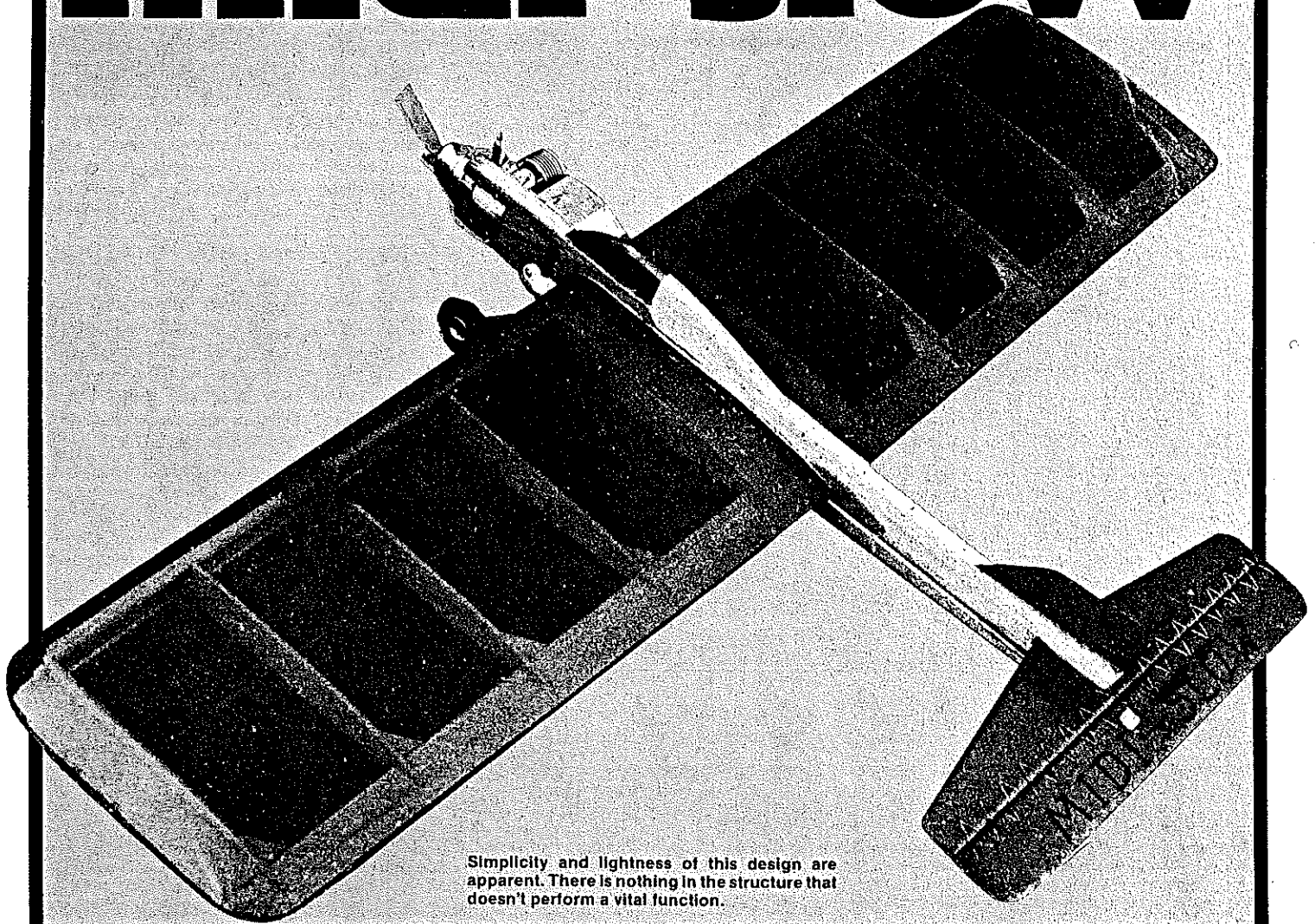


midi~slow



Simplicity and lightness of this design are apparent. There is nothing in the structure that doesn't perform a vital function.

What would an experienced CL Racing flier build to learn to fly CL Aerobatics? This model is the author's answer. For a .20 engine, it is compact, economical, builds quickly—and most important, it has characteristics for easily producing true flying surfaces. Hey, that sounds like an excellent sport flier!

CONTROL LINE is, for me, the finest form of modeling. The models are inexpensive and easily built, they can be flown in very confined areas, and yet, at its highest levels, the competition pressure and skill requirements can be overwhelming. In my view, the fact that you are directly connected to the model gives the truest sensation of "flying," and it can, therefore, give the greatest satisfaction.

