JUNIOR MECHANICS AND MODEL AIRPLANE NEWS

A MACFADDEN PUBLICATION

PRICE 15 CENTS

JUNE

FULL SIZE PLANS

BARLING NB-3...U.S. Altitude Record Holder

FLYING GLORY... 1,000 Ft. Flyer

"JUMP" by Orville H. Kneen

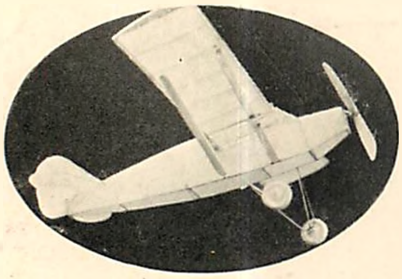
A masterpiece concerning parachutes

Motorless Flight by Anatole Feldman

Basic facts about Sail Flying

INDEPENDENCE LEADS THEM ALL!

The Stinson-Detroiter



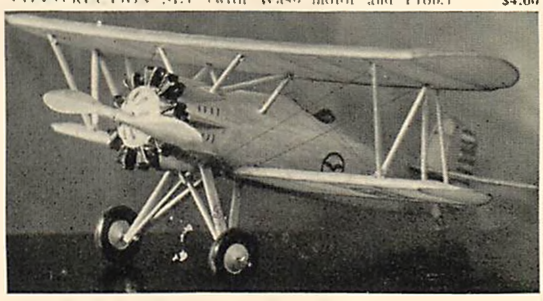
The Stinson-Detroiter, as illustrated here has flown over 2 minutes duration, it's very simple to build, very realistic and very attractive. It has detachable nose piece for duration winding, using M-6 airfoil, just like the real plane, and adjustable wing for long stable flights. Kit contains ready-stamped ribs, semi-finished prop, Jap tissue, special rubber motor, etc., packed in an unbreakable box.

CONSTRUCTION SET $1.50

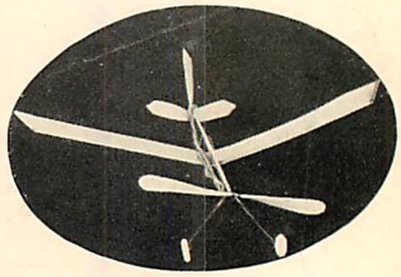
The Boeing P-12B Pursuit Ship

This 2-ft. flying-scale-model of the Boeing P-12B, the latest U. S. Army's pursuit plane, one of the fastest and most rakish machines in America will make the snappiest jobs! The ship is known for its speed, its rapid climb, its maneuverability, and was also used by Capt. Ira Eaker in the Army's Panama-U. S. dawn-to-dusk flight. This model is an authentic reproduction of the original ship, and having minute details of the real plane. In spite of these details, yet flights of 500 ft. have been obtained and durations of 45 sec. are possible. Our kit contains all the necessary parts, including ready-stamped ribs, wheels, dope, glue, Jap. Tissue, insignia plus a miniature WASP MOTOR and ALUMINUM PROP. and wood cut to size.

CONSTRUCTION SET (with Wasp motor and Prop.) $4.00



Giant-Cloud-Breaker R. O. G.



Here's an R.O.G. model that performs like nobody's business! One that's designed for climbing, stunting, gliding, speed plus duration, one that will out-perform any R.O.G. model that you have ever seen! Having a cambered wing of 20", indestructible rudder and stabilizer. Kit contains all the necessary parts and a semi-finished propeller.

GIANT-CLOUD-BREAKER R.O.G. $0.75

BABY-CLOUD-BREAKER R.O.G. (half the size of the Giant-Cloud-Breaker 50

Kiln Dried and Scientifically Cured Lata Balsa Wood

2"x6"x36" $1.00	1/8"x6"x3' ... $0.50	1/16"x6"x3' ..$0.35	1/32"x6"x3' ..$0.35
1/8"x3"x3' ... .25	1/16"x3"x3' ... .20	1/32"x3"x3' ... .20	1/8"x2"x3' ... .20
1/16"x2"x3' ... .12	1/32"x2"x3' ... .12	1/8" sq. x 3'.. .04	1/8"x3/16"x3'.. .04
1/8"x1/4"x3' ... .04	1/8"x1/2"x3' ... .07	3/16"x1/4"x3'.. .05	3/16" sq. x 3'.. .05
3/8" sq. x 3' .07	3/8"x1/2"x3' ... .09	1/2" sq. x 3'.. .09	3/16"x3/8"x40" .07

SUPPLIES OF SUPER-QUALITY

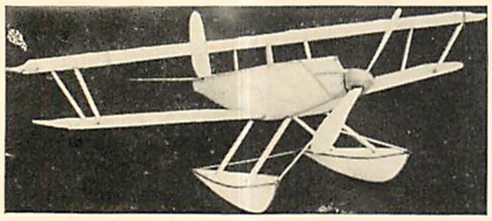
Bamboo strips 12" ea..$0.01	Ambroid, 2 oz. $0.28	Acetone, 1 oz.....$0.12
Ambroid, 1 oz. ..... .15	Banana oil, 1 oz..... .12	Banana Oil, 2 oz..... .20
Acetone, 2 oz..... .20	Jap. tissue, 5 shts.... .25	Rice paper, per sht.... .05
Jap. tissue, per sht... .10	Music wire, per ft. .. .01	Fibre wheel, 3/4" diam.
Chinese silk, per yd.. .90	Wood veneer 20"x30" .20	ea. ..... .01
Reed, any size, per ft. .01		
Bamboo strips, 19" (without joints) ea.$0.02	1" celluloid wheels, per pair .. .... .15	
1¼" celluloid wheels, per pair ..... .20	2" celluloid wheels, per pair..... .35	
Thrust bearings, .025 or .035 hole, ea. .05	Thrust bearings, .025 or .035, per doz. .35	
Brass washers, .025 or .035 hole, ea. .01	Brass washers, .025 or .035 per doz... .10	
Army's insignia, per set ..... .15	Navy's insignia, per set..... .15	
Rubber strand, 3/16"x1/32", per ft. .01½	Ambroid, 4 oz. ..... .48	
Rubber strands, .045 sq., 1/32"x1/8", 1/32"x1/16", 1/32"x3/32", per ft..... .01		
Colored, wing dope, orange, yellow, red, blue, green, pink, black, plain, per bottle .... .15		

PLEASE READ!—When ordering any of the above listed supplies or Balsa wood, a packing charge of 15c must accompany all orders. ALL ORDERS MUST AMOUNT TO NO LESS THAN 75c, including the packing charge. WE PAY THE POSTAGE. NO FOREIGN COINS OR STAMPS ACCEPTED. Canadian orders are subject to an extra charge of 25c for kits, and supplies ordered. PLEASE PRINT YOUR NAME AND ADDRESS PLAINLY. YOUR ORDER WILL BE FILLED VERY PROMPTLY FROM OUR VAST STOCK. SATISFACTION OR MONEY BACK.

The Vought Navy "CORSAIR"

BOYS! Have you a model of this famous navy fighter in your squadron? The above illustration of the model is built from our construction set. Doesn't she look realistic? We'll say so! The "Corsair" is not only a neat looking ship, but also an exceptional flyer. Our construction set includes all the necessary materials together with a miniature WASP motor and a ready-made ALUMINUM PROP. Built completely from Balsa Wood.

CONSTRUCTION SET (with WASP motor and PROP.)..... $4.00



The Sea "Hawk"

The sea "Hawk" is the result of several months of experimenting. It is a worthwhile model to build! This model incorporates the latest design in model airplanes and using real aerodynamic principles. The sea "Hawk" can make short hops off the water and make a graceful landing on ponds or pools, which will make you feel like a full-fledged admiral! Just the model to have around camp! Construction set contains all the necessary parts for you to build.

CONSTRUCTION SET $1.00

Our Other Famous Construction Sets

Record Twin-Pusher (a simple but exceptional flyer).....	$2.50
Morris Hydroplane (the record holder).....	3.00
Indoor Commercial (a neat little model).....	1.00
Outdoor Commercial (a duration flyer).....	2.50
Twin-Pusher R.O.G. (just the model you want).....	1.50
Ryan "Foursome" (the latest flying-scale-model).....	4.00
Curtiss "Falcon" (the Army's observation plane).....	3.00
Lockheed-Sirius (Lindy's new plane).....	3.00

INDEPENDENCE PRODUCTS

Boys! Did you ever stop to think, that the quality of any article is not always judged by the price? And that's why you should not insist on "cheap" and "inferior" materials. Every item listed here and in our catalog has been tested and retested by noted authorities in model airplane building, and has proven to be the best that money can buy. Our materials are not only of the highest quality but also at the lowest prices consistent with quality. We guarantee every article as exactly as represented or money refunded. INSIST ON INDEPENDENCE MODELS AND SUPPLIES and YOU WILL BE SURE OF USING THE BEST IN THE MARKET!

Our New Illustrated Catalog No. 4

Have you a copy of our latest catalog No. 4 which is just off the press? Well, it pays to send for a copy right away for it will save you from further use of "inferior" materials and from distress in prices.

Would you like to have an illustration of our latest Ryan "Foursome" the perfect flying scale-model? Wouldn't you like to have more information on the famous Boeing P-12B pursuit ship, illustration of the "Falcon", Lindy's new plane, twin-pusher R.O.G., record twin-pusher, commercial models, and amphibians that really take off from water as well as land? By all means rush a dime for a copy!

COMPLETE CATALOG NO. 4 SENT UNDER SEPARATE COVER $0.10

DEALERS!—Why not represent our line of models and supplies?—Write at once for our discount sheet for details!

The Curtiss Army "HAWK"

The Curtiss Hawk, as illustrated here is a model built from our kit. Its unusual good appearance and flying quality make it the pride of every boy. It's scaled-down and built in the same manner as the original ship. It has a spinner for the prop., real cockpit with painted instrument board, cowling and exhaust pipes, just like the real plane. Here's a chance for you to build an exact replica of that fast controllable pursuit ship, that roars through the air at speed of 180 M. P. H.

CONSTRUCTION SET (contains the necesary materials) $2.50

The Lockheed-Vega

The Lockheed-Vega "Yankee Doodle" is the best 3-foot flying scale-model in the market. Its sweeping streamlines, its smooth colors, its dashing appearances and its few external struts and appliances make it an excellent ship to build. Our construction set contains all the necessary parts, complete from aluminum paint to a miniature WASP motor.

CONSTRUCTION SET..... $4.00

INDEPENDENCE MODEL AIRPLANE & SUPPLY CO., DEPT. M-6, FAR ROCKAWAY, N.Y.

Vol. II No. 6

JUNIOR MECHANICS and MODEL AIRPLANE NEWS

CONTENTS, JUNE, 1930

In Our Next Issue

GLIDING and SOARING
and
AERIAL NAVIGATION

—o—

Two of the outstanding men in the aviation industry today, Mr. Percival White and Captain Leslie Potter, are taking a hand in the make-up of our next issue, in which will start the first articles on two of the most absorbing and thrilling subjects known to the game.

"*Gliding and Soaring*" is the title of the book written by Mr. White, and which will be published in serial form in MODEL AIRPLANE NEWS. In these articles will be outlined everything you can imagine in connection with gliders from construction to sail flying. Mr. White is the author of many works on aviation, including "How to Fly an Airplane", and he knows his subject from A to Z.

All that Lindbergh, Byrd, Chamberlin, Yancey and other successful airmen have learned about navigation in the air is set forth in simple language for you by Captain Potter. He is an outstanding aerial navigator and during his thirteen years of actual flying with the British Royal Air Force, has roamed the airways of Europe and both the Near and Far East.

—o—

In addition there will be full size plans for the construction of an Avro Avian solid scale biplane. A beautiful piece of work. Plans for an endurance model also are included in our next and wonderful issue.

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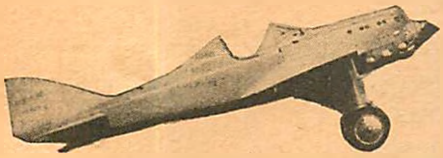
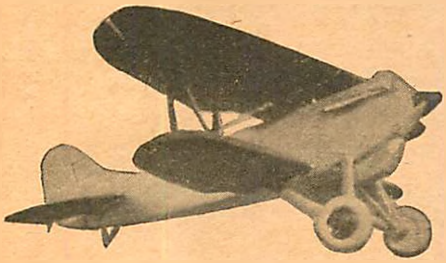
Contributors are especially advised to be sure to retain copies of their contributions; otherwise they are taking unnecessary risk. Every possible effort will be made in our organization to return unavailable manuscripts, photographs and drawings, (if accompanied by postage), but we will not be responsible for any loss of such matter contributed.

PRINTED BY THE ART COLOR PRINTING CO., DUNELLEN, N. J., U. S. A

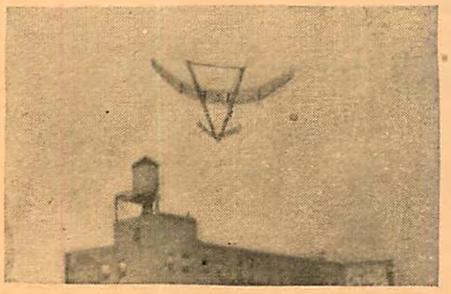
A. A. C. Model Aircrafters, 4719 Third Ave., N.Y.C.



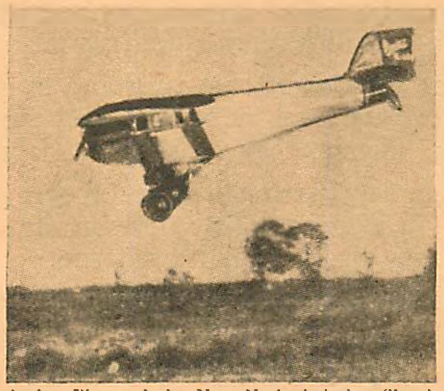
27" FRENCH BERNARD PURSUIT SHIP Kit—a low-winged flying scale model. Complete with colored dopes and full-sized blueprints $3.50



24" U. S. ARMY HAWK. One of the most popular flying scale models in the country. Kit complete with full detailed blueprints $2.50



A. A. C. CHAMPION TWIN-PUSHER in flight over roof-tops of buildings near our factory. Kit of 36" wingspan model complete with detailed blueprints...$2.50



Action Photo of the New York Aviation Show's Prize Winning CURTISS "ROBIN" Flying Scale Model built by Sky Cadet Walter Welsch of Bronx, New York, from A.A.C. Kit.

31" CURTISS "ROBIN" FLYING SCALE MODEL Kit—Complete with colored dopes and full-sized blueprints.....$6.00

ADDITIONAL MODEL AIRPLANE KITS

All Kits Are Complete with Blueprints

FLYING STICK

B. M. TRACTOR Kit. wingspan 10"..... .40
BABY R.O.G. Kit, wingspan 10"..... .50
WINDJAMMER No. 3 Kit, wingspan 30".. .85

FLYING SCALE MODELS

CURTISS "BABY" FALCON BI-PLANE Kit, wingspan 11-3/8" $1.50
JUNKERS LOW-WING MONOPLANE Kit, wingspan 38-3/8" $3.00
U. S. ARMY CURTISS FALCON OBSERVATION AND ATTACK BI-PLANE Kit, wingspan 24-1/2" $3.50
U. S. NAVY VOUGHT "CORSAIR" FIGHTER BI-PLANE Kit, wingspan 24" $3.75
KEYSTONE LOENING AMPHIBIAN BI-PLANE Kit, wingspan 34-3/4" $6.00

SOLID SCALE MODEL

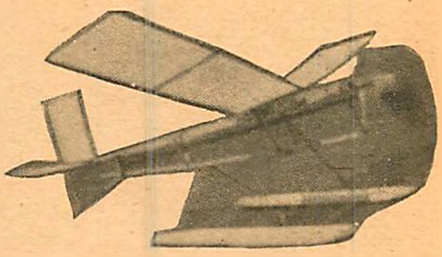
BELLANCA C.H. MONOPLANE Kit, wingspan 23-1/8" $2.50

IMPORTANT, READ

All items listed on this page are sent by Post, Prepaid. NO stamps or Foreign coin accepted. Send Express or Postal Money-Order to A.A.C. MODEL AIRCRAFTERS, 4719 THIRD AVENUE, N. Y. C.

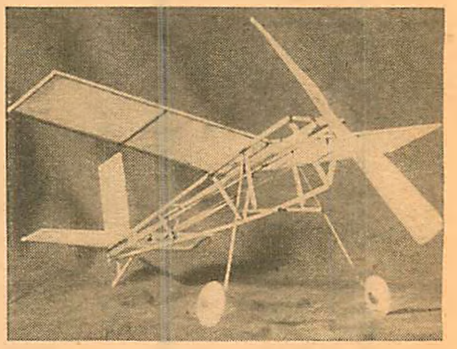
Did you get your FREE copy of the MODEL AIRCRAFTERS WORLD? If not, send for one.

22" FLYING SCALE MODEL OF COL. LINDBERGH'S Mystery Lockheed SIRIUS; or otherwise called the "DOG STAR". The entire model is constructed of Balsa Wood, excepting for the light celluloid wheels and metal fittings. The colors accompanying this kit lend the realistic touch to the finished model; which when completed in accordance to the blueprints that go with the kit weighs from two to three ounces. This model is a wonderful flyer. COMPLETE KIT, ONLY.....$3.50



28" "GIANT COMET" CONVERTIBLE LAND AND SEAPLANE FLYER. Kit with full size detailed blueprints, pontoon blocks and pair of celluloid wheels $1.75

New York's Sensation, "THE COMET"



BABY in size; but GIANT in performance. This indoor commercial model is of 11" wingspan and is guaranteed to RISE OFF THE ground. Can be converted into a seaplane if desired. Kit complete with full-sized detailed blueprints and in boxed container. ONLY 75c

Nation-Wide Demand Compels Us to Offer the Following Bargains!

Finest Grade Clear South American Balsa Wood. Specially Cut, Dressed and Prepared for Model Builders.

Plank Sizes

1" x 6" x 36" long—$0.75 each
2" x 6" x 36" long— 1.00 each
2" x 3" x 36" long— .80 each
3" x 3"x 36" long— 1.00 each

Strip Sizes

(special bundles of 25 strips)
1/8" x 1/8" x 36"—$0.60 per Bdle
1/4" x 1/4" x 36"— 1.25 per Bdle
1/8" x 3/8" x 40"— 1.50 per Bdle
(1/8" x 3/8" sizes are twin-pusher sticks.)

ADD 15c extra for postage to points west of Mississippi and Canada.

A.A.C. CHAMPIONSHIP RUBBER

1/8" flat. A skein of 200 Feet—ONLY $1.00

A.A.C. RUBBER LUBRICANT

which doubles flying time of your indoor and outdoor models (*not* Glycerine)—per bottle 25c.

A.A.C. COLORED DOPE—

excellent for wood and Japanese tissue covering—In colors of RED, YELLOW, ORANGE, BLUE, BLACK, GREEN, SILVER and GOLD—Bottle sizes of 20c, 30c and 50c each.

COLORLESS AMBROID

GENUINE Ambroid in colorless form. Excellent for invisible cementing work. 1/2 oz—15c 1 oz—20c 2 ozs.—30c

1 7/8" Celluloid wheels ..... 25c Pair (with bearings)

2" Balloon Tired Wheels ..... 50c Pair (extra light)

8" Hand Carved Balsa Propellers .50c Each

11" Hand Carved Balsa Propellers 75c Each (made right or left handed)

Pure Nitrate Dope 2 ozs. ..... 40c Btle (For silk Coverings)

9 Cylinder Celluloid air cooled imitation motors.....50c each

Send 2c Stamp for Complete Price List!

Boys!! Model airplane contests are coming. Will you be ready??

What Our Customers Say:

Newell Martin, Peabody, Mass., says:

"The Curtiss Hawk model equipped with skis, secured about 230 feet. I thought this good, as it took off the snow."

Evan Gammill, Nashville, Ark., says:

"Enough cannot be said for the Baby Tractor as a stunter."

Eugene Haynes, Winchester, Mass.

"I have three of your Baby Tractors. They fly wonderful. Send the following right away."

Nicholas Pastore, N. Y. C., says:

"I am greatly pleased with your wood and glue."

H. A. Basil, Sheridan, Mont., reports:

"Some time ago we bought the parts for a 24" Hawk. On the second flight we made a record of 592 feet."

Other Models We Sell

Junkers monoplane, record holding indoor and outdoor tractors, twin pusher, Fokker Universal, and others. All in our catalog.

When model plane builders want their supplies and sets sent quickly, they order from Hawthorne.

When they want material of the highest quality, with prices consistent with that quality, they order from Hawthorne.

When they want construction sets, plans and directions for planes that fly, that have broken records, and that have given much satisfaction to previous buyers, they order from Hawthorne.

When they want all of the above, and besides that, want their order packed in a manner that insures safe delivery, without receiving broken parts, they order from Hawthorne.

If you don't believe this, give us a trial, and we will convince you.

Specifications of Hawthorne Supplies

Our balsa wood is of the best quality, slightly above the specifications of the U. S. government. It is specially selected for absence of worm holes, knots, cross grain and other imperfections.

Our rubber, paper, wire, glue, dope, etc., is the same as used by the winners of the National contests in the past year, and is considered by many model builders as being the best obtainable.

By following up many important National model plane contests, Hawthorne designers have kept up with the best in the field today, and you may be sure that, when you buy a Hawthorne plane construction set or plan, that you have one that is strictly up to date, and one that will give the results you desire.

Hawthorne Model Supplies—Special

Large bundle various sizes of balsa wood, high quality, including flat wood, prop. blocks, long and short lengths, square wood, etc. A real buy. . . . . $ .50

High grade pure gum rubber.
1/8" x 1/32" . . . . . one full skein $1.00

3/16" x 1/32" . . . . . one full skein. $1.50

Japan silk tissue, very light and strong, the same as used by experts. Size 20" x 25" per doz. . . . . $ .40

Thrust bearings, new design, high carbon steel, in two sizes, small and large, for indoor and outdoor planes. Per dozen . . . . . $ .30

Celluloid wheels for models are very strong and light, besides being very realistic.

2" celluloid wheel. . . . . per pair $ .30

1 1/4" wheel. . . . . per pair $ .20

Ambroid cement. In 1 oz. tubes or 2 oz. cans. Price per lot of ten ounces $1.00

Airplane dope. In 2 oz. cans. Price per five cans. Plain dope for covering. . . . . $ .80

Colored dope for doping plane (what color) $1.00

New 1930 Catalog and model plane book with many new ideas, plans, etc. . . . . $ .10

Balsa Wood. Prices are on lots of Six. Length 24 Inches

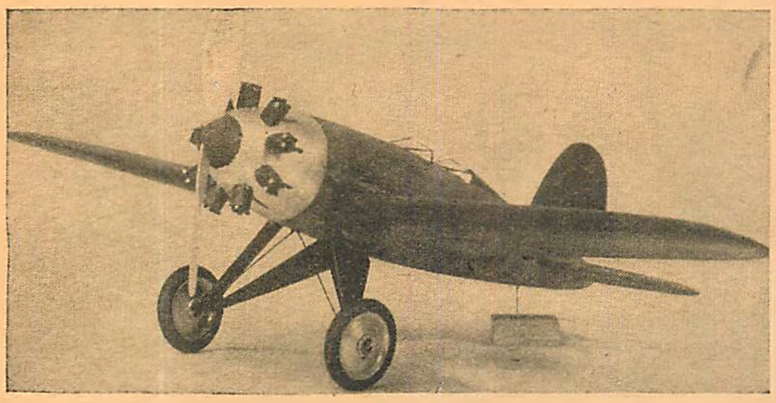
1/8" sq.	$.20
1/8" x 1/4"	$.20
1/8" x 3/8"	$.25
1/8" x 1/2"	$.25
1/4" sq	$.25
1/4" x 3/8"	$.25
1/4" x 1/2"	$.25
3/8" sq	$.30
1/2" sq	$.30
1/32" x 2"	$.30
1/16" x 2"	$.30
1/8" x 2"	$.35

1930 catalog and model book with plans, instructions, and ideas that have been the means of winning contests . . . . . $.10

HAWTHORNE MODEL AERO. CO.

DEPARTMENT M. :-: HAWTHORNE, N. J.

Hawthorne Models Are FLYING Models



Lockheed "Sirius"

2 Ft. (without N. A. C. A. cowling)

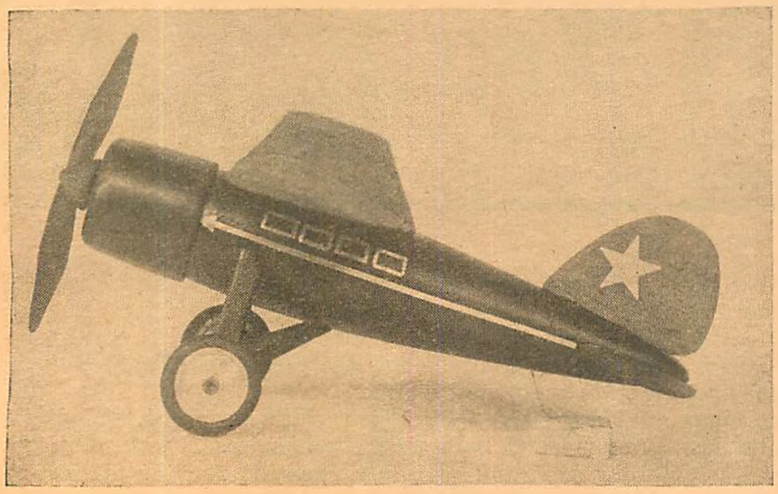
Lindbergh's Latest Plane

This newest creation of the famous Lockheed line makes an excellent flying model. With its streamlined rounded fuselage, tapered wing and absence of wing struts, it presents a clean, fast appearance seen in few planes.

The wonderful design and construction in the Lockheed has been put into the Hawthorne model with the result that in flying ability, strength and type of construction, the last word in up to date models is presented.

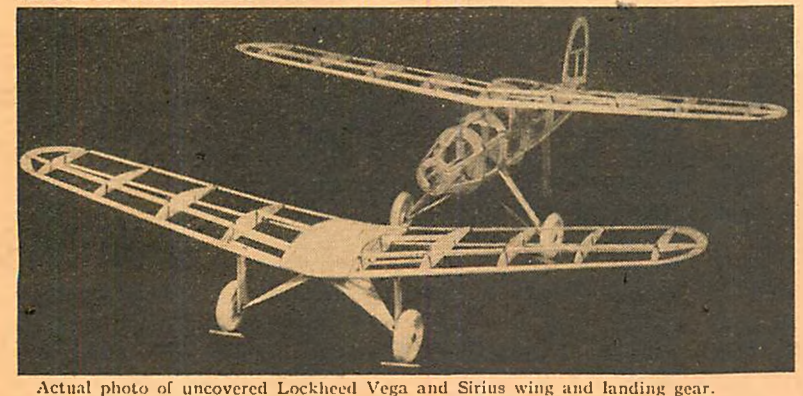
With this set is included cut out ribs, fuselage parts shaped, wire parts, wheels, radial motor parts, etc.

Construction set..... **$3.50**



Lockheed "VEGA" 2 Ft.

This famous North and South Pole plane used by Sir Hubert Wilkins, the Arctic explorer, is great for a model. The performance, construction set and price are the same as for the Lockheed Sirius model above.



Actual photo of uncovered Lockheed Vega and Sirius wing and landing gear.

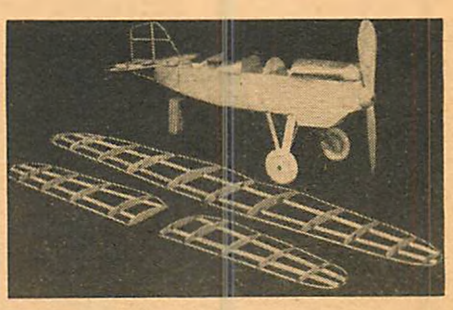
As much work is already done, such as cut out ribs, formed body parts, wing mount block on Sirius, etc., the models are not hard to make.

TWO-FOOT CURTISS HAWK

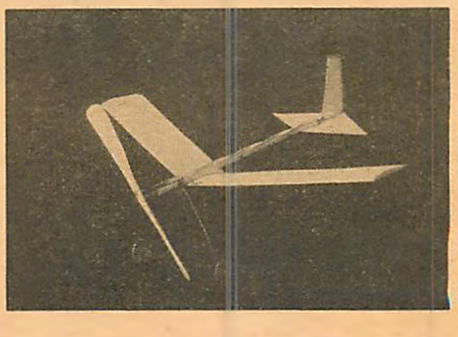
This is a model of the fast pursuit plane flown by Army and Navy aviators. The weight of this plane is about two ounces, made mostly of balsa wood. Flights of 300 feet and 40 seconds have been reported from boys who have made this plane.

The set for this model contains all necessary parts, including celluloid wheels, cut out body sides, two colors of dope, bent wire parts, plan and directions, etc.

Complete construction set..... **$2.50**



CURTISS HAWK (Uncovered)



The Baby Tractor is the simplest model to make, and as it contains only just enough parts for flying, will outfly many a larger and more costly model. This model has been flown out of sight many times, under the right conditions, and when fairly well made will average about thirty to sixty seconds duration.

Construction set..... **$.50**

Hawthorne Model Airplanes

All Hawthorne planes are scientifically designed with flying ability as the first consideration. They contain all the latest improvements in design, and the best points of models that in the last year have won contests.

Hawthorne Model Airplane Supplies are made to satisfy the demands of the most exacting model builder. They are made of the best and lightest material and are used by many of the expert model builders and contest winners of this country.

All Hawthorne construction sets contain every necessary part to make the plane, with extra material included for possible mistakes. Hawthorne planes will fly well when made correctly. The construction used in the real planes is followed as far as possible, with any necessary changes made by expert model makers, in order to increase the flight of the plane.

A few features of Hawthorne planes are the celluloid wheels, which are the strongest and lightest for models; also two colors of airplane dope, included with all scale model type planes; the success had by boys who have built these planes.

HAWTHORNE MODEL AERO. CO.

DEPT. M **HAWTHORNE, N. J.**

IMAGINE yourself a young fledgling, joyriding *along the* skyways in a fast airplane, an army instructor as pilot in the cockpit ahead. The earth unfolds as a green map, two-thirds of a mile below.

Suddenly you feel a shudder running through the ship. The tail starts vibrating violently. Something is wrong. The pilot leans over and shouts, as he throttles the engine:

"Unfasten your safety belt—and *JUMP!*"

How would you feel about that time?

I asked this question of Miss Fay Gillis, fair young student at Curtiss Flying Field, Long Island, and she laughed at me. A month before she had been in that very position.

"I didn't have time to think about how I felt. We were coming down so fast that I lost no time climbing over the edge of the cockpit. Then over I went, into the air."

The young army pilot-instructor took up his narrative of this record-breaking episode, the first real aerial adventure he has had since he graduated from the Army Air Corps eighteen months ago.

"We were up about 4,000 feet, testing an old plane with a heavy new engine. The plane had had 400 or 500 hours. We flew upside down, and went into an inverted power dive for a few seconds, when suddenly the tail began vibrating.

"It shook the whole ship. I couldn't keep her nose up. I knew we were in for it. The altimeter then showed about 3,500 feet.

"I told Miss Gillis to jump. We both had seat-pack 'chutes. It takes only a second to climb over the side and take a dive.

"By the time she was over the side the entire tail had gone. The nose being heavy, we fell into practically a vertical dive. You can believe we were dropping pretty fast, though the ground didn't come up as fast as one would expect.

"I saw Miss Gillis's parachute open out, and at the same moment both wings tore loose. I unfastened my safety belt and waited a moment for the wings and flying pieces of fabric and wood to clear the fuselage.

"Then I cut the switch, pulled myself up against the terrific force of the falling plane, and dived head-first over the side. I jerked the rip-cord and my 'chute just caught the air as I heard the machine crash. Then I lit in the trees and crashed down. That knocked me out for a few seconds. . . ."

MEANTIME Miss Gillis had floated for a few seconds, and then gently landed among the tree-tops. She pointed out the clump of tall oaks at the far edge of Curtiss Field, Long Island—probably a mile from the "contact-office" where we stood. She was probably six or eight hundred feet high when she obeyed orders to jump. Clearing the plane, her safe descent seemed assured the moment she pulled her rip-cord.

Actually she landed in two trees, her parachute spreading in such a remarkable way as to leave her suspended in her harness, dangling between the branches.

"I was forty feet or more above the ground," she recalled, in the detached manner that one relates an amusing episode on a picnic.

"It wasn't very comfortable, so I started swinging

The Ups and Downs of Aerial Life Preservers

Col. Charles A. Lindbergh putting on a parachute before making a flight. This apparatus has saved his life on four different occasions

myself, and managed to catch hold of a branch and pull myself over. But I couldn't get out of my harness, because it takes two hands to unsnap the leg-bands, when your whole weight is on them, and I had to hang on to my branch at the same time.

"So I just hung there a few minutes, thanking my lucky stars and shouting to Lieutenant Trunk, who had come to and was trying to get down.

"'What shall I do?' I called. 'Are you hurt?' Trunk yelled, 'No!'

"By this time a crowd had begun to collect, with ladders and ropes and everything. In fifteen minutes they had a rope around me, to make sure I wouldn't get dizzy and fall. Then I climbed down the ladder, and found Lieutenant Trunk already down—and that's all there was to it."

From all this she emerged without a scratch. Not even her "air-sense" was injured, for within an hour or so she was back in the air, celebrating her initiation as the second woman-member of the "Caterpillar Club."

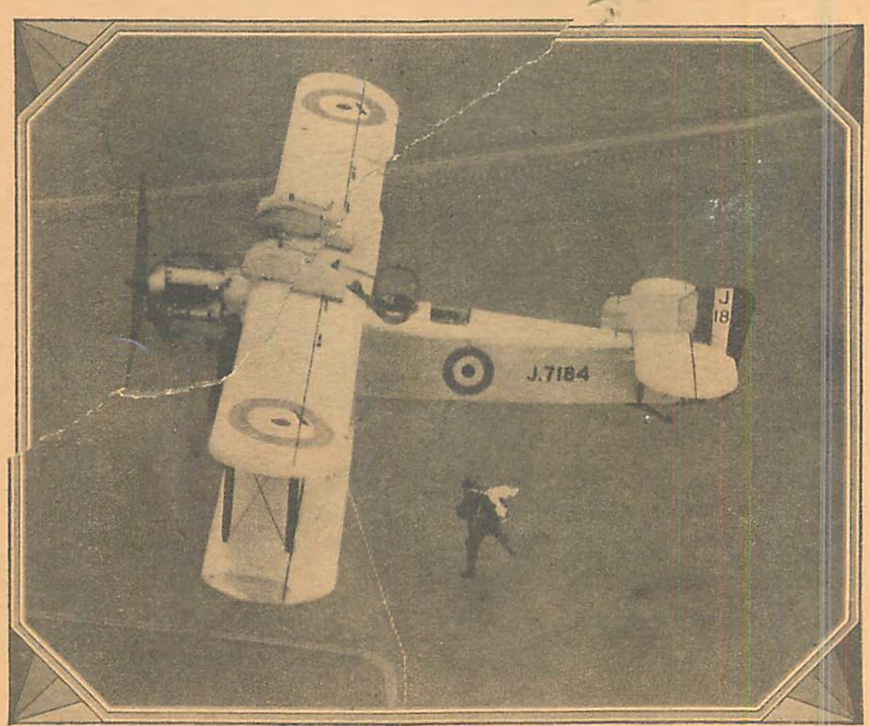
The pilot was not quite so fortunate. Hardwood trees do not make the softest of landing places. He sustained a cut between the eyes, that required fourteen stitches, and his nose suffered from the same blow. After a day or so in hospital he was back on the field.

He, too, was soon in the air again, and inclined to make light of his initiation into the inner circle of those whose lives have been saved by a "silken umbrella," when their airplanes refused to plane.

I asked him what happened to the machine.

"A total washout," he laughed. "I never saw a ship so completely shot. Sorry I didn't get a picture of the remains."

Therein lies the story of these remarkable "life preservers of the air." For if the pilot and his student-passenger had failed to equip themselves with parachutes—it is the invariable rule at Curtiss Field and in both Army and Navy — they would have been hard to separate from the pile of junk that was once an experimental plane.



