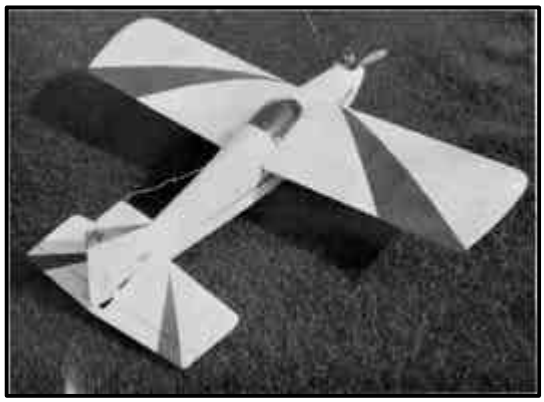


By KEN WILLARD

RCM's Chief Sunday Flier presents the Top Dawg, an .049 to .15 sport Goodyear type design for single channel through multi proportional

THE Top Dawg was designed in response to numerous requests from you Sunday fliers for a good, small sport job that would be suitable for several types of installations for radio gear — escapements, servos, reeds, galloping ghost, and even the more expensive proportional gear, such as the Orbit 3+1, Digitrio, PCS, Micro-Avionics, etc.

It has been an interesting challenge to meet such a broad requirement. From my own standpoint, 1 added another specification — that it should look hot like a racer, yet be comparatively easy to handle so the sport fliers could enjoy it. You shouldn't have to finish every flight with a severe case of nerves! Probably some of you will anyway — at least until you get used to it, because you'll want the hot version with an .09 or .10. even .15 power. But that's OK. too, as long as that's the way **you** want it!

Some interesting factors were involved in this design. The compartment for the radio gear needed to be large enough for three servos, receiver, and battery pack for proportional gear. Yet the center of gravity location had to be non-critical because of all the possible variations in equipment.

It figured that the version with the proportional gear would probably be the hottest to handle because of the heavier wing loading and higher power required. So that was the first version to be built. A Max .10 was selected to power it. and Art Strahm loaned me his Orbit 3+1 (what sublime faith!) for control.

Now. 1 don't have a lot of stick time on full house proportional gear, but I decided to make the first test flight anyway. I had done some rudder only proportional flying, and figured I'd just use rudder until 1 got the feel of it.

That first flight was a real thrill! Art hand launched the Top Dawg, and away she went, climbing straight out until I gave a slight rudder command. A gentle turn, gain of altitude, then back off on the throttle, and try to get the feel.

Somebody — I forget who — came up alongside and asked, "What have you got in that job — galloping ghost?"

"Nope. Full proportional," I replied nervously, watching the model.

"Oh, yeah," he said. "Now I see. Calm down, ole' buddy. Your hand is shaking so much that you're fluttering the elevator!"

So I did — a little, anyway. This was a hot little job — hotter than I'd been flying for a long time. But as the flight progressed, and I could see there wasn't any reason to be nervous, I began to try a little elevator as well as the rudder action. Finally, getting up more nerve, I pulled a loop, and as Top Dawg came screaming out of it, I throttled back

and brought her in for a shaky, but successful landing!

On the next flight, I let Steve Corby, an old pro at proportional, fly. Man, it was beautiful! But on the next flight I took over again and with more confidence let the model go. as you occasionally have to do with single channel gear, and decided it would be necessary to modify the fin area. It was fine for proportional, but marginal for rudder only.

Next, a friend of mine, John Forrester, using my working plans, built one for single channel servo control. Since he had a Cox .09 with engine control, he installed it — even though the single channel version is designed for .049 power.

But we flew it with the .09 anyway. Wow! It climbed with the engine in idle! However, it proved the basic design was good for single channel, even with high power. So the .049 version should be very acceptable for you fliers who just want a good looking, good performing sport machine.

If you think you can handle it, put in an .09 or a Max .10 — and be ready! I don't recommend it for beginners, even though the .049 version is very good to fly. My suggestion would be to first fry your Top Dawg with .049 power. Then install an .09 or a .10 after you've learned the reaction speed of the model. Three versions were built during the design stage. One had a 15% airfoil with 4 degrees dihedral, and this version is good for full proportional control, since you'll be controlling it all the time. The second version was similar. The difference being that it had 6 degrees dihedral. This is the best all around version, since it will free flight when properly trimmed, and return to level flight from a steep turn all by itself. This is good for single channel flying. The *third* version had a 10% airfoil and is too hot except for very experienced fliers.

Based on the flight tests, the version with the 15% thick airfoil and 6 degree dihedral was selected for publication. I think you'll like it. Here are a few building hints.

The Top Dawg, himself, holds aloft the .049 powered single channel version. Finish is Top Flite's Monokote.

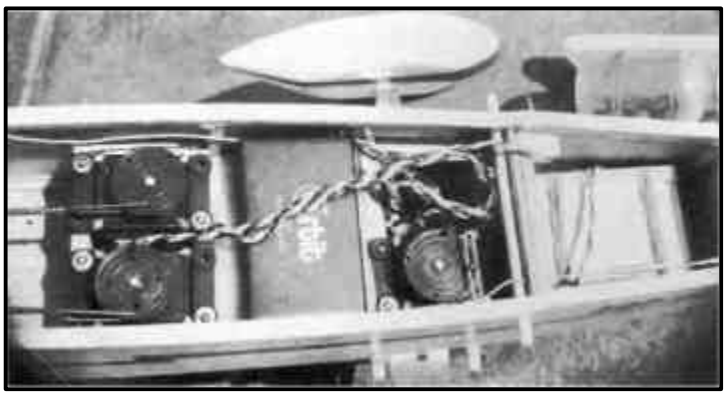
FUSELAGE

This is basically a box structure, with a turtle-deck and hatch added on top. Be sure the IV sheet material for the sides is of equal weight and strength so that the curvature of the sides is equal.

