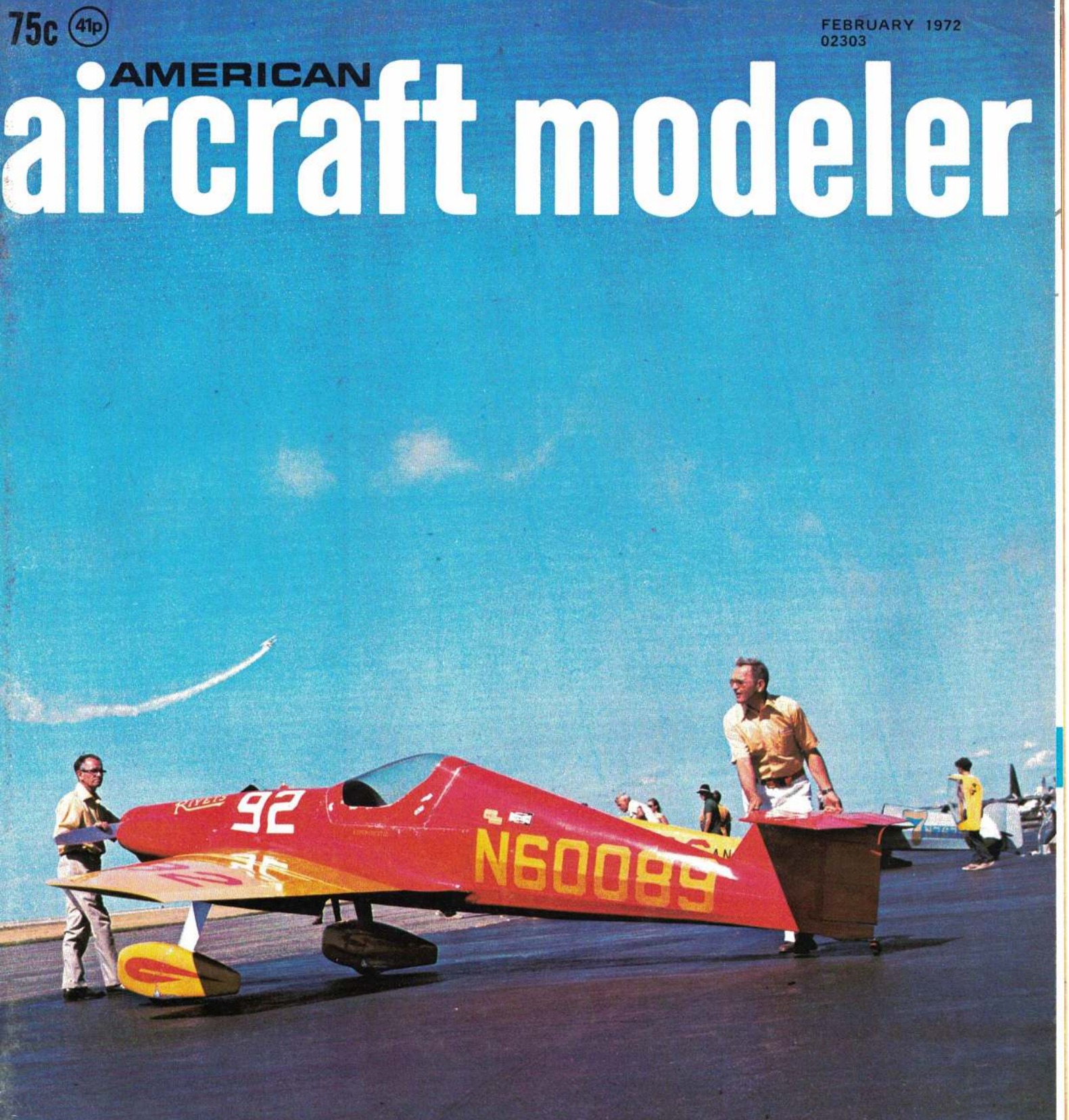
75c (41p)

FEBRUARY 1972
02303

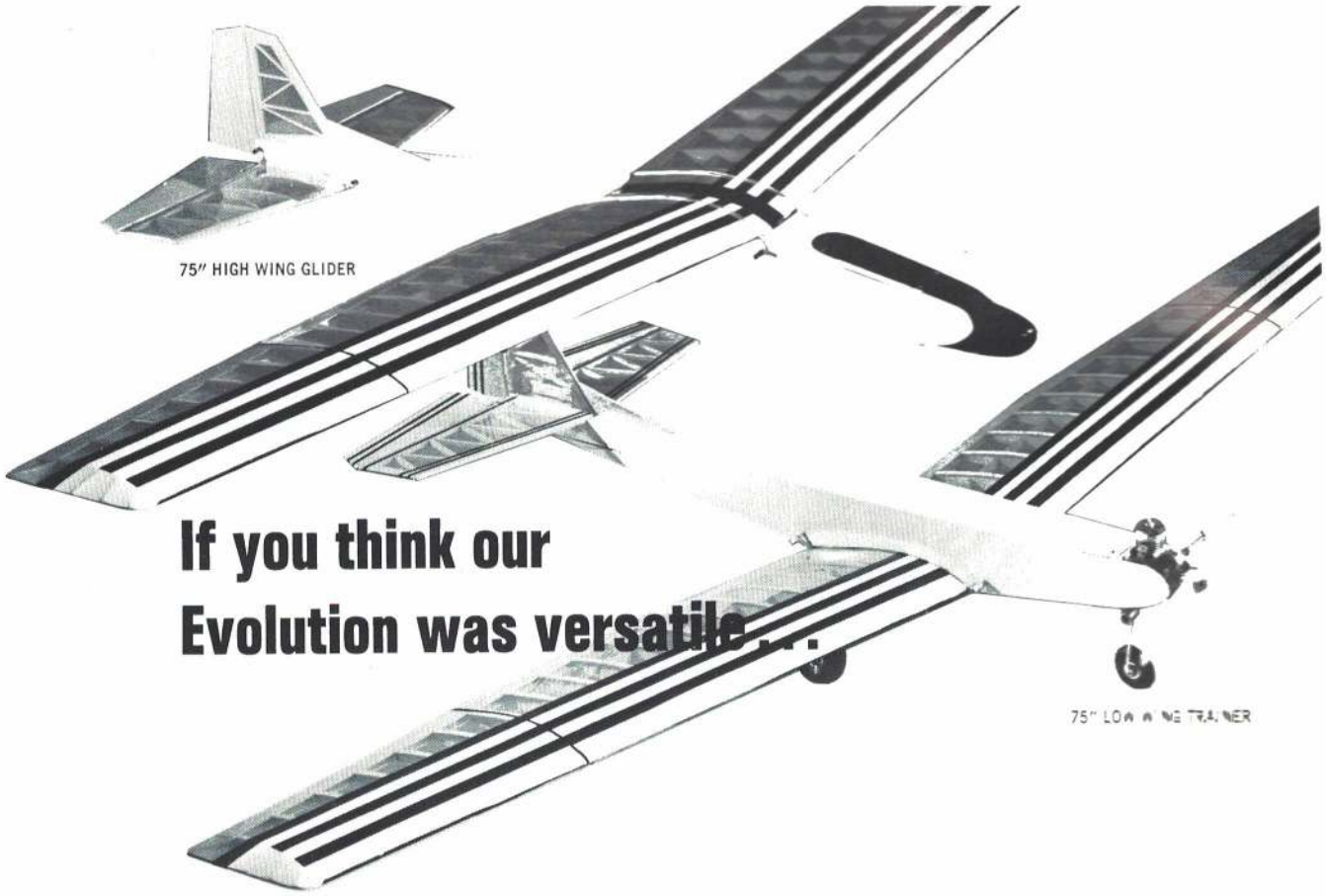
AMERICAN aircraft modeler



Story of 'Rivets' by Berliner with Karlstrom 4-view drawings

Big Flapper—RC sport/trainer, and for FAI Pattern—the Cardinal

Cheechacko: Rocket/glider for the Tenderfoot



75" HIGH WING GLIDER

75" LOW WING TRAINER

If you think our Evolution was versatile . . .

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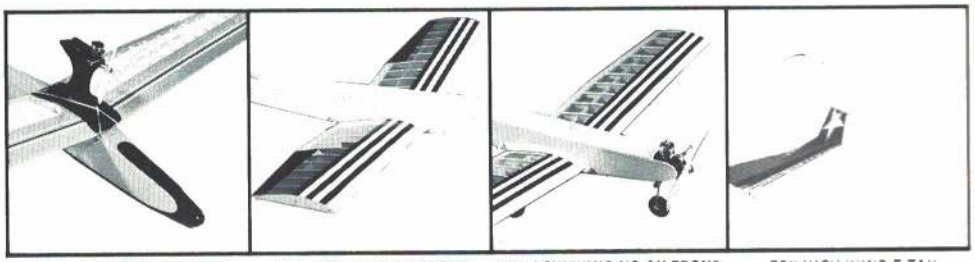
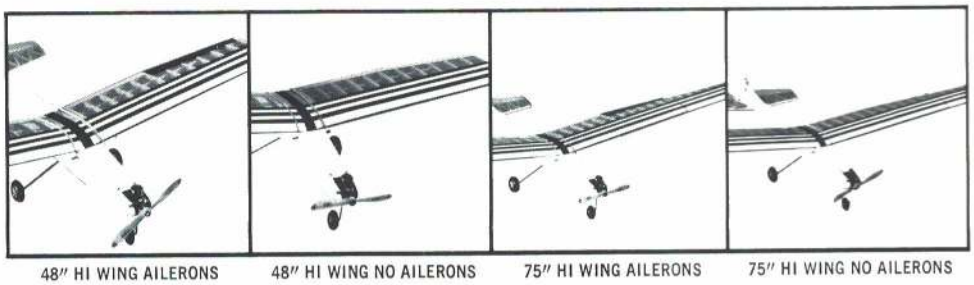


75" HI WING ENGINE POD | 48" LOW WING AILERONS | 48" LOW WING NO AILERONS | 75" HIGH WING T-TAIL



48" HI WING AILERONS | 48" HI WING NO AILERONS | 75" HI WING AILERONS | 75" HI WING NO AILERONS

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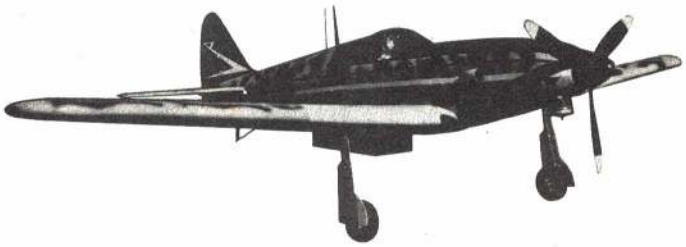

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Engine Size: .35-.40
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Cover Photo: Pound-for-pound the winningest racing plane in history, Rivets here being made ready at the Cleveland 1971 Air Races. That's Bill Falck, designer and builder, at the tail. Article and plans on pages 22 through 25. Photo by Russ Brown.

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Features:

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Departments:

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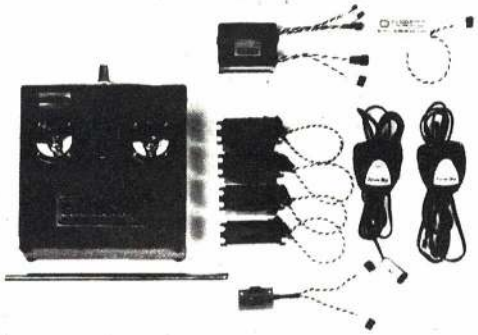
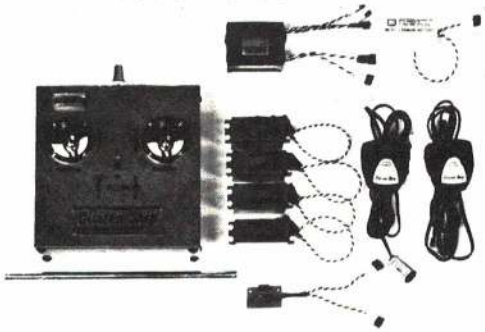


SPECIFICATIONS

CTD-716 Transmitter—27 MHz, 72 MHz, or 6 meters—*AER or AMR—Specify	
Size	2½ x 7 x 7 inches
Weight	2½ pounds
Power (Input to Final Stage)	400 milliwatts
Power Source (Included in Transmitter)	9.6 Volt Nicad Cell
CRD-716 Receiver—27 MHz, 72 MHz, or 6 meters	Specify
Size	1 9/64 x 1 17/32 x 2 23/64 inches
Weight	3¼ ounces
Sensitivity	3 microvolts
Selectivity	2.7 kilohertz
CSD-71 Servo (Four Furnished)	Rotary and Linear Output Drive
Size	1 x 1 3/64 x 2¼ inches
Weight	2⅜ ounces
Static Thrust	4 pounds
Transit Time	.6 seconds for .625 inches
Resolution	.5 per cent
CNB-4 Battery (Airborne)	
Size	⅜ x 1⅜ x 2⅜ inches
Weight	3 ounces
Rating	450 milliampere hours
CSW-71 Switch Harness (One Furnished)	Double Contact Switching
Mounting Plate Size	1/16 x 1½ inches
Weight	.64 ounces
CCT-96 Transmitter Battery Charger (Isolated)	9.6 VDC
CCR-48 Receiver Battery Charger (Isolated)	4.8 VDC
Price	$399.95

FOUR CHANNELS
Model CDS-714

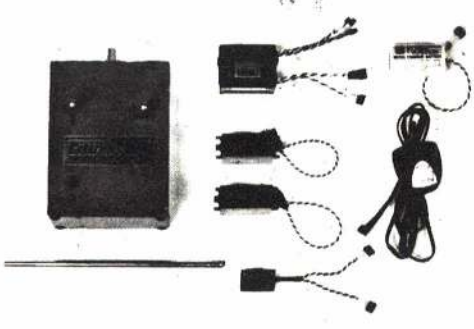


SPECIFICATIONS

CTD-714 Transmitter—27 MHz, 72 MHz, or 6 meters—AER or AMR—Specify	
Size	2½ x 7 x 7 inches
Weight	2½ pounds
Power (Input to Final Stage)	400 milliwatts
Power Source	9.6 Volt Nicad Cell
CRD-714 Receiver—27 MHz, 72 MHz, or 6 meters	Specify
Size	1 9/64 x 1 17/32 x 2 23/64
Weight	3¼ ounces
Sensitivity	3 microvolts
Selectivity	2.7 kilohertz
CSD-71 Servo (Four Furnished)	Rotary and Linear Output Drive
Size	1 x 1 3/64 x 2¼
Weight	2⅜ ounces
Static Thrust	4 pounds
Transit Time	.6 seconds for .625 inches
Resolution	.5 per cent
CNB-4 Battery (Airborne)	
Size	⅜ x 1⅜ x 2⅜ inches
Weight	3 ounces
Rating	450 milliampere hours
CSW-71 Switch Harness (One Furnished)	Double Contact Switching
Mounting Plate Size	1/16 x 1½ inches
Weight	.64 ounces
CCT-96 Transmitter Battery Charger (Isolated)	9.6 V D C
CCR-48 Receiver Battery Charger (Isolated)	4.8 V D C
Price	$369.95

*Type AER with Ailerons and Rudder on Right hand Stick.
Type AMR with Ailerons and Motor on Right hand Stick.

TWO CHANNELS
Model CDS-712



SPECIFICATIONS

CTD-712 Transmitter	27 MHz only
Size	2⅜ x 5⅛ x 6¾ inches
Weight	1½ pounds
Power (Input to Final Stage)	400 milliwatts
Power Source	Dry Cell
CRD-712 Receiver	27 MHz only
Size	1 9/64 x 1 17/32 x 2 23/64 inches
Weight	3¼ ounces
Sensitivity	3 microvolts
Selectivity	2.7 kilohertz
CSD-71 Servo (Two Furnished)	Rotary and Linear Output Drives
Size	1 x 1 3/64 x 2¼ inches
Weight	2⅜ ounces
Static Thrust	4 pounds
Transit Time	.6 seconds for .625 inches
Resolution	.5 per cent
CNB-4 Battery (Airborne)	
Size	⅜ x 1⅜ x 2⅜ inches
Weight	3 ounces
Rating	450 milliampere hours
CSW-71 Switch Harness (One Furnished)	Double Contact Switching
Mounting Plate Size	1/16 x 1½ inches
Weight	.64 ounces
CCR-48 Receiver Battery Charger (Isolated)	4.8 V D C
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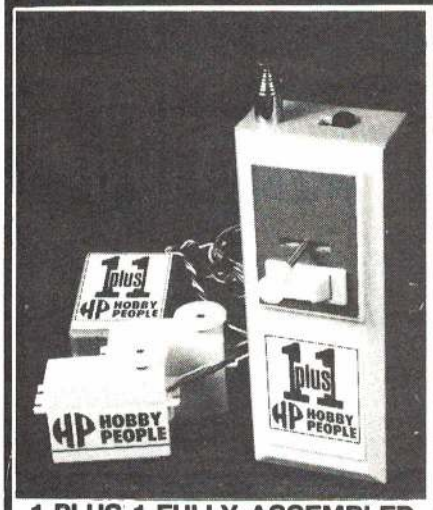

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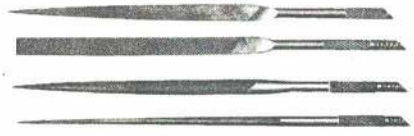

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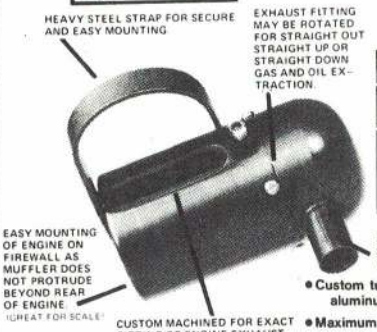

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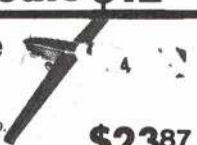

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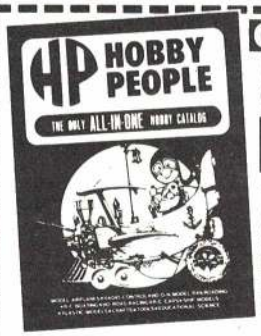

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IN 1865 JACOB BRODBECK WAS HIGH ON COIL SPRING MOTORS. THEY ARE OK UNDER AMA RULES TOO. BOING!

Editorials must always be ready-to-fly. The message should be clear, and quickly readable–like instant spinach. (Of course, we all know that if you were not waiting for the glue to dry, you would not be reading this.) So to put the shoe on the other foot–for the first and probably the last time–we give you an editorial kit. The die-cutting may be fuzzy, but don't give up.

In mind we have clockspring motors; Jacob Brodbeck, who, according to the *Denver Post* (Empire Magazine section, September 12, 1971), flew 38 years before the Wrights; a yen to build a boat; and the AMA rules book. You should not be surprised by the fact that a belfry makes an ideal indoor flying site for bats.

Old Jacob cracked up in 1865, a Civil War year which didn't deter the folks around San Antonio from buying shares in his aerial venture. No Icarus who pinned his hopes on mythological waxed wings which melted if he got too near the sun, like some NASA space shot, Professor Brodbeck was an odd genius. Jack Maguire did the *Post* piece called "The Man Who Flew before the Wright Brothers."

It must be recognized that nothing can ever be taken away from the Wright brothers' glory. They spent years on a methodical project that ranks with the achievements of people like the Curies, Pasteur, Galileo. It is fun nevertheless to reflect on the efforts of the pre-Wright visionaries. Who knows whether or not some of them got off the ground, only to bump into a tree? If they did, so what? The concept and craftsmanship of the Wright brothers' airplane now hanging in the Smithsonian will move anyone to awed silence.

Brodbeck, it appears, was a schoolteacher, surveyor, organist–and he liked to play with *his* toys. Actually, these were models of his ideas, mostly model airplanes powered by coil springs. According to Maguire, they were more advanced in design than the Wrights' first plane. "To the delight of the people of Fredericksburg and Gillespie Counties," writes Maguire, "Professor Brodbeck's toys took to the air and flew."

To supplement his schoolteacher's salary, Jacob brewed wine in 20-gallon barrels which "seemed to have sufficient strength and color to keep the customers asking for more." Perhaps it was natural that the community shared his vision. Deeming steampower too heavy–and there being no gas engines in the year of Appomattox–Brodbeck had two partly movable wings, a rudder and screw propeller. The "engine" was a large coil spring which had to be rewound constantly by the pilot. Witnesses said he took off but that, when the spring wound down at tree-top level, so did the plane. Should we laugh?

There's a model plane in the toy stores that is said to fly by wind-up spring power. Bill Hannan, whose sense of mischief is second only to our own, said this power source is in the rule book. If it is, modelers once used it too. Said those who were asked: "I'll be durned." Under Section 6, Outdoor Models–Rubber Powered, the book sez: "The use of metal spring(s) as a source of power is also acceptable." Wonderful! Let it stand. What a challenge. To be serious now (affidavit available), there is no reason why we can't achieve, say, two to three minutes duration with spring power. The models would be fun. Small field stuff. No ancient rubber motors. No noisy gas engines. And, such models can be small, perhaps smaller than you think.

Back on the flip side, why don't you prove Jacob Brodbeck could have gotten off the ground? All aircraft, big or little, come down sooner or later, when the energy gives out. Everything that goes up must come down. All Jacob had to do was get off the ground. And all models get off the ground–some come down more quickly than Jacob's creation.

Your writer already is a villain in the eyes of at least one noted historian for merely asking "Did Whitehead Fly before the Wrights?" Whitehead had more than a spiral spring for an engine. Jacob had something else too. His flying machine was man-powered! If a man on a bike can power a plane to fly–as has been done repeatedly–why could he not wind up a spring? He is still one man-power. Also the pilot! Busy, busy, busy.

For this model engine, how big a spring would it take? What gearing? Would a small flywheel add anything more than weight? Where could it be put? How big a prop, and how many rpm's? How big, or small can the model be; how light the airplane?

Before we fly off into the sunset, Jacob later sought backing for a steam-powered design. He even went to Washington (your writer is there now!). A 40,000- to 45,000-pound cast-iron steam engine would give him 80 horsepower and an airspeed of 100 mph, he thought. Seventy-five years later guys had worse ideas than did Jacob in the old wild west.

We modelers have had things for power such as: Jetex (a slow-burning rocket); CO-2, both as jet capsules and power for piston engines; compressed air; rubber bands; pulse jet engines (Dynajet); gas engines; steam engines (hi, Jacob!), electric motors; and even fly power. Yes, a housefly attached to a paper airplane soars through the air with the greatest of ease. A horsefly would be a veritable 747.

What we really want to talk about is boats–as seen through a model plane builder's eyes. But you've had enough for one month, we're sure.

Bill Winter

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Pearl Harbor Day jump

On December 7, 1941 I made a parachute jump at the old model airplane flying field at Western and Rosecrans Aves. in Los Angeles. My main chute fouled and I had to resort to my reserve chute to save my hide.

There was a good crowd at the field that Sunday, and I feel certain that some Old-Timer might have some pictures of the jump. I would be happy to hear from anyone who got some shots of my jump on Pearl Harbor Day.

Bob Diehl, 532 Irving Dr., Burbank, Calif. 91504

Observations of a sport flier

Although an active modeler for the last ten years, I have just rejoined the AMA, having let my previous membership lapse due to restrictions imposed by serving in the Marine Corps. It seems that there is a lot of talk about modelers like myself–sport fliers–and how the AMA and the industry in general seem to ignore us. There are thousands of us who fly model airplanes simply to be doing something constructive, educational, and most of all, fun. Sport fliers are not hassled by the worry that our paint job is not as glossy as the next guy's, or that our new super-duper digatron transcoder won't make our $200 airplane do a soft-shoe in the sky! As long as it flies and stays in one piece we are happy.

In my opinion, the AMA-type events and the organized contests are there in front of all modelers as a challenge to our talents and skills. If we are content to merely bore holes in the ground with our Ringmaster on a Sunday afternoon, then that's where we belong. But, if we have the ambition to take on the best, then we have to work at it–practicing and gaining experience. Some people think that competition should be made simpler so that more people would be able to compete. I don't think this is the purpose of competitive modeling; it seems to remove an important element of competition if events are made too easy.

If you can't compete seriously, for whatever reason, then go back to boring holes and be content. Remember, the thing that probably brought all of us to this hobby was being able to see something that we had built with our own hands take off and fly.

Sgt. F. C. Woolston, USMC, FPO San Francisco, Calif.

Getting JAM into school

My congratulations on the first issue of **JR. American MODELER**–it's great. As a subscriber to **AAM**, I decided to subscribe to **JAM** primarily to support Junior modeling; however, after flipping through Volume 1, Number 1, I couldn't resist building a "Feathercopter" and "Flip and Flop."

After talking to my wife, an elementary school teacher, about the magazine and its purpose, she thought perhaps some of her students might be interested and wanted to take **JAM** to school after I had finished with

it. It seemed like a good idea. Perhaps other subscribers who have wives (or husbands) in the teaching game could do the same.

The only problem with my wife's idea is that I don't want to part with my copies, so I'm ordering another subscription to be sent directly to her school. How's that for a good solution?

Earle W. Thompson, Los Angeles, Calif.

More Old-Timers

I have just put down the December issue of **AAM** and had to take pen in hand to compose my first fan letter to a model aircraft magazine to say thank you. For what? For those two Old-Timers—the Fireball and the Brooklyn Dodger.

Do you know what a relief it is to see a couple of models with some personality, some character? All I can say is bring back more! Why doesn't **AAM** reprint some of those great oldies out of the past in two or three issues each year? My suggestion is to reprint them exactly as you ran them thirty or so years ago, then update them with a half page of plans showing suggested modifications for installing dethermalizers, RC, etc. There are many of us out here that would build these oldies if we could just get our hands on those Old Time articles and plans.

Charles F. Schultz, Louisville, Ky.

Appreciates Tenderfoot series

My sincerest compliments on your "Tenderfoot" articles! It's only good sense that we cater to the basic needs of the many aspiring modelers who've been left out so long in order to celebrate the multi RC guy. Sure, a fellow who can afford expensive gear, etc. is the one whom the manufacturers are seeking, but balsa wood is still being sold—lots of young fellows need only to be shown. I'd like to think that the RC boys all have a thorough understanding of flight, but many will admit to knowing much more about operating a radio transmitter.

I hope our hobby does not become ARF, but I see many distressing signs from my vantage point. As in everything we do, basics must be taught and retaught or else there can be no appreciation in the final analysis. A kid can "turn on" with a good rubber flyer, once he has learned about design, trimming for flight, etc.

My own latest plan is to scratch build a scale s.c. (rudder only) plane with a good ½A engine. I do recall that in the selection of a prototype, the inherent stability question must be satisfied (lateral, longitudinal, directional) and I think I recall a formula for finding the CG on the plane—a certain percentage of the wing chord back from the leading edge on the longitudinal line, but where does one put it on the vertical line? I imagine that knowing how to plot this would enable one to select a good prototype and/or make necessary adjustments when drawing up a plane.

Your magazine has my deepest admiration. **AAM** will become the "conscience" of our hobby.

Stanley P. Stein, Philadelphia, Pa.

(Continued on page 84)

ON THE SCENE

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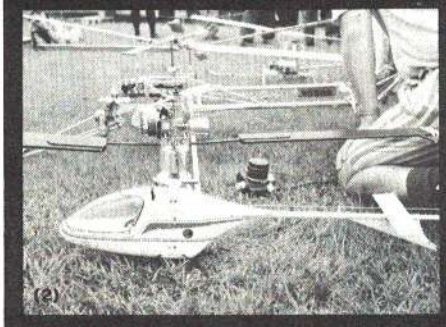
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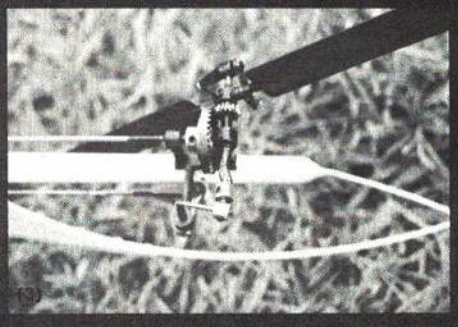
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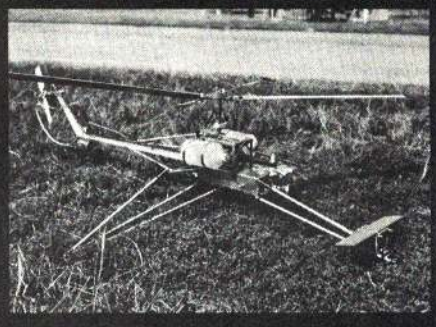

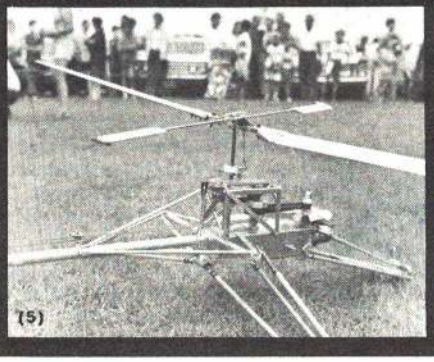
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(1) Dieter Schluter fueling up for Sunday's flight. 500 cc. of fuel lasts for only ½ hour. (2) Ingenious and simple torque reaction design actively flown by Dave Gray. To become a DuBro kit. Four channels, O.S. 40 engine. (3) Close-up of Gray's tail rotor control. (4) Early version of Gene Rock's copter with over one hour fuel. (5) The later and lighter version of Rock's model. Note landing gear is wider than rotor diameter permitting safer learn-to-fly sessions. (6) Beautiful workmanship in the design and metal fittings of Ray Jaworski's 60-powered model. Only short flights to date.

HELICOPTERS AT DAHLGREN AND DOYLESTOWN

by JOHN BURKAM

The first international RC helicopter conference at Doylestown, Pennsylvania on September 18, 1971, was a memorable occasion for the seven participants–two Germans and five Americans. The only American to fly for the crowd was Dave Gray. His beautiful model followed him around like a kitten, at times almost rubbing against him. Gene Rock flew his altitude record-holding chopper out behind the motel. Dieter Schluter tried flying one of Dave Gray's models with throttle and rudder controls reversed to agree with Dieter's accustomed directions. Skilled as he was, he could not adapt to the different time constant and control travels well enough in two practice flights to keep the two tether lines slack more than a second or two. Each man is an expert only with his own ship.

Dieter replaced his damaged Hiller-type rotor with another which had the teetering hinge locked out. It flew just as well, perhaps even steadier in hovering, but vibrated a little in maneuvers (as any two-bladed rigid rotor would!). The model flown by Bruno Gottfried had the conventional rotor and its tail did bob up and down a trifle as he was slowly flying backward over to the pit area.

One wonders if there is anything besides practice, practice, and more practice which enables these modelers to fly so smoothly. They have larger size to their advantage. They have ball bearings on the feathering (cyclic pitch change) axis of their servo rotors and they probably have very little play in their control linkage. I decided to modify my own rotor accordingly and the control linkage was spring-loaded to take out play. Control smoothness was greatly improved, but the tail still bobbed up and down a lot. Then a washer was placed between the gimbal ring and the rubber hose to restrict blade flapping to about plus or minus 3°. *Voila!* Steady as a rock.

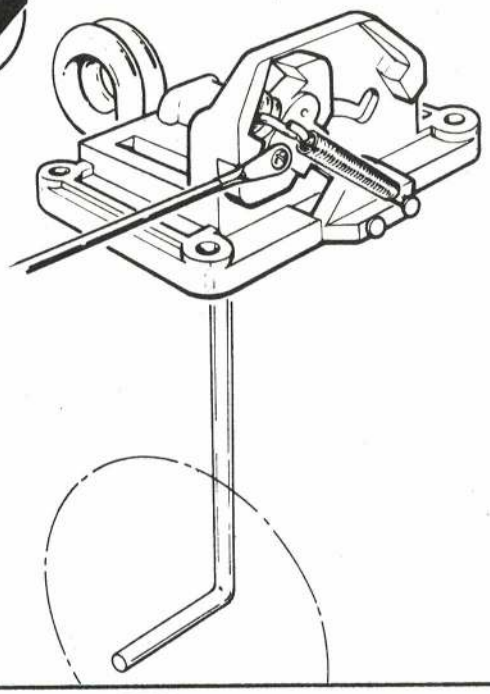
The helicopters stole the show at the Dahlgren record trials over this past Labor Day weekend. Gene Rock made the only record of the weekend when his helicopter almost disappeared from sight at an altitude of 650 feet. It was a combined altitude and duration attempt and the machine carried enough fuel to triple the present record of 27 min. 51 sec. After flying as high as he dared, Gene brought the SSP helicopter down low to check the fuel supply. He then flew it back up to a hundred feet or so to cruise around. Wind at that altitude must have been quite high and Gene was holding forward stick to keep the model in one spot. Beyond a certain point more forward stick does not produce more forward motion, but downward motion! After eleven minutes of anything but relaxing flying, neither Gene nor anyone else could tell that that was what had happened. In the next few seconds the helicopter had accomplished the first half of an outside loop, but was prevented from completing the loop by the runway.

My own helicopter, DSE-1, staggered into the air carrying a quart of fuel, enough to run its Supertigre 23 about three hours. Unfortunately, after seven min. the ship made an inadvertant downwind turn from too low an altitude and didn't recover. The next day, after makeshift repairs and minor adjustments to the control system, another try at the record was made. The engine quit after 85 sec. due to improper needle valve setting. No autorotation.

Gene's helicopter is notable for its all-timing-belt drive. Another feature of the SSP is its yaw-rate gyro mounted on and driven by the tail rotor shaft. When the helicopter turns, this gyro tilts sideways and changes tail rotor collective pitch in the direction to stop the aircraft from turning. When a turn is desired, the rudder servo pushes the gyro frame through a light spring and forcibly tilts it. This yaw-rate gyro strongly damps the turning motion of the helicopter, making it much easier to fly.

The flights of the five helicopters at Doylestown proved that helicopters are here to stay. How many more would there be if there were an event for them at the 1972 Nats? The Germans had an RC helicopter competition in 1969. The Italians are planning one in 1972. It's up to the fliers themselves to organize the event and make their own rules.

CARL GOLDBERG



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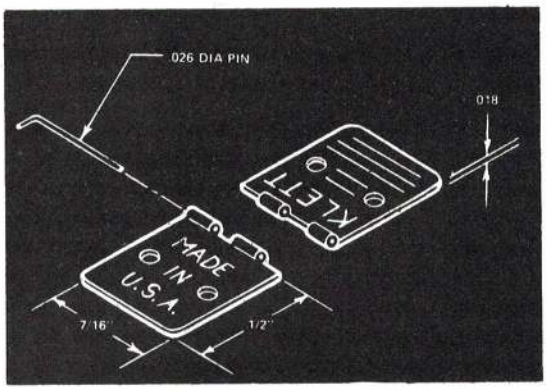

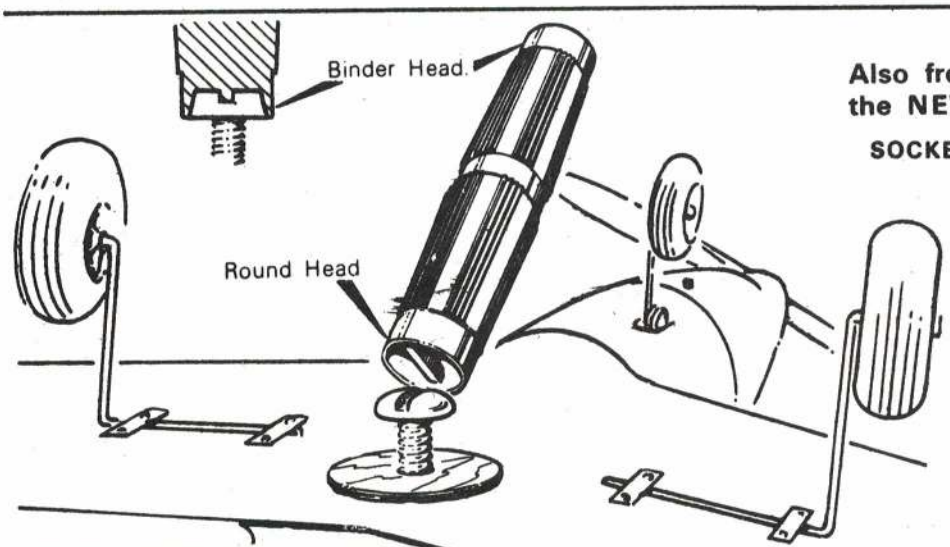

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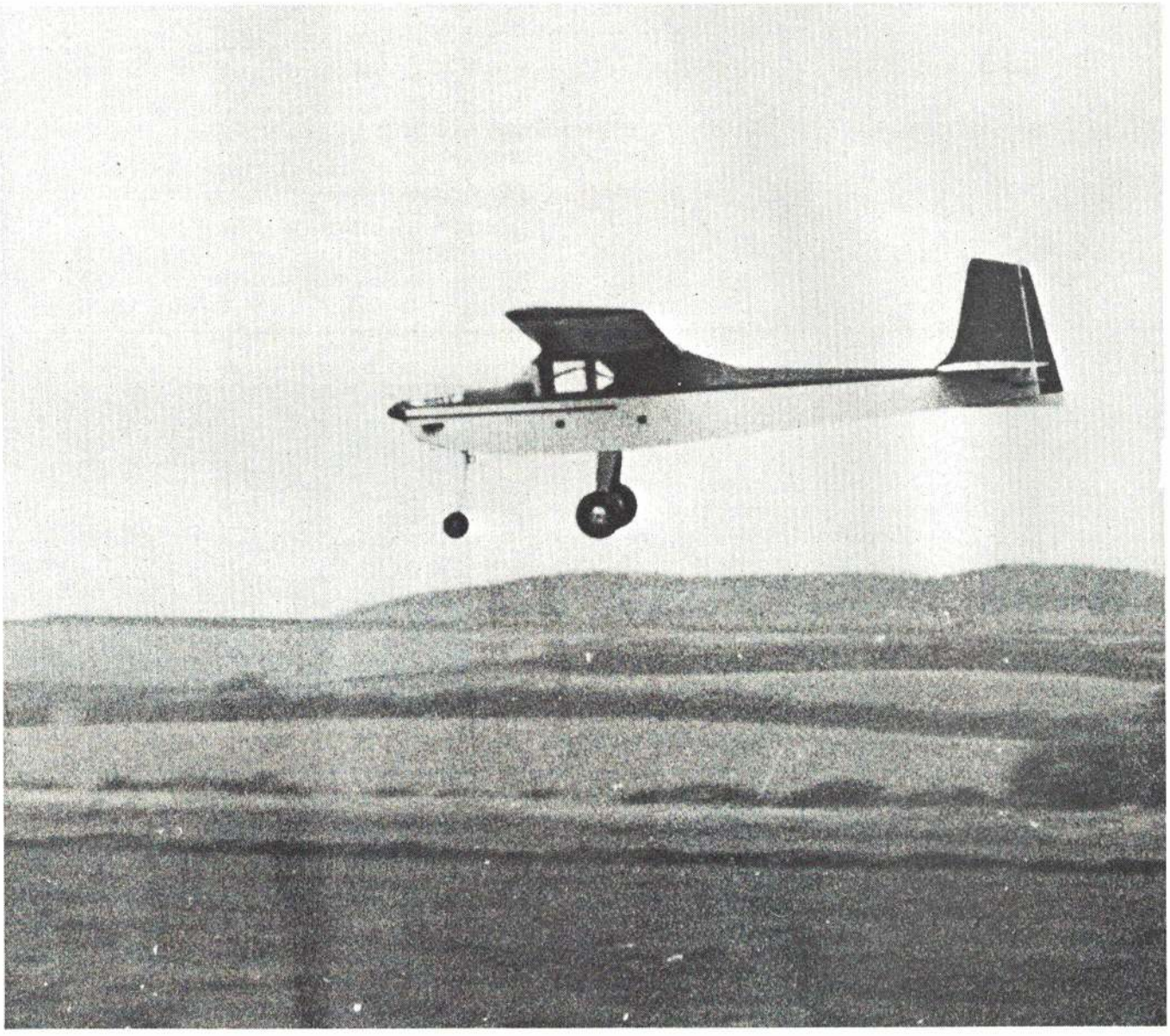
Big Flapper

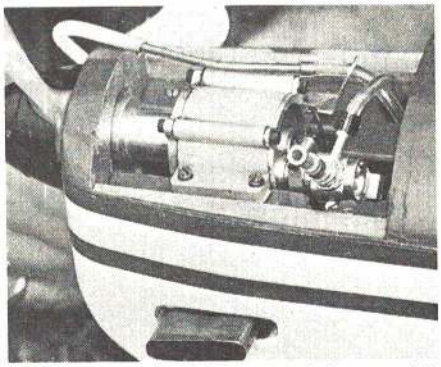
by DAVE BODDINGTON



THIS AIRPLANE WON'T DO THE AMA OR FAI PATTERN, IT WON'T TAKE RETRACTS, IT ISN'T FAST, AND IT IS NOT QUICK TO BUILD. BUT, HERE IS THE PLANE FOR THE QUIET SUNDAY FLYING CRAFTSMAN WHO WANTS A BIG RELAXING MODEL FOR THREE OR FOUR CHANNELS.

Launch of the first flight by hand because of tall grass field. Inverted engine unique and attractive in cabin jobs.

With a big engine, use a large diameter but low pitch prop, 12-5 or 13-4 would do fine. High pitch props would produce enough thrust to keep this model flying at idle!



Heavy homemade engine on prototype model. Removeable cowl not necessary with front rotor inverted engine installations if motor mounts are relocated.

Scene: *An Eight Air Force Bomber Group Airfield somewhere in the east of England.*

Time: *In the late afternoon of an early summer's day.*

The air is full of a mixture of the musty, oily, rubbery smells only to be found on service airfields, and the clean fresh smells of newly mown hay and wild flowers. In the distance, silhouetted against the descending flaming orange sun, stand the metal framework of the water tower and the sweeping curves of the huge blister hangars. A lark sings sweetly overhead, its gentle bubbling song the only sound to be heard until, suddenly, the peace is rent by the harsh crackle of a powerful engine's exhaust.

In a far corner of the airfield a group of flying personnel are busying themselves in preparation for the first flight of a newly-delivered aircraft. Despite the seemingly light-hearted bantering among the pilot, his crew and engineers, there is a tension, a nervousness that comes when the unknown has to be conquered and the unexpected can happen at any time. Finally, the moment of truth arrives and, as the plane accelerates down the runway, the spectators hold their breath.

A small correction with rudder to keep her tracking straight down the center of the track and, with speed having built up, a gentle easing back of the stick–she is airborne. Five minutes of flying around to get the feel of the ship and the controls is sufficient for this first flight; then it is time to return for the circuit and landing. Nice and easy does it on the final leg, long and flat, giving plenty of time for small corrections to direction and the descent angle. Hold off until the speed drops and then firmly down on the main wheels. A slight "curtsying" as she touches deck, but no bounce, and an almost audible sigh of relief from the pilot. After the congratulations and inquest, everyone retires for a celebration drink.

No, this is not a war story of the early 1940's, just the first flight of a new model–the Big Flapper. The location is correct though–it is the U.S.A.F. base at Molesworth in Huntingdonshire, England. Those evocative airfield smells were all there too, although the airfield had not been fully operational for a number of years. I suppose I was ten or eleven years old when I first visited an American airfield (through the woods and fields of course, as the main entrance was guarded), but my most lasting memory of that day will always be through the sense of smell.

The Big Flapper, as its name suggests, was developed from a smaller model called the Flapper–a 48" span single-channel model that featured a novel form of aileron control. It was before the days of motorized servos and I mounted the rubber-driven escapement in the center section of the wing with the rubber motor running down the span of the port wing. The winding hook was let into the tip of the wing. Surprisingly, this method of operating the narrow strip ailerons worked very well.

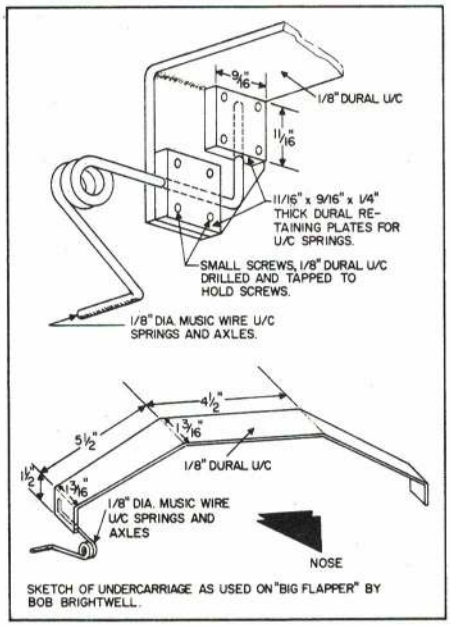
With the advent of multi-control or, more truthfully, when I could foresee the possibility of purchasing this type of equipment, I set about designing and building a large version of the Flapper for training purposes. The building went on fine until another project interrupted the progress. I never seemed to get around to completing the model and eventually let a friend, Bob "Flacky" Brightwell, have it. Bob is a perfectionist and he not only made a superb job of finishing the model, making me wish I had kept it, but also proceeded to make his own engine and radio gear for it. He incorporated a number of his own modifications, described in my notes on construction, as well. Because of these alternatives, please read the instructions carefully, study the drawings and then decide exactly how you wish to build the model.

