The Long History Of the SU Carburettor Ends

Another chapter in England's automobile history has been closed with the news that SU Carbs has produced and delivered its last batch of carburetors for Rover cars. The final shipment brings to an end an 80-year long relationship between Rover, the last of the giant British car builders, and SU.

The history began with shoes. In England at the beginning of the 20th century, one of the best known shoe manufacturing firms was Lilley and Skinner. (The firm is still in existence today and has shops in every major town in England.) Like many old British industries, the Lilley and Skinner families were linked not only by profession but also by marriage. George Skinner, one of the sons, was an expert in motor cars, and like all motorists of this period, fretted at the inadequacies of the average carburetor.

Naturally, numerous devices to improve matters were announced, and "Magic New Carburettors" were a phenomenon of the day. First announced in 1904, George's system, of automatically obtaining a correct air/fuel mixture at all engine speeds, used a piston carrying a tapered needle entering the main jet. This piston, sliding in a guide, was itself moved by a flexible pressure-sensitive bellows connecting with the mixing chamber and actuated by engine suction.

In his patent specification, the inventor was careful not to go into details of the bellows nor of the material from which it was made, which, in fact, was leather. As a shoe manufacturer, George was very familiar with this material.

A year later, George and his brother, Thomas, patented the system and with financial help from their father, set out to develop their new product. In a market where most car manufacturers made their own carburetors, the Skinners' carburetor was very expensive to produce; and it made slow progress.

By 1910, however, the SU Co., Ltd., (Skinner's Union) was founded in an open horse-tram shed on Prince of Wales Road, Kentish Town, North London. The engineering firm of G. Wailes and Co. of Euston Road, London, undertook the initial manufacture. The SU carburettor, under Thomas Skinner's direction, was establishing itself very well until the Great War (WWI) intruded. Skinner then switched to making parts for Vicker's Machine Guns and did other armament work.

The end of WWI brought its relief and its economic anxieties, but SU made it through this time by making radio parts, water cocks, windscreens, and plumbing parts, as well as by doing general engineering work when the firm could get it.

The first improved version of George Skinner's carburetor was introduced in 1925. No longer using the leather bellows, it now used just an aluminum cylinder, forming the famous SU dashpot with screw cap on top for lubricating the rod.

George then withdrew from the company, leaving Thomas to go it alone. It was tough going for the company during the 1920s, too, even though Bentley, Wolseley, Napier, and Morris were among SU users.

In 1926, Thomas Skinner offered the SU business to Morris Motors and remained as director. SU moved to Adderly Park, Birmingham, and modern equipment was installed for quantity production. Output rose by leaps and bounds, and soon SU's carburetors appeared not only on Morris and allied marques, such as MG and Wolseley, but on Morris' rivals as well.

During 1929, the development of the SU electric fuel pumps was also begun, first for cars and then for aircraft engines. WWII saw SU feed the engines of Rolls Royce Merlin 100 series engines and contribute other vital equipment to the war machine.

As a result of the blitz in Birmingham, in 1940 the company moved from Addington to Shirley; there it remained until 1947, when it moved to Erdington, its present location. The merging of Morris with Austin enlarged the market for SU products.

In the mid-'60s SU employed 1,300 workers and turned out an incredible 30,000 carbs a week for the then-booming British car industry. By the mid-'80s that figure was down two-thirds, and by 1989 the firm had been bought out by an American company.

SU now concentrates on multi-point fuel injection and limited carb production for modern cars. However, old car owners need not fear that their SU-equipped models will be without spares in the near future, as Burlen Fuel Systems in Wiltshire, England (see address below) has a long-standing arrangement to produce SU components in small production runs for collector car owners.

And it all started with a bit of leather!

(The information for this article comes from Old Cars Weekly (Oct. 20, 1994) and British Car Magazine.)

Burlen Fuel Systems, Spitfire House, Castle Road, Salisbury, Wiltshire SP1 3SA. (Phone 011 44 0722 412500; FAX 334221)

Technical SU Carbs

Continuing Series

Jim Taylor, Oklahoma

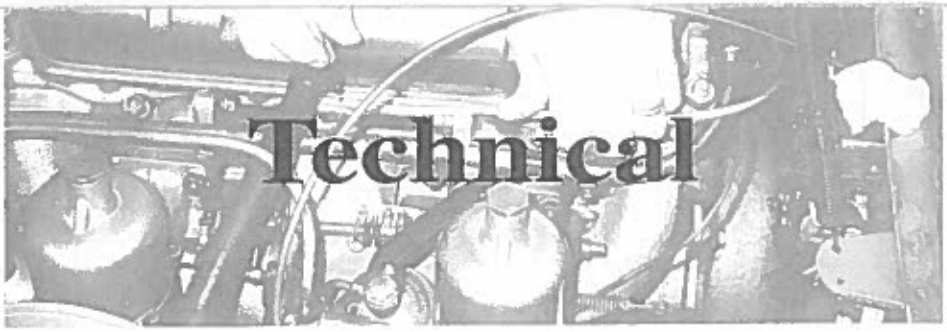
Jim Taylor is a retired design engineer with over 35 years experience rebuilding SU carburetors and fuel pumps.

Jim has completed a series of 41 articles on SU carbs and has promised to do a few more in the future.

The December 1994 issue of CHATTER left off the last three sentences of the SU Carb article on Banjo and Banjo Bolt Threads. Here is the correct text.:

Banjo and Banjo Bolt Threads

The float lid banjo bolt thread on H and HD series carbs is a 3/8"-19 British straight pipe thread. Sealing of the banjo faces is accomplished with fiber washers. The male threaded connection on some SU carburetor and fuel pump banjos is a 1/4"-19 British straight pipe thread. Sealing is on a tapered seat with a union back-up nut. It was never intended for sealing to be done by the threads. American Standard tapered pipe threads are essentially the same diameter as the British threads, but have 18 threads per inch. I often see where owners have tried to screw on American Standard pipe thread adapters and use Teflon tape as a sealant. The thread mismatch will distort the original threads and careless installation of the Teflon tape can cause strands of tape to be sheared off the thread ends and lodge somewhere in the fuel system. Use the correct fitting for the job. Use Teflon paste or Permatex anti-seize compound #133-K if a thread lubricant is desired.



Healey Cold Cough

by Gary Hemphill, Hemphill's Healey Haven

There was a time, in the early 1970s, when the only car I had was my BN7. I had to rely on this car to get me to work regardless of the weather condition or the temperature outside.

One of the first things I discovered was that the choke must operate properly or the car would not start. The Maryland temperatures can drop to the low teens during the winter, and this can make any British car hard to start.

Unless you live in a really warm climate, the Healeys need the choke to operate in order for them to start without excess cranking. Actually, even in warm weather, the choke should be required to start most British cars.

The SU carburetors do not operate like the older American cars. Pumping the gas pedal will not allow gas to enter the intake manifold. The only thing the pedal does is to allow the butterflies to open. No gas is pumped in.

When you pull the choke cable out, this drops the main jet tube in the body of the carb and shoots a little gas into the intake manifold. This also allows the carbs to run at a much richer mixture – giving more gas than the usual amount.

