47783 AUGUST 1972 75¢

RC MODELER

THE WORLDS LEADING MAGAZINE FOR RADIO CONTROL ENTHUSIASTS

THE WORLDS LEADING MAGAZINE FOR RADIO CONTROL ENTHUSIASTS

RC MODELER

THIS MONTH

Semi-scale German L-13 Dirigible photographed by Dick Tichenor. See Page 43.

THIS MONTH'S COVER

Charlene Brodbeck poses with the RCM Trainer featured in R/C Modeler Magazine's Flight Training Course. Ektachrome transparency by Reed Packard.

R/C MODELER Magazine is published monthly by R/C Modeler Corporation, Don Dewey, President. Editorial and Advertising Offices at 171 W. Sierra Madre Blvd., Sierra Madre, California 91024. (213) 355-1476. Entered as second class matter at Sierra Madre, California and additional offices. Subscriptions $7.50 per year, $14.00 two years. Single Copies 75 cents each. Add $1.00 for postage outside U.S. and Canada. (Except APO's). Change of address notices, undelivered copies and orders for subscriptions are to be sent to P.O. Box 487, Sierra Madre, California 91024. Not Responsible for unsolicited manuscripts, which must be accompanied by return postage.

VOLUME 9 NUMBER 8

AUGUST 1972

FROM THE SHOP

DON DEWEY

IS DON DEWEY
REALLY HOWARD HUGHES?

Most of you have heard of this elusive character. No one has ever seen him. Pictures are shown in a slick magazine printed on the West Coast of some young blond guy and they say it is "Don Dewey."

Consider this for a moment. Howard Hughes is rarely seen and then only by his associates. He is supposed to hide out in hotels around the world. He has always been crazy about aviation. He has bundles and bundles of money. Now, remember that this R/C magazine costs more than the few advertisements that might appear in it. Also think about this: Suppose there really isn't anyone named Don Dewey. Reliable sources tell our investigators that the so-called Don Dewey is really a plastic balloon that is made to look like a person and whenever anyone comes near the executive offices in the mountains it is inflated and this is how the Don Dewey legend came to be. Actually we all know that Howard Hughes is hiding out in California and writing articles for this magazine and designing R/C planes that can't possibly fly. He has so much money that he couldn't care what goes on in the rest of the world.

There are other rumors, too. One I heard was that there was a hermit in a cave overlooking the ocean out there who made gliders out of dried bats and when the moon was full, launched them out of the cave entrance while crying something that sounded like Dooooooooooo!!!! This is where the name Don Dewey came from, the story goes.

Another story is that when Alcatraz was vacated there was this character left over who thought he was the bird man of Alcatraz and spent most of his time looking out the window or trying to launch weird gliders made from toilet tissue. This is supposed to be the real Don Dewey and now he is hiding in the hills of California and trying to get the entire modeling USA to go for thermal soaring.

We are inclined to go for the first idea . . . especially since we heard that he has made millions selling plans and that the printing costs of his magazine are nil since they run them at night on the presses that print Gent and Swank and such type magazines . . . as evidenced by the front covers.

I, myself, am inclined to disregard that story that there is really a Don Dewey. There used to be good editorials in RCM under the name but they really disappeared, and too bad, I might add. There was a rumor that once some kid named Dewey started a magazine like RCM and ran it on a mimeograph but got mixed up with the Mafia . . . now he is supposed to be chained in a room and spends his time doing magazine layouts for the syndicates slick magazine, RCM.

Let's face it, no one has ever seen this person. Is he real? Is there really a Don Dewey? Of course not, he's got to be Howard Hughes . . . it just figures out that way.

. . . . Frank Schwartz
Middle Tennessee
R/C Society 'Glow Plug'

•

Dear Mr. Schwartz:

Your current newsletter raises the question as to the possibility of Don Dewey and Howard Hughes being one and the same. I'm happy to discover that I'm not alone in the bewilderment of this identification puzzler. My frustration on this topic is probably more real than even the most devoted readers of that publication, referred to by the other model magazines as "Playboy West," simply because of the weird things that have happened to me. I'll cite an example:

My phone rings at 3:00 A.M. A smartly barked shin on the phone table results in my annoyed hello. The firm voice on the other end says, "Good evening Mr. Tichenor, you will

to page 106

CUNNINGHAM ON R/C

Ed Rankin flags them off at recent Texas Quarter Midget race. RCM event catching on nationwide. George Rogers photo.

1972 simply has to be the year of the Quarter Midget Races since the interest has grown so rapidly from the last half of 1971 through the first half of '72. Almost every club newsletter brings word of races just held, or those up-coming. Each month the magazines feature articles dealing with Quarter Midgets, and RCM has brought to you an outstanding selection of models to build for the event which we conceived in this column back in 1968.

Why has this interest been so great? Simply because it is a racing event that has an appeal for the average builder and flier. Of course, some of the expert builders and fliers are competing in races, but, by and large, those who have the most interest are the men who either don't have enough time and/or money to jump into other forms of competition, or who simply want to enjoy the thrill of racing, and yet keep the cost at a reasonable level. After my last article on Quarter Midgets I received several letters that I think should be repeated here, along with my own thoughts and comments.

The first is a letter received by Don Dewey from Bill Cooper, Louisville, Kentucky.

"My views as expressed here are by and large general comments of fliers in the Louisville area, and have met with the approval of the Nashville and Indianapolis area fliers.

"First, since it is a racing event, it seems the logical governing body should be the NMPRA .... right now, there are almost as many sets of rules as there are clubs flying this event. I would recommend that NMPRA name Quarter Midget representatives from each of its present districts who would, in turn, poll the clubs in their district for rules.

"Now to our rules. "Our" being Bluegrass Racing Associates (BRA) and the Louisville Radio Control Club, Inc. We feel that simplicity is the key to success – the more complicated rules that you adopt, the more flyers you scare away. Case In Point: *7/8" airfoil thickness at root versus 10% airfoil. Any modeler who can build an airplane knows what a 7/8" thick wing is – but how many modelers, including a lot of experts know what a 10% airfoil is? .... True, at first a 10% rule seems more equitable but this diminishes when you consider that suddenly this becomes advantageous to a true racing purist, who wants to install retracts. He has to have a thick wing to accommodate the retracts, and everyone else suffers by flying thicker wings.*

"Basic design requirements are these: Wing area, 300 square inches; wing thickness, 7/8"; fuselage width, 2¾" minimum; fuselage height, 5" minimum at canopy; weight, 2½ lbs. minimum; engine, .15.

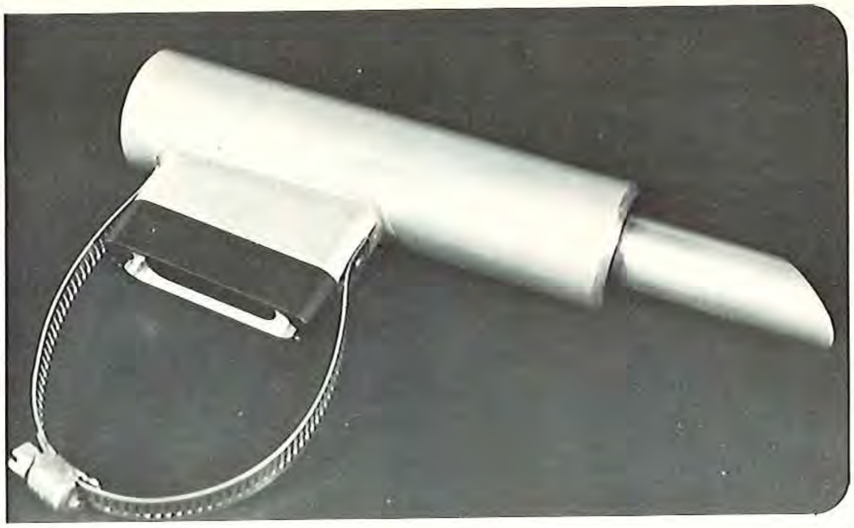
"Our course is set up with 2 pylons 565 feet apart. Our course last year was a total of 11,765 feet, or 2¼ miles. This year we plan to fly a 515 foot course, or two miles. We do require that the aircraft go around the pylons – much safer and less nerve racking.

to page 100

Quarter Midgets taking the #2 pylon in a 30 mph wind! No problem, at all. Look at that bend in the 1½" pipe pylon pole. George Rogers photo.

engine clinic

By Clarence Lee



We have another muffler to report on this month. I had been shying away from any muffler reports the last few months due to having reviewed a considerable number in the past and figuring most of you would be a little tired of reading the same old thing. I do know of several new developments under way in the field of silencing so had been holding off for something completely different than the standard muffler as we presently know it. However, the letters keep coming in wanting to know if I had tried this make or that make; what were my findings; what do I think, etc.? The majority of the letters were in reference to the SEMCO muffler, due to the fact it is an American made muffler and widely available throughout the country. I have always had a 'buy American' thing, myself, so it is nice to see more of a selection showing up. Up to now, the only other American made muffler readily available through all hobby shops has been the Murphy muffler. There have been others available such as the 'Airfoil Muffler' marketed by Al's Hobby Shop in Elmhurst, Illinois, and 'Mac's Muffler' made in California by Wally McAllister, however these seem to be available in limited quantity and not readily available through normal hobby outlets. That is, your local hobby shop can't call up his supplier and order one.

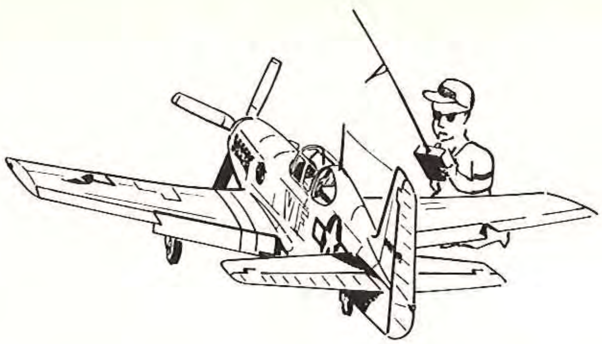
The SEMCO muffler is available in two styles, a flow-through and expansion chamber. Both models are of the same basic design as other makes of mufflers of this type, i.e. the KO, Silence-Aire, Super Tigre, etc. The mufflers are very attractive and extremely well made of aluminum anodized gold with the tail pipe left natural. Both mufflers come in three basic sizes and adapters are used for the various makes of engines. The adapter, itself, is anodized black making a nice contrast with the gold body and is bolted directly to the muffler body by two Allen head cap screws. This, in itself, is a desirable feature over some of the makes that use an adapter held in place between the engine and muffler body by tension of the retaining strap. Use of an adapter this way also has the advantage of allowing you to purchase one muffler and use it on more than one make of engine. If you decide to switch from brand X to brand Y engine you do not have to lay out a big hunk of change for a new muffler. Only the adapter is required.

Performance-wise the muffler worked as well as any of the top rated mufflers we have reviewed in the past. Tests were performed using a Veco .61 and an 11-8 Top Flite propeller. With no muffler the rpm of the engine was 11,800. With the flow-through model installed, rpm was 11,700 for a loss of only 100 rpm. With the expansion chamber model installed the rpm was 11,600 for a loss of 200 rmp, both being very acceptable figures. The noise level was measured 25 feet from the exhaust side of the engine where the highest noise level is obtained using a Radio Shack decibel meter. The flow-through model registered 100 db, and the expansion chamber model registered 99 db. Most all of your low power loss mufflers register in the 98-102 db range. It seems that a point has been reached where this is what we can expect with this type of muffler. If you want better silencing, then you are also going to have a greater power loss. Some fellows probably feel that they could sacrifice a little more power for the sake of a quieter engine. However, you must bear in mind that the additional silencing and power loss creates more back pressure and heat within the engine. This, in turn, means more varnish, carbon, and goop, not to mention shorter engine life. Invariably fliers will run their engines on the lean side when using a muffler. Detecting the correct setting is considerably harder. Most of you have a hard time telling the difference between a two and four cycle without a muffler. So, run the engine on the lean side with a high back pressure muffler and the operating temperature of your engine skyrockets. Our engines are running just below the break-down point of the lubrication oils to begin with. This is especially true of some of the synthetics. With a hot lean run the temperature of the engine exceeds the break-down temperature of the oil and it goes up in smoke and ashes. This means instant destruction. The piston galls to the cylinder wall, con-rods freeze to the crank pin, etc. So, much has yet to be accomplished in the field of muffler development. In short, lower noise level without significant power loss and its resulting back pressure and heat.

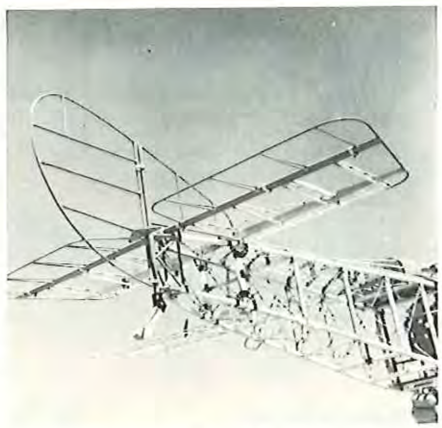
The SEMCO muffler retails for $11.95 plus an additional $2.98 for the adapters. This does make it one of the more expensive mufflers. If you can't get the muffler from your hobby dealer you can write direct to SEMCO – Model Engineering Co., 113 Graniteville Rd., Chelmsford, Mass.

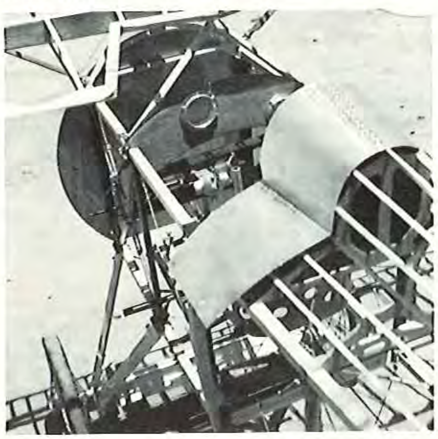
to page 95

by DAVE PLATT



SCALE IN HAND...





An example of outstanding scale craftsmanship. Jim Kiger's fully scale Hanriot HD-1 is truly amazing. Note the close attention to even the most minute details.

BELOW: In-flight orientaton could be a problem here. Japanese canard (tail first) Shinden, see text.

To be interesting, a scale model should, in our view, be either unusual – one off beat subject is worth a clubhouse full of run-of-the-mill scale efforts chosen for their similarity of aerodynamic layout to the average sport/pattern RC job – or, be a truly outstanding piece of work which, by sheer quality, rises above the vast majority of "scale" models. In support of this opinion we have some pictures for your consideration.

Illustrating the "quality" view, we have a *Hanriot HD1* built by Jim Kiger of Fremont, California. (Seems to me this must really be World War Ones-ville USA; isn't Wally Hurley from Fremont?) Study these pictures, gang. This model is a masterpiece by any standard; so much so that Jim might have our understanding if he decides never to cover it and hide all that superb work. We sincerely hope to eventually see this model (Nat's 1973, Jim? It's Scale W.C. Team selection year . . .); our thanks to Dick Franco for the pics .

Or, how about a Japanese canard – or should we say the Japanese canard, since these didn't fall as thick as the balsa dust on Top Flite's floor. The *Kyushu J7W1 Shinden* was a one-off fighter type built in 1944. The real one wasn't altogether a rave; we trust the model is better! Designed and built by Tom Tjaarda, Turin, Italy, the model has a Rossi .60, is 1/7 scale, spanning 165 cm. (5'3" to you) and weighs 4.3 kilos, whatever they are. Tom would have been forgiven for making a rather basic tryout for this highly unusual type, but not so – it has retract gear, complete cockpit with sliding canopy, rivets, and the works. Noble effort, Tom, and yes, please, send those in-flight photos of it.

Finally, a slightly more orthodox subject in the shape of a *Do. 335* from

Of only 14 Dornier 335's built, we have the only one left, here in the U.S. and we're letting it rot away! Push-pull fighter unique in WW II. Fine model by E. Willard, Australia.

E. Willard of Caringbah, N.S.W. Australia. Are all the most fascinating models being made outside America these days? This one has an O.S. .80 to heft its 10½ lbs. (Oh yes, we know what lbs. are!) Scale is 1½" = 1' and span is 68". The rear prop free wheels. The Do. 335 is one airplane this writer always got the wets about. Personally, we like the night fighter variant which looks, if anything, even more sinister than the day fighter. With ample wing area, a trike gear, and two engines in the fuselage (saving the offset-thrust worries) and maybe a Wankel in the nose, which is too slim to completely hide a regular engine, we've often felt that this would be a super project. Rumor says that Bill Koster, ex of Monogram Models, will have a C'L one at our Nats this year – if so, it will be worth looking for.

Our last photo this month shows Williams Bros. latest offering in their large range of radial engines. It's a Wright "Whirlywind," that really famous engine which powered so many of the aircraft of the 1920's and 30's. With a scale of 1½" = 1' and a price tag under ten bucks, this kit would be a real time saver for an RC builder making, say, a *Spirit of St. Louis.* Williams also has announced the LeRhone rotary engine in 1½" (9.95) and 2" (11.95) scales which will please the WW I RC Scale fans. If you want to know more about any of these, or inquire if the engine you want is in the range, write Williams Bros., 181 B Street, San Marcos, California 92069.

★★★★

For contest fans, and in particular WW II buffs, the West Jersey RC Club is running a WW II "Scramble" featuring AMA Scale and AMA Standoff Scale. The date is August 19 – 20 and the place is the Lakehurst N.A.S. We'd sure like to get to this one, but distance precludes it and anyway if we did, it'd rain. For more information, write C.D. Chuck Gill, 835 Gilbridge Rd., Martinsville, N.J. 08836.

★★★★

RETRACT GEARS, 1972 STYLE

If 1972 could be called the 'Year of Something,' it would have to be the 'Year of the Retract Gears.' We took the opportunity at Toledo to examine the new rigs and re-examine the older ones. It must be obvious, of course, that our eyes see the multitude of competitive rigs strictly from a scale point of view, and our following remarks are confined entirely to this aspect. How well each brand will perform and stand up in a sport or pattern model is of no concern to us, and it may well be that all of them are satisfactory in such installations.

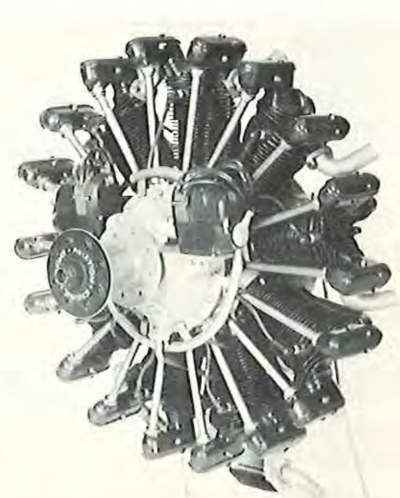
But, as we have repeatedly stressed here, scale is another matter entirely; it would be a mistake to choose a brand on a good reputation generated by one or another pattern flier's string of contest wins using this or that rig.

This is not at all to say that the pattern fliers have done us no good. On the contrary, as a minority we must realize that it took the awakening of interest in RLG by the sport and pattern fliers to stimulate the rapid development we have seen these past two years. While a dozen or two manufacturers are fighting for a piece of the large market, we scale flyers merely sit back and hope that something will come along that happens to suit our needs as well.

The retract-gear units now on the market fall, basically, into three primary types: The self-contained electric unit (Kraft, Wing Mfg.); the mechanical unit (CAS, KDH, Pro-Line, CG, etc.); and the pneumatic powered systems (Rom-Air). Added to these there are a number of units which we can call Prime Movers; whilst not retract-gear units of themselves, they are power devices intended for retract-gear operation, mostly for mechanical units. Into this group we place such items as the Royal RLG servo, the Wing Power Driver, and the P.M.G. Freon-gas system.

In what way do scale model requirements differ from a sport RC model? The answer here is fundamentally threefold. First, power. On a sport model the legs tend to be shorter and the wheels smaller and lighter. And, even if they aren't, the design can be changed to make them so, for more reliable operation. In scale our ability to arrange such changes to guarantee enough power is severely limited or non-existent. Therefore,

to page 93



Plastic kit Wright Whirlwind, another of Williams Bros. outstanding kits for flying scale fans. How about a Cyclone, Granger?

SUNDAY FLIER

KEN WILLARD

Hugh Stock and new Kestrel kit.

This past month has been a very interesting windup to some design concepts that most of you sailplane enthusiasts will find useful. Some are in relation to slope soaring, while some pertain to thermal soaring.

First, let's talk about some of the design problems we face when planning a slope soaring glider that will be suitable for racing as well as for aerobatics.

If all you are interested in is trying to break the world's speed record, then you're not concerned with the aerobatic capabilities of your design; but, if you plan to do some pylon racing, the ability to roll fast and turn fast becomes just as important as the ability to go at high speed in a straight line. The recent RCM Trophy races proved that. (The race results are covered in the Soaring feature.) And the fact that a modified Jalapeno (sorry, Jerry, but that's the way I see it) won, proves the point. It was not the fastest plane, but it could turn inside and make up for the difference.

But you never know what the slope wind will be – and that's where you want to have some versatility. In the June issue of RCM, I showed the profile of a "variable camber" airfoil which could be achieved through the use of "flaperons." I used such a system on the racing version of the Top Sailer, and it worked quite well. Two things kept it from working as well as I had hoped. First, on the day of the finals a strong wind was blowing. I had stressed the center section for a twenty-four pound load, figuring that I'd be flying at an all up weight of six pounds, and pulling four G's on the turns would be O.K. and not fold the wing. As luck would have it, the wind was so strong (about 20-25 mph right perpendicular to the hill) that I finally would up flying at eight pounds, and could have been loaded up to ten easily, except that the wing would have folded on the turns.

So I had a structural design weakness – easy enough to fix for next year. (Except that I totalled the plane in a head-on mid-air crash at a closing speed of about 100 mph in a North Bay Soaring Society race a couple of weeks later.)

The other factor was that at the speeds we are now flying in slope racing, drag really begins to count. The flaperon hinge, at the top, requires a considerable gap on the under-surface so you can drop the flaperons all the way for landing. And that gap means drag. I've given it a lot of thought, and finally came up with a hinging system that keeps the gap closed at all times other than when you are coming in for a landing. Once again, I got the idea from an old time free flight enthusiast, Carl Hermes. Figure One shows the simple geometry of the idea. By hinging at the bottom, and shaping the trailing edge of the wing and the leading edge of the flaperon so they "mesh" during aileron action, no gap will show. Then, when the flaps are dropped all the way for landing, the gap at the top doesn't matter anyway.

Another factor that's worth keeping in mind is the way the flaperons are hinged. Regular hinges work fine, and the new hinge by Robart is excellent. But, for maximum efficiency, the gap between the trailing edge of the wing and the leading edge of the flaperons should be sealed. This can be done by using a strip of MonoKote on the bottom along the hinge line, or you can make the hinge out of MonoKote, using two strips. One is applied to the back surface of the trailing edge of the wing and the forward surface of the flaperon. To do this, turn the wing upside down, lay the flaperon on the wing and apply the MonoKote to the surfaces. Then flip the flaperon into the normal position and put the second strip of MonoKote on. Figures 2 and 3 show the idea.

Although I don't have any data to prove it, I think that by sealing the gap, the drag is reduced and there should be a corresponding improvement, even if only slight, in speed. But, every little bit helps.

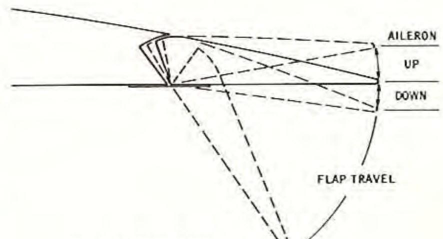


FIG. 1 FLAPERON ACTION

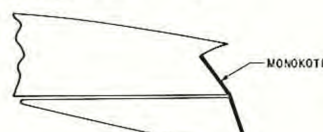


FIG. 2

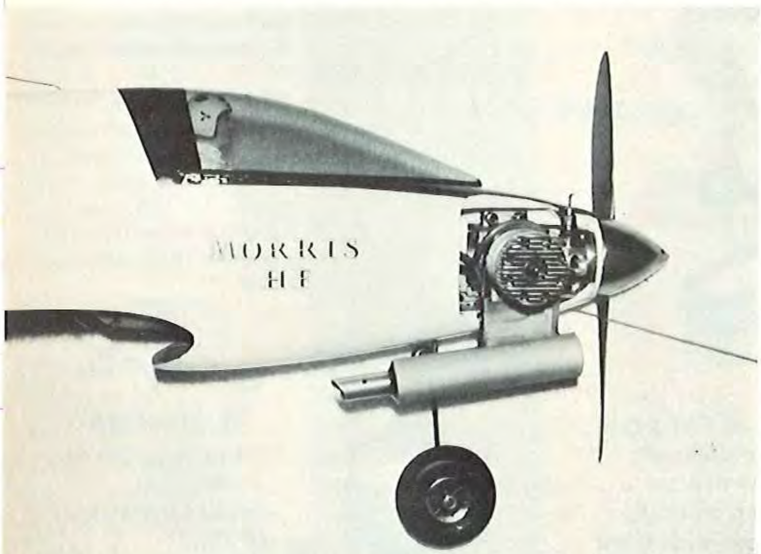
FIG. 3

MONOKOTE HINGE SCHEMATIC

*****

Thermal soaring designs keep coming along as the interest continues to grow. The German designs have led the field up until recently, but the influx of new American designs is rapidly catching up. Original designs are popular, but there is also a lot of interest in scale (or semi-scale) models of the man-carrying jobs. Hugh Stock has a scale Kestrel that he's putting out in limited quantities that really looks nice. Note the molded canopy, which has the tray integral with the molding. Very neat. And Hugh just

to page 92



From one of the world's leading competition fliers and member of the Italian Internat's Team comes this top contender for Pattern honors. Flown in two consecutive World Championships, the Morris 'HF' is an F.A.I. thoroughbred that can put you over the top in this year's pattern competition.

BY GRAZIANO PAGNI

MORRIS 'HF'

It is a true pleasure to have the opportunity of presenting the plans of my latest model, the Morris HF to the readers of R/C Modeler Magazine. Two years ago I specifically designed this plane in an attempt to achieve a superior performance in the FAI aerobatics program. I named the plane Morris in honor of my older son and HF for High Fuselage or, if you prefer, for High Fidelity.

With this plane I managed to win the Italian National R/C Championships in 1969 and was happy to place 20th during the Internationals, a truly good place for a non-professional flyer, such as I.

This model is the latest version of the Morris series and is a result of previous experience with several pattern models. For the HF, I used the same symmetrical airfoil of the older models which I believed more suitable for the FAI pattern. Furthermore, I kept the same long tail moment, modifying only the shape of the wing and of the fuselage profile. The previous prototypes of the Morris utilized rectangular wing planforms which are very reliable during the "round" maneuvers such as loops, eights, etc., but a little less desirable during the rolling maneuvers such as axial rolls, Cuban Eights, and the Rolling Circle. In order to get a tapered wing with the same characteristics of the rectangular planform, I designed a tapered wing with the taper equally distributed along the leading and trailing edges. The airfoils were chosen to have a slim 14% thick section at the root and a 16% section at the tips. This helps avoid wing tip stalls and gave the plane a tail-low landing attitude for slow and graceful landings. However, when sufficient rudder is applied, the model spins readily and if, during a spin, controls are released, it recovers immediately. Using a progressive airfoil, tail slides are also substantially improved.

In order to perform smooth maneuvers it is necessary to have good penetrating ability and the thickness of the airfoil counts. If the airfoil is too thin, however, the model easily resembles a "bomb" and this is definitely a detriment in view of European judging standards. With its symmetrical airfoil the HF is able to fly in the same manner right side up or inverted. I chose short center-hinged ailerons with no differential in order to perform better rolls, while the one degree of dihedral is adequate for good outside loops, inverted flights and rolls.

The fuselage is narrow and high for its length with the highest point at the center of gravity in order to perform knife-edge flight and to increase directional stability. The rudder surface is quite ample and this supports execution of the Double Stall Turn, Slow Roll, Tail Slide, as well as Spin maneuvers. Normally, I use a 70/75 g/dmg wing loading since I prefer the heavier loaded models since they fly easier in the wind and even better in still air. However, in order to avoid the troubles associated with large and excessively heavy models, I reduced the dimensions of the previous prototypes and used, on the HF, a new lighter radio, the EK Logictrol, and a more powerful engine, the Super Tigre G.60, which has proven to be completely dependable and powerful – a very important goal for a modern pattern contest ship. The HF is easy to build and so I will present only the essential construction notes.

WING:

Cut out the wing cores from a block of styrofoam by the normal hot wire method and draw on your cores the outline of the ailerons, bellcranks, pushrods, and landing gear. Next, cut out the shell for the aileron bellcranks and the tunnels for the pushrods. Before the sheeting is applied to the wing cores, glue the 1/8" plywood bellcrank mounts, the landing gear trunion blocks and install your pushrods.

After the wing is sheeted, glue the tip blocks in place. These should be carved from soft balsa and hollowed for lightness. After a fine sanding over the entire surface of the wing, cut out the ailerons and glue the balsa blocks in place for the hinges. Next, sand the front part of the ailerons to a triangular form with the hinges at the center. Epoxy the aileron horns in place and then sand the root section of the wings to provide the desired dihedral. Join the wing panels together upside down on a flat surface so that dihedral will result from the decreasing thickness of the airfoil. To reinforce the wing hold down area, use 1/8" plywood. In addition, wrap the center section with a strip of fiberglass cloth tape.

STABILIZER:

The stabilizer is constructed just like the wing using 1/16" balsa sheeting to cover the one piece styrofoam core. The elevator is carved from ½" balsa sheet and sanded to airfoil shape.

FIN AND RUDDER:

Carve these from ½" balsa sheet and then sand to the shape shown on the plans.

FUSELAGE:

Cut the fuselage sides from 1/8" balsa sheet and add doublers from the firewall to the trailing edge of the wing using 1/32" plywood. Reinforce the tail area with 1/32" plywood doublers as well. Now, add the 1/8" x 3/8" diagonal bracing and the 3/8" triangular longerons at the four corners.

Hold the fuselage sides upside down directly over the top plan view of the fuselage. Pin this to a flat surface and epoxy the sides to the ¼" plywood firewall and the ¼" balsa bulkhead. When the glue is dry, pull the tail together and glue it and the bottom sheeting in place.

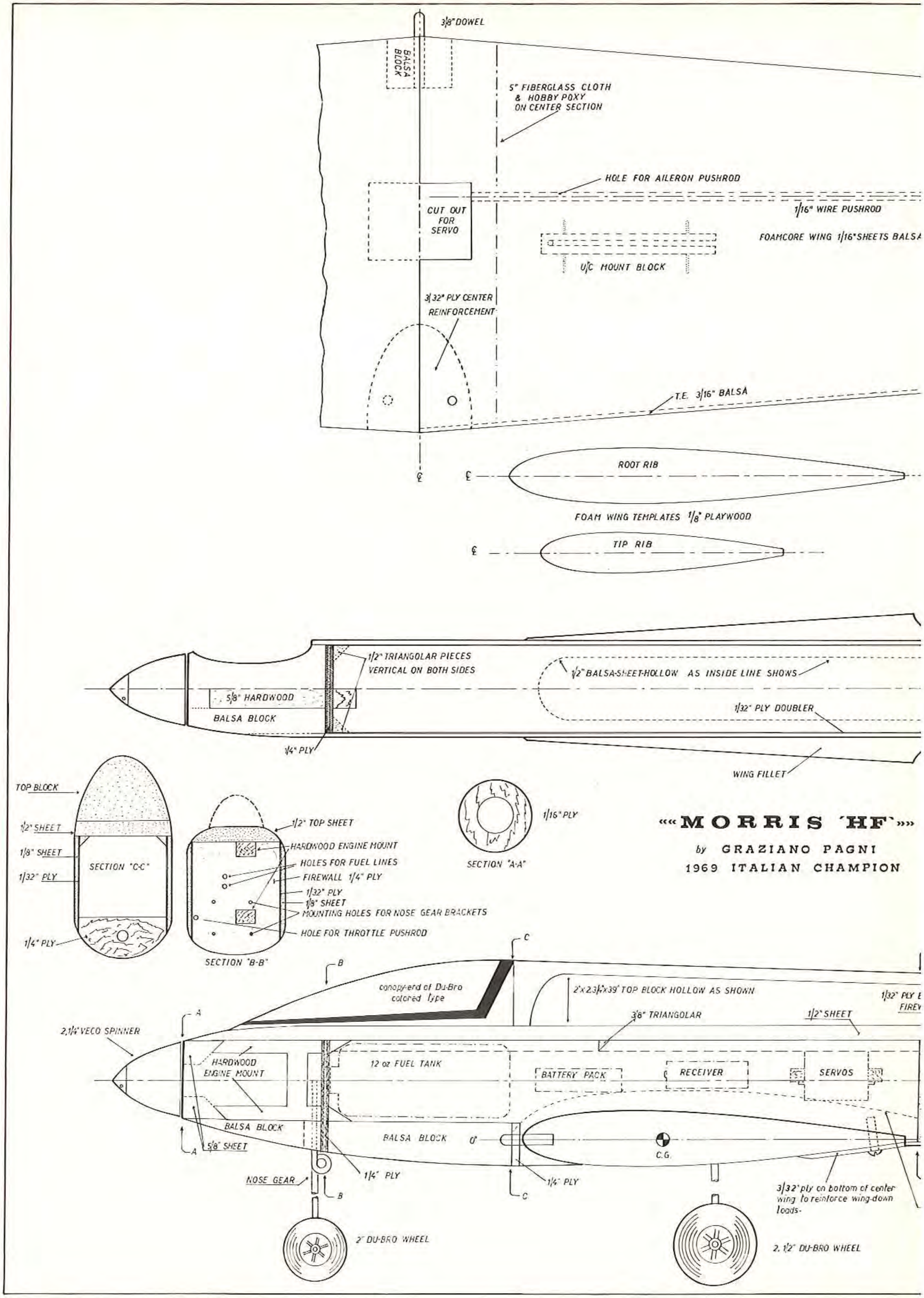
To form the top of the fuselage, glue the ½" sheet cover in place as well as the top block which should be hollowed as shown on the plans. Epoxy the 5/8" hardwood engine mount and all the balsa blocks that form the nose contours. Eventually, to add strength, cover the nose area with lightweight fiberglass cloth and epoxy glue after it has been finish sanded. Now, glue the pre-cut balsa wing fillets to the fuselage and sand them in place when the glue has dried. These Karmann fillets increase the aerodynamic performance of the model to a great degree, avoiding turbulence and drag around the area where the wing joins the fuselage. They also improve the overall appearance and strength of the model.

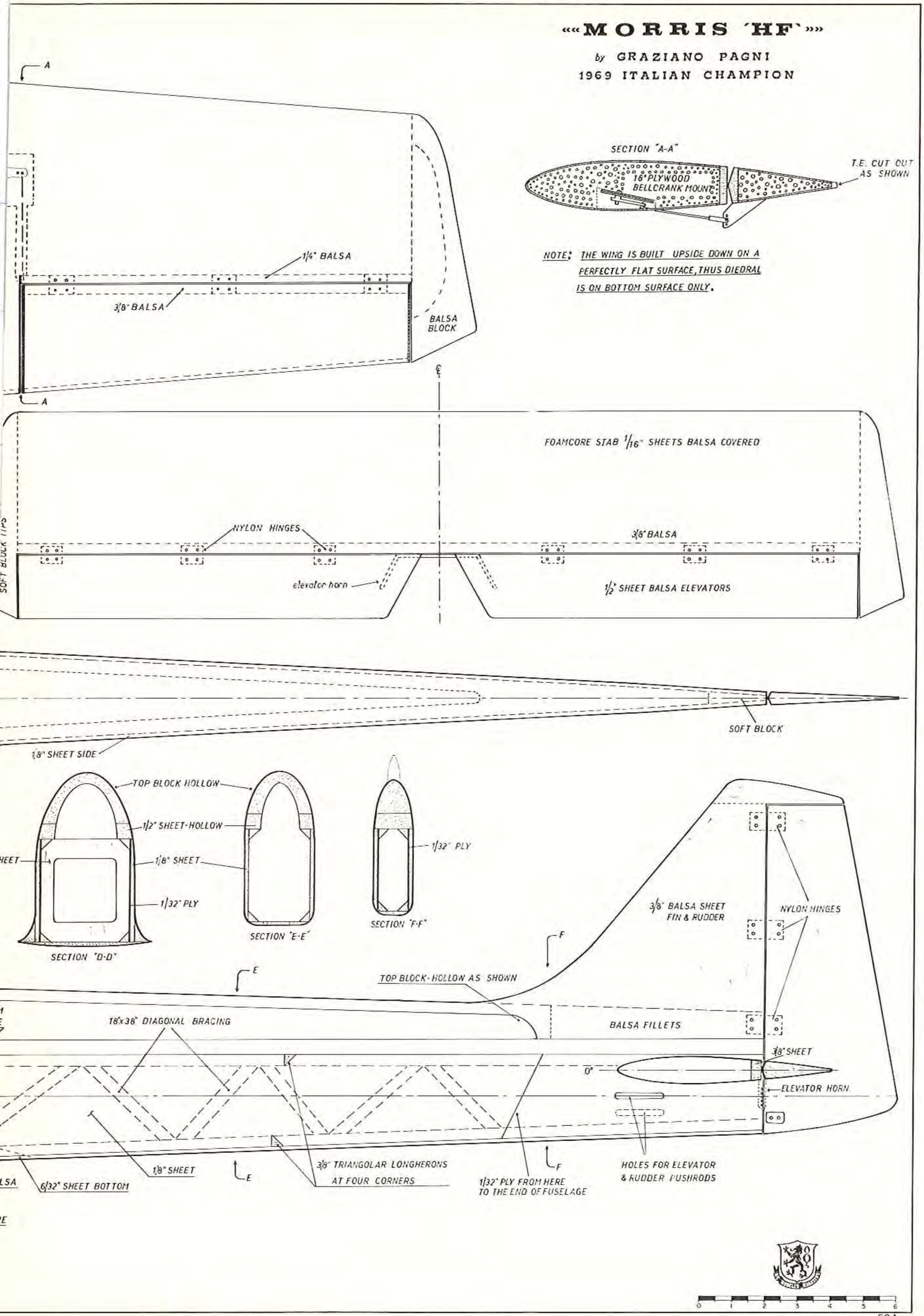
Next, install the wing hold down bolts inside the fuselage and, after placing the wing in its proper place, epoxy the ¼" ply mount with holes for the wing dowel and drill the holes for the bolts. Remove the wing and shape the fuselage to the form shown on the plans. Glue the fin and stabilizers to the fuselage making sure you obtain absolutely true alignment with the wing. Add the fillet blocks around the fin and stabilizer using EpoxoLite to save time. Finally, epoxy the canopy in place. The latter is the rearward section of a colored Du-Bro C-4 canopy. Don't forget the cute little blond girl inside!

