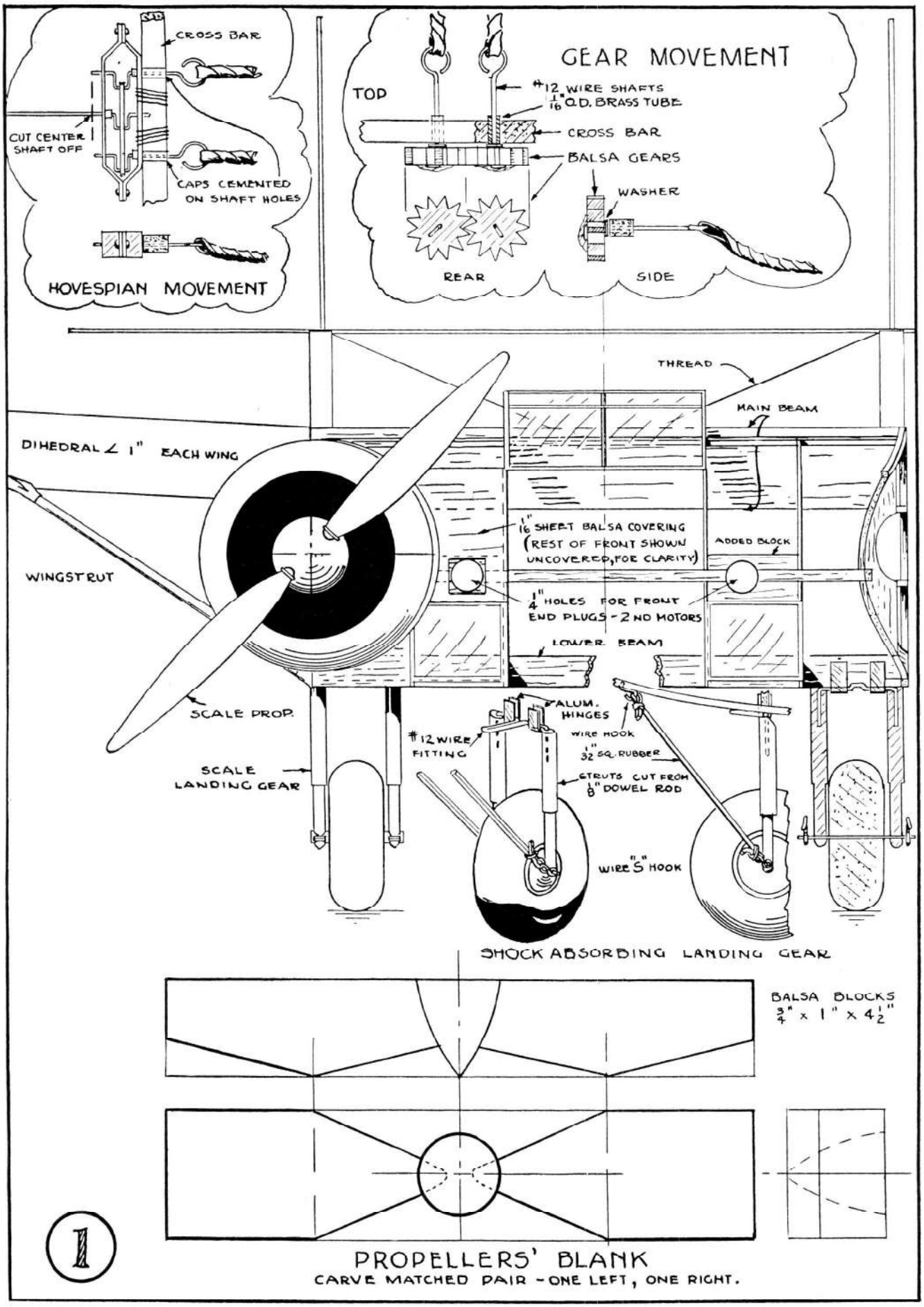
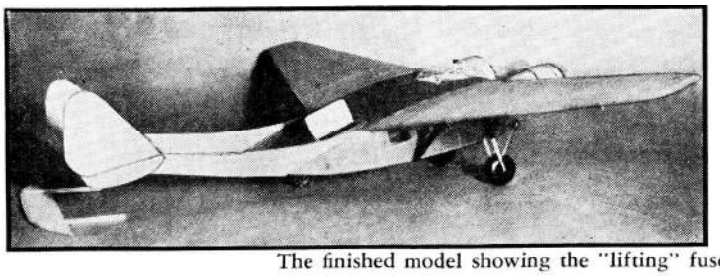
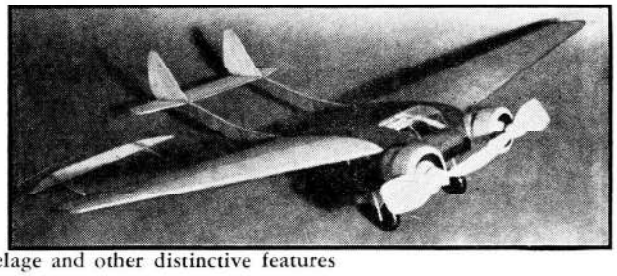