Few Control Line addicts would argue that Stunt flying is not the purest form of Control Line, for it is all about pilot skill. Surely most of us dream about flying the perfect pattern. To do that you have to start some place. The Midi-Slow was where I started, and it may also suit you.

For longer than I care to remember, I have been a Racing pilot. I even rose to the

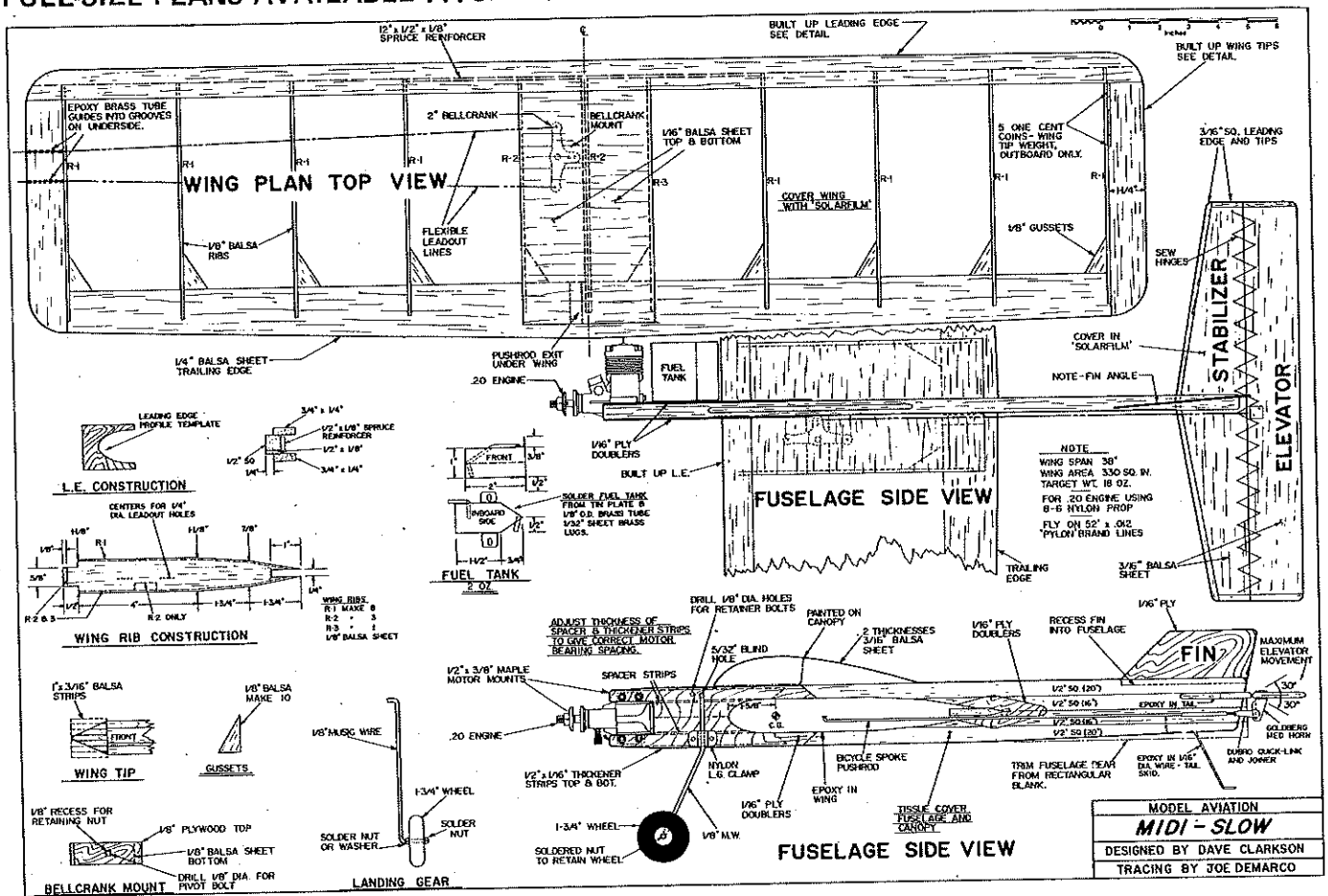
highest level of Racing while representing my country (United Kingdom) in Class F2C Team Race at the 1975 and 1979 European Championships and at the 1978 World Championships where (with my teammate, Jim Woodside) I placed 5th and was proud to be a member of the winning national team.