FINISHING:

Every modeler has his own finishing techniques so I prefer not to discuss that in this article. However, for better visibility, use bright colors. For my own part, I prefer white, red, and green . . . our national colors here in Italy.

to page 91

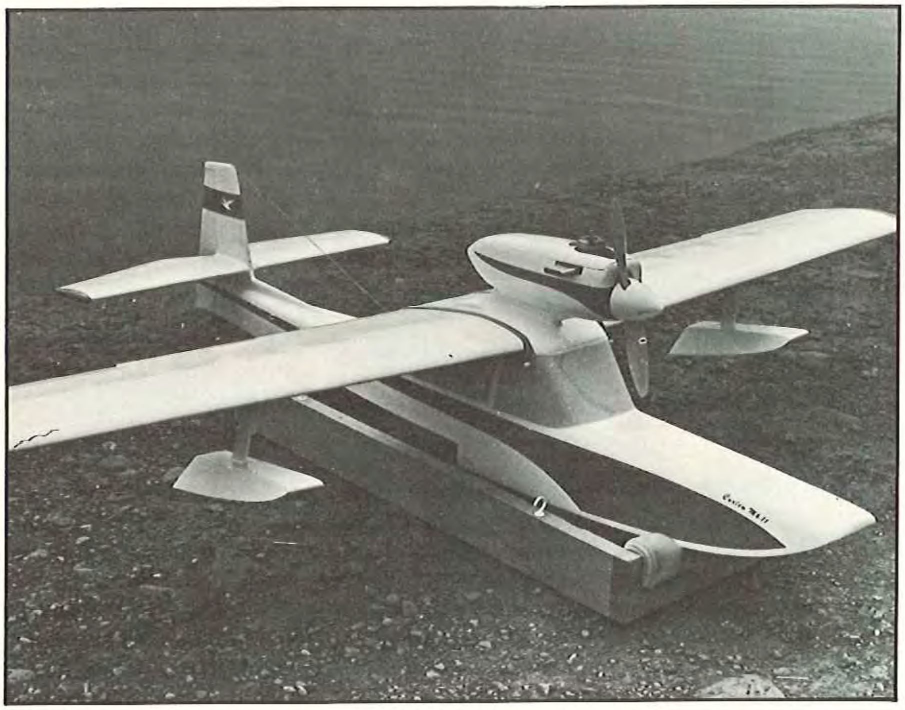

3/8" DOWEL
BALSA BLOCK
5" FIBERGLASS CLOTH & HOBBY POXY ON CENTER SECTION
HOLE FOR AILERON PUSHROD
CUT OUT FOR SERVO
1/16" WIRE PUSHROD
FOAMCORE WING 1/16" SHEETS BALSA
U/C MOUNT BLOCK
3/32" PLY CENTER REINFORCEMENT
T.E. 3/16" BALSA
ROOT RIB
FOAM WING TEMPLATES 1/8" PLAYWOOD
TIP RIB
1/2" TRIANGOLAR PIECES VERTICAL ON BOTH SIDES
5/8" HARDWOOD
BALSA BLOCK
1/2" BALSA-SHEET-HOLLOW AS INSIDE LINE SHOWS
1/32" PLY DOUBLER
1/4" PLY
WING FILLET
TOP BLOCK
1/2" SHEET
1/8" SHEET
1/32" PLY
SECTION "C-C"
1/4" PLY
1/2" TOP SHEET
HARDWOOD ENGINE MOUNT
HOLES FOR FUEL LINES
FIREWALL 1/4" PLY
1/32" PLY
1/8" SHEET
MOUNTING HOLES FOR NOSE GEAR BRACKETS
HOLE FOR THROTTLE PUSHROD
SECTION "B-B"
1/16" PLY
SECTION "A-A"
«« MORRIS 'HF' »»
by GRAZIANO PAGNI
1969 ITALIAN CHAMPION
canopy-end of Du-Bro colored type
2"x2.3/4"x39" TOP BLOCK HOLLOW AS SHOWN
3/8" TRIANGOLAR
1/2" SHEET
2,1/4" VECO SPINNER
HARDWOOD ENGINE MOUNT
12 oz FUEL TANK
BATTERY PACK
RECEIVER
SERVOS
BALSA BLOCK
5/8" SHEET
BALSA BLOCK
0°
C.G.
NOSE GEAR
1/4" PLY
3/32" ply on bottom of center wing to reinforce wing-down loads-
2" DU-BRO WHEEL
2. 1/2" DU-BRO WHEEL

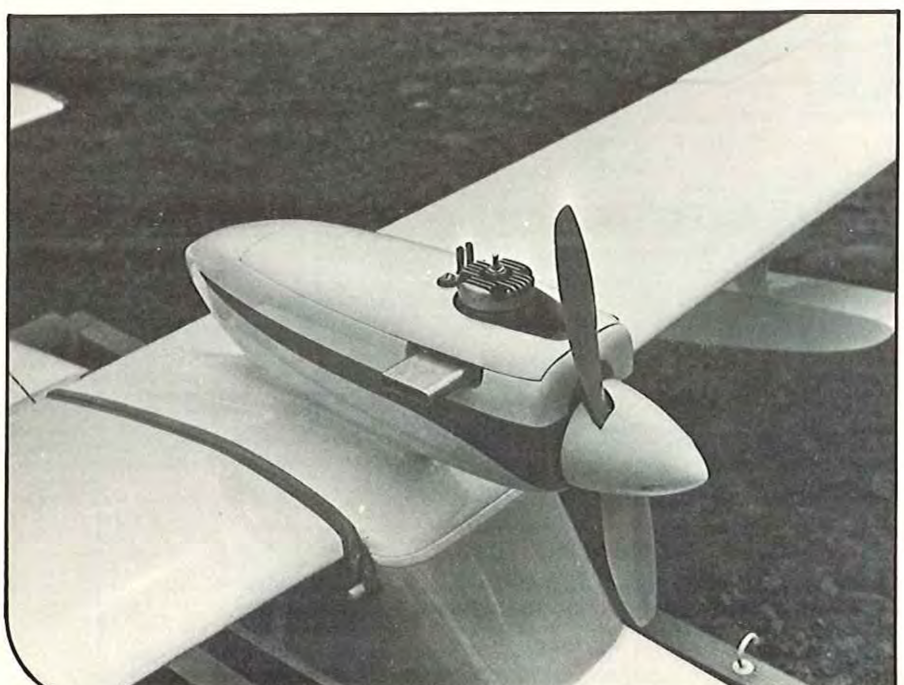

«««MORRIS 'HF'»»
by GRAZIANO PAGNI
1969 ITALIAN CHAMPION
SECTION "A-A"
1/8" PLYWOOD BELLCRANK MOUNT
T.E. CUT OUT AS SHOWN
NOTE: THE WING IS BUILT UPSIDE DOWN ON A PERFECTLY FLAT SURFACE, THUS DIEDRAL IS ON BOTTOM SURFACE ONLY.
1/4" BALSA
3/8" BALSA
BALSA BLOCK
FOAMCORE STAB 1/16" SHEETS BALSA COVERED
NYLON HINGES
3/8" BALSA
elevator horn
1/2" SHEET BALSA ELEVATORS
SOFT BLOCK TIPS
SOFT BLOCK
1/8" SHEET SIDE
TOP BLOCK HOLLOW
1/2" SHEET-HOLLOW
1/8" SHEET
1/32" PLY
SECTION "D-D"
SECTION "E-E"
1/32" PLY
SECTION "F-F"
3/8" BALSA SHEET FIN & RUDDER
NYLON HINGES
TOP BLOCK-HOLLOW AS SHOWN
1/8"x3/8" DIAGONAL BRACING
BALSA FILLETS
3/8" SHEET
ELEVATOR HORN
1/8" SHEET
6/32" SHEET BOTTOM
3/8" TRIANGOLAR LONGHERONS AT FOUR CORNERS
1/32" PLY FROM HERE TO THE END OF FUSELAGE
HOLES FOR ELEVATOR & RUDDER PUSHRODS
0 1 2 3 4 5 6

IN THE AIR, AT A FLYING WEIGHT OF UNDER THREE POUNDS, IT IS CAPABLE OF JUST ABOUT EVERYTHING IN THE BOOK.

curlew

BY SCOTT CHRISTENSEN





If you are the same type of modeler I am, you will rarely, if ever, find exactly what you are looking for in a kit. Too big, too small, never quite what you had in mind. Well, if your interests take a turn towards seaplanes, you are really in a jam! To the best of my knowledge there are only, at the most, four seaplane kits in various stages of availability. None of these flying-boat designs with the exception of one .09 powered bird, is of the "small field" (or small lake) type, the balance being .45 to .60 powered ships.

What I really wanted though, was a flying-boat type seaplane that could turn in a good performance using .19 to .29 size engines. This size of aircraft is quite popular these days and with the new, lightweight radio systems now available, full-house operation is very practical. Secondly, I wanted this ship to be attractive, easy to build, sturdy and innovative. I honestly believe, after building and flying two Curlews, that I have succeeded.

Obtaining useful information on R/C seaplanes, their design and operation is, at best, exasperating! Practically the only available data is that which can be gleaned from various construction articles that appear in model magazines. Since there is no real definitive R/C seaplane design data available, one either copies an existing design or forges ahead, leaning heavily on experience and common sense. I think the R/C seaplane is making a bid for popularity within the R/C community and that, as a result of this, many new-breed designs will be appearing in the near future. Along with these new designs could come such events as pylon racing (Schnieder Cup style?), pattern, scale etc. . . . the possibilities are exciting and probably fairly realistic.

The first Curlew was designed,

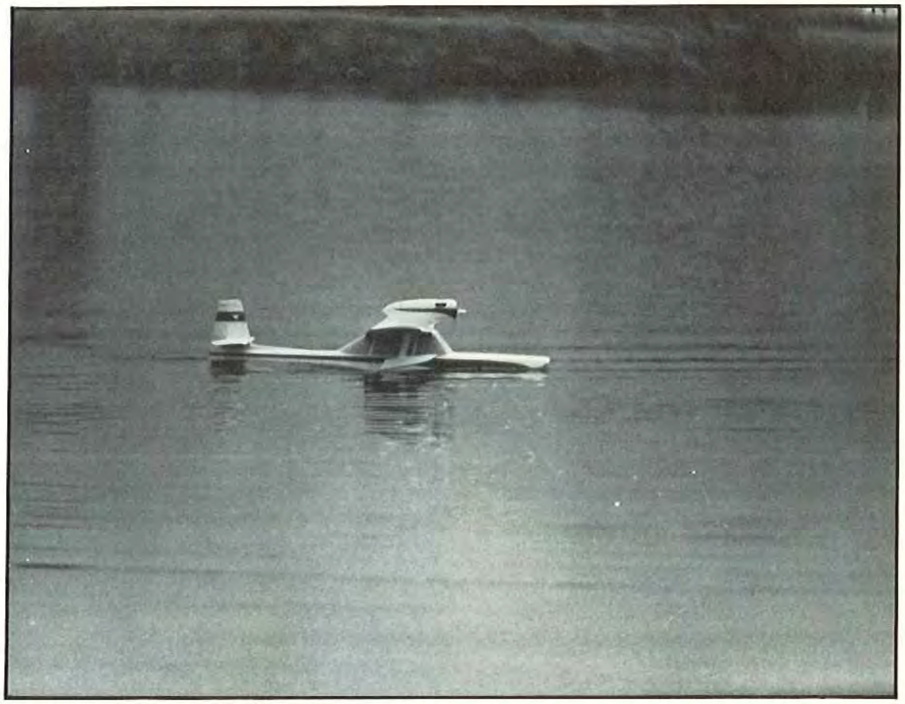
mark II

DESIGNED FOR .19 TO .29 ENGINES, THE CURLEW MK II EMPLOYS A UNIQUE HULL DESIGN THAT MAKES TAKE-OFFS AND LANDINGS A JOY.

built, and flown about a year ago. I would like very much to tell you that it flew off the board but I'll be honest and tell you that it took a month and a half of constant modification and test flying to get it to the point where it was a consistent performer. However, when the mod's were complete, the Curlew proved to be an outstanding seaplane. Because of the hull design, take-offs and landings were a joy. In the air – at a flying weight of 2 pounds and 13 ounces – it was capable of just about everything in the book.

The Mk. II version is a distillation of all of the modifications and improvements made to the original plus slight construction modifications to lessen weight, increase strength and enhance the appearance. I honestly do not feel that the Curlew Mk.II would make a good first R/C ship – it's fast, nimble and goes exactly where it is aimed. But, I am confident that this ship would make an excellent first R/C seaplane for the pilot who has some R/C flying under his belt.

If you have taken a look at the plans, I'm sure you noticed that a cross-section of the fuselage, forward of the step, is an inverted "V". The information on this hull design was obtained from a construction article authored by Mr. Willem Aarts of Holland. The theory behind this hull was intriguing and, as I later found out, quite successful on several full scale seaplanes built during the 30's and 40's. Mr Aarts explains how this hull works much better than I ever could but, in essence, the inverted "V" hull section performs two functions: (1) It literally swallows its own bow wave by funneling the passing water into the center of the hull which, in turn, (2) pushes the hull out of the water and onto the step. At this point the hull is acting very similar to a



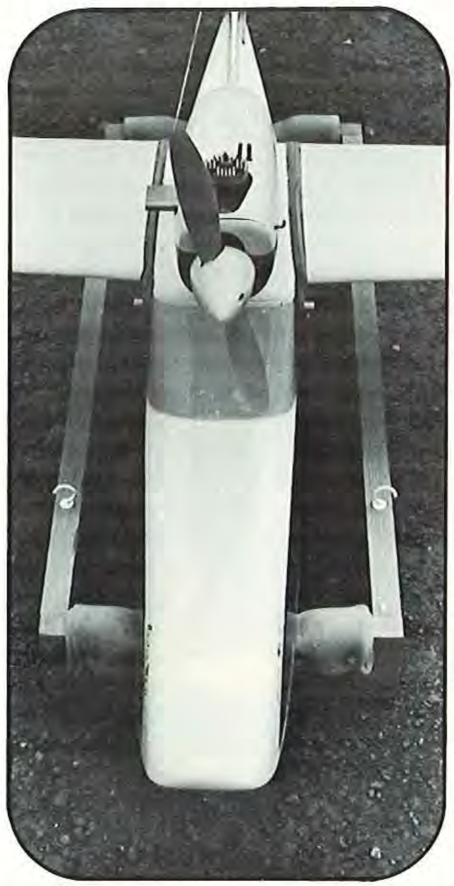
racing-type hydroplane that is up on its sponsons, which is the optimum speed mode for the hydro and, in the Curlew's case, the optimum position to be in for take-off. This entire sequence of events takes place very quickly, allowing the Curlew to take-off from a standing start in 20 to 30 feet. I have studied slow motion films of the Curlew – shot with a telephoto lens – during its take-off runs and everything that I have told you about this hull really happens! The complete absence of engine-killing bow waves is almost uncanny as is the aircraft's ability to leave the water so quickly and in such short distances. As if there was not enough incentive to build this type of hull, there is still another plus, and that is the extreme stability that you have at high speeds on the water, such as take-off and landing speeds. This is due to the sponson effect on each side of the hull.

You can certainly build the Curlew using a conventional stabilizer and elevator set-up. It will fly just as well except in the inverted maneuvers. But there is a great deal to be said for using a "flying stab" or stabilator. First, the flying stab used on the Curlew is easier to build, lighter and uses less area than conventional stab and elevator systems. The flying stab also offers you instant dynamic flight trim which, in turn, eliminates the need for leading or trailing edge shims (the use of shims in a flying-boat type aircraft may lead to areas of potential water leakage through the fuselage/wing seals). You really ought to give it a try. The system that is depicted on the plans has been completely flight tested and has proved to be extremely strong, smooth, and vibration free.

If I've managed to hold your interest so far, you probably are interested, but not quite convinced, because you heard "somewhere" that water is not good for your radio. Did you know that prolonged exposure to dust, spent fuel, and bits of gravel and weeds are just as, if not more, harmful to your radio? "But, my airplanes are sealed to avoid those hazards," is the standard reply. Well, friend, you can bet your sweet life that seaplanes need the same treatment with just a few precautions thrown in. The Curlew has requirements for four openings in its fuselage; the biggest is that area covered by the wing, the second is the outlet for the rudder control, the third is the on/off switch location and the last is the antenna exit. Protection against water leakage in these four areas are simple; a good quality of fuse-seal around the top of the fuselage; the use of NyRod for the rudder; and an internally mounted switch with a 1/16" wire push/pull extension through the side of the fuselage. Exit the antenna through the highest possible point in the fuselage and pass it through a piece of slightly over-size tubing filled with Vasoline.

Does that sound familiar – it ought to because most of you do the same thing to your land-based aircraft!

There is one last precaution that I take with my seaplanes that I feel is worthy of note. I make it a rule to never mount any of the radio gear in such a manner as to allow it to stand



in any place where water might pool inside the fuselage. Servos are mounted up on the fuselage sides with servo mounting tape. The receiver and batteries are raised up off the fuselage floor with ½" foam rubber. The switch is mounted as high up inside the fuselage as possible and, finally, during construction, the radio compartment receives a liberal coat of surfacing resin. That's all there is to it and as long as your seaplane flying is restricted to fresh water, I can practically guarantee no more radio problems that you would encounter with land-plane flying. If you must operate in salt water, I would strongly recommend the use of an "all-dry" plexiglass canister for the entire radio system, and even then, you are taking a big chance.

When built per the plans, your Curlew Mk. II will quickly introduce you to an entirely new dimension of R/C flying. Lots of take-off and landing room on a surface that is never dusty and a seaplane that is capable of just about anything you might want it to do.

GENERAL CONSTRUCTION NOTES

It really pays to look over the plans carefully. At the same time, have the "how-to" text of the article handy for reference. Many times the plans will clear up what the text didn't mention and vice versa.

Choose your wood carefully. Try to match, in weight and density, all of those pieces of wood that will oppose one another – spars, ribs, sheeting, fuselage sides, etc. . . . this small extra effort will help ensure that you finish up with a well-balanced model.

I would recommend avoiding the use of white glues in the construction of the Curlew. I used Ambroid for the general construction and epoxy for critical stress areas (ply-to-balsa joints, engine pod, dihedral braces, etc. . . .).

Cut out your fuselage sides from medium 3/32" balsa sheet. Note that the top part of each fuselage side (upper cabin area) is a separate piece of 3/32" balsa sheet, that is butt-glued to the top of the lower fuselage side. Make sure the wing saddle incidence angle shown on the plans is duplicated on each of your fuselage sides. Lay the completed fuselage sides on your work surface with the inside of each facing up. Glue in the 3/16" square balsa wing saddle longerons, letting ¾" of them extend out in front. At this point fabricate all of the fuselage formers – F-1 through F-10. Be sure to draw a centerline on each of the formers as this will be handy for fuselage alignment later.

Cut out your fuselage doublers from medium 1/16" balsa sheet. Note that these doublers are trimmed to fit inside of formers F-4, F-6 and the 3/16" square wing saddle longeron. Using contact cement or smeared Ambroid, laminate doublers to their appropriate fuselage sides. Pin the whole thing down as flat as possible and let it dry completely.

Framing of the fuselage sides is next. But first, put the two fuselage sides together and "match" them using a sanding block. Now, using a triangle, mark the exact location of each former on the inside of each fuselage side. Using the formers as guides, start at the nose, working aft and complete the framing. Note that 3/16" x 1/16" balsa is used forward of F-6 and that 1/8" square balsa is used aft of F-6.

You can now epoxy formers F-4, F-5 and F-6 in place making very sure that everything is square and aligned. Working forward, install formers F-3, F-2 and F-1, again making sure that the fuselage sides are aligned with each other. Let this assembly dry completely. When dry, install formers F-7, F-8, F-9 and F-10.

Glue in F-5A and the 1/8" square spruce longeron that runs from the center of F-5A to F-10. Now sheet the fuselage from F-5A to F-10 with medium 1/16" balsa sheet. O.K., let's tackle the sheeting of the hull forward of the step. This is accomplished by using 3 pieces of medium hard 3/32" balsa sheet. Before we begin though, bevel the fuselage sides inward to match the inverted "V" angles of the five forward formers. You will notice that this beveled angle increases toward the nose. Start the sheeting by epoxying the triangular forward center piece in place from F-1 to F-3. Now, carefully fit and install the two remaining pieces of sheeting. Dampening the outside surface of each piece will help negotiate the twist and bend that is required. Use pins and masking tape to hold the whole thing in place and let it dry completely.

Choose a very soft piece of ½" balsa sheet for the forward (and later aft) decking. Rough cut it to shape. Before you permanently mount this decking, mix up a batch of your favorite surfacing resin or some Formula II epoxy and coat the interior of the cabin area and the radio compartment. At the same time, lay in ½" wide strips of lightweight glass cloth on the floor of the hull between formers F-3 and F-4; also between F-4 and F-5. These strips go over the inside centerline seam of the floor and greatly strengthens an otherwise weak area. Now hollow out the ½" forward balsa decking as shown on the plans and glue in place. This is followed by the noseblock which was first rough-cut to shape. When this assembly has set-up and is workable, find a place to whittle and sand, grab a razor knife and a sanding block and go to it. Do all of the shaping on the decking and noseblock and sand to final shape.

When the nose and forward decking are sanded to your liking, you can then add the forward windshield. A piece of 3/16" balsa sheeting is epoxied between the two 3/16" square wing saddle longerons and up against F-4. The windshield consists of 3/32" sheet applied in three pieces to negotiate the corners.

Before we can go any further with the fuselage construction (all that remains is the aft decking and the aft windshield) it will be necessary to build the tail group. So, since the fuselage will be out of action for awhile, now is a good time to fiberglass the bottom, forward of the step. I used Sig polyester resin and their lightweight glass cloth. Fiberglass the entire area from the step to the nose. Set it aside, you can sand it off later.

FIN, RUDDER, AND STABILATORS

The two stabilator halves are built first. Their construction is conventional, the only deviation being the female receptacle tube (¼" I.D. by 11/32" O.D. fiberglass pushrod stock) that is epoxied through the stab ribs as shown on the plans. The stabs can be built completely, right up to the top forward sheeting – at this point stop, because we will soon need access to that tube.

The fin can now be built right over the plans and is also a straight forward structure. You will notice on the plans that 1/16" ply or spruce is used to sheet the lower half of each side of the fin. Tack glue one side of the lower fin so that you can easily pull it off again. Now, build the rudder. Note the pieces of 3/16" balsa scrap inserted into the lower portion of the rudder (see cross-section E). These carry through the bulge created by fuselage former F-10.

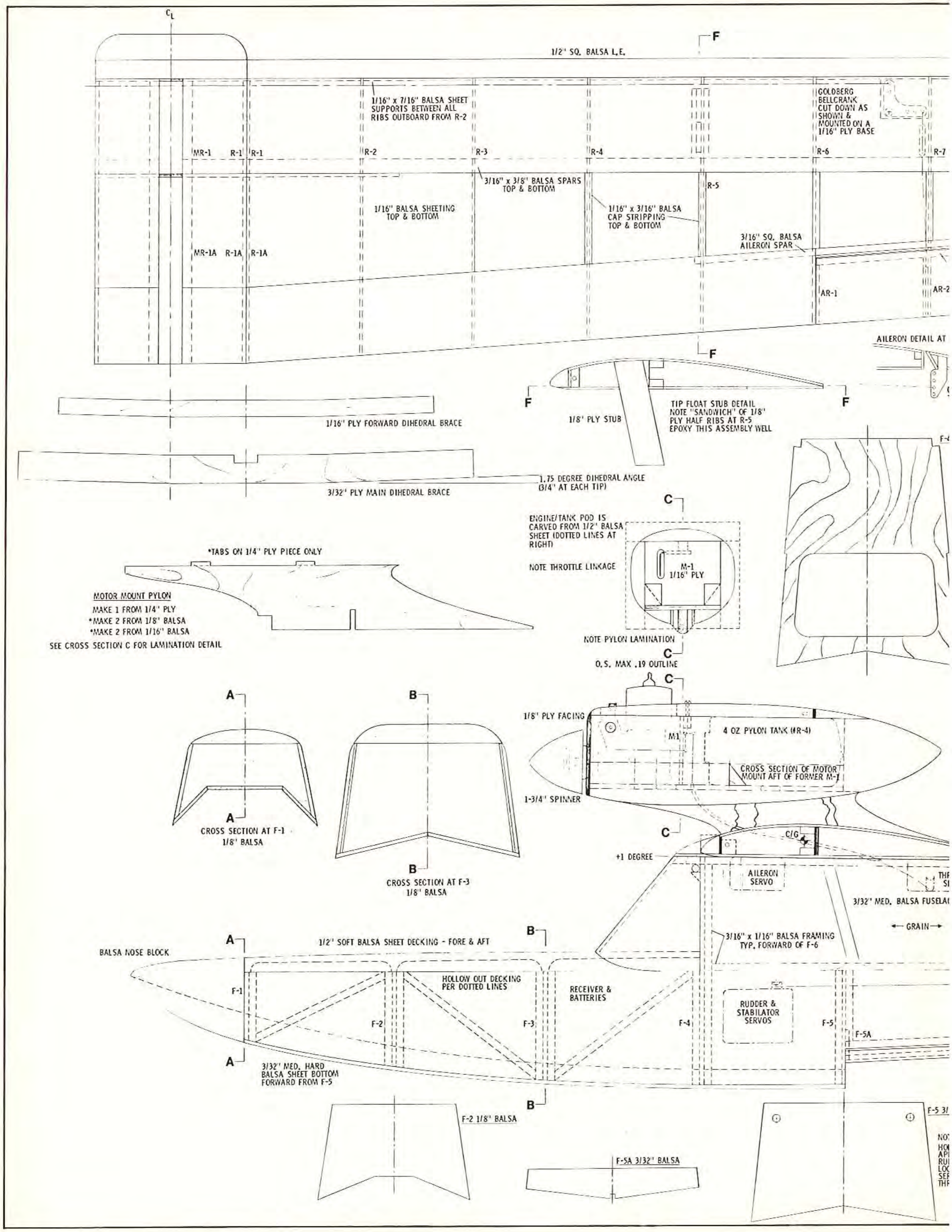
Mark the location for drilling the ¼" O.D. stabilator drive mechanism hole on the side of the fin. I would strongly suggest the use of a drill press to drill this hole, as absolute true alignment is necessary. Now, make your drive mechanism and horn. I made mine from ¼" O.D. pushrod stock that was selected on the basis that it was a firm, not tight, slip fit into the ¼" I.D. female tubing used in the stabilators. Use a slightly longer piece of this ¼" O.D. tubing than is necessary. Find the exact center of the tubing and slip your 1/8" ply or phenolic horn onto the tubing, over the center point. Now, drill a tiny hole (a pin hole is adequate) through the horn, tubing, and out the other side of the horn. You can now lock the horn in place by inserting a length of wire through the holes, crimping it on each side and placing a drop of epoxy on each end. You will notice that the horn moves freely lengthwise – no sweat, once it's inside the fin it won't be going anywhere.

After shaping the leading edge of the fin to shape, remove the tack-glued lower fin panel, insert the stabilator drive mechanism and re-glue the panel permanently back in place.

You are now ready for final assembly of the tail group and I would suggest that you familiarize yourself with cross-section D on the plans. First, make yourself two rough and oversize stab "fillets." These are made by laminating a piece of 1/8" ply or spruce onto a piece of 3/32" balsa sheet. Once again, back to the drill press. Drill each fillet with a hole large enough to accept a piece of the ¼" I.D. female tubing as used in the stabs. Epoxy a slightly longer piece of this tubing into each of the fillets leaving a little exposed on each side. When dry, sand off the excess tubing flush with each side of the fillet.

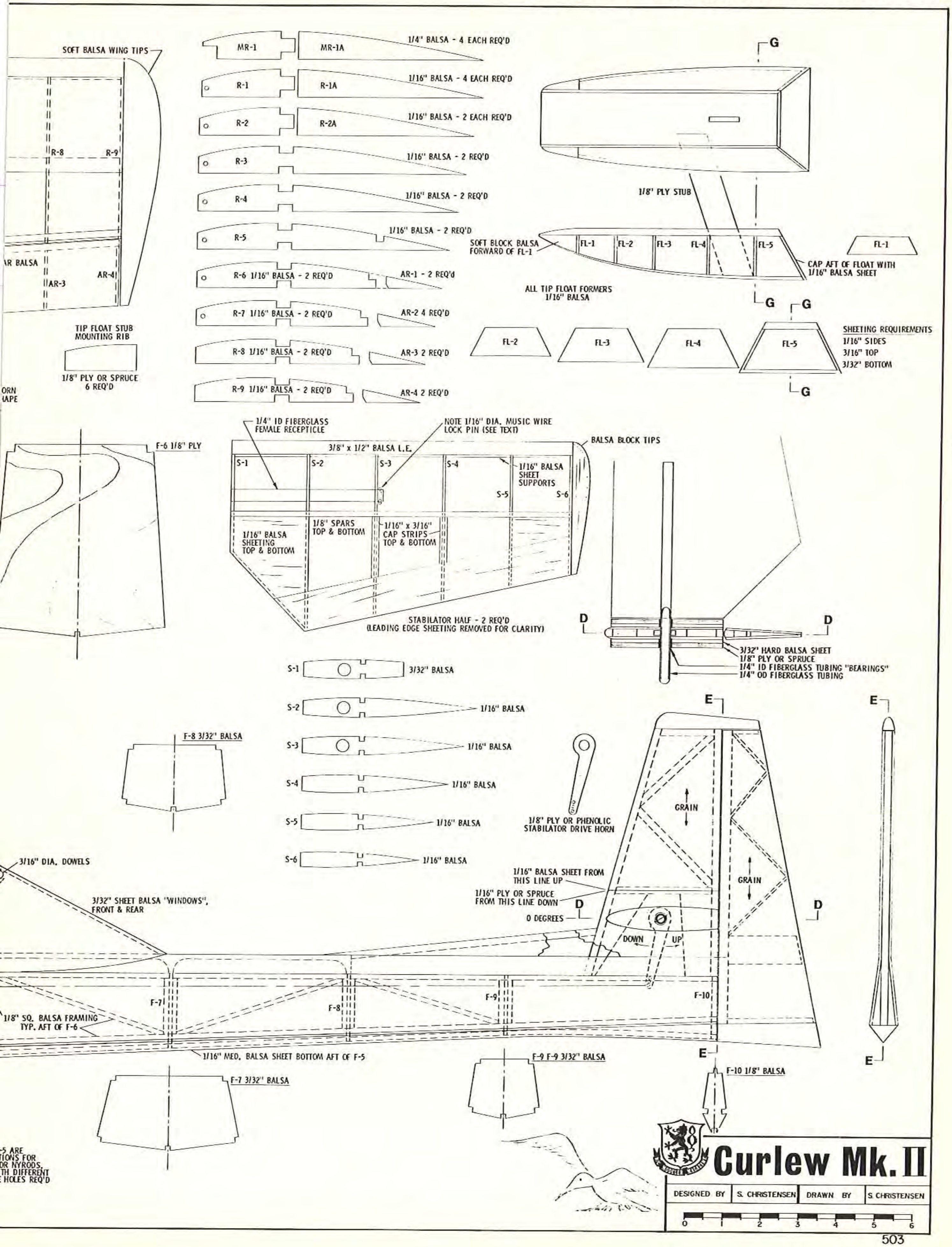
Now insert the still rough-shaped fillets over the protruding ends of the

to page 86



C L
1/2" SQ. BALSA L.E.
F
1/16" x 7/16" BALSA SHEET SUPPORTS BETWEEN ALL RIBS OUTBOARD FROM R-2
GOLDBERG BELLCRANK CUT DOWN AS SHOWN & MOUNTED ON A 1/16" PLY BASE
MR-1
R-1
R-1
R-2
R-3
R-4
R-6
R-7
3/16" x 3/8" BALSA SPARS TOP & BOTTOM
R-5
1/16" BALSA SHEETING TOP & BOTTOM
1/16" x 3/16" BALSA CAP STRIPPING TOP & BOTTOM
3/16" SQ. BALSA AILERON SPAR
MR-1A
R-1A
R-1A
AR-1
AR-2
AILERON DETAIL AT
1/16" PLY FORWARD DIHEDRAL BRACE
1/8" PLY STUB
TIP FLOAT STUB DETAIL NOTE "SANDWICH" OF 1/8" PLY HALF RIBS AT R-5 EPOXY THIS ASSEMBLY WELL
3/32" PLY MAIN DIHEDRAL BRACE
1.75 DEGREE DIHEDRAL ANGLE (3/4" AT EACH TIP)
ENGINE/TANK POD IS CARVED FROM 1/2" BALSA SHEET (DOTTED LINES AT RIGHT)
NOTE THROTTLE LINKAGE
M-1 1/16" PLY
NOTE PYLON LAMINATION
*TABS ON 1/4" PLY PIECE ONLY
MOTOR MOUNT PYLON
MAKE 1 FROM 1/4" PLY
*MAKE 2 FROM 1/8" BALSA
*MAKE 2 FROM 1/16" BALSA
SEE CROSS SECTION C FOR LAMINATION DETAIL
O.S. MAX .19 OUTLINE
1/8" PLY FACING
4 OZ PYLON TANK (#R-4)
M1
CROSS SECTION OF MOTOR MOUNT AFT OF FORMER M-1
1-3/4" SPINNER
CROSS SECTION AT F-1 1/8" BALSA
CROSS SECTION AT F-3 1/8" BALSA
C/G
+1 DEGREE
AILERON SERVO
3/32" MED. BALSA FUSELA
← GRAIN →
3/16" x 1/16" BALSA FRAMING TYP. FORWARD OF F-6
1/2" SOFT BALSA SHEET DECKING - FORE & AFT
BALSA NOSE BLOCK
HOLLOW OUT DECKING PER DOTTED LINES
RECEIVER & BATTERIES
RUDDER & STABILATOR SERVOS
F-1
F-2
F-3
F-4
F-5
F-5A
3/32" MED. HARD BALSA SHEET BOTTOM FORWARD FROM F-5
F-2 1/8" BALSA
F-5A 3/32" BALSA

FULL SIZE PLANS AVAILABLE – SEE PAGE 110



BY DON DEWEY AND BERNIE MURPHY

building the BELL HUEY COBRA r/c helicopter

PART II

LEAD PHOTO OF BELL HUEY COBRA R/C HELICOPTER BY JERRY BEASLEY

Last month (July '72 RCM), we began construction of the radio controlled model of the Bell Huey Cobra, which was designed by Dieter Schluter in Germany.

Our kit was purchased from Model Helicopters, 14695 Candeda Place, Tustin, California 92680, and they are readily available from this source.

In Part 1, we covered the assembly of the engine, fan and clutch, assembly of the transmission, assembly of the tail rotor and gear box, and installation of the bulkheads and tail rotor drive tubes in the fuselage. While we recommend the use of the German-made Veco .61, it should be noted that other engines will work, PROVIDED, that they have a 1/4-28 threaded shaft in order to mate with the fan and clutch assembly, and, of course, have enough power.

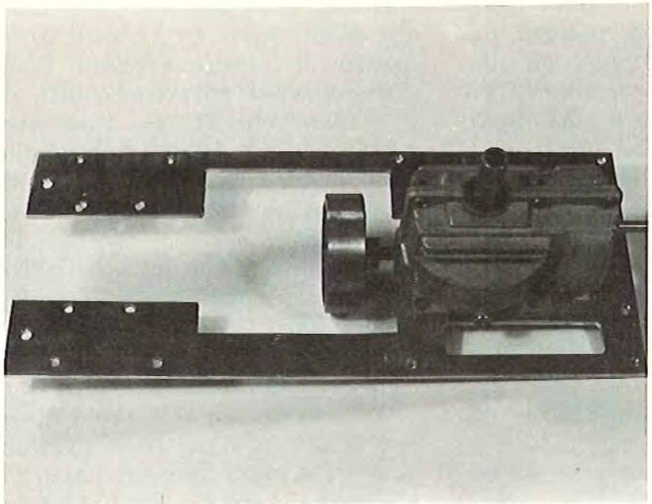
MOTOR AND TRANSMISSION ASSEMBLY

The assembly of the motor and main transmission constitutes the "heart" of the helicopter. First, locate the aluminum motor plate (01.14) and carefully remove any burrs with a small flat file, and a fine rat-tail file. Lay the plate down, with the more narrow side to the right, when viewed as if you were sitting in the cockpit of the helicopter. Study the photographs accompanying this article for the proper location of the mechanical sub assemblies on the motor plate. Mount the transmission, using four M3 x 15mm slotted head steel screws and M3 steel nuts. Now, carefully position your German Veco .61, with the fan and spring clutch attached, on the motor plate. Shim the engine with the supplied 3mm engine spacer to raise the engine sufficiently to align properly with the clutch housing (01.06). Carefully mark and drill the engine mounting holes. Slip the fan belt (01.07), used for starting, over the starting pulley, and mount the engine to the motor plate, using four M3 x 15mm Allen head steel screws (01.12) and M3 stop nuts (01.13). Alignment of the engine and transmission must be done carefully, as any misalignment will cause excessive wear on the clutch needle bearing (01.08). Next, file and sand the lower fiberglass fan housing (01.11) so that it fits snugly into the cut-out on the motor plate. Temporarily position the fiberglass lower housing so that the fan blades clear the interior of the housing. Now, mix up some Stabilit Express (No. 1 cup) and bond the fiberglass lower housing to the motor plate. When this has cured, position the fiberglass upper fan housing over the engine and the lower fan housing and check for clearance of the fan blades. Now, using your grease pencil, mark the cut-outs that it will be necessary to make in the upper fan housing. These will include a "half circle" cut-out around the glow plug, a ¾" diameter hole for access to the needle valve settings on the Perry carburetor, a 3/16" diameter hole to allow your fuel line to pass through the upper fan housing, and on the other side of the fiberglass housing, a large cut-out to allow clearance for your Veco muffler.