Construction

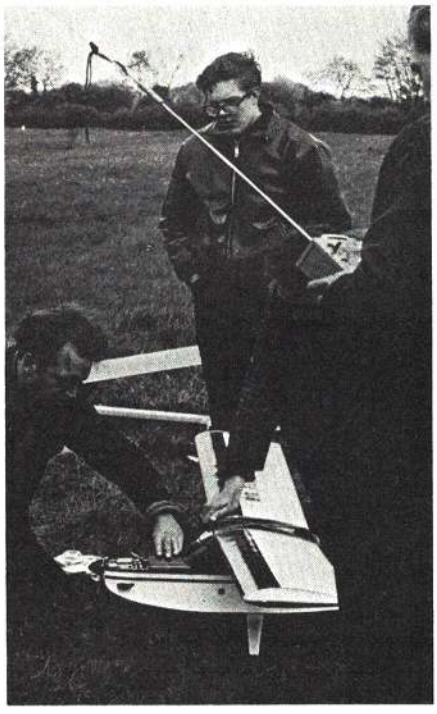
The fuselage used is the old-fashioned "box" type using sheet sides at the front with the rear end built-up from strip. The engine can be mounted either inverted or, if your motor does not start happily in this position, upright. Should the latter mounting be chosen, drop the engine bearers 3/16" to keep the propeller line correct.

Another alternative concerns the shape of the rear top of the fuselage. Originally the fuselage featured the formers F6-F8 and the two 1/4 x 3/8" stringers; however, following a mid-air collision causing considerable damage, the revised outline shown on the drawing was used for the rebuilt fuselage. There appeared to be little difference in the flying characteristics with either fuselage, so it is simply a matter of choosing the one whose appearance you prefer.

Do not omit the 1/16" plywood cabin sides as these strengthen considerably what is normally a weak area. The 1/4" sq. doublers on the top of the cabin area should be included. With bolt-on wing fixings the dowels can be omitted. If you still prefer banded-on wings, try using 3/16" dia. dural dowels instead of the more normal 1/4" dia. beech dowels. Acetate sheet for the windscreen should be of a heavy gauge as this is another



SKETCH OF UNDERCARRIAGE AS USED ON "BIG FLAPPER" BY BOB BRIGHTWELL.



Remember reeds (type of radio system)? They were used as recently as the model's first flight last year.

possible weak spot.

Admittedly this model is perfectly satisfactory as an *Ab anitio* trainer, but I think most real beginners will plump for an ultra-simple kit model or ARF model for their first attempts.

A conventional bent wire torsion bar type undercarriage is shown in the drawings; this will be quite adequate for most conditions. Bob Brightwell, however, designed an advanced form of main undercarriage featuring individual sprung wheels.

The extra work involved in making this unit will be amply repaid–the Big Flapper can be thumped down really hard on landing without the slightest bounce. A steerable twin-wheel nose leg unit was used and this combined with the sprung main wheels proved to be highly successful.

There is nothing unconventional in building the wings–just make sure that you do not build in any warps. Ribs have to be slid onto the rear spar before they are pinned into position over the plan. The leading edge is propped with 1/4" scrap balsa and the lower 1/16" x 1-1/2" trailing edge with suitably shaped pieces.

Construct the wing in three sections: center, port and starboard. The 1/16" vertical webbing is an essential part of the inherent strength of the wing, forming a box section at the front and the rear of the wing. Cut the slots for the dihedral braces after the wing sections are complete, except for capping strips. I usually glue in the dihedral braces and the wing sections together at the same time, using copious quantities of pegs and pins to keep everything together. Sheeting to the center section between the leading edge and trailing edge is not essential unless ailerons are fitted and a servo installed. The dihedral shown is intended to be used for wings without ailerons. Where ailerons are fitted, whether of the inboard or strip type, the dihedral must be reduced to a maximum of 2 percent. The reason for this reduction? Simple–the ailerons will not be effective unless you do. Nylon tube and cable connections should be used between the aileron servo and the center of the strip aileron, otherwise you may suffer from aileron flutter if the horn connection is at the inboard end of the aileron.

The fin and rudder construction is self-explanatory. The rudder may look small, compared with current aerobatic models, but was found to be quite adequate. Increase the area if you want a really snappy response or if you have plenty of multi experience.

Commence construction of the tailplane with a simple framework of 1/4 x 3/4", 1/4 x 1/2" and 1/4" strip built over the plan. When this is dry, remove from plan and add 3/16 x 1/4" strips to all "rib" stations, both top and bottom. Note that the bottom of the tailplane slots onto the top of the fuselage and that the fin slots into the top of the tailplane. Sand the tailplane to a symmetrical airfoil section. The 1/4" sheet elevators can be joined either by 3/32" dia. music wire or 1/4 x 3/8" spruce.

I much prefer covering this type of model with nylon as this adds tremendously to the model's overall strength, yet retains a certain amount of flexibility to take up the shock of hard landing (better known as a crash). It is surprising how strong an open structure type fuselage, as used on the Big Flapper, can be due to this degree of shock absorbing capability.

This model can cope with a very considerable pay load so there is no need to skimp on the decoration and fuelproofing for a change.

Why not assume that the model is going to last for a long time and really make a superb job of the finish. However, it is no good making an assumption such as this unless you make a first-rate job of the radio installation. The type of radio, linkages, hinges, engine, etc. you use is up to you–just make sure they all operate efficiently.

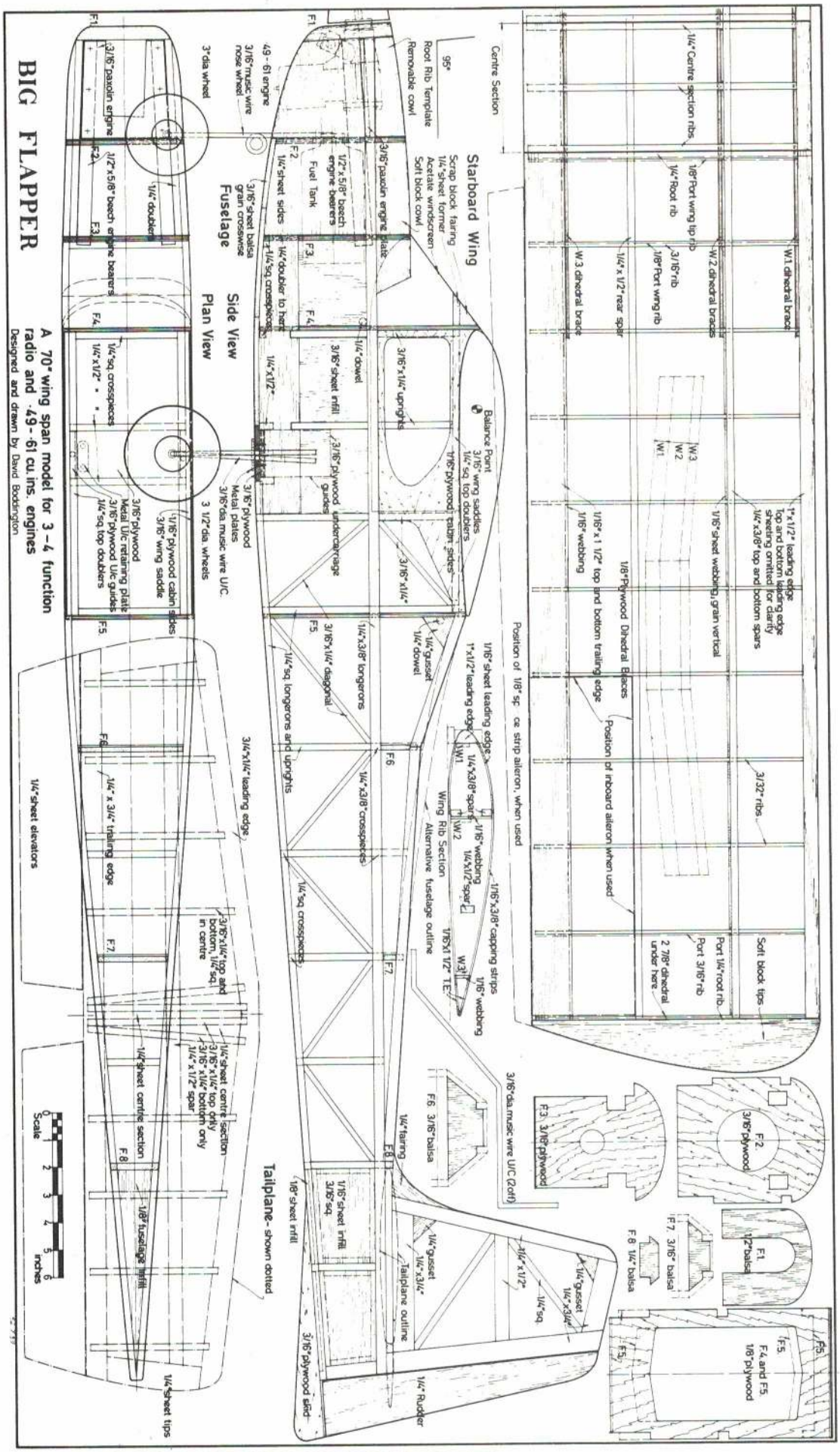
Flying

With the correct balance point–the further rearwards, the more tricky it will become to fly–and a warp-free wing you are ready for that first trip. Hand the transmitter to an experienced flier if this is your first model; it may hurt your pride but it will save you a lot of extra work.

Either hand launching or a takeoff can be attempted for the first flight. You will find it easy to handle and quite stable. The Big Flapper is not intended as a highly aerobatic model, but it will cope with the basic maneuvers with varying degrees of efficiency and style. Should you wish to do a lot of high "G" maneuvers, then it may be prudent to add wing struts.

Dural tubing struts were experimented with on the prototype and, although it was never proved that they were structurally necessary, they certainly looked quite attractive.

I sincerely hope you will enjoy building and flying the Big Flapper. It is not a unique aircraft in any way–only an honest sports model designed to give the maximum of fun and satisfaction.



FULL SIZE PLANS AVAILABLE—SEE PAGE 70

FORTY-FOURTH IN A SERIES

getting started in RC

STUNTING WITH RUDDER-ONLY.

by HOWARD McENTEE

A large number of today's RC fliers have never seen a rudder-only plane in action and can't imagine doing stunts with less than four proportional controls. If one launches an RO plane at most club fields today, proceeding to put it through loops, rolls and so on, he'll find some mighty amazed onlookers. RO flying is a lot of fun, though quite different from multi, of course. And it isn't just for beginners—some accomplished multi fliers undertake it from time to time, simply as a change from the pressures of full multi.

Probably the majority of RO planes are hand-launched. However, with proper plane design and a good pilot, ROG is entirely practical, using either two- or three-wheeled landing gear. Trike LG makes it easy—provided you have the nose-wheel turned for tracking in a straight line. You may need a fairly long runway—RO planes take off when they are good and ready (plenty of flying speed). Of course a modest breeze shortens the takeoff run. Generally the nose-wheel is not steerable on RO planes. With two-wheel gear you must be right on the ball to catch any tail swing before it develops into a ground loop. (Good plane design helps a lot here.) You can steer a two-wheel RO plane on the runway nicely once the tail has lifted to flying position. If the plane seems reluctant to break ground, old-timers found that several wide-rudder swings, once good speed had been attained, would often do the job. This probably wouldn't work with a trike-LG plane.

A few of the maneuvers that can be accomplished with a well-designed plane are shown in the diagrams. Most maneuvers start with a spiral dive, attained by holding full rudder. The plane will drop its nose and pick up speed rapidly. Actually, the turns get smaller as the plane proceeds from one, to two, to three turns of the spiral dive—and speed increases all the time. With most rudder planes, a single-turn spiral will provide enough excess speed for a roll. As the plane reaches the heading desired, neutralize rudder briefly to stop the spiral (or even give a brief blip of opposite rudder). The excess speed will cause the plane's nose to rise rapidly; for a roll, again hit full rudder when the nose is a bit above the horizon. With proper trim, the plane will do a neat barrel roll (the sketches show practically axial rolls, but you can only accomplish barrel rolls with an RO plane). As the plane completes the roll, center the rudder. Often a plane will make a whole series of rolls if you keep hitting full rudder at the proper moments. Also—most important with RO planes—you can make a good roller climb or lose altitude by governing the point at which you start each following roll (i.e., with plane nose a bit up or down). A plane that will roll well can thus be flown upwind without climbing (or even losing altitude all the time).

When you stop a roll, chances are the plane will still have excess speed and will start to climb. This tendency can be prevented by

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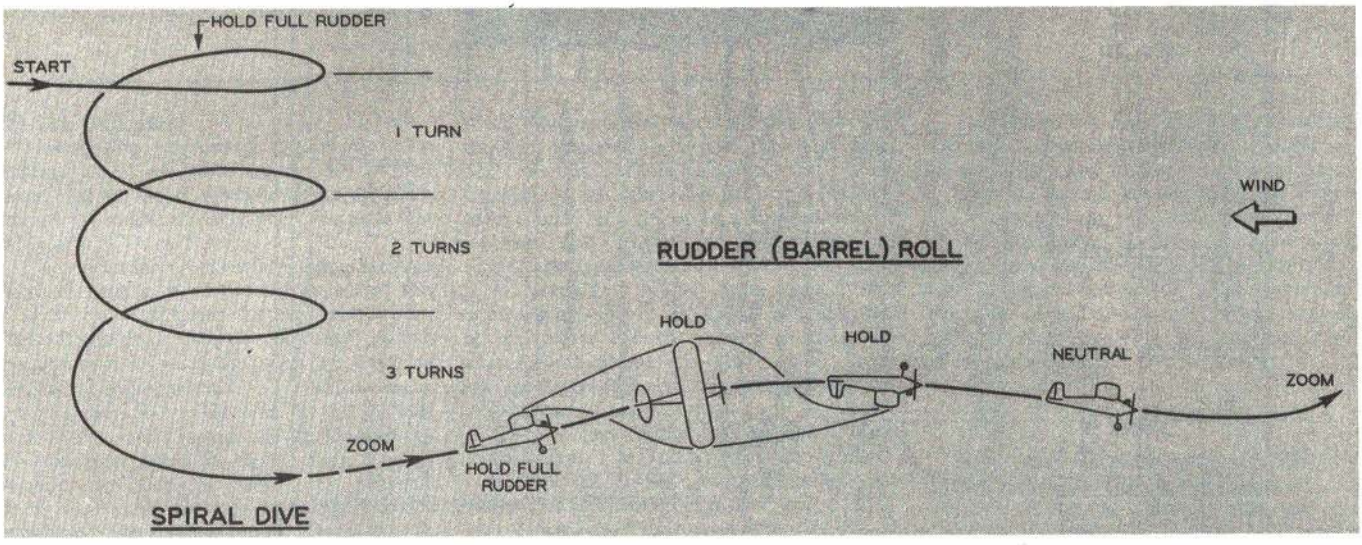

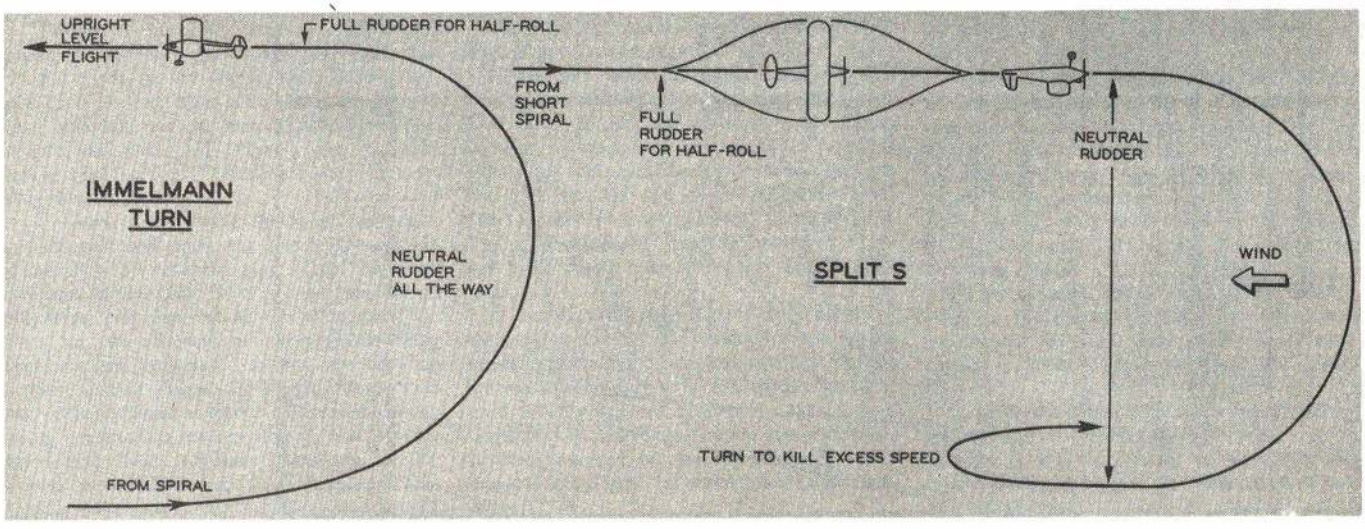

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HERE'S THE PLANE YOU HAVE TO BUILD IF ONLY TO HEAR THE SOUND OF THREE OUT-OF-SYNC ENGINES. FLIES FAST AND PULLS HARD.

BV-170

by ROBERT ANGEL

Design and photos by Terry Aldrich

One evening just before the club business meeting, Terry Aldrich came rushing in, waving a set of plans. "Fellas, I'm going to build a model airplane." "That's fine, Terry, how many engines?" "Only three this time, it's semi-scale."

Our question was a logical one, since Terry probably holds the international record for sheer number of engines on a control-line model. His XB-9, which appeared on the April 1967 cover of **AAM**, had nine engines then. Since that time, two more have been added making a grand total of eleven.

Terry sometimes uses fewer engines (only two on his F-82 featured in June 1968 **AAM**), even an occasional single engine. But there is a distinctive drone to a multi-engined model that causes heads to turn among model builders and spectators alike. For this reason, our BV-170 makes an excellent crowd-pleasing demonstration model. Terry brings it out for local airshows and club promotions and between flights it is usually on display at the local hobby shops, promoting the hobby and helping solve a home storage problem.

The full-scale BV-170 was a German plane—one of the many experimental "hot" aircraft developed during WW II. It was a single-seat light bomber, built by Blohm-Voss and powered by three BMW engines producing 1600 hp each. Wingspan was 18 meters, or just over 59 ft., including engine pods. Top speed was very respectable for the time at 478 mph.

We rediscovered the ship in a Japanese publication called *Aireview*. Published in 1959 by Kantosha Co. Ltd. (601 Kojun Bldg., 6-Chome, Ginza, Chuo-ku, Tokyo), the book is in two volumes, one of which featured German aircraft of the second world war. For those few readers who may not read Japanese, there are some sections translated into English.

A few words of caution: Do not attempt any multi-engined model until after you have successfully flown at least one other control-line plane. The BV-170 is quite stable and not tricky to fly; however, it is large, fast, and pulls on the lines like a demon. It could make a sizeable and disappointing heap of splinters unless the rudiments of construction, engine settings and control-line flying have been learned.

In reworking the full-scale aircraft plans into a profile control-line model we have held optimum fidelity to scale; however, there have been a few deviations. The very slight wing dihedral was removed and a symmetrical airfoil employed to provide ease of building, along with stable inverted flight and stunt capability. The thrust line of the engines was moved slightly upward, to the wing centerline, for the same reasons. After test flights, the landing gear was moved forward of the scale position to eliminate a tendency to nose over on landing.

Construction

The full stunt version with wing flaps, as shown on the plans, is described here. However, for simplicity and ease of construction, you may elect to make the wing without flaps. If so, simply make all 25 wing ribs to the upper rib pattern shown on the plans, and make the trailing edge solid.

Cut out 25 assorted wing ribs and the 22 false trailing edges. Pin the bottom wing spar to the plan and build the wing directly over the plan. Slide all the ribs onto the center

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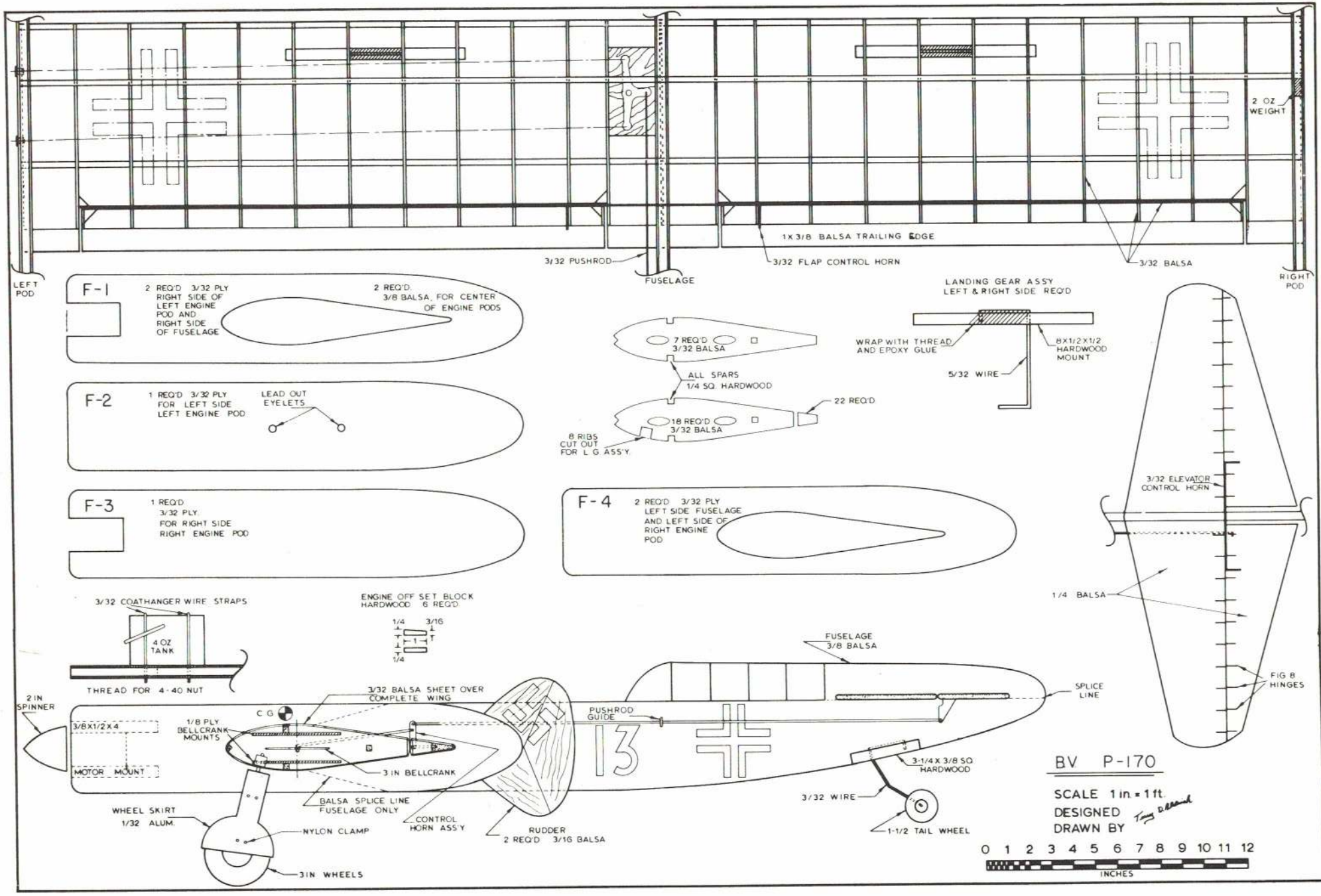
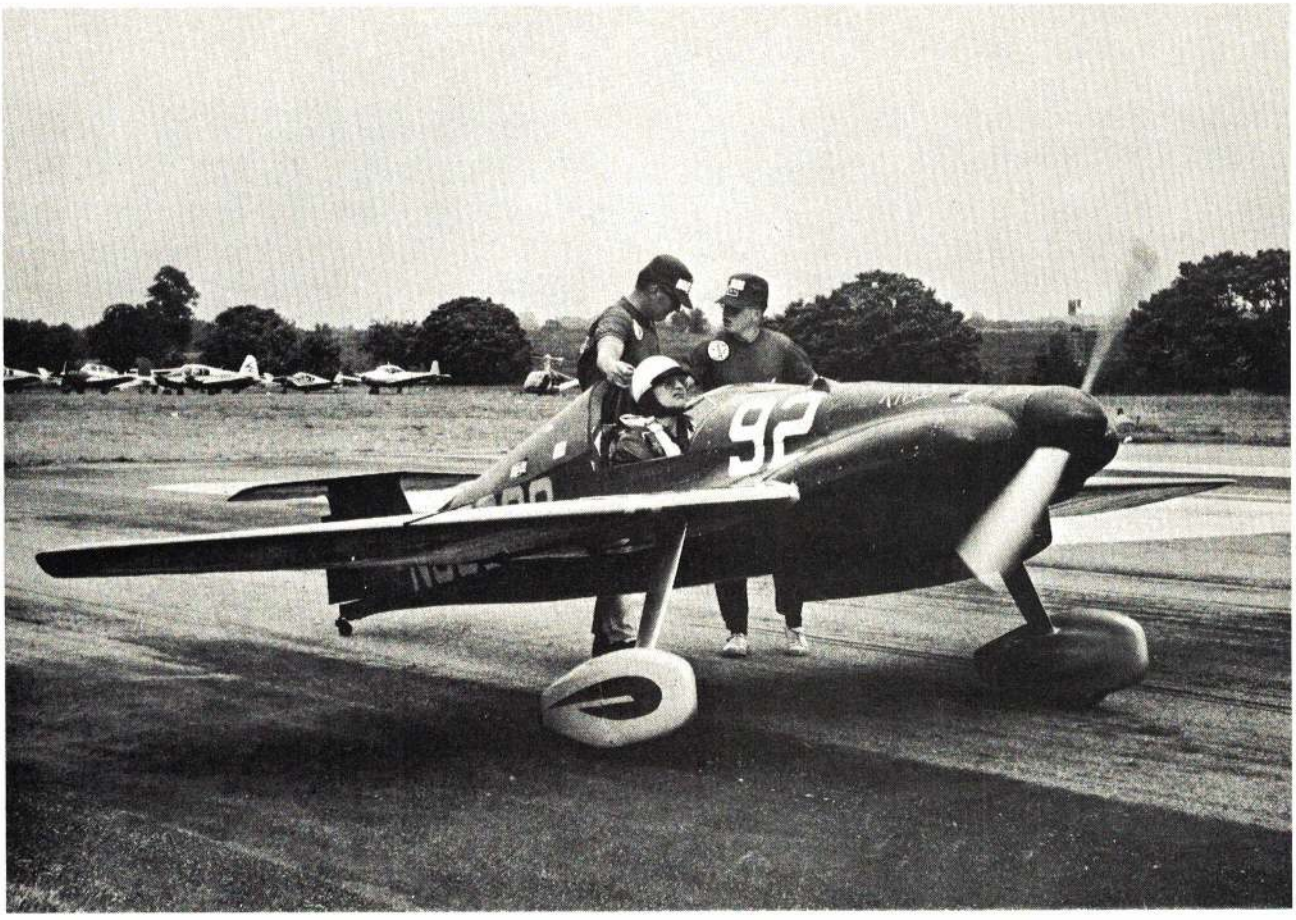


FULL SIZE PLANS AVAILABLE—SEE PAGE 70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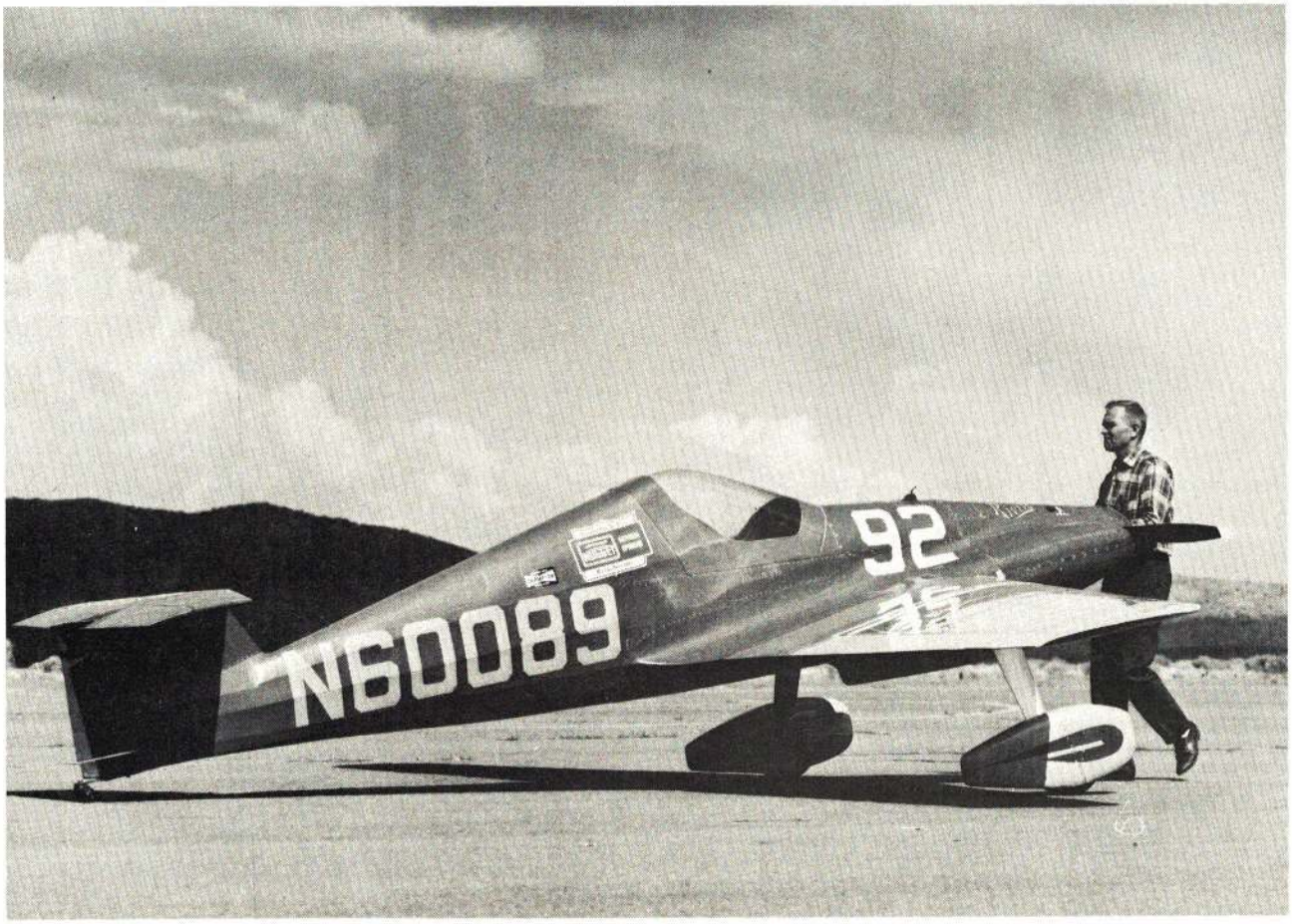
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THE PLANE TO BEAT IN FORMULA I RACES IS BILL FALCK'S 'SPECIAL.' SIXTEEN WINS—20 FIRSTS AND SECONDS SINCE 1964!

Rivets

by DON BERLINER

"Rivets" is almost as fast as the GeeBee! And a lot more streamlined! In its day, the glamorous GeeBee Super Sportster was speed personified. If it was running right, nothing could keep up with it. It is easily the most famous American racing airplane of all time. Yet it was crude and clumsy compared with "Rivets."

The strange-looking Falck Special No. 92 has been clocked twice at 231 mph around a three mile course, even though it has a little 201 cu. in. engine normally rated at 100 hp and certainly producing less than 150 hp. The great GeeBee, in its prime, was clocked at 253 mph around a much faster five mile course—pulled by a huge 1340 cu. in. engine which developed at least 800 hp.

How has Rivets designer/builder/owner/pilot Bill Falck done it? He has combined post-GeeBee engineering with two decades of personal experience and a lot of extremely hard work. His racer has the least frontal area of any machine in its class. Takeoff acceleration has been sacrificed for maximum speed on the straightaway. He has accepted the poor flying qualities of a steeply swept-back wing for the extra visibility which enables him to see the pylons while flying higher than anyone else, and thus staying out of traffic.

As important as absolute speed is in air racing, consistency is even more so. What good is a super-fast airplane if mechanical problems keep it on the ground most of the time? The classic GeeBees (R-1 and R-2) won but a single Thompson Trophy Race between them, despite their speed. Rivets, on the other hand, has won no fewer than 16 Formula I races. At one time, Bill Falck had an unprecedented string of eight straight wins. In the 23 races they have flown since the sport came back in 1964, they have placed first or second in 20!

With the Formula I class being the most competitive of all during its 24 years, such a record of success is all the more surprising. Some of the finest pilots who ever flew the pylons have tried to dislodge Falck and his model from their place in victory lane, but no one has been able to do it consistently. "Shoestring" pilot Ray Cote has come the closest, beating them at Reno in 1968-69-70, but Cote works all year long for that one race, while Falck is there every time the flag is dropped for a Formula I race.

These winning ways didn't come quickly or easily. There were slow and unhappy days, for Bill Falck knew no shortcuts to victory. When he first brought Rivets out in public for a race many laughed, for it was a funny-looking airplane. The bulging canopy extended all the way to the spinner, and the airplane flew around the pylons with its nose in the air. Bill had built his racer so he could fly it while lying flat on his back, but this streamlining idea was declared unsafe shortly before his first race in No. 92, and the hurried modifications weren't quite right. He still placed second in the Consolation Race, though his speed was only 142.5 mph.

Rivets underwent the first of several major changes which were destined to turn an also-ran into a winner for the following year—1949. As operator of the small Warwick Airport in New York, Falck had a lot of time on his hands when snow made his dirt runway useless, so he put the time to good use by methodically re-working his airplane, piece by piece. The first area to get a good going over was the canopy, and the original "plastic bathtub" was replaced by a clean canopy made from pieces of Aeronca Champion windshield. Months of hard work paid off to the tune of 20 mph and first place in the Consolation Race at Cleveland.

Yet Falck and his Rivets were a full 15 mph behind the winners, and so few people paid attention to them, except in the pits where "Willie" was becoming recognized as a very competent student of racing. But they were no particular threat to people like Steve Wittman and Bill Brennand and John Paul Jones, who were doing the winning in those days.

In the time between the last of the old Cleveland Races in 1949, and the 1951 Detroit meet, Falck completed the single most important modification to his racer—the change that was soon to make it winner. He designed, built and proved the complicated set of plumbing under the sleek new cowl that gave the model a sound like it had several extra cylinders. Basically, it was an updraft cooling system with tuned exhaust pipes, all exiting through an augmenter in the tunnel underneath the cowl. Far more efficient than the usual, simple exhaust pipes and cooling-air outlet, it enabled Rivets to advance from consolation to final races. This happened first at Miami in 1950, when they placed 7th at 173 mph, and soon became a matter of habit.

Getting into the finals was a step in the right direction, but hardly the same as winning. Falck's first win was a dramatic one, and set the theme for many races to come. At a small race in Chattanooga, Tennessee, in the spring of 1952, Bill qualified second following the great Wittman and then shared preliminary heat wins with him. In the 12-lap finals, Wittman got off to his usual fast start and Falck to his usual slow start. Lap by lap, Rivets gained on the famous Bonzo, until it was clear to everyone that only time or luck could keep that upstart with the funny airplane from pulling the upset of the year. For Wittman, there was too much time and no luck, as Falck passed him on high with a couple of laps to go and won by the narrow margin of 186.95 mph to 186.79 mph. A winter spent hammering out a fancy set of new wheel pants was time well spent for Bill Falck.

Racing soon slipped to the level where it was little more than a friendly game played by Easterners at such places as Niagara Falls, Oshkosh and Ft. Wayne. Of 11 such races held from 1954 through 1960, Falck and his racer won five, were second in three, and third in two—by far the best overall record of the period. Moreover, they hung up their first really important record by qualifying at Niagara Falls in 1956 at 208.81 mph, five mph better than the old mark. It was all a little sad though, for the great performances were before small crowds and received almost no publicity. Even the great story of Rivets being reduced almost to ashes by a fire in 1956 and then coming back to win the big race of the next season went almost unnoticed.

When racing came back at Reno in 1964, Bill Falck was not exactly an instant hero. He didn't even fly in that first race, but he won a photo finish with Bob Downey at St. Petersburg, Florida the following winter. In 1965's big races, his best were seconds at Reno and Las Vegas. He then repeated his win at St. Pete in 1966 and charged off on the greatest winning spree the sport has ever seen. Victories at Frederick, Maryland and Reno gave

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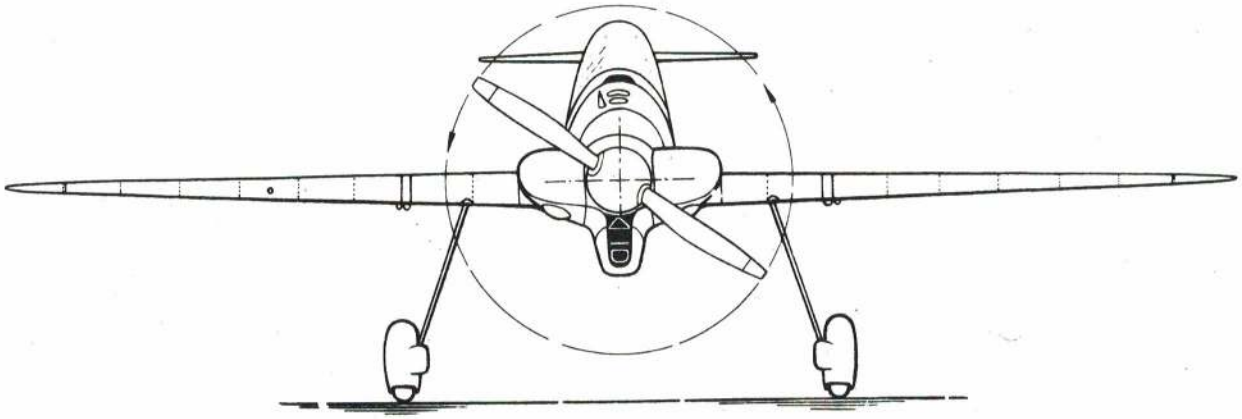

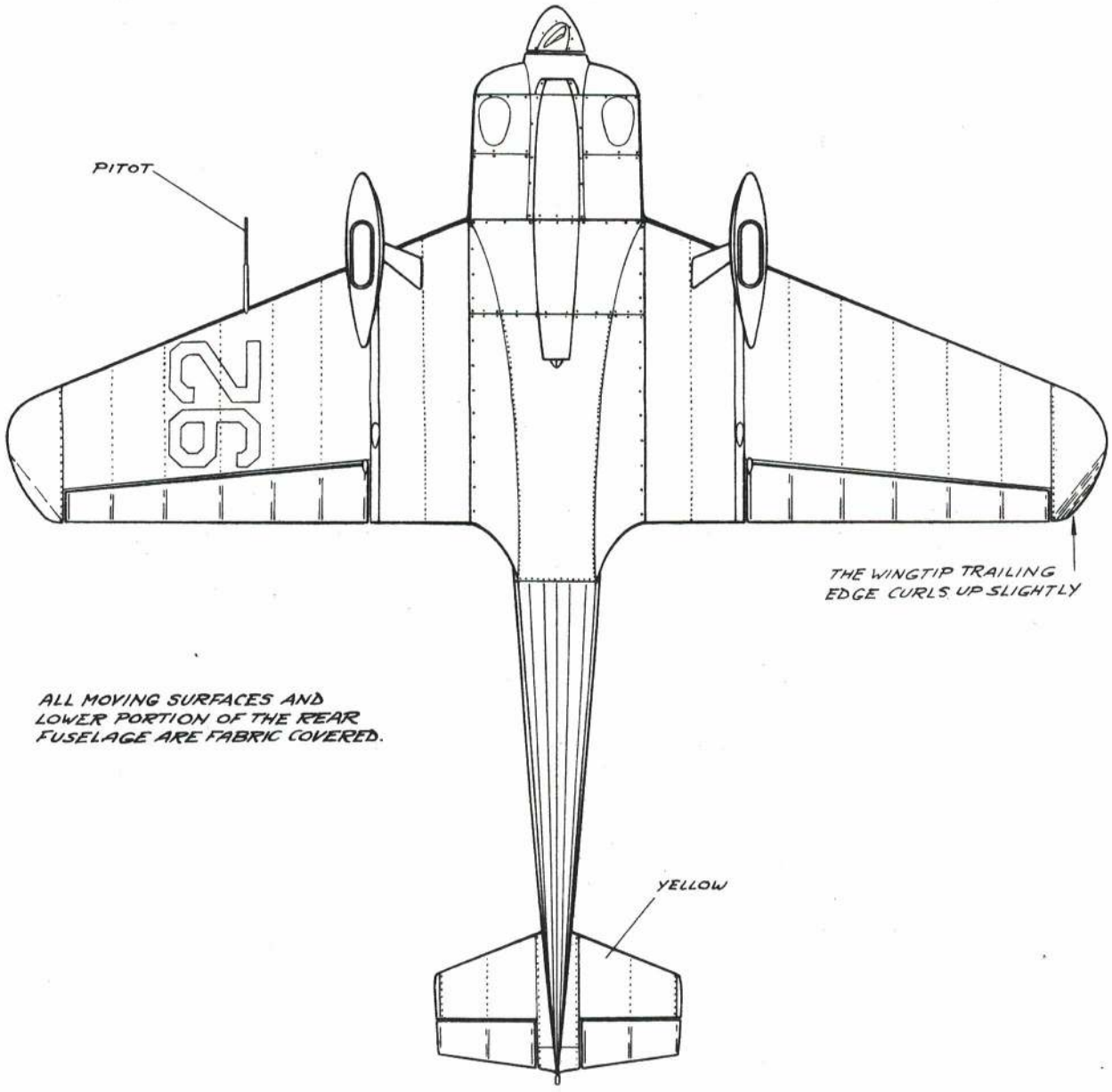

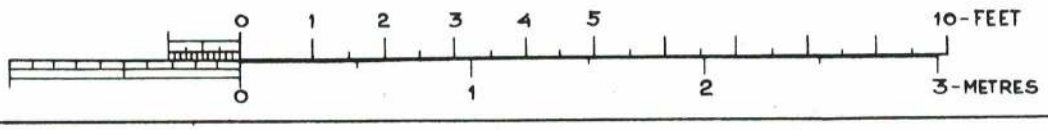

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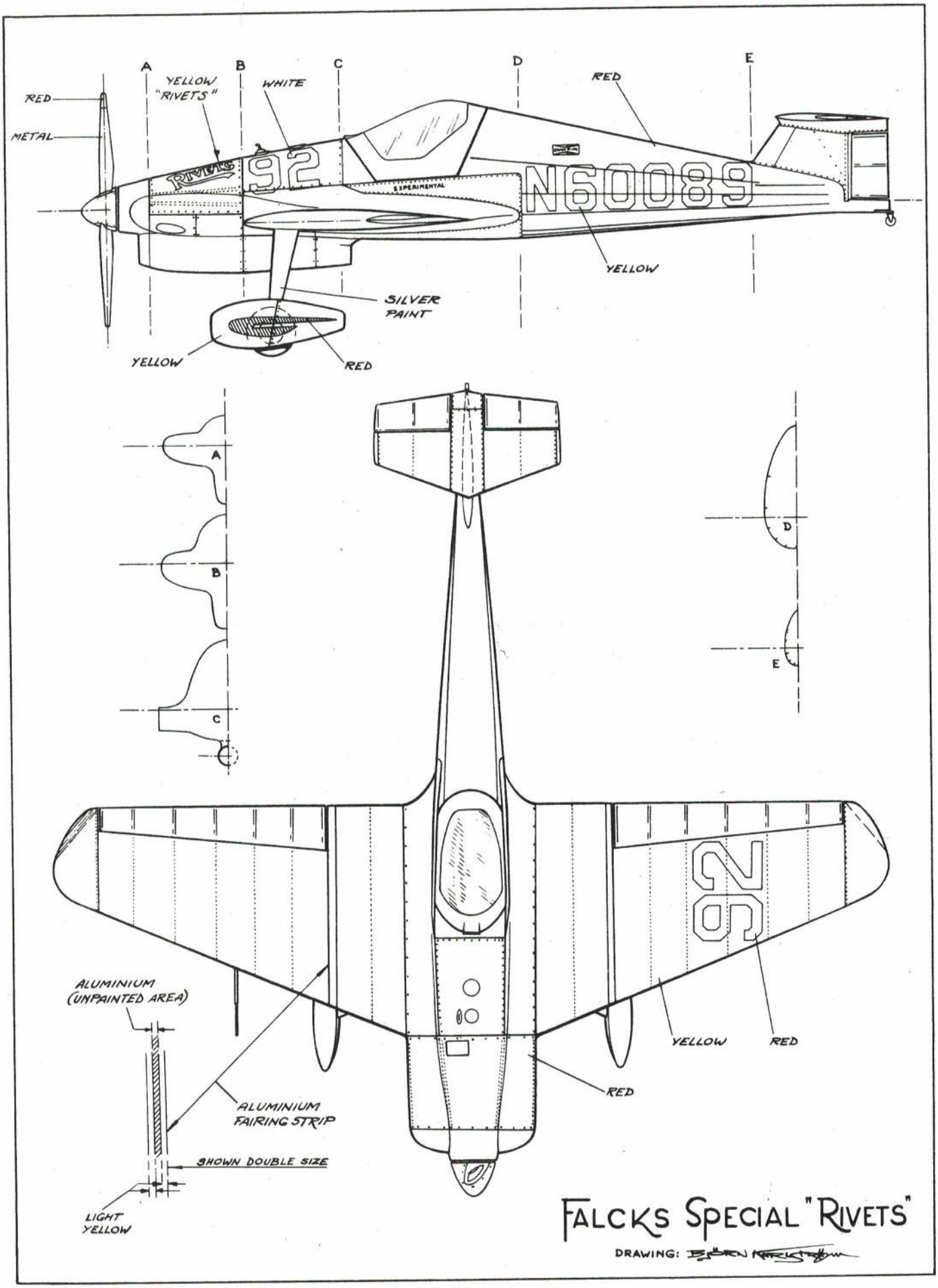


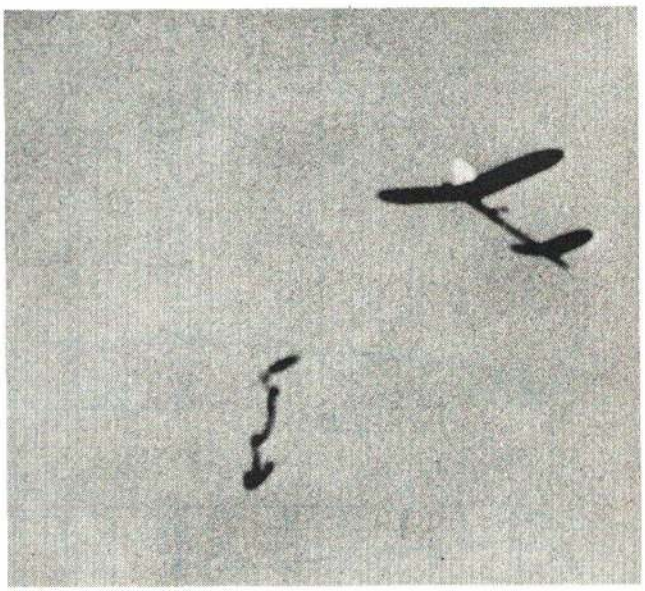
FALCKS SPECIAL "RIVETS"

DRAWING: BJÖRN KARLSTRÖM

IN SEQUENCE, THIS SHEET BALSA JOB DROPS ITS RUBBER AND PROP, THEN RELEASES PARASITE GLIDER, AND FINALLY DT's FOR LANDING

Canard Drop-Off

by ISRAEL BARAN



The little canard spirals left, counter torque, then shifts right, the power half expended. At an altitude that is only a Wakefielder's dream, the prop and rubber drop. (A gasp goes up from the crowd.) The fall seems to be in slow motion, like a chutist, and this time the prop balance weight digs in so the prop stands up on the ground. A bit later a four-inch piggy-back takes off—and stalls down. But the mother ship, now strictly a glider, keeps climbing on a thermal. Fifteen minutes later, on a windless day, it is landed a short walk from takeoff.

