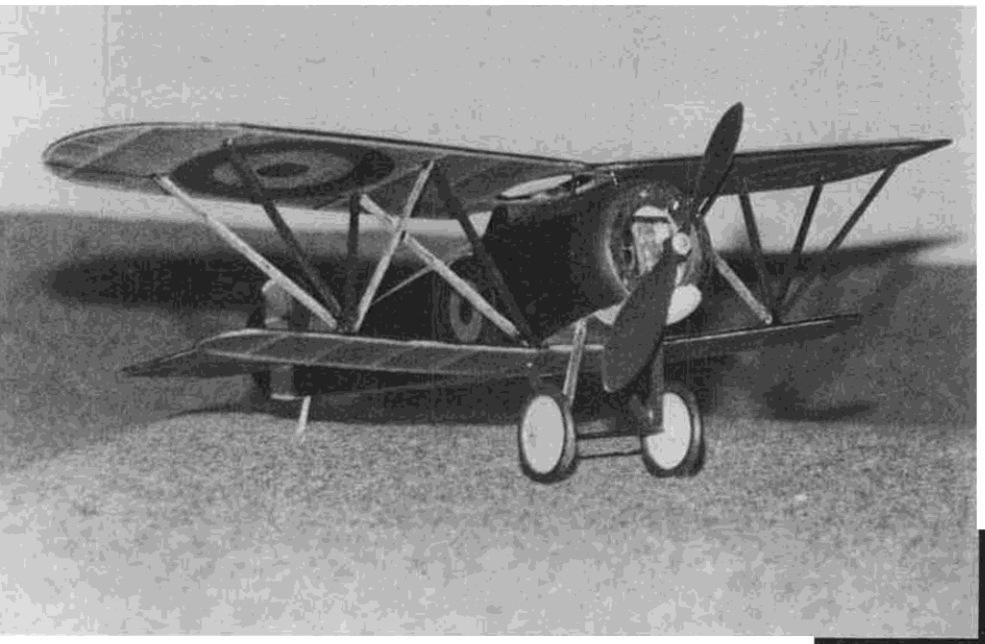
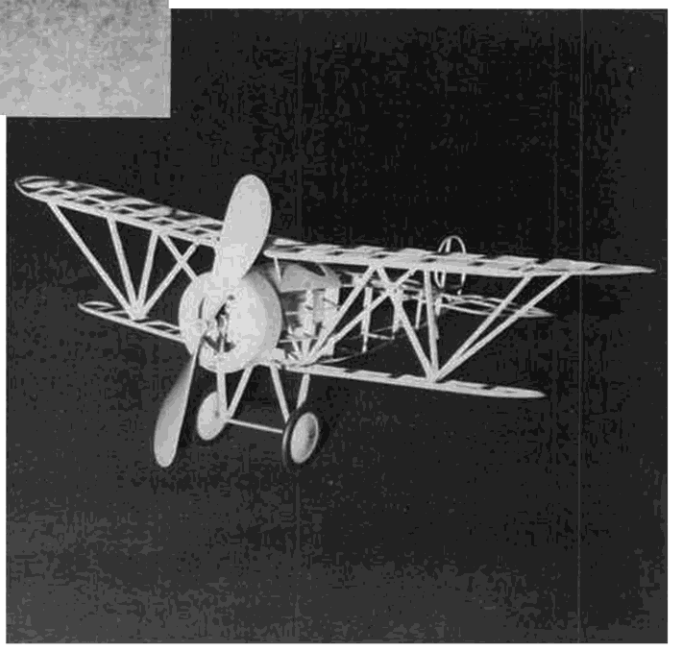




