Caille, The Winter Project !!

By: Gary Orloff

A couple years ago our club put on a display of old outboards for the Piston Power Show at the IX Center in Cleveland Ohio. Many of our members brought their favorite outboards to show with an a placard telling about that particular model. The Show features anything that was piston powered and included some really interesting displays to include, airplanes, boats motorcycles, trucks, military equipment, cars of every variety and, of course, old outboards. !

While working the show for a couple of days we met and talked with plenty of people that were interested in what our club was all about. The usual greeting was "Hey my grandfather had a motor like that, I think it's still out in his barn." The next part of the conversation usually went something like this. "Would you guys be interested in my Grandpa's old motor?" Of course our answer was, "Sure, that's what we're all about, we collect rebuild and restore these old motors!" Then the next question was: "Ok I'll see if I can dig it out, what do you think something like that is worth?" Of course we've all been there, and there can be a dozen answers to that question, but I've always found this one is the best for me ! "Well that depends!" Once you've said that, you will probably get the look, and a reply like, "Depends on what?" And that opens the conversation on how to continue, you can start by asking: "What do you remember about your Grandfathers old motor?" If the person knows what kind of outboard it is and some of the details about it, you can pretty much guess he'll have a rough idea of what it's worth or what he wants for it. On the other hand you can also tell if the individual is blowing smoke when he tells you, "We used to ski behind it and it would pull ten skiers and it was a big green 25hp something !"

That's how a lot of the conversations would go, and that's how I happened to meet a gentleman who asked me if I ever heard of a Caille. When I heard that name my ears perked up and I was caught in the moment. Not knowing much about Caille outboards I envisioned one of their racing models with the tractor propeller lower unit! But the gentleman said: "No it was a small motor and I have the original box it came shipped in!" This piqued my interest even more, so I asked him what he wanted to do with it, occasionally someone will say the magic words, "I just want to get rid of it and see it go to a good home." This was not one of those occasions; the gentleman said "It's in really nice original shape and you'd have to see it to appreciate it!" So I asked him for his number and told him I would call him after the show to arrange to come and see it!

Not knowing what model Caille it was, left me in the dark to find out what it might be worth. For him to say it was a smaller outboard narrowed it down to about a 5hp or less as they made a number of small fishing models in the early years. Now it was time to do some research to see what possibilities there might be. This is what is so great about belonging to a club like this, the information available is endless, well almost! I found the head guru on Caille Outboards, Mr. Jack Craib who has a wonderful web site that identifies the models of the Caille line, and is a very helpful individual when it comes to information on the models!

A couple weeks after the show I called the gentleman and arranged to meet him and see his Caille outboard. Luckily he was not that far away and I knew the area where he lived. He had the motor sitting in his garage but the box it came in was still up in the loft. The engine looked as good as he had described and I asked him what he wanted for it. He said "make me an offer", so I figured I'd lowball him to get a feeling for were he was price wise. I think he knew right away that I was really interested in it, I must have given the tell tale, " bright eyes look " when I first saw the motor, my bad as I know better! So when I gave him my offer he said, "Oh no, you know it's worth a lot more that that!" Once he said that I knew this was not going to be an easy negotiation! I made him another offer saying this is as far as I'm willing to go, thinking I'll let him think about it and maybe call him in a week or so and see if he'd be willing to re- negotiate his price!

A couple weeks went by and one of my good friends in the club asked if I ever called the guy on that Caille outboard? I told him yes, but we couldn't come to an agreeable price. He asked, " would you mind if I went to see it and see what I could get it for?" I said sure. He said, "What's the highest you'd go on it?" I told him my ceiling price and he said he'd get back to me on it! Knowing my friend Bob is a good negotiator I thought, this should be interesting to see what happens! A couple weeks went by and I saw the motor had gone up on Craig's List so I figured Bob didn't have much luck and wrote it off figuring someone else must have snapped it up!!

About a week later when we got together out at our friend Jim's place, Bob said, "Hey I've got something for you to look at out in the truck". Sure enough he had bought the Callie and said, "It's yours if you want it for what I paid". The price was under what I had told Bob my ceiling was, so I was happy to pay him! (See Figure 1, below.)



Caille made some very interesting outboards that even by today's standards are ahead of their time. When looking at Jack Craib's web site I determined it was a " Caille 5 speed 2 3/4 hp. also called a Pennant! One of the unique features of this engine is its' variable pitch propeller that is controlled by the tiller handle. When you push the button on the end of the handle and raise it, the propeller pitches to go forward and when you lower the handle it goes into flat pitch (neutral) then down further it goes into reverse. There are 5 positions that the handle locks into that hold it where you want it. Another unusual feature is that the powerhead does not turn only the lower unit for steering!

