

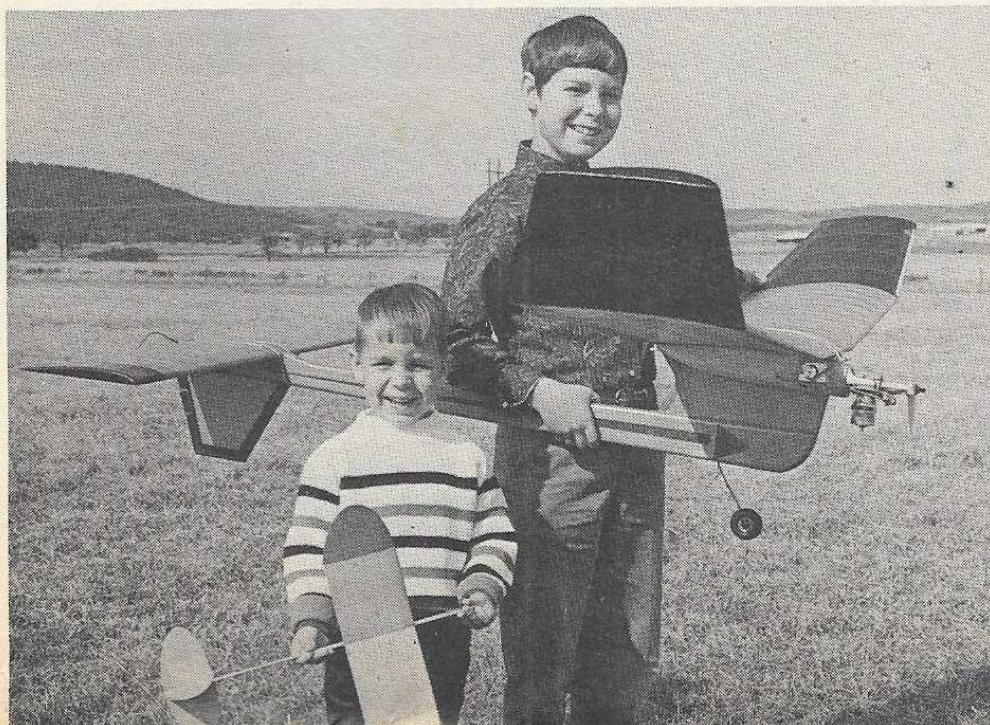


Our author with his big bird. Look at all that flat Oklahoma prairie stretching in all directions..

WITCH DOCTOR 800

In design development for more than four years, our famous free flight machine is the culmination of all this effort. That it is a winner is attested by its holding National class C record.

Two other Clem projects, Steven, 13, and Mitchell, 4, pose with a couple of their pop's F/F models.



► Perhaps the most difficult type of article to write is one in which a designer attempts to set forth objectively the merits of his own design. If the writer is too conservative in his description, the article will suffer from the lack of "color" and fail to impress his readers. On the other hand, if he exaggerates and makes unwarranted claims, he is subject to the wrath of the trusting modeler who builds the design. Humbled by this last thought, this writer will make every effort (within reason) to stick to the facts regarding the virtues of the Witch Doctor 800.

Most free-flyters are familiar with the ½ A Witch Doctor X. Those who know the "X" will recognize a difference of appearance between the "X" and the "800." The latter is not a scaled-up version of the ½ A size. However, both ships did evolve from one basic design. The more significant changes were made in the smaller size to accomplish a specific goal. Hence, the "X" was added to denote a design difference. The "straight" Witch Doctor, or what may be termed as the "original" Witch Doctor, is the subject of this article.

While it may seem presumptuous to go into some detail regarding the development of the Witch Doctor, the background is important because a builder is not expected to accept a "pig in a poke." The more information made available, the better one can judge for himself the merits of building the "800."

Witch Doctors came into being in 1963 when two B-C ships were built. One featured an undercambered wing while the other was equipped with a flat bottomed section. Both wings had a relatively high aspect ratio. The two planes were difficult to compare during the early stages of development. Only after the basic flight problems common to both planes were solved was it possible to draw a conclusion as to which wing design was the more efficient. After several months of contest flying, the writer decided the undercambered wing had a slight edge in the glide department. The wing penetration factor seemed to make very little difference.

