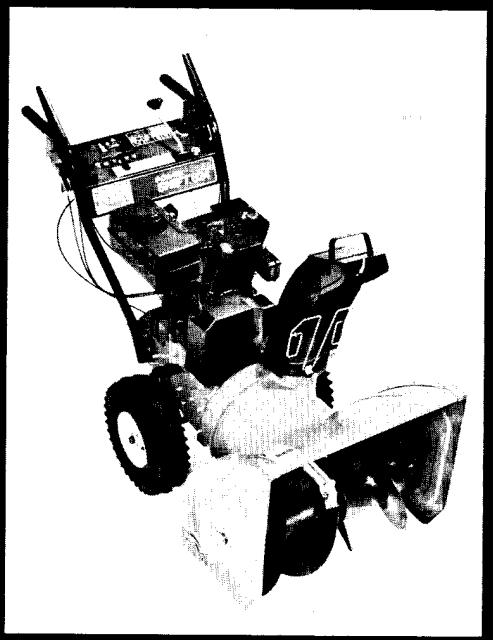
TORO®

Power Shift Snowthrower

SERVICE MANUAL



ABOUT THIS MANUAL

This service manual was written expressly for the Toro 624, 824, 828 and 1132 Power Shift Snowthrowers. The Toro Company has made every effort to make the information in this manual complete and correct.

This manual was written with the service technician in mind. It is organized so that information used most often is up front. As a result, you will find reference information on safety, identification, specifications, special tools, troubleshooting and maintenance, all in the front third of the manual.

Disassembly, inspection and reassembly procedures are covered in the last two-thirds of the manual and are grouped by component. We tried to cover each common repair with its own section or sub-section. For example, you will find that auger service and auger gearbox service are addressed separately.

And, because the Power Shift Snowthrower is a relatively complex machine, most sections will include some component theory. This information can be found at the front of each service procedure section.

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

The Toro Company
8111 Lyndale Avenue South
Minneapolis, MN 55420

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

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SAFETY INSTRUCTIONS

Servicing of any outdoor power equipment requires care and common sense to prevent injury. "CAUTION" statements have been placed thoughout this manual to enhance safety. Whenever you encounter the word CAUTION - Read the instruction because it has to do with safety. Failure to comply with the instruction may result in personal injury or death.

This manual is intended as a service and repair manual only. The safety instructions provided in this manual are for the troubleshooting and service of the product only. The individual Operator's Manuals will contain safety information on the operation of the Power Shift Snowthrowers.

Operator's Manuals with complete operational safety instruction are available through:

The Toro Company
Publications Department
8111 Lyndale Avenue South
Minneapolis, MN 55420 U.S.A.

FOR YOUR SAFETY . . .

Avoid electrocution...
Always use a grounded three wire plug and cord when starting or troubleshooting a snowthrower equipped with and electric starter.

Avoid possible fires and explosions...
Use a container designed for gasoline. Avoid spilling gasoline and never smoke while working around gasoline.

Avoid fires and falls...
Wipe up any spilled fuel or oil.

Avoid lacerations and amputations...
Stay clear of all moving parts when running the machine. Treat all moving parts as if they were moving whenever the engine is running or has the potential to start.

Avoid burns...
Do not touch engine while running or shortly after running.

Avoid falls...
Do not operate snowthrower at fast speeds on slippery surfaces.

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

Avoid possible eye injuries...
Wear eye protection when working with springs or cables.

Avoid unexpected starting of engine...
Always turn off key and disconnect spark plug wire before attempting any cleaning, adjustment or repair.

Avoid accidental misuse of fuel...
Always store fuel in a container designed for gasoline that is properly labeled.

Avoid possible injury due to inferior parts...
Use ony Toro original parts to insure that important safety criteria are met.

Avoid injury to bystanders...
Always clear area of bystanders before starting or testing a snowthrower.

IDENTIFICATION

Model and Serial Numbers

The snowthrower itself has two identification numbers: a model number and a serial number. The two numbers are stamped on a decal which is located on back of the engine mounting plate. These numbers are required whenever a warranty claim is being filed on a Toro part.

Each engine also has a model and serial number. Consult the engine manufacturers manual for the location of these numbers. Engine model and serial number must be included on warranty claims related to a failed engine component. This applies even when the claim is being filed to The Toro Company.

SPECIFICATIONS MODELS 38500 AND 38505

Mitsubishi Powered 624 - Engine Specifications*

Item	Specification
Manufacturer	Mitsubishi
Type	4-stroke, side valve, gasoline
Rated Horsepower	6 HP
Engine Speed (fast no load)	4000 ± 150 rpm
Carburetor Type	float
Choke	manual
Primer	yes
Throttle Control	yes, mounted on engine
Ignition Type	electronic
Fuel	unleaded gasoline (no methanol and not more than 10% ethanol)
Fuel Tank	3.8 liters (4 quarts)
Recommended Oil	SAE 5W30 or SAE10, API rating SE or SF
Oil Capacity	0.56 liters (19 oz)
Spark Plug	NGK BP-4HS [set gap to 0.72 mm (.028")]

* For more engine specifications, see Toro Gas Consumer Gas Engine Specification Manual or the engine manufacturer's service manual.

Mitsubishi Powered 624 - Product Specifications

Transmission

Item	Specification
Manufacturer	Toro
Type	gearbox, 4 forward, 2 reverse gears
Input Drive	pulley/belt
Output Drive	chain
Recommended Lubricant	Lubriplate® Mag 1
Lubricant Capacity	0.43 liters (14.5 oz)
First Forward Gear at fast throttle	0.88 kph (0.55 mph)
Second Forward Gear	2.09 kph (1.30 mph)
Third Forward Gear	3.22 kph (2.00 mph)
Fourth Forward Gear	4.67 kph (2.90 mph)
First Reverse Gear	2.09 kph (1.30 mph)
Second Reverse Gear	3.22 kph (2.00 mph)

SPECIFICATIONS MODELS 38500 AND 38505

Mitsubishi Powered 624 - Product Specifications (cont'd)

Auger

Item	Specification
Housing Width	61.0 cm (24")
Housing Height	53.3 cm (21")
Diameter	35.6 cm (14")
Flights	two, 8.89 cm (3.5") deep [38505 serrated]
Gearbox Speed Reduction	10:1
Gearbox Lubricant	SAE 90 EP gear oil, API rating of GL-5 or GL-6
Gearbox Capacity	0.133 liters (4.5 oz)
Speed at 4000 rpm	126 rpm

Impeller

Item	Specification
Diameter	30.5 cm (12")
Blades	three
Throwing Capacity, mass--distance	773 kg/min (1700 lbs/min) -- 12.2 m (40 ft)
Stopping Time	less than five seconds

Chute

Item	Specification
Throat Diameter	14.0 cm (5.5")
Angle of Rotation	200°
Deflector Angle of Tilt	75°

Rear Suspension

Item	Specification
Standard	pivoting axle
Optional	pivoting axle with differential

Wheel and Tires

Item	Specification
Type	low pressure pneumatic, with tube
Diameter	35.6 cm (14.00")
Width	10.2 cm (4.00")
Tread	self cleaning lug type

SPECIFICATIONS MODELS 38500 AND 38505

Mitsubishi Powered 624 - Product Specifications (cont'd)

Wheels and Tires (cont'd)

Item	Specification
Track Width	61.0 cm (24")
Tire Pressure	.5 to 1.0 kg/cm^2 (7 to 15 psi) [must be equal on both sides]

Dimensions

Item	Specification
Length	138.4 cm (54.5")
Width	63.4 cm (25.0")
Height	104.1 cm (41.0") [handle height 91.4 cm (36.0")]
Weight	100 kg (220 lbs)