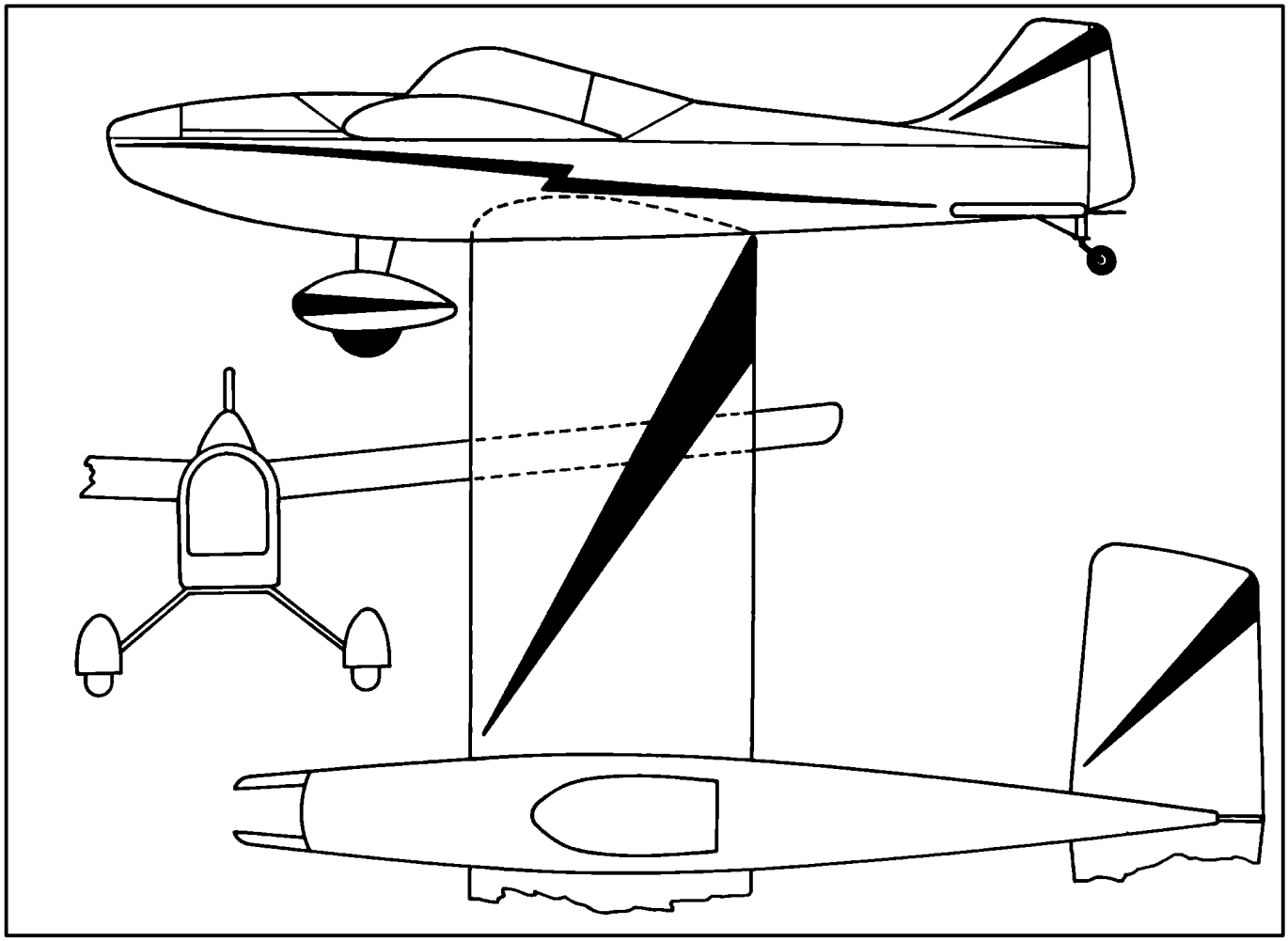
Note the sides' taper in a straight line from the bulkhead at the trailing edge of the wing back to the tail-post. This is so the turtle-deck is a half cone in shape — easy to cover with sheet balsa, since there's no double curvature to contend with.

There are three ways to make the turtle-deck. I've shown the sheet-covered stringer and bulkhead method on the plans. An easier, but slightly more expensive way, is to make it out of block balsa, hollowed out for lightness. A third way (I used it on one prototype) is to cut a Styrofoam core to shape and cover it with 1/16" sheet. This is light and strong, but shaping the Styrofoam and then covering it is a bit of a chore. No detail structure is shown in the radio compartment. It has to be tailored to the' various types of equipment, and there are too many to show them all. In general, your receiver should fit up against the bulkhead at the wing leading edge position. Then a 3/16" bulkhead can be inserted behind it so it is in a separate compartment from the servo, or servos as the case may be. If you use an escapement,

Orbit 3+1 proportional version. Installation shown below left. Motor control linkage translates angular to linear motion. Sleeve on linkage provides friction fit connections to throttle link for easy adjustment. Hobbypoxy finish.



TOP DAWG DATA SHEET



ENGINE

Single channel prototype used a Cox Medallion .049. Multi channel prototype used a Max. .10. All engines from .049 through .15 are suitable.

DIMENSIONS

Wingspan: 36" Chord: 9"
Total Wing Area: 351 square inches
Fuselage Length: 30" Max. Fuselage Width: 3½
Incidence: Wing: + 2 degrees Stab: 0 degrees

RC EQUIPMENT

Sport design for rudder only, or rudder, elevator and motor. Any single channel escapement or servo system for the .049 version. Any six channel reed, small multi proportional system, or Galloping Ghost. Author's prototypes used both single channel and Orbit 3+1 proportional system.

FLIGHT CHARACTERISTICS

The Top Dawg is quite fast with a .10 to .15 engine. It is responsive but stable. Limit elevator movement on first flights.

MATERIAL LIST

Wings:

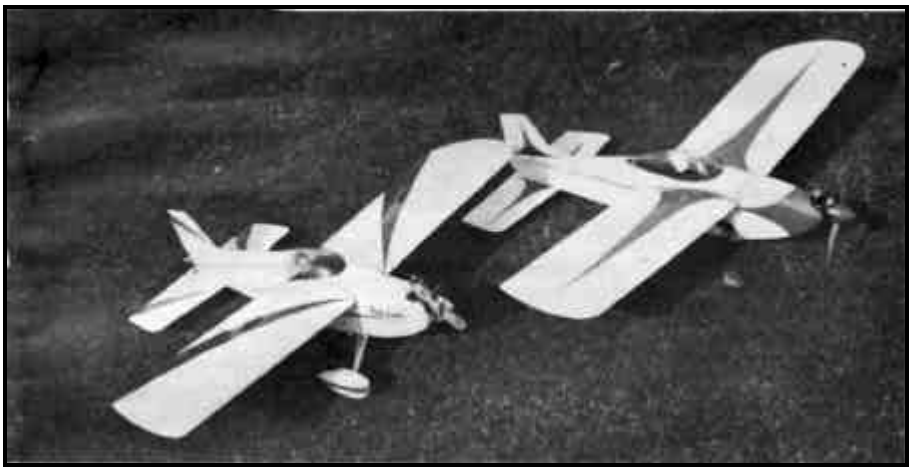
- (1) ½ x ¾x 36"
- (1) 1/16"x3"x36"
- (1) ¼" x ¾" x 36"
- (2) 3/16" x 3/16"x 36"
- (2) 1/16"x ¾"x36"
- (1) ¼" x 2" x 36"
- (1) 1/8"x 2"x 12" (scrap)
- (1) 1½" x 1½" x 10"

Tail Group:

- (1) 3/32" x 4" x 36"
- (1) 1/8 " x 5" x 36"
- (1) 1/8 " x 5" x 36"

Fuselage:

- (2) 1/16" x 3" x 36"
- (1) 1/8" x 5" x 20"
- (1) 1/16" x 4" x 36"
- (4) 3/16" x 3/16" x 36"
- (1) 1/16" x 6" x 12" plywood
- (1) 1/8" x 3" x 3" plywood scrap
- (1) 1"x4"x6"
- (1) 2" x 3" x 4"
- (1) 3/16" x 36" dowel



Two of the prototypes. Max .10, 3+ 1 version on left uses 15% wing section. .049 ship on right utilizes thinner 10% section mentioned in text.

a separate mounting bulkhead can be installed about midpoint under the wing. In the case of the Orbit 3+1, I put the motor servo right behind the L.E. wing bulkhead position, then the receiver crosswise behind a separating 3/16" bulkhead. The rudder and elevator servos were placed behind the receiver and fastened to cross pieces of bass wood glued to the top of 1/4" balsa bulkheads which came up from the floor just high enough to let the servos clear the bottom.

