TRUE FLYING SCALE MODEL

22" RYAN S-T

Detailed Instructions by Joe Ott

GENERAL NOTES

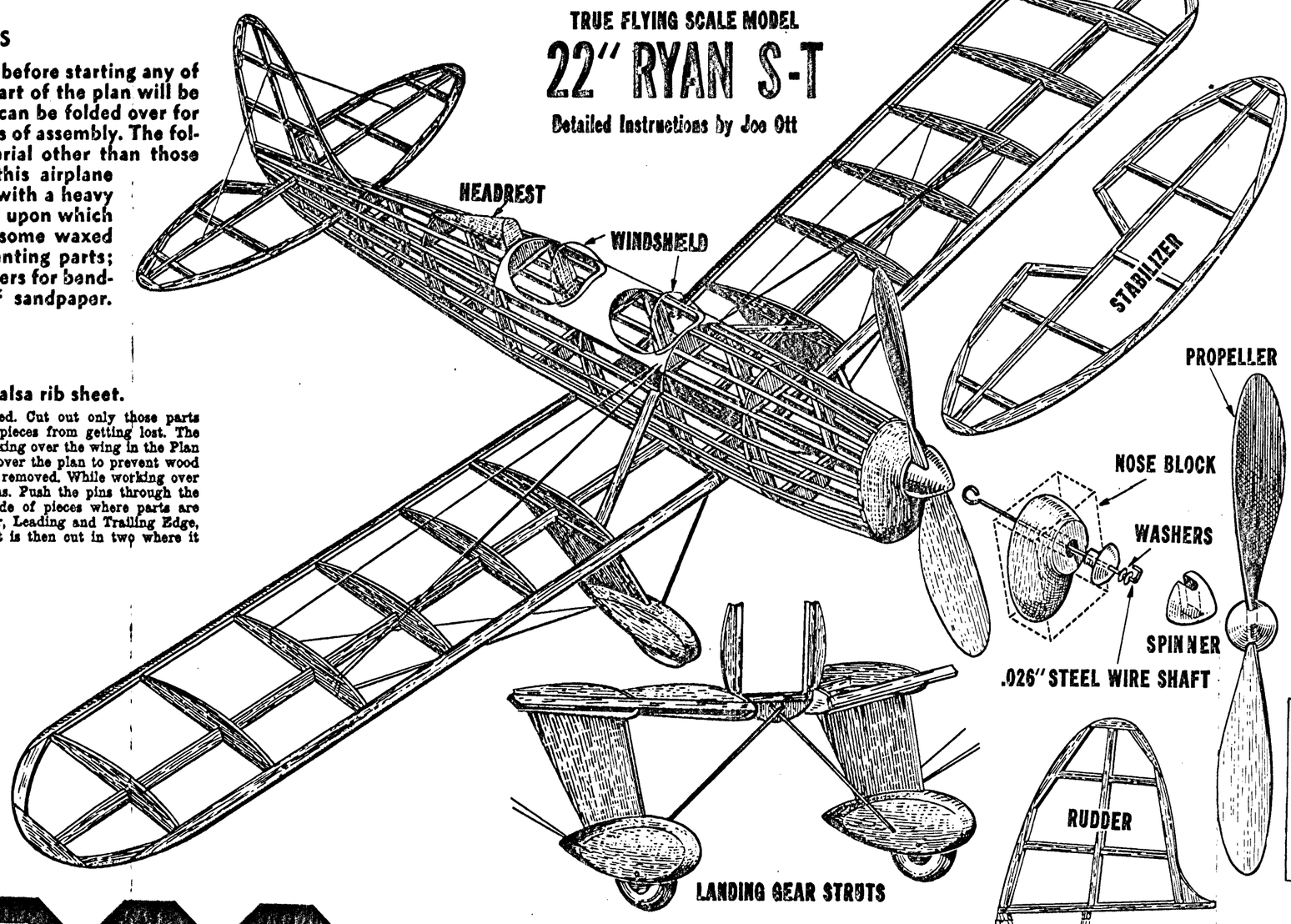
Study plans and perspective sketches before starting any of the actual model work. As only one part of the plan will be used at a time, the remaining portion can be folded over for reference and study during the process of assembly. The following few additional tools and material other than those supplied are necessary to assemble this airplane model: a razor blade (preferably one with a heavy rounded back); a small drawing board upon which to work and cement parts together; some waxed paper to place over plan before cementing parts; about fifty small thin pins; a pair of pliers for bending shaft; and some small pieces of sandpaper.

