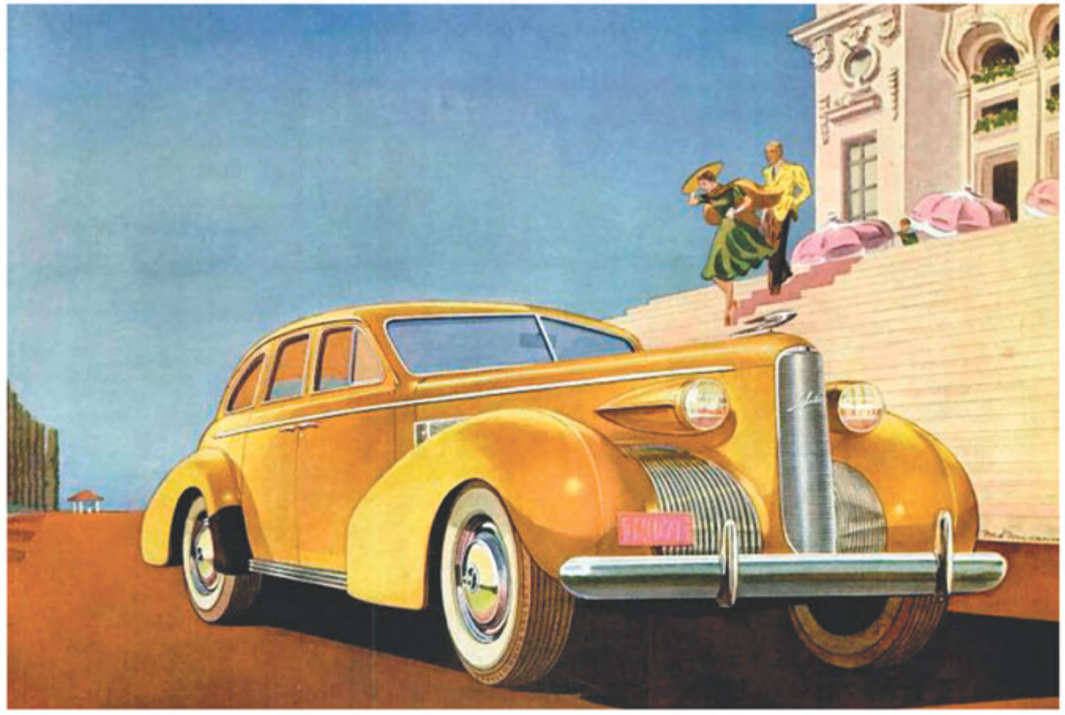

THE six-cylinder idea is no more a rightful adjunct of the Pierce-Arrow Car than are a hundred other sound ideas of car construction that we have adopted after a thorough trying out. Luxury means efficiency always.

THE PIERCE-ARROW MOTOR CAR COMPANY, BUFFALO, N. Y.
Licensed under Selden Patent

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CHECKING ENGINE BLOCKS

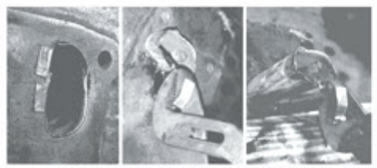
My Experience Is...

by Joe Rabelskie

**From 2007, a tribute to our old friend and restorer, Joe Rabelskie.*

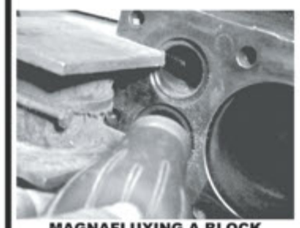
Finishing an engine block is easier when one knows what is ahead. This is why one should always take the time to systematically check an engine before beginning the work. It is equally important for one to research anything that is new or not understood. It is more beneficial to know what needs to be done, than to be able to do it.

As always, the first step after a total cleaning is a thorough visual inspection. This inspection gives a mechanic the chance to see the bare block before shop dust or fingerprints have a chance to obstruct the view, making it easier to see such problems as: damaged surfaces, broken studs, scored cylinders, and so on. In addition, the cam bearing housings should be inspected in order to insure that there are no burrs that will cause problems when it is time for bearing installation. It also affords one the opportunity to slide a piston through a cylinder or a valve into a guide before there are any particles that will misrepresent the clearances. This is also the best time to check the straightness of the deck with a straight edge.