"Great," you might say, "but what has that to do with learning to fly Stunt?" Quite a lot, really. You see, all of those years of flying fast models straight-and-level in tight traffic gave me an inbred horror of seeing my model the wrong way up and going the wrong way around—never mind actually doing a maneuver. It became very embarrassing for a geriatric pilot like me to have to confess to an inability to fly inverted. In terms of Stunt flying, I had progressed no

further than the rawest beginner.

The opportunity to do something about this very silly situation arose when my employers transferred me from the UK to Africa. Africa is not known as "the Dark Continent" for nothing! That certainly applies to Control Line Racing. With maybe one or two competitions per year, and just a handful of competitors within 1,000 miles of where I now live, the time to teach myself Stunt had finally arrived.

Since I have never been one to build other people's designs or models, I had to come up with my own trainer. Midi-Slow is an exceptionally simple model. If there is one thing I have learned in my long modeling career, it is that simplicity is the key to effective models. Simplicity also means economy and speed of construction—just



the things to suit beginners. The Midi-Slow flies nice and slow with good line tension, impressive stability, and more than adequate maneuverability.

Some of you, when viewing the plan, will look at the airfoil and go no further. True, it is not an NACA 0018, or some other scientific profile, but those of you who saw Richard Wilkins' Combat models at the 1975 AMA Nationals (at Lake Charles) will recognize it and know that it works. I believe that it was no less a Combat personality than Sherwood Buckstaff who, on seeing Wilky's models before they flew, gave his polite opinion that, with such an airfoil, their flight could not be anything but poor. Next day, after seeing them perform, Sherwood drawled to Richard, "I have an

apology to make—those models sure do fly." I am not saying that this UK-style 'flat' airfoil is better than an NACA 0018, but it really helps in getting a quickly built, light and strong, warp-free wing which "sure do fly."

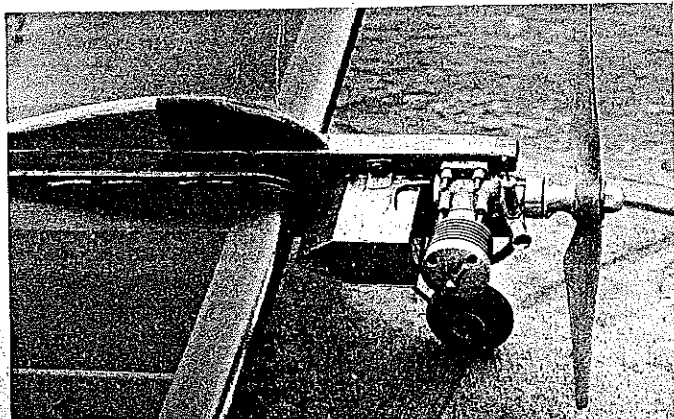
Construction really is easy. With beginners in mind, a sequential list of building instructions follows. There are a few points worthy of note. These are given first.

The fuselage core is assembled from strip balsa not only because it is cheaper (two 1/2-in.-sq. strips cost less than the smallest standard piece of 1/2-in. sheet balsa) but also because the horizontally-glued joints strengthen the fuselage and aid considerably in getting the engine thrust line and the wing and tail all easily and accurately

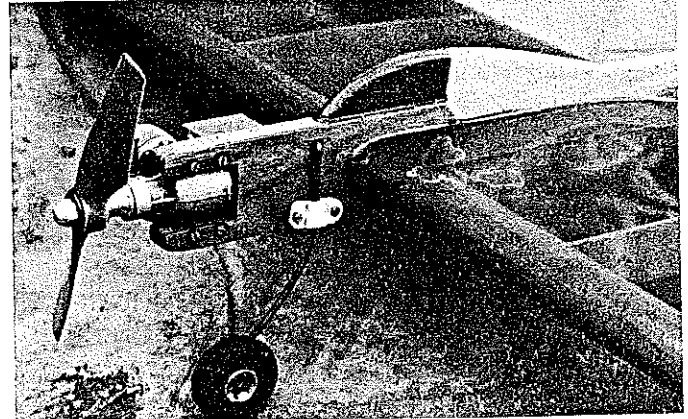
aligned to zero-zero with respect to one another.

The plans show 1/2-in. x 1/16-in. engine bearer spacer and thickener strips at the fuselage front end to give a spacing of 1 1/8 in. This bearer spacing may not suit your particular engine, so be sure to measure the bearer spacing that your engine requires, and adjust the thickness of the spacer and thickener strips to give an overall fuselage depth of 2 in.