Parachute in operation, the packing being completely released with folds of silk ready to be pulled out horizontally by the pilot chute as it snaps backward, in less than a second of time

Or had their 'chutes failed at least partly to open in time—and the time was mighty short—for the pilot—we probably would never have known what really happened on that first day of September, when a plane "went bad" during its tests. The machine was so low when the pilot jumped that no one on the field saw him above the tree-top horizon, though of course they heard the crash.

Why some pilots and passengers refuse to wear these "life-belts" is a mystery. Test pilots, who take many chances, and airmail pilots, always snap on a parachute before taking off. Exhibitionists and students learning to jump sometimes wear two, a breast type in front and a seat-pack behind. This is not due to mistrust of a single 'chute, but merely to make sure of a "happy landing" in case the rip-cord is pulled too quickly, and the billowing 'chute is fouled by the machine.

Ocean liners, launches and other water craft are required to carry life preservers for all passengers. They may never be used, but they are there when needed, and usually, of course, there is time to don them before the boat sinks.

Air-travel, however, is faster, and safety demands that the passenger be prepared. The seat-pack is convenient, makes a comfortable seat pad, and requires no instruction beyond making sure that the machine has been cleared before the ring is pulled to release the pilot 'chute.

It is very rare that the machine is so low that the 'chute will not open before the ground is reached.

One of the best things about parachutes is that they work for the amateur just as well as for the professional. Miss Gillis, a slim attractive air-recruit, told me that she started to fly on August 6, had soloed on August 31, and jumped for her life the next day.

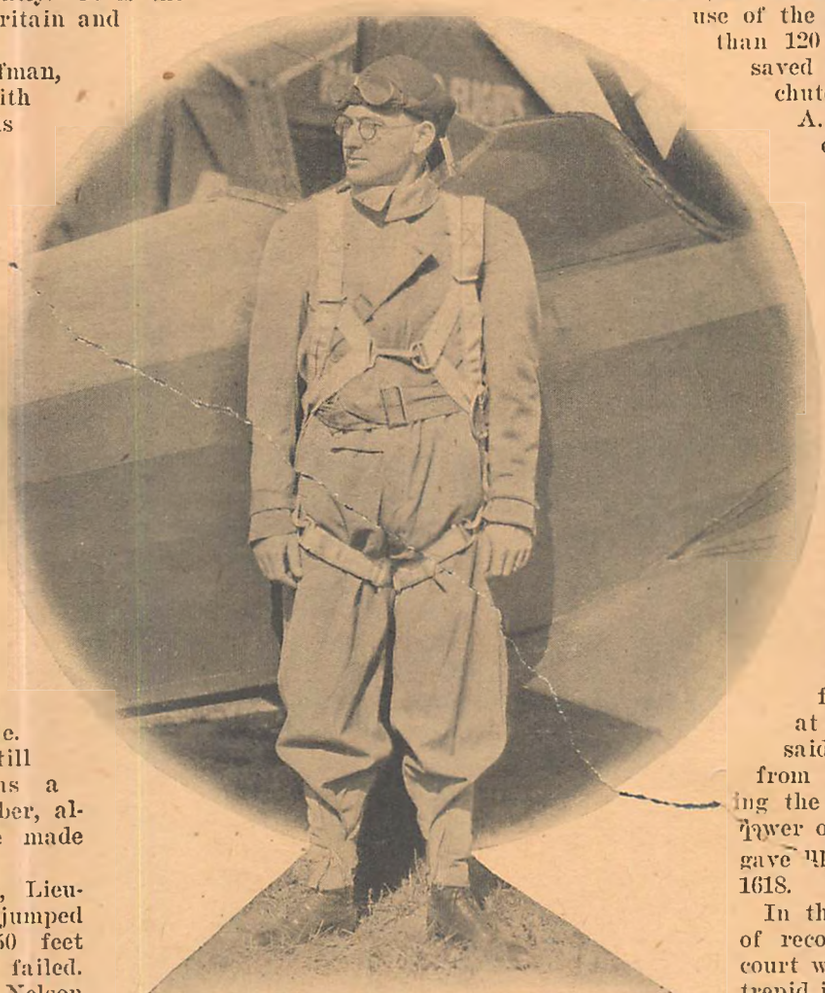
Two weeks later she joined the Curtiss sales force, keeping on with her flying lessons, and the day I saw her—October 5—she had just qualified for her private pilot's license. Thus two months from her first lesson she had completed her ten hours of flying, and made a safe landing in a parachute.

The U. S. Army Air Corps has the proof that once you make up your mind to leave the plane at 175 feet or higher, your chances of parachuting safely are just about 100 per cent. According to its records every man who has jumped with an Army type parachute and cleared the machine has had his parachute open. This is the type manufactured as the Irvin Air Chute, the most widely used, and was the only one on the market until recently. It is the standard for Great Britain and other air forces.

Major E. L. Hoffman, U.S.A., is credited with the perfection of this life-saver. Major Hoffman experimented for years with dummy loads at McCook Field, and received the Collier Trophy in 1926, for the greatest American achievement in aviation.

It is this type that has saved almost all the nearly 200 members of the "Caterpillar Club", those butterflies whose wings have failed and whose lives have been saved by a parachute. Colonel Lindbergh still holds the record as a "fourth degree" member, although several have made two safe jumps each.

One of the latter, Lieutenant Walter Lees, jumped at an estimated 150 feet when his controls failed. Lieutenant Fred C. Nelson also leaped at about 150 feet. His passenger failed to jump and was burned to death in the wreckage. The record for number saved is probably still that made May 28, 1927, when Major Lewis H. Brereton and three passengers jumped to safety when the propeller broke. The fourth passenger stayed with the plane and was killed.



Leslie L. Irvin, chief engineer of the Irvin Air Chute Co., Inc., wearing the "free type manually operated" parachute with which he has made over 100 descents in safety

This form of panic that occasionally holds even a flyer to his machine is one of the mysteries of aviation. Such was the strange fate of Lieutenant Edward Snell, Michigan National Guard officer, last year. At 1,900 feet the right wing collapsed. The pilot, Major Floyd E. Evans, shouted to Snell to jump.

Snell failed to move. Major Evans repeated his warning and jumped. His passenger apparently could not recover from his fear-complex, perhaps a form of "mental paralysis," and was killed in the crash, while the pilot landed safely.

THE remarkable feature of this case was that only a short time previously Lieutenant Snell had made a far more dangerous dive from the top deck of the *Leviathan* into New York Harbor, at the dare of a girl.

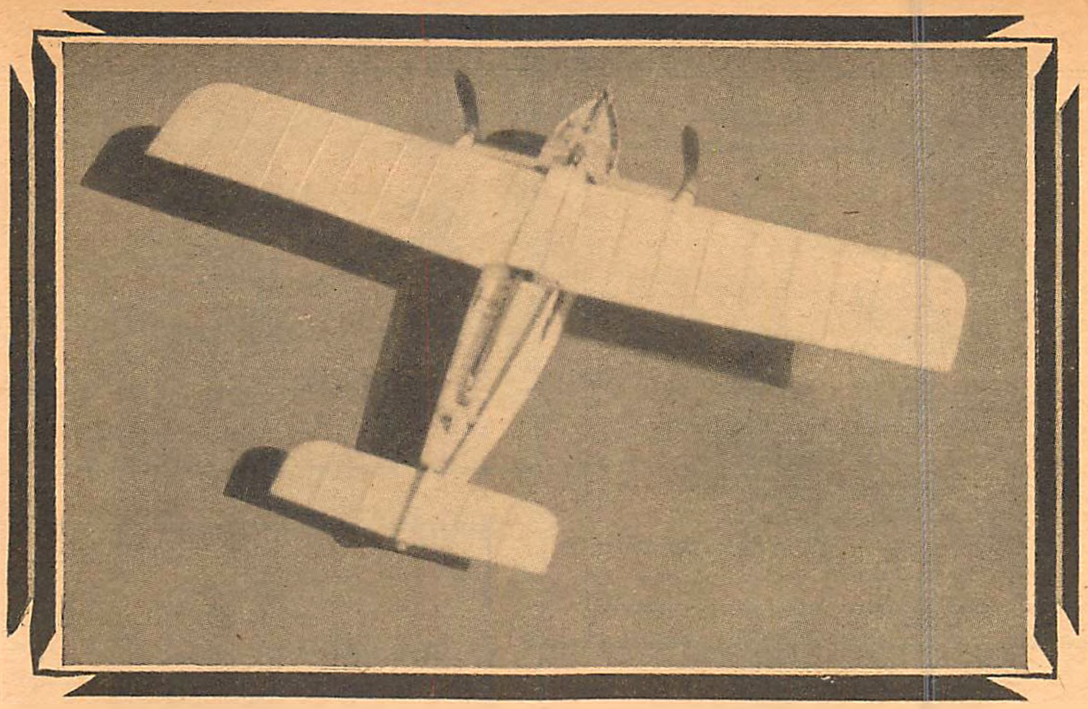
Recently a form-fitting type of parachute was designed by Master Sergeant Erwin H. Nichols, parachute instructor at the Primary Flying School, Brooks Field, Texas. One pound lighter, this type lies snugly on the back from shoulder blades to hips, and is only two inches thick. It is recommended for use in bombing and transport planes, and several companies recommend it for their passengers.

Sergeant Nichols has instructed more than 1,000 officers and cadets in the use of the parachute and more than 120 of his pupils have saved their lives by parachutes. Colonel Charles A. Lindbergh was one of his pupils.

The principle of the parachute was conceived by the first scientific student of flight, the genius Leonardo da Vinci. Details of his ideas are not known to have been put to practical use, but one of his disciples developed them, and actually built a "sort of square sail extended by four rods of equal size and having four cords attached at the corners." He is said to have made leaps from buildings, including the top of the Leaning Tower of Pisa, but if so, he gave up his hobby before 1618.

In the 17th century it is of record that the French court was thrilled by an intrepid individual who leaped with the aid of two umbrellas fastened to his girdle. Whether he made more than one leap is open to question, for the area of the much larger 'chutes now used is the least that will support a man in a safe descent.

In 1783 Sebastian Le Normand is known to have descended by parachute from the top of Montpellier Observatory. He is generally credited with inventing the parachute. Some years later the celebrated aeronaut Blanchard experimented with small parachutes dropped from balloons, to (*Continued on page* 57)



Models and Their Relation to Scientific Experiments

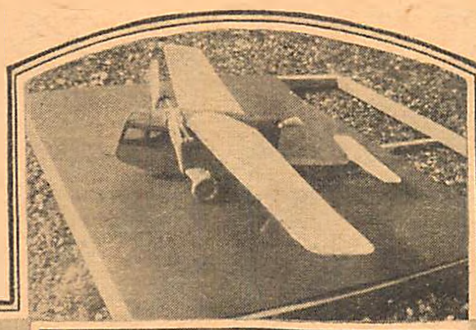
Laboratory Observations Which Can Be Adopted by the Model Builder

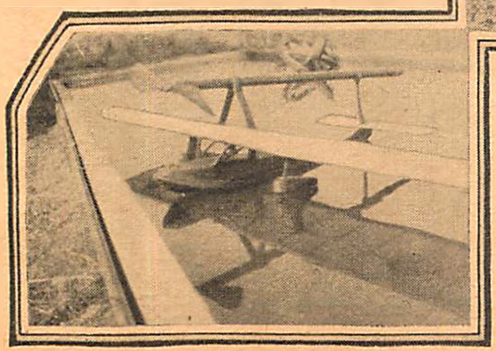
By PROF. T. N. DE BOBROVSKY

FROM time to time I shall try to describe on these pages some of the models which I have used for scientific flying model experiments, and which models have proven satisfactory and might be successfully used by other model fans.

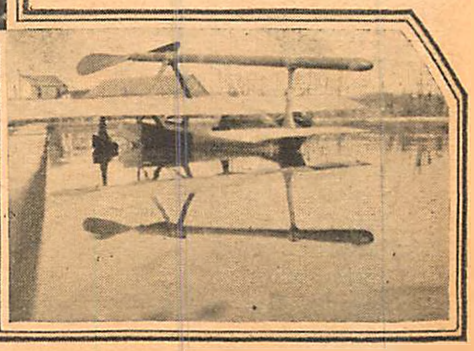
In many cases, where a new device has to be tested out and a flying model is used for that purpose, a twin-pusher type is employed. Very often this model's flight must be observed with instruments and motion pictures made. It is well known that the twin-pusher or, for that matter, all of the pusher type models are capable of carrying heavier loads, and that their unusual stability, as compared with the usual type models, makes them ideal for experimental purposes. However, one of the disadvantages of the pusher model is that they do not keep a straight course and the many constant deviations from their course makes photographing very difficult. There are three means of automatically correcting these deviations on the twin pusher.

As a rule, the small wire "cans" on models are used only to lessen the vibrations of the rubber. In the twin pusher model described in Fig. 1, however, these cans also affect the directional flight of the model as well. As can be seen in this sketch, this model is of the Penaud type with one center fuselage. Note that the cans are fastened to the wing. This serves a double purpose. First of all, it reduces the rubber vibrations and then it also helps to guide the model in straight flight. This is done in the following manner. As the model goes into a bank, the wing being somewhat flexible on the model, the wing on the outside of the bank, getting more pressure, is somewhat raised; thereby also lifting the "can" attached to the wing.





At the top is the model described as Fig. 5 in the text. Two views of Fig. 8 are seen at left and right



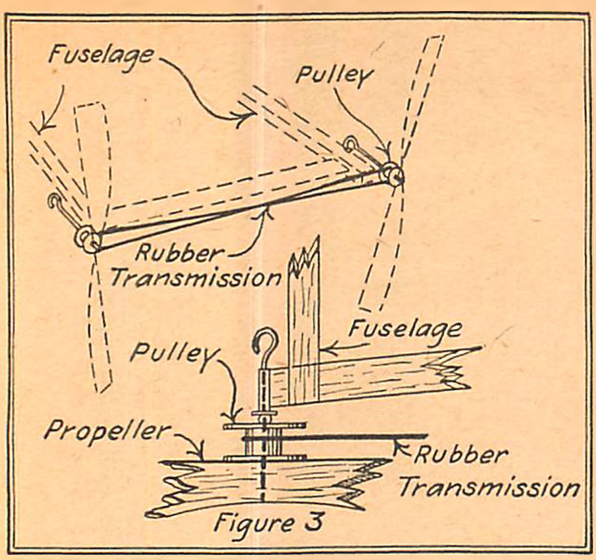


Figure 3

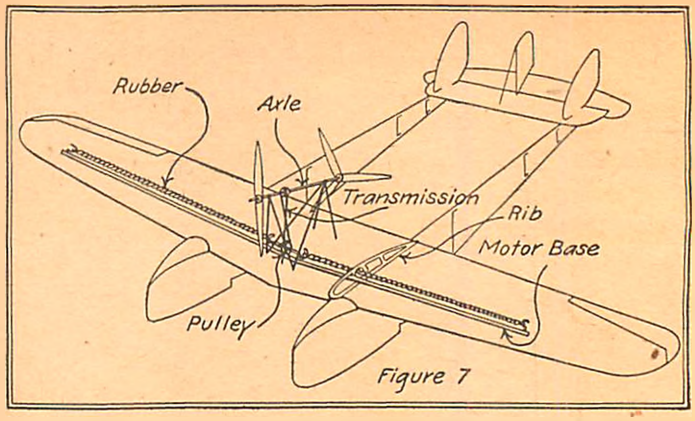


Figure 7

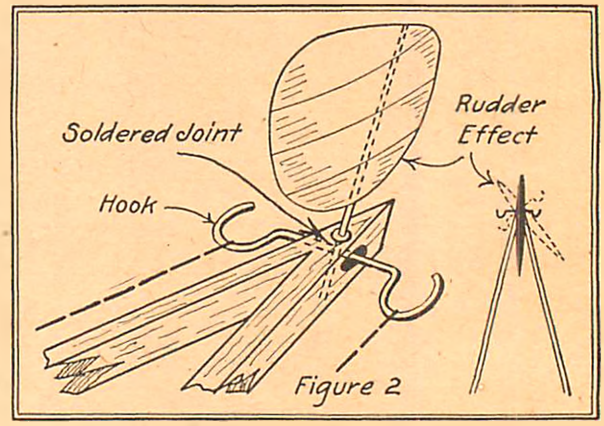


Figure 2

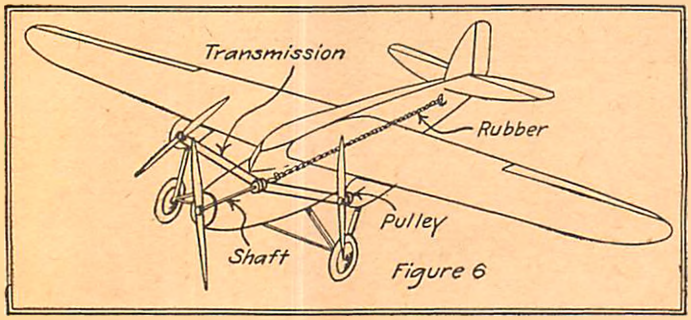


Figure 6

This "can" in turn rubs against the rubber band, thus slightly reducing the speed of the attached propeller; the other propeller having somewhat more speed, the model automatically straightens itself.

Another means of keeping a twin pusher type model in straight directional flight is illustrated in Fig. 2, where on the front of the single or double fuselage, the rubber supporting hook is made of one piece of wire. An upright metal rod is soldered to this hook, to the upper part of which a rudder is attached. This hook also hinges on this upright rod. In spite of the fact that two identical propellers may be used on this model, their revolutions are never the same. This is caused by the uneven unwinding of the knots in the rubber bands. Therefore, if one propeller should revolve faster due to the tightening of the rubber caused by the uneven unraveling—the rubber being tighter, it pulls the rudder in the opposite direction and automatically straightens craft.

Fig. 3 shows a third alternative for keeping the model in straight flight. This model, also a twin pusher, twin fuselage craft, has a small pulley fastened to each propeller, over which pulleys a small rubber band is stretched. This elastic band helps to maintain the speed of the two propellers exactly alike and also eliminates the possibility of a spin, crash, etc., in the event that one rubber motor should run down before the other. In constructing a twin pusher of this design, the shafts will have to be somewhat stronger than usual, as well as the cross piece between the two shafts.

The present methods used in the construction of multi-motored models, such as the Ford tri-motor for instance, is to propel only the center propeller, the two outside propellers being entirely free, merely revolving slowly in the air. In the first place, this is not a true imitation of the original, and in the second place, there is an unnecessary resistance by having to drag the two side propellers along; thereby greatly reducing the flying range of the model. This also means that the center propeller will have

(Cont. on page 50)

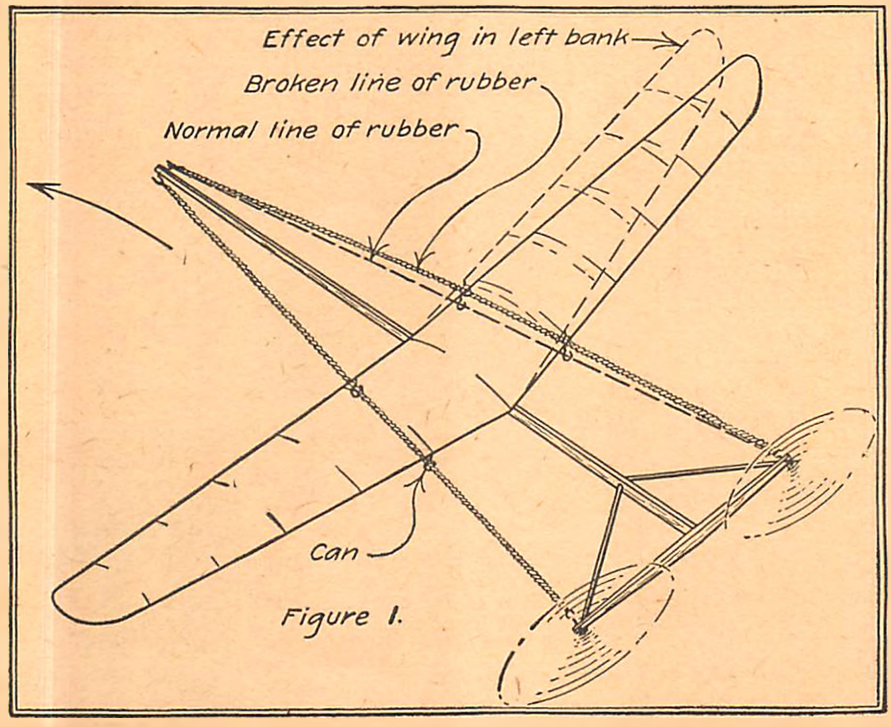
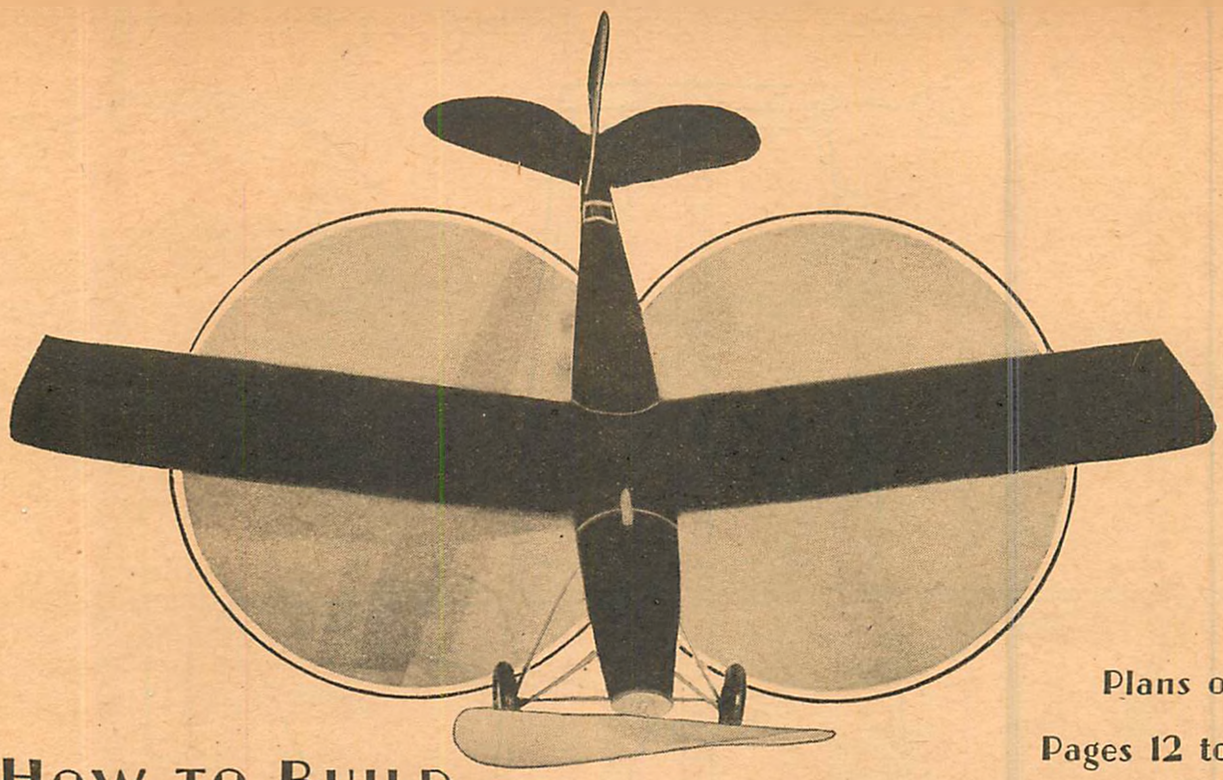


Figure 1.



Plans on Pages 12 to 18

How to Build

The Flying Glory Monoplane

A Commercial Model That Has Flown More Than 1,000 Feet

THIS model is not a copy of any particular large airplane. Designed for flying performance and simple mechanical construction, it incorporates scientific principles which make it an exceptional flyer in addition to its graceful appearance. Soon a large airplane will be placed on the market with the same V-shaped body. This feature greatly lowers wind resistance and also acts as a stabilizing influence in flight—on the same principle as the keel of a sailboat. Straight flights of 1,500 feet have been achieved with this model.

There are several new principles of model engineering used in this model which not only add to its value as an educational project but also add to its sturdiness, flight and appearance. Actual construction should not take more than five hours.

Wings

First make one rib to size shown in diagram and use this rib as template with which to make twelve more.

Take piece of basswood for spar 1/16″ x 1/4″ and cut to 27″ length.

Cut two pieces 1/16″ x 1/8″ x 28″ spruce for leading edge and trailing edge.

Then proceed as follows:

1. Pin plan on table or flat surface.
2. Place spar (No. 42) in position noted on plan.
3. Place ribs (No. 41) on spar, spacing them exactly as on plan.
4. Glue front edge (No. 43) and rear edge (No. 44) to ribs.
5. Ends of spars connecting wing tips must be slightly shaved before gluing to wing tips.

Cut plane exactly in center through trailing edge, spar and leading edge.

1. Set up two books or blocks 1-3/4″ high, about 27″ apart.
2. Place wing tips on blocks so as to form a sweep back of 3/4″ at center as in plan.
3. Glue parts No. 45 (diatral form) No. 46 (front edge brace) and No. 47 (rear edge brace) as diagrammed.

Make these parts as shown in plan. After skeleton wings have dried, cover with bamboo paper being careful to stretch well to avoid wrinkles, using nitrate dope for gluing and doping wings.

Stabilizer

Take length of reed and form outside rim on plan, using pins to hold diagrammed shape. Cut five pieces 1/16″ round wood to size as shown in plan (35, 38 and 37).

Cut piece of 1/16″ x 1/4″ basswood for center piece (No. 40) and set as shown in plan. Cut two pieces 1/16″ x 1/8″ spruce for tail formers (No. 39) and set as shown.

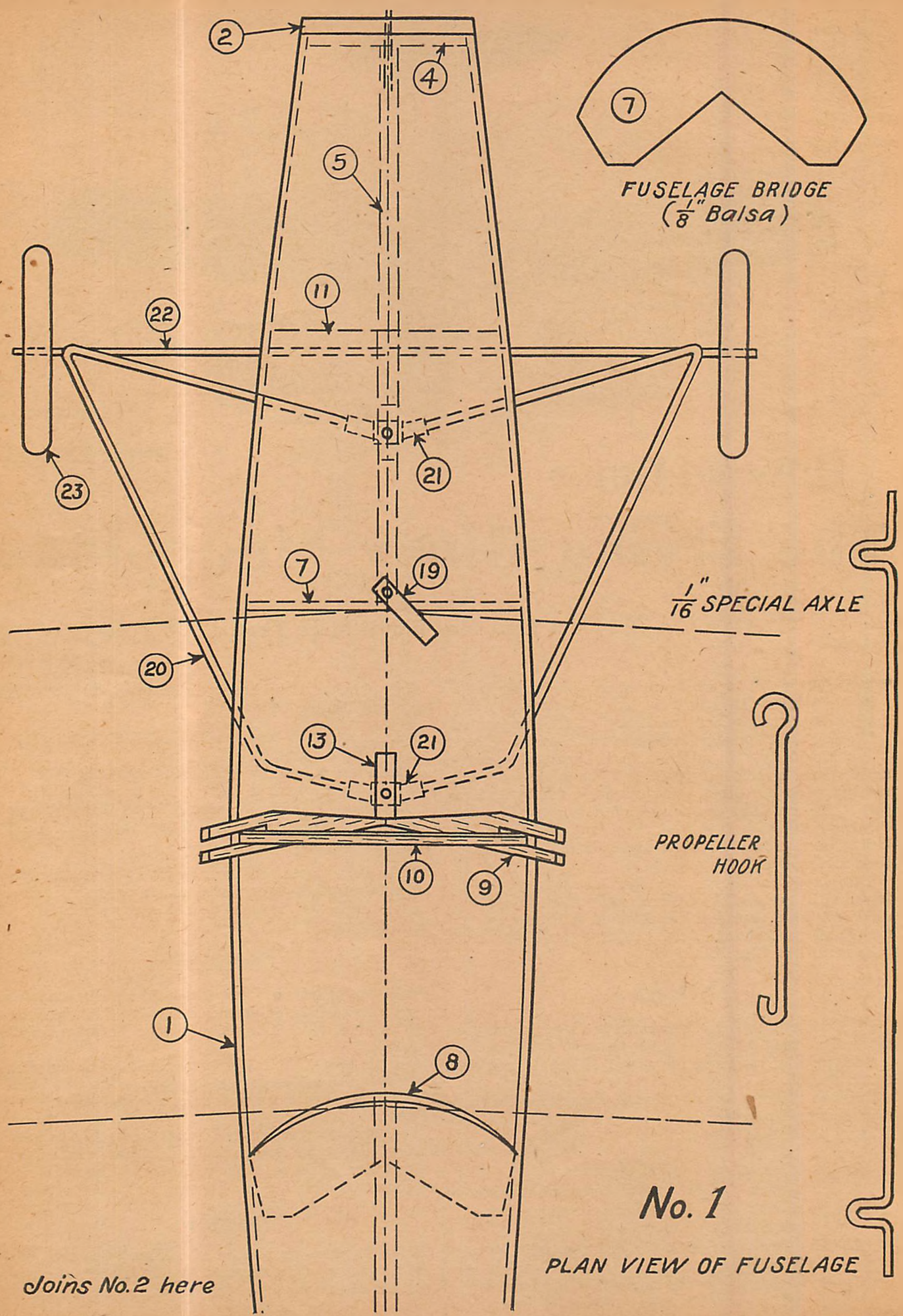
Glue these parts together having them in form and let dry. Then glue on other side. Then cover both sides.

Drill small hole on section No. 40 with a small nail as shown on plan for placing the rudder.

Rudder

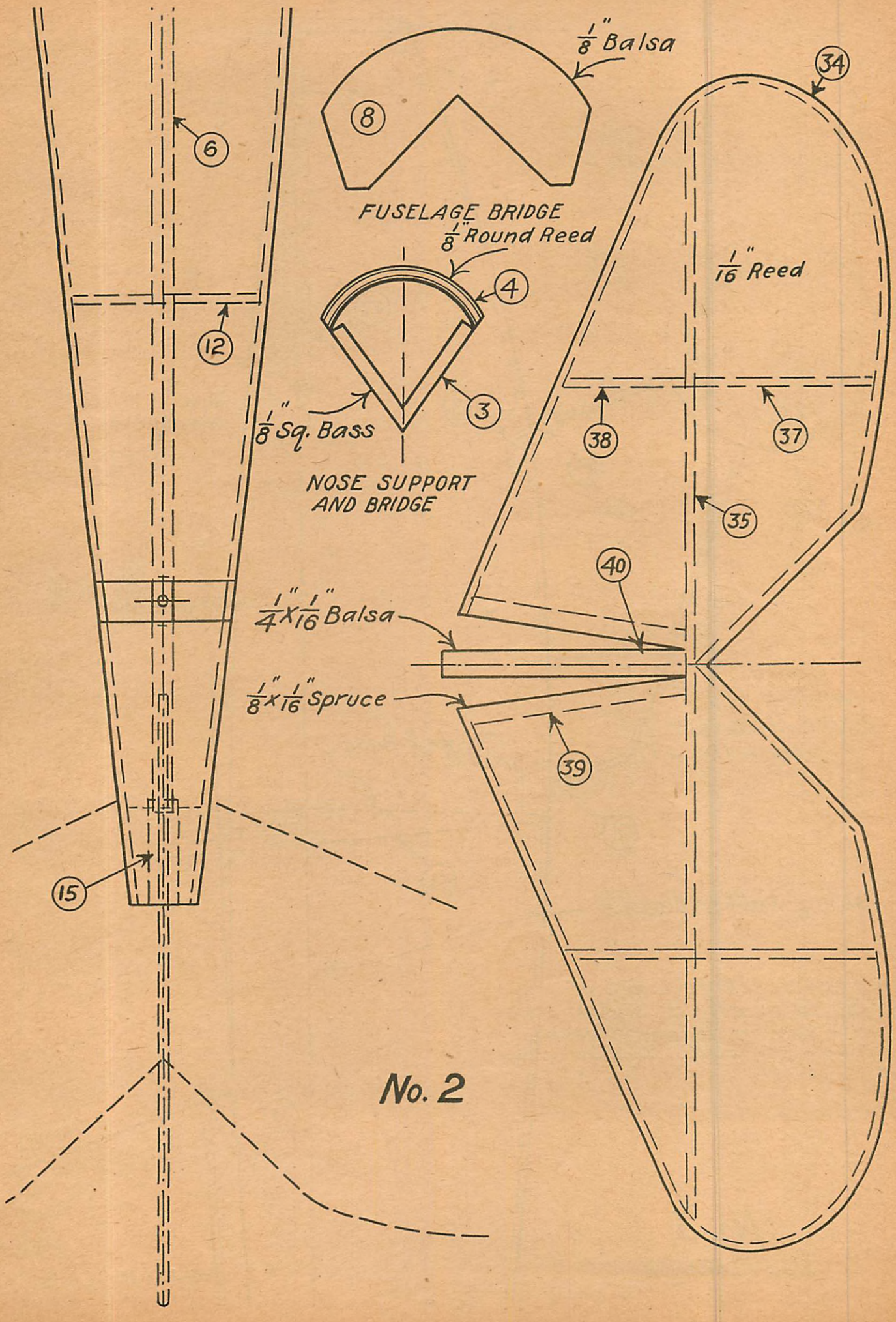
Make in same manner as stabilizer. Cut reed and 1/16″ round wood to size and glue and cover. Be sure part No. 31 extends 3/16″ beyond outer rim.

