

# Small Engines

## Troubleshooting Small Engines

*James B. Wills, Jr., Professor, Agricultural Engineering*

The mechanic or operator who does a quick, successful job of troubleshooting uses a systematic approach. As a beginner, your approach in finding trouble should be systematic. Use a check sheet or operating manual to help you follow an organized pattern in your troubleshooting.

One major problem faced by the beginner is that he finds it too easy to keep on cranking the engine when it does not start. With an engine prepared for starting, a good rule to follow is only pull the starter rope three times. If it does not start, proceed with your troubleshooting. An engine in good operating condition, properly adjusted, should start on no more than three pulls of the starter rope.

### Starting Difficulties

#### Fuel mixture

1. Check to see if the tank is empty or shut off.
2. Remove the spark plug and check to see if it is dry. If it is dry, no fuel mixture is getting to the combustion chamber. If the plug is wet and possibly fouled, too rich a mixture has accumulated in the combustion chamber. Proceed accordingly depending on the condition of the plug.
3. Check to see if the choke valve is closing when the control lever is in the fully closed position.
4. Check for a plugged fuel line or stuck foot valve.
5. Check the setting of the load needle valve on the carburetor. Open the needle valve  $1\frac{1}{2}$  turns for start up. The previous setting might have provided too lean or too rich a mixture.
6. Stale gasoline can cause starting difficulties. If in trouble, drain the system and replace with fresh gasoline.

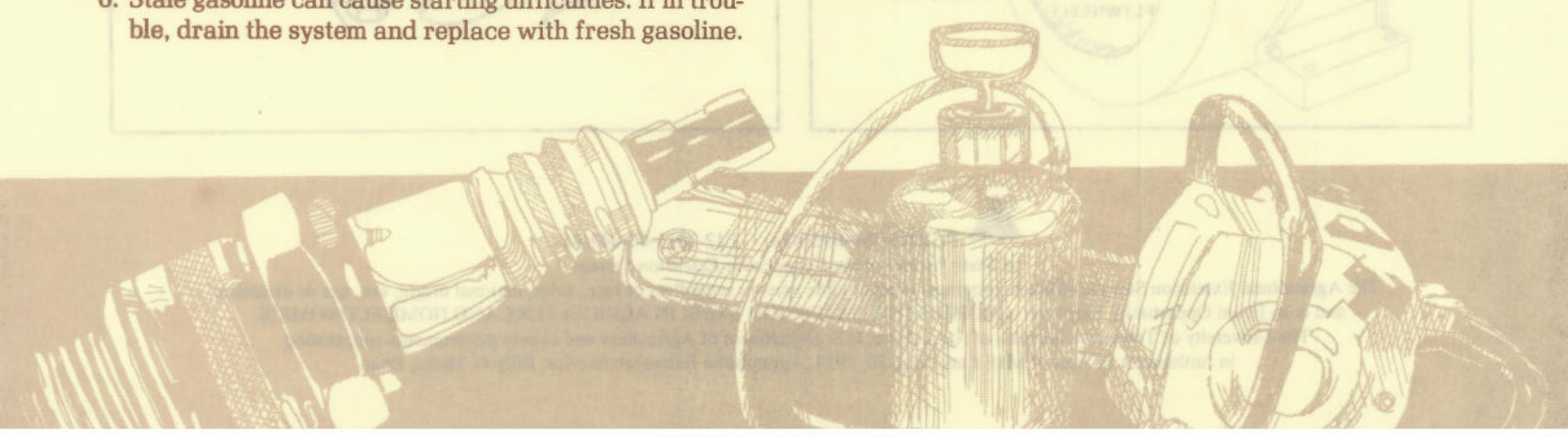
### Compression

If the engine has proper compression, more resistance will be encountered in the pull on the starting rope on one stroke of the piston as compared with the other strokes. As a simple compression test, give the flywheel a quick spin. If the flywheel rebounds on the compression stroke, the compression is good enough to start the engine. Another way of checking the compression is to remove the spark plug and then place your thumb over the hole. Turn the engine over until the compression stroke comes up; if the compression is good, you can detect it by the pressure exerted on your thumb. Some reasons for poor compression are:

- Cylinder dryness because engine has been out of use for some time.
- Loose or broken spark plug.
- Damaged head gasket or loose cylinder head.
- Piston rings stuck.
- Valves stuck.

### Ignition

Ignition troubles that you can check are limited. The spark plug itself can contribute to, or be the cause of, poor starting. Keep a fresh spark plug of the type recommended in owners manual on hand. It may be best to replace the old plug, to be sure it is clean and the gap is proper. Check your manual for gap setting which is probably .025-.030. Use some graphite grease on threads when replacing the spark plug and be careful not to over-tighten.





