Building a 1:8 Scale
1933 Gurney Nutting Rolls-Royce Phantom II

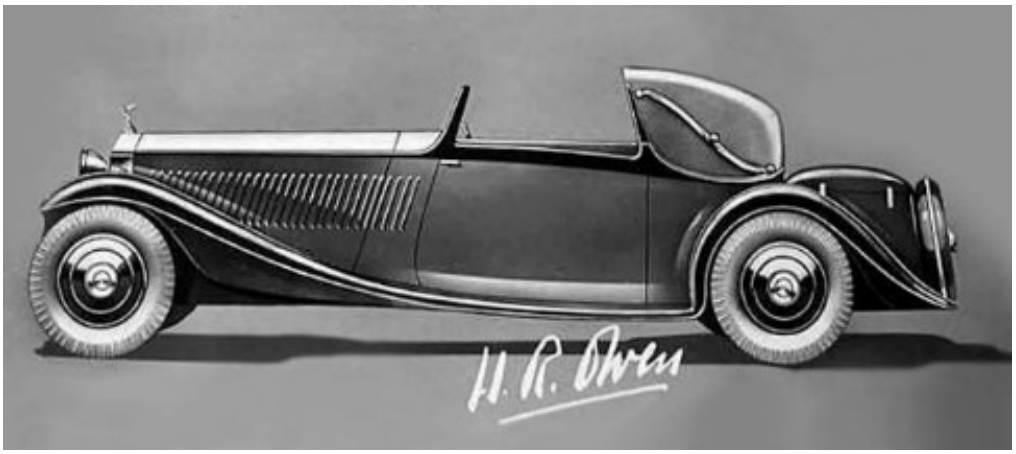
Introduction

Rolls-Royce Phantom IIs are big cars and the bodies are frequently formal, upright and staid. Gurney Nutting was one of the few coachbuilders who produced elegant attractive bodies that still draw admiration decades later. They were responsible for the very attractive 3-position cabriolet, built on the shorter Continental chassis that was the basis for the Pocher Sedanca kit.

One version of that Gurney Nutting design is this fixed head coupe with its fake folding roof (faux cabriolet). The lines are particularly sleek, yet the design manages to convey an image of respectability as well as elegance and speed. Only a handful were built.

Personally, I find this design to be one of the most satisfying of all the Phantom II bodies. There is a flow and coherence to the lines which is exceptional. Since this was likely going to be the last Rolls-Royce I built, it also seemed fitting to pick something that was particularly pleasing to the eye.

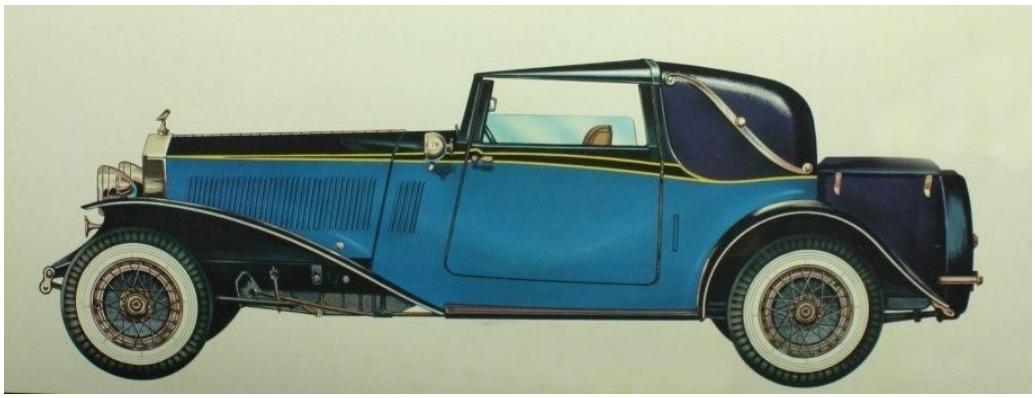
The design is very similar to one registered by Captain Owen whose business, H.R. Owen, usually handled the sale of Gurney Nutting cars. Owen considered the Gurney Nutting body to be a copy of his own design but an infringement lawsuit was never pursued. Not surprisingly though, the sale of this particular vehicle was handled by Jack Barclay.



Chassis number 170 MY, on which my model is based, was sold on 4 March 1933 to Sir Hugo Cunliffe-Owen who was chairman of the British-American Tobacco Company. He was clearly a man of taste.

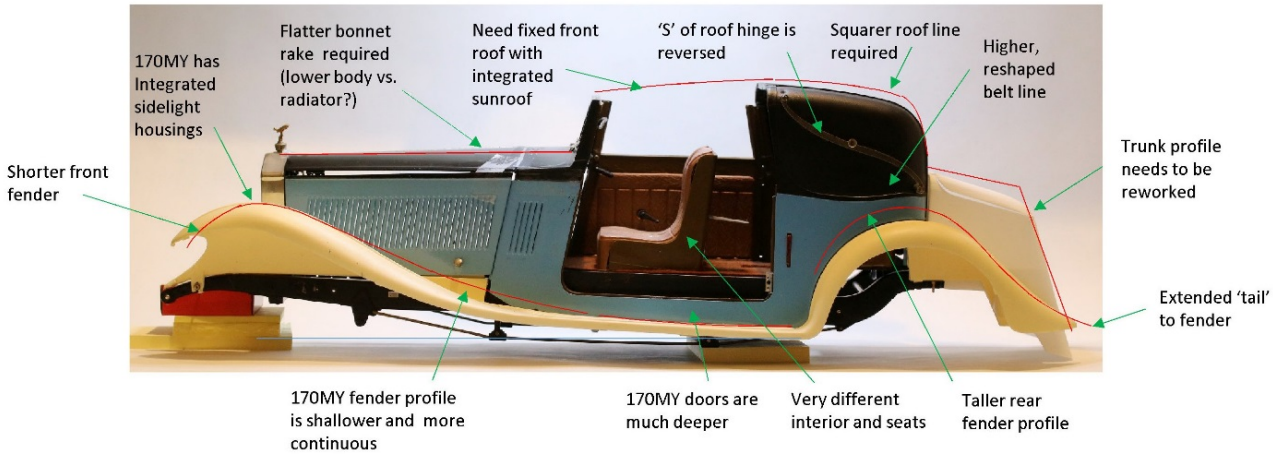
Getting Started

The platform for the model is the Pocher Sedanca kit (K72).



Even though there are some similarities in the body shapes of the two models, it was obvious a considerable amount of modification to the Pocher body was going to be required.

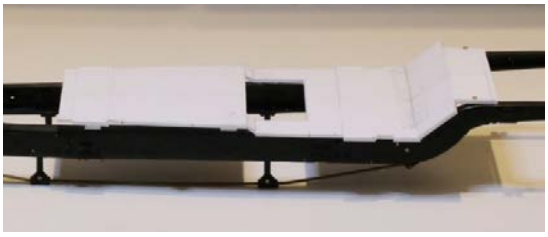
Rather than start with a brand new kit (which I didn't have) I started with an almost, but poorly, completed model I purchased on eBay. This wasn't too much of a problem since the kits are largely screwed together. So the first step was to make a rough trial assembly to understand the scope of the needed changes. The following picture tells much of the story. The fenders in the photo are Ambassador resin fenders obtained from Model Motorcars Ltd. The boot (trunk) was a first attempt at a 3D printed version but, as it turned out, the shape wasn't right and the walls were too thin.



Floor & Seats

Construction began with the floor.
My original intent was to use the Pocher floor. But so much butchery was needed that it was simpler to start from scratch.

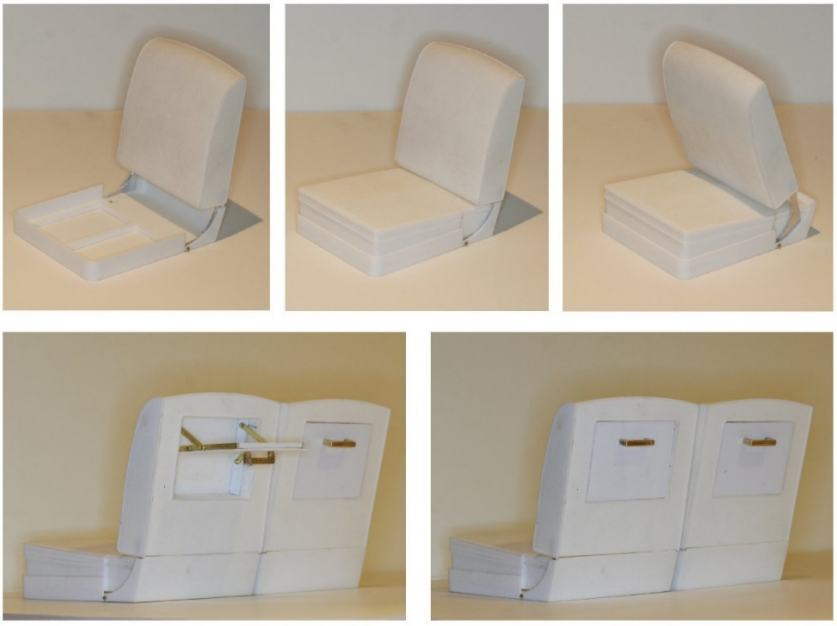
The floor is made from 2.0mm (0.080") styrene sheet with a cutout to take a footwell.
The rear part of the floor sits on the top of the chassis rails. Sloping the floor up the rear step in the chassis makes room for the rear seats.



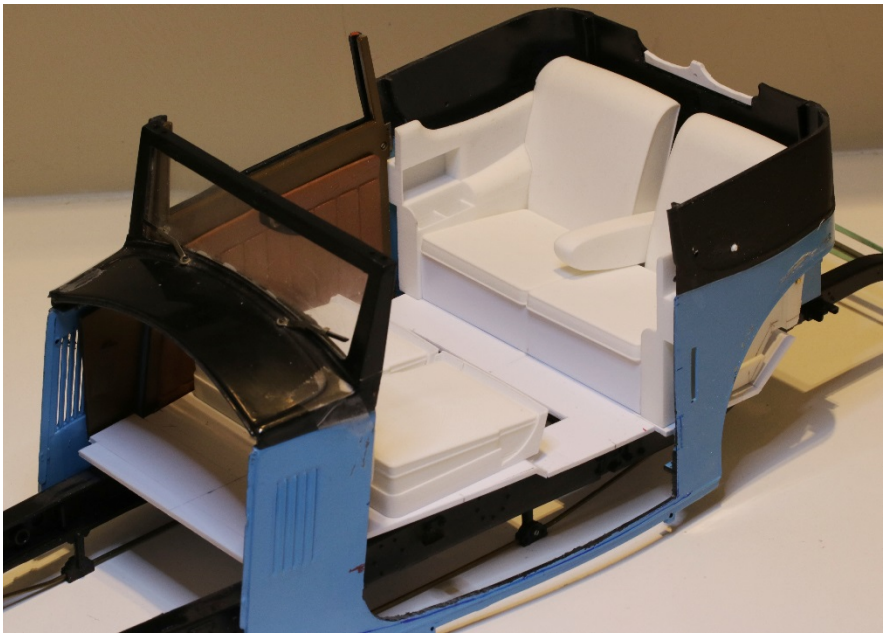
The rear seats are based on interior pictures of the prototype and designed to fit within the Pocher body shell. The seat cushions, seat backs and armrest are 3D printed, but the platform is built from styrene sheet. As on the prototype, a footwell, between the chassis cross-members, provides greater foot room for rear seat passengers.
The front part of the floor is raised 6mm, just like the prototype. The step is necessary to clear the gearlever boss on the top of the right hand chassis rail and also to provide clearance over the gearbox.

The front seats (frame, seat cushions and seat backs) are 3D printed. The seat backs tilt forward and have built-in trays for the rear passengers. Eventually, the seats will sit on rails so the seats can move backwards and forwards.

Assembled Front Seats & Trays

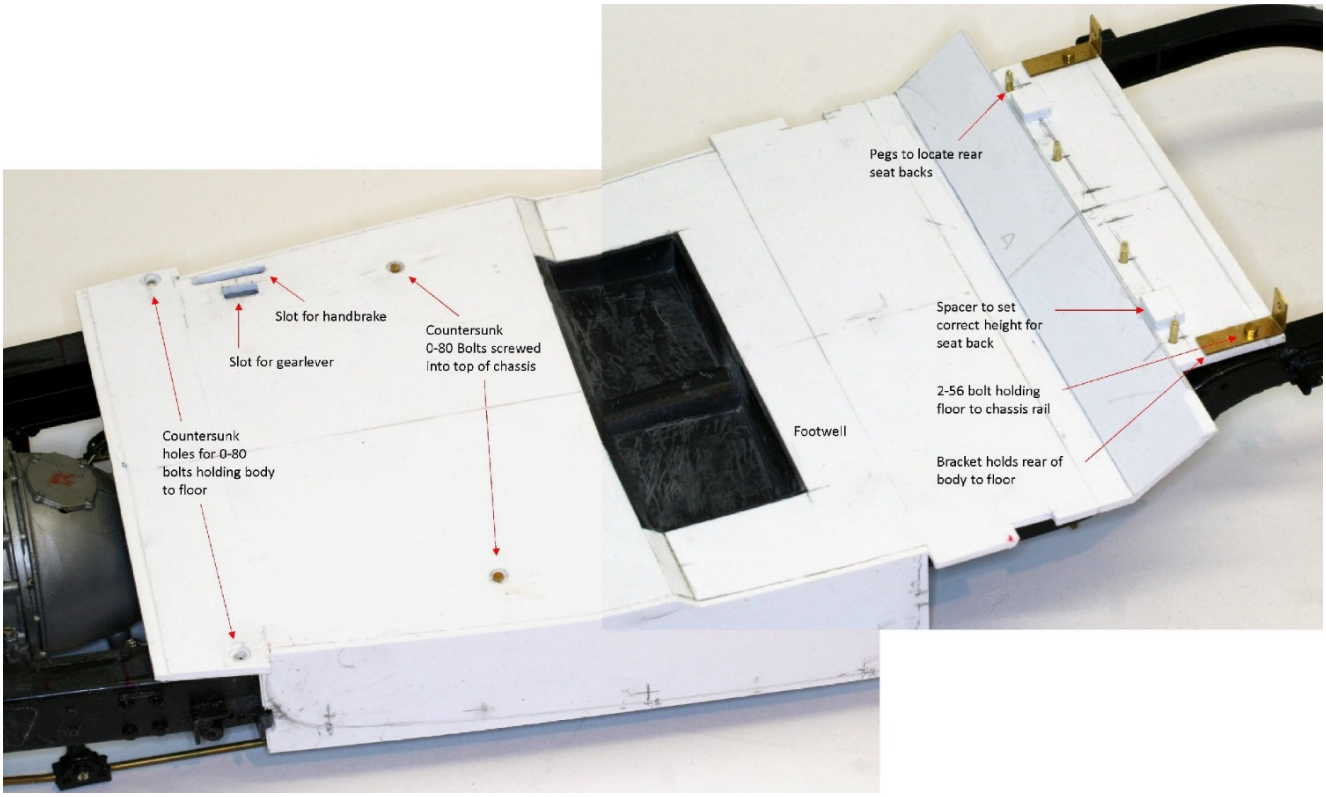


Here's the shell of the Pocher body fitted over the floor and rear seats:

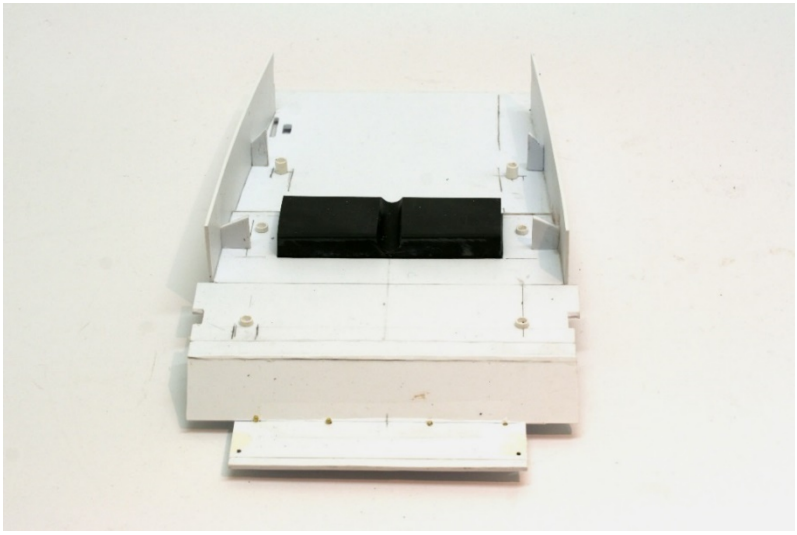


The top of the body has been cut off so the height of the roof at the back can be raised 5mm to better match the roof profile of the prototype. The prototype also has two oval rear windows vs. the rectangular window of the Pocher model.

Once the body and floor fit was confirmed, the floor could be finished. The floor is attached to the chassis by four bolts, two at the back and two at the front. The body shell is then attached to the floor with two brackets at the front and two at the back.



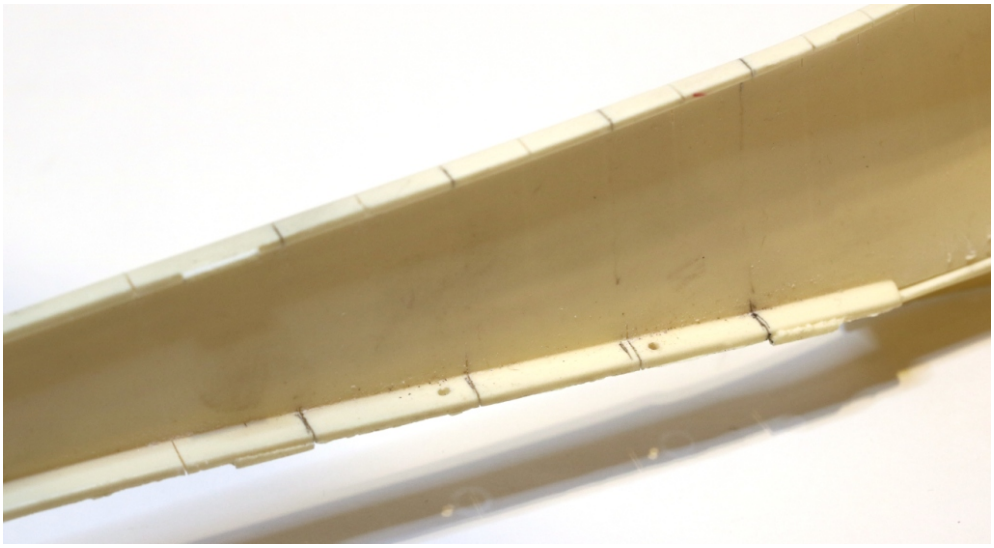
Four styrene tabs on the underside locate the floor centrally along the axis of the chassis and keep the side pieces square. Styrene tube spacers maintain the floor at the right height.



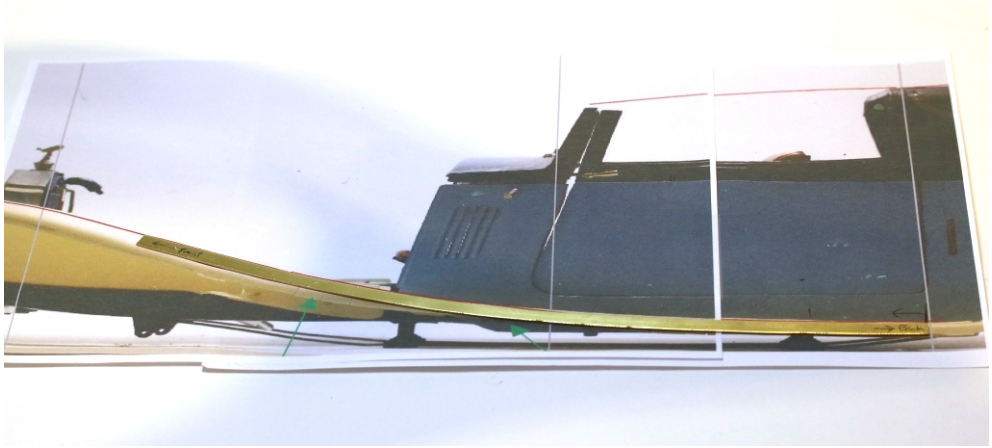
Fenders

Once the floor was built, attention could turn to the fenders. The Sedanca fenders are almost bicycle-like and the running board is separate. In contrast the Gurney Nutting fenders are deeper, the front and rear fenders and running board are integrated into one unit, and there is a continuity of line from rear fender all the way through to the front. The Ambassador model fenders are the nearest equivalent and, fortunately, Model Motorcars Ltd offers a resin version.

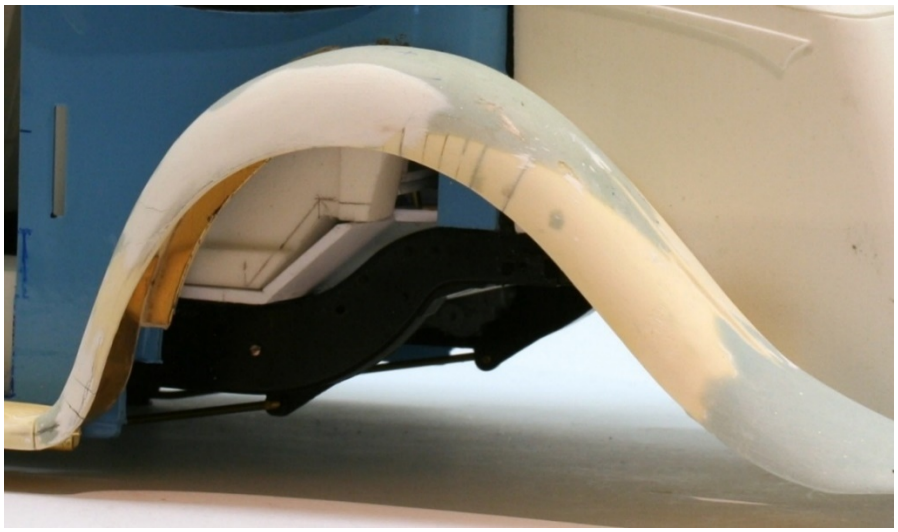
Nevertheless major modifications were necessary.
First, the sides of the fenders were slotted so the curves could be reshaped.