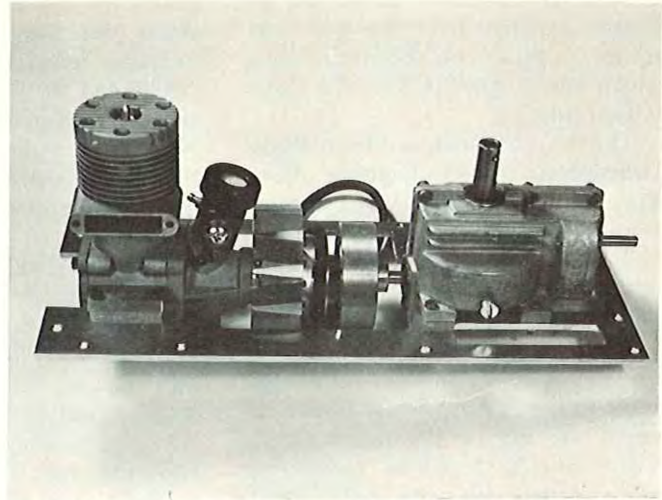
Make sure that there is at least 10mm clearance completely around the muffler, so that the fiberglass will not be scorched by the heat of the muffler. Install a Perry air cleaner on your carburetor, and then drill a hole in the top of the fiberglass housing for a short length of 1/8" I.D. brass tubing which will be inserted into the hole, and epoxied with Stabilit Express. This piece of tubing will come down to within 3/16" – 1/4" of the top of the Perry carburetor, and will extend approximately ¾" out the top of the fiberglass housing. This will be the connection point for the tubing, through which you will be able to prime your carburetor from outside the helicopter. Now, take the needle valve that comes with the engine, and attach a length of .045 music wire, approximately 6" long, to the small brass fitting supplied with your German Veco engine. Solder these parts together to provide a needle valve extension which will extend outside of your Huey Cobra fuselage. Next, take a Du-Bro wheel collar and file both ends of the wheel collar until the plating has been removed and the brass is completely exposed. Run a drill through the center of the wheel collar to remove the plating on the interior. To the top of this wheel collar, solder a terminal lug with a length of stranded wire soldered to it. Attach the collar, with lug and wire, to the tip of your glow plug, using the set screw to hold it in place. Another length of wire with a solder lug attached will be mounted to one of the rear crankcase bolts, or engine mounting lugs, to serve as a ground. These wires will be used to connect to a phono jack in the side of your helicopter for glow plug battery attachment. If you so desire, you could plan to install a micro switch in the side of the helicopter and use a nickle cadmium glow plug battery in the nose of the helicopter, since that area will require additional ballast anyway. When all of the modifications have been made to the upper fiberglass housing, secure it to the motor plate with four steel screws and nuts (01.02/.03). Once again, check the "heart" of the helicopter to assure alignment of the parts, otherwise the clutch may not function properly when the engine is started. We advise

text continued on page 76

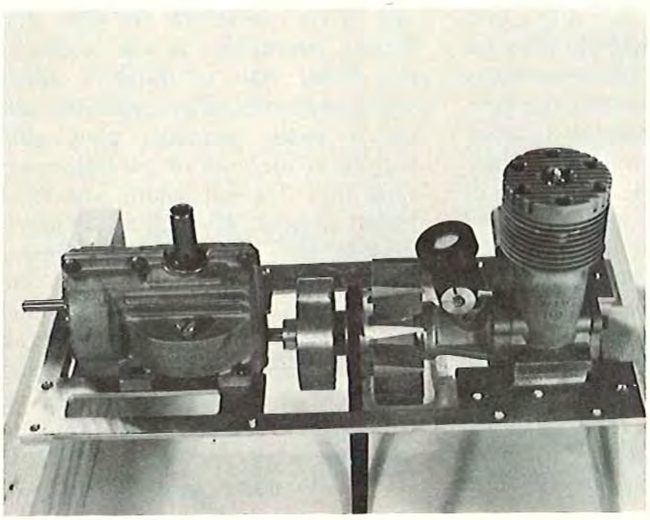
RCM's prototype Bell Huey Cobra being test flown by Bernie Murphy. Note training gear on 14 lb. helicopter.



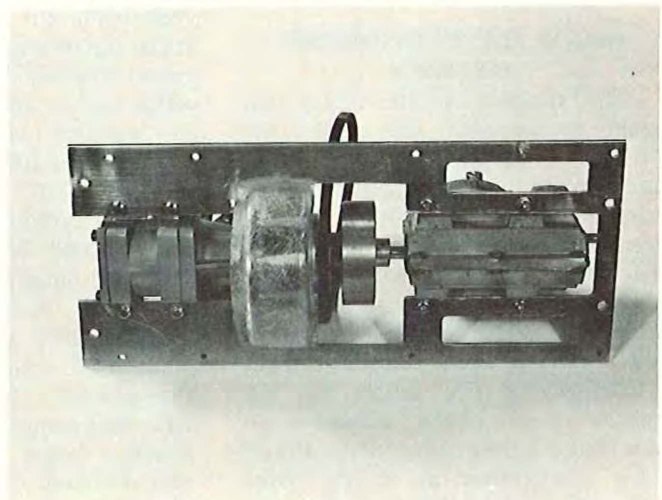
Completed transmission mounted to the aluminum baseplate. Holes for mounting the engine have been drilled.



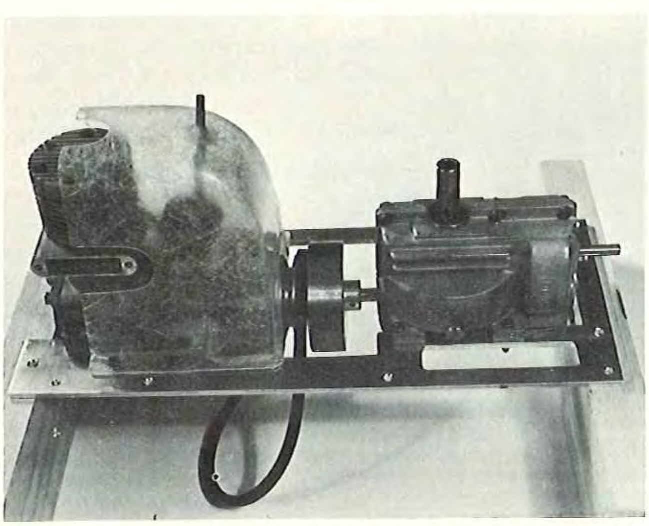
Engine/fan/clutch assembly mounted to the baseplate using 3mm spacers under the mounting lugs. Belt is also installed at this time. Engine and transmission must be aligned carefully to insure proper clutch operation. Carburetor air cleaner a must.



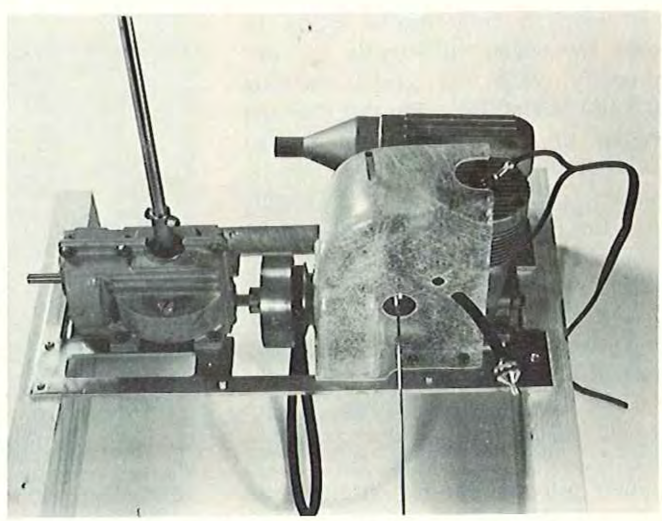
Lower fan housing fitted to motor plate and under impeller blade.



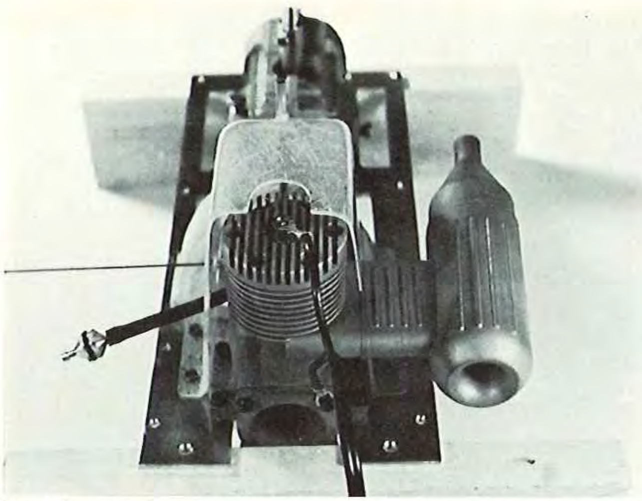
Housing is held permanently in place with Stabilit Express.



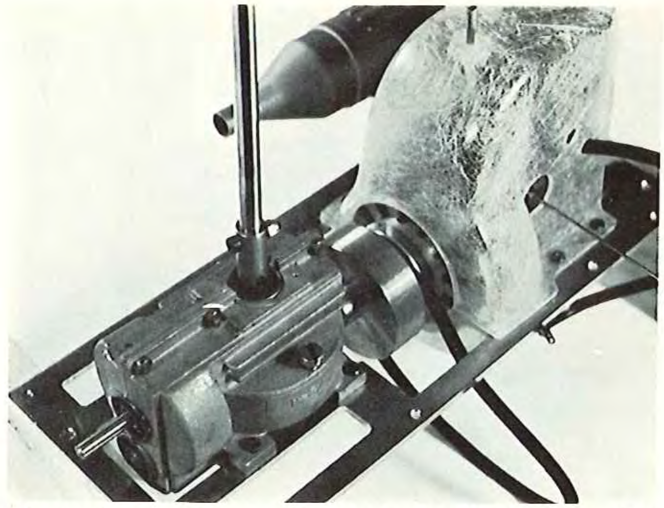
Left side of upper fan housing trimmed to clear muffler. Clearance for glow plug cut in top. Prime tube in place.



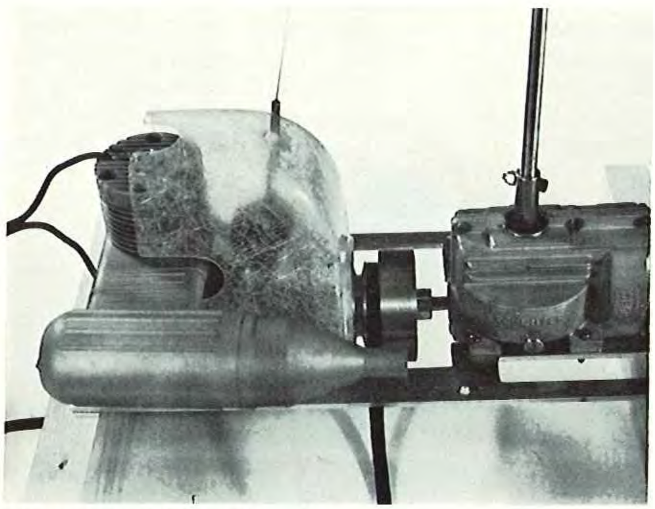
Completed "Heart." of the Cobra. Needle valve and extension, plug connection, muffler and main rotor shaft installed.



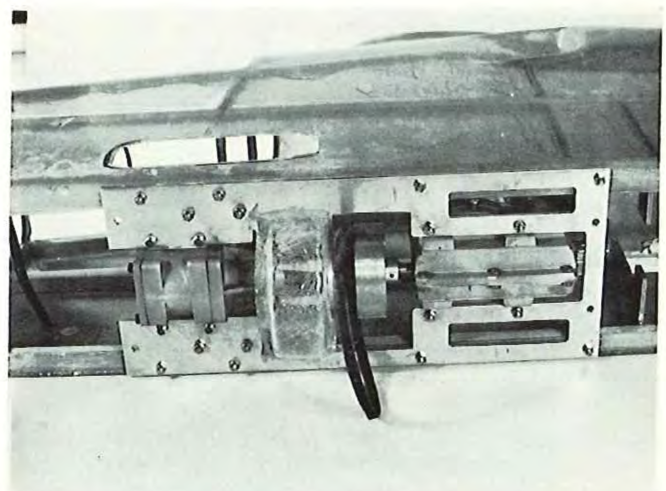
Plug wires attach to crankcase screw and collar fitting on plug.



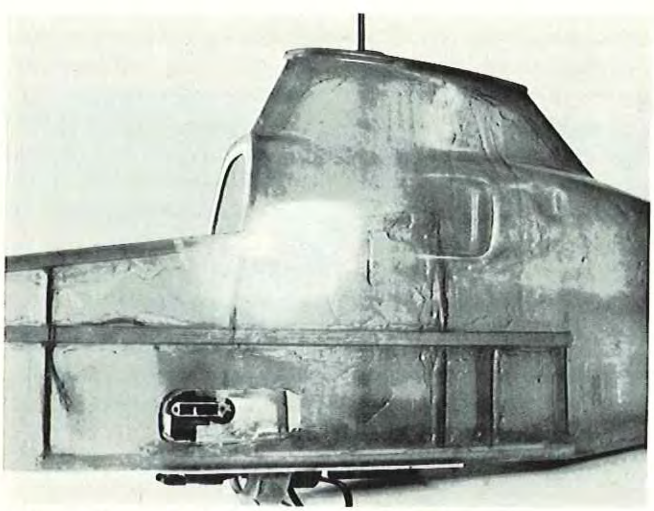
Allen head screw and stop nut hold main rotor shaft into drive shaft coupling.



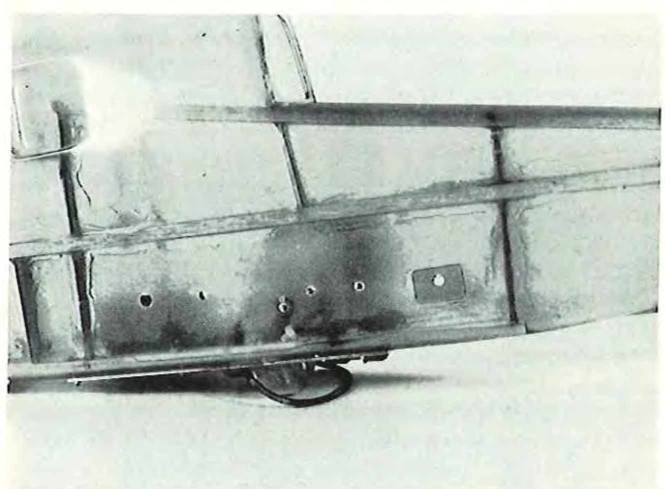
Adequate clearance around muffler a must.



Completed drive unit mounted onto bottom longeron("C").

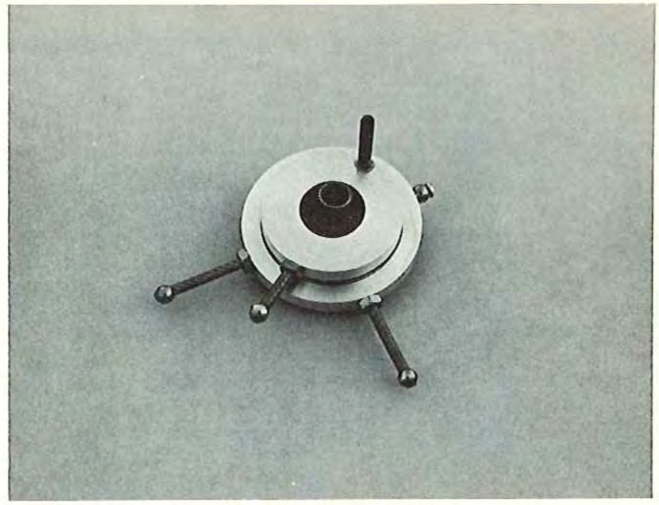


Muffler opening rough cut into left side of fuselage.

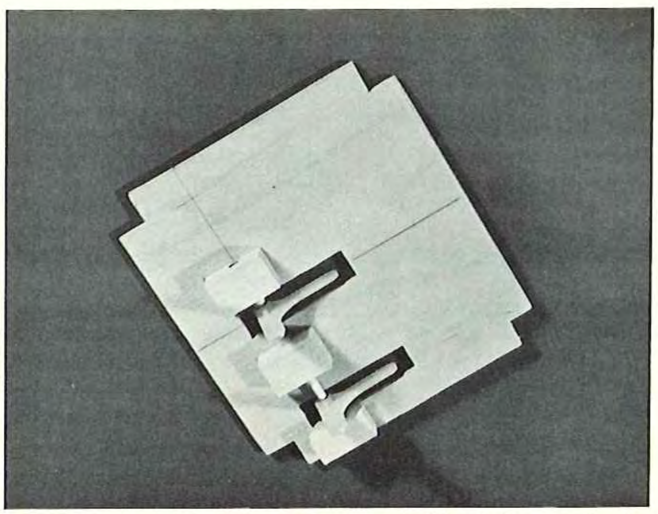


Holes for fuel valve, fill nipple, carburetor, muffler screw access, and glow plug jack located in right side of fuselage.

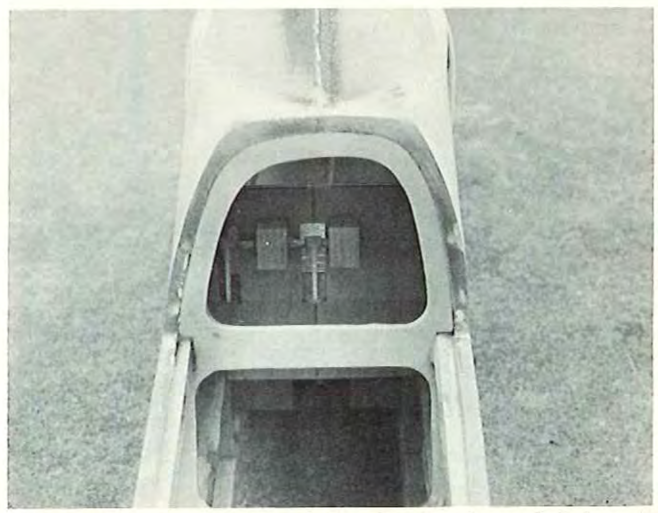
Drive installation as it appears from the cockpit.



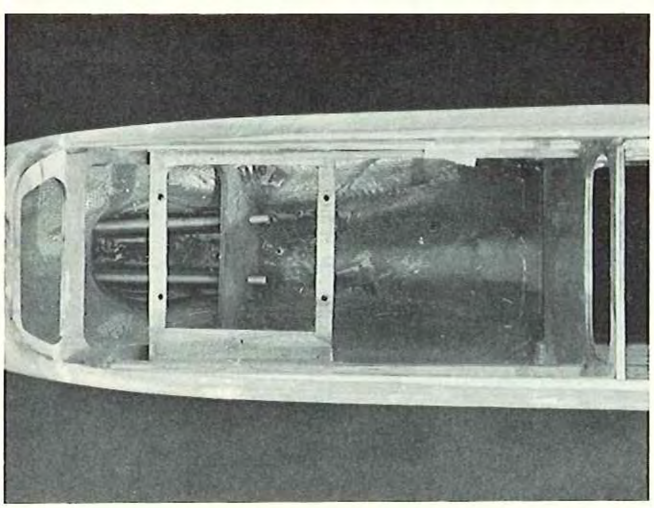
Swash plate assembly with control arms installed.



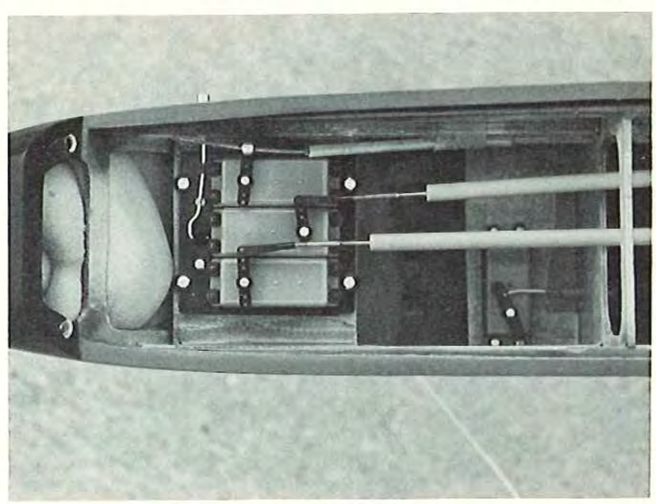
Bellcranks mounted to original servo bulkhead for swash plate control.



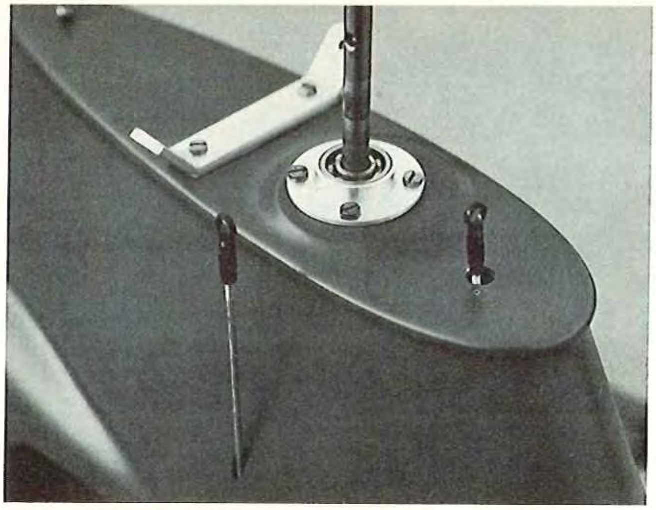
Bellcrank bulkhead glass resined into place just forward of the main rotor shaft.



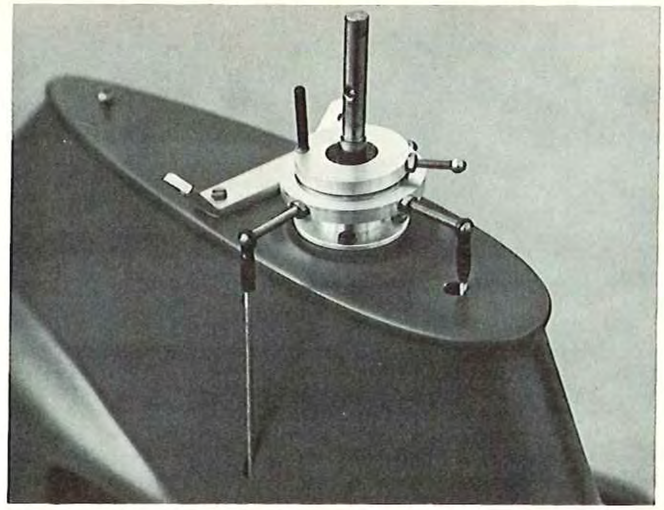
Forward servo tray fitted and glassed into place.



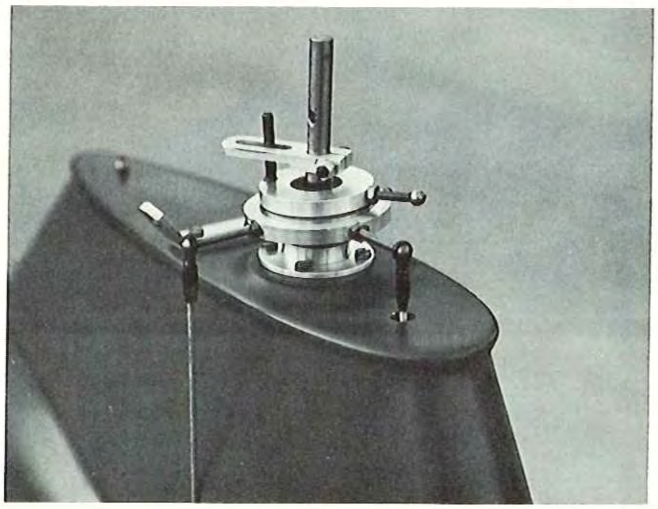
Completed radio installation. Battery packed in nose, receiver under servos. Fiberglass arrow shafts provide flex-free pushrods to swash plate bellcranks.



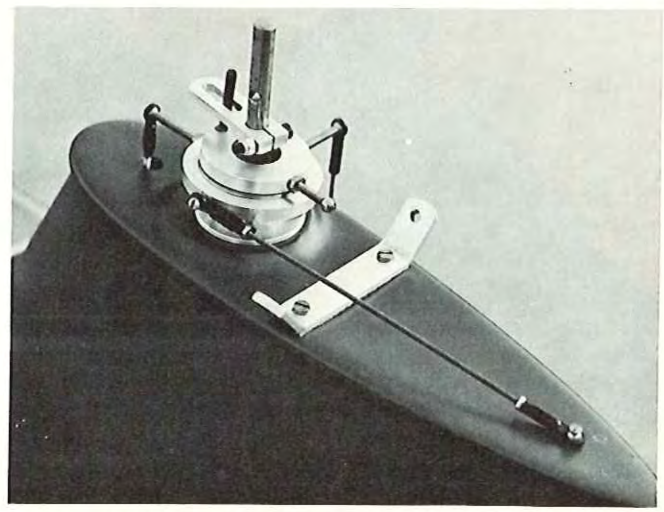
Main rotor mounting ring on top pylon, and "Missing Link" connections from bellcranks.



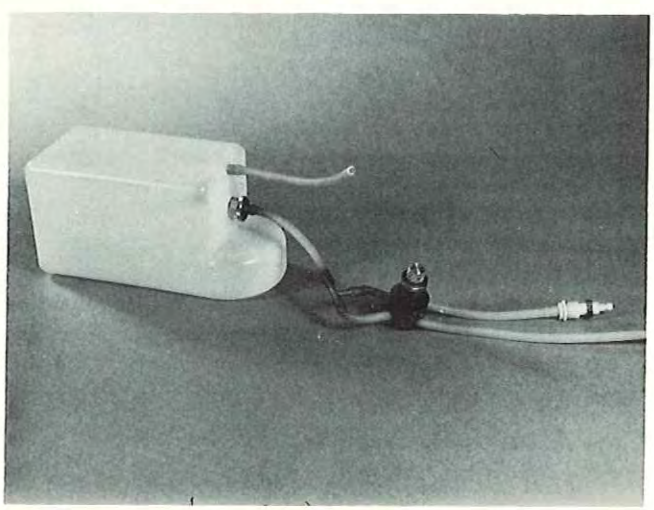
Swash plate in place on main rotor shaft.



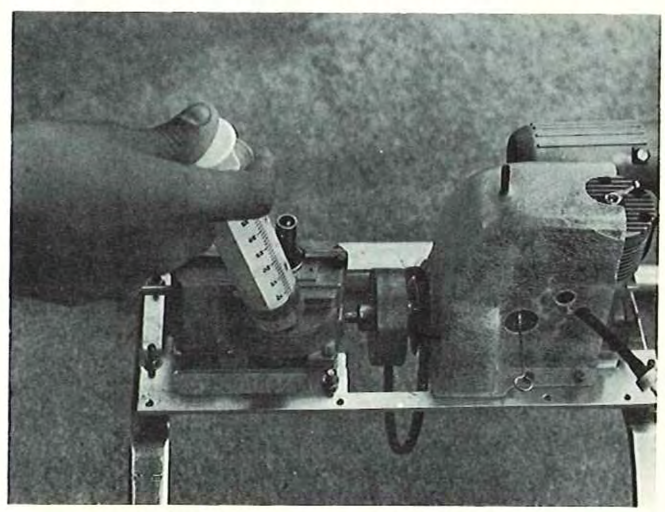
Swash plate driver holds swash plate in position on shaft, as well as driving the upper ring.



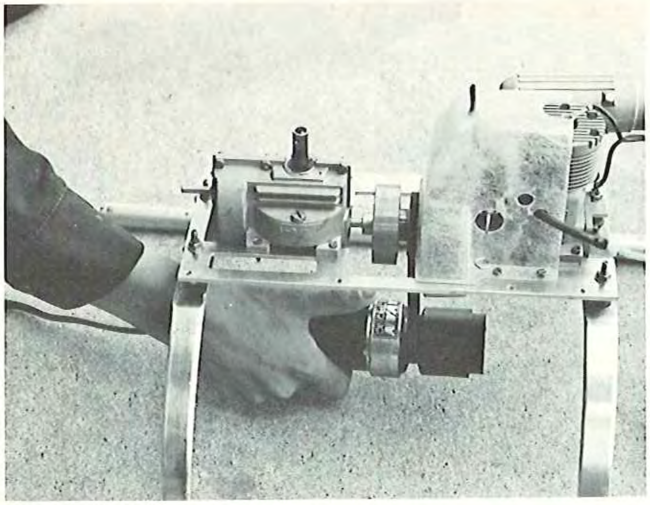
Anti-torque rod prevents the lower swash plate ring from rotating.



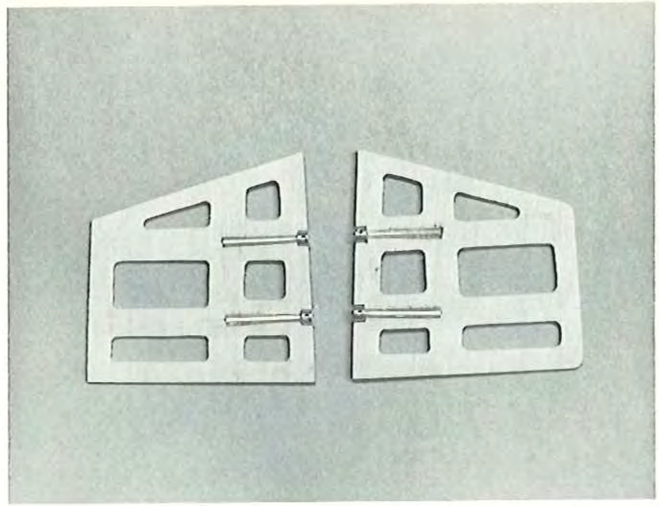
Kraft-Hayes tank with fuel valve and fill nipple installed.



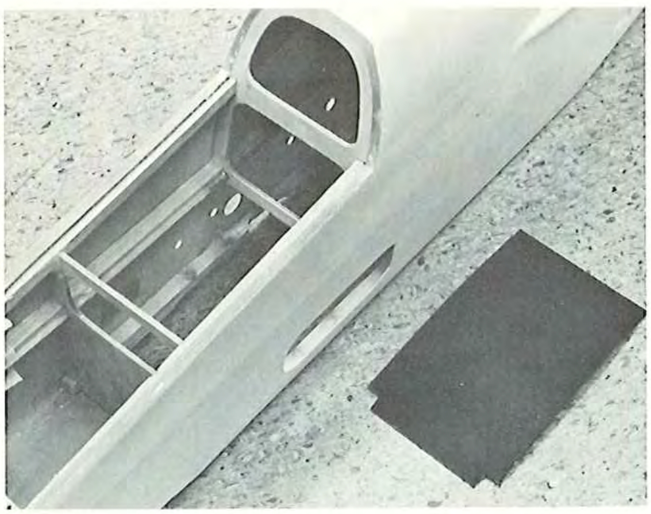
"Veterinarian" type 35cc Hypo is ideal for adding transmission oil.



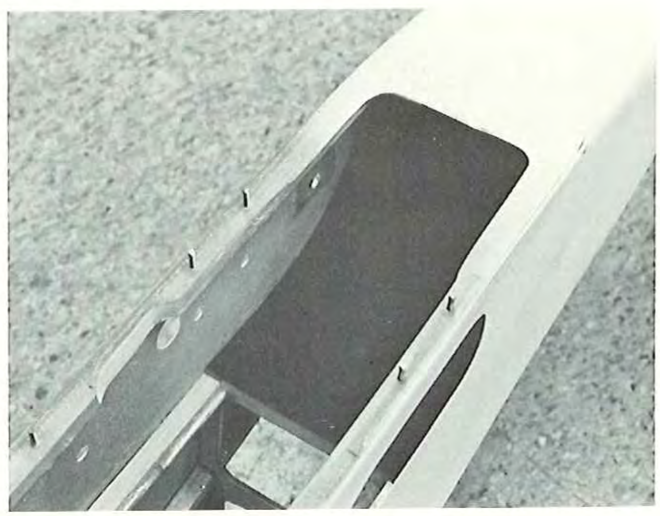
Starting technique using Kavan starter. Other starters will require adapting to 3/16" pulley.



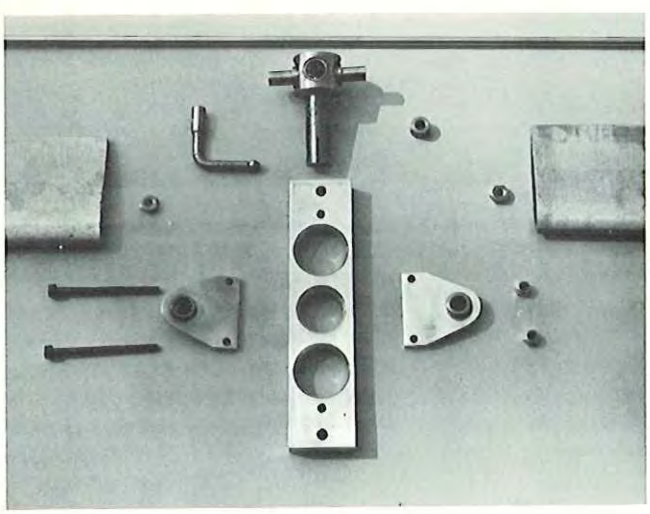
Stabilizer cores of 1/16" plywood. Tubes and collars attach to rods through fuselage. Cores covered top and bottom with 1/16" balsa.



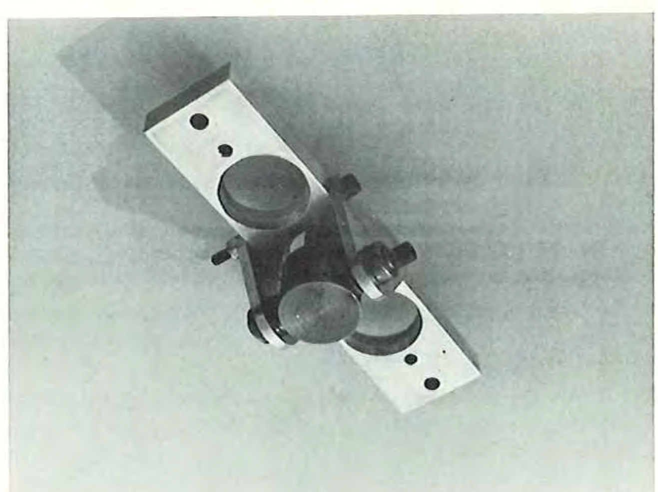
Air deflector – cardboard template proved adequate and was used instead of balsa.



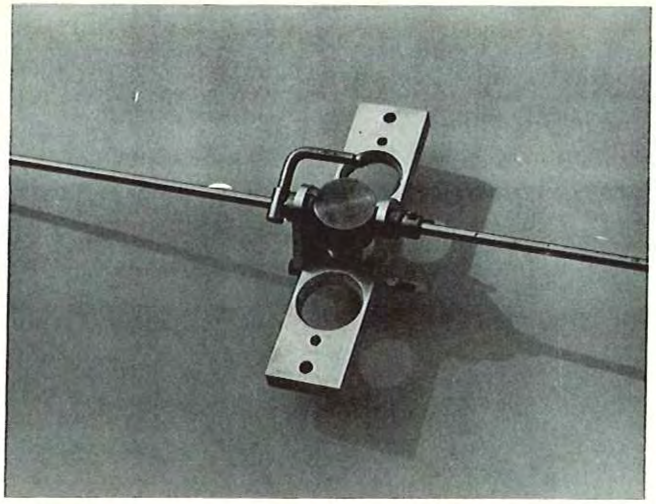
Air deflector in place.



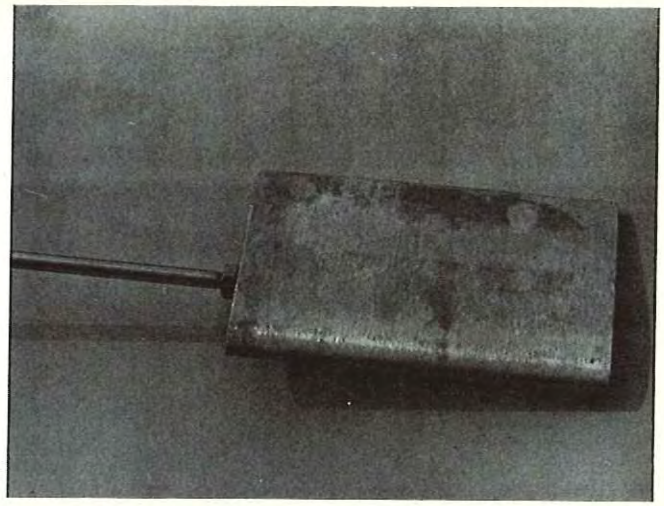
Component parts of main rotor head.



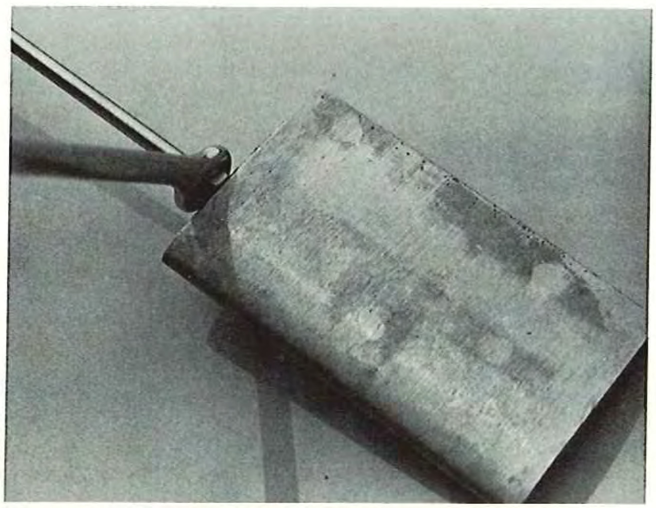
Assembly of main rotor hub to the rotor see-saw.



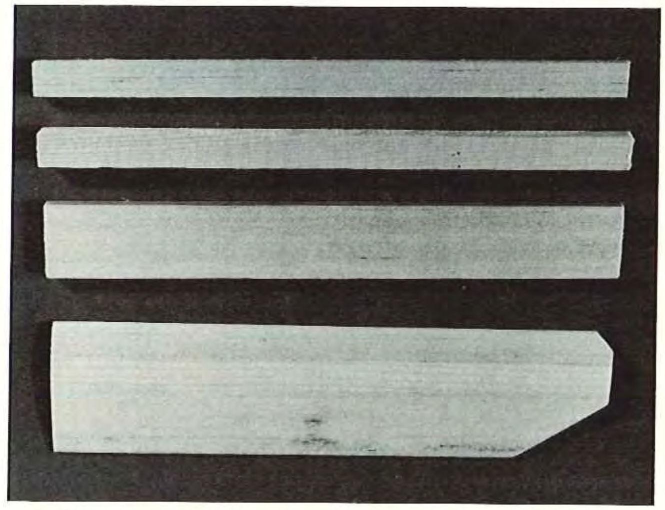
Stabilizer bar in place in main rotor hub – held in place by steering arm lever on one side and collar on the other side.



M4 nut and stabilizer blade screwed to each end of the stabilizer bar.



M4 nuts tightened back against blade provides locking.



Tail rotor blades glued up from three pieces, then sanded to final shape.

