TORO

LCE/Residential Products/
Siteworks

Walk-Behind Rotary Broom

Service Manual

ABOUT THIS MANUAL

This service manual was written expressly for Toro and Lawn-Boy service technicians. The Toro Company has made every effort to make the information in this manual complete and correct.

Basic shop safety knowledge and mechanical/electrical skills are assumed. The Table of Contents lists the systems and the related topics covered in this manual.

The Toro Walk-Behind Rotary Broom, model year 2014, is covered in this manual. The manual may also be specified for use on later model products.

Due to the compact design, parts were removed for photographic purposes when necessary.

We are hopeful that you will find this manual a valuable addition to your service shop. If you have any questions or comments regarding this manual, please contact us at the following address:

The Toro Company
Residential and Landscape Contractor Service Training Department
8111 Lyndale Avenue South
Bloomington, MN 55420

The Toro Company reserves the right to change product specifications or this manual without notice.

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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 Walk-Behind Rotary Broom.

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

SPECIFICATIONS & MAINTENANCE

NOTES

Model	38700, 23740
Engine	Kohler® 208cc Command Pro Multi Season
Clearing Width	36” (11.0m)
Starter	Recoil
Fuel Capacity	1 Gallon (4.1 L)
Engine RPM	3600 ± 100 PRM
Broom Speed	200 RPM
Direct Drive Speed	6/2 Variable Speed
Steering	Power Steering - RH/LH Clutch
Oil Capacity	.63 Qt (.06 L)
Weight	323 lbs (146.5kg)
Width	46.5” (118cm)
Length	73.0” (185.5cm)
Height	41.5” (105.5cm)
Tire Pressure	17-20 psi (117-138 kPa)
Broom Angle Adjustments	3 position 30° each direction

Checking the Sweeping Path

A broom sweeps with the tips of its bristles. When too much down pressure is applied, the broom is no longer using its tips; the broom is now working with the sides of the bristles. This limits the flicking action of the bristles, sweeping effectiveness, and can decrease broom life.

1. Drive to a flat dusty area and stop the machine.
2. With the engine running move the throttle midway between Slow and Fast. Engage the broom and allow the broom to sweep for approximately 30 seconds.
3. Disengage the broom and stop the engine.
4. Wait for all moving parts to stop before leaving the operating position.
5. Turn the engine On/Off switch to the Off position.
6. Make sure the area swept equals the length of the broom and a maximum width of 2 - 4” (51-102 mm).

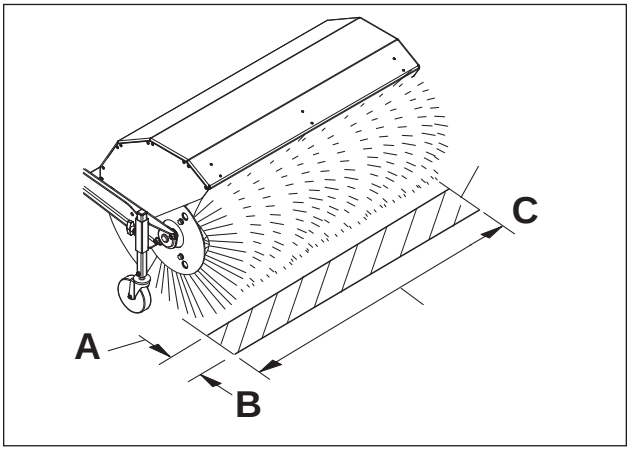

Fig. 001

A. 2 – 4” (51-102 mm) Maximum Width
B. Length of Broom
C. Swept Area

7. Adjust the broom height if necessary.

Adjusting the Broom Height

1. Drive to a flat dusty area and stop the machine.
2. Disengage the broom and stop the engine.
3. Wait for all moving parts to stop before leaving the operating position.
4. Turn the engine On/Off switch to the Off position.
5. To adjust the broom height, remove and retain the pin from the adjuster sleeve and caster wheel tube.
6. Raise or lower the caster wheel tube to achieve the sweep area as stated in “Checking the Sweeping Path” (page 2-3). Select any hole combination that is in alignment to place and latch the retaining pin; match the same position on the other side.
7. For fine tuning adjustments, slide the adjuster sleeve one pin hole up or down on the caster wheel tube to adjust the broom height in 1/8” (3 mm) increments (Fig. 002). Repeat for the other caster wheel.

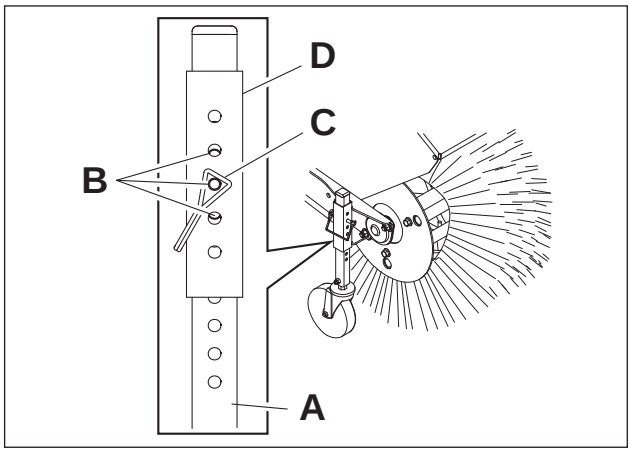

Fig. 002

A. Caster Wheel Tube
B. Positions To Achieve 1/8” (3 mm) Increments
C. Pin
D. Adjuster Sleeve

- To raise the broom in 1/8” (3 mm) increments, slightly raise the adjuster sleeve and insert the pin into the next pin hole below the current hole used.
- To lower the broom in 1/8” (3 mm) increments, slightly lower the adjuster sleeve and insert the pin into the next pin hole above the current hole used.

8. Once the desired height is reached, secure the pin on each caster wheel. Recheck the sweeping area.

Adjusting Broom Side Angle

1. Disengage the broom and stop the engine.
2. Wait for all moving parts to stop.
3. Push the lever down using the right hand thumb (A) (Fig. 003).

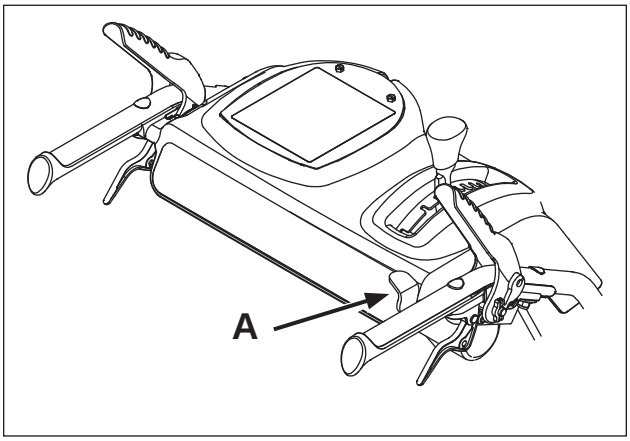

Fig. 003

4. Squeeze the left wheel clutch lever to the handle and push the broom housing to the desired angle; the broom can rotate 19° to the right or left, or straight ahead.
5. Once the broom is positioned, release the broom angle lever. Release the left wheel clutch lever and make sure the broom is locked into place.

Recommended Maintenance Schedule

MAINTENANCE SERVICE INTERVAL	MAINTENANCE PROCEDURE
After the first 2 hours	Check the traction cable. Check the broom cable.
After the first 5 hours	Check the engine oil.
Before each use or daily	Check the engine oil level. Check for loose hardware. Check the broom shaft shear pin.
Every 50 hours	Check the tire pressure. Check the condition of the belts.
Every 100 hours	Change the engine oil (more frequently in severe conditions). Lubricate the broom angle lock pin.
Every 160 hours	Check the spark plug.
Yearly	Check the traction cable. Lubricate the hex shaft. Check the broom cable.
Yearly or before storage	Check the air pressure in the drive tires and inflate them to 116–137 kPa (17–20 psi). Drain the gasoline and run the engine to dry out the fuel tank and the carburetor at the end of the season. Inspect and replace the traction drive belt, if necessary.

Checking the Engine Oil Level

SERVICE INTERVAL
Before each use or daily.

Engine Oil Type: Toro 4–Cycle Premium Engine Oil

1. Turn off the engine and wait for all moving parts to stop. Make sure the unit is on a level surface.

2. Check the oil level once the engine is cold.

3. Clean the area around the dipstick. Remove the dipstick and wipe the oil off. Insert the dipstick according to the engine manufacturer's recommendations. Remove the dipstick and read the oil level.

4. If the oil level is low, wipe off the area around the oil fill cap, remove the cap and fill to the Full mark on the dipstick. Toro 4-Cycle Premium Engine Oil is recommended; refer to the Engine Owner's manual for an acceptable alternative.

NOTE
Do not overfill.

NOTE
Do not operate the engine with the oil level below the Low or Add mark on the dipstick, or over the Full mark.

Checking the Traction Cable

SERVICE INTERVAL
After the first 2 hours, Yearly.

1. Turn off the engine, wait for all moving parts to stop, and remove the spark plug wire(s).

2. With the traction lever disengaged, check the pin in the elongated slot in the left side of the machine above the tire (Fig. 004). There should be a gap of 1/4" (6 mm) from the front of the slot to the front edge of the pin. If adjustment is necessary, see "Adjusting the Traction Cable" (page 2-10).

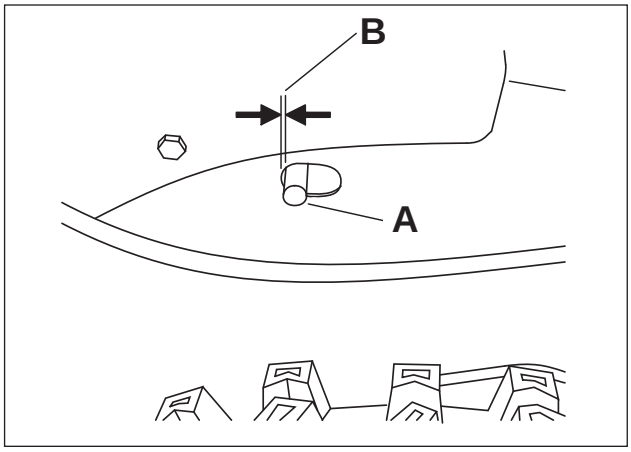

Fig. 004

A. Pin
B. 1/4" (6 mm)

Checking for Loose Hardware

SERVICE INTERVAL
Before each use or daily.

1. Turn off the engine, wait for all moving parts to stop, and remove the spark plug wire(s).

2. Visually inspect the machine for any loose hardware or any other possible problem. Tighten the hardware or correct the problem before operating.

Changing the Engine Oil

SERVICE INTERVAL
After the first 5 hours. Every 100 hours (more frequently in severe conditions).

1. Turn off the engine and wait for all moving parts to stop.
2. Disconnect the wire from the spark plug.
3. Drain the oil while the engine is warm from operation.
4. Place a pan under drain fitting and remove the oil drain plug. Allow the oil to drain and replace the oil drain plug.
5. Clean around the oil fill cap and remove the cap. Fill to the specified capacity and replace the cap. Use the oil recommended in the “Checking the Engine Oil Level” (page 2-6). Do not overfill.
6. Start the engine and check for leaks. Stop the engine and recheck the oil level.
7. Wipe up any spilled oil from the engine deck mounting surfaces.

Checking the Tire Pressure

SERVICE INTERVAL
Every 50 hours.

1. Turn off the engine, wait for all moving parts to stop, and leave engine switch in the Off position.
2. Check the tire pressure in the drive tires.
3. Inflate the drive tires to 117-138 kPa (17-20 psi).

Checking the Condition of the Belts

SERVICE INTERVAL
Every 50 hours.

1. Turn off the engine, wait for all moving parts to stop, and remove the spark plug wire(s).
2. Remove the belt cover and engine shield to check the belt condition.

Lubricating the Broom Angle Lock Pin and Hex Shaft

SERVICE INTERVAL
Every 100 hours, Yearly.

1. Turn off the engine, wait for all moving parts to stop, and leave the engine switch in the Off position.

2. Lubricate the broom angle lock pin fitting with NGLI grade #2 multi-purpose gun grease.

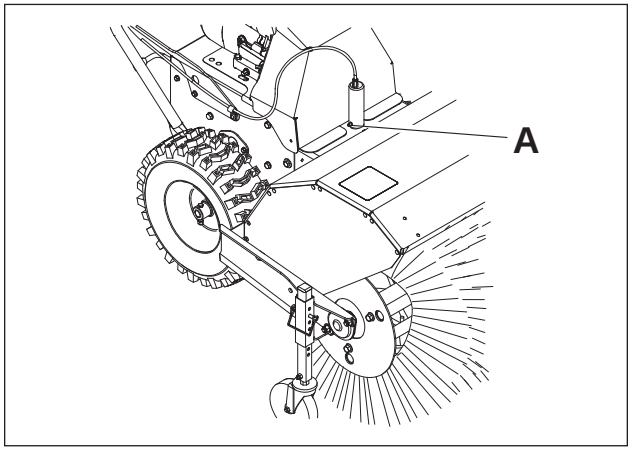

Fig. 005

A. Broom Angle Lock Pin

3. Remove the belt cover and engine shield.

4. Move the speed selector lever to position R2.

5. Dip a long, clean, small tipped paint brush in automotive engine oil and lightly lubricate the hex shaft. Rock the machine forward and rearward to rotate the hex shaft.

IMPORTANT
Do not get oil on the rubber wheel or the aluminum friction drive plate as the traction drive will slip (Fig. 006).

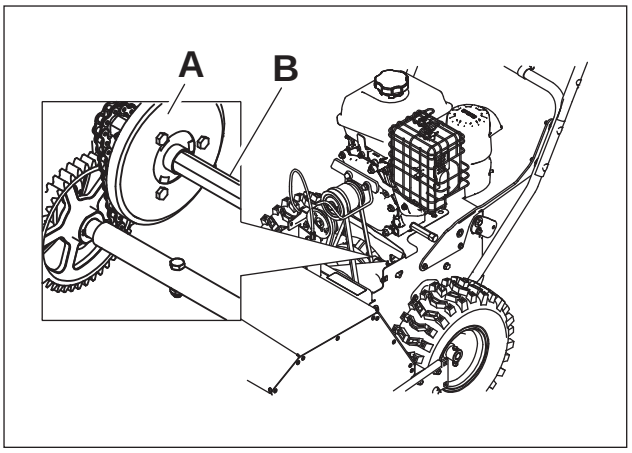

Fig. 006

A. Aluminum Fricton Drive Plate
B. Hex Shaft

6. Move the speed selector lever to position 6.

7. Lubricate the other end of the hex shaft.

8. Move the speed selector lever forward and rearward a few times.

9. Install the belt cover and engine shield.

Checking the Spark Plug

SERVICE INTERVAL
Every 160 hours.

Remove the spark plug, check the condition and reset the gap, or replace with a new plug. See your Engine Owner's Manual.

Checking the Broom Cable

SERVICE INTERVAL
After the first 2 hours, Yearly.

1. Turn off the engine, wait for all moving parts to stop, and remove the spark plug wire(s).
2. Remove the belt cover and engine shield.
3. With the broom lever disengaged, ensure the gap between the broom clutch assembly and the tab is 1/8” (3.2 mm). If the broom is not properly adjusted, see “Adjusting the Broom Drive” (page 2-11).

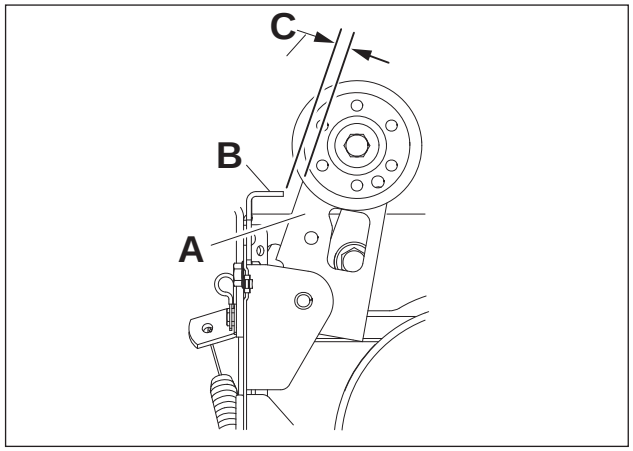

Fig. 007

A. Broom Clutch Assembly
B. Tab
C. 1/8” (3.2 mm)

Checking the Broom Shaft Shear Pin

SERVICE INTERVAL
Before each use or daily.

1. Move the machine to a level surface.
2. Turn off the engine, wait for all moving parts to stop, and remove the spark plug wire(s).
3. Check the shear pin located on the broom shaft on either side of the gear box.

