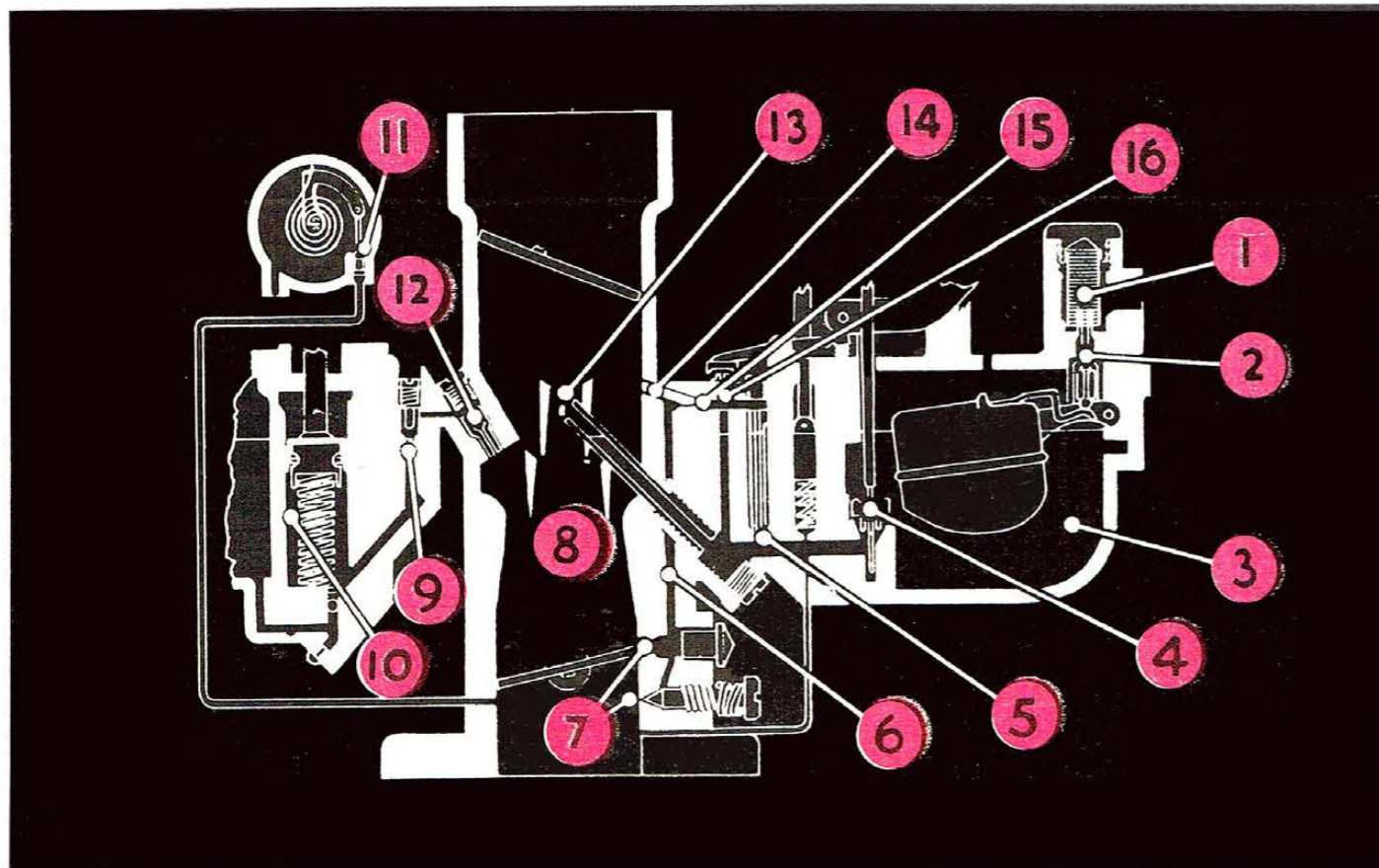


# YOUR CAR'S WEAKEST LINK MAY BE THE CARBURETOR

Here is how it works and how it can be adjusted for top performance.



