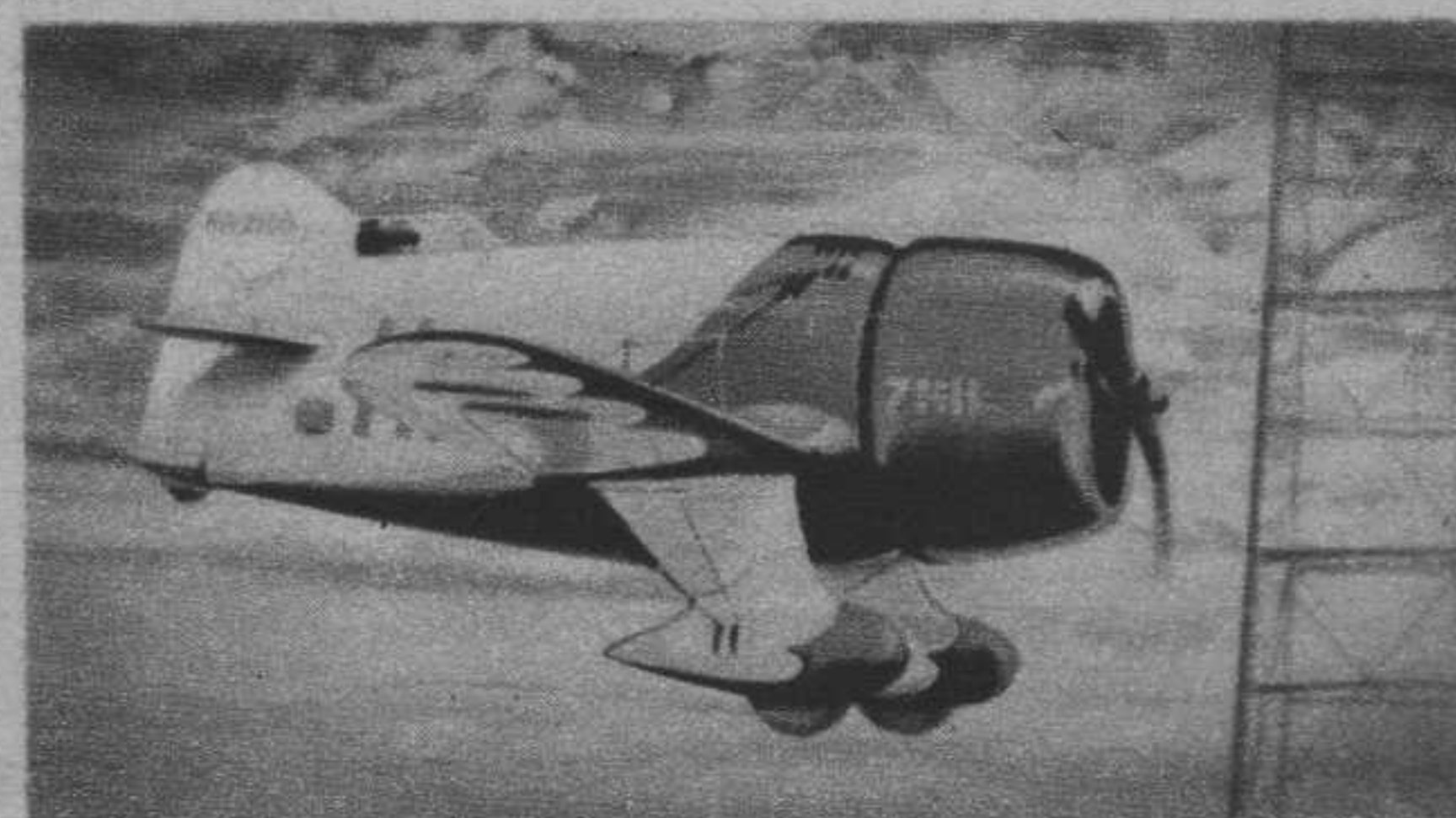
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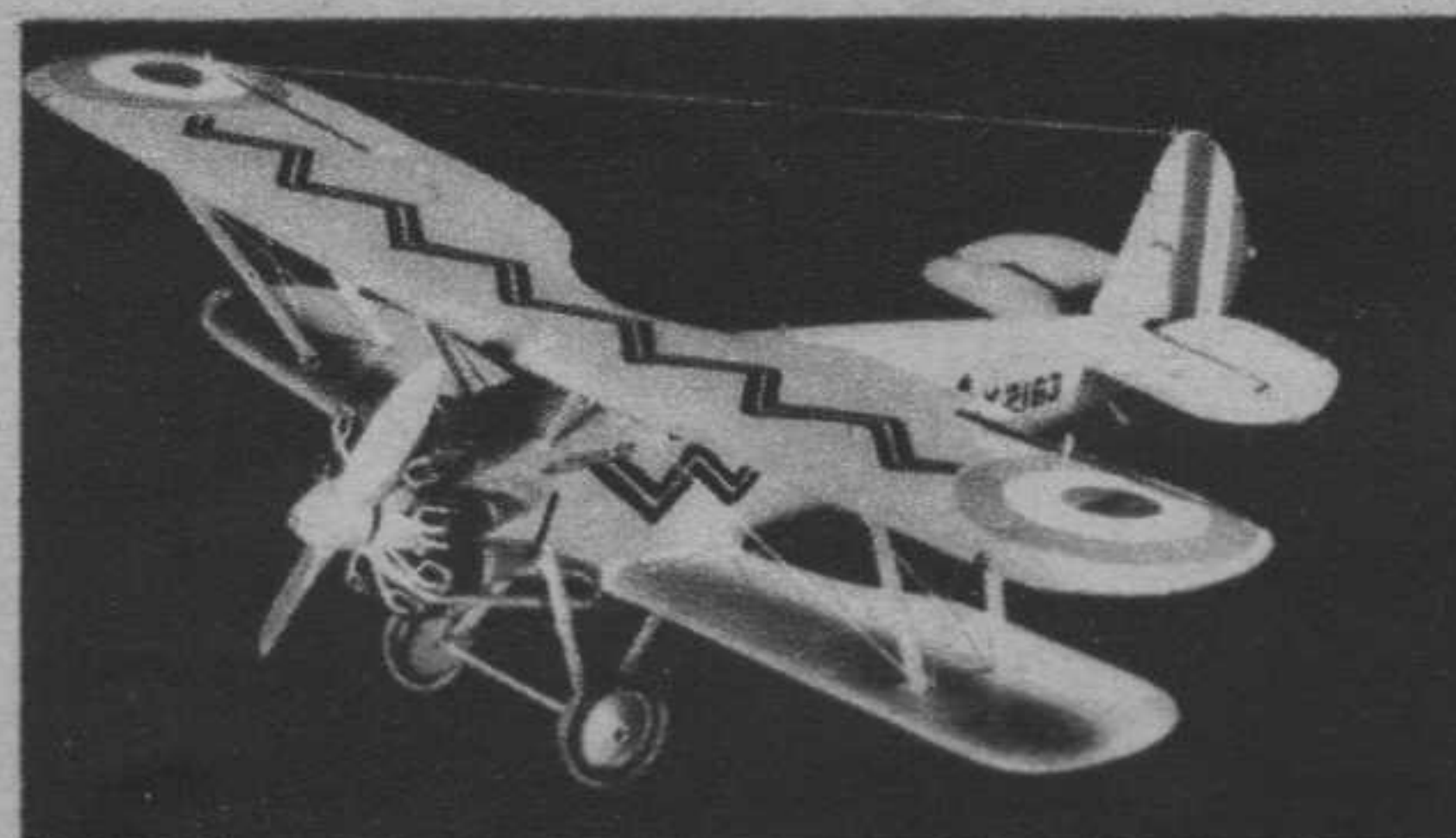
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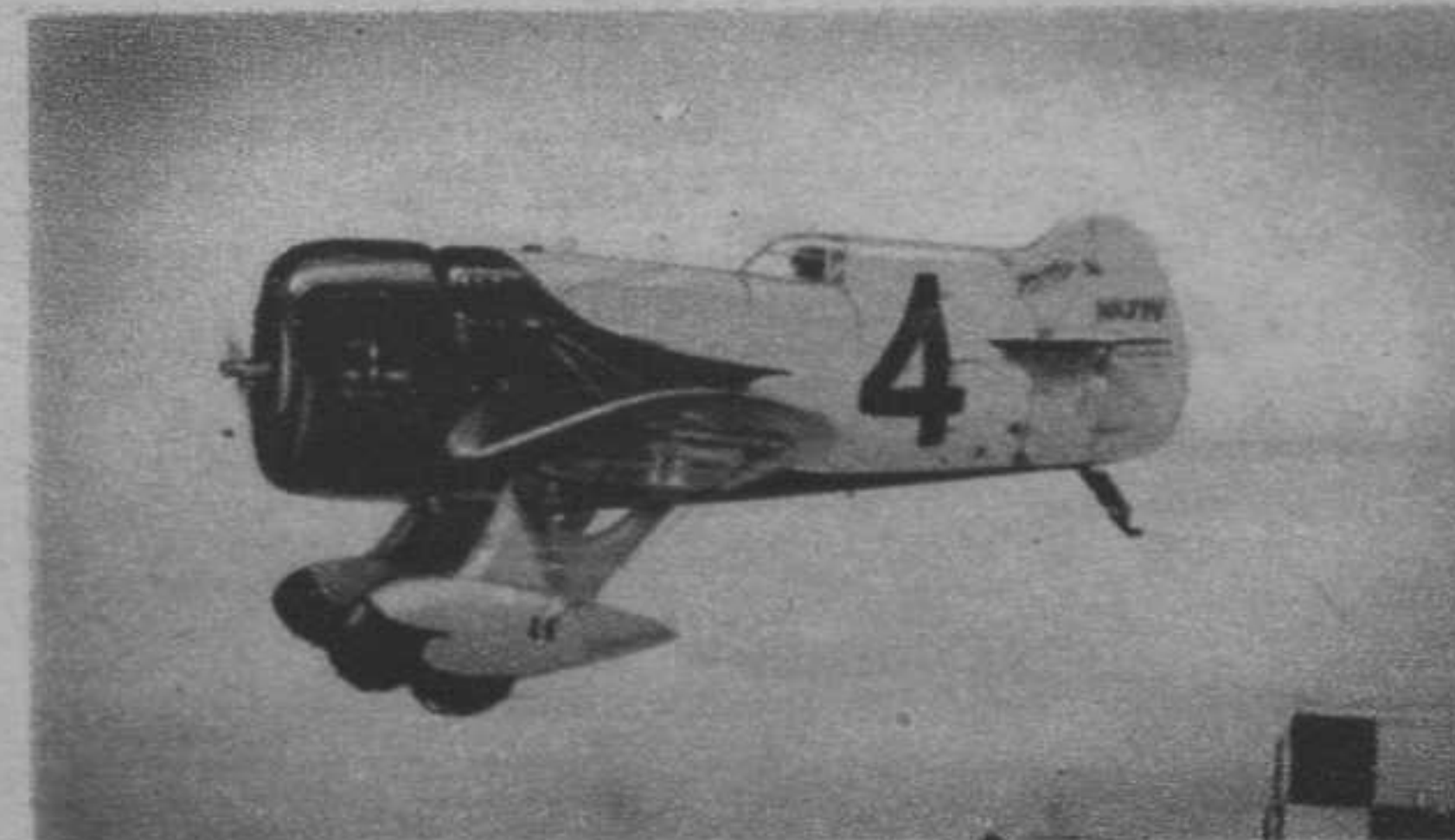
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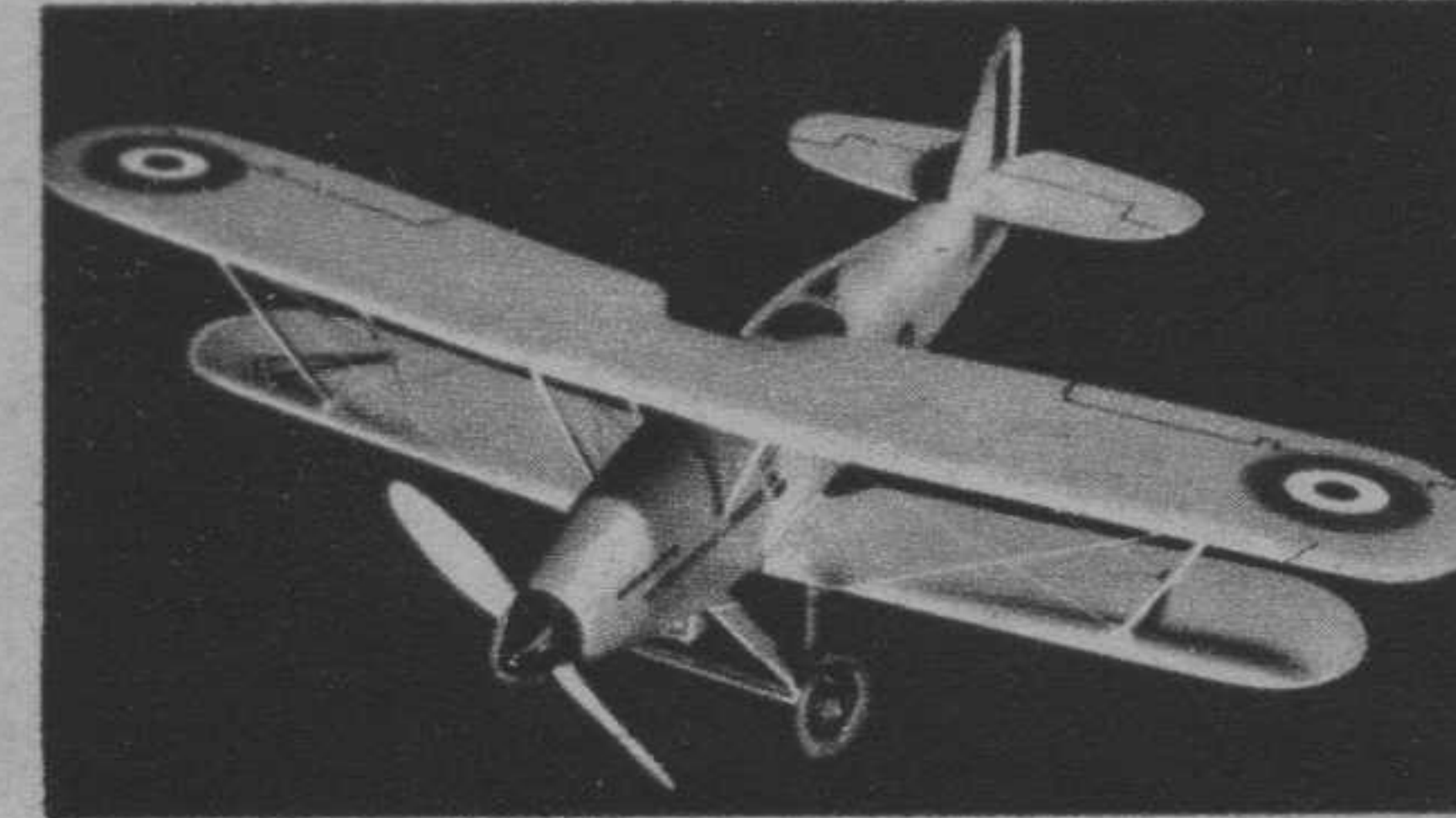
GEE BEE 1932 25c



BRISTOL BULLDOG 40c



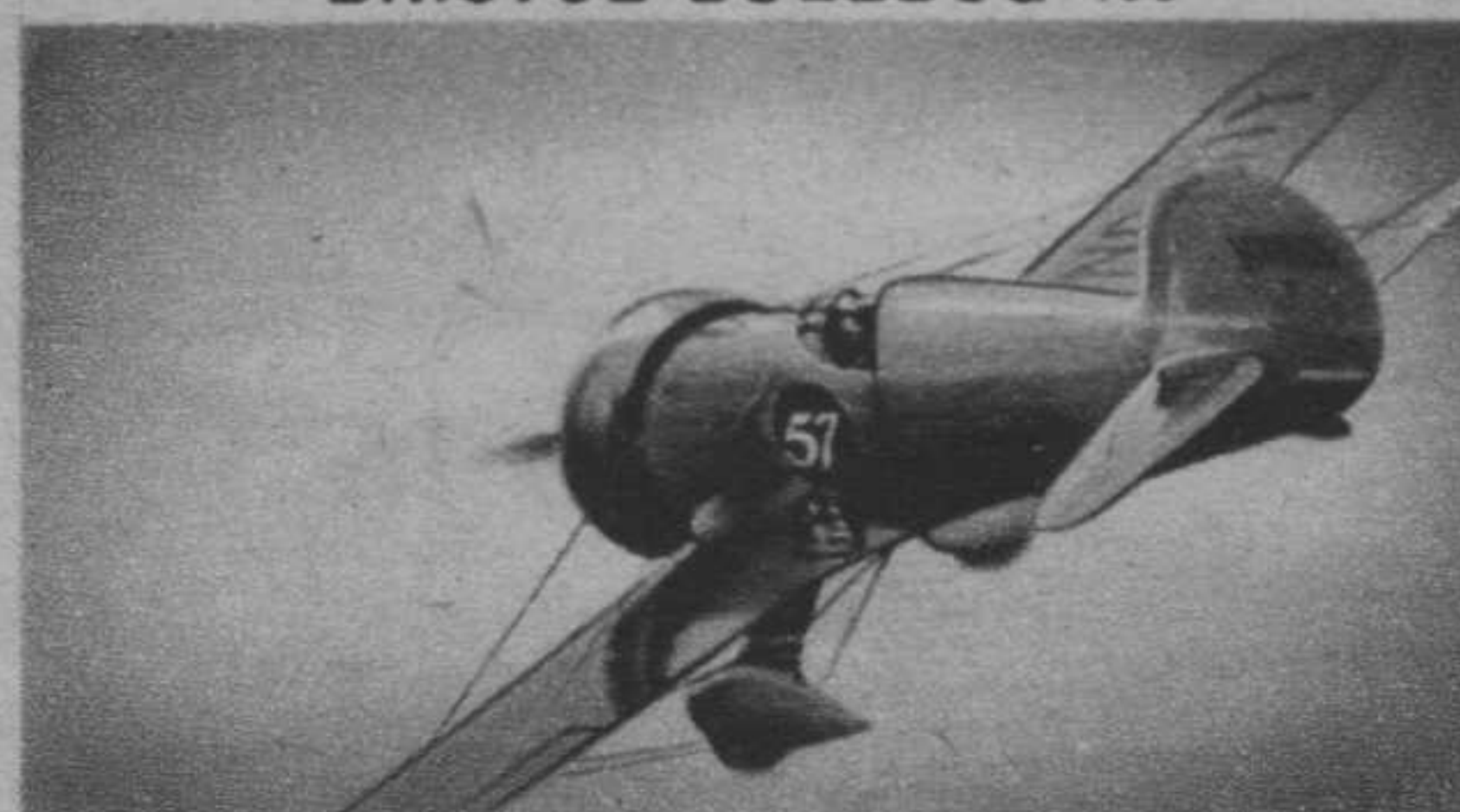
GEE BEE 1931 25c



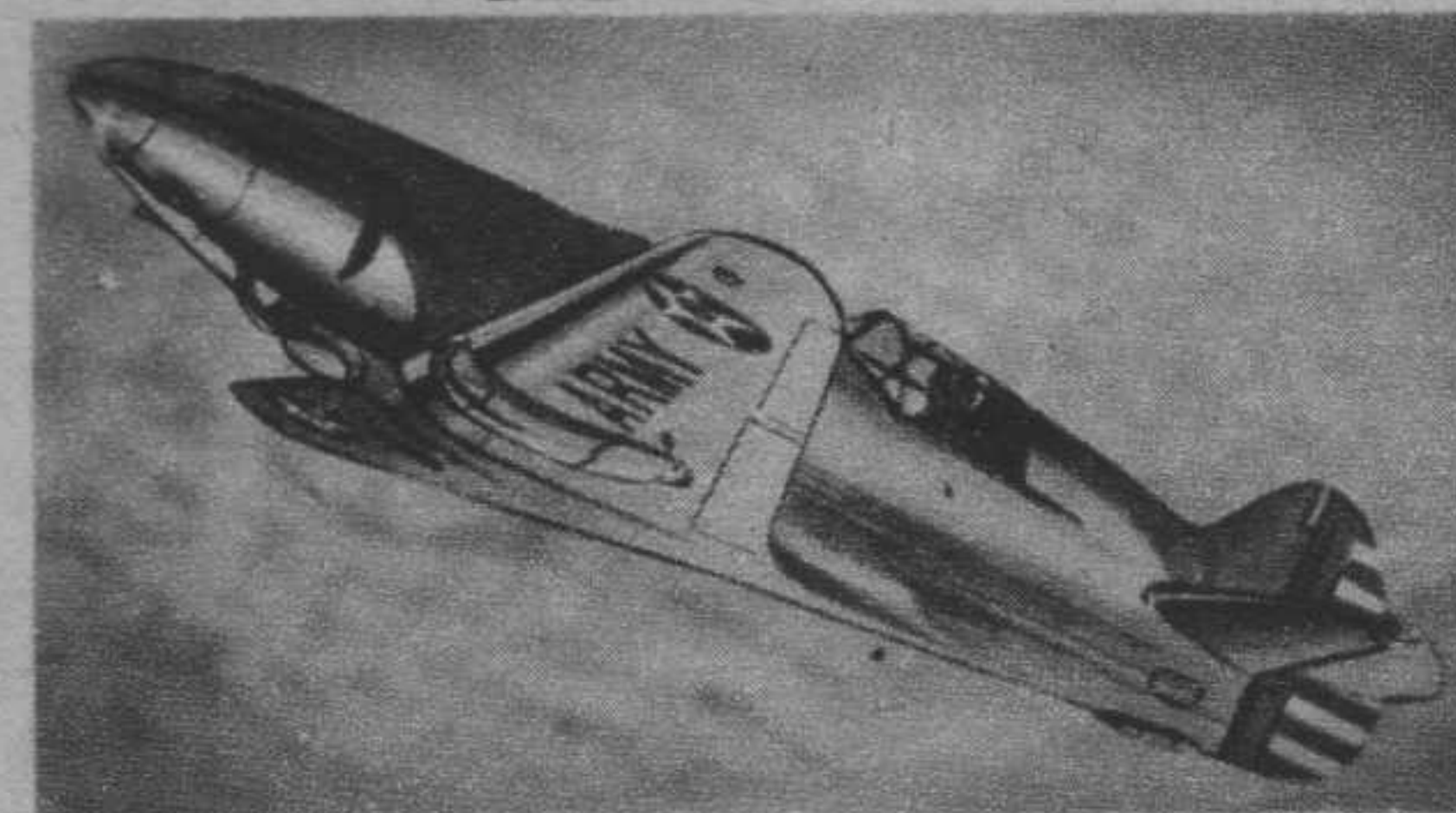
HAWKER HART 45c



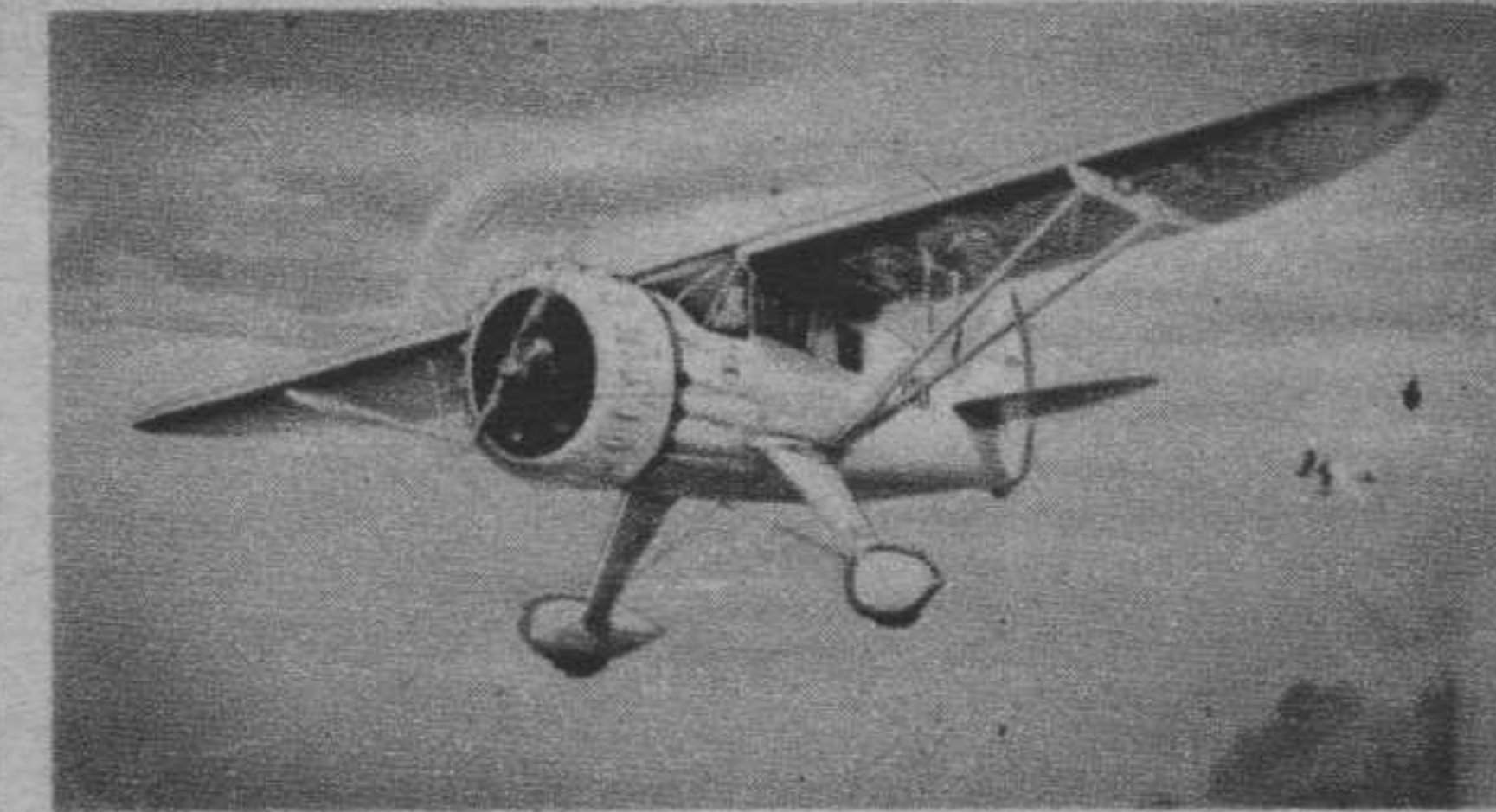
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WEDELL WILLIAMS 1934 25c

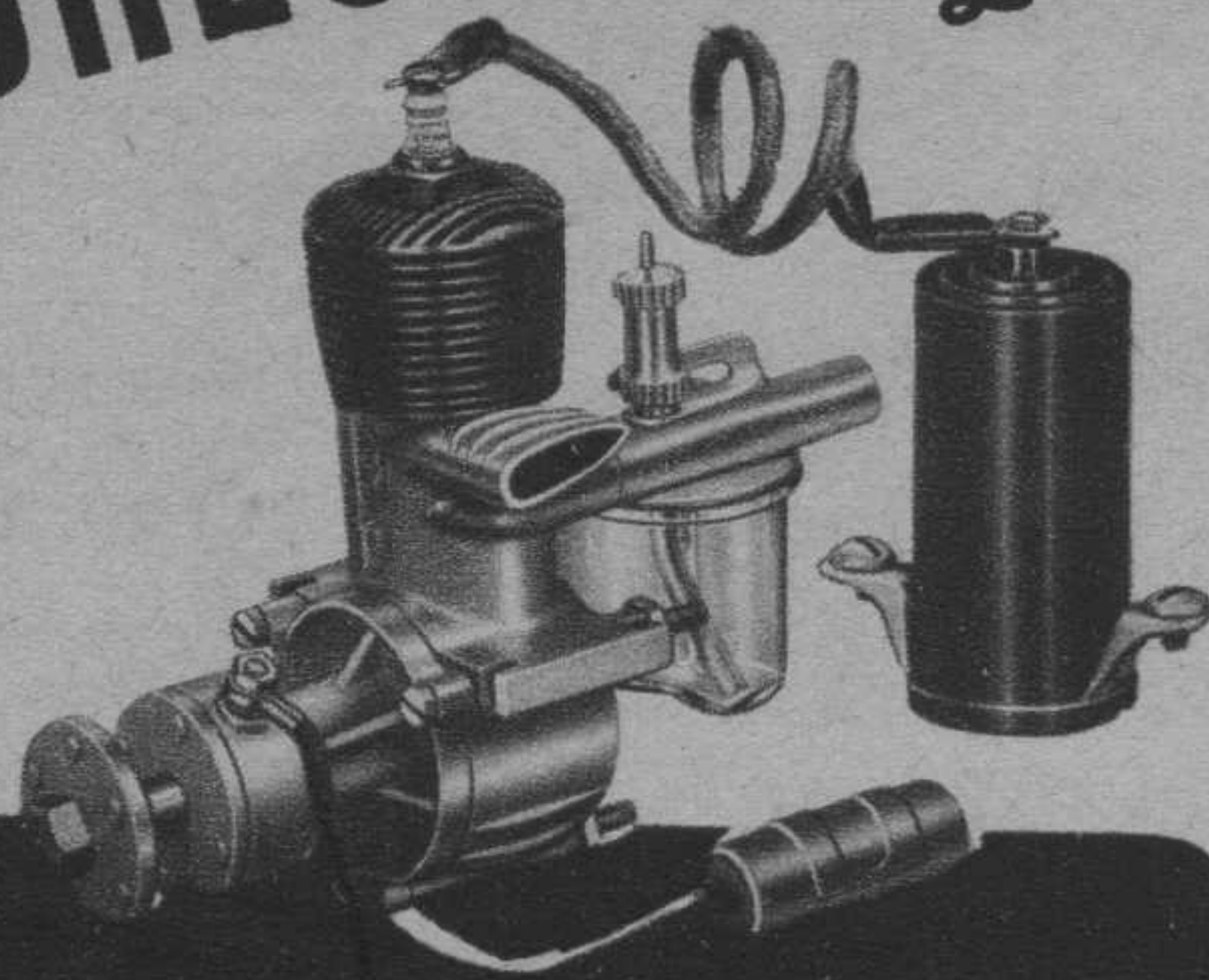


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are all that receive the attention of the boys in the white coveralls.

The propellers are cared for by a huge conical-shaped cap called a slinger ring. This cap is attached to the hub of the prop and in flight discharges a spray of fluid which completely coats the whirling blades, making them impervious to the affectionate ice film which tries ever so hard to attach itself to the metal. The fluid is a mixture of alcohol and glycerine, eighty-five percent of the former and fifteen percent of the latter. This gooy concoction is sprayed automatically by the action of the prop itself and is most efficient in its purpose.

In the first paragraph we mentioned the carburetor, most important unit of the power plant. If we implied different carburetors are put on exclusively for winter flying, we retract. The carburetors are the same all year round, because they are of a special design and can be adjusted from the cockpit to function smoothly in any kind of weather.

These little gadgets are equipped with an intensifier tube (sometimes erroneously referred to as "intense fire," which isn't such a bad name at that). This tube draws in the cold air from the front of the airplane, passes it through the exhaust stacks, which heats it, and from there into the carburetor proper. There are little openings, similar to tiny doors, which may be opened or closed to regulate the temperature of the air. By means of these carburetors it is practically impossible for an icing condition to exist in this part of the engine's vitals. Foreign air lines are fast becoming aware of the value of this gadget and are installing the American-built instrument in most of their ships.

Another precaution taken is the windshield de-icer, which in no way resembles the wing de-icer.

So the smart boys who dope out these things and the hard-working lads who install them put a small tubing around the windshield from

Red Flannels For Airliners

(Continued from page 14)

which pure alcohol is forced on the surface of the glass. The tube is copper and a special tank furnishes the pressure. The ice simply can't stand the effect of alcohol and dissipates.

The oil lines are covered with asbestos. This is to keep the oil from congealing. The cold air cools the oil, which is not so good, because engines need warmth. The asbestos covering takes care of that.

Don't think, however, that the maintenance bunch think only of the engine. That, of course, is their main concern, because there are pretty stewardesses and handsome stewards to take care of the passenger inside the cabin. They can turn on the cabin heat or supply blankets when necessary, but before the ship takes off, these inside-maintenance aids are not on the job. So it is again up to the boys in the hangar to get the ship's innards comfortable for the cash customer.

All summer, you who have visited major airports, have noticed huge, clumsy-looking motor cars with long, thick nozzles emerging from their sides, sneak up to the off side of a parked plane, and seen mechanics quickly connect the hose to a special opening in the ship. In summer this weird-looking contraption blows frigid air into the ship, keeping the temperature at a comfortable degree. But what good, you ask, is frigid air in winter?

What good, indeed? But here's where they fool you again. There was some mythological bozo, who (don't bother stopping me if I'm wrong) marveled at man's ability to blow hot and cold. In other words, he saw some lad blow on his food (beastly manners!) to cool it, and with the same breath, blow on his hands to warm them. So do these air-conditioner trucks blow hot and cold, merely by the deft manipulation of a few switches and pet cocks. The huge fans inside the trucks may be converted to blow either hot or cold air, and in winter, naturally, the heat is on. Which takes care of the passenger.

This might be a good spot to explain the working of the rubber boot, as the wing and tail assembly de-icers are known.

The long black patch which fits snugly over the edge of the wing covers a series or network of smaller tubes which run from the innards of the engine. By merely applying his hand to a small lever in the cockpit, the pilot sets this in motion. Air pulsates through the network of tubing, causing it to throb with each beat of the engine, expanding and contracting, continuously. The action is so fast that it would hardly be visible to the naked eye, but it does the job. Ice, it has been demonstrated, does not readily form on a moving surface, and the constant throbbing of the boot breaks up the film before it gets a chance to form.

There is, at present, before the board of scientists at Langley Field, a formula of sticky substance which is said to be the perfect de-icer. It has never been tested on a transport, but last winter tests were made on a small ship and the results are said to be most promising. This mixture would be smeared on the wings, antenna, struts or other parts of the plane exposed to weather, and while it is a messy and tiresome procedure, if it answers the purpose it will be well worth the time involved.

There have been many other concoctions which claimed to dispel or prevent ice. Few of them were found practical. Experimentation is constantly going on by the air-line laboratories, scientists of the rubber companies, chemical concerns and private inventors who realize there is a fortune to be made in perfecting an infallible de-icer. So far, the rubber boot, slinger ring and alky solution have been found best.

Icing conditions, long the favorite topic of the movie writers and a regular menace in the early days of aviation, are no longer feared by the air lines. They are being coped with.

Pardon me while I go out and buy some wool socks.

Winter's around the corner!



About the SOLO CLUB and how to become a member

Feeling that there is a definite need for a means of recognizing those pilots who have experienced the supreme thrill of their first adventure alone into the blue on man-made wings, Air Trails has formulated and founded the SOLO CLUB.

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

To obtain your sterling silver SOLO CLUB lapel wings and life membership identification card, comply with any of the following requirements and sign. Send with fifty cents to the SOLO CLUB, Membership Committee, Air Trails, 79 7th Ave., New York City.

Proof of Qualification as a SOLO CLUB Member

1. Dept. of Commerce license and number if held

2. F. A. I. license and number if held

Or attach any of the following:

3. Evidence of military or naval air corps service.
4. A letter from your instructor testifying to your solo flight, giving his rating and license number.
5. A notarized statement, preferably with witnesses, giving all details and data of solo flight and plane used.

In submitting the above for membership in the SOLO CLUB, I certify my willingness for the Membership Committee to investigate my application.

Applicant..... (please print)..... Age.....
Street..... City or Town..... State.....

EXTRA
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Merry Christmas C-B Model News

"Realism in Miniature"

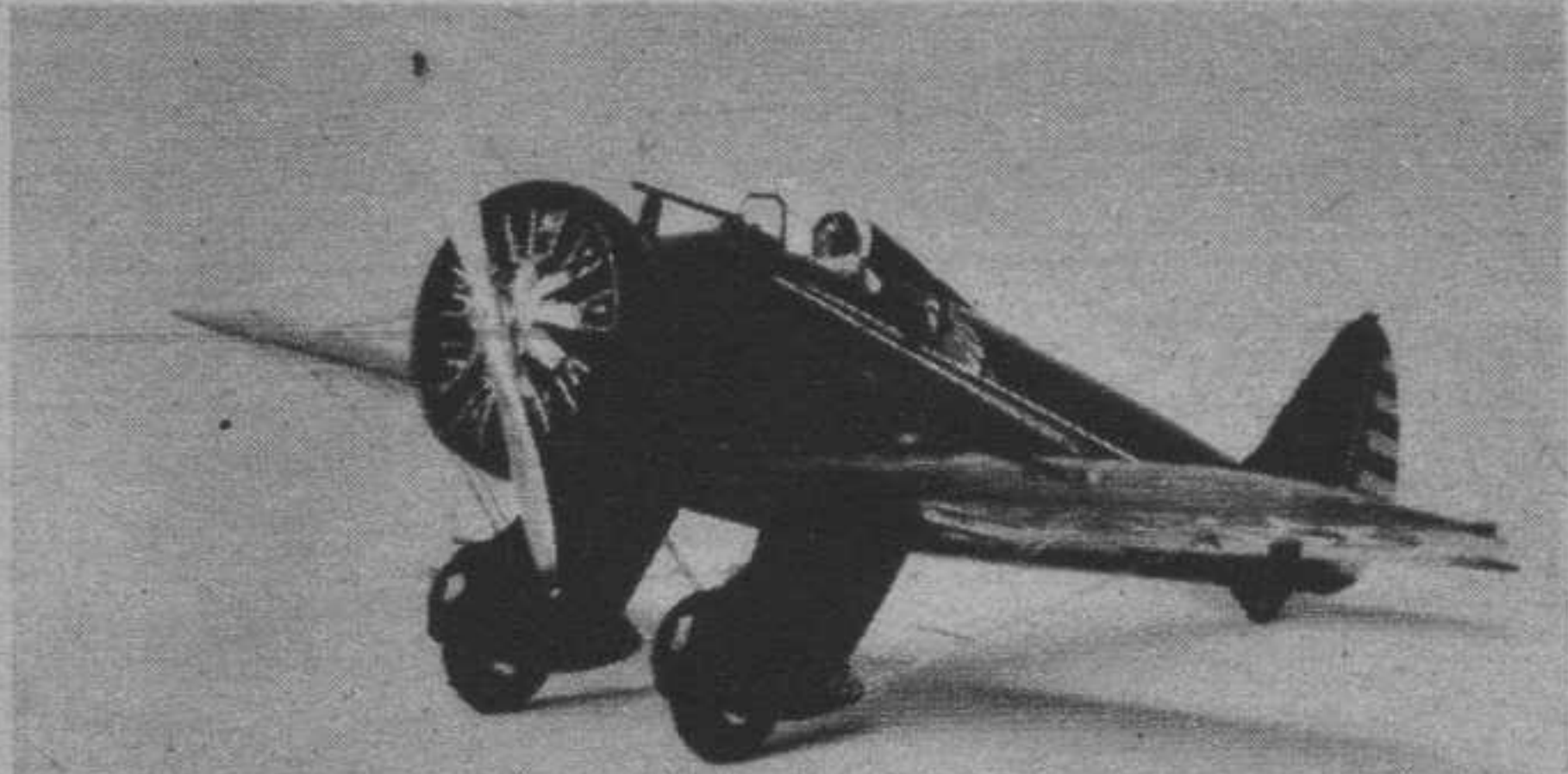
**ORDER YOUR
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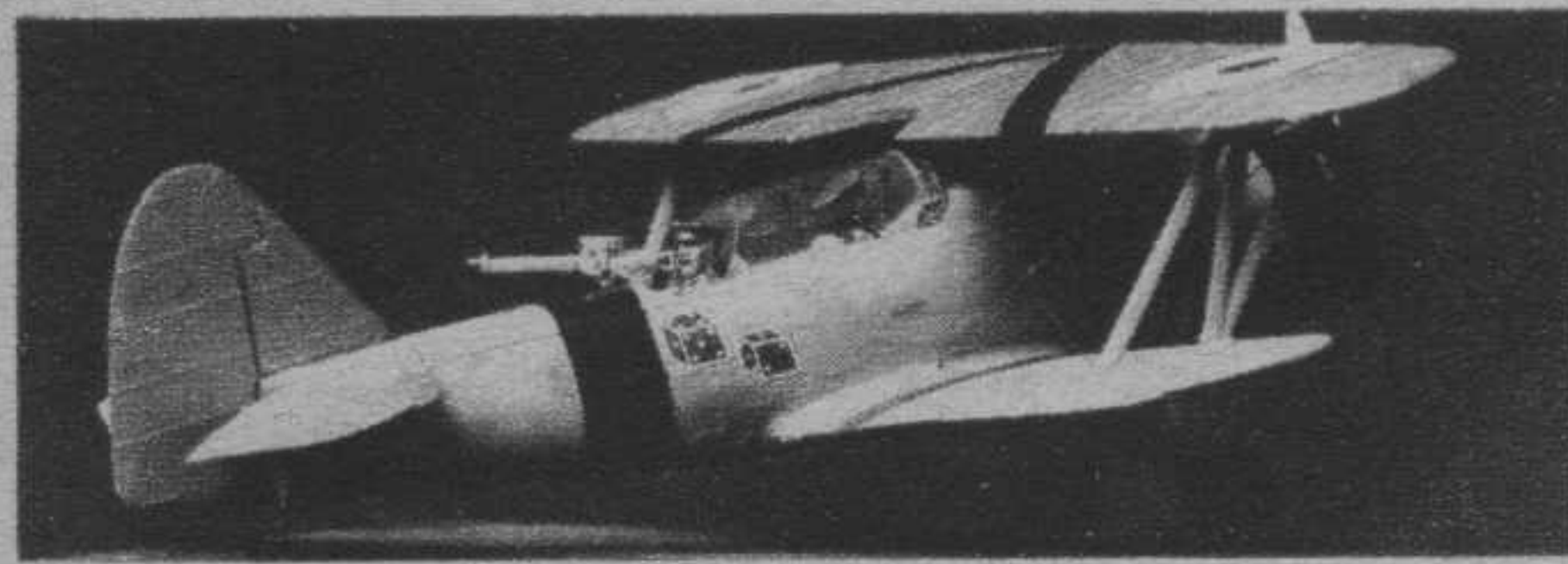
MORGANTOWN, W. VA., DECEMBER, 1939

PRICE—YOUR PATRONAGE

ACTUAL PHOTOS OF OUR MODELS



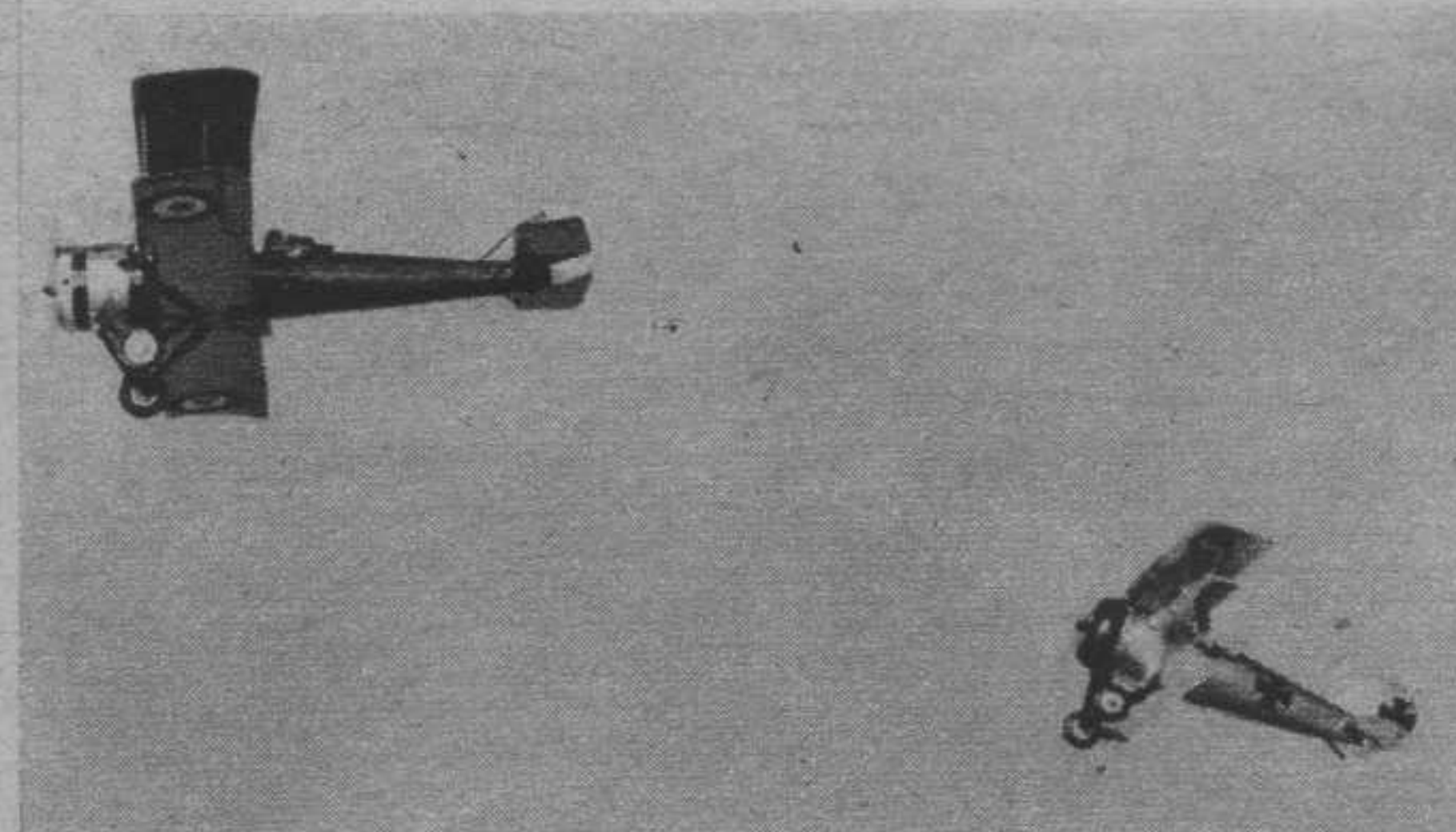
A DELUXE 13" model of this Boeing P-26A with miniature pilot, imitation wing ribs, cockpit interior, squadron insignia, etc., is offered to you for only \$9.00. A 6 1/2" model of this ship finished is priced at only \$2.00.