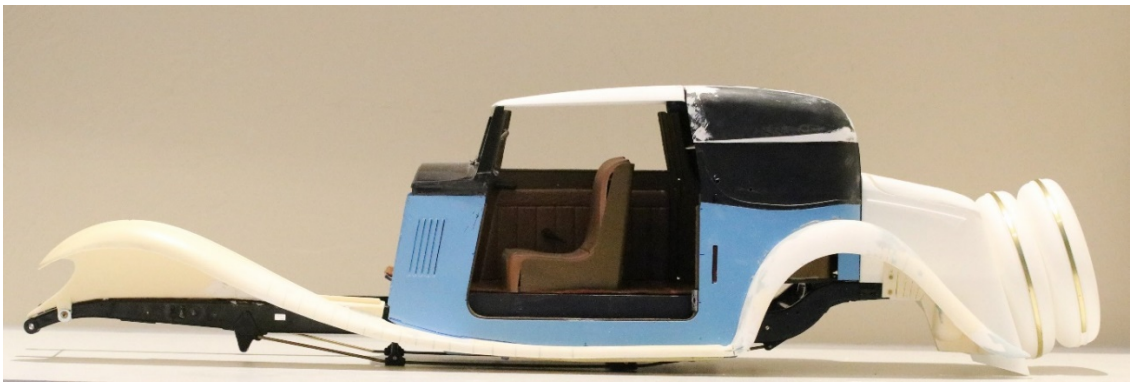
Reinforcing brass strips were glued behind the edges to maintain the new curves. Here the strips for the front fenders are being checked against a full size photographic template before being glued in place:



Body filler filled the slots and also increased the height and length of the rear fender. The tail was reshaped. The main body filler (the green-gray color in the photo below) is Evercoat's Euro-soft Polyester Glazing Putty, a two part resin auto body filler. The cured resin is relatively easy to carve, is very smooth when sanded and holds a fine edge.
For small surface imperfections, I use Tamiya White Putty which doesn't need mixing.



Now the fender is starting to look like that on the prototype.

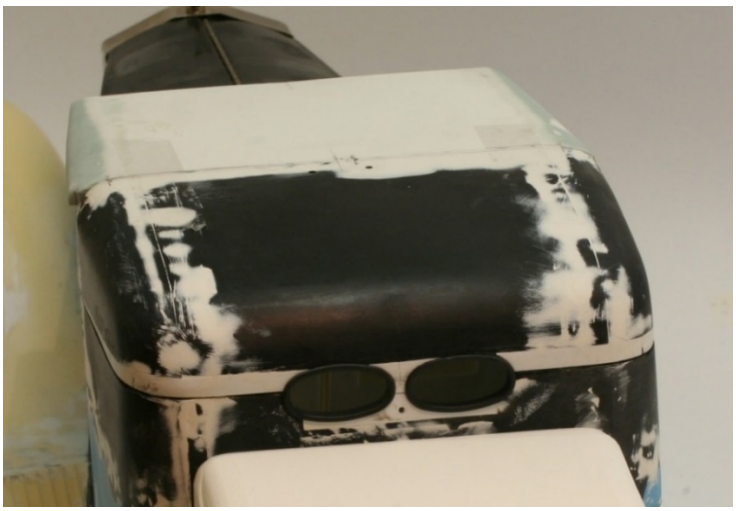


Roof

Also visible in the pictures, above and below, are the modifications to the roof required to create the squarer profile and the addition of the new, 3d-printed, front roof. The pieces of the roof are pegged together using .025” piano wire. 1/32” holes are drilled at intervals into the edge of each pieces into which a short piece of piano wire is cemented in place. A corresponding hole in the adjacent piece aligns the two pieces but also allows the assembly to be taken apart when necessary.

I’m a big fan of dry assembly using pegs and/or bolts especially when making major modifications. It’s almost impossible to anticipate every step in these custom builds so the ability to undo, add or re-do pieces is important. Once all the assembly is proven out, everything can be taken apart for painting and then glued together during final assembly with minimum risk of damage to the painted surfaces.

Here the raised lands on the Pocher roof have been milled off and the pieces glued together. The cutouts for the oval rear windows are clearly visible. The new 3D printed front roof has been pegged in place so the front and rear sections can be properly matched. Eventually a sunroof will be incorporated into the front section of the roof.



The faux roof was 3D printed. The picture below shows the first attempt. I wasn’t happy with the fit so ended up re-doing it. But at least I knew it would work!

Also visible in the photographs are the boot (trunk) and spare wheel covers.

Boot

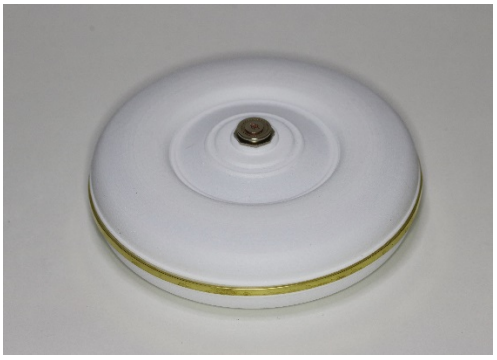
This is a 3D printed part designed to fit between the two rear fenders. The lid was printed separately and will be attached to the boot with a couple of custom made hinges.
The trunk lid is secured in position by the hinge at the back and two clasps at the front. The peg holes for the right hand side clasp are just visible in the photograph.

Pegs in the bottom of the boot lock into the chassis rails and two bolts just below the hinge fasten the boot to the rear wall of the body.

A folding, locking arm holds the lid open when necessary.

Wheel Covers

The second item is the two spare wheel covers. These 3D printed covers are designed to accept a Pocher wheel as shown below:

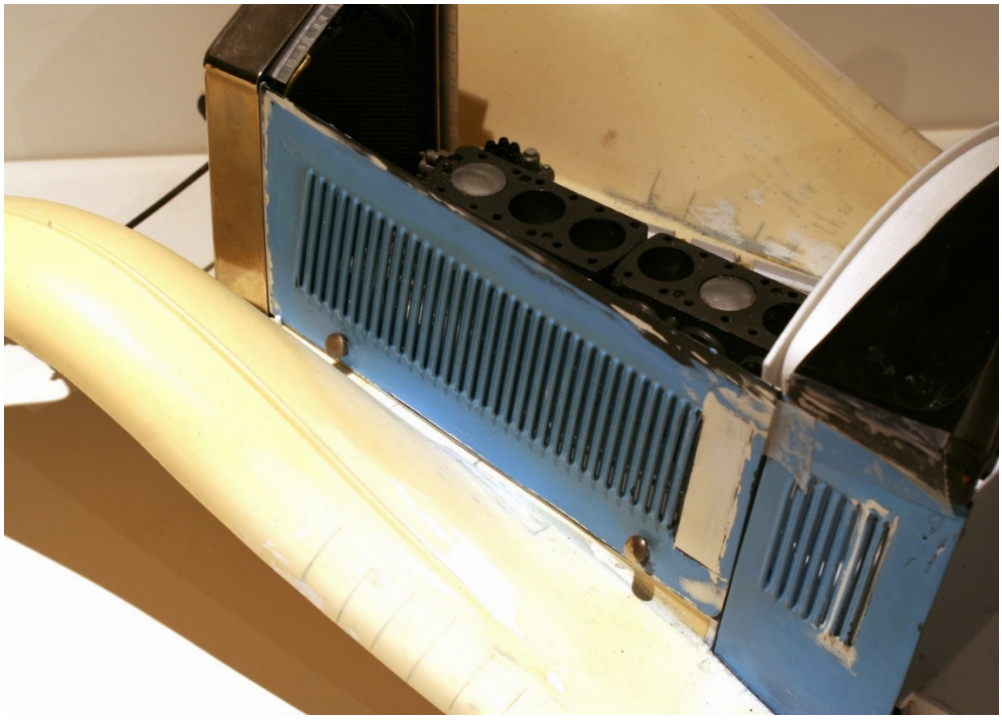


The two halves of each cover simply slot together. The 1/8” wide brass band replicates the locking band on the prototype. The covers will be attached directly to the boot.

Bonnet

Here's the completed body so far.
The faux cabriolet roof is a separate piece that will be fixed over the modified Pocher roof as shown.
The edges of the bonnet side pieces have been filed straight so they mate properly with the chassis rail covers and so the louvers line up with those on the body. The door opening has also been deepened to match the prototype.

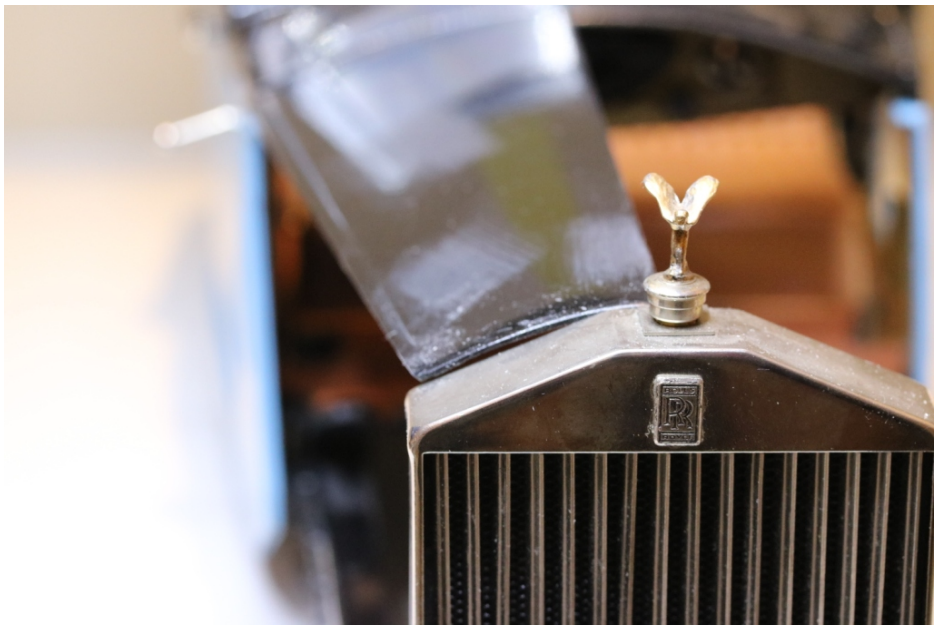
One obvious issue is that there is now a gap between the sides of the bonnet and the top. This will be filled with a styrene strip. Another issue, although subtle, is that on the Gurney Nutting prototype the bonnet louvers do not go all the way the rear edge. Also, the prototype has more louvers in the body than does the Pocher. The obvious solution was to remove three louvers from the bonnet panels and add two to the body as shown below:



The raised band along the top of the Pocher bonnet side pieces has also been removed. When the styrene strips are added, new raised bands will be made that align with and match the strake that runs across the body.

Bonnet Shape

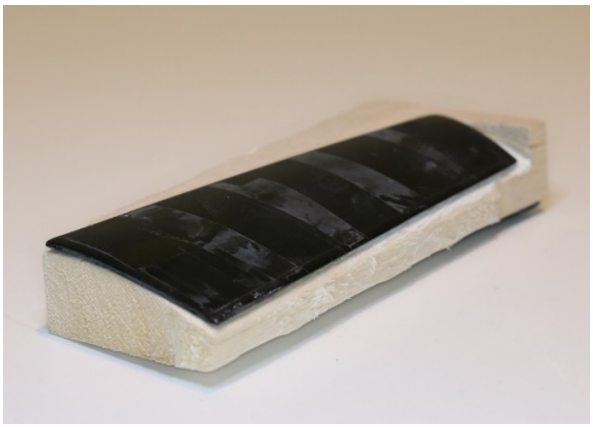
Unfortunately, Pocher parts are not always a good fit. The top of the bonnet is a good example,
When the rear edge was aligned with the body in front of the windshield, the front outer edge stuck up above the radiator:



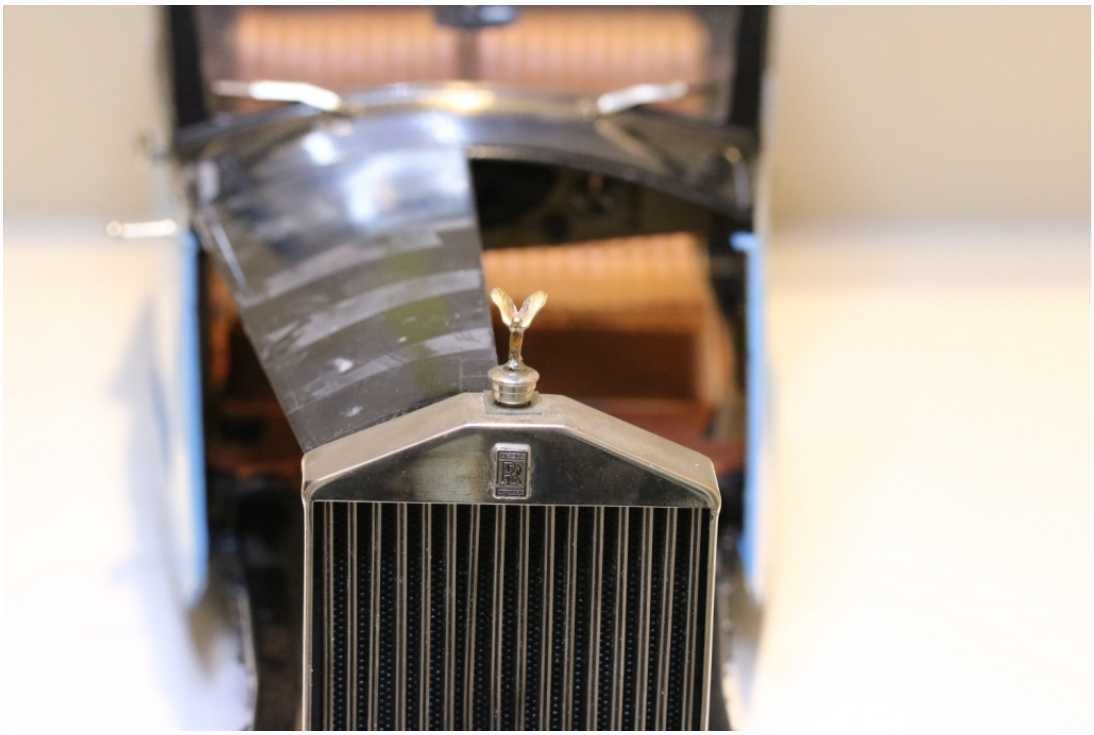
The best advice I received for fixing this is as follows. Create a balsa wood former with the right profile. Strap the warped plastic bonnet piece to the balsa wood former (I use scotch tape as strapping). Then, immerse the balsa wood former and the plastic piece into boiling water and leave for a couple of minutes, Remove the former and, with the piece still strapped to it, immerse it in cold water to 'set' the styrene. Once the straps are removed, the bonnet piece should hold its new shape.

Styrene softens between approximately 200^{o}F and 215^{o}F (93^{o}C - 102^{o}C) so boiling water works fine. I've tried using a heat gun in the past but it's tough to evenly heat the styrene and, more often than not, I got uneven edges and buckling.

Here's a picture of the former and a picture of the bonnet piece after the Scotch tape straps had been removed. This particular former is shaped so that the left half of the bonnet top can be attached to one side and the right half to the other side.



The end result:



Hinges

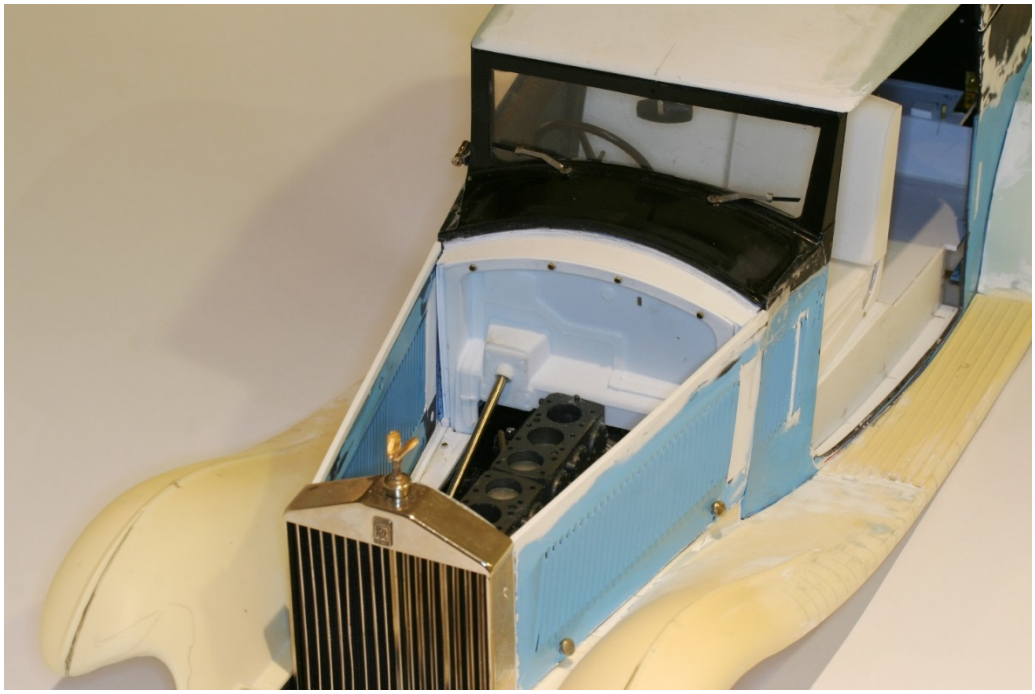
The Pocher top hinge works fine. But the little hinges connecting the bonnet tops and sides are not very good. They were replaced by full length piano hinges which I got from http://www.nelsonhobby.com. The hinges are available in 12” lengths and, even better, the hinge profile is slightly smaller than that of the Pocher top hinge. However, the hinge action is relatively stiff, so I replaced the 1 mm hinge rod with 1/32” diameter brass rod.

The hinge in front is the center hinge from the Pocher kit.

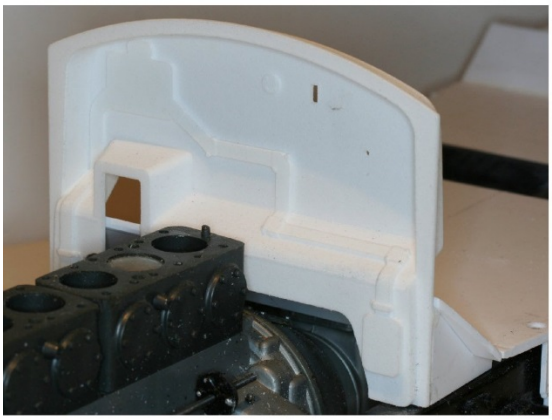
Firewall

In the photograph below, the styrene strips have been added to the bonnet sides, new bonnet retention rails added to the chassis rail covers (just visible behind the flying lady) and a modified firewall installed.

The firewall is a 3D printed version of the modified Pocher firewall outlined in 'Vol. 2 – Chassis' of my Rolls-Royce Build Notes (available at www.jrhscalecars.com). The firewall was positioned 8mm behind the rear edge of the cylinder block. The mating cowl between the firewall and the body was made up using styrene strips and is pinned and glued to the body. Four screws will lock the firewall and body together (shown in the photograph) and those screws will also hold the bonnet rub strips in place. This means the firewall can be built onto the chassis and the body then added later as part of the final assembly. This is important since the firewall needs to be in place when adding the oil lines and fuel lines,.



These pictures provide more detail about the firewall:



On each side of the firewall are the support pieces (here made out of styrene sheet). They hold the firewall upright and the rear of the support piece fits between the top of the chassis rail and the underside of the floor. A new bridge piece was then made for the floor to fit between the flat portion and the rear of the firewall. This is most clearly seen in the right hand photograph. Eventually, the styrene support pieces will be replaced by ones made out of brass sheet as outlined in my 'Vol2. – Chassis' build notes.

Doors

This is the interior paneling of the prototype doors.

The Gurney Nutting doors are quite different from the Pocher doors, so major modifications were in order: On the prototype,

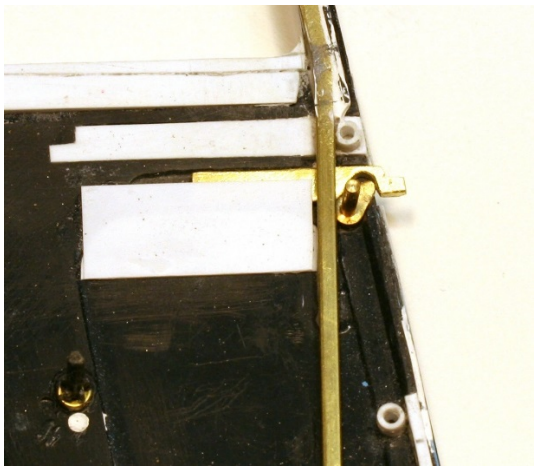
- The doors are much deeper, reaching almost down to the running boards
- The doors have a large radius transition from the front edge to the bottom edge
- The window shape is different and there is a window frame across the top
- The interior door panel is very different, as the photograph shows
- The window winder is higher on the prototype and the door lock lower.