After the wing design was selected, several Witch Doctors were built by Tulsa Glue Dobbys in 1964 and 1965 and flown in competition throughout the Southwest. Design changes continued to be made until the design was practically "bug" free. At this stage, about thirty Witch Doctors were built by modelers in other parts of the country.

Feedback from these builders enabled still more refinements to be made. Most changes at this point were structural in nature.

The design was finalized in 1967. During the (Continued on next page)

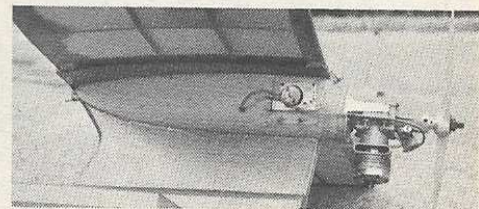
WITCH DOCTOR 800 . . . cont.

four year period of evolution, the Witch Doctor scored an impressive contest record. The plane in its present form was made possible only by the help and advice of many expert modelers who flew this plane in competition.

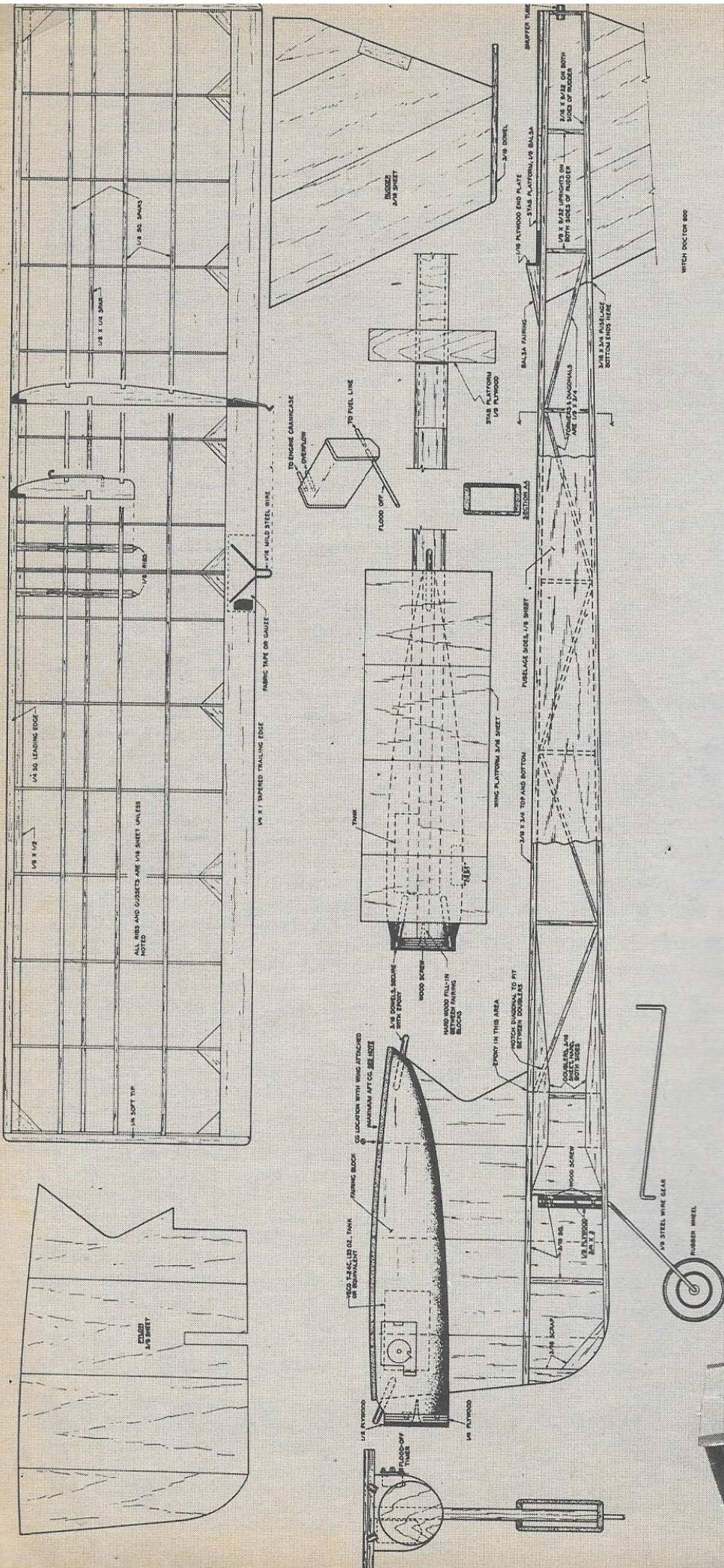
Contrary to its name, the Witch Doctor will not perform any feats of magic. It is subject to the same "downdrafts" as all planes. (The ship has even been known to make two minute flights on those third officials.) In stable air "without holes," the Witch Doctor will max easily, assuming of course that other factors are correct, such as: proper flight trim, adequate power, no mechanical malfunctions, etc. The Witch Doctor is only happy with a *hot* .29, .35 or .40 up front. Presently, the writer is using a stock .40 which gets the ship plenty high.