Why a drop-off? Why a canard?

It began before 1920. A magazine article of the day pictured several fragile, loose-tissued tractors which, according to the article, dropped their rubber and soared to respectably timed flights. A great amount of rubber may have been used since the power was not carried in the glide stage, and a contest was going on!

In the mid-thirties, when I was still unaware of the idea, I re-invented it and made two—both failures. There appeared to be no way to correct the expected severe stall induced by the rear shifted CG, and there was no solution for prop damage. True, the rubber streamed down first, but the prop did not land entirely on it, and so the conventional two-bladed prop kept chipping away at the edges. I have often wondered how the boys of 1920 solved these problems. A recent attempt of mine was complex: the wing moveable in flight, with changeable incidence actuated by wires and cams in addition. Everything failed.

A solution was developed. On a canard, with or without the prop and rubber power train, the CG position would be about the same. The prop's weight would nearly compensate for the greater length of rubber forward of the glide position CG. To trim, it would only be necessary to add a small weight. It worked out. In this model, one 3/0 split fish line sinker is squeezed to the front hook, then soldered and filed to balance after flight test. Had the weight been needed in the rear, it could have been flattened and glued to the bottom of the prop block. With more lead, the system should work using a tractor design, but it would be sensitive to different amounts of rubber; here it is not.

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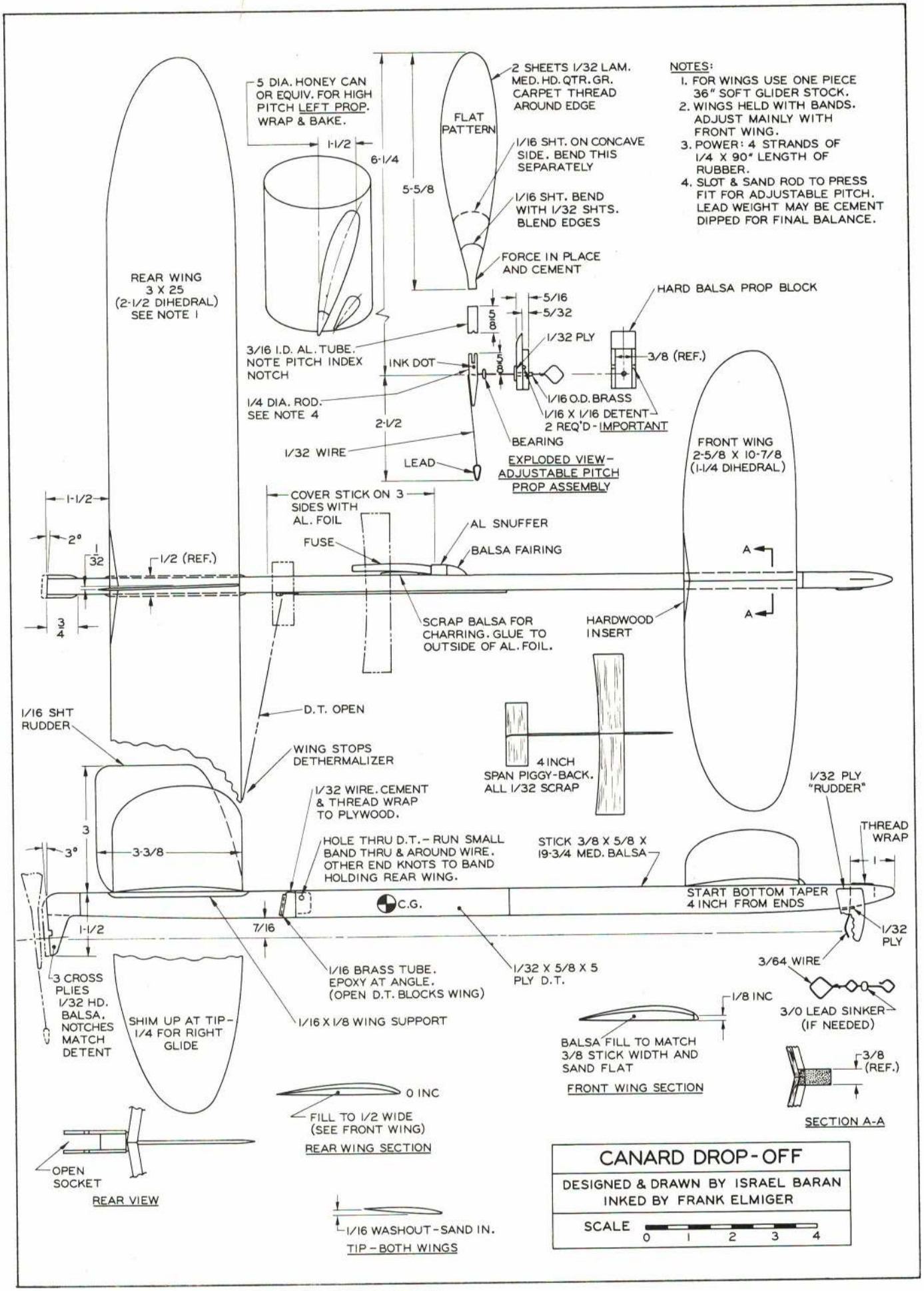

FULL SIZE PLANS AVAILABLE—SEE PAGE 70

DISTINCTIVE-LOOKING AMERICAN-DESIGNED
PLANE CREATED FOR THE FAI PATTERN MANEUVERS.

Cardinal

by DAN SANTICH

Someone once said, "What this country needs is a good five-cent cigar." Well, there is a new saying that goes, "What this country needs is a good FAI Pattern ship." Who said it? Just about everyone after the FAI Championships two years ago when this model was designed. We do not have a ship capable of the precision and grace required by the FAI Pattern. Don't get me wrong, we have plenty of airplanes that will *perform* the FAI Pattern, but there is quite a big difference between simply doing the maneuver and doing it correctly. Let's use the takeoff as an example. Just about anyone can perform this to one degree or another. You just aim it, pour on the coal and unglue it from earth when it has flying speed. It's simple, right? WRONG!

A good precision takeoff is a difficult maneuver, but a beautiful one if done correctly. It must track absolutely straight and lift smoothly from the ground in a fairly flat attitude. It takes a good pilot to do this, but more importantly, a good airplane. If a ship is not set up correctly one will have problems, even if he is the world's greatest pilot. Let's take another one on the spin. Get some altitude, head into the wind and cut the power. Bring the nose up, and as it stalls, hold up elevator and right or left rudder and aileron. It is at this point that the airplane takes over. All the pilot can do is watch as it rotates. It will either spiral or spin. If it does spin, how fast does it rotate? I have seen some pattern ships that would spin so fast it was hard to even count the turns.

Stopping it is something else. If the spin is rapid, the chances that you will stop it right on heading are remote. So, it follows that the slower the ship spins, the easier it is to stop it when you want to—not a half turn after you neutralize the sticks. Again, it is the airplane dictating the maneuver, not the pilot.

The Cardinal is the result of countless hours of research and study, as well as trial and error. Every aspect of the ship has a planned purpose. Each maneuver in both the AMA and FAI pattern was analyzed and the ship designed accordingly. It will actually climb while knife edging with full top rudder. It does not wiggle even the slightest on the double stall turn and will tail slide better than any ship I have seen. Wind has no adverse effects on it—in fact, it even helps you track straight in the loops and eights. Takeoffs are absolutely beautiful; it is almost impossible to tell exactly when the ship leaves the ground, it is that smooth. The spin rate is quite slow and it stops immediately when the sticks are neutralized. To achieve a faster spin rate and to do the loop with one and one-half snap, just move the clevis for more elevator throw. It will slow-fly at near walking speed, which enables you to put it right smack in the center of the circle every time.

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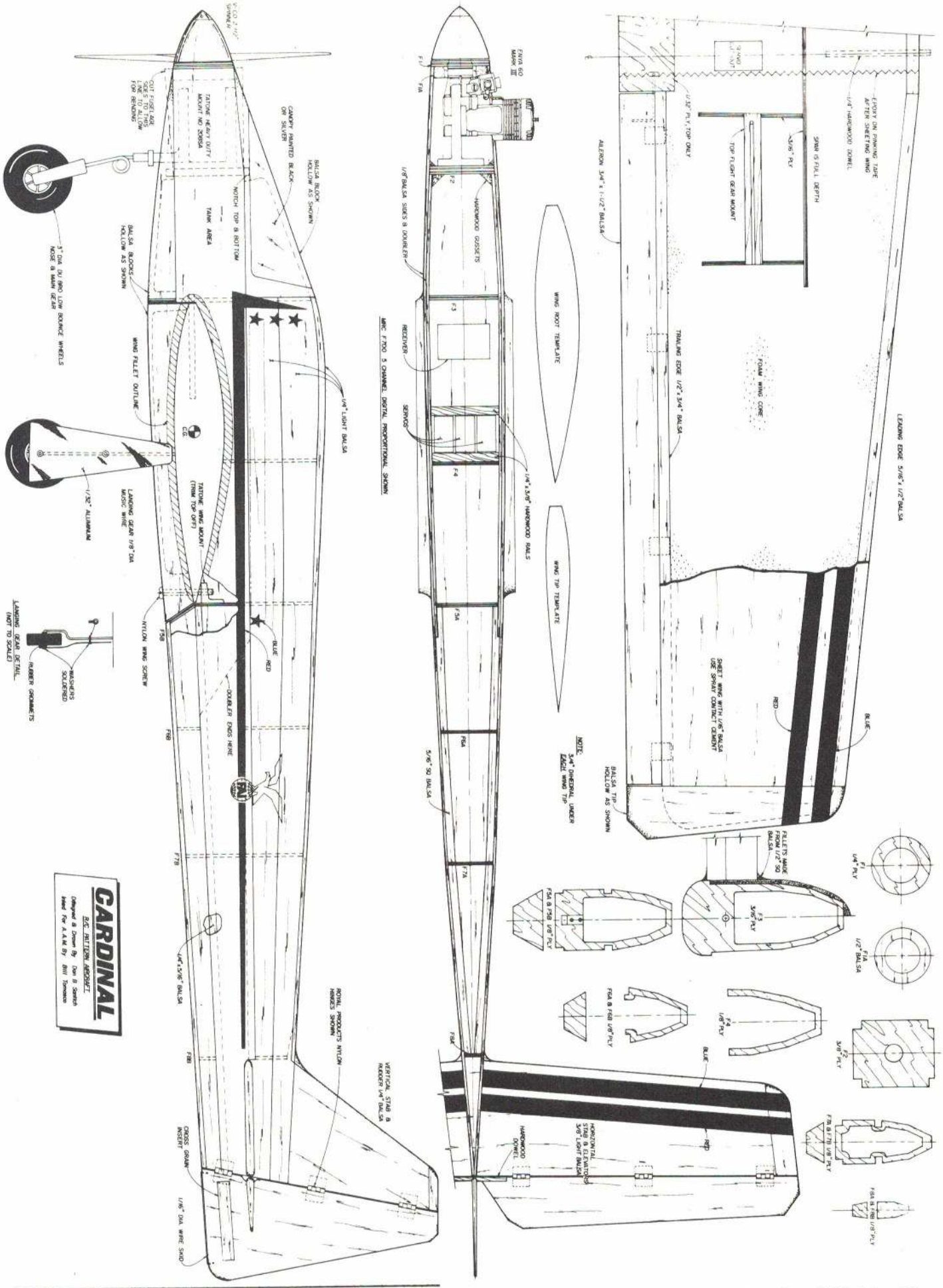


FULL SIZE PLANS AVAILABLE–SEE PAGE 70

PART II

MAKE YOUR OWN RETRACTS

GRASS-FIELD RUGGED UNIT IS SERVO DRIVEN. CABLE STEERED, AND EASILY MADE.

Last month construction of main gears for thin-wing racers and heavy stunters were presented. Lake the nose gear here, the mains are designed for hand-tool construction and reliable operation from a 180 degree servo or power driver. Once the racing gear had proven itself, it was only logical to expand the idea to include a tricycle system with steerable nose wheel.

The nose gear is made in much the same manner as the main gear. After cutting out the parts, bolt the two main Teflon blocks to a piece of 1/4" plywood with just the right spacing for two collars and the Teflon pivot block. After the gear is constructed, this plywood can be removed and used as a drilling jig for the mounting holes required in the firewall.

Add the metal cross pieces the same way as the main gear. Use a 5/64 drill in the Teflon for the 4-40 tap. Next, drill the No. 20 pivot wire hole and No. 40 locking wire hole. Take care to get these located properly and at the right angles to the blocks so that the retraction angle is correct.

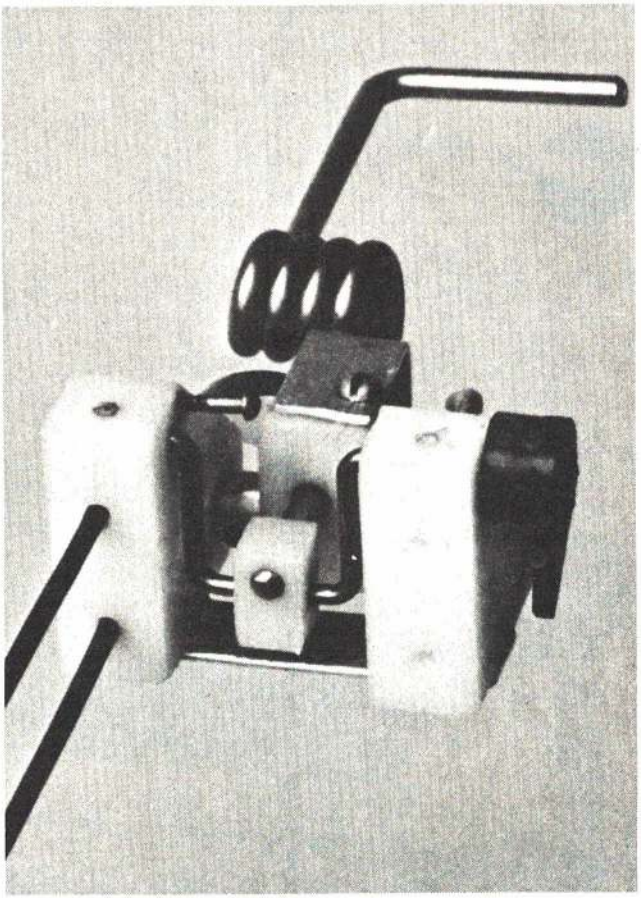
Mount the metal hanger on the pivot block and mount this with the steering arm on the 5/32 pivot wire between the main blocks. A flat should be filed on the strut for the steering arm set screw as this takes the landing loads. Next bend a locking wire as shown in the drawing. Remember, the slider block must be mounted before the final bends are made.

Remove one of the main side blocks and mount the locking wire, slider block, and strut. Check to see how things work. For proper actuation the two sides of the locking wire must be the same proper length, and the pivot ends must be aligned and parallel. It can be done as I have made several gears, but it usually takes several tries.

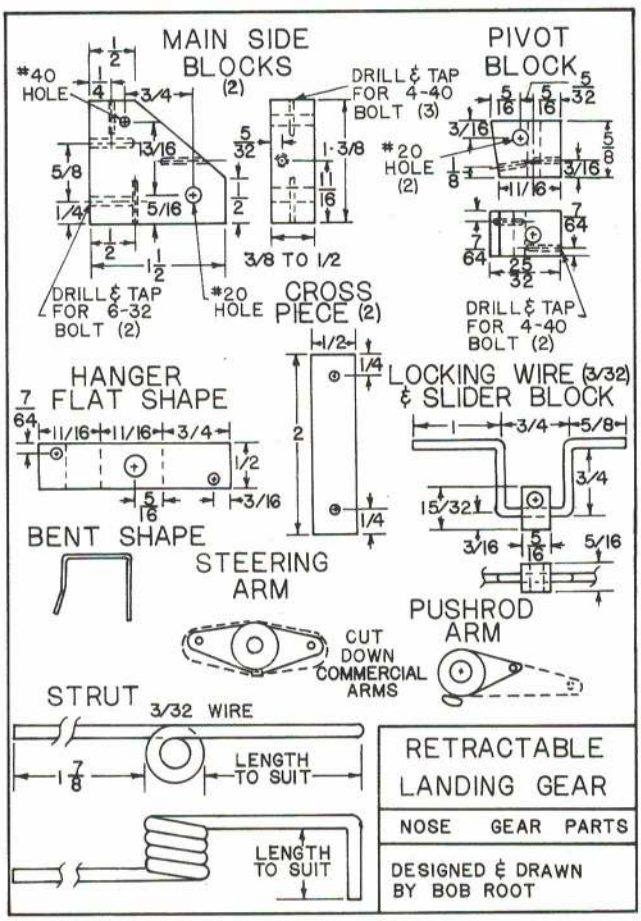
The centering arms which capture the steering in the retracted position can be made from 1 1/2" long 4-40 bolts. Tap the Teflon blocks, screw them in, and then cut off the heads and bend to shape. If the bolts are bottomed in the tapped hole they won't move. The exposed threads can be smoothed by covering with epoxy. The steering arm should be connected to the rudder servo with cables so they are slack in the retracted position.

by BOB ROOT

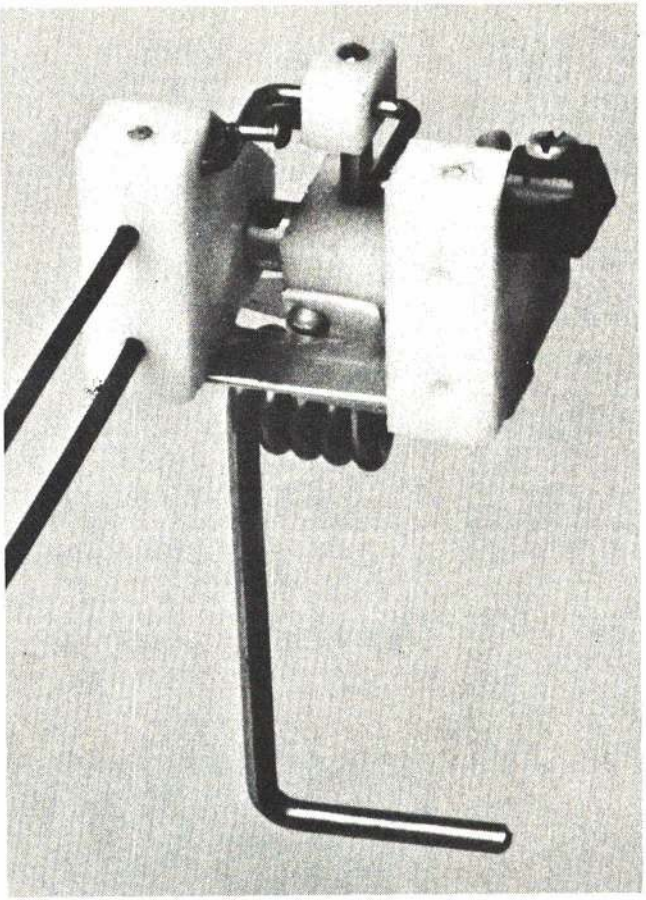
When retracted, steering system is self-centering. Mounted with bolts through the firewall into plastic gear sides. Top cross bar not mounted here.



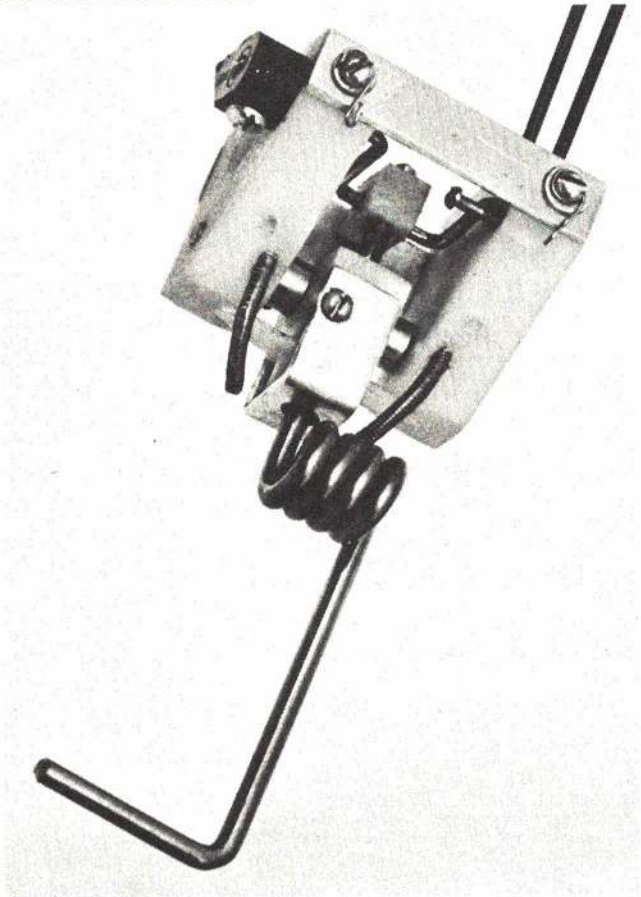
Photos by Tom Sakata

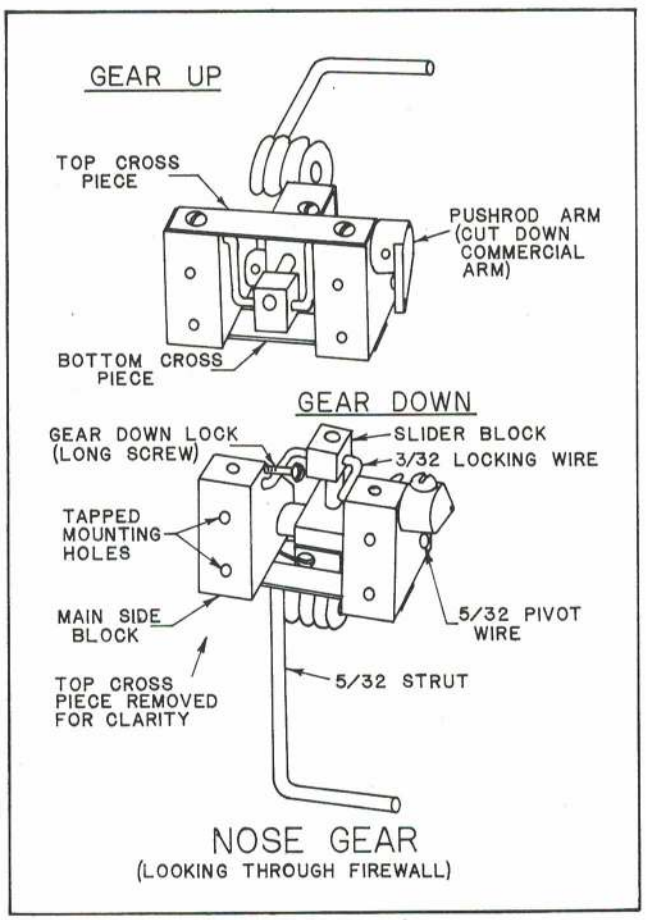


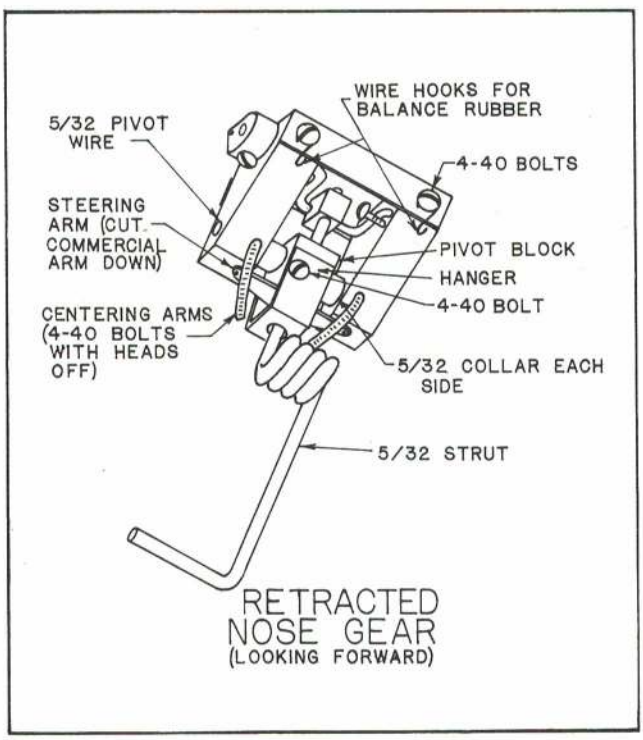
View from the firewall looking aft with gear down and locked, note movement of control arm.



View looking forward, gear up and locked. Rubber bands hooked to cross bar and around the gear leg support wheel weight and make retraction almost effortless.





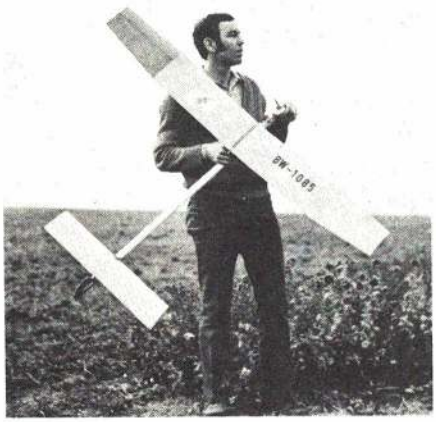


WHERE THE ACTION IS

FREE FLIGHT

BOB MEUSER
SPORT

Small FAI-Type Models: The item that appeared in Chuck Broadhurst's column concerning the Half-A-I event (December 1970 AAM, page 72) prompted German Claus Maikis to write about similar events held in Europe within the past decade. To permit easy comparison of the engine displacements, wing areas, and weights of the various classes, a table is provided. Until 1963 there was an event in Germany for models built and flown to FAI rules but limited to 1 cc (.06 cu. in.) engines. This was originally intended as a beginner's event, but with the appearance of the hot Schlosser diesel the small models became even more difficult to handle than the regular 15-powered FAI models of that era. The event had many advantages: the models were inexpensive, easy and fast to build; they were rugged enough to withstand repeated crashes; as not much could be done to improve the already powerful diesel, all contestants were able to have equally good engines at a reasonable cost.



Peter Pronath won almost every event he entered in the European Motor/Segler event. Size and weight like a Nordic A2.

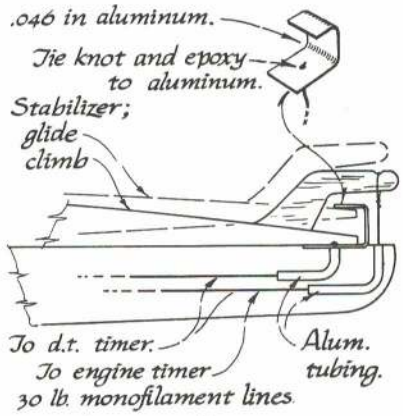
To demonstrate the excellent performance of the little models, Germany's Horst Mildner flew one against the large FAI models in the Austrian Alpen Cup competition in 1965, competing against the best FAI fliers in Europe—and won. In the U.S., 049-powered models were built to FAI rules in the early sixties for local competition, but they could not successfully compete with the larger models. In 1965 a new class was born in Europe: the Motor-Segler (MS), or powered glider. The weight and wing area are identical to A/2 Nordic gliders, but the engine size is limited to 1 cc, with an engine run of 15 sec. As MS models have a lower displacement-to-weight ratio and a lower displacement-to-wing-area ratio than FAI models, the rate of climb is not as spectacular, however, since the wing loading of the MS is lower, its glide is superior.

The earliest models built to MS rules looked like motorized Nordics, but that proved to be the wrong approach, and soon the good fliers appeared with models looking much like the regular FAI models with all their sophisticated gadgetry.

A fine example of an MS model is the one by Peter Pronath, who became German Champ in 1970—he won every contest he entered, except one, with a perfect score of 900 sec. Pronath's engines are the best, as he works at the Schlosser factory, but the stock engines are not far behind. The engines cost a small fraction of the price of a competitive FAI 15 engine. As an event in itself, or as a possible alternative to the present FAI event for international competition, Motor-Segler has much to offer.

Rules/Engines Displacement cu. cm./in.	Min. wt. oz.	Max. area sq. in.	Time sec.
FAI 2.5/.153	26.5	582	10
FAI 1.0/.061	10.6	233	10
FAI 0.8/.049	8.5	187	10
½A 0.8/.049	10.0	*	10
Motor/ Segler 1.0/.061	14.5	527	15

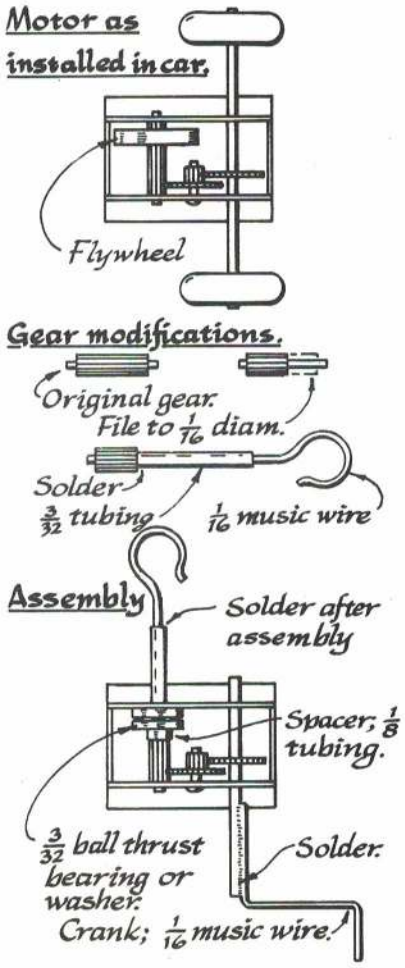
** no limit*



Bud Romak's AUTO STAB

Auto-Stabilizer Mechanism: Bud Romak designed the simple setup shown in the sketch, and has used it for several years. The U-shaped sheet metal part is held firmly against the top of the fuselage by the line going to the dethermalizer timer. During the climb, the stabilizer is held down by the line going to the engine timer. When the engine timer releases the line, the trailing edge pops up to the top of the metal part. Finally, when the DT timer releases the line, the metal part is pushed aside by the stab, and the stab trailing edge raises to its dethermalizing position—about 45 degrees. Adjust the glide position of the stabilizer trailing edge by bending the metal piece, gluing shims to the top of the stab, or tapping the metal piece for an adjusting screw. Without doubt this is the simplest auto-stab system yet devised.

Rubber Motor Winder: Winders for indoor, scale, and sport rubber-power models can be purchased but Charles Learoyd of Marblehead, Massachusetts figured out how to make one for next to nothing, which is important if you are living on a college student budget. The heart of the winder is a so-called "friction motor" ("momentum motor" would be more accurate) from a toy car, truck, or tank of the kind that has a flywheel geared to the wheels. The sketch tells the story. The most difficult job is filing down part of the long pinion. If a lathe is available, that job is simplified. An electric hand drill, or even a hand-driven one, will serve as a lathe in a pinch. A winding hook is added to the pinion, and a crank to the axle, as the last steps in the assembly. A few dabs of solder on the bent-over tabs that hold the friction motor case together will prevent it from disassembling in your hand. Greatest expenses is 39 cents for the toy car. Ratio is a bit over 10:1.



Charles Learoyd's INDOOR WINDER

BOB STALICK
GLIDER AND RUBBER

Covering the Subject: A letter from Henry Hyzer asks, "Is there some method of finishing relatively small airplanes (40" wingspan) without using dope? I hate the smell of it, my wife hates the smell of it, and it's toxic. I've tried paints for plastic models—too dull. I've looked at MonoKote in stores—much too expensive. Is there another way?"

These are all good questions. Assuming that this small a model does not need fuelproofing, what can be done? How about taming the dope odor? Add a few drops of oil of wintergreen and change the scent to one more pleasant. As for toxicity, try opening a window. Some modelers who have actual workshops have installed small exhaust fans

to remove the vapors—works well for running off exhaust fumes from engines too! Unfortunately, these answers don't get us away from using dope.

Some other suggestions would be to use polyurethane or similar plastic or resin concoctions. However, they are quite heavy and their adhesive qualities might not be satisfactory—they are quite good on solid balsa, though. Another would be to use a plastic model paint and spray a coat of clear gloss enamel over top to add some lustre. Back in the "good old days," banana liquid was used quite extensively, and some hunting should unearth this juice from somewhere. The odor really isn't that much less offensive—just different.

Other alternatives would be to vary the covering materials. **AAM** correspondent Bob Meuser covered a small coupe-sized unlimited model with condenser paper, but it suffers continual puncture problems. Saran Wrap or its equivalent has been used but it's the devil to work with and adhesion is a problem. If you're careful, you can heat shrink it though. If MonoKote is too expensive, Solarfilm is a bit less so—either is a good substitute for practically any covering job.

The construction form could be changed—going to either foam wings or sheet balsa wings, either solid or planked. The complexity and weight of such a structure may prove impractical, however. Modelers are an ingenious lot, so someone should be able to supply an answer to Henry's question. **AAM** will pay $5.00 to each of the best several solutions proposed and used in this column. Get your thinking caps on and then write.

Guess who beat the big boys in HLG?

From the Grassroots: We often get enmeshed in our own edge of the world and are unaware of modeling's universal appeal. For example, there were 325 modelers at last year's Taiwan Nationals, competing in all of the events on which we think we have a monopoly. Junior Hand Launch Glider was won by a 6-year-old girl, T. C. Lin, who beat out all the boys to win her trophy and medal. Maybe Women's lib is becoming universal, too.

First meet for these tykes in HLG event. The right beginning for future modelers.

Junior Problem Solver: George Swanson, of the Utah State Aeromodellers (U.S.A.) drops a line above last year's 12th Annual USA Contest. Ty Marrucci from Pocatello, Idaho brought his children, the youngest contestants, to compete in Hand Launch Glider. Starting them young, pre-school age, makes the Junior problem become another one of those concerns of the past.

BOB HATSCHEK
POWER

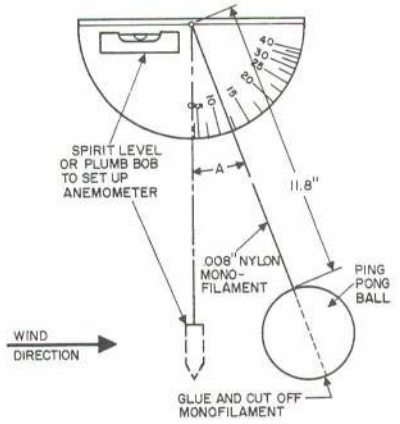
Caution: Free-flight engines, particularly 15's are now turning at rpm's that only a few years ago were considered unlikely if not impossible. To compete with the best, an engine has to turn over 20,000. And at these speeds they're beginning to shed propeller blades—many commercial wood and plastic props just can't take it.

For example, at a late fall meet one skilled and experienced competitor shattered two in a row—one on the ground and the other as the engine picked up speed after launch. These were molded nylon props made by two different manufacturers. Nobody was hit by any flying blades, but that was sheer luck.

After the mid-air failure, another contestant heard one of the blades hit the runway. He looked for it, picked it up, and found it "very hot," particularly near the fracture. This was an indication that the blade was vibrating badly—perhaps even fluttering—and the constant high speed flexing caused the nylon to soften to the point of failure under the high loads imposed by both centrifugal force and engine vibration.

This is not an indictment of nylon props. Wooden props and even some glass-fiber-reinforced props have failed at competition rpm. The point is: Be Careful! Stay out of the plane of the propeller disc, and keep other people away. After starting the engine, get behind it before revving it up. Use the best props available and don't use any that are nicked near the hub.

PING-PONG BALL ANEMOMETER



CALIBRATION TABLE

WIND, MPH	ANGLE "A"	WIND, MPH	ANGLE "A"
2.5	0.9°	22.5	52.8°
5.0	3.7°	25.0	58.4°
7.5	8.3°	27.5	63.1°
10.0	14.6°	30.0	66.9°
12.5	22.2°	32.5	70.0°
15.0	30.4°	35.0	72.6°
17.5	38.6°	37.5	74.5°
20.0	46.2°	40.0	76.5°

From design by P.L. Clemens, published in Scientific American.

Wind Velocity: Knowledge of the air we fly in is one of the free flighter's prime concerns, and wind speed is one of its major facts. Details of an extremely simple precalibrated anemometer that probably wouldn't cost a dollar to build were given in "The Amateur Scientist" column of the October 1971 *Scientific American*. It was designed by P. L. Clemens while he was serving as visiting professor at the Von Karman Institute for Fluid Dynamics at Rhode-Saint-Genese, Belgium.

The drawing shows a slight modification of Clemen's original unit, which used a commercial celluloid protractor, a spirit level, and a 16-in. handle (1/2-in. dowel) perpendicular to the plane of the protractor so the user could extend the anemometer beyond the turbulence created around his own body. The handle is undoubtly a good idea, but for aeromodeling use it would probably be preferable to mount the anemometer on a fixed pole or tripod. Either a spirit level permanently attached or a plumb bob (removed after setup so it wouldn't interfere with the pendulum) can be used to level the "instrument."

Other materials could probably be used for the pendulum cord than the .008-in. monofilament nylon used by Clemens, but they should be low in drag (small diameter, smooth surface) and light in weight for minimum effect on readings. The table-tennis ball, which is manufactured to close tolerances, is a must however.

The calibration table giving displacement angle "A" as a function of wind velocity in mph is based on the formula: $\tan A = v^2/384$. This is valid for standard temperature and barometric pressure (68° F and 29.92 in. of mercury), and any errors introduced by different conditions wouldn't be significant for free flight purposes.

BUD TENNY
INDOOR

Indoor Flying Sessions: Indoor sessions are being held at the Armory of Massachusetts Institute of Technology, Vassar St. at Mass. Ave., Cambridge, Massachusetts, on February 26 and March 11, 1972, from 3 p.m. to 6 p.m. There will also be a contest on April 8, 1972, 1 p.m. to 8 p.m. Contact Ray Harlan, 15 Happy Hollow Rd., Wayland, Mass. 01778.

Prop Covering: Numerous methods of covering props have been devised, but props are a double-curved surface and fragile. Thus, it is easy to warp the outline or stress the film in such a way that the blade warps later.

Use Building Block—The prop was built on a special block, so a covering method which uses this block for support would be best. The easiest and most consistently successful method seen to date is using an auxiliary frame to transfer the film from the hoop to the prop blade.

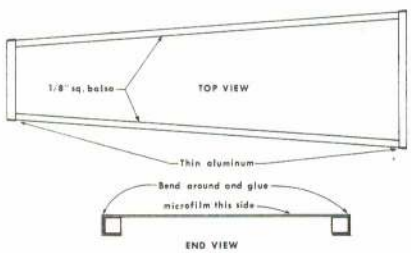


Fig. 1

Flexible Frame—Fig. 1 shows a simple covering frame which makes prop covering almost a cinch. Make the frame an inch or more longer than the covered portion of the blade, and make the narrow end of the frame at least 3/8" wider than the widest part of the prop blade. Cut the flexible end pieces from very thin aluminum or brass shim stock (a good source is aluminum food or drink cans). Bend these metal end pieces around the ends of the balsa side strips and glue firmly in place.

Cover the Frame—Place the covering frame on a flat surface, with the end strips facing up. Coat the top face of the frame with very thin office-type rubber cement. Place the microfilm hoop over the frame (film side down) so the microfilm sticks to the frame.

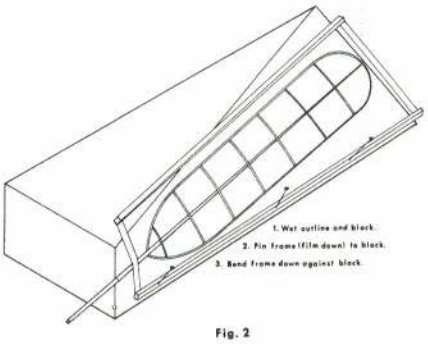


Fig. 2

Trim the frame loose (if you have two frames, it saves film and time) after making sure the film is stuck to the frame all around the edge.

Cover the Prop—Fig. 2 shows how the microfilm is transferred to the prop. First, moisten the blade outline and ribs (saliva is best) and then moisten the block outside the blade outline (plain water is satisfactory here). Pin the covering frame to the lower edge of the block as shown, then bend the frame flat over the prop blade and block. The film will stick down where there is moisture, but it may have to be forced down by blowing on it. Trim the film loose from the frame, remove the frame, and leave the prop to dry over an hour. A small heat lamp is recommended to speed the drying. Do the second blade the same way, and the prop is ready to fly.

WALT MOONEY
SCALE

N.A.R. Scale Meet: The North American Rockwell Flightmasters Annual Scale contest continues to grow in size and quality. This year's event was as spectacular as one could imagine. The judging site at the N.A.R. recreation center, which has been adequate for the previous contests, has just about reached its limit. There were models everywhere—ranging from a sub-peanut GeeBee to radio-controlled models of extremely large size. The largest, a Pfalz D III, used small wheelchair wheels for its landing gear.

The flying took place on Sunday morning following the Saturday night judging. The weather was really perfect, with no wind and no smog at all in the Sepulveda basin. There were 21 entries in Peanut Scale, and 21 in Rubber Scale. There also was a considerable number of entries in Gas, RC and UC. UC flights were few, but impressive. Bill Hannan had converted his Crosby CR-2 racer to ½A and on lines it flies. It was more of a ballistic missile in the FF Speed contest earlier in the year.

