

those nightmares: "It's my first combat match, Doctor. The starter says 'Go.' But I flip and I flip and I flip and I prime and I flip and I prime and I flip and I flip and finally the horn blows for the end of the match and—I wake up in a cold sweat. Can you help me, Doctor? What does it mean?"

Now if the doctor were some kind of psychologist or marriage counselor, he would say, "Have you communicated with your engine? Have you listened to what it was telling you?"

"Well, gosh, Doc. I didn't hear it say anything. I was just flipping the prop."

"Go home, young man, get your plane out, fill the fuel tank, connect the battery and listen to what your engine is saying to you."

The message here, then, is that the key to starting any engine is finding out what it's telling you that it wants. You may want to prime the engine but it may not want the prime!

It would be hard to cover all engines and all circumstances, but we'll look at a few common situations as examples in the hope that they will help improve new fliers' overall communications with their engines and lead to long and happy flying relationships.

(Because it is common control line practice to learn to handle engines without the use of electric starters, we are going to assume that starters will not be necessary here. Most control line competition events do not allow the use of starters.)

### COLD STARTS

The first start of the day for any engine will go smoothest if some careful preparations are made.

We need a full fuel tank, and we need fuel in the fuel line, in the crankcase and in the cylinder.

As we fill the tank, we want to make sure fuel will go through the lines. We can do this by forcing a little fuel through after the tank is full. Can we see it going through the line? If not, we may have to flush a filter or take other measures to make sure the lines are clear.

We don't want to fill the crankcase with fuel; we just want to make sure there's some in there. We can do this by choking (put a finger over the venturi and turn over the prop a few times).

We get fuel into the piston by priming and, alas, here is where many starts go wrong. How much is enough, and how much is too much?

With a cold engine, it's pretty hard to over-prime an engine, because, as a rule, cold engines don't mind a bit of a flood. (Yes, you can overdo it!)

The best way to prime a cold engine is to measure the prime. Understand that we are talking right now about an engine with an open exhaust—muffled engines provide some additional problems.

In the "old days" the common method of priming was simply to stick the fuel bulb's tubing into the exhaust and squeeze until fuel dripped out. How much fuel were we actually getting into the exhaust? Answer: We had no idea!

