The Plane That Flew to Paris

THE INSIDE STORY OF HOW CHARLES LINDBERGH PREPARED AND FLEW THE "SPIRIT OF ST. LOUIS" FROM NEW YORK TO PARIS TEN YEARS AGO—

HOW TO BUILD A SCALE MODEL OF LINDY'S PLANE

By Jesse Davidson

ON MAY 20-21 the entire aviation world commemorates the tenth anniversary of Charles A. Lindbergh's solo flight from New York to Paris. MODEL AIRPLANE NEWS also celebrates this anniversary by presenting plans and instructions for building a replica of this historic plane.

* * *

The Ryan Brougham, a commercial version of the Spirit of St. Louis. This plane carried four passengers at 125 m.p.h. and was used by Robertson Air Lines, employers of Lindbergh, as mail transport

Ten years ago a mortal became a god— the god of the skies. Winging his solitary way from New York to Paris on May 20-21, 1927, Charles A. Lindbergh gave to aviation the momentum it had been waiting for, the impetus which only daring, courage and success can give.

At the same time there came to a disillusioned people, spiritually starving on a post-war diet of sensationalism and rapidly changing morals, a manna of old fashioned virtue and character which Charles A. Lindbergh embodied, and to this young man a jaded, cynical, money-mad people gave heartfelt thanks for redeeming virtues it had discarded, and made of him a god. . . .

Aviation throughout the world was making normal progress during the post-war period when suddenly, it was jerked out of its horse-and-buggy pace. In 1926, Rene

Fonck, a Frenchman announced his intention of flying from New York to Paris to claim the $25,000 prize offered by a hotel proprietor. This offer had been standing ever since 1919.

Charles A. Lindbergh, by Julius Pinsky

Fonck, using a Sikorsky sesquiwing landplane, cracked up on the take-off when the heavily laden ship failed to rise.

In the spring of 1927 there were three flying teams planning to win the $25,000 prize. Most well-known was Lt. Commander Richard E. Byrd, his pilot, Floyd Bennett, and a crew of two in a tri-motored Fokker monoplane similar to the one he had flown over the North Pole with Bennett in 1926. Clarence D. Chamberlin and Lloyd Mertaud, an ace mail pilot, comprised the second team. Lieuts. Davis and Wooster of the Army Air Corps made up the third combination.

And then, one evening early in May, unheralded and unknown, a lone pilot from the west quietly slipped into Curtiss Field and announced himself as the fourth entrant in the transatlantic derby. His silver monoplane bore the name Spirit of St. Loius. His name was Charles A. Lindbergh.

Except for an item or two in the papers, the public was not acquainted with young Lindbergh. He was only twenty-five. Compared with Byrd of North Pole fame, with Chamberlin of endurance flight renown, Lindbergh seemed like a novice. He was alone, his ship was a bit radical in

design, it carried no radio nor life preserver. News-papers and people referred to him as the "Flying Fool."

But all of a sudden Lindbergh became the center of attraction. He seemed to know his business. There was something courageous and daring about this tall, slim youth, this "Flying Fool." While Byrd and Bennett suffered injuries when the America cracked up at Teterboro Field in a test flight, and Chamberlin wrangling about finances with Levine, Davis and Wooster killed in a load test, Lindbergh went quietly about making final preparations.

An avalanche of newspaper stories appeared which gave glimpses of his early life. He was the son of the late Congressman C. A. Lindbergh of Minnesota. His mother was a teacher of chemistry in a Detroit high school. He was urged to study law but destiny had other plans. One day an airplane made a forced landing on his college campus giving him his first opportunity to observe it at close range.

He suddenly decided to fly and enrolled in a western flying school. Barnstorming career. Then his training in the army flying school at San Antonio to be among the few graduates in a class of eighty. An airmail pilot. The only man living who made four emergency parachute jumps to save his life. The stories were an indication of what was yet to come.

There was no telling which ship would win the race to Paris but clearly the public favorite was the young man from St. Louis.

Lindbergh considered the possibilities of the New York to Paris hop while flying in a D. H. mail-plane one night in the fall of 1926, and then interested a number of public spirited St. Louis business men to finance the project, digging into his own pocket for two thousand dollars.

When Lindbergh undertook plans for this flight, he considered several important facts. The foremost one was that by using the radial air-cooled engine which was just then becoming popular, and with a plane having a high lift airfoil and lightened construction, it would not only be possible to reach Paris but under normal flying conditions, to land with a large reserve of fuel. This meant a high safety factor throughout the trip.

At that time also the monoplane was becoming more generally used. It was more efficient due to the lack of interference between the wings and consequently could

carry a greater load per square foot of wing area and attain a higher speed.

So Lindbergh finally decided on a single-motored monoplane and offered to purchase the Bellanca Columbia from Charles A. Levine, its owner. Failing, Lindbergh placed an order with the Ryan Airlines of San Diego, Cal., on February 28, 1927, for a plane to be powered with a single Wright Whirlwind J 5-C nine-cylinder radial air-cooled engine developing 225 hp. It was to have Pioneer navigating instruments including an earth inductor compass.

Standard Ryan M-2 which served as a basis for the design of Lindy's plane

The development of the Spirit of St. Louis was begun with the idea of using a standard model Ryan M-2 mail-plane and incorporating modifications to suit Lindbergh's purpose. When Lindbergh arrived at the Ryan factory two days previous to placing the order, it was determined that modification of the M-2 was less practical than developing a new design. Lindbergh laid out the basic specifications. It was to be able to carry more than 400 gallons of gas and the pilot was to be located in the rear of all tanks for safety in the event of a forced landing.

The task of designing such a plane fell to young Donald Hall, chief engineer of the Ryan Company. W. Hawley Bowlus of soaring fame was the factory manager. The design was laid out, the fuselage being somewhat similar in design and structure to the M-2 but longer by two feet.

All at once, the entire personnel of the Ryan Company caught the spirit of the undertaking, and during the two months of its construction, the men worked as they never had worked before. Day and night, seven days a week, the structure grew from a seemingly few lengths of steel tubing to one of the most airworthy planes that ever flew. It was not unusual for some of the men to labor 24 hours without rest

and on one occasion Hall was over the drafting table for 36 hours.

Lindbergh cooperated closely with Hall during the entire construction of the ship and to this very day never has a man left an airplane factory knowing as much of his ship as did Lindbergh.

The location of the pilot's cabin underneath and to the rear of the wing was one of the most radical features of the design. The disadvantage of a non-forward window for visibility was decided to be of minor importance as the result of a periscopic type vision system which was suggested by a Mr. Randolph of Ryan, who had considerable submarine experience. Lindbergh accepted the suggestion with limitations that if it were found to be of any aerodynamical disadvantage it would be discarded in New York. The periscope consisted of a panel in the instrument board through which a view directly forward was afforded by an angular mirror. It had a frontal size about three by five inches which projected from the left side of the fuselage and which could be retracted when not in use. The device proved to be of no disadvantage aerodynamically because of its retractable feature.

Sixty days after the order was placed Lindbergh test flew the ship and all tests were conducted by himself only. The actual performance figures were above the theoretical. The plane was off in 6 1/8 seconds or after a run of 165 feet. It had a top speed of 130 m.p.h.

On May 10, Lindbergh left San Diego and flew straight to St. Louis landing there 14 hours and 25 minutes later. He remained there to show the ship off to his backers and there christened the ship the *Spirit of St. Louis*. Next day, he flew to New York landing at Curtiss Field in the evening.

While Lindbergh's rivals waited for favorable weather reports, he decided to leave. In spite of a drizzling rain on the night of May 19, he ordered his ship fueled and trundled from Curtiss to Roosevelt Field in order to take advantage of the latter's longest runway. At 7:52 A.M. on May 20 he climbed into the cabin, waved a cheery "so long" and was off. . . .

The next day, in quick succession came reports of Lindbergh—he had reached the Irish coast, he was crossing over England, he was over the channel now . . . and the glaring headlines : LINDBERGH LANDS IN PARIS. People went mad with joy. He was mobbed enthusiastically and

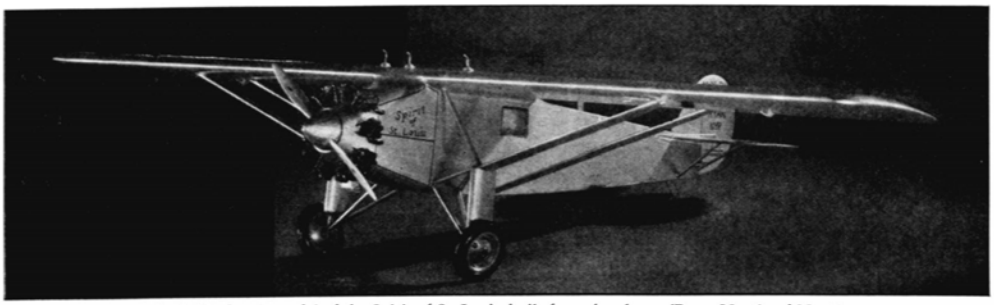
idolized as no man in the history of the world had ever been. From then on it was Lindbergh, Lindbergh and Lindbergh. Towns, cities, streets, airports and beacons were named for him. On the west coast, a Chinese woman who had given birth to a baby boy the day Lindbergh landed promptly and appropriately christened her son One Long Hop! Speculators got busy. Hundreds of people, suddenly aviation conscious, bought stock in the Seaboard Air Line—a railroad !

The rest is history. The magnificent flights of Lindbergh, Chamberlin and Byrd had given aviation new impetus.

The boom days for aviation were on. Lindbergh went on a nation-wide aerial tour under the auspices of the Daniel Guggenheim Fund for the promotion of aeronautics. Then came his Latin American good-will tour. A modern Columbus, he blazed a trail to open up new commercial air routes to Central and South America.

Aviation forged ahead with new vigor. Improvements in aerodynamic efficiency of airplanes were coming one after another. The use of metal in place of wood and fabric was a major step. In came the landing flaps, retractable landing gears, controllable pitch propellers, the use of trimming tabs, radio compasses and many other aids to aviation.

And so today, the Spirit of St. Louis, after traveling about 45,000 miles hangs in the Smithsonian Institution, the mecca for thousands of aviation enthusiasts.



The finished scale model of the Spirit of St. Louis, built from the plans. (Pages No. 6 and No. 7)

MODEL BUILDING INSTRUCTIONS

It is the opinion of the writer that no other scaled model airplane surpasses a model of the Spirit of St. Louis for its sheer beauty and clean lines, and it is his sincere hope that all model builders who up to the present time have not added a model of this famous plane to their collection will do so in the near future while these plans are available. It is doubtful whether plans of this sort will be published again

and therefore he advises you to save this particular issue so that you may be able to pass it on to others who some day desire to add this ship to their collection because of its historical importance.

The drawings should be removed from the magazine in a careful manner as you will no doubt want to replace them again for safekeeping.

FUSELAGE

The first step in its construction is to make an accurate stiff paper template of the side view and top view. The side view begins from section A-A directly behind the propeller spinner and, rising sharply to the leading edge, it follows along the undersurface of the wing and then continues on to the rear with a slight drop at the horizontal stabilizer setting. The next step is to carefully cut the fuselage block to shape, mindful of the fact that the top and bottom of the body is flat all along. Proceed by tracing the top view template on the block and cut the excess wood away carefully. Your attention is now directed to the cross section views of the fuselage shown on Plate 2. Shape the body to conform perfectly with these sections at their designated stations. Sand the fuselage to a smooth finish.

CABIN DETAILS

A glance at the cabin outlines will readily show that due to its small size it will require a great deal of care and patience in fitting it up with the various cockpit details shown on Plate 1. A pattern or template is made of the cabin shown clearly by the dotted lines on both side and top views of the fuselage. Trace them into position. Using a coping saw proceed to cut from the top of the body down into it along the lines marked out. In other words, the reward for your effort will be the displacement of a solid block of wood which can still be utilized for the making of small parts. Clean the cabin walls with smooth sanding.

The cabin parts shown on Plate 1 are numbered from 1 to 4. They include the instrument board, rudder pedals, joystick and seat. The construction of these parts is self-explanatory. Cement each unit into position as indicated on Plate 1. The instrument board should be drawn on stiff paper with the round-faced instruments made by using a compass. The background is filled in with black India ink with the

exception of the instruments. The graduating marks are made with a pen and black ink.

The right and left cabin walls are cut to shape from 1/16" sheet. The left wall (as looking from the rear of the ship) is cut to shape with the window space portion removed. After painting the inner side with gray paint, cement a thin piece of sheet celluloid in place for the window. The wall is then cemented into position. Fill in any small cracks with a bit of cement. The right wall contains the door. It is made of one piece and then a pattern of the door is drawn on it and cut out carefully. Paint gray and cement in position. Cut out the window of the cabin door and replace with a piece of sheet celluloid. The door is then hinged into position with small pins in the following manner. First fit the door into place but make sure it is free enough to swing open and close easily. Insert a small model making pin directly from above which goes through the cabin wall and penetrates part way into the door. From the bottom another pin is inserted upward and pushed deeper into the wood so that the head is not visible. Try the door now and see how it works. For the door handle use a pin head.

ENGINE DETAILS AND PROPELLER

Steps in constructing a realistic J C-5 type Wright Whirlwind engine are shown in detail on Plate 2. Cement each cylinder into its proper position as shown on the front view. Small model making pins can be used for insertion through each cylinder from its top. A part of the pin penetrates the nose. This adds strengthening. The completed motor is then colored with black India ink.

The propeller is of the Standard steel type and is carved to shape from hard balsa. Place a pin sized hole in the center of the hub. The spinner cap is carved to shape from a small block of wood and, when completed, a portion in the rear is removed for the insertion of the propeller. The portion removed corresponds to the width and length of the hub which would be concealed by the spinner cap. Before cementing the prop in place, insert a conservatively sized pin through the hub so that the prop will be able to rotate. In making the spinner cap, care should be used to insure a perfect fit to continue the lines of the body.

WINGS AND TAIL SURFACES

The wing is made in a single piece from medium balsa. Camber it to the airfoil section indicated by E-E shown on Plate 2. The wing has no dihedral. Carefully finish the wing with a fine sanding. A portion of the wing is removed at the trailing edge for the place of the window as shown on the top view drawing. A piece of sheet celluloid is cemented in place and the frames drawn on it with black India ink. Add the gas tank caps to the wing. This is shown in detail on Plate 1. The air speed indicator is made as shown and cemented to the undersurface of the left wing. See front and side view drawings. The aileron control horns are attached as shown.

The rudder and elevators are cut from 1/16" sheet and rounded with fine sanding. Add control horns to each unit.

LANDING GEAR, WING STRUTS, ETC.

The wing struts are streamlined lengths of hard balsa cut to proper dimensions. Study the drawings of the struts carefully and make all duplicate pieces match perfectly. The main landing struts as shown in the front view curve out slightly. These struts are shaped from bamboo, streamlined and curved to shape. The shock absorber housing is made of soft balsa and streamlined. Small pins are used for the wheel axles. The tailskid and horizontal stabilizer struts are made of thin slivers of bamboo cut to dimension.

PAINTING AND FINAL ASSEMBLY

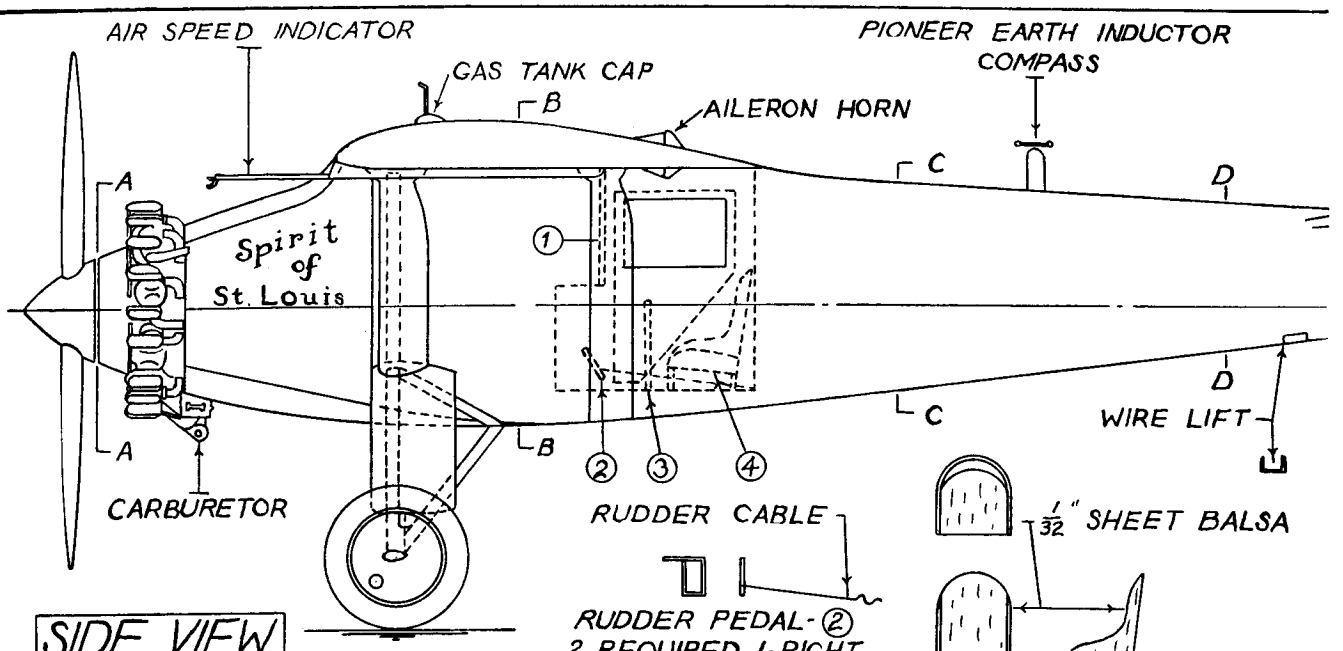
The beauty of this model and, as a matter of fact, any model, lies in the results of the paint job. The Spirit of St. Louis is aluminum in its entirety with the exception of black trimmings.

All the parts of the model must be doped and painted before the final assembly. Three coats of banana oil are applied to all wood parts with a light sanding between each coat. The aluminum mixture is composed of 2 ounces of banana oil with about 1 1/2 teaspoonfuls of powder. Acetone is used for the thinning process.

One coat will be found sufficient. If necessary, apply a second one. When the paint has dried thoroughly, mark out the ailerons on both upper and lower surfaces of the wing, the outlines of the license numbers and the hinge lines on the rudder and elevators.

The license numbers appear on the top of the right wing and on the bottom side of the left wing (looking from the rear of the ship). Assemble all the parts, using the cement generously but not sloppily.

The fillets for the wing struts and the leading edge of the wing are worked out carefully with plastic wood. Apply aluminum paint over these areas. The name *Spirit of St. Louis* is done alike on both sides of the nose. All lettering is done with black paint or black India ink where using a brush is inadvisable. The control wires are of white thread.



SIDE VIEW

RUDDER CABLE

RUDDER PEDAL - ② 2 REQUIRED 1-RIGHT 1 LEFT

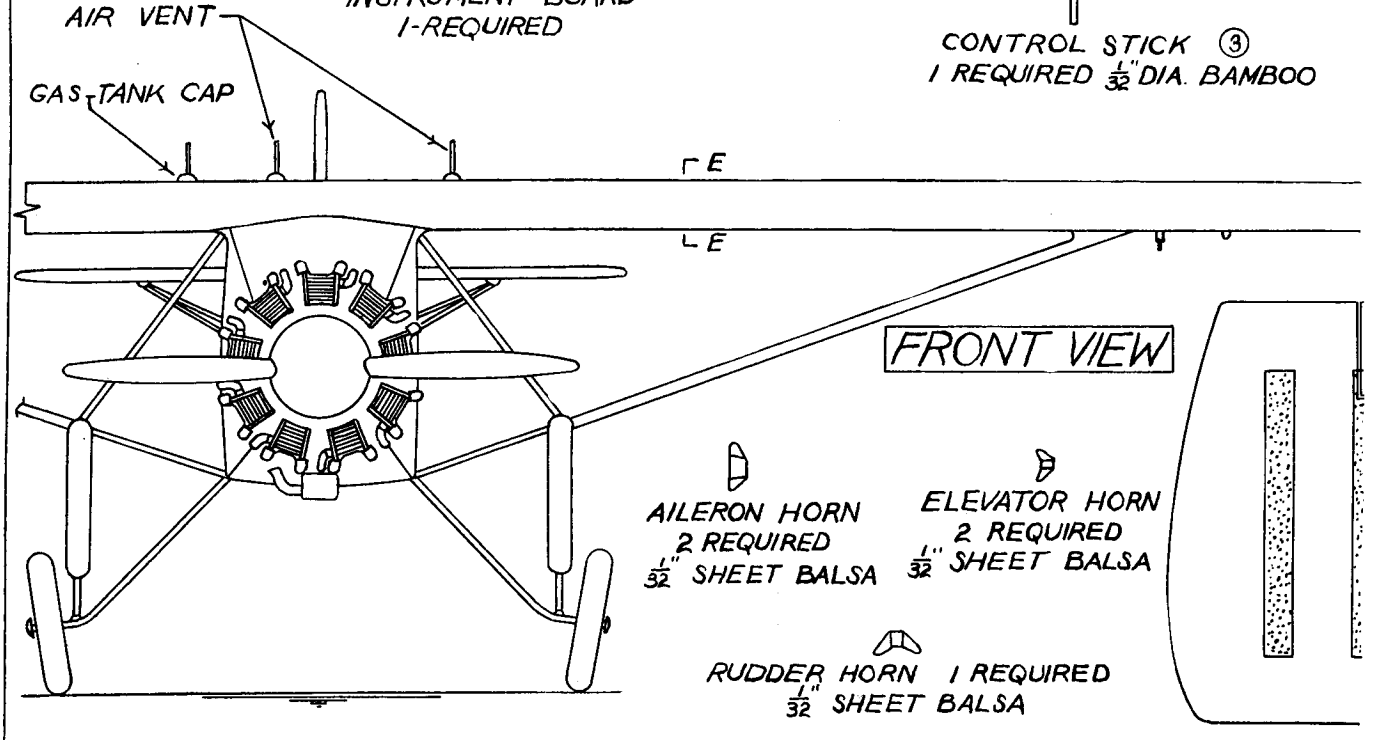
1/32" SHEET BALSA

SEAT 1 REQUIRED - ④

① INSTRUMENT BOARD 1-REQUIRED

CABIN PARTS 1-2-3-4

CONTROL STICK ③ 1 REQUIRED 1/32" DIA. BAMBOO

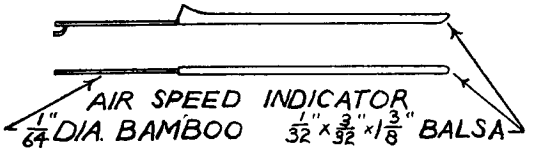


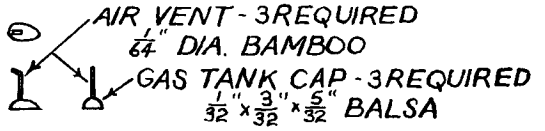
FRONT VIEW

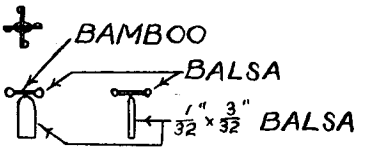
AILERON HORN 2 REQUIRED 1/32" SHEET BALSA

ELEVATOR HORN 2 REQUIRED 1/32" SHEET BALSA

RUDDER HORN 1 REQUIRED 1/32" SHEET BALSA

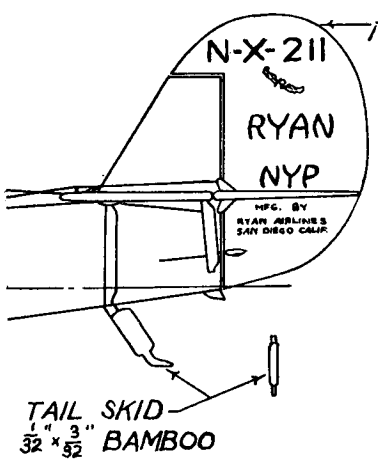






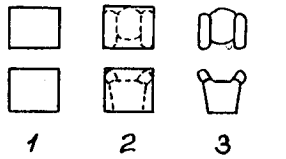
PIONEER EARTH INDUCTOR COMPASS

PLATE 1



1/16" SHEET BALSA

PUSH RODS
1/64" DIA BAMBOO



CARVED FROM BALSA
7/32" × 7/32" × 1/4"

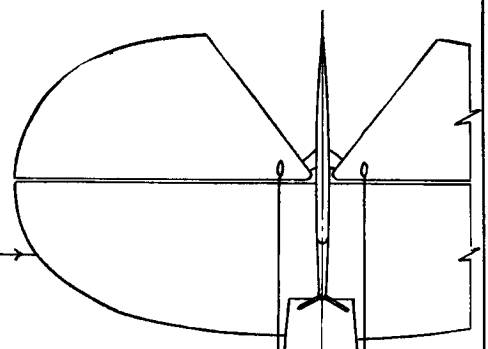
THREAD

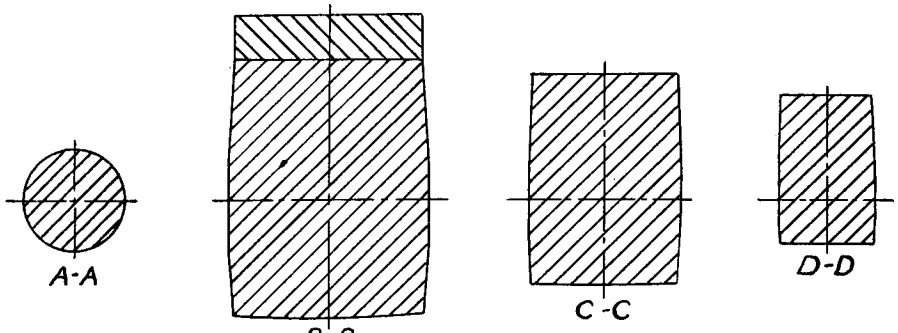
CYLINDER CONSTRUCTION

CARBURETOR
3/16" × 3/16" × 7/32" BALSA

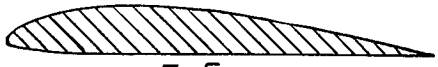
TAIL SKID
1/32" × 3/32" BAMBOO

1/16" SHEET BALSA

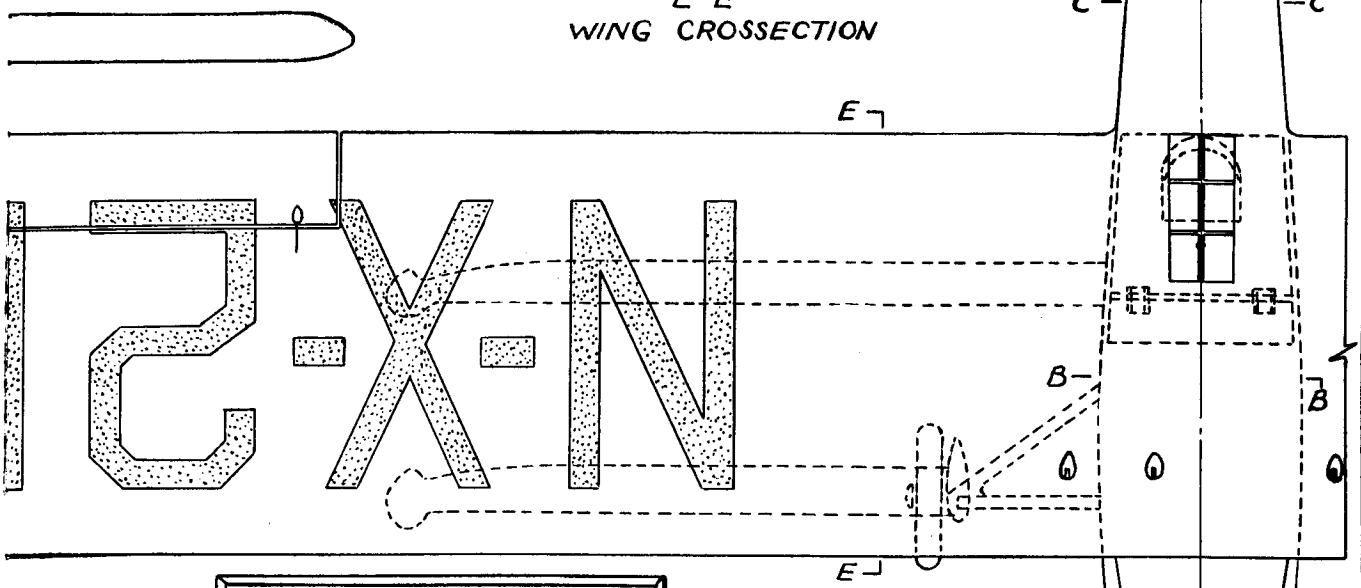


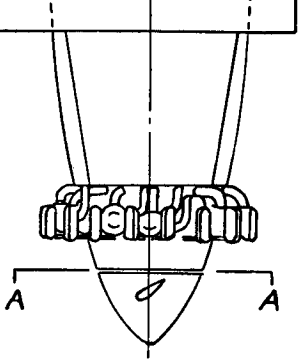


FUSELAGE CROSSECTIONS



E-E
WING CROSSECTION





RYAN MONOPLANE
SPIRIT OF ST. LOUIS
NEW YORK TO PARIS
-FLOWN BY-
COL. CHARLES A. LINDBERGH
-1927-

SCALE 5/16" = 1'

PLATE 2