As you can see, there are many ways to tailor the compartment to fit your own individual equipment preference.

Up front, there's the well braced W plywood firewall, and this firewall mounting for the engine is not only the simplest, but it also gives maximum room for installation for the tank behind the firewall. The 2 oz. tank gives a 4 to 5 minute flight with the Max. 10. Then again if you use an .049 Baby Bee or Golden Bee, you don't need this extra tank. If you use a Tee Dee or Medallion .049, the 2 oz. tank will run the engine for a longer time. Hollow the balsa block hatch to fit the tank used.

The Vic" plywood bottom piece from the firewall to just slightly off of the rear tanking gear dowel gives the strength where it's needed — up front!

The Tatone engine mount simplifies the installation of the Max .10 and makes thrust line adjustments easy.

Servo rod connections have not been detailed, since they are pretty standard, with cutouts on either side of the fuselage and the DuBro Kwik Link fittings attached to Top Flite control horns.

Do not install the dowels for mounting the wing and landing gear until after you have finished the sides. It's easy to put them in then, and it makes it a lot easier to sand the sides smooth. Also, if you're going to cover the sheet balsa with Monokote, it will go on faster and you can cut holes to fit the dowels after the Monokote is in place.

There's enough information on plans for most of you to build the fuselage without even reading these instructions.

The landing gear is a standard commercial aluminum type put out by several manufacturers. In case you can't get one locally, the old reliable 3/32" bent wire can be used. The aluminum gear looks better, and also provides a flat surface perpendicular to the axle bolt to which you can mount the wheel pants.

WING

The wing shown on the plans was the easiest to build, unless you have a friend who can make up a foam core for you. It's quite straightforward, and all information needed is right on the plans. If you prefer, the wing tips can be made of 3/16" flat sheet, cut to slope up from the bottom of the tip rib. In their case, extend the top spar out to serve as an anchoring point for the tip sheet.

TAIL SURFACES

Simple. Just cut out from sheet balsa the sizes shown. I've been asked how I keep the stab from warping, and the only answer I know is "Pick a straight sheet to begin with."

I still prefer the old reliable linen hinges for models this size. However, I'm experimenting with Monokote hinges. You cut out a piece 1/4" longer than you want the hinge to be, cut it in two, reverse one side, then overlap the center ¾ " and stick it together. Thus one side sticks to the top of the stab, the joint is at the hinge line, and the other end sticks to the bottom of the elevator. Reversing the next one gives you the hinge action.

The tail wheel bracket attaches directly to the fairing on the underside of the stab, then the 3/16" wire comes up through the small opening cut out in the center of the elevator. Finally, it is bent to fit along the bottom of the rudder. Attach it to the rudder, either with linen or Monokote, and you have a steerable tail wheel. It's sensitive though, and if you prefer a fixed tail wheel, you can bend the wire to fit forward along the side of the fuselage.

For those of you who will be flying rudder only, here's a hint: mount the elevator with hinges, but then bend the tail wheel wire at the top of the tail wheel bracket so that it fits the bottom of the elevator. Then, if you need an elevator adjustment, bend the tail wheel wire up or down to move the elevator as required. Again, fasten it to the bottom of the elevator with a strip of Monokote. Later on, if you change equipment to add elevator control, you're all ready for it just by changing the tail wheel wire.

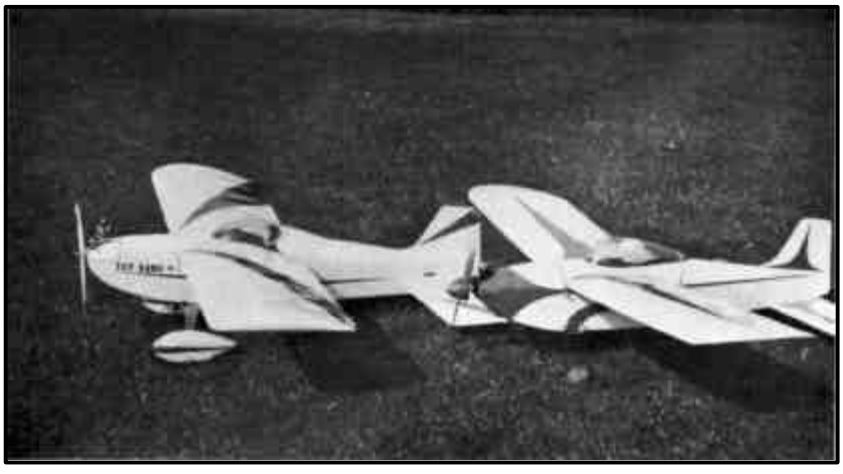
COCKPIT

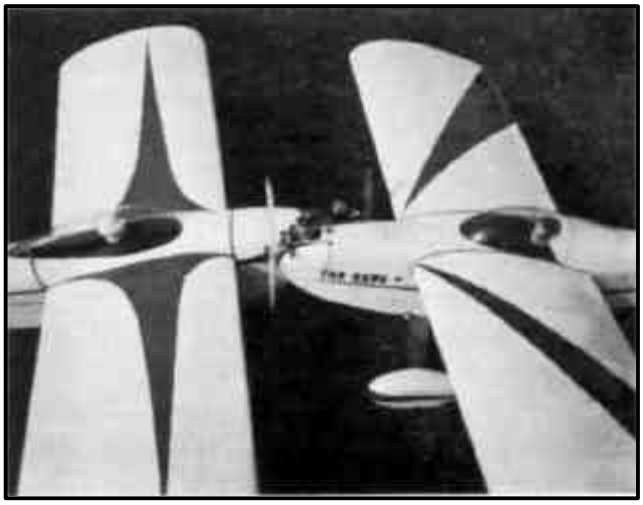
Tailoring the cockpit to fit the wing and also to fir the turtle-deck is best done by temporarily holding the wing in place while you shape the balsa blocks to fit. The little block of balsa ahead of the pilot simulating instrument panel adds a nice touch, but isn't really necessary — just looks good.

Incidentally, I tried two cockpit versions. One was the well-recognized "bubble canopy" type. Nice looking, but

(Continued on Page 77)

Another view illustrates the two fuselage configurations used on Ken's prototypes, Author chose the turtle-deck version for its similarity to many Goodyear racers.





Kissin' cousins — the Top Dawg was *de* signed for single or multi. But most o all, it was designed for you!

the majority of modelers who saw the prototypes preferred the version shown in the plans.

FINISHING

This is always a matter of individual preference. Interestingly enough, in the three prototypes used for proving out the design, three different finishing techniques were used. The original model used Hobbypoxy—directly on the sheet balsa fuselage and tail surfaces, and over three coats of butyrate dope on the silk covered wing. The second model used the standard butyrate finish.

On the third version, Monokote had just become available, and it was applied throughout — wing, fuselage, and tail surfaces. It worked out very well, especially as a covering for the aluminum cowl because it attaches equally well to wood or metal. From the standpoint of speed, the Monokote covered version was completely covered and decorated in less than half the time it took for the others. In all fairness though, it must be recorded that after several weeks it was necessary to re-shrink the fuselage and tail. No problem, though!

