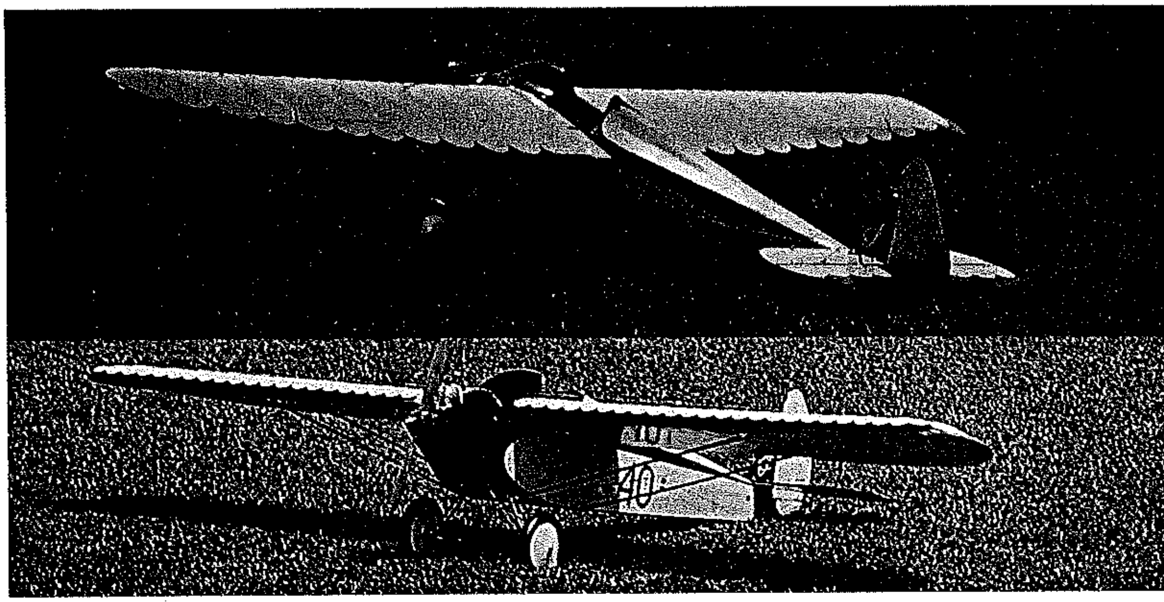
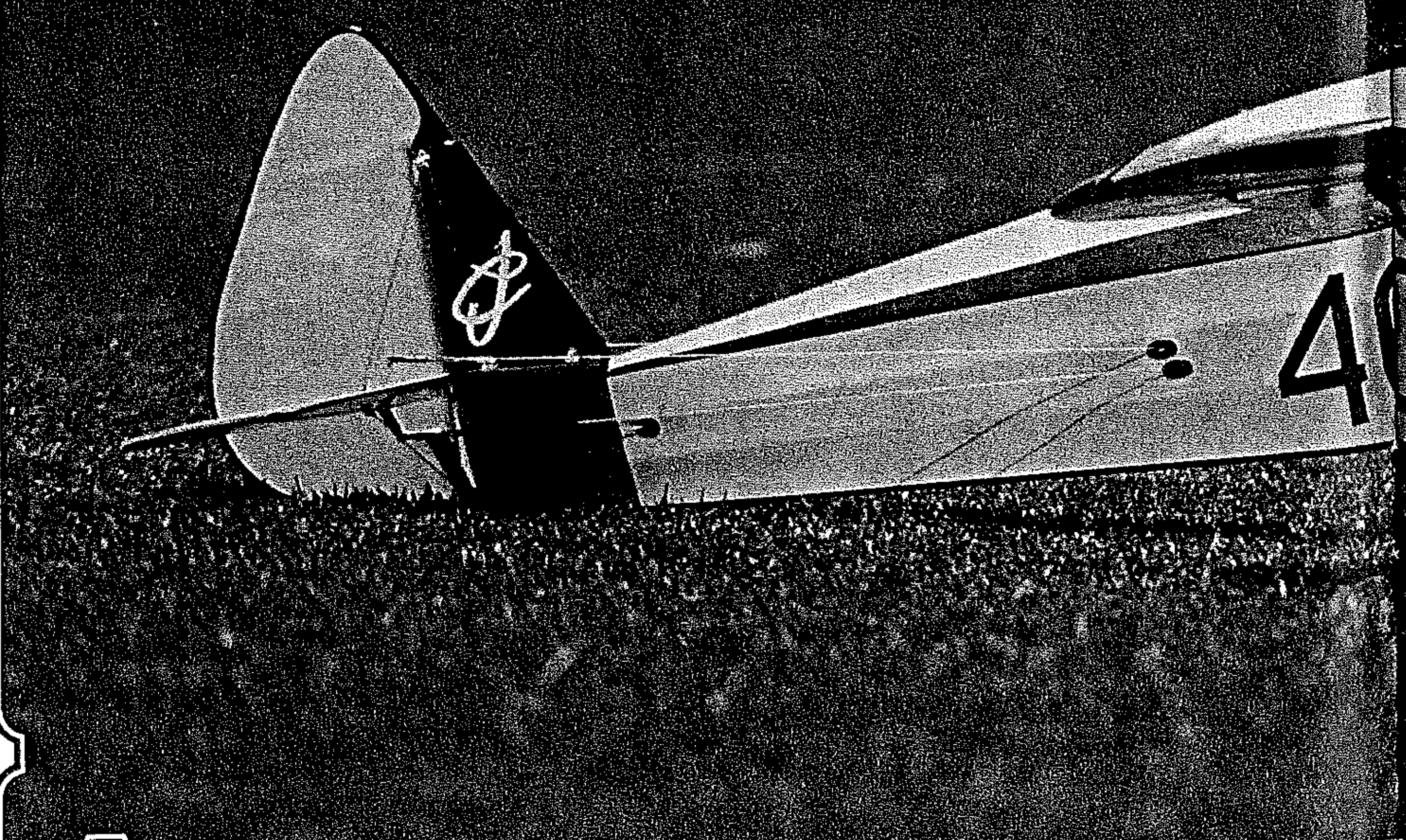
#322

ChurchM

Norm Rosenstock



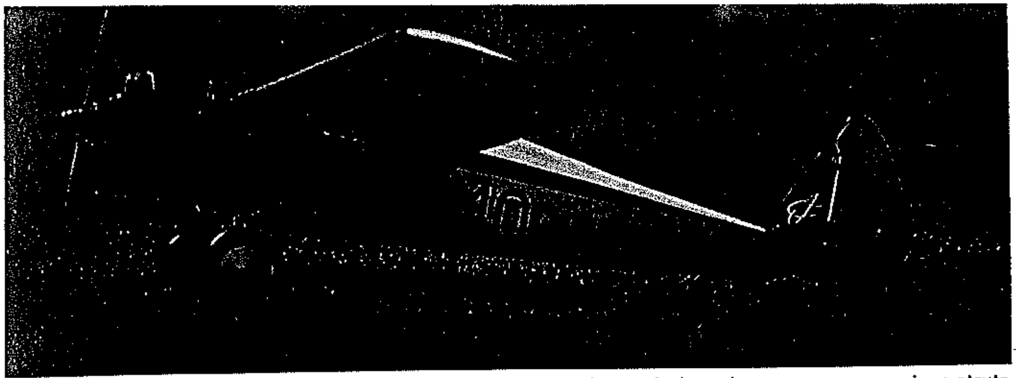
The rigging, which shows well in these views, is scale and functional. The elevators and rudder are moved by cable, just as on the prototype full-size aircraft. Ailerons use pushrods for activation, typical of most models, and the external cable is only to maintain scale appearance.