If you are looking for something new to fly and don't mind winning contests, give the "800" a try. Most of the builders who have tried it like it—especially Robert E. Frazier, a former Tulsa Glue Dobber, who flew his Witch Doctor to an official Class C. National Record. **FUSELAGE CONSTRUCTION:** Build pylon from 3/8" sheet balsa and rudder from 3/16" sheet balsa. Pre-cement pylon and rudder pieces before final assembly. After these parts have been recemented and assembled, allow to dry thoroughly. Next, pin down 3/16" x 3/4" fuselage top and check for squareness with a small triangle. Install fuselage doublers, 3/16" square, and 3/16" scrap pieces at nose for right side of fuselage. Now, pin down 1/8" x 3/4" formers and diagonals.

Cut 3/8" x 9/32" uprights and 3/16" x 9/32" piece for right side of fuselage and install. (It's important that these pieces measure 9/32" since they permit rudder to be in the center of the fuselage.) Cement rudder and pylon in place, taking care to block up level. Add 3/16" x 3/4" fuselage bottom. Add remaining fuselage doublers, 3/16" square and 3/16" scrap pieces at nose and



Close-up of pylon with Tatone fuel flood off timer and short beam mount.



9/32" pieces at tail. Next, place the 1/8" wire landing gear between two pieces of 1/8" plywood, 3/4" x 2". The plywood pieces are held firmly in place (with the wire in between) by three 3/8" long wood screws. Apply scrap plywood between plywood parts and glue well. Install the landing gear assembly into the slot at the bottom of pylon. (It will be necessary to notch the fuselage bottom to accept the 1/8" landing gear wire.)