FLYING

This is a little difficult to explain briefly, because of the many variations that are possible.

First, the single channel, .049 versions should weigh somewhere in the 25-30 oz. range, depending on the equipment installed. The lighter versions should be lively, but reasonably gentle. The 30 oz. jobs will be a little sluggish, but very easily controlled by rudder only. Keep your rudder travel to less than 12 degrees in either direction.

The multi channel, .09 or .10 powereded Top Dawg should weigh 36-42 ozs. Rudder travel should be the same as for single channel, and elevator travel will depend on your own ability. The Top Dawg is very sensitive to elevator, and I would recommend limiting the angles to 15 degrees up and down unless you are ready for violent reaction!

The sensitivity of the elevator is related to the center of gravity location, naturally. For all-around general purpose flying, the C.G. should be just about in line with the main spars. As I mentioned earlier, wide latitude in the C.G. is desirable, and it can be ½" forward of the spar (which will hold the model very steady) or even ½"behind the spar — but this is an extreme location for experts who want a really frisky performance. Make your own decision, but I'd advise the middle of the road.

So let me summarize. For the beginner, an .049 powered rudder only con-

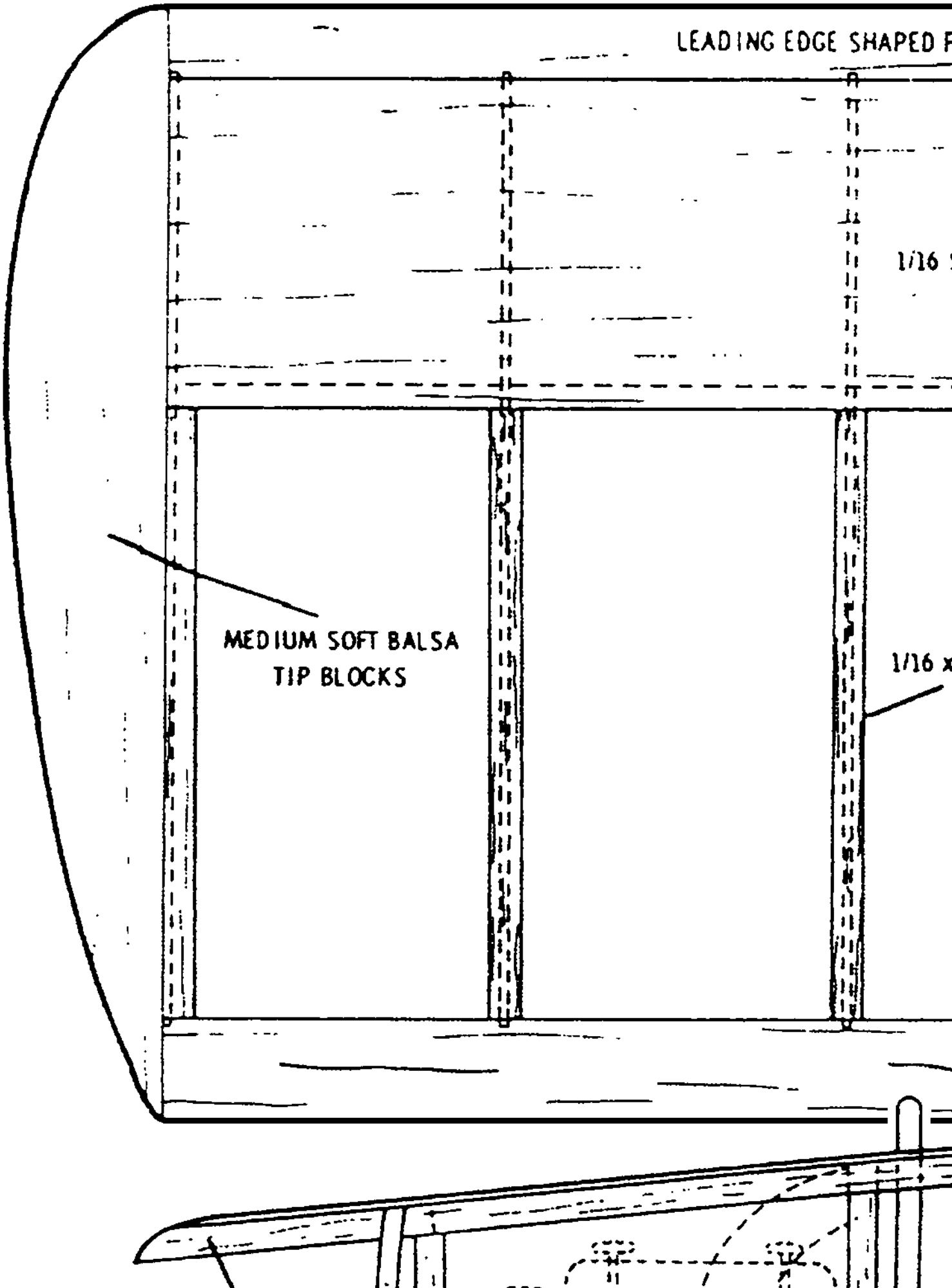
Note flexible loop on OS Max .10 to allow for servo overtravel.

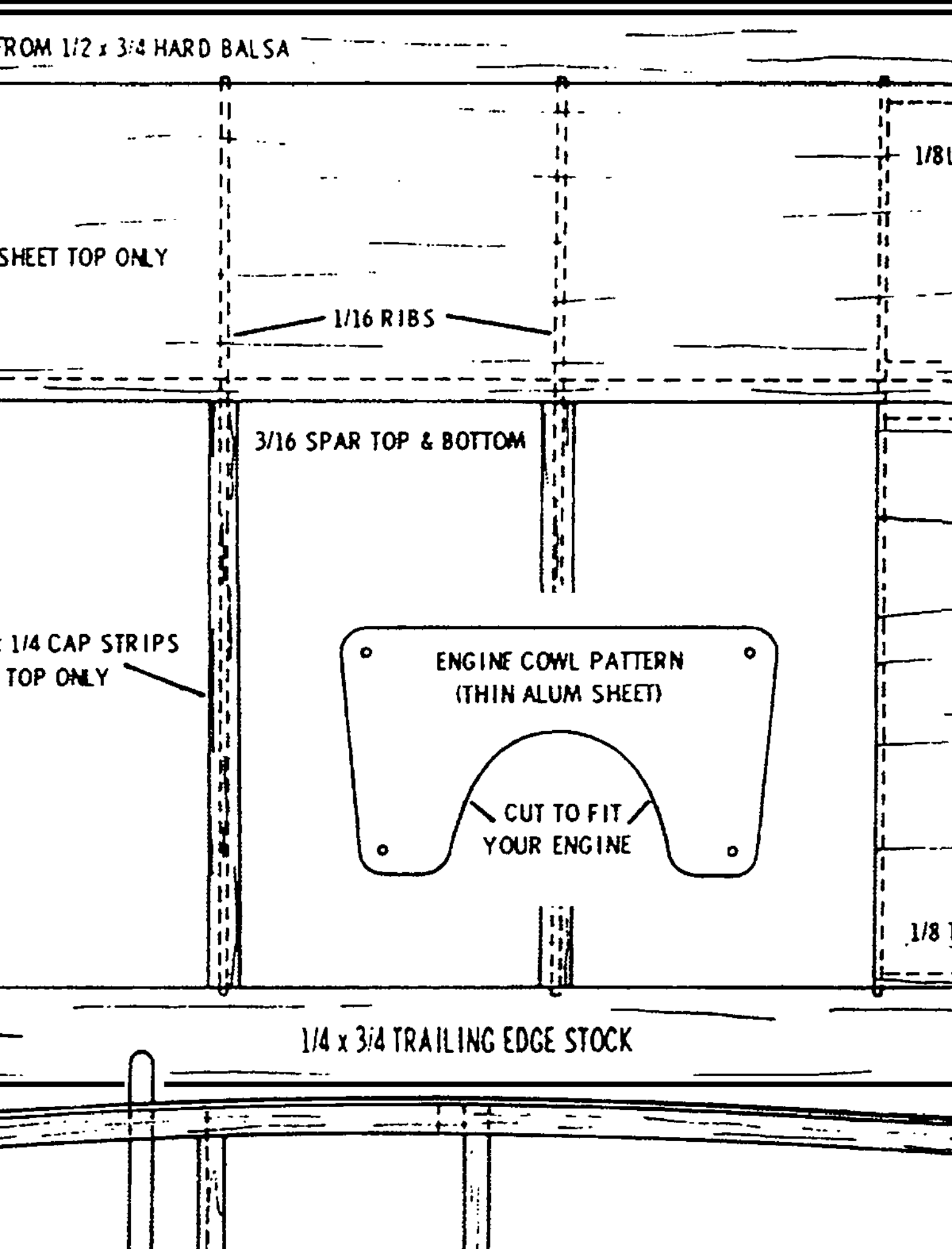
trolled version with the C.G. about 1/4" ahead of the spar, should be pretty easy to handle. It should weigh about 26-28 ozs.

