

# PROJECT

## INSTALLING A DIAPHRAGM CARBURETOR

By Brick Price

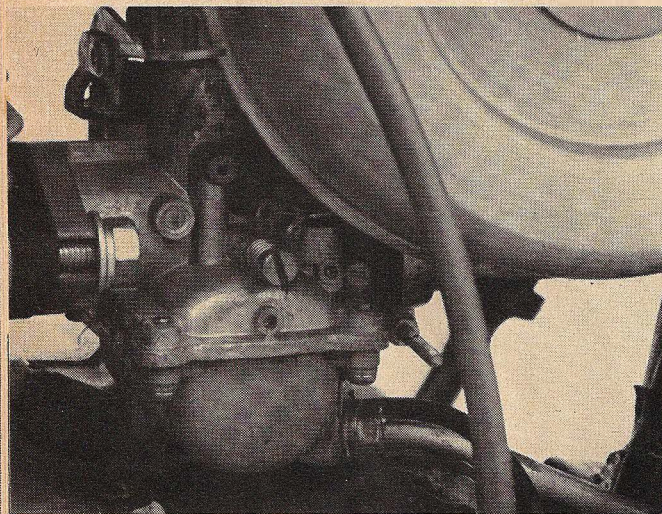
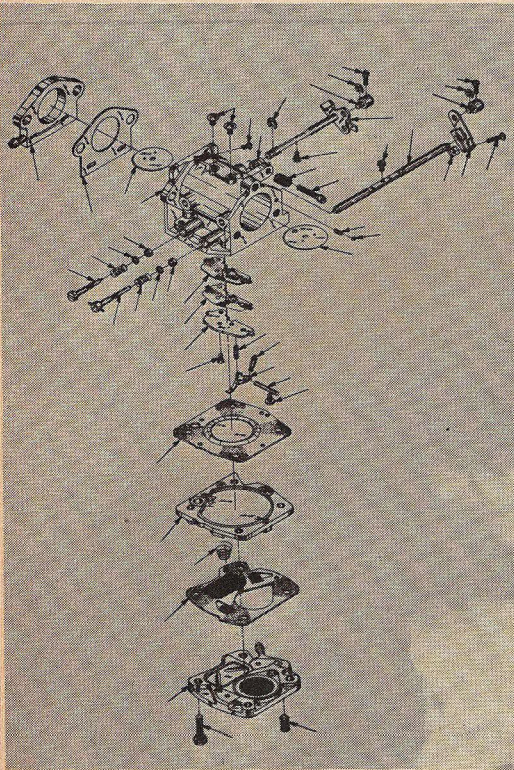
Racers have always been an ingenious lot and many of the hot items found on production motorcycles now were the result of a backyard racer's brainstorm.

One such item is the recent adaptation of diaphragm (pumper) carbs from go-karts to motorcycles. The pumper carb has been used on racing go-karts for quite awhile, but it wasn't until a few months ago that the carb was found to be useful on motorcycle engines. In operation, the pumper carb will provide instant acceleration, easier starting and superb throttle response. The pumper carb will work even when used upside down or sideways, unlike the standard bowl type which floods at anything other than level. This may not sound like much, but many motocross racers have blown their chances of winning because the bike flooded when they dumped it.

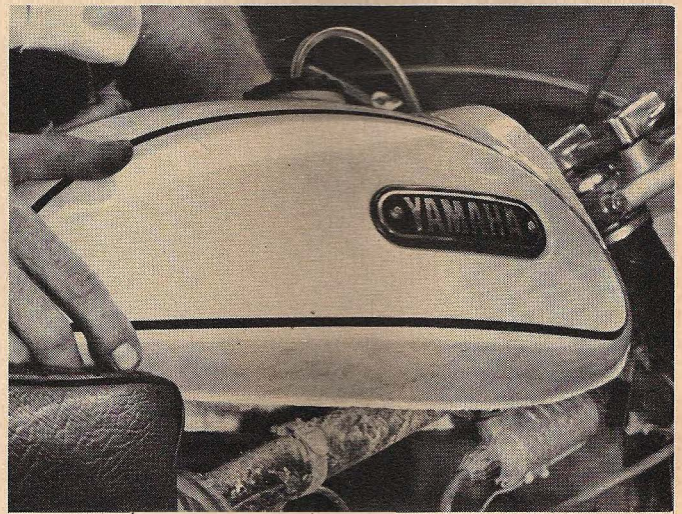
The theory behind the operation of the pumper carb is actually very simple when you boil it down to basics. The pressure pulses from the crankcase

