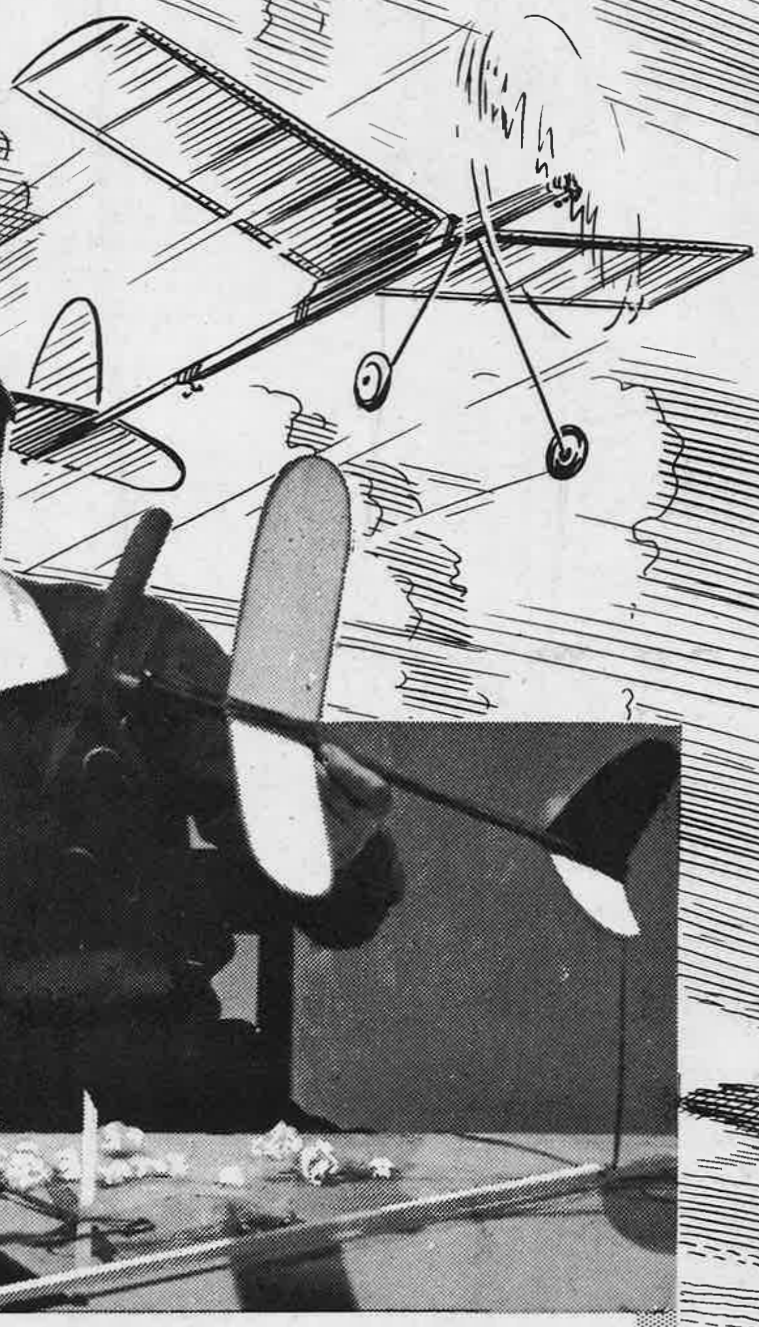
The Cleveland Press

MODEL AVIATION MANUAL





Plane building helps you use mind and hands in a pastime that's fun. It teaches you how a real plane flys and other scientific things.

It brings you into friendly rivalry with modelists your age in contests and exhibits.

It's one of the country's greatest hobbies. From it grow the men and ideas that build and fly tomorrow's planes.

Charles Tracy
Aviation Editor
The Cleveland Press





By CHARLES TRACY and JAMES D. POWELL

Follow "Model Aviation" in The Press every Monday, Wednesday and Friday



"FOLLOW THESE SIMPLE DIRECTIONS AND YOU'LL SOON BE ABLE TO BUILD ALL KINDS OF MODEL AIRPLANES!"

Most important feature of model plane building as a hobby is: IT DOESN'T REQUIRE ANY SPECIAL TOOLS OR EQUIPMENT. You can do flawless work with the few simple, cheaply acquired tools described here. Learn to use them well and you'll turn out planes like an expert.

1. WORK BOARD - smooth, soft pine, at least 4" wide by 18" long. Use it to pin framework on while assembling.

2. RAZOR BLADES - single edge type best, but double edge can be broken in two and broken edge covered with bent tin or tape to save fingers.

3. SANDPAPER STICKS - home-made and next to razor blades in usefulness; help you shape curved wood parts quickly after rough cutting.

4. PENCIL - for marking wood and drawing plans.

5. RULER - with metal edge for guiding razor blade when cutting parts from sheet balsa, also for measuring. A metal straight edge is useful.

Best advice for a boy who wants to build successful model planes is to look through the sketches and notes gathered into this booklet. Be sure you understand how to do it before plunging into the work. Take your time, be patient, for the results are worth it.

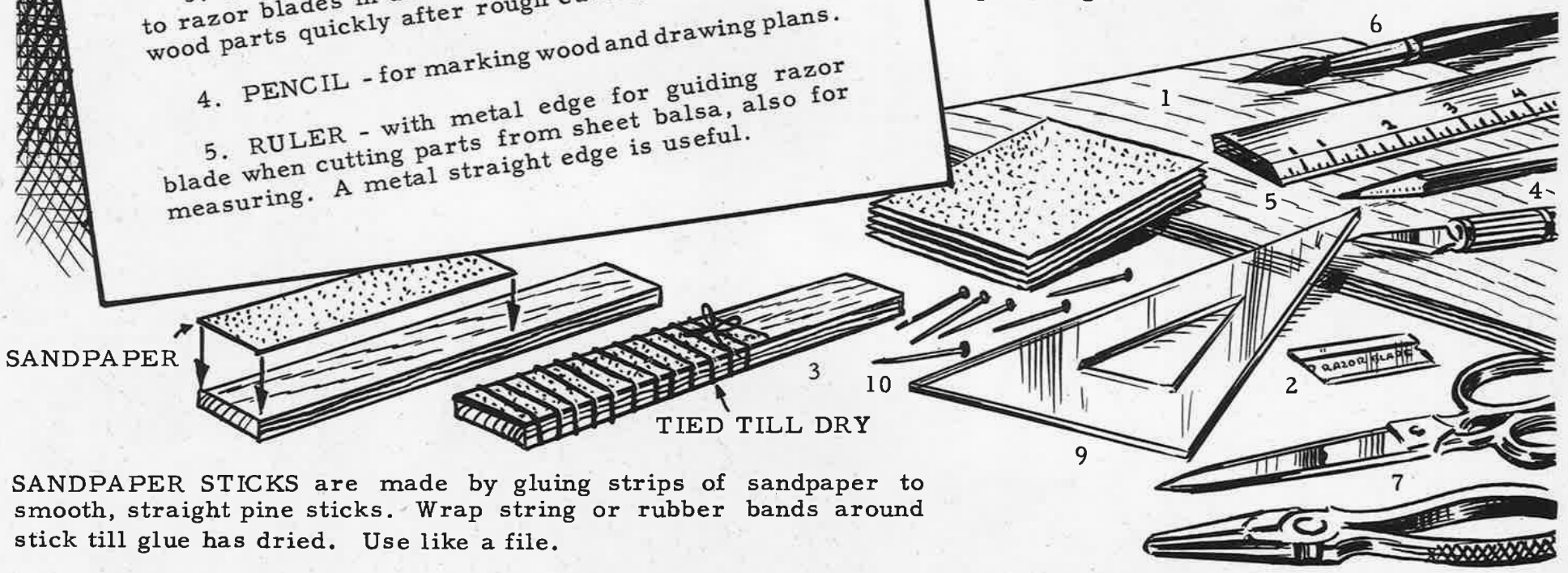
6. BRUSHES - of water-color type to spread dope on frames for paper covering; also for doping tissue.

7. SCISSORS - mainly for cutting tissue paper.

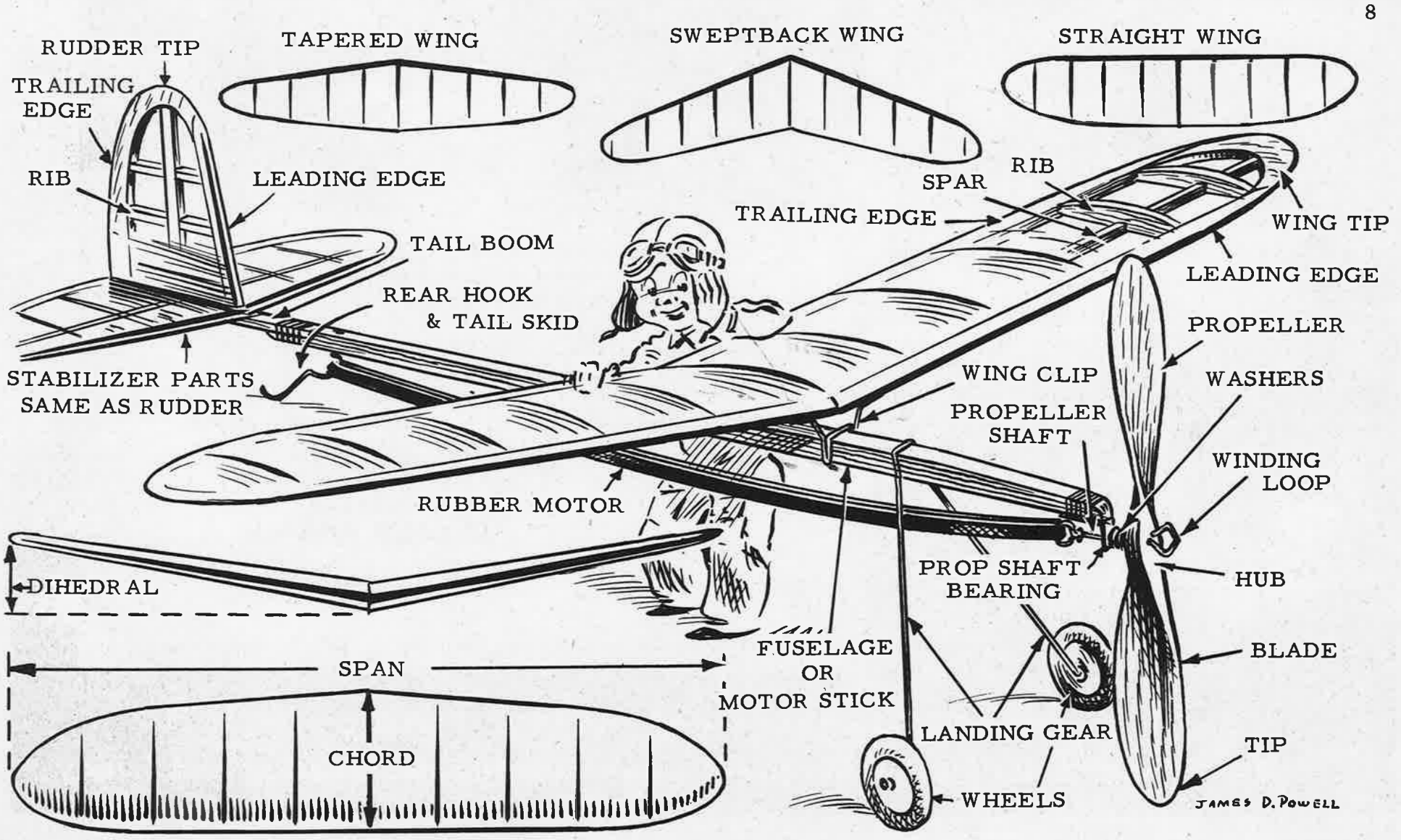
8. PLIERS - round-nose type are best, for shaping wire and pins.

9. TRIANGLE - for laying out plans and checking assemblies for true right angles.

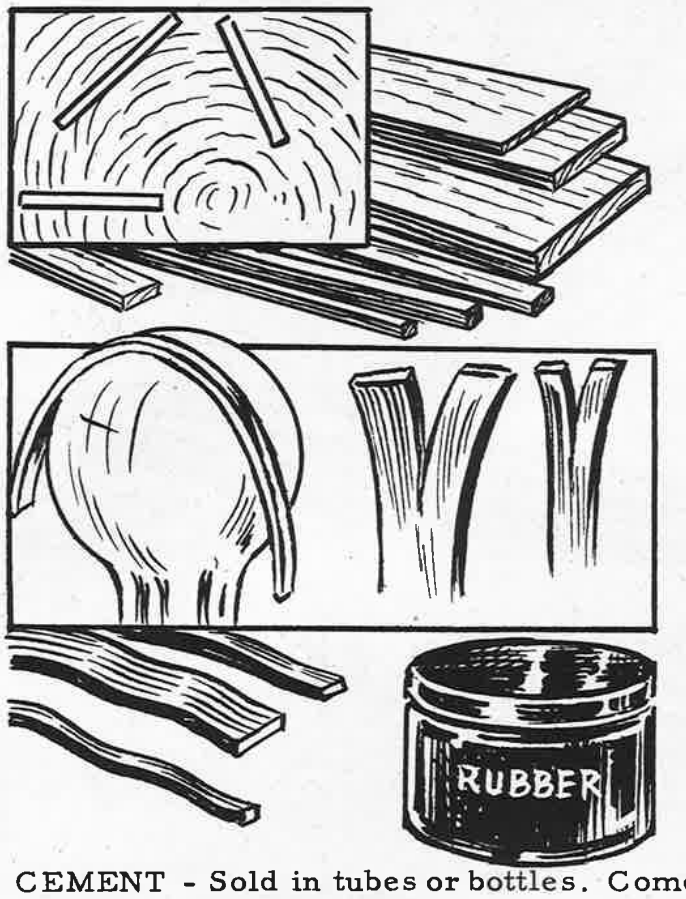
10. PINS - straight type, to hold balsa parts together while cement dries.



SANDPAPER STICKS are made by gluing strips of sandpaper to smooth, straight pine sticks. Wrap string or rubber bands around stick till glue has dried. Use like a file.



What Models Are Made Of...



MATERIALS COST LITTLE, ARE AVAILABLE IN ALL HOBBY SHOPS.

BALSA - lightest wood known, grows in South America. Sold in sheets and sticks cut to sizes suitable for model building. Soft, medium and hard grades. Sheet wood usually in 1/32", 1/16", 1/8", thicknesses, 2" or 3" wide, 36" long. Many stick sizes available. Sheets used for wing ribs, fuselage sides and covering.

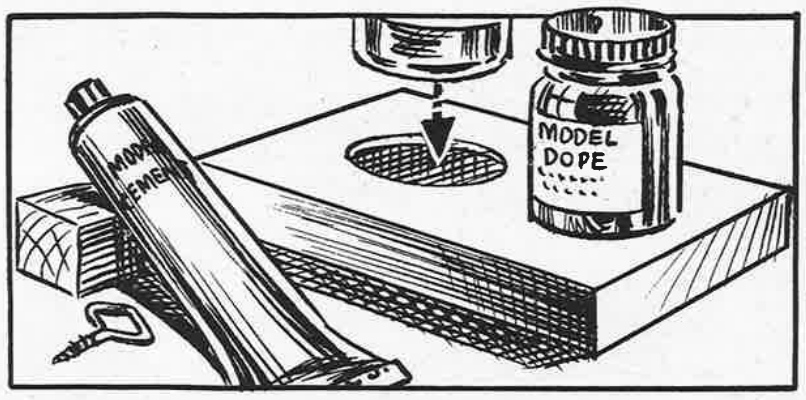
BAMBOO - Tough, straight-grained, is easily split into small sizes. Fine for struts, landing-gears, glue sticks, curved wing tips, etc. Will hold bent shape if heated with electric bulb while bending.

TISSUE - Paper for covering has "grain", is tougher and lighter than gift wrapping paper. Sold in sheets white or colors. Silkspan is a trade name. Light-weight "super fine" tissue used for indoor models, some outdoor rubber types.

