WRIGHT

WRIGHT SAW DIVISION
BEAIRD-POULAN, INC.
5320 Greenwood Road
Shreveport, Louisiana 71109

Model	Bore Inches	Stroke Inches	Displ. Cu. In.
100	1.788	1.437	3.6
GS-218, GS-2520	2	1 7/16	4.51
GS-4520, GS-5020,GS-5020A, B520	2½	1 7/16	7.06
GS-2016, B316	2	1 7/16	4.0

All models are blade type power saws. On Models GS2016 and B316 the blade is driven by a rod protruding from and integral with the head of the piston. The lower displacement of these models as compared with models GS-218 and GS-2520 is because of this drive rod. All other models, except model 100, use opposed piston construction where the front non-firing piston drives the saw. Blade on model 100 is driven by a crank through a series of gears.

To service and maintain model 100 engine, follow procedures outlined for 3.6 cu. in. engine in POULAN section.

Refer to POULAN section for parts procurement.

MAINTENANCE

SPARK PLUG. 14mm Champion J-11J or equivalent should be used on models GS-218 and GS-2520; Champion J-18-Y should be used on models GS-2016 and B316. The recommended spark plug for all other models is Champion J-14J. Electrode gap should be 0.025 for all models.

CARBURETOR. Early GS-218 engines are equipped with a modified Carter carburetor provided with wick elements (425-02) for upside down operation. Clockwise rotation of both the idle mixture and the power mixture needles leans the mixture. Desired power needle setting should be made under load and will be slightly richer than setting for highest rpm no load. Float setting is 5/16-inch from nearest edge of float, at free end to edge of body.

Late GS-218, B316 and B520; and all GS-2520 and GS-4520 engines are equipped with a Tillotson HL diaphragm carburetor with integral fuel pump. A Tillotson HL carburetor is also used as a service replacement for models using Carter diaphragm carburetors. The carburetor is supplied as a service replacement including attaching parts. Clockwise rotation of both the high speed and low speed adjustment needles leans the mixture. Normal setting for both needles is 1-1½ turns open. Refer to Tillotson section of SERVICE FUNDAMENTALS section for carburetor service.

Models GS-2016, GS-5020, GS-5020A and some B316 and B520 engines are equipped with a Carter ND or NRD diaphragm type carburetor and integral fuel pump. Clockwise rotation of both the high speed and low speed adjustment needles leans the mixture. On model ND carburetor, normal setting for idle adjustment needle is ¾-turn open; for high speed needle is 1-1½ turns open. On model NRD carburetor, set idle adjustment needle 1-turn open and high speed adjustment needle 2-turns open. On all carburetors, final adjustment must be made under operating conditions for best performance. Refer to Fig. WR2 for an exploded view of Carter diaphragm carburetor.

Fuel control lever setting on Carter carburetors should be 0.075-0.080 below flush with carburetor housing flange when measured as shown at (A—Fig. WR3). A special setting gage (Wright Tool No. 644555) is available for making the adjustment.

NOTE: On early gages, the projection (P) contacting the lever was 0.092 in length. Measure the projection if in doubt. Early gages can be modified by filing or grinding projection (P) to a height of 0.075.

When assembling diaphragm, diaphragm cover and gasket on Carter carburetors, proceed as follows: Install diaphragm (24—Fig. WR2) with button contacting fuel control lever (22). Install gasket (25) and cover (26), and install but do not tighten the retaining screws. Insert a 1/16-inch drill or other suitable tool through center hole in cover (26) and lightly press diaphragm inward as screws are tightened.

GOVERNOR. Wright blade saw models 100, GS-2016 and B316 are not governed; all other models are equipped with a centrifugal governor which should be adjusted to provide a no-load engine speed of 4800-5200 rpm. Speed can be checked with a vibrating type tachometer.

Governor to carburetor link (L—Fig. WR4) should always be installed in top hole of governor lever (G) as shown. Speed is controlled by moving outer hook of spring (S) up or down in the series of holes in lever (G). To increase governed speed, move spring up, to-

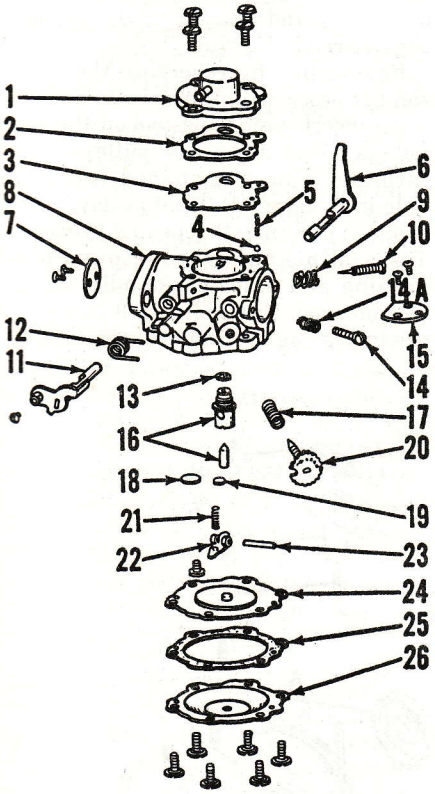


Fig. WR2–Exploded view of Carter ND carburetor. Carter NRD carburetor is similar.

