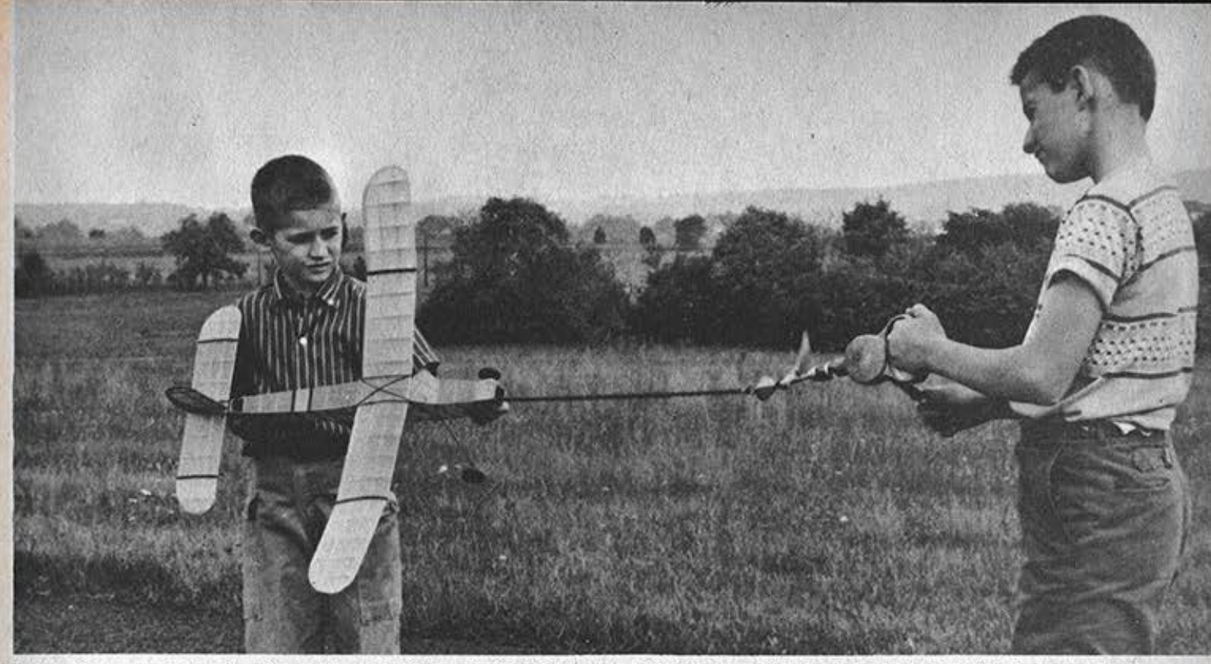


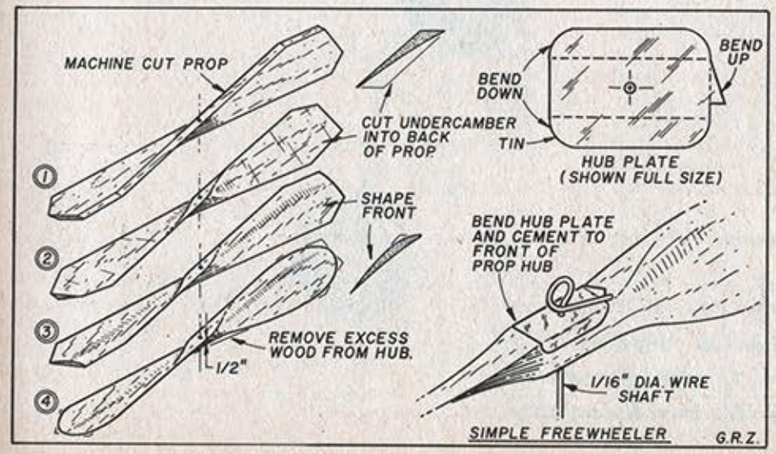
Packing in the turns with a winder this young flier and his helper learn how to handle real flying model—they'll take home trophies!

Buster!

