Section 5
GOVERNORS

THE PURPOSE OF THE GOVERNOR IS TO MAINTAIN WITHIN CERTAIN LIMITS, A DESIRED ENGINE SPEED, EVEN THOUGH THE LOAD MAY VARY.

AIR VANE GOVERNOR

The governor spring tends to open the throttle. Air pressure against the air vane tends to close the throttle. The engine speed at which these two forces balance is called the governed speed. The governed speed can be varied by changing governor spring tension, Fig. 1, or changing governor spring, Fig. 2.

Checking

Worn linkage or damaged governor springs should be replaced to insure proper governor operation. If spring or linkage is changed, check and adjust TOP NO LOAD R.P.M., Fig. 1 or check TOP NO LOAD R.P.M., Fig. 2, with engine assembled.

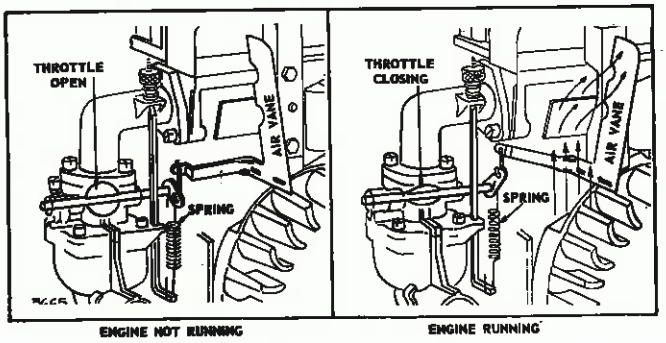

Fig. 1 — Air Vane Governor (Typical)

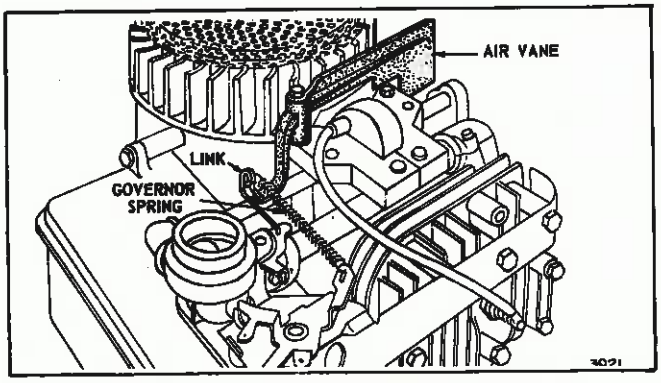

Fig. 2 — Air Vane Governor (Typical)

MECHANICAL GOVERNOR

The governor spring tends to pull the throttle open. The force of the counterweights, which are operated by centrifugal force, tends to close the throttle. The engine speed at which these two forces balance is called the governed speed. The governed speed can be varied by changing governor spring tension or governor spring. See Fig. 3.

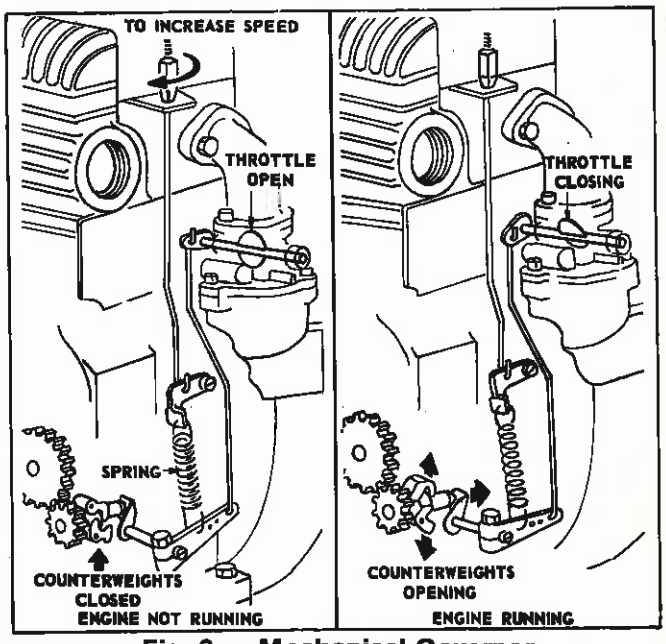

Fig. 3 — Mechanical Governor

GOVERNED SPEED LIMITS

To comply with specified top governed speed limits, Briggs & Stratton supplies manufacturers with engines using either calibrated governor springs or an adjustable top speed limit. Calibrated springs or an adjustable top speed limit will allow no more than a desired top governed speed when the engine is operated on a rigid test stand at our own Factory. However, the design of the cutter blade, deck, etc., can affect engine speeds. Therefore, the top governed speed should be checked with tachometer when the engine is operated on a completely assembled machine. If on a lawn mower, it should be operated on a hard surface to eliminate cutting load on the blade.

GOVERNOR
Speed Limits & Repair

If a Service Replacement Engine is used, check the top governed speed using a tachometer, with the engine operating on a completely assembled mower, to be sure the blade tip speed will not exceed 19,000 feet per minute. If necessary, change the governor spring or adjust the top speed limit device, so the engine will not exceed the recommended speed, based on blade length as shown. See page 6 for adjustment procedure for mechanical governor.