1. Screen
2. Needle Valve and Seat
3. Float and Bowl Assembly
4. Metering System
5. Low Speed Jet
6. Low Speed Passages
7. Idle Ports
8. Venturi and Intake Manifold
9. Accelerator Passages and Valves
10. Accelerator Piston and Cylinder
11. Automatic Choke Piston, Passages
12. Accelerator Pump Jet
13. Hi-Speed Jets and Nozzles
14. Air Vents and Bleeds
15. Economizer System
16. Anti-Percolator Passages

**E**NGINEERS have long been aware of the true importance of the carburetor. This importance was accented recently when an Italian automotive enthusiast was visiting one of Detroit's largest automotive factories. Top-level officials were showing him around the assembly line. Midway through the tour he asked them, "What is the weakest link in the reliability of American cars?"

The officials paused for a moment, reflected, then replied, "The carburetor . . . not because of design or manufacture but because all carburetors collect dirt and varnish throughout their operational life and are prone to vibrate out of critical adjustment. This cannot be avoided but the dirt can be removed and the carburetor readjusted. If car owners would get to know their carburetors, know how to clean them and how to adjust them, this weakness would be eliminated. But they don't. So, the carburetor remains the weakest link in the American car."

Such sickness affects several million cars yearly. Known as "carburetoritis," the American Automobile Association reported that in 1953 more than 3 million cars required road-side service because of faulty carburetors; trouble which could have been avoided by periodic owner check-

**A.** To keep sufficient fuel supply in float bowl, a needle valve actuated by a float regulates influx of fuel and keeps nozzle and bowl supply level when not active.

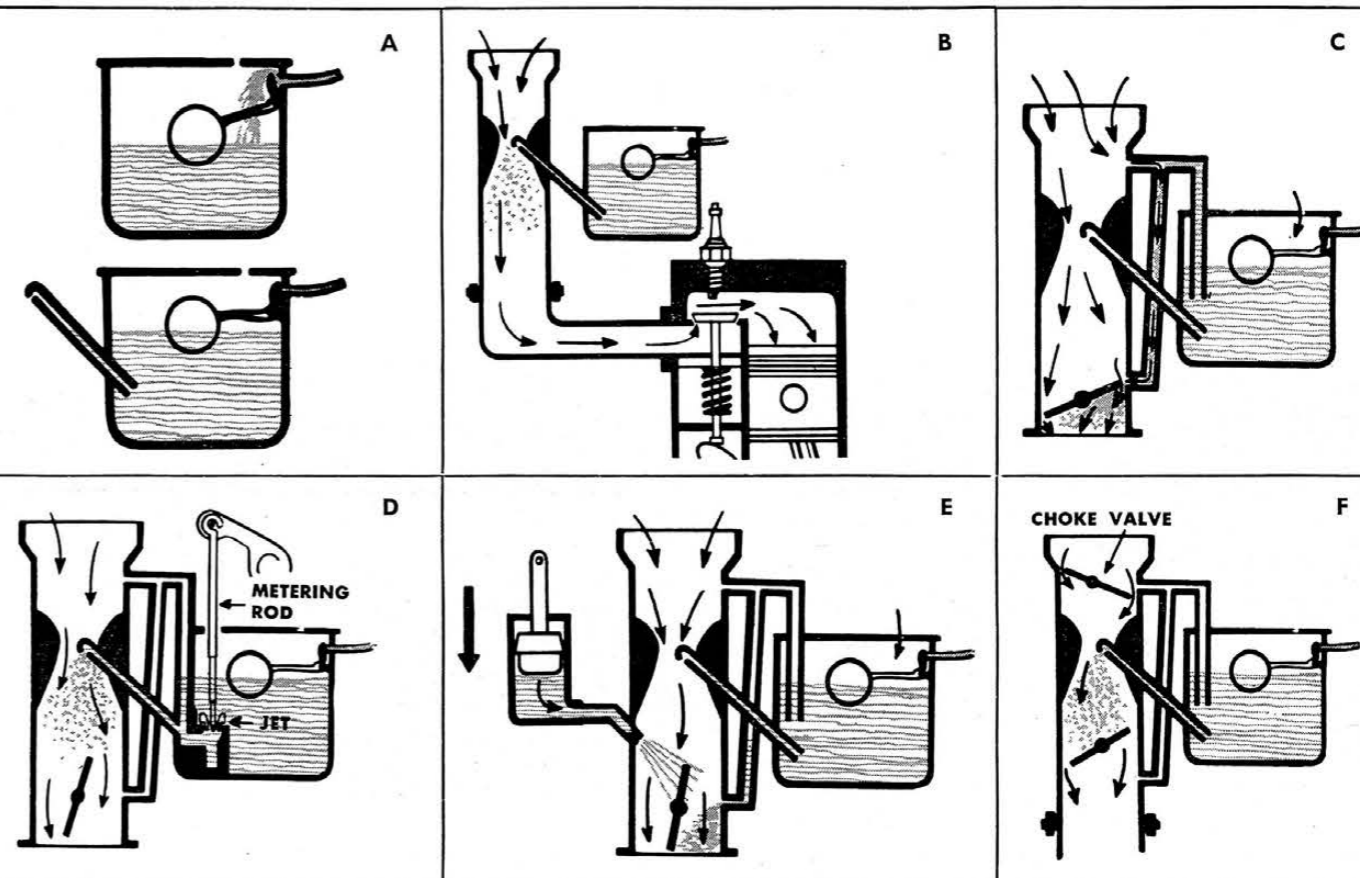
**B.** Vacuum is really pressure lower than atmosphere, thus, atmospheric pressure pushes the air in, rather than relying on pistons to "pull" fuel and air mixture in.