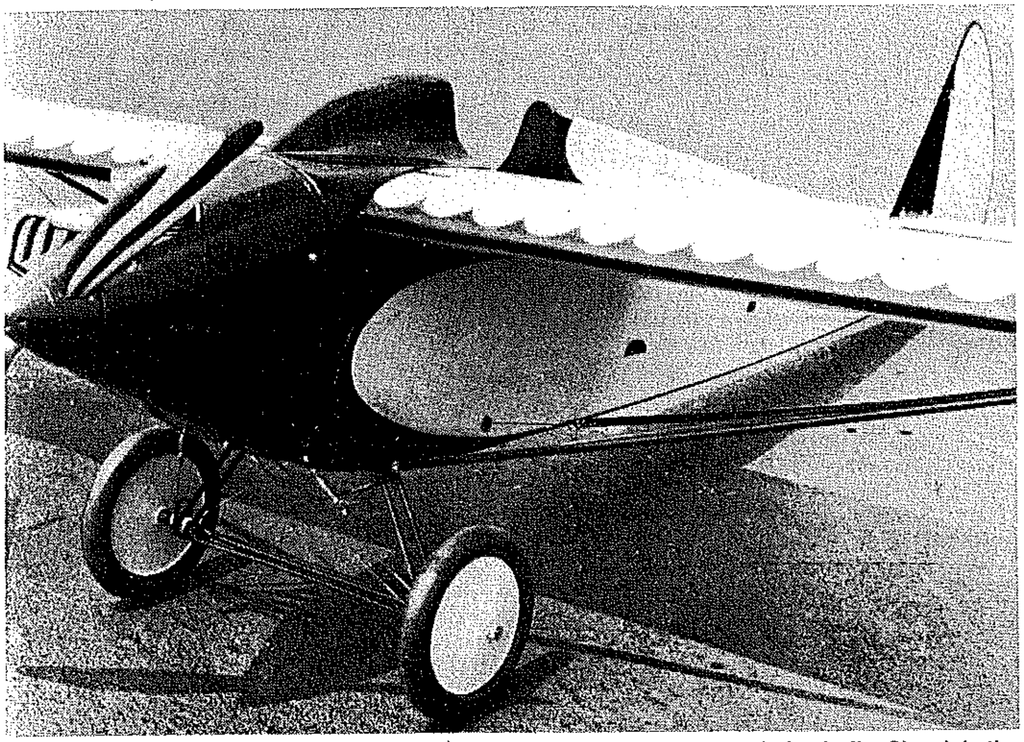
Midwing

The original Church Midwing was designed and built by Mr. James Church of Chicago utilizing the basic structures of the Heath Parasol. With its considerable streamlining compared with the Parasol, performance was vastly improved—65 mph cruising speed on the same 27-hp engine used by the Parasol. The RC model presented here is exactly Quarter Scale, but with the prototype's 26 ft. 6 in. span, that makes a handy size of 79½ in. and .60 power.

LIKE MOST RC fliers, I had been promising myself for years that, if I could find the right airplane, I would build myself a beautiful Scale model. I think most modelers have gone through this phase. My day came in 1977, while attending the WRAMS Show in Westchester, NY. As I moved from booth to booth, seeing one beautiful airplane after another (you know that feeling), I came to the

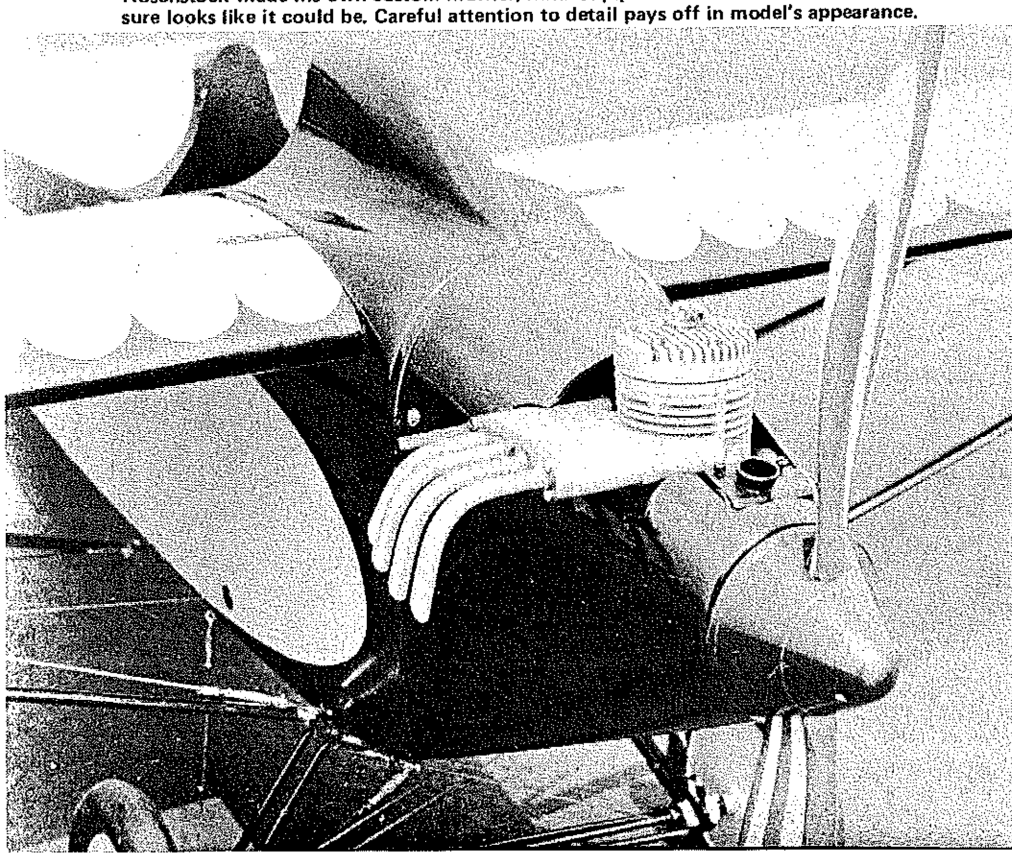


Wing struts are functional, and must be installed. Diagonal wires also are necessary, since struts are parallel. Author's model was covered with Coverite and finished with butyrate dope.



The finished Church Midwing, with the only thing which appears missing is Jim Church in the cockpit. The landing gear has solid axle bound with rubberbands for shock absorbers.

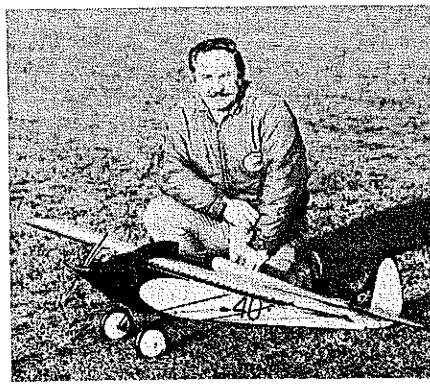
Rosenstock made his own custom muffler/exhaust pipes for the K&B .61. It's not a scale, but it sure looks like it could be. Careful attention to detail pays off in model's appearance.



booth of Classic Models. There it was.

I knew that I had found what I was looking for. It was the Church Midwing. Gene Thomas' 1½-in. scale model had a wingspan of 39¾ in., and although it had a four-channel radio in it (small Cannon), it was only powered by a Cox .049 engine. This was not what I had envisioned. As I stood looking at it, I realized that it was a little too small. Something larger, I thought, perhaps 2-in. scale, but that would only give me a model with a 53-in. span and a wing area of 477 sq. in. No, that wouldn't do. I wanted a larger airplane, perhaps with a .60 engine.

The latest vogue was Quarter Scale, but I was reluctant to get involved with a 10-ft. monster, at least not the first time around. However, the Church at quarter-size was the best of both worlds. At this scale, the airplane spans only 79½ in. and has a wing area of 1,073 sq. in., or slightly less than 7½ sq. ft. I thought, this is ideal. Even at 9 lb., the wing loading would be only 19+ oz. per sq. ft., so a .60 displacement engine would be more than adequate. I realized that this would make an excellent first Stand-Off Scale/Quarter Scale model.



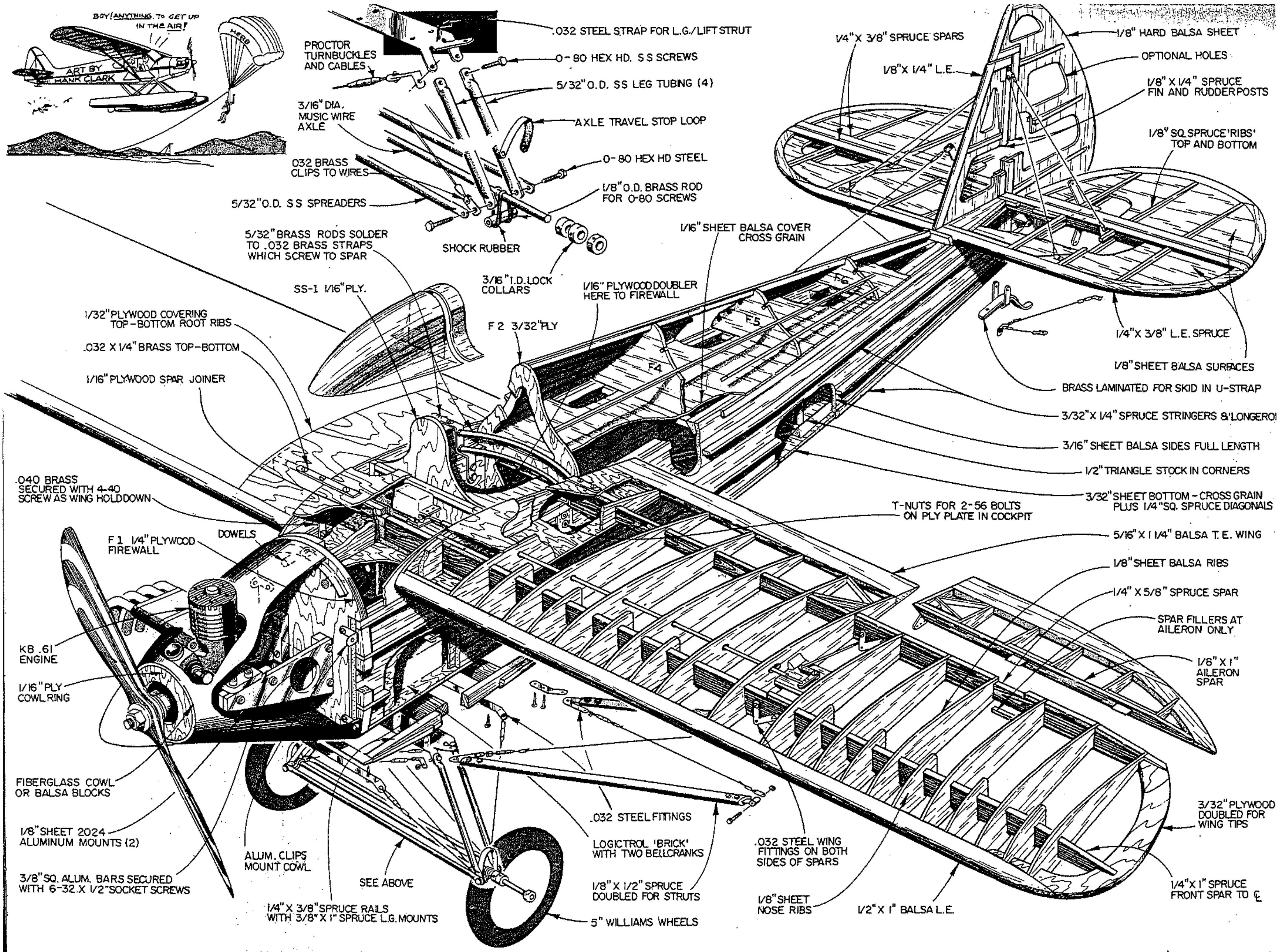
Beauty and the beast? That smile on Norm Rosenstock's face is due to the beautiful Church Midwing, designed by Jim Church some 52 years ago. Model's laminated prop is age 44!