If a governor spring must be replaced, consult the appropriate Illustrated Parts List. Choose the proper governor spring by engine type number. AFTER A NEW GOVERNOR SPRING IS INSTALLED, CHECK ENGINE TOP GOVERNED SPEED WITH AN ACCURATE TACHOMETER.

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Run engine at half throttle to allow the engine to reach normal operating temperature before measuring speed with a tachometer. To account for tolerances, which may be required by tachometer manufacturers, we suggest that the top governed speed of the engine be adjusted at least 200 R.P.M. lower than the maximum speeds shown.

Since blade tip speed is a function of engine R.P.M., lower tip speeds require lower engine speeds.

The chart below lists various lengths of rotary lawnmower cutter blades, and the maximum blade rotational speeds, which will produce blade tip speeds of 19,000 feet per minute.

BLADE LENGTH	MAXIMUM ROTATIONAL R.P.M.
18"	4032
19"	3820
20"	3629
21"	3456
22"	3299
23"	3155
24"	3024
25"	2903
26"	2791

NOTE: For correct no load R.P.M. by model and type, see engine sales manual, Note column.

MECHANICAL GOVERNOR

MODELS N, 6, 8 (CAST IRON)

Disassembly

Loosen the two mounting screws to remove governor housing. The cup can be pulled off the governor gear and the gear will slide off the shaft. See Fig. 4. To disassemble the governor crank, drive the roll pin out at the end of the governor lever; remove the governor crank bushing. Then pull governor crank out of the housing.

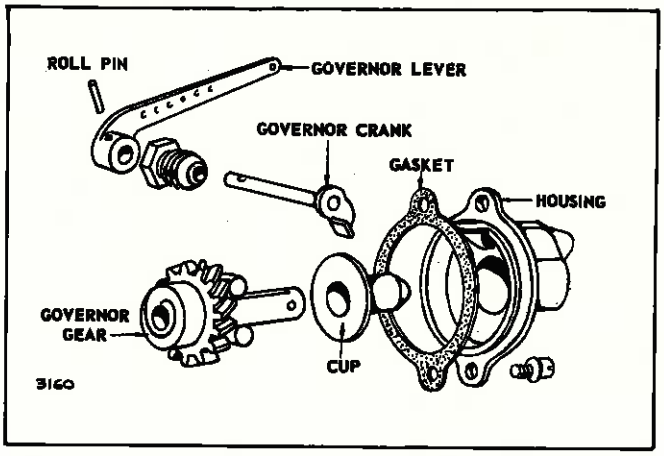

Fig. 4 — Governor Housing and Gear Assembly

Re-Assembly

To assemble the governor crank, bushing and lever to the housing, push the governor crank, lever end first, into the housing. Slip the bushing onto the shaft; then thread the bushing into the housing and tighten securely. Place the lever on the shaft with the governor crank in the position shown in Fig. 5. Place the governor gear on shaft in cylinder. Place gasket on governor housing; then assemble governor housing to the cylinder and tighten in place with two mounting screws.

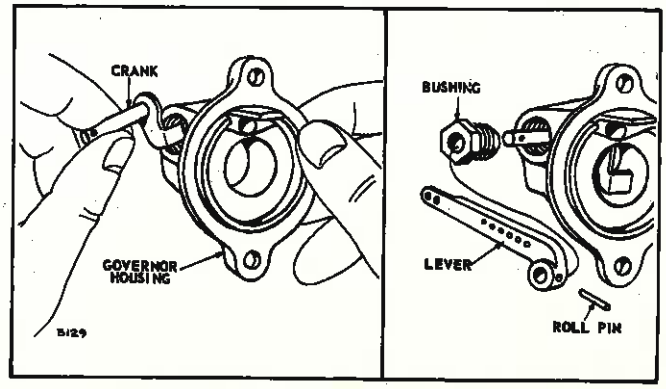

Fig. 5 — Install Crank and Lever

Adjustment

There is no adjustment between governor lever and governor crank on these models. However, governor action can be changed by inserting governor link or spring in different holes of governor and throttle levers. Fig. 6. In general, the closer to the pivot end of the lever, the smaller the difference between load and no load engine speed. The engine will begin to "hunt" if the spring is brought too close to the pivot point. The further from the pivot end, the less tendency to "hunt" but the greater the speed drop with increasing load. If the governed speed is lowered, the spring can usually be moved closer to the pivot. The standard setting is shown in Fig. 6.

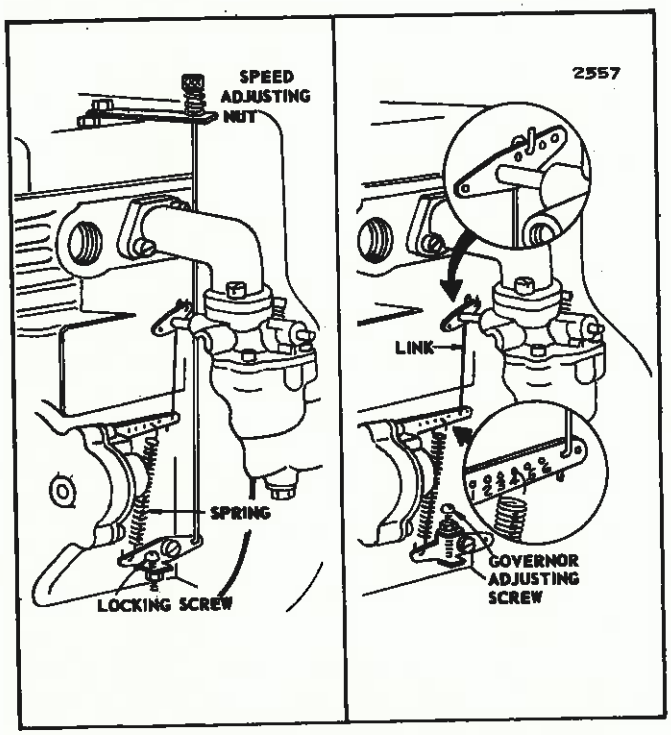

Fig. 6 — Mechanical Governor Linkage

MECHANICAL GOVERNOR

MODELS 6B, 8B, 60000, 80000, 140000 (ALUMINUM)