REMOVING WATER DIRECTOR

If an engine has a water director, as many old cars do, and it has not been taken out yet, this is a good time to do so. It seems that most mechanics never bother to remove them. Many do not know what they are for, how to remove them, or do not even know that they exist. These tubes, usually brass, are typically pressed in the block behind the water pump, in order to direct water to crucial areas where heat is more prevalent, such as between cylinders and valve seats. There is a special slide hammer tool for removing them (if one can be found). However, one can generally pry them out using a pair of slip joint pliers, by grabbing the alignment tab and using the head of the pliers for leverage. After it is pried up a little, a piece of wood can be put under it for more leverage, until it can be pulled out by hand. Then, it can be inspected and cleaned out. If damaged, they can usually still be found for most engines.

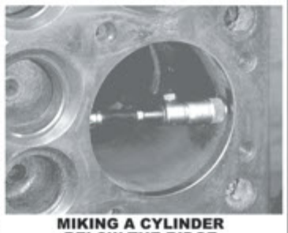


MAGNAFLUXING A BLOCK

After a complete visual is finished, the block should be magnafluxed in order to make sure there are no cracks. In addition to all of the usual places (cylinders, valve seats, etc.), one should also check any place that the visual inspection showed suspect (any place that there might have been rust), such as around freeze plugs and the water pump. Many times one would assume that a freeze plug or water pump was leaking, when in reality there could be a crack getting ready to slip by.

Preparing a block to be dependable is not just about cleaning and checking for cracks. There is a matter of making sure that the crank fits properly. This means that the saddles need to be in alignment, the caps need to fit correctly, and the housing bore needs to be on size. The best way to check the alignment is to check it with a straight edge, similarly to the deck; however, the crank can be set in with new bearings and spun. If the housing bore and the caps are correct, this will probably suffice. The caps should be a tight fit. If they can move around when in position, they can shift while running and cause the engine to seize up. If this is the case, sometimes they can be built up and machined to fit. They will however, need to be align-bored afterwards. To check the housing bore one should use an inside micrometer in three positions for size and roundness. One could always assemble the crankshaft with the new bearings and torque it down with a .003" piece of brass shim stock in it, in order to check the clearance, but it is not a good idea for checking it for roundness.

There is much to consider when checking the cylinders. The bore should first be checked for size. This is done with an inside micrometer, at several positions around the cylinder and at the bottom, middle, and just below the ridge. Checking it at several positions will determine whether the cylinder is round. Miking it at the bottom will tell approximately what the original bore was, along with the middle will help determine how much taper there is. Once the pistons are miked, one can then determine how much clearance there will be if it is honed rather than bored. This, however, is not the sole factor in determining whether a block should be bored or honed. It is equally, if not more, important to know how much wear there is under the ridge. This is where the maximum ring end gap will be determined. When an engine with a specified end gap of .016" has .0045" wear, the end gap has almost doubled. So, one can see that the problem is not that the pistons are going to be too loose, but that it will smoke. Of course, if one is not going to put a lot of miles on a car, it might not matter if there is a little smoke at the tailpipe.



MIKING A CYLINDER BELOW THE RIDGE

My experience is, too many old car hobbyists jump into a project and think that it is "all or nothing". This just is not true. Simply by understanding what things are for, how they work, and what is wrong can help one make the proper decision to move the project right along, rather than into the corner.

1947 Packard Custom Super Clipper Club Sedan, Vanderbilt Gray over Coral Blue, newest restoration of 17 known. Rebuilt 356 engine, new wiring, Overdrive, Back-up light, heater and defroster motors, 5 new Coker Bias-look Radials, Auxiliary fuel pump, Quartz clock, Door Pulls, Halogen headlights, Seat belts, $78,500. Owner 90, Ron 727-410-6352. Florida

(Answers on Page 1)

OLD CAR

MATCH GAME

"Things Associated with Manufacturers"

A	B
☐ 1. Red Ram V-8 Engine	A-BUICK
☐ 2. "Y" Block 272 CID	B-CHEVROLET
☐ 3. Nailhead V-8	C-DODGE
☐ 4. Triple Turbine Turboglide	D-NASH
☐ 5. Fluid Drive	E-CHRYSLER, DODGE, DESOTO, '53
☐ 6. Torque-Flo V-8	F-FORD
☐ 7. B-44 (Built 1942)	G-OLDS
☐ 8. Electromatic Clutch	H-PACKARD
☐ 9. Golden Commando V-8	I-PONTIAC
☐ 10. Strato-Streak V-8	J-PLYMOUTH
☐ 11. Commander V-8	K-STUDEBAKER
☐ 12. Torpedo 8	

WHY YOU'LL WANT IT

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Technically, WHIRLAWAY is a special downshift that puts you—automatically—into a lower gear ratio when you need maximum acceleration and performance. But to the driver, WHIRLAWAY is a new "sensation"—a thrilling, new feeling of power and pick-up that's instantly available at your command.