**C.** If throttle is closed all the way the engine will stop, but idle system keeps it going by acting as bypass valve bringing right amount of fuel and air into engine.

**D.** The amount of fuel entering engine is controlled by the size of jets and often by a metering rod which is raised and lowered in a jet to control fuel flow.

**E.** Accelerator pump is used to send stop-gap charge of fuel into carburetor throat. It avoids "flat spot" caused by hesitation when large quantity of fuel is demanded.

**F.** The choke valve is mounted off-center so air rushing in tends to hold it open. Closing gives a "richer" mixture. Opening choke gives a "leaner" fuel-air mixture.



ups and carburetor adjustment. If you understand carburetor operation, know how it works, when it should be cleaned and adjusted, you can own a smoother-operating, more economical car.

The job of the carburetor is simply to mix air and gasoline in the proper amounts and deliver that mixture, through the intake manifold, to the engine as the supply is needed.

Early carburetors were very crude devices, judged by the efficiency of present standards. The carburetor and fuel system of one early engine was little more than a sponge saturated with gasoline which dripped haphazardly into the engine. Later, engineers developed the fuel tank, gravity feed and a bowl which stored the fuel. Compared to these early attempts, today's design is as advanced as rocket ship travel to Mars.

Gasoline is powerful. It has three times the potential energy of TNT! But it will

not burn without the addition of oxygen. Therefore, before its power can be used in the engine, it must be mixed with air to supply the necessary oxygen. A proper combination is important, on the average, your engine uses 9,000 cubic feet of air per cubic foot of gasoline. That's equal to a room full of air per bucketful of gasoline.

The carburetor must take both elements—gas and air—begin mixing them and deliver the completed mixture in the required quantity to the engine. Here is the way it works:

The fuel pump draws gas from the storage tank, in the rear, through a small copper line to a storage bowl, atop the carburetor. This storage space is called the "chamber" or "bowl" and is simply a reservoir designed to hold a specific quantity of un-mixed gasoline.