Disassembly

To service governor, remove crankcase cover. Loosen the screw on the governor lever and pull lever from governor crank. Loosen the two mounting screws to remove gear housing. See Fig. 7. As the housing is removed, the governor gear will slip off the shaft. There is a steel thrust washer on the shaft between the gear and the governor housing.

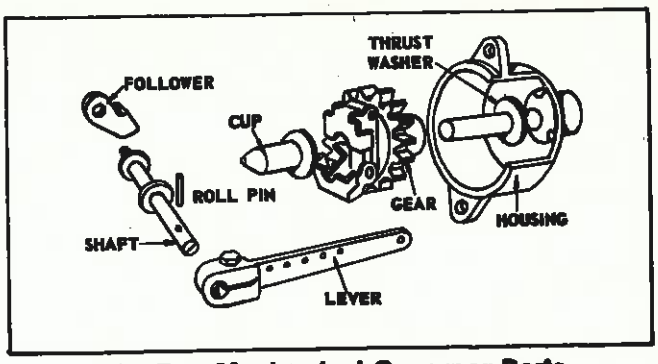

Fig. 7 — Mechanical Governor Parts

To remove governor lever shaft, remove roll pin and washer. Unscrew governor lever shaft by turning clockwise. Remove governor lever shaft. Fig. 7.

Re-Assembly

Push governor lever shaft into crankcase cover, with the threaded end in. Assemble the small washer on the inner end of the shaft, then screw the shaft into the governor crank follower by turning the shaft counterclockwise. Tighten securely. Turn the shaft until follower points down as illustrated, Fig. 8. Place the washer on the outside end of the shaft. Install roll pin. The leading end of the pin should just go through the shaft so the pin protrudes from only one side of the shaft.

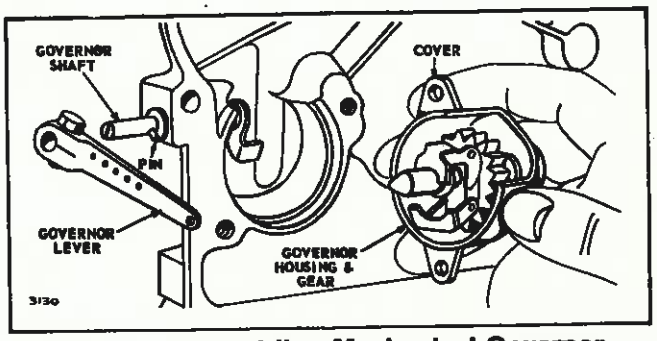

Fig. 8 — Assembling Mechanical Governor

Place the thrust washer and then the governor gear on the shaft in the gear housing. Hold crankcase cover in a vertical (normal) position and then assemble the housing with gear in position so that the point of the steel cup on the gear rests against the crank follower. Tighten housing in place with two mounting screws. See Fig. 8.

Assemble the governor lever to the lever shaft with lever pointing downward at about a 30° angle. Adjustment will be made later when carburetor linkage is assembled.

Adjustment

With crankcase cover, carburetor and all linkage installed, loosen screw holding governor lever to governor shaft. Place throttle in high speed position. Hold throttle in this position and with a screwdriver turn governor shaft COUNTER-CLOCKWISE as far as it will go. Tighten screw holding governor lever to governor shaft to 35-45 in. lbs. torque (.4-.52 mkp, 4.0-5.0 Nm). See fig. 9. Before starting engine, manually move governor linkage to check for any binding. Correct any binding in linkage or carburetor.

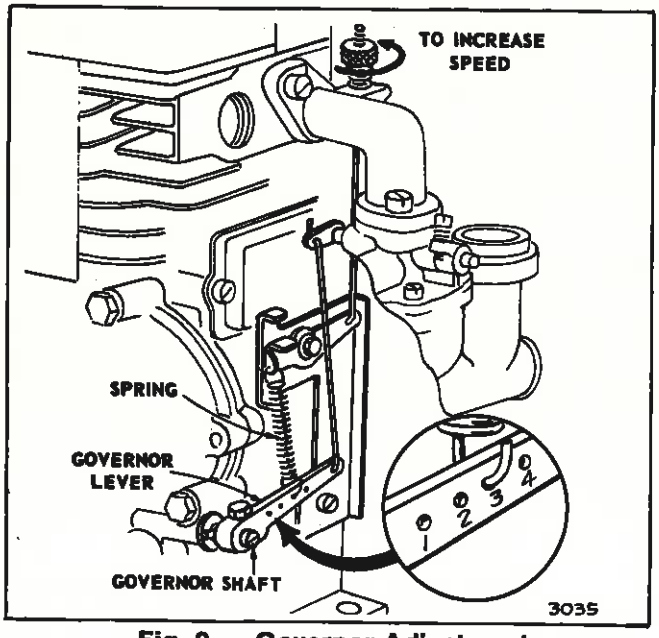

Fig. 9 — Governor Adjustment

MECHANICAL GOVERNOR

CAST IRON MODELS

9, 14, 19, 190000, 200000, 23, 230000, 240000, 300000, 320000

Disassembly

To service, remove engine base. Remove the cotter key and washer from outside end of governor shaft. Remove governor crank from inside the crankcase. Governor gear slides off the shaft.

