Building the Ramsey

CHAPTER V

The Ramsey "Flying Bathtub" is the editor's answer to the insistent demands for a two-place side-by-side sport plane that is easy to fly and that can be relied upon for cross-country work. This little ship is powered with the rugged and reliable Aeronca motor which develops thirty horsepower and which gives you a cruising range of 150 miles with only five gallons of gasoline in your tank.

The Ramsey "Flying Bathtub" is a lightly powered ship which has been designed with the sensible intention of creating a moderately fast trainer which can also be used for cross-country work where the owner's pleasure rather than speed is the primary consideration. Inexpensive to build, simple in its general design and structural details, it has certain definite characteristics which will appeal to one who appreciates real performance.

Perhaps the outstanding single characteristic of the "Bathtub" is the way it handles in the air. Test flown by one of the best-known Northwest pilots, it proved to be easy to take off, simple to handle in the air, and a positive joy to land. Veteran pilots who have since flown this job agree that in spite of its moderate horsepower and general light weight, the bathtub behaves and flies exactly like a large and powerful ship.

This is of the utmost significance to amateurs, who are apt to find in the average light plane a tricky behaviour which calls for more experience than they are likely to have. The pilot who test flew this job has remarked that it is safe and easy to fly; that it will land itself, and that it has no apparent vices.

Even a beginner can pull the "Bathtub" off the ground with a run of 100 feet or less. (By beginner I mean a student pilot and NOT any person with no training at all.) Once in the air, its extreme ease of handling, remarkable stability and responsiveness to controls make it an ideal ship for sport purposes. With the unusually low landing speed of twenty miles an hour, many of the difficulties presented by this operation are automatically eliminated. The nature of the design permits exceptional vision, and while this feature is important at any time, it becomes paramount in landing.

The "Flying Bathtub" is definitely not in the "Flying Post Card" class, but with the
Flying Bathtub

by
W. H.
RAMSEY
Designer

The Ramsey two-seater light plane loses nothing in this striking contrast with a large plane of similar general lines. Sound design and safety are characteristic features of the two ships.
ease, and the simple little motor is not only extremely accessible, but also sufficiently rugged to stand lots of work without constant attention.

**Fuselage and Outrigger**

The fuselage, tail surfaces and landing gear are built of chrome-molybdenum seamless steel tubing of conventional braced type. The wing is of wood and fabric construction. All plate type fittings are made from .049 chrome-molybdenum steel, and only aircraft steel bolts are advisable.

In starting to build the fuselage it is necessary to procure a flat surface, preferably a table, large enough to lay out all the measurements. All measurements, unless otherwise specified, are from center to center of the tubing. Care should be taken to have these absolutely accurate.

After laying out the outline from the centers, make allowance for one-half the tube's diameter, and drive straight in, ten-penny nails between which the tubing will be placed and held true until spudded together with a welding torch.

Care must be taken in welding chrome-molybdenum tubing, as insufficient heat will make a very nice-looking weld, but upon destroying the weld, it will be found that the

### Specifications of the Ramsey "Flying Bathtub"

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>High Speed</td>
<td>65 to 70 m.p.h.</td>
</tr>
<tr>
<td>Cruising Speed</td>
<td>60 to 65 m.p.h.</td>
</tr>
<tr>
<td>Landing Speed</td>
<td>20 to 25 m.p.h.</td>
</tr>
<tr>
<td>Initial Climb (1 person)</td>
<td>300 ft. per minute</td>
</tr>
<tr>
<td>Initial Climb (2 persons)</td>
<td>300 ft. per minute</td>
</tr>
<tr>
<td>Gasoline Capacity</td>
<td>5 gallons</td>
</tr>
<tr>
<td>Gasoline Consumption</td>
<td>2 gals. an hour at Cruising Speed</td>
</tr>
<tr>
<td>Motor, Aeronca, 2-cyl. horizontal opposed air cooled</td>
<td>30 h.p. at 2500 r.p.m.</td>
</tr>
<tr>
<td>Span</td>
<td>5 ft. 3 in.</td>
</tr>
<tr>
<td>Wing Area</td>
<td>168 sq. ft.</td>
</tr>
<tr>
<td>Weight (with gas and oil)</td>
<td>400 lbs.</td>
</tr>
<tr>
<td>Useful Load</td>
<td>300 lbs.</td>
</tr>
</tbody>
</table>
**Glider Manual**

