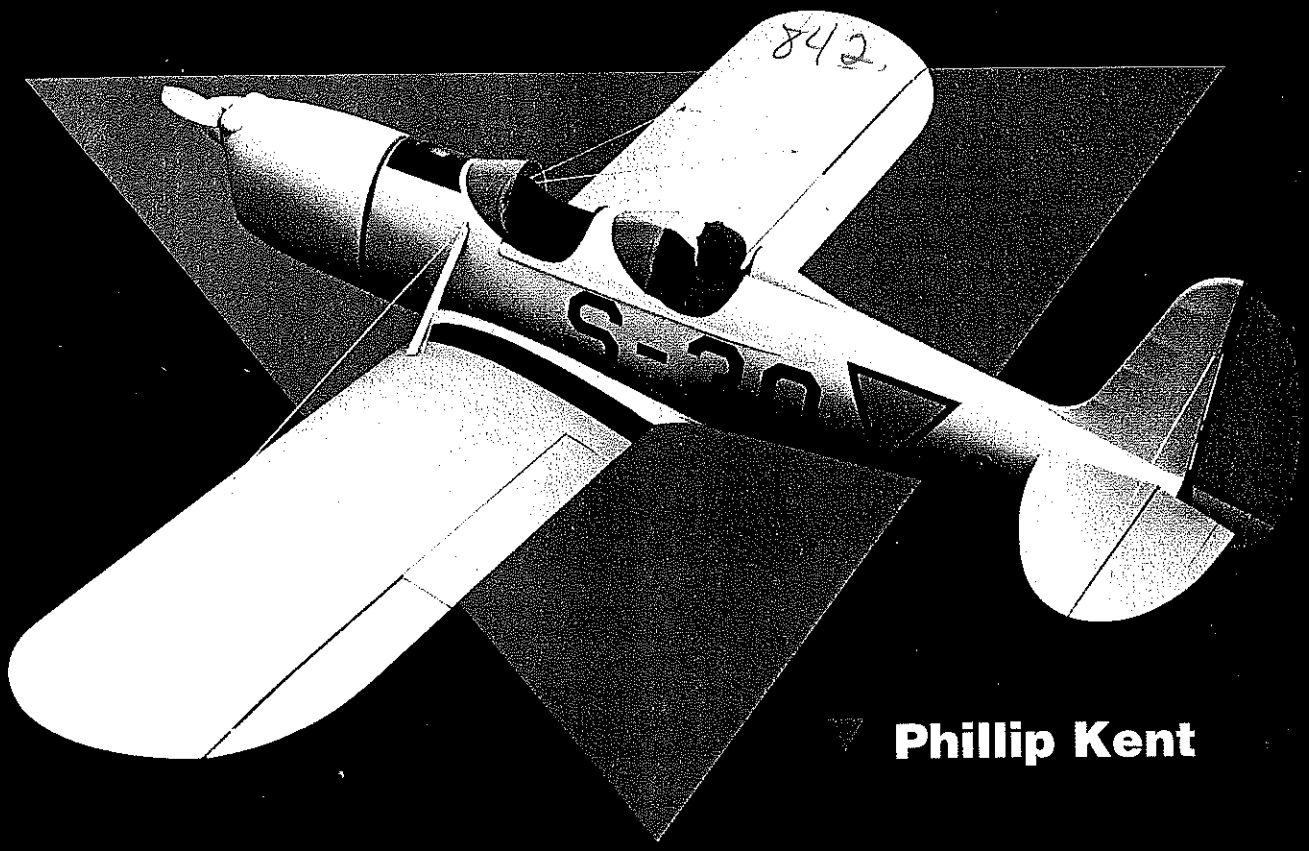
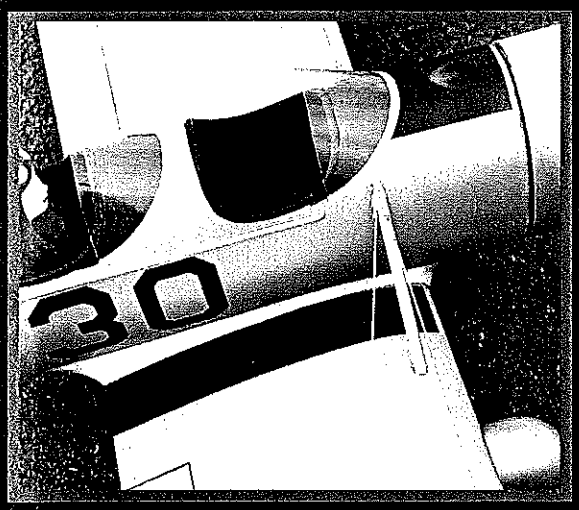
RYAN SPORT TRAINER



