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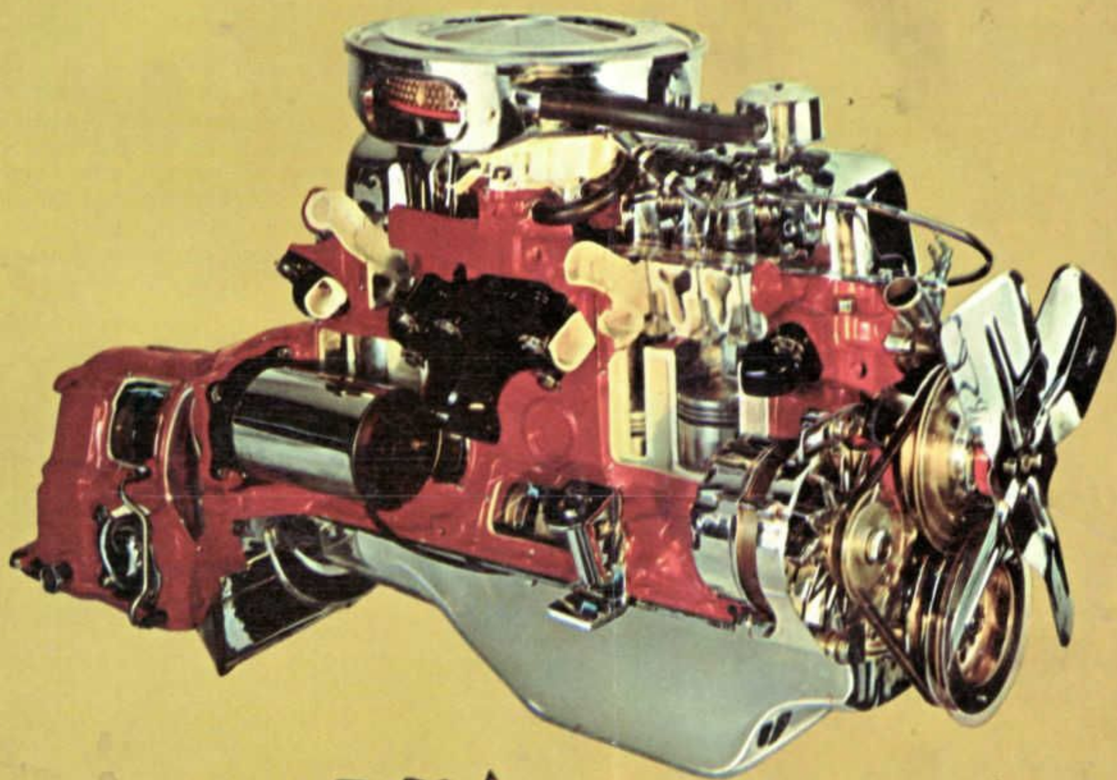

Performance Corner Features . . .

HORSING AROUND WITH THE MUSTANG SIX BY AK MILLER

Technical parts and service information published by the Autolite-Ford Parts Division and distributed by Ford and Lincoln-Mercury dealers to assist servicemen in Service Stations, Independent Garages and Fleets.

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PERFORMANCE CORNER

AK MILLER is a legendary figure in the world of modified performance vehicles. Ak was co-founder of the world's oldest hot rod club, and during his term as President of the Southern California Timing Association, the first Bonneville Speed Trials were run; the modern method of classification of cars with respect to cubic inch engine sizes versus body styles was established; and the first sanctioned drag strip competition was started. He was also one of the founders of the National Hot Rod Association. Ak has raced in events around the world, including specialized competition like the Pikes Peak Hill Climb where he holds a record of six wins in eight years in the sports car division.

Ford is unique in offering the services of Ak Miller as a Performance Advisor; to aid in the selection and application of high performance equipment that will be compatible with your vehicle and personal driving habits. Ak regularly tells "inside" info about the latest in high performance in his "Flak by Ak" column in publications like "Hot Rod" Magazine. You can get personal answers to questions by writing:

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IN THIS ISSUE

Be sure and file this and future bulletins for ready reference. If you have any suggestions for additional information that you would like to see included in this publication, please write to: Autolite-Ford Parts Division of Ford Motor Company, Merchandising Services Dept., P.O. Box 3000, Livonia, Michigan 48151.

Autolite Ford

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Condensed from "Hot Rod"

HORSING AROUND WITH THE MUSTANG SIX

By Ak Miller

In answer to requests for performance information about 6-cylinder engines, Performance Corner presents "Horsing Around With The Mustang Six,"' by Ak Miller, which appeared as a two-part article in the June-July 1967 issues of Hot Rod. Part I, which covered some very simple modifications and readily available parts from Ford and Lincoln-Mercury dealers, is presented in detail. Part II suggested some more ambitious modifications. Although any skilled mechanic could make them, they are only summarized here. Detailed information can be obtained from the July, 1967 issue of Hot Rod Magazine.

From out of the past comes the Bonneville runner himself, Ak Miller, patiently waiting for his crack at the salt in the number 13 streamlined Ford roadster.

PART I—WITH ECONOMY IN MIND, THIS FIRST "SHOT IN THE ARM" PRODUCED AN EXTRA 35 H.P.

Ford performance items for the current lineup of Ford V8 engines are easy to come by, but when we consider such equipment for the six-cylinder series, the cupboard is completely bare.

The reasons for this are quite simple. Six-cylinder engines are usually found in the lower-priced models, and their basic image is one of economy. Thus, the combination of low price and economy offers a great vehicle for the person interested in a fine, economical mode of transportation and one with an ample amount of horsepower.

However, there are scores of six-cylinder lovers who come up with the question, "How do I get just a little more power and what will it cost me?"

To these people we would like to offer our experiences with a 1967 200 cubic inch Mustang equipped with a standard three-speed transmission (2.99 in first and 1.75 in second) and a differential gearing of 3.20.

I personally felt this car would give us a good starting base since it offered an attractive body style, a very rugged three-speed all synchro gearbox, *and had been blessed with the most robust seven-main crankshaft six-cylinder engine ever conceived.*

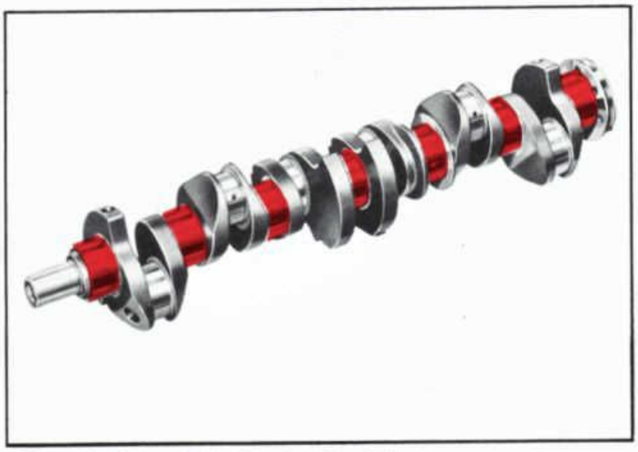

Figure 1—Seven Main Bearing Crankshaft

Measuring Horsepower

In the beginning I drove the car 2000 miles to stabilize the engine which, by the way, came with the full California Thermactor smog equipment. After bringing the engine right up to factory specifications, I took a run on my electric chassis dynamometer and recorded 65 horsepower at the rear wheels. Weighed against the 120 advertised horsepower, this sounds as if some guy at the factory forgot to give us a full load. But such was not the case, and I would like to digress here for a moment to explain a few pertinent facts about horsepower meansurement.

There are three basic means of ascertaining horsepower gains. One, of course, would be to remove the engine and run a full series of tests on a regular engine dynamometer stand. However, sometimes these figures cannot be correlated to the installed horsepower by the individual who reads the data, due to the fact that the installed horsepower is naturally somewhat less (because of exhaust inefficiencies, underhood breathing, and drag due to accessories).

Another method is the practical one of trial and error by taking the car to the drag strip, or by top speed runs, then evaluating the horsepower gains by comparing the performance gains.

The last choice is, of course, the chassis dynamometer. We felt this method was the best way to test the actual installed horsepower of the engine by measuring the output at the rear wheels. The unit we used was an electric dynamometer utilizing 18-inch rollers. Horsepower readings were obtained by a torque arm working through a potentiometer, the current being supplied by two synchronous generators driven by the rollers.

It is very difficult to come up with a 100 percent formula for converting chassis horsepower figures into actual crankshaft horsepower, so we will not concern ourselves with this matter here. We'll merely give the actual meter readings from the horsepower scale as well as the various rpm at which the readings were obtained. Thus, we will have a comparison of "before and after" readings as well as a general curve where one can readily see in what rpm range the changes were most effective.

