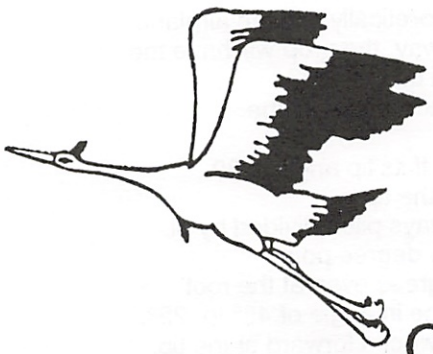
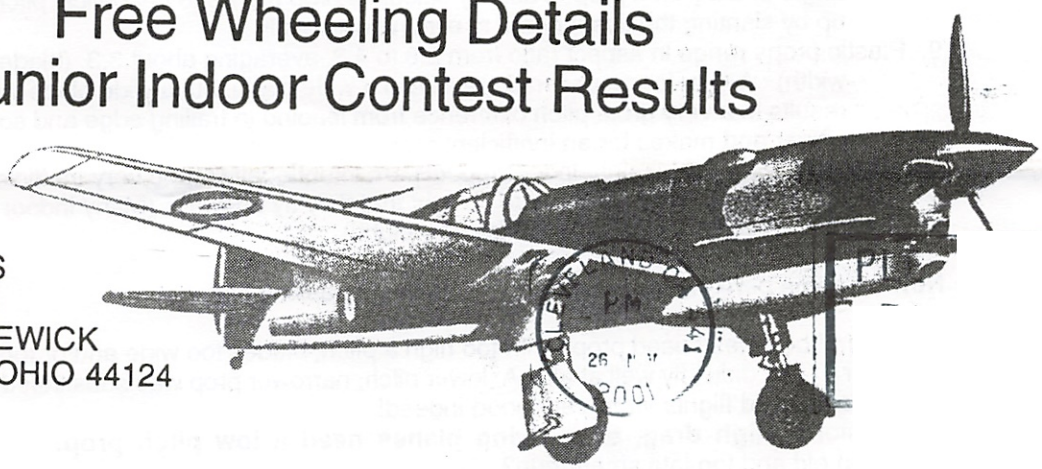
#100

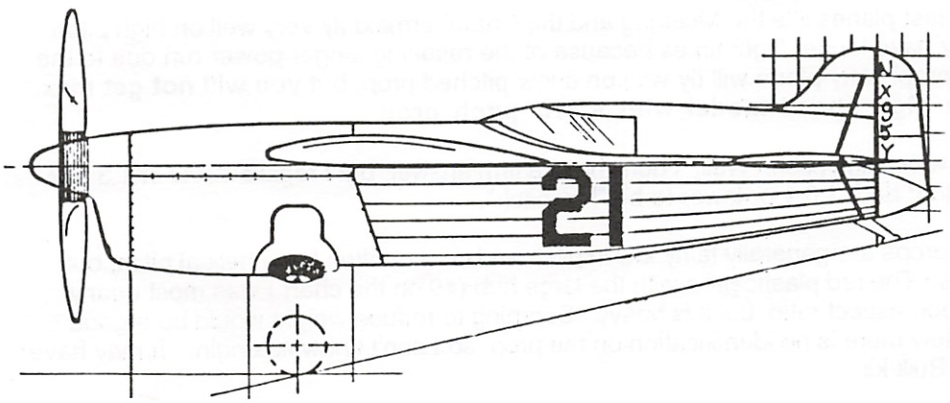
CROSSWINDS



Chambermaid
Caudron C - 714
Plastic Propellers
Carving Wood Props
Free Wheeling Details
Junior Indoor Contest Results



CROSSWINDS
RUSS BROWN
4909 N. SEDGEWICK
LYNDHURST, OHIO 44124



Observations Concerning Propellers for Outdoor Rubber Powered Models

The great search for the perfect prop. continues, but I have made a few observations that might be of some value to fellow 'gum band stretchers'.

1. The higher the pitch and the greater the width of the prop, the lower the rpm. - but - - -
2. High drag, slow flying models require lower pitched props than fast, low drag models.
   (Prop pitch can be compared to the gear ratios of a transmission. - - - -
   If you are going slow, you must be in low gear = low pitch.)
3. Most plastic props do not have true helical pitch. (so what??) I don't know about this either, but many modelers feel that props should have helical pitch.
4. Helical pitch means that at any point along the blades the prop will theoretically pull the airplane forward the same distance for each revolution. Stated another way, the prop will have the same pitch in inches at any point along the blade. Sounds good doesn't it??
5. Pitch in inches can be calculated by multiplying the tangent of the blade angle by the circumference (diameter x pi) at the same point on the blade.
   For example: a 7" diameter prop has a tip circumference of 22". If its tip angle is 20 degrees; Tan 20 = .364; so .364 x 22"= 8". So its pitch is 8" at the tip.
6. The diameter on the blade where the blade angle is 45 degrees is always pitch divided by pi.
   For example: at 8" pitch ; 8/3.1416 = 2.57" = diameter at the 45 degree point.
7. Most bottle formed props never have a blade angle as high as 45 degrees even at the root because it is difficult to twist the blades enough to get a difference in angle of 45° to 22°.
8. Under cambered blades will create a low tip pitch if the trailing edge sweeps forward at the tip. This is often responsible for the lack of helical pitch (by calculation) when measuring tip angle of a finished prop. I usually calculate prop blanks to get helical pitch, then mess it up by slanting the tips forward to eliminate tip stall!
9. Plastic props range in aspect ratio from 2.8 to 4.3, averaging about 3.3. (blade length/ blade width). A very low aspect ratio results in a wide blade, but a wide blade with undercamber results in a very great pitch difference from leading to trailing edge and soaks up a lot of power and makes for an inefficient prop.
10. Props for very light weight indoor models are intentionally made very inefficient to keep the RPMs low, but the models are so light that they fly anyway. (Many indoor models have motor weghts equal to the ariframe weight!)

Now for some personal experiences, maybe worth passing on :

On several biplanes I used props with too high a pitch, blades too wide and/or too large in diameter. They didn't fly well at all. A lower pitch, narrower prop was substituted on some of these planes and flights were very good indeed!
Conclusion: **High drag, slow flying planes need a low pitch prop.**
Too soon old and too late smart, huh?
On the other hand, fast planes like the Mustang and the Chambermaid fly very well on high pitch props. and certainly have longer flight times because of the resulting longer power run due to the slower rpm. of the prop. Any plane will fly well on a low pitched prop, but **you will not get max. flight times on a high speed model with a low pitch prop.**

What is meant by low vs. high pitch. Well, I don't have a firm answer, but I regard a P/D of 1.3:1 or more to be "high pitch" and 1.0:1 or lower to be "low pitch".

Commercial plastic props are generally fairly low in pitch and do not often have helical pitch, but there are exceptions. The red plastic prop with the large hub (#9 on the chart) was most nearly helical and had a good aspect ratio, but it is heavy. Scraping to reduce weight would be a good remedy. Unfortunately there is no identification on the prop, so I don't know its origin. It may have come from an Easy Built kit.

Is there a case for carved vs. props formed on a bottle? (bottle props).
Again, I don't know; I've had success with both types, but generally think that bottle props are best on small planes because bottle props are somewhat fragile even though mine are usually

made with basswood blades. It's also difficult to get truly helical pitch with bottle props but they seem to work very well anyway. (See above item #7).

Is there a case for carved props? Sure, because you can control the pitch. If your plane needs nose weight, why not carve a prop from a heavier wood such as bass or pine to get the weight as far forward as possible. On the other hand, if you need a low pitch prop, some plastic props will be fine and are heavier and stronger than balsa. I generally carve props if their diameters are greater than 7". (Exception - - I built a very successful Rearwin Speedster with an 8" 1/32" sheet basswood bottle prop. The plane never crashed so the prop was never put to the test!).
The best aspect ratio for props seems to be about 3.1:1, which means that the blade width should be about 32% of the blade length or 16% of its diameter.
The best prop diameter is generally about 1/3 of the wing span, but if the wing is quite wide and/or has a lot of dihedral, the prop can also be larger, up to 50% of the span. According to the book by W.F. McCombs you may also need a large rudder to compensate for a large prop.

Now, for some illustrations for those who wish to carve their own props:

1. You will need a saw for cutting the blanks. A band saw or scroll saw is best, but a simple coping saw will do if you are careful to saw perpendicular to the work so that all the surfaces are nice and square with each other.
2. A drill press or drill guide is necessary to drill the shaft hole absolutely perpendicular to the blank.
3. a 3/32" dia. drill bit, and 3/32" o.d. aluminum tubing for the prop bushing.
4. I recommend a very sharp carving knife with a stiff blade. I like one I bought from AMT some years ago, but I think they are out of business. As an alternative, Wood Carvers Supply has one identified as #610008 hand carving knife with a 1-7/8" blade that should be fine. It lists for $11.65 in their current catalog . Another is their model 430000 at $10.60 Phone: Orders1-800-248-6229 or Questions: 1-941-698-0123.
- or - If you ever travel to Dover, Ohio you could check out the Warther Museum for their whittling knives.
5. I recommend a steel rule graduated in 1/100" to do accurate measuring.
6. A calculator for calculating the dimensions of the prop blanks.

CALCULATING DIMENSIONS FOR THE BLANK :

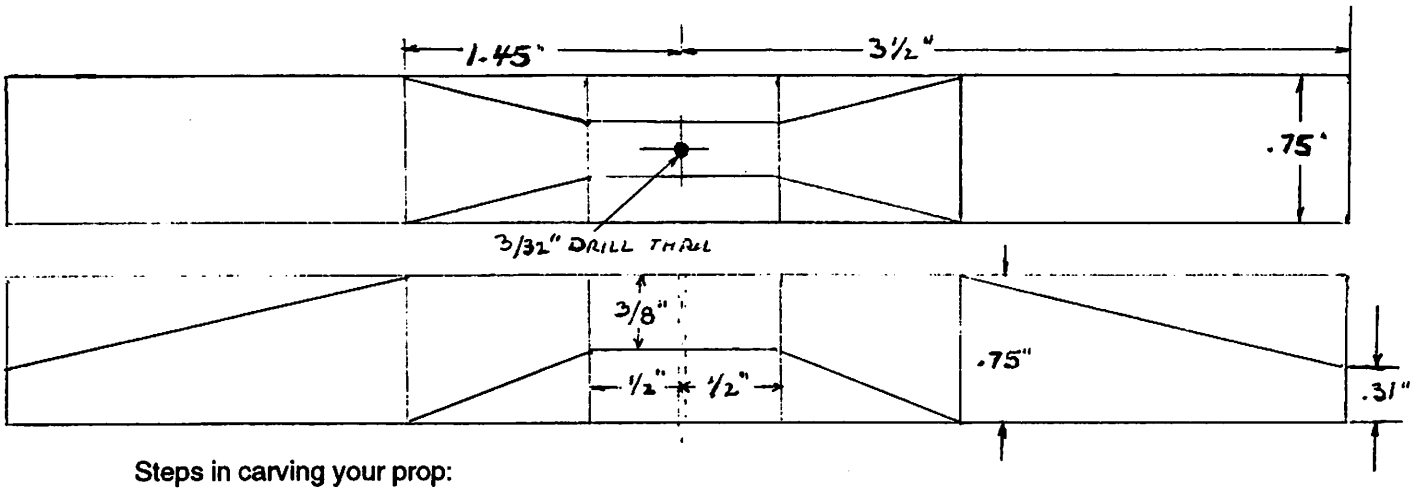
The table on page 5 shows aspect ratios of various commercial props, but I used the term loosely because I really should have called it **blade length over max.blade width** since props do not usually have parallel leading and trailing edges.