ASSEMBLY

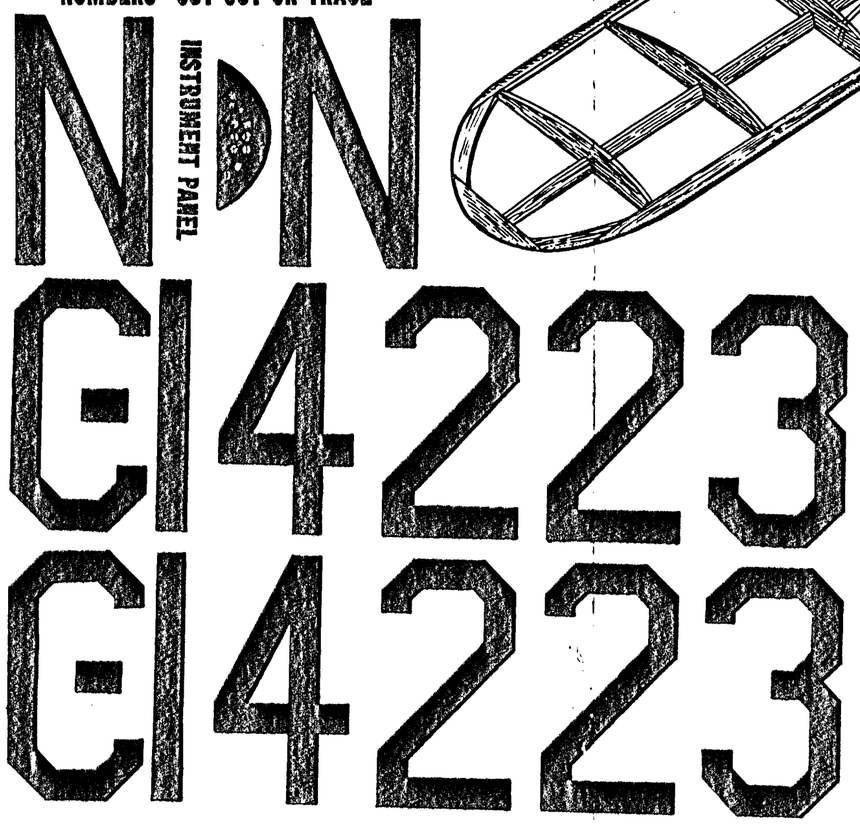
Step No. 1

Wing—Ribs **Material: Printed balsa rib sheet.**

With a razor bade, cut out all the ribs as illustrated. Cut out only those parts which will be used immediately. This will prevent pieces from getting lost. The heavy liquid is the cement. Begin assembly by working over the wing in the Plan View. It is advisable to place a piece of waxed paper over the plan to prevent wood parts from adhering to the plan and tearing it when removed. While working over the plan, hold down the balsa parts by small thin pins. Push the pins through the balsa where possible, without splitting, or at the side of pieces where parts are thin. Before notching sections that receive the Spar, Leading and Trailing Edge, see Step No. 2. The wing is assembled in one unit. It is then cut in two where it rests on the bottom side of the body.



NUMBERS—CUT OUT OR TRACE



Step No. 2

Spars **Material: Balsa strips.**

From the cut strips select the correct sizes, as required on the plan, to fit the Leading Edge, Spar and Trailing Edge. These parts are to be sandpapered on all sides. Do this before the notches are cut so the fit will be very close. The better the fit, the less cement will be required, and in this way less weight will be added to the finished model. At the same time the joint will be much firmer.