Enriching Carburetor Air/Fuel Ratio

Our first run on the dyno gave us a rear wheel rating of 65 horsepower at 4000 rpm. The air-fuel ratio meter read 14:1. From past experience, this had proven to be quite lean on our particular meter, so we immediately decided the first step would be to enrich the mixture slightly for a little better horsepower reading. The standard jet was found to be 62F, so we decided to enlarge the jet size to 63½. Our second run on the dyno brought the air-fuel ratio to 13.4:1 and netted us a reading of 71 horsepower at the rear wheels (which proved to us we were headed in the right direction).

The next step was to ascertain if we had gone far enough, so we decided to drill the main jet out to a size .067. This produced a further increase to 75 horsepower at the rear wheels with an air-fuel ratio of 12.5:1. So as not to confuse the issue, I should state that my selection would be the .065 jet size for all-around usage where one would seek horsepower and good economy simultaneously.

Ignition Timing

We then took a check on the spark lead and its effect on the horsepower we were getting at the rear wheels. An initial lead of 10° offered us the best all-around ignition setting, even though factory specifications called for 5°.

Effects of Thermactor

By removing the air cleaner, we were able to come up with an additional one horsepower rating, which in this day and age is not bad. We were also curious about the Thermactor device, so we disconnected this unit and took another horsepower test. Lo and behold, we neither gained nor lost a significant amount of power. This should be a revelation to all of the people who have cars equipped with anti-smog devices—they do not seriously affect the horsepower output of the car. On the other hand, I must confess that such units do not help the idle nor the lowspeed running. However, where they are required by law, I would certainly recommend you leave them as is, and be certain they are operating properly.

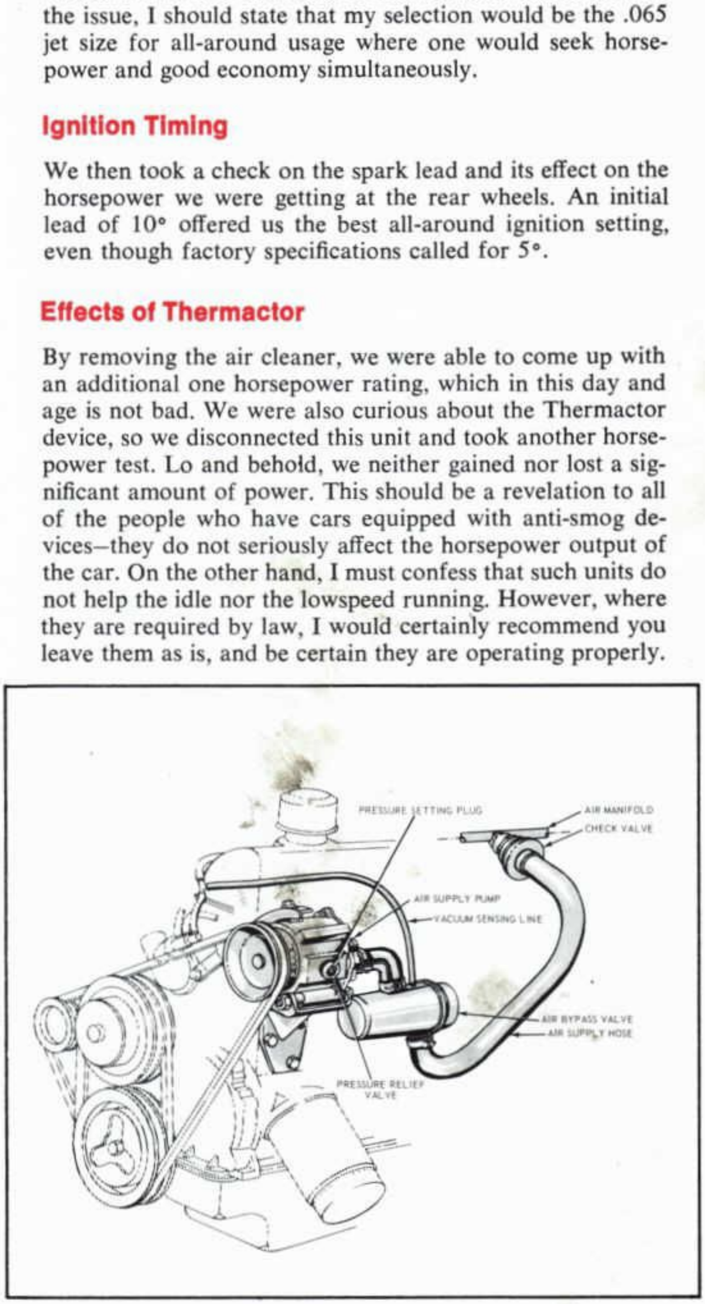

Figure 2—Thermactor Equipped 200 CID Six

Gain of 11 Horsepower

At this stage, our little six-banger was producing 76 horsepower at the rear wheels, and the only expenses incurred were drilling the main jet and removing the air cleaner. So our gain from 65 to 76 horsepower had been extremely economical. For the next changes, we had to dip into the till.

Installing Headers

Listening to the exhaust setup on this engine, we realized it was designed with some inherent back pressure. This is not all bad, as some engines operate very well with a slight amount of back pressure. However, since we were trying to uncork some horsepower, it was decided to attack this system "headers on." We took the car to Doug's Headers and asked if they had a setup for a 200 cubic inch engine. Since Doug's is one of the biggest in the business, we felt he would offer some sort of header for this engine. But, once again, the cupboard was bare—the six cylinder engine had not been included when it came to performance goodies. Doug, being a practical man, offered to make a setup for experimental purposes. He set about the job in a most workmanlike manner and came up with a setup that sounds exactly like an XKE Jacquar, or as we here in California sometimes call them, a "Tijuana Ferrari." All in all, a very pleasing sound, and certainly one that is not objectionable in any way to the "law" or the occupants of the car, was produced. In fact, I found my middle-aged foot acting like a young whipper-snapper's just to hear the beautiful tone.

So back we went to the dyno to see what gains we had made with the header system. Much to our surprise, we recorded 86 horsepower, or a net gain of 10 horsepower at the rear wheels and for a cost of around $125. The certainly proved to be a most worthwhile venture since we not only gained gobs of horsepower, we also got a good-sounding exhaust that scares every Camaro six for miles around.

Installing 240 Cu. In. Carburetor

The thought then occurred that we could use a larger carburetor to great advantage. Nestled as it is in a very low hood compartment, this becomes somewhat of a problem since the carburetor has to be extremely small to allow room enough for an ample-sized air cleaner. We found the solution at our local Ford dealer parts bin in the form of a carburetor from the 240 cubic inch six-cylinder Ford engine. This carburetor gave us a throttle bore diameter of 1.687 with a venturi of 1.290. The standard unit had a throttle bore of 1.437 and a venturi of 1.100. Since the carburetor was of the same height and air horn size as the standard unit, we figured it just had to work and certainly could do nothing but good in the horsepower department. When trying to install it, we found we had to open up the aluminum heater manifold that sits underneath the carburetor to match the newer and larger carburetor opening. This was accomplished by tapering it out to the size of the new throttle bore. We also noticed the air cleaner would hit the new choke location on the larger carburetor, so we had to work a dimple into the bottom plate just above the automatic choke housing to make this fit. When we tried to hook up the accelerator linkage, we noticed the arm on the carburetor would have to be bent a little toward the horizontal position to line up. This was accomplished by heating the throttle lever and bending it to a horizontal position. This all sounds like a lot of changing, but actually the whole job can be accomplished by any competent mechanic and in less than an hour.

To make the automatic choke heat-line hookup, we used a universal stove that clamps onto an exhaust tube. Then we used a piece of steel tubing covered with asbestos to make the bi-metal spring in the automatic choke operate as it was designed to do.

Once again, we went back to the dyno, hooked up the air-fuel ratio gauge and recorded a reading of 90 rear wheel horsepower at 4000 rpm (a gain of 4 horsepower).

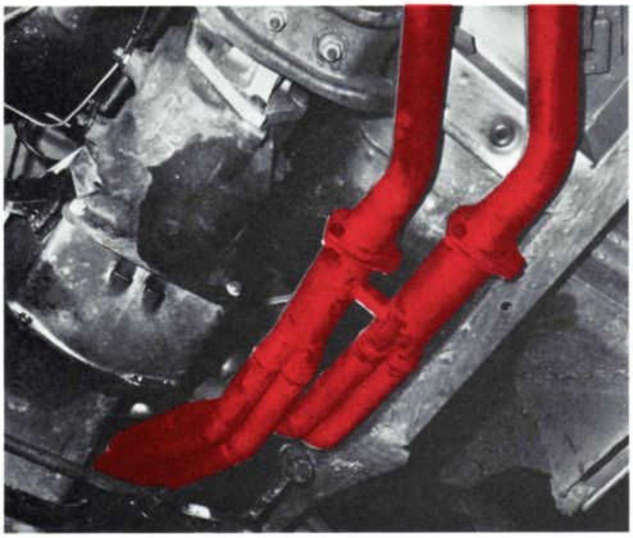

Figure 3—Tube Type Headers

Figure 4—Ford Carburetor From 240 CID Engine

The carburetor we used was Ford part number C7AZ-9510-AA and is available from any Ford dealer for $25.60. This is certainly a most reasonable expenditure for an additional 4 horsepower at this stage of tuning. The air-fuel ratio, by the way, with stock jetting in the new carb, was 13:1, so we were more than satisfied because a carburetor that can be installed and not have to be rejetted is a rarity when doing this type of work. We should note that this particular carburetor was jetted for use with thermactors. Jet sizes are usually .003 richer on such units.

