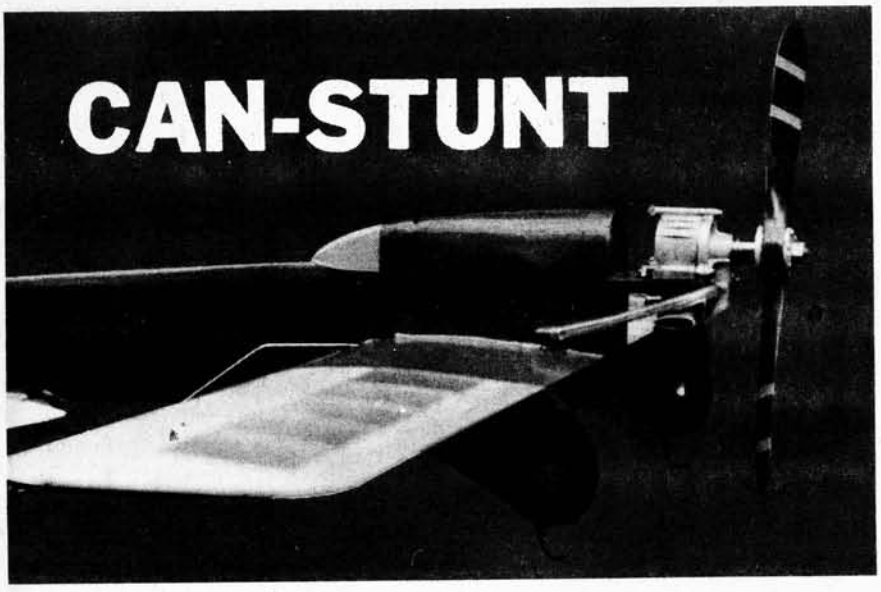
CAN-STUNT



by Paul E. Del Gatto

For something new and different in control-line flying, build this stunting canard model from the full-size plans herewith

● When the editors of FLYING MODELS suggested the idea of a canard U-control model, we had no doubts as to whether it would fly, because of the previous successes experienced with free-flight canard designs. But, we had some misgivings about its maneuverability. This skepticism was based on the fact that the area of the stabilizing wing would have to be small when compared to the surfaces generally employed on a conventional stunt model.

The reason for steering clear of a large forward surface was not because we felt it was undesirable, but because it necessitated moving the center of gravity forward, the distance being dependent on the relative size of both wing surfaces and the moment arm between them.

On a free-flight model this would not be such a problem. But, in the case of a U-control model, it meant placing one or both of the control lines forward of the main supporting surface. Not only would this detract from the appearance of the model, but it also would increase the overall drag. In turn this would effect a decrease in performance, which could otherwise be gained by enclosing the control lines within the wing.

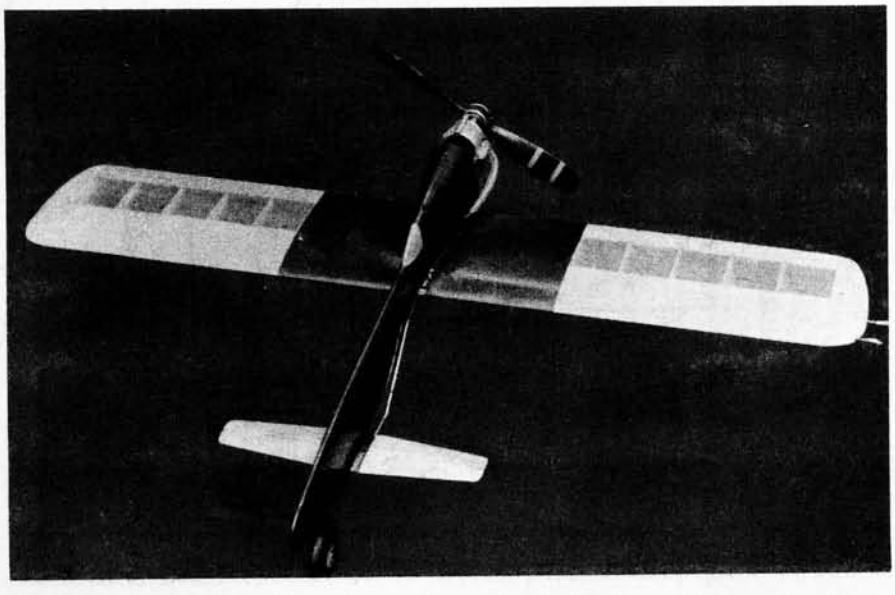
As soon as our test model was completed, we hiked out to the local flying field. We had decided that on the first flight we would proceed with extreme caution. Therefore, after the engine was tuned up for flight and the signal for the release given, the model was taxied around for approximately a half lap to feel out the controls. A slight bit of up control was then applied and the model gradually rose into the air.