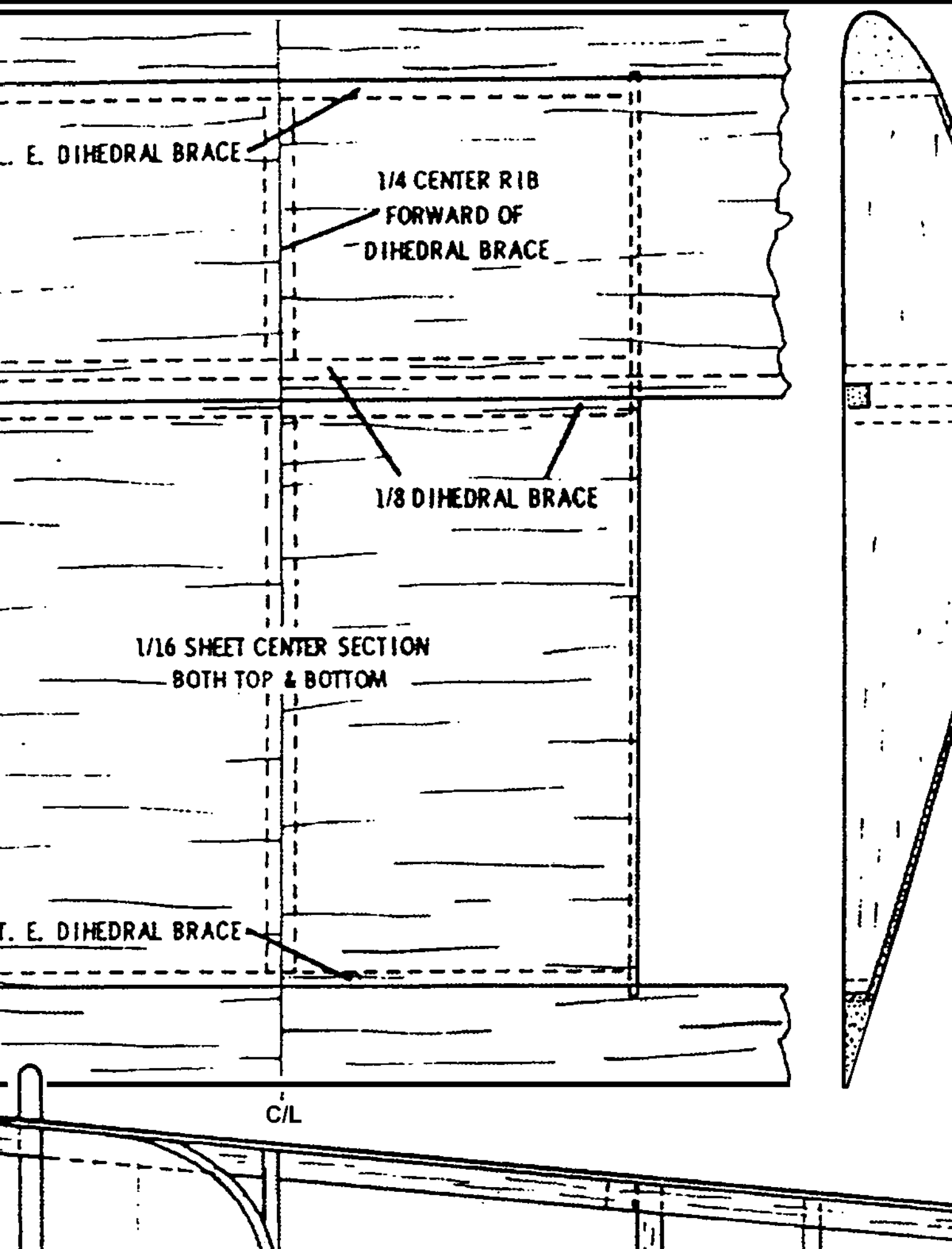
For the advanced modeler, the .09 or .10 powered job with galloping ghost, reeds, or proportional control, weighing 36-42 ozs., with C.G. at the spar, should do very well.