All This And Economy Too

About this time, our local hot rod club was having an annual economy run and we decided to enter the little Mustang six —not knowing what it would do. Since we had changed the exhaust and carburetor, we were ready to accept almost any figure. Much to our delight, the Mustang registered 35.9 miles per gallon over 200 miles of Southern California coastline. Now before you call me a liar, let me explain that 50 pounds of air was used in the tires (for low rolling resistance), and coasting was allowed whenever possible. The overall average speed was 45 miles per hour and the gas tanks were sealed. The nearest competitor registered 27 mpg. The cars were all carefully inspected for obvious infractions such as added gas tanks, etc., and when the final results were in, the Mustang was able to keep its reputation as an economy winner while performing with 90 hp (at the rear wheels), compared to the 65 hp it started life with.

Increasing Compression Ratio

Our next step was to increase the compression. To do this in the most economical manner, head milling proved to be the only way out. Since we were still getting such fantastic mileage, we felt we could well afford premium gasoline, so we decided to mill the cylinder head .060. The standard head cc'd at 54. After milling .060, it was 44. Standard compression ratio was 9.2. After the head was milled, the compression ratio was 10.5 which gave us an accepted ratio for average high test fuels.

Since we milled the cylinder head .060, in order to retain the correct adjustment on our hydraulic lifters, we needed shorter pushrods which were not available, so we installed ½-inch flat washers measuring .062 inches thick under each rocker stand. This worked out very satisfactorily although the rocker angle was not absolutely correct. The setup cost practically nothing. While we had the head off, a good valve job was had by all.

The amazing thing about this engine was its ability to start before you ever got the switch turned on. It has been the quickest starting unit I have ever worked with, and the added compression seemed to enhance this quick starting ability.

At this time, we were eagerly anticipating what horsepower the compression change had brought. Since we had increased the compression ratio, it was only normal to assume we would need a slightly colder plug. So, a set of Autolite BF32's were installed in place of the standard Autolite BF82's. Before we got the car on the dyno, I could tell the tremendous increase in the torque of the engine. It would literally want to lie on its side during fast acceleration. This little six-banger with a light flywheel and clutch grabs rpm like a full-house 289.

In subsequent checkout, the car gave us a maximum horsepower of an even 100 at the rear wheels (still at 4000), and the acceleration and general feeling of the car were staggering, to say the least.

Comparison Performance Run

We were so impressed by its performance that we immediately decided to go out and run a series of acceleration checks so that we might compare our revitalized Mustang with the current crop of six-bangers offered by other manufacturers. The accompanying table compares our figures on the Mustang six with road test figures (found in leading automotive publications) for the Camaro and Barracuda.

mph	Mustang Six seconds	Camaro Six seconds	Barracuda Six seconds
0-30	3.4	4.8	4.3
0-40	5.3	6.2	6.6
0-50	7.6	8.7	9.8
0-60	10.2	11.4	13.6
0-70	15.2	15.6	19.6
0-80	19.9	21.7	27.9
0-90	27.6	31.0	39.0

Seven Main Bearing Durability

At this point, someone is probably asking the question, "How long will it stay together?" My answer is, "Forever!" This six, unlike earlier engines, employs seven mains and has enough bearing area to support the Golden Gate Bridge. The size of all the rotating and reciprocating parts add up to but one conclusion: It is the most rugged six-cylinder engine that has been offered on the market for many a moon, and it has durability with a capital "D."

Performance and Economy

The behavior of the car at this point was every bit as good as it was in its stock form. We had increased horsepower from 65 to 100 at the rear wheels, yet had lost none of the economy or smoothness of operation inherent in this particular car. In fact, the first comment by people driving it is, "It just has to be an eight—it's too smooth." With a 0-60 time that will give its big brother a hard row to hoe, one can only say that changing of the car's personality had been well worth the expense and effort. After all, getting the gas mileage this little bear gets, we can save money we spent on the performance goodies in short order.

PART II — CAM AND CARBURETION CHANGE (PLUS A FEW OTHER TRICKS) BRING THE SIX-CYLINDER INTO THE MID 80'S AND LOW 16'S

The relative straightforward and inexpensive modifications up to this point added 35 horsepower to the Mustang six banger. Ak got still another 25 horsepower with additional modifications, some of which were not so common.

Cam Change

At this juncture, Ak decided that because the engine responded so well to minor changes, he would dig a little farther and see what he could come up with in the way of more performance.

"Automatically, our first thoughts were of the camshaft," says Ak, "which in the case of the stock unit is designed strictly for maximum torque and economy. In this area, it just can't be beat. However, the horsepower range comes to a screaming halt at 4000 rpm. And since we were desirous of going on up to 5500 rpm, we installed a special grind. We didn't wish to destroy the inherent smoothness and tractability of the little six or lose the silent hydraulic valve train action. So the specs of our cam were 260° duration, 0.408" lift, 42° overlap, intake opens at 21° BTDC. By comparison, the stock cam has 256° duration, 0.368" lift and 28° overlap."

More Spring Pressure

After changing the cam, Ak had to add a little more spring pressure for the added rpm. He used the valve retainers from a 1962, 260 Ford (part number C2OZ-6514-A, 14¢ each). He also used the standard springs from a 289 Ford (part number B6A-6513-A, 45¢ each).

Spring pressure worked out at 90 pounds (valve closed) and 190 pounds open. Installing the cam and springs added 5 horsepower. This made it possible to rev the little six up to 5500 rpm with no hydraulic pump-up. At the same time Ak put the cam in, he also installed pushrods (part number C0DE-6565-B) and adjustable rockers (part number C0DZ-6564-A), from earlier Falcon engines. They are of the same ratio, but give a handy method of adjusting pushrod lengths when changing cams. Ak definitely recommends this change.

Dual Distributor Point Springs

During the test on the cam, Ak noticed that the ignition (in its stock form) was rather unwilling to cope with anything over 5000 rpm since point float was encountered. He cured this situation by adding more point pressure with the installation of dual springs tailored to 36 ounces of tension. This stabilized the points up to our desired goal of 5500 rpm.

Unusual Carburetor Modifications

At this time, Ak felt the little six was crying for more fuel. First off, with some slight modifications, he installed a pair of vacuum controlled, slide-type, side-draft carburetors. (See July, 1967 Hot Rod for details.) They netted a very fine batch of 10 additional horsepower. Ak described it as, "A setup you can stick your foot in anytime and any place. They don't cough, hesitate or spit back . . . they just GO!"

The added carburetion let the engine belt out a solid 115 rear wheel horsepower at 4800 rpm. Translated into a 0-60 time, this amounted to a 9.4-second clocking (or close to a second off the previous time). A trip down the quarter mile netted 81 mph in the low 16-second bracket. And the car was still capable of a consistent 18-20 mpg at normal cruising speeds.

With the carburetion and cam change, the engine still had a more than reasonable idle at a steady 600 rpm, leading Ak to believe this setup could be used nicely with the C-4 automatic transmission.

After running the engine for 1000 miles, or so, Ak tried another carburetor setup: this time four carburetors with 37mm-size venturis. (See July, 1967 Hot Rod for details.) Ak was very interested in finding out what the small carbs would do for horsepower in the lower range. A reading at 2800 rpm netted 75 horsepower at the rear wheels. At 3800 rpm the net was 105 horsepower, and the top of the ladder was reached at 4800 rpm and 125 horsepower. According to Ak, "This proved that our idea on the soundness of this type of carburetion was right. When you jump on the throttle with these little bears, it is just like having fuel injection. It feels like all the horsepower just unloads at once. In driving the car on the road, we found we could still stabilize idling very nicely at around 600 rpm. This smooth idling was something to behold. We did, however, encounter flat spots in the extreme low end of the rpm range. But, after all, when playing around with 5.8 square inches of carburetion on such a small engine, one must learn to expect that all can not be 'peaches and cream'."

Summing Up

Ak described the complete modifications as follows: "The general behavior of the car in normal stop, go, and cruising ranges was a most pleasant surprise. Later tests proved this car to be capable of 84 to 85 mph in the quarter mile. With 4:1 gearing and 27-inch rubber, 5500 rpm could be had at any time, and this is 110 mph. This performance proved more than equal to several versions of the 289 2-V and 4-V jobs that we found willing to try on for size.