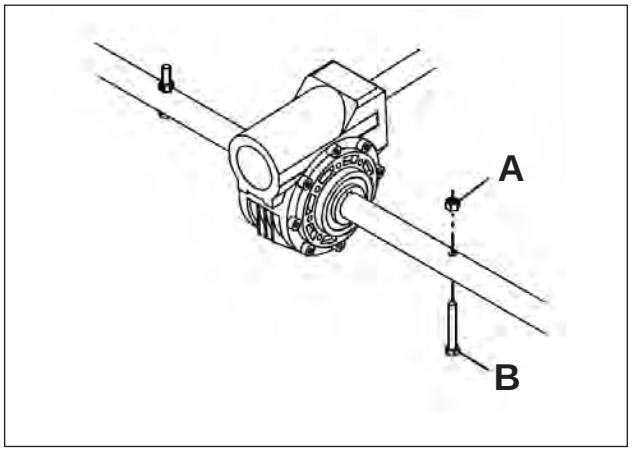

Fig. 008

A. Nut
B. Shear Pin

4. If the shear pin is damaged, remove the pin and replace with a Toro recommended pin. Secure the pin with a nut.

Checking the Broom Segments

1. Move the machine to a level surface.

2. Turn off the engine, wait for all moving parts to stop, and remove the spark plug wire(s).

3. Raise the broom by resetting the caster positions.

4. On both sides of the unit, remove and retain the outer bearing housing hardware.

5. Manually pull the power unit rearward to remove the broom assembly from the unit.

6. Support the splined shaft on either side of the gearbox.

7. Stand the broom core assembly on end so the removable end retainer plate is facing upward.

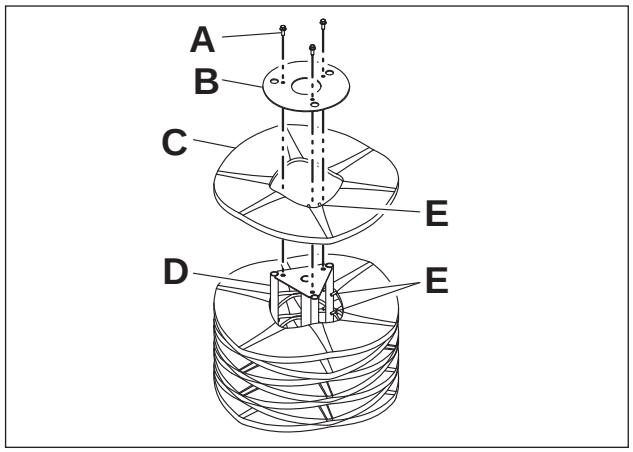

Fig. 009

A. Hardware
B. End Retainer Plate
C. Broom Segment
D. Support Shaft
E. Alignment Fingers

8. Remove and retain the hardware from the endretainer plate.

9. Remove the damaged broom segment(s). Install the new segment(s) by staggering the metal ring alignment fingers as shown in Fig. 009.

IMPORTANT
Damage may occur to the broom assembly if the broom segments are not properly installed.

10. Install the broom assembly onto the unit.

IMPORTANT
Make sure the bearing setscrews are tightened before operating the broom.

Adjusting the Traction Cable

If the machine does not drive in the forward or reverse speeds or it drives when you release the traction lever, adjust the traction cable.

With the traction lever disengaged, check the pin in the elongated slot in the left side of the machine above the tire.

There should be a gap of 1/4” (6 mm) from the front of the slot to the front edge of the pin (“Checking the Traction Cable”) (page 2-6).

If the left hand traction cable is not properly adjusted, do the following steps:

1. Loosen the jam nut.

2. Loosen or tighten the turnbuckle to adjust the pin until it is the proper gap from the front edge of the slot.

3. Tighten the jam nut (Fig. 010).

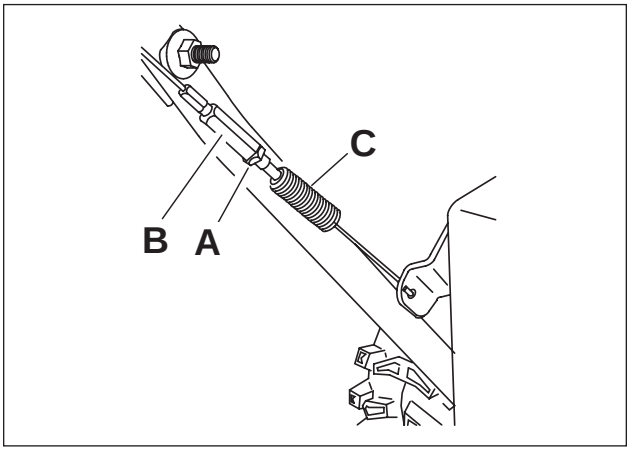

Fig. 010

A. Jam Nut
B. Turnbuckle

Adjusting the Broom Drive

If the broom cable is not properly adjusted see “Checking the Broom Cable” (page 2-9), do the following steps:

1. Loosen the jam nut (Fig. 011).

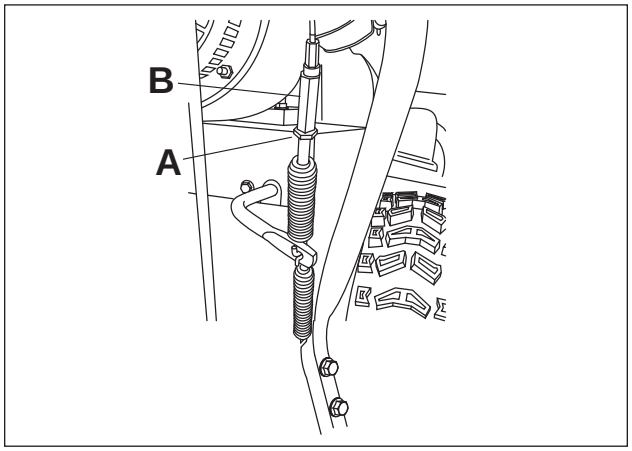

Fig. 011

A. Jam Nut
B. Turnbuckle

2. Loosen or tighten the turnbuckle that adjusts the tension on the cable (Fig. 011).

3. Adjust the turnbuckle until the gap between the broom clutch assembly and the tab is 1/8” (3.2 mm) (page 2-10).

4. Tighten the jam nut.

Adjusting the Wheel Clutch Cable

1. Squeeze the lever fully, then check the gap between the bottom of the handle and the wheel clutch lever end.

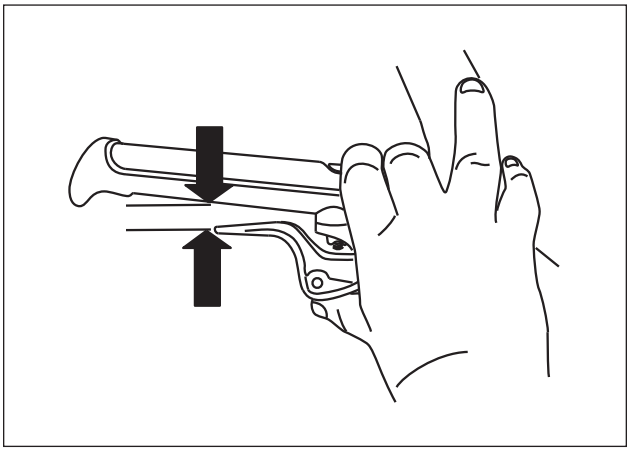

Fig. 012

NOTE
The gap should be approximately the thickness of a pencil (1/4” or 6 mm). If it is greater, loosen the cable clamp nut, slide the cable jacket up slightly, tighten the cable clamp nut, and check the gap again.

2. Repeat for the other cable.

Troubleshooting

IMPORTANT

It is essential that all operator safety mechanisms be connected and in proper operating condition prior to use. When a problem occurs, do not overlook the simple causes. For example: starting problems could be caused by an empty fuel tank.The following table lists some of the common causes of trouble. Do not attempt to service or replace major items or any items that call for special timing of adjustments procedures (such as valves, governor, etc.).

NOTE

When disconnecting electrical connectors, do not pull on the wires to separate the connectors.

Problem	Possible Cause	Corrective Action
The engine will not start, starts hard, or fails to keep running.	1. The fuel tank is empty. 2. The fuel shutoff valve is closed. 3. The throttle and choke are not in the correct position. 4. There is dirt in fuel valve. 5. The fuel cap vent is blocked. 6. Dirt, water, or stale fuel is in the fuel system. 7. The air cleaner is dirty. 8. The spark plug is faulty. 9. The spark plug wire is not connected.	1. Fill the fuel tank. 2. Open the fuel shutoff valve. 3. Be sure the throttle control is midway between the Slow and Fast positions, and the choke is in the On position for a cold engine or the Off position for a warm engine. 4. Clean the fuel valve screen and cup. 5. Clean the fuel cap vent. 6. Clean or replace the air cleaner element. 7. Clean, adjust or replace the spark plug. 8. Check the spark plug wire connection.
The engine loses power.	1. The engine load is excessive. 2. The air cleaner is dirty. 3. The oil level in the crankcase is incorrect. 4. There is dirt in fuel tank filter. 5. Dirt, water, or stale fuel is in the fuel system.	1. Reduce the ground speed or adjust the broom. 2. Clean or replace the air cleaner element. 3. Check the oil level in the crankcase. 4. Clean the fuel tank filter.
The broom does not clean the surface.	1. The broom height is incorrect. 2. The tire pressure in the drive tires is not correct. 3. You are cleaning too much debris at one time.	1. Adjust the broom height. 2. Adjust the tire pressure in the drive tires. 3. Slow down and clear smaller areas of debris.
The broom does not rotate.	1. The broom is clogged. 2. The broom drive lever is not engaged. 3. The broom drive belt is slipping. 4. The belt is broken. 5. The shear pin is broken.	1. Unclog the broom. 2. Engage the broom drive lever. 3. Adjust or replace the belt. 4. Replace the belt. 5. Replace the shear pin.
The machine pulls left or right.	1. The tire pressure in the drive tires is not correct.	1. Adjust the tire pressure in the drive tires.
The machine does not drive.	1. The drive belt is worn, loose or broken. 2. The drive belt is off a pulley.	1. Install a new belt. 2. Replace or adjust the belt.

Problem	Possible Cause	Corrective Action
There is abnormal vibration.	1. The broom assembly is loose or damaged. 2. The engine mounting bolts are loose. 3. Engine pulley or idler pulley is loose. 4. The engine pulley is damaged. 5. The belt is damaged.	1. Tighten the hardware. Replace the broom assembly. 2. Tighten the engine mounting bolts. 3. Tighten the appropriate pulley. 4. Install a new belt.
The broom does not stop when the drive lever is released.	1. The broom drive belt is out of adjustment.	1. Check the broom drive adjustment.
The broom wears out prematurely.	1. You are using the incorrect broom height.	1. Adjust the broom height.
The speed selector is difficult to move or frozen in place.	1. The hex shaft needs lubrication.	1. Lubricate the hex shaft.

NOTES

CONTROLS

Sub System Handle

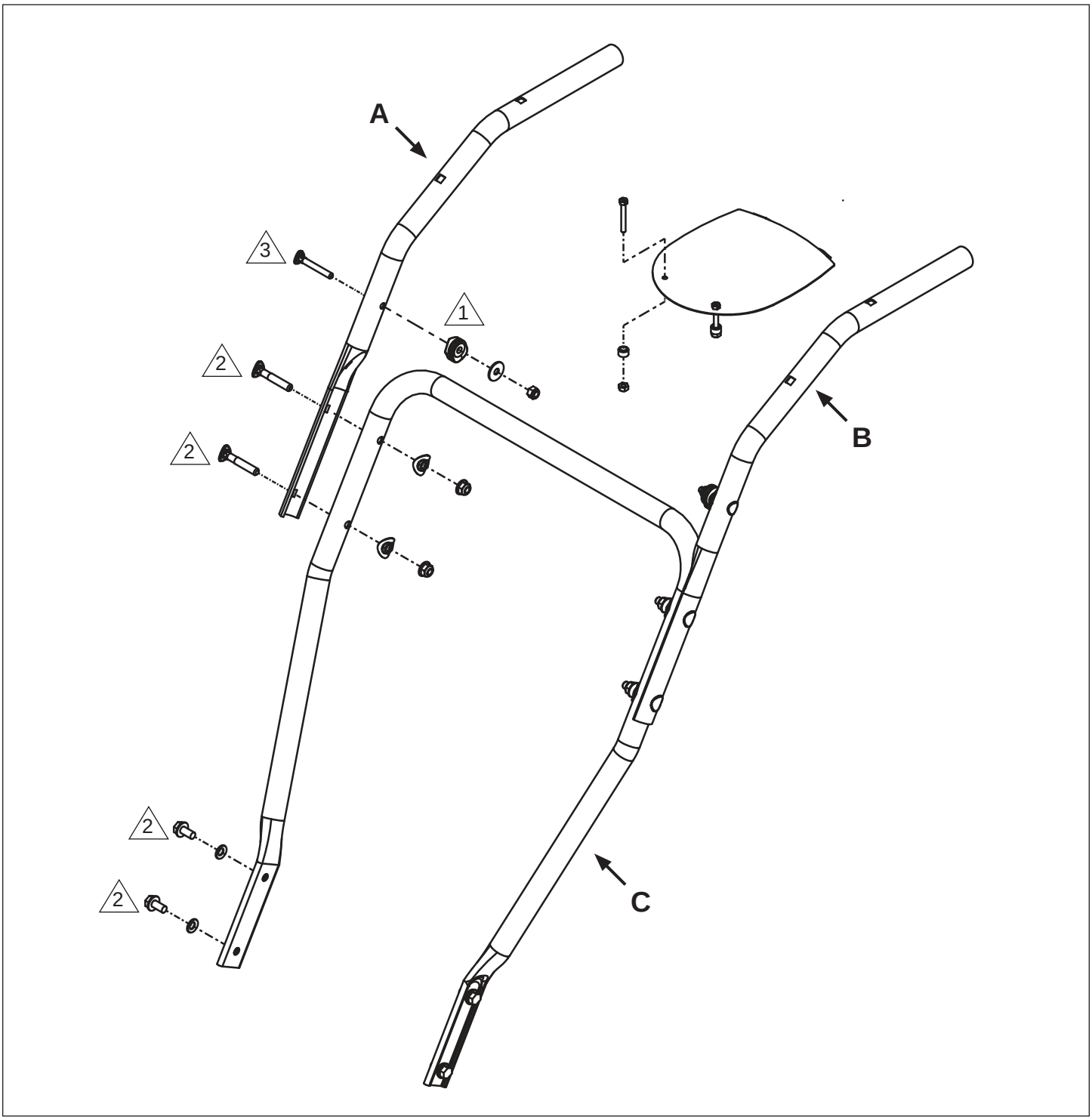

Fig. 001

A. Handle - Upper, RH
B. Handle - Upper, LH
C. Handle - Lower

1 Curved side of clamp must seat against inner round of upper handle tube.

2 Torque to 17 ft - lbs (23 Nm).

3 Torque to 8 ft - lbs (11 Nm).

Sub System Control Panel

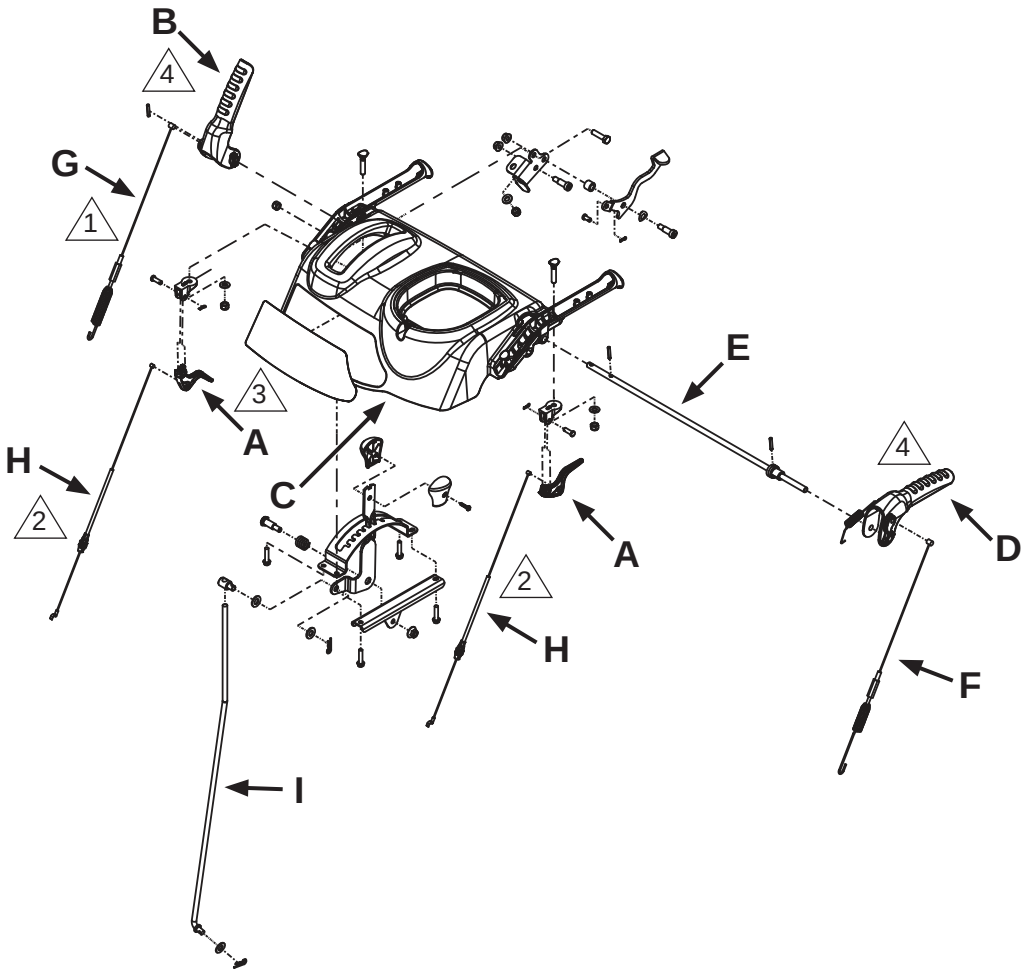

Fig. 002

A. Lever - Clutch
B. Lever - Auger
C. Panel, Control
D. Lever - Traction
E. Rod - Lockout
F. Cable - Traction
G. Cable - Auger
H. Cable - Clutch
I. Rod - Shift

1 Adjust broom cable nut to acheive .125” space to pully arm stop.

2 Clutch cable run to outside of handle bracket then to inside of broom level cable.

3 Clutch lever setting is .25” (1/4”) between handle and lever, total clearance between any two points with cable taught.