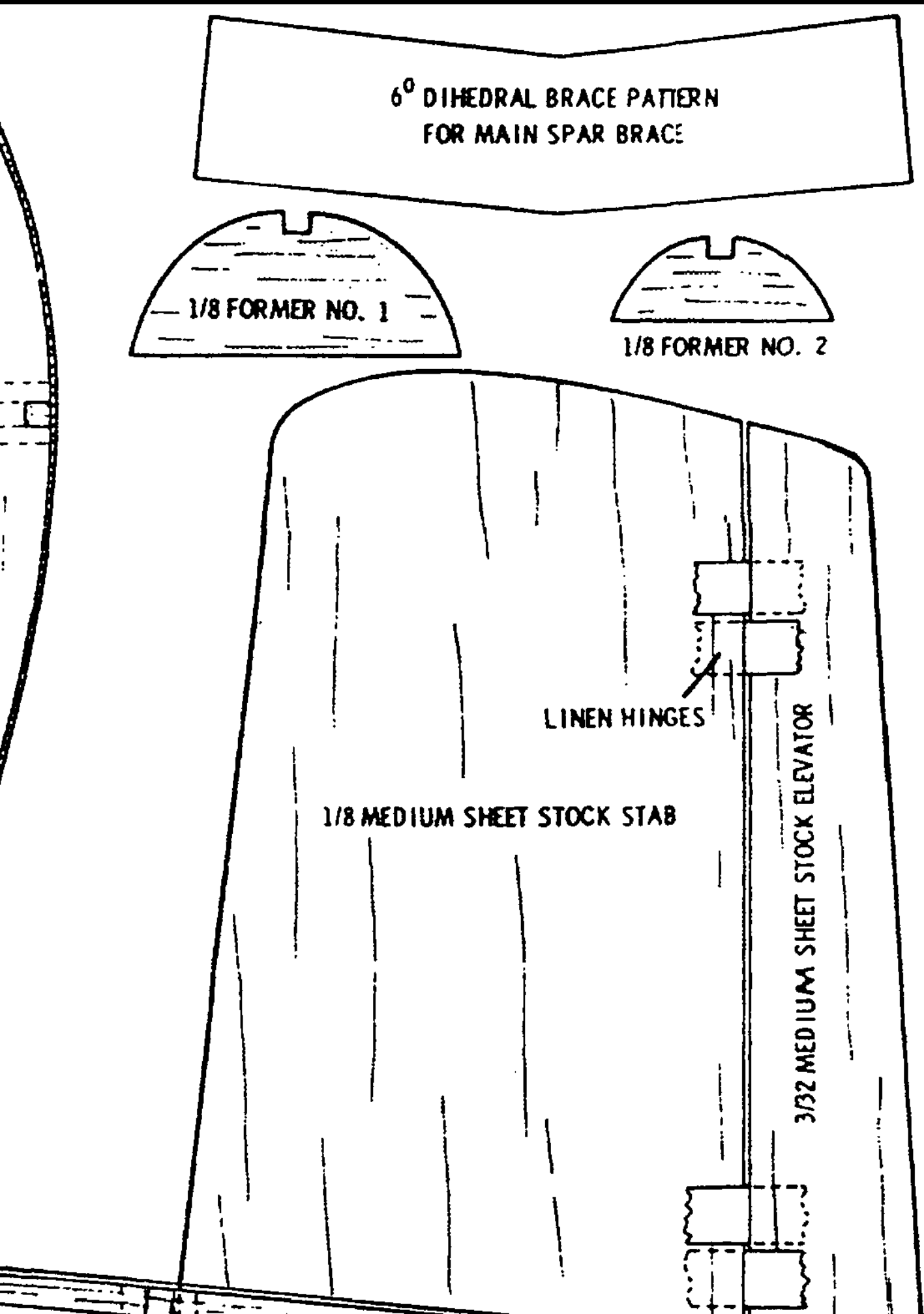
And for you "power hounds." a Max .15 in the nose will give a wild performance — but only for about three minutes, because of the 2 oz. tank limitation.

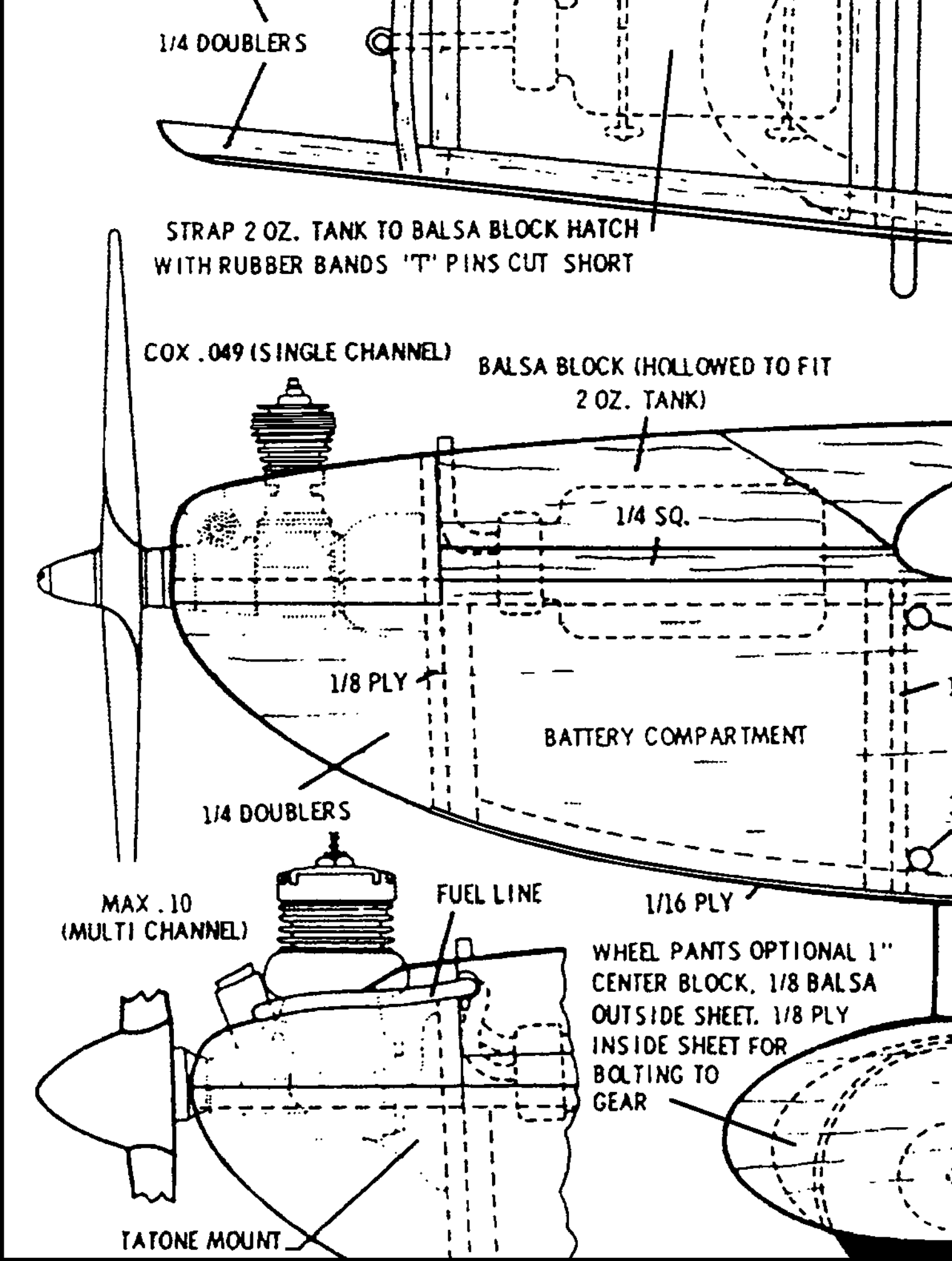
So there you have it — any way you want it. No matter which version you build, you'll find that in its class, it's the "Top Dawg."