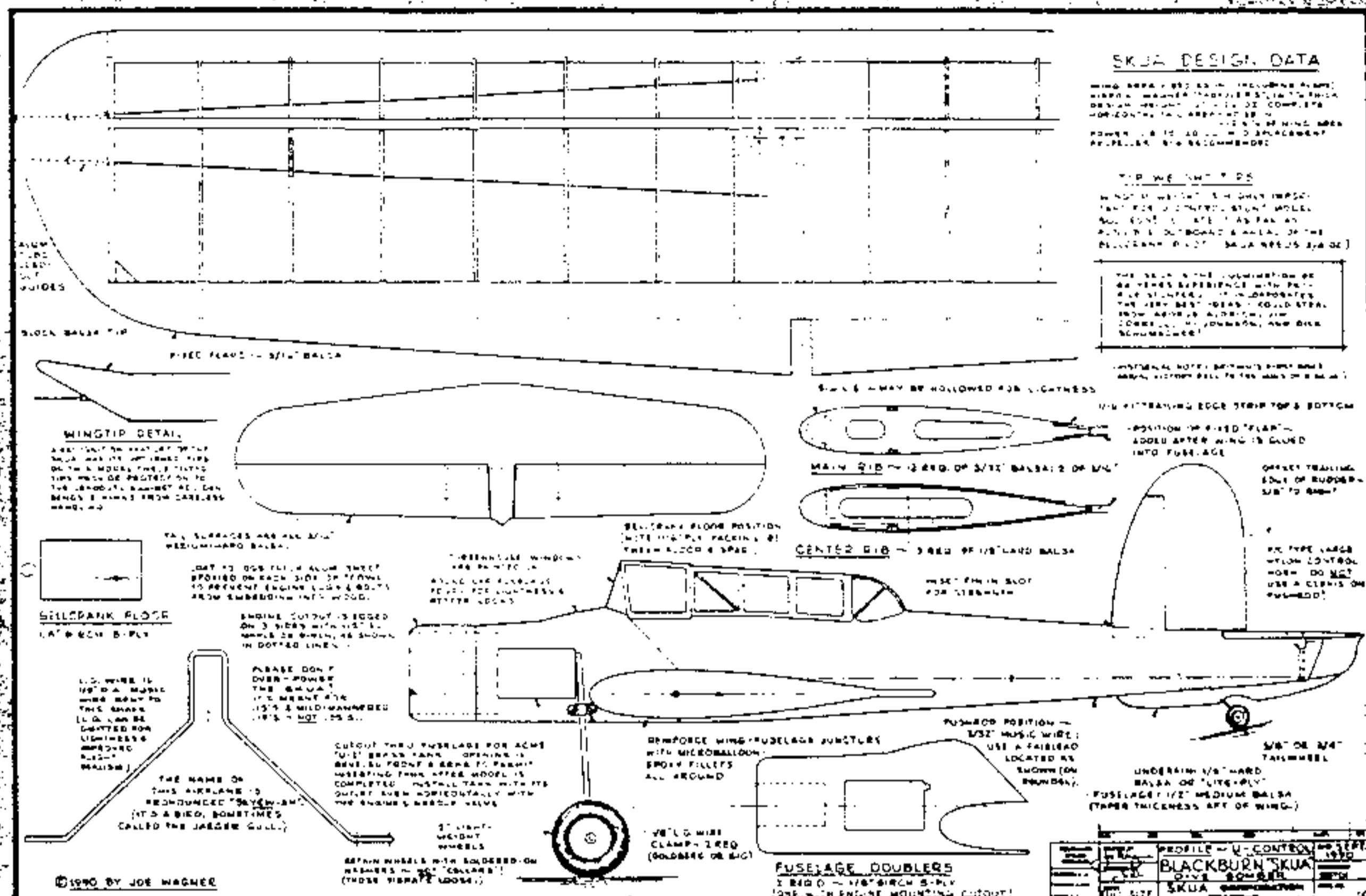
Here's a much better way: Turn the airplane so that the exhaust points up. Close the exhaust port and fill the corner with fuel. Turn the prop so that the fuel runs in. Right the airplane and prepare to flip. In this way we have given the plane a measured amount of prime. As we become familiar with the engine, we can vary the amount of prime for best results.

If we're using a muffler that can't be primed (some styles of mufflers do allow a prime, but many don't), then we have to get fuel into the cylinder by choking. With the battery disconnected, choke and flip the

against the rotation of the prop, indicating that there is fuel in the cylinder trying to ignite when the piston pressurizes.

Only some experience with the engine will tell you exactly how to "read" the bump. Generally speaking, however, a good solid bump means that the engine is ready to fire. If it is completely overloaded with fuel it may give a tremendous kick, or even not bump at all. When it doesn't have enough fuel it will not bump, or will bump weakly.

Now that we have our cold engine fueled, primed and bumping like it's ready to fire, how do we actually accomplish starting?