4 Traction and broom levers items must pivot freely after handles are bolted together and before connecting springs and cables.

Shift Lever

The shift lever on the control panel is connected to the friction wheel in the traction drive by a shift rod. Moving the shift lever moves the friction wheel to change wheel direction and speed.

Fig. 003

Shift Rod Adjustment

1. The adjustment point is a trunion on the upper end of the shift rod.

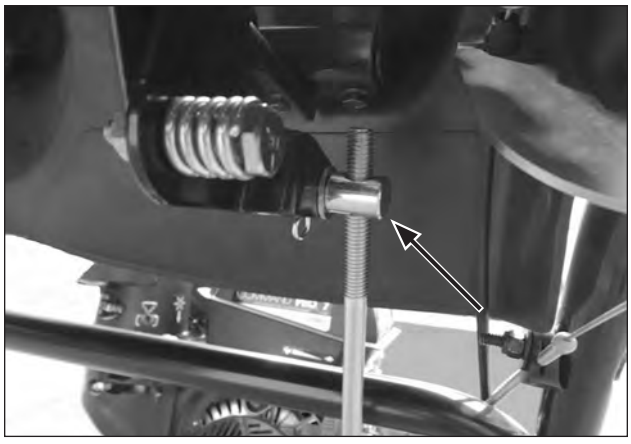

Fig. 004

2. Pull the shift rod and arm upward as far as they will go. With the shift lever in R2, adjust the trunion to take the slack out and re-secure.

Fig. 005

NOTE
Excessive slack in the linkage may cause the drive to be in reverse when shifted into first gear.

Auger Control

The bail on the right hand handle is the auger control. Squeeze the bail and the cable causes an idler to pivot, tensioning the auger belt.

Fig. 006

Auger Cable Adjustment

1. The auger cable adjustment should be checked after the first 2 hours of use and annually thereafter. To begin, ensure the auger lever is in the full up position.

Fig. 007

2. Loosen the jam nut. The cable is adjusted using the turnbuckle on the lower end of the auger cable.

NOTE
When rotating the turnbuckle, hold the cable so it does not twist.

3. Remove the belt cover. Adjust the turnbuckle until there is a 1/16” (1.5mm) gap between the stop and the auger clutch assembly. Secure the jam nut on the turnbuckle.

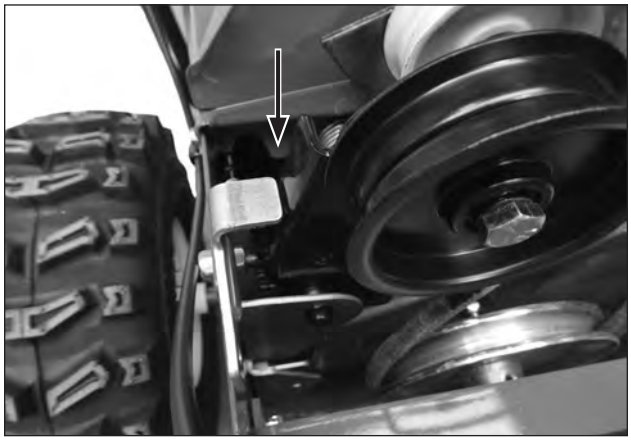

Fig. 008

Traction Control

The traction bail is on the left handle and when squeezed engages the wheel drive system.

Fig. 009

Traction Cable Adjustment

1. The traction lever should be in the full upright position with some slack in the traction cable to begin adjustment.

2. Adjust using the turnbuckle (A). Hold the cable to prevent twisting.

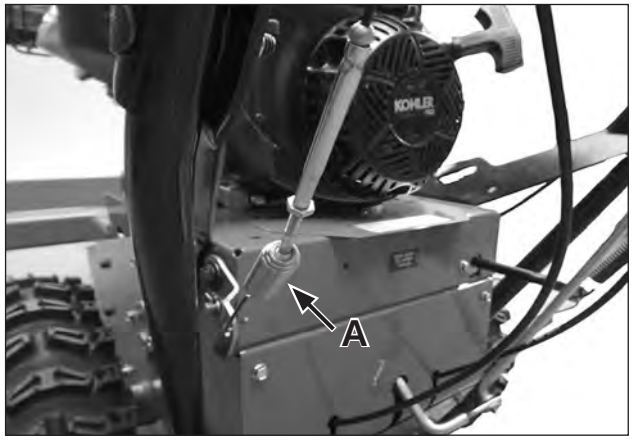

Fig. 010

3. Locate the traction rod on the left side just below the belt cover. Adjust the cable turnbuckle until there is a slight gap between the end of the rod and the front of the slot maximum 1/16” (1.5 mm). Secure the jam nut on the turnbuckle.

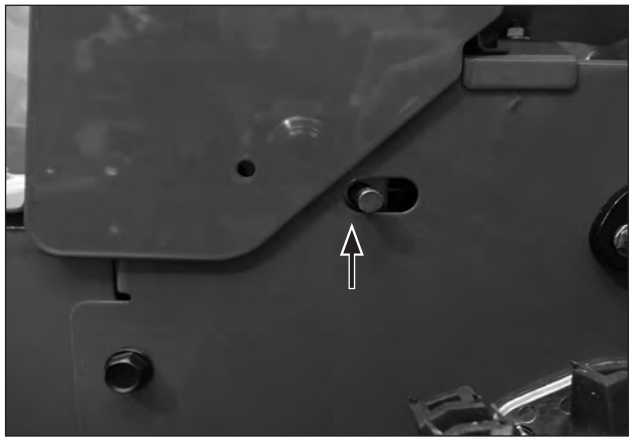

Fig. 011

Clutch Cable Replacement Removal

1. To replace the clutch cables, drain the fuel tank remove broom and stand the machine forward onto the hood. Remove both lower covers. The wheels and the bottom cover can also be removed if desired.

Fig. 012

2. Remove the nut and washer that attach the cable clamp to the handle.

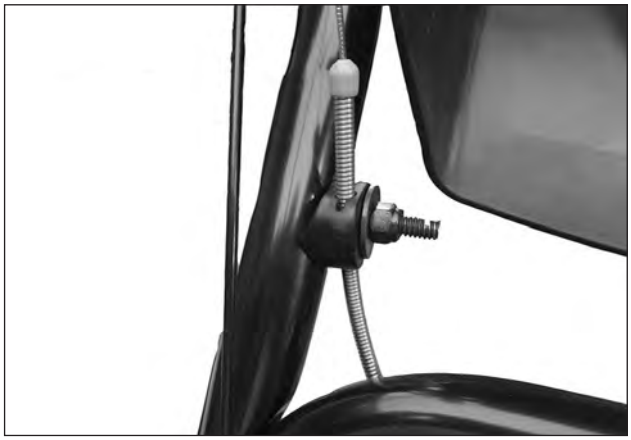

Fig. 013

3. Slip the cable Z-bend out of the wheel clutch lever on the handle.

4. Reach under the shift plate and compress the small ears on the cable fitting. The cable fitting can then be pushed out of the shift plate.

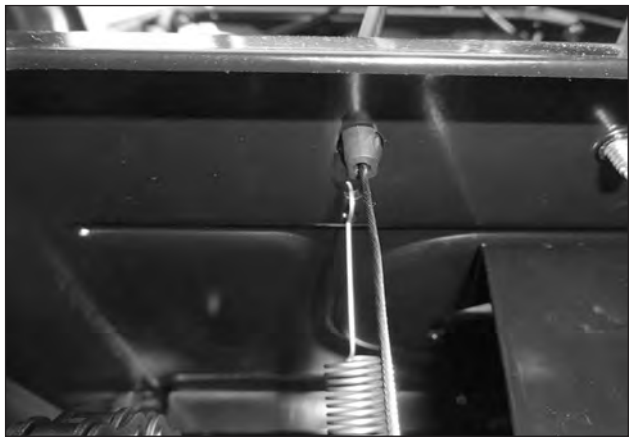

Fig. 014

5. Disconnect the lower end of the cable from the shift collar.

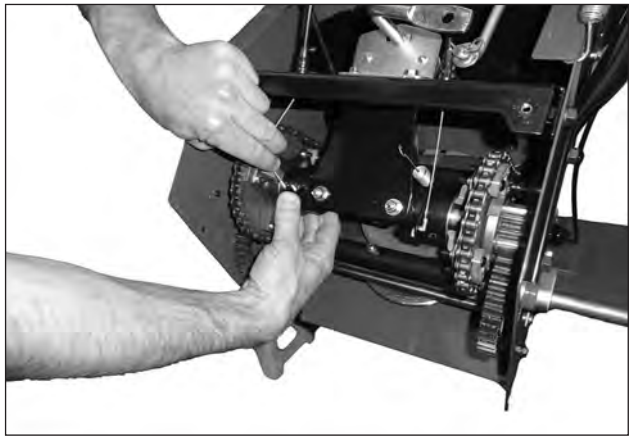

Fig. 015

Replacement

1. Feed the lower end of the cable through the shift plate and snap the cable into the plate. Install the lower end of the cable into the shift collar outside in.

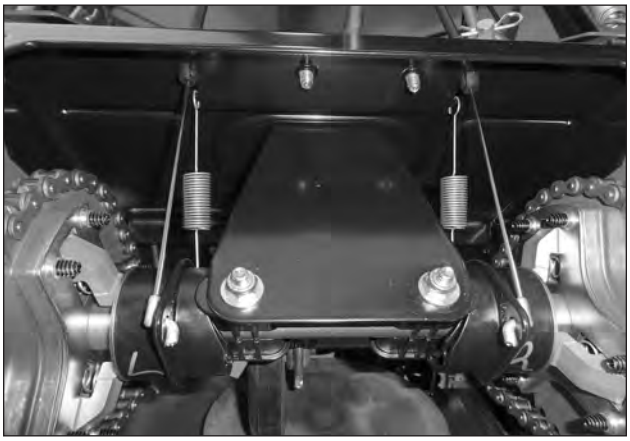

Fig. 016

2. Hook the upper end of the cable to the wheel clutch lever and install the cable clamp to the handle.

3. Loosen the cable clamp nut.

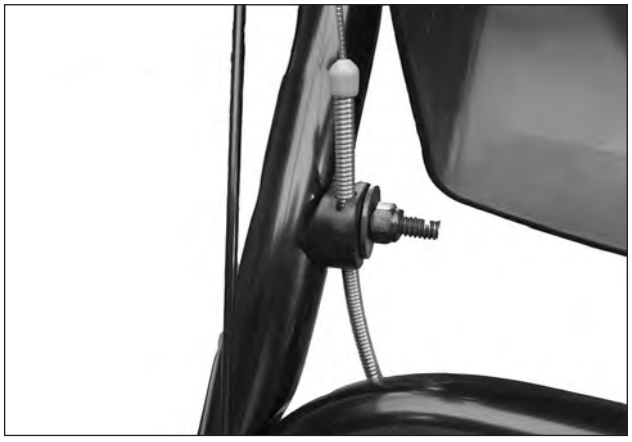

Fig. 017

4. Pull the cable jacket down gently until the wheel clutch lever is down and the slack is out of the cable. Tighten the cable clamp nut securely.

Fig. 018

5. Squeeze the lever fully and check the gap between the bottom of the handle and the wheel clutch lever end. The gap should be approximately 1/4” (6mm). If it is greater, loosen the cable clamp nut, slide the cable jacket up slightly, tighten the cable clamp nut, and check the gap again. Repeat steps for the other cable.

Fig. 019

6. Install the covers and test run the unit.

BELT REPLACEMENT

BELT REPLACEMENT

Subsystem Engine

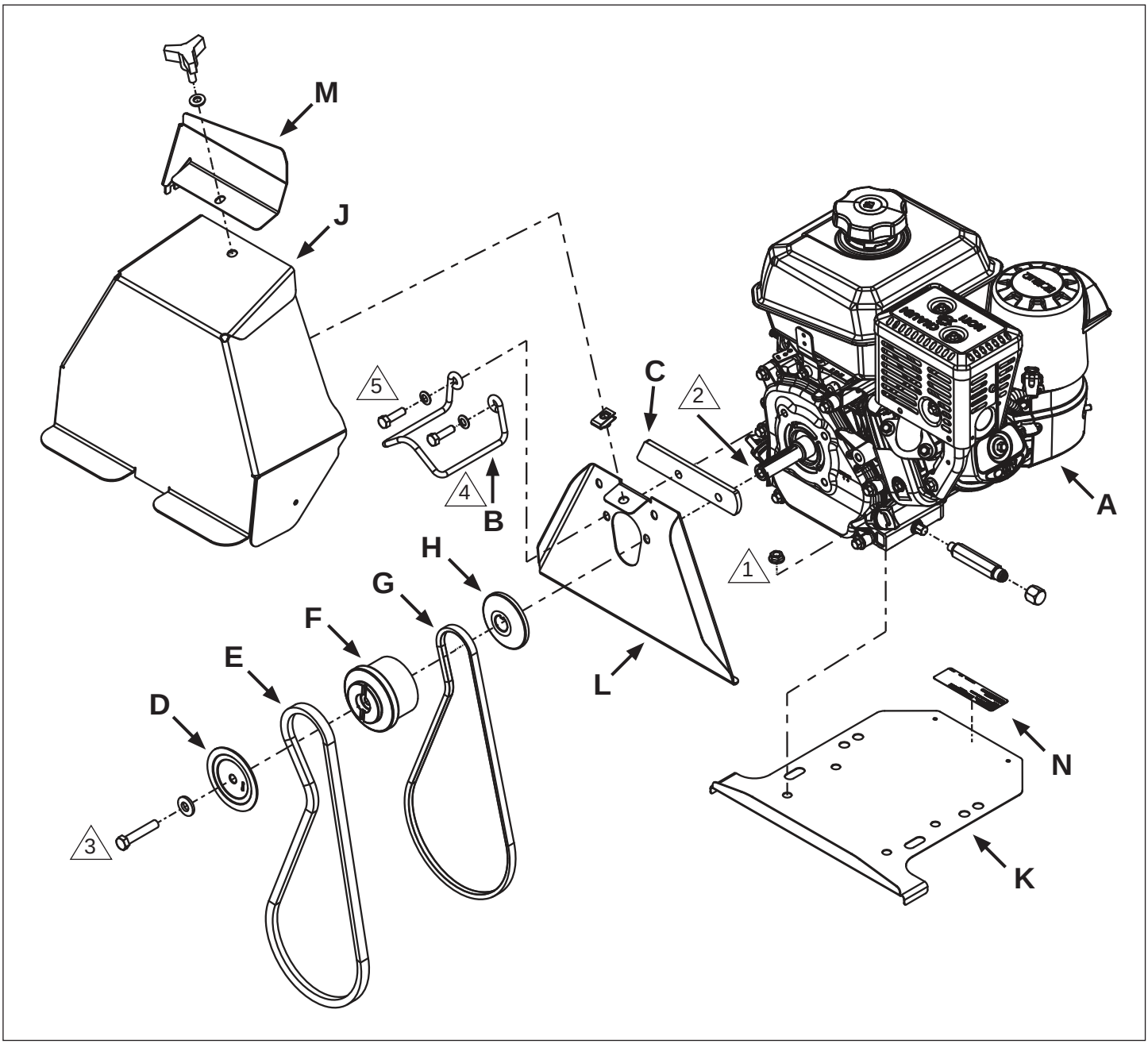

Fig. 001

A. Engine
B. Guide - Belt
C. Belt Cover Spacer
D. Sheave - Half Impeller
E. Belt Broom
F. Pulley - Engine Center
G. V Belt - Traction
H. Sheave - Half
I. Cover - Belt
J. Shield - Drive
K. Cover - Belt
L. Shield - Ice
M. Plate - Serial

1. Torque 135-165 in - lbs (15.5 - 18.9 Nm).
2. Apply light coat of anti-sieze to engine crankshaft before installation of pulleys
3. Torque engine pulley bolt to 26 - 32 ft - lbs (36 - 44 Nm). Apply Loctite® 243 to threads
4. With clutch engaged, insure belt guide has clearance from belts and pulleys
5. Torque 120-160 in - lbs (14 - 18 Nm).

Auger Belt Removal

1. Remove the belt cover.

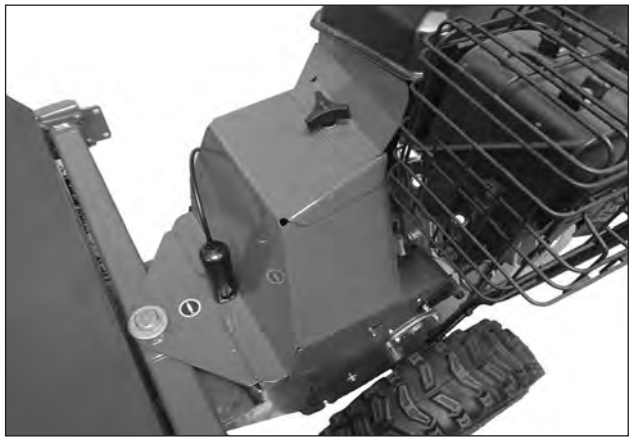

Fig. 002

2. Remove the belt guide. Be careful to avoid bending the guide.

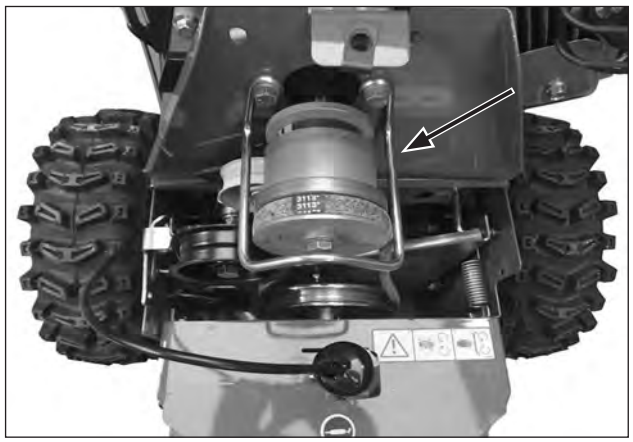

Fig. 003

3. Remove the bolt securing the engine pulley to the crankshaft. If necessary, you can hold the hub between the pulley and engine to keep the crankshaft from turning (A). Remove the pulley sheave and the auger belt from the crankshaft.