To calculate the maximum blade width of the prop you wish to make, you should decide on the ratio you want. Suppose you decide to make a 7" prop with a blade length to width ratio of 3.3. Well, the blade length is 7"/2 = 3.5" So the ratio 3.5"/3.3 = 1.06" This is the maximum blade width. To find the dimensions of the blank for this width,. at the 45° point (which is the place where the blade will be widest) multiply 1.06 by the sine of 45° which is .707. This happens to give you **.75"** for the **width and the thickness** of your prop blank. (the only trigonomety number you really need is this .707).

To determine the pitch of your prop, choose a ratio of P/D (pitch / diameter).

For example: if P/D = 1.3; D x 1.3 = pitch; 7" x 1.3 = 9.1" This means that for every revolution of the prop, the plane will theoretically be pulled forward 9.1" (if there were no slip or inefficiencies). To determine the dimensions of the blank to get this 1.3 P/D ratio we can visualize a triangle illustrating the circumference and the pitch. The base of the triangle represents the circumference of the prop at it tip and the short vertical leg represents the pitch. (see page 5) To get circumference multiply the diameter by pi. (7" x 3.1416 = 22") , so our triangle can be drawn with a base of 22" and a short vertical leg of 9.1" representing the pitch. If you want to know the angle of the blade at the tip, divide 9.1" by 22" and find the arc tangent on your calculator, but you don't really need to know this unless you are curious.

The tips are to be .31" thick, so mark this on the side of the blank at each tip.
Mark the 45 degree diameter (2.9"/2 = 1.45" from the center out on each blade). Connect this to the tip mark with a straight line on the side of the blank. This is the basic blade layout. Inboard of this you will need to decide the dimensions of the hub which are really pretty arbitrary only keeping in mind that it should be thick (long)enough to provide good bearing length and wide enough to be strong and light too. I recommend a length of 3/8" and a width of about .30". You will probably want these dimensions to extend about 1/2" from the center before the prop blades flare out, so that is what is shown below.



Steps in carving your prop:

1. After you have cut the blank and drilled the shaft hole start carving the back of the blades first. You will notice that there is a difference in cutting one direction versus the other because of the grain of the wood. Carve in the direction that will not cause splits, because you run the danger of cutting too deep if you allow the wood to split as you carve. Carve without under camber at first. The objective is to connect the front and rear corners with a diagonal cut, but be sure you cut the diagonal in the right direction or you could end up with a left handed prop! After you cave cut the diagonal in both blades, put a wire through the shaft hole and check balance. It should be close, but may not be perfect especially with balsa because of variations in density which is common with balsa. Try to get a good balance if you can, but if it looks like the wood is too variable, wait till you have carved the front sides before attempting to perfect the balance. If you sight down the diagonal cut you have made you should see a nice spiral now, indicating a helical pitch has been formed.

2.. Carve the front in the same manner, except you will want to create a convex airfoil shape here. The tips should be quite thin and the trailing edge should come almost to a knife edge.

3. Check for balance and start sanding or doing light carving to correct the balance. If one blade is a lot softer that the other you can stiffen it and make it heavier with sanding sealer or Hot Stuff. If you want to add some under camber in the rear surface, you can sand this in with coarse sandpaper, but finish up with 120 grit and 400 grit to get a really smooth surface. Go easy on underamber. The best reason for undercamber is really to stiffen the prop without making it too heavy. Excessive undercamber will result in a variable pitch from leading to trailing edge, and you will undo a lot of the helical pitch if you round off the trailing edges very much.

4. If you want to shape the blades to remove the ugly angular corners and round off the tips, use your knife and sandpaper, but follow up with sanding so the trailing edges will be thin.

Try carving props. It is not that difficult and the more you make the easier it becomes!

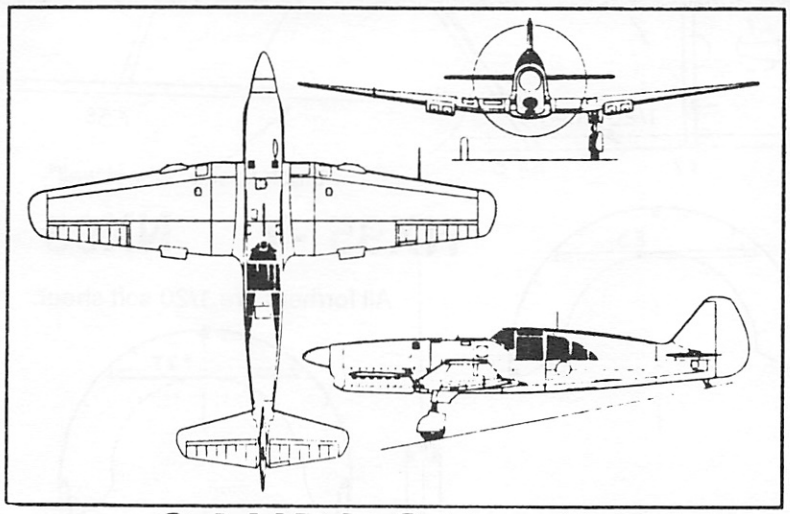
Steve Griebling - - CFFS

TABLE OF PROP PITCHES
COMMERCIAL PLASTIC PROPS

#	DESCRIPTION	DIAMETER	TIP PITCH	TIP ANGLE	TIP P/D	AT MAX. WIDTH PITCH	AT MAX. WIDTH ANGLE	AT MAX. WIDTH P/D	DIA./WD. (Aspect)
1	Black "K"	4"	7"	29	1.75	4.7	35	1.18	3.0
2	Green "2"	4.7"	7.8"	28	1.67	7.0	35	1.49	3.2
3	Gray (Japan)	4.75"	7.6	27	1.60	4.9	30	1.03	3.2
4	Black nylon (Czech)	5.5"	4.6"	15	0.84	6.9	24	1.25	3.8
5	Red (H)	5.5"	5.9"	19	1.07	6.8	31	1.24	3.9
6	Guillow D6	5.9"	10.7"	30	1.80	8.4	39	1.41	3.6
7	Red OS 150	6"	7.5"	22	1.25	6.9	24	1.15	3.5
8	Red	6.9"	12.5"	30	1.80	9.6	37	1.40	4.5
9	Red (large hub)	7"	10.7"	26	1.50	10.4	36	1.48	3.8
10	Red	7"	6.7"	17	0.96	5.2	21	.74	3.4
11	Dark Blue OS -18	7.125"	8.15"	20	1.14	6.8	27	.95	3.4
12	Gray (Japan)	7.125	7.5"	18	1.05	6.3	25	.88	3.4
13	Gray (Japan)	8"	7.7"	17	0.96	7.4	22	.91	3.3
14	Black	8.7"	7.8"	16	0.90	7.8	18	.89	3.6
15	Gray	9.50"	4.7"	9	0.65	7.5	17	.78	4.0
16	Red Undercamber	6.88"	9.9"	25	1.44	6.2	36	1.17	3.2
17	Blue Cosmo C24	9.38"	11.8"	22	1.26	11.0	27	.92	3.2
18	Black Tern Aero	6"	5.7"	17	0.95	5.5	31	.96	2.9
19	Yellow	9.38"	8.8"	17	0.94	9.0	35	.78	4.3
20	Black IGRA (Czech)	5.75"	5.4"	17	0.94	4.5	31	.78	3.1

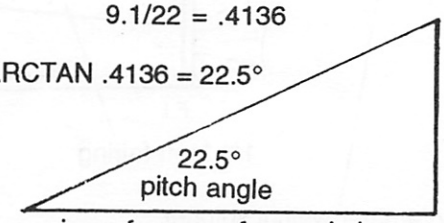
Thanks to Vern Neff and Jim Hyka for lending me several of the plastic props in this table.

21	Red N. Pacific?	6.88"	4.5"	12	0.65	6.2	35	.89	4.6
22	Gray (Japan)	5.88"	5.3"	16	0.90	5.9	25	1.00	3.3
23	Gray (Japan) U-180	7.125"	5.6"	14	0.78	6.8	26	.94	3.4
24	White IKRA (Czech)	12"	23.4"	32	1.95	13.2	38	1.10	3.6
25	White IKRA (Czech)	5.94 "	7.5"	22	1.26	7.7	37	1.29	3.1
26	Red	5.38"	8.9"	30	1.82	4.6	36	.86	3.8
27	Red Guillow D5	4.90"	8.9"	30	1.82	6.8	32	1.38	3.5



9.1/22 = .4136

ARCTAN .4136 = 22.5°

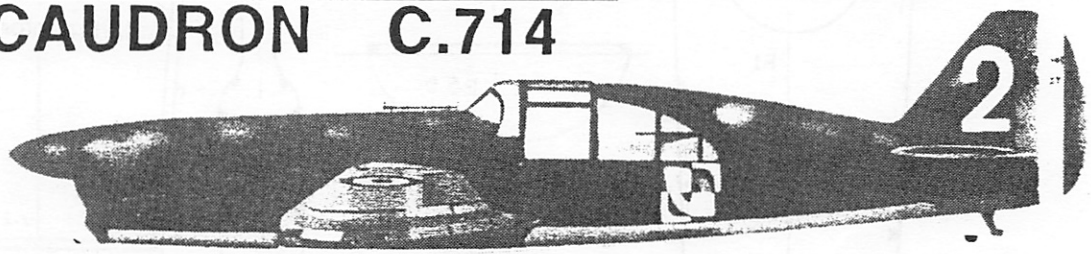


circumference of prop circle
(eg. 22" for a 7" dia. prop)

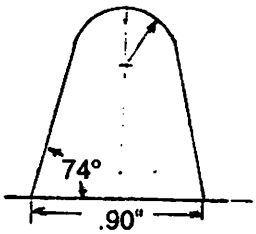
see page #3

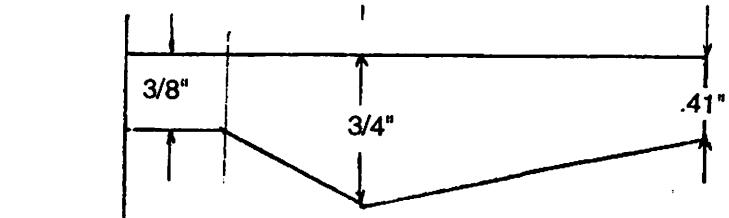
THIS TRANGLE ILLUSTRATES
THE GEOMETRY
FOR DETERMINING PROP PITCH

CAUDRON C.714



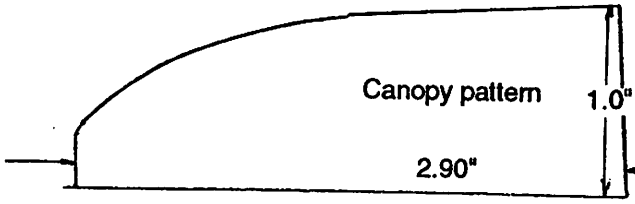
CROSSWINDS readers with dreaded RED X at issue No. 100 or lower can avoid the chop to the address label by sending $12 or more to Russ Brown at 4909 N. Sedgewick, Lyndhurst, OH 44124. Thank you.