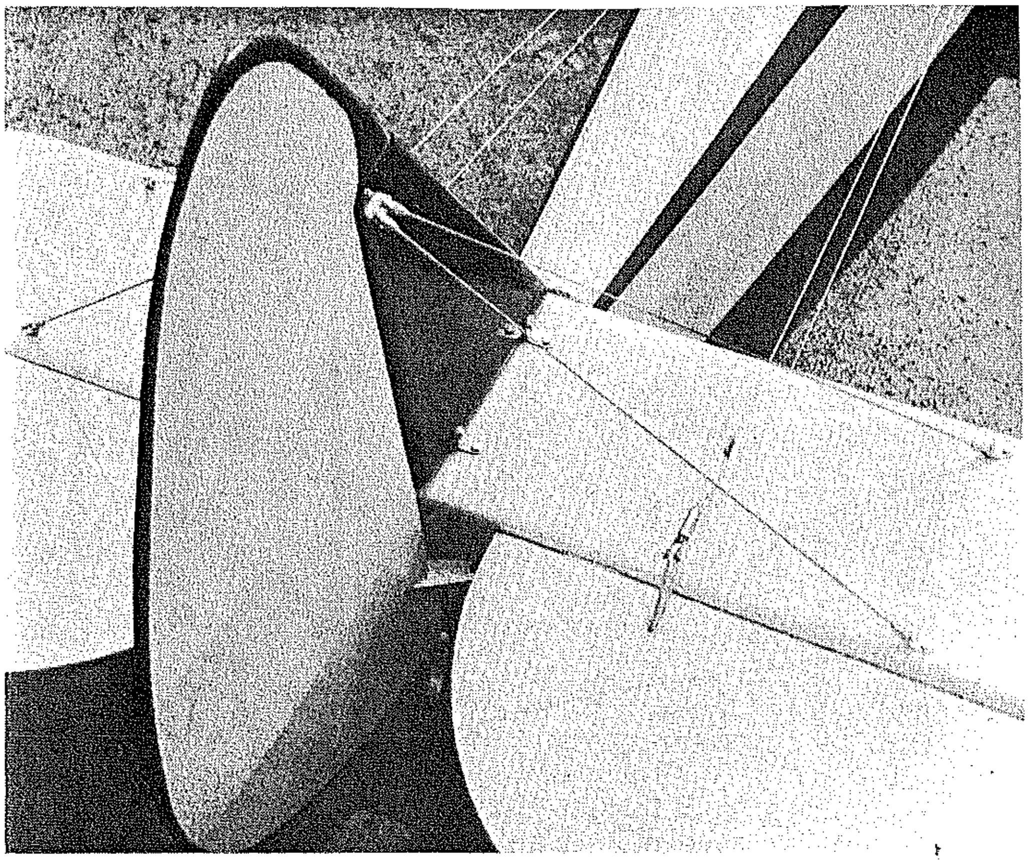
Armed with the 1½-in. plans and the excellent documentation booklet available from Classic Models, I started to scale up plans for the project. It was relatively simple. I just had to double the size of everything. Note that Gene Thomas had chosen to make two modifications from true scale for the 1½-in. model. He extended the landing gears and enlarged the tail surfaces. Looking at the 1½-in. plans, I realized that the original scale position of the landing gears (marked on the plans) would be adequate for Quarter Scale. I considered using the scale size for the tail surfaces, also, but decided that would be too small, and used Gene Thomas' enlarged version.

If you choose to build this airplane for Sport Scale competition, there is much that can be done to garner points. Start off by referring to the documentation booklet from Classic Models and their 1½-in. plans. You'll find wires, turnbuckles, pulleys and paint schemes to make the most discriminating Scale judge happy if done according to the information.

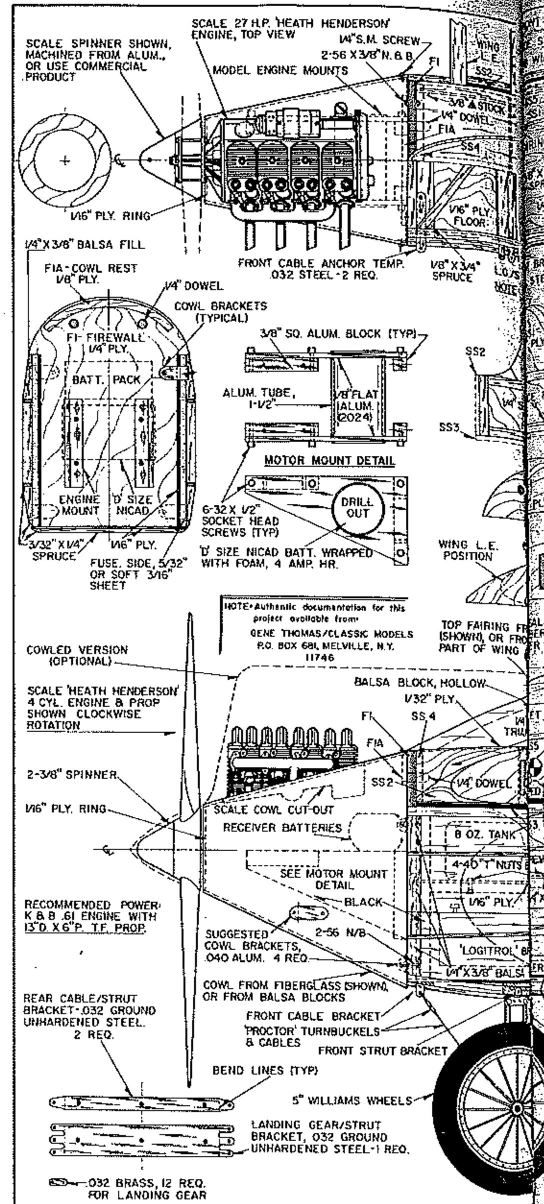
However, if you choose to build for sport flying, most of these goodies can be eliminated—with the exception of the wing struts, which are functional. Leave those off, and you are in danger of losing a wing!

