TORO®

Residential Products

2014 Power Clear® 418/621

Service Manual

SAFETY INFORMATION

General Information

This symbol means WARNING or PERSONAL SAFETY INSTRUCTION – read the instruction because it has to do with your safety. Failure to comply with the instruction may result in personal injury or even death.

This manual is intended as a service and repair manual only. The safety instructions provided herein are for troubleshooting, service, and repair of the Toro Power Clear® 418 and 621 Snowthrowers.

The Power Clear operator's manuals contain safety information and operating tips for safe operating practices. Operator's manuals are available online through your Toro parts source or:

The Toro Company
Publications Department
8111 Lyndale Avenue South
Bloomington, MN 55420

Think Safety First

Avoid unexpected starting of engine…

Always turn off the engine and disconnect the spark plug wire(s) before cleaning, adjusting, or repair.

Avoid lacerations and amputations…

Stay clear of all moving parts whenever the engine is running. Treat all normally moving parts as if they were moving whenever the engine is running or has the potential to start.

Avoid burns…

Do not touch the engine, muffler, or other components, which may increase in temperature during operation, while the unit is running or shortly after it has been running.

Avoid fires and explosions…

Avoid spilling fuel and never smoke while working with any type of fuel or lubricant. Wipe up any spilled fuel or oil immediately. Never remove the fuel cap or add fuel when the engine is running. Always use approved, labeled containers for storing or transporting fuel and lubricants.

Avoid asphyxiation…

Never operate an engine in a confined area without proper ventilation.

Avoid injury from batteries…

Battery acid is poisonous and can cause burns. Avoid contact with skin, eyes and clothing. Battery gases can explode. Keep cigarettes, sparks and flames away from the battery.

Avoid injury due to inferior parts…

Use only original equipment parts to ensure that important safety criteria are met.

Avoid injury to bystanders…

Always clear the area of bystanders before starting or testing powered equipment.

Avoid injury due to projectiles…

Always clear the area of sticks, rocks or any other debris that could be picked up and thrown by the powered equipment.

Avoid modifications…

Never alter or modify any part unless it is a factory approved procedure.

Avoid unsafe operation…

NOTES

CHAPTER 2 - SPECIFICATIONS & MAINTENANCE

Torque Specifications 2-2

Standard Torque Values (Inch) 2-3

Standard Torque Values (Metric Fasteners) 2-3

Other Torque Specifications 2-4

U.S. to Metric Conversions 2-4

Equivalents & Conversions 2-5

Power Clear® 418 (18 Inch Models) 2-6

Inspecting the Rotor Blades 2-7

Changing the Engine Oil 2-7

Servicing the Spark Plug 2-9

Replacing the Drive Belt 2-10

Storage 2-12

Power Clear® 621 (21 Inch Models) 2-14

Adjusting the Control Cable 2-15

Inspecting the Rotor Blades 2-17

Changing the Engine Oil 2-17

Servicing the Spark Plug 2-19

Replacing the Drive Belt 2-21

Adjusting the Quick Shoot™ Control 2-22

Torque Specifications

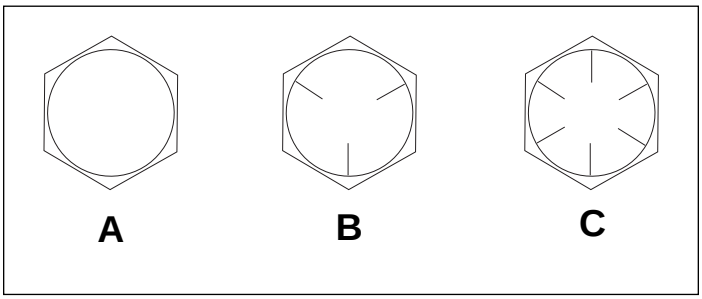
Recommended fastener torque values are listed in the following tables. For critical applications, as determined by Toro, either the recommended torque or a torque that is unique to the application is clearly identified and specified in the service manual.

These torque specifications for the installation and tightening of fasteners shall apply to all fasteners which do not have a specific requirement identified in the service manual. The following factors shall be considered when applying torque: cleanliness of the fastener, use of a thread sealant (e.g. Loctite®), degree of lubrication on the fastener, presence of a prevailing torque feature, hardness of the surface underneath of the fastener's head, or similar condition which affects
the installation.

As noted in the following tables, torque values should be reduced by 25% for lubricated fasteners to achieve the similar stress as a dry fastener. Torque values may also have to be reduced when the fastener is threaded into aluminum or brass. The specific torque value should be determined based on the aluminum or brass material strength, fastener size, length of thread engagement, etc.

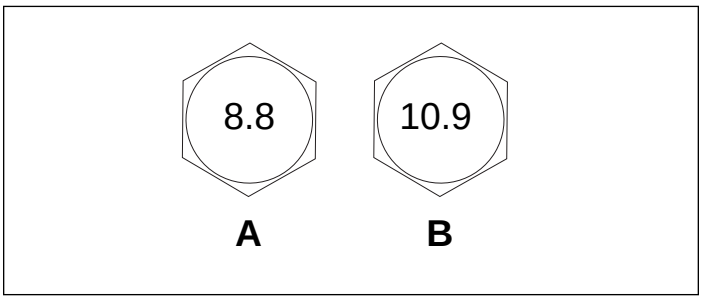
The standard method of verifying torque shall be performed by marking a line on the fastener (head or nut) and mating part, then back off fastener 1/4 of a turn. Measure the torque required to tighten the fastener until the lines match up.

Fastener Identification



Inch Series Bolts and Screws

(A) Grade 1 & 2
(B) Grade 5
(C) Grade 8



Metric Bolts and Screws

(A) Class 8.8
(B) Class 10.9

Standard Torque Values (Inch)

Thread Size	Grade 1, 5, & 8 with Thin Height Nuts	SAE Grade 1 Bolts		SAE Grade 5 Bolts		SAE Grade 8 Bolts	
	In-lb	In-lb	N-cm	In-lb	N-cm	In-lb	N-cm
1/4-20 UNC	48 ± 7	53 ± 7	599 ± 79	100 ± 10	1125 ± 100	140 ± 15	1580 ± 170
1/4-28 UNF	53 ± 7	65 ± 10	734 ± 113	115 ± 10	1300 ± 100	160 ± 15	1800 ± 170
5/16-18 UNC	115 ± 15	105 ± 15	1186 ± 169	200 ± 25	2250 ± 280	300 ± 30	3390 ± 340
5/16-24 UNF	138 ± 17	128 ± 17	1446 ± 192	225 ± 25	2540 ± 280	325 ± 30	3670 ± 340
	ft-lb	ft-lb	N-m	ft-lb	N-m	ft-lb	N-m
3/8-16 UNC	16 ± 2	16 ± 2	22 ± 3	30 ± 3	41 ± 4	43 ± 4	58 ± 5
3/8-24 UNF	17 ± 2	18 ± 2	24 ± 3	35 ± 3	47 ± 4	50 ± 4	68 ± 5
7/16-14 UNC	27 ± 3	27 ± 3	37 ± 4	50 ± 5	68 ± 7	70 ± 7	68 ± 9
7/16-20 UNF	29 ± 3	29 ± 3	39 ± 4	55 ± 5	75 ± 7	77 ± 7	104 ± 9
1/2-13 UNC	30 ± 3	48 ± 7	65 ± 9	75 ± 8	102 ± 11	105 ± 10	142 ± 14
1/2-20 UNF	32 ± 3	53 ± 7	72 ± 9	85 ± 8	115 ± 11	120 ± 10	163 ± 14
5/8-11 UNC	65 ± 10	88 ± 12	119 ± 16	150 ± 15	203 ± 20	210 ± 20	285 ± 27
5/8-18 UNF	75 ± 10	95 ± 15	129 ± 20	170 ± 15	230 ± 20	240 ± 20	325 ± 27
3/4-10 UNC	93 ± 12	140 ± 20	190 ± 27	265 ± 25	359 ± 34	374 ± 35	508 ± 47
3/4-16 UNF	115 ± 15	165 ± 25	224 ± 34	300 ± 25	407 ± 34	420 ± 35	569 ± 47
7/8-9 UNC	140 ± 20	225 ± 25	305 ± 34	430 ± 45	583 ± 61	600 ± 60	813 ± 81
7/8-14 UNF	155 ± 25	260 ± 30	353 ± 41	475 ± 45	644 ± 61	660 ± 60	895 ± 81

Standard Torque Values (Metric Fasteners)

Thread Size	Class 8.8 Bolts		Class 10.9 Bolts	
M5 X 0.8	57 ± 5 in-lb	644 ± 68 N-cm	78 ± 8 in-lb	881 ± 90 N-cm
M6 X 1.0	96 ± 10 in-lb	1085 ± 113 N-cm	133 ± 14 in-lb	1503 ± 158 N-cm
M8 X 1.25	19 ± 2 ft-lb	26 ± 3 N-m	28 ± 3 ft-lb	38 ± 4 N-m
M10 X 1.5	38 ± 4 ft-lb	52 ± 5 N-m	54 ± 6 ft-lb	73 ± 8 N-m
M12 X 1.75	66 ± 7 ft-lb	90 ± 10 N-m	93 ± 10 ft-lb	126 ± 14 N-m
M16 X 2.0	166 ± 15 ft-lb	225 ± 23 N-m	229 ± 23 ft-lb	310 ± 31 N-m
M20 X 2.5	325 ± 33 ft-lb	440 ± 45 N-m	450 ± 36 ft-lb	610 ± 62 N-m

INCH/METRIC NOTE: Reduce torque values listed in the table above by 25% for lubricated fasteners. Lubricated fasteners are defined as threads coated with a lubricant such as oil, graphite, or thread sealant such as Loctite®.

INCH/METRIC NOTE: Torque values may have to be reduced when installing fasteners into threaded aluminum or brass. The specific torque value should be determined based on the fastener size, the aluminum or base material strength, length of thread engagement, etc.

INCH/METRIC NOTE: The nominal torque values listed above for Grade 5 and 8 fasteners are based on 75% of the minimum proof load specified in SAE J429. The tolerance is approximately ± 10% of the nominal torque value. Thin height nuts include jam nuts.

METRIC NOTE: The nominal torque values listed above are based on 75% of the minimum proof load specified in SAE J1199. The tolerance is approximately ± 10% of the nominal torque value. Thin height nuts include jam nuts.

Other Torque Specifications

SAE Grade 8 Steel Set Screws

Thread Cutting Screws (Zinc Plated Steel)

Type 1, Type 23, or Type F	
Thread Size	**Baseline Torque***
No. 6 - 32 UNC	20 ± 5 in-lb
No. 8 - 32 UNC	30 ± 5 in-lb
No. 10 - 24 UNC	38 ± 7 in-lb
1/4 - 20 UNC	85 ± 15 in-lb
5/16 - 18 UNC	110 ± 20 in-lb
3/8 - 16 UNC	200 ± 100 in-lb

Thread Size	Recommended Torque	
	Square Head	**Hex Socket**
1/4 - 20 UNC	140 ± 20 in-lb	73 ± 12 in-lb
5/16 - 18 UNC	215 ± 35 in-lb	145 ± 20 in-lb
3/8 - 16 UNC	35 ± 10 ft-lb	18 ± 3 ft-lb
1/2 - 13 UNC	75 ± 15 ft-lb	50 ± 10 ft-lb

Wheel Bolts and Lug Nuts

Thread Size	Recommended Torque**	
7/16 - 20 UNF Grade 5	65 ± 10 ft-lb	88 ± 14 N-m
1/2 - 20 UNF Grade 5	80 ± 10 ft-lb	108 ± 14 N-m
M12 X 1.25 Class 8.8	80 ± 10 ft-lb	108 ± 14 N-m
M12 X 1.5Class 8.8	80 ± 10 ft-lb	108 ± 14 N-m

** For steel wheels and non-lubricated fasteners.

Thread Cutting Screws (Zinc Plated Steel)

Thread Size	Threads per Inch		Baseline Torque*
	Type A	**Type B**	
No. 6	18	20	20 ± 5 in-lb
No. 8	15	18	30 ± 5 in-lb
No. 10	12	16	38 ± 7 in-lb
No. 12	11	14	85 ± 15 in-lb

* Hole size, material strength, material thickness and finish must be considered when determining specific torque values. All torque values are based on nonlubricated fasteners.

Conversion Factors

in-lb x 11.2985 = N-cm	N-cm x - 0.08851 = in-lb 88 ± 14 N-m
ft-lb x 1.3558 = N-m	N-cm x 0.73776 = ft-lb 108 ± 14 N-m

U.S. to Metric Conversions

	To Convert	Into	Multiply By
Linear Measurement	Miles Yards Feet Feet Inches Inches Inches	Kilometers Meters Meters Centimeters Meters Centimeters Millimeters	1.609 0.9144 0.3048 30.48 0.0254 2.54 25.4
Area	Square Miles Square Feet Square Inches Acre	Square Kilometers Square Meters Square Centimeters Hectare	2.59 0.0929 6.452 0.4047
Volume	Cubic Yards Cubic Feet Cubic Inches	Cubic Meters Cubic Meters Cubic Centimeters	0.7646 0.02832 16.39
Weight	Tons (Short) Pounds Ounces	Metric Tons Kilograms Grams	0.9078 0.4536 28.3495
Pressure	Pounds/Sq. In.	Kilopascal	6.895
Work	Foot-pounds Foot-pounds Inch-pounds	Newton-Meters Kilogram-Meters Kilogram-Centimeters	1.356 0.1383 1.152144
Liquid Volume	Quarts Gallons	Liters Liters	0.9463 3.785
Liquid Flows	Gallons/Minute	Liters/Minute	3.785
Temperature	Fahrenheit	Celsius	1. Subtract 32° 2. Multiply by 5/9

Equivalents & Conversions

Decimal & Millimeter Equivalents

Fractions	Decimals	mm		Fractions	Decimals	mm
1/64	0.015625	0.397		33/64	0.515625	13.097
1/32	0.03125	0.794		16/32	0.53125	13.484
3/64	0.046875	1.191		35/64	0.546875	13.891
1/16	0.0625	1.588		9/16	0.5625	14.288
5/64	0.078125	1.984		37/64	0.578125	14.684
3/32	0.9375	2.381		19/32	0.59375	15.081
1/8	0.1250	3.175		5/8	0.6250	15.875
9/64	0.140625	3.572		41/64	0.640625	16.272
5/32	0.15625	3.969		21/32	0.65625	16.669
11/64	0.171875	4.366		43/64	0.671875	17.066
3/16	0.1875	4.762		11/16	0.6875	17.462
13/64	0.203125	5.159		45/64	0.703125	17.859
7/32	0.21875	5.556		23/32	0.71875	18.256
15/64	0.234375	5.953		47/64	0.734375	18.653
1/4	0.2500	6.350		3/4	0.7500	19.050
17/64	0.265625	6.747		49/64	0.765625	19.447
9/32	0.28125	7.144		25/32	0.78125	19.844
19/64	0.296875	7.541		51/64	0.796875	20.241
5/16	0.3125	7.541		13/16	0.8125	20.638
21/64	0.328125	8.334		53/64	0.828125	21.034
11/32	0.34375	8.731		27/32	0.84375	21.431
23/64	0.359375	9.128		55/64	0.859375	21.828
3/8	0.3750	9.525		7/8	0.8750	22.225
25/64	0.390625	9.922		57/64	0.890625	22.622
13/32	0.40625	10.319		29/32	0.90625	23.019
27/64	0.421875	10.716		59/64	0.921875	23.416
7/16	0.4375	11.112		15/16	0.9375	23.812
29/64	0.453125	11.509		61/64	0.953125	24.209
15/32	0.46875	11.906		31/32	0.96875	24.606
31/64	0.484375	12.303		63/64	0.984375	25.003
1/2	0.5000	12.700		1	1.000	25.400
1 mm = 0.03937 in.				0.001 in. = 0.0254mm		

Power Clear® 418 (18 Inch Models)

Maintenance

Recommended Maintenance Schedule(s)

NOTE
Determine the left and right sides of the machine from the normal operating position.

Maintenance Service Interval	Maintenance Procedure
After the first hour	Check the control cable and adjust it if necessary. Check for loose fasteners and tighten them if necessary.
After the first 2 hours	Change the engine oil.
Before each use or daily	Check the engine oil level and add oil if necessary.
Yearly	Check the control cable and adjust it if necessary. Inspect the rotor blades and replace the rotor blades and scraper if necessary. Change the engine oil. Service the spark plug and replace it if necessary. Check for loose fasteners and tighten them if necessary. Inspect the drive belt and replace it if necessary.
Yearly or before storage	Prepare the machine for storage.

Inspecting the Rotor Blades

Service Interval

Yearly – Inspect the rotor blades and replace the rotor blades and scraper if necessary.

Before each session, inspect the rotor blades for wear. When a rotor blade edge has worn down to the wear indicator hole, replace the rotor blades and the scraper (Fig. 001).

A. The wear indicator hole is intact; you do not need to replace the rotor blades.

B. The wear indicator hole is exposed; replace the rotor blades and scraper.

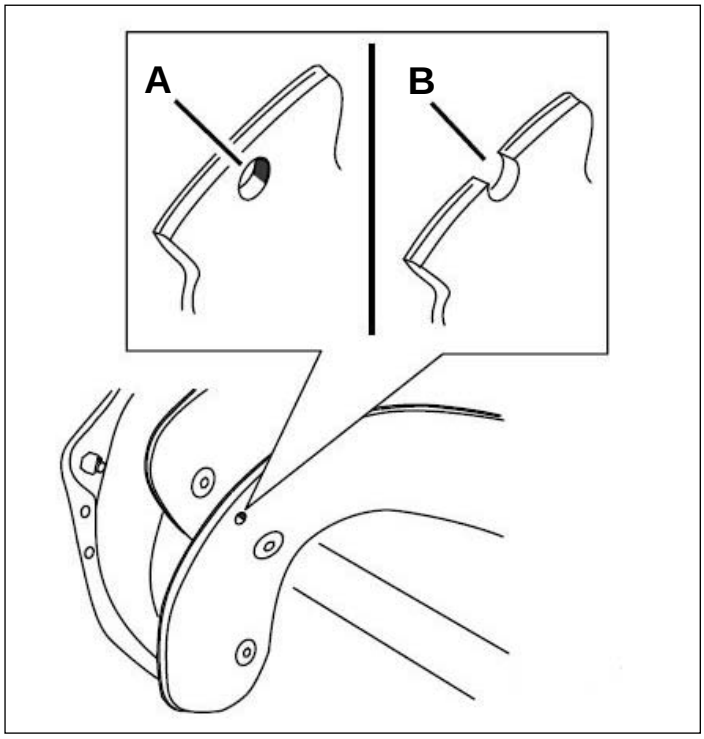


Fig. 001

Changing the Engine Oil

Service Interval

After the first 2 hours yearly.

Run the engine a few minutes before changing the oil to warm it. Warm oil flows better and carries more contaminants.

1. Ensure that the fuel tank is not overfilled and that the fuel cap is securely in place.
2. Move the machine to a level surface.
3. Place an oil drain pan under the oil drain plug (refer to page 2-17), remove the oil drain plug, and tip the machine backward (handle down) halfway to the ground to drain the used oil into the oil drain pan.

IMPORTANT
Do not tip the machine all the way back to the ground, or fuel may leak out of the machine.

4. After draining the used oil, return the machine to the operating position.
5. Install the oil drain plug and tighten it securely.
6. Clean around the oil fill cap.
7. Unscrew the oil fill cap and remove it.
8. Slowly pour oil into the oil fill hole. Wait 3 minutes, then check the oil level on the dipstick by wiping the dipstick clean and then inserting, but not screwing in, the oil fill cap into the hole.

NOTE
To determine the proper oil level on the dipstick, refer to Fig. 002.

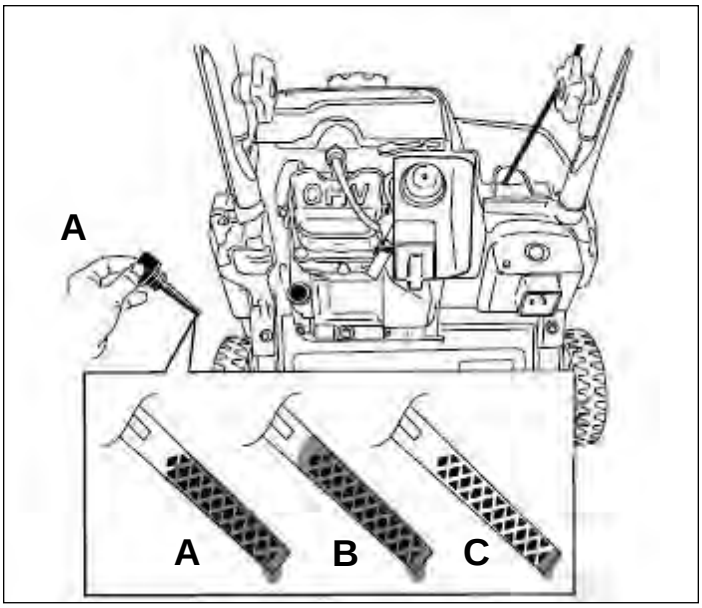


Fig. 002

A. The oil level is at its maximum
B. The oil level is too high, remove oil from the crank case
C. The oil level is too low, add oil to the crankcase

NOTE
You may tip the machine forward (handle up) a little to make adding oil easier. Remember to return the machine to the operating position before checking the oil level.

IMPORTANT
Do not tip the machine all the way forward onto its nose, or fuel may leak out of the machine.

Max fill
12 oz. (0.35 l), type: automotive detergent oil with an API service classification of SJ, SL, or higher.
Use Fig. 003 to select the best oil viscosity for the outdoor temperature range expected.

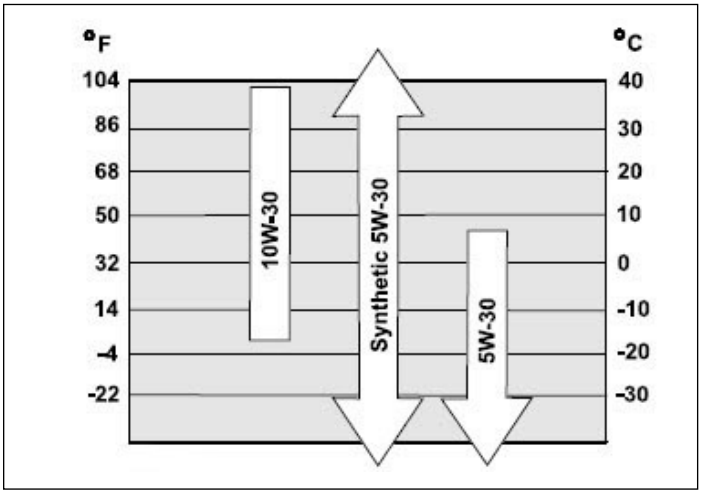


Fig. 003

NOTE
Fill the engine crankcase with oil until the dipstick indicates that the engine oil level is correct as shown in Fig. 002. If you overfill the engine with oil, remove the excess oil from the drain plug into an oil drain pan.

9. Screw the oil fill cap into the oil fill hole, and hand tighten it securely.

10. Wipe up any spilled oil.

11. Dispose of the used oil properly at a local recycling center.

Servicing the Spark Plug

Service Interval

Yearly – Service the spark plug and replace it if necessary.

Use a Toro spark plug (Part No. 119-1961).

1. Stop the engine and wait for all moving parts to stop.
2. Disconnect the wire from the spark plug.
3. Clean around the spark plug.
4. Remove the spark plug from the cylinder head.

IMPORTANT
Replace a cracked, fouled, or dirty spark plug. Do not clean the electrodes because grit entering the cylinder can damage the engine.

5. Set the gap on the plug to 0.030” (0.76 mm) (Fig. 004).

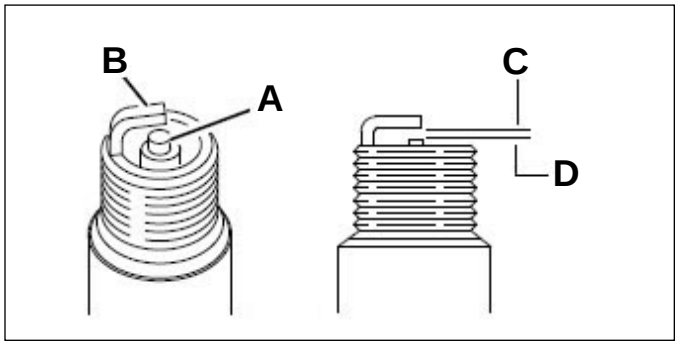


Fig. 004

A. Center Electrode Insulator
B. Side Electrode
C. Air Gap (not to scale)

6. Install the spark plug and torque it to 20–22 ft-lb (27–30 Nm).
7. Connect the wire to the spark plug.

Replacing the Drive Belt

If drive belt becomes worn, oil-soaked, excessively cracked, frayed, or otherwise damaged, replace the belt.

1. Remove the 4 bolts that hold the drive belt cover (Fig. 005) in place.

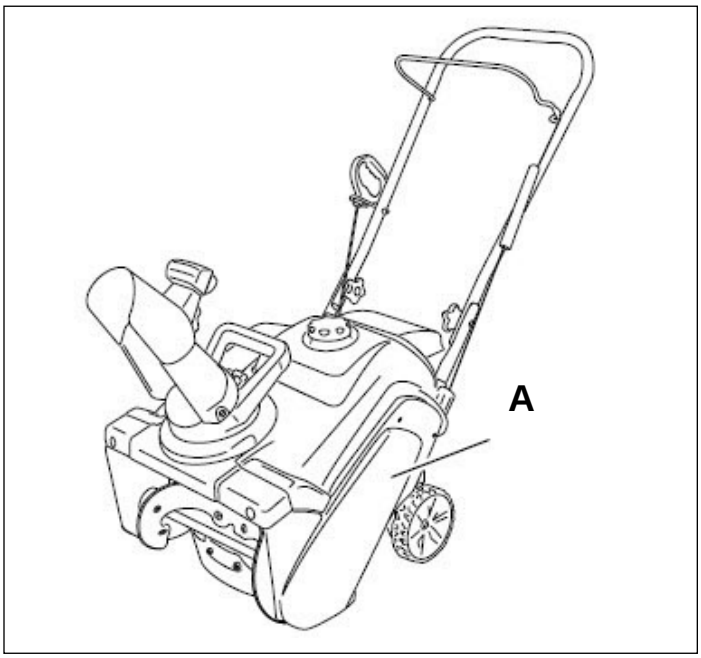


Fig. 005

A. Drive Belt Cover

NOTE
The lower front corner of the drive belt cover is fastened down with a smaller bolt, a washer, and a locknut.

2. Remove the belt from the rotor pulley (Fig. 006).

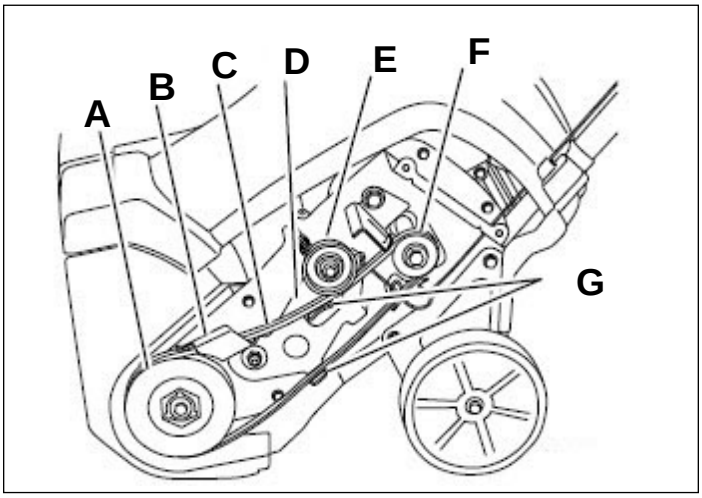


Fig. 006

A. Rotor Pulley
B. Idler Arm Brake
C. Drive Belt
D. Idler Arm
E. Idler Pulley
F. Engine Pulley
G. Tabs on the Idler Arm

3. Press down on the idler arm and remove the belt from between the tab on the idler arm brake and the rotor pulley.

NOTE
The engine pulley belt guide is very close to the pulley, and the belt may not fit through the gap.

4. Twist the belt out in front of the belt guide so that the belt is wedged between the belt guide and the engine pulley.

5. Insert a screwdriver into the hole in the belt guide as shown in Fig. 007 and flex the belt guide toward the rotor pulley enough to pull the belt through the gap.

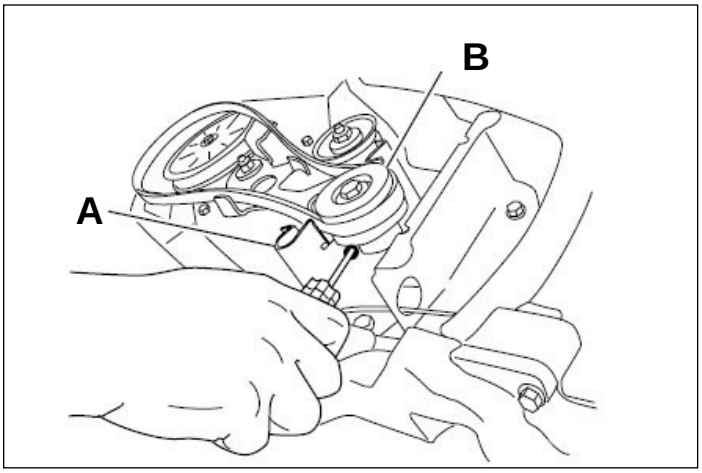


Fig. 007

A. Belt Guide
B. Engine Pulley

NOTE
Take care not to distort or damage the belt guide.

6. To install the new drive belt, reverse the steps above.

IMPORTANT
Make sure to install the drive belt so that it sits above the two tabs on the idler arm and below the idler arm brake (Fig. 006).

7. Install the drive belt cover with the fasteners that you removed in step 1.

Storage

Storing the Machine

WARNING

- Gasoline fumes are highly flammable, explosive, and dangerous if inhaled. If you store the product in an area with an open flame, the gasoline fumes may ignite and cause an explosion.
- Do not store the machine in a house (living area), basement, or any other area where ignition sources may be present, such as hot water and space heaters, clothes dryers, furnaces, and other like appliances.
- Do not tip the machine either forward or backward with fuel in the fuel tank; otherwise, fuel may leak out of the machine.
- Do not store the machine with its handle tipped down onto the ground, because oil will leak into the engine cylinder and onto the ground, and the machine will not start or run.

1. On the last refueling of the season, add fuel stabilizer to fresh fuel as directed by the engine manufacturer.
2. Run the engine for 10 minutes to distribute the conditioned fuel through the fuel system.
3. While the engine is still warm, change the engine oil.
4. Drain the fuel from the tank and carburetor by performing the following steps:

   A. Loosen the fuel tank cap.

   B. Unscrew, but do not remove, the small screw on the side of the carburetor fuel bowl (Fig. 008) until the fuel begins to drain from the carburetor. Drain the fuel into an approved fuel container.

IMPORTANT
Do not remove the carburetor bowl bolt on the bottom of the carburetor.

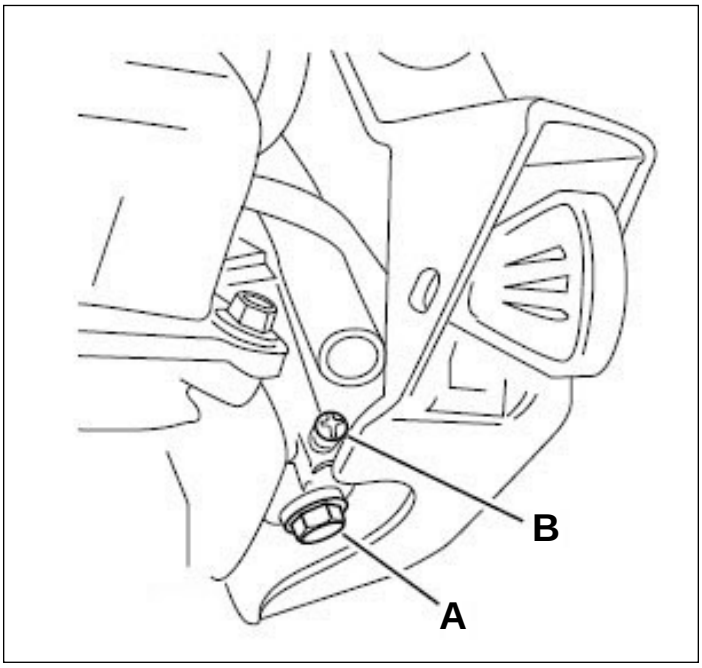


Fig. 008

A. Carburetor bowl bolt - do not remove
B. Small screw on carburetor

C. Wait for a few minutes until the fuel has drained, then install the fuel cap and tighten the small screw on the carburetor.

NOTE
Use a handheld Phillips screwdriver to tighten the carburetor screw. Overtightening the screw could strip it and cause leaking.

5. Dispose of unused fuel properly. Recycle it according to local codes, or use it in your automobile.
6. Remove the spark plug.
7. Squirt 2 teaspoons of oil into the spark plug hole.
8. Install the spark plug by hand and then torque it to 20–22 ft-lb (27–30 Nm).
9. With the ignition key in the Off position, pull the recoil starter slowly to distribute the oil on the inside of the cylinder.
10. Disconnect the ignition key from the lanyard and store the ignition key in a safe place.
11. Clean the machine.

12. Touch up chipped surfaces with paint. Sand affected areas before painting, and use a rust preventative to prevent the metal parts from rusting.

13. Tighten any loose fasteners. Repair or replace any damaged parts.

14. Cover the machine and store it in a clean, dry place out of the reach of children. Allow the engine to cool before storing it in any enclosure.

Power Clear® 621 (21 Inch Models)

Maintenance

Recommended Maintenance Schedule(s)

NOTE
Determine the left and right sides of the machine from the normal operating position.

Maintenance Service Interval	Maintenance Procedure
After the first hour	Check the control cable and adjust it if necessary. Check for loose fasteners and tighten them if necessary.
After the first 2 hours	Change the engine oil.
Before each use or daily	Check the engine oil level and add oil if necessary.
Yearly	Check the control cable and adjust it if necessary. Inspect the rotor blades and replace the rotor blades and scraper if necessary. Change the engine oil. Service the spark plug and replace it if necessary. Check for loose fasteners and tighten them if necessary. Inspect the drive belt and replace it if necessary.
Yearly or before storage	Prepare the machine for storage.

Adjusting the Control Cable

Checking the Control Cable

Service Interval

After the first hour – Check the control cable and adjust it if necessary.

Yearly – Check the control cable and adjust it if necessary.

Move the control bar back toward the handle to remove the slack in the control cable (Fig. 009).

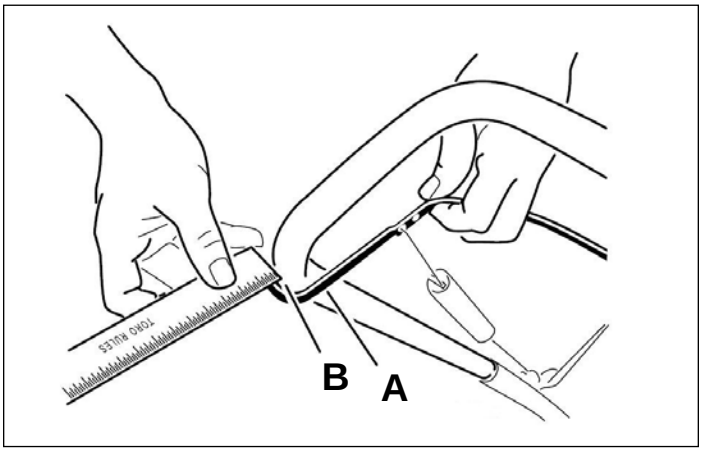


Fig. 009

A. Control bar (2mm to 3mm) gap
B. 1/16” - 1/8”

NOTE
Ensure that a 1/16” - 1/8” (2mm to 3mm) gap exists between the control bar and the handle (Fig. 009).

IMPORTANT
The control cable must contain some slack when you disengage the control bar for the rotor blades to stop properly.

Adjusting the Control Cable

1. Slide up the spring cover and unhook the spring from the adjuster link (Fig. 010).

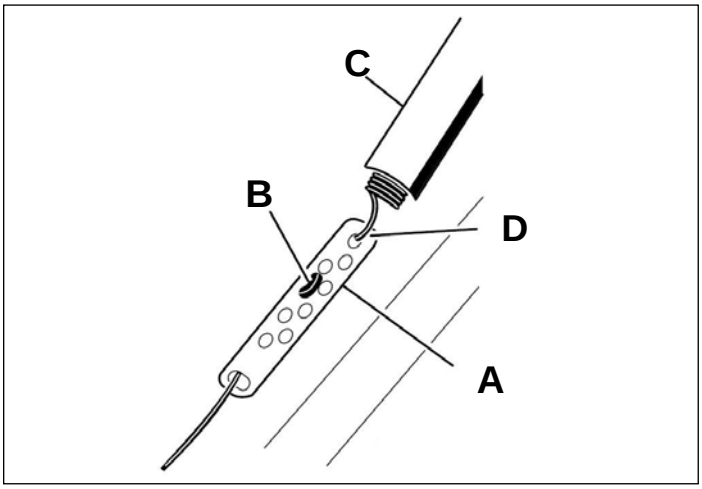


Fig. 010

A. Adjuster Link
B. Spring Cover
C. Z-Fitting
D. Unhook the Spring

NOTE
You can pull up the adjuster link and cable to make unhooking the spring easier.

2. Move the Z-fitting to a higher or lower hole on the adjuster link as needed to obtain the 1/16” - 1/8” (2 mm to 3 mm) gap between the control bar and the handle (Fig. 010).

NOTE
Moving the Z-fitting higher decreases the gap between the control bar and the handle; moving it lower increases the gap.

3. Hook the spring to the adjuster link and slide the spring cover over the adjuster link.

4. Check the adjustment; refer to Checking the Control Cable.

NOTE
After extended use, the drive belt may wear and lose its proper belt tension. If the drive belt slips (continuously squeals) under a heavy load,disconnect the spring from the adjustor link and move the upper end of the spring to the hole that is further from the pivot point in the control bar (Fig. 011). Then connect the spring to the adjustor link and adjust the control cable.

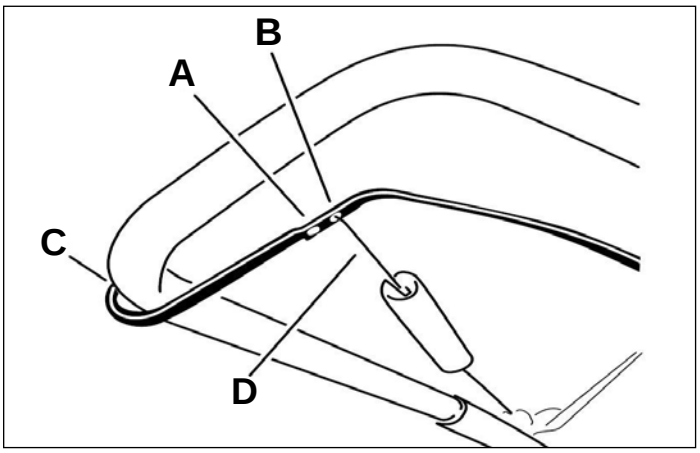


Fig. 011

A. Remove the upper end of spring from this hole
B. Insert the upper end of spring into this hole
C. Pivot point
D. Upper end of spring

NOTE
The belt may slip (squeal) in wet conditions; to dry out the drive system, start the rotor and run it without a load for 30 seconds.

Inspecting the Rotor Blades

Service Interval

Yearly – Inspect the rotor blades and replace the rotor blades and scraper if necessary.

Before each session, inspect the rotor blades for wear. When a rotor blade edge has worn down to the wear indicator hole. Replace the rotor blades and the scraper (Fig. 012).

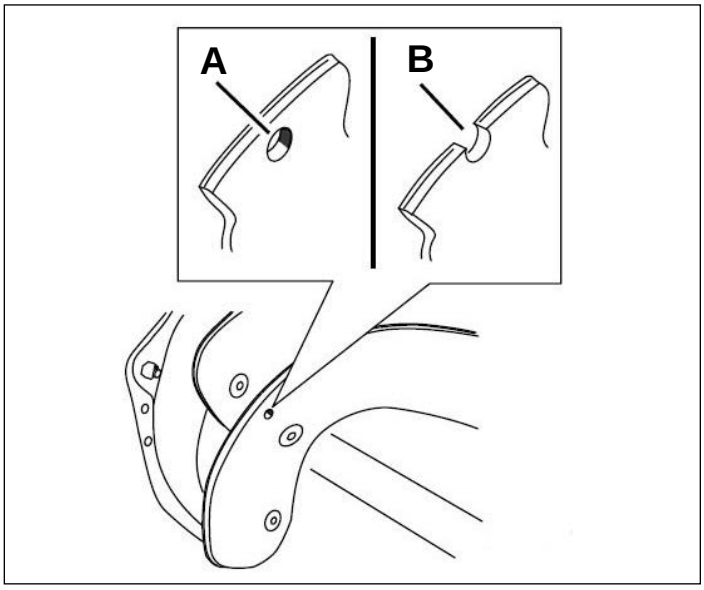


Fig. 012

A. The wear indicator hole is intact; you do not need to replace the rotor blades.

B. The wear indicator hole is exposed; replace the rotor blades.

Changing the Engine Oil

Service Interval

- After the first 2 hours
- Yearly

Run the engine a few minutes before changing the oil to warm it. Warm oil flows better and carries more contaminants.

1. Siphon the fuel from the fuel tank into an approved fuel container, or run the engine until it stops.
2. Move the machine to a level surface.
3. Place an oil drain pan under the oil drain plug, remove the oil drain plug, and tip the machine backward and drain the used oil in the oil drain pan (Fig. 013).

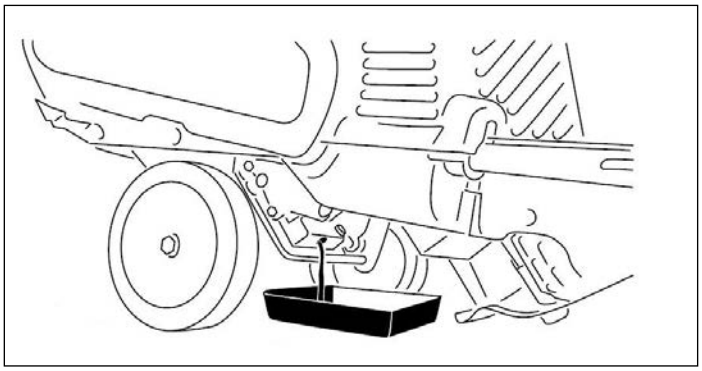


Fig. 013

4. After draining the used oil, return the machine to the operating position.
5. Install the oil drain plug and tighten it securely.
6. Clean around the oil fill cap (Fig. 014).

7. Unscrew the oil fill cap and remove it (Fig. 014).

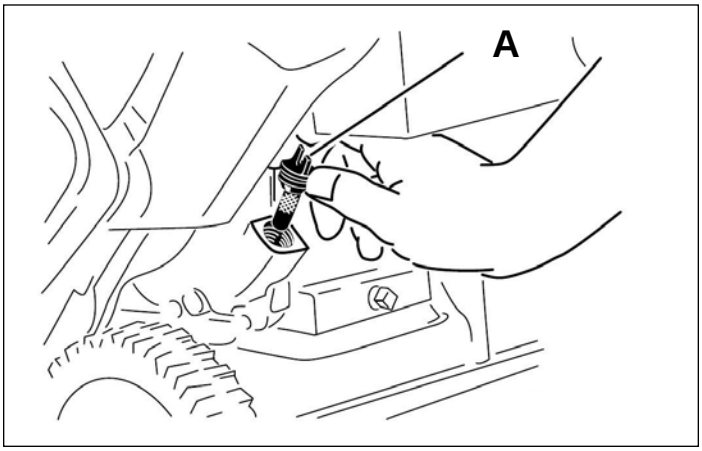


Fig. 014

A. Oil fill cap

8. With the machine in the operating position, carefully pour oil into the oil fill hole. Wait 3 minutes for the oil to settle and add enough to bring it to the point of overflow (Fig. 016).

NOTE
You may tip the machine forward (handle up) to make adding oil easier. Remember to return the machine to the operating position before checking the oil level.

IMPORTANT
Do not tip the machine all the way forward onto its nose, or fuel may leak out of the machine.

Max fill: 20 oz. (0.6 l), type: automotive detergent oil with an API service classification of SJ, SL, or higher.
Use Fig. 015 to select the best oil viscosity for the outdoor temperature range expected.

9. Screw the oil fill cap into the oil fill hole, and hand tighten it securely.

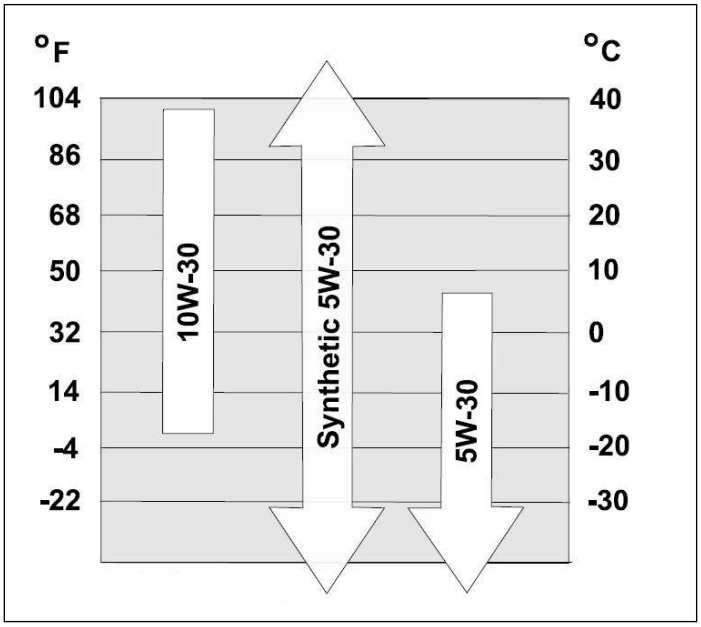


Fig. 015

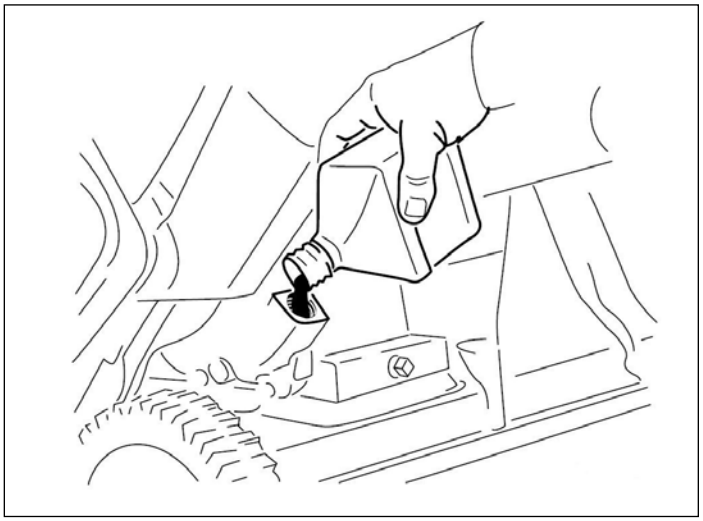


Fig. 016

10. Wipe up any spilled oil.

11. Dispose of the used oil properly at a local recycling center.

Servicing the Spark Plug

Service Interval

Yearly – Check the spark plug and replace it if necessary.