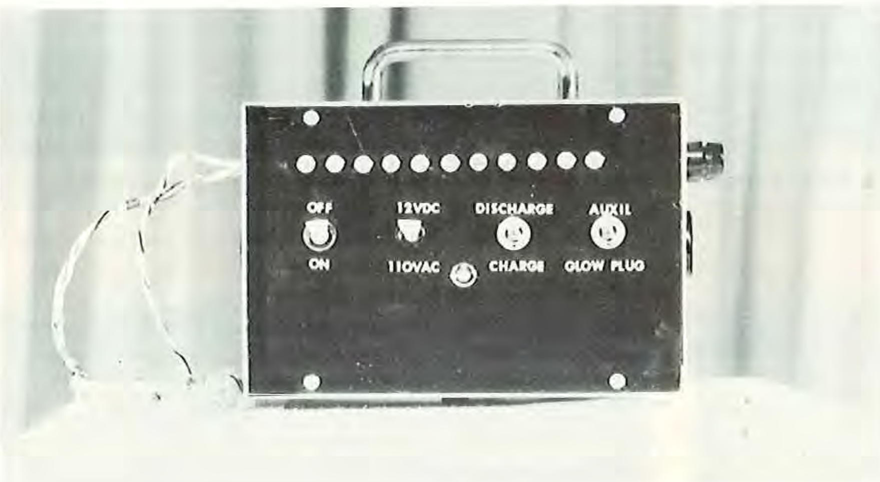
Tail rotor blades must be fitted into the blade holders correctly, allowing the blades to pivot if they should strike the ground.

Inexpensive Binks air brush used with K & B SuperPoxy.

NICKEL CADMIUM BATTERY SERVICER AND POWER SUPPLY

BY J.F.W. GURKE & R.J. WILD

Photos by K. Kuhl



Would you like to:

1. Ensure total reliability and long life from your nickel cadmium battery packs?
2. Charge your battery packs on the field and at home without removing them from your plane or transmitter?
3. Have a single field power source for your glow plug, fuel pump, 12VDC starting motor, soldering iron, etc.?

It can be done with a single simple, safe and inexpensive unit. You can eliminate glow plug cells and chargers, the mess of wires, clips and connectors in the field box and, most important, eliminate the possibliity of equipment failure resulting from weak, defective or insufficiently charged nickel cadmium cells.

THEORY

HOW DO YOU ENSURE TOTAL RELIABILITY AND LONG LIFE FROM NICKEL CADMIUM BATTERY PACKS?

1. By proper recharging of the individual cells with a battery charger designed to recharge nickel cadmium cells.
2. By periodically checking the condition of individual cells under load characteristics, replacing defective cells, and recycling weak ones to increase their performance.
3. By periodically fully charging and discharging or "cycling" each cell with a battery discharger designed to discharge nickel cadmium cells.

IS IT BEST TO RECHARGE OR DISCHARGE NICKEL CADMIUM CELLS STACKED IN SERIES OR INDIVIDUALLY?

Since nickel cadmiums are usually discharged in series when used, one would assume that this is the best way to charge them. This is not so.

One cell will invariably have a lower voltage than the adjacent cells. This doesn't mean that it is weak or defective, but it has an individual characteristic, as a result of past use or manufacture. When in use, charging or discharging, although current will continue to flow through, the polarity of this cell could reverse (positive terminal becomes negatively charged, negative terminal becomes positively charged). This is one thing that can weaken and even ruin nickel cadmium cells.

In order to:

1. Ensure maximum charge on each cell;
2. Prevent polarity reversal when charging or cycling;
3. To detect weak or defective cells;

each cell of the battery should be treated individually.

CHARGER THEORY AND DESIGN

WHAT IS A BATTERY CHARGER?

A battery charger is a source of direct current having a voltage higher than that of the fully charged battery. The positive terminal of the charging source is connected to the positive terminal of the battery so that the charging current flows in the opposite direction to the discharging current.

WHAT TYPE OF CHARGING SYSTEM IS BEST FOR NICKEL CADMIUM BATTERIES?

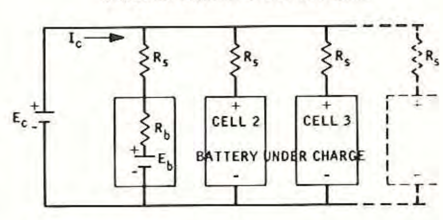
The constant current source is the easiest to construct and has the advantage of low cost for this application.

WHAT IS THE RECOMMENDED CHARGING CURRENT FOR NICKEL CADMIUMS?

The recommended, safe and optimum charging current is one tenth the rated ampere hour capacity of the cells (displayed on the cell or battery case).

WHAT ARE THE MAIN BUILDING BLOCKS FOR A CONSTANT CURRENT CHARGER?

CONSTANT CURRENT CHARGING CIRCUIT



E_c = charging source voltage
I_c = charging source current
R_s = series charging resistor
E_b = cell voltage
R_b = cell internal resistance (usually small)

To maintain constant current a charging source voltage of **ten times** the battery voltage and a current limiting resistance **much greater** than the internal resistance of the cells must be selected.

HOW DOES ONE CHOOSE THE CHARGING SOURCE VOLTAGE AND MATCH THE CURRENT LIMITING RESISTOR OF THE PROPER WATTAGE?

Since nickel cadmiums usually have a voltage in the range of 1.1 to 1.4 volts, the charging source voltage was chosen to be 13 volts. By choosing this voltage we are able to use a car battery for field operation and household current in the shop.

The value of the series resistor required is obtained by the formula:

1. R_s(K ohms) = $(E_c - E_b) / I_c$ (milliamps)

To check the wattage of the resistor required the formula:

2. Power (milliwatts) = $(E_c - E_b) \times I_c$

(TABLE I)
SUGGESTED VALUES OF SERIES RESISTORS
FOR STANDARD CELLS USED IN R/C

Battery Capacity	225 MAH	500 MAH	600 MAH
Recommended Charging Rate	23 MA/H	50 MA/H	60 MA/H
Series Resistor (R_s) Required to Nearest Standard Value	510 ohm 5% or 470 ohm 10%	240 ohm 5% or 270 ohm 10%	200 ohm 5% or 180 ohm 10%
Minimum Wattage of Series Resistor	1/2 W	1W	1 W

HOW DOES ONE ACHIEVE THE DESIRED CHARGING SOURCE VOLTAGE FROM 115 VAC?

Since we have picked 13 volts for field operation, we need only get 13 volts from a rectified supply. The circuit we picked consists of a center tapped (.5 amp 20 VCT) transformer followed by a full wave rectifier (50% duty cycle to achieve 1 amp capacity). Low cost was the only reason this approach was taken. A single stage of capacitive filtering was included and, for protection, a ¼ amp fuse was placed in the primary circuit.

HOW DO YOU ACHIEVE AUXILIARY POWER OUTPUTS FOR GLOW PLUGS, ETC.?

The same principle of current limiting resistors is used. First you must measure the current required to operate your equipment and then apply formulas 1 and 2 to obtain the value of the resistor required.

DISCHARGER THEORY AND DESIGN

WHAT IS A BATTERY DISCHARGER?

A battery discharger is a load or resistance applied to the battery to dissipate its electrical energy.

HOW DO YOU CHOOSE THE BEST DISCHARGING CURRENT FOR THE NICKEL CADMIUM CELLS?

The load on each cell should preferably be about the same as that in actual R/C use. If you don't know what the load is, 100 MAH is a fairly reasonable value to choose.

HOW DO YOU OBTAIN THE SAME LOAD ON EACH CELL AND PROVIDE A CELL CONDITION CHECK?

We chose G.E. #222 bulbs to dissipate 150 MAH current and an easy visual check of cell condition was provided. The bulbs will not all draw the same current so individual selection may be necessary to obtain resistance uniformity. Low cost was the primary reason this simple method of cell monitoring was chosen.

CONSTRUCTION

Construction of the unit itself is very simple. The only thing that must be adhered to is the polarity of components. The parts list, photos and accompanying figures should be self-expanatory. Layout or arrangement of components is not critical and would depend upon the case enclosing them, hence no circuit board. We used a perforated bread board and hard wired the components.

This unit was built to be compatible with the "RCM Royal Classic" which contains 11 cells. The unit can be modified by the addition or deletion of series resistors, bulbs, and a choice of connectors with the right number of pins.

There are many other components which could have accomplished the same task, however, we chose those detailed as they were locally available and less expensive than more commonly used items. Your scavenging ability and ingenuity can be exercised to cut costs and provide a unit to suit your needs.

PARTS LIST FOR
CHARGER DISCHARGER

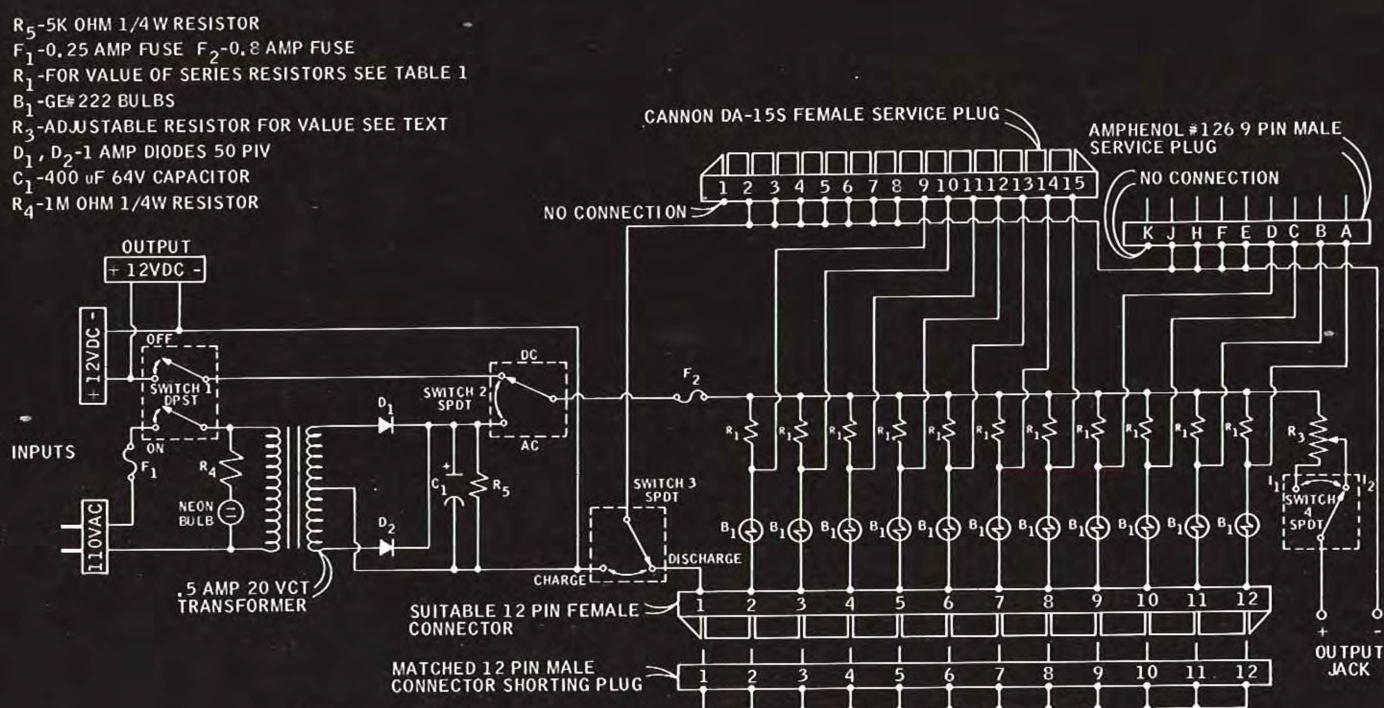
- 1 .25 amp fuse and holder
- 1 .8 amp fuse and holder
- 1 1 Meg ohm 1/4w resistor
- 11 180 ohm 1 W resistors
- 1 5 K ohm 1/4 W resistor
- 1 DPST switch
- 2 SPDT switch
- 1 Neon bulb
- 1 Hammond 20VCT - 1/2 amp transformer
- 2 1 amp diodes 50 PIV
- 3 15 pin connectors (1 male, 2 female)
- 3 9 pin connectors (2 male, 1 female)
- 1 400 uf 64 V capacitor
- 1 AC plug (male)
- 1 DC plug

Misc. – breadboard, grommets, jacks, wire, utility case, etc. and resistors, switches, etc. as required for auxiliary power functions.

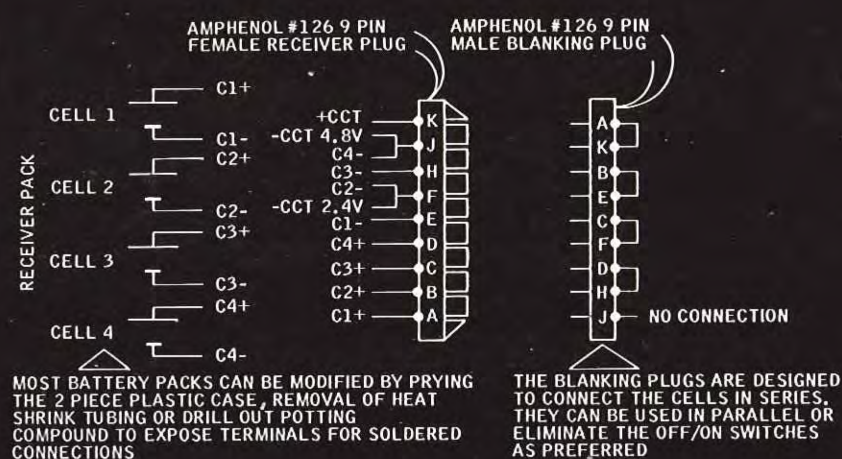
(TABLE 2) Operation Modes

	CHARGE		DISCHARGE	AUXILIARY	
	110 VAC Source	12 VDC Source		110 VAC Source	12 VDC Source
Switch #1	On	On	N/A	On	On
Switch #2	110 VAC	12 VDC	N/A	110 VAC	12 VDC
Switch #3	Charge	Charge	Discharge	Charge	Charge
Switch #4	N/A	N/A	N/A	Select Req'd.	Select Req'd.
Shorting Plug	Out	Out	In	Out	Out
Operation Time	10-15 hrs.	While Equipment is Idle in Field	Till all Lights Go Out (Chart Cell Performance)	As Req'd.	As Req'd.

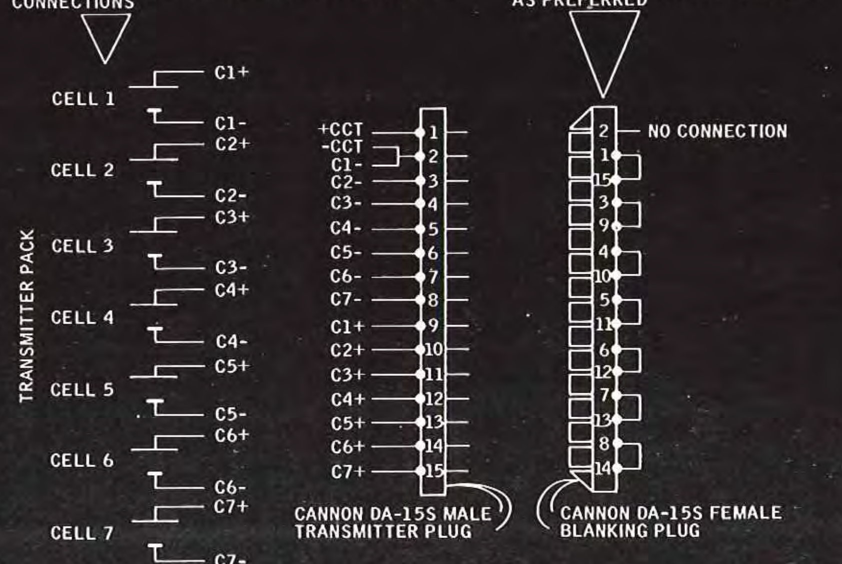
A charge-discharge cycle should be repeated several times at the beginning of a flying season, about once a month during the season, and once every two months in the off season. If it is noted that one or more lights go out, and, on repeated cycles continue to go out long before the others, the corresponding cell should be replaced. However, a cell may initially show up as weak but on successive cycles, come back to life or at least within a tolerable range.



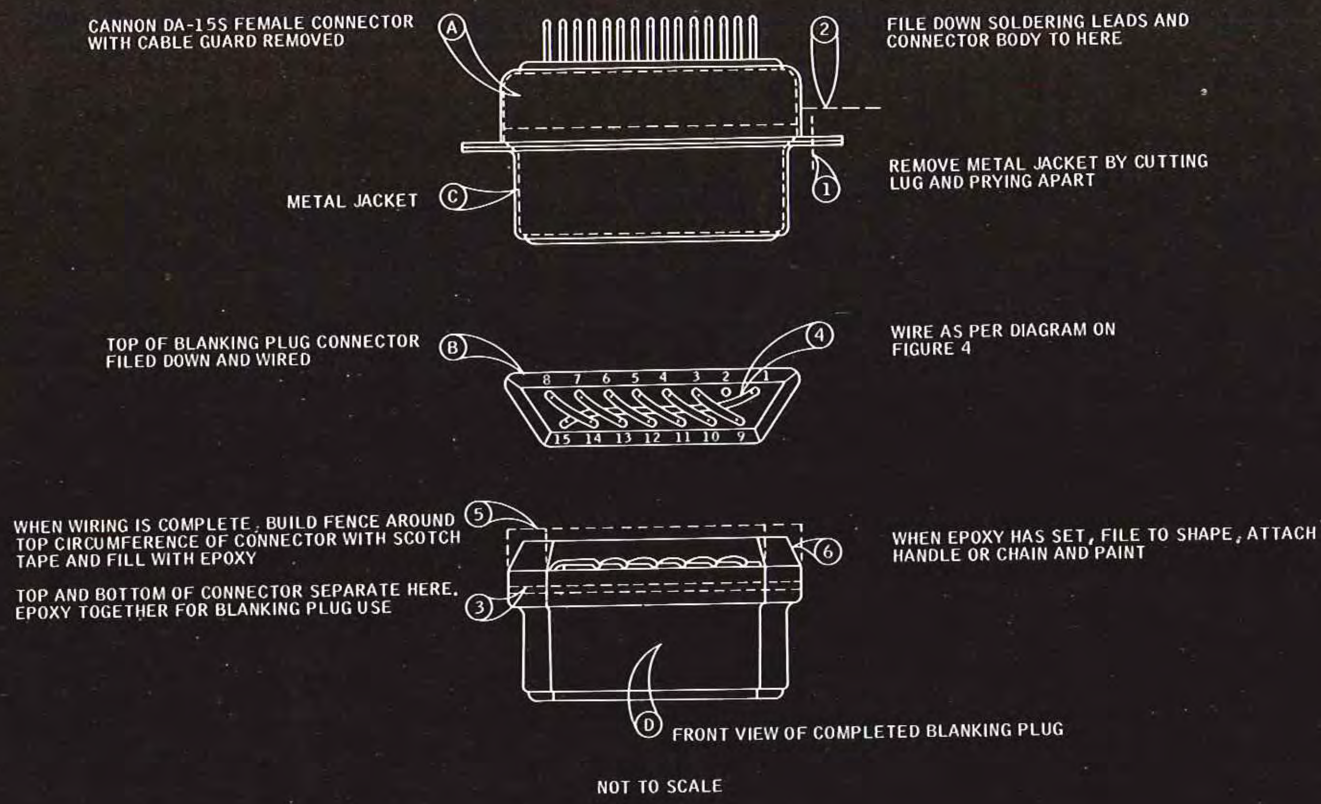
(FIGURE 2) CHARGER DISCHARGER SCHEMATIC



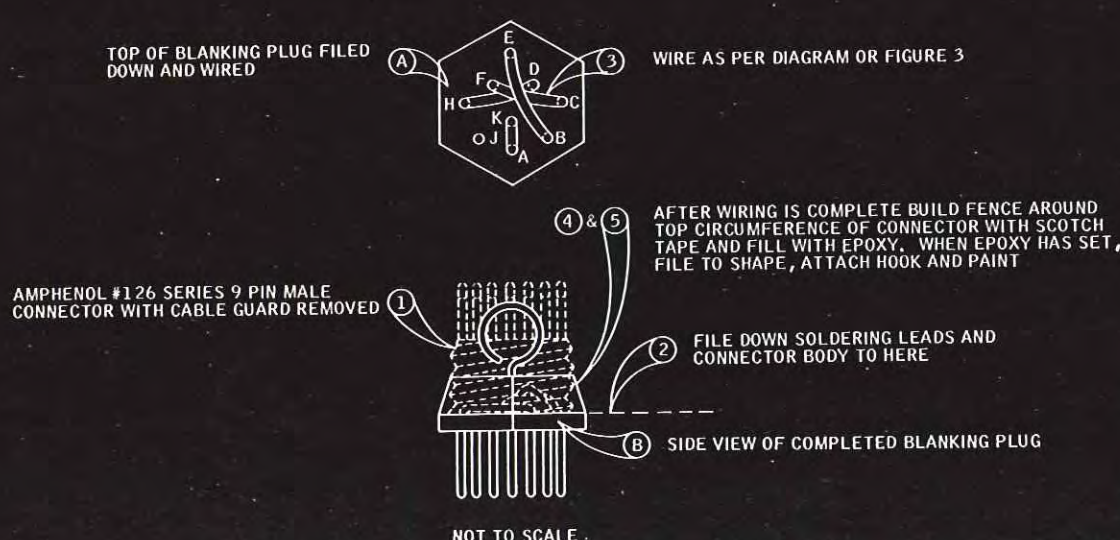
(FIGURE 3)
SCHEMATIC OF MODIFICATIONS
REQUIRED FOR AIRBORNE PACK



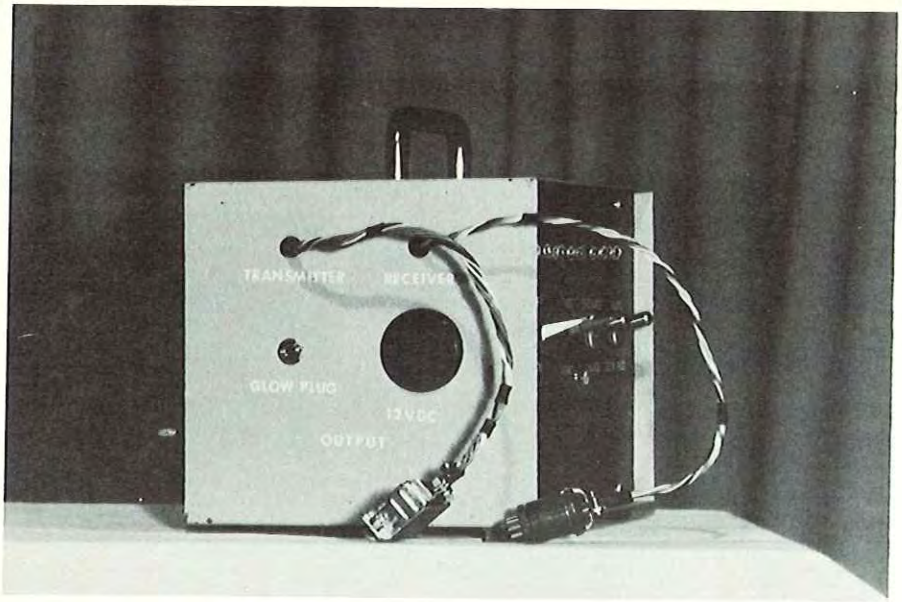
(FIGURE 4)
SCHEMATIC OF MODIFICATIONS
REQUIRED FOR TRANSMITTER PACK



(FIGURE 5) BLANKING PLUG FOR TRANSMITTER BATTERY PACK

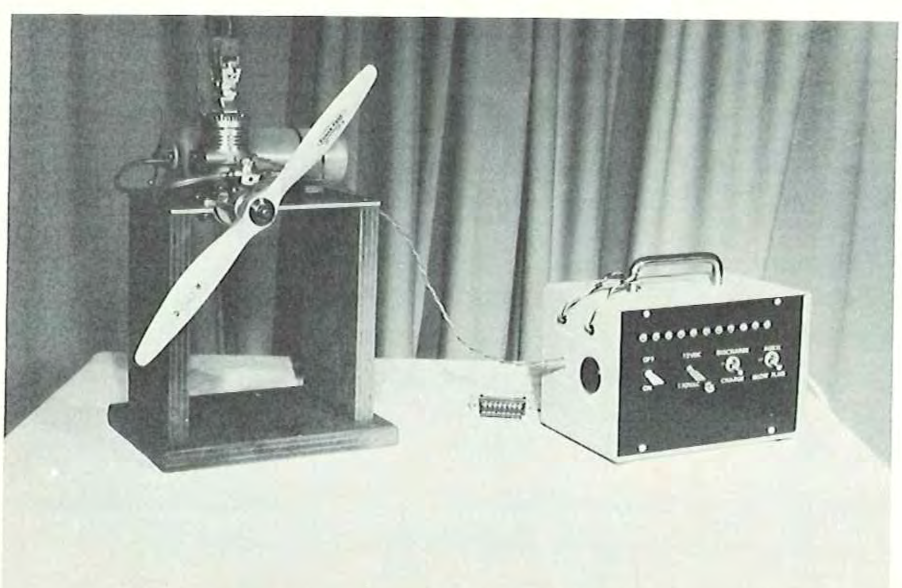


(FIGURE 6) BLANKING PLUG FOR AIRBORNE BATTERY PACK



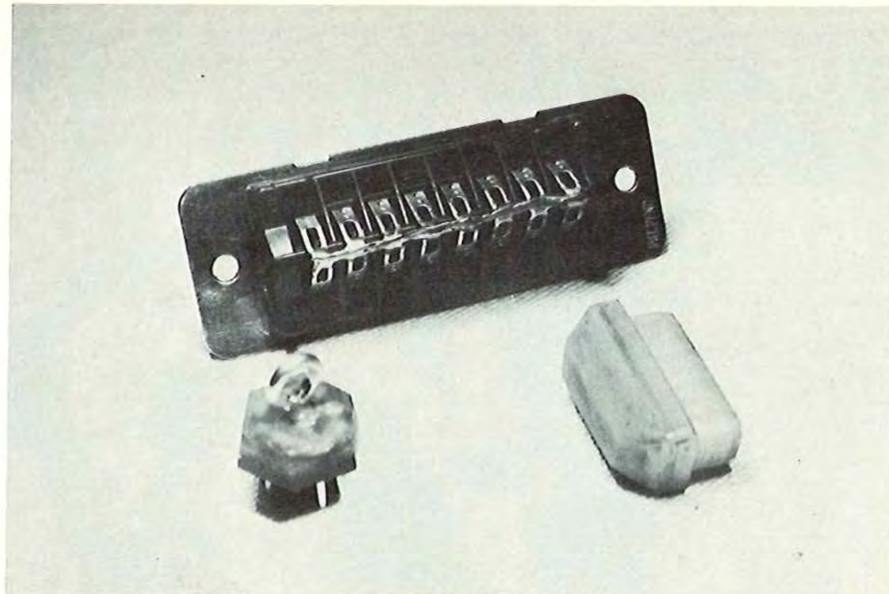
Output side of charger-discharger unit showing plugs, jacks, etc.

Charger connected to transmitter and receiver packs from 110VAC. Note input side of unit with fuses, 12VDC and 110VAC input plugs. R/C equipment shown is a six channel "RCM Classic" in a "Queen Classic" case (R/C Modeler, March 1970) with a few of my own innovations.

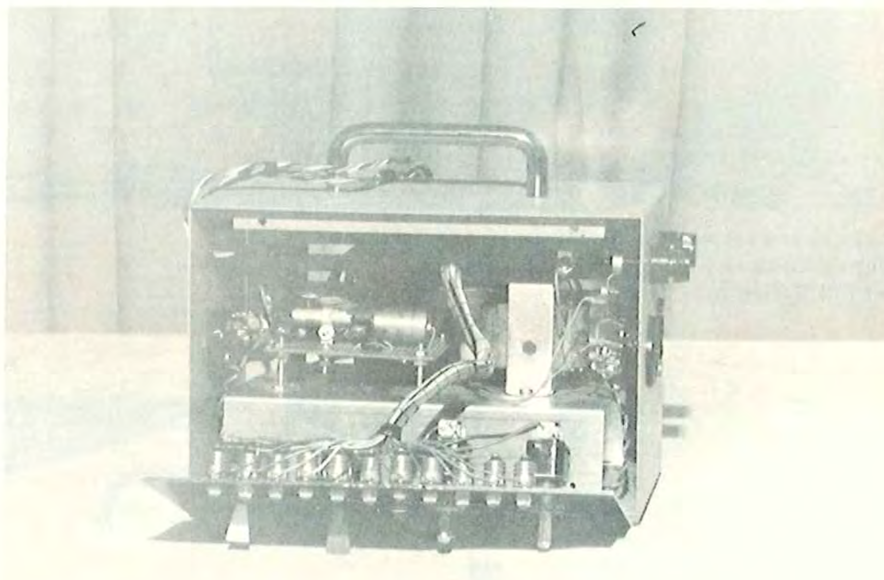


Charger auxiliary showing 110VAC operation for bench testing Merco .49 dual plug.

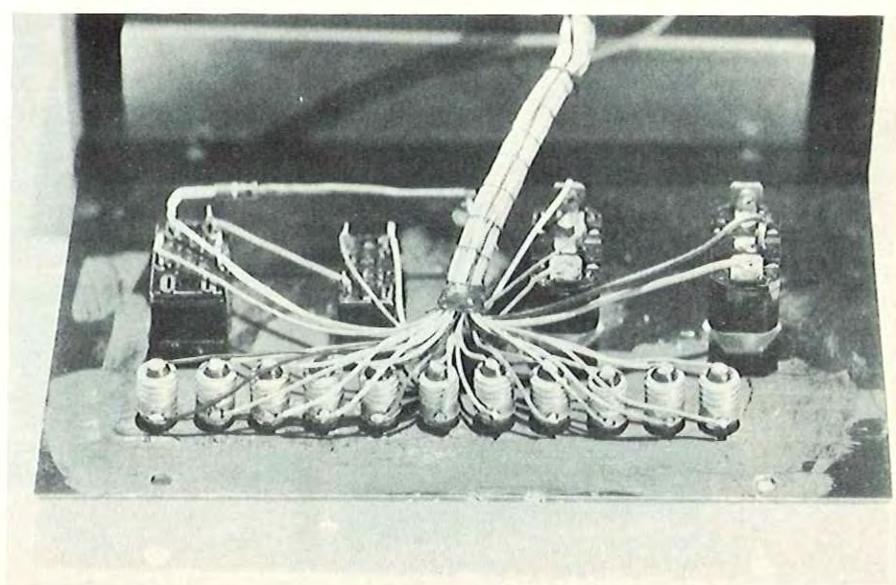
Discharger shorting plug (top)
Receiver blanking plug (left) and
transmitter blanking plug (right).

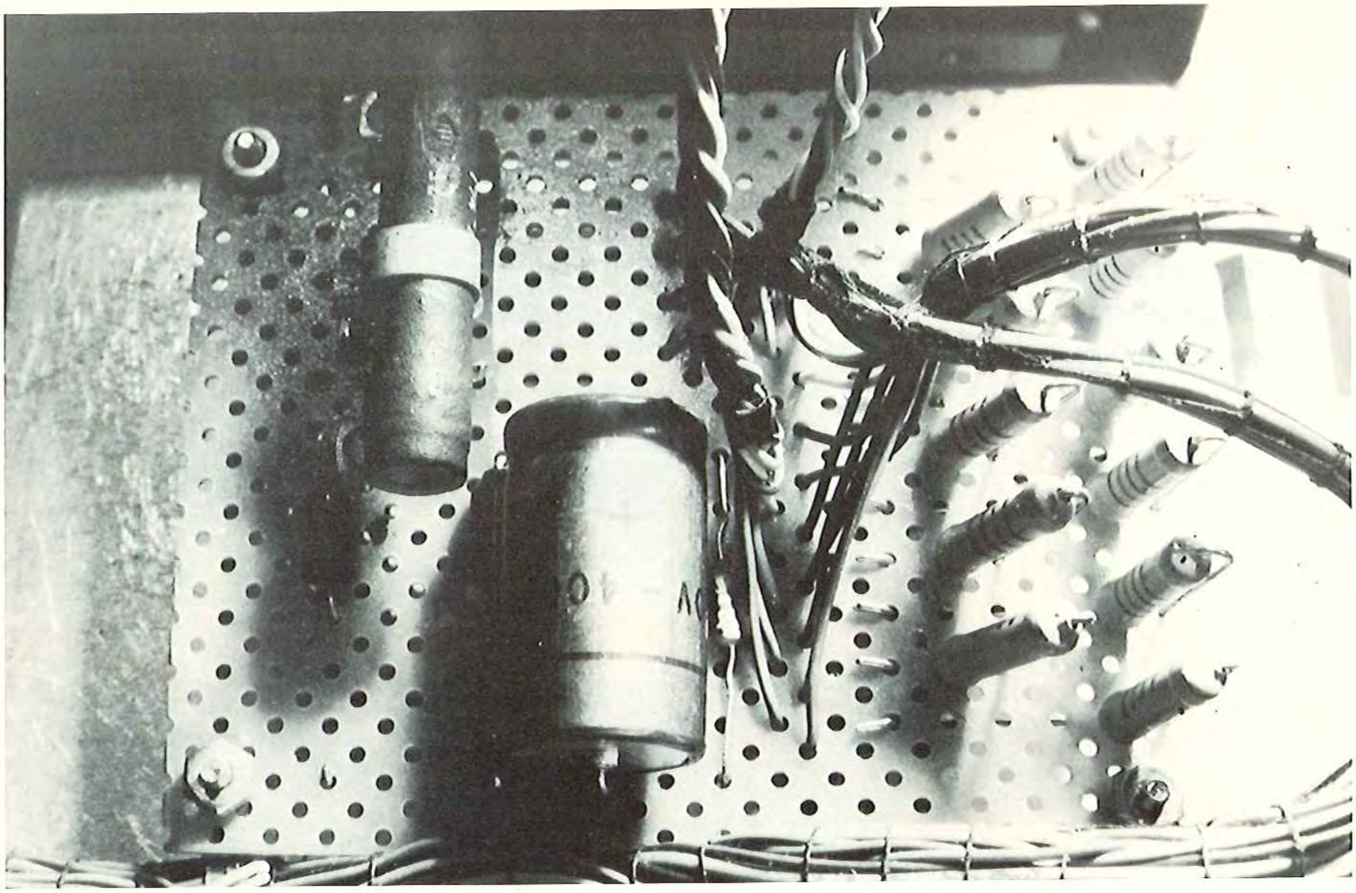


Front panel opened. Lots of
wire is required to do the job right.



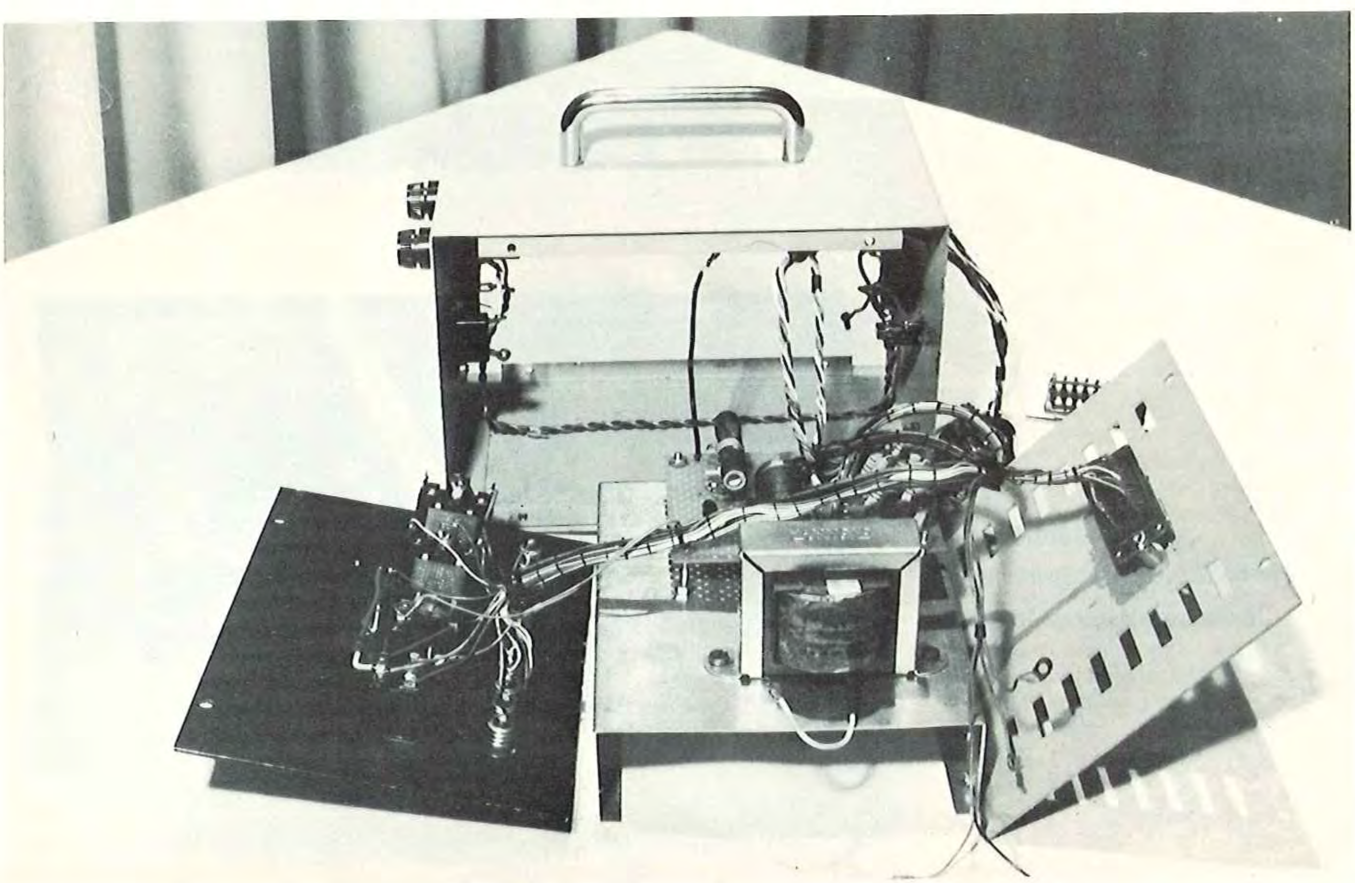
Back of front panel.
The bulbs were mounted in holes
in the front panel with epoxy.





The bread board as we did it. Hard wiring isn't difficult but a printed circuit is easy to design if you are so inclined. (See R/C Modeler April 1970).

A view showing relative location of components.