CROSS BAR
CUT CENTER SHAFT OFF
CAPS CEMENTED ON SHAFT HOLES
HOVESPIAN MOVEMENT
GEAR MOVEMENT
TOP
#12 WIRE SHAFTS
1/16" O.D. BRASS TUBE
CROSS BAR
BALSA GEARS
WASHER
REAR
SIDE
THREAD
MAIN BEAM
DIHEDRAL ∠ 1" EACH WING
1/16" SHEET BALSA COVERING (REST OF FRONT SHOWN UNCOVERED, FOR CLARITY)
ADDED BLOCK
WINGSTRUT
1/4" HOLES FOR FRONT END PLUGS - 2 NO MOTORS
LOWER BEAM
SCALE PROP.
ALUM. HINGES
#12 WIRE FITTING
WIRE HOOK
1/32" SQ. RUBBER
SCALE LANDING GEAR
STRUTS CUT FROM 1/8" DOWEL ROD
WIRE "S" HOOK
SHOCK ABSORBING LANDING GEAR
BALSA BLOCKS 3/4" x 1" x 4 1/2"
1
PROPELLERS' BLANK
CARVE MATCHED PAIR - ONE LEFT, ONE RIGHT.





The finished model showing the "lifting" fuselage and other distinctive features

Build This Flying Burnelli Transport

How You Can Build and Fly a Model of the Most Unique Transport-Bomber Ever to Take the Air

By ALAN D. BOOTON and RALPH PICKARD

THE unusual design and safety features of the Uppercu-Burnelli all-metal 14 passenger transport have caused favorable comment both in the U.S. and abroad.

The ship resembles a huge flying wing and the airfoil-shaped fuselage tends to carry its share of the load. The two 725 hp. Pratt & Whitney engines are mounted on opposite sides of the leading edge of the fuselage, at angles away from each other to counteract the opposing drag caused by flying with one motor. This feature is included on the model, while the retracting gear and wells are omitted for simplicity.

Specifications and Performance

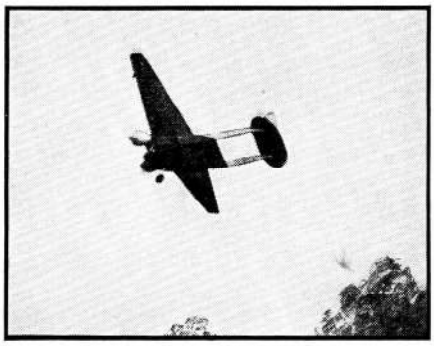
Cruising speed at sea level	185 m.p.h.
Max. speed at sea level	210 m.p.h.
Span	71′
Length	44′
Heighth	10′
Weight empty	8000 lb.
Pay load	3200 lb.

and has a cruising range of 600 miles.

The model passed through several stages of experimentation before the present systems of powering were adopted. At the beginning, single motors were applied to each propeller, but the duration was too short. Then outrigger motor sticks were tried with success, but they spoiled the appearance of the model. Finally, two sets of motors were tried with each prop in the manner shown on the drawings, with equal success. If you do not care to make the balsa gears, the Hovespian movements may be used. Metal gears were tried and it was found that they weighed the tail of the model down too much to add proportional weight to the nose. The balsa gears are light, easy to make and fit in well with model building methods, because the shafts are cemented to the gears in the same manner a propeller is attached.

