UNIVERSAL MODEL AIRPLANE NEWS

MARCH

15¢
20 cents in Canada

"A COURSE IN AVIATION FOR FIFTEEN CENTS A MONTH!"

JOSEF KOTULA

THE TRAVELAIR SPEEDWING

MANEUVER CONTEST, Page 22

Read This Letter QUICK!

Balsa Planks
1" x 1" x 24".....15c
(6 for 80c!)
1" x 3" x 36".....40c
2" x 3" x 36".....70c
2" x 6" x 36".....$1.25

Sheets—Balsa
1/32" x 2" x 24"..... 4c
1/32" x 2" x 36"..... 5c
1/16" x 2" x 24"..... 4c
3/16" x 2" x 36"..... 7c
1/16" x 3" x 24"..... 5c
1/16" x 4" x 24"..... 6c
3/32" x 2" x 24"..... 5c
3/32" x 2" x 36"..... 7c
1/8" x 2" x 24"..... 5c
1/8" x 2" x 36"..... 9c
3/16" x 2" x 24"..... 8c
3/16" x 2" x 36".....11c
1/4" x 2" x 24".....10c
1/4" x 2" x 36".....14c

Banana Oil
In new "Open-Mouth" Jar
(See photo)
1 oz.....10c 2 oz.....15c

Colored Dope
In new "open-mouth jars," permitting quick, easy insertion of brush. Secret mix. No streaks, dries fast. Famous everywhere!
Per 1 oz. (open-mouth) jar 10c
1 oz. Thinner 10c

Celluloid Motor Cylinder

Feather-weight (black)....4c

Celluloid Sheets
Transparent (4"x5½") 4c

Tissue Paper
Superfine Quality Tissue (18" x 24") per sheet, 8c; White Hakone Tissue (21" x 31") per sheet, 5c; Hakone Tissue in blue, red, orange, khaki, black, yellow (20½" x 21") per sheet, 5c.

"Dear Comet: I want to congratulate you on the keen balsa wood you handle. A hardware store in town carries your supplies and I buy all my material from them. Your Comet balsa is the best I've bought anywhere. It is the smoothest, has the best grain and, all in all, IS PERFECT. Your other supplies are O.K. as well.

"Received your colored CATALOG and I sure treasure it! The models you've designed are knockouts!"—Bernard Lindquist (Wisc.). THANK YOU, BERNARD! Your letter is typical of thousands received at our factory. We hope your message will inspire other builders to get the most and the best supplies at reasonable prices—genuine COMET-crafted supplies!

COMET'S QUALITY SUPPLY PRICES CUT!

Balsa Strips
1/16" sq. x 24".....1c 12 for 6c
1/16" x 1/8" x 24".....1c 12 for 7c
3/32" sq. x 24".....1c 12 for 8c
1/16" x 1/4" x 24".....1c 12 for 9c
1/8" sq. x 24".....1c 12 for 10c
1/8" sq. x 36".....1½c 12 for 12c
3/32" x 3/16" x 24".....1½c 12 for 12c
3/32" x 3/16" x 36".....2c 12 for 18c
1/8" x 1/4" x 24".....2c 12 for 18c
1/8" x 1/4" x 36".....2c 12 for 20c
3/16" sq. x 24".....2c 12 for 20c
3/16" sq. x 36".....2½c 12 for 24c
1/4" sq. x 24".....2½c 12 for 24c
1/4" sq. x 36".....3c 12 for 30c
1/8" x 3/8" x 24".....2½c 12 for 24c
1/8" x 3/8" x 36".....3c 12 for 28c
1/4" x 1/2" x 24".....5c 6 for 25c
3/8" sq. x 24".....5c 6 for 25c
3/8" x 1/2" x 24".....7c 6 for 30c
1/2" x 1/2" x 24".....8c 6 for 36c

Balsa Prop Blocks
No. 1—½" x ½" x 6"..... 1c
No. 2—½" x ½" x 8"..... 2c
No. 3—9/16" x ⅝" x 8"..... 3c
No. 4—¾" x ¾" x 8"..... 4c
No. 5—⅞" x 1¼" x 8"..... 5c
No. 6—¾" x 1½" x 10"..... 6c
No. 7—1" x 1½" x 8"..... 7c
No. 8—1" x 1½" x 10"..... 8c
No. 9—1" x 1½" x 12"..... 10c
No. 10—1½" x 1⅝" x 12"..... 12c

Thrust Bearings
Liteweight, sturdy, accurately drilled. See photo..3c ea.

Dowel Rods
1/16" dia., 24" long.....6 for 5c
1/8" dia., 30" long.....3 for 5c

Shredded Bamboo
12" lengths, 1/32" x 1/16" 2 for 1c

Propeller Shafts
Made from tough No. 9 piano wire. Good for rear hooks, too. 2 for 2c

Washers
Our own brass washers specially cut, 5/32" outside dia. 12 washers per envelope, only 5c.

Sandpaper
10-piece package...4c

Imported Silk
18" x 36" 40c (½ yd.) 75c a yard

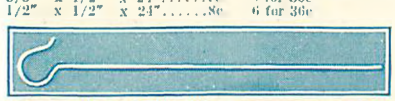
Ambroid
Per tube 10c

Alum. Wire
5-ft. coil 3c

Hard Rubber Tubing
1/16" dia. x 6 ..... 3c
3/32" dia. x 6 ..... 3c

Rubber
1/32" x 1/16".....3 ft. for 1c
1/8" flat.....2 ft. for 1c
3/64" x 3/64" (No. 20) 2 ft. 1c
1/32" x 3/16", 1c per foot

Cement
Made from the most famous secret formula in this field, dries fast, liteweight, transparent, waterproof—packed under pressure. Big new tube.....only 10c



Music Spring Wire
Highly polished and straightened in 2-foot lengths 2c
No. 6.....016" No. 10.....024"
No. 8.....020" No. 12.....029"
No. 14.....033"

Celluloid Wheels
Black.
3/4" dia..per pair 8c
1" dia..per pair 10c
1-3/16" dia..per pair 10c

Builders Wise Use COMET Supplies — Take a Tip from Experienced Guys!

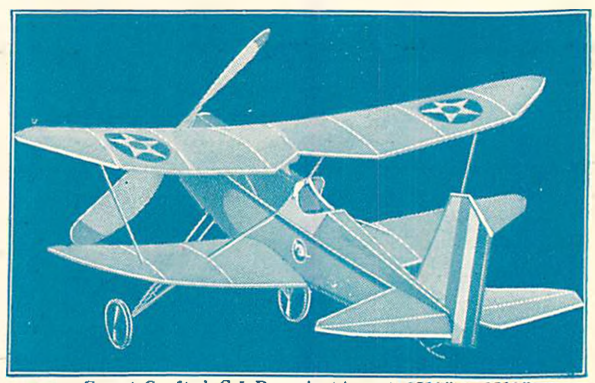
"COMET Planes are the EASIEST Built, the BEST Looking—BEST FLYING Planes I EVER SAW! *Your Service Very Good and* P-R-O-M-P-T!"

Alan Cummings with his 4 Comet planes. Happy Landings, Alan!

You'll agree with Alan Cummings when you order your first Comet kits. Now, fellows . . . . why experiment? Buy, build and FLY Comet planes—they give you the BIGGEST value for the lowest prices—and they FLY—how they FLY! Quick . . . . join the Comet Crowd TODAY!

NEW ARMY PLANE! "C-1 Pursuit Made RECORD Competitive Flight of 1300 FEET!"

"It was the easiest ship I ever constructed—plans so easy to follow."—Clyde Kowalka (Ohio). Looks like real Army biplane. Takes off, scuds thru skies, makes perfect 3-point landing. Greatest 75c Army plane in America! Thousands successfully built, flown. COMPLETE Comet-Crafted kit: 75c at Dealer's or prepaid. Order!


Comet-Crafted C-1-Pursuit (Army) 15½" x 12¼"

"What a Bullet Is the RED RACER! So Easy to Build, Too!"

says Fred Dickson (Wash., D. C.). "Gee, what a whizz the Red Racer is! 'Ask the boy who owns one!' He'll tell you what a bullet it is. Easy to build, too. Comet SUPPLIES are A-1 quality also!" Quick—get this SENSATIONAL FLYING RACER! 15½" x 11½". An EXCLUSIVE Comet design. No one else makes this sleek, trim, bright red beauty! Your Red Racer is waiting for you inside brilliantly colored, sturdy box—COMPLETE materials, including Comet's usual superior 3-view, FULL-size plans, etc. Only $1 at Dealer's or prepaid—and the biggest buck's worth anywhere! Get your Comet-Crafted Red Racer now! Like thousands!

$1 At Dealer's or Prepaid

15½" x 11½"

GIVEN!
Big 12-in. balsa glider GIVEN with your kit order.

HOW TO ORDER — SEND NO MONEY!

100% Satisfaction Guaranteed, or exchange made without extra cost or money refunded! We pay postage on all kits on Cash Orders. On C.O.D. kit orders, you pay postman for kits, C. O. D. fee, postage. **We pay Postage on Cash Supply Orders** amounting to $1. If your order is under $1, add 15c extra for packing and shipping. **If you order supplies C.O.D.**, you pay C.O.D. fee and few cents postage, also 15c packing and shipping charge on orders under $1. Over $1, you do not pay 15c packing and shipping charge. NO SUPPLY ORDERS ACCEPTED FOR LESS THAN 50c! **General Rules:** West of Mississippi, 10c extra. If you send check, add 10c extra. Always use money order. CANADIANS: Send 20% extra. No C.O.D. International Money Orders only. No Canadian stamps or coins. Now hurry and order—and tell your friends about Comet supplies and Comet FLYING kits! **Let's go!!**

Comet Model Airplane and Supply Co.
3114 Harrison, Dept. M-33-F.
Chicago, U. S. A.

C.O.D. ☐ Send articles checked on coupon and written on sheet of paper enclosed C. O. D. I'll pay postman for articles plus C.O.D. fee, postage. Comet guarantees satisfaction.

Cash ☐ I enclose $_____ for articles checked on coupon (and on enclosed sheet). Send them prepaid. Comet guarantees satisfaction.
Red Racer [ ] Army Pursuit [ ] Dipper [ ] Zipp Flyer [ ] Catalog 6c with order, 10c without order [ ]
Print Clearly

NAME_____
STREET_____
City_____ State_____
(Send me one 12" "Gift" Glider with this order)

QUICK! Get 5-Color 24-Page CATALOG!

Most beautiful, detailed, ever printed. Shows planes in FULL COLORS. Lists quality supplies. Limited supply left. Hurry! 6c with order, without order **10c**

DEALERS! SALES GUARANTEED! Write quick on letterhead for Guaranteed Sales Plan. Thousands making easy, extra profits. Cash in on our BIG ADS! Write!

CLUBS! Write for Special Discounts on quality supplies.

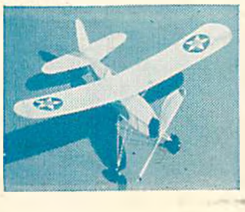
NEW! "Never Saw a Kit So COMPLETE!" The ZIPP!

15" x 11"

REDUCED TO **50c** at Dealer's or Prepaid

Jack Pfeifer of S. Dak. writes: "Never saw a kit so complete as The Comet Zipp . . . . drawings so clear—and does she fly!" We've REDUCED the price from 75c to 50c at dealer's or prepaid . . . . so get this big, graceful beauty! Be FIRST to thrill your friends with its soaring flights. The supply of Zipps your exclusive original flying design) will melt away at the new low 50c price—so ACT PROMPTLY! Kit is COMPLETE, FULL-size 3-view plans, etc. Grab this BARGAIN now!

Makes DIPPER Stunt, Loop, "Snap-Roll" — FLIES 900 FEET!



Gang . . . . here's a letter from a Dipper builder! Great guy is he! (The Dipper, as you know is the world's BEST 50c FLYING plane). Theo. Baxter (N.C.) says: "I've made several Dippers. I shortened the prop about one inch on the last Dipper, and it will now loop, snap-roll, do vertical banks—then level off and make the prettiest landing I've ever seen a model make in my 2 years' model experience. I believe your Comet design of models cannot be beat for looks, strength and flying ability!" **That's all, fellows.** The COMPLETE Dipper kit costs you 50c at Dealer's or prepaid. A word to the wise is sufficient!
Weight: 1/3 oz., 12½x9½"

50c at Dealer's or Prepaid

Our NEW cement tube is just as big but better-looking in red, yellow, black!

100 STRIPS of Balsa 1/16" x 1/16" x 24" ONLY 5c

Yes, you can get 100 pieces of genuine, quality split balsa strips (1/16" square x 24") for only 5c, provided you order $1 or more worth of Balsa Products Company supplies from this advertisement! Just think . . . . 200 feet of balsa strips for 5c! This is a remarkable value . . . . and we hope to make many new friends and get re-orders from our thousands of old friends. But you must act immediately to take advantage of this SPECIAL 5c price as this offer closes Midnight, May 31, 1933.

Watch our big page advertisement every month in Universal Model Airplane News for "get acquainted" Special Offers. We believe that you will get more for your money by waiting till you see our Monthly Special Offer. As you know, this is a company formed by mature business men who are model airplane "hobbyists"—and BUSINESSLIKE SERVICE has been our motto from the start. A constantly GROWING flood of orders PROVES that model airplane builders prefer to deal with a company that SPECIALIZES on giving quick service, full value, low prices—and guarantees satisfaction, or exchange, or money back! NOW . . . . send us an order for supplies amounting to $1 or more—add 5c to that order and get 100 balsa strips with your order!

Only one batch of 100 balsa strips to a customer! Remember, to get the special 5c price, you must send order of $1 or more worth of supplies.

Offer Good only till Midnight, May 31, 1933—So Order Now!

SEND NO MONEY—Just the Blank!

Just send convenient Order Blank below, check the "C.O.D." space, pay postman on delivery! Easy, simple. **REMITTANCE RULES:** (1) No order under 50c accepted. On supply orders up to $1.50 add 15c packing, postage. Add 10% on orders over $1.50. West of Mississippi, add 10c extra to above charges. (2) We pay postage, insurance on orders of $4 or more, except on balsa planks. (3) Canadians add 25c on orders up to $1.50, 15% on orders over $1.50. No Canadian postage, coin accepted. Use International Money Order! (4) Order C.O.D., or (5) Remit cash by postal or express money order. Add 15c extra if check is sent. (6) Print order clearly. (7) Satisfaction guaranteed, or exchange made, or money refunded.

Get Your B.P.A. CATALOG FREE Send 3c stamp to cover mailing cost. You'll be surprised to see this beautiful Catalog which PICTURES our many wonderful supply items. This also entitles you to year 'round information on any new prices, new items, we get out! Send stamp with your order **NOW!**

TO:
Balsa Products Co.
1319 So. 5th Av., Div. M-33,
Maywood, Ill., U.S.A.

ORDER BLANK

I enclose 3c for Catalog ☐

C.O.D. ☐ I enclose no money. Send C.O.D., articles listed here. I'll pay postman for articles, packing charge, postage, C.O.D. fee.

CASH ☐ I enclose $........ Please send articles ordered below.

PRINT NAME..

Street.............................City.............................State..........

Quantity	Size and Description of Article	Price Each	Amount

(Copyrighted 1933 by B.P.A. Co.) Total $.........

Write rest of order on page margin, if not enuf room here!

A PLEA for FAIR PLAY!

There are many fine companies selling model airplane supplies. Naturally, we think Balsa Products Company of America to be the one for you. If we have made strong statements in our advertisements about our company and its products, it has been without the thought of "knocking" any competitor . . . . in fact, it has been due to our attempt to picture for you IN WORDS just what it means to American Model Builders to do business with a company operated by mature business men. Of course, only by actually sending in your order can you EXPERIENCE FOR YOURSELF the thrill of B.P.A. service . . . . quality . . . . low prices . . . . and money-back guarantee. ORDER NOW AND SEE!

ORDER *Without Risk!*

BUY SUPPLIES ON OUR "SATISFACTION GUARANTEED" PLAN — Save Time, Money!

BALSA STRIPS 24" Lengths

1/16" square, each	.01	12 for 5c
1/16 x 1/8", each	1c	10 for 5c
3/32" square, each	1c	9 for 5c
1/16 x 1/4", each	1c	8 for 5c
1/8" square, each	1c	8 for 5c
3/32 x 3/16", each	1½c	8 for 8c
1/8 x 3/16", each	1½c	8 for 8c
1/8 x 1/4", each	2c	5 for 7c
1/8 x 3/8", each	2c	5 for 7c
1/4 x 1/2", each	3c	5 for 10c
3/8" square, each	4c	5 for 16c
3/8 x 1/2", each	5c	5 for 20c
1/2" square, each	6c	5 for 25c
1 x 1", each	13c	4 for 45c

Other sizes to order.

BALSA STRIPS 36" Lengths

1/8" square, each	1c	6 for 5c
1/8 x 1/4", each	2c	6 for 10c
3/16" square, each	2c	5 for 9c
1/4" square, each	3c	5 for 12c
1/8 x 3/8", each	2c	5 for 9c

SHEET BALSA

	24"	36"
1/32 x 2"	3c	
1/16 x 2"	4c	5c
1/16 x 3"	6c	
1/16 x 4"	9c	
3/32 x 2"	4½c	6½c
1/8 x 2"	4½c	6½c
3/16 x 2"	6c	9c
1/4 x 2"		11c

PROPELLER BLOCKS

3/8 x ½ x 6", each	1c	6 for 4c
1/2 x ¾ x 6", each	1c	6 for 5c
9/16 x ⅞ x 7", each	2c	6 for 10c
3/4 x 1⅛ x 8", each	3c	3 for 8c
7/8 x 1¼ x 8", each	4c	3 for 10c
3/4 x 1½ x 8", each	5c	3 for 13c
3/4 x 1¼ x 10", each	6c	3 for 15c
1 x 1½ x 8", each	7c	3 for 18c
1 x 1¼ x 10", each	8c	3 for 21c
1 x 1½ x 10", each	9c	3 for 24c
1 x 1½ x 12", each	10c	3 for 27c
1¼ x 1⅝ x 12", each	13c	3 for 35c
2 x 2 x 12", each	17c	3 for 48c

PLANK BALSA

1 x 3 x 36" .. 33c — 2 x 6 x 36" .. 80c
2 x 3 x 36" .. 55c — 2 x 6 x 40" .. 95c

BAMBOO

1/16 x 1/4 x 12"........1c ea., 6c per doz.
1/16 x 1/4 x 15"........1c ea., 8c per doz.
1/16 sq. x 12"........4 for 1c, 36 for 8c

JAPANESE TISSUE

White, 19 x 26" .... 4c per sheet 36c per doz.
Red, yellow, green, blue, black, orange and khaki colored Jap tissue, 20½" x 24" 6c per sheet 48c per doz.

THRUST BEARINGS

Small size .... 2c each; per dozen 18c

BEST GRADE RUBBER

No. 20 sq. (.045") .... 3 ft. for 1c
1/32 x 1/16" .... 3 ft. for 1c
1/32 x 1/8" .... 3 ft. for 1c

DRI-QWIK CEMENT

Large size tube 10c
Pint 85c

BANANA LIQUID

1 oz. bottle 7c
2 oz. bottle 10c
Pint 60c

ACETONE

2 oz. bottle 10c
Pint 75c

ALUMINUM TUBING

1/16" dia., per ft. 8c
3/32" dia., per ft. 8c
1/8" dia., per ft. 10c
3/16" dia., per ft. 11c
5/16" dia., per ft. 13c

CELLULOID WHEELS

¾" dia., per pair 6c
1" dia., per pair 7c
Above two sizes in black, white, blue, red.
1-3/16" dia.—(Black only) per pair... 8c
1⅝" dia., per pair 10c
1⅞" dia., per pair 16c
Above two sizes in blue, white, black, green, yellow.
3" dia. Jumbo wheels (Black only), per pair 30c

CELLULOID DUMMY MOTORS—9 cyl.

1½" dia. 18c
2" dia. 22c

STREAMLINED WHEEL PANTS

Large size to fit 1⅝" and 1⅞" dia. wheels, pair 29c
Small size to fit ¾" and 1" wheels, pair 15c
N.A.C.A. Cowling, 2" dia., each 14c

DOWEL RODS

1/16" dia., 24" long .... 8 for 5c
1/8" dia., 30" long .... 7 for 5c

SHEET ALUMINUM

.006" thick, per sq. ft. 12c
.010" thick, per sq. ft. 18c

CELLULOID SHEETS

4 x 6" 3c

MUSIC WIRE

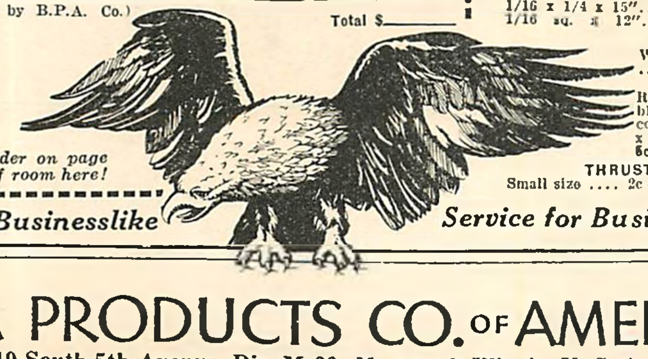
Straightened and cut to 2-foot lengths. 2c per length .014", .016", .018", .020", .022", .024", .029", .033".

WASHERS

Per doz. 3c

PROPELLER SHAFTS

Each 1c



Dependable Businesslike Service for Businesslike Model Builders!

BALSA PRODUCTS CO. OF AMERICA

1319 South 5th Avenue, Div. M-33, Maywood, Illinois, U. S. A.

DEALERS!

Write on letterhead today for Special Discounts. BIG PROFIT handling B.P.A. supplies. REAL SERVICE! Deal with BUSINESS MEN!

UNIVERSAL

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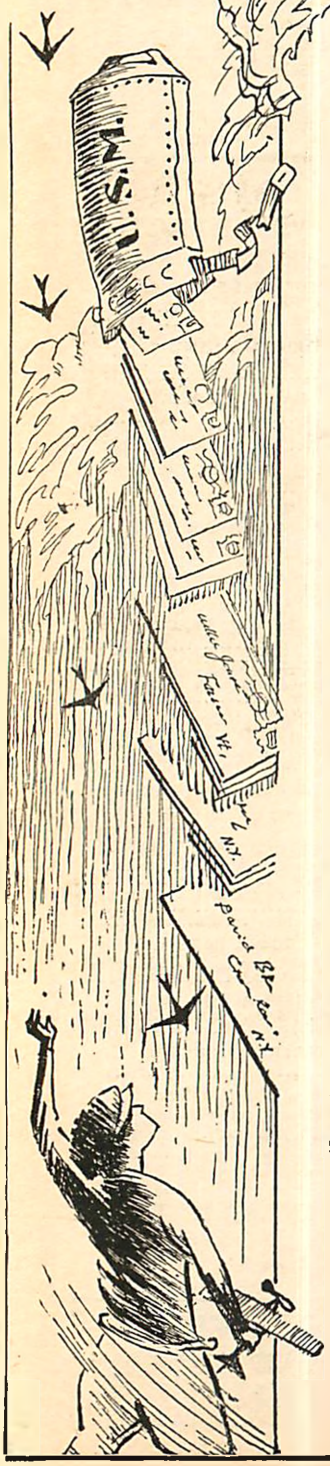
Vol. VIII *No. 3*



Edited by ***Charles Hampson Grant***

CONTENTS

MARCH—1933

In Our Next Issue

NEW WINGS FOR OUR AIRPLANES, by Fletcher Pratt, gives an interesting description of the latest development in the line of airplane wings.

FIGHTING WINGS continues the vivid story of Captain Swaab at "the Front" during the World War, as told by Orville H. Kneen.

Stockton Ferris, Jr., presents excellent plans and instructions to build a popular flying scale model in BLAZE AIR TRAILS WITH THIS HOWARD "PETE."

A MINIATURE F.9 C.2 FIGHTER by Joseph Battaglia, gives instructions and plans to build a scale model of this clever little ship in complete detail.

In addition, three views of popular planes by Stockton Ferris, Jr.; THE AERODYNAMIC DESIGN OF THE MODEL PLANE; "WHATS" AND "WHAT NOTS" OF MODEL PLANE BUILDING, and other items, make the April issue of UNIVERSAL MODEL AIRPLANE NEWS exceedingly interesting.

Order your copy of UNIVERSAL MODEL AIRPLANE NEWS from your newsdealer now, or send $1.65 for your year's subscription to this office, 125 West 45th Street, New York City.

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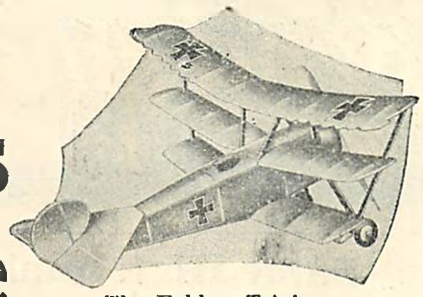
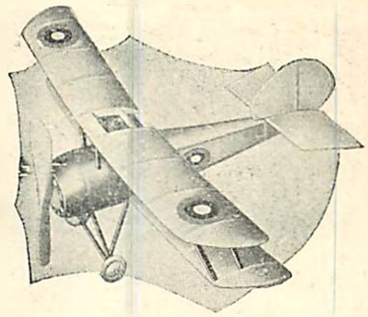
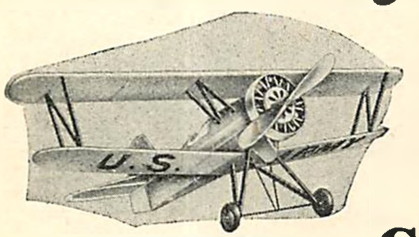
Pick Yours from these Six Flying Scale Models



The Fokker Triplane
12-inch Span



The Sopwith Camel
12-inch Span



The Boeing Fighter
12-inch Span

Compare these Kits with others costing more!

Complete Kits 12-in. Size

Guaranteed to Fly!

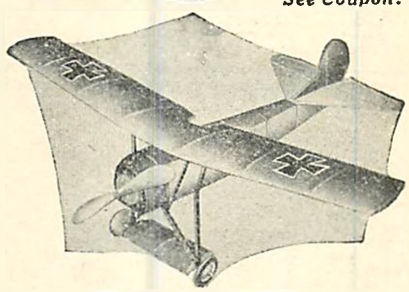
25c EACH

See Coupon!

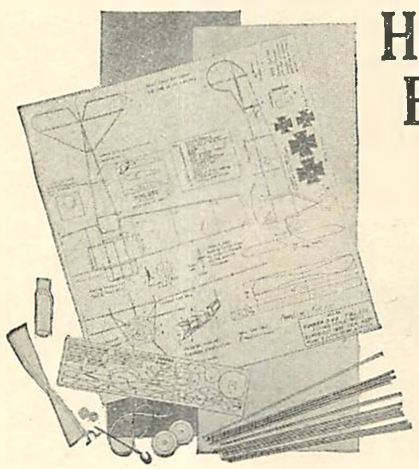
These new "IDEAL-O-PLANE" Models have made a decided hit; everybody is building and flying them. And no wonder! They are the finest you ever saw, the equal in appearance, and detail of Models costing two and three times as much. Look at these pictures, everyone an actual photograph of a Model made with these Kits. These are *Flying Scale Models* with full fuselage bodies, cambered wings, shock-proof landing gear, carved balsa propellers and other features of high-priced Models. Everyone has lots of detail designed right into the Model so you can reproduce it easily and accurately. Our Engineers have been working for months to develop these extraordinary flyers, and now you can build and fly a whole fleet for what one good Model formerly cost.

The air performance of these 12-inch Models is simply wonderful. The duration flights you can get will astonish you, and we guarantee every Model to fly when correctly built according to instructions. They weigh only ¼ oz. each and have loads of power.

You can build several of these Models in less time than it would take to build only one more complicated Model. Of course, the details require careful workmanship, but every Kit is so complete, and all parts so carefully finished, that building is a real pleasure. You'll save a lot of time by building two or three at once; you can work on one while another is drying. We are putting out these Kits by the thousands, and such large-scale production allows us to finish them more completely and still sell them for the very low price of 25 cents each. *(See Coupon)*

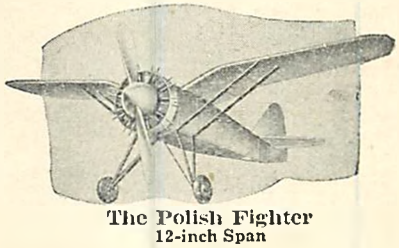


The Fokker D-VIII
12-inch Span

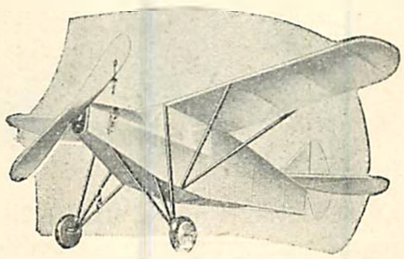


Here's What You Get in Every Kit for 25 cents

First, the Plan: a big, 12½ x 13½-in. sheet printed on heavy paper showing full-size views of side, top and front elevation, with every operation shown in clear detail and explained by instruction notes; also directions for finishing the propeller. Insignia markings are included on this sheet; just cut them out and glue in place. The wing ribs, fuselage formers, wing top, bulkheads, landing gear struts, and other parts are printed on sheet of balsa ready to be cut out. Two big sheets of colored Jap Tissue are included for covering fuselage, wings and tail assembly. Other materials are: 12 balsa strips for spars, longerons and such parts; 3 bamboo strips for reenforcing; ⅛ inch rubber for motor; 1 bottle cement; 2 hardwood wheels, ¾ in. size; 1 propeller shaft; 2 washers; 1 rear rubber hook; 1 machine carved balsa propeller ready for sanding and finishing. Every Kit is complete with everything required to make the finished Model. Compare the contents with others which cost much more and you'll realize what wonderful value these Kits are for only 25 cents each. *(See Coupon)*



The Polish Fighter
12-inch Span



The Puss Moth
12-inch Span

Here's your chance to get the jump on the other fellow. Build a couple of these "IDEAL-O-PLANE" Models and you'll have them all doing the same when they see them. Look them over here and send your order along right away. Our big-scale production enables us to secure very low prices on materials, and we are passing this saving along to you. We cannot, however, fill orders for less than two (2) Kits because the packing and postage charges are too much. So send your order for two or more Kits at one time. Then the price is 25 cents straight for each Kit, and we prepay all postage charges right to your door.

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Every Model builder should have this fine bulletin. Illustrates and describes new IDEAL Models and lists hundreds of accessories, parts and supplies every builder needs all the time. Send 2c stamp for your copy now.

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"IDEAL-O-PLANE" 12-in. Flying Model Kits

.....Boeing Fighter Kit	.....Sopwith Camel Kit
.....Polish Fighter Kit	.....Fokker Triplane Kit
.....Fokker D-VIII Kit	.....Puss Moth Kit

[Kits are 2 for 50c; 3 for 75c; 4 for $1.00; all 6 for $1.50. We pay all packing and postage charges. No orders accepted for less than two (2) Kits. Check the Kits you want in the list above and mail this coupon at once.]

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Don't Spend Another Penny

you read every single one of these Deep Cut Prices on the

AAA SELECT BALSA WOOD

NOTE: AAA grade was the designation of super-quality balsa wood originated by C. M. & S. Company and now used by many for inferior and soft grades. Beware of substitutes.

Cut balsa wood usually obtainable is cut at random, that is, without any selection, from plank balsa on hand. In the factory of the Cleveland Model & Supply Company where large quantities are used, being cut into millions of pieces annually, the wood is sorted by texture for the size to be cut. Careful inspection for defects is given all pieces.

Sheet Balsa

1/32 x 2 x 18.....02 1/8 x 2 x 18.....04
1/16 x 2 x 18.....03 3/16 x 2 x 18.....05
¼ x 2 x 18.....06

Strip Balsa

1/16 x 1/16 x 18, 4 for .01 1/8 x 3/8 x 18.....02
1/16 x 1/8 x 18, 3 for .01 1/8 x 1/2 x 18.....02
1/16 x 3/16 x 18, 2 for .01 3/16 x 3/16 x 18.....01
1/16 x 1/4 x 18, 2 for .01 3/16 x 1/4 x 18.....02
1/16 x 5/16 x 18, 2 for .01 1/4 x 1/4 x 18.....02
1/8 x 1/8 x 18, 2 for .01 1/4 x 5/16 x 18.....02
1/8 x 3/16 x 18.....01 1/4 x 1/2 x 18.....03
1/8 x 1/4 x 18.....01 3/8 x 3/8 x 18.....03
1/8 x 5/16 x 18.....01 3/8 x 1/2 x 18.....04
1/2 x 1/2 x 18.....05

Bulk Balsa

½ x 3 x 18 .....18 2 x 3 x 18..... .24
1 x 3 x 18..... .20 1 x 6 x 36..... .40
2 x 6 x 36..... .75

NEW CLEVELAND ENAMEL-DOPES

Developed after three years' experimenting involving considerable work by our experimental department and is not obtainable elsewhere as it is made specially for us to our secret formula. To distinguish it from ordinary dopes we added the prefix "enamel."

