

RESTORING AN ANCIENT EVINRUDE

By Christopher Scratch

Chapter 4 – The Finishing Touches

After putting the main pieces of the motor back together and test running it, it was time to focus on finishing the project off. Taking note of what had to be done to complete the motor involved making not only a list of what had to be refurbished, but also a list of what had to be created. Some of what had to be built would have been designed from either evidence provided by existing motors of the same era, eye witness accounts of what most LIKELY should be present or not, and also by perusing whatever literature was available from the time period of 1909 to 1911. Obviously, since I had nothing to go by except what I've happened to learn or see during my time as a collector, information would have to come from outside sources, such as club members who have been collecting a lot longer than I have.

The members that I contacted were more than happy to help in anyway they could. Owen Aho provided pictures of the oldest known surviving Evinrude, or at least the motor with the lowest documented believable serial number. Using these pictures as a guide, I could state with some degree of confidence that my carburetor parts, flywheel, timer mechanism and exhaust manifold were all correct for this motor, since they are identical matches for the parts found on # 705. I could also verify that the tiller handle yoke was most likely from a replacement from a later model Detachable; on the motor I have, the yoke is cast iron with a bolt for tightening in the front, but on other motors from the same era, that part is cast bronze with a thumbscrew style fastener on the back-side of the yoke. Sure would be nice to find the correct bronze part for my motor; guess I'll just have to keep my eyes peeled at the yard sales is all.

Now, to point out some of the discrepancies that I uncovered in the restoration of this motor. Tom Goepfrich supplied some copies of advertising material identified as being for the 1910-1911 time period which indicated that my piston should have a single wide ring on it; if you will recall, in Chapter Two I regaled you with the story of how I managed to break the bottom ring on the piston, so we now know that the piston I have more than likely is NOT the original. Mark Zimmerli has a motor of similar vintage, and by examining his engine parts we were able to confirm that, yes indeed, one ½ inch wide ring is the factory supplied part. Since TRW doesn't sell that series of piston or ring anymore, I guess I won't worry about replacing it anytime soon. The piston in the motor is more than good enough to make it operational; if I want the real McCoy, I can machine the divider out from between the two grooves and make one big wide ring groove. I don't think I will be attempting to do that anytime soon however. Remember, if it's not broke, I shouldn't be working on it eh!

A second disparity came to light when it was suggested that this motor should have had a painted flywheel, not a nickel-plated one like I did. I won't argue much about this, just that I've seen them restored both with painted or plated flywheels. All I do know for a fact is that my flywheel had remnants of nickel plating still hanging onto it when it got here, so when it was re-finished, nickel plate was the surface finish of choice. Whether its 100% correct or not is apparently open to some debate.

Another possible discrepancy that came up is the discussion about which are the correct decals, and whether any decals were even used on early engines. Motors that appear in advertisements from Evinrudes' early years do not accomplish much in defining this matter very clearly. Richard Hiiuvain was kind enough to supply me with plenty of photocopies from 1911 and 1912 that show plenty of illustrations of Evinrude Detachables portrayed in several different advertisements; none of those illustrations, however, depict an Evinrude motor with any sign of a decal or label on it. The first Evinrude literature of ANY sort that depicts a decal on a motor is the 1913 catalog, which shows a decal on the starboard side of the gas tank only, and nowhere else. It has been suggested that very early Detachable specimens were not supplied with decals at all, and that the only identifier visible on the motor was the serial number plate; I wish that suggestion had

come in BEFORE I put decals on. They do dress up the motor, and although it's probable that leaving them on the motor is not accurate for restoration purposes, they look so nice that now that they're on, they're going to stay on. I did have an interesting conversation with the folks at Decal Headquarters about whether or not there were decals on 1909 or 1910 motors. They tell me that their decals were copied from an original 1909 motor. I don't mean to split hairs, but I've found no such evidence that suggests any 1909 or 1910 motors sported decals of the like. I also question the accuracy & authenticity of the Oiling Instructions decal; it states that you are to use "6 filler capfuls of oil per gallon of gasoline". The early motors use such a small filler cap that even if you COULD manage to fill it with oil, I feel safe in saying that 6 such capfuls would amount to a negligible amount of oil anyway; my opinion is that the 6 capfuls of oil would only pertain to later version