After several laps of spinning around, we felt the model out with some wing-overs. As we had hoped, the ship responded quickly, in spite of the small control area. Since this is a canard, the control surface is lowered when you want the nose up—to get the nose down, you raise the control surface. This is just opposite of what occurs in a conventional control-line model, so make sure you make your line connections at the wing tips accordingly. Reverse your lines so that an up movement of your wrist makes the plane climb, even though the control surface itself is lowered.

One thing that was of interest to everyone who had seen the model fly was the high speed attained, sometimes upward of 75 m.p.h. For a small class "B" profile model, this is quite a lot, indicating that the canard configuration can successfully be employed on other types of U-control models.

Getting back to the Can-Stunt, we would like to emphasize the fact that you don't have to be a stunt expert to fly it. Proof of this is the fact *(Turn to Page 50)*

The photo above shows the upside-down engine installation—the photo below gives an overall view of the entire plane. Since this is a "tail-firster," you'll either have to run your engine backwards or carve a special prop. You're bound to have a lot of fun with this novel ship!



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CAN-STUNT

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that we've had other modelers take a crack at flying the model since that first day and many of them have expressed the desire to construct one. How about joining them?

FUSELAGE: Begin by cutting out the profile in accordance with the full-size plan. Then, cut out the firewall and cement it in place. Allow ample time for drying, then place the motor mount in position. Correct alignment of the motor mount is important, otherwise the model may prove difficult to trim for flight.

The blocks which make up the fairing at the rear of the profile are cemented in position next. If you wish to conserve weight at the rear of the model, hollow out the blocks after they have been shaped.

Next, bend the landing gear strut to the desired shape, inserting the wheel in the process. Then cut a groove on each side of the profile to fit the landing gear strut and cement it in position. Bend the wire nose guard to shape and cement in position. Now, using a long thin knife, round off and taper the profile towards the nose. Don't remove too much as you need the weight forward of the main wing to attain a suitable center of gravity position.

WING: The wing is conventional in construction with but one exception, the built-in rudders. First cut the trailing edge to the desired length and notch at each rib location. Then, cut out the ribs. Since they are all the same size, they all can be cut out at one time, thereby saving time and insuring correct alignment. Next, the two plywood rudders are cut to shape, and a rib is cemented to each face of the rudders.

Start assembling the wing by pinning down the trailing edge and cementing the ribs in position. Add the leading edge to the structure and then secure the main spar in position. Allow ample time for the basic structure to dry, to minimize any warping tendencies, then remove the wing from the plan and trim off the excess cement.

Before sheeting the wing, it will be necessary to install the bellcrank unit, control rod and lead-out wires. If your engine will run backwards without difficulty, install the units for clockwise flying as shown in the plans. If your engine is temperamental (as was ours!), install the units for counterclockwise flying.

For counterclockwise flying, it will be necessary to carve a propeller. The one shown in the plans proved highly successful. And, since it is virtually impossible to damage the propeller because of its location, one propeller will suffice for the model.