Comes in the following colors in well-made, one-ounce and two-ounce screw-cap bottles, which help prevent rapid evaporation, unlike corked bottles: Diana Cream, Military Yellow, International Orange, Grass Green, Fire Chief Red, Army Olive Drab, Navy Blue, Havana Brown, Glistening White, Glossy Black, Silver, Gold, Clear.

1 oz., 12c; 2 oz., 20c

Paper Cement

1 oz. ..... 12c 2 oz. 20c

Quality Colorless Waterproof Cement

1 oz. ..... 12c 2 oz. 20c

Same High Quality...

nothing changed except the price!

Now Every Model Builder can afford the Genuine Cleveland Diamond Parts and Supplies. Send for the No. 11 Complete List—free to everyone!

WHEELS

Wheels are all turned of hard wood and are uncolored. They may be colored easily to match the model they are to be used on. Used exclusively on Cleveland models when supplied. All accurately drilled.

Wheels.....1¼" dia. .04
Wheels.....1½" dia. .05
Wheels.....1¾" dia. .06
Balloon Wh..1¼" dia. .05

TISSUE

No. 1 tissue is a fairly heavy texture. No. 2 and No. 3 tissues are much finer than No. 1. No. 2 is most commonly employed.

No. 1 tissue (cream) 24 x 36 ..... .10
No. 2 tissue (very light cream) 21 x 31 04
No. 3 tissue (white) 20½ x 24½ 03

FIBRE

For propeller blades, etc.

Red fibre .025 x 3 x 9 ..... .08

CELLULOID

This is the thinnest celluloid made, only .005 thick, and shouldn't be confused with impractical cellophane for windshields and windows on models.

Clear celluloid 2 x 6 ..... .03

MUSIC WIRE

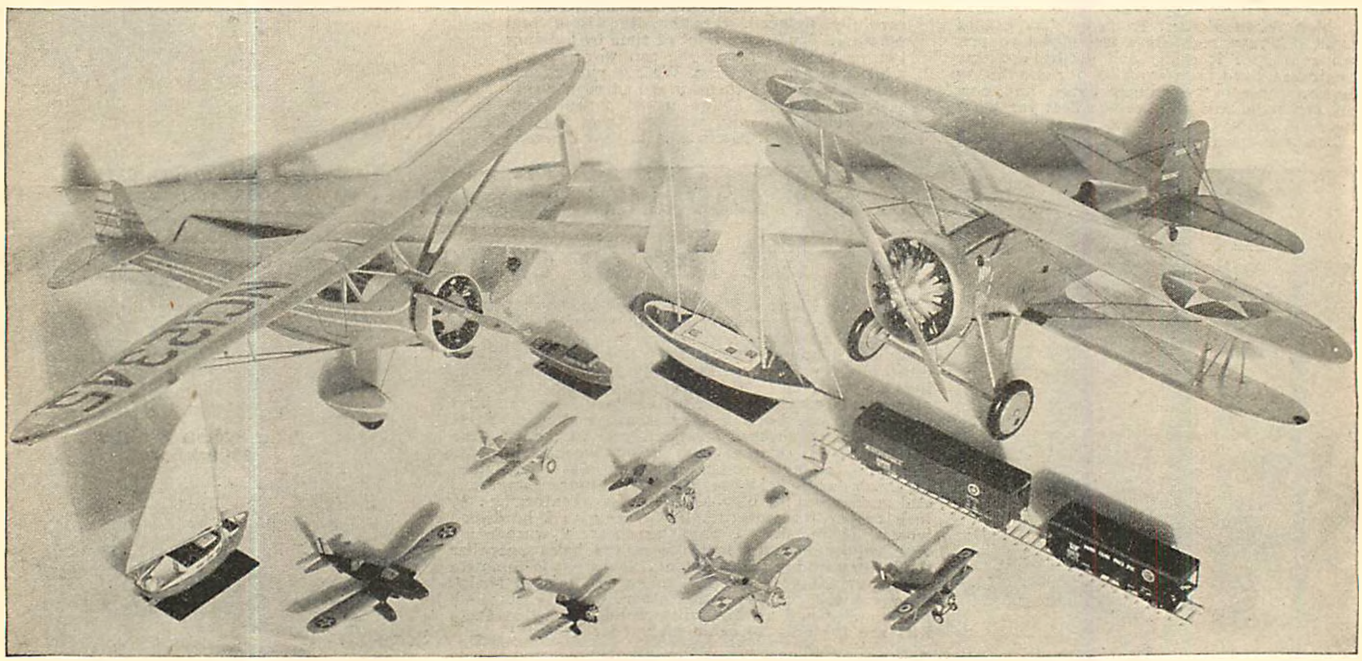
Our music wire is for mechanical purposes manufactured in this country and is the finest obtainable. Each piece is tinned to prevent rusting and comes in straight one-foot lengths. This wire should not be confused with the brittle and so-called straight pieces of imported music (or piano) wire. No. 12 used mostly.

No. 5 music wire, 1 foot ..... .01
No. 8 music wire, 1 foot ..... .01
No. 12 music wire, 1 foot ..... .01
No. 14 music wire, 1 foot ..... .01
No. 26 hinge, 1 foot, tinned ..... 2 for .01

RUBBER

Much of the so-called model airplane rubber sold today is not fine para rubber and is not full-size as the model builder usually thinks.

Drawings for Navy Boeing F4B-3 below are almost identical to Army P12-E



All these, and more, in the 2nd Issue of "CLEVELAND MODELMAKING NEWS & Practical Hobbies"

For those who still want the '32 Gee-Bee and Heath!

(Full details in the January M. A. N.) However, please note that the 15c packing charge MUST be included with each kit, so remit $1.15 for each or order will not be shipped. Drawings come with the Issue No. 1 of "CMN&PH" for 25c —Why not subscribe?

It's far ahead of the first issue—and most of you modelmakers thought that was a bang-up start. We hope to keep getting better as we go along. So let's have your wholehearted support—remember it's your magazine—and we want to fill it with the keenest kind of material, drawings, reading matter, etc. The picture above shows you just part of the "construction feast" you get with Issue No. 2. Listen: ¾" scale Cleveland-Designed standard drawings for a 22½" Boeing Fighter F4B-3 (or F4B-4) and the well-known Monocoupe, 21" span, two extremely beautiful models in their class, ¾-inch scale Soaring Glider, ½-inch scale Boats, ⅛-inch scale Curtiss A-8 Attack, Wedell-Williams, Polish Fighter, Monocoupe, Boeing F4B-3, Sopwith Camel, and Soarer, to say nothing of the two very fine freight cars, well detailed, (not toys but MODELS) a Pennsylvania box car and a Missouri-Pacific coal gondola. To top this off, besides other things, there is a 1/32-inch model of an 1854 schooner (not shown in the photograph), the second of a series of Historic Ships Cleveland-Designed by Captain E. A. McCann. Why, you can't afford to miss this issue or those following! All FULL-SIZE PLANS for articles described!

Send YOUR Subscription TODAY—See Coupon for Rates!

IT'S A REVELATION!

"Attached to this letter you will find $1.00 in cash for a one-year subscription to 'Cleveland Modelmaking News and Practical Hobbies.' Your magazine has been a revelation to the model builders in this town. We hope that you will keep up the good work."

Mt. Morris, N. Y.

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3/64 Sq. (.045")		25 ft.	.16
7½ ft.	.04	210 ft.	1.10
25 ft.	.12	1/32 x 3/16	
210 ft.	.70	7½ ft.	.07
1/32 x 1/8		25 ft.	.25
7½ ft.	.05	210 ft.	.70

PROPELLER ASSEMBLY PARTS

Hubs

Right hand Hubs slotted and drilled for No. 8 MW ¼ x ¾ ..... .03

Right hand Hubs slotted and drilled for No. 12 MW 5/16 x 15/16 ..... .04

2 Bladed Spinners Only No. 3 Blade

Right hand Spinners slotted and drilled for No. 12 MW ¾ dia. x 9/16 ..... .07

Right hand Spinners slotted and drilled for No. 12 MW 1½ dia. x ¾ ..... .10

Right hand Spinners slotted and drilled for No. 12 MW 1¼ dia. x 1⅛ ..... .10

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to write immediately for our new Dealer Prices (Clubs and Manufacturers also) on the complete line of Cleveland Diamond Parts and Supplies. See for yourself if it isn't just THE opportunity you've been waiting for to boost sales with a bang, and make new friends. Don't delay! Rush your request at once—a postal will do! **You'll never regret it—for you'll save plenty.**

Blades

	Per Pr.
Blades for 6½" dia. x 1⅛ Propeller	.05
Blades for 7" dia. x 1¼ Propeller	.05
Blades for 8" dia. x 1½ Propeller	.05

All Blades have tabs which are folded when cementing into hub. This tab is cut off if the blades are to be used in Spinners.

Washers (Bronze)

5/32 dia. to fit No. 5 and No. 8 wire, packed 12 per envelope ..... .04

3/16 dia. to fit No. 12 and No. 14 wire, packed 12 per envelope ..... .04

Bearings Buttons

13/16 dia. x 1/8" (Thin) bearing button ..... .02

13/16 dia. x 1/4" (Thick) bearing button ..... .02

INSIGNIA (Cocards)

	Pr.
Star in circle insignia, 1"	.01
Star in circle insignia, 2"	.02
Star in circle insignia, 3"	.03
Maltese German Crosses, 1½"	.02
Maltese German Crosses, 2"	.02
Maltese German Crosses, 3"	.03
Polish insignias, 1"	.01
Polish insignias, 3"	.03

Many others in No. 11 Price Sheet. Send for it—It's FREE.

NEW LOW PRICES

on the entire Cleveland-Designed Line of Kits of authentic Flying Models—Quality unchanged!

Authentic ¾ in. Scale. Spans Range 15" to 33"			
SF-1: Sport-Trainer	$1.95	SF-14: Fokker Triplane	$1.95
SF-2: Mystery Ship	2.75	SF-15: Fokker D-7	1.95
SF-3: D H 4	2.75	SF-16: Albatross D-3	1.95
SF-4: Curtiss Jenny	2.75	SF-17: L. Bayles's Gee-Bee (1931)	1.50
SF-5: Laird Solution	1.95	SF-18: H. Racer Pete	1.00
SF-6: Polish P-6	2.50	SF-19: Supermarine S6-B	1.95
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SF-8: Boeing P-12 C	2.50	SF-21: Hawk P-6E	1.95
SF-9: SE-5	1.95	SF-22: Akron Fighter F9C-2	1.95
SF-10: Sopwith Camel	1.95	SF-23: Boeing P-26	1.95
SF-11: The Quad	1.95	SF-24: Lockheed Vega	2.75
SF-12: Bishop's Nieuport Scout	1.95	SF-25: Cur. A-8 Attack	2.75
SF-13: Spad 13	1.95		

¾-in. "N" Type Supplies Kits (Do not include drawings)

N-1: Heath Parasol	$1.15	N-3: Monocoupe	$1.40
N-2: Gee-Bee Sup.-Sport	1.15	N-4: Boeing F4B-3	1.40

These prices include 15c service charge

Authentic ⅜-in. Scale. Span 29"

JSF-1005: High Performance Boeing Bomber $1.95

⅜-in. Scale Semi-profile. Spans 27" to 37½"

FL-301: Amphibion	$1.50	FL-303: Pirate Bomber	$1.50
FL-302: Trimotor	1.50	FL-304: Commodore	1.50

Large Outdoor Profile Fuselage Models Spans Range 33" to 36"

FL-201: C. Robin	$1.50	FL-203: C. Bull Pup	$1.50
FL-202: C. Sirius	1.50		

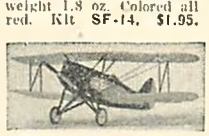
⅜-in. Scale Profile Fuselage Models Spans Range from 10" to 18¾"

FL-101: Two Gliders	$ .75	FL-107: Mystery Ship	$ .75
FL-102: G L Trainer	.75	FL-108: Boeing Mail	.75
FL-103: Fleetster Monoplane	.75	FL-109: (Discontinued)	
FL-104: Boeing P-12	.75	FL-110: Vought Corsair	.75
FL-105: Eaglerock Bullet	.75	FL-111: Lockheed Sirius	.75
FL-106: (Discontinued)		FL-112: Curtiss Falcon	.75

Now Everyone Can Afford to Build Famous "C-D" Models

1917 Richthofen's Triplane
Span 17⅝"; length 13¾"; weight 1.8 oz. Colored all red. Kit SF-14, $1.95.

1930 Howard Racer
Span 15"; length 13¼"; weight 1.3 oz. Colored all white. Kit SF-18, $1.00.



1930 G. Lakes Sport Trainer
Span 20"; length 15¼"; weight 1.5 oz. Colored International orange and black. Kit SF-1, $1.95.

1931 Supermarine S6-B
Span 22"; length over all 21⅝"; weight 2.9 oz. Colored silver and blue. Kit SF-19, $1.95.

All photographs on this page are of actual "Cee-Dee" models. We never use photos of the real ships in advertising our models.

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1. Terms: Strictly cash-with-order. C.O.D.'s not accepted. Postage stamps and foreign coins not accepted. Send postal or express Money orders, or checks. Cash is risky.
2. No order accepted under 50c (plus packing charge.)
3. Prices: Subject to change without notice. All prices include shipping, postfree, but 15c packing and handling charge on all orders for supplies only, **must** be included with every order. ("N" kits already have the 15c charge added.)
4. When ordering, write clearly, especially name and address; use one line for each item ordered.
5. Everything guaranteed to be as represented, or your money refunded. (Return nothing until receiving our written permission.) We assume no responsibility for goods damaged in transit, for we pack securely. INSURANCE 5c EXTRA.

FOR THOSE WHO WANT ALL CURVED PARTS PRINTED ON BALSA

These four Kits contain Balsa Already Printed Out and Numbered. Not simply a few rubber stamped pieces—but all the irregularly shaped parts printed out. This simplifies and authenticates construction—merely cut out numbered parts and assemble right on the drawing.

1932 Curtiss F9C-2

Known as Akron Fighter. Span 19⅛"; length 15¼"; weight 2.2 oz. Silver and blue. Kit SF-22, $1.95.

1932 Boeing P-26

Formerly XP936. Span 20¼"; length 17⅜"; weight 2.5 oz. Colored yellow and olive drab. Kit SF-23, $1.95.

1932 Lockheed Vega

Span 30¾"; length 21"; weight 3.7 oz. Colored red and gold. Kit SF-24, $2.75.

1932 Curtiss A-8

Span 33"; length 24"; wt. 4.7 oz. Colored yellow and olive drab. Kit SF-25, $2.75.

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Ask Your Dealer for "Cee-Dee" Kits

for the Cleveland-Designed Flying Models you want. If he hasn't or can't get what you're after, don't accept substitutes, but order direct.

Handy Order Coupon

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Enclosed is $..... for which please rush items on attached list (or written on page margin):

( ) Copy of Issue No. 2—25c

( ) Sample copy of "CLEVELAND MODEL MAKING NEWS & Practical Hobbies"—25c. (Includes large ¾" scale drawings of '32 Gee-Bee and Heath while they last. 25c creditable against subscription price if second individual copy is not purchased).

( ) Subscription for six issues of C. M. News & P. H. (Including 1st issue) $1. (Saving 50c.)

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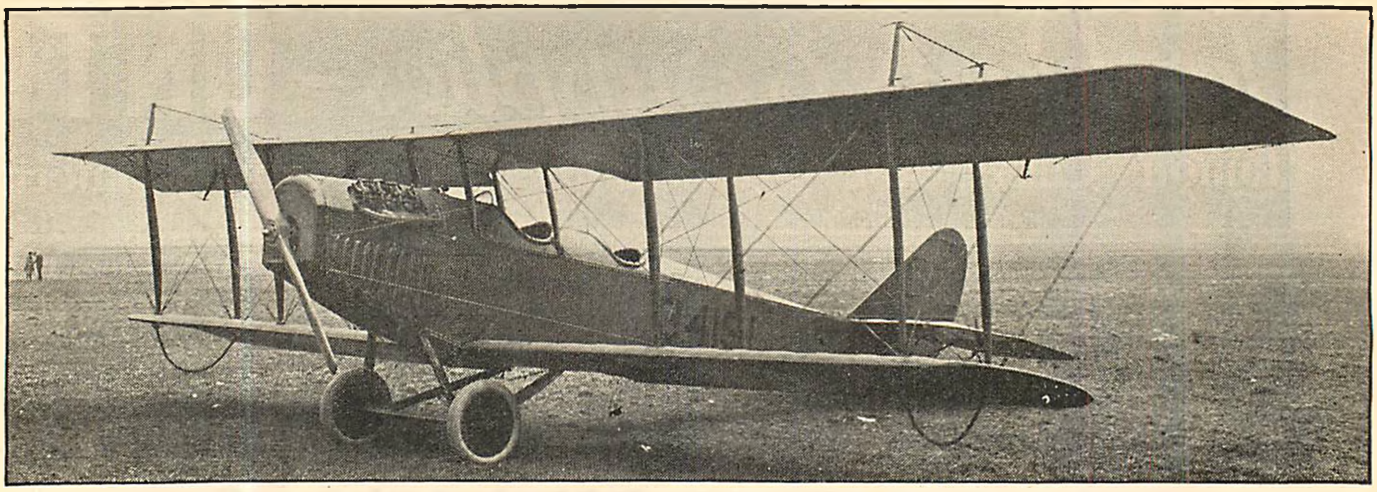


The Curtiss J.N.4 Trainer, which helped to win more American air battles than any other plane.

Fighting Wings

America's Second Living Ace's Own Story of the Part He Played While Making Air-Fighting History During the World War

By Orville H. Kneen

Author of "Flying for Everybody"

PART ONE

CAPTAIN Jacques M. Swaab ("Jack" to his innumerable friends in the U. S. Army Air Corps and elsewhere) is today the second living American Ace of those who trained and fought in the World War with the American forces. Only six American air fighters made as many or more victories, not considering a few who enlisted with the Lafayette Escadrille or other allied squadrons, and thus had an opportunity to pile up victories for a year or two, before American-trained pilots entered the fray.

The 22nd Pursuit Squadron was one of the last of our battle squadrons to be equipped with planes, because of the great scarcity of both training and combat machines. Yet some members of this notable group, such as Captain Swaab, were among the first to volunteer and to be trained in the United States, with final training in France. The 22nd did not see action until September 2, 1918, when First Lieutenant Arthur Ray Brooks shot down a German scout. Captain Swaab went into action September 8th, two months and three days before the Armistice. This brilliant young combat squadron piled up 46 official victories. In our forces, it finally ranked second only to Captain Eddie Rickenbacker's veterans, who had won numbers of victories before the 22nd was organized.

Captain Jack Swaab became Flight Commander of the 22nd in recognition of his skill, daring, resourcefulness and cool-headedness in battle. He is credited with ten of the Squadron's score. He is certain of six more, but these combats took place ten to twenty-five miles inside the German lines, and the required three witnesses could not always be found.

Captain Swaab probably is close to a record for all air forces in number of enemy planes brought down within a period of two months, or for victories per flying hour. Until now he has declined to tell his war story.

Captain Swaab was the first and only pilot known to have brought down three enemy planes in a single combat, on his first encounter with the enemy. He brought down more enemy planes per encounter, more per hour of fighting, than any other pilot.

He shot down more enemies during a given period (forty hours of flight, September 4 to November 4 inclusive, 1918), than any other pilot, with the possible exception of Frank Luke. (It is believed that Rickenbacker's greatest record was two enemy planes in one day.)

He reported seventeen victories all told. Only ten have so far been officially confirmed, this requiring three independent observers (not in the Air Force) who actually witnessed an enemy plane destroyed in the reported region at the reported time. Several victories were so far within the German lines that no Allied confirmation could be obtained.

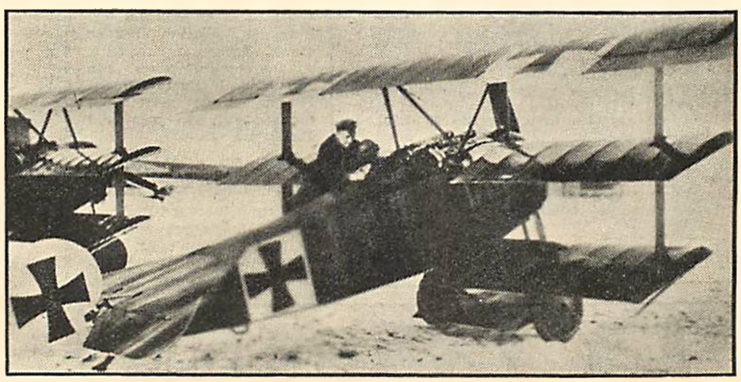
Captain Swaab's Life Today

At 7.25 p.m. one day, after an interview in which he gave some of the facts in this story, at his apartment in New York (bachelor quarters):

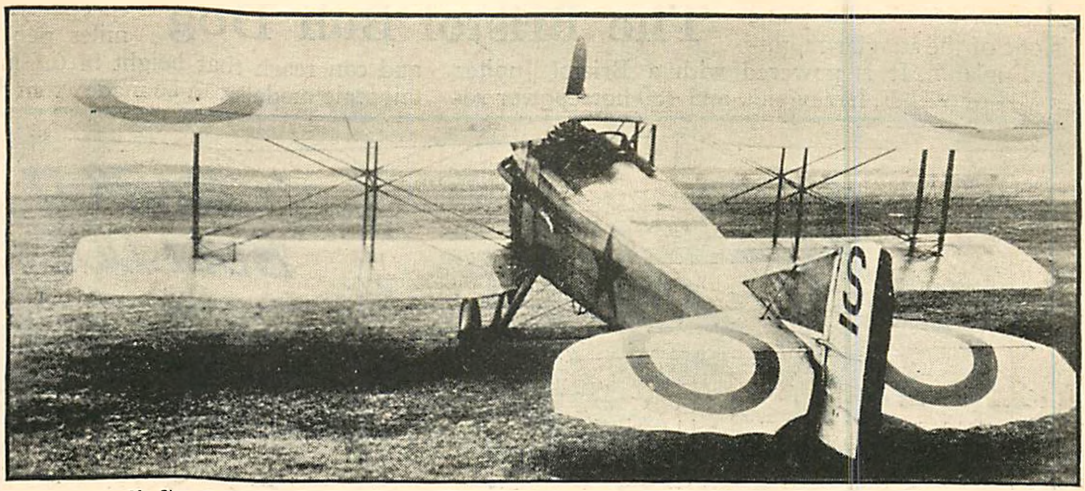
"Sorry to have to leave you, but you see I'm due at a meeting of the Quiet Birdmen at 7:30. Then I have to be in Washington at 10:30 this evening . . . ."

The telephone rang. Said Captain Swaab to the caller, quite casually:

"Yes, call me up at the office in the morning—I'll be there at 10:00 sure . . . ."



Fritz tunes up a Fokker Triplane for a little patrol work. Note the two machine-guns. (Actual War picture.)



A Spad on the battle front. One of the greatest World War fighting ships.

That was not an unusual end of his busy day. New York at 7:30 p.m., fly to Washington for a 10:30 appointment, fly back to New York and at work as usual next morning. Captain Swaab feels that a good war is the only sure way of getting long hours of sleep.

Swaab's good-luck tokens: All aviators have some mascot or good-luck token. While in Paris in August, 1918, Swaab received from a friend a sheet of paper at least 150 years old, with a strange history. The legend was that during a smallpox scare in Europe, some forty years before, the only people not stricken were those who had a copy of this paper on the wall. It was generally credited with preventing bad luck. He had a copy made and carried it with him. It seemed to work, in his case.

He also had a bracelet made from a 20-franc gold piece. The words "Republique de la France" were removed, and his name engraved instead, also the figures "13". He wore it as an identification tag, and it was always to be seen on his wrist.

BACK in 1912, when Jacques M. Swaab was eighteen, every boy wanted to fly, as they all do today: the Wrights were making records; Glenn Curtiss was inventing his "hydroplane"; President Roosevelt had flown the year before; E. B. Ely had shown, at risk of his neck, that an airplane could alight on a battleship's deck; Lincoln Beachey flew over Niagara Falls and down through its misty gorge.

Young Jack determined to fly. He had to build his own plane and so he began with an old auto engine. With some pictures of airplanes and such advice as could be found, he and another lad built their small biplane in the basement of the family garage. It had a span of twenty-four feet. They took it apart and out to Mineola, Long Island, where all New York planes were flown—if they would fly.

Jack's plane refused to rise. The first run ended against a stone wall. He took it back to the garage, rebuilt it, and a month later it did take the air. The young pilot, never before aloft, got up to 300 feet!

"It was the biggest shock of my life!" he declares; or perhaps his first rough landing after circling the field, gave him his biggest shock. But he went up again, and that first day gave him twenty minutes of real flying.

His parents had let him alone, thinking he would fail and then forget about it. This was something else again! His father told him "it was his own neck" he was risking. His mother objected. But they gave in to the extent of allowing him to fly all that summer and fall.

He got in about seventy hours in the air without serious injury, then went off to school and did not fly again till the war, five years later. Beyond doubt it was this first mastery of the air that enabled him to fly and fight so well against the Germans. His early training gave him confidence and probably saved his life when, during his most exciting combats, flying had to be automatic while he fought the enemy.

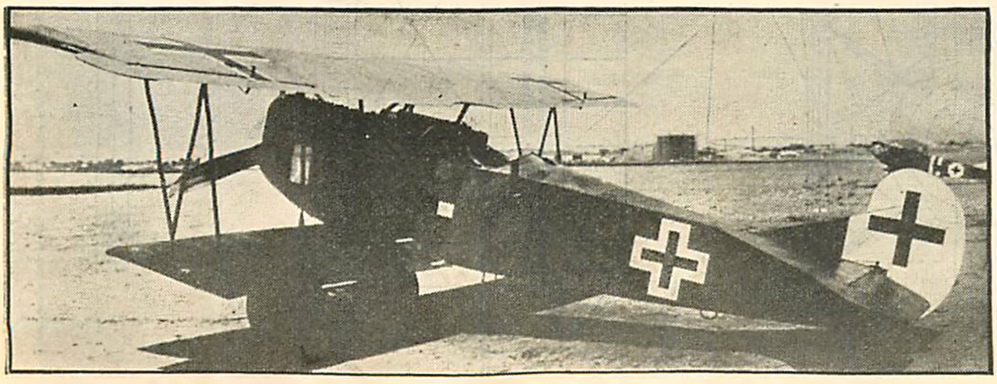
When war was declared Jack at once enlisted in the "Aviation Section of the Signal Corps," as it was then called. He trained on the early "Jennies," at Wilbur Wright Field, Dayton, Ohio. There he was fortunate enough to be invited to dinner with Orville Wright, pioneer of flight, and his sister Katharine.

He had some nineteen hours of training in the air. He never told of having flown his own airplane five years previously. Finally, with other recruits, he went to Garden City, Long Island, and from there took the "Tunisian" across, without meeting any submarines.

THE war was going badly for our Allies. The young American fliers found the British discouraged, the French even more so. "Too late," they all said.

But the French received the dashing *Americains* with open arms. From the lovely little village of St. Maixent young Swaab was ordered to Issoudun flying field, soon to become the largest and finest *chasse* school in the world. But oh, how muddy!

It was April, 1918, before he was being trained for real aerial combat. The early training was on the queer little French *rouleurs,* ships which did not take the air because their wings were "clipped." Then came aerial gunnery in which hits were made by camera shots instead of bullets, the position of the "enemy" plane on your film showing whether you would have hit him with a machine gun—or not.



One of the well-known German Fokker D VIIs at the front.

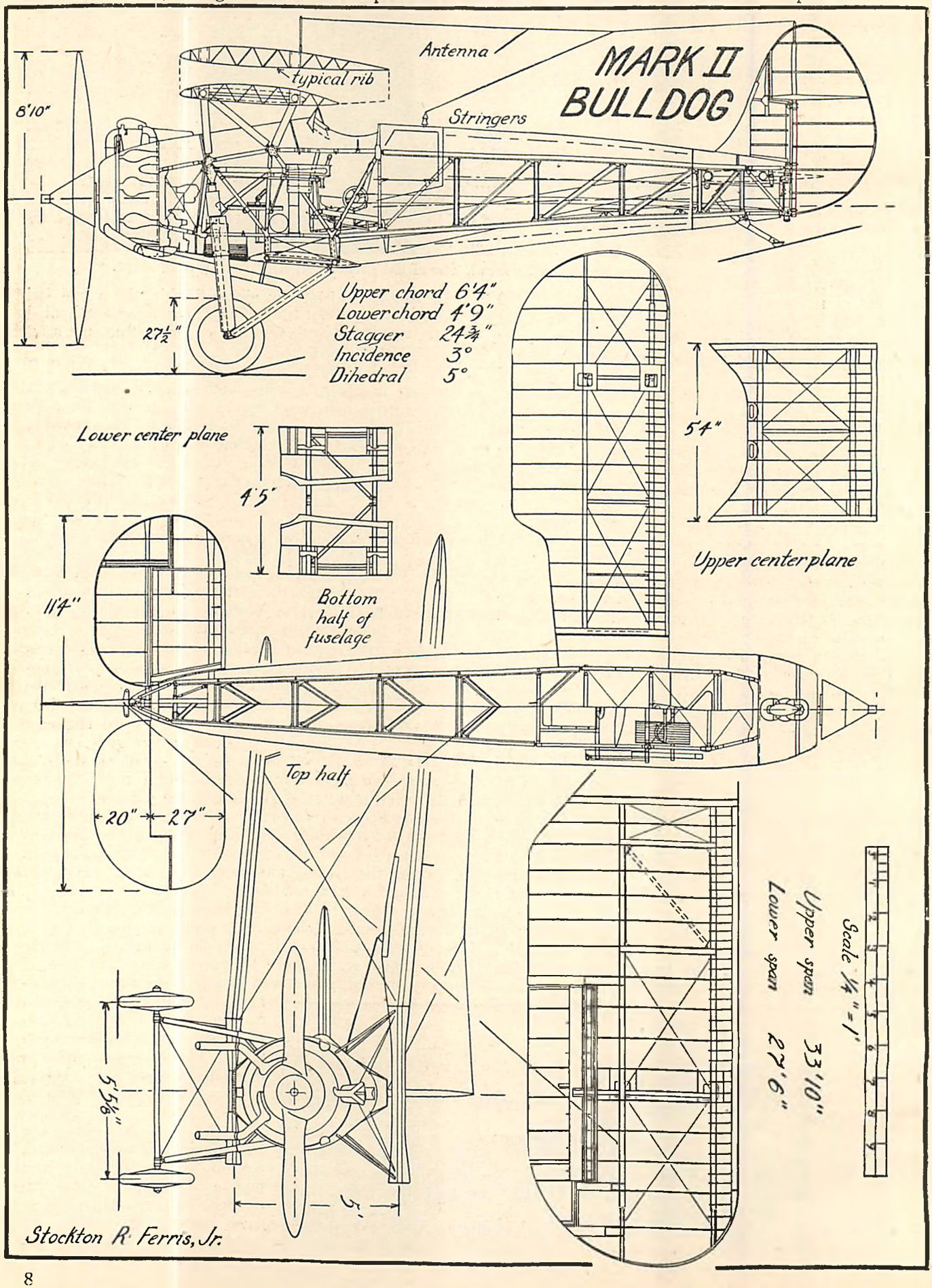
Once Swaab was sent up by the instructor, who intended to "ride his tail" and show the class how it was done. Instead, Swaab got on *his* tail, and made sixteen perfect "hits," to the instructor's none!

If he was inclined to be "cocky" about this, he got

(*Continued on page* 43)

The Bristol Bull Dog

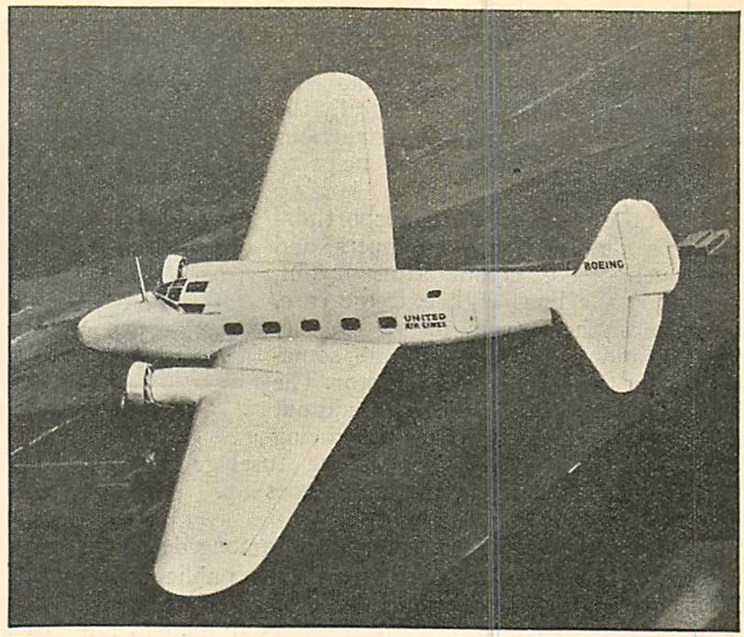
THIS British pursuit plane is one of the standard fighters of England. It is powered with a Bristol Jupiter Series VII or VII F, having 420 and 480 horsepower respectively. It has a speed of 177 miles per hour at 10,000 feet, and can reach that height in 6.7 minutes. Beautiful detail scale models can be made from these plans.



Reflections of an Airplane Designer

Important Points the Designer of Transport Planes Must Consider in Order to Insure Efficient Operation and Passenger Comfort

By Alexander Klemin
Prof. of Aeronautical Engineering, N. Y. U.

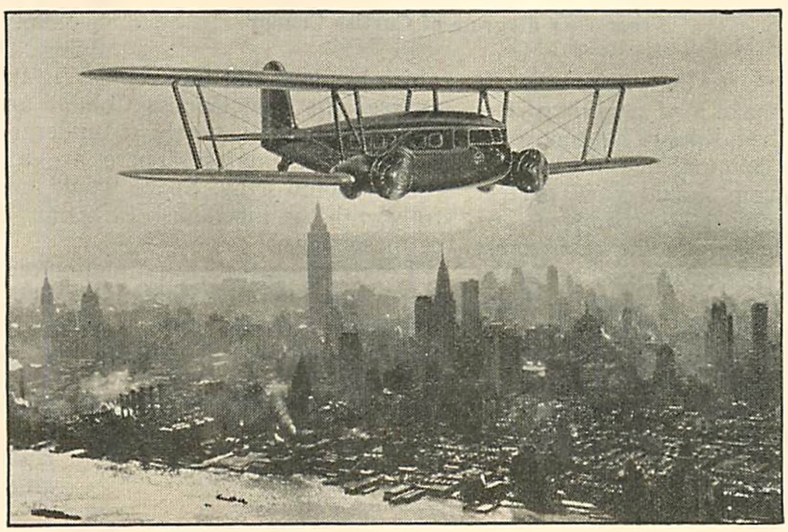


The latest Boeing Transport shows clean lines and high speed

PART ONE

BACK in the early days of flying, some years before the war, the writer of this article flew with Howard Rinehart (one of the Wright Brothers' first students) in a Wright Biplane. The passenger had to sit in a chair placed on top of the lower wing, with absolutely no protection in the way of cockpit or windshield. There was no safety belt; safety belts were regarded in those days as savouring slightly of cowardice. A wing strut was indeed conveniently handy to the chair, and this the passenger usually grasped with affection. Fortunately the weather was good, the biplane steady and Howard very considerate of the novice taking his first flight. At one time the slow machine encountered a stiff head-on wind, and appeared to hover over one particular spot, and that spot a church steeple. The steeple looked sharp indeed, and the adjoining graveyard somehow appropriate.

While the airplane is unchanged in its basic principles, remarkable progress has been achieved since those days and modern air travelers would be horrified if they had to fly in such primitive craft as the early Wright planes. Fifty miles an hour was then considered fast. To-day a number of transport planes, either built or in process of construction have top speeds of over 200 miles per hour, and passengers travel in all the luxury of a Pullman car.


The new Curtiss Condor carries fifteen passengers, at 175 m.p.h., with comfort

How Progress Has Been Realized

If the airplane has not changed in basic principle, how has such improvement been achieved in this relatively short space of time?

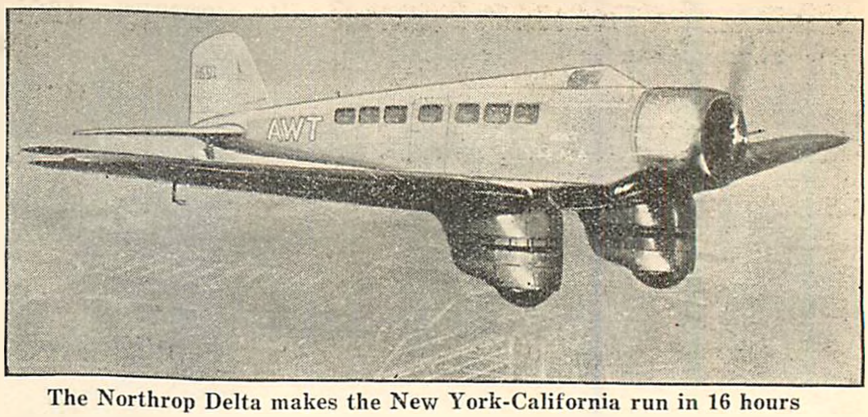
The engine has grown immensely in power, and by refinement in design, become unbelievably light for a given power. A steam engine at sea weighs several hundred pounds per horse-power; a motor boat engine, rugged and sturdy, will weigh 10 to 15 pounds per horse-power; an automobile engine of 40 horse-power may weigh over 300 pounds. The modern aircraft engine weighs only a little over a pound per horse-power! So the airplane designer has at his disposal an extremely efficient, light and powerful source of energy.

THE early propellers were all of wood. They had of necessity thick blades, particularly at the root. Now the propellers are of metal, made of solid duralumin or hollow steel section. With the greater strength of metal, it is possible to make the blade elements quite thin in proportion to their width. At the tip the sections of a propeller are almost knifelike. The result is that the modern propeller may have an efficiency of 85 per cent; that is for every 100 horse-power developed by the engine, 85 horse-power goes into useful work pulling the plane through the air. In the early days, 70 per cent efficiency was considered quite good and a difference of 15 per cent in the propeller efficiency means a saving of 105 horse-power in a 700 horse-power engine.

Still another source of advance has been in ridding the airplane wing of the tangle of struts and wires which characterized pioneer planes. Now even in a biplane, the external bracing (as struts and wires are called) have been reduced to the absolute minimum. Sometimes when a single or monoplane wing is employed, the external bracing disappears completely. The wing is then tapered, that is, gradually thickened and widened from tip to the root or point of attachment to the fuselage. A little reflection will show that the cumulative effect of the air forces is greatest at the root, and it is precisely here that the wing

is thickest and strongest. Thus the tapered "cantilever" monoplane is every bit as strong as the old-time wing with its many struts and wires. Naturally the absence of all external obstructions reduces the air resistance and helps to increase the speed.

When the fuselage of a transport airplane is designed, the engineers and draftsmen make layout after layout, smoothing the lines with extreme care. Sometimes they even resort to clay models, and use eye and thumb somewhat after the manner of a sculptor. The lines of the fuselage are in fact laid out with as much care as the lines of a racing yacht. The final result is that the fuselage is truly "streamlined" and again the speed goes up.



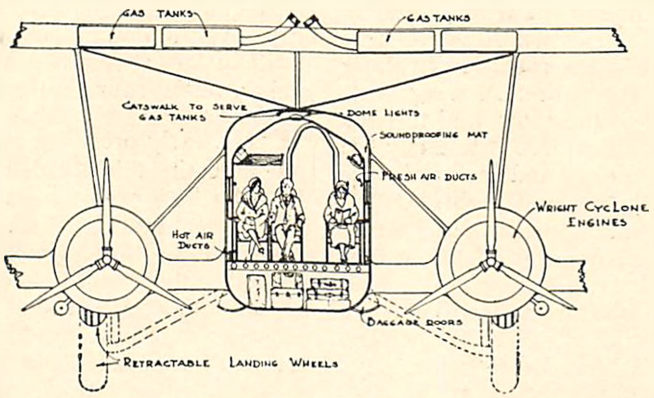
The Northrop Delta makes the New York-California run in 16 hours

THERE is to-day keen competition among designers in the question of speed, which the public insists upon quite rightly. In the short space of about five years cruising speeds have risen from 125 miles an hour to 175 miles per hour, and no one can predict where the race for speed supremacy will stop.

It is the skilful combination of all the above elements that has given us the higher speed. But a great deal more is required of the air transport designer than just speed.

What the Passenger Should Have

First of all, the passenger cabin should be adequately heated and adequately ventilated. This is no easy problem considering that the plane may fly over a Western desert with an external temperature of ninety to a hundred degrees, or sail over the rockies in the bitter cold of winter plus high altitude. There must be no exhaust gas admitted to the cabin, no smell of oil. The vibration must be reduced to a minimum and so must the noise. The chairs must be comfortable and adjustable to make long periods of flying more pleasant. There must be adequate lighting, with individual lights if possible. A lavatory and wash room must be provided. The passenger should have perfect vision. What is the use of flying over the broad spaces of the continent, if they cannot be seen? The cabin must give a feeling of ruggedness and spaciousness, yet at the same time no structural members must obtrude themselves on the passenger's consciousness. The cabin must be a good example of the interior decorator's art, neither too ornate nor yet too severe. And all this must be combined with light weight of all cabin furnishings and accessories, since every pound employed in furnishings is so much commercial pay load lost.



Front view diagram of Curtiss Condor

Members of the public who have never or rarely traveled by air, are always a little nervous of airsickness. Somehow while seasickness or airsickness are neither dangerous nor painful, they are ignominious. Every one is ashamed of possible resort to an airsickness container. Fortunately statistics show that not over 2 or 3 per cent of air passengers ever suffer from airsickness. Moderately good weather, a steady plane, and a skilful pilot are excellent precautions against airsickness, but medical men tell us that perfect ventilation, absence of noise and vibration are equally essential. Hence the stress laid on these items, apart from their effect on the general feelings of the passenger.

An Excellent Modern Transport

THERE are several splendid and thoroughly modern transports now available or in process of construction, as we have stated previously. Our photographs show, with some details of each, the Northrop Gamma (see drawing page 21), which the famous pilot, Captain Frank Hawks, will use for his experimental high speed flying; the Northrop Delta, which has been put into regular 16-hour transcontinental service; the new Curtiss Condor and the Boeing twin engine transport shortly to undergo its trial flights at Seattle, Washington. There are a number of others equally noteworthy. Space would not permit us to deal fully with the ingenious devices and skilled construction of these ships.

Let us concentrate our attention on the Curtiss Condor, which has already rendered much useful service on American airlines, and of which the latest version is even now successfully undergoing its trials at St. Louis. It is shown flying over the skyscrapers of Manhattan, and is a thoroughly representative type.

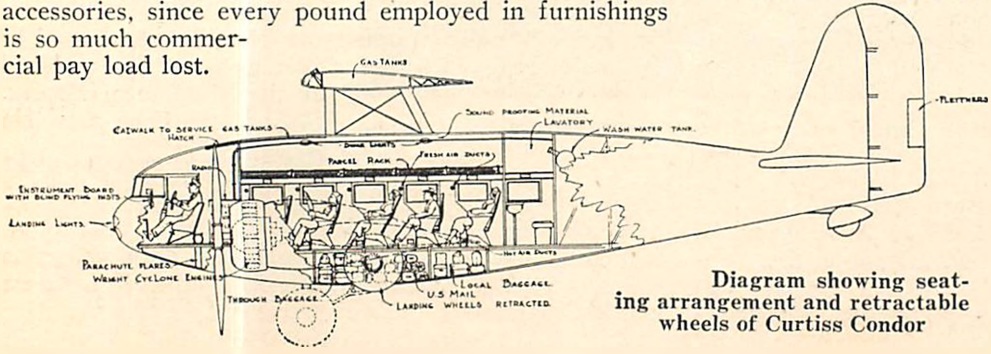


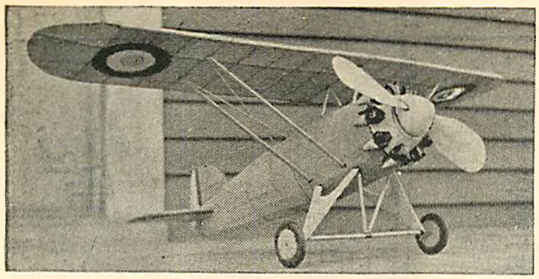
Diagram showing seating arrangement and retractable wheels of Curtiss Condor

The Specification of the Curtiss Condor

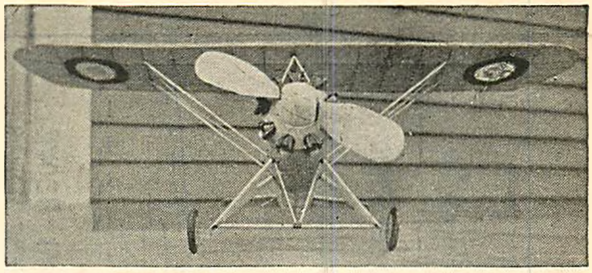
WE have explained in a previous article the importance and significance of the specification. Let us set down the specification of the Condor:

Length overall	48 ft., 10 in.
Height overall	16 ft., 1 in.
Wing Span	82 ft.
Wing area	1208 sq. ft.

(*Continued on page* 44)



The completed model is very realistic and an excellent flyer



Just like the large ship, with bracing, shock absorbers, and engine.

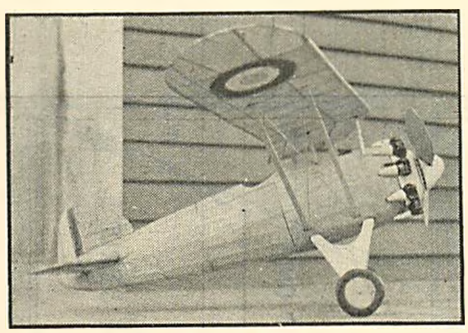
Building the Morane-Saulnier "Pursuit"

Patience While Building This Model Will Give You a Flying Replica of a Modern French Pursuit Ship

By Richard Rioux

FRANCE is air-minded; there is no doubt about it. The French Air Force is one of Europe's best policemen. You should make a comparison of the foreign planes with those of this country.

The first of the modern French pursuit ships to come before the model builders of America was the Bernard C1, then the Dewoitine D27-C1, which the skillful French pilot, Marcel Doret, so cleverly demonstrated at the National Air Races in Chicago in 1930. Now I take the privilege to present to the readers of UNIVERSAL MODEL AIRPLANE NEWS, the Morane-Saulnier Type 221-C1 pursuit ship. The makers of this stubby little job have been making monoplanes for years; the World War saw many ancestors of this plane. The real ship is powered with a Gnome-Jupiter 650 horsepower motor, and "grabs altitude like a homesick angel."



This model will "grab" an altitude of seventy-five feet

The Fuselage

The fuselage of this model is rather difficult to build, but is very light. It looks bulky, though it is well streamlined. First cut the formers of 1/16" balsa veneer as shown in Figs. 3 and 5. There are no main longerons, the formers are separated by stringers only. The stringers are numbered from the top clockwise around the fuselage. Put stringers 1, 5, 9 and 13 in place first. Then add stringers 3, 7, 11 and 15 in place and line up the fuselage. Between formers E and F, near the positions of the stringers 3, 7, 11 and 15, place beams of 1/8" x 1/4" balsa. These beams will absorb the shock of the landing gear and wing. Between formers E and L are diagonal struts meeting the formers at the junction of stringers 3, 7, 11 and 15. Stringers 2, 4, 6, 8, 10, 12, 14 and 16 run back to former L and end there. Notice the numbering of the formers L and K in Fig. 5. In back of former H and just above stringers 5 and 13, place the rear hook base. This base is made of 1/8" x 1/4" balsa, a rear hook of *No. 10 music wire* is securely mounted in the center of it.

Cover the top of the fuselage between stringers 3 and 15 with smooth 1/64" veneer. Cover as far back as former H. The rest of the nose to a short distance past former F is covered the same way. Veneer covering is not as hard as it seems and it looks great; making the model resemble its metal-clad big brother. Make the tail-piece N of soft balsa and bore three holes through it to lighten it. Now finish covering the fuselage. I use superfine, but that is optional.

Landing Gear

THE hardest part is completed and you must be anxious to finish; so here goes.

Plane down a piece of 1/4" veneer to 3/16" thick. Cut the two pieces 3 1/4" long and 2 1/2" wide and shape to the form of P in Fig. 5. Sand the edges round and do the same with pieces Q and T (see Fig. 6). Prop the fuselage up and cement the pieces P in place. Spread them with piece Q and brace with pieces T, from the center of Q to the front of P. See detail in Fig. 1. Make the axles, Fig. 1, and skid, Fig. 2, of No. 10 music wire. While the fuselage is propped up cement these parts in place. Cut 2 wheel centers of 1/8" stock and 4 sides of 1/16" veneer, see Fig. 7. Cement parts together, sand edges round, and attach brass bushings to each side of each wheel. Mark the tire lines on with a compass and place the wheels on their axles. The model can now stand on its own "feet."

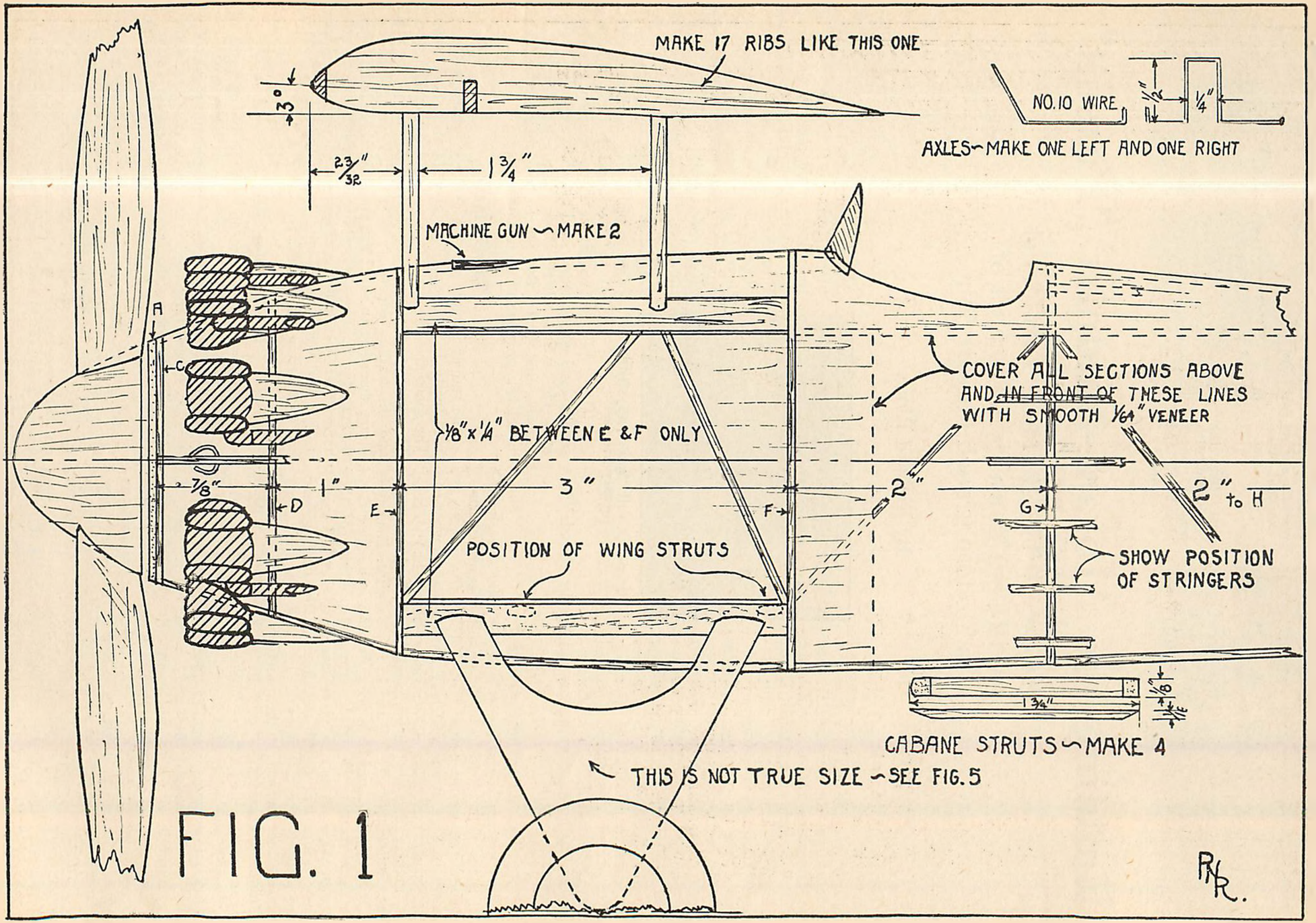
Tail Surfaces

The rudder is built up of 1/16" x 1/8" balsa and outlined with 1/32" square bamboo. Cover both sides. The spars and ribs are composed of 1/16" x 1/4" stock. The leading edges are shaped from 1/8" x 1/4" material and the trailing edges of 1/8" x 1/16" strip. The tips M are shaped from soft balsa and have three holes bored through for lightness. (See Figs. 2 and 5.) Cover the halves of the stabilizer and cement in place as shown in Fig. 2, bracing them with the 1/16" x 1/32" bamboo struts from the rudder.

Motor, Etc.

The motor may be made up of balsa cylinders or of a 3" diameter celluloid motor. The exhaust stacks can be made of radio spaghetti or aluminum tubing. The cylinder streamlining pieces are made of balsa. Don't be afraid of making the nose heavy because you will probably have to add lead to (*Continued on page* 39)

Editor's Note—When you desire a true scale model, construct the tail surfaces as shown by the heavy black lines. However, if you wish a model of superior flying quality, construct the tail surfaces as indicated by the dotted lines on the plans. I suggest also that you set the stabilizer at a positive angle of incidence of one degree positive. (Front edge raised about 1/16" above horizontal position.)


MAKE 17 RIBS LIKE THIS ONE
3°
NO. 10 WIRE
1/2"
1/4"
AXLES ~ MAKE ONE LEFT AND ONE RIGHT
23/32"
1 3/4"
MACHINE GUN ~ MAKE 2
A
C
1/8" x 1/4" BETWEEN E & F ONLY
7/8"
1"
D
E
3"
F
2"
G
2" to H
COVER ALL SECTIONS ABOVE AND IN FRONT OF THESE LINES WITH SMOOTH 1/64" VENEER
POSITION OF WING STRUTS
SHOW POSITION OF STRINGERS
1 3/4"
1/8"
3/16"
CABANE STRUTS ~ MAKE 4
THIS IS NOT TRUE SIZE ~ SEE FIG. 5
FIG. 1
RNR.

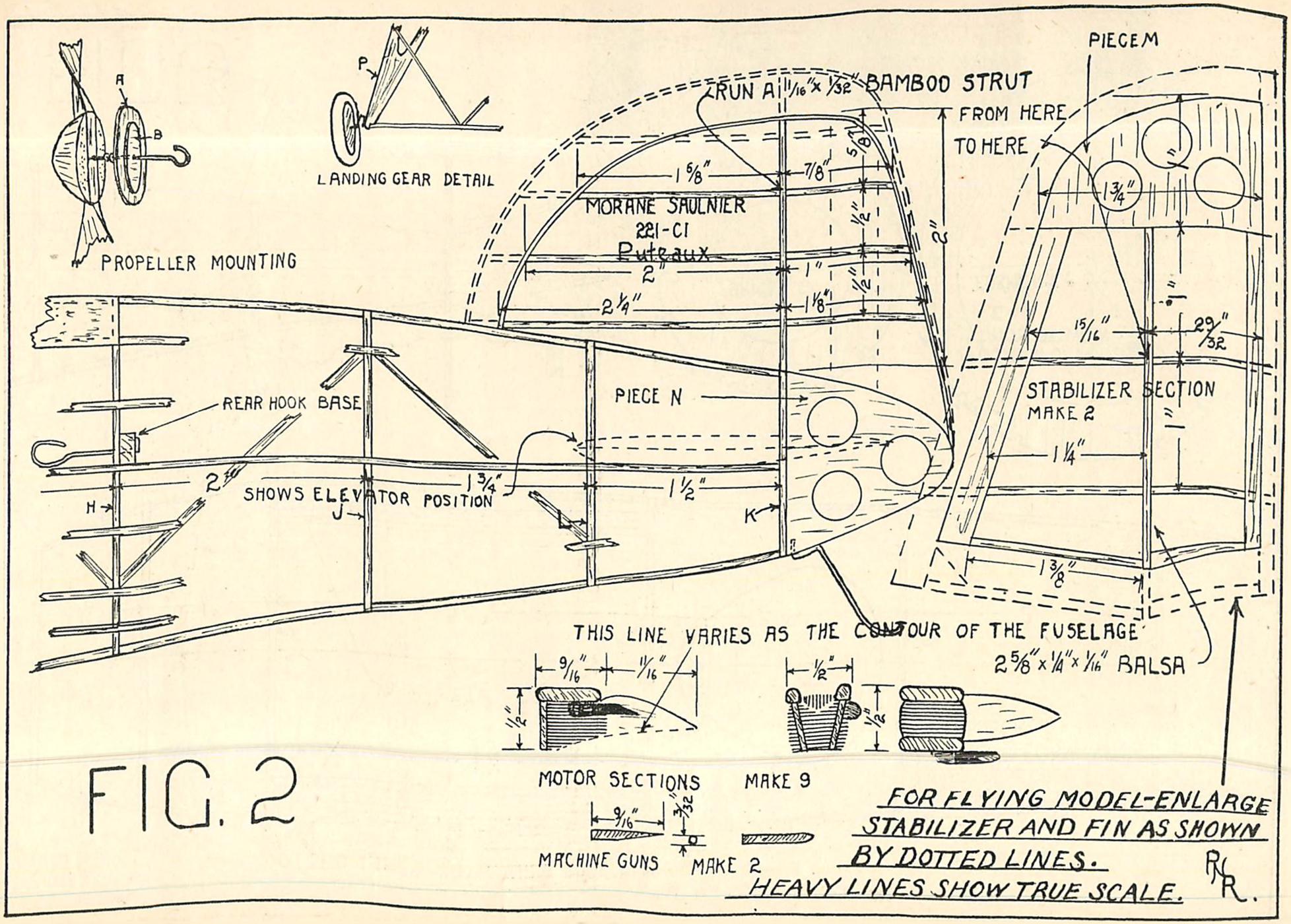

A
B
PROPELLER MOUNTING
P
LANDING GEAR DETAIL
RUN A 1/16" x 1/32" BAMBOO STRUT
FROM HERE
TO HERE
PIECE M
1 5/8"
7/8"
5/8"
1/2"
MORANE SAULNIER
221-CI
Puteaux
2"
1"
2 1/4"
1 1/8"
1/2"
2"
1 3/4"
15/16"
29/32"
1"
STABILIZER SECTION
MAKE 2
1 1/4"
REAR HOOK BASE
PIECE N
2"
1 3/4"
SHOWS ELEVATOR POSITION
1 1/2"
H
J
K
1 3/8"
THIS LINE VARIES AS THE CONTOUR OF THE FUSELAGE
2 5/8" x 1/4" x 1/16" BALSA
9/16"
1/16"
1/2"
1/2"
1/2"
1/2"
MOTOR SECTIONS
MAKE 9
9/16"
3/32"
MACHINE GUNS
MAKE 2
FOR FLYING MODEL-ENLARGE
STABILIZER AND FIN AS SHOWN
BY DOTTED LINES.
HEAVY LINES SHOW TRUE SCALE.
R.R.

FIG. 2

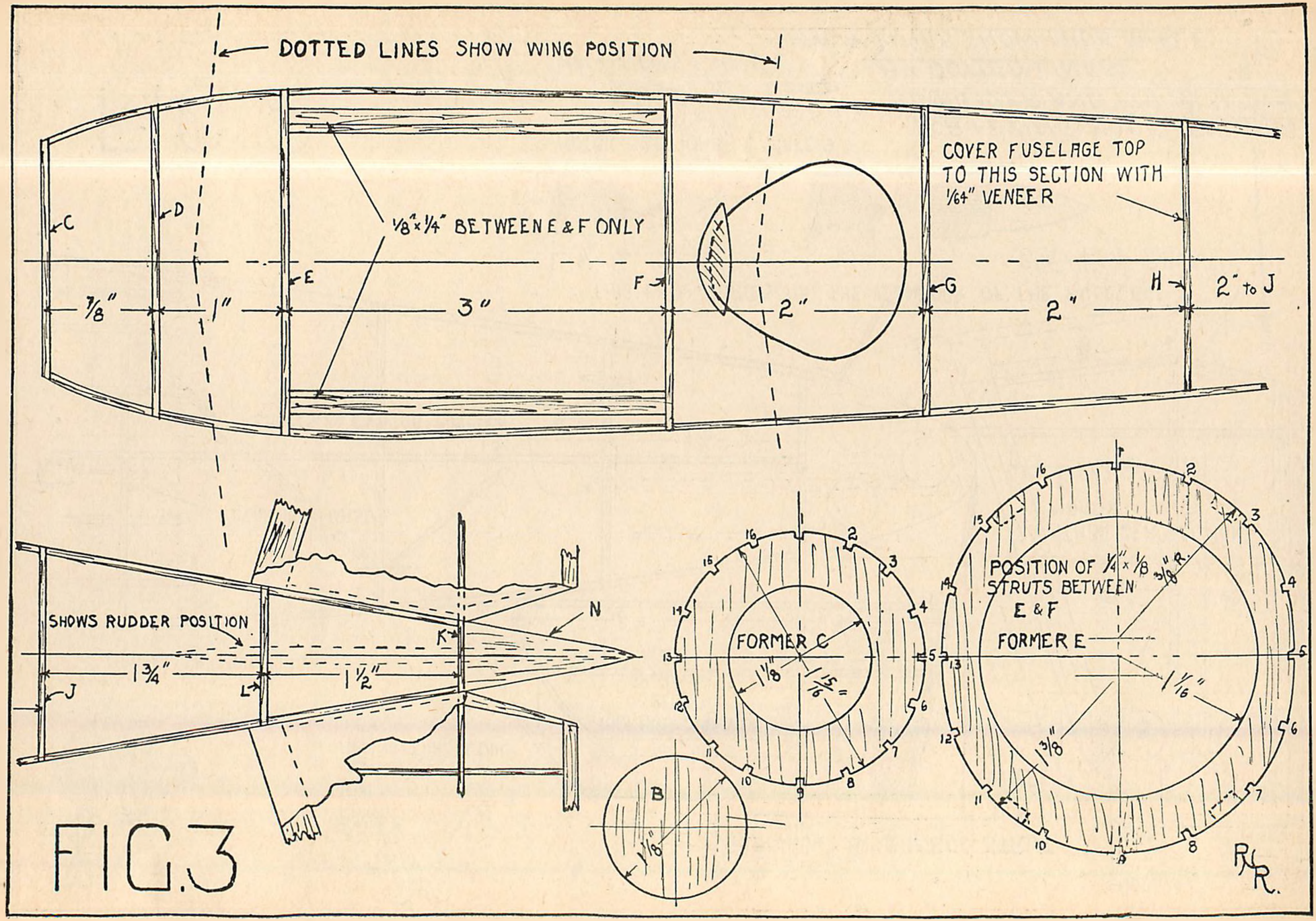
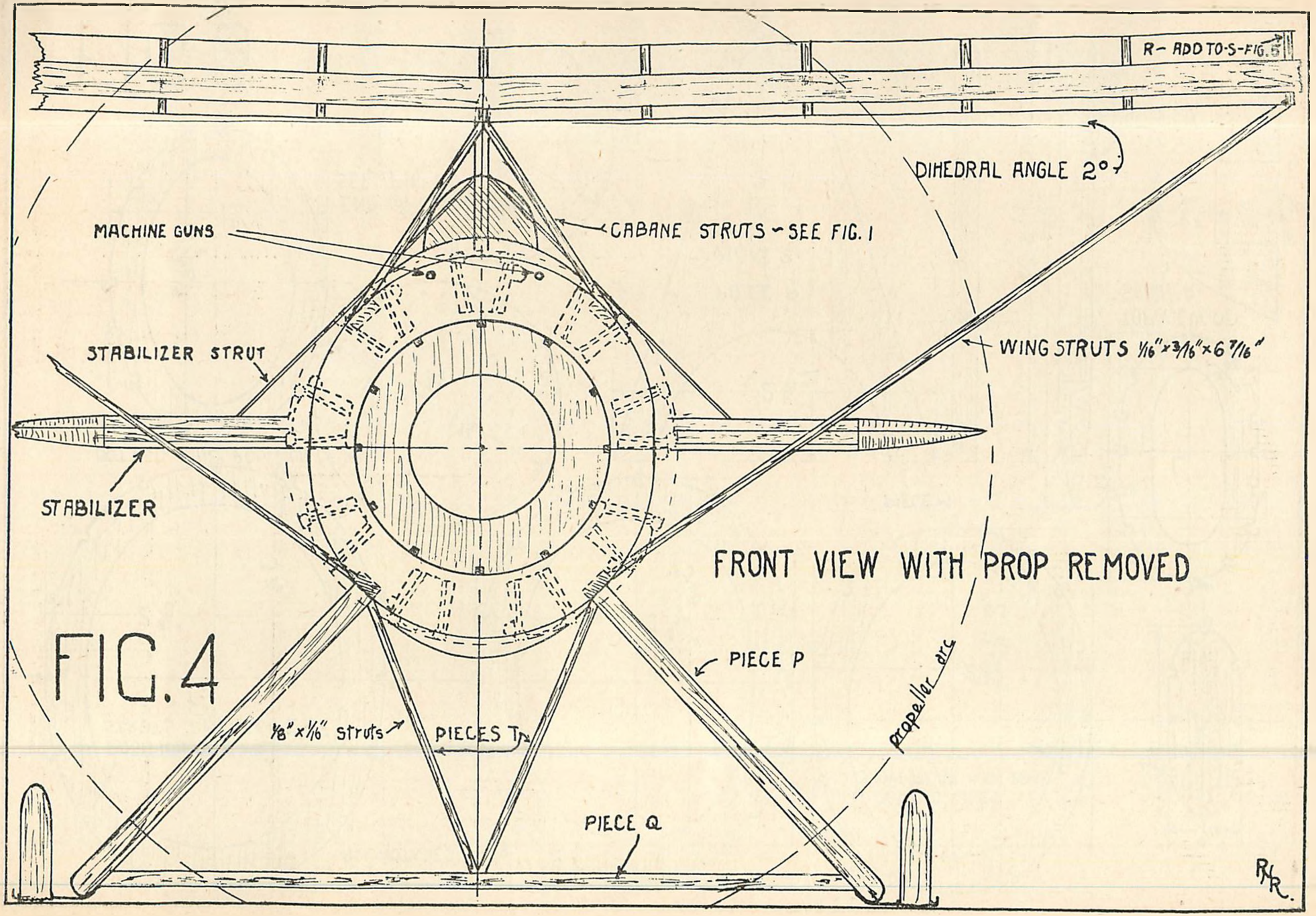

DOTTED LINES SHOW WING POSITION
COVER FUSELAGE TOP TO THIS SECTION WITH 1/64" VENEER
1/8"x1/4" BETWEEN E & F ONLY
C
D
E
F
G
H
2" to J
7/8"
1"
3"
2"
2"
SHOWS RUDDER POSITION
N
K
L
J
1 3/4"
1 1/2"
FORMER C
1 1/8"
1 5/16"
B
1 1/8"
POSITION OF 1/4" x 1/8" STRUTS BETWEEN E & F
3/8" R.
FORMER E
1 1/16"
1 3/8"
R.L.R.