WHAT *Whirlaway* DOES!

WHIRLAWAY gives you extra power . . . extra pick-up . . . extra speed . . . *when you need it*. Just step all the way down on the accelerator, any time you're cruising along at a speed under 55 miles per hour, and WHIRLAWAY goes into action. Instantly, automatically, you shoot ahead as if you were jet-propelled! Speeding out of danger! Sweeping up a hill! Swinging out ahead of traffic! Then, when you let up on the accelerator, or reach a speed of 68 miles per hour, you automatically return to Hydra-Matic Drive's economical, fourth-speed cruising range.

OLDSMOBILE

HOW TO USE *Whirlaway*

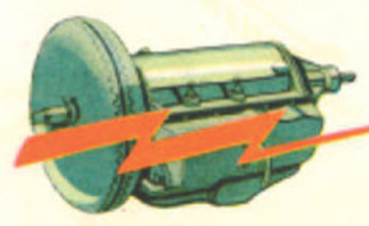
. . . FOR SAFETY AND GREATER PERFORMANCE

WHIRLAWAY is simplicity itself in operation. All you do, when you need extra pick-up, is the perfectly natural motion of "stepping on the gas." You don't shift gears . . . don't push a clutch . . . just step down quickly on the accelerator, *all the way to the floor*. The rest is *automatic!*

1 Imagine you are breezing along a highway like this . . .

2 Suddenly, for safety's sake, you need a burst of acceleration . . .

3 All you do is step on the gas, all the way to the floor . . .



4 Instantly, automatically, WHIRLAWAY responds . . .

5 Shooting you ahead with a "Futuramic" surge of pick-up!

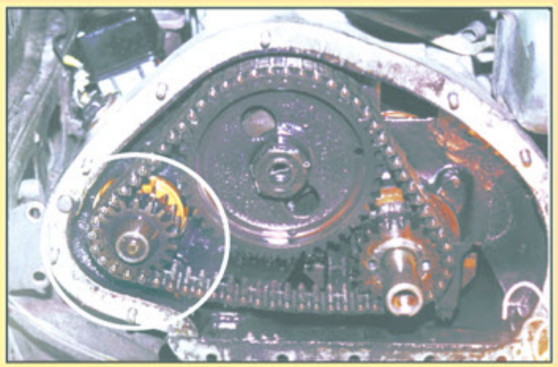
OLDSMOBILE

DRIVING OLD CARS

DETERMINING GENERATOR TYPES & POLARIZING

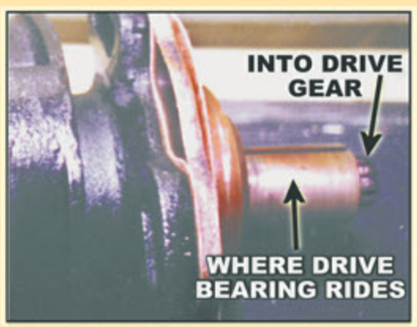
by Bill Johnson Publisher

Many of our cars from the 1930's until there were alternators, used a voltage regulator and generator to electrically charge the system. They varied from Negative to Positive Ground and 6 volt to 12 volt, but they were pretty much the same. The system from a car that I owned is one I want to cover this month–a 1936 Packard Coupe #1401, a Senior car with old technology, straight front axles, mechanical brakes, etc., before Packard changed to modern technology in 1937, with new suspension and hydraulic brakes, I had the '36 and still have the '37.



TIMING CHAIN

Packard Senior cars in 1936 used a "silent chain" gear driven generator with a brass adapter. The nose of the adapter allows the gears bearing to ride on it and the armature's teeth fit into the gear on the timing chain. In removal or assembly of the generator, if the gear is knocked out of the timing chain, the radiator/grill shell, radiator and timing gear cover have to come off. We did this once before, during the engine rebuild, and is it a big job! With the parts out for rebuild, I felt it was a good time to research the charging system, to know how it works, and have a plan to possibly fix it on the car or to remove it with the least chance of destruction.



BRASS ADAPTER PLATE

THINGS TO KNOW ABOUT A GENERATOR CHARGING SYSTEM:

1. You first determine what kind of generator you have. Before alternators, most early cars used (1) 3rd-brush Generators through the mid-'30's, (2) Shunt-type (2-brush) through the '50's until alternators became industry standard.
2. How is the generator grounded–internally or externally? (This will determine how it is polarized.)
3. What is the generators output (amps)?
4. What is the voltage regulator output? (volts)
5. How to polarize the generator.

Our '36 has a 3rd-brush generator, and is externally grounded.