1. Pump housing
2. Gasket
3. Diaphragm
4. Choke shaft ball
5. Choke shaft spring
6. Choke shaft & lever
7. Throttle disc
8. Carburetor body
9. Spring
10. Idle needle
11. Throttle shaft & lever
12. Throttle return spring
13. Strainer
14. Idle speed screw
14A. Spring
15. Choke disc
16. Inlet needle & seat
17. Spring
18. Welsh plug
19. Welsh plug
20. High speed needle
21. Spring
22. Fuel control lever
23. Pin
24. Diaphragm
25. Gasket
26. Cover

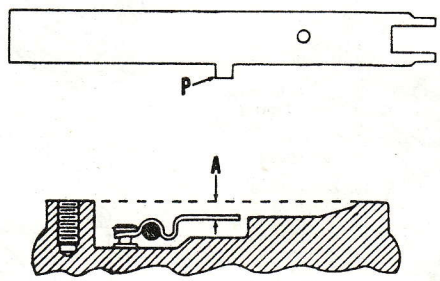


Fig. WR3–On Carter carburetor, fuel control lever is correctly adjusted when distance (A) measures 0.075-0.080. Projection (P) on early gages may need to be modified because of change in adjustment recommendation. Refer to text.

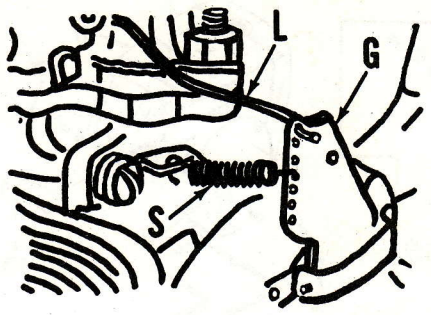


Fig. WR4–On governed models, speed is controlled by moving outer hook of spring (S) upward or downward in holes in governor lever (G). Carburetor link (L) is always positioned in top hole as shown.

ward link (L). A setting change of one hole will change governed speed approximately 300 rpm. Check to make sure governor linkage is not bent or otherwise damaged, and that governor or linkage does not stick or bind.

MAGNETO. Magneto is flywheel type with coil, condenser and breaker contacts located on a stator plate under the flywheel. Recommended breaker point gap is 0.020 for all models except GS-2016 and B316, which should be 0.015. On all models except GS-2016, B316 and B520, ignition is correctly timed when mark on back of stator plate is in register with mark on crankcase. Magneto stator plate is free to rotate about boss on crankcase and is locked into position with a lock screw. See Fig. WR5. Spark should occur (points should open) when piston is 0.125 inch BTDC for GS-218; 0.155 inch BTDC for GS-2520; 0.105 inch BTDC for GS-4520, GS-5020 and GS-5020A.

On models GS-2016, B316 and B520, ignition timing is fixed and not adjustable.

LUBRICATION. Mix ½ pint of non-detergent SAE 30 engine oil with each gallon of gasoline preferably of the unleaded type.

CARBON. Muffler and exhaust ports should be cleaned of all carbon every 50 hours if engine is operated continuously at full load. Reduction of exhaust noise and loss of power are usually caused by carbonized ports and muffler.

REPAIRS

CONNECTING ROD. The crankshaft crankpin end of the connecting rod (or rods) is supported by 30 individual uncaged needle rollers. The piston pin end of rod is provided with a caged needle bearing and renewal of this bearing should be accomplished only with the use of special pullers. Parting faces of rod and cap are not machined but are fractured to provide the doweling effect of the meshing of the consequent uneven surfaces. It is advisable therefore to wiggle the rod cap back and forth while tightening to make sure that the interstices of the fractured joint are in perfect mesh. When cap retaining screws are tightened, the parting line is practically invisible. Needle bearing in upper end of rod is renewable.

Early B-316 engines used a ⅜-inch piston pin which was a slip fit in piston bosses. Late engines use a 7/16-inch piston pin which has an interference fit requiring heating of the piston for installation. Only the piston fitted with the larger pin is available for service, requiring renewal of connecting rod if piston is to be renewed.