The original plane was built by Jim Church. The first airplane that he built was a Heath Parasol. After he sold it, he started to build the Midwing, which was nothing more than a Heath Parasol with the wings lowered to the top longeron. This eliminated the cabane struts that supported the wing above the fuselage. It seems so simple,


BOY! ANYTHING TO GET UP IN THE AIR!
HERB
ART BY HANK CLARK
.032 STEEL STRAP FOR L.G./LIFT STRUT
PROCTOR TURNBUCKLES AND CABLES
0-80 HEX HD. S S SCREWS
5/32" O.D. SS LEG TUBING (4)
3/16" DIA. MUSIC WIRE AXLE
AXLE TRAVEL STOP LOOP
032 BRASS CLIPS TO WIRES
0-80 HEX HD STEEL
1/8" O.D. BRASS ROD FOR 0-80 SCREWS
5/32" O.D. S S SPREADERS
SHOCK RUBBER
3/16" I.D. LOCK COLLARS
5/32" BRASS RODS SOLDER TO .032 BRASS STRAPS WHICH SCREW TO SPAR
SS-1 1/16" PLY.
1/16" PLYWOOD DOUBLER HERE TO FIREWALL
1/16" SHEET BALSA COVER CROSS GRAIN
1/32" PLYWOOD COVERING TOP-BOTTOM ROOT RIBS
F 2 3/32" PLY
.032 X 1/4" BRASS TOP-BOTTOM
1/16" PLYWOOD SPAR JOINER
F4
F5
F6
.040 BRASS SECURED WITH 4-40 SCREW AS WING HOLDDOWN
DOWELS
F 1 1/4" PLYWOOD FIREWALL
K8 .61 ENGINE
1/16" PLY COWL RING
FIBERGLASS COWL OR BALSA BLOCKS
1/8" SHEET 2024 ALUMINUM MOUNTS (2)
3/8" SQ. ALUM. BARS SECURED WITH 6-32 X 1/2" SOCKET SCREWS
ALUM. CLIPS MOUNT COWL
SEE ABOVE
1/4" X 3/8" SPRUCE RAILS WITH 3/8" X 1" SPRUCE L.G. MOUNTS
5" WILLIAMS WHEELS
.032 STEEL FITTINGS
LOGICTROL 'BRICK' WITH TWO BELLCRANKS
1/8" X 1/2" SPRUCE DOUBLED FOR STRUTS
.032 STEEL WING FITTINGS ON BOTH SIDES OF SPARS
1/8" SHEET NOSE RIBS
1/2" X 1" BALSA L.E.
1/4" X 1" SPRUCE FRONT SPAR TO ℄
3/32" PLYWOOD DOUBLED FOR WING TIPS
1/8" X 1" AILERON SPAR
SPAR FILLERS AT AILERON ONLY
1/4" X 5/8" SPRUCE SPAR
1/8" SHEET BALSA RIBS
5/16" X 1 1/4" BALSA T. E. WING
T-NUTS FOR 2-56 BOLTS ON PLY PLATE IN COCKPIT
3/32" SHEET BOTTOM - CROSS GRAIN PLUS 1/4" SQ. SPRUCE DIAGONALS
1/2" TRIANGLE STOCK IN CORNERS
3/16" SHEET BALSA SIDES FULL LENGTH
3/32" X 1/4" SPRUCE STRINGERS & LONGERO
BRASS LAMINATED FOR SKID IN U-STRAP
1/8" SHEET BALSA SURFACES
1/4" X 3/8" L.E. SPRUCE
1/8" SQ. SPRUCE 'RIBS' TOP AND BOTTOM
1/8" X 1/4" SPRUCE FIN AND RUDDER POSTS
OPTIONAL HOLES
1/8" HARD BALSA SHEET
1/4" X 3/8" SPRUCE SPARS
1/8" X 1/4" L.E.



Split elevators require two sets of cables for control. The author bolted together the vertical fin, stabilizer, and fuselage with small brackets and screws, but now recommends epoxying.



but no one had thought of doing it before. The result was an increase of 30 mph with the same engine and wings—quite remarkable.

The front cowl design of the Midwing was influenced by Ed Heath's Baby Bullet. This was a direct result of having accompanied Ed Heath to the 1928 National Air Races in Cleveland. Witnessing the fantastic performance of the Baby Bullet was bound to have a profound impression on whatever design might come from this man's fertile imagination. The result was the Church Midwing.

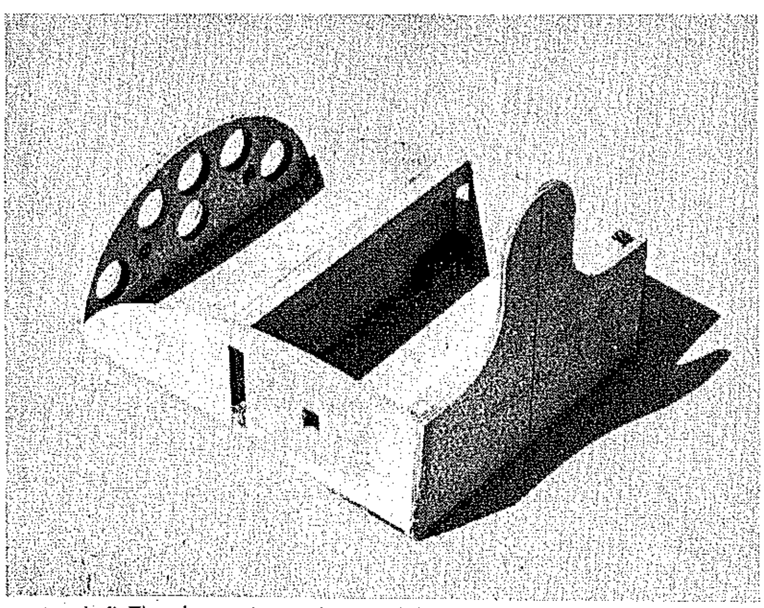
The Church Midwing was raced in the 1929 National Air Races after having been test-flown by Ed Heath. The Midwing almost won the race, but a burnt valve in the Henderson four-cylinder engine forced it out of the lead.

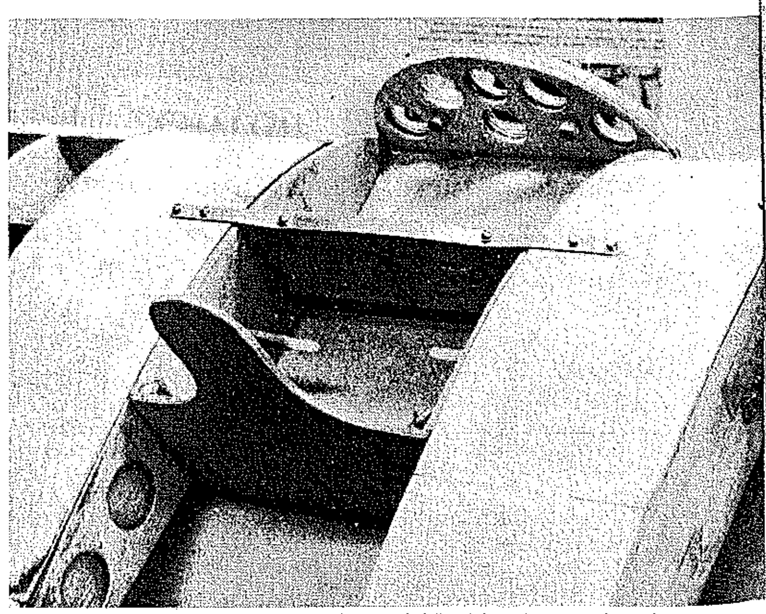
If you are a confirmed Scale builder, you will want to get the reprint by the Experimental Aircraft Assn. of the *1931 Flying and Glider Manual.*

Construction: This is an RC model for the experienced builder and flier.

Building the project requires a variety of materials. In addition to balsa, you will need spruce, plywood, aluminum, steel and fiberglass. The adhesives I used were epoxy, cyanoacrylates (Hot Stuff, Zap, etc.), and Ambroid. However, most adhesives are suitable.