Re-Assembly

Assemble the governor gear and cup assembly on shaft protruding on inside of cylinder. Then insert governor shaft assembly through bushing from inside of cylinder. Assemble governor lever to governor shaft loosely.

NOTE: Later models have a spacer between governor shaft assembly and bushing.

Adjustment

Loosen screw holding governor lever to governor shaft. Place throttle in high speed position. Hold throttle in this position and with a screwdriver turn governor shaft COUNTERCLOCKWISE as far as it will go. Tighten screw holding governor lever to governor shaft to 35-45 in. lbs. torque (.4-.52 mkp, 4.0-5.0 Nm). See Fig. 9. Before starting engine, manually move governor linkage to check for any binding.

NOTE: If governor bushing is replaced it should be finish reamed to .239-.2385 (6.07-6.05 mm) after installation using Stanisol or kerosene as lubricant.

MECHANICAL GOVERNOR

ALUMINUM MODELS 94000

The mechanical governor used on Model Series 94000 is illustrated in Fig. 10. The governor gear is part of the oil slinger.

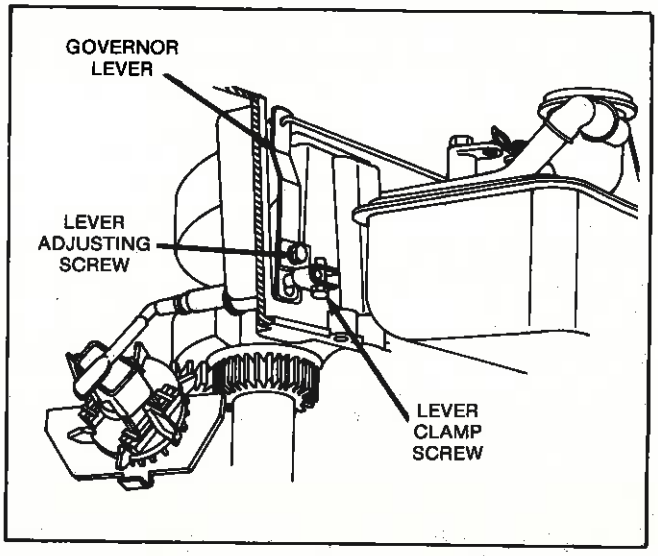

Fig. 10 — 94000 Governor

Disassembly

Before governor can be serviced, it is necessary to remove engine sump. To remove governor shaft, remove lever adjusting screw, Fig. 10 and loosen lever clamp screw, Fig. 10. Slide off clamp. Lift governor lever up to release slot in governor shaft and slide governor shaft out of bushing. If oil slinger and governor gear assembly interferes, remove.

Re-Assembly

Insert governor shaft into governor bushing from inside cylinder. Then slide governor lever on governor shaft and slide lever down onto shaft slot. Slide on lever clamp and start screw in adjusting slot on clamp. Torque lever clamp screw to 15 in. lbs. (.17 mkp, 1.7 Nm). Install oil slinger and governor gear assembly, sump gasket and oil sump. Place non-hardening sealant on screw "A," Fig. 11, and tighten all sump screws.

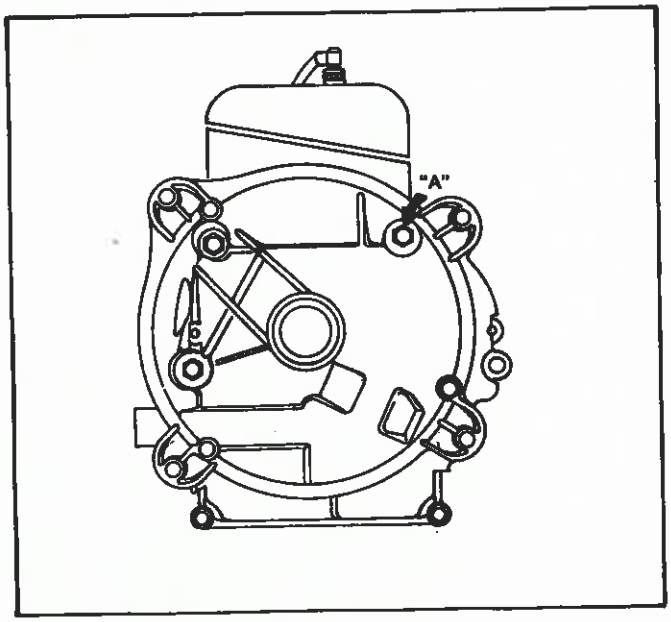

Fig. 11 — Sealant on Screw

Adjustment

Loosen lever adjusting screw, Fig. 10. While holding governor lever and governor clamp to the left (counterclockwise), tighten lever adjusting screw to 15 in. lbs. (.17 mkp, 1.7 Nm).