Accessories

Item	Part Number
Tire Chain Kit	56-2700
Snow Cab	66-6200 or 68-9500
Drift Breaker	66-7960
Light Kit	66-7950
Differential Kit	38038
Snowthrower Cover	66-6660

Mitsubishi Powered 624 - Torque Specifications

Fastener	Torque
Traction Gear Case Screws	1.38 kg m (120 in lbs)
Chain Guard Screws	0.12 kg m (10 in lbs)
Pivot Arm Shoulder Bolts	3.45 kg m (300 in lbs)
Auger Gearbox Screws	1.38 kg m (120 in lbs), *note tightening order, page 73*
Impeller Shaft Set Screws	2.36 kg m (205 in lbs)
Impeller Lever Screw	0.12 kg m (10 in lbs)
Control Box Nuts	1.84 kg m (160 in lbs)
Belt Guide Screws	0.81 kg m (70 in lbs)

SPECIFICATIONS MODELS 38510 AND 38513

Tecumseh Powered 624 - Engine Specifications*

Item	Specification
Manufacturer	Tecumseh
Type	4-stroke, side valve, gasoline
Rated Horsepower	6 HP
Engine Speed (fast no load)	3300 ± 150 rpm
Carburetor Type	float
Choke	manual
Primer	yes
Throttle Control	yes, engine mounted
Ignition Type	electronic
Fuel	unleaded gasoline (no methanol and not more than 10% ethanol)
Fuel Tank	3.8 liters (4 quarts)
Recommended Oil	SAE 5W30 or SAE10, API rating SE or SF
Oil Capacity	0.56 liters (19 oz)
Spark Plug	Champion RJ-17LM or Autolite AR7N [set gap to 0.76 mm (0.030")]

* For more engine specifications, see Toro Gas Consumer Gas Engine Specification Manual or the engine manufacturer's service manual.

Tecumseh Powered 624 - Product Specifications

Transmission

Item	Specification
Manufacturer	Toro
Type	gearbox, 4 forward, 2 reverse gears
Input Drive	pulley/belt
Output Drive	chain
Recommended Lubricant	Lubriplate® Mag 1
Lubricant Capacity	0.43 liters (14.5 oz)
First Forward Gear at fast throttle	0.88 kph (0.55 mph)
Second Forward Gear	2.09 kph (1.30 mph)
Third Forward Gear	3.22 kph (2.00 mph)
Fourth Forward Gear	4.67 kph (2.90 mph)
First Reverse Gear	2.90 kph (1.30 mph)
Second Reverse Gear	3.22 kph (2.00 mph)

SPECIFICATIONS MODELS 38510 AND 38513

Tecumseh Powered 624 - Product Specifications (cont'd)

Auger

Item	Specification
Housing Width	61.0 cm (24")
Housing Height	53.3 cm (21")
Diameter	35.6 cm (14")
Flights	two, 8.89 cm (3.5") deep [38513 serrated]
Gearbox Speed Reduction	10:1
Gearbox Lubricant	SAE90 EP gear oil, API rating of GL-5 or GL-6
Gearbox Capacity	0.133 liters (4.5 oz)
Speed at 3400 rpm	125 rpm

Impeller

Item	Specification
Diameter	30.5 cm (12")
Blades	three
Throwing Capacity, mass--distance	773 kg/min (1700 lbs/min) -- 12.2 m (40 ft)
Stopping Time	less than five seconds

Chute

Item	Specification
Throat Diameter	14.0 cm (5.5")
Angle of Rotation	200°
Deflector Angle of Tilt	75°

Rear Suspension

Item	Specification
Type	pivoting axle
Optional	pivoting axle with differential

Wheel and Tires

Item	Specification
Type	low pressure, pnuematic, with tube
Diameter	35.6 cm (14.00")
Width	10.2 cm (4.00")
Tread	self cleaning, lug tread

SPECIFICATIONS MODELS 38510 AND 38513

Tecumseh Powered 624 - Product Specifications (cont'd)

Wheels and Tires (cont'd)

Item	Specification
Track Width	61.0 cm (24") to outside of tires
Pressure	.5 to 1.0 kg/cm^2 (7 to 15 psi) [must be equal on both sides]

Dimensions

Item	Specification
Length	138.4 cm (54.5")
Width	63.5 cm (25.0")
Height	104.1 cm (41.0") [handle height 91.4 cm (36.0")]
Weight	100 kg (220 lbs)

Accessories

Item	Part Number
Tire Chain Kit	56-2700
Snow Cab	66-6200 or 68-9500
Drift Breaker	66-7960
Light Kit	66-7930
110 VAC Electric Starter	38-7590
Differential Kit	38038
Snowthrower Cover	66-6660

Torque Specifications

Fastener	Torque
Traction Gear Case Screws	1.38 kg m (120 in lbs)
Chain Guard Screws	0.12 kg m (10 in lbs)
Pivot Arm Shoulder Bolts	3.45 kg m (300 in lbs)
Auger Gearbox Screws	1.38 kg m (120 in lbs), note tightening order, page 73
Impeller Shaft Set Screws	2.36 kg m (205 in lbs)
Impeller Lever Screw	0.12 kg m (10 in lbs)
Control Box Nuts	1.84 kg m (160 in lbs)
Belt Guide Screws	0.81 kg m (70 in lbs)

SPECIFICATIONS MODELS 38520 AND 38525

Mitsubishi Powered 824 - Engine Specifications*

Item	Specification
Manufacturer	Mitsubishi
Type	4-stroke, side valve, gasoline
Rated Horsepower	8 HP
Engine Speed (fast no load)	4000 ± 150 rpm
Carburetor Type	float
Choke	manual
Primer	yes
Throttle Control	yes, mounted on engine
Ignition Type	electronic
Fuel	unleaded gasoline (no methanol and not more than 10% ethanol)
Fuel Tank	4.7 liters (5 quarts)
Recommended Oil	SAE 10W30 or SAE 10, API rating SE or SF
Oil Capacity	0.80 liters (27 oz)
Spark Plug	NGK BP-4HS [set gap to 0.72 mm (.028")]

* For more engine specifications, see Toro Gas Consumer Gas Engine Specification Manual or the engine manufacturer's service manual.

Mitsubishi Powered 824 - Product Specifications

Transmission

Item	Specification
Manufacturer	Toro
Type	gearbox, 4 forward, 2 reverse gears
Input Drive	pulley/belt
Output Drive	chain
Recommended Lubricant	Lubriplate® Mag 1
Lubricant Capacity	0.43 liters (14.5 oz)
First Forward Gear at fast throttle	0.88 kph (0.55 mph)
Second Forward Gear	2.09 kph (1.30 mph)
Third Forward Gear	3.22 kph (2.00 mph)
Fourth Forward Gear	4.67 kph (2.90 mph)
First Reverse Gear	2.09 kph (1.30 mph)
Second Reverse Gear	3.22 kph (2.00 mph)

SPECIFICATIONS MODELS 38520 AND 38525

Mitsubishi Powered 824 - Product Specifications (cont'd)

Auger

Item	Specification
Housing Width	61.0 cm (24")
Housing Height	53.3 cm (21")
Diameter	35.6 cm (14")
Flights	two, 8.89 cm (3.5") deep [38525 serrated])
Gearbox Speed Reduction	10:1
Gearbox Lubricant	SAE90 EP gear oil, API rating of GL-5 or GL-6
Gearbox Capacity	0.133 liters (4.5 oz)
Speed at 4000 rpm	126 rpm

