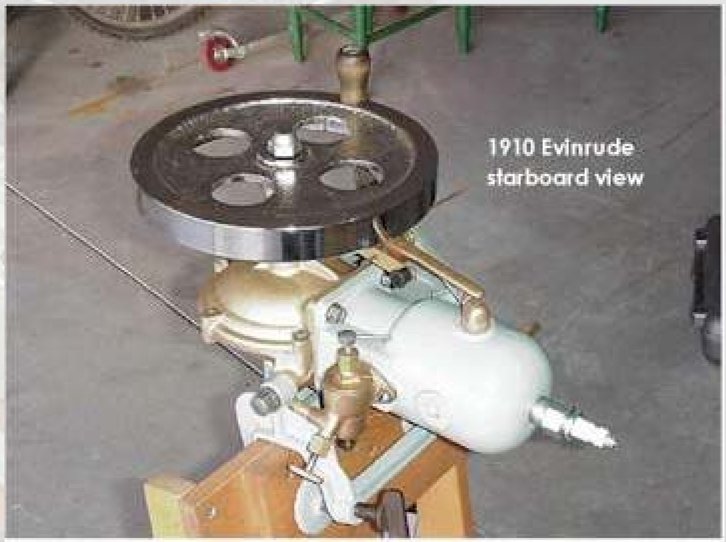
RESTORING AN ANCIENT EVINRUDE

By Christopher Scratch

Chapter 2 – Refurbishing the Power-head

Well, now the motor is at my place. I can't believe it. Now what do I do with it? Should I run it? Should I tear it apart? How does one verify that the parts that are on the motor are all correct or not? How am I going to fix the parts that aren't right, or even harder, replace what isn't there? How thorough a restoration should I attempt to do, or should it just be cleaned up and run "as-is"? A million thoughts went through my head. This was Evinrude number 1207, a pretty low digit in the serial number sequence. There just are not that many Evinrude motors surviving that we know of from the very early days. Up until about 1991, the earliest documented Evinrude known was #780, which came out of Vermont. Sometime in the mid-90's, #705 came to the surface. Where does #1207 stand in the queue as far as oldest motor known in Canada, or in North America, for that matter? Does it make the top ten? What year is this thing really, can it be a 1910 as I'm referring to it as, or is it actually an early 1911 motor? What is the possibility that Ole Evinrude himself had a hand in assembling this engine in the old factory on Lake Street in Milwaukee? Who can say that he didn't? I can honestly state with some degree of reliability that I've worked on and/or rebuilt literally hundreds of motors in my lifetime, everything from Ford 427 Cammers & side-oilers to electric fan blower motors. This is the first time I've ever worked on a motor that gave me the shakes. Guess I was just a tad excited, eh. There's something about working on a piece that's over 90 years old that I guess I just have a difficult time trying to explain. What a feeling.



Well, one has to start somewhere, so out come the tools; but before I disassemble anything, it was decided to try and run the motor again with my own buzz-coil set-up. Its been awhile since I used a buzz-coil to fire a motor, but luckily there was a hand-drawn schematic taped to the coil so it was easier to remember which wires were hooked to which terminals. After hunting down a 6-volt battery with some juice left in it, the appropriate connections were made, and some fuel added to the tank. Set the timer, bounce the flywheel a few times to prime, turn on the power and bounce the flywheel against compression. POW!!! Off she goes, popping away to beat the band. I adjust the carb to smooth it out, and let her run for about 10 or 12 seconds, then kill the juice, and the motor stops. Now I'm all tingly again. I never have this much fun on the Polaris.

Anyway, I do want to get into the motor and see if everything inside is OK. I don't do purely "cosmetic" restorations, a motor has to run if I own it, but I don't want them blowing up either, so the inside has to look as good as the outside. So, off came the flywheel and timer, and then the gas tank & carburetor as a unit. Two minutes more, and the cylinder is dislodged from the crankcase. Another two minutes sees the crankcase split apart and the crankshaft, connecting rod assembly & piston exposed to the sunlight for the first time in God only knows how many years. I was amazed that the crank bushings and crankshaft journals looked to be in such fine shape. I'm surmising by the look of things that the bushings have been replaced at some point during the

motors life. Usually something (as in crank bushings) is worn out-of-round to a degree. No such issues here, and this is an early motor without the grease fitting and cup that later Evinrudes were fitted with in order to supply additional lubrication to the upper crank bushing. I did make a mental note to run a heavier gas to oil ratio in this motor to account for that. My 1922 Evinrude Detachable gets 16:1 mix; this one is going to get 8:1 when it runs.