FIG. 3


R- ADD TO S-FIG. 5
DIHEDRAL ANGLE 2°
MACHINE GUNS
CABANE STRUTS - SEE FIG. 1
STABILIZER STRUT
WING STRUTS 1/16" x 3/16" x 6 7/16"
STABILIZER
FRONT VIEW WITH PROP REMOVED
FIG. 4
PIECE P
propeller arc
1/8" x 1/16" struts
PIECES T
PIECE Q
R/R.

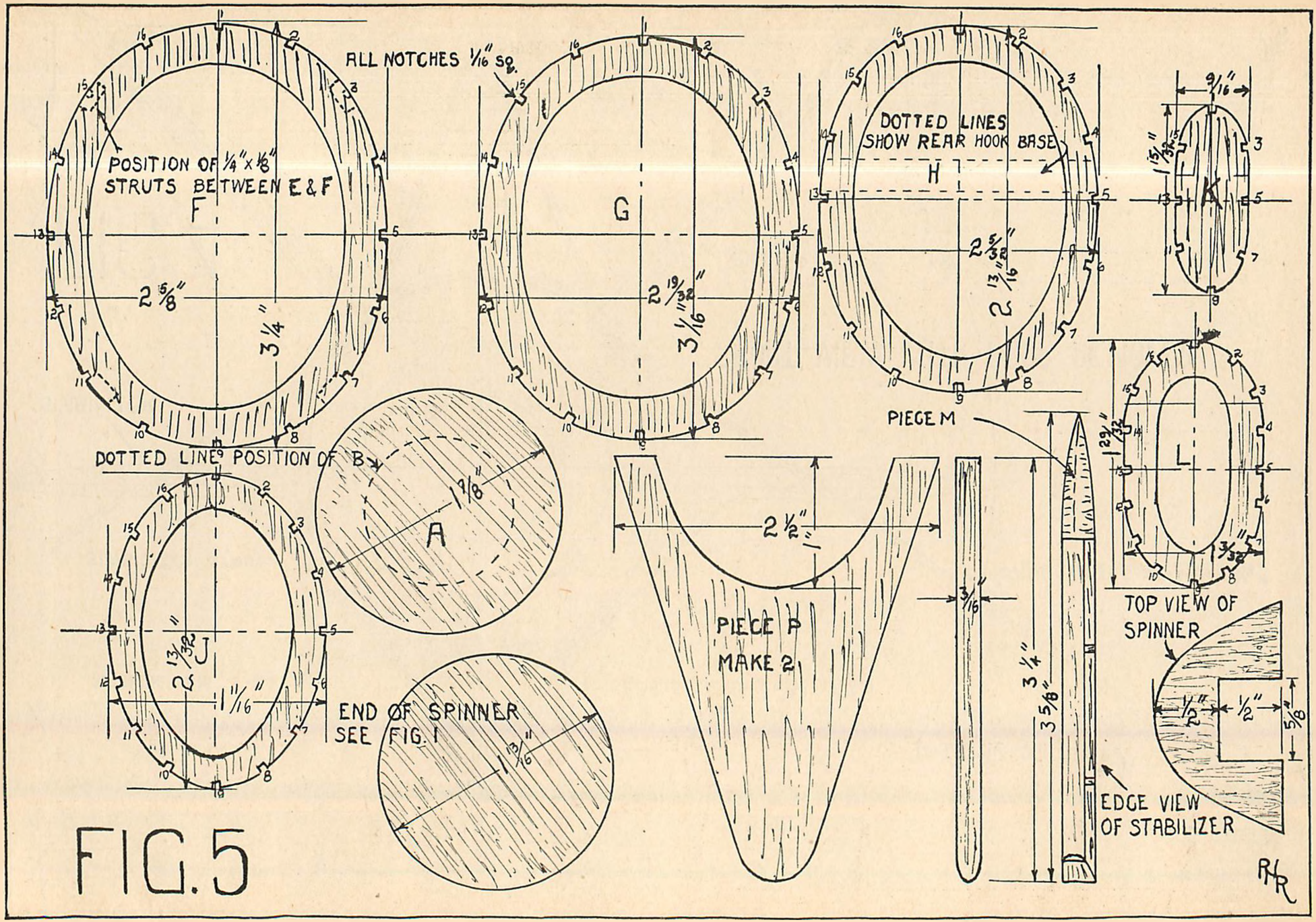

ALL NOTCHES 1/16" SQ.
POSITION OF 1/4" x 1/8" STRUTS BETWEEN E & F
F
2 5/8"
3 1/4"
G
2 19/32"
3 1/16"
DOTTED LINES SHOW REAR HOOK BASE
H
2 5/32"
2 13/16"
9/16"
1 15/32"
K
1 29/32"
L
3/32"
DOTTED LINE POSITION OF B
A
1 1/8"
J
2 13/32"
1 1/16"
END OF SPINNER SEE FIG. 1
1 13/16"
PIECE M
2 1/2"
PIECE P MAKE 2
3/16"
3 1/4"
3 5/8"
TOP VIEW OF SPINNER
1/2"
1/2"
5/8"
EDGE VIEW OF STABILIZER
RHR

FIG. 5

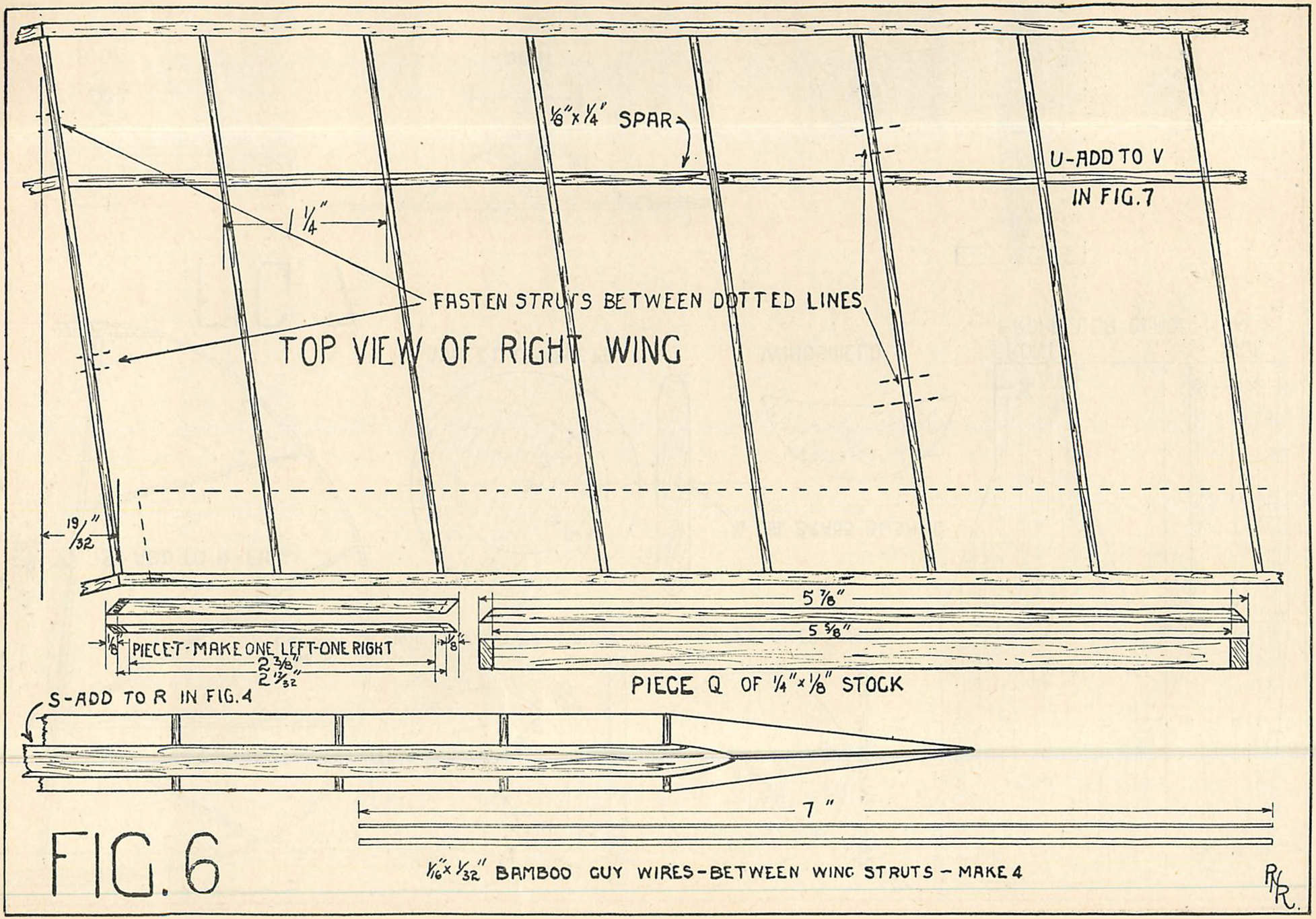
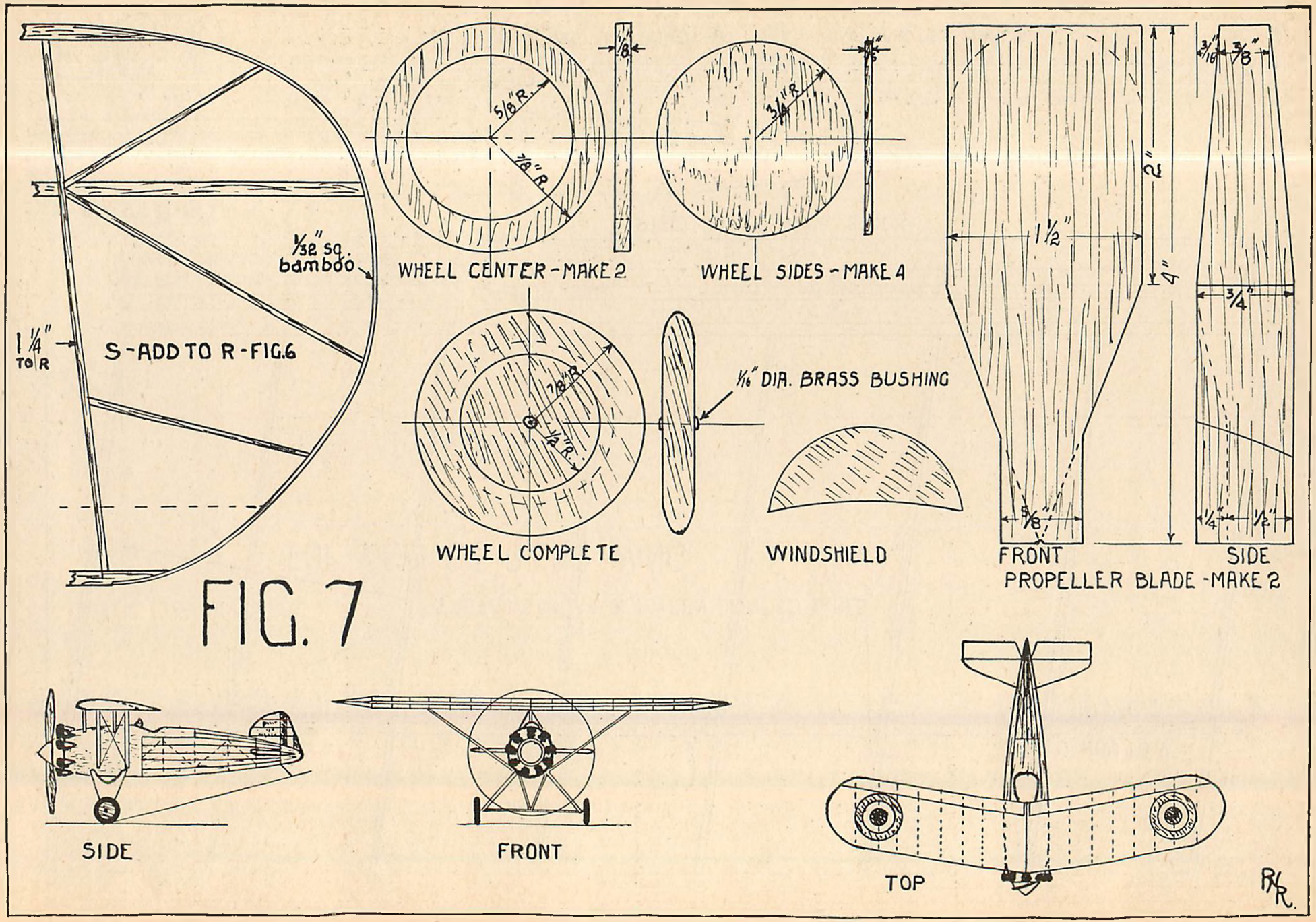

1/8" x 1/4" SPAR
U-ADD TO V IN FIG.7
1 1/4"
FASTEN STRUTS BETWEEN DOTTED LINES
TOP VIEW OF RIGHT WING
19/32"
PIECE T - MAKE ONE LEFT-ONE RIGHT
1/8"
2 3/8"
2 13/32"
5 7/8"
5 5/8"
PIECE Q OF 1/4" x 1/8" STOCK
S-ADD TO R IN FIG.4
7"
1/16" x 1/32" BAMBOO GUY WIRES - BETWEEN WING STRUTS - MAKE 4
RR.

FIG. 6


1/32" sq. bamboo
1 1/4" TO R
S - ADD TO R - FIG. 6
5/8" R.
7/8" R.
1/8"
WHEEL CENTER - MAKE 2
3/4" R.
1/8"
WHEEL SIDES - MAKE 4
7/8" R.
1/2" R.
1/16" DIA. BRASS BUSHING
WHEEL COMPLETE
WINDSHIELD
1 1/2"
2"
4"
5/8"
FRONT
3/16"
3/8"
3/4"
1/4"
1/2"
SIDE
PROPELLER BLADE - MAKE 2
FIG. 7
SIDE
FRONT
TOP
R/R.

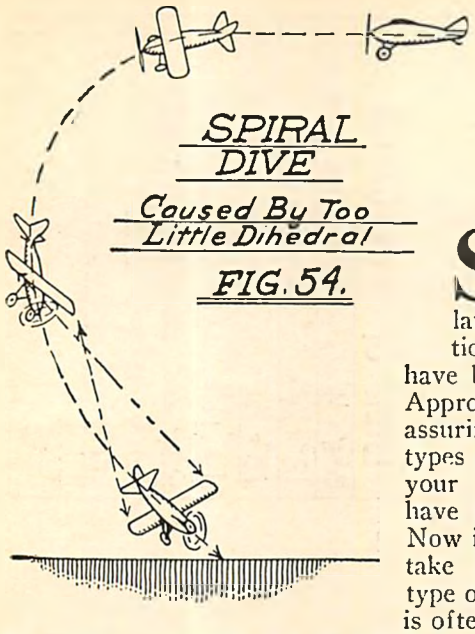


FIG. 54.

The Aerodynamic Design of the Model Plane

Spiral Stability and How You Can Build it Into Your Models. Also, the First Considerations of Longitudinal Stability, the Jinx of the Model Builder

By Charles Hampson Grant

ARTICLE No. 14 CHAPTER III

SO far in our discussion of stability, the lateral and directional varieties have been considered. Appropriate ways of assuring these two types of stability for your model planes have been suggested. Now it is necessary to take into account a type of stability which is often overlooked. It is, in fact, a combination of lateral and directional stability, and is called *Spiral Stability*.

Probably the best way to have you understand the character of this type is to call attention to certain incidents I am sure you have experienced with your model planes at one time or another.

You have finished a scale model after long hours of patient work. You wind it up for its first flight and proceed to launch it in correct fashion. With great expectancy and awe you watch your model as it gets under way, climbing at a normal gentle angle. Then as you scan it with critical eye you see the plane bank or tilt to the right or left as chance dictates. The normal and hoped-for reaction of the plane to this maneuver is a slide sideways, resulting immediately in an action which rights the plane, but on this occasion, the ship continues to slide sideways, from which action a turn naturally results.

You notice now, while holding your breath, that the nose drops and the turn becomes tighter. At the same time the bank becomes steeper. All this develops into a tight spiral which usually ends with a nose dive into old mother earth, Fig. No. 54. If the ground is well padded, everything may be well for another flight,—with the same resulting spiral in evidence of incorrect design. However, such a maneuver often results in splinters and mangled haywire. What is the trouble? You ponder long hours, usually without a solution to the problem presenting itself. What is the matter with the plane? It has no spiral stability!

The answer is simple, but what of the cure? That is also easily effected if you know how. If it happened to be my model I should immediately proceed to give the wings greater dihedral angle . . . . Usually six to ten degrees on *each* wing is sufficient to cure any trouble of this kind. Then, presto, the model would fly perfectly.

This performance, showing spiral instability, usually is characteristic of flying scale models, the design of which closely follows that of a large full-scale ship. It is only to be expected, for large planes are often unstable spirally. However, this annoying quality is frequently exaggerated in the model plane because its designer has increased the size of the tail surfaces, including the *fin*. This enlargement of the fin, in connection with the customary LACK of dihedral in scale models, ruins the model that would otherwise be an excellent flier, if correctly designed and proportioned.

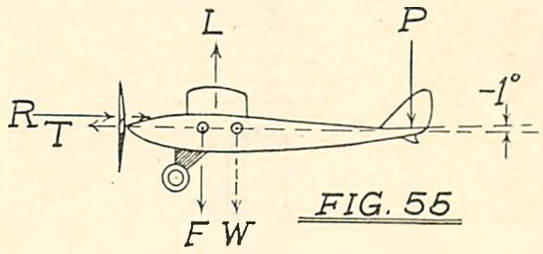


FIG. 55

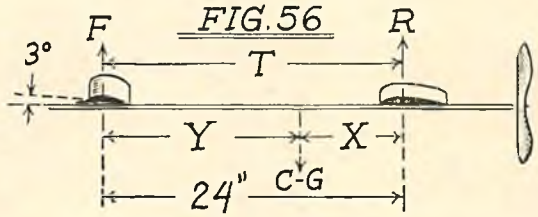


FIG. 56

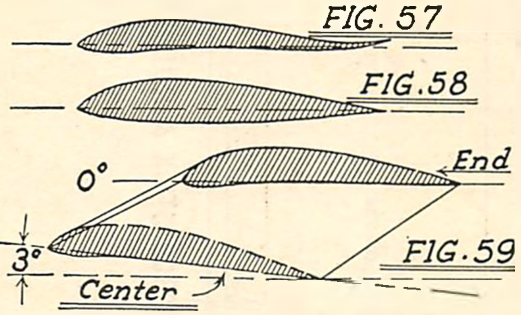


FIG. 57

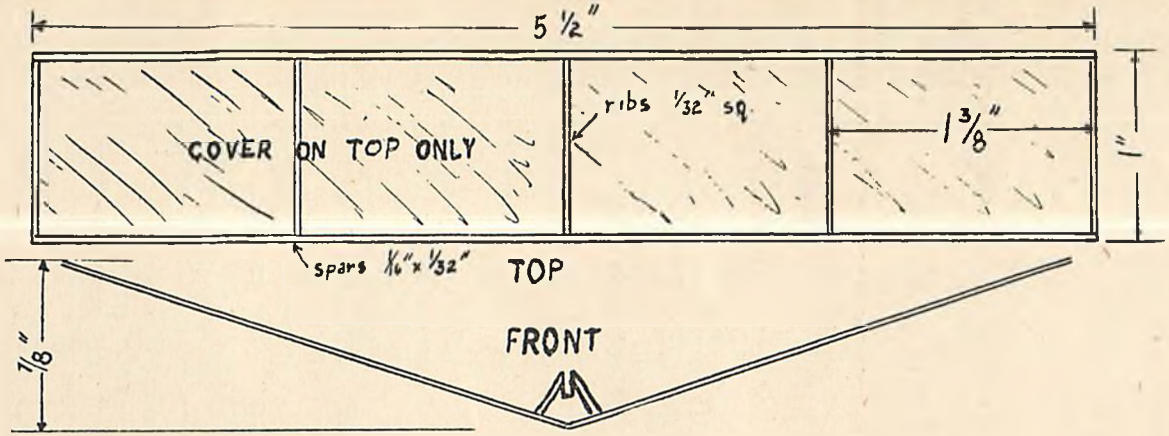
FIG. 58

FIG. 59

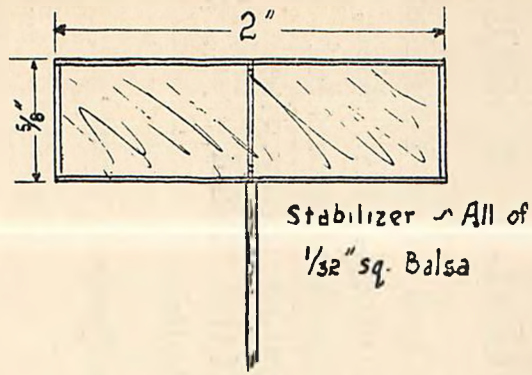
In many cases spiral stability results from an attempt to reduce the spinning tendency by enlarging the fin. Briefly, the cause of this trouble is too little dihedral in combination with a large fin.

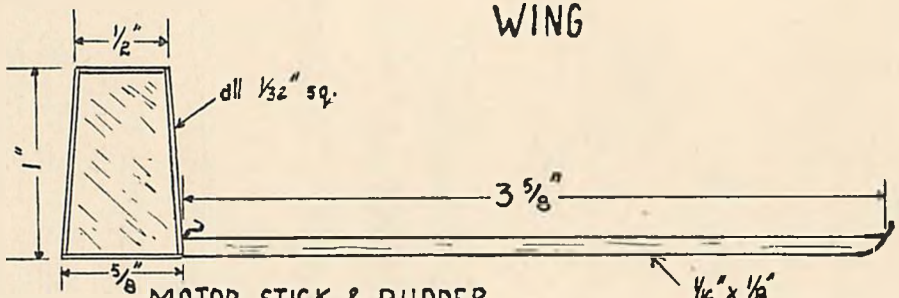
In order to show how little conception even many designers of large planes have of the problem of stability, let me quote what one author says in an accepted textbook on aeronautics. He says, "spinning can be readily corrected by enlarging the fin, but this procedure is not advisable as it results in spiral instability." This is as far as this gentleman goes. He neglects to tell that a large fin may be used, if sufficient dihedral is given to the wings, without the possibility of a spin or spiral dive resulting. This author has not had enough model flying experience, otherwise he would not be content to make such a misleading statement. Under such conditions it does not appear that we will have any *truly stable commercial* airplanes until some of our expert model fliers start to design them. It is a fact that most of our airplanes today either have a tendency to spin or have a tendency to spiral dive if not persuaded to do otherwise by the constantly guiding hand of the pilot.

Flying can never become universal, by the average person, until these tendencies are eradicated. A commercial airplane should be (*Continued on page* 36)

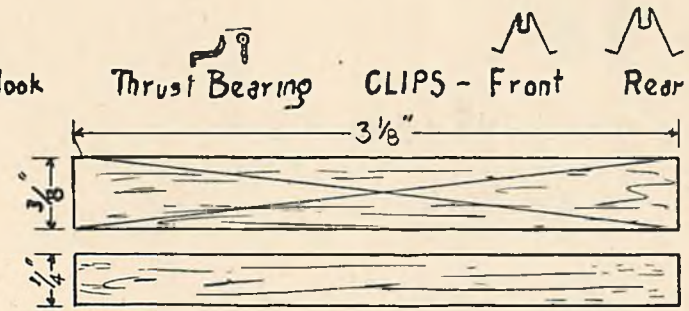


WING

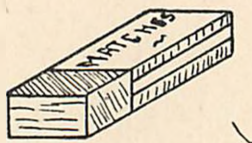


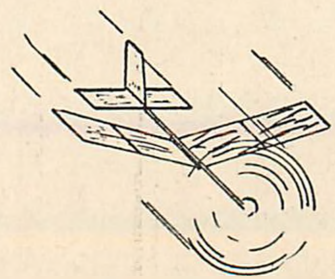


MOTOR STICK & RUDDER



Propeller Block





HIGH-POWERED GNAT

DATA	
weight of wing	.005 oz.
weight of Motor Stick & Rudder	.005 oz.
weight of Rubber	.0015 oz.
weight of Propeller	.002 oz.
wing loading (W/S_w)*	.359
power loading (W_r/W)*	.112
endurance	97 secs.

* W = weight of plane, S_w = Area of wing
W_r = weight of rubber

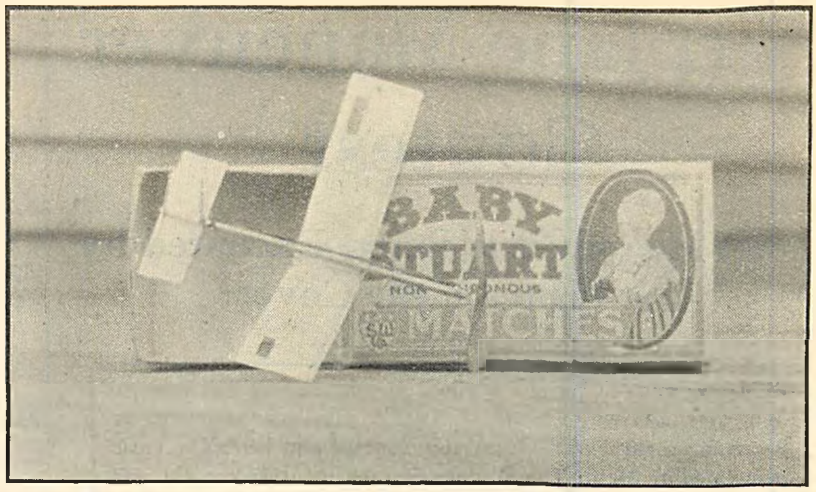
BILL OF MATERIAL
3 5/8" x 1/8" x 1/16" - motor stick - balsa
12" x 1/16" x 1/32" - wing spars - balsa
18" x 1/32" x 1/32" - ribs, tail surfaces - balsa
10" x 1½" superfine paper
3 1/8" x 3/8" x 1/4" - propeller - balsa
wire parts
rubber

RLR

A High-Powered Gnat

Here is a Natty Little Ship that Will Afford You Great Pleasure at Small Cost

By Richard Rioux



The Gnat completed is small enough to fly in restricted space. Note its size compared to match box.

THE high-powered Gnat has a very high performance-cost ratio. Housed in a kitchen-size match box, it is easily transported and adds amusement to any model airplane club meeting. The model made its spectacular 97-second flight, out of doors, on a very calm hot day. The rubber used was shredded from a toy balloon. The propeller "pulled" for about 30 seconds; air currents gave it a break for the rest of the flight.

Motor Stick

Make the motor stick of very soft 1/16" x 1/8" balsa. Cut it 3 5/8" long and attach the rear hook and thrust bearing, both being made of light wire, in position. Round off the corner below the thrust bearing with fine sandpaper and polish the complete motor stick.

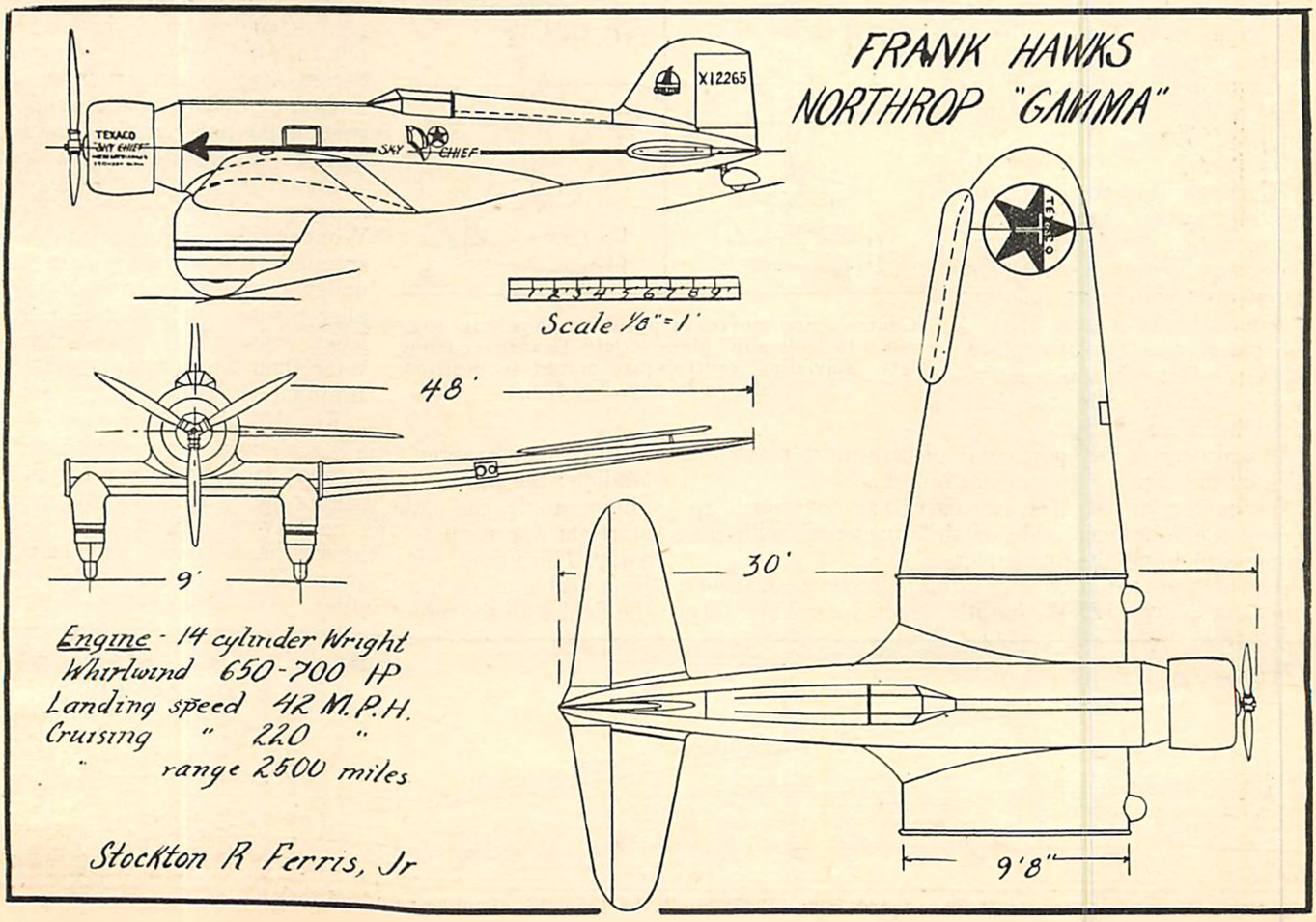
Tail Surfaces

The tail surfaces are made entirely of soft 1/32" square balsa. Sand all the parts round with fine sandpaper. Make the stabilizer first and cover it on the bottom. Construct the rudder on top of the stabilizer, let dry, and cover on one side only. Slightly sand the end of the motor stick so that the stabilizer will be perfectly level with the bottom of the motor stick. Cement in place and set aside to dry.