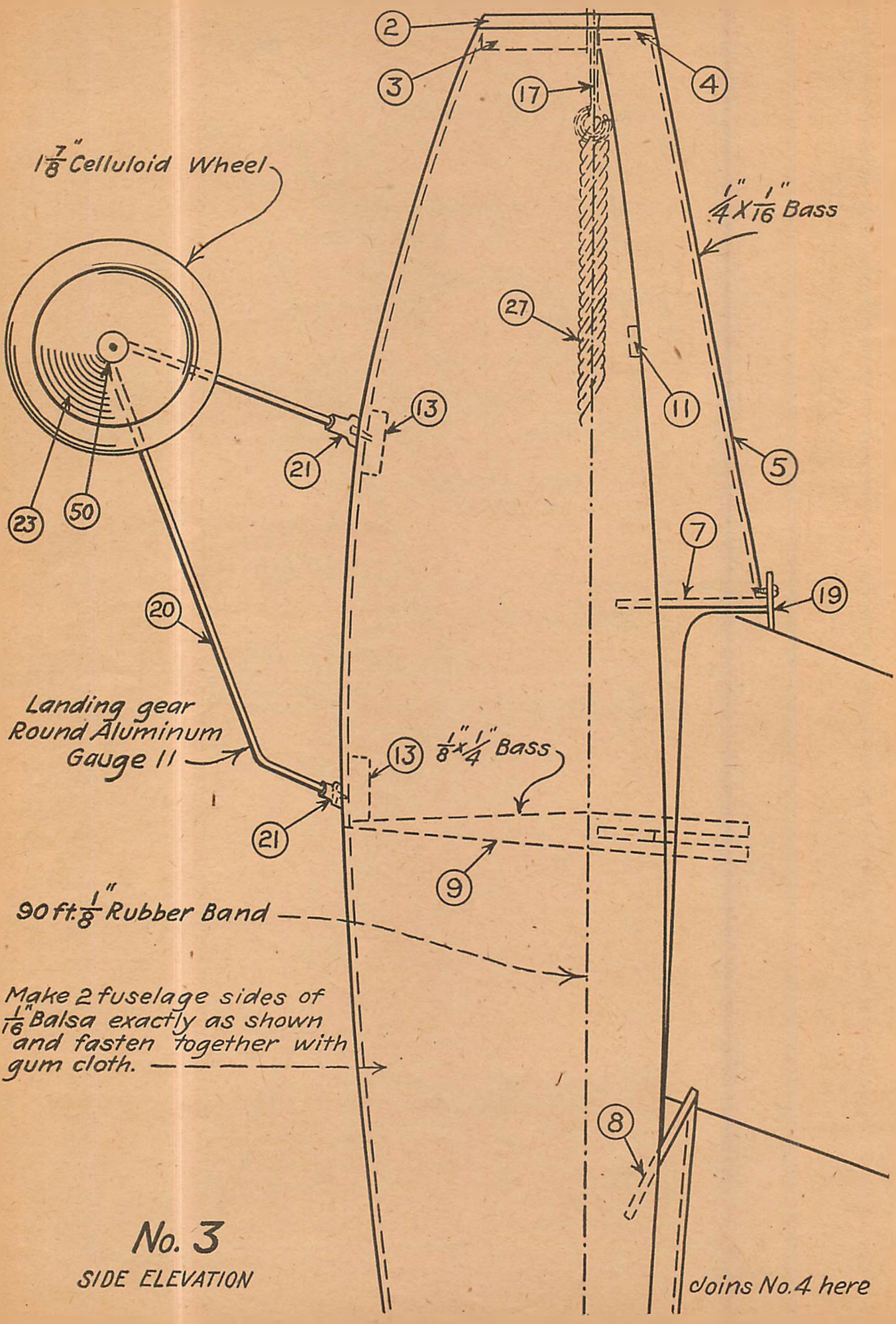
(*Continued on page* 50)

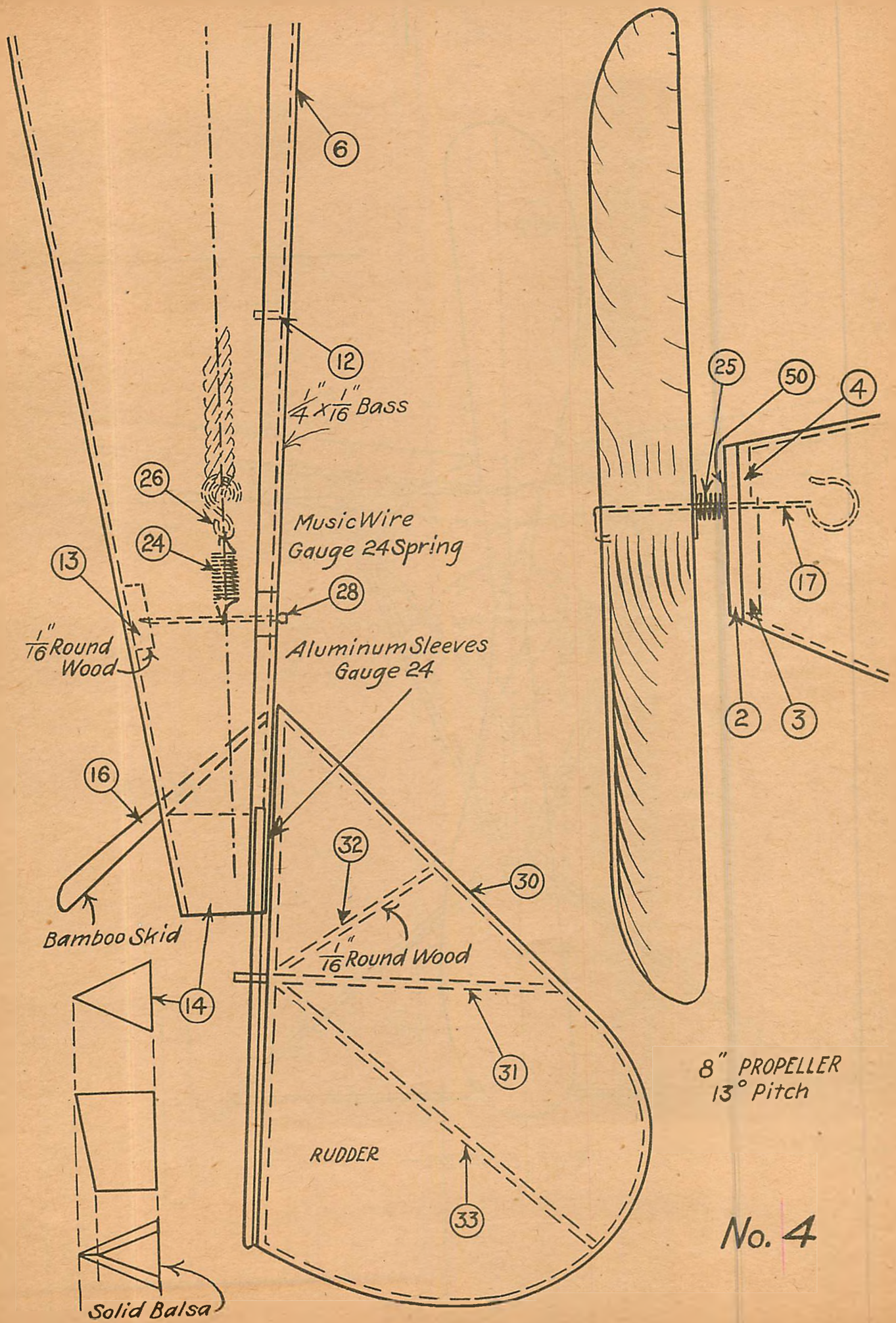


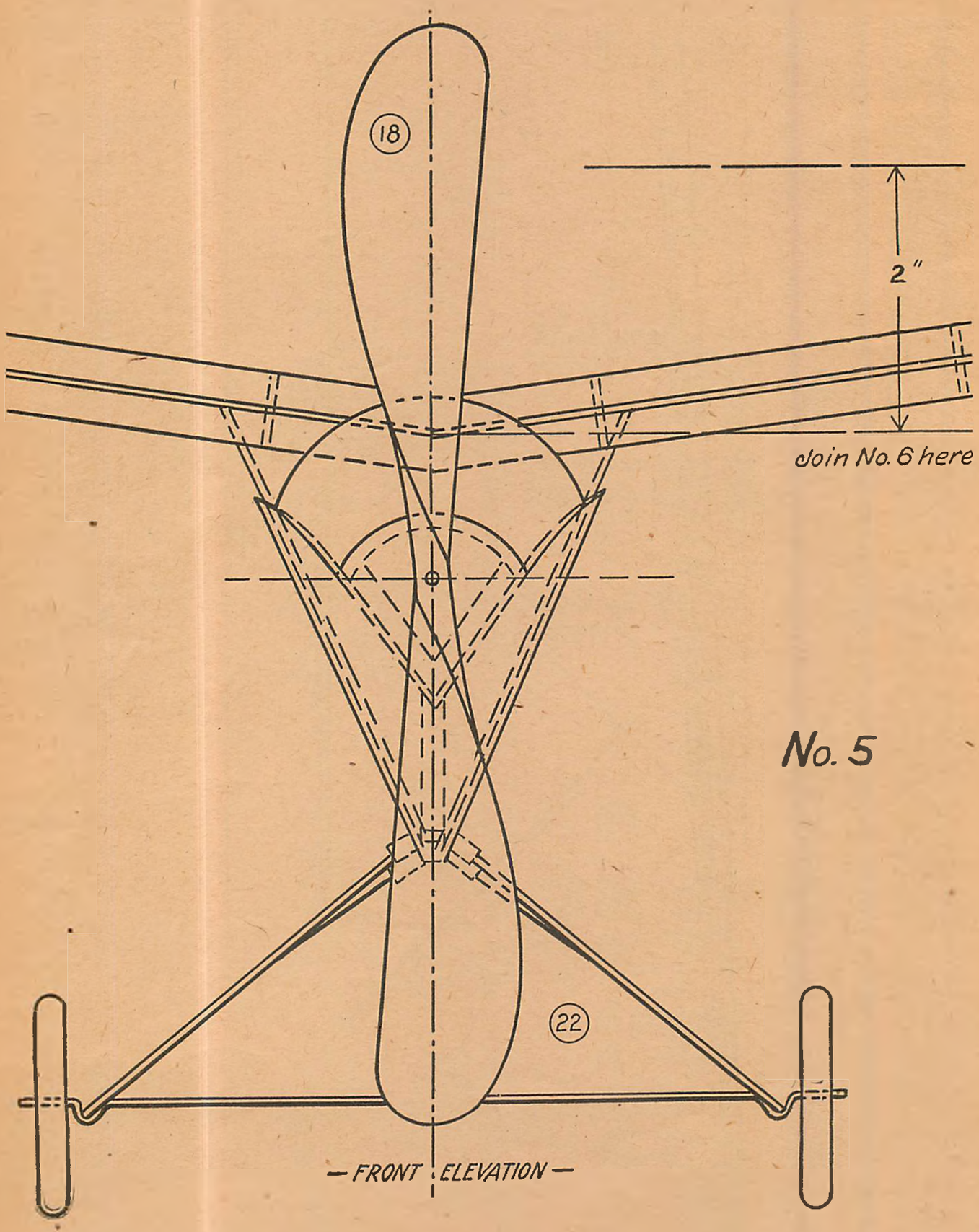
No. 1

PLAN VIEW OF FUSELAGE

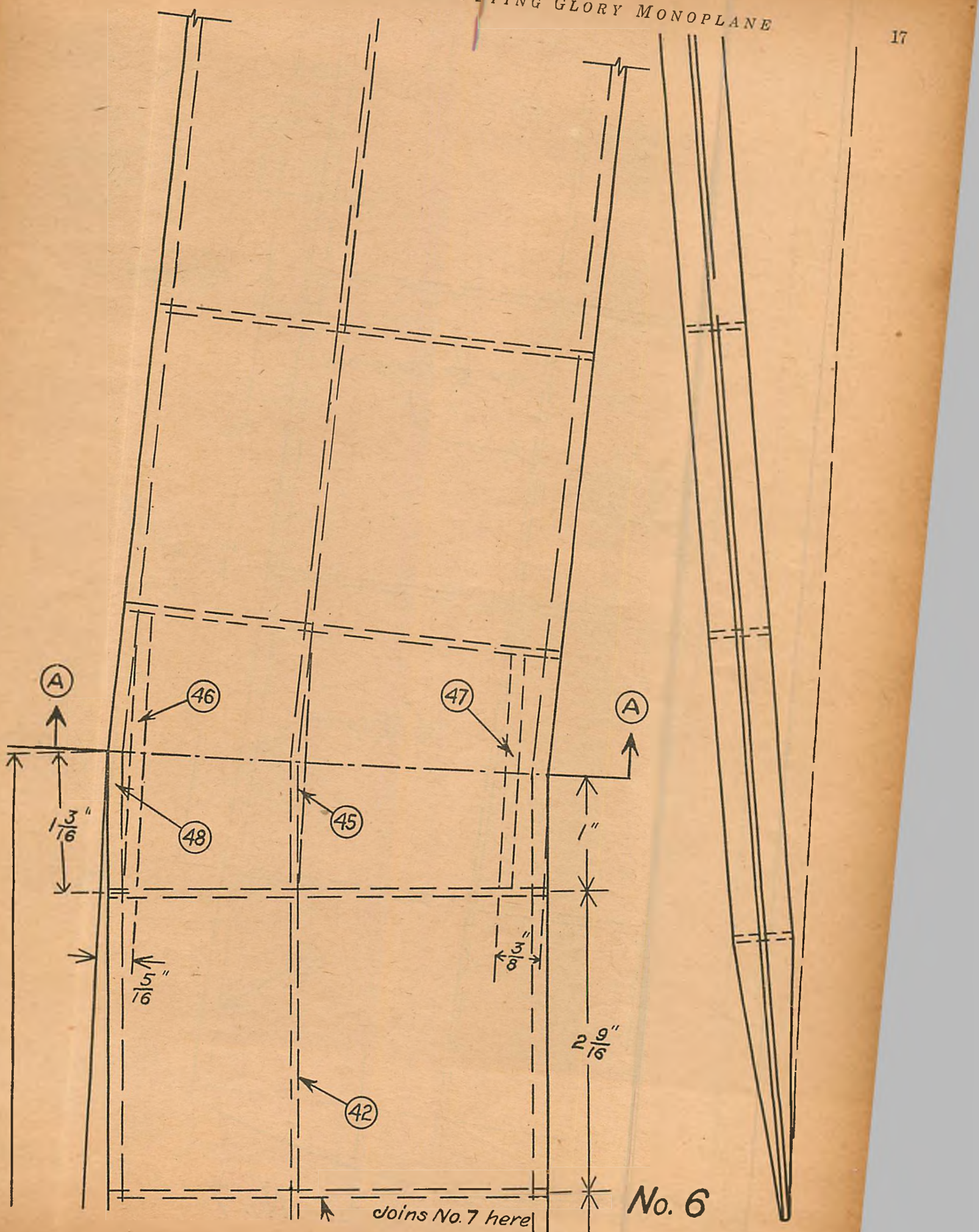

1/8" Balsa
8
34
6
FUSELAGE BRIDGE
1/8" Round Reed
4
1/16" Reed
12
3
1/8" Sq. Bass
38
37
NOSE SUPPORT AND BRIDGE
35
40
1/4" x 1/16" Balsa
1/8" x 1/16" Spruce
39
15
No. 2

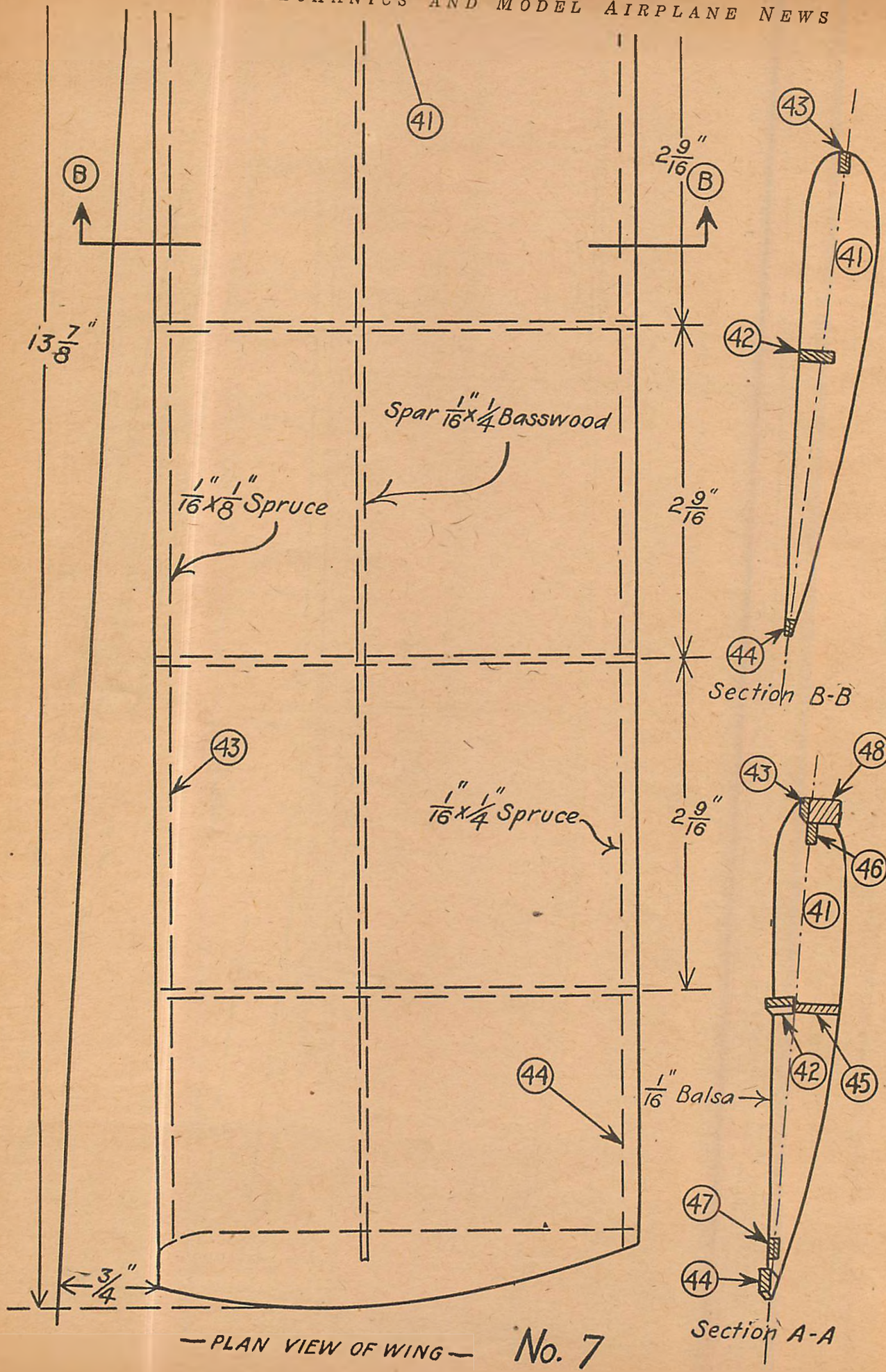

2
3
17
4
1 7/8" Celluloid Wheel
1/4 X 1/16" Bass
27
11
13
21
5
23
50
7
19
20
Landing gear
Round Aluminum
Gauge 11
13
1/8 x 1/4" Bass
21
9
90 ft. 1/8" Rubber Band
Make 2 fuselage sides of
1/16" Balsa exactly as shown
and fasten together with
gum cloth.
8
No. 3
SIDE ELEVATION
Joins No. 4 here


6
12
1/4" x 1/16" Bass
26
24
13
Music Wire
Gauge 24 Spring
28
1/16" Round
Wood
Aluminum Sleeves
Gauge 24
16
32
30
Bamboo Skid
1/16" Round Wood
14
31
RUDDER
33
Solid Balsa
25
50
4
17
2
3
8" PROPELLER
13° Pitch
No. 4

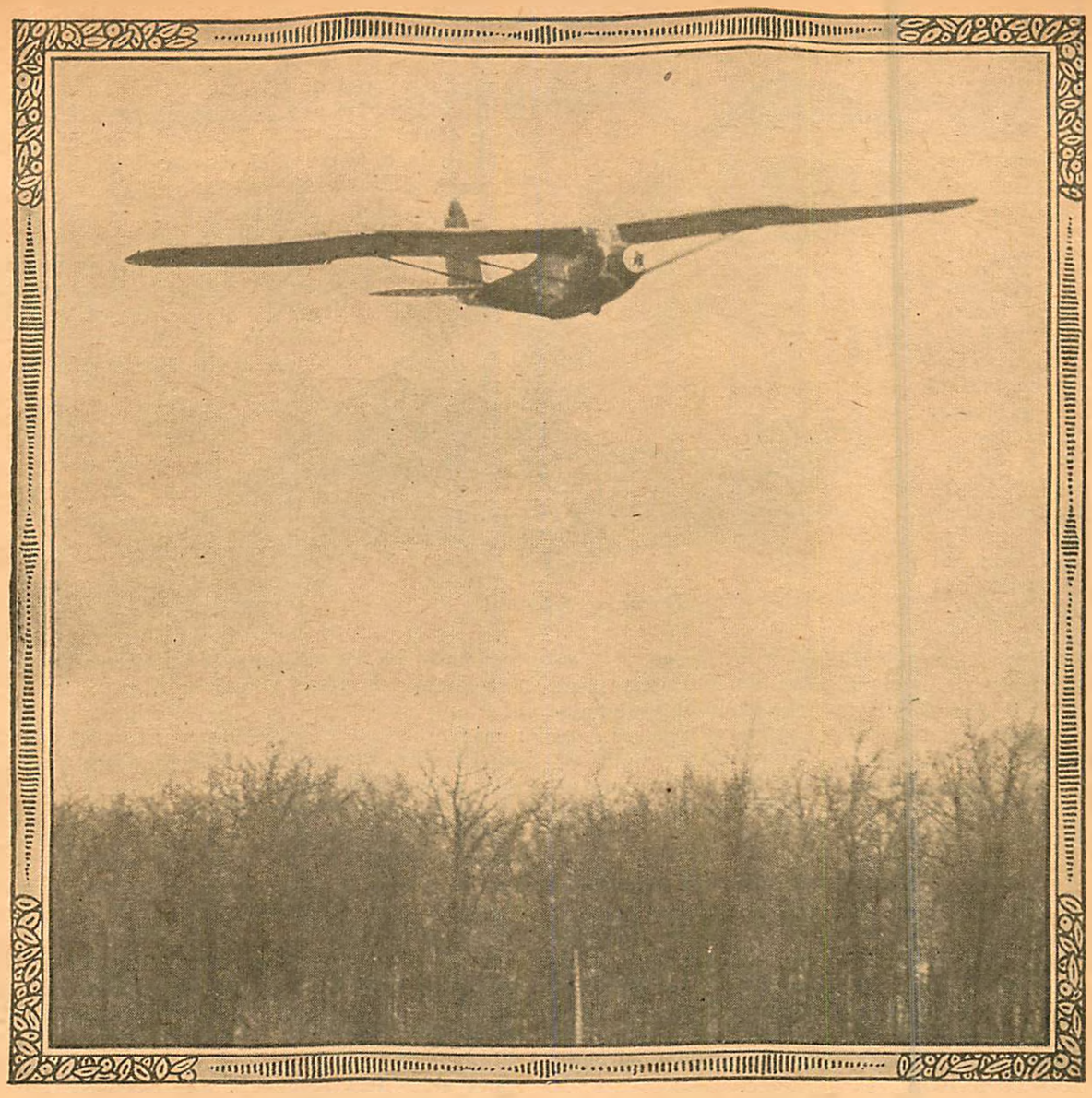


No. 5


A
46
47
A
48
45
1 3/16"
1"
5/16"
3/8"
2 9/16"
42
Joins No. 7 here
No. 6



—PLAN VIEW OF WING— No. 7



A striking view of the "Eaglet" soaring in the air, with Capt. Frank M. Hawks at the controls

Motorless Flight—

A Treatise Which Clears Up Much of the Mystery of Sail Flying

By

ANATOLE FELDMAN

MAN'S dream of flying on outstretched wings is as old as man himself. For twenty years now, his planes and his Zeppelins, propelled by gasoline engines, have carried him over the earth and the waters. Today, a flight to the unexplored regions of the poles, if not an every day occurrence, is a feasible practicability. But beyond this, there is a still more interesting, and perhaps more important development in aeronautics; motorless flight—the sustained flights in a heavier-than-air machine without propelling power. Take-offs, landings, banks and turns have all been achieved by the simple utilization of the most common element about us—air.

Germany today has gone air-minded. Bird-minded might be the better term, for the youth of the country has turned to motorless flight and, with the usual Teutonic thoroughness, is rapidly mastering the uncertain element of the air.

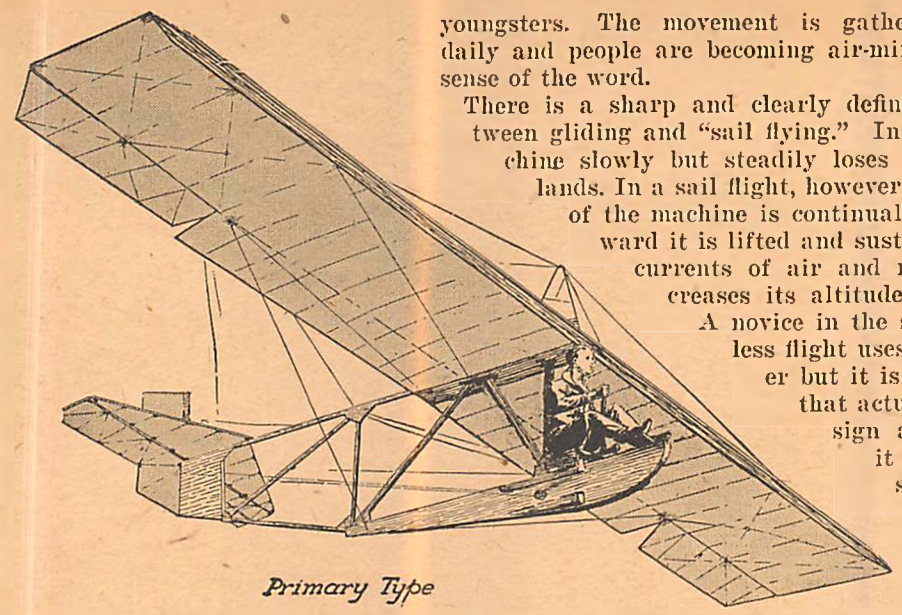
In the past year over three thousand availed themselves of the free instruction fostered by a wise government and offered in the public schools. Control sticks, elevators, air currents and gliding angles are discussed as familiarly as radio and tennis.

True, in the plane of the German boy there is no motor, yet he actually flies. And from the very nature of his bird-like machine, he learns more about flying and the laws that govern it than many a veteran pilot of the standard aircraft. For after the first day, which is devoted entirely to intensive lecturing, he climbs into the seat of his glider, grips the controls, waves his arm and leaps off in space.

No instructor flies with him. He is

sustained in the air by his own efforts; and his salvation depends on his knowledge, concentration and quick thinking.

Any boy in Germany over fourteen, who has the necessary interest and initiative, may receive official instruction in the art of gliding. All the preliminary instruction is given by competent, trained men and the percentage of really serious accidents is so small as to be practically negligible. True, for the youngster the preliminary gliding is not dangerous, the machines rarely rising more than ten or twelve feet off the ground. But this is just the beginning—the elementary ground work. As he progresses, becomes sure of his machine and its medium, cross-country flights of thirty and forty miles are accomplished at elevations of three or four hundred feet—in short, motorless flight lasting for hours.



Primary Type

FORTUNATELY, the art of gliding is not confined to the youth of the country alone. The universities also foster the science and almost every campus has its glider club, formed with the express purpose of studying the design, construction and principles of the motorless plane. It is here that the sensitive "sail planes" have been developed; marvelously dexterous machines as graceful and sure in the air as the birds they emulate.

Despite man's memorial aspiration to fly, it has only been in the last decade that he has succeeded in propelling himself through the atmosphere in a heavier-than-air machine. We have our Zeppelins, our mammoth freight and passenger planes, all powered by gasoline engines. We wage war in the air, explore the inaccessible corners of the globe and speed up the world's business with wings and high powered motors but the time is here, too, when simple gliders cross mountains, sail over oceans, ride clouds, and yes, even hover still in the heavens like a pinioned hawk before the swoop.

Man is beginning to learn what the birds have always known—that the air will support him, even as water supports a swimmer, if only he will operate the wings of his glider correctly. So far has he advanced in the mastery of the air that all those old bugaboos of the flyer—wind gusts, squalls, pockets, clouds and storm—are now recognized as having a definite, useful value in motorless flight.

A covey of hovering birds, suddenly shooting vertically in the air without the flap of a wing, is an observation common to all of us. And by using the identical air currents that propel the birds, man, too, in motorless planes, can rise and descend and direct his course above the surface of the earth.

There are over two hundred glider clubs in Germany today. Ten thousand flights in motorless planes were made in 1928 and at a conference in the Rhone Mountains in Central Germany, one hundred and five machines competed. The science, sport, art—call it what you will—is more than an interesting novelty for the youngsters. The movement is gathering momentum daily and people are becoming air-minded in the true sense of the word.

There is a sharp and clearly defined difference between gliding and "sail flying." In a glide, the machine slowly but steadily loses altitude until it lands. In a sail flight, however, though the nose of the machine is continually pointed downward it is lifted and sustained by upward currents of air and maintains or increases its altitude.

A novice in the science of motorless flight uses the simple glider but it is the "sail plane" that actually *flies*. In design and construction it is far more sensitive and responsive than the glider to the vertical air currents. Those most commonly in use at present in Germany weigh from two to three hundred pounds and boast a wing surface of twenty square yards. Their design is such that with remarkable ease they float upward on air currents. So sensitive are they in operation that in actual flight the pilot almost feels that he has wings and tail. He is one with his machine; there is and must be perfect co-ordination between the two. A movement on the part of the flyer is reflected in his ship and vice versa. The illusion of a man with wings is still more heightened in watching from the ground an expert pilot manipulate his motorless plane.

On first witnessing motorless flight it seems an inexplicable miracle but when one has learned a few rudiments of the design of the sail plane, a good deal of the mystery vanishes. The most distinctive feature of this type of craft is its long, narrow wings, reaching at times sixty feet in length and less than five feet in width. They are built narrow to prevent excessive eddies and long to give enough wing surface to lift the weight of a man and a possible passenger.

As compared to a glider, the method of launching a sail plane is very interesting. A simple glider merely rolls or is dragged down an incline before it takes off. A sail plane, however, is altogether too light for this method. If started slowly it would bob about like a feather in a gale and immediately get out of control. In launching an elastic rope device is used, which catapults the plane in the air like a stone out of a sling.

The pilot must maintain this initial speed by pressing down the nose of his sail plane, which act decreases the angle of the tilt of the wings. Gravity then operates and draws the plane earthward in a gentle angling flight which is called a glide. From this, it can truthfully be said that gravity is the motor power of the motorless plane.

BUT the interesting and important feature of this fact is that though the sail plane *glides down, it gains altitude at the same time.* On the surface of it, the thing looks impossible but the following illustration makes it clear.

Imagine that a model glider is released from the ceiling in one corner of a room to fly down to the floor at the opposite end. And also imagine that at the same time some Samson thrusts the entire room high in the air. Thus visualized it will be seen that the model glider will be gaining altitude while flying down. There are a score of other illustrations just as apt. It is in identically this way that sail planes

make sustained flights—by using the opposing forces of gravity and the upward currents of air.

As in every other machine or engine, efficiency is a prime factor and, in the design of the sail plane, it is continually striven for. The most efficient motorless plane is the one with the lowest sinking velocity, for it will respond to the slightest upward current and give the pilot more time to reach the next column of vertical air.

A CROSS-COUNTRY flight in a motorless plane is achieved by the simple process of coasting from high up in one air current to the foot of the next. Of course there are many other determining factors which make for the success of a flight; the design of the plane, the skill of the pilot and the contour of the terrain over which the flight is made.

From an elevation of 2,000 feet an ideal sail plane, with a low sinking velocity, will glide to earth in about sixteen minutes, whereas a simple glider will be forced to land in half that time.

But the flyer of the motorless plane is not interested only in a plane that sinks slowly. He is after speed and distance. The best machines that have been built to date will fly between seven and eight miles, gliding down from an altitude of 2,000 feet. This is a ratio of about one to twenty and is technically called the gliding figure.

Speed, of course, is a prime consideration in motorless flying, for with a fast machine a pilot can quickly get from one vertical air column to the next. Very often in flying from one such column to another the plane will have to buck strong head winds and this consideration has led to the development of low and high wind machines.

In summing up, then, the fundamental principles underlying motorless flight, we arrive at three chief factors: speed, gliding figure and sinking velocity. Unfortunately, as yet, it has been impossible to combine all three in one machine. It is another case of the practically possible as opposed to the ideally efficient.

By far the most useful factor in motorless flight is the vertical air column. Of all such currents the best known and most used is the one called "slope upward" found in mountainous country. It is created when an air current hits a hillside and rushes upward. By starting against this a sail plane rapidly gains altitude.

Along with the pilots of motor planes, flyers of sail planes avoid forests as much as possible as they offer no landing places. However, the sand dunes along a seacoast make for excellent flying conditions. Usually there is a steady inshore breeze blowing off the ocean and this, striking the rising elevation of the shore, causes a steady, prevailing upward current of air, proportionately higher than the up slope mountain air streams.

It has been the general experience that flying over the sand dunes of a seacoast requires but half the skill and work of flying over mountains, where every depression in the hills makes its own particular eddy.

One of the most interesting of all upward air currents is the one which causes the cumulus clouds. A skillful pilot of a sensitive sail plane can "hang" under such a cloud and be carried along and even sucked up by the uprising wind. It is possible that this specific current may revolutionize the science of motorless flight, for with its aid a pilot can make long and sustained flights over great distances.

But flying under clouds has its disadvantages, also. It is a tricky business and requires all the skill and attention of the flyer, for at any moment the cloud he is flying with may change its shape or dissolve completely, leaving him no alternative but to land.

UPWARD air currents are also produced by the sun shining on certain reflective objects on the ground, such as metallic roofs, large squares of paving, etc.

It is by recognizing, understanding and using these various upward air currents that the glider pilot stays aloft and covers ground. New and interesting facts concerning the immense air ocean about us are being discovered daily.

Germany's intense interest in the motorless plane is due in great part to the Versailles Treaty. For under the original provisions of that document certain restrictions were placed on the nation's aircraft development. Consequently her (*Continued on page* 62)

Captain Frank M. Hawks, famous airman and holder of coast-to-coast records (right) and J. D. ("Duke") Jernigin jr. (left).

WINGS of VALOR

Into the darkness flew Jimmy in pursuit of the stranger

By
JACK D'ARCY

JAMES WEBSTER, a mail pilot, takes off from Morgan Field, Salt Lake City, for Cheyenne on a regular trip. He waves good-by to his son, James junior, who is always at the field to see his father leave. Webster has taught the boy all he knows about flying and, except for experience, Jimmy is the equal of his father.

As Webster heads east with the mail, he notices a biplane below him which seems out of control. He waves to the other pilot and sees the plane shoot to earth. He kills his engine and glides down, landing close to the other plane.

Offering his services he bends over the engine of the incapacitated plane when suddenly he turns and sees a wrench coming through the air. Too late to dodge it, he is struck by it and stunned.

Hours later, Cheyenne telephones that the mail has not arrived and the super orders Jimmy out to look for his father. Jimmy, pleased and excited at the prospect, is soon in the air. His orders are to fly low and slowly so that he may observe the surrounding country.

Suddenly a biplane comes toward him, similar to the one his father piloted. Jimmy jerks back his stick and rises to meet the approaching ship. He gets close enough to see the pilot and observe a crescent-shaped scar on his cheek. Though Jimmy waves, the other man gives no evidence of having seen him.

Night is coming and Jimmy turns his plane toward Morgan Field to report failure of his search. He is met by the super and ground crew, all very much excited.

When he reaches the super's office, Jimmy is shown a note that had been dropped from a biplane to the effect that the mail plane, pilot and cargo had been stolen and a ransom of ten thousand dollars demanded.

The kidnaper's ship promises to return that night and drop further instructions regarding the ransom.

THUS it was that, when under normal circumstances the only inhabitant of Morgan Flying Field was the aged night watchman, the super and Jimmy Webster sat in an unlighted office; and a pair of trusted mechanics smoked on the tarmac as they leaned against a trim monoplane equipped for a long and arduous journey.

In order not to arouse the suspicions of the kidnapers, the super had ordered that only those lights used ordinarily at night be lit. Hence, the two who kept vigil sat in a darkness broken only by the glow of the super's perennial cigar and a shaft of silver radiated by a fast disappearing moon.

Jimmy struck a match cautiously and examined his wrist watch.

"Two fifteen," he said. "Perhaps they won't come."

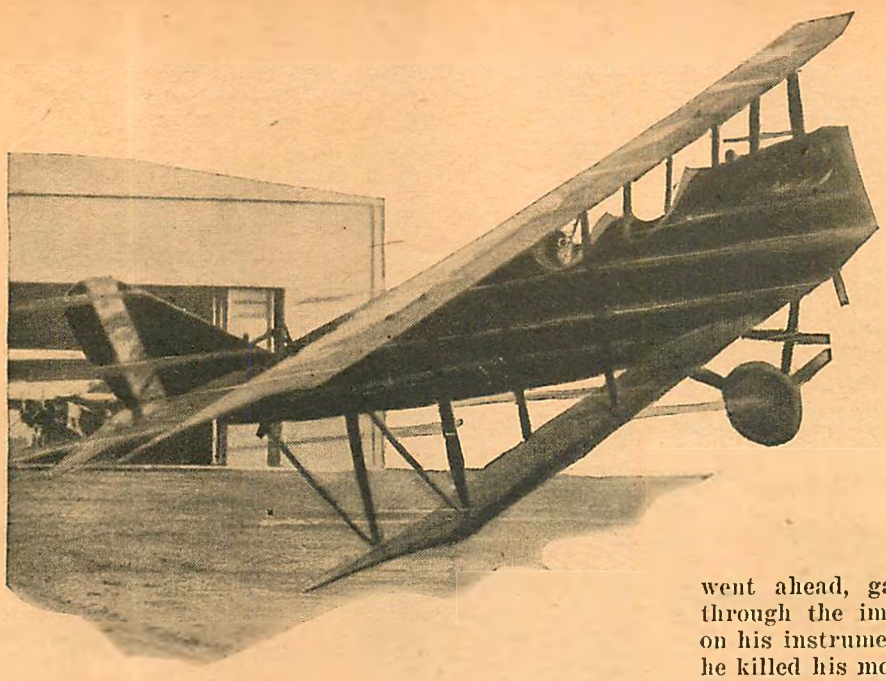
"We've stayed up this long," answered the older man. "We may as well make a night of it."