<table>
<thead>
<tr>
<th>Speed Range</th>
<th>Gallons</th>
<th>lbs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.65 to 70 m.p.h.</td>
<td>8</td>
<td>400</td>
</tr>
<tr>
<td>60 to 65 m.p.h.</td>
<td>8</td>
<td>300</td>
</tr>
<tr>
<td>20 to 25 m.p.h.</td>
<td>8</td>
<td>200</td>
</tr>
<tr>
<td>100 ft. per minute</td>
<td>8</td>
<td>168 sq. ft.</td>
</tr>
<tr>
<td>500 ft. per minute</td>
<td>8</td>
<td>.168 sq. ft.</td>
</tr>
<tr>
<td>8 gallons at Cruising Speed</td>
<td>8</td>
<td>.300 lbs.</td>
</tr>
<tr>
<td>.65 to 70 m.p.h.</td>
<td>8</td>
<td>.300 lbs.</td>
</tr>
</tbody>
</table>

**Flying and Outrigger**

Fuselage, tail sur-
rounding gear are
of chrome-molybde-
num steel tubing.

The wing is of wood
fabric construction.

All measurements, if
otherwise specified,
are center to center of
the centering bars.

Care should be
accurate.

- Allowance for one-half the
diameter,
- Drive,
- Nails
- Welding torch.
- Insufficient heat will
- will be found that the

**Measurements**

- .65 to 70 m.p.h.
- .60 to 65 m.p.h.
- .20 to 25 m.p.h.
- .100 ft. per minute
- .500 ft. per minute
- .8 gallons
- Cruising Speed
- at .2500 r.p.m.
- .32 ft.
- .5 ft. 3 in.
- .168 sq. ft.
- .400 lbs.
- .300 lbs.
Simple Construction and Detailed Plans Make "Bathtub" Easy to Build

This three-quarter view shows the unique fuselage design from which the "Flying Bathtub" derived its name. The large wing area evident here reveals why this ship can come in and land at 20 m.p.h.

filler is only pasted on. Too much heat will destroy the metal and weaken the joint.

Having the jig ready for laying in the tubing, curve the members to be used for longerons as nearly to shape as possible to form the top and bottom lines of the fuselage.

By curving the tubing, which can easily be done cold (do not heat), there will be no sharp bends at the joints and the work will be symmetrical. Place the longerons in the jig, then cut and lay in all brace members. Then spot weld and remove the assembly. Cutting off the nail heads will assist in removing the work.

As both sides of the fuselage are identical, both may be built in the same jig. Now connect the two sides with the main cross members, both top and bottom, being sure to have them at the proper joints and both sides the same distances. Square the assembly by measuring opposite diagonal corners and getting both distances the same. Then put in diagonal braces. If proper care is taken the fuselage will be square.

Now fasten the fuselage solidly to the floor and proceed with the outrigger. This should be kept as nearly true as possible, but being wire braced, minor variations are readily corrected. Brace the outrigger with No. 10 hard aircraft wire.

The landing gear is built entirely of ½”x-1” square .049 tubing with the exception of the axles, which are 1” with ½” wall round tubing. This gear is of very simple construction, and the plans are so clear that no one will have any trouble with this detail.

The tail skid, which is shown in minute detail in the drawings, contains a 1”x8” coil spring having a pressure capacity of eighty pounds. In constructing, first build up both ends, put the spring in the upper end, compress the strut, put in the bottom bushings, and weld as shown in the plans. The strut should be left compressed until cool so as not to draw the temper from the spring.

In the next installment we will take up the construction of the wings. These are of the conventional spruce and fabric construction, so if you are able to go ahead with the fuselage, the rest will be easy. If the welding is too much for your workshop, it will pay you to call in an experienced welder. A good man should be able to do the whole job for you in two days; and you will be more confident when you take the air if you know that a workmanlike job of welding has been done.

Just a word of warning before you start building. If you haven’t the price of an Aerocraft motor, or one of the other motors especially designed for light planes, such as the Continental A-40 or the Bristol Cherub, build some other plane. Converted auto or motorcycle engines cannot be used.