The wing-to-fuselage joint should be as neat as possible. Care taken here will pay off in terms of model life. A low-viscosity, slow curing epoxy glue (like Hobby epoxy Formula 2) should be used for this joint. Spread the epoxy evenly over the wing center where the fuselage will be. Slide the



Years of flying Team Race models by the author have proved one thing to him: a single wheel is all that is needed for controllable takeoffs and landings. Besides, a single-wheel gear is simple to make.



Forward canopy location performs a useful function—protects the needle valve when the inevitable inverted landing takes place. Note compact engine/tank arrangement and unusual tank design.

wing into the fuselage, making sure by measuring that it is square and centered. Finally, fillet the joint with the same glue using your fingers; rub hard with your fingers to force the epoxy well into the joint.

Balsa is expensive stuff, so do take care to select unflawed, straight-grain wood of those strengths specified on the plans. If you are careful in cutting out the wing and tail components, you will find that you only need one sheet each of $\frac{1}{8} \times 4$, $\frac{3}{16} \times 3$, and $\frac{1}{4} \times 3$ balsa. Similar care in cutting the wing and tail covering film will result in only 26×36 of covering material being needed.

Construction details. When I refer to "epoxy," I mean the low viscosity, slow curing type (like Hobbyepoxy Formula 2). "Glue" means an aliphatic wood glue (like Sig-Bond). For cutting out balsa and thin plywood parts, use a steel rule and a strong knife with a new blade. Use a vise and a small hacksaw to cut out the bellcrank platform and the engine bearers.

I use a lot of sticky tape to hold things together while the glue sets, augmenting this with pins and clothespins when gluing fuselage doublers and the wing center sheeting. The flat airfoil section allows the wing to be weighted onto a flat board while the glue sets. Do use this method to give a warp-free wing.

Wing. Mark rib locations across $\frac{1}{4} \times 3$ sheet at right angles. Cut from this sheet the leading edge (LE) and trailing edge (TE) components.

Glue $\frac{1}{2}$ sq. and $\frac{1}{2} \times \frac{1}{8}$ LE core strips together; glue $\frac{1}{2} \times \frac{1}{8}$ spruce reinforcer onto the middle of one long face. Glue marked $\frac{1}{4} \times \frac{3}{4}$ strips onto LE core with core projecting $\frac{1}{4}$ in. forward of the top and bottom strips.

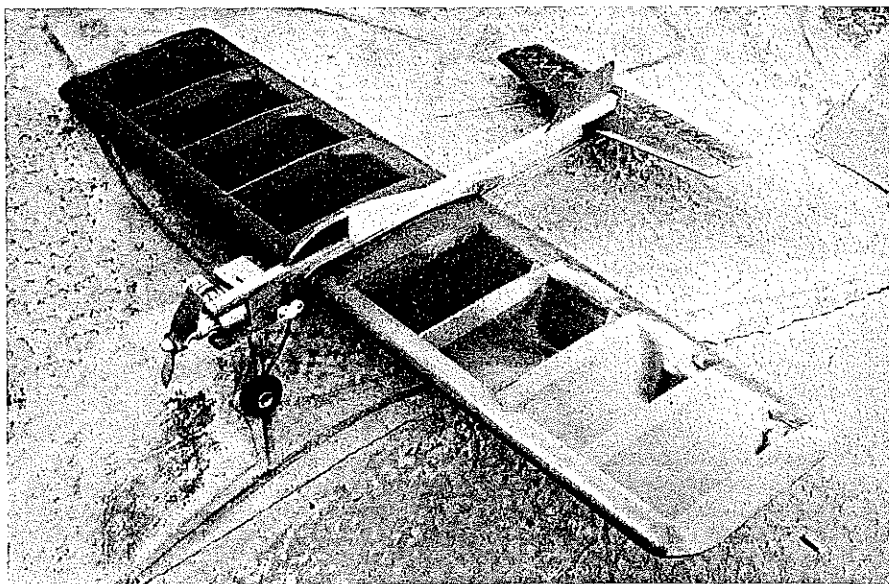
Mark $\frac{1}{8}$ sheet for ribs and gussets, and cut them out. Drill inboard ribs with $\frac{1}{4}$ -in. holes for lead-outs. Cut out and glue the bellcrank platform components. Drill for the pivot bolt. Mount pivot bolt and then the bellcrank with untrimmed pushrod and lead-outs attached.

Glue the two center ribs together. Glue all ribs to the TE, assuring that all are square. Glue on TE/rib gussets. Glue LE onto ribs/TE assembly. Weight frame onto a flat surface while glue sets to diminish warps.

Glue bellcrank platform into wing. Epoxy five 1¢ coins to the outside surface of the outboard tip rib. Glue thickener strips to the front top and bottom of tips. Notch outer tip to clear tip weight coins neatly.

Glue on $\frac{1}{16}$ sheet over center panels, top and bottom. Bottom sheeting has $\frac{1}{4} \times 1$ rear for pushrod exit. Glue on wing tips. Groove underside of inboard tip for lead-out guide tubes. Plane and sand LE, TE, and tips to shape. Sand rib profiles gently to a smooth section.

Epoxy lead-out guide tubes into grooves under inboard tip. Insert lead-outs through guide tubes.



The wing structure is simple but tough—and the unusual airfoil helps in building it flat. Note that the vertical fin is recessed in the fuselage top and angled to keep outward line tension.

Tail. Cut out components from $\frac{3}{16} \times 3$ sheet, and glue together. Glue on $\frac{3}{16}$ sq. LE, then glue on the tips. Sand to profile and airfoil section. Cut off elevator, and round the hinge edges.

Cover tail and elevator separately, using your favorite film. Sew neatly together to form the hinge. Remove covering film from the stabilizer exactly where it will be glued to the fuselage; use a very sharp modeling knife.

Fuselage. Accurately mark and cut out core strips, spacer and thickener strips, engine bearers, doublers, canopy, and fin. Glue together the core strips (the strip next to the top is notched on the top surface for the tail). Glue on spacer strips. Trim fronts of the top and bottom strips to match the engine bearer strip ends. Glue on the engine bearer and thickener strips.

Sand sides flat, and accurately glue on all doublers. Shape the bottom behind the wing TE. Sand the top, bottom, and rear until smooth, and round any sharp edges. Glue together the canopy components, and sand to shape.

Cover the fuselage and canopy separately with tissue. Glue on the canopy and fin. Epoxy the tail skid in place. Drill fuselage for engine, tank, and landing gear mounting bolts. Drill a blind hole for the end of the landing gear. Fret out the wing hole and sand to fit the wing exactly.

Assembly. Epoxy the wing and tail into the fuselage, measuring to be sure that they are centered and square with respect to the fuselage. Cover the wing halves with your favorite iron-on film. Paint the cockpit with a contrasting color. Brush a fuelproof finish on the fuselage. Seal covering film edges and elevator hinge sewings with the fuelproof.

Bolt the control horn onto the elevator and reinforce with epoxy glue. Trim the pushrod to length, and install the Quick-

link. Find the correct hole in the horn plus the proper Quick-link adjustment to give equal up and down elevator movement of about 30° . Make lead-out loops to give equal length with neutral elevator.

Cut, bend, and solder the fuel tank and landing gear. Check the tank underwater for leaks. Drill tank lugs oversize for the mounting bolts.

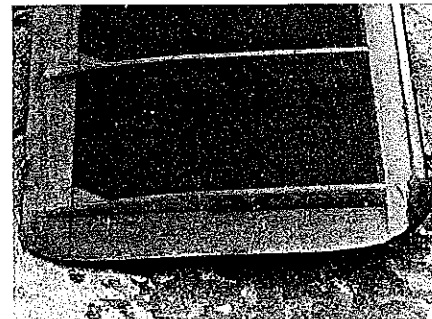
Bolt on the engine, fuel tank, and landing gear; use lock nuts. A muffler for the engine is recommended.

Checks. Accurately determine the fore-and-aft balance point of the assembled model. If it is more than $1\frac{1}{4}$ in. back from the leading edge of the wing, epoxy lead weight in a small recess you will need to cut behind the engine between the doublers and the bearers.

View the model critically from the rear for wing warps. Remove any by reheating the covering film while twisting opposite the warp. Hold until the film has cooled. Repeat until no warps are present.

Flight trimming. Place washers under the front mounting bolts of the engine if line tension is inadequate. Move the tank up or down relative to the engine to give an acceptable run through all maneuvers. Increase or

Continued on page 156



Coins are the most-available tip weights around. Four can be seen here, glued to the outside of the tip rib. About $\frac{1}{4}$ oz. is needed.

Used by NATS Champion Dave Pearce

RED MAX—FUEL OF CHAMPIONS

Low Priced, Clean Burning, Detergent, No Rust or Foam, High Film Strength, Protects Moving Parts, Consistent Quality, Shipped Fast

Your choice of castor, synthetic or any combination of castor and synthetic oil.

