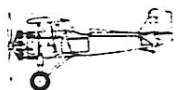
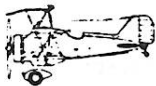


Curtiss R3C-1 (F3C-1)



Curtiss F7C-1



Curtiss F9C-2



Wright NW-1



Vought FU-1



Atlantic XFA-1

# MAX - FAX

THE NEWSLETTER OF THE D.C. MAXCUTERS

MARCH/APRIL 1985

## MEMBERSHIP

Dues for membership in the D.C. Maxcuters is \$10.00 per year for residents of the U.S.A., Canada, and Mexico, and \$11.00 for all other countries. Your mailing label indicates the year and month of the last issue of MAX-FAX for your current membership. A red mark in the box below is a reminder that your current membership is nearing its end. Send a check, payable to D.C. Maxcuters, to the Treasurer.

DUES REMINDER



## PRESIDENT

TOM SCHMITT  
11014 Marcliff Road  
Rockville, MD 20852

## SECRETARY

BILL POOLE  
9301 Lynmont Dr.  
Adelphia MD. 20783

## TREASURER AND NEWSLETTER EDITOR

ALLAN SCHANZLE  
20008 Spur Hill Dr.  
Gaithersburg, MD 20879

## MEETINGS

The D.C. Maxcuters hold meetings on the first Wednesday of every month at the College Park Airport, the oldest continuously operating airport in the world.

## UPCOMING EVENTS

- MARCH 2: INDOOR FLYING AT RANDOLPH JR. H.S. 3:00 to 6:00 PM  
IS UNCERTAIN - PLEASE CHECK WITH TOM SCHMITT - 530-0327.
- MARCH 16: INDOOR FLYING AT RANDOLPH JR. H.S. CANCELLED -  
FLYING SESSION WILL BE HELD THE SAME DATE AT  
PEARY H.S. FROM 2:00 to 5:00 PM. NOTE TIME CHANGE.
- MARCH 24: INDOOR FUN FLY RESCHEDULED AT U.S. NAVAL ACADEMY FIELD HOUSE  
10:00 AM to 5:00 PM. PLEASE CONTACT TOM SCHMITT (301) 530-0327  
FOR CONFIRMATION.
- MARCH 29 INDOOR FLYING AT W. JOHNSON H.S., 7:00-10:00 PM
- APRIL 12 INDOOR FLYING AT W. JOHNSON H.S., 7:00-10:00 PM
- APRIL 19 INDOOR FLYING AT W. JOHNSON H.S., 7:00-10:00 PM
- MAY 10: CO<sub>2</sub> SCALE MASS LAUNCH AT COMSAT.
- JUNE 14: 20" PACIFIC ACE MASS LAUNCH AT COMSAT.
- JULY 12: H.L. GLIDER AND P-30 AT COMSAT.
- AUGUST 9: WW-I AND WW-II MASS LAUNCH AT COMSAT.
- SEPT. 7: SUMMER FUN FLY AT COMSAT.

CLUB NEWS  
ALLAN SCHANZLE

THERE'S NO WAY to express our regret that the Annapolis contest on January 13 was cancelled at the last minute. Tom Schmitt contacted everyone we thought would attend but we know we missed a few. Our apologies to those of you who unknowingly made the sojourn. Check Tom's report in this issue.

THE MARCH/APRIL 1984 issue of MAX-FAX had as its feature plan a model of the Sparrowhawk F9C-2. At that time we failed to point out that a color 5 view of this plane appeared in the February 1969 issue of American Aircraft Modeler.

THE FRIENDLY POSTPERSON brought a note from Ernie Wisley (10065 E. Glendon Cr., Santee CA, 92071) that he has the Profile publication (#187) on the Junkers monoplanes, which includes the D-1 which we featured in the Nov/Dec 1984 issue of MAX FAX. He is willing to copy pages for cost and postage. Thanks for the kind offer Ernie, because I know of several people who have expressed an interest in an enlarged version of the D-1.

WHILE WE'RE ON the subject of the D-1, let me comment on its flying ability. The initial tests were made last fall at our COMSAT field, and the model is really quite a good flyer. However, the wing on my version was built too light (the plans were beefed-up) and there are substantial warps that just don't allow the model to be flown indoors. But outdoors, it could be a real contender.

ONE OF OUR Canadian contingent, Peter Mann (36 Sydenham St., Guelph, Ontario, Canada, N1H 2W4) wrote to convey some information about my comment in the last issue about the Hell13 (alias He100) being a legitimate WW-II combat aircraft. He conjectures that if these planes did indeed get into the WW-II fracas, it was most likely in the defense of the main Heinkel factory at Rostock-Marienehe.

SOMETIMES YOUR EDITOR fails to express his appreciation to those of you who make the job of putting together this bi-monthly trashwrapper a "non-job". For those who have played the role of newsletter editor, I'm sure you know what I mean. In many cases, the entire job may have fallen solely upon your shoulders, and that's when being an editor is less than enjoyable. You do it purely out of love for modeling - an attempt to make a contribution to a hobby that has given you so much in return.

But then, if you're lucky, others begin to make contributions upon your request. You then become a true editor; a manager if you will. Once you reach this plateau, things begin to happen, almost automatically. Complimentary notes accompany subscription renewals. Even financial donations. Membership size increases, seemingly without bound, although you know there are a finite number of rubber scale enthusiasts around the world.

And then it happens. People begin to offer material for publication in your product. You read it, perhaps change it a little, and sometimes you even have to reject it on the grounds that it is totally unreadable, or perhaps, in your opinion, the technical content came right off the barnyard floor. Making such decisions can cause your mood to traverse from exhilaration to depression. Let me digress from the main theme of this newsletter and give you an example.

I don't ever remember meeting Joe Wachter, a member of the Philadelphia SOTS Club. Perhaps we've brushed elbows at a contest or two, but such an occasion doesn't ring a bell. Recently, Joe has sent a substantial amount of information in the form of plans, photos, and documentation. Included was a set of original sketches of a dog he called OLD FAX, the Maxey Mutt. Unknown to Joe, these arrived the day after I had signed the euthanasia paper for my 13 year companion pooch, Cracker. The local COMSAT attendees will recall Cracker as the affectionate female K-9 that could be trusted to walk around, not over, our precious models. She followed me for every chase of a plane - tail wagging, ears pinned back, and just happy to be there. You could almost see a smile on her face. But, like all of us

sooner or later, she is now gone, and only fond memories will exist this coming spring when we return to COMSAT.

The voluntary contribution by Joe is just one example of why I continue to play the role of editor. Sure, I put the thing together, but others of you submit plans, articles, 3-views, and a multitude of other items. Somewhere in this issue you'll find the first sketch of OLD FAX. To Joe, and all the rest of you who help to make this newsletter a success, a hearty thank you.

THE FEATURE PLAN in this issue is another full size foldout of an Ansaldo SVA-5, by Pat Daily. You have to see this one to appreciate its detail and workmanship. Mark Fineman gives us some ideas on enlarging three views that should help make this task easier, and a brief antidote of post WW-I British humor was submitted by Frank Renaut. Tom Schmitt again gives us those lovely photos as well as a note on the availability of past issues of Historical Aviation Album. And finally, we continue with part 3 of the series from Sport Aviation on Stabilizers. Read on, and enjoy.

THOSE BLOODY CLEVER ENGLISH  
Frank Renaut

Here is a true story I cribbed from "The Aeroplane." I thought it worthy of repetition, slightly condensed.

Gang of workmen bricklaying a new building on RAF station after the war (refinements having been added to the Avro Anson), and the squadron leader takes them all for a ride in an Anson. Time to land, he can't get the bloody wheels to come down. Doesn't want to damage machine, because of trying to explain passenger list in the accident report. Cuts one engine, feathers prop., and uses starter motor to turn it horizontal. Makes most of approach on one engine, cuts the other, feathers prop. and uses starter to turn it horizontal. Makes deadstick landing on the bits of the wheels that protrude underneath; no damage!

ANNAPOLIS FUN-FLY POST-MORTEM  
Tom Schmitt

If the K.I.S.S. (Keep It Simple Stupid) principle is used we should say there was neither FUN nor FLY at the Naval Academy on 13 January. Much to our chagrin there was a late switch in athletic events which ousted our contest. Attempts were made to contact all potential attendees by phone. Unfortunately some were not informed including one new member all the way from Richmond. Please accept our regrets with hope it will not happen again. We are trying to re-schedule a winter/early spring indoor contest. If successful you should find an announcement in this Newsletter. If not, we hope you will make the journey to our summer contest. Until then, happy flying.

PEARY HIGH SCHOOL MINI-CONTEST												
JANUARY 26, 1985												
CONTEST RESULTS FOR FUN-1												
NAME	AIRCRAFT	ROUND ELIMINATED							PLACE			
		1	2	3	4	5	6	7				
RANDY KLEINBART	SE-5	X										1
ROLFE GREGORY	HIERWOOD											
BERT PHILLIPS	VELEZ			X								
DAN DRISCOLL	SE-5						X					3
BILL BELL	FINEMAN							X				
DON BRULL	FRANKEN								X			2
WILEY PRISSEL	FRANK									X		
KEVIN SHARBERG	DOUGLASS										X	
CONTEST RESULTS FOR PENNY PLANE												
NAME	AIRCRAFT	BEST TIME (S)	PLACE									
RANDY KLEINBART	No Non Cents	357	1									
ROLFE GREGORY	Penny Avenge	240	3									
DON BRULL	No Non Cents	304	3									
PAUL SPERBERG	CEBAR BANKS	109										
GLEN SIMPERS	No Non Cents	345	2									
BOB CARSTON	CANSON SPECIAL	261										
BILL CARKE	CEBAR BANKS	269										

U.