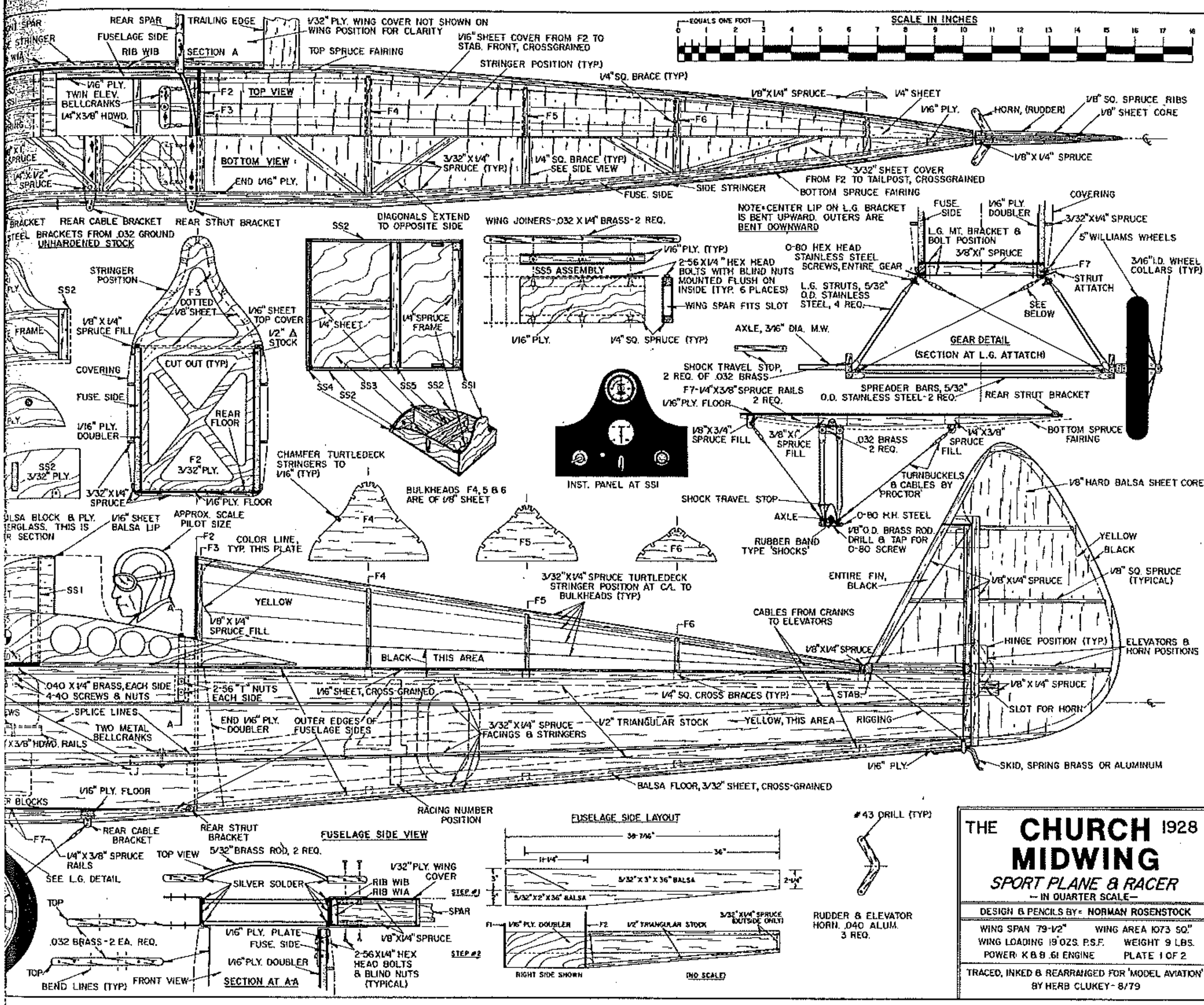
Drilling and tapping are needed to make the motor mount. Should you have any problem in





Left: The wing center section after initial assembly. The small holes in the butt ribs are for the aileron pushrods. Right: Trial fit of the wing panels to the center section. Note the scale wing panel connecting straps; on the underside of the wing, there are more straps.

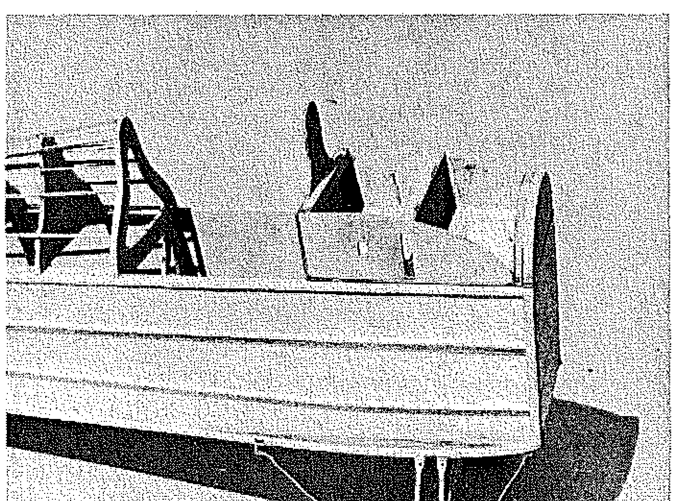
FULL-SIZE PLANS AVAILABLE . . . SEE PAGE 128

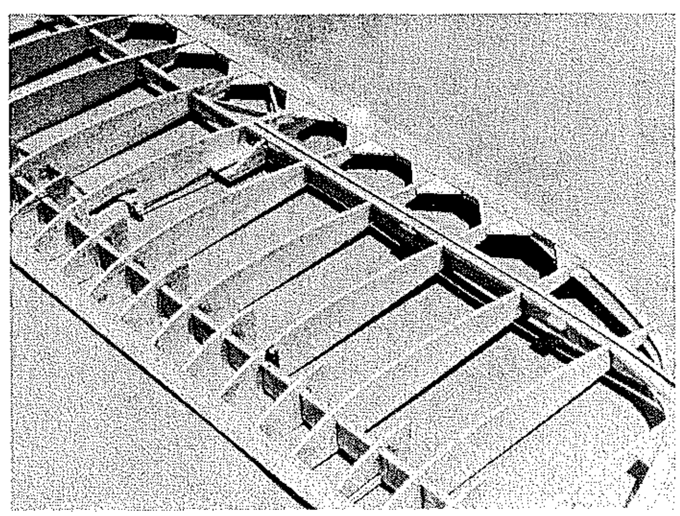


this area, I'm sure that someone in your flying club has these skills and would help. Most of the screws are of the 0-80 and 2-56 size, and are used with either hex nuts or blind nuts.

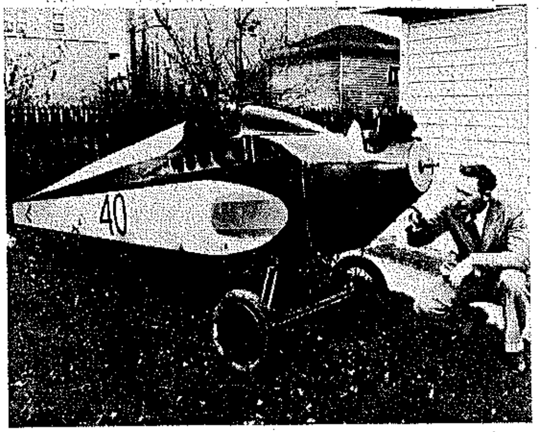
Fuselage: The fuselage construction is straightforward. The sides are 5/32 sheet balsa. (If 5/32 is not available, use slightly softer 3/16 instead.) On the plan is an inset drawing showing step #1 and step #2. After cutting out formers F-1 and F-2, epoxy them into place and assemble. After the 1/16 plywood floor is in place and the top and bottom sheeting is in place on the aft portion, start making up the landing gear and strut fittings.

The fittings are made from 1/32 x 2 x 18-in. ground stock (steel) which can be obtained from any machinist or mill supply house. Look in the Yellow Pages. While you are picking up the


The fuselage sides are 5/32-in. sheet balsa. Stringers are added for shape. Wing center section sits in place; note box for wing spar.

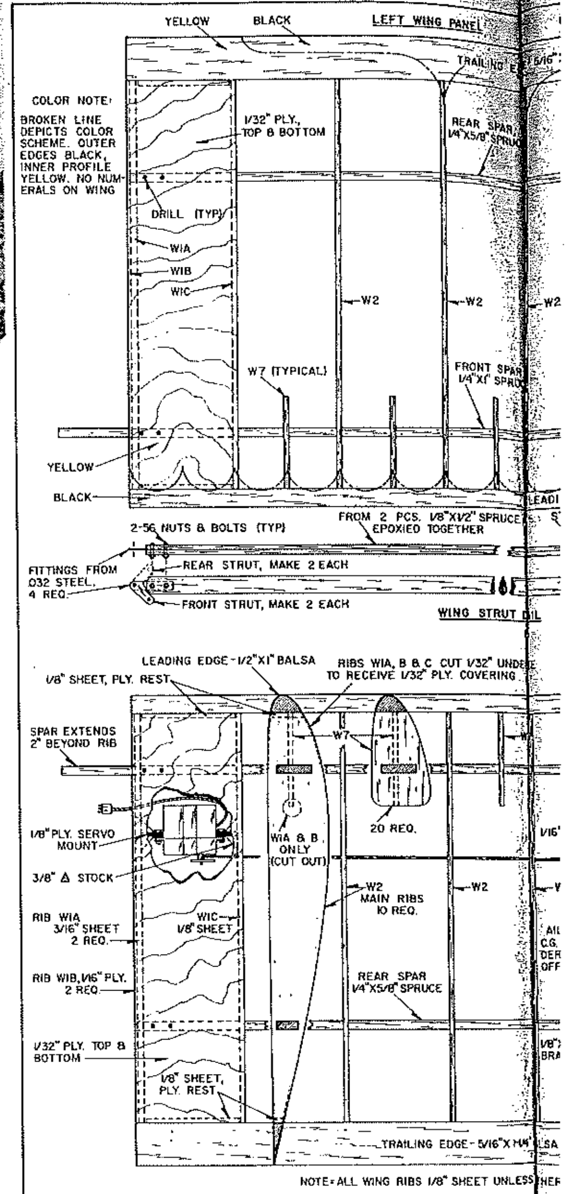

No surprises in wing construction; it's typical. Do note the ¼-in. sq. spruce post for scale (non-functioning) aileron cable pulley.

Prototype photos courtesy of the Scale Classics documentation book on the Church Midwing.



Jim Church and the fuselage of his Midwing. This picture reveals details not seen in other views, such as wing support brackets.

