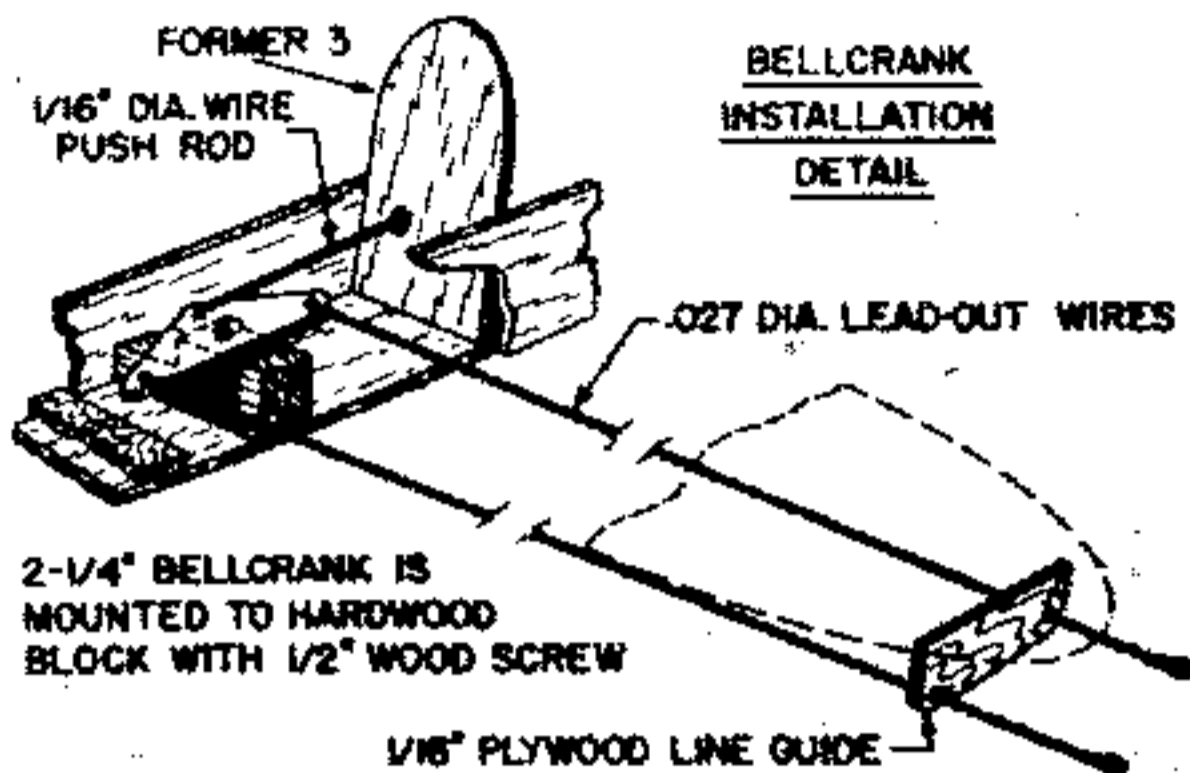


Uniliner

(Continued from page 45)

guide into groove. Apply glue liberally. Cover entire model with tissue as it adds greatly to strength and rigidity of completed model. Choose a tissue close in color to that which you intend painting; in this way you need only apply two coats of colored dope to cover well. Add Scientific pilot's head, bubble canopy, Trim Film decorations, then apply coat of fuel proofer.

If you class yourself as a beginner,



balance model close to leading edge of wing (this prevents model from climbing too rapidly when it comes around into wind). For the more experienced flyer who intends looping, balance model from $\frac{1}{2}$ " to $\frac{3}{4}$ " behind leading edge.

Do your initial testing on a calm day in order to get the feel of this new control system. Remember that although the Mono-Line control system eliminates loss of control, it does not eliminate "pilot error." That's strictly up to you.

Bill of Materials—Uniliner

- 2 sheets 3/32" x 3", fuselage and tail surfaces.
- 1 sheet 3/16" x 3", wing.
- 1 sheet 1/16" x 3", turtle deck, formers, etc.
- 3/32" plywood, firewall.
- 1/16" plywood, landing gear mount and control line guide
- 1/16" diameter music wire, landing gear.
- 1 pr. 1 1/4" wheels, pilot's head (optional) and a bubble canopy.

Chrome-Plate

(Continued from page 48)

type—without piston rings—and if the piston is of cast iron or steel, it is a candidate for chrome-plating. Aluminum and its alloys will not chrome-plate without an undercoat of nickel or other metal, so for the average modeler, aluminum, brass and metals other than iron and steel are out. Among the motors which respond well to the chromium treatment may be listed: Torpedo, Forster, Arden, Bantam, DeLong, OK including COs, Ohlsson, Cannon, old model Atwoods and Cyclones, Vivell, Madewell and the new baby motors.

