

Kingston Carburetor Float Arms *by Paul Gockel*

There is no more Byrne, Kingston & Co. carburetor makers in Kokomo, Indiana. Parts are hard to come by, but salvation is near. You can make your own! Everyone's all gaagaa over the new nitrophyl floats, as they should be, but what good is a new float if the arm and needle, which supports them are gone? I have three Kingston carbs, (as do some other dippy people), all of which are lacking their internal mechanism necessary to start and stop the flow of gasoline from the tank. Too much mindless monkeying and misguided human interface to bend arms has more than likely resulted in broken arms, which then got discarded with nothing to replace them. That's my story, anyway.

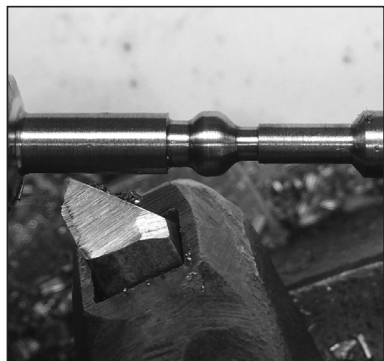
Ian Dickson told me many years ago that Bob Skinner was making new float arms. I gave Bob a call. He was a real treat to talk with as his immense knowledge and encouraging conversation was all I needed. He wasn't going to make any more arms, but sent me some of his castings and advice. What more could a guy ask? Let's get started. Bob's castings arrived in the mail. Holy crap, they're tiny. I borrowed a friend's Jacobs #33 chuck so I could hold the arms in the lathe to face the pivot hole. I could now centre drill it, and bore through with a 3/32" drill. Perfect! (A different batch of castings wouldn't be so easy.) I faced the other side with the arm mounted on a mandrel I had to make. Wow! It fits in the carburetor. Amazing! I machined all four remaining arms in a like manner.

Disaster #1: Due to bent, burred and random sized original pivot pins, nightmares would ensue as I pursued perfection on future arms. Nothing fit, nothing standard. This seems to be a recurring theme in carburetor construction. I found the same with the Reo's Holley. A lot of polishing pins was necessary, not so they'd look good at the boat show, but so the arm would not bind. No float of any material will overcome a binding float arm.



Photos: Paul Gockel

A newly machined float arm pivot hole.



I'm no model maker and these parts are extremely small. Off came my glasses so I could see. Next, I determined the threads of the retaining nut. They look like 1/4" x 32. I ordered the brass hex stock and taps to make these. While I was waiting for those things to arrive, I made a needle. More tiny stuff. An accurate dimensioned drawing of the original needle helped. Then I made needles from discarded Xerox machine feed rollers. Wonderful stuff; far better than hardware store steel. I ground a form tool to make the little ball in the middle, then kept machining the future needle until it was finished.

Machining a new steel needle. Note the ball formed in the middle of the shaft. The lathe's tool is 1/4" square so you'll have some idea how small the needle is. Note the different shaft diameters either side of the ball. It copies what was done in the factory. It serves no purpose in the proper functioning of the carburetor; rather, it's the manifestation of a faulty-made form tool. (tool not shown) I copied it.

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Constant measuring is vital if the scrap bin is to remain empty. I made some needles out of brass and some out of steel. Since most carbs use steel needles, those are the ones I'll use.

The 1/4" brass hex stock arrived so making the tiny nuts was the next project. You'll need to machine 3/32" of material length down to 0.245" diameter for the threaded portion. I set up the lathe's gear train for 32 threads per inch and then with the power OFF, and using a ground 60° inclusive bit, machined the tiny threads by manually pulling the chuck around. To use power on such a tiny piece would have ruined it. (This was a trick the late Roy Davies taught me.) About six passes was all it took to complete a nut. I'd check it periodically with a broken float arm's female threaded bore to know when to stop. Then using a series of newly sharpened drill bits, I bored through the nut and counterbored one end with a ball mill to allow the needle to articulate once it was captive in the arm. This is important. It's a many-stepped and many-tooled operation to complete one nut. In fact, each component requires many different steps and tools to complete.

All this so far has been fairly straightforward machining. Nothing is really tricky except for its extremely small size. Now comes the hard part. (huh?!)

How to machine the arm where the needle and nut assembly pass.