An original photo showing Jim Church standing proudly with his Midwing. The relative size of the plane becomes readily apparent.



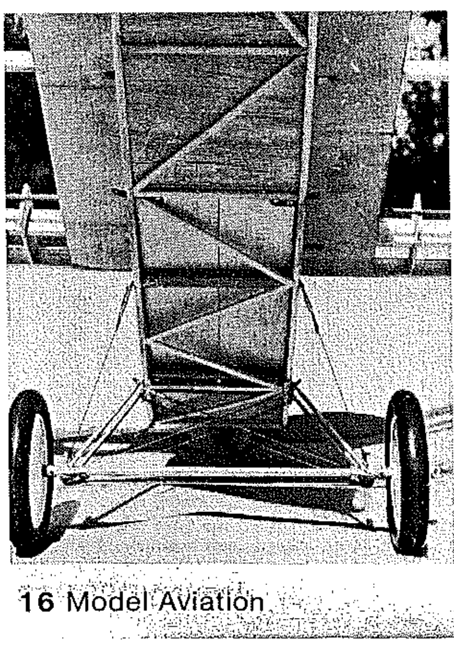
ground stock, you can also purchase 6-32 socket-head capscrews. (You will find them to be somewhat cheaper than when buying a few at a time in plastic bags.) Taps and drills can also be purchased here. When buying taps, ask for the "gun" or spiral point taps, as they are stronger and easier to work. You will also need a #36 drill for that tap. Other drills needed are #29 and #43. The fittings can be cut with a hacksaw and shaped with ordinary files. Be careful, when sawing or drilling this material, not to allow it to become very hot; it is tool steel, and it will harden and become unworkable. If this should happen, take a torch and heat the metal until it is red hot, then let cool *slowly* to anneal it. After bolting all the fittings in place, the stringers can be installed as shown on the plan.

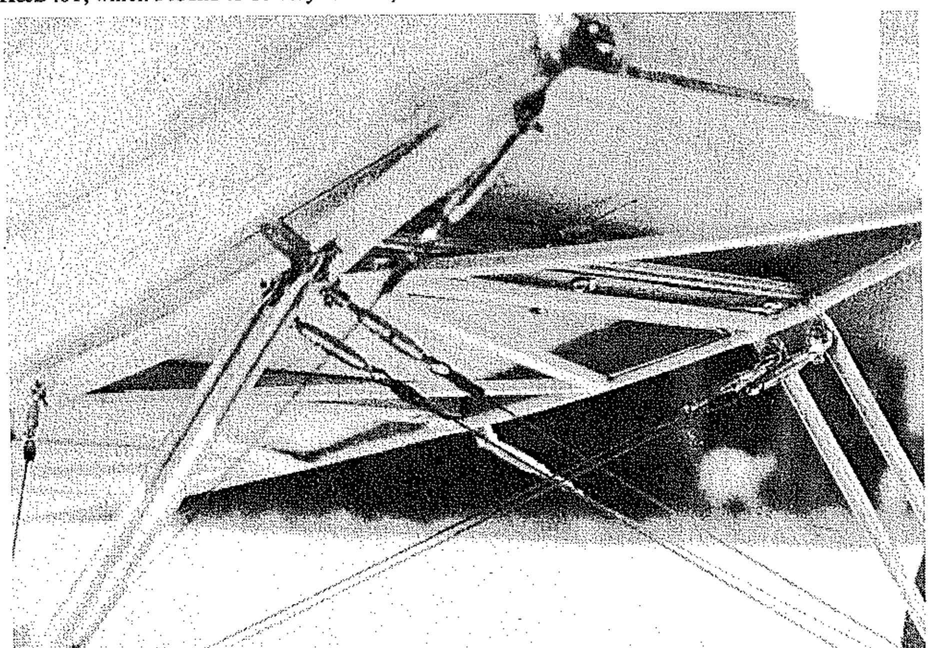
The landing gear is a beaut. It had me stumped for some time, then one day I walked into a surplus store which carried metal and found 5/32-in. stainless steel tubing. I went crazy! Now, let me see. The full-scale aircraft had ⅝-in. tubing for the landing gear, and 5/32 x 4 = ⅝. That's it! I made the landing gear just about the same way as the original—by pounding the ends flat with a hammer, and drilling the flattened portions to bolt the assembly together. The front view of the landing gear shows the exact length: 4 in. from hole-to-hole, and remember that the ends are 90° out of phase. Four are needed.

Yeah, I know what you are going to say next: Where am I supposed to get 5/32-in. tubing? Well, I never said it was easy! However, there are some options: 1) you can use 5/32-in. brass tubing, and cut short lengths of ⅛-in. music wire to fit inside the tubing between the flattened ends; 2) make the landing gear from 5/32-in. music wire, and bolt the wire across the fuselage to the 1/16 ply floor; 3) you can do as I did, and check out the surplus stores.

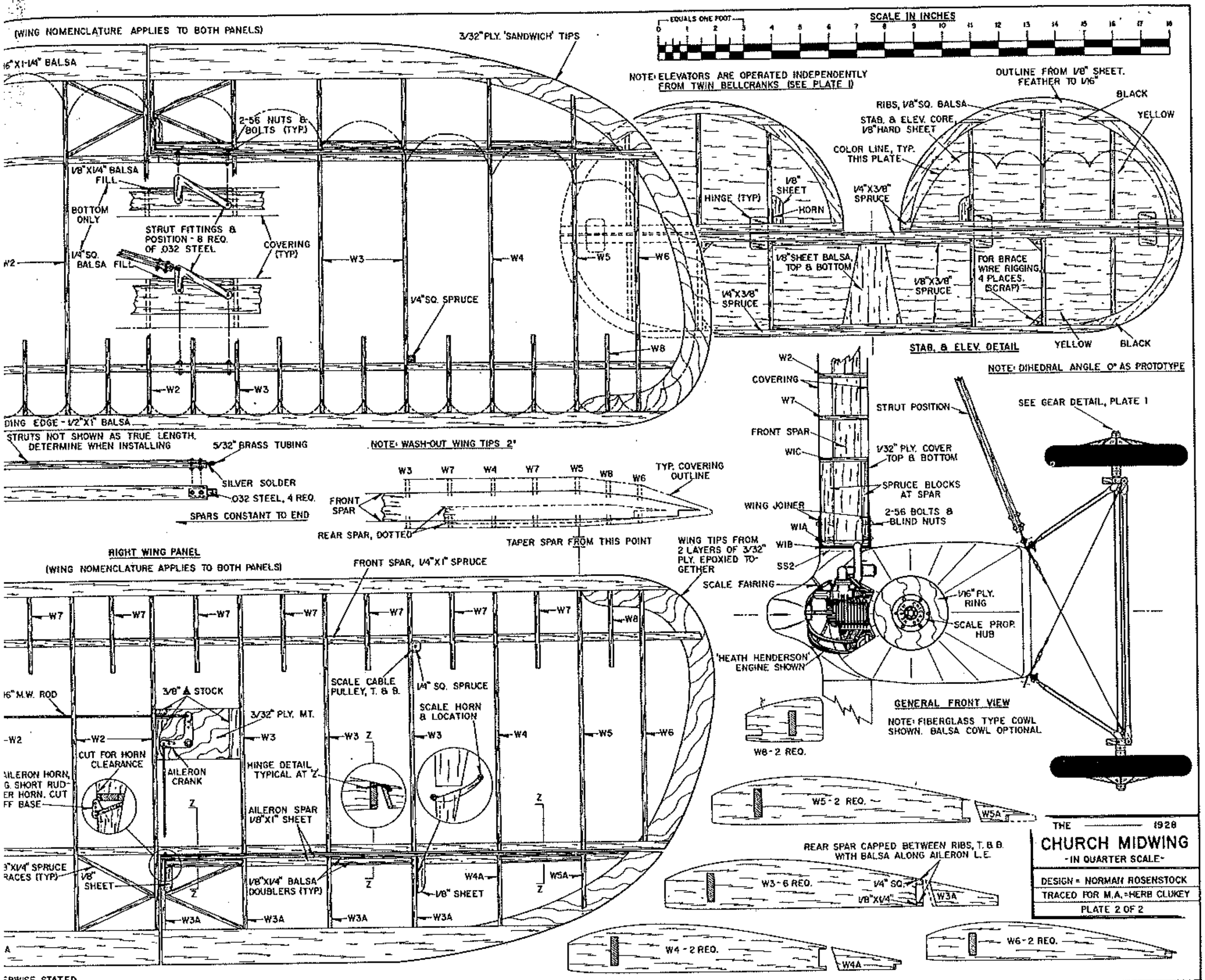
Assembling the landing gear was another problem. According to the full-scale drawings, the bolts were ¼-in. diameter hex head. This scales down to 1/16-in. diameter hex head! The first thing I did was go to the railroad department of the local hobby shop, where I got some 0-80 hex head screws. I was delighted that it was so easy, until I went to assemble the landing gear and found that the slightest stress or flexing of the landing gear would break the screws. I was distraught! What else could go wrong? Then I found it—a place where a Scale modeler can get excellent hardware—a company called Caltronic Laboratory can supply stainless steel 0-80 hex head screws, as well as 2-56 and up. This discovery saved the project, as the entire airplane is bolted together. I've never had one bolt break yet.