MAN is proud to present this rubber-powered model. It is mighty fine flier. Easy to build—but takes some "try."

by GERALD R. ZEIGENFUSE

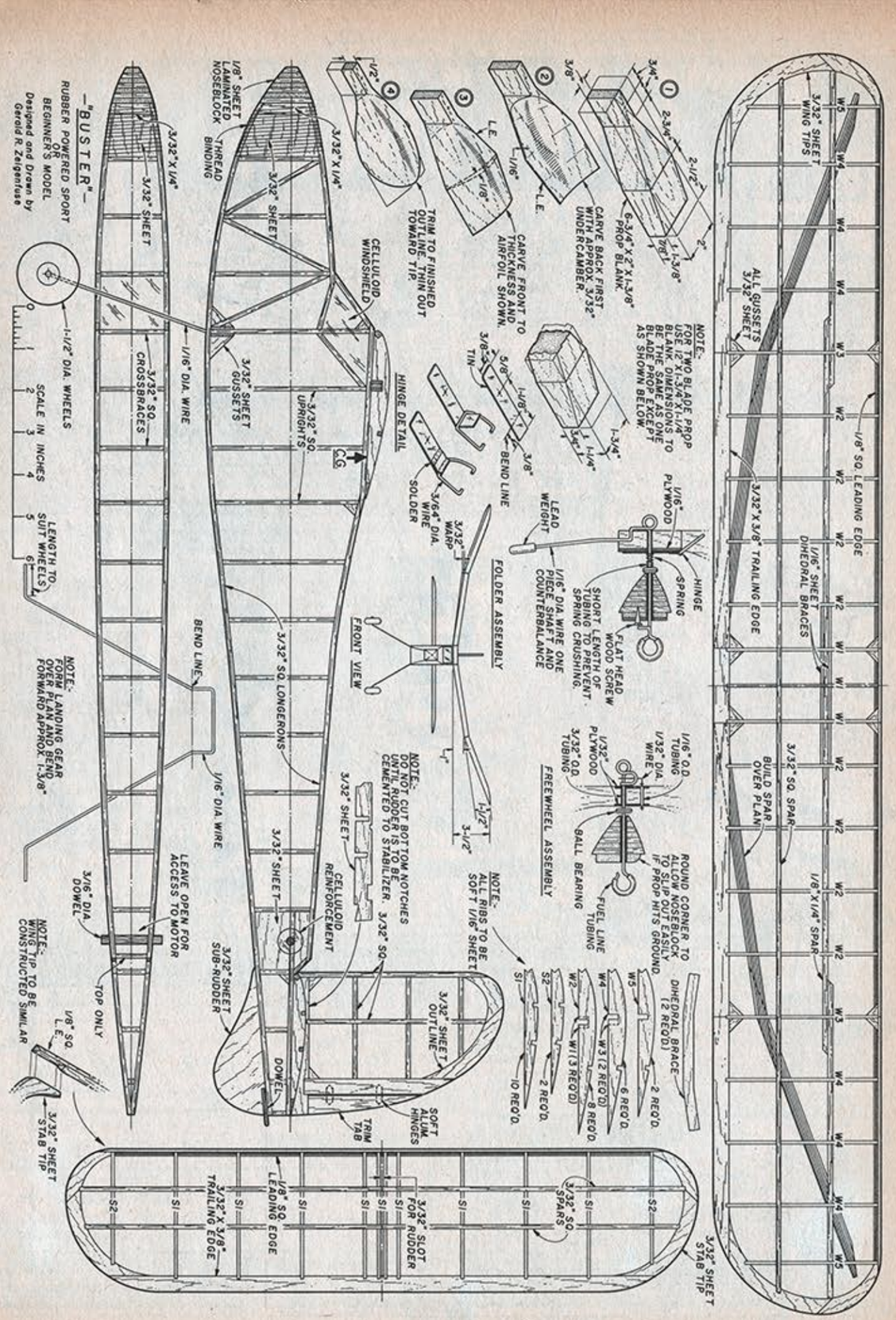
Hand winding for a short test flight, the author uses a contest-type folding one-blade prop.



► Buster is a plane that will be enjoyed by both beginner and experienced builder. For the experienced it is just the thing on a nice day when you don't want to risk flying all those hot contest jobs. For the beginner, it is the next step up towards contest models from such planes as the "Quickie Mail Plane," in the January, 1957 issue, by Sherman Gillespie.