To keep the quantity of gasoline in the bowl at an almost constant level a needle

valve, actuated by a float, controls the gas coming into the bowl. Since the fuel must be taken from the bowl to the carburetor throat, a nozzle is used as the main outlet from the bowl. An air passage is called the Air Horn or Throat. This leads past the nozzle, into the intake manifold of the engine. The outlet of the nozzle is located about halfway down the throat, in a narrowed portion called the venturi.

As the pistons in the engine move downward, they "pull" air down the throat. Actually, they create a vacuum in the throat and the air, at atmospheric pressure, rushes in at a high speed which often exceeds 250 mph. (Vacuum is simply pressure lower than atmospheric pressure.)

At the narrow portion of the throat, the venturi, where the nozzle outlet is situated, the vacuum becomes the greatest.

(Continued on page 58)

**Wear  
A Real  
CRASH  
HELMET**



**Wear It  
For Safety!**

**Only  
\$3.98**

Tough, rugged, reinforced plastic helmet making them comfortable to wear and providing an added safety factor by keeping the shell at a distance from the skull. Offers great protection for all sports, adjustable to all head sizes and available in either the red or white color. Sorry, No C.O.D., Money Back Guarantee!

**WAL-MAR PRODUCTS CO.**

10023 So. St. Lawrence Ave., Chicago 28, Ill. (Dept. H)

## MAKE EXTRA MONEY!!

Spare time work at home. Big mail-order firm needs men and women to send out postcards. Easy! No experience necessary. Just address and mail. Steady work every month. Act now—write at once.

**BUSINESS INFORMATION CORPORATION**  
143 Belmont Street, Belmont, Mass.

## WHITE SIDEWALLS \$9.95

Genuine Rubber . . . Not a paint

**DO-IT-  
YOURSELF  
KIT**



**ONLY 4 easy  
steps**

Contains Everything for  
easy installation

See installation story in Nov. Rod & Custom  
Complete Kit \$9.95 c.o.d.  
Any 15 or 16 inch tire

**DAMCO ACCESSORIES, Inc.**  
BOX 432 • SANTA FE SPRINGS 1, CALIF.



### Cast Aluminum Club Plaques

Raised Lettering & Emblems  
5 x 8 Size — \$2.00 Each  
5 x 9 1/2 Size — \$2.25 Each  
No Pattern Charge on Orders  
of 10 or More. Send Us Your  
Design in Full Scale.

Chicago Metal Craft, Box 511, Port Chicago, Calif.

## JACKET EMBLEMS



Multi-colored emblems and decals of nearly every sport, wool felt screened in assorted colors—Only 50c

Order by  
Number



**LADY LUCK**

Emblem or Decal  
(Specify on order)  
4 in. . . . . \$ .25  
7 in. . . . . .50  
10 in. . . . . 1.00  
T-Shirts . . . . . 1.50  
(Specify Size)

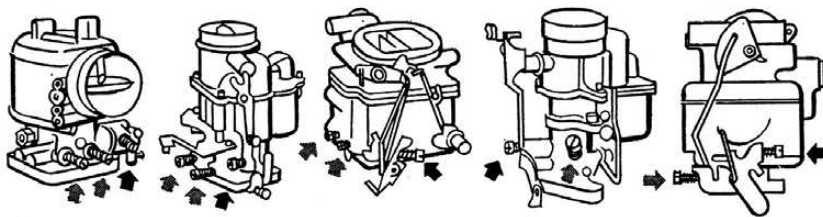


**SEND NOW**—for NEW completely illustrated catalog of emblems, jewelry, novelties and accessories . . . only 25c

Dealerships **SPOT ENTERPRISES**  
Open P.O. Box 66 Culver City 5, Calif.

## CARBURETION

(Continued from page 39)



➡ THROTTLE SCREW ➡ IDLE SCREW

Thus, the higher atmospheric pressure on the surface of the gas in the bowl pushes the gas up and out of the nozzle into the throat.

As the gas gets into the fast-moving air stream at point of the venturi, it breaks into a fine spray and mixes with the air. The fuel-air mixture rushes down the throat to the intake manifold and into the combustion chambers. The pistons move upward compressing the mixture. When fully compressed the mixture is ignited by the spark plug.