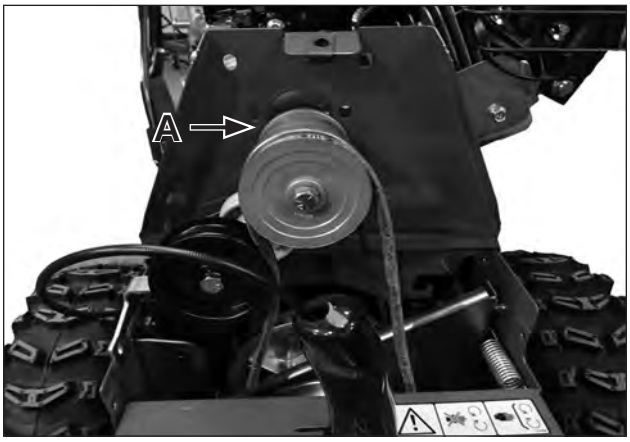

Fig. 004

4. The auger belt can now be removed from the impeller pulley.

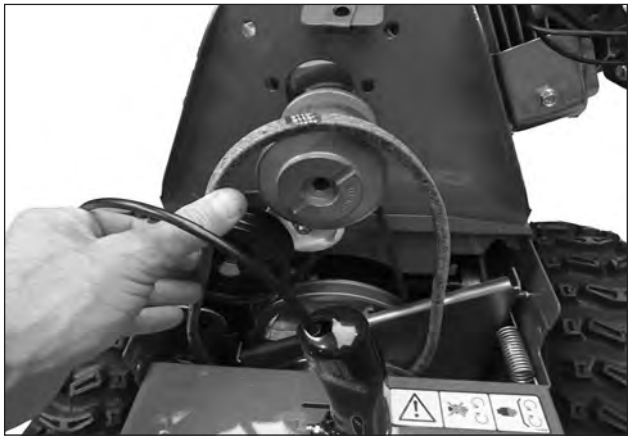

Fig. 005

BELT REPLACEMENT

Auger Belt Installation

1. Route a new belt around the broom shaft pulley.

2. Place the belt in the groove of the engine pulley. Install the pulley sheave. Make sure that the keyways line up from the sheave to the pulley. If they are not aligned the sheave will break when tightening.

Fig. 006

3. Apply Loctite® 242 to the bolt and install. Torque the bolt to 29 ft - lbs (40 Nm).

Fig. 007

4. Replace the belt cover. Test run unit.

Traction Belt Removal

1. Remove the auger belt as outlined on page 4-3.

2. Slip the center section of the crankshaft pulley off the crankshaft.

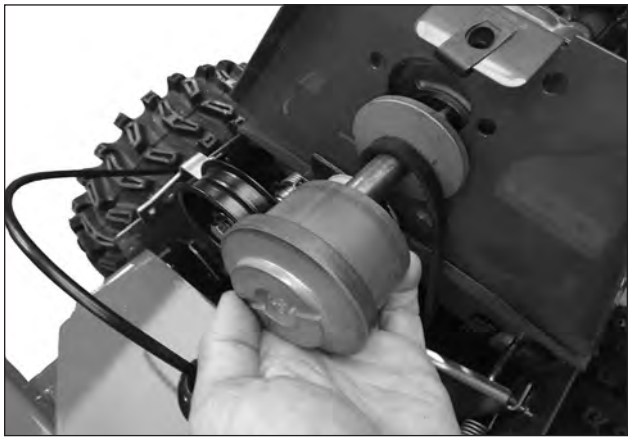

Fig. 008

3. On the left side of the machine, remove the hairpin cotter key from the speed control link.

Fig. 009

4. Move the link to the side and let it rest in the saddle provided. Reach down alongside the link and remove the belt from the lower pulley. Then remove the belt from the crankshaft pulley.

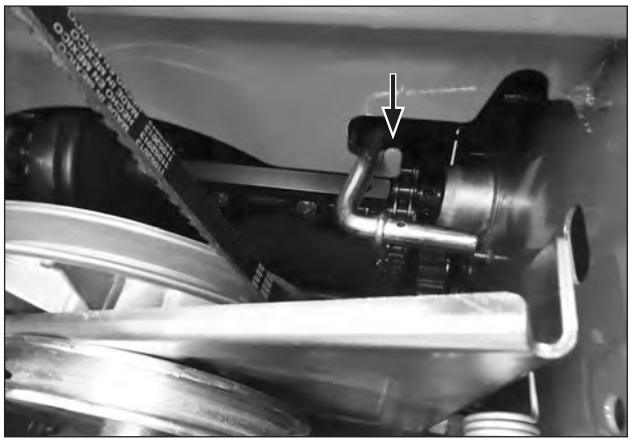

Fig. 010

5. Reverse the process to install the belt.

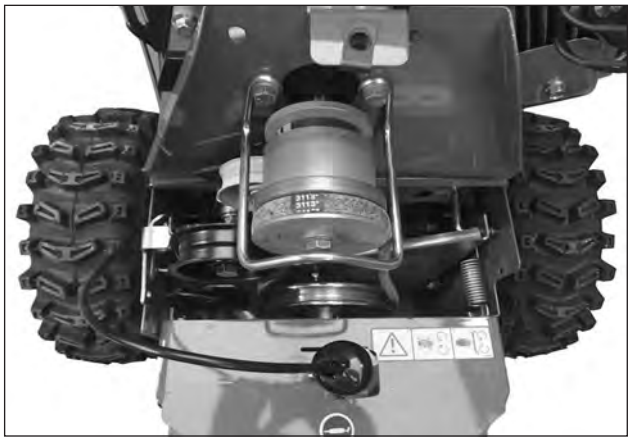

Fig. 011

BELT REPLACEMENT

6. Install the auger belt and install the pulley sheave. Make sure that the keyways line up from the sheave to the pulley. If they are not aligned the sheave will break when tightening.

Fig. 012

7. Install the belt guide. Check for proper clearance between the belt and the belt guide. Engage the auger belt and look between the belt and belt guide on the left side. There should be about a 1/8" (3.2mm) gap. Tighten the belt guide mounting bolts to 19 ft - lbs (26 Nm).

8. Adjust the belts as needed as outlined in the Controls section.

TRACTION DRIVE SYSTEM

TRACTION DRIVE SYSTEM

Sub System Frame

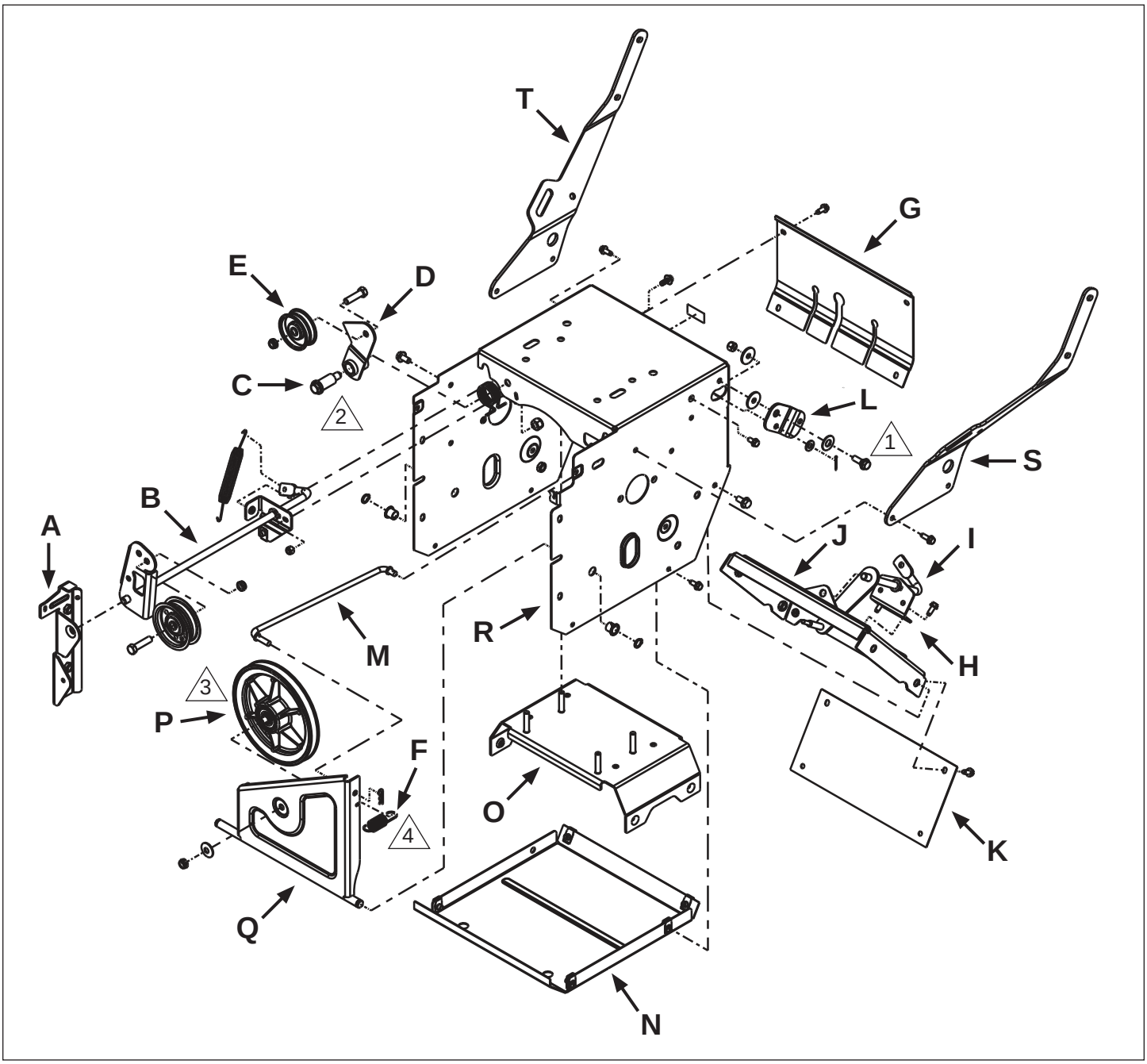

Fig. 001

A. Bracket - Idler Impeller
B. Impeller Clutch Asm
C. Bolt - Shoulder
D. Arm - Idler
E. Pulley - Idler
F. Spring - Extension
G. Cover - Upper
H. Bracket - Rod
I. Lever - Control
J. Shift Plate
K. Cover Lower
L. Bellcrank - Drive
M. Link - Control, Speed
N. Pan - Bottom
O. Frame Brace Asm.
P. Traction Pulley Asm.
Q. Friction Wheel Bracket
R. Traction Frame Asm.
S. Brace - Handle, LH
T. Brace - Handle, RH

△1 Shoulder screw shall be torqued to 170 - 250 in - lbs. (20-30 Nm). Bellcrank must pivot freely.

△2 Apply a light coat of ant-sieze to pivot surface.

△3 Traction pulley assembly to be free of any lubricants.

△4 Longer hook arm on spring connects to friction wheel bracket assembly.

Sub System Clutch Drive

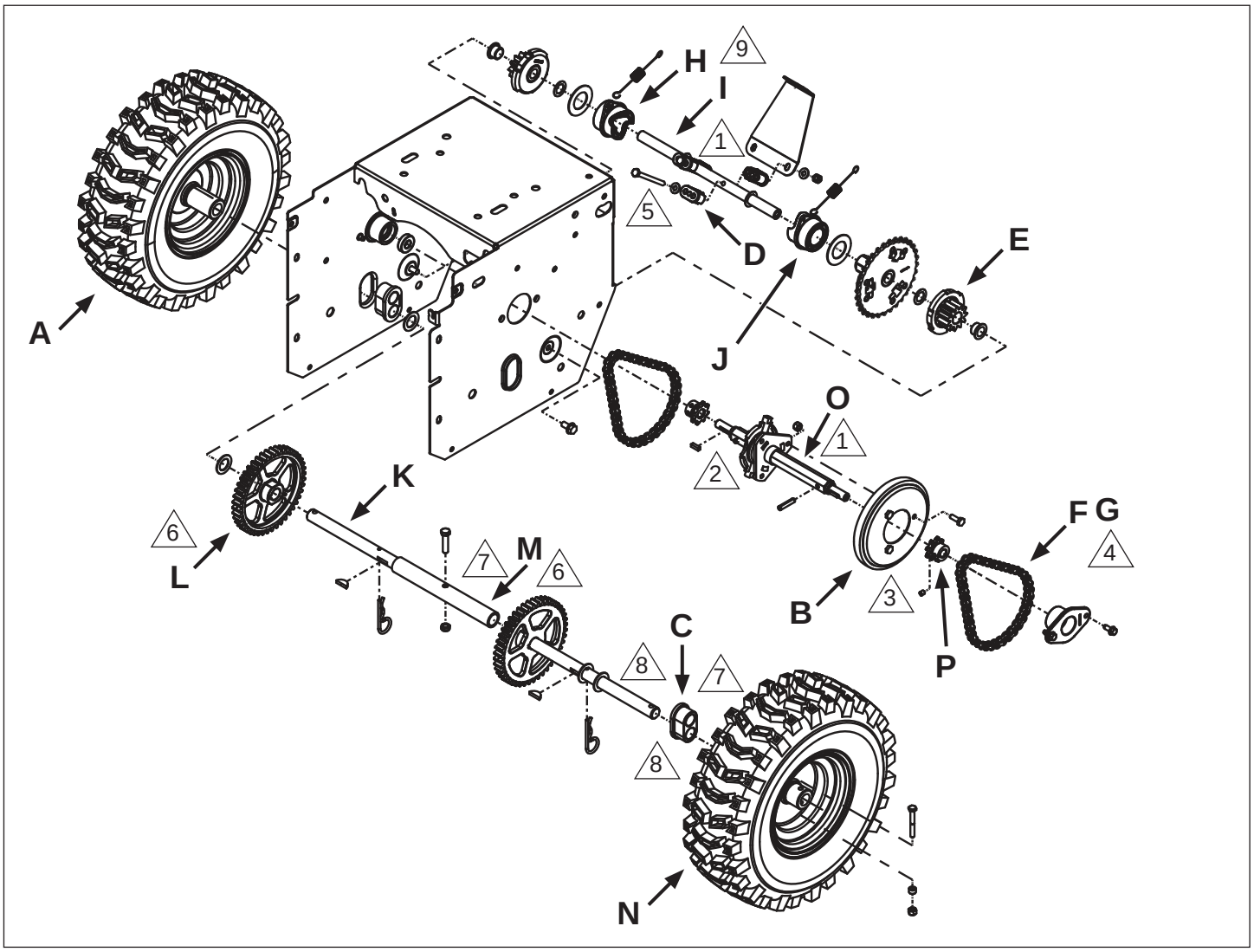

Fig. 002

A. RH Wheel and Tire Asm.
B. Wheel - Friction
C. Bearing - Axle
D. Guide - Collar
E. Lit Gear Asm.
F. Chain - Roller
G. Link - Connector
H. Collar - Shift, RH
I. Shaft - Intermediate
J. Collar - Shift, LH
K. Shaft - Axle
L. Gear - Axle, 44 Tooth
M. Tube - Axle
N. LH Wheel & Tire Asm.
O. Shaft - Hex
P. Sprocket 8 Tooth

1. Apply light coat of oil hex portion of shaft.
2. Hex trunion must slide freely along hex shaft.
3. Assemble sprocket flush against shoulder on shaft.
4. Install chains with master link clip toward center of machine. Closed end of master link to be in direction of rotation going forward.
5. Torque screws to 50 - 70 in - lbs (6 - 8 Nm). Do not deform plastic.
6. Grease axle gears.
7. Add anti sieze before installation of axle shaft.
8. Axle to be installed in bottom hole of axle bearing.
9. Rotate shift collars fully to the stop. Insure smooth operation, check each of 6 pawls to insure they return fully when shift collar is released.