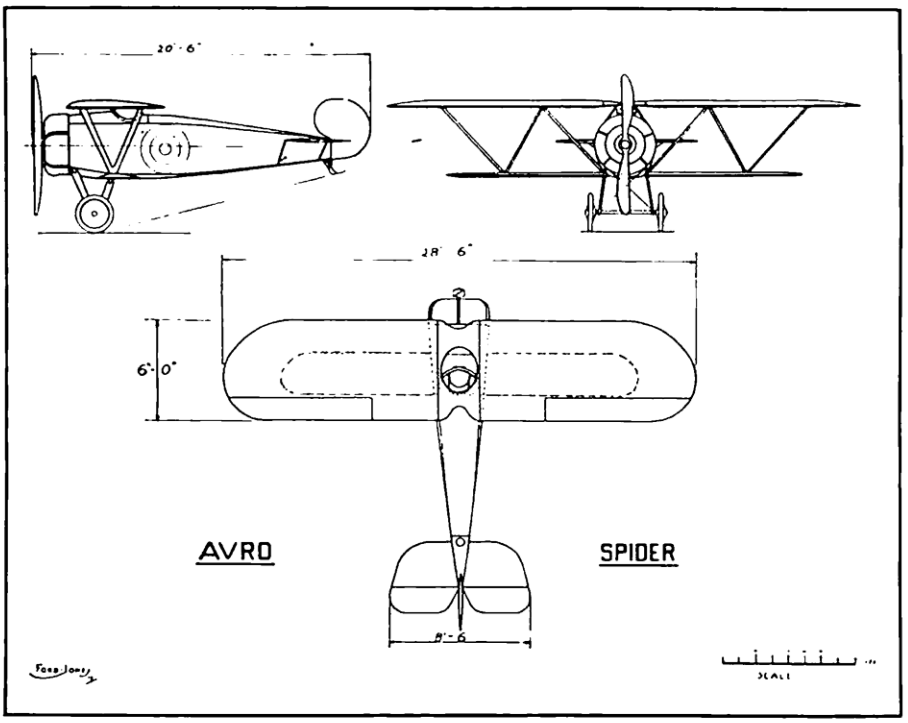
Avro Spider

By WALT MOONEY. . .Professor Peanut comes through again, this time with a delight from the 1919 issue of Jane's All the World's Aircraft. It's CO_2-powered, and a snap to build.

• The three-view for this interesting World War I biplane was published in the 1919 issue of *Jane's All the World's Aircraft*. Several features make it somewhat different from most of the other biplanes of the period. It has a large low aspect ratio top wing and a small high aspect ratio lower wing. As a consequence, the insignia carried on the wings is carried on the top and bottom of the top wing. It also has no interplane wire bracing because it uses a "Warren" truss "V" strut arrangement between the wings. Finally, the top wing was set very close to the top of the fuselage so that the pilot's eyes were in line with the wing, theoretically giving the pilot a better field of view than the more conventional biplanes.

Of course, the pilot's head is no longer protected in the case of a noseover on landing, and the wing's aerodynamic efficiency was somewhat decreased by the hole in the center of the top wing. Still, it makes into an interesting Peanut Scale of a little modeled WWI airplane.

Love these new copy machines, they'll take a three-and-a-half-inch span three-view and blow it up to thirteen-inch Peanut size. That's what was done here, which ac-



counts for the roughness on some of the outlines. But it gives a true enlargement which was then cut apart and rearranged into a more normal Peanut format and the model structure drawn in place. Note that the horizontal tail size has been increased. It looks awfully small on the three-view.

The basic model structure is very conventional, so it will not be allowed to take up much space in this article. The model was designed to be built as either rubber or CO_2-powered and the removable CO_2 powerplant installation will be covered as well as an innovative way of decorating and covering the model. Finally, the wing assembly was done a little differently than usual, and that will also be discussed in detail.

All the main structure is balsa and, except for the fuselage box itself, can be built directly over the plans. The lower wing plan is shown dotted, under the top wing, so to speak. Its leading and trailing edges are continuous right across the fuselage. That is, the whole lower wing is a single unit. The top wing, tail surfaces, and fuselage sides are totally conventional.

Once you have all the parts made, sanded smooth, and ready for covering, assemble the uncovered model.

The model in the photographs is covered with pre-decorated condenser paper and has not been doped at all.

Staedtler Lumocolor 357 permanent felt pens were used to decorate the condenser paper. Permanent pens are used so that the condenser paper can be water shrunk after the model is covered without the color smearing. Condenser paper is totally airtight and does not need dope for sealing. As a result, the felt pen ink does not run along the fibers as it will with regular tissue.

Tape a piece of condenser paper down over the wing plan and using a circle guide draw in the roundels using a red pen for the center and a blue one for the outer ring. Then use a brown pen to color the entire rest of the top wing covering leaving a one-sixteenth wide blank outline around the outside of the blue. Make sure the brown is smoothly done as possible and extends at least a quarter inch beyond the outline of the wing. Now using the decorated paper locate it very carefully over the top wing structure and glue it in place using thinned out white glue.

