Repairing a Leaking Brass Carburetor Float

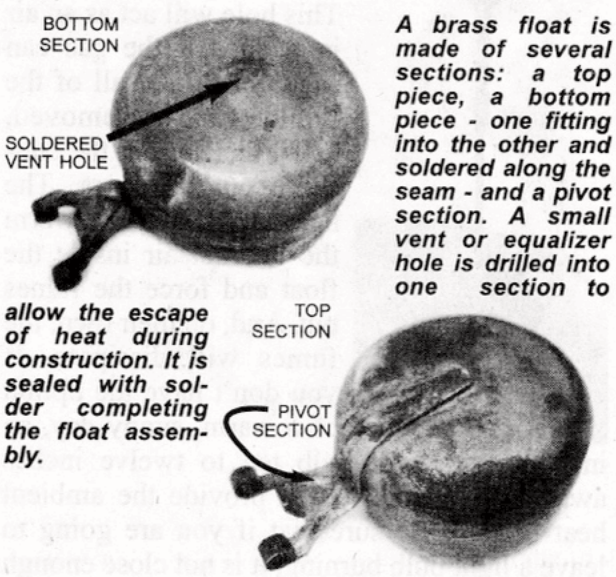
Over the years we have mentioned 'work hardening' of brass and copper. The generally soft and malleable metals age, and often as a result of flexing or bending the molecules of the metal rearrange making the metal extremely brittle and subject to splitting and cracking.

If you have ever had a thin sheet-brass part, like a headlight bucket, you have probably seen a series of cracks or thin lines indicating 'stress fractures.' The same thing happens with the eighty or ninety year old carburetor floats. Granted, the float is subject to constant movement and vibration, but the fissures normally don't occur at the pivot points. They generally occur in the very thin brass sheet-metal of the body of the float.

When a crack occurs in the headlight bucket, it's cosmetic. In the float though, a leak will cause problems. It could be rough running, hard starting, excessive leaking of gas from the carb, or the engine running very rich. The float is designed to drop when the level of fuel in the fuel bowl decreases. When it falls, it allows the needle valve to pull away from its seat and allows additional gas to enter the carburetor. When working properly, as the float rises, it forces the needle valve against the seat and stops or reduces the gas flow into the float bowl. It is a finely engineered ballet which is constantly ongoing while the engine is using gasoline.

But when the float bowl cracks, gasoline seeps into the inside of the bowl, preventing the float from rising when it is supposed to. The result: gasoline continues to pour into the float bowl.

Sometimes – I repeat, sometimes – a float bowl can be repaired, if the damage is not too extensive, if the cracks are limited or if a puncture is causing the leak. The remedy for repairing a brass float is soldering. Soldering thin sheet-brass is always problematic. The solder itself is heavy; heavier than the brass itself. Adding too much solder - even a little bit can throw off the fine balance - will require recalibration of the float/needle valve. Next, brass is a tremendous conductor of heat. Too much heat will spread through the metal and melt the solder in other joints. Too large a fissure can allow the liquid solder to drip inside of the float, severely altering the weight. The only way to remove it is to open the float causing some serious headaches about re-soldering the float. And if the crack is narrow but long, soldering it, beginning at one end and continuing along the crack is difficult. As one end is repaired, the heat remains in the metal and tends to melt the section that you have just repaired.



A brass float is made of several sections: a top piece, a bottom piece - one fitting into the other and soldered along the seam - and a pivot section. A small vent or equalizer hole is drilled into one section to allow the escape of heat during construction. It is sealed with solder completing the float assembly.

When the float was originally built, it was made in two or three sections. Often the top section fits inside the bottom section and the two parts are soldered together. Remember that the brass was new and was not work hardened when new. The metal was more 'forgiving' then. A vent hole, or equalizer hole, was drilled into one section to relieve pressure that developed as a result of the internal air being heated (by the soldering). After the seams were sol-

dered, and the pivot assembly was soldered on, and the entire unit is allowed to completely cool, the vent hole was soldered closed.

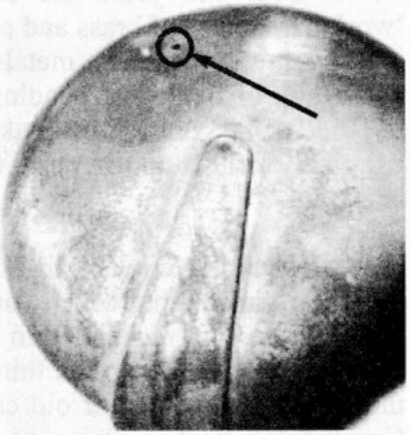
Today when repairing a brass float, the vent hole should be unsoldered or otherwise opened to allow hot air to escape while you are working. It, too, can be easily soldered closed later.

Before we even think of repair, you must get rid of all of the gasoline and gasoline fumes from the inside of the float bowl. Putting a very hot soldering iron against the brass will rapidly heat the inside air/fumes and could easily result in a BOOM! Odds are, after the boom, the repair required will be considerably more extensive.