Wing

The wing goes the extreme in dihedral angle but it keeps the model from rolling as it climbs on, or near, the burble point. The five ribs are cut from 1/32" square balsa and are sanded round. The spars are cut of 1/16" x 1/32". Sand the edges round, cement ribs in place, crack in dihedral, and cover on top. Carefully fasten wing clips in place and set aside to dry.

(*Continued on page* 38)



Airplane Maneuver Contest

What Maneuver is Being Executed by the Plane on the Cover?

Do you wish to become a pilot? If you do, you will want to know how and why a plane is made to perform the maneuver pictured on the cover. Enter this contest and learn the basic principles of flight. The Winner of each monthly contest will receive as a prize, the beautifully colored original painting of the cover picture. $100.00 in prizes given to winners of the contest of six monthly pictures.

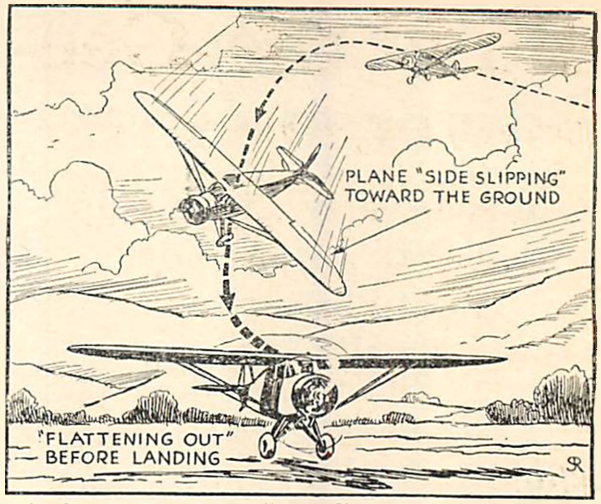


Fig. No. 1. How a left "side-slip" landing appears. A plane moving sideways does not lift as much as when it flies straight forward, thus it drops faster.

Explanations by Stewart Rouse

THIS is all you have to do:—Examine the cover picture carefully and determine what maneuver the plane is executing. This can be done by noting the position and altitude of the plane and the setting of the ailerons, rudder and elevators. When you think you can give the correct answer, write us, naming the maneuver and how it is performed. Also give your name and address, printed or typewritten. The last maneuver in this contest will appear on the cover of the July issue of UNIVERSAL MODEL AIRPLANE NEWS.

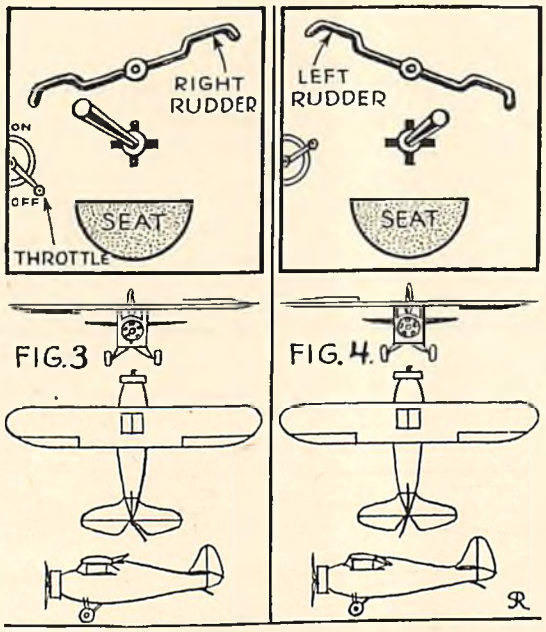
Winners will be chosen on the basis of accuracy, neatness, and the amount of detailed information given about each maneuver. The awards will be as follows:

Winner of 1st place, $25.00; 2nd place, $15.00; 3rd place, $10.00; 4th to 7th places inclusive, $5.00; 8th to 19th places inclusive, $2.50.

All answers to any particular picture must reach this office by the 20th of the current month.

The correct answer for any particular cover will appear in the following issue of this magazine, with diagrams explaining the maneuver.

Send answers to: *Maneuver Contest,* UNIVERSAL MODEL AIRPLANE NEWS, 125 West 45th Street, New York City.



Controls are moved to positions shown in Fig. No. 3 to "side-slip" plane to left. To recover from left "side-slip," controls are moved to position shown in Fig. No. 4.

Answer to February Cover Picture

By this time, probably some of you contestants are boiling over with anticipation about the correct answer to last month's cover picture. Well, we will proceed to enlighten you.

Back in the days of aviation's infancy, we mean before 1912, many a plane crashed to earth from low altitudes due to the much feared "side-slip." This is a sort of aerial down-hill skid, either to right or left, and can quickly be remedied by a quick turn in the direction of the skid. Today the side-slip has lost its terrors and in fact has been put to work as the intentional "front-slip," which when used in landing a plane, makes otherwise impossible landing places quite safe.

Fig. No. 1 shows a plane making a "side-slip" landing. Wonderfully enough, the descending side-slipping plane is under complete control of the pilot throughout its descent. It looks sensational but is often safer than the ordinary "glide" landing.

Fig. No. 2 shows two planes in the act of landing. One is making an ordinary "glide" landing; the other, a "side-slip" landing. Due to its flat gliding angle, the plane making the "glide" landing must start its approach to the field from a point 1¼ miles away. This is bad, for if the weather is hazy, the field may be invisible at such a distance. During the long glide to the field with the motor idling, (*Continued on page* 38)

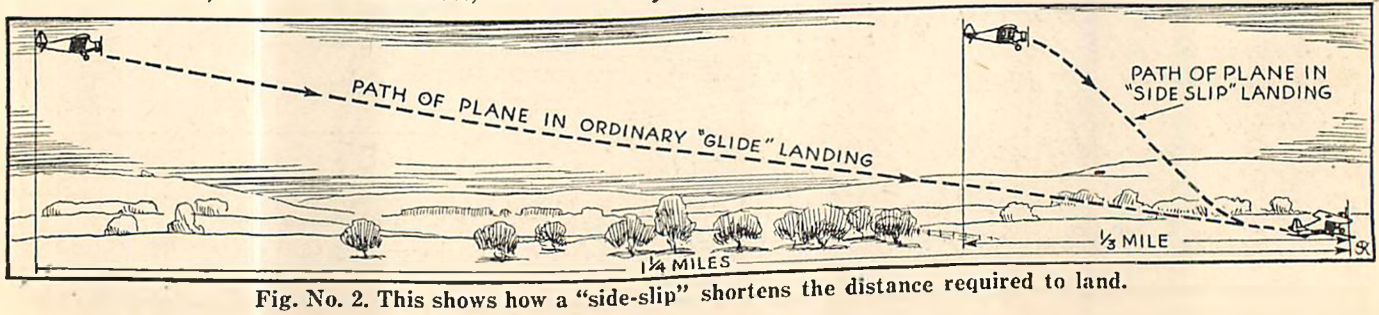
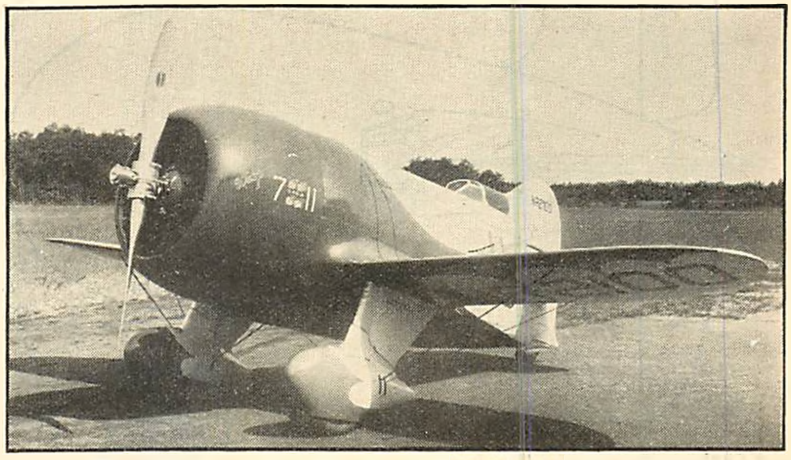


Fig. No. 2. This shows how a "side-slip" shortens the distance required to land.

Build the Gee-Bee Super-Sportster

Several Enjoyable Hours Can Be Yours Building This Sixteen-Inch Solid Scale Model of the World's Fastest Land Plane

By Robert Morrison



The 300 m.p.h. Gee-Bee Super-Sportster as she looked while at the Cleveland Air Races

SPEEDING down the home stretch could be seen a large barrel-shaped object followed by a long stream of black smoke. It was no other than the Gee-Bee racer piloted by Jimmie Doolittle, the ace of racing pilots, winning the Thompson Trophy race at Cleveland. The plane flashed across the finish line, speeding at approximately 300 miles per hour, and then began to zoom to a height several thousand feet above the large group of spectators at the Cleveland Airport. The black smoke following in the wake of the ship was caused by the unburned gas given off by its Pratt & Whitney Wasp engine, "souped-up" to 700 horsepower. Doolittle's Gee-Bee Super-Sportster was so far ahead that it lapped every contestant, with the exception of Jimmie Wedell in a Wedell-Williams low wing racer. The ship then came in for a landing, making contact with the ground at 85 miles per hour, a very high landing speed for an airplane.

Not only did the Gee-Bee win the Thompson Trophy race, but it also is the holder of the land plane speed record of the world. Flying over a measured course four times, it made an average speed of 296 miles per hour, surpassing the record held by France for a period of seven years.

The Gee-Bee racer is rather easy to build, having no struts and of simple design. Be neat and accurate and you will have a model well worth your while. Follow instructions carefully. Balsa wood or white pine may be used in the construction of the model. If there is anything that you don't quite understand of the detailed construction plans, then the accompanying three-view outline drawing may help.

Materials Needed

Piece	*Size*	*Part*
1	1'3" x 1" x 4"	Wing
2	8-¼" x 4-¼" x 3-½"	Fuselage
3	5-¼" x ½" x ½"	Prop
4	3-¼" x 3-¼" x 2"	Cowl
5	1-¾" x 1-¾" x 1-⅜"	Motor
6	5" x ½" x ½"	Cylinders
7	2" x 1/16" x 1/16"	Push rods and miscellaneous
8	4-¼" x 1-½" x ¾"	Rudder
9	4-½" x 2-¼" x 3/16"	Elevators
10	6" x ¾" x 1-¼"	"Pants"
11	2" x 3" x ⅜"	Landing gear

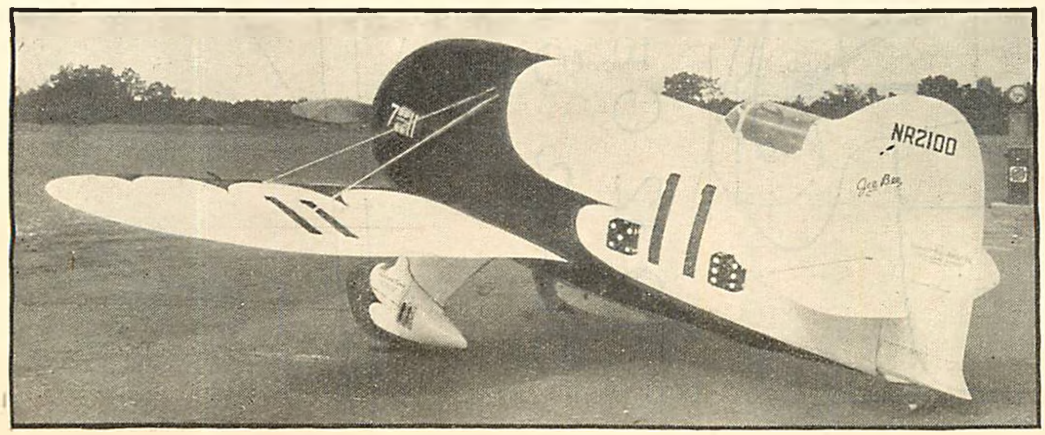
Can black lacquer or dope
Can white lacquer or dope
Can red lacquer or dope
Can ambroid
Small sharp chisel
Razor blade
Coarse and fine sandpaper
Three small brushes

TRACE on tracing paper the outline of the top view of the wing. Then lay the paper on board No. 1 as far to the left as possible and draw over tracing, pressing heavily in order to make slight groove in board. Then turn paper *upside down* and go through the same procedure on the right-hand side of the board. With a soft lead pencil draw along the grooves outlining the wing so they can easily be seen.

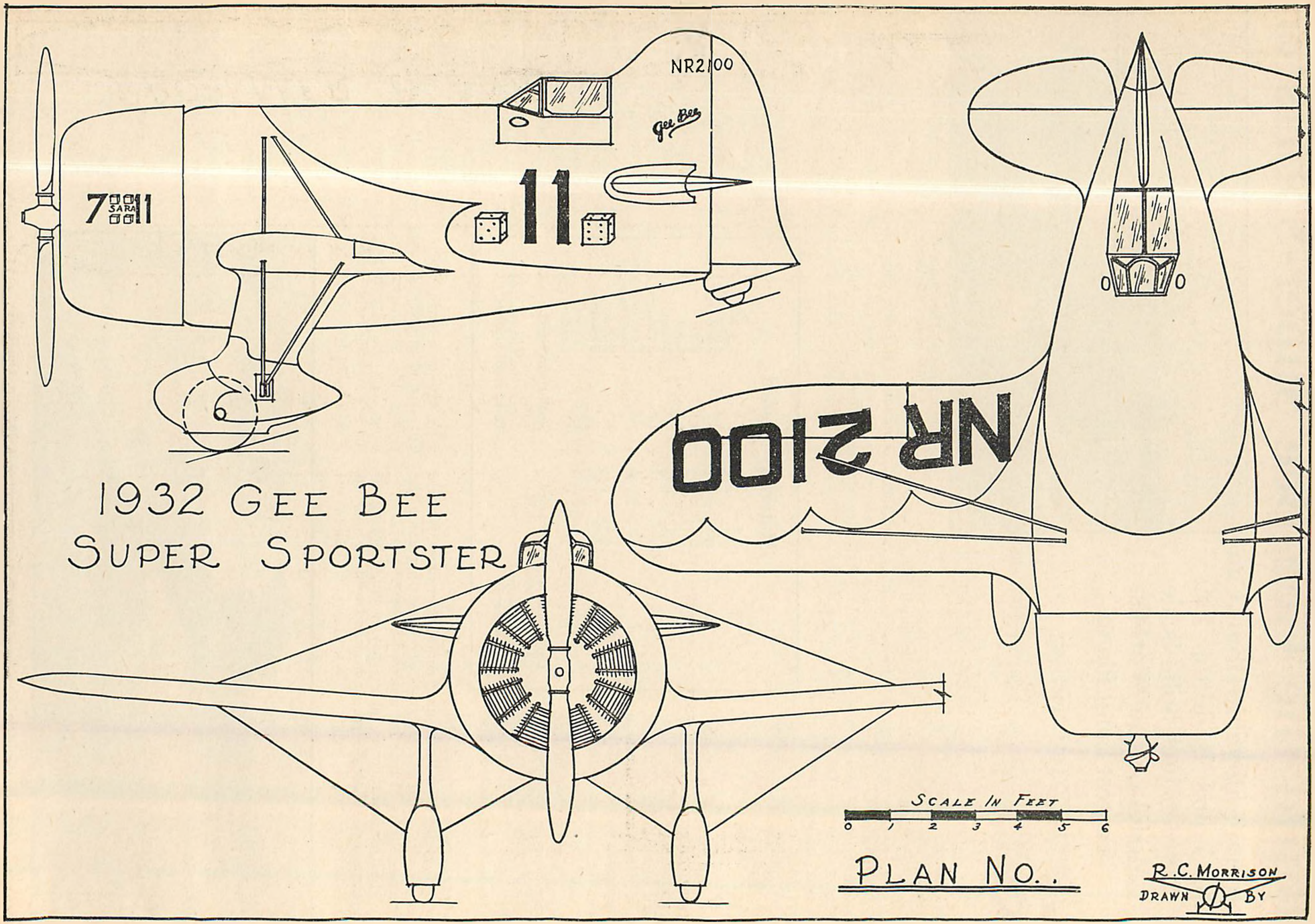
Next proceed to cut wing to shape, using either a jig saw or a small sharp chisel, preferably the chisel. Cut around grooves, leaving about 1/16" margin. Applying fine sandpaper, smooth out the edges of the wing. You will then have two separate pieces of wood, the left and the right wing.

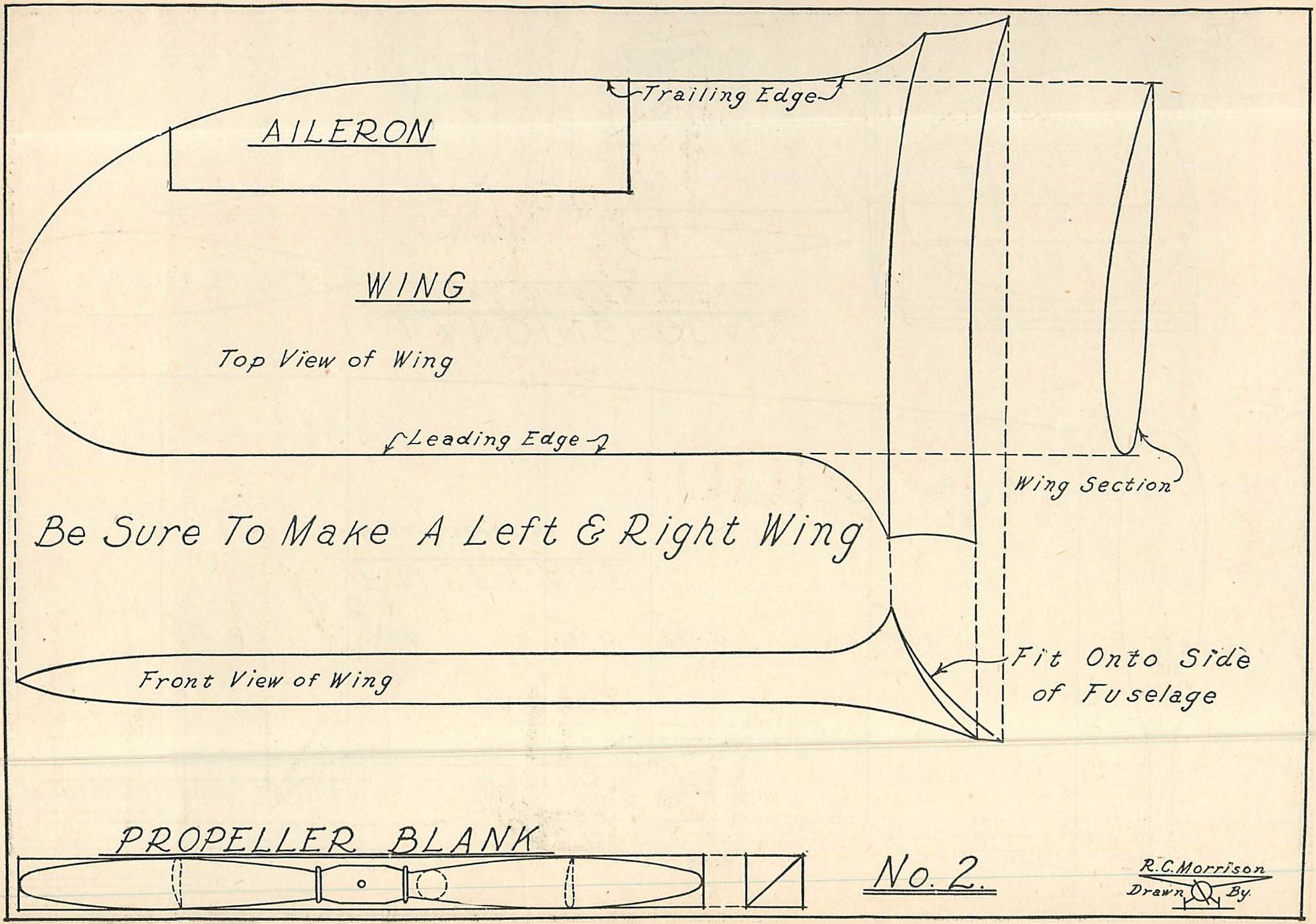
After that has been accomplished, draw front view on leading edge of the wing pieces as shown in Plan No. 2. Then with the use of a chisel cut around the outlines just drawn. If it is too difficult for you to carve out, bulge in wing where it joins fuselage. This bulge may be supplemented by putty after the complete assembling of the model. Sandpaper thoroughly and then proceed to round out leading edge of the wing. (See wing section in No. 2.) Then taper down rest of

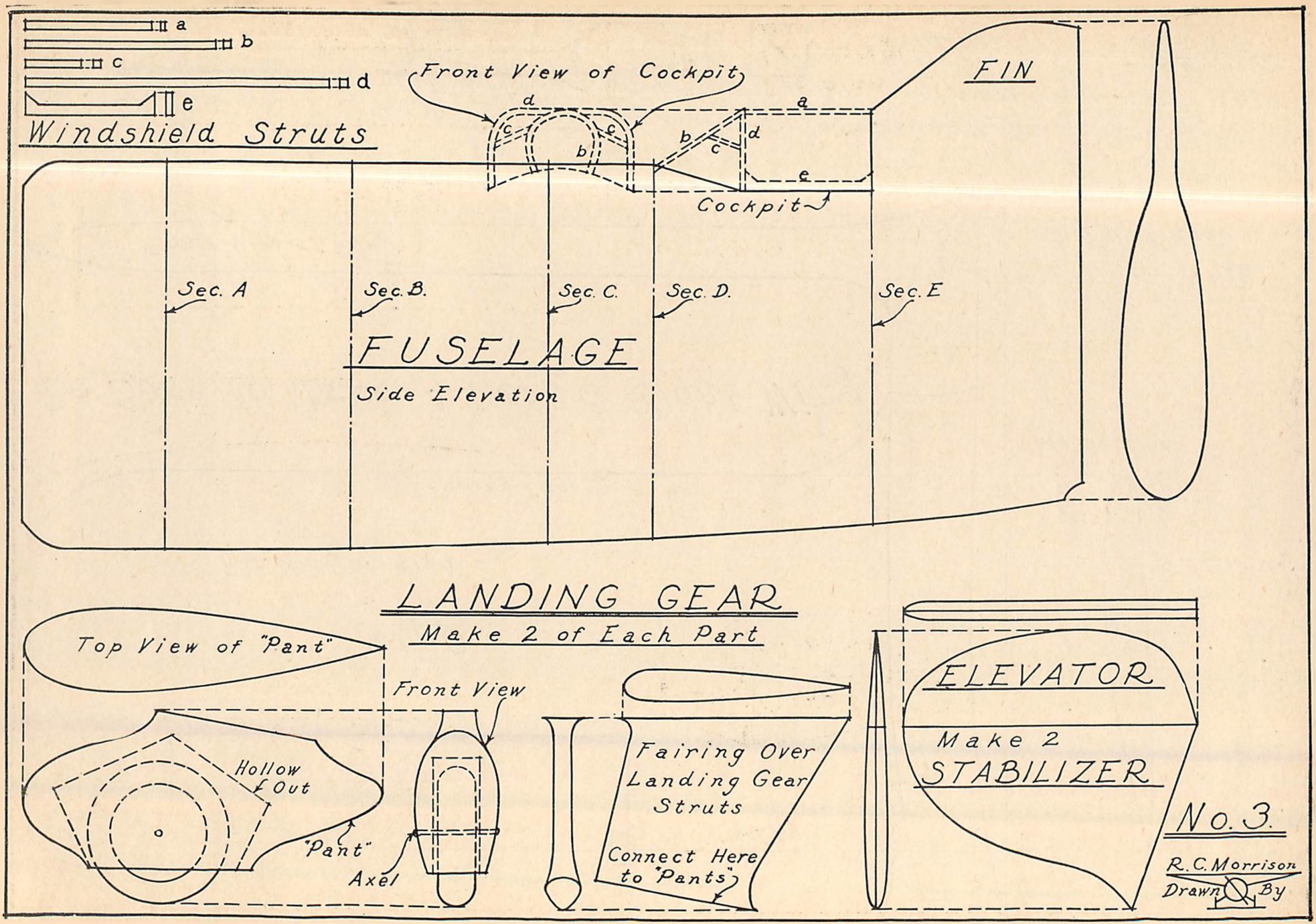
(*Continued on page 40*)

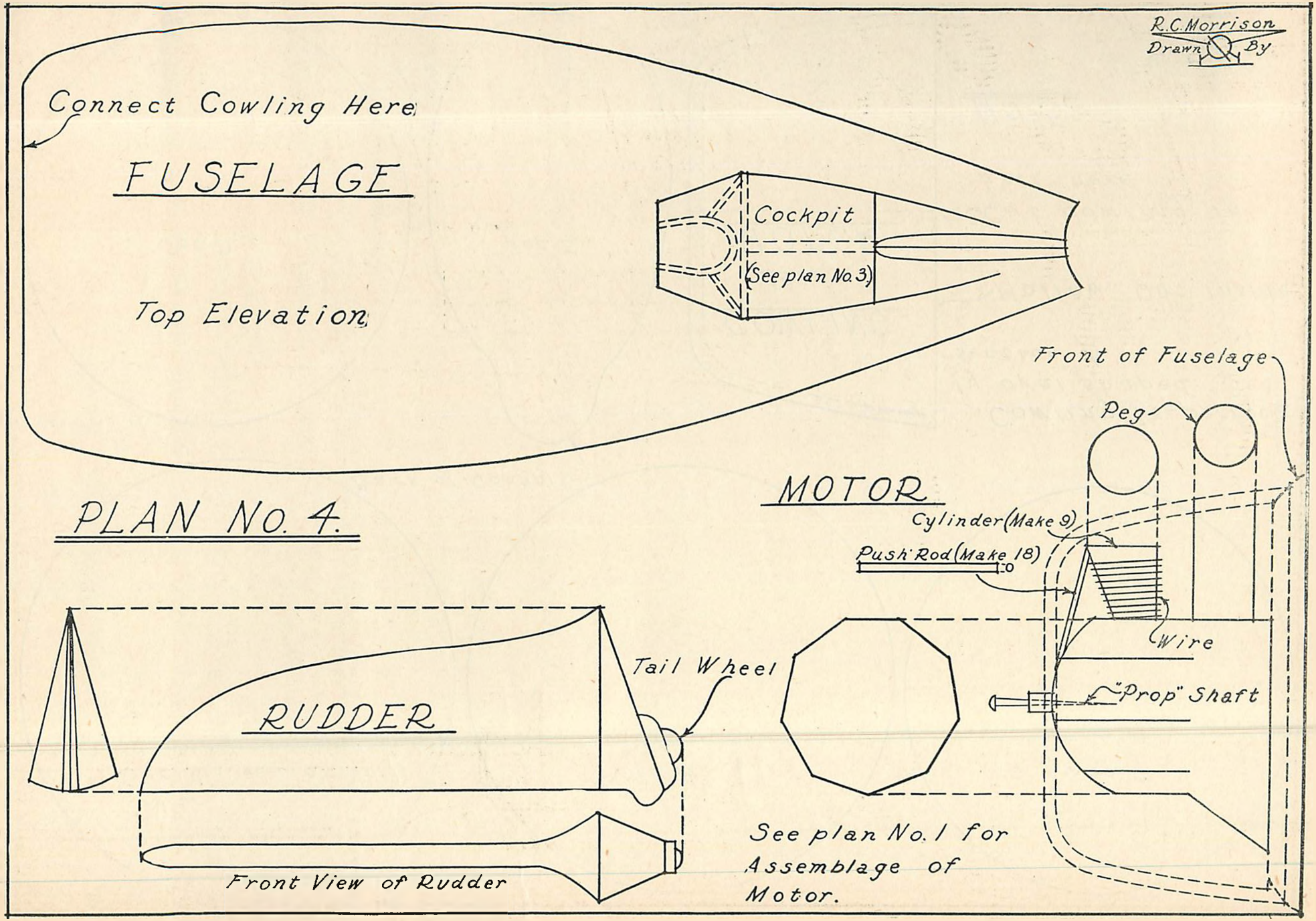


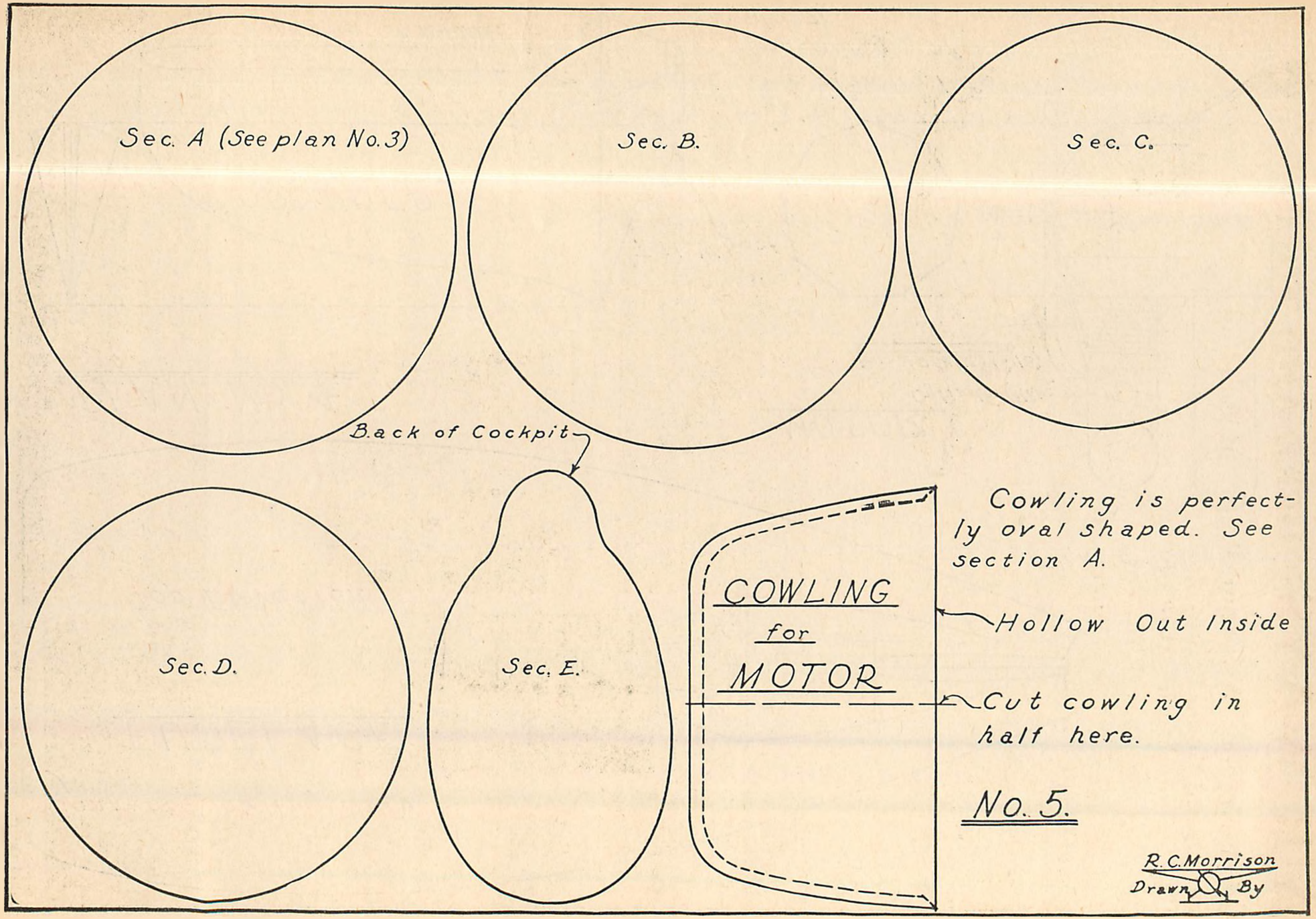
Jimmie Doolittle won the Thompson Trophy in this 700 h.p. Gee-Bee


NR2100
Gee Bee
11
7 11
SARA
NR 2100
1932 GEE BEE
SUPER SPORTSTER
SCALE IN FEET
0 1 2 3 4 5 6
PLAN NO.
R.C. MORRISON
DRAWN BY


AILERON
Trailing Edge
WING
Top View of Wing
Leading Edge
Wing Section
Be Sure To Make A Left & Right Wing
Front View of Wing
Fit Onto Side of Fuselage
PROPELLER BLANK
No. 2.
R. C. Morrison
Drawn By.