Impeller

Item	Specification
Diameter	30.5 cm (12")
Blades	three
Throwing Capacity, mass--distance	818 kg/min (1800 lbs/min) -- 12.2 m (40 ft)
Stopping Time	less than five seconds

Chute

Item	Specification
Throat Diameter	14.0 cm (5.5")
Angle of Rotation	200°
Deflector Angle of Tilt	75°

Rear Suspension

Item	Specification
Type	pivoting axle
Optional	pivoting axle with differential

Wheel and Tires

Item	Specification
Type	low pressure, pneumatic, with tube
Diameter	35.6 cm (14.00")
Width	10.2 cm (4.00")
Tread	self cleaning lug tread

SPECIFICATIONS MODELS 38520 AND 38525

Mitsubishi Powered 824 - Product Specifications (cont'd)

Wheels and Tires (cont'd)

Item	Specification
Track Width	61.0 cm (24") to outside of tires
Pressure	.5 to 1.0 kg/cm^2 (7 to 15 psi) [must be equal on both sides]

Dimensions

Item	Specification
Length	138.4 cm (54.5")
Width	63.5 cm (25.0")
Height	104.1 cm (41.0") [handle height 91.4 cm (36.0")]
Weight	100 kg (225 lbs)

Accessories

Item	Part Number
Tire Chain Kit	56-2700
Snow Cab	66-6200 or 68-9500
Drift Breaker	66-7960
Light Kit	66-7950
Differential Kit	38038
Snowthrower Cover	66-6660

Mitsubishi Powered 824 - Torque Specifications

Fastener	Torque
Traction Gear Case Screws	1.38 kg m (120 in lbs)
Chain Guard Screws	0.12 kg m (10 in lbs)
Pivot Arm Shoulder Bolts	3.45 kg m (300 in lbs)
Auger Gearbox Screws	1.38 kg m (120 in lbs), note tightening order, page 73
Impeller Shaft Set Screws	2.36 kg m (205 in lbs)
Impeller Lever Screw	0.12 kg m (10 in lbs)
Control Box Nuts	1.84 kg m (160 in lbs)
Belt Guide Screws	0.81 kg m (70 in lbs)

SPECIFICATIONS MODELS 38540 AND 38543

Tecumseh Powered 824 - Engine Specifications*

Item	Specification
Manufacturer	Tecumseh
Type	4-stroke, side valve gasoline
Rated Horsepower	8 HP
Engine Speed (fast no load)	3300 + 200, - 150 rpm
Carburetor Type	float
Choke	manual
Primer	yes
Throttle Control	yes, mounted on engine
Ignition Type	electronic
Fuel	unleaded gasoline (no methanol and not more than 10% ethanol)
Fuel Tank	3.8 liters (4 qts)
Recommended Oil	SAE 5W30 or SAE 10, API of SE or SF
Oil Capacity	0.71 liters (24 oz)
Spark Plug	Champion RJ-17LM or Autolite AR7N [set gap to 0.76 mm (.030")]

* For more engine specifications, see Toro Gas Consumer Gas Engine Specification Manual or the engine manufacturer's service manual.

Tecumseh Powered 824 - Product Specifications

Transmission

Item	Specification
Manufacturer	Toro
Type	gearbox, 4 forward, 2 reverse gears
Input Drive	pulley/belt
Output Drive	chain
Recommended Lubricant	Lubriplate® Mag 1
Lubricant Capacity	0.43 liters (14.5 oz)
First Forward Gear at fast throttle	0.88 kph (0.55 mph)
Second Forward Gear	2.09 kph (1.30 mph)
Third Forward Gear	3.22 kph (2.00 mph)
Fourth Forward Gear	4.67 kph (2.90 mph)
First Reverse Gear	2.09 kph (1.30 mph)
Second Reverse Gear	3.22 kph (2.00 mph)

SPECIFICATIONS MODELS 38540 AND 38543

Tecumseh Powered 824 - Product Specifications (cont'd)

Auger

Item	Specification
Housing Width	61.0 cm (24")
Housing Height	53.3 cm (21")
Diameter	35.6 cm (14")
Flights	two, 8.89 cm (3.5") deep
Gearbox Speed Reduction	10:1
Gearbox Lubricant	SAE90 EP gear oil, API rating of GL-5 or GL-6
Gearbox Capacity	0.133 liters (4.5 oz)
Speed at 3400 rpm	125 rpm

Impeller

Item	Specification
Diameter	30.5 cm (12")
Blades	three
Throwing Capacity, mass--distance	818 kg/min (1800 lbs/min) -- 12.2 m (40 ft)
Stopping Time	less than five seconds

Chute

Item	Specification
Throat Diameter	14.0 cm (5.5")
Angle of Rotation	200°
Deflector Angle of Tilt	75°

Rear Suspension

Item	Specification
Standard	pivoting axle
Optional	pivoting axle with differential

Wheel and Tires

Item	Specification
Type	low pressure, pneumatic, with tube
Diameter	35.6 cm (14.00)
Width	10.2 cm (4.00")
Tread	self cleaning lug tread

SPECIFICATIONS MODEL 38540 AND 38543

Tecumseh Powered 824 - Product Specifications (cont'd)

Wheels and Tires (cont'd)

Item	Specification
Track Width	61.0 cm (24") to outside of tires
Pressure	.5 to 1.0 kg/cm^2 (7 to 15 psi) [must be equal on both sides]

Dimensions

Item	Specification
Length	138.4 cm (54.5")
Width	63.5 cm (25.0")
Height	104.1 cm (41.0") [handle height 91.4 cm (36.0")]
Weight	100 kg (225 lbs)

Accessories

Item	Part Number
Tire Chain Kit	56-2700
Snow Cab	68-9500
Drift Breaker	66-7960
Light Kit	66-7930
110 VAC Electric Starter	37-4810
Differential Kit	38038
Snowthrower Cover	66-6660

Tecumseh Powered 824 - Torque Specifications

Fastener	Torque
Traction Gear Case Screws	1.38 kg m (120 in lbs)
Chain Guard Screws	0.12 kg m (10 in lbs)
Pivot Arm Shoulder Bolts	3.45 kg m (300 in lbs)
Auger Gearbox Screws	1.38 kg m (120 in lbs), note tightening order, page 73
Impeller Shaft Set Screws	2.36 kg m (205 in lbs)
Impeller Lever Screw	0.12 kg m (10 in lbs)
Control Box Nuts	1.84 kg m (160 in lbs)
Belt Guide Screws	0.81 kg m (70 in lbs)

SPECIFICATIONS MODEL 38545

Mitsubishi Powered 828 - Engine Specifications*

Item	Specification
Manufacturer	Mitsubishi
Type	4-stroke, side valve, gasoline
Rated Horsepower	8 HP
Engine Speed (fast no load)	4000 ± 150 rpm
Carburetor Type	float
Choke	manual
Primer	yes
Throttle Control	yes, mounted on engine
Ignition Type	electronic
Fuel	unleaded gasoline (no methanol and not more than 10% ethanol)
Fuel Tank	4.7 liters (5 quarts)
Recommended Oil	SAE 10W30 or SAE 10, API rating of SE or SF
Oil Capacity	0.80 liters (27 oz)
Spark Plug	NGK BP-4HS [set gap to 0.72 mm (.028")]

* For more engine specifications, see Toro Gas Consumer Gas Engine Specification Manual or the engine manufacturer's service manual.