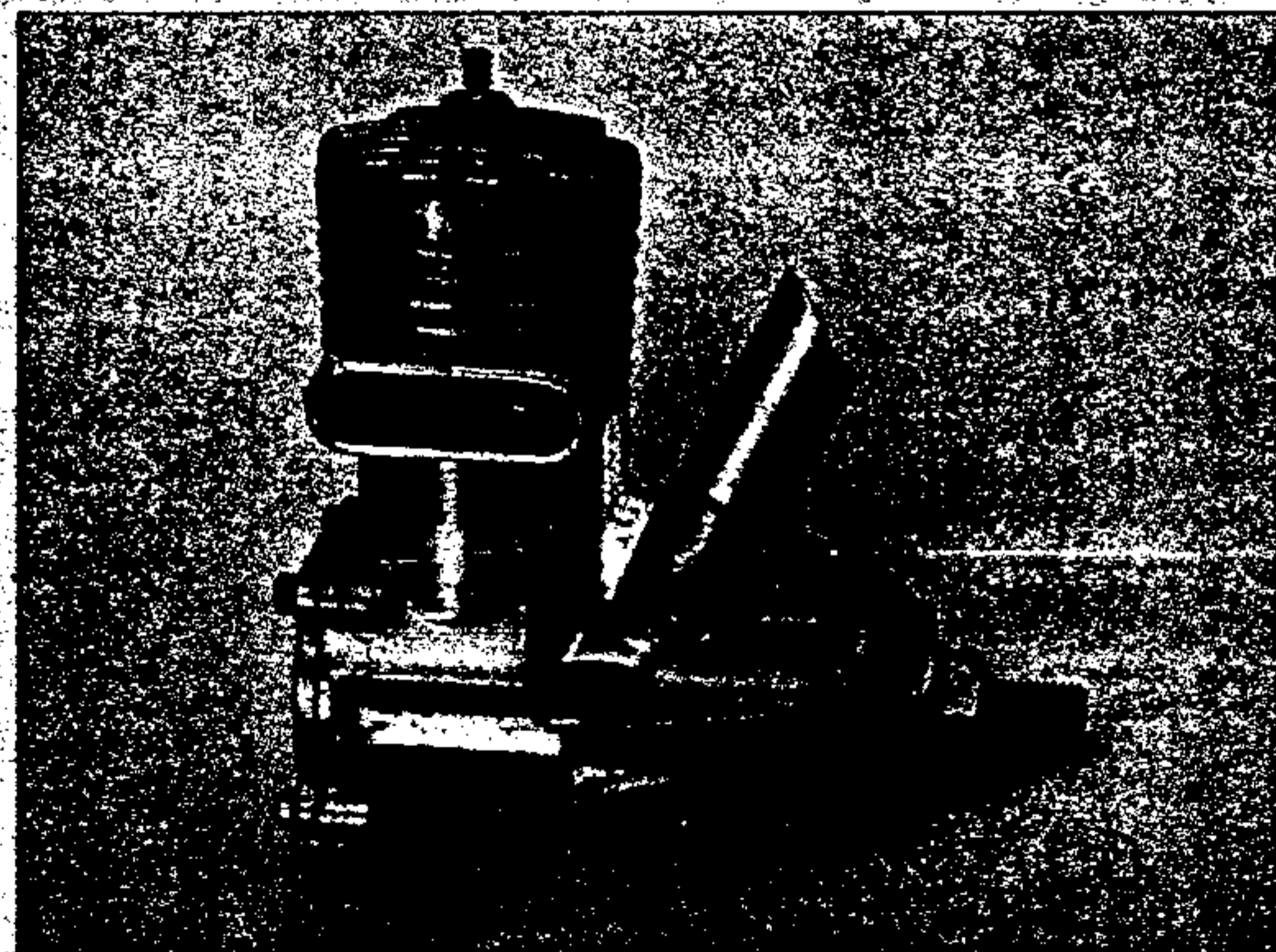


prop several times. Then connect the battery and feel for a bump. We'll keep choking until we get a good solid bump.

The bump, in fact, is the key to starting any kind of engine.

The very beginning flier may not be familiar with "the bump." It's the kick you feel when you have the battery connected and turn over the engine slowly, holding the prop securely. The engine will kick back

First of all, we need to get one thing straight—who is boss here? Are we going to start the engine, or are we going to let it do what it wants? If we are going to start the engine, we are going to show it who is boss. We are going to flip the prop *smartly*. Little, tentative pecks at the prop, or slow, graceful rotations are just not going to be successful; we need to get the prop spinning at something resembling running speed.



Joe Wagner most CL need longer intake for reliable suction feed. This is his modified Vaco 35.