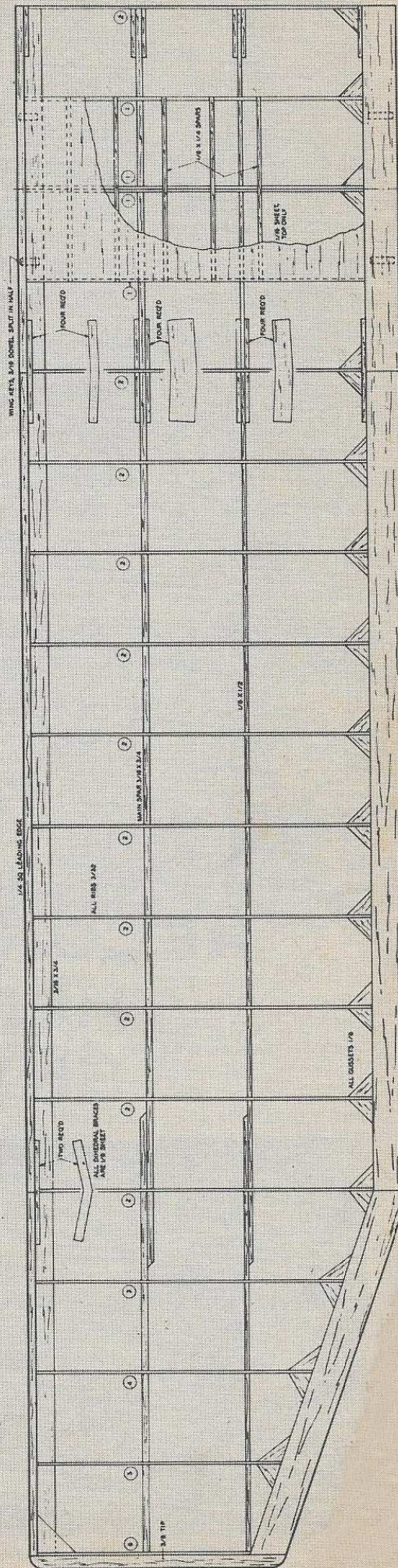
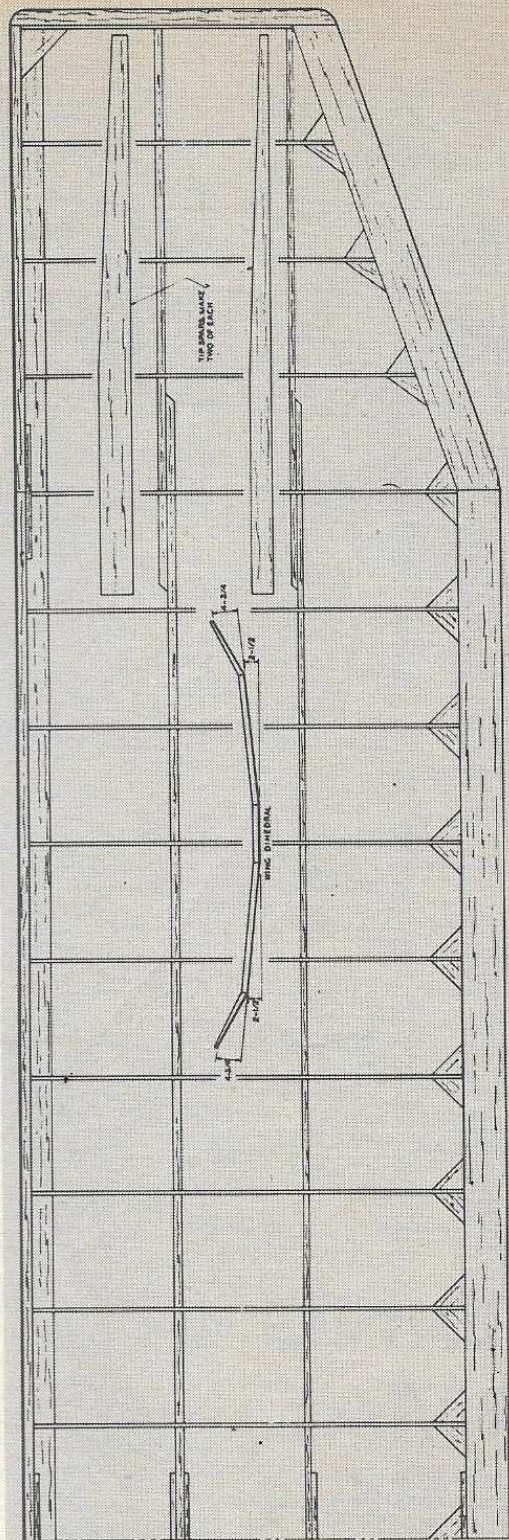
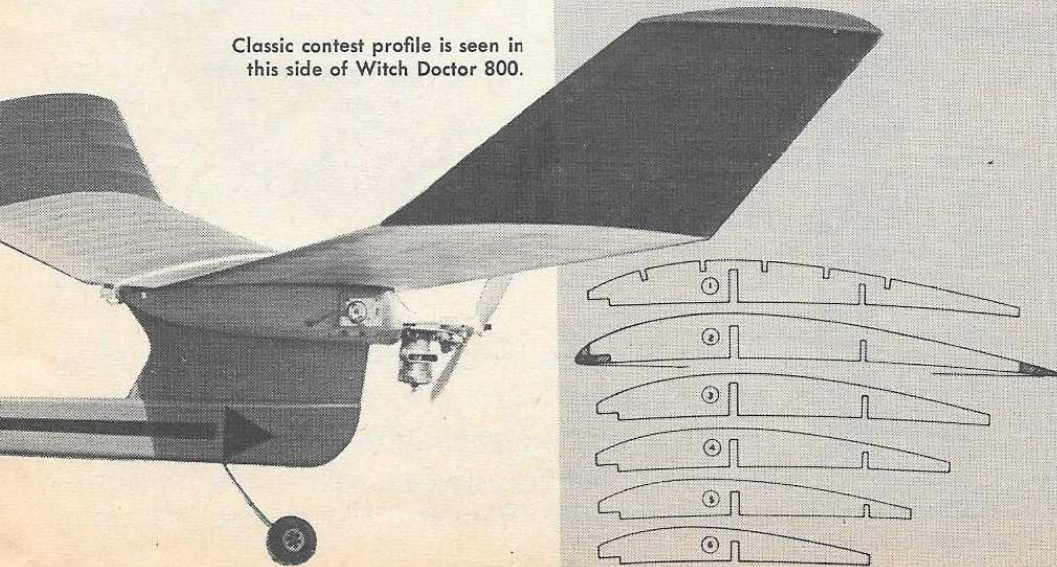
When completely dry, remove the fuselage framework from board. Place the fuselage on top of 1/8" sheet balsa and trace the fuselage sides. Cut the sides out and glue liberally to the fuselage framework. Lay the fuselage on a level surface, add weights, and allow to dry overnight.