BLUEPRINTS FOR THE "FLYING BATHTUB"

If you are contemplating building the "Flying Bathtub" and would like a set of blueprints from the designer’s original drawings (similar to these reproduced here, but done up larger for shop use) you can obtain them for $7.50 from Modern Mechanics and Inventions, 529 South Seventh Street, Minneapolis, Minn.
The wings are of the and fabric construction, and should be able to complete the work. Only select spruce should be used. Compress strut braces are not necessary. The wings can be fabricated with aluminum or plywood, with the choice depending on the desired appearance and weight. The wings should be strong and lightweight, with proper bracing to ensure stability. The diagram provides detailed instructions for the construction of the wings, including the use of spruce and plywood for the spars and compression struts. The diagram also shows the placement of the control wires and the aileron spars. The wings are designed to be lightweight and easy to build, with detailed instructions for the construction of the spars and compression struts.

Building the Wings

The wings are of the and fabric construction, and should be able to complete the work. Only select spruce should be used. Compress strut braces are not necessary. The wings can be fabricated with aluminum or plywood, with the choice depending on the desired appearance and weight. The wings should be strong and lightweight, with proper bracing to ensure stability. The diagram provides detailed instructions for the construction of the wings, including the use of spruce and plywood for the spars and compression struts. The diagram also shows the placement of the control wires and the aileron spars. The wings are designed to be lightweight and easy to build, with detailed instructions for the construction of the spars and compression struts.
Five Gallon Wing Tank Gives Cruising Range of More Than 150 Miles

Building the Wings

The wings are of the conventional spruce and fabric construction, so if you have been able to complete the welded steel fuselage, the rest should be easy.

Only select spruce, free from knots and pitch pockets, should be used for the wings. It should have eleven to twelve annular rings to the inch and should be straight grained. There is absolutely no substitute for aircraft spruce in this work, and one is foolish to attempt to cut the cost a few dollars by using cheaper wood. When in the air the weight of yourself, your plane, and your passenger are carried by the wing, and the best material is none too good.

If the wood for spars is procured at your local lumber yard it is advisable to have it cut too wide and then let it season in a moderately warm and shady place, so that in the event of slight warpage it can be cut and made true. Wood secured from an aircraft lumber company is usually thoroughly seasoned before being cut and sold.

The wing is double wire braced with No.
This Plate Gives All Necessary Details for Making the Wing Spars

Complete details of the flying struts and attachment fittings are given on this plate. All struts are of 1/4" x 0.032 gauge chrome molybdenum steel tubing, streamlined with ribs of 5/16" x 0.032 gauge aluminum soldered to the struts and spaced nine inches from center to center. These are covered with burlap fabric and doped. If these struts are constructed accurately you won't have to worry about the angle of attack of the wings, as this has been taken care of on the drawings.

1/16 hard wire (market wire). The top and bottom wires pass through the edge of the spars and cross behind the compression struts.

To save work it is advisable to assemble the wing on a table to which blocks have been fastened in a straight line so that they will just fit inside the spars. This will enable you to remove the wing from the jig true, if equal pressure has been put on the brace wires.

In assembling the wing, slide the wings on the spars to their approximate place.

Then put plywood reinforcements on at the fitting, joints and drill for fitting. The ribs may then be slid to the correct place and nailed and glued firm.

The jig for the wing ribs may be made similar to that of the fuselage, but it is better to lay out the rib full size, from the dimensions given on the working drawing, on a large piece of heavy paper, the paper being fastened to a flat board of sufficient size.

The boundaries and keepers for the cap strips and diagonals should be formed out of rib stock. This rib stock may either be pur-
Powered With a

This three-quarter front view of the airplane is mounted.

chased ready cut, or own shop by sawing are a full quarter of all the rib stock of Blocks, of the same size. Should be nailed in at

When the jig is in the ribs becomes a simple is cut to proper size then the junction point gusset plates cut from on with casein glue, and wire nails. When of fastened together, re and glue and nail the junction points on the

All ribs are alike ex ailerons. To change ribs, cut out 1½" rear spar. A half in the aileron spar, shown behind this cut-out on diagonal pieces at this moved back proportion of the drawings will be to you.

Incidentally, the diagonal pieces spar are not shown on the spars (one for each wing stock. The depth of light by measuring the airfoil is laid out.

When assembling ends aileron hinges on the spar. This is necessary aileron from traveling

The Emp

The various photographs, ship, especially the on this article, will give y
Chased ready cut, or may be made in your own shop by sawing spruce into strips which are a full quarter of an inch square. Have all the rib stock of the same dimensions. Blocks, of the same dimensions as the spars, should be nailed in at their proper places.