RANDOLPH JR. H.S. MINI-CONTEST												
FEBRUARY 9, 1985												
CONTEST RESULTS FOR GOLDEN AGE												
NAME	AIRCRAFT	ROUND ELIMINATED							PLACE			
		1	2	3	4	5	6	7				
CLAUDE ROWELL	PEE MATH						X					2
ALLAN SCHANZLE	TRUDER CUB											1
DAN DRISCOLL	PIPER J3							X				
BILL BELL	REARWIN								X			
MARIE YODER	REARWIN									X		
DOLE BUCHANAN	ASTRO										X	3
PAT DAILY	COMETS											
	MAJAN										X	
CONTEST RESULTS FOR NO-CAL												
NAME	AIRCRAFT	TOTAL TIME	PLACE									
DON BRULL	HUSTLER	296	1									
DAN DRISCOLL	DAYTON WRIGHT	68	3									
BILL BELL	CITABELA	73										
RANDY KLEINBART	CHAMBERLAIN	217	2									
PAT DAILY	SELMAN FSF	43										

PHOTO PAGES  
Tom Schmitt

1. The full size plan in this issue, a terrific CO<sub>2</sub> powered Ansaldo SVA-5 by Baron von Daily.
2. Craig Leszkiewicz's solution to a tough problem; detailing a Model A engine in a CO<sub>2</sub> powered Peck peanut Pietenpol. A description will appear in the next issue of MAX-FAX.
3. First flight by Pat's Ansaldo at Peary High School. The Baron is a brave man!
4. Kevin Sharbonda with his nifty F4B-4, another one of Joe Fitzgibbon's great Golden Age kits.
5. A "hole in one", "one point landing" or ----; the aftermath of Dudley Prisel's Bearcat's duel with the rafters at Peary, after a zero-lift terminal velocity dive the F8F found a soft spot in the floor - a crack!
6. Another Guillow kit masterpiece by Allan Schanzle, this time the Grumman Avenger in Midway time period colors and markings.
7. That dynamic duo Bert Phillips and his daughter Evelyn winding his Velez for the WWI mass launch event at Peary.
8. Doug Buchanan is a firm believer in camouflage. It was difficult to get a shot of his Cessna.
9. Mark Fineman enlarged Earl Stahl's XP-54 125% with very good results. The great photo is by Mark.
10. The winner of our WWI bash at Peary, Rolfe Gregory with a Nieuport 17, no less! Plan is available in the March/April 1982 issue of MAX-FAX. This dude really out-flew all the competition.
11. Bud Carson's "Carson Special" heads for Pennyplane Heaven during the Peary contest. I don't believe it ever came back.
12. Randy Kleinert should have received an award for persistence. He reassembled his SE5 at least twice before the WWI event. What did we do before Zap, Hot Stuff, etc.?
13. A neat model of the Bleriot canard held by a very pretty young lady, Nicole Blagg of England. Photo via Bill Hannan.
14. Bill Bell does build models other than Golden Age Kits, as witnessed by this Corben from, I believe, either a Comet or Megow plan.
15. This photo was promised in the Nov/Dec MAX-FAX. Bill Noonan's great shot at the FAC Nats IV of his Martin Kitten impacting his jumbo Fokker.

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HISTORIC AVIATION ALBUM AVAILABILITY  
Tom Schmitt

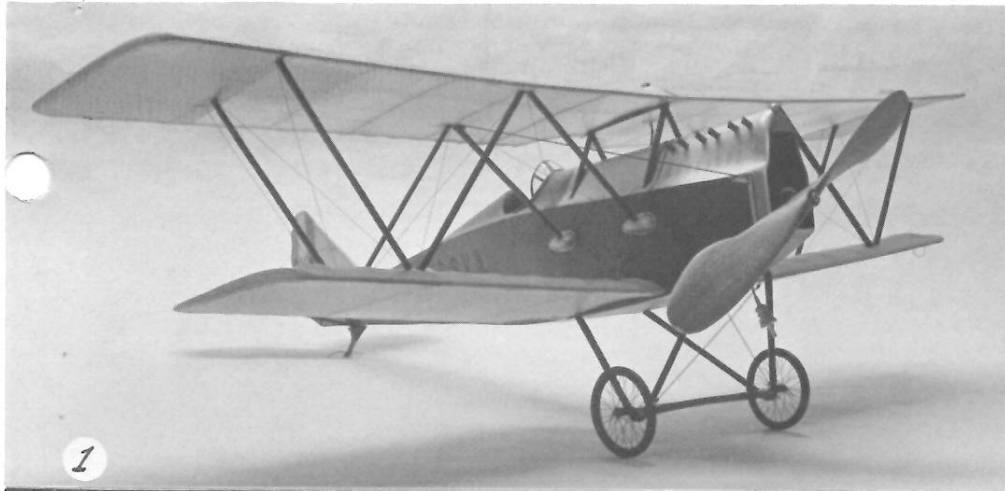
Several club members have expressed interest in obtaining back issues of Paul Matt's great publications, "Historic Aviation Albums." The following note was included in my package containing his latest issue, No. 17. It indicates the possible availability of back issues. It is worth a try for you anxious scale fans.

HISTORICAL AVIATION ALBUM  
Paul R. Matt  
P.O. Box 33  
Temple City, California 91780

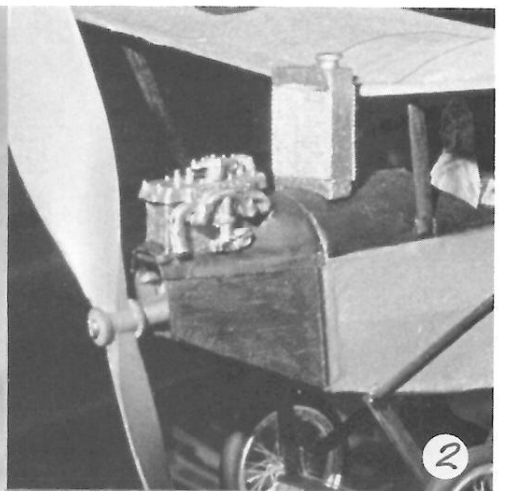
We uncovered a small cachet of early issues of Historical Aviation Album. All the books are clean and complete, some have slight smudges or cover scratches but most appear to have never even been looked at. We had to pay a premium for the batch but feel it was well worth it.

If you have any missing issues or lost any from your collection, send us your needs and we'll see if we can fill them. We'll send a quote, condition report and hold the volumes for a reasonable length of time under your name.

No dealers or wholesalers, please. There aren't that many.



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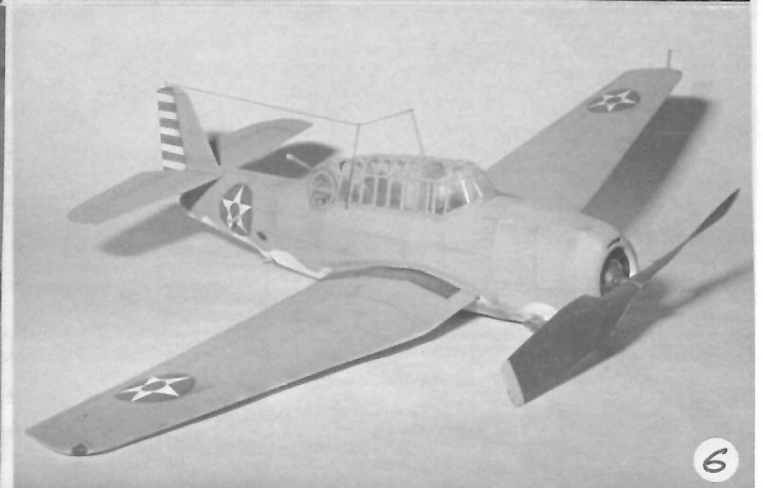
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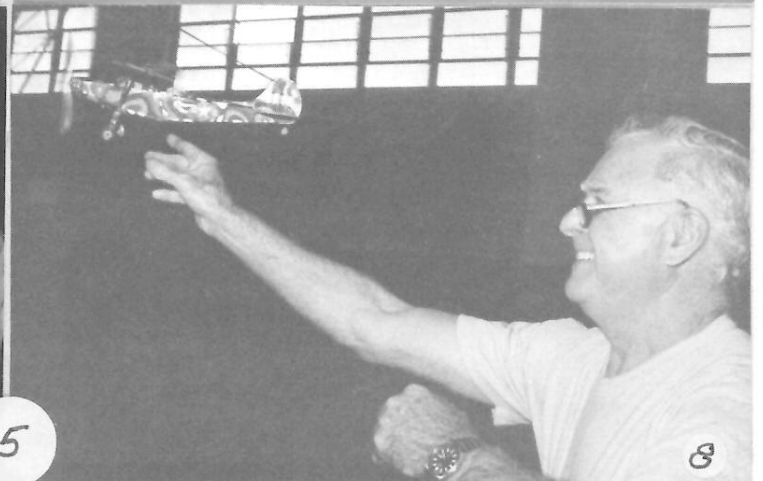
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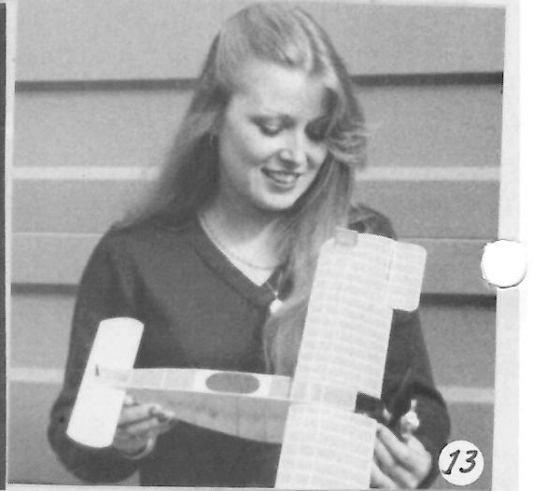
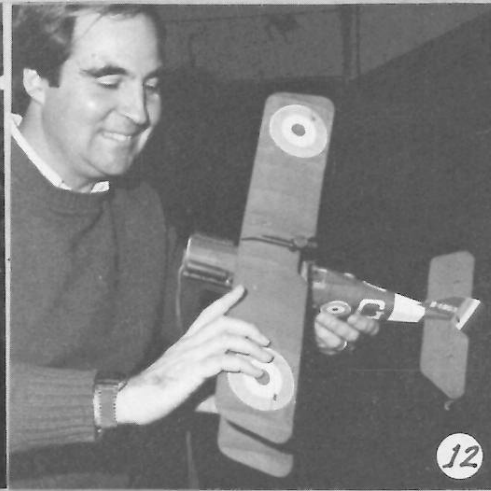
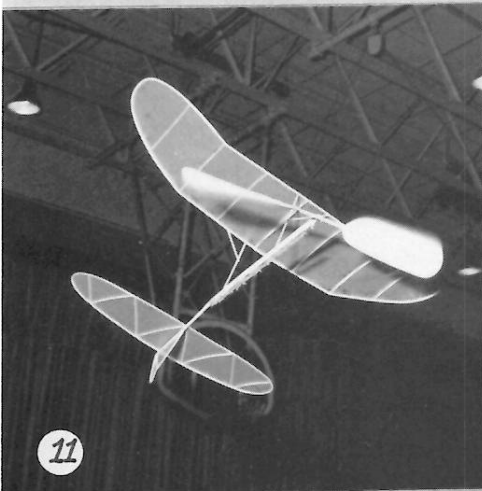
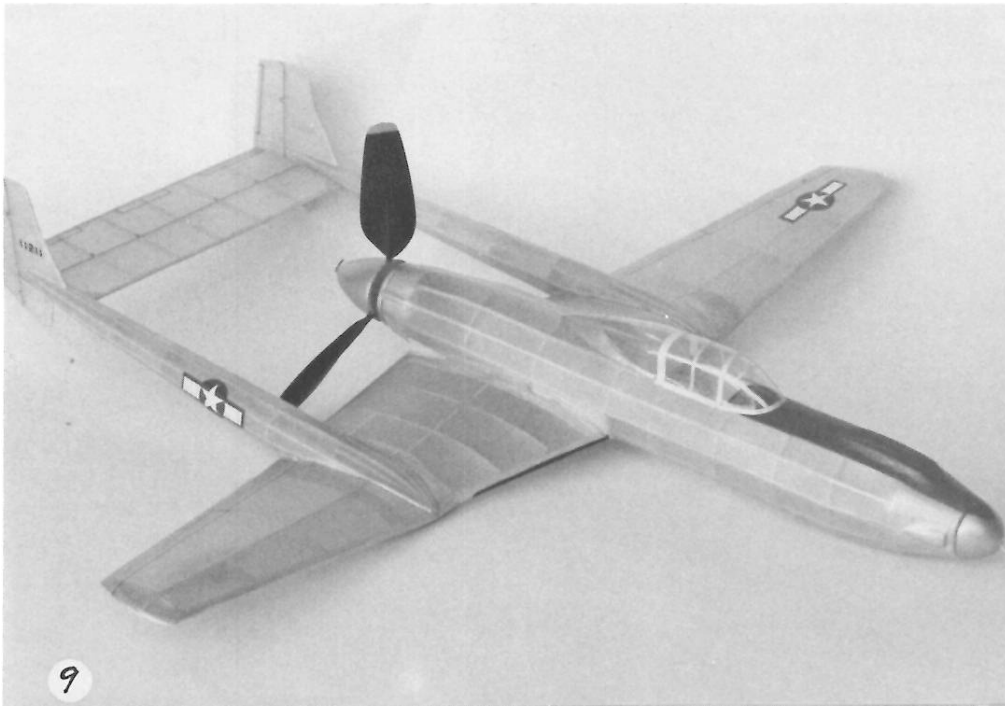


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ENLARGING AND REDUCING PLANS:  
A FAIRLY PAINLESS INTRODUCTION  
Mark Fineman

Like your beloved editor, Flash Schanzle, I too hate to draw up plans. Mind you, I'll do it under extreme duress, but I do find it dreadfully tedious. Therefore I've ferreted out anything that makes the task less hateful.