Now, carefully cut the top wing loose from the assembled skeleton. The strut system, being a nice set of triangular trusses, will remain in place on the lower wing. Decorate a piece of condenser paper to cover the bottom of the top wing. It has roundels but is not colored brown. Cover the bottom of the top wing, and, when the glue is dry, watershrink the top wing. When shrunk, dry cement the wing back in place on the struts.

Now remove the bottom wing from the struts and remove the fuselage from the top wing. The struts which have been cemented to the top wing should remain nicely in place.

The top half of the wing struts should be colored with the brown felt pen while the

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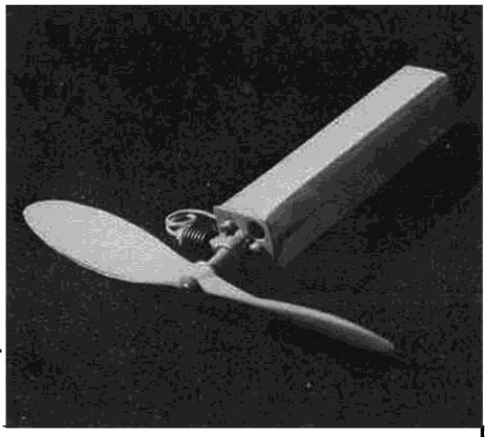
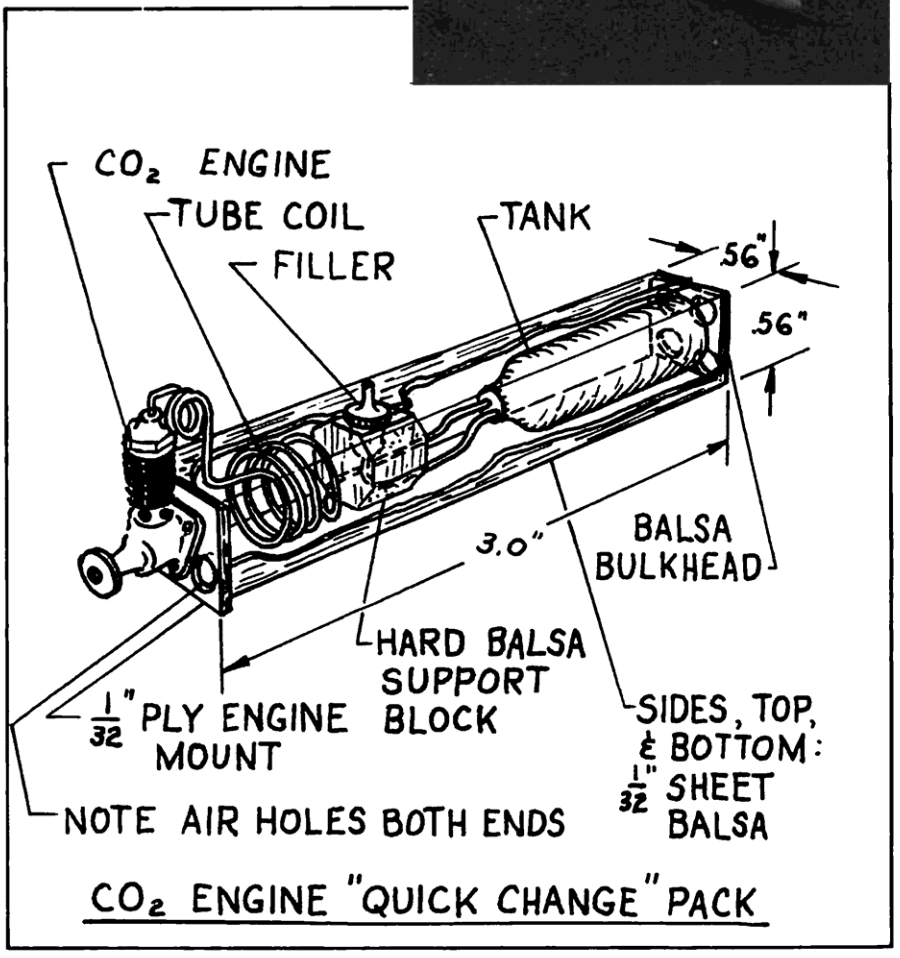
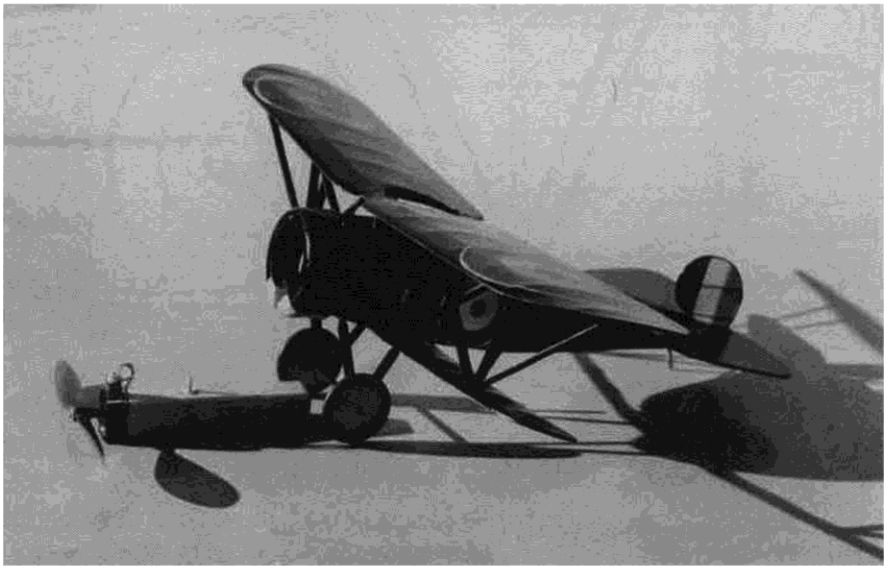