When the jig is once made, making the ribs becomes a simple process. The rib stock is cut to proper size and placed in the jig; then the junction points are covered with gusset plates cut from 1/16" plywood, glued on with casein glue, and nailed with 1/4" x 22 wire nails. When one side of the rib is fastened together, remove it from the jig and glue and nail the gusset plates over the junction points on the other side.

All ribs are alike except those forming the ailerons. To change the jig for your aileron ribs, cut out 1 1/4" immediately behind the rear spar. A half inch block, representing the aileron spar, should be then nailed behind this cut-out on your jig, the strut and diagonal pieces at this section of the rib being moved back proportionately. A careful study of the drawings will make this detail evident to you.

Incidentally, the dimensions of the aileron spar are not shown on the drawings. These spars (one for each wing) are of 1/2" spruce stock. The depth of all spars is best ascertained by measuring the openings after your airfoil is laid out.

When assembling your wing, have both end aileron hinges come inside the hinges on the spar. This is necessary to prevent the aileron from traveling sidewise.

The Empennage

The various photographs of the original ship, especially the one on the last page of this article, will give you a good idea of the external appearance of the tail surfaces. The working drawing of the tail group will show you everything you will need to know about this part of the job. The entire empennage...
Complete Details for Attaching Flying Struts to the Wing Spars

These two working drawings give dimensions and details for attaching the front and rear flying struts to the wing spars. You will note that the sparce spars are protected by placing a piece of ½" plywood between them and the strut fittings, which are made of 20 gauge steel. Reference to the plate on page 690 will reveal that the flying struts are attached to the spars between the last two full ribs on each wing. Place these fittings accurately.

The external appearance of the tail surfaces. The working drawing of the tail group will show you everything you will need to know about this part of the job. The entire empennage is welded up of steel tubing, and if you don't forget the extra care which the smaller sized tubing will require in welding you should have no trouble with this work. There is little difference between the horizontal stabilizer assembly and the vertical-fin-rudder assembly save size and position. The stabilizer and rudder both have ¾"x.032 tube hinge beams, while 5/16"x.032 and ¼"x.032 steel tubing is used elsewhere, as pointed out in the drawing.

You will find that the empennage will warp considerably where the light tubing is used, but with a little careful checking and lining up by hand, bending cold, for there is little bending to be done, you will get a perfect job.

There is quite a trick to heating a steel tube in the proper place to get the right results. Heat the tube on the side which is to be bent to a dull red. At first this actually increases the bend, but when the tubing cools...
This Roomy Cockpit Permits Side-by-Side Flying in Comfort

off you will find that it has assumed an angle opposite to the original bend, and almost invariably come out exactly right.

In handling small tubing, extreme care must be taken not to get the metal too hot and burn the tubing. It is easy to tell if the weld is good. If it is so clean that it looks as if new metal had been placed there the job is okay. A poor weld has a sand effect on the outside and is very scaly. If these faults show up, throw that piece away and build a new piece. It is for this reason that I advise that you call in a welder for a couple of days if you can't do a good job yourself. The man's wages could easily be less than the cost of the material you might spoil.

Controls

The working drawing on the last page of this article gives such a complete description of the control assembly that further comment is unnecessary. You will note that the pedal assembly is for dual controls, while there is only one stick, which is rigged up in the center of the cockpit. The pilot, therefore, will have the stick at one side instead of between his legs. The gun should be placed on the most convenient side for the one who will usually do the taking off and landing. If dual control is not desired, one set of pedals may be omitted.

Rigging

Both wing panels should be set exactly alike. The horizontal stabilizer should be level unless it is found necessary to correct for either nose or tail heaviness. Take plenty of time, get everything correct, and a good flying ship will be your reward.

Covering and Doping

This procedure should be carried out by
the envelope method wherever possible, and the open edges hand sewed. Use three coats of clear dope and two of pigmented dope, applying the first coat with either a brush or a low pressure spray gun. Be sure the first coat thoroughly penetrates and fills the fabric and that all other coats thoroughly cover. Doping should be done under fairly warm conditions and each coat permitted to dry before further application.

These working drawings show the method of attaching the wing to the top longon, and give full details for the dual control foot pedal assembly. One set of pedals may be omitted if desired.
Good Instructor

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