Let's start with a 3-view. How do you make it model size? I start by taking a photographic transparency of the original 3-view, which is then made into a slide. It happens that I have a special copy camera at work that makes the job easier and faster than with a 35 mm camera, but I've also done the slide copying with a small camera. If you use a small format camera, like the ubiquitous 35 mm single lens reflex, don't hold it by hand. Use a tripod or better yet, a copy stand and check to be sure the camera is set up at right angles to the artwork (this step is important but not critical). Also leave a little room along the borders of the picture to allow for eventual mounting of the slide. Snap your pictures, send them out for processing, and wait patiently for the slides.

When they arrive, set up a slide projector and project the desired 3-view onto a convenient wall. Instead of a screen, though, project the slide onto a large sheet of graph paper (available from art supply stores - quarter-inch squares are a good size). By moving the slide projector toward or away from the wall, you can make any size projection you desire. Use straight reference lines in the 3-view, like thrust lines or center lines, as a guide to maintaining perpendiculars within the projected picture. You may have to tilt the front, back or sides of the projector with small shims until everything lines up with the graph lines. As further insurance, copy only one wing and one stabilizer half on the graph paper. Later on you can make a tracing and flop it. This procedure insures that the flying surfaces are perfectly symmetrical. Once the projector is where you want it, DON'T TOUCH IT! Use standard drafting tools (a steel straight edge, french curves, and the like) to trace the projected drawing onto your graph paper. Don't worry too much about rough spots - you can refine the lines later on. This may also be a good time to calculate the stab area and trace an enlarged version, once the main drawings have been completed.

Armed with the basic drawing, you can then place it on a drawing board, cover with tracing paper and make up the model plan. Sorry, I can't tell you how to do that. Maybe some other time when I have a few dozen pages to fill.

This technique is also good for calculating markings. Take a transparency of the Profile, Karlstrom drawing, or whatever and project that onto the model plan. By carefully adjusting the position of the projector, you can more-or-less get the drawing of the marked aircraft to coincide with your plan. Now just make a tracing of markings, noting their position on the plan.

(A brief digression: It's interesting to see how little two or more of the views in a 3-view actually agree with one another. For example, it is common to find a front view that shows the plane to be wider than the top view! You'll have to sort these discrepancies out on your own. It also makes you wonder what the big deal is about having a 3-view for documenting a model. Lots of 3-views, even some drawn by the famous practitioners, are nothing short of loony upon close inspection.)

A variation on the slide technique is to make up an overhead transparency of the 3-view and project that. Many schools, offices, and even printing shops have facilities to make the larger type of transparency - it works just as well as the photographic slide.

In the last year or so I've also become interested in enlarging model plans. This started with a peanut Republic XP-47H by Pres Bruning (from MODEL BUILDER Magazine) that I wanted to enlarge to compete in indoor scale. At about this time I discovered that many copy shops have copying machines that can enlarge in certain fixed steps. My local shop had a machine that would blow up an original to 125% (that means 25% larger than the original) on 11 x 17 inch paper. The first pass brought the plan up to about 16 inch span. I then cut that enlargement in two and ran each piece through again at 125%. Now I had a plan of about 23 inch span. Surprisingly, only modest changes had to be made to the plan in order to beef up the structure.

This past summer Bob Schlosberg gave me a copy of a 175% Peck Prairie Bird. For some goofy reason I fell in love with it and built the crazy thing (a 30 inch span Prairie Bird, for gosh sakes). Again, little structural modification was called for. Since the entire plan is enlarged, the proper wood sizes are suggested directly on the new plan. I had the foresight to install a DT on the new ship, and it was lucky that I did. It has already maxed several times.

The final chapter in this saga was written just a few months ago. There is now a new generation of copying machine that has a feature called "zoom enlargement and reduction." This means that the copier will reduce the original artwork or plan to as little as 64% or increase it to as much as 154% in single percentage steps. I first saw this little beauty at our local copy shop. With this machine you can enlarge a plan to 119% if you wish or reduce it to 71%. This means that you can now make precise size changes from the original to the copy in single percentage steps! Let's see how this actually works: I took a plan of an Earl Stahl Blackburn Skua and decided to up it to Jumbo size. In order to bring it up to 36 inch span, I calculated an increase of 148% was required. We punched up the number on the machine, copied the original plan (four pages from AIR TRAILS), and I had an instant jumbo. It should be noted that with enlargements this great, there are limits to the size of the original artwork in order to get it all to fit on to the 11 x 17 paper. At 148% the original could not be larger than about 7.3 x 10 inches.

This machine also came in handy when I had to enlarge the tail surfaces on my recalcitrant Waco Coast Guard. I just ran the plan through the machine at a calculated enlargement (I think it was 115% - that's a 15% increase over the original) and I had a precisely proportioned enlargement of the original plan with which to work. I'm sure you can come up with your own clever ideas. How about making enlargements and reductions of your favorite airfoils? That has possibilities, no?

The particular machine that I have been using is a Toshiba 7815, which is fundamentally the same as their model 7816. I recently saw a commercial for a Cannon zoom copier, so I expect that there will be many on the market. Let me know if you think up additional applications.



ANSALDO SVA-5  
Cdr. Pat Daily, USN

In WWI the fastest fighters flew in the neighborhood of 115 mph - except for the Ansaldo Scouts which had top speeds in excess of 145 mph - that's quite a difference, even for 1918. This series of aircraft, starting with the SVA-1 and commencing with the SVA-10, were characterized by a beautifully streamlined fuselage that became triangular in section just aft of the cockpit. They were powered by S.P.A. 6-cylinder or Isotta-Fraschini engines of approximately 220 hp. This rugged plane probably would have been much more successful if doctrine involved diving attacks rather than tight-turning dogfights - for the Ansaldo had the speed to break off combat at will.

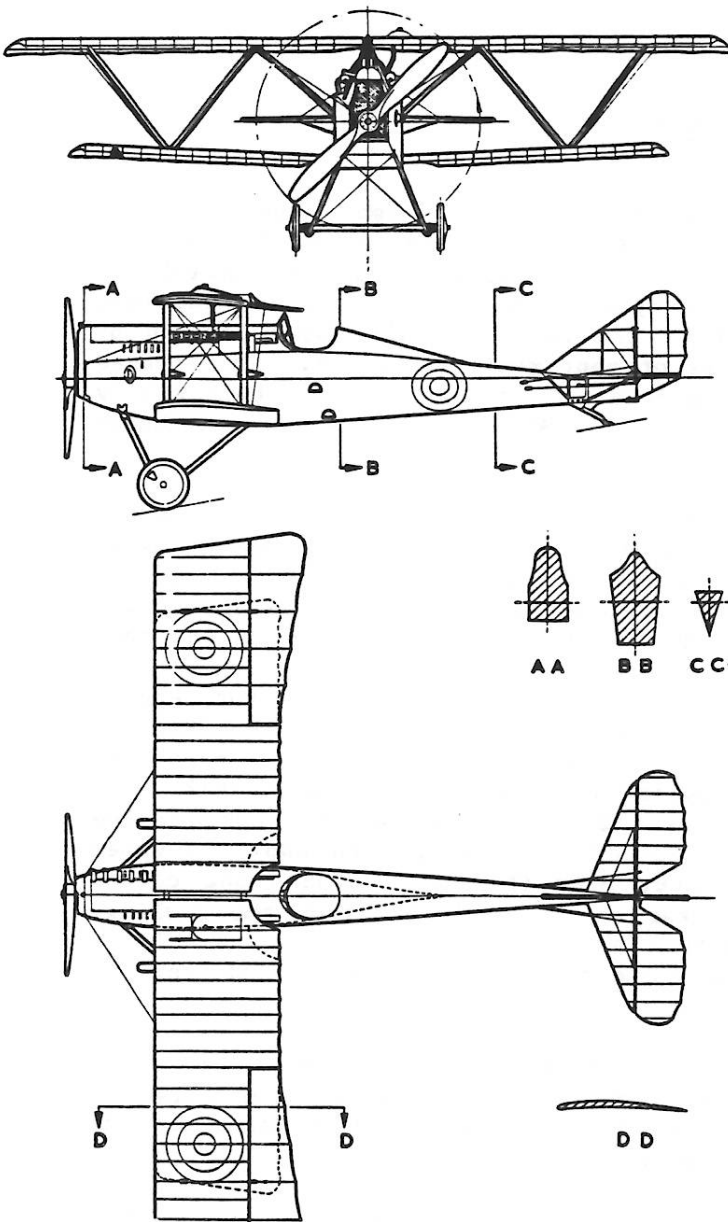
This model is .58 inch to the foot scale and is specifically designed for the new Brown BEE CO<sub>2</sub> engine. Build the fuselage with 1/16 hard longerons over the side view - make the uprights from the cockpit to the tail post about 1/16 inch longer than indicated so that the triangular rear fuselage section will be deep enough. Connect the two sides with appropriate length pieces of 1/16 balsa - do the rear lower section last. Add formers and sheet the top as indicated. I made the radiator and upper section of the cowl from A to B removable for engine adjustments. The grill is model railroad brass screen. On my previous 15 inch Ansaldo, I simply made the radiator and engine all removable - on a tray - take your pick. Wings are straightforward. I used split ribs with scale underchamber. The upper wing is 2 sections attached in typical fashion to a sawhorse-like cabane affair in the center. Make cabanes from basswood and anchor with epoxy to upper longerons. To get the proper wing incidence, make the top of the front cabane 18/32" from the cowling. The top of the rear cabane is 15/32" from the cowling. Use a jig. Hungerford wheels of 1 1/4" with 1/8" tires are perfect. The axle is mounted with dental rubberbands looped between the spreader bar cutouts and over the outside of the gear struts.