While you're at that surplus store, see if you can secure some 2024 aluminum. You'll need some ⅛ x 5 x 5 in. for the motor mounts, as well as a length of ⅜ x ⅜ x 12 in. You will be surprised how easily you can make the motor mount with a hacksaw and a file. You will have to locate the holes for your engine on the ⅜" square beams, making sure of the length from the engine drive-washer to the firewall. The engine I used was a K&B .61, which I found to be very reliable, but





Left: The landing gear and rigging—an accurate duplication of the original. Note the number of cables and turnbuckles. Above: Another view of the landing gear mount and bracing. The turnbuckles allow adjustment to achieve alignment for symmetry. Article has much source data.



most any sport-type .60 will do.

The front engine cowling and the front top fuselage fairing (part of the wing center section) on my model are made of fiberglass. Alternately, they can be made of balsa blocks and thin ply, but making them of fiberglass is not so hard, and in a way it is somewhat simpler. The balloon method is quite easy. All that is needed is to carve a plug slightly smaller than needed, lay up the glass cloth with the resin, and force the balloon over the piece. If you are not familiar with the technique, write to Hobbypoxy and they will be more than happy to send you information on the method.

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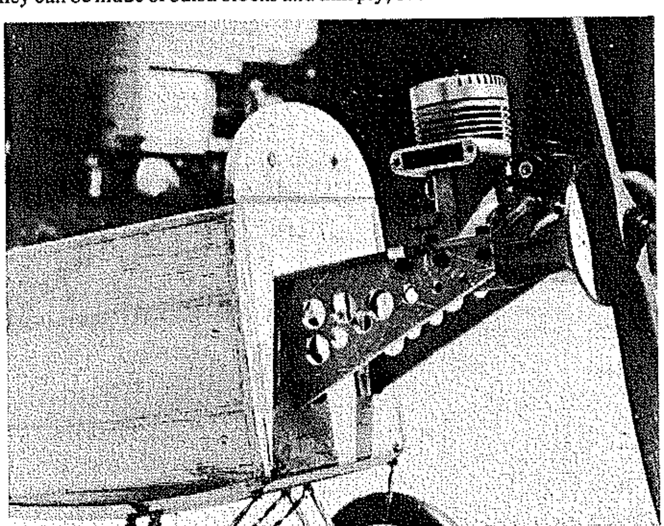
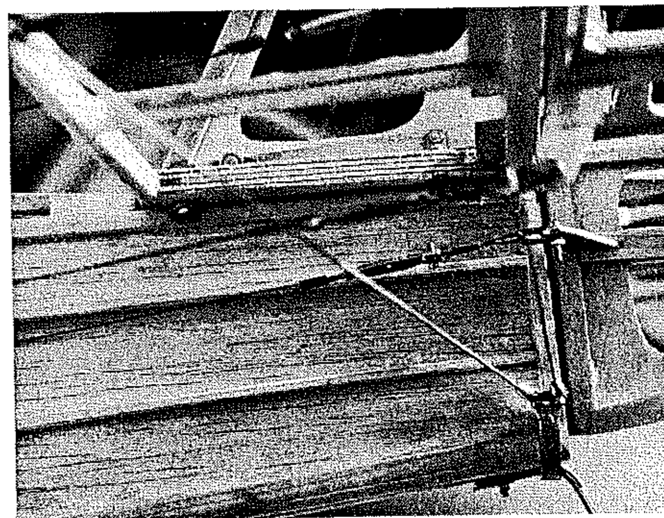


The engine mount in its original configuration. Later, a hole was put through the mount sides to accommodate a D-size Nicad battery for onboard ignition; this also provided the necessary nose weight.



The screws holding the U-shaped bracket (which holds the tail skid) are also used to fasten lower stabilizer stays. Turnbuckles at ends of control cables are used to adjust the control trim.

landing.

"Not so pleasant are memories of "back-fire" of engines and smarting fingers as a result of hand-flipping the props. Now we have glow-plug engines with electric starters to cure that situation for those who enjoy power flight.

"I am fascinated by the almost silent tiny CO-2 engines, if powered flight is desireable. But then there is the ultimate, completely silent flight. Hence the design and creation of my "Fly'n Things."

The challenge to create what I call space-ship gliders came via an article in another magazine on making planes from styrofoam package plates that hold items such as vegetables and meats at the supermarkets.

"I started with the simple delta-wing type. This proved to have a beautiful, low graceful glide—if you just let it drop with a slight push between thumb and forefinger. This was okay if you could then get up to some high point, for instance third- or fourth-story window, and launched it. I wanted more performance, so on to the larger designs shown in the drawings."

Interference has all but closed our nearby flying site. Boaters using RC frequencies nearby ruin the weekends, and week-day sorties are daring things. So we called the Mad Test Pilot, loaded up a station wagon with all the RC jobs it would hold, and arrived at Shangri-La at 8:45, 50 miles away. We flew a constant stream until 4:20: down and up, bang, bang, bang. In 40-odd flights —all of them long—we had not a single glitch. Things are getting might twitchy in populated areas near cities.

If this be "retirement," you can keep Heaven. During the week, we pound the typewriter, as of yore, and as predicted, we love the new boss. He's a bit flakey. No more laments, please. Looking forward to being joined by more of you guys. Wilbur and Orville, we salute you.

A clarification: Although the story about Charlie Grant in the November issue was not in error, Charlie is concerned that the words, "he thinks," in connection with his being the first man to fly heavier-than-air in Vermont, could cloud the record. It seems there was a baker in Rutland who made such claims, but a thorough search of the Rutland newspaper files at the time indicated that all of the man's attempts had ended in crashes. He used a towed glider, and no witness stated that he had flown successfully. The same man, in 1911, bought a Curtiss machine, and then became the first in the state to fly a powered craft. Charlie's first glider flight was made by running down a sloped roof and sailing off into a 20-odd-mph wind. Later flights traveled nearly 500 feet. Charlie's first earned him a membership as an Early Bird.

You are cordially invited to make use of this column—and to provide pleasure and fun for fellow modelers. *Bill Winter, 4330 Alta Vista Dr., Fairfax, VA 22030.*

Garber/Winter

Continued from page 7

working on a series of films on the history of flight. He is in charge of the Smithsonian's Kite Festival that takes place each year on the Washington Monument grounds—earning a yearly splash in the local newspapers. In fact, at the Garber Facility you'll find Chinese kites that formed the nucleus of the Smithsonian's aeronautical collection in 1876—and such contrasts as the Minute Man II ICBM Guidance and Control System, and the Jupiter vehicle which carried two monkeys into space in May of 1959.

Free tours of Garber Facility, Wednesdays and Fridays at 10 a.m., Saturdays and Sundays 10 a.m. and 1 p.m. Reservations at least two weeks in advance. For reservations and info: (202) 357-1400, Monday thru Friday. Or write: Tour Scheduler, Education Services Division, National Air and Space Museum, Washington, DC 20560. Individuals or groups of up to 40 acceptable for tours lasting approximately two hours.

Ch. Midwing/Rosenstock

Continued from page 17

My engine spinner is machined of aluminum. For static judging, it can be made of balsa and glued to a scale-type prop. For flying, another spinner and prop may be substituted.

The radio that I installed in my ship was of the brick type, which has the receiver and three servos installed within it. I find the brick convenient to install and remove.

Tail Surfaces: The tail group consists of ⅛ firm balsa with ⅛ sq. ribs glued in place. Use a large sanding block to taper off the ribs and some of the sheet core, leaving about 1/16 thickness at the trailing edge. The leading edge should be sanded to a round cross section. Each elevator has its own horn, and is hooked up with control cables, from Proctor Enterprises, to a bellcrank located in the floor of the cockpit. This, in turn, is moved via a short 1/16-in. music wire pushrod to the servo. The rudder is controlled in the same way. Its bellcrank sits alongside the elevator bellcrank. The stabilizer is epoxied to the ¼-in. sheet fill on the top longeron, and the vertical fin is epoxied to the stab. Take care as to its alignment. (On my model I bolted the tail assembly together and onto the fuselage, but I feel that this was not practical due to the amount of work involved.)

The control horns are made of .040 aluminum. Three are required. The portion of the horn which is glued inside the surface should be roughed up a bit with a file before epoxying in place.

Wings: The wing is constructed in a conventional way. The tips are made of two layers of 3/32 ply. Cut out four, and epoxy them together to make two pairs. The tips should be complete from leading edge to trailing edge. After the wing and wing tips are completely assembled, and the epoxy is fully cured, the ailerons should be cut out, and the wing tip severed at that point. Place the servos in the wing root so that no electrical extension is required; a "Y" connector is needed to connect the two servos to the receiver.