Step No. 3

Sandpapering **Material: Square Block (not furnished).**

For sandpapering a long thin piece of balsa wood, whether square, oblong or flat, first secure a square block of wood and fold the sandpaper around it so that the sandpaper is held against one of the flat sides. Apply this flat sandpaper block to the balsa strips and move back and forth in a rubbing motion. By this method, the square longitudinal pieces will not be rounded and the corners will be kept square.

Step No. 4

Stabilizer **Material: Balsa 1/16" sq. and 1/16"x3/16".**

The stabilizer is assembled in one unit. Work over the Plan View. Be sure the long cross member is in one piece. Sandpaper all the strips as explained in Step No. 3 before cutting to correct length and cementing. Use waxed paper and pins in assembly. Do not remove the stabilizer until the cement is thoroughly dry. While permitting this to dry completely, you may start on the next part.

Step No. 5

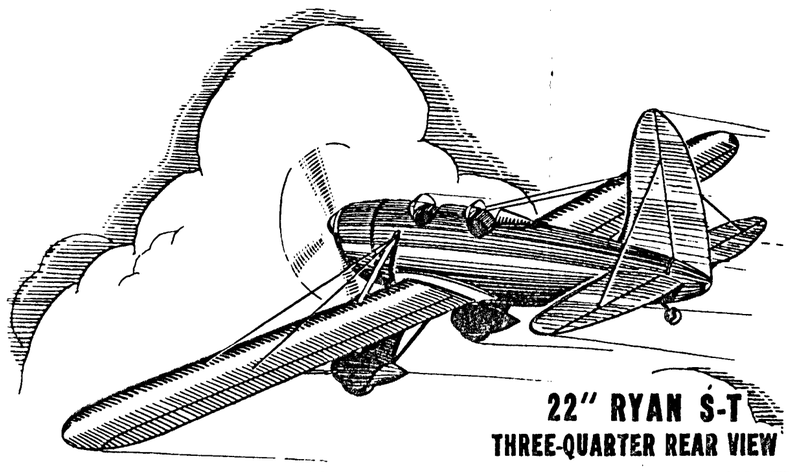
Rudder **Material: Balsa 1/16" sq. and 1/16"x3/16".**

The assembly for the rudder is the same as for the stabilizer. It is best to assemble all these parts as a single unit first. Then, where requied, sections can be cut away or units can be cut in two. This should be done only at the final assembly.