Side clearance of rod on crankshaft should be 0.014-0.024.

If connecting rod is rusted, pitted or shows evidence of overheating, rod and needle rollers should be renewed. Normal I.D. of crankpin end of rod is 0.6936-0.6940. If I.D. exceeds 0.6950 or if race is out-of-round more than 0.0005, renew rod.

PISTONS, RINGS AND CYLINDERS. The following data should be observed:

Firing piston—O.D.

GS-218, GS2520	1.9963-1.9966
GS-2016, B316	1.9950-1.9955
GS-4520 (before 2K3354)	2.4963-2.4966
GS-4520 (after 2K3353) GS-5020 and B520	2.4977-2.4982

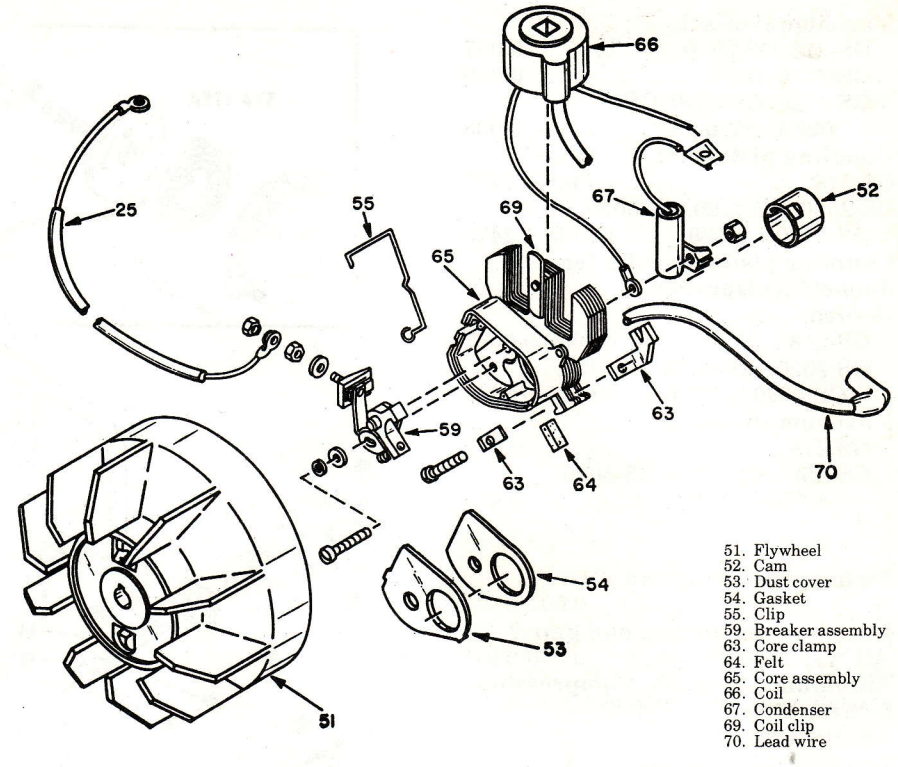
Firing cylinder bore—I.D.

GS-218, GS-2520, GS-2016 and B316	2.0000-2.0005
GS-4520, GS5020 and B520	2.5000-2.5005

Firing piston to cylinder—diametral clearance

Desired

GS-218, GS-2520	0.0034-0.0042
GS-2016, B316	0.0045-0.0055
GS-4520 (before 2K3354)	0.0034-0.0042
GS-4520 (after 2K3353), GS-5020, GS-5020A, B520	0.0018-0.0028



51. Flywheel
52. Cam
53. Dust cover
54. Gasket
55. Clip
59. Breaker assembly
63. Core clamp
64. Felt
65. Core assembly
66. Coil
67. Condenser
69. Coil clip
70. Lead wire

Fig. WR5–Phelon (Repco) magneto typical of type used on all models except GS-2016 and B316. Magneto used on Model B520 is similar except timing is not adjustable.

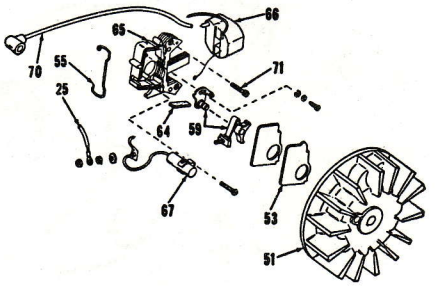


Fig. WR6–Exploded view of magneto used on GS-2016 and B316. Timing is non-adjustable.