Replacement, Governor Shaft Bushing

When a new governor shaft bushing is pressed in, it should be pressed in until 1/16" (1.58 mm) extends out from crankcase. Finish ream with 19058 reamer using Stanisol or kerosene for lubricant.

Installation, Governor Spring

Hold governor spring as shown in Fig. 12 with open end of small loop down. Hook large loop in throttle link loop as shown in Fig. 12 and pull loop toward throttle lever until end of spring loop snaps on. Hook small loop in throttle control lever as shown in Fig. 13.

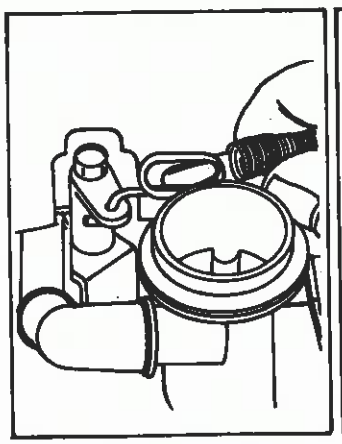

Fig. 12 — Installing Governor Spring

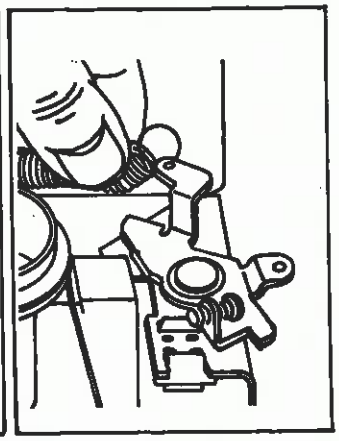

Fig. 13 — Governor Spring Installed

100000, 130000, 140000, 170000, 190000, 220000 and 250000 (Aluminum Cylinders)

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Disassembly

The governor used on the horizontal shaft models is illustrated in Figs. 14 and 16. The governor used on the vertical shaft models is incorporated with the oil slinger. Figs. 15 and 16.

The only disassembly necessary is removing the governor assembly as one unit from the shaft on the crankcase cover on horizontal models. On vertical shaft models, it is removed as part of the oil slinger. Further disassembly is unnecessary.