Sub System Clutch Pack

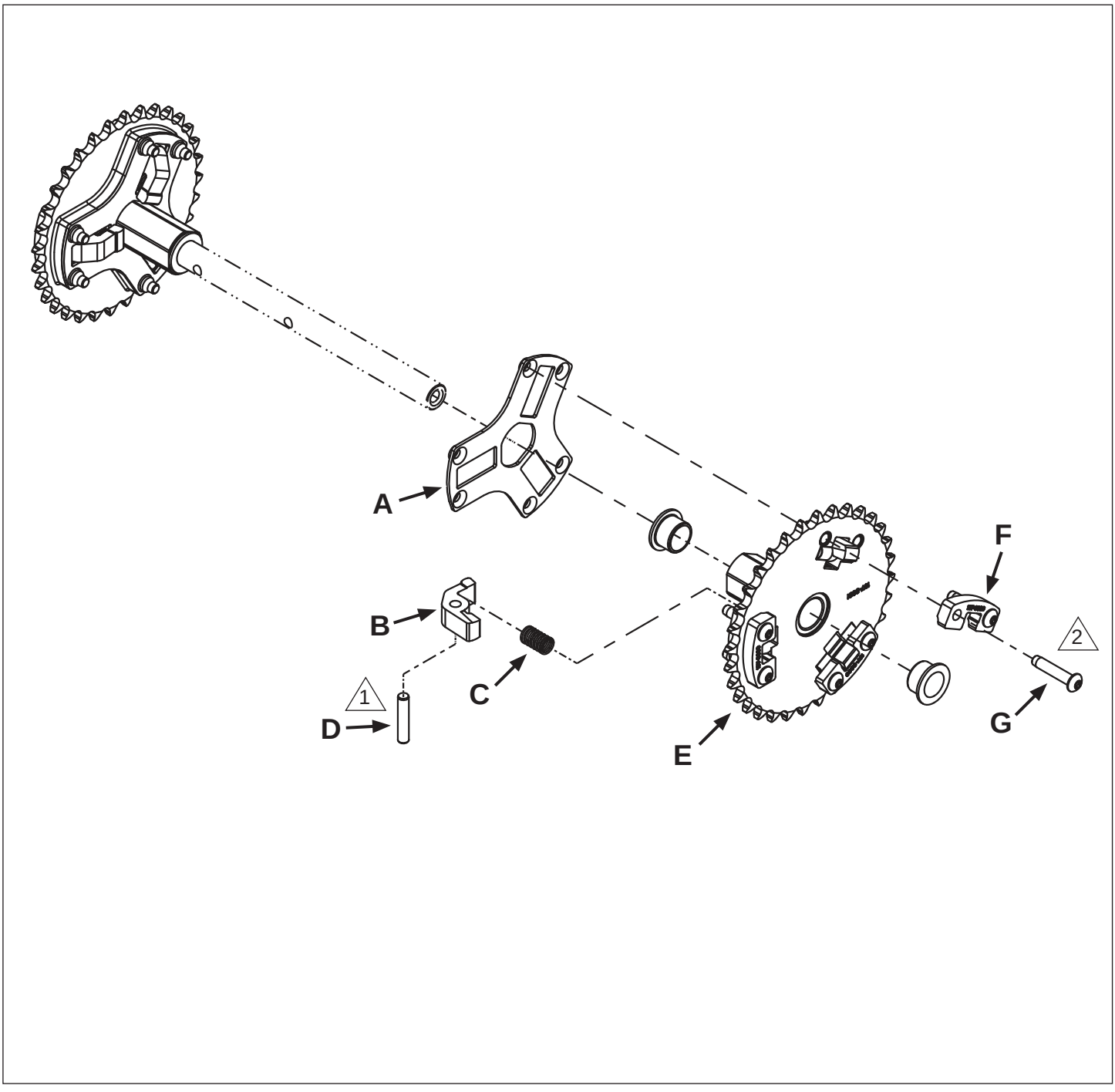

Fig. 003

A. Retainer - Pin, Pawl
B. Pawl - Clutch
C. Spring - Compression
D. Pin - Dowel
E. 32T Sprocket Asm
F. Support - Pawl
G. Screw - Torx Button Head

1 Apply a light coat of oil to dowel pin before assembly

2 Torque screws to 100 - 125 in - lbs (11 - 14 Nm).

The freewheel steering system is used on the walk-behind rotary broom. Handle mounted triggers allow clutching the wheels simultaneously or independently, so one or both wheels can “freewheel”. This feature makes turning, reversing, and traction control simple and efficient.

When the drive is engaged, it is engaging the friction wheel. The hex shaft turns and drives the chains to the 32-tooth gear, in turn driving the 44-tooth gear powering the wheels. Each wheel is declutched by engaging its handle mounted trigger; this pulls the clutch cable, which rotates the shift collar. The shift collar, following a cam, is forced outwards toward the wheel, in turn, pushing into the spring loaded pawls to disengage the 11-tooth pinion gear from the 32-tooth gear.

Disassembly

Drain the fuel from the fuel tank. Remove the broom as outlined in Broom head section. Tip the unit forward onto the hood to access the rear covers and plate. Support the broom with jackstands.

1. Disconnect the shift linkage and remove the wheels.

Fig. 004

2. Remove the upper and lower covers.

Fig. 005

3. Remove the bottom plate.

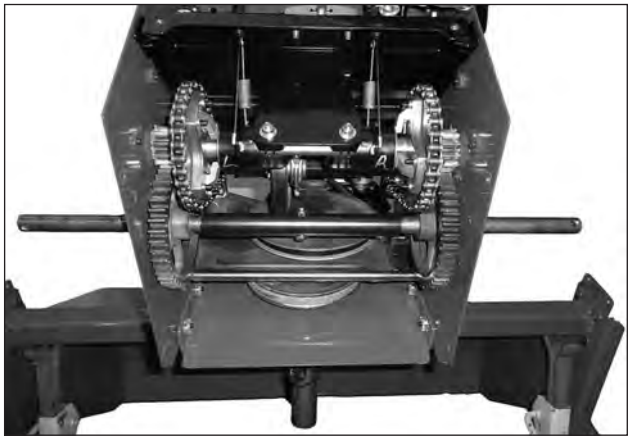

Fig. 006

4. Remove the 2 cap screws securing the bearing retainers that hold the hex shaft to each side of the traction assembly. Remove both bearing retainers.

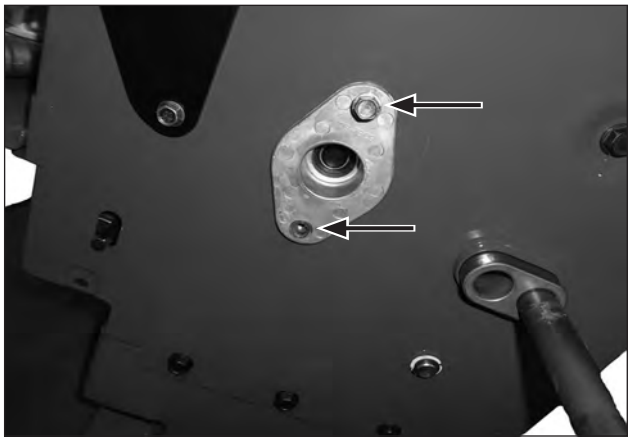

Fig. 007

NOTE
This will ease removal and reinstallation of the drive chains.

5. Remove both bolts that hold the wheel clutch assembly to the housing.

Fig. 008

6. Remove the extension springs. Unhook the spring from the lower clutch collar and housing.

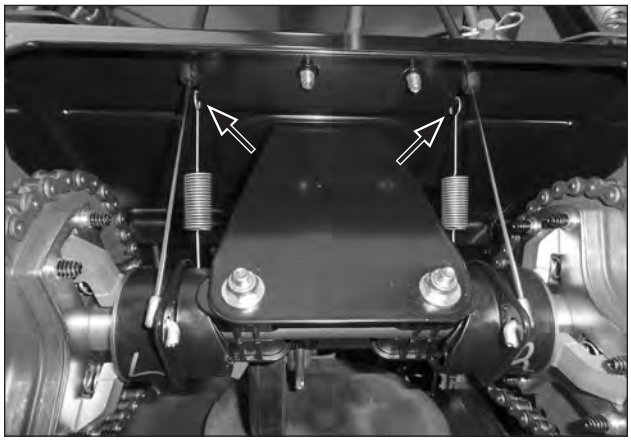

Fig. 009

7. Remove the clutch cables. Rotate the shift collar up to release tension on the clutch cable and maneuver the Z-bend of the cable out of the upper clutch collar.

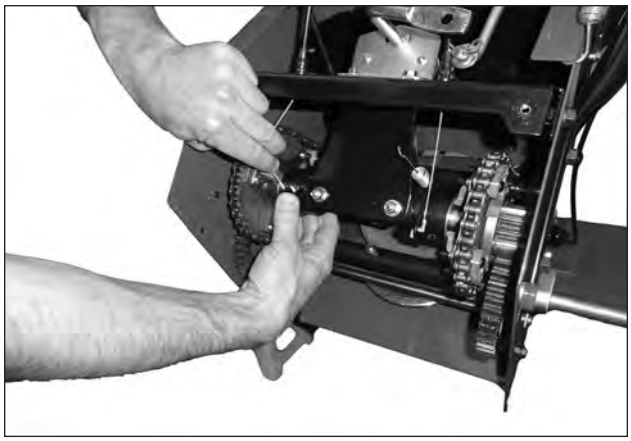

Fig. 010

8. Unbolt the upper end of the shift brace from the housing.

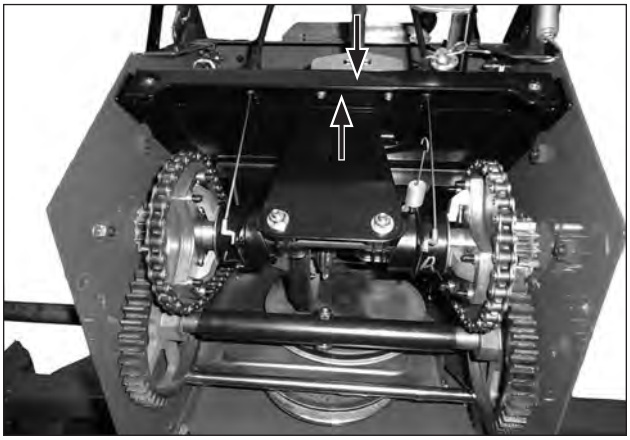

Fig. 011

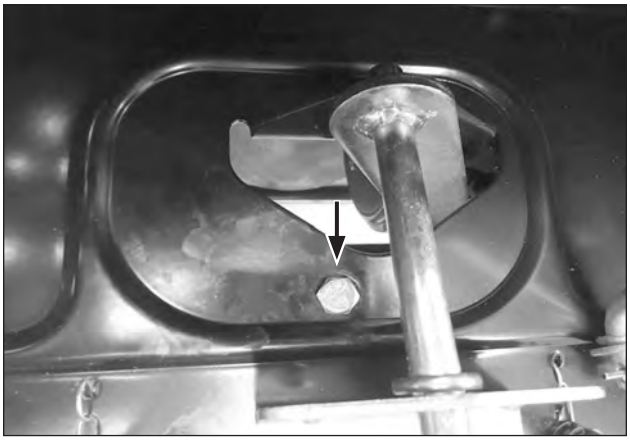

Fig. 012

9. Remove both roller chains from the 32-tooth gears and lift the wheel clutch assembly from the traction unit.

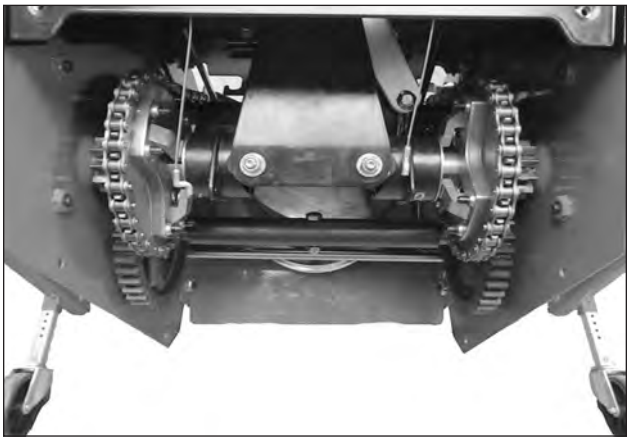

Fig. 013

NOTE
Install a washer and screw into each end of the shaft to keep the parts from sliding off.

Fig. 014

10. Remove both hairpins located on either side of the axle of the 44-tooth gear.

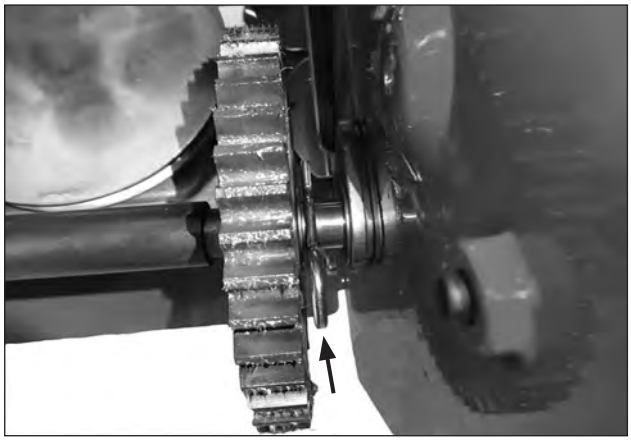

Fig. 015

11. Remove the woodruff key from one side of the axle shaft by sliding the 44-tooth gear inward towards the center of the shaft to expose the woodruff key. Pry up on the outside edge of the key to remove it.

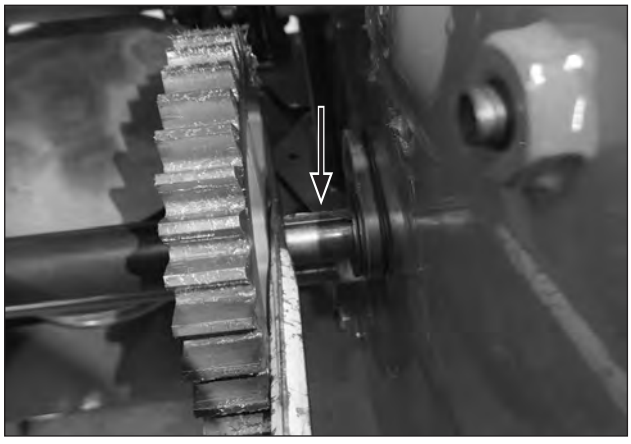

Fig. 016

12. Slide the axle shaft out through the bearing retainer one at a time, holding onto the 44-tooth gear.

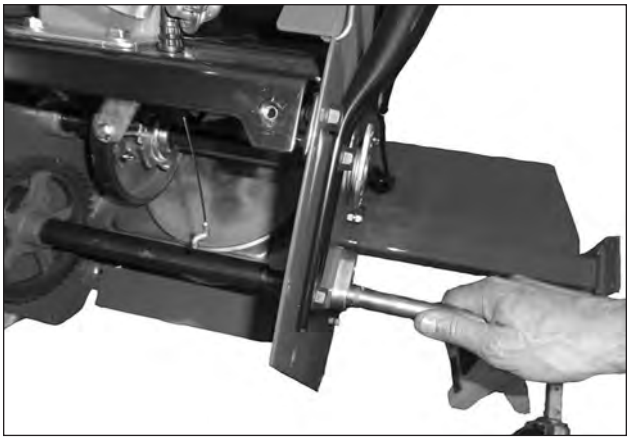

Fig. 017

13. Slide the tube of the axle shaft through the housing.

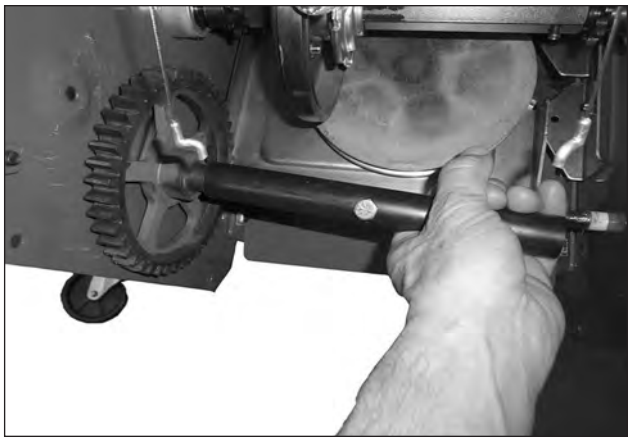

Fig. 018

14. Remove the other half of the axle shaft with the 44-tooth gear.

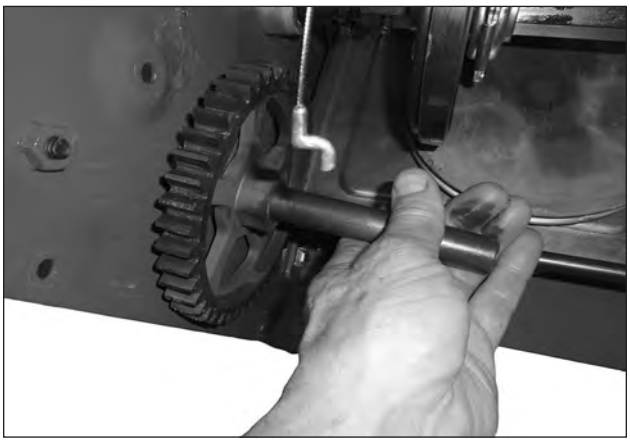

Fig. 019

15. Remove the two screws from the shift rod bracket and remove the traction control lever and bracket assembly from the friction wheel.