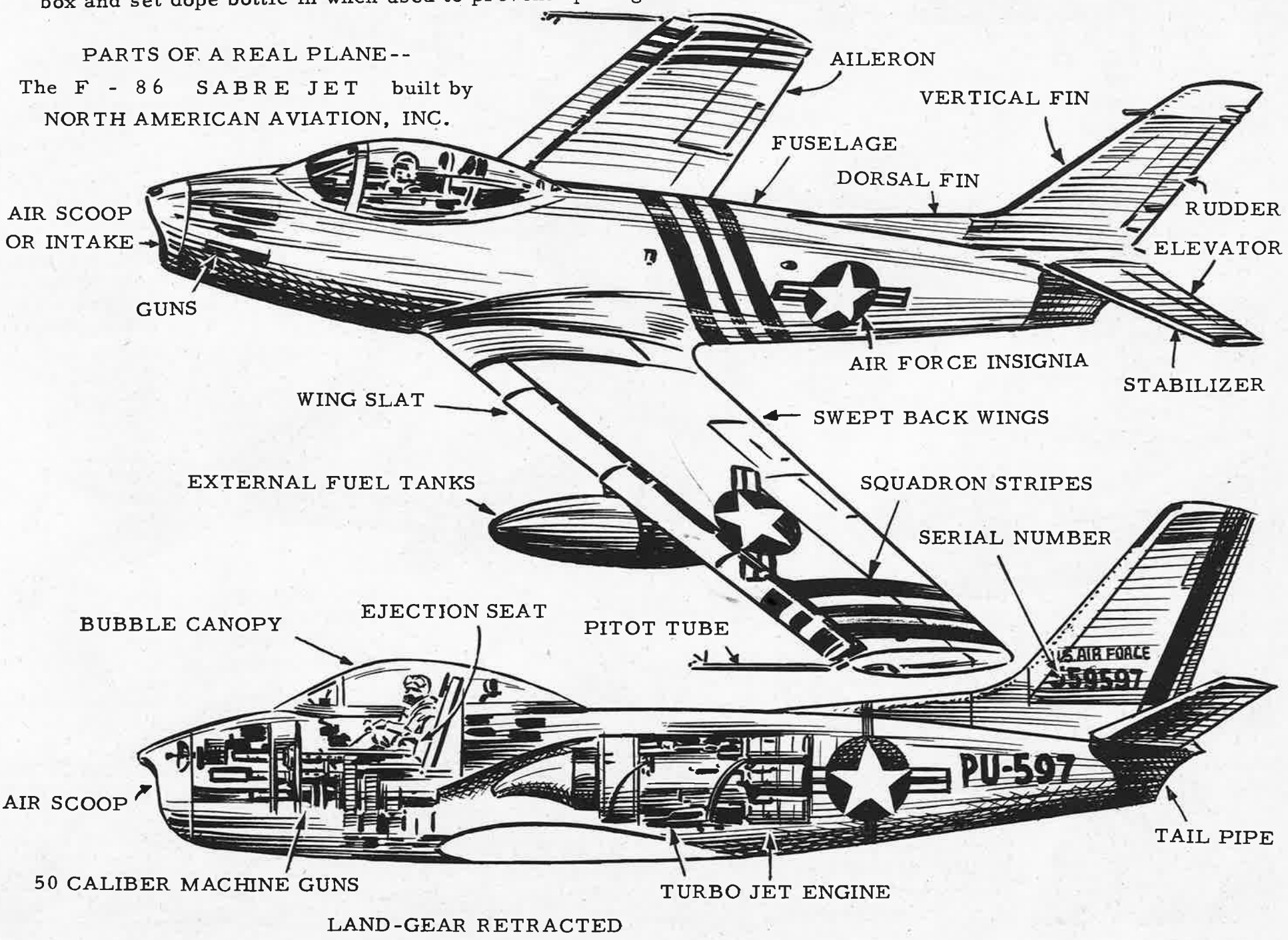
RUBBER - Strand for powering models is sold by the foot, comes in sizes like balsa sticks. One-eighth inch flat works good on most models. Indoor jobs use 1/16" flat or smaller. Big outdoor jobs use 3/16" flat. Oil rots rubber. So does heat and sun. Talcum powder and soap keep it from sticking together. Special "lubricant" is available. Keep rubber in a painted jar that keeps out light and air.

CEMENT - Sold in tubes or bottles. Comes as fast-drying or regular. Some brands are "fuel proof" and usable for glow-plug gas jobs. May be thinned with acetone. Keep covered when not in use.

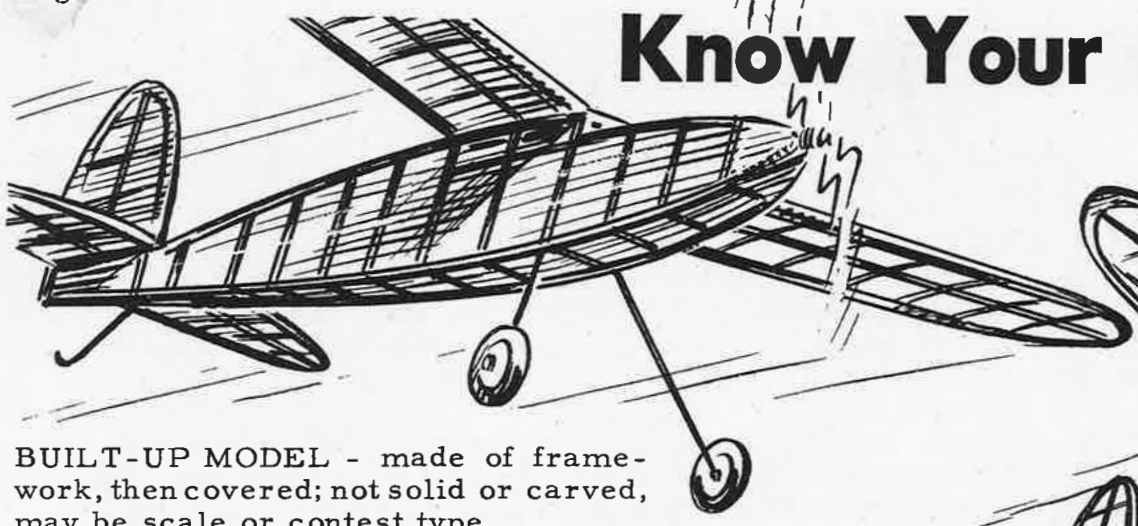
DOPE - for painting models comes in clear and colors. Clear holds tissue to balsa frames. After shrinking paper with water, apply clear dope to keep it tight and fill pores. Several coats on wood fills pores and gives gloss to color coats. Don't dope light-weight models or surfaces will warp. Use "dope thinner" to clean brushes or thin dope. Cut hole in shallow cardboard box and set dope bottle in when used to prevent spilling.



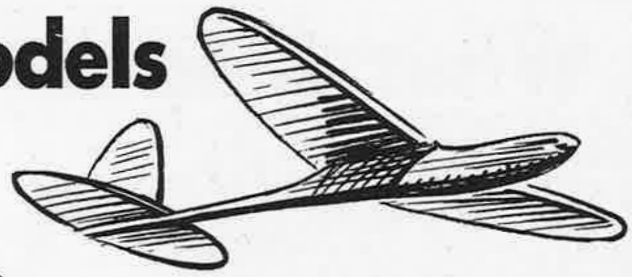
PARTS OF A REAL PLANE--
The F - 86 SABRE JET built by
NORTH AMERICAN AVIATION, INC.



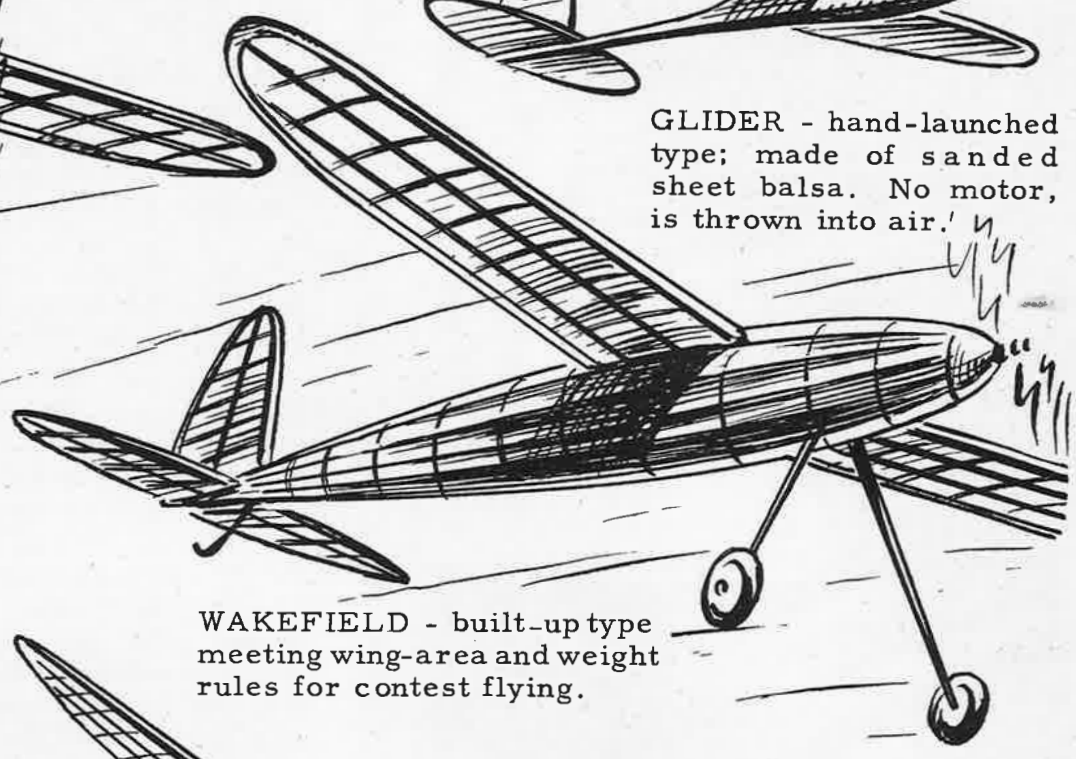
Know Your Models



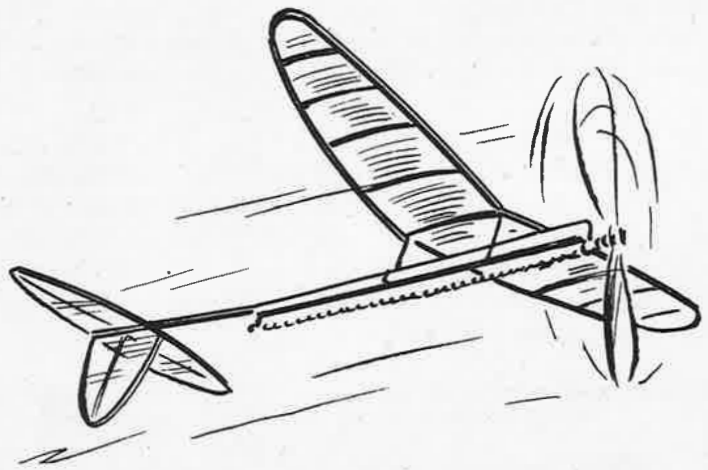
BUILT-UP MODEL - made of framework, then covered; not solid or carved, may be scale or contest type.



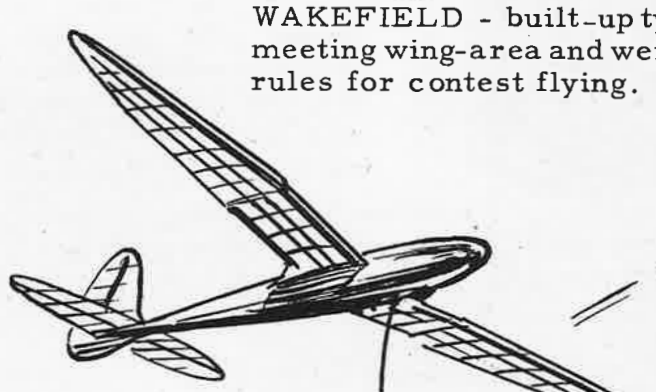
GLIDER - hand-launched type; made of sanded sheet balsa. No motor, is thrown into air.

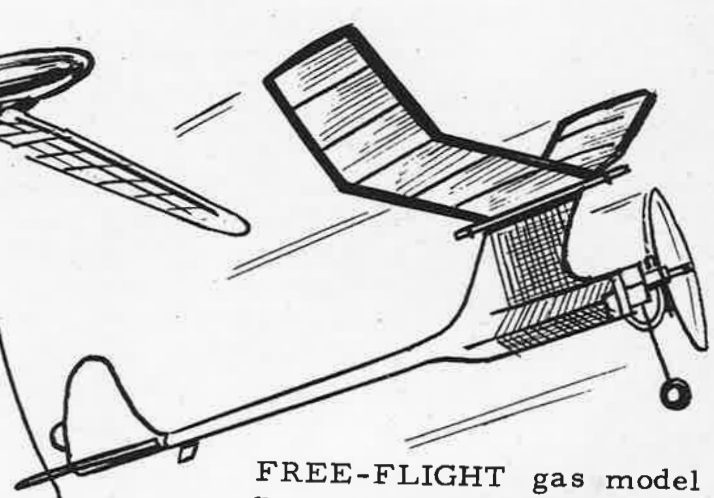


WAKEFIELD - built-up type meeting wing-area and weight rules for contest flying.

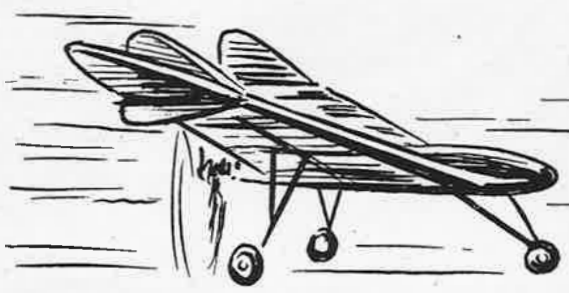


INDOOR MODEL - built for lightness; for duration contest indoors.

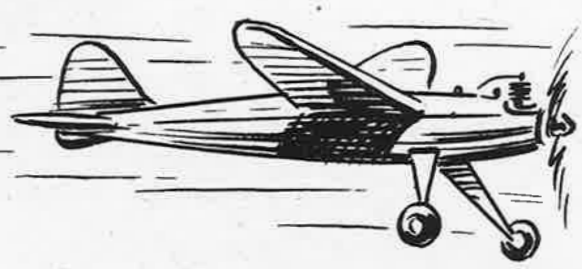




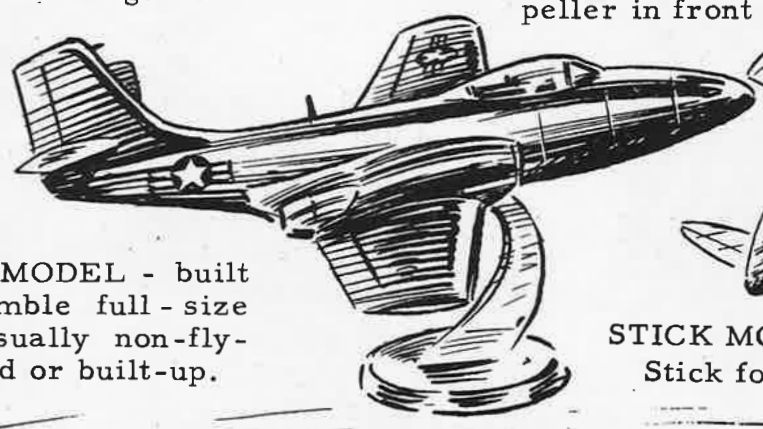
FREE-FLIGHT gas model flys on limited motor run, timed for duration of flight in contests.



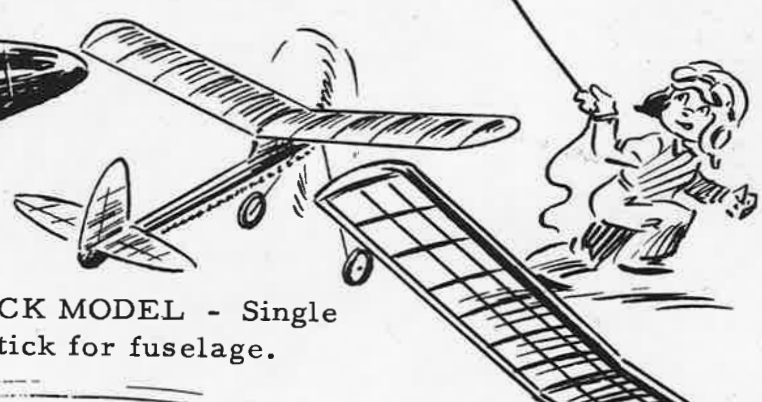
PUSHER - model with propeller behind main wing.



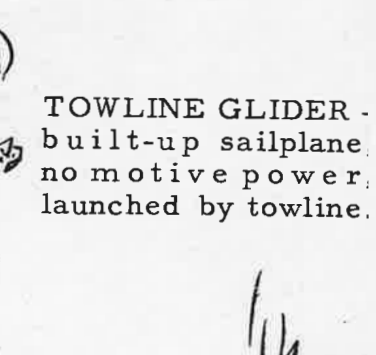
TRACTOR - model with propeller in front of main wing.



SCALE MODEL - built to resemble full-size craft, usually non-flying; solid or built-up.



STICK MODEL - Single Stick for fuselage.



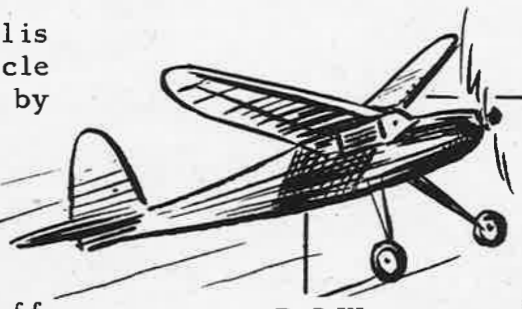
TOWLINE GLIDER - built-up sailplane, no motive power, launched by towline.



STICK MODEL - outdoor contest model; built-up, covered body of small cross-section.



CONTROL-LINE model is held by wires to fly circle course; controlled by wires in flight.



ROG means "rise off ground" unassisted.



ROW means "rise off water" unassisted.

