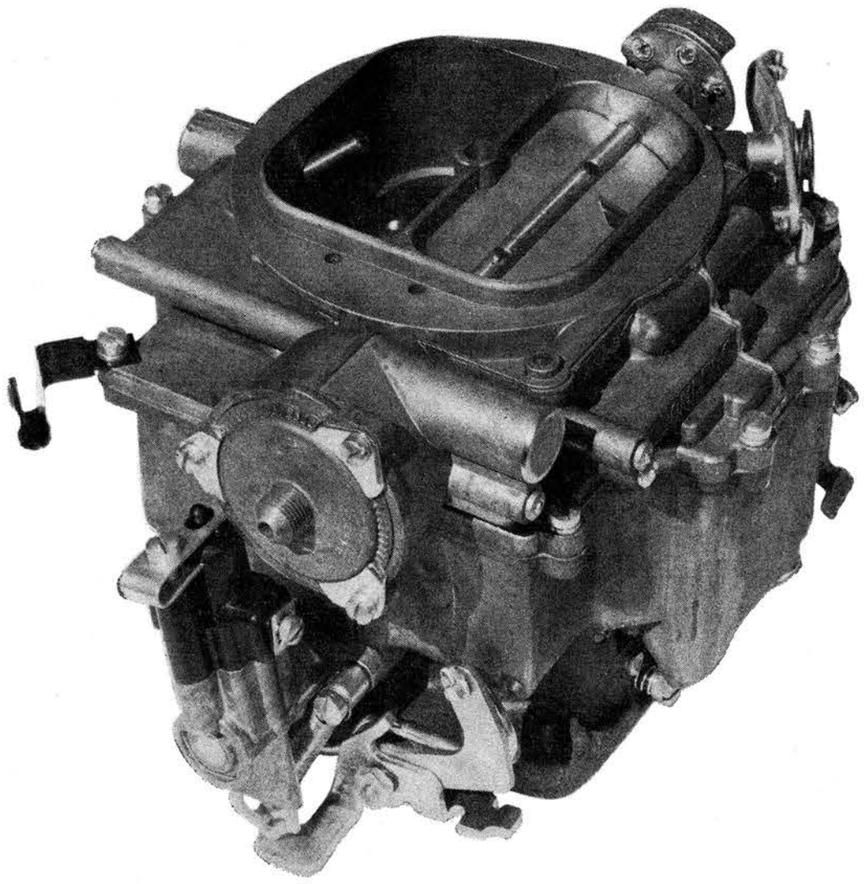

By Barney Navarro
Photos by Poole

4 THROAT CARBURETION

SOME misguided individuals have come to grief when they reasoned that if two carburetors will increase the horsepower of the family car, three or four should do wonders!

What did they find? At 20 miles per hour in high gear, the car actually slowed down when they floored the throttle of their passenger car equipped with four dual-throat carburetors.

These drivers thus learned the hard way one simple truth: Additional carburetion never helps minimum speed high gear performance, in fact, in many cases it is detrimental.

Why use a quad-jet carburetor then if the original stock carburetion of one dual-throat component completely fulfills the demands of an engine at slow high gear speeds?

First—most alterations of cars to increase horsepower result in reduced low speed performance, unless accompanied by increased compression and larger piston displacement.

Second—it must be realized that four dual-throat carburetors are in reality eight carburetors, whereas the quad-jet unit is in reality *two dual throat* carburetors. The latter was devised solely to eliminate the low speed disadvantages of multiple carburetion.

Incidentally, the expression quad-jet carburetor should never have been adopted since it is misleading and has no relation to the carburetor's main function. A more expressive term would be *progressive carburetion*, or, better yet, *progressive double twin carburetion*. After all, the key to its success is the mechanically progressive action of the throttle. In other words, one pair of throats opens first and if the throttle is depressed further, the other pair opens.

Wide spread too is the misconception that all four throats open simultaneously. If this were true, there would be no point in having four throats since the same results would be obtained by using two larger throats with the same total area.