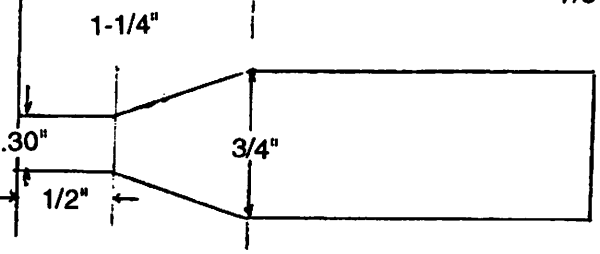




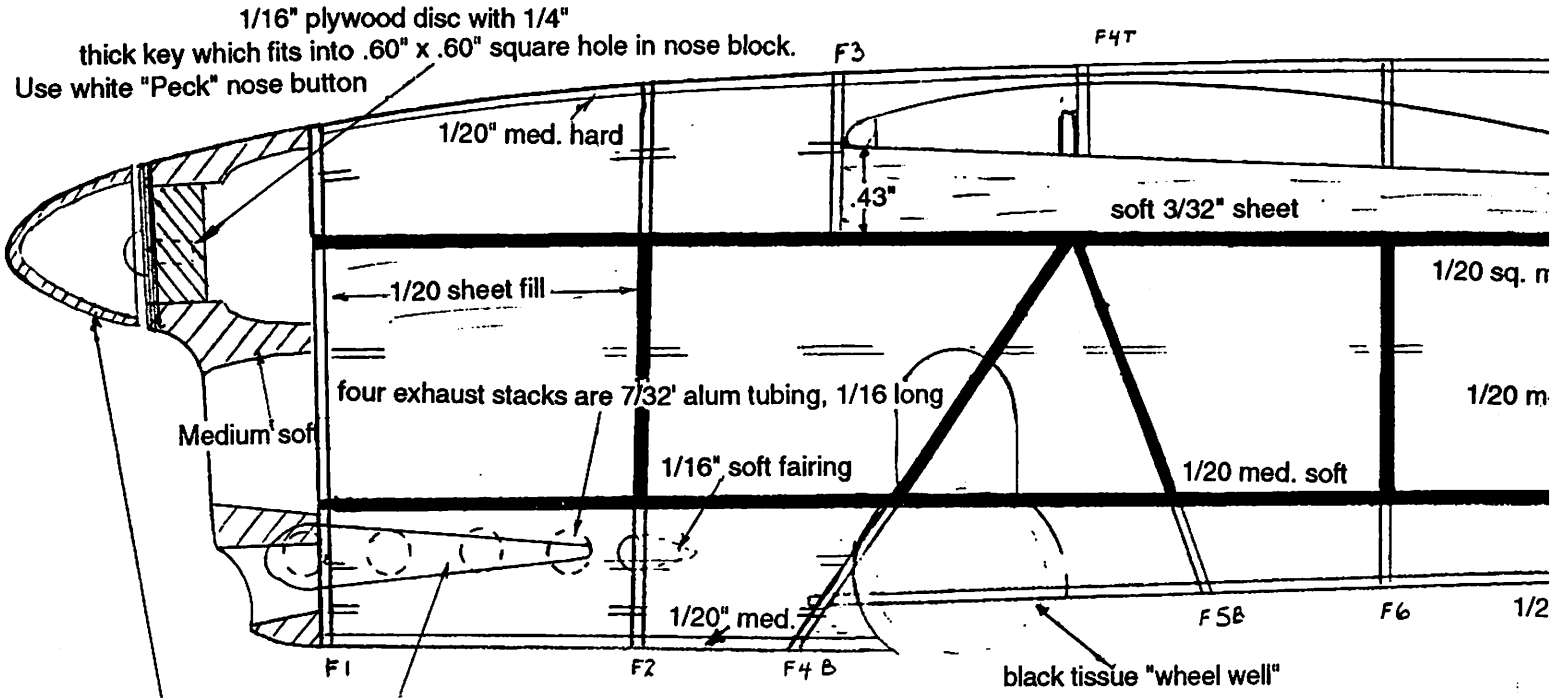
Prop. is 6" dia. 7.8" pitch bass, pine, poplar or very hard balsa

7/8" tires - soft



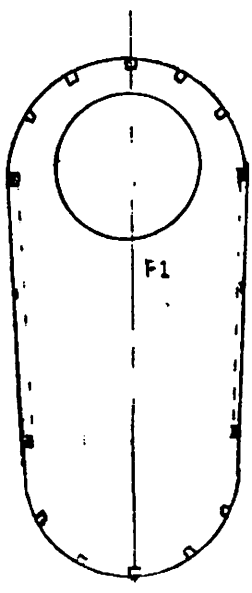


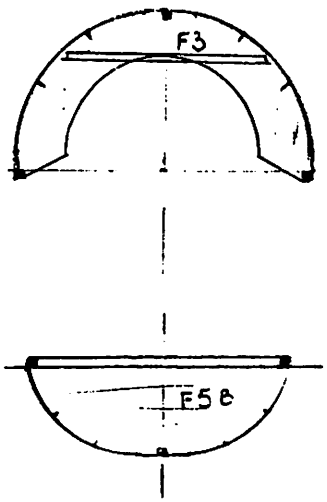




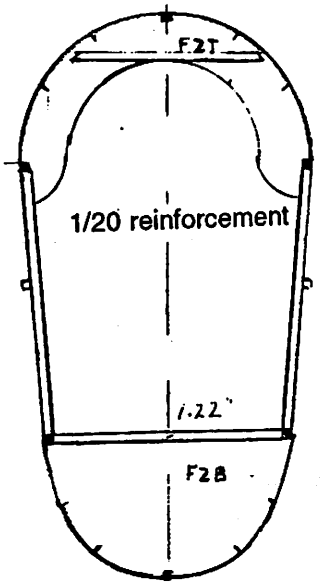
NX95 -Y NX95 -Y

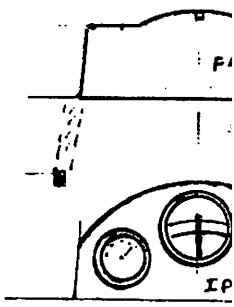
All formers are 1/20 soft sheet.

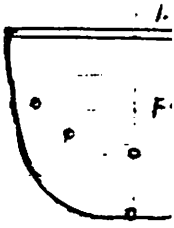


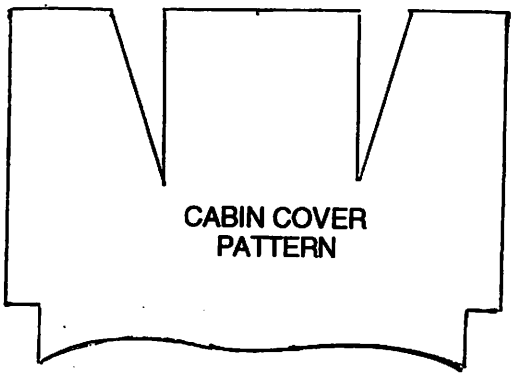












s.

Dihedral breaks

1/16" sq. Med.

1 2 3 4 5

ribs. Attach after model is covered.

1/32" ribs

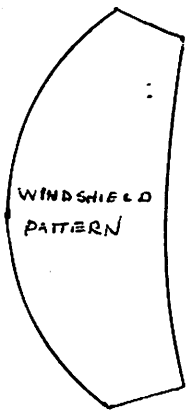
ıout - both tips by canting
e at trailing edge.

SADDLE FORMER
1 /16" BALSA

rudder outline is 1/50x 1/20 laminated

Spar pattern - spar is 1/20" medium soft balsa

E F 1/20" x 3/32" 1/20" sq.



D

ıq. side stringer butts against upright at station "F"

G

1/64 ply tail skid.

1/20" sq. stub stringers above stab, both sides

1/32" x 1/8" bass motor anchor - use 1/16" dia. aluminum tubing for rear hook.

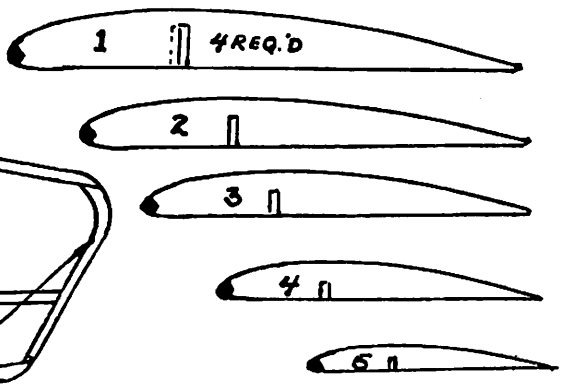
Cockpit covering is .003 acetate. (Vacuum forming is optional)

Use black trim strip for cockpit panel lines

7" wide, 1/8" thick and extend 1/16" beyond trailing edge.
ılued to 1/16" stiffener and inserted between formers
where shown, then sand to fuselage contour. This
t tissue when you cover top part of fuselage.

Top of Caudron was Olive and brown splotches, bottom was light grey.

nger notches in formers F and G after assembly in order to
tringers in a straight line



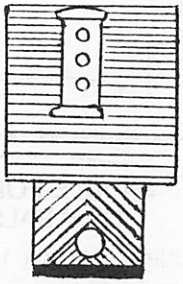
3/32" sq. sanded to blend to airfoil.

is 1/20"x 3/32" vertical. Ribs are 1/32" x 3/32" sanded to blend.
T.E. is 1/32"x3/32". L.E. is 1/16" sq..Two Lams 1/50"x 1/16"

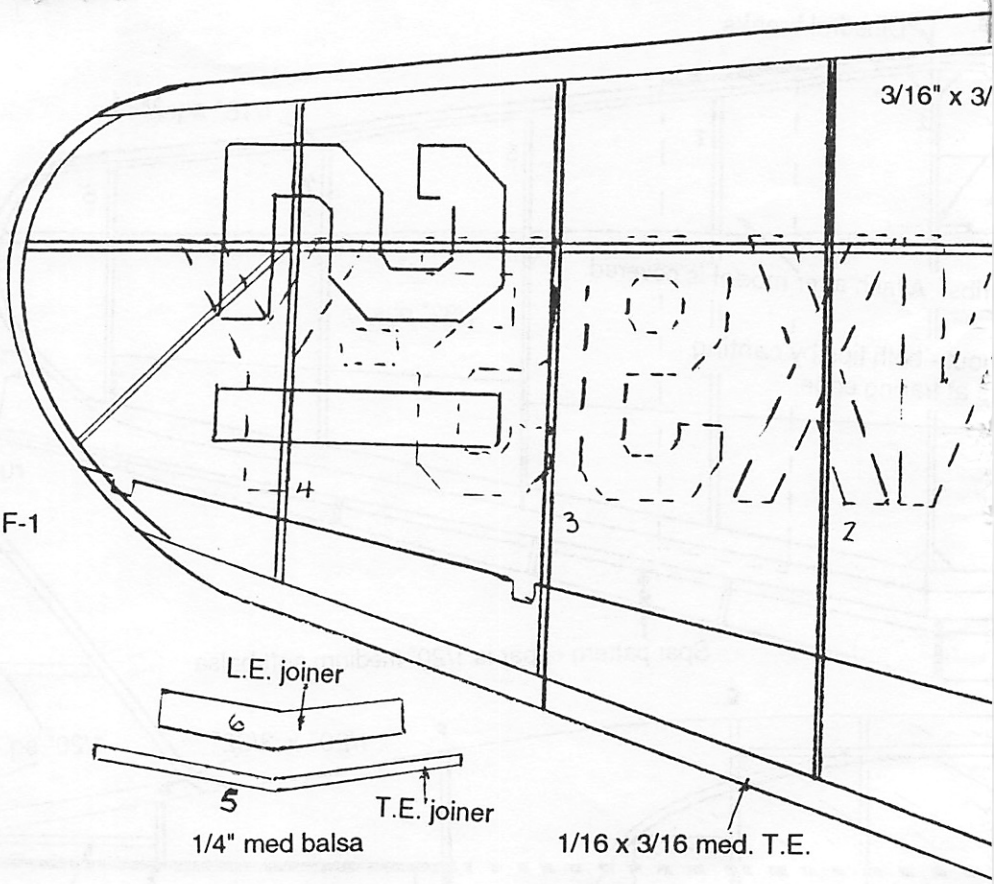
CAUDRON C.714

13"PEANUT SCALE

VIDE A COLOR PRINT OF THE CAUDRON FOR ANYONE WISHING TO BUILD THE MODEL
EBLING 753 CLIFFSIDE DRIVE, AKRON, OH 44313 (330)864-7533



Cut out "Engine" and glue to F-1



1/4" med balsa

1/16 x 3/16 med. T.E.