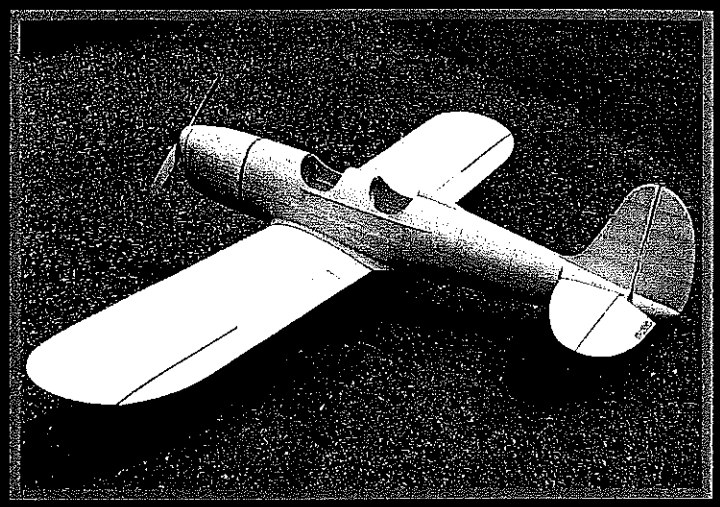
Phillip Kent

This small Ryan is easy to transport in one piece (no wasted time on the flying field) and is also very economical to run. It is small in size by today's standards for Scale models, but some people need and like models like this.

This 1/6-scale model is based on the Netherlands East Indies aircraft that were purchased in 1940 as STM-E2 landplane trainers. The inspiration came from the very nice color photographs that appear on the covers of the Dorr B. Carpenter book *Ryan Sport Trainer*, SunShine House, Inc. ISBN 0-943691-03-6.



Cockpit openings are padded; windshields are made from sheet acetate with litho plate trim. Wing bracing is shirring elastic.



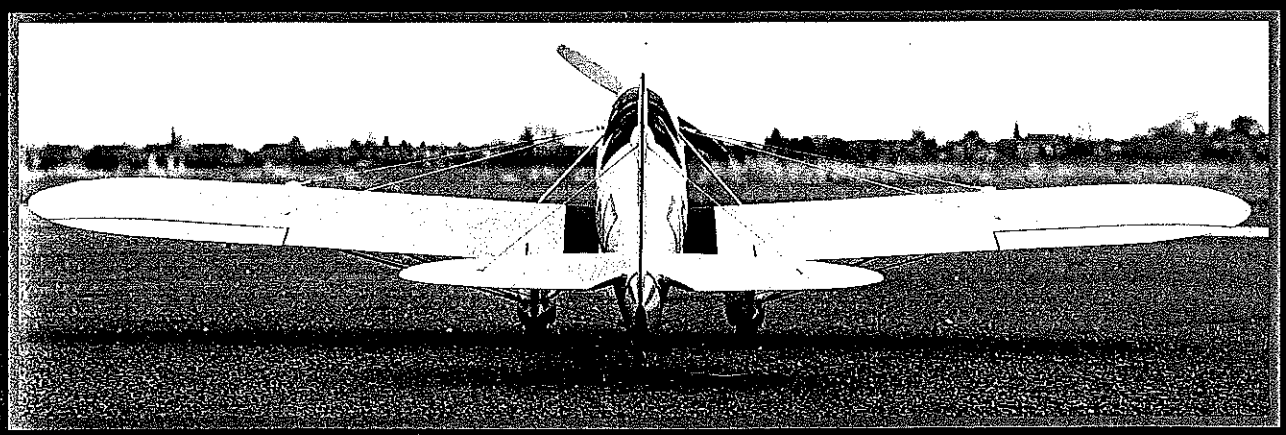
The Ryan was covered with heat-shrink fabric, and was given a coat of cellulose primer before final silver finish.

CONSTRUCTION

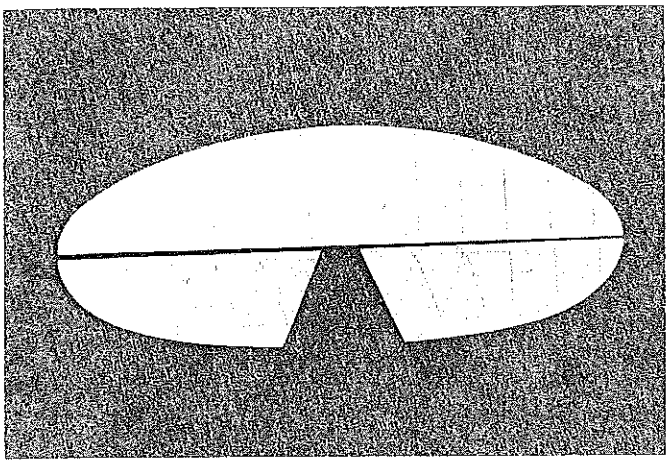
The Ryan ST uses typical model aircraft construction techniques. The materials used are balsa, plywood, and a small amount of hardwood.

Fuselage: The fuselage uses the crutch method of construction. A ½ x ¼ balsa strip is pinned over the plan and the cross-pieces fitted. Cement ⅛ square balsa strips to the crutch to support the sheet covering. The upper formers are added next and then the 3/32 sheet balsa capping pieces. Fit the engine bearers and cover the structure with 3/32 sheet balsa.

