AGAIN THE CURTAIN OF TIME ROLLS BACK AND HENRY STRUCK BRINGS YOU THE THIRD IN HIS MODEL SERIES OF SHIPS THAT| MADE AVIATION HISTORY. WITH GLENN H. CURTISS, ITS DESIGNER, AT THE CONTROLS, ONE OF THESE PUSHERS MADE THE FIRST-FLIGHT FROM ALBANY TO NEW YORK. IN ANOTHER THE FAMOUS LINCOLN BEACHEY DID THE FIRST LOOP. YOUR COLLECTION OF HISTORICAL MODELS WON'T BE COMPLETE WITHOUT—

The Curtiss Tripod Pusher

TRAIL BLAZERS OF THE AIR—No. 3

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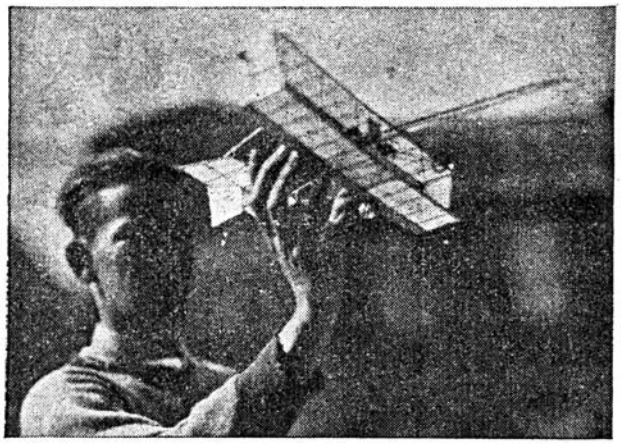
By Henry Struck

Here's the author, poising his model Curtiss for a flight. In a moment he'll let 'er go—then watch her soar toward the open sky! She's a swell flyer, make no mistake about that.



GLENN HAMMOND CURTISS, born in Hammondsport, N.Y. May 21, 1878, showed even in his youth the love for speed and mechanical experimentation that made him the most versatile and practical designer in the early development of the air-plane.

Curtiss was first attracted to bicycle racing, where he proved himself the champion of the surrounding countryside. Incorporating some of his own improvements, he was soon successfully engaged in the manufacture of bicycles. His spare time was spent tinkering with an old gasoline motor, and it was only a short time before the ingenious youth had attached his

motor to a bicycle. Once again the peaceful village was awed and disturbed by the sight of the dust cloud that heralded the passage of Glenn Curtiss.

Improvements quickly followed in his motorcycles and before long Curtiss was winning every race he entered. In 1902 he built an eight cylinder, V-type engine, mounted it in a light motorbike frame, and took the machine to the hard, smooth sands of Daytona Beach, Fla. Here he succeeded in setting a world's record for speed that stood for over 20 years, flashing over a measured mile in 46 seconds at a speed of about 90 m.p.h.! Ninety miles was *fast* thirty years ago.

On his return he placed two of his motors in a propeller-driven road wagon. When he added a small wing to the contraption to ease the bumps Curtiss began to ponder ways and means of getting the wagon into the air. However, the fate of many another inventor over-came him, when lack of funds forced him to abandon his research for a while.

Then Alexander Graham Bell, famous as the inventor of the telephone, began experimenting with a honey-comb-like structure of triangular cells which he called a tetrahedral kite. Recognizing Curtiss as the outstanding builder of gasoline motors, he called upon him to supply a power plant capable of flying the tetrahedral kite.

At the Bell home in Nova Scotia, Curtiss met F. W. "Casey" Baldwin, who afterwards made many blimps powered with Curtiss engines, J. A. D. McCurdy, later a; famous stunt flier, and Lieut. Thomas Self ridge, who later lost his life in the first fatal airplane crash. Believing that much faster progress could be made as a group, they formed the Aerial Experiment Association, but the cold weather of the Canadian winter caused their removal to Hammondsport.

