

## READYING USED ENGINES.

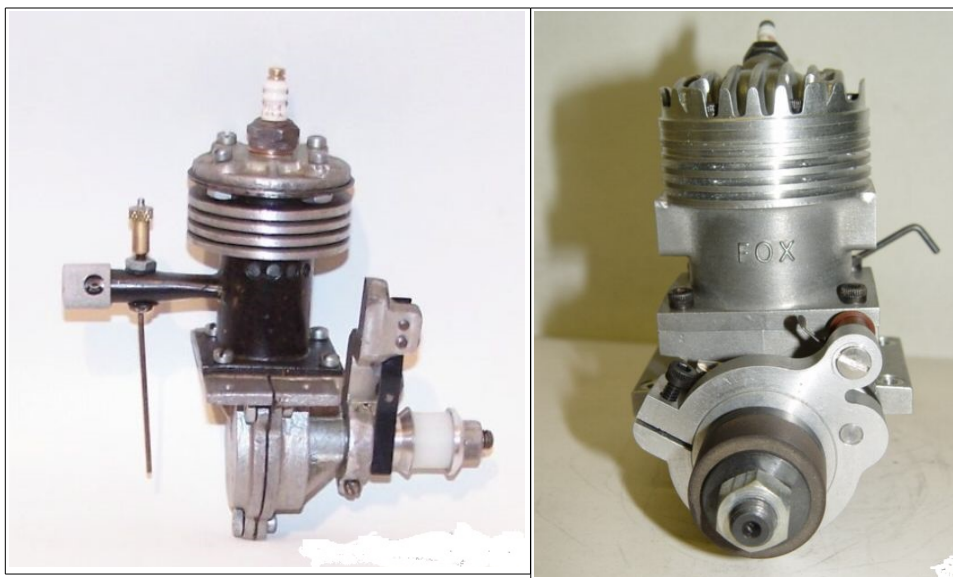
By Bob Angel

Most used engines turn out to be quite serviceable as long as they're complete and have no obvious flaws, such as low compression or odd noises when turned over. That said, quite a few can't be placed on a test stand, started and run satisfactorily without some tweaking first being performed. Sparkers obviously have a few more things that can get out of whack.

Many lists of "Why your engine might not run" have been published. But many of those lists are very simplified, similar to instructing you that if your computer doesn't work, make sure it's plugged in to the wall socket. I'll recite some of the both common and oddball things that I've encountered over the years when prepping an engine for running. Let's first review a good routine to use for any unfamiliar engine before even trying to run it.

**FROZEN ENGINE:** If an engine is completely frozen up and doesn't turn over with a prop in place, a film cover heat gun usually frees it up quickly. Hold it in one hand wearing a thick glove and heat it thoroughly with the gun, occasionally trying to move the prop. Keep at it for at least 5 minutes, as heat + time helps. Once that prop moves, you're home free and you need to put some fresh fuel or oil in and just turn the prop to flush it through. Keep in mind if you apply too much force and break something, it's kinda late to start over.

If that quick treatment doesn't work, the next step is to remove the plug and possibly the case cover, squirt lube in all the openings, let sit, and try again. The best lube is generally the same fuel type the engine was last run on, whether gas or alcohol based. Penetrating oil doesn't usually do much good as it has a tough time penetrating long distances through goo that may not be of the same base as the oil. Finally some recommend immersing in a crock pot with anti-freeze overnight. But the worst case I had to deal with was a little in line twin that survived all those treatments and had to be completely disassembled to prevent breaking something.