Use a **NGK BPR6ES or Champion RN9YC** spark plug or equivalent.

1. Stop the engine and wait for all moving parts to stop.
2. Rotate the discharge chute so that it faces forward.
3. Remove the discharge chute, the discharge chute handle, and the chute seal by removing the 3 large screws and one small screw (Fig. 017).

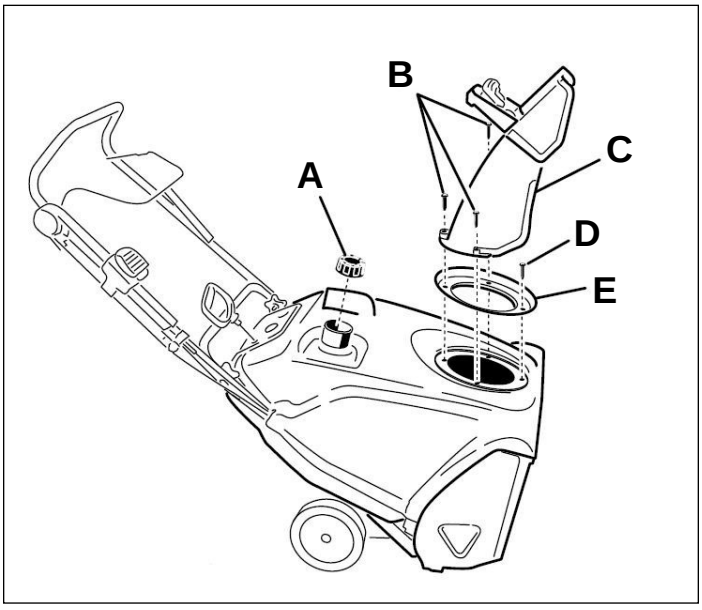


Fig. 017

A. Fuel Tank Cap
B. Large Screws (3)
C. Discharge Chute
D. Small Screw
E. Chute Seal

4. Remove the 4 screws that secure the shroud (Fig. 018).

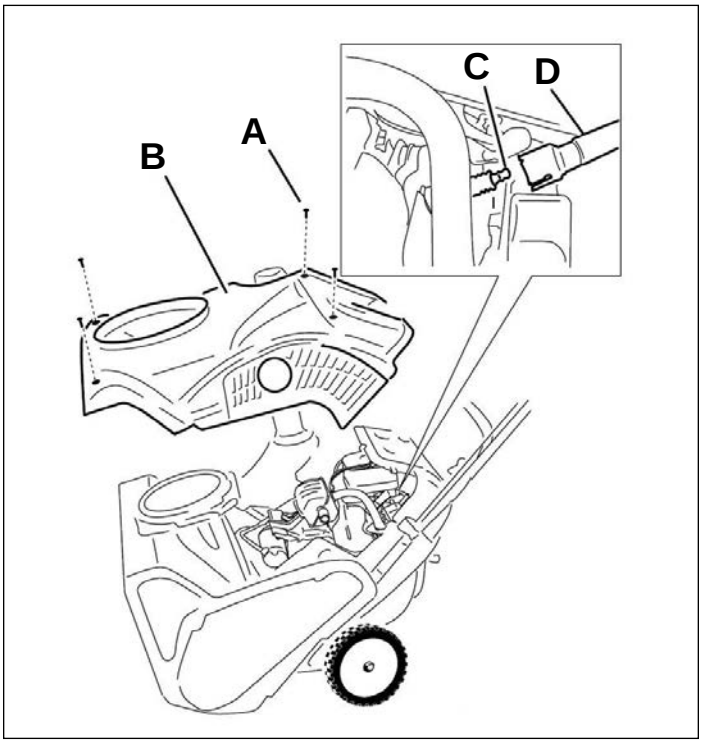


Fig. 018

A. Screw (4)
B. Shroud
C. Spark Plug
D. Spark-Plug Wire

5. Remove the fuel tank cap.
6. Remove the shroud (Fig. 018).
7. Install the fuel tank cap.
8. Disconnect the wire from the spark plug.
9. Clean around the spark plug.
10. Remove the spark plug from the cylinder head.

IMPORTANT
Replace a cracked, fouled, or dirty spark plug. Do not clean the electrodes because grit entering the cylinder can damage the engine.

11. Set the gap on the plug to 0.030” (0.76mm) (Fig. 019).

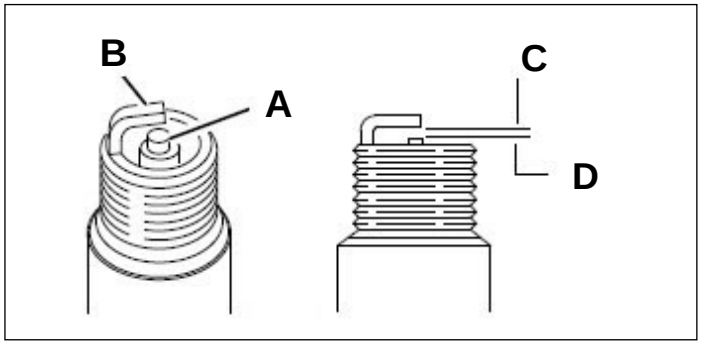


Fig. 019

A. Center Electrode Insulator
B. Side Electrode
C. Air Gap (not to scale)

12. Install the spark plug and torque it to 20–22 ft-lb (27–30 Nm).

13. Connect the wire to the spark plug.

NOTE
Ensure that the breather tube is routed above the spark plug wire as shown in Fig. 020.

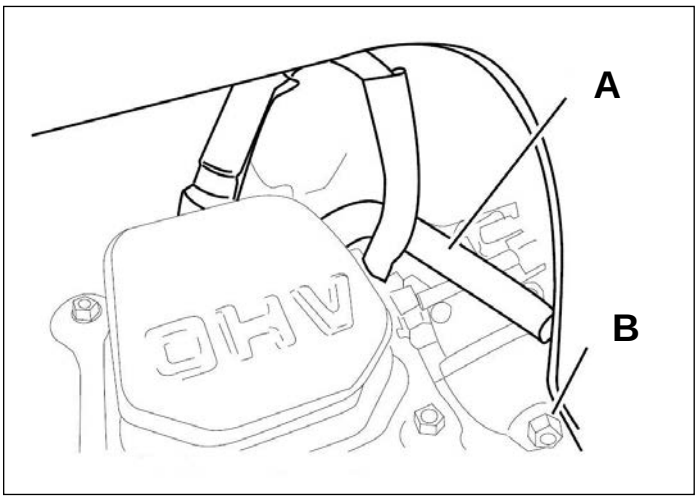


Fig. 020

A. Breather tube B. Carburetor drain bolt

14. Remove the fuel tank cap.

15. Install the shroud with the screws you removed in step 4.

NOTE
Ensure that the upper and lower shrouds fit together in the side grooves.

16. Install the fuel tank cap.

17. Install the chute seal, the discharge chute, and the discharge chute handle onto the machine using the hardware you removed in step 3.

NOTE
The small screw goes through the small hole in the chute seal at the front of the discharge chute opening.

Replacing the Drive Belt

If drive belt becomes worn, oil-soaked, excessively cracked, frayed, or otherwise damaged, replace the belt.

1. Remove the drive belt cover by removing the 3 bolts as shown in Fig. 021.

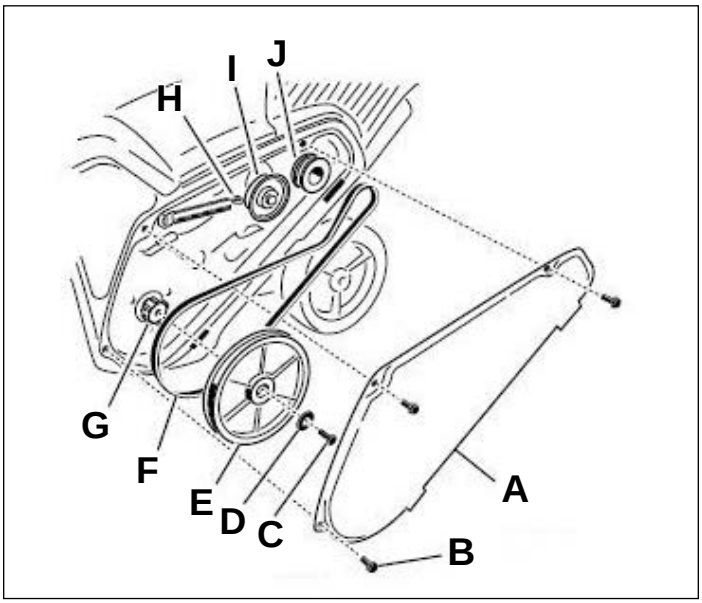


Fig. 021

A. Drive Belt Cover
B. Bolt (3)
C. Rotor Pulley Bolt
D. Curved Washer
E. Rotor Pulley
F. Drive Belt
G. Rotor Shaft
H. Brake Spring (unhook from idler arm here)
I. Idler Pulley
J. Engine Pulley

2. Unhook the brake spring from the idler arm to release the belt tension (Fig. 021).

3. Remove the screw and curved washer that holds the rotor pulley (Fig. 021).

4. Remove the rotor pulley and the drive belt (Fig. 021).

5. Install the new drive belt, routing it as shown in (Fig. 022).

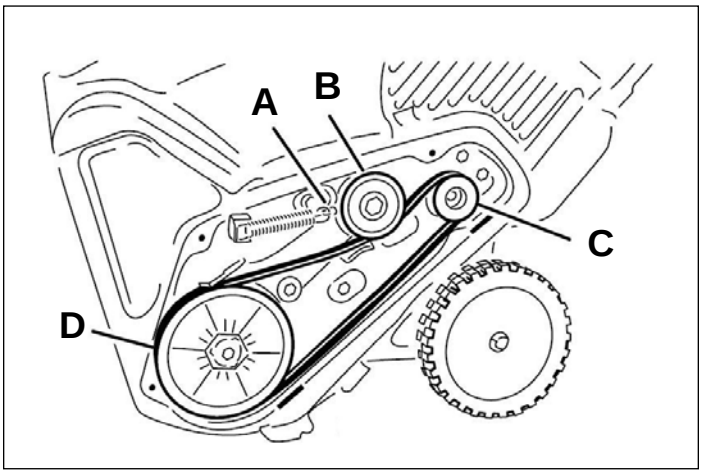


Fig. 022

A. Brake Spring (install on idler arm here)
B. Idler Pulley
C. Engine Pulley
D. Rotor Pulley

NOTE
Route the new drive belt first around the engine pulley, then the idler pulley, and finally around the loose rotor pulley positioned just above the rotor shaft (Fig. 022).

6. Install the rotor pulley onto the rotor shaft (Fig. 022).

7. Install the curved washer and the rotor pulley bolt and tighten them securely (Fig. 022).

NOTE
The concave side of the curved washer goes against the outside of the pulley.

8. Install the brake spring onto the idler arm (Fig. 022).

9. Install the drive belt cover with the bolts you removed in step 1.

NOTE
Ensure that the drive belt is properly adjusted and operating; refer to “Checking the Control Cable” and “Adjusting the Control Cable.”

Adjusting the Quick Shoot™ Control

If there is more than 1/2” (13mm) of slack in the Quick Shoot cable (Fig. 023) or the discharge chute does not rotate left and right in equal angles, adjust the Quick Shoot control cables.

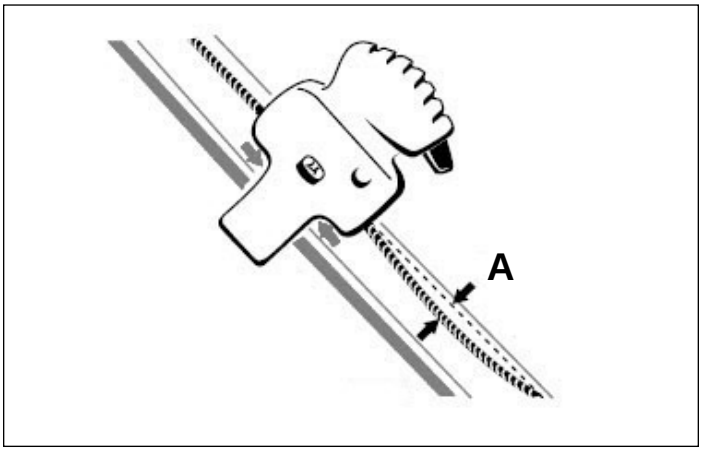


Fig. 023

A. 1/2” (13mm) maximum slack

1. Loosen the two Quick Shoot control cable clamps (Fig. 024).

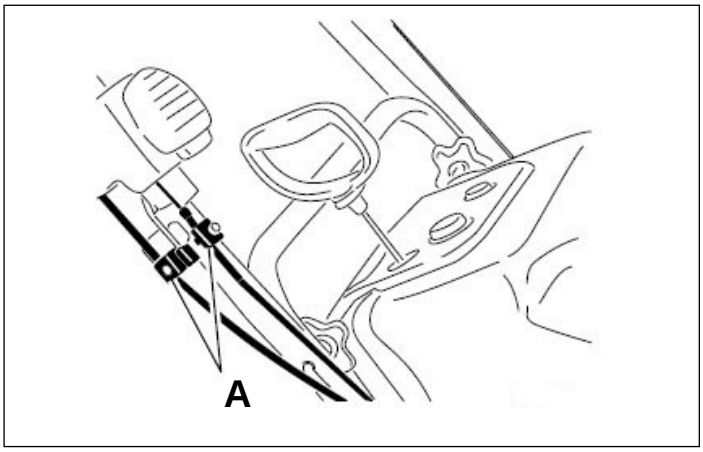


Fig. 024

A. Cable Clamps

2. Position the Quick Shoot control between the two arrows located on the right hand side of the upper handle (Fig. 025).

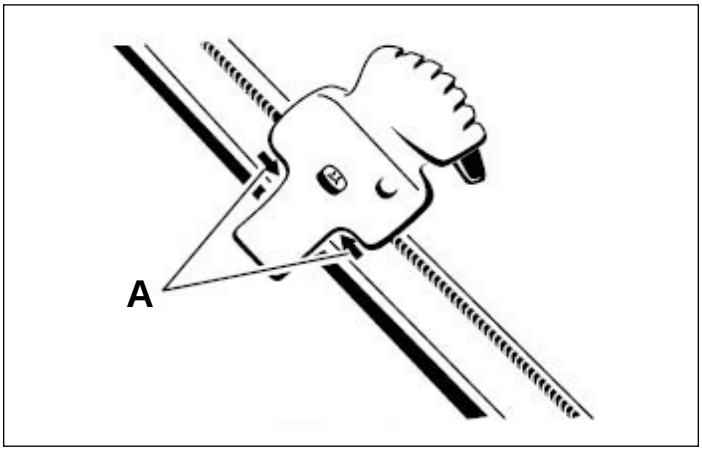


Fig. 025

A. Arrows

3. Rotate the discharge chute so that it faces straight ahead and the arrow on the back of the discharge chute aligns with the arrow on the shroud (Fig. 026).

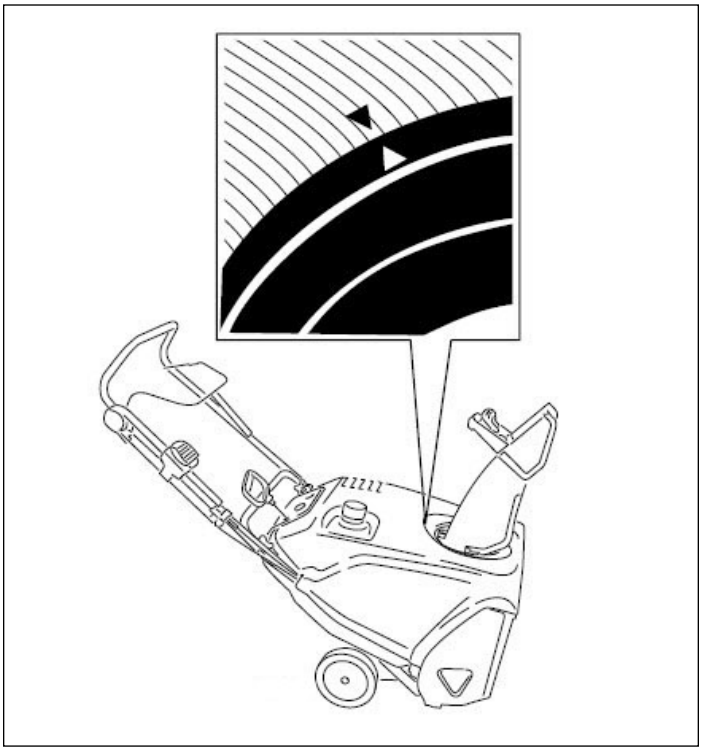


Fig. 026

4. Hold the discharge chute in the straight-ahead position, pull the lower cable casing downward until you remove the slack in the cable, and tighten the screw on the lower cable clamp securely (Fig. 027).

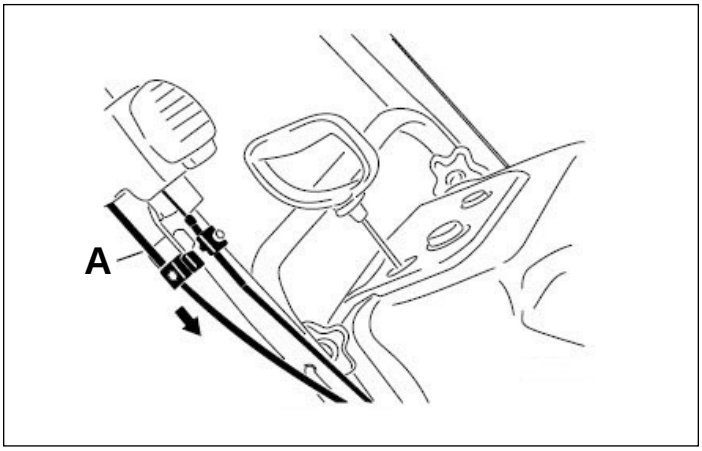


Fig. 027

A. Lower cable casing

5. Pull the upper cable casing forward until you remove the slack in the cable, and tighten the screw on the upper cable clamp securely (Fig. 028).

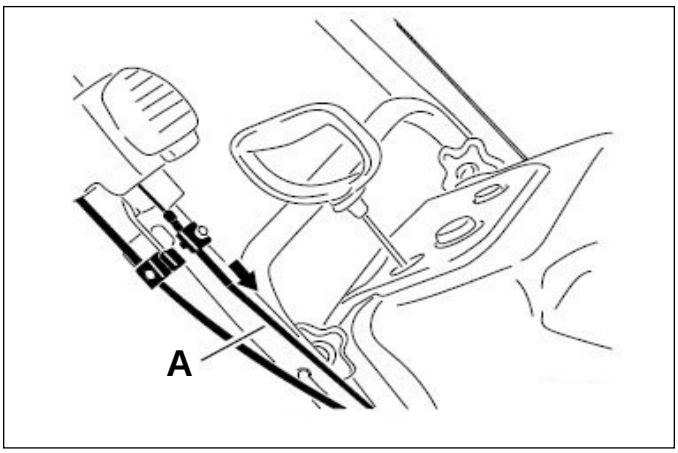


Fig. 028

A. Upper cable casing

NOTE
Do not over-tension the cables. If the cables are over-tensioned, the Quick Shoot will be hard to operate.

NOTES

CHAPTER 3 - CHASSIS

Power Clear® 18 Inch Snowthrower Main Frame – Lower 3-2
Power Clear® 18 Inch Snowthrower Main Frame – Housing 3-3
Power Clear® 18 Inch Snowthrower Main Frame – Shroud.....3-4
Power Clear® 18 Inch Snowthrower Main Frame – Upper Handle 3-5
Power Clear® 18 Inch Snowthrower Main Frame – Lower 3-6
Power Clear® 21 Inch Snowthrower Main Frame – Housing 3-7
Power Clear® 21 Inch Snowthrower Main Frame – Chute..... 3-8 to 3-9
Power Clear® 21 Inch Snowthrower Main Frame – Handles 3-10
Power Clear® 21 Inch Snowthrower Main Frame – Power Shoot.....3-11
Power Clear® 21 Inch Snowthrower Main Frame – Shroud.....3-12
Power Clear® 21 Inch Snowthrower Main Frame – Quick Shoot.....3-13
Power Clear® 21 Inch Snowthrower Main Frame – Quick Shoot.....3-14
18 Inch Shroud Removal 3-15
21 Inch Shroud Removal 3-16
Quick Shoot Contols.....3-17