Jimmy nodded in agreement, completely forgetting that it could not be seen in the opaque light of the room.

They sat in a friendly silence for about thirty minutes. Then a faint drone in the distance caused Jimmy to sit bolt upright, his pulse pounding in anticipation. The super heard it too. He rose and crossed to the window, peering into the dark skies above.

Jimmy hurriedly flung on his flying togs and headed for the door.

"In case it's them," he said hastily and ungrammatically, "I'd better be near the plane. I'll tune her up now, and be prepared for a take-off the minute they fly over. You stand in the center of the field and yell if



The Hunt Is On and Startling Revelations Follow in Its Wake

they drop or make a move to drop a message."

"Okay," said the super, and they started out of the door into the night.

As Jimmy reached the tarmac, he could see that the grease monkeys had also heard the approach of the distant plane. One crawled from under the cowling, and the other ran a cloth over the instrument board.

"She's all okay, Jimmy," said one. "Fit to fly the Atlantic. Can you hear 'em?"

"I can hear somebody," replied Jimmy, as the roaring in the night became more and more distinct. "I hope it's the right ship. Anyway, I'll get set."

He sprang to the cockpit and eased the throttle open. As he gave her the gun, his engine shouted a staccato answer to the pounding in the distance. Gradually he shut her down, and feeding just enough gas to keep her revving, listened eagerly for the oncoming ship.

For a twinkling second, a star was obscured in the heavens by a huge black shadow, and the distant drone had turned to a powerful ominous roar in the stillness of the night. Suddenly there flashed in Jimmy's vision a swooping, winged bird from the east side of the field. She swung down in an abrupt arc, as though about to land, and then as swiftly as she had come, thrust her nose to the moon and zoomed upward.

The super's shout and Jimmy's cry of "Contact!" rang out simultaneously through the night. The moon was fast dropping out of sight as he taxied over the field into the darkness beyond. As he whizzed past the super, the latter waved a metal cylinder in the air. Jimmy's last doubts were banished. The plane had dropped the promised message.

Back came the stick and up went the monoplane. Up and to the west in the direction taken by the other plane. Jimmy strained his keen eyes through his flying goggles. It was no easy task to pursue a speeding plane on such a night as this. His engine singing a monotonous song of power, he winged his way toward the heart of the Rockies.

True, as yet he could not see his quarry, but, playing a hunch, he went ahead, gaining speed and altitude as he tore through the impeding blackness. When the indicator on his instrument board registered eight thousand feet, he killed his motor and dived.

Drumming steadily out of the distance came the sound for which he listened. Jimmy's eyes gleamed with satisfaction, as he came out of his dive and headed in the direction of the sound. He gave the Sikorsky everything she had in an endeavor to sight the ship ahead before she was hopelessly lost in the perilous night—the night enveloping those dangerous mountain peaks which spelled death to the careless flyer.

STRAIGHT ahead of him loomed a bleak, black crag. Pulling back the stick with all the strength of his muscular brown hands, he zoomed almost vertically. It seemed to him that his landing gear must scrape the mountain side, but no indication of disaster came. He breathed more freely, and once again his aching eyes swept in a searching arc.

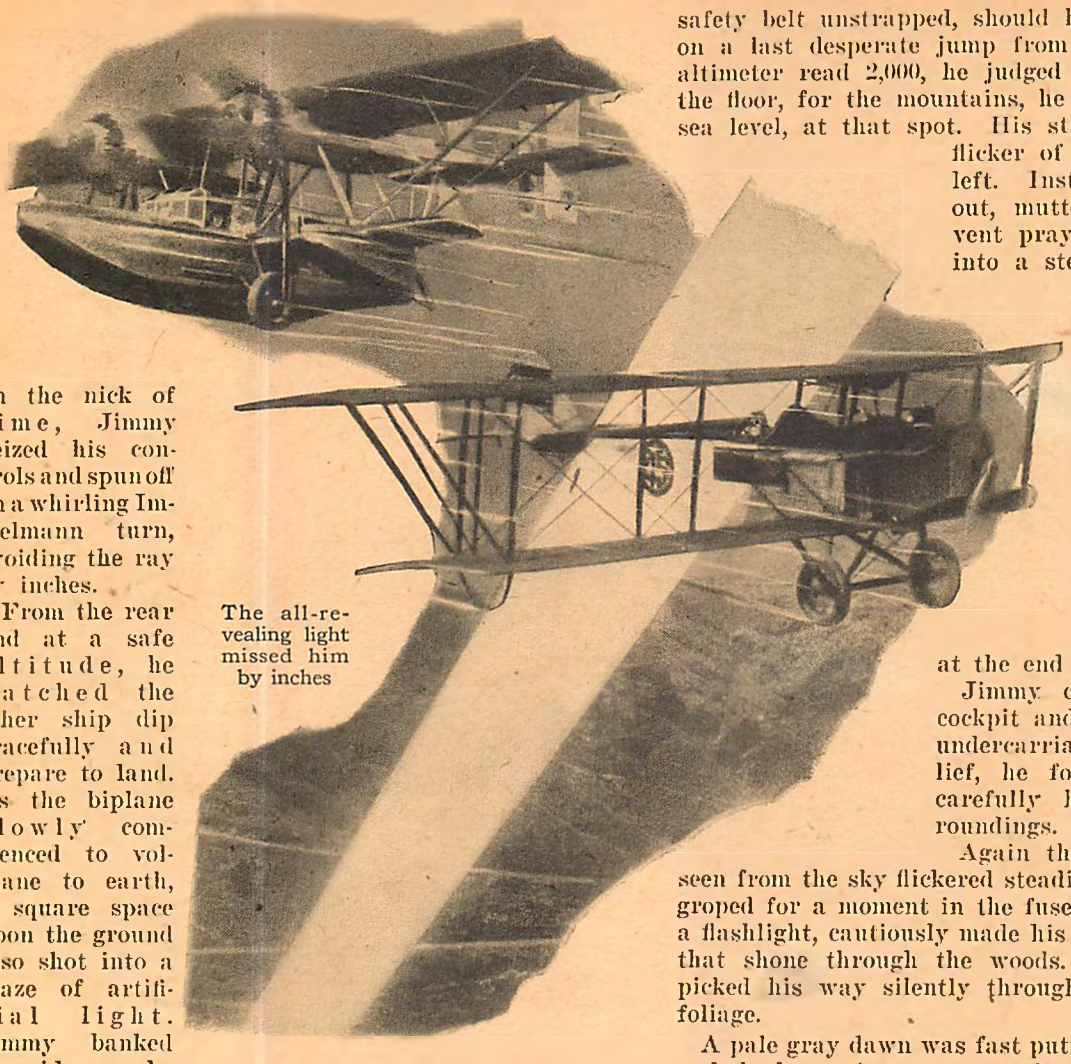
There in front— Was it imagination or did some form actually scurry over the snowy peaks? He coaxed a few more revolutions from his already taxed prop, and bore down on the shadowy phantom ahead. A scarce hundred yards behind his quarry, he recognized the ghostly figure as the Curtiss of the afternoon encounter.

Deliberately he lagged behind as much as he dared. He could not risk losing sight of the other plane but, on the other hand, it was better policy to make sure that his quarry was unaware of his presence. When his eyes could just make out the shadowy silhouette of the other, he gave her the gun again, and brought all his flying skill into play in an attempt to maintain an unvarying distance between them.

He turned swiftly—but it was too late

Over the black-topped Rockies they roared. Pursued and pursuer—the potent pounding of each motor drowned in the roar of the other. On and on! Prop blades whirling viciously through the night as though fanning the very blackness aside to make way for themselves! Underneath—hard, jagged, material rock. Overhead—a fathomless, infinite abyss of pitch.

Suddenly, as though precipitated from the depths of Hades, a stream of yellow light shot up from the earth, enveloping the biplane in a protecting noose of blinding light.



The all-revealing light missed him by inches

In the nick of time, Jimmy seized his controls and spun off in a whirling Immelmann turn, avoiding the ray by inches.

From the rear and at a safe altitude, he watched the other ship dip gracefully and prepare to land. As the biplane slowly commenced to volplane to earth, a square space upon the ground also shot into a blaze of artificial light. Jimmy banked warily as he watched the biplane achieve a landing, and her pilot emerge from the cockpit and walk across the field.

Then, as suddenly as it had sprung into being, the light disappeared, leaving the night blacker than ever. Jimmy blinked his eyes to reaccustom them to the darkness. For a few minutes he flew aimlessly back and forth while his racing brain attempted to formulate a plan.

To lose the trail here would be utter folly. If he should return to Morgan Field, he was by no means sure that he could retrace his route on the morrow. To wing his way to the nearest town and commandeer an automobile to bring him to this spot seemed to be the best scheme, but yet not without its drawback. He doubted strongly if he could pilot a car to this remote place in the heart of the mountain. To essay a landing in this treacherous darkness was well-nigh impossible. Nevertheless, after a moment's thought, Jimmy Webster decided to do just this.

Slowly he banked and commenced his perilous descent. Danger lurked ominously in the thick darkness that surrounded him. He concentrated with all the power of his keen young mind, and conjured up a mental photograph of the white spot that a moment before had been bathed in a shaft of light. He brought her nose round and headed for the place where he judged the other ship had landed.

Death grinned over his shoulder, as he killed his motor for the hazardous dive. Down, down, he went, the wind singing an ominous dirge through his struts. His bronzed face set in a thin, grim smile, he gripped the controls tensely and waited for—he knew not what.

Down he plunged, a flashing gray meteor in the darkness. His eyes were glued to the altimeter and his safety belt unstrapped, should he have to gamble all on a last desperate jump from his ship. When the altimeter read 2,000, he judged that he was close to the floor, for the mountains, he knew, were far above sea level, at that spot. His straining eyes caught a flicker of light, low and to the left. Instinctively, he flattened out, muttered a swift but fervent prayer and put the plane into a steep dive.

He waited tensely. There was a jarring bump as she pancaked and bounced upward. He gripped the sides of the cockpit, ready to leap to earth if a crash threatened. Again the monoplane fell to the ground, scuttled forward for a moment, and then relaxed like a tired bird at the end of a long journey.

Jimmy clambered out of the cockpit and hastily examined his undercarriage. To his intense relief, he found it intact. Then carefully he surveyed his surroundings.

Again the light which he had seen from the sky flickered steadily in the distance. He groped for a moment in the fuselage and, withdrawing a flashlight, cautiously made his way toward the gleam that shone through the woods. Like an Indian, he picked his way silently through the underbrush and foliage.

A pale gray dawn was fast putting the night to flight, and the huge pine trees were becoming shadowy silhouettes in the first faint light of day. Suddenly there loomed before him the outlines of a rude shack. Jimmy stopped abruptly, and pressed the button that shut off his flashlight.

HIS right hand dropped to his belt, and he felt the reassuring metal of the .38 he had thrust in his holster before leaving the field. He withdrew the weapon and cautiously continued his approach. He ducked down and crept up underneath the window. Slowly he raised his head until his eyes were on a level with the sill. His face hardened at the sight which met his eyes.

Three men were gathered about a table. Despite the hour, it was apparent that they had not yet been to bed. Empty bottles lay strewn about the floor, and huddled on a bunk in the corner of the room was a prostrate figure. Jimmy's pulse picked up a beat as he realized that in all probability it was his father.

He turned swiftly as he heard a crackle of the underbrush behind him. But too late! A heavy hand descended and his wrist was wrenched violently. The .38 dropped from his suddenly numbed fingers, and the barrel of an automatic struck him a glancing blow upon the head. Blood zigzagged crazily down his cheek.

In desperation he lashed out wildly with his free hand, summoning every last ounce of his fast oozing strength. He fought against the blackness of unconsciousness which threatened to envelop him. His swinging fist met nothing but the empty air. A flashlight burst to sudden light, almost blinding him as the brilliant beam shone full in (*Continued on page* 56)

How to Build A Barling NB-3

Easy Construction Details for a Three Foot Flying Model

THE Barling NB-3 is one of the most famous light sport planes in America. It has broken the world's light plane record in a non-stop flight from Brownsville, Texas, to Winnipeg, Canada—1,650 miles in sixteen hours. It also holds the American light plane altitude record of more than 27,000 feet.

Necessary Materials

15 strips	1/8" x 1/8" x 18"	balsa	leading edge, fuselage longerons, braces
5 strips	1/16" x 3" x 18"	balsa	ribs, bulkheads, elevator and rudder ribs
2 strips	1/8" x 3/16" x 18"	balsa	wing spars
2 strips	1/16" x 1/16" x 18"	balsa	trailing edge
1 piece	1/4" x 1/4" x 2"	balsa	axle streamlines
4 strips	1/8" x 1/4" x 17"	balsa	landing gear struts, center wing spar
4 strips	15"	bamboo	stringers
1 strip	1/8" x 1/4" x 18"	spruce	motor stick
1	1-1/2" x 3/4" x 10"	white pine or spruce	propeller block
1	1/8" round dowel 12"		
2 feet	No. 10	music wire	fittings, landing gear
1	2 ounce bottle	ambroid	
1	2 ounce bottle	banana oil	
4 sheets		Japanese tissue	
1 large		thrust bearing	
1 pair	2" diameter	celluloid wheels	
1 piece	1/32" x 2" x 6"	balsa	cockpit formers
1 piece	2" x 2"	transparent celluloid	windshields
21 feet	1/8" flat	rubber	motor
6		copper washers	
1 package		model making pins	

Fuselage

In the construction of the fuselage it will be noticed that the nose or motor mount is removable. The nose is made of formers A, B, C and D, as shown in drawing. A wire clip for the motor stick is shaped from a piece of No. 10 music wire. The bamboo stringers are spliced from 1/4" x 15" bamboo cut as thin as possible and fastened in place with ambroid. As shown in drawings, 1/8" dowel sticks are used in the nose for attaching and detaching.

When the nose is complete lay it aside and prepare to work on the fuselage. Note that this is constructed in a box-like form. Use 1/8" x 1/8" balsa cut to the proper size for the body. Be sure the fuselage is straight and in line.

When this is complete, from a piece of balsa 1/16" thick cut out all half formers from E to Q. Ambroid these formers in their proper positions and set the fuselage aside to dry.

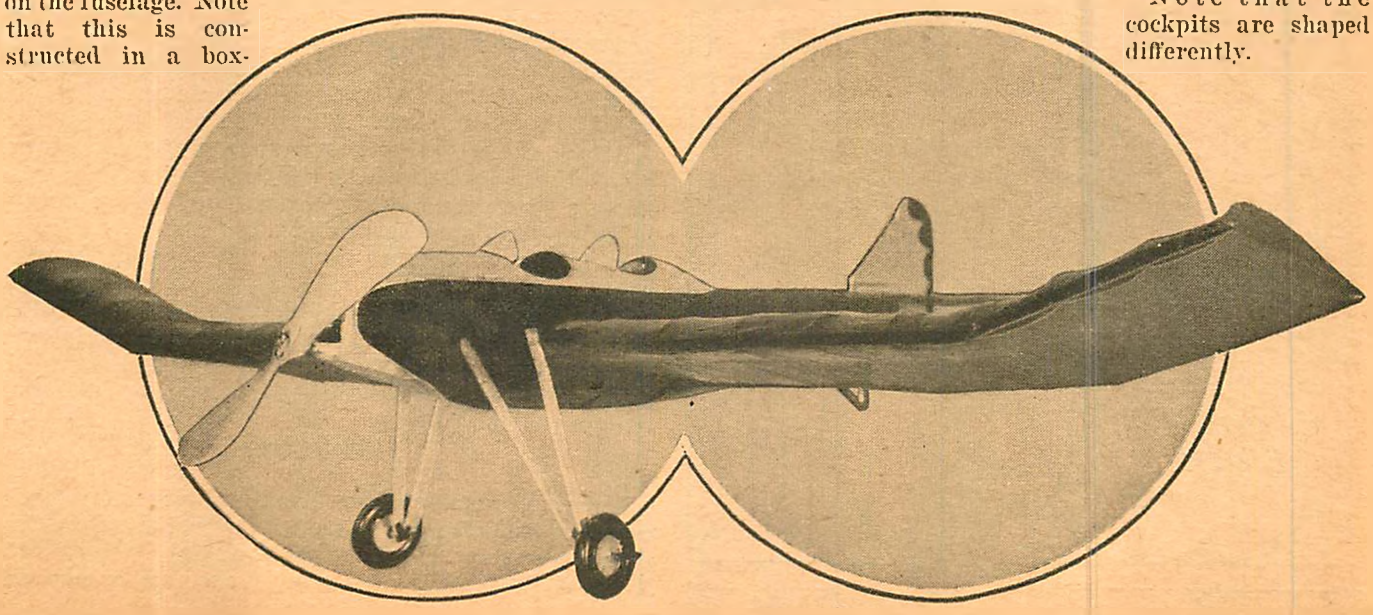
Tail Group

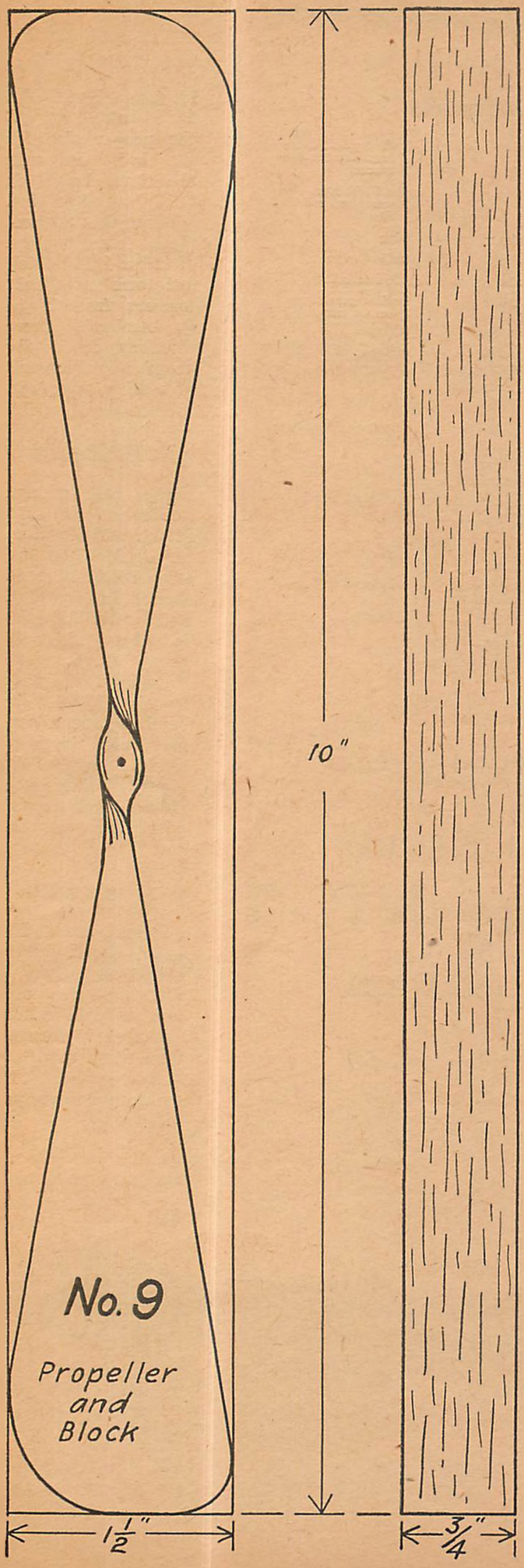
The tail group, consisting of the rudder and elevator, is built up of streamlined ribs as shown in drawing. Use ambroid lightly when this is being done. The curved shape is made by bending 1/32" bamboo over a candle flame, steam or electric iron. Take plenty of time to do this. Then cover with Japanese tissue.

Cockpits

From the 1/32" balsa sheet, cut to shape as shown in drawing. Use pins and ambroid to hold the cockpit formers until they dry.

Note that the cockpits are shaped differently.





Landing Gear

Construct the landing gear from balsa 1/8" x 1/4" cut to the right length. Cut out grooves in the struts and insert and ambroid 1/16" bamboo cut to the right size. This will strengthen the landing gear struts. Allow plenty of time to dry.

Now bend the wire axle to shape and ambroid it to the balsa struts. The two celluloid wheels are held in place by small copper washers and a block of balsa made from the sketch in the drawing. Shape out the streamlines and ambroid them at the end of the axle.

Tail Skid

The tail skid is constructed of bamboo bent over a candle flame, steam or electric iron, and is ambroided in place, as shown in the drawing.

Wings

It will be noted that the wings on the NB-3 are turned up at the tips. This is done to insure stability. Use 1/16" flat balsa for the ribs. Notice in the drawing that only twelve ribs are cut out on top to hold a brace. All ribs are alike in shape and can be easily made.

Build up the wings; one right and the other left. Use 1/8" square balsa for the leading edge and 1/8" x 3/16" for the center spar. 1/16" x 1/16" square balsa is used for the trailing edge. Be sure to have the first five ribs notched on top on both wings. The other two notched ribs are ambroided to the fuselage afterwards as shown in the drawings. When the wings have been completed, lay aside for a while.

Now take the fuselage and ambroid the elevator and rudder in position. Allow about one-half hour to dry. Carve the propeller to the standard shape, sandpaper and remove all bumps. A large cupping is not necessary. An airfoil section to the blades insures better performance. Balance the propeller. If it is right, insert the propeller shaft and ambroid firmly.

Assembling

The ship is ready for assembling at this point. Take the motor stick, insert the propeller and fit the rubber motor in position. Insert in the fuselage. A strong piece of string will be needed. Tie it around the fuselage and keep shifting it until the fuselage balances perfectly. Take one of the ribs that are to be ambroided to the fuselage.

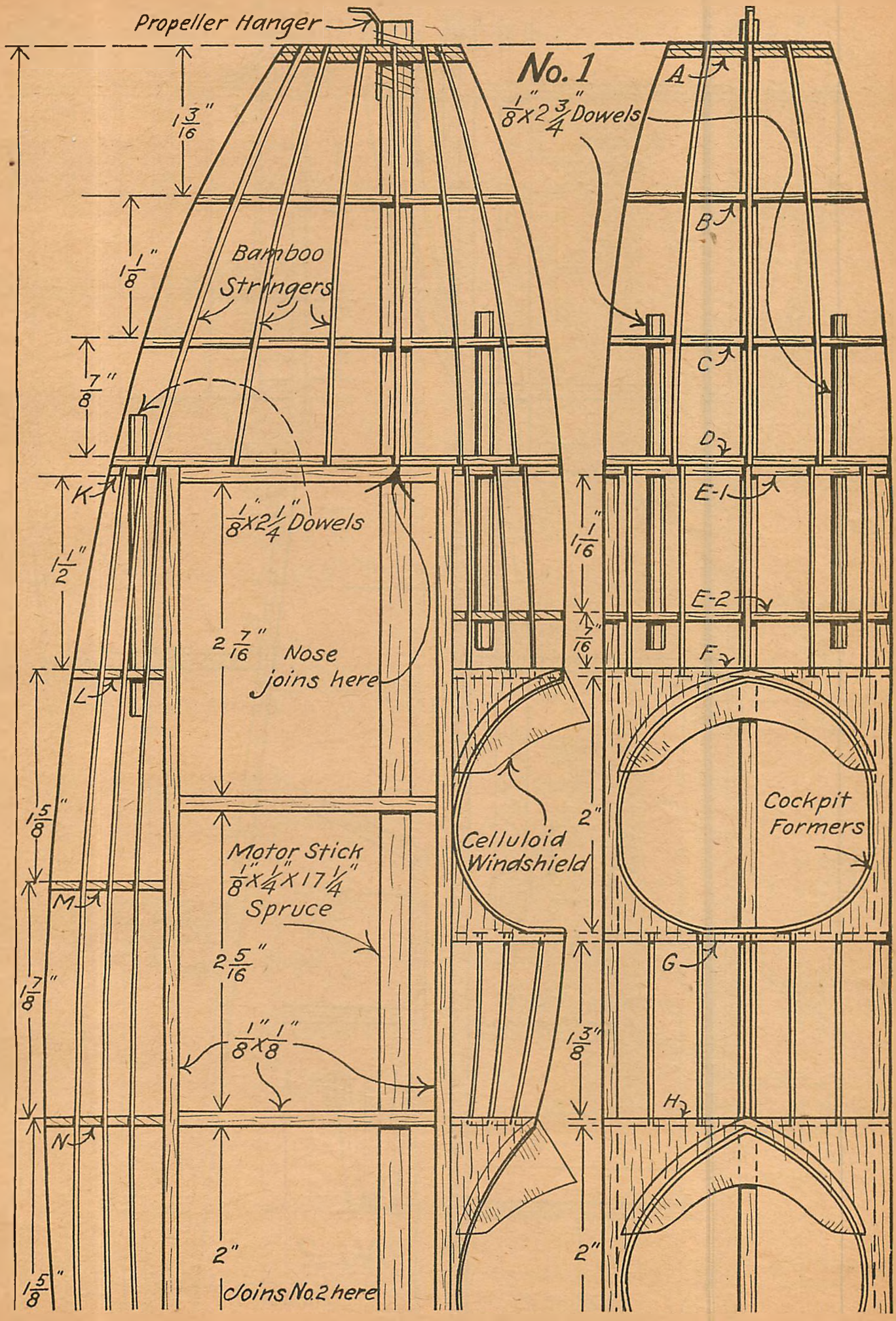
Set that rib 1/3 forward of the balancing position and mark it. Mark both ribs. Remove and string and ambroid the ribs in place, one on each side of the fuselage. Give the ribs a 2° angle of incidence. Use pins to hold the rib in place. Allow plenty of time to dry.

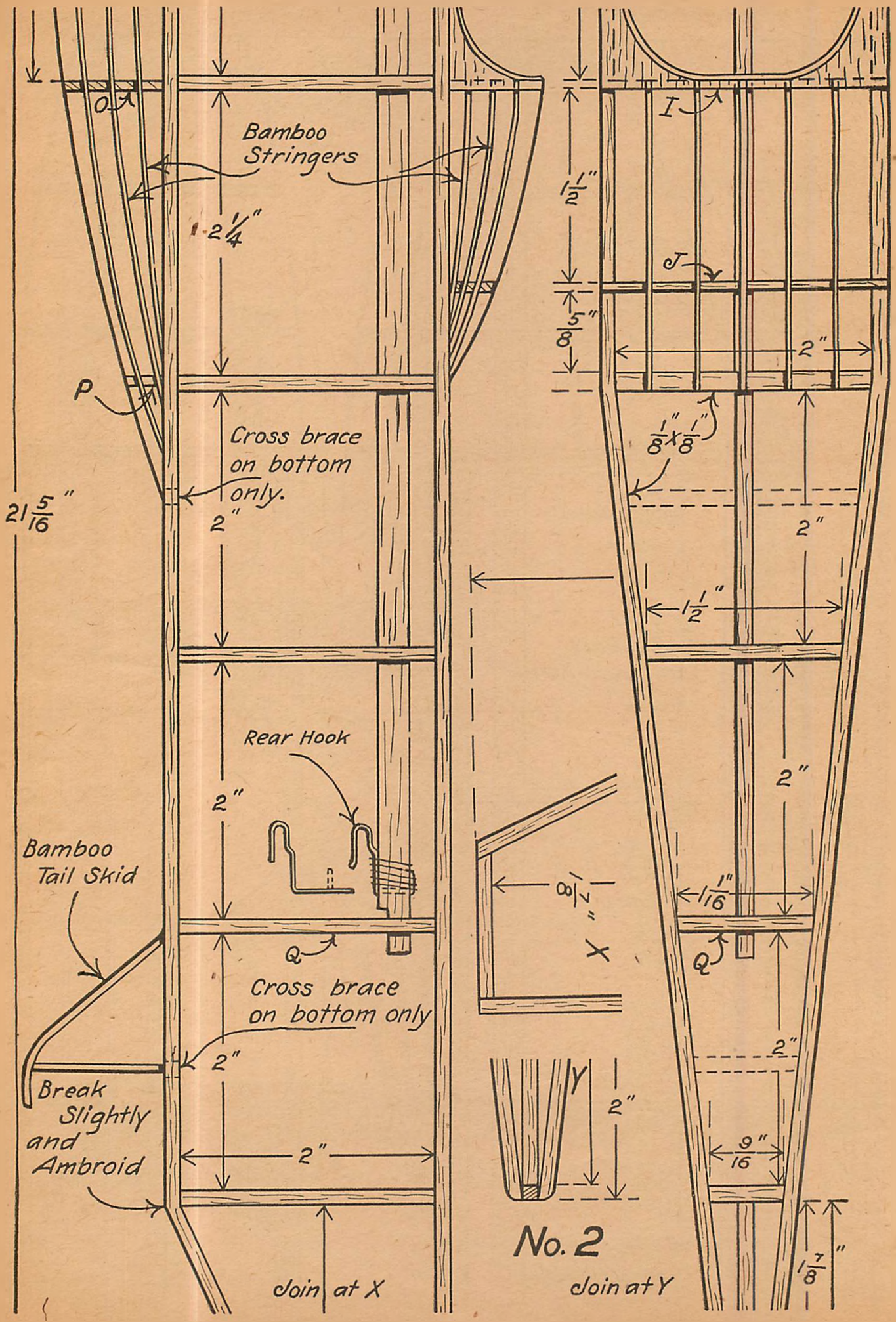
Attach the wings, one at a time, using enough ambroid. Use a bottle to hold them up or blocks of wood. Be sure your wing is straight out. The fuselage must be in flying position when this is being done. Allow at least two or three hours to dry. Then attach the other wing.

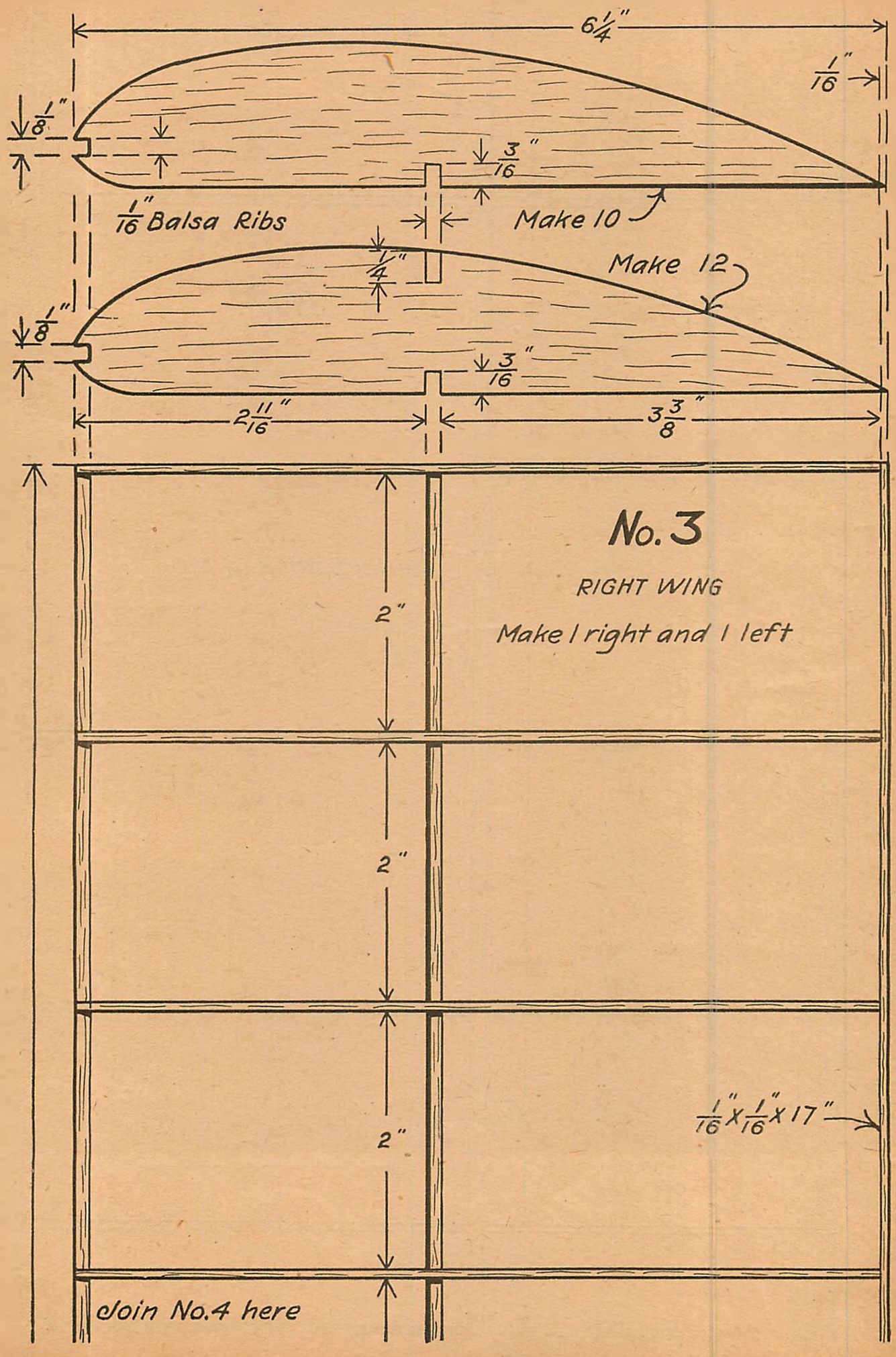
After this is thoroughly dried, ambroid the 1/8" x 1/4" x 16" strip firmly in the notches. This strip runs through the fuselage to the fifth rib of both wings. This brace will keep the wings from sagging downward.