Gliders as usual were the first machines they built, and after experience had been acquired a simple biplane design was attempted. The first flight in the latter was made by "Casey" Baldwin. The plane lifted from the frozen surface of Lake Keuka under its own power and covered a distance of 320 feet. The *Red Wing* as it was called was soon wrecked, however, by a gust of wind.

UNDAUNTED, the A.E.A. built another machine. This one, the *White Wing*, was far more successful. Equipped with wheels instead of the skis used on the previous model, flights of 1000 feet were made. On the *White Wing* were used the first ailerons, the patent rights to which were successfully contested by the Wrights, who maintained that the principle was the same as

their wing warping method. Further difficulty was encountered when the French pioneer, Henri Farman, attempted to restrain the A.E.A. from using a wheeled undercarriage.

In 1908 the Scientific American trophy was won by Curtiss in the group's third plane, the *June Bug*, with a flight of one mile in one minute, 42 seconds. This flight was also noteworthy as the first pre-announced public demonstration in America.

Encouraged by this success another machine, the *Silver Dart*, was constructed. A 60 h.p., water cooled, V-8 engine, a direct ancestor of the famous OX-B, was designed by Curtiss and mounted in the ship. Upon being taken to Canada the *Silver Dart* made the first flight in the British Empire. Over 300 flights were made in this plane, among them the one in 1909, when Curtiss again won the Scientific American trophy, this time traveling a distance of 24 miles.

The aim of the Aerial Experiment Association had now been accomplished and the group was accordingly disbanded.

By 1910 the Curtiss Tripod, featuring a three wheel landing gear with a brake on the front wheel, ailerons, and an engine of a very high power-weight ratio, had proven its reliability. On May 29, 1910, Glenn Curtiss made his famous flight from Albany to New York City, a distance of 150 miles, with only two stops, winning permanent possession of the Scientific American trophy.

Another outstanding feat in a Curtiss pusher was performed soon afterward by Lieut. Eugene Ely, when he landed and took off from an improvised wooden deck laid on the battleship Pennsylvania.

Lincoln Beachey, the king of all stunt pilots, was a user of Curtiss airplanes. Beachey had begun his career in aviation as a pilot of the early Baldwin dirigibles. As soon as Curtiss began to produce his Tripods, the reckless Beachey deserted the slow and flabby blimps for the swifter and more maneuverable airplanes.

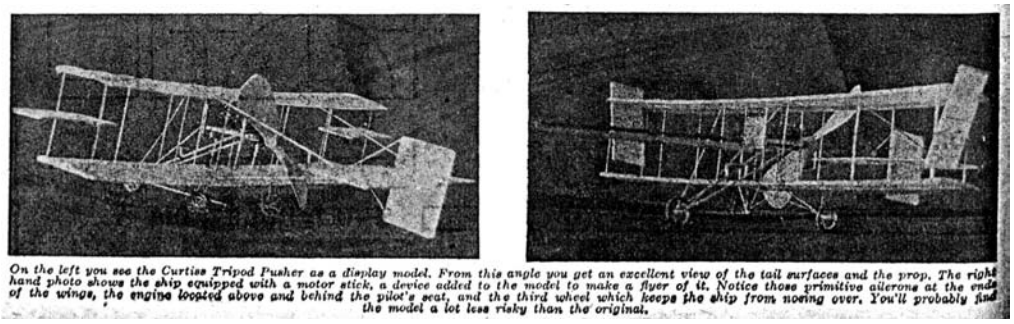
Lincoln Beachey was the first to zoom, whip stall, and spiral, besides being the first American to fly upside down and loop. His control over his plane was almost uncanny. He flew miles over the boulevards of Chicago with his wheels almost touching the roofs of the automobiles below. Often he flew through or landed and took off inside buildings.

To Glenn Hammond Curtiss for his tireless enthusiasm, vision and daring must go the credit for proving the airplane a practical and reliable means of transportation. Curtiss realized

that before airplanes could be produced in sufficient numbers to serve the people the infant industry needed many trained men, and the training he gave at his school gave many men their start in the aviation industry.