Fuselage

Make two sides of the fuselage right on the drawing. Use 1/16" sq. except where 1/16" sheet is shown. To get the curve at the front, seen on the top view of the sides, pinch the wood with finger nails at 1/16" intervals until the curve of the sides matches the curve of the drawing. Assemble the sides with the



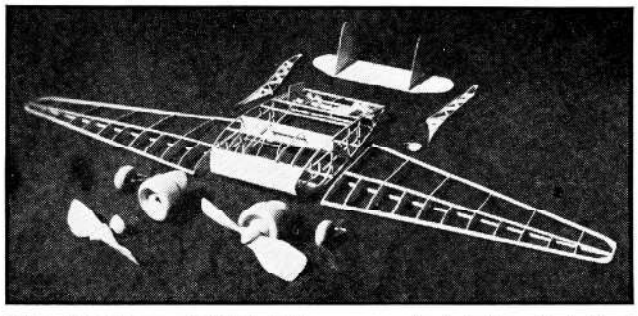
The model is stable in flight

spacers between. Cover the front with soft 1/16" sheet after the "A" and "B" formers have been cemented in, and cut out for the lower windows and the front plug openings on the leading edge.

Make the two tail booms right on the drawing to insure true shape. The longerons and spacers are 1/32" x 3/16", stripped out of 2" sheet. The 1/32" formers and small tail block are cemented on while on the drawing.

Cowlings

Carve the cowlings out of medium balsa to the thickness shown to get the proper balance. Add the ⅛" discs and noseplug to each. Sand the outside of the cowlings between coats of dope. Cut out a portion of each cowl, one to fit the left side and one to the right. Be sure to keep the top and sides correct, relative to the center lines of the prop shafts.



How the uncovered finished frame parts look before their final assembly. Note the light construction.

Propellers

Cut both blocks to the same shape blank, but carve one to turn left and one to turn right. It is possible to use two right hand props, but a left and a right are more efficient. Note that the spinners are carved integral with the props. Cement 1/16" tubing in the noseplugs, insert the prop shafts through plugs and props with several washers between, and bend winding loops in the shafts before cementing.

Tail Surfaces

The tail surfaces are cut out of 1/32" sheet balsa. Make a whole stabilizer from the half pattern, and two rudders. Cement the rudders to the stabilizer as shown on the drawing. Now make the "extra stabilizer surface." The model will fly without it, but better glides and performance result from its use, and then it may be removed to return the model to scale. The "extra" has the 1/32" x ⅛" prongs cemented to the top and bottom to hold it to the stabilizer without cementing to the stabilizer.