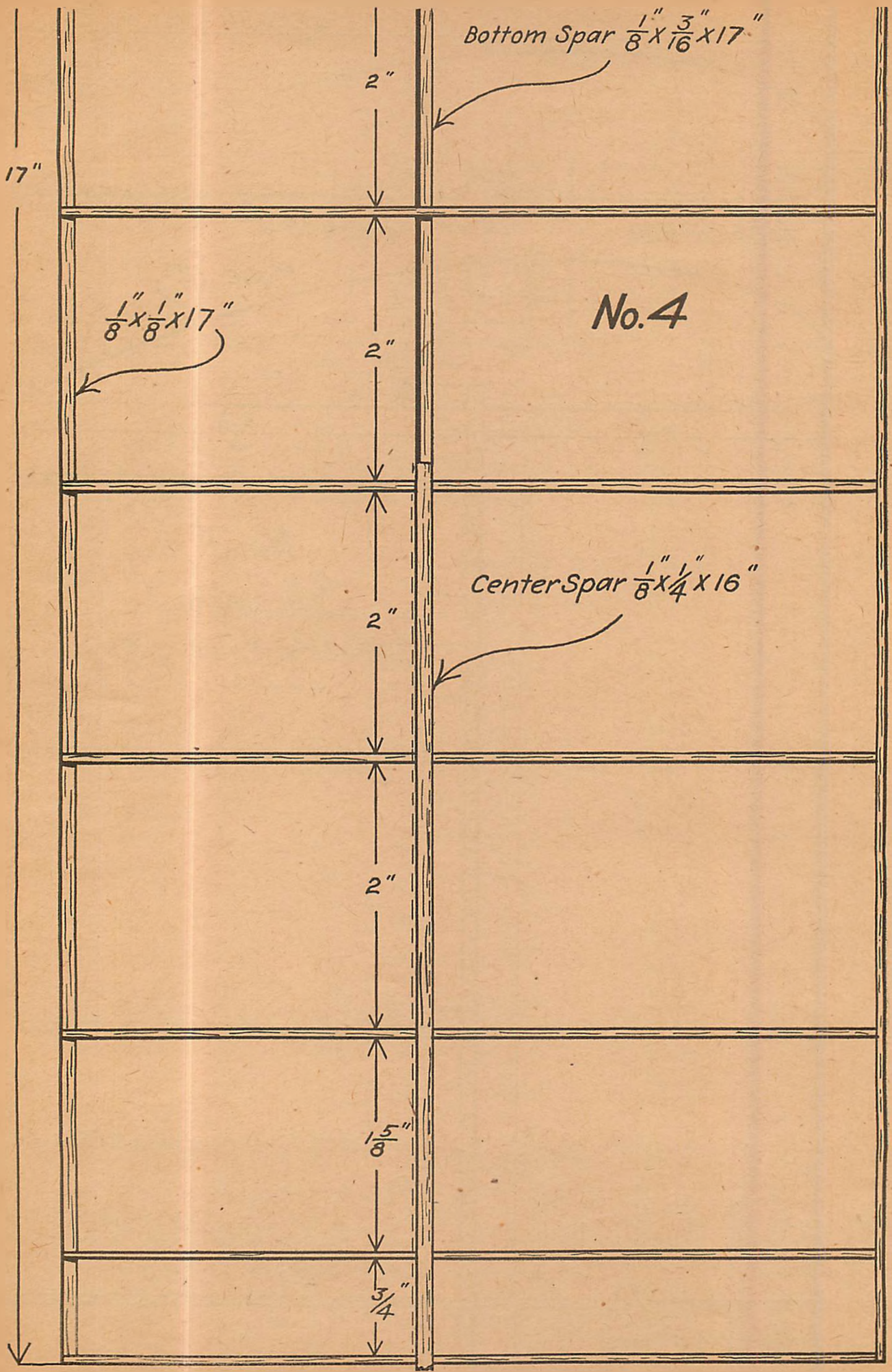
Covering

Remove the motor stick. Use the Japanese tissue for covering and also banana oil. Cover the wings first, then the fuselage. Pull the paper as tightly as possible. Run a slightly damp cloth over (*Continued on page 63*)

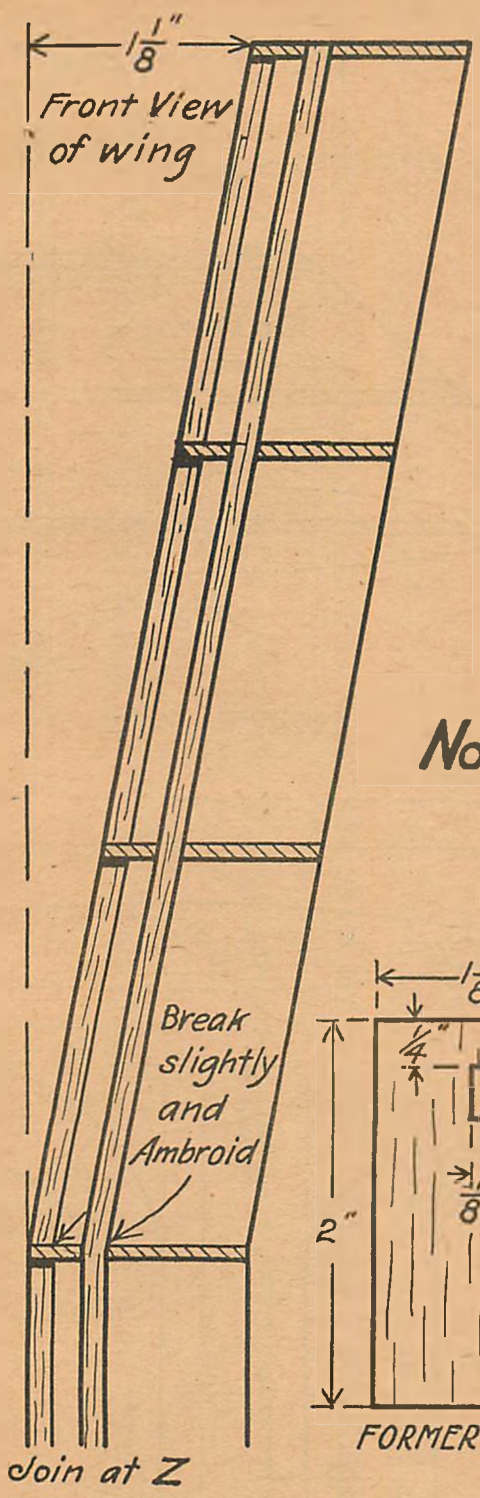

Propeller Hanger
No. 1
1/8" x 2 3/4" Dowels
A
B
C
D
E-1
E-2
F
G
H
1 3/16"
1 1/8"
7/8"
K
1 1/2"
1/8" x 2 1/4" Dowels
2 7/16" Nose joins here
L
1 5/8"
Motor Stick 1/8" x 1/4" x 17 1/4" Spruce
M
2 5/16"
1 7/8"
1" 1/8" x 1/8"
N
1 5/8"
2"
Joins No. 2 here
Bamboo Stringers
1 1/16"
7/16"
2"
Celluloid Windshield
Cockpit Formers
1 3/8"
2"


O
Bamboo Stringers
1 2 1/4"
P
Cross brace on bottom only.
21 5/16"
2"
Rear Hook
2"
Bamboo Tail Skid
Q
Cross brace on bottom only
2"
Break Slightly and Ambroid
2"
Join at X
I
1 1/2"
J
5/8"
2"
1/8" x 1/8"
2"
1 1/2"
2"
1 1/16"
Q
2"
2"
9/16"
1 7/8"
X
Y
2"
No. 2
Join at Y


6 1/4"
1/16"
1/8"
3/16"
1/16" Balsa Ribs
Make 10
1/4"
Make 12
1/8"
3/16"
2 11/16"
3 3/8"
No. 3
RIGHT WING
Make 1 right and 1 left
2"
2"
2"
1/16" X 1/16" X 17"
Join No. 4 here

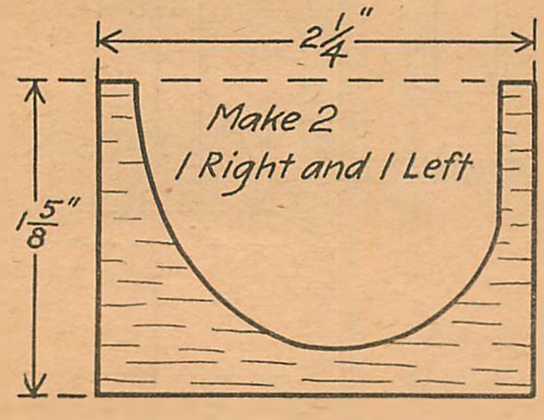

Bottom Spar 1/8" x 3/16" x 17"
17"
2"
2"
1/8" x 1/8" x 17"
No. 4
2"
Center Spar 1/8" x 1/4" x 16"
2"
1 5/8"
3/4"

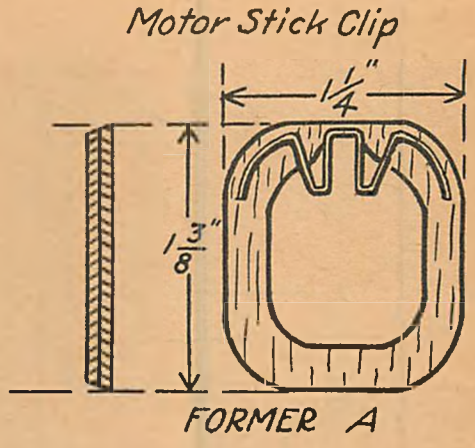

Z

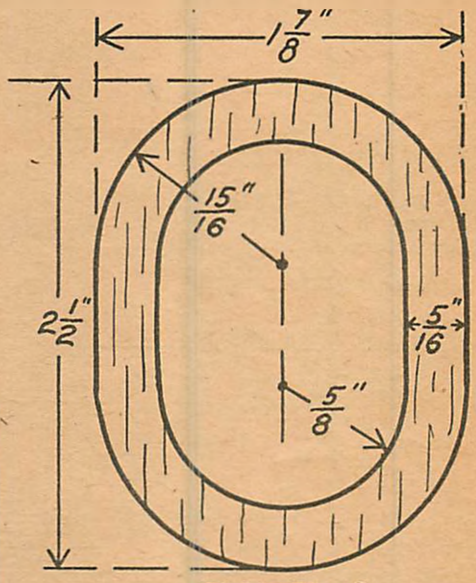

1 1/8"
Front View of wing
Break slightly and Ambroid
Join at Z

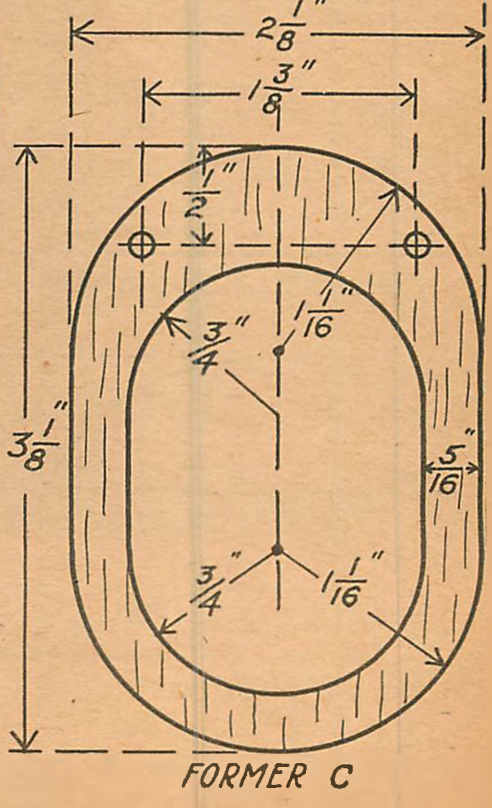
No. 5

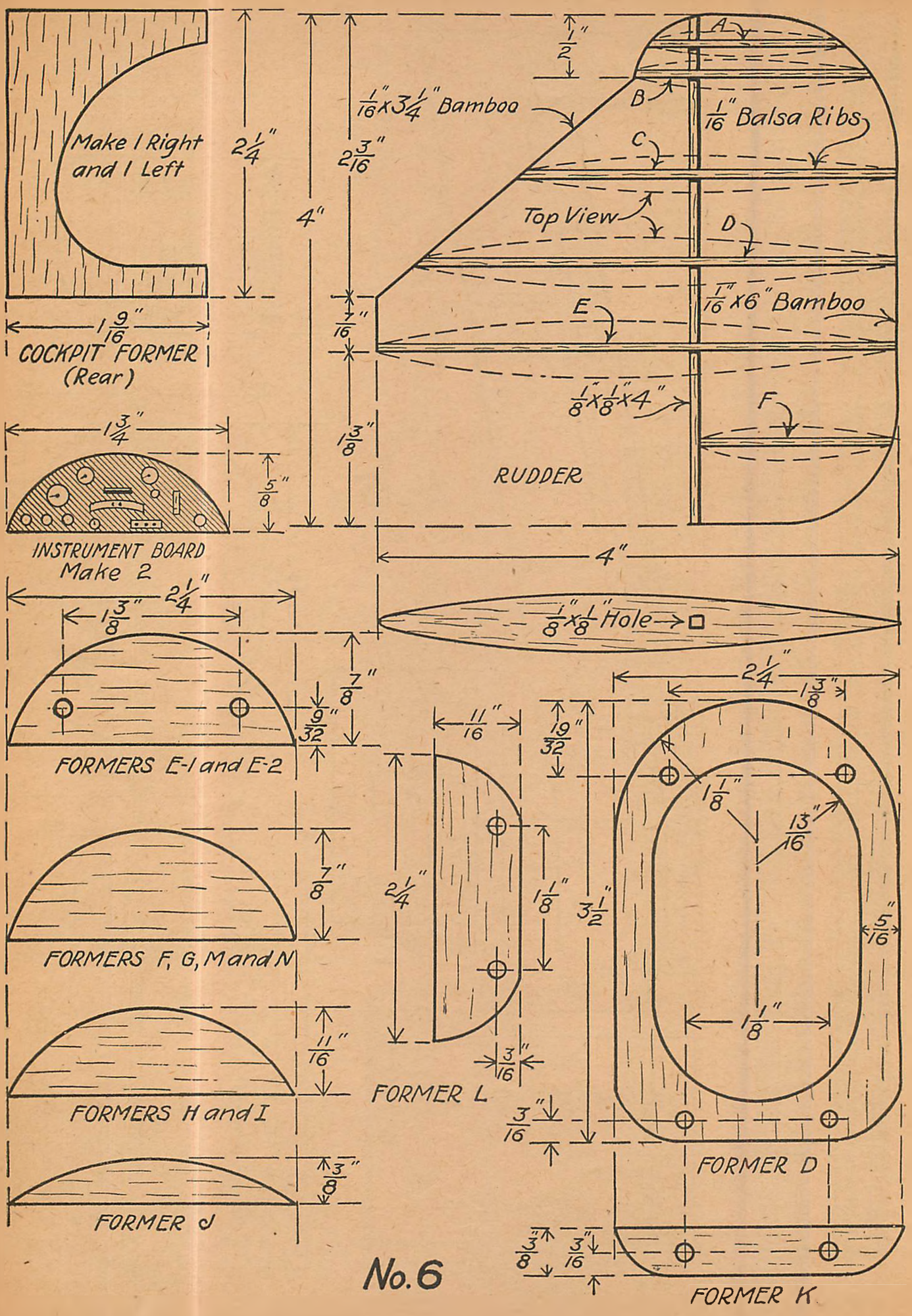
1 1/8"
1/4"
1/4"
1/8"
2"
FORMER Q


2 1/4"
Make 2
1 Right and 1 Left
1 5/8"
COCKPIT FORMER
(Front)

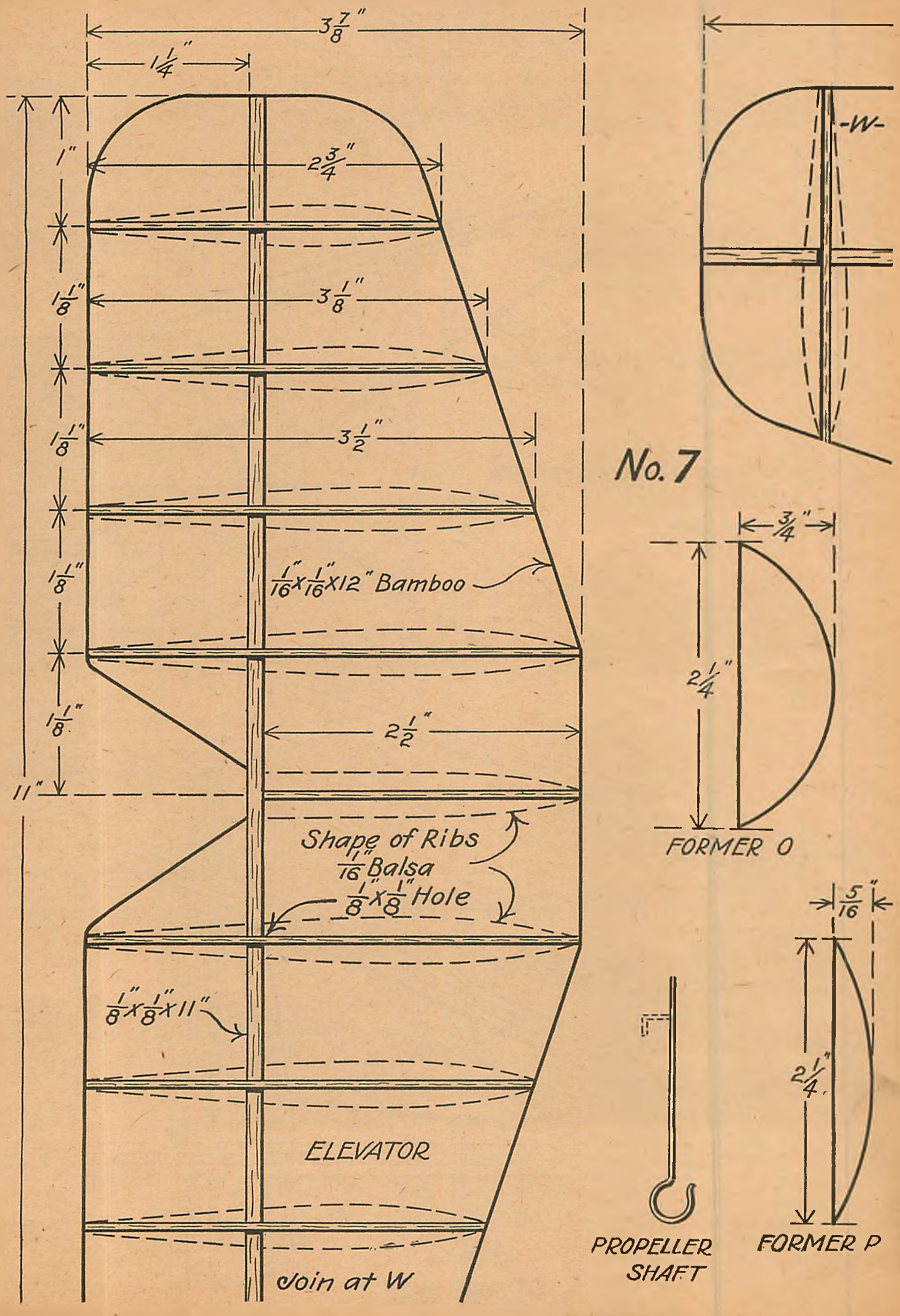

Motor Stick Clip
1 1/4"
1 3/8"
FORMER A

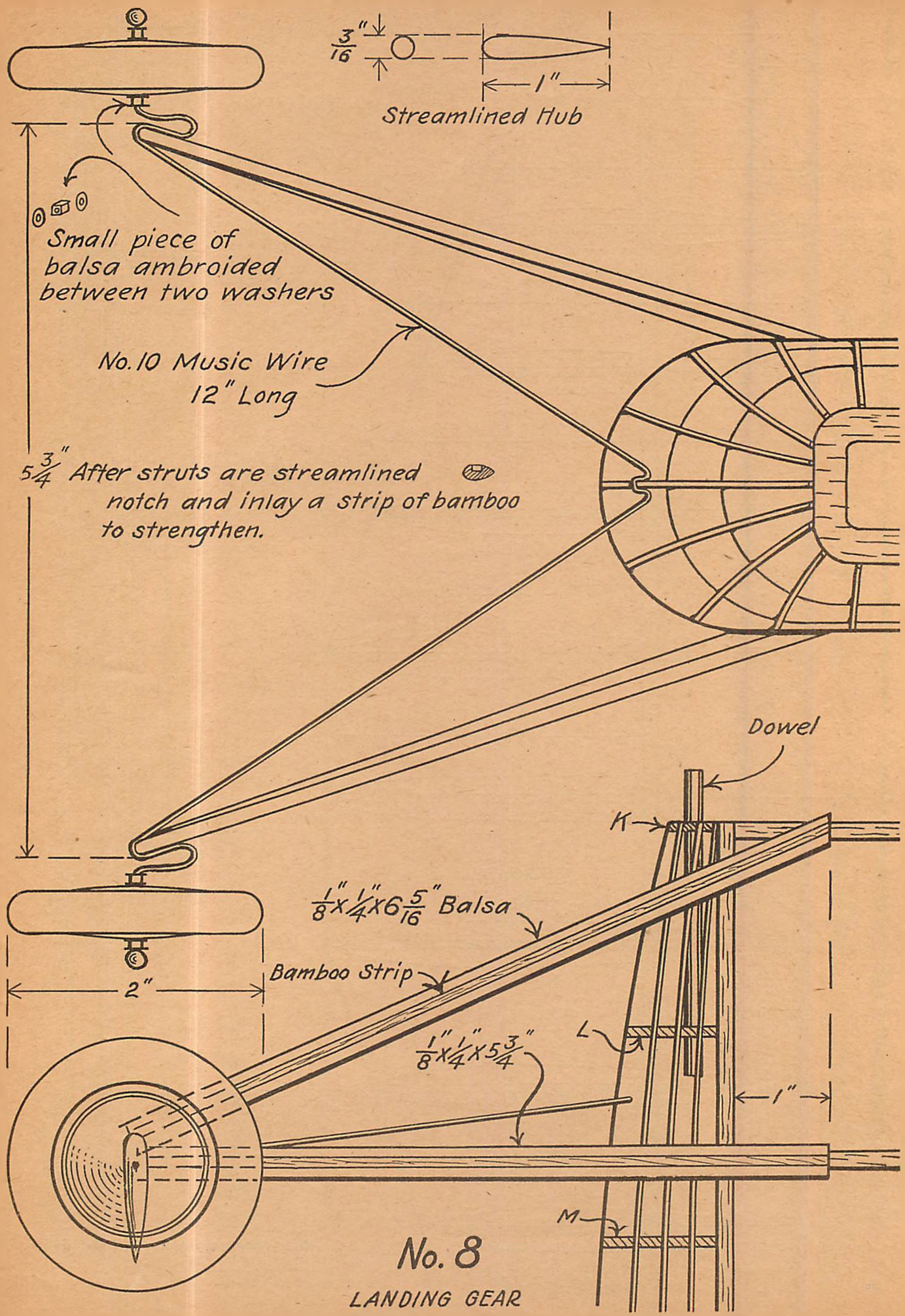

1 7/8"
15/16"
2 1/2"
5/16"
5/8"
FORMER B


2 1/8"
1 3/8"
1/2"
3/4"
1 1/16"
3 1/8"
5/16"
3/4"
1 1/16"
FORMER C


Make 1 Right and 1 Left
2 1/4"
1 9/16"
COCKPIT FORMER (Rear)
4"
2 3/16"
1/16"x3 1/4" Bamboo
1/2"
A
B
C
D
E
F
1/16" Balsa Ribs
Top View
1/16"x6" Bamboo
7/16"
1 3/8"
1/8"x1/8"x4"
RUDDER
1 3/4"
5/8"
INSTRUMENT BOARD Make 2
4"
1/8"x1/8" Hole
2 1/4"
1 3/8"
7/8"
9/32"
FORMERS E-1 and E-2
11/16"
19/32"
2 1/4"
1 3/8"
1 1/8"
13/16"
3 1/2"
5/16"
1 1/8"
FORMERS F, G, M and N
FORMER L
3/16"
FORMERS H and I
FORMER D
3/8"
FORMER J
FORMER K

No. 6


3 7/8"
1 1/4"
1"
2 3/4"
1 1/8"
3 1/8"
1 1/8"
3 1/2"
1 1/8"
1 1/8"
11"
1/16"x1/16"x12" Bamboo
2 1/2"
Shape of Ribs
1/16" Balsa
1/8"x1/8" Hole
1/8"x1/8"x11"
ELEVATOR
Join at W
-W-
No. 7
3/4"
2 1/4"
FORMER O
5/16"
2 1/4"
PROPELLER SHAFT
FORMER P



No. 8
LANDING GEAR

A Course in Airplane Designing

By Mastering This Valuable Course, the Model Builder of Today Lays the Cornerstone for His Career as the Aeronautical Engineer and Designer of Tomorrow

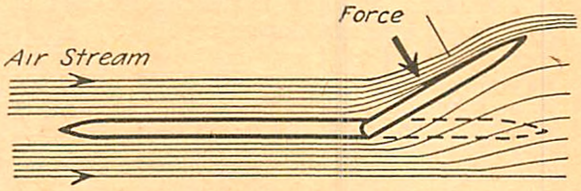
By Ken Sinclair

IN presenting this course, Model Airplane News *wishes to stress the fact that model building is more than a mere sport. If the builder of model airplanes learns the fundamental principles underlying airplane flight and designing, he prepares himself for a future career in the most profitable phase of aviation.*

The policy of Model Airplane News *is not to encourage or teach its readers to become pilots, but rather to become aeronautical engineers, designers, salesmen, manufacturers, or equip themselves for any other positions which require the training of the specialist or executive. Study this course from month to month, master it in every detail and you will gain a fundamental knowledge of the how and why of airplane design which will be second to none.*

The Editor.

Figure 1



Action of Control Surfaces

FLYING scale models, and some other models, are usually equipped with several control surfaces, to enable the person flying the ship to have some control over its movements after it leaves the ground. All control surfaces act in the same way, whether they are horizontal, like the elevators and the ailerons, or vertical, like the rudder. For this reason, the same basic explanation applies to them all.

We see in Figure 1 a control surface. The portion at the right is the movable part, the dashed lines showing its normal position, while the solid lines show its position when moved by the pilot. The air stream, coming from the left, is not very much disturbed when the control is in the normal position, but if the control is moved the air is forced out of its allotted place by the surface. But the air stream does not want to be moved. It resists, pushing against the displaced control surface with a force that is represented on the drawing by the heavy arrow. This force is then transmitted through the hinge to the rest of the ship, causing it to swing in the direction desired. It makes no difference whether the control surface is placed vertically or horizontally, because the air resists being moved, no matter in which direction.

Figure 2

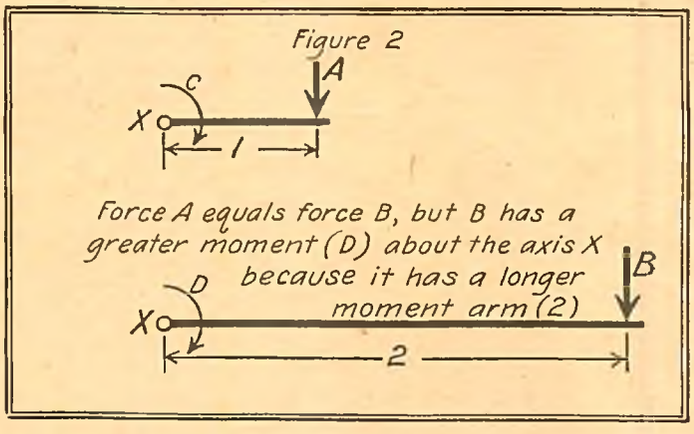
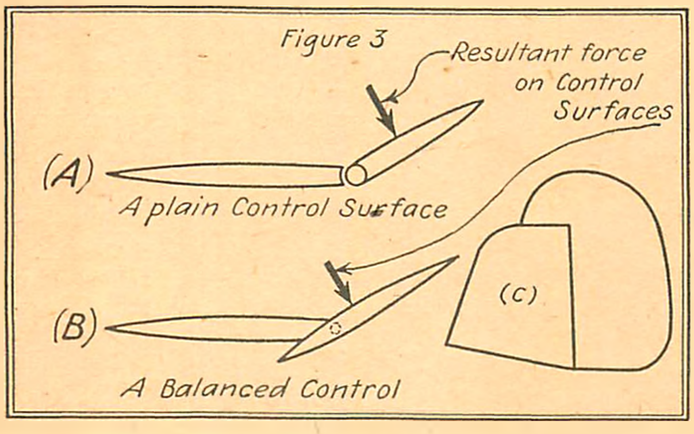


Figure 3

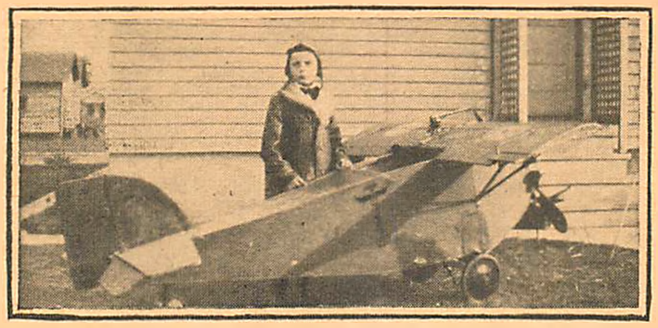


Having learned why there is a force set up on a displaced control surface, let us learn something about the force and its effect on the ship as a whole. You have probably tried to turn a rusted nut with a short wrench, found that it was too tight, and used a longer wrench on it, turning it easily. Why does the longer wrench turn the nut? Surely you were no stronger when you used the longer wrench, and surely the nut did not suddenly loosen up! The reason for this is shown in Figures 2 and 3. The force that you apply on arm one is acting at a shorter distance from the axis of rotation than is the force that you apply at arm two. The two forces themselves may be equal, but the one applied on the longer arm has a greater moment about the axis because it is farther away from it. This fact enabled you to turn the nut with the long wrench, though you were unable to turn it with the shorter one.

Let us apply this same principle to the airplane. If the control surface is placed a short distance from the center of gravity it will have to be quite large if it is to exert enough force on the ship to control it. However, if we place the surface (*Continued on page* 54)

The American Sky Cadets

MODEL aircraft, a sport which has enlisted at least a million boys and girls, got off to a flying start for 1930 with the announcement today by the Playground and Recreation Association of America of the Fourth National Playground Miniature Aircraft Tournament. Since the first tournament conducted in 1927 after Colonel Charles A. Lindbergh's ocean flight, interest and skill among juniors in building model planes has shown marked progress, the association reports.



Thomas Hilton, 112 Westfield Ave., Elizabeth, N. J. with a plane he built

Boys and girls up to twenty-one years of age are eligible to compete for the national finals to be held in Atlantic City, N. J., on October 10 and 11 next. Those under sixteen compete in the junior class. The contestants for the finals are chosen on the basis of records their planes have made in local tournament held on or before September 2.

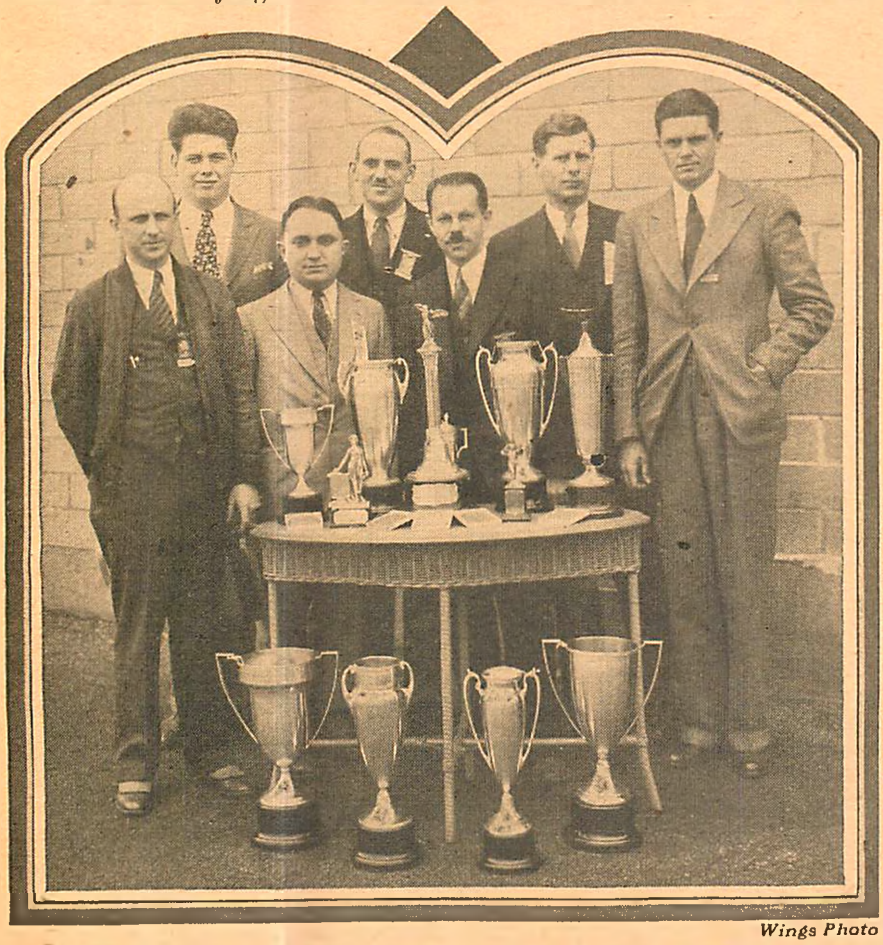
Model aircraft is sponsored by the recreation departments in nearly 200 cities as a constructive hobby for spare time.

The planes flown in the national tournaments have advanced in design, ingenuity and records achieved each year. At the 1929 tournament in Louisville, Kentucky, a fuselage model built by Henry Pacewitz of Chicago flew for 14 minutes 32-2/5 seconds and was then lost from view of the judges over two miles from the starting point. This broke the record of 12 minutes 30 seconds made by the rising-off-water model of Tudor Morris in the 1928 contest.

"I read the results of the Louisville contest with great interest and genuine astonishment" wrote Edward P. Warner, editor of *Aviation* and formerly assistant secretary for aeronautics, Navy Department. "The records that are now achieved seem almost unbelievable. . . . I am sure that these events do a lot of good."

Orville Wright and Colonel Charles A. Lindbergh are co-chairmen of the tournament committee. Miss Amelia Earhart, a committee member, has offered a special trophy to the girl who makes the best record among the girls who enter. Girls are eligible also for the general trophies in direct competition with boys. Entering the contest for the first time last year, girls made some excellent records.

The tournament is conducted on a strictly amateur basis, no cash prizes being awarded and no one being qualified to compete who has accepted money for building or flying model planes. Cooperating with playground and recreation bodies are civic and social organizations, boys' clubs, schools, camps, the Boy and Girl Scouts, Camp Fire Girls, Y. M. C. A. and Y. W. C. A. Aero clubs of adults, now numbering nearly 200, have done much to foster junior aircraft activities.



Wings Photo

Members of the Executive Committee of the National Indoor Model Airplane Contest held during International Aircraft Exposition, St. Louis. Included in the group are G. E. Bounds, Carl Ehrhardt, Joseph Lukas, Capt. Jack Bursey, Maj. James K. Tully and Harry Maynard

N.Y. Boys' Club

No one can visit the Boys' Club of New York at 10th Street and Avenue A, without being deeply impressed by the magnificent work that is being carried out there.

The idea was conceived by Mr. E. H. Harriman and the club was opened in 1876. Today at this club alone there are over 7,000 members, while at the Jefferson Park branch the membership is 4,000.

Under a strong committee and run by a staff of voluntary leaders, the boys of the district have facilities for recreation here from which they would be cut off were it not for the good work of the club.

Clubs for different activities have been organized, each conducted by a leader. Billiards and ping-pong tables have been provided and one sees here, perhaps the happiest bunch of boys in New York.

The mural decorations have been done by the boys, under the leadership of Mr. Max Starr and are excellent pieces of work.

Camp Jamesport, L. I., is for the boys' summer activities and the members are sent up in groups to enjoy those activities.

The latest club to be formed is the aviation group affiliated with the American Sky Cadets.

Mr. Mitchell, himself an aviator, had been talking to the boys on avia-

Announcing the National Contest at Atlantic City; Progress of the New York, South Haven, Mich. Clubs

Joseph Ehrhardt, St. Louis, 17-year-old high point winner of the first annual National Indoor Model Airplane Contest held during International Aircraft Exposition, St. Louis
Wings Photo

tion in general and it was decided that the interest shown augured well for a model building group. Mr. Henry T. Vance took charge of this group and the club had a great inauguration.

For this meeting the Hon. F. Trubee Davison, Assistant Secretary of War, kindly lent to the American Sky Cadets, a U. S. Army Air Corps' official film showing the training of an army pilot. Another film, entitled "Aviation", was obtained through the courtesy of Pathe Bros., New York. These two pictures were highly appreciated by the boys. After the films had been shown, Mr. Vance led off the speakers by announcing the formation of a model airplane club. He then introduced Mr. Daley of the Curtiss Ground School, and an instructor at New York University.

This speaker outlined the different courses that are given and told the boys of the many jobs connected with aviation. Mr. Daley was followed by Mr. Moriarty, Assistant Administrator of the American Sky Cadets, who told of the aims of this national group.

Mr. R. B. Smith, Traffic Manager of the Aviation Corps Consolidated Air Lines, then gave the boys an outline of the transportation side of aviation, telling something of the great amount of work required to run airplane services.

Next came a surprise, when from the back of the auditorium and down the center aisle, to the platform, came five aviators led by Commander Eiseman of the U. S. Naval Air Station at Far Rockaway, N. Y.

The commander introduced them one by one and each had a few words of advice and encouragement for our future aviators. These aviators were: Commander Eiseman, Capt. George Haldeman, Major Leigh, Capt. Hall Stevens and Capt. Calhoun. Each of these aviators stressed one point. The importance of the man on the ground. The successful aviator is not the man who just flies and nothing else.

Aviation, they said, is a great subject and there is a future in it for the man who knows his job. The big money is in the ground jobs—inventing, designing, instructing, mechanics, selling. All these positions need years of study and a thorough knowledge of planes and aviation.

The evening was a great success and Mr. Vance is to be complimented on the fine results obtained.

Two weeks later the club met for organization. Members signed up and were given their wings, kits, and certificates. The officers of the club are:

LEADER
Mr. H. T. Vance

FLIGHT COMMANDERS

Casey Jones Flight—Steve Remete
Roger A. Williams Flight—Steve Naleshnik
Eagles Flight—Joseph Zaky
Commander Eiseman Flight—Pete Noznick
Treasurer—Stephen Szabago
Secretary—Stanley Ropiak

A contest was held at the next meeting for the baby indoor tractors which had been built, and the winners were awarded passes for a free flight in an airplane.