are used to create a signal pressure on the diaphragm. A "Duck" valve keeps crankcase suction pulses from pumping up the diaphragm like a balloon by bleeding air into the atmosphere. The difference between the air bled into the atmosphere and the pressure pulse is called the signal pressure. This pressure acts on the diaphragm to open or close the fuel inlet valve. At high rpm the pressure builds up in the signal chamber and allows the fuel to flow directly in proportion to the engine's needs. The fuel inlet valve would be open almost continually during an uphill grind at high rpm when the engine loads are greatest.

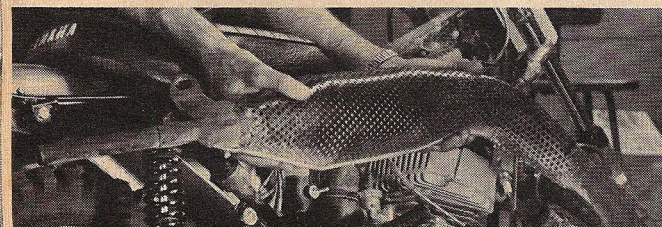
The idle and main discharge systems have adjustment needles to regulate the amount of fuel passing through as well as a check valve in the main discharge system to prevent air from entering during idle. The same signal pressure that regulates the inlet valve is used to operate the diaphragm type of fuel pump in the carburetor base. When the engine demands and



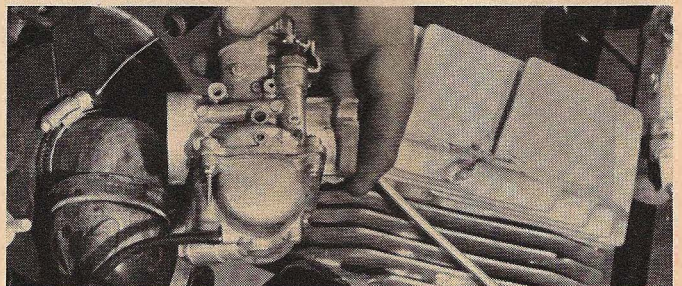
1. Although we're showing the installation on our project bike, the Yamaha 125 Motocrosser, the procedure is similar on all single cylinder, two-stroke motors.