Much misinformation has been distributed also regarding the opening of the second pair of throttle valves on four-throat carburetors. The favorite fairy tale has to do with the speed of the car and dates back to the 1941 Buick.

In most cases, the speed of the car has nothing to do with the opening of the second pair of throttles. The only thing that controls the opening is the distance from the floor the throttle pedal is depressed. The Lincoln, Cadillac, and Oldsmobile all have a simple mechanical linkage that opens the second pair of throttle valves after the throttle pedal is depressed a certain distance. With such an arrangement it is still possible to open the throttle valves too much at extremely low speeds and experience to a lesser degree the same reaction as the fellow with four dual-throat carburetors.

An exception to this rule is the Buick V-8 carburetor, which depends on manifold vacuum to supplement control of the second pair of venturii. The Buick V-8 carburetor contains a double set of butterflies in the secondary portion of the throttle body. The extra set is placed directly over the conventional mechanically operated ones and these butterflies are designed in such a manner that they are opened by manifold vacuum. This is accomplished by designing the pivot shafts off-center so that a larger portion of the butterflies are on one side of the shaft. This produces a unit that air flow will open because it doesn't have equal pressure exerted on each side of the shaft center as is the case with conventional butterfly type throttle valves.

In conjunction with the unbalanced butterflies, a small weight is employed to keep them closed. The weight, located on the outside of the carburetor base, is positioned opposite the heavy side of the butterflies. Instead of being merely heavy enough to balance the butterflies, its weight is sufficient to keep them closed when manifold vacuum is low. This means that when the throttle pedal is floored at low speeds and all four mechanically operated butterflies are opened, the effect of two of them is nullified by the auxiliary vacuum operated ones. As speed picks up and the engine's fuel mixture flow increases, manifold vacuum also is built up and the auxiliary butterflies open. This arrangement makes it impossible for non-mechanically inclined drivers to overcarburete their engines.

Progressive carburetion is by no means a new innovation. The 1941 Buick employed two dual-throated carburetors with a delayed action throttle plus the vacuum control. Buick's first attempt was unsuccessful because of the dimensions of the long inline eight cylinder engine. There was just too great a distance between the extreme ends of the engine to obtain equal distribution. Buick engineers placed the carburetors adjacent to the center of each group of four cylinders as is the practice with normal dual carburetion, but, at low speeds and low throttle settings, one carburetor fed the whole engine. Such an arrangement caused one end, or one group of four cylinders, to be ideally situated, but the other end required about a foot and one half of manifold to feed it.

The more universal usage of V type engines has now made it possible to employ the old principle without this disadvantage.

True to tradition, Ford and Mercury engines are still the favorite hop-up candidates. (Read—Why Ford's The Favorite—June '52 HOP UP Magazine.) By that, we mean that more people are in-

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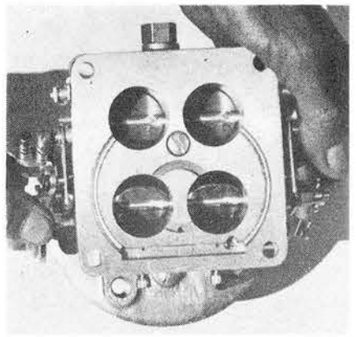
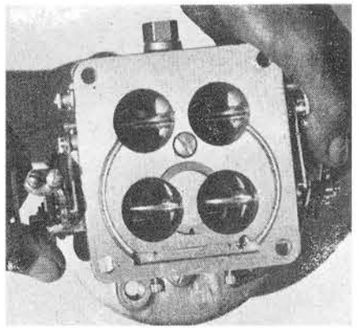
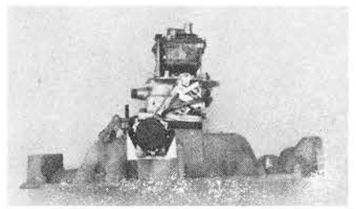


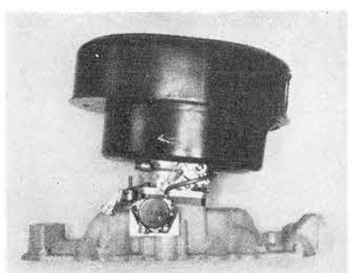
Bottom view of 4 throat carburetor showing position of primary throttle valves when secondary pair starts to open up