Color schemes are numerous and range from simple buff colored wings and tail surfaces to mottled camouflage. See notes on plans for references. Be sure and cover the fuselage with orange tissue - this requires less paint to simulate the reddish brown plywood fuselage. My color scheme is:

- Wings - Buff with rondels on top upper surface only - lower side tips of top and bottom wings are red (left wings) and green (on right wings) into the outboard struts.
- Fuselage - Red brown with rondels
- Cowl - From above upper longerons to just forward of cockpit = silver. Add louvers with ink or airbrush.
- Radiator - Brass
- Grill - Black
- Tail - Buff with tricolors on rudder
- All Struts - Black
- Other Hardware - Silver
- Spread Bar - Red brown
- Skid + Brake at rear of fuselage - Black with gray skid
- Gas Tank on wing - Silver

My Ansaldo weighed 23 grams for airframe (bare), 32 grams covered and detailed. Engine with 6cc tank is 16 grams. Total flying weight is 48 grams. No balast needed. Good luck and Bon Giorno!

ANSALDO S.V.A.5



ANSALDO S.V.A.5

The S.V.A. (Savoia Verduzio Ansaldo) aeroplanes were built by the Società Ansaldo of Genoa and Turin. In the summer of 1917 the S.V.A.5 single-seater fighter was designed by Verduzio. Its power unit, the 220 h.p. SPA 6A engine, had a rectangular frontal radiator and six exhaust stubs which discharged on the starboard side of the nose. The wings had the usual wooden spars and ribs, internally wire-braced and covered with fabric; the top wing had no dihedral and carried the ailerons, which were of unequal chord; the lower wing had dihedral and a shorter span. There was no centre section, the cabane struts being of the trestle type. Interplane bracing consisted of tubular struts which formed a Warren truss in front elevation; a system which resembled the bracing arrangements of the ill-fated aeroplanes designed by Professor Knoller for Austro-Hungary. No flying or landing wires were necessary.

The plywood-covered fuselage was long in relation to the wing span. Forward of the cockpit it was flat-sided; from cockpit to tail it tapered gradually in both the horizontal and vertical planes, the vertically tapered sides meeting to form a knife-edge to which the tail-skid was attached. The top of the cowling and the fuselage top decking conformed in section to the shape of the pilot's head and shoulders, so that by moving his head slightly he had a good view in most directions. A small tail-plane and plain rounded elevators were fitted; the fin was triangular and the plain rudder had a 'scalloped' trailing-edge. The under-carriage vees were unusually wide. Twin Vickers guns were mounted in the grooves in the top of the cowling, in front of the cockpit; on some machines they were well forward and inaccessible during flight.

The first S.V.A.s were delivered to fighter training schools in autumn 1917. Early in 1918, however, it was decided to use the type as a long-distance strategic reconnaissance aeroplane, and operational flights began in March. The S.V.A.5 was the perfect machine for this role, having plenty of lift to carry heavy fuel loads, and more than enough speed to shake off enemy fighters. The best of the S.V.A. units was the 87a Squadriglia, 'La Serenissima'—the Venice squadron, whose aircraft carried the Lion of St. Mark painted on their fuselage sides.

Many amazingly long flights were carried out by S.V.A. pilots. On May 21st, 1918, Tenente Locatelli and Ferrarin flew to Friedrichshafen, photographed the airship sheds and returned to their base—a distance of 440 miles.

Locatelli went to Zagreb and back, a distance of 562 miles, on June 24th. The most famous operational trip took place in August, when seven S.V.A.5s escorted a two-seater S.V.A.9 all the way to Vienna, returning unscathed to their point of departure, after a journey of 625 miles. Reconnaissance and bombing raids were also made on Bolzano, Innsbruck and Franzensfeste. All these flights involved dangerous mountain crossings.

Six squadrons and five sub-units were equipped with S.V.A.5s. A seaplane version, the S.V.A. Idro-AM, was supplied to one unit.

After the war, many record-breaking flights were made by S.V.A.s. 1,245 S.V.A.5s and 50 S.V.A. Idro-AMs were built.



# IS A HORIZONTAL TAIL NECESSARY?

## Lifting Tails, One-Piece Tails and Servos

### Part 3

By George B. Collinge  
(EAA 67, Lifetime)  
5037 Marlin Way  
Oxnard, CA 93030

Illustrations by the Author

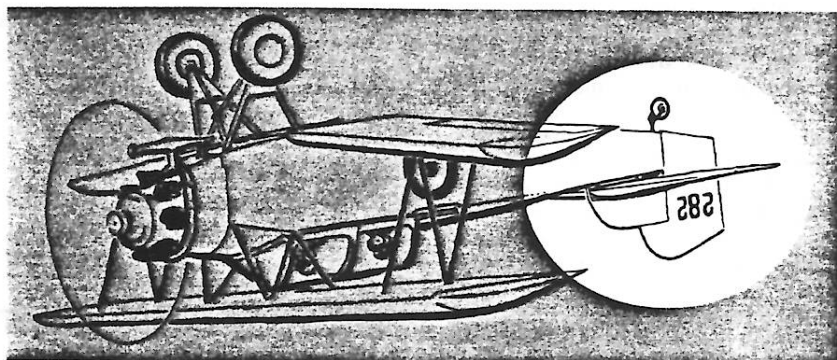


Fig. 3-1 Stuck.

**D**ISTINCT FROM SYMMETRIC-SECTION tails that are set at a small positive angle of incidence but in reality are operating at a negative angle of attack in downwash and in direct contrast to negatively-arched stabilizers, there have been such things as "lifting" tails. Rarely employed, except in the very early days, their use has been for purposes other than basic longitudinal stability. Example: the prototype of a popular biplane of the 30's exhibited a tendency to go flat during a spin (Ref. 1). Rather than redesign and adjust the CG to a more forward position and/or enlarge the existing tail area, the stabilizer was given the quick fix of a positively-cambered airfoil section. A degree of longitudinal dihedral remained which gave acceptable stability, but spin behavior was improved. The cambered stabilizer helped in lifting the aft end and forcing the nose down. Spin recovery was further encouraged by the restriction — "Solo from front seat only".

When this airplane was produced in quantity early in WW-II and put into elementary military-training, it was naturally subjected to an extremely wide-range of aerodynamic situations not normally experienced in civilian use. As the main wings employed a highly-cambered airfoil section, they became super stable when inverted (see Fig. 3-1). The

airplane would stiffen on the top of a loop and attempts to roll off or execute an Immelman (lots of rudder on this aircraft due to low-response ailerons) frequently resulted in a flat but this time inverted spin, a condition assisted by the now-inverted tail and by the addition of a large squarish winter-canopy. Recovery was sometimes difficult, especially with a pair of green student pilots aboard doing "mutual practice" and suffering acute disorientation. A number of these airplanes spun into the ground, keel upwards.

For a designer to arrange the four forces (lift, weight, thrust and drag) through a single point is an ideal only, but the airplane type that seems to most closely approach that state of perfection in numbers has to be the so-called midget racer. In this category, mid-wings predominate in company with minimum cp-travel airfoils. Fuel location close to the CG

ensures little trim drag throughout the flight envelope and only smallish tails are needed (see Fig. 3-2).

In contrast, one of the most difficult aircraft to give reasonable longitudinal stability and handling is the high thrust-line boat. A typical early example, a British Bradford-built twin, incorporated a tail with an inverted RAF 15 section, mounted at a moderate angle to provide nominal "engines-off" longitudinal dihedral but which was greatly augmented by the increased tail down load in the "engines-on" slipstream. The large nose-down couple created by power application was thereby neatly counterbalanced (see Fig. 3-3).

Some early designers were obviously concerned about the simultaneous up and down loads that occurred with the two-piece tailplane. On the other hand, the one-piece, all-moving tail was always smooth and flat and required only a small deflection to be

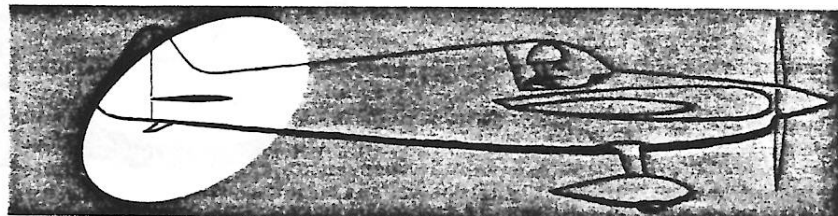


Fig. 3-2 Look allkes.

effective. The French Morane was a pioneer in the utilization of this kind of tail, as were its many copies, including Fokker and Pfalz (see Fig. 3-4).

However, unless the control column was held firmly by the pilot (or by other means) longitudinal stability was nil. This because a plain free-floating surface tends to trail, thus providing no resistance to pitch changes. Steady flight would have required constant pilot attention (Ref. 2).

Early airplanes with an all-moving tailplane generally had the highly-cambered main-wing airfoil. A nose-down disturbance would move the cp well aft. Unless checked immediately, an ever-increasing angle of dive would result because of the aforementioned absence of an automatically imposed down-load on the tail (see Fig. 3-5). During a nose-up displacement, the cp forward-travel would pull the nose up farther, requiring a forward push-force to stop it (see Fig. 3-6).

This pitch instability, accompanied by the heavy feel of wing warping, no fixed fin plus the handling quirks of a rotary engine produced airplanes difficult to fly, particularly as gun platforms, a requirement that suddenly became very important in those years. As speeds approached 100 mph this type of tail became increasingly difficult to handle, falling into disuse.

In the latter part of WW-I and into the post-war years, airplanes went faster and controls became much heavier to move. Some got very heavy. This situation would probably have remained for a lot longer than it did except for the fact that many aircraft were multi-engined and non-feathering propellers exacerbated the difficulty of engine-out flying. Pilots just did not have the leg strength to push on and hold on adequate rudder to fully compensate for the asymmetrical thrust of the live engine combined with the drag of a windmilling propeller. Hence, servos first became popular on rudders.

Anton Flettner had invented the servo in Germany during WW-I. Subsequent royalty fees financed his later extensive helicopter work (Ref. 3). The servo was for years referred to as the "Flettner tab" and has been used in various roles on a great many of the world's airplanes.

Its original basic function was to provide a light-to-operate control which in turn aerodynamically moved

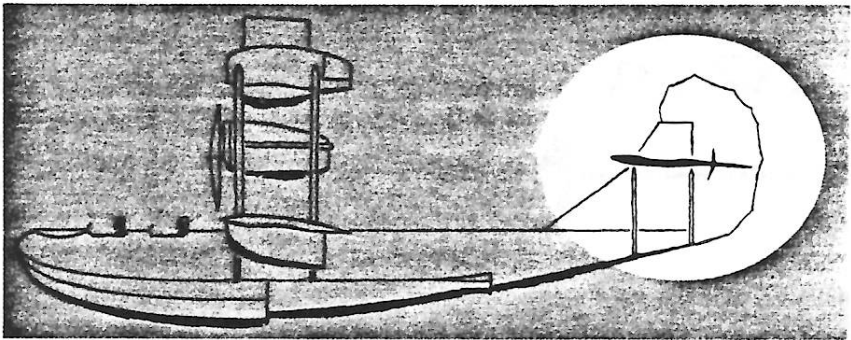


Fig. 3-3 P-5 Cork 1 1918.