25. Short-out (kill) wire
51. Flywheel
53. Dust cover
55. Clip
59. Breaker points
64. Felt
65. Core & box
66. Coil
67. Condenser
70. Spark plug wire
71. Mounting screws (2 used)

Maximum allowable
GS-218, GS-2520 ..... 0.007
GS-2016, B316 ..... 0.010
GS-4520, GS-5020, GS-5020A, B520 ..... 0.008

Coupling piston—O.D.
GS-218 ..... 1.7448-1.7472
GS-2520, GS-4520, GS-5020, GS-5020A, B520 .... 1.2465-1.2475

Coupling piston to cylinder—diametral clearance
Desired
GS-218 ..... 0.0038-0.0067
GS-2520, GS-4520, GS-5020, GS-5020A, B520 .. 0.0025-0.0040
Maximum allowable
GS-218 ..... 0.012
GS-2520, GS-4520, GS-5020, GS-5020A, B520 ..... 0.008

Firing piston ring end gap
All Models 0.007-0.017

Coupling piston ring end gap
All Models So Equipped ...0.005-0.013

Minimum Allowable Compression @ Cranking Speed (Psi)
GS-218, GS-2520 55
GS-4520, GS-5020, GS-5020A, B520 60
GS-2016, B316 90

On models GS-2016 and B316 refer to Fig. WR8. Three internal seal rings (54) and two external seal rings should be installed alternately. Tool (Wright part No. 644528) should be used to install front bushing (57).

CRANKSHAFT AND SEALS. On all models both ends of the crankshaft are supported in ball type bearings. If shaft has damaged threads, enlarged keyways or if run-out is excessive, renew the shaft. Connecting rod journal (crankpin) must be free of pits, galling or score marks. Crankpin diameter is 0.5605-0.5608 for all models. Crankshaft should be renewed if crankpin diameter is worn more than 0.0005 smaller than new or if out-of-round exceeds 0.0005. Crankshaft ball type main bearings should be a press fit on crankshaft and main (ball) bearing outer races should be a tight fit in crankcase bores. Crankshaft end play should be 0.011-0.024.

All crankcase seals must be maintained in good condition in a two cycle engine because crankcase compression loss causes loss of power and may eventually result in more serious damage. It is important therefore to exercise extreme care when renewing the crankcase seals at each end of the crankshaft to prevent their being damaged during installation. If special seal protecting sleeves are not available, use cellophane tape to cover any threads, shoulders and keyways over which the seal must pass during installation.