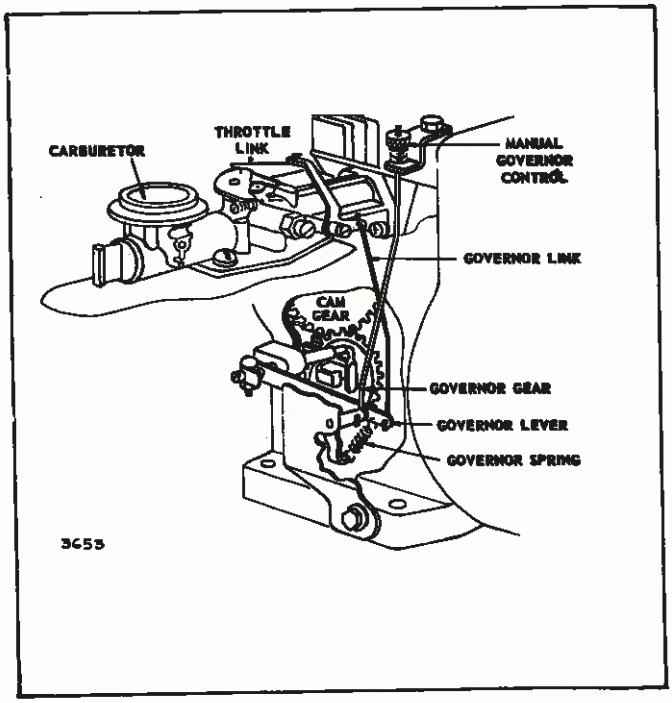


Fig. 14 — Horizontal Shaft

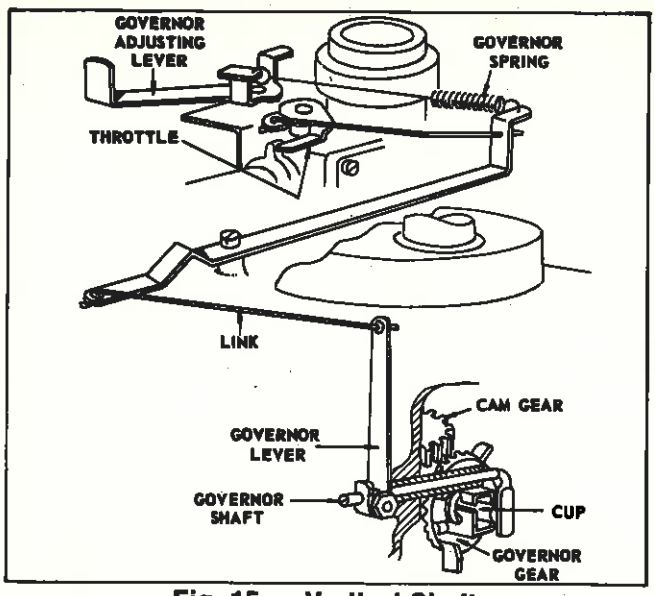


Fig. 15 — Vertical Shaft

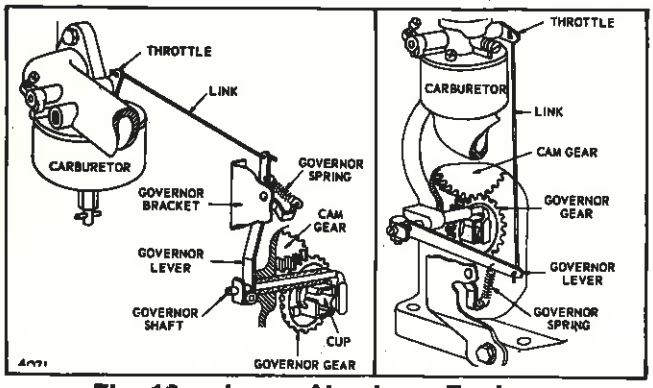


Fig. 16 — Large Aluminum Engines

Re-Assembly

On horizontal crankshaft models, the governor rides on a short stationary shaft and is retained by the governor shaft, with which it comes in contact after the crankcase cover is secured in place. Press governor cup against crankcase cover to seat retaining ring on shaft, prior to installing crankcase cover. It is suggested that the assembly of the crankcase cover be made with the crankshaft in a horizontal position. The governor shaft should hang straight down parallel to the cylinder axis. Fig. 17. If the governor shaft is clamped in an angular position, pointing toward the crankcase cover, it is possible for the end of the shaft to be jammed into the inside of the governor assembly, resulting in broken parts when the engine is started. After the crankcase cover and gasket are in place, install cover screws. Be sure that screw "A," Fig. 19, has nonhardening sealant on threads of screw. Complete installation of remaining governor linkages and carburetor and then adjust governor shaft and lever.

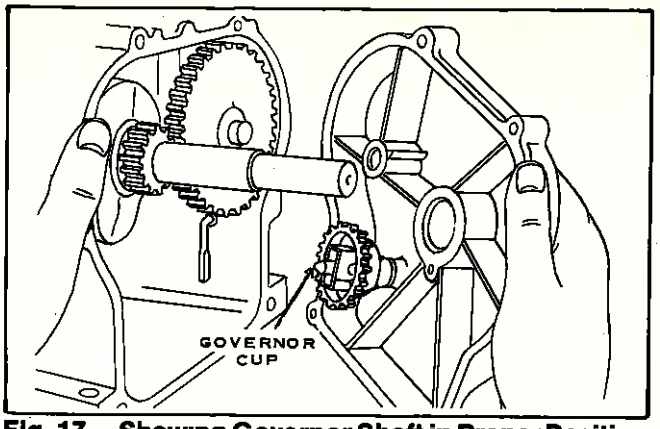


Fig. 17 — Showing Governor Shaft in Proper Position

On vertical crankshaft models the governor is part of the oil slinger and is installed as shown in Fig. 18. Models 100900 and 130900 use spring washer as shown in Fig. 18. Before installing sump be sure that governor cup is in line with governor shaft paddle. Install sump cover and gasket being sure screw "A," Fig. 19 has nonhardening sealant on threads.

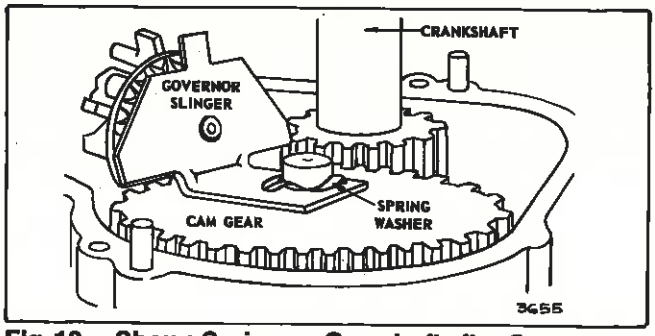


Fig. 18 — Shows Spring on Camshaft after Governor is Installed. Models 100900 and 130900 Only.

NOTE: On right angle auxiliary drive power take off models, screw "A" does not need sealant but the four screws holding the gear sump cover do need sealant. See insert, Fig. 19.

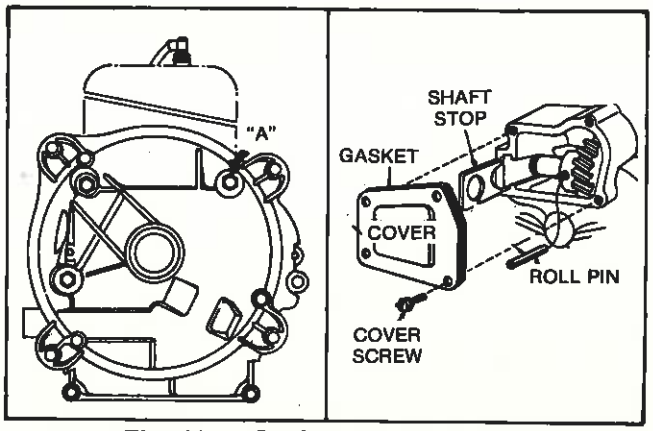


Fig. 19 — Sealant on Screw "A"

Complete installation of remaining governor linkages and carburetor and then adjust governor shaft and lever.

NOTE: If governor bushing is replaced it should be finished reamed to .2435-.2410 (6.18-6.12 mm) for 1/4" (6.35 mm) or with 19058 reamer for 3/16" (4.76 mm) governor shaft.