However, all was not perfect. There were some things that I didn't like about the inside of the motor. The compression was not what I thought it should be, there was a "hissing" sound quite evident when cranking the motor over slowly, or even just when you manually pushed the piston into the cylinder assembly as it traveled through the bore and closed off the port openings. Must investigate that. Also, the connecting rod retaining screws were locked in place by small cotter keys. Not factory issue, as far as I know. The ring gap on the top ring was running over the exhaust ports, and it was discovered that the locking pin for the ring had worked its way into its bore, allowing the ring to rotate in its groove. This would have to be addressed, one does not want to chance having a ring end catch on a port opening and break off, creating Heaven only knows what kind of damage to your cylinder wall and/or piston. Further examination of the locking pin revealed that the pin fit was sloppy, allowing the pin to move in and out of its bore with very little effort either way. In addition, it was discovered that there were additional holes drilled in the bottom of the ring groove for lock pins that were not there anymore. This would account for the "hissing" sound one could hear on the compression stroke. This could not be construed as a positive situation, but it was not entirely hopeless either. Bob Skinner came to the rescue here, and proceeded to put on a clinic of reviving ancient motor parts. The approach taken involved inserting plugs in the existing locking-pin bore(s), then re-locating the ring in a manner so that a new hole could be drilled in the bottom of the ring groove, using the actual ring as a guide for hole location. This step had to be undertaken because of the fact that none of the existing lock-pin holes were of a suitable diameter to allow for a proper press fit of the locking pin. With the hole drilled, a pin of suitable size to allow for a press-fit of about .001" was inserted into the newest bore, and voila, the ring is securely locked in place and any worries of catching the port opening with a ring gap end are now history. Bob honed the cylinder walls for me with a Sunnen rigid hone; his technique was fascinating and educational. As he worked on the cylinder, he explained the reasoning behind the steps he takes in redoing the old motors. Rigid hones are better for the antiques than ball-hones are. Ball-type hones will put a radius on the port openings as the hone is passed up and down in the cylinder through the honing stroke. That's a positive attribute for running high-RPM Mercurys. However, radii on the port openings on the rowboat-style of motor will affect your blow-down time, which in turn affects your power stroke, and the motor may not operate like it should. The rigid style hone will keep the edges of the port openings sharp and square, as well as correcting any out-of-round or tapered condition that is present in the cylinder walls, whereas a ball hone will not correct these conditions. I would normally use a lubricant like WD-40 on the cylinder walls when honing. Bob prefers instead to run the hone dry through the cylinder. This practice does require pulling the hone out on a regular basis to wash the buildup off of the stones with mineral spirits or Varsol, but one cannot argue with the results as far as finish and accuracy are concerned. Bob has many useful, well thought-out and track proven tips & tricks like this up his sleeve. No small wonder all his motors run as well as they do.

Oh, a bit of a sidebar story here. We were checking the ring end gap on the rings that were in the motor when I got it. I took the top ring off the piston, since that groove had to have a repair done on it. I figured "well, why not take the second ring off too?" I very shortly wished I hadn't thought of that. Yep, you guessed it, I broke the ring. A perfectly good antique piston ring down the tubes just because I took an "idiot pill". DOH! Again, Skinner to the rescue, we rummaged through his various boxes of parts till we found two rings that were the right diameter, but were too tall, if you can believe it. No big problem there, took me about 20 minutes on the surface grinder at work the next day to get them down to the proper height. There was only one original ring that had gotten ruined, but I ground down a pair of them just in case I got stupid with the second one too. Lesson learned here is "if it ain't broke, and ya want it broke, let Mr. Scratch work on it for ya".

Now with the piston repair complete and the cylinder honed, things could start to go back together once the parts were cleaned up and repainted (cylinder, gas tank, transom bracket, transom pads) or left bare (carburetor, timer lever, exhaust manifold, brass fittings, bolts & washers). There's a glass-bead cabinet at the plant, I spent some time using it to clean all the parts down to the bare metal. The brass parts were just left in the as-glassed condition. The cast iron pieces got treated to "Armor-Coat" rust enamel in an appropriate grey shade. The only cast iron part that did not get the paint

treatment was the flywheel, I sent that out to my plating source for nickel plating. Did a lot of work on that flywheel. It was pitted fairly heavily in spots around the rim. Glass beading took care of the remnants of plating that were still hanging on to the cast iron. (Note; this is a necessary step when you are considering re-plating a cast-iron wheel. If you let the plater strip the old plating off with the chemicals in his system, the cast iron will come under attack from the acids. The result will be a lot of holes opened up on the surfaces that were not evident before. The process is just too aggressive against cast iron; but you can prevent this from happening by glass-beading all the old nickel plating off the part, so the plater doesn't have to do the stripping for you). On the top and bottom, the surface grinder was put to work again to flatten both sides out and take about .010" off the "show surface" of the rim. "RGS Engineering & Machine Service" was sub-contracted to do the work on the outside diameter in a lathe. After final stoning and oiling, the wheel went to the plater. He did a great job for me, I only wished I'd done a better job of stoning the wheel after the final cut on the grinder. What looked and felt smooth as glass in the bare iron state showed very light yet distinctive lines on the top surface of the wheel after plating. It's difficult, if not impossible, to feel them, but you can definitely see them. Oh well, I was still happy with the wheel; my default excuse (aka the "Scratch Motto") is "if it turned out perfect, nobody would believe that I did it anyway". I doubt anybody will notice any lines when the motor is running.