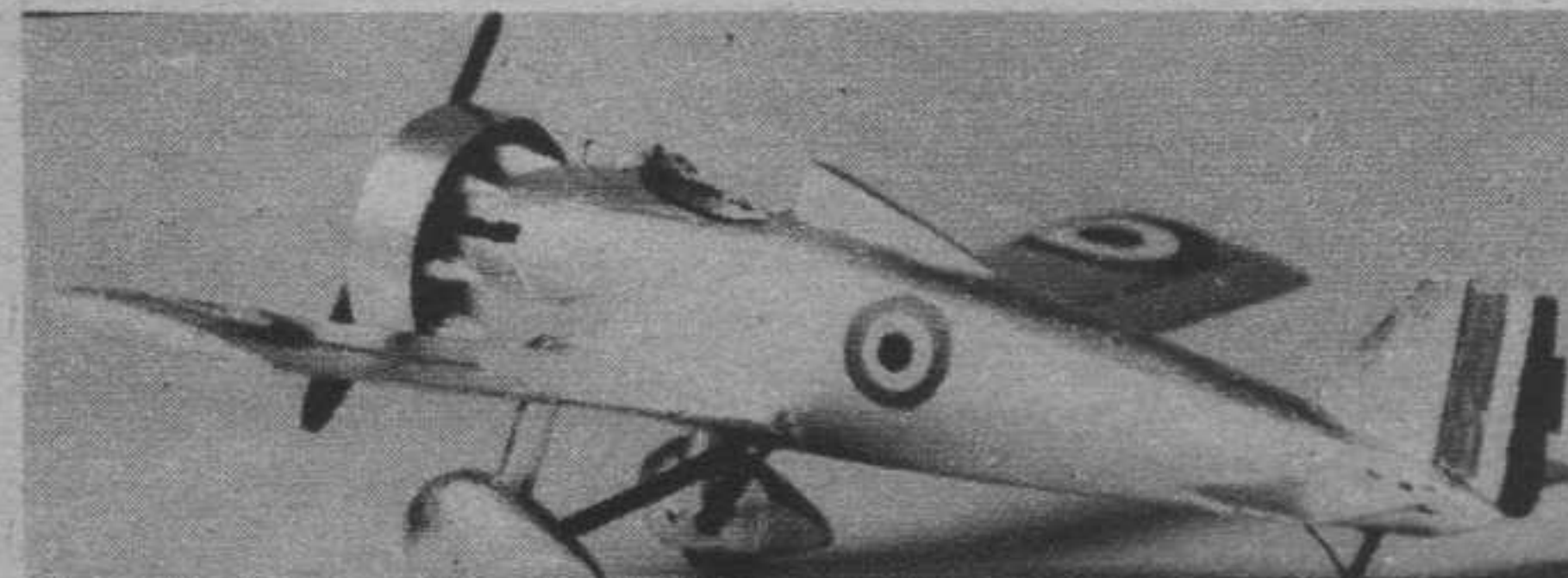
THE NAVY'S old "reliable" Vought SBU-1 is now offered to you in a finished scale model, complete with machine guns, pilot and observer, detailed built-up motor, wing-step, imitation wing ribs and many other details in a 17" job at \$12.00. A 9" model at only \$2.75.



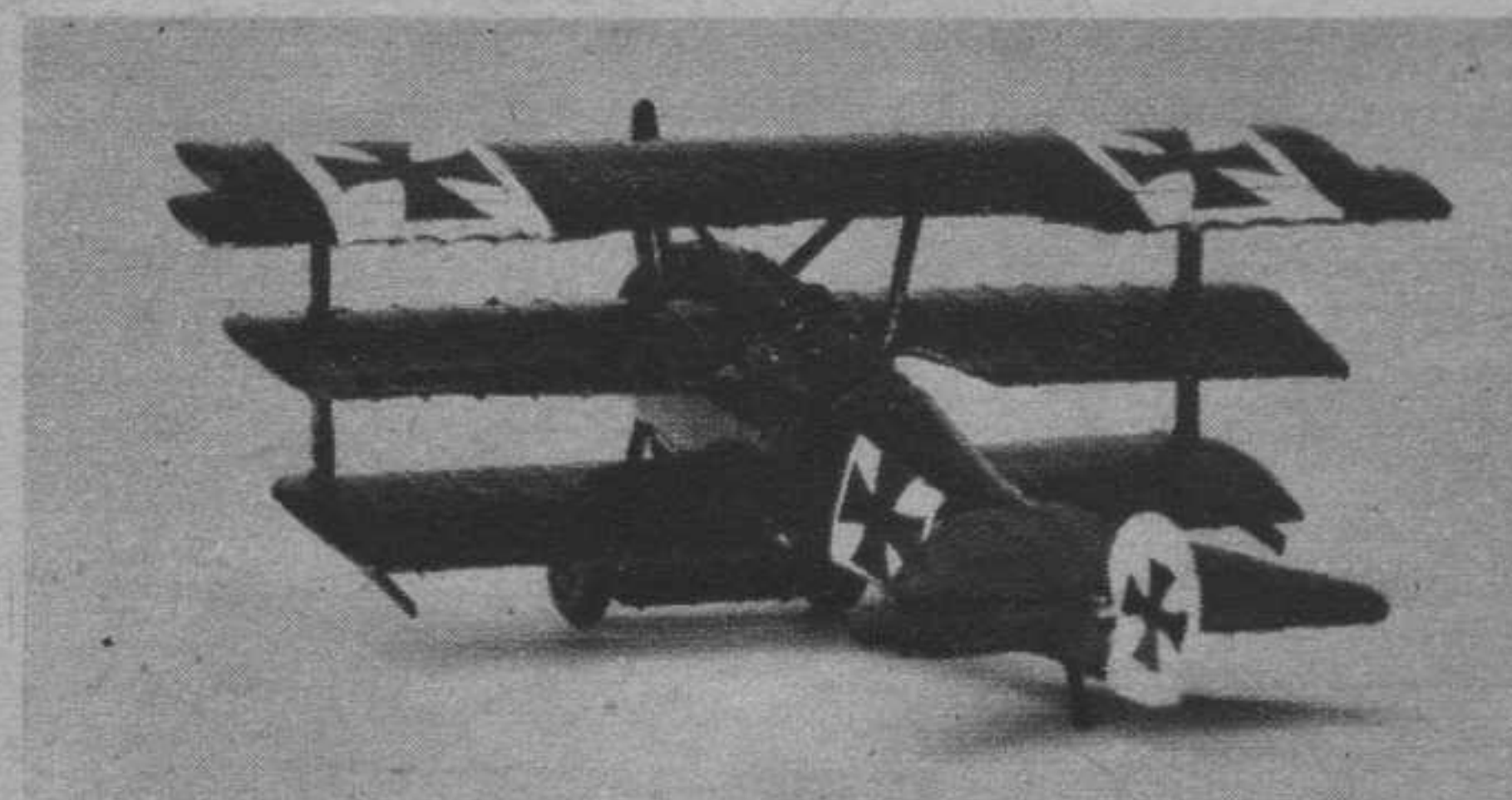
HERE'S the British Hawker Fury with a wealth of detail and having a wingspread of 8 1/2" only \$2.00. A deluxe model with a 17" wingspread is only \$7.00.



IN A WORLD WAR "atmosphere" we have two of our models posed in a dogfight—the 7" Pfalz Triplane attacking a 10" Salmson two-seater. Priced at the lowest for finished models, the Pfalz Triplane only costs \$1.75 and the Salmson \$2.75. In our deluxe line, a 12" Pfalz is listed at \$7.00 and the Salmson \$10.00.



SPEEDY, streamline, is the way to describe this 8" finished model of the Vickers Jockey. A nice addition to any one's miniature airdrome for only \$2.00.



NO COLLECTION is ever complete without the Fokker Triplane and so we offer this ship with a wingspread of 6 1/2" for only \$1.75. If you want a deluxe model with pilot, wing ribs, motor and cockpit detail, etc., a 12" finished model is priced at \$7.00.

Finished Solid Scale and Gas Models Solve This Year's Christmas Gift Problem

Ideal Presents For Modern Youth

Dad, Mother, or relative. This message is addressed to you. There is nothing more appropriate as a gift than a finished solid scale model airplane—nothing more timely. Many models to choose from and priced extremely low. If you may desire, we can enclose a Christmas greeting card with your name and ship to any address that you may designate. There is absolutely no charge for this service.

All models listed below are completely finished, include many details as, movable controls (not from cockpit), wire rigging, insignias, machine guns where needed, painted in colored, glossy lacquers, rubber tired wheels, etc.

UNITED STATES MODELS

8 1/2" Aeronca, Taylorcraft or Taylor Cub.....	\$ 2.00
7 1/2" Boeing P-26A or F4B-4.....	2.00
8 1/2" Beechcraft or Waco cabinplane.....	2.25
12" Lockheed Electra.....	5.00
12" Vultee Attack-Bomber.....	4.00
8" Seversky or North American.....	2.30
32" NC-4 Navy Seaplane.....	35.00
7 3/4" Curtiss P-6E, P-37 or F11C-2.....	2.00
25" Boeing Flying Fortress.....	25.00
22" Douglas Transport.....	15.00

FIRST WORLD WAR MODELS

11" Breguet or Rumpler two-seater.....	2.75
7" Sopwith Camel or Albatross D-3.....	1.75
7 3/4" Fokker D-7 or D-8 monoplane.....	1.75
11" L.V.G. or D.H.4 two-seater.....	2.75
18" Gotha or Friedrichshafen Bomber.....	7.50
24" Handley-Page or Vickers Bomber.....	15.00
6 1/2" Spad, S.E.5 or Nieuport 17.....	1.75

SECOND WORLD WAR MODELS

10" Breguet or Lysander two-seater.....	2.75
8" Hawker Hurricane or Spitfire.....	2.00
8" Polish PZL or Heinkel.....	2.00
9" Messerschmitt or Dornier.....	2.00
24" Handley-Page Night Bomber.....	15.00
8" Dewoitine D-27-C1 or Potez.....	2.00
10" Fairey Battle plane or Magister.....	2.75
8" Nieuport 161 or Caudron.....	2.00

Special Services, Many Uses Found For Ready-Built Models

The most common questions that we are asked is why we have specialized in finished models when there are so many model builders in the country, and why we do not concentrate all of our efforts in selling kits and supplies like so many other companies?

Our answer is, we have specialized in this branch of model work because there was a need for it. Prior to the inception of this firm there wasn't any company that anybody could turn to for a finished model.

During the past years we have constructed models for many of the leading kit manufacturing companies who in turn supply their dealers with exhibition models as part of their promotion, advertising and merchandising work. . . . Manufacturers of the real planes use our models to give to their salesmen and distributors in putting over their selling points to the customers. . . . Many of our customers are pilots—private, in the service, or commercial—who like to have a model of the ship they fly to show to their friends, or to decorate their dens.

In many cases there are aviation fans who are interested, or are connected in this field who do not have the time to build models themselves. . . . Often, builders themselves, use our models as a basis for their construction work. . . . In schools and universities, models are used by instructors to point out some important phase in the theory of flight. . . . Managers of toy, hobby and department stores, procure finished models for advertising and window displays—as nothing attracts attention like a finished gas job or a finished solid scale or rubber powered model.

Women, too, use models as bridge gifts or in the home to give it that "modern touch." And there are many other uses too numerous to mention.

We can be of service to you. Won't you give us your problem and give full particulars? We will be glad to make any model from any stock kit in this country or we can refer to our own library of over 7,000 plans. Our trained staff is at your disposal.

May we hear from you?

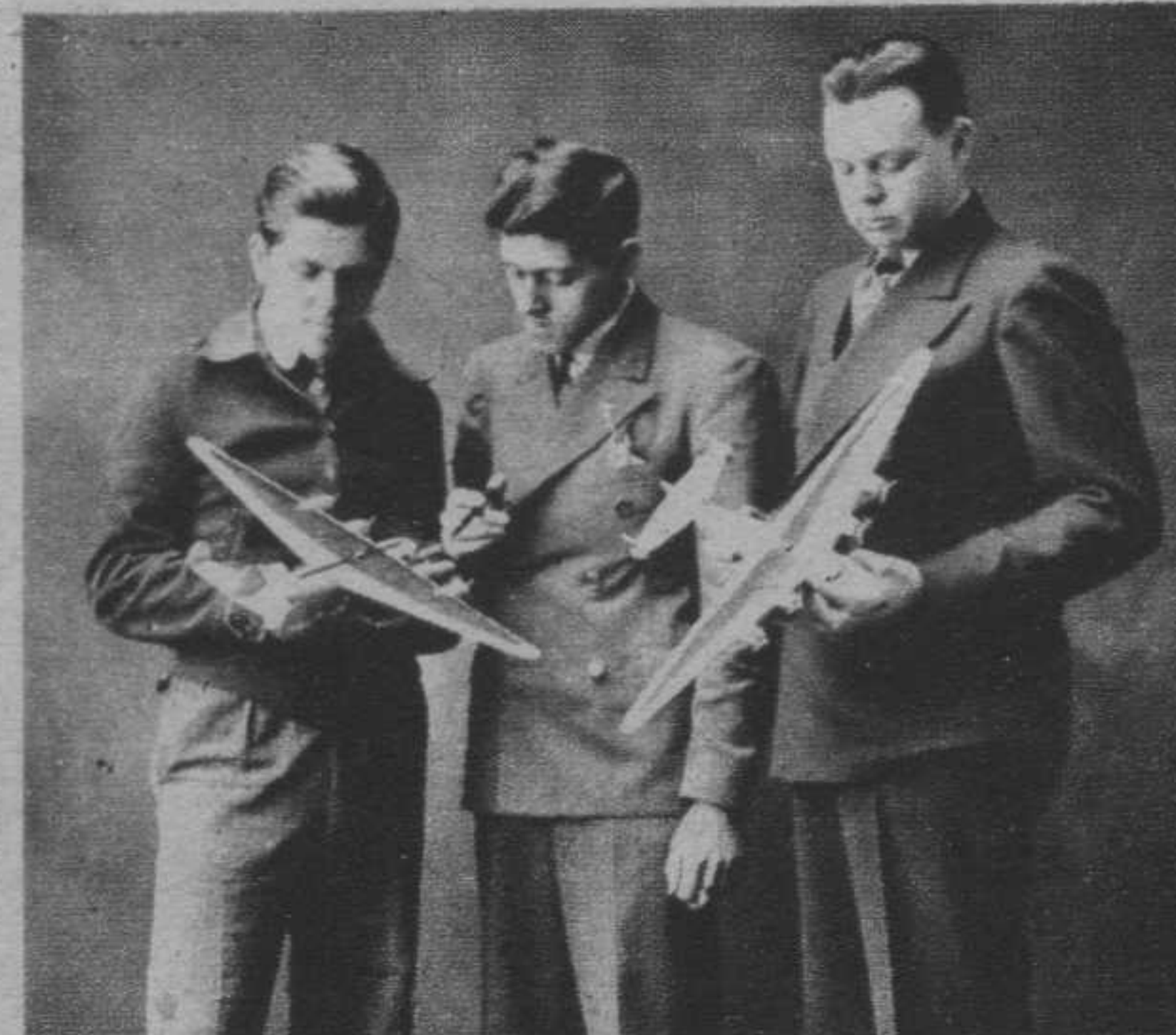
Ordering Instructions

Please read carefully. All orders shipped F.O.B. Morgantown. Remit by postal or express money order, check, cash sent by registered mail. Prompt service. All orders sent insured. Because of limited space it is impossible to list all the types of models we make. However: "YOU NAME IT—WE'LL MAKE IT." When desiring correspondence, enclose self-addressed, stamped envelope for a return reply. We will not answer post card inquiries.

Address your orders to—

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DEPT. AT-2 POST OFFICE BOX 160
MORGANTOWN, W. VA.

OFFICIALS INSPECT MODEL TRANSPORTS



Three company officials are shown in the above photograph inspecting two models of the Boeing Clipper just off the assembly line and ready to be shipped to a large industrial design company. This same firm has purchased 30 models during the past few months to be used in their work.

MODEL KITS, SUPPLIES

We can give prompt service on kits and supplies of the **PEERLESS MODEL AIRPLANE CO.** Catalogs 5c. To dealers—Write in for discounts on your letterhead. No post card inquiries, please. Pittsburgh and vicinity dealers may buy through our branch there and save shipping charges. Write for full particulars.

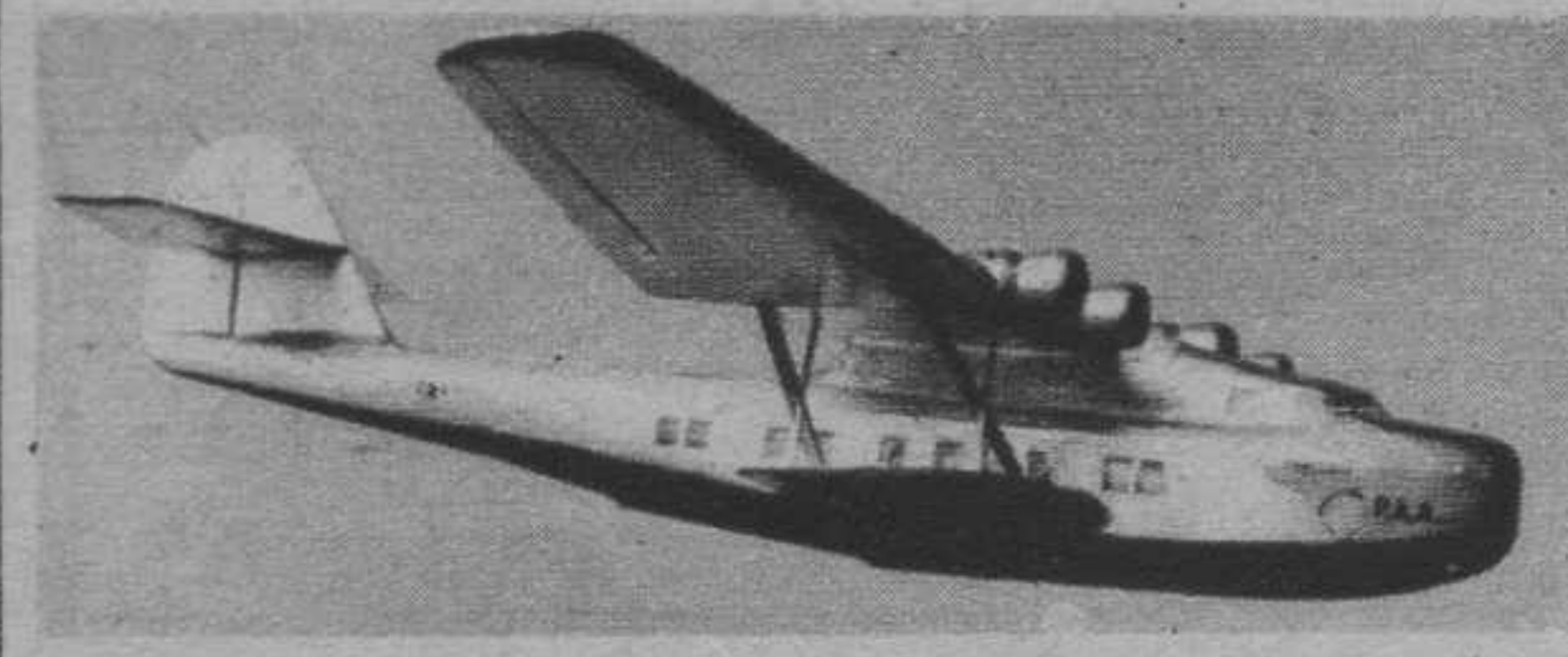
U. S. LINE-UP: FIGHTING, RACING, TRANSPORTING



ONE OF Uncle Sam's top-notch fighters in model form—the Grumman Fighter. This 7" finished model makes a very attractive model on any desk, mantel piece or on a radio top. Only \$2.00. A deluxe 14" version of this ship with pilot, interior cockpit details, wing rib imitation, etc., \$9.00.



AND NOW we give you racing fans a break by presenting you with a 5" Gee Bee racer at \$2.00. On request we will be able to make any racing craft that you may designate.



IT IS ONLY natural that we present this historic model to you solid scale fans . . . graceful in appearance, the 22" China Clipper ranks high with the aviation enthusiasts. This model has a hollowed out hull, built-up motors, China Clipper color scheme and details at only \$20.00.

All Gas Jobs Test-Hopped

To you gas job fans we offer the following ready-to-fly gas models which all will be test-hopped before shipment is made. These ships come complete in all details, painted, air wheels, timers, batteries, switch, propeller and the motor wired, and MOUNTED READY TO RUN!

The large gas models are powered with the Ohlsson "60" and the small ones with the Ohlsson "23". We can substitute any other motor if so desired. In the event no motor is wanted, deduct for the price of the motor and we will send the finished model only. We can supply you with any motor on the market. Send correct amount and we will send any motor postpaid and insured.

COMET GAS MODELS

72" Clipper or 54" Zipper.....	\$43.00
45" Golden Eagle or 48" Mercury.....	30.00

MEGOW MODELS

52" Piper Cub or 54" Cadet.....	30.00
72" Commander or 60" Soaring Eagle.....	40.00

PEERLESS GAS MODELS

48" Pippin or Rocket.....	30.00
70" Black Hawk or Taylor Cub.....	40.00

CLEVELAND GAS MODELS

50" Cloudster, Fleetster or Playboy.....	25.00
57" Korda Champion.....	35.00

IN 'PLANE' FUN

No newspaper is complete without any column devoted to humor and for your amusement we offer the following.

"Well, Pat, do the twins make much noise?"

"Noise! Shure, each wan cries so loud yer can't hear the other."

Gently he pushed her quivering shoulders back against the chair. She raised beseeching eyes in which faint hope and fear were struggling. From her parted lips the breath came in short, wrenching gasps. Reassuringly, he smiled at her.

BZZZZZZZZ, went the dentist's drill.

Refrain from the enumeration of the common gullinaceous birds before they have emerged from the mechanical progressive process of incubation. All which means:

"Don't count your chickens before they're hatched."

"That will be enough out of you," the doctor said as he stitched the patient together.

"How did you get that red on your lips?"

"That's my tag for parking too long in one place."

"There's a fly in my soup."

"That's no fly. That's one of those vitamin bees you've heard about."

"When does the next plane leave for Chicago?"

"Two-fifty, sir."

"Make it 2:48 and I'll take it."

Happy is the mosquito that can pass the screen test.

"How are my chances, Doc?"

"Oh, pretty good, but I wouldn't start reading continued stories if I were you."

"How did you get that bump on your head?"

"A thought just struck me."

"How many passengers does your plane carry?"

"It depends how well acquainted they are."

It's funny how this world can be so complicated when there are so many simple people.

And so, all good jokes to a punny end must come.

SOLID SCALE KITS

These complete kits include full size plans, liquids, cowlings, cut out parts, wire, etc., and packed in a sturdy and attractive box. Orders over \$1 sent postpaid—Under \$1, add 10c for postage.

12 1/4" Vultee Attack-Bomber.....	\$1.00
17" Bristol Fighter.....	1.00
11" Fokker Triplane.....	.50
11 1/2" S. E. 5.....	.50
12" Sopwith Camel.....	.50
12" Nieuport 27C-1.....	.50
13" Pfalz D-3.....	.50
18" Ryan S-C Cabinplane.....	.50

"The Phone-Booth Special"—A microfilm stick model kit complete with full size plans, microfilm solution, cement, wire, 1/64 and 1/32 sheet and strip balsa, etc. An excellent indoor flying model for 25c.

Dealers write for discounts on your business letterheads. No post card inquiries will be answered.

"THE BULLET" A READY-TO-FLY MODEL AIRPLANE

NOTHING TO BUILD

WHAT A FLYER!!!



30" Wing Span

\$2.00
25c Postage

BUY IT—FLY IT IN A MINUTE

Just attach the wings and propeller, wind up the powerful motor, and let 'er go! One-piece moulded fuselage—practically crash-proof . . . moulded puncture-proof wings . . . authentic details from nose to tail. The greatest model airplane value ever offered. Sleek, formidable looking, military pursuit-type plane, super-streamlined throughout. If your dealer can't supply you, order direct, adding 25c for postage.



CURTISS
OSPREY

18" Wing Span
\$1.25
15c Postage



VOUGHT CORSAIR

18" Wing Span
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15c Postage



\$1.00

15c Postage
BELLANCA
RACER

20" Wing Span

ANY BOY CAN EASILY BUILD AND FLY THESE

All the parts and materials necessary to build a complete model in each kit—
nothing else to buy.



REARWIN
SPEEDSTER

18" Wing Span

75c
15c Postage

SEND 5c
FOR CATALOG



LOCKHEED
ORION

20" Wing Span
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15c Postage



THE NEW
ALL FINISHED MOULDED
SELLEY-TEX
ASSEMBLY KIT

22" Wing Span

**1 HOUR
BUILDING TIME
TO ASSEMBLE THIS SNAPPY FLYER**

HERE AT LAST IS A SUPER QUALITY model that is scientifically designed that will give amazingly long flights. All parts of the Moth are beautifully moulded in the form of light, hollow shells, perfectly shaped and fully detailed. The fuselage shells are firmly fused together, forming a crash-proof fuselage. All wing surfaces are moulded to the correct wing curves and are completely finished. Ask your dealer—if he can't supply you, send direct \$1.50, plus 15c postage.

BOYS send 5c for the New Selley Catalogue just off the press—illustrating and listing Gas Motor Kits—die cast model airplane and boat parts, or get the catalogue FREE by sending 25c for a Gold-plated Pin—wings which you can proudly wear showing your enthusiasm for airplanes.

DEALERS NEW CONFIDENTIAL PRICE LIST on spinings and die cast items also new low prices on Balsa and other accessories.

SELLEY MFG. CO., INC., 1377 GATES AVE., DEPT. 412, BROOKLYN, N. Y.

Model Matters

(Continued from page 33)

games or similar exercise. During the summer classes are held five days a week. All material is furnished without expense by the Junior Chamber of Commerce.

These Kansas people have the solution for keeping the youngsters interested in worth-while things. Can you imagine anything more conducive to self-control than the ability to start all over with the broken pieces of a gas model that has just spun in, or a model whose breaking rubber has carried away most of the fuselage? And before we end the sermon for this month, how about the feeling when a new model finally turns in its first good flight? It sort of gives you courage to tackle anything—models or otherwise.

Model Builder Walter Lees made his first solo flight recently. He's been one of the stalwarts of the Philadelphia Model Airplane Association for the past nine years. His flight instruction was part of the training course awarded to him under the Taylor Memorial Fund. He was chosen by the Aero Club of Pennsylvania as the 1939 winner of this annual award. . . . By way of keeping track of model builders who have made good, it's good news to know that William Stout is back in the airplane business. He had spent the last half dozen years or so building cars, trailers, and trains. His last designs were the Ford Tri-motor and Stout Sky Car. His new design is a light plane intended for mass production. Incidentally, the two Stout national trophies are evidence of Bill Stout's interest in model airplanes.

J. L. Sadler of Little Rock, Ark., continues to win contests with his low-wings. At the second annual meet last September his model disappeared on the first official flight. Sadler drove the eighty-some miles to his home to get an old low-wing and was back in time to put in two more flights to hang up the highest average of 4:26. Plans for this remarkable model are scheduled for an early issue of A. T. This model was using the original propeller after more than one hundred flights. Unfortunately, Sadler is still hunting his wandering job. . . . We chuckled when learning that Myrt Thomas is still keeping the Little Rock boys on their toes. She threw a scare into their ranks when she came within a second or so of winning the elimination contest last spring. At the recent meet she was also a serious threat—taking third place. A sort of feud is developing since Sadler placed first in both these meets. Come on, gal, we're rooting for you.

More and more model clubs seem to be developing their own private flying fields where the boys can click off flights without any handicaps other than gravity and air currents. The Aero-Craftsmen of Baltimore have their private airport at Model Haven at Loch Raven, outside Baltimore. Their first contest was held there last August. Robert Wiehle of Washington, D. C., won the large-bore event. He has been grinding out excellent models for many years. But

what's even better is his mighty pleasant nature. . . . Richard Barber of Utica, Warren Boardman of Albany, and Charles Uht of Danville, Ill., were the winners of the National Aero Reserve contest held in Rochester and were flown to the National Air Races in Cleveland in the Lockheed 12 owned by Gannett Newspapers and piloted by Lieutenant John L. Scherer, director of the N. A. R. Thomas Hogan of Hartford was declared N. A. R. champion, but unfortunately declined to make the trip to Cleveland. Hogan is physically handicapped and thought it would be too much of a strain. But this handicap didn't interfere with his making the winning flight of 8:40 in the rubber-powered event. Gannett Newspapers have been consistently model-minded in their policy. They have done excellent work in promoting the hobby throughout upstate New York. Modelers can learn about the complete program by writing National Aero Reserve, Rochester Airport, Rochester, N. Y.

Estimated daily attendance at the two-day meet at the Second Annual Gulf States Model Meet in New Orleans was 15,000 people, with 5,000 cars in the parking lot. This is the only Southern meet that invites interstate competition. One hundred and seventy-five model builders from all parts of the South accepted the invitation. Kenric Hunter of Mobile, Ala., took the Open Gas; Asbun Wilds of Port Arthur, Texas., the Rubber Endurance; and Roger Jones of Baton Rouge, La., the Flying Scale. Senior gas-model winner was Ray Hubbard of Dallas, Texas. Mr. Jumonville of New Orleans is responsible for much of the work required in raising funds and putting the meet across.

Writing in the Virginia Model Association bulletin, Phillip Pepoon reveals the research he's done on model coverings. One particularly interesting item is that "medium bamboo paper weighing .51 ounces—per square yard—with one coat of dope—one half red dope and one half acetone—weighs .91 ounces, increasing the weight by .40 ounces per square yard." The problem of how much weight dope does add arises frequently. Pepoon has worked out a complete list of various materials and the weight added by dope of varying consistency. Pepoon works in the National Advisory Committee for Aeronautics laboratories. His research is accurately and thoroughly compiled. We're looking forward to learning more about his work in the hobby when we see him at the meeting of the academy this Thanksgiving. Modelers interested in learning more about model covering material are invited to write Phillip Pepoon, 141 Melrose Ave., Hampton, Va.

It's unlikely there will be any sweeping changes in the 1940 contest rules. The few items which will be exposed to possible revision are continuance of the three-flight average or return to best of three flights, dropping of the Open Class gas events, possible increase of the maxi-

mum wing area for Class A gas models to 250 square inches. (Maximum now is 225.) . . . A Brown-powered Zipper flown by Bud Lindsley, Sioux City, Iowa, won the annual Sioux Falls, N. D., contest. A strong, gusty wind made flying difficult, but Verne Snyder of Sioux Falls did 2:50 with a rubber fuselage—another case of rubber models outflying gas . . . A trip to Mars has become a reality! It was a Zipper and not a rocket that made the trip. John Eberle of Pittsburgh sent his gas model off the boards on the first official flight of the Fourth Allegheny Mountain Area Meets—it caught a thermal and landed at Mars (of course, we refer to the small town in western Pennsylvania and not the planet). The model was launched at about 12:30 and landed at 2:45. The farmer who watched it land called up the model airport immediately upon its landing. Eberle won the Open Gas with 6:22 average. Pete Bila took the Senior Gas with 2:49.

Harry G. Vogler, Jr., continues to give the boys in the Pittsburgh area bigger and better contests through his capable work as contest director. . . .

CHICAGO SKY LINES. (By Frank Nekimken.) Continuing its line of novel contests, the Chicago Park District Model Airplane Association offers the latest—a gas-versus-rubber affair. This is the first event of its kind since Maxwell Bassett cleaned up at the 1933 Nationals flying his gas model against rubber. At that

time the rubber builders complained. Now they are asking for it—a battle to the finish with no holds barred. Both types must conform to N. A. A. rules. Modelers must decide before the contest which side of the fence they are on—whether they're putting their hopes in gas or in rubber. Fifty dollars and considerable merchandise are at stake. And since I'm the one with whom all contestants check their peevishness—sometimes called contest director—I'll be able to give you a first-hand account of the brawl.

Chicago means business when we threaten to be host to the national meet in 1940. A bid from Chicago was placed with the N. A. A. in which the Chicago *Daily Times* and the Chicago Park District agreed to cosponsor the Nationals. Maurice Roddy, aviation editor of the *Times*, and myself—representing the C. P. D.—were assured that definite word as to the locality would be forthcoming before the end of the year.

Carl Goldberg has hit the trail. The gas-model wizard of the Comet company is completing a swing through Wisconsin, Pennsylvania, New York and points east. Like the traveling Indian medicine salesman, he stops at each hamlet, town, and village, pulls open his trailer, and out comes an exhibition of scale, rubber, and gas model. A movie projector is set up to illustrate the Goldberg talk on the pitfalls and trials that await the model builder when he tries to build and fly a model. I went along with Carl on a "sample" trip to Ba-

tavia, Ill. We found plenty of enthusiasm. I hope Carl managed to visit your home town. We're proud of him here in Chicago, but don't begrudge you a chance to meet him.

Here's a contest we suggest you try. Chicago boys liked it. Last year we conducted a model "Fun Fest." This year we repeated it with even more success. The contest is held in a large parking lot adjacent to the River-view Amusement Park from 10 a. m. to 1 p. m. Gliders and rubber models are flown. There are no restrictions or rules of any kind. Each contestant—there were over 200 at this year's meet—may fly as many gliders and as many rubber models as he wishes. As many flights are allowed as the contestant can make during the scheduled time, and the best three flights are added together.

At 1 o'clock the contest ends and the entrants receive free admission and free rides in the amusement park. Later in the afternoon prizes are awarded. The contest is sponsored by the Chicago *Times* Air Cadets, Riverview Park, and conducted by C. P. D. craft instructors.

CALIFORNIA NOTES. (By Elbert J. Weathers.) All is quiet on the western front. Modelers are digging in for the three big meets scheduled for the near future. In the meanwhile, Eastern readers should be interested in the precision-type contest which we've developed out here. We're proud of this development and feel that builders in other parts of the

country would do well to include it on their contest program. It has many advantages over a strictly durational contest, since it obviously makes for much better engineered gas models.

A typical precision contest is the annual Chancellor Midget Air Races. A possible fifty points are awarded on the plane itself without consideration of its flying. Another fifty-five points are granted on flying. Here is the breakdown of the points awarded:

A. Construction	Pts.
a. Originality and general design...	10
b. Paint job	10
c. Covering	10
d. Woodwork	10
e. Metalwork	10
B. Flying	
a. Take-off	10
b. Flight	20
c. Glide	10
d. Landing	10
e. Time of flight within allowed 10- to 20-second limits.....	5

Each contestant is allowed two official flights—points being awarded for each. Thus there is a total of 160 points to shoot for.

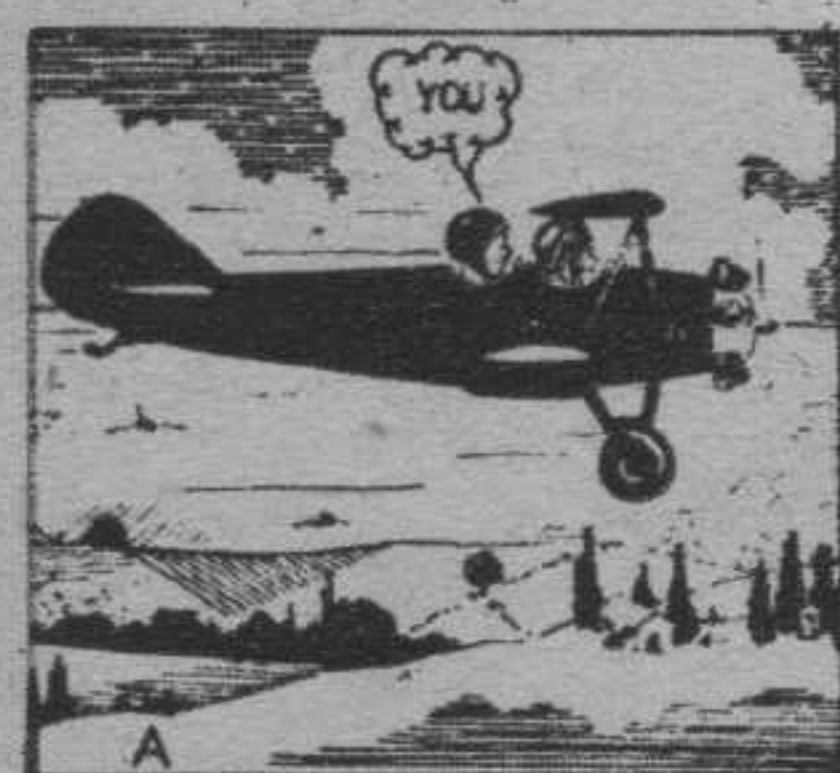
KANSAS NEWS. (By Leo Rutledge.) Organization is the keynote to the successful operation of any program, whether it be recreational, educational, or industrial. An example of the effectiveness of organized effort is Wichita's model aeronautic program. Incorporating new ideas in youth education, this community has produced some very outstanding results. Some few years ago a group

The Standard Books on Flying — the World Over

These are the books the airmen use —TO MAKE THEMSELVES BETTER, SAFER FLIERS

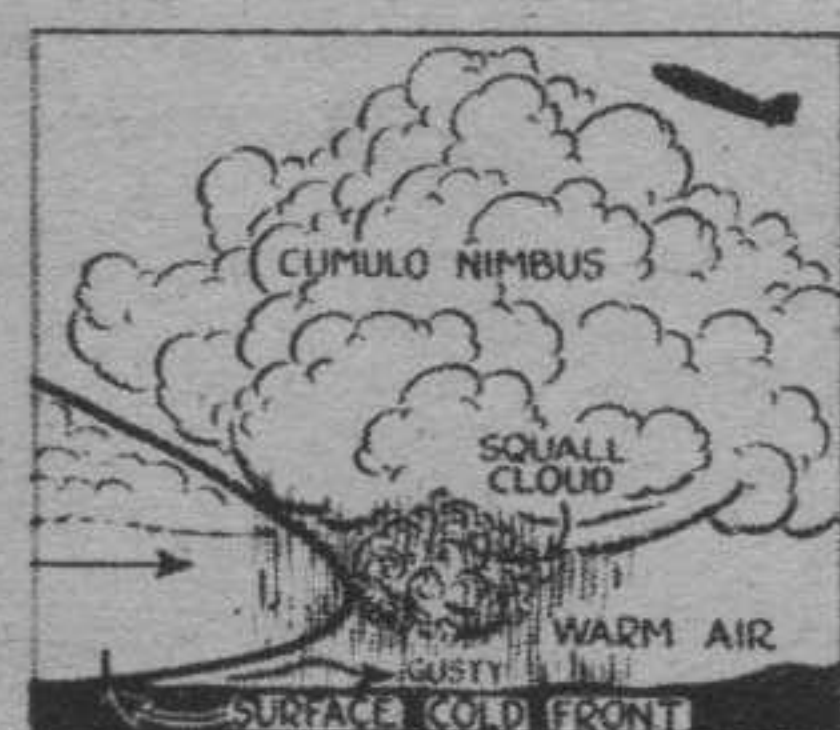
OVER a quarter million copies in use throughout the world! . . . The text is completely authoritative and technically correct—yet written in pithy instructor-to-student language that's a pleasure to read and a cinch to remember. The illustrations—over 700 specially made drawings—actually show, step-by-step, everything about flying from basic principles through the very latest developments in instrument flying.