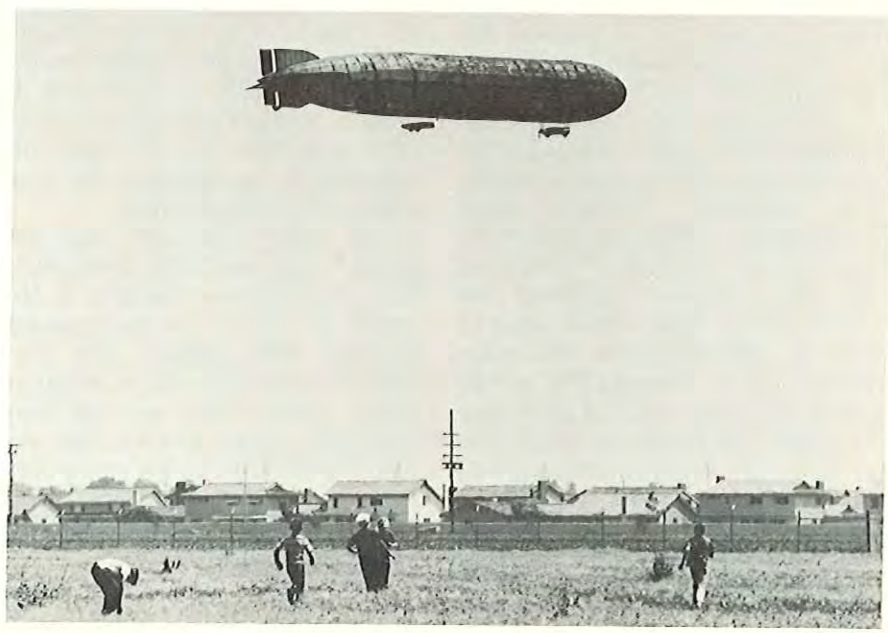
RC IN THE NEWS: GIANT SEMI-SCALE GERMAN L-13 DIRIGIBLE FLIES IN SOUTHERN CALIFORNIA

by dick tichenor

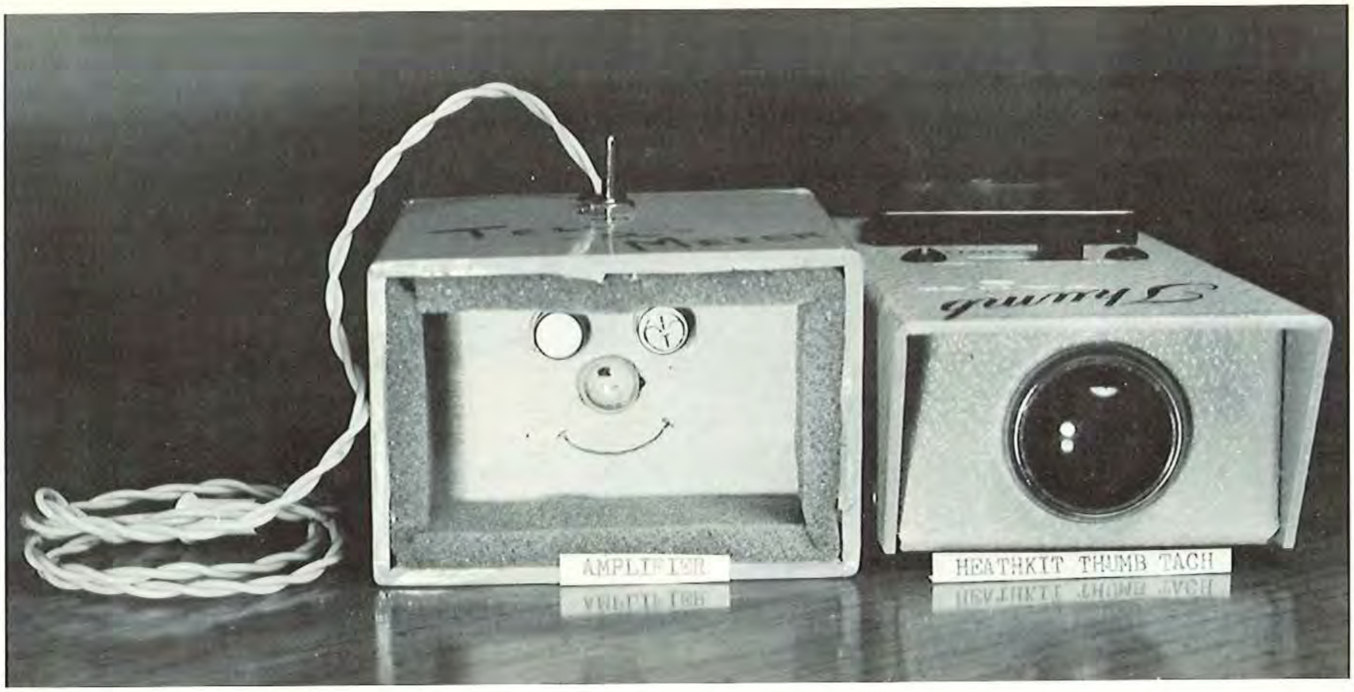
Through the miracle of modern radio control equipment, all sorts of projects are now possible. Dr. Harmon Ward, of Westminister, California, has come up with one of the most impressive R/C projects we've seen in his stand-off scale German L-13 Dirigible. Here are the statistics of the amazing machine: Length: 26 ft.; Diameter: 42 in.; Weight: 8 lbs.; Helium capacity: 189 cu. ft.; Power: 1 O.S. Max .20; Fuel Capacity: 10 oz.; Radio Equipment: Larson 5RS.

Dr. Ward assembled this behemoth in about 3 months time incorporating several ingenious features. The formers are double ring circles made of balsa strips with longitudinal stringers of spruce. Helium is pumped into five plastic bags providing lift for the lighter-than-air craft. Plastic pill bottles are used for filler valves requiring only to snap the covers off to fill the bags and then pop them back on for a tight seal.

Transportation for the huge airship is eased a bit by its being made in two sections, separating in the middle, and held together with small rubber bands and wire hooks spaced around the circumference of the parting rings. Each trip to the flying field, however, calls for a large rental van truck.



Surprisingly enough, the Max .20 pushes the L-13 around at close to scale speed and the control surfaces are completely effective as evidenced by its spectacular flights. Not so surprising is the crowd of spectators Dr. Ward draws each time he takes it out to the field. Maybe he should charge admission to cover that $50.00 helium bottle to fill the huge air ship! □



THE RCM TELL-A-METER

BY WILL D. MITCHELL

Have you ever wanted to know your exact engine RPM in-flight? Did you ever want to know your plane's exact stall airspeed or the airspeed that gives the longest glide? How about the angle of attack associated with these speeds? Would you like to measure your ship's vertical velocity, or its altitude? How about cylinder head temperature? The RCM Tell-A-Meter can do all of this, and more - - - - -

To my knowledge, no one has yet successfully telemetered all this data back to the flier, but now you can. All you need is a transistor radio, a Heathkit Thumb Tach, and $4 – $14.

The Formula I pilot needs to know his engine RPM, and his airspeed, so he can find that elusive best prop/fuel/engine combination. Measuring speed continuously in-flight, he can determine exactly how hard to pull around the pylons without sacrificing too much speed to induced drag. Angle of Attack instantly tells the racer whether he is rounding the pylons correctly, tells the sailplane pilot when he is gliding for maximum endurance, or maximum range, and tells any flier exactly how hard he can pull up before stalling, at any airspeed. Cylinder head temperature tells you about a lean run before you've ruined that beautiful mill. Vertical velocity tells you whether your sailplane is in a thermal, or in sink, and even tells you how high to point the nose skyward for maximum height, whether you use a Hi-Start, winch, or power pod. If there is anything you want to know about your hand crafted beauty, the Tell-A-Meter can probably tell you, while you are actually flying.

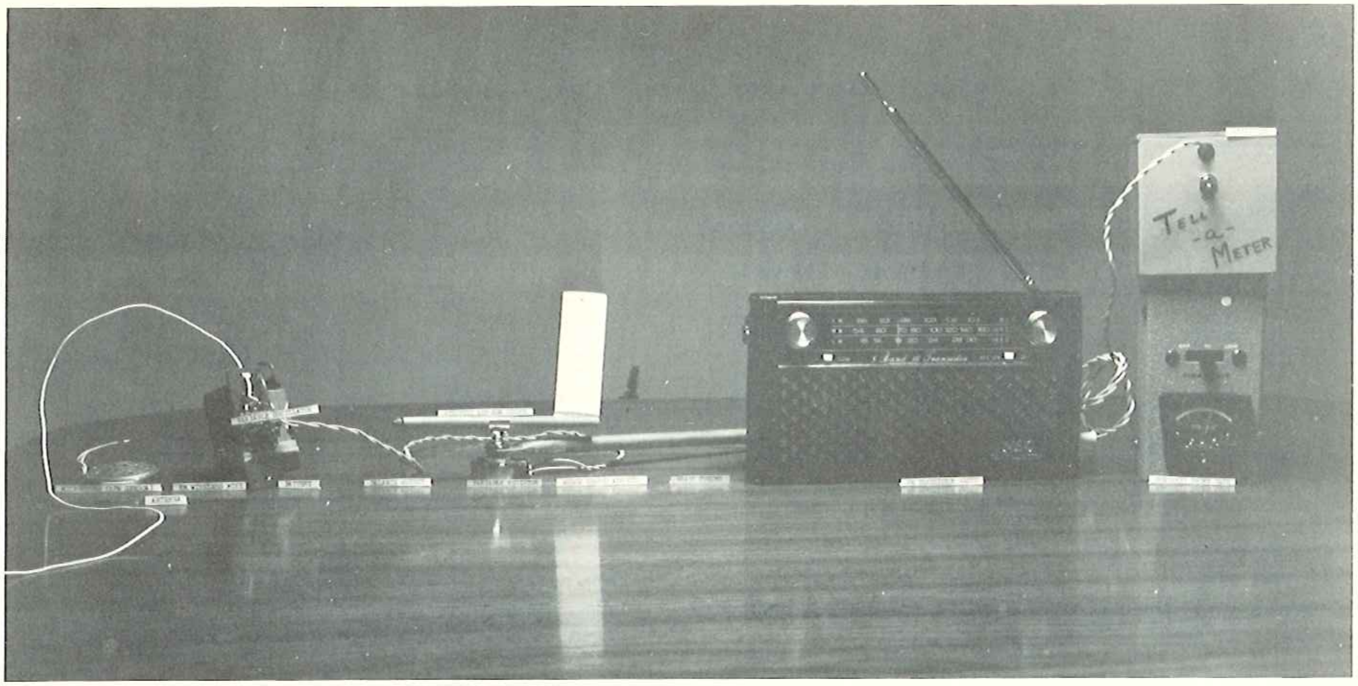
But there is an even more important reason the Tell-A-Meter exists. The model airplane designer is just about the last of the great eyeball engineers. With precious little hard data to work with, he is forced to design mostly from feel, and from what has worked well for him and others in the past. This is why models tend to evolve in families of - - - Flies, - - - Sticks, etc. For originality too often means inferiority.

But, with hard data to work from - - - data taken inflight at our Reynolds numbers and airspeeds - - - this picture can change. The hard data that the RCM Tell-A-Meter gives you is inherently more accurate than what "seems good," for it can tell you without a doubt which changes have an edge in performance. Only better airplanes can result.

THE TELL

The "Tell" is the airborne sensor and transmitter. It senses whatever parameter you want to measure, and transmits the data to the "Meter" on the ground.

Most large electronics suppliers sell cheap wireless mikes, wireless phono oscillators, wireless guitar amplifiers, etc. Mine is an FM wireless mike from Allied Radio Shack, costing only $2.49. Buy your choice, with a battery and microphone, and you have the RPM Tell. Other sensors will be discussed later, but the RPM Tell shows


TELL
-a-
METER

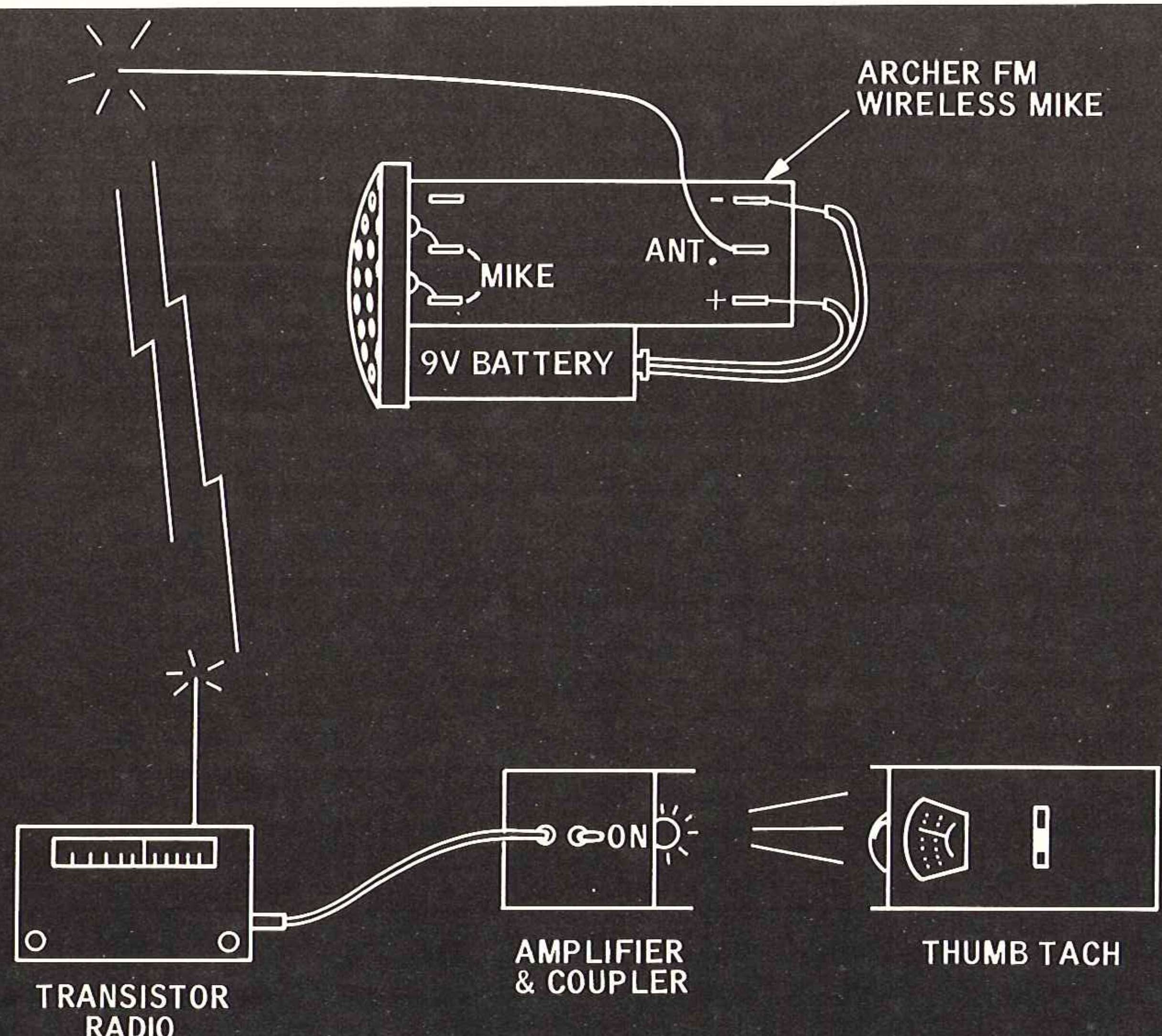
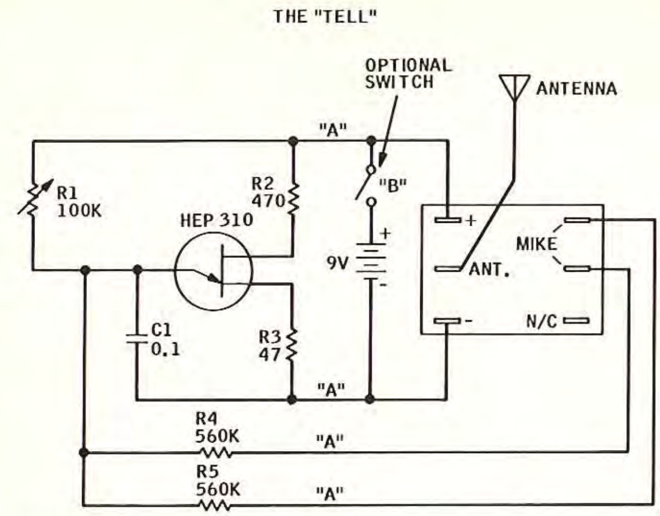
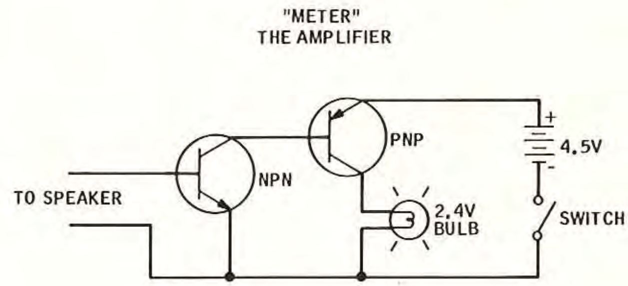

ARCHER FM
WIRELESS MIKE
ANT.
MIKE
9V BATTERY
TRANSISTOR
RADIO
ON
AMPLIFIER
& COUPLER
THUMB TACH

FIG. 1



RESISTORS 1/4 OR 1/8 WATT
R1 IS THE SENSOR
WHEN USING A MICROPHONE AS A SENSOR, BREAK 4 WIRES AT POINTS "A"
HEP 310 - MOTOROLA - $2.29 RETAIL

FIG. 2



NPN - MOTOROLA HEP 254 - $1.89 RETAIL
PNP - MOTOROLA HEP 641 - $2.20 RETAIL
EVERY TRANSISTOR I COULD TRY WORKED, 19 DIFFERENT TYPES

FIG. 3

the principles involved.

Wrap the microphone in foam rubber to muffle the engine's roar a bit, and stick the Tell somewhere in your bomb. The mike will hear the engine's exhaust note, and transmit it to the Meter on the ground.

THE METER

The "Meter" is a transistor radio, tuned to the "Tell" and optically coupled to a Heathkit Thumb Tach. Each time a pulse of sound escapes the engine's exhaust, the pulse is transmitted to the radio. The circuit in Fig. 3 amplifies it, and the light bulb flashes. The Thumb Tach reads the flashes, and shows exact engine RPM. Simple, what?

I expected to read 1/2 the actual RPM on the first model, yet my tach read exact RPM. It turned out that distortion in the very cheap mike was generating two distinct pulses of sound for each rotation of the engine. If you are not so lucky, you can either re-calibrate your tach, or simply multiply the readings by two.

For the Meter circuit, I've suggested two cheap transistors, but I've tried all 19 different type germanium and silicon transistors in my junk box. Every one worked. So, if you have some old, good transistors lying around, by all means use them. Just be sure the PNP transistor will carry 150 ma through its collector. Most will.

The wires to the radio can be soldered directly to the speaker terminals, letting you hear the engine while you read its RPM on the meter. And there's no Doppler effect. Reverse the wires at the speaker terminals, and use the position that is most sensitive. Although there will be a rather bad impedence mismatch, you can try using the radio's earphone jack. Just solder the wires to an earphone plug and plug it in. Again, one position of the wires will be more sensitive than the other. If you want to kill the sound from the speaker, you'll have to use the earphone jack, but this will not work with all radios.

The radio volume control determines the brightness of the bulb. With a 2.4 volt bulb from a rechargeable flashlight, and 3 pen cells for a battery pack, all should be correct. Different transistors may require slightly different battery or bulb voltages for optimum results. I tried bulbs from 1.5 to 4.5 volts and batteries from 2.4 to 6.0 volts, before settling on this combination.

As seen in the photo, and Fig. 4,

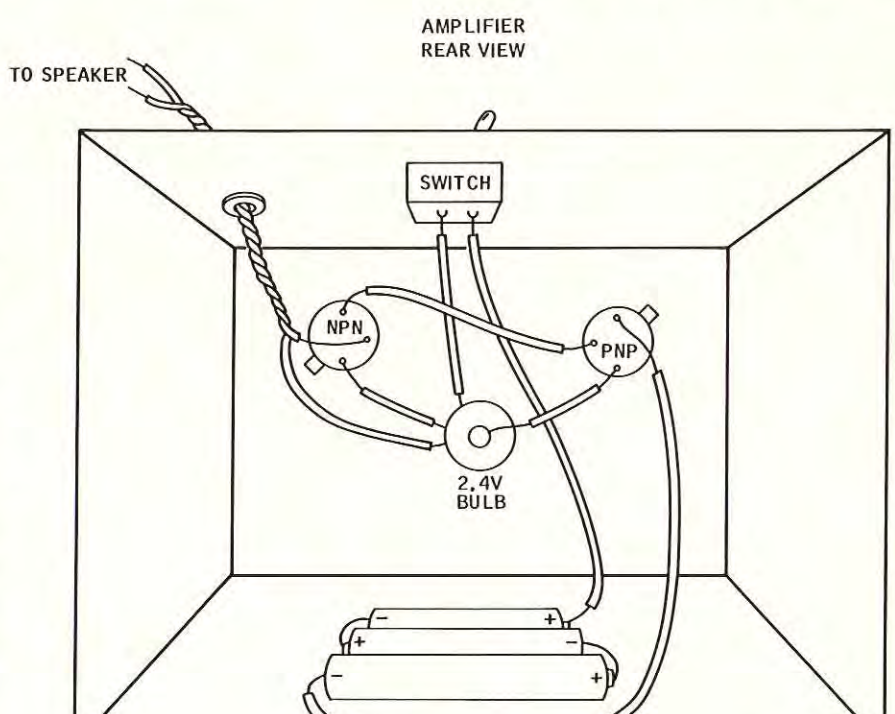


FIG. 4

the Meter circuit is mounted on a piece of 1/16" plywood, which is installed in a plywood box. The box is foam lined, and covered with light blue MonoKote. It is just the right size to slip over the business end of a Thumb Tach, so its bulb almost touches the tach lens.

I soldered the batteries in place, using long life alkaline cells. Current drain is about 1 ma with the bulb dark, and rises to about 100 ma under normal usage. If you wish, you could use a battery holder, or nicads, at extra cost. If you do solder your cells, remember to use a bare minimum of heat. Batteries can be damaged, or even destroyed by excess heat, and some will explode.

SENSORS

RPM is the easiest parameter to measure; the mike can hear that. Other parameters must be converted to electrical impluses somehow. The easiest way is to construct a variable pitch oscillator, having the sensor vary the pitch. If the pitch is near the RPM range of the engine, the Thumb Tach will read out the pitch on its RPM scale. Then a simple graph converts the RPM on the Thumb Tach back to whatever parameter you measured in the first place.

The Unijunction transistor oscillator has an ideal output for this device, and its pitch is easily adjusted by a variable resistor. The circuit in Fig. 2 costs only $3.47 retail. Drill the proper holes in a small piece of Formica or plywood, and mount the components. Solder the proper wires together on the back, and check. When it is correct, dribble epoxy on the circuit to insulate and vibration-proof it all. Then wire the circuit to your wireless mike, and use servo tape to mount the battery.

In Fig. 2, the variable resistor R1 is the sensor. If you turn its shaft, you'll hear the Tell's pitch changing, and you'll see the meter move on the Thumb Tach.

To turn the Tell on and off, simply snap and unsnap the battery, or provide a small switch at point "8" in the circuit. If a microphone is to be used, disconnect the entire oscillator circuit. Do not just remove the wires that go where you'll connect the microphone, for the oscillator will still bleed through and cause confused readings. And finally, if you want to change the value of R1, or change the pitch of the oscillator, this formula will aid you, within about 10%.

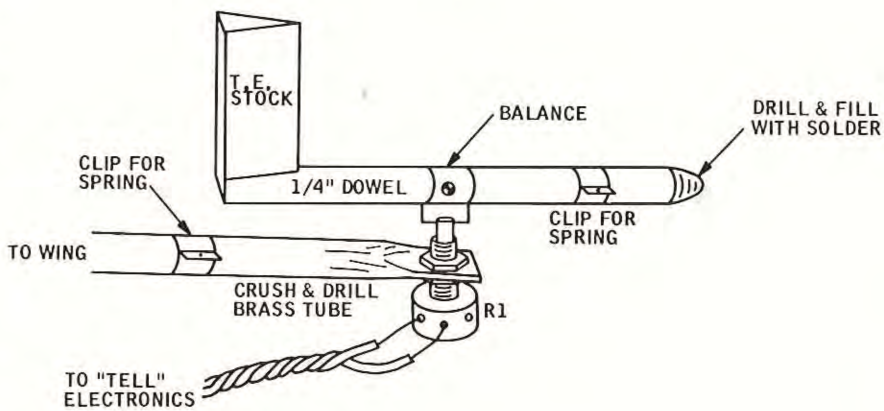
$$\text{Frequency (in RPM)} = \frac{25{,}000{,}000}{\text{Resistance (R1 in ohms)} \times \text{Capacitance (C1 in mfd)}}$$

AIRSPEED SENSOR

This is a movable vane mounted on the shaft of the variable resistor R1. As the plane accelerates, the dynamic pressure of the wind blows the vane back against a light return spring, changing the value of R1. The assembly is balanced to eliminate acceleration and gravitational errors, and the amount of friction in the shaft of R1 must be small. I took an old 100K pot apart and rebent the wiper care-

to page 56

AOA SENSOR



FOR AIR SPEED SENSOR ATTACH SPRING TO CLIPS. ROTATE R1 TO CALIBRATE
KEEP THE VANE TRIANGULAR IN SHAPE, NOT AN AIRFOIL

FIG. 5

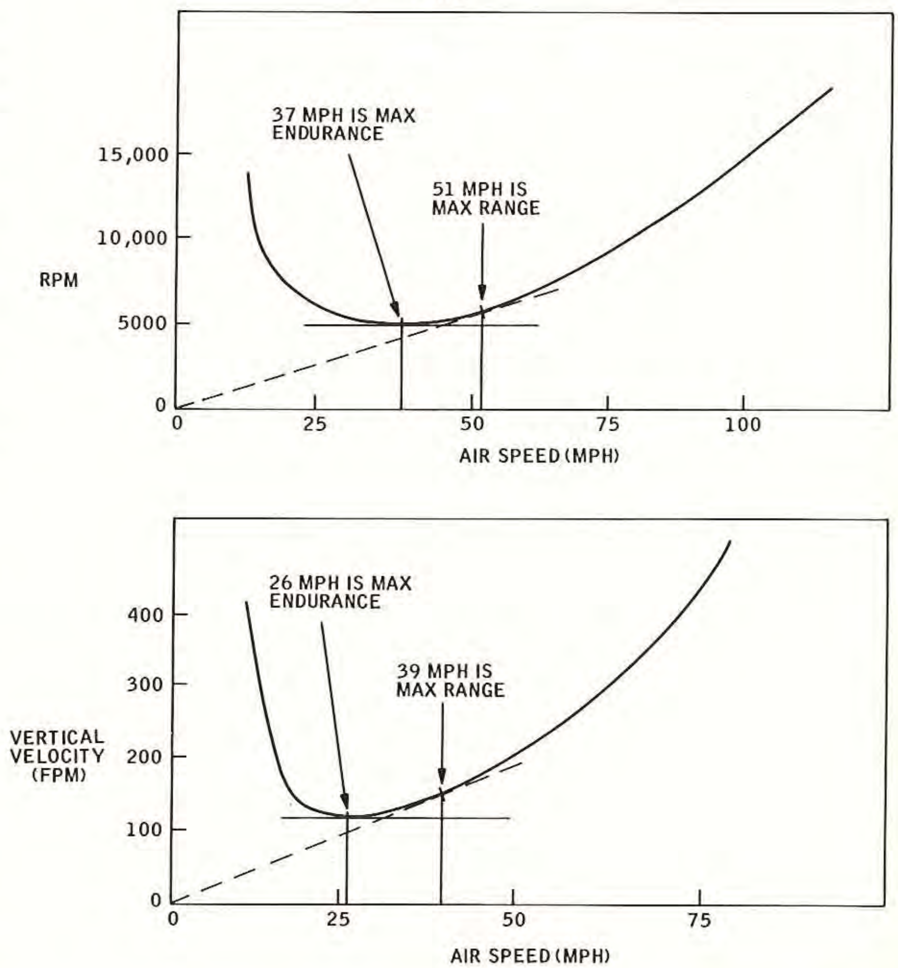


FIG. 6

SOARING

WITH DON DEWEY

1972 RCM SLOPE SOARING RACES

by Ken Willard

Jerry Arana, flying his "Boss" (please don't call it a Jalapeno!) took home the RCM Perpetual Trophy for the second time by winning all of his races and then beating John Baxter in a flyoff at the 1972 RCM Trophy Races at Sunset Beach, California, April 22nd and 23rd. His winning speed was slightly over 55 mph! Picture No. 1 shows Jerry receiving the trophy from Whitey Pritchard.

John Baxter took second, and Rick Walters, third. Picture No. 2 shows the three top winners holding aloft their George Popa wire sculptures, which unfortunately don't show up against the sky background.

Fifty-six entries, the largest field ever, competed. Picture No. 3 shows most of them.

Flying wings were popular, but too slow for the wind conditions that prevailed. The Gryphon, by Ron Neal, was used by many, and did well in the light air, but during the finals on Sunday they just couldn't keep up with the heavier speed jobs in the strong wind. Picture No. 4 shows the most unusual flying wing that was entered. Regrettably, I didn't get the name of the modeler who is holding it, except that he's the brother of Mike Marzalek, the designer.

Picture No. 5 shows one of the more unusual entries – a scale Lockheed U-2 by Bill Stullick. It, too, performed very well.

Jerry Wolfram took a Del Gavilan fuselage, added a swept and clipped wing version of the Peregrine, installed his own tip vortex plates, and came up with the "Fastagon." It was, too, but kept breaking the wing on landings. Picture No. 6 shows the lines.

Bob Andris showed up with a seven pound (dry) racing version of his Diamant. Probably the fastest plane at the races, but the center section of the wing wasn't strong enough. Maybe next year. Picture No. 7 shows how the wings drooped under their own weight.

Picture No. 8 shows Bob Andris launching my racing version of the

Top Sailer. Placed sixth, and should do better next year with more practice and some modifications.

One modeler even used a midget racer of the Formula I type, with the engine replaced by lead. Not fast enough. No. 9 shows launch.

Whitey Pritchard explains the workings to Mr. Hinkle, the ranger on duty. (Picture No. 10.) Rangers were disturbed about ecology damage due to crowds trampling down the manzanita cover of the dunes. We feel the damage was small, and temporary, because crowds were kept on the roadway as much as possible. It is a problem that must be solved before next year, however.

Picture No. 11 shows a perfect start. Four planes, all behind the starting line, dive for speed as the countdown hits zero.

Picture No. 12 shows three planes turning at the far pylon. Note flagmen with flags just dropped as planes pass

the line and make their turn.

So, Jerry Arana now has two legs on the RCM Slope Racing Trophy. One more and it's his. But he'll have to work for it. Newer and faster ships are already on the boards for next year! I've got one too. Gonna' call it the "Lead Sled." Andris and Wolfram will have stronger wings. Baxter will practice turns. Walters will add more ballast. And some dark horse will probably beat us all!

LSF SOAR OLYMPICS PREP UNDERWAY

Santa Clara, California, 1 May 1972 – Plans for the League of Silent Flight 1972 RC Soaring Tournament are firming. Scheduled for 26 and 27 August at the Mile Square Marine Helicopter Air Station, Fountain Valley, California, a task force of key personnel is heavily involved in planning and scheduling the multitude of details.

Historically an innovative event, the '72 Soar-Lympics will introduce Frequency Availability Registration (FAR). Frequency congestion in many major soaring competitions has become a significant problem with chaotic impact on orderly conduct of flight schedules. The FAR system, which limits the number of contestants accepted on any single, AMA recommended, Super-Het frequency, will be a "first" at the '72 Tournament. By implementation of FAR, Tournament Officials hope to maintain pre-planned balance of frequency utilization, and thereby maximize the number of competition flights on each contest day. Pre-registration will provide each contest applicant the opportunity to identify primary and secondary frequency choices.

Another step-up in sophistication for a nationally recognized soaring event will be progressive eliminations. Following Saturday's schedule of three . . . with an option for four . . . diverse events, all competitors will fly Round One of the Finals on Sunday, 27 August. Round Two of the Finals will be limited to the top 80 scorers; Round Three will be reduced to the top 60 pilots; and Round Four will be competed by the 40 fliers with the highest cummulative scores. The system is planned to provide the maximum number of flights to the greatest number of participants while emphasizing the competition challenge for front-runners.

Pre-registration will be required for assured acceptance, and priority will be offered for a limited time to enthusiasts who hold advanced levels in the LSF Soaring Accomplishments Program. Pre-registration will be open 1 July thru 31 July, and is expected to fill all available openings. On-field registration cannot be guaranteed. Pre-registration forms will be mailed to all LSF Members and key distribution points in early June.

To encourage participation in the Scale Classification, no limits as to frequency or registration time will be imposed, though early registration is encouraged. Static judging of scale entries will be conducted on Saturday, and the top ten models will progress to flying competition in the First and Second Rounds on Sunday. Gate entries will be accepted in the scale class up to 0800 hours, 26 August.

The LSF 1972 RC Soaring Tournament is co-sponsored again this year by leading commercial organizations who are heavily committed to the soaring sport: Du-Bro, Kraft, Midwest, Model Airplane News, Orbit, R/C Modeler Magazine and Top Flite.

The Soar-Lympics, an AA contest with AMA Sanction 548, will include precision, speed and duration tasks which will be in accordance with the AMA Rules for Radio Control Sailplanes (Provisional) as published in the 1972 Model Aircraft Regulations. Tasks I, II, III and V will be flown. The "One Sailplane/One Wing" rule will be enforced. The Scale Event will be conducted in accordance with AMA RC Scale Sailplane Rules (Provisional).

Off-field headquarters will be the Sheraton Beach Inn, Huntington Beach, California, a ten-minute drive from the field activities. The Sheraton Beach is a modern resort inn featuring all vacation luxuries for family recreation including swimming pool, color TV, and a private nine-hole golf course. The inn is fronted by an expanse of public beach on the Pacific shores.

Within a few minutes of easy driving from the Sheraton Beach are such internationally famous family attractions as Disneyland, Knott's Berry Farm, Marineland, Japanese Deer Park, Movieland Wax Museum, the Tallmantz Air Museum and many other commercial and natural meccas for vacationing sailplaners and their crews. The Sheraton Beach has approved a schedule of special rates on rooms for LSF Tournament guests.

Public and commercial camping facilities are available in the area for the outdoor sportsman. No overnight parking or camping is permitted on the Marine Air Field. The banquet rooms of the Sheraton Beach will be the location of Saturday evening dinner and entertainment. Other public rooms will offer cocktails and dancing for the pleasure of smaller groups. A hospitality room will be open for LSF Tournament fliers, guests and friends on both Friday and Saturday evenings.

A pre-contest Pilots' Briefing is scheduled at the Sheraton Beach on Friday evening from 2000 to 2100 hours. The on-field briefing will be from 0730 to 0745 on Saturday morning. First launch will be at 0800.

The LSF 1972 RC Soaring Tournament is hosted by the San Fernando Valley Silent Flyers (sfVsf) . . . a dynamic, one-year old club of more than 125 flying members, headquartered in Woodland Hills, northwest of the LA Metropolis. Jack Seeley, sfVsf President is Tournament Manager. Le Gray, President of the LSF, is Tournament Director.

In the photos above, Astronaut Jim McDivitt is shown with the Graupner Cumulus sailplane. John Kiker, member of the Manned Spacecraft Center R/C Club watches as Jim put the Cumulus into a thermal.

The League of Silent Flight is a world-wide organization of R/C soaring enthusiasts. Membership in the League is open to any serious sportsman. Information about the LSF may be obtained by addressing queries . . . with 16 cents return postage included . . . to The League of Silent Flight, P.O. Box 2606 Mission Station, Santa Clara, California 95051.

GRAUPNER CUMULUS
By John W. Kiker

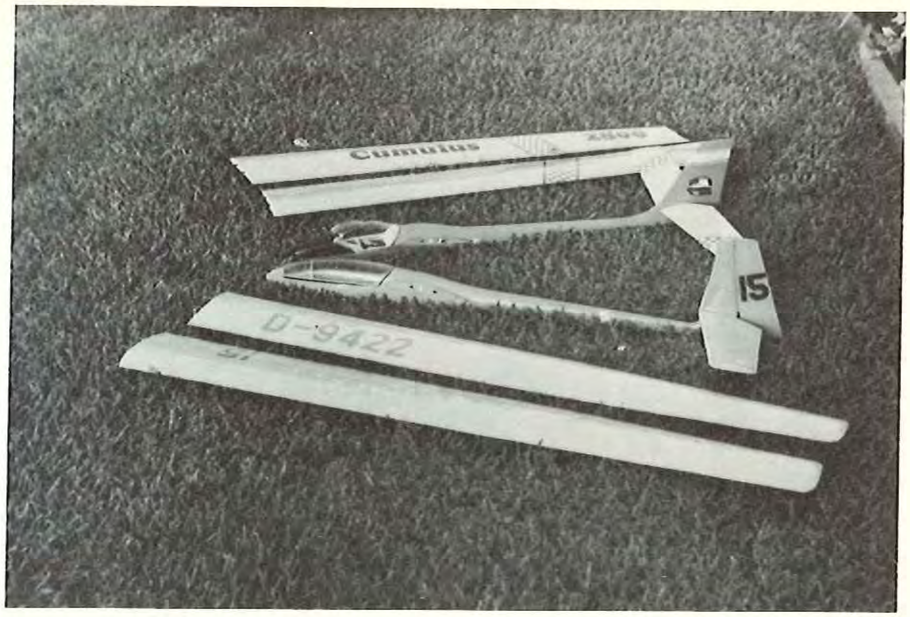
The famous Graupner "Cirrus" has been flown in and won numerous contests throughout the United States.