When I finally got the engine home and did a more complete look at it, there were a few little things wrong that I didn't see originally, nothing of great consequence, the tiller handle was missing and there was a broken handle on one of the primer cups. So I had to make a new tiller handle! (See Figure 2, below)



I then lengthened the primer cup handle with brazing rod then filed it to match the other one. There is a crankshaft oiler cup that screws into the crankshaft bushing neck under the flywheel that was bent, that was cut off rethreaded with an adapter added and screwed back in! It has a pipe cleaner inside it that wicks the oil to the crankshaft to keep it lubricated! (See Figure 3, below)



The gas tank had some pretty deep dents in it and a fair bit of corrosion near the fuel shut off. All these things were repairable with time and patience and, of course, those things were on the surface and were just cosmetic. The engine turned over nicely and had compression but in checking further I found it didn't have any spark. That didn't surprise me as any engine that has sat more than 10 years usually needs some TLC to get it going, but more on that later!

I thought I would start by just doing a good clean up to strip away years of grease and dirt but when I started trying to clean things I discovered a few more problems. I pulled the exhaust manifolds and muffler as it too had some pretty good dents in it, probably from being tossed in the trunk of a car. (See Figure 4, below)



Some time ago one of our members, Mr. Scott W. made a profound statement that has always stuck with me! "If you're looking for a good motor to use and go fishing with, don't pick the pretty shiny one, pick the dented up one, cause that's the onethat always went in the trunk of the car going to Canada every year as it always started and ran!"

Once I had the manifolds off I could look into the exhaust ports and see the pistons. That's when my plans to just fire it up changed! One piston was missing the bottom ring and other piston had a chunk out of the middle ring, so now I'm wondering how did the whole bottom ring disappear? Someone had to have been into this engine and taken it out! So the decision was made for me, I had to pull the jugs and see if there were any other problems inside! But before I did I decided to clean the carburetor. It is a very basic model and other than years of varnish and green corrosion on some of the needles and passages it cleaned up fairly well. These old opposed cylinder engines didn't use rotary or reed valves to feed the fuel to the engine, but rather a simple pop-it valve carburetor that allowed the fuel air mixture to be sucked in when the pistons went up creating a negative pressure in the crankcase! One hi speed needle controlled the mixture from the carburetor and a single float controlled the fuel flow. One thing I will note is I haven't found any cleaner that cuts the green varnish that forms from old gas, and I tried a bunch of them! What worked was just scraping and picking at it till I got down to the bare metal. Hopefully it will work if I ever get it to run ! (See Figures 5 and 6, below)





So pulling the cylinders was pretty basic, unscrew four nuts off the studs and a couple good tugs and they were off! The bores looked good, no scratches or gouges just nice and carboned up! The exhaust ports were almost closed from carbon and the top of the cylinder was loaded too! Not sure what kind of oil was used in it but what ever it was it sure loaded things up! The pistons are cast iron and are on bronze connecting rods. Now that I could see down into the crankcase, everything looked good with plenty of oil on the internals. (See Figures 7 and 8, next page!)



Both pistons had rings that were either missing or had chunks out of them so now the hunt was on for new rings. I sent a message to Jack Craib asking where I could purchase a set of new rings? I got an answer saying there was a guy that had all kinds available, but before I ordered them I wanted to check my own stock from one of the sources I had acquired years ago. Much to my surprise I found I had what I needed of the proper size to make a complete set. So now it was just a matter of cleaning everything and putting it back together. (See Figures 9 and 10, below!)



The gas tank was the next challenge, there are a number of ways to remove dents from aluminum tanks. Some suggest using heat and air pressure, but I'm not quite that brave as I've found aluminum can be a tricky metal to work with. While learning to weld I melted plenty of holes and ruined a few good parts for projects when trying to repair them. What I've found works is to cut a panel out behind the flywheel large enough to be able to work out all the dents. This worked pretty well for the dents but the top of the tank where the gas fill is was a different situation! It looked like someone had dropped the motor upside down directly on the gas cap and pushed it in about 1/4 inch! But by using a couple pieces of wood and a threaded rod with a block on the inside, it pulled out evenly. (See Figures 11, 12, 13, 14, and 15....next few pages!)