The Curtiss Tripod, our project this month, is a replica of the type flown by the great Beachey. Built in 1912, it was similar to planes used by Curtiss on his Albany-New York flight and by Ely to and from the deck of the Pennsylvania, except that the small auxiliary tail surface in front of the main wings was omitted.

Proportioned to the usual scale of ½" to 1' the completed model is shown half size on the three view plan, while the parts on the layout page are actual size.



On the left you see the Curtiss Tripod Pusher as a display model. From this angle you get an excellent view of the tail surfaces and the prop. The right hand photo shows the ship equipped with a motor stick, a device added to the model to make a flyer of it. Notice those primitive ailerons at the ends of the wings, the engine located above and behind the pilot's seat, and the third wheel which keeps the ship from nosing over. You'll probably find the model a lot less risky than the original.

SURFACES

DUE to the absence of a regulation fuselage, the easiest method of construction is to begin on the wings. Pin together 28 slats of soft 1/16" sheet balsa ¼" by 1½". Shape the resulting block with a knife to the wing section. Sandpaper smooth and you have a batch of perfectly alike ribs. The leading and trailing edges are also shaped with knife and sandpaper to the proper cross section.

To assemble the wing, mark the location of the ribs on the edges. Pin the trailing edge to a soft board. Cement the end and center ribs to it. The leading edge is then pressed against the nose of the ribs and held in place with pins. The remainder of the ribs are now inserted. When the glue is dry remove the wing frames carefully from the board and sandpaper to smooth any bumps or roughness. Note each end rib is braced with a strip of 1/16" sq. balsa to prevent covering from wrinkling at corners.

The construction of the tail group and ailerons is exceedingly simple. Balsa 1/16" sq. is used throughout. Assembly may be directly on the drawing.

The next step is to cover all the surfaces on both sides with white tissue. The under camber of the wing necessitates

sticking the paper to the bottom of every wing rib. Clear dope is best for adhesive. Do not spray with water or dope any part until the model is assembled, in order to avoid warping the light structure.

ASSEMBLY

ALL struts and outriggers are of bamboo slightly less than 1/16" sq. Sixteen interplane struts, A, are needed to connect the wings. They are all 2½" in length. The location of these struts is shown by small squares on the wing panel layout. Point the struts slightly, dip the ends in cement and force them into the lower wing at the tips. Press the upper ends into the top wing. Check the alignment to make sure the entire structure is square and that both wings have the same incidence. Insert the rest of the struts to complete the wing cell.

The tail booms, B, are 5" long. Point the ends and force into the trailing edges of the wings. Attach the stabilizer to their apex. A small strut, C, glued against the stabilizer's leading edge, maintains the correct incidence difference of 1/16", or a 2-degree angle between the wings and tail. Cement the rudder in place, bracing it to the stabilizer with two thin strips, D, of 1/64" sq. bamboo. Small brass bushings are glued to the ailerons. Through these a snug fitting bamboo axle is passed and cemented to the outer bay struts.

Assembly of the landing gear is begun by embedding the short struts, E, which are 7/8" long, into the bottom wing in the position shown on the wing layout. Running from the center of the lower wing, F and G meet at the extremity of E. The rear axle, bent from .028 music wire, is securely cemented to F. The front wheel is supported by the diagonal struts H and I. Notice that H passes inside the front center section struts and outside the rear set, in order to reach the proper opening for the wheel without bending.

Making real spoke wheels by the following method is not difficult. Cement together two sheets of 1/16" balsa with the grains crossed. Cut three wheels from them. Remove the inside of the wheels with a razor that has been broken diagonally to provide a pointed cutter. Force a pin through the rim and hub of 3/32" round balsa (step 1).