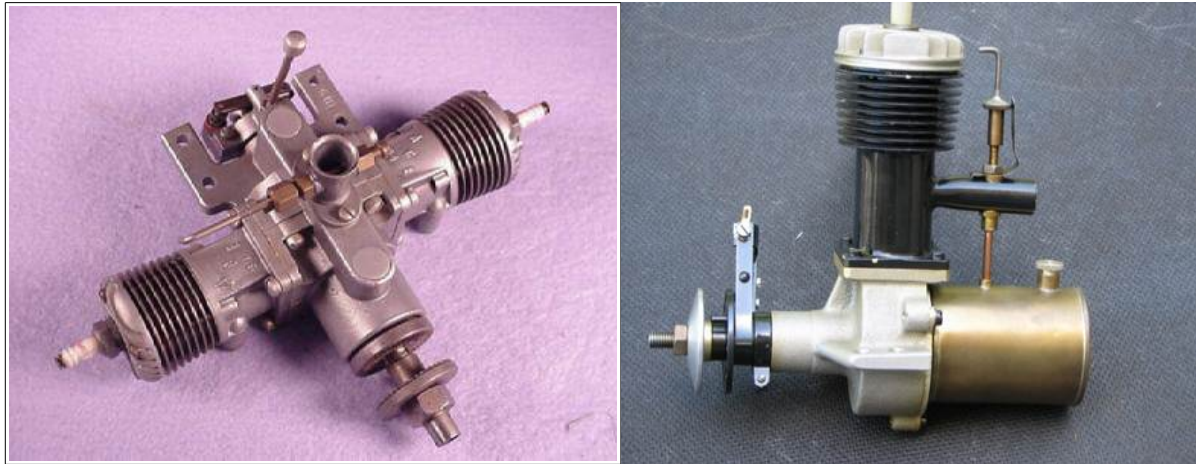
QUIZ: Can you name the engines?

Clues: The one at left is of .56 displacement. The one at the right has FOX cast on the front. Answers at the end.

Check that all nuts and screws are snug. If the needle valve might rotate when running, fix it with a proper clicker, or a short piece of fuel line to snug the needle. For engines with screw-in cylinders or backplates, check that they are not loose. Check that a glow plug will light. A spark plug can have blackened porcelain but still work OK, but if there's any doubt, substitute a new or known good plug.

Connect a long fuel line to the fuel inlet, blow through it while listening for the hiss. Open and close the needle valve while listening. A trained ear can tell you the approximate starting setting just by listening. If it's plugged completely, a shot of fuel usually removes the

goo. Check that the spraybar holes are aligned pretty much at right angles into the airstream, but aimed slightly to the engines inside. But that usually isn't necessary unless you find a loose spraybar nut and the spraybar might have rotated.



Here are a couple more for I.D. The one at right is a repro of a German engine. Answer later.

**EXCESS POINT RESISTANCE:** Points often need attention on a used engine. Using a continuity light or an Ohmmeter connected between ground and insulated point, check that the points make and break. With luck, the points usually just need congealed goo cleaned off. But lots of other things can cause resistance. Check that the Ohmmeter reads the same low resistance with points closed as does a direct short with both meter probes on the case. A timing light will glow dimmer if the points have excess resistance. A loose staked in moving point "button" can cause this. I've successfully soldered the button to its spring on a couple of Browns, and just replaced the whole moving point on others.

The timer can develop high resistance between its frame and ground, especially on such engines as Ardens where the case corrodes easily. Check resistance between the timer body and the crankcase to confirm this. Working the timer back and forth with a little fresh fuel or electronic cleaner squirted in will usually fix it. Otherwise you may have to mechanically clean off the corrosion. I found a reproduction cam for one Arden was ground wrong, requiring the timer arm to be set in an awkward and dangerous position for starting. Since the timer cam can only be fitted in one position on the Arden's crankshaft, a new cam was necessary.

Take a look at point gap. At the speed most of these engines run, gap isn't usually as critical as most instructions would indicate. If the gap looks "reasonable", let it alone. Re-setting the gap on an O&R for instance, can be a real pain and usually isn't needed. But closing a gap down to about .006" will give more dwell and make a hotter spark - if needed. But if not needed, it otherwise can cause the coil to run hotter than necessary. Check the nuts that hold the wire lead to the fixed point. These often get loose (even running in a ship) and can cause a lot of frustration before finding the problem.