"We also tried the 4:1 gearing in conjunction with the four-speed tranny, and our conclusions would be to forget this setup since it wreaks havoc with gas mileage and is certainly not conducive to good smooth road speeds at 70 mph. Instead, stay with the three-speed synchro with the 3.20 rear gear set. As for the remainder of the work, take your pick. It all proved very exciting and rewarding for us since we have always felt that true hot rodding is venturing into the unknown or unusual.

"I have personally gained a tremendous respect for the latest version of the seven-main, six-cylinder engine and sometimes wish one could purchase such a package, call it a GT Six, and add some minor heavy-duty equipment to the chassis. This combination would give a good accounting of itself when compared to many foreign sporty jobs that cost considerably more.

"So as we close our hood and roar off into the setting sun, we can only say come on and join the six-cylinder parade for more fun with less money than you could imagine!"

EDITOR'S NOTE: Some of these modifications may affect the car warranty. If you plan to modify, be sure to discuss it with your Ford or Lincoln-Mercury dealer. And of course, the warranty does not apply to any engine that is used in a "competitive" event, defined in the warranty as: "Competitive events shall be defined as formal or informal time trials, competition with any other vehicle, or any abnormal application of stress to the vehicle or the components thereof in a competitive situation."

NEW 4-PINION LOCKING DIFFERENTIAL

A new design 4-pinion torque sensitive locking differential is available as optional equipment on 1968 Mustang, Cougar, Fairlane and Montego models equipped with a 390, or 428 CID engine.

DESCRIPTION

The new torque sensitive locking differential (Fig. 1) employs a mutiple disc clutch to control differential action. Shim(s), which control side gear mounting distance, four steel, four friction and one composite plate (steel on one side and friction material on the other) stacked on a clutch hub, and four ear guides are housed in the differential cover. Located in the differential case between the side gears is a one-piece pre-load plate and block (four-pinion) and four calibrated pre-load springs, which apply an initial force to the clutch pack. Additional clutch capacity is derived from the side gear thrust loads. The four friction plates are splined to the clutch hub which in turn is splined to the left axle shaft, and the eared steel plates are dogged to the case; thus, the clutch is always engaged.

Model identification and application are shown in the chart in Fig. 2, Page 8.

OPERATION

The clutch capacity, due to the pre-load springs and side gear thrust loads, resists differential action. Under normal cornering, the clutch slips as the torque generated by differential action easily overcomes the clutch torque capacity allowing normal differential action to take place. Under adverse weather conditions where one or both wheels may be on a low traction surface such as snow, ice or mud, the friction between the clutch plates will transfer a portion of the usable torque to the wheel with the most traction.

Assembly and disassembly procedures for the new axle assembly (removable carrier) are the same as shown in the current shop manuals, except in the area of the differential case assembly which follows:

DISASSEMBLY

1. Remove ten bolts securing the ring gear to the differential case assembly. The ring gear must be removed in order to separate the case halves.
2. Remove the rear gear by tapping the gear with a soft hammer or press the gear from the case.
3. Place the differential case in a press to load the case at the bearing journals so that the pre-load of the springs is overcome (approx. 1,500 lbs.). (If a press is not available, two 7/16" bolts and nuts can be used in the ring gear mounting holes (one on each side) to compress the case halves together and overcome pre-load spring tension.) Then, while the case is still under pressure, loosen the two Allen or Phillips head screws which hold the case halves together until one or two threads of the screws remain engaged. Remove the case assembly from the press. Tap on the cover to spring it loose; then, remove both screws.
4. With the cover facing down, lift off the case. Remove the pre-load spring plate and four pre-load springs.
5. From the cover remove the side gear, four clutch plate ear guides, clutch hub, friction and steel clutch plates and shim(s).
6. With a suitable drift, drive out the pinion shaft lock pins from the case.
7. With a brass drift, drive out the long pinion shaft from the case. Drive from the end opposite the lock pin hole.
8. Remove the two short pinion shafts using a drift, driving each shaft from the center outward. Lift out the center block, then remove the pinion gears, thrust washers and side gear and thrust washer.
9. If the differential bearings are removed, the bearings can be installed in one of the following ways:
   a. With the differential case and cover completely assembled.
   b. On the case or cover when disassembled. However, when pressing the bearings on the cover, a block of wood or fiber must be used as shown in Fig. 5 in order to avoid damage to the cover.

ASSEMBLY

1. Lubricate all parts with Ford Hypoid Lubricant (Ford Part No. C6AZ-19580-C), or equivalent, during assembly of differential.
2. Mount the differential case in a soft jawed vise and place a side gear thrust washer and side gear in the counterbore of the case.
3. Install the pinion thrust washers and place the pinion gears on the side gear; aligning the holes in the washers and gears with the holes in the case.
4. Install the center block so that the shaft holes are aligned with the holes in the pinion gears and case. The center block has two machined sides and two rough sides.
5. With a brass drift, drive in the long pinion shaft from the outside of the case aligning the lock pin holes in the

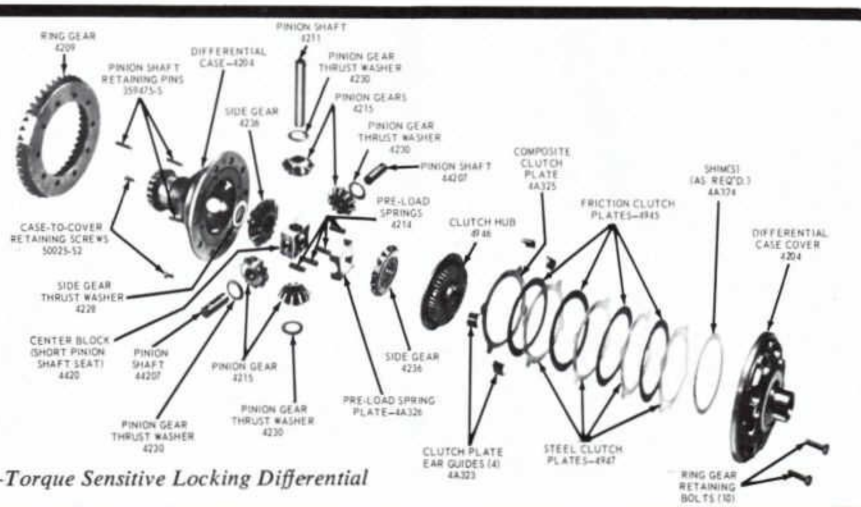

Figure 1—Torque Sensitive Locking Differential

shaft with the holes in the case. The center block should be positioned so the long shaft is driven through the rough side and short shafts driven through the machined side (Fig. 6).

6. With a suitable drift, install the shaft lock pins. Make sure the pinion and side gears move freely.
7. Place the four pre-load springs in the holes provided in the center block.
8. Position a pre-load plate over the four springs, making sure the springs are properly seated. The pre-load plate straddles the center block over its narrower or machined width.
9. Mount the differential cover in a soft jawed vise or holding fixture.
10. Insert shim(s) of 0.050 total thickness in the cover cavity.
11. Install the composite plate (friction material on one side and steel on the opposite) on the back side of the clutch hub with the friction material against the hub; next, install a friction plate, then steel, friction, steel, friction, steel, friction, and lastly a steel plate (Figures 1 and 7). When new clutch plates are used, soak the plates in Ford Hypoid Lubricant (Ford Part No. C6AZ-19580-C), or equivalent lubricant, for approximately 30 minutes before installation.
12. Place the clutch hub with the clutch plates into the clutch ear cavities in the differential cover. Make sure that the splines on the last friction plate are engaged on the hub.
13. Obtain locally a 5/8" x 2½" or 9/16" x 2½" bolt, nut and two 1½" outside diameter flat washers approx. 1/8" in thickness. These parts are required to compress the clutch pack in order to obtain the proper shim selection (Fig. 7). Install a flat washer on the bolt, and place the bolt through the clutch hub. Hold the bolt in position and turn the cover over. Place a flat washer on the bolt and then install the nut. Be sure the washers are centered, and torque the nut 10 to 15 ft.-lbs. (Fig. 8).
14. Place the shim template tool (Ford Tool No. T68P-4946-A) in the clutch hub. Some clearance should be observed between the shim tool and the cover-to-case mating surface. Using a feeler gauge, determine the exact amount of clearance. Refer to the shim pack thickness chart (Fig. 4) which will indicate the correct amount of shim(s) to subtract from the 0.050 shim originally installed. In order to correctly select the proper shim(s), the shim template tool and the chart must be used.
15. After the proper shim selection is determined, remove the bolt, nut and flat washers. If it is necessary to revise the shim thickness, remove the clutch hub and clutch plates.
16. Install the selected shim(s) in the cover cavity, reinstall the components as outlined in Steps 8 and 9.
17. Install the four steel clutch ear guides and side gear.
18. Place both assemblies in a press, and press the two halves together; then, insert the two Allen or Phillips head screws, and tighten evenly until tight. If a press is not available, any two stock bolts and nuts may be used opposite each other in the ring gear retaining holes to compress both halves.
19. Install the ring gear and ring gear bolts and washers. Tighten evenly and alternately across the diameter of the ring gear. Torque the bolts to 65-80 ft.-lbs.
20. Prior to installation of the torque sensitive locking differential into a vehicle, a bench torque check must be made. With currently released locker tools, check the torque required to rotate one side gear while the other is held stationary. The initial break-away torque may exceed 250 ft.-lbs. The rotating torque required to keep the side gear turning with new clutch plates is 100 to 250 ft.-lbs. With re-used clutch plates, the minimum torque required is 40 ft.-lbs. (The torque may fluctuate 10-40 ft.-lbs.)