JAMES D. POWELL

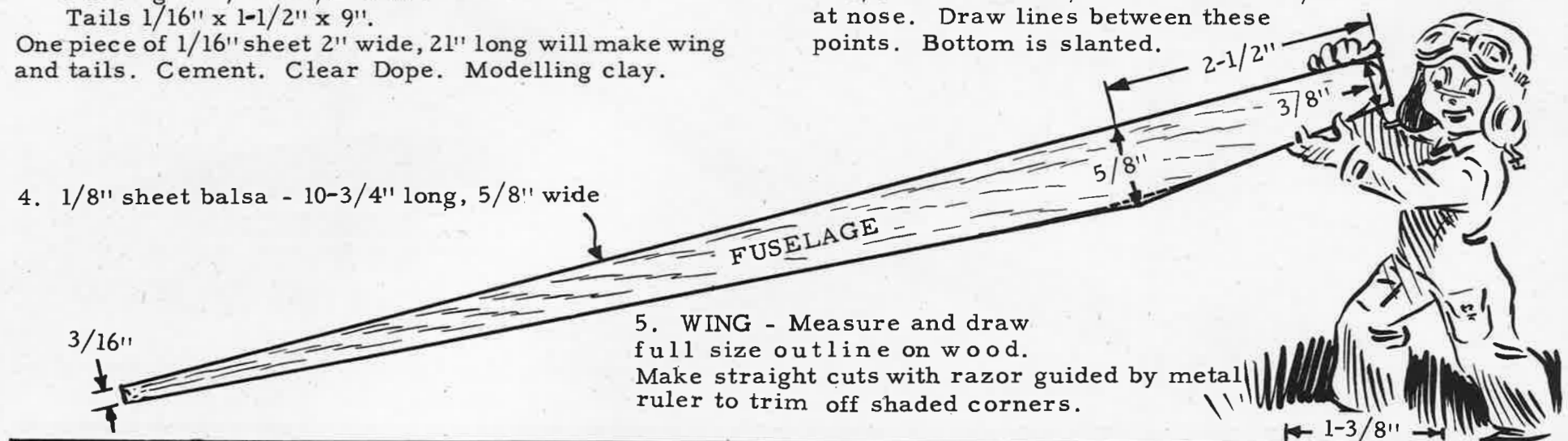
The ZOOMER

1. This hand-launched glider teaches you to lay out full size plans, make and balance a flying model. Study all sketches and notes first.

MATERIALS

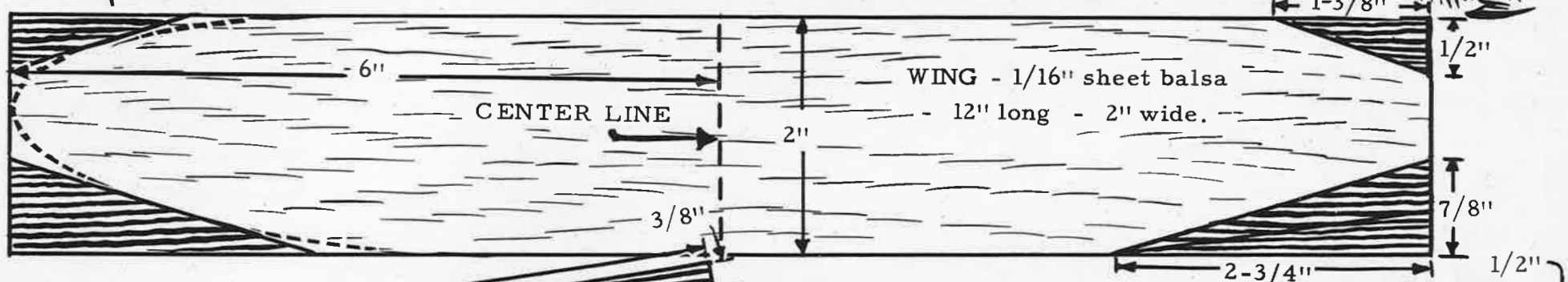
2. Wing - 1/16" x 2" x 12".
Fuselage - 1/8" x 5/8" x 11".
Tails 1/16" x 1-1/2" x 9".
One piece of 1/16" sheet 2" wide, 21" long will make wing and tails. Cement. Clear Dope. Modelling clay.

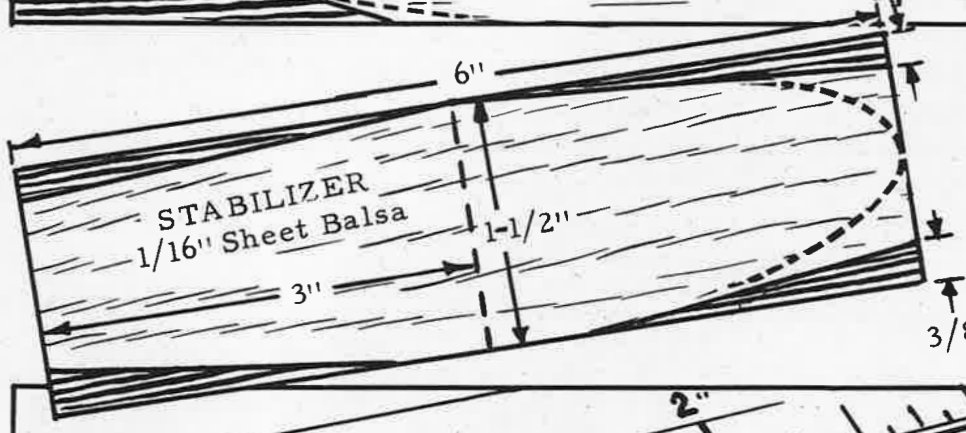
3. FUSELAGE - Copy side view on wood full size. Measure 2 1/2" from nose for thickest point of 5/8". Measure 3/16" at rear and 3/8" at nose. Draw lines between these points. Bottom is slanted.



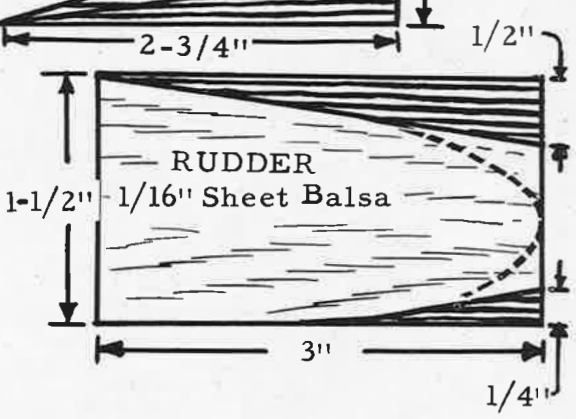
4. 1/8" sheet balsa - 10-3/4" long, 5/8" wide

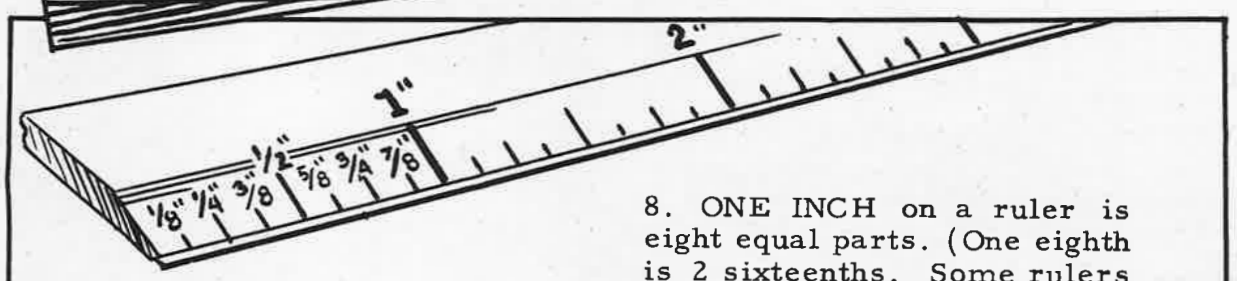
5. WING - Measure and draw full size outline on wood. Make straight cuts with razor guided by metal ruler to trim off shaded corners.





6. COPY tail on balsa full size. Don't try to cut curved lines. Trim off shaded corners with straight cuts.

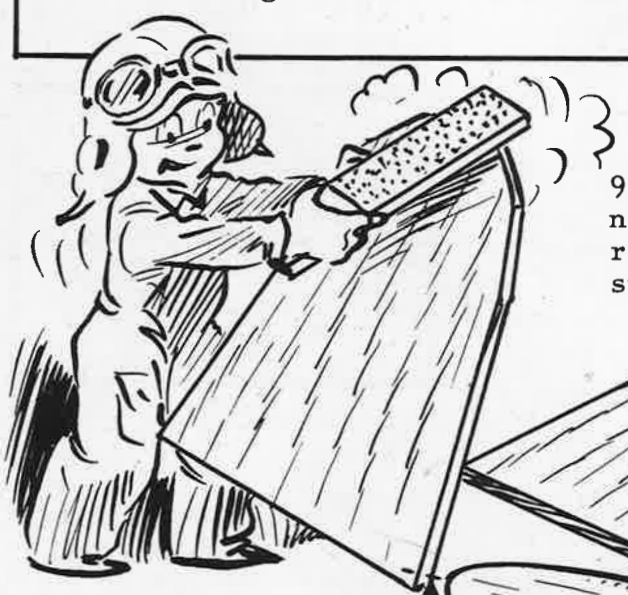




8. ONE INCH on a ruler is eight equal parts. (One eighth is 2 sixteenths. Some rulers show 1/16ths.) Reading from end of ruler to 1" mark: one-eighth, one-fourth, three-eighths, one-half, five-eighths, three-fourths, seven-eighths.

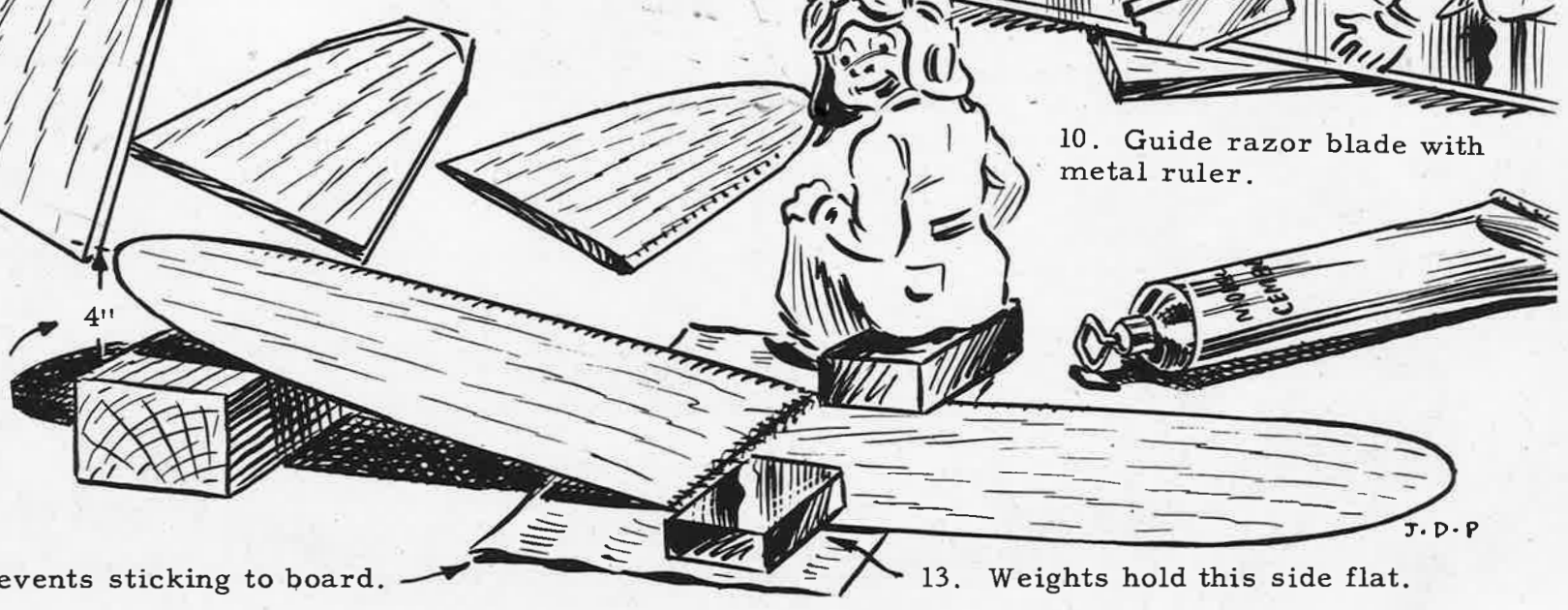
7. DRAW parts on wood in order shown to save wood.





9. Sandpaper corners and edges round, top and bottom surfaces smooth.

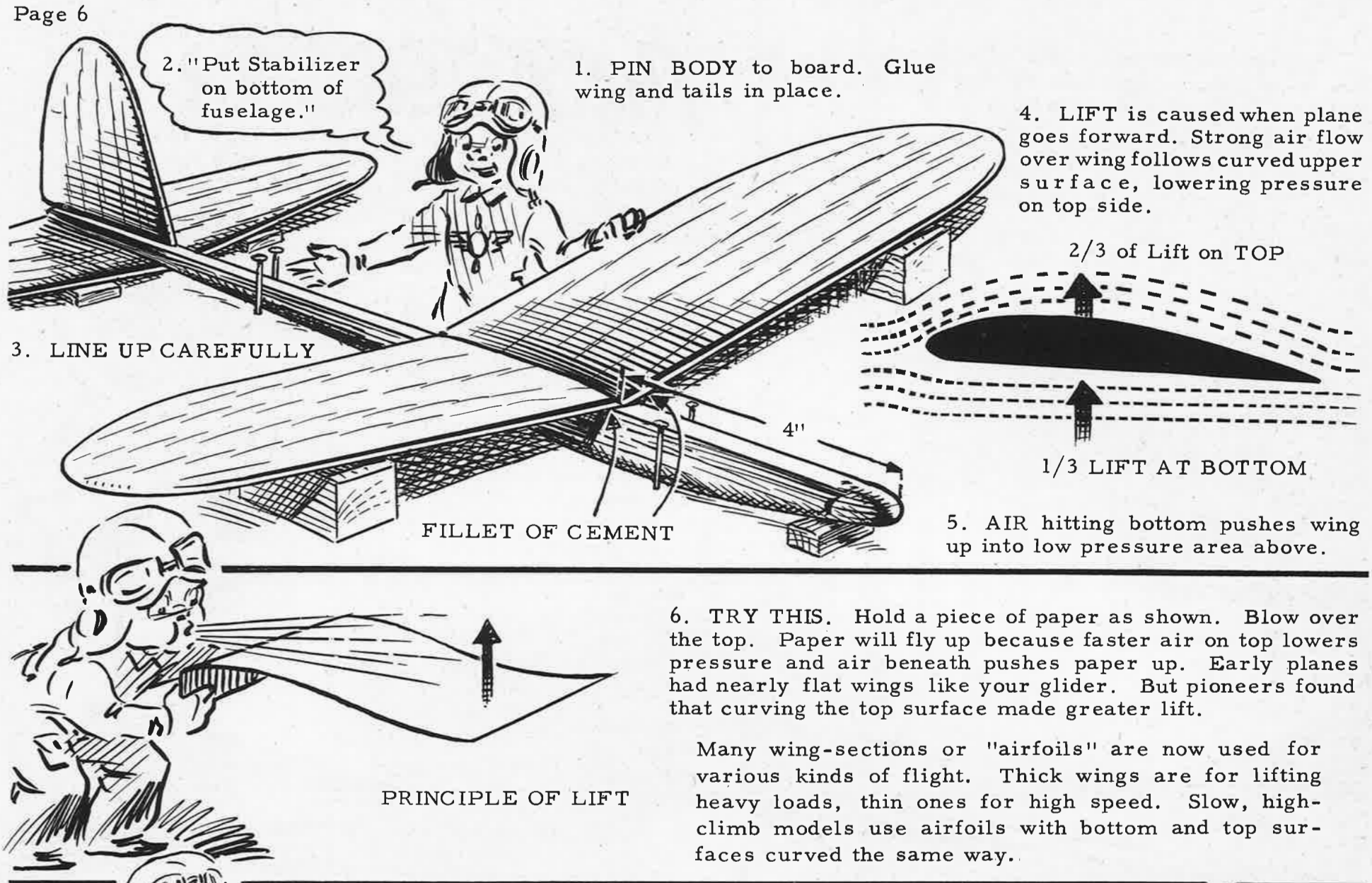
10. Guide razor blade with metal ruler.