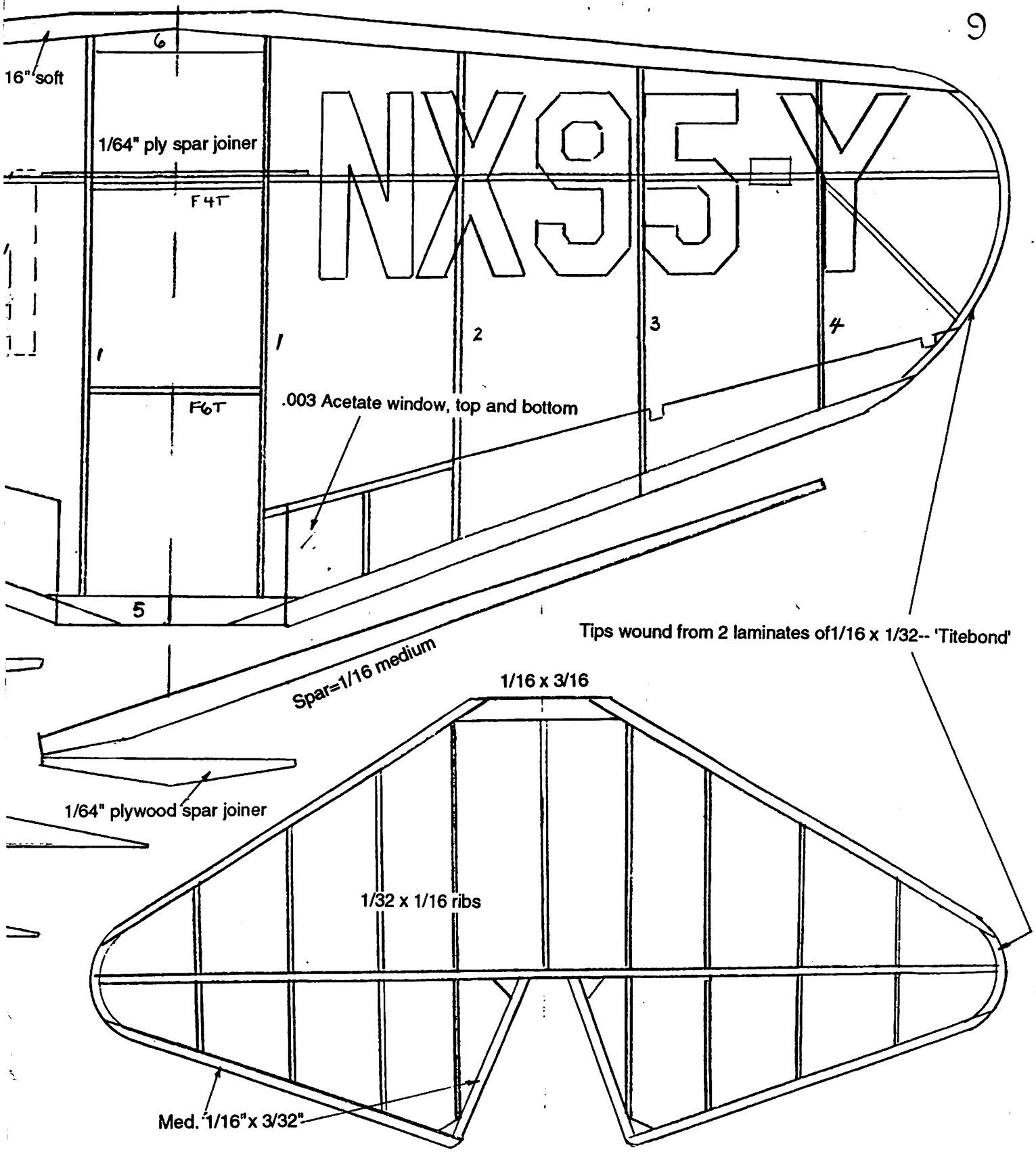
silk thread bracing



The Chambers R-1 Special with a Menasco B4 of 95 hp in which Russel Chambers crashed. He died later.

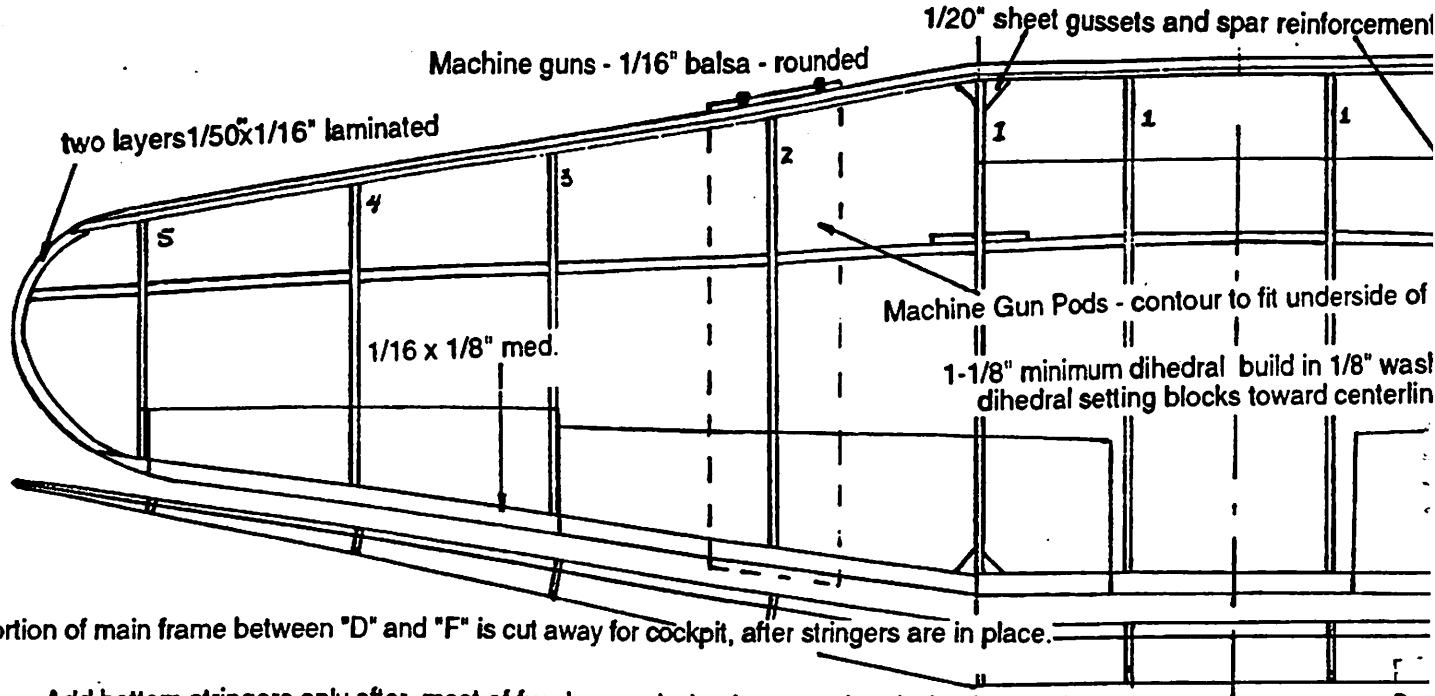
COLOR SCHEME: All cream with black registration numbers. use "raw sienna" chalk on white Esaki tissu then, spray on "Krylon" clear, gloss lacquer Rudder and fin are outlined in black to the width of the laminates