Mitsubishi Powered 828 - Product Specifications

Transmission

Item	Specification
Manufacturer	Toro
Type	gearbox, 4 forward, 2 reverse gears
Input Drive	pulley/belt
Output Drive	chain
Recommended Lubricant	Lubriplate® Mag 1
Lubricant Capacity	0.43 liters (14.5 oz)
First Forward Gear at fast throttle	0.99 kph (0.62 mph)
Second Forward Gear	2.41 kph (1.50 mph)
Third Forward Gear	3.70 kph (2.30 mph)
Fourth Forward Gear	5.30 kph (3.30 mph)
First Reverse Gear	2.41 kph (1.50 mph)
Second Reverse Gear	3.70 kph (2.30 mph)

SPECIFICATIONS MODEL 38545

Mitsubishi Powered 828 - Product Specifications (cont'd)

Auger

Item	Specification
Housing Width	71.1 cm (28")
Housing Height	53.3 cm (21")
Diameter	35.6 cm (14")
Flights	two, 8.89 cm (3.5") deep
Gearbox Speed Reduction	10:1
Gearbox Lubricant	SAE 90 EP gear oil, API rating of GL-5 or GL-6
Gearbox Capacity	0.133 liters (4.5 oz)
Speed at 4000 rpm	126 rpm

Impeller

Item	Specification
Diameter	30.5 cm (12")
Blades	four
Throwing Capacity, mass--distance	909 kg/min (2000 lbs/min), 12.2 m (40 ft)
Stopping Time	less than five seconds

Chute

Item	Specification
Throat Diameter	14.0 cm (5.5")
Angle of Rotation	200°
Deflector Angle of Tilt	75°

Rear Suspension

Item	Specification
Standard	pivoting axle
Optional	pivoting axle with differential

Wheel and Tires

Item	Specification
Type	low pressure, pneumatic with tube
Diameter	40.6 cm (16.00")
Width	12.7 cm (5.00")
Tread	self cleaning lug type

SPECIFICATIONS MODEL 38545

Mitsubishi Powered 828 - Product Specifications (cont'd)

Wheels and Tires (cont'd)

Item	Specification
Track Width	64.8 cm (25.5") to outside of tires
Pressure	.5 to 1.0 kg/cm^2 (7 to 15 psi) [must be equal on both sides]

Dimensions

Item	Specification
Length	138.4 cm (54.5")
Width	73.7 cm (29.0")
Height	106.7 cm (42.0") [handle height 94.0 cm (37.0")]
Weight	109.1 kg (240 lbs)

Accessories

Item	Part Number
Tire Chain Kit	63-3040
Snow Cab	68-9500
Drift Breaker	66-7970
Light Kit	66-7950
12 VDC Electric Starter	68-7250
Differential Kit	38038
Snowthrower Cover	66-6660

Mitsubishi Powered 828 - Torque Specifications

Fastener	Torque
Traction Gear Case Screws	1.38 kg m (120 in lbs)
Chain Guard Screws	0.12 kg m (10 in lbs)
Pivot Arm Shoulder Bolts	3.45 kg m (300 in lbs)
Auger Gearbox Screws	1.38 kg m (120 in lbs), note tightening order, page 73
Impeller Shaft Set Screws	2.36 kg m (205 in lbs)
Impeller Lever Screw	0.12 kg m (10 in lbs)
Control Box Nuts	1.84 kg m (160 in lbs)
Belt Guide Screws	0.81 kg m (70 in lbs)

SPECIFICATIONS MODEL 38570

Briggs and Stratton Powered 828 - Engine Specifications*

Item	Specification
Manufacturer	Briggs and Stratton
Type	4-stroke, side valve, gasoline
Rated Horsepower	8 HP
Engine Speed (fast no load)	3300 + 200, - 150 rpm
Carburetor Type	float
Choke	manual
Primer	yes
Throttle Control	yes, mounted on engine
Ignition Type	electronic
Fuel	unleaded gasoline (no methanol and not more than 10% ethanol)
Fuel Tank	3.8 liters (4 quarts)
Recommended Oil	SAE 5W30 or SAE 10, API rating of SE or SF
Oil Capacity	1.30 liters (44 oz)
Spark Plug	Champion RCJ-8 or Autolite AR7N [set gap to .76 mm (.030")]

* For more engine specifications, see Toro Gas Consumer Gas Engine Specification Manual or the engine manufacturer's service manual.

Briggs and Stratton Powered 828 - Product Specifications

Transmission

Item	Specification
Manufacturer	Toro
Type	gearbox, 4 forward, 2 reverse gears
Input Drive	pulley/belt
Output Drive	chain
Recommended Lubricant	Lubriplate® Mag 1
Lubricant Capacity	0.43 liters (14.5 oz)
First Forward Gear at fast throttle	0.88 kph (0.55 mph)
Second Forward Gear	2.09 kph (1.30 mph)
Third Forward Gear	3.22 kph (2.00 mph)
Fourth Forward Gear	4.67 kph (2.90 mph)
First Reverse Gear	2.09 kph (1.30 mph)
Second Reverse Gear	3.22 kph (2.00 mph)

SPECIFICATIONS MODEL 38570

Briggs and Stratton Powered 828 - Product Specifications (cont'd)

Auger

Item	Specification
Housing Width	71.1 cm (28")
Housing Height	53.3 cm (21")
Diameter	35.6 cm (14")
Flights	two, 8.89 cm (3.5") deep
Gearbox Speed Reduction	10:1
Gearbox Lubricant	SAE 90 weight EP gear oil, API rating of GL-5 or GL-6
Gearbox Capacity	0.133 liters, (4.5 oz)
Speed at 3400 rpm	125 rpm

Impeller

Item	Specification
Diameter	30.5 cm (12")
Blades	four
Throwing Capacity, mass--distance	909 kg/min (2000 lbs/min) -- 12.2 m (40 ft)
Stopping Time	less than five seconds

Chute

Item	Specification
Throat Diameter	14.0 cm (5.5")
Angle of Rotation	200°
Deflector Angle of Tilt	75°

Rear Suspension

Item	Specification
Standard	pivoting axle
Optional	pivoting axle with differential

Wheel and Tires

Item	Specification
Type	low pressure, pnuematic, tube type
Diameter	40.6 cm (16.00")
Width	12.7 cm (5.00")
Tread	self-cleaning lug tread

SPECIFICATIONS MODEL 38570

Briggs and Stratton Powered 828 - Product Specifications (cont'd)

Wheels and Tires (cont'd)

Item	Specification
Track Width	64.8 cm (25.5") to outside of tires
Pressure	.5 to 1.0 kg/cm^2 (7 to 15 psi) [must be equal on both sides]

Dimensions

Item	Specification
Length	138.4 cm (54.5")
Width	73.7 cm (29.0")
Height	106.7 cm (42.0") (handle height 94.0 cm [37"])
Weight	109.1 kg m (240 lbs)

Accessories

Item	Part Number
Tire Chain Kit	63-3040
Snow Cab	68-9500
Drift Breaker	66-7970
Light Kit	66-7940
110 VAC Electric Start	37-4630
Differential Kit	38038

Briggs and Stratton Powered 828 - Torque Specifications

Fastener	Torque
Traction Gear Case Screws	1.38 kg m (120 in lbs)
Chain Guard Screws	0.12 kg m (10 in lbs)
Pivot Arm Shoulder Bolts	3.45 kg m (300 in lbs)
Auger Gearbox Screws	1.38 kg m (120 in lbs), note tightening order, page 73
Impeller Shaft Set Screws	2.36 kg m (205 in lbs)
Impeller Lever Screw	0.12 kg m (10 in lbs)
Control Box Nuts	1.84 kg m (160 in lbs)
Belt Guide Screws	0.81 kg m (70 in lbs)

SPECIFICATIONS MODEL 38573

Tecumseh Powered 828 - Engine Specifications*

Item	Specification
Manufacturer	Tecumseh
Type	4-stroke, side valve gasoline
Rated Horsepower	8 HP
Engine Speed (fast no load)	3300 + 200, - 150 rpm
Carburetor Type	float
Choke	manual
Primer	yes
Throttle Control	yes, mounted on engine
Ignition Type	electronic
Fuel	unleaded gasoline (no methanol and not more than 10% ethanol)
Fuel Tank	3.8 liters (4 quarts)
Recommended Oil	SAE 5W30 or SAE10, API rating of SE or SF
Oil Capacity	0.71 liters (24 oz)
Spark Plug	Champion RJ-17LM or Autolite AR7N [set gap to 0.76 mm (.030")]

* For more engine specifications, see Toro Gas Consumer Gas Engine Specification Manual or the engine manufacturer's service manual.