2. Remove the gas tank by unbolting it at the rear and pulling up and aft on it.

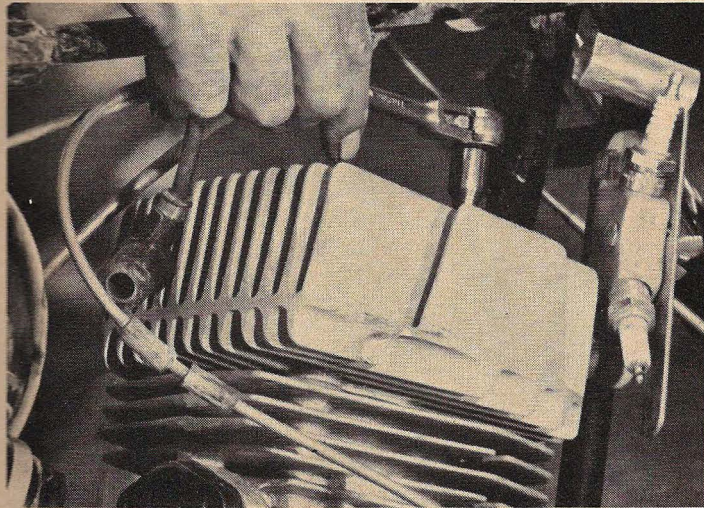


3. Remove the exhaust pipe and muffler assembly.

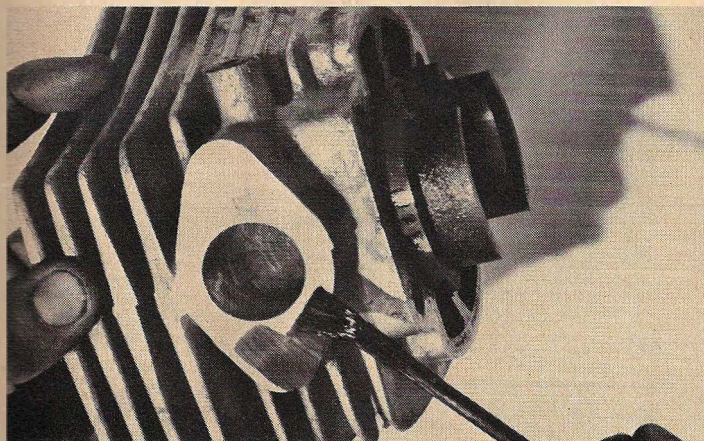


4. Unbolt the carburetor, remove the throttle cable and fuel line.

# YAMAHA



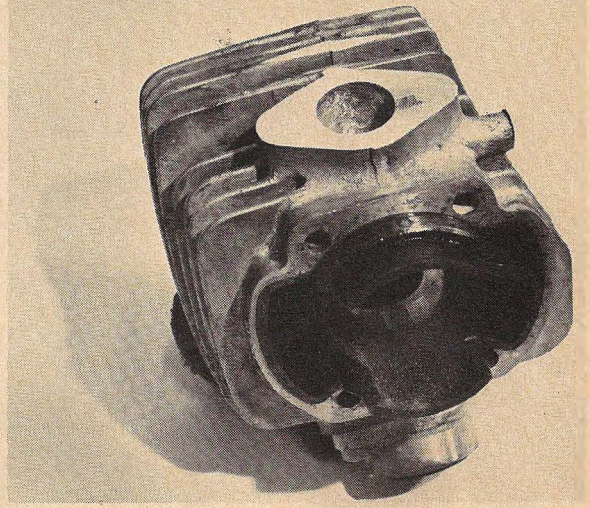
5. Carefully remove the head and barrel. Now would be a perfect time to clean out excess carbon.



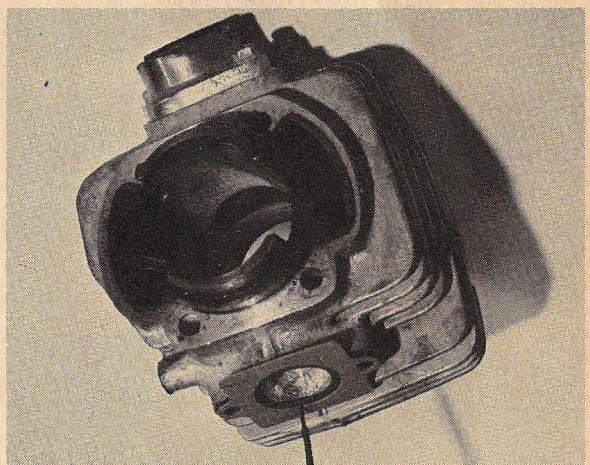
7. Cover the flange with machinists' marking dye, liquid shoe polish, or a Magic Marker.