A special programme was put on a week later when Mr. C. S. (Casey) Jones, president of the Curtiss-Wright Flying Service, very kindly consented to be present to give a talk to the members.

Mr. Jones, after telling the members that the expense of taking a flying course, might keep some away, mentioned how gliders were coming to the fore in the United States and that gliding would soon be within the reach of all. He described the various kinds of gliders and said that not only was gliding a sport but that it was most useful in teaching many laws, a knowledge of which was required by aviators.

He interspersed his message with one or two personal experiences and gave a most entertaining talk.

The business of the meeting only took a few minutes under the able chairmanship of Steve Remete. Steve needs no gavel, works at high speed, puts everything to the vote and what Steve says goes, the majority following as a matter of course!

Hat in the Ring Squadron

One of the great air battles of the century was pulled off recently in South Haven, Michigan, when the South Haven Model Airplane Club, known as the Hat in the Ring Squadron, was challenged in a tournament by the Kalamazoo Scout Airplane Club.

The boys from Kalamazoo came down in full force, bringing planes of every shape and description, to in-

vade the South Haven tarmac. But the South Haven boys were ready to live up to their slogan and met their foes with an air fleet that proved irresistible.

As the weather was a bit wintry for an out-door meet, the grounds chosen for the match was the Michigan State Cavalry Armory in South Haven. The boys themselves showed their organizing ability by completely conducting the tourney from start to finish, and though feeling ran high in the contests, the fighting was restricted to the air.

The timing committee was specially chosen of unbiased experts, equipped with stop watches and field glasses. The meet was given considerable publicity in the local newspapers, who have recognized the fact that the air engineers, inventors, pilots and mechanics of tomorrow are busy in the model airplane groups of today.

Willis Potthoff with a scale model of the Stinson Detroiter and the Lindbergh medal it won at the National Indoor Model Airplane Contest at the International Aircraft Exposition

forty-five and two-fifths seconds. If the meet had been held outdoors on a still day, Thayer's high-flying plane would have shone to far greater advantage.

Wayne Hoag, another South Haven ace, took third place. He too had serious plane trouble, but in spite of this he scored up twenty-five and four-fifths seconds.

The boys from Kalamazoo force included every member of the Boy Scout Airplane Club. Unfortunately two of the planes were temporarily laid up in the hangars because of crash damages.

They promise to be in first class shape for the return meet, which is to be held before long at Kalamazoo.

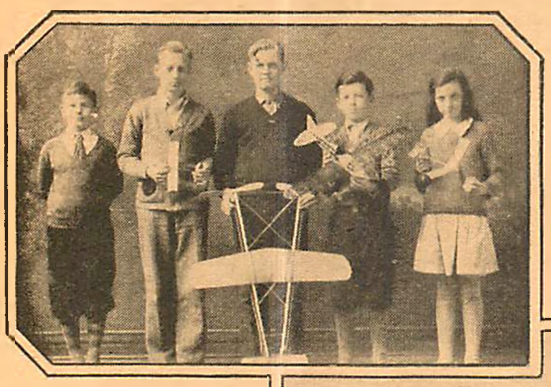
Twelve boys showed up from Breedsville to attend the meet, with the intention of getting all the dope on starting a club and series of tourneys of their own. There is a possibility that a "three-way" meet may be arranged as soon as the Breedsville boys get things into shape.

The gang at South Haven are now planning an "Air Circus" to be held there in the latter part of July, a three-day get-together of plane enthusiasts and model builders.

Contests in every class will be announced, and big Wacos, Travel Airs, and Eaglerocks will be in the air, as well as the tractors and twin pushers of the younger pilots.

Preparations for the event are well under way and there is every indication that all expectations will be realized.

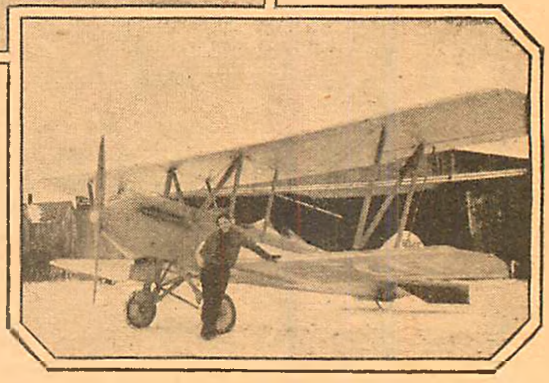
Every model building enthusiast is doing his utmost to make the "Circus" an all around success.



Members of the Hat in the Ring Squadron of the American Sky Cadets, So. Haven, Mich. Left to right, Herbert Streeter, Eddy Kuhn, Wayne Hoag, Jimmy Callahan and Jean Appleyard. All build their own models and have created a number of records, while Jean is secretary of the club and builds planes, too

Billy Williams, instructor of the Hat in the Ring Squadron, with his OX-5 Eaglerock, who held at one time the record of being the youngest transport pilot in the country

Another grouping of the Hat in the Ring Squadron. Left to right, L. H. Streeter, Billy Williams, Jim Callahan, Alfred Patner, Smith Dodge, Junior Croft. Rear, Edward Kuhn, Herbert Streeter, Wayne Hoag, Douglas Larson, Jean Appleyard, Phelps Whitlow and Edgar Reader



Eddie Kuhn, ace pilot for the Hat in the Ring outfit, chalked up first place for himself and won the honors for South Haven. His entry soared like a bird for one minute and twenty-seven seconds. That time is a mark for the boys to shoot at.

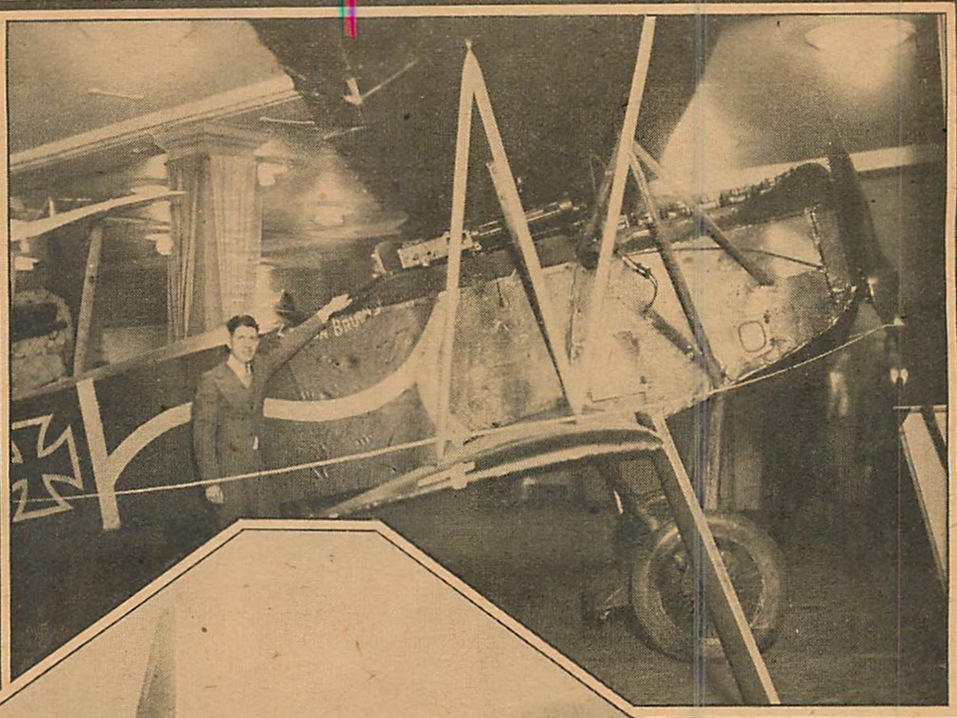
Thayer, of Kalamazoo, chief among the contenders, got off to a great start, but his plane fouled the rafters just as it seemed that a new record would be created. Those things happen to even the most experienced of model pilots.

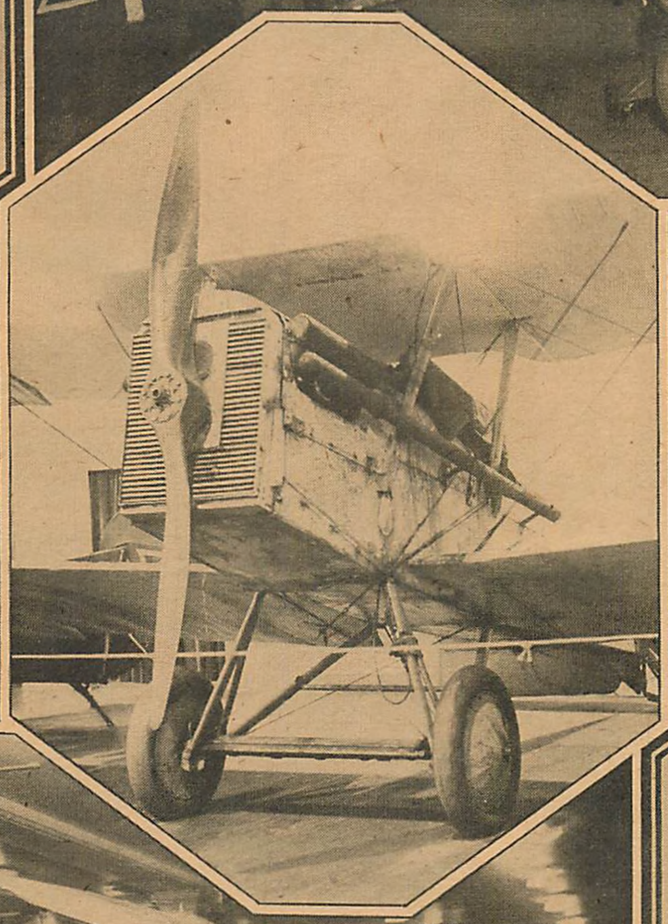
Thayer was a representative of his home town at the National Model Airplane Meet at Detroit last year. In spite of his bad luck, his plane took second place, banking and climbing around the armory for

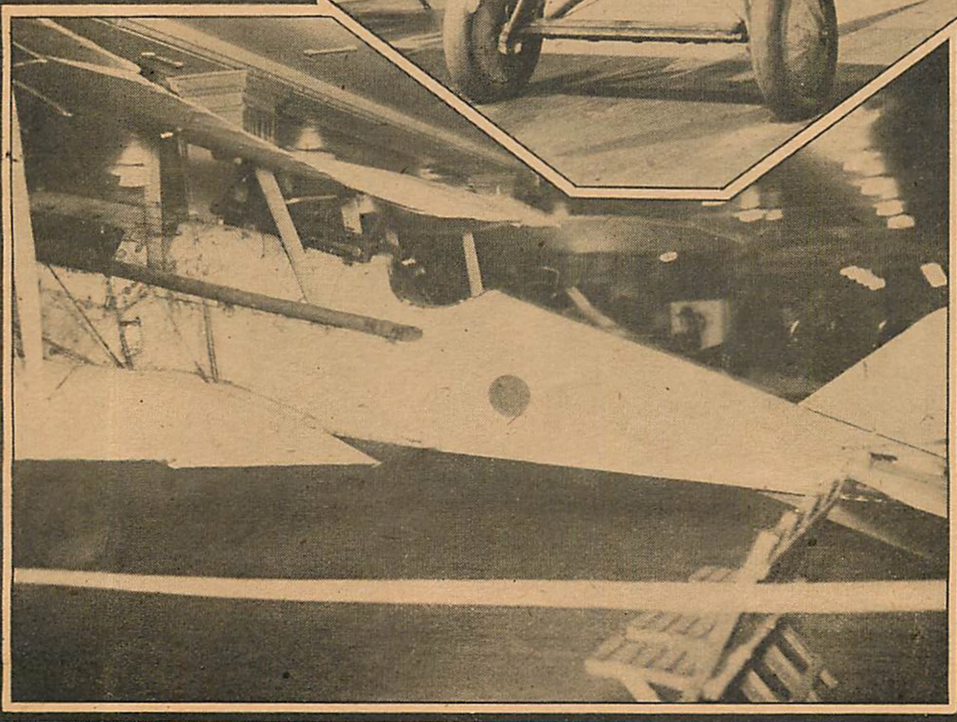
Brendan J. Kelly, 47 Bevy Court, Brooklyn, N. Y., with a model built by himself

ON this page are shown two planes used in active fighting during the World War. At the right is a photograph of a German Fokker D-7, in which is clearly seen one of the Spandau machine guns. Notice also the "N" struts, so popular today.

News Events



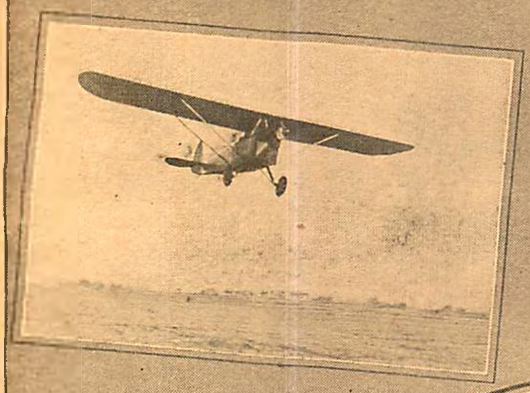




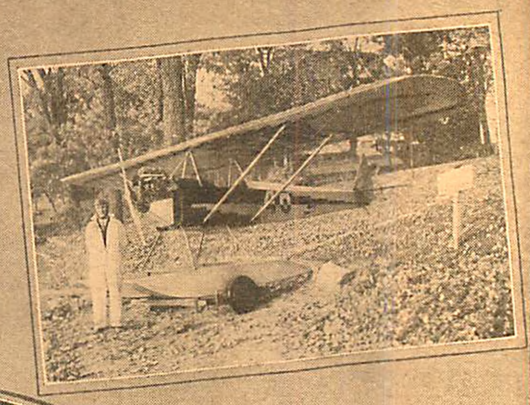
IN the center is shown a view of the British SE-5. Vickers guns were mounted in the same position as the guns on the Fokker D-7. Below is another view of this famous single seater fighter.

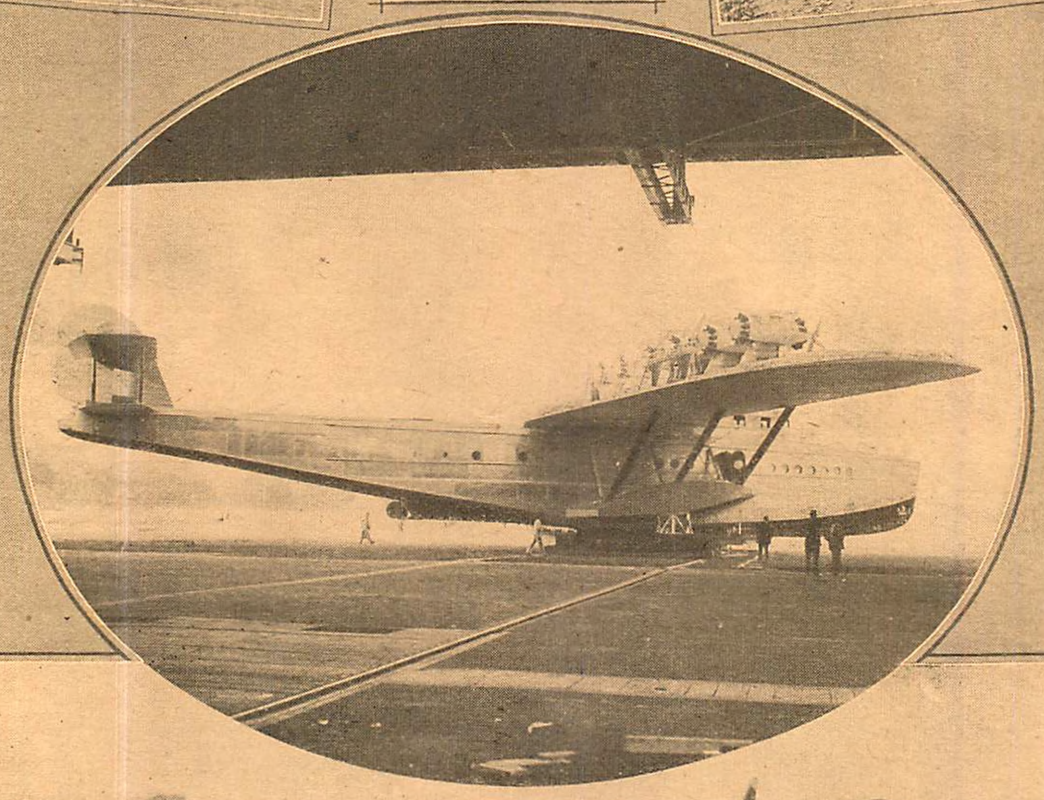
Both the SE-5 and the D-7 were much alike in the matter of performance.

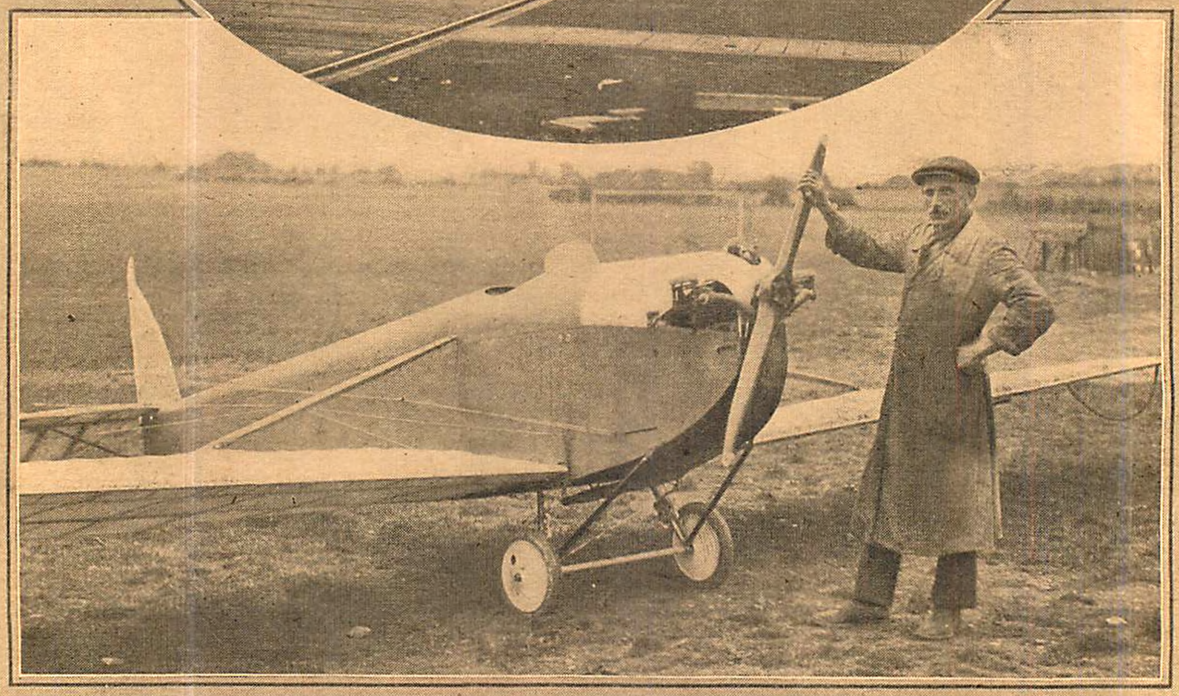
News Events



THE convertibility of the Heath Super Parasol monoplane is amply demonstrated in the two top photographs. At the left, the plane is shown with an ordinary wheel landing gear and at the right, shown fitted with pontoons for landing on water



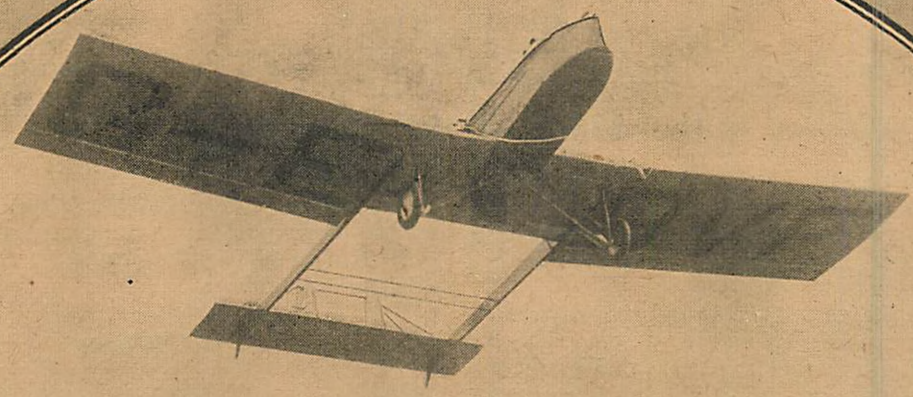




IN the oval is shown a striking view of Germany's monster of the air, the Dornier Do-X. This plane, it will be remembered, successfully took off with 169 people on board and cruised over Lake Constance for one hour at a speed of 110 miles

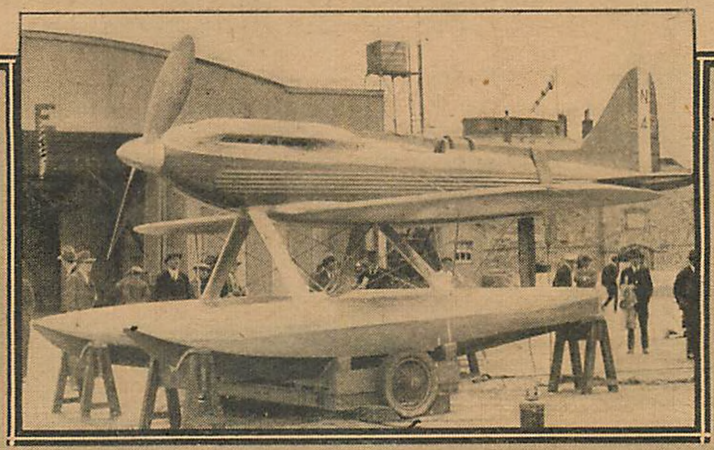
BELOW is seen a De Haviland 53 which has been dubbed in England the "tradesman's runabout." It is fitted with a 6 h. p. motor and the wings are automatically detached for garaging purposes. This baby plane is capable of 70 miles an hour and its size is well portrayed in contrast with the mechanic

P. & A. Photos.



UNUSUAL in design and adding greatly to the comfort of its passengers is the first English built pusher type monoplane (above). This plane eliminates some of the gas fumes of the motor, which is located behind the passengers, and affords them a better view

P & A Photo

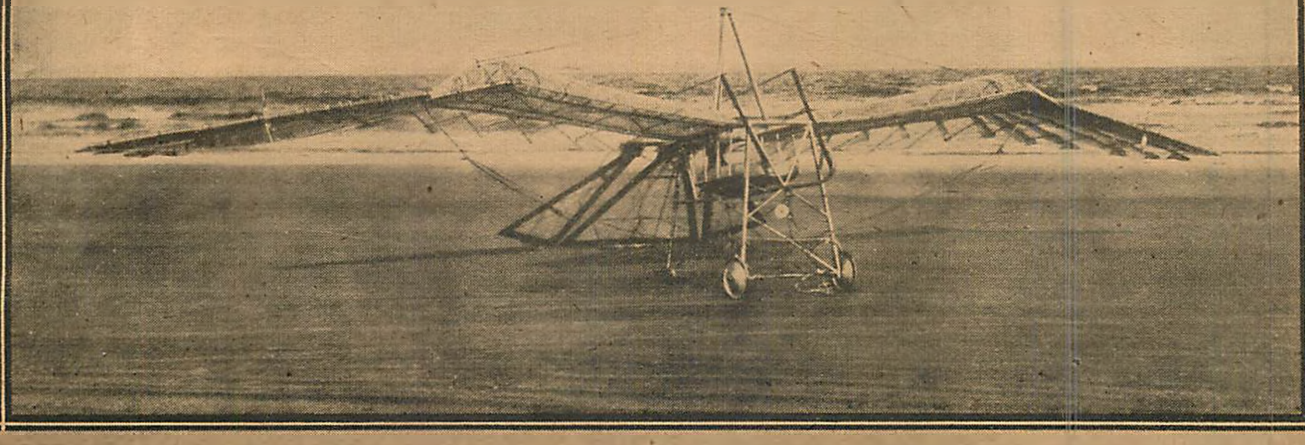


IN center is a side-view of the world's speediest plane, the Supermarine Rolls-Royce S-6 seaplane, in which Squadron Leader A. H. Orlebar established the world's record of 357.7 miles per hour at Calshot, Southampton, England, in 1929. This plane won the 1929 Schneider Cup trophy at an average speed of 328.63 m.p.h.

P & A Photo

BELOW is given an excellent view of what might be termed a mechanical bird, the ornithopter. It is a wing-flapping, foot-propelled machine, weighing only 100 lbs., although it has a wing spread of 25 ft. and a fuselage measuring 8 ft. in length. It is claimed that it can attain a speed of 40 miles per hour

P & A Photo



A Flying Model of a Real Glider

Inexpensive Easy to Construct and the Thing of the Moment

ALL over this country and Europe, glider clubs are springing up everywhere, in schools, universities, and among private enthusiasts. The example set by Wilbur and Orville Wright at Kittyhawk, N. C., has been followed with such success that to date W. H. Bowlus of California has chalked up an American record of nine hours, five minutes, and the Germans, spurred on by motor-plane restrictions, have piled up more than fourteen hours and forty-three minutes.

A pilot who knows glider principles and the wayward ways of air currents can take off at the end of a rubber rope in one of these light, motorless planes, and by sheer skill remain in the air for hours. Flights of more than ninety miles have been recorded.

The best method of getting the hang of a glider is to build a working model and experiment by flying it yourself. Here are plans for a glider model to be made entirely of balsa wood. It was designed by the president of the Detroit Model Airplane Flyers' Club, Mr. Robert Flury.

Fuselage

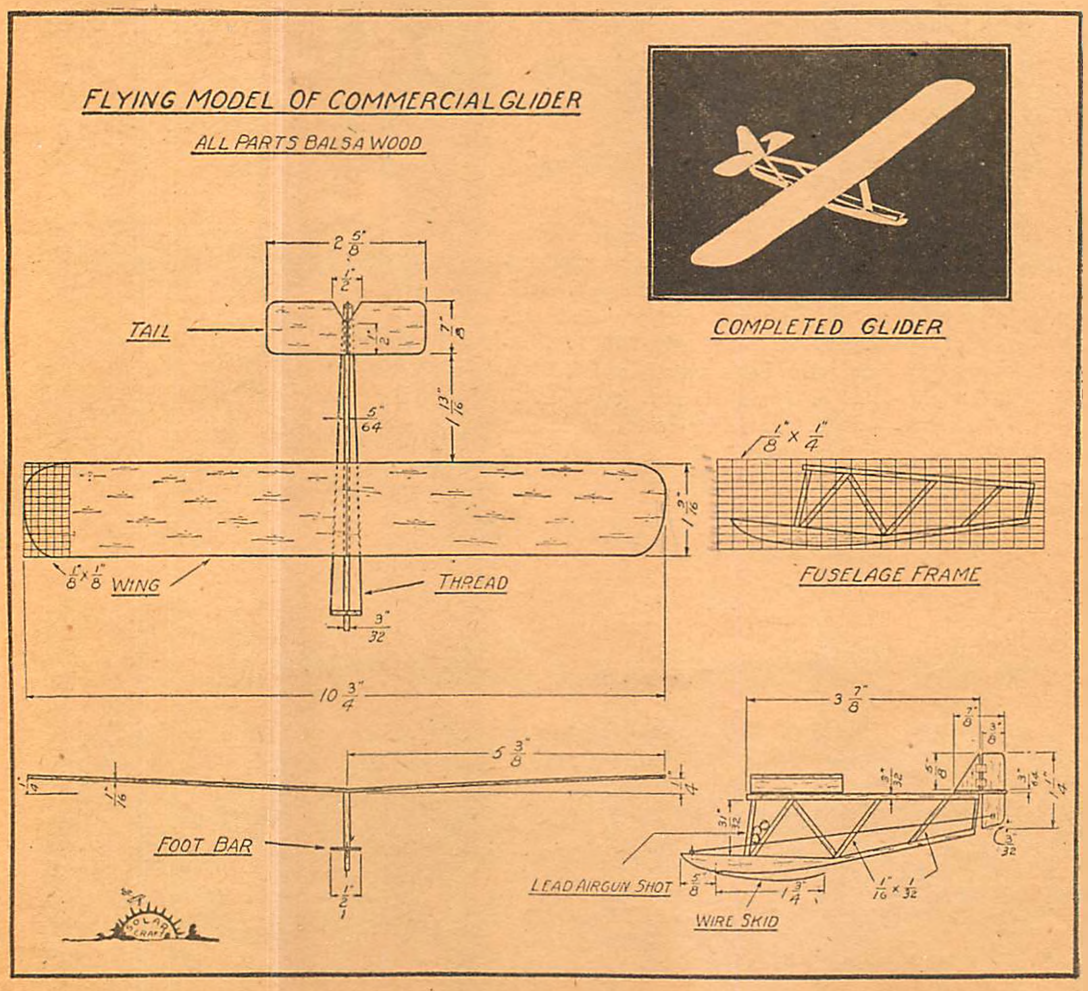
Prepare a sheet of paper by laying it out in rectangles one-eighth by one-fourth of an inch each. Now lay out the full size frame plan on this paper. Make the shoe or lower part of the frame from a piece of balsa 3/32" x 5/8" x 5 1/4". Cut the paper pattern, trace around it on the wood, and work down to line with razor and sandpaper.

Bend the wire skid from a 2" piece of music wire, with 1/4" of the end turned up and glued into the shoe as shown in the illustration. The top member of the frame comes next. Its dimensions are 3/32" x 3/32" x 3 7/8". Frame ends and bracing are as shown, 1/32" x 1/16". Lay the bracing over the paper pattern in order to make the angles just right. In assembling the frame, be sure to use special model-maker's glue.

Wing

The wing should be a solid piece of thin balsa. Lay out pattern for the ends on a sheet of paper squared off 1/8" x 1/8". Cut out the pattern and trace on the ends of the wing, cutting down to shape with razor blade. Now sandpaper the wing down to a little less than 1/16" in thickness, rounding edges and ends. Find the exact center of the wing and make a heavy pencil mark across it at right angles. Now place the wing flat on a table, hold a ruler across the pencil line, and lift one end of the wing 1/2" from the table, thus forming the dihedral angle.

If the wood breaks or cracks across the center, a coat of glue spread across the crack on the top and bottom of the wing will strengthen it. When finished, glue the wing to the wing stick about 1/16" from the end.



Tail

Make the tail piece from pattern in the same manner as in the above. Round off the corners and edges smoothly and glue carefully to the wing stick.

Fin and Rudder

These are 1/32" thick. Carve the fin exactly to shape and glue to the tail piece. Make the rudder, then hinge it to the fin with two strips of Japanese tissue paper which are glued to each side of the fin and rudder as shown in the illustration.

Weights

The commercial glider is balanced by the weight of the pilot. Since our model flies alone, this must be compensated for. Glue three lead *(Continued on page 63)*

MACFADDEN AVIATION ADVISORY BOARD

Conducted by
Capt. H. J. LOFTUS-PRICE
(Ex-Royal Air Force)

CHAIRMAN OF THE BOARD

SEVERAL readers made some of the bumpiest landings seen round this tarmac during the past weeks, and chief among them is George Stevens, of Upton Park, London, England. "Is navigation an essential part of flying?" George asks. "Should one study aerial navigation?"

Well, we sat back and studied that one, and decided to ask a few ourselves. For instance—"Is soap an essential part of a bath?" True, it is possible to bathe without soap, but is it a good bath? "Is a ball essential to a football game?" True, a game might be played with a bundle of rags or paper tied with string, but is it a good game?

See what we are driving at?

As a matter of fact, one of the most serious drawbacks to aviation today is not the *number* of pilots but the lack of good pilots. By that is meant the number of pilots who, once they are out of range of beacons and railways and roads which can be followed, can fly "blind," which is another way of saying "navigate" their planes.

Hundreds of persons are being graduated each week from the "ten-hours-and-you-solo" type of school as private pilots, and ninety-nine out of a hundred are just that—private pilots. The other one, with an eye to his or her future, keeps one foot on the ground (metaphorically speaking) and digs into a good course in avigation, to give aerial navigation its proper name.

From these one-out-of-every-hundred blossom forth your Lindberghs, Byrds, Chamberlins, Yanceys and Williams. Ninety of the other ninety-nine slowly fade from the picture through lack of initiative, and the other nine muddle through to limited commercial licenses after much hard work and worry.

This sounds discouraging, but it is not meant that way.

Much of the cause of lack of initiative and necessity for good pilots in the sense outlined lies in the general layout of the country itself.

Isn't it quite natural for a pilot to ask, "Why study navigation when everything I want in indicators is on the ground itself? Every highway stands out like a ribbon leading from one town to another. The railways are easy to pick out from the air. In the southern and central states the ground is so laid out in mile squares that, providing one has a general idea of the compass direction being flown, it is easy to follow the roads."

That's just it. There's no incentive to learn navigation. Nevertheless, if every pilot were compelled to undergo a course in avigation many of the mishaps so glibly attributed to "crashed in a fog" or "lost in a fog" or "forced down by bad weather and crashed on landing" would be eliminated. Furthermore, a national nucleus would be established from which in time of need the Government could draw replacements for the air corps.

This can readily be appreciated when it is realized that military aviation of the future will not be restricted to regulations such as, "the Nth and Mth squadrons will meet over Columbus, Ohio," (which can be reached by following highways and railroad tracks) but will be more like "fifteen squadrons will concentrate over M6a3.7 at 10,000 feet"—a spot on the map known only to the authorities and which can be reached only by aerial navigation.

So, perhaps, you can realize exactly the importance avigation plays in aviation and in the matter of good pilotage. If you are bent on taking up aviation as a career, treat it as such and as you would any other business career. Learn all there is to learn about aviation, and that will take you more years than you think.

This brings us to the question of education. Many readers have asked whether an education is necessary to learn the art of piloting. Yes and no. Practically anyone can be taught to pilot a plane, but it is the educated pilot who outstrips the other fellow.

Education, however acquired, is the basis of all success, and this refers to aviation perhaps more than any other industry.

If all those airmen who successfully flew across the Atlantic and to Honolulu, excepting those who fell victim to mechanical or atmospheric mishaps, had not mastered mathematics at school or studied the subject afterwards, how do you think they would have been able to plot their courses before and during their flights?

Forget the bright remarks of several news correspondents in Paris who gabbled about, "with a map drawn on a piece of paper from a copybook, and with only one or two dots representing New York, Ireland and Paris, Lindbergh flew the Atlantic, etc., etc". Lindy had studied and prepared for that flight for months before he accomplished it, and the basis of all his preparation was education. And that's that.

—o—

Below is continued our list of planes used in the World War.

Italian—A. E. R. (Continued)

Gabardini tractor monoplane, training machine, 50 h.p. Gnome engine

Macchi "5", single-seater water plane M 5, Isotta Fraschini V.4b engine 160 h.p.

Macchi "7", single-seater water plane M 7, Isotta Fraschini V.6 260 h.p. engine

Macchi "8", two-seater seaplane M 8, scouting, Isotta Fraschini V.4B, 160 h.p. engine

Macchi "9", two-seater seaplane M 9, scouting and bombing, 280 h.p. Fiat A 12 bis. engine

Macchi "12", three-seater seaplane M 12, scouting and bombing, Ansaldo S. Giorgio 4 E.28 450 h.p. engine

Macchi "14", single-seater fighter M 14 land biplane, 110 h.p. LeRhone engine

Macchi "15", five-seater land biplane, scouting, 280 h.p. Fiat 12A bis. engine

Sia "F.B." airplane, bomb dropper, Fiat A 12 bis. 300 h.p. engine

(1916) Sia biplane, bombing, two 700 h.p. Fiat engines

EACH month the Macfadden Aviation Advisory Board will endeavor to answer all questions concerning model building and aviation in general. Address all questions to

The
Macfadden Aviation Advisory
Board,
MODEL AIRPLANE NEWS
1926 Broadway,
New York City

Enclose with your letter a self-addressed and stamped envelop to facilitate an answer, as space is limited and all letters can not be answered in these pages.