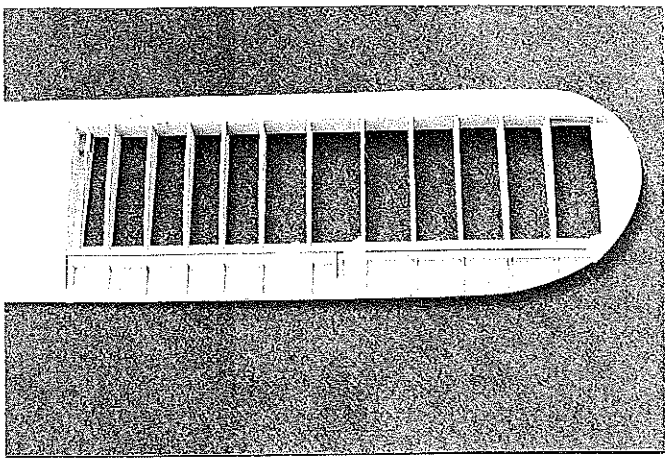
The upper fuselage should still be in place over the plan while the sheeting is being fitted. Because there are no compound curves, there should be few problems with the application of the sheeting. Wetting the outside with water will help the sheeting to bend; use pins to hold it in place until the glue dries.



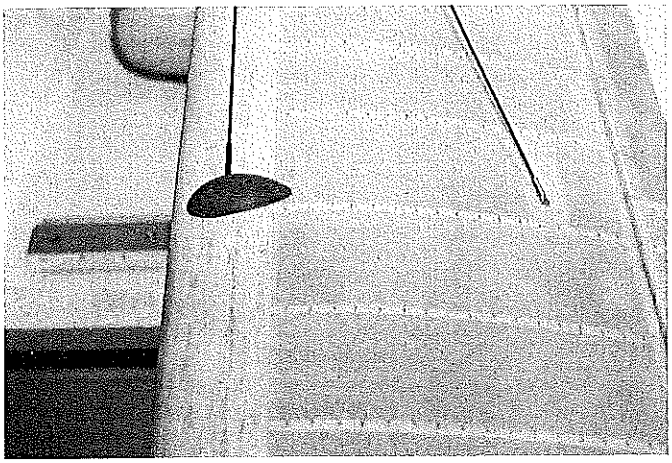
The author was pleasantly surprised at the Ryan's ground handling and landing characteristics—not "skittish," he says.



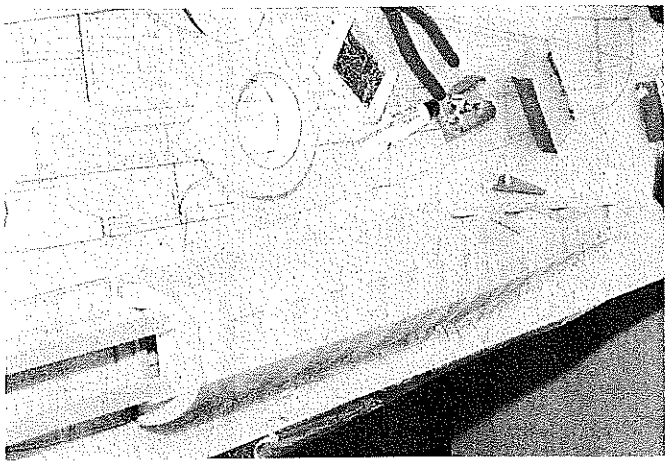
Prototype stabilizer used sheet-balsa core with strip ribs; author feels that solid sheet balsa would also work.



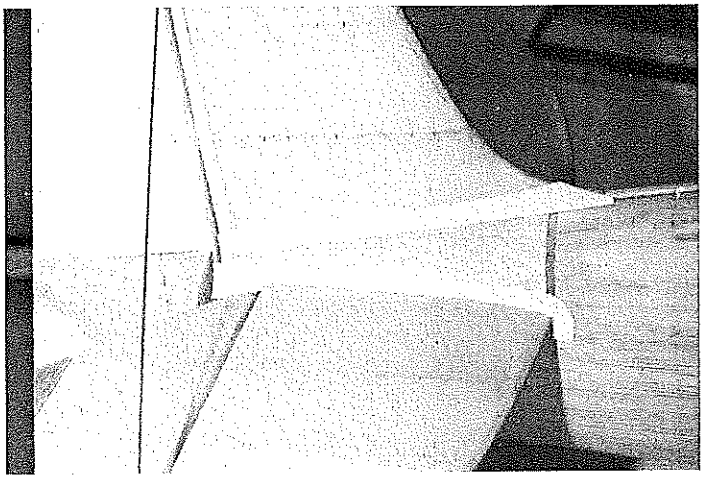
Flaps and ailerons are built on balsa sheet bottoms. The aileron tip curves upward to follow the spar shape.



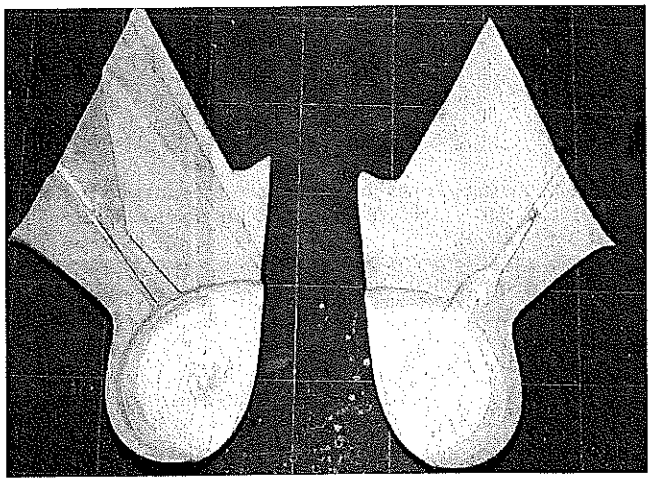
Wing rib tapes were made from tissue; simulated stitching,rivets were made from white glue. Sanding sealer panel lines.



Fuselage half-shell under construction, using crutch method. The Ryan's lack of compound curves makes sheeting easier.



Tail section fairings and brace wire detail. Tailplane bracing is thin piano wire soldered into flattened brass tubing.



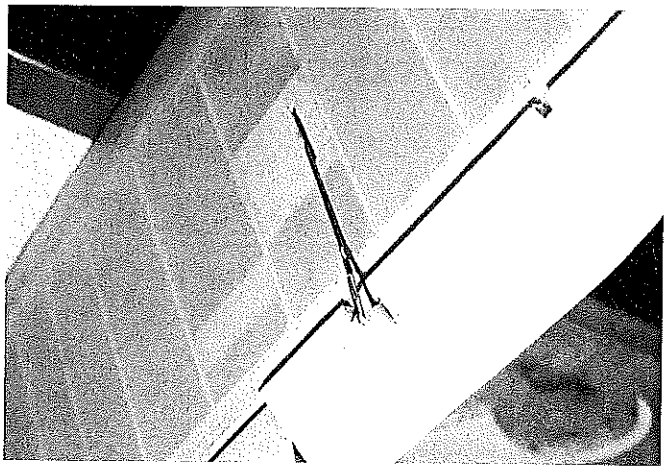
Balsa-and-plywood wheel "spats" are tack-glued together for carving, then split and hollowed. Glass cloth cover.

Remove the half-shell from the plan and add the bottom formers and capping pieces. Build in the tank compartment and then complete the sheeting. Trim and add the ¼ sheet capping pieces to the top and bottom, using balsa cement as the adhesive. Carefully carve the cappings to shape and sand to size.

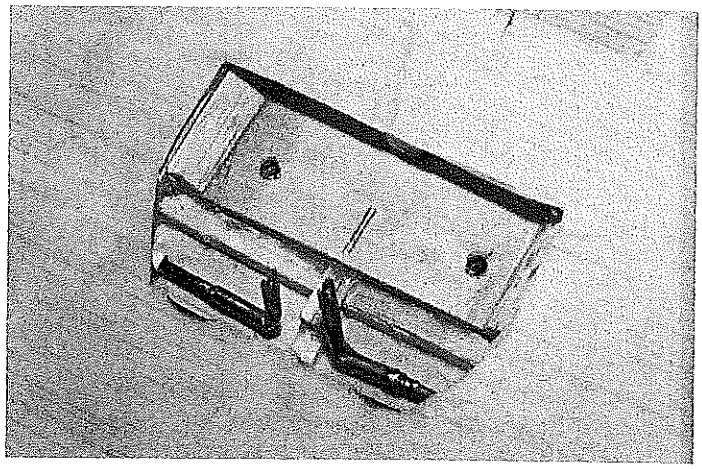
The cowl is designed to fit over the engine from the front. Fit the formers F1, F2, and F3 in position on the engine bearers, tack in place, and add the ½ sheet top and bottom pieces. Plank the top of the cowl and sheet the sides. The cowl front and bottom are from soft block balsa. These pieces should be tacked in place and carved to shape before cutting out the cooling holes.

Additional work on the fuselage should be left until after the wings are completed. Then, using the completed wing as a pattern, cut away the bottom capping and sheeting so that the wing is a snug fit. Add the .4mm wing-root fairing

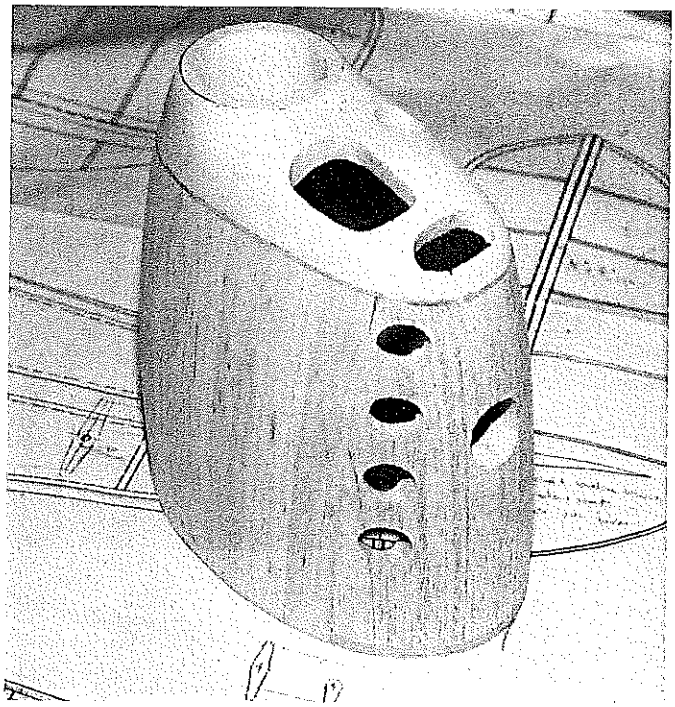
Continued on page 20



Flaps and ailerons use Robart hinges.



Flattened brass tube is soldered to torque rod.



Cowl is planked on top with sheeted sides. Front and bottom are carved from soft block balsa, then cooling holes added.

RYAN SPORT TRAINER

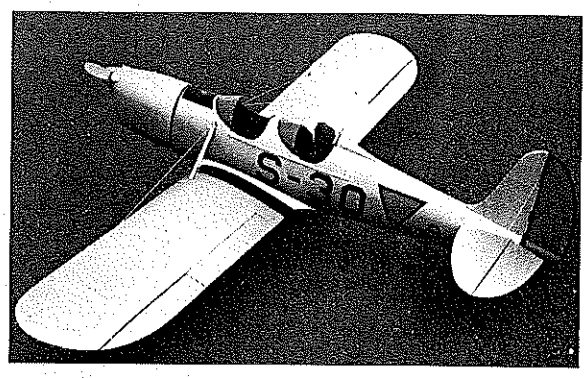
Type: RC Scale **Wingspan:** 60 inches

Engine: O.S. Max 40 Surpass

Functions: Rudder, elevator, throttle, ailerons

Construction: Built-up

Covering/finish: Glass cloth & heat-shrink film; cellulose paint w/fuel proofer



In the difficult times of the 1930s, commercial flying businesses could only make a living by using the older Aeronca, Travel Air, Taylorcraft, Great Lakes, and WACO aircraft for flight instruction.

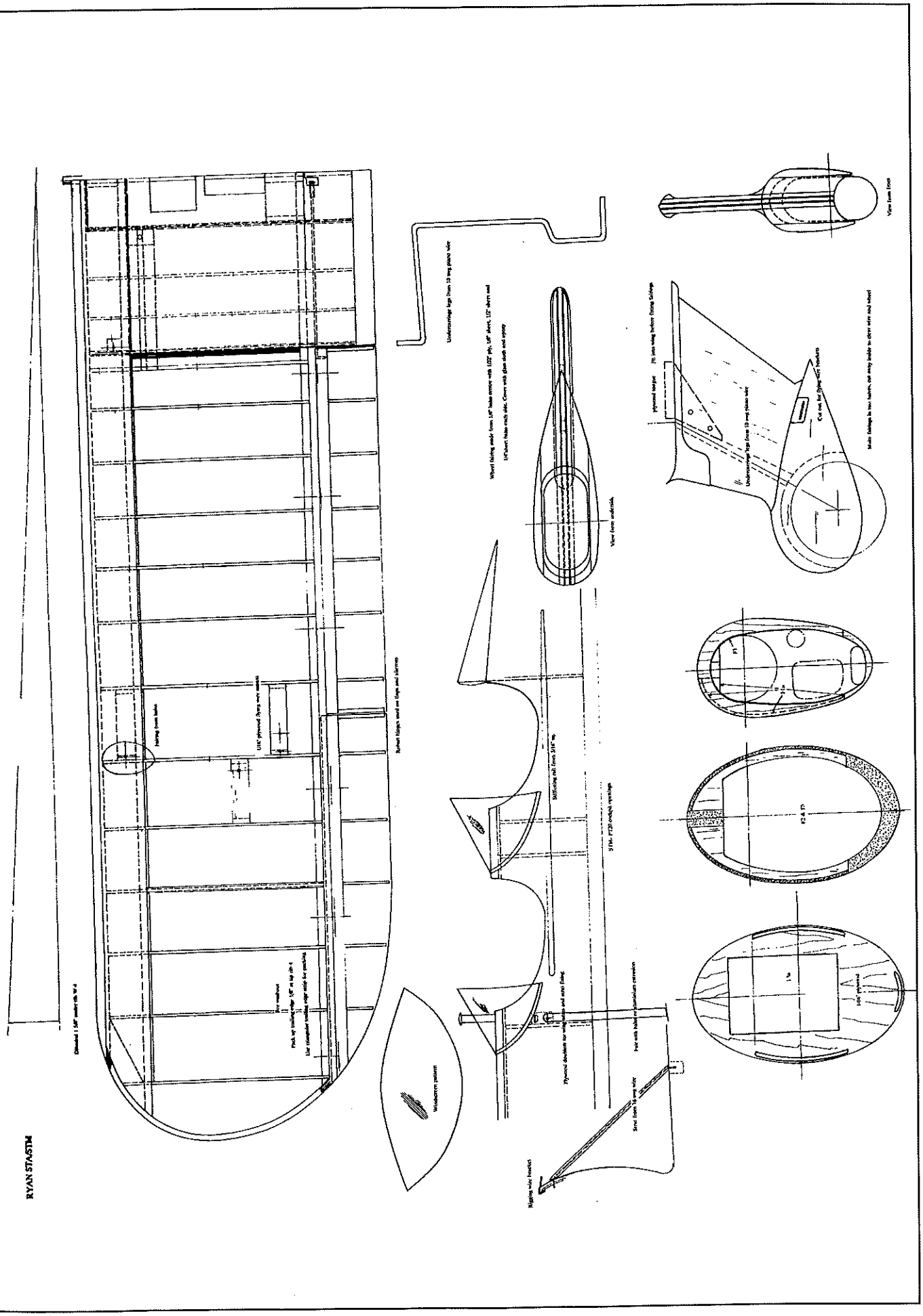
To design a new aircraft for this market was a risk, but in 1932 Claude Ryan engaged a young engineer named Millard Boyd to develop his original ideas for a low-wing streamlined monoplane that would be capable of meeting the needs of trainee pilots.