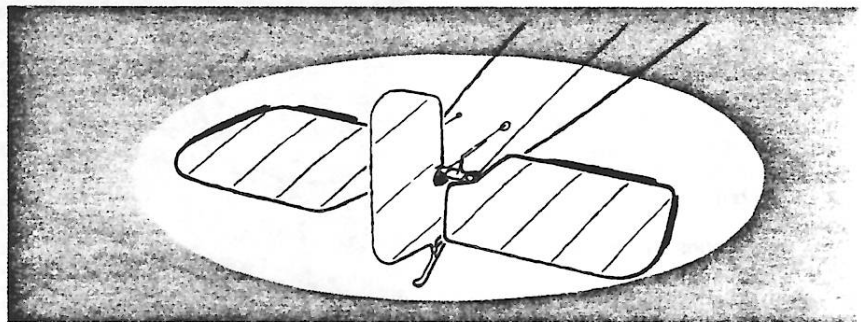


Fig. 3-4 M5K Fokker 1914.

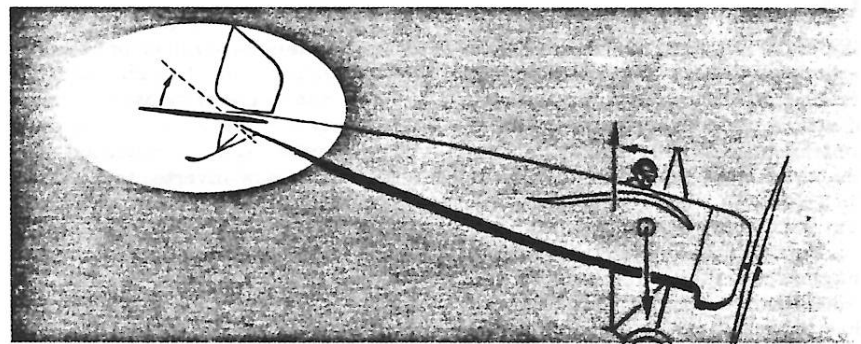


Fig. 3-5 Pull against dive.

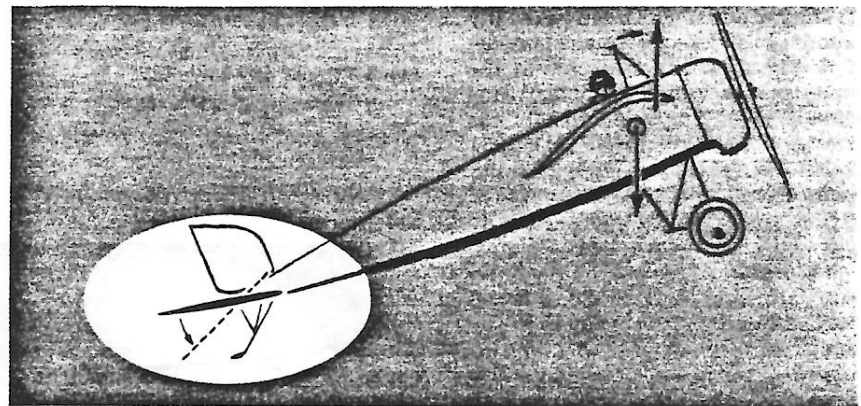
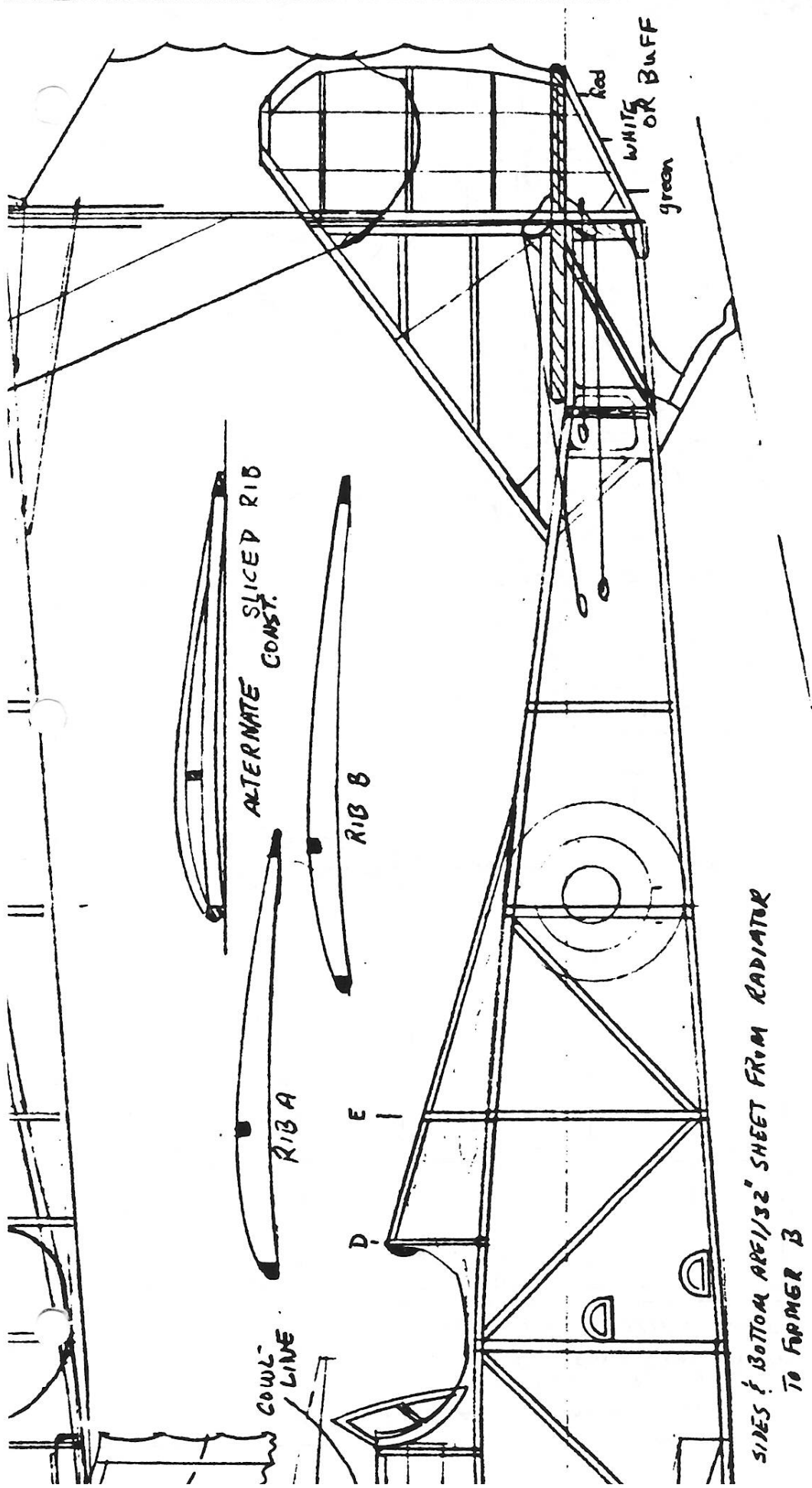


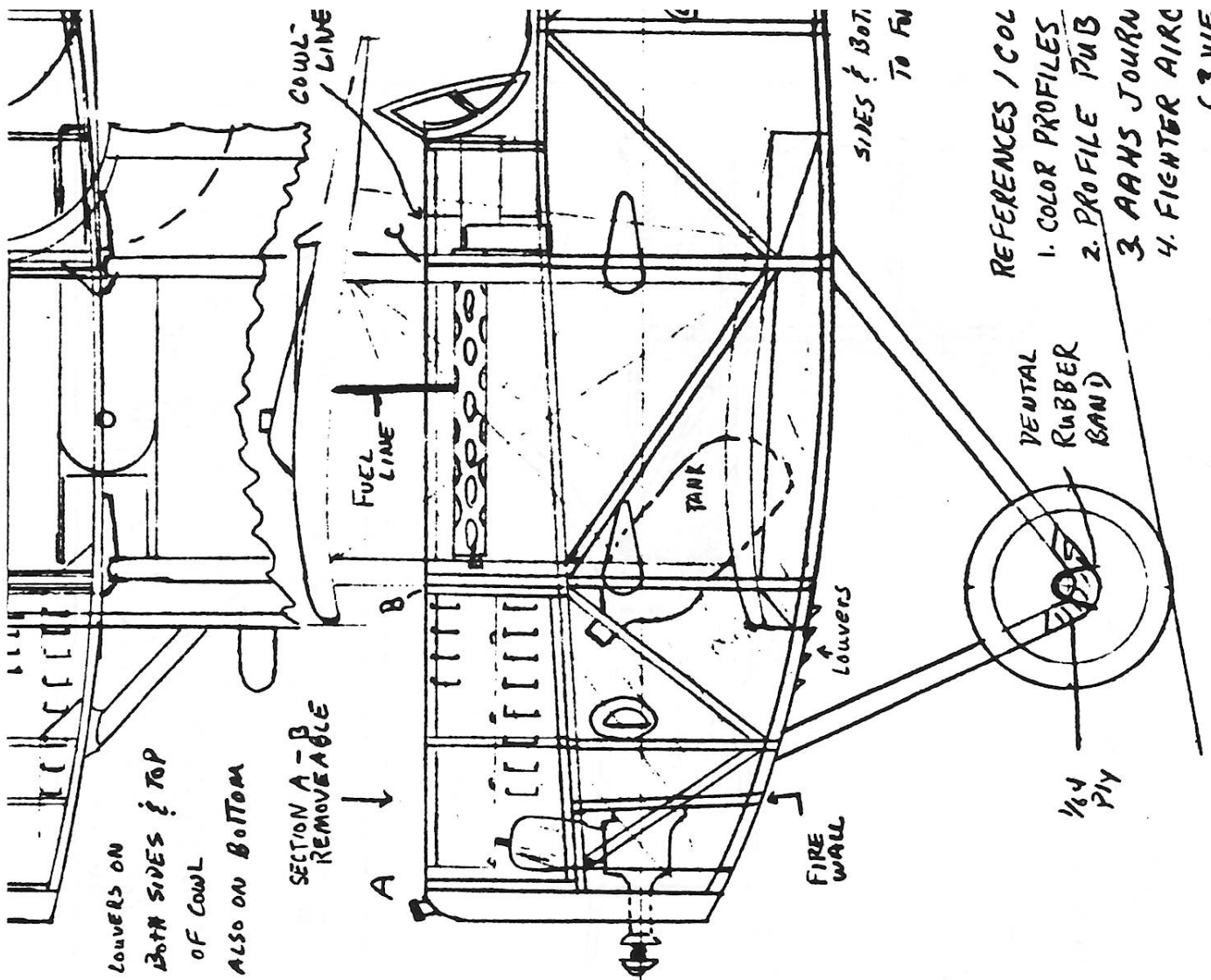
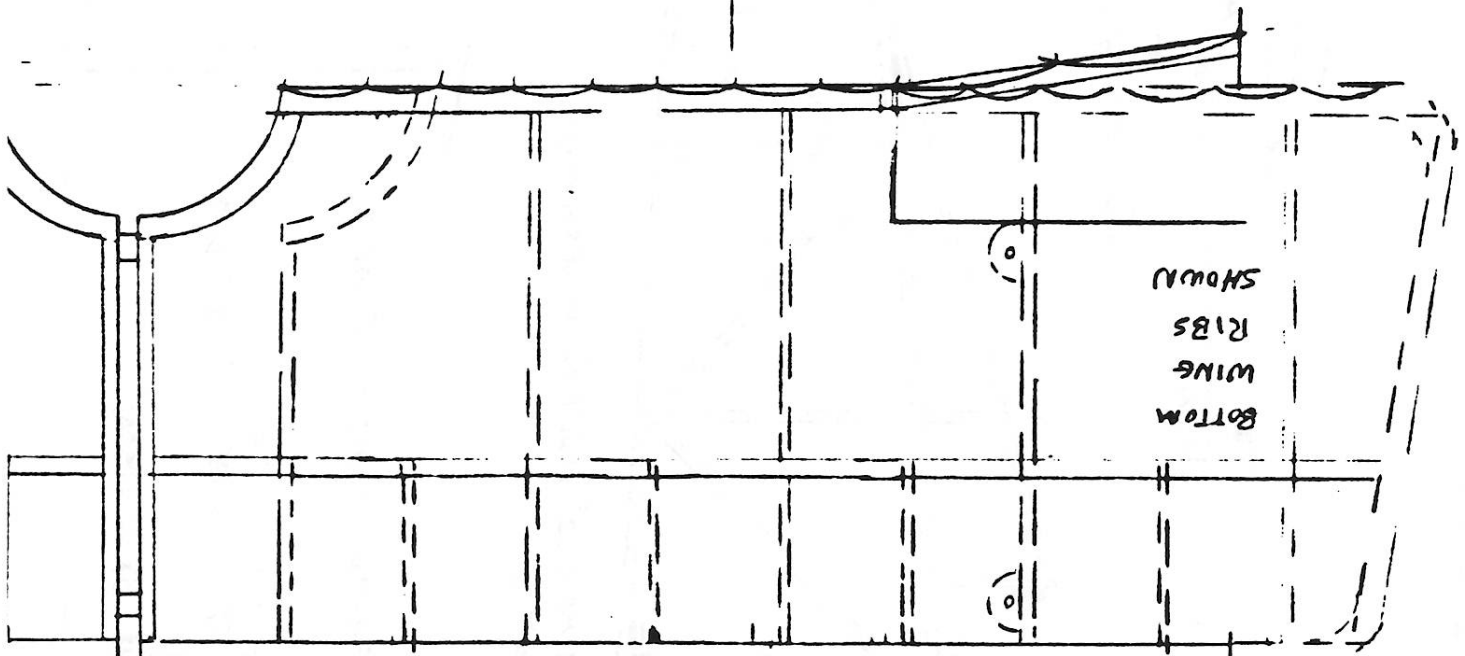
Fig. 3-6 Push against dive.