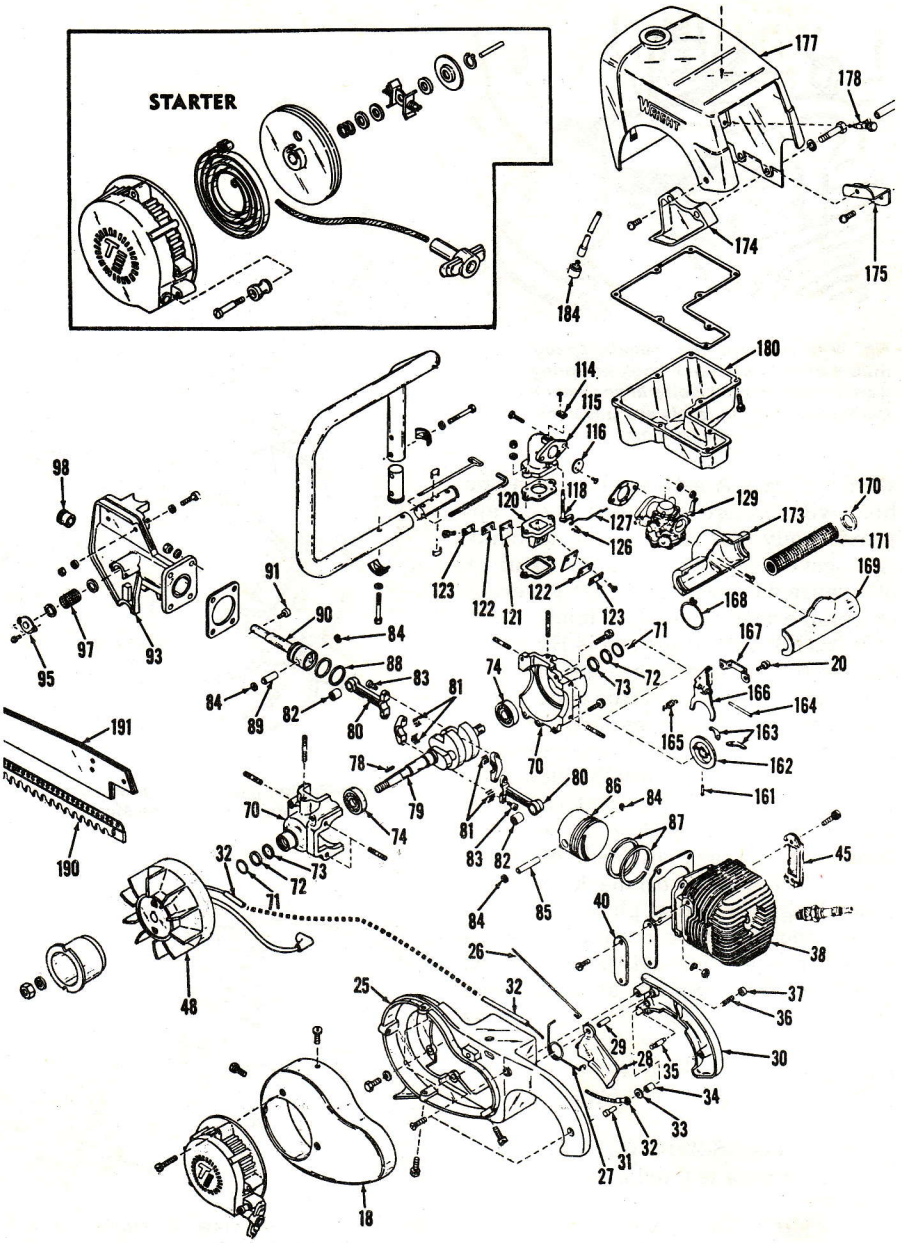


Fig. WR7–Exploded view of Wright GS-5020A blade saw. Models GS-4520, GS-5020 and B520 are basically similar.

18. Air shroud
25. Shroud base and rear handle
26. Throttle cable
27. Trigger spring
28. Trigger
29. Pivot
30. Handle cap
31. Short-out terminal
32. Short-out wire
33. Insulating washer
34. Insulator terminal
35. Trigger holding pin
36. Holding pin spring
37. Knob
38. Rear (firing) cylinder
40. Inlet passage cover
45. Exhaust cover
48. Magneto
70. Crankcase assy.
71. Seal retainer spring (2 used)
72. Seal retainer (2 used)
73. Crankcase seals (2 used)
74. Main bearings (2 used)
78. Key
79. Crankshaft
80. Connecting rods (2 used)
81. Needle rollers
82. Caged needle bearings (2 used)
83. Allen head screws
84. Retainer rings
85. Piston pin
86. Firing piston
87. Firing piston ring
88. Coupling piston rings
89. Coupling piston pin
90. Coupling piston
91. Blade screw
93. Front housing
95. Filter cover
97. Filter element
98. Bearing and seal
114. Throttle shaft retainer
115. Manifold
116. Governor throttle shutter
118. Governor throttle shaft
120. Reed plate
121. Reed
122. Reed support
123. Holding strip
126. Clip
127. Governor throttle rod
129. Carburetor
161. Governor arm pin
162. Governor disc
163. Governor arms
164. Governor lever pins
165. Governor spring
166. Governor lever
167. Governor lever bracket
168. Filter cover retainer rings
169. Cover
170. Filter end gasket
171. Filter
173. Housing
174. Front support
175. Mounting bracket
177. Fuel tank top
178. Fuel shut off
180. Fuel tank bottom
184. Fuel filter

CRANKCASE. The crankcase on all models except GS-2016 and B316 is two piece and is detachable from the cylinder. Triple-M, EC-847 sealer or equivalent should be used on mating surface of crankcase halves.

On GS-2016 and B316 the crankcase and cylinder are one piece (42—Fig. WR8). "O" ring (65) should be renewed each time cover (62) is removed.