The erosion near the gas drain was quite bad and actually had a hole eaten all the way through. This was a problem when it came to trying to weld it as you have to have clean bare metal and absolutely no corrosion where your going to strike the arc, otherwise it will blow a hole faster than the Road Runner running from Willy Coyote! So grinding out the erosion to get to clean metal is mandatory. Once accomplished, welding it closed is just a mater of taking your time and doing it a little at a time. The dent next to the corrosion pounded out with a hammer and rounded wood dowel. Forgot to mention, with the panel cut out it made cleaning the inside of the tank much easier. When looking at the picture of the tank with the panel cut out you can see a small button on the port side top corner, it turned out to be the vent with a small tube soldered to the bottom of the button inside the tank. Unfortunately, when trying to take it loose the tube twisted off the bottom of the button, so we'll tackle that later!

Now with the dents all pounded out and the holes welded closed it was time to weld the panel back in ! Positioning the panel so all gaps from cutting it out are equal and it's flush with the (IMG 1557) surrounding surface, it was time to weld. There are several ways to accomplish holding the panel in position, using very thin wire, bent to go under the panel is one, but a couple pieces of masking tape under it also works. Welding it is touch and go, tack it on the corners and once the welds support it, then the tape can be pulled out. (See Figure 16, below)



Then just finish the welding ! (See Figure 17, below)



The next process is finishing the outside so it can either be painted or polished! There were quite a number of nicks and scratch's so sanding them out was out of the question. Using a filler of some kind might be the answer. I have used Bondo in the past with some success but this time it didn't want to stick too well. One of the sites I have found useful for alternative products is Sky <u>geek.com</u>, they deal in aviation products and parts, I found them when looking for Zinc Chromate primer paint for aluminum. The latest product bought is a two part epoxy very similar to JB Weld, it's called "Smooth on A4 Metalset"! The difference is this stuff doesn't sag or run out from between two pieces to be joined! It worked great for filling some of the little erosion pitting and also the deep gouges and scratches. But now it had to be sanded to get ready to paint and that wasn't as easy as Bondo. But the finish came out much better! Now that the tank was welded up smoothed out and ready for paint, the weather was the only hold up! We finally got a break in the weather and I was all ready to paint, 65 degrees was just about the minimum temp to spray a coat of primer, it went on nicely and by the next day was plenty dry and the temperature was even better at 70*! I chose a burgundy color that I thought complimented the gray I had painted the cylinders. Now all I needed was a set of decals to finish it up!

The lower unit, water pump and cooling tubing was next on the list to check out, I had looked at it briefly and saw that everything was there and was in working order so all that was necessary was to clean things and check out the water pump. The pump is a piston plunger style positive displacement that is driven off a cam on the propeller shaft. There are two check valves, one for intake and one for discharge, they were both working fine. Caille built their lower units out of Bronze and Brass and then nickel plated everything, down tube, shift linkage, skeg, gear housing and even the variable pitch propeller. As mentioned earlier the propeller changes from reverse pitch to forward pitch by rotating each blade at the same time with a movable yoke controlled by the linkage from the tiller handle. The linkage also incorporates the tubing to send the cooling water up to the cylinders by means of a flexible hose from the pump up the tubing to a T, which feeds both cylinders. There is a connection at the top of the linkage / cooling tubing that connects to the tiller arm, a clever two in one system ! (See Figures 18 – 21, below).







The next part of the project was a real challenge, the magneto! Normally these old cloth wrapped coils are very durable and last a long time! Usually it's just a matter of cleaning the points and maybe changing the condenser and they'll produce a nice blue spark. Not so in this case! Testing both the coil and the condenser showed them both to be bad. That presented a bit of a problem as this coil is duel wound where it fires both spark plugs at the same time. Looking in all the usual places to find a good replacement, nothing popped up. So now the search was on! I wondered if one from a PO-15 or a Speeditwin might fit the mag plate and I could modify things to make it work. But I never did look into it, the reason was because I came across a very unlikely possibility that maybe could work! While calling around to try and locate a replacement coil, a gentleman I contacted said: "Hey, I have something that might work for you!" As he described it to me I pictured something that looked similar to what I had. He told me the price and after some thinking I said why don't you send me one and I'll take a gamble on whether I can make it work or not. A couple days later I had it in my hand and it was nothing like I imagined! Best description is, it looks exactly like a Bendix Sintilla coil except it has two little buttons on one side where the plug wires would attach! If you've ever worked on a ChrisCraft or one of the old Green top Merc's, you may have seem a Bendix magneto. They were used in a variety of motors and worked fairly well ! (See Figures 22 and 23, below)



One of the unique things about the Bendix or as they are also known, "Sintilla" coils is they are not part of the laminates that surround the magnet rotor, but just fit up against them and are held in place by a couple spring clips! This gave me an idea that maybe I could just make them fit up against the laminates of the Caille magneto and it would produce a good spark? Knowing enough to get me in trouble on how a magneto works, it seemed possible!