SIDES & BOTTOM ARE 1/32" SHEET FROM RADIATOR TO FRAMER B

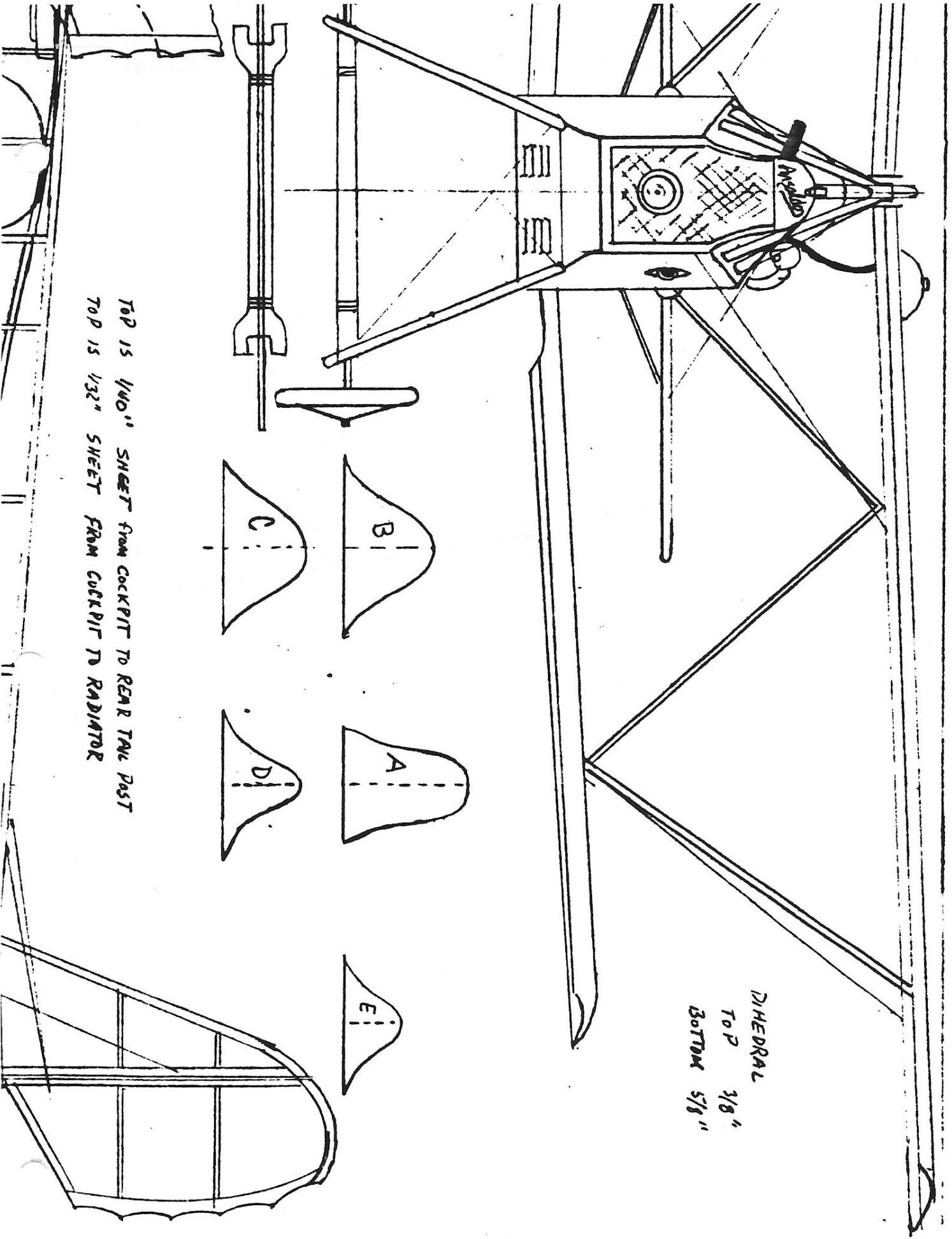
ENCES / COLOR  
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ANSALDO SVA-5  
 17 1/2" SPAN FOR COL  
 DESIGNED / DRAWN BY  
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- REFERENCES / COL
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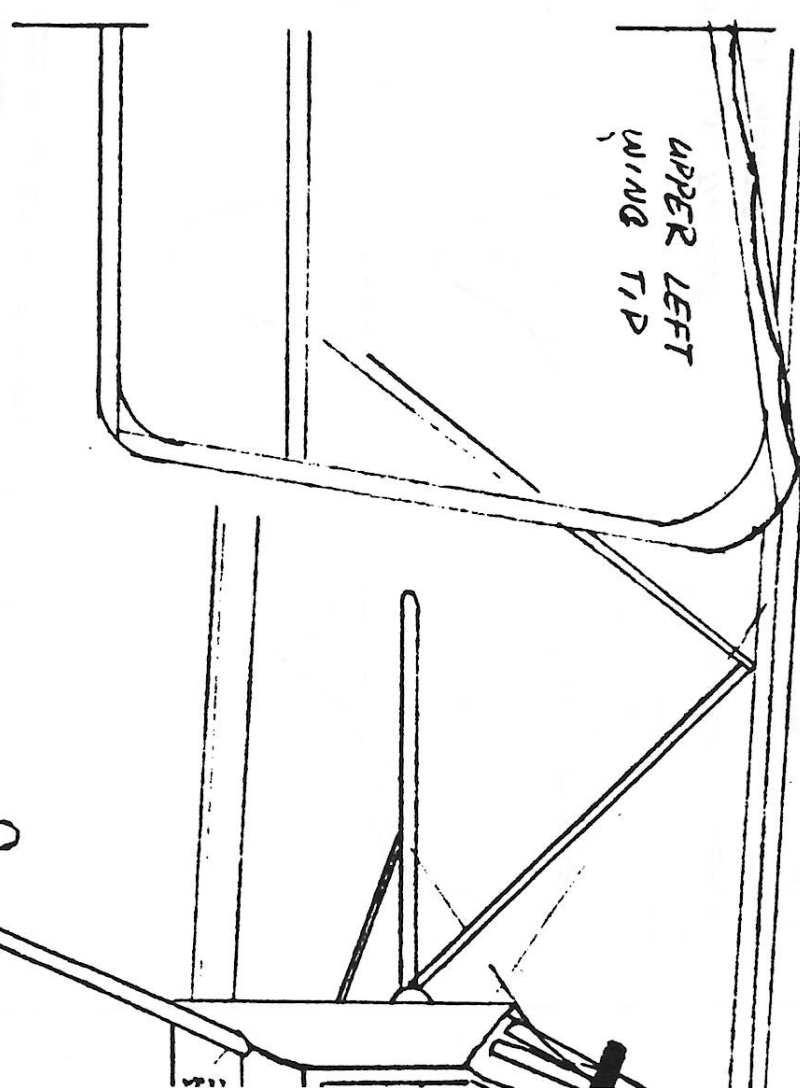
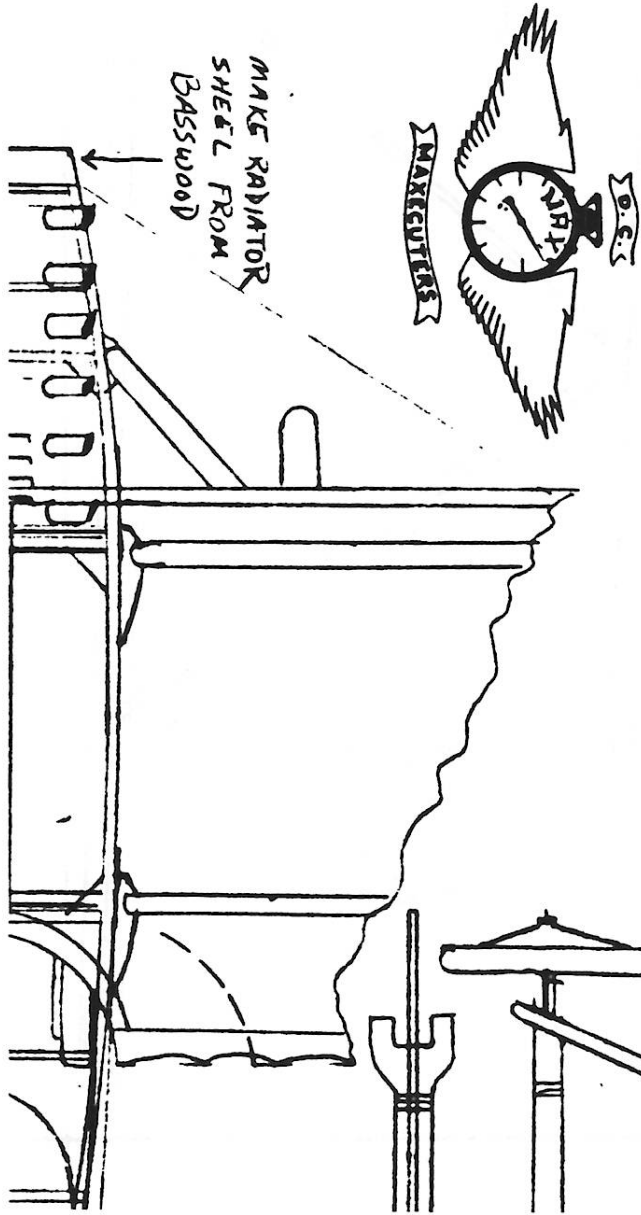
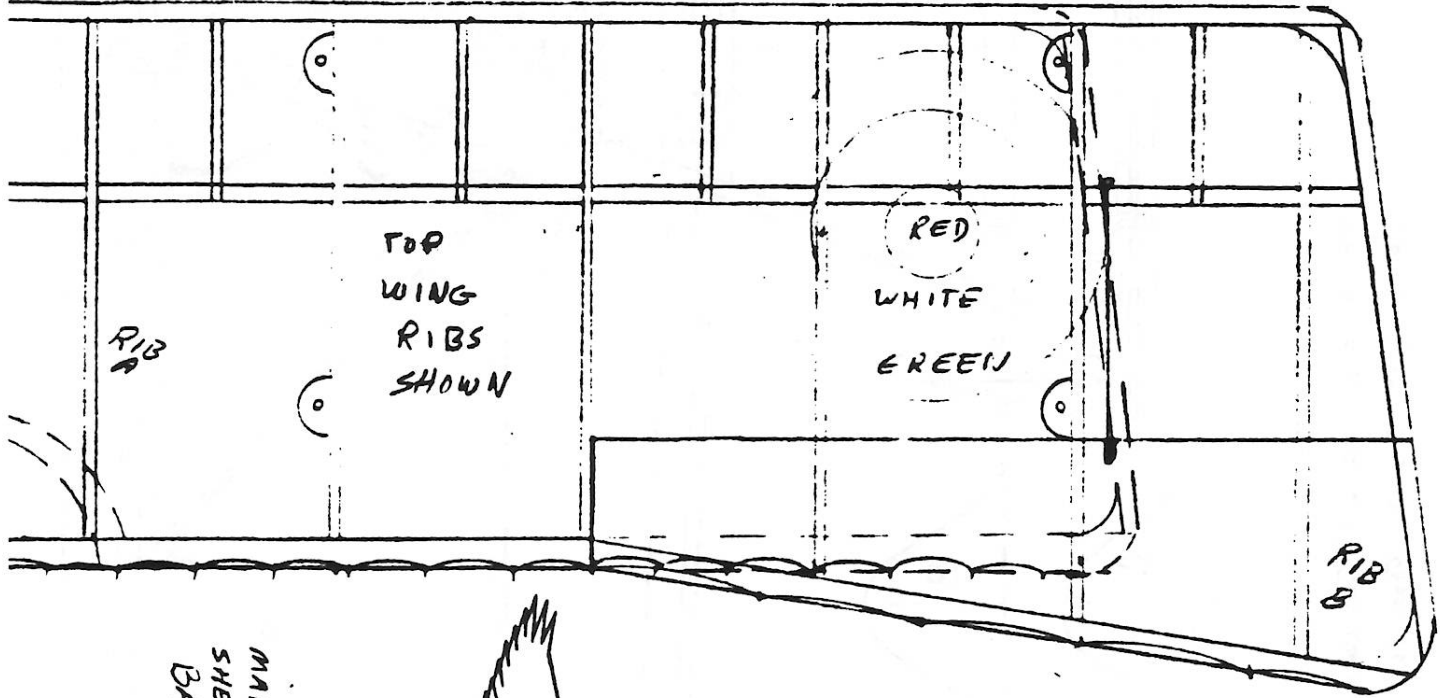
WINGS - LIN  
 COLOR: FUSLAGE - WOOD (Red-Brown)  
 COWLING - FROM FORMER C' TO RADIATOR ALUMINUM ONE - BOTTOM FROM RADIATOR TO REAR GEAR ATTACH - F  
 TAIL SURFACES - LINEN WITH TRICOLOR OR RUDDER



