

A EN 201 - Agricultural Power Units

Small Engine Disassembly

Objectives:

The Student Will Be Able To:

1. Appreciate teaching methods and safety practices used in the small engine disassembly/assembly;
2. Identify and record engine information; and
3. Identify engine parts and explain how the basic parts work together in the engine.

Required Reading For Quiz:

1. Chapter 3, Engines, Fundamentals of Service; John Deere
2. Enclosed Power Point Presentation
3. Laboratory Introduction

I. Introduction:

The gasoline engine consists of many parts that function together as a smooth power team. It is important to be able to identify these parts and explain how they fit and work together.

Students are to disassemble a typical four-stroke cycle engine, study the basic parts, and then prepare to check for wear and reassembly of the engine in the two laboratories that follow this one. Before starting to disassemble the engine, make sure it is full of oil, then run the engine for a minute or two. **Safety glasses must be worn!** *Remember, the speed of work done in the next three labs is not important!* What is important is a careful, workmanlike approach to the job.

At the beginning of this lab the instructor will properly disassemble an engine that will be similar to yours. It is your job to pay close attention to the techniques used, as well as to take detailed notes for your own purposes. Following the instructor's disassembly, you and a partner will be charged with the disassembly of an engine that will be assigned to you.

The following disassembly procedure will take you step-by-step through the process. The procedure is generic in that it works with a number of different types of engines that are present in the lab. Reminders have been given to you for each step, and will let you know when engine differentiation is important. It is important that you remember that this is not a race! Careful attention should be given to each step.

Remember, there are no silly questions! If you cannot remember how to do something, please stop and ask!

Required Materials:

- Tool Set & Lab Manual
- Eye Protection
- Red Rags
- 10 "Zip-Lock" bags

II. Engine Information:

Engine Make: _____.

Model Number: _____.

Type & Code Number: _____.

Engine Stroke/Cycle: _____.

Horsepower: _____.

Vertical Shaft: Horizontal Shaft:

III. Lecture Oriented Disassembly Procedure:

1. Drain Oil from Crankcase (See Figure, 3.1)
2. Drain Fuel from Tank
3. Disconnect the Spark Plug Cable and Remove Spark Plug
4. Remove Air Cleaner & Mounting Plate if Equipped
5. Remove Blower Housing
6. Remove Vane Governor, Carburetor Linkage, and Armature
Reminder: Sketch a picture of the linkage assembly to the left of this page for reassembly purposes. 5hp models will not have a vane governor or linkage that attaches to it.
7. Remove Carburetor and Fuel Tank (Do not remove carburetor from tank)
Reminder: Some models require step 8 before this step. On 5hp models DO NOT loosen or remove the mechanical governor bar. Remove the linkage only.
8. Remove Muffler
9. Remove Flywheel Screen & Starter Clutch -OR- Crankshaft Nut, Bell Housing, & Flywheel Screen (See Figure, 3.2)
10. Remove Flywheel (See Figure, 3.3)
Reminder: Keep track of the flywheel key.

Note: If the engine you are working on is equipped with a Magnetron® Ignition System, disregard steps 11-13. ***Sketch the points & condenser assembly to the left of this page for reassembly purposes before disassembly.**

11. Remove Breaker Point Cover

12. Remove Breaker Points and Condenser

13. Remove the Armature Wire if Still Attached

14. Remove Cylinder Head

Reminder: Sketch or note cylinder head bolt differences & locations to the left of this page for reassembly purposes.

15. Remove the Crankcase Cover (See Figure, 3.4)

Reminder: Use caution not to tear the gasket. Oil may still be in the crankcase.

16. Remove the Camshaft (See Figure, 3.5)

Reminder: Sketch the position of the timing marks to the left of this page.

17. Remove the Tappets/Lifters (may fall out when cam is removed)

18. Unbolt the Connecting Rod from the Crankshaft

Reminder: Use a 6 point socket only! Sketch the orientation of the cap to connecting rod as well as the connecting rod to the engine to the left of this page.

19. Remove the Piston

Reminder: Note the orientation of the piston when removed from the cylinder.