CHASSIS

Power Clear® - 18 Inch Snowthrower

Main Frame – Lower

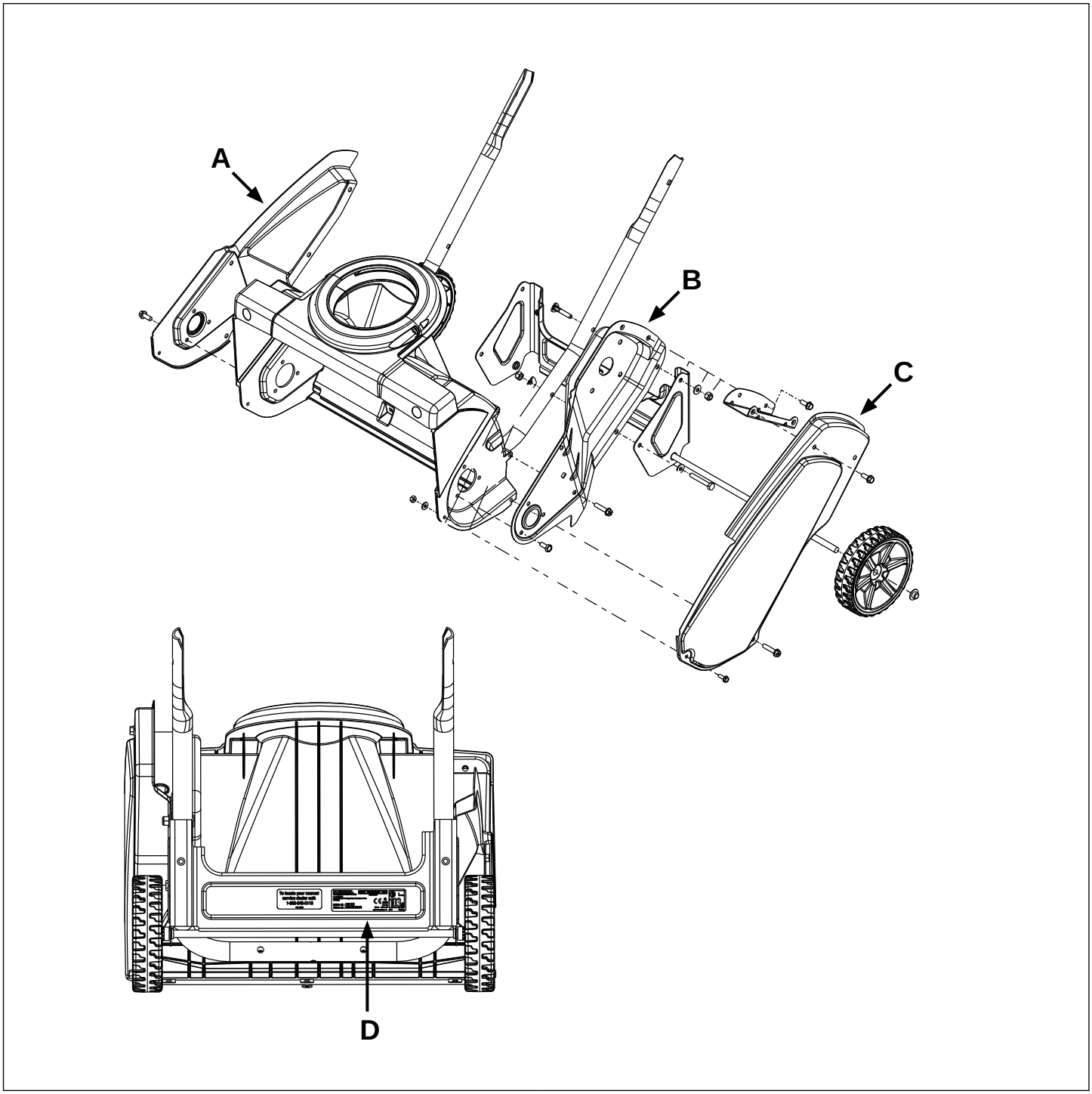


Fig. 001

A. Side plate RH
B. Side plate LH
C. Belt Cover
D. Model/Serial Decal

Power Clear® - 18 Inch Snowthrower

Main Frame – Housing

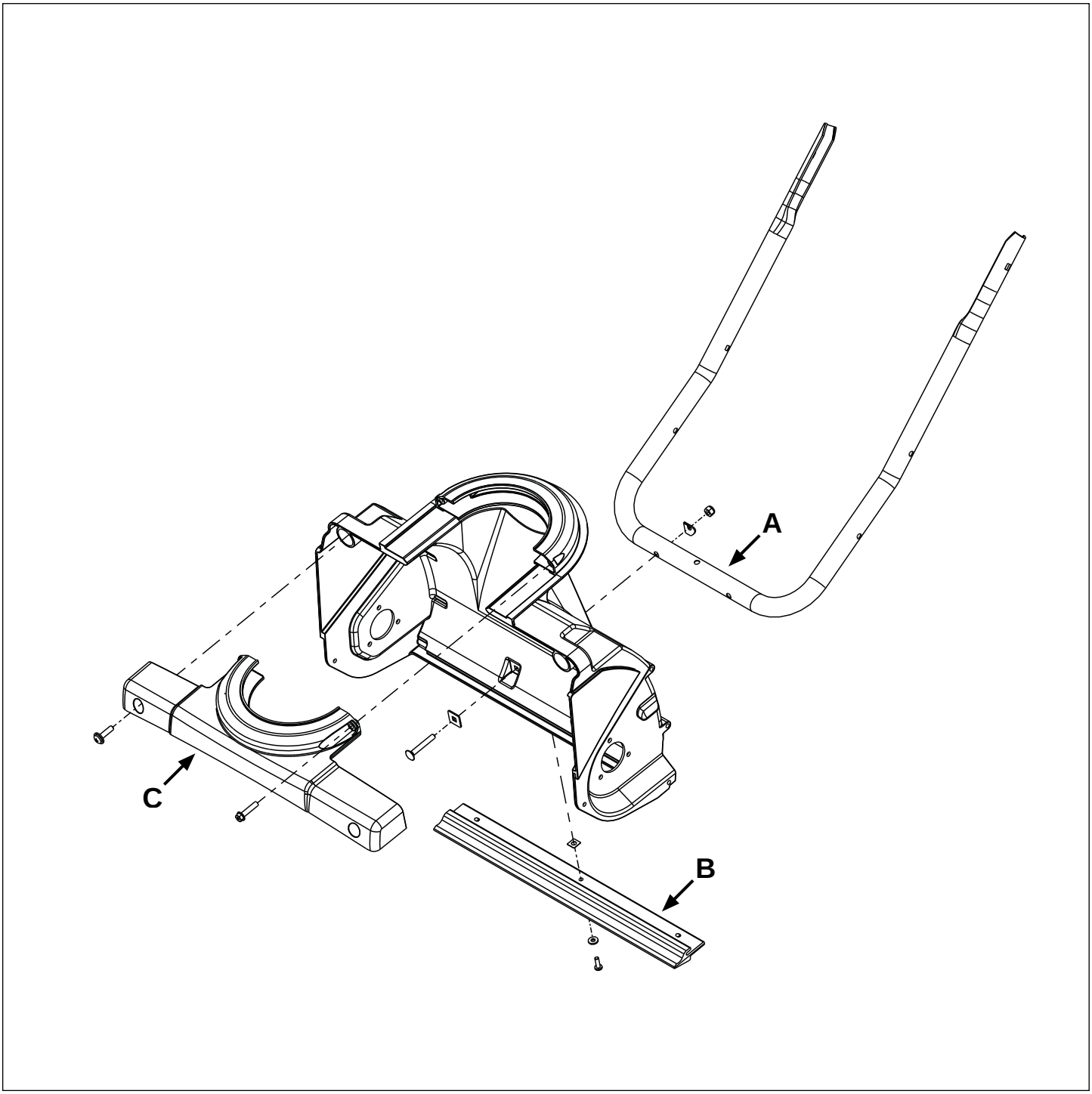


Fig. 002

A. Lower Handle
B. Scraper
C. Chute Retainer

Power Clear® - 18 Inch Snowthrower

Main Frame – Shroud

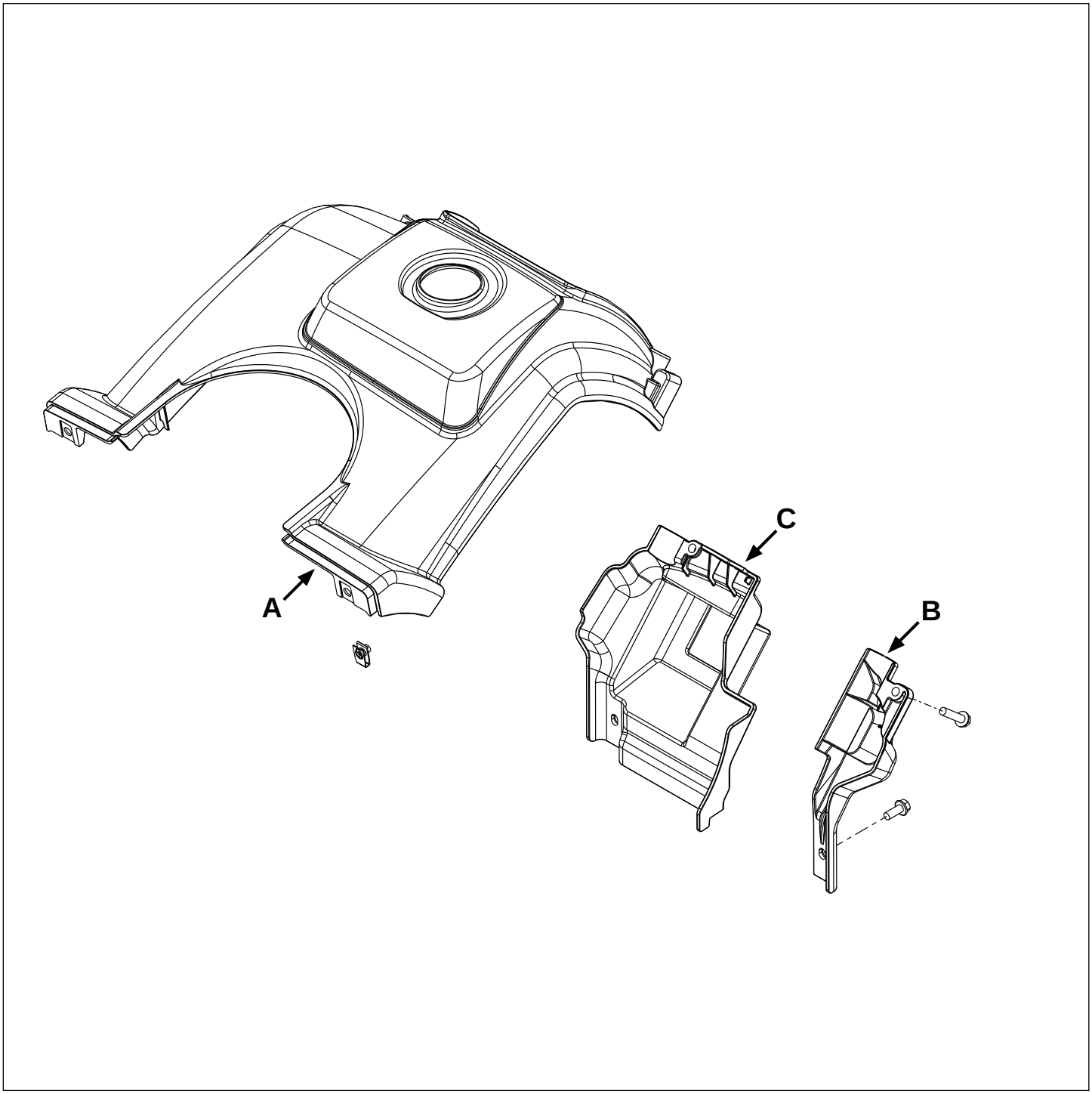


Fig. 003

A. Shroud Assembly
B. Lower Shroud LH
C. Lower Shroud RH

Power Clear® - 18 Inch Snowthrower

Main Frame – Upper Handle

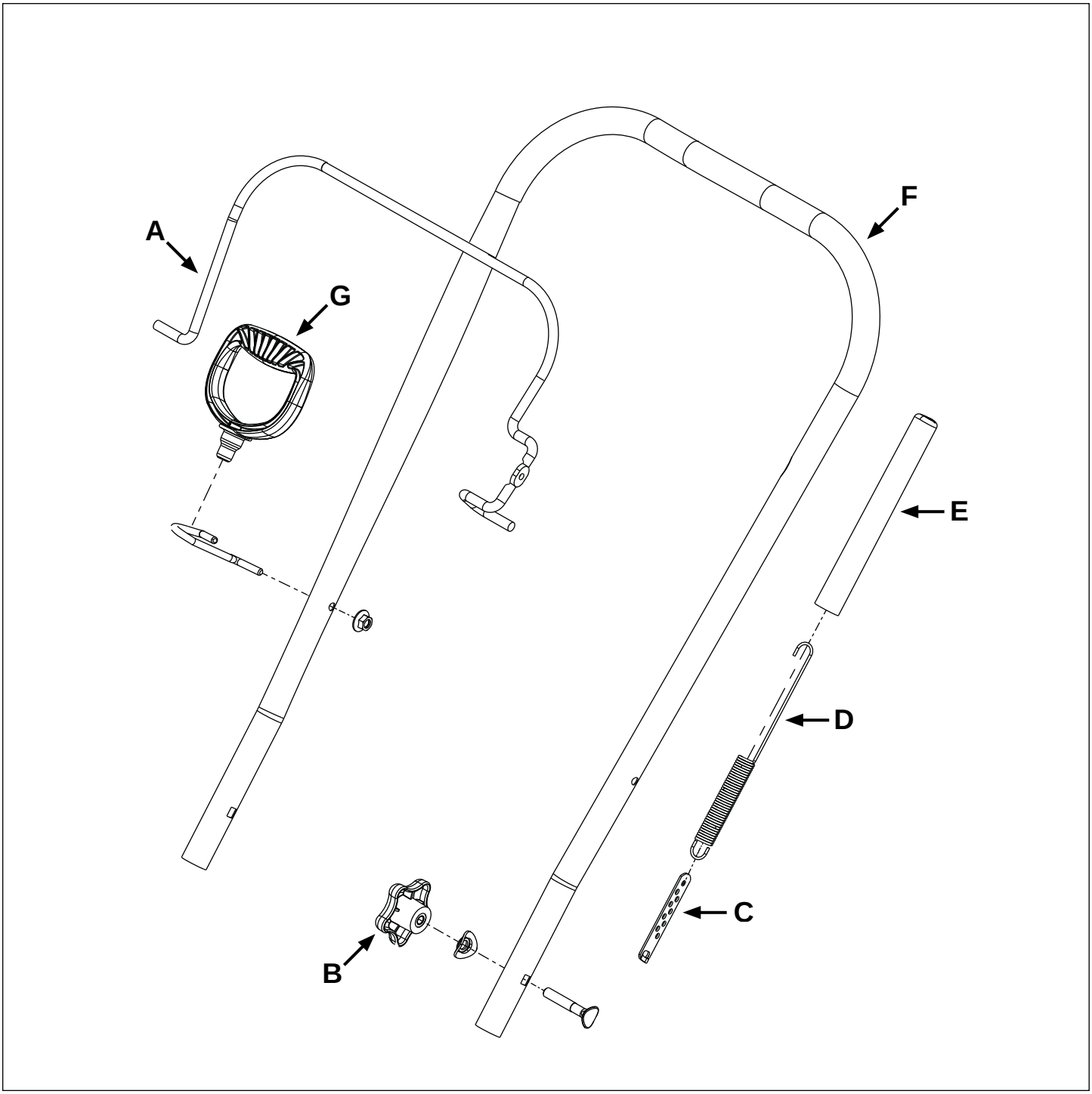


Fig. 004

A. Clutch Bail
B. Handle Knob
C. Cable Clutch Adjuster
D. Clutch Spring
E. Spring Cover
F. Upper Handle Assembly
G. Recoil Handle

Power Clear® - 18 Inch Snowthrower

Main Frame – Lower

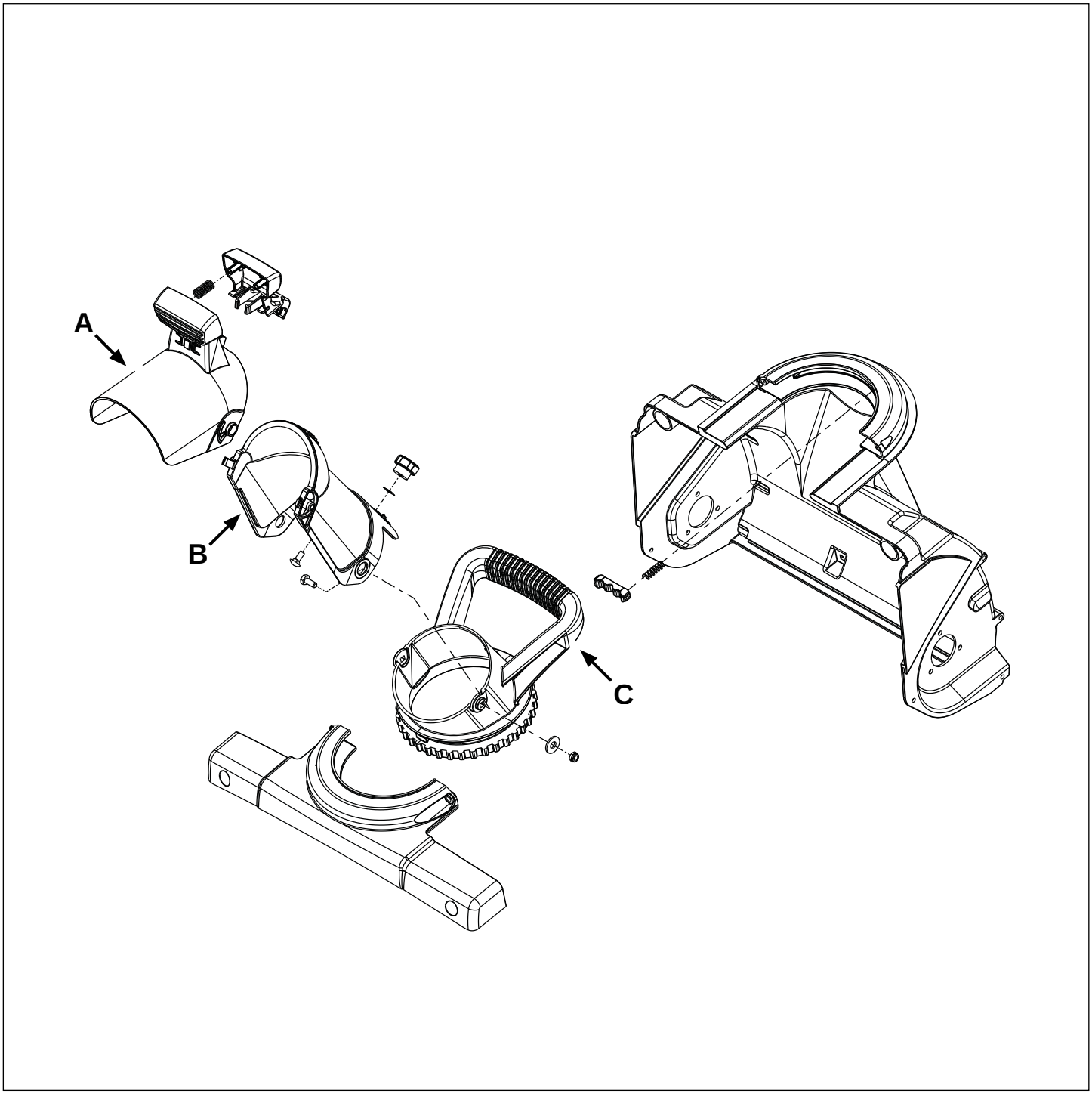


Fig. 005

A. Chute Deflector Assembly
B. Discharge Chute
C. Chute Handle

Power Clear® - 21 Inch Snowthrower

Main Frame – Housing

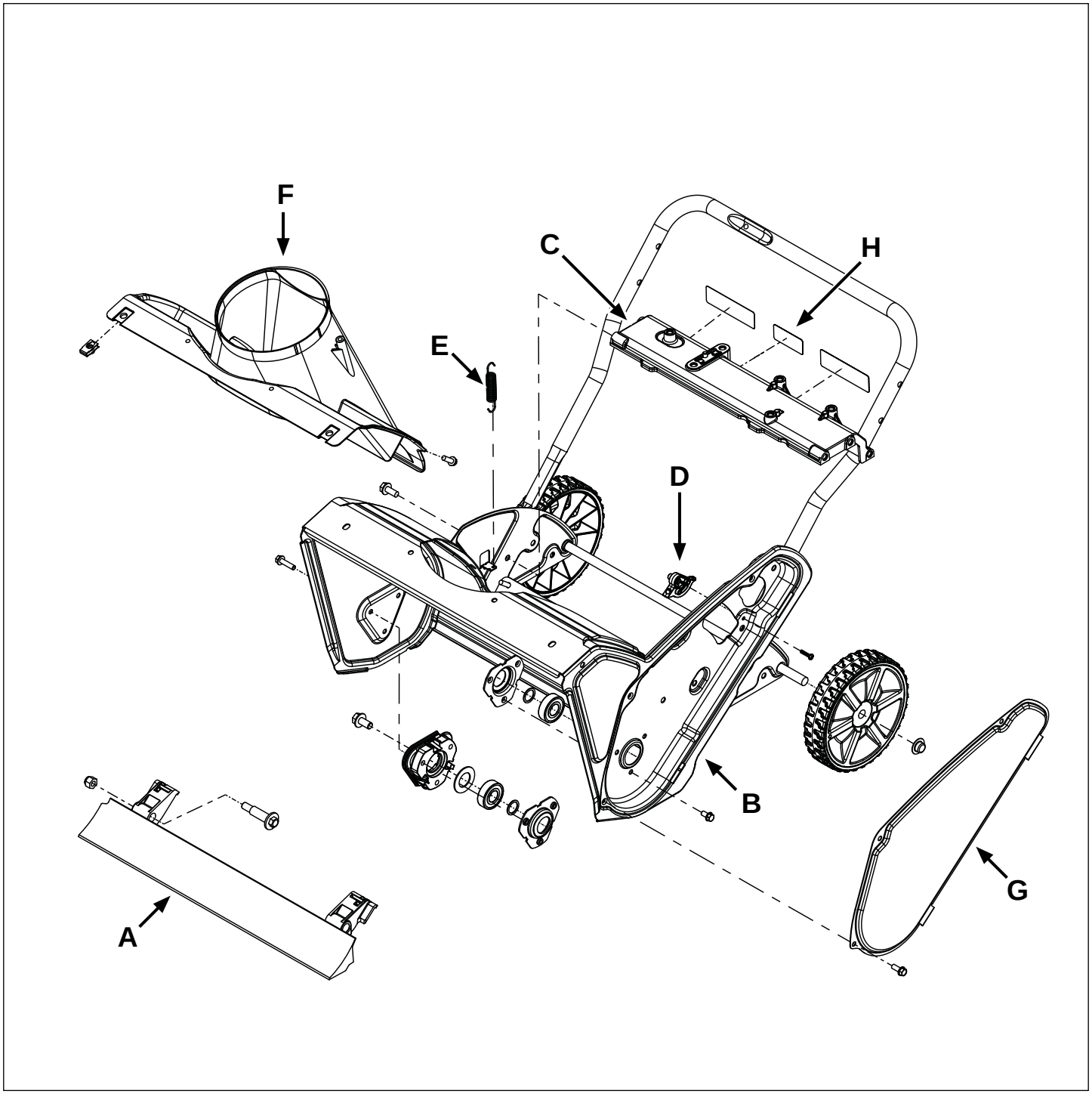


Fig. 006

A. Scraper Blade
B. Auger Housing
C. Frame Brace
D. Clutch Cable Guide
E. Extension Spring
F. Lower Chute
G. Belt Cover
H. Model/Serial Decal