POWER: 4 strands of .085 TAN II, 24" long, braided

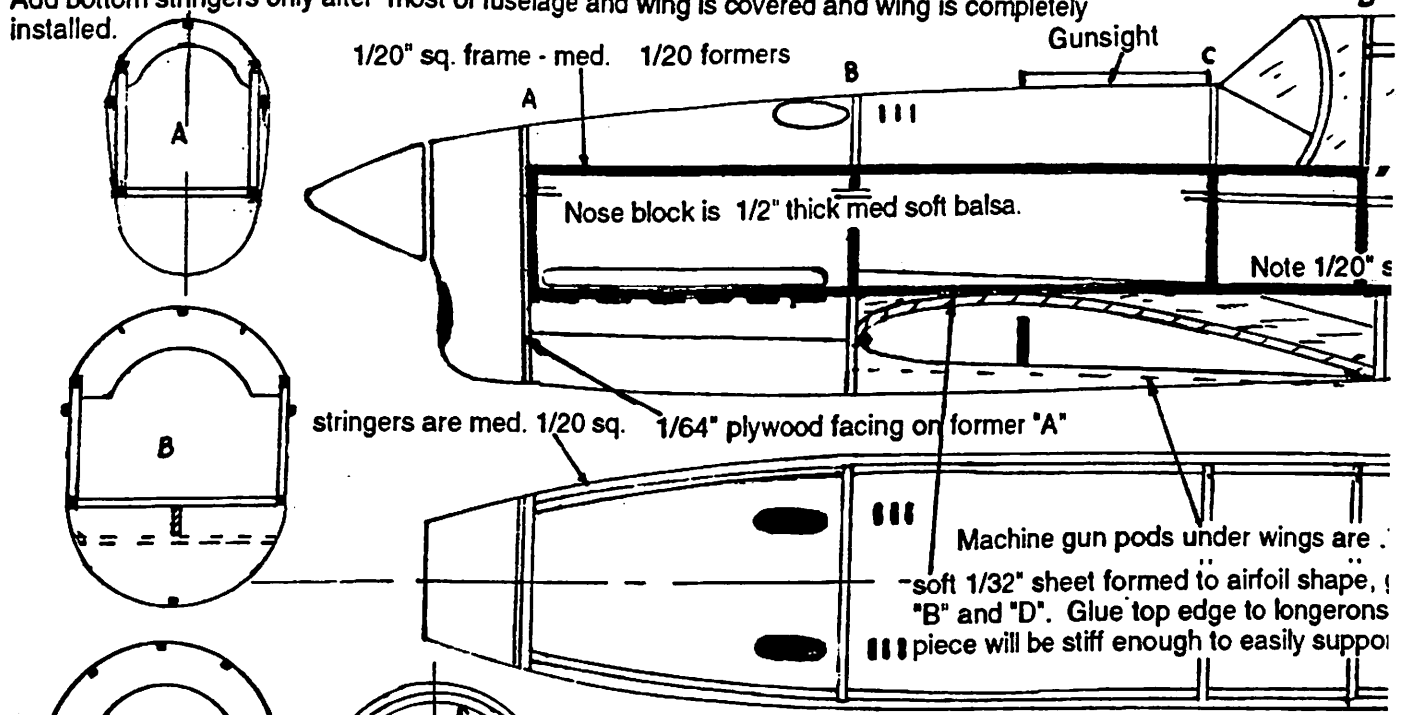


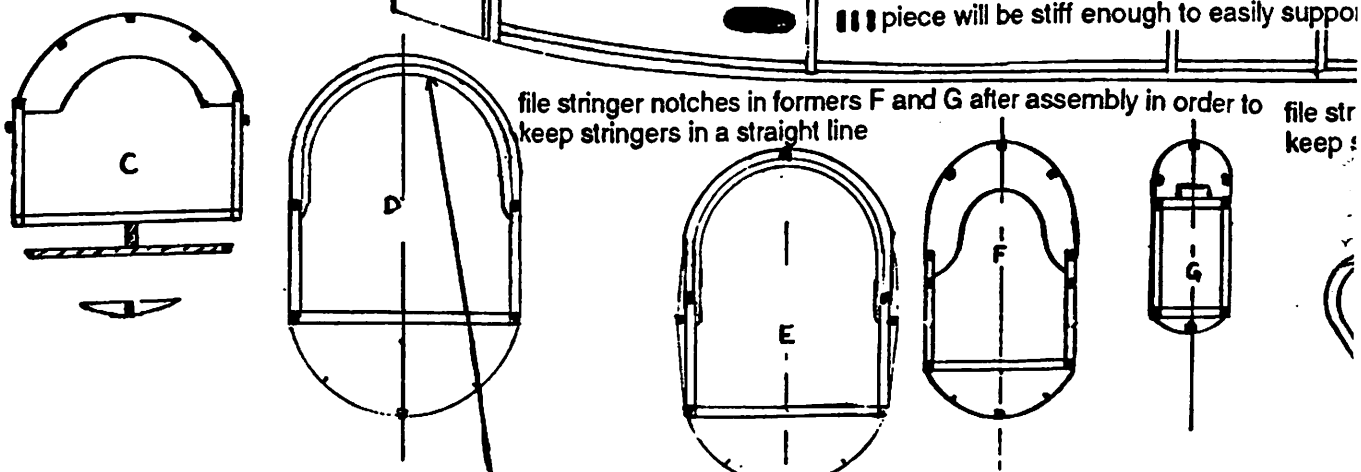
Very important: Cover bottom of fuselage and wings before building top of fuselage structure from nose to cockpit. Then shrink the wing tissue and assemble wing to fuselage. Complete the fuselage structure and cover it. Shrink the fuselage tissue and spray on the Krylon. If there are any warps in the wings water spray them, one wing at a time, and let each wing dry while it is pinned down to a flat surface with waxed paper under the wing.

"CHAMBERMAID"



Add bottom stringers only after most of fuselage and wing is covered and wing is completely installed.





Formers "D" and "E" are two layers of 1/32"x1/20" balsa, water soaked and bent around a hot form.
Note that laminations are offset at ends, outer lamination butts against longeron s; inner end overlaps uprights; use "Titebond" for a laminate adhesive.
File notches for stringers after formers are in place to assure stringer alignment

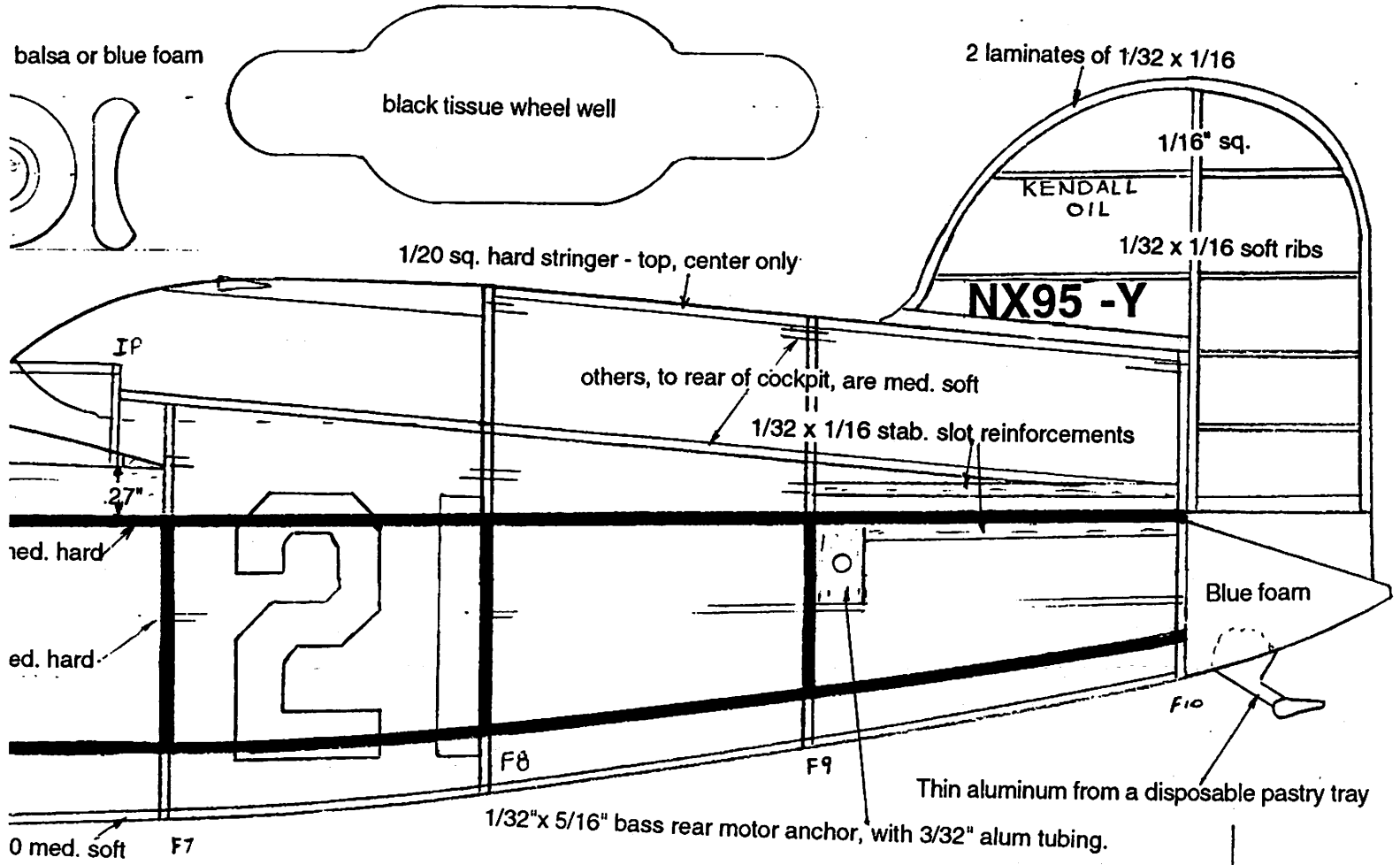
Stabilizer is airfoil shaped - spar

I WILL PRC
STEVE GR

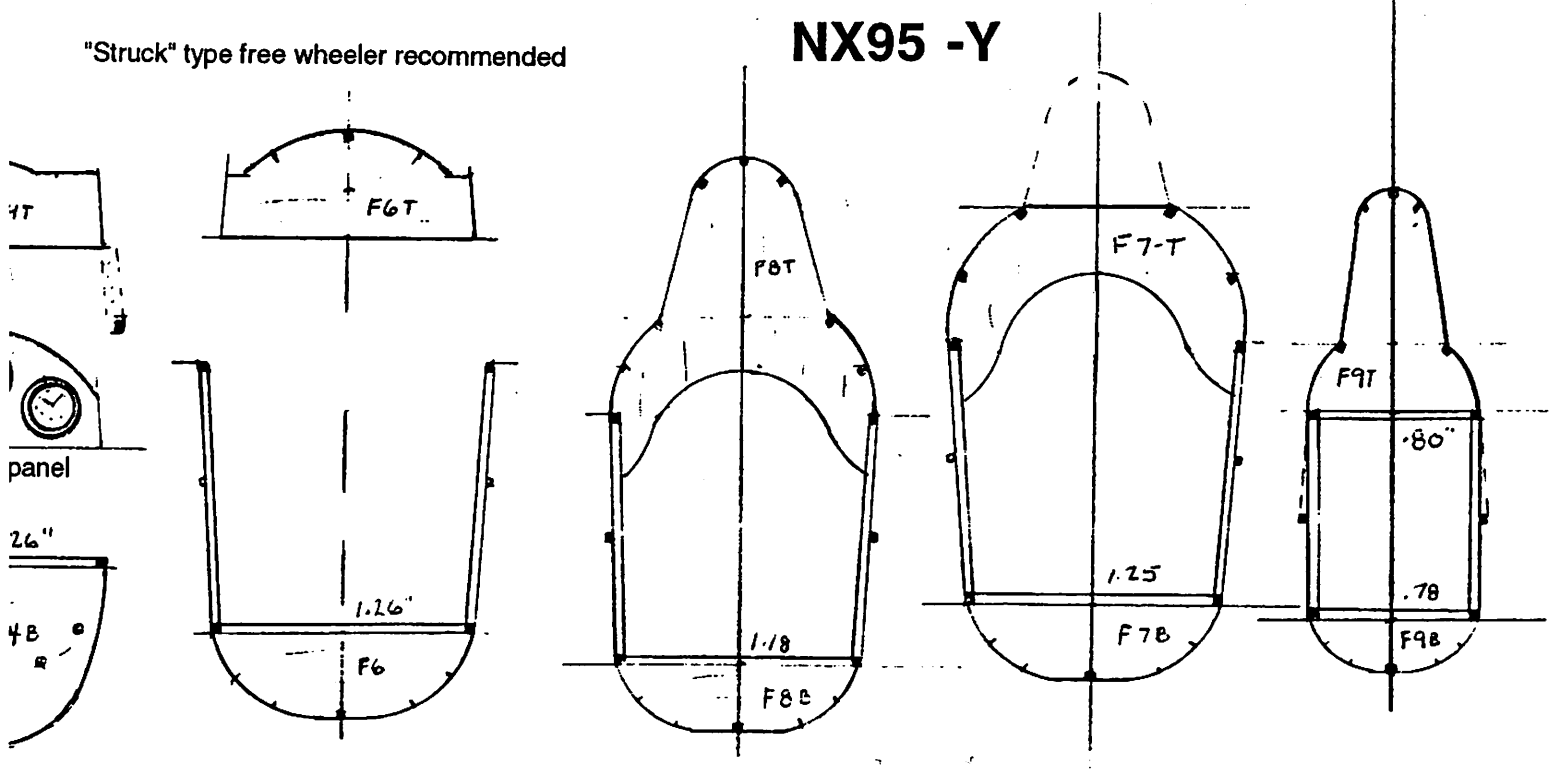
RUSSELL CHAMBERS

"CHAMBERMAID"

13" PEANUT SCALE
Modified from a plan
by Preston Bruning
and R.S. Hirsch
PLAN BY STEVE GRIEBLING, CFFS



"Struck" type free wheeler recommended



THE CHAMBERMAID

Russell Chambers built the little 95 hp. Menasco B4 powered racer in his living room for the 1938 Greve race. This was the only B4 built and it was supercharged to develop 125 hp. While flying northwest of Cleveland, the supercharger blew up and damaged the aircraft badly. Chambers sheared off a tree in landing but crawled out of the cockpit and walked half a mile to a highway where he was driven to a doctor. He received five stitches for a bad cut but seemed to be alright. Several days later he collapsed at an airport hargar and died a few hours later from a brain concussion. He had been employed as a service representative for Menasco under Art Chester. You will note that the registration on the tail in the two photos from the EAA journal are oriented differently. Since the plane had such a short life, this is curious. Also note that the photo with the horizontal registration has no landing gear spats, so it was probably taken at an earlier time although the racing number 21 had already been applied to the fuselage. I also wonder if Kendall Oil withdrew their endorsement?