REED VALVE. Reeds should seat lightly against reed plate throughout

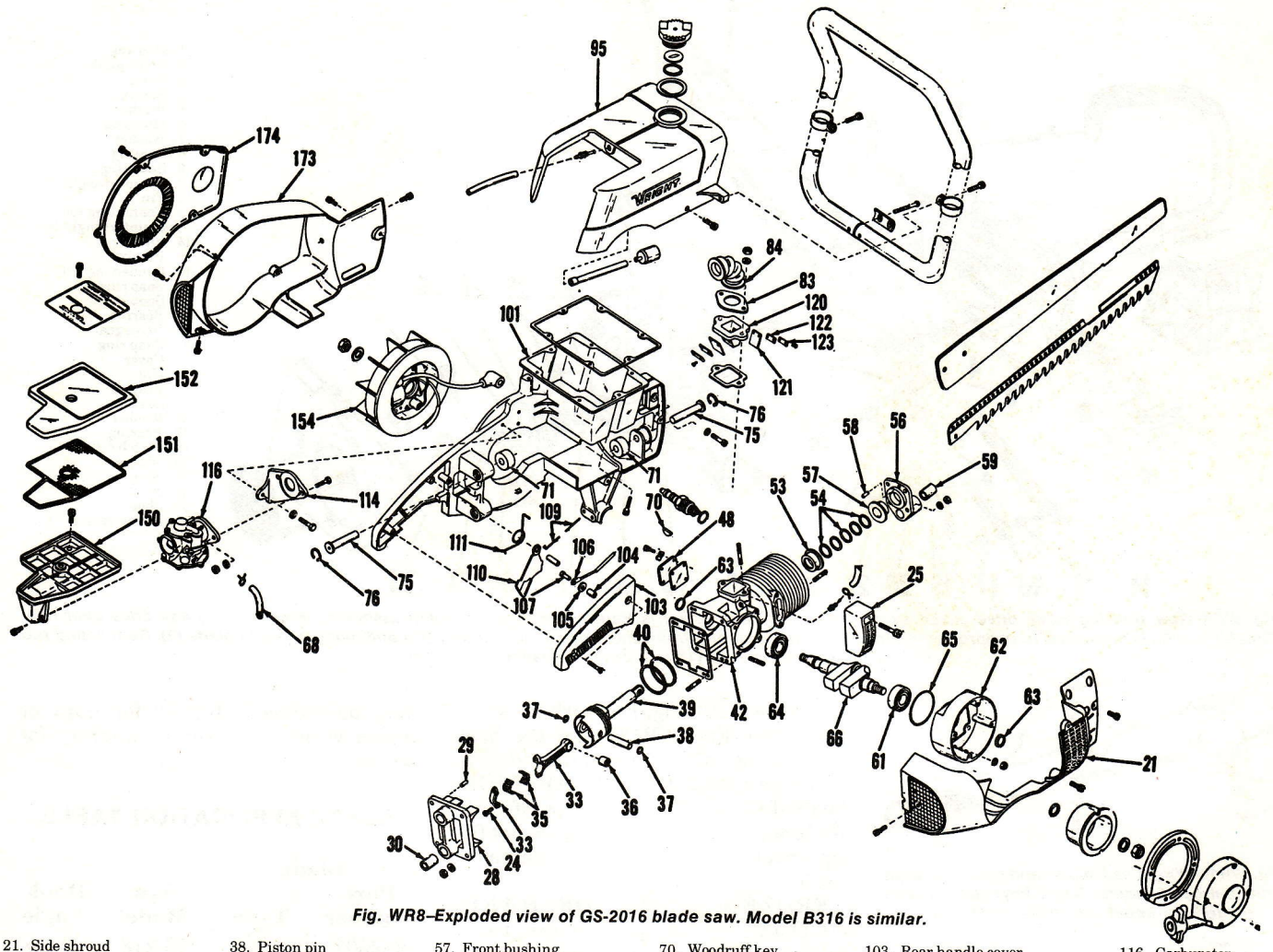


Fig. WR8–Exploded view of GS-2016 blade saw. Model B316 is similar.

21. Side shroud
24. Allen head screws
25. Exhaust cover
28. Crankcase cover
29. Dowel pins (2 used)
30. Guide pin bushings (2 used)
33. Connecting rod
35. Needle rollers
36. Caged needle bearing
37. Retainer rings
38. Piston pin
39. Piston and blade driving rod
40. Piston rings
42. Crankcase and cylinder
48. Transfer port cover
53. Ring retainer
54. Contracting sealing rings (3 used)
56. Front housing
57. Front bushing
58. Dowel pin
59. Guide pin bushing
62. Bearing cover
63. Crankcase seals (2 used)
64. Main bearing
65. "O" ring
66. Crankshaft
68. Pulse passage hose
70. Woodruff key
71. Guide pin spring (3 used)
75. Guide pins (3 used)
76. Retainer rings (3 used)
83. Bellows plate
84. Bellows
95. Fuel tank top
101. Main frame and fuel tank bottom
103. Rear handle cover
104. Terminal insulator
105. Insulating washer
106. Short-out wire
107. Trigger short-out terminal
109. Throttle cable
110. Trigger
111. Trigger spring
114. Carburetor mounting bracket
116. Carburetor
120. Reed plate
121. Reed
122. Reed support
123. Holding strip
150. Air filter base
151. Filter element
152. Filter cover
154. Magneto
173. Air shroud
174. Cover

their entire length with the least possible tension. Check seating by blowing and drawing air through ports with mouth. Renew broken, cracked, warped or rusted reeds and pitted or worn reed plate.