Power Clear® - 21 Inch Snowthrower

Main Frame – Chute

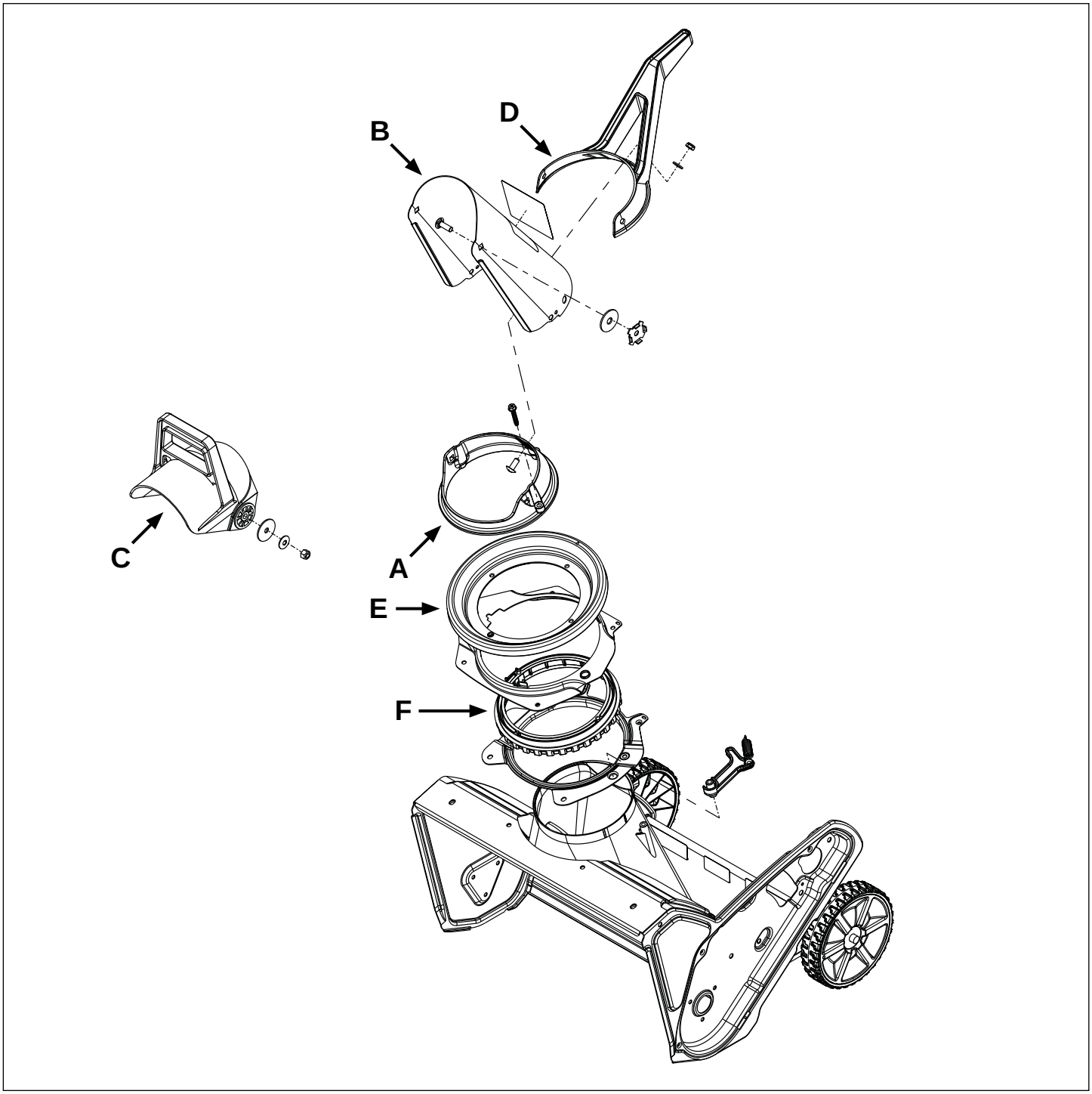


Fig. 007

A. Chute Ring
B. Discharge Chute Assembly
C. Chute Deflector
D. Chute Control Handle
E. Chute Seal Ring
F. Chute Ring Gear

Power Clear® - 21 Inch Snowthrower

Main Frame – Chute

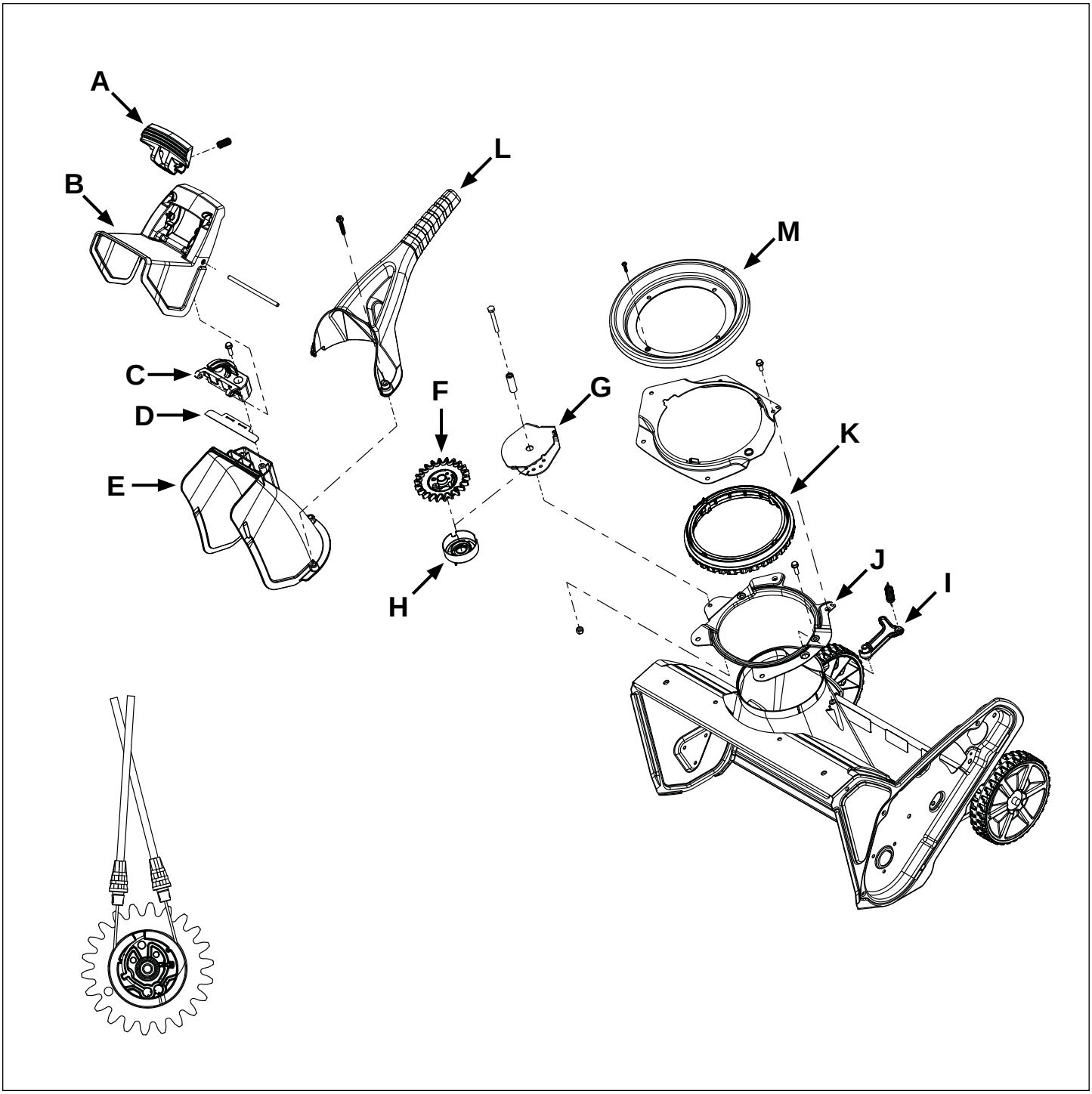


Fig. 008

A. Deflector Trigger
B. Chute Deflector
C. Ratchet Deflector Hinge
D. Deflector Seal
E. Chute
F. Pinion Gear
G. Pinion Bracket
H. Cable Retainer
I. Detent Paw
J. Chute Support Ring
K. Chute Ring Gear
L. Chute Handle
M. Seal Ring Chute

Power Clear® - 21 Inch Snowthrower

Main Frame – Handles

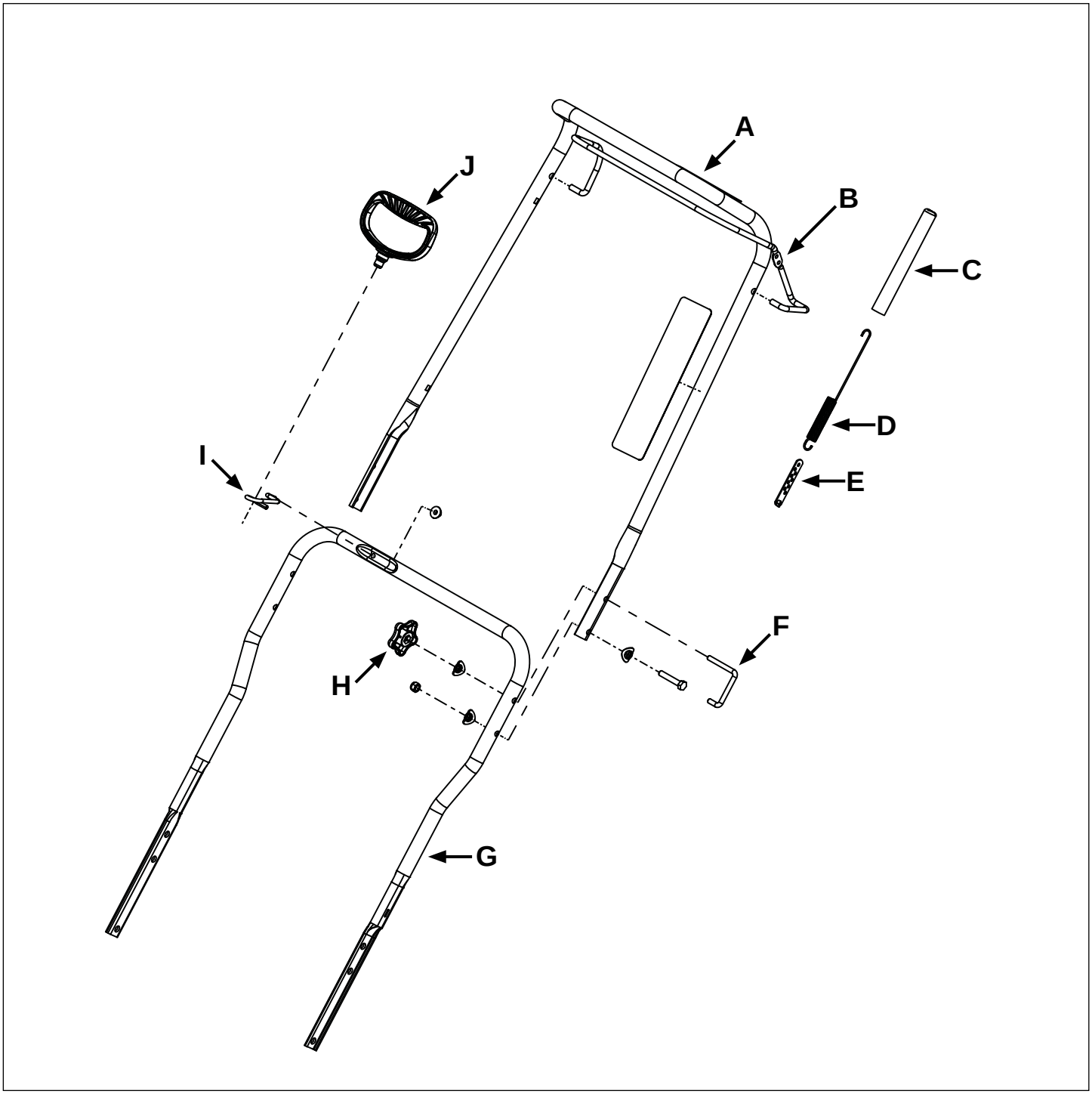


Fig. 009

A. Upper Handle Assembly
B. Control Bail
C. Spring Cover
D. Clutch Extension Spring
E. Clutch Cable Adjuster
F. Handle Lock
G. Lower Handle
H. Handle Knob
I. Rope Guide
J. Recoil Handle

Power Clear® - 21 Inch Snowthrower

Main Frame – Power Shoot

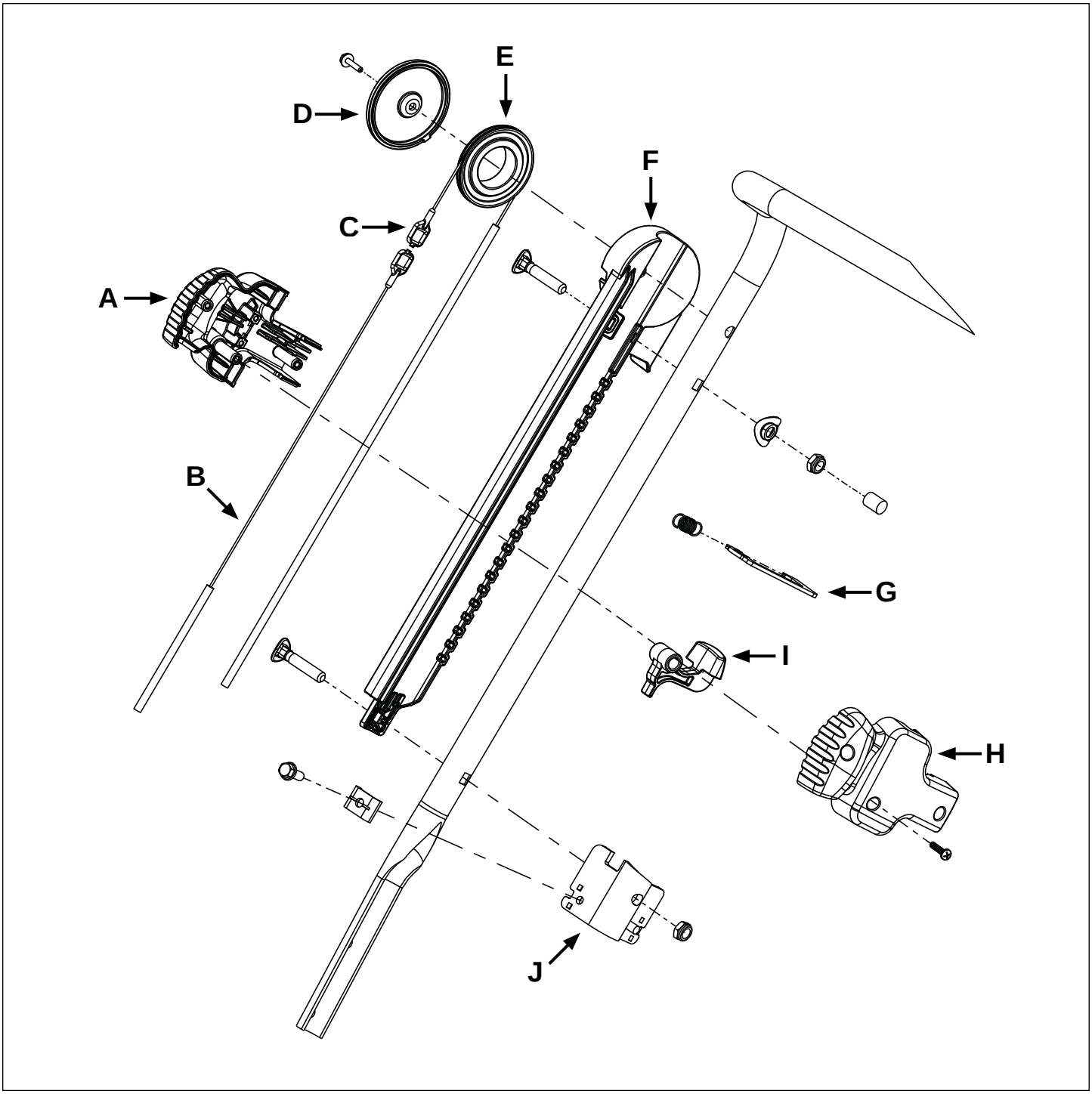


Fig. 010

A. Slider Handle RH
B. Short Chute Cable
C. Long Chute Cable
D. Pulley Cover
E. Slider Pulley
F. Slider Track
G. Chute Lock Plate
H. Slider Handle LH
I. Trigger
J. Cable Bracket

Power Clear® - 21 Inch Snowthrower

Main Frame – Shroud

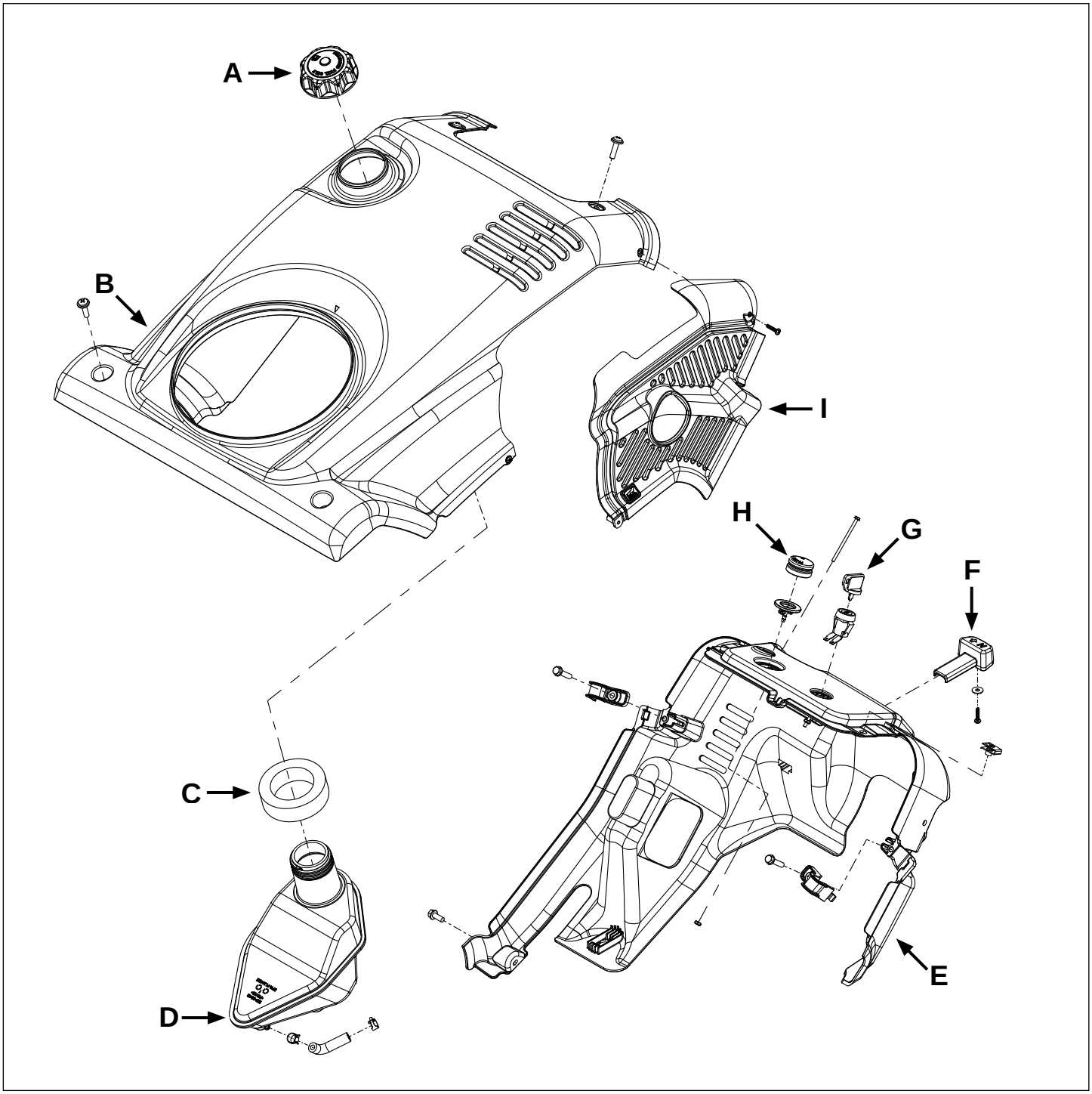


Fig. 011

A. Gas Cap
B. Shroud Assembly
C. Tank Seal
D. Fuel Tank
E. Lower Shroud
F. Choke Knob
G. On/Off Switch
H. Primer Bulb
I. Exhaust Baffle

Power Clear® - 21 Inch Snowthrower

Main Frame – Quick Shoot

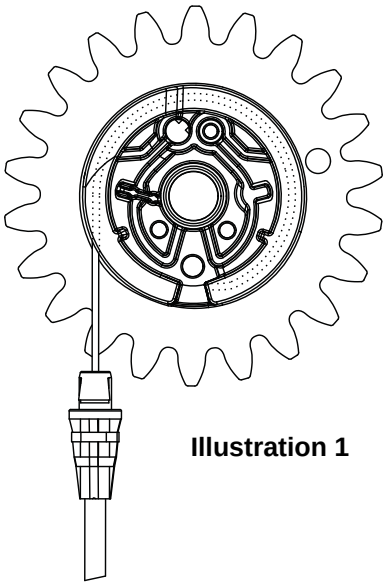


Illustration 1

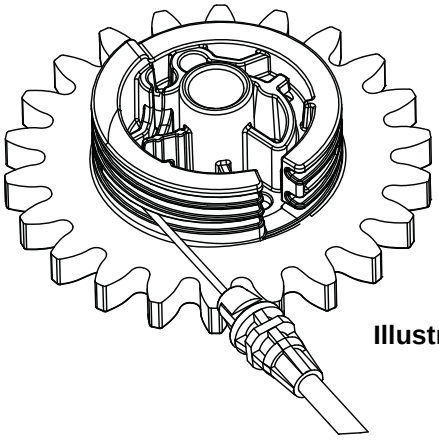


Illustration 2

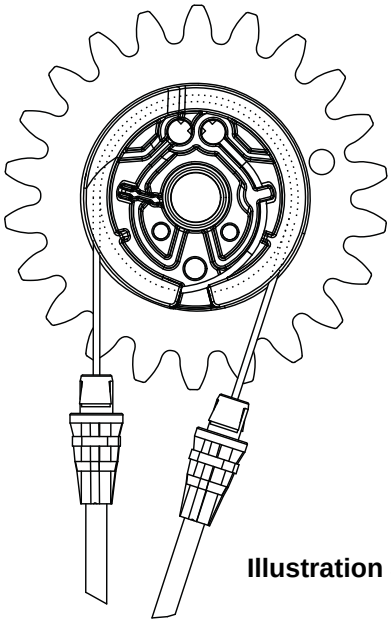


Illustration 3

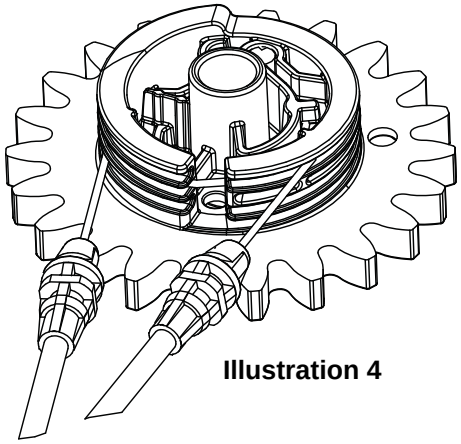


Illustration 4

Fig. 012

Power Clear® - 21 Inch Snowthrower

Main Frame – Quick Shoot

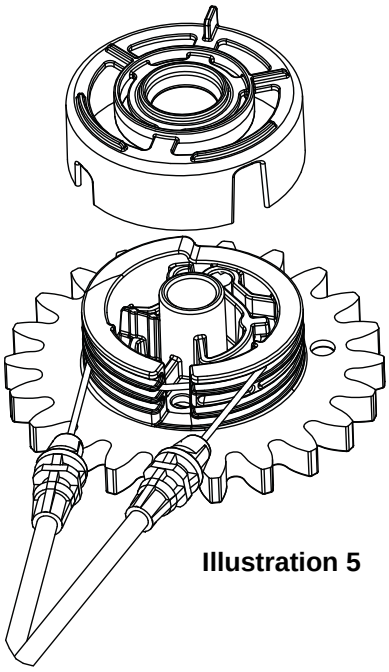


Illustration 5

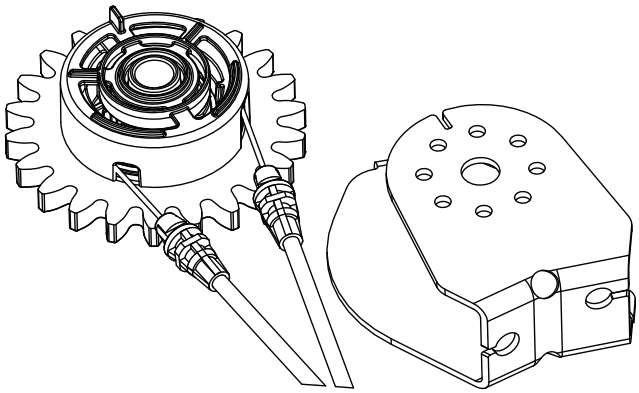


Illustration 6

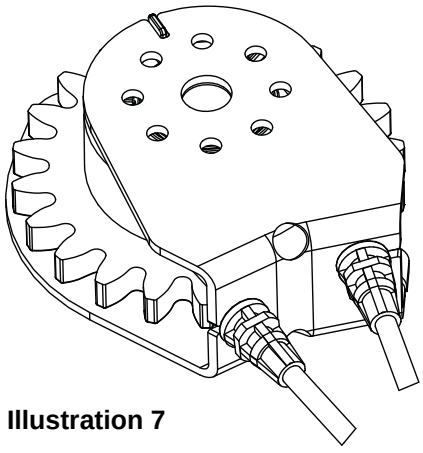


Illustration 7

Fig. 013

18 Inch Shroud Removal

1. Remove key from ignition. Remove the screws securing the lower shrouds (A). Remove the right and left lower shrouds (B) (Fig. 014).