11. Cut wing across center. Prop one tip 4", cement cut back together for dihedral angle.

12. Wax paper prevents sticking to board.

13. Weights hold this side flat.

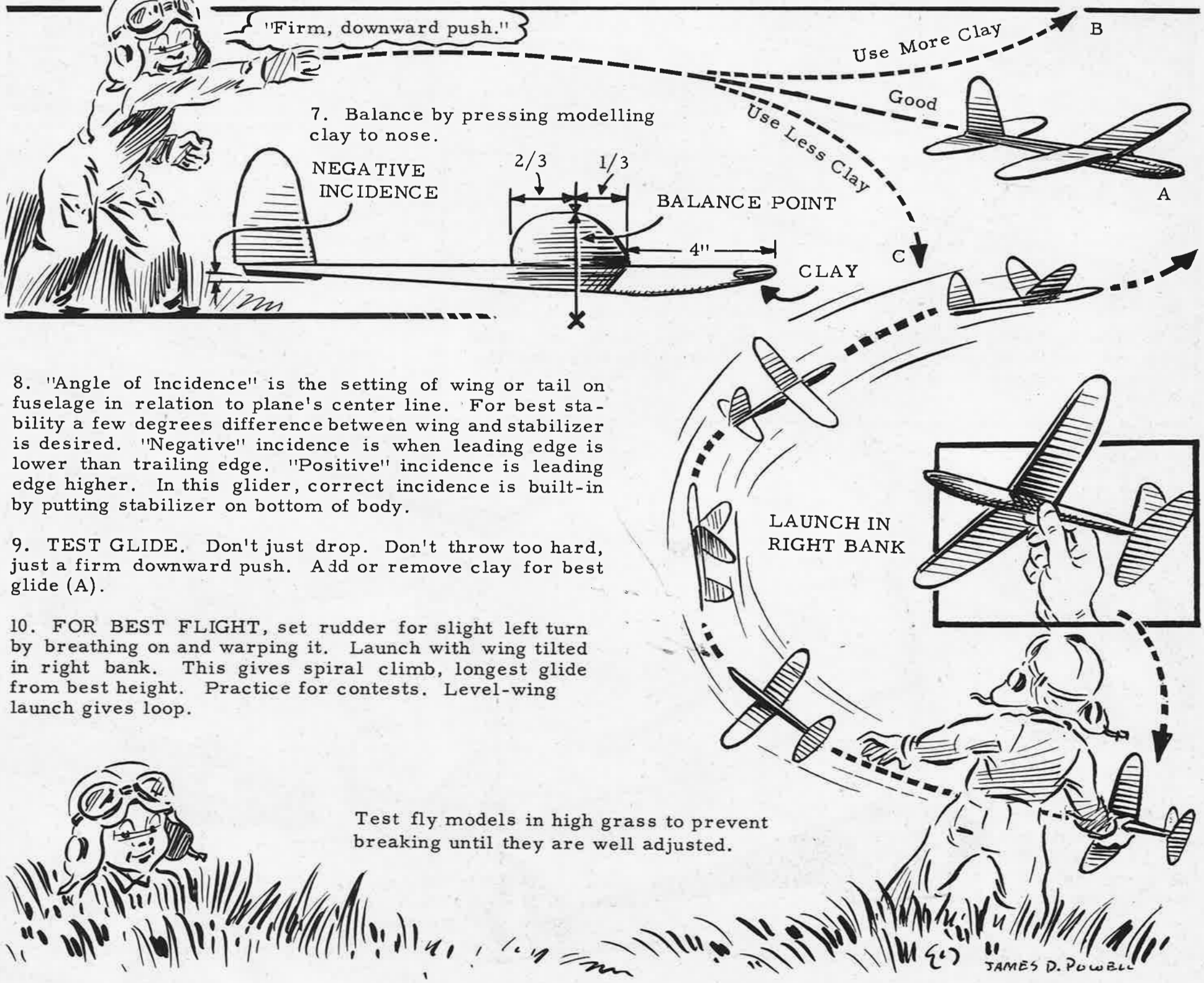


4. LIFT is caused when plane goes forward. Strong air flow over wing follows curved upper surface, lowering pressure on top side.

5. AIR hitting bottom pushes wing up into low pressure area above.

6. TRY THIS. Hold a piece of paper as shown. Blow over the top. Paper will fly up because faster air on top lowers pressure and air beneath pushes paper up. Early planes had nearly flat wings like your glider. But pioneers found that curving the top surface made greater lift.

Many wing-sections or "airfoils" are now used for various kinds of flight. Thick wings are for lifting heavy loads, thin ones for high speed. Slow, high-climb models use airfoils with bottom and top surfaces curved the same way.



8. "Angle of Incidence" is the setting of wing or tail on fuselage in relation to plane's center line. For best stability a few degrees difference between wing and stabilizer is desired. "Negative" incidence is when leading edge is lower than trailing edge. "Positive" incidence is leading edge higher. In this glider, correct incidence is built-in by putting stabilizer on bottom of body.

9. TEST GLIDE. Don't just drop. Don't throw too hard, just a firm downward push. Add or remove clay for best glide (A).

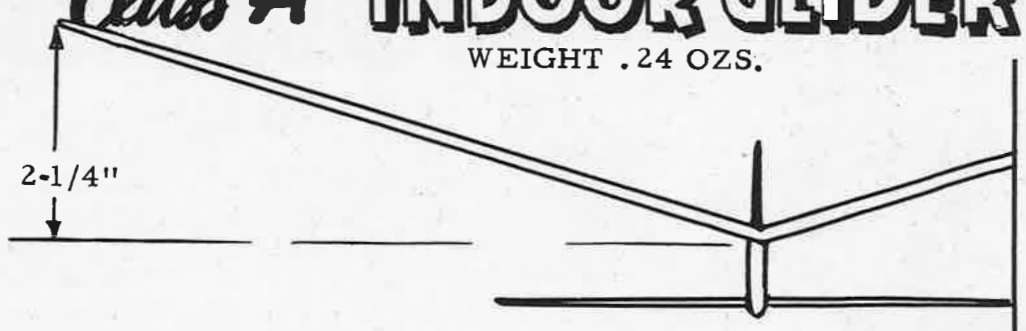
10. FOR BEST FLIGHT, set rudder for slight left turn by breathing on and warping it. Launch with wing tilted in right bank. This gives spiral climb, longest glide from best height. Practice for contests. Level-wing launch gives loop.

Test fly models in high grass to prevent breaking until they are well adjusted.

JAMES D. POWELL

Class "A" INDOOR GLIDER

WEIGHT .24 OZS.



SCALE IN INCHES



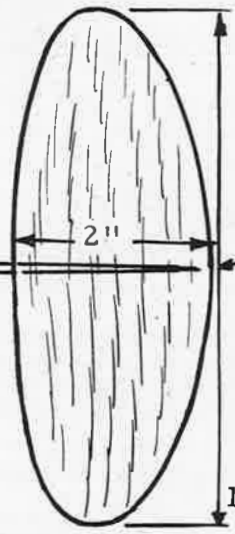
14" TOTAL
WING SPAN



WING CROSS-SECTION
Enlarged Scale
Note Undercamber

WING - 1/8" SHEET BALSA

FUSELAGE - BALSA
1/8" x 3/4" x 16-1/8"



STABILIZER
and
RUDDER of
1/32" Sheet
Balsa

Give Entire
Glider High
Polish Finish



Fuselage Section
Enlarged Scale

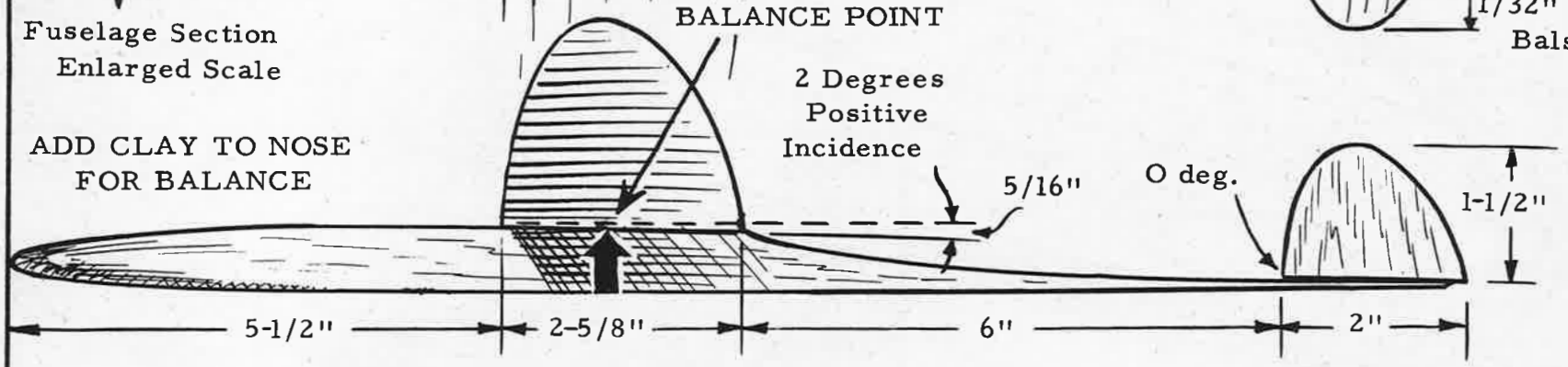


Fuselage Section
Enlarged Scale

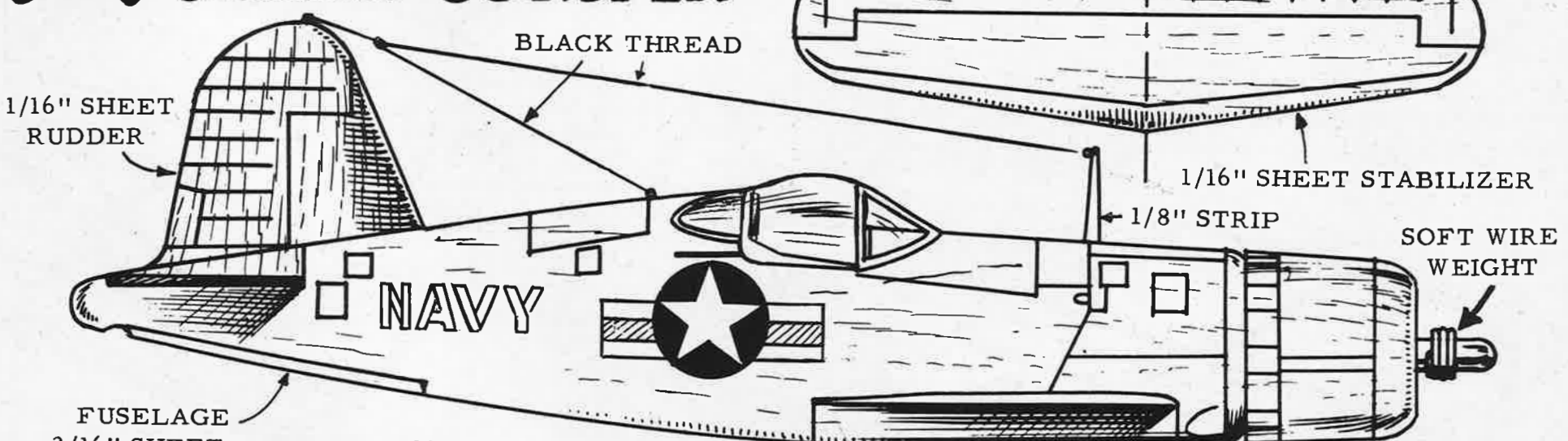
BALANCE POINT

2 Degrees
Positive
Incidence

ADD CLAY TO NOSE
FOR BALANCE

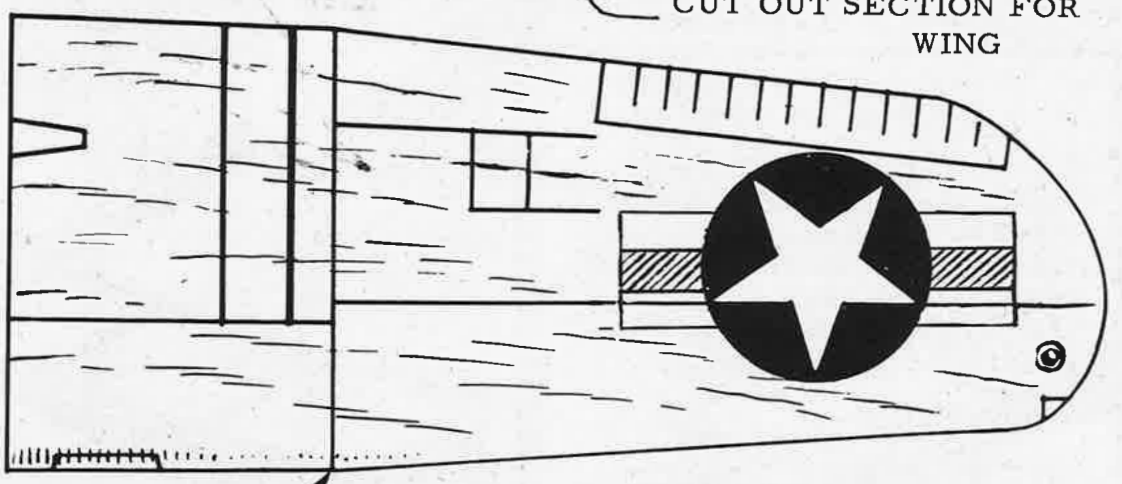


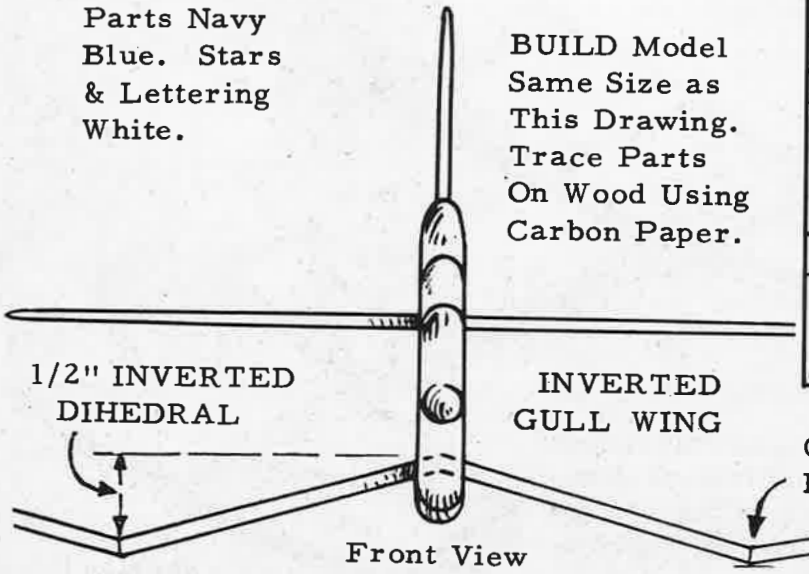
Cook Cleland's CORSAIR



COLOR - All
Parts Navy
Blue. Stars
& Lettering
White.

BUILD Model
Same Size as
This Drawing.
Trace Parts
On Wood Using
Carbon Paper.



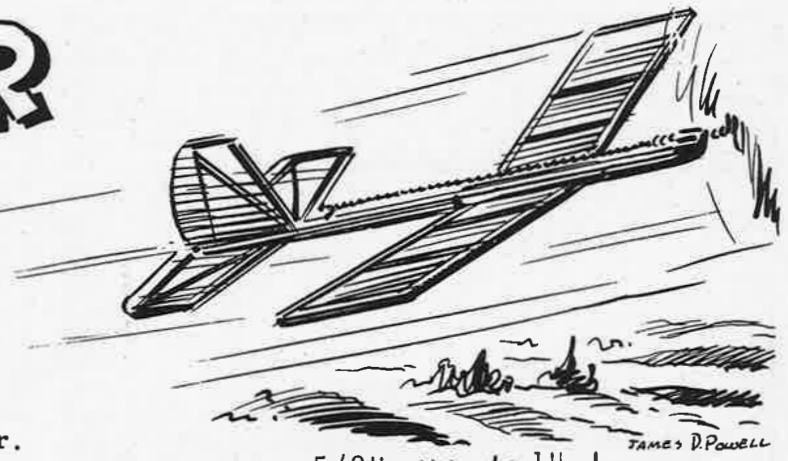


1/16" SHEET WING
MAKE 1 RIGHT &
1 LEFT.