SAW BLADE AND GUIDE

MAINTENANCE. The blade and guide are especially designed to not require lubrication and should not be greased or oiled. Gum deposits can be removed from blade by soaking overnight in kerosene or solvent. Keep blade sharp and blade driving screw tight. Clean sawdust from guide groove, if necessary, with a stiff wire or similar tool. NEVER OPERATE ENGINE WITH BLADE REMOVED.

Saw blade breakage is usually caused by improper maintenance or operation. The most common causes of blade breakage are:

PINCHING. Never pry the blade out of a pinch. Use a wedge, if necessary, to free blade and guide. Prying can break the blade or loosen guide keys (H—Fig. WR10), resulting in subsequent breakage.

LOOSE BLADE SCREW. Keep the blade driving screw (L—Fig. WR10) as tight as possible, using the long shank Allen wrench which is a part of the saw tool kit. A loose screw can cause metal fatigue and blade breakage.

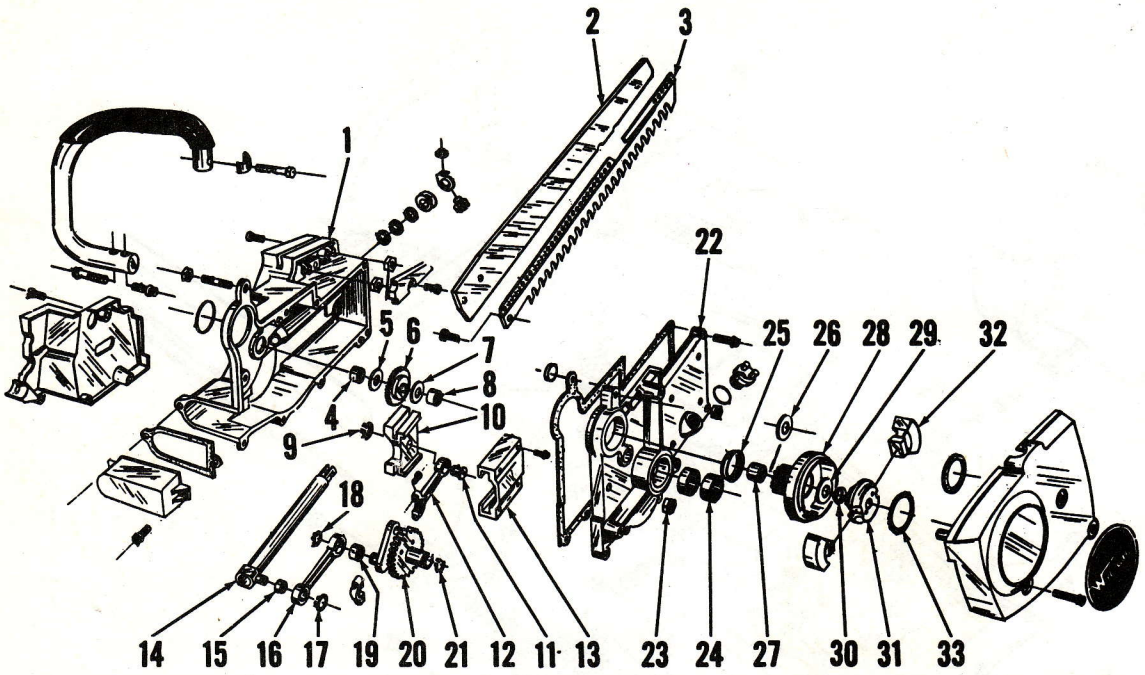
DAMAGED GUIDE. Loose or missing retaining keys (H—Fig. WR10) will cause blade breakage. Guide keys are spot welded in guide slot. Renew the blade guide if defects are suspected.

LOOSE COUPLING PISTON BEARING. On some models, a worn coupling piston bearing and seal assembly can result in blade breakage. Check for side play between coupling piston shaft and the seal. Install new parts if wear is apparent.

EXCESSIVE SPEED. Excessive speed can cause blade breakage on governed models. Adjust as outlined in preceding GOVERNOR paragraph.

REMOVE AND REINSTALL. To remove the saw blade, remove driving screw (L—Fig. WR10). Slide blade forward until free of coupling piston and guide keys (H); then lift blade from guide slot.

When installing blade, make sure blade moves freely in guide slot. If binding exists, check for sawdust or



1. Housing
2. Blade guide
3. Blade
4. Bearing
5. Washer
6. Idler gear
7. Washer
8. Bearing
9. Snap ring
10. Counterweight
11. Pin
12. Connecting rod
13. Counterweight track
14. Plunger
15. Bearing
16. Connecting rod
17. Snap ring
18. Snap ring
19. Bearing
20. Drive gear
21. Snap ring
22. Cover
23. Nut
24. Bearing
25. Seal
26. Washer
27. Bearing
28. Clutch drum
29. Washer
30. Seal
31. Rotor
32. Shoe
33. Garter spring

Fig. WR9–View showing blade drive assembly on model 100 saw. Power is transmitted through clutch assembly, idler gear (6) and drive gear (20). Circular motion is converted to reciprocating motion at drive gear and transmitted by connecting rod (16) and plunger (14) to blade (3). Connecting rod (12) and counterweight (10) are used to balance movement.