Car Line	Engine	Transmission	Service Model Tag	Ratio	Ring Gear Size
Fairlane and Montego Pass.	390-2V & 4V 428-4V C.J.	3 & 4 Spd. Std. & C6 4 Spd. Std. & C6	WFC-A	3.50:1	9"
			WFC-B	3.91:1	9"
			WFC-C	4.30:1	9"
Mustang and Cougar	427-4V ①	C6 Automatic	WFD-A	3.50:1	9"
	390-2V & 4V 428-4V C.J	3 & 4 Spd. Std. & C6 4 Spd. Std. & C6	WFD-B	3.91:1	9"
			WFD-C	4.30:1	9"

① Cougar Only

Figure 2—Model Usage Chart

SPECIAL TOOL

Shim Template	Tool No. T68P-4946-A

TORQUE SPECIFICATIONS	FT. LBS.
Minimum torque required to turn axle shaft and side gear with one wheel on the ground.	40
Bench check with new plates Original plates	100 to 250 ① 40 Minimum
① This rotating torque may fluctuate up to 40 ft. lbs.	

HYPOID LUBRICANT REQUIREMENTS

Ford Specification	Quantity	Service Refill
ESW-M2C104-A (C6AZ-19580-C)	5 Pints	Bottom of filler plug hole.

Figure 3—Tool, Torque and Hypoid Lubricant Specifications

NEW 4-PINION LOCKING DIFFERENTIAL

SHIM PACK THICKNESS CHART

Feeler Gauge Reading	Remove Shim(s) From Nominal	Total Req'd Shim Pack Thickness ①	Feeler Gauge Reading	Remove Shim(s) From Nominal	Total Req'd Shim Pack Thickness ①
0.001 0.002	None	0.050	0.028 0.029 0.030 0.031 0.032	0.030	0.020
0.003 0.004 0.005 0.006 0.007	0.005	0.045	0.033 0.034 0.035 0.036 0.037	0.035	0.015
0.008 0.009 0.010 0.011 0.012	0.010	0.040	0.038 0.039 0.040 0.041 0.042	0.040	0.010
0.013 0.014 0.015 0.016 0.017	0.015	0.035	0.043 0.044 0.045 0.046 0.047	0.045	0.005
0.018 0.019 0.020 0.021 0.022	0.020	0.030	0.048 0.049 0.050	0.050	0.000
0.023 0.024 0.025 0.026 0.027	0.025	0.025			

① Service Shims are available in 0.010″ and 0.005″ Thicknesses.

Figure 4—Shim Pack Usage Chart

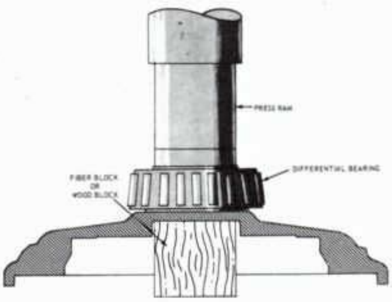

Figure 5—Installing Differential Bearing

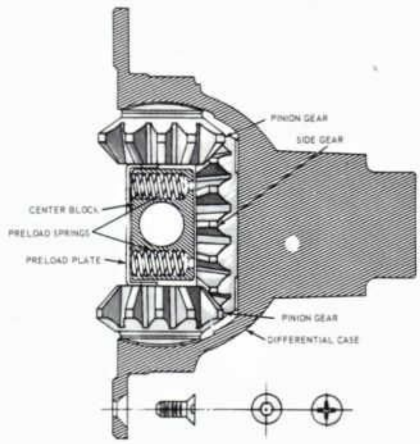

Figure 6—Center Block and Pre-Load Spring Installation

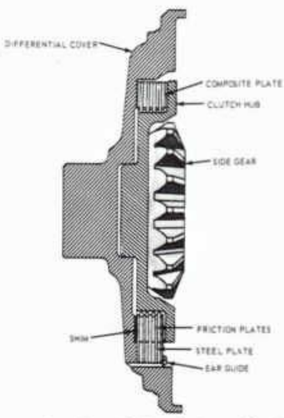

Figure 7—Clutch Pack Installation

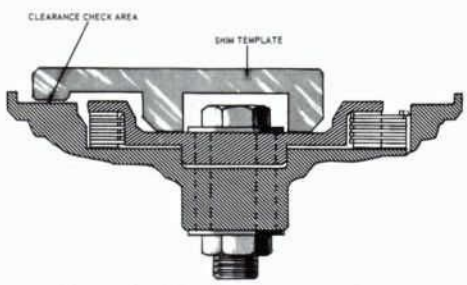

Figure 8—Shim Template Tool

ALL ABOUT FORD PCV SYSTEMS

WHY A PCV SYSTEM

Burning a highly compressed air/fuel mixture in an internal combustion engine produces a lot of desired horsepower . . . and some not so desirable by-products. Some of the by-products of combustion flow out of the exhaust pipe while most everything else ends up in the crankcase. These by-products contaminate the oil in the crankcase, to the point of causing serious problems, if not properly controlled.

Burning a gallon of gas, for instance, creates about a gallon of water. Most of it exits through the exhaust system as steam. But the remaining water vapor may combine with certain oil or fuel contaminants to form acids. Acids, of course, corrode metal parts.

Combustion gases slip by the piston rings into the crankcase. These "blow-by" gases contain excesses of gas vapor (especially during cold weather starts, when combustion is incomplete), soot and other contaminants which can lead to varnish and sludge forming materials. A high quality oil filter, such as the Autolite two stage, depth type filter, and high quality motor oils, such as those that meet Ford Specification M2C101-B, can to a great degree combat the harmful effects of these contaminants. However, they need help. The best and most efficient type of assistance is to provide the crankcase with a "fresh air breathing system."

Figure 1—Combustion Produces Horsepower and Undesirable By-Products

Road Draft Tube System

Up to the early 1960 models, the most common method of crankcase breathing was by means of the road draft tube. Fresh air entered at the oil filler cap and exited beneath the car from a tube attached to the crankcase. However, the car had to be *moving* in order for the system to work. In fact to work efficiently, the car had to be moving over 20 mph so enough vacuum would be created at the end of the tube to cause the air to flow through the crankcase. So while the road draft tube did a good job of removing blow-by fumes and condensation vapors, it had three disadvantages.

- At idle, and speeds under 20 mph, it didn't properly ventilate the crankcase.
- The gases vented to the atmosphere contained unburned hydrocarbons that contributed to air pollution.
- The unburned blow-by gases were wasted, since they could contribute more miles per gallon if recycled to the carburetor.

To correct these disadvantages, positive crankcase ventilation (PCV) systems were incorporated on Ford-built vehicles beginning in 1960, on cars registered in California only. By 1963, all Ford-built vehicles used in the United States had a PCV system.

Positive Crankcase Ventilation Systems

Instead of a road draft tube, PCV systems incorporate a tube that runs from the crankcase back to the carburetor, or air cleaner. All 1968 Ford Motor Company vehicles use a "closed" type system. These are *sealed* to the atmosphere. Prior PCV systems were both "closed" and "open." Functionally they are the same, in that both recycle blow-by gases and condensation vapors back into the carburetor air/fuel mixture, to be burned in the combustion chamber. "Open" and "closed" systems differ only in the way ventilation air enters the crankcase: from which each derives its name.

Ventilation air for the "open" system enters through the oil filler cap, just as with the earlier road draft tube. The cap contains a filter to clean the air. Air flows from the valve cover, down into the crankcase, and then is metered through a spring loaded ventilation (regulator) valve into a hose which routes the fumes into the carburetor; usually at the spacer plate.

Ventilation air for the "closed" system (Figure 2) enters through the carburetor air cleaner. Here it's cleaned by the air filter, or a special screen-type secondary filter. The air then is routed to the valve cover, flows down through the crankcase and back to the carburetor much like the "open" system. The "closed" system can always be identified by the oil filler cap, which is sealed to the atmosphere. As previously mentioned, the oil filler cap of the "open" system vents to the atmosphere.