Your Wings THE MANUAL OF FLIGHT

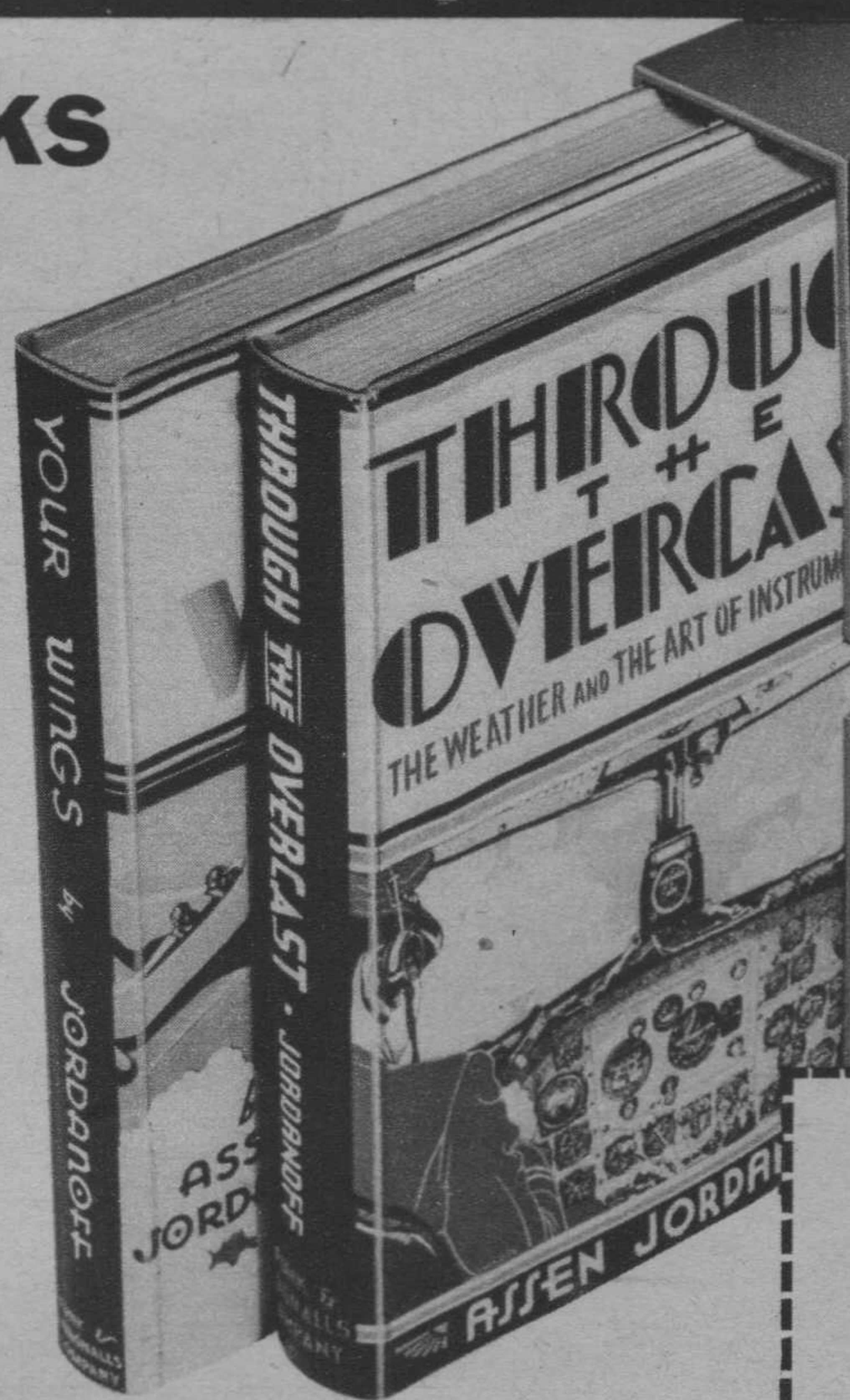


Now translated into seven languages, the book *Time Magazine* calls "the most readable preliminary instructions available" is being used by tens of thousands of aviators and students—in France, England, South America, Central Europe, Russia, Far East, U.S.A. Takes you from basic principles through advanced aerobatics. Will help you prepare for the tests for all grades of Federal licenses. 425 illustrations. Size 7" x 9½".

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\$KYWAY TREBLED ITS SALES IN THE PAST YEAR. THERE'S A REASON!

(Selected Hard Stock)

18" Balsa Strips

1/16 sq. 60, 5c

1/16x3/16 18, 5c

1/16x1/4 15 for 5c

3/32 sq. 30, 5c

1/4 sq. 30 for 5c

1/4x3/16 12 for 5c

1/4x1/2 10 for 5c

3/16 sq. 8, 5c

1/4 sq. 6 for 5c

1/4x1/2 3 for 5c

18" Balsa Sheets

1/64x2 6 for 10c

1/32x2 9 for 10c

1/16x2 8 for 10c

3/32x2 7 for 10c

1/4x2 6 for 10c

3/16x2 3 for 8c

1/4x2 3 for 9c

1/4x2 2 for 11c

3" & 36" cost twice

18" 3x36, 3 times.

NOSE BLOCKS

1x2x11c

2x2x12c

2x2x13c

3x3x14c

3x3x27c

3x3x39c

5x5x217c

REED

1/32 - 1/16 8' 5c

1/4 - 1/2 4' 3c

SANDPAPER

12 sheets for 5c

5 FOOT Balsa

1/4x3/16 ...12 20c

1/4x1/2 ...10 20c

3/16 sq.8 20c

1/4 sq.6 20c

1/4x1/2 ...3 20c

1/4 sq.2 20c

1/4x1/2 ...2 20c

Sheets, 4 times 18"

Double the above

price for genuine

aircraft SPRUCE

18" Balsa Planks

1/4x1/2 ...2 for 5c

1x11 for 5c

1x21 for 5c

2x21 for 16c

2x31 for 23c

2x61 for 38c

3x61 for 72c

Plastic Balsa

Can (4 oz.) ...23c

Tube (1 oz.) ...10c

PROP. BLOCKS

1/4x1/2 x 5 7-5c

1/4x1/2 x 6 6-5c

1/4x1/2 x 8 3-5c

1/4x1/2 x 10 2-5c

1/4x1/2 x 12 3c ea.

1/4x1/2 x 15 5c ea.

1/4x1/2 x 18 5c ea.

MODEL PINS

Pkg. 100 1/2" 5c

Thrust B'rings

1/2 doz. sm. 5c

1/2 doz. lge. 7c

ALUM. LEAF

5 sheets for 5c

GAS MOTORS—

Ready to Run p.p.

Free prop & Oil.

Ohlsson 23. \$16.50

"Gold Seal 18.50

Brown Jr. D 12.50

Brown Jr. B 21.50

Syncro Ace 9.95

Forster ... 17.75

O.K. Special 11.80

Husky Jr. 12.50

Hi Speed... 16.50

Denny Mite 15.85

Mighty Mdg. 9.50

In Kit Form 7.85

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BIG ALLOWANCE

For Old Motors

Champion Plugs

1/2 or 3/4 .65c ea.

Aero Super-Coil

1 1/2 volt \$3.00 p.p.

3 volt \$2.75 p.p.

Smith Coil

3 volt (p.p.) \$2.50

Austin Flight

Timer (p.p.) \$1.25

DuralTimer (p.p.)

Lgt. wgt. ... \$1.95

Gas Funnel 25c

SAE70oil, 2oz 15c

Kh'st Manif'ld

Keeps Ships Clean

Fits Brown, Bunch

Motors (p.p.) 85c

Condensers ... 20c

MODEL KNIFE

Steel blade ... 10c

Nose Plugs

1/4 - 8, 5c; 3/4 - 6 5c

1 - 4, 5c

Mach. Guns

3/4"2 for 5c

1 1/4"2 for 7c

1 1/2" Lewis 2, 9c

1 3/4" Lewis 2, 11c

INSIGNIAS

American, French,

English, German

24 & stripes 5c

TISSUE, AA

All col., doz. 19c

Silver ... ea. 4c

Superfine, white 5c

Wood Veneer

20x30 ... 2 for 17c

BAMBOO PAP'R

White ... 5c ea.

Colors ... 2 for 15c

Gas Model Silk

H'vy qual 40c yd.

WIRE

.014 6 ft. 2c

.020 .028 6 ft. 3c

.034 .040 6 ft. 6c

.049 6 ft. 8c

1/16" 3 ft. 5c

3/32" 5 ft. 15c

1/8" 5 ft. 25c

BROWN RUB.

1/16 sq. 15 ft. 5c

1/4 flat 15 ft. 5c

3/16 flat 12 ft. 5c

Skein 225 ft.

1/16 35c, 1/2-

60c, 3/16-85c

Dummy Rad. En-

gine (Celu.)

1 1/2" 8c, 2" 12c

2 1/2" 14c, 3" 17c

Sheet Celluloid

5x7-4c 14x17-15c

PLUGS & JACKS

Set of 225c

BOMBS

3/4"2 for 7c

1 1/4"2 for 13c

3"each 14c

CEMENT

CLEAR DOPE

THINNER

1 oz. 5c, 1/2 pt. 30c

2 oz. 9c, pint 50c

Colored Dope

1 oz. 6c, 2 oz. 11c

1/2 pt. 35c pt. 60c

PROPELLERS

Balsa Paulo Ritz

Wina Gas

5-4c-7 Mod.

6-5c-9

7-6c-12-9-40c

8-7c-15-10-40c

9-8c-19-11-40c

10-9c-23-12-50c

12-10c-28-13-50c

14-12c-X-14-50c

15-15c-44-15-50c

16-16c-X-16-50c

18-25c-X-18-1.00

Alum. Tubing

1/166c ft.

3/32, 1/47c ft.

3/16, 1/29c ft.

Sheet Alum. sq. ft.

.003-10c .010-15c

SPRAY GUNS

Sm. 59c; Lge. 97c

Toggle Switch

50c value ... 30c

DURALANGLES

1/2x1/2 per ft 15c

3/4x3/4 per ft 22c

Prop Shafts—doz.

Sm. 6c Lge. 10c

(Ball B'r'ng Type)

1/16-15c, 1/8-33c

WHEELS per pr.

Breh

Bisa A

Celu L

U

1/2 .01 .03

3/4 .02 .04 .05 M.

1 .03 .05 .07 .06

1 1/2 .04 .07 .10 .09

2 .06 .10 .16 .12

2 1/2 .12

3 .15 .30

TREXLER WHEELS

1 1/2, 1 1/4-40c pr.

1 1/2, 2-50c pr.

2 1/2, 2 1/2-60c pr.

Gas Mod. 2 1/2-\$1

3-1.25-3 1/2-1.50

4 1/2-1.75 all p.p.

M&M WHEELS

1 1/2, 1 1/4, 1 1/8 50c

1 1/2, 2, 2 1/2 60c

Gas Mod. 2 1/2 90c

3 1/4 1.50, 3 1/2 2.75

4 1/2 2.75, 5 4.00

MICROFILM

RUBBER LUBE

WOOD FILLER

1 oz. 9c, 2 oz. 15c

Allig. Clips 5c

Mask. Tape cd. 5c

Spag. Tub'g 3' 10c

BALL BEARING

WASHERS

Special ... 5c each

Camel's Hair

Model Brushes

Med. 5c Lge. 8c

Sm 3c Gas Mod 15c

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PRICE LIST.

of men in Wichita had the foresight to recognize the value of model building. Operating under adverse conditions, these men staged contests, conducted experimental work, and endeavored to create general interest.

In June of 1938 these sponsors came in contact with an organization of young men who were dedicated to a program of civic improvement. The Wichita Junior Chamber of Commerce, of whom I speak, agreed to sponsor and promote the program started by the first group.

Organizing a model aeronautics committee headed by two capable youth leaders, plans were drawn up. Methods of financing, selection of personnel, youth-contact procedure, publicity, methods of both practical and theoretical work, and many other vital points were incorporated into a workable program. This committee established a laboratory for the study of theory and actual constructional phases. To complete a well-rounded program a flying field of 147 acres was obtained for experimental work and for the staging of meets.

It was felt that the general program would be helped by a mutual exchange of ideas and a certain amount of social and recreational activity. Hence the Model Division of the Kansas State Aviation Association came into being.

Many other organization steps which have been adopted could well be presented, but time and space prohibit. Detailed information on our program is available to all model enthusiasts. Address Leo Rutledge, 2115 E. Kellogg, Wichita, Kan.

NORTHWEST MODEL NEWS. (By Glen Chambers.) Mr. Harry N. Fosbury, senior advisor and contest director of the Portland (Ore.) Gas Model Club, reports on their unique organization. Most of the boys like Class A ships—225 square inch maximum area and .20 cubic inch displacement. (The Elf factory is located there.) Not only is a large percentage of their jobs Class A, but out of twenty-three members, seventeen are busy on original designs. This seems like some sort of record.

Via Dick Megorden comes the good news that Chuck Lamb, Jr., model builder of long standing in this territory, was promoted from Boeing Aircraft

Gliding And Soaring

(Continued from page 22)

inside the cockpit and watching only the instruments.

As soon as straight flying has been learned, the next step can be tried—gentle turns. Here the needle of the turn indicator has to be held slightly off-center by the rudder, and when applying bank one has to watch that the ball on the bank indicator is in the center, as in an improper turn the ship will either skid or slip; in the skid the ball will be on the side of the high wing, while in a slip the ball will be on the side of the low wing, while in a perfect turn it will be in the center. Steep turns are a bit more difficult, as the bank must be held off, and some backward pressure is usually necessary on the old stick.

It is also very important for the sailplane pilot to know how to get out of a spin on instruments. If he finds himself in such a predicament, he should use opposite rudder until the turn-indicator needle comes out of its corner and goes into the opposite one, neutralize the rudder immediately, and ease the stick forward to the central position. What happens is something as follows: When opposite rudder is kicked, the spin stops and the needle of the turn indicator comes out of its corner. The ship is considerably slowed up with the stick back, and noses up rapidly. The turn indicator becomes unstable and the needle starts going into the opposite corner; at that moment the rudder is neutralized and the stick is eased forward to prevent nosing up and stalling.

With the advent of the Link trainer it became a fairly simple matter to learn instrument flying. The student can practice all its steps on the ground. We do not recommend trying to fly blind without the knowledge of instruments and practice in their use, as the uninitiated pilot has a great tendency to believe his "feel" rather than the story on the dials—and many an expert pilot has got himself into a tough spot from just that.

U. S. NEWS AND ACTIVITIES

This year the Associated Glider Clubs of New Jersey threw open their yearly contest to pilots residing outside of the State. The event was named the Eastern States Meet and was held at the Schley Glider Field, Liberty Corners, N. J., over Labor Day and the following week end. Unfortunately the weather was far from favorable for soaring and no spectacular flights were accomplished. Altogether, six ships were entered: the Hudson Valley Glider Club's Schweizer utility, christened the *Flying Cruller* by its pilot, Herbert Sargent; the S. S. A.'s two-place Schweizer sailplane and Franklin utility; the Airhoppers' Schweizer, flown by Jack Brookhart and Lew Barringer; Don Lawrence's Lawrence sailplane and Cadet utility. The program consisted of endurance flights, spot-landing contests and stunting exhibitions. Jack Brookhart won first prize and the title

of Eastern States Champion; Lewin Barringer was second.

For the second year in succession a caravan of three sailplanes made its way from different points to the National Air Races at Cleveland. Chet Decker of New Jersey, Emil Lehecka of New York City, and Ted Bellak of Frankfort, Mich., put on their famous Glider Trio act at the races. Emil flew his Rhoensperber, while Ted and Chet were at the sticks of their Minimoas. Every day the boys were towed aloft by the same plane, and after releasing on signal, put their graceful sailplanes through a series of formation aerobatics.

Captain J. S. Charles of the American Airlines, who recently built himself a Baby Bowlus Albatross, certainly went to town with it. Having been towed up recently by a 65-h.p. Cub, he soared for over five hours and reached an altitude of 10,200 feet. The flight was made in Atlanta, Ga.

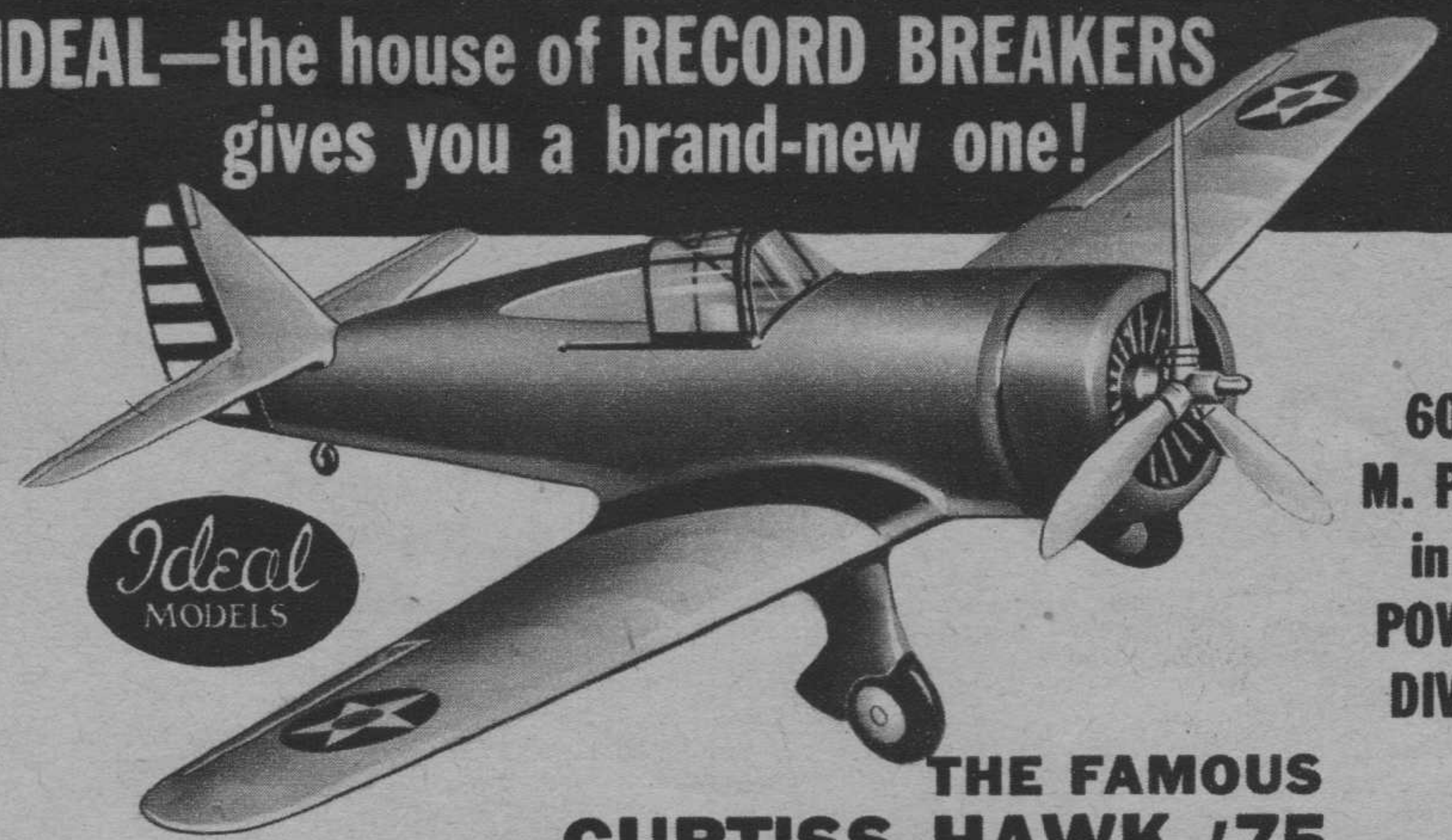
Our friend Don Mitchell of the Bowlus Sailplane Co. writes us another one of his interesting letters regarding Bowlus activities. "To date," he says, "thirty-nine Baby Albatross sailplane kits have been sold; fifteen of them have been set up and the rest are in various steps of construction. For the past three years Hawley Bowlus has been designing a super Albatross. We built one in four weeks' time and test-flew it seven days before the national meet. However, knowing nothing about its performance, we thought best not to send it East and kept it here to play around with. We plan to turn it out in kit form beginning the first of the year. It will be sold as a complete ship, also, if desired. The ship's specifications are as follows: Span, 42 feet; area, 120 square feet; airfoil at root, modified Goettingen 549 12-percent section; airfoil at tip, NACA 2409; washout, 3 degrees; dihedral, 4 degrees; wing, elliptical, full cantilever, shoulder-high; fuselage is the pod type, molded under 80,000-pound pressure, the same size as the Baby Albatross except it has no neck; boom tail; total weight, 240 pounds; wing loading, 3.5 pounds per square foot; take-off speed, 30 m.p.h.; landing speed, 27 m.p.h.; minimum sinking speed, 2.5 feet per second; maximum gliding ratio, 30 to 1 at 67 m.p.h. The ship can be assembled in four minutes by three men."

Gas Model Licenses

(Continued from page 42)

dark color, black preferred. This should be thinned until it flows easily but still retains its opacity. Should the paint loosen the foundation color of the wing in places, causing it to mix into the color being used, simply give it time to dry before finishing. Benzine or a soft eraser will easily remove the pencil lines.

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POWER
DIVE!**

THE FAMOUS CURTISS HAWK '75

**that broke every existing speed record!
—latest addition to Ideal's fleet of famed**

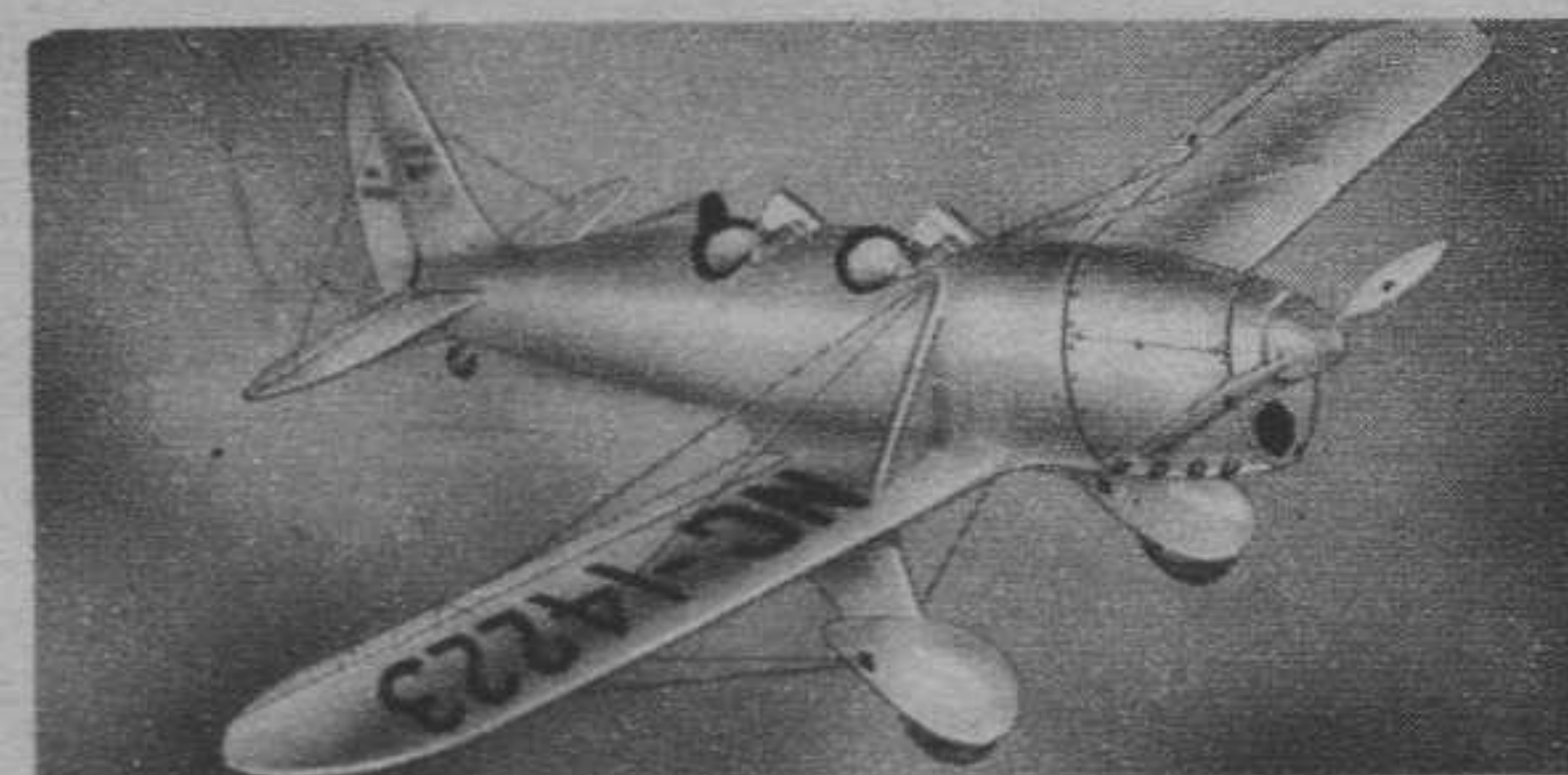
SUPER-DETAIL

AIRPLANE MODELS

CURTISS HAWK '75 (photo above) Scale $\frac{3}{4}$ ". Wingspan 27". Overall 20 $\frac{1}{2}$ ". Colors: Army blue and yellow. **COMPLETE KIT \$2.00.**

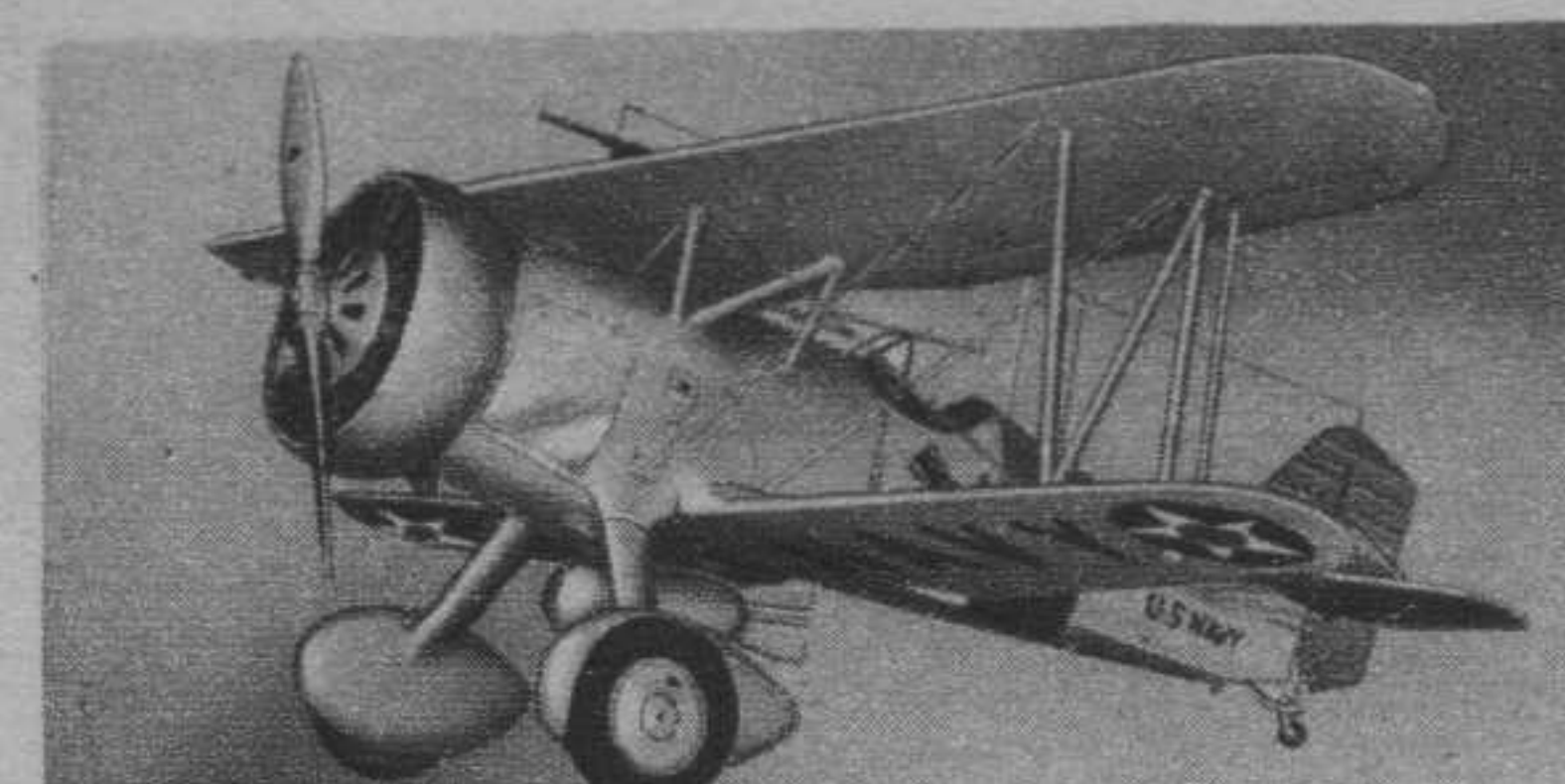
RYAN S. T.

AIR CHIEF



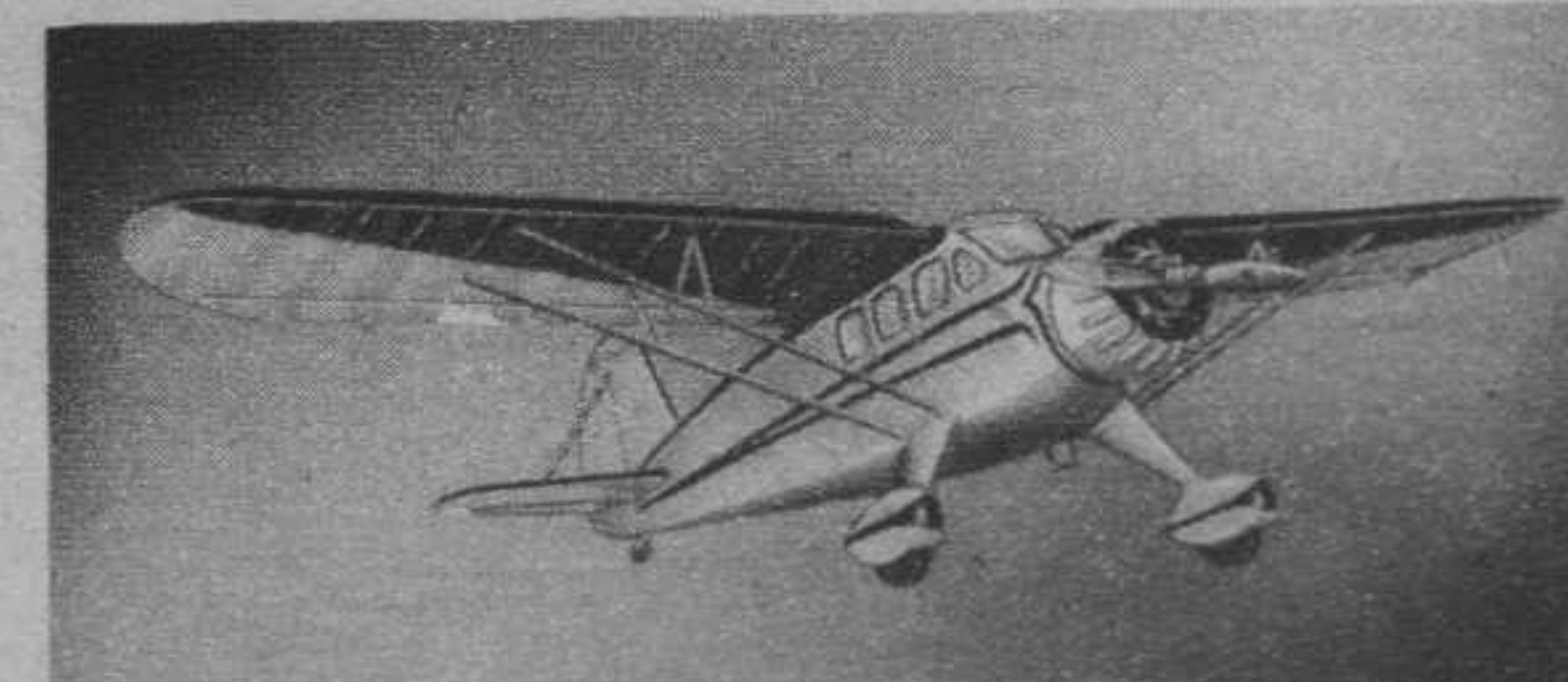
Wingspan 22 $\frac{1}{2}$ ". Length 16 $\frac{1}{2}$ ". Exact $\frac{3}{4}$ " scale. Weight 2 $\frac{1}{2}$ oz. Replica of the speedy 2-place sport plane. Kit complete, postpaid **\$1.50**

CURTISS GOSHAWK



Wingspan 23 $\frac{3}{4}$ ". Length 16 $\frac{3}{4}$ ". Weight 3 $\frac{3}{4}$ oz., exact $\frac{3}{4}$ " scale. Now you can build your own with the most complete kit. This Navy fighter has many more details than you can see in the photo. Streamlined drag ring specially designed; two detachable blade propellers, coated with the new IDEAL high lustre finish, with silver, yellow, red and black. Kit complete, postpaid **\$2.00**

STINSON RELIANT

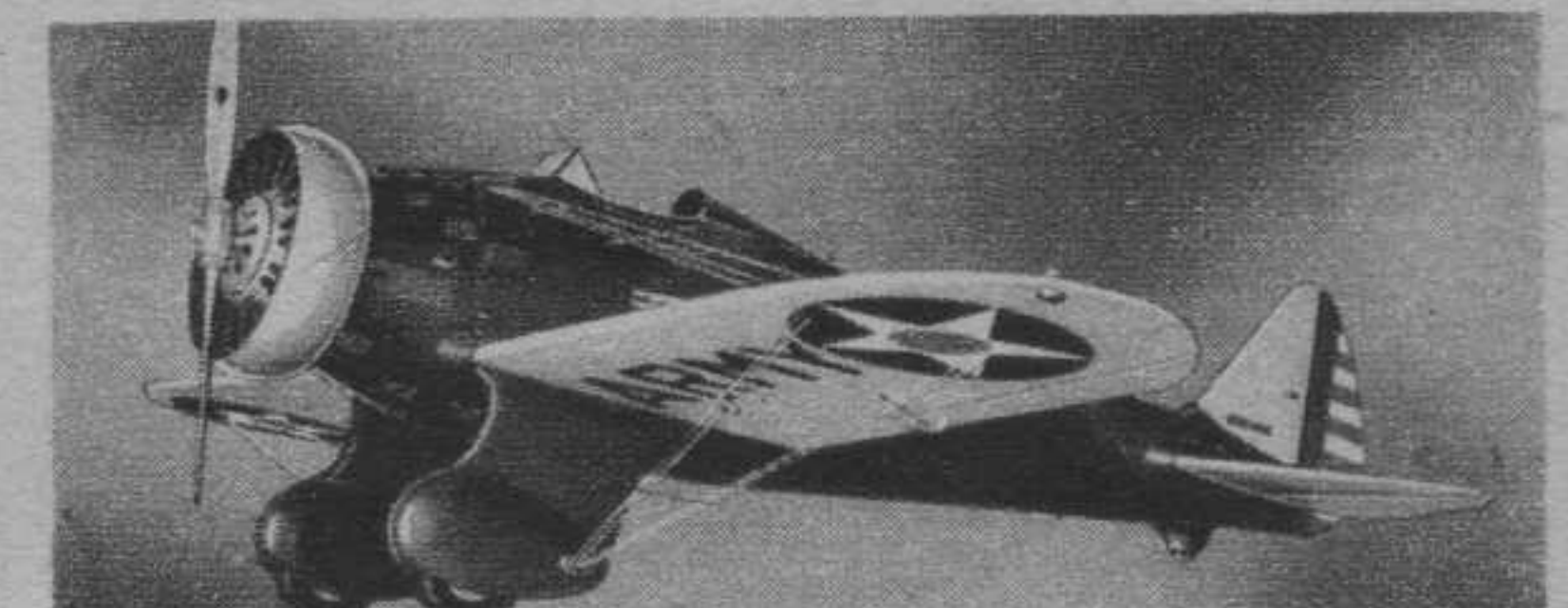


Wingspan 32 $\frac{5}{16}$ ". Length 21 $\frac{1}{4}$ ". Weight 3 $\frac{1}{2}$ oz., exact $\frac{3}{4}$ " scale. Exact reproduction of one of the latest 4 passenger cabin planes. Adjustable speed arresters built into the wings, movable cabin doors, complete interior with four seats and control column. Colored in bright contrasting yellow and black. Kit complete, postpaid **\$2.50**



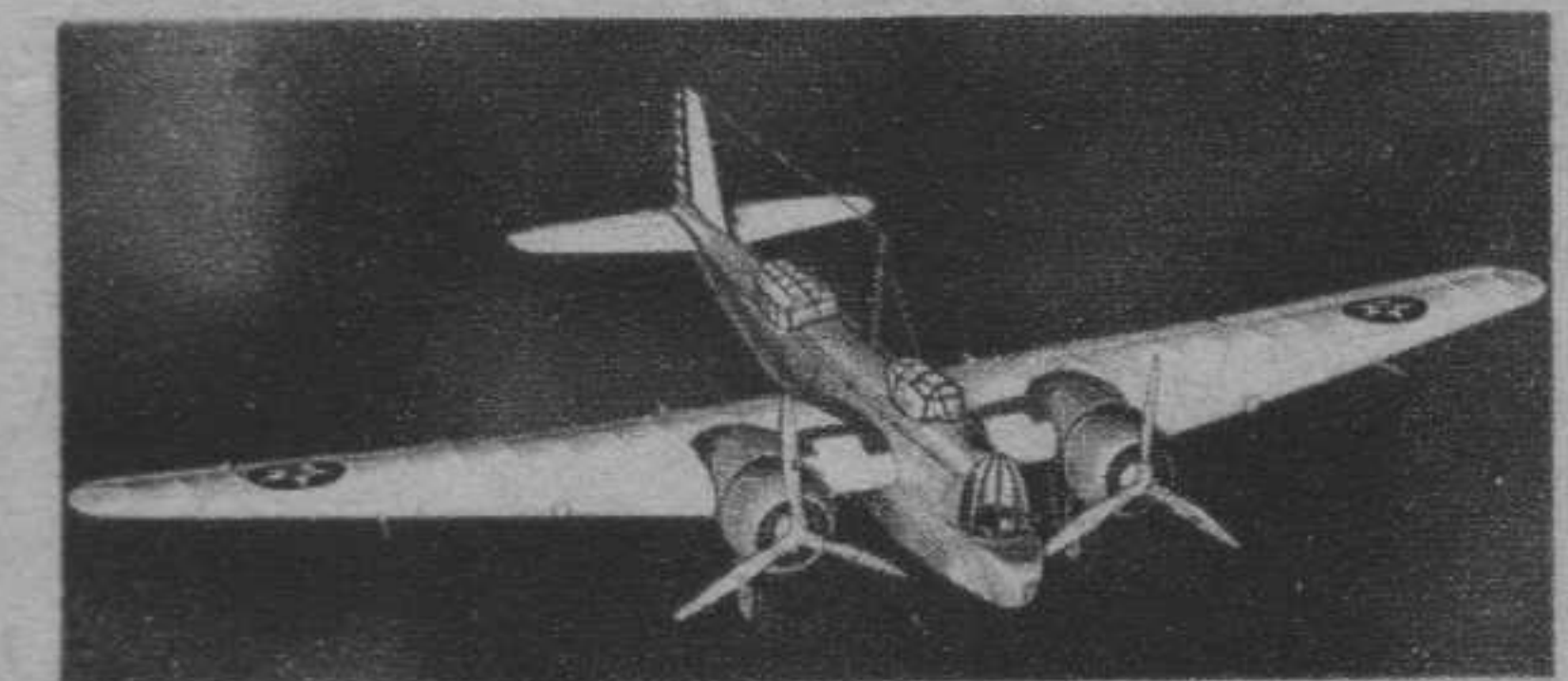
Wingspan 61". Length 39". Exact $\frac{3}{4}$ " scale. Weight 2 $\frac{1}{2}$ oz. Easily equipped with any standard miniature motor. Has pneumatic air wheels, shock-absorbing landing gear. Kit complete (without motor), postpaid **\$6.00**

BOEING P-26A



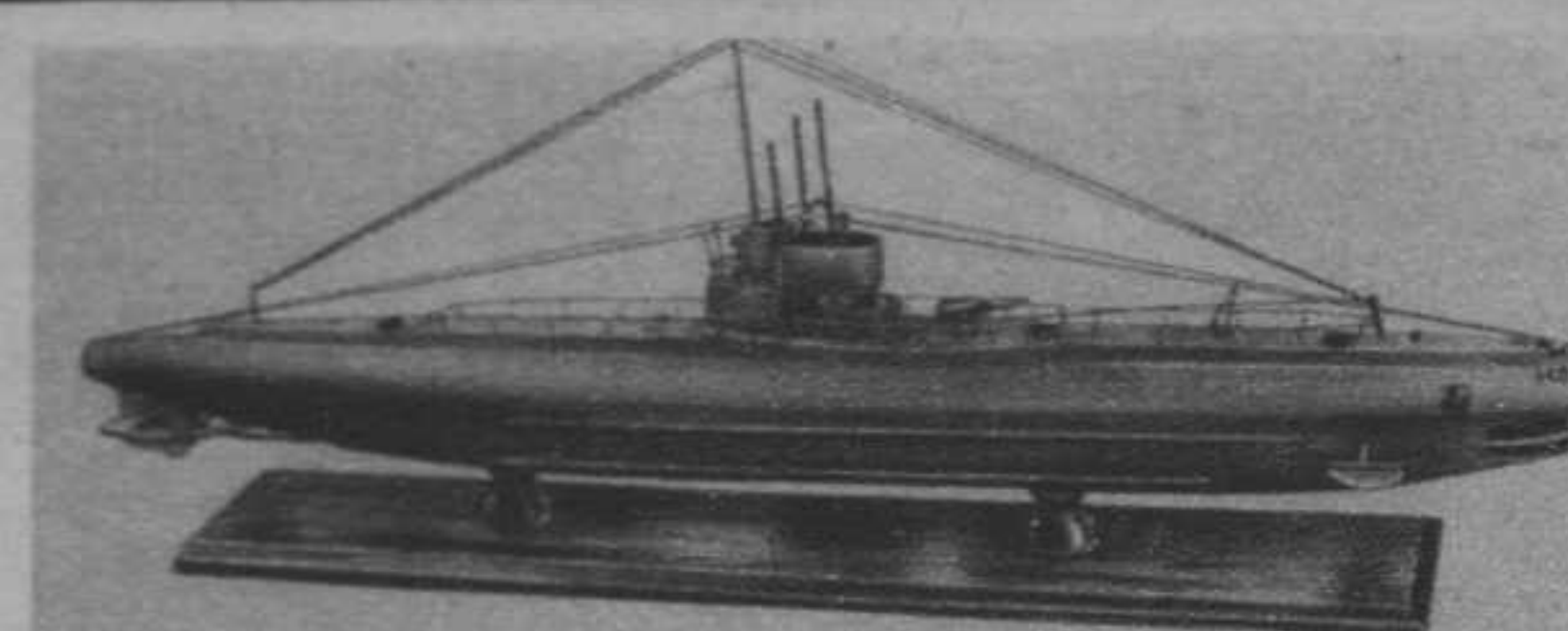
Wingspan 21 $\frac{1}{4}$ ". Length 18". Weight 2 $\frac{1}{2}$ oz. Exact $\frac{3}{4}$ " scale. One of the newest, most advanced of all fighting planes. Fast, speedy, with full armament, capable of over 240 miles per hour. Beautifully colored in olive drab and yellow. All Super-Detail parts included. Kit complete postpaid **\$1.75**

MARTIN BOMBER



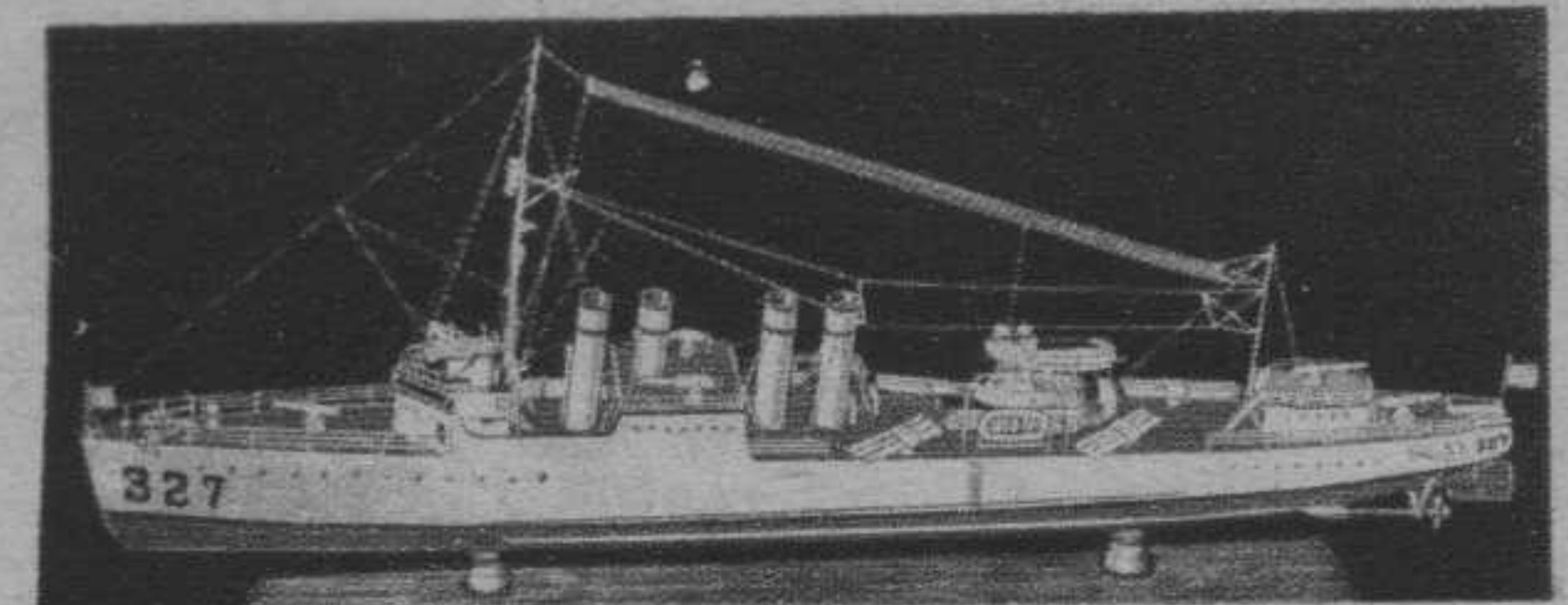
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The Molecule

(Continued from page 30)

The cabin windows are cut after the blanks have been cemented into place. A small brace between windows will help to stiffen this spot. Use heavy celluloid for the windows.