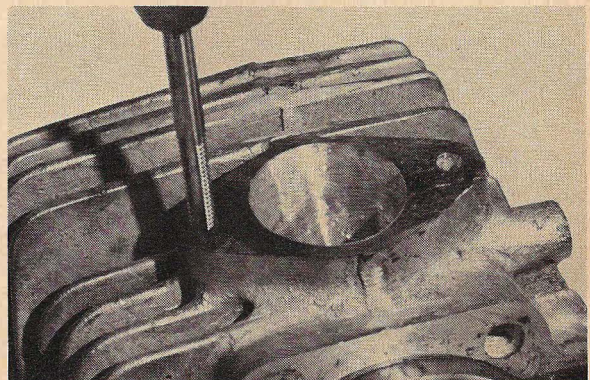
9. Grind the intake port to match the scribe lines with a rotary grinder or small drill and stones.



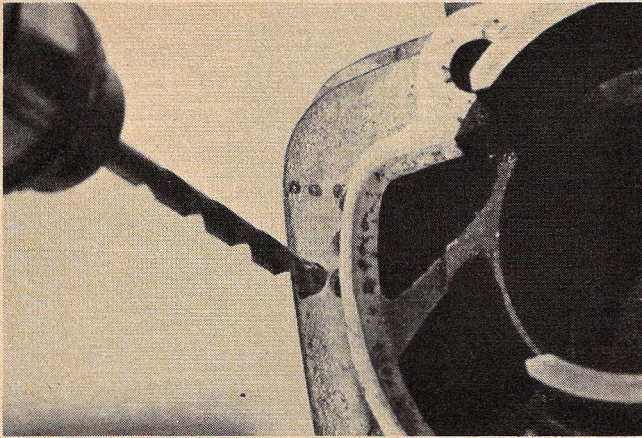
6. The hardest part of the job will be in locating someone who can fill the existing carburetor stud holes with a heli-arc weld. On cast iron this won't present a problem, but aluminum requires the professional touch. Surface grind the carburetor mounting flange until it is perfectly smooth. Check the surface with a straight edge.



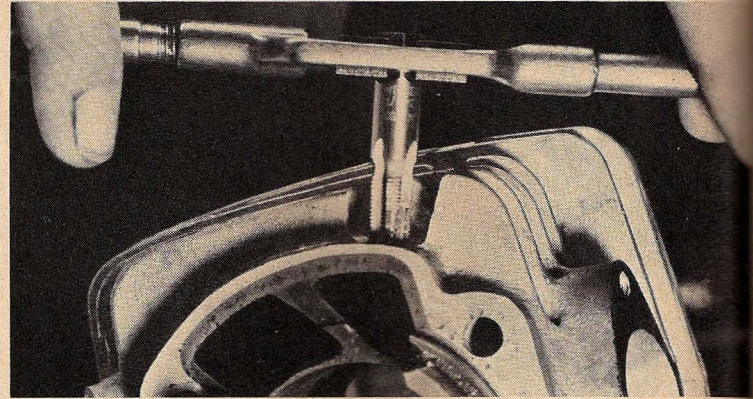
8. The gasket as supplied with the kit can be used as a template to scribe the new stud location and the larger piston port opening.



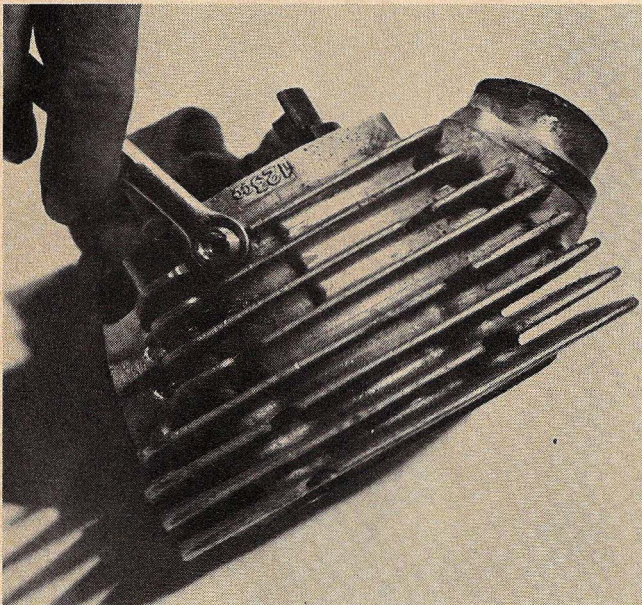
10. Drill a number 7 hole at each scribe line for the new 1/4-20 stud locations.



