1925 Franklin 11A Babcock bodied coupe
(A project I'm calling 'The Phoenix')
By Steve Hall
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On August 10, 2022 I purchased what is going to be my most ambitious auto restoration project to date. It's a 1925 Franklin 11A Babcock bodied coupe that I purchased from club member Wes Scott who purchased it from the Estate of Jim Bray in Kansas along with his 1931 153 Dietrich bodied speedster (aka the ' Lindbergh' Franklin).

The car is completely disassembled with many parts in 30+ boxes and numerous larger parts, wheels, tires, steering assemblies, cowls, fenders, full elliptical leaf springs, multiple crankshafts, camshafts, wood sills, headlamps and more! Wes and Jack Boswell helped move all the parts to my place in one trip one weekend using Wes's F150, car hauler, My Chevy Silverado, and Jack's Ford F250. I told Wes after we unloaded it all if I knew there was that much stuff I might have decided against going through with this deal!

I call this a restoration project but in reality it will likely be an endeavor that gets the vehicle driving again with a certain amount of patina. My goal is to get a rolling chassis by 2025, which might be a bit ambitious since I need to remake one or both of the wood sill frames that support the engine, body and suspension. Franklins of this era used two three ply laminated second growth ash sills that are about 12 feet long. One of the sills has a rotted section that may not be salvageable. I may need to use oak or hard maple to remake the sills since ash is difficult to obtain these days.

My first effort on this project was to disassemble one of the engines from the lot that was complete thinking that this would be one of the easier places to start. Franklin used a 25.3 horse power 6 cylinder air cooled engine with 3-1/4" bore and 4" stroke. Crankshaft main and rod journals are 2" diameter. At first I thought I might be able to free the engine cylinders by soaking liberally in penetrating fluid. That proved fruitless so I decided to start taking the cylinders off one-by-one to see which was hanging things up from rotating. Franklin cylinders of this model are made of one casting (a true 'jug' no separate cylinder head which has advantages and disadvantages). The major advantage is no possibility of 'head gasket' leaks. The major disadvantage is if the piston is stuck you have to leave the rod on the crank to give you leverage to pull the cylinder up & down to free the piston from the cylinder since there is no easy way to access the piston from the top side. Well… six cylinders later I discovered that not only were the cylinder/piston assemblies pretty much stuck, the crank was still stuck. I removed the oil pan and began to free the connecting rods one-by-one. Each rod was fairly snugly adhering to its respective crankshaft journals. I was able to get 5 rods out without damaging the babbitt bearings on most, but one babbitt bearing did break on the bearing cap side. Franklin used solid die cast babbitt insert bearings (no steel or bronze backing) for the connecting rods and the main bearings. More on the babbitt bearings shortly…

After the rods were out I started taking off the main bearing caps and discovered the reason for the stuck crank… rust from years of condensation cycles had slowly grown to penetrate into the babbitt

bearing surfaces preventing any chance of movement. Only slight pitting on the babbitt was evident though, so not so much of a problem. The real problem was that three of the inner 5 main bearings (7 total) were cracked on the upper half shells due to a design flaw in the oiling system. Franklins use an all aluminum crankcase that's cast in two halves. The upper half holds the crank and camshaft and the lower half is a solid cast aluminum oil pan with an integral sump, oil pump and oil gallery distribution system to cooper distribution lines. The main bearing caps are fastened by two long bolts that straddle the bearing cavities in the center of the crankshaft bore. The issue Franklin faced was the oil gallery could not be drilled directly on center to the bearing or it would interfere with the bolts that secure the lower main bearing caps, so Franklin drilled the oil gallery offset to the side of the bearing cradle bore. Franklin designed a relief on the back side of the upper babbitt bearing 5/16" wide at 35 degrees diagonal to direct oil to the center of the bearing where there is an oil groove cut concentrically around for the oil gallery that feeds oil to the connecting rod journals through a rifle bored port in the crankshaft between the main and rod journals. Franklin cut the relief in the upper main bearing long enough so that during assembly a person could not install the bearing inserts backward and block the oil supply. This is good from an foolproof manufacturing assembly design perspective, but the long relief left only about 0.150'' of babbitt bearing over most of the length of the bearing leaving the bearing susceptible to breakage over long term abuse from crankshaft vibrations. I noticed in the Franklin drawing for the insert bearing in change "O", Franklin removed the relief on the back side of the bearing on November 30, 1928 presumably realizing the design flaw. The change incorporated a note indicating consult assembly instructions for repairs (presumably a note that instructed the service person to install the relief so the oil gallery hole lines up and is not installed backward and block the oil supply since the design change would mean the bearing can only be installed one way and work correctly!)