The new Ryan, called the Sport Trainer, flew for the first time on June 8, 1934—only nine months after the first drawings were produced. The early models were somewhat underpowered by the 95hp Menasco B4 engine, and a new version called the STA (using the 124hp Menasco C4 or D4 engine) was introduced. Military versions of the aircraft were known as the STM (Sport Trainer Military Model). There was little difference between the military aircraft and their civilian counterparts.

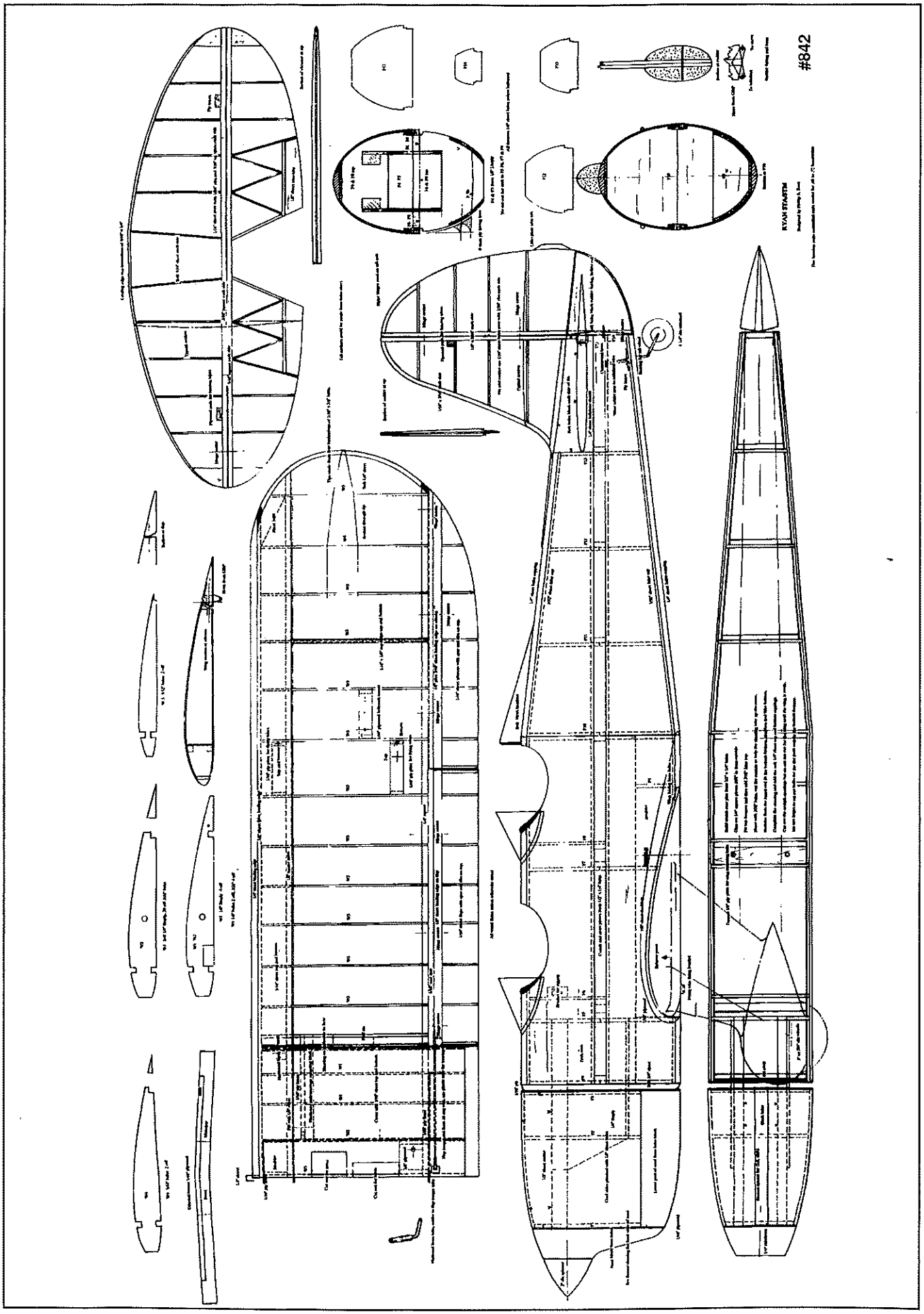
Mexico was the first country to order the unarmed STMs. Honduras placed an order for single-seat armed versions of the aircraft in May 1938; Guatemala ordered STMs in July 1938. The US Army was interested in procuring training aircraft as the war clouds gathered in Europe, and an STA was tested for this purpose. It was not really what the Army wanted, but it was readily available.