TOP IS 1/40" SHEET FROM COCKPIT TO REAR TAIL POST  
 TOP IS 1/32" SHEET FROM COCKPIT TO RADIATOR

DIHEDRAL  
 TOP 3/8"  
 BOTTOM 5/8"

V FOUNDELS = GREEN, WHITE, RED CENTER RADIATOR = BRASS  
 ABOVE UPPER LONGERON STRUTS = BLACK OR ALUMINIUM  
 MINIMUM OTHER HARDWARE ALUMINIUM OR BLACK





a large main-surface. Early adaptations were sometimes given the added leverage of an extended boom (Fig. 3-7). A variation, the spring-centered servo, gained wide usage during and after WW-II although it could result in sluggish or soggy response on the initial portion of take-offs and landing runs.

With other servo types, the pilot directly commanded the main surface which incorporated a geared servo. In this case the servo always moved a fixed percentage of the angular travel of the boosted main-surface.

In concert with these developments, servos doubled as trimmers on all main control-surfaces; in the pitching plane on many aircraft, it displaced the adjustable stabilizer. Servos or boosters employed on ailerons lighten the feel and in effect, increase the rate of roll (Fig. 3-8). Servos are used extensively, right up to the realm of irreversible, hydraulically-actuated surfaces with artificial feel.

The elevons of an English (general aircraft) experimental tailless-glider of 1940 each utilized a tab that functioned as a servo to lighten the aileron action. With elevator movement the same tab operated only as a trim tab. This ingenious adaptation kept the control feel properly harmonized, that of the elevators heavy and that of the ailerons light (Ref. 4).

Widespread activity with tabs was bound to lead to their application as "anti" servos, to revitalize the long disused one-piece or slab tail. While the slab's undesirable floating or trailing characteristics could be minimized by centering it with a bungee, springs per se tend to veil true feel.

A better system is a geared servo, reversed in its action so as to oppose the main surface angular travel. Powerful aerodynamic centering action results, but with a high degree of feel, the magnitude of which can be readily tailored to suit a specific airplane-design (Fig. 3-9). It can double at the same time as a bias (trimmer). This concept, applied for in July 1945, was granted a U.S. patent in August 1951 to John W. Thorp, assignor to Lockheed Aircraft Corporation.

The "anti-servo tab", as it came to be called, has moreover been designed into elevators of two-piece tails to reduce trail and/or restore feel when masked by springs or weights in the system.

Next month — Pitch stability further examined.

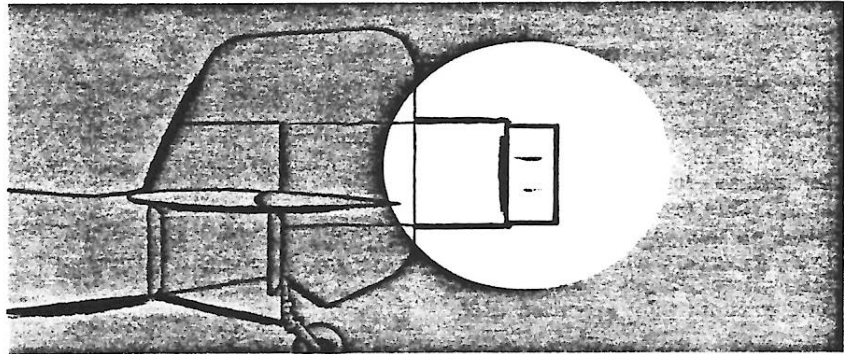


Fig. 3-7 Bolton-Paul 1934.

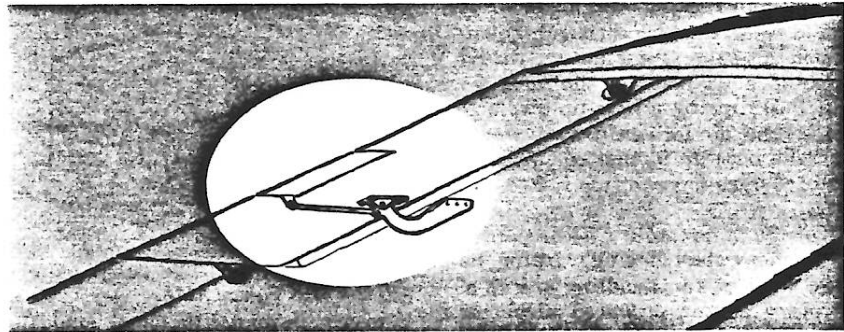


Fig. 3-8 Harvard mkII 1940.

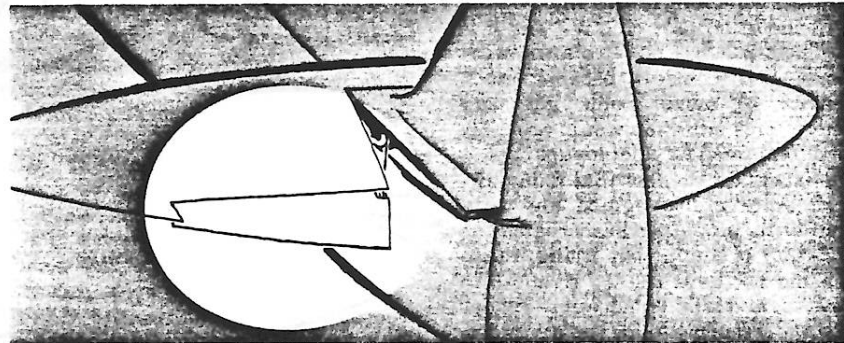


Fig. 3-9 Glider anti-servo tab.

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2. Soaring, August 1982, page 2. Harland Ross describes flight in his homemade 1937 RS-1 Zanonia sailplane which had a plain "flying

stab/elevator" (later changed). It was tiring because of "oscillating flight".