Usually, when the choke is pulled out, you will feel very little resistance. After about the first half inch (possibly more on some models) of travel you should feel a stronger resistance. This is the important part of the choke operation. The first part of the travel is just moving the linkage and opening the throttles slightly. The last part of the travel is dropping the jet tubes, thus enriching the mixture.

Even though the carburetors may vary on the different models, the principle is still the same. The jets must drop in order for the car to start without grinding the starter motor.

There is a brass shaft on the HD type carbs that runs vertically through the body of the carburetor. It has a little spring under the top of it that helps it to return after the choke is released. The brass shafts must slide freely through the body of the carb or the jet tubes will not drop. This shaft is operated by a cam on the choke lever, and its primary purpose is to open the throttles a slight amount. Often times the shaft has built up corrosion, which will not allow it to move freely through the carb body. What happens then is the choke only operates the throttles but does not enrich the mixture. This in turn will not allow the car to start easily, or if it does start, it will cough and backfire, through the carbs.

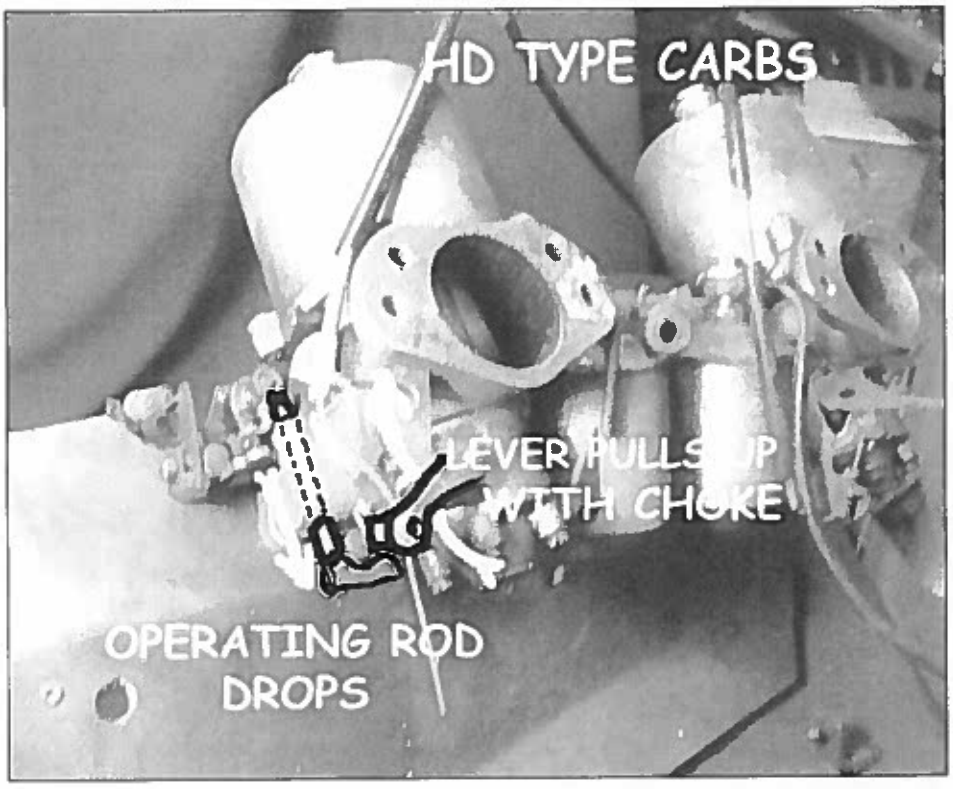
Excessive backfiring through the carbs will eventually cause the damper piston shaft to punch a hole through the damper piston top on the plastic type caps. Some cars have brass caps and this is not a problem.

The H type and the HS type carburetors have a little different arrangement in that the choke linkage drops the jet tube directly. The jet tubes are still brass and can very easily bind up. These type carbs are a little less likely to develop the problem of binding up.

I have found that the proper maintenance on the brass shafts or tubes is quite easy and only requires a few minutes.

Have someone operate the choke, pulling the cable out as far as it will travel. While this is being done, look at the operation of the choke at one of the carbs. On the H type and the HS type, you should be able to see the jet tube drop. On the HD type, you should see the brass shaft move freely through the carb body and the lever being raised that in turn drops the jet tube.

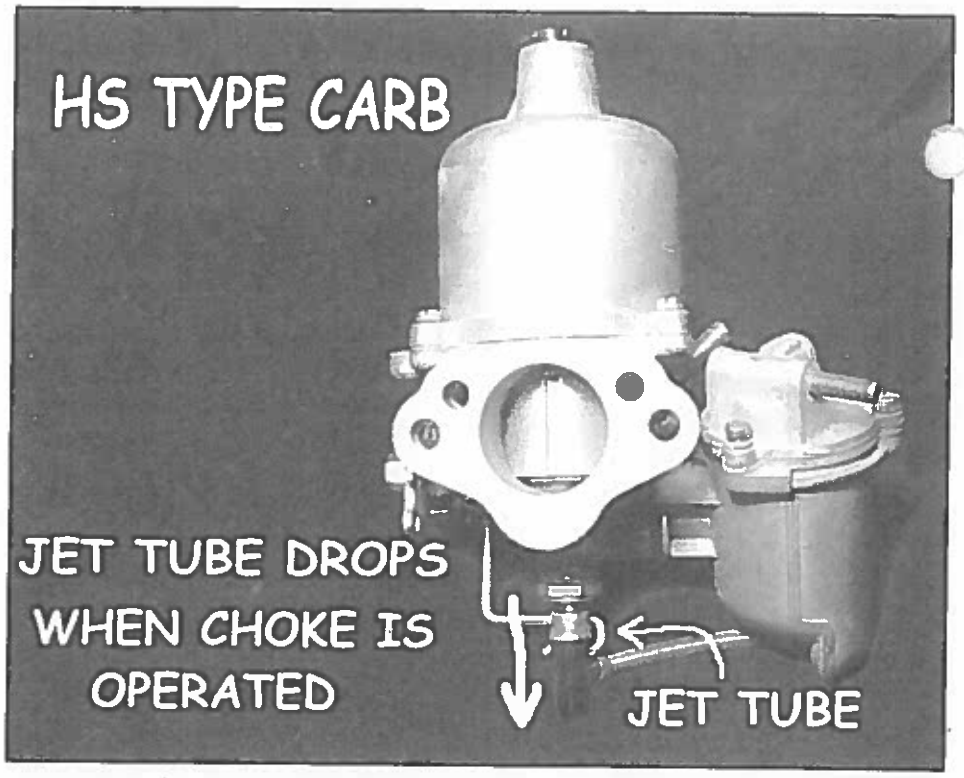
On the HD type carbs, it is quite possible you may have to slide the shafts