Fiat-Sia-B.R. biplane, scouting and bombing, F. I. A. T. A14 650 h.p. engine
S. I. A. 1 flying boat, bombing type
S. V. A. biplane, single-seater fighter, 220 h.p. S. P. A. (Ansaldo) engine
S. V. A. single-seater, daylight bomber, S. P. A. 200 h.p. engine
Ansaldo single-seater biplane "Primo" fighter, 220 h.p. S. P. A. (Ansaldo) engine
Ansaldo 1 (called also the "Balilla"), single-seater biplane, hunter, S. P. A. 200 h.p. engine

Japanese

Itch fighter, 50 or 80 h.p. Gnome engine (small airplane)
Nakajima, fighting and reconnaissance, two-seater biplane, Hall Scott engine, 150-200 h.p.

U. S. A.

D.H. 4A, 400 h.p. Liberty engine (only one used on actual front in Europe)

Training Airplanes

Curtiss J.N.4 (B, C & D)
Standard J1 for primary training
Curtiss J. N. H., two-seater (Hispano-Suiza)
Thomas Morse S.4 (B & C)
Standard E.1, single-seater for advanced training

This ends the list of wartime planes which I have been able to obtain and now I will start the other surprise; giving a list of World War aces with ten or more machines to their credit. It is quite possible that records might not be correct in this respect, so that if any of you know of others, do not fail to write in and let me know.

United States

Lieut. E. Richenbacher	26
Major Raoul Lufbery	18
Lieut. Frank Luke	18
Lieut. Elliot Springs (R.F.C.)	15
Lieut. David E. Putnam	13
Major Geo. A. Vaughn	13
Lieut. Frank E. Baylies	12
Lieut. Reed Landis (R.F.C.)	12

(Another ace is Capt. David Ingalls but we have no record of the number of planes he brought down.)

French—(living)

Lieut. Rene Fonck	59
Lieut. Charles Nungesser (died on Transatlantic flight in 1927)	38
Lieut. Georges Madon	38
Lieut. Maurice Boyan	29
Lieut. Guerin	22

(To be continued)

Dear Sirs:

Which goes the fastest; a Zeppelin or an airplane?

Who is the world's greatest ace, living or dead? Who was engaged in the most air battles in the World War?

What is balsa wood?

How can you tell a water-cooled motor from an air-cooled motor at a distance of about 20 ft.?

Yours truly,
SIDNEY CLARK,
Box 30,
Prince George, B. C., Canada.

Answer:

The speed of a Zeppelin is about 85 miles per hour and that of an airplane 357 miles per hour; obviously, the latter is by far the speedier of the two.

The designation of the world's greatest ace, living or dead, is a question open to controversy. However, credit is usually given to Baron von Richthofen, the German ace, who figured in more air battles than any other flyer.

Balsa is light, pithy wood grown only in South America. It is best for model building as it is the strongest wood for its weight.

Air-cooled engines usually have the cylinders exposed, whereas water-cooled motors are usually covered in; hence, it is easy to distinguish the two. Also, the air-cooled type have "flanges" or cylinders, while water-cooled motors' cylinders have smooth sides.

Dear Sirs:

Why has a cambered wing more lift than a flat wing?

Yours sincerely,
DICK JUDGE,
Wardner Post Office,
Wardner, Idaho.

Answer:

A cambered wing has more lift than a flat wing because greater vacuum is created on top of the wing and this vacuum creates greater lift. The average vacuum over the top of the wing is responsible for two-thirds of the entire lift.

Dear Sirs:

Can you give me some information as to how one could enter the Naval Air Corps Training School?

Yours truly,
RAMON CARL DOUGAN,
1021 Circle Park,
Knoxville, Tenn.

Answer:

Enlistment in the Navy Air Corps is made at any U. S. Navy Recruiting Station, where the applicant may make mention of his preference for working into the aviation branch of the service. Those possessing the basic qualifications for this work have a good chance of selection for aviation duty. However, the selection is competitive and any who try for it unsuccessfully will be required to complete their enlistments in the Navy.

Enlistment is open to male citizens between 17 and 35. Recruits are sent to the Naval Training School at Newport, R. I., for eight weeks of training. Many men are transferred from the training station for a series of instruction courses and duty in aviation. The final course in this series is in the Pilot's School at Pensacola, Fla. Upon completion of this course men are designated Naval Aviation Pilots.

Any recruiting station is prepared to give candidates for aviation a special physical examination to determine their qualifications for flight training, and to advise them as to their prospects without incurring any obligation on the part of the applicants.

Gentlemen:

Would you please tell me if a man graduates from a flying school and receives a pilot's license may he be a U. S. Mail Pilot?

Yours truly,
HERBERT JAUCHEN,
65 Merriam Ave.,
Leominster, Mass.

Answer:

The question of a graduate of a flying school becoming a U. S. Air Mail pilot is governed by Government selection. A pilot can apply for such a job if he is working for any concern carrying mail.

Gentlemen:

Please tell me what type of plane is commonly used for shipping on civilian fields. I would also like to know how fast the plane can go, the gas capacity and size.

Yours truly,
JACK DE MORELAND,
1014 B St., S. E.
Washington, D. C.

Answer:

There are many types of planes used in transportation or civilian service. The Ford-Trimotor is one of the many in such use and we give you below the specifications desired, taking this airplane for example.

Its dimensions are as follows: span 74 ft., length 49 ft. 10 in. height 12 ft. 8 in., wing area 785 sq. ft.

The fuel tanks, located in the wing, have a total capacity of 200 U. S. gallons.

The performance of this plane is as follows: maximum speed 114 m.p.hr., cruising speed 95 m.p.hr., stalling speed 5 m.p.hr., ceiling 14,000 ft., cruising range 570 mi.

Dear Sirs:

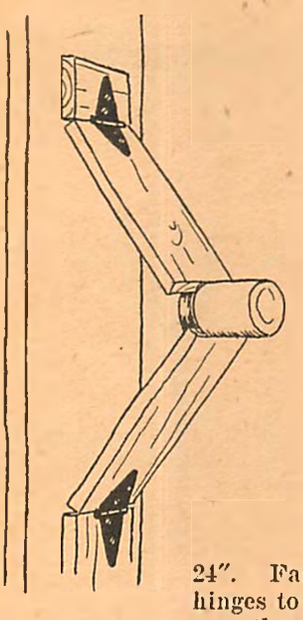
I want to know something about the landing and take-off of a plane. In landing, which hits the ground first, the wheels or the tailskid? In taking off, which leaves the ground first, the wheels or tailskid?

Yours truly,
LOY F. PETERSON,
1496 W. Main St.,
Decatur, Ill.

(Continued on page 53)

Home Labor Saving Devices

A Few Examples of Handicraft

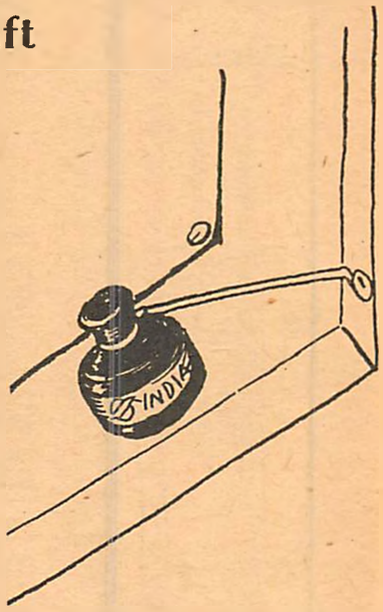


For Your Mother

Caps on fruit jars and cans have a way of sticking. This is a sure-fire little device that requires only a pair of hinges and some light boards, and which will unscrew the toughest cap without effort on the part of the user.

Take two pieces of wood, about 3″ x 3/4″ x 24″. Fasten them vertically with hinges to short pieces of wood, which are themselves nailed to a wall. Make the two pieces just long enough to touch when not in use. This device grips more tightly as it is closed.

For the Artist



Many fellows who use a tilted drawing board in making freehand and mechanical drawings find it unhandy to search for the ink bottle each time they want to fill a pen. Here's a twist for keeping the bottle in plain sight on the board, and believe it or not, the ink won't spill. Just tie a stout string around the bottle neck, and fasten the other end of the string to a thumbtack on the top edge of the board.

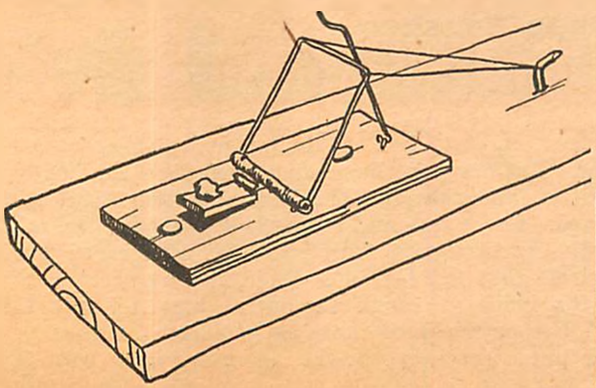
Safety Mouse Trap

Many people, and perhaps your mother is one of them, dislike setting mouse-traps because of the tendency they have to snap your fingers as you are setting them. Five minutes work will make the household mouse-traps safe and convenient.

First nail the trap to a piece of flat wood about 2″ by 8″ by 1/2″, near one end. Drive a six-penny nail up through the board from the bottom a short distance behind the trap, and bend it over.

Now fasten a string to the flying bar of the trap, just long enough so that it will hook over the nail point. Set the trap in the ordinary way, and the string will prevent its going off at the wrong time.

As soon as the trap is in place, turn the nail around so that the string will slip off.



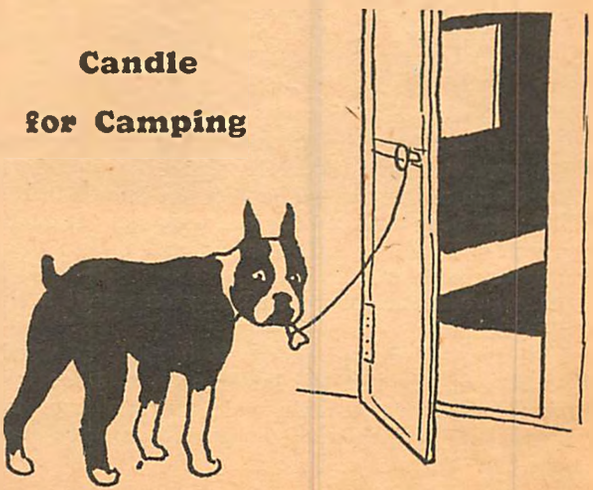
See Page 52

For the Pup

Your dog is a member of the family. But how about it? Does he have to beg for admittance each time he "wants in"? Here's a kink that will fix it so that any swinging or screen door can be opened by the dog. Just suspend a bone from the door knob, at the end of a stout cord about six to eight inches long. In the beginning, the dog will try to play with the bone, and try to carry it off. In that way, he'll learn how to open the door.

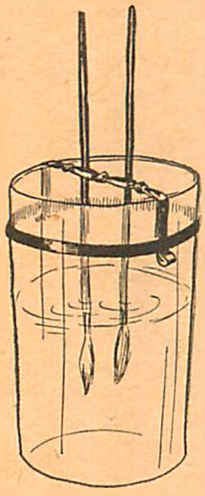
When the lesson is clearly learned, substitute a bit of wood for the bone, and your pup will have his own "latchkey".

Candle for Camping



JUNIOR MECHANICS DEPARTMENT

Save Your Brushes



Camel's hair water-color brushes will last twice as long if they are kept ready for use in the device shown above.

The only materials necessary are two rubber bands and a glass tumbler.

Tie three knots in one band and fasten it across the top of the glass.

Brushes will hang easily from the space between the bands, their tips protected in water.

Need Needles?

Around the workshop it's handy to keep needle and thread, not only for first-aid to torn clothing, but also for many jobs of mending and fastening. The only trouble is that needles have a way of getting lost. Here's a clever little device for preventing that.

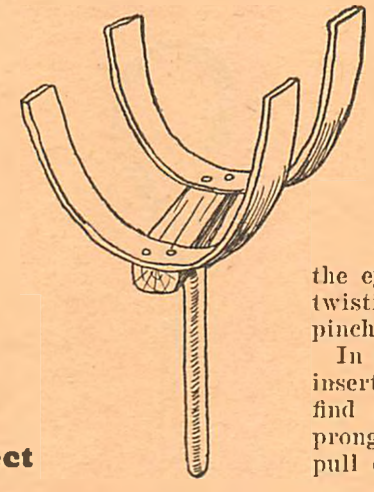
Take two used pencils of the same size and shape, a little longer than the needle. Remove both eraser ferules, smooth down the little points on the inside which held them to the wood, and push the lead clear out of one pencil. Use the other ferule as a cap, whittling down the wood a little if necessary. The needle fits loosely in the space once held by the lead. You'll find that the whole apparatus will fit inside a large spool, and there you are.

A Cork-Hook

There is only one way to remove a cork which has been forced down into its bottle, and this is it. Take a common large safety-pin and cut off the head. Sharpen the cut end to a fine point, and then bend both points to a right angle so that they face each other.

Now take 8 or 10 inches of No. 8 gauge wire, flatten one end for an inch or so, and insert this flat end through the eye of the safety-pin, bending it back and twisting to fasten firmly. It is a good idea to pinch the eye so that the wire is gripped tight.

In use, the prongs are pressed together and inserted in the neck of the bottle. You will find it easy to catch the cork between the prongs, which will only grab tighter as you pull cork and all through the bottle neck.



Protect Your Clothes

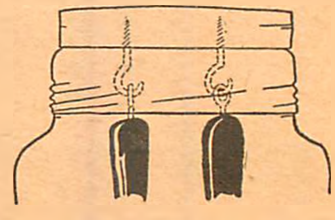
There's no chore more unpleasant than carrying in wood from outdoors, especially when the weather is wet.

Here's an old device—(the hod was known in Rome)—which has been adapted for the purpose. It saves your clothes from soiling and tearing, and makes the entire job easier besides.

Take two barrel hoops and saw off about a third of the circles.

Nail these U-shaped pieces to a piece of wood 2″ x 4″ x 12″, and mount the latter on a two foot piece of broom handle or curtain pole. Strap iron may be substituted for the barrel hoops if you have some and know how to cut and bore it.

For Dope Brushes



Brushes ought to be kept in lacquer thinner or turpentine. But everyone has found that these liquids dry up swiftly, and that the brushes are often found stiff and hard. For a safe and convenient brush-holder, take an ordinary two-quart fruit-jar. Cut a piece of wood to a circle that fits the top. Then run up screw-hooks from the inside, through the metal top and into the wood. Use as many of these as you have brushes.

Now put a screw-eye in the (*Continued on page 52*)

How to Build a Canoe

Water Thrills and Sport for Everyone

By E. F. Furth

SPRINGTIME is the beginning of out-of-doors time. For many this means camp, swimming and other water sports. Some buy canoes while others get more pleasure in owning one which they have built themselves, though it might involve problems never met before. Building a canoe is a challenge to any boy, but worth while.

First, either make or secure two trestles of the same height and sturdily built. To the center of these and connecting both, nail a piece of 2″ x 4″ x 14′ 0″ long, as a center guide. Mark off the center of this piece and another mark is made 4′ 0″ each side of the center. These are the locations of the forms. Form A goes on the center line and form B, one each at the other lines.

Take two pieces of 1″ x 6″ x 12″ long and one piece 1″ x 6″ x 34″ long. Attach one piece of 1″ x 6″ x 12″ long upright to each end of the 34″ piece with screws. Lay out this form according to form drawing A. Cut to lines and strengthen across top with strip.

Use two pieces 1″ x 6″ x 1′ 8″ and one piece 1″ x 6″ x 2′ 0″ for each of forms B. Screw together so that the dimensions of form B may be laid out on them. Then cut to lines and strengthen forms across the top.

Locate form A to center mark and one form B to each mark 4′ from center. Be sure that these forms are at right angles with the 2″ x 4″.

Select enough material from the 3/8″ x 2″ for ribs to make a rib about each of these forms.

It would be well at this point to select some method of steaming the rib and steam the material so that it can be bent. One way is to place a piece of large pipe in the ground with the lower end plugged. Fill this with water and build a fire around it. Lengths of each rib may be obtained by passing a tape measure about the form and allowing a little for waste. As each length is cut, drop it in the pipe and allow to steam thoroughly. Clamps will help to hold these strips to the form.

Select material and lay out form C, over which the strips forming the bow and stern should be bent. Attach these to the 2″ x 4″ at the ends of the center line drawn lengthwise.

Be sure all forms are set square and plumb. A careful checking at this point will save a lot of trouble later.

Take the four pieces of 1″ x 1″ x 16′ 0″ long oak and attach them to these forms with screws, as indicated in drawing. Be sure to drill the strips for the screws.

All of the ribs may now be steamed, bent and placed in position. The center ones should be placed first and worked each way toward the ends. They should be placed 1″ apart and in a vertical position.

After all the ribs have been placed and secured on the outside of the 1″ square oak strips, remove the 2″ x 4″ from the bottom and substitute a strip 2″ wide and 1″ thick; long enough to run along the bottom of the canoe and be attached to the stem and stern piece.

IF canvas is used for covering, it should be extra heavy and can be used without planking underneath. Lay a wide strip of canvas on the framework and tack the center line to the center line of the canoe bottom strip, using copper or galvanized nails. Stretch it, leaving no wrinkles or fullness. Cut it with shears at the ends and lap it over 2″, snipping off the surplus.

Cover the canvas with a good coat of marine glue to shrink it and fill up the pores or meshes. This must be followed by three good coats of paint or varnish inside and out, to be effective.

The short deck in stem and stern may now be placed and a thin strip of moulding attached to the gunwales over the edges of the canvas. A long strip may be attached to the keel to prevent the canvas from being worn through from rubbing on the bottom. If half round brass can be secured, it is to be used to attach the canvas from the top of the stem around the keel to the top of the stern. Cut and shape and center brace. Place in position.

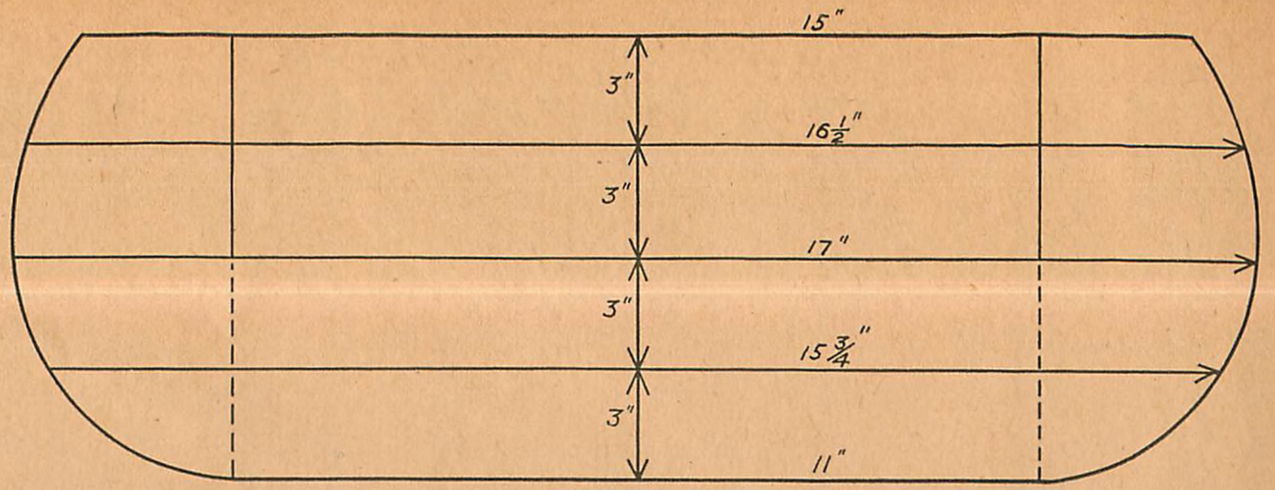
It is well to make a slat flooring out of thin material to protect the bottom inside.

Make seats and locate at proper positions.

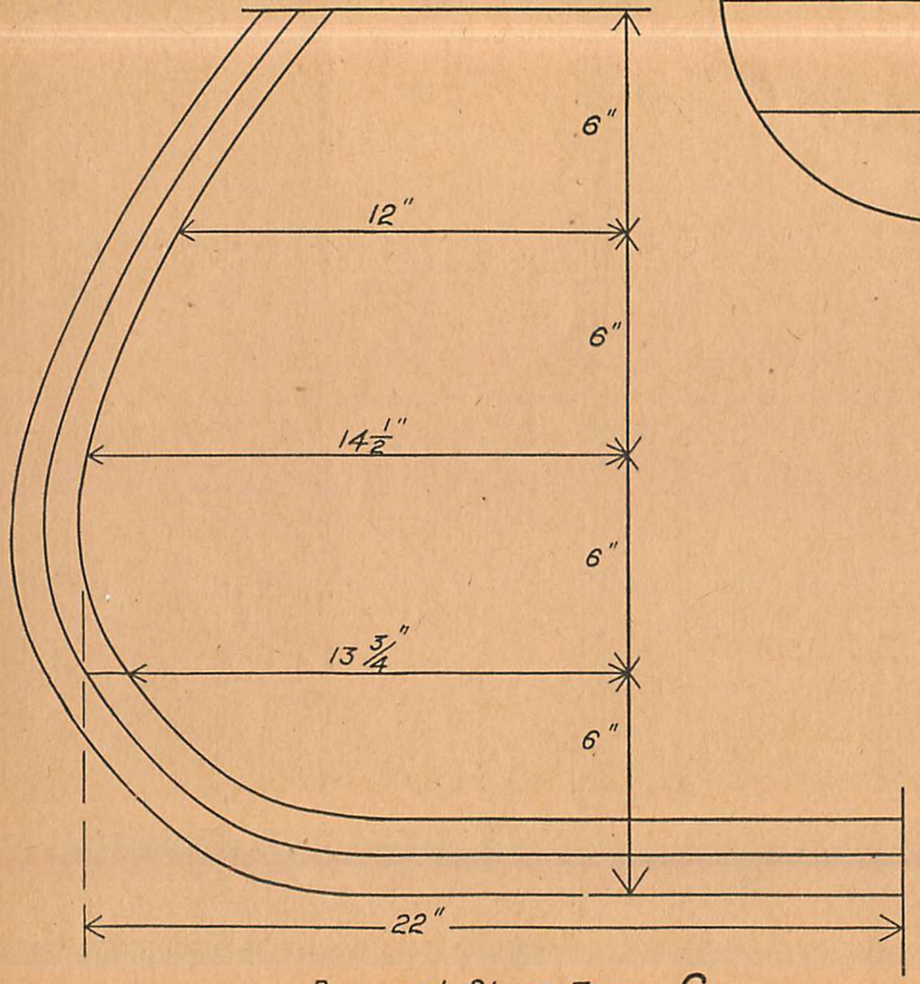
Necessary Material

1 piece	2″	x 4″	x 14′ 0″	pine	base (temporary)
2 pieces	1″	x 6″	x 1′ 0″		form A
1 piece	1″	x 6″	x 2′ 10″		form A
2 pieces	1″	x 6″	x 2′ 0″		form B
4 pieces	1″	x 6″	x 1′ 8″		form B
4 pieces	1″	x 1-3/4″	x 2′ 10″	oak	stem pieces
2 pieces	1″	x 1″	x 16′ 0″	oak	gunwales
4 pieces	1″	x 1″	x 16′ 0″	oak	side strips (temporary)
200 ft.	3/8″	x 2″		ash, elm, hickory or cypress	ribs
275 ft.	1/4″	x 3″		cypress	planking (if used)
1 piece	1/2″	x 3″	x 14′ 0″		keel
2 pieces	1″	x 1″	x 14′ 0″	oak	seat raisers
1 piece	1-1/2″	x 1-1/2″	x 10′ 0″	oak	seats
1 piece	3/8″	x 3″	x 31″	oak	thwart
2 pieces	1/2″	x 6″	x 1′ 0″	cypress	deck
1 piece	28″ wide x 18′ 0″ long			canvas	
2 gallons				paint	

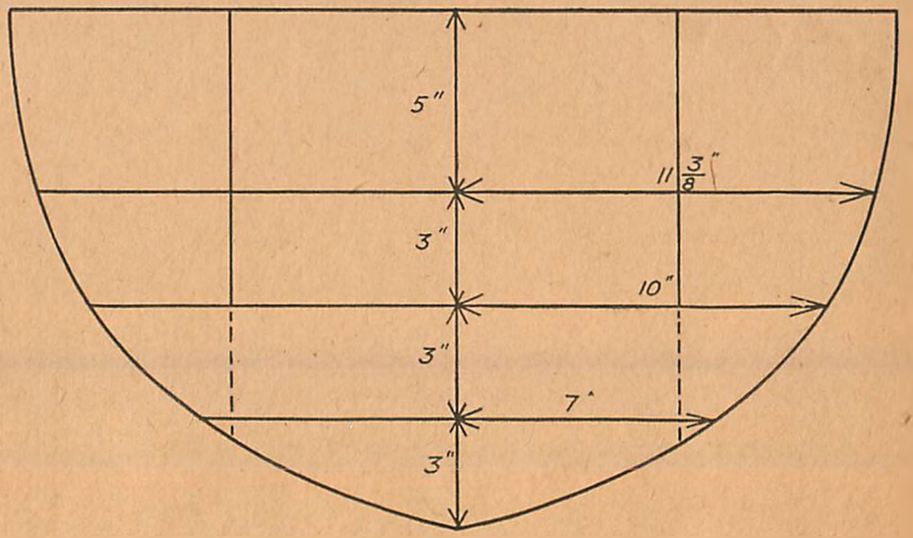
See Plans on Pages 48 and 49



Center Form A

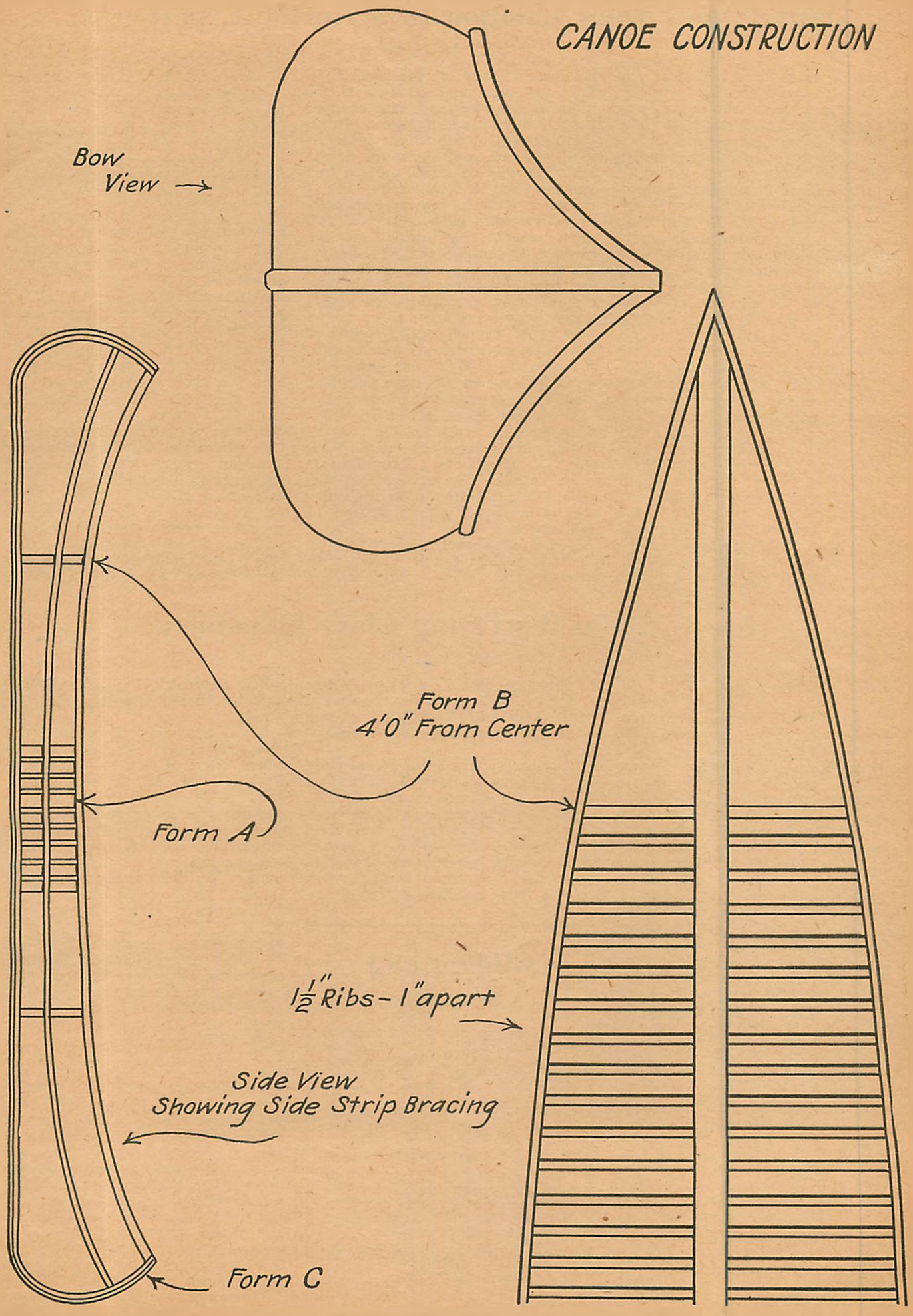


Bow and Stern Form C



B Form for 4'0" each side of center

CANOE FORMS


CANOE CONSTRUCTION
Bow
View
Form B
4'0" From Center
Form A
1½" Ribs - 1" apart
Side View
Showing Side Strip Bracing
Form C

Models and Their Relation to Scientific Experiment

(*Continued from page* 10)

to be of a much greater diameter to be able to pull the craft along, which also necessitates the raising of the landing gear to allow free swing of the propeller—another deviation from the original. Multi-motored models in general, where all propellers have to revolve, cause a lot of thought to the builder of flying and scale models. Placing more than one rubber motor often meets with many obstacles; lack of room, they spoil the form of the model, nor do the use of gears or chain transmissions seem to give the right results. However, it is not difficult to apply rubber motive power to all propellers on such models as the Fokker and Ford tri-motors, the Fokker four-motor, Curtiss Condor two-motor, or particularly on the multi-motored seaplanes, where the propellers are placed on the top wings such as the Savoia-Marchetti, Dornier-Wal four-motor, the Do X twelve-motor, Fokker amphibian, etc. It can be done effectively and quite simply.

Further illustrations and photographs show multi-motored flying models where all propellers are driven, thereby greatly aiding the performance and, at the same time, the aesthetic appearance of the plane is not hampered with oversize propellers and landing gears. In all these cases just one rubber motor is used and all propellers are driven with the aid of small pulleys and rubber band transmissions; Fig 4 shows a 30-inch wing-spread, two-propeller cabin model. It is a full scale model, the interior of the cabin fully equipped with washroom, thirty-two passenger seats, two seats and control equipment in the pilot's compartment, doors, etc., and it is driven only with one rubber motor with two 6″ propellers. The weight of the entire model is only four ounces. Six strands of 1/8″ flat rubber is used. This model flies extremely fast and in absolute straight direction.

The model shown in Fig. 5 is a 34″ wing-spread, tri-propeller flying model, the propellers used being three 5″ propellers. Its weight is three ounces. The rubber motor is placed on the bottom of the fuselage and is composed of six strands of 1/8″ flat rubber.

Fig. 6 is a sketch showing how three propellers can be driven with one rubber motor with the aid of these rubber-band transmissions.

Fig. 7 is a sketch of a Savoia-Marchetti twin-propeller flying boat, where the two rubber motors are placed in the line of pressure within the wing and where one rubber band on pulleys operates both propellers.

In central float flying boats, the motor should be placed in the fuselage and the propeller or propellers driven by means of the small rubber transmissions. Based on my long experience with flying models, I have found models constructed and propelled in the above manner to be very stable and the power of the rubber motor fully exploited.

The flying boat model shown in Fig. 8, a six-foot flying model I had occasion to use in my experiments, is driven by a single motor, the rubber being placed in a hollow wooden tube above the wing. This method, however, spoils the appearance of the craft and the performance is far below that of models where the rubber is placed in the float and the propeller driven by rubber transmission; in which case the craft is much better balanced and the resistance lessened about thirty per cent.

How to Build the Flying Glory Monoplane

(*Continued from page* 11)

Fuselage

Take 1/16″ x 3″ balsa and cut fuselage side exactly as shown in plan. Use this side for template with which to make second side. Only two are needed. Fasten together at bottom with 3/4 gum cloth and let dry.

Prepare tail stock (No. 14) from 5/8″ x 5/8″ x 1″ balsa, making a V-shaped block as shown on plan. Spread fuselage sides and insert tail stock, ambroid in place and fasten with string while drying. When dry, shape down till flush with sides. From 40 gauge 7/8″ x 7/8″ aluminum form stabilizer sleeve (No. 15) by wrapping sheet around block of wood 1/16″ x 1/4″. Glue sleeve on top of tail stock reinforcing with gum cloth. Take care to keep sleeve in straight position between fuselage sides and in line of flight.

Make from 1/16″ balsa front and rear fuselage bridges (parts 7 and 8) to size shown in plan. Glue inside of fuselage sides in exact positions shown in plan.

Make nose support and bridge from 1/8″ x 1/8″ basswood and 1/8″ x 1/8″ reed (parts 3 and 4) and form as diagrammed.

To insert nose support place fuselage in a vertical position with the front on a flat surface, glue in place as shown in diagram.

Make upper cowling ridge (No. 5) from 1/16″ x 1/4″ basswood cutting to size as needed and glue between nose bridge (No. 4) and front fuselage bridge (No. 7) flush with top.

Cut piece of balsa for cross cowl brace 1/16″ x 1/4″ and fasten flush with top of fuselage sides with ambroid.

Cut three pieces 3/16″ round wood 5/8″ long and fasten in bottom of fuselage in position shown (No. 13).

Place wings temporarily in position on top of fuselage and ambroid back fuselage brace (No. 8) in correct slanting position as shown in plan. Make sure top is flush with top of front cowling brace. Leave wings in position while rear brace dries to insure correct position and slant.

Make two wing supports (No. 9) same shape and size as shown in plan from 1/8″ x 1/4″ basswood. Making slot to fit and support 1/16″ x 1/4″ basswood wing spar. Before gluing permanently, place wings in position and note if wing supports hold wing spars correctly.

From 1/8″ x 1/16″ spruce (No. 10) make wing cross sustainer and glue in place as shown in plan.

Make rear ridge (No. 6) from 1/16″ x 1/4″ basswood and fasten to top of rear fuselage bridge (No. 8) and insert about 1/16″ inside aluminum sleeve and glue in place.

Make rear fuselage brace (No. 12) from 1/16″ x 4″ balsa and glue as shown in plan touching No. 6 and flush with sides. Drill a small hole in No. 6 in order to allow motor pin (No. 28) to enter hole already made in reinforcement pin (No. 13).

Shape tail skid (No. 16) from 1/8″ x 1/8″ bamboo and glue as shown in drawing.

Nose Piece

Take piece of laminated wood and make in same shape and size as shown in drawing, and drill hole as shown in plan for a tight fit of the 1/16″ diameter brass tubing of propeller shaft.

Make a flange from No. 15 gauge brass. Drill holes in center, solder

piece of tubing in it and nail to nose piece.

Propeller

From block of 7/8" x 1 3/4" x 8" basswood make propeller as shown in drawing—13° pitch. Drill a 1/16" hole in center.

Propeller Shaft

Use 1/16" x 2 3/4" steel rod (No. 17) flatten one end, and force through the center hole of prop until flattened end is embedded in wood, preventing slipping of shaft inside the hole. Place a copper washer on shaft where it emerges from propeller and then slip nose piece (No. 2) with tube, on shaft making sure smooth rotation is possible. Then turn hook with pliers as shown in drawing. Fasten nose piece to nose support and bridge with two No. 1 3/8" round head wood screws.

Landing Gear

Shape two pieces 11 gauge aluminum rod (No. 20) as shown in plan and fasten on two V-shaped brass fittings (No. 31). Screw to fuselage enforcement piece (No. 13) with No. 1 round head wood screw.