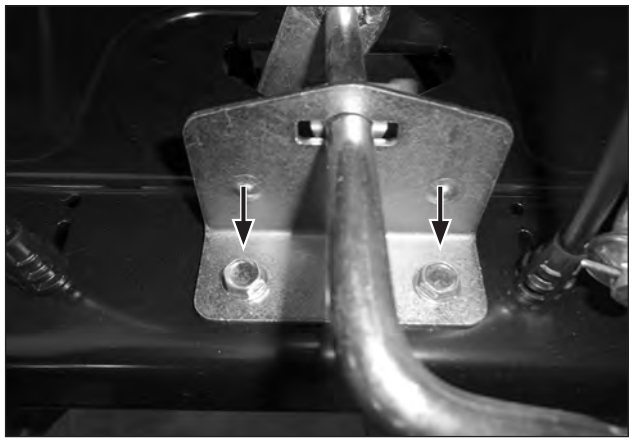

Fig. 020

Fig. 021

16. Remove the bearing retainer that holds the hex shaft (if not previously been done).

Fig. 022

17. Remove the hex shaft assembly/friction wheel from the housing.

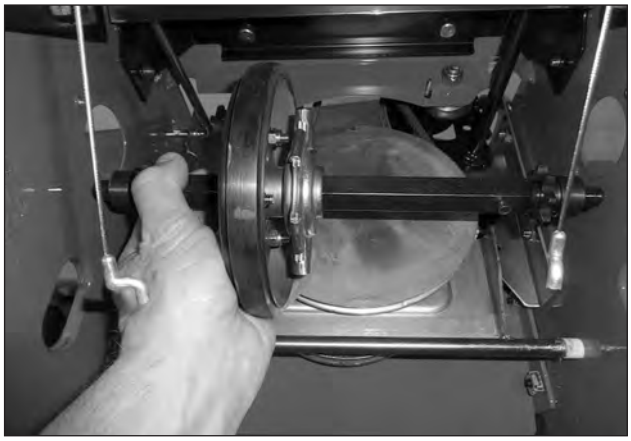

Fig. 023

18. Remove the friction wheel from the hex shaft by removing the three nuts and bolts that hold the friction wheel to the plate on the hex shaft.

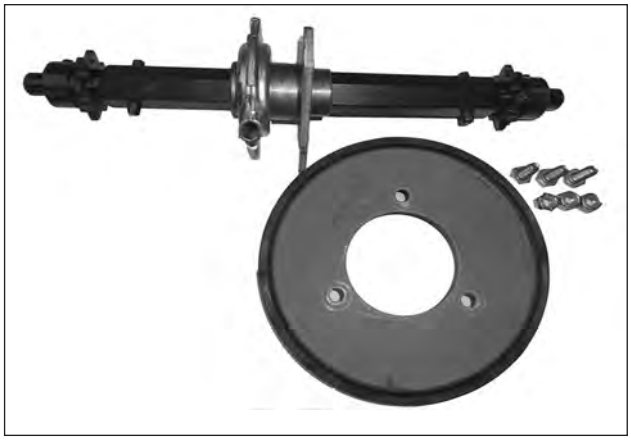

Fig. 024

19. Move the unit to the upright position and remove the belt cover.

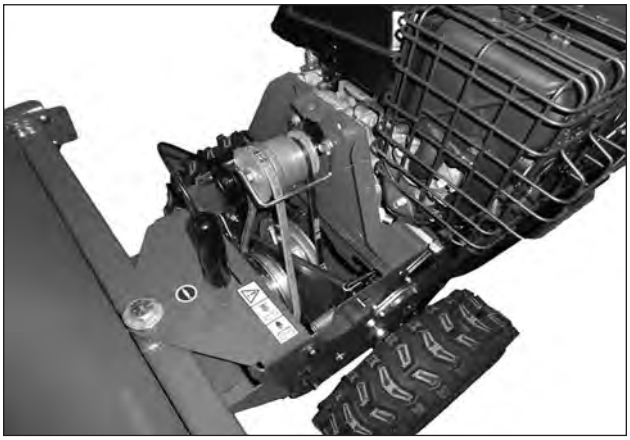

Fig. 025

20. Remove the hairpin cotter connecting the speed control linkage to the pivot pulley plate assembly.

Fig. 026

21. Remove the extension spring from the housing.

Fig. 027

22. Slide the speed control linkage from the pivot pulley plate assembly.

Fig. 028

23. Place the unit back onto the broom housing.

24. Remove the retaining ring from both sides of the housing and slide the nylon bushing off the pivot pulley plate shaft.

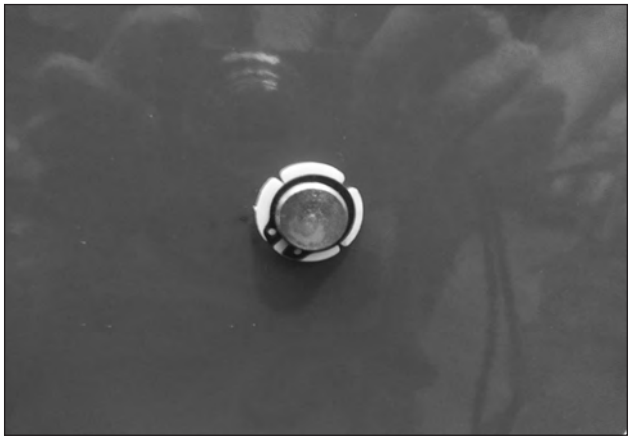

Fig. 029

Fig. 030

25. Tilt the pivot pulley assembly to release the traction belt tension and remove the belt from the traction pulley.

Fig. 031

26. Remove the pivot pulley plate assembly from the housing.

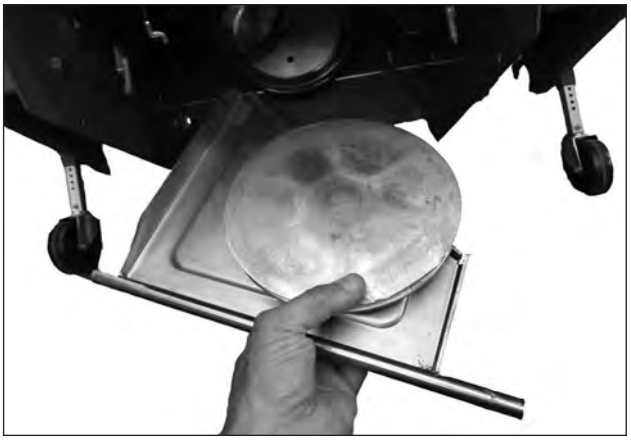

Fig. 032

27. Remove the locknut from pivot pulley and separate the pulley from the plate.

Fig. 033

Fig. 034

Drive System Assembly

1. Install the pivot plate assembly into the housing and install the belt. The idler pulley (A) should be pushed away from you to install the pivot plate.

Fig. 035

2. Install the two bushings and the two “C” clips onto the pivot plate shaft.

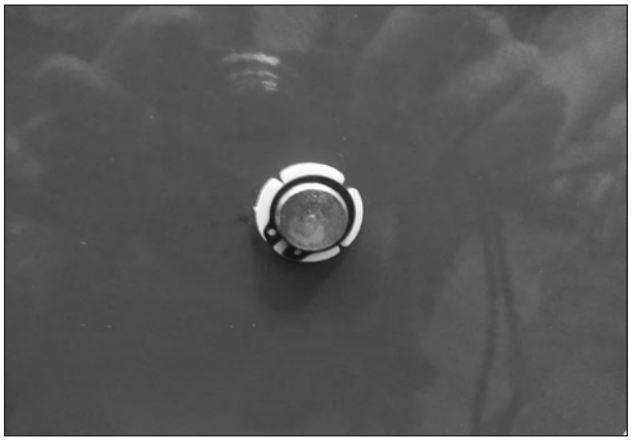

Fig. 036

3. Install the speed control linkage (B) through the pivot plate and install the hairpin cotter (A) into the hole of the speed control linkage on the outside of the pivot plate.

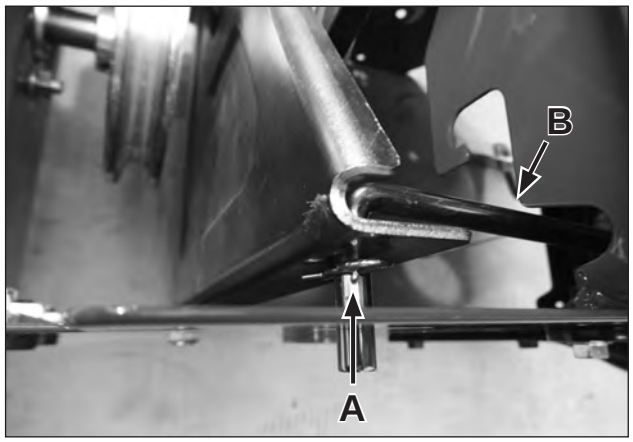

Fig. 037

4. Install the long end of the spring to the cut out on the pivot plate.

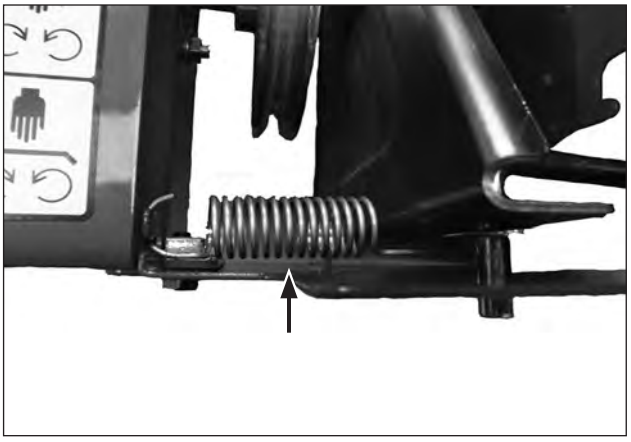

Fig. 038

5. Install the short end of the spring to the frame.

6. Install the friction wheel assembly. Lay the shift mechanism onto the housing and insert the shift shaft into the friction wheel assembly in the direction shown.

NOTE
It is important that the friction wheel and shift mechanism are to the right of the unit as shown and that the wheel is free of dirt, oil, anti-seize or any other lubricant.

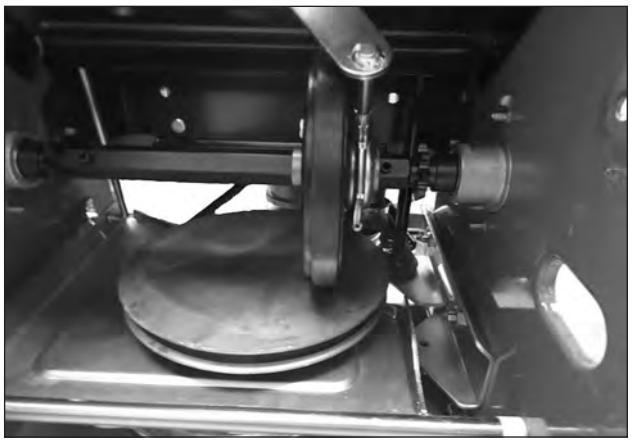

Fig. 039

7. Before mounting the friction wheel assembly, install the chains onto the 8-tooth sprockets making sure the closed end of the master link is going in the direction of rotation in the forward gears.

Fig. 040

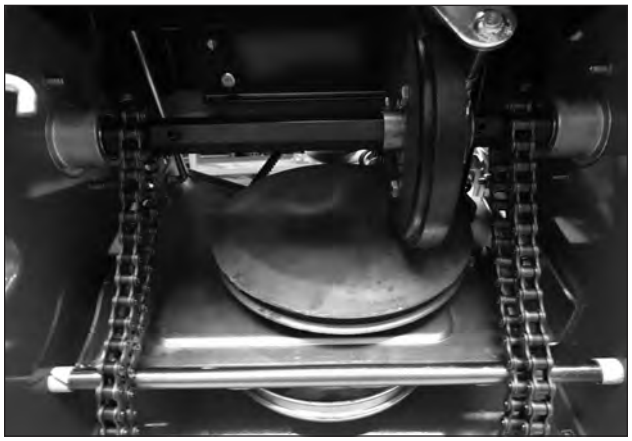

Fig. 041

8. Install both bearing retainers.

Fig. 042

9. Before installing the axle with the 44-tooth sprockets, apply a light coat of anti-seize to the outer 5” (12 cm) of both ends of the axle shaft. Also apply a light coat to the inside diameter at both ends of the tube about 4” (10 cm).

Fig. 043

10. Make sure the axle bearing end that is holding the axle shaft is on the bottom.

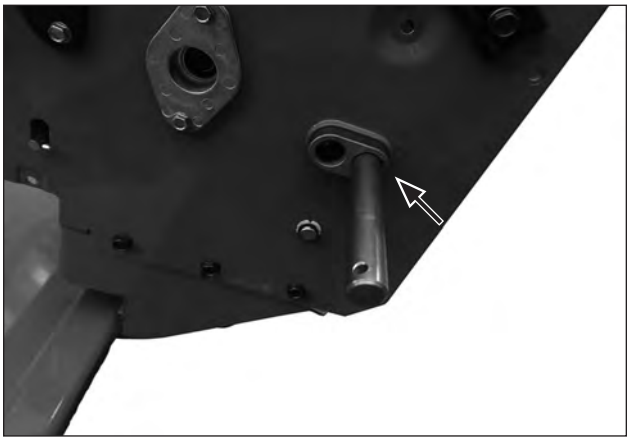

Fig. 044

11. The 44-tooth gears should have the hub facing inward.

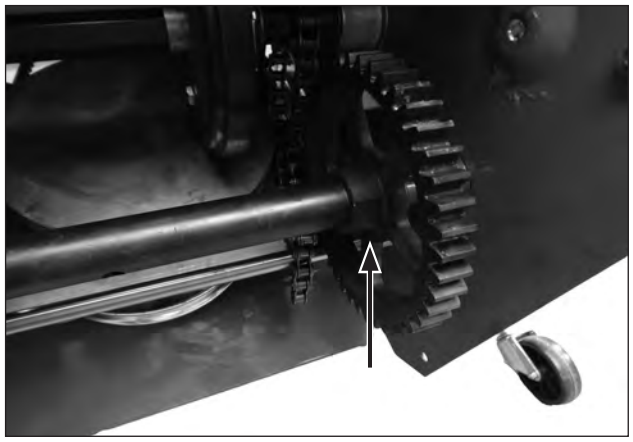

Fig. 045

12. Slide one end of the axle shaft with tube into the housing.

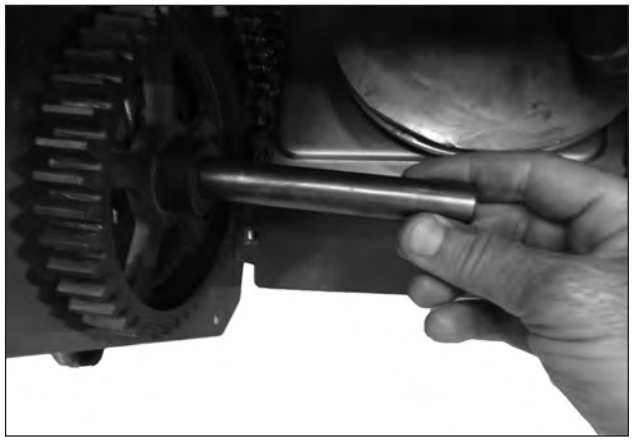

Fig. 046

13. With the woodruff key out of the other side of the shaft as well as all other components, install the axle bearing onto the housing and then slide the shaft in through the bearing and housing, through the two washers, and 44-tooth gear into the tube.

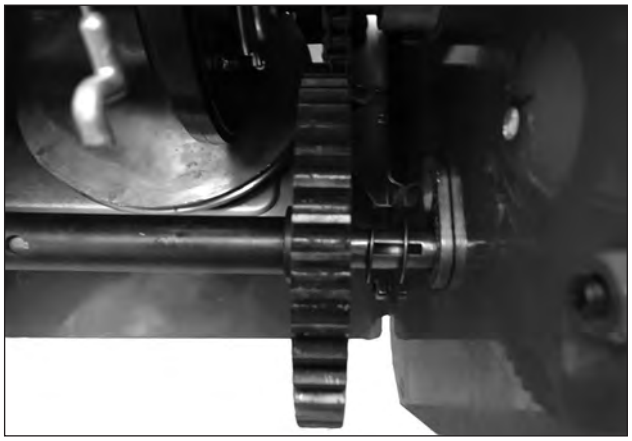

Fig. 047

14. Insert the woodruff key onto the axle shaft evenly. Make sure the 44-tooth gear can ride over the shaft freely.

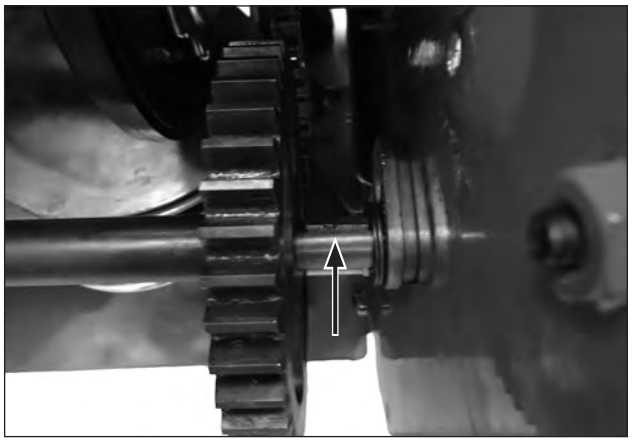

Fig. 048

15. Position the hole for the hairpin cotter between the two washers. Push the hairpin cotter into place. Repeat for other side.

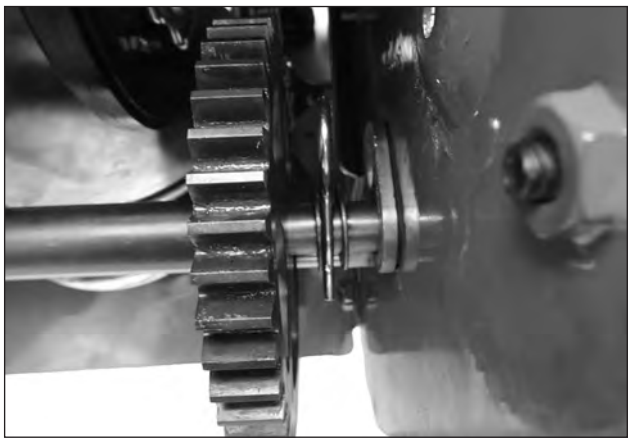

Fig. 049

16. Lightly coat the 44-tooth gear with anti-seize.

Fig. 050

17. Before installing the wheel clutch assembly, lightly coat the 11-tooth gear of the wheel clutch with anti-seize.

Fig. 051

18. Install the wheel clutch assembly with the brace shift plate facing away and up towards the housing, making sure the collars are correctly installed with the “RIGHT” and “LEFT” facing inward and the right and left flanges facing toward you.