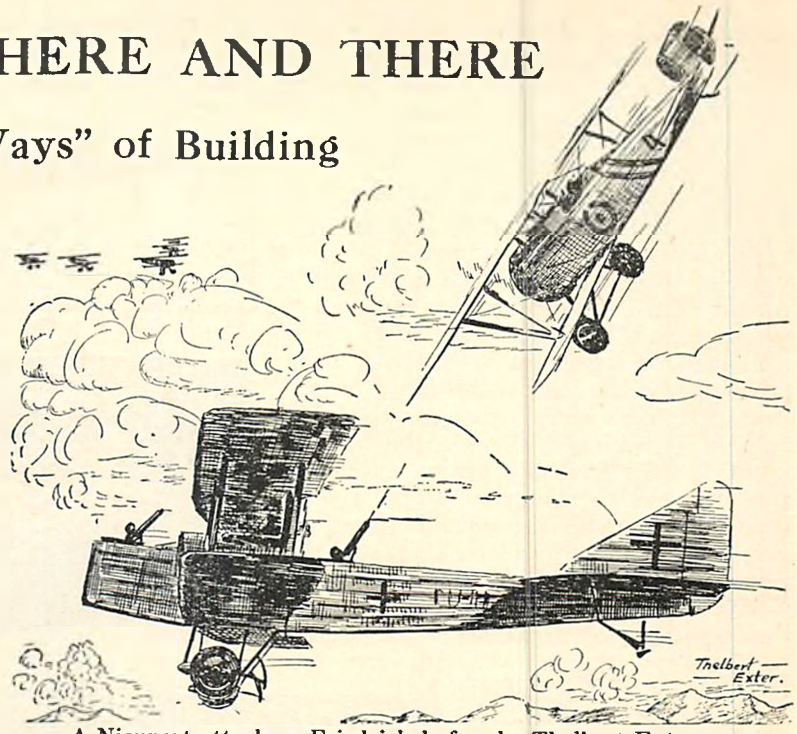

a
b
c
d
e
Windshield Struts
Front View of Cockpit
FIN
Cockpit
Sec. A
Sec. B.
Sec. C.
Sec. D.
Sec. E
FUSELAGE
Side Elevation
LANDING GEAR
Make 2 of Each Part
Top View of "Pant"
Front View
Hollow Out
"Pant"
Axel
Fairing Over Landing Gear Struts
Connect Here to "Pants"
ELEVATOR
Make 2
STABILIZER
No. 3.
R. C. Morrison
Drawn By


R.C.Morrison
Drawn By
Connect Cowling Here
FUSELAGE
Top Elevation
Cockpit
(See plan No. 3)
Front of Fuselage
Peg
MOTOR
Cylinder (Make 9)
Push Rod (Make 18)
Wire
"Prop" Shaft
PLAN NO. 4.
RUDDER
Tail Wheel
Front View of Rudder
See plan No. 1 for Assemblage of Motor.


Sec. A (See plan No. 3)
Sec. B.
Sec. C.
Back of Cockpit
Sec. D.
Sec. E.
COWLING
for
MOTOR
Cowling is perfectly oval shaped. See section A.
Hollow Out Inside
Cut cowling in half here.
No. 5.
R. C. Morrison
Drawn By

AIR WAYS—HERE AND THERE

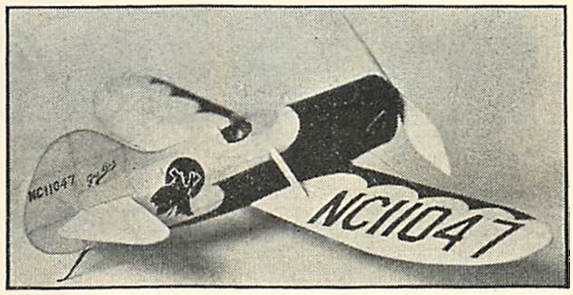
Get Busy and "Air Your Ways" of Building and Flying Model Planes. In This Column, Space Will be Devoted to the Activities of Our Readers. Let Others Know What You Are Doing



A Nieuport attacks a Friedrichshafen, by Thelbert Exter.

HELLO, Air Ways readers. Here is another month at hand, with a full pouch of mail from readers that will be of great interest to you.

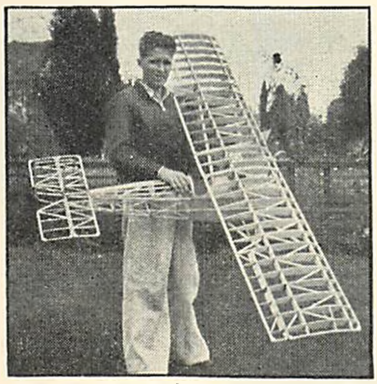
Recently we published pictures of a ground trainer for budding pilots, which was built under the supervision of Harold F. Maschin, by a group of boys in Westfield, Mass. Many requests have been received for the plans of this machine, so our readers may look for plans of it in some future issue. Maschin has been kind enough to contribute Picture No. 1, a flying scale model of the Gee-Bee Sportster-D, which he has recently built. The wing span is 24" and it weighs only 1¼ ounces. The picture shows a scale size propeller, but with a flying propeller attached, this model shows good performance. Models of this ship should be very easily built as the shape of the body is such that it may be simply constructed.



Picture No. 1. A 24-inch Gee-Bee Sportster-D, weighing 1¼ ounces. By Harold Maschin.

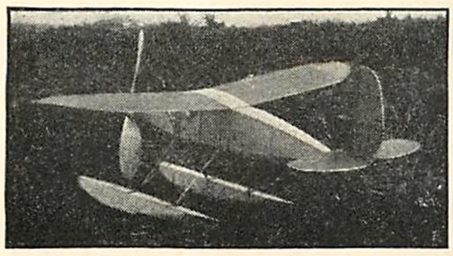
Picture No. 4. Gerald Cord collects and sells pictures of all kinds of planes. Here he is.

Mr. Gordon Light of 1404 Oak Street, Lebanon, Pa., who won the Wakefield trophy event at Atlantic City recently, sends us Picture No. 2, of a new development which he has been working on. It is a hydro edition of his recent prize-winning model. This should be particularly interesting considering the performance that was established by this model as a land plane. Plans for both the land plane and the hydro, pictured here, will appear in the magazine in the near future. The average flight of this ship, R. O. W., is 60 to 70 seconds. Take-off requires a run of 15 feet. Light tells us that the model is very rugged and will give good performance even after the duckings which naturally result from hydro operations. It is convertible from land plane to seaplane or vice versa in ten seconds.

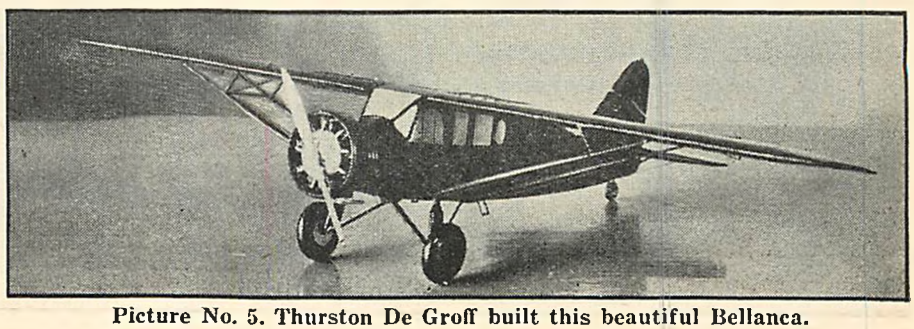


Picture No. 3. The first plane D. Pittenger ever built has a 7-foot wing span.

Here is Picture No. 3 of D. Pittenger of 5315 Cronus Street, Los Angeles, Calif., and the first model which he has ever built. Many of us will realize that he has done a remarkable thing in doing such an excellent job on his machine. I, for one, would be very much ashamed to put my first attempts at model building beside the machine which he is shown holding. However, times have changed it seems. Another interesting point about this model is that it has a wing spread of 7 ft. and weighs one and one-half pounds uncovered. The tires came from Firestone ash trays. It carries a three-pound gas engine. The gas tank



Picture No. 2. Gordon Light has just turned out this hydro that R.O.W.s and flies seventy seconds.



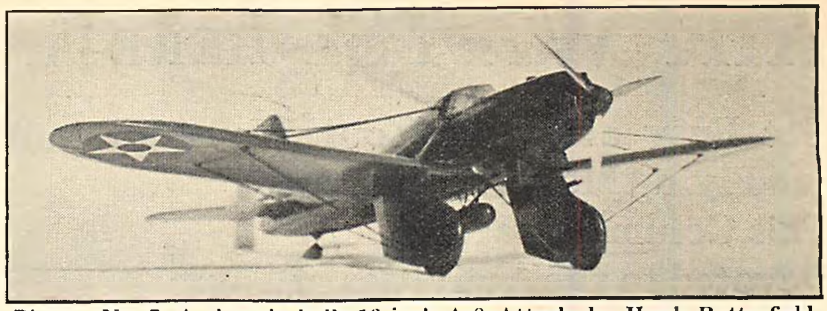
Picture No. 5. Thurston De Groff built this beautiful Bellanca.

can be seen in the center of the wing. If the model builder does not wish to use a gas engine as motor power, he may install a rubber motor, which requires one hundred feet of rubber to fly the model properly.

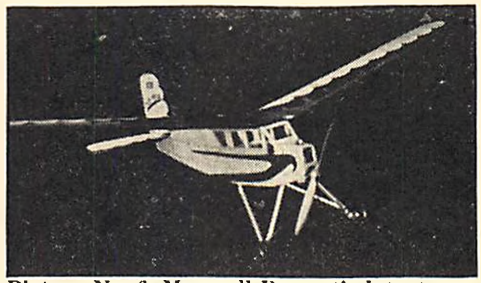
PICTURE No. 4 shows a very enterprising young man, Gerald D. Cord of 301 South Olive Street, San Antonio, Tex. Cord is one of these young men who is unfortunate, or shall I say fortunate enough not to have a personal fortune. He must depend upon his own resources in order to make a living and so he has cast his lot in the airplane field. Personally I cannot see why he did this if making a living is the primary object. In the past, many aviation enthusiasts have been on the point of starving quite often. However, he has something that will be of interest to our readers, I am sure. He has made a collection of all kinds of pictures of war airplanes. Also, he is a specialist in drawing plans for ships. He is particularly interested in getting in touch with young men interested in model building in all parts of the world and promises to answer all letters received. Here is a chance for some of you young fellows to make a valuable connection.

Here we have an interesting model, Picture No. 5, of the Bellanca Pacemaker, that was built by W. Thurston De Groff of Westport Avenue, Norwalk, Conn. It has a span of 12" and is 1/40th actual size.

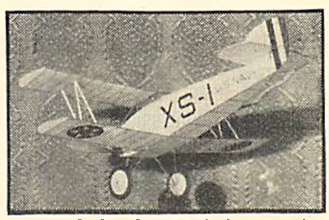
Many readers will probably remember the sensational flights that were made by the gasoline model belonging to Maxwell B. Bassett of 11th Street and 66th Avenue, Oak Lane, Philadelphia, Pa., which took place at Atlantic City in September. Bassett has just completed an improved ship which is shown in Picture No. 6. He tells us that some remarkable flights have been made with it.



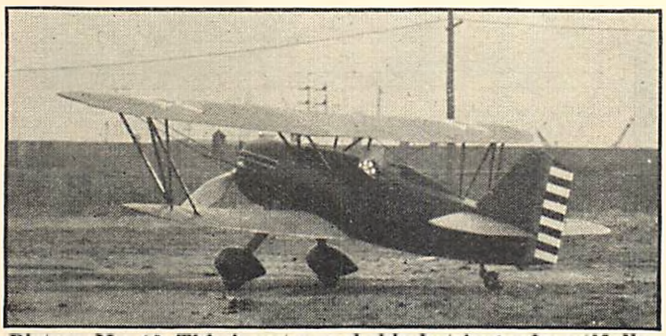
Picture No. 7. A cleverly-built 13-inch A-8 Attack, by Hugh Butterfield.



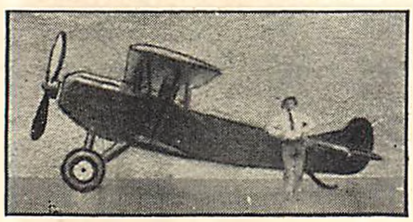
Picture No. 6. Maxwell Bassett's latest gas engine model. It is some flyer.



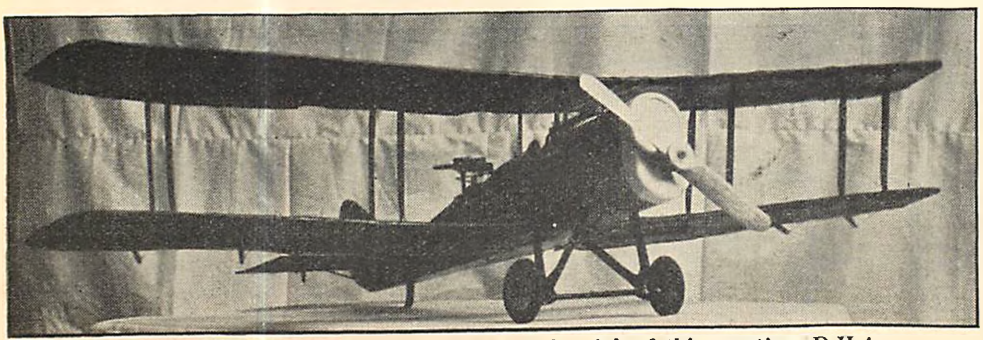
Pictures Nos. 8 and 9: Here is one of the finest flying scale models ever built. It is an XS-1, submarine plane, by John Tyskewicz.



Picture No. 10. This is not a real ship but just a beautifully built exact scale model of a Curtiss Hawk, by Bronik Soroka.



Picture No. 11. The man standing by this Fokker D VIII is not the builder, Peter Davis.



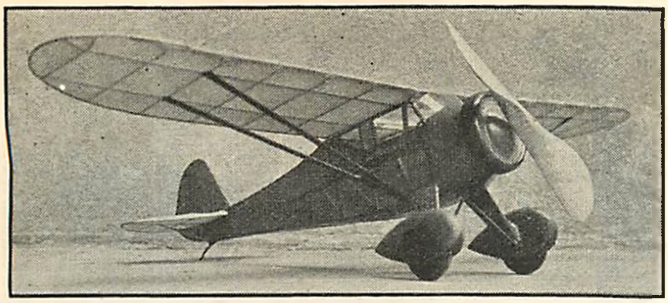
Picture No. 12. Jack Berry, Jr., made a fine job of this wartime D.H.4.

The previous model flew for over 15 minutes.

Hugh Butterfield of 311 North Walnut Street, Momence, Ill., has submitted Picture No. 7, which shows an A-8 Attack plane, built from plans appearing in UNIVERSAL MODEL AIRPLANE NEWS. Following a desire to be original, Butterfield has built this ship exactly to one-half the scale of these plans. That is, instead of 26" wing span, he has made the model with a wing span of 13".

Our old friend, John Tyskewicz of 32 South Governor Street, Hartford, Conn., the author of the autogiro article which appeared in the magazine some time ago, submits pictures No. 8 and No. 9 for your consideration. They are photos of the XS-1, originally designed by the Naval Aircraft Factory. From the pictures, one can readily see that it has been built very beautifully. It was scaled from the actual ship to 1/12th actual size. The full-size ship is very small, having a wing span of only 18", but there is a good reason for this. This was the plane that was designed for use on board submarines. Wheels have been substituted on the model for pontoons. Tyskewicz says that this model out-performs any flying scale model that he has ever seen. It weighs only .66 ounce. When flown indoors, it is capable of an 80-second flight and will attain an altitude of 60 feet in 6 seconds. The glide ratio is approximately 6 to 1. Tyskewicz says that he has flown this ship against all types of scale models and it outperforms them in any phase of flight. How many readers would like plans of this ship?

ONE of the finest contributions this month is Picture No. 10. This shows a Curtiss Army Hawk P.6-E, flying scale model, built by Bronik Soroka of 356 East 78th Street, Cleveland, Ohio. The remarkable thing about this ship is that it is made to exact scale, all the controls being movable. Insignias are painted on with a brush and all the separate parts were made by hand by its builder. The dum-



Picture No. 14. Here is a neat little Monocoupe by John Jacobs. It flies beautifully.

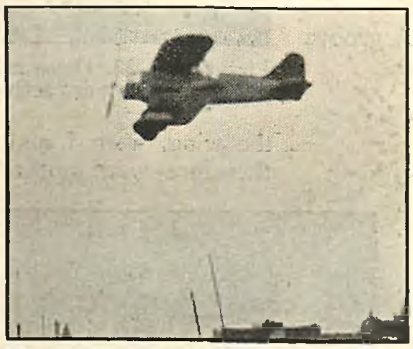
my instrument board can be seen plainly.

Peter Davis of 1616 Mallory Street, Jacksonville, Fla., has recently built a Fokker D-7, which is shown in Picture No. 11. Probably you will think that the figure standing beside the machine is Davis, as I did. However, upon careful examination you will see that the machine is a solid wood model with a dummy figure of a man propped up alongside of it. It looks very realistic indeed, don't you think?

Jack Berry, Jr., of 29 Main Street, South Boston, Va., helps to make this column more interesting this month by the contribution of Picture No. 12, which shows a De Havilland 4 scale model, which he recently built. Models of this machine are scarce, probably because the present-day model builders do not realize the significant part it played in the World War. This was one of the fastest battle planes at the Front, making a speed of approximately 135 miles an hour. It carried two men, the pilot in the front cockpit and a machine-gunner in the rear. The American edition of this ship was equipped with a 400-horsepower Liberty motor. We commend Berry for his excellent workmanship.

Milton Satel of 56 East 184th Street, Bronx, New York, contributes Picture No. 13 which shows an F.9C.-2 tearing across the landscape. Contrary to appearances, this is not a full-size ship but merely a solid scale model, which has been strung on a wire by its builder. The effect of speed was acquired by taking the picture of the machine when it was slightly out of focus. Satel also has sent us a picture of a Sopwith Dolphin which we are unable to publish. However, it is a very nice piece of work.

John Jacobs of 123 South Penn Street, Allentown, Pa., writes and tells us that he has given his Monocoupe model the air, shown in Picture No. 14. He now requests that we give it an airing in Air Ways. He tells us that it flies exceedingly well, which we can readily believe after careful examination of the picture.



Picture No. 13. Milton Satel, builder of this F.9 C.2 says that it is only a model.

Picture No. 15. Charles Lewis's fuselage model stages a cross-country flight. Rather bad for bunions.

HERE we have a picture, No. 15, that comes all the way from Roswell, New Mexico. This shows a cabin model in flight which was built by Charles A. Lewis of 507 South Rich Street. Lewis tells us that he was bitten by the aeronautical bug some six years ago and has followed the hobby continuously up to the present time. From the picture, we would say that this ship is putting up a pretty good performance. Flying pictures are the hardest kind to get and they are usually a real test of the ingenuity of the photographer and his ability to use a camera properly. Consequently we cherish pictures of this nature more highly than any others.

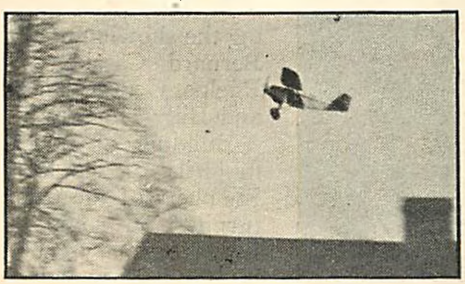
Charles Holtz of Cloverdale, Calif., sends us another contribution in the form of Picture No. 16, which shows the Cloverdale Airport (model). Holtz wishes us to excuse him for the unsuitable background of fencing and wire. Possibly it was necessary to close the airport in this manner to keep the crowd of enthusiastic airplane fans at a safe distance.

John Szenczyk, of the Advance Aero Model Club, 34 Ward Avenue, Easthampton, Mass., contributes Picture No. 17. It shows him at the left and one of his friends, Chester Evans. Evans is holding the cup won by Szenczyk at the Detroit A.M.L.A. contest. Szenczyk is an old-timer at model building and is an expert in the art.

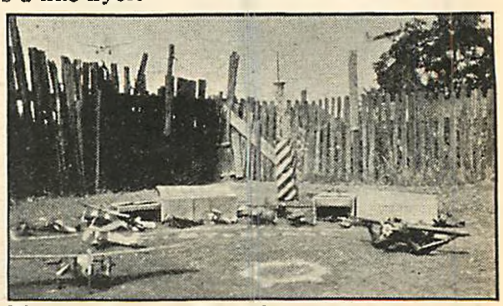
Picture No. 17. John Szenczyk, one of our prize model builders, and his friend, Chester Evans.

Alan D. Booton of 8 Charles Street, Asheville, N. C., contributes two pictures to help make our columns attractive. This gentleman is 26 years old and is an expert model builder. Picture No. 18 shows his model Curtiss Hawk in full flight against the sky line, over a house top. This photograph is not "faked" and shows the excellent flying qualities that can be built into a properly designed scale model. Picture No. 19 shows a Hawker Fury which he recently has completed. This also is a neat job and flies well. Booton has promised to send us some pictures of his model autogiro in flight. He has been an autogiro enthusiast and says he first had success with the autogiro built from plans in UNIVERSAL MODEL AIRPLANE NEWS. This machine was designed by John Tyskewicz.

Picture No. 19. Alan Booton is responsible for this neatly made Hawker Fury. It is a fine flyer.



Picture No. 18. A model Hawk that is a beautiful flyer, as this picture shows. Alan Booton built it.



Picture No. 16. The Cloverdale Model Airport: proprietor Charles Holtz. Business seems to be good.

We recently received a letter signed "Click D" (whoever this may be), who contributed a very helpful suggestion, so we are going to pass it on to you here. This is a method for making your own rubber-tired wheels. You proceed as follows:

1. Cut a piece of rubber tubing equal to the circumference of the wheel that you wish to build. The diameter of this tubing depends upon how large you wish the tire to appear.
2. Cement the ends of the tubing together with rubber cement. Thus your tire is made.
3. Make the center of the wheel from white pine or balsa, as desired. The diameter should be a little larger than the inside diameter of the tire.
4. Cement the tire around the disc of wood. A groove on the disc will help to hold the tire in place.

Picture No. 22. These members of the C.S.M.E. are some of the most active builders in the country.

CLUB NEWS

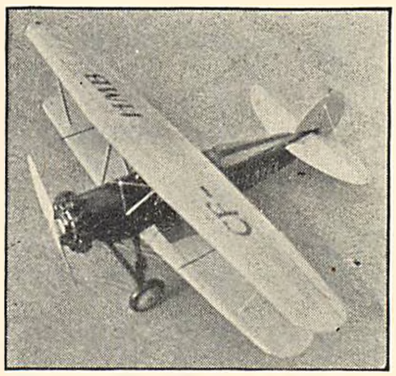
Galt Model Airplane Club

THE Galt Model Airplane Club of Galt, Ontario, has been quite active recently. John T. Dilly states that they are rebuilding their laboratory to encourage future activity. Members of the club recently "cleaned up" in the Galt Hobbies Exhibition contests. Winners were:

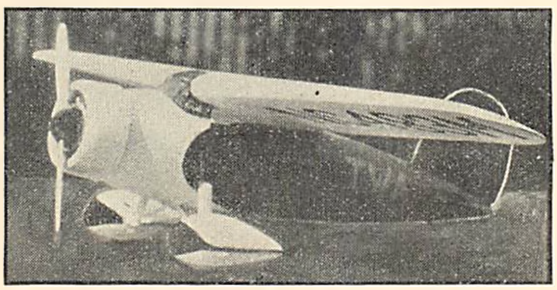
Flying: 1st, Ernest Barrie; 2nd, Alex Smillie; 3rd, Bruce Peacock.

Scale: 1st, Wally Boniface; 2nd, Ted Cooper; 3rd, George Teather.

Dilly contributes Picture No. 20, showing his carefully built Waco taper wing which was judged the best model in the show but which did not receive a prize as Dilly was disqualified because he was managing director of the show. This seems like a tough break for Dilly.



Picture No. 20. A detail scale Waco Taper Wing, by John Dilly.



Picture No. 21. A solid scale Lockheed Vega of fine workmanship, by George Ginn.

Columbus Society of Model Engineers

Although the first snow of the season slowed up the local model building activity somewhat, a fairly good attendance and many good flights were obtained at the indoor contest held in the Fair Grounds Coliseum, Sunday, December 4. Two designs seldom seen in the local contests, the French Potez and the Monocoupe, due to the short nose and the forward position of the wing, were found hard to keep from stalling and therefore were not adopted as good endurance scale model designs. However, this theory was blasted and the difficulty overcome when both types flew for more than sixty seconds.

Wing slots on flying scale models were successfully demonstrated on both the Stinson and the Potez, by Dale DeBowman and Eli Ross at the contest of the 4th. The slots were permanently set in an open position and when the model would reach the stalling point, the slots would take effect and the model would settle slightly, level off and resume its normal flight position. Both models obtained better results with the slots than without them. However, the slots made it much more difficult to adjust the models to circle since the tendency of the slots is to return the wing to normal position when it assumes a banking position. Additional experimental work with various designs among which is the new "Vacuplane," recently exploited by the Miami University, is under way. The problems of these new types will be discussed at the C.S.M.E. model airplane ground school classes which has been steadily gaining popularity among the members since its introduction the first of the year. The school is held at a local downtown hotel every Saturday and a noticeable improvement in the models of the members who have been attending is apparent. The text used is the UNIVERSAL MODEL AIRPLANE NEWS articles on aerodynamic design.

Picture No. 23. Col. Bishop of war fame explains some interesting points to Montreal boys.

AN exhibition of flying and non-flying scale models were placed on display at the RKO Theatre during the showing of "Airmail" there. The exhibitors were: Bernard Cassidy, Dale Moyer, John Malloy, Eddy Phelps, George Ginn, Dale DeBowman, Emerson Limes and Billy Herbert.

Building of non-flying scale models constitutes the majority of the local school model building activities. Members of the Central High School Aviation Club are turning out some fine-looking replicas of the various Boeing military types. Several members of the class, led by Ralph Bosworth are scaling up all of the small three-view drawings from the UNIVERSAL MODEL AIRPLANE NEWS of the past year and when (*Continued on page 47*)

"Whats" and "What Nots" of Model Plane Building

Simple and Effective Methods That Will Help You to Cover and Decorate Your Model Accurately

By Howard G. McEntee

PART VI

WITH the preceding installment of this series, we finished the actual construction work and we now come to what is by far the most important part of model building, the covering and finishing. It seems a crime, the number of good models which are spoiled by poor covering. I believe every model builder has either had the experience himself or at least seen the effects of a good model job ruined by a poor covering job. A good many readers will no doubt tire of hearing this theme harped on so much, but it is so important that the writer will risk their displeasure. For this reason, the somewhat meager instructions given in the first article of this series, relative to covering, will be enlarged upon and explicit directions given. Just one more argument will be given to clinch all the foregoing, and that is, no matter how fine a job of building is done on the framework, a poor covering job will ruin it all. Also that a smooth, careful job of covering will make a mediocre construction job look much better than it really deserves. This is by no means a suggestion to be careless with construction and only careful with covering, for no matter how fine a model looks from the outside, the real pride of ownership comes from the knowledge that inside, as well as out, the ship is as perfect as the construction can make it.

The first point in covering is to have the model frame ready for the work. By this, we mean that the wood must be smooth and all small projections, such as pieces of hardened glue, splinters, etc., smoothed off. Very often when a joint is made, the glue will drip downward slightly, forming a sort of point when it hardens. This point, unless cut off, will make the paper bulge out.

Wherever possible, in order to save work, the paper should be put on before the frame is finished. This refers especially to paper through which struts must pass and the process was described in Part 5 of this series. Briefly, it consists of covering that section through which a strut passes, before the strut is put in place. Then a lot of tedious and often inaccurate fitting is dispensed with, as the exact size hole for the strut may be cut through the paper in just the right place. It might be well to refer to Part 5 in order to fix the idea clearly in your mind.

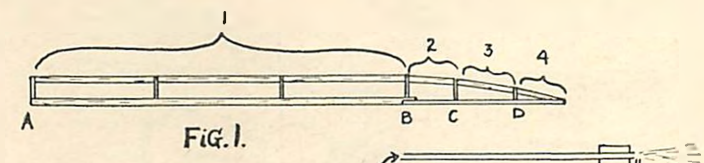


FIG. 1.

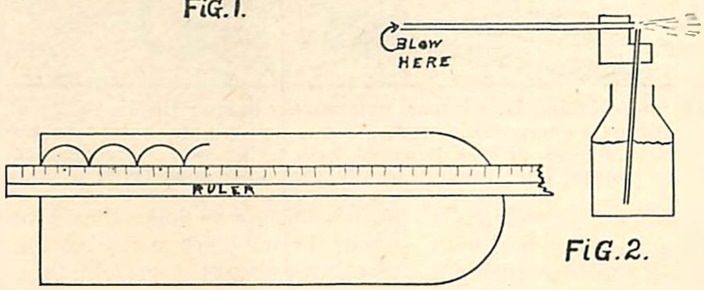


FIG. 2.

FIG. 3.

THE next point in covering is to have the paper prepared. Very often in shipping, the paper must be folded several times, the resultant creases being a hindrance to good covering. These may be removed by ironing the paper. Do not wet it and take care to avoid scorching. After ironing, let the paper stand till it gathers the normal amount of moisture. If this is not done and the covering work is started immediately after ironing, the paper will sag badly later when it takes up a little moisture.

Of course, the colored Japanese paper is handled exactly as the white is, but care should be taken to get genuine model paper, superfine being a good grade, and not some cheap tissue paper substitute, as the latter not only is much too weak and easily punctured, but cannot be tightened up evenly. The good paper is so cheap, and easily obtained at model houses, that there is no excuse for not using it.

A point often neglected in model covering is that most model tissue has a definite grain. This is easily discernible, and becomes more so when coated with dope or banana oil. Therefore, when covering where many small pieces are needed, as on some fuselages, use care to have all pieces with the grain in one direction, because if one piece or more has the grain at an angle, the finished job will look more like a patchwork quilt than a respectable model. For the same reason, it is best to cover a model with the grain running lengthwise, both on fuselage and wings. It is also probable that paper shrinks slightly more along or with the grain than across it, another reason for having the paper applied uniformly.

The biggest bugaboo of all covering work is wrinkles. For the reasons set forth at the beginning of this article, the technique of covering without causing wrinkles will be described in detail. When covering with a single large piece of tissue, as on a wing or flat fuselage side, use adhesive on as few frame members as possible and preferably only on the edge and end pieces. This leaves a larger expanse of paper to draw up and straighten out possible wrinkles. Of course, on very fragile surfaces such as wings of indoor or duration models, and of many tail surfaces, it is better to glue to every rib or cross member, so as to prevent warping. Remember then, that the smoothest surface results from having a large expanse of paper glued only at the edges, but that this should only be applied to surfaces capable of standing the slightly greater pull, than when the paper is glued to every frame member or rib.

BANANA oil is the favored adhesive for model covering. Regular model glue is too heavy and causes a messy job, while white paste, which is sometimes used, is apt to dry out in time and, besides, it takes too long to dry so that the work may proceed. Banana oil takes just long enough to dry to allow slight shifting of the paper to remove wrinkles if necessary. Then too, it is light, waterproof, and if it is (*Continued on page* 42)

Aviation Advisory Board

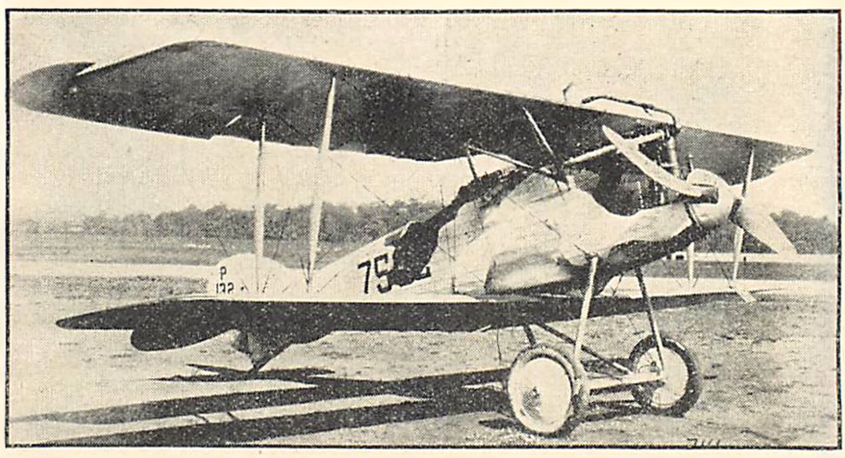
Conducted by
CHARLES HAMPSON GRANT
Chairman of the Board
Formerly of
The Technical Section, Air Service, U. S. Army

AMONG the questions which we have received this month, that show the greatest amount of thought and intelligence relative to model design, are those submitted by Calvin Rollins of 4013 Holdrege Street, Lincoln, Nebr. This young man is going after the problem in a manner that will not be denied.

Here are some of the questions:

Question: How does an inertia starter work?