Buster is an excellent stable performer. Because of its light weight, it is rarely damaged. It is simple to build, uses no odd sizes of wood. Commercial props may be used as substitutes for the ones shown on the plan; but I recommend carving your own prop, as it is no more difficult than carving a hand-launch glider wing. A prop is merely a twisted wing anyway! Well, let's start to build it. Study the plans and read the article thoroughly and I'm sure that you will find this a most enjoyable building project.

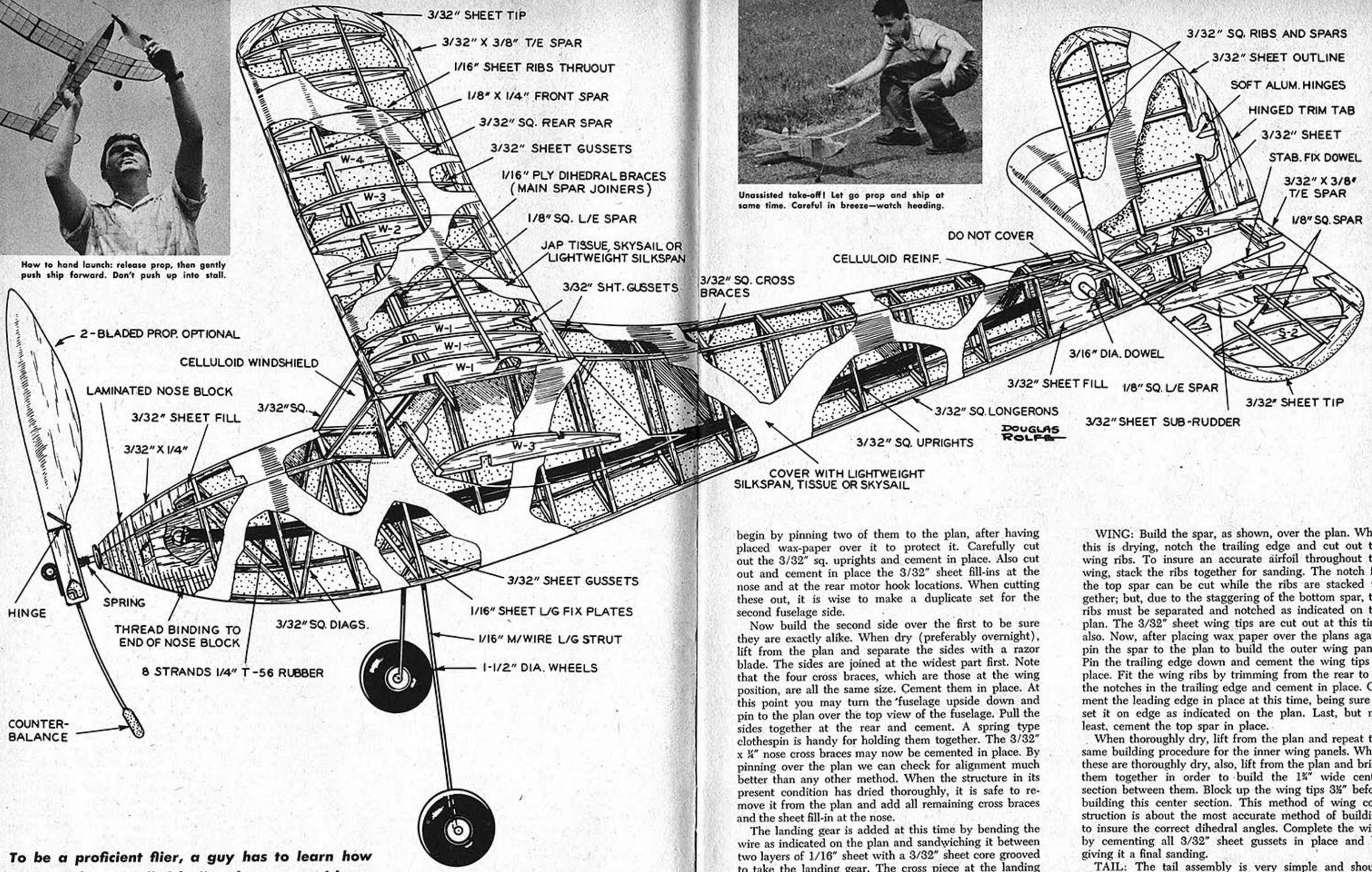
FUSELAGE: Select four very hard 3/32" sq. strips. They should be as nearly equal in strength as possible to prevent uneven bending, which would pull the fuselage out of line when assembling it. These are the longerons and we (*Continued on page* 13)



FULL SIZE PLANS AVAILABLE. SEE PAGE 56.