Here's a comparison of the two assembled doors (both doors are unpainted):

Window Mechanism

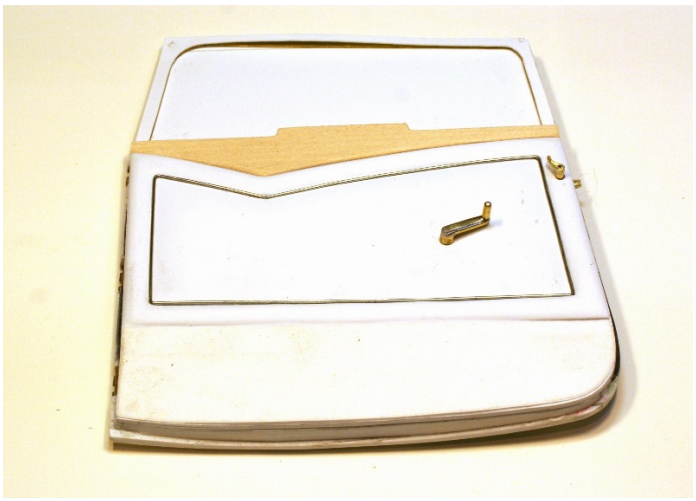
The Pocher window mechanism is simple and rather crude. The glass is too thick and the window guides aren't that effective. So, based on my experience with the Figoni & Falaschi model, I chose to have the window glass move vertically in a 3/32" C section brass channel. The interior width of the channel is 1/32", which easily accommodates a 0.020" thick clear acrylic window which is a more realistic thickness. By slotting the channel walls with a Xacto saw it's possible to create tight bends. After solder filling the slots, the completed section is glued in place and the door frame is then quite strong.

The first step was to remove the internal ribs from the Pocher door and lengthen the door by adding a 2mm thick extension. A 1/16" thick curved brass strip was glued to the inside of the extension to help give the door a greater bow. Next, a new slot was milled lower in the door that would take a sliding door lock made from 1/16" x 1/4" brass strip. The lock would be operated by the Pocher lever (right hand photograph). The old slot was filled with styrene strip.



The Pocher rack and winder were salvaged and integrated into the new mechanism. Here the rack section has been incorporated into a test window made from 0.020" styrene sheet. The test window let me experiment with fit, clearances and the highest possible positioning of the winder shaft, without having to waste much more expensive clear acrylic sheet.
The winder shaft is anchored in a new indent milled in the door and by a hole in the interior door panel. The Pocher winder gear is very prone to stripping, so precise alignment is very important. To help with the alignment, the interior panel is fitted with 1/16" styrene pegs that, in most instances fit into short styrene tubes located around the door. This approach avoids the use of unsightly screws.

The interior panel is constructed from layers of styrene sheet. The ‘cushioned’ center panel and surround is made from 0.100” (2.5mm) thick styrene sheet milled and sanded to create the padded appearance. The wood paneling is basswood which will be stained to match the dashboard. ‘Carpeting’ on the lower section completes the door.

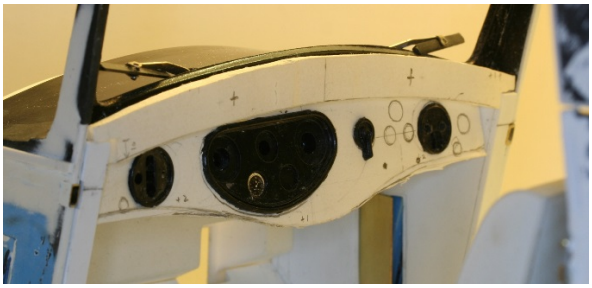


Dashboard

Like almost all Phantom IIs, the Gurney Nutting dashboard is made of wood.

As you can see in the photograph, the layout is quite different from the Pocher model, although the instrument binnacle has the same five instrument arrangement and the Telegage (for fuel level) is in its usual position on the left hand side. In addition to the standard shock absorbers, this particular vehicle was also equipped with Andre Hydro TeleControl shock absorbers. The hydraulic pressure on the friction plates was adjustable and two gauges on the dashboard (for the front and back shock absorbers) indicated the hydraulic pressure. Those gauges can be seen behind the upper right quadrant of the steering wheel. Andre shock absorbers were a normal addition to Phantom II Continentals since they aided high speed driving for which the Continentals were particularly suited.

It wasn’t possible to use the Pocher instrument panel and windscreen surround, so a new one would be fabricated from 1/8” and 1/4” thick basswood. The first step was to use foam board to make a trial layout:

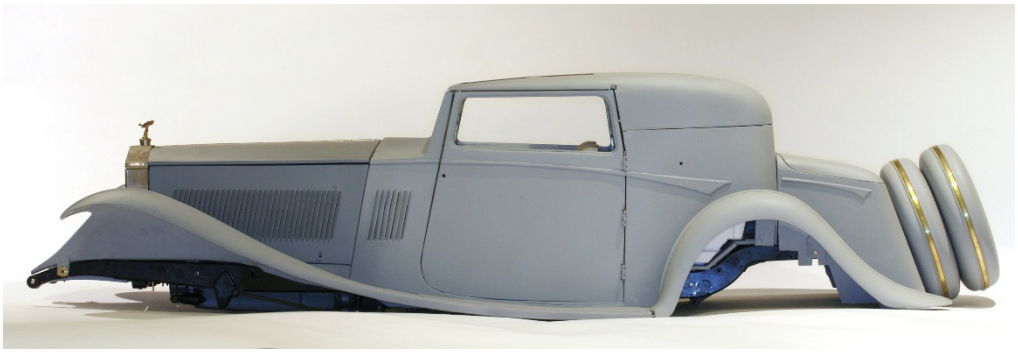


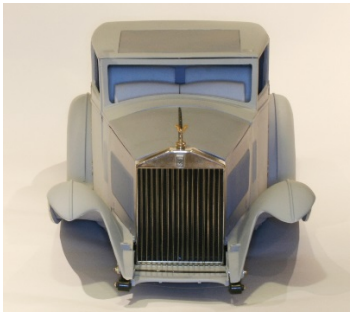
From that layout the wooden dashboard could be constructed. At this point the pieces are simply pressed into position.

The steering wheel and column were temporarily mounted to ensure the cutout in the dashboard was in the right place and the rake and clearances for the steering wheel were correct. All that remained was to make additional cutouts for the other instruments and switches and stain the wood.

Primed Body

At this point most of the body work had been completed, although not painted.
Here are some pictures of the primed body. The faux roof is the obvious missing element!!



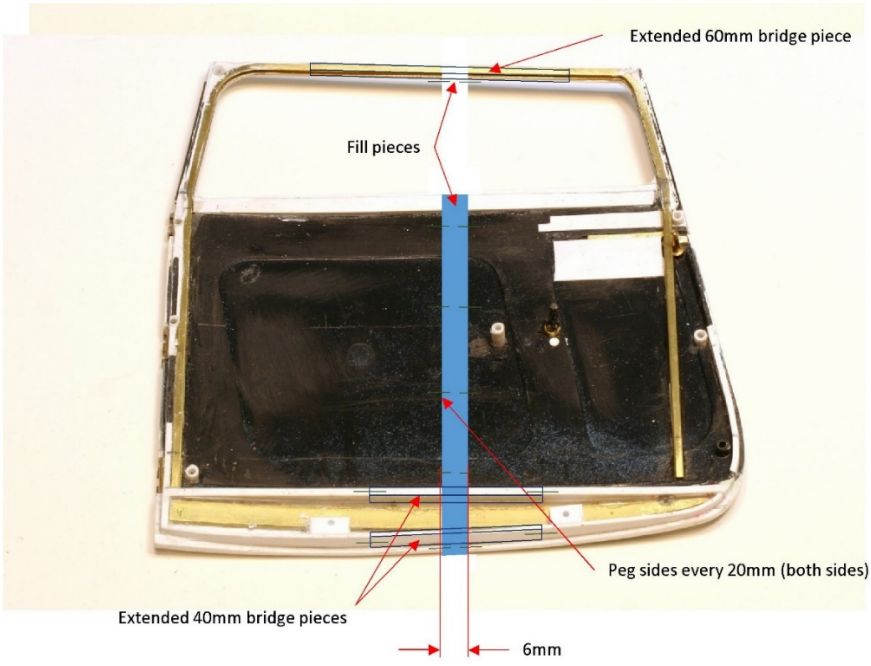


Re-do

The model was now beginning to look a lot like the prototype.

But, the more I compared the profile of the model with the profile of the prototype, the more concerned I became with the difference in the door widths. If you look carefully it's clear from the photos that the faux cabriolet's doors are slightly wider than the Pocher doors that were used in the model. It's a relatively small difference, about 6mm in 1:8 scale, but it has a noticeable impact on the visual balance of the vehicle's profile. Of course, the wider door also makes sense because it would have made entry and exit easier from the rear seats. The difference in door width also explained why, in my model, the front edge of the rear seats was set back from the rear edge of the door whereas in the prototype this wasn't the case.

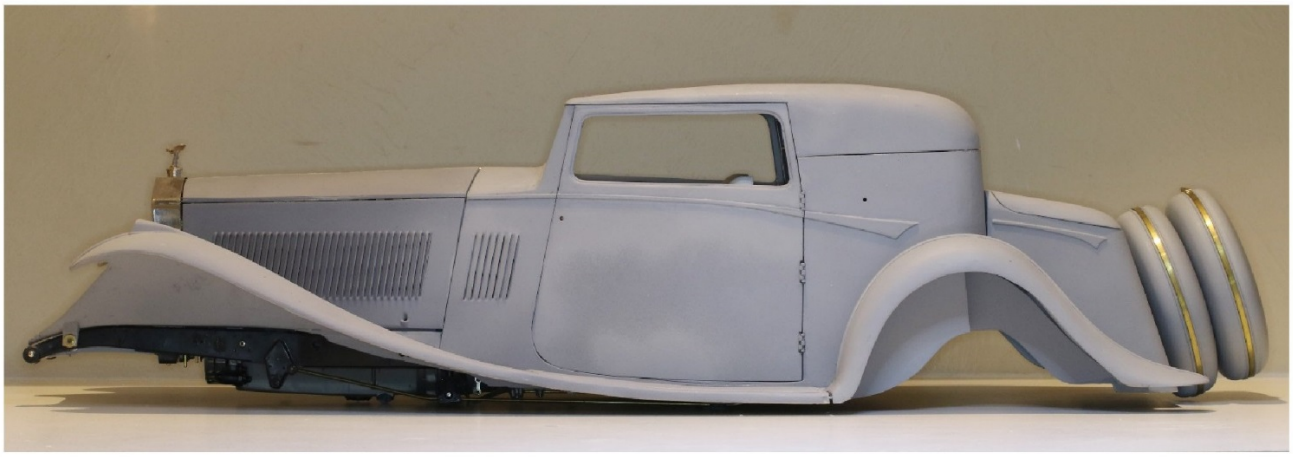
Well, I was building a replica and the aesthetics of the vehicle design was one of the reasons for tackling the model in the first place so, despite the work involved, I decided to widen the doors and cut the body back to accommodate them.
Here's how I proposed to make the change:



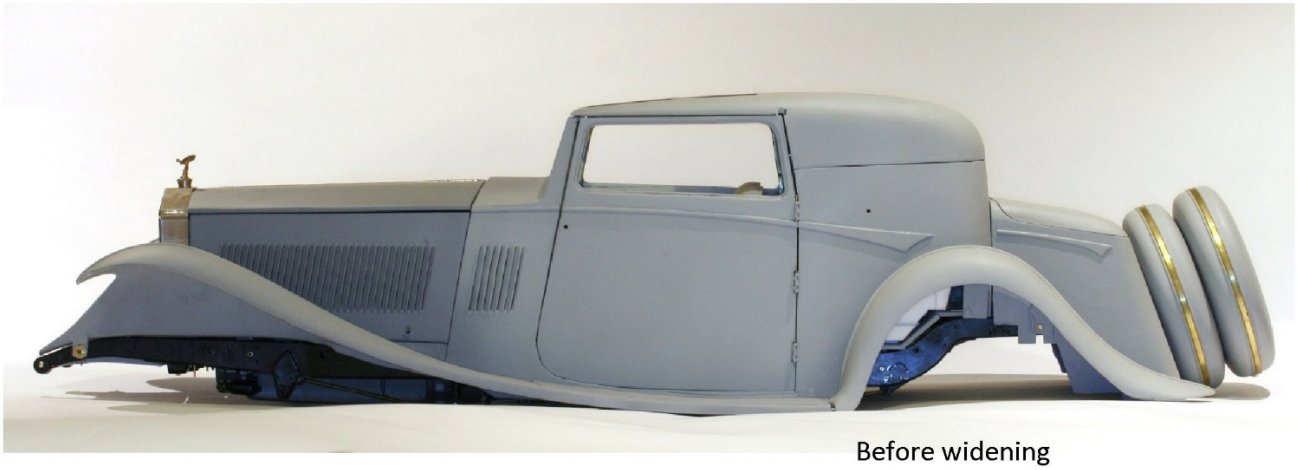
Cutting the door down the middle was going to be the best option:

- It was going to be the least amount of work.
- Most of the door construction could be conserved including the window winder and door latch mechanisms.
- The door hinges, which were working well, wouldn't be affected.
- Extended bridge pieces could be used to stiffen the door across the fill pieces and so preserve the door strength.

Here’s the revised profile after the doors had been widened:



Doors widened by 6mm

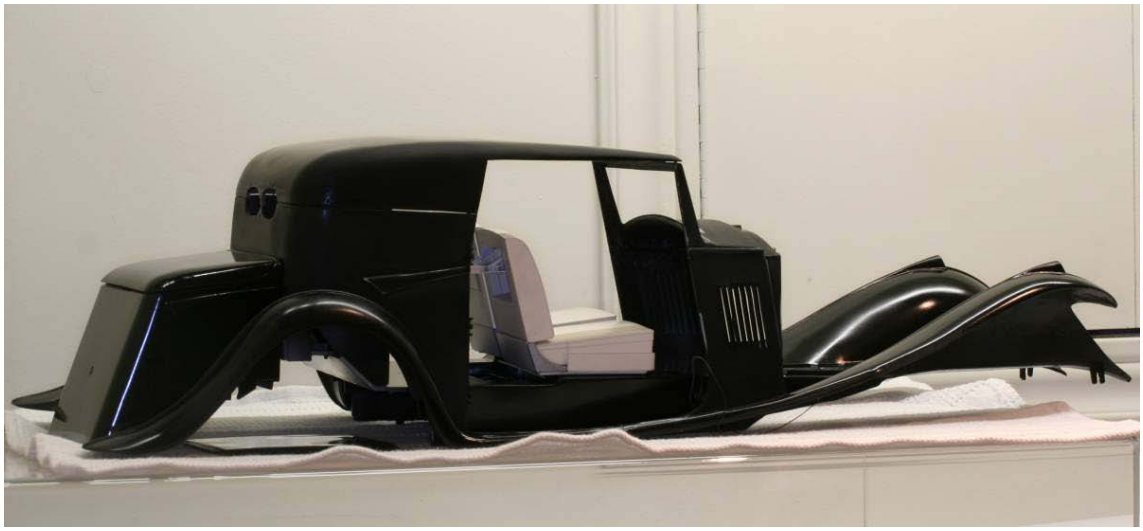


Before widening

It’s a subtle difference, but it significantly improves the visual balance and rake of the car’s profile.

Body Painting

With the door size and body mounting to the chassis finalized, it was possible to start painting. The body will be gloss black which is absolutely the best finish for highlighting surface imperfections!! So multiple coats and careful sanding between coats is necessary. Because of that, I use automotive lacquer paint, although Tamiya's synthetic lacquers are also very good. Each coat is thin, which preserves detail and dries quickly, but I still like to let each coat dry for two days before sanding and re-coating.



As you can see, the upper body is still separate from the lower body. Here they are just pegged together. Having them separate really helped with designing and fitting the headlining and fitting the rear seats. But with that work now virtually complete, the upper and lower halves can be glued together and the seam filled, sanded and painted.

As this photo shows, the front seats have also been painted and assembled ...

It may not be obvious here, but the rear fender has been modified to create a smoother transition from the leading edge of the fender into the running board. The need for that became obvious when I compared the profile of the prototype with that of the model. Again, it was a small difference, but important.

The wires you see in the photo are for the LED sidelights incorporated into the fenders. Eventually they'll be connected to a 9V battery under the rear seats and to a switch under the boot.

One important step was to ensure that the floor fitted over the handbrake and gear levers. Because of the side skirts on the floor, those levers have to be attached to the chassis before the floor can be installed. So, it was crucial to get the fit exactly right. I'm also adding an 'H' gate for the gear lever which will be mounted to the gear lever mechanism. This was normal practice. The 'H' gate explains why the slot in the floor for the gear lever is rather large.

Also visible are parts of the door hinges. I've never liked the Pocher door hinges, (they are crude and the mounting method very unsatisfactory) so I fabricated new hinges from 1/16" brass tube soldered to .016" brass hinge plates. Hinge pins are .025" piano wire which gives enough clearance in the brass tube for the hinges to operate freely. I mill out and slot the body and the door panels to take the hinge plates which makes sure the hinge pins are well outside the doors (just like the prototypes). This way the gap between the doors and the body can be minimized. When installing the hinges on the body (and door panels) I use a long piece of piano wire to keep the top, middle and bottom hinges in alignment with each other. Otherwise the risk of misaligning three hinges is very high.

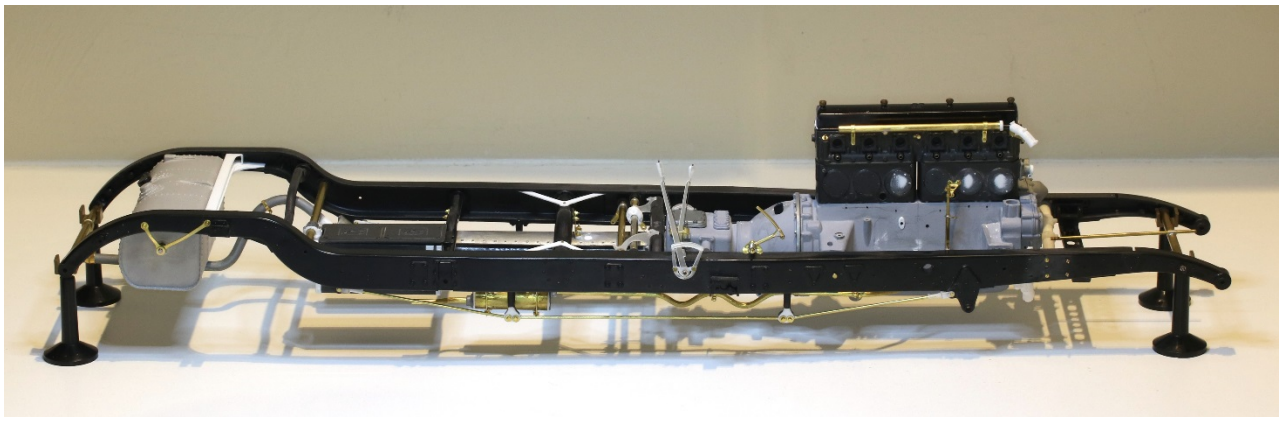
At this point it was time to begin final assembly of the chassis.
It was also obvious I was not going to finish the model before my annual pilgrimage south to a warmer climate. Since I have no painting facilities down south, the final painting of the body would now have to wait until late Spring. Well, so be it. My model construction always seems to have a pace of its own, and I've learned it is best not to force the pace. I would have time to get most of the chassis work done before I left so that became the focus.

Chassis

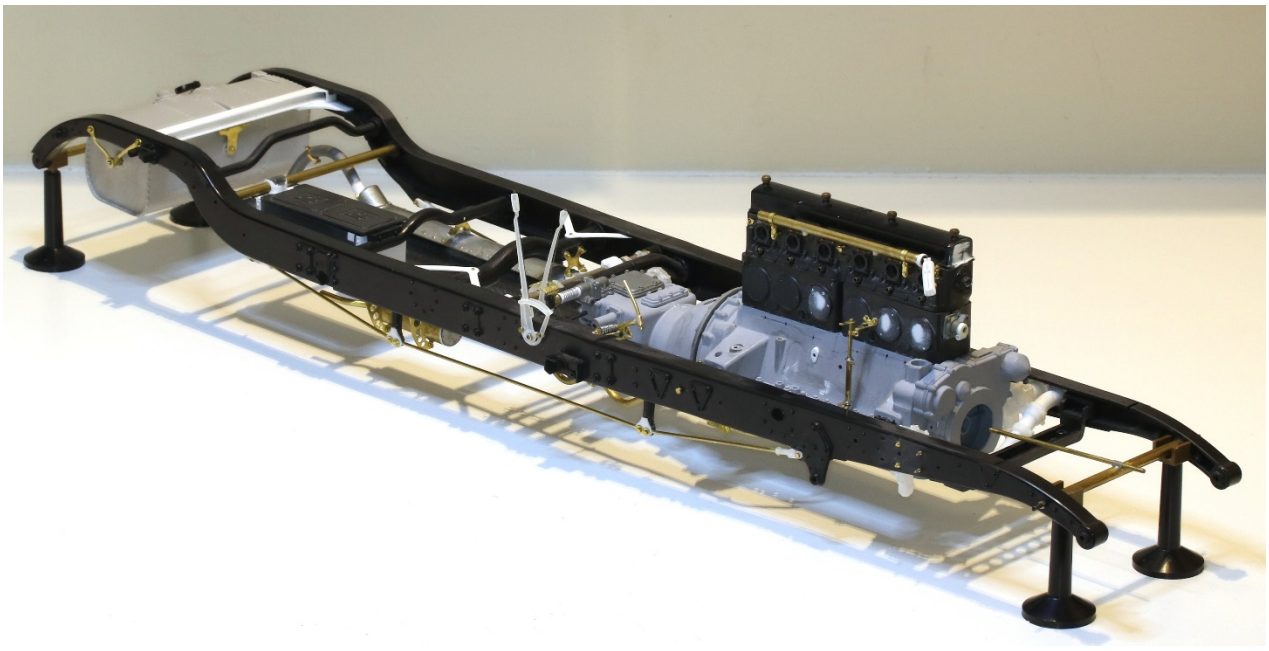
The chassis incorporates a significant number of changes that add lots of detail and historical authenticity.