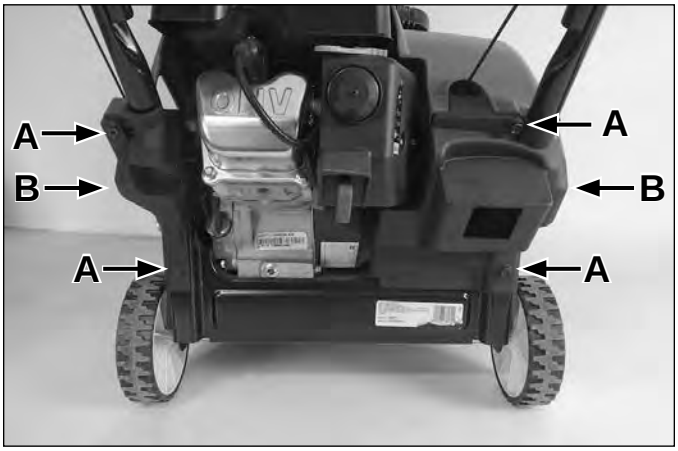


Fig. 014

2. Remove the belt cover. Disconnect the clutch cable from the belt guide. Slide the cable through the housing (Fig. 015).

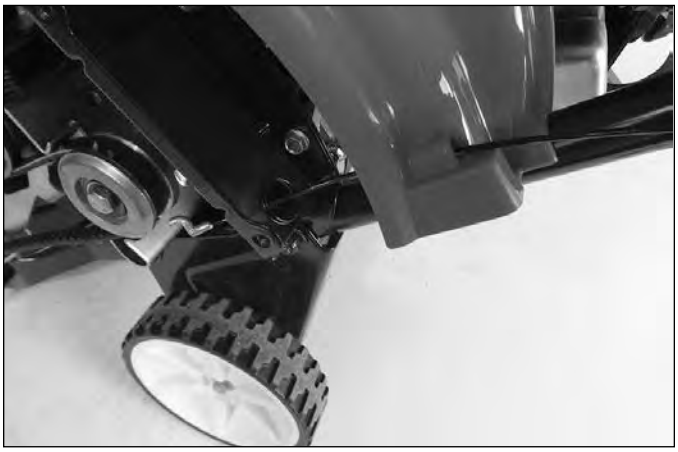


Fig. 015

3. Remove the shroud screws and fuel cap and remove the shroud. Reinstall fuel cap (Fig. 016).

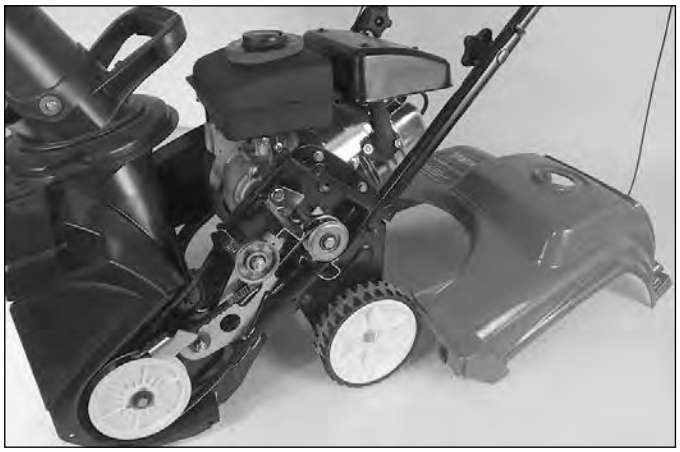


Fig. 016

21 Inch Shroud Removal

1. Remove key from ignition. Remove the bolts that hold the discharge chute to the chute seal ring (Fig. 017).

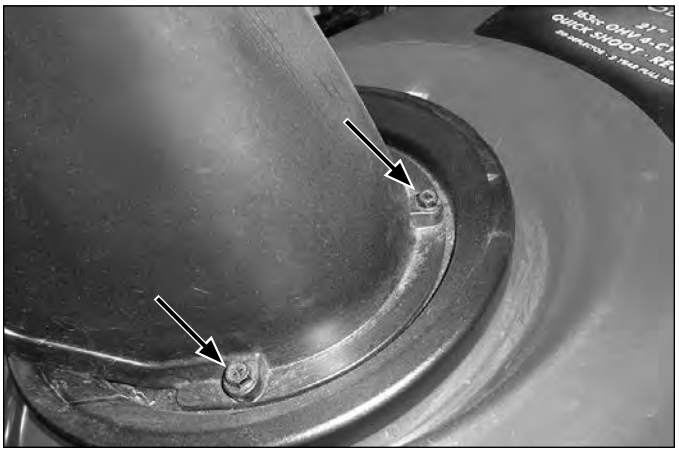


Fig. 017

2. Remove the single screw holding the chute seal ring Remove the ring (Fig. 018).

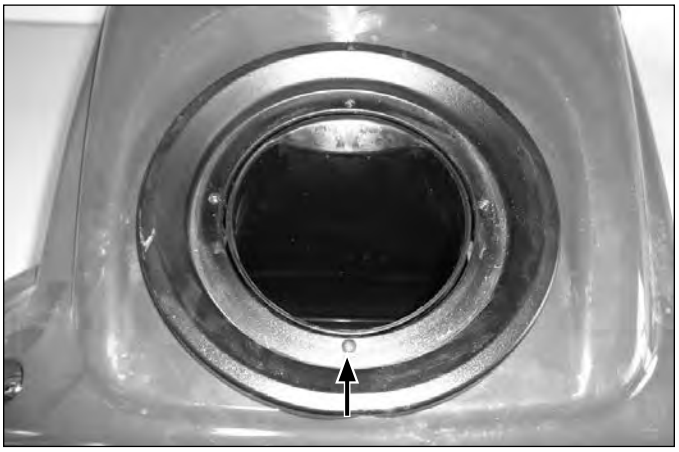


Fig. 018

3. Remove the two rear screws holding the shroud to the chassis. Remove the two front screws holding the shroud to the chassis (Fig. 019).

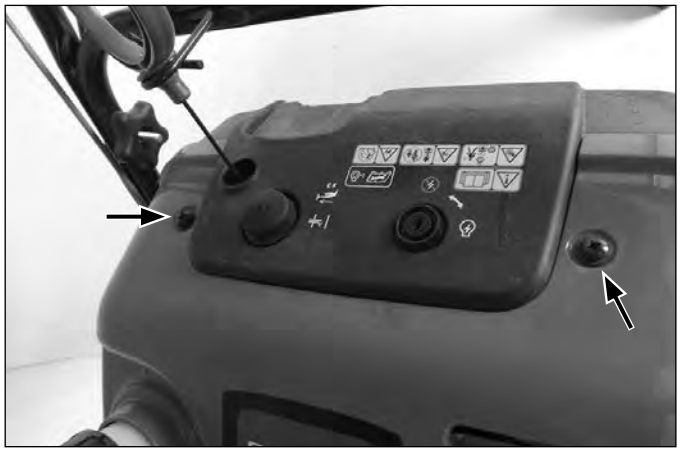


Fig. 019

4. Remove the shroud (Fig. 020).

Fig. 020

Quick Shoot Contols

1. Remove the bolt holding the quick chute gear assembly to the chute housing (Fig. 021).

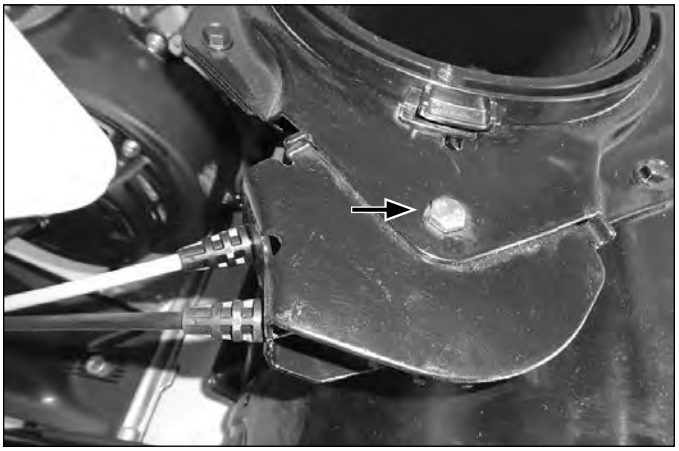


Fig. 021

2. Remove the complete assembly. Remove pinion spacer sleeve (A) Fig. 022).

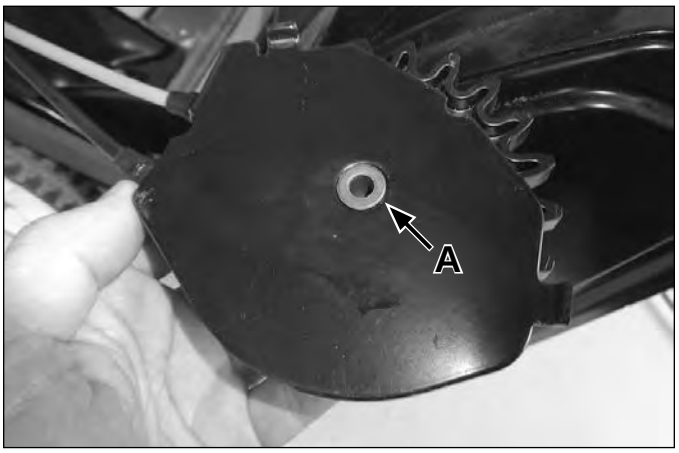


Fig. 022

3. With a pliers, compress the cable locks and remove the cables from the pinion bracket (Fig. 023).

Fig. 023

4. Turn the gear assembly over and remove the cable retainer (Fig. 024).

Fig. 024

5. With the cable retainer removed, note the direction of the cable wrapping (Fig. 025).

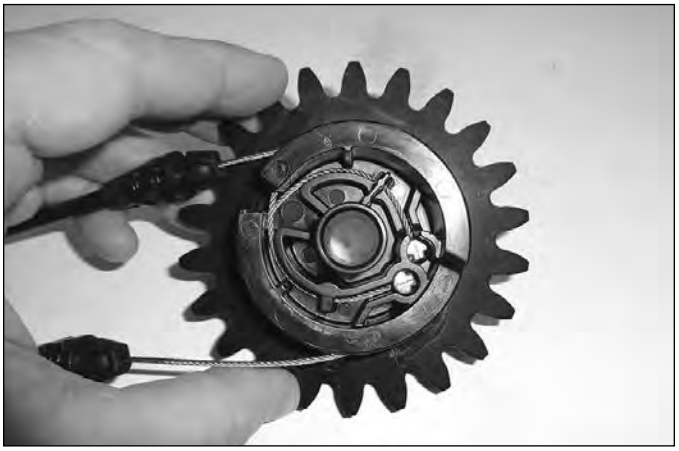


Fig. 025

6. To re-wrap the cables, refer to the following steps and the illustrations on pages 3-13 and 3-14. With the pinion gear facing up, the **black** cable is routed furthest to the bottom of the gear. Insert the barrel end of the cable into the hole and secure the cable under the tab in the gear (Fig. 026).

Fig. 026

7. Wrap the cable around the bottom of the spool (Fig. 027).

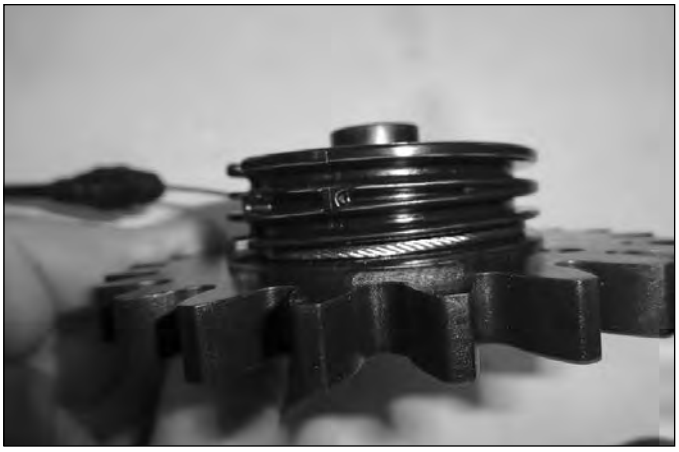


Fig. 027

8. When the cable is fully wrapped, it should look like this (Fig. 028).

Fig. 028

9. Insert the barrel of the **grey** cable into its slot in the gear. Secure the cable under the tabs in the gear (Fig. 029).

Fig. 029

10. Route the cable around the top of the spool (Fig. 030).

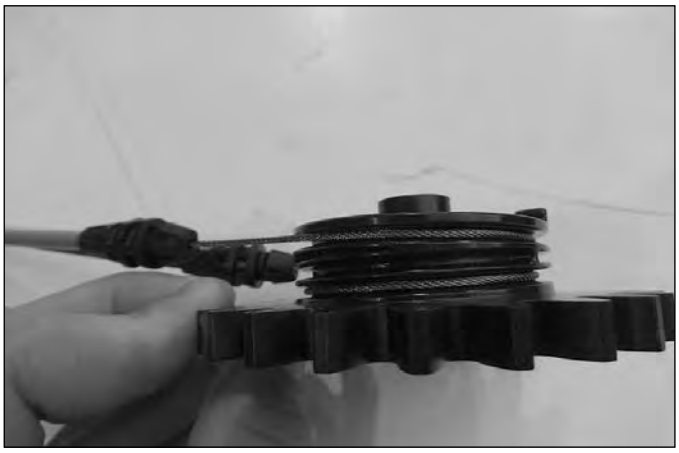


Fig. 030

11. When the cables are routed correctly the cables and gear should look like this (Fig. 031).

Fig. 031

12. Slide the gear into the pinion bracket and secure the cable locks (Fig. 032).

Fig. 032

13. Align the quick chute control and the discharge chute as outlined in the specifications and maintenance chapter. Insert the pinion spacer sleeve and insert the pinion and bracket assembly as shown. Tighten bolt to 8 ft-lbs (11 Nm) (Fig. 033).

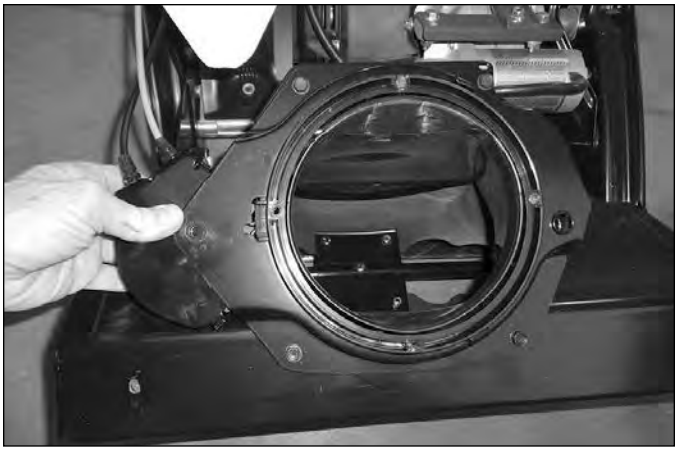


Fig. 033

NOTE
Do not overtighten!