Fifteen modified STAs, called YPT-16s, were ordered. The modifications were most noticeable around the cockpit area where an external stiffening stringer was fitted to compensate for the loss of strength caused by the larger cockpit openings. Civilian versions of the Army models were designated STA-2 and subsequent Army aircraft became PT-20s. ✈

Phillip Kent

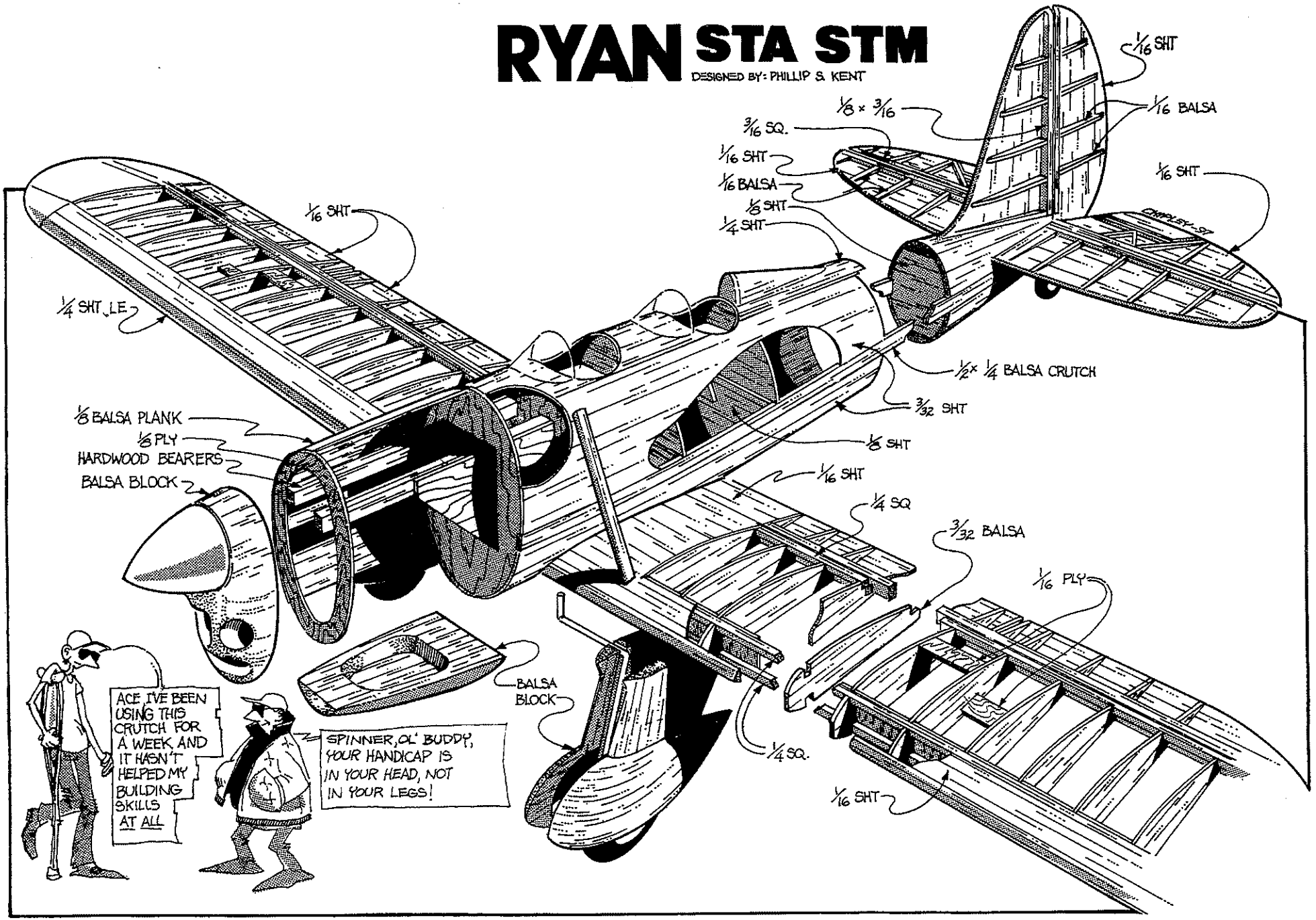


Full-Size Plans Available—see page 165



RYAN STA STM

DESIGNED BY: PHILLIP S. KENT



Ryan/Kent

Continued from page 11

base and build up the fairing with soft balsa block. The ¼ sheet tailplane mount can now be added and the headrest can be shaped from soft block. Do not fit the headrest until after the fuselage has been covered.

Tail Unit: The tailplane, fin, and rudder were built using the core method of construction. Since the model has a long nose and there was no center-of-gravity (CG) problem with the prototype, it would be possible to use soft sheet balsa for these components. Sand the units to the correct airfoil sections as shown on the drawing.

There is a large fairing at the bottom of the fin; make from soft balsa and hollow out. The rudder horn is made from 1/16 G.R.P. sheet; one side connects to the servo and the other to the steerable tailwheel.