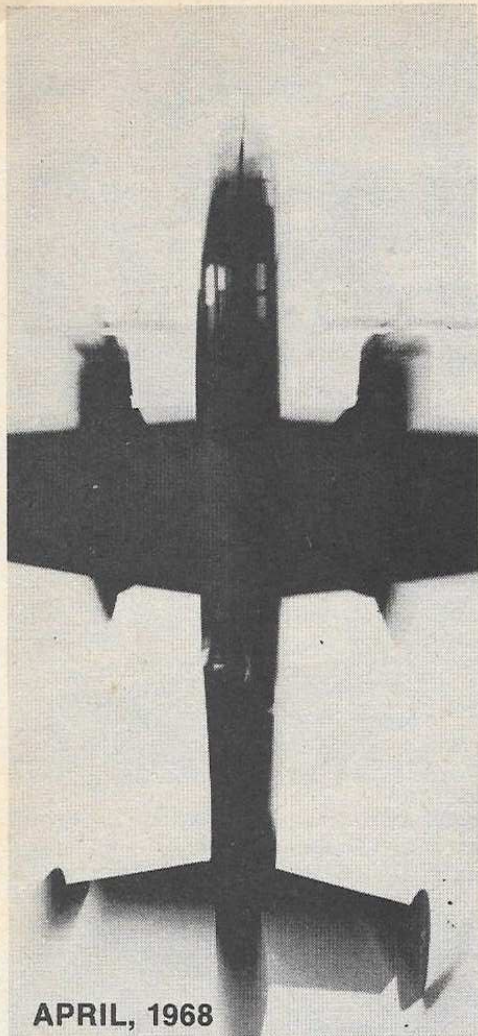
When fuselage is dry, add 1/8" plywood stab platform in place. Add 1/16" plywood end plate and balsa fairing. Glue 1/8" balsa stab platform in place. Add 1/16" balsa to top of platform and taper as shown on plans. Install snuffer tube and epoxy 1/16" steel wire DT hook in place at rear of fuselage.

Cut out the firewall fairing blocks and shape as shown (see side view, top view and front view). Cut out necessary wells for installation of fuel tank and tatone flood-off timer. (See timer installation.) The side you choose to install the tank and timer depends on whether you are right-handed or left-handed. Normally, the timer would be on the left side for a right-handed flier. If you desire the timer on the *right*, place the tank on the opposite side. Also, consideration must be given to the piping arrangement of the tank for a left-handed setup.

Install tank in fairing block and cement blocks to pylon. Surfaces should be precoated with cement. Add 3/16" sheet wing platform, wing holddown dowels and wheel. Cut 1/4" firewall and 1/8" wirewall to the size shown on plans. Drill motor mount holes into firewalls and install *blind mounting nuts* to back-side of firewall. The spacing of the mounting holes will depend upon what type of engine mount is used. A Tatone *short beam* (Continued on page 44)

Classic contest profile is seen in this side of Witch Doctor 800.





APRIL, 1968

DOOLITTLE RAIDER

Lieutenant Colonel "Jimmie" Doolittle startled the world with his daring Tokyo raid on April 18, 1942. And this is the plane that did the job: the B-25 bomber. The new Revell model kit of the B-25 is an authentic reproduction of Colonel Doolittle's own airplane...the first American plane over Japan. Build the model that's almost as dramatic as the raid itself. It's completely detailed and realistic, including movable parts. Less than \$2.50.

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Model of THE MONTH



Witch Doctor 800

(Continued from page 13)

mount (.29) was used on the original Witch Doctor. The short beam mount is recommended unless you plan to use a rear rotor engine which requires more horizontal space.