% Nitro	One Gal	4 Gal Case or 5 Gal Can Per Gal	24 Gal Per Gal	126 Gal Per Gal	30 Gal Drum EA	54 Gal Drum EA
0%	10.50	6.60	5.75	5.35	103.00	140.00
5%	11.50	7.80	6.95	5.85	152.00	235.00
10%	14.00	9.10	8.25	7.79	205.00	330.00
12%	15.00	9.70	9.00	8.67	227.00	368.00
15%	16.00	10.10	9.25	9.00	258.00	425.00
25%	23.00	17.50	16.00	14.47	363.00	614.00
40%	30.00	25.00	23.00	21.00	520.00	897.00
60%	38.00	33.00	31.00	29.00	705.00	1230.00
NEW Economy Fuel With Castor Oil Lubricant						
10%	11.00	7.80	7.00	6.60	170.00	280.00

Free delivery on 1, 4, 5, 25, 126 gal. deals in U.S.A. 30 & 54 gal. drums are freight collect, FOB Clover, S.C. Gallon price is determined by nitro content & total quantity ordered. S.C. orders add 4 % sales tax. Use charge card on any order, COD's limited to U.P.S. shipment only. Deduct 3 % for prepayment by Money Order or Certified Check.

NEW—Power Booster Oil for 1/4 scale engines... \$10/qt. or \$30/gal.

NEW—Power Booster for 1/4 scale engine \$12/qt., \$38/gal, freight included. Use 3 oz./gal. Prices are subject to change without notice.

FHS Supply, Inc. Rt. 5 Box 68, Clover, S.C. 29710

(803) 222-7488 or 222-7285

lightly on the aluminum sheet. It is not necessary to press the tape hard onto the aluminum, just be sure that it is smooth, and has no wrinkles. Now draw the letter or number you desire on the tape and to the required size. Let's say that you have made the letter "C." Now, using the X-Acto knife, cut along the drawn lines, and when all lines are cut remove the letter "C." What remains on the aluminum sheet is your stencil.

Now, very carefully remove the stencil (do not tear or stretch the tape) from the aluminum, and apply it to your model in the appropriate location. be sure all edges are down tight on the model and paint in the letter with the desired color. When the paint is dry, remove the stencil. While the process described dealt only with a single letter, any number of letters or numbers (or combinations) can be made at one time. A little thought and planning will allow you to make almost any kind of letter, number or insignia.

Send CL Scale ideas, photos, building tips to: Bill Boss, 77-06 269th St., New Hyde Park, NY 11040.

Midi-Slow/Clarkson

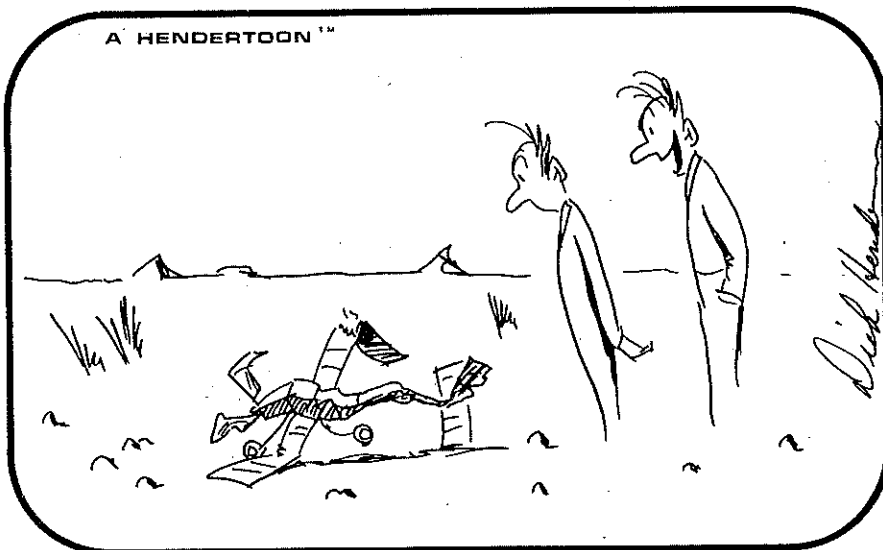
Continued from page 71

reduce elevator movement to give the desired response to control input.

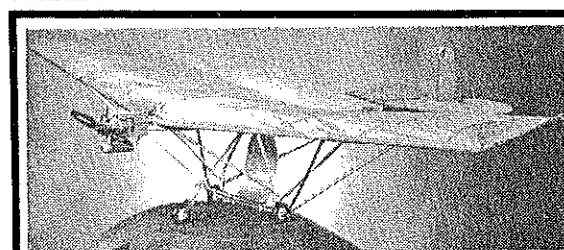
For a small profile Stunt model like Midi-Slow, the tank can present a bit of a problem since the gap between the engine and the wing is necessarily rather small in order to get the balance point right. The plans show the 2-oz. tank I use. It is rather unconventional in that the wedge is at the rear and not at the side. It also has a single uniflow-type vent. Fill it via the vent tube with the fuel feed to the engine disconnected and with the model's nose held vertically downward.