Mel Ford and his RC 1913 Etrich Taube.

The piece de resistance for the day was the two flights of Mel Ford's RC 1913 Etrich Taube. This model with pilots in the cockpits, shock absorbing gear, wire wheels, Taube structure, and translucent covering was truly the hit of the meet. It used surface warping for control and flew nearer to scale speed than any other. Mel was second behind Joe Bridi and a truly excellent Nieuport. Mel didn't attempt much of the standard pattern, but what real Taube was ever looped?

Bill Hannan's Train monoplane won FF Gas using a Brown CO-2 engine for power. Fernando Ramos' 1911 Cessna took Rubber Open, with Clarence Mather's Stormovick second. Junior Rubber was won by Kim Mather's Porter; Doug Mooney's Piper Super Cruiser was second. Peanut was taken by Clarence Mather's Jodel Mascaret. There was no Junior class in Peanut, which hurt a little considering the number of Juniors entered.

One other model of noteworthy effort was young Jon Hoshizaki's rubber-powered ducted fan Mig 15. This young man is a really creative youngster and is willing to try anything. His Mig flew well enough to qualify. In fact, he had it a little overpowered for the first flight which turned into a three-second vertical climb. A four-bladed balsa fan was used at the front of the fuselage duct (inside the duct) and the motor ran to the back of the tail pipe. A truly noble effort.

The help scale modelers are getting by using the products of the Williams Bros. was much in evidence at the contest in the form of wheels, props, and engine cylinders. They have now brought out a series of crankcases to be used with their cylinders. This will take most of the drudgery out of simulating radial engines. The photo shows five, seven and nine cylinder combinations. Using more than one crankcase makes simulating 14's, 18's and even corncobs easily feasible. These kits are available in three scales—3/8", 1/2" and 3/4".

We won't say too much about how your author did this year except that he got qualifying flights with all his models. He also blew two motors in his four ft. span Porterfield which looked like a lace doily at the end of the contest.

Author launches Fokker at N.A.R. meet. Photo by Robert Angel.

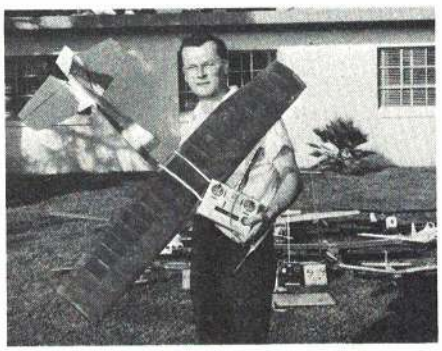
In Peanut Scale they allowed unlimited attempts and counted the three best flights. This resulted in endless flying, much friendly competition and lots of fumbles and fun. It was the best. Flights of note: Fernando Ramos' Cessna disappearing overhead in a thermal only to have the nose block drop out luckily and dethermalize the model (the rest of the modelers were wishing it would just keep going); Bill Warner's GeeBee doing really nice knife-edge flights; a Goodyear racer Peanut, "The Gray Ghost," flying inverted as well as upright at the will of its pilot; a Peanut Scale Fokker D VI which would climb up, stall, do a 1½ turn spin and recover at the request of its owner.

RADIO CONTROL

DON LOWE
SPORT AND PATTERN

Reflections on the World RC Championships: An event of this nature and magnitude is not soon forgotton and will yield material for reflection and discussion for some time. Of particular interest, of course, are those views in the many newsletters given by writers who were present at the championships. In general, the opinions expressed about the job done by the AMA and volunteers in organizing and conducting the contest have been complimentary. Not all have agreed with the choice of winners, however.

Nino Campana writing in the October-November '71 issue of the Soo (Canada) Modelers Newsletter, "The Glitch," provided an outstanding and entertaining review of the action as well as his personal views of the results. He writes: "There ain't no justice, or, we wuz robbed! department. The sentimental and real winner was Wolfgang Matt. Simply stated, he was robbed of first place because the two lines of judges were very unbalanced. Judges at flight line 1 were generous to a fault, giving Bruno Giezendanner 7,075 points on his first flight—the highest score awarded for a single flight during the entire contest. On his second flight, in front of a different set of judges, he received only 5,295 points, more truly representative of the calibre of flight exhibited.



Dumas "Evolution" by Dave Wines has traveled to Korea, Thailand, and other parts of the East. He likes all kinds of RC planes.

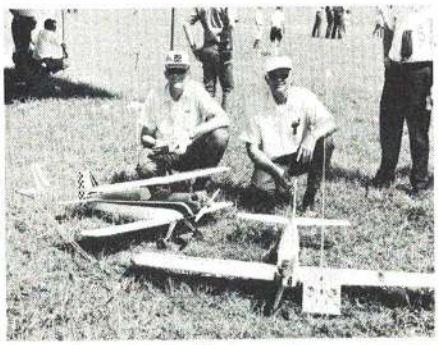
"There is no denying that the first round for those flying on flight line 2 was demoralizing, and may have had a stupifying effect. They were able to recoup points by flying before the generous judges in round 2, but by then the damage had been done." Nino added that the judging was conducted by honest men who worked very hard for long hours and who strove to be fair to all.

So even at the World Championships uniform judging is the weak link in pattern competition. As it is impossible for a judge to accurately measure the mechanical preciseness of a maneuver, scoring is based on a combination of maneuver accuracy and impression. Unfortunately each judge has his own aesthetic standards, so large variations in scoring can result. One way to remedy this situation might be to select judges on the basis of past performance in comparison with others; then get a large group together and select (on the basis of practice judging) those who are consistently similar in judging. Obviously this requires more work, money and time, but wouldn't it be worthwhile in selecting the champion of the world?

For those who would like a good, complete report on the contest together with detail on the fliers' aircraft and equipment, the September AMA Competition Newsletter is a good source.

Dave Scully learns the hard way. Next time he will remove the backing from Super Mono-Kote before application. Yes, this happened in flight!

Standardization: Frank Schwartz, that genial Editor of the Middle Tennessee RC Society Newsletter, "Glowplug," writes concerning a subject close to the heart of many a modeler. "Perhaps not many of you recall the days when there was no proportional and the hottest and best you could get were reed outfits. Servos weren't much of a problem... there were the Bonners which were the most popular, followed by the tiny Annco and also the Citizen-Ship servos. There was some standardization then. At least everyone realized that a certain amount of throw was required. Everyone had a servo that went 7/8 in. end to end. No problems. Throttles on engines required just about 7/8 in. at the end of the throttle arm and everyone was happy. Then along came proportional and nobody seemed to care. Things have gotten to such a sad state and some manufacturers' servos have such little throw that Rocket City sells a lot of servo arm extenders and surely pays their rent with a gimmick to put on your servo that gives you enough throw for your throttle to work well. Why have these manufacturers lost sight of the fact that 7/8 in. throw is really needed? Guess they figure you can solve these minor problems yourself. And if that isn't trouble, consider the fact that no manufacturer uses the same size output head on their servo." Frank points out that every manufacturer has his own particular output dimensions and you must use his particular output wheels or arms.



At an airport dedication near Albany, Georgia Frank Watson and Ron McCallum put on RC demonstrations. Photo by Connie Watson.

"At least Duke Fox has come up with the right idea. His new 60 has three holes in each lug for mounting to replace some of the popular engines that have different size mounting hole spacing. My wishes are that his 60 is the best in the world so perhaps the rest of the engine manufacturers will realize that someone besides themselves makes an equivalent product and could consider that there is no harm in having mounting lugs the same spacing and size as "X" brand. It's about time modelers, if they want it, ask manufacturers of motors and RC equipment to standardize where they can for the benefit of their customers."

Did you ever stop to think of the standardization that we already have? How it happened is mysterious but I'm sure we're all grateful for it. To name a few: glow plugs—screw threads, wrench dimensions and battery voltage; wheels—diameters, axle sizes; prop shaft dimensions; prop diameter, pitches and hole size; balsa wood sizes; radio operating frequencies. It would make life a little bit easier for modelers if the list of interchangeable items were expanded. Sounds like an item for the Hobby Industry Association.

Cracked ARFS: Are you rubber duck fanciers despairing for a good practical way to repair cracks in your favorite plastic toy? "Fixum," a product by Indy Flite of Fairland, Indiana, does a good job. It's a kind of filled glue containing a solvent that makes it stick extremely well to the plastic and has enough body to allow filleting and buildup over the crack. It air dries and sets completely in a couple of hours depending on the thickness of application.

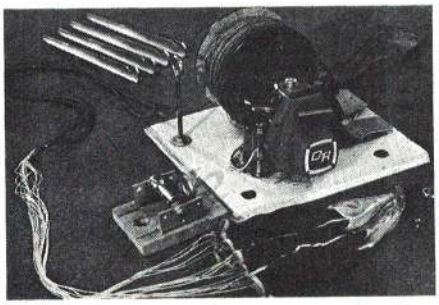
Area III RC Championships: The Area III final contest of the season was held October 9-10 at Charleston, West Virginia. The unique aspect of this contest was the number of events held: Classes A, B, CN and CE pattern, stand-off scale, Funfly, Formula I, Open Pylon and Midget Pylon—all in two days. CD Steve Strum and the Mountaineer RC Club got it all in with room to spare. A very interesting flying site with mountains in the background and very choppy conditions when the wind blows.

It was the first time I had ever flown the Funfly event. The "guys in the know" had special ships which would flat spin like crazy, roll like a whirling dervish and loop like a ukie. Would you believe 35 turns from a 15-sec. climb? My Phoenix did about ten, and it spins fairly fast.

New Challenges: I had the privilege of a ride in one of the Goodyear blimps the other day and what an extraordinary experience! It is flown aerodynamically using a rudder and elevator control and is very sluggish on the controls. An airship would make a very interesting RC project. How about some of you adventuresome modelers trying it? I can't recall having seen a practical RC blimp. How about an RC autogyro? There has been very little activity in this area. Control mechanisms for an autogyro should be simple. For a real challenge try a helicopter or one of the experimental V/STOL aircraft designs. How about a tailless or canard design? The Waterman "Airmobile" would make a very unique project with separation of the pod by remote control! How about letting me know of your RC project and we will try to give it some exposure.

HOWARD McENTEE
FAI AND GLIDERS

Gliders At Doylestown: Here are a few notes on the unofficial Glider meet held on the last day of the World RC Stunt Championships. Part of a program that included pylon racing and many special demo flights, the Glider meet unfortunately was at the tail-end of the list, and was completed just before it started to rain. There were 12 fliers in the event, including a three-man U.S. team chosen from top winners at the U.S. Nats—J. Nielsen, C. Carlsen and O. Heithecker (all mid-westerners). Six countries competed. The meet was won with a 10-min. flight by Sandy Pimenoff of Finland (Captain of the Finnish Aerobatic Team), flying a Graupner Cumulus which was built during his stay at Doylestown! British flier Dweyer was second. Our top winner was Heithecker in third.



Experimental winch uses O&R 1hp engine, weighs only 14 lbs.—lighter than some models pull!

Lightweight Power Winch: Electric winches are very popular for glider launch, but they are awfully heavy. And when one cannot park a car near the flying spot, they can present a problem. Gas engine winches have generally been made from old lawnmower engines, and these units also turn out pretty heavy though they work fine.

A good compromise seems to have been reached by Dick Jansson (Wellesley Hills, Mass.), a member of NERCM. Dick's unit is built around an O&R one hp utility engine, a compact and light power plant which includes gas tank, centrifugal clutch and 7-1 gear reduction to output shaft all in one unit, as seen in photo. Portability is outstanding—the complete winch on its 13 x 15" baseboard weighs only 14 lb. and is easily carried in one hand. (Compare that weight to winches in general use today!) The cord reel is fitted directly to the output shaft from engine gear box—no additional speed reduction is needed. The reel has a 3½ dia. hub, 4" wide. Originally the reel had 5½" dia. rims, but Dick found this wasn't large enough to hold the 3000 ft. of nylon fishing line (125 lb. test) he wished to carry, so the drum was enlarged to 8" diameter by adding masonite plates to the original aluminum drum end plates. To the right of the engine two pedals may be seen; the closest one controls engine throttle, the other is for a brake on the drum. Note large eyebolt which guides the cord onto the drum. The pulley for the far end of the line is at the left of the winch baseboard. Also shown is the length of rubber shock cord, the parachute for the end of the line, and tow ring. Three tent pegs hold the winch down firmly, the fourth is for staking down the line-end pulley.

This winch will not tow aloft some of the monsters seen at glider fields. However, it does nicely on craft up to 4-lb. weight and perhaps 10" span. Dick strongly feels that glider trim should be "optimized" in order to get best results from this little winch. He points out that the more powerful gas and electric jobs can pull a glider badly out of trim aloft, but here where power is limited a well-trimmed glider will tow much more easily. (And will fly better, too!) This optimization entails experimentation with CG position (by changing ballast weight). An adjustable tow hook is also useful for operating under different wind conditions. Dick has an interesting operating trick that we hadn't seen before—should be most useful where there are trees in which the released parachute could be stranded, or even at meets where multiple winches are in use. As soon as the glider is off the tow hook, he revs the winch motor to full speed; this pulls the parachute straight downward, regardless of wing conditions. It makes for a longer retrieving walk, but could prevent some line tangles!

CLAUDE McCULLOUGH
SCALE

Realistic Ryan: Bob Karlsson turned out a beauty of a PT-22 with a variety of ingenious features. The fuselage is built up from formers and stringers and covered with 1/64" foam wing-skin plywood. Sheets overlap at the scale

Described fully in text, this is Karlsson's beautiful and very fine flying Ryan PT-22.

locations to affect the metal skin and seams on the prototype. Grain of the plywood runs around the fuselage, rather than lengthwise, to prevent sucking down between the stringers after painting. Very little finish is required on this hard, smooth surface.

The Webra 61 is completely enclosed and is effectively cooled by baffling the air from the scale front openings past the engine. As previously stated in this column, it isn't how much cooling air that counts but where you put it. Williams Bros. 2" scale Whirlwind cylinders were reworked to look like the jugs of the Kinner radial used on the Ryan.

The landing gear problem posed by this choice of subject was neatly solved. Both the front and rear leg are mounted in usual torsion bar blocks. The diagonal tube between them is a telescoping affair that can slide shorter or longer as the gear flexes. The bottom crosspiece is pivoted at each end where it fastens to the bottom of the front and rear leg. The front leg can also be made partly telescoping to simulate the oleo action of the full-scale unit but neither it nor the diagonal arm has or needs any coil springs inside. Flexing action is provided entirely by the two torsion bars. The gear rides over rough ground in a scale-like manner, yet is strong and practical. This same type of gear is used on the Ryan STA but is covered with pants and fairings.

Residue Remover: Readers will recall discussion here of the invisible chemical film left by some brands of masking tape on the surface of a model. After a top coat of clear is applied the streak turns yellow and becomes all too visible. Bruce Lund, who flew the der Jager bipe at the Nats, says the surest way to solve this problem is to wipe the finish with DuPont Automotive Enamel Reducer after removing the tape. He cautions that the dope must be completely cured before cleaning.

Dan Lutz prepares his Rearwin Speedster on floats for a flight at Lake Elsinore ROW meet.

You've Got Three Minutes: A tightly cowled engine can be a headache to start. The usual method of high throttle and misdirected exhaust prime may cause a real flame from the resulting backfire. Or the prime gets into the cylinder and floods the motor. The carburetor intake is usually easier to get at. So open the throttle barrel to high position and put in several drops of fuel. Close the throttle and start in low speed. Not only is this procedure more reliable, but you won't need a chicken stick to keep your fingers. For an inverted installation, give up trying to beat the odds of not *if*, but *when* you'll have a drowned-out glow plug and turn the model upside down on a stand.

Always run up the engine to tune and clear it just before a contest starts. If an inverted engine must sit around for a long time it should be turned over so it won't collect oil in the plug.

The best solution of all to every scale engine starting problem will cost some money. Get one of those compact, handy electric starters now being offered and a motorcycle battery to power it. These little gems will start the most cantankerous clunker in under 10 seconds without priming and inverted jobs don't have to be turned over. Greatest thing since the Brown, Jr.

Scale Data Sources: Leslie Hunt has undertaken the task of locating all the rare aircraft of the world. The latest edition of his book *Veteran and Vintage Aircraft* (available from Sky Books International, 520 Fifth Ave., New York for $7.95) lists and illustrates the collections of museums and aircraft on display in a variety of other locations. It's a handy guide for vacation stops. Many of the museums will provide photos of their specimens by mail. If not, a scale nut can be enlisted to photograph for you.

BOB STOCKWELL
PYLON RACING

Season Championship: The most extraordinary event anyone has ever seen at a pylon race occurred at the last race of the season in Southern California at Whittier Narrows, October 9-10, sponsored by the San Gabriel Valley Radio Control League. The Season Championship, which appeared to be a runaway for Terry Prather, suddenly broke wide open when Terry crashed his number one airplane in the fifth heat and his only backup in the sixth heat. With 45 entries, and Terry being limited to 16 points (four firsts), with Lee Frey only 26 points back in the standings, and Jack Hertenstein only 28 points back, George Killeen, 32 points back, and Bror Faber, 37 points back, it was not inconceivable that one of them might accumulate enough points to pass Terry in the standings.

The contest had been plagued by mid-air collisions. In two of them, neither plane was seriously damaged. A third one was in the "birthday race" between Johnny Brodbeck, Jr., and Larry Leonard—they were celebrating their 36th and 30th birthdays, respectively. Johnny won the race in 10 laps, but Larry was putting in an eleventh lap as a result of a cut, so Johnny flew companionably along with him on the extra lap as though still racing. Coming out of the third pylon just before the finish line they collided with a resounding impact and totalled both airplanes.

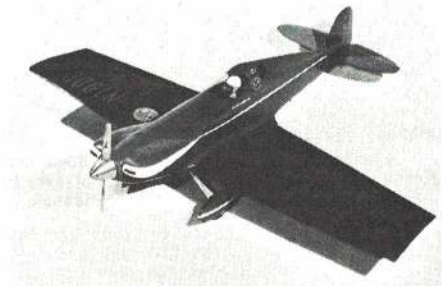
In a crucial race between Mike Bridges and George Killeen, who was still well up in the standings and had a chance of passing Terry Prather for the championship, the race was nip-and-tuck all the way. Again it happened coming out of the third pylon. We watched them crunch together in the full-bank attitude and we expected to see one or both head for the deck with pieces of balsa shredding behind. Instead, Mike's orange Miss Dallas locked onto the top of George's Minnow and stayed there. The two planes continued to fly, locked into this position. Mike simply neutralized all controls on the upper airplane and George managed to continue flying the joined airplanes from the lower position, as it were. It appeared for perhaps as long as a minute that he would succeed in landing this weird configuration with minimal damage. Mike had shut off his engine, but George's was still running full bore: the cutoff somehow failed to work. George was climbing the wedded planes for altitude, trying to get some stability and position for a landing approach. Meanwhile, the other two in the race were continuing around the pylons—they were the only ones who didn't get to see toy airplanes in the mating season.

After all this suspense, the ending was an unhappy one. The planes, still tightly locked together, suddenly went into a spin. By throwing full opposite controls on both aircraft, when George could not pull it out alone, they managed to get out of the spin, and for an instant there was still hope. But they were then low to the ground and ran out of flying speed: the monster suddenly snap-rolled straight into the ground.

The rest of the race was something of an anticlimax, though after anything other than the wedding reported above it would have been one of the most exciting contests ever. In the end Jim Jensen and Bror Faber were tied for first. Bror Faber, the Southern California V.P. for N.M.P.R.A. 1970, and pilot for the Nupen/Faber team, won the flyoff by a margin of less than a tenth of a second, a bare ten feet ahead of Jensen in crossing the finish line. It was so close that it could easily have been called a dead heat and been flown over again. Three of the top four finishers were Miss Dallases—first, second and fourth. Third and fourth were also decided by a flyoff between Bob Smith, flying his Miss DARA, and Joe Vartanian and his Miss Dallas, with the former winning. Fifth place was taken by Dan McCan, flying another Miss DARA. There were two Supertigres (Faber and Vartanian), and three K & B Torpedoes (Jensen, Smith, and McCan) at the top of this final race of the season. We hear that both companies are coming out with new engines for 1972. K & B expects to be out by February; we haven't heard the date for the Supertigre.

Though the competition was close, Terry Prather's four firsts still placed him high enough in the standings at this final contest that he has once again won the Season Championship as well as the Nationals in Formula I. He placed first in five out of the eight races he entered—all with the same airplane! His Stafford Minnow was over a year old when it died in the fifth heat at Whittier Narrows. It was also the same engine throughout the whole season. Terry now stands alone among pylon competitors: he is the only one to win the Championship in Formula I twice, especially two years in a row.

Joe Vartanian, with his Miss Dallas, had to fly-off for third place in the races.



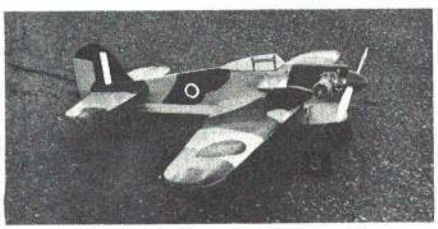
Current most popular West Coast racer is Miss Dallas kitted by John Garabidian. They finished in top four at Whittier Narrows race.

A New Year: The 1972 season is about to get underway. There is every reason to expect it to be the most exciting season ever. New airplanes like the Miss Dallas, the Miss DARA, the Shark, and new versions of familiar planes like the mid-wing version of the Cosmic Wind that Bob Violett flew at the Nationals all add variety to the entries. New engines will certainly take the times below the 1:30 that Bob Smith set as a new record at the Tracey races in Northern California. The flying is getting better all the time. There are new names and new faces coming into the races. New officers in N.M.P.R.A., like Al Prather in Southern California and Garry Korpi in the Western District, will stir things up, while the old reliables like Hal deBolt will keep the solid tradition going.

CONTROL LINE

BILL BOSS
SPORT AND SCALE

Aluminum Joints Made Easy: Scale modelers should be especially interested in the results of Ray Williams' research on the methods for joining aluminum. The techniques outlined below can be used for forming aluminum cowling, fairings, cockpit detail, tuned pipes, mufflers, etc. Strength and light weight are the key words that make aluminum an almost ideal metal for use in models, but is frequently avoided because of the lack of a suitable method of adhesion for joints. However, aluminum can be bonded in a number of ways, some of which are within the average modelers capabilities. The four most common methods are welding, brazing, soldering and gluing. Of these four methods, welding is perhaps the most difficult due to the added requirement of highly specialized equipment which is usually not available to the average modeler. We therefore will discuss the other three methods.



Dressed-up profile becomes Hawker Typhoon for John Fett. All it takes is realistic colors not necessarily scale. Fox 15 engine gives ample performance. Made from Hobby Helpers plans.

Brazing—A propane or oxy-acetylene torch can be used for joining parts to form exhaust elbows, pipes, mufflers and joints that require maximum strength. Materials needed for brazing can be purchased at most local welding or tool supply stores. Alcoa and Mills each manufacture good brazing supplies. The materials to be brazed must be washed clean with a detergent and dried. Apply a reaction flux to the surfaces to be joined and heat until the flux boils. At this point apply the brazing rod to the joint. If done correctly, the metal will flow much like molten solder. Let joint cool naturally. Wash thoroughly with hot water and detergent. A properly made joint will need little or no finishing.

Soldering—The use of a small torch or 75 watt soldering iron can be used for making fuel tanks and small scale parts. The first extremely important step is to clean the parts to be joined as outlined in brazing. Heat is now applied to the material. When sufficiently hot, apply solder to the material, not the heat source. Kester and Alcoa each make a good low-temperature solder for use with aluminum. When solder melts and begins to run, move the heating element back and forth until the solder wets the entire surface. Let soldered material cool naturally and wash.

Gluing—Many modelers have tried to glue aluminum with little or no success and most accept the task as an impossible thing to do. The secret in obtaining a good glue joint lies in the preparation of the surfaces to be glued. Wash the joint with solvent or thinners and air dry. Do not touch the surfaces to be joined, especially with your fingers. Now immerse the areas to be joined for ten min. in a cleaning solution containing 10 parts by weight of sulphuric acid, 1 part sodium dichromate, and 30 parts distilled water at 125 to 155 degrees Fahrenheit. Wash the solution off with distilled water and let air dry. The surface is now ready for gluing. Your favorite epoxy or special adhesives for aluminum that are made by Devcon and Duratite can be used. A word of caution about the cleaning solution. Because of the nature of the elements used in the cleaning solution it should be handled with care and stored out of the reach of youngsters. If you can't mix the solution yourself seek the aid of your local chemist.

Winter Indoor Models: Winter months mean indoor type activities for most modelers. Pat March is shown looking over his indoor CL scale P-35A. The plane is powered by a Mabuchi FT-26D motor geared for a 3:1 ratio. Landing gear is retractable by reversing polarity of input power. Propeller does not reverse due to the use of a bridge-type rectifier circuit around the propeller motor. The plane also features a metallized plastic finish.

Round-the-pole flyer by Pat March uses metalized plastic covering on P-35A model. A Mabuchi slot-racer-type motor is geared 3-1. Trick wiring system gives retract landing gear operation.

Indoor electric-powered CL models could be just the activity for which your club has been looking for the winter months. It certainly is a means of introducing youngsters to model aviation. Those who can't adjust and fly rubber models or start a gas job can successfully fly electrics on a line.

HOWARD RUSH
COMBAT

Publicity in St. Louis: Mark Pattie of Evansville, Indiana, and Gary Frost of St. Louis put on a Combat demonstration between halves of a pro football game in St. Louis for 46,000 spectators. Mike Tallman and Lou Woolard drove all the way from Wichita, Kansas to fly formation Stunt at the same show. Gary's Club, the St. Louis Hot Heads, has organized several flying demonstrations this past season. It's an effective way to recruit members and keep the public aware.

Better Streamers: Murry Frank, AMA VP and Nats Combat Director, recommends eliminating the cardboard tag between the string and crepe paper on streamers. The tag rotates in the breeze, causing streamer failures from twisting, and also tends to break the paper at the tag when the streamer is nibbled at the far end by enemy aircraft. An alternative is to

Unique in modeling is this specialty team. They are sponsored by a hobby shop—Joe's Hobby Center in Dearborn, Michigan.

double the end of the crepe paper twice and tie the string directly to the paper. This streamer won't twist or pull apart. Unless a kill is made, there's always at least a tuft of paper left, so it's still easy to tell cuts from kills.

Murry puts a mark on the string four ft. in front of the paper with a felt-tip marker to indicate minimum kill zone length. This mark has to extend behind the tail of the plane, making sure everyone has a legal kill zone. It's best to start with at least six ft. of string when making a streamer to allow for tying at both ends.

We've found that the six-lb. test string specified in AMA rules is too light for today's 35-size Combat. Twenty lb. test is about right. Streamers cut from crepe paper sheet fray less in the wind than those from the two-inch rolls. Most crepe paper sheet available now is ten feet long, giving more to slice at and slowing the planes down better than the eight-ft. paper. I have submitted a proposal to the AMA CL Contest Board to make these changes official. Write and tell them what you think.

Supertigre Bearings: The stock rear bearing on the Supertigre G.21 35 will self-destruct when run with more than 30% nitro fuel. It's standard size and can be replaced by a New Departure No. 3L01 ball bearing, available at any bearing supply store.

JOHN SMITH
SPEED AND RACING

Equipment Manufacturers: A couple of months ago I promised a list of independent suppliers of speed and racing equipment. Had a slight delay getting all the names together, but here it is. Cut this list out so you can keep it handy.

The following key of the products available will facilitate locating the equipment needed. (1) Magnesium and/or aluminum speed pans; (2) fiberglass speed and rat top shells; (3) aluminum wings; (4) wing spars; (5) aluminum stabilizers; (6) control units, torque units and two wire; (7) CL wire; (8) mono line handles; (9) dollies; (10) modified and custom engines.

Bill Wisniewski tells about how he did it after winning FAI finals in Cleveland and setting new record in the process.

Manufacturers

Bill Keller, 201 Ashwood Ave., Dayton, Ohio 45405 (2,6,7,10)

Wisniewski-Clarey, 4261 Petaluma, Lakewood, Calif. 90713 (10)
Bill McGraw, 1325 Carol Dr., Memphis, Tenn. 28116 (6,7,8,10)
Rick Wisniewski, 201 Petaluma, Lakewood, Calif. 90713 (3,4,2)
Technamics, Box 1665, Scottsdale, Ariz. 85252 (1,3,4,5,6)
Dale Kirn, 283 N. Spruce Dr., Anaheim, Calif. 92805 (1,2,6,7,8, complete 1/2A equipment, wheels, tanks, etc.)
Frye-Roselle, 217 W. Wenger Rd., Englewood, Ohio 45322 (10)
Walter Brassell, 4361 Montview Dr., Chattanooga, Tenn. (9)
George Aldrich, 3219 Shady Springs, San Antonio, Tex. (6,7,8,10)
Cliff Telford, 8616 Rayburn Rd., Bethesda, Md. 20034 (10)

With the above suppliers, you can buy any component for Goodyear, Rat Race, or Speed.

New Speed Club: "Speed Flying, Anyone?," a new speed club in the Los Angeles area has been formed. They ran their first contest, AA meet, on November 21, '71. All Speed events and Juniors free entry. Here is one group that is trying to remedy the Junior problem. Many other clubs could follow in their footsteps. If, in 1972, each Open or Senior member could bring just one Junior into our hobby, think of the way we would be perpetuating model building. For more info on the SFA club write: SFA, 4261 Petaluma, Lakewood, Calif. 90713. Have your model fueled and the lines out. This gang is ready to fly.

New CD (Female Type): Bev Wisneiwski received her CD license last fall and her first job was running All Speed meet mentioned above. I don't know how many ladies are CD's, but I do know Bev will be one of the best. She did an outstanding job helping me at the Nats last year. And for those who think they can outargue her on the rules, don't even try, because she knows the book from both ends. Congratulations, Bev. Your presence will certainly brighten the circles.

Be Ready for Spring: Soon the circles will be cleared of snow so now is the time to check all your equipment. Check especially those lines that may have been stored in a damp place—they rust pretty quickly. Also watch for proper ventilation when running engines indoors during the winter months.

New Class C Record: 209.874 mph set with a ZDE converted GHQ on January 1, 1972. Record set at the First Annual Hudson River Speed Meet. Model was flown in the Holland Tunnel, N.Y. The record is being protested as records cannot be set indoors, but, and it's a good point, tunnels are open at each end. A CB decision will be forthcoming soon. Model was of conventional design. Engine ran a DeBolt designed pipe, prop was a 10-13, (L.H.) and the fuel was standard 62% with 8% Furrican Oil added for better lubrication in below sea level conditions. Flying line was airfoil in section to reduce drag. So that's the one to shoot at in '72.

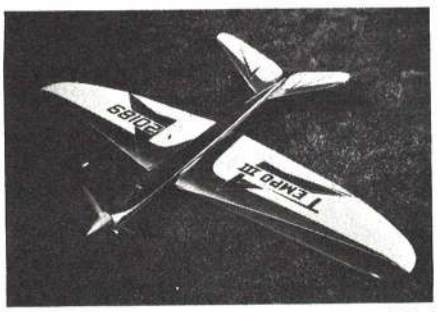
JOHN BLUM

CARRIER AND STUNT

What Control System? Numerous ways to control the elevation and throttle of a Carrier model are available. The most effective to date is the 3-line J-Roberts system. Set up properly, equal tension is maintained on all three lines throughout the various speed phases of the flight. The linkage in the handle is designed to work with the linkage travel arrangement in the bellcrank. Thus, with all control lines and wing leadouts at the prescribed proper length, control is efficient and effective.

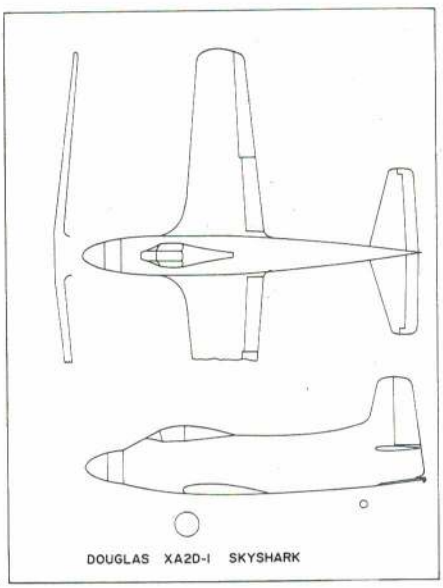
This is not the only system that works, however. Using a standard handle for elevation, and holding a third line in the other hand for throttle will work, although this permits two undesirable circumstances. When the third line is pulled for slow speed there is no automatic stop and the model can be pulled toward the pilot permitting loss of elevation control. During the high-speed run the third line dangles and flops loosely creating extra drag and inefficiency. (The loose, dangling line can also develop in the J-Roberts system if care is not taken in setting up the line length.)

If your system is for sport flying, anything may work satisfactorily. If the system is to be used in competition, then where do you pay the price? In sport flying, throttling of the model is more casual and permits more time, whereas in competition, time and performance is what wins. The high-powered engines and intricate throttles and meters are more demanding than the sport flying setup. Yet, with proper equipment, the competition machine can work simply and effectually.



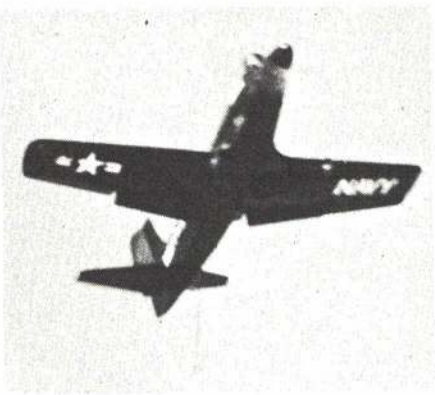
Tempo III by Scott Crichton uses modified Thunderbird wing. A good handling ship.

V-Tailed Stunter: Scott Crichton of Watertown, South Dakota relates effective use of "V" tail in stunter. Experimentation was performed on a Goldberg Buster, first flown with conventional tail and then with the "V" tail for comparison. Then a step to the bigger ship with longer moments and the "V" tail. The Tempo III is capable of consecutive overhead maneuvers without loss of line tension.



Another Carrier Design: Sketch shows three-view of Douglas Skyshark which offers an intriguing design for Navy Carrier.

Tony Naccarato's model, launched at the 1971 Nats, used a Rossi 60. It looked good in the air and handled well on slow speed. The 32-in. span produces about 163 sq. in. of area. This is somewhat smaller than the Sterling



Well-tamed Rossi 60 in Tony Naccarato's Skyshark does its thing at low speed.

At full revs, the plane explodes off the carrier.

First at Dayton was Dave Wallich with Rossi-powered Guardian. Note difference in design from Skyshark models in other photos.

Guardian by comparison, but still effective. Built for Class I at 30-in. span would be about 10 sq. in. larger than the phenomenal Netzeband Guardian. A potent aircraft.

Article and Content: This part of "Where The Action Is" will be what the modelers make it. Mail all contributions and suggestions on Carrier and Stunt to John Blum, 2417 Glen Pl., Granite City, Ill. 62040.

special interest

FRED MARKS
AERODYNAMICS, ELECTRONICS

Experiments with Laminar Foils: David Isley wrote to say: "The discussion on laminar airfoils in your column (April 1971 **AAM**) has prompted me to write concerning experiments being conducted with these sections. The laminar sections have been used, so far, only on Quarter Midgets. The data is not highly quantitative, but it is sufficient to suggest some conclusions.

"The conditions under which the testing has been done is as follows: All planes were built to meet the MARKS (Ohio) rules, and weighed between 2½ and 2¾ lbs. Lap times were on a two pylon type course with the pylons 330 ft. apart. The engines used were 15 O.S. MAX and Fox RC burning 25% nitro fuel. The props were 7/6 Power Props as these seemed to give the best results with these planes and engines. The Fox engine had been modified and has about a 1500 rpm edge on the O.S.

"The higher induced drag at high lift coefficients (mentioned in the earlier column) does appear to be present with laminar sections during tight pylon turns. Planes with the laminar wings have been repeatedly observed to slow more in the turns than non-laminar wings of similar area and planform. However, this only occurs during the tightest possible turns. Also, once the wing is unloaded a little, the plane accelerates quite rapidly out of the turn. Lap times have been increased as much as 0.2 sec. when using this type of turn. When the turns are opened up from approximately 50 ft. to about 70 ft., the problem all but disappears and the lap times are down with the non-laminar types. The slightly wider course is an advantage, at least to me, because it is much easier to fly consistently and the plane is not always in so much traffic. However, for those who like to fly with the pack, there appears to be a way to minimize the slowing in tight turns.

"There are other factors that affect induced drag and they appear to be more important than the increase due to popping out of the low drag bucket. They are aspect ratio, wing taper, and wing loading. To test these factors, three planes were built. The first plane was a Miss Cosmic Wind with a rectangular wing in the mid-wing configuration. The aspect ratio was 3.2:1 and the area was 320 sq. in. The second was a Miss DARA with a tapered wing having an aspect ratio of 5:1 and an area of 320 sq. in. The third was an Owl Racer with a tapered wing having an aspect ratio of 5.5:1 and an area of 352 sq. in. The sections used on all three planes was a 64-110 and the taper ratios (tip to root) was 0.6 on the tapered wings. Some surprising results were obtained when comparing these planes to one another and to non-laminar wing types.

"The rectangular wing would literally stagger through tight turns but a high speed stall was never observed with this plane. The tapered wing on Miss DARA was a great improvement over the rectangular wing. The lap times improved by more than one second when using the same Fox engine as used in the Cosmic Wind. The advantage was entirely in the turns, as the top speeds were measured and found to be closer than the error in our timing system (a stop watch, two flagmen, and a measured distance). When flying a slightly wider course, the Miss DARA is a match for most of the non-laminar types in the area. The Owl proved to be the best turning plane of the three. Surprisingly, the increased area seems to be an advantage rather than a detriment. This wing turns with the best of the non-laminar sections and has no significant effect on the top speed of the plane. In fairness, there is one unknown variable due to the shape of the Owl fuselage. It is very clean and wind noise in the glide is almost nonexistent when compared to the other two planes. How much of the Owl's performance is due to the fuselage shape is unknown.

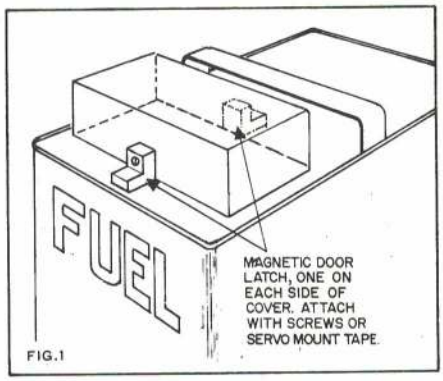


FIG.1

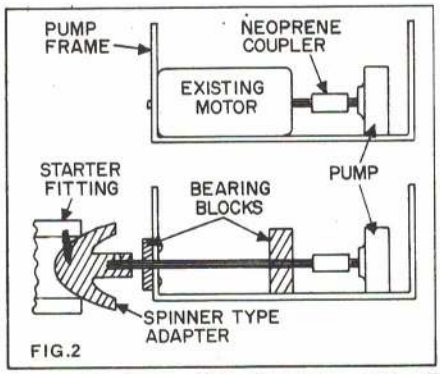


FIG.2

"The most striking aspect of all three planes was their docile flying characteristics. This we have attributed to the laminar sections. The planes are very reluctant to stall and an abrupt stall has never been observed with these sections. The wing never really quits flying, it just slows up and will maintain altitude with very little power. In dead stick landings, full up elevator can be eased in and the plane will develop and maintain a rather steep glide angle without stalling. With a little practice, this can be used to get the plane into small fields at much slower landing speeds. The flare is automatic when the plane is low enough to encounter ground effect."

Experience with full-scale aircraft has shown true laminar flow to be difficult to achieve and difficult to maintain operationally. However, the evidence presented from the above tests is interesting. I suspect that, at the speeds pylon racers fly, they could benefit from aerodynamic clean up and optimization of wing sizing and configuration. Nevertheless, it is still tough to beat a perfectly tuned engine, good reliability, and a skilled pilot.

Improving the Usefulness of Electric Fuel Pumps: Most electric fuel pumps are extremely convenient and work well—for a while! The motors provided have a rather limited life, primarily because of the bronze spring-finger type brushes, but also because the motor is overloaded when castor oil is permitted to gum up the pump. The vane-type pump will outlast several motors, so repairs, maintenance and improvements are in order.

Numerous modifications have been seen at the flying field. A Micro-Mo motor (TO-5 size), geared down operates quite nicely on one nickel-cadmium starting cell. The existing motor may also be replaced by a 6-V slot car motor which has excellent oilite or ball bearings and high-quality brushes for long life. The motor for the old Bonner reed servos is excellent quality and performs well at 2.4 to 3.0 volts.

By way of maintenance, fuel should never be permitted to sit in the pump. Always reverse the pump with the outlet line held up to ensure drainage. Occasional flushing with clean alcohol is needed. (No, that doesn't mean lying in the shade pumping beer from the keg to you!)

One handy item for holding the pump on the fuel can appeared in the DCRC newsletter and is shown in Figure 1. An item I hope to try as soon as someone can be conned into constructing it, is shown in Figure 2. The idea is to use the electric engine starter to drive the pump. No dropping resistor, separate cell or switching required—just put the starter to the adapter and pump fuel like mad!

LARRY ROBBINS and BOB BECKMAN
RC CAR RACING

New Frequencies: The long awaited FCC decision on additional frequencies for model use other than airplanes has been announced. Effective November 15 one existing and two new spots in the 72 MHz range became available for use with any model (i.e., boat, car, airplane, etc.) for hobby purposes. The two new frequencies are 72.16 and 72.32. The 72.96 spot is no longer restricted to airplanes only. No word yet on when equipment on the new frequencies will be available, but it should be simply a matter of proper crystals and tuning. Hopefully, multiple frequency sets will be available eventually.

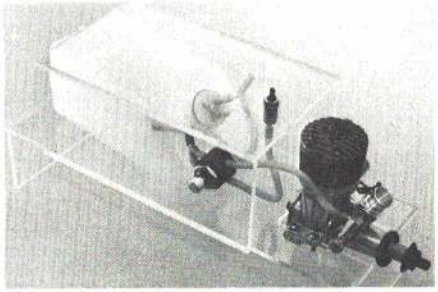
Endurance Races: On October 24, the Washington (D.C.) RC Racing Association (WRCRA) ran a series of "Mini-Enduros." No qualifying was required and everyone who entered ran (or tried to) a one hour heat. The race had been announced as a rain-or-shine affair, but there was no shine. The wet track and drizzle through the morning cut down on the entries, but brought out some interesting information. Predictably, several people found out that radios don't work well filled with water. None of the currently available tires have much traction on wet tracks. Foam tires can soak up water so fast they're almost too heavy to turn. Butyl tires act like they're on ice. The most effective seem to be capped foam, provided the side walls are sealed. In general, the main points learned were that the enduros can be fun and, with a properly set-up car, the weakest link is probably the driver.

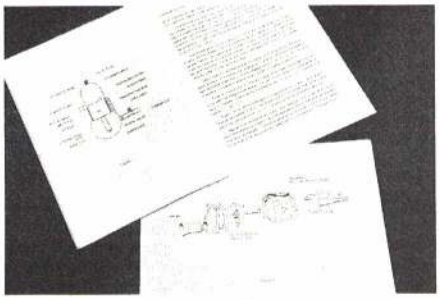
Track Markers: Inexpensive, easily stored, yet very effective track markers can be made from plastic cups and bowls. Disposable dishes made from plastic foam (one brand name is China Foam) come in several styles and sizes. The 12 oz. cereal bowl makes the best base for the marker. The top section is a thin plastic cup about five in. high and two and one-half in. in diameter. The bowls come in packages of a dozen and the cups in packages of 100. The best cups for our purpose are bright orange in color. The final ingredient is a small bag of mortar or concrete mix (Sacrete is one brand).

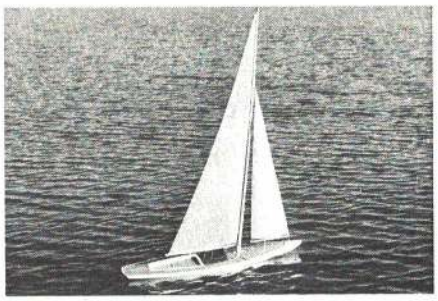
Mix some concrete and pour about ½ in. in the bottom of each cup to be used. While the concrete sets, cut a hole in the bottom of each bowl for the cup. The hole should be a snug fit over the top of the cup just below the bead around the lip. The hole can best be cut by using a round pattern (the end off a beer can is about right) and a No. 11 X-acto knife. After the concrete sets, the markers are assembled by putting a bead of cement around the lip of the cup and pressing the cup into the hole in the bowl. Make sure you use a cement that won't attack the foam bowl.