THE MODEL

The construction of the model is a little unusual because of the wing mounting and rubber motor location. I have built three Chambermaids so far, because they have a habit of flying away. In all of these I have used a somewhat modified 13"peanut scale plan by Preston Bruning. And each time I have found ways to simplify the construction to reduce building time and weight. The present plan is my third "simplification".

It is most important to plan your work on this model, particularly with respect to covering and installation of the wing. The wing and lower portion of the fuselage should be covered and the wing must be installed before the upper decking of the fuselage is added.

The two 3/32" runners under the wing must be cut very accurately to insure the correct incidence angle and wing alignment. The bottom edges of these should be sanded at an angle so they will conform to the slant of formers F3 and F7. They are sanded to the proper curvature later.

Build the fuselage box frames in the usual manner but select medium hard 1/20" square pieces for the top longerons and medium soft ones for the bottom longerons. Save aside two medium hard pieces for the uppermost side stringers, because these and the top longerons are used to support the tension of the rubber motor. To keep the fuselage in alignment I recommend you match all pairs of longerons for stiffness.

The ends of the box structure sides are inserted and glued into notches in F1 and F10. Then add lower crosspieces and F3. Cut the two 3/32" soft wing runners and butt them to F3, then butt F7 to the rear of these runners. The runners will stiffen the longerons and keep them perfectly straight as you add stringers later. Complete the rest of the fuselage except for the section above and in front of the wing. Note the 1/32"x1/16" reinforcements under and over the stabilizer slot. After the two uppermost side stringers are in position, carefully fit the 1/32" bass rear motor anchor plates between these stringers and the top longerons and glue them securely.

The wing is made in the usual manner. The 1/64" plywood spar joiner is best added when the two wing halves are off the board. I like to use alligator clips to hold the spar joiner to the spars while the glue is drying. The spar joiner sets the proper dihedral angle when its lower edge is aligned with the spars. The trailing edge and leading edge joiners are shaped from 1/4" thick balsa. Cut these accurately for a good fit. It may be necessary to do a little careful sanding to get a perfect fit, but the satisfaction of a perfect fit is gratifying! Make sure the wing will fit perfectly between formers F3 and F7. If necessary trim the leading and trailing edges till it does.

The stabilizer and rudder are built in the usual manner, but use fairly light balsa for the 1/32" ribs since they are spaced fairly close to each other. The tip outlines of the wing and empennage are made form two layers of 1/32" x 1/16" "A" grain balsa soaked in water and bent around a cardboard form. I like to prebend these around a warm soldering iron or light bulb because they are much less likely to kink and are partly dried in the process. I use Titebond glue for their adhesive.

Cover the lower and rear portions of the fuselage and the entire wing. Go ahead and water shrink the wing tissue , apply dope, registration numerals and aileron lines. Then attach the wing to the fuselage and glue it in place. Build the rest of the fuselage around the wing and complete the fuselage covering. With a very sharp razor blade or knife, cut through former F10 and sand a slot in it to clear the stabilizer. Cut the tissue away from the stab. slot and insert the stabilizer. If it is not perfectly aligned with the wing, sand the members over and under the slot as needed to correct the alignment. Add the rudder, putting just a tiny left turn into its position.

The tail cone is made from blue foam or light balsa. If you use balsa, I recommend you hollow it to reduce weight. This is not necessary with foam, but remember not to use solvent based dope over foam!! I use acrylic paint on it. Some modelers like to coat the foam with thinned "Titebond" to get a more glossy finish before painting. Shape the cone so it matches the contour of F10 and so its upper edge blends in to the rudder . Note the contour line on the plan which suggests a sharp delineation between the rounded lower section and the thin upper section.

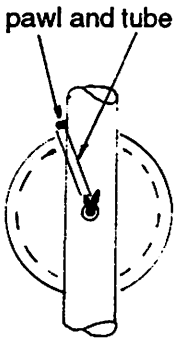
The canopy is made by vacuforming .020 butyrate plastic sheet over a form as shown on the plan. Cut the plastic to about 4" x 5" and tape it a piece of heavy cardboard or 1/4" to 1/2" plywood centered over a hole about 3"x4". Heat the plastic over an electric heater, with tape side up (away from the heat) till the plastic sags, then very quickly invert board and taped-onplastic over the carved form which is centered over holes in your vacuum box. The vacuum should have been turned on by this time. A shop vac or home vacuum cleaner produces plenty of suction for this.

Make the prop from either hard balsa or from a hardwood like pine, bass or poplar. I recommend a P/D ratio of 1.3:1 or 1.4:1 since this is a high speed, low drag aircraft. The prop diameter can be as large as 6.5" because the wing area is large for its span. If you use a balsa prop you will probably need some ballast in the nose to get the proper balance point - 1/3 back from the leading edge of the wing. I recommend the Henry Struck type of free-wheeler because it can be mostly concealed within the spinner and seems to be nearly foolproof. Remember, when cutting the slot in the prop for the pawl of this type free wheeler that it **must** point directly at the prop shaft or the free wheeler will not disengage properly! I like to use a stirrup (modified Crockett hook) as the rubber hook on the prop shaft, but for simplicity you may prefer to simply unhook the rubber for winding a-la indoor technique. The recommend bend for this is shown below.
Choose a large field for test flights and put in only a hundred or so turns for your first test flights. Gradually build up the turns, and as you do, make sure the model turns gently to the left as the power is increased. The glide should be quite good. If it is not, adjust the balance point to get a good glide, then work with the thrust line to correct any problems with the powered flight.
Be sure to put your name and address on the plane!

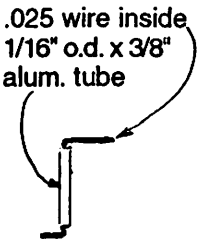
Steve Griebling - CFFS

Henry Struck type free wheeler details:

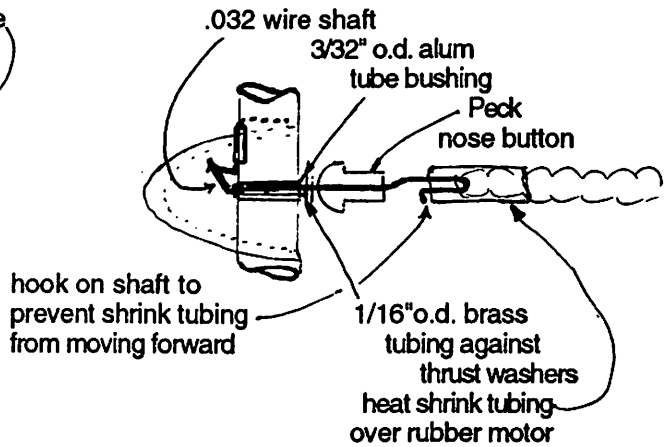
FRONT VIEW



PAWL AND TUBE ASSEMBLY



SIDE VIEW



CAUDRON C.714

THE FULL SIZE PLANE

The C.714 was an obvious descendant of the famous Caudron C.460 racer which carried Michel Detroyat to victory in the Greve and Thompson races of 1936. The C.714 was preceded by the C.710 01 which crashed in February 1937 in the Verrieres forest during testing and the C.710 02 with revised tail surfaces. The C.710 02's were modified with retractable landing gear, oval tail surfaces and twin 20 mm cannon and renamed C.713 in 1937. All were designed by Marcel Riffard.

The C.714 was first flown on July 6, 1938 and an order for 20 was placed for 20 in November 1938 with and option for 180 more. The first series was completed in June 1939 and they were flown operationally in 1940 by the Groupe de Chasse Polonaise at Lyon-Bron (GCI/145) a group of Polish trainer pilots who had fled to France. A total of 63 had been completed by the time of the armistice in 1939. There had been plans to send 80 to Finland, but only 6 were delivered and saw no operational service.
The C.714 was powered with the V12 Renault RO-3, 450 hp. air cooled engine. Its top speed was 283 mph. at 13,125 feet and 286 mph. at 16,405 feet. The time to climb to 13,125 feet was 9.66 minutes. This climb speed was not considered competitive with other contemporary fighters, most of which had much more powerful engines, however, the plane was relatively simple to build and was made of non- strategic materials.

The span = 29' 5-1/8", Length = 28' 3-7/8", Height = 9' 5" and wing area = 134.55 sq. feet. Empty weight was 3,075 lbs. and loaded weight was 4,145 as listed in the "Complete Book of Fighters" by Green and Swanborough, but only 3,858 lbs. in the "Encyclopedia of Military Aircraft" by Angelucci and "World War II Airplanes" volume I, by Angelucci and Matricardi.

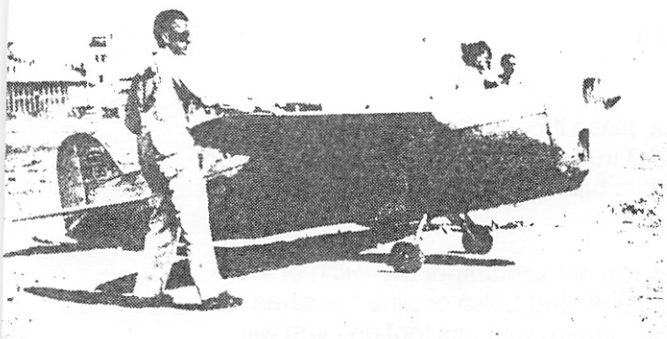
Color renditions of the C.714 in show the plane to be light gray on the undersides with either olive and brown /green or dark gray with olive/rose wavy camouflage above. The latter has a rose colored spinner.
I will send color prints to anyone wishing to build the model. You may contact me by phone at (330) 864-7533 or write to me at 753 Cliffside Drive Akron, Ohio 44313.

THE C.714 MODEL

The C.714 is an interesting and unusual appearing model. The limitations of the full size plane should not prejudice one from building the model, because those limitations were entirely due to the low powered Renault engine, which, of course, is not a factor in a rubber powered model. On the contrary, the long fuselage and nose moment make it an attractive choice for rubber power. My peanut size model flew well "right off the board".