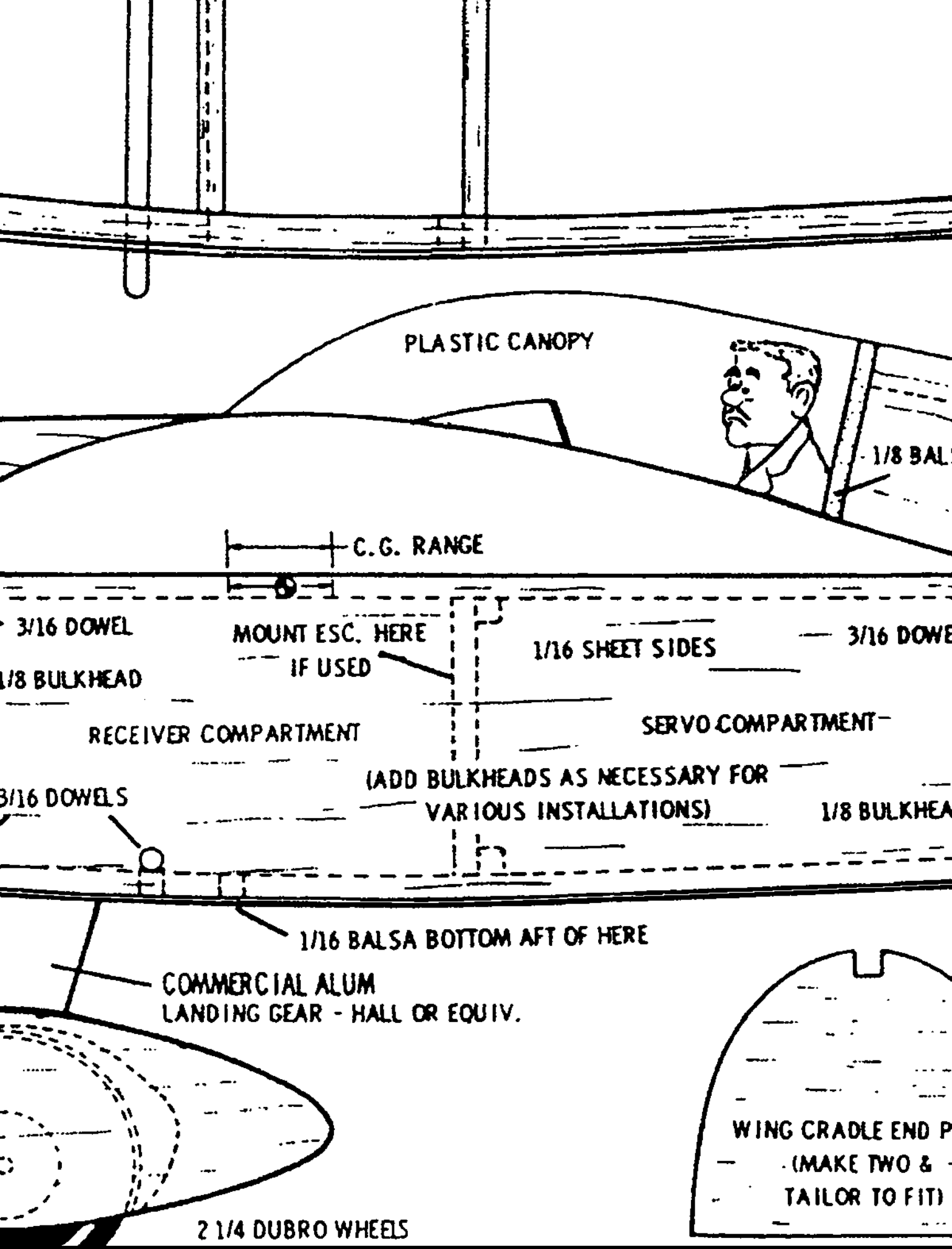

LEADING EDGE SHAPED F
1/16
MEDIUM SOFT BALSA
TIP BLOCKS
1/16 x

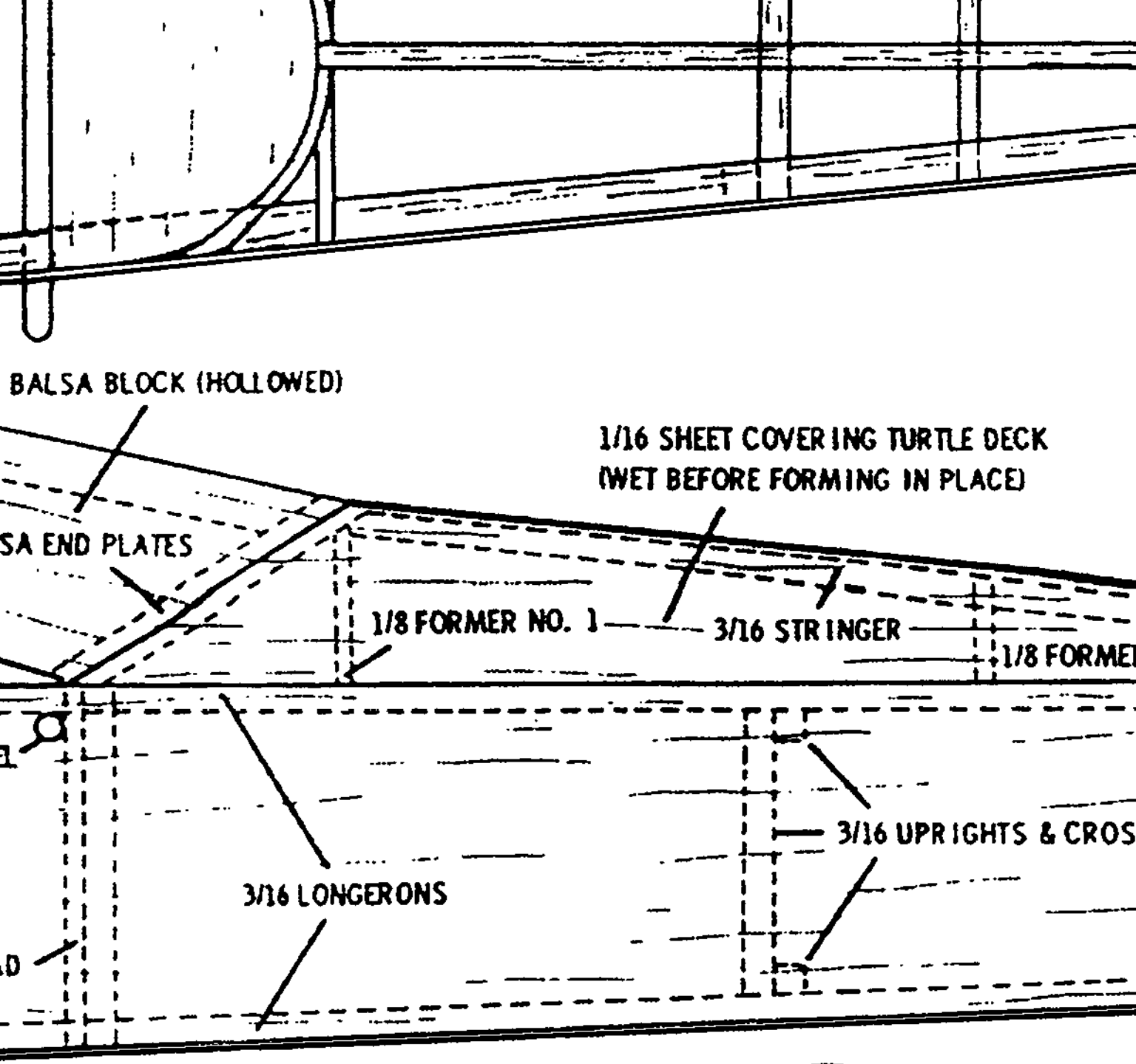

FROM 1/2 x 3/4 HARD BALSA
SHEET TOP ONLY
1/16 RIBS
3/16 SPAR TOP & BOTTOM
1/4 CAP STRIPS
TOP ONLY
ENGINE COWL PATTERN
(THIN ALUM SHEET)
CUT TO FIT
YOUR ENGINE
1/4 x 3/4 TRAILING EDGE STOCK