JAMES D. POWELL

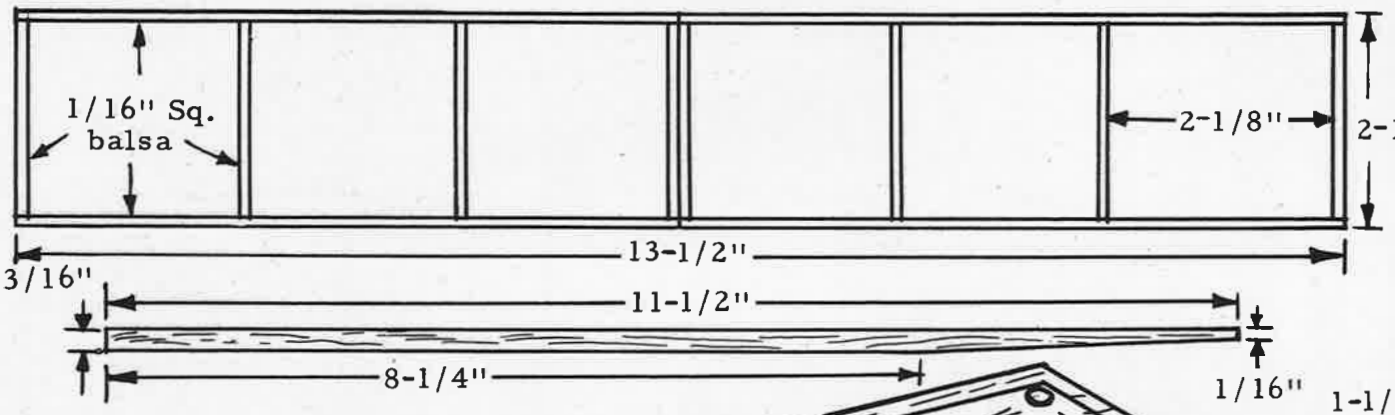


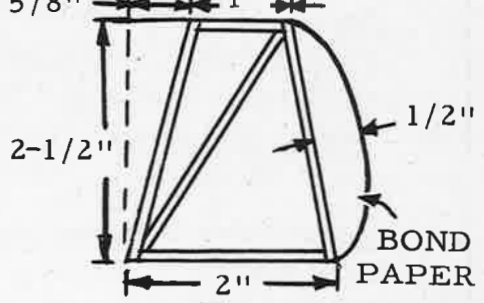
The CLIMBER

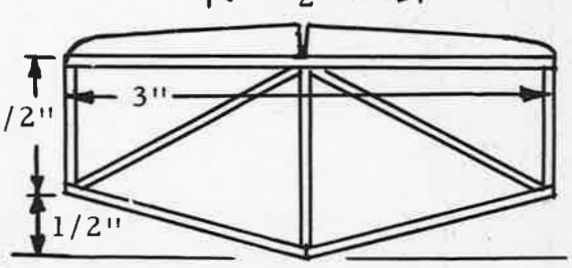


LIST OF MATERIALS

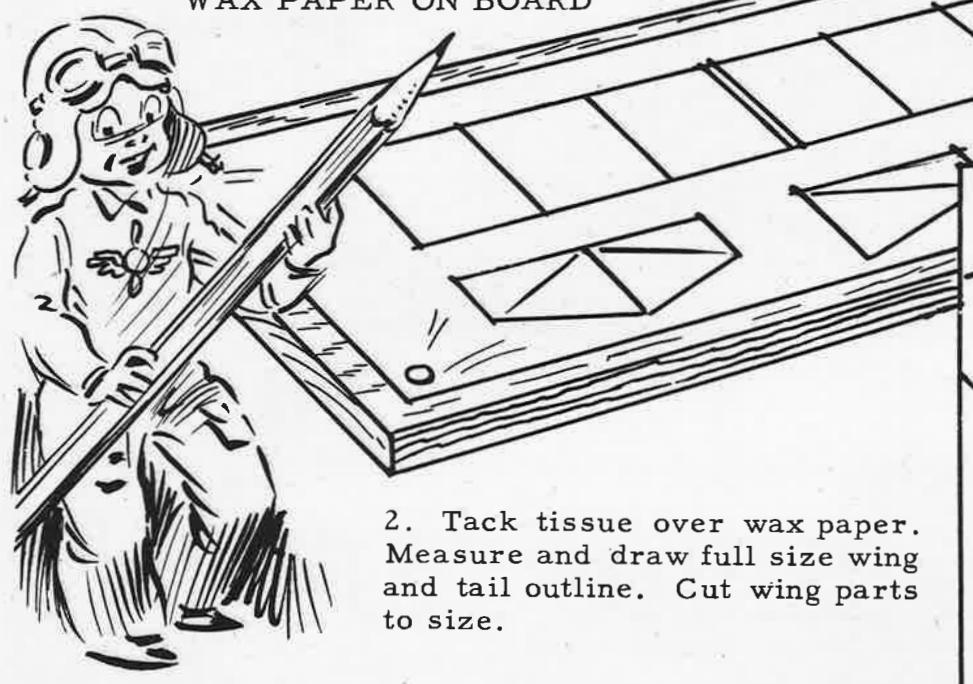
6 - 1/16" x 1/16" x 18" balsa sticks.
1 - 1/8" x 3/16" x 12" motor stick.
1 - 1/16" x 1/8" x 12" wing mount.
1 - 3/16" x 1/4" x 7/8" prop hub.
1 - 1/32" x 1" x 6" prop blades.
18" of 1/8" flat rubber; cement; dope
prop shaft; prop bearing; tissue paper.





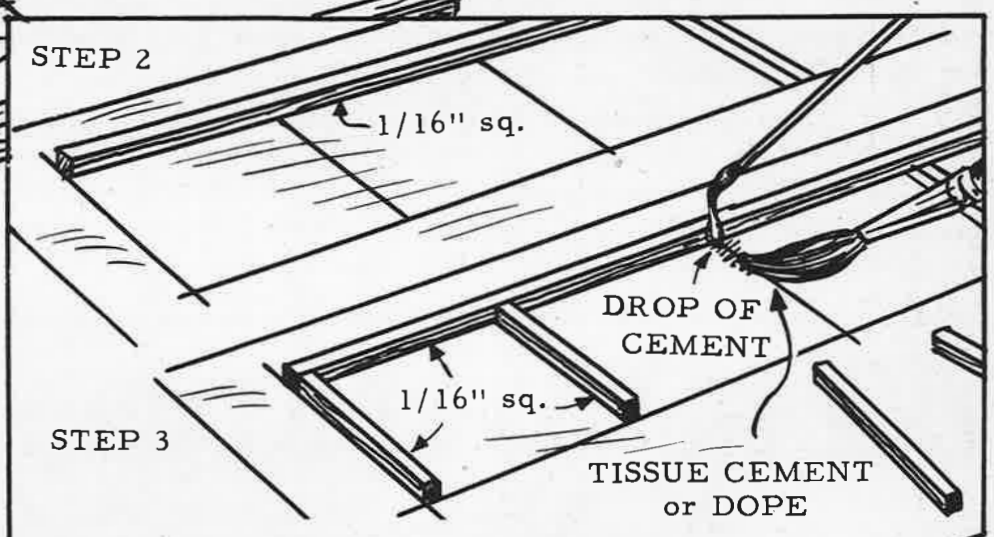


WAX PAPER ON BOARD



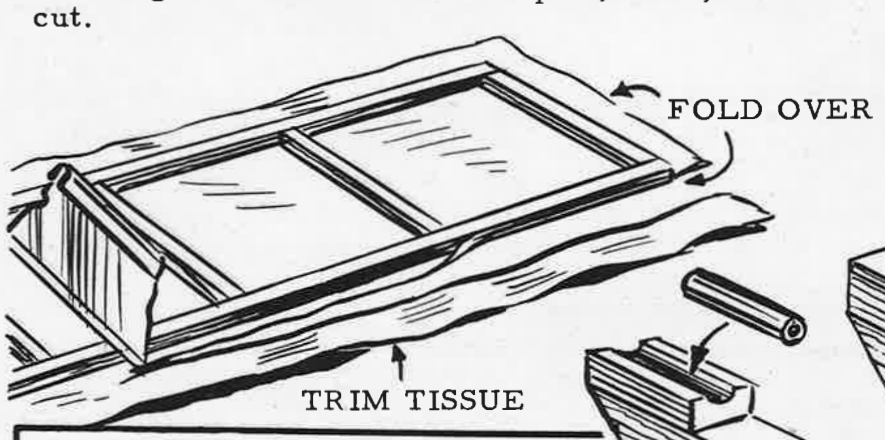
STEP 1

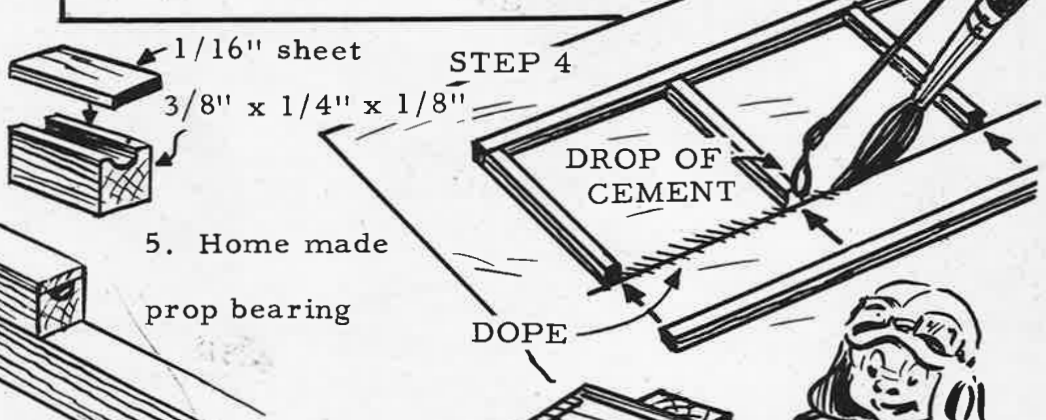
2. Tack tissue over wax paper. Measure and draw full size wing and tail outline. Cut wing parts to size.



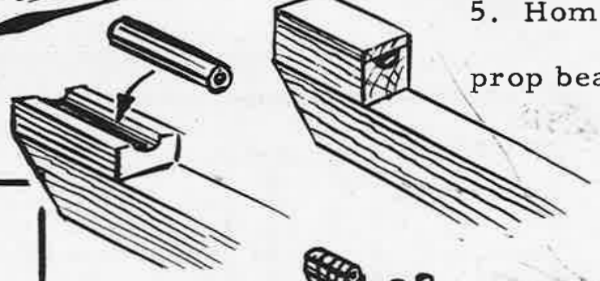
3. Brush dope on one wing spar and lay on tissue over line. Do same with ribs gluing joints. 2nd spar is last.

4. Follow same steps to make tail. When dry, cut wing at center, raise one tip 3", block, cement cut.





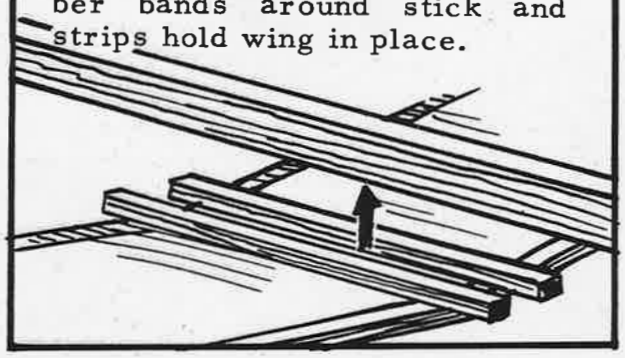
5. Home made prop bearing



6. Long bead also makes prop bearing

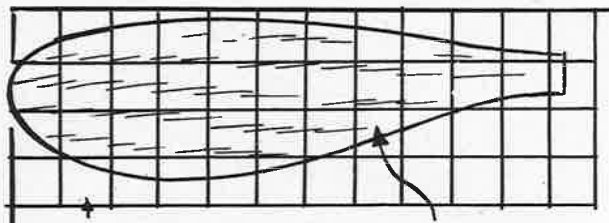
WING IS MOVABLE FOR BEST FLIGHT SETTING

7. Glue wing mount strips to center of wing. Put motor stick between to get snug fit. Carefully remove motor stick until mount strips dry. Small rubber bands around stick and strips hold wing in place.

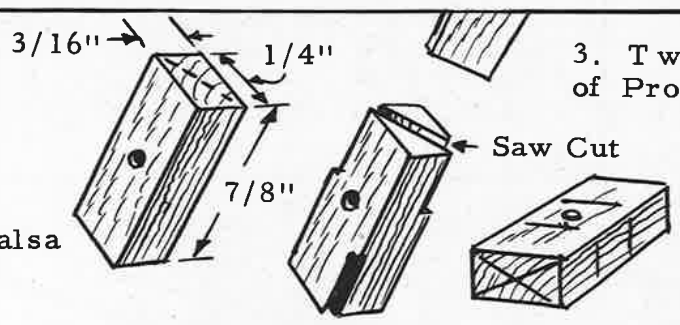


8. Wing and stabilizer go on bottom of motor stick. Rubber on top. Pin fuselage while tail dries. Line up by sighting from front.

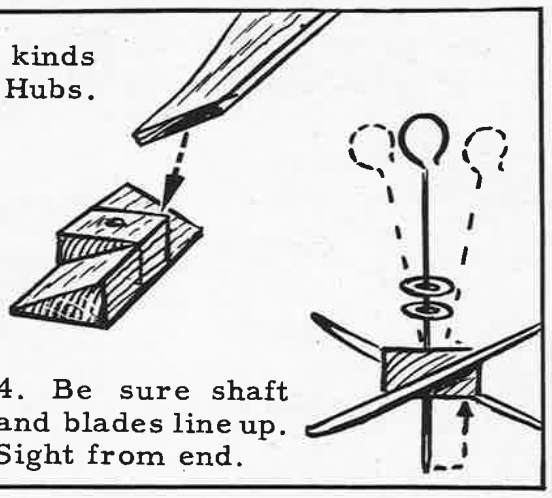
9. Do Not Dope.



1. Rule off 1/4"-squares, sketch prop blade, cut out pattern, trace and cut from 1/32" wood.

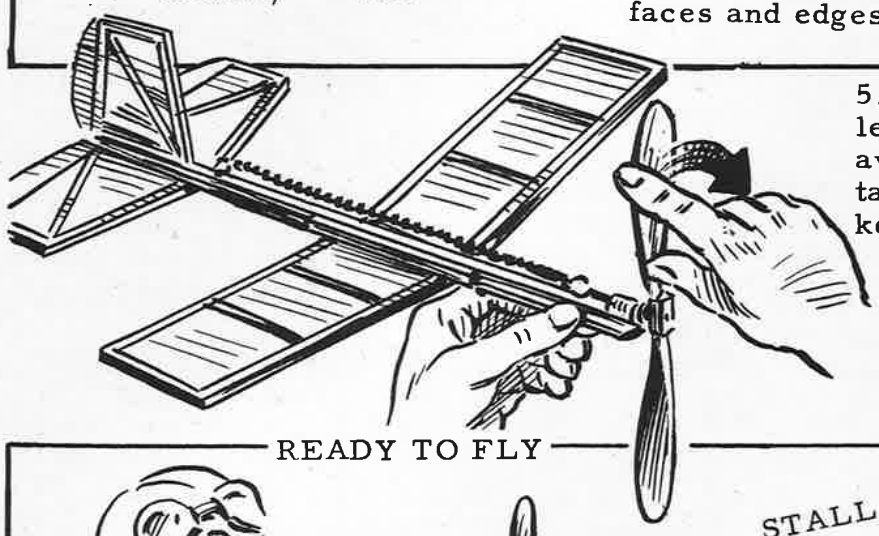


2. Use hard balsa for prop hub. Follow sizes, cement blades to hub. Sand paper faces and edges smooth.



3. Two kinds of Prop Hubs.

4. Be sure shaft and blades line up. Sight from end.



READY TO FLY

5. Wind by holding motor stick nose in left thumb and forefinger. Turn prop away from you. Count turns. Rubber can take 125. Put talcum powder on rubber to keep it smooth.

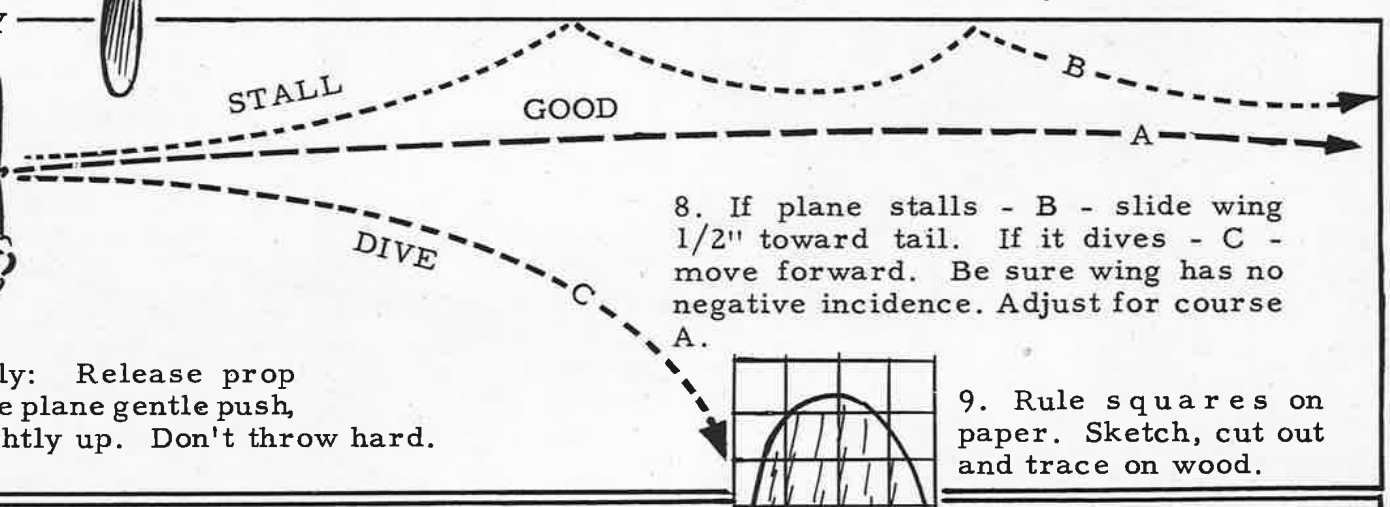
Use rubber lubricant to keep strands from sticking together. When not used, keep rubber motors in dark, air-tight can.