20. Remove the Rings and the Connecting Rod from the Piston (See Figures, 3.6-9)

Reminder: Sketch the piston ring orientation if differences exist. Sketch the orientation of the connecting rod to the piston to the left of this page.

21. Remove the Crankshaft (See Figure, 3.10)

Reminder: Note the differences in the ends of the crankshaft.

22. Remove the Valve Cover Plate

23. Remove the Valve Springs and Valves

Reminder: Note possible differences in the valve springs. Some engines may have different valve keepers.

Note: Be sure not to lose any parts of your assigned engine! The basic internal engine parts are pictured below in Figure, 3.14. If parts are lost speak with the lab instructor about it. DO NOT fail to inform instructor, because damage could result if engines are reassembled with parts missing. Be sure to clean all of your engine parts, wipe them down, and keep them all in a bin! Return the bin to the shelves in the small gas engine room.

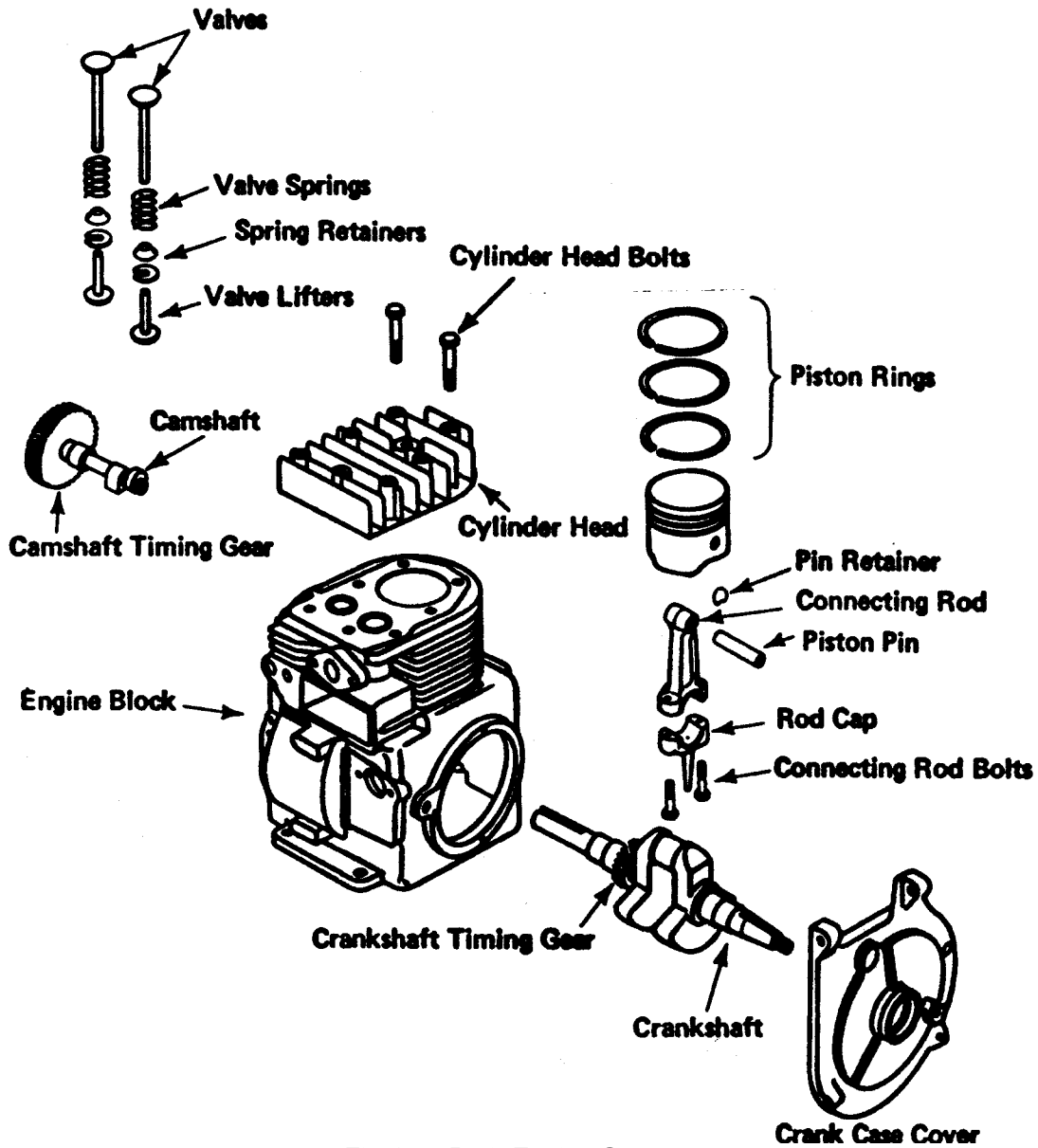


Fig. 3.14, Basic Engine Components

Figures Used In Disassembly Procedure:

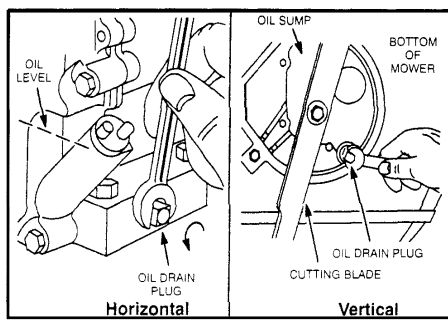


Fig. 3.1, Draining the Engine Oil
Courtesy of Briggs & Stratton Corp.

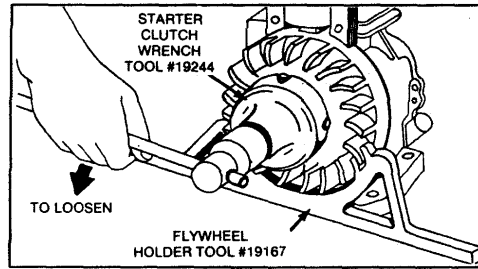


Fig. 3.2 Removing the Starter Clutch
Courtesy of Briggs & Stratton Corp.

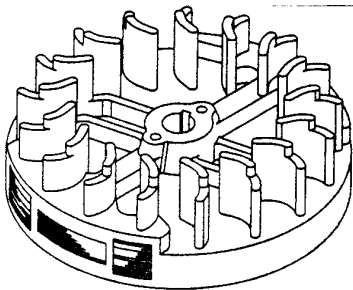


Fig. 3.3, Removed Flywheel
Courtesy of Briggs & Stratton Corp.

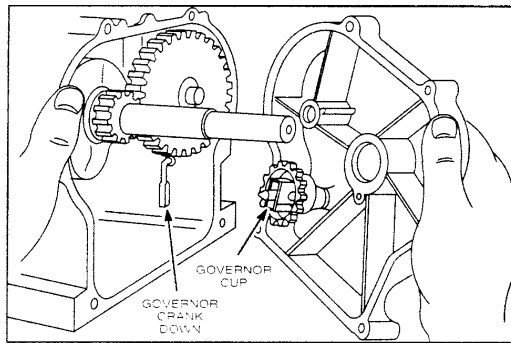


Fig. 3.4, Removing the Crankcase Cover
Courtesy of Briggs & Stratton Corp.

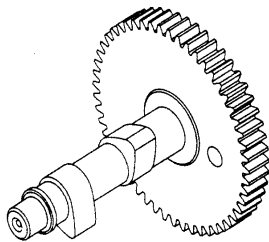


Fig. 3.5 Cam Gear
Courtesy of Briggs & Stratton Corp.

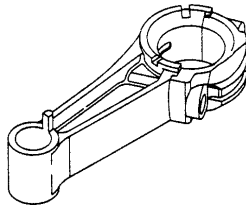


Fig. 3.6, Connecting Rod
Courtesy of Briggs & Stratton Corp.

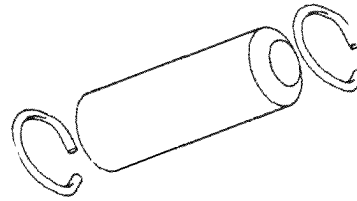


Fig. 3.7, Piston Pin
Courtesy of Briggs & Stratton Corp.