Use a #60 drill bit (0.040") and a pin vise – not an electric drill – to drill through the solder of the vent hole. This hole will act as an air inlet so that the gas can seep out. When all of the liquid gas is removed, leave the float in the sunshine out of doors. The heat of the sun will warm the internal air inside the float and force the fumes out. And, on their own, the fumes will dissipate. If you don't have the option of a warm, sunny day, an incandescent light bulb ten to twelve inches away from the float will provide the ambient heat needed. Be sure that if you are going to leave a light bulb burning, it is not close enough to anything for the heat to ignite its surroundings.

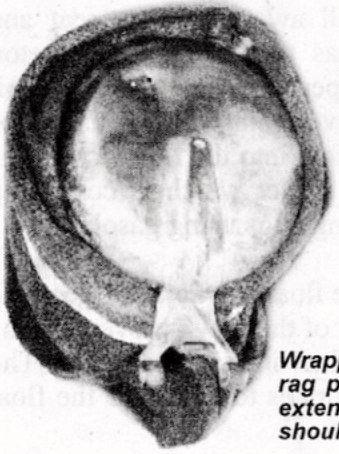
When the float is free of any potentially explosive fumes, it is time to isolate the leak(s). Put a piece of tape over the vent hole that you drilled. Use a pair of needle-nosed pliers, and hold the float in a bowl of very hot water. The heat of the water will pressurize the air inside the float. The air will escape in a stream of bubbles. Mark the spot from which the bubbles are being emitted with a 'Sharpie' marker. Allow the float to cool completely before proceeding. Remove the piece of tape from the vent hole.

Take photographs, make drawings, take measurements – whatever is necessary - so that after removing the marker you will again be able to locate the leak. Thoroughly clean the entire area using a brass wire brush, a small piece of brass-wool and then a wash with acetone to remove any sediment or varnish remaining on the metal's surface. When the acetone has dried, clean the surface with a solvent which leaves no residue. I like 'PRE' from Eastwood. It's an aerosol and has all kinds of uses around the shop. From this point forward, do not touch the area around the leak with your fingers. You do not want any skin oil to contaminate the surface.



Even with the hole drilled and the metal cleaned, the leak hole is difficult to see (circle & arrow).

Soldering should be done with a soldering iron, if possible, but if a soldering gun is to be used, it must be on low heat. Never use a torch or mini-torch to heat the metal. It is imperative that the heat applied at the point of the leak not be permitted to migrate to the soldered seams. I usually wrap the piece in a wet rag. The rag acts like a heat sink preventing the heat from radiating from the target area. In the case pictured, the leak is located on a sur-



Wrapping the float in a wet rag prevents the heat from extending to areas which should not be heated.

face reasonably far from the seam and on the side opposite to the vent hole. The rag was wrapped around the float preventing the heat from reaching the soldered seam. It was held in place with a rubber band.

Clean the tip of the soldering iron, and tin it with fresh solder. Remember, the metal must be heated to the temperature adequate to melt the solder. Merely dripping a drop of solder onto the hole will probably result in a faulty seal. Using the tip of the soldering iron, heat the metal just to the point that a bit of solder melts when touched to the brass. Let the solder just begin to solidify and use a wire brush to get rid of any excess solder over the hole. You want a minimum of solder on the float so as not to appreciably alter the weight.

Allow the float to cool completely (this is very important) before using the same procedure to seal the vent hole. Hopefully there will be enough old solder remaining around the drilled vent hole so that no more will have to be added. Melt the old solder and spread it over the hole.

(Note: in the pictured example, the liquid in the float was removed without having to drill the vent hole. Since it was a tiny hole – about 0.040" – it was repaired without having to open a second vent hole.)

Allow the float to cool completely. Use a very fine small file or an emery board to remove any excess solder. To test the completed repair, use the hot water again. Dip the float into the water and watch for bubbles. If none appear, your job is done. If they do appear, it's back to work to locate and solve the leak problem.

→ WE NEED YOUR INPUT ←

May I ask for your feedback? We are presently working on what could be a very interesting topic: digital inpection cameras for the auto mechanic.

We have only minimum experience with them, and we have been unable to gather enough information to pass along to you in the way of a recommendation.

I have to expect that a number of you have purchased (or borrowed) a digital inspection camera in the past. Perhaps your primary goal was not automotive. Maybe you were doing some work around the house and had to see behind a wall, under the sink, or in a hidden, dark corner of the basement.

If that was the case, and if you are the kind of car-nut that we expect you are, you dragged the camera out to the garage or the shop and played with it there, too.

Please let us know how it worked for you (or if it didn't work, let us know that as well).

If we get enough responses perhaps we can suggest whether getting one for yourself is a good idea or not. Thank you.

Write to: Skinned Knuckles, Box 6983, Huntington Beach, CA 92615 or
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