6. Simple knot ties ends of 18" piece of 1/8" flat rubber.

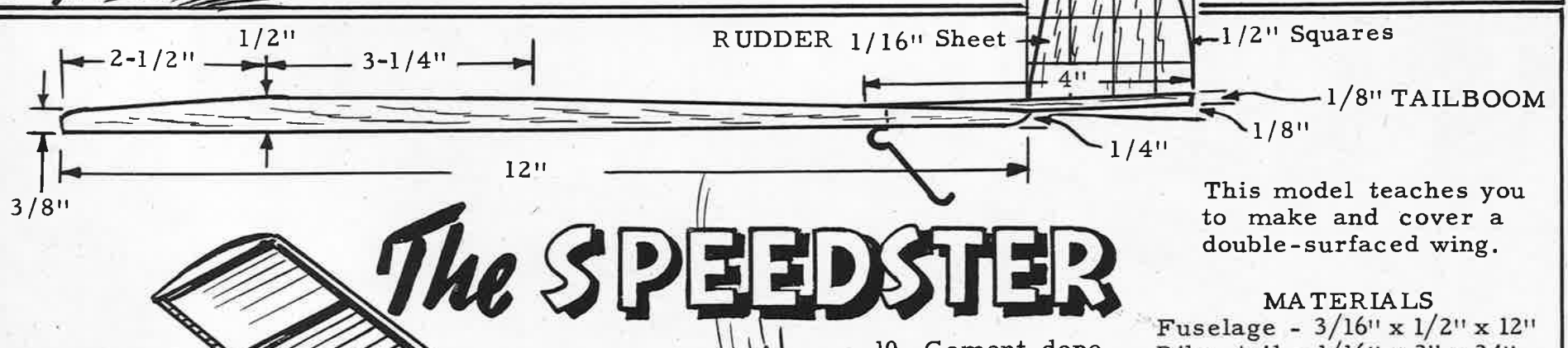


7. To Fly: Release prop first, give plane gentle push, nose slightly up. Don't throw hard.



8. If plane stalls - B - slide wing 1/2" toward tail. If it dives - C - move forward. Be sure wing has no negative incidence. Adjust for course A.

9. Rule squares on paper. Sketch, cut out and trace on wood.



The SPEEDSTER

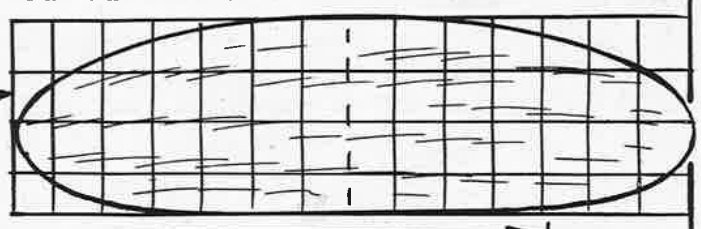
This model teaches you to make and cover a double-surfaced wing.

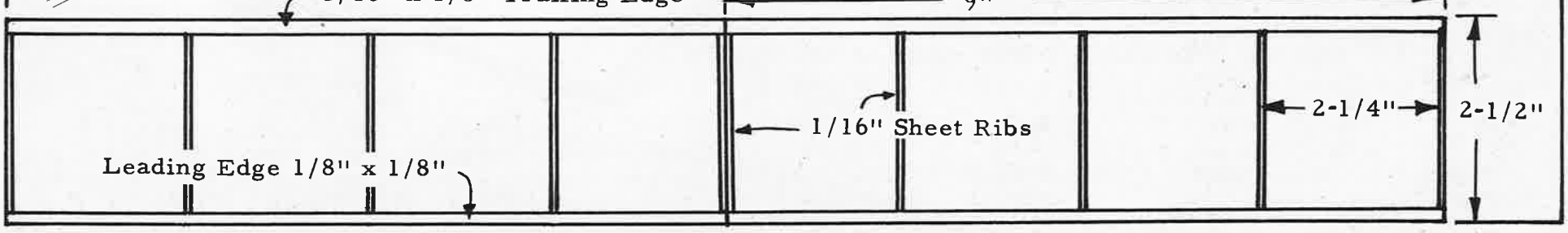
MATERIALS
Fuselage - 3/16" x 1/2" x 12"
Ribs, tail - 1/16" x 2" x 24"
Wing spar - 1/16" x 1/8" x 18"
Wing spar - 1/8" x 1/8" x 18"

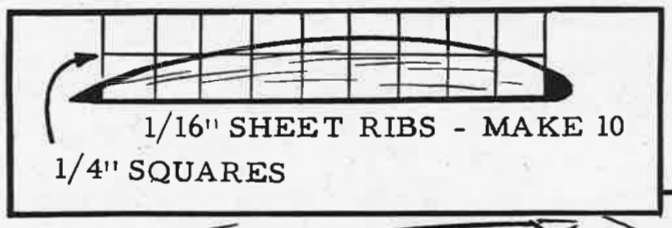


10. Cement, dope, tissue, 3/4" wheels, prop bearing, wire, rubber, 2 washers.

11. Draw squares on paper, sketch in tail outline, cut out paper, trace and cut out wood.







1. Rule 1/4" squares over 3/4" x 3" area of writing paper. Put dots where rib pattern crosses grid lines. Connect dots with smooth curve, sketching full size rib outline.



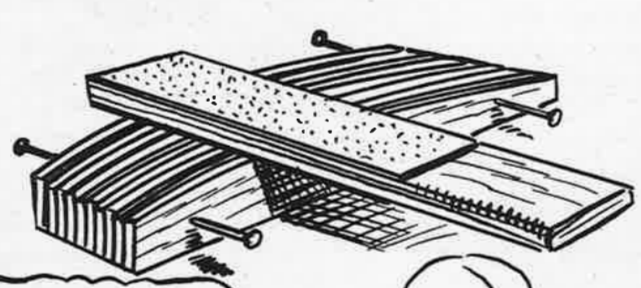
2. Blacken back side of pattern with pencil. Lay on sheet wood and trace with sharp pencil.

3. Use pointed razor to cut out ribs. Stay outside lines. Don't cut too close. Allow for sanding.

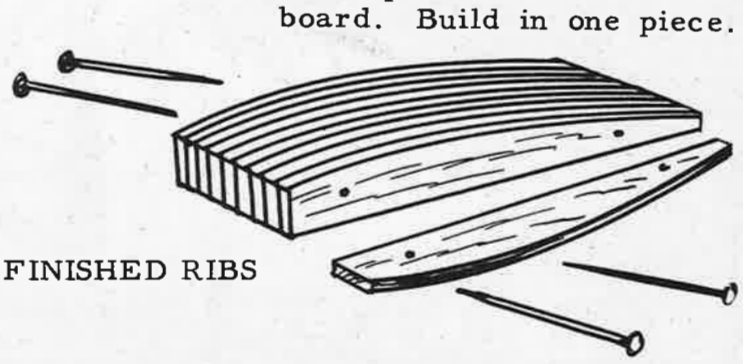
4. Cut 1st rib carefully. Use as pattern for others. See wing plan pg. 9. Draw full-size plan. Pin to work board. Build in one piece.

5. Pin rough cut ribs into "sandwich". Carefully sandpaper, making all bottoms flat, then hold flat on bench and sand top curve.

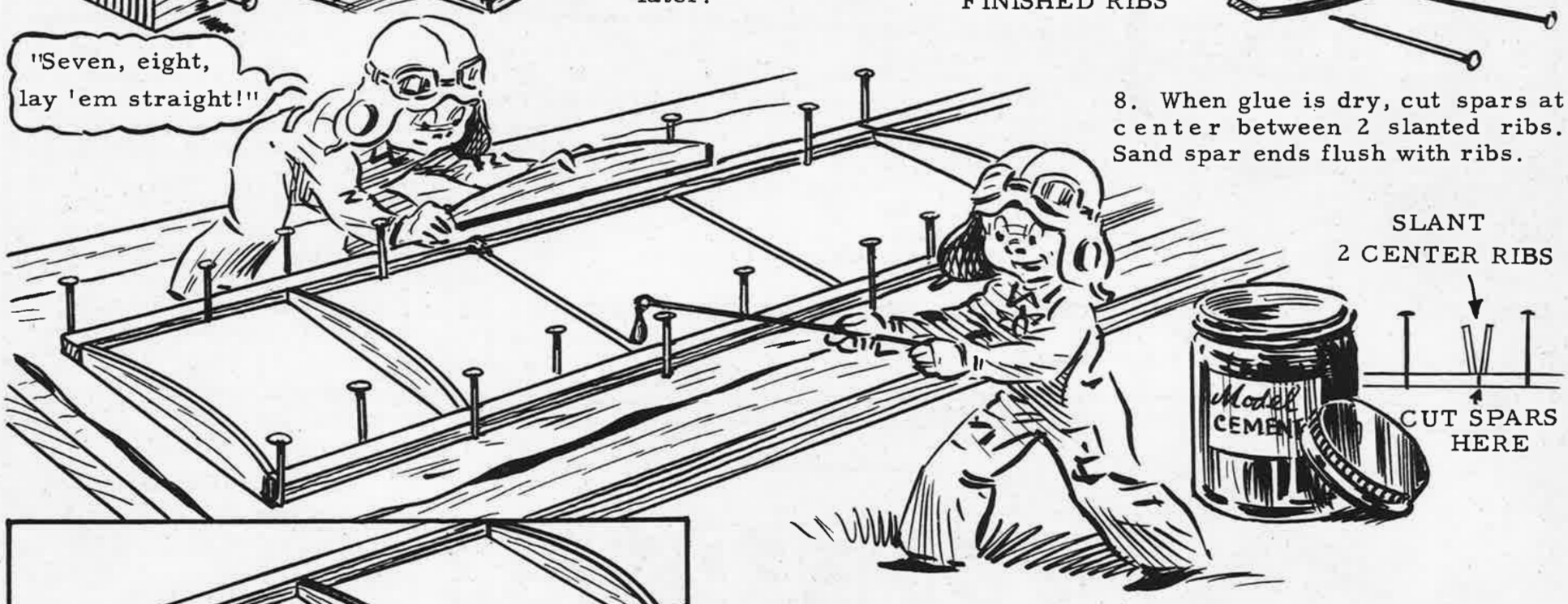
6. Pin leading edge spar to drawing, pin side of wood, not through it. Glue end ribs to leading edge.



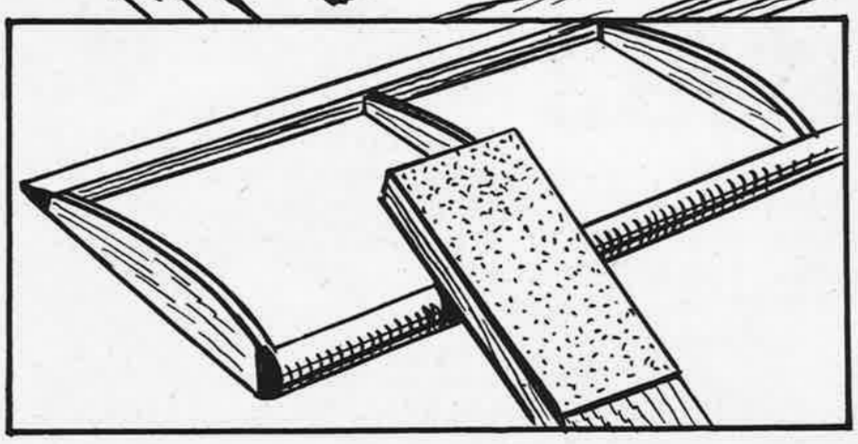
7. Glue and pin trailing edge spar in place. Add all ribs. Slant 2 center ribs like "V" to form dihedral later.



FINISHED RIBS

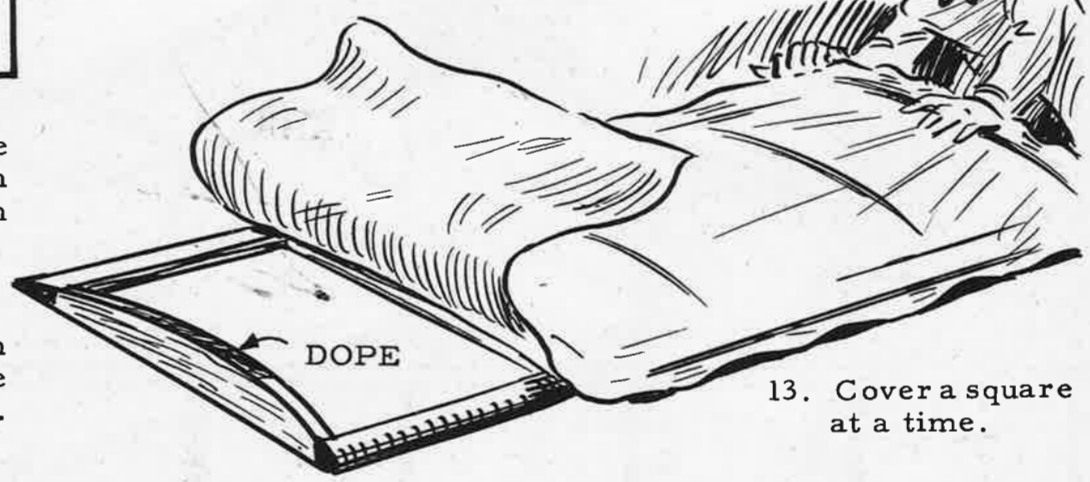


8. When glue is dry, cut spars at center between 2 slanted ribs. Sand spar ends flush with ribs.



9. Use sanding stick and round front of leading edge spar full length. Send trailing edge spar to wedge shape. This completes rib shape when viewed from end.





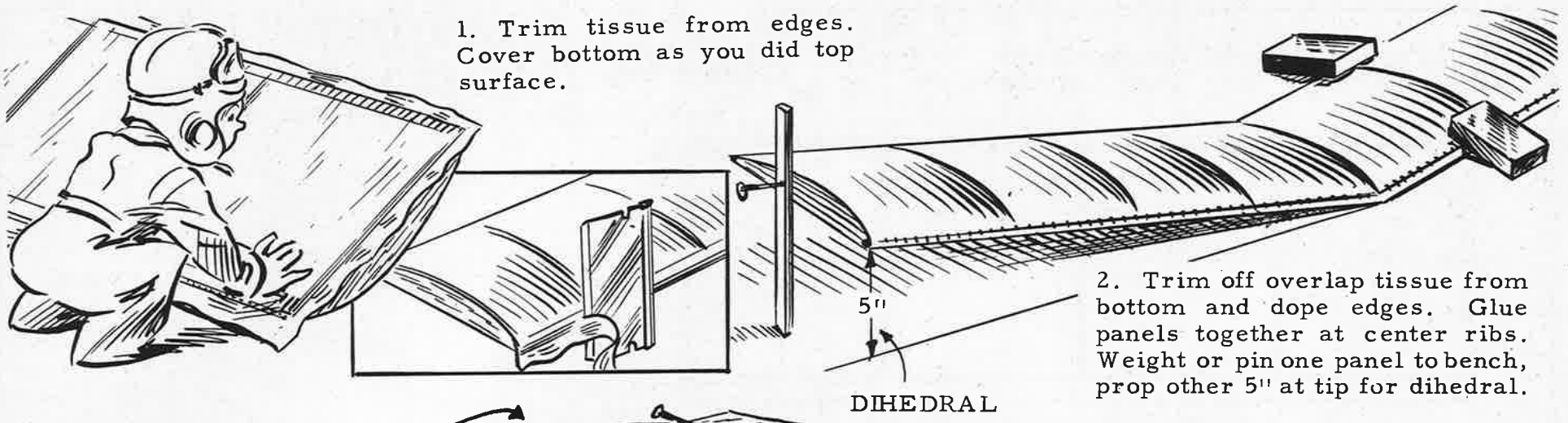
10. Cover 2 wing panels separately, top surface first. Cut tissue 1/2" larger on each side. Brush clear dope on top of one end rib. Lay paper in place. Press paper to doped rib. Let set.

11. Roll paper back from wood and brush dope on spars and next rib. Stretch paper back in place over all ribs, pressing it to frame where doped. Repeat this until all covered.

12. Paper will stick better if frame is doped before any covering is begun.

13. Cover a square at a time.

14. Pull paper tight from end, over ribs, not crosswise over leading and trailing edges. This keeps best airfoil shape.

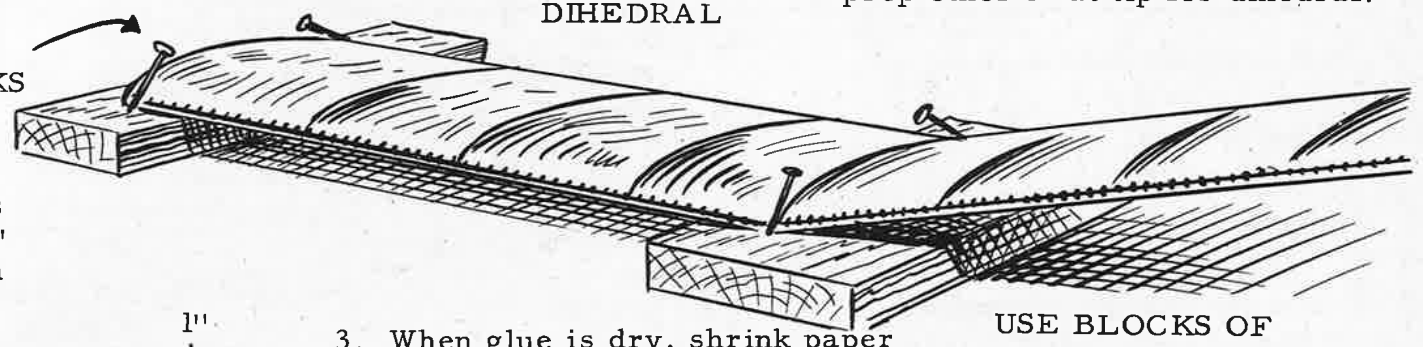


1. Trim tissue from edges. Cover bottom as you did top surface.

5"

DIHEDRAL

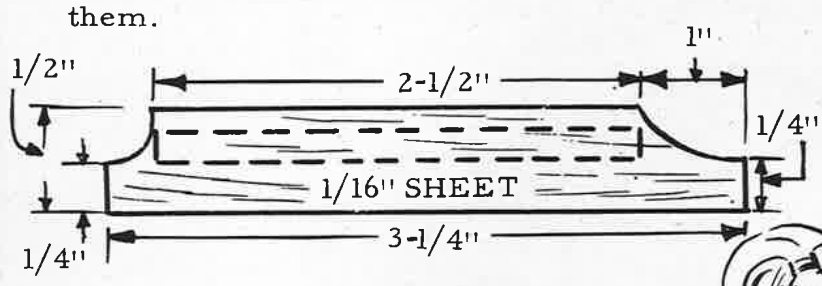
2. Trim off overlap tissue from bottom and dope edges. Glue panels together at center ribs. Weight or pin one panel to bench, prop other 5" at tip for dihedral.