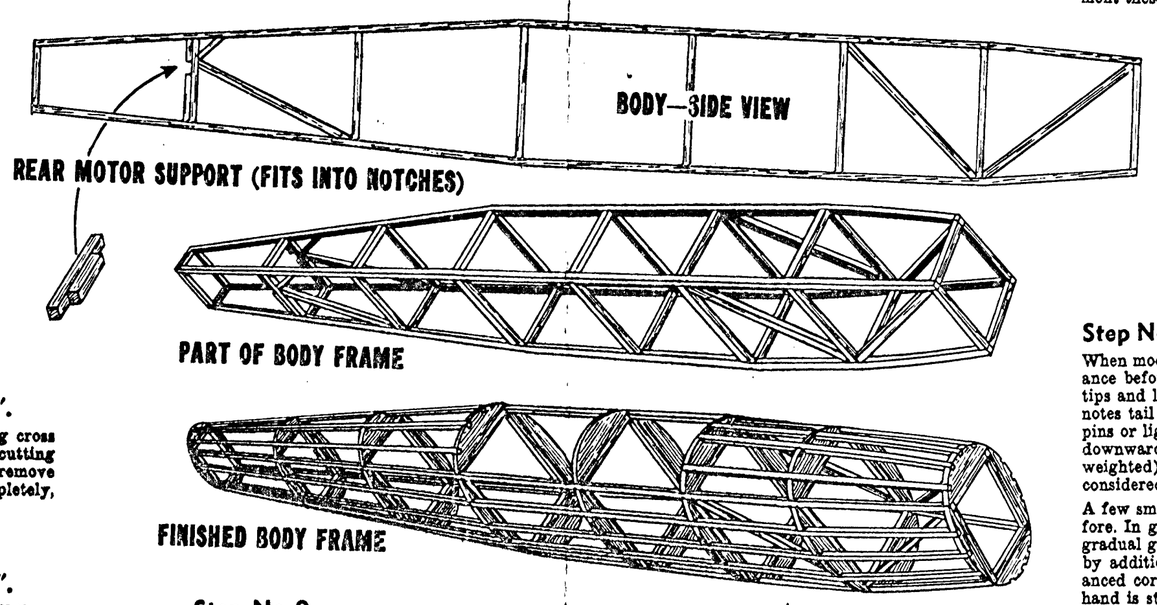
Step No. 6

Body Sides **Material: Balsa 1/16"x1/16".**

When ready to start work on any part, (1) study the plan, (2) check the part sizes, (3) check the perspective sketches, and (4) check the final fitting together of the units just before covering. The heavy lines in the Side View of the plan show the first section to be assembled. Two of these body sides must be constructed, and it is easiest to make one complete side, then place a piece of waxed paper over it and build the second section directly over the first.



22" RYAN S-T
THREE-QUARTER REAR VIEW



Step No. 7

Body—Square **Material: Balsa 1/16"x1/16".**

The second body construction step is the assembly of the two sides into the square frame. The perspective sketches illustrate this unit best. Pin the sides just completed down over the Plan View. Then cut cross braces two at a time (upper and lower) and cement in place, one station at a time. Start at the rear and work toward the front. Bend the longitudinals where necessary—a little wetting will help. Crack (do not break) and align. Always cement cracked joints. The last uprights at the rudder should be checked to match the rudder thickness before cementing.

Step No. 8

Body—Formers **Material: Balsa on printed sheet.**

Continuing from assembly Step No. 7, cut the body formers from the printed sheet and cement them to the body uprights and cross braces. In cutting out the notches, do not forget to make them a trifle smaller than the printed outlines, in order to get a good tight fit for the stringers. Since some formers are very much alike, be careful to check the body sections closely. Cut and cement one set of formers at a time. The last body section is finished after the rudder is cemented to the main body, then the stringers are continued to the rudder outline.

Step No. 9

Body—Stringers **Material: Balsa 1/16"x1/16".**

The stringer material is the same size as body longerons. They should be sandpapered (and kept square) before being fitted and cemented. The more longitudinal stringers that are used, the better, thus making smaller flat spaces between them and thereby filling in and making a more nearly circular or elliptical shape. For example, a square has four sides, a hexagon six, and an octagon eight—increasing in number of sides as the figure approaches more and more to the circular.

Step No. 10

Cockpits **Material: Printed outline.**

The cockpit outlines are printed to size and should be cut out or traced. Allow about 1/8" margin on each size for final trimming. The windshields are cemented to the paper cockpit covering.

Step No. 11

Nose Block **Material: 3/8"x1-1/4"x2-1/16".**

Continuing with the body construction, cut the nose block to fit the Front View. Draw a circle on the square block, and saw (scroll saw or jig) or cut with razor. Drill or cut hole in center to fit the hardwood nose bearing. Make bearing fit very tightly. Cement the finished nose block direct to the front of body.

Step No. 12

Landing Gear **Material: Balsa printed sheet.**

The landing gear struts and the pants covers are outlined on the printed sheet. The core of each wheel pant is supplied as a balsa block. Trace the outline and inside circle, then cut to shape. Fit the wheels before cementing the covers. Cut out core and cement the covers to the flat block. Then when dry trim the whole pant and sandpaper to correct size. Check up on perspective sketches and Plan Views for the finished shape. Note the two braces running to the center of former (see sketch).

CUT OUT BLACK LINES BELOW TO USE IN OUTLINING CONTROLS

Step No. 13

Propeller **Material: Supplied in kit.**

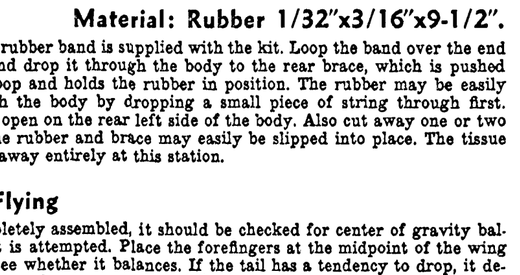
A machine-cut propeller is supplied in the kit. It is not completely finished, but all that is necessary is to sandpaper the corners and edges as illustrated in the sketches. Pierce the center hole with a very thin pin, which should be smaller than the diameter of the shaft. The propeller should be balanced. This is done by placing it on a pin which in turn is stuck on to the edge of a board, permitting it to revolve freely. It must be balanced so that it remains stationary in any position. Sandpaper the heavy side to even the blades in weight.