Now that I realized the crank had to come out, it was time to start working on removing the clutch from the flywheel which is necessary to obtain access to the bolts that hold the flywheel on the crankshaft. The flywheel has to be removed to access the bolts that fasten the rear main aluminum labyrinth style oil seal halve castings to the bock. Franklin used a Brown-Lipe 'pull' release type clutch design where the pressure plate assembly slides into the cast flywheel housing. There are four precision hard cast steel centralizers that hold the pressure plate assembly true in the housing. The problem was… you guessed it… the four centralizer blocks were rusted to the flywheel housing and they are not accessible when assembled. Again, using the tried and true penetrating oil applications and heat I was able to free the pressure plate assembly but sacrificed a spring that holds the steel pressure plate friction disk retracted when the clutch is released. With the pressure plate assembly out, I could access the pressure plate friction ring and centralizers. With a little heat (Wes's rosebud torch) and Wes's vice grip slide hammer tool I was able to slowly and carefully pull, little-by-little, each of the four centralizers with the puller symmetrically moving the puller to each of the centralizers until the assembly pulled out. Nothing broke which was good since where can you find parts?!?

Now the crank was out it was time to work on the camshaft which, you guessed it, was stuck. Thinking most of the problem was with the oil pump drive gear and shaft which is driven by helical gear on the camshaft. I applied penetrating oil, employed back-and-fourth rocking and eventually freed things enough to get the oil pump gear and shaft out. The camshaft still would not turn much so I decided to

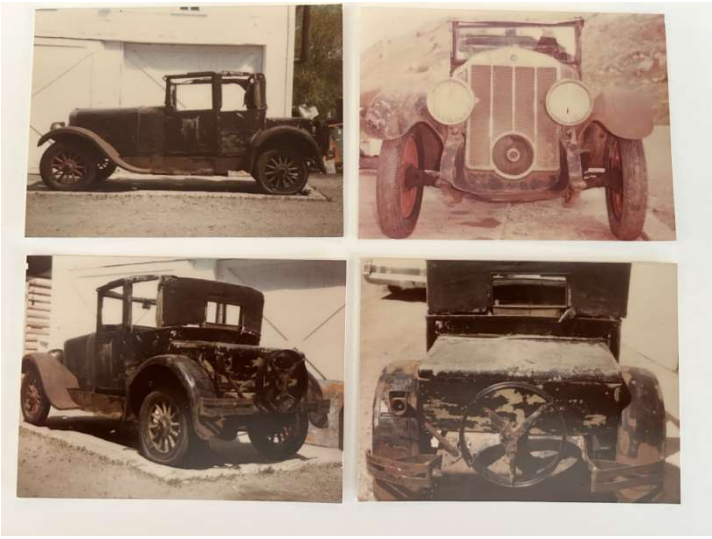
pull it and the bearings out. The camshaft bearings are designed to come out with the camshaft which actually turns out to have been good in this case, since less damage to the camshaft bearings would occur in the typical situation where you pull a camshaft through a set of tapered bearing inserts. I applied heat to the aluminum block casting around the aluminum cam bearings to expand the aluminum casting which made removal with a slide hammer much easier and no damage.

So, the next step in the engine project is deciding between several options to address the main bearing situation.

1. Find used babbitt bearing inserts that are still good, use those, polish the crank and reassemble.
2. Grind the crank, pour babbitt main bearings in the block & caps, and then align bore to the crank size.
3. Purchase custom made babbitt inserts, align bore to the crank size.
4. Use the crank and block from latter 1926 engine that has poured main bearings and crankshaft that was ground 0.015" undersize in the past.

While I'm considering options, I have plenty left to do on other stages of this project. The cylinders and pistons are probably usable as-is with honing, piston knurling and new rings. The pistons and cylinder bore on this engine were increased +0.015" over standard at some point in the past. I will need to do valve work. The exhaust guides are very worn out (valve guide to stem clearance end play is 0.035"! Should be about 0.005" for this air cooled application).

I'm now working on inspecting the steering assembly, cleaning up the leaf springs, and will likely tackle the wood sills next. I'll provide more updates as the project continues.