Proper installation of the firewall is important to your safety. Follow these next few steps carefully and you will have a trouble-free installation. First, install a piece of 3/8" thick hardwood in the gap between front end of the fairing blocks, using epoxy glue. When thoroughly dry, remove excess hardwood to conform to fairing block shape. Epoxy 1/4" thick plywood firewall into place. When dry, thread a 3/4" long wood screw into firewall and hardwood fill-in as shown on plans. It will be necessary to countersink the firewall to permit the wood screw to fit flush. Glue 1/8" plywood firewall into place. Wrap two layers of gauze or fabric tape around front end using epoxy glue. The gauze or tape should be approximately 5/8" wide to cover the firewall edge and a portion of the nose block. Apply a second coating of epoxy to complete the installation.

Next, round the fuselage corners as shown in the front view and Section A-A and sand liberally. Give the fuselage two coats of clear dope, sanding lightly after each coat, and cover the fuselage with jap tissue or lightweight silkspan. Apply five or six coats of clear dope to fuselage.

TIMER INSTALLATION: Engine vibration can ruin a timer in a very short time. Vibration can be reduced greatly by installing the timer in the following manner: Cut the timer hole oversize to permit the sides and bottom to be lined with thin strips of sponge rubber. If timer screws are used, do not thread them in all the way. This will allow the timer to "float", reducing vibration. In lieu of using screws to hold the timer in place, small rubberbands work very well. Stretch two small bands over the face of the timer and secure them with small wood screws positioned below and above the timer well. If the bands are positioned correctly, they will not interfere with the operation of the timer. Change the bands periodically.

WING CONSTRUCTION: Taper the main spar tips from 3/16" x 3/4" balsa. Taper the secondary spar tips from 1/8" x 1/2" balsa. See tip patterns on plan. Pin 3/16" x 3/4" leading edge in place and glue the 1/4" sq. leading edge on top. Pin trailing edge in place and block up under the front with 1/16" scrap balsa. The rear of the 3/16" x 3/4" leading edge is also blocked up slightly to maintain airfoil shape. See rib #2 which shows a cross section of the leading and trailing edge. Next, pin the

spars to the plans, blocking up with scrap balsa to make sure the spar will be flush with bottom of the undercambered ribs. Glue ribs into position and install the 1/8" scrap balsa gussets. Before joining the wing sections, cut and sand the leading edge to shape. Go over the entire wing with sandpaper to remove any burrs and irregularities. Pre-glue all dihedral braces and their matching surfaces. Reglue surfaces and attach the two main panels to the center section. Set the proper dihedral angles and allow to dry.

Install the tip panels and glue the remaining ribs over the dihedral joints. **NOTE:** It will be necessary to widen the notches in these ribs to permit installation. Glue 1/8" x 1/4" spars in place at the center section and cover with 1/16" sheet (top only). Sand the wing again to remove any rough spots and apply a coat of dope to the surface. Cover the wing with medium weight silkspan (or your favorite covering material) and apply five or six coats of Sig Lite-Coat (low shrink) dope. It would be well to cover or paint the bottom of the wing tips a dark color for good visibility while flying. Cement the 3/16" split dowel wing keys into position.

STABILIZER CONSTRUCTION: Cement the 1/8" thick half ribs together as shown on the plans. Build the stabilizer and allow to dry. Sand thoroughly and cover with medium weight silkspan or your favorite covering material. After applying a couple of coats of dope, add the 1/16" mild steel wire hooks. Apply fabric tape or gauze over the hold-down hook on trailing edge.

A stock K&B 40 engine is shown on the designer's Witch Doctor 800. Any good hot .29, .35, .40 or .45 engine can be used. The hotter the engine, the happier the Witch Doctor. Note the plumbing arrangement. On this particular airplane, the timer is on the right side and the tank on the left. "Lefties" prefer this setup.

Use a Veco T-24C or equivalent. Unsolder the existing brass tubing and seal the holes. Make new holes in the tank and install new tubing as shown in the drawing. (The outlet which goes to the engine crankcase is also used to fill the tank. The overflow outlet is sealed off before starting engine.) Before installing the tank in the airplane, make sure it is pressure tight. Seal off all outlets with the exception of one. Attach a piece of fuel tubing to this outlet and submerge the tank in a glass of water. Blow through the tubing and look for air bubbles which will indicate leaks.

C. G. LOCATION: The Witch Doctor can be balanced at any point in between the two arrows shown on the plans. If most of your flying is done where the

Plenty of WIN-POWER!

from a **Tornado PROPELLER**

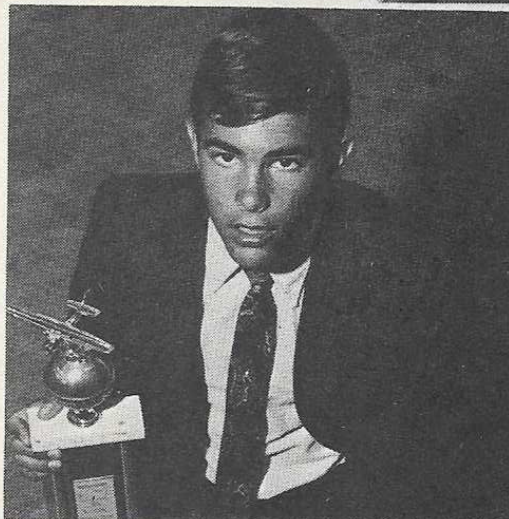
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2 Blade Tractor		2 Blade Pusher		3 Blade Tractor		3 Blade Pusher	
5-3	5-4	5-3	5-4	5-3	5-4	5-3	5-4
5 1/2-4	6-3	6-4	25¢	10-4	10-6	85¢	
7-4	7-6	7-8	40¢	11-4	11-6	11-8	\$1
8-4	8-6	8-8	60¢				
below in white, too							
5 1/2-3		5 1/2-4		9-4		9-6 9-7 9-8	
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85c		85c		85c		85c	
8-6 8-8		9-6 10-6		\$1		RC 12-4	
\$1.25		3 Blade Tractor		50¢		12-5 12-6 \$1.50	
9-6 10-6		6-3 6-4		50¢		GRISH BROS.	
10-4		3 Blade Pusher		50¢		ST. JOHN 1, IND.	
\$1.50		6-3		50¢			

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wind is no factor, the plane can be safely flown with the C.G. located near the aft arrow. *Do not* balance the plane aft of this point. Normally, where winds prevail, balance the ship near or on the forward arrow.

FLYING: A properly adjusted airplane is the real secret to winning performance. The best design in the world is worthless in competition unless it is properly trimmed for power and glide. Take plenty of time to get the full potential out of your airplane. Usually, only minor adjustments are needed on the Witch Doctor 800. If the flying surfaces have any visible warps, remove them with steam before attempting to fly. Check the C.G. location and hand toss the ship several times. If it has a tendency to stall, remove about 1/32" of balsa from the rear of the stabilizer platform. Continue this until a flat glide is obtained. A slight stall can be eliminated by adding additional stab tilt. Too much tilt, however, will cause the ship to turn too tightly. The left side of the stab should be higher than the right side (looking from the rear) giving the plane a left glide turn.

If the Witch Doctor has a tendency to nose down during the glide, add 1/32" scrap balsa to the rear of the stab platform (under the trailing edge of the stab) until the glide is correct. Usually, it's difficult to tell if the glide is actually correct until a power flight is made. When you think the glide is about right, add power. Hand launch the ship with a five second engine run at about three-fourths power. If the ship climbs slightly to the left, fine. If it goes to the right, correct with rudder tab. A very slight adjustment, 1/32", goes a long way, so take it easy on the rudder tab. Observe the glide from your first power flight. If the plane

has a stalling tendency, it may get on its back during a longer power run. If this is the case, remove 1/32" of balsa from the rear of the stab platform until the ship has a steep climb with no looping tendency.

If the plane flies shallow, or tends to nose down during the first power flight, add 1/32" scrap balsa under the stab trailing edge until this situation is corrected. Try a few more short power hops until the power pattern and glide are good. Gradually increase the power runs with full power. The Witch Doctor should climb very steep to the left with one-half to one complete turn in fifteen seconds.

If the ship has a tendency to corkscrew tightly and yet has a good glide, chances are the C.G. is too far forward. Balance the model 1/8" farther aft and remove about 1/32" of balsa from the rear of the stab platform. Some fliers prefer a corkscrew climb which assures a good transition from power to glide. However, a more straight away climb is desirable for greater altitude. If the ship has a good climb but a long dive after the engine quits, move the C.G. slightly forward until the transition is good. Fly your ship over and over again until you know it well. Don't forget to light the DT fuse, even on test flights with short engine runs. Happy landings!