NUTS! Yes, a nut. I sawed off a piece of 7/16" hex stock, faced the sawn part and drilled it 5/16". This was to hold the round boss of the arm casting. It didn't work. I had to keep drilling up by letter sizes, and grinding lumps off the casting until it did fit. Once it fit, I split the hex along the length of a flat with the milling machine (could have used a hacksaw) so it would act like a collet and hold the rough casting securely once the whole assembly went in the lathe's 3-jaw chuck. (You wonder why tiny things cost so much? Are you getting the idea?) I drilled it from the bottom up with a number 15 drill, (0.180") ...factory specs.

Before this, however, in order to find an accurate centre to drill and once I solved the pivot pin problem, I mounted each arm in the carburetor bowl and with a sharp scribe, marked the brass float arm boss by reaching up through the gas inlet hole. It gave a good idea of an otherwise nebulous centre. (It's amazing what you think of when lying in bed at night.) Centering the boss would not have been good enough since an eccentrically mounted needle would leak. Remember, this is not space-age technology, but alternatives are available.

Great. Now how am I going to do the other end? I can't just turn it over because the arm hits the chuck face before the collet nut reaches the jaws. Over to the milling machine and set it up accordingly. (I did need the mill after all, but have since devised a new method.)

The set-up worked as predicted. Still using the split nut, I centre-drilled the casting, and drilled down 0.140" with a 5.6 mm drill. (I switched to metric here [ye gads!]) Well, it's the correct size drill for a .75" x 32 tap. Read Machinery's Handbook.) Finished it with a ball



The project so far. A new brass needle, a new nut and the old broken float arm used as a thread gauge. Not only does it all fit, but once assembled, it all articulates in the arm as it should.

end mill. Now we have a ball-and-socket joint, like your hip. Back to the bench or lathe it went and using the correct bottoming tap, chips went a-flyin' as the threads were cut. But once it stops turning, you stop turning.

The hour of decision. (and Billy Graham's dead.) I assembled everything. Whoa! It worked! The nut went all the way down to its shoulder and the needle still articulated as it should! No binding of parts. Assembled in three bowls, three arms did exactly as they should—they turned on and off the flow of gas, or in this case, air.

There's the matter of 6-36 screws to hold the float to the float bushing—another obsolete thread size. Don't worry, it too is on the docket. It's a little premature to publish this article without a proven arm, but my publisher keeps harassing me.

You'll need to trust me for the results. Next spring, each one of these will need to be tested. Each fitted with a new nitrophyl float, I guess that'll be my job.

I've not told you all my secrets but you have enough. Maybe you'll come up with some of your own. Unlike the ignition coils, I have found nothing on the internet showing how these parts were made. Automatic screw machines were expensive. Could they have been a likely alternative in the Kingston shop? I can't imagine Kingston doing this in the factory the way I did it. Maybe they did.



Photos: Paul Gockel

The completed float arm and needle project. I've never machined anything so small before, but it was successful.

I discovered this was not a straightforward project. Like rebuilding a boat, you never appreciate the product until you try to duplicate it yourself. That intimate relationship is what teaches you so much. Many stumbling blocks had to be overcome along the way, such as seizure of the entire mechanism when the prototype was installed. Ooops. Since the parts cannot be seen once assembled, many thoughtful assumptions had to be made. I also learned that this may have been a terribly-built apparatus. Way too many sloppy tolerances in non-standardized parts in unworn, random-sized factory components, all in an otherwise fine carburetor. No wonder the corks bound up, the arms broke and carburetors leaked. And compared with a Schebler, this was the expensive model! This was most disappointing as I strived for precision from the start, assuming Kingston had done the same. But they worked. This project has saved many a Kingston carburetor from the scrap heap. Strangely, no matter how accurately the parts were made, nothing seems interchangeable. Remember that parts should not be robbed from one component for another anyway; the net addition to the supply of valuable dippy parts is zero, yet the scrap bin fills. Soldier on. Get or make new parts to keep the supply line going. And think twice before bending anything. And thank Bob Skinner.



Not quite finished yet but here are three new functioning float arms ready for their new nitrophyl floats and a spring day to test them. They all go up and down, and they all turn on and off, just as they should.