- A smaller 20 gall fuel tank (not the one in the Pocher kit)
- Piping for the chassis lubrication system, and the foot lever for the related oil tank
- Fuel lines
- Vertical type front shock absorbers. The horizontal type in the Pocher kit wasn't introduced until later.
- Hydraulically adjustable Andre Hartford friction shock absorbers front and rear, as well as the associated piping and tanks. These additional friction shock absorbers were virtually standard on all RR Continental (SWB) chassis.
- A slimmer radiator, (consistent with the prototype). Proper bonnet rub strips have also been added. The slimmer radiator is essential in order to add the torque reaction damper to the engine.
- Modified hangers for the carburetor inlet pipe.
- Shorter hangers for the exhaust muffler … that brings the muffler more in line with RR practice.
- Modified rear exhaust pipe and flange interface with the muffler.
- Insulation wrapped exhaust piping.
- Scratch built leaf springs which provide a stiffer, more realistic suspension. (No more Pocher 'sagging'.)
- Modified steering column, steering box and steering arm
- A rear axle and brake assembly that allows the brakes to be pulled on. The Pocher brake linkages will be replaced by correct brake shackles, rods and wires.
- A modified brake equalization arrangement to better mirror the prototype.

Some are visible here …



and here;

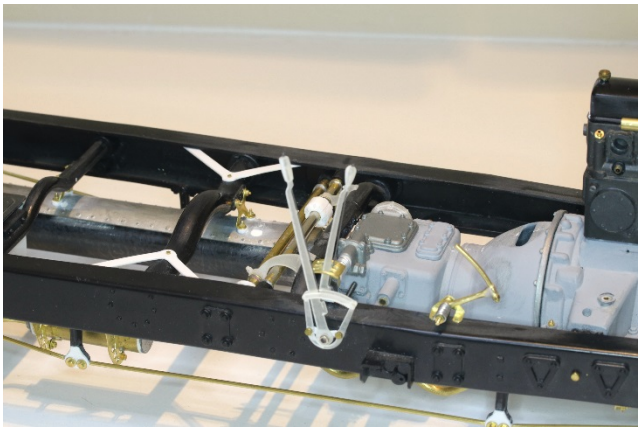


Many of these changes are detailed in my Super Detail Notes, accessible here:
http://www.jrhscalecars.com/RRSuperDetailing.html

What follows are pictures of some of the details …

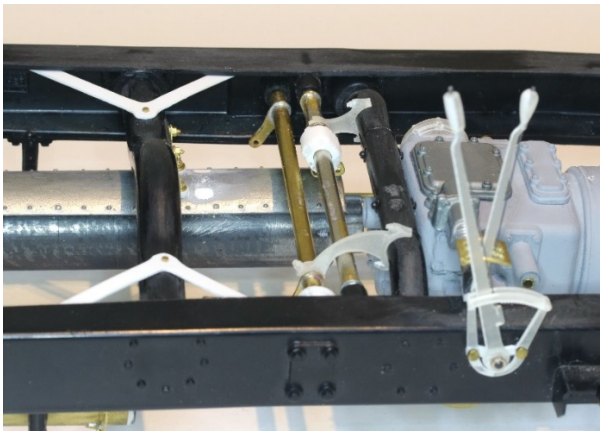
This photo shows the added rear cross member, the smaller fuel tank, modifications to the rear of the muffler and to the rear exhaust pipe ...

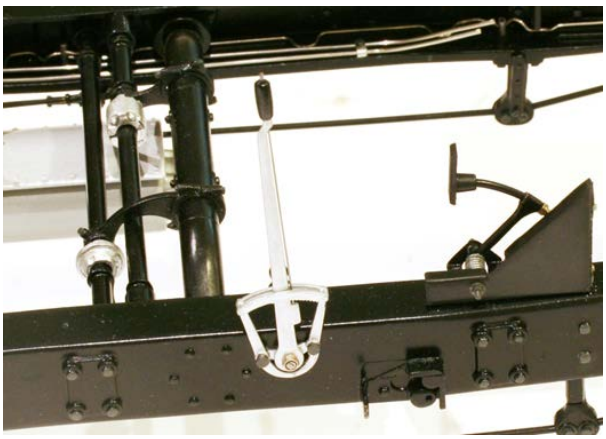
Here the bracings for the main cross-member and new brake equalization brackets have been added. The handbrake lever and frame and the gear lever were also 3D printed to match prototype designs. To the right of the handbrake lever is the chassis mounted accelerator pedal. Again this was RR practice, although Pocher used a different approach.



These two close ups shows more detail of the brake equalization mechanism, the chassis mounted accelerator pedal and the handbrake and gear lever mountings.

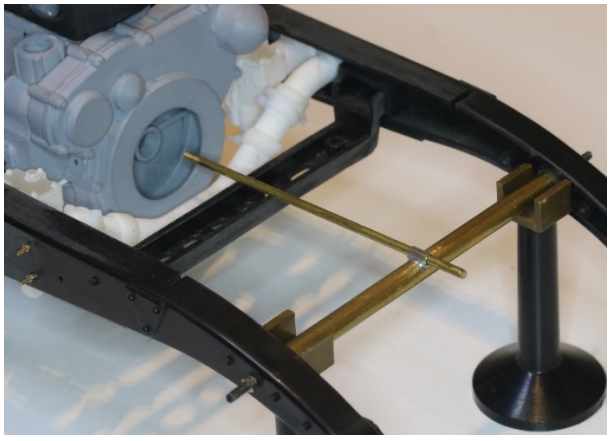
The Pocher brake equalizer rackets are incomplete and slotted to clear the cross-member tab. They are also a poor fit. New two piece arms were 3D printed. Just like the prototypes, they were designed to be assembled around the cross member rather than slid over the cross-member Pocher style.
The muffler is mounted on new, shorter, more realistic hangers. New mounting holes were needed for the heat shield.
Behind the handbrake lever is a new gear lever and 'H' gate. The top of the 'H' gate protrudes through the floor in front of the driver's seat. Both the handbrake and gear lever were 3D printed to better reflect the prototypes including the wire operated ratchets which are just visible in the photos.



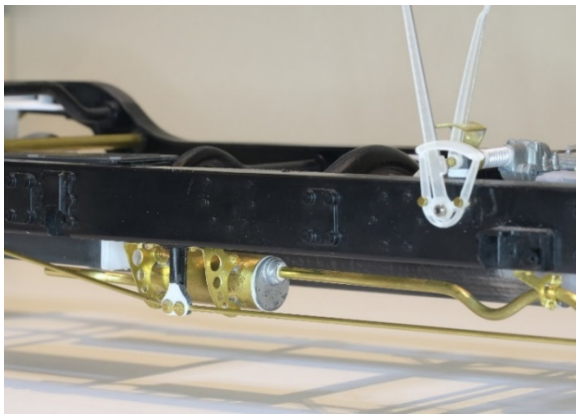


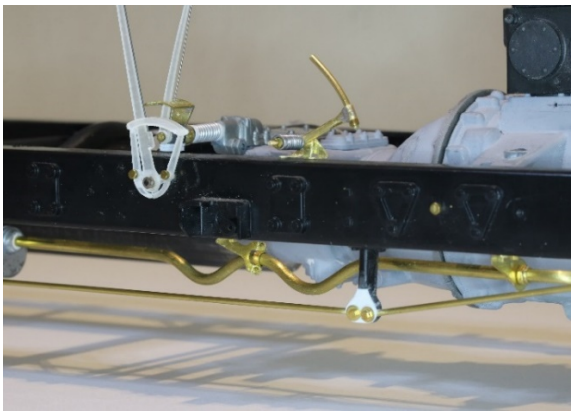
The photo opposite shows the test fitting of the vertical-type shock absorbers and the cross-member for the torque reaction damper. Everything is a tight fit in front of the engine so test fitting is critical.

I also prefer to fabricate my own front cross-member and build into it a more realistic bracket for the starting handle. The Pocher bracket, and starting handle for that matter, are just too big.

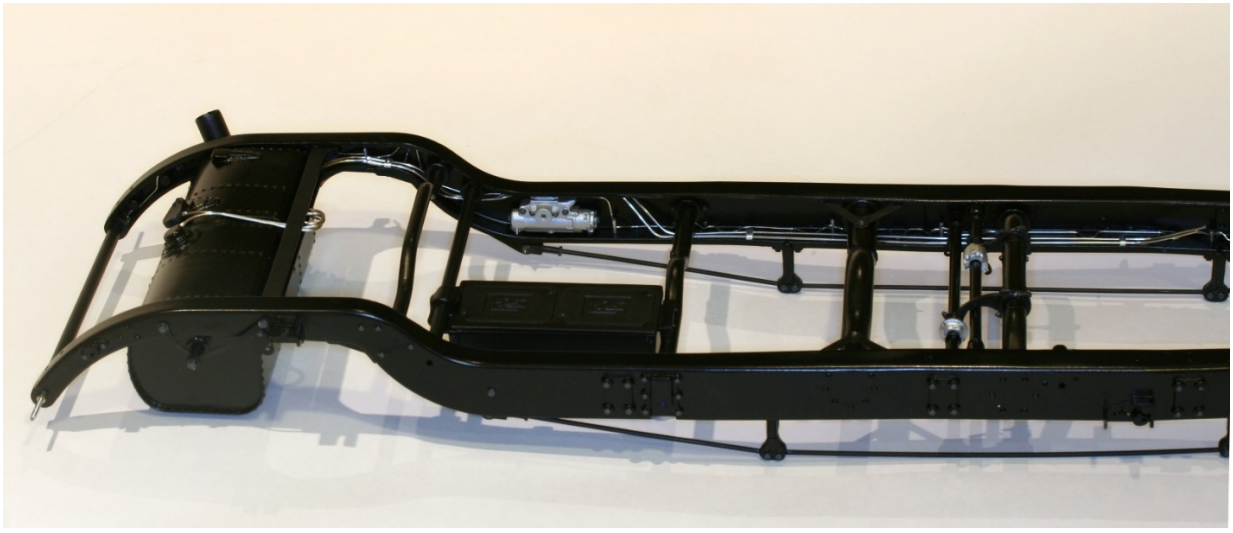


These two photos show modified hanger brackets for the carburetor inlet muffler (described in the Detail Notes) and inlet pipe. The inlet pipe is a 1/8” brass rod. The pipe is mounted higher than the Pocher version, just like the prototype,

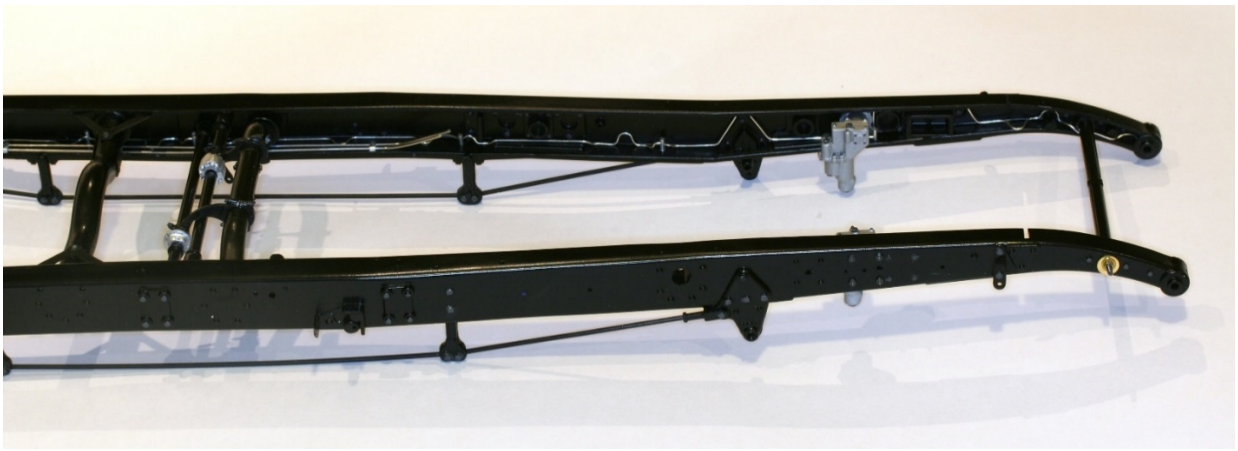




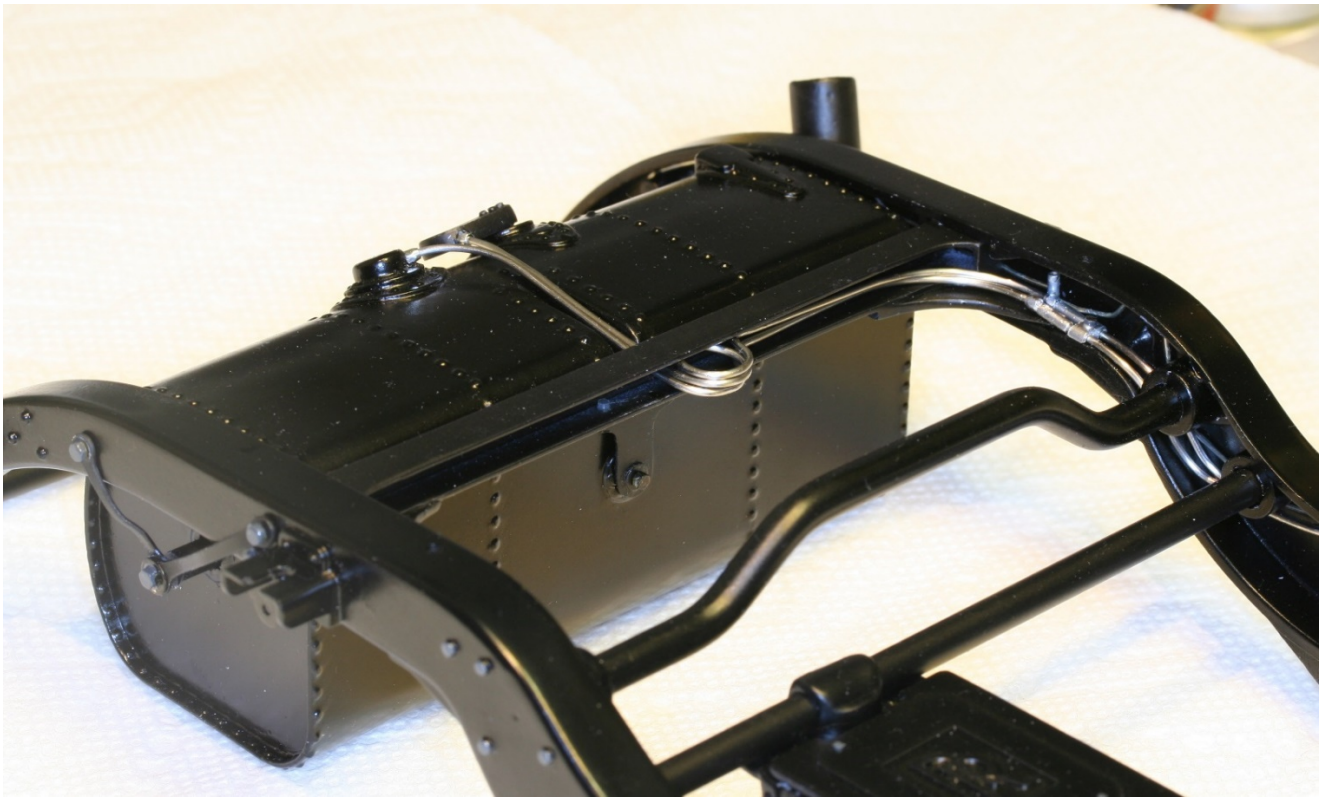
Once all the chassis modifications were completed, painting and assembly of the chassis and its components could begin. Here’s a picture of the rear of the chassis with assembly part way along. Crucially, the fuel lines and the chassis lubrication oil lines have been installed.

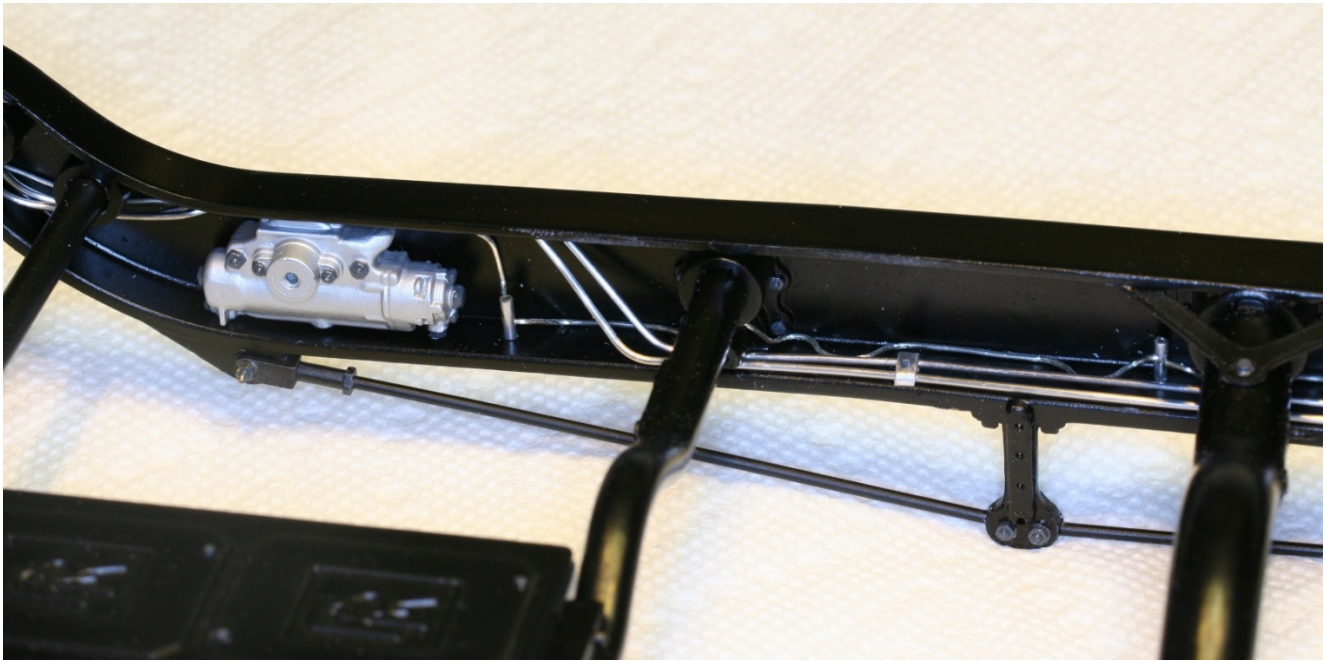


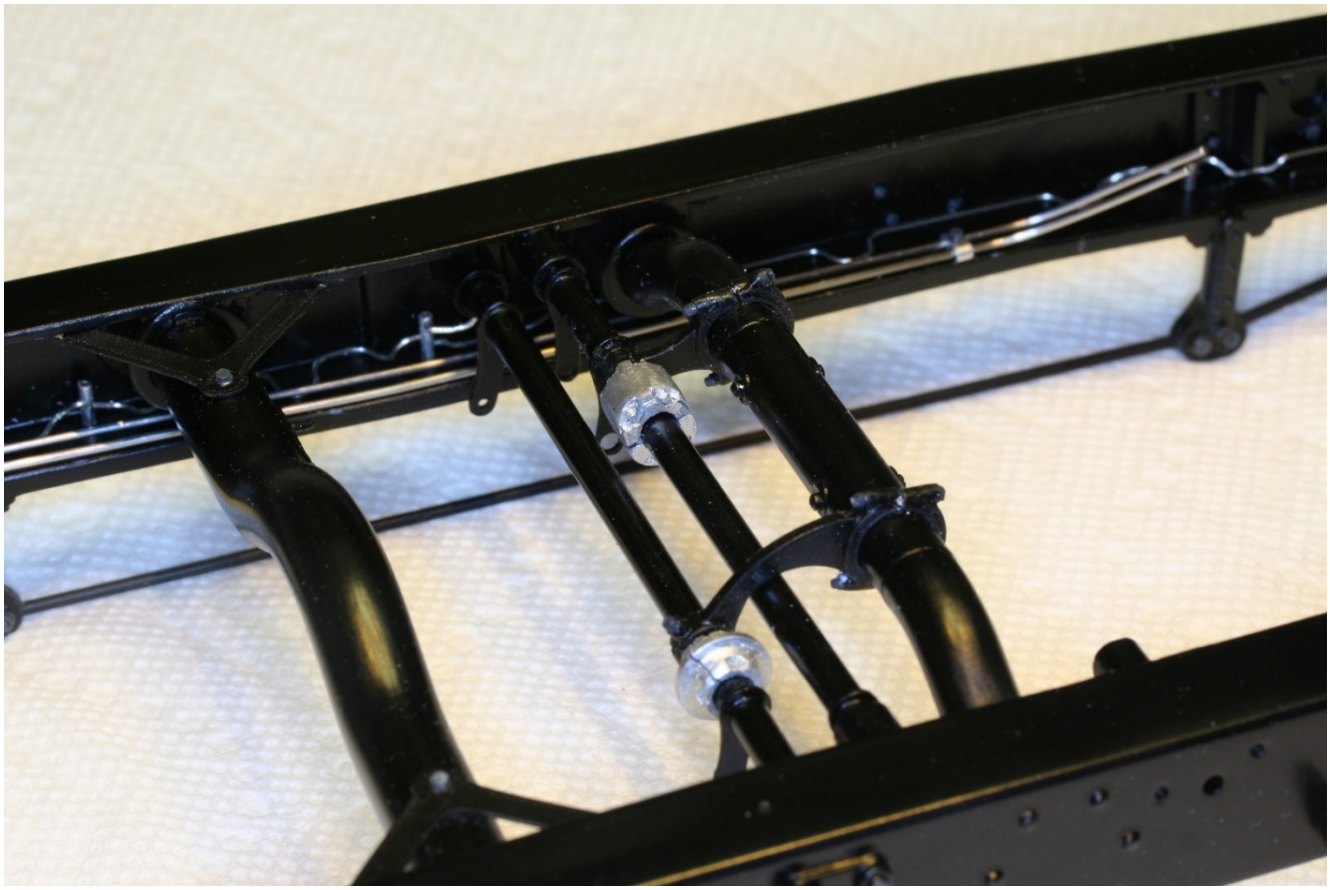
The chassis lubrication system fed lube from an oil tank on the engine side of the firewall (and included in the Pocher kit) along two lines that snaked along each chassis rail. Hubs at several points along the chassis fed lube to various bearing points. The lubrication line is easier to see in this photo of the front of the chassis.