Tecumseh Powered 828 - Product Specifications

Transmission

Item	Specification
Manufacturer	Toro
Type	gearbox, 4 forward, 2 reverse gears
Input Drive	pulley/belt
Output Drive	chain
Recommended Lubricant	Lubriplate® Mag 1
Lubricant Capacity	0.43 liters (14.5 oz)
First Forward Gear at fast throttle	0.88 kph (0.55 mph)
Second Forward Gear	2.09 kph (1.30 mph)
Third Forward Gear	3.22 kph (2.00 mph)
Fourth Forward Gear	4.67 kph (2.90 mph)
First Reverse Gear	2.09 kph (1.30 mph)
Second Reverse Gear	3.22 kph (2.00 mph)

SPECIFICATIONS MODEL 38573

Tecumseh Powered 828 - Product Specifications (cont'd)

Auger

Item	Specification
Housing Width	71.1 cm (28")
Housing Height	53.3 cm (21")
Diameter	35.6 cm (14")
Flights	two, 8.89 cm (3.5") deep
Gearbox Speed Reduction	10:1
Gearbox Lubricant	SAE 90 weight EP gear oil, API rating of GL-5 or GL-6
Gearbox Capacity	0.133 liters, (4.5 oz)
Speed at 3400 rpm	125 rpm

Impeller

Item	Specification
Diameter	30.5 cm (12")
Blades	four
Throwing Capacity, mass--distance	909 kg/min (2000 lbs/min) -- 12.2 m (40 ft)
Stopping Time	less than five seconds

Chute

Item	Specification
Throat Diameter	14.0 cm (5.5")
Angle of Rotation	200°
Deflector Angle of Tilt	75°

Rear Suspension

Item	Specification
Standard	pivoting axle
Optional	pivoting axle with differential

Wheel and Tires

Item	Specification
Type	low pressure, pnuematic, tube type
Diameter	40.6 cm (16.00")
Width	12.7 cm (5.00")
Tread	self-cleaning lug tread

SPECIFICATIONS MODEL 38573

Tecumseh Powered 828 - Product Specifications (cont'd)

Wheels and Tires (cont'd)

Item	Specification
Track Width	64.8 cm (25.5") to outside of tires
Pressure	.5 to 1.0 kg/cm^2 (7 to 15 psi) [must be equal on both sides]

Dimensions

Item	Specification
Length	138.4 cm (54.5")
Width	73.7 cm (29.0")
Height	106.7 cm (42.0") [handle height 94.0 cm (37")]
Weight	109.1 kg m (240 lbs)

Accessories

Item	Part Number
Tire Chain Kit	63-3040
Snow Cab	68-9500
Drift Breaker	66-7970
Light Kit	66-7930
110 VAC Electric Start	37-4810
Differential Kit	38038

Tecumseh Powered 828 - Torque Specifications

Fastener	Torque
Traction Gear Case Screws	1.38 kg m (120 in lbs)
Chain Guard Screws	0.12 kg m (10 in lbs)
Pivot Arm Shoulder Bolts	3.45 kg m (300 in lbs)
Auger Gearbox Screws	1.38 kg m (120 in lbs), note tightening order, page 73
Impeller Shaft Set Screws	2.36 kg m (205 in lbs)
Impeller Lever Screw	0.12 kg m (10 in lbs)
Control Box Nuts	1.84 kg m (160 in lbs)
Belt Guide Screws	0.81 kg m (70 in lbs)

SPECIFICATIONS MODELS 38565 AND 38580

Briggs and Stratton Powered 1132 - Engine Specifications*

Item	Specification
Manufacturer	Briggs and Stratton
Type	4-stroke, side valve, gasoline
Rated Horsepower	11 HP
Engine Speed (fast no load)	3300 + 200, - 150 rpm
Carburetor Type	float
Choke	manual
Primer	yes
Throttle Control	yes, engine mounted
Ignition Type	electronic
Fuel	unleaded gasoline (no methanol and not more than 10% ethanol)
Fuel Tank	3.8 liters (4 quarts)
Recommended Oil	SAE 5W30 or SAE 10, API rating SE or SF
Oil Capacity	1.30 liters (48 oz)
Spark Plug	Champion RCJ-8 or Autolite AR7N (set gap to .76 mm [.030"])

* For more engine specifications, see Toro Gas Consumer Gas Engine Specification Manual or the engine manufacturer's service manual.

Briggs and Stratton Powered 1132 - Product Specifications

Transmission

Item	Specification
Manufacturer	Toro
Type	gearbox, 4 forward, 2 reverse gears
Input Drive	pulley/belt
Output Drive	chain
Recommended Lubricant	Lubriplate® Mag 1
Lubricant Capacity	0.43 liters (14.5 oz)
First Forward Gear at fast throttle	0.88 kph (0.55 mph)
Second Forward Gear	2.09 kph (1.30 mph)
Third Forward Gear	3.22 kph (2.00 mph)
Fourth Forward Gear	4.67 kph (2.90 mph)
First Reverse Gear	2.09 kph (1.30 mph)
Second Reverse Gear	3.22 kph (2.00 mph)

SPECIFICATIONS MODELS 38565 AND 38580

Briggs and Stratton Powered 1132 - Product Specifications (cont'd)

Auger

Item	Specification
Housing Width	81.3 cm (32")
Housing Height	53.3 cm (21")
Diameter	35.6 cm (14")
Flights	two, 8.89 cm (3.5") deep
Gearbox Speed Reduction	10:1
Gearbox Lubricant	SAE 90 weight EP gear oil, API rating of GL-5 or GL-6
Gearbox Capacity	0.133 liters (4.5 oz)
Speed at 3400 rpm	125 rpm

Impeller

Item	Specification
Diameter	30.5 cm (12")
Blades	four
Throwing Capacity, mass--distance	1000 kg/min (2200 lbs/min) -- 12.2 m (40 ft)
Stopping Time	less than five seconds

Chute

Item	Specification
Throat Diameter	14.0 cm (5.5")
Angle of Rotation	200°
Deflector Angle of Tilt	75°

Rear Suspension

Item	Specification
Standard	pivoting axle
Optional	pivoting axle with differential

Wheel and Tires

Item	Specification
Type	low pressure, pnuematic, tube type
Diameter	40.6 cm (16.00")
Width	12.7 cm (5.00")
Tread	self cleaning lug type

SPECIFICATIONS MODELS 38565 AND 38580

Briggs and Stratton Powered 1132 - Product Specifications (cont'd)

Wheels and Tires (cont'd)

Item	Specification
Track Width	64.8 cm (25.5") to outside of tires
Pressure	.5 to 1.0 kg/cm^2 (7 to 15 psi) [must be equal on both sides]