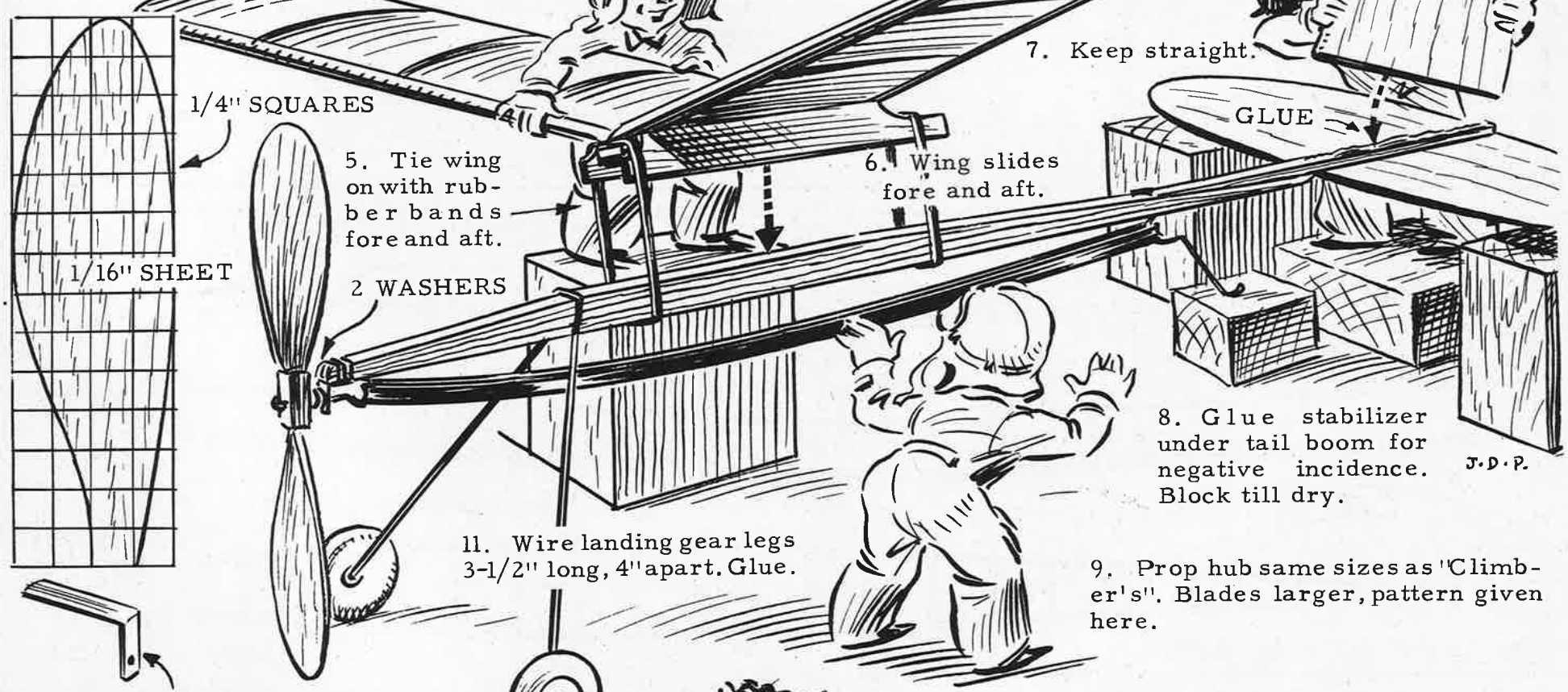
DAMP WING PANEL PINNED DOWN ON BLOCKS SO BOTTOM SURFACE WILL DRY

USE BLOCKS OF SAME THICKNESS

4. Wing Mount. Cut 2 pieces to sizes shown. Glue 3/16" motor stick wood between them.



3. When glue is dry, shrink paper tight with water. Apply with brush, cotton or spray. Do top and bottom of one panel. Let dry. Then wet other panel. Pin to boards while drying so it can't warp.



1/4" SQUARES

1/16" SHEET

5. Tie wing on with rubber bands fore and aft.

2 WASHERS

6. Wing slides fore and aft.

7. Keep straight.

GLUE

8. Glue stabilizer under tail boom for negative incidence. Block till dry.

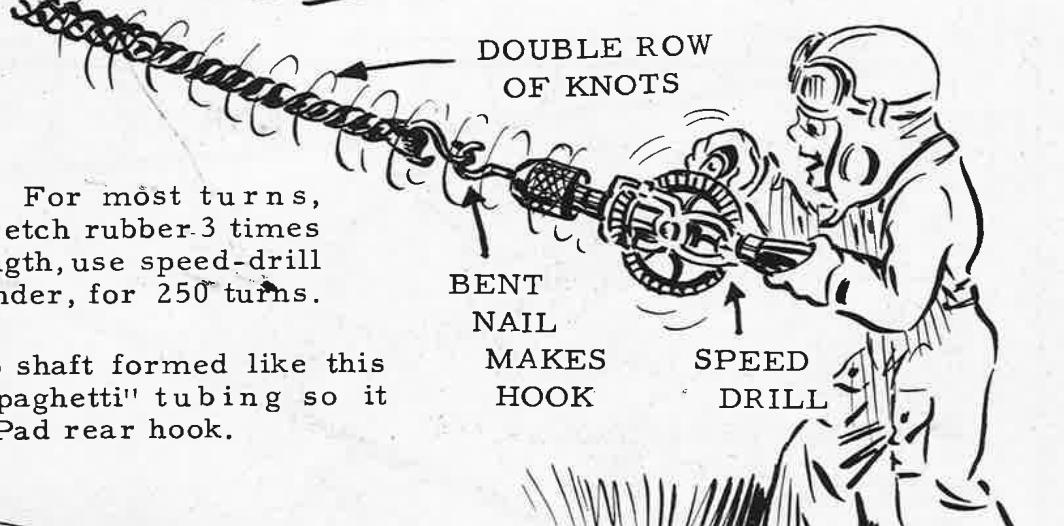
J.D.P.

11. Wire landing gear legs 3-1/2" long, 4" apart. Glue.

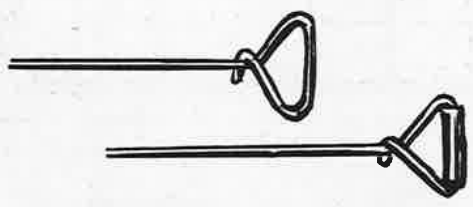
9. Prop hub same sizes as "Climber's". Blades larger, pattern given here.

READY MADE

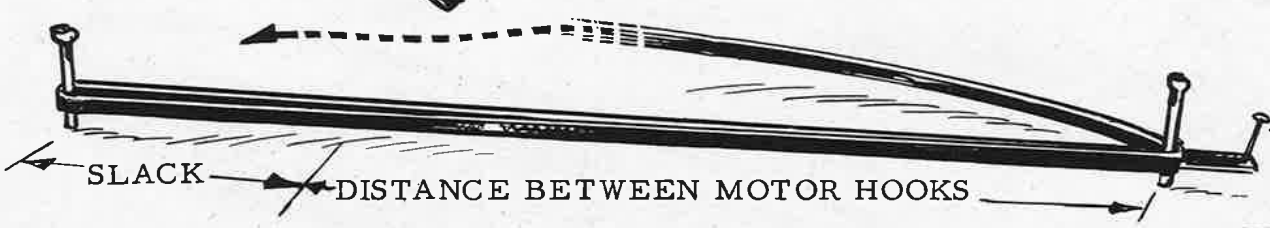
10. Bend prop bearing from music wire or buy ready made.



12. For most turns, stretch rubber 3 times length, use speed-drill winder, for 250 turns.



13. Music wire prop shaft formed like this then padded with "spaghetti" tubing so it doesn't cut rubber. Pad rear hook.



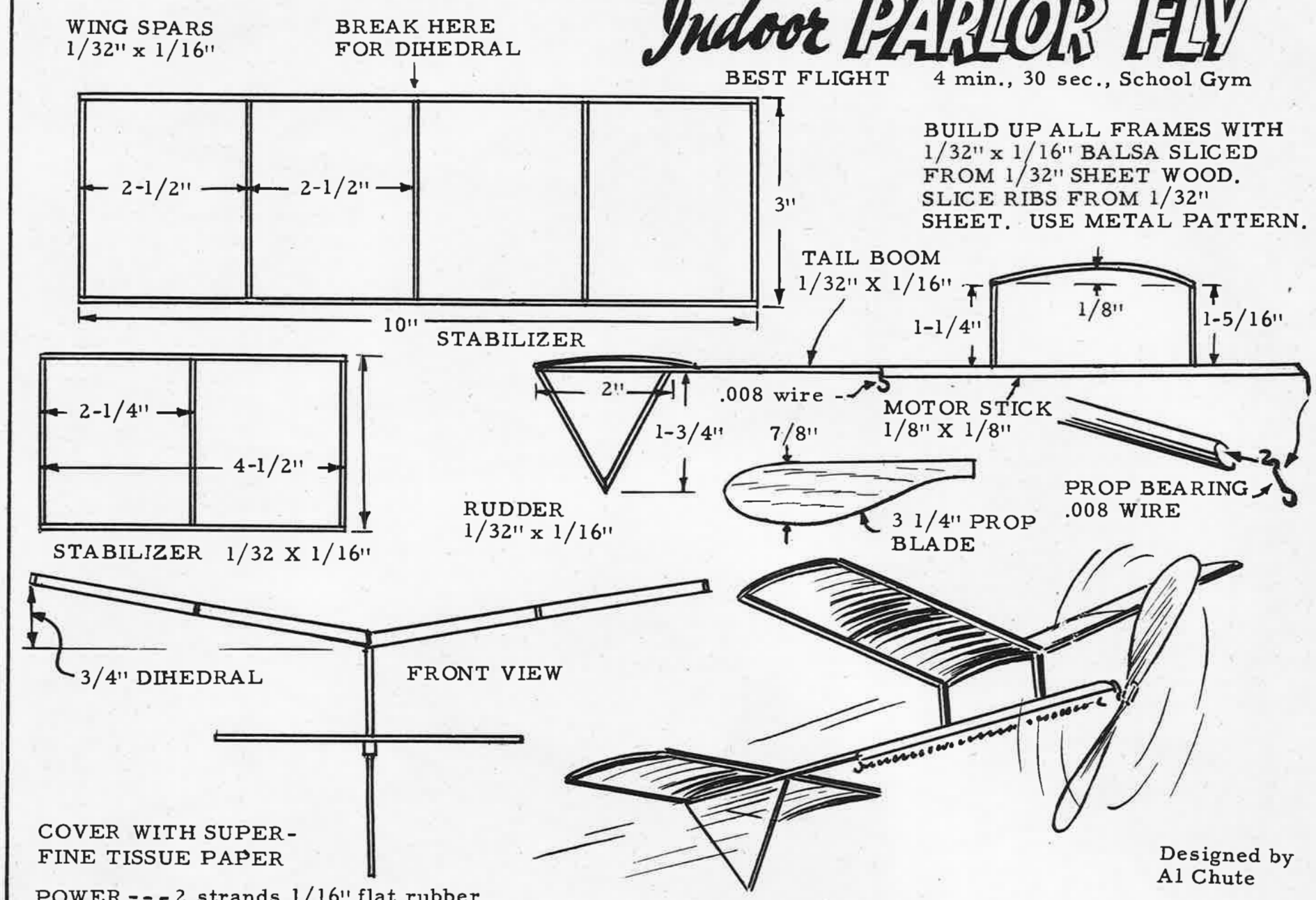
14. Rubber is not tight between hooks. Allow 1/3 more slack on big models. Loop rubber around nails to make motor. Use 4 strands. One loop is 2 strands.

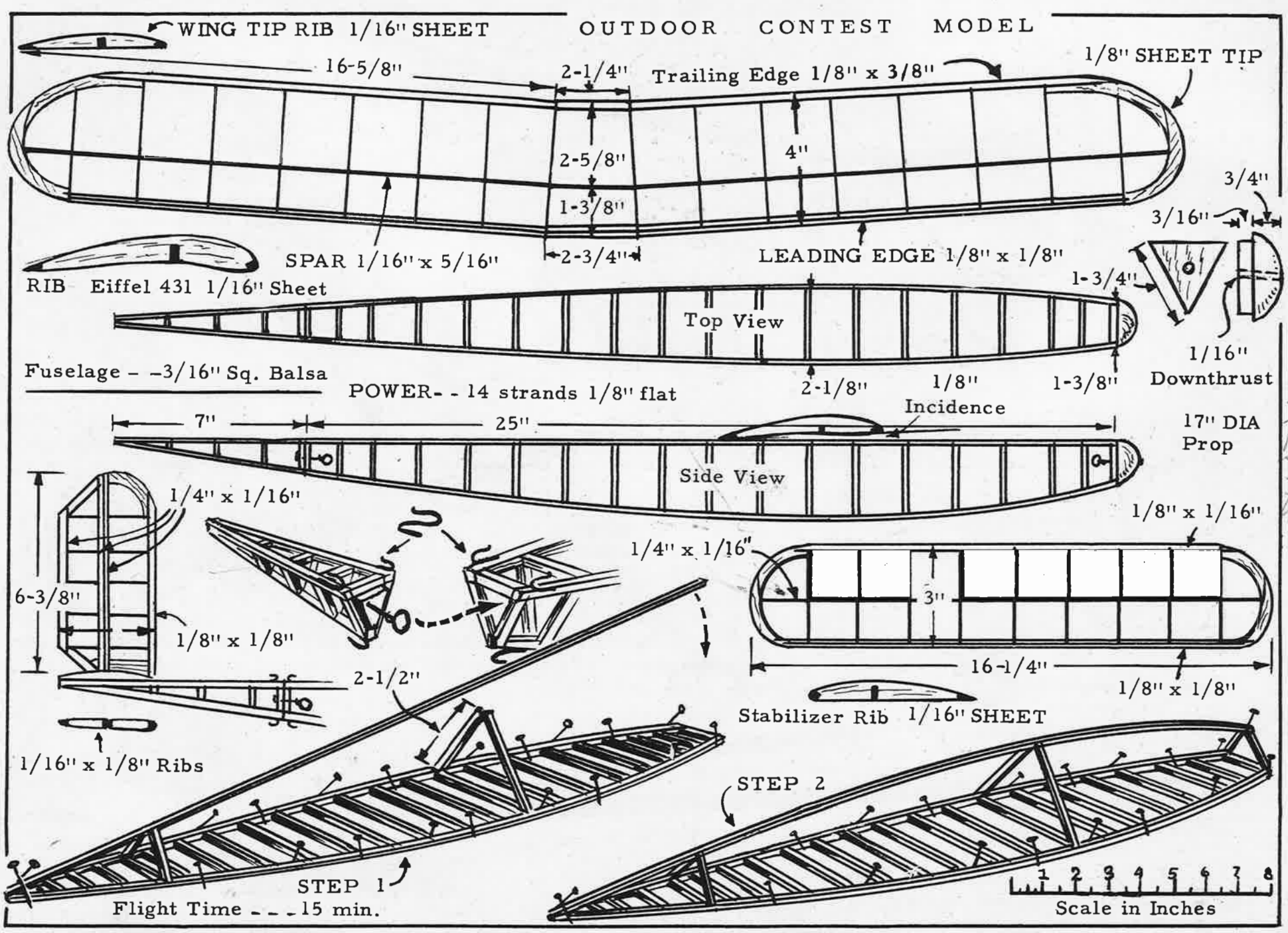


15. Tie strands to hooks with pieces of rubber band.

Indoor PARLOR FLY

BEST FLIGHT 4 min., 30 sec., School Gym





The CABIN TRAINER

RUDDER 1/16" SHEET BALSA

1/16" NEGATIVE INCIDENCE

1/16" SHEET TIPS

0 1" 2" 3" 4"

SCALE FOR FUSELAGE WING & TAIL SURFACES

FORMER B-1/16" SHEET

FORMER F-1/16" SHEET

1/16" SQUARE

DOWEL

D

A

E

C

B

1/16" SQUARE

FUSELAGE 1/16" SHEET

DON'T COVER BOTTOM HERE

1/16" SQUARE

FORMER D-1/16" SHEET

FORMER C-1/16" SHEET

1/16" X 1/8"

1/16" SQ.

FORMER A 1/16" SHEET

STABILIZER 1/16" SHEET

Hold Wing on with rubber band around dowel and over hooks in cabin.

5"

Draw full size plan of wing and build over it.

1/16" X 3/16"

First make this -- Glue Sides to it.