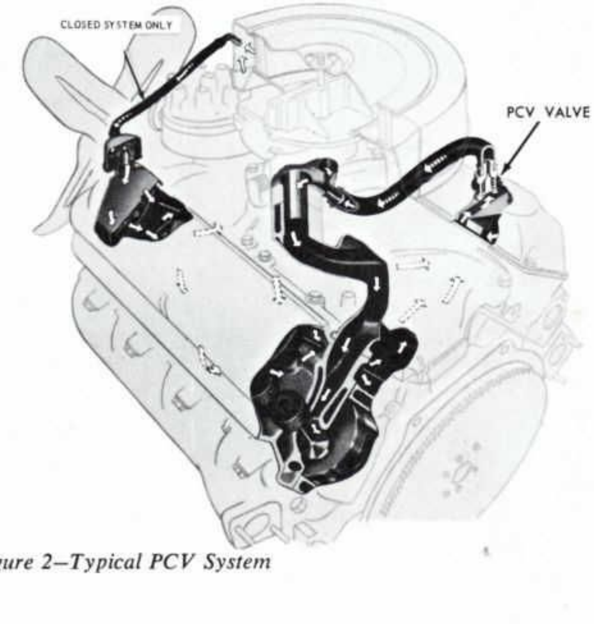

Figure 2—Typical PCV System

ALL ABOUT FORD **PCV** SYSTEMS

PCV VALVE

Both "open" and "closed" PCV systems use a ventilator (regulator) valve, except some early 1963 6-cylinder engines (Figure 3). On engines without valves, the air enters through the oil filler cap, which faces into the air flow of the engine fan. The air circulates through the crankcase and is forced through an oil separator located either at the front of the engine, or to the rear as shown in Figure 3. Manifold vacuum and crankcase pressure maintain a positive flow of fumes through the air cleaner and into the carburetor. A PCV valve is unnecessary because the fumes enter at the air cleaner and thus do not affect the air/fuel mixture ratio.

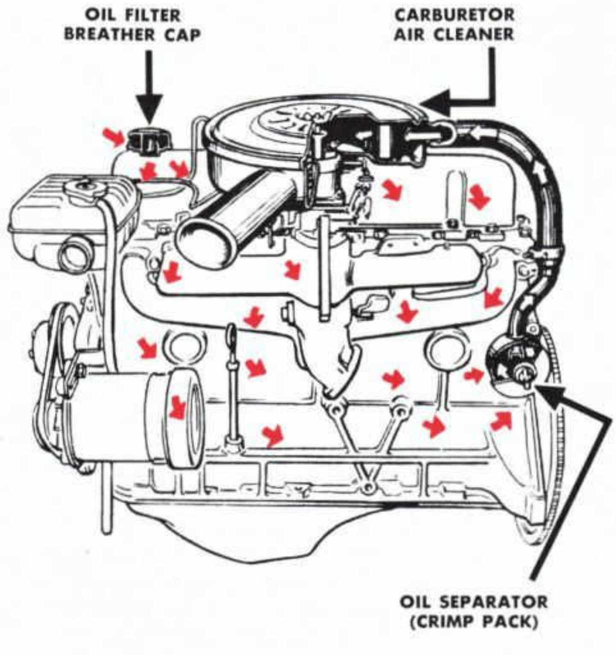

Figure 3—Typical PCV System Without A Valve

Crankcase fumes in most other engines, however, enter *below* the carburetor (usually at the carburetor spacer plate), and thus affect the air/fuel mixture ratio. A PCV valve meters the amount of fumes emitted to the air/fuel mixture.

How The PCV Valve Works

PCV systems do not rely on vehicle speed, as did the earlier road draft tube system. Instead, PCV systems make use of engine vacuum that exists anytime the engine is running. This assures a continuous, positive flow of ventilation air through the crankcase at all engine speeds. Airflow, however, must be regulated to meet changing operating conditions.

For instance, high vacuum conditions exist at engine idle, while ventilation requirements are low. Furthermore, at engine idle the air/fuel mixture ratio is on the rich side, and the volume of flow through the carburetor is low. Without a PCV valve, high vacuum would cause too many crankcase fumes to be drawn into the carburetor, thereby diluting the air/fuel mixture and adversely affecting engine performance. Uncontrolled high vacuum could also pull oil from the crankcase into the carburetor.

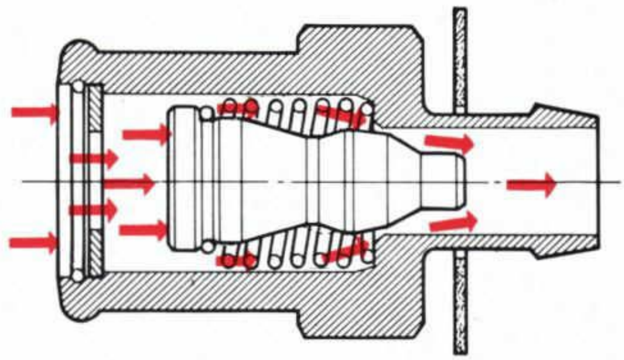

Figure 4—Idling or Low Speed PCV Valve Operation

At high vacuum, the jiggle-pin valve moves forward overcoming the spring tension and meters a small flow of crankcase fumes.

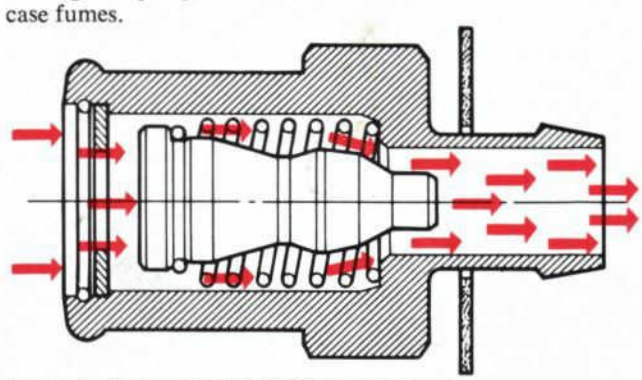

Figure 5—Higher Speed PCV Valve Operation

At higher speeds the vacuum is lower, so the spring moves the jiggle-pin away from the orifice to permit a greater flow of crankcase fumes. This is desirable because more crankcase fumes are present due to increased blow-by past the piston rings at wide throttle openings. Also, at higher speeds a greater volume of air/fuel mixture flows through the carburetor. It can tolerate a greater volume of crankcase fumes without adversely affecting engine performance.

SERVICE

Why It's So Important

Periodic servicing of the PCV system is essential. It is vitally important to "closed" systems, because of the importance of getting fresh air to the crankcase. A plugged system or inoperative valve means there is absolutely no way to get rid of the blow-by gases and condensation vapors except through the motor oil additives. They will quickly be used up, resulting in sludge, varnish, and corrosion. While "open" systems can get a little air through the oil filler cap, it is by no means enough if the PCV system is plugged. It may take a little longer, but the end result is the same—sludge, varnish and corrosion. All of these problems can be avoided, however, if the PCV system is operating properly. In fact, it will do a better job of keeping the engine oil free of sludge and engine contaminants than the earlier road draft tube system—because it works *all* the while the engine operates. The way to keep it operating is periodic service.

ALL ABOUT FORD PCV SYSTEMS

Periodic Service

The PCV valve system should be TESTED every 6,000 miles. *If necessary,* clean the system (valve, hoses, tubes, fittings, carburetor spacer plate, etc.) and replace the regulator valve. At 12,000 miles the system *must* be CLEANED and the regulator valve REPLACED. A low volatility, petroleum base solvent is recommended for cleaning. Also perform maintenance services for related components: Replace the carburetor air filter at specified intervals, clean the special screen-type filter located in the air cleaner of some "closed" PCV systems, clean the oil filler cap filter of "open" systems every 6,000 miles, and the crimp pack or maze screen oil separator (Figures 3, 6, 7 & 8) which also must be cleaned every 12,000 miles. All parts may be dried with compressed air, except the filters. Shake them dry, as compressed air may damage the filter media. If there is any doubt about the cleaning capacity of a filter, replace it.

NOTE: Under extremely abnormal driving conditions, the PCV system may have to be cleaned, and the PCV valve replaced before the normal 12,000 mile interval.

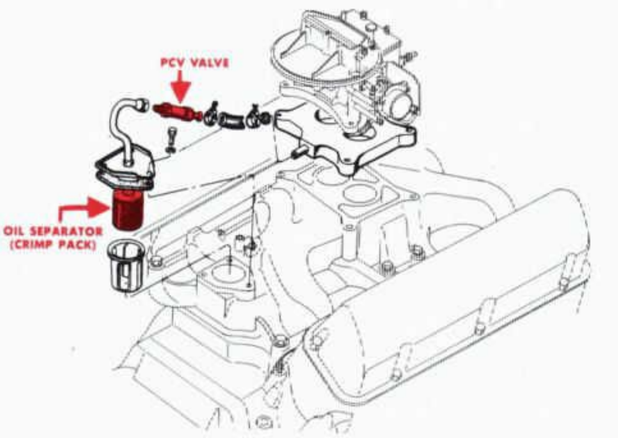

Figure 6—Typical V-8 Engine With Serviceable Oil Separator

PCV Valve Locations

The PCV valve is located on the top, rear rocker arm cover on all 6-cylinder engines (Figure 9); behind the carburetor on most V-8 engines with an oil separator (Figures 6 & 7); and in the right, rear rocker arm cover of all other V-8 engines (Figure 10), except 1967 and prior model 430 and 462 Lincoln engines, where it's located in a tube at the right, rear of the engine.