THIRD-BRUSH GENERATORS

What is a 3rd-brush generator? This generator uses the third brush as an internal means of controlling the maximum output of the generator. The field circuit is connected to the third brush, so that the current fed to the field windings is taken off the commutator by the third brush. The two main brushes are located on the commutator at the two places between which there is maximum voltage. The third brush is placed between the two and consequently picks up less than the maximum available voltage. By moving the third brush toward the adjacent main brush, the voltage across the field and the current through the field windings can be increased Additional field current increases the strength of the magnetic field, causing a higher generator output. By moving the third brush away from the adjacent main brush, the voltage across the field windings is reduced, less current will flow in the fields, and the generator output will be decreased

The 3rd-brush generator was originally used in the automotive industry because of its simplicity and because it was easy to regulate generator output by changing the position of the third brush. Another benefit was that the 3rd-brush generator tended to regulate itself and, within limits, would not produce an excessive amount of current. In a two-brush shunt generator, without some form of regulation the voltage could become excessive at high speeds. High voltage would result in excessive current flowing through the field winding, developing an excessively strong magnetic field, which would further increase generator voltage and output. This increased voltage and

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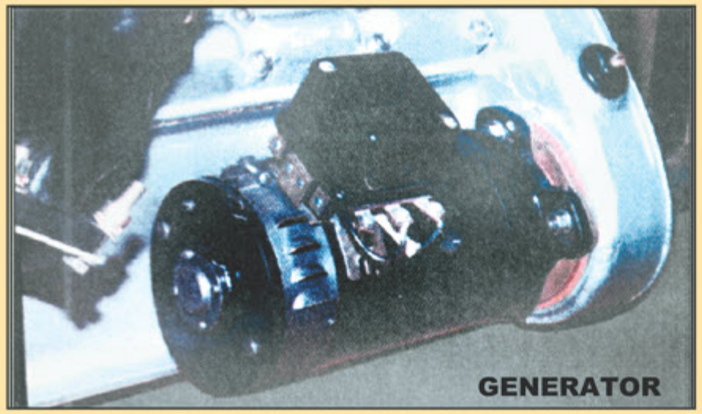

GENERATOR

current would ultimately cause the generator to overload and become overheated. The 3rd-brush generator is not subject to excessive overloading since it is generally self-regulating and normally can not produce too much output if the third brush is adjusted properly.

Factory or Motors manuals will indicate the type generator for your car, as well as the output. Manuals will also provide a diagram, but sometimes don't specify how it is grounded. To determine the ground, look at the diagram to see how the ends of the field coils are connected.

EXTERNALLY GROUNDED (Type A Circuit, as used on Packard, GM and most other cars (see Motors manual for your type) has the field connected to the insulated main brush (on ours its the third brush) inside the generator, with the opposite end of the ground, or return circuit outside the generator usually grounded in the coils of the regulator.

INTERNALLY GROUNDED (Type B Circuit, on Ford products and others (see Motors manual for your type) generators have field circuit connected to ground inside the generator with the opposite end of the field circuit connected to the insulated side of the circuit outside the generator.

Another way of determining external or internal ground without a diagram, is to use an ohm meter to check armature and field for continuity. To check for External Ground remove one brush (doesn't matter which one). This will not show a break in continuity between the armature and field. For Internal Ground remove one brush. This will show a break in continuity between the armature and field.

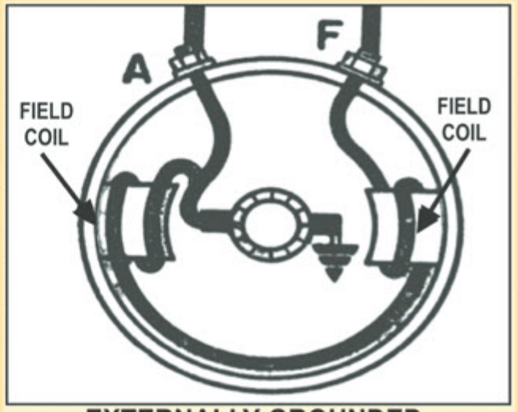
GENERATOR OUTPUT: Our Packard manual showed our generator output as 30-33 amps cold and 27-30 amps hot, regulated output 6¾ - 7¼ volts.

POLARIZING: For an externally grounded generator, with key off, polarize using a jumper wire to momentarily touch the battery and armature (gen.) poles of the voltage regulator. This will produce a flash, not a severe spark.

