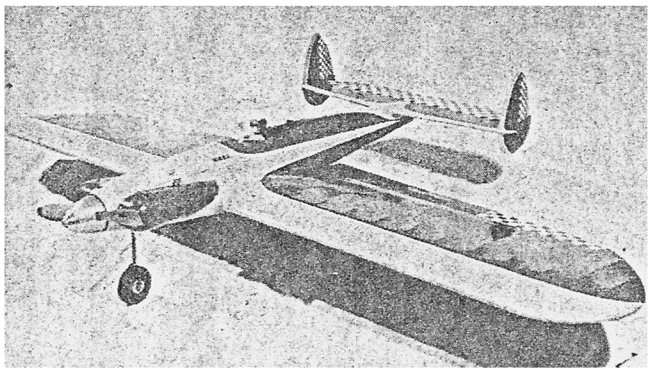
MARS

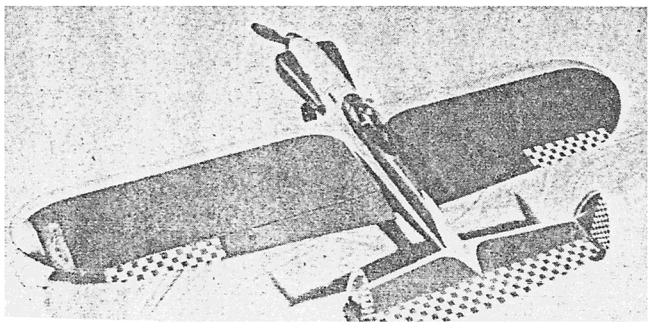
Giving the release signal to his helper, Bob gets set for the take-off. He reports that the trike gear cuts down on those point-losing bounce landings.

by BOB PALMER

Combining realism and appearance with top stuntability, this job may be the finest of its kind to be published in any magazine.



Side-mounted Fox fits neatly in "applecheek" cowl. The wing is a 15% thick section with carefully and correctly calculated flap movement.



Stunt flying has greatly changed in the last three years; more time and more realistic design is needed to get those extra points. The *Mars* is qualified to do the A.M.A. stunt pattern and is designed also, to obtain full appearance points. Span is 49", wing area 404 sq. in.

A.M.A. rules call for a possible 80 points for appearance and give points for certain parts of the model. Taking into consideration all of these things, I designed the *Mars*. I decided upon a tricycle gear because, with this gear, take-offs can be held a little longer, looking more realistic, and giving you the fullest possible points; also, for good landings. It's difficult to get wheels in perfect place on a conventional landing gear to make good landings without that hopping effect, and with one hop, you'll get only 10 points.

In designing the wing, I have selected a 15 per cent section. Having built wings with different percentage sections, I decided the 15 per cent is ideal. You will notice in the plans the size of wood in this wing. It's light, but very strong; a little more trouble, but it's worth it. Weight will have a lot to do with performance. Keep this in mind in your purchases and building. The wing has a little sweep in the tips for appearance and less drag. Using a tricycle gear I could use a double-fin tail. This gives good stability and good action of the elevators.

The cowl is one of the features. By simply removing the one screw, the entire engine and tank is exposed, giving access to removal of either. This, my second experience with side mounting and first completely cowled engine, turned out better than expected. After I hit upon the idea of removing part of the cowl with the hatch block, construction became simple.

Having had quite a bit of experience in tricycle gears before, design was no problem and, in the initial tests, taxiing with full power on all the way around the circle, was not difficult and without swinging in on take-off. Landing required a different approach than with two-wheelers but, after a few practice landings, *B-25* landings were a cinch.

This model is equipped with flaps. A lot of trouble has been experienced by persons

using flaps for the first time so I'd like to clear up a few misguided ideas. I've tried all sorts of flaps: big ones, small ones, some in the wing and even double ones. For what you get out of them and the improvement of one over the other, the trailing edge attachment flap is the most simple and ideal for stunt. I've gone over a lot of stunters at contests and find the problems were mostly hook up and movement of control surfaces.