Smooth out the entire body with fine sandpaper. Finish by brushing one or two coats of microfilm solution on the surface first, followed up with one coat of varnish. It is important to have some finish on the body which will withstand the rotting effect of gas and oil. But stay away from dope and paint, as they will put the body out of shape in time. The microfilm solution and varnish are absolutely harmless in this respect.

Make the nose the following way: Copy the two front formers onto a piece of paper. Cut each piece $\frac{3}{32}$ " smaller all around. Cut $\frac{1}{2}$ " off the curvy part of each in a straight line. These cut-offs will be filled in with a solid block. Cut out the formers of $\frac{1}{8}$ " sheet and leave them solid. Now cement the two together at the same angle as the front of the body. While an auxiliary $\frac{1}{4}$ "x $\frac{1}{4}$ " holds the front former in place, plank the sides with $\frac{3}{16}$ " soft balsa and put solid blocks on top and bottom. Carve and sandpaper to shape. Use clear dope and paint inside and out in order to make it gas-proof. Two bamboo tracks anchored in the bottom of the nose support the coil. The battery box is made of hard $\frac{1}{16}$ " sheet balsa and

cemented firmly. The landing gear is of $\frac{1}{16}$ " piano wire faired in and reinforced with a large-face brass bushing on each side of the nose.

The motor is mounted on two aluminum brackets which in turn are screwed to the front former. I have used a sawed-off Austin timer—but, shifted a little forward, even a full-size one will fit in.

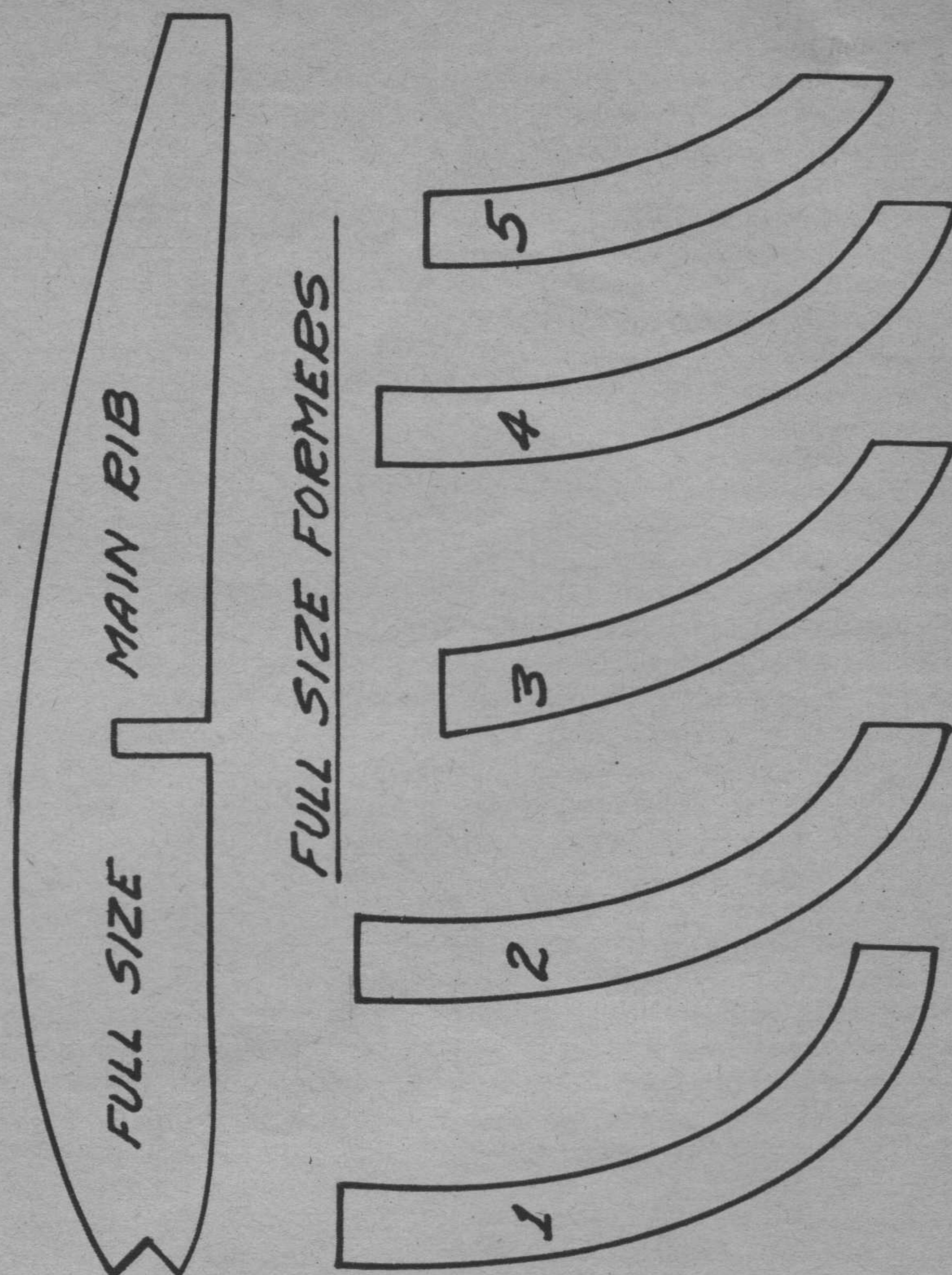
Solder all the connections into a firm joint. To avoid losses through interference, the high-tension wire is brought through a slot between the nose and the cabin front. The whole nose is held firmly to the body by rubber bands on each side. Provide piano-wire hooks for this purpose, both on the nose and body.

WING AND TAIL

The wing is made in two halves. Cut out all the ribs for the straight part of the panel. Pin the trailing edge down and butt-joint the two end ribs. Now slide the spar through the notches and fasten the leading edge. Follow with the rest of the ribs. Bend the bamboo tips above the gas range, and notch them in place. Fit in the smaller tip ribs, which are sanded lower and lower toward the tip.

The front cut-out ring may look odd to some, but it is the only way to preserve the cabin position.

The tail employs no spar. The outline is cut out to shape and as-



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sembled. Flat balsa ribs are set in, whereupon the edges are sandpapered into a streamlined section. The rudder tab is solid balsa hinged with small aluminum pieces. Cover all the surfaces with single Jap tissue. A couple of coats of dope should make it water- and gas-proof to a reasonable degree. The wing and tail units are fastened with rubber bands.

FLYING

Glide the model without the prop, whose weight is replaced with a rag bundled around the motor. If there

is any incidence change necessary, do it on the elevator. When the hand glide is perfected, leave the rudder in straight position, open the motor to about seventy-five percent and hand-launch the model ten to twenty degrees off the wind to the left. If it does not continue to turn in the same direction and stalls around under power, give it one-eighth-inch left rudder the next time. All adjustments should be carefully considered before being put into effect.

My original model has made hundreds of flights without damage.

Sand and Spinach

(Continued from page 15)

patterns, we find that the designers employed by the various powers have arrived at substantially the same answers. The planes of Germany, France and England, therefore, now resemble each other closely as far as color is concerned, and can be identified only by means of their national insignia and differences in structural design. The topsides of pursuit ships are painted with a camouflage design of olive-green and yellow-brown, nicknamed "sand and spinach" by Britain's airmen. The undersides of the little fighters are done in white or sky-blue. This same general color scheme is also used on day bombers, observation and ground-attack machines. Night bombers and fighters substitute a nonreflecting black paint for the sky-blue tints and partially obscure their insignia.

How effective is aerial camouflage? Can it really make a plane invisible? The answer is no. We can no more make a plane invisible with paint than we can make a man invisible with a trick coat. However, if a man blackens his face and hands and wears black clothes, he becomes practically invisible in a dark room, even in the beam of a flashlight. Ski troops dressed in white coveralls are almost invisible against a background of Alpine snow fields. Both of these are examples of good camouflage.

C. A. V. U.

(Continued from page 23)

pleasanter to fly from than the kind we used to take off from at certain fields we could mention.

★ ★ ★

We asked the author of "Should Army and Navy Air Forces Combine?" to give an account of himself. Here's his dossier:

Born in 1892 in sod house on prairies of Nebraska, during a cyclone. Started soldiering in revolution in Nicaragua, 1909. Commanded machine-gun unit before he started shaving. Followed that with revolutions in Venezuela, Brazil, Honduras and Mexico.

In 1914, while serving with the U. S. Intelligence at Vera Cruz, Mexico, took first airplane ride with Naval Lieutenant Towers—now an admiral. Joined Canadian infantry—P. P. C. L. I.—August, 1914. Wounded and invalided from service, September, 1915. Joined Royal Naval Air Service. Trained in France and England. Service in France, defense of Lon-

don and Channel patrol. Invalided from service on account of wounds, 1917.

Joined American air service with rank of captain, rating J. M. A. Assigned to Selfridge Field and built School of Aerial Gunnery and was school commandant until transferred to France. Took courses at Issoudun and then was assigned as school commandant of aerial gunnery with post of duty at St. Jean de Mont. Remained there for the duration of War.

Discharged from American army, March, 1919, into the reserves. Commanded observation squadron, reserve, at St. Charles, Missouri, for five years. Subsequent to World War, took part in revolutions in Guatemala and Cuba. Went into business of commercial exploration engineer in Mexico, Central and South America. Used first airplane ever to be operated in Mexico for commercial exploration, photographing tropical timber tracts.

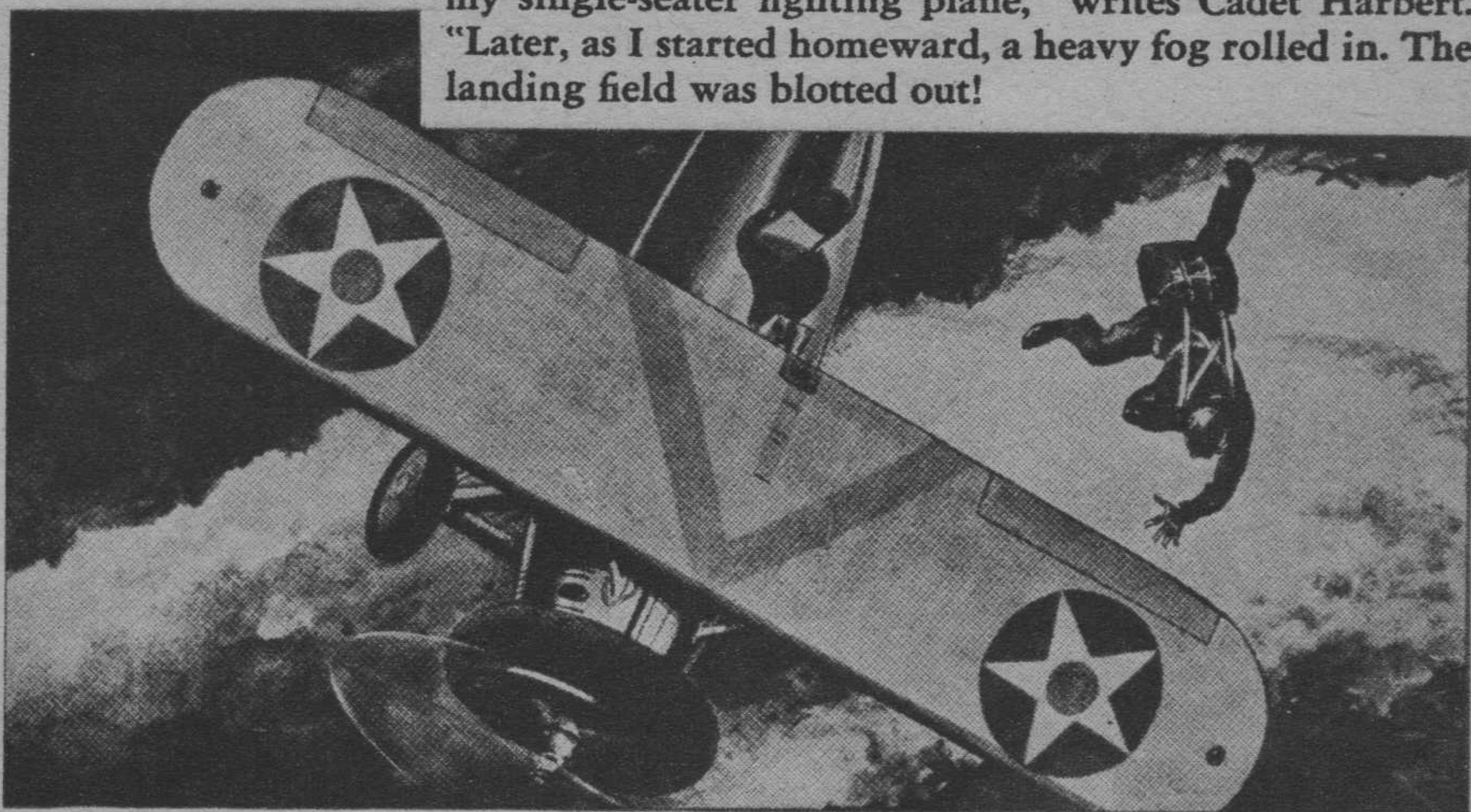
"I HAD TO BAIL OUT IN A PEA SOUP FOG!"



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Aviation Cadet
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1 "I took off from Pensacola on a night training flight in my single-seater fighting plane," writes Cadet Harbert. "Later, as I started homeward, a heavy fog rolled in. The landing field was blotted out!"



2 "It was too dangerous—for myself and those below—to attempt a landing. I had to bail out in that pea soup fog! Heading for open country, I circled at 5,000 feet until the gasoline gauge showed empty, then jammed the stick forward and catapulted into space!"



3 "I landed waist-deep in the wide mouth of a river. Marooned by deep water on all sides, I grabbed my flashlight, and—despite the soaking—it worked! Guided by its beam, two fishermen eventually found and rescued me—thanks to 'Eveready' fresh DATED batteries—which you can depend on in emergencies!"

(Signed) C. A. V. U.

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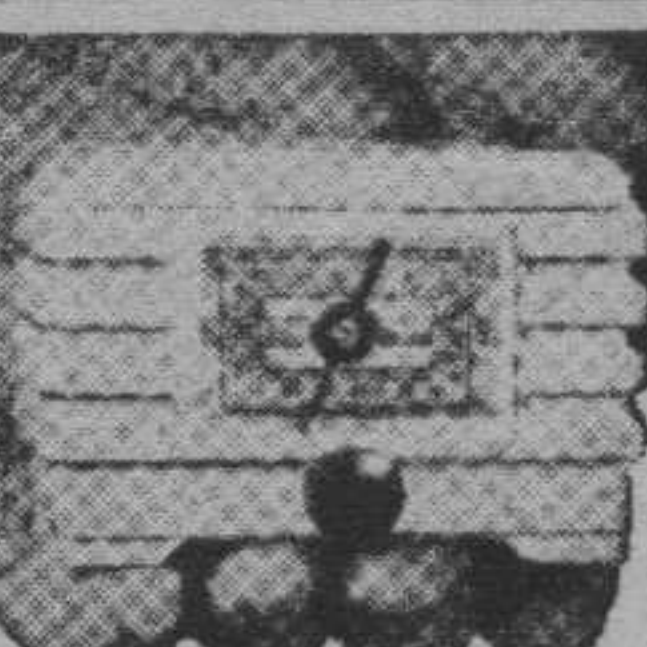
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The Eyes Of War

(Continued from page 21)

is not directly above the ground is compensated by "rectification." This is a process which is an elaboration of the amateur's trick of straightening out converging lines by tipping the enlarging easel.

The five-lens camera is a favorite among multiple-lens cameras. This has one lens pointing straight down and four others set at an angle pointing front, rear and both sides. The photographs, when assembled, have the form of a Maltese cross, but even such extreme angles offer little difficulty to the engineers who derive exact measurements from these peculiar photographs.

If you set a common collar button on a table and look at it directly from above, it forms a circular pattern. Now look at it from above but move your eye six inches to one side. You will see the familiar form of the collar button. This demonstrates the great difference between the theoretically correct vertical position and the shot which is only slightly oblique. Rectification would enable you to produce the circular-pattern view from the angular view!

The value of mosaic mapping is to show the general terrain. The time required for assembly prevents its use for the study of day-to-day and hour-to-hour changes; these are revealed by single shots. One interesting application to reconnaissance work is the time-lapse photograph.

A new sector has been opened by the enemy. The defenders know there is intense activity which the scouts cannot observe. A ship goes up and makes a shot of the suspected area at a known elevation, the lowest from which operation is practical. The use of telescopic lenses, special films and filters make this operating elevation much greater than was the case in the last war. The important thing, however, is to have the elevation as definite as possible. If there is strong sunlight, it is also important to know the time.

At a later time, usually the next day at the same hour and from the same elevation, a second shot is made of the same area. In the meantime a positive on film has been made from the first negative. As soon as the second negative is developed and dry it is placed over the first one. The same objects are brought into the

same position. The positive and negative cancel each other to produce a more or less uniform gray tone. However, any object which is present in the second film which was not present in the first one shows up as an unmistakable area much lighter or darker than the background tone. The way in which even pin points show up is truly amazing. Discarded oil cans, pieces of equipment and other objects are revealed. Any major difference is shown in shape, so that study of an enlargement from that part of the negative will unmistakably show up the camouflaged gun, emplacements, concealed dumps or anything which has come into existence or been altered during the interval.

About the most startling phase of aerial photography is in the field of stereoscopic photography. This is based on the same principle as the old-fashioned double picture cards and the hooded viewer which adorned every parlor table forty years ago. The startling realism of a scientifically produced three-dimensional photography never fails to enthrall the spectator. The effect is produced because the image which is produced upon the retina of the eyes is identical with that produced by the real object. The method is always to make such pictures from two negatives, one made for each eye. To show you how real the stereo effect is, just try this experiment. Place a coin, such as a quarter, on the edge of a table so that about two fifths of the coin extends over the edge of the table. Walk back about six or eight feet. Cover one eye with one hand. Extend the forefinger of the other hand, walk up to the table and without hesitation knock the coin off the table by striking it with the forefinger without touching the table. It is perfectly easy to do this with both eyes open, but with one eye closed most people miss the coin by inches.

When the photographs are made, they are examined by a viewer which is an elaboration of the old parlor viewer. The bad part is that ordinary stereo photographs show depth only to a distance of a thousand feet or so, so that depth value is lost at great altitudes. However, by separating the two lenses, the depth range is extended. By making two shots of

the moon at several hours' separation, the rotation of the earth provides the distance and good stereo photographs of the moon are possible. By suspending two cameras from the wings of the ship, sufficient separation is obtained, not only to reveal depth on the ground, but to exaggerate this depth so that the difference between the height of a man and that of a child is easily seen, even when the shot is made at several thousand feet elevation. By having a known separation of the lenses and making the shot from a known altitude if possible, by careful measurement with special instruments, to determine the height of even small objects on the ground, the fake trench wouldn't fool the stereo camera a second.

And now, if you want to get into the actual exercises of aerial photography, consider this problem.

The enemy has a new type of aircraft, the external design of which must be studied. The only change is to make a shot of the ship, in the air, when passing. A daring flier may get within 1,000 feet. Assuming that both ships fly at 300 miles an hour, and your camera is equipped with a lens of 12-inch focal length, what exposure must be given to obtain a clear, sharp photograph?

The ships' speed is 300 m.p.h. Meeting and passing makes the relative speed 600 m.p.h.

M.p.h. x 1.467=feet per second (f.p.s.).

Ratio of image motion on film to that of original is the same as the ratio of lens focal length to distance of original. Distance is 1,000 feet, lens focal length is 1 foot, so the image moves 1/1,000 as fast as the actual ship. The exposure must be such that the image will travel approximately 1/100 inch or less.

Solution:
600 (m.p.h.) x 1.467=880.2 f.p.s.
880.2/1,000=0.8802 feet per second, image-on-film speed.
0.8802 x 12=10.5624 inches per second.

10 inches is 1,000 times the limit of 0.01 inch, so the time is divided by 1,000.

10.5624/1,000=0.0105624, or 5/10,000 over the limit, which is not a significant error. Therefore the exposure time is 1/1,000 second under the conditions stated.

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1939 Stout Trophy Winner

(Continued from page 34)

FLIGHT

The original model was adjusted by setting the wing and tail at a definite angle to each other—two degrees angular difference—and maintaining that relation during all adjusting. The wing was shifted to produce the best glide possible. The center of gravity was about an inch behind the trailing edge of the wing when the best glide was had. The wings were perfectly straight with no warps for adjustment. The rudder was warped slightly for a right turn. The nose plug was offset to produce the correct climb adjustment. The model did not climb very fast, but a long motor run gave it more time to strike a thermal. Even without the help of thermals, the glide stretched out the time pretty well. The model circles to the right under power and in the glide. The circles are about one hundred feet in diameter, because the designer thinks that too tight a circle will induce an unnecessarily steep glide. The maximum turns are twelve hundred, a few of which remain after the prop has folded.

BILL OF MATERIALS

- 5 pcs. $\frac{1}{8}$ sq. x 36", longerons
- 8 pcs. $\frac{1}{8}$ sq. x 36", cross braces
- 1 pc. $\frac{1}{16}$ x $\frac{3}{16}$ x 11", bamboo wing runners
- 1 pc. $\frac{1}{16}$ x $\frac{3}{4}$ x 12", wing mount
- 1 pc. .045 x 36" wire, wing mount
- 2 pcs. $\frac{1}{4}$ sq. x $\frac{1}{4}$ " hard balsa, nose plug
- 1 pc. $\frac{1}{4}$ sq. x $\frac{1}{4}$ " hard balsa, nose plug

- 4 pcs. $2 \times 2 \times \frac{1}{16}$ ", wheels
- 1 pc. brass tubing, $\frac{1}{16}$ " hole x 1" long, wheel hub
- 1 pc. $2 \times \frac{1}{16}$ x 16", balsa fill-in

Wing

- 3 pcs. $\frac{1}{8}$ sq. x 36", leading edge and spars
- 1 pc. $\frac{1}{8}$ x $\frac{3}{8}$ x 36", trailing edge
- 1 pc. $\frac{1}{16}$ x 2×36 " balsa, ribs
- 2 pcs. $\frac{1}{16}$ sq. x 12" bamboo, wing-tip strips
- 1 pc. $\frac{1}{20}$ x 3×36 ", leading-edge covering

Stabilizer

- 1 pc. $\frac{1}{16}$ x 2×12 ", ribs
- 2 pcs. $\frac{3}{32}$ sq. x 36", spars
- 1 pc. $\frac{1}{20}$ x 3×36 ", leading-edge covering
- 1 pc. $\frac{1}{8}$ x $\frac{5}{16}$ x 36", trailing edge
- 2 pcs. $\frac{1}{16}$ sq. x 12", bamboo stab tips

Rudder

- 1 pc. $\frac{1}{8}$ sq. x 36", rudder ribs
- 1 pc. $\frac{1}{8}$ x 1 x 36", leading edge, trailing edge, rudder base rib
- 1 pc. $\frac{1}{16}$ sq. x 12", bamboo rudder tip

Miscellaneous

- 1 pc. $\frac{1}{16}$ diam. x 36", landing-gear prop shaft
- 1 pc. $\frac{1}{32}$ x $\frac{3}{8}$ x 2", brass prop hinge
- 1 pc. $2 \times 2 \times 9\frac{3}{4}$ " prop block
- 1 pc. rubber or cambric tubing for shaft
- 4 $\frac{1}{4}$ "-diameter copper washers
- 4 sheets colored tissue paper
- Solder for prop counterbalance
- Cement, dope, thread, plastic wood

New Curves

(Continued from page 42)

placing in a medium-hot oven, over a gas flame if your cone is metal, or over a soldering iron.) Swept-forward ellipses, which are widely used at present, can be made by bending two complete ellipses—each of the required aspect ratio. Cut them along the long axis and join alternate halves to each other to form the swept-forward ellipse.

Another use for the cone form is in the shaping of fuselage bulkheads for elliptical cross section. Take a piece of soft iron wire or solder wire and bend it around the cone. Place the wire on the cone so that the axes (*a* and *b* in illustration) correspond to those required by the particular bulkhead. Remove the bent section of wire from the cone and trace the curve on the balsa sheet and cut out the bulkhead.

The size of cone you want will depend upon the size of your models. Indoor needs usually can be filled with a small cone whereas outdoor models will require a larger size. Large funnels are satisfactory and are available in a variety of sizes. The cone-shaped metal vases used in florists' shops are excellent. If a lathe is available a cone can be quickly turned out of wood to practically any proportions.

It will be convenient to mark off various sizes of curves on the cone indicating and labeling with a pencil where the wood must be placed on the cone to produce the desired size of tip. This will be helpful in duplicating curves when more than one is required for a model.

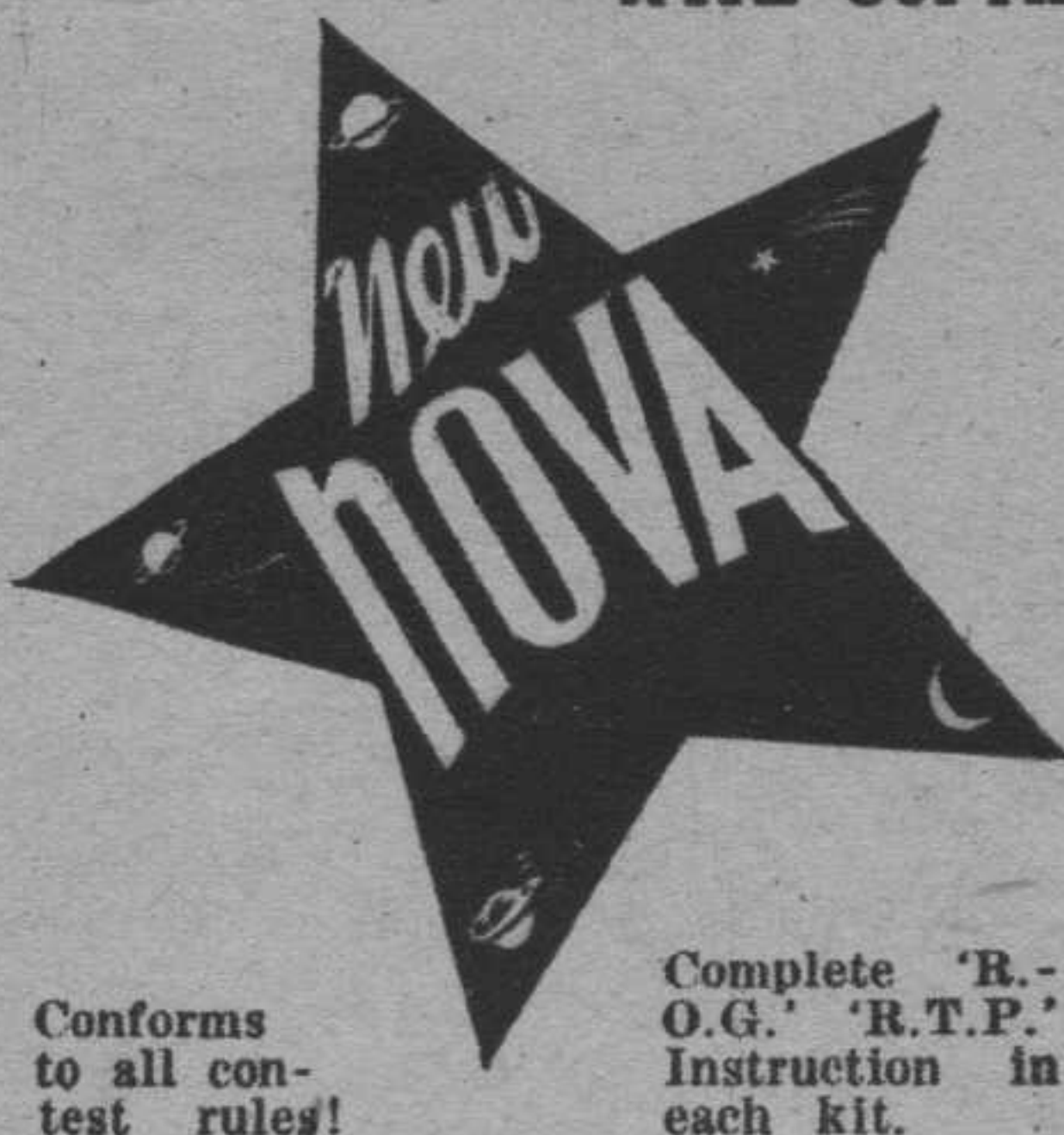
The areas of the various types of curves have been indicated in the drawing. The value "3.14" which appears in the formula for the area of the circle, ellipse, and parabola, is constant and does not change regardless of the size. The area of the hyperbola cannot be conveniently calculated. In checking its area, hold it over a piece of paper ruled off in inch squares. Add the total of squares and parts of squares inclosed by the hyperbola. It is oftentimes convenient to use this method of checking areas regardless of the type of curve used.

When selecting wood for bending do not pick soft-grade balsa. It will be easier to bend, but the finished wing is much more likely to warp. Select the hardest grade that it will be feasible to use for the particular type of curve you are bending. For outdoor work best results are obtained by cementing together several thin strips rather than using a single heavier one.

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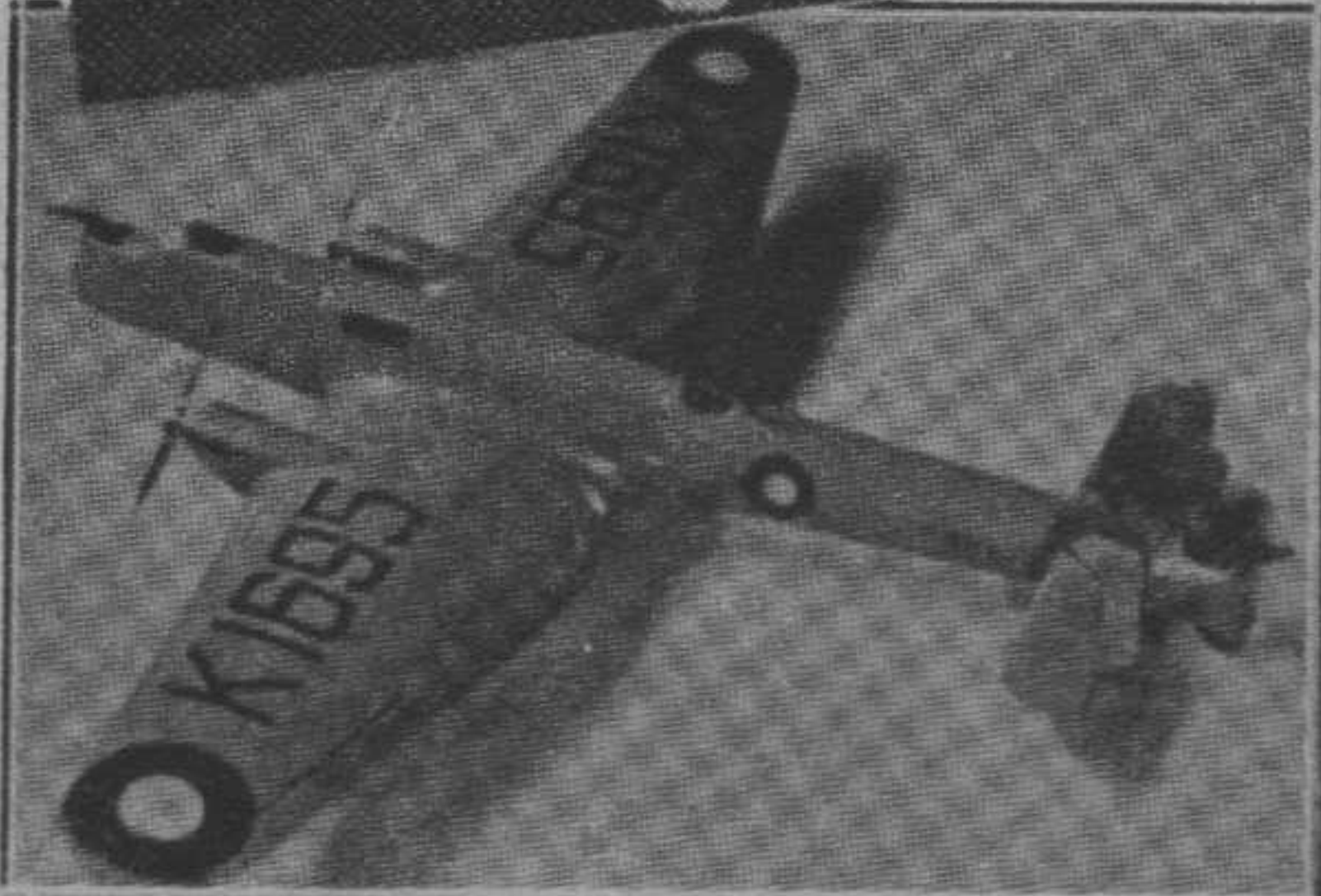
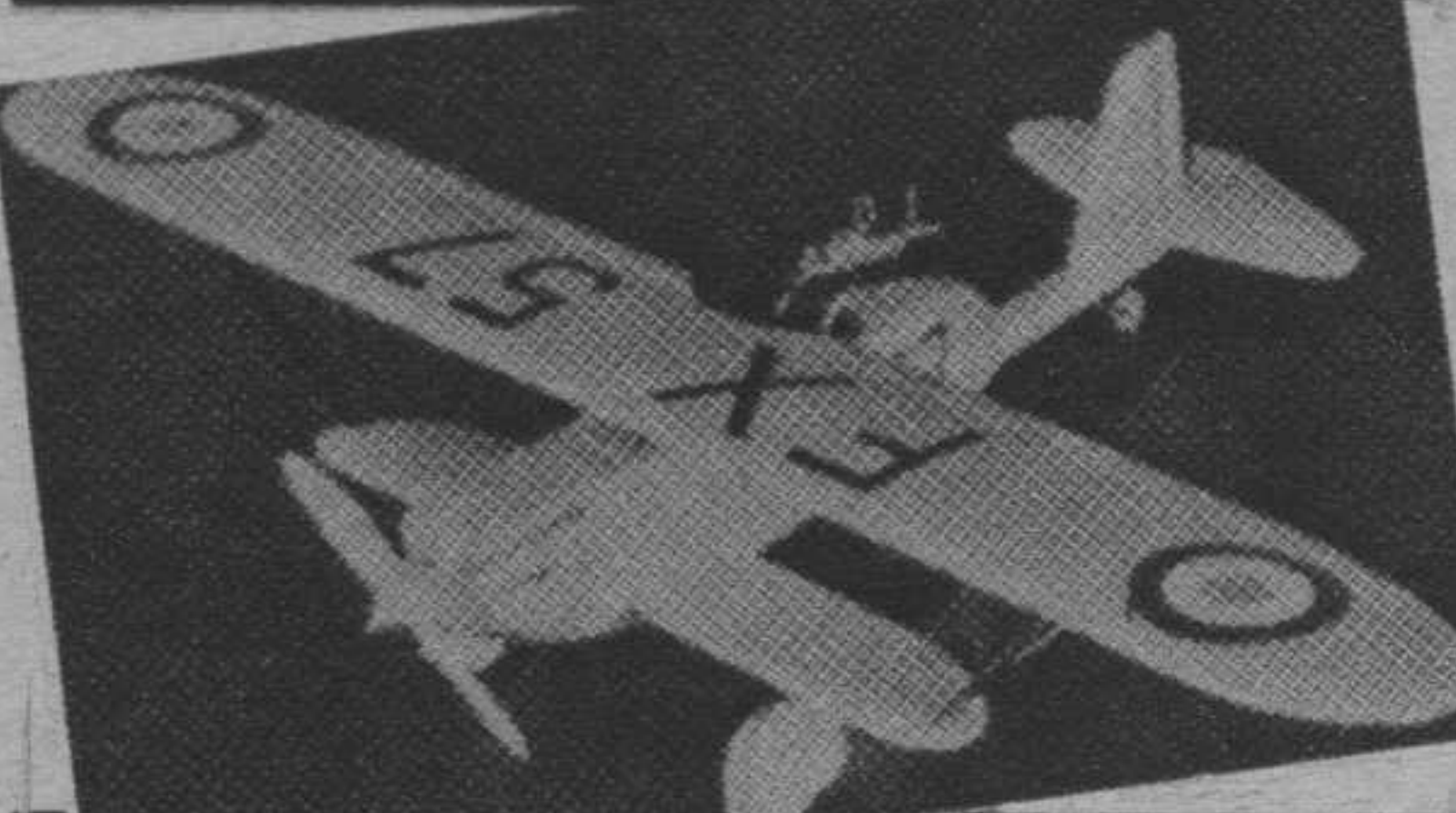
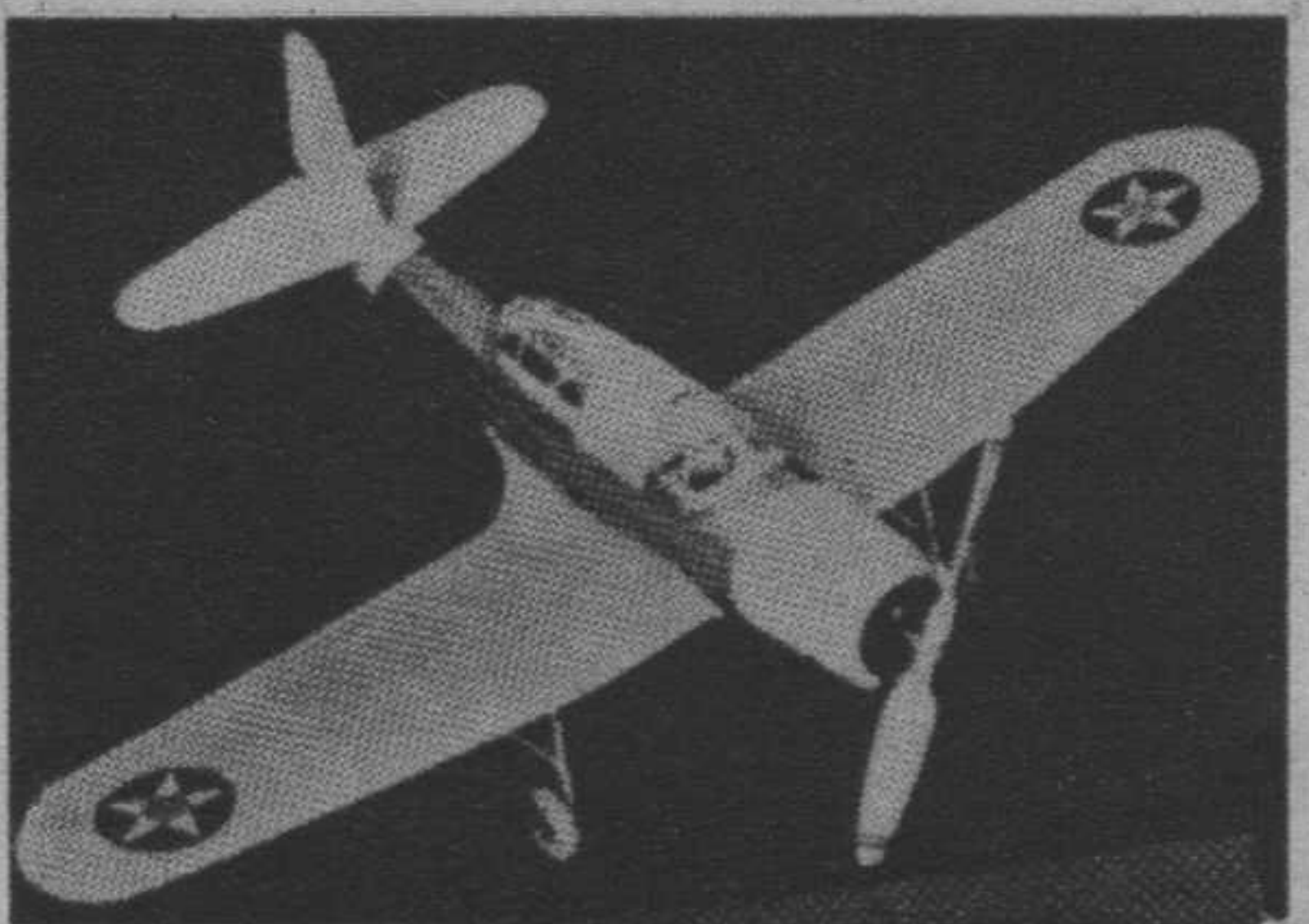
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PAULOWINA And Balsa THRU-OUT!