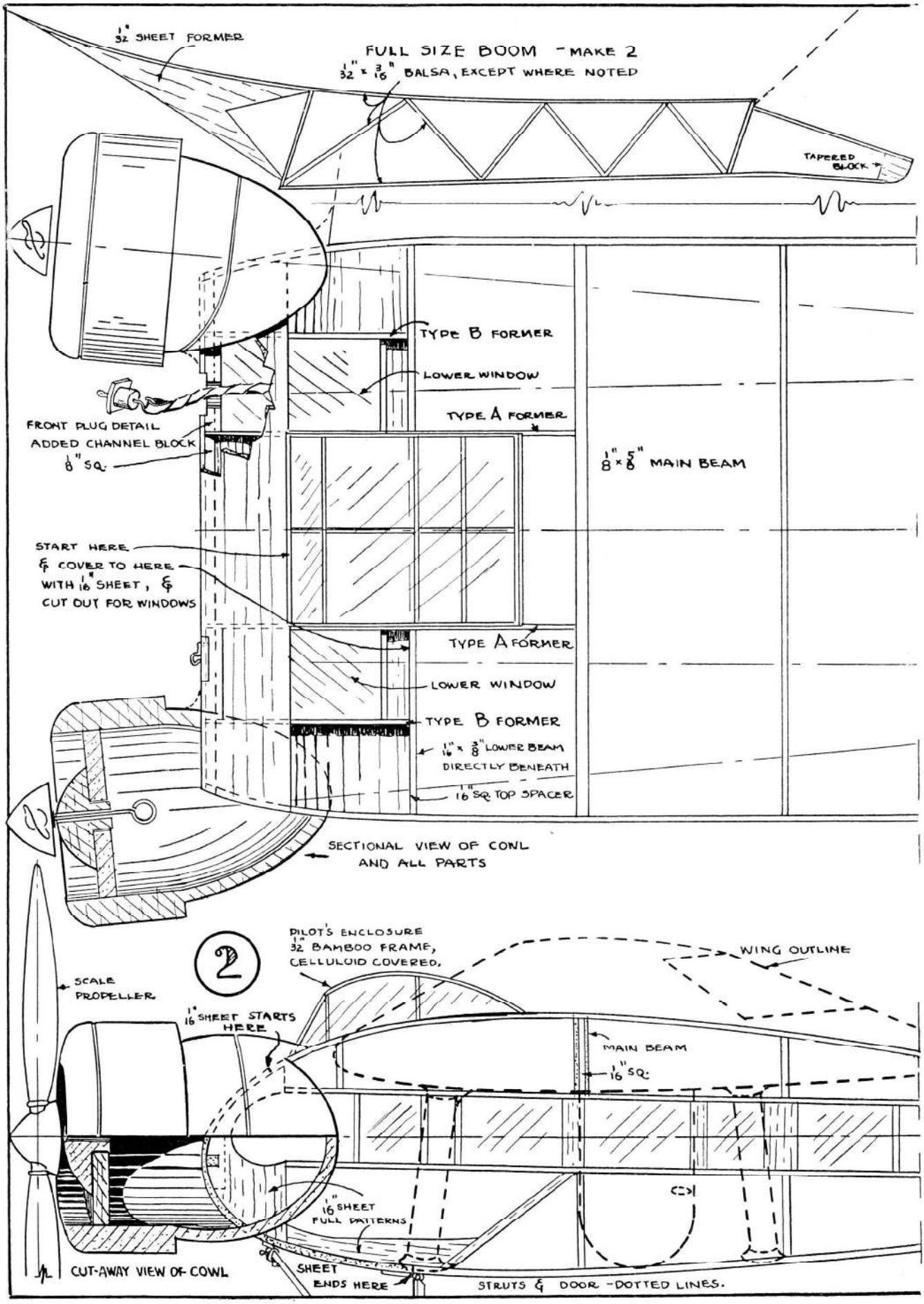
Landing Gear

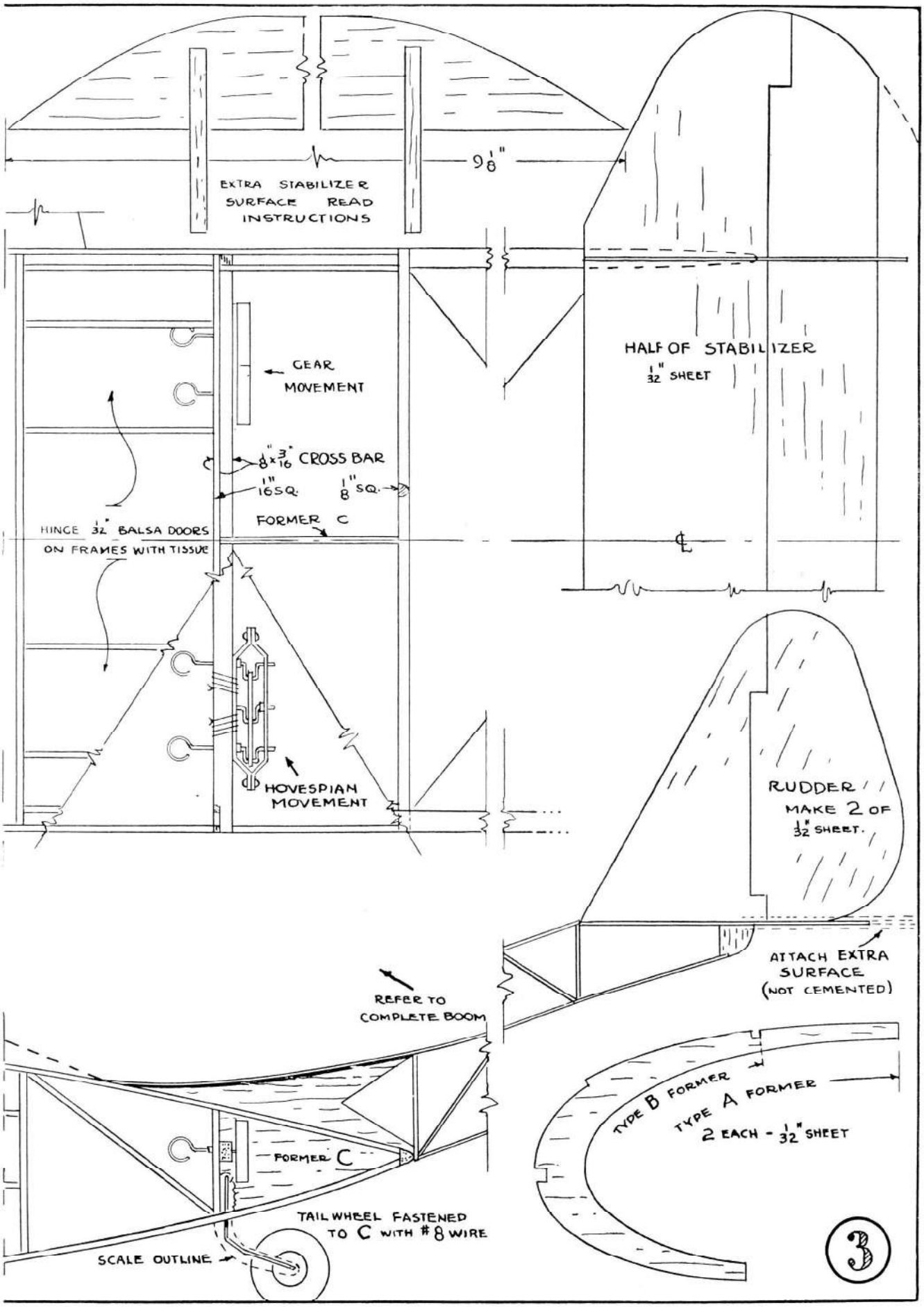
Note that the front "struts are really 1/32" sq. rubber and the top wire fitting is bent to extend to the front to prevent the gear from folding forward, but permits it to spring backward when struck. Follow the drawing and you will be pleased with the results.