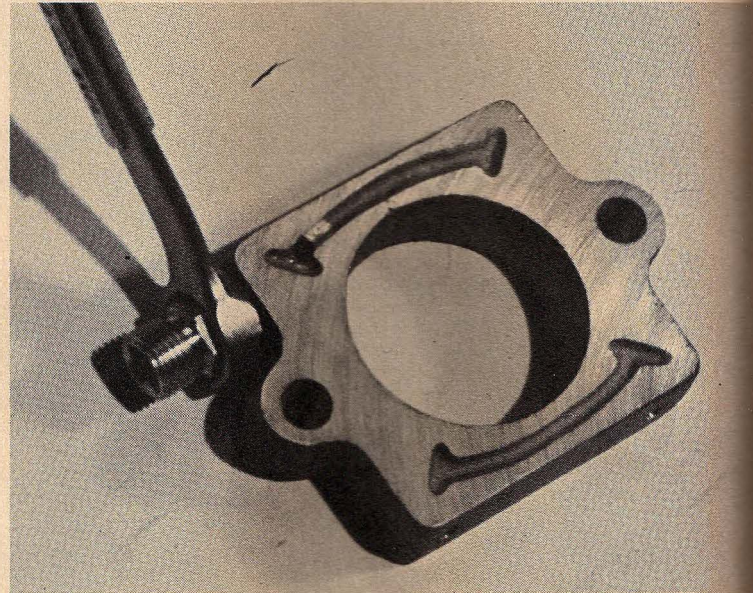
11. Drill a series of small holes in the pattern as shown. Knock out the tab formed by the drilling and file all edges smooth.



12. Drill a 11/32 inch hole and thread it with a 1/8 inch pipe tap.



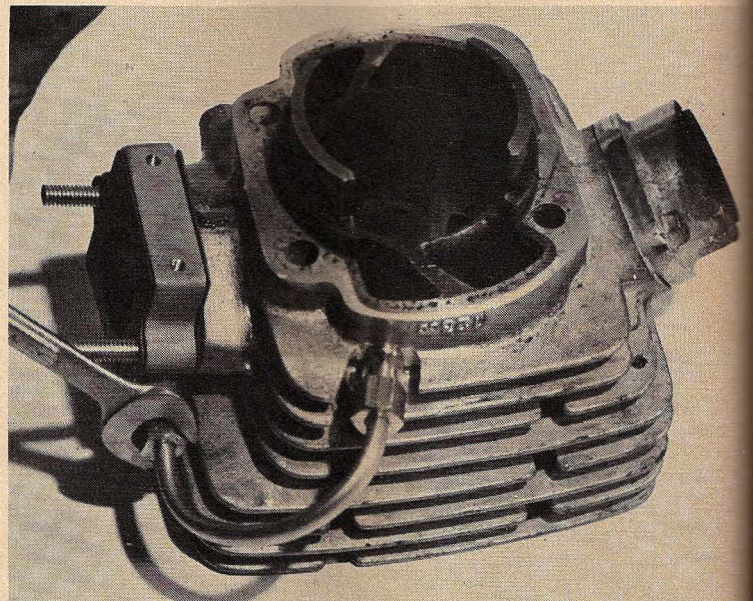
13. Install the pipe fitting in the barrel.



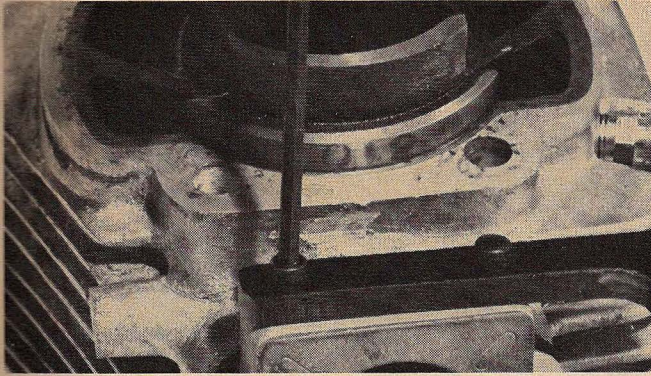
14. Install the fitting on Kendick's Uni-Plate.



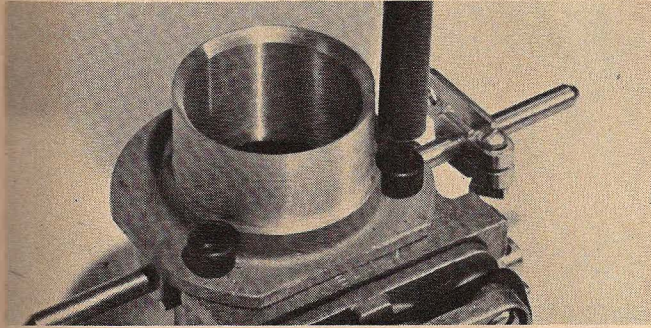
15. Trim the mounting studs to size, making sure that the carb won't bottom out when they're tightened down.



16. Carefully bend the copper pulse tube to shape. Slip the nut and ferrule over each end and connect them to the fittings.



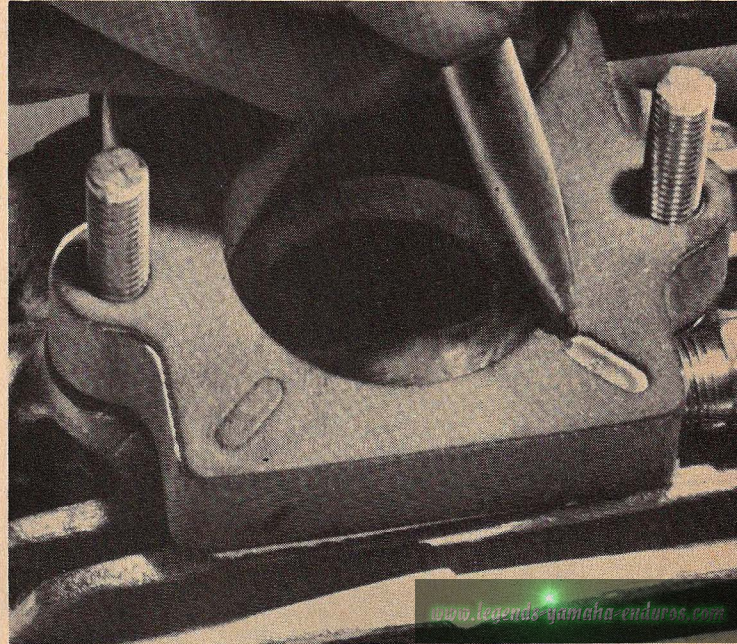
17. Install the throttle bracket using Loctite on the screws to keep them from working loose.



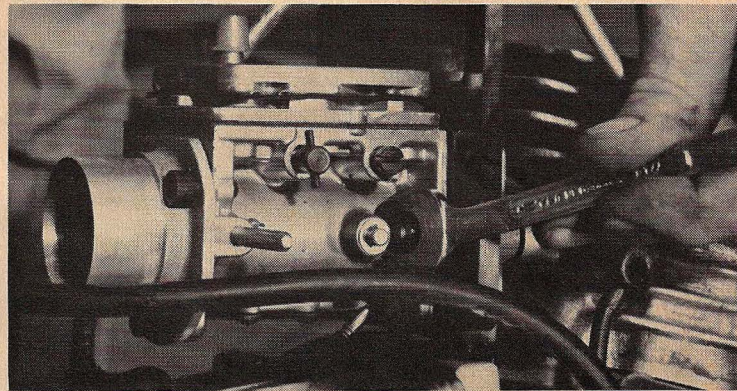
19. Each kit includes an air horn to simplify the hook up of an air cleaner.