Dimensions

Item	Specification
Length	138.4 cm (54.5")
Width	8.38 cm (33.0")
Height	106.7 cm (42.5") [handle height 94.0 cm (37")]
Weight	120.5 kg m (265 lbs)

Accessories

Item	Part Number
Tire Chain Kit	63-3040
Snow Cab	68-9500
Drift Breaker	66-7980
Light Kit	66-7940
110 VAC Electric Starter	37-4630
Differential Kit	38038

Torque Specifications

Fastener	Torque
Traction Gear Case Screws	1.38 kg m (120 in lbs)
Chain Guard Screws	0.12 kg m (10 in lbs)
Pivot Arm Shoulder Bolts	3.45 kg m (300 in lbs)
Auger Gearbox Screws	1.38 kg m (120 in lbs), note tightening order, page 73
Impeller Shaft Set Screws	2.36 kg m (205 in lbs)
Impeller Lever Screw	0.12 kg m (10 in lbs)
Control Box Nuts	1.84 kg m (160 in lbs)
Belt Guide Screws	0.81 kg m (70 in lbs)

SPECIAL TOOLS AND OTHER NECESSITIES

The Power Shift Snowthrowers do not require any complex tools for most servicing. Servicing can be accomplished with the following:

Necessary Tools

Complete English Socket Wrench Set (1/4" thru 1")
Complete English End Wrench Set (1/4" through 1")
Phillips Screwdrivers
Standard Screwdrivers
Pocket Knife
Rubber Mallot
Pliers (regular, needle nose and linesman)
Snap Ring Pliers (outside)

In addition to those tools, it is a good idea to have the following on hand:

Lubricants, Sealants and Adhesives

Item	Toro Part Number
Anti-seize Compound	505-109
Hylomar® Sealant	505-105
Loctite®	505-103
Lubriplate® Mag 1 Grease	505-101
Permatex®	505-22
SAE 90 Weight EP Gear Oil	secure locally
Bentonite® Grease	available from Tecumseh/Peerless

TROUBLESHOOTING

Unit Does Not Propel Forward

Possible Causes	Remedy
Insufficient traction	Check tire pressure, lock differential, install chains
Wheels not pinned to axle	Position klik Pin through wheel and axle
Reverse cable too tight	Adjust cable
Shift fork spring malfunction	Repair spring
Traction belt slipping	Adjust traction cable
Traction belt slipping	Remove ice accumulation in lower belt cover.
Forward bevel gear or sliding clutch malfunction	Repair gear or jaw damage

Unit will not Propel Backward

Possible Causes	Remedy
Wheels not pinned to axle	Position klik pin through wheel and axle
Reverse cable too loose	Adjust reverse cable
Traction belt slipping	*Adjust traction cable*
Reverse bevel gear or jaw clutch malfunction	Repair reverse gear or jaw clutch damage

Neutral Not in Correct Location

Possible Causes	Remedy
Lower shift rod not adjusted correctly	Adjust lower shift rod
Shift bracket incorrectly assembled	Reassemble control box correctly

Shift Lever Will Not Lock in Power Shift or Reverse

Possible Causes	Remedy
Lockout lever tabs broken	Replace lockout lever
Lockout lever binding	Free by spraying with WD40
Lockout lever spring malfunction	Replace lock out lever spring

TROUBLESHOOTING (cont'd)

Operator Can Shift Between Forward and Reverse While Traction Lever is Engaged

Possible Causes	Remedy
Lock out lever tabs broken	Replace lock out lever
Lockout lever binding	Free by spraying with WD40
Lock out lever spring malfunction	Replace lock out lever spring

Wheels Will Not Swing When Power Shifting

Possible Causes	Remedy
Indexing mechanism out of sequence with wheels	Release shift lever then push into Power Shift again
Insufficient traction	Assist axle swing by lifting on handles slightly during Power Shift
Insufficient traction	Units with differential: push down on handles, lock differential
Latch cable misadjusted	Adjust latch cable
Pivot arms frozen or binding	Free pivot arms

Machine Does Not Propel in a Straight Line

Possible Causes	Remedy
Uneven tire pressure	Adjust tire pressure to .5 to 1.0 kg/cm^2 (7 to 15 psi) equally.
Uneven traction on pavement	Consider chain installing chains
Skids not adjusted evenly	Adjust skids
Both wheels not pinned to axle	Position klik pin through both wheel and axle

Engine Kills When Auger or Traction are Engaged

Possible Causes	Remedy
Engine not sufficiently warmed up	Allow engine to warm up before engagement
Debris jammed in auger or impeller	Clear auger and impeller
Auger or impeller frozen with ice	Allow snowthrower to warm

TROUBLESHOOTING (cont'd)

Poor Snowthrowing Performance

Possible Causes	Remedy
Engine rpm too slow	Always throw snow at full throttle
Ground speed not matched to conditions	Use slower gear (do not throttle back!)
Belt slippage	Adjust impeller belt
Auger halves on wrong sides	Reinstall on correct sides

Impeller or Auger Does Not Turn

Possible Causes	Remedy
Debris jammed in auger or impeller	Clear debris
Auger or impeller frozen with ice	Allow snowthrower to warm
Belt slippage	Adjust impeller belt
Loose pulley	Tighten pulley fasteners
Missing auger bolt	Replace auger bolt
Impeller loose on impeller shaft	Tighten impeller shaft fasteners
Gear malfunction in auger gearbox	Repair auger gearbox

Traction or Impeller Does Not Disengage

Possible Causes	Remedy
Cable too tight	Adjust cable
Belt guide broken	Replace belt guide
Incorrect belt	Check parts catalog for correct belt

Chute Plugs With Snow

Possible Causes	Remedy
Engine rpm too slow	Always throw snow at full throttle
Belt slippage	Adjust impeller belt
Ground speed not matched to conditions	Select slower gear in heavy conditions, faster gear in light conditions
Impeller and chute areas rough	Sand, paint and wax chute and rough areas in housing and chute
Snow too wet	Allow snow to melt or freeze

TROUBLESHOOTING (cont'd)

Scraper Catches on Uneven Pavement

Possible Causes	Remedy
Scraper adjusted too low	Adjust scraper per Operator's Manual

Snowthrower Leaves Snow Behind

Possible Causes	Remedy
Scraper improperly adjusted or worn	Adjust scraper
Skids improperly adjusted or worn	Adjust skid

Rapid Skid and Scraper Wear

Possible Causes	Remedy
Operator snowthrowing with wheels in rear position unnecessarily	Use forward wheel position for light snow
Defective skid or scraper	Replace skid or scraper

Front End Rises

Possible Causes	Remedy
Snow very hard	Put wheels in rear position
Ground speed too high for conditions	Select slower gear

MAINTENANCE

CAUTION: To prevent accidental starting of the engine while performing maintenance, rotate the ignition key to off and remove it from the switch. Next, pull the wire off the spark plug and make sure the wire does not accidentally touch the plug.

Maintenance - Draining Gasoline

1. Stop the engine and pull the wire off spark plug.
2. Remove the cap from the fuel tank and use a pump-type syphon to drain fuel into clean gas can.

   NOTE: This is the only procedure recommended for draining fuel.

   CAUTION: Since gasoline is highly flammable, drain it outdoors and make sure the engine is cool to prevent a potential fire hazard. Wipe up any gasoline that may have spilled. Do not drain gasoline near any open flame or where the gasoline fumes may be ignited by a spark. Do not smoke a cigar, cigarette or a pipe when handling gasoline.