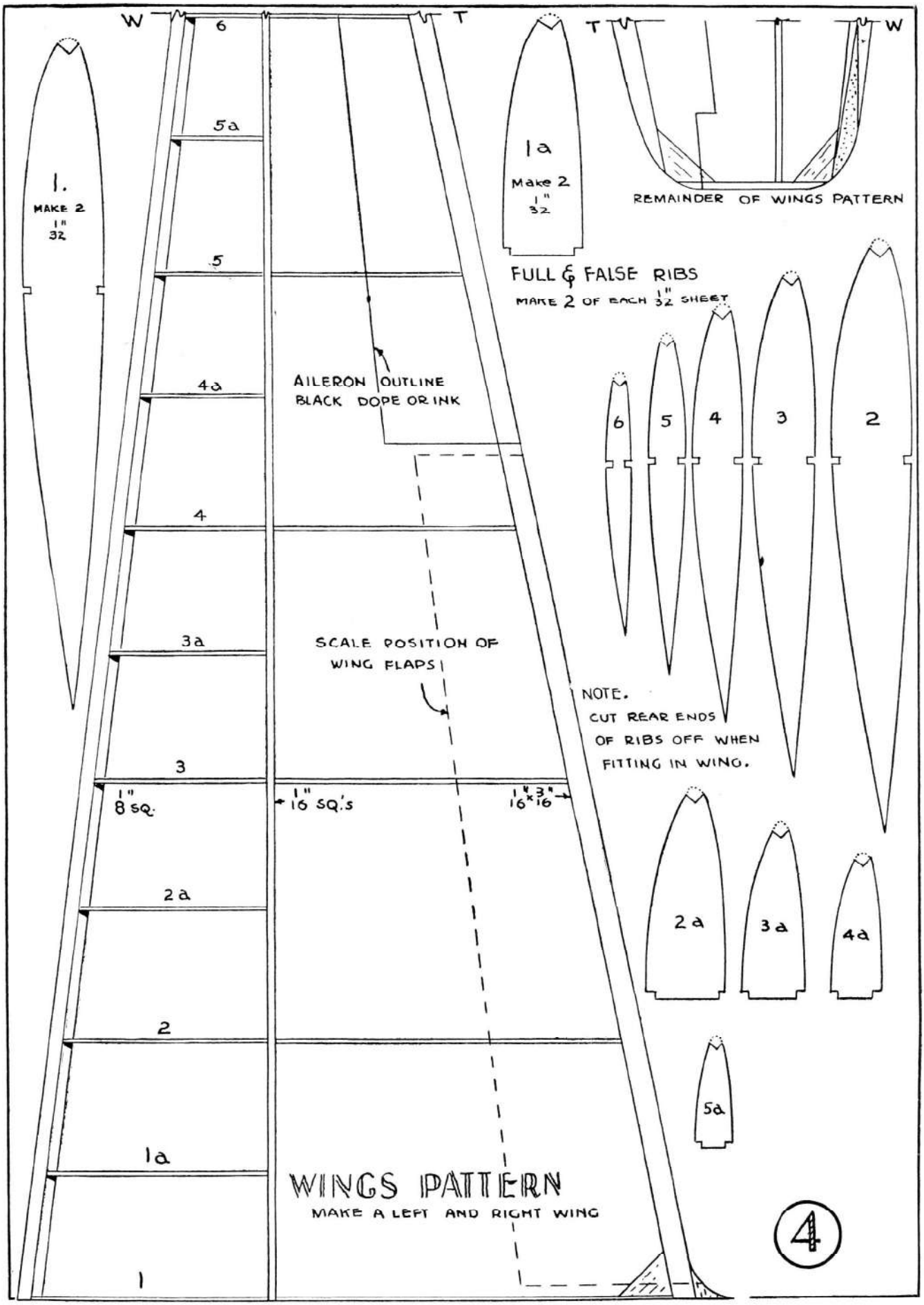
Movement Units

To get matched gears, it is best to make a sheet aluminum pattern. Bend a pin U-shaped at the point and cut the head off. Cement 3 1/32" x 2" sq. sheets of hard balsa together with the grain of each crossing the other. This plywood should dry several hours before attempting to use it. Scribe ½" circles on the surface of the plywood with a compass, then cut and sand carefully to the line. Nine discs are obtainable from the 2" sq. sheet, enough to have several to practice on. Now place the aluminum gear pattern on a disc and insert the bent pin, straight end first, in the center holes of both and pull through until the point reaches the pattern. Force the point

(Continued on page 49)


1/32 SHEET FORMER
FULL SIZE BOOM - MAKE 2
1/32" x 3/16" BALSA, EXCEPT WHERE NOTED
TAPERED BLOCK
TYPE B FORMER
LOWER WINDOW
TYPE A FORMER
FRONT PLUG DETAIL
ADDED CHANNEL BLOCK
1/8" SQ.
1/8" x 5/8" MAIN BEAM
START HERE
& COVER TO HERE
WITH 1/16" SHEET, &
CUT OUT FOR WINDOWS
TYPE A FORMER
LOWER WINDOW
TYPE B FORMER
1/16" x 3/8" LOWER BEAM
DIRECTLY BENEATH
1/16" SQ TOP SPACER
SECTIONAL VIEW OF COWL
AND ALL PARTS
2
PILOT'S ENCLOSURE
1/32" BAMBOO FRAME,
CELLULOID COVERED.
WING OUTLINE
SCALE
PROPELLER
1/16" SHEET STARTS
HERE
MAIN BEAM
1/16" SQ.
1/16" SHEET
FULL PATTERNS
CUT-AWAY VIEW OF COWL
SHEET
ENDS HERE
STRUTS & DOOR - DOTTED LINES.


9 1/8"
EXTRA STABILIZER SURFACE READ INSTRUCTIONS
HALF OF STABILIZER
1/32" SHEET
GEAR MOVEMENT
1/8 x 3/16 CROSS BAR
1/16 SQ.
1/8" SQ.
FORMER C
HINGE 1/32" BALSA DOORS ON FRAMES WITH TISSUE
HOVESPIAN MOVEMENT
RUDDER
MAKE 2 OF 1/32" SHEET.
ATTACH EXTRA SURFACE (NOT CEMENTED)
REFER TO COMPLETE BOOM
FORMER C
TAIL WHEEL FASTENED TO C WITH #8 WIRE
SCALE OUTLINE
TYPE B FORMER
TYPE A FORMER
2 EACH - 1/32" SHEET
3


W
T
6
5a
5
4a
4
3a
3
2a
2
1a
1
1.
MAKE 2
1" 32
1a
Make 2
1" 32
T
W
REMAINDER OF WINGS PATTERN
FULL & FALSE RIBS
MAKE 2 OF EACH 1" 32 SHEET
6
5
4
3
2
AILERON OUTLINE
BLACK DOPE OR INK
SCALE POSITION OF
WING FLAPS
NOTE.
CUT REAR ENDS
OF RIBS OFF WHEN
FITTING IN WING.
1" 8 SQ.
1" 16 SQ.'s
1" 3" 16 x 16
2a
3a
4a
5a
WINGS PATTERN
MAKE A LEFT AND RIGHT WING
4

in a larger slower ship. Build cleanly even when your work will not be noticed and you will not have the unnerving experience of seeing your gas job "moult" high in the air.

If no changes are made in the design, the first flight should be made with the front strut of the wing mount directly over the No. 2 bulkhead. If anything, this adjustment is slightly on the diving side. If you doubt the wisdom of this, ask a friend who has ever had the nightmare of watching his gas job seesaw all over the landscape—up and down, up and down, and finally down! In a slight dive, a model will scoot all over the lot until the gas is out or the switch is cut, and, barring trees, walls, pedestrians and such, will end up little the worse, save for wear on the wheels and the breathing organs of the poor builder who is always accorded first chase. A bike is a great asset at a time like this.