That's the basic operation of a carburetor, but such a simple design would not fulfill all of the requirements of modern automotive operation. Differing fuel-air mixtures are demanded by varying driving conditions. Today's driver demands quick pick-up, easy starting, smooth idling and high and low speeds. To satisfy each of these conditions and to afford complete control over the engine, there are refinements which must be added to the basic carburetor design to offer these controls.

First, to achieve reliability at variable speeds, a throttle valve is located at the bottom of the throat, below the venturi. It regulates the flow of the air-fuel mixture to the combustion chambers. Opening the throttle increases the amount reaching the chamber. Closing it reduces the amount the throttle thus speeds up or slows down engine speed.

If you closed the throttle all the way, the engine would stop since there would be no gas or air entering the chamber. In order to allow the engine fuel for idle, a separate idle system is built into the carburetor.

It is simply a by-pass, large enough to allow only sufficient gas and air to get the engine running and to keep it running when the throttle valve is closed. The path of fuel through the idle circuit is called the idle system. The flow-path of fuel from the bowl through the nozzle is called the high-speed system.

The actual amount of gas that goes through the two systems is controlled by jets; carefully measured pin-point openings from the bowl into each passage-way. There is often a metering rod included in this system. It is a tapered rod which is raised and lowered in a given

jet to control the amount of gas passing through. Normally, it is used only in the high speed system of some types.

These refinements solve most of the problems not answered in the original, basic design. However, when you suddenly floor-board the foot pedal and "step on the gas," the throttle opens. Air rushes into the throat immediately, but despite this immediate reaction, it takes time for the gas to move up the nozzle and into the throat. Therefore, a source of immediate fuel is required. An accelerator pump is included in the carburetor to provide immediate response. It is a pump directly linked to the throttle and, in operation, forces an extra charge of gasoline into the air stream during the time the throttle is actually in the opening process.

Every contingency in carburetor design is now accounted for except one. It is often necessary to change the proportion of air and gas fed to the engine. For example, to start a cold engine, a "rich" mixture is required in the combustion chamber to be certain sufficient gas will vaporize to give a good burning mixture. But once the engine has reached proper running temperature the requirements have changed and it requires more air and a lesser percentage of gasoline. To accommodate these varying mixtures a choke valve is set at the top of the throat to regulate the amount of air entering the throat. Closing the choke gives a richer mixture. Opening the choke valve gives a leaner mixture: the two terms do not refer to the amount of fuel-air reaching the combustion chamber, but instead, describe the varying percentage of fuel in the air flow.

Choking may be manual or may be automatic. If it is manual there will be a choke control mounted on the instrument panel. The control is connected to the choke valve by a thin flexible wire. Pushing the control "in" opens the choke.

If the choke is automatic, there will be no control on the instrument panel. You will have no direct control over its operation. Instead, it will operate automatically, perhaps through a tube connected to the engine manifold and the varying vacuum pressure at that point, which is directly related to fuel-air need. Vacuum

**ARROW**  
AUTO PARTS CO.  
SPEED AND POWER EQUIPMENT

**NEW 62 PAGE**  
Wholesale Catalog  
**50** HOT ROD, CUSTOM  
& SPEED EQUIPMENT  
SPEED GEMS Division  
**ARROW AUTO PARTS**  
Dept. 1 1600 WASHINGTON AVE. N. MINNEAPOLIS 11, MINN.

changes will control the operation of the choke plate.

Because of the seemingly complicated assembly of differing functions, the carburetor depends heavily upon cleanliness for optimum operation. A car with a dirty carburetor will gradually lose its original power which means that the driver—normally unable to detect the creeping paralysis of “carburetoritis,” will shell out an ever-increasing sum for gasoline.

Generally, this is the “standard operating procedure” for this type of automotive ill. It can occur with sudden swiftness, severe enough to be noticed immediately and repairs are made, but generally, there are more prolonged symptoms, hardly noticed at first, till the gas bill reaches an all-time high and power an all-time low.

There are then, two considerations: first, your car may be the victim of the constantly expanding paralysis of “carburetoritis” or may suddenly stop without warning. In either instance the results are similar: costly fuel consumption, below normal operation. The sick car loses power, sputters, stalls and wastes gasoline. The important thing is to check and clean your carburetor before these conditions occur.

There is no way to avoid costly delays and repairs if you let a dirty carburetor continue operation. When a carburetor is dirty it must be cleaned. In the past the only solution has been to remove the carburetor and have an expert clean it. It has been a necessary, but costly, operation. Chemical engineers were seeking a cheaper and faster method.

What was needed? A solvent which could be introduced into the carburetor to clean it without removal and which could be used exactly as the gasoline is used.

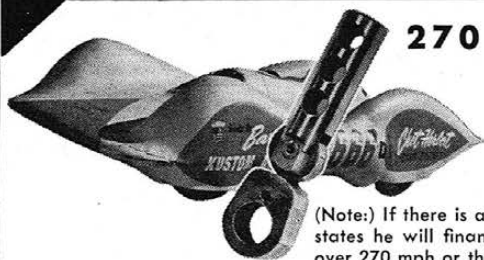
The Pennsylvania Refining Company is representative of the companies who felt that a chemical such as this could be developed. Their answer is a product, called GUMOUT, which, according to the company cleans carburetors easily and efficiently at home.

Their process takes 20 minutes and is performed with the carburetor on the car. In condensed form, the process consists of warming up the engine (out of doors), disconnecting the fuel line at the carburetor and plugging the line at that point. Then, after fitting special adapters included in their kit to the carburetor, introducing an equal mixture of gasoline and Gumout into the carburetor. The engine is started and the Gumout is passed through the carburetor passages and burned in the combustion chamber. On its way to the engine, the Gumout removes the varnishes and the dirt which has collected in the passages.

After cleaning, it then becomes necessary to readjust the carburetor to make

(Continued on page 60)

## ROLLER TAPPET CAM RECORDS



### 270 mph Beast V

**Exceeds world “B Class” record!**

Unofficially timed September 4th at Bonneville Nationals over the 5-mile course. Official timers failed to get time on record run and bad weather conditions prevented rerun.

(Note:) If there is any protest to his statement, Chet Herbert states he will finance AAA timing if the car fails to attain over 270 mph or the protestor will finance the run when the car exceeds that time. AAA fee is \$1700 per day for runs. The Beast V is powered by two Dodge V8 engines with roller tappet cams and showed a total displacement of 485 cu. inches providing 650 HP for this record run.

### 252 mph Shadoff

### Special

**Exceeds world “C Class” (183 to 303 cu. inches) record!**

Officially timed September 3 at Bonneville with a 2-way average of 248 mph which unofficially beat its own “C Class” world record in '53.

The Shadoff Special, owned by Malcolm Hooper with engine by Ray Brown, won the trophy for fastest officially timed mile of the '54 Bonneville meet. Powered by a 1952 Chrysler engine sleeved to 302 cu. inches and equipped with roller tappet cam, the power output was over 390 HP.

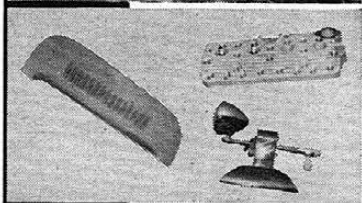
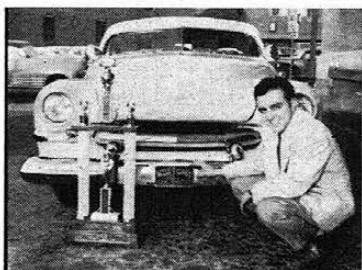


*These same roller tappet cams can tremendously increase the horsepower of your O.H.V. passenger car. For information, write to:*

Roller Tappet Cams  
Experimental Engines

## CHET HERBERT

11042 Santa Ana Freeway  
Anaheim, California



*you can become a member of*

# KUSTOMS OF AMERICA

**Sanctioned by George Barris, foremost custom car creator and designer**

**HERE IN ANSWER** to the many demands from custom car enthusiasts throughout America, we proudly present a nationally organized association for the unification of this fast growing medium with unlimited membership benefits.

**MEMBERSHIP ENTITLES YOU TO AN EXCELLENT DISCOUNT ARRANGEMENT ON THE FOLLOWING:**

- Leading Monthly Automotive Magazines
- Custom Automotive Accessories
- Speed Equipment for All Makes
- Club Emblems, Jackets, T-Shirts, Etc.
- Trophies
- Custom Rugs and Upholstery

INTRODUCTORY MEMBERSHIP ONLY \$2.00  
NO AGE LIMIT

No car necessary. Club open to men & women

ML 12 **KUSTOMS OF AMERICA** ML 12

**5864 Hollywood Blvd., Hollywood 28, Calif.**

*I hereby apply for membership in the Kustoms Of America and enclose..... for one year's dues, entitling me to receive an official membership card, windshield decal, discount catalogue and full association privileges.*

NAME..... AGE.....

STREET ADDRESS.....

CITY..... STATE.....

CLUB AFFILIATION (if any).....

*Please Print Plainly. Application blanks are not required. A letter will suffice.*

## Fibreglass Dechrome Kits

**\$1.00**

and up. (Add 25c for postage...No C.O.D.) Also pd. kits. Contains METALFAST which adheres to metal.

Everything from Dechroming (Metal-Bonding) to complete car bodies. Ideal for rusted spots; eliminates leading. Write for details.

FIBREGLASS-EVERCOAT CO.  
7608 Reading Rd., Cincinnati 37, Ohio

## NEW SUPRISE WHOLESALE CATALOGUE



SEND  
25¢  
NOW

ONEST CHARLEY  
SPEED SHOP  
Box HU 3086 Chattanooga Tenn.

## WHY USE A VERTEX MAG?



A magneto combines all the functions of a battery, coil, distributor and condenser... eliminating all the problems of a single or dual coil battery system.

- FITS ALL CARS WITHOUT ALTERATIONS
- POWERFUL AND STEADY SPARK 70 TO 8000 RPM
- EASY STARTING IN ALL WEATHER
- AUTOMATIC ADVANCE CALIBRATED FOR YOUR ENGINE
- HUNT MAGNETOS ARE ON 95% INDY RACE CARS... CONSISTENTLY WINNERS IN ALL TYPES OF RACES

JOE HUNT 2600 W. Vernon Ave.  
L.A. 8, Calif.

## PEP UP with a PEP-MASTER

EXCLUSIVE FOR CHEVROLET CARBURETORS, GEAR SHIFT MODELS 1934-1952

Perfected by LOUIS CHEVROLET

UNBELIEVABLE PEP FOR CHEVROLETS, EQUAL TO LATE MODELS

5 MINUTES INSTALLATION TIME, ANYONE CAN INSTALL PEP-MASTER AT LESS THAN 1/2 COST OF OTHER PEP DEVICES.

★ POWER ★ PEP ★ ACCELERATION  
ORDER YOURS TO-DAY Only \$2.00, MONEY REFUNDED IN TEN DAYS IF NOT SATISFIED  
PEP-MASTER Co. P.O. BOX 9057 FT. WORTH, TEXAS

(Continued from preceding page)

use of the optimum power which a completely clean carburetor can deliver. There are only two adjustments on most carburetors. Both affect idling only. To change any other function of the carburetor you must change integral parts of the carburetor, these alterations should not be done except by a competent carburetion expert.

The idle speed of your engine is controlled by the throttle screw in the linkage near the bottom of the carburetor. Turning it "in" speeds up engine idle. Turning it "out" slows engine idle.

The air-fuel mixture, controlled by an idle screw in the base of the carburetor is the other control. Turning it "in" reduces the amount of mixture going through the idle system. Backing it "out" increases the mixture. Some carburetors have more than one throat. Your carburetor may have two or four throats. The basic linkage may be the same as that described but instead of one throttle and idle screw there will be two, one for each of the two idle systems used.

To adjust your carburetor: start the engine and try adjusting the throttle screw "out." If the engine stalls turn the throttle screw "in" until the engine continues running without use of the foot pedal. Now, turn the idle screw "in" slowly until the engine sounds rough and as if it were about to stall. Turn the idle screw out one-half turn. If the engine now sounds good the carburetor idle system is properly adjusted. If the engine idles too fast, turn the throttle screw "out" slowly, until the engine speed comes down to the desired idle rate. Continue repeating the idle and throttle adjustments until the engine is set for proper-sounding idle.

You can judge proper engine idle in five ways. You can hear the evenness and smoothness. You can see the engine vibrate on its mounting; a little is o.k., a lot is bad. You can feel vibration by leaning against the fender. You can see the fan rotating steadily. A steady rotation is good idle. You can listen to the exhaust for a steady firing rhythm.

In addition, there are gauges and devices on the market which can aid in carburetion adjustment. Tachometers, exhaust analyzers and vacuum gauges can perform a valuable service. They are not absolutely necessary but are competent, time saving devices.

Obviously, you cannot adjust for proper engine idle unless other components are in top adjustment. Carburetion, compression and ignition are the three factors which influence engine operation. Adjusting the carburetor affects only one of these... carburetion. The other elements must also be correct.

Your car can only be as good as its carburetion system. If you keep the carburetor clean you will get better performance and mileage. ●

## FORD ROAD TEST

(Continued from page 15)

mph, then quickly braking. The car snuggled closer to the highway than a piece of gum on the Pennsylvania Turn-Pike. During our braking distance test, weather interfered. Rain came up making it impossible to check detonation marks, but even on the wet pavement, the combination of tubeless tires and Ford's new brakes proved highly efficient.

Much of this is due to Ford's improved brakes. The design is identical to previous models, but drum size has been increased. 1954 size was 10 inches and this year, the brakes go to an 11-inch double-acting duoservo brake and drum. The lining is still riveted to the shoe.

Even smaller items have been studied and redesigned for '55. Our test staff had lodged a complaint about '53 & '54 ash trays. Their placement and design did not facilitate easy use. This has been rectified this year. The snubber plate has been moved to the front and it is now possible to snuff out a cigarette without striking the radio knobs directly above. But the tray remains directly beneath the radio and smoke from cigarettes rises around the knobs. In time it will tend to tarnish them.

Upholstery, too, is new and more lavish than in past years. Ford has never been especially noted for exciting upholstery but this year it comes in all colors and fabrics from conservative woollens to metallic and wool combinations, copper cloth and nylon. These fabrics, upholstered over Ford's new interwoven steel seat springs and foam rubber cushions, make a comfortable seat.

Because of the wrap-around windshield, wind wing area has been reduced. It is now a small rectangular plate about 3 inches in width. It does not pass as much air as previous models, but new intake ducts supply fresh air on demand. The intake duct openings are fitted on each side of the hood, just below the hood edge and carry air into the compartment on each side.

The Fairlane, which *MOTOR Life* road-tested, comes equipped with dual exhausts. Only two Ford cars come so equipped; the Fairlane and the Thunderbird, but duals are optional on all models this year.

One "goodie" for enthusiasts is Ford's new "power package"—a last-minute answer to the demand for increased performance. Ford's kit includes 8.5:1 heads, 4 throat carburetor, special manifold, dual exhausts and a "hot" distributor.

Other accessories available are: special chrome (as shown on the Fairlane) headlight trim and wheel skirts. But with or without accessories, the '55 Ford has many of the features—both power and design—of higher priced cars. It should make Ford owners a proud lot and having pride of ownership, Ford owners will be difficult to live with. ●