The flaps on this model are ideal in size and should move 30° to 35° with the elevator moving 40° to 45°. This allows model to square off, which is needed in the square loop and vertical climb, dive and wing over. The method of hook up to the bellcrank is important. The *Mars* uses two wires, one for the flaps and the other for the elevator.

Being a consistent winner means careful preparation. I believe almost anyone can do it. Constructing a good airplane is first. So build your model as accurately as you can, especially when installing the engine and accessories. Fasten the engine and tank securely, using lock washers.

Don't be sloppy with your cement joints. Use only enough to insure a good job.

Awaiting a contest to try the *Mars* in competition, Douglas Spreng and I went to Tucson, Arizona. Doug, with his *Mars*, came out a top appearance points winner. The interest of attending modelers and spectators thrilled us both, and I knew we had a good all-around stunter for sure.

Cut fuselage doublers using side view. Lay out tank mounts and cement. Install F2 and F1 in place, square assembly and let dry. Cut sides out, including wing slot. Cut bulkheads out and cement in place. The engine used is a Fox *35*, but any 29 or 31 with firewall mounting is perfect. A *.19 Torpedo* would do well, too. In the case of the Fox, where the three bolts are tapped in the case, I used 4/40 x 3/4 screws and cut them off, then ran a nut upon the case and through the firewall and fastened with another nut and lock washer. Cut the hatch block out and leave uncontoured until cowl blocks have been cut. By studying plan and seeing where hatch separates, you'll see that part of the cowl block on the right side is cemented to the cowl block. Cement the belly block in place, carve the two cowls and cement on the left one.

Landing gear will require some careful bending. For this reason I used 3/32" wire and soldered it double. You will notice Veco landing gear clips holding the nuts for the three bolts of the engine, thus serving a dual purpose. Cut the belly block into gear location. Install the engine, lower cowl and hatch block, and carve out until engine has just enough clearance. Cut the hub of a broken propeller and install the spinner. With the spinner on the hatch blocks and cowl block on, refer to drawing and photographs. Carve to contour of spinner.

The top deck is a solid soft balsa. Tack cement and carve to shape. Carve out the canopy, remove top deck, and finish inside of cockpit. I used railroad paint, but first, prepare wood for finishing as prescribed in the painting of model. I used gray paint for flooring and black for headrest and radio equipment.

Cut ribs as shown and assemble trailing edge. Remember inboard wing is shown on the plan and left wing will be 2" shorter. Splice 36" pieces in overlap of center line; in other words, not at the center line, but the bottom being in overlap, from the top splice on a rib. Cement up trailing edge on a straight board. By pinning trailing edge in upright position, mark rib locations and insert ribs. Mark location on 3/16" sq. in. spars, and cement and hold with rubber bands. You will notice holes in ribs for 1/8" sq. in. To make it easy, bandsaw a stack of ribs and drill a 3/16" hole. A 1/8" sq. can be slid through these holes. Cement to each rib assembly, rib 3 and rib 4, and wingtip. Wingtips are of 1/4" balsa and spliced like free flight. Flaps are of 3/16" balsa and sanded to a tapered edge of 3/32". Assemble flaps with horn and cement horn well. Leave the flaps off until wing is assembled.

Cut the stabilizer and elevator out of 3/8" balsa. Lightly cement stabilizer to elevator, then carve to airfoil shape. Cut out as shown on plan, and insert ribs that are oversize. After they are dry, fare into contour of stabilizer. Now cut rudders to shape, cut a notch in rudder. The rudder is set in the stabilizer by the tongue method. Set rudder in place and replace the pieces on each side of the tongue. This will help hold your rudders good and secure. Building a thick tail may be new to you, but it really pays off in smoothness and less stalling out.

Install the Veco horn in the elevators, cement hinges on, and cut 3/32" control rod to length, within 5" of bellcrank, by taking brass tubing of 3/32" inside diameter. Saw off lengths of 3/32" and use these instead of washers to hold control rods on the horns, and solder well. Install the tail on the fuselage, being very careful to line up on center line and horizontally.

This gear not only has spring effect but torsion also. Look at the plan and bend accordingly. Wrap with string and cement well. Bolt landing gear clip on bellcrank floor. Banner wheels are very realistic. Install wing in place. Measure landing and trailing edge,