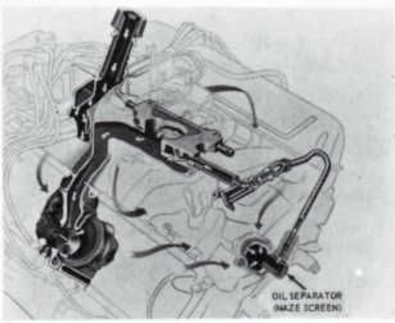

Figure 7—Typical V-8 Engine With Non-Serviceable Oil Separator

Figure 8—Aluminum Pack Oil Separator for 1968 390 and 428 Engines (Except 390 GT and 428 Police Interceptor)

Figure 9—PCV Valve Location—6 Cylinder Engines

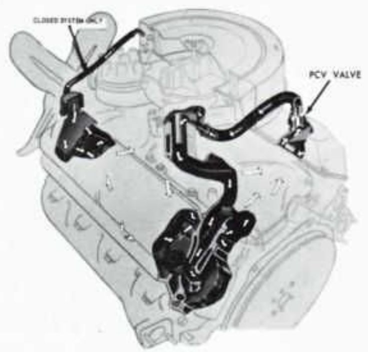

Figure 10—PCV Valve Location—Most 8 Cylinder Engines

CRANKCASE VENTILATION OIL SEPARATOR USAGE CHART

ENGINE	MODEL YEAR	TYPE OF OIL SEPARATOR*	FIGURE
Serviceable Type			
223, 6-cyl.	1963	Crimp Pack	3
220, 260 8-cyl.	1962-65	Crimp Pack	6
289 8-cyl.	1963	Crimp Pack	6
289 4/B Special	1963-67	Crimp Pack	6
390, 428 Exc GT & P.I.	1968	Aluminum Pack	8
406 4/B & 6/B	1962-63	Crimp Pack	6
427 4/B & 8/B	1963-67	Crimp Pack	6
430, 462	1961-68	Crimp Pack	6
Non-Serviceable Except When Intake Manifold Is Removed			
352-390	1960-63	Maze Screen	7

*Ford Basic Part Number—6A631

ALL ABOUT FORD **PCV** SYSTEMS

AUTOLITE PCV VALVES

The following chart lists the Autolite PCV valves used on Ford Motor Company vehicles. See your Ford or Lincoln-Mercury Dealer for other make applications. Autolite PCV valves feature these outstanding advantages:

- 100% inspected for flow characteristics.
- Plunger slides against orifice during operation providing an automatic self-cleaning action . . . designed to help prevent sludge build-up and clogging between service periods.
- Spring is designed to brush lightly against the orifice inner diameter to help prevent build-up of sludge or flow restriction.
- Close tolerance machining of plunger and orifice provide optimum valve performance and efficiency.

AUTOLITE PCV VALVE USAGE—FORD MOTOR COMPANY CARS

(See Your Ford or Lincoln-Mercury Dealer for Other Make Applications)

YEAR, MAKE & MODEL	ENGINE DISPLACEMENT	AUTOLITE VALVE NO.
BRONCO		
1966-68 6 Cyl.	170	EV-5
8 Cyl.	289	EV-8
COUGAR		
1968 8 Cyl.	427	EV-1
1967-68 8 Cyl. Exc. G. T.	289, 302, 390	EV-8
8 Cyl. G. T.	390	EV-42
FAIRLANE		
1968 6 Cyl.	200	EV-43
1965-68 8 Cyl.	289	EV-8
1968 8 Cyl.	302	EV-8
1968 8 Cyl.	427	EV-1
1967-68 8 Cyl. G. T.	390	EV-42
1966-68 8 Cyl. Exc. G. T.	390	EV-8
1963-67 6 Cyl.	170, 200	EV-5
1964 8 Cyl.	260, 289	EV-2
1962-63 8 Cyl.	221, 260	EV-4
1962 6 Cyl.	170	EV-13
FALCON		
1968 6 Cyl.	200	EV-43
1965-68 8 Cyl.	289, 302	EV-8
1963-67 6 Cyl.	144, 170, 200	EV-5
1964 8 Cyl.	260	EV-2
1963 8 Cyl.	260	EV-4
1962-62 6 Cyl.	144, 170	EV-13
1960 6 Cyl.	144	EV-7
FORD		
1968 8 Cyl.	302	EV-8
1965-68 6 Cyl.	240	EV-5
1966-68 8 Cyl.	390, 428	EV-8
1966-68 8 Cyl.	427	EV-1
1965-67 8 Cyl.	289, 352	EV-8
1965 8 Cyl.	390	EV-8
1964 8 Cyl.	289	EV-42
1963-65 8 Cyl.	427	EV-1
1963-64 6 Cyl.	223	EV-5
1962-64 8 Cyl.	352, 390	EV-1
1963 8 Cyl.	260, 289	EV-4
1962-63 8 Cyl.	406	EV-1
1961-62 6 Cyl.	223	EV-4
1961-62 8 Cyl.	292	EV-1
1961 8 Cyl.	390	EV-23 (1)
1961 8 Cyl.	390	EV-1 (2)
1961 8 Cyl.	352	EV-1
1955-60 6 & 8 Cyl.	All	EV-16
LINCOLN		
1958-68 8 Cyl.	All	EV-1
1956-57 8 Cyl.	368	EQ-19
MERCURY		
1965-68 8 Cyl.	390, 410, 428	EV-8
1965 8 Cyl.	427	EV-1
1963-64 8 Cyl.	390, 427	EV-1
1962-63 8 Cyl.	406	EV-1
1962 8 Cyl.	390	EV-1
1961-62 8 Cyl.	292,352	EV-1
1961-62 6 Cyl.	223	EV-4
1961 8 Cyl.	390	EV-23
1956-60 8 Cyl.	312	EV-16
1958-60 8 Cyl.	383, 430	EV-1
1957 8 Cyl.	368	EV-19
1955 8 Cyl.	292	EV-16
MERCURY INTERMEDIATE (COMET MONTEGO)		
1968 6 Cyl.	200	EV-43
8 Cyl.	427	EV-1
1965-68 Exc. G. T.	289, 302, 390	EV-8
1967-68 G. T.	390	EV-42
1964-67 6 Cyl.	170, 200	EV-5
1964 8 Cyl.	260, 289	EV-2
1963 8 Cyl.	260	EV-4
1963 6 Cyl.	144, 170	EV-5
1961-62 6 Cyl.	144, 170	EV-13
1960 6 Cyl.	144, 170	EV-7
METEOR		
1962-63 8 Cyl.	221, 260	EV-4
1962-63 6 Cyl.	170, 200	EV-5
MUSTANG		
1968 6 Cyl.	200	EV-43
8 Cyl.	427	EV-1
1968-68 8 Cyl. G. T.	390	EV-42
1965-68 8 Cyl.	289, 302	EV-8
1965-67 6 Cyl.	170, 200	EV-5
1965 8 Cyl.	260	EV-2
THUNDERBIRD		
1965-68 8 Cyl.	390, 428, 429	EV-8
1962-64 8 Cyl.	352, 390	EV-1
1961 8 Cyl.	390	EV-23 (1)
1961 8 Cyl.	390	EV-1 (2)
1955-60 8 Cyl.	All	EV-16

*Ford Basic Part Number—6A666

1—With Cast Iron Manifolds 2—With Aluminum Manifolds

LIMITED SLIP DIFFERENTIAL CHATTER

Limited slip differential clutch plate chatter is usually more likely to be caused by a lubrication problem than a mechanical problem. For instance, the condition can often be corrected by simply driving the vehicle in 5 fairly tight circles clockwise, and then in 5 circles counter-clockwise. This allows the lubricant to work in between the clutch plates which should provide smooth, noiseless operation. However, if the chatter still exists, do not replace the clutch plates.

Instead, siphon the lubricant from the axle. Refill with a lube that is known to meet Ford specification ESW-M2C104-A, such as Ford Hypoid Gear Lube, Ford Part No. C6AZ-19580-C. Road test the vehicle. If the chattering still exists, the vehicle should be driven approximately 25-50 miles, at which time the chattering should disappear. If this does not eliminate the chattering, only then should the clutch plates be replaced.

Disassemble and clean the differential carrier. Install *new* friction plates. Clean and flush the axle housing. **NOTE:** New friction plates must be soaked for ½-hour in the hypoid lube recommended above.