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27½" VOUGHT Scout-Bomber

200 finished parts! U. S. Army, 2 seater, low wing bomber. Kit, with its finished parts is ready to build this accurately detailed flying model. All bulkheads and formers, cut to size, notched & numbered. Twenty-two Paulowina wing ribs, cut to scale & notched. Turned Cowling & Cylinders to build realistic dummy motor, exact counterpart of the original. Struts shaped & streamlined. Rear hook mounted. All metal parts formed, 2 Paulowina Props (1 scale, 1 flying type). Land & Skid wheels, paper to cover in 4 colors, Rubber, Cement, Detailed Plans & Instructions included in this 'TRU-DETAIL' kit. **\$3.00**

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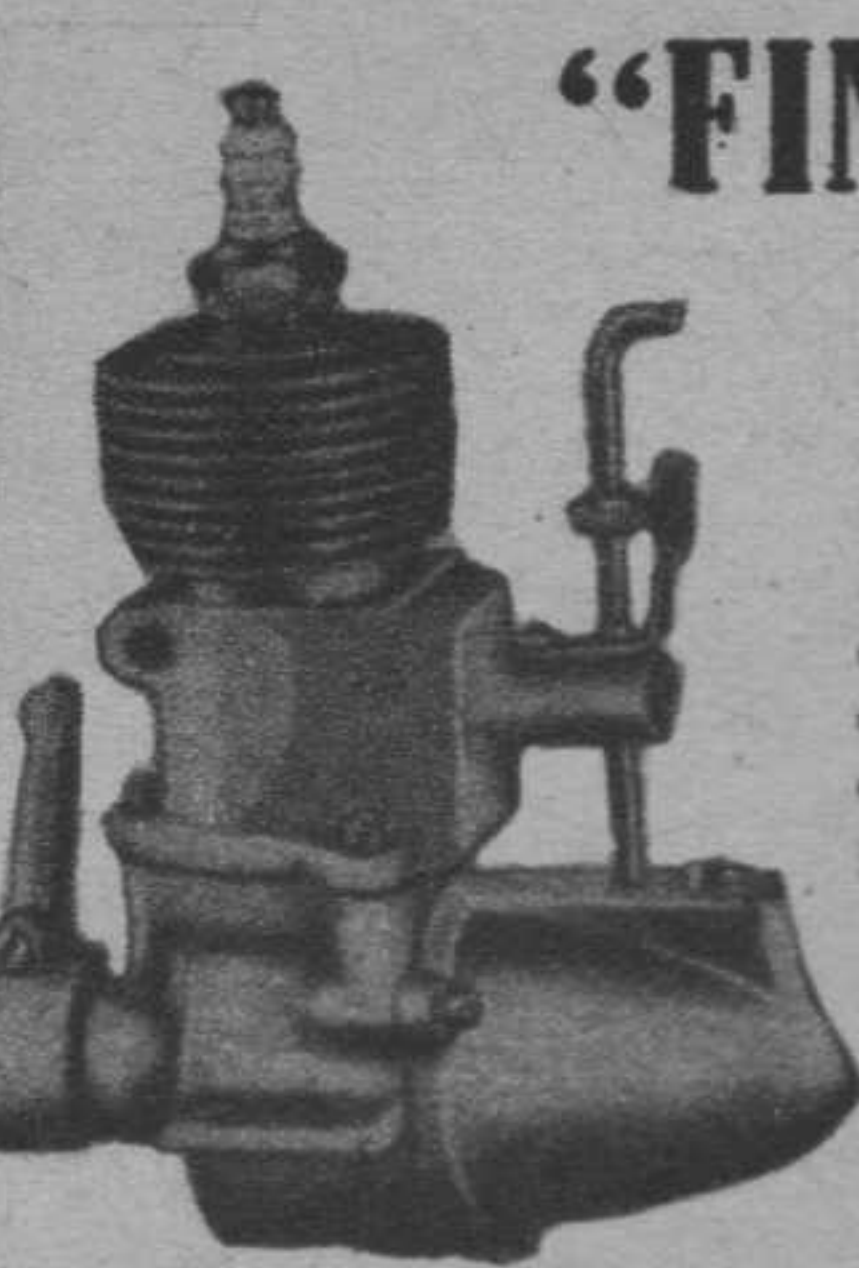
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SPECIFICATIONS: Wt. bare 9 oz. Bore $\frac{1}{8}$ ". Stroke 15/16. H.P. 1/5 plus. R.P.M. from 300 to 7000 (13" prop.) up to 10,000 with flywheel! Complete with coil, condenser & Champion Spark Plug. Mounted on test block.

With Men Who Know

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(See list of advertisers on page 66)

(Continued from page 37)

conduct indoor meets throughout the early months of 1940.

For further information on model meets in your vicinity which were sanctioned too late to appear here, write to the National Aeronautic Association, Model Division, Dupont Circle, Washington, D. C., inclosing a three-cent stamp.

A MODEL MODEL CLUB

Aviation leaders have acclaimed the National Air Races which are conducted each year at Cleveland under the sanction of the National Aeronautic Association as one of the best-managed shows of its kind in the world. Right now, we'd like to warn the promoters of that annual classic to watch their laurels, for there's a new personality looming on the horizon who bids fair to steal their glory.

Permit us to introduce Jimmy Metchicas of Greenville, S. C. Jim is the spark plug behind the Torque Fliers Model Airplane Club down there, an N. A. A. affiliated modeling organization.

Late last summer, the Torque Fliers put on a two-day meet called the Tri-State Model Airplane Contest that was a knockout. First of all, the club secured the cosponsorship of the Greenville Exchange Club. Four events were held for rubber and gas entries, and prizes were given for both duration and appearance winners.

Here's what Jim wrote those who entered: "We have acquired the Hotel Greenville for one dollar per person per night. . . . All contestants will attend a free picture show after the first day's flying is completed. . . . After the second day's flying is completed everyone will attend the banquet where the prizes will be awarded."

How's that for the first annual meet put on by a new model club?

But, really, that's nothing. You aren't fully aware of the capabilities of these Metchicas. In order to put on a bang-up competition and present cash awards, Jim & Co. went out and rounded up \$400. Yes, sir, \$400. Jim tells you how it's done: "First, I would get up early in the morning, about eight a. m., and take another member of the club with me. He would carry a very good-looking gas model with a smooth-running engine. We would call upon every eligible merchant in town and ask each

one to sponsor a model in the meet, the cost to be ten dollars, and the merchant's name would be painted on the ship. Look at the publicity he'd get in the local papers if 'he' won!"

As a result of their "advertising" campaign, the club collected the \$400 from forty merchants and created an unprecedented interest in their contest. More than 125 participants turned out from South Carolina, North Carolina and Georgia. And to prove that he's a real booster for model aviation, Jim compiled a list of all the entrants with their home addresses and offered the list without charge to all club officials in the South to enable them all to invite the entire crowd to their own meets.

ODDITY IN THE NEWS: GAS MEET IN MASSACHUSETTS

It's not often that we are privileged to present contest reports on Massachusetts gas meets. Up there one finds little open country, and it seems that most available space has already been cornered for airports or codfish-drying grounds.

But here is a competition conducted by the Massachusetts Gas Hawks, who bill themselves as "New England's Most Active Gas Club." We'll wager some of the Connecticut N. A. A. Gas Model Chapters will challenge that statement; but, seriously, the Gas Hawks are a grand band of model builders. A meet was held on September 24th with a twenty-second engine run, and out of the chill New England dawn, Gordon Sampson of Lynn, Mass., emerged victorious with a :62.3 average.

The competition was directed by Irving Day, N. A. A.'er of Danvers. Officers of the Gas Hawks are Charles Sanborn, president; Arthur Jackson, vice president; and Ina Brennan, secretary. The Hawks were instrumental in leading the battle to have a State ban on gas jobs lifted several years ago. At one time the entire band of intrepid fliers trooped into the historic old State Capitol on Beacon Hill to sit down with the legislators in an effort to have the laws amended which prohibited gas flying. The club took along gas models to the session, and the solons were much interested by the ships. The Hawks' efforts were largely responsible for the ban being lifted.

Bombs and How They Work

(Continued from page 19)

Some will detonate the bomb almost instantly, while others are calculated for specific, split-second delayed action. A heavy demolition bomb would be equipped with a delay fuse to postpone the explosion until after the projectile has crashed through the top of its target, in order that the full "upward and outward" shove of the explosive might undermine and rip the target completely apart.

Fragmentation bombs, on the other hand, are always fitted with instan-

taneous fuses. These bombs are used against personnel exposed aboard ships or in the field, gun crews, and the like. Here, for best efficiency, the bomb must hurl its jagged fragments before any are lost by burial in the ground.

Oh, no! Bomb dropping no longer is the friendly, playful sport it was back in those citrus-casting days. Now it is a grim game of death played with cold, calculating, merciless precision. Take these "frag" bombs

SANTA CLAUS says:

"THIS IS A COMBINATION VALUE THAT CAN'T BE BEAT"—
"And it's just in time for Christmas"



THE MERCURY BULLET

48" WINGSPAN
14 oz. WEIGHT

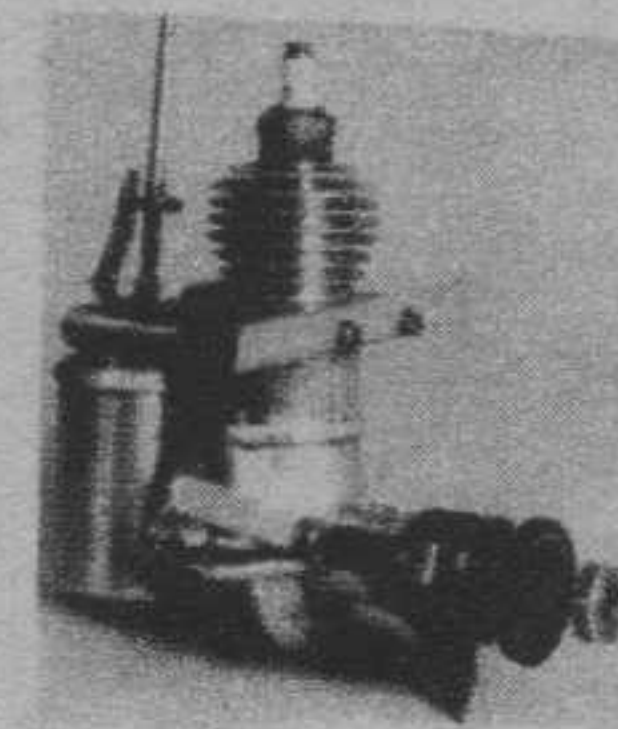
Climbs like a sky-rocket. A thermal catcher if there ever was one. Designed for small bore engines. Kit is complete with alum. Cowl, nose, wire, cement, dope, Celluloid, Tissue, Balsa strips, cut to size, full size plans and printed sheets, etc.
Price of kit, if 1.50 bought separate... 1.50 p.p.

ALL FOR ONLY

\$10
Postpaid

1. MERCURY BULLET GAS MODEL
2. MERCURY GNAT MOTOR
3. MERCURY AIR WHEELS
4. MERCURY CARVED PROP

Here is everything you need in one package. Nothing else to buy. Put the plane together—attach the wheels and prop—mount the motor—and go out and fly! Go out and send this new MERCURY CHAMPION COMBINATION to new time and distance records! This is truly history making value in the model airplane field. Imagine!—for \$10 you get: a gas plane, motor, air wheels and carved prop!!! RUSH YOUR ORDERS TODAY!

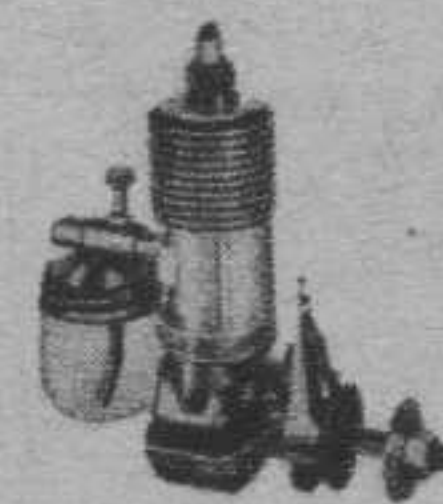


THE MERCURY GNAT

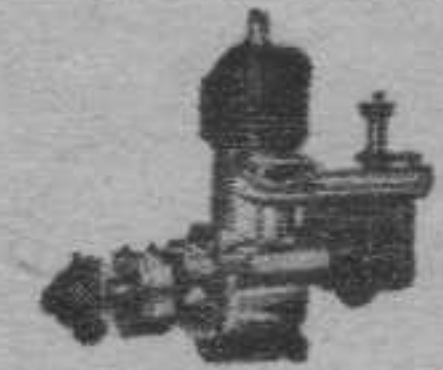
MOTOR IS COMPLETE WITH SMITH COIL, CHAMPION SPARK PLUG AND CONDENSER

The GNAT is the most powerful, easy starting, smoothest flying engine of its calibre. Bore—9/16; Stroke—3/8; R.P.M. 7500; H.P.—1/10; Weight—4 1/2 oz.; Displacement—156 cu. in. Will fly planes up to 2 1/2 lbs., with 5 1/2 ft. wing spread.
Price of Motor, 7.95 (ready to run) if 7.95 p.p. bought separate....

ALL LEADING GASOLINE ENGINES!



BROWN, JR. MODEL D
More value for your money. Includes new timer, chrome crankshaft, needle valve, transparent gas tank. Complete with coil and condenser, ready to run.
\$12.50



THE NEW OHLSSON "23"
A sensational motor which has been winning contests and setting records right along. H.P.—1/7; Stroke—3/8; Bore—3/8; Bare engine wt.—only 4 1/2 ozs.; Complete with coil, condenser—ready to run.
\$16.50

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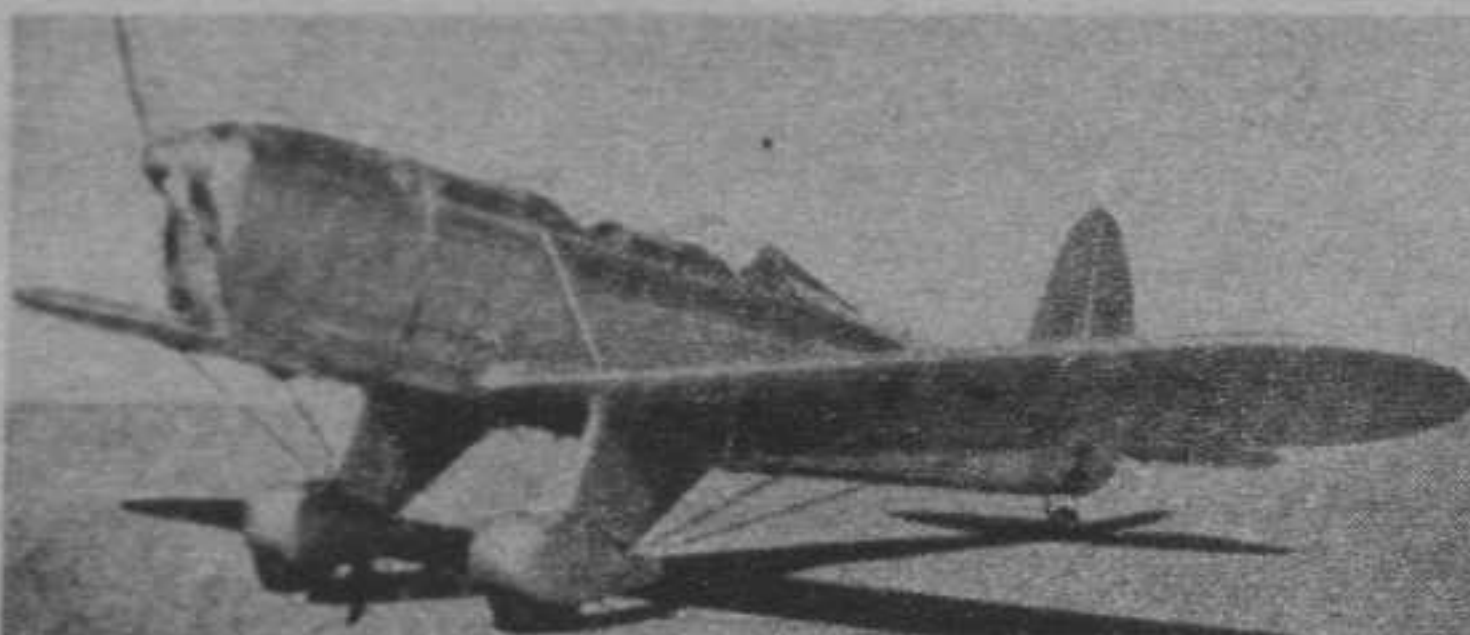
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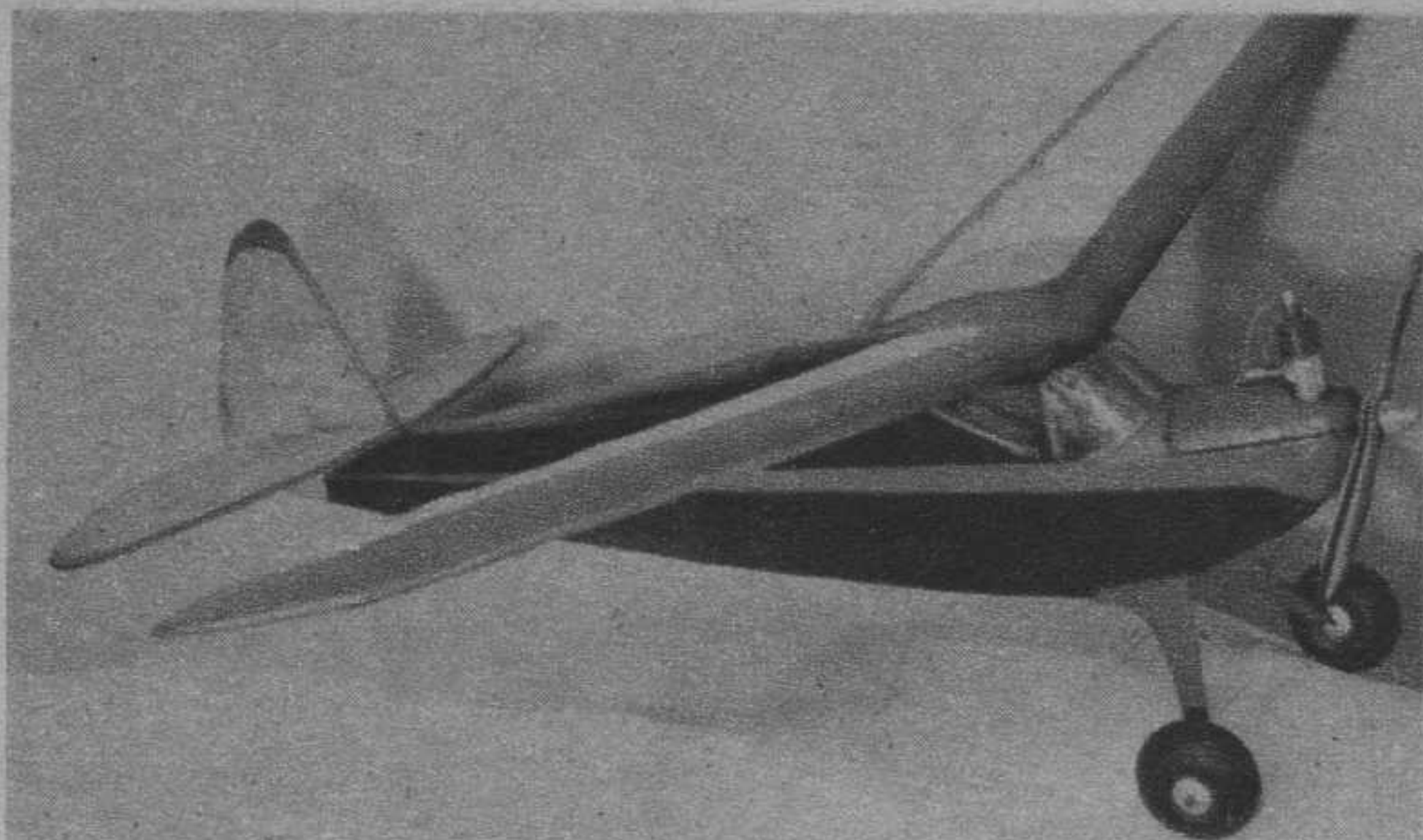


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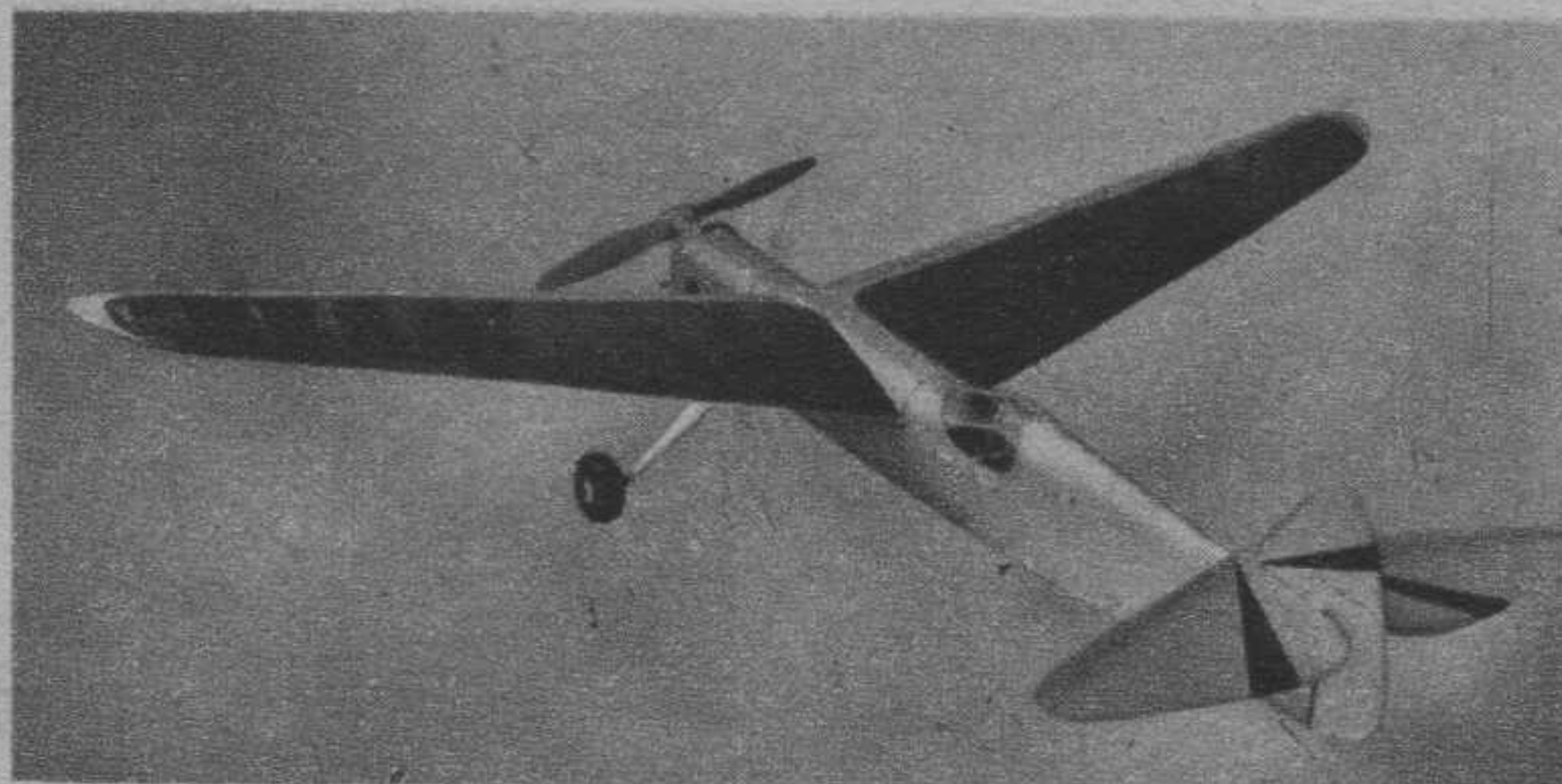


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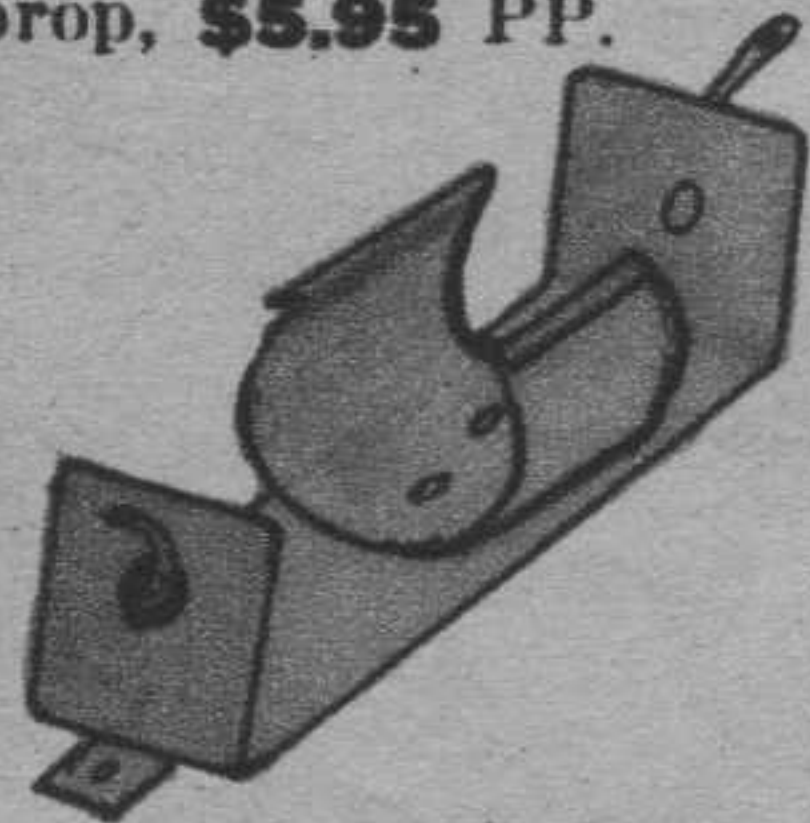
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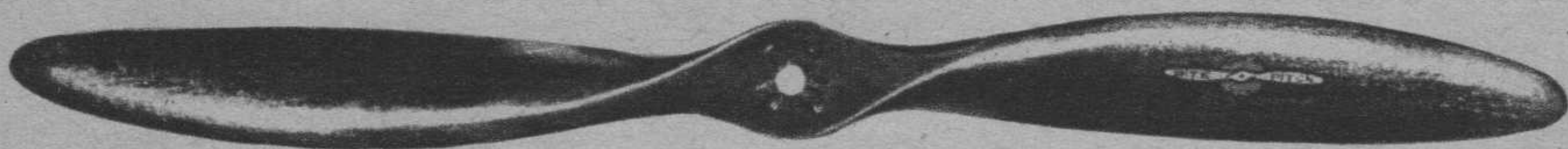
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again—their designers can tell you exactly what will happen when one is dropped under given service conditions. They know how many men should be killed, how many injured, how many of the injured should later die.

They'll tell you, too, that the "ideal" segment from the average "frag" bomb weighs one fifth of an ounce and will completely penetrate a three-quarter-inch spruce board—or a man's vital organs!

Airplane projectiles as used today can be divided into three general classes: explosive, chemical, and dummy. The "demos" and "frags" naturally fall into the explosive class, together with the comparatively harmless practice type that carry a simple load of black powder for smoke puffs.

Among the chemical bombs are smoke-screen, incendiary, and poison-gas types. As used in our army today, chemicals are chiefly "hider-outers." The official training regulations say:

"At present the formation of smoke screens is employed to mask known enemy observation posts, to conceal and protect the front flank of attacking troops from enemy observation, and to blind hostile machine guns."

For straight smoke effect, a liquid called titanium tetrachloride is used in the bombs. Released into the air, it forms a dense white smoke which is comparatively harmless. In other types of smoke bombs, white phosphorus is used. This chemical is definitely dangerous, since it takes fire immediately upon being exposed to the air, produces a very heavy white smoke, and frequently sets fire to property.

The United States army at present has no chemical bombs other than these. Certain armies, however, notably the Japanese and Franco's forces during the late Spanish war, have been charged with the use of poison-gas bombs.

Other chemical bombs used by European armies include liquid oxygen and thermite types. The oxygen projectiles have created a great deal of tenseness among military men and reporters. Reputedly used in Spain, they are said to possess tremendous powers of blast and have admittedly caused much havoc. Drawbacks seem to be the difficulty and uncertainty of transportation and preservation of the liquid oxygen.

Thermite bombs, also used in Spain, according to reports, are of great incendiary value. Filled with a compound capable of producing an almost inextinguishable conflagration at a temperature of nearly 6,000° Fahrenheit, they are light in weight and can easily be transported by air in great numbers.

But let's get back to American aerial bombs. And next on the list are "dummies." Dummy bombs, of course, are just that. Used for instruction or practice purposes, they may merely be empty shells of standard or obsolete types filled with water or sand. They are not explosive. Some dummy projectiles are cylinders cast in concrete and equipped with wood or steel tail fins.

From the military standpoint, of

course, explosive bombs are the most important and best known. "Demos" now in service run from 100 to 2,000 pounds, although these figures do not indicate the actual weight of the bomb. One model of the army's Mark 1 bomb, for instance, really weighs 2,121 pounds, but it's far easier to refer to it as just a 2,000-pounder. In the demolition types, the explosive filler usually runs slightly more than fifty percent by weight. The cases are made as light as possible in order to get the most explosive in.

The amount of *blast* resulting from a "demo's" detonation is of more moment than the number or weight of fragments scattered. In the "frag" type of projectile, however, seldom does any structure have to be destroyed; therefore, they contain only enough explosive to burst open the case and fling the segments within a limited radius. "Frag" bombs vary in weight from seventeen to thirty pounds, and the "live" filler may be as little as ten percent of the total weight.

Bombs are carried aboard planes in two ways—in exterior bomb racks fitted beneath the wings, or in racks built within the fuselage. The newer planes, particularly those built expressly for bombing, are mostly equipped with the interior racks.

During the World War the eggs were dumped over the side by hand or were released from simple exterior racks. The actual art of bombing was pretty much of a hit-or-miss proposition, but even that was hell for those unfortunate enough to be on the receiving end.

Today, American bomb sights are reputed to be the best and most accurate in the world. Bombing today is a real science, and the instruments used are simply remarkable, combining as they do intricate timing and optical devices. Before our air-corps pilots and bombers are given a chance to use them, they serve an "apprenticeship" in bombing from a simulated altitude of fifteen thousand feet in a little silolike building only eighty-five feet in height!

This miniature bombing range at the air corps' Advanced Flying School at Kelly Field, Texas, is unique indeed. The bombers-to-be take their positions in seats resembling cockpit seats arranged on circular platforms near the roof. Each student is supplied with a radio key and is in contact with an operator stationed out of sight. The op has control of a huge switchboard connected with a set of six hundred lights installed beneath the floor of the building. The lights shine up through holes to simulate bomb or shell bursts in a huge diorama which, painted to scale on the floor, represents the San Antonio section as seen from fifteen thousand feet. Troops and artillery emplacements, and the like, are represented on the floor by traditional "tin soldiers."

The radio man switches on the lights as directed by the students, and valuable practice is gained in correcting for errors of speed, aiming, et cetera. The equipment is also used by the air corps for instruction in artillery observation.

The Chinese Like It Stormy

(Continued from page 17)

them of dirt and blood, and go to work again, knowing full well they'll have the same thing to do all over again tomorrow, or perhaps even in an hour or two. But the show goes on. Much of the mechanical work is done under the shelter of trees to prevent spotting from the air, and repair units are widely separated to prevent a single lucky bomb from annihilating everything at one blast. Like the pilots, the mechanics get in their best work when the skies are overcast and the bombers and attack planes cannot see their objectives.

When the weather is clear and visibility unlimited the pilots loaf and watch the Japanese raiders unload their bombs. They gamble on the percentage of duds and hits and sometimes they have to run for their lives to escape the fires that rage with greedy fangs through the wooden buildings that have stood for centuries in peaceful security against all invaders, until the coming of the airplane. At times when they get sufficient advance warning of a raid the pilots take off with their transport planes and fly to concealed spots in the mountains and there wait until the raids are over. Then they return and take on their loads and fly them to their destinations, carrying on the traditions of this new industry of China.

It's when the clouds hang low or the rain lashes down in torrents and they know the enemy bombers and attack planes will remain snug in their nests at home that the China air transport comes into its own. Relegated to the background are the blasting of the bombs, the spraying of machine-gun bullets and the anguished cries of the wounded. They have no time for the raid that's over; it's the one tomorrow they have to beat. It's a case of sky overcast, visibility poor or zero, and there's work to be done.

Up from the field pockmarked with recently filled-in bomb holes, soggy with teeming rain, the DC-3s, the Junkers and other transport planes soar into the air to be at once lost to sight in fog, rain or the clouds.

It's blind flying at its best, or perhaps its worst. There are no radio beams to help them find their way through the overcast to their destination. Their only aid is a two-way voice radio of German manufacture, a radio that to date has never let them down through failure. The pilot knows his destination but is never sure what he will encounter on the way. They fly high and follow a compass course. Up above the murk and rain they sometimes encounter a lurking Japanese air fighter and have to run for it, dive into the clouds, twist and turn or use methods of their own that have been developed through necessity. The criterion of their success in these mad flights is that to date only one DC-3 has been brought down by the Japanese aircraft, and the German-China company has lost three Junker planes.

Many of the Chinese pilots were trained in the United States, and the fact that they get through and de-

liver their cargoes of freight, passengers and mail, day after day and month after month, attests to their being good, a credit to their trainers.

War has solidified China as a nation as nothing else in the world could have done, and aviation is drawing them closer together commercially. They have discovered that the provinces drained by the Yangtze River are the logical commercial centers of China. Commercial airplanes have proved to them that it is possible to keep their lines of communication open and to transport freight, passengers and mail to and from the outside world under the most trying conditions ever attempted in the history of aviation.

Tucked away in the mountain fastnesses of these western provinces of China are fertile valleys that have the oldest irrigation systems in the world. Here for centuries the people have tilled the soil and manufactured everything they needed as a community project, all crops going into the common granaries for the benefit of everyone. Today the airplane is tapping these rich storehouses and bringing out their products to feed and clothe the armies and millions of homeless, starving Chinese. Were it not for the transport airplane these natural depositories of riches would still be as inaccessible as though in the possession of the Japanese themselves.

Not only has aviation aided China by expanding its aerial transport, but it has instigated the building of thousands of miles of motor roads. Today China is undergoing the greatest road-building program of any country in the world. The miracle of transportation is there to stay. Never again will these countless valleys be secluded from the rest of the country and the world. Hundreds of thousands of coolies are laboring in the mountain fastnesses of the provinces of Szechwan, Sikan, Yunnan, Kwangsi, Kweichow and others, building motor roads to tap these rich reserves heretofore inaccessible, and on across the borders of India and Indo-China and so to a new route to the outside world.

This road-building program is a natural follow-up of the aerial transport system that has carried much of the road-building material and machinery into the impassable mountain regions. Wherever there is room enough they have already built landing fields, and the inhabitants of these valleys no longer flee in terror when a huge transport plane roars out of a cloud and spirals down to a safe landing.