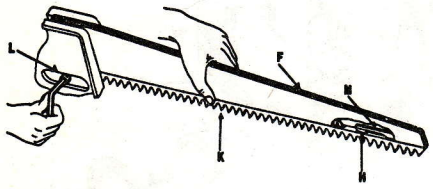


Fig. WR10–Wright saw blade and guide showing principal components. Guide keys (H) are spot welded to guide (F) on inside of blade slot.

F. Guide
H. Guide key
K. Blade
L. Driving screw
M. Blade tang

other obstructions in slot, and remove with a stiff wire or similar tool. Tighten driving screw (L) as tight as possible with the Allen wrench, using full strength and leverage.

SHARPENING. To sharpen the blade, first remove blade from saw and clamp in a vise. Even (joint) the teeth, if necessary, by filing lengthwise of blade as shown in Fig. WR11. File only until there are no high teeth; outer teeth normally wear faster, inner teeth need not be reduced to height of worn, outer teeth. Blade need not be jointed unless extreme variations of individual teeth height exists.

NORMAL USE (Standard Blade). Use only a Wright Safety File (rounded edges), Part No. 644504, or equivalent.

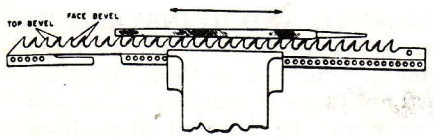


Fig. WR11–When long teeth become a problem, the saw blade should be jointed with a file as shown. An occasional short tooth is not usually harmful.

For normal cutting, file with no shear angle (See Fig. WR13), and the hook angle (Fig. WR12) recommended in accompanying BLADE APPLICATION TABLE. File until tips of teeth are brought to a sharp point. Do not file top bevel except to shape a damaged tooth.

FROZEN WOOD (OR HARDWOODS). To help prevent tooth breakage in extremely hard or frozen wood; or for a smoother cut in plywood, file the teeth carefully and uniformly to 0° hook (Fig. WR12) and 30° shear angle (Fig. WR13). NOTE: Leading edge of shear angle is toward the top-bevelled edge of tooth and is reversed for alternate teeth. Saw should be carefully jointed before filing, if required.

MEAT CUTTING BLADE (Part No. 652-500). Use a triangular saw file and sharpen both sides of teeth, maintaining tooth angle.

SPECIAL CARBIDE PLATE. (Part No. 652508). File only top bevel (Fig. WR12). The normal bevel angle should be maintained for regular cutting; but may be reduced slightly for hard or frozen wood, or increased slightly for soft woods.

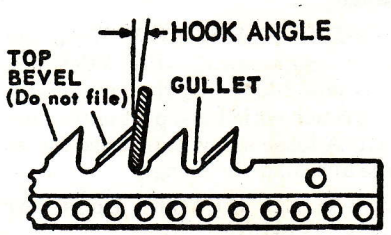


Fig. WR12–Sharpen standard blades by filing only the cutting face as shown. File the top bevel only to reshape a damaged tooth. Refer to text.

BLADE APPLICATION TABLE

Part Number	Blade Type	Saw Model	Hook Angle
652507	18″ Std.	GS-218	None
633604	20″ Std.	GS-2520*	None
633629	20″ Std.	GS-4520*	None
633642	20″ Std.	GS-5020, GS-5020A	5°
633655	20″ Std.	B520*	10°
633657	16″ Coarse	GS-2016, B316	5°
65207	16″ Fine	GS-2016, B316	None

*Blade 633655 supplied as replacement for all models GS-2520, GS-4520, GS-5020 and GS-5020A. Installation of the new blade requires the use of guide 628576 on early models.

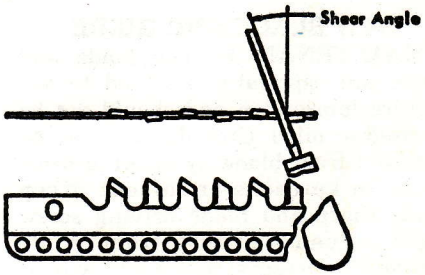


Fig. WR13–Up to 30° shear angle may be used to prevent tooth breakage in extremely hard wood; or to provide a smoother finish cut in plywood Refer to text.