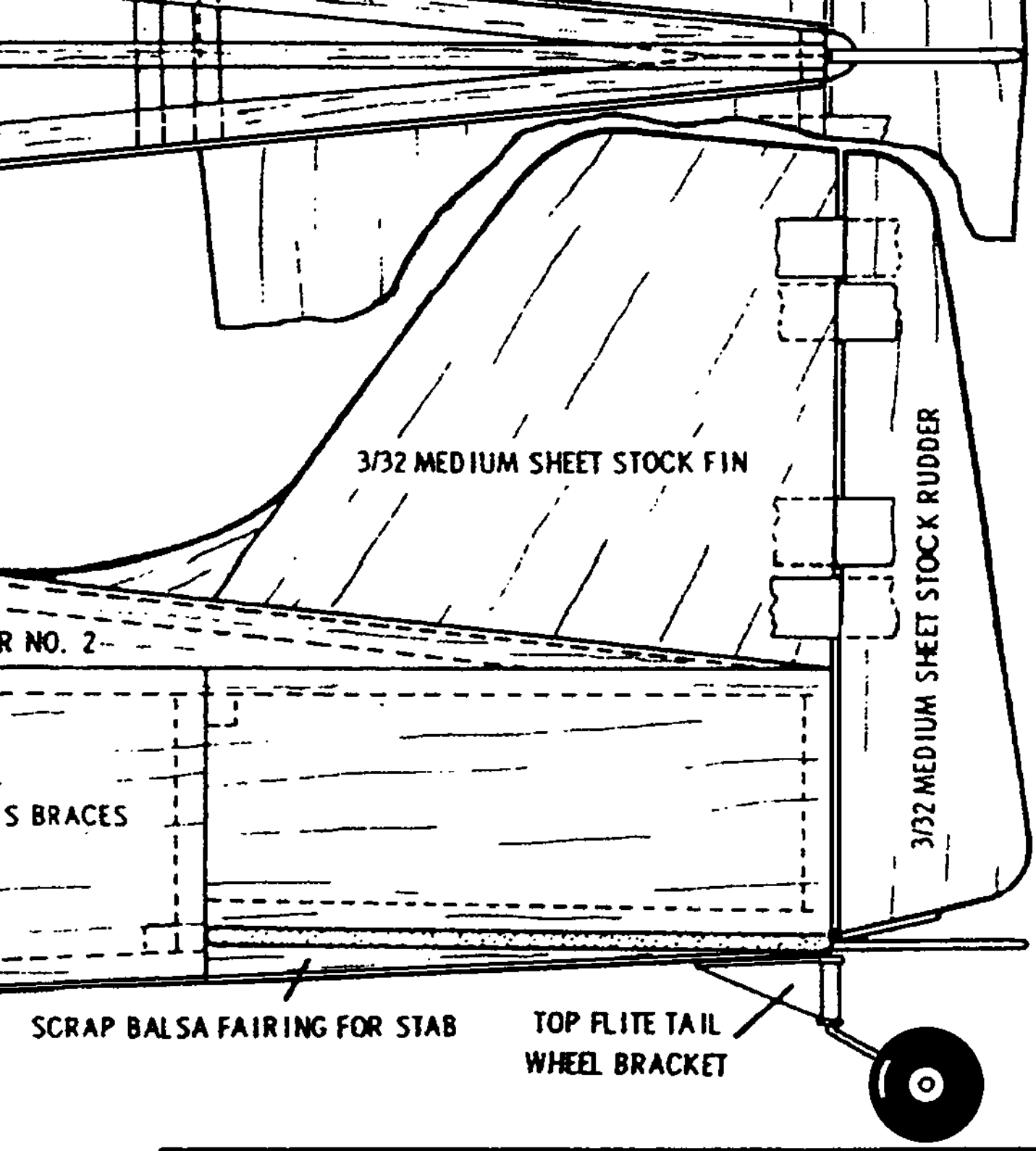

. E. DIHEDRAL BRACE
1/4 CENTER RIB
FORWARD OF
DIHEDRAL BRACE
1/8 DIHEDRAL BRACE
1/16 SHEET CENTER SECTION
BOTH TOP & BOTTOM
T. E. DIHEDRAL BRACE
C/L


6° DIHEDRAL BRACE PATTERN
FOR MAIN SPAR BRACE
1/8 FORMER NO. 1
1/8 FORMER NO. 2
LINEN HINGES
1/8 MEDIUM SHEET STOCK STAB
3/32 MEDIUM SHEET STOCK ELEVATOR


1/4 DOUBLERS
STRAP 2 OZ. TANK TO BALSA BLOCK HATCH
WITH RUBBER BANDS 'T' PINS CUT SHORT
COX .049 (SINGLE CHANNEL)
BALSA BLOCK (HOLLOWED TO FIT
2 OZ. TANK)
1/4 SQ.
1/8 PLY
BATTERY COMPARTMENT
1/4 DOUBLERS
MAX .10
(MULTI CHANNEL)
FUEL LINE
1/16 PLY
WHEEL PANTS OPTIONAL 1"
CENTER BLOCK, 1/8 BALSA
OUTSIDE SHEET. 1/8 PLY
INSIDE SHEET FOR
BOLTING TO
GEAR
TATONE MOUNT


PLASTIC CANOPY
1/8 BAL
C.G. RANGE
3/16 DOWEL
1/8 BULKHEAD
MOUNT ESC. HERE
IF USED
1/16 SHEET SIDES
3/16 DOWE
RECEIVER COMPARTMENT
SERVO COMPARTMENT
(ADD BULKHEADS AS NECESSARY FOR
VARIOUS INSTALLATIONS)
3/16 DOWELS
1/8 BULKHEA
1/16 BALSA BOTTOM AFT OF HERE
COMMERCIAL ALUM
LANDING GEAR - HALL OR EQUIV.
WING CRADLE END P
(MAKE TWO &
TAILOR TO FIT)
2 1/4 DUBRO WHEELS


BALSA BLOCK (HOLLOWED)
1/16 SHEET COVERING TURTLE DECK
(WET BEFORE FORMING IN PLACE)
SA END PLATES
1/8 FORMER NO. 1
3/16 STRINGER
1/8 FORME
3/16 UPRIGHTS & CROS
3/16 LONGERONS
1/8 BALSA BULKHEAD
AT L. E. & T. E. WING
POSITIONS (CUT T. E.
BULKHEAD OUT AS REQUIRED
FOR YOUR SERVOS OR
ESCAPEMENT)
1/8 PLY FIREWALL
ROUND
BOTTOM
FOR APP



OFF SIDES &
LONGERONS
PEARANCE

RADIO CONTROL modeler MAGAZINE

TOP DAWG

JULY 1966

DESIGNED BY	KEN WILLARD	DRAWN BY	G. FLORES

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300 DPI