How to hand launch: release prop, then gently push ship forward. Don't push up into stall.

Unassisted take-off! Let go prop and ship at same time. Careful in breeze—watch heading.



To be a proficient flier, a guy has to learn how to cut and cement "sticks," and to cover with paper and dope. To know how an airplane works, what stability really is, build this free-flying ship.

begin by pinning two of them to the plan, after having placed wax-paper over it to protect it. Carefully cut out the 3/32" sq. uprights and cement in place. Also cut out and cement in place the 3/32" sheet fill-ins at the nose and at the rear motor hook locations. When cutting these out, it is wise to make a duplicate set for the second fuselage side.

Now build the second side over the first to be sure they are exactly alike. When dry (preferably overnight), lift from the plan and separate the sides with a razor blade. The sides are joined at the widest part first. Note that the four cross braces, which are those at the wing position, are all the same size. Cement them in place. At this point you may turn the fuselage upside down and pin to the plan over the top view of the fuselage. Pull the sides together at the rear and cement. A spring type clothespin is handy for holding them together. The 3/32" x ¼" nose cross braces may now be cemented in place. By pinning over the plan we can check for alignment much better than any other method. When the structure in its present condition has dried thoroughly, it is safe to remove it from the plan and add all remaining cross braces and the sheet fill-in at the nose.

The landing gear is added at this time by bending the wire as indicated on the plan and sandwiching it between two layers of 1/16" sheet with a 3/32" sheet core grooved to take the landing gear. The cross piece at the landing gear location is removed and the landing gear assembly is cemented in place with lots of cement and gusseted. The thread binding at the nose is optional, but is highly recommended, as it prevents the nose from spreading apart when taking a hard shock.

WING: Build the spar, as shown, over the plan. While this is drying, notch the trailing edge and cut out the wing ribs. To insure an accurate airfoil throughout the wing, stack the ribs together for sanding. The notch for the top spar can be cut while the ribs are stacked together; but, due to the staggering of the bottom spar, the ribs must be separated and notched as indicated on the plan. The 3/32" sheet wing tips are cut out at this time also. Now, after placing wax paper over the plans again, pin the spar to the plan to build the outer wing panel. Pin the trailing edge down and cement the wing tips in place. Fit the wing ribs by trimming from the rear to fit the notches in the trailing edge and cement in place. Cement the leading edge in place at this time, being sure to set it on edge as indicated on the plan. Last, but not least, cement the top spar in place.

When thoroughly dry, lift from the plan and repeat the same building procedure for the inner wing panels. When these are thoroughly dry, also, lift from the plan and bring them together in order to build the 1¾" wide center section between them. Block up the wing tips 3½" before building this center section. This method of wing construction is about the most accurate method of building to insure the correct dihedral angles. Complete the wing by cementing all 3/32" sheet gussets in place and by giving it a final sanding.

TAIL: The tail assembly is very simple and should prove no problem. Begin the stabilizer by cutting out all the ribs, stacking them together, and sanding and notching as you did the wing ribs. The trailing edge is notched and the stabilizer tips are cut from 3/32" sheet. Pin the trailing edge to the plan first (*Continued on page* 46)

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Buster!

(*Continued from page 13*)

and cement the tips in place. Cement all the ribs in place, trimming as per the wing ribs to fit the trailing edge and cement the leading edge in place. Finally, cement the two 3/32" sq. top spars in place. Finish by giving a good sanding.

The rudder is constructed by first cutting out the outline from 3/32" sheet balsa. Pin it to the plan and pin all the 3/32" sq. strips in place. The movable trim tab is spot cemented in place and the complete rudder assembly sanded.

NOSEBLOCK AND PROPELLER ASSEMBLY: Performance in the finished model depends on how well you construct this unit. Although it may look difficult at first, it actually is very simple. Decide which type of prop you want to use. The flight times of the author's plane were higher when using the folding prop. The two bladed prop runs longer, but the glide is not nearly as good as it with the folding prop. I also prefer the fast snappy climb you get with the one-bladed folder. However, the choice is still up to you.