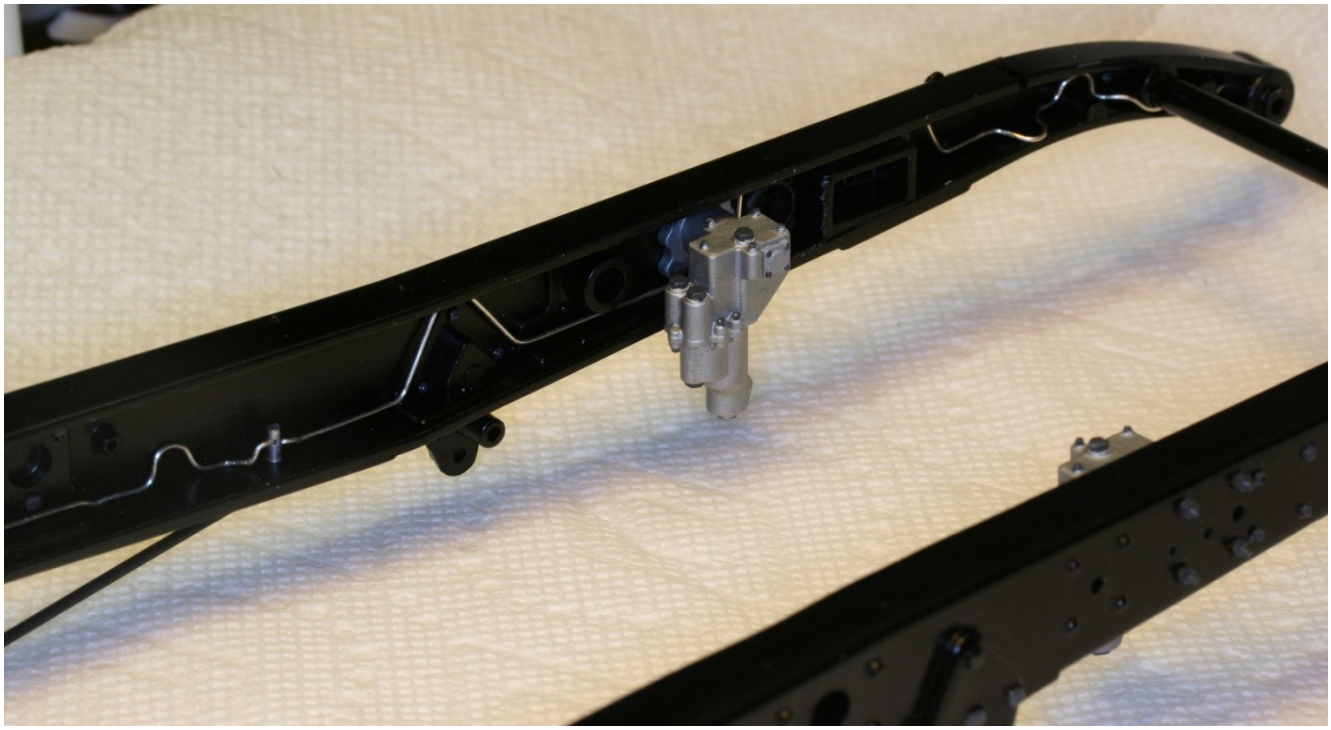


The fuel lines are 18Ga wire, the lubrication line 22Ga. Here's more detail:





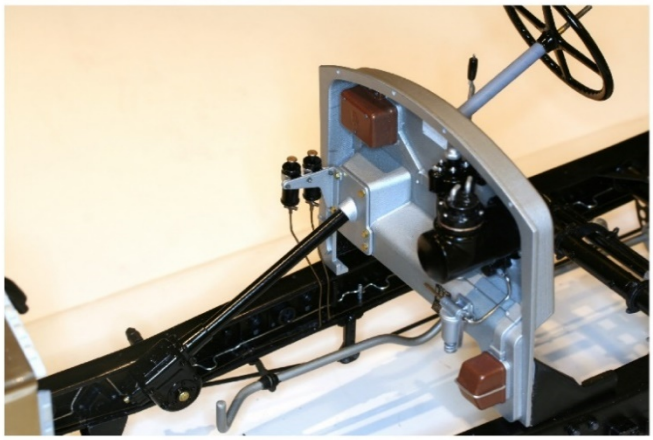


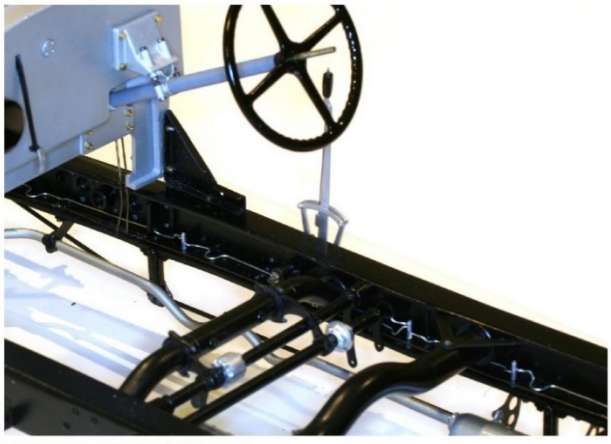


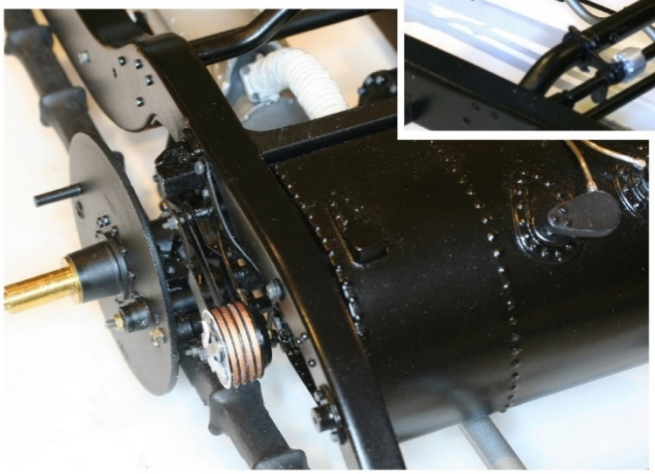
Next was the addition of the firewall and radiator.
Placement of the firewall has to be precise since it anchors the front of the body shell and, at the same time, it holds the steering column in place. In this model, as on prototypes, the back of the firewall is bolted to the chassis by triangular braces, one on each chassis rail. This construction is also outlined in my website build notes.

Initially, the firewall and radiator were only temporarily anchored in place since both would have to be removed to allow the engine and gearbox to be installed.

Prominent on the right-hand outer edge of the firewall (below) are the two hydraulic tanks that allowed the Hartford friction shock absorbers to be remotely adjusted by the driver. Two knobs and two gauges on the dashboard (one each for the fronts, one each for the rears) allowed bladders on the backs of each shock absorber to pressurize the friction plates. Just visible, on the inside lower edge of the chassis rail is the hydraulic line feeding the front Hartfords. The line branches just behind the radiator and the line connected to the left hand front shock absorber runs under the radiator support cross-member. The line for the rear Hartfords runs along the right hand chassis rail and branches just in front of the rectangular rear cross member. The bronze colored line feeding the back of the right hand rear Hartford shock absorber is just visible in the lower photo.
Visible in the right hand photo of the firewall is the foot lever that allowed the driver to pump lube into the chassis lubrication system.

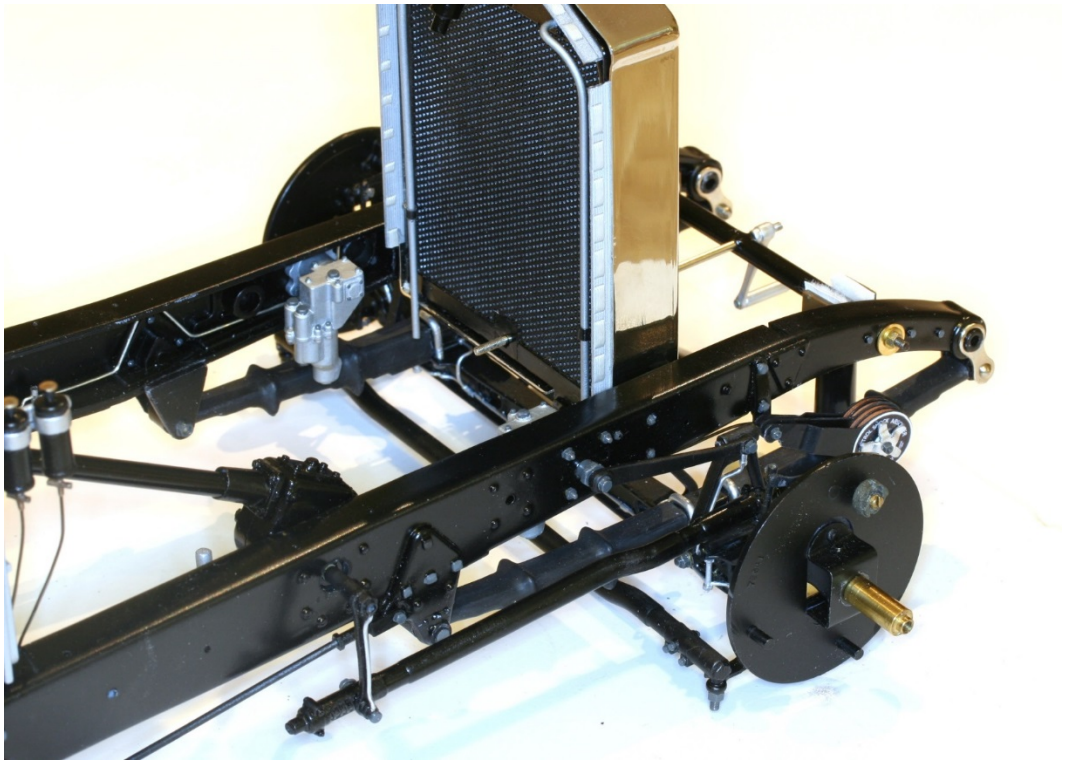




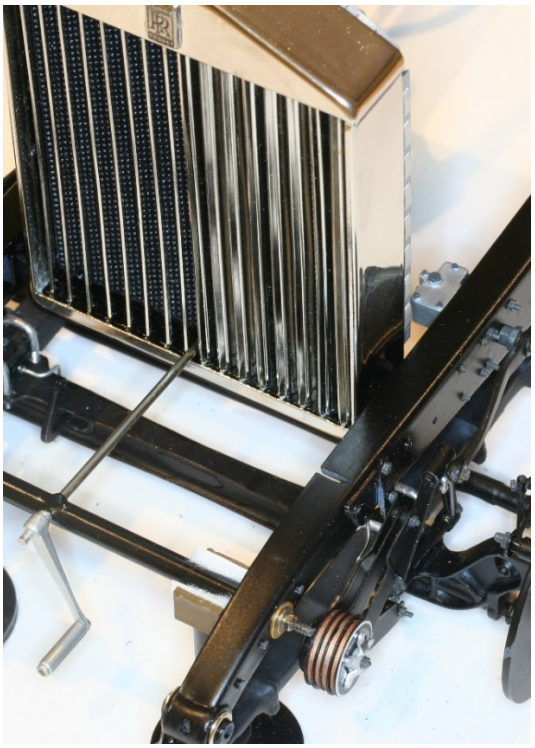


This shows the hydraulic feed line more clearly…

The radiator has also been modified, as described in the Detail Notes. The slimmer radiator accommodates the addition of torque reaction dampers and allows more realistic rub strips to be added against which the bonnet will rest.
The steering arm lever has been replaced with a version that better reflects Rolls-Royce practice. And the steering arm is heavily modified. All these changes are also described in the Detail Notes.



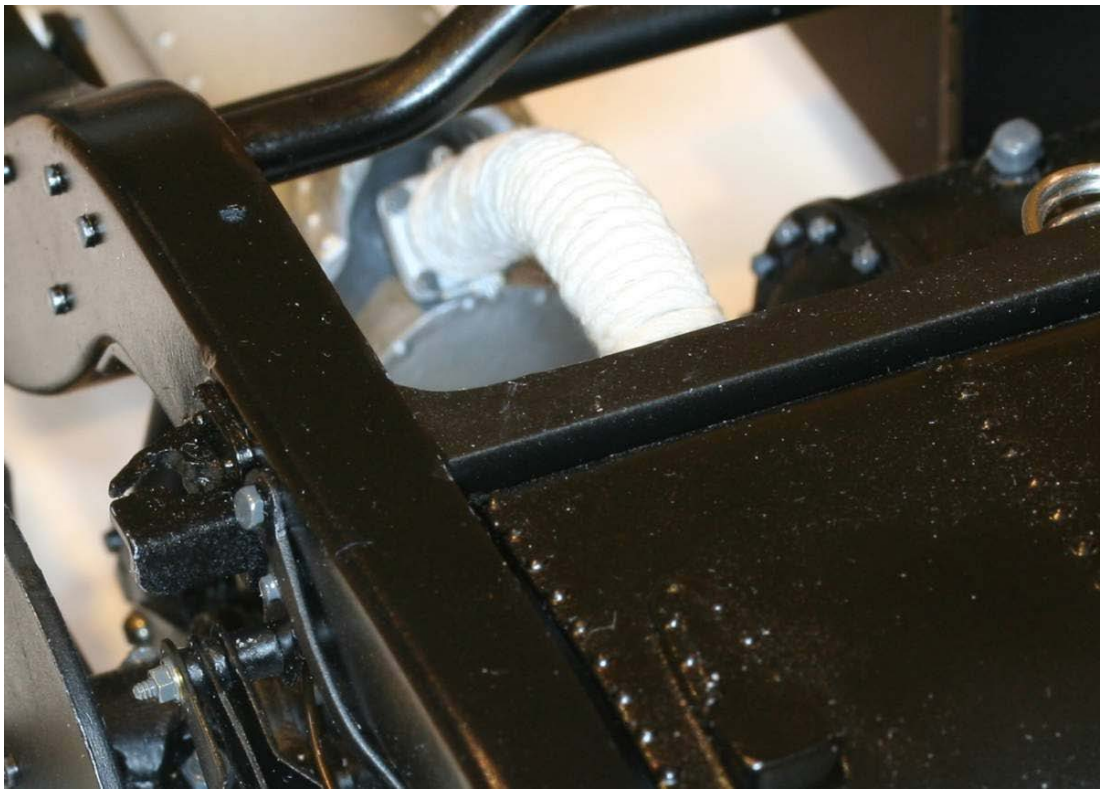
Below you can see the front suspension and the Hartford shock absorber. Just visible behind the Hartford is the hydraulic line feeding the bladder.
In the picture is a new starting handle fabricated based on RR drawings. It's less bulky than the Pocher handle.



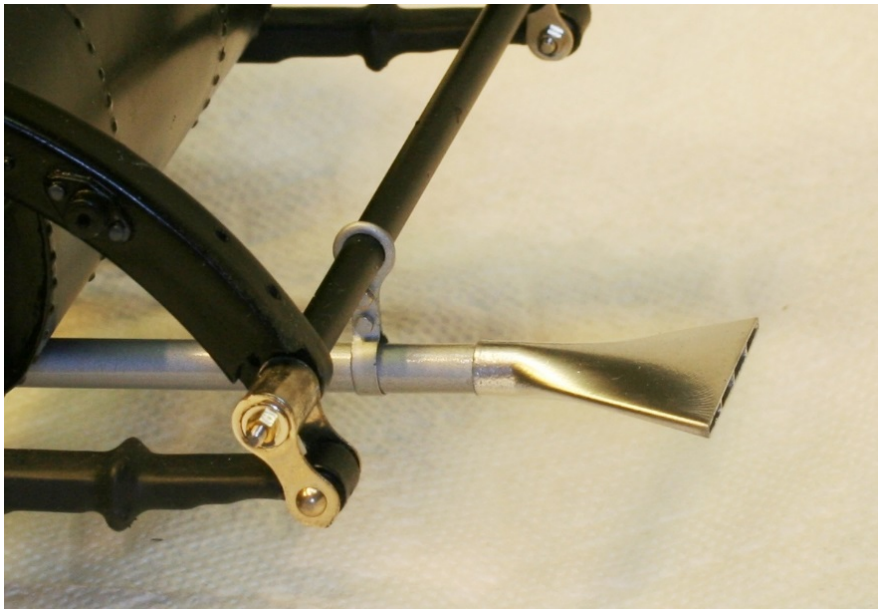
The rear brake assembly was also heavily modified (once again using the Detail Notes) to allow cables to 'pull' on the brakes. Here the cables have yet to be installed.

The rear exhaust pipe connection to the muffler was extensively modified. Pocher simplified the connection and it looks, and is, unrealistic. An angled hole was drilled into the Pocher steel muffler and a new exhaust pipe fabricated from brass bar. A double flange slips over the bar to simulate the flanged connection behind the muffler.

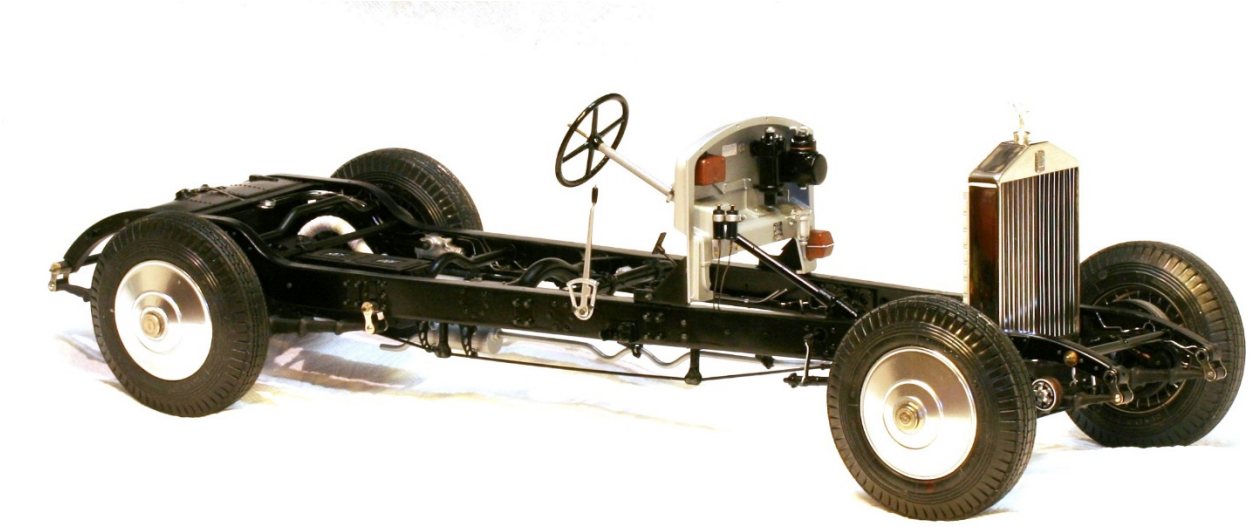
This, somewhat out of focus, picture shows the flange and insulation:



At the end of the exhaust pipe is this elegant fantail …

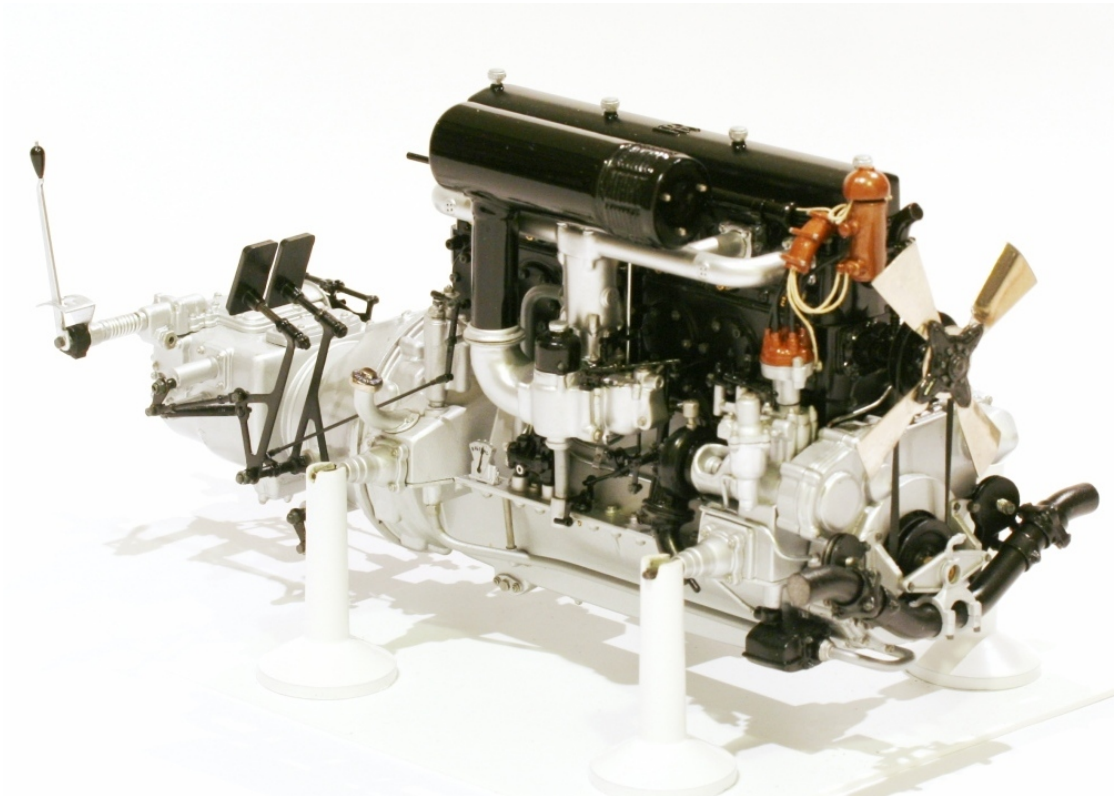


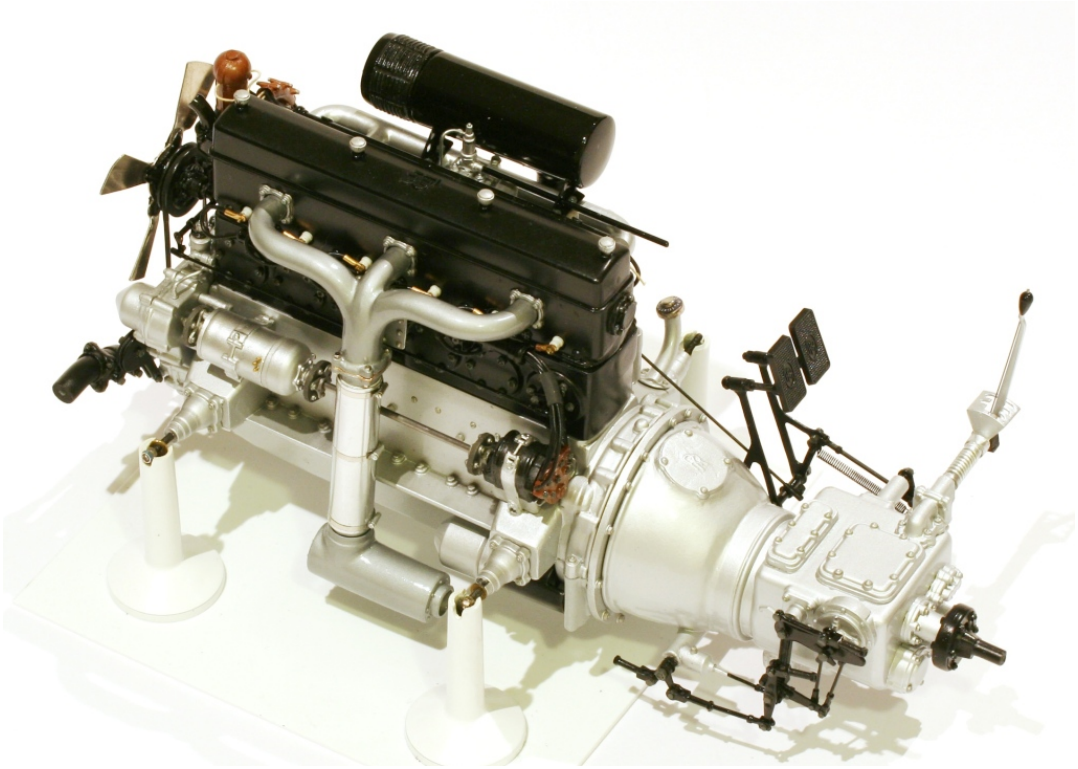
Finally, here's the almost completely assembled chassis, but without the engine …



Engine

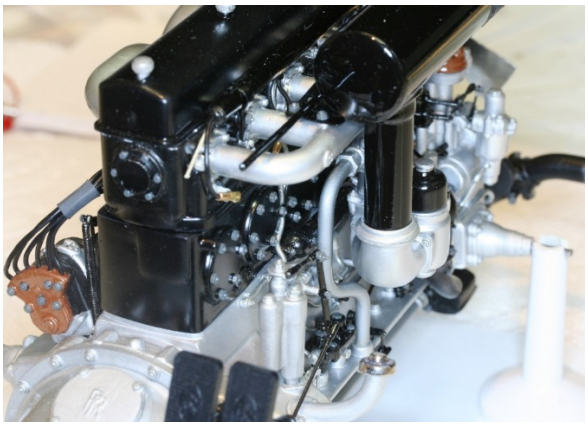
The engine for this 1933 Rolls-Royce included the third generation semi-expanding type carburetor. The carburetor is very different from the one featured in the Pocher kit. I had originally built the engine as a standalone model but decided to use it on this vehicle model rather than build a new engine. As these pictures show, it includes a large horizontal air cleaner.



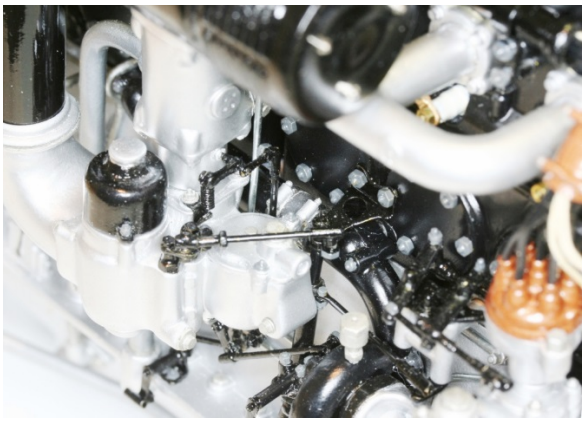


The engine has been super-detailed with all the enhancements included in my RR Semi-Expanding Carburetor build note, available on my website at www.jrhscalecars.com. Other details have also been added.

Following are some detailed pictures of the engine:

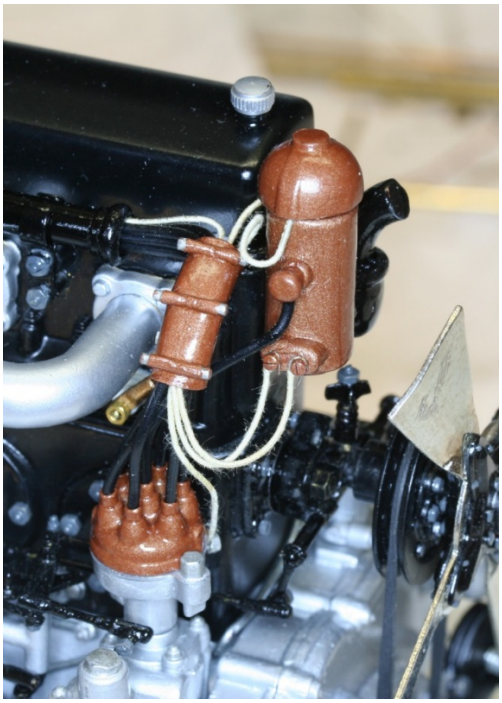


Of particular not in this photo is the semi-expanding carburetor and its modified inlet pipe (vertical in the center of the photo.)
In the bottom center-right of the photo is a new, more realistic, oil filler pipe. It was obtained from Model Motor Cars.
The black rod in the center of the photo, and appearing from behind the air cleaner, is connected to the starting carburetor which sits over the center of the inlet manifold. The rod will connect to a lever on the dashboard.



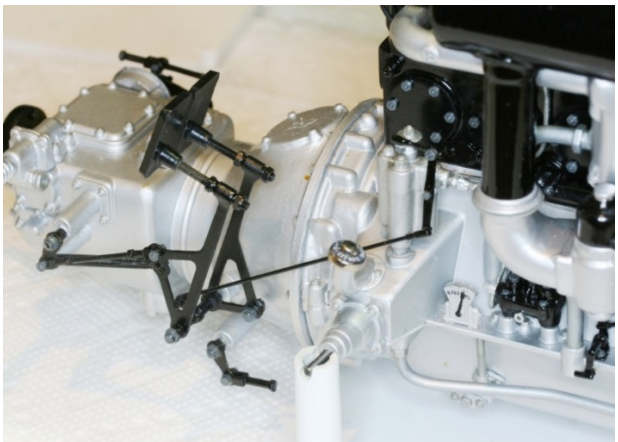
This photo shows the complexity of the carburetor controls. Pocher didn't include carburetor controls in its kits, but adding all this detail seems to make the model come alive.
The water pump (bottom right) has been heavily modified to accept the control rod that is mounted across its end.

Detail of the distributor, ignition coil, wiring conduit and associated wiring.
The housings were made from Bakelite, an early form of thermosetting plastic. Typically it would have a brown to dark brown color and a semi-glossy, almost metallic like, finish.

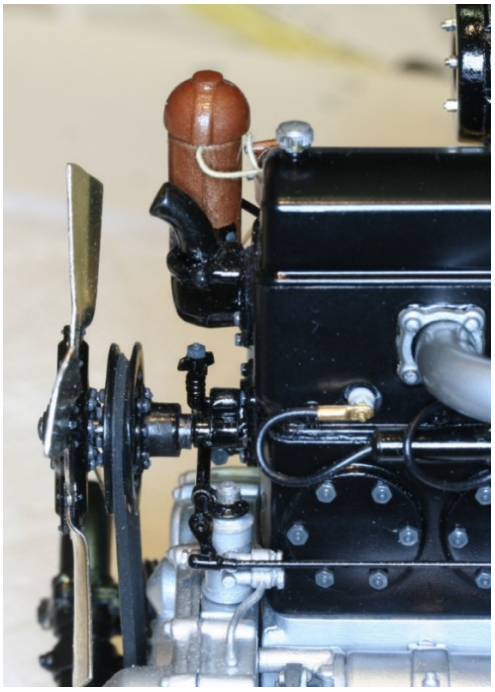


Here you can see the several oil lines that have been added. They are consistent with Rolls-Royce practice.

The oil filter, to the left of the oil filler in the photo, was operated each time the clutch pedal was depressed. The long thin rod in the bottom left of the photo connects to the clutch pedal arm.



A closer look at the pedals.
New pedal arms were fabricated from brass sheet to better mirror the prototype. The accelerator pedal has been removed and the bottom connecting arm shortened. The accelerator pedal will be mounted on the chassis rail, which was standard Rolls-Royce practice.



A control rod has been added under the fan mounting. This is attached to a long rod running down the side of the engine and controls the Magneto.
The vacuum pump, below the fan mounting, has also been heavily modified. A bracket on top supports the control rod running in front of the engine. Three bosses have been added. Two are for oil lines. The third, on the left of the vacuum pump, but not really visible in this picture, is for the vacuum line that will run from the pump along the side of the engine to the Autovac. That's how the Autovac gets its vacuum. The vacuum line will be installed once the engine is in the chassis.

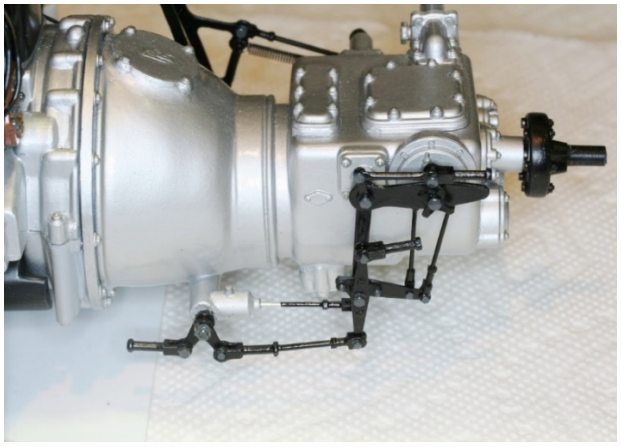
Also visible are the spade-like connectors on the spark plugs. They are closer to the real thing.

The control rod to the Magneto can just be seen behind the bottom edge of the exhaust heat shield. The exhaust heat shield was common on virtually all Phantom IIs. It protected the ignition wiring. As here, insulation wrapping was also often added to the downpipe.

The base of the magneto has been modified to better show the method by which it was strapped to the engine block.

More detail of the Magneto.

.



This picture shows the replacement brake servo. The Pocher parts do a poor job of representing the real servo.

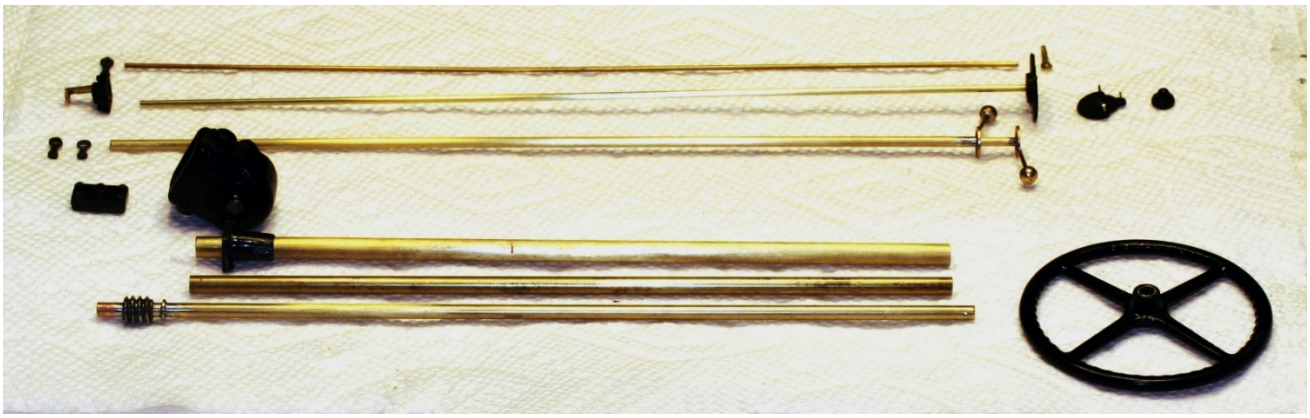
The gearlever, obviously, should be connected to the gearbox even though Pocher doesn't do that. Here's the typical Rolls-Royce arrangement. The black boss (underneath the gate) attaches to the chassis rail (glue!).

The torque reaction damper was standard on all Phantom IIs built after Jan 1932 but it was left off completely from the Pocher kits. It is one of the most complex arrangements you can add to a Phantom II. It requires substantial modification to the radiator and to the timing gear cover on the front of the engine. A boss also needs to be added to each chassis rail to anchor the cross-member. Detail build notes are available on my website.

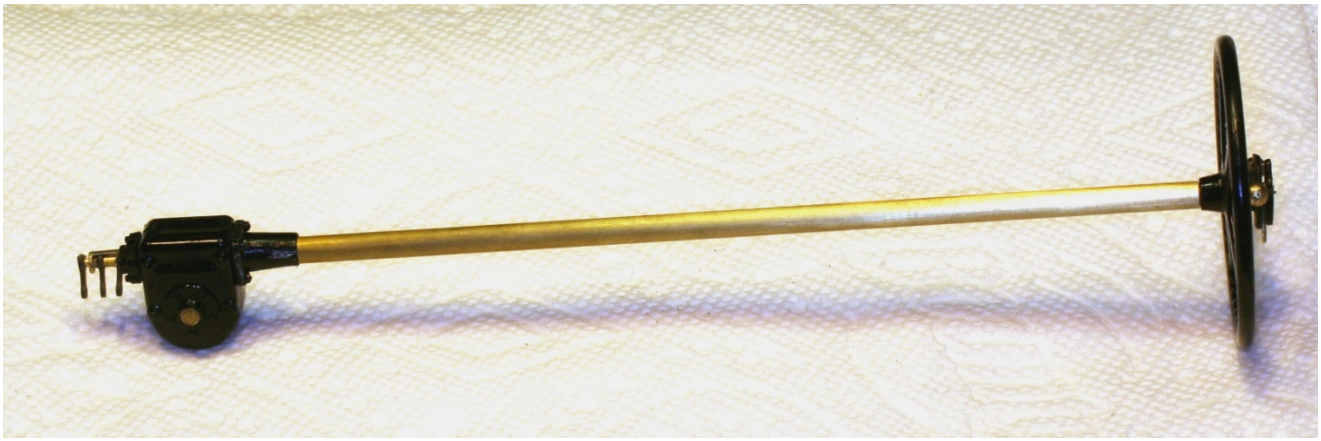
Steering Box

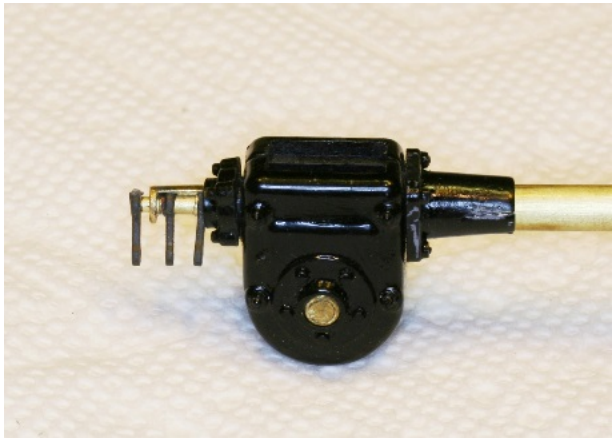
With the engine complete, the steering mechanism was next to be completed. This is important because the steering box has to be installed into the chassis before the engine can be installed.

This is a layout of the various steering column components before painting.
Construction of the various pieces shown here is described in my RR Build Notes – Vol.2 available on my website.



And here's the completed assembly:





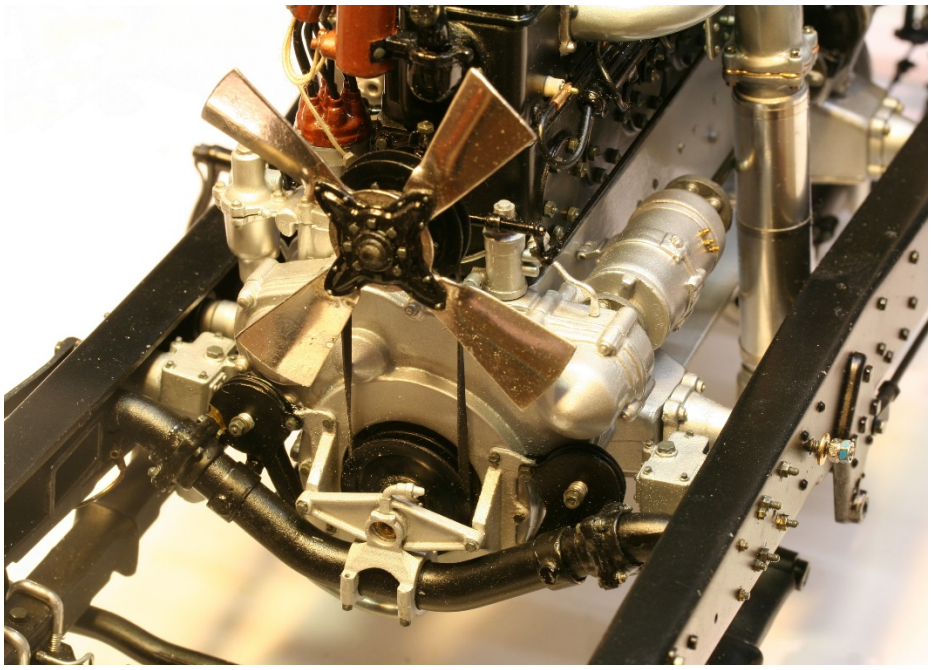
This close up shows the control levers on the end of the column. The one on the left controls the carburetor fuel mix (weak to strong), the other two control the ignition timing and the governor respectively.

Engine Installation

If you're building a seriously detailed model, finishing the chassis with the engine in place risks damage to the detail parts and the paint on the engine. So, I prefer to build the engine separately and install it into the chassis at the last minute. Fortunately, there's enough flex in the chassis rails that, if the front axle is separated from the chassis on one side, and the firewall and radiator removed, the engine can be squeezed into place.
Here the chassis rails have been splayed just enough to accept the engine:

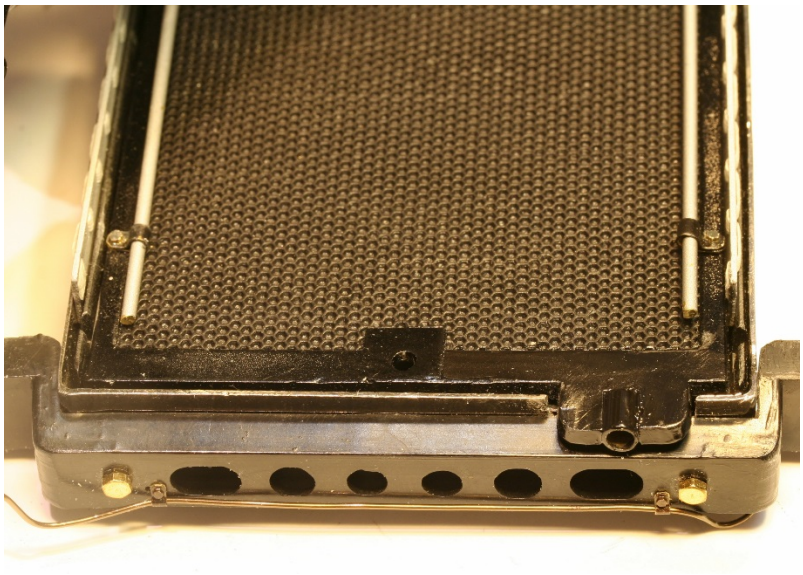
The first step was to set the steering box in place. It's impossible to install it once the engine is installed. Keeping the steering box in position, the engine was then put in place (but not bolted up), and the torque reaction damper cross-member seated properly. Next the radiator was carefully installed. As you can imagine, this is all a 3D jigsaw puzzle so patience is needed.

Here's the chassis with the engine in place and before the radiator was installed:
(At this point, the exhaust manifold and downpipe are only temporarily in place. They will need to be removed to add the vacuum line from the vacuum pump to the Autovac.)



Additional Radiator Modifications

So far, so good.
Except …. the bottom radiator hose connection now interfered with the torque reaction damper cross-member. Ugh!
The solution was to reconfigure the bottom hose connection so it lay much flatter against the radiator. At the same time the overflow pipes were shortened. Here's a picture of the changes:



The wire along the bottom of the radiator cradle is part of the hydraulic line to the front left-hand side Andre Hartford friction shock absorber. After the radiator is installed, the ends of the wires will be straightened out and sleeved to the rest of the line.