Caption: 1925 Franklin 11A, Babcock Bodied Coupe (pictures circa 1979 before it was disassembled)

Caption: Wes Scott left and Steve Hall right unloading a full elliptic leaf spring. Wes: "I'm glad to have space in my shed back" Steve: "if I knew there was this much stuff I might have reconsidered the purchase!" Wes: "trust me, you are going to need it all, sell what you don't use after"

Caption: Various Franklin parts: Leaf springs, rear trunk, crank shaft, clutches, flywheels, two transmissions, rear fenders…

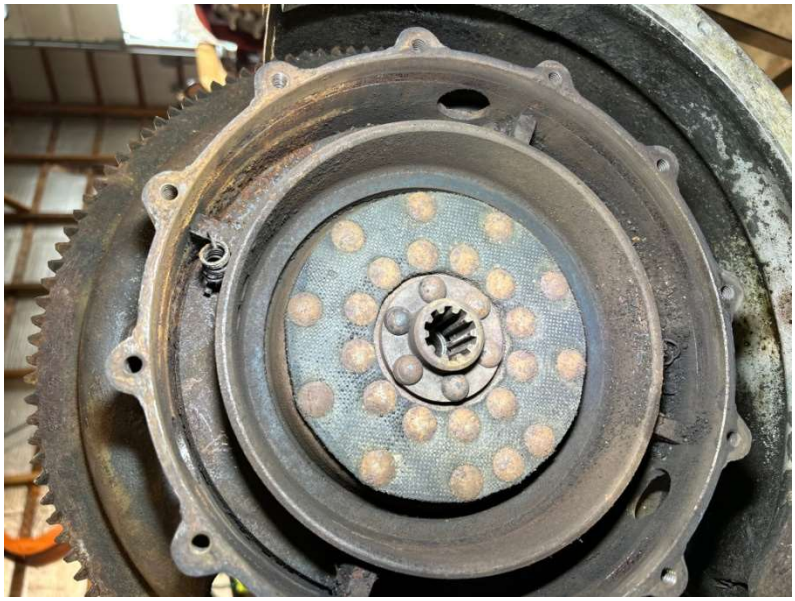
Caption: Franklin Air Cooled Engine, one cylinder jug removed.

Caption: Air Cooled Engine, all cylinder assemblies removed

Caption: Center main bearing-solid babbitt (die cast). Note: Oil gallery relief 'cut/cast' diagonally on the back side to allow oil from the oil gallery supply in the crankcase at the edge of the bearing to the center of the bearing.

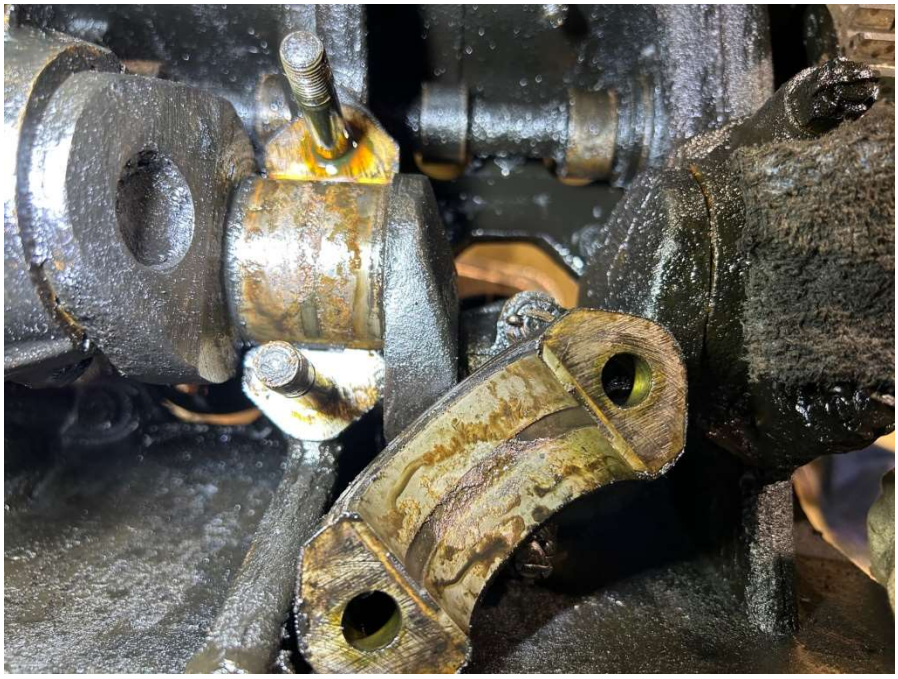
Caption: Main bearings. Note damage to upper babbitt bearing shells due to the weakness of the oil gallery relief.

Caption: Upper crankcase main bearing cradle. Note offset oil gallery port and oil staining behind where the bearing oil passage relief is cast in the bearing shell.



Caption: Clutch thrust ring in flywheel housing- Note the four centralizers rusted to the flywheel housing and broken release spring.

Caption: Pulling thrust ring out of flywheel housing.



Caption: Years of condensation cycles rusted the surface of all the main journals.