Start by obtaining a medium weight balsa block of the proper dimensions as shown on the plan. Layout the prop blank and cut out with a jig saw or coping saw. The carving sequence is shown on the plan so follow it carefully. If you are carving a two blade prop, do not finish one blade first and then the other, but complete one step on one blade and repeat it on the other side. Rough balancing should also be done after completion of each step. After carving is completed, work the prop over with lots of sandpaper.

Cement a 3/8" x 1½" piece of 1/16" plywood on the back of the hub and install a ½" length of 3/32" outside-diameter tubing into it. Make the hinge next and attach to the prop by binding with thread and cementing well. Bind only to the center of the hub. When soldering, be careful that the solder doesn't flow all the way back to the wire. It will cause binding and could even solder the hinge into one solid unit, which means you have to start all over again. After the hinge is installed, cover the prop with tissue and apply several coats of dope, sanding after each coat for a nice finish.

The front end of the 1/16" wire shaft is bent first. The hub is notched out to take the counterbalance and a piece of 1/16" sheet is put back in after it. Bind the rest of the hub with thread and cement well. Cast a lead and solder weight on the end of the counterbalance slightly over-size and file the excess metal off until the prop balances perfectly. To balance the freewheeling prop, add more dope to the lightest blade.

The noseblock is made from seven ¼" sheet laminations. Drill a ¼" dia. hole through the finished block. The plug which fits into the fuselage is laminated from ¼" sheet and 1/16" plywood and cemented in place. The plywood is needed to anchor the wood screw stop firmly. If you are using the freewheeler, you can use just one piece of 3/16" sheet. The nose block must be a snug fit inside of the fuselage. Carve it to a rough outline and plug it into the fuselage and sand it to the final shape. By putting it into the fuselage you can make it blend into the lines of the fuselage better. The bushing is made by slipping a piece of 3/32" O.D. tubing into a ¼" O.D. tubing and inserting into the noseblock. We prefer this type of bushing rather than a single piece of 3/32" O.D. tubing because the smaller diameter tubing will tend to cut into the sides of the noseblock when subjected to any kind of punishment.

Slip the tensioner spring over the shaft along with the short (¾") length of tubing and the ball-bearing washer and insert into the noseblock and bend the loop at the rear. Slip fuel line tubing around the loop to prevent the shaft from cutting the rubber motor. One of the secrets of a perfectly functioning tensioner is to bend the loop as close to the back of the noseblock as possible. If you don't, you will have to back the wood screw out too far to engage the stop on the shaft. The wood screw will work loose in short order and come out. The Folder Assembly sketch on the plan shows about ¾" space between the back of the noseblock and the stop on the shaft when the tensioner is at rest. The freewheeler assembly is sketched on the plan and you should have no trouble with it.

COVERING: If you can obtain Jap Tissue, use it. If not, light weight Silkspan or Skysail will work well and will be more durable at the cost of a slight increase in weight. Before covering, give the entire airframe a good sanding and check all the joints. An extra coat of cement is well worth the time involved. Put a coat of clear dope on every part of the airframe that will have the covering attached to it, on the fuselage, longerons, the wing and tail, the leading and trailing edges, and the ribs at the dihedral breaks. Sand the fuzz off with fine sandpaper and proceed to cover. This preparation is very necessary as it helps the tissue adhere better.

The fuselage is covered with four pieces of tissue, one for each side. The grain should run the length of the fuselage. Put clear dope all around the edges of one side and lay the tissue on it. Attach one end at the front and pull the other end to the rear and attach it. Do not pull tight, but just enough to pull out any wrinkles. Go back to the front and pull the tissue out and attach to the sides, working toward the rear. Again use just enough tension to smooth out the wrinkles. All four sides are done in this manner. When finished, spray with water and let dry. The tissue now will be stretched tightly and you can brush on three to five coats of clear dope cut 50-50 with thinner.

The wing is covered top and bottom. Each section of the wing is covered with two pieces of tissue, one for the top and the other for the bottom. The wing and tail are covered in the same manner as the fuselage. That is, just dope around the edges and when attaching paper just pull it tight enough to smooth out the wrinkles. If the tissue doesn't want to smooth out at the tips, cover them with separate strips between each rib. The wing and tail are also given three to five coats of thin, clear dope. Avoid using colored dopes as they really add to the weight. If you want to trim it fancy, use colored tissue instead.