NOTES

CHAPTER 4 - POWER PROPEL SYSTEM

Power Clear® - 18 Inch Snowthrower Rotor Assembly 4-2

Power Clear® - 18 Inch Snowthrower Drive System 4-3

Power Clear® - 21 Inch Snowthrower Rotor Assembly 4-4

Power Clear® - 21 Inch Snowthrower Drive System 4-5

18 Inch Rotor Removal & Replacement 4-6

21 Inch Rotor Removal & Replacement 4-8

Paddle Replacement (All Models) 4-10

18 Inch Scraper Removal & Replacement 4-11

21 Inch Pivoting Scraper Removal & Replacement.....4-12

Power Clear® - 18 Inch Snowthrower

Rotor Assembly

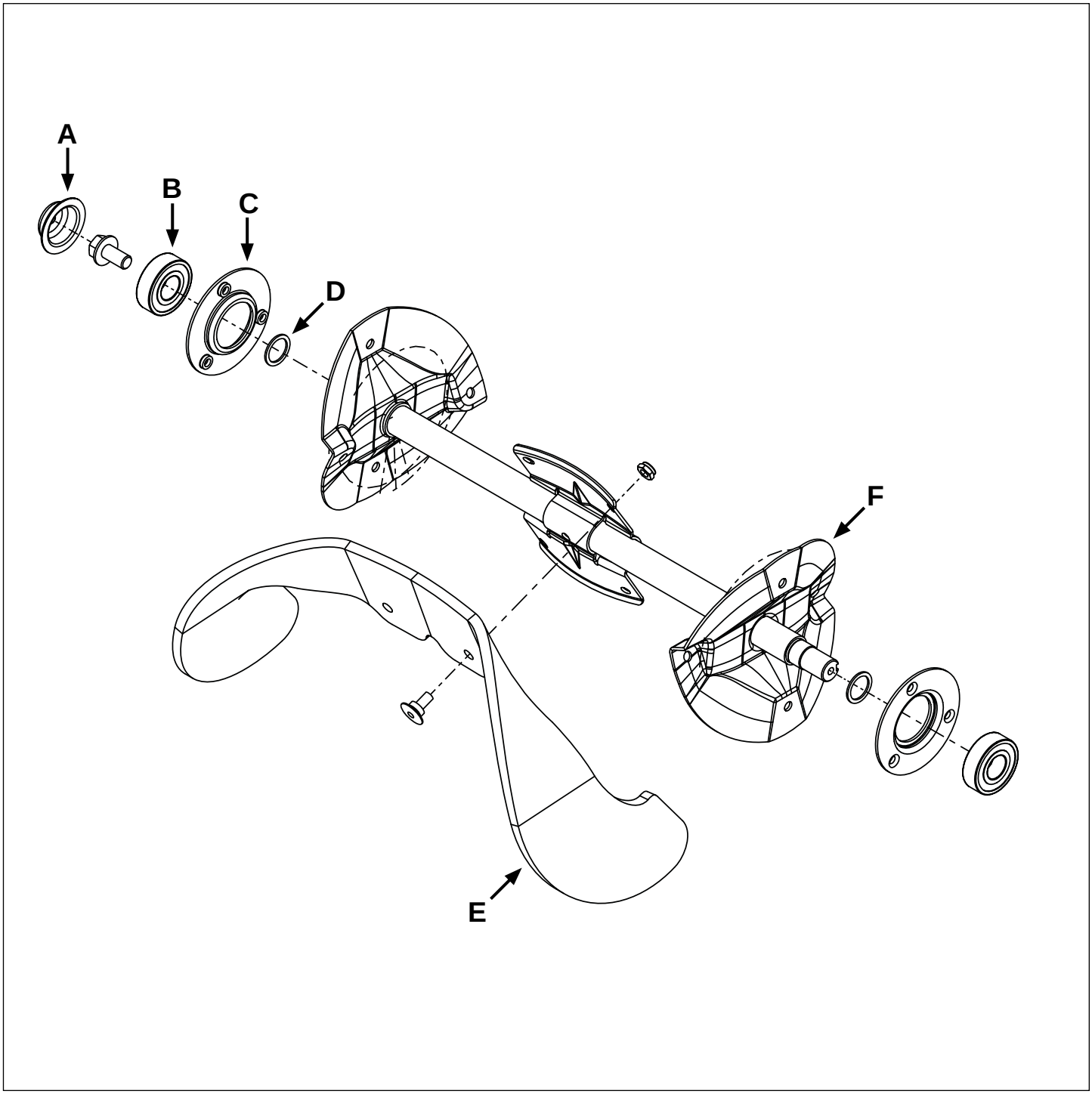


Fig. 001

A. Side Plate Cap
B. Ball Bearing
C. Bearing Flange
D. Thrust Washer
E. Rotor Blade
F. Rotor Assembly

Power Clear® - 18 Inch Snowthrower

Drive System

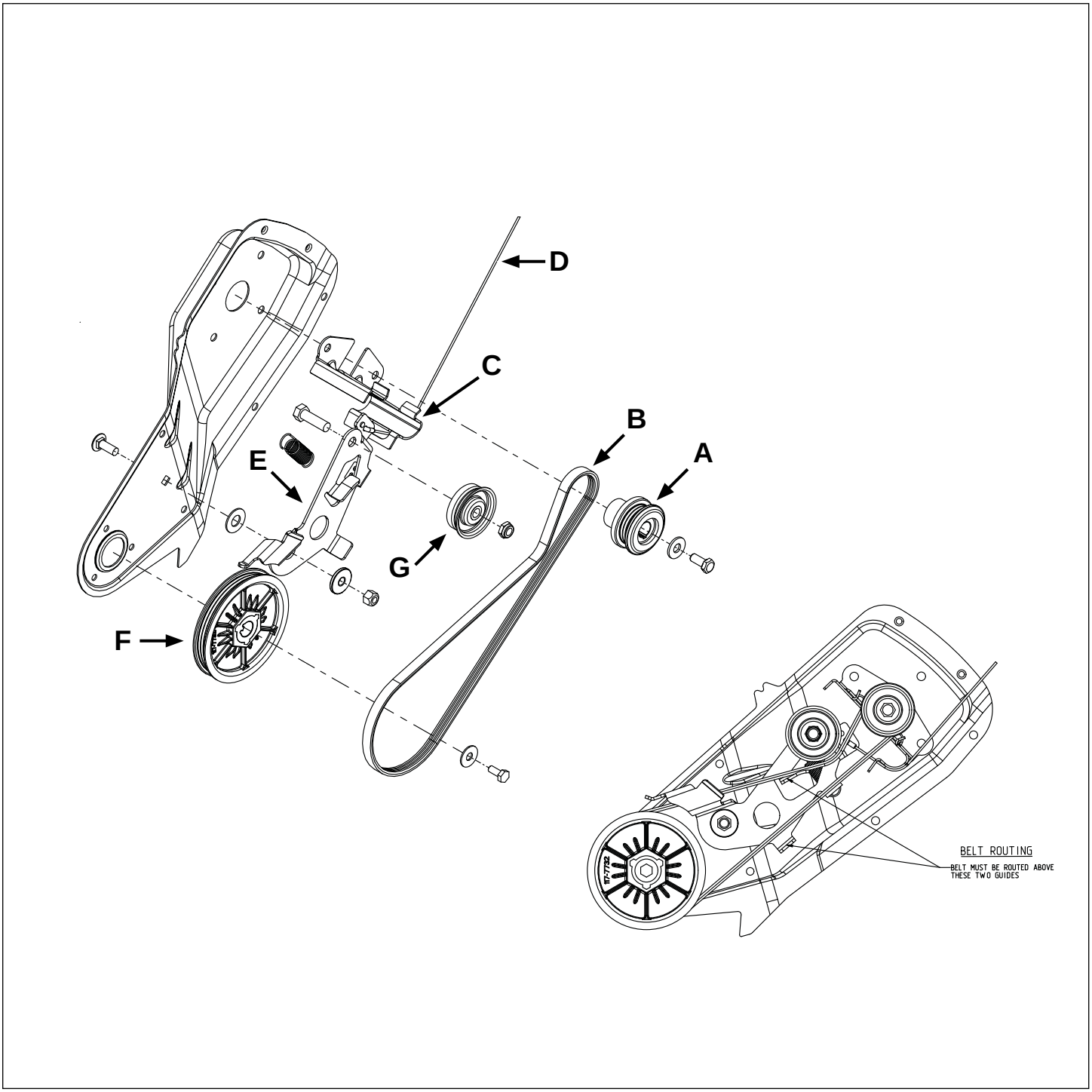


Fig. 002

A. Engine Pulley
B. Ribbed V-Belt
C. Belt Guide
D. Clutch Cable
E. Idler Arm
F. Rotor Pulley Assembly
G. Idler Pulley

Power Clear® - 21 Inch Snowthrower

Rotor Assembly

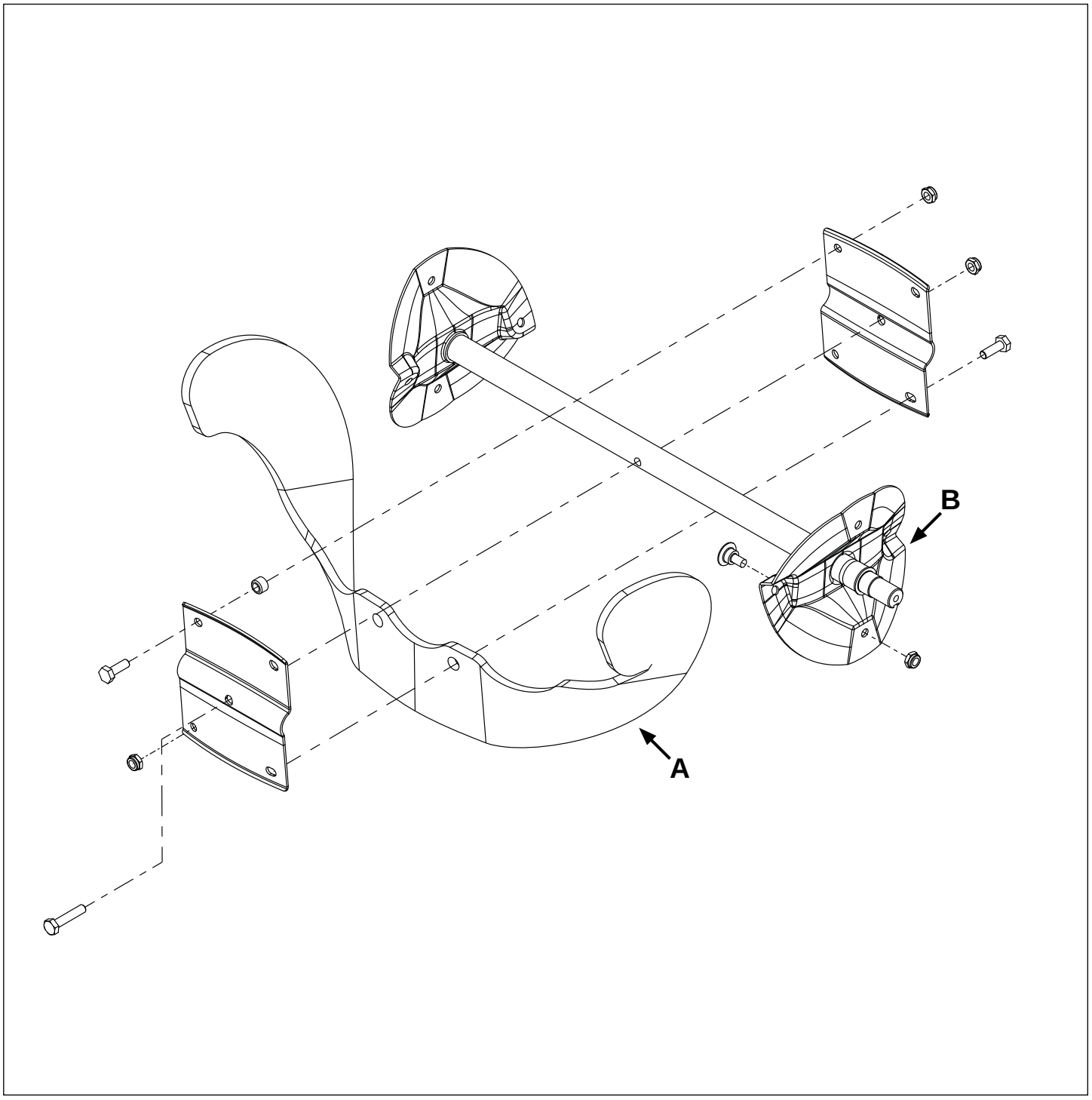


Fig. 003

A. Rotor Blade
B. Rotor

Power Clear® - 21 Inch Snowthrower

Drive System

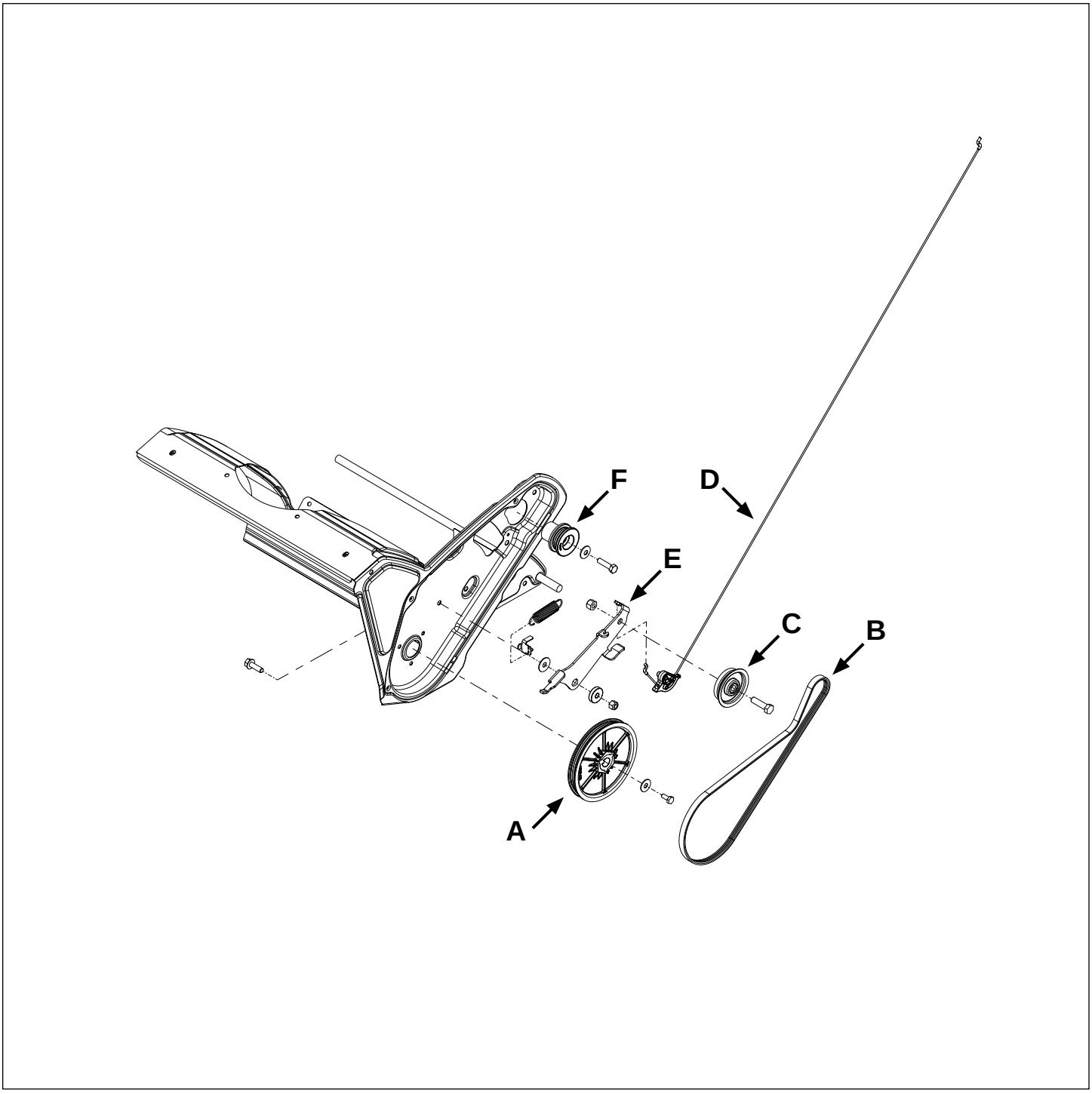


Fig. 004

A. Rotor Pulley Assembly
B. Drive Belt
C. Idler Pulley
D. Clutch Cable
E. Idler Arm
F. Engine Pulley
G. Pinion Bracket
H. Cable Retainer

18 Inch Rotor Removal & Replacement

1. Remove the belt cover. Remove the drive belt (A) and the rotor pulley (B) (Fig. 005).

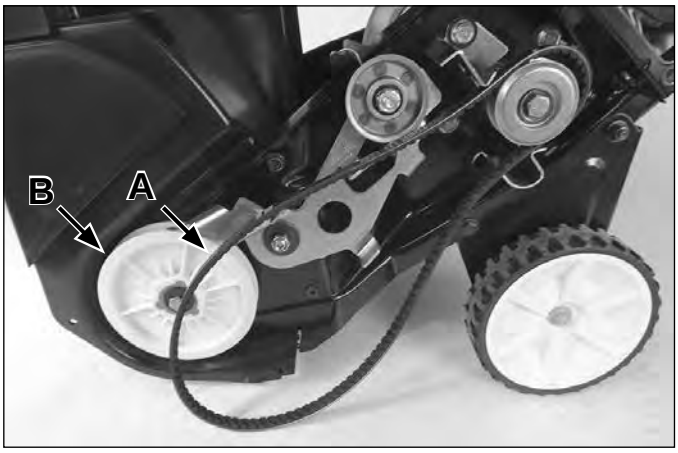


Fig. 005

2. Remove the three rotor bearing screws on the belt side of the housing (Fig. 006).

Fig. 006

3. Remove the three rotor bearing screws on the opposite side of the housing (Fig. 007).

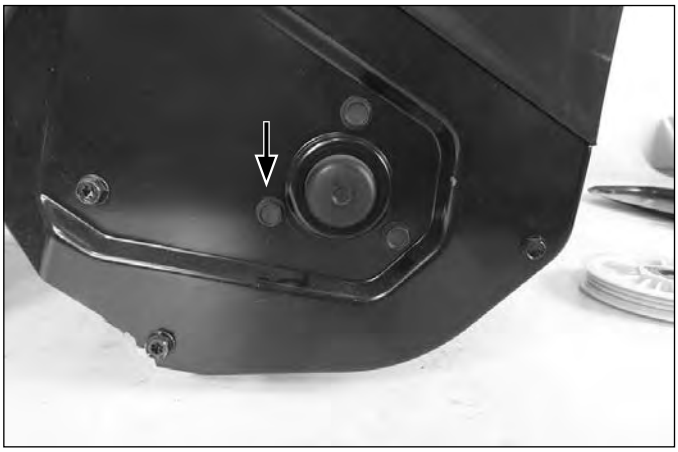


Fig. 007

4. Remove three bolts holding the side plate to the rotor housing (A). Loosen the wheel bracket bolts (B) (Fig. 008).

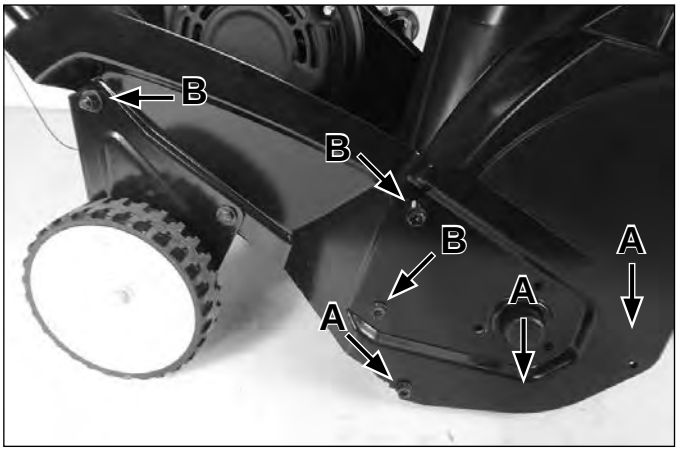


Fig. 008

5. Pull the side plate out slightly to gain clearance to get the rotor out (Fig. 009).

Fig. 009

6. Lift rotor assembly out of the housing (Fig. 010).

Fig. 010

7. Replace rotor parts as required (Fig. 011).

Fig. 011

8. Slide rotor back into the housing. Reinstall the bolts and torque to 8 ft-lbs (11 Nm) (Fig. 012).

Fig. 012

9. Re-install the rotor pulley and drive belt. Torque rotor pulley bolt to 8 ft-lbs (11 Nm) (Fig. 013).

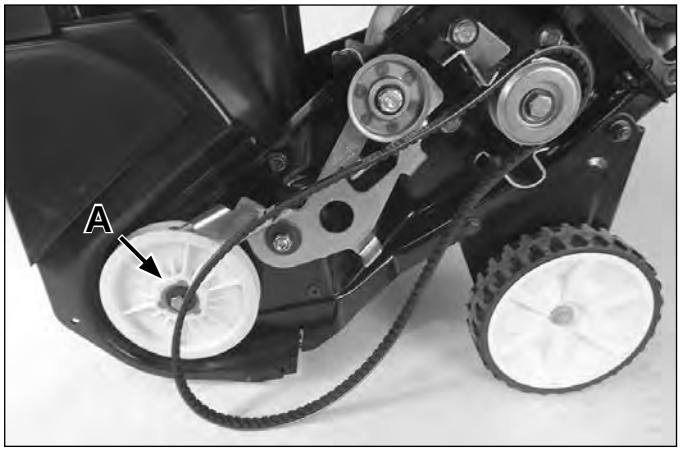


Fig. 013

10. Re-install the belt cover. Torque bolts to 8 ft-lbs (11 Nm).

21 Inch Rotor Removal & Replacement

1. Remove the belt cover. Remove the drive belt (A) and the rotor pulley (B) (Fig. 015).

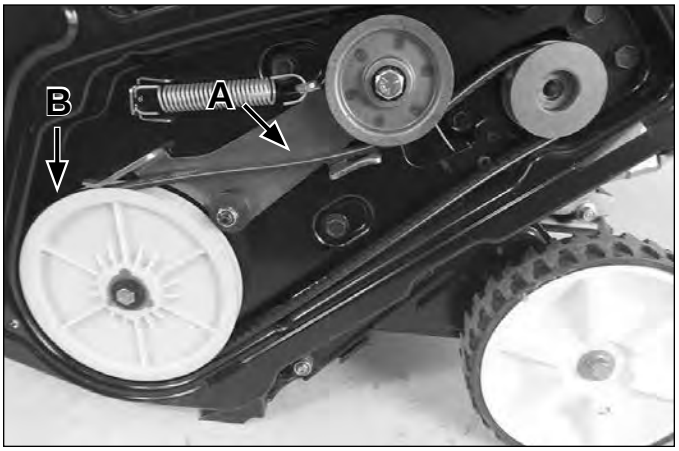


Fig. 015

2. Remove the three rotor bearing screws on the belt side of the housing (Fig. 016).

Fig. 016

3. Remove the three rotor bearing screws on the opposite side of the housing (Fig. 017).

Fig. 017

4. Remove the rotor assembly from the housing. (Fig. 018).

Fig. 018

5. Remove the bearing spacer bolt and bearing spacer.

6. Remove bearings and flanges. Replace rotor parts as required (Fig. 019).

Fig. 019

7. Re-install the bearing spacer and bolt. Torque bolt to 20 ft-lbs (27 Nm) (Fig. 020).

Fig. 020

8. Re-install the rotor assembly into the housing. Re-install the rotor bearing screws. Torque to 8 ft-lbs (11 Nm) (Fig. 021).

Fig. 021

9. Re-install the drive belt and rotor pulley. Torque the rotor pulley bolt to 8 ft-lbs (11 Nm) (Fig. 022).

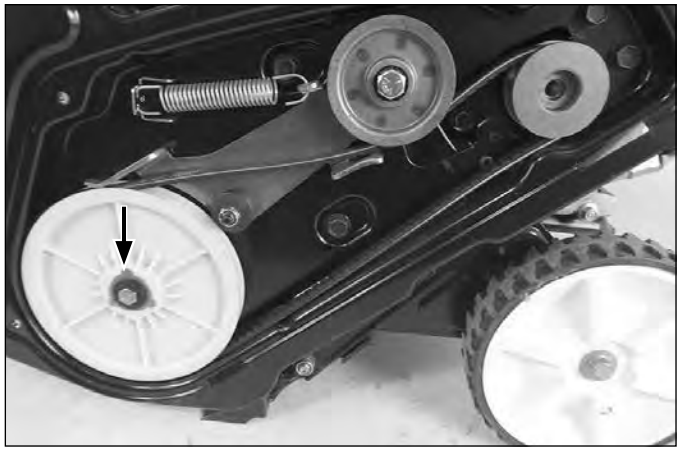


Fig. 022

10. Re-install the belt cover. Torque the bolts to 8 ft-lbs (11 Nm).

Paddle Replacement (All Models)