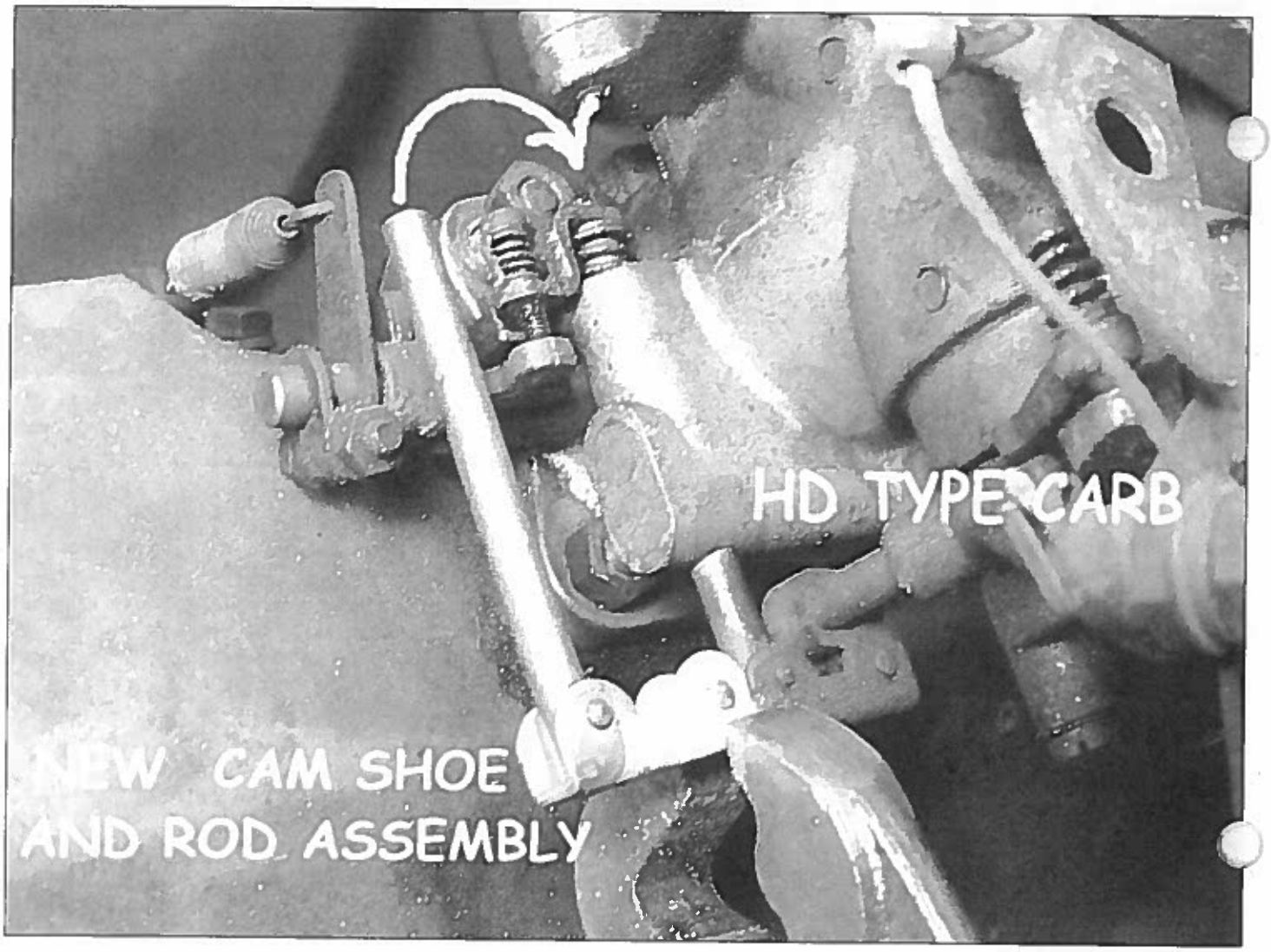


out and clean them with a very fine steel wool. I have also found that "3 in One" oil works great to lubricate the shafts, once they are cleaned. It may be advisable to roll up a bit of fine sand paper to clean the hole in the carb body. If the shaft is stuck in the carb body, DO NOT use a punch to knock the shaft out. This will "mushroom" the end, and it will never pass through the hole – trust me, I have made this mistake.

If your chokes work correctly, the car should start regardless of the air temperature. If you get a lot of backfiring or coughing, the choke is not allowing enough fuel to enter the intake manifold. By the same token, failure for the chokes to return to the normal position, after the car has warmed up, will cause excessive black smoke to exit out the exhaust pipe – this being unburned fuel.

The "Big Healeys" have a lot of cast iron under the hood, and if you want your car to start properly, check the chokes.





Balancing SU Carburetors

We know that the balancing of SU carburetors requires the removal and replacement of the anchoring nuts and bolts, and washers for the air cleaners, We also know the contortions required to replace the washers and nuts up under the carbs (as well as the kneeling, searching and cursing when we drop them.. twice!). I think the following might simplify the problem.

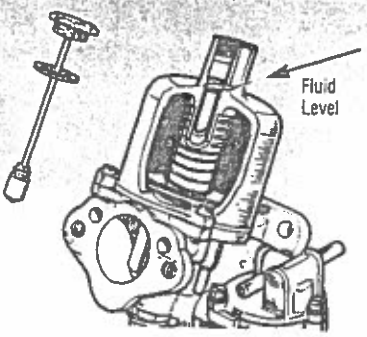
The holes in the carb flanges that the 1/4" (.250") air cleaner anchoring bolts go through are .257" plus (at least the ones for my BN-1 Austin-Healey "H" carbs) and this just happens to be the recommended hole size to install 5/16" x 18 t.p.i. helicoils. Run the 5/16" x 18 t.p.i. tap in a helicoil kit into these holes with the wing nut tool. The insert may be a little long for the thickness of the flange but screwing a 1/4" x 18 tpi bolt through will break off the little tang and set them.

Now the removal and replacement of the air cleaners is from the outside, and washers and nuts under the carburetor are not required. This method can also be used on other British cars with the same set-up.

Donald LaTrobe
Huntington Beach, CA

SU Carb Dashpot Oil

The purpose of the SU damper is to retard the rapid upward movement of the piston on the rapid throttle opening associated with acceleration. This delay in piston movement causes a momentary decrease in pressure at the throat, thus achieving a momentary increase in richness much the same as with an accelerator pump. The weight of the oil in the damper determines the amount of dampening. A lot of race mechanics use automatic transmission fluid for some misguided reason obscure to me. I think it is too light for normal use. SU publications recommend 20 weight, which I would follow. (Moss sells the correct SU dashpot oil, under #220-225 for a 125ml. bottle -Ed.)



Do not overfill the damper. The proper procedure is to fill "below the top of the hollow piston rod", not "below the top of the chamber neck". Overfilling just spills over into the suction chamber and makes a mess. One easy check is to remove the damper and then re-insert it. If you feel resistance before you reach the threads on the cap, you've put in enough oil.

Jim Taylor
Kansas City Austin-Healey Club

SU Carburetor Tips

By Jim Taylor

Editors note: Jim Taylor is a retired design engineer living in Bartlesville, Okla., with over 40 years experience rebuilding SU carburetors and fuel pumps and can be contacted at 1222 Harned Dr., Bartlesville, Okla. 74006, 918-333-3444. The following is one of a series of articles on the most common problems that Jim has observed in carburetors that come to him for service.

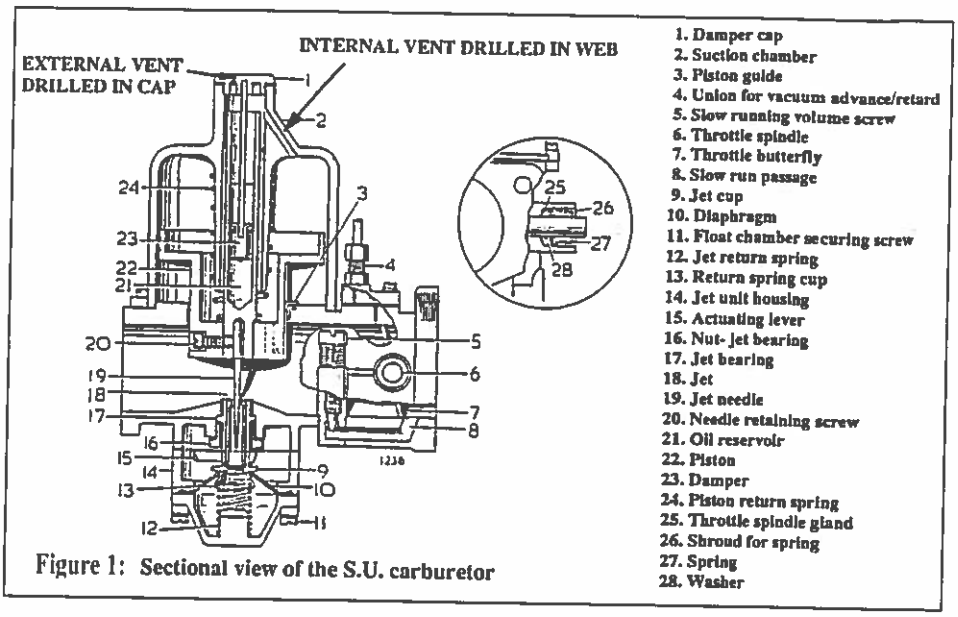


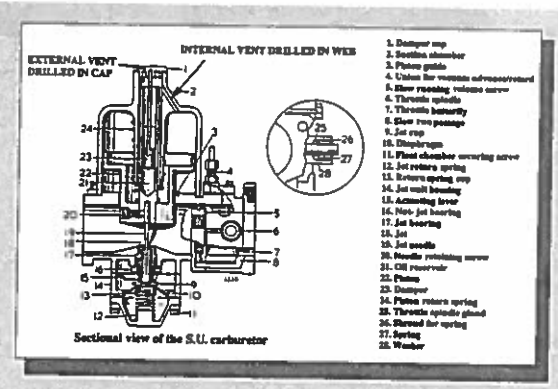
Figure 1: Sectional view of the S.U. carburetor

LVI. A-H 100-M Carbs

A popular option is to convert A-H 100-4 cars to 100M specs. Certainly, upgrades to the engine proper need to be made. A typical way to upgrade the carbs is to obtain a used pair of TR3 or TR4 H-6 carbs. Refit them with 100-4 throttle stop levers, jet levers and links, float bowls, float lids, throttle return spings, stirrup, and trunion pins. It is also necessary to add long brass lid nuts, brass chamber screws, short overflow pipes and OA-7 needles. This provides correct functioning carbs with about 99% authentic appearance.

Owners who don't know the complete history of their cars often ask me if their carbs are authentic. The following subtle differences have been noted:

1. 100M carb pistons have one hole in the bottom of piston. TR3 has two.
2. Body key which orients the piston on 100M is round. TR3 key is long and slender.
3. TR3 fast idle boss is tapped on inboard side of right hand carb.
4. Vacuum advance connection on 100-M is 5/16-22 BSF. TR3 is 7mm x 1.0.



Technical SU Carbs

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Banjo and Banjo Threads

The float lid banjo thread on H & HD Series carbs is a 3/8" - 19 British straight pipe thread. Sealing of the banjo faces is accomplished with fiber washers. The male threaded connection on some SU carburetor and fuel pump banjos is a 1/4" - 19 British straight pipe thread. Sealing is on a tapered seat with a union back-up nut. It was never intended for sealing to be done by the threads. American Standard tapered pipe threads are essentially the same diameter as the British threads but have 18 threads per inch.

Mechanicals

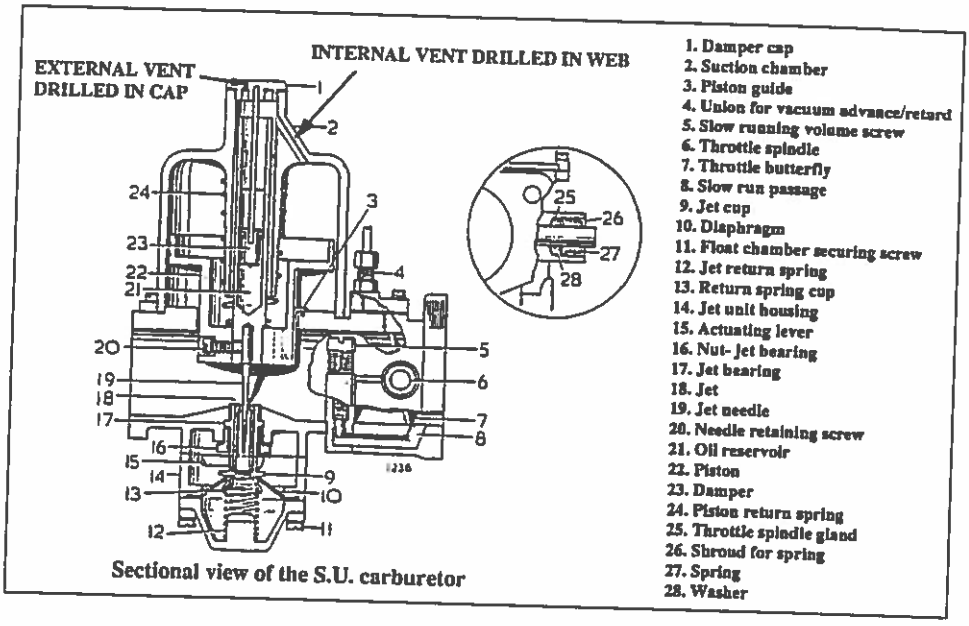
SU Carburetor Tips

by Jim Taylor
Oklahoma AHOC

Editor's note: Jim Taylor is a retired design engineer with over 40 years experience rebuilding SU carburetors and fuel pumps. Following is a continuation of a series of articles published several years ago in CHATTER.

XLII. Polishing Choke Shafts

Pulling the choke on the HD series carbs can be a formidable task. When servicing the carbs I like to polish the choke shaft and fast idle rod with a fine wire brush on an electric drill. This will remove any corrosion on the brass parts. To remove the choke shaft from the jet housing, knock out one or in some cases two taper pins with a 3/32" punch. After polishing, spray the brass shafts with WD-40 before reassembly. Also remember if you open the throttle with your foot on the accelerator pedal while pulling the choke, the fast idle mechanism does not have to overcome the throttle return spring.



Sectional view of the S.U. carburetor

XLIII. Removing Fast Idle Rod

On the HD series carbs the fast idle rod often will be stuck tight rendering the choke inoperative. Remove the dog-legged plate from the top of the assembly but screw the retaining screw back into the rod as far as it will go. Wire brush the exposed rod surfaces with a fine rotary wire brush. Squirt an aerosol penetrating oil on both ends of the rod. Gently tap the ends of the rod first one direction and then the other. Continue to wire brush and spray as freshly exposed surfaces appear. If it is really stubborn, heating the aluminum casting with a propane torch or hair dryer will help. Screwing a long 2BA screw such as a float bowl mounting screw into the top of the rod will allow you to tap the rod on out the bottom. Do this only after some movement is established as vigorous pounding can bend the long screw.

XLIV. Removing Stuck Bolts

Often float lid inlet banjo bolts, float bowl mounting bolts, jet bearing lock nuts, and steel chamber screws will be rusted and stuck in the threaded holes in the aluminum casting. After soaking in a penetrating oil, heating the affected area will expand the aluminum more than the steel thus facilitating removal. A propane torch is ideal but if not available sometimes a hair dryer will suffice. An electric hair dryer can heat the parts to approximately 150°F. Often this is just enough. Sometimes nothing will work and parts have to be sacrificed.

XLV. Improvisation

Sometimes replacement parts just aren't available. Two instances come to mind. The retaining clip on the end of the carb damper has a small I.D. but has to have a large enough O.D. to retain the damper piston. I haven't found a readily available "E" ring or snap ring that fulfills both criteria. A 2/0 dress snap was used on the early T-series MG dampers and works just fine.

On the HS-2 carbs found on Sprites and Midgets, the jet head screw has a brass grommet that serves as a bearing between the screw and the jet link and is just thick enough to prevent the screw head from pinching the jet link. Often these grommets are lost when the uniniated disassemble the carbs. A shoe eyelet will work. It is necessary to file it down to where it is just slightly thicker than the jet link.

SU Carburetor Tips

by Jim Taylor, Oklahoma AHOC

Editor's note: Jim Taylor is a retired design engineer with over 40 years of experience rebuilding SU carburetors and fuel pumps. Following is a continuation of a series of articles published several years ago in CHATTER.

XLVIII. Needle Sleeve

On several occasions I have found the mounting hole for the metering needle to be wallowed out. I presume a stuck needle broke on an attempt to remove it and had to be drilled out. This can be done very precisely with an 1/8" drill in a drill press without damage to the piston. Trying to drill with a hand drill probably caused the wallowing. In these cases I cleaned up the hole with a 5/32" drill in a drill press. I then inserted a brass model builders tube 5/32" O.D. x 1/8" I.D. x 7/16" long. This centers the needle and the locking screw will deform the thin wall tube enough to hold the needle securely.

XLIX. HS Vent Tube Rotation

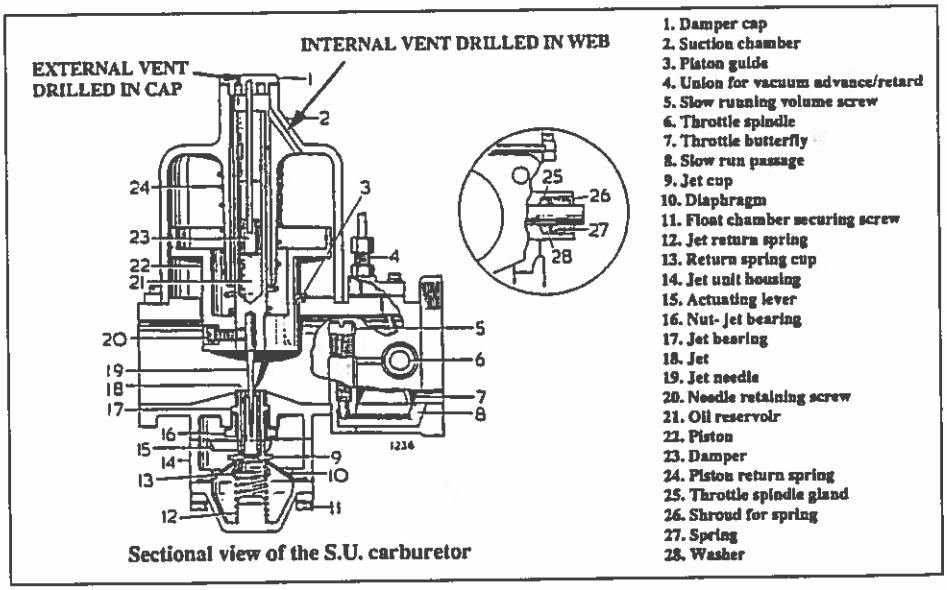
Most of the float lids on the later HS carbs had a ¼" vent tube pressed into the lid. A small vent hole was then drilled through the underside of the lid and through the underside of the tube. Frequently a rubber hose was used to carry the overflow or vent off to some other location. The rubber hose often is stuck tightly and is twisted to get it loose. In the process the vent tube may be rotated so that the hole in the tube doesn't line up with the hole in the lid thus blocking the vent. Severe internal flooding will occur. Pry the hose straight off or cut it but don't twist.

L. Early Float Bowl Mounting Bolts

The MG T-series carbs and the AH 100-4 and 100M carbs had a shouldered float bowl mounting bolt. This bolt required two thin fiber washers with a metal skid washer between the fiber washers as the seal against the bolt head. On pre-WWII carbs there was a groove in the upper surface of the bolt head for a cork seal. The later 3-piece fiber washer assembly does not fit well in the groove. I've found a standard 9/16" I.D. x ¾" O.D. x 3/32" "O"-ring replaces the cork seal very nicely.

LI. Bowed Flanges – Early Types

MG-TC's and earlier cars had carb bodies that were sand cast using a relative soft material. They had a characteristic blue-gray color. Quite often the mounting flanges would be bowed, maybe as much as 1/16", due to over tightening the flange bolts coincident with too thick a gasket. Milling the surface to get it flat thins and further weakens the flanges. I have had good success putting the carb body between two flat plates in a press and heating the juncture of the flange and body proper with a torch. Load on the press was approximately 100 pounds force. After flattening the flange, final surface finishing can be done by lapping on some 120-grit emery paper on a flat plate.



Sectional view of the S.U. carburetor

Wire Mesh Air Cleaners

Now that's a good idea!

Want to keep you engine clean inside?
The owner's manual indicates that engine oil should be poured in to the air cleaners to catch the dirt. The only thing those air cleaners keep out are insects, and the oil you pour in usually just drips out the bottom and all over the frame and motor.
Try this: take your wife's Pam cooking spray from the kitchen and spray it into the air cleaners! You will get more even distribution and coverage on the wire mesh and it will not leak all over.

Carb Rebuild

The SU (means Skinners Union named after Thomas Carlyle Skinner and his partner or "union" George Herbert, but that's another story) has always been a mystery to me until I bought a 1966 Volvo with shop manual which explained the working of the carbs as follows:

The Carburetor automatically varies the air venture area and fuel jet size according to engine demand. Figure 1 shows a simplified carburetor diagram. Note the movable piston which changes the effective area of the venture. AS the piston moves up and down, the tapered jet needle mounted in the base of the piston varies the cross-sectional area of the jet. The movement of the piston thereby changes the venture area of the carburetor, and the fuel size to deliver the proper air/fuel mixture under all load and speed conditions.

The difference between atmospheric pressure and carburetor venture vacuum moves the piston. Atmospheric pressure from the air cleaner bears on the bottom of the piston through a small air intake port in the carburetor body. A small hole in the bottom of the piston opens into the suction chamber above the piston causing the low venture pressure to be felt there. If the vacuum in the suction chamber increase (absolute pressure decreases), the pressure difference is higher and the piston moves up. If the suction chamber vacuum decreases, the piston moves down.

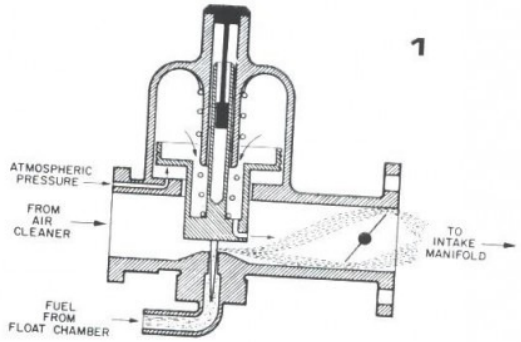
Figure 1 shows the condition of the carburetor at idle speed. The carburetor throttle flap is closed and the volume of air passing the piston is small. Air passing the piston causes a small depression to be felt in the suction chamber. The piston rests on the carburetor bridge and admits very little air. IN addition, the metering needle width constricts the area of the jet and little fuel enters the venture.

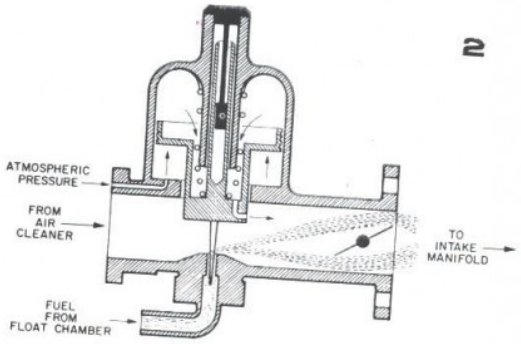
As the throttle flap opens, airflow through the gap between the piston and the bridge increases (see Figures 1 &2). The depression (vacuum) behind the piston increases, causing the vacuum above the piston to increase. The piston rises, seeking equilibrium and increasing the jet area to admit more fuel. The piston reaches equilibrium when the venture area at the bridge increase enough to reduce the depression above the piston. This reduction is just enough to balance the weight of the piston and the force of the piston spring.

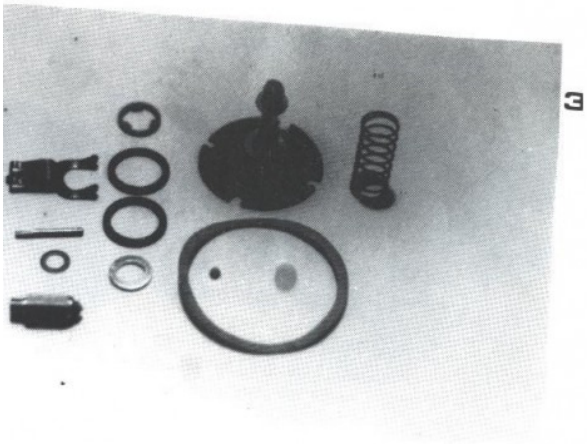
The piston therefore rises and falls as the throttle opens and closes, varying the amount of air and fuel admitted. The taper of the metering needle determines the variation in mixture ratio and throughout the range from idle to full throttle.

Looks and sounds simple enough. So why does it give so many people so much trouble?

Carb rebuilding kits are about $35.00 and contain all the parts you need to rebuild 2 cars (see Figure 3). (ed. Price may be obsolete.)







Well, I decided to try rebuilding my carbs and I took pictures in the process, so this month we will cover “rebuilding the carb” with a step-by-step photo layout and the next monthly we will explain “how to set up the carbs”.

There are few designs of the SU’s on Healeys, so consult your shop manual for the exact details of your carb. The carbs pictured are HD8 for 3000.

The hardest part of the operation of car rebuilding is getting the air cleaners and car off the car. This is the time you convince the wife and kids (those with little skinny fingers) to help Dad with the car. Once they see how easy it is to get the 2 nuts off the top of the car, they will be embarrassed to quit when they can't even see the bottom 2 nuts.

I will not go into how and what to remove to get the carbs off and out of the car, the manual does a good job of that. I would suggest these tips, however,

1. TAKE PICTURES of the carbs IN THE CAR before you take them out. You will be surprised how this will help you when you replace them (shoot the last 3 pictures of your next roll of film).

2. Put a SHOP RAG under the cars over the Abyss of the frame. I have lost more air cleaners nuts, washers and wrenches down that hole.

3. Take ONLY ONE CARB APART at a time. You can use the other as a guide.

4. Take NOTES and scribe marks on match up items.

5. The carbs are made of aluminum and some linkage is brass and they buff up real nice. I bought a buffing wheel for my electric drill an used polishing compound to buff them.

6. Check the adjustments of carbs before you take it apart and write them down. Count the number of turns on the slow-run valve (screw it down) or throttle adjusting screw, and the number of turns to raise the jet flush with the bridge (see Figure 8). We will use this information to reset the carbs.

7. For added “show appeal” paint air cleaners with “HAMM-R” Finish paint #322 Silver (manufactured by Illinois Bronze Paint Co., Lake Zurich, IL 60047). This spray can give that original finished look and to top it off, add “cooper air cleaner” decals, to top off air cleaner so you can read them from the drivers side.

To dismantle:

1. Remove the piston/suction chamber (Figure 4 #1) spring and piston.

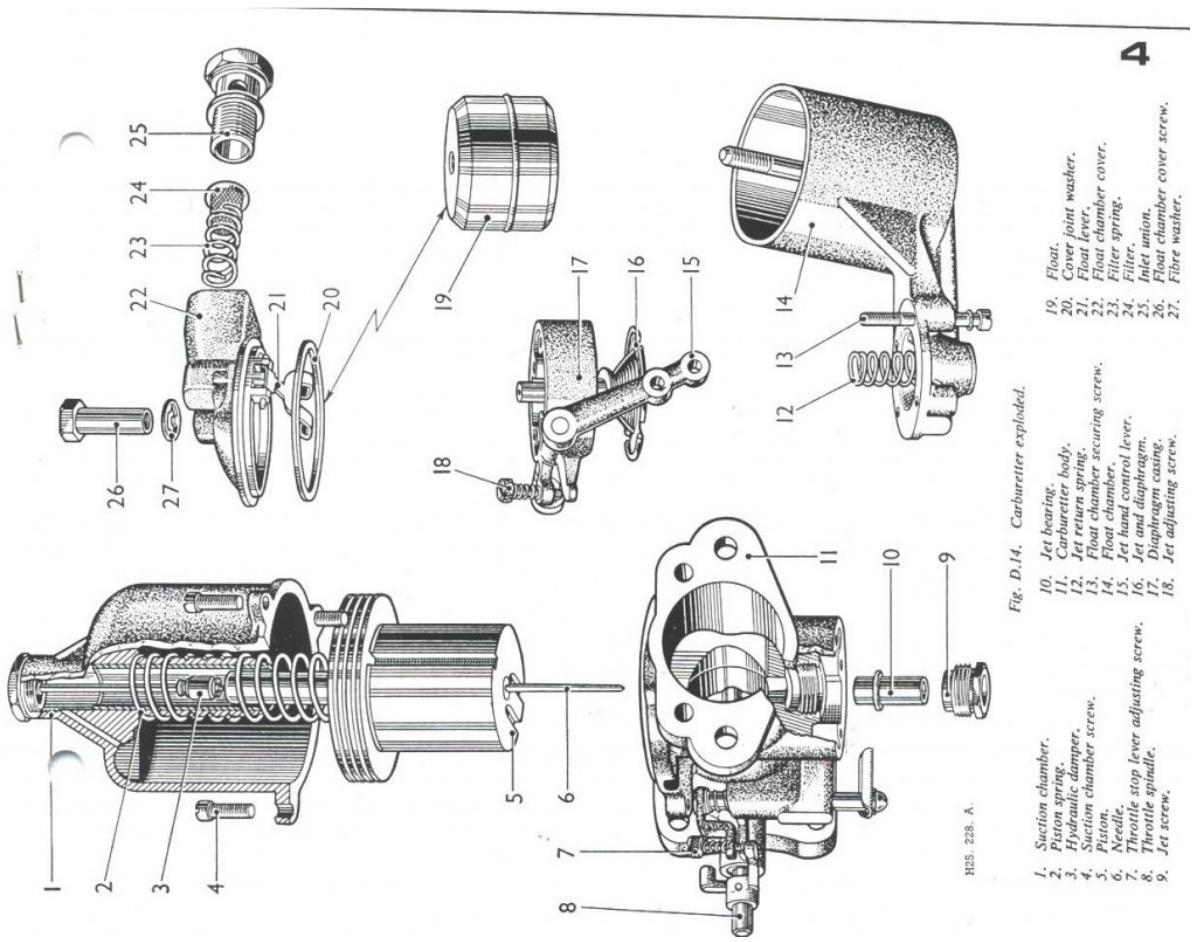


image 4

2. Remove nut on top of fuel float, gasket and float.

3. Mark (for line-up later) bottom of float chamber with diaphragm casing and bottom of carb and remove 4 screws that hold it all together. (The diaphragm and spring can now be removed.)

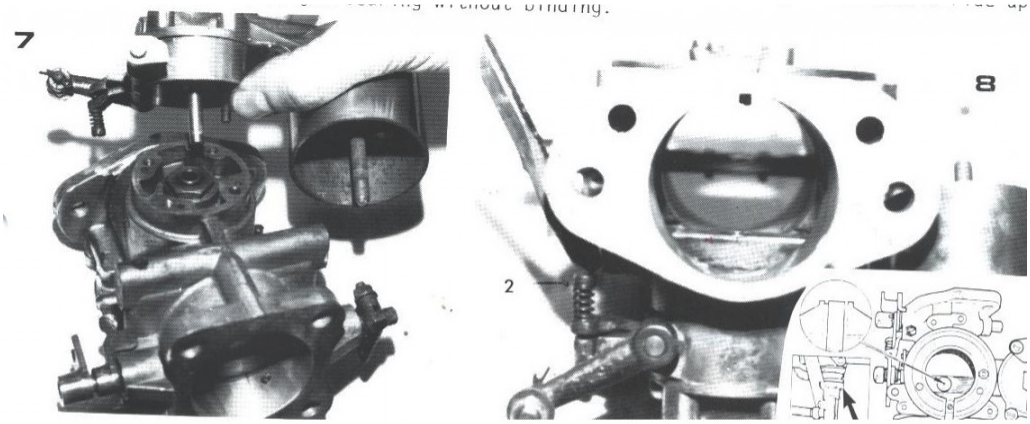
4. Remove all screws, linkages and clean carb with carb cleaner, buff if desired.

1. Install new diaphragm spring and diaphragm in float chamber (Figure 5). Match up diaphragm casing (Figure 6).

images 5, 6

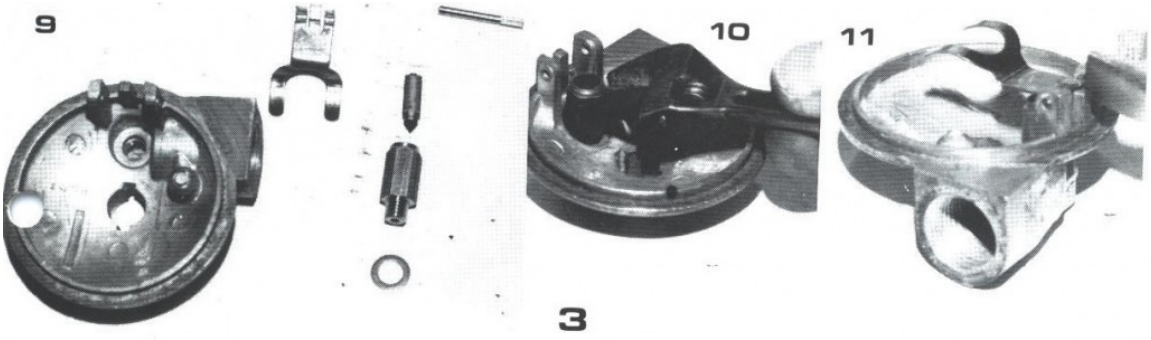
2. Slide diaphragm into jet bearing in bottom of car, replace screws and check operation of jet, when jet linkage is moved does jet move down? Does it snap back up? If not, loosen crews and turn casing slightly. Jet should ride up and down in jet bearing without binding.

3. Turn jet adjusting nut (early cars) or jet adjusting screw (#2 Figure 8) until jet is flush with bridge (Figure 8). Now turn the NUT down 2 complete turns (12 flats) or the screw 2 turns. Check these numbers with where the jets were originally set.



images 7, 8

4. Replace float needle casing and needle the forked lever and float (Figure 9, 10 and 11).



images 9, 10, 11

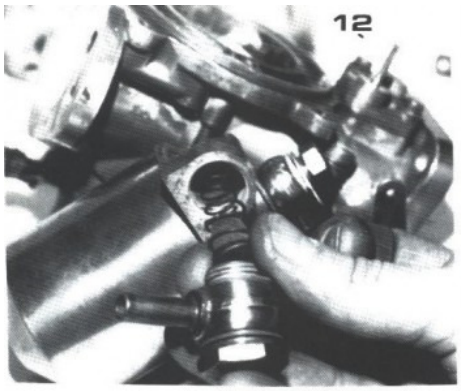
5. Put new gasket on the top of the float chamber and new gaskets (red) on gas inlet (use spark plug socket).

6. Replace slow-run valve (Figure 14) screw to bottom then back out 2 ½ turns or throttle adjusting screw (early carbs) 1 ½ times.