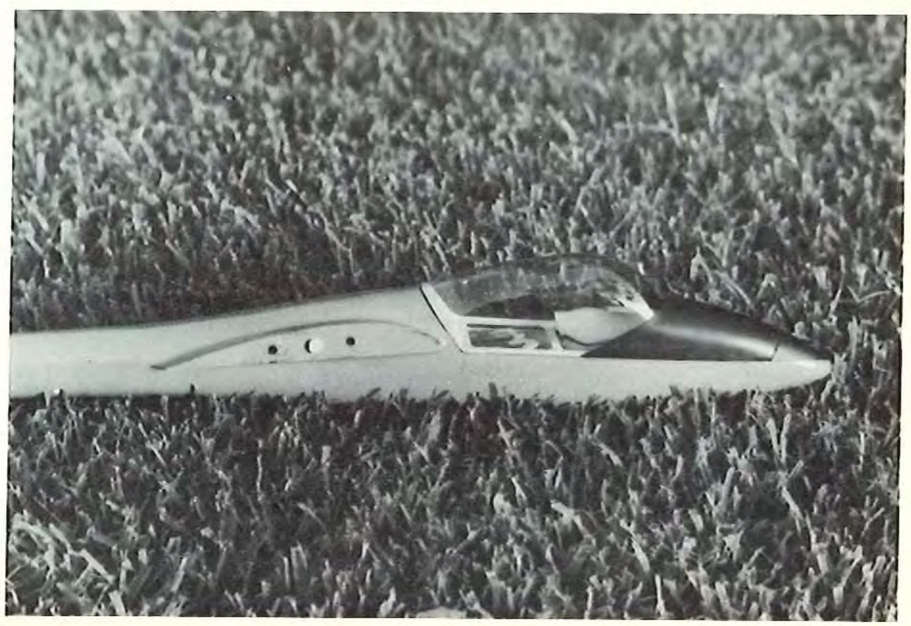
I was fortunate enough to obtain one of the first ones while in Europe in the Fall of 1969. Now, Mr. Graupner and his Chief Engineer, Mr. Militky, have designed and produced another sailplane, the "Cumulus" which, in many ways, out performs the magnificent "Cirrus." With the increased interest in R/C sailplanes, it, like its brother the "Cirrus," will be a winner.

The sailplane was first shown to the public at the German Hobby and Toy Fair in February of 1971. I received a photograph of it about this time from Mr. Militky. The "Cumulus" appearance, with its swept wings, appealed to me so much that I made arrangements to have one of the first kits for sale mailed to my home in Houston, Texas. The long wait began and, finally, in June of 1971, I was notified it was in Customs. After one week of red tape and many phone calls, I received the model. Much to my sorrow, the model had been badly damaged by the Customs inspectors in opening the box. Both wings were broken about 10" from the tip and the cockpit canopy mashed. This nearly broke my heart, as it had been well packed.

This is the highest quality and most complete ARF kit I have ever seen. The quality has to be seen to be believed. The fuselage is molded from nylon, already assembled, and produced from the "Cirrus" mold. There is a fillet at the vertical fin that changes the appearance and adds strength to the rear of the fuselage. This was a weak area in the ABS Cirrus fuselage. The wings and tail surfaces are foam covered with balsa wood skins. The balsa wood covering has been factory bonded with epoxy. This allows the use of any type paint without the danger of melting the foam. All of these parts are smoothly sanded and ready for your favorite finish. The wing is swept back a few degrees which helps the appearance as well as the aerodynamics. I suspect another reason for this is to reduce the amount of ballast needed in the nose for proper balance. The work required to complete the model for flight consists of putting on your favorite finish and installing radio gear.

At this point, it should be noted





TOP PHOTO: The Graupner Cirrus and Cumulus. CENTER PHOTO: The Cumulus tail group. BOTTOM PHOTO: The Cumulus cockpit – only the canopy is changed from the Cirrus.

Bill Anderson holds Grand Esprit prototype for photographer at RCM test site. New Airtronics kit is a pacesetter for highest quality workmanship and total prefabrication. Performance is going to be hard to beat.

that the only problem involves mounting the servos. I bonded a nylon mount in the fuselage cut from 1/8" nylon sheet. The glue used was formic acid and must be handled with extreme care. This kit comes with a mount made for Graupner's servos and my S-4a's would not fit the mount provided. On my prototype, the wings and all control surfaces were finished and trimmed with MonoKote while the fuselage was painted with an orange lacquer provided by Graupner. The radio equipment consisted of my very old World Engine M.A.N. 2-3-4 radio gear and, for convenience, I used my OS 10 engine "Cirrus" power pod to get the "Cumulus" to altitude. The total time from opening the box to completion took only six hours! It is interesting to note that the "Cumulus" and my "Cirrus" weigh exactly the same amount. This was three pounds, five ounces with the radio gear installed. The radio equipment weighed ten ounces. The OS-10 engine presented an excess amount of power and corresponding trim problems with the first flight of the "Cirrus." This was not true on the "Cumulus" which flew perfectly on the first flight.

I now have many flights on the "Cumulus" launched using both a Hi-Start system as well as the power pod. Naturally, the performance is better without the drag of the pod. The swept back wings gives the effect of an increase in dihedral. It turns in a very small diameter which is ideal for thermals. I do not believe the lift-to-drag ratio (L/D) is as good in still air as the "Cirrus." It is really too early to make this a positive statement until such time as I can accurately measure it both with and without the power pod. The model is even safe for beginners to fly since it has very gentle stall characteristics which was not true of the "Cirrus." The all movable rudder is also very effective. This is a big improvement over the "Cirrus." The stabilator is identical in movement to that of the "Cirrus." There is another feature of the "Cumulus" that is interesting and that is it is strong enough for limited acrobatics. I have flown it inverted and performed loops as well as some very sloppy rolls. Ailerons will be required to perform good axial rolls. As yet, I have not decided the ailerons are worth the extra time and trouble to install. Many of the Manned Spacecraft Center Members have flown the "Cumulus" and really like it. My most celebrated pilot has been Astronaut Jim McDivitt. He was kind enough to pose for the photos accompanying this article. The other photographs adequately describe the model as well as the differences between it and the "Cirrus." The photographs were taken by Kirby Hinson, Jack Ottinger, Bill Norris and myself using a Minolta with an F 1.4 lens.

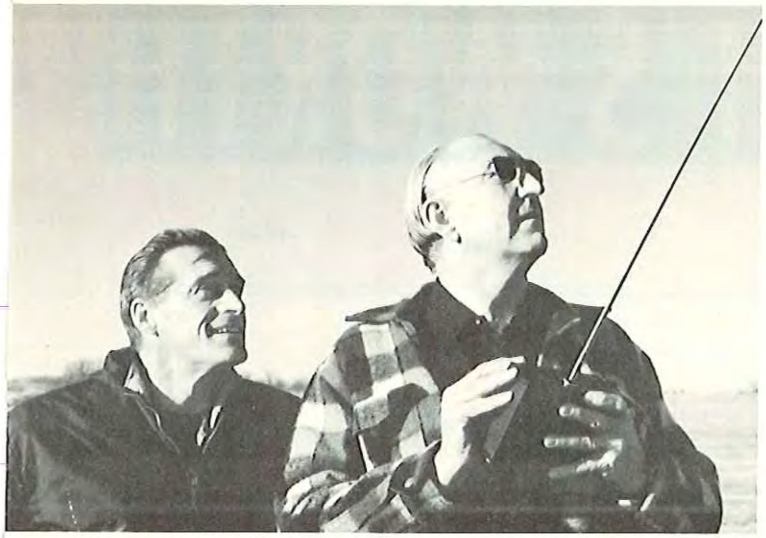
In summary, this is the finest ARF R/C model I've ever seen. The engineering is superb, and typical of Graupner models. I'm sure, in the future, a great number of "Cumulus" models will be seen flying and perhaps become even more popular than the "Cirrus." Should any of you like additional information, I'll reply to all letters. Drop me a line, c/o RCM, P.O. Box 487, Sierra Madre, California 91024.

SAILPLANES AND ACCESSORIES

EK's Little Red Brick (the LRB) has a new look for 1972. All LRB units now have complete three-channel control and precision control sticks with adjustable tension. The LRB, a

to page 66

EK Products LRB was designed for the sailplane enthusiast. Three channel control with "brick" configuration. Reliability plus!

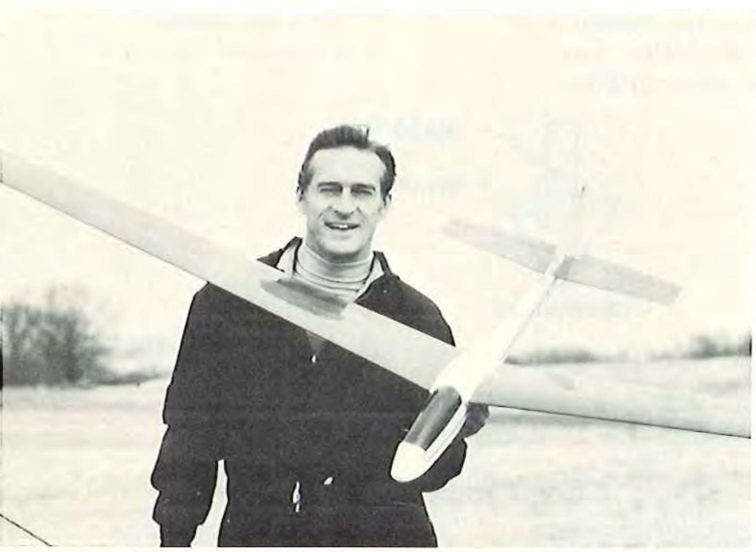


David Packard (r) former Dep. U.S. Sec. of Defense under Melvin Laird, & currently Pres. of the Hewlett-Packard Co., tries his hand with a sailplane belonging to Dr. John Foster (l). Dr. Foster is the Dir. of Def. Research & Eng. in the Dept. of Defense and an active RC'er.

Young John Foster launches the family's Monterey. Dr. Foster is at the controls and Dave Heebner (right) observing. Mr. Heebner is a Deputy Director for Tactical Systems in Foster's office. John Strong, DC/RC member, at left of photo.

Dave Heebner concentrates on a landing approach with his Monterey. Length of cigarette ash indicates period of concentration!

Dr. Foster launches Don Clark's modified Kurwi. Captain Jim McNerney, U.S.N., President of DC/RC, in background.

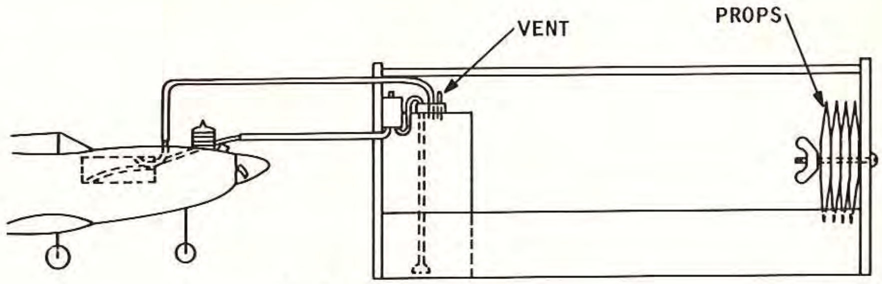


A happy Dr. John Foster after a successful day of sailplane flying . . . nothing broken!

Dr. Foster with 13 year old son, John, at the controls during a thermal flight. Pure relaxation – the name of the game. All photos by Dr. Walt Good.

FOR WHAT IT'S WORTH

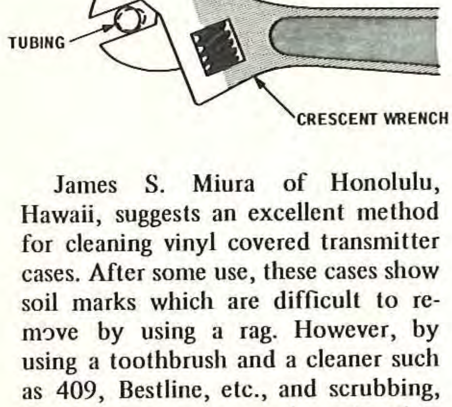
Clive Alexander of Florida, Transvaal, So. Africa, suggests that to prevent fuel from getting all over your plane and starting pad, try using a second plastic tube from the tank overflow back to the fuel container so that, when pumping fuel, you can see through the plastic tube when the tank is full, then reverse the pump till the outlet tube is clear of fuel, leaving no mess on the floor of the plane. Be sure to remember to provide a vent pipe in the fuel container. In addition, to hold spare props in your field box, use a long ¼" bolt through the side of the box, slide the props on this bolt, and retain them with a wing nut.



NO. 1 NO. 2

For inexpensive nickel cadmium batteries, stop by the local electronics shop that services two-way radios used by the Police and Fire Departments. The portable walkie-talkies used by these departments employ rechargeable batteries that are discarded when defective. One battery pack picked up had twelve 500 mah button cells in series. By splitting them apart and testing them individually, only one cell was found to be defective while the other cells were as good as new. This idea was submitted by Ray Meverden of Neenah, Wisconsin.

Mel Mattson of Antioch, California, suggests that metal tubing can be restored to true roundness by adjusting the jaws of a wrench to the appropriate tubing size, then rotating the wrench gently around the tubing.

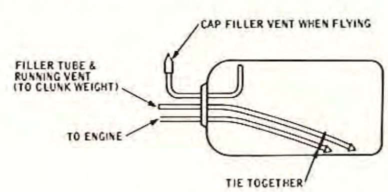


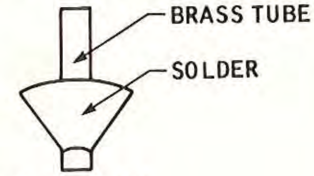
James S. Miura of Honolulu, Hawaii, suggests an excellent method for cleaning vinyl covered transmitter cases. After some use, these cases show soil marks which are difficult to remove by using a rag. However, by using a toothbrush and a cleaner such as 409, Bestline, etc., and scrubbing, like-new appearance can be restored to the vinyl covered transmitter case.

George J. Gurnavage of Tamaqua, Pennsylvania, mentions that a lot of wives get slightly more than peeved when their husbands get castor oil and fuel residue on the rugs in the house. George mentions that he has tried a lot of cleaners and nothing seemed to work to help the situation. However, if any of you see spots on your carpet then obtain some Fantastik Spray Cleaner, which is made by Texise, and available in all supermarkets. It's also terrific for cleaning up those fuel soaked aircraft after a flying session.

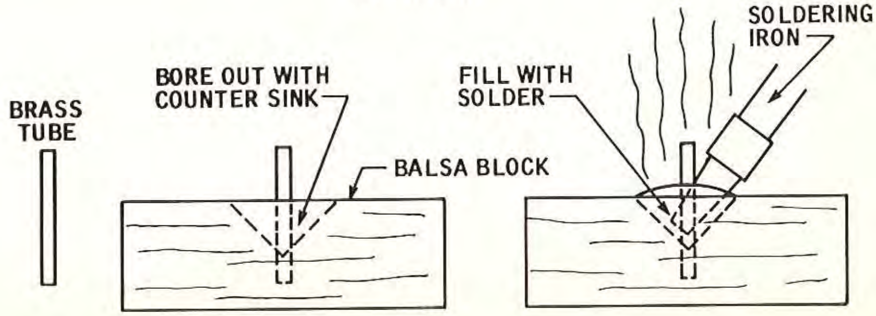
Bryce Petersen of Charleston, West Virginia, suggests that, if you need a new clunk for your fuel tank, or would like to have a heavier one than the one normally supplied, a small piece of brass tubing and some solder is all you need in order to fabricate your own. First, countersink a hole in hard balsa and mount a short length of brass tubing as shown in the sketches. Fill the hole with solder and presto – a new custom made clunk for your fuel tank.

The "chicken hopper" principle of tank venting, used in control line models to eliminate the effect of changes in tank head on mixture strength, can be applied to R/C clunk tanks. Three outlets are required. One is a vent to the top of the tank which is open for filling and closed with a plug for normal flying. The other two vents each have a flexible line and pick-up weight. One of these goes to the carburetor, while the other vents to the fuselage top. According to Henry L. Potter, of Los Angeles, California, in his installation, he has tied the two weights together with wire although this may not be necessary.



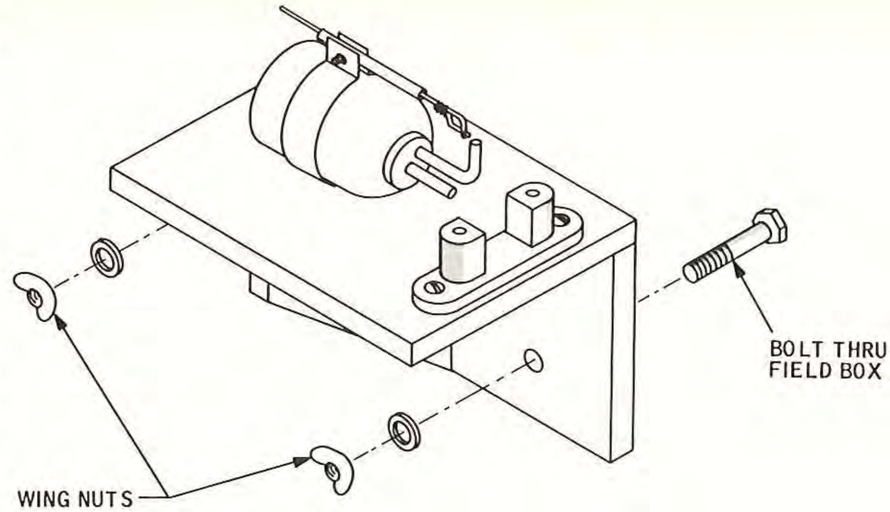


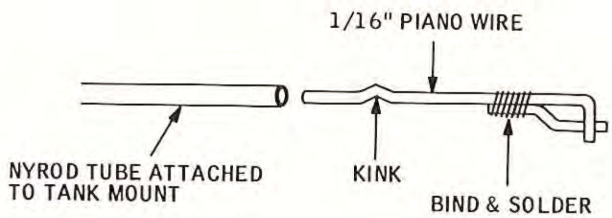
DRAWING X2



Henry mentions that he gets a full run at peak power on a ten ounce tank with a Veco .50 with this arrangement, while as with a "standard" tank vent system, he had to take off 4-cycling in order to run out the tank. Be sure to use very flexible tubing.

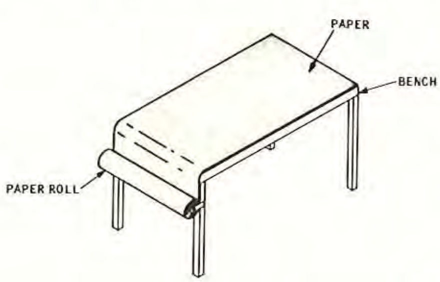
James M. Than of Adelphi, Maryland, submitted the accompanying sketch for a detachable engine test fixture for a field box which can be utilized for breaking in a motor in a remote corner of the flying field. The fixture is attached to the field box by means of wing nuts and can be readily detached when not in use. Provision is also made for throttle control of R/C engines as shown on the sketch. A commercial Tatone test stand is used.



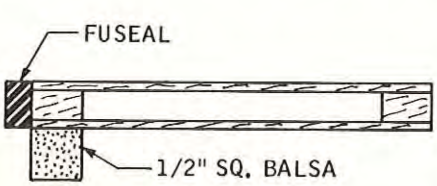


DETAIL OF THROTTLE CONTROL UNIT

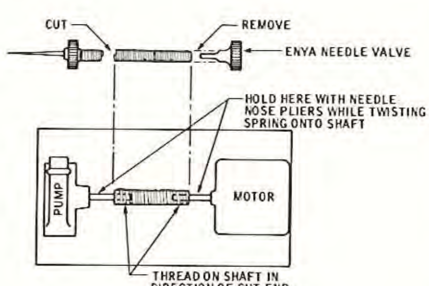
Gene Bobik of Cedar Rapids, Iowa, suggests paper used in the construction industry, between sub-flooring and flooring, makes a fine, inexpensive and tough work bench covering. Gene has mounted the roll at one end of his bench and, when he gets the covering slopped up and scribbled on, he merely cuts it off, discards it, and pulls the new covering over the bench as doctors often do on their examining tables. The accompanying sketch should be self-explanatory.



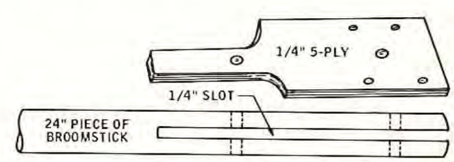
The RCM Fuselage Jig in the February 1972 issue can be further improved by one substitution and one addition, suggested by Gerald J. Reinhard of Brillion, Wisconsin. First, use Midwest Fuseal for facing material which will save search and application time. Second, add a hard balsa block at one side of each jig block for pinning the material and to avoid fore-and-aft side shifting while gluing.



L.A. Symasek of Jacksonville, Florida, submitted the drawing for what has turned out to be a very workable improvement to his Andy Wright Electric Fuel Pump. After the rubber tubing, which serves as a drive shaft, wore out from the inside, the author substituted a needle valve spring from an Enya engine, cut to the proper length. The inside diameter of the spring is a nice tight fit to the motor and pump shafts. Once twisted on to the shafts, the spring will not shift or wear out, yet retains the needed flexibility for efficient pumping.



Charles Auerbach of Hartsdale, New York, suggests that a ¼" 5-ply plywood piece can be cut to the full width and length of your motor bearers from the firewall plus 4" beyond the nose of your aircraft. This fuselage spray paint painting retainer is drilled to fit your motor mount holes. Next, taper to fit the nose opening on your model. Using a two foot section of broom stick handle, cut a ¼" slot to the length of the plywood, slip the handle on the plywood, and drill two ¼" holes. Bolt together. Assemble the unit to the motor mount and place the broomstick handle into a vice. The fuselage can now be rotated as needed while you paint. For each model you only need a new plywood piece.



Bob Peterzen of Omaha, Nebraska, suggests that, when using metal motor mounts, you may have trouble keeping the mount bolts tight. To cure this problem, Bob placed some .020 gasket material between the engine and the drilled-and-tapped mount and the bolts stayed permanently tight. The little compression created by the gasket material was enough to take up the slight amount of slack developed when the engine vibrates and to keep tension on the bolt. It also acts as a slight vibration dampener.

HAVE A BETTER WAY?
SEND IT IN!

RCM TELL-A-METER

from page 47

fully until it just barely touched the element. When I oiled the shaft and removed a few burrs, it was very free. If you need extreme accuracy, there are special potentiometers, made with negligible friction, but they are expensive.

The prop blast, and the flow of air around the airfoil will both cause errors. Therefore, this sensor is mounted on a probe that extends forward of the leading edge of the wing, well out of the prop blast. It's not pretty, but it's more accurate. Notice that the device does not take static pressure, air density, or temperature into account, all of which affect true airspeed. Actually, since the device is calibrated to local conditions, and altitude change is rather small, any errors are negligible. Calibrating in Denver and flying in San Francisco, would not be conducive to accuracy, of course.

To calibrate the Airspeed Sensor, find a calm day, and a convertible or a truck. Instruct the driver to drive at various speeds while you hold the sensor well away from the vehicle. Take meter readings at each speed, keeping records. Then do the same in the opposite direction, to cancel any effects of a breeze. Make several runs and plot out a graph that converts the Thumb Tach readings to speed. If there is any noticeable breeze, try to drive directly into it, and then with it, rather than crosswind. Then average your readings. The vane should be about 45 degrees to 60 degrees forward at zero airspeed, and deflect about 45 degrees to 60 degrees backwards at maximum airspeed. Fig. 5 has a diagram of the airspeed and AOA Sensor.

AOA SENSOR (Angle of Attack)

This sensor is the Airspeed Sensor with its spring removed. Two for the price of one. With the spring removed, the vane will streamline with the air, and will measure the angle between the free flowing air and the wing. This angle is angle of attack.

Calibrate your AOA Sensor at home. First, check that your floor is exactly level, with a carpenter's level. Then block up the plane so that its leading and trailing edge are exactly the same distance from the floor. If you use a twisted wing, measure half way out the wing. Then mount the probe and level its vane. Note the meter reading, and adjust the body of R1 until the meter reads mid-scale. Now, using an accurate protractor, move the vane in 1 degree increments both sides of level. (Level is zero AOA.) Plot the values, and you have another conversion graph. AOA of nearly all acrobatic planes stays between −25 degrees and +25 degrees. See Fig. 5.

Here's how AOA helps the R/C pilot. There is an interesting relationship between airspeed, the weight of the plane due to G forces, and the angle of attack, at the stall point. It is well known that the wing can be stalled at any airspeed, by simply pulling enough G's. Say that your plane weighs 5 pounds sitting still, and that at 75 mph your wing can produce a maximum of 20 pounds of lift. If you pull four G's, your plane weighs 20 pounds, all the wing can support. If you exceed 4 G's the plane stalls immediately. Now, say that you slow the plane down until the wing is capable of producing only 5 pounds of lift, and you note that this occurs at 20 mph. This is commonly referred to as the stall speed, for if you slow down any at all, the wing cannot support the plane.

If you would measure the wing's AOA at 20 mph straight and level, and again at 75 mph in a 4G turn, you would find the two AOA's to be equal! In fact, any wing always stalls at its same angle of attack, regardless of airspeed, plane weight, or G forces!

If you are measuring the angle at which your wing stalls, you can pull back on the stick right to the verge of disaster, knowing all the while just where the edge of a stall is. You know that nothing else can affect the stall, speed, G's, nothing.

If you know the parasitic drag of your plane, and the induced drag curve of your airfoil, you could calculate the most efficient AOA for pylon turns. This AOA would get you turned around as rapidly as possible without undue speed sacrifice. But you can also determine the correct value by simply comparing lap times with the AOA's you hold in the turns. Then, it's simple to adjust your elevator so that max elevator movement gives that AOA.

In unaccelerated flight, such as soaring, there is an AOA that gives maximum gliding distance, and another that gives maximum gliding time. These angles are entirely independent of weight! Not that a 6 pound glider will have the same endurance as the same plane with 3 pounds of lead removed, but if each plane glides for its own maximum time, they will both glide at the same angle of attack. Since the sailplanes are not pulling G forces, there is one airspeed for each angle of attack. Therefore, you can fly at a constant airspeed, or a constant AOA, your choice, for best performance. I outfitted one sailplane with an AOA sensor, hooked to an analog servo that controlled the elevator. The R/C servo could also move the elevator through a mixer assembly, and had more authority, for positive control. With the AOA system in operation, sort of an elevator axis autopilot, my still air times off a 2 minute engine run (power pod) increased an average of 22%! I could have just as easily used an airspeed sensor, but it offered a little more drag. Still, as Mr. R. Ben Givens points out, airspeed can be measured electronically, with very little drag.

VVI SENSOR
(Vertical Velocity Indicator)

VV, or Vertical Velocity can be measured mechanically, or electronically. Mr. Givens was kind enough to send me plans for his marvelous Thermal Sensor, and has published, with Mr. Maynard Hill, an article in the March 1969 issue of Flying Models. His Thermal Sensor is far more sensitive than any mechanical device. I haven't asked his permission, so I can't print his ideas, but mating the sensing portion with a wireless mike does work well. With the addition of the Thumb Tach, you'll have an exact figure, rather than a rising and falling tone, to give you VV. Some of us are tone deaf!

VVI calibration may present a problem; here are some possibilities. You could build an Altitude sensor and a VV sensor, installing them in the same plane. Then, while holding a constant Vertical Velocity, time the climb or dive to a given altitude. VV is measured in feet per minute. Alternately, an Air Force instrument shop, or the instrument repair facility at a large airport will help you. They have highly accurate calibration facilities for airplane Vertical Velocity Indicators. One other possibility is taking a ride in a light plane.

Plotting a graph of VV vs. Airspeed (for sailplanes) gives two vital airspeeds – the speed for maximum time aloft, and the speed for maximum flying range. Plotting a similar graph of RPM vs. Airspeed for a powered flight, gives a maximum time aloft speed, and a maximum range speed. For powered and soaring flight, the maximum time aloft speed is the most efficient speed at which your plane can fly. It is the speed that gives you maximum lift, for a minimum drag. Use it to obtain the highest altitude off a winch, or highest altitude in a given time limit, for spin competitions. Use the maximum range speed for gliding back home when you've drifted far downwind in a thermal, or your engine quit downwind of the field. Fig. 6 shows sample graphs finding these speeds.

ALTITUDE SENSOR

For this, acquire an aneroid. Sources include airplane altimeters, true airspeed and mach indicators, automatic parachute openers, and barometers. An aneroid is a flexible metal bellows, with air sealed inside. As a plane climbs, the outside air pressure drops, and the air trapped in the aneroid tries to escape. This forces the aneroid to expand, moving the altimeter's needles. Simply connect your aneroid to the arm on your variable resistor, and you're in business.

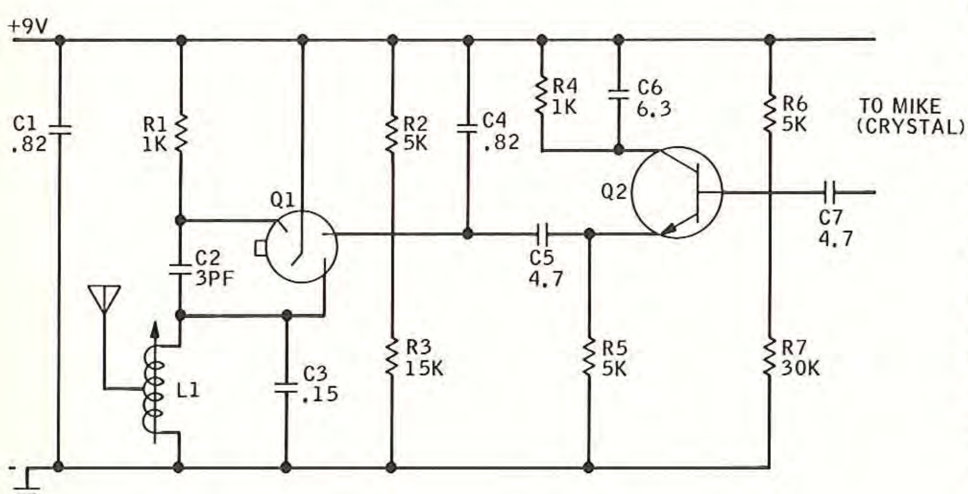
Calibration depends on your needs and uses. Aneroids are generally accurate to only 50 feet at best. A major source of error is temperature change, for a rise in temperature causes the aneroid to expand. Aircraft altimeters use a bi-metallic compensator in the mechanism, a good argument for using the guts of an altimeter. Unfortunately, temperature change with altitude is seldom predictable near the ground, so for accuracy, compensate.

You must re-zero the altimeter each day you fly. The air pressure changes constantly, and it is actually air pressure you are measuring. An easy way is to note the altimeter reading on the ground, and simply add or subtract that amount to each airborne reading.

There are many calibration possibilities. You could drive up a mountain with a borrowed aircraft altimeter in your hand, or you could compare meter readings with road signs that often give highway elevation. Most towns have the elevation of their city hall or post office published on a map, or located on the city limits sign.

to page 64

WIRELESS MIKE



L1 - FERRITE TUNED

—

2 METER HAM BAND
3 TURNS TOTAL
ANT. TAP AT 3/5 TURN FROM GROUND

—

FM BAND
3 1/2 TURNS TOTAL
ANT. TAP AT 4/5 TURN FROM GROUND

—

.025" WIRE ON A
0.2" CORE, FERRITE TUNED

—

Q1 2SA 342 OR HEP 3 MOTOROLA (BOTTOM VIEW SHOWN)
Q2 2SA 175 OR HEP 2 MOTOROLA
ANTENNA 20" LONG

—

SOURCE - ARCHER FM WIRELESS MIKE SLIGHTLY MODIFIED

FIG. 7

RCM TELL-A-METER

from page 58

Remember that your flying site is not at sea level, and that the elevations on a map are all referenced to mean sea level.

Perhaps a friend will take you for a ride in his private airplane. Be sure the cabin is unpressurized, and be sure he knows that your FM wireless transmitter and receiver will be operating. He probably won't mind, but either or both might interfere with his VOR navigation equipment while you're working. The cabin pressure will not exactly equal outside air pressure because of ram and venturi effects. You can diminish the errors by asking the pilot to fly slowly, or you can eliminate them entirely by taking along another airplane altimeter. Do not connect it to anything just hold it in your hand. An airport mechanic could probably loan you one for a few hours.

If your airport is large, or if there is a military airdrome nearby, see if their instrument shop will help you calibrate your sensor. They have highly accurate pressure chambers for calibration of their own instruments. This is what I did, and my instrument has a maximum error of 55 feet under all conditions. Would the FAI recognize your data for a record? I don't know, but they probably would, if your preparation and presentation were made with care.

Wireless mikes I've tested have had an airborne range of 150 to more than 10,000 feet. The best was the Archer FM Wireless Mike by Allied Radio Shack. A good circuit for the 2 meter ham band is shown in Fig. 7.

ALTIMETER

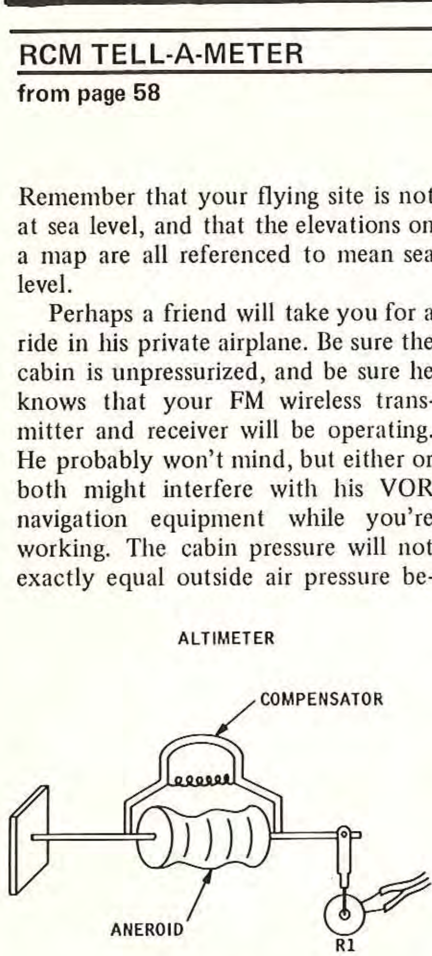


FIG. 8

CHT SENSOR
(Cylinder Head Temperature)

Epoxy a Veco 51A2 thermistor to the outside of an auto water hose clamp. Attach the clamp to the cylinder head of your engine, being careful not to obstruct the fins. The 51A2 has a resistance of 100,000 ohms at 75 degrees F which drops to 3500 ohms at 400 degrees F. Mr Clarence Lee says that this is the highest temperature an engine should reach, as the lubrication begins to break down at 400 degrees F.

Calibrate the CHT sensor by placing it in your wife's oven. Most ovens are accurate to 25 degrees F or so, but you could place a high temperature thermometer inside as a check. Be sure to use high temperature insulation on your wires, such as enameled wire, or teflon insulation.

Measuring CHT inflight will tell you well in advance of a lean run. Your engine is already damaging itself due to galling and friction, when it starts sounding sick, but a rise in CHT will show immediately so you can throttle back and land. Scale fans and pylon pilots with closely cowled engines will find the CHT Sensor a boon on test hops, for cowling design, and even in competition. One note, up to a point, engine power increases with CHT, even in a two cycle condition.

G SENSOR (Gravity)

Curious about how many G's your pattern plane can pull? Attach a

AUTOMATIC THERMAL FINDER

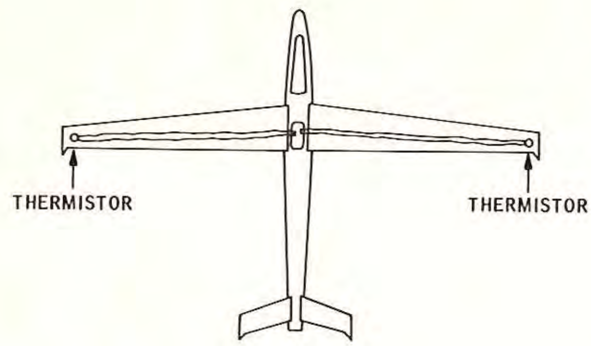


FIG. 11

COMPASS

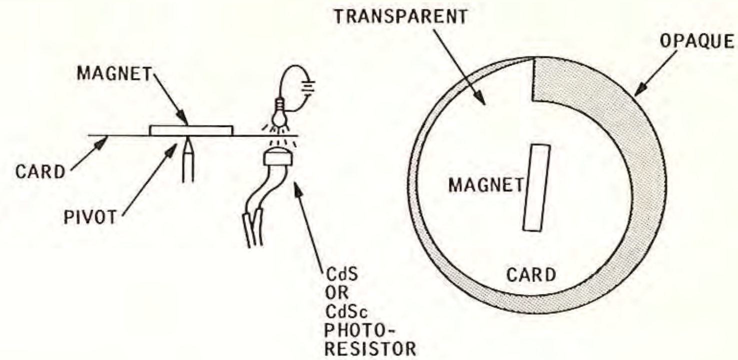


FIG. 12

weighted arm to resistor R1, instead of the vane, with a spring return. When G forces are pulled, the arm deflects downward (or upward, if inverted) changing R1's value. To calibrate, first weigh the entire arm and find its balance point. Then attach the arm, and prepare several weights equal to the whole arm. Hang the weights at the balance point, one at a time, and take meter readings. One weight, plus the arm, is 2 G's. Each added weight adds a G.

OTHER POSSIBILITIES

To give you an idea of the endless possibilities, here are a few things I haven't tried yet. If you want to measure something, the chances are excellent that the RCM Tell-A-Meter can do it for you.

If a thermistor in an insulated tube were mounted in each wing tip, the two could easily tell you which is in warmer air! Veco thermistors can easily measure fractional degrees of temperature difference and Veco will

CYLINDER HEAD TEMP SENSOR

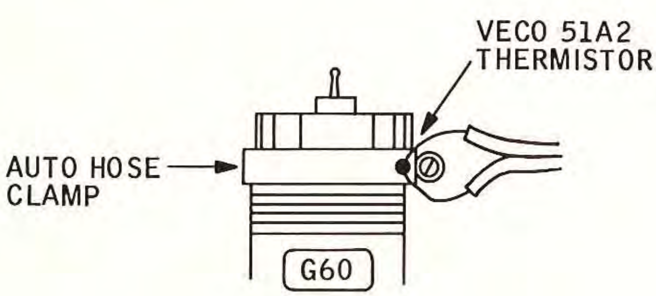


FIG. 9

ACCELERATION SENSOR

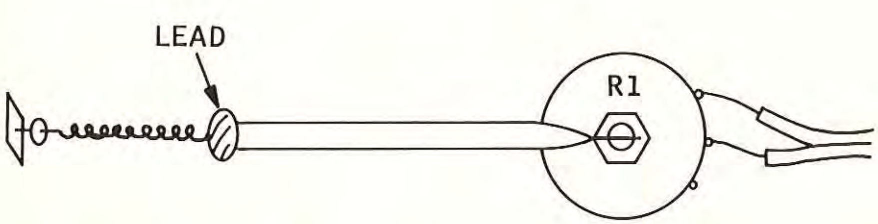


FIG. 10

send you free literature showing just how it is done. When I try this, I'll probably mount the thermistors in wooden tubes under the wing tips and connect their leads to a Givens Thermal Sensor. Air will flow through the tubes, and I could even hook up an analog servo to the rudder. The plane would always turn toward warmer air. An ordinary rudder servo would be connected to the rudder also, through a mixer, for positive control.