1. With the rotor assembly removed from the housing, remove the Torx™ fasteners (Fig. 023).

Fig. 023

2. Remove the two inner bolts holding the paddle to the rotor (A) (Fig. 024).

Fig. 024

3. Remove the paddle. Be sure to remove the rotor blade spacers (A) and install them in the new paddles (Fig. 025).

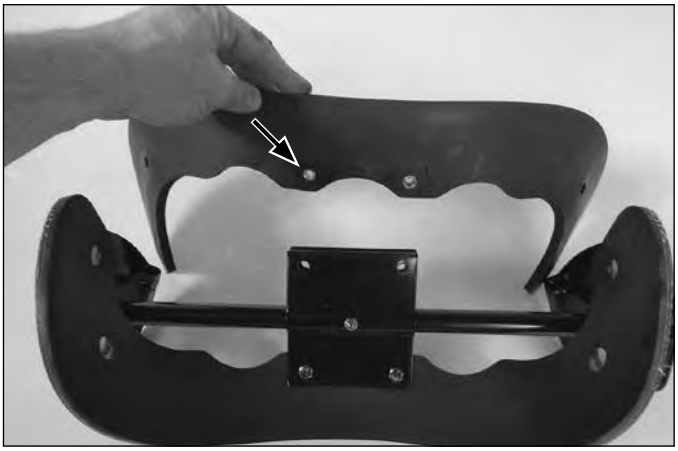


Fig. 025

4. Install new paddles and install rotor assembly back into the housing.

18 Inch Scraper Removal & Replacement

1. Remove the three bolts attaching the scraper to the frame.

2. Install a new scraper. Torque bolts to 16 in-lbs (0.184 kg-m) (Fig. 26).

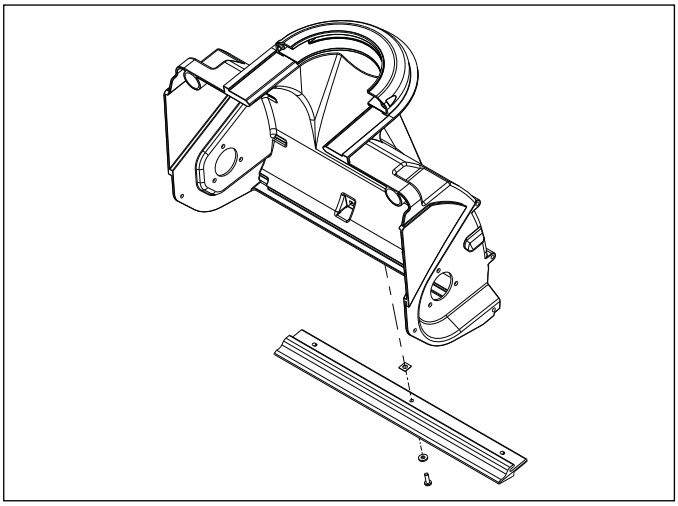


Fig. 026

21 Inch Pivoting Scraper Removal & Replacement

1. Remove the spring from each side of the scraper (Fig. 027)

Fig. 027

2. Remove the bolts from each side of the scraper (Fig. 028).

Fig. 028

3. Remove the scraper from housing (Fig. 029).

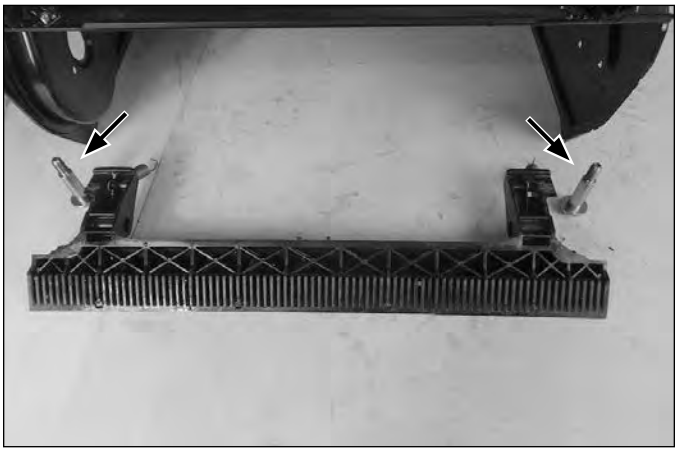


Fig. 029

4. Insert new scraper. Re-install springs and bolts. Torque bolts to 20 ft-lbs (27 Nm) (Fig. 30).

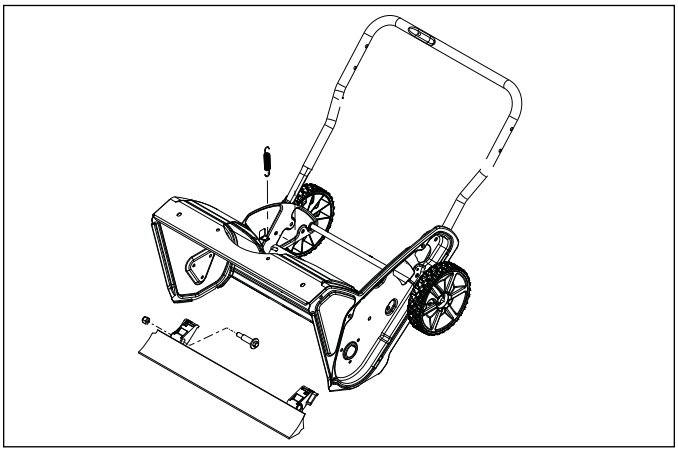


Fig. 030

CHAPTER 5 - ENGINE MOUNTING

Power Clear® - 18 Inch Snowthrower Engine Mounting 5-2

Power Clear® - 21 Inch Snowthrower Engine Mounting 5-3

Engine Removal 18 Inch Models.....5-4

Engine Installation 18 Inch Models.....5-5

Engine Removal 21 Inch Models.....5-6

Engine Installation 21 Inch Models.....5-8

ENGINE MOUNTING

Power Clear® - 18 Inch Snowthrower

Engine Mounting

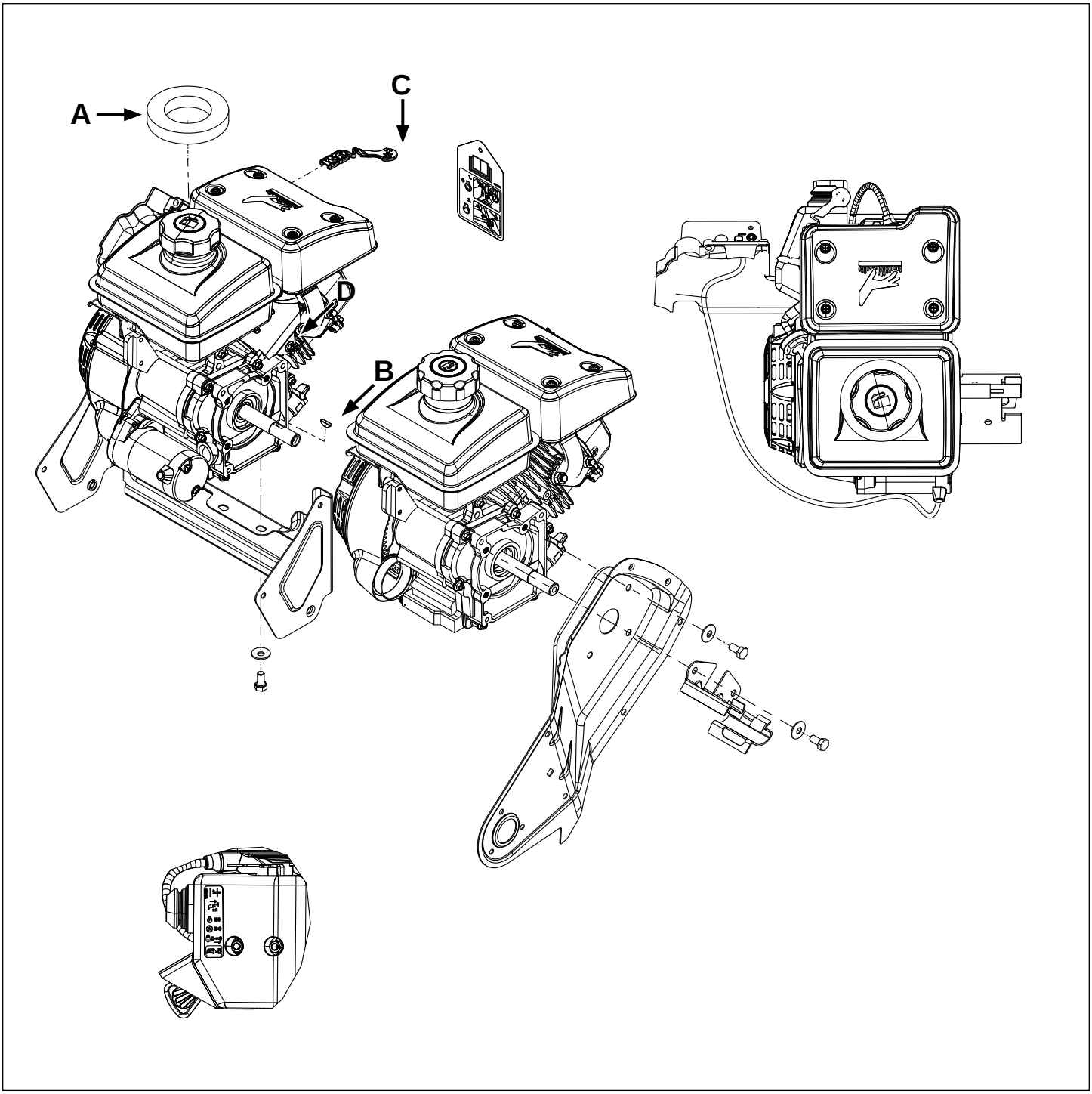


Fig. 001

A. Tank Seal
B. Woodruff Key
C. Choke Lever

Power Clear® - 21 Inch Snowthrower

Engine Mounting

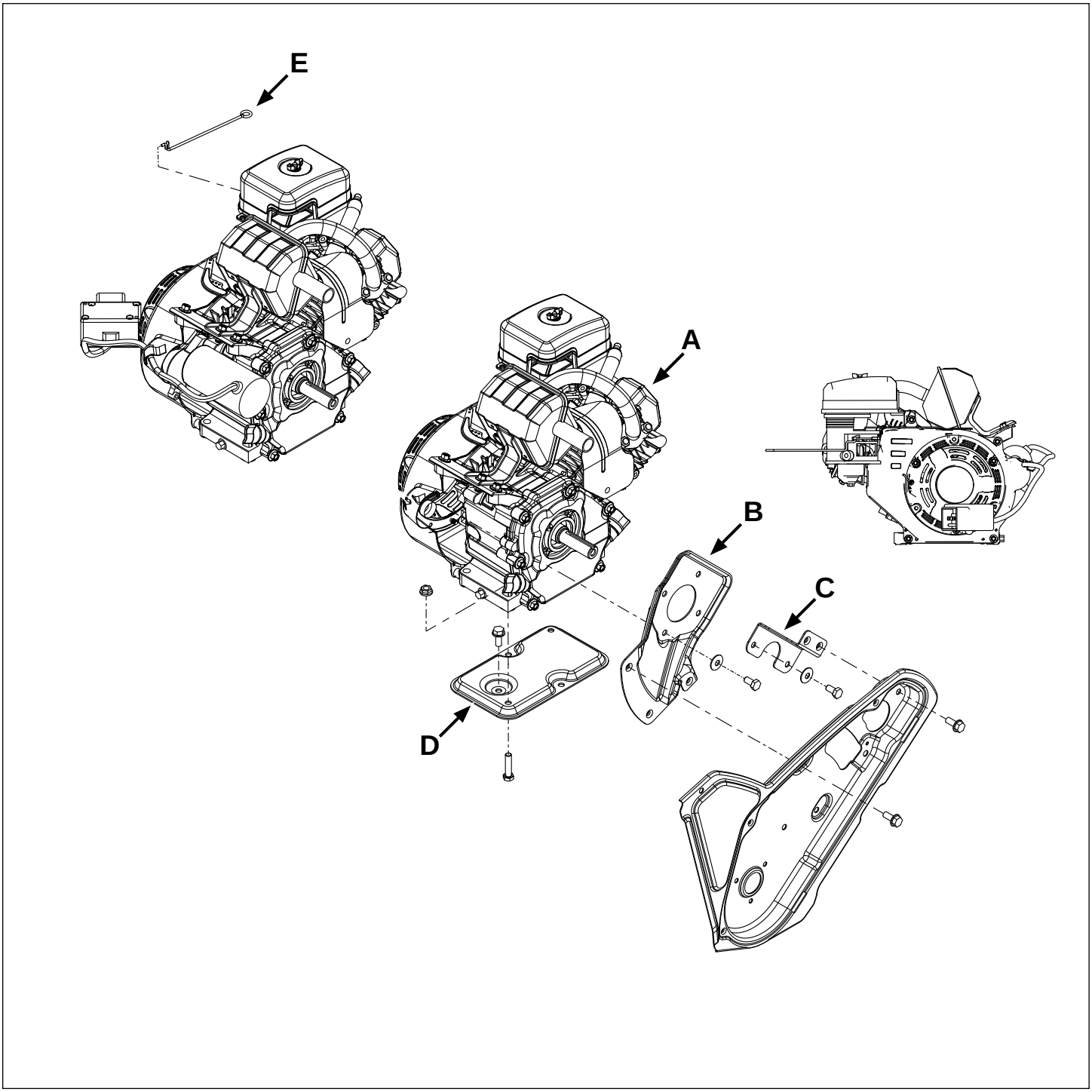


Fig. 002

A. LC168FS Engine
B. PTO Engine Plate
C. Side Engine Support
D. Engine Support
E. Choke Link Knob

ENGINE MOUNTING

Engine Removal 18 Inch Models

1. Remove the shroud as outlined in Chapter 3.

2. Remove the belt cover and remove belt as outlined in chapter 2.

3. Remove the engine pulley bolt and remove pulley (Fig. 003).

Fig. 003

4. From the underside of the chassis, remove the two engine mounting bolts (A) (Fig. 004).

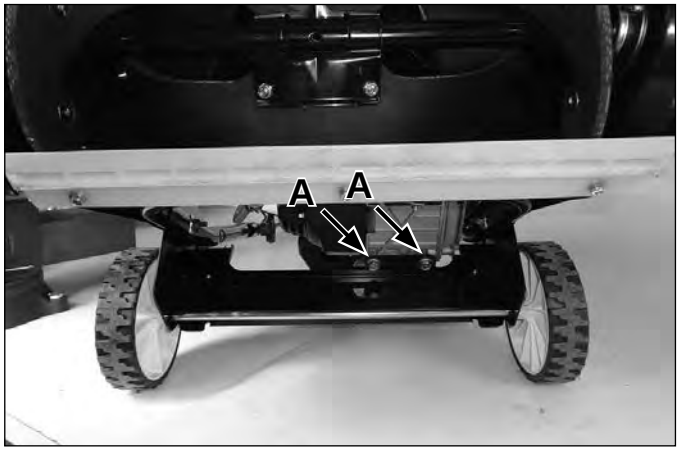


Fig. 004

5. Remove the four engine mounting bolts that connect the engine to the side plate (A) (Fig. 005).

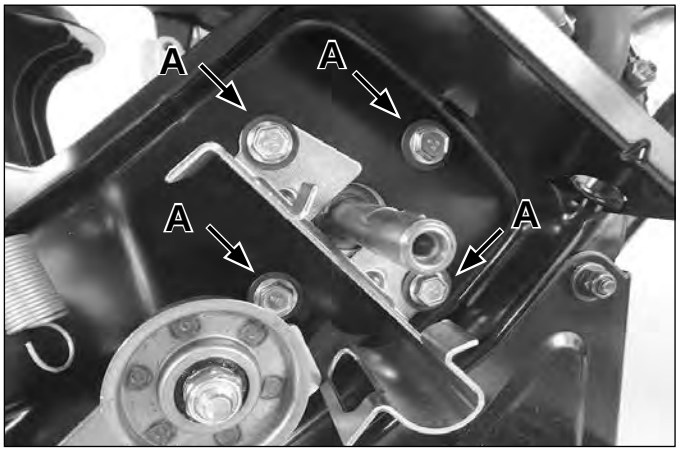


Fig. 005

6. Remove the engine from the chassis (Fig. 006).

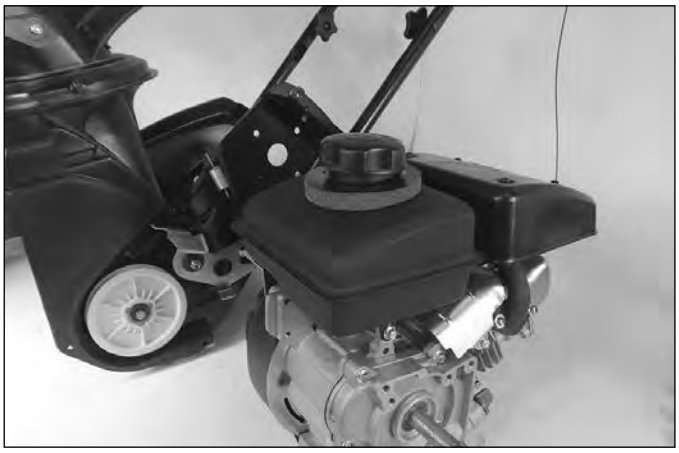


Fig. 006

For engine service information, see Single Stage Snow Engine Service Manual LC154FS/ LC154FDS (87cc), PN 492-9233 or LC168F/LC168FD (163 cc), PN 492-9230

Engine Installation 18 Inch Models

1. Insert the engine into the chassis. Install the four engine mounting bolts that connect the engine to the side plate (A). Torque to 14-18 ft-lbs (19-25 Nm) (Fig. 007).

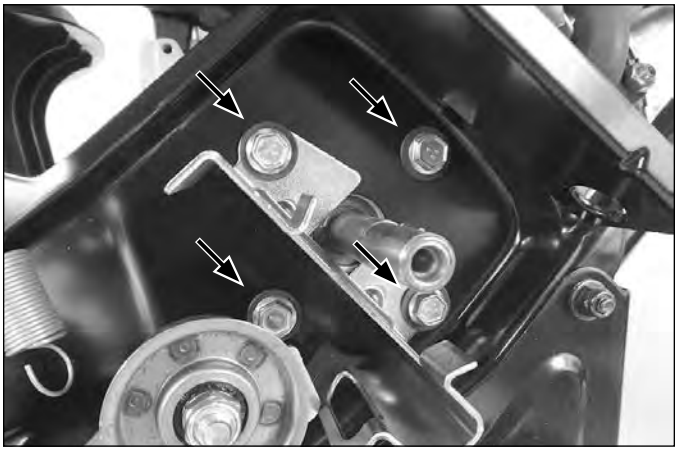


Fig. 007

2. From the underside of the chassis, install the two engine mounting bolts (A). Torque to 14-18 ft-lbs (19-25 Nm) (Fig. 008).

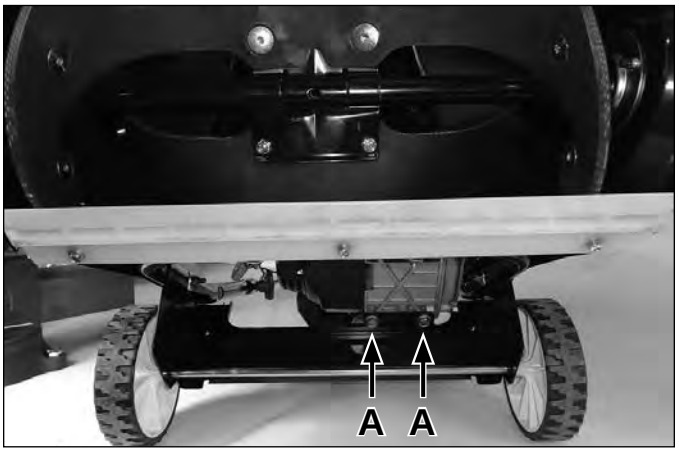


Fig. 008

3. Install the engine pulley. Torque bolt to 19 ft-lbs (26 Nm) (Fig. 009).

Fig. 009

4. Install the belt as outlined in chapter 2. Install belt cover. Install shroud as outlined in chapter 2.

Engine Removal 21 Inch Models

1. Remove the shroud as outlined in chapter 3.

2. Empty the fuel from the fuel tank into a suitable container. Remove the fuel hose and remove the fuel tank.

3. Remove the screw from the underside of the choke knob and remove the choke knob (Fig. 010).

Fig. 010

4. Untie the knot on the recoil handle (Fig. 011).

Fig. 011

5. Route the recoil rope through the lower shroud and knot the rope (Fig. 012).

Fig. 012

6. Disconnect the primer hose from the primer bulb and remove the ignition wires from the ignition switch. (Fig. 013).

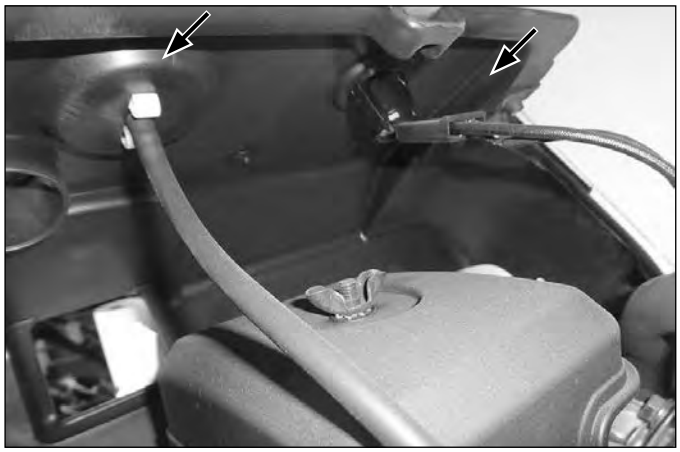


Fig. 013

7. From the underside of the chassis, remove the two engine mounting bolts (A) (Fig. 014).

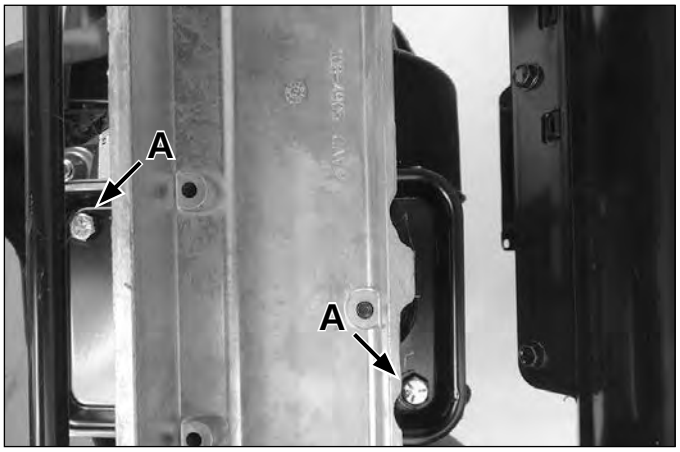


Fig. 014

8. Remove the belt cover and belt as outlined in chapter 2 (Fig. 015).

Fig. 015

9. Remove the engine pulley.

10. On some models, the engine pulley has two set screws. One is an allen head set screw and the other is a bolt. Be sure to loosen both set screws before attempting removal (Fig. 016).

Fig. 016

11. Remove the four engine mounting bolts that secure the engine to the engine plate (A) (Fig. 017).

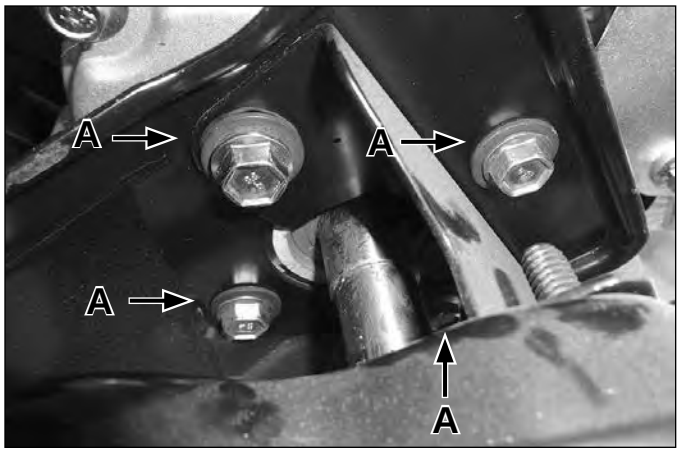


Fig. 017

12. Remove the engine from the chassis (Fig. 018).

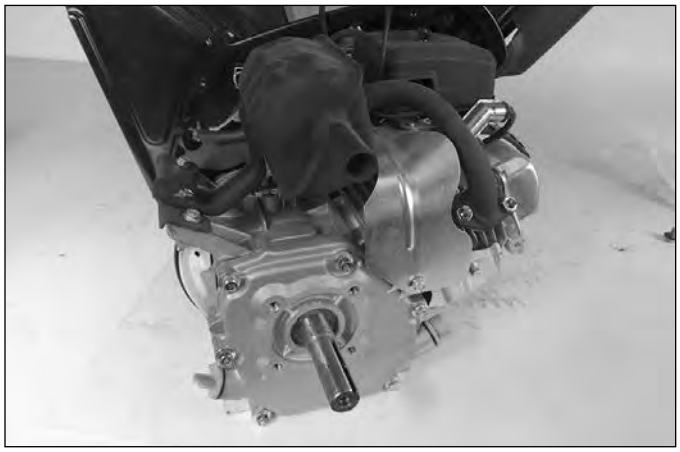


Fig. 018

Engine Installation 21 Inch Models

1. Insert the engine into the chassis. Install the four engine mounting bolts that secure the engine to the engine plate (A). Torque to 14-18 ft-lbs (19-25 Nm) (Fig. 019).

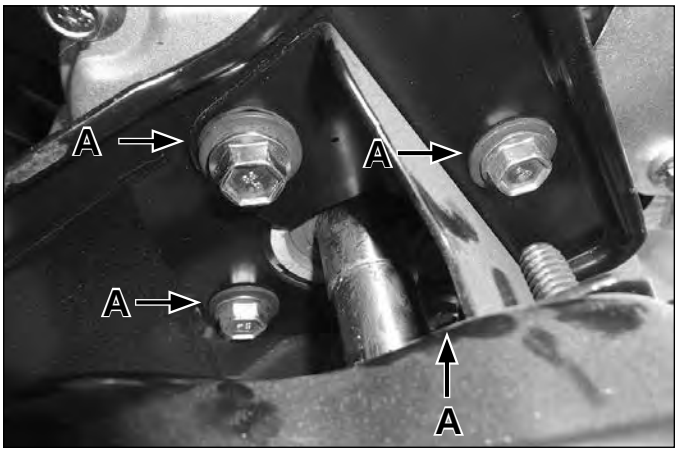


Fig. 019

2. From the underside of the chassis, install the two engine mounting bolts (A). Torque to 14-18 ft-lbs (19-25 Nm) (Fig. 020).

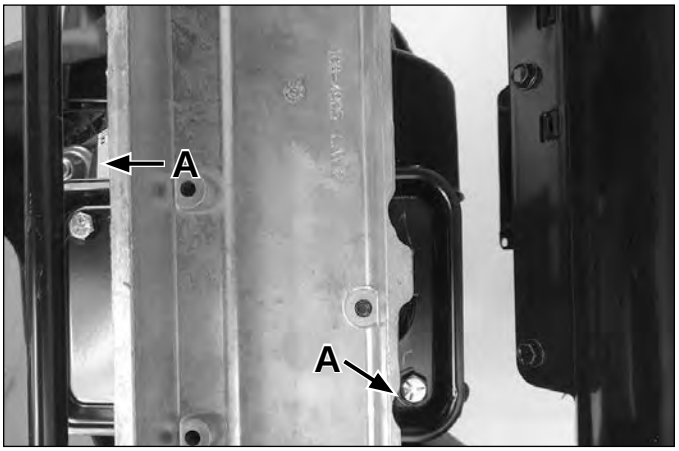


Fig. 020

3. Install the engine pulley. If the unit has a bolt holding the engine pulley on, torque the bolt to 19 ft-lbs (26 Nm). If the unit has set screws, slide the pulley onto the shaft and install the belt. With a straight edge, align the pulley with the rotor pulley so the belt is straight.Tighten set screws (Fig. 021).

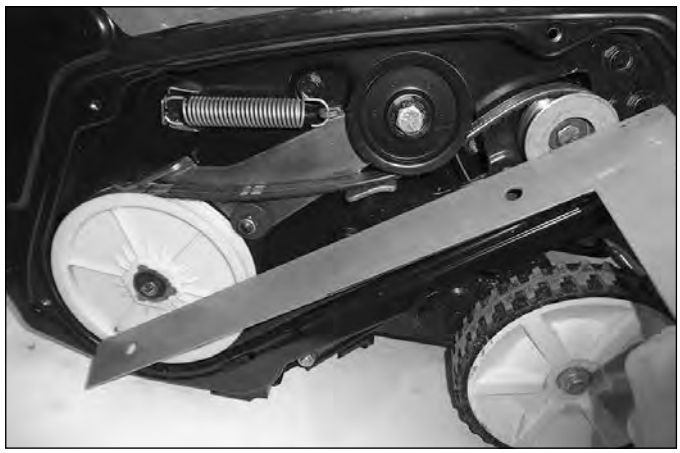


Fig. 021

4. Connect the primer hose to the primer bulb and plug the ignition wires into the ignition switch (Fig. 022).

Fig. 022

5. Untie the recoil rope knot and route the rope through the lower shroud. Install the recoil handle and knot the rope (Fig. 023).

Fig. 023

6. Slide the choke wire through the lower shroud and install the choke knob and screw (Fig. 024).

Fig. 024

7. Install the fuel tank and connect the fuel line.

8. Install the belt cover and shroud as outlined in chapter 2.

NOTES

Residential Products

2014 Power Clear® 418/621

Service Manual

Form Number 492-9340