The result is a highly visible orange pylon on top of a white base. The concrete is heavy enough to keep the marker stationary in average wind. If needed, two or more can be stacked for added stability in higher wind. At the same time, they are light enough to avoid damage to a car if they are hit. And finally, two or three dozen markers stack together into a fairly small space.

new products check list







Model and Allied Publications/Aero Modeller Annual. For 1971-72, another in the series of hard-bound English modeling handbooks. 128 pages. Designs and plans for some of the world's outstanding CL, gliders and free-flight aircraft plus numerous technical articles on a wide range of subjects. Nearly 40 three-views of everything from old Wakefield designs to CL Mig 21. $1.88. Model and Allied Publications Ltd., 13/35 Bridge St., Hemel Hampstead, Herts, Great Britain

Lead Industries/Swivel-Grip. Great addition to plastic scale worker's shop, adjustable clamp grasps small parts securely, allows spray painting on all sides in single spraying. No more painted fingers! $1.69. Lead Industries, 10115 Franklin Ave., Franklin Park, Ill. 60131

Dean Brown/Two-stroke-cycle handbook. One of the best of its kind, book is billed as "technical instruction" and is probably the most complete and detailed treatment of the two-cycle model aircraft engine available. 18 pages including 11 detail drawings cover basics of front- and rear-rotor engines plus principles of carburetion. $1.50. Technical Products, Box 343, Placentia, Calif. 92670

Royal Products/Kavan Speed Plane. World speed record holder, sleek fiberglass fuselage-foam wing plane has topped 200 mph. Designed for Rossi 60, span is 44", fuselage, 50", wing area, 415 sq. in. Recommended for any 60 engine. $44.95. Royal Products Corp., Box 22186 Wellshire Branch, Denver, Colo. 80222

Sheler Hobby Products/Styrofoam cutter. For cutting wing cores from bulk styrofoam, cutter is hand-held and uses heavy-duty wooden frame with matched .037 piano wire cutting edge. Heavy-load transformer assures constant and correct operating temperature; special adjustment keeps wire under tension while working. $24.95. Shelor Hobby Products, Box 893, Covington, Va. 24426

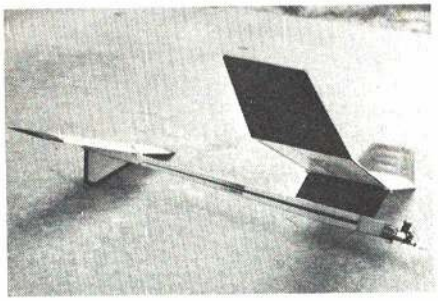
Cox/Complete rocketry kit. For both a theoretical and practical approach to the hobby, package contains everything required to start beginner off on right foot. Teaches principles and applies them to real rocket-powered multi-stage flights. Included: NIKE ZEUS rocket, engines, igniters, launch system, other accessories. Approximately $20. L. M. Cox Mfg. Co., 1505 E. Warner Ave., Santa Ana, Calif. 92705

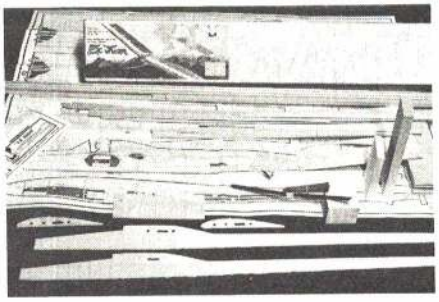
Dumas Planes/Control-line stunters. Inspired by LTV Crusader and Corsair II lines, CL kit features strong I-beam wing spar, 35 power. Span, 38". Kit C-35, about $12. Dumas Products Inc., 790 S. Park Ave., Tucson, Ariz. 85716

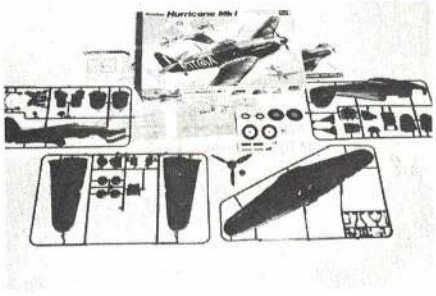
Sonic/Fuel selector valve. Consisting of a two-way selector valve, filler fitting with 100-mesh filter, and necessary fuel lines, system offers dependable switching of fuel system from "fill" to "operate" position. Advantages: no need to disconnect fuel line at carburetor when fueling, no danger of flooding engine while fueling or from fuel expansion on hot day if selector is in "fill" position. With full instructions, $3.95. Sonic Tool Co., 9 Salem Dr. West, Whippany, N.J. 07981

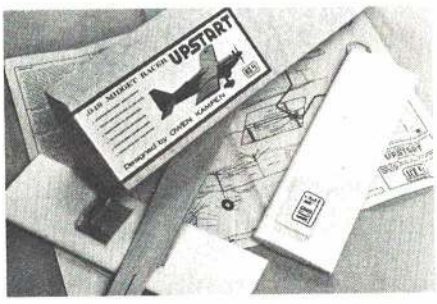
Hartman Fibreglass RC/Two-for-one offer. Increasing interest in RC model yachting has given rise to American Model Yachting Association. Free first-year membership available with purchase of sloop kit Olympia, shown in photo. Full details in Hartman Boat Catalog, available for 24 cents in stamps from Dwight Hartman, Hartman Fibreglass RC, Argentia, Ill. 62501.

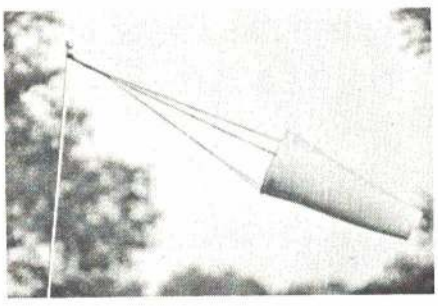
by FRANK PIERCE

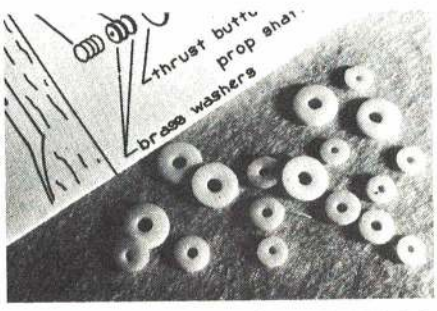


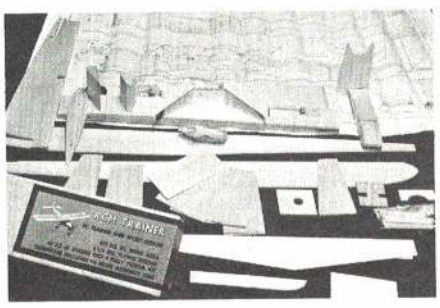


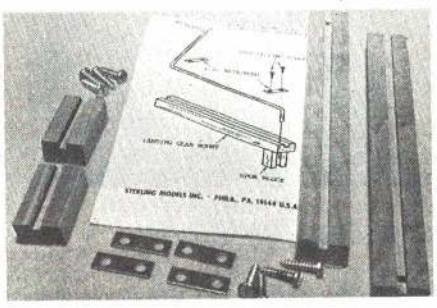












Clemcraft/New free-flight. "Okie Bird," 1/2-A free-flighter for sport and contest flying, flies at less than 1/2 lb. with 296 sq. in. wing area and 45" span. Strong, top-spar wing design for extra ruggedness and warp-resistance. Hand-selected and die-cut balsa. Additional details available from manufacturer, Clemcraft, Box 524, Sand Springs, Okla. 74063

Revell/Hurricane MK I. 1/32-scale plastic model of early-production Hawker Hurricane, kit features detailed Merlin engine, removeable cowling, scale instrument panel and other realisms which make a breathtaking true-to-life miniature of this famous fighter. 15" span. Revell, Inc., 4223 Glencoe Ave., Venice, Calif. 90291

Bahrman/Thrust washers. For the rubber-power types, a series of new low-friction teflon thrust washers are available. Extract the last gram of power from the final turn of your prop with the help of pure teflon! 1/32, 1/16, and 3/32" sizes, 40, 50 and 50 cents respectively for pack of six. Bahrman Studio, 10644 Burbank Blvd., North Hollywood, Calif. 91601

Tatone Products/Exhaust manifold. New design low-silhouette manifold is designed primarily for scale applications with inverted, tightly cowled engines such as Ryan STA. Includes two lengths of exhaust tubing to keep inside of cowl clean. For 45 to 80 engines only. $5.95. Tatone Products, 4719 Mission St., San Francisco, Calif. 94112

ACE Radio Control/Midget racer. 049-powered near-scale midget racer is designed for two-channel RC. Uses ACE 15% semi airfoil foam wings with unique no-rubber band wing mounting. Built-up fuselage from precision-cut quality balsa. Formed landing gear, 34" span. $10.95. ACE R/C, Inc., Higginsville, Mo. 64037

Bridi Hobby/RC Trainer. Built-up construction from precision-cut sheets, "RCM Trainer" features high-wing, tricycle gear design, 672-sq. in. wing area, and is designed to fly on 40 to 61 power. Flying weight, approximately 6¼ lbs. Construction time, about 6 hours. $44.95. Bridi Hobby Enterprises, 34625 Pineforest La., Harbor City, Calif. 90710

Midwest/RC sailplane. "EZ Juan" is unique open-cockpit sailplane of unusual configuration. Built-up construction with pre-cut fuselage sides, plane has span of 9', 810-sq. in. wing area. $29.95. Midwest Products Co., 400 S. Indiana St., Hobart, Ind. 46342

R. P. Adams/Novelty wind sock. Cute but functional, WS-1 windsock can register direction and velocity of winds up to 20 knots. Bright orange, 4" long. Just the thing to put on your radio aerial to show your affinity to aviation. $1.98. Robert P. Adams Co., Box 592, Walden, N.Y. 12586

Sterling/Landing gear mounts. Precision machined from top-quality hard rock maple, gear blocks are drilled and grooved for 1/8" dia. struts. Hardware included as shown in photo. Billed to provide extremely strong and efficient torsion action for gear installation. Sterling Models Inc., Belfield Ave. and Wister St., Philadelphia, Pa. 19144

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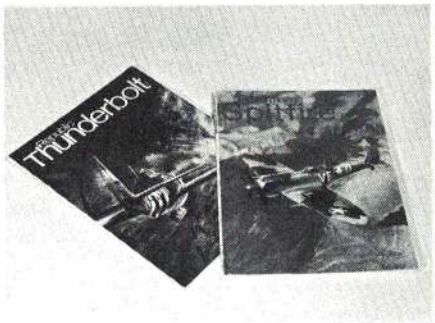

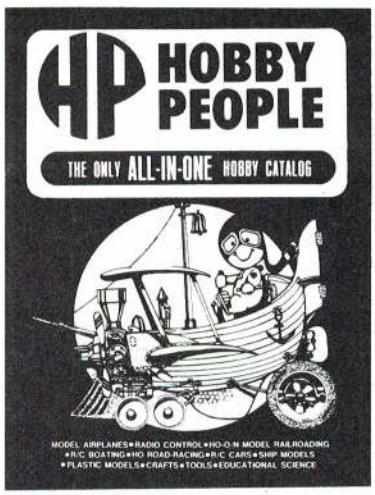

NEW LITERATURE

Hobby People/Catalog. Billed as "all-in-one" catalog, book contains 200 large, illustrated pages—of interest to all types of hobbyists. Real bargain is the dollar-off coupon, redeemable against any of the low prices already listed. 50 cents. Hobby People, 130 E. 33rd St., Los Angeles, Calif. 90011

Bill Dean & Associates/Camouflage & Markings. Shown are nine recent publications out of series of 12 covering detailed data on insignia and color schemes of R.A.F. in Northern Europe. Lots of technical hardware data also included as spin-off. Books in series sequentially page-numbered for ease of binding if desired. Approximately 20 pages each, including full-color three-view. $1 each. Printed in England.

Bill Dean & Associates/Ducimus Classics. Also from same importer, first two of new aircraft biographies. Large detailed volumes include not only massive technical data, but information on life, background of designer. All you ever wanted to know, from drawing board to terminal production on Supermarine Spitfire, Republic P-47 Thunderbolt and their ancestors. Next up: Junkers Ju-87. Ducimus Classic Books, $3.95. Bill Dean & Associates, 166-41 Powell Cove Blvd., Whitestone, N. Y. 11357

Estes Industries/Two new educational books. For teachers, *Aerospace Education and Model Rocketry*, designed to provide quick intro to model rocketry. Details of teaching aids, experiments, lesson plans, as well as launch data. For late grade or Jr. high school general science teachers. Free on school stationery; otherwise, $1. *Space Age Technology* is a thorough grounding in aircraft and rocket technology which may be used as self-study course or as text for classroom use. Illustrated throughout. 52 pages, $1. Estes Industries, Inc., 708 11th St., Penrose, Colo. 81240

World Engines/Catalog Manual. More than just items and cost lists. World has provided detailed description of entire line plus associated technical articles specifically cut to novice in RC or advanced U-control. Beautiful full-color illustrations on almost every page. $1. World Engines, Inc., 8960 Rossash Ave., Cincinnati, Ohio 45236

Polk's/Model airplane and model ship catalogs. Two huge books giving complete lines of dozens of manufacturers. Both catalogs are fully illustrated and are useful for general reference as well as ordering. Also many hand and shop tools plus accessories. Airplanes, $1.49; Ships, $1. Polks Hobby Department Store, 314 5th Ave., New York, N. Y. 10001

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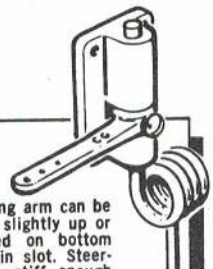

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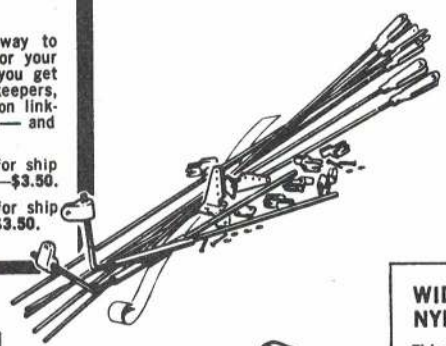

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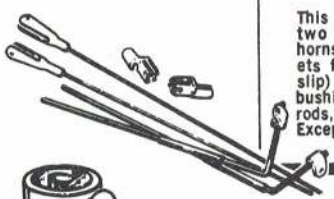

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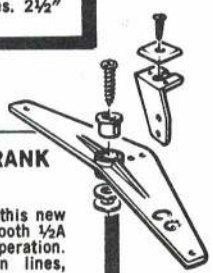

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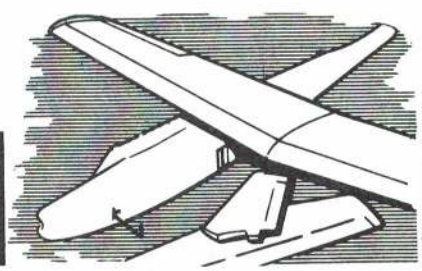

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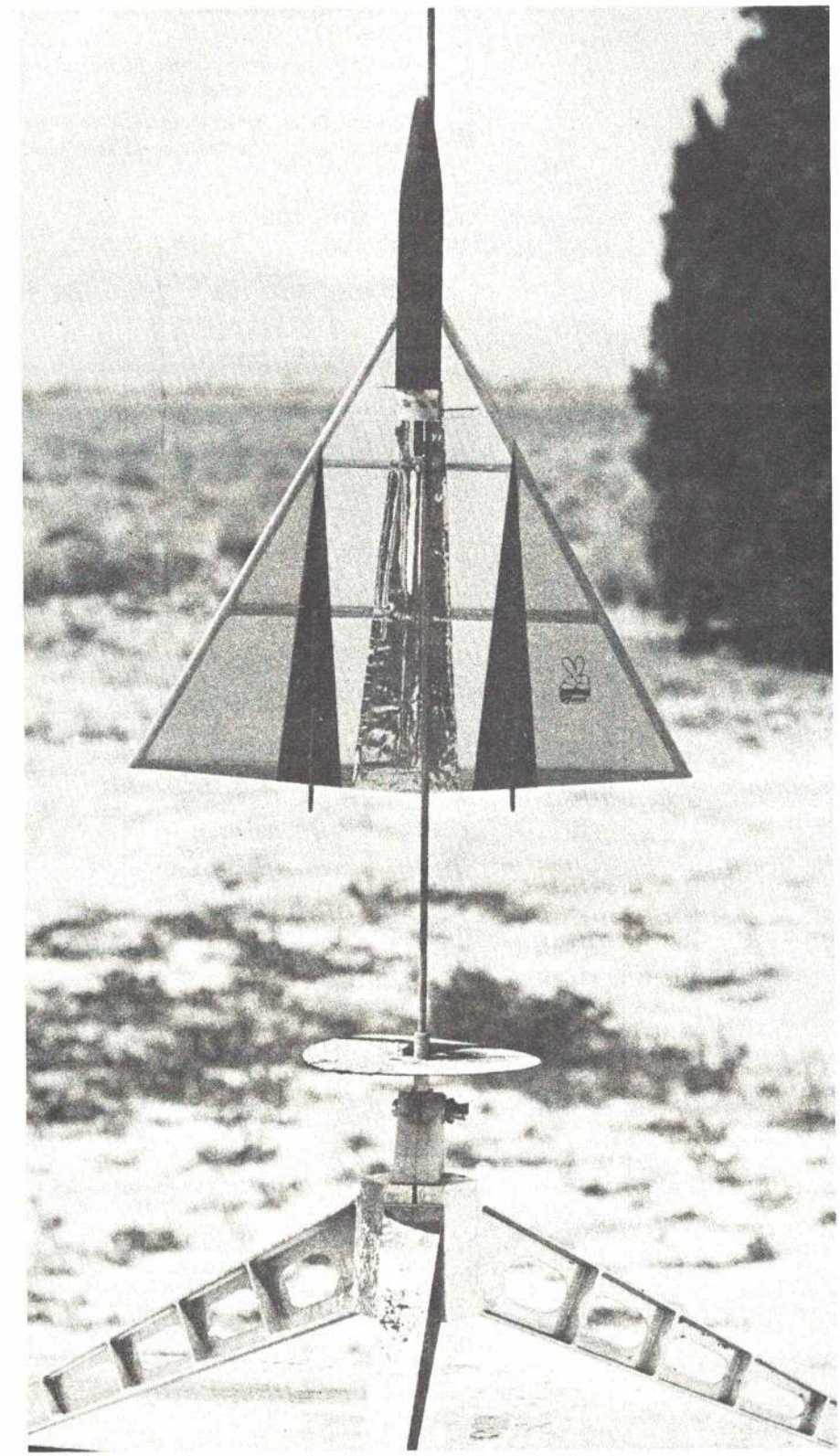


by LARRY RENGER

Cheechako is a "boost-glider"–a model airplane which uses a high thrust rocket motor to achieve altitude, then glides smoothly for a landing. This model will use 1/2A6-2 size Estes, Centuri or equivalent model rocket motor. Bigger engines will provide a more spectacular climb, but are not recommended for the Tenderfoot.

A "Cheechako" is a tenderfoot in Canada and the northern fringes of the United States. This model was specifically designed for this magazine's series of easy to build and fly models. It is not an "off-the-shelf" design which sort of fits the slot. The design goals which were set up before pencil hit paper are: (a) no critical shaping or carving; (b) built-in alignment and trim; (c) warp-proof construction; (d) no moving parts or critical tolerances; (e) good performance. In other words, try to design an AMA Delta Dart for rocket power, only more so.

Cheechako meets all these goals and even manages to look sharp as an added feature. The use of a flat construction, delta planform wing with preshaped trailing edge stock is the secret to the success of this model. I went through (and I mean THROUGH) several prototypes to get the trim to the "off the building board" stage. If your model is built exactly to the plans and balanced where indicated, it should fly too.

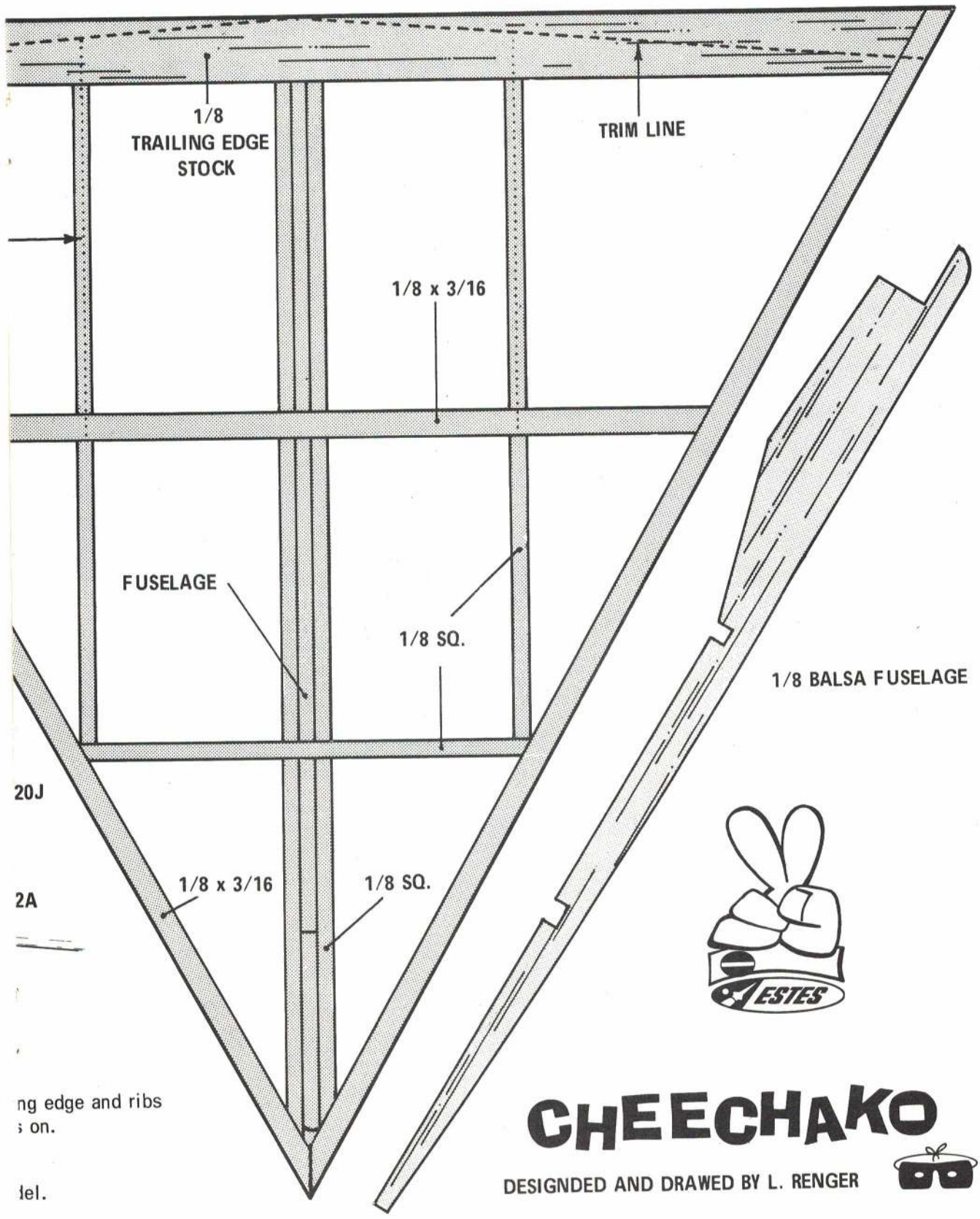
Construction

The basic construction sequence, shown on the plans, is self-explanatory, so we will just hit a few details here to help make your model perfect.

Cut each stick slightly oversize, then trim down to fit its space smoothly. Fit and trim till each part is right; don't hesitate to throw out a part if it is cut too small.

Use white glue or Titebond–but sparingly! Smear a thin film of glue on each part where it is joined, then slip the parts together. Sand the basic frame flat, using 220 grit paper and a sanding block. (A small plastic box works well for a block.)

The proper tissue technique is as follows: (1) Apply two coats of dope to all parts of the model where the tissue will touch it. Sand very lightly after each coat with 320 or 400 grit paper. (2) Cut the tissue oversize, using "Jap" tissue only! (Your hobby dealer will carry this product.) The grain runs along the wingspan. The paper will tear more easily along the grain to test which way it goes. (3) Lay the tissue on the model and very lightly tack it down with raw thinner. You can make it go around corners easier on the edges by dampening that part before sticking it down. To final trim the tissue, use a new razor blade–no knife blade comes close to that sharp edge. Shrink the tissue with water spray or gently brush the water on.



20J

2A

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ESTES

CHEECHAKO

DESIGNDED AND DRAWED BY L. RENGER

SIG SWEEPS 1971 NAT

ALL FOUR GRAND NATIONALS WINNERS USE

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3rd Place C-L SCALE 1971 NATIONALS
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2nd Place R-C SCALE 1970 WORLD CHAMPIONSHIP
by Maxey Hester

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JIM CLEM, THE DESIGNER, WON FOURTH IN B COMPETITION AND SECOND IN C

1970 NATIONALS WINNER

GRADY TURNER OF LONGVIEW, TEXAS WON FIRST PLACE CLASS C SENIOR WITH WITCH DOCTOR 800

1971 NATIONALS WINNER

EDDIE THOMAS OF ABILENE, TEXAS WON FIRST PLACE CLASS C OPEN WITH WITCH DOCTOR 800

EDDIE G. THOMAS WITH HIS WINNING WITCH DOCTOR 800

HERE IS THE BALSA THE CHAMPIONS USED!

SIG

STICKS
36" Lengths

1/16 x 1/16	.04
1/16 x 1/8	.05
1/16 x 3/16	.06
1/16 x 1/4	.07
1/16 x 3/8	.09
1/16 x 1/2	.11
1/16 x 3/4	.14
1/16 x 1	.17
3/32 x 3/32	.06
3/32 x 3/16	.07
3/32 x 1/4	.08
3/32 x 3/8	.09
3/32 x 1/2	.12
3/32 x 3/4	.16
3/32 x 1	.19
1/8 x 1/8	.06
1/8 x 3/16	.07
1/8 x 1/4	.08
1/8 x 3/8	.12
1/8 x 1/2	.15
1/8 x 3/4	.18
1/8 x 1	.20
3/16 x 3/16	.09
3/16 x 1/4	.11
3/16 x 3/8	.13
3/16 x 1/2	.18
3/16 x 3/4	.21
3/16 x 1	.25
1/4 x 1/4	.15
1/4 x 3/8	.17
1/4 x 1/2	.19
1/4 x 3/4	.25
1/4 x 1	.32
5/16 x 5/16	.17
5/16 x 3/8	.23
5/16 x 1/2	.28
5/16 x 5/8	.34
5/16 x 1	.39
3/8 x 3/8	.20
3/8 x 1/2	.27
3/8 x 3/4	.35
3/8 x 1	.44
1/2 x 1/2	.30
1/2 x 3/4	.40
1/2 x 1	.50
5/8 x 5/8	.35
5/8 x 1	.47
3/4 x 3/4	.48
3/4 x 1	.62

48" Lengths

1/8 x 1/8	.08
1/8 x 1/4	.11
1/8 x 1/2	.18
3/16 x 3/16	.12
3/16 x 1/2	.25
3/16 x 3/4	.29
1/4 x 1/4	.20
1/4 x 1/2	.27
1/4 x 3/4	.35
5/16 x 5/16	.22
3/8 x 3/8	.27
3/8 x 1/2	.34
3/8 x 3/4	.46
1/2 x 1/2	.40
1/2 x 3/4	.53

SHEETS
36" Lengths

1/32 x 2	.24
1/16 x 2	.27
3/32 x 2	.32
1/8 x 2	.36
3/16 x 2	.42
1/4 x 2	.54
3/8 x 2	.63
1/32 x 3	.35
1/20 x 3	.35
1/16 x 3	.35
3/32 x 3	.44
1/8 x 3	.50
5/32 x 3	.55
3/16 x 3	.60
1/4 x 3	.79
5/16 x 3	.86
3/8 x 3	.94
1/32 x 4	.50
1/16 x 4	.50
3/32 x 4	.55
1/8 x 4	.70
3/16 x 4	.79
1/4 x 4	.89
3/8 x 4	1.18
1/32 x 6	1.08
1/16 x 6	1.08
3/32 x 6	1.24
1/8 x 6	1.29
3/16 x 6	1.39
1/4 x 6	1.54
3/8 x 6	1.89
1/32 x 8	1.38
1/16 x 8	1.38
3/32 x 8	1.48
1/8 x 8	1.54
3/16 x 8	1.70
1/4 x 8	1.93
3/8 x 8	2.15

48" AAA Sheets

1/32 x 3	.50
1/16 x 3	.50
3/32 x 3	.59
1/8 x 3	.66
3/16 x 3	.79
1/4 x 3	1.08
3/8 x 3	1.35
1/16 x 4	.68
3/32 x 4	.74
1/8 x 4	.85
3/16 x 4	.95
1/4 x 4	1.10
3/8 x 4	1.45
1/16 x 6	1.44
3/32 x 6	1.60
1/8 x 6	1.72
3/16 x 6	1.84
1/4 x 6	2.05
3/8 x 6	2.42

TAPERED TRAILING EDGE
36"

1/8 x 1/2	.19
3/16 x 3/4	.22
1/4 x 1	.29
5/16 x 1¼	.34
3/8 x 1½	.40

BLOCKS
3" Lengths

1 x 1	.07
1 x 2	.13
2 x 2	.18
1 x 3	.18
2 x 3	.25
3 x 3	.40

6" Lengths

1 x 3	.13
1/2 x 2	.16
3/4 x 2	.20
1 x 2	.25
1½ x 2	.29
2 x 2	.33
1/2 x 3	.22
3/4 x 3	.31
1 x 3	.34
1½ x 3	.42
2 x 3	.46
3 x 3	.77
1/2 x 4	.33
3/4 x 4	.39
1 x 4	.44
1½ x 4	.57
2 x 4	.67
3 x 4	.99
1/2 x 6	.50
3/4 x 6	.55
1 x 6	.65
1½ x 6	.90
2 x 6	1.00
3 x 6	1.35

12" Lengths

1 x 1	.24
1/2 x 2	.31
3/4 x 2	.38
1 x 2	.46
1½ x 2	.55
2 x 2	.66
1/2 x 3	.42
3/4 x 3	.59
1 x 3	.66
1½ x 3	.80
2 x 3	.98
3 x 3	1.48
1/2 x 4	.65
3/4 x 4	.74
1 x 4	.87
1½ x 4	1.09
2 x 4	1.32
3 x 4	1.97
1/2 x 6	.95
3/4 x 6	1.09
1 x 6	1.26
1½ x 6	1.76
2 x 6	2.05
3 x 6	2.80
1/2 x 8	1.05
3/4 x 8	1.35
1 x 8	1.65
1½ x 8	1.85
2 x 8	2.40
3 x 8	3.40

BLOCKS
18" Lengths

1 x 1	.35
1 x 2	.70
2 x 2	.98
1 x 3	1.00
2 x 3	1.50
3 x 3	2.20
1 x 4	1.25
2 x 4	2.00
3 x 4	3.00
1 x 6	1.90
2 x 6	3.00
3 x 6	3.90
1 x 8	2.50
2 x 8	3.60
3 x 8	5.00

24" Lengths

1 x 1	.48
1 x 2	.92
2 x 2	1.32
1 x 3	1.32
2 x 3	1.96
3 x 3	2.98
1 x 4	1.75
2 x 4	2.65
3 x 4	3.95
1 x 6	2.52
2 x 6	4.10
3 x 6	5.60
1 x 8	3.30
2 x 8	4.80
3 x 8	6.80

PLANKS
36" Lengths

1 x 1	.66
1/2 x 2	.94
3/4 x 2	1.17
1 x 2	1.39
1½ x 2	1.66
2 x 2	1.93
1/2 x 3	1.15
3/4 x 3	1.55
1 x 3	1.90
1½ x 3	2.40
2 x 3	2.89
3 x 3	4.40
1/2 x 4	1.90
3/4 x 4	2.15
1 x 4	2.45
1½ x 4	3.20
2 x 4	3.90
3 x 4	5.90
1/2 x 6	2.85
3/4 x 6	3.25
1 x 6	3.80
1½ x 6	4.90
2 x 6	5.95
3 x 6	7.50
1/2 x 8	3.10
3/4 x 8	3.95
1 x 8	4.90
1½ x 8	5.50
2 x 8	7.15
3 x 8	9.95

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3/16 x 3	.65
1/4 x 3	.85
3/8 x 3	1.00

C-GRAIN AAA
8-12 Lbs.

1/32 x 2	.29
1/16 x 2	.32
3/32 x 2	.37
1/8 x2	.41
3/16x 2	.47
1/4 x 2	.59
3/8 x 2	.68
1/32 x 3	.39
1/16 x 3	.39
3/32 x 3	.49
1/8 x 3	.55
3/16 x 3	.65
1/4 x 3	.84
3/8 x 3	.99

VH - VERY HARD

1/16 x 3	.40
3/32 x 3	.48
1/8 x 3	.53
3/16 x 3	.62
1/4 x 3	.80
3/8 x 3	.93

TRIANGULAR CUT BALSA 36"

1/4 x 1/4	.19
3/8 x 3/8	.24
1/2 x 1/2	.29
3/4 x 3/4	.39
1 x 1	.54

ROUNDED EDGE AILERON & ELEVATOR STOCK

1/4 x 1	.44
3/8 x 1	.49
1/4 x 2	.60
3/8 x 2	.69

ROUNDED EDGE PLANKING 36"

5/32 x 1/4	.09

LEADING EDGE
36" Lengths

3/8 x 1/2	.30
1/2 x 1/2	.35
3/4 x 3/4	.54
1 x 1	.77

36" TAPER CUT
1/16" Edge

1/4 x 3 x 36	.82
1/4 x 4 x 36	.95

36" WING SKINS

1/16 x 12	2.15
3/32 x 12	2.40

BAGS OF BALSA
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FIRST PLACE IN CLASS B

1971 Nationals Winner

AVAILABLE SOON AS A SIG KIT

GUY'S SELECT SPRUCE

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36" Lengths	
1/16 x 1/8	.05
1/16 x 3/16	.06
1/16 x 1/4	.07
3/32 x 3/32	.05
3/32 x 1/8	.06
3/32 x 3/16	.07
3/32 x 1/4	.08
1/8 x 1/8	.06
1/8 x 3/16	.07
1/8 x 1/4	.08
1/8 x 3/8	.10
1/8 x 1/2	.13
1/8 x 3/4	.17
3/16 x 3/16	.09
3/16 x 1/4	.11
3/16 x 3/8	.14
3/16 x 1/2	.18
1/4 x 1/4	.15
1/4 x 3/8	.18
1/4 x 1/2	.22
3/8 x 3/8	.24
48" Lengths	
3/32 x 3/32	.07
3/32 x 1/8	.08
3/32 x 3/16	.09
3/32 x 1/4	.10
1/8 x 1/8	.08
1/8 x 3/16	.09
1/8 x 1/4	.11
1/8 x 3/8	.14
1/8 x 1/2	.17
1/8 x 3/4	.22
3/16 x 3/16	.12
3/16 x 1/4	.15
3/16 x 3/8	.19
3/16 x 1/2	.24
1/4 x 1/4	.20
1/4 x 3/8	.24
1/4 x 1/2	.30
3/8 x 3/8	.32

BIRCH AIRCRAFT PLYWOOD

12" Lengths		1/16 x 12	.90	3/16 x 12	2.20
1/32 x 6	.40	3/32 x 12	1.00	1/4 x 12	2.20
1/16 x 6	.45	1/8 x 12	1.10	**48" Lengths**	
3/32 x 6	.50	3/16 x 12	1.10	1/32 x 12	3.20
1/8 x 6	.55	1/4 x 12	1.10	1/16 x 12	3.60
3/16 x 6	.55	**24" Lengths**		3/32 x 12	4.00
1/4 x 6	.55	1/32 x 12	1.60	1/8 x 12	4.40
12" Lengths		1/16 x 12	1.80	3/16 x 12	4.40
1/32 x 12	.80	3/32 x 12	2.00	1/4 x 12	4.40
		1/8 x 12	2.20		

Special 3-Ply Plywood		1/64" PLYWOOD WINGSKINS	
1/8 x 6 x 12	.35	1/64 x 12 x 12	.80
1/8 x 12 x 12	.70	1/64 x 12 x 24	1.60
1/8 x 12 x 24	1.40	1/64 x 12 x 48	3.20
1/8 x 12 x 48	2.80	1/64 x 24 x 48	6.40

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THE PERFECT TRAINER

VERY STABLE AND EASY TO FLY

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- Authentic Decals
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- Molded Engine Cowling
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FOR ENGINES .19 to .35

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- Strong One-Piece Wing
- Molded Engine Cowling
- Authentic Decals
- Formed Landing Gear
- Full-Size Detailed Plans
- Aluminum Engine Mounts
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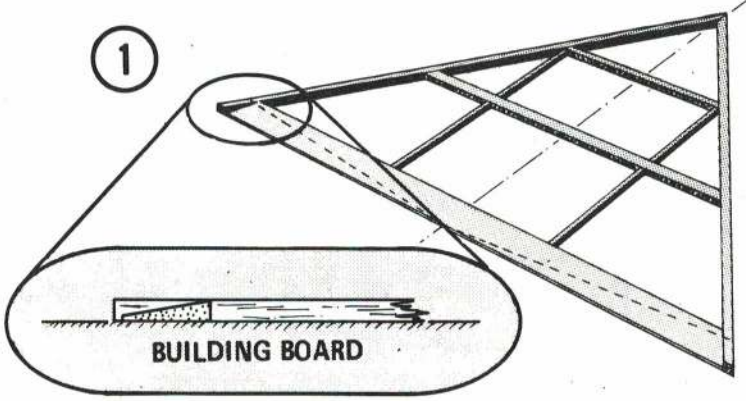
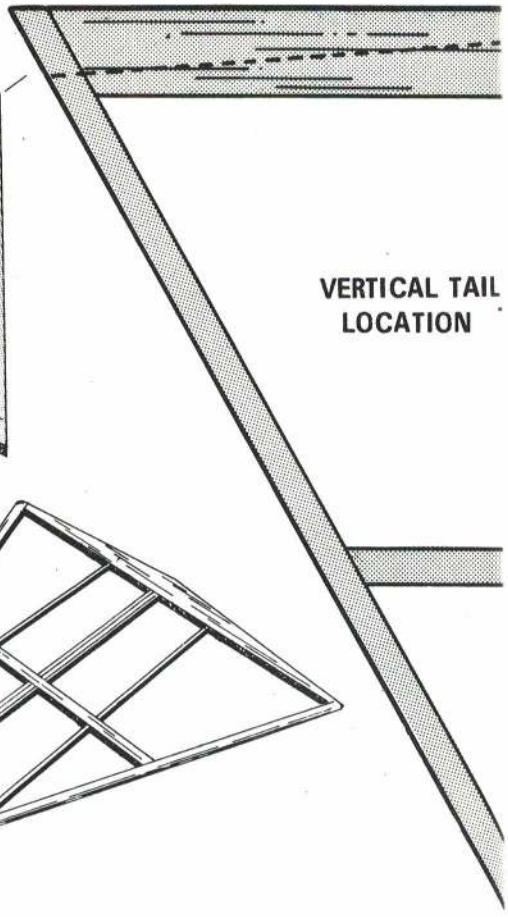
SIG MANUFACTURING CO., INC

401 S. FRONT STREET — MONTEZUMA, IOWA 50171

Glue basic frame together pinned upside-down over plan. Trim trailing edge to shape on dotted line.

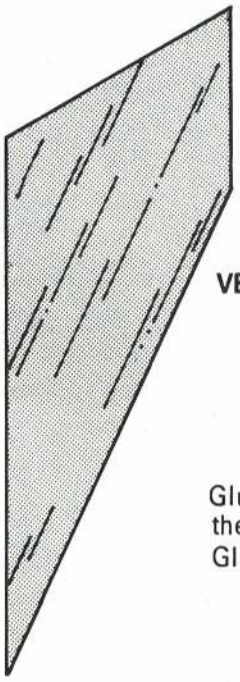


1

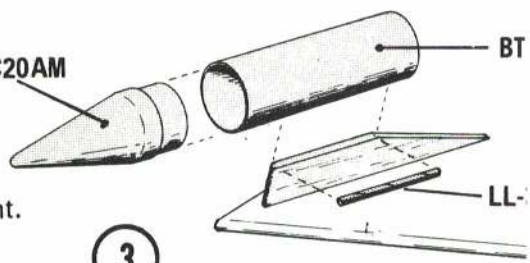


Cut out fuselage. Unpin and flip over the wing, glue the fuselage in place. Add doubler strips. Round the leading edges. Tissue model top and bottom. Apply 3 coats of clear dope.

2

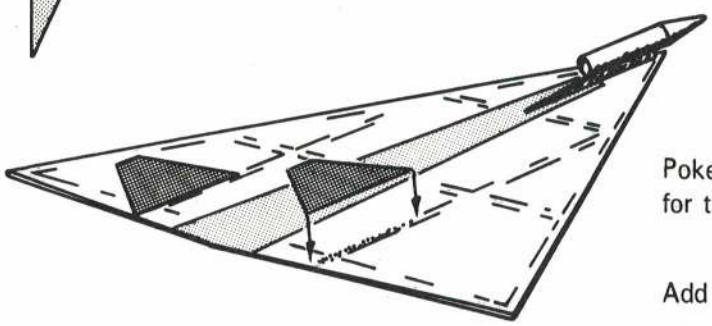


VERTICAL TAIL: 2 REQUIRED
1/16 SHEET BALSA



Glue the nose cone into the body tube, then glue this assembly to the pod mount. Glue the launch lug in the joint corner.

3

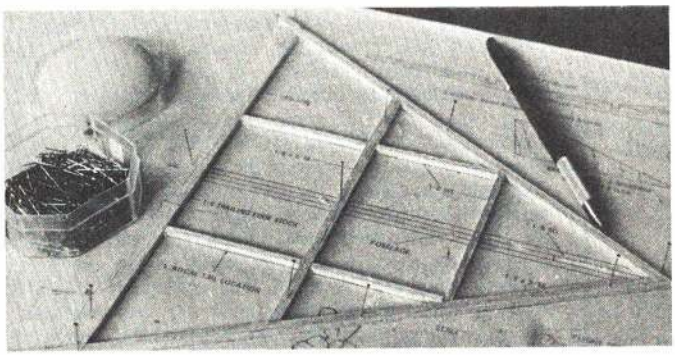


4

Poke pin holes through the tissue over the traili for the vertical tail joints. Glue the verticaltails

MAKE SURE THEY ARE STRAIGHT!

Add the foil protector strip and decorate the moc



Hand glide the plane with used motor or equivalent weight to check trim. If glide is good, the rocketing climb will be good.

Remove plan from magazine and protect it with wax paper during construction. Note trailing edge is pre-shaped trailing edge stock, available in most hobby shops.

It says it on the plans, but it can't be over-emphasized: GLUE THE RUDDERS ON STRAIGHT!! The pod alignment should also be accurate. The pin holes through the tissue, shown on the plans, allow the glue to make a good wood-to-wood bond. The foil protector strip can be ordinary household aluminum foil stuck down with rubber cement.

Flying

Flight should be pretty good "off the board," but here is what to do to fine-tune your model. First, check the balance–it should be exactly 4¼" from the nose point of the wing. Fly the model with a 1/2A6-2 engine to start with. It should go up straight with perhaps a slight roll. If the model loops seriously, trim the trailing edge narrower in the center. (You got some with a steeper than normal angle carved in.) For a slight arch-over on the way up, tweak just a little turn into one rudder to make the model roll on its upward travel.

The glide should be smooth with a wide turn. Warp the rudders to add or remove turn. Move the CG back and forth to achieve a smooth glide just on the edge of the stall. The model may tend to stall more near the ground due to turbulence. Don't re-adjust to cure this, it is normal.

SCALE ANTENNA TIES

by WARREN KOHLER

AT A PAST Nationals I ribbed several of my fellow contestants in the scale event about improper antennas of scale World War II United States Army Air Force aircraft. The reactions varied from: "It's too late now" to, "Where can I get the information?" It is in answer to the latter question that I am writing this article.

During World War II I was a USAAF radio repairman. My duties included the installation of antenna assemblies.

There were five ties as shown in the photograph. They are: (1) "T" type lead-in-take-off-splice. This is used where the lead-in from the antenna to the radio equipment is some distance from the ends of a straight run; (2) "L" type lead-in-take-off-splice. This is used where the lead-in from the antenna is at the end, such as at the antenna mast; (3) "V" wrap is used where the antenna required is rather long and must run from a point, such as a mast, to the tail and then back to another point such as a lead-in insulator; (4) "W" lead-in take-off-splice. This is used, as in the P-40, where the antenna runs from one wing-tip to the tail, to the other wing-tip, with the lead-in from the tail point; (5) The "Strain" type antenna splice. This is used on any end of wire attachment (if you are still using solid control-line wire this is an excellent solderless tie).