You could measure fuel level by putting a float inside the tank. The float would move an arm connected to your variable resistor, which is also inside the tank. The wires exit through the fuel vent tube.

FUEL LEVEL SENSOR

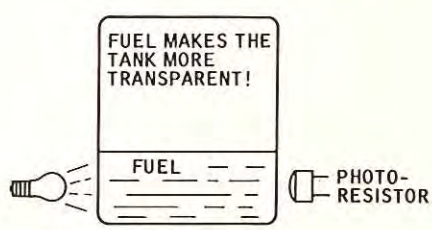


FIG. 13

An airborne compass could form part of the world's first model plane autopilot. With this, you could make an approach and landing, without ever looking at the plane . . . **Maybe**. A friend, acting as controller, would give you headings and altitudes to fly, just as a radar controller might to an airliner, right down to touchdown. It would be difficult and expensive to get a variable resistor with a shaft free enough for a compass to turn it. But the home-made device in Fig. 12 should do fine. The light bulb shines through the acetate, and as the acetate turns to align itself with the earth's magnetic field, the amount of light reaching the photocell changes. The photocell is a CdS or CdSe type that varies its resistance as light changes. Come to think of it, this idea could be used in the fuel level system, if you use translucent fuel tanks. See what I mean about the endless possibilities?

You now have at your disposal a means of acquiring hard data in a realm of flight seldom investigated. Air flow can be predicted with considerable certainty when it flows past a giant air liner's wing, for billions of dollars have been spent investigating just that. But, there was little money and very low speed aerodynamics, at Reynolds numbers under a half million. And air often acts quite differently at such low airspeeds, weights, and Reynolds numbers. For instance, in many clean model wings, even without laminar airfoils, the air stays laminar until it is well past the wing!

Data carefully developed for large planes applies to ours, but only roughly. There are refinements possible in every aspect of our flying. There are probably far better airfoils than any we have today, and there may be dramatic new ways of reducing drag, just around the corner of our imagination. Only creative investigation can find them.

USEFUL ADDRESSES

Thermistor sources

Veco (Victory Engineering Corp.) 128 Springfield Ave., Springfield, N.J. Phone: (201) 379-5900. Thermistors in large quantities, and literature and data on thermistors.

F S I, 740 Melrose Ave., Los Angeles, California. Thermistors. Request $10.00 minimum order.

Brill Electronics, 1065 Terra Bella Ave., Mountain View, California 94040. Thermistors.

Potentiometers, Special

Computer Instruments Corp., 92 Madison Avenue, Hemstead, L.I., N.Y. 11550. Phone: 483-2800. Precision low torque pots in all varieties. □

SOARING

from page 52

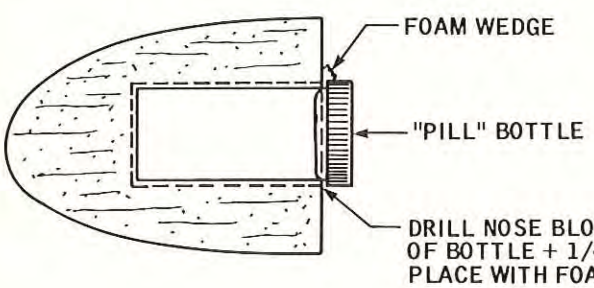
moderate-priced unit designed especially for beginners, still features its famous "brick" servo-receiver package. The receiver measures 2.75" long x 1.69" wide x 1.45" high and has an airborne weight of only 8 oz. (with 2 servos). Control accuracy is better than 1%, and receiver current drain is 25mA. List price is $119.95 for the LRB with 2 servos. For details, write: EK-logictrol, 3233 W. Euless Blvd., Hurst, Texas 76053.

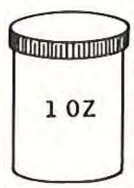
*

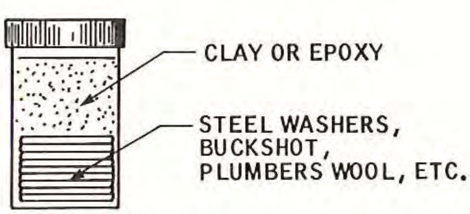
Rose Industries, 1190 N. Rose Street, Escondido, California 92025, has manufactured an aluminum reel for your sailplane winch. Instructions on how to build a power winch utilizing this reel can be found in the April 1971 issue of R/C Modeler Magazine. The aluminum reel from Rose Industries has ¼" thick sides with an 8" outside diameter. The reel is 3½" wide with a 5/8" center hole. Price is $20.00 plus tax.

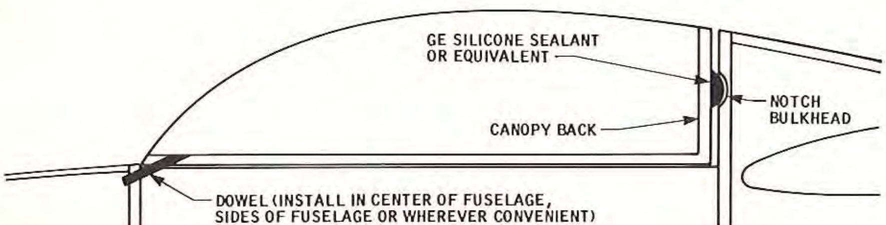
*

The popular Gryphon aerobatic slope soaring sailplane from Model Dynamics, P.O. Box 2294, Orange, California 92669, can now be powered with the new Gryphon Power Pod when the lift leaves. Gryphon Power Pod allows you to use a .09 engine for power assist or use a .15 – .19 engine with servo for full throttle control. Designed to fit your Gryphon, two screws puts it on or takes it off. The Power Pod builds fast with simple construction and an easy mount. It is designed to mount a .09 to .19 engine and includes internal space for a one ounce tank and a Kraft KPS-12 servo. Complete step-by-step instructions are included and all parts are pre-cut to fit exactly. Price is $6.60 from your dealer or order direct. Tested, Approved and Recommended by RCM.









SAILPLANE HINTS & KINKS

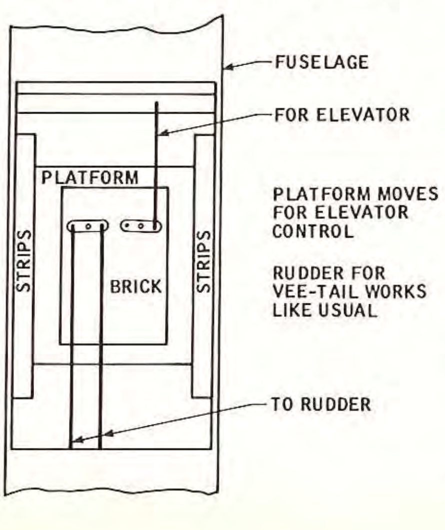
A neat way to make ballast changes in sailplanes is to have several plastic pill bottles, all of the same size, but each filled with a different amount of weight. The nose block of the sailplane is drilled out to the size of the bottle plus ¼" to allow for a wedge of foam, etc. The weight may be made up of steel or lead washers, buckshot, plumbers wool, etc., and can be retained by epoxy or clay. Shorter but fatter containers may be made from 35mm color film canisters. This idea was submitted by Denny Darnell, of Tulsa, Oklahoma.

*

The attached diagram illustrates what is involved in a simple method of latching canopies on gliders where there is little stress or vibration. If the canopy is inset in the fuselage at both the front and back, use a small blob of silicone or floral clay at both ends. If only the back is inset, use a dowel to hold the front and a blob of silicone or floral clay at the back. If necessary install a dowel. Next, put some silicone on the back panel of the canopy then notch out the fuselage with a cone shaped cut-out to match the location and size of the dab of silicone which you installed. Let the silicone dry overnight then insert a dowel into the fuselage and pop the canopy down into place. The silicone will compress and then expand into the cut-out. If too much has been used, trim it down with a sharp knife. This idea was submitted by Ernie Roberts, of Pierrefonds, Quebec, Canada.

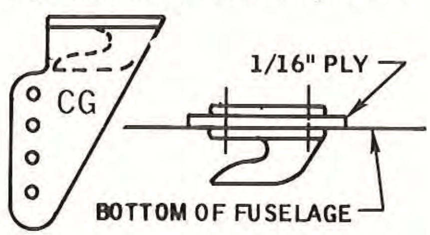
*

If you are constructing a V-tailed sailplane using ruddervators and have a two channel brick, this idea from Clifford Cross of Arlington, Texas, will be of value to you. The brick is installed on a moving platform with the rudder portion hooked up normally. The elevator linkage is hooked to a non-moving portion of the fuselage and moves the brick mounted on the movable platform for elevator control, as illustrated by the sketch below.



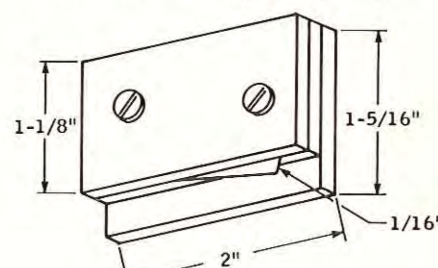
*

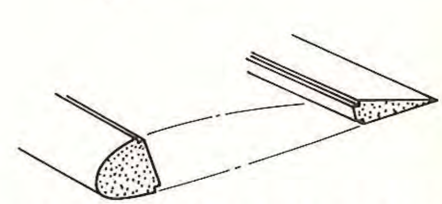
Here is an easy way to make a sturdy, light tow hook for a small to medium sized sailplane as submitted by Dr. D. Douglas Henning, of Santa Maria, California. It's made from a Goldberg long control horn and fabricated with a Dremel Moto-Tool. According to Dr. Henning, it has survived a great number of tows and just about as many hard landings. The sketch should be completely self-explanatory.



*

Brian Shaw, of Surrey, England, submitted this idea for a rebate tool as an invaluable shop aid for cap stripping. It is made from two pieces of 1-1/8" x 2" x 1/16" and one piece of 1-5/16" x 2" x 1/16" mild steel, aluminum, or glass fiberboard. Be sure to set the razor blade to protrude 1/16" as shown in the sketch and drill and bolt the assembly together. When in use, make two rebating cuts at right angles to remove a 1/16" square rebate. This facilitates and strengthens the location of wing rib cap strips.

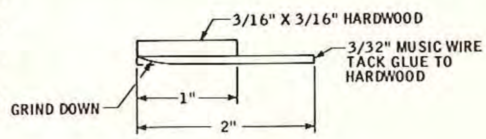




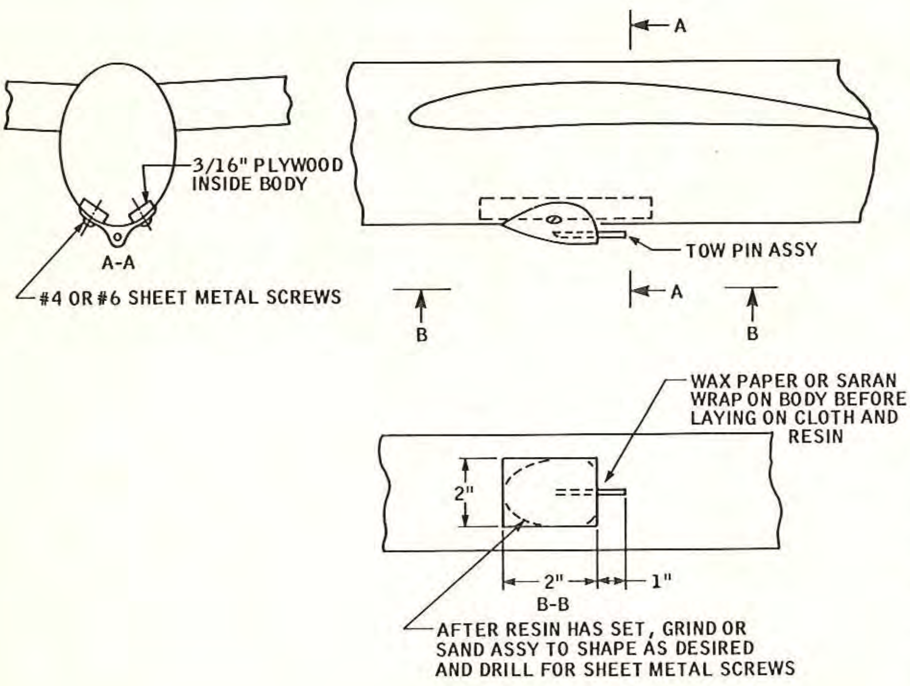
TO LOCATE CAP STRIPS, CUT 1/16" X 1/16" REBATES IN L.E. AND T.E.

Most builders of RC sailplanes find

that many kits or plans have a poor tow hook arrangement or, actually none at all is shown. A movable hook is of great advantage to the builder since it can readily satisfy the requirements for C.G. location, launch method, and wind velocity. The fiberglass hook, as shown in the Sketches A and B, from Dave Burt of Evanston, Illinois, will conform to the bottom of



SKETCH "A"
TOW PIN ASSY



SKETCH "B"

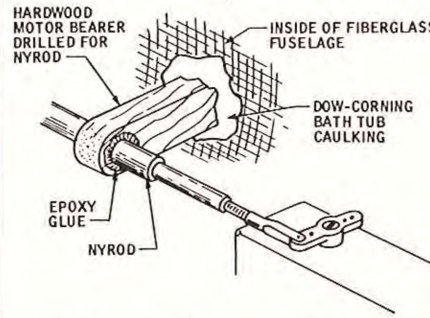
any sailplane, and is suitable for towing or hi-start launching of sailplanes up to 6 pounds. The hook can be made by using polyester fiberglass resin or epoxy resin. The cloth should be 2" wide, 10 oz. woven glass like that used for reinforcing wing center joints or, alternately, Hobbypoxy Easy-Duz-It cloth.

First, place wax paper or Saran Wrap over the body where the hook will be installed. Second, put down two 2" square layers of cloth saturated with resin. Third, add the tow pin assembly (see sketch A) so the 3/16" square hardwood piece raises the tow pin away from the body. Fourth, while the resin is still wet drape 3 or 4 more layers of 2" sq. cloth and resin over the top and around the pin assembly. (See sketch B.) Use your fingers to mold the cloth and resin into a smooth contour and work out any air bubbles. Fifth, while the entire mess is setting up, file, grind, and sand it to your satisfaction and then drill two holes for the #4 or #6 sheet metal mounting screws.

*

For sailplane enthusiasts using fiberglass fuselages, the following sketch from M.H. Dailey of Edmonds, Washington, shows an easy and efficient method of installing NyRod or Gold-N-Rod pushrods inside the fiberglass fuselage.

*

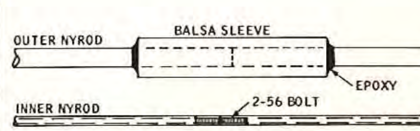


Sailplane enthusiasts seeking a poor man's winch might try this idea from Bob Phillips, of West Islip, New York. Modify a conventional, single speed bicycle by removing the rear tire and installing a stand broad enough to keep the frame vertical with a man on the saddle while keeping the rear wheel clear of the ground. Provide guides such as fishing rod guides or simple improvised ones to keep the winch line clear of the works, leading it forward. The handle bars can hold a stop watch, transmitter, aspirin, and the like.

*

If you need a quick simple way to add ballast to your sailplane to obtain the correct balance, try "Taypa-Wate" for the job. These can either attach permanently or temporarily inside or outside the fuselage. "Taypa-Wates" are flat 1/2" x 3/16" lead weights with adhesive backing that are used in automotive wheel balancing. In addition, they are marked with lines indicating quarter ounces and are easily cut with regular wire snips. Most tire stores or auto part houses carry them in stock. When balancing a sailplane they can be attached outside and, after the model is trimmed, they can be concealed inside of your fuselage. This idea has been submitted by Earl Witte of Mehlville, Missouri.

*



While on the subject of NyRods, Maurice C. Taylor of Ohio City, Ohio, mentions that, after building a few models and using a NyRod in each, he had accumulated quite a few left-over pieces. They were really too long to throw away and, yet, they were too short for anything except for use from the servo to the nosegear. Since Maurice was building a large sailplane he used the following method to splice and use all of his assorted lengths of NyRod. To splice the outside piece of NyRod, he roughed up the outside surface with a file to about 1¼" from each end. Then he cut a medium hard piece of leading edge balsa to a length of 2½". Into this he drilled a hole into which the NyRod was tightly fitted. To make the joint, use a long piece of 1/8" wire to hold the two lengths of NyRod in alignment and have the tube of balsa slide onto one end. Wipe the outside roughed-up area with epoxy and then slide the tube of balsa over to center exactly on the joint. Place extra epoxy around the ends of the balsa and let dry with the wire in place. The balsa can later be trimmed off to a round shape. The inner NyRod is simply joined by a 2-56 headless bolt which screws into each end. The joint is then sanded slightly. The joints between the inner and outer NyRod should be chamfered to avoid any chance for the edges to possibly catch or hang up.

*

When balancing the typical RC sailplane, a substantial amount of weight is often required, writes Albert F. Niessner, Jr., Boalsburg, Pennsylvania. Lead offers the most economical dense weight material (approximately 0.4 lb. per cubic inch) that may not be easily molded to fit in tight or irregular quarters. Balancing a sailplane which requires up to 8 oz. of nose weight led to the use of lead shot for the ballast. An experiment has shown that the density is only 30% less than solid lead. The shot (the size is not critical provided that the individual shot is small compared to the size of the volume being filled). It has a density of 0.267 lbs. per cubic inch when it is well packed. The weight is equivalent to an equal volume of solid steel. The amount of shot required is found by strapping a paper cup on the sailplane at the location where the shot is to be placed. Enough shot is put in the paper cup to properly balance the sailplane. Hobbypoxy glue is then mixed with the shot and this mixture is then poured into the nose or tail of the sailplane. Fine adjustment of the balance can be made by chipping some of the shot away.

The "molded in" feature of this technique allows the weight to be placed in the very nose of the sailplane where it does not use up any of the equipment space. In applications where the sailplane requires a large weight but has a short nose moment, a weight savings can be obtained by placing the balance weight as far forward as possible. The lead shot is available at most sporting goods stores for reloading shotgun shells. A number 2 or number 4 shot works well in most applications. An even denser package can be obtained by using a large shot mixed with a fine shot. The latter must be sufficiently small to fill the voids between the larger shot.

BELL HUEY COBRA

from page 29

the use of lock washers under all nuts used on the motor plate. We also advise the use of Loctite on all attachment hardware.

The main rotor shaft (03.07) is attached to the drive shaft (02.04) by means of the coupling (02.01). An Allen head screw and stop nut are used to attach the main rotor shaft into the coupling. Now, drill a hole in the center of the airframe pylon as shown on the plans. This hole should be slightly larger than the main rotor shaft. Next, turn the airframe over and, with the utmost caution, insert the entire motor plate with the motor/transmission/drive shaft installed into position in the bottom of the fuselage, feeding the main rotor shaft through the hole just drilled in the top of the main rotor pylon.

Adjust the position of the mounting plate so that it is centered on the longerons "C" without binding the rotor shaft, but still aligned inside the airframe. You may find that you will have to cut away with a sanding drum part of longeron "C" and the fiberglass flange in the bottom of the fuselage where the motor housing will not seat properly. Make sure that the motor and transmission mounting plate seats properly on the bottom of the fuselage, then hold firmly in place with masking tape while you drill 8 holes for the 3mm attachment bolts into longerons "C". Next, mount the motor plate by putting a large washer under the head of each 3mm bolt, and epoxy into place from inside the fuselage with Stabilit Express, with the thread protruding through the bottom of the fuselage. Temporarily install regular M3 nuts until the Stabilit Express cures, but replace at final assembly with stop nuts (01.13). While the motor, transmission, and motor shaft are temporarily installed, mark for the necessary cut-outs in the sides of the fuselage for those items which will require external access during actual flight operations of your helicopter. An ideal way to locate the proper points for these items is to shine a bright light through the opposite side of the fuselage so that you can see the mechanisms inside. First, locate the area for your muffler and cut this area out in the left fuselage side, and slightly undersize. When the hole has been cut, position the muffler then, using a grease pencil, mark the area to be cut away, again allowing a minimum of 10mm clearance completely around the muffler so that you will not burn or scorch the fuselage sides. On the right side of the fuselage, drill two 3/16" diameter holes directly in line with your muffler mounting screws, since the muffler must be mounted after the engine and transmission have been installed. These access holes are to allow you to insert a screwdriver from outside the right side of the fuselage in order to loosen or tighten the muffler mounting screws.

The next hole to be drilled is the large hole to allow access to the carburetor settings. Be extremely careful in drilling all of these holes that you do not press too hard on the drill and allow it to strike the mechanisms inside. Next, drill the appropriate holes for a fuel shut-off device, as well as a fuel filling device. Since your fuel tank is sitting slightly higher than the needle valve, the tank could siphon fuel into the engine, thereby flooding it. For this reason, we recommend installing a fuel shut-off device in the side of the fuselage so that the fuel can be shut-off between the tank and the engine when the engine is not in operation. Next to this hole we installed a fuel filling nipple. Near the front of the fuselage, drill a hole for the installation of the phono jack if you intend to use an external starting battery for your glow plug, or for a micro switch, if you intend to carry a rechargeable nickle cadmium starting battery inside of the fuselage.

Now, remove the engine, transmission and main rotor drive shaft, and finish cleaning up the access holes that you have made in the fuselage. Any point where the fuselage will have to sustain any stress, such as the phono jack, should be backed up with a small piece of plywood or fiberglass cloth applied to the inside of the fuselage with resin. Now, enlarge the hole in the center of the airframe pylon for the main rotor drive shaft to at least 15mm diameter. After this has been accomplished, reseal with polyester resin any portion of longerons "C" where they cut away or sanded for fitting of the engine and transmission mounting plate. This area of the fuselage must be completely fuel proofed.

Check the top of the main rotor pylon and make sure that the area on which the main rotor mounting ring (03.02) is to seat is flat and level. If not, file and sand the area until a firm level base for the ring is made. Re-mount the engine and transmission mounting plate and slide the main rotor shaft through the enlarged hole in the main rotor pylon. Slide the main rotor mounting ring (03.02) onto the protruding rotor shaft. Position the ring so that the mounting holes are at 45° to the fuselage centerline, and drill four holes for the M3 screws (01.15) which will eventually hold the main rotor mounting ring in place. Install these screws to hold the ring in position, but do not attempt to put the nuts on the underside at this time. At this point, the swash plate assembly (05.5000) can be temporarily slid into place on the rotor shaft, above the mounting ring. Install the two long swash plate arms (05.06) into the lower swash plate ring. Install the short swash plate arm (05.06) into the upper ring. Lock all three arms securely with M3 jam nuts (01.03). Slide the swash plate driver (05.01) onto the rotor shaft, and clamp against the top of the swash plate using an Allen head M3 x 15mm (01.12) and M3 stop nut (01.13). The anti-torque rod (05.17) is attached to the left side of the swash plate using a Missing Link (04.04) and 2 x 8mm self tapping screw (05.22). The other end is attached to the center of the pylon using M2 x 10mm screw and nut. The hole for this screw should be located with the swash plate positioned with the Missing Link ball on the left side, and the lower arms directly forward and on the right.

At this point you should decide how your radio installation is to made. The information included with the kit shows the pitch and roll servos mounted vertically just forward of the main rotor shaft. The throttle and tail rotor pitch servos are shown mounted on a plate in the forward section of the nose. Since all indications pointed to the nose of the helicopter requiring ballast, we decided to install all of our servos in the forward area. This would also offer more protection from the engine slop. Bellcranks were installed on the original servo mounting bulkhead. The position of the bulkhead and the bellcranks was carefully determined to allow for straight (a must) and vertical pushrods to the swash plate arms. Substantial pushrods must be used between the servo and the bellcranks, if this system is to be used.

It is also imperative that the bellcranks be carefully fitted to eliminate all play in the linkages. The position of the receiver and battery is a matter of choice, but should be kept as far forward as possible. If you are not adept at making close fitting, free running linkages, it would probably be better to install the servos as shown on the plans. In any event, the decision should be made, and the servo mounting platforms installed, and the radio trial fitted, with any necessary linkages fabricated and pushrod holes cut in the pylon. Once the fuselage has been painted, the locations of these holes is far more difficult to determine. While you're at it, drill a 1/16" hole through the bottom of the fuselage just behind the nose gun turret. This will be for your receiver antenna, which will simply hang loose outside of the fuselage. Attempting to route the antenna through the fuselage will result in severe radio interference due to the noise generated by the transmission and the "metal-in-metal" noise created by the tail rotor drive shaft.

Now, once again, remove the engine and transmission assembly from the fuselage so that we can proceed with the final fuselge detailing necessary prior to sanding and painting. This would be a good time to mount your motor plate and break-in your engine and transmission. Remove both screws (fill and drain) from the transmission and add 35cc of Hypoid 90 transmission oil through the upper hole. Caution, do not overfill the transmission, or, when hot, the oil will be forced out through the sealed bearings. It is recommended that this new engine-transmission assembly be run in for approximately one hour before attempting flight. Incidentally, remove the main rotor drive shaft from its coupling before running the assembly. After filling the transmission, firmly replace the screws.

The stabilizers, located a few inches forward of the vertical tail, as shown on the plans are cut from ¼" balsa to the shape shown, and then sanded to the airfoil shown. These stabilizers are to scale size, and there is some question as to whether or not these stabilizers are adequate to prevent the helicopter from tipping forward during high speed forward flight. At present, we recommend installing the larger stabilizer as was used on Dieter Schluter's ship (see Fig. 1). The stabilizer, small or large, has little effect at

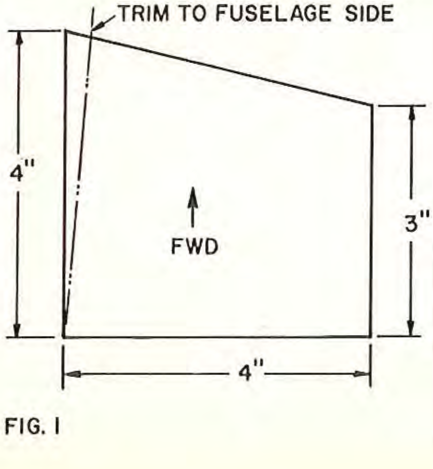


FIG. 1

League of Silent Flight

LEAGUE OF SILENT FLIGHT
P.O. Box 2606
Mission Station
Santa Clara,
California 95051

By Le Gray

Perhaps you are curious about the LSF . . . the League of Silent Flight. Many people are these days, because the LSF is attracting the attention of R/C sailplane fliers throughout the world. Recent press coverage has given many details, but other points may also be of interest.

The LSF is an association of people who have a common interest . . . R/C soaring. It is designed for the individual . . . it is a "program" . . . it is not a club. Participation in the LSF neither conflicts with nor requires club membership. In fact, many clubs find that group participation in the LSF program can excite new areas of interest and be the basis of new growth.

The League of Silent Flight Soaring Accomplishments Program provides a realistic challenge to the serious R/C soaring enthusiast through a series of meaningful standards of flying proficiency . . . goals that can be attained at most local flying sites. Membership in the League can only be earned . . . by personal, documented performance. Membership cannot be "bought" . . . there are no membership dues or fees.

To become a member, an R/C sportsman must fulfill the requirements of Level I of the LSF Soaring Accomplishments Program; a 5 minute thermal soaring flight; a 15 minute slope soaring flight or a second 5 minute thermal flight, and five spot landings within 3 meters (9.84 feet) of a target point.

Advanced levels in the Soaring Accomplishment Program are progressively more difficult. Level V, for example, requires a 2 hour thermal flight, an 8 hour slope flight, a 10 km (6.21 miles) goal and return flight, as well as considerable contest success.

Only members . . . sportsmen who have achieved Level I or higher . . . are privileged to display the LSF insignia. The LSF emblem on a jacket or sailplane is a symbol of proven performance . . . it has been earned . . . and is displayed with pride anywhere in the R/C soaring world.

The LSF is growing – fast – but the "grass roots" concept, the personal challenge for the independent sportsman, will be maintained, because that is the League of Silent Flight.

Serious sportsmen are invited to associate with the LSF by submitting the following to the Executive Board: (a) name; (b) mailing address; (c) FAI organization affiliate and license or membership number; (d) radio operator's license number; and (e) a statement similar to the following:

> "I, (the undersigned), support the philosophies, concepts and criteria set forth in the Bylaws of THE LEAGUE OF SILENT FLIGHT and give notice herewith of intention to attain Level I of the LSF Soaring Accomplishments Program, and by so doing, earn full recognition and privilege of membership."

All correspondence to the LSF should include at least **16** cents in stamps for return postage. Correspondence should be addressed to The League of Silent Flight, P.O. Box 2606, Mission Station, Santa Clara, California 95052, USA.

low speed or hovering. However, as speed increases, the tail tends to rise, causing the rotor blade to pitch forward with respect to the ground, resulting in an undesirable diving attitude. It appears that the larger stabilizer is required to hold the tail down. The plans show the stabilizer passing through the fuselage, in a permanent mounting. It was decided that on our ship, we would mount the stabs in half sections, using rods through the fuselage. The stab sections are held in place by means of wheel collars built into the stabs. With this installation, we can experiment, since the stabs are readily removable, and can be replaced with smaller stabs at a later date. Even the incidence can be easily changed by relocating one rod. A check of the photos will clarify how this was done – but the choice is yours.

While you are working in the tail section of the fuselage, bend your tail skid from 1/8" music wire. Mount this to a piece of 1/8" plywood. The unit is then installed into the fuselage and held with two 4-40 screws and nuts, using large washers under each. Use sufficient resin on the inside to hold securely. We recommend that the tail skid be bent downward at a sharper angle than as shown on the plans. The reason for this being that, as shown on the plans, the skid extends through the lower portion of the rudder. Any side flexing of the skid would surely break the rudder, hence we recommend bending the skid to exit below the rudder. This also provides additional protection for the tail rotor blades which extend below the fuselage. Once the skid has been installed, you can carve and shape the rudder portion of the vertical stabilizer. This may now be installed using epoxy glue or resin.

Meanwhile, up forward in the engine room, we must install an air deflector to route the air being blown over the engine out through the bottom of the fuselage. This deflector can be made from balsa (grain across the fuselage) or simply bent from lightweight cardboard. The deflector extends across the fuselage and is curved from the bottom of bulkhead 3 forward and down to the bottom of bulkhead 2. Once fitted, the deflector is resined into place and thoroughly coated with resin. When cured, locate and cut out access to the glow plug.

The Huey Cobra has small stub "wings" located just about on the C.G. These "wings" serve primarily as armament platforms. These "wings" are not shown on the side view of the plans, but are detailed in the small 3-view drawings on the plans. These wings serve no purpose on the model, and are for scale appearance only. The wings are also highly vulnerable to damage during the training process, thus some thought should be given to mounting. They can be mounted rigidly, anticipating that you may have to repair them from time to time, or they can be fastened with removable fasteners such as Taran fasteners or double sided tape, or with blind mounting nuts and screws through the fuselage side from the inside. These "wings" should be positioned approximately centered on the main rotor drive shaft, just forward of the jet intakes. Their approximate size for your model should be 4½" long at the root, and sweeping back to 2¾" at the tip. The total length of the wing from the exterior of the fuselage to the tip is 4½". The maximum height of the airfoil of the wing at the root is 1-1/8", tapering up from the bottom to 7/8" at the tip. The fabrication of these "wings" is up to you, but we would suggest that they be made up of soft balsa, carved and sanded to shape with a plywood root rib, and a carved balsa armament tip. Follow the three views on the plans and the photographs of the full scale Cobra for scale detail information on these items. Be sure to reinforce the interior of the fuselage with thin plywood or fiberglass cloth in the area where the wings attach to the fuselage.

The last step toward the completion of the fuselage is to prepare it for priming and painting. The "wings," stabilizer, and wood portion of the fin should be given two coats of Francis Surfacing Resin, sanding between coats. Careful sanding after the second coat should render them as smooth as the fuselage. Remove all mechanical assemblies and radio gear from the fuselage, and thoroughly sand the exterior of the fuselage, then fill any noticeable nicks or holes with Green Stuff Putty (Auto Supply Store) or your favorite filler. The airframe is now ready for priming and painting, whenever convenient. We will discuss our finishing later.

At this point, with the internal workings of our machine in order, we turn our attention to the assembly of the main rotor head and main rotor blades, as well as the assembly of the tail rotor blades.

Begin assembly of the main rotor by installing the main rotor hub (06.19) between the two rotor head brackets (06.11) which are, in turn, screwed to the see-saw (06.15) using two Allen head M3 x 40mm screws (06.08) and two M3 stop nuts (01.03). Slip the stabilizer bar through the main rotor hub, centering approximately. Slip the steering arm lever (06.05) onto the stabilizer bar, with the arm toward the center, positioning against the needle bearing (06.10) in the rotor head bracket (06.11). From the other end of the stabilizer bar, position a collar against the opposite bearing. Lightly lock the arm and collar in place, as they will be adjusted later. Screw an M4 (06.02) steel nut onto each end of the stabilizer bar as far as they will go. A stabilizer blade (06.01) is now screwed onto each end of the stabilizer bar. These blades are positioned so that their airfoils travel in the same direction, and their centerlines are parallel. Lock securely in this position by tightening the M4 nuts against the blades. The blade holders (06.17) are now attached to each end of the see-saw using two M3 x 15mm Allen head steel screws (01.12) and M3 stop nuts (01.13) to attach each pair of blade holders. This completes the basic assembly of the main rotor head.

The main rotor blades consist of a shaped hardwood (ash) forward section, and a shaped balsa wood rear section. The two parts of each main rotor blade should be securely glued or epoxied together. When dry, they should be sanded to a uniform airfoil shape as shown on the plans, and cut to exact length. Care should be taken to insure that the fit between the blade holders and the blades is accurate. A plastic material is supplied for covering the main rotor blades. The inboard end, where the blades will attach to the main rotor head should not be covered, but, rather, painted. We chose to cover our blades with chrome MonoKote, rather than with the material supplied. Our reason being basically a choice of color. We have found that the chrome blade, with a colored tip is, to us, an easily visible disc when spinning. In any event, the tips should be of a bright color. Checkerboard MonoKote is supplied for the tips, in two colors (red & white, black & white). Each tip is covered with a different color, allowing a visible check, later, when running, to determine if a blade is running out of line. The two colors make it possible to determine which blade is running "out." We suggest that these be used, at least initially, until flight trimmed. Once all is in order, the tips can be made the same color. After the blades have been completed, they can be drilled for fitting into the blade holders. This must be done extremely carefully and per the drawings in order to ensure a firm, positive, accurate mounting of the blades to the rotor head. The blades are then installed, using three Allen head steel screws (01.12) and three stop nuts (01.13) for each blade.

The tail rotor blades are constructed of three pieces for each blade, a balsa leading edge, a spruce center spar, and a balsa trailing edge. The three pieces for each blade should be glued or epoxied together. When dry, they are sanded to a uniform airfoil shape using the Clark Y configuration shown on the plans. The mounting hole in the blade must be drilled accurately to the dimensions shown. Do not make the mistake of seating the blades firmly in the holders and locating the holes in this manner. The blades, when properly installed do not fit into the bottom of the blade holders, instead they are mounted out toward the end of the holders in such a manner that the blade shape will allow the blades to rotate in the holder. This has been done to prevent shattering of the blade should it strike the ground. Again we caution, drill the mounting holes exactly as shown on the plans. Finishing of the tail rotor blade is a matter of choice. Covering material is supplied. The blades may also be covered with MonoKote or, as in our case, painted with SuperPoxy or a comparable finish.

At this point, all sub-assemblies of your new helicopter have been completed. The only work remaining is the final finishing of the fuselage and construction of the training landing gear. Before painting, remember to cover the ends of the tail rotor drive tube with masking tape. Our helicopter fuselage was finished entirely with K & B SuperPoxy, even the lettering and markings. A true olive green color can be obtained by mixing three parts of yellow SuperPoxy with one part blue SuperPoxy and one part orange SuperPoxy. K & B has also made available a satin hardener for use with SuperPoxy, eliminating that brilliant gloss which is otherwise obtained. All surfaces were given one coat of SuperPoxy primer, then sanded with #320 wet-or-dry paper, used dry. Any imperfections were filled using the Green Stuff mentioned earlier, then sanded smooth. Prior to the application of the second coat of primer, the surfaces were wiped down with a clean cloth dampened with rubbing alcohol, removing most of the sanding dust and oily fingerprints. The ship was then carefully wiped down with a tack rag, and a second thin coat of primer applied. The second coat of primer was lightly sanded with #400 wet-or-dry, again used dry. The ship was again wiped down with alcohol and the tack rag, prior to addition of the final color coat. Two coats of the olive green SuperPoxy were then applied, using very thin coats, applied immediately, one over the other. The ship was painted using the cheapest ($5.95) syphon type Binks air brush. The entire finishing of our helicopter required 8 ounces of primer and a total of less than 6 ounces of color (total – all colors).

We will be back again next month with Part 3 of assembling the Bell Huey Cobra. Part 3 will cover final assembly adjusting, balancing, assembly of the training landing gear, and flying. If you are building the Bell Huey Cobra along with us, we would recommend that you obtain six #10 fiberglass arrow shafts, and six pieces of wood doweling to fit inside of them. The doweling should be epoxied inside the arrow shafts, filling them completely. Incidentally, these shafts should be at least 28" long. With this done, you will be ready to begin assembly of the training landing gear. In the meantime, complete any painting and decorating.

(to be concluded next month)

CURLEW MARK II

from page 25

stabilator drive mechanism up against the fin with the hardwood sides facing out. Slip a bond paper spacer over the tubing, up against the fillets. Then insert the right and left stab halves onto the fin, up against the bond paper spacers. Since you haven't sheeted the top forward part of the stabs, you should be able to see the tip of the stab drive mechanism come out of the stabilator tubing. Block up the whole assembly so that (1) The stab halves are perfectly aligned with each other. (2) The fin is approximately in the correct relationship to the stabs – 0 degrees, and that (3) the exposed tip of the horn is where you want it to be for neutral elevator. When this assembly is firmly blocked in place, drill a 1/16" diameter hole through each end of the female stab tubing, ¼" inside the outer ends. Drill these two holes (one in each stab) at an angle so that the leading edge sheeting of the stab halves will clear the wire inserts that will soon be installed.

Unblock the assembly and pull off the stabs and the spacers. Epoxy a short length of 1/16" music wire into the holes at each end of each stab half. Now, slot each end of the male ¼" O.D. tubing so that it will just barely accept the 1/16" music wire retainers. Shape the fillets to the root section of each stab half and epoxy them onto each side of the fin in the neutral or 0 degree position. The final location of these fillets is important, do it carefully.

When the fillets are dry, test fit the stab halves. The whole assembly should be slop-free, well aligned and easily activated by the exposed horn tip. When you are satisfied, finish sheeting the stab halves, add the tips, and sand the whole assembly to final shape.