Make your special axle (No. 22) as shown in drawing from 1/16" steel wire and attach celluloid wheels with washers, flattening end of axle to keep wheels in place. Fasten axle with wheels attached to landing gear and secure with a little ambroid. Keep wheels in line with body.

Motor Parts

Make one S hook (No. 26) from 1/16" steel rod. From 14 gauge music wire make closely spiraled rear spring (No. 24) with seven spirals and an eye at both ends as shown in drawing. Motor pin (No. 28) to hold spring in position should now be inserted in holes previously made in rear ridge (No. 6) and enforcement pin (No. 13). The motor is nine feet of rubber band coiled into 8 strands and attached to front and rear hooks. Put a little oil on prop shaft bearing and be sure shaft spins freely.

Cover rear and front of open fuselage top with bamboo paper and dope.

Make wooden button (No. 19) from basswood to lock wings in place.

Ready for Flight

Set up wings, rudder and stabilizer. Look model over to see if rudder and stabilizer are straight. Hold model by nose with one hand and with the other give propeller about 100 turns. Set model on smooth surface. Lift tail slightly off ground and give forward push. The plane will take off, fly a few hundred feet and make a perfect three point landing. The landing of the Flying Glory is one of the strong features of the plane.

Adjust anything which may be

necessary. For the next trial give propeller 125 to 200 turns. Launch from hand or ground.

For endurance, pull nose piece out, hold, and turn propeller while someone holds plane. Give 300 turns. Resultant flight should measure from 500 to 1,000 feet.

If the stabilizer is not straight the plane will either rise sharply or dive.

If the rudder is not straight the plane will veer sharply to either side. Much of the plane's performance depends on the skill used in handling the stabilizer and rudder.

Necessary Material

1	piece	1/16" x 6" x 36"	balsa	fuselage sides, wing ribs and all other balsa parts
4	lengths	1/16" x 1/4" x 36"	basswood	
3	lengths	1/16" x 1/8" x 36"	spruce	wings
1	length	1/8" x 1/4" x 12"	basswood	stabilizer and rudder
1	length	1/8" x 1/8"	basswood	
4	lengths	1/16" x 12"	round wood	
1	piece	1/16" x 6 feet	reed	
1	length	3/16" x 12"	round wood	
1	piece	5/8" x 5/8" x 1"	balsa	
1	piece	1/8" x 1/8" x 41"	bamboo	
1	piece	1/8" x 1" x 3"	balsa	
1	piece	7/8" x 1/2" x 8"	balsa	propeller block
1	piece	1/8" x 4"	reed	
9	feet	1/8"	rubber band	
1		1/16" x 12"	steel rod	
1		1/16" x 1/2" (inside diameter)	brass tubing	propeller shaft bearing
1	piece	1/8" x 1-1/2" x 1-1/2"	laminated wood	front piece
2		1/8"	fitting	landing gear
1	piece	No.11 x 20"	aluminum rod	landing gear
1			front spring with hook	motor
1			rear spring with hook	motor
1		1"	wire brad	base for motor hook
1	piece	No. 40 7/8" x 7/8"	aluminum	tail stock
1/2	sheet	24" x 19" x 20"	Japanese tissue	
1	can		nitrate dope	
1	tube		ambroid	
3		No. 1—3/8"	wood screws	
3		3/8"	nails	
2		1-7/8"	black celluloid wheels	
3			brass washers	
1	piece	3/4" x 20"	gum cloth	
1	piece	No. 15 x 1/2"	brass	
1	package		model pins	

Home Labor Saving Devices

(*Continued from page* 16)

handle of each of your brushes and suspend them in the jar, with just enough liquid to keep them in good shape. Since the fruit-jar is airtight, there will be no evaporation.

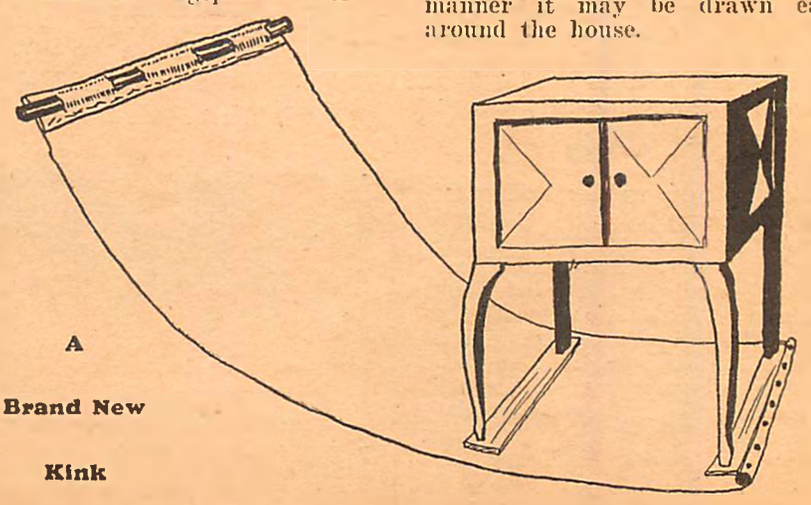
Candle for Camping

Here's one of the handiest and cheapest candle-holders ever made. Just take 18 or more inches of wire. Twist it around a piece of wood the same diameter as the candles you are to use, in two rings as shown. Bend the end under to prevent the candle slipping through. The other is bent into a hook for ridgepole or tree.

When heavy furniture has to be moved, there is always danger of marking floors. Here's a little contrivance which can be made in twenty minutes out of an old rug and two rods.

Take a piece of carpet or rug eight feet in length, and cut it to 28" wide, to allow passage through doorways. A piece of wood 1" x 28" is tacked to one end, the floor end. The other end of the rug is folded and sewed roughly. Slits are cut to allow passage of the handle rod.

As shown in the picture, the piece of furniture is placed on strips of board to prevent sliding. In this manner it may be drawn easily around the house.



A

Brand New

Kink

Macfadden Aviation Advisory Board

(*Continued from page 44*)

Answer:

The best landing is one in which the wheels and the tailskid touch the ground simultaneously. Sometimes, however, the wheels will hit the ground first. In the take-off, the tail skid leaves the ground first.

Dear Sirs:

I would be obliged to know if an airminded man could fly an airplane without going to a flying school. My friend says it can't be done, while I say that if he has built and flown model airplanes and has studied an airplane designing course and every fundamental fact about airplanes and finally knows everything about flying without having had his hands on the controls, he can fly without going to a flying school. I don't mean stunt flying but taking only a small ship, such as the "Baby Bullet" or the "Heath Super Parasol".

Yours truly,
GASPER GRANGER,
Spring St.,
Swanton, Vt.

Answer:

We would not advise anyone to attempt to pilot an airplane without a course of instruction at a flying school, no matter how thoroughly he may be versed in aero-dynamics. While one may know everything about flying in theory, it still is necessary to receive actual practice of such theory under the guidance of an experienced flyer. If one had read widely about how to drive an automobile, this would not qualify him to step in a car and drive it without some one beside him who had actually driven a car before; hence, why apply it to flying a plane?

It is barely possible, of course, that in a remote individual case a man might be able to pilot a plane without attending a flying school or receiving instruction of the kind but it would be an extremely rare instance and hardly establishes a rule.

Gentlemen:

Kindly inform me where I may get a map of all the principal air mail routes of the United States and what it will cost.

Yours truly,
FRANK CLEAVER,
5317 13th St., N. W.,
Washington, D. C.

Answer:

We would suggest that you apply to the Department of Commerce, Aeronautics Branch, Washington, D. C., for such a map. To our knowledge, this is free of charge.

Dear Sirs:

I have a plane which should go 600 ft. but it will not go that far

and not very quickly. What can I do to make it go farther and faster?

Yours truly,
BUD JENSEN,
3416 Dale Ave.,
Leves Park, Rockford, Ill.

Answer:

We would suggest that you move the wings backward slightly; thus decreasing the lift, which possibly slows up your machine. Also, we would suggest that you add a faster propeller with about four more strands of rubber.

Gentlemen:

I would like to know if a rotary motor has pistons that are stationary and instead of the pistons moving, the cylinder walls and cover do. Please tell me the difference between a rotary and a radial engine.

Yours truly,
RAYMOND HAACK,
Williamsbury, Iowa.

Answer:

Air-cooled motors have two classifications; the radial revolving and the radial fixed types.

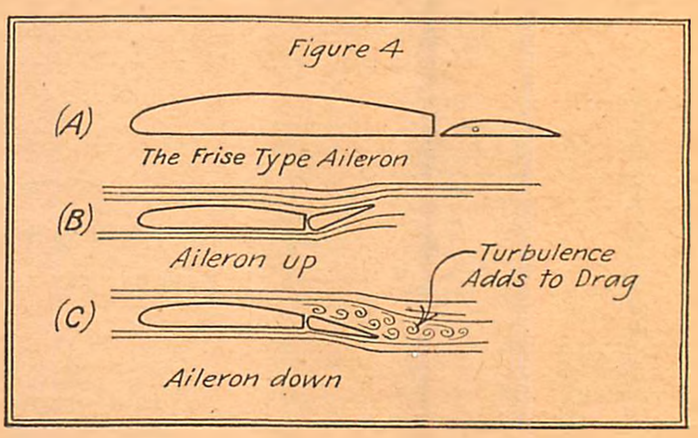
The radial revolving type, or rotary, is a form of engine in which the cylinders, instead of being arranged along a horizontal crankshaft, are fixed radially like the spokes of a wheel around its hub. The ignition of the charge on the power stroke does not cause the revolution of the crankshaft, which is fixed, but causes the engine itself to revolve around the crankshaft and, by suitable connecting mechanism, imparts motion to the propeller.

The radial fixed type is more generally used today. In this type the cylinders are arranged radially like the spokes of a wheel around its hub but they do not revolve. The piston rods are directed toward the center, where they connect with a "master rod" leading to the crankshaft, to which the propeller is attached, either directly or through a chain of gears.

A Course in Airplane Designing

(*Continued from page* 35)

at a greater distance from the center of gravity it will have much more effect, making it possible for us to use a smaller surface. It is not the best procedure, however, to design a ship with a very long fuselage and small tail surfaces, because the added structural weight of the long fuselage will more than offset the lessened resistance of the smaller surfaces.



ANOTHER important application of this matter of moment arms is in the control surfaces themselves. By looking at the control surface in the plane of the axis and in its direction, as in Figure 3, we see that if the resultant force on the surface is acting at a comparatively great distance from the axis it will have a powerful moment about the axis, tending to turn the control surface back toward neutral. Now let us try to get the resultant force to act nearer the hinge, thereby reducing the hinge moment. How can we do this? There are two good ways. One is to make the control surface longer and narrower, bringing the force toward the axis. This method is used only to a reasonable extent, because a very narrow surface is hard to build.

Another method is the balancing of the control surface. This means that some of the surface is placed ahead of the axis, so that the resultant force is moved up toward it. One must be careful, however, to keep the surface behind the axis larger than that before it, since the surface will become uncontrollable if the force acts ahead of the axis. Figure 3 (b) shows a balanced control surface, looking down the axis, and (c) shows the same surface in the plan view. In man carrying airplanes, balanced controls are used to lessen the strain on the pilot. They are not used on racing ships, and are seldom used for ailerons, because they have a tendency to cause fluttering of the surfaces at high speeds.

THIS brings us to the subject of ailerons. Ailerons are the control surfaces of the wings. They are placed horizontally, their function being to control the inclination of the ship in banks and turns. When an aileron is lowered it has the effect of increasing the angle of attack of the wing, thereby giving it more lift. If the aileron is raised it cuts down

the lift of the wing. Here the model builder runs into difficulty. If he wishes to make his ship turn in flight, he may apply rudder and aileron. The ship takes off. As soon as it leaves the ground it begins to turn, forced around by the rudder and inclined toward one side by the ailerons. Then, if the ship flies rapidly, the outside wing raises higher and higher, finally causing the ship either to sideslip or spin. What happened? Just this. That outside wing was traveling through the air faster than the inside one was. Its greater air speed gave it more lift. The greater lift raised it higher and higher. Take a model in your hand, simulate a turn, and you will see that the wing on the outside of the turn travels faster than does the inside wing. For this reason, it is usually inadvisable to use the ailerons to help the model ship turn. If it has enough stability and is designed well it will take up enough bank without the aid of the ailerons.

The ailerons, valuable as they are, cause a lot of trouble. In addition to the effect mentioned above, they have a drag effect. An aileron that is raised does not increase the drag of the wing greatly, but let that aileron be lowered, and things happen! As we see in Figure 4, the raised aileron does not cause much turbulence of the air flow, because the air, already trying to go up from the top of the wing, is aided by the aileron in this position. If we drop the aileron down, however, the air must follow it lower than ever, if it is to follow the curve of the wing. The air is as we saw above trying to draw away from the top of the wing, and the lowered aileron leaves a space for it to fill. This makes a region of turbulence above the aileron, and turbulence of the air stream is the cause of drag. In larger ships this effect is overcome in a number of ways. The Frise type aileron, shown in outline in Figure 4 (a), is used on several ships, while differential ailerons are used on others. Differential ailerons are arranged so that the aileron that is raised goes farther than the one that is lowered. I think you can easily see how this will overcome the drag effect.

Questionnaire

1. Why is there a force set up in a control surface when it is moved out of its normal place? Does the air stream resist any attempt to move it?
2. If you were designing a model ship, would you make the fuselage extraordinarily long so that the elevators and rudder would be efficient? Why not?
3. Why are balanced control surfaces used on large ships?
4. Why does the outside wing on a turn have more lift than the inside wing?
5. Name one method of overcoming the aileron drag effect.

Wings of Valor

(Continued from page 24)

his face, blotting out the surroundings.

"Well, well," said a voice. "If it isn't the little boy I passed this afternoon."

Jimmy choked back a sob of rage that rose to his throat and tried to stare beyond the glaring light into the face of his captor. In the grayness of the dawn, he distinctly noticed that upon the other's cheek was a small white scar. The threatening automatic poked him in the chest.

"Get going," said the scar-faced one. "We'll go inside and let the boys have a look at you."

WITH the menace of the gun behind him, Jimmy slowly made his way to the shack. As he flung the door open two of the men within sprang to their feet, their hands groping at the holsters at their hips. The third member of the party retained his seat, calmly puffing a cigarette. The voice of his captor boomed over his shoulder, reassuring his cronies.

"It's all right," he said. "I just caught this kid snooping around. He's got a plane down the line somewhere. I heard him land."

A bearded, bulky ruffian rose from his seat at the table and bore down on Jimmy.

"Did you bring the cash?" he demanded.

Jimmy shook his head. His eyes were directed to the huddled figure on the bunk opposite. But he perceived no movement. For a moment a cold fear clutched at his heart. Suppose—suppose it was too late! Suppose his father was already dead?

A rough hand jerked him by the shoulder.

"Well, speak up. Are you deaf? Did you bring the money?"

Jimmy turned his head and looked unflinchingly into the menacing eyes of the bearded bandit.

"No," he said. "You'll get no money. All you'll get is twenty years in jail."

His questioner eyed him through narrowed lids.

"You're a fresh kid," he said with an oath. His hand suddenly left his hip and shot out, giving Jimmy a stinging blow across the face. For a fleeting moment, Jimmy forgot the peril of the gun behind him. A consuming flame of rage swept aside all thoughts of danger. Like a tiger he leaped on the bearded bandit. His right hand swung in a short arc and crashed against the other's jaw. The man staggered and dropped to his knees. Jimmy heard a startled oath behind him. He became swiftly aware that one of the occupants of the table was standing over him, an upraised bottle in his hand. Quickly he flung up his arm in protection but it was too late. With a sickening thud the bottle found its mark on his head. A shooting pain darted through his whole being, a strange nausea gripped him, and, with a groan, he collapsed upon the floor.

THE bearded man came to his feet, his hand holding his jaw.

"Throw him over there with the other one," he ordered. "We've got some new plans to make now."

Without ceremony the lad's inert body was picked up from the floor and hurled carelessly on the bunk which already held the bound form of his father.

Fate has decreed that Jimmy join his father as prisoner of that grim band. Will he manage somehow to give them the slip or must father and son go down in oblivion as "among the missing"? Read the next installment for the next move in the game.

Curtiss "Robin" Scale Model Contest Winners

Two records went by the boards in connection with the Curtiss "Robin" scale model contest. First, there were more than 300 entries; secondly, there were seventy-two models actually delivered in time for judging!

Prize winners were as follows:

First Prize
RAYMOND F. SEKULSKI
2251 N. Third St., Harrisburg, Pa.

Second Prize
E. T. CROSSON
1415 Pennsylvania Ave., Dallas, Texas

Third Prize
FRED C. SPARROW, JR.
17 Beckwith St., New London, Conn.

Fourth Prize
HENRY MARTIN
308 Grove Street, Scranton, Pa.

Fifth Prize
K. T. RICHARDSON
Hill Top Lumber Co., Castle Shannon, Pa.

Sixth Prize
WILLIAM F. ZANDER
2073 West 38th St., Cleveland, Ohio

Judges for the Contest were Mr. C. S. (Casey) Jones, President of the Curtiss-Wright Flying Service, Clarence Chamberlin, President of the Crescent Aircraft Company, Captain H. J. Loftus-Price, Editor, MODEL AIRPLANE NEWS, Lieut. F. M. Hopkins, Military Tactics Instructor at New York University, Cadet-Colonel Albert Fregosi, of N. Y. U. Air Corps, Lieut. Reid Lumsden, former instructor at the Lebanon, Tenn., Military Academy, and Mr. Thomas L. Bulger, President of the Associated Aircraft Clubs.

Jump!

(*Continued from page* 8)

which animals were fastened.

Andres Jacques Garnerin, another French parachutist, dropped from a balloon over Paris in 1797, from a height variously estimated from 2,000 feet to over a mile. He repeated his feat over London in 1802, from 8,000 feet, receiving a few scratches. Many experiments were thereafter made. In 1837 Robert Cocking, testing a new type, fell to his death from 5,000 feet.

The approved type today is complete in one unit, strapped to the person in varying ways. The seat-pack is most often used. The lap-pack is preferred by observers and gunners, the back-pack by balloon observers and exhibition jumpers.

All fasten to the flyer in approximately the same way, with straps over the shoulders and a hook across the chest, and straps about the upper part of the leg with a snap-hook on each leg strap. The straps about the legs pass across the flyer's hips, so that when the chute opens, no matter what type it is, he is sitting in what amounts to a swing, with webbing taking the place of the ropes of the swing, on either side of his body.

Above his head the webbing divides into four "risers" and the shrouds of small cords which lead to the outer edge of the parachute are attached to the harness in four places. The rip-cord which he pulls to open the 'chute—actually a strong wire cable—hangs usually on the left side of the wearer's chest.

The bag of the 'chute is of high-grade silk. The shroud lines are of silk cord, which are continuous from their point of attachment on one side of the harness to the other. They pass through and over the top of the air 'chute. There is a shock-absorbing vent in the silk bag.

The standard army type has a small pilot 'chute to drag out the main 'chute, and this is attached to the peak of the big 'chute. The pilot 'chute has steel ribs and a spring and is folded under rubber-cable tension. Thus when the rip-cord is pulled the pilot 'chute springs out of the container and pulls the large bag out into the line of flight. The average time required for the 'chute to open and assume normal descent is two to three seconds after the rip-cord is pulled.

THE little pilot 'chute is thirty inches in diameter. The big 'chute varies from twenty-two to twenty-eight feet in diameter. The standard general service size is twenty-four feet. The twenty-two foot 'chute is used generally with a twenty-eight foot 'chute, the latter being worn on the back in exhibition jumps, while the small one is carried on the chest for emergency.

This extra 'chute has sometimes saved the lives of exhibition jumpers. Mrs. Irene McFarland of Cincinnati, for a long time the only woman member of the Caterpillar Club, was saved by such a use of two 'chutes. She was attempting an

Model Airplane News Plans and Parts

Those who wish to purchase parts for the construction of models, or blueprints, will be furnished with the name and address of the company which stocks them, upon request for this information from the reader. Address the Editor, MODEL AIRPLANE NEWS, Macfadden Publications, Inc., 1926 Broadway, New York City.

exhibition jump from a height of 2,000 feet over Grisard Field, Cincinnati. Her regular 'chute fouled on the landing gear of the plane from which she jumped. She then landed successfully by using the emergency 'chute, in this case the regular army parachute. The one that fouled was another type.

A properly made parachute can be guided to some extent. By pulling the lines on one side the 'chute can be sideslipped about ten feet for every hundred feet of drop. This is not enough to make any headway against a wind of any velocity. The expert parachutist, however, can avoid obstacles to a large extent. The landing should be made with the feet close together, the knees somewhat bent, and the body relaxed.

No effort should be made to stand up. The fall is like a jump from a six- to ten-foot wall, and it is easier and less dangerous to take a roll or tumble than to brace one's self and try to avoid it. The snaps on the leg harness and the one on the chest can be unfastened quickly in case the jumper falls in the water and must swim, or if such a strong wind is blowing that injury might result from being dragged along the ground. Ordinarily these snaps can be unhooked with one hand.

The Army Air Corps and commercial firms repack the parachute once a month if it has not been used. This helps in keeping creases from forming in the silk and damaging the material. A pack that has been wet should be opened and dried to prevent mildew. J. J. Runger, expert packer and jumper at Curtiss Field, told me he would repack his 'chute only a week after he had omitted one of his Sunday leaps.

It takes about an hour for two men with proper equipment to repack a 'chute. Since it must be folded exactly right to be usable, this is very important. Incorrect folding may result fatally to the jumper, since the 'chute functions properly only if arranged exactly as it is designed to be. The Army Air Corps is always glad to instruct civilians in the proper packing of parachutes.

COOLNESS is the most essential requisite in parachuting, and there have been some truly remarkable examples of calmness on the part of the flyer who has had to jump. Probably one of the most unusual examples of this was the case of Lieutenant Julius Barr of the Army Air Corps. His plane caught fire at 5,000 feet when flying over Selfridge Field, Mount Clemens, Michigan.

The flames trapped Barr in the cockpit, just as his flying suit caught on a projecting piece of the control mechanism. He was unable to release himself. Fearing his parachute might burn, Barr removed it and held it over the side of the ship until the licking flames burned his clothing free.

He then beat out the flames in his

clothing, donned his parachute and went over the side to a safe landing. The plane was destroyed. Had Barr lost his head while trapped by the flames, a tragedy would certainly have resulted.

The development of the parachute has caused the complete revision of many theories previously held about what happens to a person falling from a great altitude. For many years it was believed that a person falling from a height would become unconscious or die before he struck the ground. Tests made by the Army Air Corps recently show this supposition to be wrong.

By means of tests with a dummy lit by a flare light and a camera timing the fall by the click of the shutter at intervals of a second, it was found that the fastest speed at which a man falls is not more than 120 miles an hour. As soon as the dummy picked up speed, the air resistance increased until there was no further acceleration. Thus a plane falling or diving at the rate of 200 miles or more per hour, as has happened, would pass the man even in a straight fall without his parachute open. A plane in a tailspin invariably spirals around him.

SINCE his speed is never more than 120 miles an hour and an aviator in an open cockpit is easily able to withstand the blast from such a speed, it is not likely that a man could ever become unconscious while falling through the air. The question was of great interest to parachute manufacturers, because if a man were to become unconscious he would be unable to pull the cord.

This question has been answered by some of the men who have made record parachute drops. The longest delayed opening now on record is that of Jack Cope, veteran Chicago stunt pilot, who jumped from a plane 15,000 feet up and dropped an estimated 10,000 feet before pulling the rip-cord.

The previous record drop before opening the 'chute was made by Harold Whitby, machinst's mate, U.S.N., who dropped 4,400 feet before jerking the ring. His drop was made in connection with many of the tests of the rate of fall which the Army and Navy have conducted.

The minimum height from which a safe drop can be made has never been completely determined, though, as stated before, at least two men have landed safely from drops of only about 150 feet. In the army experiments it was found that in a drop from a plane with a horizontal velocity of 80 miles per hour, the parachute inflated in three seconds and the dummy dropped 175 feet in three seconds. This would make 175 feet the barest minimum.

It was found, however, that when the leap was made from a plane going at a faster horizontal speed, inflation was speedier and a lower height was possible in safety. From a plane flying at or near the stalling speed, the jumper should leap while

still several hundred feet high.

A French military pilot had an amazing experience when his plane suddenly dived from 5,000 feet. Jerking on the stick to right it, he caused such a sudden shock that he was thrown out of the cockpit. He pulled his rip-cord and landed safely.

Various stunts have been tried with parachutes. One of the earliest experiments was that of the jumper taking motion pictures while falling. James K. Clark, one of the star parachutists of the Navy, tried this in 1926. He used an automatic camera lashed to his body, and his jump was made from several thousand feet above Anacostia.

The camera failed to record much in the upper part of the fall, and a curious hodge-podge of ground and sky resulted when he approached the earth. The experiment has been tried a number of times since.

One of the most recent stunts was that of Henry Bushmeyer, a professional parachute jumper and instructor at Roosevelt Field, Long Island. He leaped from a plane at 10,000 feet and broadcast to a chain of radio stations a thrilling account of his descent.

Bushmeyer used a tiny broadcasting set which had been used on the Graf Zeppelin to tell the story of its globe-circling journey. The transmitter had a range of more than a mile, and after a slight delay because Bushmeyer had to be dropped out of range, due to the wind, the story came through perfectly. The stunt undoubtedly helped to add to the reputation of the parachute for safety.

While the parachute is close to perfection for the saving of lives of flyers under even extremely difficult conditions, there are many experiments going forward now to extend its usefulness still further.

Thus the Army and Navy are working on the idea of a parachute capable of lowering an entire plane to earth. Two successful landings of a plane by a huge parachute have been made. The first was accomplished at Los Angeles on August 24, 1926, by a parachute 50 feet in diameter, invented by Harry A. Douchett, chief machinist's mate, U. S. Navy. The ship was lowered with its pilot from a height of 2,500 feet after the engine had been killed.

THE plane was blown three miles from the field during the drop, which took 66 seconds. It was held to the parachute by a 40-inch steel cable. The plane made a pancake landing, but with no damage save breaking of an undercarriage part and the snapping of a propeller blade. The nervy pilot of the plane was R. Carl Oelze of the Naval Reserve.

The experiments were continued, and at Tracy, California in 1928, a 72-foot 'chute was used to land another plane. At a height of 2,200 feet the pilot, E. J. McKeon, shut off the motor and went into a dive. The 'chute opened and landed the

plane gently. A complication arose, however, when the huge parachute dragged the plane for some distance on the ground and somewhat damaged it.

This difficulty was met in a still more recent experiment, when an 84-foot parachute, the invention of Major E. L. Hoffman, U.S.A., was tested at Wright Field, Dayton, Ohio. This huge 'chute was tried out with a 1,600-pound bomb as a weight. Major Hoffman developed a release mechanism, which insured the bomb from being dragged after being landed.

This device works instantly and in a descent with a plane would be operated by the pilot an instant prior to landing. Since there was no one with the 'chute to operate it, the release was pulled after the bomb struck and the bomb was dropped instantly.

After the weight is dropped the parachute deflates. Until this device was invented it did not collapse and because of its huge size, great difficulty was experienced in capturing it during the preliminary trials. When caught after being pursued across the field by an automobile, it lifted the men who were trying to deflate it and dragged them with it.

This largest of parachutes is developed along the same lines as the standard 24-foot parachute perfected by Major Hoffman. It has the pilot 'chute, vents in the dome, and a corresponding weight and quality of silk are used in the parasol and shroud lines. There are ninety-six panels and forty-eight shroud lines in the giant 'chute.

The plan of dropping the entire fuselage with the passengers in it, and also various methods of letting the passengers down at the decision of the pilot, without leaving it to them to make up their minds about jumping, are recent ideas in parachuting that are being developed.

Plagiarism

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A "parachute seat", the invention of Floyd Smith, was tested on April 3, 1929 at Trenton, N. J., with success. By means of this device the passenger slides through a trap door in the bottom of the plane, when the pilot releases a control. The 'chute opened instantly, leaving nothing to the volition of the passenger.

R. E. Taylor, formerly a star parachute jumper at Lakehurst, and Marie Smullin of Philadelphia, made the jump when the inventor, piloting a Ryan monoplane, released the control. Perfect landings were made.

The Irvin Chute Company is conducting experiments with a parachute devised to drop the entire passenger compartment, and also a 'chute for the plane itself.

Severe tests are now being devised by the Department of Commerce so that parachutes sold for commercial aviation may be as nearly fool-proof and as practical as possible.

Parachutes will be required to open fully in 25 drops with a 200-pound dummy thrown from an airplane traveling 60 miles an hour, and from an altitude of not more than 150 feet.

In other tests parachutes must open fully from 500 feet even when lines are twisted in packing.

Dropping with an 800-pound load will test the strength. Rate of descent must not exceed 18 feet per second. Silk canopies must be replaced after four years, and cotton canopies after two years and harness after two years.

Thus the approved parachutes will be so safe that no one need hesitate a moment when the test comes.

Motorless Flight

(*Continued from page* 21)

air-minded students perforce turned to the study and development of engineless flight. They have made mighty strides in the field and the interest is continually fostered by a score of competitions held yearly throughout the country.

Johannes Nehrig, in a plane of his own design and construction, recently established a new world's record for motorless flight when he flew 44 miles, using slope and cloud winds. He attained an altitude of 2500 feet.

The first successful passenger flight was of thirteen minutes duration.

The record for motorless flight with a passenger is held by Ferdinand Schulz, who stayed aloft 9 hours and 21 minutes. With his passenger, Heinz Reichardt, he shuttled between Rossitten and Pillkoppen, in East Prussia, for that length of time.

On October 2nd, 1925, Schulz made another record, staying aloft in a motorless plane 12 hours and 6 minutes. Two years later, on May 3rd, 1927, he bettered this time, staying in the air 14 hours and 7 minutes.

A Model Glider

(*Continued from page 42*)

"B-Bs" or air-gun shot in the frame of the fuselage.

With a piece of music wire, attach a strip of balsa 1/16" x 1/16" to the front of the shoe. The wire can be forced through the balsa into the shoe. Glue two little blocks of balsa to each side of the rudder. A piece of thread should now be glued from each block to the end of the foot bar.

For straightaway flying, set the rudder in line with the frame of the fuselage and launch from the hand. If the foot bar is adjusted so that the rudder turns at an angle to the fuselage frame, the glider will of course fly in circles.

A Barling NB-3

(*Continued from page 26*)

the covering of the body, wings and tail. When the dampness dries out, notice how stiff the paper will be. Then coat with banana oil.

Attach the nose and slip in the motor stick. Make sure everything is lined up and firm. Try gliding the plane. If it glides well, it is ready to be flown.

Wind the rubber motor about fifty times and head it into the wind. The plane will make a short hop and then land. Wind it up again to one hundred and fifty or two hundred and let it go. Longer flights may be attained by hand launching.

Frank Hawks' Glider

Captain Frank M. Hawks' cabin glider "Eaglet," in which he flew from San Diego to New York on the first transcontinental and the longest glider flight ever attempted, is the only aircraft of its kind extant.

The "Eaglet" was designed and built by Prof. R. E. Franklin, of the University of Michigan, and his brother Wallace, for The Texas Company.

Specially stressed for airplane towing, it is of monoplane type, with a fifty-foot detachable wing and an overall length of twenty-one feet. Its triangular, fabric-covered fuselage is of tube steel, as are the struts. Its wing is of wood. Empty, it weighs 300 pounds; with Hawks and his cargo aboard, it weighed 500 pounds.

Fully loaded, the "Eaglet" has a stalling speed of about fifteen miles an hour. Its gliding ratio is twenty-two to one, which is to say that from an altitude of one mile, in still air, it can glide to any place within a twenty-two-mile radius.

In addition to the telephone with which Hawks communicated with the tow plane and the radio receiving set for his entertainment in flight, the "Eaglet's" distinctly new features are its all-enclosed cabin and complete instrument board.

Glider Records

Official List of Endurance and Distance Flights

The following is the official list of endurance and distance flights made by all types of gliders:

One Pilot—No Passenger

Duration—14 hours, 43 minutes, 25 seconds, by Lieutenant Dinort, October 19, 1929, at Rossitten, Germany, in a specially designed Primary Training Glider of the Rhoen-Rossitten Gesellschatt.

Cross-Country Flight Over Predetermined Course—Ninety-two miles, made by Robert Kronfield, summer of 1929, in a Professeur, standard type of the Rhoen-Rossitten Gesellschaft, at Wasserkuppe, Germany.

Altitude—7,300 feet above point of start, made by Robert Kronfeld, summer of 1929, in a Professeur, standard type of the Rhoen-Rossitten Gesellschaft, at Wasserkuppe.

One Pilot—One Passenger

Duration—9 hours, 21 minutes, made by Schultz, summer of 1927, at Rossitten, Germany, in a model of the Rhoen-Rossitten Gesellschaft.

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The insignia of the American Sky Cadets—illustrated above—identifies the wearer as an air-minded chap who already knows something about the intricate and interesting problems of airplane design and construction and is rapidly learning more. For the American Sky Cadets is the most helpful organization of its kind in existence. If you are air-minded you should become a member and wear the handsome silver wings which every cadet receives free upon joining. And if you are promoted to the commission of Flight Commander or Squadron Commander, as you very likely may be, you can replace the silver wings with the gold wings which will be sent to you with your commission. Read what you get with your membership in addition to the insignia.

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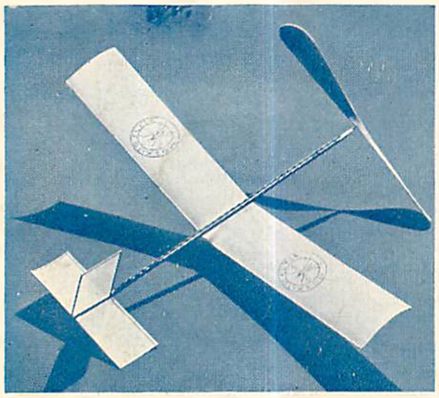

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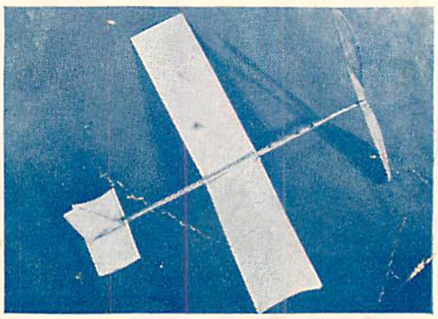

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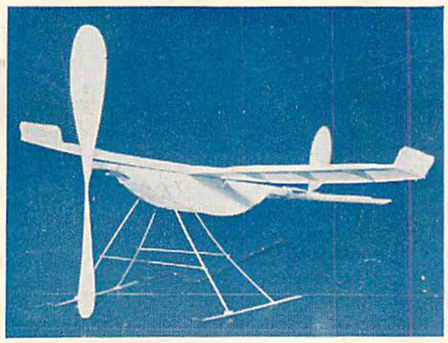

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1/16 x 1/32"	.01	per foot
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Pcs. No. 60 Drill Wire 36" long	.10	each
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Washers	.10	" "
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Bentwood Propellers 6" long	.12	"
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" " 8" "	.16	"
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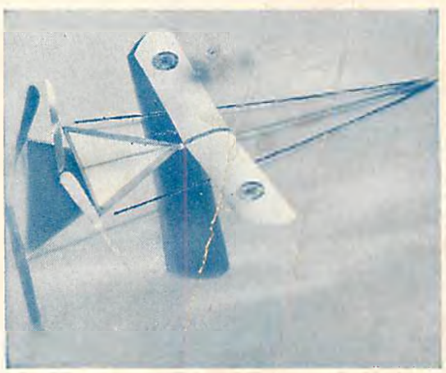

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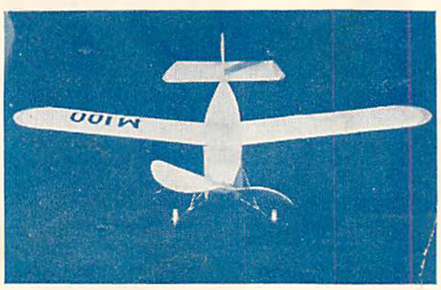

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