This tank design gives a very even fuel feed to the engine right from the start to the finish of the tank. This is an important point if you are using a side-exhaust, loop-scavenged glow engine. Such engines are well-known for unsteady running when side-mounted in Stunt models. It may well be, depending on your particular engine, that muffler pressure to the tank may be necessary, and the feed point of the tank may need to be raised above the engine axis in order to give a truly steady run.

One of the ready-made metal tanks for Slow Combat may be suitable. Soldering



"-----THEN LAUNCH EVER SO GENTLY OVER TALL GRASS!"



Grasshopper

A complete 1/6 scale R/C model kit designed to assemble, look and fly like the famous Weedhopper™ Model-C Ultralight AIRCRAFT. Each part of the all aluminum structure is pre-bent and drilled. The nylon rip-stop coverings are all pre-sewn.

Available in your choice of four colors at your hobby shop now. 1/6 Scale \$169.95 1/3 Scale \$269.95

Other ultralights available soon. **a carlberg companies product**
8170 WEST PENN AVE ROSEVILLE, IL 61473 PHONE 309/426-2161

IT'S HERE AND IT FLIES

Wingspan 56"
Channels: 2 - 3
Wing Area: 690 sq. in.
Engine: 19 - .35



CURTISS "GOSHAWK"

Offered in Two Sizes: Kloritz or .60 Plan Drawings & Partial Kits

Quarter Scale: Kloritz type Engine, 9 1/4" Span
Quarter Scale Plan Set: \$30.00 (6 Sheets). For Opposite Wing View: \$12.00 (2 Sheets). Our 2" Scale Plan Set is \$15.00 (2 Sheets). For the Opposite Wing View add \$7.75.

2" Scale: For .60 Engines, 63" Span, 980 Sq. In.

Please add \$2.50 for Postage & Handling. Other designs are available too, send \$1.00 for Catalog. Partial Kits are offered for all our designs to simplify and speed your building.

RICHARD G. BARRON Phone: (602) 933-6911
11506 Ohio Ave., Youngstown, Arizona 85363 U.S.A.

PUT YOURSELF IN THE PICTURE — WITH THE REMARKABLE

GMP CRICKET

DESIGNED AND BUILT IN THE U.S.A.



**"We Want You To Fly —
Not Just Buy —
An R/C Helicopter"**

**FLASH
— NOW AVAILABLE —
A NEW, AMAZING, COMPLETELY
AEROBATIC ROTOR SYSTEM
FOR CRICKET!**
Cricket Can Now Do 20 ft. Diameter
Loops, Consecutive Rolls, and
Tight Pylon Turns
ONLY \$49.95
(INCLUDES NEW 'GOLD ROTOR HEAD',
NEW FLYBAR, NEW PADDLES
AND CONTROL ARM)

SEND \$2 FOR
ILLUSTRATED CATALOG AND TECHNICAL LITERATURE

GMP

GORHAM MODEL PRODUCTS

23961 CRAFTSMAN RD., CALABASAS, CALIFORNIA 91302

QUALITY, PERFORMANCE & SERVICE

(213) 992-0195

OTHER FINE GMP PRODUCTS:

GMP HELICOPTER KITS	
CRICKET "CUSTOM" Kit (#C100) uses .19 to .25 engines	\$199.95
CRICKET "SUPER CUSTOM" Kit (#S100) GOLD AND BLACK with fully assembled Custom Rotor Head ANODIZED	\$299.95
CRICKET - BUILT (#B100) without radio and engine	\$259.95
CRICKET "SUPER CUSTOM" - BUILT (#SB100) GOLD AND BLACK w/o radio and engine (SPECIAL ORDER ONLY - ALLOW 14 DAYS)	\$289.95
COMPETITOR "CUSTOM" '45' Kit (#545) fully aerobatic w/collective pitch, full Bell/Hiller aerobatic head and custom tail rotor system	\$329.95
COMPETITOR "PROFESSIONAL" '50/60' Kit (#550) fully aerobatic competition class machine, same as '45', with added autorotation capability and custom machined rotor head	\$399.95
HUGHES 300C Kit (#H300) uses .25 to .40 engines	\$249.95
HUGHES 300C CONVERSION Kit (#C300) for CRICKET	\$ 99.95
HIRDBO SCALE KITS	
Bell OH-1B "IROQUOIS" Kit (#501)	\$489.00
SA-315 "LAMA" Kit (#500)	\$475.00
"GAZELLE" Kit (#503)	\$549.00
Bell AH-1S "TOW COBRA" Kit (#504)	\$525.00
Bell 206 "JET RANGER" Kit (#502)	\$489.00
For CRICKET	
Gold Custom Rotor Head (#334) factory assembled w/extra S.S. bearings	\$34.95
NEW: MINIATURE YAW RATE GYRO	\$69.95
<small>REQUIRES 3 OF LOW THRESHOLD GYROS THAT MATCH TEN</small>	
Universal Paddles (1pr) (#616) Provide a sparkling aerobatic performance for any helicopter	\$ 4.95
SPARE PARTS CARRIED FOR ALL MODELS.	