FORMER E 1/16" SHEET

1/16" X 3/16"

RIBS 1/16" SHEET MAKE 11

0 1" 2" 3"

Scale for ribs and formers only.

1/16" SHEET

STEP 1

STEP 2

1/16" X 1/8"

BENT PIN

1/16" DOWEL

STEP 3

1/16" X 2" Dowel

3"

CEMENT and BIND

4 1/2"

NOSE BLOCK FITS INTO "A"

USE 7" DIA. PROPELLER

POWER is 4 strands of 1/8" flat rubber wound 150 turns or 250 with winder.

DRAW LINES CORNER TO CORNER

MARK CENTER

SAW OUT BLANK

CARVE BACK FIRST

CARVE FRONT

SAND WELL ROUND TIPS

Hand carved props are best for contest flying. Pitch is set by block size. Carve to rough shape. Use wood rasp or sand sticks to finish. Balance carefully. Dope and polish

STEP 1 - Make "Crutch" of 1/8" x 1/4" Hard Balsa

1/4" x 3/8" x 7"

1/8" x 1/2" x 2" PINE

1/8" x 1/2"

FORMER #1
1/8" SHEET

1/8" SHEET

1/16" SHEET BACKBONE

STEEL WIRE HOOKS

RUDDER - 1/8" SHEET SOFT BALSA

ALUMINUM RUDDER TAB

STEEL WIRE HOOKS

END OF SHEET COVERING

1/16" SHEET PLANKING AT BOTTOM OF FUSELAGE

1/16" SHEET

1/16" SHEET SIDES

1/8" x 1/2" x 7/8"

FORMERS MAKE 16

FORMER #1 FIREWALL 1/8" PLYWOOD

LANDING GEAR

SUB-RUDDER 1/8" SHEET MAKE 2

STEP 2: ADD BACKBONE, PYLON AND FORMERS AT EACH SIDE OF BACKBONE. BACKBONE AND PYLON ARE BUILT FLAT AS ONE UNIT.

1/16" SHEET SIDES

RUDDER GOES BETWEEN TWO CENTER RIBS

FLAT

1/16" SHEET - BOTTOM ONLY

CRUTCH-MAKE OF 1/8" x 1/4" HARD BALSA

LEADING EDGE 3/8" x 1/4"

1/16" SHEET BRACES

1/16" SHEET BRACES

SPARS-- 1/8" x 1/8"

1/16" SHEET FLUSH WITH BOTTOM

1/16" SHEET

SPARS 1/8" x 1/8"

TRAILING EDGE 1/2" x 3/16"

TIP DIHEDRAL "BREAK"

1/8" SHEET TIPS

1/16" SHEET RIBS MAKE 26

TRAILING EDGE 1/2" x 3/16"

CENTER LINE OF WING

CENTERLINE OF STABILIZER

1-7/8"

AFTER GLUING IN DIHEDRAL, BRACE JOINTS WITH 1/16" SHEETS AS ON PLAN. THESE ARE GUSSETS.

DIHEDRAL LAYOUT

3/4"

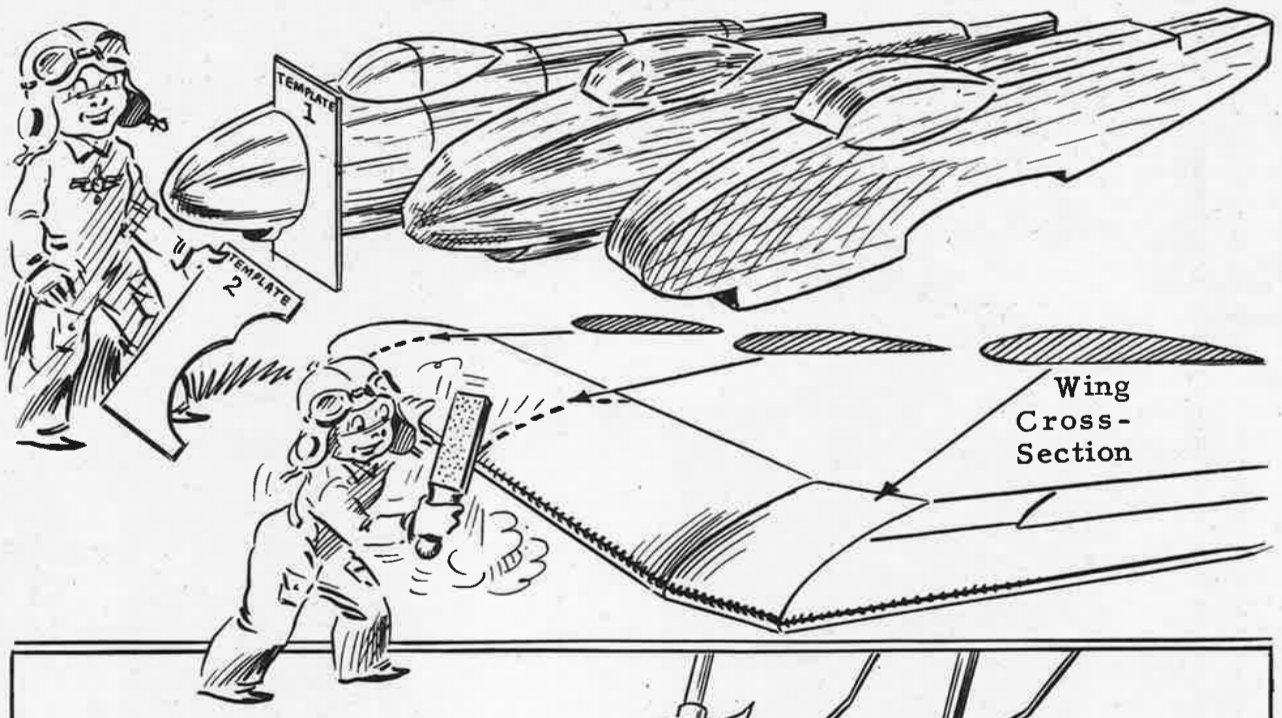
J.D.P.

COVER ENTIRE FRONT OF FUSELAGE WITH 1/16" SHEET BALSA. COVER REMAINDER WITH TISSUE PAPER

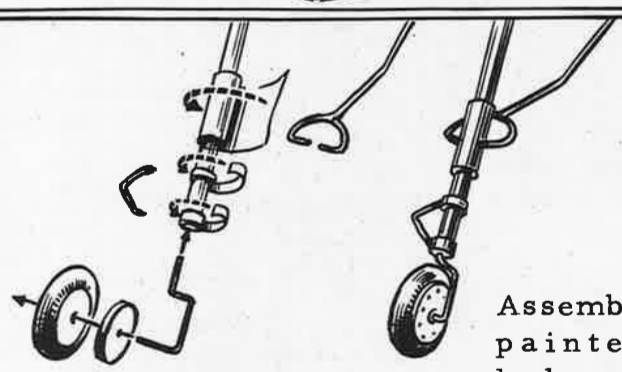
½A GAS JOB

SCALE IN INCHES

0 1 2 3 4 5 6 7 8 9 10 11 12



Wrap silkspan paper, cut to proper width around wood dowel to form shock absorber. Wood disc glued to wheel makesbrake drum. Soft wire finishes strut work.



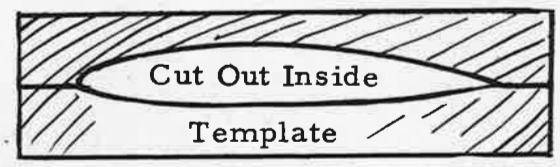
Assembled and painted strut looks real.

SOLID MODELS

Saw out rough outlines, whittle to general form & sandpaper. Cut TEMPLATE pattern from light cardboard. Check fuselage shape by holding pattern to it, sighting from end to check high spots. Use various patterns at 4 or 5 points along fuselage.

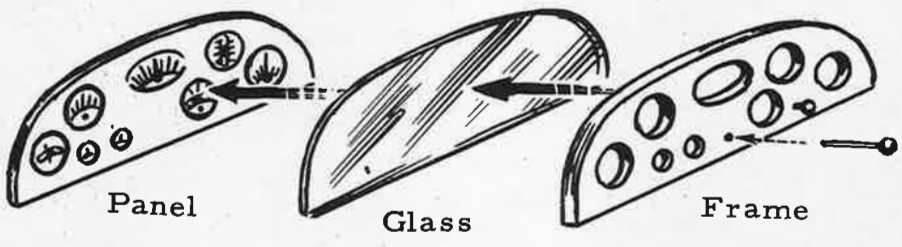


This airfoil is poorly formed. Trailing edge too thick. Doesn't fit pattern. More sanding needed.



SHAPING WINGS

Real plane wings are bluntly rounded at front, tapered sharply to a knife-edge at rear or trailing edge. From wing plan make drawing of airfoil cross-section then cut out template. Sand wing until it fits smoothly inside pattern.

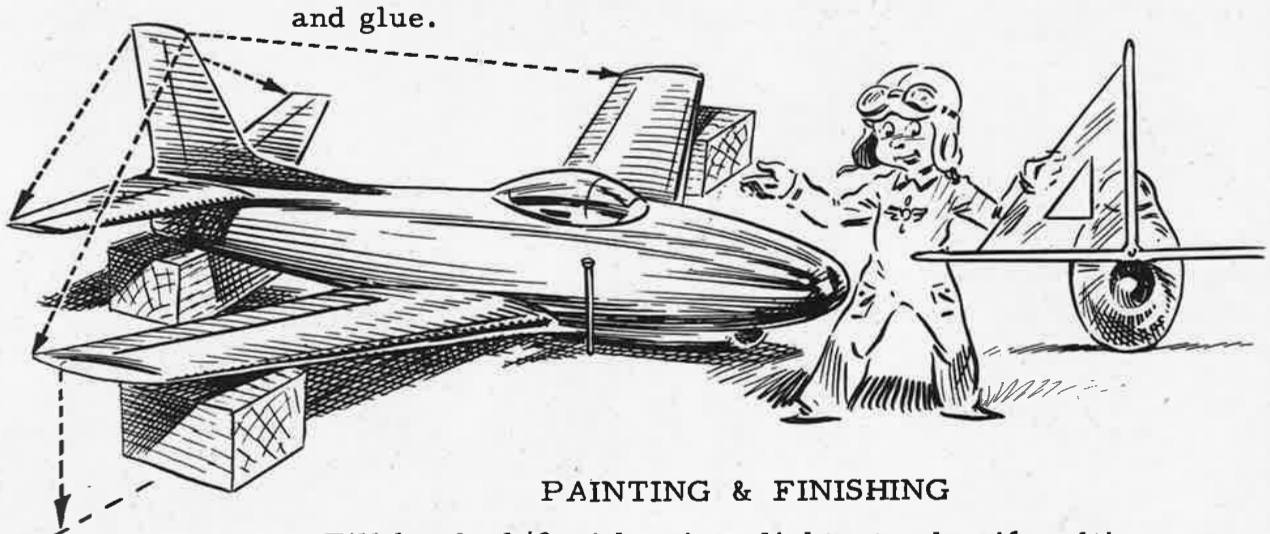


GLASS COVERED INSTRUMENT PANEL

Get photos of panel you will make. Draw or cut out instruments from magazine pictures. Shape sheet wood of proper thickness; mark dial sizes and locations on it. Drill hole for each. Sand both sides smooth. Cut heavy paper to panel size and glue instruments to it in proper position to line up with holes. Sandwich together with clear plastic in between and glue.

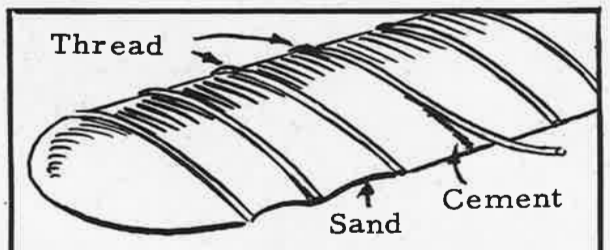
LINE-UP SURFACES

Well-sanded parts put crookedly in place spoil an otherwise fine model. Use care in assembly. Measure with ruler or string between points on rudder, wingtips, and elevator tips as shown right, to get true assembly. Do this while glue is soft, Block parts to true position. Don't move until thoroughly dry.

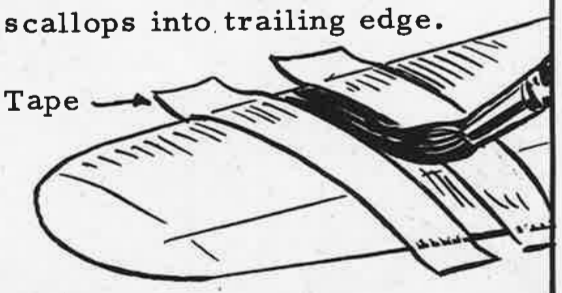


PAINTING & FINISHING

Fill bottle 1/3 with paint, lightest color if multi-colored model. Add 1/3 sanding sealer and 1/3 talcum powder. Do not mix until powder is measured, then stir thoroughly. Give model several coats, sanding between each when thoroughly dry.



Wrap thread or fish line around sheet balsa wing, cover with tissue, to duplicate ribs. Sand scallops into trailing edge.



Use masking tape to get neat lines between twc colors.

Thick mixture of talcum and paint is used for fillet. Build up fillets a little at a time, drying between. One large fillet will crack when drying.

Silkspan paper may be put over sheet wood models to fill pores. Apply several coats of paint. Sand lightly between each. Sand marks of overlapping paper.

Apply more color or clear dope and final coat of paint. Sand lightly if runs appear. Leave details off till polished.

Final finish is rub-down with wax. Use Simonize rubbing compound briskly but lightly. Rub out brush marks, not too long in one place. Have patience. IT PAYS.



Prop Layout

Square Section

Finished Prop
1 Right
1 Left

Warping wings' outer rear corners through Cables A & B made plane bank. Tilting elevators made climb or decent.

Wright Bros. Airfoil

Ref. Line

Spars

9 deg incidence

Tip interplane struts not cross-braced. (Wires A)

Wires E

Cables A & B

Wires A

Wire B

Wires F

Pulleys

Wires A

Wires C

Sprocket

Wires K

Wires G

Cable A

Strut A

Wires A

Wire J

Endless Chain

Strut C

Wires L

Strut B

Wires D

Chain Guard

Wires H

Wires P

Elevator Cables

Shaft A

center line

Strut F

Warping Control

Elevator Control

Wires A

Sprockets

Pipe B

Pipe A

Strut D

Control Cradle

Cable B

Shaft B

Foot Rest

Rudder Cables

Q

Solid Drive Shaft

Lock-nut & plate

Drive Shaft Housing

Gas Tank

Cable A

Hinge

Rear spars hinged here to permit warping effect.
rudders linked to warping controls

Ribs

Control cables omitted this side of wing

Brace wires omitted this side of wing

Sprocket 12" Dia

Strut E

Strut A

Elevator Planes

Shaft A

Strut D

Water Radiator

Gas Line

Shaft B

Gas Tank

Chain Guard & Brace

Endless Chain

Cable B

Pulley

Cable A

Pulley

Wire M

Tip interplane struts not cross-braced. (Wires A)

Rear cross-brace wires different than front.

Cable A

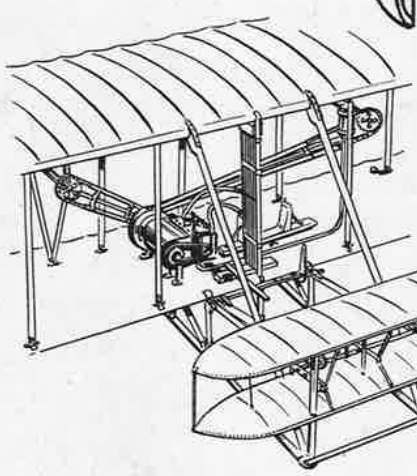
Cable B

Rear brace wires not like front

Rigging Diagram

Strut Fitting

Struts - Rectangular with corners rounded.



Engine: 4 cylinder, water cooled, made by Wrights, rated 12 h.p. at 1205 rpm mounted on side, drove 2 propellers 8 ft. dia. in opposite direction at 356 rpm.

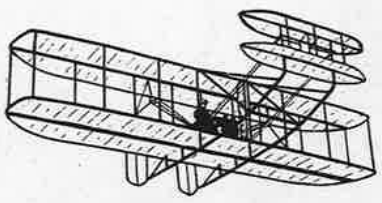
Cable A

Cable B

Pulley

To Rudder

Control Cable Diagram



All ribs, spars, struts & Frame were spruce & ash wood, unfinished, natural color. Wing covering was unbleached muslin, undoped, buff color, on bottom & top surface of both wings. All wires & fittings were steel.

REAR - RUDDER

Laminated Clear Spruce Propeller

FRONT - ELEVATOR

Pulley

Gas Tank

Radiator

Gas Line

A

Thrust Line

Wires N

Pipe A

Wires Q

Pipe B

Strut D

Strut F

Foot Rest

Wires O

L

Wires P

Elevator Cables

Flywheel

Rudder Cables

Pilot lay prone in hip cradle, operated wing warping controls by shifting hips side to side.

0 1 2 3 6 9 12

Scale in Feet

General Lay-out WRIGHT BROTHERS Original "Flier" Kitty Hawk Biplane which made first successful powered flight Dec. 17, 1903 at Kitty Hawk, N. C. Built by Orville & Wilbur Wright in Dayton, O.