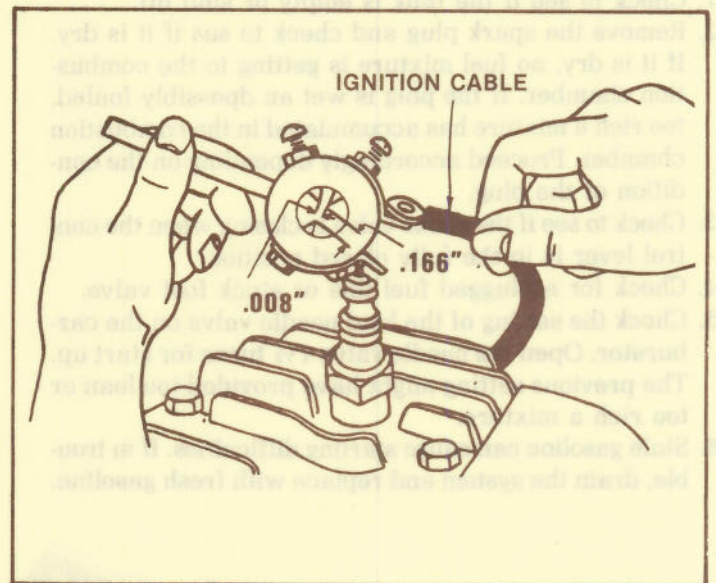
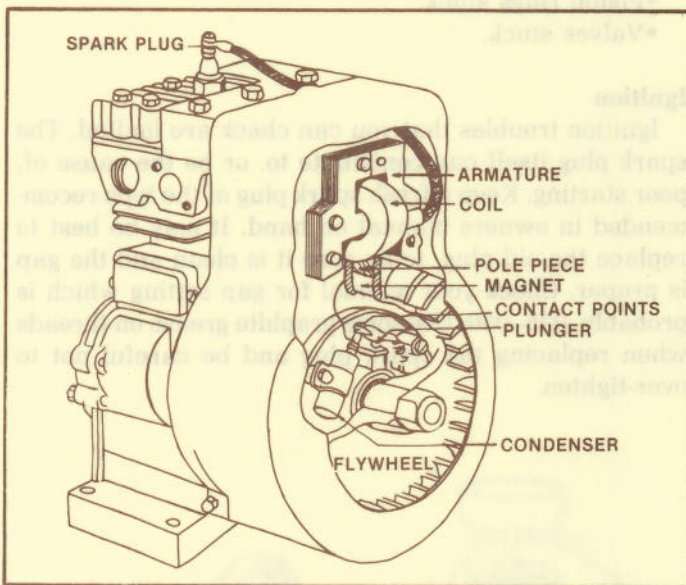
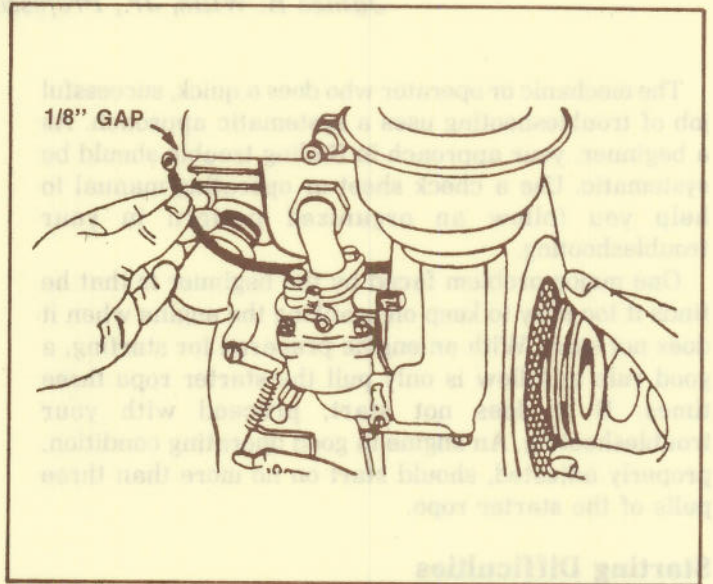
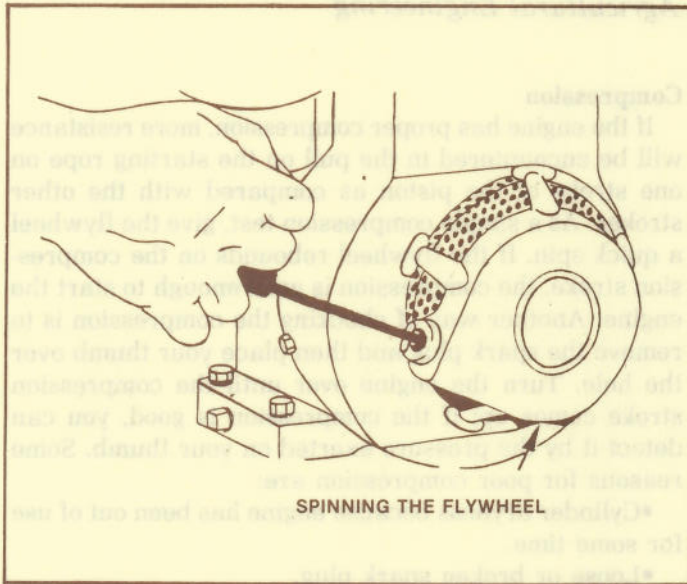
To check spark, engine not running, hold the end of the ignition cable about one-eighth inch from any metal part of the engine and spin the flywheel. The spark should jump the gap steadily if the gap remains consistent.

If you get a good spark by doing this, you can assume there is no ignition trouble up to this point. If you get no spark, the cable may be faulty or the magneto bad, in which case you should take the engine to a repair shop.

To make further checks, remove the spark plug. With

the cable attached, lay the plug on the engine block and spin the wheel. If the plug is good, a spark will jump the gap between the electrodes. If no spark occurs at the plug, the plug needs attention or needs to be replaced.

If starting troubles are still encountered after checking the fuel supply, compression and spark, you should secure the services of a mechanic. If operating adjustments are made correctly and you have running difficulties, contact a qualified service engineer.



SP268B-3M-4/95(Rep) E12-2015-00-049-95

*A State Partner in the Cooperative Extension System*

The Agricultural Extension Service offers its programs to all eligible persons regardless of race, color, national origin, sex, age or disability and is an Equal Opportunity Employer. COOPERATIVE EXTENSION WORK IN AGRICULTURE AND HOME ECONOMICS.

The University of Tennessee Institute of Agriculture, U.S. Department of Agriculture and county governments cooperating in furtherance of Acts of May 8 and June 30, 1914. Agricultural Extension Service, Billy G. Hicks, Dean