Split a length of bamboo to 1/64" sq. for the spokes. Sharpen one end, and push it through the rim and into the hub (step 2). Break off the excess and repeat the process. Alternate spokes are directed to opposite sides of the hub. The dotted lines on the wheel indicate those on the far side. The completed wheel

with the excess bamboo clipped off and the pin removed is shown as step 3. Should the builder wish to sacrifice realism for a speedier construction, solid balsa wheels on which the spokes and tires have been reproduced with India ink may be used.

The front wheel is mounted in a fork bent from .028 wire and cemented to H. The spreader J extends from the center of the rear axle to the neck of the fork. The short V of struts K completes the landing gear strut assembly. Slip the rear wheels on the axle. Bend over the wire to retain them.

The entire plane may now be sprayed lightly with water to tighten the tissue. A thin coat of dope is applied when dry.

DETAIL AND FLYING

THE dummy motor is made of soft A balsa. The cylinders and crankcase are constructed separately. A rectangle of 1/8" sheet balsa simulates the radiator. These parts are doped lightly to prevent "fuzzing," then detailed with black India ink as shown. Drill a hole through the motor at the proper angle for the prop shaft.

Washers with bushings inserted are cemented to the rear of the engine and the front of the radiator as bearings. A short length of 1/16" aluminum tubing is driven into the crankcase to form a socket for the wire prong on the motor stick. The motor bearers of 1/16" by 1/8" balsa are cemented to the sides of the crankcase. After mounting the radiator between the center section struts, fit the finished motor behind it, being careful to keep the prop shaft bearings in line. The motor stick is " by 3/16" by 8 ½” balsa. The rubber hook and the prong are both of .028 wire and cemented firmly to the stick.

In order to be able to wind the prop in the usual clockwise direction it will be necessary to use a left handed propeller because of the pusher mounting. As carving a left handed prop, while requiring no special technique, is a bit unusual for most of us, it is best to proceed slowly to make sure of every cut. Finish the blades to the outline given.

Slip the shaft formed of .028 wire through the bearings. After adding two washers and the prop, the remainder is bent over and embedded in the hub. Put the motor stick in place and string four strands of 3/32" rubber between the hooks.

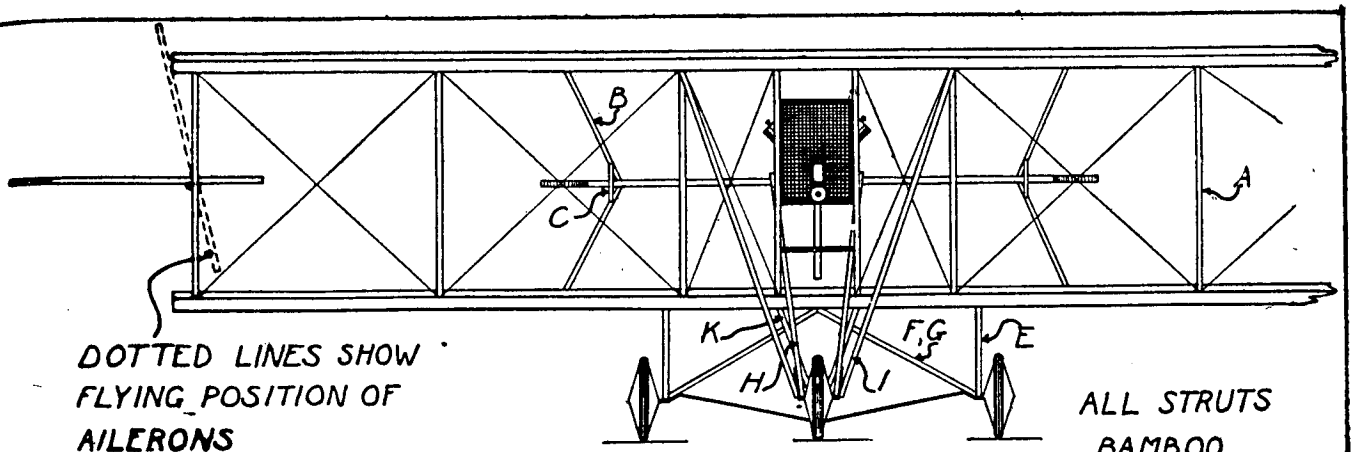
Raise the ailerons to their flying position and glide the model. Any stalling tendency may be corrected with a small amount of clay stuck to the front of the motor stick. Add weight to the tail to correct too steep a glide. When properly adjusted a very good

glide and a swell landing on the tripod undercarriage can be made. After a few short test hops with about 100 winds the motor may be lubricated, stretched, and wound with a winder to get some real flights. To get all the performance the Tripod is capable of, keep your model as light as possible by using a good grade of light balsa wood. The original model weighed .5 ounces ready to fly.

The brace wires of black thread are not necessary for a flying model but may be added for exhibition purposes.

Next month's model, the Deperdussin seaplane, winner of the first Schneider Cup race, will let us make good use of the many puddles left by the spring rains.

THE CURTISS TRIPOD PUSHER—Plate 1

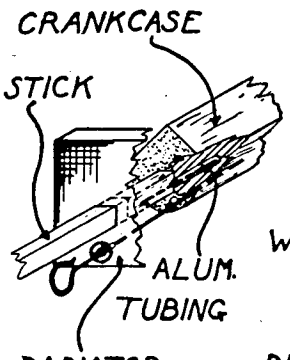


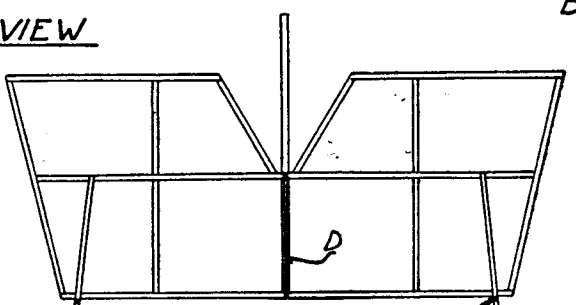
DOTTED LINES SHOW FLYING POSITION OF AILERONS

ALL STRUTS BAMBOO

FRONT VIEW

REMOVABLE STICK DETAIL





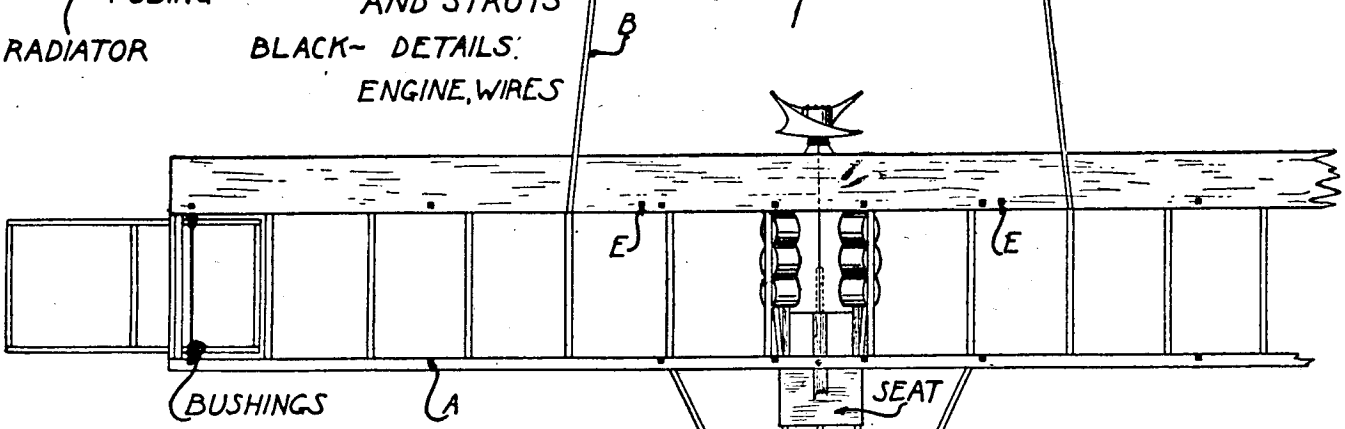
WEIGHT
READY to FLY
.5 OUNCE

COLOR

WHITE- (NATURAL) ALL SURFACES AND STRUTS

BLACK- DETAILS: ENGINE, WIRES

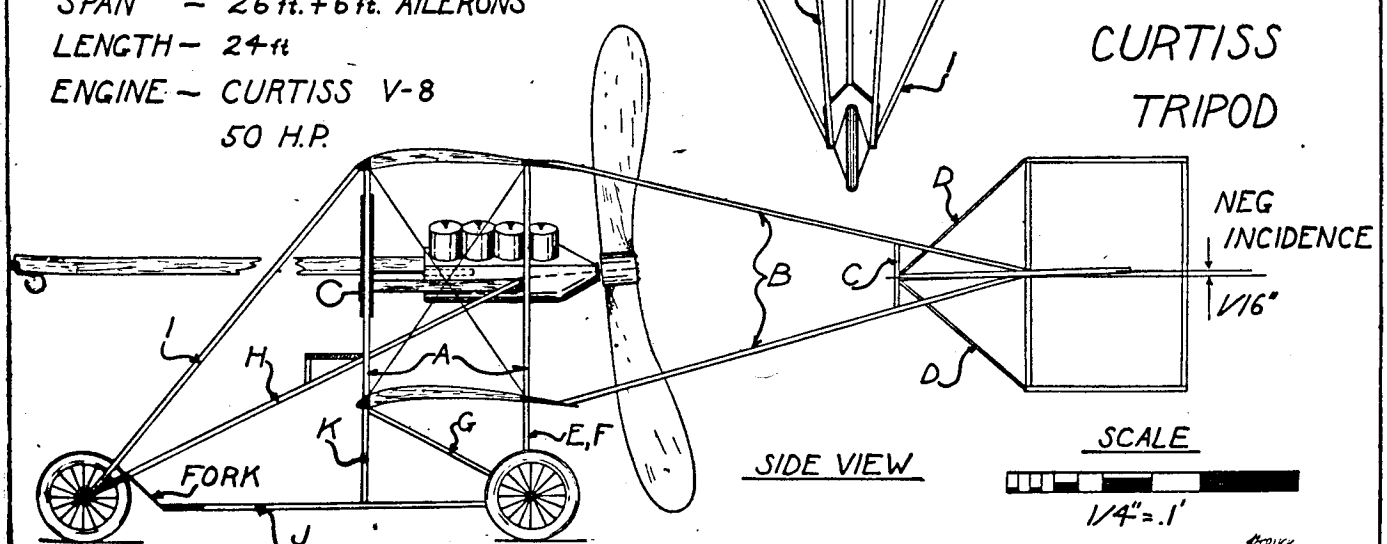
TOP VIEW



SPECIFICATIONS

SPAN — 26 ft. + 6 ft. AILERONS
LENGTH — 24 ft
ENGINE — CURTISS V-8
50 H.P.