Sometimes a weak point spring can result in "point float" and erratic running at higher speeds. With open points you can (very carefully) use a dowel pressed lightly against the point spring while running to check this. You'll notice an RPM increase if that's the problem. I've come across more than one McCoy 60 with that problem. I carry a small curved hardwood shim in my field kit which slips in to compress the point spring by a few

thousandths. At least once, I've shared one with another McCoy flyer on the flying field, and it works well.

We've mentioned prop slippage before as a problem sometimes hard to detect or cure. It can result in a 'no start' or erratic running. It occurs often in big high torque engines, especially those with small drive washers, such as Forster 99's or Orwicks. But even Ardens can also have pesky prop slippage. And the Arden can easily spin the prop off, also tossing the 2 piece spinner screw off to get lost. A custom 1 piece spinner nut is a good investment for an Arden if you can make or find one.



These three engines should be a little easier to identify than the previous four.

In a no start situation, the basic ignition system is also often suspected. That's another lengthy subject we've explored before and maybe again sometime. But the best way to rule out that problem is to wire in a separate clip-on system that you know is solid. And the old standby of running the engine on a glow plug won't necessarily identify an ignition system fault; but it can be a clue, and can at least allow you to get a needle setting. If you do run it glow, FAI (no nitro) fuel should be used, as many sparkers will break something, even on 5% nitro. You can run a sparker as a glow with gas and oil, but it's usually harder to start, and you may have to leave battery heat on while running. And it appears to me that the glow/gasoline combination is harder on the engine than using methanol fuel.

**TWO FINAL UNUSUAL ENGINE PROBLEMS:** I'd made a tank for a friend for an Ohlsson side port that either had no tank or the original was damaged. It worked fine, until a few weeks later; when the engine would start but not keep running. He finally solved the problem himself when he took the tank apart. I'd forgotten that unlike me, he normally used gas and oil instead of FAI fuel. I'd used silicone tubing to extend the pickup tube to the bottom of the tank. The gasoline had swelled the silicone over time letting it fall into the tank bottom. A short piece of black gasoline tubing fixed the problem.

Very recently I test ran a Brown Jr. that's to be one of our upcoming door prizes. I did it at the field so we could all be witnesses. Did you ever notice how a group of guys will all stare at an engine running on a test stand until it quits? I ran it on FAI fuel, but to keep from melting the plastic tank I'd temporarily installed a glass air brush bottle, which fits nicely in the Brown's screw on top.

The engine started easily but quit suddenly with about half the tank used. After a second run with identical results, we noticed that bubbles were slowly building and popping out at the fuel intake line inside the tank. That seemed weird as we couldn't figure out what

was making back pressure to cause that. But those bubbles showing through the glass tank allowed us to identify the problem quickly.

Like many older sparkers, Brown's use gits caps for the tank filler opening. There is usually enough slop in the spring loaded cap that replacement air can get in with no problem. But once in a while the fit is perfect enough that the cap seals completely. In this case the cap was sealing, but the glass bottle was absorbing a little heat from the running engine so it was building just enough pressure inside to match the need for replacement air. But that pressure got a little mismatched at about half a tank and stopped the engine. Later those bubbles we were seeing resulted from the tank cooling and creating a slight vacuum inside. A sliver of balsa under the gits lid resulted in a full run.

We later recalled that Dick Fischer had also had that problem with a gits cap and always slipped something under the cap. At home I made a permanent fix with a slight notch in the opening under the gits cap. Bob Angel



Here's the world's simplest tool for unscrewing Brown Jr. cylinders from their cases. It's made of 1/8" music wire.

The tool plugs into the holes in the head and gets clamped into a vise upside down. Using a gloved hand you can then just grasp the crankcase and unscrew it.

If you're not very accurate at wire bending, you can make those wire legs a little longer, so a little less

tweaking is needed to accurately hit the holes.

Make sure the Browns' piston isn't frozen in the cylinder before disassembly.

**ENGINE QUIZ** answers in order they were presented: First we have an Apex Skylark 56, and a Babb Fox. Next an Ace Twin and a replica German Felgiebel. And the last two should get easier for most folks in the US with a Cannon 300 or 358 and a Forster 99 next to an Atom.