signal pressure are low, the pump puts out less fuel. When the rpm is up the pumping action creates a suction in the fuel system causing positive fuel pressure and no possibility of starvation. This positive pressure eliminates the foaming action found in bowl type carburetors on rough terrain or at high revs. The pumper carb has many other advantages over the standard carburetor including insensitivity to altitudes. At high altitude, less air is sucked into the engine which creates a weaker signal pressure and a lesser amount of fuel injected into the main discharge system than at sea level. Another excellent feature is that the rider can adjust the mixture controls by hand while riding. The simplicity of this unit makes it adaptable to all motorcycles by using carbs with one of two different bore diameters. A bore diameter of 1-3/8 of an inch (35mm) is adequate for anything up to a 250cc single while the larger 1-1/2 inch (38mm) unit will work best on all larger machines. Complete kits are available from Kendick Engineering, 9520 DeSoto Ave., Chatsworth, Calif. 91311. Kendick recommends the following settings:

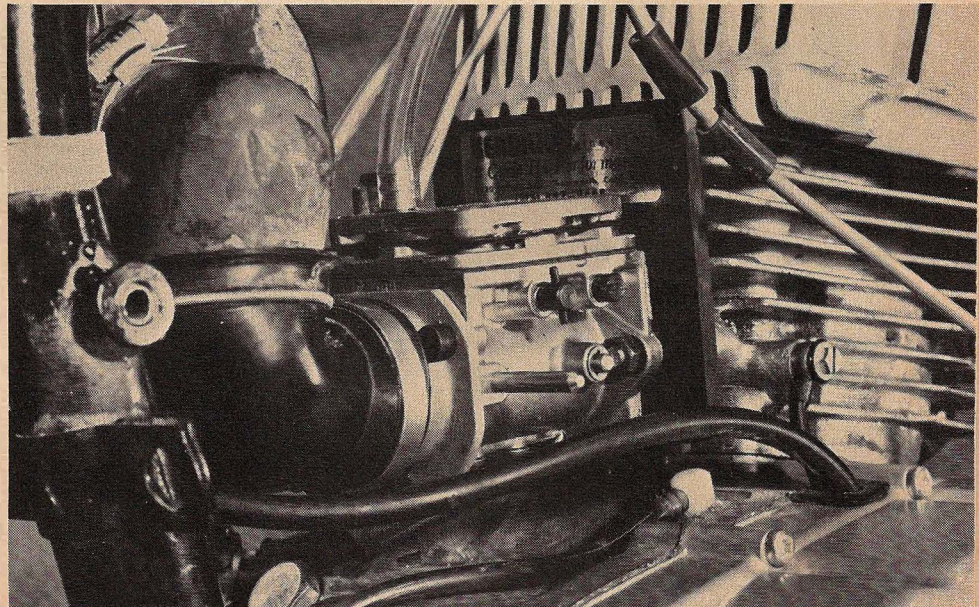
- 100cc - H jet - 3/8 turn open  
L jet - 3/8 turn open
- 250cc - H jet - 1/2 turn open  
L jet - 1/2 turn open
- 360cc - H jet - 3/4 to 7/8 turn open  
L jet - 5/8 turn open



18. Install the gasket and check to see if the pulse hole is open.



20. The carb assembly should be as follows; gasket, Uni-Plate, gasket, heat shield, gasket and carb.



21. Everything can be replaced just as it came off. It may be necessary to replace the air filter and/or the connecting hoses since the new carb takes up a little more room.