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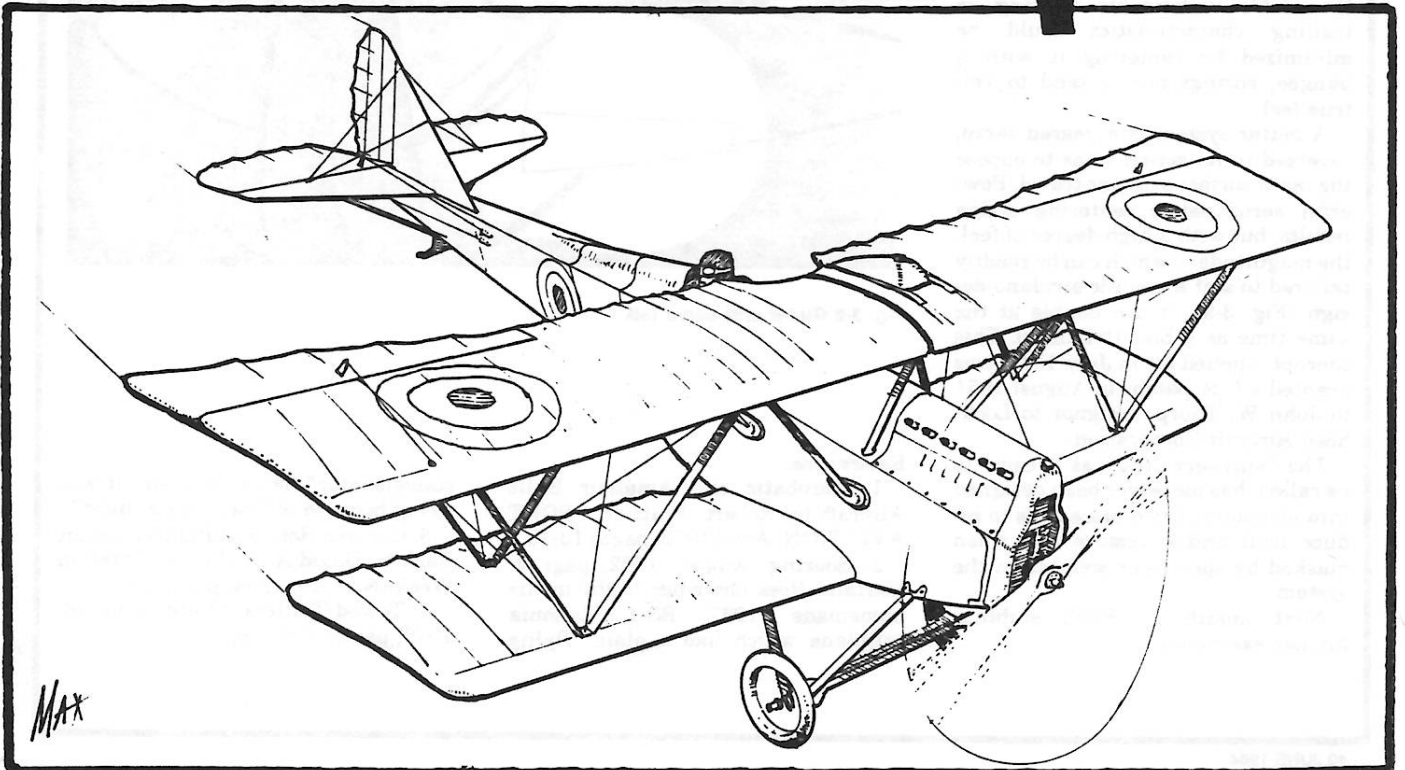
4. Towed Tailless, Flight, Sept. 26, 1946, pages 328-329.

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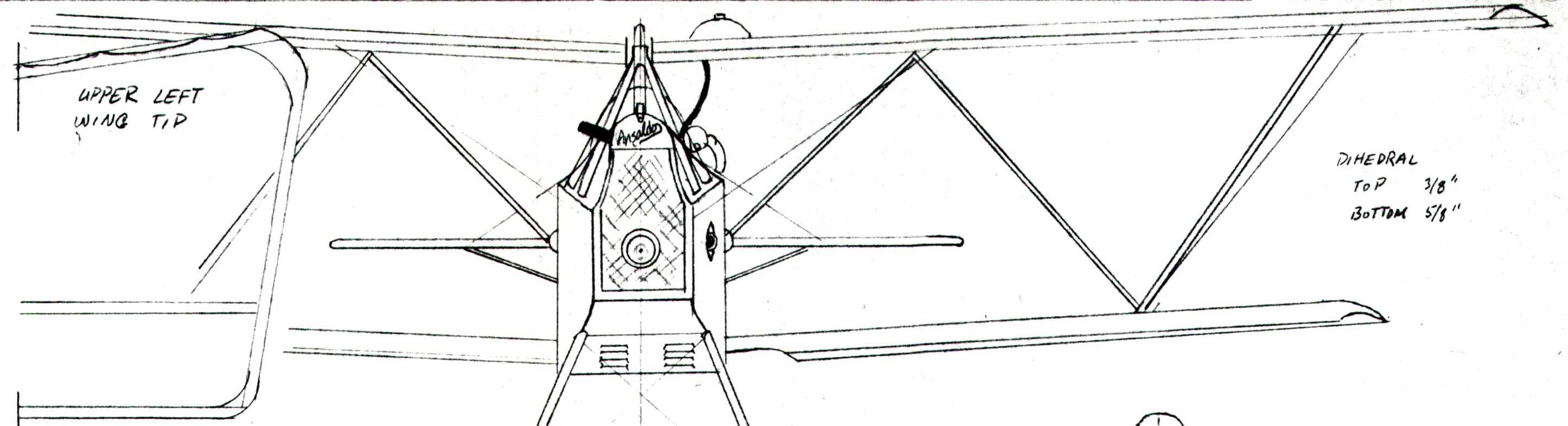
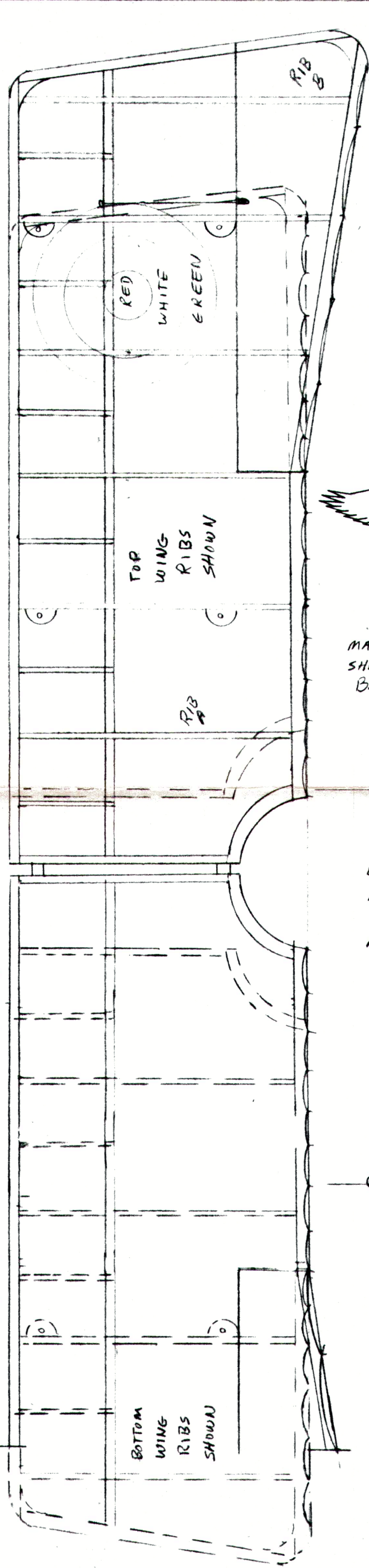
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COLOR: FUSELAGE = WOOD (AHL-BROWN)  
 COULING - FROM FORMER "C" TO RADIATOR ALUMINUM ONLY ABOVE UPPER LONGERON  
 - BOTTOM FROM RADIATOR TO REAR GEAR ATTACH = ALUMINUM  
 TAIL SURFACES = LINEN WITH TRICOLOR ON RUDDER

WINGS - LINEN  
 RIBS - GREEN, WHITE, RED CENTER  
 STRUTS - BLACK OR ALUMINUM  
 OTHER HARDWARE ALUMINUM OR BLACK

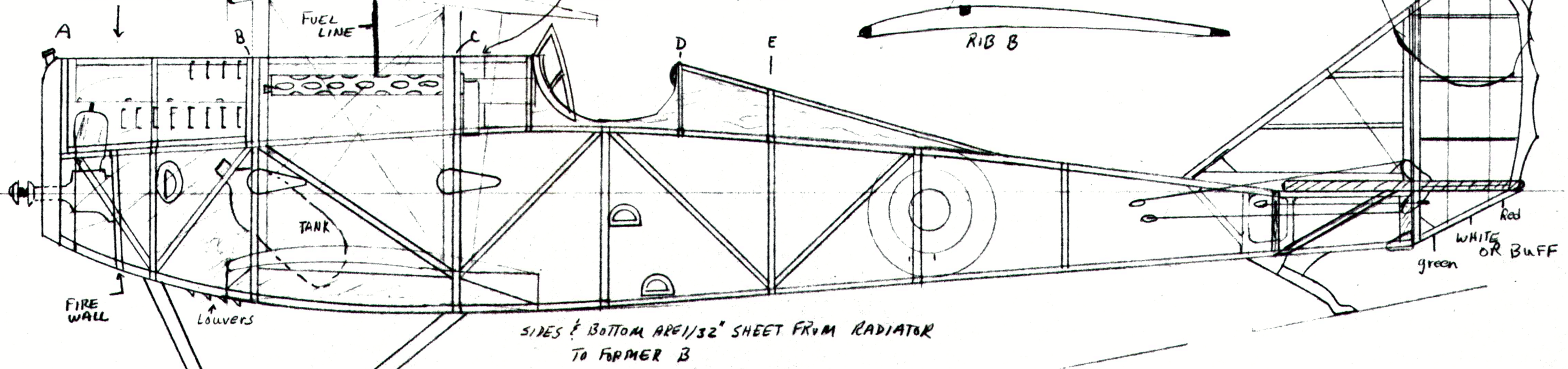
WINGS - LINEN  
 RIBS - GREEN, WHITE, RED CENTER  
 STRUTS - BLACK OR ALUMINUM  
 OTHER HARDWARE ALUMINUM OR BLACK



MAKE RADIATOR SHEEL FROM BASSWOOD

LOUVERS ON BOTH SIDES & TOP OF COWL ALSO ON BOTTOM

SECTION A-B REMOVEABLE



TOP IS 1/40" SHEET FROM COCKPIT TO REAR TAIL POST  
 TOP IS 1/32" SHEET FROM COCKPIT TO RADIATOR

- REFERENCES / COLOR
1. COLOR PROFILES OF WWI COMBAT PLANES
  2. PROFILE PUB # 61
  3. AAHS JOURNAL VOL. 16 NO. 4
  4. FIGHTER AIRCRAFT OF THE 1914-1918 WAR (3 VIEWS)
  5. BOMBERS 1914-1918 BY MUNSON

**ANSALDO SVA-5**  
 17 1/2" SPAN FOR CO2  
 DESIGNED/DRAWN BY  
 CDR PAT DAILY USN  
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