After the sheeting has been applied, cut out the balsa wing tips and cement them in position. Then, sand the completed structure until the desired airfoil shape is obtained. In shaping the forward control surface, try to obtain an airfoil shape such as that shown on the plans. An efficient forward surface contributes much to the success of the model.

Now, bend the control horn to shape and drill the hole for the control rod. Then, cement the control horn in position and hinge the fixed and movable surfaces together. After this has been done, the completed stabilizing surface can be cemented to the fuselage.

FUEL TANK: If you have never made a fuel tank before, you may find the task a little tedious, but not at all difficult when full-size templates are available. Just follow the patterns shown on the plans and drill the holes where indicated. Then, bend the tank at the points indicated on the layout and solder the small flap to complete the seam.

The rear end piece is then soldered in position, followed by the fuel tank filler, fuel outlet and fuel vent.

Before sealing the tank, remove any rosin which may have accumulated in the tank while soldering. Seal the tank by soldering the front end in position, and around the outlets. File away the excess solder, and then test the tank under water by blowing through a piece of neoprene tubing, attached to the fuel line, while at the same time you cover the outlet tube and the filler tube. If there is a leak present, it will be shown up by an air bubble.

The result will be a tank which conforms to the shape of the model, thus keeping the drag way down. Because the engine is located at the rear, you need never worry about pressurizing the tank—the fuel will always pack into the fuel outlet as fast as you need it.

ASSEMBLY & FINISHING: Now that the tank is completed we can assemble the model. Cut out the fuselage bottom as indicated on the plans, set the tank in position, and cement the wing in place. This completed, replace the fuselage bottom piece and connect the control rod.

Cover the wing with a light grade of silkspan and apply three coats of clear fuel-proof dope to the entire wing. One coat of clear fuel-proof dope is then applied to the remainder of the model to provide a base for the colored fuel-proof dope. Apply two to three coats of the latter, depending on the consistency.

When the last coat has dried completely, rub down the entire painted area with a fine rubbing compound to eliminate the orange peel effect and obtain a high lustre.

Now install the engine of your choice, preferably one of between .19 and .23 cubic inch displacement. A larger engine is not recommended, primarily because the increased weight of a larger engine would make the model difficult to trim for flight.

FLYING: Make a final inspection before making any atempt to fly your model. First of all, check the model for balance. The model should balance on, or slightly forward of the bellcrank pivot point.

Place stops on the leadout wires to limit the control movements for the first few flights.

If you haven't as yet given the lines a good pull test *(Turn to Page 52)*

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do so now, before you demolish the model or hurt some spectator. The snap movements in stunt flying exert a sudden force on the lines which is much greater than that which occurs in speed flying. This is the primary reason why most of the models that pile in due to broken lines are stunt models.

Now that you're all set, we suggest you get down to the business of flying. And, when you do, we're sure you'll agree that the Can-Stunt fully lives up to its name!

BILL OF MATERIALS
(Balsa unless otherwise specified)

1—⅝" x 2" x 36" (hard).....Upper and lower half of profile
1—¼" x ¼" x 36" (hard)....Rear wing leading edge
1—3/16" x 3/16" x 36" (hard).....Rear wing spar
1—¼" x 15/16" x 36" (medium tapered stock) .... Rear wing trailing edge
1—1/16" x 2" x 18" (hard).....Rear wing ribs
2—1/16" x 2" x 36" (medium)....Rear wing sheeting
1—⅝" x 2" x 36" (medium).....Rear wing tips and fuselage fairings
1—¼" x 1" x 18" (hard).....Stabilizing wing
1—¼" x 5/16" x 8½" (basswood)....Stabilizing wing
1—1/16" x 1¾" x 3¾" (plywood).....Firewall
1—3/16" x 1¾" x 6.5/16" (plywood)....Motor mount
1—1/16" x 2⅝" x 9" (plywood)....Rear wing rudders
1—7/16" x ⅞" x 9" (poplar).....Propeller

Light-weight gas model silkspan for wing covering; .040" dia. wire for lead-out controls; .063" dia. wire for control rod and nose guard; 3/32" dia. wire for landing gear strut; 1⅞" dia. wheel; .040" i.d. brass tubing for lead-out wire; .010" soft brass for tank; .020" soft brass for control horn; Cloth for hinges; 3/32" i.d. brass tubing for fuel outlet; 1/16" i.d. brass tubing for fuel tank filler and vent; Scraps of balsa, plywood and silk; Nuts, bolts, washers; Ohlsson & Rice .23 or any good .19 to .23 engine.