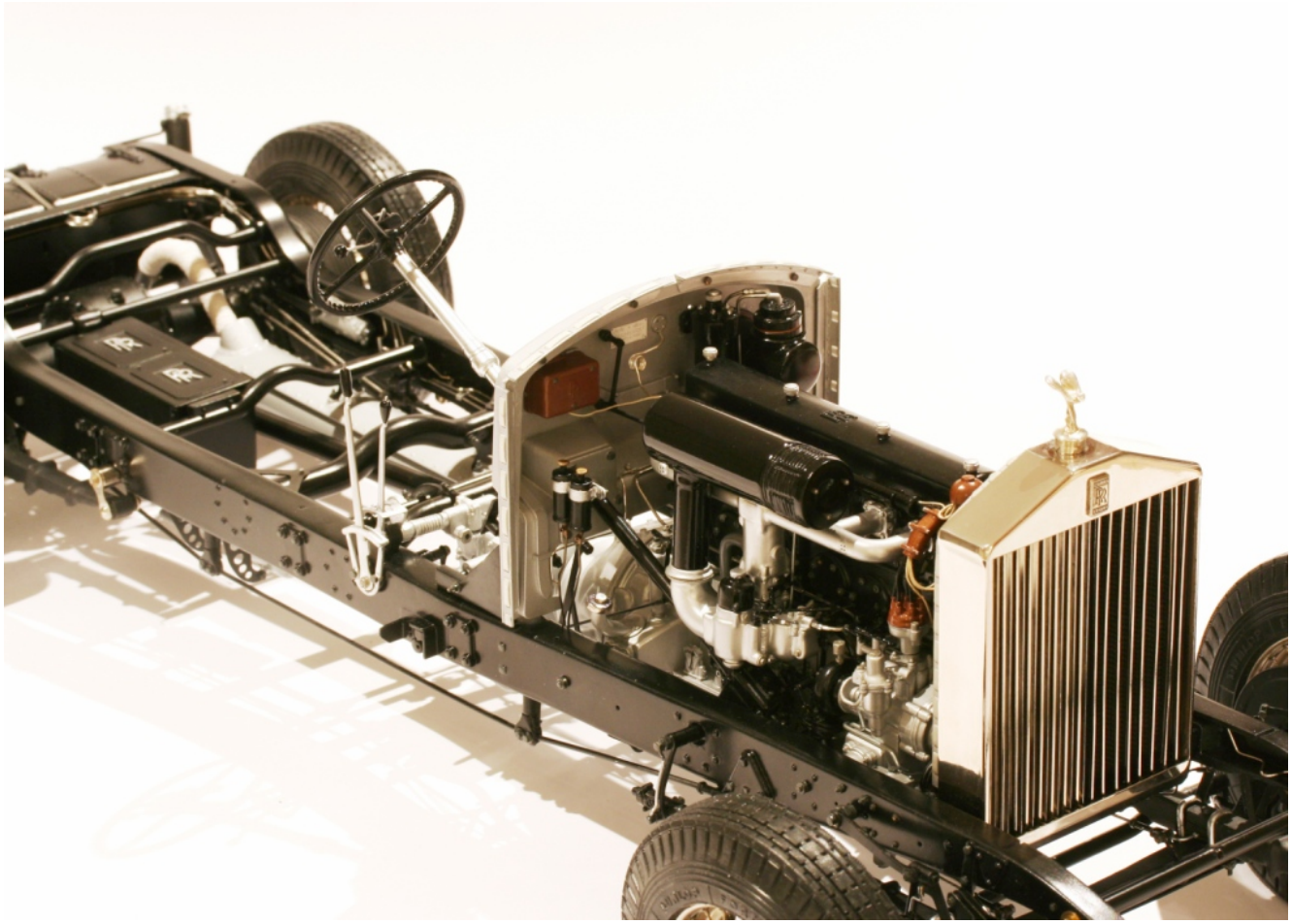
Assembled Chassis & Engine

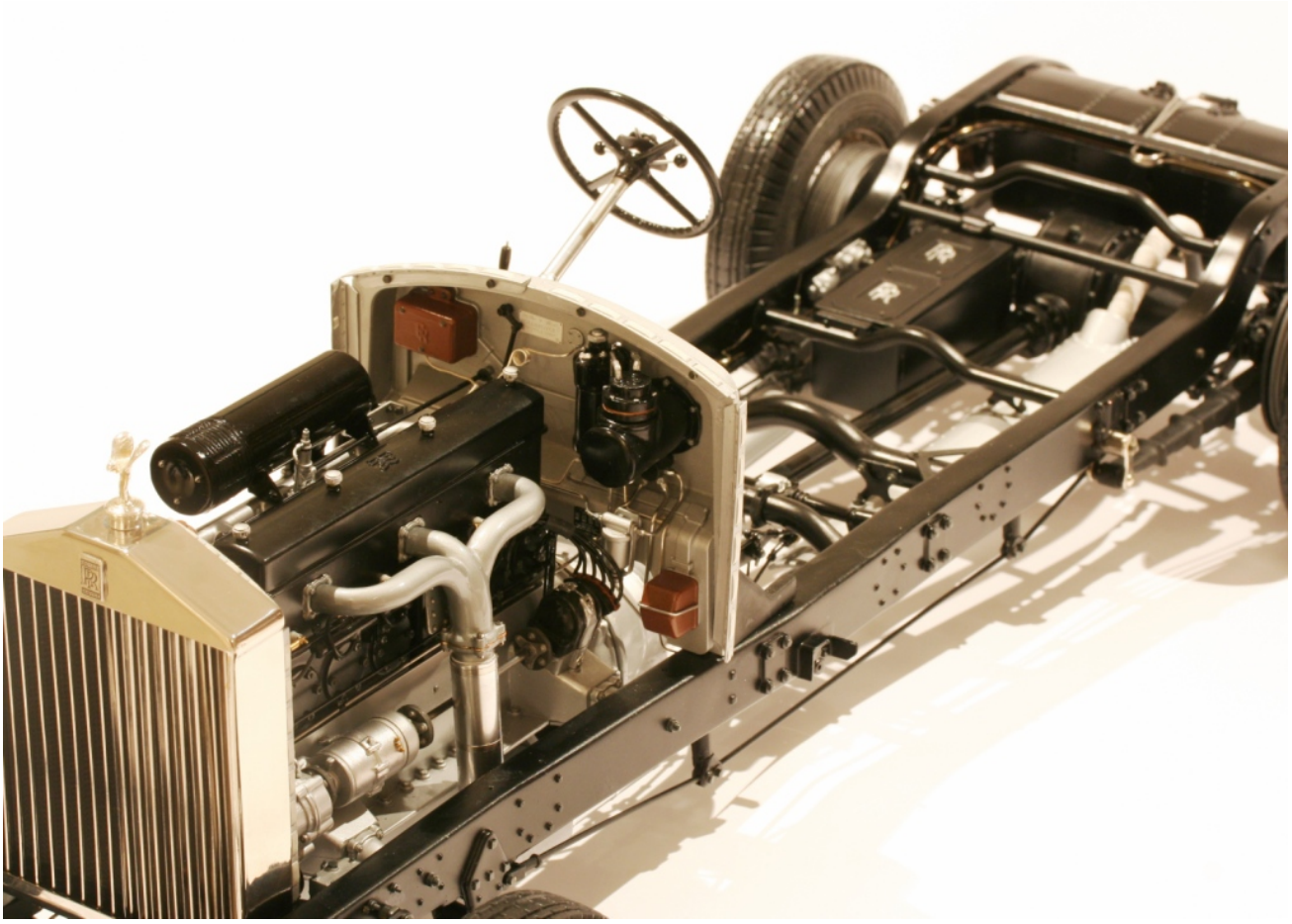
With the radiator installed, and the chassis bolted up to the engine, the front cross-member could be installed, the engine bolted up to the chassis rails and the front axle bolted into place.
After that the propeller shaft was squeezed into place and the firewall installed.

Then the major remaining steps were to:

- Hook up the hydraulic lines to the Andre Hartford shock absorbers
- Complete the steering column control linkages
- Complete the lube lines from the oil pump to the end of the lube lines on the chassis.
- Complete the fuel lines from left hand chassis rail to the Autovac
- Add the vacuum line from the vacuum pump to the Autovac
- Add the fuel line from the Autovac to the carburetor
- Complete the linkage from the starting carburetor to the firewall
- Add the water temp line from the engine to the firewall
- Make a final installation of the exhaust system.
- Add the front brake cables between the brake levers on the front axle and those on the gearbox

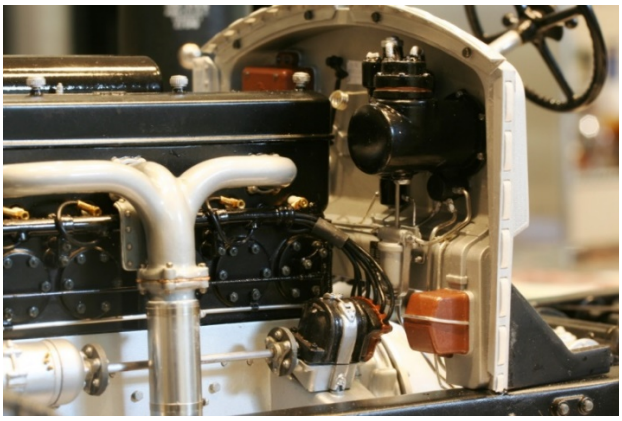
Here's the completed chassis and engine

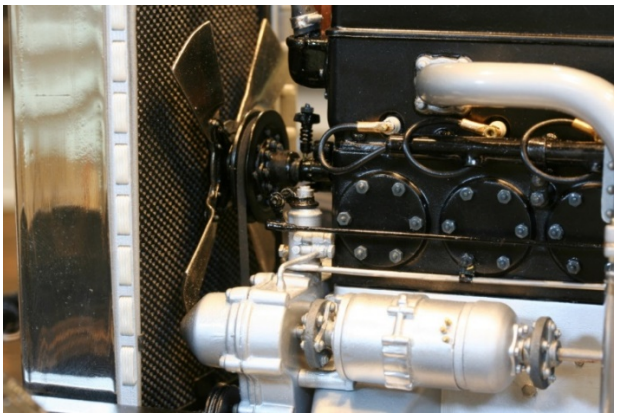




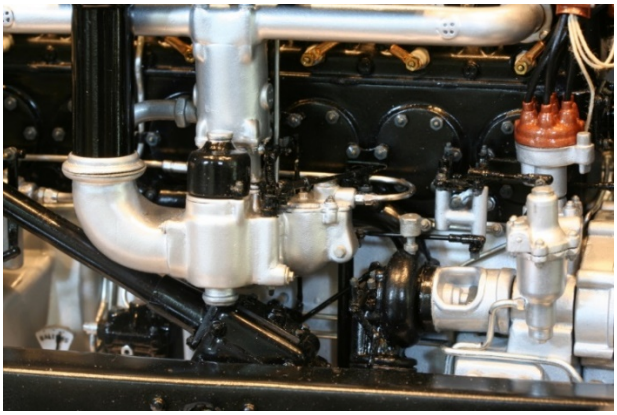
Detail

The following pictures show some of the chassis/engine detail of the final steps:



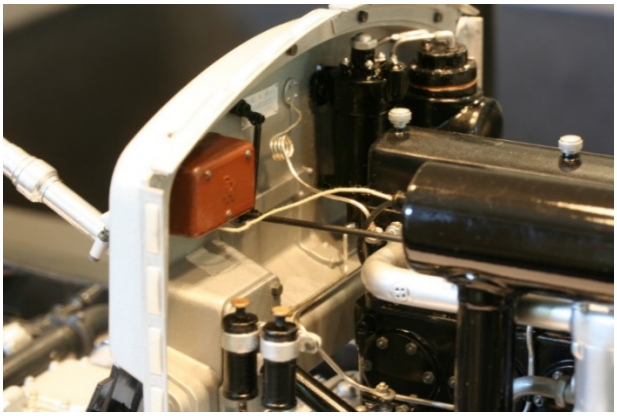


- The fuel lines into the Autovac are clearly visible
- The silver tube behind the top of the exhaust downpipe is the vacuum line

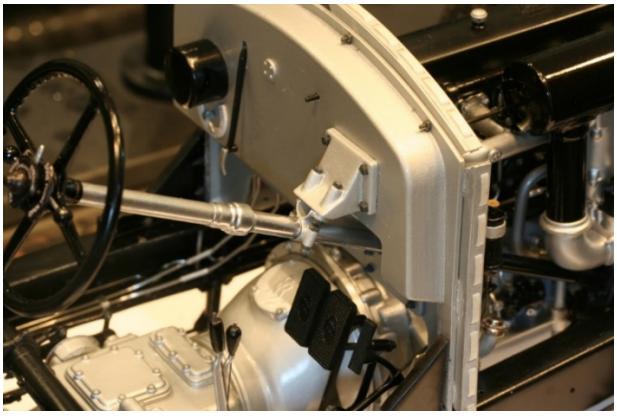


- The fuel line into the carburetor loops in from behind.

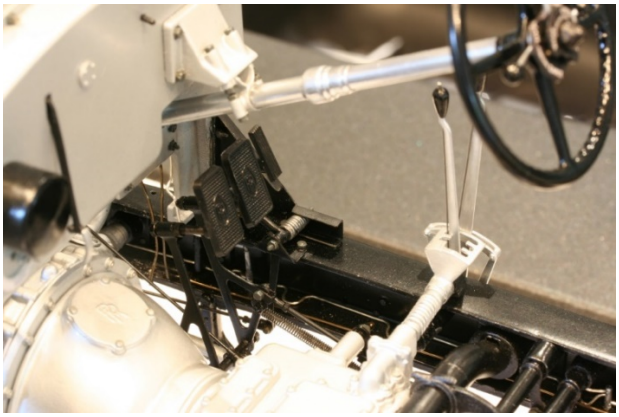
- More detail of the fuel line
- The oil reservoirs for the Hartford shocks and the link from the engine oil filter to the clutch pedal are also clearly visible.



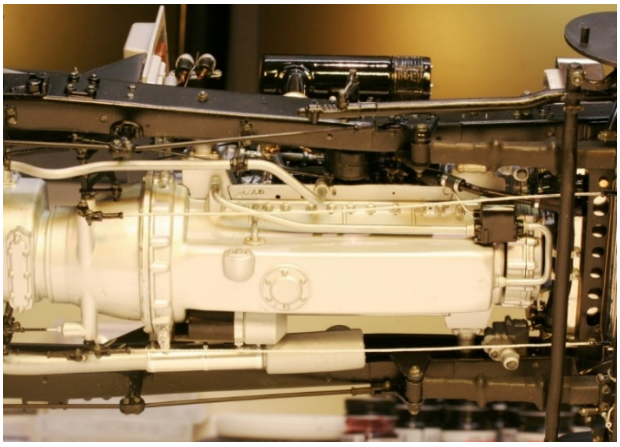
- The line to the water temperature gauge is in the center of the photo.



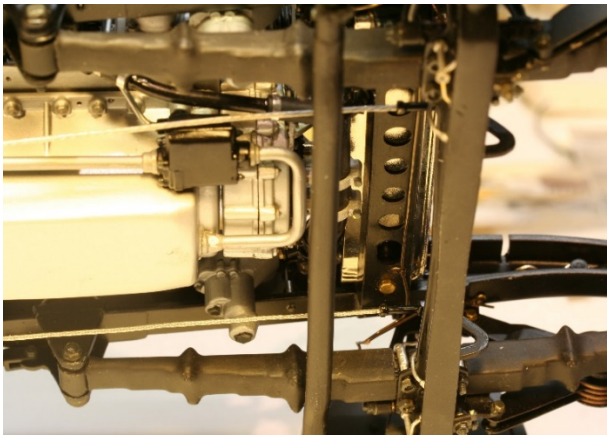
- Steering column detail



- Pedal and gear lever detail



- Front brake cables

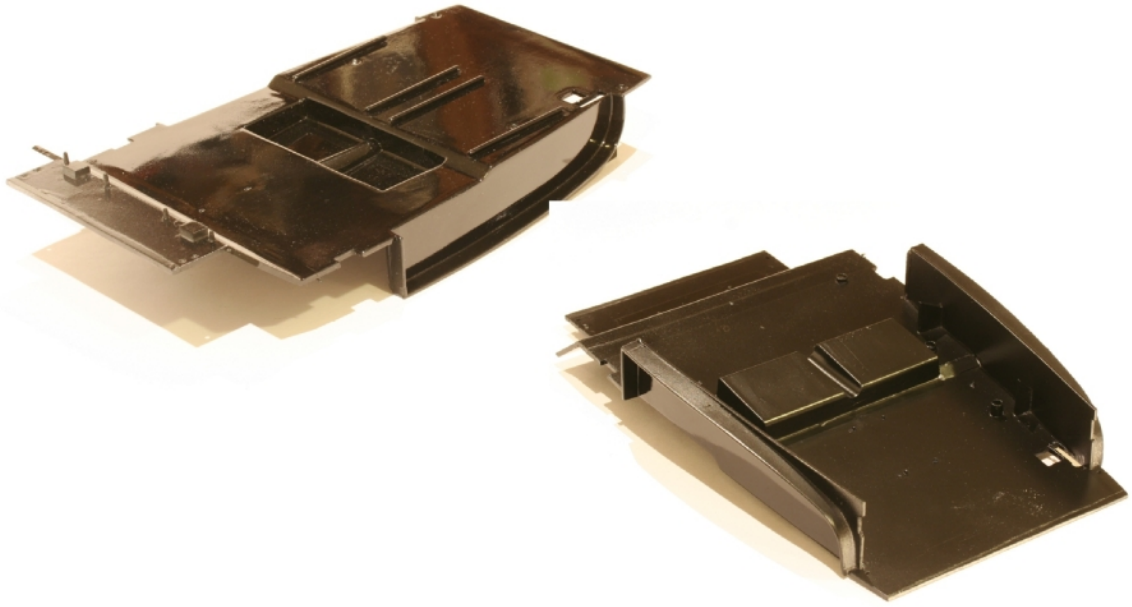


- The radiator hose connection to the water pump is just visible behind the upper brake cable.
- You can see the tight fit of everything between the engine and the radiator

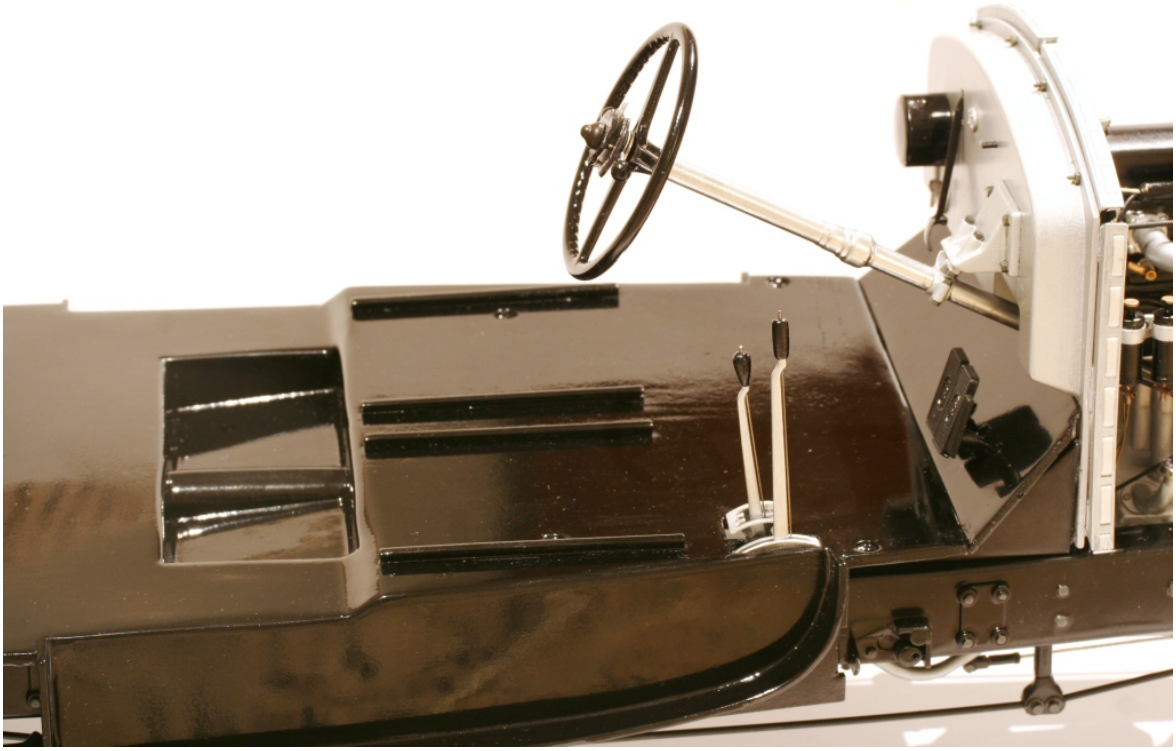
Back To The Body

With the chassis complete, the floor could be installed and final construction of the body started.

Here are top and bottom views of the floor:



And here the floor has been installed.
Pocher used slots in the floor to accommodate pedal movement, but it's more accurate and realistic to use holes in the floor, as shown below. Some careful measurement is needed!



Next was a quick test fit of the body shell, boot and bonnet ….

So far, so good.

Body Shell, Faux Roof & Headliner

Now it was time to finish the assembly of the body shell … installing the faux roof, headliner, rear window pieces, and sunroof.

This is the 3D printed faux roof

Here with unpainted irons

The irons are held in place at their ends with pegs. Those pegs will also anchor the faux roof to the body shell.

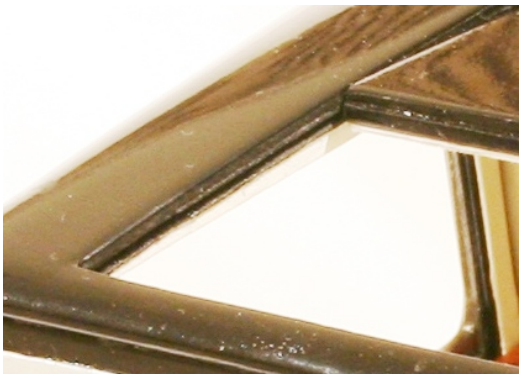
Additional pins, arrayed around the edge of the faux roof, will assist in anchoring the roof to the shell.