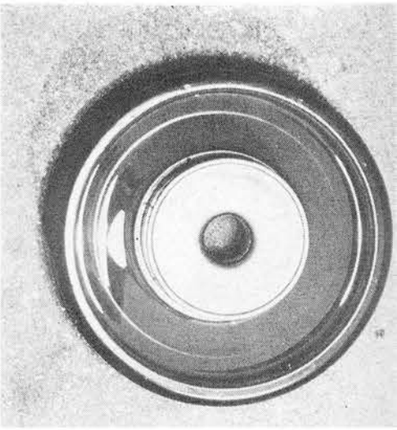
Same carburetor as above but with both primary and secondary throttle valves now wide open at full throttle position



1953 Lincoln carburetor and choke assembly mounted on a Navarro manifold. Air cleaner flange is below float bowl

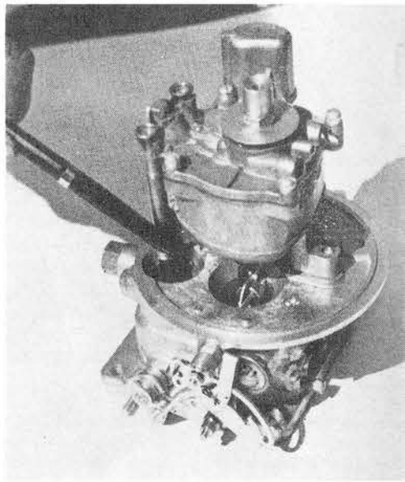


Same as above but with 1953 Mercury air cleaner. Note how cleaner fits around carburetor producing low overall height

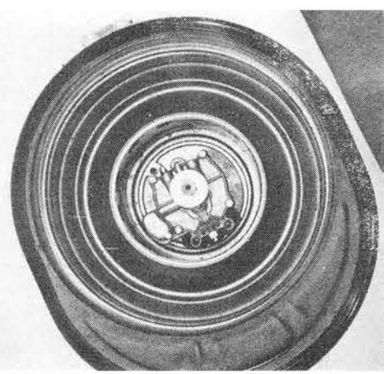


Top view of 1952 Mercury air cleaner with lid off. Small air passage in center must be doubled if this cleaner is used

Pencil indicates Lincoln venturii. It is quite apparent that exposed location makes the use of air cleaner necessary



1953 Mercury air cleaner with lid removed. Note Lincoln carburetor float chamber seen through large air passage

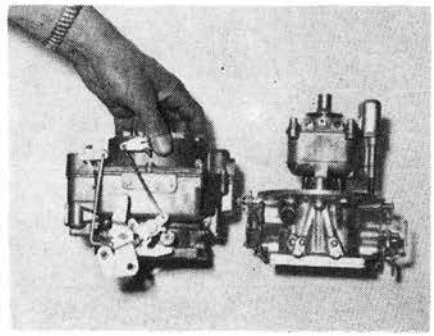


FOUR THROAT CARBURETORS

(*Continued from page 27*)

terested in hopping up Fords and Mercurys than any other cars. Hopping up engines often means applying tomorrow's improvements today, which, to Ford and Mercury owners so inclined, means installation of special intake manifolds designed for use with the four-throat carburetors. They are also available for Studebaker V-8's.

Special manifolds for the four-throat carburetor's application to Cadillac, Oldsmobiles and Buicks are not available because these cars come so equipped from the factory. And some models that are not factory equipped can be fitted with the factory items obtainable at their agencies. This makes it impractical for speed equipment manufacturers to make anything similar. However, manifolds are now available for Cadillacs, Oldsmobiles and Buicks that employ two four-throat carburetors for added performance.