CONTROL INSTALLATION

(Continued from Page 32)

balanced, the flight will be short and sweet. We have heard of models with beer-can fuselages and wings made of a roofing shingle that flew, simply because they were balanced properly and the control system was located correctly.

Briefly the theory involved is this: In effect, the model is suspended on the end of the flying wires at the bellcrank pivot point. The balance point or center of gravity must be located slightly ahead of the pivot point. When the model takes off and as speed increases, centrifugal force increases. The C.G. of the model tends to move outward. Since it is located slightly ahead of the point at which the model is suspended, the model tends to nose outward. This creates tension on the lines which allows the flyer to have uniform control of the model's elevators. Maintaining the line tension is the main function of the system, elevator control is the result.

Obviously if the C.G. is not located properly in relation to the bellcrank pivot, some rather queer results will be obtained. If the C.G. is behind the pivot, the tail will swing outward and the model will fly in toward the center of the circle—that's all!

The determination of the C.G. location is dependent on the type of model and the wing location. Lifting airfoils and symmetrical airfoils (at slight angles of attack) usually have the force of lift acting at a point about ¼ of the chord back from the leading edge. Since lift raises the weight of the model into the air it follows that the C.G. should be located under or at the lifting point. Some models and some airfoils fly better with the C.G. located farther ahead than 25% of the chord. A safe rule to follow is: Balance the model at or ahead of the 25% chord line, and locate the bellcrank pivot point slightly behind the balance point. If this is done the model will be properly trimmed for flight.

The line guides on the wingtip are an essential part of the control system too. They serve to maintain the directional control of the model. As centrifugal force tends to turn the model outward, the guide keeps the flying wires and the model at right angles so the ship travels tangent to the circle.

THE ELECTRON

(Continued from Page 23)

motor mounts and crutch before finally cementing them in place, using ¼" flat rubber to pull the crutch into the contour of the motor mounts. Cut out bulkhead 3 from ⅛" plywood.

Bend and cut the landing gear wire as shown on the plan and bolt it to the bulkhead, being sure to fasten one wire to each side. Now, cut bulkhead 4 from ¼" hard balsa and cement in place. Do the same with bulkhead 3.

Next, take two pieces of ¼" x 3" x 4" medium-hard wood and cement these between bulkheads 3 & 4, setting them on the crutch to form an "A" frame. Cut and cement the remaining bulkheads in place.

Copy the pattern for the wing rest (tracing a right and left side to complete the pattern) on ¼" three-ply plywood. Cement a piece of ¼" by ½" rock-hard balsa to the bottom center of the platform and allow to dry. Then, cement the wing platform in place between bulkheads 4 & 6, on top of 5. Don't be afraid to use plenty of cement, but be careful to keep the platform parallel to the crutch. After the cement has dried, apply a few more coats. Next, cement the ¼" x ½" balsa sub-crutch in place.

The ⅛" sheeting then is applied on bulkheads 6, 7, and 8, down to the level of the sub-crutch. If you wish, you can plank it with ⅛" x ¼" medium-soft balsa instead of sheeting.

Now cut out the cockpit opening. Cut out the headrest platform from a piece of 13½" long ⅛" *(Turn to Page 55)*

SCOOP!

FLYING MODELS proudly presents Hank Cole's new "Flapalong" control system in the February, 1951 issue, on sale January 10th. This new system makes control-line flying easier than ever before—prevents many crack-ups—yet uses the conventional two-wire control-line system.