FINAL ASSEMBLY: The rudder is now cemented into the stabilizer. Also cut the rudder tab away (you remember it was spot cemented in place during construction) and install the soft aluminum hinges. The tail assembly may be cemented directly to the fuselage if you so desire, but for ease of transportation, it is best to have it removable. In this case you must cement two 3/32" sq. strips to the bottom of the stab to key it to the fuselage. This will prevent shifting and allow it to be put on correctly every time. Check the surfaces for warps and be sure they are free of them except for the one in the wing as shown on the front view on the plan.

The motor is made up of eight strands of ¼" T-56 24" long. I've tried many different motors and find this to work best along with an equivalent motor of six strands of ¼" Pirelli. Wash the motor in lukewarm water and when dry, lubricate it with a mixture of glycerin and tincture of green soap. This is easily obtained at any drug store. Prewind the motor by starting at 200 turns and work up to 600 turns, 100 turns at a time allowing about 45 minutes rest in between. This motor will take more than 600 turns, but it will deteriorate rapidly so use 600 turns as your maximum and one motor will last several months. Insert the motor into the fuselage and secure at the rear with the 3/16" dia. dowel. Adjust the wood screw to stop the prop with approximately 50 turns left in the motor. If you are using the freewheeler use a shorter motor with about 1" of slack or tension the 24" long one. This is accomplished by splitting the motor into two sections and winding each one about 100–150 turns backward. Then allow to unwind at the rear and let the motor entwine about itself.

Balance the plane at the point shown on the plan, which is 1" forward of the trailing edge, by adding weight to the nose or tail. The weight of the wheels can be used to advantage, heavier wheels to be used if the plane is tail heavy.

FLYING: Wait for a nice day before attempting any flights. As the weather is usually poor when you finish a plane (it almost always is for me) you have time to check the plane for warps and balance again. I repeat, check for warps and balance and correct if necessary.

Test glide the plane by aiming it for a point about 50 feet ahead of you on the ground and giving the plane a slight shove toward this point. Do not point it up because it will stall even though the trim may be perfect. If the plane stalls, shim up the trailing edge of the wing 1/32" at a time until a smooth, flat glide is obtained. If the plane dives, shim up the leading edge of the wing 1/32" at a time until a good glide is obtained. At the same time bend the rudder tab over to the right to get right hand glide circle. A 75-100 ft. dia. circle is adequate. After you are satisfied with the glide, wind about 75 turns into the motor and launch into the wind. Again, do not push, but give the same slight shove as you did when hand gliding. The plane should climb about 20-30 ft. and then glide gently back down after the prop folds. Watch the glide as you can make final adjustments on it at this time.

As you increase the number of winds on succeeding flights, you may notice the plane turning sharply or climbing too steeply. Correct this by using thrust adjustments. To correct a stall, use downthrust by placing a sliver of wood in back of the noseblock at the top to angle it down. If 1/16" downthrust fails to kill the stall, remove it and start by using a right thrust adjustment. My plane needed only 1/32" right thrust. Each plane varies slightly, so adjust to suit the needs of your plane for a right hand power turn and right hand glide turn. Remember, use the rudder for glide turn only and thrust adjustments for power turn. As your adjustments correct the flight path of the plane, increase the number of turns and use a winder. As you approach 600 turns, the plane will leap out of your hand and go into a steep right hand spiral, which gradually opens up as the power diminishes and the plane makes its transition into the glide circle.

I hope you have as much fun flying Buster as I have. The original shown in the pictures has gone through three motors and has over a hundred flights on it with the only damage being tears in the tissue when pulling it out of trees. It is, without a doubt, my favorite plane and I hope it will be your favorite too. I would be interested in hearing from anyone who builds this plane so write to me c/o MAN.

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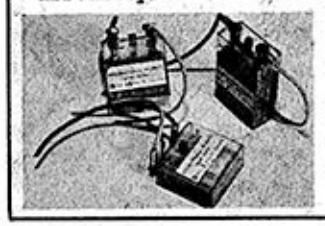

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