Step No. 14

Bearing, Etc. **Material: Supplied in kit.**

The bearing, shaft and washers are all furnished complete and ready to use. Note that the shaft is placed through the bearing, then through the washers, and then through the propeller. After the shaft is pushed through the propeller, bend it over into a "U," and then pull it back into the hub and cement very securely. Be sure the shaft is aligned properly with the blade so that it revolves truly. The hole in the bearing is a trifle larger than necessary, and therefore a washer must be cemented to the front end, to prevent the shaft from wobbling. The bearing and washer should fit snugly. The complete bearing, propeller and shaft unit is removable from the front, making it easy to attach or replace the rubber band.

PILOT CUT OUT AND PASTE IN POSITION



FULL SIZE COCKPITS CUT OUT OR TRACE

Step No. 15

Covering **Material: Tissue.**

All of the individual complete parts should be covered on both sides or all around. First sandpaper all rough edges and make all corners slightly rounded. Fit the tissue paper first, a section at a time, then apply the tissue cement (thin liquid), and finally attach the tissue and allow it to dry. Always use the darker or heavier color of tissue for the body, and the lighter shade for the tail and wings. Cover all the pieces completely and apply as much tissue paper in one section as is possible without undue wrinkling. With a very fine atomizer or insect gun, spray the entire covered framework very lightly with water and allow to dry. This will shrink the tissue, drawing it up very tightly. After all the parts have been covered, the model is ready for final assembly.

Step No. 16

Assembly **Material: Various parts.**

When all the various parts are completed, they should be assembled together. Check the positions of the various units and start cementing them to the body—the landing gear and tail skid first, then the stabilizer and rudder; the wing last. The wings are braced with heavy thread. Align, then secure position by cementing.

Step No. 17

Decorations **Material: Printed on plan.**

The control outlines, the numbers, and the pilot, are all printed on the back of the Plan ready to be cut out, or if preferred, they may be traced on light paper and inked in. Cement these paper decoration to the tissue or balsa wood with the thin liquid (banana liquid, or tissue cement). The heavy cement will draw and make wrinkles in the tissue—the thin liquid will not. Paste decorations where they are shown in the various sketches. Cut out pilots' heads, paste opposite sides together, and cement the head to a piece of balsa wood, and cement the whole in the cockpits.

Step No. 18

Motor **Material: Rubber 1/32"x3/16"x9-1/2".**

A large single rubber band is supplied with the kit. Loop the band over the end of the shaft and drop it through the body to the rear brace, which is pushed through the loop and holds the rubber in position. The rubber may be easily drawn through the body by dropping a small piece of string through first. Leave a space open on the rear left side of the body. Also cut away one or two stringers so the rubber and brace may easily be slipped into place. The tissue should be cut away entirely at this station.