In all cases an antenna tie point is separated from the airframe by an insulator which is approximately 3" long and 1/2" in diameter (see sketch). On any long antenna run, a tensioning spring was also used (see sketch). When antenna wire is used as a connection from the mast to an insulator, the wire to the mast passes over a thimble to prevent chafing (see sketch).

In describing the various ties, perhaps I should explain several terms: Antenna–that part which runs from point to point; Antenna End–the end of the antenna that extends, after passing through an insulator; Tie Piece–a short piece of wire (approx. 18" actual, 2" or 3" for model work) that is used in completing the ties and wraps; Lead-in–the piece that will connect the antenna to the radio equipment; Lead-in End–the short piece of lead-in that is used in the tie or wrap.

In typing the "T" splice, the antenna is strung first and a length of lead-in and a tie piece are needed: (1) Wrap the lead-in end five tight turns about the antenna then one turn open-spaced and then five tight turns; (2) Starting with about the middle of the tie-piece close to the lead-in, wrap in the opposite direction five tight, one open and five tight turns around the antenna; (3) With the other end of the tie-piece wrap around the lead-in five tight turns, one open and five tight.

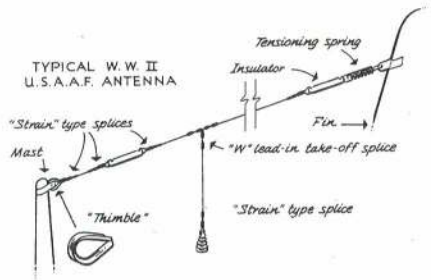
In all of these ties the scrap wire left after wrapping is not cut, but twisted off close to the last turn. This is to prevent making a nick in the antenna or lead-in which will fail under vibration. To twist the wire off bend a "crank handle" and twist around until in parts.

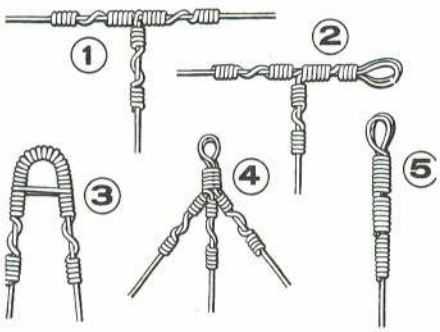
The "L" type splice utilizes the antenna end as the lead-in and a tie piece: (1) Pass the antenna end and tie piece through the insulator and make five tight wraps with the antenna end around the antenna and both ends of the tie piece, then lay this down against the antenna and tie piece; (2) Make five tight wraps with one end of the tie piece; (3) Bend down the antenna end toward the lead in point; (4) With the same end of the tie piece as used before, make five tight, one open and five tight turns around the antenna end (lead-in); (5) With the other end of the tie piece make five tight, one open and five tight turns around the antenna.

In the "V" wrap the antenna is first wrapped with twenty turns at the point where it will run through the insulator; the tie pieces are crossed to the opposite side after passing through the insulator and each wrapped with five tight, one open and five tight turns.

To make the "W" wrap the antenna is first passed through the insulator along with the lead-in and tie piece. Wrap all the wires with five turns using the lead-in part then direct this toward the lead-in point. The lead-in is then wrapped with five tight, one open and five tight turns using one end of the tie piece. With the lead-in end, wrap the antenna with five tight, one open and five tight turns. Wrap the other end of the tie piece around the remaining leg of the antenna.

In all of the wraps using an open turn, a small amount of solder is flowed in at this point to join the wires.





The final wrap is the "Strain" type splice which is solderless. (1) Pass both the main section and tie piece (antenna, lead-in or connecting piece) through the insulator or around the lead-in or thimble. (2) Wrap antenna, antenna-end and tie piece with nine turns of one end of the tie piece; (3) Wrap antenna and antenna-end with nine turns of the second end of the tie piece; (4) Wrap the antenna with nine turns of the antenna-end.

The antenna wire used by the USAAF was steel wire, (for strength) copper plated (for conduction) of approximately 3/64" diameter. Thin magnet wire would be best for appearance in model work though not very strong. Thin music or control line wire would be best for strength. The real "scale bug" could copper-plate the steel wire.

These ties refer only to USAAF antennas of the World War II period. I have no knowledge as to the methods that were employed by the Navy, or on Allied or Enemy aircraft.

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Scare Headlines Call for National Safety Program

AMA leaders met on the seventh of October in New York City with government representatives in response to news stories concerning a reported near collision (which actually was a sighting) between a model plane and a jet airliner within the landing approach zone of JFK International Airport on Sunday, October 3. The meeting was requested by AMA members who were disturbed over the nature of the reporting and its potential harm to model aviation activities. In attendance were representatives from the Federal Aviation Administration, the U.S. Naval Air Station, the U.S. Coast Guard, the New York City Police Department and AMA national and local club officers.

Following considerable discussion concerning the report which led to the news stories, it was agreed that although model aviation activities have had an excellent safety record to date, additional steps should be taken to help prevent a recurrence of such incidents. Specific proposals resulted from the discussion with reference to model flying in an FAA Terminal Control Area (TCA) near large commercial airfields:

1. No unorganized model flying activity.
   a. Flying in designated areas only, with positive control provided.
   b. No insurance coverage for activity not under group control.
   c. Flying under control of a safety officer.
2. No flying of a nature likely to result in flyaways or free flight–fail safe operation desired.
3. Monitoring of tower control frequencies to be provided.
4. Maximum publicity to be used to inform all model flyers of the problem and danger.

It was emphasized in the meeting that the basic safety problem concerned model flying within newly established FAA zones called Terminal Control Areas. Within each TCA the FCC is responsible for operations of aircraft from ground level to several thousand feet up. In the New York City area, for example, the TCA for JFK extends for eight miles around the airport. This means that anything lifting off the ground within that area is of FAA concern. Merely limiting model flying operations to several hundred feet of altitude, which is adequate near airports in many areas of the country, is not in itself considered sufficiently safe for operations within the TCA. Such operations can be tolerated only if conducted in a manner, and with sufficient control, to prevent accidents at all altitudes within the TCA.

Club Activity Safest

It was also brought out that organized-type activity, such as that conducted by AMA chartered clubs, would minimize the problem if a safety or control officer was provided to be responsible for operations in a manner that could stop or prevent flying in the vicinity of full scale aircraft. The FAA and AMA officials

Newspaper clippings resulting from the October 3 incident in New York plainly show the sensationalism used in reporting despite the fact that the airline captain's report was of a sighting, not a near miss.

Still, a national safety program is needed to completely avoid the possibility of a future incident which could result in regulations from outside being imposed on modelers.

Full-size and miniature aircraft don't mix! A single irresponsible flight endangers all model flying activities. Photo shown is a composite—not an actual situation.

present agreed that a major concern was any lone flyer operating outside of group control.

The need for group activity in TCA situations was stressed by the basic FAA requirement for complete knowledge and control of all flying within the zone of responsibility. Since direct control of model flying was considered to be impossible, in the opinion of the senior FAA official at the meeting, the next best situation would be to know where and how any model flying would be taking place and under whose responsibility.

It was generally agreed that the long-range solution to the problem might be the establishment of officially recognized model flying sites within the TCA jurisdiction—with no model flying except at those sites. The police representative at the meeting pointed out that there was already a law which could be applied to eliminate any flying (model or otherwise) conducted in a dangerous manner, and that it would be easy to interpret that law to mean any flying outside of designated areas.

It was also pointed out that while present FAA regulations do not clearly indicate what model flying is legal or illegal, there would be no problem establishing this in a relatively short time if a compelling need was indicated. Specific regulations already exist for model rocket and kite flying. FAA regulation in itself, however, was not agreed to be needed or desired, so long as self-regulation by model flyers was felt to be effective.

Unorganized or undisciplined flying was repeatedly stressed as a basic problem, with the danger that one careless flyer could cause all model flying to suffer. The need, therefore, was seen to be for all flyers to get together and prevent irresponsible flying—or flying which was not under control and knowledge of other flyers. As in the incident reported the weekend previous to the meeting, a single flight with bad publicity had widespread effects on all model flying in the New York area.

Inaccurate Reporting Harmful

The situation was obviously compounded by irresponsible news media which distorted the facts, but this was acknowledged to be a continuing problem not likely to be overcome. Both AMA and FAA officials agreed that there was almost nothing that could be done to prevent such media reaction or bring about corrections to erroneous reporting—the media had proved to be unresponsive in the past and also in connection with the October 3 incident.

With such a media situation the danger is that misguided public pressure could force government actions which otherwise might not be considered necessary. As in the case which resulted in this meeting, the public impression was obviously one of near disaster, although the facts of the situation are that the model plane was some distance from the airliner, and even if the model and the airliner had collided, the likelihood of a catastrophe was extremely small. Regardless, the public reaction created by scare headlines and distorted reporting was too far developed to be overcome by retraction or restatement of earlier reports, especially since there appeared to be little media interest in setting the record straight.

Aside from the fact of whether or not any real hazard exists concerning model flying in the vicintiy of airports, it is clear that there are two problems which need prompt and vigorous action in order to prevent model flying activities from being curtailed due to emotional rather than factual consideration.

1. A major public relations effort is needed to change the image of model flying. The popular public image is one of toys being flown by boys rather than the true picture of miniature aircraft being flown by responsible adults.
2. Much more needs to be done to be sure that all model flying is conducted with maximum safety precautions, with particular regard for operations which might be in the vicinity of full scale aircraft.

The public relations need is twofold: within the aviation community and to the general public. Unfortunately, most aviation people are unaware of the nature of current miniature aircraft activities. FAA people, for example, generally are not knowledgeable concerning such activities; the same goes for airline personnel. This is so despite the fact that some of our model flyers are FAA and airline employees.

PR Benefits

In the case of the government people involved in the meeting described, their attitude toward our activity changed upon meeting the model flyers and learning of the true nature of the sport and hobby. The change then resulted in constructive discussion of mutual problems and proposed solutions. Particularly effective was explanation of the fact that many modeling people are professionals in aviation and in the general business community: airline pilots, engineers, lawyers, dentists, etc. The same appreciation is needed by the general public if the negative aspects of media reporting are to be minimized.

Also helpful would be greater appreciation of the benefits of miniature aviation activity: educational, recreational and inspirational (youth leadership).

The activity's positive contribution as a deterrent to juvenile delinquency is well known by those involved but not by others. The same is generally true of the educational benefits concerning creative and scientific teaching, leading to careers in technological fields. But the greatest impact can probably be made concerning the recreational aspects, the effect being that many pilots, technicians, engineers and executives find model flying to be a great release from the daily job pressures, enabling them to better cope with the problems their work involves.

Safety Emphasis Needed

In the end, however, all the positive aspects of the activity can be ignored if maximum safety of operations is neglected. Here again, the possibility of careless or irresponsible actions by a few needs to be minimized by the concerted efforts of the rest. Where such actions have been tolerated in the past, they need to be eliminated in the future—starting NOW.

This is not mere sermonizing. It is the handwriting on the wall which says that another near collision can result in drastic reaction. We have, in effect, been given a warning to prove that self regulation can prevent recurrences. Failure to do that can be expected to result in regulation being imposed on us from outside.

Our greatest danger at present is a tendency toward tolerance of unsafe flying even

THIS IS LAST ISSUE FOR 1971 AMA MEMBERS

Only those who renewed memberships by December 10 can be assured of receiving continuing issues of American Aircraft Modeler without interruption. 1971 AMA members who didn't pay 1972 dues by this date likely will miss the March issue. It's simply the mechanics of magazine ordering and mailing. The March issue is mailed in January, but it's December when copies have to be ordered and the mailing tape of addresses has to be prepared.

Similarly, for subsequent issues, it's necessary to get membership processing initiated as soon as possible—it's too costly and complicated to do anything else. If you haven't signed up for 1972 AMA membership yet, do it now in order to avoid losing any more service—if your dues payment is received by January 10th, you will receive the April issue which is mailed in February.

PRESIDENT'S MEMO

A MESSAGE TO MODELERS' WIVES (BLESS 'EM!). Your husband's air modeling can be one of the MOST IMPORTANT INGREDIENTS in your marriage. Whether it works for or against your marriage is strictly YOUR OWN CHOICE.

In offering the following thoughts I can speak with authority, because as a hobby shop owner for 31 years I have seen marriages made and marriages broken right in my store.

A smart wife will use her husband's modeling as a primary tool toward developing a stable, well adjusted, smiling home life. She will realize that every man has a certain amount of time, a certain amount of money, and a certain amount of energy that he is going to spend SOMEWHERE. It's best that he spend it at home or at a flying field in the company of other contented husbands. There are some far worse things he COULD be doing.

Provide a man a haven to want to come home to–a pleasant face to look at–and a relaxing activity like modeling as a hiding place from the day's problems. Model building will not solve his problems, but it will let his mind and emotions rest and regain strength. Then, when he finally has to face those problems, he is better equipped; when his problems are more easily and wisely solved, he is a much nicer guy to live with. Considering, this, YOU CAN ACTUALLY BE SELFISH by encouraging his modeling, and the world will never realize your selfishness.

TRANSPO 72, the U.S. International Transportation Exposition, will feature sport aviation air shows, including aeromodeling, next June at Dulles Airport near Washington D.C. Studying plans for the event are John Clemens, AMA President; Col. M. Roth, National Aeronautic Assn.; Col. C. Aly, Transpo's Chief of Operations.

The family budget should enter into your attitude towards a husband's desire to build model planes. Again I speak from experience when I say that, for the total hours he enjoys modeling against the dollars spent, it is the MOST ECONOMICAL activity in which he could indulge. And most of it is RIGHT AT HOME where he should be. The time involved vs dollars spent includes the dreaming of "how good it is going to fly", the planning, the shopping, the buying, the building, and then having an end product from which still MORE enjoyment can be had.

To emphasize what a bargain modeling is, he even gets the first few hours of entertainment free in just shopping without yet having spent a nickle. I know! I run a hobby shop!

The OTHER ATTITUDE that you as a modeler's wife can take is a DISASTROUS one. You can "fight" his hobbies. You can be jealous of them. You can treat them as "the other woman" who you feel competes with you for his time and attention.

If you are a thoughtful woman you are warm and soft and can smile and smell good; that model plane is cold and stiff and probably greasy and smells bad. If you let it compete with you, even in your mind, you are a fool and deserve your fate. Be smart; use modeling to bring him home. Going out to fly with him might even be fun. He is already bound to be an EXCEPTIONAL GUY or he wouldn't have the urge to do something constructive like model building.

Now, fellows, I've gone to bat for you with your women. Do your part: be reasonable, meet 'em halfway, and don't spend all the family's hobby money (and "bean" money) on yourself.

HAPPY MARRIAGE!

John E. Clemens
AMA President

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though we condemn it and have various rules against it. This refers to club activity in which a few people habitually ignore club safety regulations and in which club officers are reluctant to be tough about enforcement. It also refers to individuals who have taken chances while flying, knowing that equipment failure could result in a dangerous situation.

The warning of the New York meeting is that the time is now to end our tolerance of the past and to organize our flying activity more effectively to minimize the chances of another incident which could bring on intolerant regulation. The proposals produced by the New York meeting are, therefore, worth closer study.

"Lone Wolf" Endangers All

The point concerning allowing only organized flying in Terminal Control Areas is related to the need for any model flying to be known to FAA Traffic Controllers. This suggests that flying may only be permitted in designated areas, and only certain kinds of flying at that. Control Line would not be involved since such flying is tethered, and the plane does not actually get completely free of the ground. Free Flight, however, may be impossible in TCA situations, although limitations on size and weight may permit flying of small or lightweight models.

If any controls or limitations are involved, the need for organized activity is all the more emphasized, with a safety on control officer present to enforce requirements. This ties in with the suggestion for TCA tower frequencies to be monitored at all times. Receivers for such monitoring are relatively cheap and within the means of clubs. But the most important point brought out in the discussions relating to these proposals was the need for someone not flying to be responsible for the actions of all others at the model field.

Along with this basic arrangement, it was suggested that AMA could help provide additional incentive by voiding insurance coverage for any model flying not conducted in accordance with TCA requirements. It was suggested that this be made part of the proposed new AMA Safety Code currently being considered by the AMA Executive Council.

"Dethermalizer" May Be Required

Fail-safe Radio Control flying was also proposed. It was noted that self-neutralizing controls would not provide the kind of safety desired. In the event of radio failure, a free-flying model is NOT desired. Preferred is immediate descent to earth, although it was acknowledged that a crash dive was not necessarily good either–such an occurence could be dangerous over spectators or unknowing general public.

A gliding model without control was felt to be highly dangerous, especially if it should be caught in a thermal and drift out-of-sight. It was noted that the incident in question most likely involved such a model. It was reported to be at 2,000 feet–far above normal RC model flying altitudes since visibility would be extremely poor (a six-foot model at that altitude would be equivalent to less than one-sixteenth inch at arm's length). RC flying normally takes place well under 500 feet simply because the model has to be kept close to be able to tell what it is doing.

With gliding or diving models not considered safe in case of control loss, a compromise solution has been suggested. This is to "dethermalize" the model, a practice now standard for Free Flight competition models. This would be relatively simple to do by causing the horizontal stabilizer to deflect upon signal loss. The resultant rapid but flat descent of the model would probably be the safest situation obtainable.

This appears to be preferable to an earlier FAA proposal–back in '63–that all models be equipped with fail-safe parachutes! This proposal was seriously considered but shelved since it might be ineffective due to the possibility of the chute providing enough lift under certain conditions to nullify the desired result. But whether by chute or by dethermalizer, the thinking is still there that fail-safe operation is desirable.

Publicity Campaign

All of the proposals concerning operation and control, however, were considered secondary to the prime need for publicity concerning the problem. FAA and AMA officials agreed that a maximum effort needs to be made, especially through the model press and industry, to alert all model flyers to the concern for immediate attention to safe flying practices–before something worse happens than another near collision incident.

Model publication representatives present promised a major campaign would be initiated, and that full cooperation by the industry could be expected. In addition to reporting on the New York meeting, regular promotion of safe flying practices was

Chartered Club officers who receive the AMA Monthly Mailing found out in December what was December's big modeling news. Did you? If not, ask your officers why not!

offered. It was also suggested that a campaign to provide each model flyer with a Safety Code would be pursued, with the object of having such codes displayed on flyers' tool kits.

Printing of such codes could be a joint effort of AMA, publishers and model manufacturers. The goal would be to saturate all the outlets–clubs, hobby shops, kits, and other means of distribution–with self-stick or decal-type printed codes and slogans. The need to reach all model flyers, including non-AMA members, was stressed. Those outside of organized activity are in particular need of getting the message if the effort is to be effective.

Close cooperation between AMA, model press and industry leaders was promised to develop a unified approach to publicity aspects of the problem, with FAA officials to be kept informed of progress. Good communications between all parties was acknowledged to be vital.

The New York meeting ended without specific action being taken in any direction, but it was obvious that the AMA leadership is expected to pursue the proposals for eventual (soon as possible) adoption of more effective safety practices for model flying.

Also, although the New York meeting was treated as a local problem, it was plain that national response is expected since the same dangers apply elsewhere. Additionally, it was concluded that the dangers go beyond flying problems in TCA areas–they apply everywhere that full scale and miniature aircraft are likely to use the same airspace.

Al D'Amico, vice-president of the Pennsylvania Avenue Radio Control Society (PARCS) and a radio news broadcaster for New York station WPIX, organized the meeting as a concerned model flyer and member of the news media who felt that direct communication was needed between all interested parties in order to clarify details of the incident and any implications which might result. Also present were other club officers: Sal Alu, president, and Bob Duran, V.P., Pan American Model Aero Club; Irwin Perlman, president, and Richard Brooks, secretary, Radio Control Society of Marine Park; John Pimental, president, Blue Angels RC Club.

AMA officers present from District II (N.Y. and N.J.) were Joe D'Amico, PARCS Field Controller and AMA associate vice-president for Radio Control; Bill Boss, AMA vice-president; attending from Washington, D.C., was John Worth, AMA executive director.

Don McGovern, editor of Flying Models, represented both his magazine and others, as well as the Suffolk Falcons of Long Island. Another joint representative was Bob Caplan, FAA Air Traffic Controller and also a member of the Suffolk Falcons Model Club.

FAA New York area representatives were John Harris, Air Carrier Operations Inspector; E. Silverman, Operations Branch; H. C. Spiselman, JFK Tower.

Military representatives were Commander P. A. Ammons, Commanding Officer, Naval Air Station, N.Y. (Floyd Bennett Field); Commander D. L. Muir, Executive Officer, Coast Guard Air Station, Floyd Bennett Field.

Representing the New York City Police Department, Aviation Unit, was Captain Robert Oberle.

Scholarships Awarded to Three AMA Members in 1971

Congratulations and checks have already been presented to three 1971 AMA scholarship recipients. The awards were in amounts of $1,000, to George Pharr, AMA 65435, of Montgomery, Ohio, and $500 each to Richard Leidner, AMA 31706, of Miami, Florida, and Robert Hanford, AMA 7272, of Tulsa, Oklahoma. The 1971 AMA scholarships were awarded in the second year of this continuing AMA program. (See details about how AMA members may apply for 1972 scholarships in the latter part of this article. All Juniors and Seniors in high school should at least write for the scholarship application.)

George Pharr, Jr., the major scholarship recipient, showed superior academic and modeling achievements. George has been active in a variety of aeromodeling activities; he has built Control Line, Free Flight, Indoor and Radio Control models, and has participated and placed in most of these categories in numerous contests, including the 1968, 1969, 1970 and 1971 AMA Nationals. He was a member of the Queen City U-Control Club in 1968-69 and a member of the Southwest Ohio Free Flighters in 1969-70, serving as the latter group's vice-president and treasurer in 1970.

Academically, also, George has reached a superior level of achievement. His scores for the National Merit Scholarship Qualifying Test merited him a letter of commendation. His grade point average was equally admirable, achieving a perfect 4.0 out of a possible 4.0. His school activities were also well diversified; he belonged to the National Honor Society, was awarded the Harvard Book Award presented to the Outstanding Junior, and was honored as the Outstanding Chemistry Student in 1970. He took part in the school orchestra, was president of the band, and won the John Philip Sousa outstanding musician award. In June, 1971, George graduated second out of 300 students from Sycamore High School in Montgomery, Ohio. He is now attending Rice University in Houston, Texas, where he plans to study chemistry and mathematics. All of these extraordinary achievements made George the top AMA scholarship applicant of the 1971 program.

The Scholarship Committee recommended that two other applicants each be granted $500 awards, and the Executive Council approved the recommendation.

Robert Hanford, another outstanding AMA member-student with an academic grade point average of 3.8 out of a possible 4.0, attended Nathan Hale High School in Tulsa, Okla., where he participated in a great variety of school activities. These include the medical club, the Latin club, the math club, and membership for two years in the National Honor Society. Also, Robert is a well-rounded athlete and has won letters in baseball, basketball and tennis, and he has actively participated in a variety of other sports. Outside of school, Robert is an avid modeler. As Free Flight (his main modeling interest) Chairman of the Tulsa Glue Dobbers and a member of that club's National Contest Team in 1968, Robert has enjoyed many modeling experiences and has won more than 40 trophies. He is currently enrolled at Rice University in Houston, Texas, where he expects to major in physics.

The other scholarship winner, Richard Leidner, was a member of three honor societies at the Miami Palmetto Senior High School and is a very active model builder. Although recently there has been no formal Control Line club in his area, Richard has helped fill the void by encouraging and instructing many beginning model builders. Most of his modeling experience has been with Control Line, particularly Stunt, but he has also flown and placed in contests with Free Flight and Radio Control models. His other interests include chess, scuba diving, and flying full size airplanes.

Like each of the other scholarship winners, Richard was an outstanding student and a member of the National Honor Society. He was ranked fourth out of 1055 students in his class and acquired a grade point average of 4.4 out of a possible 5.0. His National Merit Scholarship Qualifying Test performance earned him a rating in the 94% (of those who took the test) and his Preliminary Scholastic Aptitude Test (P.S.A.T.) scores were equally as remarkable. Richard plans to use his AMA award to study aerospace engineering at the Massachusetts Institute of Technology.

Again, congratulations to three outstanding AMA member students. It is our hope that the AMA scholarship awards will be of meaningful benefit in the completion of their educations.

1972 Scholarship Program

The AMA scholarships to be awarded in 1972 will be the third time for such awards in this continuing program which highlights the educational aspects of air modeling. With each successive year, as the prgram becomes better known, more and more teen-agers are requesting Scholarship Application forms from AMA HQ, and with revised guidelines this year concerning the eligibility of applicants, it is expected that many more AMA members will go one step further and apply for the awards. Also, the deadline this year for returning completed Scholarship Applications has been extended to May 31.

Any current AMA member is eligible who (1) has flown a model in AMA sanctioned competition in 1971 or in 1972, prior to submitting the Scholarship Application, and (2) graduates from High school in 1971 or 1972.

Send to AMA HQ now for 1972 Scholarship Application, The filing deadline is May 31. All AMA members are eligible who graduated from high school in 1971 (or will graduate in 1972) and have flown in an AMA sanctioned meet last year or this year. Send self-addressed stamped envelope with Scholarship Application request.

George Pharr, $1,000 scholarship winner. U.S. Navy photo.

$500 scholarship winners: Robert Hanford, above, Richard Leidner, below.

This is modified from the previous requirements.

In 1970 and 1971 it was required that applicants must have taken the National Merit Scholarship Qualifying Test, the results of which were a major factor in determining the winners. This year, however, the NMSQT was given in late October (1971) prior to the publication of this article, potentially preventing many able and interested students, who may not have taken the test, from qualifying in this year's program if the requirement was maintained. Because of this, and because the AMA Scholarship Committee wishes to take into account all aspects of each applicant's achievement (scholastic, aeromodeling, community, etc.) it has been decided that the taking of the NMSQT will not be required. Yet it should be noted that a good NMSQT score will be to the applicant's benefit.

In other words, all applications will be considered, and more young people will be eligible. If you are at all interested in the program (or if you know of someone who may be) please write for the 1972 Scholarship Application Form. Send your request, along with a self-addressed stamped envelope to AMA HQ, 806 Fifteenth St., N.W., Washington, D.C. 20005.

Each applicant must complete his form and return it to AMA HQ by May 31, 1972. It is particularly important that this deadline be met as some applicants were turned down last year due to late entry.

The winers are selected by AMA's Scholarship Committee which consists of the chairman, Cliff Telford, who is also AMA District IV Associate Vice-President; Art Schroeder, District II Associate Vice-President; Bob Stalick, District XI Vice-President; and John Worth, Executive Director.

The Scholarship Program was first conceived when Matty Sullivan (AMA Life Member, former Nats Contest Director, manufacturer of Pylon Brand Products) made a major contribution for this particular purpose. Later on AMA membership dues have aided in the financial support of this program (10 cents per adult member) as have contributions to the AMA Scholarship Fund (which are federal tax-deductible).

When the AMA Scholarship Program was first initiated in 1969, it was expected that only one $1,000 scholarship would be awarded annually. In 1970, due to the outstanding achievements of two of the applicants, two $1,000 scholarships were awarded. In 1971 the awards again exceeded the amount originally contemplated, and three scholarships were awarded. The number and dollar amounts of the 1972 awards will depend upon the amount of money available in the Scholarship Fund and also the relative qualifications of the applicants as determined by the Scholarship Committee. However, it is anticipated that scholarships amounting to at least $1,000 will be awarded in 1972.

Serving its members well is an important element in any organization. Fortunately AMA's maturity and financial growth have made possible a variety of services for all of its members, not merely the adult majority. Activities such as the Delta Dart program and the Scholarship Program illustrate AMA's continuing support of youth-oriented activities. However, a truly successful 1972 Scholarship Program can be realized only through participation. We urge all eligible aspirants to take advantage of this opportuntiy by sending for an AMA Scholarship Application now.

Executive Council Summer Meeting

Wednesday, July 28, 1971
Holiday Inn, Northbrook, Ill.

Meeting began at 9:30 p.m., with the following AMA officers present: President John Clemens, Dallas, Texas; Secretary-Treasurer Earl Witt, Chambersburg, Pa.; John Worth, Executive Director, Washington, D. C.; Cliff Piper, V.P. (District I), Atkinson, N. H.; Bill Boss, V.P. (II), New Hyde Park, N. Y.; Ronald Morgan, V.P. (III), Scotland, Pa.; John Patton, V.P. (IV), Frederick, Md.; Jim Perdue, V.P. (V), Athens, Ala.; Al Signorino, V.P. (VI) Bridgeton, Mo.; Jack Josaitis, V.P. (VII), Dearborn, Mich.; Murry Frank, V.P. (VIII), Wichita Falls, Tex.; Stan Chilton, V.P. (IX), Wichita, Kans.; Alex Chisolm, V.P. (X), Fresno, Calif.; Bob Stalick, V.P. (XI), Albany, Ore.; Joe D'Amico, Associate V.P. (II), Brooklyn, N.Y.; Frank Schwartz, A.V.P. (V), Nashville, Tenn.; Glenn Lee, A.V.P. (VI), Batavia, Ill.; Bud Tenny, A.V.P. (VIII), Richardson, Tex.; Bob Meuser, A.V.P. (X), Oakland, Calif.; Joe Bridi, A.V.P. (X), Harbor City, Calif. The following items were on the agenda.

Cars and Boats

General discussion covered the subject and developments since the previous council meeting at Toledo in February. Worth stated that significant progress had been made in working with leaders of the RC car fraternity to develop a means whereby AMA could provide membership services for their interest, if AMA leaders were interested in going in that direction.

Discussion indicated, however, that there was currently an apparent decline in car activity and a noticeable cooling off by car interests in proceeding with further exploration. Only one letter had been received from RC industry firms who had been previously asked to comment, and this letter was negative to the idea of accommodating car interests within AMA. Meanwhile new officers had just been elected to the principal car interest group (R.O.A.R.) and they had requested more time to develop a current official position on the question of whether closer ties with AMA should be pursued.

There was an apparent consensus that the matter should not be pressed at this meeting. Patton then moved to table action on the subject until the winter ('72) council meeting. Chilton seconded the motion which was then voted on and passed: 13 for, 1 against (Perdue) No other action was taken on the subject.

Safety Committee

At the previous winter council meeting it had been decided that the finalization of an AMA Safety Code would be held up pending recommendations from an AMA Safety Committee. At the same time the Safety Committee had dissolved pending settlement by the council of the question of whether the group would be advisory or policy-making: with or without authority above Contest Boards.

Discussion followed by an informal poll of council members revealed a consensus that the committee should be advisory. Stalick then moved to establish an advisory type Safety Committee; seconded by Witt and approved unanimously.

Clemens then introduced Jerry Kleinburg of San Antonio, Texas, as the newly appointed Safety Committee chairman. Kleinburg then presented his ideas and approach concerning activation of a new committee. He also presented a tentative slate of members but this was not affirmed as council members felt that better representation was needed for all interests, Free Flight and Control Line specifically. Kleinburg agreed to reconsider the committee makeup in line with the council thinking.

No further action was taken on the question of the Safety Code pending new Safety Committee activation.

Special Interest Representation

This agenda item resulted from a specific proposal of the East Coast Soaring Society (ECSS) for appointment of RC Glider representatives to the Contest Board. Council discussion showed a reluctance to establish additional district representation since there were already so many Contest Board representatives. Further discussion indicated a consensus that special interest groups should be included in AMA communications to provide opportunities for their inputs. Worth made a motion, seconded by Stalick, that the ECSS and the League of Silent Flight be included in Contest Board communications in a manner for them to make rules recommendations. The motion was approved 12 for, 2 abstained (Boss and Frank).

Stalick offered a further motion, seconded by Worth, that Contest Board chairmen include major special interest organizations, those composed mostly of AMA members, in Contest Board communications and to solicit their recommendations concerning rules. The motion was approved 13 for, 1 abstained (Witt).

AMA Financial Investment Policy

Worth described current practices concerning investment of surplus funds in interest-bearing savings and loan accounts. He also indicated various alternatives which had been suggested by AMA members and asked for guidance concerning future handling. Witt spoke in favor of the current policy, noting that the accounts were diversified and all insured against loss while returning a good interest percentage (between 5 and 6 percent). Frank moved to endorse the current policy; seconded by Morgan and unanimously approved.

Executive Director Salary

After noting that it had been two years since the last salary increase and that it had been a cost-of-living-type raise, the council voted to approve a 15% combination cost-of-living and merit-type increase, effective immediately.

Distinguished Service Awards

a. Whalon Webb was nominated by letter from the Chicago Model Masters Club. It was noted that Webb, a long time Contest Director and area Contest Coordinator, had died since the last council meeting following a long hospital stay since working as an AMA official at the 1970 Nats. Signorino made a motion to accept the nomination; seconded by Ron Morgan and unanimously approved.

b. Al D'Amico was nominated by the Pennsylvania Ave. RC Club of N.Y., in recognition of service in securing the use of Floyd Bennett Naval Air Station as a model flying site. Boss made a motion to accept the nomination; seconded by Frank and approved by a vote of 12 for, 2 abstained (Josaitis, Patton).

Publications Review

Worth reported on the current status of AMA publications, indicating the likelihood of increased costs and the possibility that such costs might make alternative arrangements worth considering for the future. But it was noted that until costs did actually escalate, the current cost status was satisfactory and no changes were recommended.

General discussion indcated a consensus to improve AMA communications by wider distribution and circulation of our publications. Various problems in doing so were discussed, involving HQ staff effort, time, and cost. Worth explained that ways were being sought to broaden distribution at reasonable cost and effort and that several promising possibilities were being developed. Chilton then made a motion to defer action on publications until the winter council meeting, with the expectation that the cost situation would by then be better known; seconded by Stalick and unanimously approved.

Adjournment, Reconvention

Noting that it was well past midnight, the council agreed to adjourn and reconvene the next night: 10 p.m. at Glenview NAS, Bldg. 27.

The council reconvened with the same attendance as the previous meeting, except for the following: Josaitis, Lee, Meuser, D'Amico, Schwartz, Bridi. The agenda listing continued from the previous evening.

RC World Championships

The current financial status was reported on by Worth, with additional comments by Witt, indicating a favorable situation, still within the $20,000 originally authorized by the council for this project.

A new factor was discussed, that of post-meet hosting of foreign participants including a proposal for an AMA-assisted social and sightseeing program—American modeling families would act as hosts for a three-day period. Worth and Patton spoke in favor of the concept, and considerable discussion followed concerning the extent of AMA aid.

Stalick made a motion to approve up to $3500, if necessary, for post-meet hosting support, seconded by Perdue. Further discussion indicated a consensus for partial support, coupled to sharing by hosts and visitors. An amendment by Worth was accepted to include the $3500 within the $20,000 authorization by council. The motion was then approved unanimously.

Contest Board Operational Procedure

Discussion of current and past Contest Board problems, including the possibility of in-person CB meetings at a time other than the Nats, indicated a consensus for changes to reduce controversy concerning CB actions. In particular there was general agreement that a moratorium on rules changes was needed.

After much debate on the nature of such

Turn to page 60.

AMA News Extra .....

1972 AMA RULES

At the time of this report some of the AMA Contest Boards had not completed Final Voting on proposals for changing the competition rules for 1972 effectivity; all Final Voting was in progress, however, and by next month all of the new rules should be available for publication. Work on the Radio Control and General AMA rules was still to be completed (as was the deciding votes on three FF proposals). What follows are the rules revisions which have passed the Final Vote and will apply beginning January 1, 1972.

Control Line

CL Scale: The new minimum control line requirements for small models (weighing three pounds or less and with engine displacement between .10 and .35 cu. in.) call for either single strand or multi-strand wire minimums of .015" each when two lines are used or .012" each when three lines are used.

Stunt: The Contest Board is to establish guidelines for judges to use in awarding static scoring points. Also, it is introducing Novice Stunt as a supplemental rule event having static scoring only for workmanship and also having a simplified maneuver schedule.

Scale

The Scale Contest Board has agreed to accept the Control Line CB's voting regarding lines for small CL Scale models as described above. Also, the Scale CB has set up rules for new competitions: Non-Flying Scale (in which models intended for flying may also be entered), RC Sport Scale (variously known as Stand-Off Scale, Dirty Scale, etc.), and Scale RC Sailplanes.

Radio Control. A new rule requires obtaining a takeoff score for a model to be considered in competition placing. In demonstrating use of flaps it is no longer necessary to do so during takeoff, and now a maximum score for each of the previously multiple aerobatic maneuvers can be obtained by performing just one roll, loop or spin.

Indoor Scale. A new flight scoring system has been adopted. This provides for obtaining one point for each second of flight but limits the maximum flight points to the number of scale points the model is awarded.

General. A new paragraph has been added to the rules with the purpose being to prevent downgrading for an exposed model engine when the subject has a configuration which prevents any practical method of complete concealment. Rule 25.2.8, which previously required the competitor to supply a list of all purchased parts and services, has been eliminated.

Free Flight

Gas. The FF Contest Board has adopted a new flyoff procedure for Category II events. After three three-minute flights have been obtained, the engine run is progressively reduced, while the max flight remains three minutes, and only hand launching is permitted. For the first flyoff (the fourth flight), the maximum engine run is seven seconds; for the second to final flyoff, the engine run maximum is five seconds. (Still not finally decided is whether the same type of system will be applicable to Category I--with a five-minute max--and whether two attempts will be allowed for each flyoff flight.)

Coupe'D'Hiver Rubber. The FFCB has passed a new rule which allows each contestant to enter two Coupe D'Hiver models in conformity with the number of models allowed for other AMA Free Flight contests. Note that this has no effect on International Contests for these models (which allow only one model).

WITT RE-ELECTED SECRETARY-TREASURER

Earl Witt received 3,958 votes, approximately 10% of the AMA membership, in his bid for re-election as AMA secretary-treasurer for the 1972-1973 term. Witt was unopposed on the ballot (because no other nominations had been received by the Nominating Committee), but there were write-in votes for about two dozen others.

The six district vice-president elections each saw the incumbent V.P. as the victor. The voting was recorded as follows, the underscores being for those re-elected. District I--Cliff Piper (407), write-ins (3); Dist. III--Ron Morgan (490), Frank Vidmar (366), write-ins (2); Dist. V--Jim Perdue (382), Jim Edwards (202); Dist. VII--Jack Josaitis (470), write-ins (4); Dist. IX--Stan Chilton (200), write-in (1); Dist. XI--Robert Stalick (149), Robert Hepker (111). Piper, Josaitis and Chilton were unopposed on the ballot.

By special arrangement with the publisher this page is produced at the very last minute, just before the magazine is printed, to bring you the latest news concerning current Academy of Model Aeronautics events of national significance.

Hobby Dealers–Clubs–Leaders: need AMA application blanks? For a free supply write to AMA HQ, 806 Fifteenth St., N.W., Washington, D.C. 20005. Specify how many are wanted.

an action, Frank made a motion that there be a moratorium for rules changes in 1972 except for necessary safety matters, and that the Contest Boards be directed to clarify and edit the rule book for 1973, to remove ambiguities and loopholes, without changing intent of the rules. The motion was seconded by Stalick and unanimously approved.

Chilton then moved that the question of annual Contest Board meetings be deferred until the 1972 winter council meeting; seconded by Frank and unanimously approved.

Scholarship Committee Recommendations

Three awards were suggested for 1971: one for $1,000 and two for $500 each, to be announced at the 1971 Nats. Frank made a motion to accept the recommendation; seconded by Worth and approved unanimously.

New Business

a. Stalick recommended that letters be sent to families of Nats officials to thank them for allowing the officials to participate on behalf of AMA and model aviation. Approved without formal vote.

b. Clemens reactivated the Hall of Fame discussions left over from the last winter council meeting. He asked for council approval of his intent to use a council of Past AMA Presidents as the selection committee to authorize awards. Approved without formal vote.

c. Clemens invited Associate V.P. Bud Tenny to present his comments concerning council actions. Tenny reviewed past history of his Contest Director Handbook project and asked for council action. It was agreed that the council would review copies of the document in its present form, copies to be made and circulated by HQ to the council.

Tenny then brought up the subject of his Contest Director upgrading proposal which he submitted in 1967 without positive action since. Worth noted that this proposal had been referred to the Contest Boards for further action and that such action had been tabled on several occasions pending counter proposals or related suggestions which needed to be explored. The net result was that the original proposal had not been accepted or rejected.

Boss made a motion to have the council again consider the proposal; seconded by Frank and approved by vote of 10; for 2 abstained (Witt, Signorino). HQ was requested to send copies of the proposal to the council.

d. Boss asked for a definition of council policy concerning replacement of council members unable to continue service. He reviewed previous replacements and stated his objections to current by-laws procedure. He also made several suggestions for a specific and detailed procedure to replace the current more general procedure.

Discussion by council members indicated a consensus in favor of flexibility in preference to specifics, so that a decision could be based on the situation at the time rather than by a procedure which might prevent the council from acting as it felt best. No further action was taken on the question.

Meeting Adjourned

Noting that for the second night in succession the council had kept working past midnight, Clemens thanked all present for working under difficult conditions and advised that the next meeting would be after the first of the year, with the possibility of Washington, D. C., being the location rather than Toledo.

AMA News Bits

Recommends Contest Flying

The president of the AMA chartered Valley Forge Signal Seekers (Pa.) in a column of the club's Hear Ye Newsletter chose to relate his feelings regarding some of the differences between sport and contest flying. This followed a contest in which VFSS President Jack Salmon (AMA 40699) and six club members had, for the first time, entered the Class A Pattern event.

"It really is surprising to find how different it is to do the pattern when you know that you are being judged and you only get one chance to do each maneuver," he said. Add to this the flight time limit (there really is plenty of time, he admitted) and the pressure builds to the point where, somehow, those rolls and loops that looked okay at the home field don't look so good in the contest.

"In spite of all this, it is exciting, it is fun, and I would highly recommend it for a change of pace," Salmon continued. He suggests studying the Class A RC pattern in the AMA rule book and trying it the next flying session. Not only does he feel that the flyer will get a kick out of trying it, but he is sure the result will be a better and more disciplined pilot. "Then when you feel you can do all the maneuvers in some fashion, look for a contest and enter."

Lesson from Near Disaster

The AMA chartered Tri-Cities Aeromodelers (Tenn.) brought to our attention by means of the club newsletter the importance of safety precautions in storing chemicals. It seems that club member Bob Jessee (AMA 68192) learned the hard way–he had diluted some nitromethane 50% with methanol into gallon glass jugs (to make safer storage for the nitro), filling them to the top and capping them off, leaving no room for expansion. One jug cracked apparently due to temperature change which caused the expansion, and a gallon of highly flammable liquid poured out onto the floor. Fortunately there was no fire, but it was a good lesson to Bob and other modelers to always leave at least a couple inches of air space to allow for expansion, and preferably to store flammables in metal containers.

All Top Dawgs

To someone who has flown a fast Formula I or Formula II model, racing with .15-powered Top Dowgs may seem like a terribly tame sport. But according to Larry Killian (AMA 11311) the speed, fun and excitement that can be derived from races with these models is surprising. Killian was Contest Director of pylon races for Top Dawgs in a Fun Fly last August sponsored by the AMA chartered Spirits of St. Louis R/C Flying Club. Spirits' rules called for stock models and stock (unmodified) RC 15's with throttle, and for throttle to be sufficiently effective so that the airplane would stand still on the club's grass field when the engine was at idle.

Send Pictures

Readers tell us that they enjoy seeing what other AMA members are doing and flying through the picutes printed in the AMA News section. It's a service we enjoy providing, but it is dependent upon photo submissions by the readers.

Won't you help? All types of photos are needed: RC, CL, FF, Indoor, Scale, Action, posed, construction, gimmicks, etc. All types of prints are acceptable, black-and-white or color–including the instant development type. On the back of each print write the name of the photographer, the names of the persons and models shown, and a brief description of each model's features. No payment possible for photos used, but photographers will be credited. Send pictures to Publications Director, AMA HQ, 806 Fifteenth St., N.W., Washington, D.C. 20005.

CONTEST CALENDAR

Official Sanctioned Contests of the Academy of Model Aeronautics

DEC. 31-JAN. 1-2—JACKSONVILLE, FLA. (AAA) King Orange FF, CL & RC Internationals. (FF Cat. I). Site: Imeson Airport. B. Day CD, 4353 Thistleberry Dr., Eau Galle, Fla. Sponsor: Jacksonville Free Flight Team.

JAN. 22-23—BUCKEYE, ARIZ. (AAA) 22nd Annual Southwestern Regional FF, CL & RC Model Airplane Championships. Site: Buckeye Airport. W. Morris CD, 7422 E. McKinley St., Scottsdale, Ariz. 85257.

JAN. 29-30—PHOENIX, ARIZ. (AA) Southwestern RC Championships. Site: Auxiliary II. G. Sing CD, 5603 W. Morten, Glendale, Ariz. 85301.

FEB 6—LOS ANGELES, CALIF. (A) Racing CL Series. Site: Sepulveda Basin. J. Plaunt CD, 909 S. Second St., Apt. I, Alhambra, Calif. 91801.