China accepts this new era with a sang-froid that is as stoic as China itself. They have no fear of airplanes and now they are positive that aerial transport will finally be the means of frustrating their enemy. They have accepted the war planes as their curse and the transport planes as their salvation. Regardless of weather conditions, every transport plane is always loaded to capacity. Large training centers have been established in the fastnesses of the western prov-

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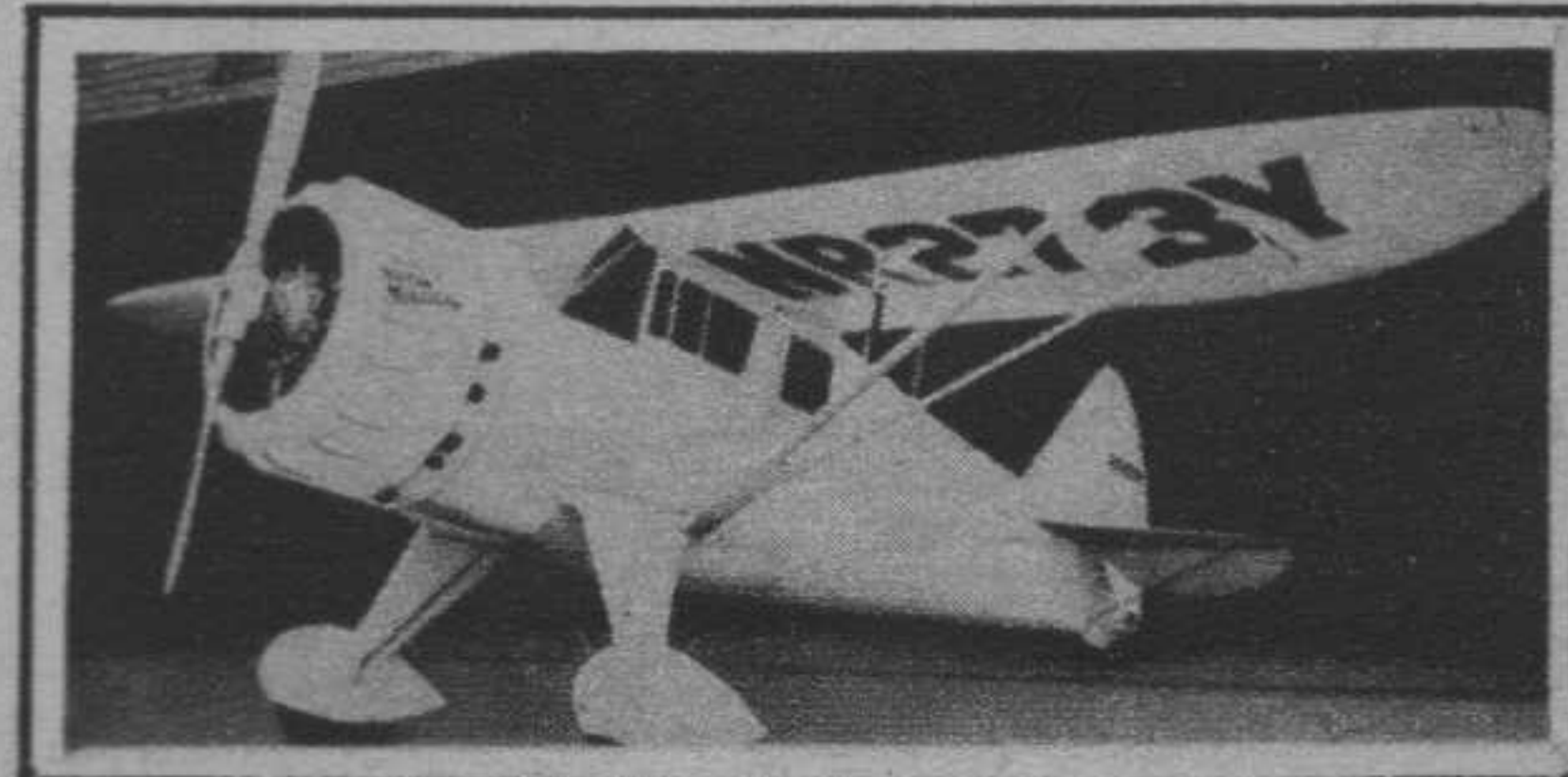
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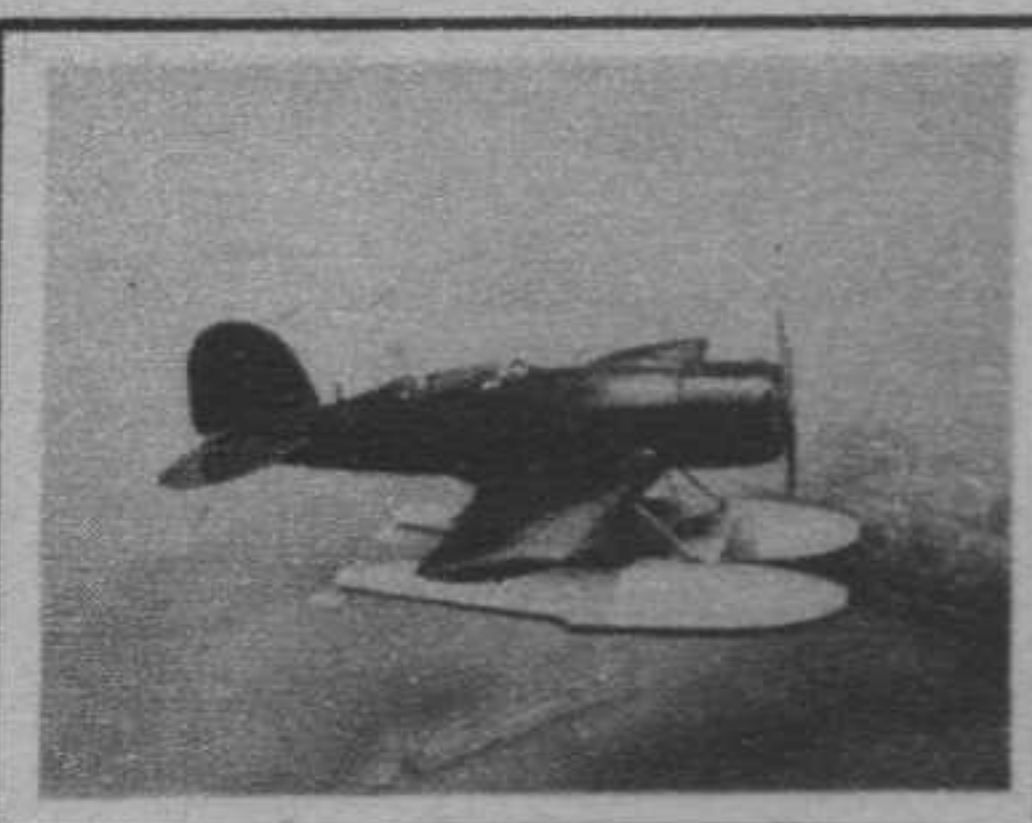


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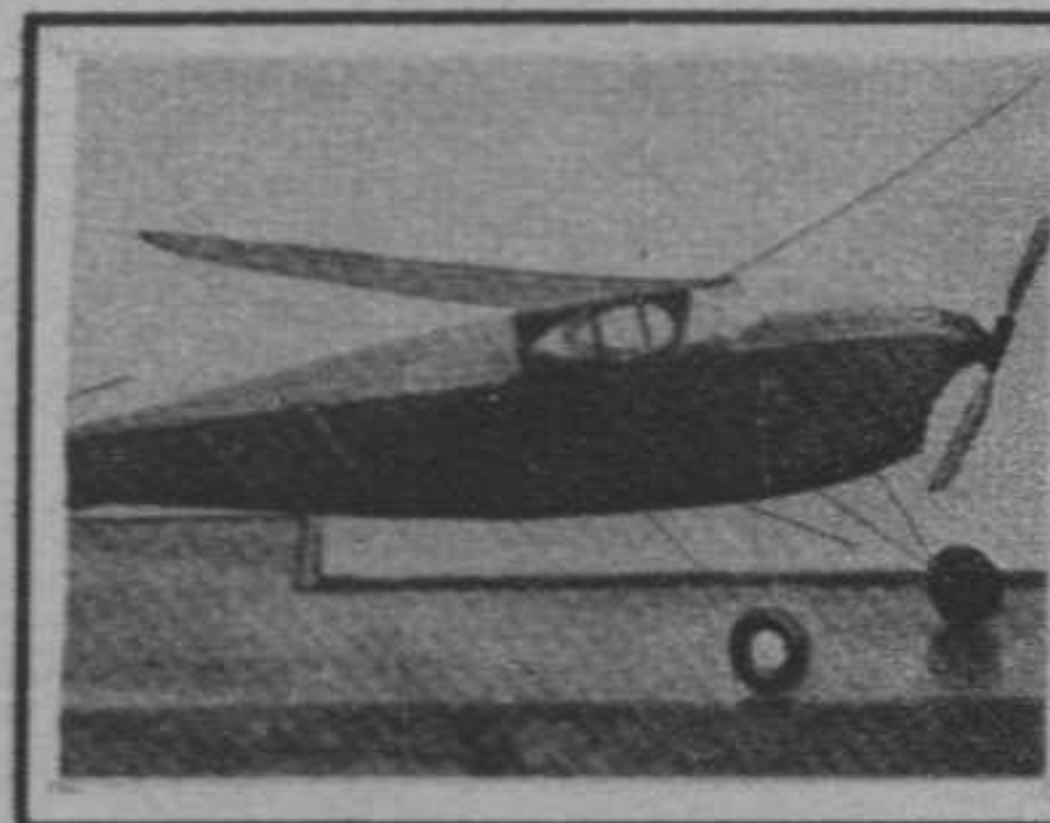
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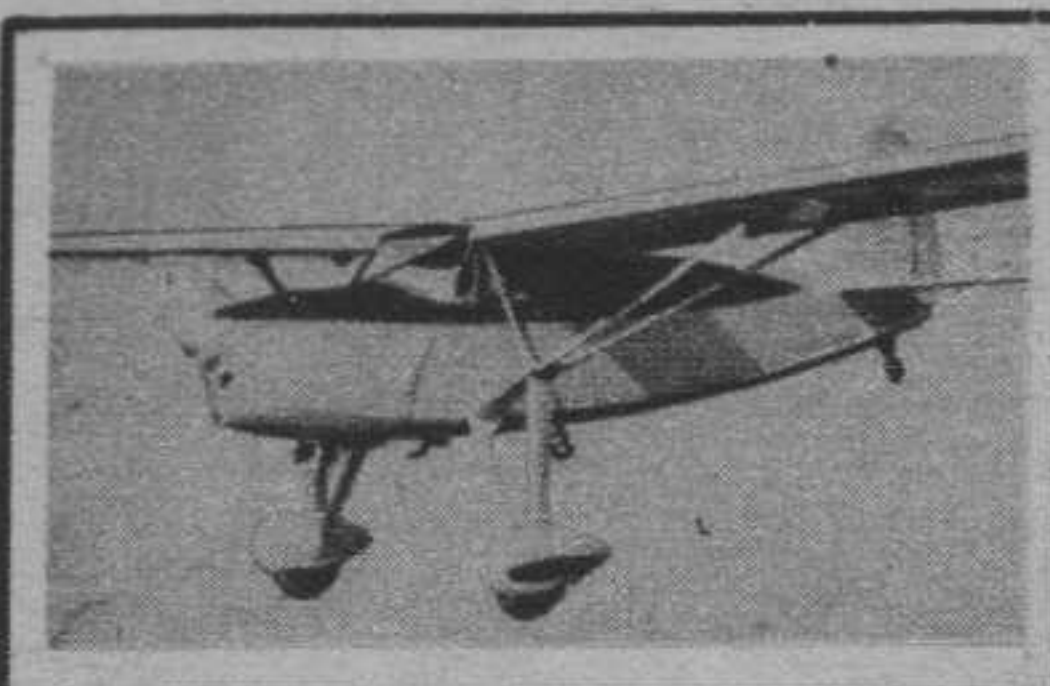
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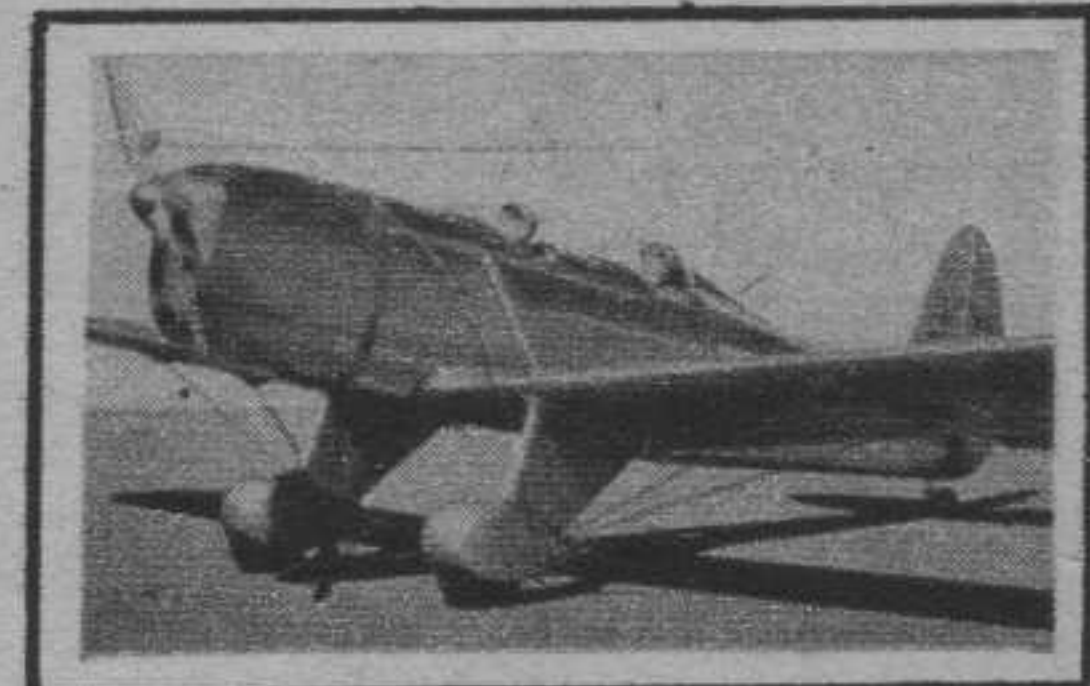
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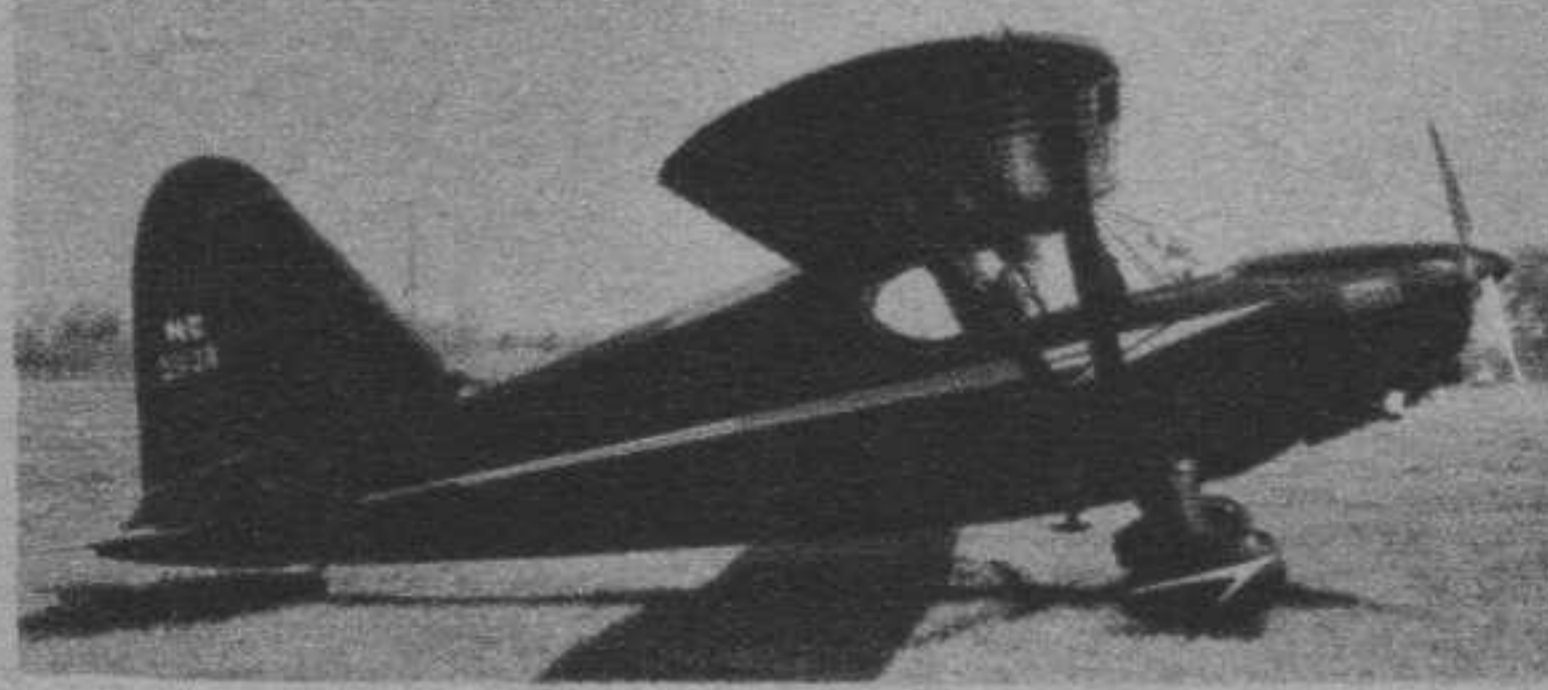
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inces, but even though the war rages
it is mostly transport pilots and me-
chanics who are being trained.

The territory served by the com-
mercial transport planes in western
China is as rough as anywhere in the
world. Altitudes of sixteen thousand
feet and more must be reached to
cross the ranges. They land in nar-
row gorges with a mountain stream
on one side and the sheer sides of a
cliff on the other, discharge their pas-
sengers, mining machinery or road-
building equipment, and soar away
again into the clouds with a return
payload of foodstuff or manufactured
products.

Mountain streams are being har-
nessed to supply electricity to towns
and factories, and all the equipment
has been flown in by plane. To such
an extent has commercial aviation
brought out the possibilities of this
heretofore undeveloped — commer-
cially—portion of the Republic of
China that the Chinese themselves
declare they will never again center
their commerce in large cities on the
coast where they are defenseless
against a powerful navy. They will
keep them back in the hills, nearer
their base of natural supply and
where they will always be able to
utilize their new system of aerial
transport.

As is to be expected, the average
flier is not fitted for this type of
transport flying, or rather bad-
weather flying. It's the case of many
being called but few chosen. It takes
a peculiar temperament to stand up
under the constant strain of bad
weather, the eternal vigilance neces-
sary to outguess and outmaneuver an

enemy only too happy to pounce
down upon a defenseless transport
plane, for none of them is armed and
their only defense is the speed and
the skill of the pilots. Nothing speaks
better for these pilots flying the China
transport planes than that they do
take the dare.

It is a strange paradox that through
war, China, which has always been
one of the most peace-loving nations
in the world, should rise to greater
heights as a nation by the use of a
peaceful instrument—the transport
airplane. It is the first time in the
world's history that the fighting and
commercial forces of aviation have
been so arrayed against each other,
and it is not to be accepted as a cri-
terion of what would happen in any
other country. It was the condition
of China and the Chinese people that
has made this change all the more
remarkable, and it will be interesting
to watch the next two years to see if
guile and commercial transport can
win over force and the death and de-
struction that is being rained down
from the skies by aerial armadas.

It is the most interesting and pro-
gressive experiment the world has
ever seen in the way of aerial trans-
portation, made all the more impres-
sive by the almost unsurmountable
conditions under which it is being car-
ried out. It is to be hoped the rest
of the flying world may learn a valu-
able lesson from the history now be-
ing made by the transport pilots of
the airways of China.

May they survive to see the day
when they, too, will welcome C. A.
V. U.

Should Army And Navy Air Forces Combine?

(Continued from page 13)

know and understand fleet maneu-
vers and be able to co-operate with
them. The belief is that if naval
fliers do not have a thorough ground-
ing in naval tactics they will be
handicapped in case of a major naval
engagement.

The navy wants its fliers to be
naval men and under the direct su-
pervision of naval officers, subject to
navy rules and the navy lists of pro-
motion. Naval promotion is slow.
And then there is the plucking board
that sits and passes on the ability of
an officer—which includes social
qualifications—and throws him out
because he does not meet its ideas of
proper material for promotion to the
higher grades. That sticks in the
craws of the career naval fliers.

The army command insist that a
flier, especially in observation, must
be trained with the army and as-
signed to combat units. They can't
conceive a flier being trained to co-
operate with field artillery or heavy
guns being able to do good work with
a naval unit. Before the days of
two-way radio this might have been
true to some extent, but voice radio
has changed all that.

All of which brings in the training
of pilots for service with the Ameri-
can armed forces, army or navy.

The essentials of flying are the
same, regardless of what craft is used.

The mission the individual pilot is as-
signed to carry out is something else
again. The strongest argument for a
unified air service seems to be based
on this point.

At the present time the United
States government has under way
plans for the training of twenty thou-
sand pilots for service with our armed
forces. Shall they be trained in part
for duty with the navy and part for
the army, and if so in what propor-
tion? First of all, they must have a
thorough grounding in the basic
principles of aeronautics in all its
branches, from mechanical to theory.
There is no valid reason why the
navy can teach navigation or aëro-
dynamics better than can an army in-
structor. The army fliers use navi-
gation just as much as do the navy
fliers.

There must be pilots for various
types of aircraft assigned to various
duties. Under the unified system all
pilots would be trained under the
most approved system, either in one
large central school maintained along
the lines of West Point or Annapolis,
or, after doing their ground work at
this school, be sent to schools in vari-
ous parts of the country for their fly-
ing instruction. They would all re-
ceive the same prescribed course and
would be equally good fliers within
the limits of the personal element.
One pilot naturally takes to the fast,

JASCO BALSA

**COLOR CODED—GRAIN
GRADED—SMOOTH CUT**

● Weight of balsa determines its strength. JASCO
weighs and paints blocks before cutting, and so
making selection very easy for us to send you what
you need.

● "Lightness with Strength" is the battle cry of
aeronautical engineers. We cut our balsa to take
advantage of its natural properties. We introduced
the famous "C" grain which gives you maximum
strength for its weight.

● We spent seven long years perfecting our cut-
ting technic. Now we can cut balsa with smooth
polish without sanding. (Sanding cuts deep into
balsa fibers. Saw marks make balsa as weak as
the deepest scratch.) Herewith specifications and
prices:

**COLORS DESIGNATE POUNDAGE
PER CUBIC FOOT**

Yellow 6 lbs. Planking, lead, edge covering, ribs.
Lt. Green 7 lbs. Curve covering, ribs, light strain.
Orange 8 lbs. Especially for ribs, bulkheads, tips.
Lt. Blue 9 lbs. Strong ribs, large section spars.
Red 10 lbs. Tubes, light spars, trail, edge.
Green 11 lbs. Spars, longerons, stringers, etc.
Blue 12 lbs. Spars and longerons for light gas.
Natural 13-15 lbs. Gasoline powered models.

"C" GRAIN—Ribs, bulkheads, spars, strained parts.
"A" GRAIN—Wherever bonds, tubes or curves are
needed.

"B" GRAIN—Between C & A. Best for shallow
bending.

COLOR CODED BALSA FOR OUTDOOR MODELS
36" strips. Obtainable between 9 and 12 lbs.

1/16 sq. 2-1c	3/8 sq. 7-5c	1/4 sq. 2-5c
1/16x3/8 3-2c	1/2 sq. 2-3c	1/2x3/8 3-3c
1/16x3/16 4-3c	1/2x3/8 2-2c	1/2x3/8 2-7c
1/16x1/2 1-1c	1/2x3/8 2-5c	1/2x3/8 5-5c
1/16x3/4 2-2c	5/32 sq. 1-1c	3/8 sq. 2-7c
1/16x3/4 2-2c	3/16 sq. 2-5c	3/8 sq. 5-5c
3/32 sq. 3-2c	3/16x1/2 2-2c	3/8 sq. 6-6c
3/32x3/16 1-1c	3/16x3/4 2-5c	3/8 sq. 5-5c
3/32x3/4 2-2c	3/16x3/4 3-3c	3/8 sq. 8-8c

36" Sheets. Color Coded 6-12 lbs. "A", "B" &
"C" Grains. Special Note: "C" grain can be
had only from 1/64 to 1/8.

Size	Width	Size	Width	Size	Width
1/64	3"	3/32	3"	1/4	3"
1/32	3"	1/8	3"	5/16	3"
1/20	3"	5/32	3"	3/8	3"
1/16	3"	3/16	3"	1/2	3"

5 FOOT HARD (13-15 lbs.) BALSA FOR

Size	Width	Size	Width	Size	Width
3/32 sq. 2-2c	1/2x3/8 7-7c	3/16x1 9-9c			
3/32x3/8 1-1c	1/2x1 7-7c	1/2 sq. 4-4c			
1/4 sq. 2-2c	3/16 sq. 3-3c	1/2x1 10-10c			
1/2 sq. 3-3c	3/16x3/4 4-4c	5/16 sq. 6-6c			
1/2x3/8 4-4c	3/16x1 5-5c	3/8 sq. 8-8c			
1/2x3/4 4-4c	3/16x3/4 7-7c	1/2 sq. 10-10c			

RUBBER MODEL

Size	Width	Size	Width	Size	Width
12x1 11-11c	1/2x1 8-8c	3/16x1 8-8c			
13x1 11-11c	1/2x1 12-12c	1/2x1 8-8c			
14x1 11-11c	1/2x1 12-12c	1/2x1 10-10c			
15x1 11-11c	1/2x1 12-12c	1/2x1 10-10c			
16x1 11-11c	1/2x1 12-12c	1/2x1 10-10c			
17x1 11-11c	1/2x1 12-12c	1/2x1 10-10c			
18x1 11-11c	1/2x1 12-12c	1/2x1 10-10c			

SPECIAL FOLDER

Size	Width	Size	Width	Size	Width
10x1 11-11c	1/2x1 8-8c	3/16x1 8-8c			
10x1 11-11c	1/2x1 12-12c	1/2x1 8-8c			
10x1 11-11c	1/2x1 12-12c	1/2x1 10-10c			
10x1 11-11c	1/2x1 12-12c	1/2x1 10-10c			
10x1 11-11c	1/2x1 12-12c	1/2x1 10-10c			
10x1 11-11c	1/2x1 12-12c	1/2x1 10-10c			

GLIDER SUPPLIES

Size	Width	Size	Width	Size	Width
3/32x2 11-11c	1/2x1 8-8c	3/16x1 8-8c			
5/32x3 11-11c	1/2x1 12-12c	1/2x1 8-8c			
3/16x3 11-11c	1/2x1 12-12c	1/2x1 10-10c			
1/4x4 11-11c	1/2x1 12-12c	1/2x1 10-10c			
3/32x2 11-11c	1/2x1 8-8c	3/16x1 8-8c			
5/32x3 11-11c	1/2x1 12-12c	1/2x1 8-8c			
3/16x3 11-11c	1/2x1 12-12c	1/2x1 10-10c			
1/4x4 11-11c	1/2x1 12-12c	1/2x1 10-10c			

SPECIAL BROWN

Size	Width	Size	Width	Size	Width
3/32x2 11-11c	1/2x1 8-8c	3/16x1 8-8c			
5/32x3 11-11c	1/2x1 12-12c	1/2x1 8-8c			
3/16x3 11-11c	1/2x1 12-12c	1/2x1 10-10c			
1/4x4 11-11c	1/2x1 12-12c	1/2x1 10-10c			
3/32x2 11-11c	1/2x1 8-8c	3/16x1 8-8c			
5/32x3 11-11c	1/2x1 12-12c	1/2x1 8-8c			
3/16x3 11-11c	1/2x1 12-12c	1/2x1 10-10c			
1/4x4 11-11c	1/2x1 12-12c	1/2x1 10-10c			

CONTEST RUBBER

Size	Width	Size	Width	Size	Width
3/32x2 11-11c	1/2x1 8-8c	3/16x1 8-8c			
5/32x3 11-11c	1/2x1 12-12c	1/2x1 8-8c			
3/16x3 11-11c	1/2x1 12-12c	1/2x1 10-10c			
1/4x4 11-11c	1/2x1 12-12c	1/2x1 10-10c			
3/32x2 11-11c	1/2x1 8-8c	3/16x1 8-8c			
5/32x3 11-11c	1/2x1 12-12c	1/2x1 8-8c			
3/16x3 11-11c	1/2x1 12-12c	1/2x1 10-10c			
1/4x4 11-11c	1/2x1 12-12c	1/2x1 10-10c			

STRAIGHT 36" WIRE

Size	Width	Size	Width	Size	Width
3/32x2 11-11c	1/2x1 8-8c	3/16x1 8-8c			
5/32x3 11-11c	1/2x1 12-12c	1/2x1 8-8c			
3/16x3 11-11c	1/2x1 12-12c	1/2x1 10-10c			
1/4x4 11-11c	1/2x1 12-12c	1/2x1 10-10c			
3/32x2 11-11c	1/2x1 8-8c	3/16x1 8-8c			
5/32x3 11-11c	1/2x1 12-12c	1/2x1 8-8c			
3/16x3 11-11c	1/2x1 12-12c	1/2x1 10-10c			
1/4x4 11-11c	1/2x1 12-12c	1/2x1 10-10c			

JASCO LIQUIDS AND CEMENT

Size	Width	Size	Width	Size	Width
3/32x2 11-11c	1/2x1 8-8c	3/16x1 8-8c			
5/32x3 11-11c	1/2x1 12-12c	1/2x1 8-8c			
3/16x3 11-11c	1/2x1 12-12c	1/2x1 10-10c			
1/4x4 11-11c	1/2x1 12-12c	1/2x1 10-10c			
3/32x2 11-11c	1/2x1 8-8c	3/16x1 8-8c			
5/32x3 11-11c	1/2x1 12-12c	1/2x1 8-8c			
3/16x3 11-11c	1/2x1 12-12c	1/2x1 10-10c			
1/4x4 11-11c	1/2x1 12-12c	1/2x1 10-10c			

COVERING

Size	Width	Size	Width	Size	Width
3/32x2 11-11c	1/2x1 8-8c	3/16x1 8-8c			
5/32x3 11-11c	1/2x1 12-12c	1/2x1 8-8c			
3/16x3 11-11c	1/2x1 12-12c	1/2x1 10-10c			
1/4x4 11-11c	1/2x1 12-12c	1/2x1 10-10c			
3/32x2 11-11c	1/2x1 8-8c	3/16x1 8-8c			
5/32x3 11-11c	1/2x1 12-12c	1/2x1 8-8c			
3/16x3 11-11c	1/2x1 12-12c	1/2x1 10-10c			
1/4x4 11-11c	1/2x1 12-12c	1/2x1 10-10c			

LIQUID

Size	Width	Size	Width	Size	Width
3/32x2 11-11c	1/2x1 8-8c	3/16x1 8-8c			
5/32x3 11-11c	1/2x1 12-12c	1/2x1 8-8c			
3/16x3 11-11c	1/2x1 12-12c	1/2x1 10-10c			
1/4x4 11-11c	1/2x1 12-12c	1/2x1 10-10c			
3/32x2 11-11c	1/2x1 8-8c	3/16x1 8-8c			
5/32x3 11-11c	1/2x1 12-12c	1/2x1 8-8c			
3/16x3 11-11c	1/2x1 12-12c	1/2x1 10-10c			
1/4x4 11-11c	1/2x1 12-12c	1/2x1 10-10c			

LIQUID

Size	Width	Size	Width	Size	Width
3/32x2 11-11c	1/2x1 8-8c	3/16x1 8-8c			
5/32x3 11-11c	1/2x1 12-12c	1/2x1 8-8c			
3/16x3 11-11c	1/2x1 12-12c	1/2x1 10-10c			
1/4x4 11-11c	1/2x1 12-12c	1/2x1 10-10c			
3/32x2 11-11c	1/2x1 8-8c	3/16x1 8-8c			
5/32x3 11-11c	1/2x1 12-12c	1/2x1 8-8c			
3/16x3 11-11c	1/2x1 12-12c	1/2x1 10-10c			
1/4x4 11-11c	1/2x1 12-12c	1/2x1 10-10c			

LIQUID

Size	Width	Size	Width	Size	Width
3/32x2 11-11c	1/2x1 8-8c	3/16x1 8-8c			
5/32x3 11-11c	1/2x1 12-12c	1/2x1 8-8c			
3/16x3 11-11c	1/2x1 12-12c	1/2x1 10-10c			
1/4x4 11-11c	1/2x1 12-12c	1/2x1 10-10c			
3/32x2 11					

light fighting plane. Another develops a natural aptitude in the use of bomb sights or the machine gun or perhaps photography.

As they are graduated under this system, the daily record of the student is studied, his aptitude for any certain branch of flying and his natural desires are all taken into consideration, and he is assigned to that branch of service and type of work for which he is best qualified. It is understood, of course, that in an emergency he can be shifted into any other field of the air service.

If he should be assigned to the battle fleet of the navy, as a matter of course he comes under direct com-

kind of training advocated by proponents of a unified air service.

One thing preached by every branch of service is *esprit de corps*. It has been said that if you took a man away from established branches of the service, with all their traditions, and assign him to a purely flying unit, he would not have this spirit. Is it thinkable that an American could not be just as loyal to a unified air service? The air service is certainly one to be proud of. It requires the highest type of men to fulfill all its requirements, and these must be constantly on their toes.

Four years is the required course at West Point and Annapolis. After that, if a graduate of the line school wishes to enter the flying service, he must put in years of additional training. A school of the air devoted entirely to the technical training of fliers would shorten this period of training by at least two years. In case of an emergency it would be still further reduced. A pilot can't fly all the time. During the period of instruction there would be plenty of time to train the student flier in all the essential principles of army and navy maneuvers and at the same time eliminate a great deal of technical study that is of no value to a flying fighting force.

The navy and the army each has its own traditions. The air service is new and still encumbered with growing pains and supervision of nonfliers. But in its comparatively short life it, too, has developed an *esprit de corps* that would be greatly enhanced were it not compelled to be called army or navy spirit. Why not the air-corps spirit?

The first naval attack of the present war in Europe was carried out by land bombers. Not by planes of the army or the navy but by planes of the Royal Air Force acting under orders of the air minister in co-operation with the navy. Therein lies the great argument for a unified air service. If either the army or the navy is carrying out a plan of attack, it can be assisted, if necessary, by the entire forces of the unified air force.



Capt. Tracy Richardson

mand of the naval officer of the fleet's aircraft. If a flier be assigned to an artillery unit, he will operate under the direct supervision of the brigade, divisional or army command to which he is attached, and any orders concerning that flier or group of fliers would not come from the high command of the air forces but from the officer in charge of the immediate command in which he is serving.

The value of the individual pilot is not so much that he is a good army or navy pilot, but that he has the training that would make him available for either type of service—the

Weather Service and the Private Flier

(Continued from page 6)

transatlantic flight, made by the NC-4. In September, 1919, he took balloon training at Akron, Ohio, and qualified as a pilot.

From October of that same year until June, 1922, he was aërological officer and airplane pilot at the naval air school, Hampton Roads, Virginia. He was commissioned as a lieutenant, U. S. N., in 1921 while on this assignment.

From 1922 to 1928 he was in Washington, D. C., as officer-in-charge of the naval aërological organization. From 1928 to 1931, he served as aërological officer on the dirigible *Los Angeles*, at Lakehurst, New Jersey.

March to October, 1931, found him in Europe, assigned to duty at meteorological institutes.

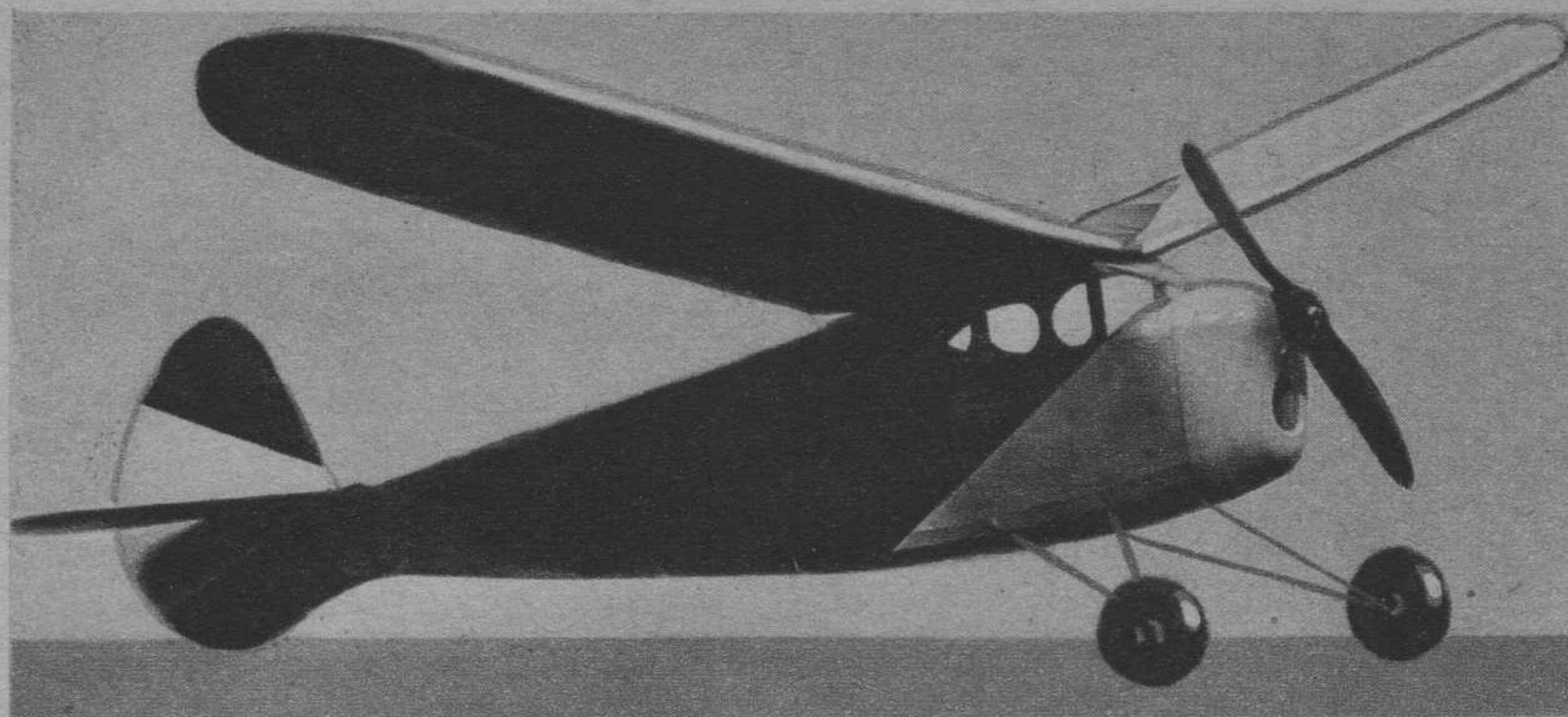
In 1932 he was promoted to lieutenant commander and assigned to the U. S. S. *Oklahoma* for general

studies until 1934, in June, when he took over as officer-in-charge, airship training school, Lakehurst, New Jersey.

He served as executive officer of the air station at Lakehurst from 1935 to 1937, and then went to the post of construction, repair and damage-control officer on the U. S. S. *Lexington*. June of 1938 found him promoted to commander and assigned as executive officer of the U. S. S. *Utah*.

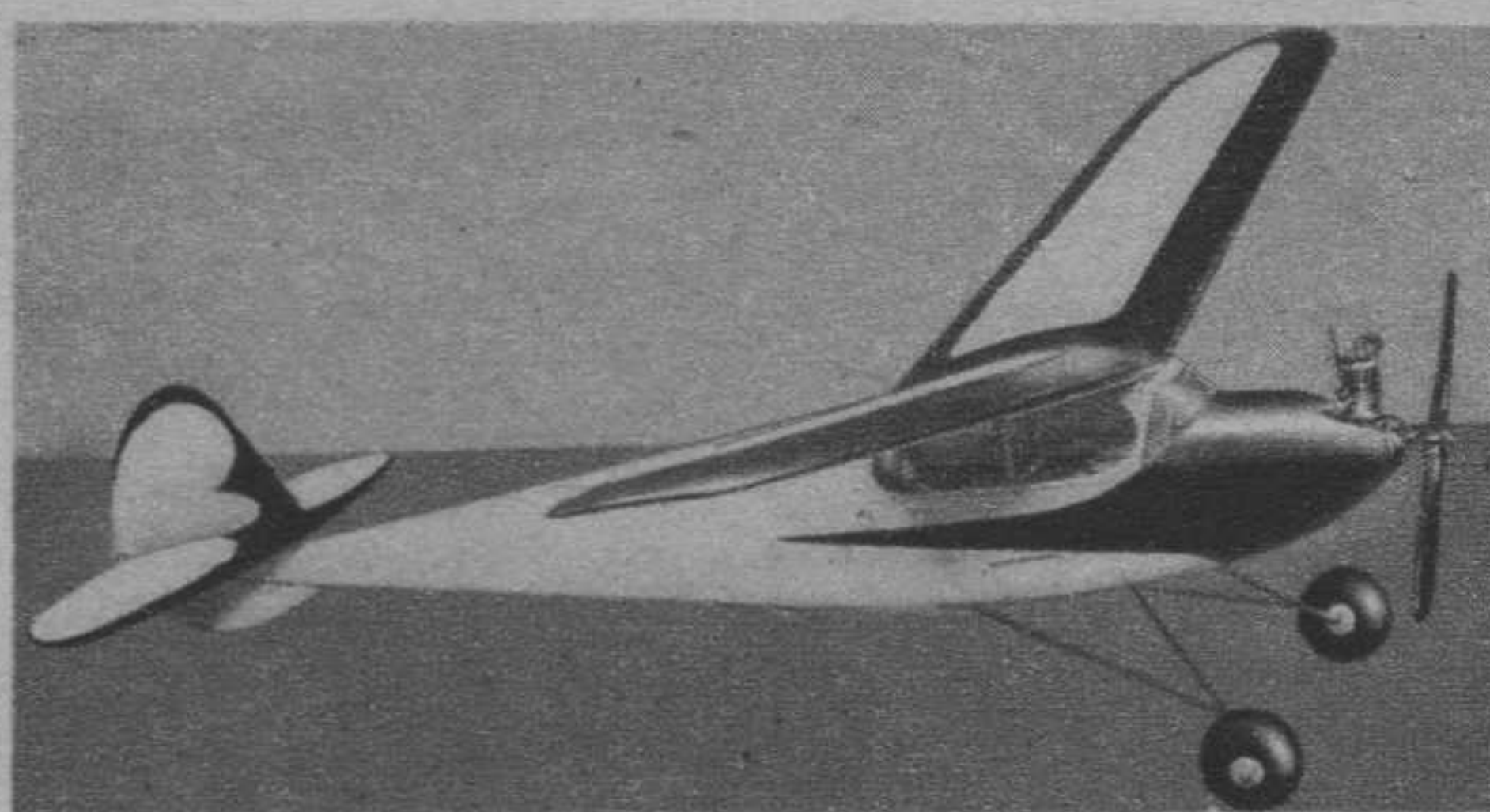
December 15, 1938, brought him back to Washington for assignment to the department of agriculture as acting chief of the weather bureau. On January 1, 1939, he was removed from the active list of the navy, and the next day appointed chief of the United States weather bureau.

One can't help feeling after reading his history that he is a natural for his job.