Maintenance - Chain Lubrication

1. Annually lubricate the drive chain with chain lubricant. See Figure 1. Wipe up any excess oil.

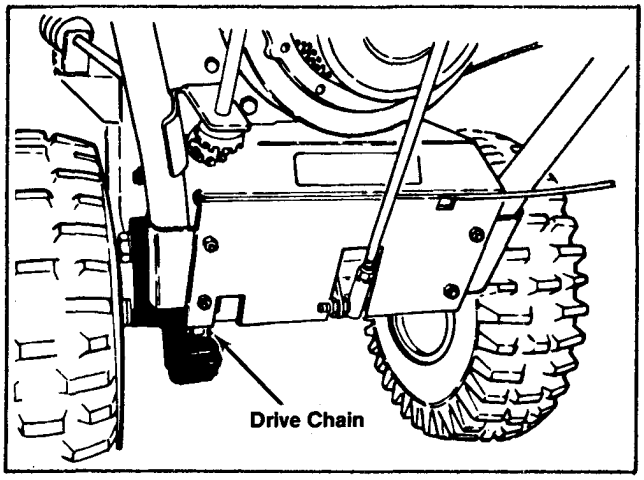

Figure 1

Maintenance - Changing Crankcase Oil

Initially change oil after the first 2 hours of engine operation; thereafter, change oil after every 25 hours of engine operation or annually. If possible, run the engine just before changing oil because warm oil flows better and carries more contaminants the cold oil.

1. Pull the wire off the spark plug and make sure the wire does not contact the plug accidentally.
2. Clean the area around the oil drain cap. Next, slide the oil drain pan below the drain extension; then remove the oil drain cap. See Figure 2.

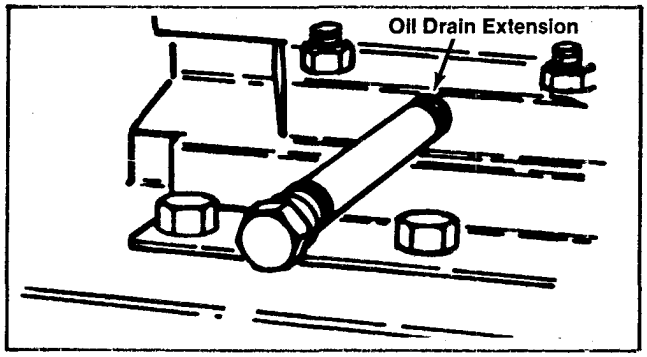

Figure 2

3. After all the oil is drained, install the oil drain cap.
4. Position the snowthrower on a level surface. Next, fill the crankcase with oil. See **Specifications** Section for capacity of your engine. Wipe up any oil that may have spilled.

Maintenance - Auger Gear Box Oil Service

The auger gear box is filled with oil at the factory so regular maintenance is not required. However, if the oil must be replaced in gear box:

1. Drain gasoline from the fuel tank. Wipe up any spilled gas.
2. Position the snowthrower on a level surface.
3. Clean the area around pipe plug so dirt is removed. See Figure 3.
4. Put a drain pan below the front of auger box and remove the pipe plug.
5. Tip the snowthrower forward and hold it up until all oil drains from the gear box.
6. Carefully let the snowthrower down to its normal position. Make sure it is on a level surface. Next, full the auger gear box with GL-5 or GL-6 SAE 85-95 EP transmission oil to the point of overflow.
7. Install pipe plug in gear box.

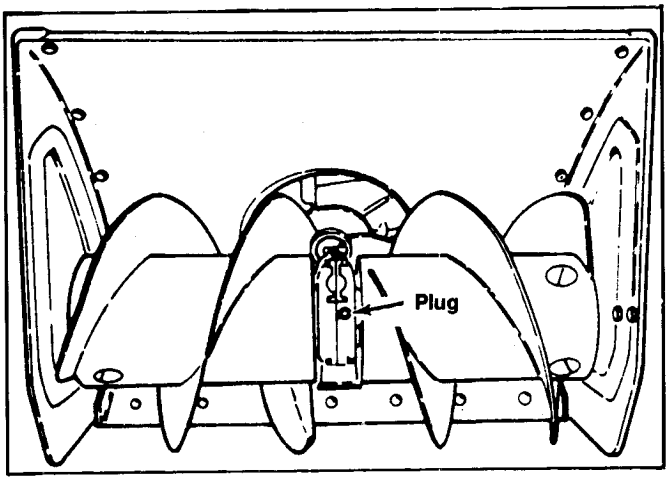

Figure 3

Maintenance - Impeller Drive Belt Adjustment

If the auger/impeller belt slips resulting in decreased snowthrowing performance, an adjustment is required. WHENEVER A NEW BELT IS INSTALLED, AN ADJUSTMENT IS REQUIRED.

1. Remove the three flanged head capscrews securing the belt cover to engine frame and slide belt cover up the cables.
2. Check idler and brake adjustment. There should be a minimum clearance of 3 mm (1/8") between the tab on the impeller idler arm and the brake arm. See Figure 4. If there is less than 3 mm (1/8") clearance, the belt must be replaced.

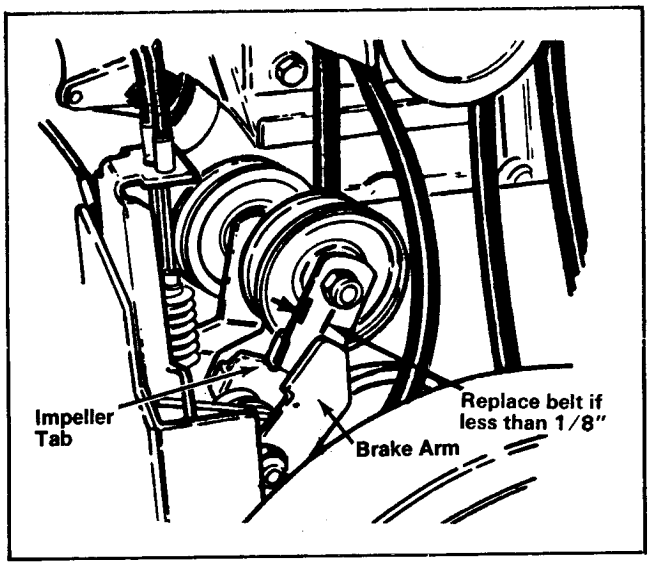

Figure 4

3. Loosen the upper jam nut securing the auger/impeller cable to the mounting bracket. See Figure 5.

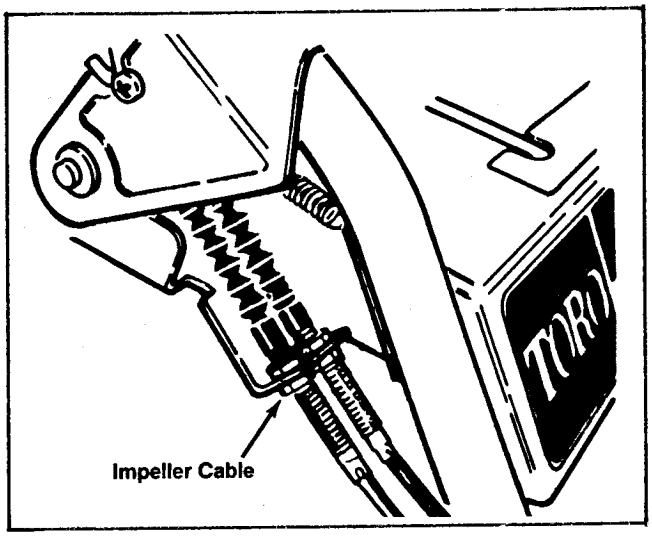

Figure 5

4. Rotate the bottom jam nut upward to increase belt tension.

   NOTE: When adjusting the cable, always rotate the nut one turn at a time.