The removable CO_2 package requires a bit of modification during initial construction of the fuselage, but effort is worth the extra trouble. You can remove unit, and put it in another model. This allows you to use only one CO_2 motor for multiple models, and lets you hide the CO_2 filler inside, rather than have it protrude from the fuselage.





The Spider with its CO_2 unit removed for display. Note the placement of the filler tube.

top wing is off, and the bottom half of the struts should be colored when the bottom wing has been removed. It is best not to color the struts prior to the initial skeleton assembly because the model cement used can make the color run onto the wing ribs, and it might show through on the uncolored lower surface coloring.

Decorate the fuselage side covering in a similar manner to the wing and cover the fuselage. The top and sides of the fuselage, the top of the lower wing, and the top of the horizontal tail are brown. The vertical tail can be covered with uncolored paper and the stripes put on after covering. The front stripe is blue, the middle is white (uncolored), and the aft is red.

When all the parts have been covered, check to see that all the places that need to be colored are colored. It's tough to try to get a felt pen in between the struts after everything is assembled. Add the rest of the details, such as, the hinge lines, using a thin black felt pen, wheels, tailskid, and tail struts.

If your model is to be powered by a rubber band, a half-inch Williams Bros. thrust bearing is used and fits into a square hole in the bulkhead at the front of the cowl. Install a plastic propeller and rear motor peg in the time-honored fashion.

For the CO_2 installation, a little modification is required at the beginning of the fuselage assembly, and a removable CO_2 engine package needs to be constructed. This is a little extra effort but has the nice feature that you can use the engine in other models and its easy to load and the loading valve is hidden instead of on an unsightly stem of tubing sticking out of an otherwise beautiful model as has been published from time to time.

If your model is to be powered by a CO_2 motor, make up the motor package first because some of the modifications to the model are internal and must be made to fit your particular "quick change" engine package.

Basically, the idea is to make a small neat package that can be pushed into the front of a fuselage to be held in place by friction or a single pin, with the engine neatly inside the cowl, and still have the cylinder and the lines and tank exposed to plenty of air. Also, with the package outside of the airplane, engine adjustments and filling must be easily accomplished. The "quick change" package in the photographs has been used in three different airplanes and has been trouble-free. The filler installation is easily supported and very strong, and vibration of the tubing has been pretty well eliminated so tube cracking should not be the problem that it is sure to be with the filler at the end of a long, free stem.

The holes in the engine mount plate and in the bulkhead at the opposite end of the package are absolutely essential to allow free passage of air past the tubing coil and past the tank. This air flow is required to gasify the CO_2 and therefore there must also be an air escape hole from the fuselage itself. In the case of the Avro Spider, the cockpit itself is enough. The tubing coil should just touch all sides of the box, so that it is not free to vibrate. Do not use cement or sealer to immobilize the coil because that will act as insulation and prevent the heat transfer we need from the air flow to the CO_2 gas.

The engine shown is the Brown A-23 and has been a real little jewel.

Have fun with your Avro Spider. •