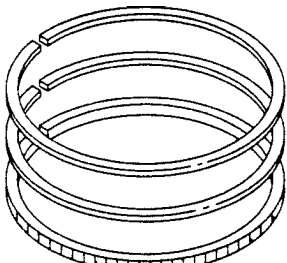


Fig. 3.8, Piston Rings
Courtesy of Briggs & Stratton Corp.

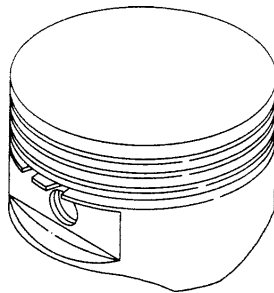


Fig. 3.9, Disassembled Piston
Courtesy of Briggs & Stratton Corp.

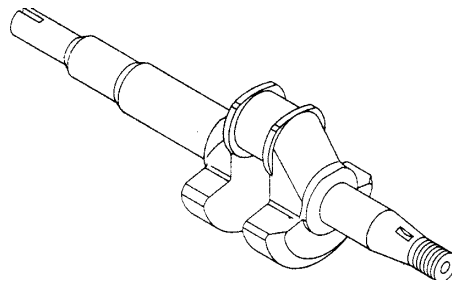


Fig. 3.10, Disassembled Crankshaft
Courtesy of Briggs & Stratton Corp.

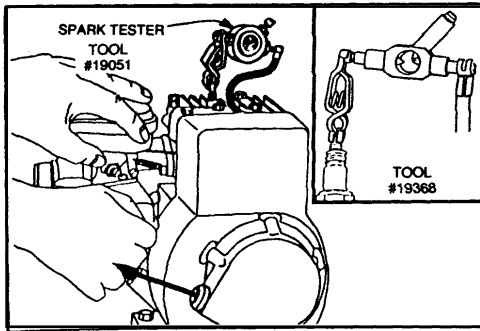


Fig. 3.11, Checking for Ignition Spark
 Courtesy of Briggs & Stratton Corp.

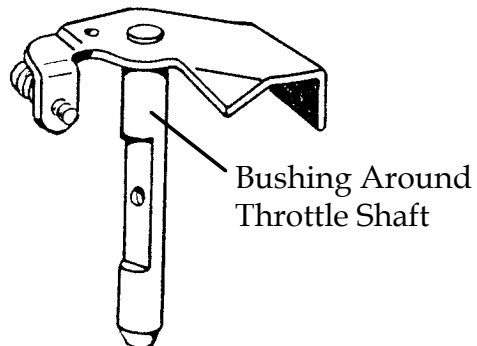


Fig. 3.12, Checking Throttle Bushing Wear
 Courtesy of Briggs & Stratton Corp.

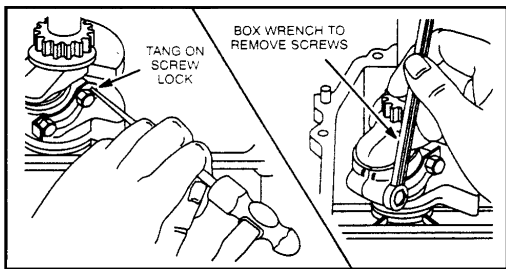


Fig. 3.13, Straightening Rod Lock
 Courtesy of Briggs & Stratton Corp.

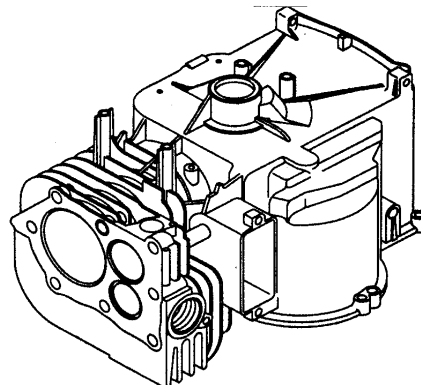


Fig. 3.15, Disassembled Crankcase/
 Cylinder Head
 Courtesy of Briggs & Stratton Corp.



Notes:

