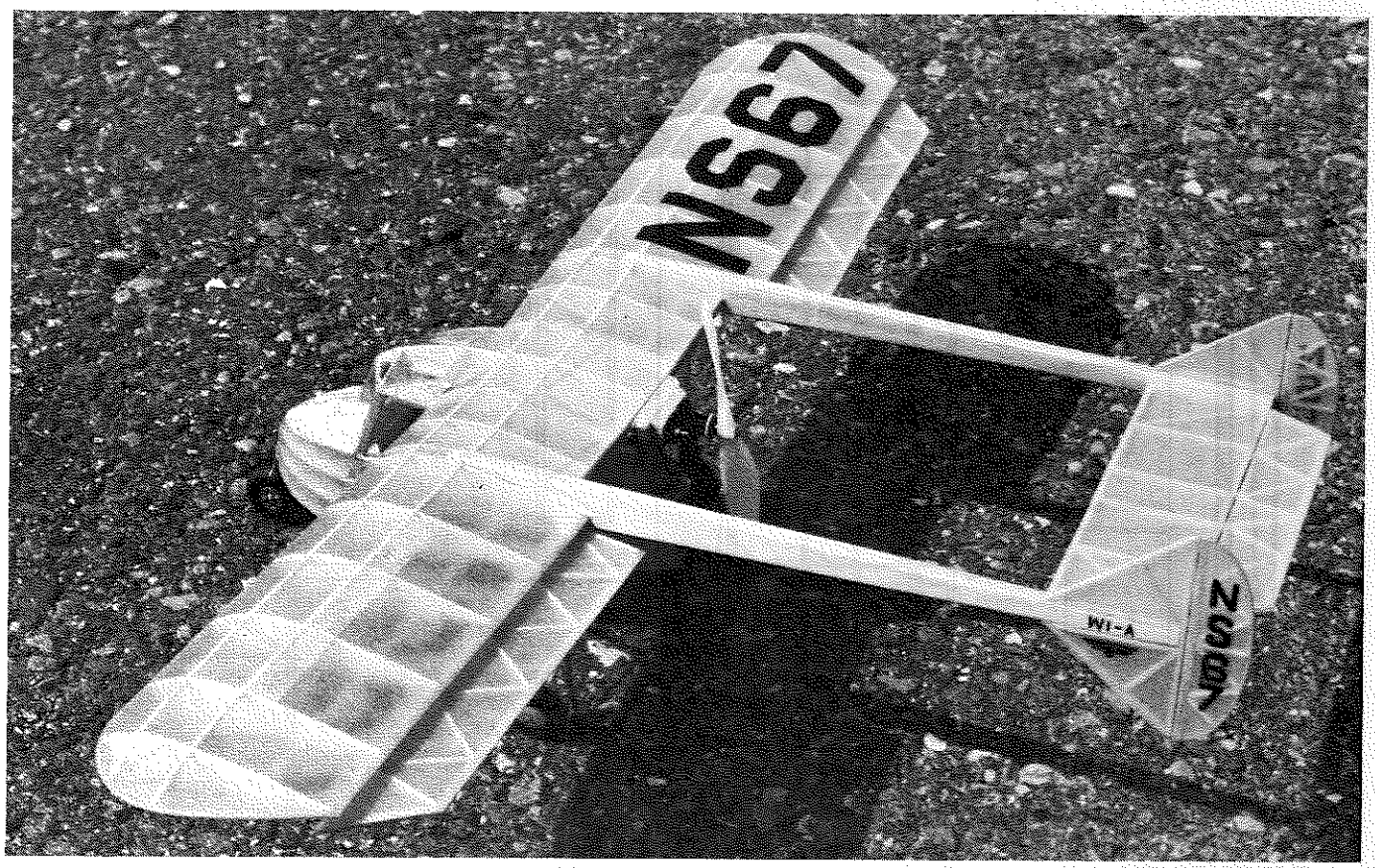

WEICK W1-A

By WALT MOONEY . . . What does our Peanut Bender do when he finds a design that hasn't enough room for a rubber motor? Turn to Fizz Power! This little ship is a perfect subject for CO_2 engines.

• The Weick W1-A was built in the early 1930's as a research safety airplane. It was operated and tested by the U.S. Bureau of Air Commerce in 1935, and was known for a time as the Weick rudderless. It went through several modifications over a period of several years, and was rebuilt by Fairchild Aircraft Corporation to the configuration modeled here.

Mr. Fred Weick went on to design the Ercoupe, another safety airplane, and also to work for Piper Aircraft, where he had some influence on the design of the Cherokee and some agricultural airplanes.

With the exception of the very early airplanes by Curtiss and a few others, the W1-A was one of the first aircraft to be equipped with tricycle landing gear, something that almost all modern general aviation aircraft have, for safer landings and ground handling.

This aircraft was selected for a CO_2 model for several reasons:

1. It is an historically significant airplane.

2. It has a reasonable free flight configuration. Tail size and dihedral were satisfactory.

3. Being a pusher, the CO_2 engine is protected in case of a crash.

4. CO_2 engines are easy to start, even when they are located between booms.

5. And, of course, it's an interesting shape.

This model is not what is known to the model airplane world as a straightforward design. However, it is not a difficult model to build.

Besides its general twin boom, center pod, pusher configuration, the model is built with separate surfaces. The flaps, elevator, and rudders (it certainly wasn't rudderless after the Fairchild rebuild), are built separately from their respective fixed surfaces. The flaps forced this decision, because they are separate airfoils. Therefore, there are a few more pieces to make than usual.

In addition, the pod and boom arrangement doesn't lend itself to the usual construction techniques. Try to keep the model light in weight, because it is rather large for the single cylinder CO_2 engines.

The fuselage pod is the most different of all the components, so a fairly complete building sequence follows.

First, cut out all the separate parts. Note that the "floor," "ceiling," and "deck" are only given as half-patterns. Make two halves and cement them together, or make a complete pattern before making them out of a single piece. Note the grain direction indicated on the various pieces. Two of the three bulkheads are assemblies. Use light 1/16 sheet, or even 3/32. Cement the uprights on either side of the web as shown. Note that the front bulkhead leans aft in the side view, and cut the ends of the uprights appropriately. Hot Stuff is useful (although not indispensable) to fix the bends in the front uprights. Use hard balsa for the front keel, and bottom keel. Use light balsa for the aft keel, which is also assembled from two pieces. Use hard balsa for the upper and lower formers. Note that two of each are required. Above the ceiling there are three cabin top ribs. One long one goes along the centerline of cabin forward of the wing.

Start assembling the body by cementing the bottom keel to the com-

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plete floor. Now you know why the floor grain goes crossways to the fuselage! The grain direction makes it easier to bend the floor to match the bottom keel shape. Next, cement the front keel and aft keel in place. Start thinking about how the engine will be installed. It will require a hole in the front bulkhead to allow the filler line to get through. Start bending your engine tubing so you can see how it will finally fit in place.

Now cement the bulkheads in place. Cement the ceiling on top of the bulkheads. Fit a 1/16 x 1/8 bottom windowsill between the front and middle bulkhead on each side. Cement the complete deck to the top of the front keel and the front of the front bulkhead. Part A is cemented in place and then part D along the aircraft centerline forward of A. Cement blocks on either side of D above the deck, and some 1/16 sheet below to reinforce the location for the CO_2 filler. Now cut a hole for the filler, notch out filler clearance in the front keel, and install the filler. Locate the other components of the CO_2 system. Make a snug fitting hole in a soft balsa block to fit the tank and cement the block to the floor. Press the tank into place.

Cement the motor mount block in place. Mount the engine on the firewall using the recommended attachment method for your CO_2 engine. Then cement the firewall to the motor mount block. Cement items "C" in place. With the engine installed, the structure of the body can be finished by adding the formers and three side stringers. Use 1/16 x 1/32 basswood for the stringers. Then add the three cabin top ribs, noting that the side ribs lean inward at the top. Add items "B" on either side of the cabin top center rib. Add the windshield center post.

Make the nose gear. The wire fork extends up through a short length of 3/32 aluminum tubing and then extends back on either side of the front keel for about half-an-inch. Use a commercially available rubber-tired wheel. It must be in place while the wire is being bent. Cement the wire and also the aluminum tube to the front keel, using short cloth strips wrapped over the tube and back on either side of the front keel for reinforcement.

The side braces for the main landing gear are bent out of a single wire and cemented to the underside of the floor. See the landing gear wire diagram. This will require a temporary cut in the bottom keel to install the aft brace, which is continuous. End the forward braces short of the keel. Cloth reinforcing for the wire-to-floor attachment is in order.

Next make the booms. They are essentially box spars that taper in the side view and are constant width in the top view. At their forward end, they are notched to fit over the trailing edge of the center section of the wing. Firm balsa is in order here, for strength.

The flying surfaces are conventional in construction. Just follow the plan.

The dihedral of the wing starts at the fuselage sides. Don't forget the gussets in the wing structure. The booms, which are fitted to the wings as if there were no dihedral, will slant inward, as will the fins, which are fitted to the booms as if the booms didn't lean. The fins therefore lean in with the dihedral angle. This is the true scale situation.

The stabilizer must be trimmed on its ends to match the angle of boom lean.

It's probably best to cover the model before assembling the various components, except for the area of the body which is above the wing, which must be done last. Cover the booms with tissue for reinforcement.

After covering, cement all the parts in place. The main landing gear wire, which becomes the axle, is made to be pressed into and cemented to the boom. It is inserted through the side braces as shown in the landing gear wire diagram.

Struts and fairings for landing gear wires on this model were made from plastic tubing taken from old plastic drapes. Veteran's thrift shops provided a second-hand source. The tubing is approximately 3/32 round on the landing gear side braces, about 1/16 x 3/16 oval for the wing strugs, and two sizes as shown for the vertical landing gear leg. If such plastic tubing is not easily available, carve the fairings and struts from balsa sticks.

The main wheels on the model in the photo were made from balsa, to help keep the center of gravity where it is.

OK!! So, how does the model fly? It has had flights of up to 42 seconds from an R.O.G., as an official flight at a contest. To do this required about 3/16 of up elevator and about 1/16 of left rudder . . . in the left rudder only. The flaps were mounted about 5 degrees down. I would not recommend more because they are effectively removing any washout in the wing, and more might make the model's flight characteristics a little twitchy.

The flight center of gravity is shown on the side-view. For early flight tests, make sure it's there. Ballast the model if necessary. Have fun with your Weick W1-A.

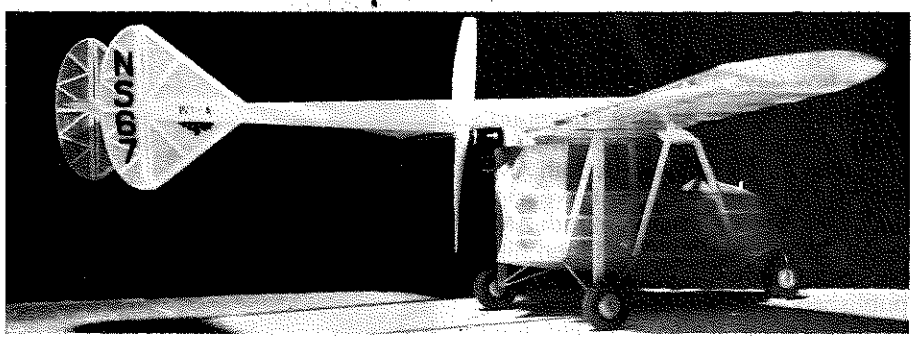
Now for some thoughts on CO_2 powerplants for this model. I believe this model is a little large for the single cylinder engines available now (there are three on the market). It would be ideal for a twin-cylinder, however, the model in the photograph flew on a single-cylinder engine.

Test your engine before you install it. It's going to be a pain to get it out if it doesn't work.

Don't expect a CO_2 engine to work well on a cold day. It requires heat to vaporize the gas. A couple of holes in the body covering, one at the front and another at the back, will provide fresh air to the tank area and help prevent the tank from refrigerating the inside so it never sees anything but cold air.

Personally, I'd recommend the Brown Twin-Cylinder CO_2 engine for this model. Next, I'd recommend the single cylinder Brown engine. I've had good luck with all my Brown engines . . . though they cost a little more, they've been worth it. It appears that the engine in the model I built suffers from a problem reported in Aero Modeller sometime back. It had a very short service life and will no longer put out enough power to fly the model. The CO_2 gas appears to leak past the piston.

In addition, the CO_2 cartridge holder for the Brown appears quite safe. I've never had a problem from a safety standpoint. A couple of the other loaders (not all of them) were loose enough to scare me, and one actually shot itself apart as I was screwing it together. •



Designer of this plane, Fred Weick, later came up with the famous Ercoupe, another safety airplane. Interesting format for an R/C Sport Scale model, no?

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