The directions given in this article were discovered the hard way. Before the war, I had a few pistons plated with success by a commercial plater. With the war, commercial plating was restricted because of the scarce metals and I was out of luck. At the same time new motors left the market. In desperation, I worked for the secret formula. Some six months of intermittent experimentation at length led to success. First, I turned to the books on the subject which I secured from engineering libraries at three universities. I soon discovered that much of the material, the chemical formulas and electrical data were "too far over in the book" for my comprehension. However, I picked up enough essentials to get going and to make a few test runs. I soon learned that these test runs should be held in the safety of a laboratory and not in the open air. I had to be careful of the

of these instruments now except a crude rheostat, made from a spring taken from a common window-shade roller. All the other rheostats burned up anyway.

Yes, the first thing to know is that it takes a lot of amps to chrome-plate, though the voltage should only be from four and a half to six and the cells in your battery will largely determine that. A good hot automobile battery is ideal. Don't try to use dry cells, for they are not powerful enough. Be careful how you use the battery from the family bus. I got in Dutch with the Missus one day when I exhausted the battery in both my car and hers while I was trying to learn how. The process uses about as much juice as the starter—a slight exaggeration but not too far off. However, the average piston with the outfit throwing well will generally plate to the correct thickness in three to five minutes.

The first and constant thing to remember is cleanliness! After the outfit is set up and the bath is heating you should start cleaning the piston, and the cylinder too as it is needed for testing. The piston must be free of all oil, even the natural oil from your skin. The bath must be kept free from an oil scum on the surface. You can pick oil off the bath with a piece of dry balsa wood.

Most motors that still run but have lost their peak will need only a three-to five-minute plate: others may need up to fifteen minutes. For each minute in the bath, with the plate at the bright stage, something like .0005 is deposited, so the books say. I plate for three minutes, try the piston in the cleaned cylinder for a fit and if necessary plate for two minutes more, *et cetera*. If too much chromium is deposited, it may be easily removed with no damage to the piston by emerging the piston in concentrated hydrochloric acid, HCL (muriatic acid at your tinsmith). A slightly tight piston may be lapped in with jeweler's rouge, and you can bet that the cutting will be on the cylinder as the plate is harder than a file. Don't try to lap much as you may loosen the piston pin. Then, too, lapping with rouge is a slow process, like a cat eating a grindstone.

The skill, of course, is in getting the piston plated to the right snugness—not too tight nor too loose. Deposit is greatest the first few minutes, and the rate drops sharply after the first fifteen minutes.

Crankshafts and other parts may be plated too, but it is not practical to build up much wear. With the entire shaft in the bath, it will tend to plate the shaft tapered, with the heavy plate at the prop end, because of the diffused magnetic field at the crank throw of the shaft. (For you electrical wizards, the magnetic field is also strongest at the top and bottom edges of the piston. There is a slight "snowdrift" at these points, but this is insignificant on a three- to ten-minute deposit.)

The equipment needed is modest. You will require, in addition to a well-charged standard automobile battery, the following inexpensive material: 1. One-quarter pound chromium trioxide crystals (CrO₃). This will cost about a dollar. 2. One shy teaspoon of sulphuric acid (H₂SO₄). 3. One and a half quarts of distilled water. 4. Two lead plates for the positive electrodes 4 1/2" x 2 1/2". Convenient thickness. 5. Three bus bars about 1/4" diameter 6" long made of convenient material. Old automobile gas tubing well polished with sandpaper will do. 6. Eight or ten feet of standard house wire. Number 10 or 12 will work well. 7. A steel spring from a discarded window roller shade for a crude rheostat. 8. Some spring clothes pins or simple snap clamps. 9. Six or seven inches of 1/16 steel wire for holding the piston. 10. A glass jar some six inches in diameter, quart and half capacity, with about a 4" opening. (I use a pound glass tobacco jar.) 11. A hot plate and galvanized pan with wooden grill in bottom for a double boiler for heating the solution during the plating process. (I use the bottom half of an old waffle iron.)

Now for rigging the outfit. Mix the one-fourth pound of CrO₃ crystals and the quart and a half of distilled water in the glass jar and add a shy teaspoon of sulphuric acid (H₂SO₄). Go easy on the acid! This is your plating solution and will plate hundreds of pistons. After using, cover carefully and save. The solution I am using now is over three years old. If you wish and if you can, you might purchase the solution all mixed from a commercial plater. He usually knows his business and often improves the bath and reclaims it with other ingredients which you need not know, for they are not practical with small batches of electrolyte. Commercial platers usually zealously guard their "secrets," however, but if you have a friend in the business he can give you valuable tips.

Remember, the solution is a poison, so wash off your hands and provide ventilation for the fumes which rise in the plating process. The fumes will irritate the nose and throat and give you a "cold." Don't

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