With the faux roof fitted to the shell, the headliner could be installed and the rear window finished. The windows are finished by gluing 3D printed oval flanges on the outside to a rectangular window cover on the inside.

The window glass is a .020” clear acrylic oval slotted into a groove in each oval flange.
The headliner is 3D printed nylon, 0.7mm thick. The nylon is strong, flexible and also has a slightly rough pebbled surface which is more consistent with a headliner than a very smooth finish. Both the headliner and rear window panel were painted so they were the same color as the seats (as per the prototype).

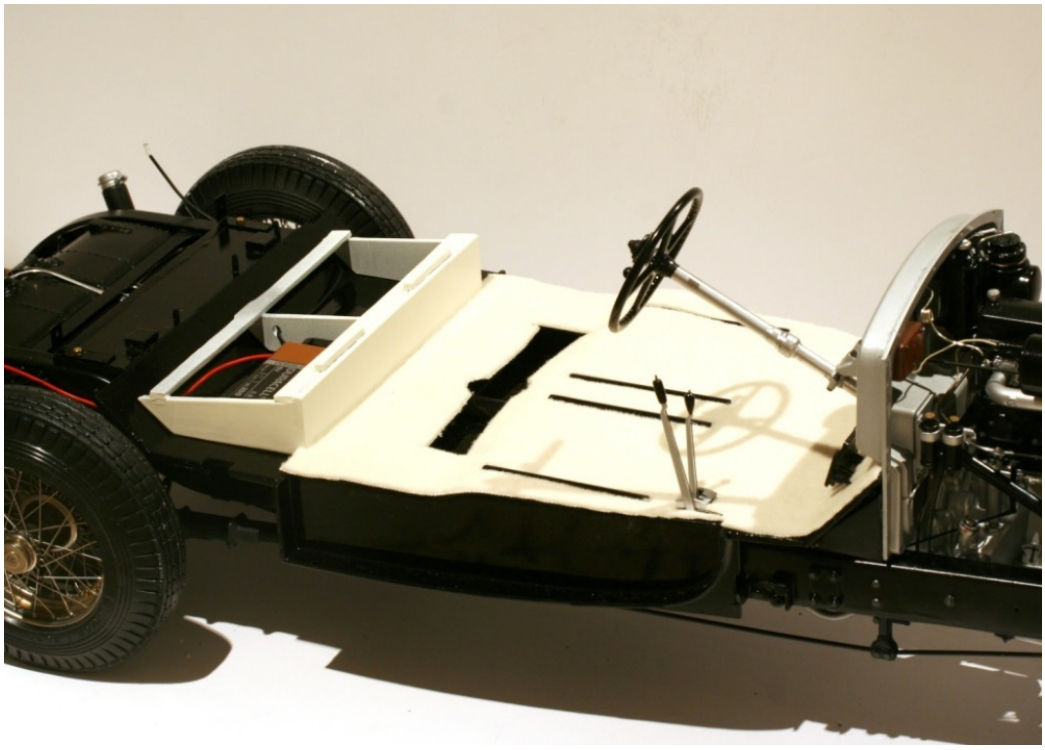
Sunroof

Tracks on either side of the body act as guides for the working sunroof. Two horizontal pins on each side of the sunroof slide along the tracks allowing the roof to open and close. The tracks are made from 1/16” square U-shaped brass channel.



Carpet

Before installing the body over the floor, the carpet needed to be glued in place. The carpet I used is made for dollhouses, but it is perfect for 1:8 scale models. I used tracing paper to create two templates; one for the main carpet and one for the footwell insert. The tracing paper was also marked for the positions of the pedals. The seat rails, seen protruding through the carpet, are high enough to allow the position of each of the seats to be adjusted forwards and backwards. In the photo below, the carpeting of the footwell has still to be completed.



Body In Place

With the carpet in place, the body shell and headliner could finally be installed.
The rear seats, rear side panels, front seats and front footwell side panels were also installed.

As on the prototype, there is a storage box for refreshments on the side of each rear seat. You can see the open lid in the photo above. Also visible are the reading lights, again one on each side. The prototype had a wall cabinets where the reading lights are, but it seemed more useful to have the lights so I designed my own. The lights are made from 1/4“ clear acrylic rod with a small LED bulb glued into the end. The rod is surrounded by a styrene tube, half of which is then capped to create the hood.
Here’s the effect of the reading lights:

Next the ends of the rear seat panels and the gap between the headliner and body were covered.

This completed the rear seats compartment.

After the rear seating area was finished, the windshield was installed. The windshield is .020” clear acrylic sheet cut to fit the space behind the windshield opening in the body. The dashboard and surrounding wood trim hold the windshield in place.

Dashboard Lights

Since I was adding LED exterior and reading lights, it seemed appropriate to backlight the instrument display. This is the dashboard front:

The instrument decals were mounted on 3D clear acrylic blocks which had 0.5mm high, 1mm wide rims. These blocks then had black 3D printed covers around the instruments. 3D printed nylon blocks behind the acrylic blocks provided housing for the LEDs. The LEDs shone into the acrylic blocks and the light then escaped around the edges to illuminate the instruments.

All the wires were routed to positive and negative terminals on the back of the dashboard:

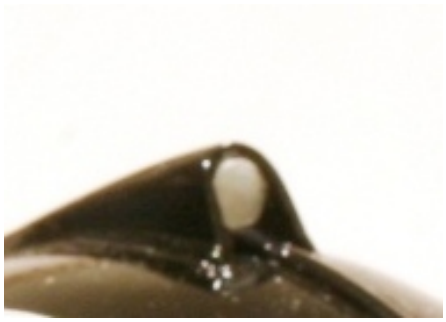
The illuminated dashboard worked well, although, as this photo shows, some more work was needed to block out stray light using black paint:

Footwell Panels

With the dashboard installed and wires run to the terminals, the front footwell panels could now be installed. They have working louvers, just like the prototype:

Fenders

Once the body was installed, the fenders could be added. They are bolted into place ... against the chassis at the front and against the body at the rear.
Each fender has a sidelight over the top of the front wheel. The sidelight was made from a 3D printed hollow acrylic pod which had space for a small LED bulb. On the prototypes the sidelight lenses were frosted which was easy to replicate by sanding the acrylic lens. The pod was glued to the top of the fender and flared in using Tamiya white putty.
Before painting, the rear ends of the fenders were modified (again!) by building up their profiles so that the inside rear edge covered the rear mounting points of the leaf springs. These mounting points are exposed in the Pocher Sedanca model but were covered on the Gurney Nutting prototype. It makes for a much sleeker appearance.



Doors & Windows

Now it was time to complete the modified doors and windows.

.020” thick clear acrylic was used for the windows and, as with the test setup, the Pocher rack was spliced into place.
Based on experience with the test setup, the Pocher window winder gear spur gear was replaced with a slightly oversize 3D printed nylon version. The Pocher gear is molded in a soft plastic and the teeth wear very quickly. As a result the winder mechanism is very unreliable. Nylon is much more durable.

Here's a comparison of the new gear with the Pocher original.

The flange above the new gear teeth helps keep the window glass against the gear.

The 3/32" square tube glued over the gear stem provides a positive drive for the window winder handle. New handles were fabricated in brass to better represent the Gurney Nutting handles

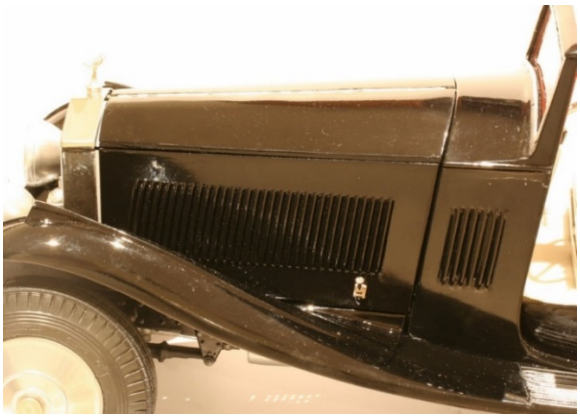
Here the interior door panels are in place:

The small lever at the front edge of the door operates the door locks.
The lower covering is from a home window blind and, conveniently, matches the color of the rest of the panel.

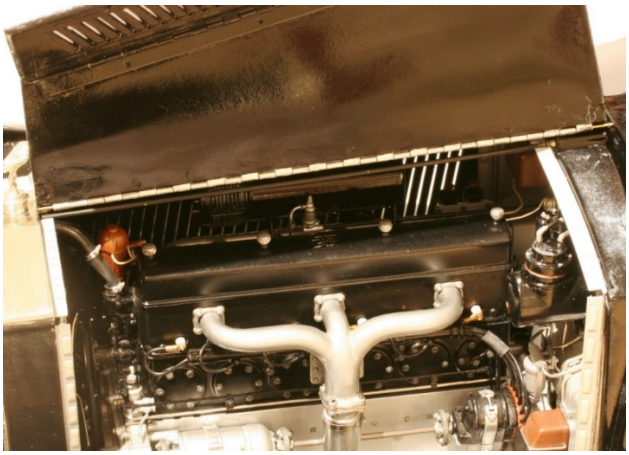
And here the doors have been installed.

Bonnet

The Pocher bonnet panels had previously been modified and piano hinges added. Here they are after painting and with non-working bonnet latches added. The latches are from Model Motor Cars. Small clips on the inside rear of each vertical bonnet panel do the work of holding the panel against the chassis rail.



The bonnet is held in place by the center hinge pin which is anchored into the firewall at one end and the radiator at the other end. A separate stay allows for adjustment of the distance between the firewall and the radiator.



The stay is just visible here. Nuts on either side of a bracket fixed to the firewall allows for adjustment.

Again the stay is just visible under the bonnet hinge.

Front Lights

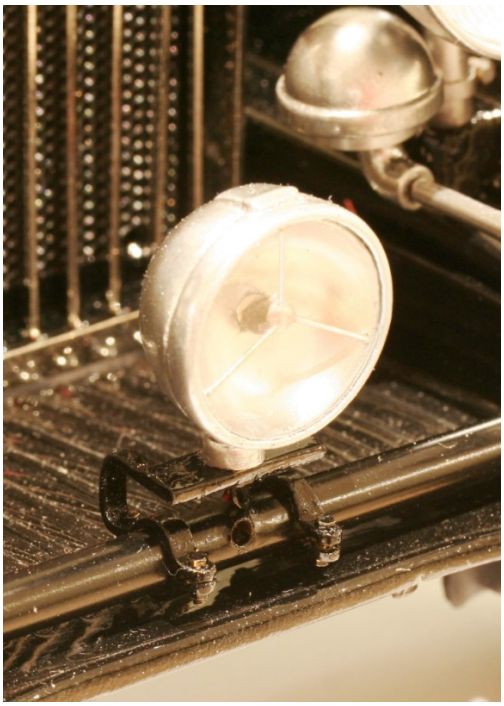
The Pocher headlights are rather crude, somewhat oversized, and inconsistent with the ones Gurney Nutting used. They were replaced with 3D printed shells. The Pocher reflectors could be used, but had to be sanded down so that they would fit inside the new shells. 5mm LED soft white bulbs were fitted to the reflectors, the wires being fed down the inside of the mounting posts. Soft white LED bulbs were used since they are more consistent with the color temperatures of pre-WWII headlights.

After priming and light sanding, the shells were first painted gloss black and then finished with Rustoleum's Metallic Lacquer. The lacquer is the best chrome-equivalent that I've been able to find (and I've tested just about every chrome paint there is). However painted parts are very prone to marking, so they need to be handled with care at least for the first few weeks after painting. The three point braces were fabricated from brass strip and new lenses made from .040 acrylic sheet.

New, 3D printed, horns were made based on measurements derived from prototype photos.

Between the two headlights is a single driving light mounted above the cross member. The body and lens were made from 3d printed nylon. A 3mm LED provides illumination. The three pointed brace was fabricated from brass rod. The bolt holding the driving light to the bracket is drilled out to take the wires from the LED.

Here's a picture of the light and its mounting bracket:

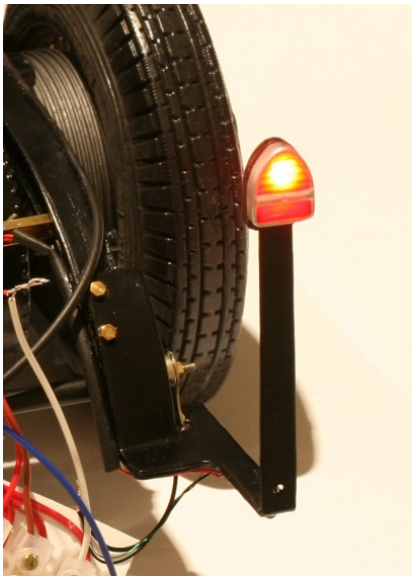


Rear Lights

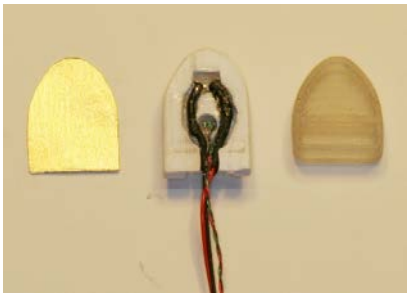
Because of the twin spare wheels mounted on the trunk, the rear lights aren't mounted on the wings but, instead, are mounted on stalks on either side of the spare wheels. I made brackets, which screw to the chassis rail, that emulate these stalks.

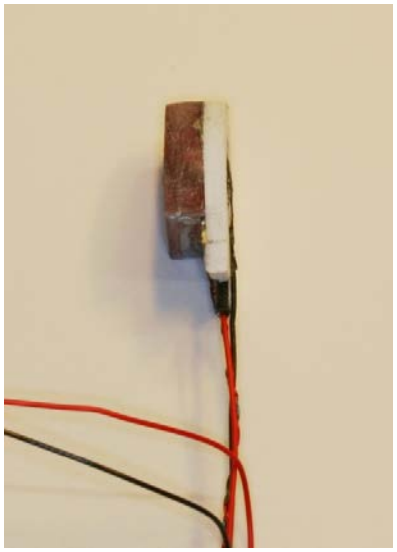
The rear light assembly consists of a lens, mounting block for the LEDs, and a rear cover plate:

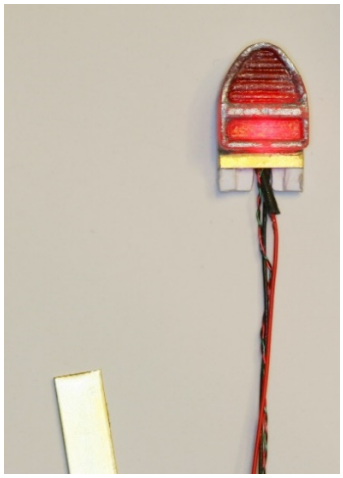
Here's the finished rear light assembly with the brake light lit.



The rear lens is made from 3D printed acrylic, painted on the inside with red lens lacquer. The mounting block houses a 3W brake light LED on top, a 1.5W chip LED for the sidelight on the bottom.



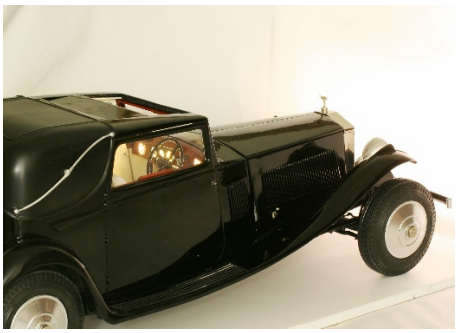




A slot in the mounting block takes the 6mm wide stalk.

Here are the rear sidelights on the finished model:

And the instrument panel backlighting:

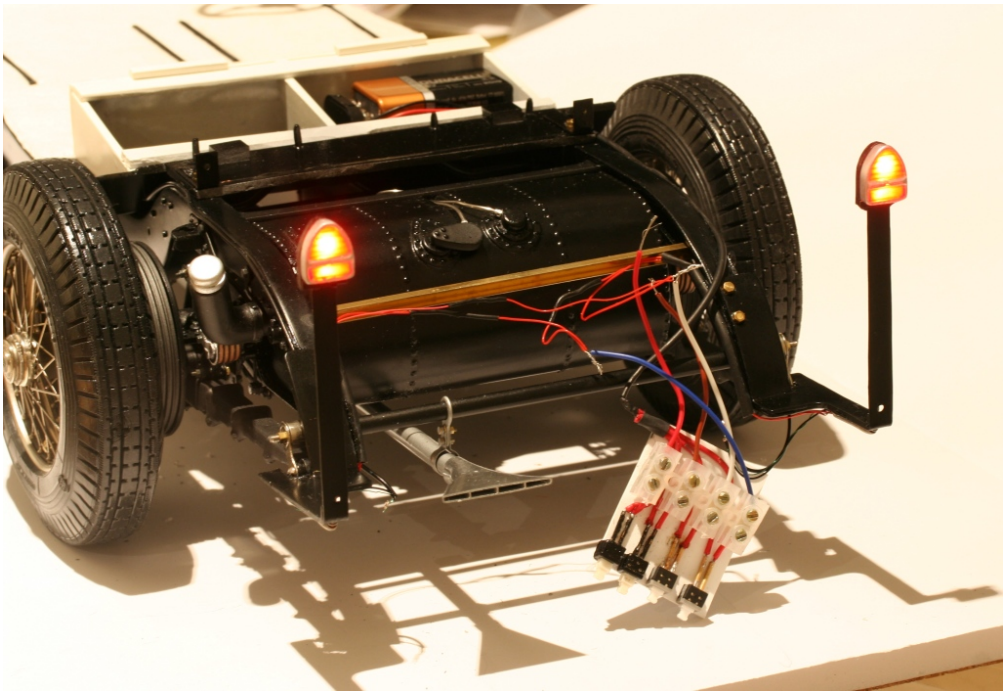


Front Lights

The front lighting is very impressive:

The lights are controlled by micro-switches mounted on a small panel glued to the back of the rear edge of the boot. Four switches control, respectively, headlights, sidelights and dashboard lights, reading lights, and brake lights.

This ‘under construction’ photo shows the switch panel, some of the wiring and the 9V battery in the rear seat platform. It also shows the ‘U’ tube cross-member which I added to the rear of the fuel tank to act as a channel for the various wires.



Boot

With the body finished, it was time to finish the boot.

Closeup of the clasp:

The lid has been glued to its hinge and the interior lined with a flock-like cloth.
Tracing paper was used to make templates for the liner floor and sides. Card stock was cut to the shape of the templates, then flocked cloth glued over the card stock and trimmed to shape.

Here it is in place and attached to the body.

Toolbox

Visible inside the boot is a toolbox. It wasn't part of the prototype, but I had the miniature tools and a toolbox seemed like a neat idea. I wanted it to be flat, so it wouldn't interfere with luggage loaded in the boot, but also look like a toolbox.
Here are some close ups:

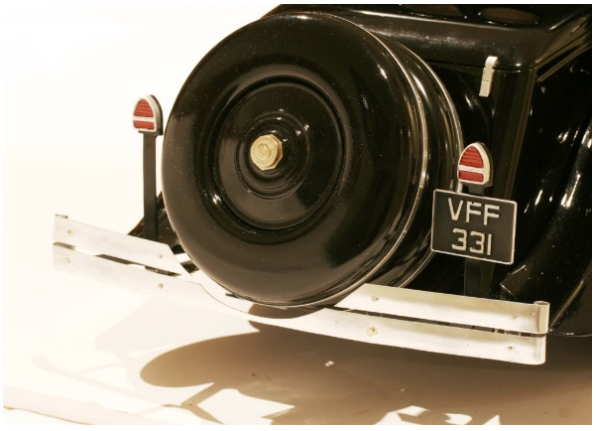
Construction is a series of layers inside a double styrene frame. The styrene base is covered with flocked paper and then overlaid with a cutout for the tools made from styrene sheet. The hinge is made from 3/64 thin wall brass tube laid on top of the inner frame. The hinge pin is 0.020" piano wire pushed through from the one side of the box.

Bumpers and License Plate

One last step was the installation of the bumpers on the bumper supports and the mounting of the license plates. The bumpers are made from 6mm wide brass strip shaped to replicate the slight edge to edge roll of the prototype.
The license plates were 3D printed in acrylic and the letters match the proportions of the prototype. For reference, the size of the letters and their spacing were outlined in the UK's Road Traffic Act 1930. Incidentally, that Act also abolished all speed limits for cars!

Front

Rear



The Finished Model

Now it was time to celebrate!

But …. that faux roof doesn't look quite right ….

Postscript

A year and a half after the model was completed, my nagging concern about the profile of the faux roof had become worse. The issue was that the roof seemed too high at the back and the elegant sweeping profile of the prototype wasn't properly reflected in the model. So, after much thought, and a little bit of nervousness, I decided to remove the faux roof overlay, and mirror the "faux" convertible features directly onto the underlying roof. I was pretty sure the roof could be removed without too much damage and that any repair and repainting could be limited to the rear roof. This would be helped by the fact that the roof would be painted in semi-gloss black as distinct to the gloss black of the rest of the body. Any seam lines between the roof and the gloss black body parts might therefore seem natural.

The whole body was first masked off, except for the area of the faux roof. Removing the faux roof overlay was then straightforward since it had been pegged to the underlying roof with short pieces of piano wire. With the old roof off, the pegs were extracted, the holes filled, and any surface irregularities filled with body filler.

To mimic the "faux" features, the edges of the roof were trimmed with 1.5mm half round styrene strips and the outline trim of the sliding roof cut from 0.20" styrene sheet. A couple of coats of primer, light sanding and two coats of lightly sprayed semi-gloss black set the paint base. Then more light sanding, three final coats of semi-gloss black and re-installation of the 'irons' completed the new roof.
Below are pictures of the new profile (with some minor fixes still to be done), and a comparison to the prototype:

Much better!

The revised roof profile seems to fit better with the sweep of the Gurney Nutting design.

The attractions of this particular Phantom II are lines that are particularly sleek, yet convey an image of respectability, elegance and speed. I'll let you be the judge as to whether or not I succeeded.