As far as the turn for your first flight is concerned, the safest thing to do is sit down and figure out just what adjustments will keep the model in a straight line. It will probably turn anyway, but it won't spin. Notice the models behavior closely, and adjust it with the rudder flap for a 40 or 50 foot circle with the torque for its second flight.

We think this new idea of making gas jobs a reasonable size is the greatest (or should we say smallest) thing that has hit gas-jobbing so far, and after your first Cloud-Kisser, so will you!

Build This Flying Burnelli Transport

(Continued from page 23)

through the pattern and into the disc. In this manner, the pattern is held in the same place throughout the cutting. Now cut the teeth with a razor blade or razor knife and file to a final close fit with a 3-cornered file or a prepared stick of fine sand paper the same shape of the file. Remove the pattern and pin and insert a straight pin. As each gear is made, dip it in cement and brush surplus off. When dry, repeat the process of dipping. After three or four coats have been applied and the gears have smooth glossy coats, they are ready to use. If the teeth have not been brushed off properly, they may be wavy, but refiling will get them back into shape. If filing again is necessary, dip the gears in thin dope or banana liquid and brush surplus off, to keep the teeth smooth.

Drill 1/16" holes through the cross bar (it should not be installed until the movements are on it) exactly 7/16" O.C. and insert ¼" lengths of 1/16" aluminum tubing for bearings. Insert the shafts through the bearings and the gears with washers between, the same way a propeller is mounted, but do not cement either the tubing or the shaft until the gears are found to run smoothly. It may be necessary to move the bearings closer or farther apart. Cement the bearings first and let them dry before bending and cementing the shafts to the gears. Install the cross bar movement assembly in place at the rear and cement former C in the center.

To use the Hovespian movement, cut the middle shaft off close to the frame and proceed as per drawings.

Assembly and Covering

Cover the booms on both sides from the rear to the first spacer. Cover the bottom and attach landing gear and tail wheel. Cover sides and cement celluloid inside the windows. Cover top and cement booms in place and then the tail surfaces on them. Make the cockpit cover frame of 1/32" sq. bamboo, and cover with celluloid. Make the pair of wings, cover and attach to fuselage so that the spars are in line with the main beam of the fuselage and the contour of the wings line up with the top longerons of the fuselage. Cover remainder of booms and cut 1/16" x ¼" streamline struts and fit them to the wings, noting that each wing has 1" dihedral at the tips. Make two 1/32" sheet balsa hatch doors and hinge them on with tissue. Power the model with two loops of ⅛" flat rubber to each half motor and put a few drops of heavy oil on the gears. Spray the model lightly with water to tighten the tissue and apply a thin coat of dope.

Flying the Model

It strains the movements to wind by the propellers, so use a double winder. Stretch and wind each side at a time and put in the same number of turns. Slip the "extra stabilizer surface" on and glide until the model has a flat glide. Keep increasing the number of turns of the motors, then, until satisfactory flights are obtained, by making adjustments after each flight.

List of Materials

Balsa

2 medium ¾ x 1 x 4¼" flying props.
2 hard ¼ x ⅜ x 4⅜" scale props.
2 medium 1¾ sq. x 2⅛" cowl blocks.
1 hard 1¼ sq. x 2" wheels and nose plugs.

1 medium 1/16 x 2 x 12" sheet formers and struts.
1 soft 1/16 x 2 x 12" fus. leading edge.
1 medium 1/32 x 2¼ x 8½" stab.
6 medium 1/32 x 2 x 12" other sheet parts.
1 medium ⅛ x 1½ x 3" cowl discs.
1 medium 3/16 x ½ x 2" to make chan. blocks.
1 ⅛ x ⅝ x 6" main beam.
1 ⅛ x 3/16 x 6" cross bar for rear of motors.
3 ⅛ sq. x 12" leading edges, etc.
2 1/16 x 3/16 x 12" trailing edges.
12 1/16 sq. x 12" fusel., spars, spacers.
2 Hovespian movements as shown (optional)
1 sq. in. thin hard sheet alum. hinges, pattern.
1 doz. ⅛" model washers.
2 sheets colored tissue.
4 1/32 sq. x 12" bamboo strips.
3 oz. clear model dope.
2 oz. good cement.
1 24" length No. 12 wire hooks, shafts, fittings.
1 4" length No. 8 wire L.G. fittings.
1 10" length ⅛" dowel rod. L. gear struts.
1 6" length 1/16" alum. tubing bearings.
60 inches ⅛" flat black rubber, lubricated.
12 1/32" sq. rubber for landing gear.
1 ⅝" tail wheel.