WHY 'CRICKET'? — BECAUSE 'CRICKET':

- Is the simplest, most reliable R/C Helicopter you can buy
- Flies the best — easiest to learn on, stable yet responsive
- Uses a small, inexpensive and quiet engine
- Is easy to transport, fuel and start
- Is manufactured in the USA — parts are low cost and always available from over 600 hobby stores nationwide
- Will always intrigue and challenge you — It is the experts' favorite as a warm-up and practice machine
- Can be converted into a scale Hughes 300C for only \$99.95 — see product list

THE WORLD'S FINEST RC HELICOPTERS

AVAILABLE AT YOUR LOCAL HOBBY STORE NATIONWIDE

tanks is one of the skills needed for Control Line, so you might as well begin now. The tin-plate of a soft drink can is ideal for tank construction, provided that the paint on the outside and the lacquer on the inside is all scrubbed off using a wet Brillo pad. Lapping all of the joints and using a powerful electric soldering iron (I use a 60W iron, and it is only just powerful enough), plus lots of flux (and cleanliness) is the way to ensure no leaks.

Wait for a calm day to do the trimming flights. You will learn nothing in windy conditions except, perhaps, that you are a brave fool!

Any .20 cu. in. engine should prove acceptable. This size engine is inexpensive and widely available. When equipped with a muffler, it should be quiet enough to keep most of the populace content.

The sharp-eyed among you will have noticed that Midi-Slow is equipped with an old, smelly diesel—a MK III Oliver Tiger. The Oliver is a lovely old engine with impeccable manners, but it is far from common and not ideal for Stunt.

A good friend in the UK has built a Midi-Slow using a muffled OS .20 glow engine, and he reports that this combination is ideal. If you are intending to use such an engine, an 8 x 6 nylon prop and 52 ft. of .012 Pylon Brand lines will prove best and give Midi-Slow the flight characteristics I have found with mine.

Can I now fly Stunt? Well, the old saying about old dogs and new tricks has a lot of

truth to it, but Midi-Slow has been a great aid for me in trying to prove that this saying is not always true. For the beginner who does not have any prejudices built in by many years of Control Line Racing experience, the transition from straight-and-level to flying the full AMA CL pattern recognizably, if not beautifully, should come easily with Midi-Slow.

Some of you may be thinking that Midi-Slow may be a perfect stepping stone, but boy is it ugly! Even I would not boast about its looks, but what do you build for a Stunt trainer? Beauty is about bottom of the list of concerns. Ease, speed, economy of construction, and flight performance are what you need—and Midi-Slow has these aplenty. Save that beautiful model plan for when Midi-Slow has done its job and you can fly Stunt properly. I have—and I'm glad I did.

Gee Bee R-1/Haffke

Continued from page 78

the covering. White Permagloss was applied to the entire airframe. The red trim was cut from bright red Permagloss using patterns made from the plans, and ironed over the white. Black pinstriping tape was used to separate the colors.

The markings really make the model, and they are not all that difficult to do. The registration and racing numbers were cut from blank sheets of Coverite's Graphics material and applied. Again, black pinstriping was applied around all of the numbers.

FOX 35 STUNT — IN CONTINUOUS PRODUCTION FOR 34 YEARS



**NOW
REDUCED TO
\$27.95**

Remember Control Line? Simple Airplane — no batteries — no servo's — no frequency problems — no electric starters. That was the no tension way to fly. Why don't you re-live yesteryears by helping your child or a young neighbor build and fly a Control Line Model Motor — Fox 35 Stunt, of course. In 34 years nobody has been able to improve on its easy starting or reliability.

Our Hot Line: (501) 646-1656

FOX MFG. CO.

5305 TOWSON AVE.
FORT SMITH, ARK. 72901