Wing: The wing can be built directly over the plan. Pin the ¼ square bottom spars, the 3/16 flap/aileron spar, and the center-section trailing edge. Add the ribs and the laminated tip, followed by the top spar and the false leading edge.

The laminated tip is best made around a former, which can be made from plywood cut to the inside tip shape. Cover the face where the strips are to be placed with masking tape to keep them from sticking to the former. Glue four strips of ⅜ x 1/16 balsa strips together (use white glue) and wrap them around the former. Start at one end, holding the strips in place with masking tape as they are wrapped around. Allow to dry overnight.

Remove the partially built wings from the plan and join the two halves using the plywood braces. This is the time to fit the linkages for the ailerons and flap torque tubes. The undercarriage blocks should be fitted and then the bottom leading edge sheeting. The wing should then be pinned back over the plan with a ⅛ piece of packing under the outer rib trailing edge to give some built in washout.

With the packing still in place the leading edge can now be sheeted and the vertical webbing pieces fitted. Carry out the same procedure for the second half. Complete the wing sheeting, add the capstrips, and any support blocks for rigging, etc.

The flaps and ailerons are built on a 1/16 sheet bottom. The aileron tip will need to curve upward to follow the spar shape. This can be achieved by firmly stroking the sheet balsa along the grain towards the tip with a piece of round dowel or the handle of a modeling knife.

Undercarriage, Spats, and Tailwheel: Bend the piano wire legs to shape and fit them into the blocks that are in the wing. The wire can be held in place with a plywood cover or the more normal metal brackets.

The wheel covers or spats are made from balsa and plywood and are built in two halves. Make up the laminated halves as indicated on the drawing and spot-glue them together; two or three spots of glue only—you have to get them back to two pieces later.

Carve and sand the covers to shape and cut out for the bracing wire brackets. Split the covers and remove the center portion where the wire leg and plywood stop fit. The plywood stop that is fitted into the wing controls the rearward travel of the legs. The wheel covers are fastened to this stop and the underside of the wing. There should be ample movement for a spring effect on the undercarriage legs. On the prototype model the wheel covers were covered with lightweight glass cloth before fitting in place.

A steerable tailwheel was fitted to the original model, and the bearing was made from brass strip and tube. A flattened brass tube extension was soldered to the top of the axle shaft. It is drilled and connects to a short pushrod from the rudder closed-loop crank.

Finishing: There is considerable rigging on the wings and tail unit. Make sure that all plywood pads to accept these fittings are in place before covering.

The fuselage cowl and wheel covers were covered in lightweight glass cloth using epoxy. This finish is quite easy to apply and it does prevent damage to the balsa surfaces later.

The wings and tail were covered in heat shrink fabric. Tissue rib tapes were added and simulated rib stitching in the form of small blobs of white glue applied with a pointed piece of 1/16 dowel. Panel lines were marked out on the fuselage, strips of masking tape fitted, and a coat of sanding sealer painted on. When the tape was removed it left a realistic edge to the panel; a final application of white glue rivets completed the illusion.

The prototype was finished in cellulose paint, sprayed on. My advice is for you to use what you are comfortable with and what you think is best. My model was painted in the Dutch East Indies color scheme but there are so many other interesting alternatives. Do a little bit of research and decide which aircraft type you are going to model before starting to build. Scale Model Research (3114 Yukon Ave., Costa Mesa CA 92626) has a good range of photographs of this aircraft.

The model was given a coat of cellulose primer before the silver final finish. The markings were masked off and sprayed orange. The black outlines, letters, and numbers were cut from trim film, but the rudder outline was hand-painted. The whole model was then given a coat of fuel proofer; I mixed equal parts of gloss and matte to give what I considered a more-realistic finish.

The rigging for the wings was made from shirring elastic. I had thought of using flat wire rigging, but there was no structural need and the elastic is much lighter too. The bracing for the tailplane was made from thin round piano wire soft-soldered into brass tubes with flattened ends.

Padding was fitted round the cockpit openings and the two dash boards were added. The wind shields are from acetate sheet with a litho plate trim.

Flying: Balance the model where shown on the drawing. There should be no problem getting this right, but the radio gear might need to be located farther aft than normal because of the long nose. The model was fitted with an O.S. 40 Surpass four-stroke engine using an 11 x 7 propeller.

The first flight was from our grass flying field and there were no problems. The model was taxied out and turned into wind. A quick check was made to see that all the controls were functioning in the correct manner and the engine was run up at full power. Everything was all right, so the throttle was opened and away she went. The model proved easy to fly and only a slight amount of down trim was needed (I had set the model up with a small amount of up trim before the first flight as a safety precaution).

Some models of the Ryan have been considered skittish on the ground; I have been pleasantly surprised with the ground handling and the effortless way that three-point landings can be achieved. The model is mildly aerobatic, but with the O.S. 40 Surpass, speed has to be built up in a dive before the maneuver. Perhaps one of the new larger-capacity O.S. 52 Surpass engines would give it that livelier performance.

The Ryan ST is easy to build, it looks good, and it is fun to fly—are you tempted? ✈

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