Refill the axle with the recommended lube, and drive the vehicle in fairly tight circles; clockwise and counter-clockwise. If chattering still exists, drive the vehicle for an addition 25-50 miles. The chattering should disappear as soon as the new lubricant works in between the clutch plates.

A/C EXPANSION VALVE DIAGNOSIS PROCEDURE

The following diagnosis procedure must be used, if the air conditioner expansion valve is suspected of malfunction. This procedure can be accomplished without removing the valve from the vehicle.

1. Install suction and discharge pressure gauges on the compressor service valves.

2. Open the valves and operate the engine at 1000 rpm with the air conditioner system on high blower and maximum cooling.

3. Observe the pressure gauges.

   A. If the suction pressure does not stablize (varies more than 10 psi.), then
      1. Stop the engine, remove the expansion valve thermal bulb and clamp; clean the bulb clamp and suction line thoroughly; reinstall the bulb and clamp SECURELY and reinsulate.
      2. If the problem still exists, proceed with Step C-1.

   B. If the pressure remains above 50 psi, and the compressor knocks, then
      1. Check the thermal bulb for looseness and perform Step A-1.
      2. If the problem still exists, proceed with Step C-1.

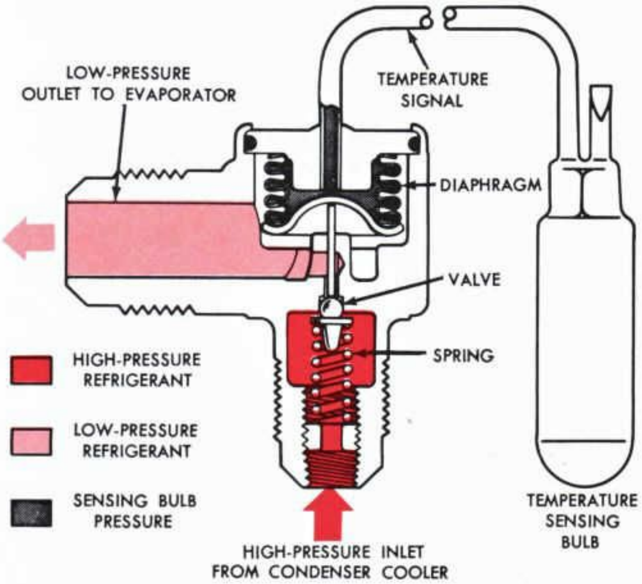

Figure 1—A/C Expansion Valve and Temperature Sensing Bulb

   C. If the pressure goes below 0 psi., then
      1. Stop the engine, exhaust the Refrigerant-12 charge slowly through the suction service valve gauge port and observe the discharge pressure gauge. If the discharge pressure does not drop below 70 psi., the valve is stuck shut, and the valve should be replaced.
      2. If the discharge gauge pressure does drop, exhaust the entire charge, evacuate the system and recharge with the prescribed weight of refrigerant (2½ pounds for most models).
      3. If the system now functions normally, the problem was caused by a low charge and, therefore, the leak must be found and repaired.
      4. If the system does not function normally, the problem is elsewhere. It is suggested that the compressor function and oil level be checked.

SERVICE BRIEFS

5-SPEED TRANSMISSION HIGH SHIFT EFFORTS AND NOISE

(Spicer, Fuller, Clark, New Process)

Poor preventive maintenance can contribute to various 5-speed transmission problems. The following is the suggested proper preventive maintenance as related to transmission lubricant and "C" series shift linkage.

Transmission Lubricant:

To insure proper lubrication and operating temperatures, it is important that proper lubricants be used and correct oil levels be maintained in transmission. For temperatures above 10° F, Heavy Duty Engine Oil SAE 50 is recommended. For temperatures below 10° F, Heavy Duty Engine Oil SAE 30 is recommended. The API service classification of this lubricating oil can be MS, DG, DM, or DS. Lubricants with (EP) additives, such as multi-purpose lubricants, should not be used. Extreme pressure lubricants have a tendency to break down, form sludge and varnish which can contribute to a hard shifting complaint.

Transmissions should be drained and refilled at 12,000 mile intervals (off road at 8,000 mile intervals). Lubricant should be added to the transmission until the lubricant level is to the bottom of the filler hole.

"C" Series Shift Linkage:

Failure to properly lubricate the "C" series shift linkage also contributes to increased transmission shifting problems. Lack of lubrication between slip joint and the shift lever can result in a complaint of hard shifting out of reverse, second, or fourth gears. It is also possible to inadvertently overlook the slip joint zerk fitting while lubricating the vehicle. The shift linkage should be lubricated with Ford Multi-Purpose Long Life Lubricant (Ford Part No. C1AZ-19590-B, -C, -D, or -E) or equivalent. The normal maintenance interval for the "C" series vehicle is 4,000 miles.

DEGREASING CLUTCH PRESSURE PLATE

Cortinas with Manual Transmission

New and reconditioned clutch assemblies supplied for service are coated with a preservative grease. When installing one of these clutches, it is only necessary to degrease the *pressure plate* surface by wiping it clean with a cloth dipped in cleaning solvent or similar solvent. The clutch pressure plate, as an assembly, MUST NOT BE DEGREASED BY COMPLETE IMMERSION in a degreasing solution. To do so will remove the special lubricant from the clutch finger pivots, cover plate windows or diaphragm fulcrum rings.

INSTALLATION TIP-OIL SEALS WITH GARTER SPRING

The garter spring, which maintains lip tension on many types of oil seals, may "jump off" during installation. This is usually caused by a vibration shock that is transmitted through the installing tool when it is struck by a *steel* hammer. Garter spring jumpoff can be reduced by using a plastic or hard rubber mallet, instead of a steel hammer.

CRANKCASE EMISSION CONTROL VALVE ADAPTER AND GROMMET

All 390 & 428 Engines except 390 GT and 428 Police Interceptor

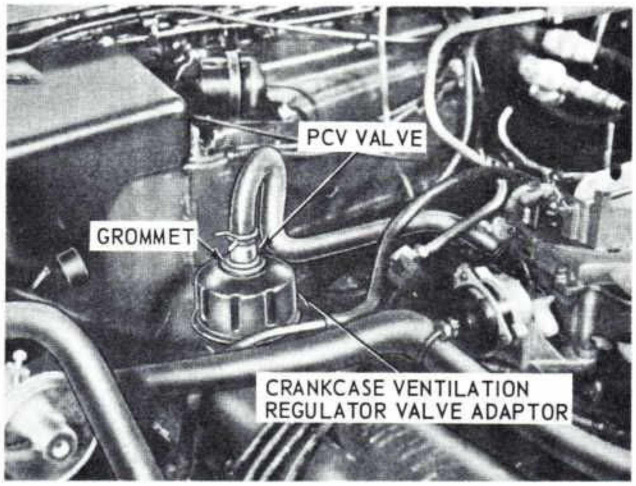

Figure 2–Crankcase Emission Control Valve Adaptor and Grommet

A new crankcase emission control valve adaptor and grommet is located on the right hand rocker arm cover of the subject engines (Figure 2). The adaptor's physical appearance and retention is the same as the oil fill cap used on the left hand rocker arm cover. Internally, the filter media consists of an aluminum pack in place of the air pack used in the oil filler cap. The grommet has a raised center section that is used to retain the PCV valve and prevent valve flow restriction or bottoming against the internal baffle of the adaptor.

The recommended service procedure is:

1. Each 12,000 miles, remove the adaptor and wash in a low volatility petroleum base oil.
2. Shake the adaptor dry and re-install.

CAUTION: Do not dry with compressed air as damage to the filtering media may result.

COMPLIMENTS OF

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YOUR SOURCE FOR GENUINE FORD AND AUTOLITE ORIGINAL EQUIPMENT PARTS

Autolite gives you a fast, convincing method to build more PCV system business

USE THIS SENSATIONAL NEW AUTOMATIC TESTER

- Show your customers the condition of their PCV system under actual operating conditions
- Fits in your pocket
- Use it when you check the oil

It takes just seconds. Place tester over oil filler opening when engine is idling. A moveable ball instantly indicates if system is okay. Only one moving part—no clumsy boxes, hoses or adapters. Ruggedly constructed for long service life. A "must" for every service station and garage to provide customers with visual proof as to whether or not their PCV system is in good shape to prevent rough idling, poor gas mileage, oil contamination and oil consumption. Available where Autolite parts are sold under Part No. EV-44.

. . . AND WHEN IT'S TIME FOR A NEW PCV VALVE

Keep Ford original equipment quality in Ford-built vehicles . . . and other makes too

INSTALL AUTOLITE PCV VALVES

- Automatic self-cleaning action prevents sludge build-up and clogging between service periods.
- Specially designed stainless steel spring prevents flow restriction or failure from corrosion.
- Close tolerance machining of plunger and orifice provides optimum valve performance and efficiency.

All Autolite PCV valves 100% inspected for compliance with Ford specifications and State and Federal requirements.