WING AND MOTOR MOUNT

The wing is built in three pieces – the two panels and the center section. The engine/tank pod, mounted on its pylon, simply keys into the center section, between the two ¼" ribs shown on the plans.

I built my wing panels at the same time I built the fuselage because of the "downtime" between gluing operations. The wing panels build up very quickly. The tip float stub boxes must be installed prior to sheeting the top leading edges of the panels, as must the aileron linkages. In fact, the only practical way to do this is to join the wing panels together with the center section, complete with dihedral braces and sheet the top of the wing after all is installed. You may have your own preference for aileron linkages but mine were simply 1/16" music wire pushrods, connected in the center section with a piece of square brass tubing. This tubing is then drilled vertically and a length of 1/16" music wire inserted so that it protrudes down through the wing and into the cabin area. Your servo simply drives this wire left and right for aileron action. When the linkages are installed and working freely the leading edges of the two wing panels can be sheeted and the tips glued in place.

The engine/tank pod is made from soft ½" balsa sheet epoxied around a 1/8" ply floor with hardwood engine bearers epoxied in place as shown on the plans. Be sure to slot the 1/8" ply floor of the pod to accept the tabs on the ¼" ply pylon. Also be sure to angle-cut the two engine bearers aft of MR-1. This must be done so that the tank will fit. Also, pre-drill your engine bearers and install blind mounting nuts on the bottom of the 1/8" ply floor.

The throttle linkage is embedded in one of the 1/8" balsa laminates used in making the pylon. Before you commit yourself by epoxying the whole assembly in place in the wing center section, make very sure the linkages are free. First, key the pod onto the top of the pylon and then key this assembly into the wing. Epoxy well, let it dry completely. When dry, place the wing onto the fuselage and shape the center section forward overhang to match the forward windshield – see plans. Sand the whole wing to final shape.

To strengthen the center section of the wing and the pylon, I fiberglassed the entire area from ½" outside the wing panel joints all the way up to the engine/tank pod. This really keeps vibration from the engine to a minimum.

Now you can install your tip float stubs into the boxes in the wing and start building the tip floats.

TIP FLOATS

A big problem with most R/C seaplanes that use tip floats is that they usually do not have sufficient bouyancy to keep the wing out of the water under windy conditions. Not so with the Curlews wing tip floats! They were specifically designed to handle windy weather and yet remain relatively "clean" in flight.

These floats are simple and quick to build. Build them upside-down, gluing one former at a time. Then epoxy in the stub receptacle box, sheet the sides, the bottom, and cap the ends. Sand to final shape and set them aside for finishing.

FINAL ASSEMBLY

Remember when I said to draw a

centerline down each of the formers? Well now you get to use them. Mark off the true center of the rear ½" balsa decking, using the centerline of F-6 and F-10 as reference points. With a jigsaw, cut a 5/16" wide slot for the fin assembly using the centerline drawn on the decking as centerline for the fin. Rough-cut rear decking to shape and hollow it out per the plans.

Your rudder and stabilator controls (I suggest NyRods) must now be fed through the holes in the formers. Securely connect your stabilator linkage to the exposed horn on the bottom of the fin. The rudder control is fed through a drilled hole in the decking. Now, epoxy the fin into the slot in the decking and glue the decking in place, always checking for alignment. When this assembly is dry, shape the aft deck to final configuration and install the rear wing dowel and windshield, the same as you did for the forward windshield.

FINISH

I prepared my Curlew for finishing by filling the nicks and dings in the wood with DAP White Vinyl Spackling compound. I also used this material for fairing in the fillets on the fin. Sig Epoxolite was used to fillet the pylon to the engine/tank pod and the top of the wing center section.

Any finish that you use on your land based aircraft is suitable for finishing seaplanes. This includes MonoKote or Solarfilm. I really liked the way the new K & B Super Poxy was written up in the December 1971 issue of RCM (From The Shop) and I decided to give it a try. My wing was first covered with silkspan, doped, sanded and allowed to dry for at least 72 hours. The Super Poxy was then sprayed on. The finish is beautiful and really tough – one of the best I've ever been able to achieve.

FLYING

Choose your engine carefully, reliability is a must! The Curlew flies well with a .19, .20, .23, .25, .29 or .30. That's quite a choice of engines for one airplane, but then, the Curlew is quite an airplane. I would imagine that your Curlew will weigh-in around 3 to 4 pounds and, with seaplanes, a little extra "horse push" is convenient to break loose from the water, so don't be afraid of the larger engines.

Your tip floats rubber band onto the tip float stubs in the wing. This arrangement allows them to pop-off on a hard wing-low landing. These floats must be adjusted so that they allow the airplane to lean just slightly when at rest with one float just out of the water.

O.K., check your radio and make sure left is left and up is up and that your ailerons are hooked up correctly. Start your engine and make the radio check again. If you are having vibration problems – shut it down, go home and repack the radio. Assuming all was well, release the Curlew out into the water. Taxi around a bit at different speeds. This will help acquaint you with the controls. You will notice several things right away. There is no need for additional water rudder. The Curlew's rudder shape should be more than adequate for the job even in windy weather. Secondly, you'll notice that the airplane sits low in the water. This is partly true because inverted "V" hulls seem to have this characteristic. But because the Curlew's profile is somewhat low, this also contributes to the "low in the water" look.

Enough playing around – give yourself some take-off room and head her into the wind. Steadily advance the throttle to wide open and hold her straight with a little right rudder. Almost immediately she will be up on the step and her forward speed will just about triple. Flying speed is attained quickly but you will have to fly her off because she will stay on the step all day long. Keep the ship climbing at a shallow angle until you've got about 50 feet of altitude. At this point feed in a turn and head her back toward you. Trim as necessary on the transmitter but if the trim requirement is drastic, set-up a landing and take care of it on the ground. Landing the Curlew is about as much fun as taking off. The airplane has a low stall speed but I still try to keep the nose down on approach and I start my flare at around 5 feet off the water and just let her settle in as smooth as can be. Due to the inverted "V" hull, there is very little tendency to skip like flat bottom types – once it's down it's down.

I guess I've taken you as far as I can with this project. I hope that it is as satisfying and rewarding for you as it's been for me. I would appreciate hearing from you about your Curlew Mk. II and perhaps if you're ever in the San Francisco Bay Area, we can get together and tear up a lake or two. You can write to me through RCM.

Happy Flying .... □

MORRIS HF

from page 19

FLYING:

Insure that the plane is balanced properly according to the plans and check that all of your control surfaces are free and well-centered. Start the engine, turn on the switch, give full throttle and good luck!

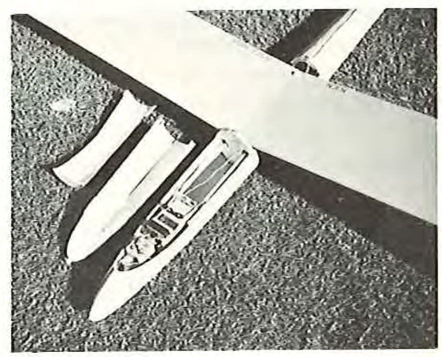
The Morris HF will be a smooth performer and should help you win your share of pattern contests. I would be obliged to those of you who build the Morris HF if you will drop me a note of your impressions. My address is: Graziano Pagni, Via Vettori, 170, S. Scroce Sull'Arno (Pisa) Italy. □

SUNDAY FLIER

from page 16

put it up for his half hour flight for LSF Level Three.

I'm still working away at the design of the Top Sailer. Here's a shot of three different versions. The slope racing version with the virtually flat wing has "flaperons" with the rudder coupled. The sport version, in the center, has a sheet balsa wing, like the Schoolmaster type construction, and the thermal contest version has the open framework wing. The airfoil on the racer is virtually the same as the Eppler 374. The sport version has a "flat bottomed 385" section for ease of construction, and the thermal wing has the true Eppler 385. Polyhedral in the thermal wing can also be had in the sport wing simply by bending the steel rods which hold the wing tip in place. The center section is solid, held in place with a dowel at the leading edge and nylon bolt at the trailing edge, similar to power plane practice. The solid center section works very well – and is a must for racing. The close-up shot shows the prototype with the wing fairing and the canopy removed. The new Kraft brick fits comfortably up in the nose. Production versions will have a plastic canopy rather than the molded balsa type shown. Simplicity is the keynote.



*****

Here's another letter from Major Ken Phillips over in Vietnam. Thought you would find it as interesting as I did – particularly the ingenuity of the Vietnamese Air Force Major in using materials that are available.

Dear Ken:

Just a short letter of thanks for printing my request for plans and/or kit of the DeBolt Acrobat. I received letters from two hobby shops about the same time that I received the March copy stating that they each had one kit in good condition. One was in Kentucky and the other was from San Lorenzo, California. I ordered both kits. The one from Kentucky arrived almost by return mail but, thus far, San Lorenzo hasn't come through, yet. Probably waiting for my check to clear. I am building the kit now but I'm having to take my time as supplies are a bit hard to come by. Plenty of *balsa but glue gets to be a problem. I also received a set of Acrobat plans in the mail from a fellow modeler who I had never met, named Byron E. Trent, along with a nice letter and a color photo of his DeBolt Acrobat with a familiar fiberglass cowl and paint job. I really believe that it is the same Acrobat that was on the cover of R/C Modeler a couple of years back being held by a nice looking brunette. Mr. Trent is a retired Air Force Officer living in South Daytona, Florida at 2261 Granada Drive. Because I believe that kindness should be passed on to the next fellow modeler, I am sending a set of Acrobat plans to the modeler who advertised in R/C Modeler, April 1972 issue, for the same plans or kit. I will tell him that he can repay the kindness by passing it on, when the opportunity arises, to a fellow modeler. There are a few bums in this hobby but thank the good Lord they are very few.*

Thought that you might be interested in the fact that there is a Major in the Vietnamese Air Force who makes the nicest copy of your Headmaster that you can imagine, entirely out of foam and plywood. He is a most ingenious man. He uses a guitar string as a cutting wire for his foam cutter. He slices the foam into ¼" sheets and then cuts it into sides, top and bottom of the fuselage and doubles the load carrying portion with plywood. The fin and stab are the same with a ¼" x ¼" spruce spar for additional strength. He cuts the wings and uses a spar top and bottom and then adds leading edge and trailing edge and covers the front 1/3rd of the airfoil with balsa and then cap strips and covers with MonoKote. The fuselage is left clear and is painted with a military epoxy resin. He has shortened the span and put a Max .35 stunt engine, converted to RC. Here at Tan Son Nhut we fly from an active taxiway and it gets pretty exciting at times trying to get one down while a 707 is using your landing strip and your engine just ran out of home brew. If you would be interested I'll be happy to send you some pictures of Major Long's Headmaster's building procedures. I knocked the tail section off his Headmaster the last time out and he had it repaired and ready for the air again using that good old epoxy. The man is a prime example of modeler ingenuity and determination, and the guiding light of the Vietnamese RC modelers in the Saigon Area.

Thanks again for the assist on the Acrobat. I am still curious as to what has happened to Pappy DeBolt, if anything other than retirement. I have had a lot of flying pleasure because of his designing and kitting skills.

Sincerely,
Kenneth G. Phillips, Jr.
Major, USAF

Major Phillips knows by now that ole' Pappy is still flying and designing.

And isn't it a good feeling when you can do a fellow modeler a favor, then hear that he's passed it on to others? □

SCALE IN HAND

from page 14

available power is a paramount consideration, unless the subject happens to have a very favorable layout similar to a sport model, such as the *Comanche.* Such lucky cases are, however, all too rare.

Second, space requirements. Here again, a sport model's design can be changed to accomodate the required paraphenalia, whereas the scale modeler is allowed no such luxury. This consideration narrows the choice to those brands which will fit in satisfactorily. Some of the available units are a good deal better than others in this respect, being either more adaptable (we have in mind here the ability of some units to place the main body of the unit remote from the point of leg projection) or else being simply smaller physically and, thus, more apt to fit an average installation requirement.

Third, and lastly, retraction angle. Again, the sport RC modeler gets all the breaks. He can provide for an installation which uses whatever retraction angle the unit under consideration is provided with. We, of course, can not. Sometimes this last consideration can rule out an otherwise perfectly acceptable system. Any manufacturer of an RLG system intended to be aimed at the scale market (speed the day!) would do well to bear this last factor in mind and list variable retraction angle as one of his basic design criteria. We know that this is possible to do, since we had exactly this feature in a design two years ago.

This brief resume of the factors influencing a scale modeler's choice of brand does not, and cannot, offer any solid advice on choosing one brand-name over another, since the requirements vary from one subject to another. However, a few generalized gems of wisdom from our 150 year's experience in these matters might be helpful to those truly at a loss to sort out the system most suited to a particular requirement.

Of the three basic mechanical variations described, each system has its merits. The self-contained electrical units are tidy and easy to install, as are the pneumatic units; the mechanical units have a tendency to be messy in this respect. Among the electrics, the Wing "Olympic" probably would be the choice for most scale-type installations since it is compact and has the remote-leg feature referred to earlier, a real blessing in a case where the leg projects from a short distance behind the leading edge, as found on, say, the *Mustang*. A possible disadvantage with electrical units is the chance of radio interference, however slight, and the fact that undetected excess friction will cause short battery life; which leads to no charge and a gear which won't work. Bitter memories!

Despite these considerations, we personally feel that the electric units have more going for them than the mechanical units, which in many cases, suffer the same problems if they are electrically driven. The need for push-rods does tend, as we said, to be untidy and, consequently, unreliable. In fact, a situation where the unit has to be placed at an angle within the wing (to get a forward-swept leg to lay at a backward-swept angle when retracted) can get to be a real hassle.

There are, nevertheless, good features in the mechanical units. When driven by a powerful prime mover (D.T.D. has a servo with really exceptional power) the mechanical units can often drive a leg which slows up an electrical system alarmingly. Also, the down-lock on some of these units is extremely rugged, an important factor when your scale job weighs in over 8 lbs. Of these units, our vote would go to the CAS or the Pro-Line brands, though the latter might need modification to its spring-balancing system if the legs were heavy. The CAS unit does have correct balancing (making it unique among all the brands featuring "balanced" legs) but may be a little less durable.

Which leaves us with the only pneumatic (Freon gas) unit, the Rom-Air (the PMG being a prime-mover type). The Rom-Air has two very desirable features – its power, which on first exposure is a little alarming, and the fact that it has a variable retraction angle up to its upper limit of 90° – a fact which the maker seems not to care to advertise, but which is an important plus. Additionally, this system has a very tidy-type installation since the neoprene gas-lines can be routed conveniently to suit the model. This can be especially helpful when the unit is installed at an angle within the wing. Taken all around, this unit seems to be the favorite choice of all for most scale models, for these reasons. It will be interesting to see if the scale modelers prove out this analysis, and more interesting yet, to see if any manufacturer will decide that the scale market is worth reaching for.

★ ★ ★ ★

Next month we'll start a new feature on Finishing and Painting. Be here, huh? □

ENGINE CLINIC

from page 10

Dear Mr. Lee;

I have one of your 71 series Veco .61's which I am very pleased with. I have recently changed from nylon props to wood props via your recommendation in R/C Modeler.

With the present airplane I'm flying, I'm using Top Flite 11/8 super-M's. As you know the hole in the prop for the crankshaft is much too small for this engine. I, therefore, have been using a hand reamer to ream these props out to proper size. I have noticed that these props are not balanced as well as I would like them to be. Would you recommend a particular brand or type of prop balancer I should use and the most efficient way to go about balancing these props.

Thank you very much.

Sincerely,
Wayne L. Boots
Waterloo, Iowa

There are several excellent prop balancers available, Wayne. Both

Prather Products and Du-Bro market small hand held units. Quite a few fliers have been a little puzzled about where to rework the prop when you want to bring it into balance. And, incidentally, every prop should be checked for balance. Some of you other fellows out there might be a little surprised how a lot of that vibration you complain about would be considerably less if you started balancing your props. Always remove material from the face of the prop at the tips. The tips having the most leverage means less material to remove. Never remove material from the back of the blade. The back of the blade determines the pitch of the prop and, if you remove material there, you will change the pitch of the prop. Just use sandpaper or a small wood file if the prop is badly out of balance, and remove material from the front at the tip evenly. Be sure and retain the airfoil shape. Don't take all the material off of the leading part of the blade so that the back part is then thicker.

Dear Mr. Lee:

I've been involved in modeling only about 16 months and my question may seem naive to you. Perhaps you have answered it many times. Nevertheless, I've asked this of several long time modelers and never got a logical answer. The first time I fired up and adjusted my S.T. .60 I was amazed at the vibration I felt while holding back the model. A quick look disclosed that my plane was average, vibrating no more or no less than all the others on the field. No one seemed concerned about this. Modelers seem to accept this as the nature of the beast. Since then I've listened to, and read countless opinions and advice of experts in the hobby on counteracting the effects of this vibration; by balancing props and spinners, packing receivers and batteries in foam rubber, merits of multi-cylindered engines, etc. Very quickly, a beginner sees the devastation vibration produces on all equipment. However, I've yet to see or read about a serious effort on what this novice feels is the basic problem. That is, the direct mounting of the engine to rigid wood or metal mounts, thereby transmitting the engine vibration directly throughout the entire aircraft.

Here's my question. Why don't we use a rubber or synthetic bushing between the engine frame and the airframe mounts? Auto engines, washing machines, air compressors and *no end of other machines and appliances which produce substantial vibration have utilized this principle for years.*

A common example of this is the single cylinder compressor in an air conditioner. When improperly adjusted or worn mounting bushings occur, an air conditioner can literally shake itself loose from a strong window or wall mount. Conversely, when these bushings are correct the unit hums along and you can scarcely feel the vibration on the metal case. I'm sure you are aware of all of this, but perhaps you can explain why an industry which produces sophisticated engines, radios and other assorted hardware either can't or won't look into this situation. If they have, I find no one aware of it. I'm no engineer and maybe that's why this appears ridiculously obvious to me. Perhaps I'm too new at this and the reason that rubber mounting bushings aren't used is so obvious that I should know it, but I've yet to get a good reason from anyone, so far. I would certainly appreciate your thoughts on this.

Thank You
John Burk
Indianapolis, Indiana

John, over the years many fellows have tried many ways of damping out the vibration of the engine. This was much more of a problem back in the old 'reed' days than it is now. Vibration would cause the reeds to vibrate, resulting in many unwanted controls. It was quite common to mount engines of 1/8" plywood breakaway plates to dampen vibration. Rubber mounts and many other methods were used. However, soft mounting such as this only resulted in the engine bouncing around in five different directions. The thing you are not taking into consideration regarding automobile engines, compressors, etc., being mounted on rubber pads is the weight of the engine or compressor. They are supported by rubber pads but rely on their own weight to keep the unit stationery, as well as damping the vibration. Believe me, if there was anything that could be done to our engines to reduce vibration it would be done. Unfortunately, it is impossible to dynamically balance a single cylinder engine. You have to have a mass on the other side as in a twin. Making all of the reciprocating parts as light as possible helps but there is a limit to how light you can make a piston, wrist pin, etc. So vibration, to some extent, is always going to be with us.

Dear Mr. Lee:

I have a 1969 model H.P. .61 RR. The engine has only three hours on it, break-in time on a stand prior to installing it in a plane. The engine ran well for the first two hours with no problems. But lately it has gotten the bad habit of reverse running. It kicks back when starting and then runs in reverse until I open the throttle which promptly kills the engine. I have tried different settings on the carb but with no success. When it does run in the right direction it runs perfectly with both good idle and good power. Do you have any idea what is wrong?

Thank you for your time and trouble.

Jim Taylor
California, Kentucky

Jim, why in the world did you spend three hours running the engine on the bench?? This is just a big waste of time and may be the cause of your problem. I would guess that with this amount of running, which was undoubtedly rich, the engine has built up enough varnish and carbon to effectively raise the compression ratio. The higher compression is not causing the engine to kick and run backwards. You should clean the carbon from the top of the piston and inside of the head and see if this does not help. Also, are you sure you did not change the level of your tank? A high tank will let the fuel gravity feed and flood the engine. Flooded engines will kick and quite often start backwards. Flipping the engine smartly backwards is often the solution for this. It will kick and take-off running the correct direction. In the future, don't waste your time with so much bench running. Any of your .60 size ringed engines now can practically be flown out of the box. One or two runs on the bench is okay if you want to familarize yourself with the engine and let a few of the rough edges smooth up inside the engine. But more than this is not necessary. If more running is required, then there is some defect within the engine.

Dear Clarence:

I have a Veco .35 engine with a good number of hours on it. After cleaning it up recently, I noticed that the engine began leaking gas around the crankshaft bearing just behind the prop hub. What I was wondering was if there was any way to cure this condition short of replacing or reworking the front bearing.

Yours truly,
Jim Cooney
Missoula, Montana

This is a very popular question and I have answered it many times in the past. However, I realize we are picking up new readers all the time who have not read past columns.

A little leakage out of the front of the crankshaft bearing is perfectly normal and, actually, desirable. It ensures that the bearing is receiving sufficient lubrication. However, if the fuel sprays out like a spray gun and gets the whole nose of the airplane wet, this is bad. Both fuel economy and performance of the engine will be affected. This is caused by too loose a fit between the crankshaft and the bearing – or in the case of a ball bearing engine, the crankcase housing. There is nothing that can be done about it other than to replace the crankcase and, in the case of a sleeve bearing engine as your Veco .35, the crankshaft.

I wonder if you would answer a question for me concerning the use of a U-Control type engine for RC work.

I have an older, but good running McCoy .19 with no throttle control which was used very successfully for U-Control flying. I am now starting R/C and hate to see a good engine laying idle.

The question is this, is it possible to put a Perry (or other make) carburetor over the air intake port and convert the engine to R/C throttle control use. If this is possible, is it advisable?

Sincerely,
Mike Wilson
Nova Scotia, Canada

There is no reason why you can't convert your McCoy .19 to R/C use, Mike. Both Perry and Kavan make carburetors that can be adapted to the engine. You will need something in the way of exhaust restriction to keep the glow plug hot and the idle reliable. The easiest way here is to use a muffler.

Dear Mr. Lee:

I have been flying with a K & B .40 FR with the Perry carb for quite awhile. I am a sport flyer with limited funds, consequently I run goopy rich and my engines last forever. So, the problem I had with the .40 was quite annoying (evidently others have had the same problem). That is, after about 5 or 6 flights, the engine would begin leaning out, sometimes quitting before I could get it down.

On tearing the Perry down I would invariably find a fine slush of varnish-like particles in the slits. I was puzzled, as I had a good in-line filter. So, I installed a bronze clunk filter to back-up the in-line filter – still no help. (Incidently the engine pulled through both filters with no difficulty until the carb clogged.)

Then one day as I lay looking at the fine wire mesh of the in-line filter, it struck me that here was the problem. Surface tension holds fuel in the mesh (the soap bubble effect). Between flights the large surface area and thin film serve to oxidize the castor oil on the screen. When starting up again, the fresh fuel breaks this now hardened film loose and it settles in the Perry.

I threw the in-line filter as far as I could and have had no trouble since. I have retained the clunk filter which has given no trouble, perhaps because it is open to the air less; and if one never drains his tank completely, it never will be. As long as one is flying regularly this poses no problem. Just be sure to clean the clunk thoroughly after extended periods of idleness.

Sincerely,
John Fox
Tullahoma, Tennessee

It is always nice when someone comes up with a solution to their problem themselves and sends it along. However, I am not too sure your solution is exactly the right way to go. Leaving fuel in the tank after a flying session is not a good idea. The more volatile ingredients evaporate, leaving a heavy castor base. This, mixed with fuel when you fill the tank for your first flight next time out, requires a different needle setting than following flights. Fuel in the tank also causes fuel line tubing to swell and deteriorate faster. The easiest solution to this whole problem would be to run your fuel through a filter as you fill the tank. Then you would not need either the in-line or clunk filter. This is the practice I have followed for many years and have never had any problems with dirt or foreign matter in the carburetor. □

CUNNINGHAM ON R/C

from page 8

"One area we really feel strongly about is the method of scoring. With all due respect to the clubs using the 'Best 2 times' rule we feel that it is a weak link in an otherwise relatively strong chain. We use, basically, the same point system as Formula 1: 4 points for a first place finish, 3 points for second, 2 points for third, 1 point for 4th and zero for no finish at all.

"Now to the Idle Rule. Before our racing starts we require everyone to demonstrate that his engine will idle — 5000 rpm or less and, believe me, you can land any Quarter Midget at this rpm. However, we feel that this is not an equalizer. We feel that the Idle Rule is a detriment to the novice builder and flier who may not be able to tune his engine to achieve a low idle, thus defeating the purpose of this event. Nashville, under the guidance of Bob Reuther, has what I think is the answer. The contest furnishes the fuel, and the only requirement is that each engine has a barrel type carburetor."

This, very briefly, summarized Bill's thoughts from his article, and now, let's move over and give Bob Penko from Kirkland, Ohio, the drivers seat. Bob, as most of you know has been, for the past several years, the most outspoken supporter of Quarter Midgets, and his efforts, and those of his club, have been probably the most intrumental in bringing Quarter Midgets to its standing today.

"After reading your article in the May issue of RCM I was happy to see someone write his true feelings on Quarter Midget Racing of today.

"Since the first introduction of Quarter Midgets by RCM in 1968, our club has been very active in building, testing and setting up rules that we feel would keep to the true feeling of the sport.

"The AMA will print a bare minimum on Quarter Midget rules, to better qualify the event for AMA insurance, however, the Quarter Midget Pylon League has taken what we feel are the best of all rules suggested to us by the various clubs oriented in Quarter Midget Pylon. Most of the rules were in accordance with the MARCS Club, but did adopt the language from other clubs to try to nail things down. The two rules we did add were the 15% nitro content fuel rule (effective in 1973) and the no-retracts rule. Both rules were made for the reasons of holding speed down and for safety, as well as to help keep the cost down.

"We have been asked time and time again to please keep the event for the average flier, inexpensive, and for the sport flier who can get involved, because he enjoys the "low key" competition, and this is where we feel our rules will do just that.

"The Formula I and II pylon racing will first let the hot fliers go all out, dollars and all. Our rules are not favored by some of the hot racing type pilots, and that is how it should be.

"The Quarter Midget Pylon League issues this challenge: We will accept the pilot with the fastest two heats

from any AMA sanctioned Quarter Midget Meet as the 1972 World Champion, provided the race is run on a two mile course and the enclosed rules are enforced."

A brief of the rules by the MARCS are as follows:

"Models entered in this event are to be of conventional design and recognizable replicas of full-size propeller driven aircraft, which have competed in closed course racing. Deltas and tailess aircraft will not be allowed.

"Engine: Nominal stock .15. "Stock" means produced in quantities of 500 or more, and reasonably available. No reworking shall be allowed.

"Carburetor: Engines shall be equipped with a servo operated radio controlled throttle capable of varying engine rpm and commercially available from factory available production parts produced in quantities greater than 500, although not necessarily from the same manufacturer as the engine. Throttles must be able to reduce the engine rpm sufficiently to permit the aircraft to be landed when required. The aircraft must be landed under power and must stop rolling with the engine still running after each heat. Failure to do so will result in 20 seconds being added to that heat. The aircraft must also be capable of unassisted take-off.

"Fuselage: 2¾" wide and 5" high at the canopy.

"Wings: Minimum wing area shall be 300 square inches. Thickness 10% of chord in 1973, 7/8" minimum at root for 1972.

"Fuel: Nitro content of fuel shall be no more than 15% in 1973. Fuel shall be supplied at contest and brand specified in the contest announcement.

"Racing Course Specifications: The course is 10 laps with individual length of 1030'-3". Total distance traveled is 2 miles. Two pylons 515'-1¼" apart from the race course. 10 full laps.

*"Operation of the race: Pylon judges at No. 1 and No. 2 will be positioned a safe distance from the pylon in line with the corresponding pylon and use an appropriate method to signal a missed pylon to the flier in question. (***Bob further says that the AMA will require that the pilots will stand on the side lines 150' from the pylon centerline.)**

"Maximum of 4 planes per heat, engine start time is 1½ minutes, all laps are flown counterclockwise, for each pylon cut an extra lap must be flown, three cuts constitute disqualification. Planes need not fly around the pylons, but past a line perpendicular to the centerline of the pylons. All planes will be flagged off at the same time. Times of best 2 flights averaged determines the places. Landing gear shall be fixed, not retractable, weight shall be 1½ lbs. minimum and 4 lbs. maximum."

Bob further states that AMA will suggest only rules to cover events for insurance purposes.

Now that you have briefly read what a majority of the fliers in the central United States are using, I would like to comment, again briefly, on what my opinions are. First, I have never seen any of the basic rules used by the California group that is pushing Quarter Midgets on the West Coast, but judging from some of the pictures that I have seen of those competing, the aircraft appear more to my line of thinking, and the races are probably run just like Formula I.

First, let's talk about the race course. I am against the two pylon course for several reasons. *(Ed's note: Agreed)* The first is safety; there is no place to hide for the pilots and the

Chuck Cunningham, creator of Quarter Midget Event, assists with fueling. George Rogers photo.

callers, and I don't like the AMA idea of standing 150' **outside** of the course to fly. The three pylon course has 3 very definite assets: (1) It offers a hiding place within the triangle, a pretty safe place to fly. (2) It provides a good training ground for those pilots who may want to progress to Formula I in that he learns to turn the pylons the same as in the larger races, and (3) the same course can be flown, either using No. 1 pylon at the same distance as a Formula I course, or by moving it into just 300' from Numbers 2 and 3. By using a three pylon course with No. 1 upwind 300' and No. 2 and No. 3 100' apart, 10 laps is a 1½ mile course, and this set up can be used in very small flying sites.

Aircraft design: Frankly, I am against the rules calling for a model of an aircraft that has been flown in a closed course race. *(Ed's note: Agreed)* We have a scale racing event in Formula I, but why not let down the barriers in this event, and let it be a replica of an aircraft, thus leading the way for the designers to develop new styles and designs of aircraft. But, in any case, they should be simply a "look-like" instead of a true scale event.

Wing thickness: The 10% rule seems to be one that creates a problem for the contest judges, a 7/8" thickness at the root with straight line taper to the tips would be very easy to judge, and a simple go, no-go gauge can be constructed to measure this, while a 10% thickness would be difficult to figure, without argument. For an easy event, take the easy way, 7/8" thick where the wing meets the fuselage, and let the tips be any thickness. If the Formula I wings don't break at the tips at the speed they are traveling, these wings won't. I personally like a thicker, more lifting tip, anyhow, so why fuss. The thicker tip will turn quicker, but the thinner may fly a bit faster.

Fuel: By all means, limit the nitro

John Banta and Shoestring QM built from RCM plans. George Rogers photo.

to 15% and let the contest provide the fuel. It doesn't cost much, and levels out the expert and non-expert to a great degree.

In my opinion, the winner of any race should be the flier who has beat the other guys. Frankly, I can't get too excited racing against the clock. To me the only way to score a race is to give points for winning heats. Naturally, if two fast racers cannot fly against each other due to a frequency problem, then this should be settled by the fastest times, but if you have a race with five or more heats, then the most consistent, fastest flier will emerge as the winner, so I simply can't agree with the fastest two times to determine the outcome. *(Ed's note: Agreed)*

I hope that the Quarter Midget can become at least a semi-official event but, in becoming so, I sincerely hope that it can be contained as a racing event for the less-than-professional pilot with the emphasis on aircraft design and the ability to get around the pylon rather than who has the most hopped-up engine. Let's race, but let's let **everbody** race.

A few more thoughts that have developed on Quarter Midget racing after being the Contest Director for our last two meets as well as just missing bringing home the bacon in each meet. A staggered start isn't bad if you have a small runway but, if you have a wide runway, then a race horse start is just fine. The positioning for a staggered start is easy, done on an odd-man-out coin flip!

Flying this type of model is very easy, but for you beginning fliers, be sure to use a little down trim in your model. This keeps it in a slight diving condition, so that you have to hold the nose up to fly. This keeps your aircraft from ballooning when you turn number three pylon and head into the wind. Even if you do climb a bit into the wind, when you turn number 1 and start back to number 2, let the aircraft dive, and with the wind under her tail, you really scoot toward the downwind turn.

If you are having club contests to get QM racing started in your area, simplify the rules even more. Don't worry about wing thickness, or engine idle, or power on landings, or anything until the times begin to get good and the competition gets tough. Then you can start being strict on the rules. But, the name of the game is to race, and to encourage as many people as possible to participate in the race.

Until next month, I'll be looking for you at Dewey's poster stand. You should see what he has in his mind . . . . . □

TAKE A LOOK AT THIS

from page 6

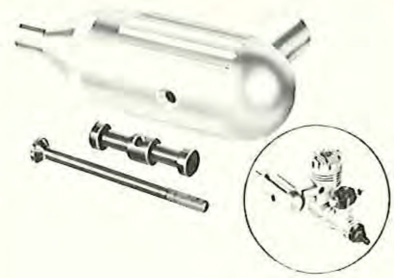
Jerobee Industries, Inc., 120702A N.E. 124th Street, Kirkland, Washington 98033, has added some long awaited racing accessories to their line. Now available is a sporty aerodynamic wing – a scaled down version of the wing used on the Auto World Jerobee McClaren. Molded in high strength Cycolac® the wing adds to both the performance and the appearance of your Jerobee car. This wing fits all Jerobee cars and is available in assorted colors. It comes complete with decals, screws, and mounting template. Retail price is $2.95. Also available from Jerobee Industries Inc., is their aluminum Heat Sink which is designed to cool the Cox engine through the fuel tank. This helps prevent fuel from evaporating when used on internal tank models. This is a must on models using a remote tank where no fuel is in the engine tank to help cool it. This comes complete with mounting spring for $2.50.

Rose Industries, 1190 No. Rose St., Escondido, California 92025, is producing a new Model C-Clamp which is designed to keep your wing ribs firm and square as shown in the photograph. This item is a must for the modeler who uses hardwood spars ana is, in fact, a low priced wing jig. Two sizes are available, one for 1/16" ribs and one for 3/32" ribs. They are light and versatile and can be used for many of your difficult gluing jobs. Now available at your hobby dealer or order direct from Rose Industries at $1.50 per set of five. Tested, Approved, and Recommended by RCM.

Robart Mfg., Co., P.O. Box 122, Wheaton, Illinois 60187, has produced the outstanding complement to their Robart Hinge Point, recently reviewed in R/C Modeler Magazine. This new item is the Hinge Point Drill Jig which is designed to accurately locate and mark the hole location for the Robart Hinge Point. The Drill Jig automatically finds the center of the control surface and then you simply drill through the jig for a perfectly located 1/8" diameter hole. The third step is to insert the Hinge Point with glue. Made of hardened machine steel, the Hinge Point Drill Jig is priced at $2.98. Tested, Approved, and Recommended by RCM.

New Champion – EK-logictrol has a new and improved Champion for 1972. All Champion units now have full six-channel control and precision control sticks with adjustable tension. The Champion features a four IF can receiver design, with double-tuned RF front end and tuned RF stage, and the double-deck, servo plug-in receiver. Featured also is the 3-wire servo amplifier design, permitting the loss of a battery without loss of control. Servos have been redesigned to accept the new I/C servo amplifier. List price is $329.95 for the two-stick Champion and $349.95 for the single-stick Champion.

In addition, EK-logitrol's Super-Mini, the world's smallest servo, is now featuring a new I/C (integrated circuit) servo amplifier. The amplifier is approximately 1/16" square and contains 29 transistors and 2 diodes in a 12-head DIP packpage. It uses the 3-wire servo system and external PNP driver transistors. It has one-battery-out capability. The Super-Mini weighs 1.2 oz. with amplifier and 1.0 oz. without. Its thrust is 3.5 lbs. It has centering accuracy of ± .5% and drift of less than 1%. The Super-Mini has gold-plated, solderless plug connectors and a 16mm precision motor with silver alloy brushes. It features a hard-surface feedback potentiometer and molded nylon case. Write: EK-logictrol, 3233 W. Euless Blvd., Hurst, Texas 76053.



A specially designed muffler for the Veco .19R/C "Series 71" has been introduced by K & B Manufacturing, Division of Aurora Products Corp., 12152 Woodruff Avenue, Downey, California 90241. As it tones down exhaust noise, to conform to standards now enforced at many air fields, it also maintains a higher degree of performance than is possible with other mufflers. Consisting of three parts it can be installed in a couple of minutes. Available at most hobby dealers – $6.95. □

FROM THE SHOP
from page 4

proceed to Torrey Pines this weekend and do a photo story on the relationship between the R/C glider club and the full size glider club. Include a lovely, well-endowed chick in the photos. Be sure to obtain a model release signed by the young lady with her name, address and phone number to be mailed to the RCM P.O. box with the photographs. My decision to provide coastal fog at Torrey Pines next weekend is none of your business, simply follow your instructions. Your telephone cord will self-destruct in five seconds."

Sure enough the coiled cord disappears into a puff of smoke and I'm sitting there stunned, holding the handset and choking from the putrid aroma of this latest fiasco.

Saturday morning and the drive to Torrey Pines finds heavy coastal fog. The gliders couldn't fly but they were sitting there waiting to be photographed. Taking a quick glance around the field, I was instantly attracted to a voluptuous blond standing there in the mist. What else could I do but casually stroll over and lay on approach No. 46? "Hi there, I represent an influencial magazine and would like to photograph you with these gliders. Heaven only knows how this might influence your future." Her quick evaluation of this fat old gray haired man with his Instamatic resulted in a sultry, "O.K.".

The photos and model release were mailed to the P.O. box as directed. A few days later, after Pacific Telephone had repaired my phone one more time, I dialed the number I had copied from the model release only to hear the recorded, "The number you have dialed is no longer a working number." Big deal, I also had copied the address. No answer to my knocking on the door but the apartment manager was helpful for a fin. The model had last been seen getting into a Mercedes with curtained windows, custom California license RCM-DD. A plain brown envelope had been taped to the door containing money for the final months rent and instructions to call the Salvation Army to pick up everything in the apartment.

Later there was a full page ad offering a big poster, in color yet, featuring this same blonde. Why not call the RCM office and ask questions? My request to speak to Mr. Don Dewey was answered by, "What's a Don Dewey?" I was put on hold for awhile and finally a different female voice advised that she was sorry, Mr. Dewey was not in the office, no she didn't know when he would be in nor where he could be reached.

I occasionally receive checks for my services signed by Patricia Crews who is a lovely brunette, but quite noncommittal. Her talents with karate and judo discourage too many questions so that's a dead end.

I just don't know. Anyway, this is only one of many episodes. If you uncover any good stuff in this mystery, I would certainly like to be clued in.

Dick Tichenor
RCM Staff Photographer

•

Just to set the record straight: Pat Crews is a lovely brunette . . . she does know Karate and Judo and she does sign the checks.

As for me . . . I am a figment of my own imagination. A legend . . . a myth . . . perpetuated by prophetic scribblings on outhouse walls.

Peace. □