Building "Little Tick"

(Continued from page 21)

switches. However, as these mechanisms were not designed for this purpose, the time range of most of them is not large enough to permit long flights. The Eastman Kodak timer is an exception. Due to the principle upon which it works, it can be set for periods of as long as three minutes.

It is unsatisfactory to a certain extent because the temperature and humidity affect it to such a degre that its dial cannot be accurately marked off. This makes it necessary to recalibrate it before each day's flights.

So far, most of these timers had to be mounted on the outside of the fuselage to facilitate the winding and setting of them.

Setting them, while not being complicated was still not a simple procedure for the switch had to be closed, the timer wound and set, and a catch placed to keep it from running until the plane was ready to take off. Some had to be set in motion before the motor could be started.

After reading this far it would appear that I do not like these camera timers. This is not so, for I have seen plenty of them perform splendidly. So it was with the idea of doing away with all of the above mentioned "faults" that a new timer called "Little Tick" was developed.

"Little Tick" is very dependable and has a perfect score to date, over a hundred flights being successfully completed.

Having a run of from ten seconds to three minutes it operates at a constant speed and once the dial is marked off it never has to be recalibrated for neither heat nor cold has any effect upon it. A switch is built into it and still the total weight is less than two ounces.

Mounted inside the body, a small shaft, with a pointer affixed, extends through the side of the plane. The dial is mounted on the outside of the fuselage. Only one operation is required to wind and set it, close the switch and set it in motion.

It is built in the frame of a small clock, the escapement of which controls its speed.

In building "Little Tick," first secure a small clock of the type found on most night tables. You might have one in the house; if not, they are inexpensive when new and may be purchased for a song at most pawnshops.

To begin with, the clock is taken out of the case and the hands and face are removed.

Before taking it apart further, study the accompanying drawings making sure that you know just what is to be done. Few dimensions are given. This is due to the fact that most clocks differ in size, but no matter what size clock you obtain, it can be adapted to the timer.

Now getting back to the clock, note the positions of the gears together with their functions. You will notice that the center post, or the shaft to which the hands were attached, is geared to the spring on one side, and on the other to a train of gears leading up to the escapement. This last set of gears leading to the escapement wheel are the only parts used, so the spring and center post are removed. If the clock has an alarm, this is also discarded. When these parts have been taken out, the frame will be half empty, so in order to save weight the empty part of it is cut off. The frame has to be taken apart to cut it accurately. In removing the balance wheel, be sure that the hair spring attached to it is not stretched or strained in any way.

When all the parts have been removed both sides of the frame are clamped in a vise and the sections which housed the spring and the alarm are cut off.

The spacer bars may have to be relocated. The holes for them can be drilled while both sides are still in the vise.

It is important that the holes be directly opposite each other so that the gears will fit perfectly.

Next, the first gear in the train, the one which meshed with that on the center post, is removed from its shaft and its hub is drilled out so that a length of 1/16" diam. drill rod can be inserted.

A U-shaped strap cut from 1/32" brass, with a small piece of the clock spring riveted to the bottom of the U, is placed around the gear on the shaft. It should be separated from the side of the gear by spacer washers. Then its ends are soldered to the shaft.

Drill out the bearings on the frame to accommodate this larger shaft and reassemble the works.

When the new shaft is rotated, the gear does not turn with it but the U-shaped strap does. The curved spring on top of the strap slides over the teeth of the gear and acts as a ratchet. That is, when it is turned in one direction it merely slides over the teeth but coming back it engages these same teeth and turns the gear with it. As the gear leads to the escapement, the speed at which the shaft turns is accurately controlled.

A small coil spring wound from fine piano wire and placed on the shaft, supplies the power to return the shaft to its starting position.

The switch is built on the outside of the frame and is actuated by a small arm soldered to the shaft which protrudes from the case.

A piece of fibre 1/16"x¼"x½" is riveted to two brass brackets which are then soldered on the frame.

The contact arm, made from a piece of the old spring, is grounded to the frame. A contact point made by cutting a small slice off a 3-inch nail, is soldered to the arm at a point directly below the center of the fibre plate. The upper point, on the fibre plate, is a small flat head screw.

If the contact arm were to reach the lever on the shaft, the arm itself would bend between the contact point and the end of the arm and more power would be needed to open the circuit. In order to prevent this, a short stiff piece of brass soldered to the arm near the point makes contact with the lever.

Now after describing how the parts are built, here is the way they work.

When the timer is at rest, the lever on the shaft rotated by the spring holds the contact arm down separating the points. When the shaft is turned, the lever moves with it, closing the points, the claw sliding over the teeth of the gear.