Cadillac and Lincoln 4 throat carburetors. Compare Lincoln's low air cleaner flange at right with Cadillac's height

Since four-throat installations on cars other than Fords and Mercurys are a rather standardized routine operation, we will not go into any lengthy discussion of that problem. But, as Fords and Mercurys are not normally equipped for four-throat carburetion, we will explain the inherent problems of such conversions.

The most misunderstood principle of the 1949 through 1953 Fords and Mercurys is that of the distributor. All American automobile engines, except Ford products, employ a spark advance mechanism that requires a flyweight governor in conjunction with a vacuum load adjustment. Ford, Mercury and Lincoln distributors depend on venturi vacuum in conjunction with manifold vacuum to advance and retard the spark.

Venturi vacuum is not to be confused with manifold vacuum, since they are completely different. Venturi vacuum is produced by the flow of air through the carburetor venturi and is the same vacuum that causes fuel to flow from the discharge nozzles. Manifold vacuum is produced by the engine. The farther the

throttle is depressed, the lower the manifold vacuum. Not so with venturi vacuum; the farther the throttle is depressed and the faster the engine operates, the higher the vacuum. These two vacuum sources are utilized to operate the distributor advance mechanism so the flyweight governor is eliminated.

Cadillac, Oldsmobile and Buick carburetors do not have a venturi vacuum takeoff as do the carburetors of Ford products. Lincoln carburetors have the venturi vacuum takeoffs but require the complex mechanism of the Lincoln distributor before they can be useful. It can now be readily seen that a special distributor is necessary whenever a four-throat carburetor is installed on a Ford or Mercury engine.

Spalding and Mallory distributors are the only ones available that employ the flyweight governor and manifold vacuum to control spark advance. Of the two, the Spalding unit is the smoothest operating because it employs a diaphragm for load adjustment. The other distributor uses a piston brake which is either full on or full off, so the engine's requirements are not met under all conditions. Of prime importance is the fact that ALL four-throat carburetor installations cannot use the stock distributor.

The second consideration when installing a four-throat carburetor on a Ford or Mercury is the type of air cleaner to be employed. Currently, two types are available: the Hellings and, in the case of the Lincoln carburetor, the stock 1953 Mercury cleaner. When the Lincoln carburetor is used it is very important that an air cleaner be employed. Otherwise the rush of air from the engine fan would be detrimental to the proper functioning of the carburetor. This is because of the location of the venturi, as seen in the accompanying illustration. Note also the Mercury air cleaner illustrations of the 1952 and 1953 types. One has too small a top opening for a four-throat carburetor. The 1952 model can be adapted by enlarging the air passage.

Many who install the Lincoln carburetors and Mercury air cleaners experience some interference from the rear bearing of the generator. The same condition occasionally occurs with the Hellings cleaner. In both cases, a dent produced with a hammer will solve the problem.

For those that want the advantages of dual carburetion without its inherent disadvantages, the four-throat carburetor is the answer. However, it must be noted that cost is a very definite factor to consider. Standard dual throat Ford carburetors sell for $13.60 each, whereas the Lincoln four-throat units cost $65.00 and the Cadillac equivalent is $74.00. The necessity of changing the distributor adds another $30 to $60 to the bill. After spending $20 to $22 for an air cleaner you can consider the job complete. Expensive, yes, but it's the closest thing to perfection in carburetion that is possible.

7 TOOTH CUSTOM

(*Continued from page 49*)

geles. The headliner is finished in red and white Fabrilite, pleated through the top and side sections.

Except for the chrome rub rails, the body sides have been stripped clean of any possible protuberance that might destroy the slab-sided effect that identifies this model. The door handles were replaced by toe-operated electric push buttons and Barris also removed the flares on the rear fender and the taillights.

The rear fender seams were filled and the fenders extended a bit. The deck lid was carefully reworked to conceal the hinges, all corners were rounded and the handle removed. Operating the deck lid is another electric push button located inside the car.

Skirts are from a '51 Mercury, cut and fitted to match the Ford fenders. Bullet-type spot lights and Olds hub caps were mounted and the car was lowered front and rear to complete the body work.

A hand-rubbed Fire Engine Maroon metallic finish sets off this Barris creation, giving it added individuality.