Answer: First, an inertia starter consists of a flywheel which is geared to a hand-crank in such a way that one turn of the hand-crank spins the flywheel a great number of revolutions. By means of this weighted flywheel spinning at high speed, inertia is built up, inertia meaning the tendency to keep moving. Many of you will remember the heavy flywheel that is contained in friction toys. When once you spin the flywheel at a considerable speed, it tends to keep spinning. To start an engine with a starter, the mechanic turns the hand-crank as fast as possible, gradually working it up to proper speed. When full speed is attained, the small flywheel in the starter is spinning with great velocity. At this moment a clutch is thrown in which suddenly gears the starter flywheel with the engine. This little flywheel has so much momentum that it spins the engine over a sufficient number of times, with one cranking, to start it.



This is the German Roland D. VI, used extensively during the last year of the war. Its design is comparable with present day planes except in the type of construction used. It was powered with a 160 h.p. Mercedes six-cylinder engine. The fuselage was of the monocoupe type.

Question: For what purpose are automatic wing slots on a wing's leading edge?

Answer: This question has been answered before. Briefly, they reduce the stalling tendency of the ship by allowing a small stream of air to pass up through the slot and over the upper surface of the wing, thus reducing the boiling of the air at stalling angles.

Question: On the propeller of a duration model, what amount of cupping is most efficient?

Answer: I should advise 3/32 of an inch cupping for every inch of width of blade. This might be increased to ⅛ of an inch in order to give greater effect.

Question: Which blade characteristic is best for duration on cabin model propellers, (a) a long, narrow blade; (b) a short, cupped blade with more width or (c) a medium four-bladed propeller?

Answer: I should use (b) a short, cupped blade with more width because you are limited on this type of model to the length of blade that you can use, unless you wish to lengthen the landing gear excessively. This type of blade will give the equivalent of large blade area without large diameter.

Question: Which is best for altitude?

Answer: A long, narrow blade is best for altitude because with any given pitch the angle of the blade to the plane of rotation is less for large diameters than for small. This enables the propeller to pull with greater efficiency when climbing.

Question: What is meant by negative angle of setting of the stabilizer?

Answer: When the chord of the stabilizer which passes through its leading and trailing edges is parallel with the line of thrust (usually the center line of the rubber motor), the stabilizer is set at zero degrees. Under these conditions it passes through the air at zero degrees when the machine is in normal flight. If the front of the stabilizer is depressed below the horizontal line of flight, thus allowing the air to strike the top of the stabilizer instead of the bottom, as would be the case if it were set positively, the stabilizer is said to be set at a negative angle.

Question: What are the features you would incorporate in an altitude ship?

Answer: (a) Large wings of medium camber (10 to 1) with an aspect ratio of 9 to 10. (b) A propeller with a diameter of 2/5 to ½ the span with medium or narrow blades, and a pitch of not more than twice the diameter. The best probably would be one and one-half times the diameter.

Here is a question from William Shee of 60 Country Club Road, Waterbury, Conn.

Question: The nose of my plane always goes up into the air when I fly it. What should I do?

Answer: This performance indicates that your model is tail heavy. Small weights should be placed in the nose so that it hangs in a perfectly horizontal position when it is suspended by a thread, the center line of which passes through a point one-third (*Continued on page* 48)

Here we are again

with Another Full Page of History-Making Values that have made the name "WOBURN"

famous the country over, for **HIGH QUALITY KITS** and **SUPPLIES** at Unheard of **LOW PRICES!**

NEW "GLOISH" BALSA

24" STRIPS

1/32	x	1/16	9 for	2c	1/2	x	1/2	2 for 5c
1/16	x	1/16	9 for	2c	1/2	x	3/4	2 for 7c
1/16	x	3/32	9 for	2c	1/2	x	1	2 for 9c
1/16	x	1/8	9 for	2c	1	x	1	1 for 8c
1/16	x	3/16	4 for	1c				
1/16	x	1/4	9 for	3c				
3/32	x	3/32	9 for	3c				
1/8	x	1/8	9 for	3c				
1/8	x	3/16	9 for	4c				
1/8	x	1/4	2 for	1c				
1/8	x	3/8	3 for	2c				
3/16	x	3/16	3 for	2c				
3/16	x	5/16	3 for	2c				
1/4	x	1/4	3 for	2c				
1/4	x	1/2	3 for	4c				
5/16	x	5/16	3 for	4c				

24" SHEETS

1/32	x	2	5 for	8c
1/20	x	2	5 for	8c
1/16	x	2	5 for	9c
3/32	x	2	5 for	11c
1/8	x	2	4 for	12c
3/16	x	2	3 for	12c
1/4	x	2	2 for	12c
5/16	x	2	2 for	13c
1/2	x	2	1 for	9c

Special Size Balsa

1/100	x	2 x 20	3 for	10c
1/64	x	2 x 20	5 for	11c

24" PLANKS

1 x 2	1 for	15c
1 1/2 x 2	1 for	18c
2 x 2	1 for	20c
2 x 3	1 for	25c
2 x 4	1 for	35c
2 x 6 x 24"		50c
2 x 3 x 40"		45c
2 x 4 x 40"		60c

PROPELLER BLOCKS

3/8 x 3/4 x 5	3 for	2c
5/8 x 1 x 7	2 for	3c
5/8 x 9/8 x 8	1 for	2c
3/4 x 3/2 x 10	2 for	5c
3/4 x 3/2 x 12	1 for	4c
7/8 x 13/8 x 14	1 for	5c
7/8 x 7/4 x 16	1 for	8c

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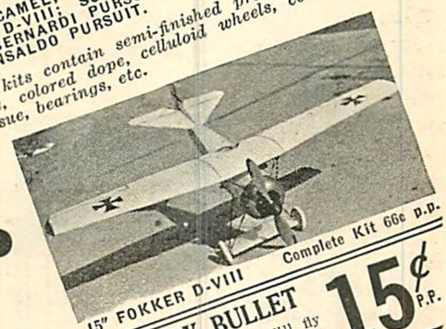

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1¾"	diam.	22c
2"	diam.	25c
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3"	diam.	35c
3½"	diam.	45c
4"	diam.	60c

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2"	diam.	25c
2½"	diam.	28c
3"	diam.	30c
3½"	diam.	36c
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WOBURN

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Aerodynamic Design of the Model Plane

(*Continued from page* 19)

capable of *flying itself under all* conditions without constant correction of deviations of the plane, from the true flight attitude, by the pilot. It is perfectly possible to build such a stable plane without the installation of an automatic controlling device, as many of you model builders already know. In plain words, this is a challenge to large plane designers, on the part of model airplane builders, to sacrifice a little aerodynamic efficiency for the sake of greater natural stability and safety,—if they know how.

The cure for spinning and spiral dives is, briefly, the proper proportion of dihedral and fin area. If the fin area is too small, spinning or a spiral dive or rolling oscillation may result as quickly as if there was no dihedral on the wing. So, if you have a plane with plenty of dihedral, yet it spiral dives, you can be sure the cause is too little fin area. Simply enlarge the fin. This will probably cure the trouble.

However, there is another important factor that may contribute to a delay in the recovery of a model from a spiral dive. This is the position of the fin. If the center of fin area is not well above the longitudinal axis of the machine, trouble in respect to spiral diving may result. If the fin is placed well *above* the longitudinal axis, the angle of attack on the wing will increase when the plane banks, which fact will have a tendency to pull the nose up out of the dive, into normal flight again. (It is my purpose merely to give you the facts here. The discussion of the reasons for these various reactions will be given in detail later, after you have been told what the simple corrections are for all these troubles.)

In summing up we should say that the rules to follow in order to prevent spinning or spiral instability, are:—

1.—Make fin with an area of not less than 10 per cent of the total wing area.

2.—Make the wings with a dihedral of not less than (5) degrees on each wing. It is not advisable that each wing should have more than (10) degrees of dihedral.

3.—Place the fin area well above the longitudinal axis of the fuselage, or above the line of thrust.

Longitudinal Stability

Longitudinal Stability has been defined as that quality that an airplane possesses which causes it to resist or recover from any displacement about the lateral axis. Or in other words—if an airplane is longitudinally stable it should resist successfully any tendency that tries to nose it over into a dive or nose it up into a stall, or it should return immediately to its normal flight position if any such displacement should take place.

Fig. No. 38, Page No. 31, November, 1932, issue shows an airplane which has been displaced longitudinally. If it is longitudinally stable, the nose and tail should move in the direction indicated by the arrows to bring the plane into the line of flight again.

A plane may show lack of longitudinal stability in two ways. (1.) Upon being launched into flight it may nose upward into a stall or downward into a dive, under power, from which maneuver it never regains its equilibrium. (2.) It may fly along in proper flight position for a short distance, when it may be nosed upward or downward suddenly by a gust of wind, from which position it never recovers to its correct flight attitude.

In the first case the plane is forced out of normal flight position by a feature of incorrect adjustment or design, EXISTING WITHIN THE PLANE ITSELF, while in the second case the plane is thrown out of flight balance by an EXTERNAL factor. However, in both cases the plane lacks sufficient longitudinal stability to overcome these tendencies to displace it, or to recover its balance when once it is displaced.

Thus we see that the factors which govern stability longitudinally may be divided into two classes.

1.—Those that tend to displace the plane from its normal flight attitude.

2.—Those that resist, or cause the ship to recover from a displacement.

We will leave the discussion of *how* these factors act until later, when we will take up the theory involved. Now, for your ready reference and convenience we will merely tell you what these factors are and *how to use them to accomplish the best results.*

The factors entering the design of a plane that may be instrumental in causing a displacement from the normal flight position, or have a disturbing influence on its longitudinal stability, are:—

1.—*The position of the center of gravity relative to the lift on the wing.*

2.—*The type of wing section.*

3.—*The size of the wing chord.*

4.—*The difference in angle between the wing and the stabilizer.*

5.—*The speed of the plane.*

6.—*The length of the stabilizer moment arm, which is the distance between the center of gravity (approximately center of the wing) and the center of the stabilizer, measured parallel to the longitudinal axis.* See Fig No. 55.

7.—*The position of the line of thrust, or propeller pull, relative to the center of resistance of the machine as it passes through the air.* (T and R, Fig. No. 55.)

When one considers the number of factors entering the problem of building a longitudinally stable ship, it is no wonder that a satisfactory solution appears so elusive. But this is not all. Now we must consider the factors of design that will determine the *resistance* of the model to displacement from the normal flight attitude, and which will act to right the ship when once it is displaced or thrown off balance. These factors may be listed as follows:—

(1.) *The position of the center of gravity relative to the center of lift, (The Wing) considered in a vertical plane.* (2.) *The area of the horizontal tail surfaces, hereafter to be called the stabilizer.* (3.) *The distance of the stabilizer from the center of gravity (approximately the center of the wings).* (4.) *The angle of the stabilizer to the line of thrust. (Normal line of flight.)*

Now, suppose we consider each one of these disturbing and helpful factors separately, and determine their values and position in order to secure the greatest possible amount of longitudinal stability, or at least a sufficient amount for our needs.

The first factor which may cause a displacement is: (1) The position of the center of gravity relative to the lift on the wing, considered in a horizontal plane. If

the center of gravity is to the rear of the vertical line of life as at (W) Fig. No. 55, it will have a tendency to pull down the tail and nose the ship up into a stall, unless the stabilizer is designed to carry part of the load. This is not usually the case however, on the average model plane. The tail plane usually is set at (1°) negative angle of incidence causing down pressure.

In order that the center of gravity (Point of Balance) will not have a disturbing effect but, rather, will contribute to a model plane's stability, it must be located *ahead* of the line of lift (L) as at (F) Fig. No. 55, when a non-lifting tail is used. Here is a good rule to follow. If you locate the wing of your plane so that the center of gravity is a distance of from (1/4 to 1/3) of the chord, back of the leading edge of the wing, you may be sure this factor will cause you no difficulty.

The cause of the lack of flying ability in many of the so-called flying scale models is the improper location of the center of gravity. It is usually too far back, making the model tail heavy. To be assured that the center of gravity of your ship is well forward, it is wise to make the rear of the fuselage and the tail surfaces as light as possible. Otherwise it may be necessary to weight the nose of your plane in order to give it the proper balance for flight.

So far we have been referring to the TRACTOR models. What about PUSHERS? Where should the center of gravity be located on a pusher? If the small front plane and the large rear one are placed on the model at the same angle of incidence, the lift on each one will be proportional to their areas, provided similar wing sections are used on both wings, front and rear. However, the front wing, for stability reason, is placed at a larger angle of incidence, which actually causes the front plane to lift about twice as much per square inch as the rear plane, when flying horizontally. Thus it has the effect of being twice as large. In Fig. No. 56 the lift on the two wings are indicated by arrows (F) and (R). The center of gravity must therefore be located somewhere between the two planes, its position being determined by the relative lift of the front and rear planes. We will say that it is located as shown by arrow (C. of G.), (X) distance from the center of lift of the rear plane (1/3 of chord back from its leading edge) and (Y) distance from front plane's center lift (F).

Suppose, now, that the distance between the plane's respective points of lift is 24 inches—Then: $X+Y=24$, or $X=24-Y$, and $Y=24-X$.

However, we know that (X) and (Y) are proportional to the lift of the front and rear wings respectively. Also, that the lift of the two wings is proportional to $\left(\frac{A_R}{2A_F}\right)$ where (A_R) equals the area of the rear wing and (A_F) equals the area of the front wing which is set at a larger angle of incidence, giving the effect of $(2A_F)$. So now we have: $\frac{Y}{X} = \frac{L_R}{L_F} = \frac{A_R}{2A_F}$ or $X = \frac{2A_F Y}{A_R}$, and $Y = \frac{A_R X}{2A_F}$.

These two formulas may be solved by substituting the value of (24-X) for (Y) in the first formula and (24-Y) for (X) in the second formula, if the distance between the

(*Continued on page* 41)

Airplane Maneuver Contest

(*Continued from page 22*)

the motor may become chilled and stop (especially in winter is this danger present) and then the pilot will have to make a dead stick landing and consider himself lucky to have judged his distance and gliding angle well enough to land on the field instead of "the orchard." With high hills around the field, a "glide" landing is impossible unless a "spiral" landing (a circular glide) is used and this is not very safe.

Now, take a look at the other plane and you will see that it just flies along at the same altitude from which the first plane began its descent. Finally it gets to a point near the edge of the field and "side-slips" down very steeply, using only 1/3 of a mile in distance. This is more convenient than the glide landing of the first ship.

But how can a side-slipping plane lose altitude? The broad side of the fuselage, landing gear and fin creates a tremendous air resistance as they are pushed against the air flow by gravity. Thus, the forward speed is reduced and helps to decrease the wing's lift, causing the plane to drop steeply. The effective span is also reduced when the plane moves forward in a sidewise position. (See Fig. No. 1.)

Now you will want to know how the pilot executes a side-slip landing. Well, suppose we do one to the left, and here, you take the controls. (Figs. Nos. 3 and 4.) Shove the stick forward and to the left, that drops the nose a lot and banks the plane steeply to the left. Now shove your right foot forward, giving right rudder, so that we are skidding down cornerwise toward mother earth but not as fast as in a dive. We are getting down to about 175 feet, so you'd better straighten her out for the landing. Give her some left rudder to head her into the slip. Shove the stick over to the right and forward. Now she's straight, so pull back on that stick and level off for a happy landing.

Watch for the next cover!

A High-Powered Gnat

(*Continued from page 21*)

The Propeller

The propeller is carved from a soft 3⅛" x ⅜" x ¼" balsa block. Cut along the diagonals and shape in the conventional manner. Attach a light shaft and two 1/16" diameter celluloid washers.

Flying

Assemble the model and put on a loop of fine golf-ball rubber or that shredded from a toy balloon. Adjust the model for the maximum glide, as this model will not stall at such an angle. Take the model into a large hall or auditorium; as very seldom is the outside air suitable. Give the Gnat a row or so of knots and let it go. If it doesn't paddle more altitude under its wing in proportion to any "crate" in the hall, search the plane carefully for a stowaway that's holding it down.

This plane could have been made with very much lighter parts and covered with microfilm instead of superfine. The heavier model, however, will stand the handling of enthusiastic spectators. Build the model light and you will be sure of success.

DEALERS !

The list of model airplane dealers to whom "Universal Model Airplane News" will send by direct mail timely items of commercial news—will be held open for additional names until April 1st. Please use business letterhead. Address: Dealer Department, UNIVERSAL MODEL AIRPLANE NEWS, 125 W. 45th Street, New York City.

Building the Morane-Saulnier "Pursuit"

(*Continued from page* 11)

the nose anyway to keep the model from looping.

The machine guns are made of 3/32" aluminum tubing. Make the windshield of sheet celluloid as shown in Fig. 7.

The Propeller

Cut the propeller spinner out of medium balsa and groove as shown in Fig. 5. The blades are carved individually from blanks drawn in Fig. 7. Notice the small groove in the hub end so that the shaft will not separate the ends. When the blades are carved, round off the tips, cut down the hub, and cement ends together. When dry add shaft and spinner; balance. Cement formers A and B together with their grain crossed and a bushing on the shaft of the propeller and embed it in the hub. Place one in former A also. Put two washers in place, put A and B on the shaft and then bend hook in the end. Lower three loops of 1/8" flat rubber in the fuselage with a bent wire and engage the rear hook. Pull the rubber taut and fasten the propeller shaft to the end. The rubber will hold the propeller mounting in position and former B will fit into former C.

The Wing

MAKE 17 ribs, as shown in Fig. 1, of 1/16" veneer. The main spar is made of 1/8" x 1/4" medium balsa. Build the wing on Fig. 6 and see that the ribs are 19/32" out of line. The leading edge is shaped of 1/8" x 1/4" balsa and the trailing edge is shaped of 1/16" x 1/8" stock. The tips are made of 1/32" square bamboo and braced by 1/16" square pieces as shown in Fig. 7. Put a dihedral angle of 2 degrees in each wing. The cabane struts shown in Figs. 1 and 4, are mounted on the fuselage first. Cover the wing and cement the center rib to the cabane struts. The wing should be propped up and the 1/16" x 3/16" x 6 7/16" wing struts added. The three-view layout in Fig. 7 will be of assistance at this point. Brace the wing with the crossed 1/16" x 1/32" x 7" bamboo guy wires.

Doping and Coloring

Give the complete plane a thin coat of dope as a base. Then put the 3" cocardes on the wing. The center is blue, the middle is white, and outside ring is red. Then the rudder. There are three vertical stripes: the blue nearest the spar, the white in the middle and the red on the outside. Color the rest of the wing and rudder, as well as the whole stabilizer, bright orange.

Dope the fuselage a royal blue except in front of former D. The spinner, landing gear struts, cylinder streamlinings, and the section between formers C and D are doped a chalky white. The cabane struts, propeller, wing struts and guy wires are silver. The wheels are blue with black tires. With black lines mark the control surfaces. Notice the full length ailerons.

Flying

Take the model to the field in which you fly your models. By adding little pieces of lead to the inside of former C, you may adjust the model to fly properly. Then try the model with a few turns in the motor. If it flies level, the model is properly balanced.

Watch for the April UNIVERSAL MODEL AIRPLANE NEWS
OUT MARCH 1st

Build The Gee-Bee Super-Sportster

(*Continued from page 23*)

wing to trailing edge. Go over all surfaces with coarse sandpaper to get off all the rough spots and then apply fine sandpaper, making the wing sections ready for painting, which will follow later on.

Tail Units (Plans Nos. 3 and 4)

THE tail units, sometimes called tail surfaces, are made in a similar manner as the wing. Use the pieces of wood Nos. 8 and 9. Draw top view, cut, then draw side view, cut, and then sandpaper for painting. The tail surfaces are composed of the rudder, Plan No. 4, and the elevator and stabilizer, Plan No. 3. On the usual planes the fin (Plan No. 1) is made with the rudder as the stabilizer is with the elevator, but, because of the unusual design of the Gee-Bee, it is better to make the fin as part of the fuselage. A small tail wheel may be made or purchased to fit in the streamlined fairing of the rudder.

Fuselage (Plans Nos. 3, 4 and 5)

If you do not wish to hollow out the cowling around the motor, it may be made with the fuselage as one piece. The accompanying plans, though, will give you full details for hollowing out cowling and inserting miniature Pratt & Whitney engine. Instructions for making nosing will follow later. Draw side view of fuselage on piece of wood No. 2. Cut to shape as you did the wing and tail surfaces, and then draw top view. Finish shaping out the fuselage, referring constantly to the fuselage sections on Plan No. 5. The position of the sections are shown on side elevation of Plan No. 3. Smooth over the surface of the fuselage first with coarse and then fine sandpaper.

The cockpit may then be hollowed out, if desired. Next make the windshield panels from strip No. 7. Cut them to shape with a razor blade. Let struts B and D soak in hot water a few minutes so they will bend easier. Next ambroid (glue) them in their respective positions on fuselage. It is preferable to ambroid D in place first and then A. Permit connections to dry and then ambroid B in place. C and E will go on last. Lay fuselage aside after connections have been covered once more with the ambroid in order that they may hold firmly. After waiting about ten minutes, go over the whole windshield framework with very fine sandpaper, rounding out all the sharp corners or edges. The fuselage construction will then be completed.

Nosing (Plans Nos. 4 and 5)

Draw front view of cowling (Sec. A in Plan No. 5) on block No. 4. Cut to shape and then draw side elevation and cut. Sandpaper thoroughly. Then proceed to cut cowling in half. This makes it much easier to hollow out. Chisel out the insides and then ambroid the two sections in place once more.

The next step is to make the cylinders of the motor. Round out piece of wood No. 6 and then cut off nine pieces the exact size of the cylinders shown in Plan No. 4. Draw side elevation on each one and cut to shape with a sharp razor blade. Sandpaper thoroughly and then wrap wire or black thread around each cylinder. Apply plenty of am-

(*Continued on page 46*)

Aerodynamic Design of the Model Plane

(*Continued from page 37*)

wings is 24 inches as stated above. However, if we call this distance (T) as in the Fig. No. 56 then the distance $(X) = \frac{2A_F(T-X)}{A_R}$, and $Y = \frac{A_R(T-Y)}{2A_F}$. Thus we find the location of (C. of G.). Incidentally the value of (2A) for the lift of the front wing will require an angle of incidence of about three degrees as shown in Fig. No. 56.

You will find that usually the (C. of G.) should be located at a point 1/4 to 1/3 of the total distance between the wings, in front of the rear wing. In other words (X) =(1/3 T), and (Y) =(2/3 T) approximately.

Now we come to the second factor that may tend to cause a displacement of the airplane from its normal flight position, i.e., *The type of wing section.* Obviously we will wish to regulate all of these disturbing factors to have as little upsetting effect as possible.

In chapter No. 1 (articles appearing in February, March and April, 1932, issues of this magazine) it was shown that the center of pressure or lift moves backward or forward on the wing, with changes in the angle of attack of the air flow against the wing. This movement is of such character and magnitude that it causes the curved or cambered wing to be very unstable, in a longitudinal sense. In fact this characteristic of the wing is the primary cause that prompted designers to put stabilizer tail surfaces on an airplane.

However, if we can reduce the movement of the center of lift on a wing our airplane will have less tendency to be unstable. Through experiment it has been found that a wing can be made fairly stable in itself in several ways, as follows:

1.—By putting a reverse curve on the wing section at the trailing edge, Fig. No. 57. This, however, will reduce the wing's efficiency slightly.

2.—By making our wing section with a negative camber on the bottom instead of a positive camber Fig. No. 58. This type of section is commonly known as an (M) section. It is very efficient, giving more speed, and not quite so much lift as the positive cambered section. The important thing here is that its center of pressure movement is less than on other wing sections of positive camber.

3.—By using a sweep back on the wings of (15) to (20) degrees on each side, and constructing it in such a way that the angle of incidence grows *less* from wing root to wing tip, as shown in Fig. No. 59.

The model designer may take his choice as to the method he will use to reduce center of pressure movement. He can secure longitudinal stability with an ordinary wing with positive under-camber, if all other factors are correct, such as the stabilizer.

If you wish to use one of these methods to help the longitudinal stability of your model, method No. 2 will probably give you the greatest satisfaction.

Well, here we are at the end of our space, so it will be necessary for us to wait until next month, in order to continue the discussion of the other important factors involved in longitudinal stability. Until then, Happy Landings.

"Whats" and "What Nots" of Model Plane Building

(*Continued from page 33*)

necessary to remove a piece of paper later on, the paper may be peeled off quite easily. Yet it holds very firmly. Of course for larger models, over 3½ feet spread, some stronger adhesive is necessary. This can be made by diluting model cement until it is the right consistency. No definite rule for dilution can be given as it depends on the paper to be used, but on models up to five or six feet, the cement should not be used straight.

For silk, however, banana oil is not satisfactory, so a thin grade of model cement is necessary. While on the subject of silk, a warning is in order. Don't try to use silk bought in department stores or other such places for models under 8 feet spread, even if you buy the finest they have. It is much too heavy, and it cannot be doped satisfactorily. The writer covered a five-foot model with such silk, only to have to tear it all off again because it wouldn't tighten up smoothly or evenly. The silk finally used on this job was a special model grade, bought from a well-known supply house in New York City and it was only one-half as heavy as the other grade, although it is remarkably strong. The complete process of finishing silk will be described later on.

When you buy your banana oil, do not get it at a paint store unless you know just how it should smell and look. Most paint stores carry a material they variously call, banana oil, bronzing fluid and other names. Most of this is totally unfit for model use as it is a sort of thin varnish, and has not the properties for model work which we desire. Real banana oil was formerly used for painting purposes, but the new substitute is much cheaper, and for painting, just as satisfactory.

Drug stores sometimes carry what they call banana oil, but it is usually a chemical called amyl acetate and totally unfit for model use, being watery and without any adhesive properties. Therefore, unless you know just what you are getting, buy your oil only from reliable model supply houses.

LET us now start the actual work of covering a wing. If the wing has a flat bottom and the top tapers down to the bottom at the tip, we use four pieces for the top, while only one is needed on the bottom. Fig. 1 illustrates this. The tip ribs are successively lower, which means that the paper between each pair is at a different angle from the piece before it. Since we can't bend one piece of paper simultaneously from front to back to follow the rib curve and at the same time from end to end of the wing to follow the tip shape, different pieces must be used between each two ribs. To start covering, cut a piece of paper about ½" wider than the chord of the wing and an inch longer than the distance between ribs A and B. Apply a good coating of banana oil to the full lengths of ribs A and B *only*. Lay the paper in place and draw it smooth lengthwise and crosswise on the wet ribs. When they are dry, apply the adhesive with a thin flat stick to the full length of leading edge, doing one section between ribs at a time if it is a large wing. Then do the trailing edge.

(*Continued on page 48*)

Fighting Wings

(*Continued from page 7*)

taken down when, on a cross-wind take-off to "show off" before his comrades, the young aviator was flipped up and neatly ripped off the landing gear, skidding along on the fuselage. The propeller struck and went into a shower of splinters. Swaab ducked under the cowling and came out without a scratch. The plane was "not quite a wash-out."

But what a razzing he got!

Soon American troops were taking Cantigny and other strongholds. But the pilots had to have further gunnery instruction, at Furbara, Italy. They were royally entertained.

In July, 1918, the young Lieutenant and his group were back at Issoudun. Americans were now everywhere.

Then he was made an instructor! There was only one way to get out of this assignment. He "boggled" a test flight, deliberately made himself appear dumb and incompetent. By such tactics he finally saw action instead of merely training others, for which he was well fitted.

From this point on we let him tell his own story.

Captain Jack Swaab's Own Story

ON August 26, 1918, several of us were ordered to Toul, France, to join the 22nd Pursuit Squadron, 2nd Pursuit Group. That was just fourteen months after the 22nd was organized—over a year of waiting for planes!

We were mostly 20 to 24, all First Lieutenants except Clint Jones, who was a 2nd. I recall "Handsome Jack" Agar, tall, with jet-black hair, a great favorite. Howard Clapp was blonde and quiet, our champion "red dog" player, and Phil Hassinger never had much to say. Rem Vernam was always panning the Germans. Clint Jones was the best-dressed, his blond hair always "slicked." A. C. Kimber was built like a string bean. As for myself—"who wants to know?" Just a regular American, I'd say.

We packed up like a house afire, and bumped the bumps all night from Orly, near Paris, to Toul, our airdrome near the front. Eight men in a compartment built for six—and exactly room enough for *two* to sleep! No wonder we played cards all night and talked about the war, the arm-waving Frenchmen, the noise, and everything.

Captain Ray Bridgman, our Commander, had flown with the Lafayette Escadrille and we were rather scared to meet him. But he was just a fine big kid and shook hands all around. For the first time we decided that this war was going on and was something serious. The big American drive was getting under way. Our job was to patrol the lines, keep the Germans out of the sky if possible, give our doughboys a chance on the ground.

Next day we looked our planes over. Brand-new Spads, they looked great. But gee, how many jiggers they had that could go wrong!

The Hisso motors were good ones, for that day. But they had a regular habit of conking out when you needed them most. The guns had to be broken in and rigging checked. We were busier than a convention of monkeys.

(*Continued on page 46*)

TODAY'S "UNIVERSAL MODEL AIRPLANE NEWS" READERS ARE TOMORROW'S AVIATION LEADERS.

Read
the CLASSIFIED DIRECTORY
on Page 48 for Price Lists,
Catalogues and Special Offers

Reflections of An Airplane Designer

(*Continued from page* 10)

Climb at sea level.....850 ft. per minute
Service ceiling.....15,500 ft.
Absolute ceiling.....17,500 ft.
Top speed.....170 miles per hour
Cruising speed.....145 miles per hour
Range at cruising speed.....560 miles
Gasoline capacity.....300 gallons
Power plants.....
2 700-horse-power Wright Cyclones

Fifteen passengers, 2 pilots, 450 pounds of baggage and express, and 200 pounds of mail, with a total payload of 3200 pounds.

This is probably as fast as any multi-motored transport of to-day. It is true that the multi-motored machine cannot quite equal the performance of the single-engined craft. But the slight sacrifice in speed is well worth while. With one engine out of commission, the Condor will still be able to fly continuously at 3000 feet altitude.

The engines are two geared-down 9-cylinder air-cooled Wright Cyclone R engines. Our diagrams show three-bladed propellers. Why the gearing down and why the three-bladed propellers? There are three main elements of noise to be combated. First the mechanism of the engine itself with its valves, and other mechanism; no matter how refined the design of an engine may be, no matter how many ball bearings and other devices may be incorporated, a certain amount of engine noise will remain. The second, and more important source of noise is in the exhaust. To decrease the noise of the exhaust, the exhaust pipe is run under the lower wing and back. This keeps a good deal of the exhaust noise away from the cabin. Finally there is the noise of the propeller. It has been shown definitely by experiment that the propeller is most noisy whose blade tips run so fast that they approach the speed of sound (which is 1092 feet per second). The Wright engine turns over very fast: namely, 1900 revolutions per minute. That is one of the reasons it only weighs 1.22 pounds per horse-power. If the propeller were direct driven from the engine, the tips would travel dangerously near the speed of sound. By gearing down, and by using a three-bladed and therefore a smaller diameter propeller, the tip speed is kept within much lower limits. Hence both exhaust and propeller noise are kept down.

OUR readers will further notice that over the engine there is mounted a circular cowling which covers the engine and blends into the engine nacelle. The engine nacelle in turn streamlines into the wing. It is aerodynamic devices such as this that the modern designer uses to keep down air resistance.

Why are the gas tanks placed entirely in the upper wings and right outside the fuselage or central body? First, because no matter how reliable engine pumps may be, gravity is still more reliable. Second, there is less danger of fire.

Servicing is always an important item with the operator of the airplane; the designer does not always give servicing the thought he should. The Curtiss designers have put a catwalk on top of the fuselage to service the gas tank, an excellent precaution and one which will be much appreciated by mechanics in the field.

Why Advertised Models are Best

Of the five hundred model manufacturers doing business in this country today, the fifty advertising in UNIVERSAL MODEL AIRPLANE NEWS are the largest and oldest. These firms whose advertisements you see in this magazine have reached their present positions because their models were good, their prices fair, and their service excellent. These firms which advertise are anxious to continue growing and are following their old successful method of pleasing the customer. Order from them with confidence!

We are always talking of top speed and cruising speed. The transport operator prefers to talk of "block to block" speed, based on the actual time from one airport to another. That explains why the baggage compartment under the passenger cabin is so carefully arranged in sub-compartments, marked Through Baggage, U. S. Mail and Local Baggage. With these sub-compartments the work of arranging and sorting baggage is reduced to a minimum and time is saved accordingly.

THE Condor will carry 15 passengers, and a total of 3200 pounds of pay load. Another good point. The transport operator is not only concerned with speed and safety. He also wants to make money, and the way to make money is to have a large pay load. The Condor, designed by experienced engineers working closely with officials of the transport lines themselves, *is* likely to make profits for the users.

We have previously spoken of the advantages of the cantilever monoplane. But the Condor biplane has very little bracing as the photographs will show. And the lighter weight of the biplane offsets its somewhat greater resistance.