FEB. 6—GREEN BAY, WISC. (A) Polar Bear FF Meet (Cat. I). Site: Frozen Green Bay. R. Cowles, Jr. CD, 2424 Ducharme Ln., Green Bay, Wisc. 54301.

MARCH 5—LOS ANGELES, CALIF. (A) Racing CL Series. Site: Sepulveda Basin. J. Plaunt CD, 909 S. 2nd St., Apt. I, Alhambra, Calif. 91801.

APRIL 8-9—NEW ORLEANS, LA. (A) 1st Annual New Orleans Spring Fiesta RC Scale Invitational Meet. Site: Crescent City RC Club Flying Field. A. Wiltz CD, 3231 47th St., Metairie, La. 70001.

APRIL 9—LOS ANGELES, CALIF. (A) Racing CL Series. Site: Sepulveda Basin. J. Plaunt CD, 909 S. 2nd St., Apt. I, Alhambra, Calif. 91801.

MAY 7—LOS ANGELES, CALIF. (A) Racing CL Series. Site: Sepulveda Basin. J. Plaunt CD, 909 S. 2nd St., Apt. I, Alhambra, Calif. 91801.

JUNE 3-4—NASHVILLE, TENN. (AAA) 9th Annual Mid-South RC Championships. Site: Percy Warner Park. B. Reuther CD, 6602 Highway 100, Nashville, Tenn. 37205.

JULY 15-16—MENOMONEE FALLS, WISC. (AA) 2nd Annual Pre-Nats RC Warm-up. Site: Aero Park Airport. F. Morrissey CD, 14100 W. Park Ave., New Berlin, Wisc. 53151.

AMA OFFICER DIRECTORY

The most recent complete directory was published in the October AAM, page 64.

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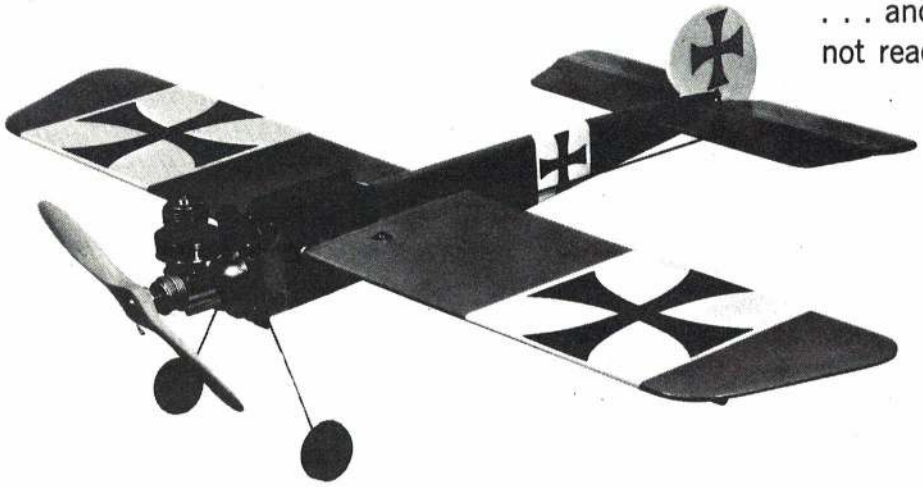

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Getting Started in R/C

(continued from page 18)

immediately applying enough rudder to hold a turn steep enough to keep the plane turning in level flight until its speed drops to normal.

A loop often requires two or three turns of spiral dive to gain enough speed to carry over the top. For this maneuver, center the rudder on the desired heading and, if all is well, the plane will produce a neat loop. Again, it is often possible to do several loops consecutively with the speed gained from a good hot spiral dive.

The two other maneuvers shown are combinations of loop and roll. For the Immelmann, make a half loop, followed at the top by a half roll. For the split-S it's just the opposite—a half roll and then a half loop. In this one you will gain a lot of speed in the downward-going half loop, so you will have to go into a moderate turn to kill the extra speed. You might be able to combine these two maneuvers, doing the split-S first and then the Immelmann.

Actually, quite a few additional maneuvers are possible. A good pilot can produce an acceptable Cuban Eight, and it is quite possible to do good spins with RO planes. They also will often do beautiful tail-slides.

It requires a competent design to do all these maneuvers. Often you'll find a plane will do good rolls, for example, but will not loop. We had one like this that was a demon roller, but every loop tried resulted in an Immelmann turn, with the plane rolling out at the top. This was probably due to a rather high dihedral (what made the plane such a good roller). Some planes will do better rolls and spirals to one side than to the other; some will spin only in one direction.

All the above information has been based upon an RO plane with no other controls—thus no throttle. If throttle is added, some of the effects of elevator are gained. For example, you can trim your plane for excess climb at full throttle which will aid rapid ROG's, loops, etc. You will no doubt still have to spiral dive for some maneuvers, but throttle does add flexibility. With this extra control we get away from the beautiful simplicity of just rudder-only—what really bugs the less-experienced modelers when you show up at the field and go through a complex stunt routine!

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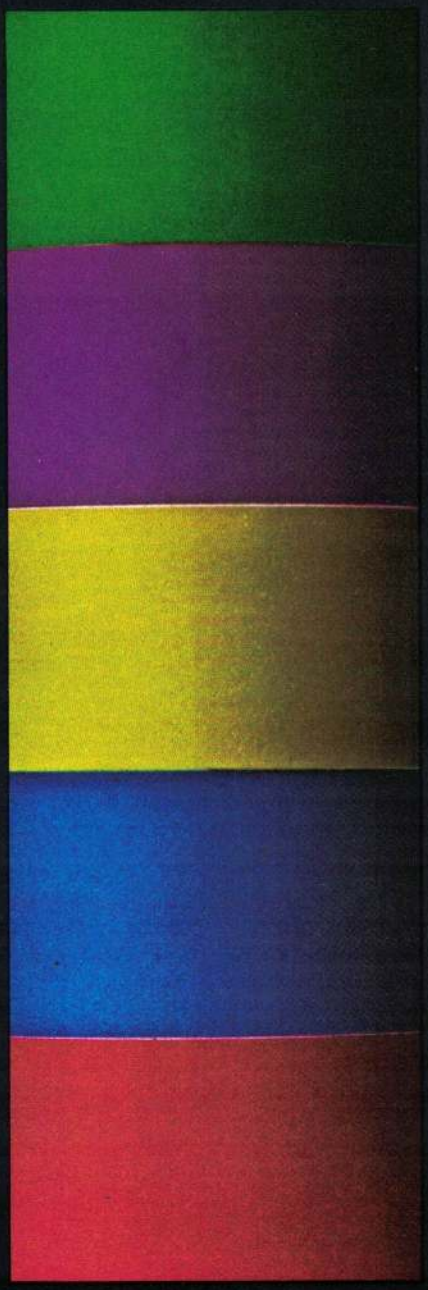

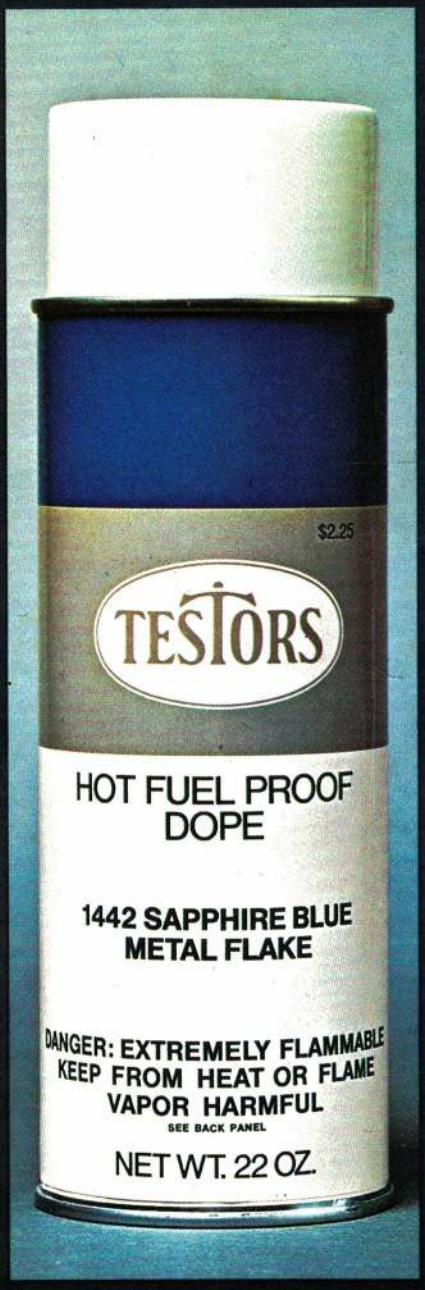

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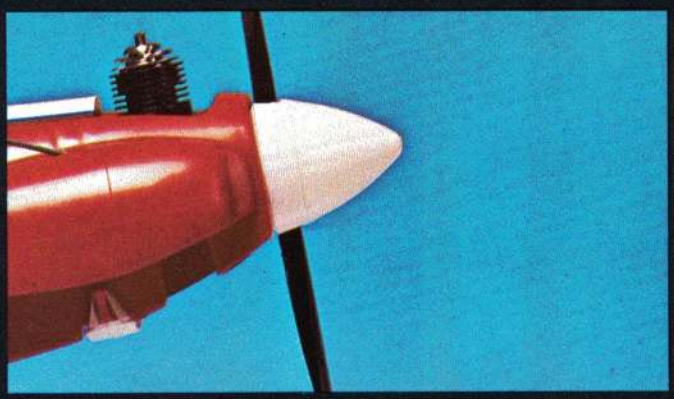

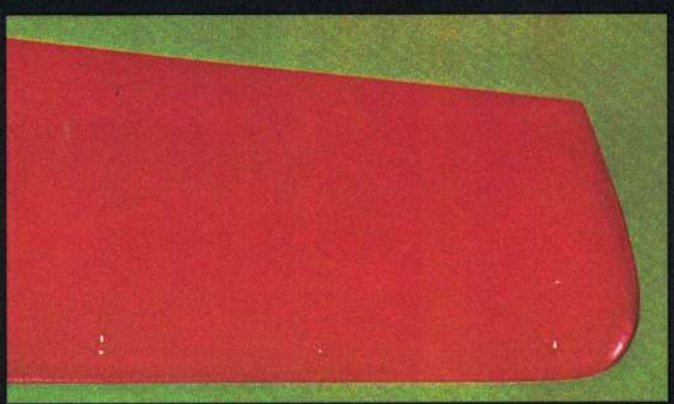

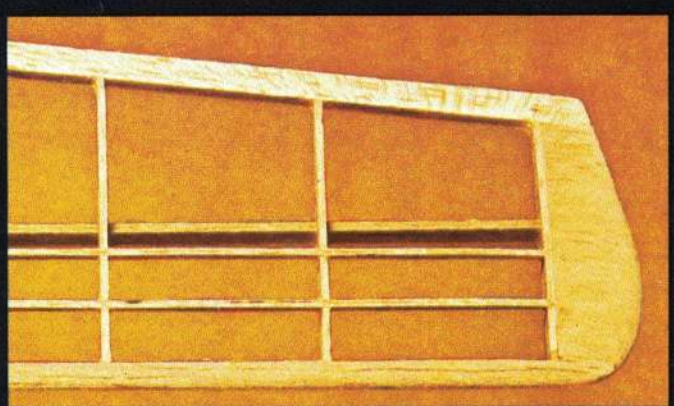

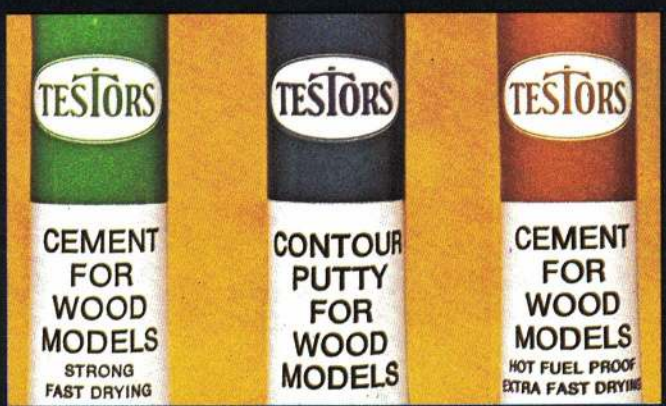

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The service experts listed in this advertisement are, for the most part, people who have been working with Digitrio and other kit systems in the various areas mentioned. They have all put together an M.A.N. System from a raw kit and have agreed to stock parts that are compatible with World Engines Systems. They have been given schematics of World Engines Systems and current OS Digital Proportional Systems. Many of these service experts service other makes of equipment other than our own. Consider these people for repair work or for help in matching up our flight packs.

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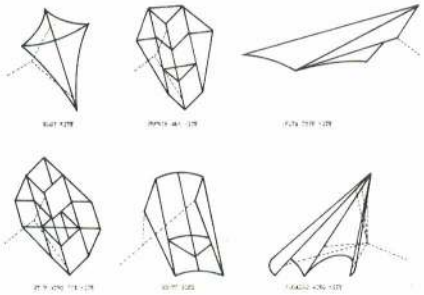
GO FLY A KITE

by CLIF OSBORNE



THE HISTORY of kites goes back three-thousand years. They have been used in warfare, in bridge building, for gathering weather information and just to have fun. At the turn of the century, they reached their peak and were an adult pastime. With the advent of the airplane, they declined in popularity until the 1950s. Since then they have been coming back and have again become a scientific vehicle. Even though March winds and kites are synonymous, they can be flown anytime there is sufficient wind. Actually, March winds are considered too rough and uneven for good kite flying.

In the April 1962 issue of *True* magazine I found an article written by Max Gunther, titled "The Manly Art of Windhooking." It dealt with the adult aspects of kites and flying and was quite an inspiration. Later, in the March 1966 issue of *The Wonderful World of Ohio*, I came across an article about Ben Blinn. Ben owns a sign company in Columbus, is a very avid kite flier and is an expert on high altitude flying. This was the spark that got me going.

The article mentioned the American Kitefliers Assoc., Silver City, New Mexico 88061. I joined and got my first issue of Kite Tales, their quarterly publication. The association was founded in 1964, has a membership of over three hundred and is growing steadily. Membership is limited to persons over twenty-one. Yearly dues are ten dollars.

Kite building became a study for me. There are many kind of kites. Modern materials, plastics and adhesives have produced a new breed of kites. There is the familiar two stick, or Eddy kite; box kites in triangular, square, rectangular form; and stub wing box kites, along with the French War kite. Modern designs such as the delta-shaped Valkyrie, the Aerokite inflatable kite, the Scott Sled semi-flexible kite and the Rogallo wing flexible kite, are just a few of the new designs. Although there are a half dozen companies building good commercial kites, it still remains pretty much of a do it yourself hobby if you prefer large or unusual kites.

My favorite kite is the Scott Sled, invented by Frank Scott of Dayton, Ohio. It measures 36 by 40". I built it out of colored drop cloths. Uprights are 1/8" dowels. It is easy to build and rather inexpensive, and flies best on eight- to fifteen-pound test monofilament line. In the lightest winds and thermals, it's a dream. Robert Ingraham of the AKA has had them up to 7,000 feet. My second favorite kite is the stub wing box. It is basically a square box set on edge with spreaders added and wings attached. It is a little harder to fly and handle but a terrific flier. It will nose like an inquisitive beagle in light gusts and climb high in a steady wind. It doesn't fight hard coming in and is an excellent camera kite.

I try to keep my kites under 48" in height, requiring no heavier than thirty-pound test line. For this line I use nylon monofilament, which I buy in large spools from a local discount store. It has the advantage of strength, small diameter and low drag, allowing the kite to go higher than with a coarser line. Although it is a little harder to handle, it makes up for it in the extra altitude that one can get.

Some form of reel is necessary to store the line. It should be strong, not too heavy and have good line capacity. Nylon monofilament imposes extra problems in reel design. It is slick and will not lay in place like a braided or twisted line, thereby imposing a higher stress on a reel. The first reels that I used were a commercially made clothes-line reel, which I loaded with mono. It cracked a five-eights dowel. I replaced the dowel only to have the new one bend. Next I designed a drum type of reel using three-fourth-inch plywood and dowels with two of the dowels protruding on opposite sides like a crank. A friend built one and it broke under the pressure of mono. He then designed a larger reel of the same basic design, only used more one-inch dowels. Once, after cranking in 6,000 feet of twenty-pound mono, he heard the reel blow up two hours later, cracking one of the dowels and breaking another one in half.

If you decide to use nylon monofilament, be sure to design and build a strong reel using either a solid core or metal cross pieces. The mess that results from several thousand feet of line on a reel that blows is sickening.

When you become tired of routine flying, try a few new items. A high-altitude flight with 10,000 feet of line is considered a good start. This takes good equipment and some know-how. Next, you might try photography. You can also rig some type of dropper or time release and drop parachutes, plastic bottles, paper strips, flour or corn starch streamers or small gliders. When you tire of this, try aerobatics or kite fighting.

Thermals, those magic bubbles that aid free flighters and glider boys, also add to kite flying. A light kite, such as a Scott Sled, does very well in thermal flights. My first experience was late spring last year. I took out a Sled. The winds were light and variable. I got the Sled up and paid out 2,000 feet of line in an easterly direction. Suddenly the kite veered to a position 100 feet south of the line and faced in a northwesterly direction. It then laid flat and rotated through a 270-degree arc. In a few minutes the thermal had passed, the kite clothes-lined out and finally settled to the ground. A weird but interesting flight.

To the average flier the tug of kite as it dances in the sky is joy enough. Will Yolen, dean of kite fliers, calls this contemplative flying. The sun, sky, clouds and a kite dancing up there is a tranquilizer that calms the soul.

One of my memories of this kind of flying happened last year. It was a warm late summer evening. A fellow worker had completed a new 42" stub wing box kite and had gotten 6,000 feet of twenty-pound test mono. We drove out to watch him. He had the blue and silver kite out on 2,000 feet of line. I gave him a hand and he gradually worked out the remaining 4,000 feet of line. At intervals he would stop and let the kite climb upwards to gain more altitude. Finally, with all the line out, the kite stopped clothes-lining and started climbing up to its maximum height, nosing each slight change in the breeze like a dog hunting a rabbit. In the

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distance the sun glinted off a passing airliner. As I stood there watching that kite, I felt that feeling of self detachment and the problems of the week just faded away. It was a satisfying feeling.

Kites may not hold a fascination for every one, but I have found them a lot of fun. Kite flying makes me look for a place to hook the wind, to study the weather, to relax and, for a time, to forget the problems of the world. It has come into its own with elderly and retired people who live on a limited income and had no hobby. It is a hobby that gives one fresh air, exercise and sunshine for a very economical outlay of money. Try it for a welcome and interesting change.

Canard Drop-Off

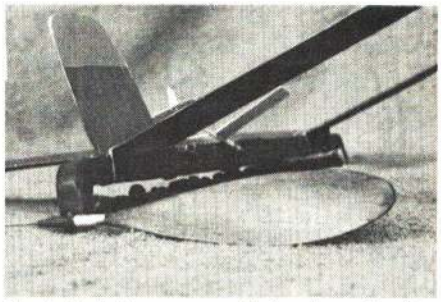
(continued from page 26)

The cemented edge of the laminated prop plus a rim of carpet thread protects the prop in "landing." (Thread may be used around wing tips and leading edges for virtually repair-free flying.) Hard quarter-grain balsa is still bendable and flexible enough, yet keeps its twist well–but soak first for thirty minutes. The press-in-place rod is useful for playing with pitch angle or changing a blade. (I have never changed the original, however.) The counter-weight of a one-bladed prop always hits the ground first–sometimes "stands up." Still, color the blade for easy retrieval. Remember to bend a left prop for normal winding. If the rod is oversanded, a turn of scotch tape restores the press fit. The lazy way to do it is to use a smaller diameter rod and use scotch tape anyway.

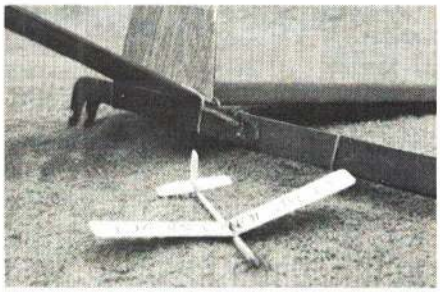
The rubber must drop from the nose end first. This explains the detent on the prop block. The entire power train now falls in a roughly horizontal fashion, since the resistance of a one-bladed prop and the rubber is about the same.

In effect, this is a small Unlimited Rubber job. The prop's high pitch and camber let it unwind forever. Torque is to the right. My model wants to go up to 300 winds with the torque, but above that it spirals tightly left,

(Continued on page 72)



Single-bladed prop won't break on landing and is easier to release when launching model.



Parasite glider is named "Tension Remover," burning fuse releases it. Note folded DT paddle.

KID STUFF?

Let's face it. First, you have to find out how much fun it is to actually fly before you can get enthused over building complicated models.

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JUNIOR ACES

Built-up stunt wing; simple profile fuselage. .049 engine; nylon bellcrank, horn.

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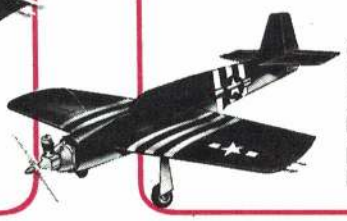

Cosmic Wind
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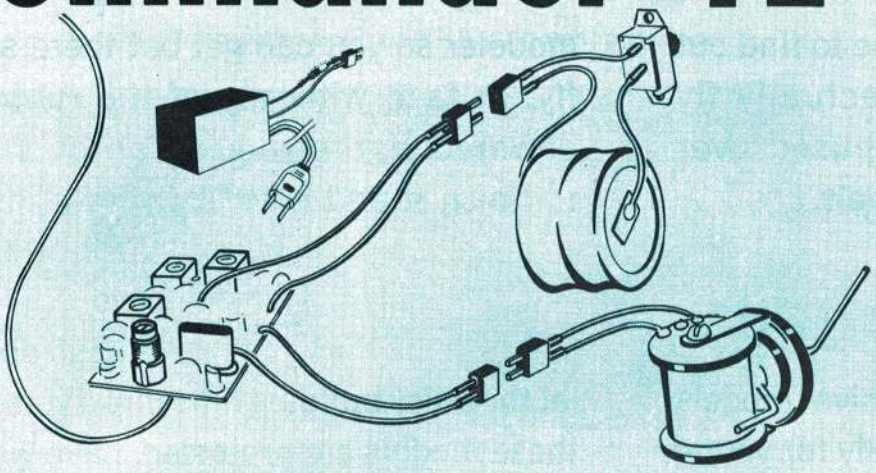

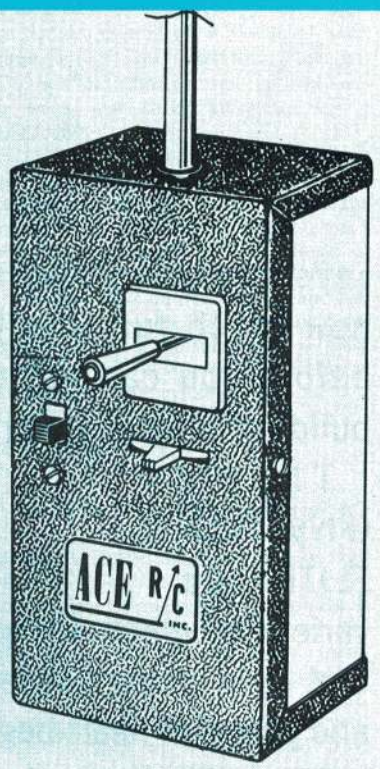

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Rudder follows directly the movement of your stick.

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The same receiver and transmitter can be used with airplanes from 18" - 72" wing span.

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–IDEAL FOR THE BEGINNER

–GREAT FOR A FUN OUTFIT FOR THE EXPERIENCED FLYER

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Weighs less than a gram; small enough to fit on the actuator. Works only with DE receiver.

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The Commander '72 uses 2 pin connectors. These are gold plated Deans units. Many R/C uses besides expandability of Commander Paks. With plastic tubing for insulation.

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No. 30L21—Ace CW Switch Guard .39

SINGLE AXIS BEZEL

The Commander '72 Transmitter uses a single axis bezel on the stick assembly. If you'd like to convert your older model transmitter with one, we are offering them separately. Simple to do.

No. 15K20—Single Axis Bezel $1.00

ONE INCH REINFORCING TAPE

The one-half inch brand of 3M Reinforcing Glass Tape is available at almost any corner drug store or hardware store. The one inch variety, which is finding increasing usage in strapping, dihedral bracing, and other applications in R/C, is virtually nonexistent on the consumer market.

Ace R/C is doing something about it, and has it available in 10 yd. rolls 1" wide.

This will allow you to buy only what you need instead of having to buy a case!

This is 3M Scotch brand Glass Reinforcing Tape--the highest quality available.

No. 35L10—1" Reinforcing Tape, 10 yds. $1.89

6 AMPERE WET NICAD BATTERY

We have an unused surplus 6 amp nickel cadmium battery which measures only 4¼" x 2 1/8" and is only 7/8" thick. These are in a nylon case and have a new pressure cap; have been completely checked out and refilled, but should be charged before they are used. This is a husky 6 ampere hour, and at our price is a great bargain for the quality and the amperage involved.

Excellent for starting, boats and other heavy duty applications.

No. 38K7—6 Amp Nicad Wet Cell $3.95

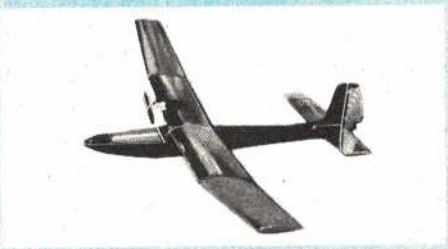
SERVING R/C SINCE 1953

DICK'S DREAM KIT

Highly Recommended for Beginners

† 34" Foam Wing -- Moulded sections
† Top grade die-cut wood parts
† For .020 engines
† Commander Baby or Baby Twin
* Owen Kampen design

No. 13L100—Dick's Dream Kit $5.95



ACE HIGH GLIDER KIT

† 70" Foam Wing -- Moulded sections
† Precision Machine cut and sanded wood
† For .049--Power Pod parts supplied
† Recommended for Rudder-Only Standard or Stomper Commander
* Owen Kampen design

No. 13L104—Ace High Glider Kit $14.95

ACE MINI FOAM WINGS

Ideal For New 1/2A Racers!

Special 17% semi-symmetrical airfoil expanded foam developed by Owen Kampen for the small planes.

The constant chord measures 35" span, width is 5½". Area is 192.5. Weight about 3 oz.

The taper section is 35" span, center is 5½" which tapers to 4". Area is 166.24. Weight is just over 2 oz. Come in two 17½" pieces which may be easily epoxied for desired dihedral.

No. 13L166—Ace Foam TAPER Wing $2.95
No. 13L192—Ace Foam CONSTANT Wing 2.95

COMING—The 2T Kit

The 2T by Ron Jacobsen is an .049 trainer with a 50" wing span using Ace Mini Foam Wings. This is designed for use either with rudder only or digital 2 channel.

SOPWITH TRIPLANE WING SET

The Sopwith Triplane by Fred Reese, featured in the January issue of R/C Modeler, uses three of our constant chord foam wings. In order to make it more economical, and also more feasible for us to ship, we have packaged three of them in one box. We're passing the saving on to you.

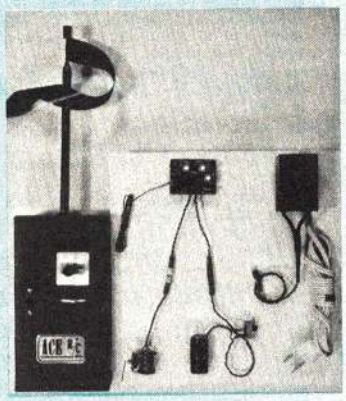
Full size plans are available from R/C Modeler (check the January issue). With the 3 foam wing sets available as one item, this should help you get going on this project.

No. 13L205—Triplane Wing Set $6.95

LOOK FOR THIS EMBLEM

ACE R/C INC.
HIGGINSVILLE, MO. 64037

YOUR SIGN OF QUALITY



Dear Friend:

We're quite proud of the Commander '72, fully detailed on the opposite page. We have the lightest weight, the most versatile, and also, for the first time, a completely expandable system to meet all pulse rudder only requirements.

The Commander '72 package is engineered as carefully as the high priced spreads, and has more to offer than any comparable system. It will go into many airplanes that will not take other single channel systems.

The most notable success story of 1971 is the Dick's Dream and the Commander Baby. We literally have thousands of satisfied customers with this combination. They range in age from 10 to 70 years of age.

The 2T by Ron Jacobsen will be our next kit. It will be available in March. Watch our next ad for more details. It will be published in the March American Aircraft Modeler.

It is a 50" span foam wing job. Easy to build. Rugged construction to take the knocks. For .049, it was first made for 2 channel bricks, or two servos. Then it was also found to be an excellent Pulse Rudder Only plane--AND motor control can be easily added with the KRD Throttle Control and Commander Transmitter conversion (See ad next month).

FLASH! We've just been informed that Dick Jansson has achieved his LSF Level II Float Flight qualification with a duration of 63 minutes and 18 seconds flying off of Cape Cod--and just to add to that information, the plane that he was using was the modified Ace High, which we detailed in the last ad in AAM.

Other planes completing the qualification requirements at the same time were a Windward, Phoebus, and Alpha II.

Remember we have full details of Dick Jansson's modification to his Ace High glider for winch start and two channel digital operation available in an R/C Data Sheet. This is available to you free for a stamped addressed No. 10 envelope.

1972 looks exciting from where we sit. You have undoubtedly noticed the many articles appearing in the model magazines on Rudder Only recently. The word is that more will be published soon.

Get in on the fun, and

Keep 'em pulsing,

Paul F. Runge

SUDDEN SERVICE PLANS

No. 0193, Cutie Coupe — Coupe d' Hiver F/F by Dave Linstrum. Quick to build with all-sheet surfaces. Your first rubber contest model. **$1.75**

No. 0291, R/C Nobler — Ed Sweeney's conversion of famous C/L stunt ship. A highly maneuverable R/C. Only .40 for all AMA/FAI stunts. **$2.50**

No. 0491, Emeraude — Duke Crow reduced famous home-built to R/C size (65"). .40 to .60, does stunt pattern. Gentle. Two sheets. **$3.75**

No. 0591, Small Fry Special — Mottin's C/L trainer for Tenderfoot. Easy to build. An .049. **$.75**

No. 0592, Messerschmitt Bf. 109E — R/C, semi-scale by Munninghoff. Mean look of efficient fighter. Two sheets. **$3.75**

No. 0593, Manta — Howard Kuhn's Boost Glider for model rockets easy to build from sheet. A winner. **$.75**

No. 0691, Jr. Sky Squire — R/C sport-trainer by Jess Krieser, .09 to .19. From Galloping Ghost to multi-digital proportional. Span 48" (416 sq. in.), 3 lbs. **$2.50**

No. 0692, ½A Sky Squire — Small version famous Sky Squire. 1 ch. rudder-only, or rudder, elevator and motor on Galloping Ghost. Only 22-28 oz. **$2**

No. 0693, Mustang — Rabe's great near-scale C/L stunt. Flies pattern with ease. ST 40. Over 57". **$2**

No. 0792, Rivets — Speedy, responsive R/C. Owen Kampen design for .020. Adams Baby Actuator, rudder-only. **$1.75**

No. 1183, Corrigan — James Wilson's unique ½A C/L stunt model. Flies tail first! Stable like big stunt ships. Easy to build, 23". **$1.75**

No. A693, Sweeper — Windy Urtnowsky's giant, C/L stunter, 78" span. .60 up front. Many trim adjustment features. **$2.75**

No. A695, Lady Maxley — Brian Donn's A/2 Nordic towline. Davis 3 foil. Ritz construction. **$1.50**

No. A697, Dwarf Dip III — Easy to fly, rubber Coupe de Hiver by Charles Sotich, a winner! For small fields. Warp-resistant. **$1.50**

No. A691, E A A Biplane — Nick Ziroli's scale R/C uses .40 engine, full house gear. 38" wings, semi-symmetrical foil, box-and-stringer fuselage. Two sheets. **$2.50**

No. A692, Miracle Worker — John Blum's C/L trainer. Combat, carrier, stunt. Easy-to-build profile. .35 engine. **$1.50**

No. 1291, Demon Delta — Fast, mild-stunting C/L for 35-45. Looks like modern fighter. Attract attention for demonstrations. By Jerry Farr. **$2.50**

No. 1292, Dolphin II — Czechoslovakian R/C for pusher, 09-15 mounted at rear under T-tail. Rudder/motor, good slope soarer. **$1.75**

No. 1293, A/Wonder — Simple all-balsa A-1 towliner by Bob Stalick. Ideal for beginners at towline events. **$1.50**

No. 0201, Cardboard Cutie — Inexpensive all cardboard C/L for Tenderfoot. 049. Two sheets. **$1.25**

No. 0202, Push-Air — For Brown's tiny CO2 engine. Simple F/F by Ehling, like Curtiss-Wright Jr. **$.75**

No. 0203, Ole Tiger — Bob Morse's swift Formula I R/C of Bob Downey's famous racer. K&B 40. **$3.50**

No. 0204, Classical Gas — Haught's C/L stunt for 35, for flyers graduating from profiles. **$2**

No. 0205, Kestrel — Dave Boddington's delightful R/C rudder-only soarer with 02. **$1.50**

No. 0302, Bearcat — Al Rabe's stunt C/L was talk of the 1966 Nats. Aldrich customized ST 46. **$2.00**

No. 0301, 1916 B&W — Biplane on floats was Boeing's first airplane. Beautiful R/C job by Francis Reynolds, uses a 60. Two sheets. **$4.50**

No. 0304, M. K. Sportster — Ho Fang-Chiun's cute cabin free-flight takes 049 power. **$1.25**

No. 0401, D-H 88 Comet — Scale twin by Skip Williams from Jan. '69 centerspread for .20's. Fast, stable, can fly pylon rules. **$3.75**

No. 0402, Lively Lady — World Championships winning Nordic by Elton Drew. Well detailed plan. All weather flyer. **$3.75**

No. 0404, Sweapea — C/L Goodyear by Williamson for club project also is tough trainer. For 35 engine. Balsa cutting guide incl. **$2.50**

No. 0502, Mod Pod — All - purpose model, F/F, R/C, or tether — glider or power. Fiberglass pod, arrow-shaft boom. **$1.75**

No. 0503, Royal Marine — By Yuji Oki of Japan, magnificent seaplane with 6' wing. Two 40's or one 60. Graceful lines, smooth flyer, handles easily on water. Two huge plan sheets, every part shown in detail. **$8.00**

No. 0601, Flower Power — Sport/stunt full-house RC with a 40 engine. All-balsa, simplified structure. Plugs generation gap. **$2.50**

No. 0602, Skyraider — Profile or built-up fuselage shape Navy Carrier job for 35-60 engine. A winner or a trainer all-in-one. **$2.00**

No. 0603, Waco — Delightful bi-plane, stick and tissue, rudder-only RC on 09 to 020 for FF. Very well detailed plan. **$2.50**

No. 0701, Suds — Nimble RC for sport or competition. One-piece construction, 40 to 60 engines. Build fast from standard balsa sizes. By Joe Dolan. **$4.25**

No. 0702, Contender — Military-like RC, also Sport/Stunt type for 35-60. Tri-gear, removable no-dihedral wing. Fast building. By Dave Platt. **$4.25**
Special Offer: Get both Suds and Contender plans for only $7.00

No. 0703, Ironsides — Record-holding CL jet speed model. Metal or wood model shown. Uses Dyna-Jet. By Jerry Thomas. Two plan sheets. **$1.25**

No. 0704, Cessna AW — Delightful stick and tissue FF of great private plane of years ago. Indoor or outdoor version possible. Peanut Scale too. **$1.50**

No. 0801, Winnie Mae — Spectacular RC Vega for strong 60 engine in 2"-1' scale, foam and balsa, lots of details. By Monty Groves. Two big sheets. **$4.50**

Also, special 1½"-1' version for FAI scale, 40 thru 60's. Two sheets. Order as No. 0802. **$4.25**

No. 0803, Thermal Dart — Enlarged and improved rubber-powered beginner's delight by Frank Ehling. **$1.00**

No. 0804, BV-141 B — Asymmetrical WW II fighter bomber in profile for 049 engine by Terry Aldrich. Easy to make, good flyer. **$2.00**

No. 0901, Sorcerer — Pee Wee 02-powered, free-flight flying saucer uses sheet wing, easy to make by Tenderfoot builder. **$1.00**

No. 0902, Cloud 9 — Intricate contest winning Wakefield by Roger Gregory. Plan shows streamlined prop/hub design. **$3.50**

No. 0904, Antoinette — Signorino/Zundel RC. 98" wing, nearly scale, flies well on .36, like powered glider. Plans 3 huge detailed sheets. **$9.00**

No. 0905, Mini Cat — Bud Atkinson scaled down the Cat series, for pulse or light digital and up to 19 engines. Easy to make RC sport flyer. **$2.75**

No. 1001, Phantom — Well-engineered RC Dyna-Jet-powered scale fighter by Ralph Saldivar is practical but noisy model. Highly detailed plane. Jet installation shown. **$4.00**

No. 1002, Hobbit — Simplified Nordic Al by Bob Stalick is steady on tow, all-weather flyer. **$1.50**

No. 1003, Charger — ½A powered sweptwing stunter does full pattern on long lines safely. **$2.00**

No. 1101, Autogiro—Simple 049-powered model builds fast and gives unique performance. Pusher prop or motor. **$1.25**

No. 1102, Aerobile—Large scale CL or RC of a famous Waterman roadable plane. Uses 45-60 motor. Wing detachable, car drivable! Large single-sheet plans. **$4.00**

No. 1103, Akromaster—RC scale/stunt model or real aerobatic plane for 45-60 engine. Fast and responsive, easy to make, simple shapes. **$2.75**

No. 1104, Tardon—Formula II semi-scale pylon racer or stunt plane for 40 engines. Won event at 1969 NATS. Groovy flier. **$3.00**

No. 1201, Stiletto—Unique ½A proto model uses much-extended motor shaft for clean prop thrust and speed. **$1.00**

No. 1202, King Kong—Huge flat-land soarer for competition use has 12' wing of glass, foam, and balsa. By Sarpolus. **$3.25.**

No. 1203, 10-HI—Six-foot span, 049-powered flying wing is high-performance model with sporting flair. Huge plan. **$3.50.**

No. 0111, Dragonfli — Fast graceful competition stunter by Phil Kraft. Uses big 60's and retracts. **$4.00**

No. 0112, Toothpick — Long thin winged combat CL ship is both fast and quick turning. For hot 35's. **$2.25**

No. 0113, Luton Minor — Delightful 10-powered semi-scale RC for three light servos is high-winged parasol monoplane. **$2.25**

No. 0211, Cobra—Steve Wooley's great, smooth-flying CL stunt ship for 35's. Light model, ideal for both FAI and AMA patterns. **$3.50**

No. 0212, Voodoo—Converted Goldberg kit for streamer-towing RC combat, by Ed Sweeney. Two servos with 19 engine. For new event. **$2.75**

No. 0213, Guillotine—Modified from CL for RC combat. Maneuverable, fast, responsive, and fun. Glides well. For two servos and 19 engine. For new event. **$2.75.**

No. 0312, EKKO—A compact FAI pattern and sport model for 35 engines. All wood low-winger. **$3**

No. 0311, Skydancer — Two-channel-equipped RC boost glider using aileron and elevator control. Lofted by new, powerful rocket motor. **$2**

No. 0411, P-51 Mustang—Semi-scale 60-powered with ARF Lanier or Dee Bee wing on balsa fuselage. Realistic and quick construction. **$3.25**

No. 0412, Grouper—Unique in appearance, oval balsa fuselage hides a big 60 engine. Easy-to-make stunter for commercial ARF wings. **$3.25**

No. 0413, Dauntless—Low-wing scale profile FF model for sport flying on inexpensive 020 engine. **$1.50**

No. 0414, Nesmith Cougar—Accurate scale CL model of boxy homebuilt. Fine beginner's scale model using 19. A winner with detail. **$3.50**

No. 0511, Fire Wagon—Contest free flight model for ½A, by James Clem. Diagonal-ribbed wing resists warps. **$1.75**

No. 0512, Platypus—Unusual-looking RC aerobatic seaplane, made with balsa-covered foam blocks. Uses a 60. **$3.00**

No. 0513, Troop Glider and Tug—Two models, one a twin-engine, 19-powered C-46 Profile, the other a scale CG-15 troop-carrying WW II glider. Both on one large plan. **$2.75**

No. 0611, Phantom Stunter—Very realistic jet-like model of Blue Angels plane with typical stunt moments and airfoil. For 35-45 engines. **$2.75**

No. 0612, Crusader Stunter—Anhedral wing, ventral fins and full array of missiles and drop tanks. It is a unique but truly competitive flyer on a 35 or 40 engine. **$3.00**

No. 0613. Simple-Fly—Semi-symmetrical CG airfoil low-wing on box fuse. Performance for beginner on 29 or novice contest ship with a 50. **$2.50**

No. 0614, Sopwith Pup—Single or multi-channel, nearly-scale model for 10 to 19 power. Highly detailed plans. Stable flyer. **$3.50**

No. 0615, Santana—Jon Davis' contest-winning towliner A/1. Uses fiberglass boom, stiff warp-resistant wing. **$2.00**

No. 0711, Phoenix 5—Don Lowe's latest in a series of swept-wing competition stunters for 60 and retracts. **$3.00**

No. 0712, Bonanza/Debonair—Build either V-tail or conventional version of this popular fast light plane for full-house radio and a strong 60. Fine-flying ships, foam wing construction. **$5.00**

No. 0713, I.F.O.—Would you believe a FF 020-powered flying saucer which really flies? Built-up construction looks real. **$1.00**

No. 0714, Helldiver—Semi-scale CL model of WW II torpedo bomber builds fast and is rugged. **$1.50**

No. 0811, Douglas Mailplane—Large FF scale of Western Air Lines M-2 bipe. For 09 power. Could fly with light radio. **$3.00**

No. 0812, Hot Canary—Unique Formula II/FAI racing biplane by Bob Sigelkoff. Although unusual-looking, it is fast and quickly built. **$3.25**

AAM PLAN SERVICE
733 Fifteenth St., N.W.
Washington, D.C. 20005

Please send the following plans by First Class mail, at no extra charge. I enclose $_____ for payment.

Name _____

Address _____

City _____ *State* _____ *Zip* _____

PLAN NO.	COST
# _____	$ _____
# _____	$ _____
# _____	$ _____
# _____	$ _____
# _____	$ _____
# _____	$ _____

Total: $

No. 0813, Pogo—Model of Owl Racer for Formula I features midwing, low stab, non-cheeked cowl. Very stable and plenty fast. By Bob Morse. $3.50.

No. 0814, Flying Fortress—Not a scale plane, but a novelty CL flying medieval castle for a 19. $2.75

No. 0911, Fletcher—McCullough's magnificent tri-geared, low-wing crop duster scale job for 60's. Generous area and moments. All balsa. Highly-detailed plans on 2 sheets. $7.50

No. 0912, Killer—Fast, responsive combat plane. All-balsa for 35's has many wins. $3.00

No. 0913, ACE High—Featherweight 049-powered RO glider uses a set of ACE R/C foam taper and constant chord wing sets. $2.25

No. 0914, Sakitumi—Highly-developed 40-gram Wakefield plane by Brian Donn features latest trends in gadgets and design. Well-detailed plan. $3.00

No. 1011, FAIMan—Competition FAI free flight job for screaming 15's. Simplified construction with warp-preventing wing. Build a winner. $2.75

No. 1012, Peregrine—All-out RC slope soaring racer for ailerons and elevator. V-tail, laminar wing; aerobatic, too. Balsa fuselage with foam wing. $3.50

No. 1013, Hi-Pro—Highly proficient slope/thermal soarer. Build several versions from these plans. Balsa wing and glass fuselage. $3.50

No. 1015, Marut—Named for the Wind Spirit. Designed for windy weather CL contests. Large-size jet appearance uses 45 engine. Two sheets. $4.50

No. 1111, Longster—Large-size free flight scale ship for 09 power, also ideal as small RC. Construction similar to real plane. $2.75

No. 1112, Buster—Built-up profile Goodyear racer well-streamlined and a winner. For hot 15's. $1.75

No. 1113, Bippi-Bipe—Delightful scale-like rudder-only or GG model for single channel and 09 engine. A fun plane. $2.75

No. 1211, Fireball—Jim Walker's great design presented as it was by Bruce Lund. For ignition 23's or smaller on glow. $2.00

No. 1212, Brooklyn Dodger—Sal Taibi's great old-timer FF job presented as it was by Bob Harrah. For ignition 23-35 or smaller glow engine. $1.75.