Adjustment

Loosen screw holding governor lever to governor shaft. Place throttle in high speed position. While holding throttle in this position and with a screwdriver turn governor shaft clockwise as far as it will go. Tighten screw holding governor lever to governor shaft to 35-45 in. lbs. (.4-.52 mkp or 4.0-5.0 Nm) torque. See Fig. 20.

Before starting engine, manually move governor linkage to check for any binding.

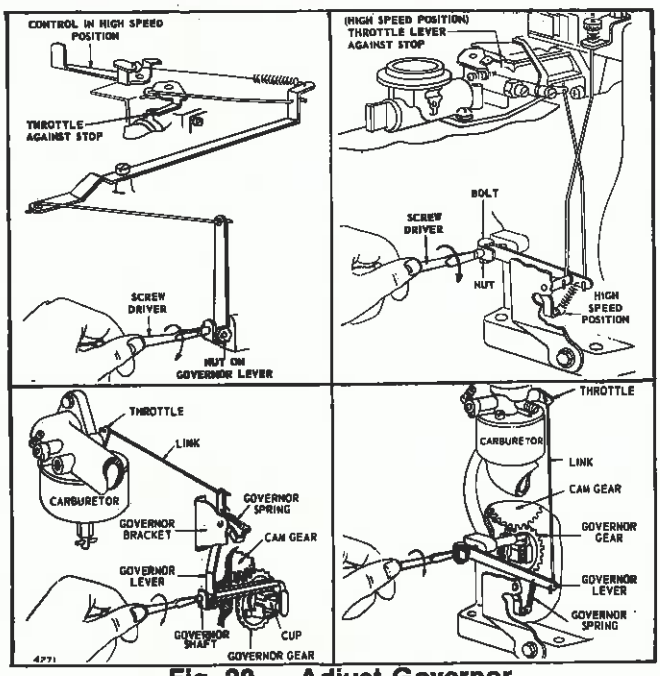
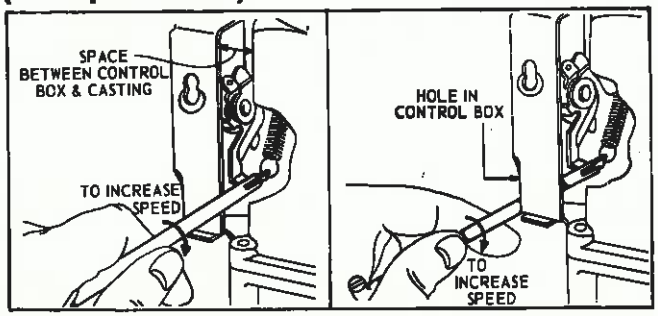


Fig. 20 — Adjust Governor

MECHANICAL GOVERNOR — ADJUSTING TOP NO LOAD SPEED ALUMINUM MODELS 100200, 130200, 170000, 190000, 220000, 250000 (Except 253400)



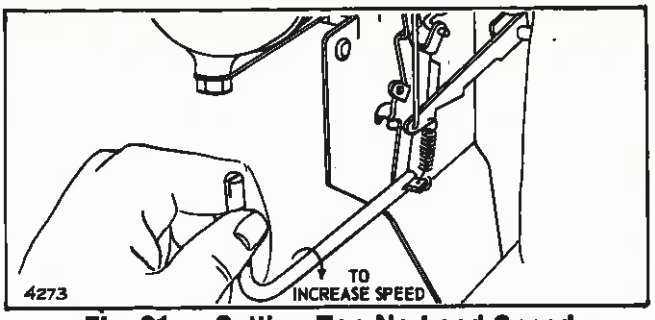


Fig. 21 — Setting Top No Load Speed

1. Set control lever to maximum speed position, with engine running. see Fig. 20.
2. Use tool 19229 to bend spring anchor tang to get desired top speed. See Fig. 21. To make own tool, see Fig. 22.

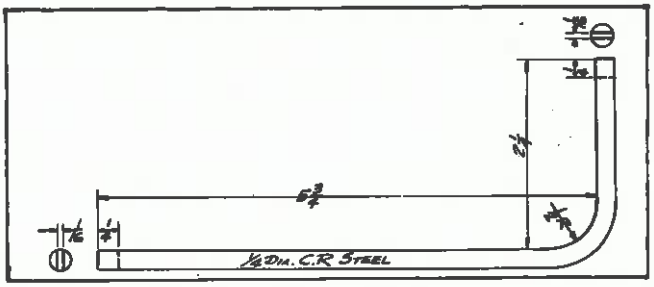


Fig. 22 — Tang Bending Tool

To adjust governed idle refer to Section 4, Governor Controls and Carburetor Linkages.

ADJUSTING MECHANICAL GOVERNOR

MODEL SERIES 253400

On Model Series 253400, governor adjustments are the same except top governed speed. To set top governed speed, turn screw "A" in to decrease or out to increase R.P.M. Refer to Engine Sales Manual, Note column for recommended governed R.P.M. See Fig. 23.