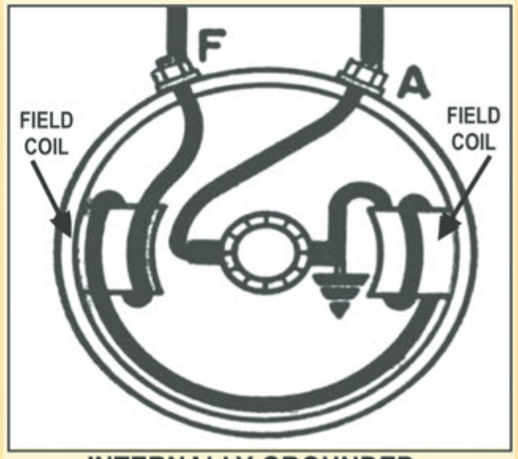
Internally grounded generators are polarized (key off) by connecting all leads but the one to the generator "field" or "F" terminal. With a jumper wire, connect momentarily from the insulated battery terminal to the "F" terminal. There will be a "flash" and the generator will be polarized. Then, re-connect the "F" terminal lead. It is imperative to know how your generator is grounded, because incorrectly polarizing can burn out the armature and the voltage regulator.

With this information we were ready when we got our parts back. The rebuilt carburetor and sending units worked great. We pulled the car outside to reduce gas fumes and polarized the generator. (When a car sits, especially if battery disconnects are used, the generator (voltage regulator) can lose its magnetism, resulting in the need to re-polarize, even if nothing was disconnected from the charging system.

Before polarizing, we cleaned the voltage regulator points with a riffler file (cupped file for voltage regulator points), then polarized



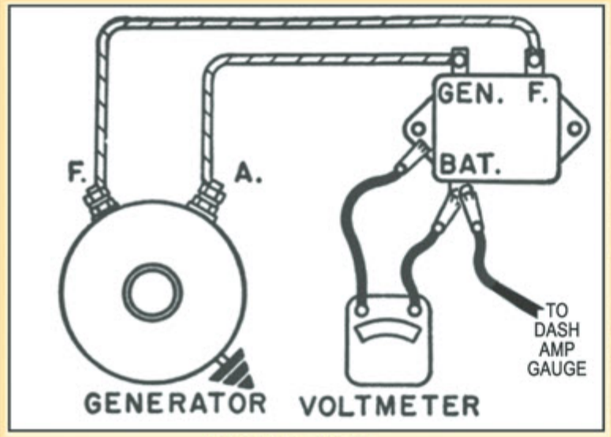
EXTERNALLY GROUNDED
SIMPLIFIED CIRCUIT OF GENERATOR WITH FIELD CIRCUIT GROUNDED OUTSIDE GENERATOR. FIELD CIRCUIT IS CONNECTED TO GROUND EITHER THROUGH THE REGULATOR CONTACTS OR THROUGH THE REGULATOR RESISTANCE, TO PERMIT HIGH OR LOW GENERATOR OUTPUT.



INTERNALLY GROUNDED
SIMPLIFIED CIRCUIT OF GENERATOR WITH FIELD CIRCUIT GROUNDED INSIDE GENERATOR. FIELD CIRCUIT IS CONNECTED TO THE INSULATED SIDE OF THE CIRCUIT EITHER THROUGH THE REGULATOR CONTACTS, OR THROUGH THE REGULATOR RESISTANCE.

CONTINUED

"batt"-to- "gen" and got a flash. To test the generator voltage output, we used a volt meter, putting one lead on ground and one on the battery pole of the voltage regulator, and with the car running, the reading on the volt meter was 6.1 volts. Revving the engine showed no change. The reading should have been 7.4 volts max. The problem was now clearly with the generator. Adding up the clues led us to oxidation on the armature and brushes. We removed the generator's band covering the brushes and sprayed electrical contact cleaner (non-flammable type) on the turning armature as the car ran. In about a minute, the dash amp gauge needle jumped to the positive. The generator was charging!



VOLT TEST

Now, everything is working and we know a lot more about vintage charging systems. With less and less information out there about generators and polarizing, I hope this helps. The one lesson that I won't have to learn again is to start and drive the cars on a designated schedule--no exceptions! A note on using volt meters to check generator systems: I only use "analog" volt meters–the digital ones jump around on my generator systems.

Enjoy your cars, and keep em driving!

Of course, all safety precautions must be implemented--disconnecting the battery when necessary, use of safety goggles, rubber gloves, etc.

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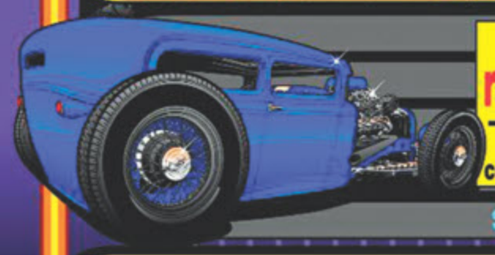

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