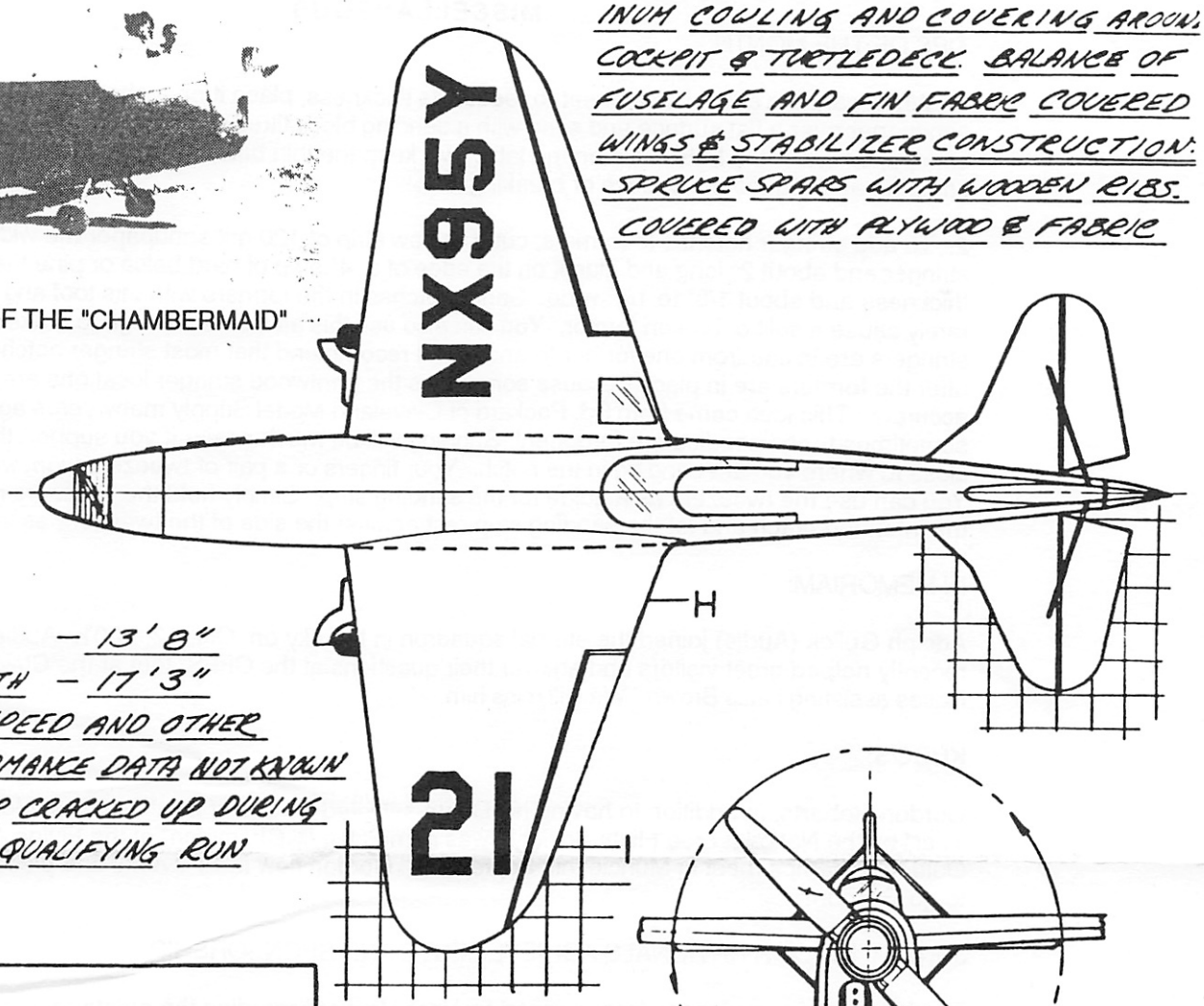
The only unusual feature in construction is in the treatment around the cockpit, where longerons have to be cut away to allow the deep side windows to remain unobstructed. The side stringers provide the necessary strength to resist the tension of the rubber motor. Otherwise, the construction is conventional box type with stringers.

Note that formers for the cockpit are made from soaked and laminated balsa strips to keep the cockpit clear and light. You may prefer to substitute 1/64 x 1/32 bass for balsa here. The 1/32" sheet wing saddle is similar to that on the "Spiteful" plan in Crosswinds issue #99. The machine gun pods are best made from blue foam and are attached after covering and doping the model. Cover them with gray tissue adhered with "Titebond" thinned 50/50 with water, or paint them with acrylic.
The noseblock is soft balsa. It is not necessary to hollow it if you use a balsa prop, because you will probably need a little nose ballast. If a plastic or hardwood prop is used, you should hollow out the nose block to compensate for the difference in prop. weight.
I recommend a carved 5 to 6" diameter hardwood or balsa prop with a P/D of 1.3:1 to 1.4:1. since this is a fast flying, low drag model.



EARLY VERSION OF THE "CHAMBERMAID"

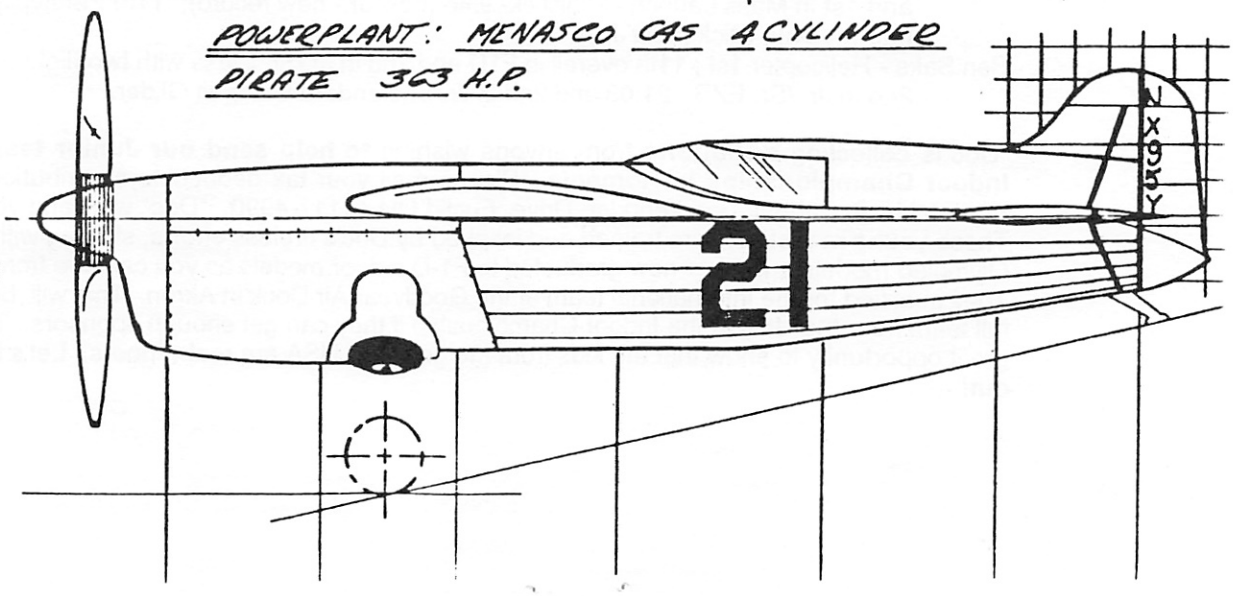
FUSELAGE CONSTRUCTION: WELDED STEEL TUBING WITH ALUMINUM COWLING AND COVERING AROUND COCKPIT & TURTLEDECK. BALANCE OF FUSELAGE AND FIN FABRIC COVERED WINGS & STABILIZER CONSTRUCTION: SPRUCE SPARS WITH WOODEN RIBS. COVERED WITH PLYWOOD & FABRIC



SPAN – 13'8"
LENGTH – 17'3"
MAX SPEED AND OTHER PERFORMANCE DATA NOT KNOWN AS SHIP CRACKED UP DURING INITIAL QUALIFYING RUN

CHAMBERS R-I
"CHAMBERMAID"

POWERPLANT: MENASCO GAS 4 CYLINDER PIRATE 363 H.P.



MISCELLANEOUS

TIPS OF THE MONTH:

1. When sanding a thin balsa sheet to reduce its thickness, place it on a sheet of 100 to 120 grit sandpaper over a flat surface and sand with a sanding block fitted with 150 to 220 grit paper. The sandpaper under the balsa, laid on the table, will keep the thin balsa sheet from sliding and crimping and reduce the chance of breaking it.

2. To add stringer notches to formers, cut a narrow strip of 120 grit sandpaper the width of the stringer and about 2" long and glue it on the edge of a 4" strip of hard balsa or pine the same thickness and about 1/8" to 1/4" wide. Sand notches in the formers with this tool and you will rarely cause a split or broken former. You can also use this as a straight edge to make sure the stringers are in line from one former to another. I recommend that most stringer notches be filed in after the formers are in place because sometimes the printwood stringer locations are not accurate. This idea came from Ed. Packard of Cleveland Model Supply many years ago, but sometimes these goodies are forgotten! Sanding will be much easier if you support the former close to where you are sanding in the notch. Your fingers or a pair of tweezers work well for this. You can use the tweezers as a guide for the sanding strip! Simply hold the tweezers right next to the intended notch and let the sanding strip rest against the side of the tweezers as you sand.

IN MEMORIAM:

Adolph Gulick (Audie) joined the eternal squadron in the sky on Oct. 12, 2001. Audie most recently helped greet visitors and answer their questions at the CFFS tent at the Cleveland Air Races assisting Russ Brown. We will miss him.

KUDOS:

Gordon Roberts, in addition to having his Début selected as one of the "Ten Best Models of the Year" by the National Free Flight Society, was named "Rally Champion" at the Flying Aces Outdoor Champs meet in Muncie this September. Gordon flew in 11 events and placed in 7! Way to go Gordon!

JUNIOR INDOOR NATIONALS ACHIEVEMENTS AND SPONSORSHIP:

The following is condensed from a report by Vern Hacker regarding the outstanding performance of Junior members of the Cleveland Clowns at the United States Indoor Championships in Johnson City, Tennessee in May, 2001:

Alex Johnson 4th - Unlimited Science Olympiad; 3rd in Limited SO
also 10:33 in Pennyplane and 11:33 in Limited Pennyplane.
Brian Johnson 2nd - Unimited SO 5:42, 1st in F1D - 22:27; 11:59 - Limited Pennyplane.
Dave Rigotti Jr. 1st - "Around the Pole" 3:55; 1st in Middle School Division, 1st Unlimited Division, and 1st in Mass Launch. Ministick- 9:46 (best Jr.- new record); 11th Pennyplane - 13:56 - Intermediate Stick (best Jr.).
Ben Saks - Helicopter 1st ; 11th overall in F1D and 2nd in Jr./Sr. Class with two flight total of 39:46; 2nd in Jr. /Sr. EZB - 21:03 and 2nd in Jr./Sr.standard Catapult Glider.

"Doc"is collecting **donations** from anyone wishing **to help send our Junior team to the Indoor Championships in Romania.** Please mail your tax deductible contributions to Vernon Hacker 25599 Breckenridge Drive, Euclid OH 44117-4990. "Doc" will send you a receipt. These young modelers were trained and inspired by Doc's tireless efforts, starting with Science Olympiad models and have now graduated to F1-D indoor models as you can see from the above. They qualified for the International team at the Goodyear Air Dock in Akron. This will be the first full team from the USA at the Indoor Championship if they can get enough sponsors. This is a great opportunity to show that the kids from the good old USA are real winners. Let's help them out!

FREE WHEELING DEVICES FOR RUBBER POWERED MODELS

There are three basic types of free wheelers in common use and each has some advantages, but most importantly, a **good free wheeler will allow the prop to turn really freely**, with minimal drag or friction from the tension of the rubber motor. To avoid this tensional friction it is necessary to solder a washer to the prop shaft behind the prop or use a spacer installed to keep the tension from bearing on the front of the prop. There is tensional drag even with unbraided motors, but much more if the motor is braided. Braiding, of course, is widely used to keep the unwound motor from bunching and changing the center of gravity of the plane in the glide.