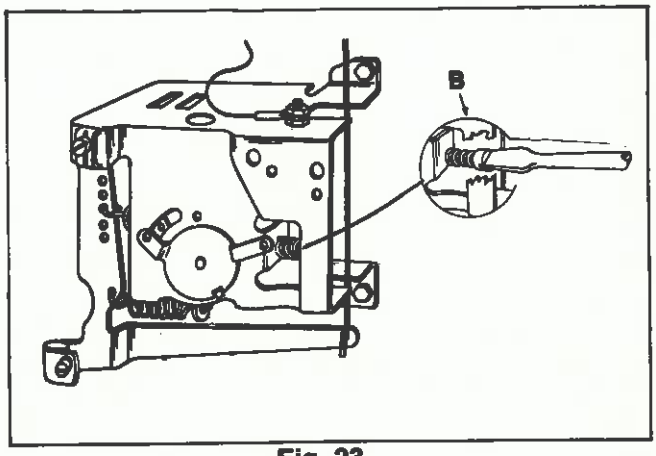


Fig. 23

GOVERNORS
Speed Setting

MODEL SERIES 190000, 200000, 230000, 300000, 320000 (Cast Iron Cylinders)

For fixed speed operation, loosen lower stop nut. Adjust top stop nut to obtain top no load governor R.P.M. as shown in Engine Sales Manual, Note column. Tighten lower stop nut. Fig. 24.

For remote control operation, adjust lower stop nut to obtain top no load governed R.P.M. as specified in the Engine Sales Manual, note column. Fig. 24.

To adjust governor idle refer to Section 4, Governor Controls and Carburetor Linkages.

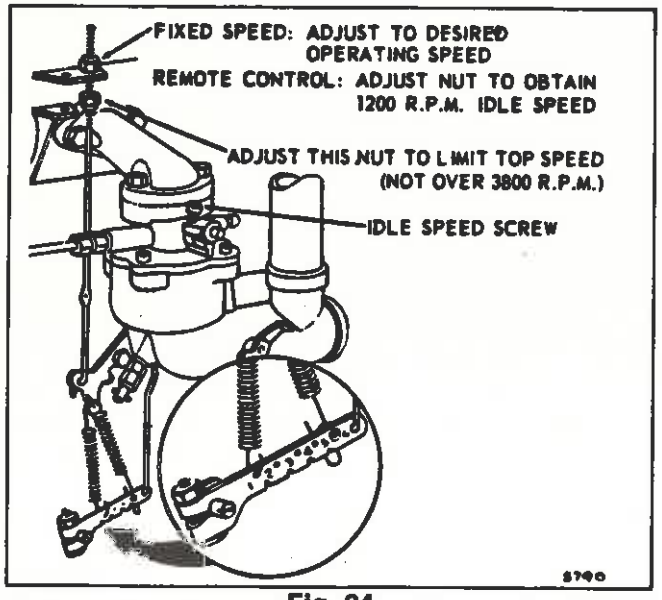


Fig. 24

OBTAINING CLOSER GOVERNING (Generator Applications Only)

Governor regulation to within two cycles of either 60 or 50 cycles can be obtained if the following procedure is done:

MODEL SERIES 100000, 130000

a. 1800 R.P.M., 60 cycle or 1500 R.P.M., 50 cycle generators — Push speed adjusting nut in and up to release spring tension, Fig. 25. Start engine and pull out on speed adjusting nut to the maximum length of travel. Set engine speed to 2800 R.P.M. by bending governor tang, Fig. 21. With engine still running, return speed adjusting nut to slot and turn nut to obtain 1875 R.P.M., 60 cycle, or 1600 R.P.M., 50 cycle, no load.

b. 3600 R.P.M., 60 cycle or 3000 R.P.M., 50 cycle generators — Push speed adjusting nut in and up to release spring tension, Fig. 25. Start engine and pull out on speed adjusting nut. Set engine speed to 4600 R.P.M. by bending governor tang, Fig. 21. With engine still running, return speed adjusting nut to slot and turn nut to obtain 3700 R.P.M., 60 cycle, or 3100 R.P.M., 50 cycle, no load.

MODEL SERIES 140000, 170000, 190000, 220000, 250000 (Aluminum Cylinders)

a. 1800 R.P.M., 60 cycle or 1500 R.P.M., 50 cycle generators — Push speed adjusting nut in and up to release spring tension, Fig. 25. Start engine and pull out on speed adjusting nut. Set engine speed to 2600 R.P.M. by bending governor tang, Fig. 21. With engine still running, return speed adjusting nut to slot and turn nut to obtain 1875 R.P.M., 60 cycle or 1600 R.P.M., 50 cycle, no load.

b. 3600 R.P.M., 60 cycle or 3000 R.P.M., 50 cycle generators — Push speed adjusting nut in and up to release spring tension, Fig. 25. Start engine and pull out on speed adjusting nut. Set engine speed to 4200 R.P.M. by bending governor tang, Fig. 21. With engine still running, return speed adjusting nut to slot and turn nut to obtain 3700 R.P.M., 60 cycle or 3100 R.P.M., 50 cycle, no load.

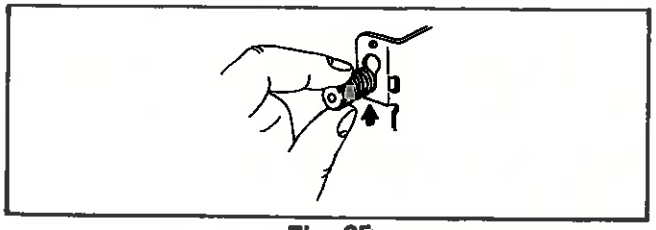


Fig. 25

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