7. Oil and insert fast idle push rod, if removed (Figure 15).

8. Install piston, piston and suction chamber, check that piston falls off the way down freely.

9. Install carbs back in car. Not air cleaners yet.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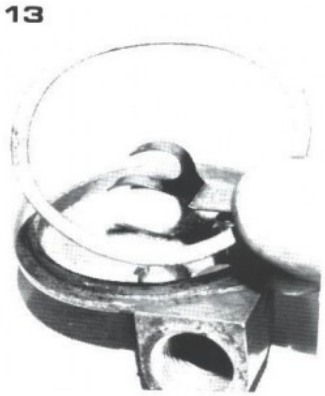
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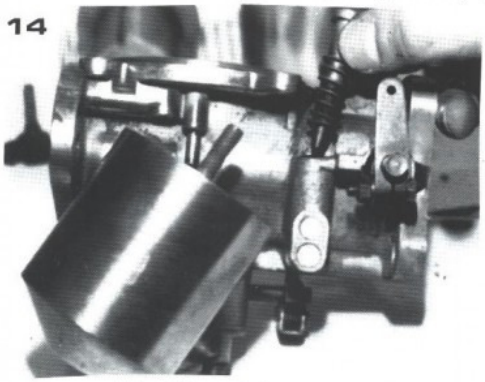
6) Replace slow-run valve (figure 14) screw to bottom then back out 2½ turns or throttle adjusting screw (early carbs) 1½ times.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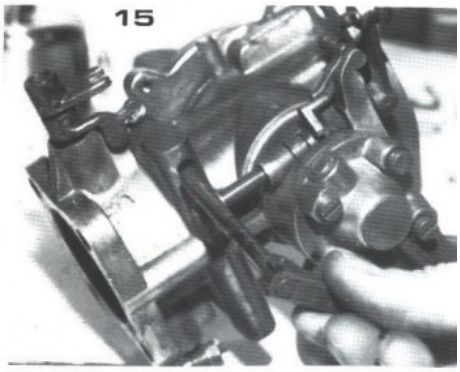
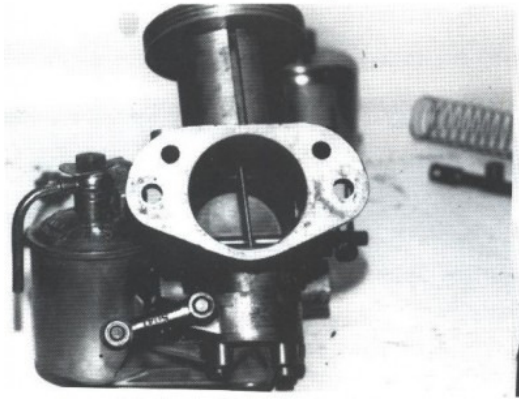
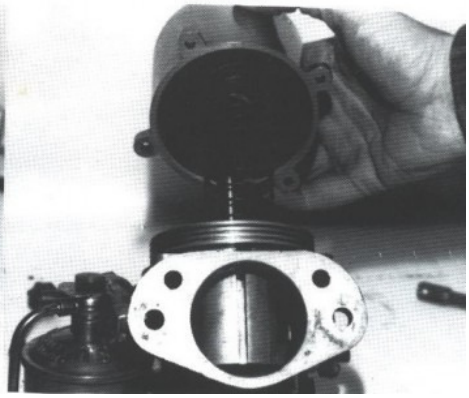

15

7) Oil and insert fast idle push rod, if removed, (Figure 15)

8) Install piston, piston and suction chamber, check that piston falls all way down freely.





Carb setup 2

Carb Set Ups
It's Harder Than You Think
By: Steve Jekogian
See the "Carb Rebuild" post for the initial instructions.

In the March 1986 newsletter, we covered rebuilding SU carburetors step-by-step. I got some feedback on the article and I am sure I will get more.

Two steps suggested by Bob Avery of British Motors in Parsippany, NJ, had to do with "jet centering" and throttle plate (butterfly) centering.

Four the first, "jet centering" prior to installing the new jet (Steps 2 and 3, Figure 7, March 1986 newsletter) install piston, spring and suction chamber (Step 8). With needle coming through jet bearing, push jet up in bearing with needle going through it. Move up and down and turn or rotate it until you do not feel any resistance or drag.

If you feel drag, you have to center the jet. To do this, loosen jet nut (Figure 7, the nut the jet goes through). Trial and error work on moving this jet bearing will make the piston fall correctly and you will feel no drag when you move the jet up and down. Mark location of jet, remove and do Steps 2 and 3 in the March issue. Check that piston falls down freely after assembled.

Now on to the car set up.

1. Craig Holden, of the Philadelphia Region, sent an article to me on Car Rebuilding and Set up and it was a great help in writing this article. He had a really good hint.

Prior to starting the car, let the fuel pump work a few minutes t fill the fuel float bowls, while you check for leaks around fuel lines, float chamber, etc.

2. Settings should be
- Throttle Screw
- Early Carbs – back out until screw clears plate below it then 1 ½ to 2 turns.
- Late Carbs (HD8) – Slow run valve (Figure 14) screw to bottom then back out 2 ½ turns. These carbs also have a throttle screw which is for "fast idle", back this out to clear plate below it. With choke out full, this should be adjusted to give you about 1,300-1,500 RPM.

3. Put oil of correct weight into piston dome suction chamber.

4. If air cleaners are off the car, you will have to put a bolt in the hole where the air cleaner bolt goes through to hold choke linkage.

5. Start car. If it is difficult, try enriching mixture. Turn jet down or adjusting screw clockwise.

6. Once the care is warm and the choke is off, readjust settings if disturbed in Step 5.

7. Slacken both the clamping bolts on the throttle spindle shaft.

8. Adjust throttle adjusting screw or slow run screw to correct idle speed (or as close as you can get it). Turn these screws an equal amount on each car. Unison is helpful here to show equal air sucking. If you do not have one, just listen to the sound of the air being sucked in.

9. Check for correct mixture of jets. I usually put a flat blade screw driving ¼" in the carb throat and twist it to lift the piston. (If the air cleaners are on you have to use the lift pin, good luck!)

Lift the front carb piston to adjust the rear. By that I mean when you lift the front piston it lets a lot of air (over lean) mixture into the motor and ONLY the rear carb will keep the car running.

Do What Motor Does Cause
Left front piston 1. Motor stalls. Rear carb too lean.
2. Motor idle does not
change Rear carb too rich

This is the same for the other carb. Go back and forth from one carb to the other and adjust.

What you want is a slow idle that is just lobbing along, barely running but running. Try to get this barely running RPM speed (when you left a piston) at the same RPM for the front and rear carbs.

Note: you might have to adjust throttle screws or slow run screw to keep idle up or down.

When you think you have it right, let it idle. Is it firing on all cylinders, running smoothly? If not, keep adjusting. If it is smooth richen it slightly by turning the mixture adjustment screws down another ¼ to ½ turn or jet nut 1 or 2 flats. If it still is running okay, you are in good shape. If not, lean it out lightly.

10. Tighten interconnection on throttle shaft leaving a .006 clearance between the link pin and lower edge of the fork.

11. Oil and replace the air cleaner and away you go. Note: you might have to adjust throttle screws or slow run screw to keep idle up or down.

When you think you have it right, let it idle. Is it firing on all cylinders, running smoothly? If not, keep adjusting. If it is smooth richen it slightly by turning the mixture adjustment screws down another ¼ to ½ turn or jet nut 1 or 2 flats. If it still is running okay, you are in good shape. If not, lean it out lightly.