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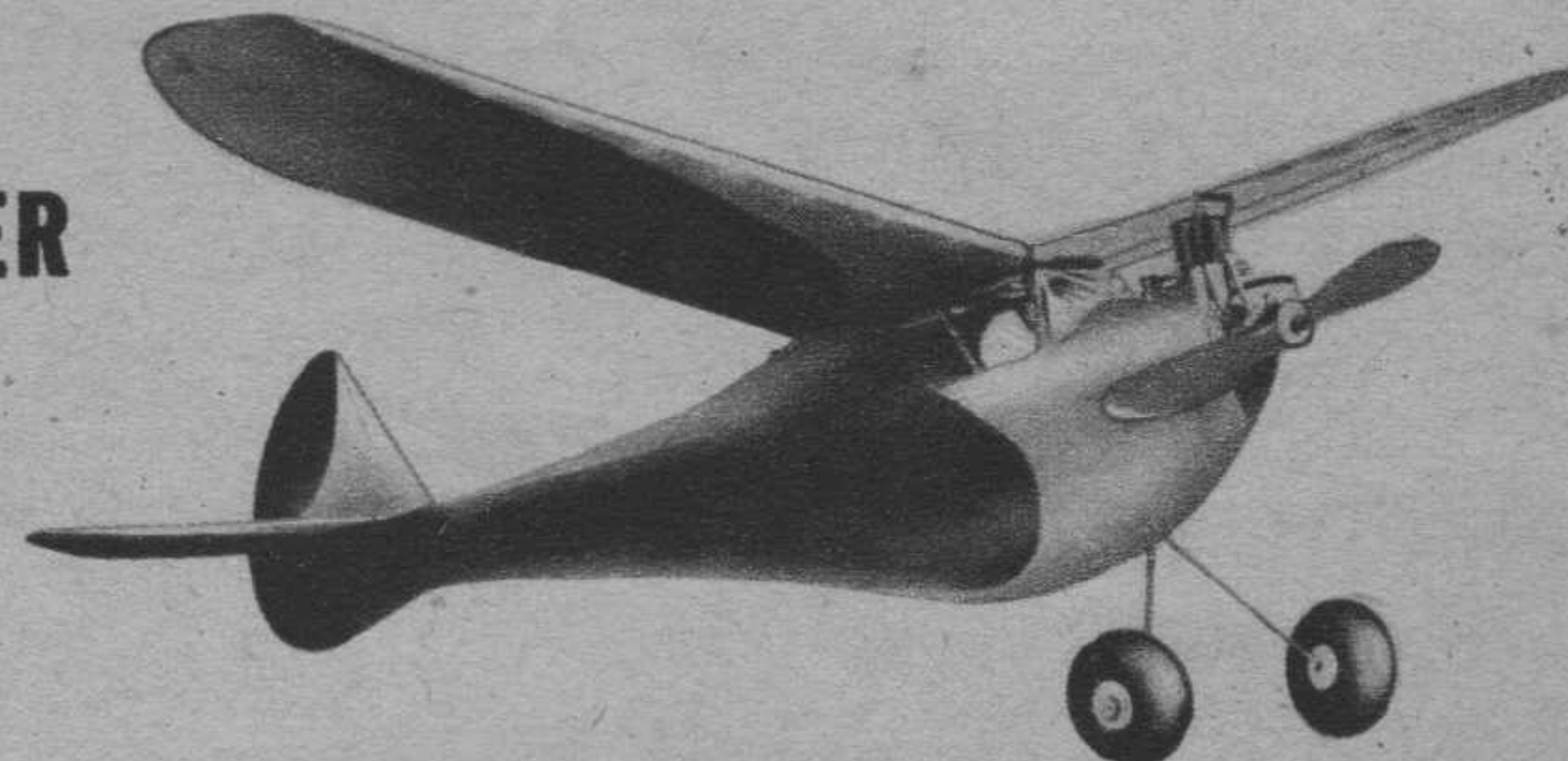
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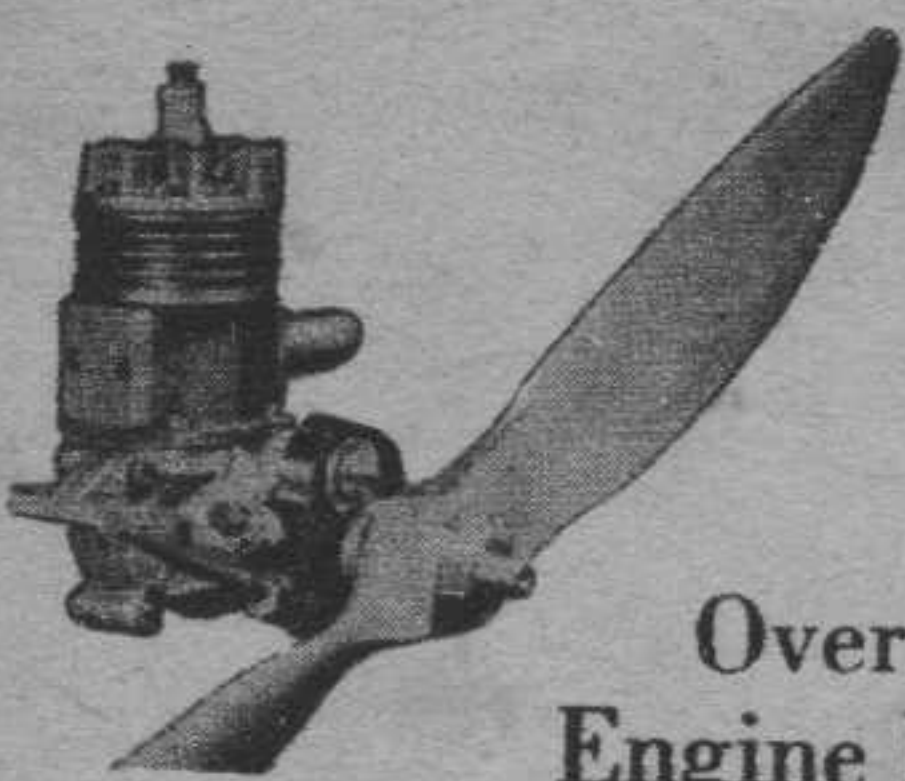
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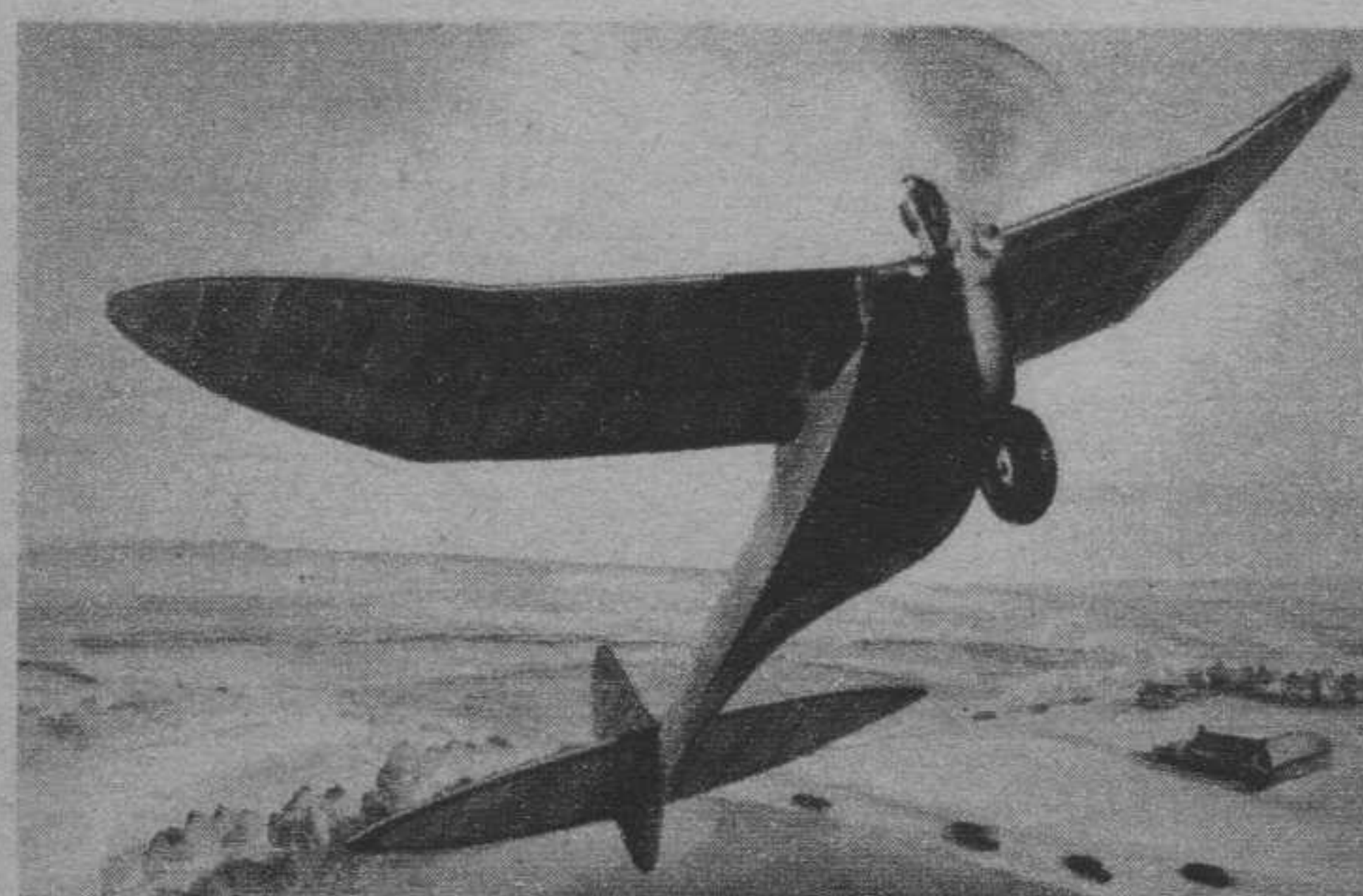
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The 36" Sky-Rocket (illustrated)—money can't buy a better Class A performer. Shulman design, 12-hour complete construction, easily transported, single-wheel landing gear, weight 13 ounces ready to fly. Complete kit, with airwheel, everything needed for building, all hardware, etc., \$1.95 PP

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Sky-Ranger—36" taper-wing Ohio state endurance champ. Complete kit, formed shafts, shaped landing gear, prop, rubber, wheels, etc., \$1.00 PP

Other ships: Commander, Class C gas job, 6', \$5.00 PP, Skipper, 48" Class B ship, \$2.50, new low prices only when purchased direct.

Vought Export Fighter

(Continued from page 41)

to house a 2 1/2"-diameter celluloid engine. The cowl is held to the model by slipping onto a special Bulkhead #1 cut from 3/16" stock.

Flying propeller is shown on Sheet 5. It is a three-bladed propeller. Each blade is carved separately and inserted into a three-bladed hub as shown. Care must be taken to see that all the blades are attached with the same pitch angle, otherwise the propeller will not track. If desired, a scale propeller may be used. The side view of such propeller, a Hamilton Standard, is shown on Sheet 1. The front view is of conventional metal propeller shape.

Motor stick is 1/8 x 1/4" stock. It is attached to the celluloid engine as shown. The engine is held to the cowl by small drops of cement on each cylinder. The propeller shaft is then passed through the rear of the engine. A ball-bearing washer is placed on the shaft. Following this the propeller is placed on. The shaft is bent to the shape shown on Sheet 5 and forced into the hub of the propeller. A drop of glue will secure the shaft to the prop. It is important that the shaft be lined properly. This should be checked.

The rear hook is bent as shown. It is attached to the motor stick by inserting the prong end of the hook into the stick, wound and glued.

COVERING THE MODEL

Because most of the parts are attached directly to each other they can be covered separately. The model is covered with superfine tissue. The portion of the fuselage adjacent to the wing incorporating the fillet should be covered with the wing in place. This will result in a neater fillet. The manner of covering is left to the builder, for no two builders will agree as to the correct manner. However, this might be said: The grain

of the paper should run in one direction. After the parts have been covered a thin spray of water should be applied to shrink the paper taut. A few coats of banana oil will preserve the tautness of the paper and protect it from changes in weather.

ASSEMBLY

The wing is first attached. It attaches directly to the fuselage, with Formers #5, #6, and #7 lining up with the center-section stringers. A piece of bamboo, as shown on Sheet 2, is used as a fairing strip from the wing to the fuselage. With the wing set, the center section can now be covered with the portion of the fuselage adjacent to the wing.

The rudder is next attached. It is glued directly to the top stringer. To counteract torque the rudder should be offset slightly to the left—looking from the cockpit.

The stabilizer is next glued in place. It is advisable not to secure it permanently until the model has been flown. The tail block is now glued in place and finished off to a smooth surface.

FLYING THE MODEL

The model is powered with four to six strands of 1/8" flat rubber. The model is first glided to determine its balance. If it stalls, weight must be added to the cowl. If it dives, which it is likely not to do, weight must be added to the tail. The stabilizer setting should be zero. With the model balanced, give the propeller about thirty winds and hand-launch. If the model tends to stall, increase the stabilizer angle; if it dives, set it at a negative angle. The settings should be slight as they will be found most effective. The model should be fully powered to about 150 winds on four strands, somewhat less for six.

Choosing the Right Gas Prop

(Continued from page 38)

2 h.p., the climb in feet per second will be 192 x .2/2 or 19.2 feet per second, or 1,152 feet per minute.

Most of the factors entering the gas-model-propeller calculations usually vary in a straight line, which results in simple equations. They are valid if the pitch ratio, the ratio of pitch to diameter, is not higher than .70; then the nomograph in Fig. 2 may be used for estimating the diameter of the propeller.

The nomograph indicates that the propeller diameter is not influenced by the speed of the model; only the pitch will be different with variant speeds. On the other hand, the efficiency will not change materially if the same pitch is retained and the diameter is changed. For ready selection of diameter and pitch of a propeller for a model in straight flight having a certain weight and a standard engine, a table is illustrated in Fig. 3 which will be a great aid to the designer. For maximum climb, use propellers in the last two columns.

propellers with lower pitch than they should have in straight flight.

The pitch of a propeller is the advance per turn a propeller would make if it slides up a slope on its flat working side.

The pitch obtained from the slope of the working side is called the nominal or geometrical pitch; this pitch can be measured with a protractor, usually at the three-quarter distance from the axis and then graphically or mathematically enumerated.

Propellers having the same geometrical pitch on all blade elements give the highest efficiencies, but if the slipstream of the propeller is obstructed by the proximity of the engine or by an oversized fuselage the efficiency is greatly reduced; in such case the pitch is decreased toward the hub.

The diagram in Fig. 4 may be used for estimating the pitch of a propeller or finding it from the equation that the pitch of the propeller to be two tenths of the diameter plus three

quarters of the advance per turn. For example, the diameter is fourteen inches, the flying speed thirty feet per second and the revolutions eighty per second; then the pitch will be .2 x 14 plus 3/4 x 30/80 or 2.8 inches plus .28 feet or 6.2 inches.

Another question is the blade width, which is measured at the three-quarter distance from the hub. Durand's tests show that for increasing blade width the efficiency decreases and the power coefficient increases; but the increase in power coefficient is less than the increase in blade width.

The blade width should be from eight to ten percent of the diameter if a two-blade propeller is designed; the blade width for a three-blade propeller is the same, except the diam-

eter is only ninety percent of the two-blade propeller.

The weight of the propeller is another problem; the propellers should be light enough to break without injury to the engine but heavy enough to give uniform power delivery; most of the manufactured propellers are satisfactory for the two-cycle engines, but for the increasing popularity of the four-cycle engines we suggest a heavier propeller.

Metal propellers should not be used for contest work, because of the danger to the spectators and possible damage to the engine shaft.

Owing to the variant contest rules, model builders should carry a few propellers of different diameters and pitches best suited to the flying qualities of their individual model.

Pick-a-Back

(Continued from page 39)

The stick is slit at the rear to hold the rudder. Landing-gear struts are bamboo, the upper ends sharpened and pushed into slits which have been cut in the motor stick with a sharp knife.

Carve the prop from the size block indicated, or buy a ready-cut six-inch prop, which will prove entirely satisfactory if sanded smooth with the excess weight cut away.

Pin the prop to the nose, add two strands of 1/8" rubber in the proper place, and find the point at which the model balances without the wing. Then cement the wing in place so that a point at one third of its chord is over the point of balance. Note the little lift block cut from a scrap of 1/8" sheet balsa which cambers the center of the wing and raises the leading edge 1/16". At this time crack the wing at the center and recement it so that there is an inch of dihedral at each tip.

RELEASE ATTACHMENT

The frame which supports the glider is very simple. Important points to watch in assembling it are to cement all joints securely, and to make sure the upper projections of the rear struts coincide with the slots in the glider wing. The struts are pushed right through the R. O. G. wing for rigidity.

You're now ready to make the prop spring. This is pretty much a cut-and-fit proposition. However, use a good pair of small-nosed pliers and some patience and you won't have any trouble with it.

The method of operation is as follows. The long end of the prop spring pushes back when the rubber is wound tight, and passes through the front guide, through the wire end from the glider, and through the rear guide. When the rudder unwinds, the tension decreases, and allows the spring to pull forward so that the glider hook is released. The wire from the glider should be normally a little high so that it has to be sprung down to reach the end of the prop spring. This will cause the glider to leap upward upon release.

FLYING

And that's all there is to the construction. Make the prop shaft, can, and rear hook and cement them in place. Then install the prop. You may have to bend the spring a little to line up the thrust line. Don't forget a couple of washers between prop and spring. Put a couple of strands of 1/8" rubber on the model and try gliding it without the glider. Bend the trailing edge of the stabilizer up or down until the model glides smoothly.

Then wind the rubber just enough to engage the glider hook and attach the glider. Hand-launch the model. If it spirals too sharply apply opposite rudder and warp the trailing edge of the inside wing down. If it stalls bend the prop spring to give downthrust. If it dives, warp the stabilizer trailing edge up slightly or apply upthrust. When the model flies smoothly under a few turns, give her plenty of room and use a winder.

And don't forget to take your pick-a-back along to the next contest that has a stunt event!

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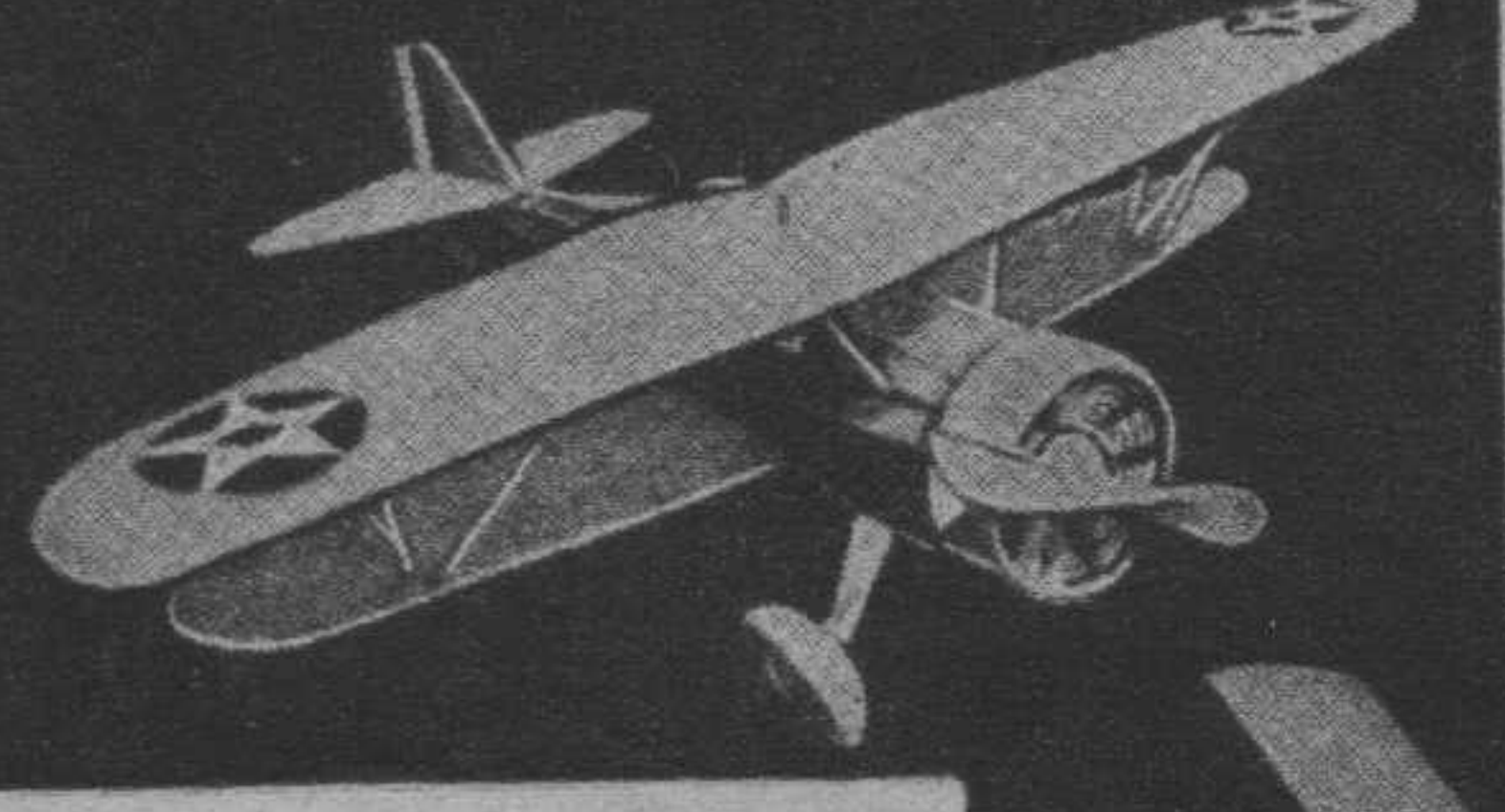
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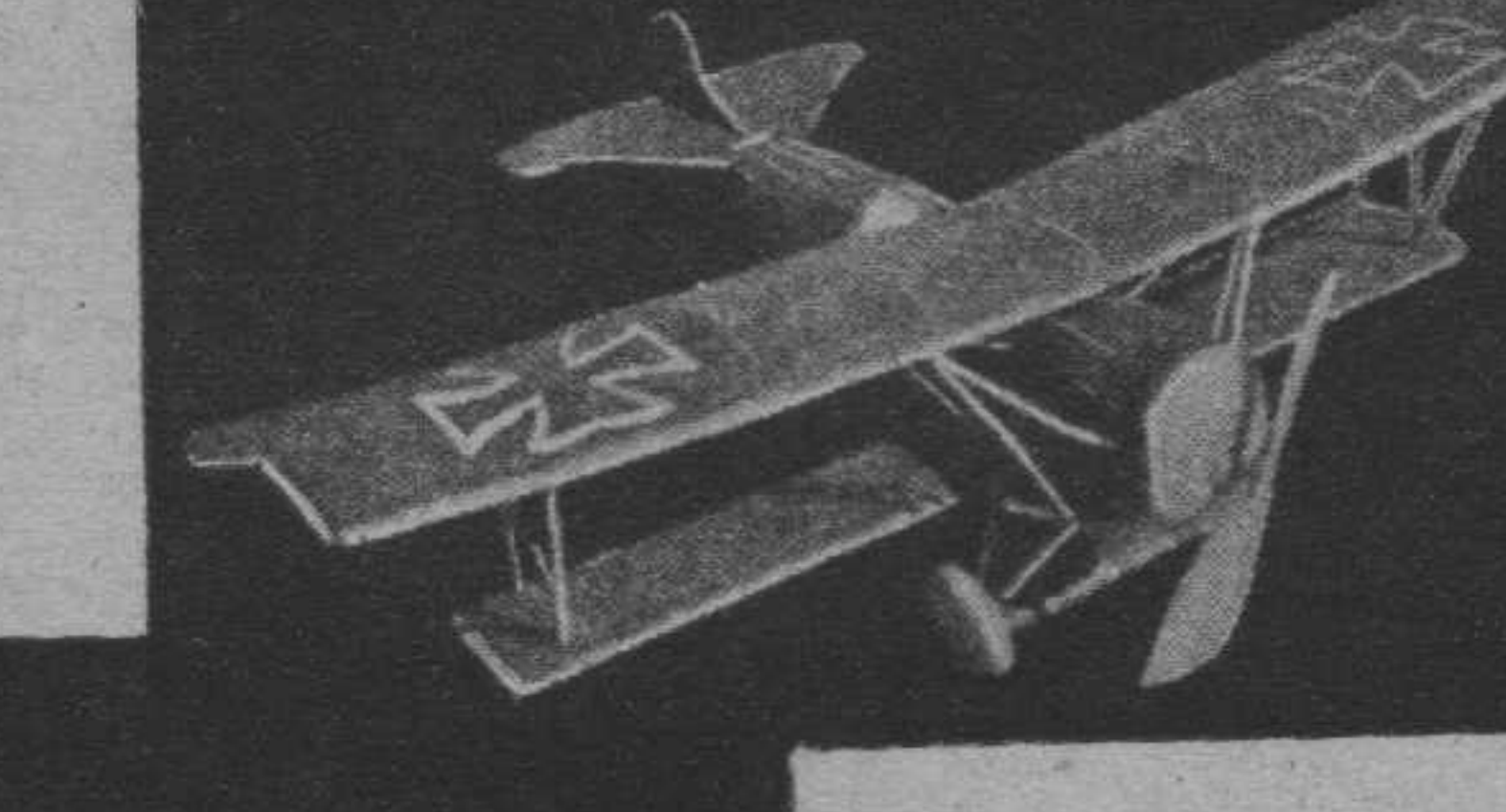
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A Kit from IMPERIAL is the Ideal Christmas Gift

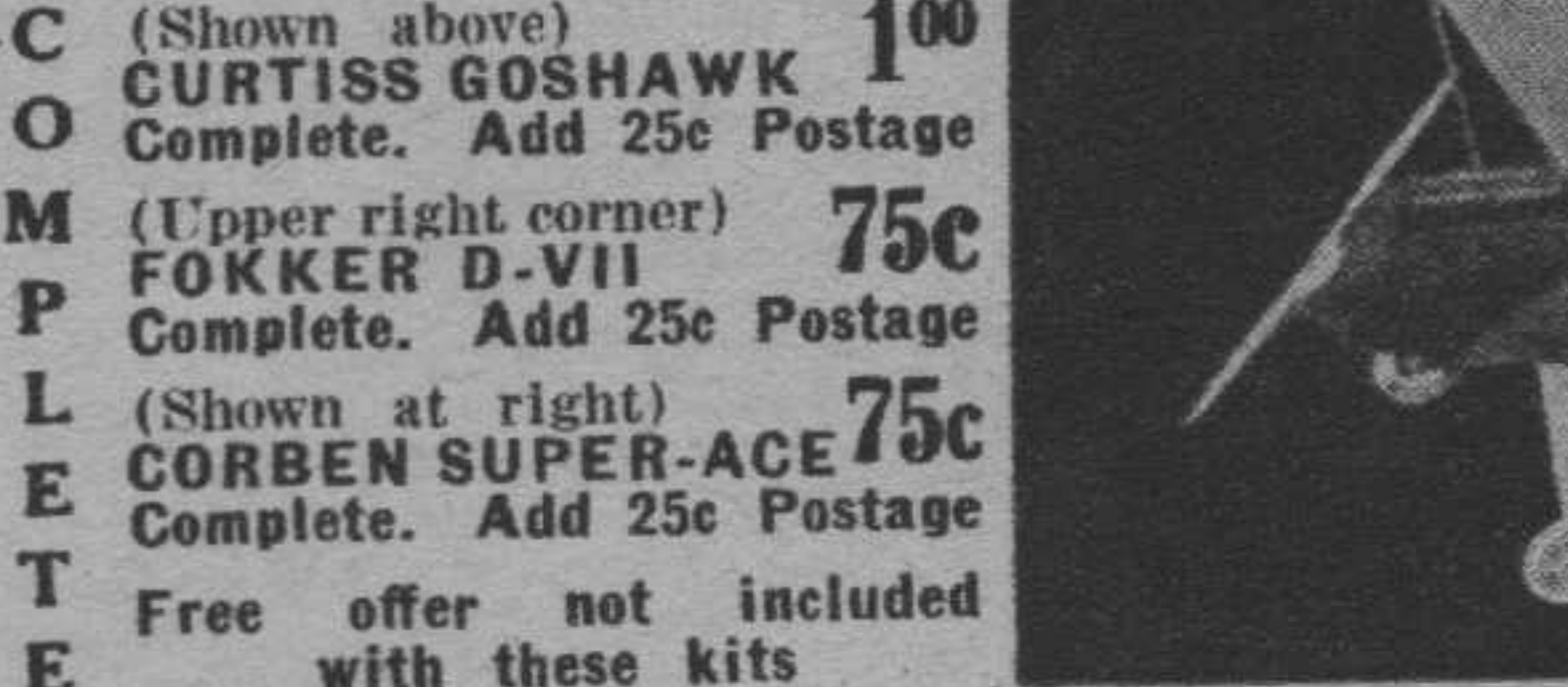
36" FLYING KITS..and, boy, do they FLY!



C (Shown above)
CURTIS GOSHAWK 100
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M (Upper right corner)
FOKKER D-VII 75c
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L (Shown at right)
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- Ohlsson 23.....\$16.50
 - Gold Seal.....18.50
 - Brown, Jr. "D".....12.50
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 - Mighty Midget (Kit) 7.85
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NORTHROP GAMMA



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20 IN. FLYING PLANS 10c—3 for 25c Sparrow Hawk, Spad Chass., Vought Corsair, Curtiss Swift L. W., Waco Cabin Biplane, Douglas Dolphin, Boeing P12F, Fokker D-VII, S.E.5, Goshawk, Gee Bee, Boeing P26A, Monocoupe, Northrup Gamma, Fairchild 24 Cabin, Corben Super-Ace.

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Add 75c for 1 pair Pneumatic Wheels (value \$1.50)

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SPECIAL OFFER

with each \$2.00 gas model order, 1 pair 3/4" air wheels (value \$1.50) for only 75c.

SPONGE RUBBER WHEELS

- 1" dia...pair .15
- 1 1/2" dia...pair .18
- 1" with brackets each50c

CELLULOID

- 6x85c
- 12x1619c

WOOD VENEER PAPER

- 20x30 .1 for 10c

METAL PROPELLERS

- 2 blades 3 blades 1/2" dia...1.00
- 1 1/2" dia...1.00
- 2 1/2" dia...1.00
- 3 1/2" dia...1.00
- 4 1/2" dia...1.00

DUMMY RAD. ENGINE (Cellu.)

- With or without Cowl
- 1 1/2" d. 15c; 2" d. 20c; 3" d. 25c

PURSUIT MACH. GUNS

- 3/4", 1 1/2" or 1 3/4", each 5c

ALUM. COWLINGS

- 1 1/2" 15c, 2" 18c, 3" 25c

Specify whether anti-drag or closed BOMBS

- 3/4" .4c 1 1/2" .7c 2" 1.2c 3" 1.5c

CELLULOID PANTS, per pair

- 1/2" to 1" .18c
- 1 1/2" to 1 3/4" .33c

GUNS WITH RING MOUNT

- 1 1/2" 10c 1 3/4" 15c

WING AND TAIL LIGHTS

- 12" 10c; 15" 15c 24" .20c

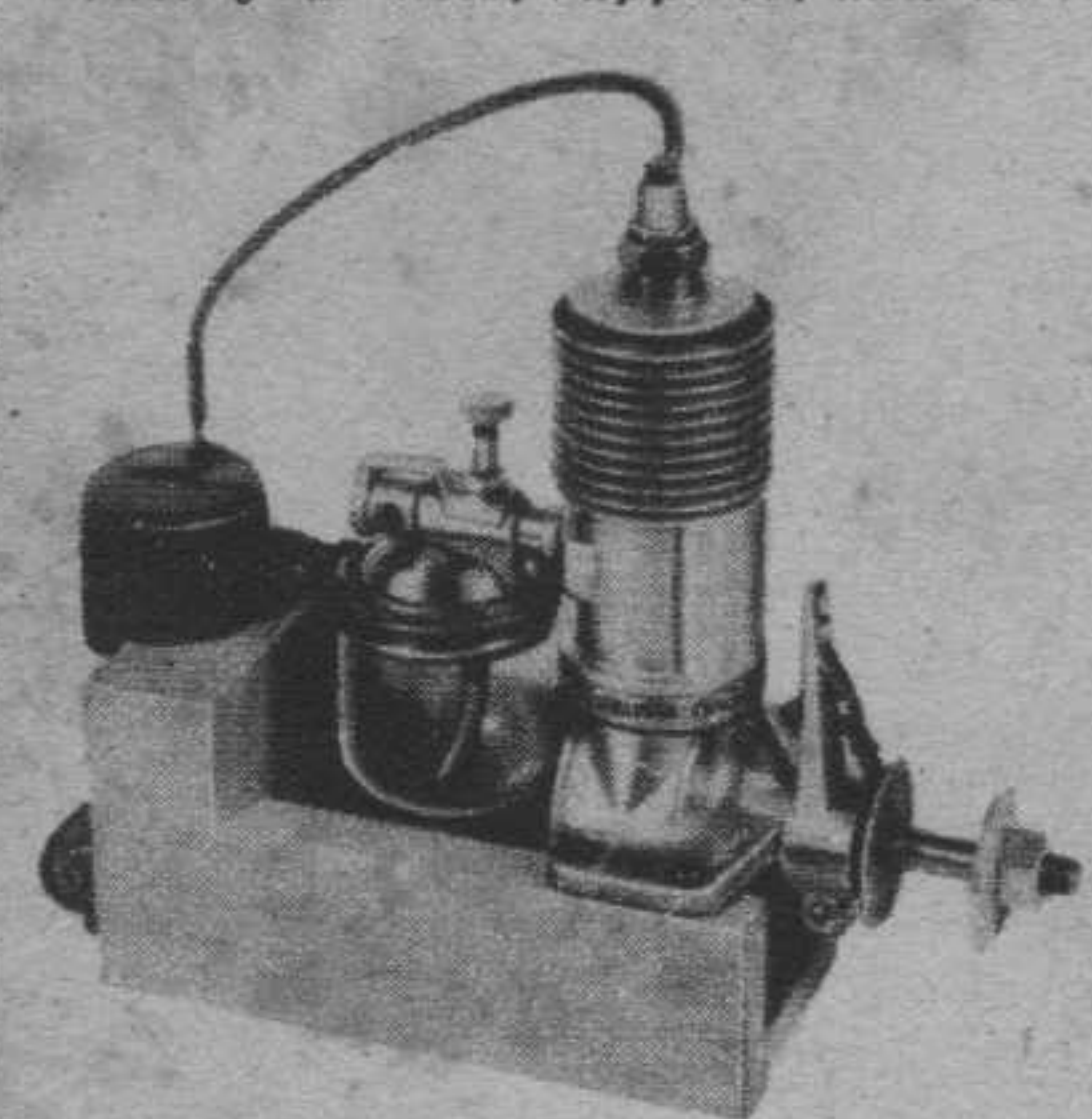
GAS MODEL SUPPLIES AT CUT PRICES!

- 5-FOOT Balsa** 1/2" x 1/2" 30 for 20c 1/2" x 3/4" 12 for 20c 1/2" x 1" 10 for 20c 3/16x3/16 8 for 20c 1/4" x 1/4" 6 for 20c 1/4" x 3/8" 3 for 20c 1/4" x 1/2" 1 for 3c 1/2" x 1/2" 2 for 20c add 20c pkgge. charge. Balsa prices for Spruce, Basswood, or Pine.
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TUBING** 1/4" x 1/4" ft. 15c 1/2" x 1/2" ft. 15c 3/4" x 3/4" ft. 15c 1" x 1" ft. 15c 1 1/2" x 1 1/2" ft. 15c 2" x 2" ft. 15c 3" x 3" ft. 15c 4" x 4" ft. 15c 5" x 5" ft. 15c 6" x 6" ft. 15c 8" x 8" ft. 15c 10" x 10" ft. 15c 12" x 12" ft. 15c 14" x 14" ft. 15c 16" x 16" ft. 15c 18" x 18" ft. 15c 20" x 20" ft. 15c 24" x 24" ft. 15c 30" x 30" ft. 15c 36" x 36" ft. 15c 42" x 42" ft. 15c 48" x 48" ft. 15c 54" x 54" ft. 15c 60" x 60" ft. 15c 72" x 72" ft. 15c 84" x 84" ft. 15c 96" x 96" ft. 15c 108" x 108" ft. 15c 120" x 120" ft. 15c 144" x 144" ft. 15c 168" x 168" ft. 15c 192" x 192" ft. 15c 216" x 216" ft. 15c 240" x 240" ft. 15c 264" x 264" ft. 15c 288" x 288" ft. 15c 312" x 312" ft. 15c 336" x 336" ft. 15c 360" x 360" ft. 15c 384" x 384" ft. 15c 408" x 408" ft. 15c 432" x 432" ft. 15c 456" x 456" ft. 15c 480" x 480" ft. 15c 504" x 504" ft. 15c 528" x 528" ft. 15c 552" x 552" ft. 15c 576" x 576" ft. 15c 600" x 600" ft. 15c 624" x 624" ft. 15c 648" x 648" ft. 15c 672" x 672" ft. 15c 696" x 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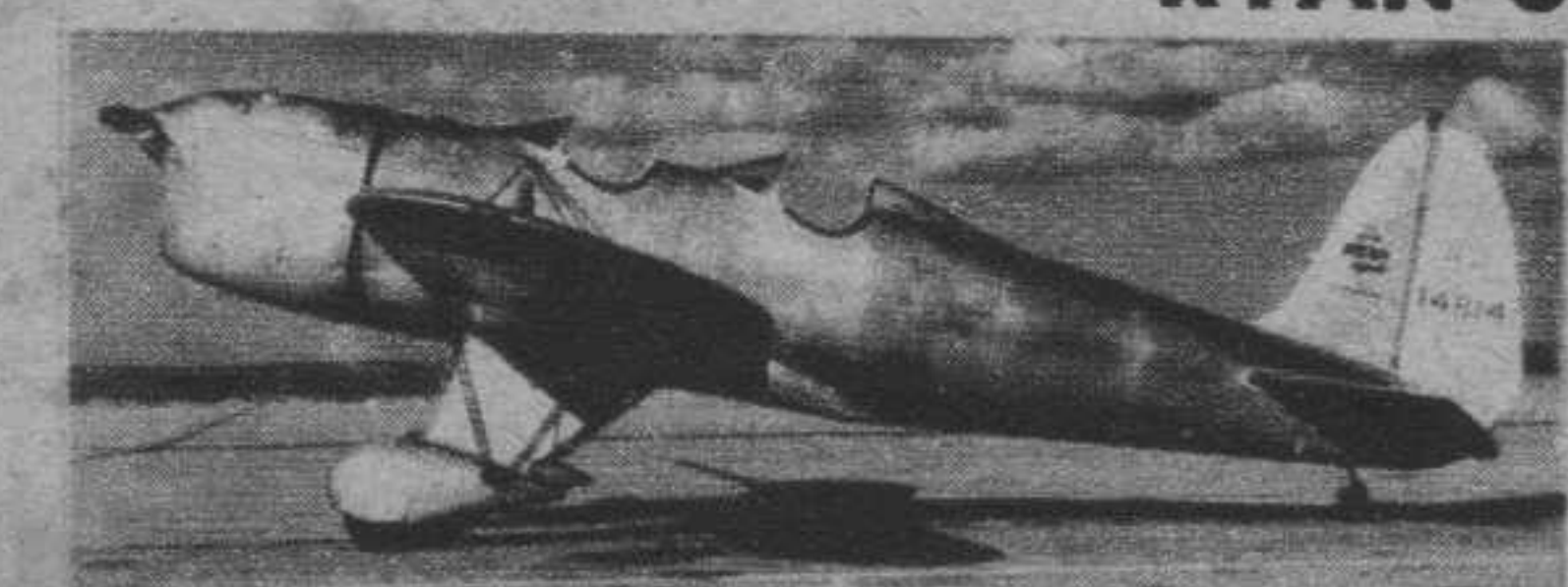
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Air Adventurers

(Continued from page 26)

June Blackford of San Mateo wins a Photography award for a splendid shot of a Fleet trainer owned by the Summit Flying School, which operates out of the San Francisco Airport. Miss Blackford uses the Eastman box Brownie and Gevaert film, which seems to produce some very sharp negatives.

Then from Luke Field, Honolulu, we get a letter from C. W. Beech, who is a member of the Seventeenth Air Base Squadron out there. He appears to be a great model builder and he sends us two pictures of an amphibian which he has built. One shows the uncovered framework in rare detail and the other shows the little ship resting on the water of a swimming pool.

Nace Mefford of Covington, Va., gets around plenty and recently he visited the air base at Langley Field, where he was told that the U. S. army air corps plans a great publicity campaign to get pilots and mechanics for the new and vastly improved air force. He was allowed to inspect an army Lockheed and saw a Boeing B-15 and had further opportunity to look over some A-17s and B-18s which greatly impressed him. Nace also sent in four very fine pictures of some of the planes there.

Hubert Smales of Hinton, West Virginia, sends in a long letter about his activity and the work his club is doing for model builders out there. He has induced a local store to put in a full stock of model supplies, and, as Hubert says, "that is doing something in a small town like this." Hubert is quite an artist, too. We expect to see him among the topnotchers in a few years if he sticks to comic cartoons.

William J. Crone, Box 367, Simcoe, Ontario, Canada, is a new hard-working member who advises us that he is the boy to come to if you want to obtain the unusual or hard-to-get model

plans. Bill seems to have some trick of being able to draw plans from photographs, and if any of our members have some special plan they would like they should contact Bill and he'll try to help them out. He is now working on a new bomber model in which he plans to use two Brown Junior engines. Wow!

We have many other Photographer's awards. Richard Ehrler of Dormont, Pa., sends in a neat shot of a T. W. A. transport at the Allegheny County Airport. Jerry Cohen of Brooklyn got an unusual shot of the military planes displayed at the New York's World Fair. John Deubel of Rochester bags an award for two prints of Douglas observation ships taken at the Rochester Municipal Airport. Lonnie Neal of East Wanatchee, Wash., discovered an old Ford tri-motor job out at his local airport. Irwin Spandau of Sunnyside, N. Y., clicks for his award for a print of the Nordmeer, the German transatlantic seaplane mounted on the catapult of the mother ship. This is a very interesting shot, but unfortunately not sharp enough to assure good magazine reproduction.

And that's all for this month. Let's hear from you, Air Adventurers. We'll be glad to publish anything that will be of interest to the club.