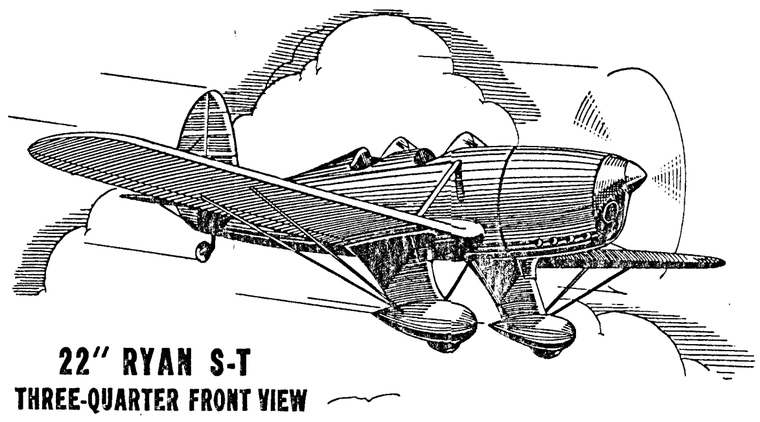
Step No. 19 Flying

When model has been completely assembled, it should be checked for center of gravity balance before any trial flight is attempted. Place the forefingers at the midpoint of the wing tips and lift the model to see whether it balances. If the tail has a tendency to drop, it denotes tail heaviness, which may be overcome by adding a small buckshot or a few heavy pins or light-weight nails to the nose on the lower side. If the nose has a tendency to point downward, the procedure for balancing is reversed (that is, the tail should be slightly weighted). When the plane remains horizontal while suspended on the fingertips, it may be considered balanced.

A few small trial glides should be made AFTER the model has been balanced, and not before. In gliding, if the nose of the ship has a tendency to climb, and if it does not make a gradual glide to the floor or to the ground, the tail is still a little heavy. This must be offset by additional weight at the front part of the model. To be certain that the model is balanced correctly, hold it ready for launching unwound, and when the glide after leaving the hand is steady and consistent, and goes forward from 10 to 15 feet, it may be considered a normal glide. The model is then ready for its trial flight. When gliding a model do not launch it upward and forward. Instead, launch it with the nose pointed slightly downward, permitting gravity to take effect. Before trying a powered flight, it is advisable to test the motor by winding up the propeller with the right forefinger and permitting the rubber to be unwound two or three times. At this time, check the trueness of the propeller rotation. While turning the propeller be sure to hold the model firmly directly behind the propeller hub and bearing. Always hold the model at a point where there are cross braces. The proper number of turns for the rubber may be checked by looking through the space in the cockpit. When you see that the coils or twists are fairly small and tight, after approximately 100 to 150 turns, the motor is wound up enough for flying.

No. 2152

Printed in U. S. A.



22" RYAN S-T
THREE-QUARTER FRONT VIEW

Elevator outline made from black paper strip

ELEVATOR

STABILIZER

ELEVATOR

1/16" x 1/16"

1/16" x 1/16"

BULKHEADS CUT FROM PRINTED SHEET

BODY CROSS SECTIONS

Aileron outline made from black paper strip

AILERON

WING FLAP

RIGHT WING

BODY

BODY CROSS SECTIONS

WING RIB SECTION

TRAILING EDGE 1/16" x 1/8"

Wing flap outline made from black paper strip

AILERON

SPAR 1/16" x 1/8"

WING FLAP

WING RIBS

1/16" x 1/8"

LEFT WING

LEADING EDGE 1/16" x 1/8"

WING TIP 1/16" x 1/8"

PLAN VIEW

Concaved

END VIEW

FINISHED PROPELLER

Rudder outline made from black paper strip 1/16" x 1/8"

RUDDER

FIN

1/16" x 1/8"

TAIL WHEEL

LONGERONS 1/16" x 1/8"

Leave this section partly uncovered to allow rubber motor to be easily attached and replaced. One or two additional stringers may be cut away.

HEADREST

COCKPITS

BODY

WING

Two strand rubber motor 1/32" x 1/16" x 9"

SIDE VIEW

STREAMLINE WHEEL PANTS

WHEEL

PROPELLER

Hardwood bearing must not be cemented in place. This is necessary to permit attaching and replacing of rubber motor.

WINDSHIELDS

Hardwood propeller bearing

All heavy lines 1/16" x 1/16" balsa

PROPELLER DIAMETER

TAIL BRACE BLACK THREAD

LANDING WIRES BLACK THREAD

BODY

WING STRUT 1/16" X 3/16"

RIBS

WING

DIHEDRAL

LANDING GEAR STRUTS

1/16" X 3/16"

FLYING WIRES BLACK THREAD

Pants made from three pieces of balsa

Landing gear axle made from heavy bank pin

FRONT VIEW

TESTED & APPROVED BY JUNIOR BIRDMEN OF AMERICA INSTITUTE 26

FULL SIZE

22" RYAN S-T

FLYING SCALE MODEL