Fig. 052

19. Route the chains around the 32-tooth gear of the clutch assembly.

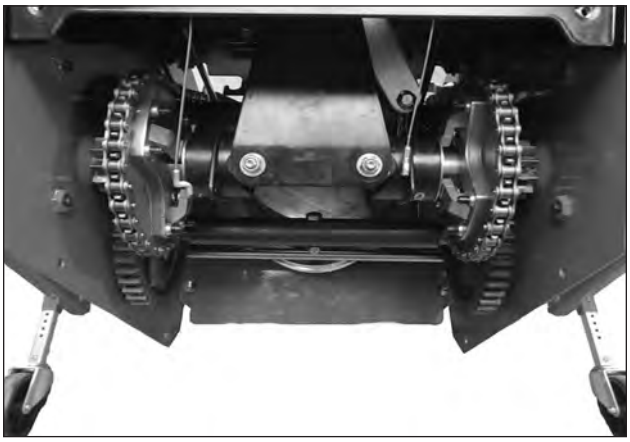

Fig. 053

20. Attach the shift brace plate to the housing.

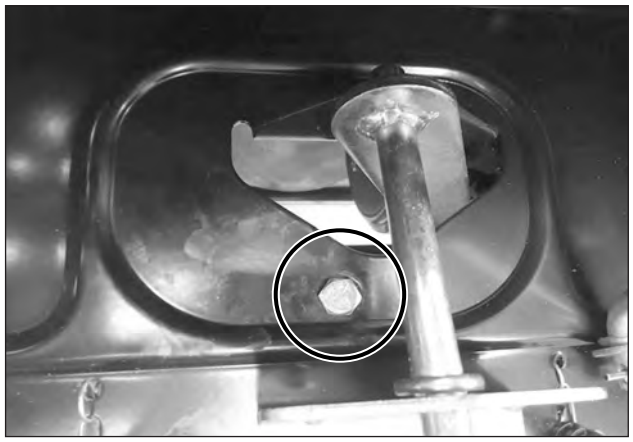

Fig. 054

21. Torque the two intermediate shaft screws to 170 - 300 in - lbs (19.2 - 33.9 Nm).

Fig. 055

22. Install the two extension springs from the lower part of the shift collar flange to the housing.

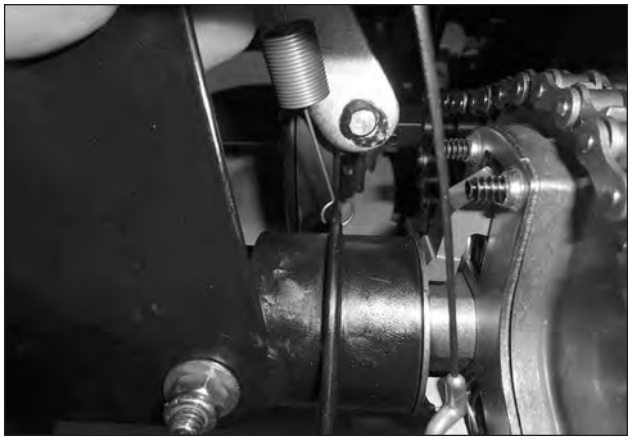

Fig. 056

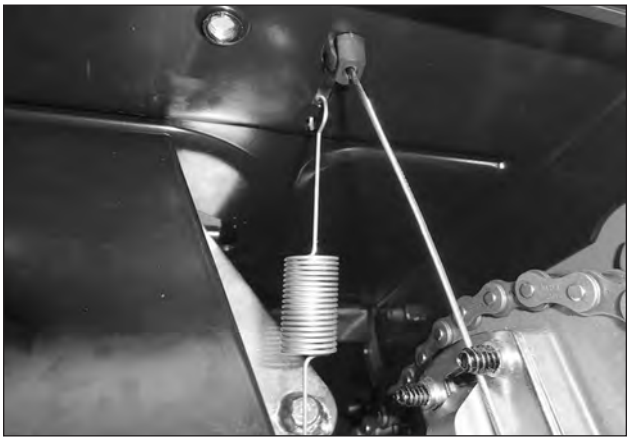

Fig. 057

23. Install the Z-bend of the clutch cable from outside to inside of the shift collar.

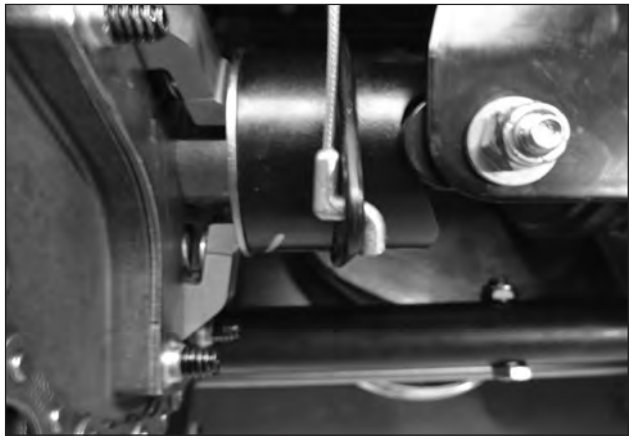

Fig. 058

24. Install the shift rod/traction rod lever onto the housing making sure the traction control fits into the friction wheel.

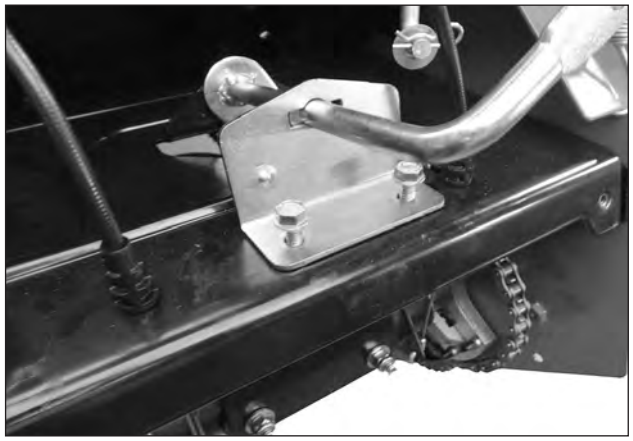

Fig. 059

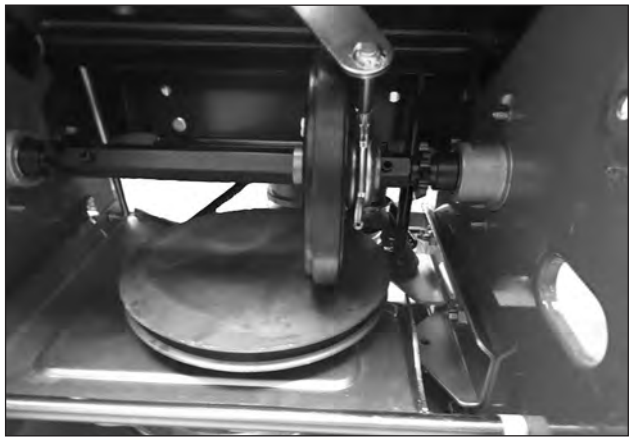

Fig. 060

25. Install the lower cover.

Fig. 061

26. Install the upper and lower covers, with the upper cover overlapping the lower cover.

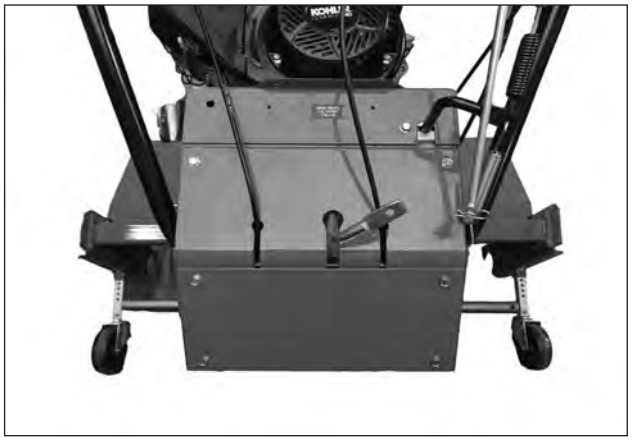

Fig. 062

27. Connect the shift linkage to the shift rod/traction rod lever with a washer between the linkage and hair pin.

Fig. 063

28. The wheels are installed with the V-tread rotation forward.

Fig. 064

29. Bolt the wheel hub to the axle shaft and torque to 115 +/- 15 in - lbs (13 +/- 1.7 Nm).

Fig. 065

30. Install the belt cover.

31. Check clutch cable adjustment and adjust if necessary. Refer to “Traction Cable Adjustment” on page 3-6.

Wheel Clutch Disassembly

1. Remove the 11-tooth gear from the 32-tooth gear by sliding it off the shaft.

Fig. 066

2. Slide off the washer behind the 11-tooth gear.

Fig. 067

3. Remove the 32-tooth sprocket gear and the thrust washer from the shaft.

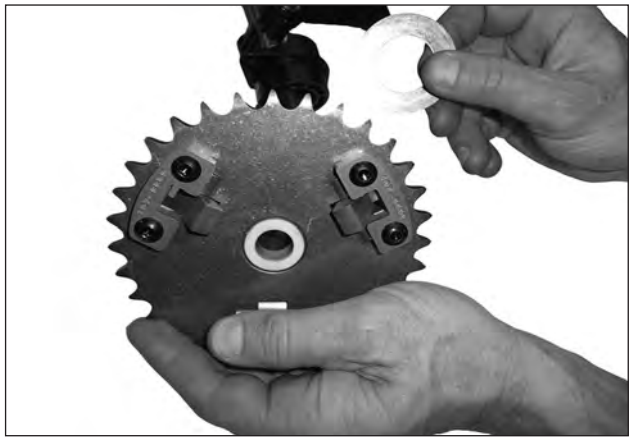

Fig. 068

4. Remove the shift collar and flat washer from the shaft.

Fig. 069

NOTE
Shift collars are marked right and left hand at the top of the inside flange.

5. Unbolt the four guide collars from the shaft.

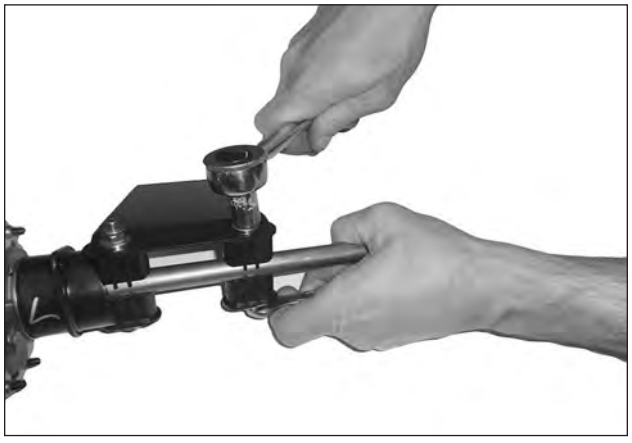

Fig. 070

6. Remove the wheel clutch components from the other end of the shaft.

Fig. 071

7. Remove the three (per gear) compression springs from under the pawls and set aside.

Fig. 072

8. Remove the six (per side) T-27 Torx screws that hold the pawl supports.

Fig. 073

9. Remove the retainer plate off the gear hub.

Fig. 074

10. Remove the pawl pins and pawls from the 32-tooth gear.

Fig. 075

11. Repair or replace components as needed.

Fig. 076

Wheel Clutch Assembly

NOTE
Apply a light coat of SAE 30W oil to the intermediate shaft before assembly.

1. Set the 32-tooth gear on a flat surface and install the pawls. Apply a light coat of oil to the dowel pins and install the dowel pins into the pawl assembly.

Fig. 077

2. With the pawls facing up and away from the hub, slide the retainer plate onto the hub. Make sure the pins are seated flush and the retainer plate sits flush onto the gear.

Fig. 078

3. Clamp or hold the gear and turn it over to properly install the three pawl supports and Torx screws.

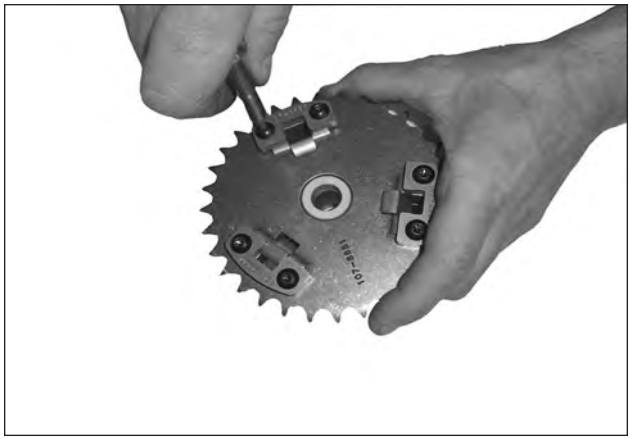

Fig. 079

4. Torque the T-27 Torx screws to 100 - 125 in - lbs (11.3-14.1 Nm).

5. Install the four guide collars to the shaft with the shift brace plate.

Fig. 080

6. Torque the screws to no more than 50-70 in - lbs (5.65-7.9 Nm).

7. Slide the flat washers next to the guides.

Fig. 081

8. Install the RIGHT and LEFT collar.

NOTE
The top flanges of the shift collars have “right” and “left” stamped into them. Install accordingly on the right and left ends of the shaft with the shift brace plate oriented as shown.

Fig. 082

Fig. 083

9. Install the compression springs under the pawls.

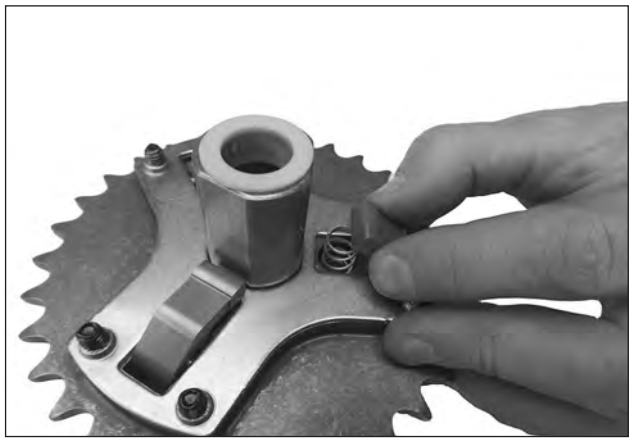

Fig. 084

10. Slide the thrust washer onto the 32-tooth sprocket gear.

Fig. 085

11. Slide the complete 32-tooth gear sprocket onto the shaft.

Fig. 086

12. Install the flat washer.

13. Make sure the 11-tooth gear slides on so it is flush with the end of the shaft.

Fig. 087

14. Make sure the pawls are up against the thrust washer and the springs are not binding and are compressing properly.

Fig. 088

15. Apply a light coat of anti-seize to the 11-tooth gear. Repeat for the opposite side.

Fig. 089

16. Install the assembly into the housing.

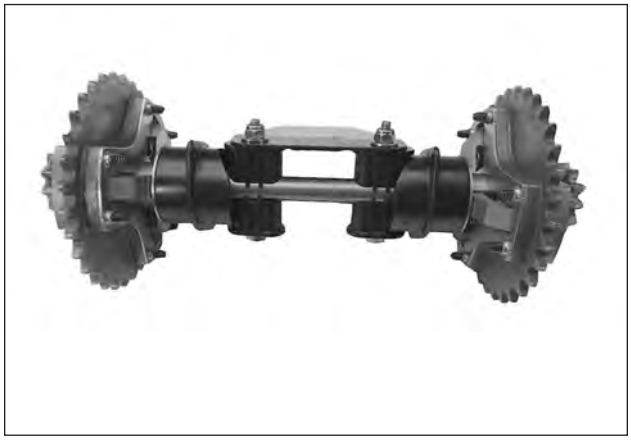

Fig. 090

After installation, rotate the left and right collars fully to the stop. Ensure that the mechanism operates smoothly. Check each of the six pawls to ensure that they return fully when the shift collar is released. (A non-returning pawl indicates binding or missing parts).