The landing gear is retractable. This retractable gear is operated electrically, with a mechanical lever for emergencies. Three warning devices indicate the position of the gear to the pilot.

The Passenger Cabin

We have already stated what the general requirements for the passenger cabin are. We have seen that noise has been given much attention. Let us see how the other requirements for passenger comfort are met in the modern air liner.

Entering the cabin from the side, the passenger finds the seats arranged in three rows abreast, and five deep, all facing forward. Nothing is so disagreeable as to face backward on the airplane. There is a twelve-inch aisle between the seats, which are high backed and reclinable, with deep upholstery. The aisle of this width is wide enough for all practical purposes. Apparently the travelers on our airlines are big and prosperous men, who want plenty of room. It is understood that the famous wrestler Strangler Lewis is very fond of air travel. He weighs some 230 pounds, and people like him must be provided for. It would be a horrible thought for the pilot were he required to carry a complement of huge wrestlers, however, and the climb and take-off would suffer severely! Cabin walls are fitted with sockets for tables, to be used for serving meals, writing letters, or for business men in writing reports, etc., while *en route*. The cabin interior is finished with a combination of fabric and leather.

POSITIVE ventilation, supplying fresh air through controlled outlets at each seat, is provided. The cabin heater also has individually controlled outlets at each seat, with a master control available to the pilot who may determine the cabin temperature by a glance at the thermometer.

Other refinements in passenger accommodation include a lavatory complete with mirror, running water, etc. Each seat has a call bell for steward service, and there are ash trays, coat racks and magazine racks.

Surely a far cry from the first Wright biplane, with little of our ideal specification left unfilled!

Fighting Wings

(*Continued from page* 43)

MY expert mechanics had made my Spad a little faster than the others. The more I flew it the better I liked it. And it liked me, for a very few days later it was to save my life in the wildest, most exciting and the bloodiest two hours I ever spent, or ever expect to spend on this earth!

On September 2nd, 1918, Lieut. Arthur Ray Brooks volunteered to go up on voluntary patrol. He was dusting along when he caught sight of an enemy Rumpler. The German, Brooks said afterward, was trying to edge over our territory, to look us over, in the wake of one of our Spad patrols flying toward Nancy.

Brooks chased the enemy and caught him. The fight was soon over. A short and sharp combat ended when the enemy went down in roaring flames, crashing near Aumaucourt-Bey.

Two days later Flight Commander Tyndall, Ray Brooks and Clint Jones were cruising along when they spotted an enemy Fokker in the very act of attacking an American balloon.

The enemy was so busy he never saw our boys. The three of them dived down from 14,000 feet, straight for the Fokker. It took them too long. The balloon was in flames before they got there. But how they rode that Fokker's tail! Finally machine guns from the ground got him, and he made his last dive to earth.

The Germans were beginning to learn that Americans could fight in the air. But we had had no real battle. Rain kept us on the ground one day. On another I put in an hour on voluntary patrol, but saw nobody, friend or foe. On one patrol my motor conked out soon after the take-off, and I had to land and get her fixed.

Then came September 8th. I didn't know it, but it was to be the biggest day of my life. It seemed as if I had barely fallen asleep when I was called—at four o'clock!

My, oh my, how warm that bed was! And how dark, damp and dismal it was outdoors. We had a light snack of hominy, fried eggs, hot-cakes, hot biscuits and coffee. Just a bite. Just for luck, I ate the share of two men. I was going to need it.

THE patrol that day was made up of novices. Even our leader, Ray Brooks, had made only about five trips over the lines. Captain Bridgman, our commanding officer, gave us some good advice while we waited for our motors to warm up:

"An hour and a half is plenty this time, Ray. Stick together, fellows—no matter what happens! Learn your planes. Study your motors. And be sure to *keep inside your own lines!*"

Clear orders and good advice. I'll swear I, for one, had no intention of breaking them *all*, before I got back to that airdrome. It was to be a long, long hour-and-a-half before they were to see me again!

My little Spad was painted green, with yellow lines, and our shooting-star painted on the neat, streamlined fuselage. The five of us jumped into our machines and waved farewell. Now for the war!

Brooks had the first bad luck. His motor went bad and he had to limp down. Lieutenant Ray Little swung into the leadership. I was flying as rear high man for our V-formation, the leader flying low, at the point. We headed up and toward the front lines, marked by slow firing of big guns, which we could hear but little. We could see the puffs from shells, and thus knew when we were finally over the scene of dispute.

We climbed over the clouds, into the hot sunlight. I saw a beautiful silhouette of my plane on a cloud as we passed. Earth vanished. I for one began to get nervous, when suddenly our leader dived down, down through the white, fleecy cloud banks.

We all followed, swiftly, steeply diving, till our ears rang. Had our leader spotted the enemy? Was there a lot of him?

A few seconds more, and I dropped out of the lowest cloud. My squadron had vanished! I spotted only two—one traveling toward Germany, at a high rate of speed—the other headed in the general direction of Russia, or I was crazy!

And then anti-aircraft fire, most dreaded by the young war pilot, opened up all around me, with black puffs that seemed to get ever closer. High explosive! I was too busy—and too scared, for the moment—to look for the rest of my squadron.

It was every man for himself!

(*To be continued*)

Build This Gee-Bee Super-Sportster

(*Continued from page* 40)

broid to hold them in place. Cut off eighteen push rods from No. 7 strip. After they have been made, construct the rest of the nosing from block No. 5. Follow same procedure as in building the other parts of the model. Make a peg out of some scrap wood to hold the cowling onto the rest of the motor. Carve propeller from No. 3 piece of wood as shown in Plan No. 1. Sandpaper thoroughly and drill small hole for propeller shaft.

Landing Gear (Plan No. 3)

MAKE landing gear of blocks Nos. 10 and 11 as shown on Plan No. 3. Slice pants down the middle and hollow out as you did cowling in order that wheels may be inserted. The wheels may either be made or purchased. After ambroiding pants together once more, insert wheels, using pins as axles. Be sure to make two of each part of the landing gear.

Painting (3-View Plan)

Draw color lines, numbers, and dice as shown in 3-view drawing on the different parts that you constructed. The whole plane is red and white with the exception of the motor and the tires of the wheels, which are black. The whole front of the model is of vermillion red while the back is mostly of silver white. If balsa wood has been used in building the model, many coats of dope or lacquer will have to be used in order to give a fine finish to the model. After putting on the first coat, let it dry and then go over the painted surface with fine sandpaper. Then when you put the next coat on you will have a much smoother finish. Paint all the parts before assembling them. If you have hollowed out the cockpit, it is best that you paint the inside white and the fittings black so they will stand out more clearly.

Assembly of Model (3-View Plan)

Using plenty of ambroid, connect wing sections to their proper places on the fuselage. *Make sure they are straight.* Put small blocks under wing tips and fuselage to hold them in place. While waiting for the connections to dry, ambroid cylinders onto the rest of the motor. By this time the wing and fuselage will dry and the motor may be ambroided to front of fuselage. Ambroid sections of landing gear together while waiting for motor to dry. Next connect cowling in place around motor, using peg to hold it in place. Then ambroid rudder onto fuselage. After that has dried thoroughly, put on horizontal tail surfaces and then the landing gear. Pin "prop" to nose and attach wire or thread braces to landing gear and wing as shown in three-view outline layout (Plan No. 1). Ambroid isinglass in place on windshield. Touch up all connections with paint and the model will then be completed.

Air Ways—Here and There

(Continued from page 32)

these are added to the collection they now have they will have the most complete list of drawings in the city.

Nelson Black, the recently elected president of the Columbus Society of Model Engineers, is working on one of those tricky little Thaw Specials and judging from his past record as a model builder, we expect to see another possible winner of the 1933 national scale event. Mr. Black's 1930 third-place winner of the national non-flying scale event, appeared in the December issue of this magazine.

South High School members have started on a model of the local municipal airport which, when completed, will be used to exhibit at the Ohio State Fair.

Picture No. 21 is a view of the solid wood Lockheed Vega built by George Ginn. The model is of twenty-four-inch wing span and is finished to the finest detail. Navigation lights, which are lighted by a small flashlight battery enclosed in the wing, is just one of the many fine details he has included in the model. Mr. Ginn specializes in this type of airplane, having built over twenty flying models of Lockheeds in the past two years.

Picture No. 22 was taken at a contest in 1932. The builders are top row, left to right: George Ginn, Hyp Dauben, James Canter, James Hughes and William Stearns. Lower row, left to right; Allan Loofborrow, John Malloy and Paul Ford.

Each year for the past three years, our organization has participated in the annual central Ohio Boy Scout Circus. This year we are again invited to exhibit and present a flying event for the circus. An advance showing of the interesting features of the show will be placed on exhibit at the Southern Hotel, February 9th.

Montreal Model Aeroplane Club

Quebec Branch—Model Aircraft League of Canada

THE Montreal Model Aeroplane Club, reorganized after a period of inactivity last fall, is now in a very flourishing condition and became affiliated with the Model Aircraft League of Canada, on the first of the year. The Honorary President of the Club is Colonel Wm. Bishop, V.C., Canada's greatest war Ace and an intrepid airman, supported by a slate of officers all of whom are active in Canadian Aviation. Picture No. 23 shows Col. Bishop talking with some of the boys.

Flying meets and scale model contests are held monthly, under the direction of Sydney M. Nesbitt, the Club Secretary, who is the "man behind the gun" in model airplane work.

The first of this season's meets was held in the Craig Street Drill Hall, Montreal, on October 22, and was presided over by Mayor Rinfret and Colonel Bishop, the latter presenting the prizes. The winners in the Flying Stick and Baby R.O.G. events were Max Bercovitch and William Nelson, with Art Caine placing first in the Flying Scale. Prizes for the best scale models went to Jack Sears, A. Cockle, J. Suddes and W. Powe.

At the second meet, which was held on November 19, the Grand Prize of a flight

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Aviation Advisory Board

(*Continued from page 34*)

of the chord of the wing back from the front edge. In other words, measure the chord of the wing, take one-third of this distance and measure it off from the leading edge toward the rear. Mark this point, then suspend the model so that the thread is immediately over the point just mentioned. After this, weight the nose until the ship hangs in a horizontal position. If the nose still has a tendency to rise after this is done, raise the front edge of the stabilizer slightly, 1/16 of an inch for example.

R. M. PADLEY of 103-55 97th Street, Ozone Park, N. Y., writes in and wishes to know what weights models of various types should be.

Answer: Typical models which have recently come to my attention are as follows: Baby R.O.G., 35/100 of an ounce. Indoor hand-launched endurance ship, 125 square inches of wing area, .225 ounces. Outdoor twin pushers, 1½ ounces to 3 ounces, wing area 150 square inches. Cabin models of about 100 square inches, 1 ounce to 3 ounces. A good rule to remember is, an outdoor model is fairly light when it has 100 square inches of wing area to every ounce. If it has 50 square inches of wing area for every ounce, it is reasonably light. A model may be considered heavy when it weighs 1 ounce for every 30 square inches of wing area.

Air Ways—Here and There

(*Continued from page 47*)

to Quebec and return in a Canadian Airways Plane was won by George Richardson who amassed the highest aggregate score in the flying events.

At the third monthly meet held in December, Harry Solomon became Grand Champion, making the longest sustained flights in the Indoor Tractor and Baby R.O.G. events and so gained possession of the cup until the next meet. Art Caine again won the Flying Scale contest, sending his model up for a beautiful flight which received much applause from the spectators. In the scale model event Ken Tucker placed first, with Harry Solomon second and Garnett Rogers third.

Model Flying Club of Australia

IMPORTANT news comes this month from our friends on the other side of the world. Gordon Ratcliffe, 16 years old, made a remarkable flight of 28' 27 2/5" with his single propeller tractor monoplane, with a span of 36". The machine reached an altitude of 6000 feet. The model was last seen when the watch was stopped, heading for Parramatta. At this point, it was six miles from the point of take-off. A day or so later the machine was recovered at a point thirty-six miles away. This is certainly a remarkable flight and though officially is not a world's record due to the fact that the machine did not remain in sight for more than 28' 27 2/5", it may be said that this plane is capable of flying to a record at any time.

Gordon Light made an official flight of 25' 35" in September. Since that time, he has made an unofficial flight of 51' 43", said flight being witnessed by two or more people, which betters the Australian time. However, with such a performance coming from Australia, it is not at all certain that official records will remain in this country for any length of time.

The next contest was held in January, 1933 (no news of this contest has been received yet), in competition for the Augus and Coote cups.

New Haven Junior Aero Club

The Connecticut Model Airplane Meet will be held April 21 and 22 at New Haven, probably in the State Armory on Goffee Street and at the New Haven Airport. Contestants will be notified at least two weeks in advance in regard to the exact place at which the Meet will be held.

For complete information and application blanks, write to the New Haven Jr. Aero Club at the New Haven Airport, New Haven, Conn. All applications must be received before April 5, 1933.

Correspondents Wanted

The following young men would like to have other readers of UNIVERSAL MODEL AIRPLANE NEWS correspond with them.

1. Joe Miller, 6420 South Sacremento Ave., Chicago, Ill.
2. Ruel Pease of Ashfield, Mass.
3. Warren Reed, 3160 Y Street, Sacramento, Calif.
4. Alvin J. Schaefer, 432 Dewey Street, Sandusky, Ohio.

"Whats" and "What Nots" of Model Plane Building

(*Continued from page 42*)

When dry trim off all around with a sharp razor blade. Do not worry if the covering is slightly wavy, as these waves will disappear when the paper is tightened. Never pull tightly across the wing on the paper as this causes more sag between ribs. Needless to say, for a smooth covering job the ribs must be all the same curve and all glued in the same line. If one or more is a little too high or too low or if the curve differs from the rest, no amount of careful covering can produce a smooth workmanlike job. Do not worry about getting on too much banana oil, for it soaks into the wood somewhat and it dries quickly besides. However, don't smear it on so thick that it spills over on the paper.

The covering on section two, of the wing shown in Fig. 1, comes next. It must be cut before putting on so that it fits on rib B with 1/16" or so overlap. The outer end of the paper is cut a little large and trimmed off later. Since the area to be covered with this piece is small, we can glue it on all at once, so put banana oil on both ribs B and C and the edges between them. Then lay the paper carefully in place, lapping it carefully over rib B. Do not try to pull it tight, just smooth out the large wrinkles, the natural stiffness of the paper being sufficient to make it lie flat. Pieces 3 and 4 are put on in a similar manner. For the bottom a piece of full size may be used, so cut it a little larger than the outline of the whole wing. Use ribs A and B again to start the gluing, followed by the leading and trailing edges between them. Do the whole tip at once.

Next month we will continue our discussion on covering and finishing your model plane.

GIVEN FREE

A Beautiful **Glider KIT**

Everything to Complete a Real Model Glider, with a purchase of $1 or more.

NOTE All Balsa shown here in 18" lengths can also be had in 36" lengths, if requested.

Balsa Wood

This balsa is clear, straight grained stock. It is strong, light, and free from defects. If hard or soft wood is desired, specify when ordering.

18" Lengths

1/16 x 1/16	26 for .05
1/16 x 1/8	24 for .05
1/16 x 1/4	24 for .07
1/8 x 1/8	24 for .05
1/8 x 3/16	24 for .09
1/8 x 1/4	24 for .12
3/16 x 3/16	10 for .06
3/16 x 1/4	10 for .07
1/4 x 1/4	10 for .08
1/4 x 3/8	6 for .08
1/4 x 1/2	6 for .09
3/8 x 3/8	6 for .09
3/8 x 1/2	6 for .10
1/2 x 1/2	4 for .10
1 x 1	2 for .16

40" Lengths

1/8 x 3/8	.03
1/8 x 1/2	.03
3/16 x 3/8	.03
3/16 x 1/2	.04

Sheets—18" Lengths

1/32 x 2	1 for .05
1/16 x 2	1 for .06
1/8 x 2	1 for .09
3/16 x 2	2 for .08
1/4 x 2	2 for .09

Plank Balsa

1 x 3 x 36	.25
1 x 6 x 36	.38
2 x 3 x 36	.42
2 x 6 x 36	.75
2 x 5 x 40	.75

Propeller Blocks

1/2 x 3/4 x 5	8 for .06
1/2 x 3/4 x 6	8 for .07
5/8 x 1 x 7	8 for .09
5/8 x 1 x 8	4 for .06
3/4 x 1 1/8 x 8	4 for .08
3/4 x 1 1/8 x 10	4 for .09
3/4 x 1 1/8 x 11	2 for .07
7/8 x 1 1/2 x 11	2 for .08
5/8 x 1 1/4 x 12	2 for .07
7/8 x 1 1/2 x 12	2 for .09
7/8 x 1 1/2 x 14	2 for .16

Dowels

Straight grained, true size birch dowels — highest quality grade.

1/8 x 18" long	7 for .05
3/16 x 36" long	6 for .05
1/4 x 36" long	4 for .05

For a limited time

12" lengths	12 for .05

Bamboo

Genuine, straight grained, no-knot TONKIN Bamboo. Strong and light. Splits easily.

	Doz.
1/16 x 1/4 x 15"	.07
1/32 x 1/4 x 8"	.04
1/16 x 1/16 x 9"	.03

Japanese Tissue

A fine tissue for covering flying scale models. Strong, light, and takes dope well.

20 x 24	3 for .05

Veri-Fine Tissue

One of the lightest tissues known. Excellent for endurance models, because of its extremely light weight.

20 x 15	.04

Colored Tissue

Just the thing for the new bright colored ships that are so popular nowadays. Red, Orange, Brown, Blue

20 x 24	2 for .05

Wood Veneer Paper

Very useful in scale and flying-scale models. Strong, yet light enough to fly.

20 x 30	.13

Celluloid Wheels

Experience has proven these wheels best for flying scale models.

	Pair
3/4" wheels	.05
1" wheels	.07
1 3/8" wheels	.09
1 7/8" wheels	.13

Bushings

for wheels..... 4 for .02

Music Wire

Strong, springy wire sold in this new, convenient manner.

1 ft. lengths—straight .014, .020, .028, .031 6 feet for .02

Dummy Motors

The very thing for adding that realistic touch to scale and flying scale models. Extremely light. Nine cylinders.

1 1/2" diam.	.16
3" diam.	.28

Rubber Thread

Careful testing has proven this rubber to be the highest in energy content per unit of weight. This means more turns and less breakage.

.045 sq.	50 ft. for .12
3/32 flat	50 ft. for .13
1/8 flat	50 ft. for .13
3/16 flat	50 ft. for .16

ALUMINUM ITEMS

Drag Rings

Used on the real ships for cutting down wind resistance. Makes a beautiful addition to any radial motored model.

1 1/2" diam.	.15
2" diam.	.17
2 1/2" diam.	.22
3" diam.	.25

N.A.C.A. Cowlings

No dummy motor needed when this cowling is used. Has a hole for thrust bearing in the nose.

1 1/2" diam.	.15
2" diam.	.17
2 1/4" diam.	.23
3" diam.	.26

READ BEFORE ORDERING: In Order for Prompt Delivery Please Comply with Instructions Below.

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Winnie Mae or Bellanca Pacemaker 15-inch Full Size each	15c
Outdoor Cabin Tractor	10c
Twin Pusher	10c
3 R.O.G. Stick Models	10c
Travel Air Mystery Ship 24-inch Full Size	40c

HEY FELLOWS!

TAKE A LOOK AT THESE REDUCTIONS

¶ VALUES!— *Yes, emphatically so! These material and Kit offerings certainly must be* THE BEST VALUES IN THE COUNTRY *judging by the way the orders are coming to us. The model airplane builders of America know Madison Quality and Leadership* AND THEY KNOW *that Madison gives the best values. Read, convince yourself and order at once!*

Aluminum Tubing

.010 wall thickness	ft.
1/8 O.D.	.05
3/16 O.D.	.09
1/4 O.D.	.11

Aluminum Leaf

Real sheet aluminum, yet almost as light as paper. Makes a beautiful covering job.

.0003 thick

3 1/2" wide	5 ft. for .05

Sheet Aluminum

12" wide	ft.
.003	.12
.005	.12
.010	.16

Washers

For indoor, outdoor, and flying scale models.

Large size, 1/4 O.D. Dozen, 1½c; Per 100, 10c
Small size, 1/8 O.D. Dozen, 1½c; Per 100, 10c

Clear Cement

The fastest drying, lightest and strongest cement on the market. Try some now. You'll be amazed at its marvelous properties.

1 oz. tubes	.06
2 oz. tubes	.08
4 oz. cans	.20
1 pt. cans	.60
1 gal.	4.50

Clear Dope

Just suited for the model user's requirements.

2 oz. cans	.07
4 oz. cans	.13
1 pt. cans	.35
1 gal.	2.50

Acetone

For thinning out heavier liquids.

2 oz. cans	.07
4 oz. cans	.13
1 pt. cans	.35
1 gal.	2.50

Colored Dope

Highest quality pigmented dope. Do not confuse with inferior grades. Leaves a smooth, even color upon drying.

Blue, Red, Yellow, Orange, Silver, Black, Olive Drab

2 oz. cans	.09
4 oz. cans	.17
1 pt. cans	.60

Thrust Bearings

Light, strong bearings. Hole is truly centered.

Large size .035 hole Each, .01½; Dozen,	.15
Small size .025 hole Each, .01½; Dozen,	.15

Insignias

U.S. Army and Navy type. Improves the appearance of models by 100%. Each sheet contains 4 stars in circles for the wings, and red, white and blue stripes for both sides of the rudder.

	sheet
1" diam.	.02
1 1/2" diam.	.03
2" diam.	.04
2 1/2" diam.	.05

Outdoor Twin Pusher

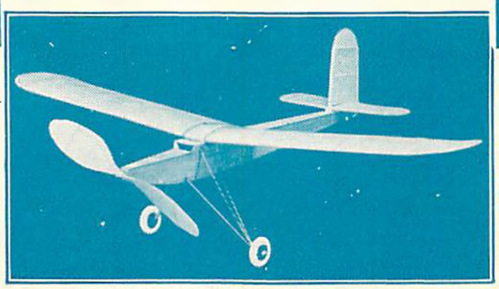
A twin pusher that has actually flown 12 minutes not once—but several times. This plane has several features which cannot be found elsewhere. It has a 40-inch "A" frame that is a marvel for lightness and strength, a 36-inch, high cambered, tapered wing, and two 12-inch, high pitch props powered by 68 feet of ⅛ flat rubber. The kit contains complete plans and instructions, stamped ribs, and all other materials needed for the construction of the model. Price **Reduced to 75c** Add 10c for Postage

TWO-IN-ONE KIT

Contains the around-the-world "Winnie Mae" and the "Transatlantic Bellanca." Both 15" wing spans. Kit contains full size plans, bulkheads, large tube of cement and all other materials needed to complete these two wonderful models. Get yours now.

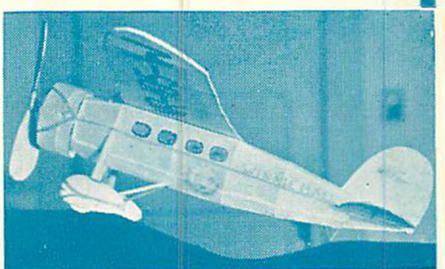
REDUCED TO 75¢

Add 10c for Postage



3-in-1 Kit

Three R.O.G. Stick Models **75c**



Outdoor Cabin Tractor

One of the snappiest flying models in its class, proper engineering and all balsa construction does it. This plane has a double surfaced, high lift wing, 30-inch span, all balsa fuselage, extra strong landing gear to withstand the shocks of outdoor flying, and a large, wide-bladed propeller to keep it up for long endurance flights. The Kit contains complete plans and instructions, stamped ribs, large tube cement, 1 oz. bottle clear dope, pair celluloid wheels, and all materials needed to complete the model. Price **Reduced to 75c** Add 10c for Postage

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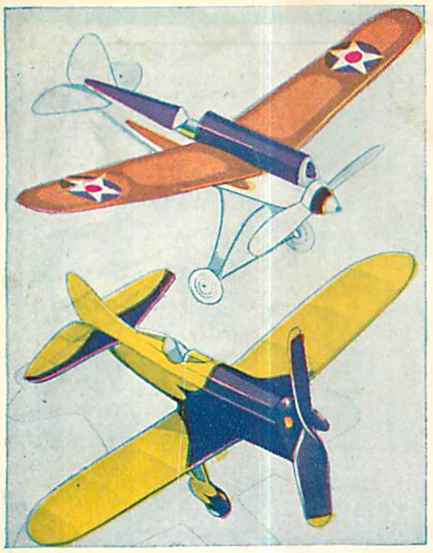

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Comet ANNOUNCES two marvelous 25c plane-kits that **REALLY FLY** . . . Gee-Bee Sportster D. and The Secret Attack Plane . . . each **separately packed** . . . sold to you **together only** inside big, colored box—50c at Dealer's or prepaid! Both planes EASY to build, fly fine! **Biggest** value **ever offered** model builders! Note that these **Comet Kits** give you **cement** and **banana oil**—many others DO NOT! **SECRET ATTACK PLANE** (top photo) . . . our **latest** army attack . . . some say it's an exact model of the "mystery" ship used by Secret Service (Int.). . . others claim it's the Army's **hidden** "ace in the hole." What a bargain at 25c!

Gee-Bee SPORTSTER D . . . a **beautiful** job, full of "IT"—a FLYING SCALE that **really flies!** Every builder wants this early-type Gee-Bee (a **better model** flyer than most types). Only 25c.

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NOT SOLD SEPARATELY

WARNING! Many 25c kits on market LEAVE OUT banana oil and cement—COMET 25c kits are COMPLETE and INCLUDE famous COMET CEMENT AND BANANA OIL! Don't buy any 25c kit unless you get banana oil and cement—get FULL VALUE for your money!

These two 25c Comet FLYING kits **sold only** in "2-in-1" combination kit for 50c. CONTENTS of both plane-kits include: Jap tissue (blue, yellow, orange); banana oil, cement, balsa strips, printed balsa formers, sheets, Army insignia, rubber motors, sandpaper, balsa prop block and printed blades, headrest, shredded bamboo, wire, prop shafts, washers, celluloid, waxed paper, pins, FULL-size 3-view plans, EASY instructions, etc. **Limited supply** ready, so ACT QUICK! Remember—Comet gives you the BEST and MOST Value—and **BEST SERVICE!**

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Of course you know what miniature replica models are—non-flying scale—but wait'll you get these brand-new COMET replica kits at only 25c each! (Not less than 2 to a customer.) SPECIAL OFFER: ANY 5 for $1, 12 for $1.95, at dealer's or prepaid. Actual photograph shows 'em in full, real colors. COMET-CRAFTED solid miniature kits contain: Wings, rudders, elevators, pants (where shown), ALL PRINTED on correct thickness sheet balsa—fuselage blocks—vent, cowls for radial motors—aluminum printed props—cement—coloring—INSIGNIA—brace wires, struts, FULL-SIZE, 3-VIEW plans, wheels, sandpaper, EASY instructions. The BIGGEST, BEST "Buy" in replica models.

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5 for $1 Not less than 2 per customer! At Dealer's or Prepaid

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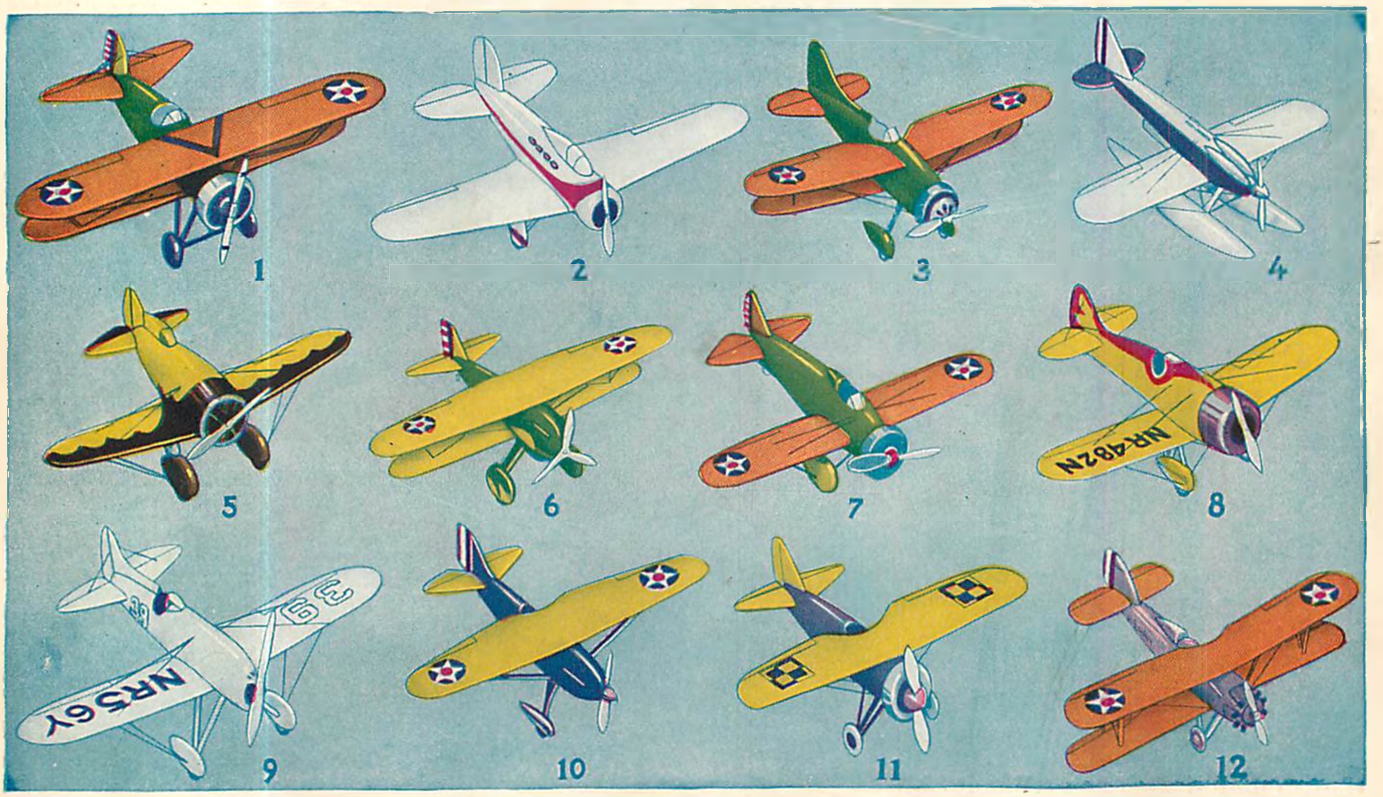

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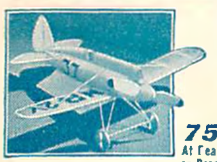

75c At Dealer's or Prepaid

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Be FIRST to build, fly, this thrilling new Phantom Fury—silent Rider of The Night Skies! Bargain price: 50c at dealer's or prepaid. Note **pants**, stream-lined landing gear! Is THIS the secret army plane we hear about but never see? What a FLYER! 13" x 10½"! Act quick! COMPLETE kit in strange "Ghost" box has EVERYTHING needed: Colored Jap tissue, spec. bal. prop block, print. rib, sheet, formers, pants PUNCHED OUT, bamboo, bal. noseblock, headrest, tube cement, banana oil, all wire parts, sandpaper, FULL-size 3-View plans, EASY instructions, etc. Selling like wild-fire! **Beat your friends**—order Fury **today!**

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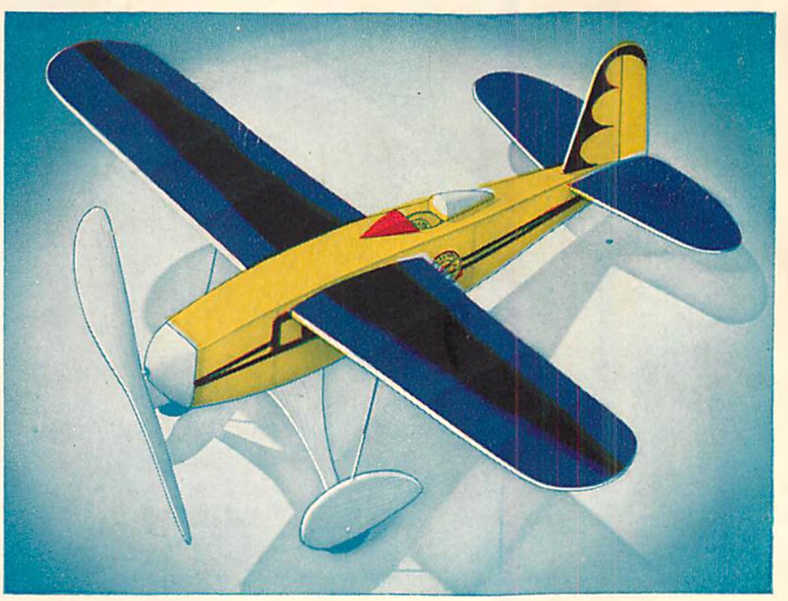

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