No. 1213, Canus—Sixty-powered and large-size FAI aerobatic RC plane. Very quick building. $4.00

No. 0125, Firecracker—FAI scale RC pylon racer with special fast airfoil and homemade retracts (in text), a winner by Bob Root. $3.50

No. 0121, Penguin—Unusual scale CL flying model of post-WWI pre-flight trainer. Simple and RC-able. Uses 19 to 35 engine. 3-views on plan. $2.50

No. 0122, Pay-Up—TeeDee 020-powered AMA Pay Load event winner also nice for sport FF. Simple and sturdy. $1.50

No. 0123, Nifty Novice—049 thru 15 power for monoplane or biplane Tenderfoot CL trainer. With power, bipe is stuntable. SPECIAL PRICE $1.00, decal included.

No. 0124, P-38—Semi-scale WWII fighter with single 049 flies rudder-only pulse RC with ACE mini-foam wings, others useable. $1.25

THIS MONTH'S PLANS

No. 0221, Big Flapper—Large high wing is docile flyer for a 60 engine and 4 channels. Nice trainer/sport plane. $3.50

No. 0222, BV-170—Three 35's power this sort-of-scale German profile fighter. It is big, pulls hard in flight, stunts too. $4.75

No. 0223, Canard Drop-Off—Rubber pusher sport flyer drops its prop and rubber when unwound, then drops a piggy-back glider. All balsa and flies great. $2.00

No. 0224, Cardinal—Excellent FAI European-type RC pattern plane of foam/balsa construction. Up-to-date ship it for 60's, suitable for retracts. $4.50

Canard Drop-Off

(continued from page 66)

then shifts its turning circle (odd, but it works).

Flying

A tractor can be launched with almost no push. Not so easy here. The hand that lets go last is the hand that restrains the wound up prop, controls direction, and presses hard from behind the CG. A tractor prop is already spinning, "hanging" the plane a moment before the body is let go. Directional stability before the stall point is passed is not in much danger. Not the canard. Meant to go at one o'clock to the wind, it might find itself at right angles—unless pushed hard, with confidence. Tilt it also, with the right wing low.

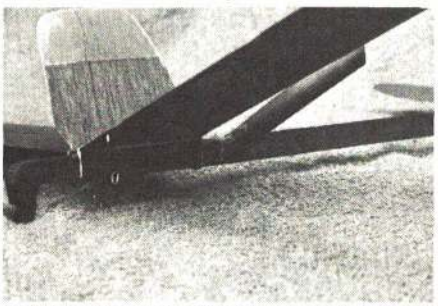
Fortunately disaster is not that terrible! The prop and main wing are safely in the rear. Only the wire hook up front bends easily. Thus, use the tiny front "rudder." To take the power, the climb spiral should be tight. If there is a power loop, the short moment canard will likely flip-flop to recovery.

You should find it extremely stable in the wind and not overly sensitive to fore and aft adjustments (to wing position or down thrust changes). However, wing tilt and side thrust should be precise, so shim the wing and sand the open socket as needed. Dihedral on two wings holds it up well, until you get it right.

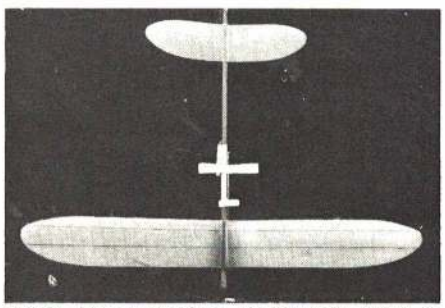
The piggy-back glider is held in place and released by an additional band around the fuse.

Eyeball the entire design, and adjust to stall for fun and recovery. Have small child chase if necessary. Make a fleet and launch simultaneously!

Rarely does a bird with tail in front appear in nature. The uninitiated may smile at first sight of the backward flight even as it climbs 500 feet or so. Yet the canard form as used here is not a whim but an evolvement.



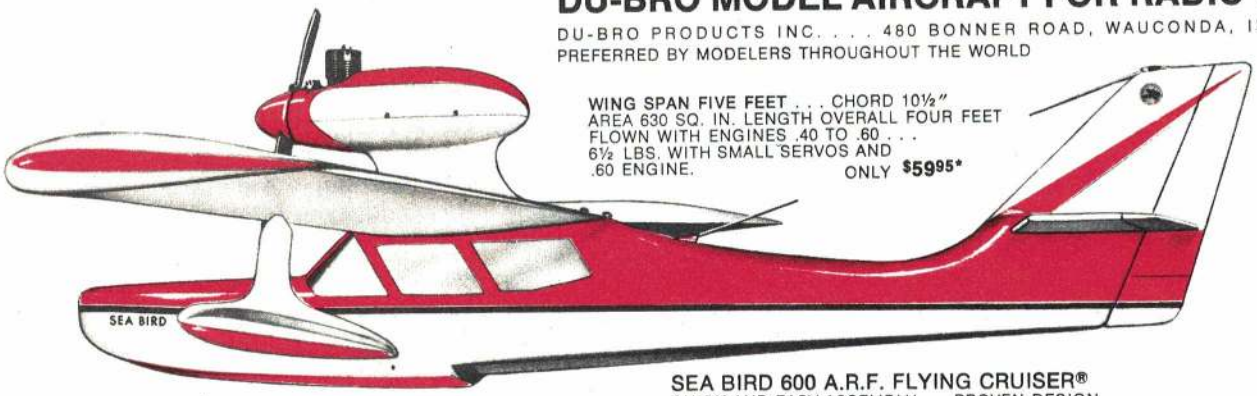
Dethermalizing paddle swings out against the wing causing the model to spiral tightly and flat spin down.



Bright area on fuselage beside little glider is alumimum foil for protection from the burning fuse.

DU-BRO MODEL AIRCRAFT FOR RADIO CONTROL

DU-BRO PRODUCTS INC. . . . 480 BONNER ROAD, WAUCONDA, ILL. 60084 U.S.A.
PREFERRED BY MODELERS THROUGHOUT THE WORLD



WING SPAN FIVE FEET . . . CHORD 10½″
AREA 630 SQ. IN. LENGTH OVERALL FOUR FEET
FLOWN WITH ENGINES .40 TO .60 . . .
6½ LBS. WITH SMALL SERVOS AND
.60 ENGINE. ONLY **$59.95***

FITTINGS GROUP INCLUDES ALL CONTROL LINKAGE . . . MARINE BRASS PUSH RODS, AILERON CONTROL HORN WIRES AND THROTTLE LINK RODS.

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QUICK AND EASY ASSEMBLY . . . PROVEN DESIGN AND PERFORMANCE SUPERIORITY OVER LAND OR WATER.

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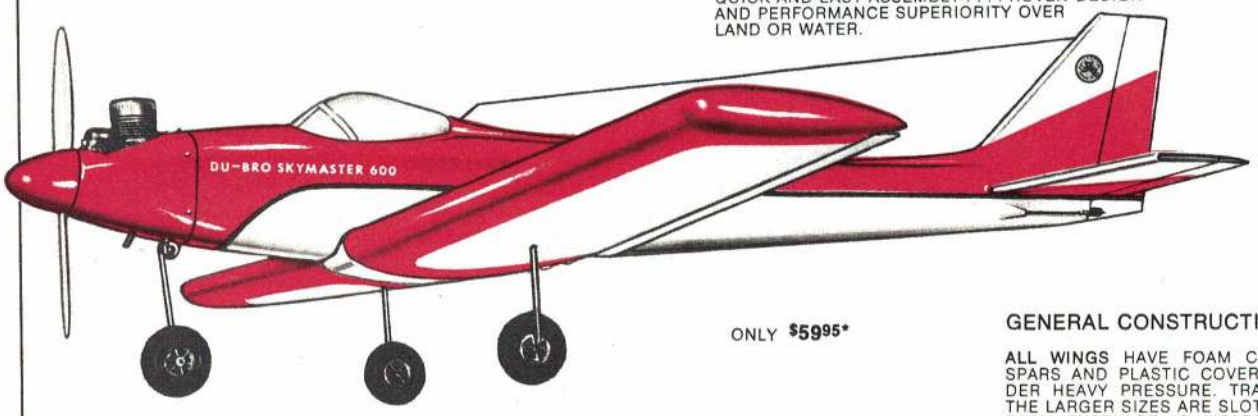

ONLY **$59.95***

GENERAL CONSTRUCTION DATA

ALL WINGS HAVE FOAM CORES WITH FULL SPARS AND PLASTIC COVERING APPLIED UNDER HEAVY PRESSURE. TRAILING EDGES OF THE LARGER SIZES ARE SLOTTED FOR HINGES. **EACH FUSELAGE** IS MOLDED FROM VIRGIN CYCOLAC UNDER INTENSE HEAT AND PRESSURE THEN HAND FITTED WITH HIGH GRADE PLYWOOD INTERIOR STRESS FORMERS. TOP QUALITY THROUGHOUT. **PRE-FORMED TAIL SURFACES** FIT TOGETHER EASILY AND THE LARGER SIZES ARE PRE-SLOTTED FOR HINGES AS AN ADDED CONVENIENCE. SEA BIRD AND SPORTSMAN KITS INCLUDE ELABORATE HARDWARE SETS AND PAINT MASKS FOR WINDOWS. QUICK AND EASY ASSEMBLY.

DU-BRO SKY MASTER 600®

- 60 ENGINE, MODERN DESIGN AND EXCEPTIONAL AEROBATIC CAPABILITIES COMBINED WITH EASE OF ASSEMBLY AND SUPERIOR CONSTRUCTION FEATURES GIVES THIS AIRCRAFT ALL THOSE QUALITIES DEMANDED BY TODAY'S BUSY, MASTER RC FLYERS. THE DAY YOU OWN AND PILOT THIS OUTSTANDING DU-BRO SKYMASTER 600 WILL INDEED BE A PROUD DAY FOR YOU.

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CHORD AT ROOT	11¾″
CHORD AT TIP	8¼″
AREA, TAPERED	610□″
CURVE	SYMMETRICAL
FOIL, PERCENTAGE AT ROOT	18
FOIL, PERCENTAGE AT TIP	18½

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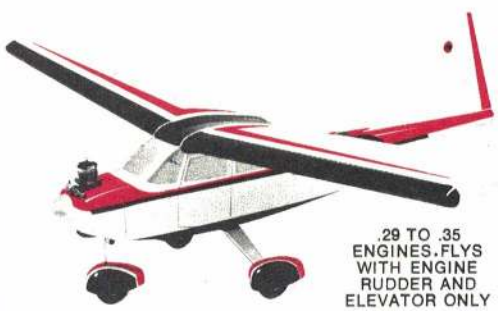

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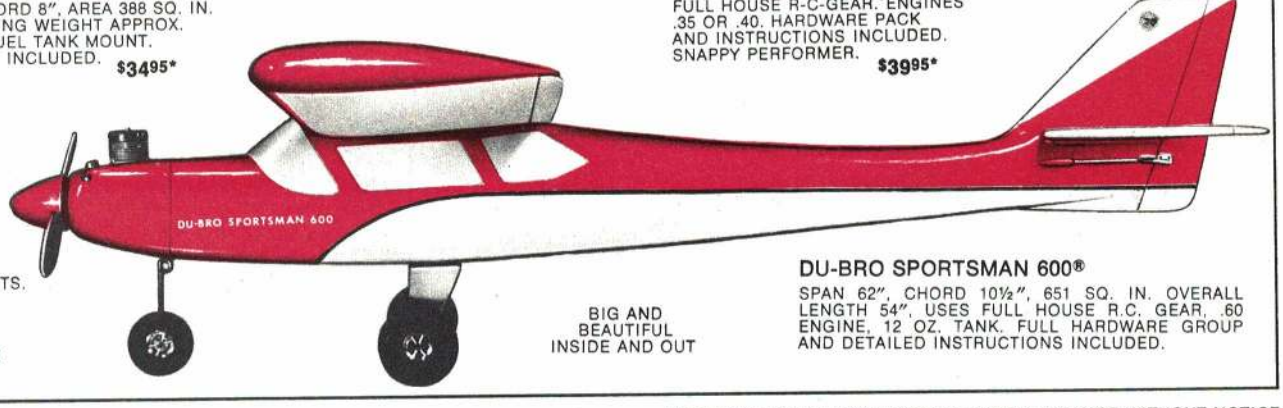

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Rivets

(continued from page 23)

him the first Formula I National Point Championship. Winning all three races in 1967 gave him a second championship. In 1968, two firsts and a second meant yet a third championship. In 1969, it was three firsts and a second, and championship number four. They combined wins at Ft. Lauderdale, Florida, and Wilson, North Carolina, and a second at Reno for a fifth straight national title in 1970, along with a qualifying record of 231.26 mph.

As the 1970's dawned and the ranks of Formula I began to swell with more new racers than had ever been seen before, there were increasing chances that new airplanes would come along to take the place so long held by Rivets. Its excessive weight–635 lbs. vs. 520-550 lbs. for most of the other fast ones–was a serious handicap. Being more than 20 years older than when he built No. 92, Falck seemed unwilling to start over on a new racer, though it was widely recognized that he had the skill and knowledge to build a new airplane that would be as unbeatable as Rivets had been for the past decade.

But, until someone can consistently beat him at more than one race site, Bill Falck will no doubt continue to terrorize Formula I with possibly the finest racing airplane, pound for pound, that has ever flown.

Note: Our special thanks to Eddie Fisher, of Birdland Airport, Leroy, Ohio for suggesting this airplane.

Specifications:

Dimensions:
Length—18' 0"
Wingspan—17' 9"
Wing Area—66 sq. ft.
Wing Airfoil—modified M6
Aspect Ratio—5.23-1
Empty Weight—635 lbs.
Normal Loaded Weight—855 lbs.

Performance:
Maximum Speed (est.)—255 mph.
Landing Speed—70 mph
Cruising Speed—n.a.
Cruising Range—n.a.

(n.a.—not applicable, as the airplane is never flown cross-country.)

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AM-1

BV-170

(continued from page 20)

spar, space them out, and fit them over the bottom spar. Cement all ribs to the bottom and center spars. Add the top spar, cementing it in place. Cement the 1/4 x 1/4" leading edge in position, then add the two short outermost sections of trailing edge. Cement the 3/32 x 3/4" cap strips along the trailing edge of the shorter wing spars. Leave the trailing edge off the wing center section until the flaps have been installed.

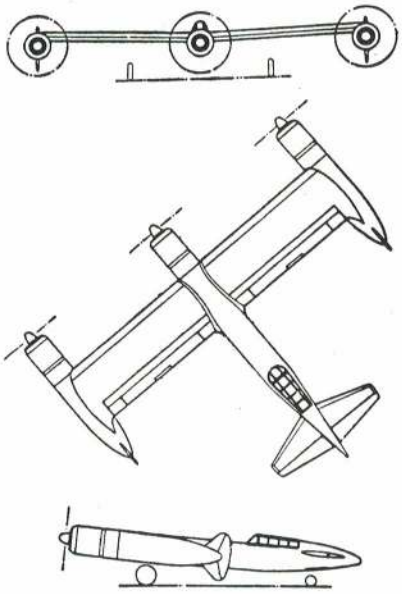
Remove the wing from the plan, sand and shape the leading edge, and perform final sanding on all ribs, etc. for sheeting. Install the bellcrank, leadouts and pushrod. Leave the outside leadout ends unfinished until the engine pod is in place. Use a long bolt through both plywood bellcrank mounts, adding hardwood bellcrank spacer blocks epoxied between the plywood mounts. (A strong bellcrank assembly is needed.)

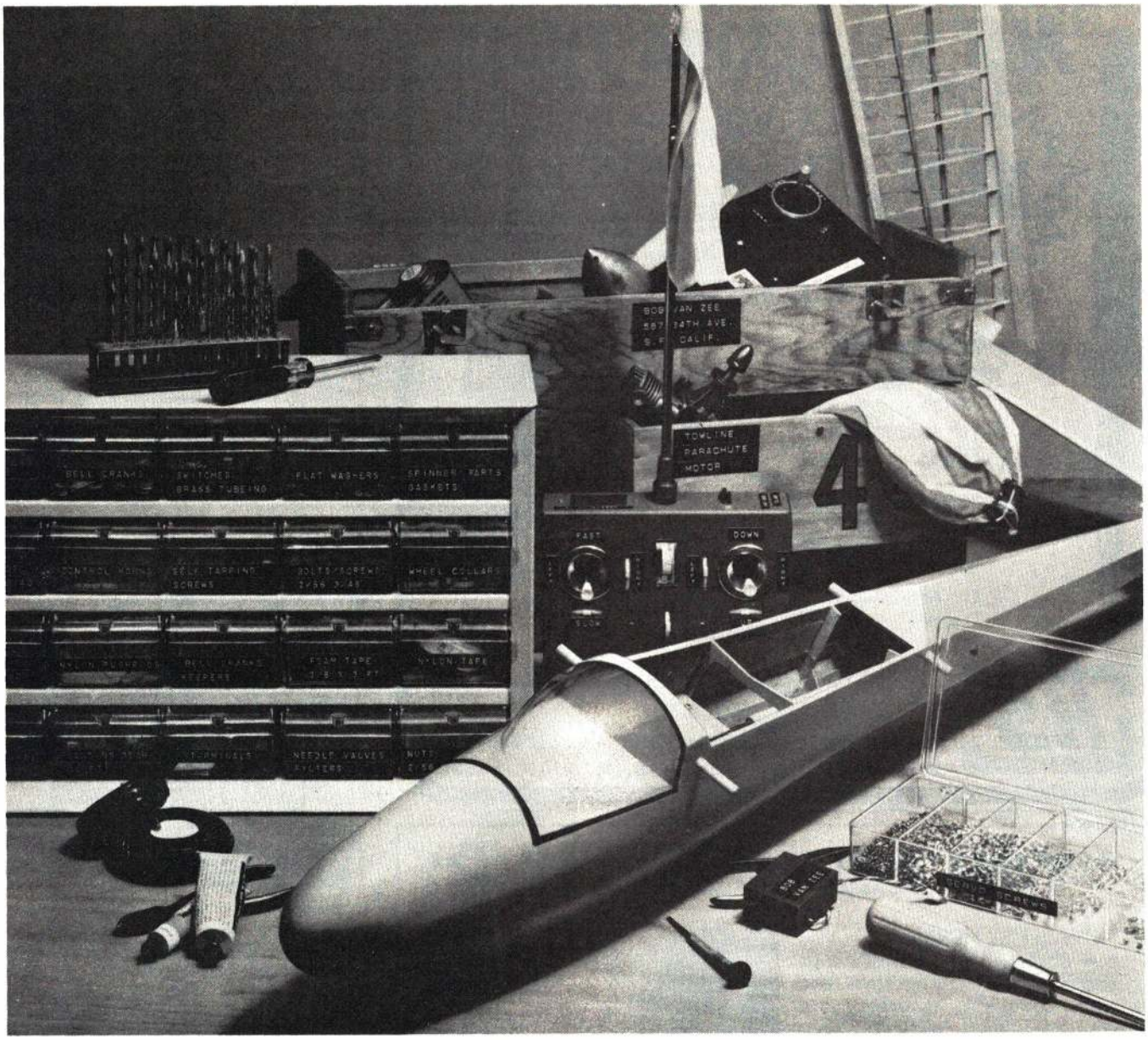
Construct the two wing flap assemblies directly onto the plans. Pin the bottom 3/32" sheeting and then glue the 3/8 x 1" trailing edges over the sheeting. Add the false ribs, control horn, upper sheeting and the front cap strip. Remove the linked-together flaps very carefully, and sand the front cap strip to a rounded contour.

Make up two landing gear assemblies as shown on the plans. Install only the left one at this time. The right LG assembly must be installed after the fuselage is in place on the wing. Install the outboard wing tip weight.

Using lightweight 3/32" balsa, sheet the wing, except for a sizeable opening around the right landing gear mounting area. Attach the wing flaps with linen cloth hinges on each side, using at least three pairs of one-in. wide hinges. Make sure the cloth is cemented to the outer (upper and lower) wing surfaces only, and not on the thick interior surfaces of the hinge area. Install the short center section trailing edge. Sand the wing at this time, finishing the areas where the fuselage and wing

Bv P. 170





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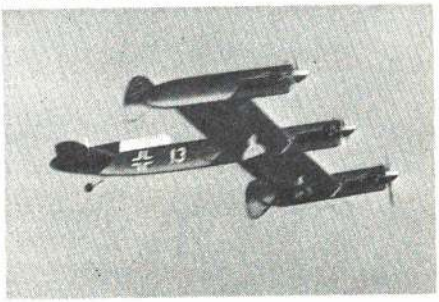
pods will be mounted, then connect the front pushrod.

Trace the main fuselage and the two engine pod outlines onto lightweight 3/8" balsa, four in. wide. Note that the fuselage is spliced at the wing cutout to allow use of 36" long balsa stock. Size the engine openings to fit the engines you intend to use, allowing for the hardwood motor mounts. Trace the six plywood doublers onto 3/32" ply, again sizing the F1 and F3 sections to fit your engines. Cut out the plywood doublers.

Cement the fore and aft halves of the fuselage together and onto the left side plywood doubler all at the same time. Cement the two engine pods to their respective left-side plywood doublers. Three sets of hardwood motor mounts are then cemented into place, as are the three right-side plywood doublers. Make up the six small hardwood engine offset blocks as shown on the plans. These blocks provide the engine sidethrust and also act as spacers so that the crankcases do not project through the left-side plywood doublers. Check their dimensions against your particular engines and alter if necessary. Epoxy these blocks into place, and when dry drill the engine mounting holes and the tank mounting holes. Fabricate the tail-wheel assembly as shown on the plans and cement it into place in the fuselage.



Shape and sand the engine pods, rounding off all outer edges. Make up two rudder assemblies as shown on the plans and install them centered on the pods with no offset. Finish sand the rudders to a streamlined shape; shape and sand the fuselage, rounding off all edges. Leave the upper aft section flat for the cabin and elevators. Shape and sand the upper aft (cockpit) section, but do not yet cement it in place.

Cut out the stabilizer and elevators, and round all edges. Sand the leading and trailing edge to a streamlined cross section. Install a combination elevator linkage and control horn. Connect the elevators to the stabilizer using figure eight hinges of carpet thread, or

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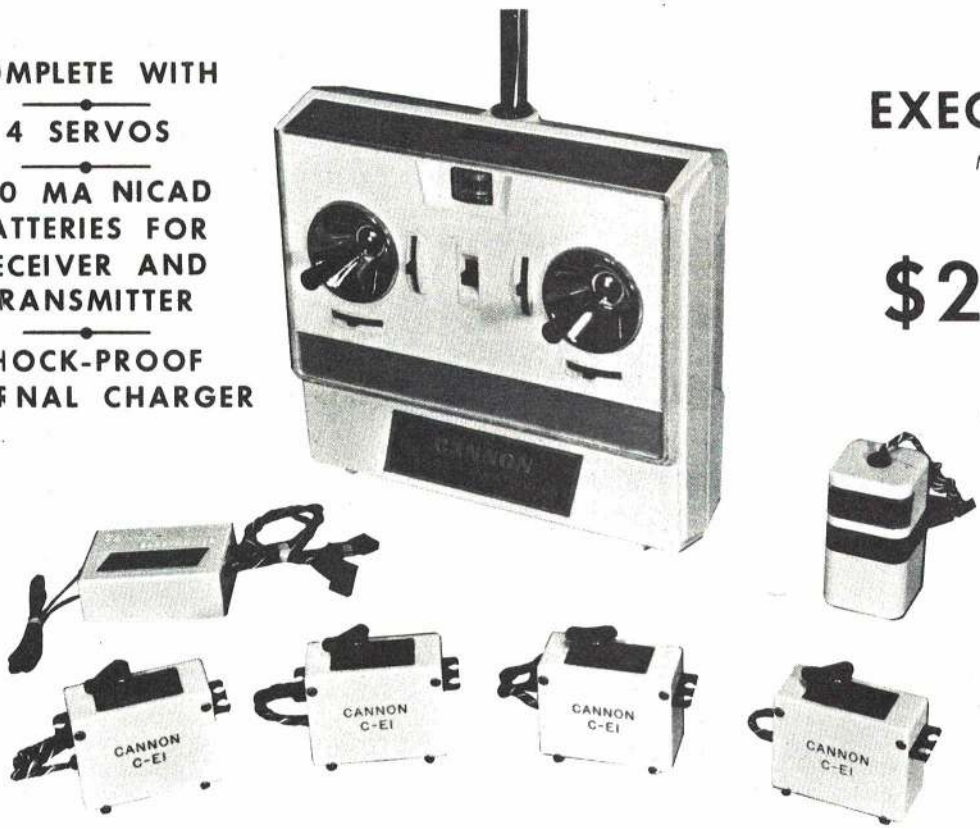

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your own pet method.

Fit the fuselage onto the wing from the right side and cement into place. Cement the right landing gear assembly and complete the wing sheeting around this area. Fit the outboard engine pods and cement them into place. Install control line leadout eyelets and form the leadout wire ends.

Connect both ends of the rear pushrod, letting the formed wire pushrod guide hang loosely on the pushrod at this time. Align the stabilizer in all directions, and cement into position. While the cement is still wet, move the stabilizer fore and aft to the position where flaps and elevator are exactly neutral at the same time. Wait about 10 min. and then fit the upper rear fuselage section, carving out for the stabilizer and the elevator linkage.

Apply plastic balsa to all fillet areas, dents, cracks and outright mistakes. Sand the model completely. Brush on at least four coats of sanding sealer, sanding between each coat. Mask off all areas not to be sprayed. The plane pictured had six coats of sealer and was finished as follows.

Spray equipment was used after the sealer coats. The base color, a pale sky blue, was applied to the entire plane. Next, a light green dope was sprayed on all upper surfaces, blending it into the blue color. Finally, a dark green was sprayed in a camoflauge pattern on the upper surfaces over the lighter green. The cockpit area was masked and painted separately. The final finish was several coats of clear dope rubbed between coats. The last clear coat was left unrubbed for better fuelproofing. The white numbers and crosses, and the black and white swastikas were cut out of vinyl (scotch-cal) material.

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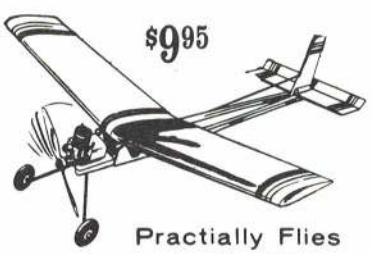


Practially Flies by itself!

Mount the engines and tanks, each with an in-line fuel filter. Install the pushrod guide into the fuselage. Put on wheels, and wheel pants. Install props and spinners and your model is completed.

Flying

Never attempt to run a multi-engined plane without fuel filters. Before flight, start each engine separately and set the needle valve to the usual slightly rich setting. Once you have adjusted each engine and are starting all three for flight, never touch any of the needle valves. Start the engines by choking and priming alone. Adjusting a needle valve in and out is not an aid to starting. If any engine will not hold a steady setting with a fuel filter installed, you have a maintainance problem which should be corrected.

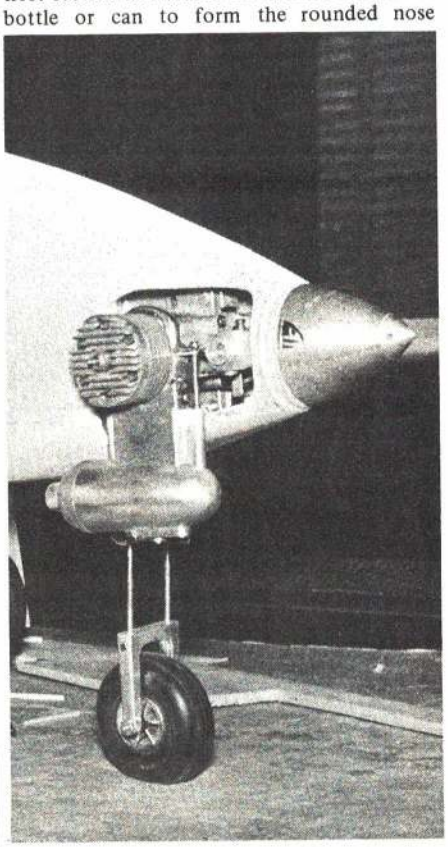
This model has been flown on just the outboard engine during testing; however, this is not generally recommended. Just before launching, have a helper top off the center and inboard fuel tanks so that these engines will quit last. For safety, use .018" flight, 70 ft. lines as a minimum diameter and pull-test the control system. Ear plugs are seriously recommended for the flight crew.

Cardinal

(continued from page 28)

Construction

Cut out all fuselage parts and mark with a ball point pen. Epoxy doublers to fuselage sides. Do not use white glue as it will warp the balsa. Glue stringers to rear half and, when dry, epoxy bulkheads F3 and F5 in place. Drill F2 for Tatone side nose gear mount, install blind nuts, and epoxy in place. Wet the nose section forward of F2 and use a 2-in. dia. bottle or can to form the rounded nose



Tatone engine/nose gear mount used and recommended for balance and heat sink effect.

section by sticking the bottle between the wetted sides and wrapping with rubber bands. When dry, add F1A and epoxy vertical triangle braces to the front and rear of F2. Glue remaining bulkheads in place making absolutely sure it is aligned properly–the fuselage must be true.

I built mine on a small card table in our apartment here in Japan, and I got it straight, so you lucky fellows with fabulous workshops and building jigs should have no excuse. Epoxy top nose block in place (after it has been hollowed out) and glue on upper and lower portion of fuselage. Use a razor plane to shape after everything has dried. Add F1 and lower nose block with epoxy after hole is drilled for nose gear to go through. Sand to shape and make cutout for engine. Shape and glue vertical and horizontal stabs in place, again being very careful of alignment.

Since a foam wing is used, not much explanation is necessary. Select the lightest possible foam and make sure you epoxy gauze tape on after the wing is sheeted. Add lower portion of fuselage to bottom of wing. Fit wing to fuselage and add fillets. You will have to form your own main gear due to its unusual shape and length. Make sure you use good hard wire. The wheel fairings are made from aluminum stock, but 1/32 plywood could also be used. Strip ailerons are used; however, perhaps the puritan would prefer the center-hinged, barn-door type. Take your pick. I have found that the rolls are cleaner by using very large strip-type ailerons, since very little throw is required. They also make the wing easier to construct.

(continued on page 86)

Modeler Mail

(continued from page 11)

A fighter's demise

Regarding the Grumman F3F-2 fighter (N-7-F) in your December 1971 issue, I am sorry to report that the last airplane was destroyed on the way home from the Oshkosh fly-in on August 7, 1971.

The aircraft had been bought from Bill Ross by a fellow out West. After some aerobatic maneuvers, an insecurely fastened gas cap caused the plane to leak gas and it caught fire. Both men got out with parachutes but were severly burned. I am sorry to see the last in a line of aircraft now gone.

Mike Murphy, Oak Lawn, Ill.

Forster engine

In your article "Brooklyn Dodger" (December 1971 AAM), the author makes reference to the "Forrestor 29" engine. I've heard that mistake made before—but the correct name was the Forster 29. It also had a big brother of about .31 displacement so that both Class B and C could be flown with the same plane. The Forsters and the Bantams (.16 and later .19) were just about the only disc-rotary valve engines available for many years and really ruled the roost.

Walter J. Klein Jr., Brooklyn, N.Y.

(continued on page 85)

Good Riddance to Old Days

Please accept my congratulations and best wishes in your new publishing venture, the **Junior MODELER.** How I wish this type of publication had been available 30 years ago when I was struggling to learn—alone and ignorant, happy and remarkably unsuccessful.

I used to peel glue off my fingers while making pine and cardboard kits in the war years and bought an O&R 60 when they became available again. Four years later, my Physics teacher showed me how to make it run; for my first control line plane I put this big brute in a Dreamer which augered into the ground after half a lap, accelerating through 100 mph as I froze on the handle. No $12.95 plastic planes to learn on in those days.

John R. Agnew, M.D. Fort Myers, Fla.

Airships galore

In your November issue, Ronald Biddle inquired about books on the R-101. I know of two books that discuss her at any length. *Sliderule* by Nevil Shute is probably available in most libraries. A paperback edition was published in 1964 by Ballantine Books, 101 Fifth Ave., New York, N.Y. 10003. The second book is called *The Millionth Chance*, but I can't recall the name of the author or publisher.

A television program, "Great Disasters of Our Time," produced by the BBC in 1968 discussed the R-101. *British Rigid Airships* written by Robin Higham (G.T. Foulis & Co., Ltd., London, 1961) contains several photos of the R-101 and other British airships as well as a good bibliography.

Famous Airships of the World by J.A. Sinclair (Fredrick Muller, Ltd., London, 1959) has some data. You also might try the

(continued on page 88)

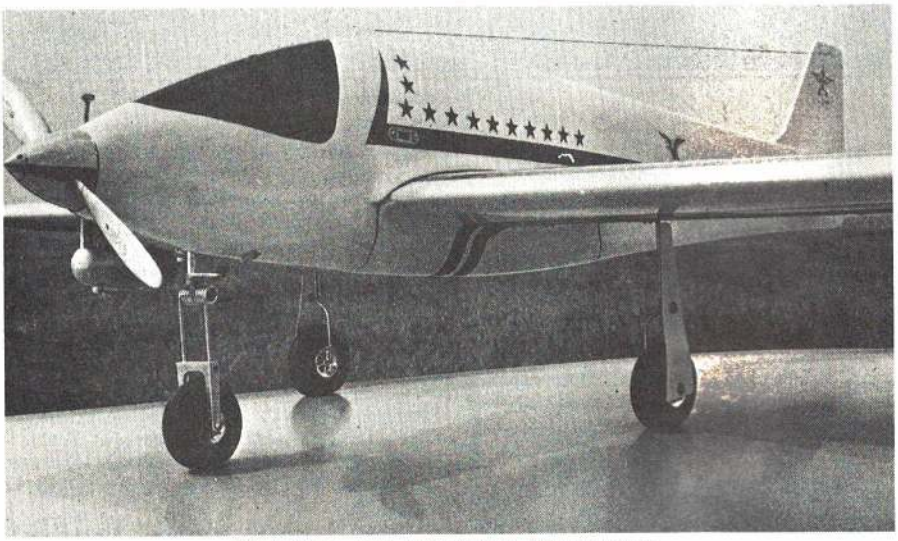
Cardinal

(continued from page 83)

A word about the "funny airfoil." It is the NACA 64 A215 and although it is a laminar-flow, low-drag airfoil, it has excellent slow flight characteristics. It has been used on such successful ships as the Orion, Thunderstormer, and Twister. If you prefer, go ahead and use a fully symmetrical one.

The "easy does it" method of finishing is my favorite and that is how this one is done. It is light, quick, and very attractive. "What is the 'easy does it' method?" you ask. Send off to Hobbypoxy and they will send you all the poop on how it is done correctly. Here is my "easy does it" method: I use Sig epoxy because it cures fast. Mix about three oz. each of resin and hardener, thin to a vodka consistency and brush on the bare wood. Let cure Repeat the same procedure only not so thin this time. The reason for the very thin first coat is to let it soak into the wood to increase the strength of the balsa. After the second coat has cured, sand down with coarse sandpaper and remove all bumps and fuzz. Sand it once again using a finer grade paper this time. Fill all nicks, cracks, and dents with Epoxolite and after it is cured, scrape it down using a double-edge razor blade. Do not use stainless steel blades, as the edge goes off almost immediately. At this point the grain should not show. If it does, add another coat of thinned glue and scrape down again. Wet sand it and spray on a coat of gray Hobbypoxy (black and white mixed). Wet sand any rough spots and spray on your color.

Since I have gone into so much detail, there is not much left to say, except try to be selective in your choice of wood and keep the weight down. Do not try to "beef it up." I learned a long time ago not to sacrifice weight for strength. Mine tips the scale at just over 6½ pounds.



Other than gear and engine, the profile is clean—offering low drag. Laminar wing allows speed and needs large maneuvers, but in this case, also permits stable, slow flight.

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(continued from page 85)

Encyclopedia Britannica or Jane's *All the World's Aircraft* of the late 1920's for more information.

If you are interested in other airships, Higham has plans of the R-80 in his book. There are plans of the LZ-40 in *The Zeppelin in Combat*, written by Douglas Robinson (G.T. Foulis & Co., Ltd., London, 1962). The *LZ-129 Hindenburg* by the same author was published in 1964 by Arco Publishing Co. Inc., 210 Park Avenue South, New York, N.Y. 10003, and was available for some time through America's Hobby Center for $2.95. *The Airships Akron and Macon*, by Richard K. Smith (United States Naval Institute, Annapolis, Md., 1965) has good drawings of these ships.

The Science Museum, Aeronautical Section, South Kensington, London SW 7, England, has a magnificent set of drawings (120:1-14 sheets) of the R-34—the first airship to cross the Atlantic both ways—which they will send you for about $7.00.

A flying model of a rigid is quite an undertaking, particularly with RC equipment aboard. One cubic foot of helium will lift almost exactly one ounce. Most rigids had a fineness ratio (length to max. diameter) of around five or six. So a six-ft. model would have a diameter of about one foot. A rough figure for volume (allowing for the taper at the ends) is $L \times D^2/2$—you would have only

INDEX TO ADVERTISERS

three cu. ft. of helium or a lift of three oz. The lightest three-channel receiver/batteries/servos set comes in around six to seven oz. That doesn't include any propulsion.

I've been building an RC model blimp–6 ft. long, 20" dia. cylinder, 12-cu. ft. volume. By pulling servos apart and mounting props directly on the motor shafts–one pointing fore and aft for propulsion, one pointing down for vertical control, and one pointing sideways at the stern for direction–I think it will be flyable.

Prof. Caxton C. Foster, U. of Massachusetts, Amherst, Massachusetts

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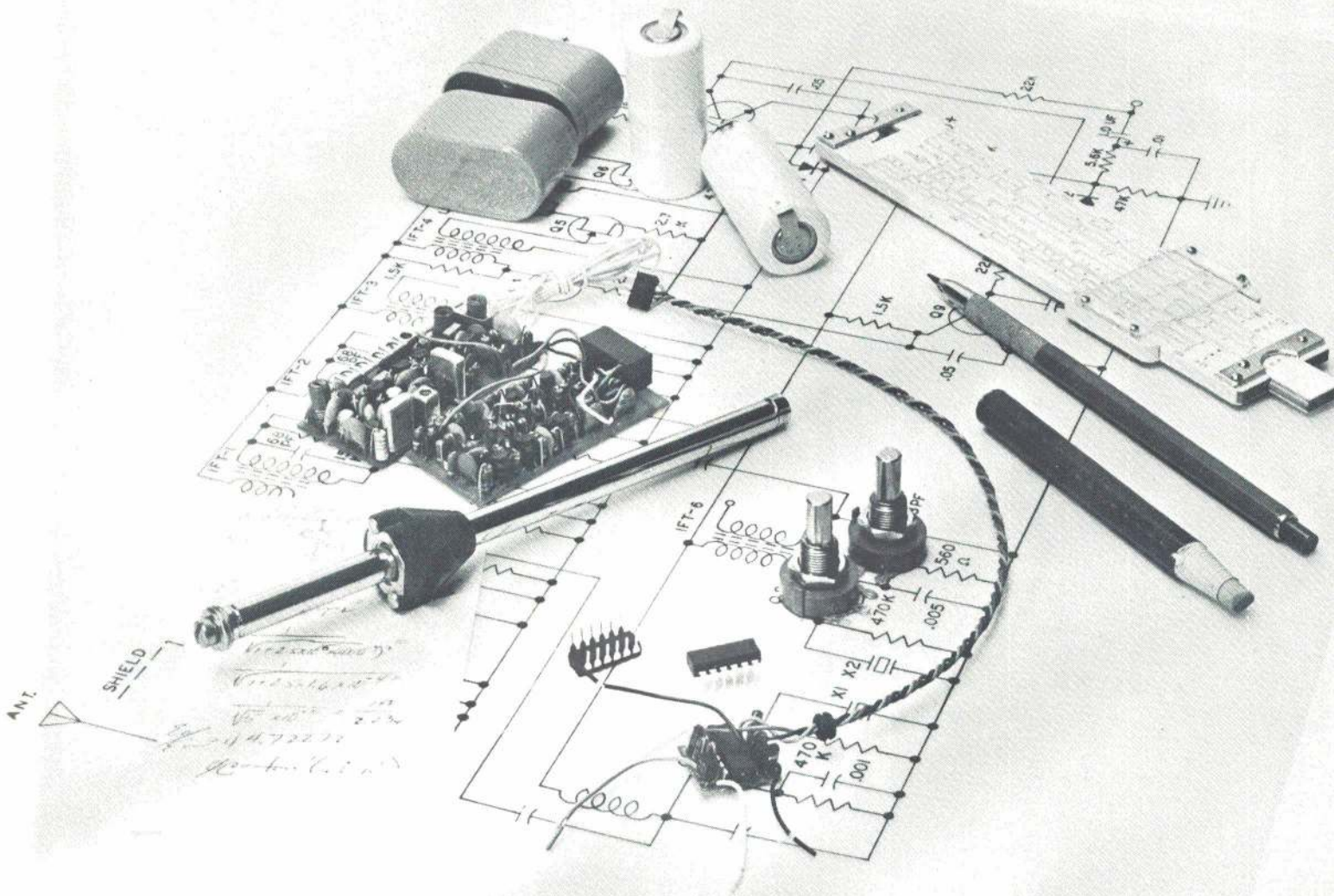

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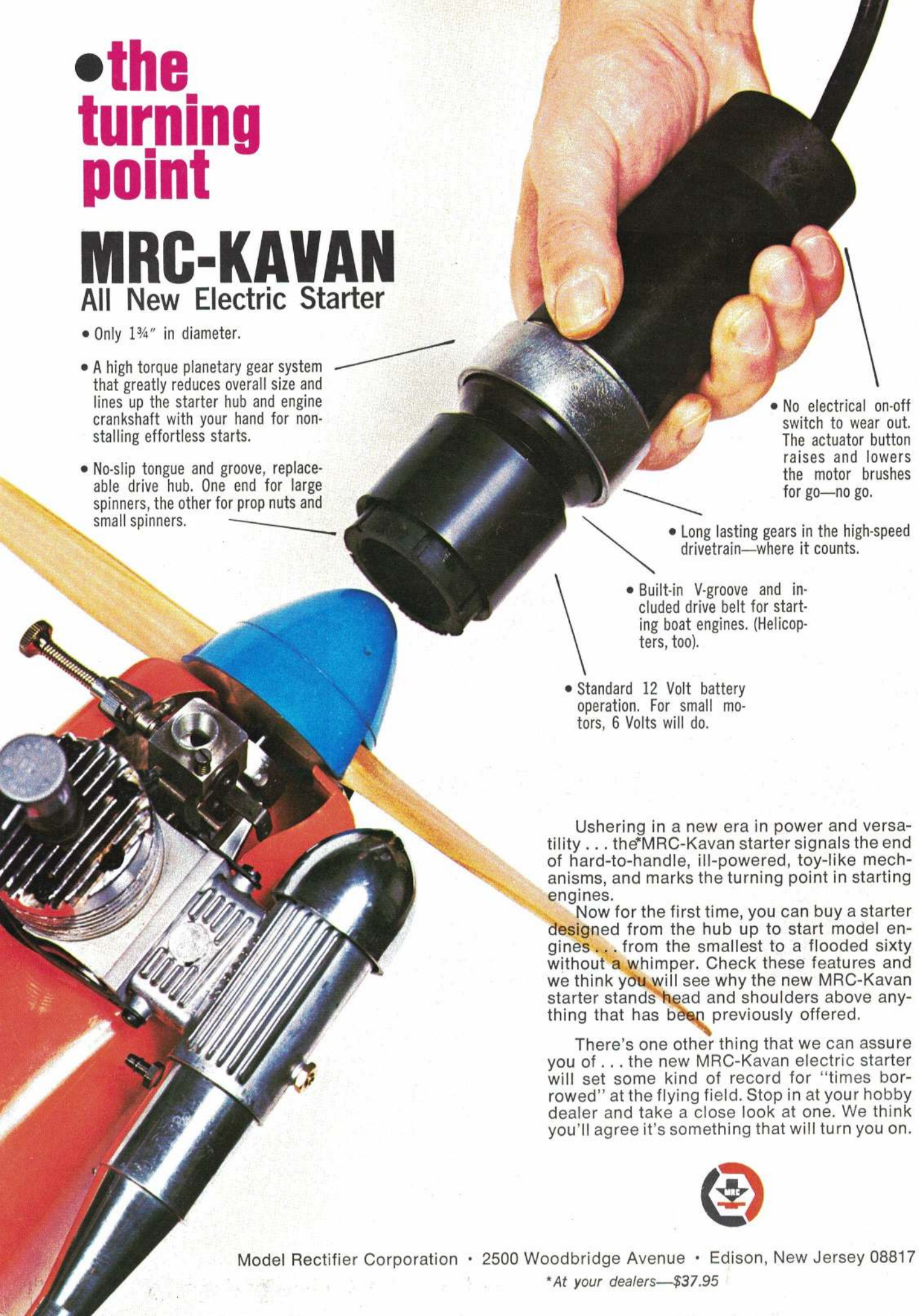

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