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Air Trails Advertisers—December, 1939

Aero Industries Technical Inst.	Back Cover
Aeronautical University	64
Christie Batlas	49
Bay Ridge Model	63
Briegleb Aircraft Co.	66
California Flyers	45
Capitol Aircraft & Supply Co.	61
Cleveland Model & Supply Co.	Second Cover
Comet Model	Third Cover
Craft Service	66
Craftsman	64
Dremel Mfg. Co.	56
Funk & Wagnalls Co.	51
Geppert Studios	66
G. H. Q. Motors	64
Gun Model Co.	66
Hawk Model Airplane Co.	47
Heathe Model Airplane Co.	66
Hobby Lobby, Inc.	48
H. & F. Model Airplane Co.	62
Ideal Aeroplane & Supply Co.	53
Imperial Model Aero Supply	65
International Models	57
Junior Aero Supplies	62
Junior Motors Corp.	62
Lange's Model Supplies	64
Leader Model Airplane	66
Lincoln Airplane & Flying School	48
Lionel Corp.	52
Logan Model Aircraft	66
Megow's	43 & 56
Mercury Model Airplane Co.	59
Meyer Engineering	66
Midget Radio Co.	56
Midwest Model Supply	55
Model Aeronautics Pubs.	62
Modelcraft	44
National Carbon Co.	55
Neil's Hobby Shop	64
Nelson Co.	66
New Cyclone Aircraft Co.	60
Ohmeyer	66
Ohlsson Miniatures	48
Carl Ort	64 & 66
Paramount Models	64
Parks Air College	3
Pitman Publishing Co.	62
Polk's	46
Radio Control Headquarters	66
Rite Pitch Propellers (All American Hobbies)	60
Ronald Press	5
School of Aeronautics	66
Selley Mfg. Co.	50
Skyway Model Aircraft Supply Co.	52
Speedway Mfg. Co.	64
Triboro Model Supply	66
Trost Model Airplane Shop	56
Used Aircraft Directory	66
Waterbury Model Builders Supply	66
Westlake Model Co.	64
West Towns Hobby Shop	66

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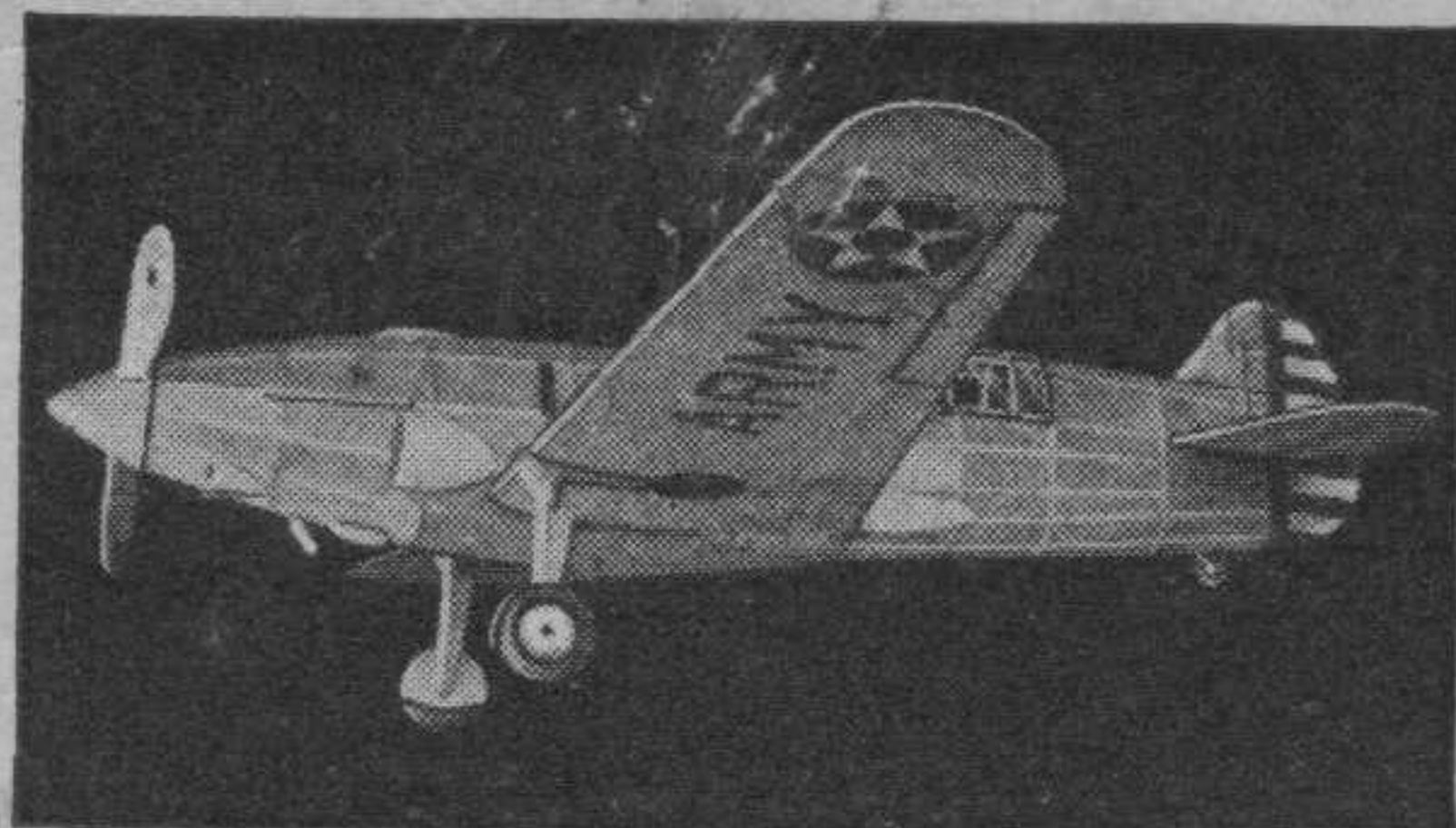


Carl Goldberg sketched while at work.

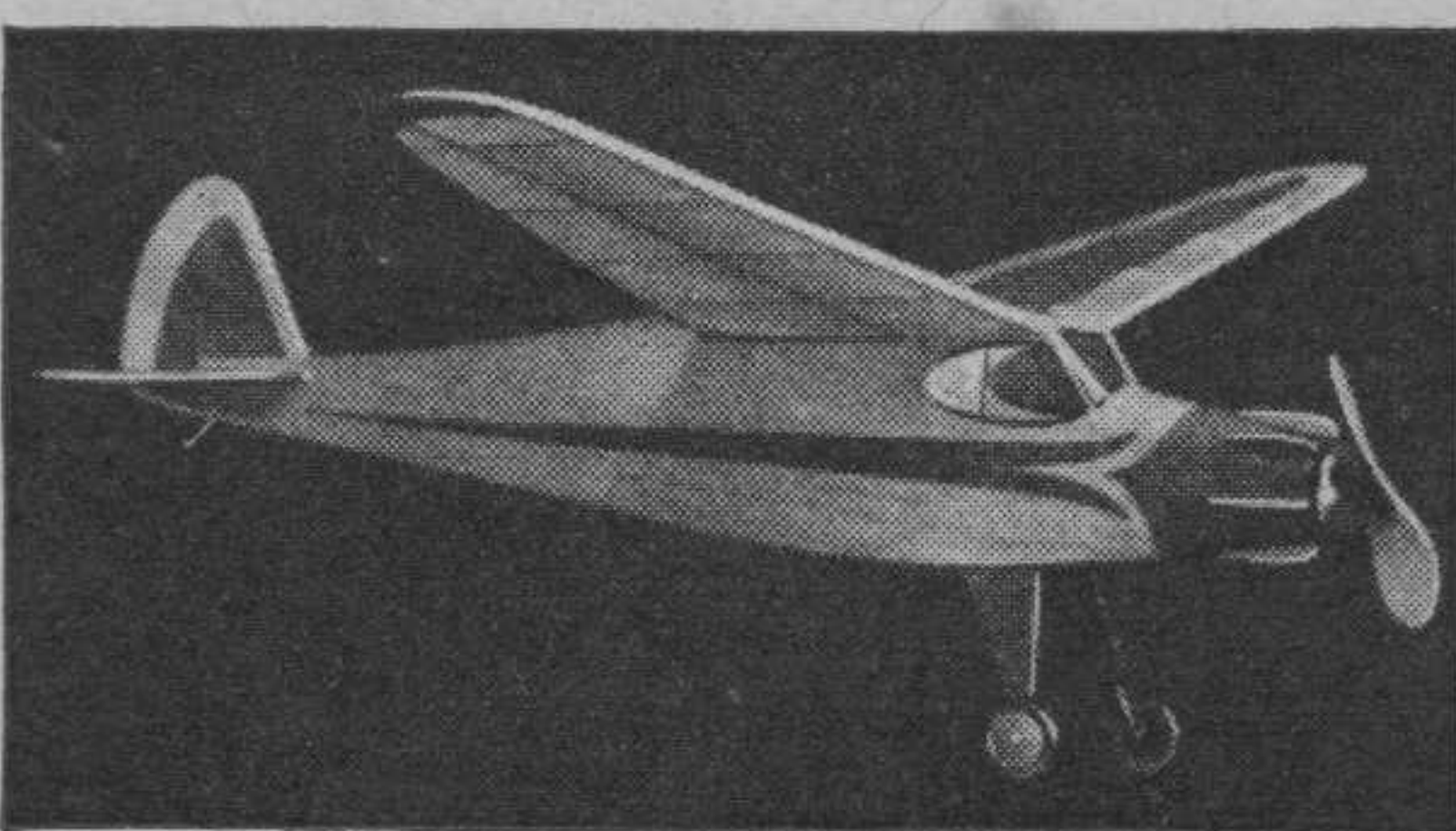
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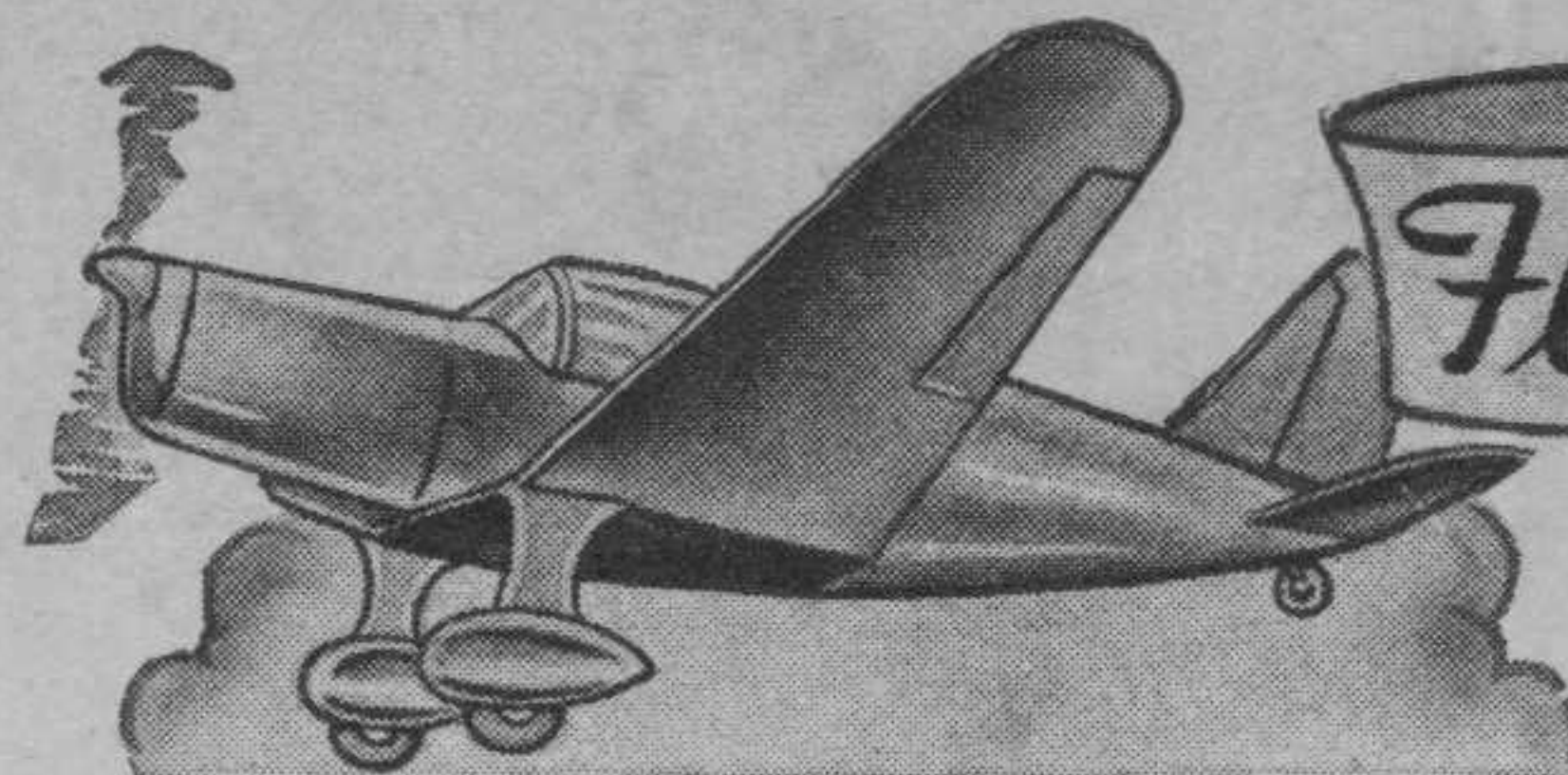
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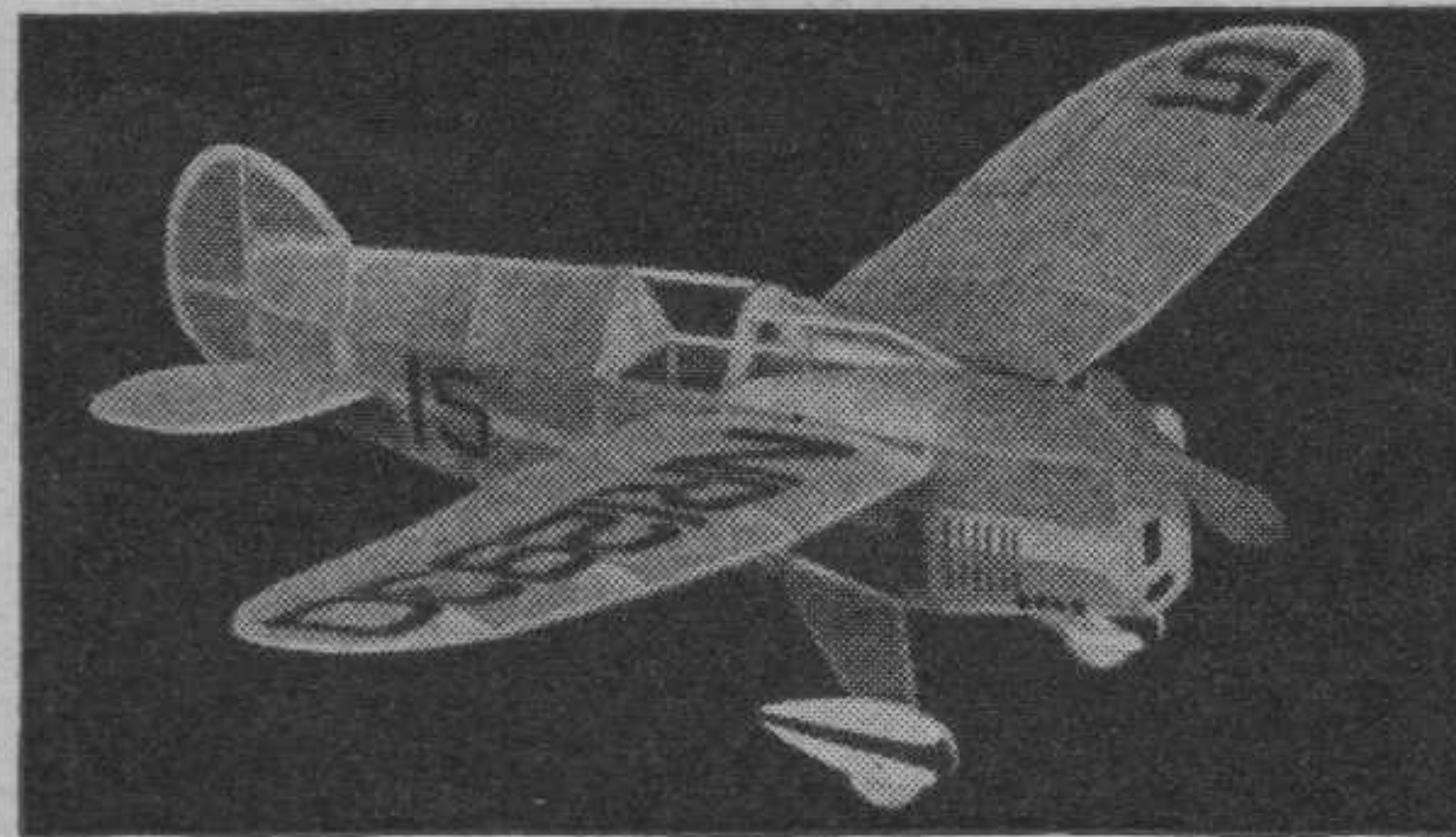
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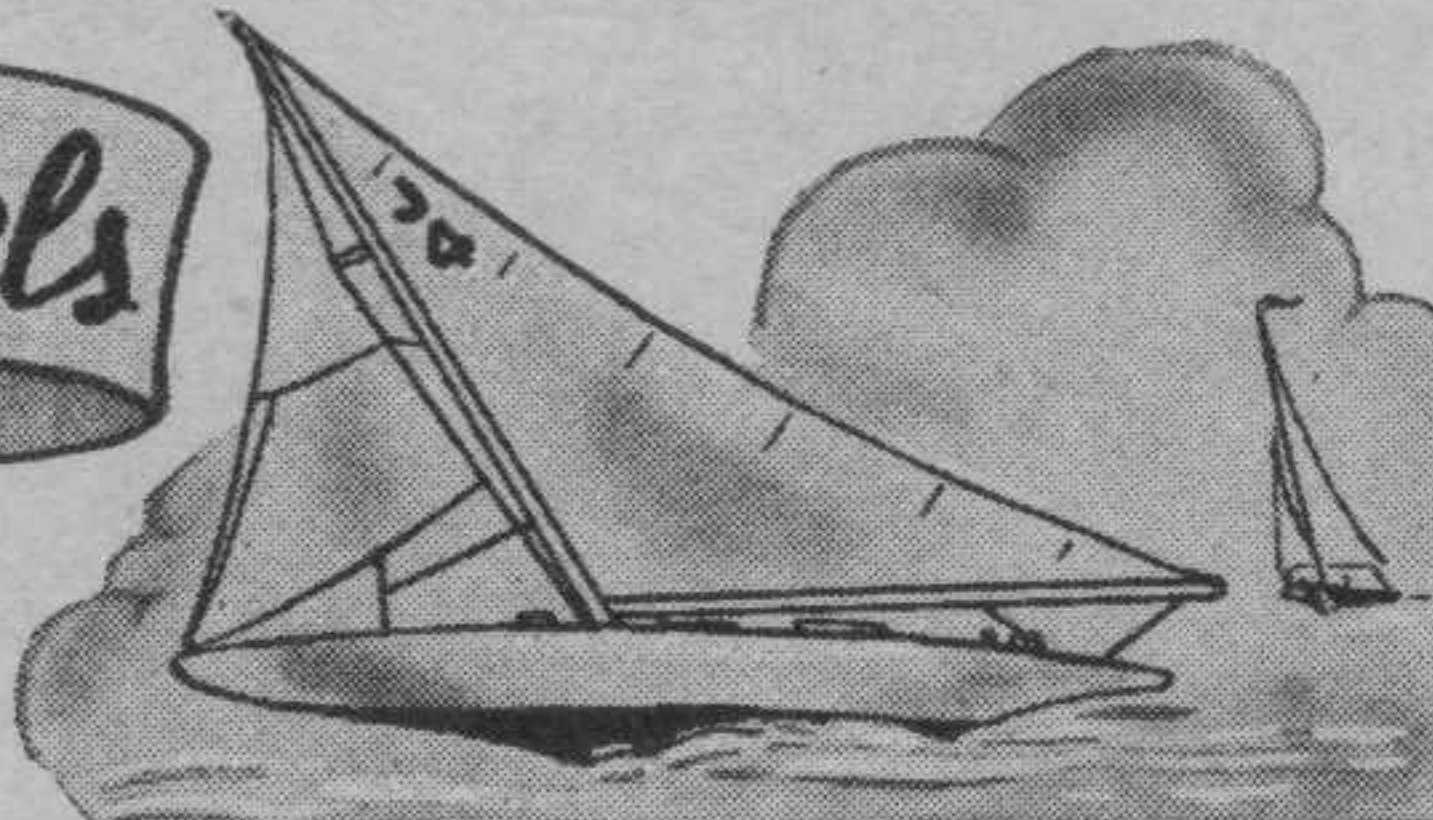
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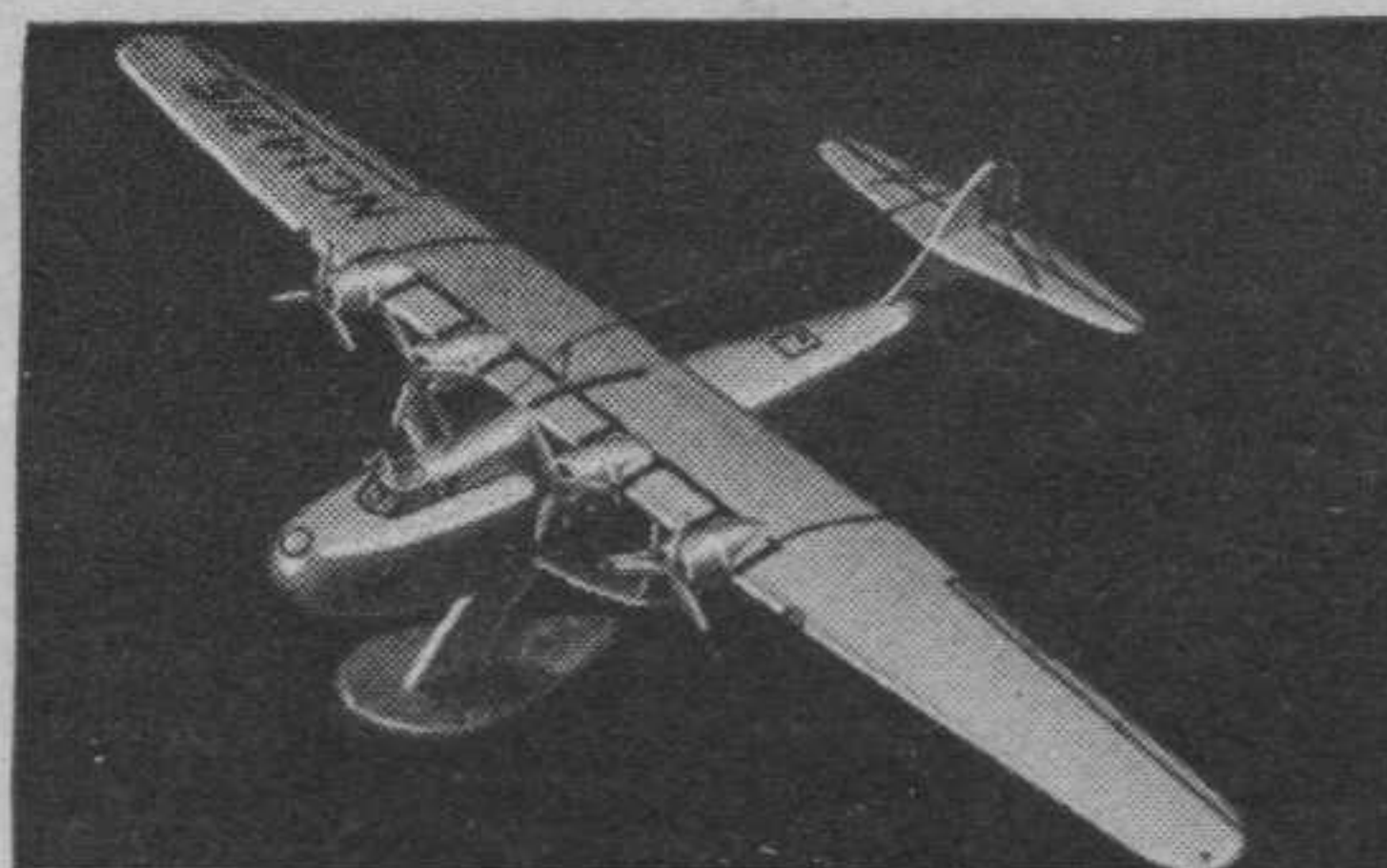
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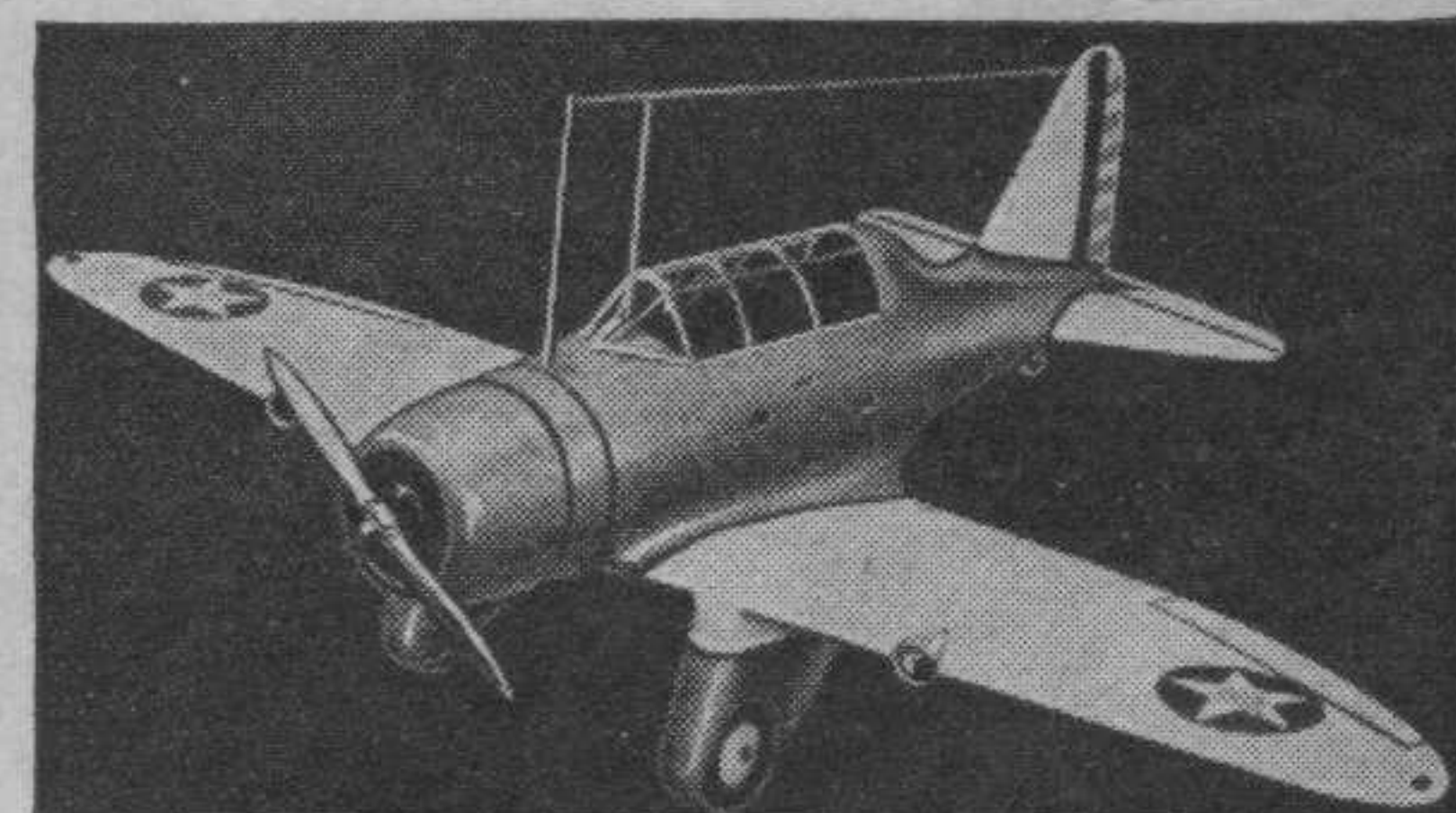
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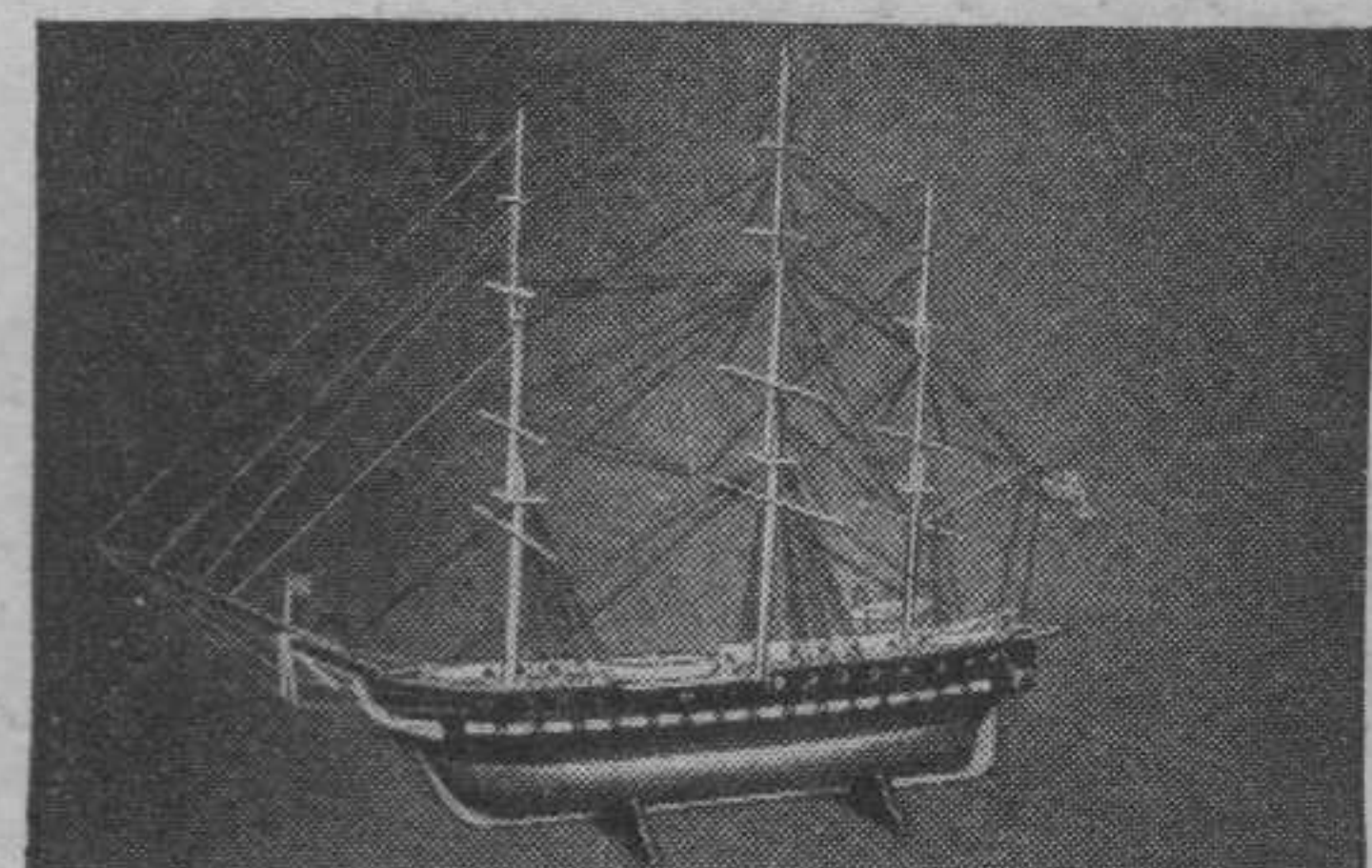
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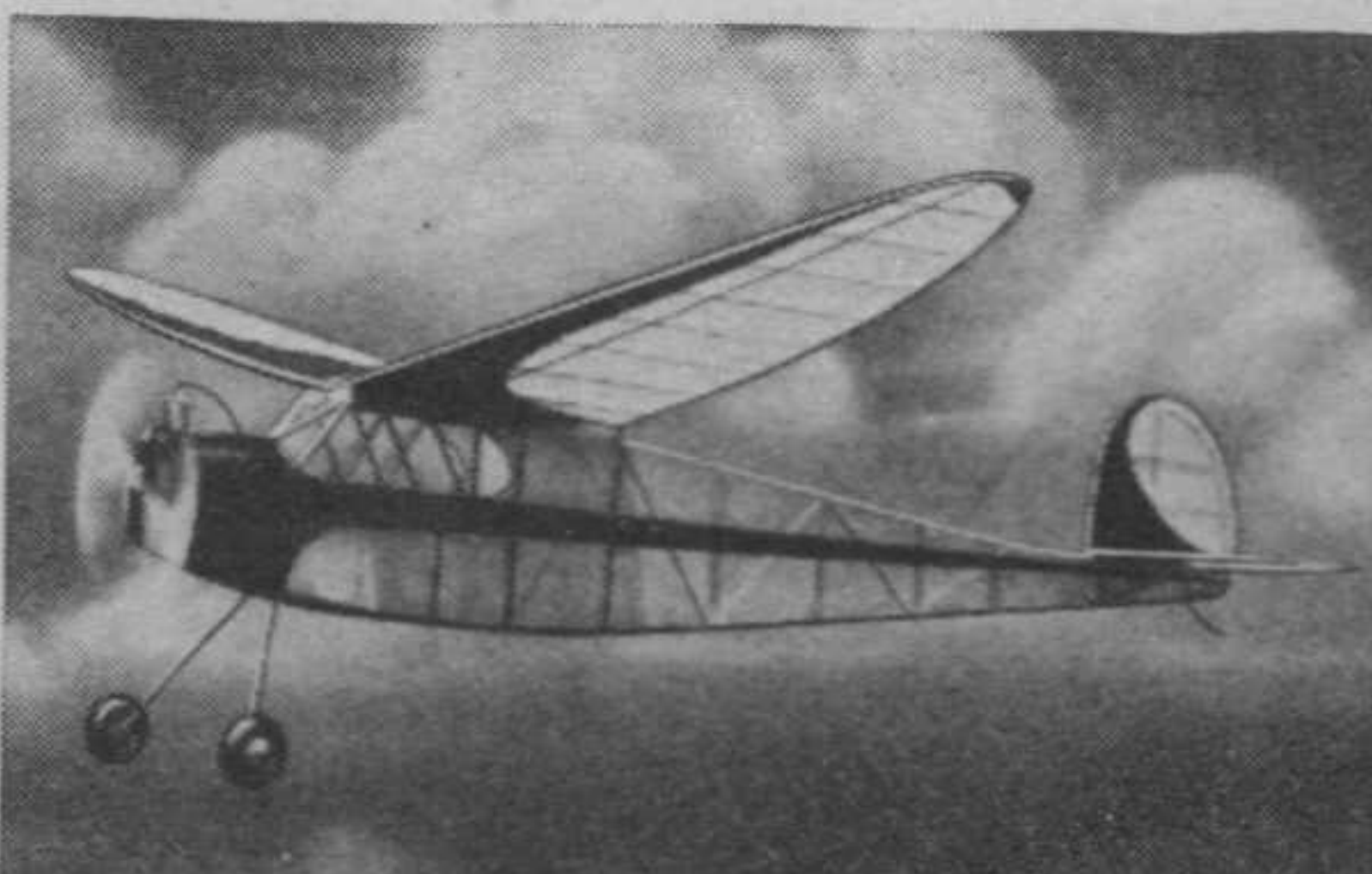
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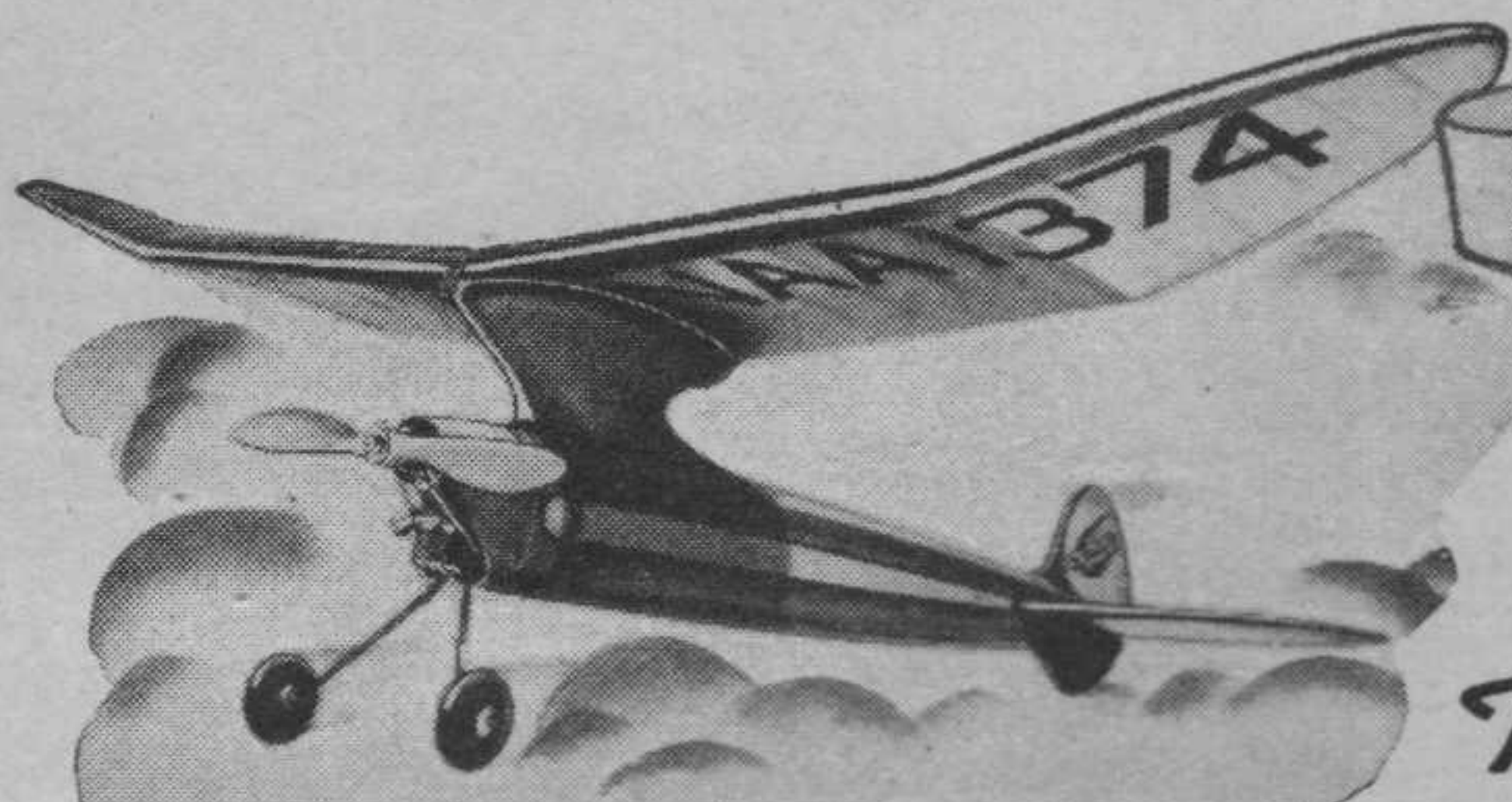
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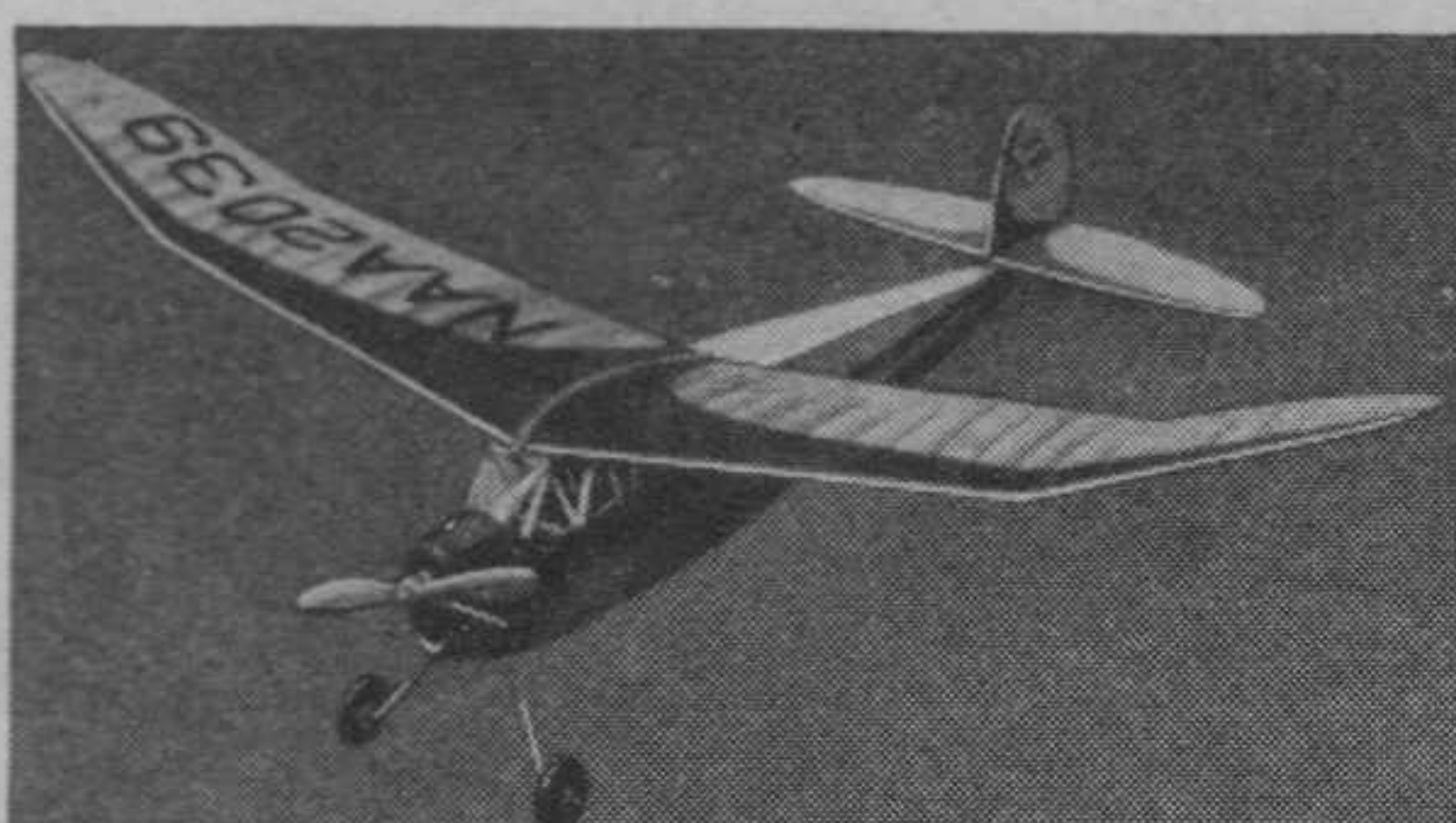
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☐ Aircraft Mechanics ☐ Aeronautical Engineering
☐ Undecided. Please send more information.

Years of High School: None ☐; 1 ☐; 2 ☐; 3 ☐; 4 ☐

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