Time to start putting some stuff back together before I forget just where its all supposed to go. Assembly of the power-head parts was very simple. I layered the upper & lower crankshaft journals with molybdenum grease, the same kind I used on new camshafts when rebuilding the Fords. It works very well as a lubricant, and, as a bonus, helps seal the crankcase bushings too. The cotter keys on the connecting rod bolts got replaced with brass mechanics wire, looped through both screws and twisted tight against the outside of the rod cap. I put a little Loctite on the screw threads just for insurance against loosening. With the crankshaft, piston and rod assembly lowered into the bottom crankcase shell, it was time to close the rest of it up. The original string used to seal between the crankcase upper & lower halves was left in place, but I did use some RTV Silicone sealant to make sure there were no leaks. I use that on all the snowmobile engines I've ever worked on to seal crankcases where there are no gaskets, and it's never let me down, so I figured it would work as well on the rowboat motor. Making new gaskets for the cylinder & carburetor flanges, plus the exhaust manifold, took a whole 20 minutes, and so now the power-head could be finished off. Once the gaskets were cut, it took all of 10 minutes to re-assemble the whole power-head. The only tools you really need are a flat-bladed screwdriver, a half-inch combination wrench, and either a Crescent wrench or socket of a suitable size for the flywheel nut. What a delightfully simple design.

The gas tank was the final piece of the power-head that I had left. Oh, there was still an exhaust can to construct, fasteners to clean up & re-finish, and thumbscrews to figure out, but that's another story. The gas tank was actually in very good condition, all things considered. Not perfect, but it was not

rusty and it did not leak. Nonetheless, it still required a fair amount of handwork to make it look more presentable. Some of the bracket legs were coming unsoldered from the underside of the tank, so there was that detail to attend to. I used some acid to clean around the bracket, then utilized a copper iron heated with a propane torch to supply localized heat to re-solder the bracket legs. You have to be very careful with the heat when soldering the bracket. You do not want to heat the tank seams themselves if you don't have to. Terrible things can happen to a formerly leak-proof Detachable Rowboat Motor gas tank if one gets over-zealous with the application of heat around the soldered seams. I'm not very good at soldering, but managed to get done what had to be done, which means there was some solder deposited in appropriate areas, but no explosions occurred and the local Fire Department's services were not required. Now it was on to the main body of the tank. There were no major cave-ins present on the various tank surfaces, but enough dips and dings were there that the use of some automotive body-filler was necessary. Took me about 6 hours of puttying,

drying, sanding, checking for low & high spots, refilling, re-sanding, rechecking, re-re-filling, yada yada yada. Finally had the result I could be happy with, so I masked the bronze cup part of the tank as well as the filler spout neck and hit it with the primer. Presto! Porosity City. More potholes than a Sudbury sidestreet. It's amazing how many microscopic pinholes will show up in your filler after you put the primer on. My eyesight must really suck when it comes to examining sanded filler, it sure LOOKED flat when the sanding was done and I blew off the surfaces with air. Oh well, guess that's why the Bondo folks also sell spot putty. More putty, more sanding, more inspection, more pinholes, more putty spots, more sanding, more inspection, more sanding, more sanding, and more sanding. That's enough, I've had it. Don't care anymore. Paint the damn thing and get it over with. Jeez! Time to invoke the "Scratch Motto"!

The primer was applied for the final time, light sanding done on the dry primer, then the top coat(s) of Armor-Coat enamel applied. The best tank I've ever done, period, even though you can still see pinholes on some surfaces. The tag will cover some of it, and most of the rest will be underneath the flywheel. Also the last tank I'll ever do. I quit. Can anybody tell me why bugs are so attracted to fresh paint? That's what I get for attempting to let it dry in the garage. I finally gave up trying to dry it in the garage, and proceeded to put the fresh-painted tank in my "motor room" closet to dry. I didn't care what the room smelled like while the paint was curing just as long as the aphids & gnats stayed somewhere else.

That's all for now, the next chapter deals with matters south of the power-head. Till then, good luck with your old iron eh!

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