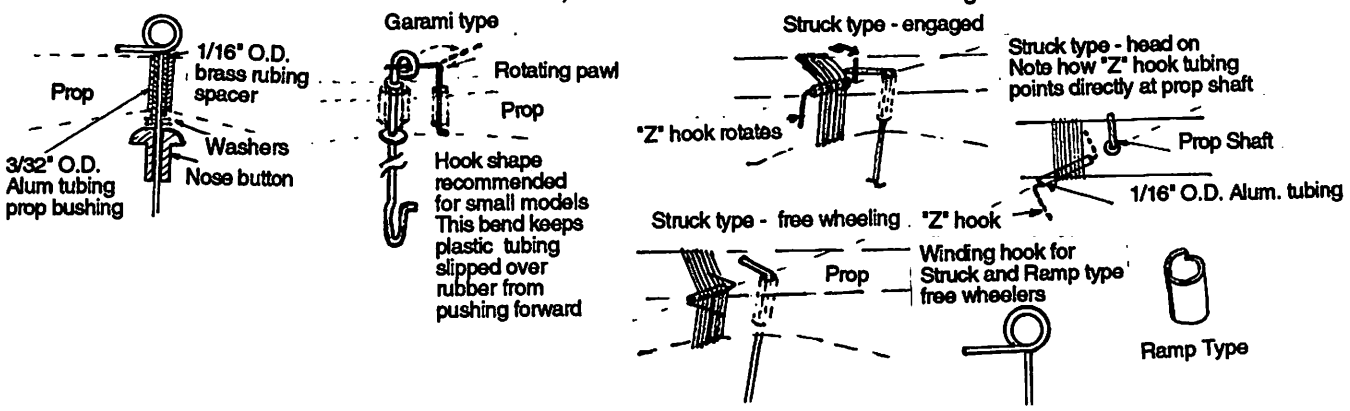
I prefer to use a short piece of brass tubing as a spacer because I don't trust solder to hold up under the fully wound tension of the rubber motor. The brass tubing needs to be about .02" longer than the thickness of the prop hub bushing. It bears against the thrust bearing behind the prop and against the winding hook in the front. For models using .032" wire prop shafts, 1/16" O.D. brass tubing is perfect, and the prop hub bushing is best made from a short piece of 3/32" aluminum tubing "Hot stuffed" to the prop hub. If you use a plastic prop, the hub bushing is not necessary, but be sure the hole in the prop is .067" diameter (drilled with a number 51 drill) so there is minimal friction to the brass tubing and minimal prop wobble.
(Sometimes you see a spring loaded tensioner used with a free wheeler, but I think this is unnecessarily complicated and heavy even though it eliminates the need for braiding the motor).

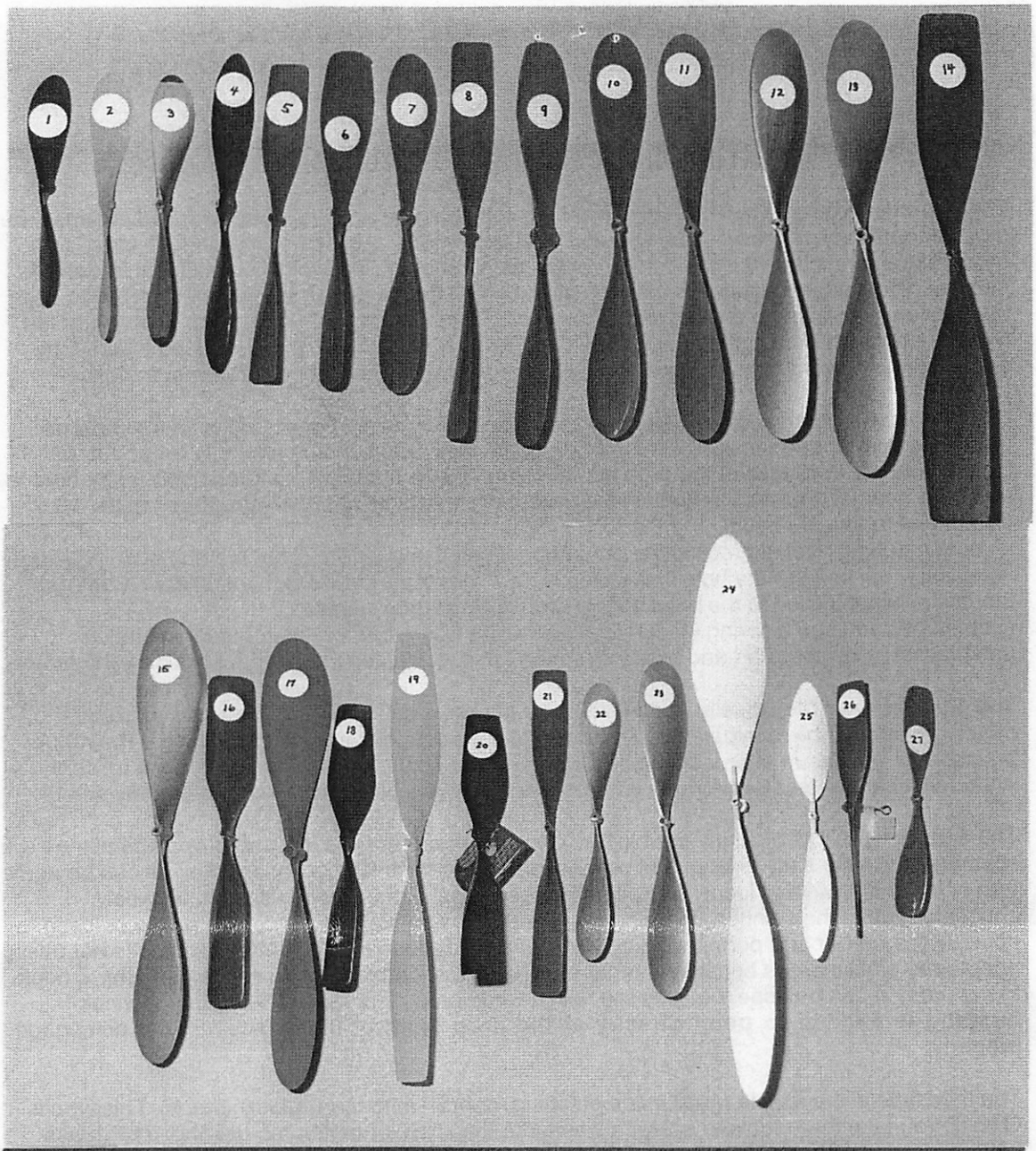
The **Garami** type free wheeler is easy to make but requires fussy latching technique after the motor is wound. I have experienced a couple of cases of unintentional unlatching if the rubber bunches for an instant after launch and stops the prop shaft, but otherwise it is quite reliable. Although it can be modified for use with spinners I feel the Struck type is a better choice here.

The **Struck** type is particularly trouble free and very easily applied to wood props and planes with spinners. It is very easy to latch and never seems to come unlatched by accident. It can be made with or without a winding loop. If a spinner is used, most of the mechanism can be nicely concealed within the spinner. In those cases a sort of 'Crockett' hook or 'Stirrup' can be used to hook up the rubber and permit winding with the prop disconnected. The Struck type is not easily adapted to plastic props because it requires binding a short piece of tubing, holding the Z hook, to the prop. It can be done, but is easier with a wood prop. It is essential that the "Z" hook **bushing is aligned to point directly at the prop shaft** or the device will not disengage properly.

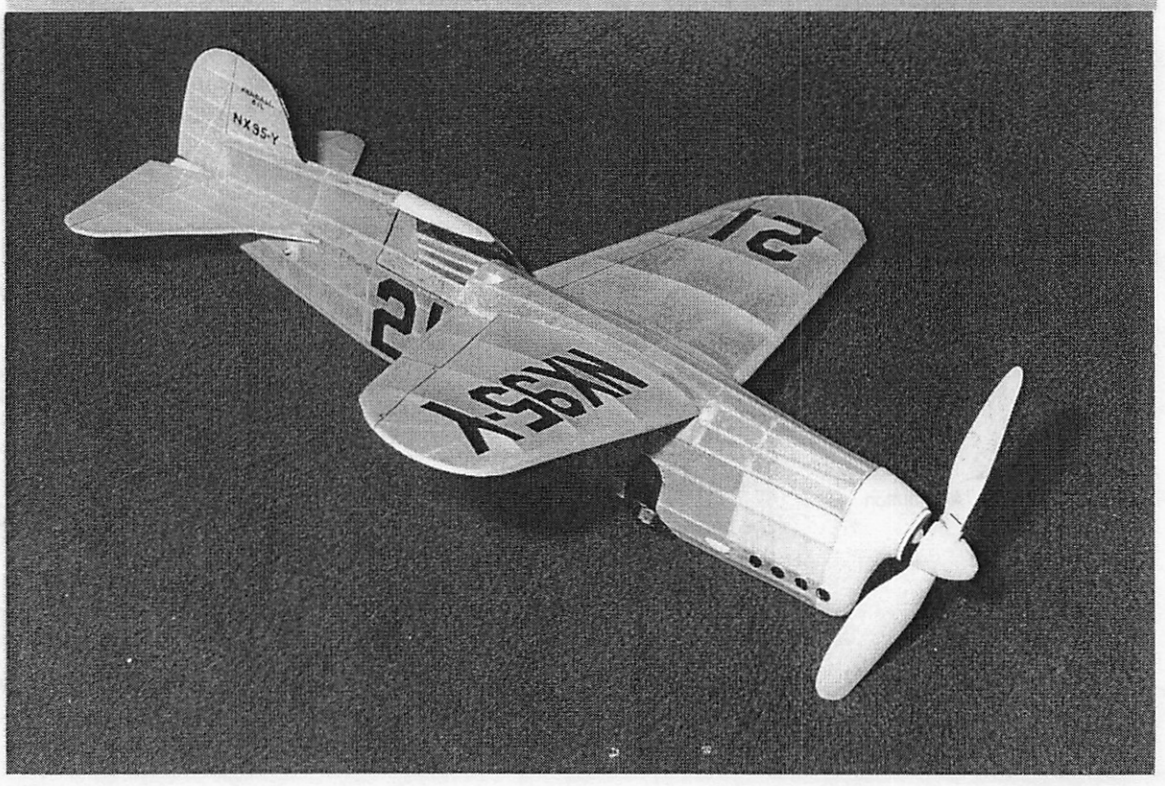
The third type is the simple **ramp** made of tubing, or built- in to many plastic props. This type is O.K. IF you take the trouble to solder a washer to the shaft, or better yet, use the 1/16" brass tubing spacer mentioned in paragraph #2 above. Without this there an be a considerable amount of friction between the ramp and the prop shaft free-wheeling hook in the free-wheeling mode resulting in a lot of drag from the prop which is trying to free wheel! The disadvantage to this type is that it is fairly easy to push the prop toward the fuselage accidentally, when launching the plane, disengaging the prop shaft pawl from the ramp, very quickly losing all your turns and maybe even damaging the fuselage, as the rubber motor unwinds violently.

I have also used a free wheeler which can be unscrewed from the prop shaft to allow for quick changing of props, but it requires a few tools and a little extra work, so I don't consider it to be a standard free-wheeling device. I will make one of these for $2.00 for anyone who would like to try it. Just send a note to me at 753 Cliffside Drive, Akron OH 44313. Steve Griebling.




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