Starboard side of motor showing decals in place



Detachables with the long tubular protrusion from the bottom side of the cap, typically found on motors from about 1914 and up. There is also a difference in size of the gas tanks between the early (1909-12) motors and the 1913 and up engines, inasmuch as identical decals do not fit all the tanks. My tank, for instance, is about as original as one could ever hope it to be, yet the starting instructions decal that fits most other motors was too long for the port-side panel of my gas tank. I'm not the only person who has run into this issue, I've seen pictures from other collections where the decal is wrapped around the corner of the tank as opposed to having it all on the flat surface of the side panel. When it was time to apply the decal on the port-side of the tank on # 1207, instead of wrapping the decal around the edges of the tank panel, an attempt was made to cut the decal and splice it together in three pieces to make it fit. I never could make it look like I wanted it to so I ended up just pulling it off and leaving the port side of the tank sans decal. I'm still not 100% convinced that these early ones had decals anyway, if I'm wrong I hope somebody can steer me in the right direction.

Other items that I was able to confirm included the transom screws and pads. Scott Smith helped a great deal by providing some pictures of his father's early Evinrude (# 780), which helped give me a look at what this motor would have been equipped with from the factory. Motor # 1207 came with home-made thumbscrews (as shown in the picture) and pads where the screw would have a turned-down section that passed through the pad and was flared on the underside to lock the pad onto the screw, as opposed to the "ball & socket" arrangement normally seen on most all Detachable Rowboat Motors. The pads I had were actually correct, but someone had milled the "fingers" off of them and drilled a hole right through, so I'd have to replace those. The proper screws were actually hex-head bolts instead of thumbscrews, we are able to determine this thru illustrations in the earliest Evinrude advertisements, and also the photos provided by Scott confirm it as well. Suitable bolts were made out of steel hex-stock, and for the transom pads I bought a pair of reproduction bronze castings from Art Dekalb.

One other item that provoked some discussion between myself and a club member was the matter of what the correct steering handle should be. My assumption was that this should use the flat brass tiller bar with the cored-out or hollow sections, with the casting number "46" appearing on it, but the question was raised as to whether this would be correct for the early motors, or if # 1207 had been retro-fitted by one of its previous owners. The other party's belief was that the actual handle yoke should have a round cast iron hollow socket that accepted a wooden handle section that would serve as the hand-grip area. After conferring again with veteran collectors, and careful reviewing of the physical evidence that we do possess in the way of other motors of similar vintage and photographs, the common conclusion was yes, indeed, the flat brass tiller bar would be the appropriate part to use.

This motor had come from Wisconsin without its steering handle, but luckily Larry Carpenter still had a couple of reproduction bronze handles left to sell, so that issue was dealt with. With all that stuff out of the way, it was time to focus on the last missing item; the muffler assembly.

Once again, it was time to ask club members for favours to assist in gathering information needed to build a correct-looking muffler. One more time, Scott Smith's photos were referred to so we could get a feel for what standard the muffler should conform to. I had a couple of long telephone conversations with Mark Zimmerli, and he volunteered the use of the exhaust assembly off of his early Detachable to assist in making a replica of the muffler and end caps. We haven't figured out quite yet just HOW early Mark's motor is, but it's safe to say that he has the only Evinrude Rowboat Motor that I know of that is chrome plated! I figured on using his original parts to have patterns made to cast the top & bottom caps in brass, but then decided to try something a little different this time.

Mr. Skinner volunteered to help (again), boy I certainly get spoiled with that guy around. Anyway, what he did was end up making 2 out of the 3 parts for me. I didn't ask him to, he just went ahead and did it. The muffler can was produced using a section of brass tubing, 6 inches long by 2 ¾ inch OD by 2 ½ ID. The outside diameter was perfect, but the walls were too thick. The original can supplied by Mark had a wall of .040", whereas the tubing we could buy at the time only came with 1/8 inch thick wall, about .085" too much material. I did not want all that weight hanging out on the end of a 94-year-old aluminum exhaust manifold; so, Bob ended up machining the excess brass from the ID. What he had to do was make a slotted tube out of aluminum to slide over the brass can so as to facilitate chucking the whole piece into a lathe for turning the ID. Failure to use this method will result in buckling the sidewalls of the brass can as you machine it, and you will never get a truly round piece of brass tube when you're finished, and you will be extremely lucky if it even fits like its supposed to. Putting a slot in the aluminum for its full length allows you to spread the aluminum to fit it over the brass, and also allows some room for the aluminum to contract and squeeze the brass tube when you tighten the jaws on the chuck. This will also allow a machinist to work on the part without having it sing & howl at him because of vibration, and permits faster machining and a better final finish on the machined surface. After Bob completed the machining on the ID, he then built a template out of another section of aluminum tubing to create the pattern for the exhaust relief holes. He measured the holes on the sample muffler to get an idea of the proper spacing, then proceeded to mark up the template tube. By coating the tube with layout blue, then using a height gauge to scribe grid lines at the appropriate spacing in the dried bluing, one is able to accurately determine the positions for the holes in the triangular pattern. After the holes are drilled in into the aluminum template, you can then fit the template over the brass tubing stock, set the part in a V-block on the drill press table, and proceed to drill all the .070" holes for the exhaust venting. Using the V-block allows you to rotate the part so that the drilled hole is always absolutely perpendicular to the axis of the brass tubing. (Note here: there was some disagreement amongst collectors that I talked to about whether or not the muffler should have the "double inverted triangle" hole pattern drilled into it or not; in the end the second triangle was omitted since I felt that the holes in the bottom end cap would allow the motor to breathe adequately, and a single triangle pattern is what Mark's sample muffler had).