The wing spars are made of ¼ x 1-in. spruce. If this size is not available, take two ¼ x ½-in. pieces and epoxy them together. Do not use white glue unless you can clamp the spar over its entire length until the water in the glue has evaporated. Water makes the wood swell and warp, and unless you can keep it clamped, you will end up with a warped spar. I used a slow-cure epoxy, and clamped it to the edge of my workbench. In two hours, I was able to proceed with the construction.

The wing center section should be built at the same time as the wing, because the three pieces must fit together properly. Once the SS-5 assembly is completed and the brass wing joiner strips are installed, the wing should be roughly assembled on a large bench to check the fit. The butt ribs, WIA and WIB, on each wing should make good flat contact with SS2 on the center section. Also note how the strips of brass lay over the spar on the wing panel.

The original aircraft had about 5/16 x 6-in. bolts which went through the spar to hold the wing to the center section. This means you would need a screw about 1½-in. long, and they don't hardly make them kind no more. I suppose they could be made, but I chose another route. I glued filler blocks to the spar between the first two ribs. Blind 2-56 nuts had been inserted under the blocks so that they corresponded with the holes in the brass strips. All together, 16 2-56 hex head screws are used to fasten the wing panels to the center section. After the spacer blocks have been epoxied in, make a ply mount for the servo, and provide a removable hatch cover on the bottom of the wing so that the servo can be serviced. Then the 1/32 ply can be glued in place. Do not make the mistake of cutting off the spar projections at the root end of the wing. The spar should project 2 in. beyond the root rib.

The wing support struts are shown on the drawing, but no length is given, as the length may vary from model-to-model. On my model, the wood portion ran about 19 inches (not including fittings). After making the fittings, cut four pieces of ⅛ x ½-in. spruce a little longer than needed. Notch out one side of one ⅛ x ½-in. strip, and install one fitting with five-minute epoxy or Hot Stuff. Then swing the other end to where it will connect, and place the other fitting on the strip as you adjust your length to suit. Now, epoxy the second fitting into place. When both ends have their respective fittings tacked into place, take a #43 drill and place it into the inboard hole, then drill through the wood. Next, glue the second strip on top of the first. When fully dry, take your # 43 drill, and drill back through the pre-drilled holes, through the fitting and into the wood of the piece just glued. When this is done, a short 2-56 round-head bolt and nut can be installed with a little epoxy. The screws and nuts should be slightly over-tightened until the head of the bolt and the nut sink part way into the wood.

Remember to make two front struts and two rear. The difference is in the airfoil shape. The rigging on the wing support struts is criss-crossed from rear fitting at the fuselage to the forward fitting at the wing, and conversely from the front fuselage connection to the rear wing fitting. I used two turnbuckles, one for each wing. After the ship is assembled and the turnbuckles adjusted I safety them and don't touch them again. The wing support struts are fastened to the fittings shown on the wing drawing. These fittings, like the others, are made from 1/32-in. steel (four required), and are bolted to the spars as is shown, with 2-56 round-head screws and nuts with a little epoxy. Don't forget to place a little ⅛ balsa around the fittings, so that you have a place to hang your covering.

In the 40 some odd years that I've been modeling, I've tried all the various coverings. The Coverite used on this model is the best yet. It does so much for the strength of the aircraft that it is almost unbelievable. When the servo quit on me during an early flight, the plane would have been a basket case if it were not for this covering. As it was, the damage was repaired, and the plane soon ready to fly. The model was doped with clear butyrate dope, then sprayed all over with three to four coats of Cub yellow, then trimmed with black, as was the original.

The ship carries a D-size four ampere hour Nicad in the nose to aid in relieving the tail-heavy condition. Drill out the motor mount side plates and insert aluminum tubing big enough to carry the battery. It's hooked up to the glow plug and switched on when the carburetor is from idle to one-third open. A micro-switch on the throttle linkage does the trick. The advantage is that I am able to get a reliable idle on the engine, down to 1,800 rpm, and I don't need an external battery for starting. I just open the throttle wide, choke the engine one or two flips, then close the throttle to just above idle—and it will usually start on the first or second flip of the prop. Talk about surprised people—you should see the look on their faces when I start up. A word of caution: 1) never leave the engine in the idle position when not running, or your battery will be dead in about an hour; 2) Wrap your "D" battery with foam rubber, and make sure that the tubing carrier in the motor mount will accommodate the battery with foam rubber-padding; failure to shock-mount the battery will destroy it. By the way, a ⅛-in. wheel collar with 18- or 20-gauge wire soldered to it makes an excellent plug connector. Be sure to make a cardboard washer to put under the collar, to prevent it from shorting to ground.

Flying: The original aircraft had no dihedral, and this model, in keeping with the original, also has none. The only "problem" with flying is that it flies like a full-scale aircraft. Coordinated rudder must be used with turns; otherwise, the turns appear stilted and strange.

My model weighed 9½ lb., which netted a wing loading of 20 oz. per sq. ft. The first takeoff was unexpected. I gave a little power to get the ship rolling, then added a little more power to get the rudder to take effect. The plane suddenly lifted off! Later, I checked the position of the throttle and tached the engine. It was turning over at about 7,000 rpm with a 13-6 Top Flite prop. My K&B .61 will give me a maximum of 10,000 rpm on that prop. In flight, she handles best when throttled back slightly, to about 8,000 rpm.

I had thought of reducing the engine size to a .45, but realized that the additional power with the bigger engine might help me should the plane get into a tight spot, and it has. Also, putting in a smaller engine would reduce the weight in the nose of the aircraft, and would require the addition of some lead weight to keep the correct center-of-gravity.

Otherwise, the ship is easy to fly. It floats over a hot runway like the old 40 hp Cub. Under these conditions, it is necessary to feed in a little down, to cause the ship to descend at a faster rate, to make a wheel landing. The on-board ignition system is an asset, because if the rpm is too high, the plane will not sink; but at 2,000 rpm the prop acts as a disk plate, causing drag. The on-board ignition keeps the fire going at very low speeds.

Although the plane was a lot of work, I derived great satisfaction from meeting the challenges it provided. I hope it will do as much for you. Enjoy.

Sources

Classic Models, P.O. Box 681, Melville, NY 11746. Documentation Booklet for Church Midwing, $3.00. Plans for 1½-in. Church Midwing, $8.00.

Experimental Aircraft Association, Inc., EAA Air Museum Foundation, Inc., Franklin, WI. *1931 Flying and Glider Manual*, $2.00.

Caltronic Laboratory, 461 S. Cochran Ave., P.O. Box 36356, Los Angeles, CA 90036. Catalog, Precision Model Engineering and Instrument Components—for stainless steel machine screws, etc., no charge.

Proctor Ent. Corp., P.O. Box 9641, San Diego, 92109. Turnbuckles, rigging and control cable, pulleys. Send for catalog, $1.00.

Hobbypoxy Products, 32 Pine St., Rockaway, NJ 07866. Instructions on balloon method of fiberglassing, no charge.

Coverite, 420 Babylon Rd., Horsham, PA. Information on their covering material, send pre-addressed stamped envelope.

LSF Regionals/Pruss

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streamlined the system, and his experience can be of benefit to any of us who are interested in that system. Dave has offered to provide rules and an organizers' guide in the near future.

For next year, the LSF officers haven't yet decided on whether 1981 will be a regional tournament or an international one. Because the F3B World Championships have a two-year program, the league front office is trying to set an LSF schedule which would dovetail with the F3B Team Selection Program.

The LSF is funded by these tournaments. Except for the contributions made when members send in their level forms, the league depends on the contest for financial support. The current officers wish to thank all members for their past contributions.

Any input to the LSF can be made by contacting one of the following:

Gordon Pearson, President, 8232 Earhart Road, South Lyon, MI 48178.

Warren Plohr, Vice President, 5395 Sunset Oval, North Olmstead, OH 44070.

Warren Tiahrt, Secretary, 7647 Twilight Court, Clarkston, MI 48016.

Keith Finkenbiner, Treasurer, 907 Barley Drive, Wilmington, DE 19807

Applicants for membership can write directly to the League of Silent Flight, P.O. Box 39068, Chicago, IL 60639. Include a self-addressed envelope.

Good Lift!

RC Scale/Wischers

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some additional weight in the nose for balance. Usually this means that batteries must be located udner the fuel tank, even when a long extension cord is required. We have run long extension cords through our models in some profusion, to batteries and remote servos, with no ill effects. Another trick to help balance a tail-heavy condition is to use an extra large fuel tank, if nose space permits. The plane will be carrying much more fuel than needed. *In contests, the model is weighed without fuel, and using fuel for ballast can help to keep within weight limits.* The risk in this method is the temptation to use all of the fuel on a long flight, with a subsequent tail-heavy landing. An alternate system would employ two tanks, for greater effect, with a rear tank feeding the ballast tank which is located near the engine. Always land with the ballast tank full.

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