1912 CURTISS TRIPOD

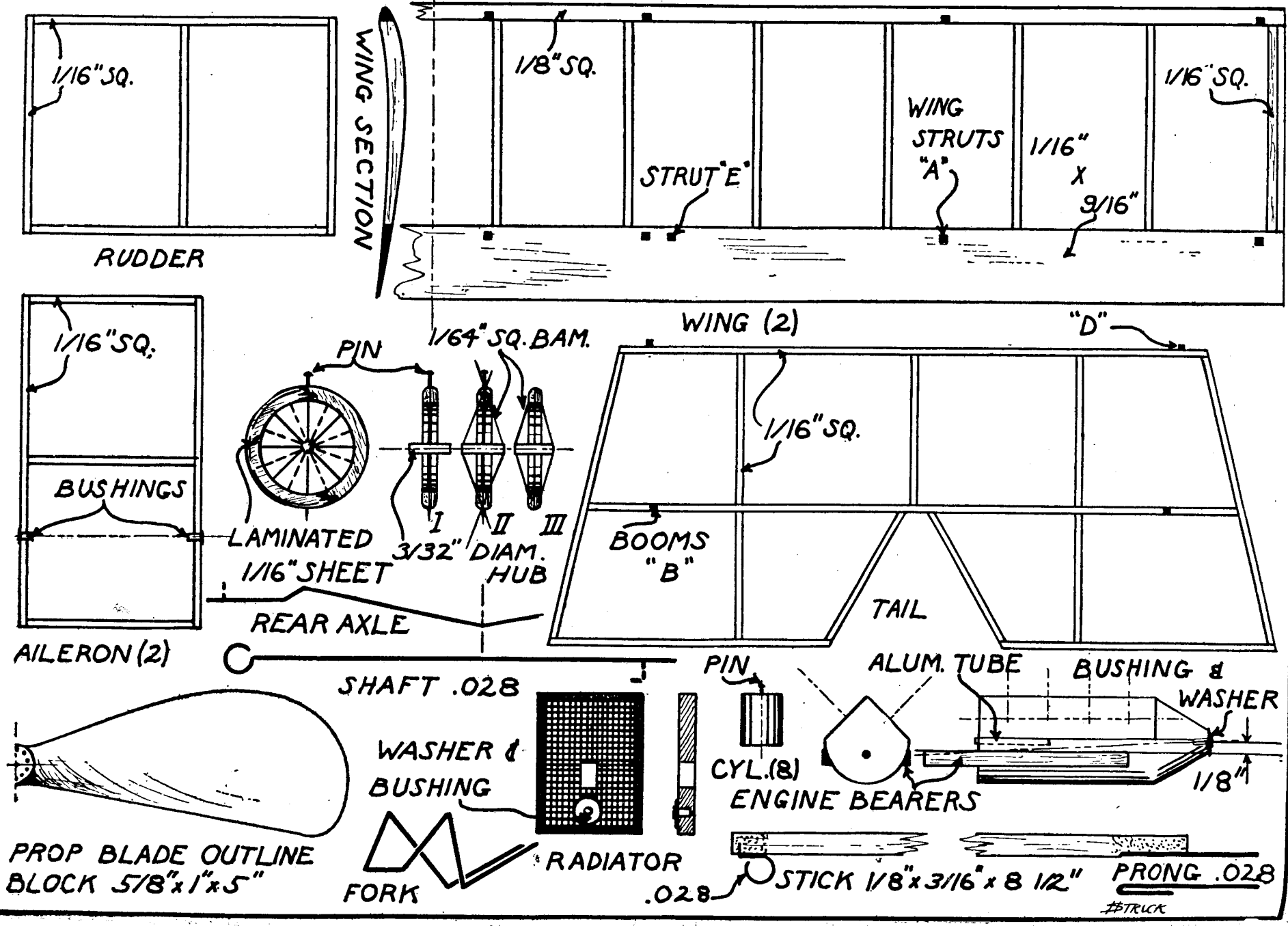


SIDE VIEW

SCALE

1/4" = 1'

STRUCK


1/16" SQ.
RUDDER
WING SECTION
1/8" SQ.
STRUT "E"
WING STRUTS "A"
1/16" X 9/16"
1/16" SQ.
WING (2)
"D"
1/16" SQ.
BUSHINGS
AILERON (2)
PIN
1/64" SQ. BAM.
LAMINATED 1/16" SHEET
3/32" DIAM. HUB
I II III
REAR AXLE
BOOMS "B"
TAIL
SHAFT .028
PIN
ALUM. TUBE
BUSHING & WASHER
1/8"
CYL.(8)
ENGINE BEARERS
WASHER & BUSHING
FORK
RADIATOR
PROP BLADE OUTLINE
BLOCK 5/8" x 1" x 5"
.028
STICK 1/8" x 3/16" x 8 1/2"
PRONG .028