The laminate bar that goes thru the center of the Sintilla style duel fire coil has an angle on each end of the bar that measures 15 degrees. They angle in toward the side that has the two buttons that will fire the plugs. In trying to figure how to position the coil so it would match up to the original laminates I decided I would have to cut the old coil bar out to come up with a way to hold the new coil in the correct position.

(See Figures 24 through 27, next page!)



Once I cut the old coil bar out I had the two large laminate ends that were radiused to match the inside of the flywheel. Each end piece has two screws thru it to hold it in place. Luckily the distance between the end pieces was less than the narrowest part of the new coil laminates. Because each end of the new coil had a 15 degree angle cut on it, I thought if I had a slot milled into the corner pieces at a 15 degrees angle, the coil would be captivated in the slot and all I'd have to do is make something to hold it against the milled slot. So off to my good friend Dave that owns a machine shop. Once I explained what I needed him to do, it only took him about 15 minutes to set it up and make the cuts, and they fit perfectly! Boy it's nice to have such talented friends !

(See Figure 28, below!)



Now that the slots were cut and the coil fit in them, I needed a way to press them against the angle in the end pieces. A couple of small pieces of aluminum with threaded holes in them and bent with a radius to match the bottom of the magneto plate worked when they were epoxied in place. With two small 8-32 screws in the aluminum pieces, they held the coil tight against the slot in the end laminates!

The last pieces of the magneto puzzle were, a new condenser and a couple small coil wires and the two plug wires. With temporary plug wires soldered to the buttons, the true test was to see if it worked! I placed the magneto plate back on the engine and installed the flywheel, installed my spark tester, wrapped a rope around the flywheel and gave it a good pull! Voila we've got a nice blue spark! I was so happy all I could say was: "Yes Yes ! This was all a gamble and I wasn't sure it would work, so now that I know it does, there are several other old opposed twin outboards that we can bring back to life with this new coil !

(See Figure 29, next page!)



Finishing up all the little things is sometimes the most frustrating part of the job, as I always like to say: "The devil is in the details". One of them was with the carburetor! When I took it apart I remembered the fuel line fitting came in the the back side of the float bowl, which faced the crankcase! But when putting things back together, for the life of me I couldn't see how it could fit back where I thought it was supposed to go. I was also fighting the tiller handle as it was hitting a little plug on the bottom of the carburetor. I must have taken that darn thing on and off a dozen times trying different combinations to make the fuel line fit and keep the tiller from hitting the plug! There is another threaded opening that goes into the float bowl from the bottom so I plugged the one in the back of the float bowl and screwed the fuel line fitting in the bottom opening.



Thinking I had the problem licked I then realized the fuel line didn't fit right as now the tiller hit the nut on the fitting! All these things were just interfering by a couple thousandth of an inch! But it finally all came together once I put the gas tank on and bent the fuel line a few places to make it fit! That worked out Ok except I didn't have the right kind of wrench to tighten up the fittings. A couple months ago we had been working on an engine out at my buddy Jim's and I ran into the same situation, just couldn't quite tighten up a fitting down in the lower cowl of an engine. Jim has just about every tool a mechanic could want to do a job and after looking thru his tool box I came up with exactly the right wrench. It was a 9/16" double open end wrench, only one end is conventional, the other is at a 60* angle! And that's what I needed for this fitting.

3/8th and 5/8th I didn't want or need a set that went up to 1 1/2 "! Actually 7/16" thru 9/16 would do fine, but I couldn't find a set in that range. So what would most mechanics do in such a case? Make one ! Having several old double end wrenches from my Grandfathers collection I found one that had the 1/2" X 7/16" open end. These old wrenches were made extra heavy with too much material on the open ends, so the first thing to do was grind off some of the excess to make it easier to get into tight places. Copying a standard open end wrench gave a me a good pattern to follow. Once the grinding was done I cut the open end off and ground a little more off the handle part, then welded it back on at the angle needed to tighten the fitting on the gas line, the old saying " necessity is the mother of invention " proved to be true once again.



(See Figure 30, below!)

So now that it's almost done with the gas tank bolted on, fuel line tightened, it just needed to have the nickel plating polished and it would be ready to run ! But because it was now early March and the Piston Power AutoRama was coming up in just a couple weeks I thought it better if I didn't try and run it so it would be nice and clean for the show ! After all isn't that why we go to all this work, to show these old motors to the world so they're not forgotten ? I just wonder if the Gentleman that sold the motor will be at the show again ?

(See Figures 31 and 32, next page!)



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