Anyway, by the time he was done, Bob had created another work of art for my old antique motor. After the can was finished, he then machined the bottom end cap piece out of a brass bar stock by cutting out a piece to the correct diameter using a band-saw, then chucking the part in the lathe to machine out the 2.750" diameter recess for the muffler can; after that operation was completed, he turned the part around, chucked it on the ID, then turned the 2.900" outside diameter. This is a fairly simple operation to do if you've got the proper equipment. He left it blank after he was finished machining, I was going to take care of drilling the holes in the bottom for the retaining bolts and for the exhaust venting. I had planned on using Mark's part as a pattern by laying his end plate up against the raw brass one and spraying layout blue through the holes; then, after the bluing dried on my raw part, I would have a pattern to follow for drilling. This would result in a mirror or reversed image for the holes. That's all fine and dandy, and would have worked out quite well; however, what I ended up doing instead was putting the end cap on a rotary table in the mill, indicating it to center the part, then just rotate the table and refer to the degree markings to equally space the drilled holes. There are two holes drilled to allow ¼ inch retention bolts to pass through the cap, the other vent holes are .070" in diameter. Nice thing about having use of a milling machine, you just have to clamp the part down and move the table around instead of unclamping the re-clamping the part over and over. Well, the easy part is over, now for more fun stuff. Time for the "piece de resistance", the top muffler cap.

I suppose there were a couple of options here as far as reproducing the top cap. Using an original part to make a pattern for casting would certainly have been one way to do it, probing the part on a Co-Ordinate Measuring Machine and feeding the data into a program to create a tool and cutter path would have been another; if I had a better grasp of that type of knowledge and more up-to-date software at the plant, this is the way I might have gone. Instead, the method chosen was to machine the part on the Bridgeport using the rotary table again. Using a section of ½ inch x 3 inch brass bar, the



Brass plate with hole drilled for indicating centre point

center point was located and a ¼ inch hole drilled to allow me to indicate the plate on the rotary table, then I could accurately machine the outside & inside diameters, as well as the outer profile for the mounting lug that protrudes from the front end of the muffler cap. This same method could be used to make the bottom cap, which is actually a simpler part to mill; its just a round cap, it doesn't have the mounting lug sticking out the front of it like the top one does.

“free-hand” by tracing the outline of the manifold mating surface with Prussian blue, then following the outline and machining away the material beside it so that the pad would stand proud of the area around it. I'm simply not very well coordinated when it comes to machining in that manner. Straight lines are no problem, but the compound curves sure gave me fits, until I figured out how to use the rotary table for that too. Only took about an hour and a half to cut the ID and OD, took about at least another hour just to cut that pad profile. Not the best job, but I'm sure in the future the parts I make will look better. Not that I'm anticipating a huge demand for exhaust parts for early Evinrudes, mind you, but I still have to make at least one more set; Mark Zimmerli wanted a set of end caps made in return for his lending me the parts I needed to copy, which is more than fair, I think; darn decent of him to lend me the extremely rare exhaust parts in order to duplicate them. Otherwise, I'd only be guessing as to



Milling the recess for the muffler can



Muffler can pocket finished

what these things were supposed to look like. So, I will get all the mistakes out of my system on the first set that goes on my engine, then Mark will get the benefit of my “experience” on his set of parts eh! Oh wait, here's a better idea; I'll improve on the next set and hold on to those, and give Mark my originals, just keep it between you and me eh!

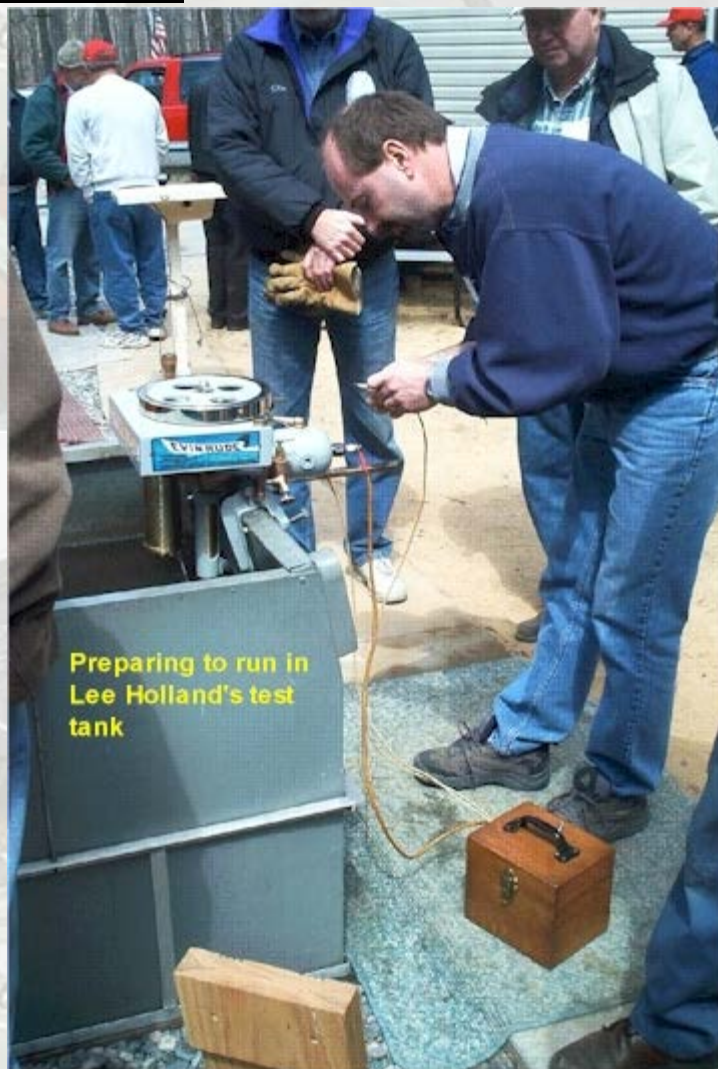
Anyway, once the pad profile work was done, it was a nothing job to finish off by drilling the three bolt holes and milling the exhaust port opening, then do some hand sanding and polishing on the machined outer surfaces to remove as many tool marks as possible. Then, it was to the glass

bead cabinet to take some of the gloss off the brass, after which, the final result was deemed to be satisfactory to the engine's owner. Lucky for me that he's not a hard guy to please eh! After wet sanding the brass tubing, the whole thing was assembled onto the exhaust manifold and now she's ready to run legally instead of with the illegal racing exhaust.



I dry-fired it in the garage just to test things out, and to give the wife a scare, hehe, then gave her a good run in the test tank at Lee Holland's meet on April 10, 2004.

1910 Evinrude with 2004 manufactured muffer assembly. Probably acorn and wing-nuts were not factory issue, but I like how they look anyway.



Preparing to run in Lee Holland's test tank



Well, that's about all that's fit to print on this particular subject. In closing, I must say its been a wonderful experience, both with working on this neat old antique engine, and also writing the chronicles that document its story of revival. I must acknowledge the contributions made by so many AOMCI members, I do not think I could have completed this project without their able assistance, for which I am grateful.

Owen Aho and Scott Smith, who provided great photos of motors earlier than # 1207

Mark Zimmerli, who was kind enough to trust me with an extremely rare set of parts for duplication

Jim Ross, who provided insight on various finishes and fasteners appropriate for engines from this era

Richard Hiiuvain, who supplied me with some great photocopies of old advertisements and parts catalogues

Tom Goepfrich, who sent some copies of early Evinrude literature from 1910-11 and some great photos of a cherry 1912 motor for comparison

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Thanks to Dan Jones for supplying the Algonac photos.

Last but certainly not least, Robert Skinner, who dragged this thing home from Wisconsin and was so very helpful (as always) in bringing it back to life. I've lost count of the ways that I've benefited from his friendship, knowledge and expertise.

That's all for now; till next time, good luck with your old iron eh!

Chris S



Makin' blue smoke in Algonac, MI

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