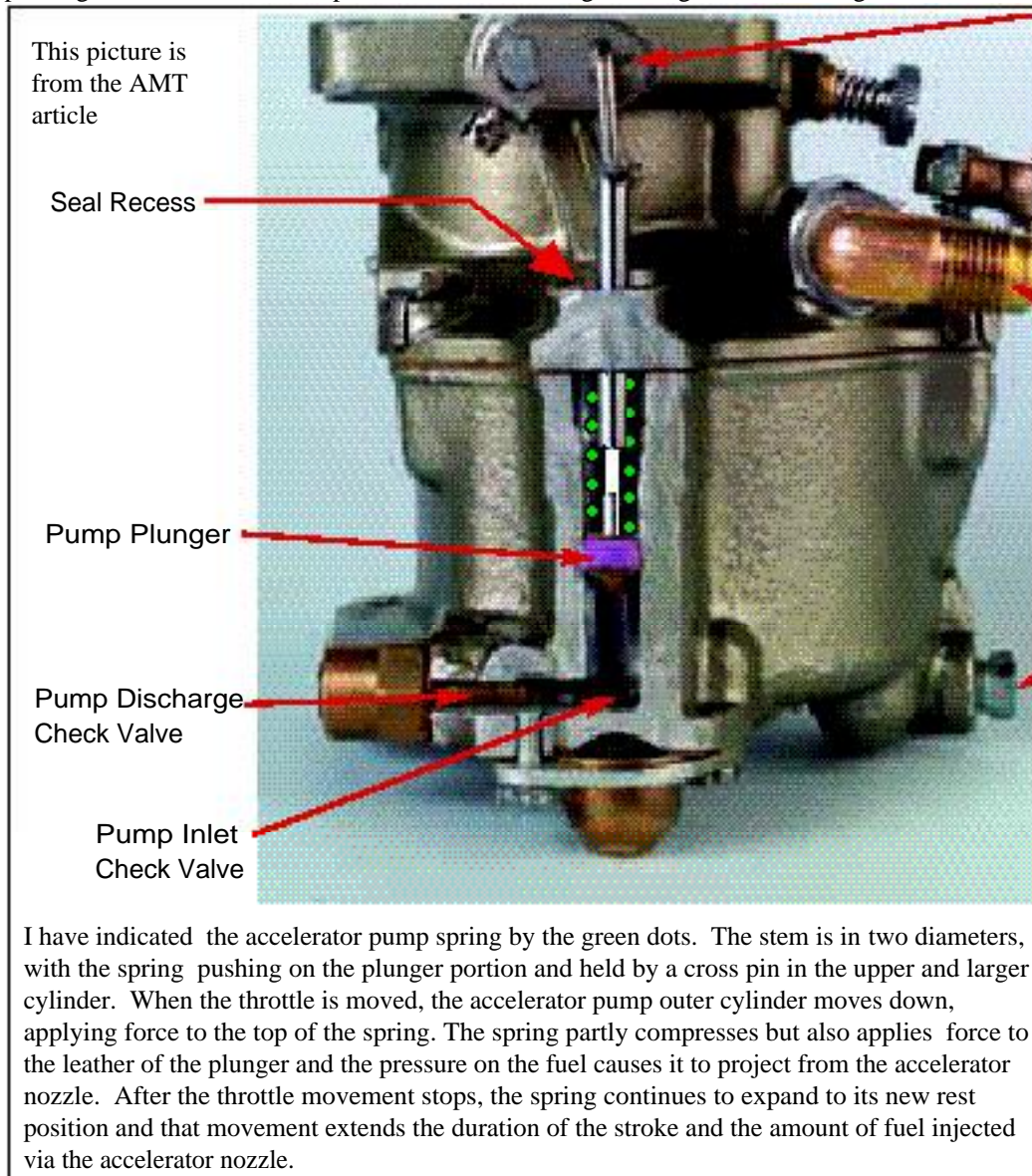


JACK'S MARVEL, NOVEMBER '04

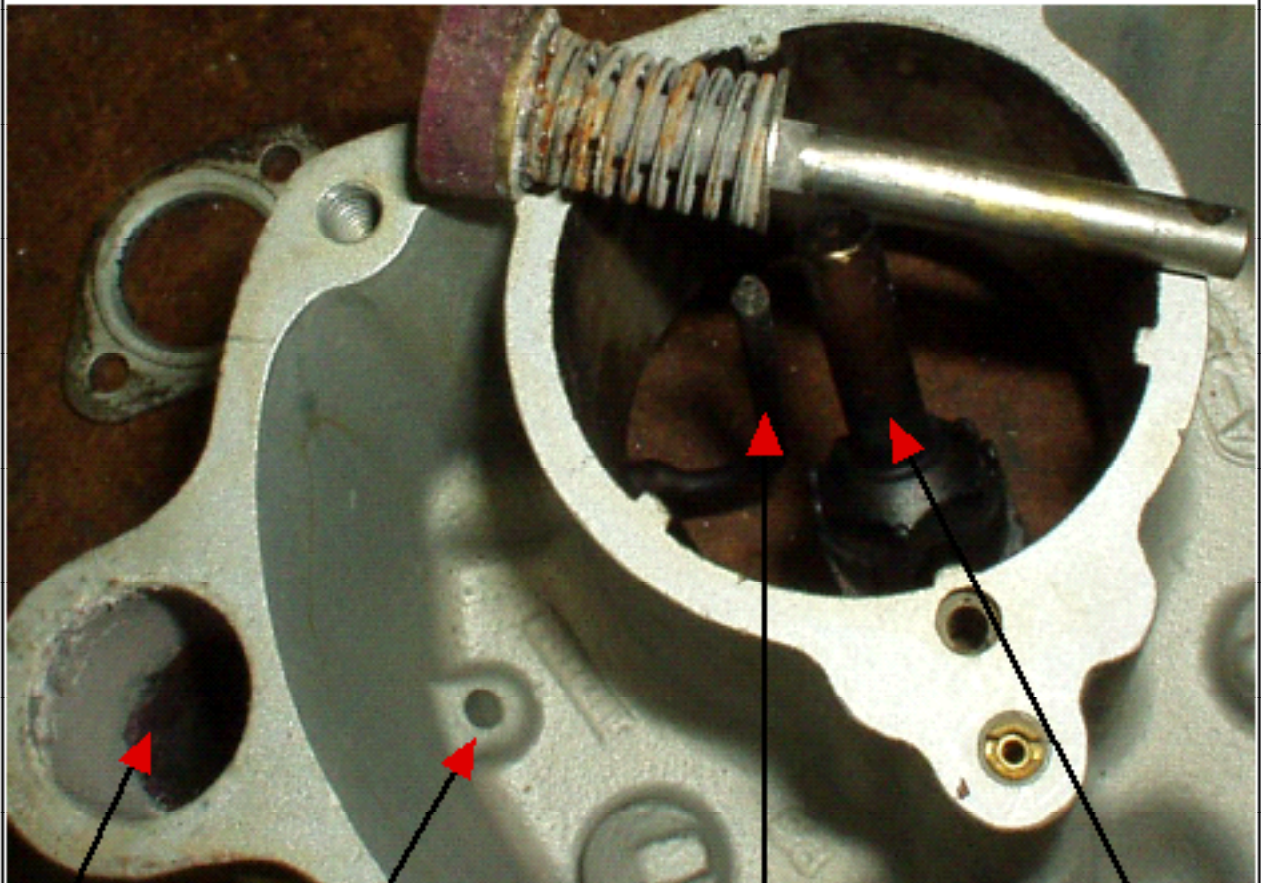
Jack's carb in November '04, removed because the engine would not start when being primed by the use of short strokes of the accelerator pump/throttle. He had been advised many times to not use the accelerator pump at engine start but to use the primer. This, time doing it wrong uncovered a significant fault.



Corrosion at the top of the accelerator pump chamber, rust on the stem and the tension spring of the leather seal, but zero corrosion inside the carb so the water which did the damage was not from the main fuel chamber. This picture is from AMT.

The pix following indicated to us that the water doing the corroding and rusting which caused the loss of prime for the pump was coming in from the top, maybe around the stem of the pump. Perhaps via the air bleed hole shown in the first picture? No, the bleed hole channel vents from the "local ambient" from inside the carb, same place as for the main fuel chamber.

This carb was overhauled in July because the accelerator stuck and would not let the throttle move beyond the half-open position. Same problem, rust and jammed or stuck. Now November, the same fault of rust.



Pump well

Fuel path to the accelerator pump chamber. The pump inlet check valve prevents the fuel...and water...from backing up into the main fuel chamber.

The main fuel nozzle. It doesn't appear to have any outlets, but they are there.

The accelerator pump discharge nozzle. If you leave any fuel in the pump chamber and are foolish enough to be looking down at this item, the fuel jet will hit you if the pump is fully pulsed.

The previous occasion of the accelerator pump failure was when the throttle refused to move beyond about half open. It was found that the accelerator pump was stuck and would not let the throttle move beyond that point. Removing the carb and confirming the symptoms, it was repaired and the repair included a new pump, the old parts showing the same sort of rust pattern as shown here. Although the seal was not tight fit to the pump shaft, the seal could not be replaced in this style of casting.

The most logical cause of the water being in the accelerator well on top of the pump plunger leather is that the ingestion happened while washing the engine, allowing the water to enter the "slop" annulus between the accelerator pump shaft and the packing for it in the carb top.

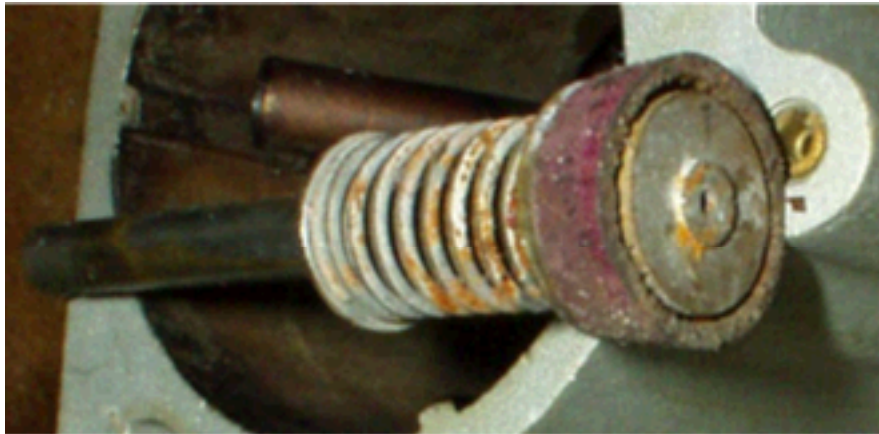


This is the underside of the top part of the carb, and this corrosion is at top of the accelerator pump chamber. This picture is the first sight of the air (and water maybe) bleed hole into the top of the accelerator pump chamber. No, there is no way for water to enter via the bleed hole.

This corrosion is at the top of the accelerator pump chamber in the bottom part of the Marvel casting.



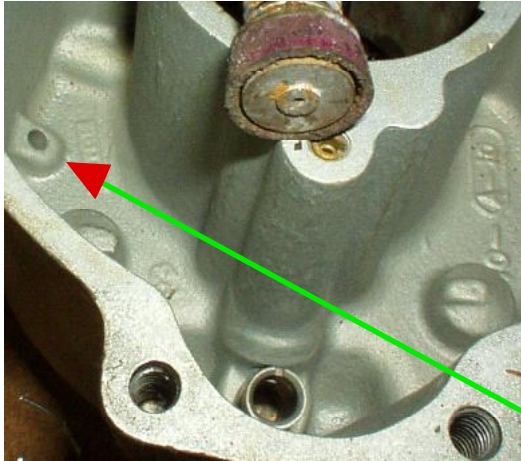
Below, the done-in accelerator pump, well rusted. Although barely apparent here, there is a coiled tension spring underneath the "leather" which applies outward force to keep the leather tight against the well wall. There apparently came a time when the rust junk caused the water held at the top of the purple leather to seep beyond the seal and caused the rust you see at the bottom.



The pump, first showing the "As Removed"

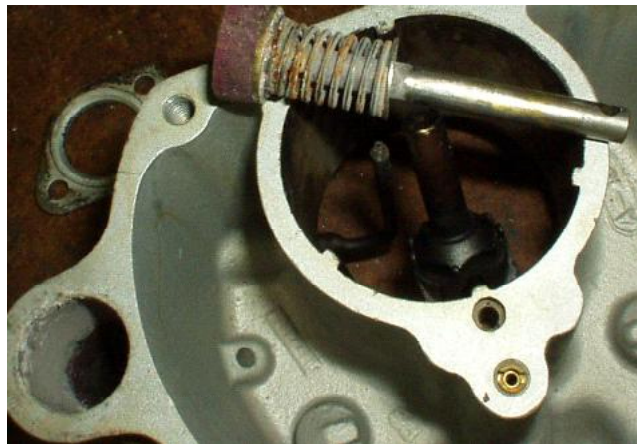


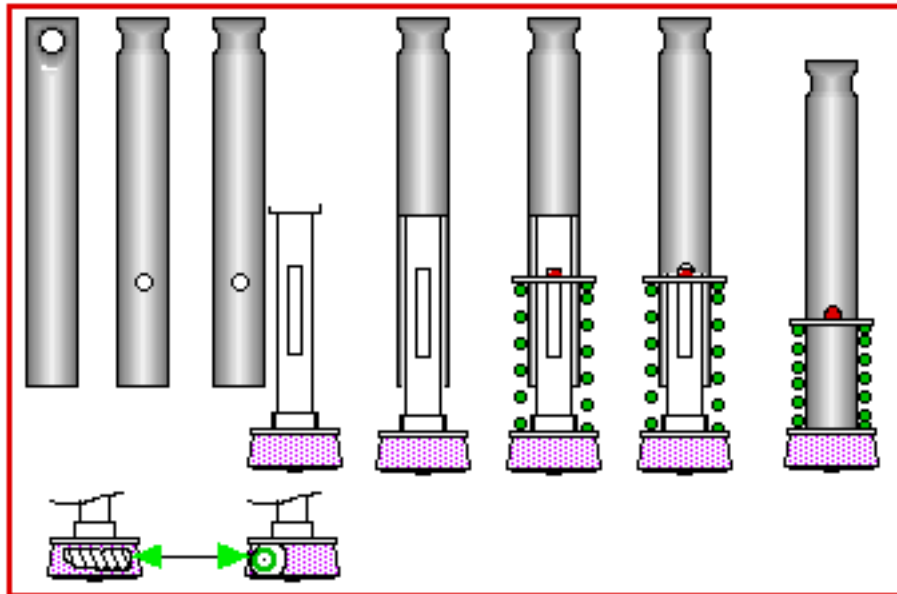
Disassembled but without the re-used pin and the top depressed washer which is held between the pin and the top of the spring. Note the slot in the inner cylinder.



A more inclusive view of the pump action end and the pristine interior of the bottom casting. That hole on a slanted boss at the left is where the gas from this chamber goes to the accelerator pump reservoir. Note not a whit of corrosion.

Similar view, showing the accelerator pump chamber, the fuel transfer passage to it, the pump, and the very clean interior of the carb. Look down in the accelerator pump chamber and you can view the different surfaces....one smooth because it gets rubbed by the pump leather and above that the non-smooth, possibly corroded?? section.





The pump assembly. Just above, the cutaways showing the internal coiled spring which applies constant outward pressure on the leather to maintain the seal to the wall of the chamber.

From the left top, a view of the outer cylinder with the hole in the top through which the connector from the throttle arm goes. Next the same cylinder rotated to show the hole for the pin which nestles in a cupped washer which sits on top of the spring. The inner and outer cylinders, the latter with its special slot through which the pin can slide when the outer cylinder moves down each stroke. The inner cylinder shown nesting with the outer, no pin. Third from the right, the assembly showing the two cylinders, the spring, and the pin in place and the spring relaxed but at the full extension allowed by the restraints.

Second from the right, ready for a stroke of the pump and on the right, the stroke, illustrating the spring compression. During the downward stroke, the spring compresses, and the pump forces fuel out of the accelerator nozzle. After the throttle stops, so does the downward movement of the accelerator pump outer cylinder, but the compressed spring then expands to its normal length and that expansion moves the pump plunger until the pin strikes the bottom end of the slot in the inner cylinder. That continued movement ensures a longer duration of diminishing fuel flow from the accelerator nozzle.

Two Castings:

After the second time this happened, it was explained that there are two different Marvel castings. One includes a recess which accommodates an O'ring and a retainer which makes replacing easy so any leak into the accelerator well can be quickly stopped. The other, like this one of Jack's, has a non-repairable, non-replaceable seal so there are only two ways to keep water out when the wear allows water to enter: 1. don't wash the engine in a manner that allows water to hit the carburetor, or 2. don't wash the engine.

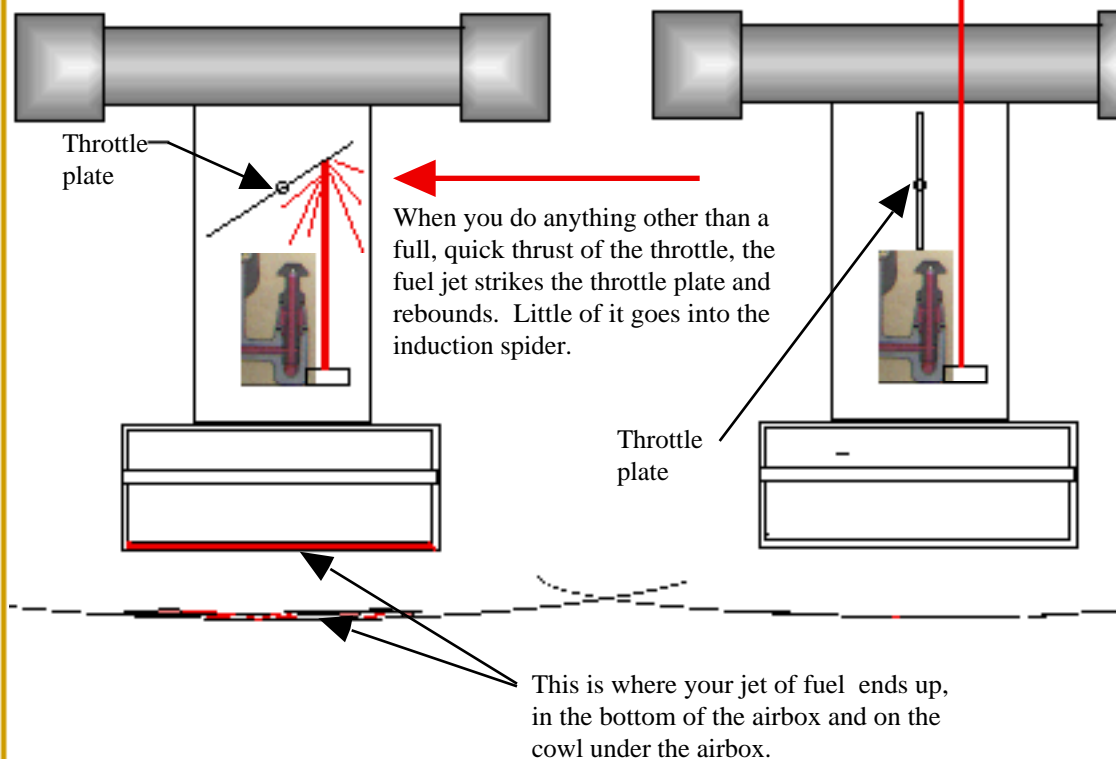
USE THE PRIMER!! No book tells you not to use short strokes of the throttle/accelerator pump for engines with the Marvel carb so they do not explain the result as noted in the sketch. Continental and Cessna books say the same thing...use the primer to introduce fuel into the induction spider.

Great liberties were taken with respect to sizes and features in these figures. The air box, carb outline and induction spider are meant to provide the setting to show what happens when a partial thrust of the throttle/accelerator is used. Most of the fuel jet rebounds from the throttle plate and ends up in the bottom of the airbox and cowl, there to await ignition.

Things to remember: A. The carb is never empty of fuel until the accelerator pump is cycled and no fuel comes out anymore! B. Never, ever, be looking down the throat of the carb when the accelerator pump is manipulated!!!!

For Marvel users, unless you do a full, swift plunge of the throttle, little of the accelerator stream of fuel will get by the throttle plate!! Do not partially open and close the throttle before or while starting as this is likely to deposit raw gasoline in the air box and constitute a fire hazard. The fuel which rebounds off the throttle during a short thrust falls back into the air box. There, it constitutes a fire hazard in the event of a backfire.

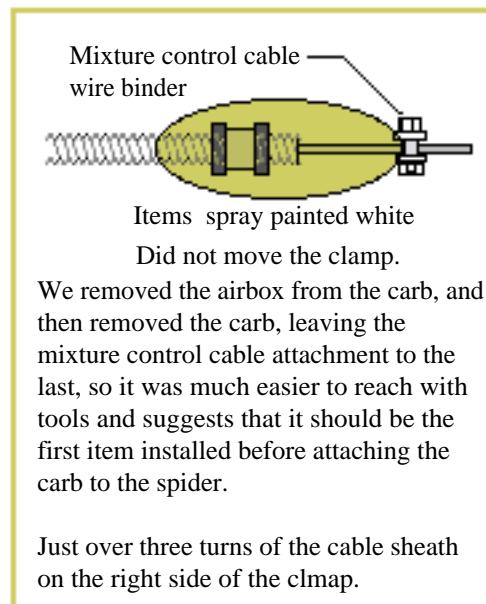
If you use a **full quick thrust of the throttle**, most?? of the fuel goes up and strikes the top of the induction spider. The jet, if there were nothing in the way, would go up 36 plus inches.



When this carb was installed in July, after the same repair, the hardest part of the installation was to get the push-pull cable wire and the clamp and the spiral guide and the mixture control arm and its stops all in sync. For the re-installation, this feature will be the first to be connected so as to have the most knuckle room for the tightening of the bug nut holding the push-pull cable wire. Whew!



Just before loosening the bug nut which holds the push-pull cable to the mixture control arm, we painted a sector to include the push-pull sheath, the clamp and mount, and the bug nut such that we could reconnect the wire in the same positions. Later, after the re-installation, the paint worked as planned. No additional jiggling of the parts was necessary to get the mixture control arm to go from stop to stop.



Neal
filed as Jack's Marvel nov
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