BROOM HEAD

Subsystem Broom

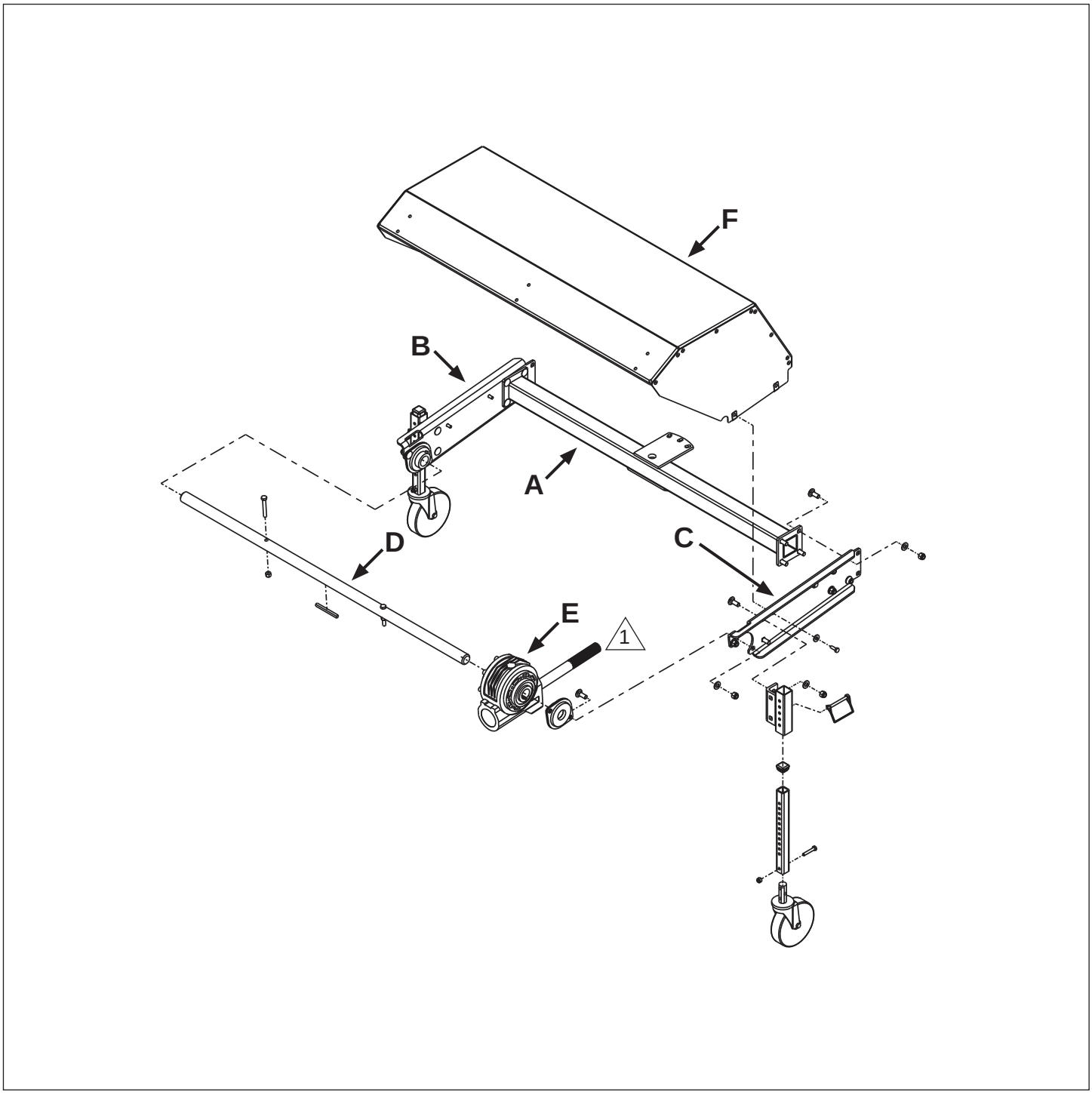

Fig. 001

A. Frame
B. Arm - Right
C. Arm - Left
D. Shaft
E. Gearbox - Worm
F. Hood - Broom

1 Silver grade anti-sieze applied to gearbox splined shaft interface with driveline.

BROOM HEAD

Broom Mounting

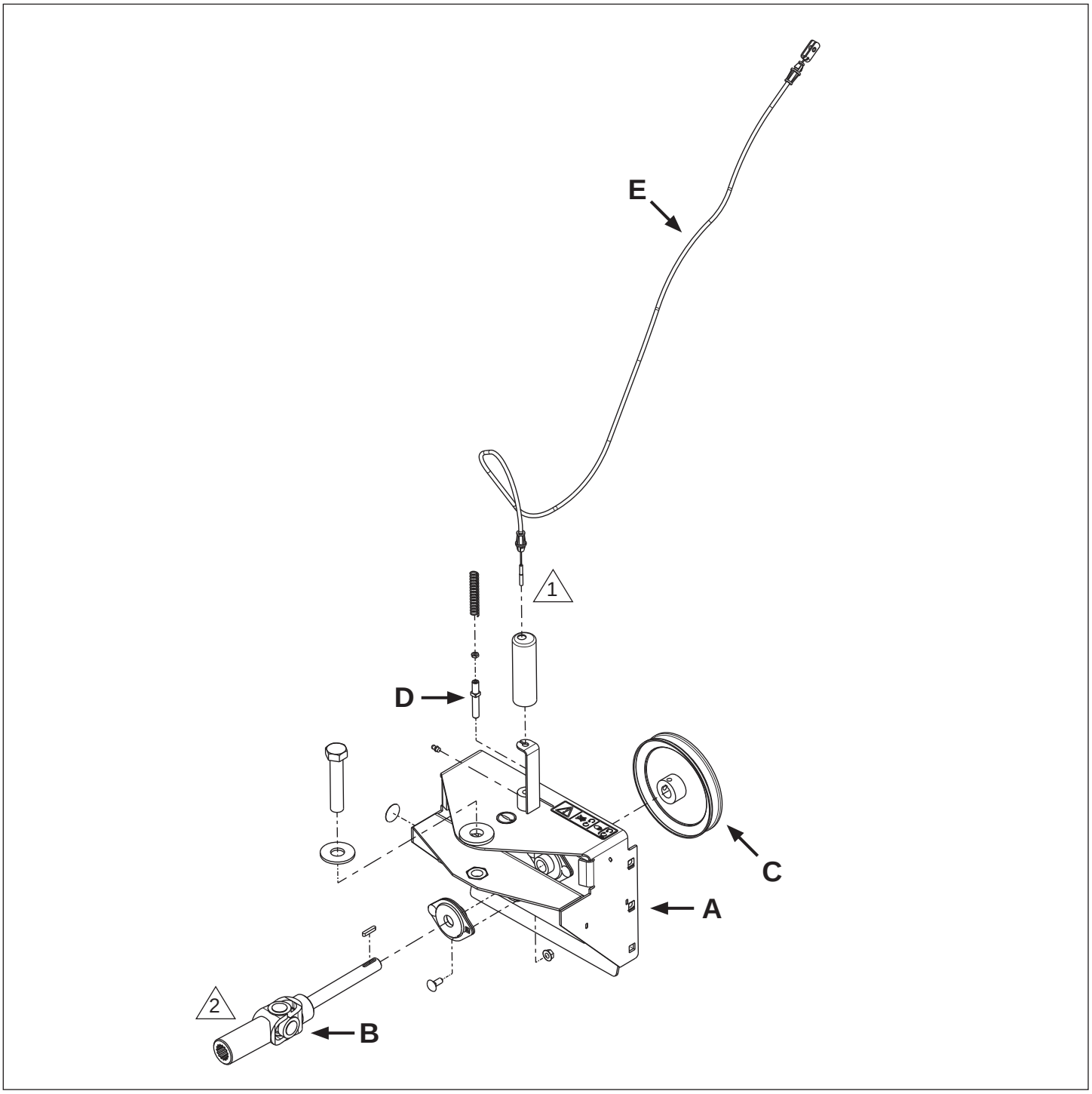

Fig. 002

A. Frame - Mounting
B. Driveline
C. Pulley - Impeller
D. Pin - Swing
E. Cable - Broom Angle

1 Cable/pin set position - measurement from top thread start to top of jam nut is .31” (5/16”) +/- .05” (3/64”).

2 Silver grade anti-sieze applied to driveline interface with gearbox splined shaft.

Broom Core

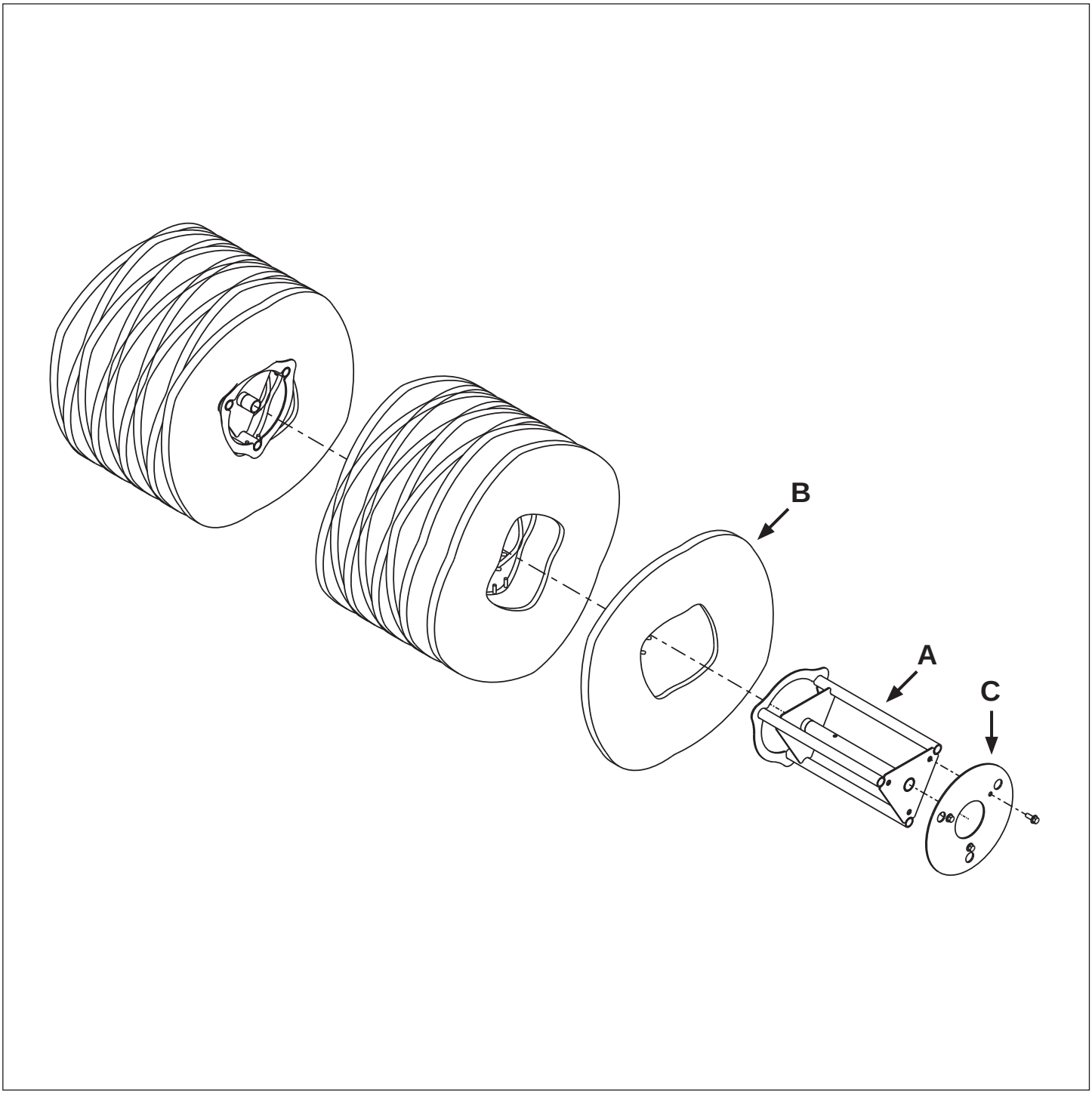

Fig. 003

A. Core, Broom
B. Segment - Poly
C. Plate - End, Retainer

BROOM HEAD

Filament Removal

1. Drain fuel from fuel tank.

2. Remove pillow block bearing bolts (4) on broom shaft

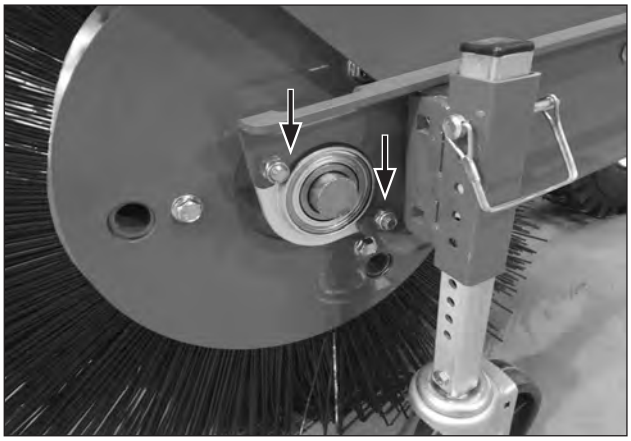

Fig. 004

3. Tip machine back on its handles to remove broom assembly. Slide broom spline shaft out of coupler.

Fig. 005

4. Remove filament retainer plate by removing three bolts from each side. Remove filaments.

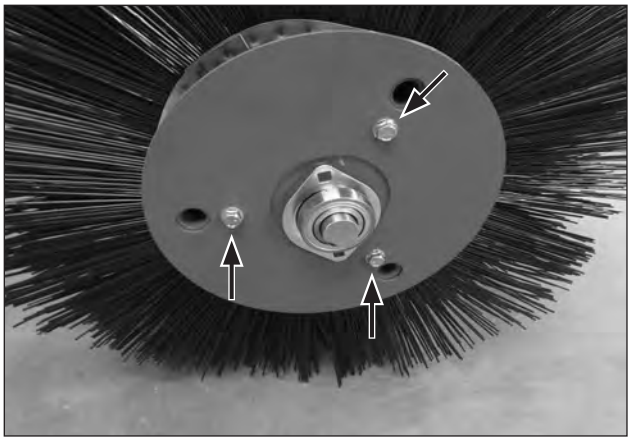

Fig. 006

Replacement Filament Installation

1. Stand broom shaft on one end. Begin adding replacement filaments.

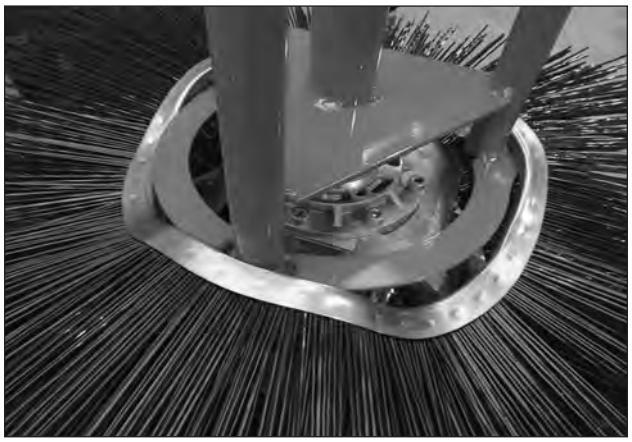

Fig. 007

NOTE
Make sure to place each section onto the broom shaft so that the 2 locator pins are on each side of the tube frame, and the first filament is offset toward the center of the gearbox.

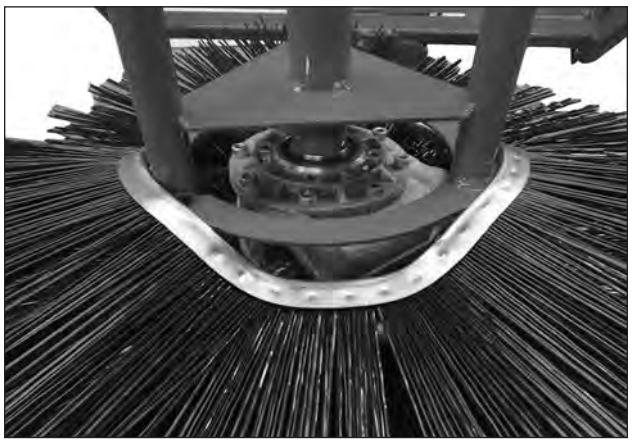

Fig. 008

2. Continue to add replacement sections, alternating locator pins to the next shaft tube as you place additional sections (Fig. 009).

Fig. 009

3. Locate the filament retainer plate over the end of the broom shaft. Align the filament retainer plate over the broom shaft tubes. Install 3 retainer plate bolts.

NOTE
It may be necessary to flatten the last filament for installation. Lay the filament section on a flat surface and tap the high offset down slightly with a hammer. Only flatten the broom section a little at a time to the point of the retainer bolts making contact with the welded nuts. Tighten the bolts evenly, ensuring the brush section is not being pinched between the retainer plate and the shaft assembly. Torque all bolts to 26 ft - lbs (35.25 Nm) (Fig. 010).

Fig. 010

4. Repeat this procedure for the opposite side of the broom shaft.

5. Place the broom assembly on the floor so that the gearbox shaft is closest to the floor.

6. Apply silver grade anti-seize to gear box splined shaft end. Slide the broom back into the machine just far enough to install the drive shaft into the spline coupler.

Fig. 011

7. Lift the handles to align the broom frame with the broom shaft. Install the pillow blocks around the bearing.

8. Install the carriage head bolts from the inside of the frame, frist through the pillow block plates, then into the frame. Loosely install the nuts. Repeat for the other side. Torque pillow block bolts to 26 ft - lbs (36 Nm).

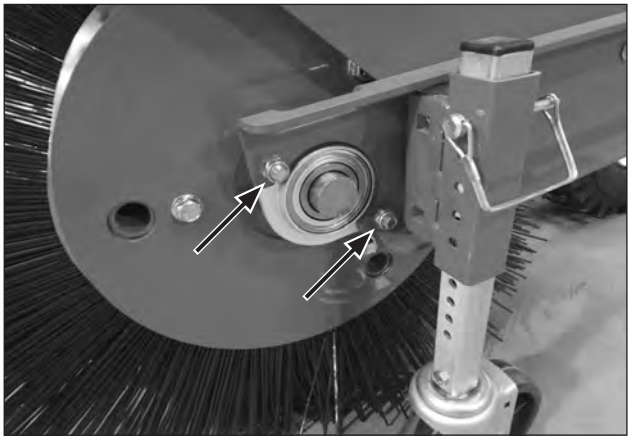

Fig. 012

TORO

LCE/Residential Products/
Siteworks

Walk-Behind Rotary Broom

Service Manual

Form Number 492-9342