   NOTE: Do not adjust the belt too tight because it may cause the auger/impeller to turn when the auger/impeller is in the disengaged position. If this occurs, readjust the lever by loosening belt tension.

5. Tighten upper jam nut against bracket.

   CAUTION: Improper adjustment may cause injury if auger/impeller turns when the lever disengages. Use only genuine Toro replacement parts.

6. Recheck the idler and brake adjustment referring to step 2.
7. Reinstall the belt cover.
8. Check tension of belt by operating the auger. If the belt slips, repeat procedure.

Maintenance - Traction Drive Belt Adjustment

If the traction belt slips during operation, an adjustment is required. Whenever the belt is replaced, an adjustment is required.

1. Loosen the upper jam nut securing the traction cable to the mounting bracket.
2. Rotate the bottom jam nut upward to increase belt tension.

Maintenance - Traction Drive Belt Adjustment (cont'd)

NOTE: When adjusting cable, always rotate nut one turn at a time.

3. Tighten the upper jam nut against the bracket.
4. Check the tension of the belt by operating the machine. If the belt slips, repeat the procedure.

   CAUTION: Do not adjust the belt too tight because it may cause the snowthrower to creep when traction lever is in the disengaged position. If this occurs, readjust by loosening belt tension.

Maintenance - Replacing Drive Belts

If the auger/impeller belt or traction belt become worn, glazed, stretched, oil-soaked, or otherwise defective, belt replacement is required.

1. Pull wire off the spark plug and make sure it does not contact the plug accidentally.
2. Remove the three thread forming screws holding the belt cover in place, and slide the belt cover up cables.
3. Move the speed shift control to N, neutral.
4. Remove the two flanged head capscrews securing the idler pulley assembly to the engine frame. Remove the idler pulley assembly. See Figure 6.

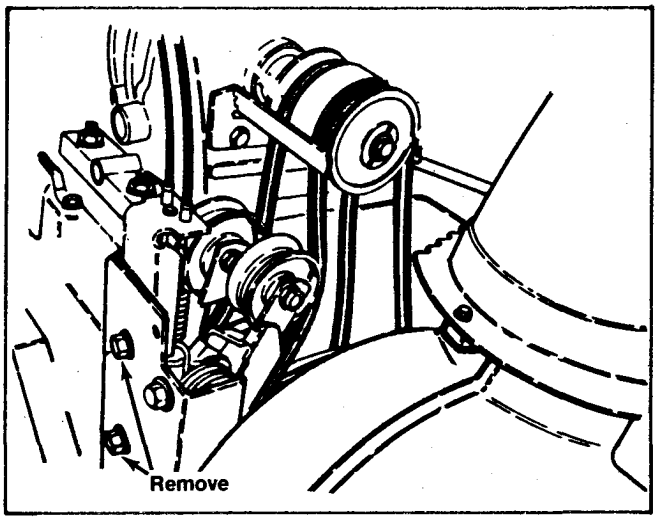

Figure 6

5. Remove the capscrew and lockwasher securing the half sheave to front of pulley assembly.
6. Slide auger/impeller half sheave and belt off crankshaft and remove belt from impeller pulley.
7. If replacing the traction belt, slide the mid section of the on pulley and belt off crankshaft and remove belt from transmission pulley.
8. On the control cable which corresponds to the belt being replaced, loosen the jam nuts securing cable to bracket. Cable must be free to slide in the bracket when changing the belt(s).
9. Reinstall the belts by reversing procedure. Make sure tabs in half sheave are inserted into the mounting grooves in the auger/impeller pulley when reinstalling.

   NOTE: Make sure the idler pulleys are aligned with the belts when reinstalling idler pulley assembly.

10. Readjust the belts, referring to **Maintenance - Impeller Drive Belt Adjustment or Maintenance - Traction Drive Belt Adjustment, pages 37 and 38.**

    CAUTION: Improper adjustment may cause injury if auger/impeller turns when the lever disengages. Use only genuine Toro replacement parts.

Maintenance - Drive Chain Adjustment

The drive chain must be adjusted to maintain 1/8-3/8 of an inch deflection at mid span between transmission and axle sprocket. Check chain deflection after every 25 hours of operation.

1. Check deflection of the chain by lifting up on the chain with moderate pressure at mid span. There should be 1/8-3/8" deflection. If deflection is not as specified an adjustment is required. See Figure 7.

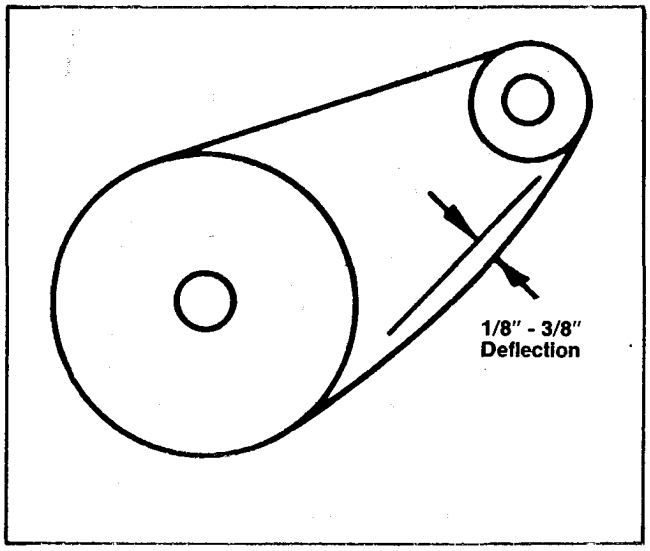

Figure 7

Maintenance - Drive Chain Adjustment (cont'd)

NOTE: To adjust the drive chain, the snowthrower must be tipped up on the auger housing. However, before the snowthrower is tipped, siphon all gasoline from fuel tank.

2. Make sure the wheels are positioned in rear position. Move the shift control into 2nd gear and tip the snowthrower up onto auger housing.

3. Loosen the four flanged head capscrews (two each side) securing transmission frame to engine frame. See Figure 8.

4. Lightly lift up on the transmission frame until 3 to 9 mm (1/8 to 3/8") chain deflection is attained, then retighten the flanged head capscrews.

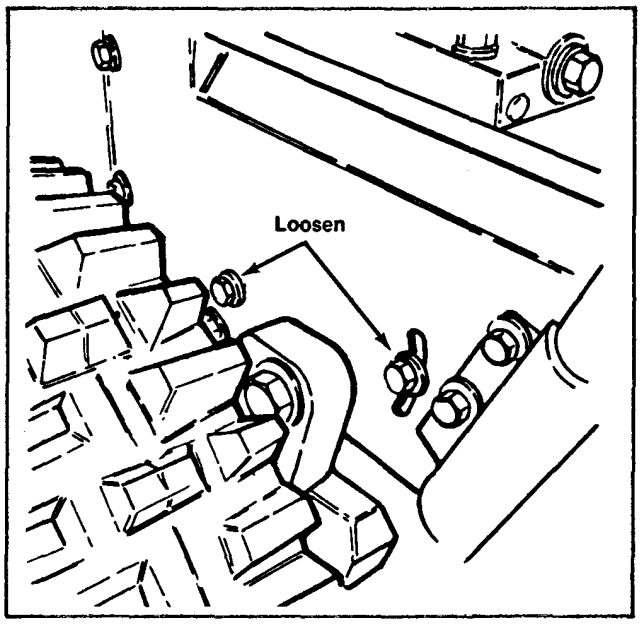

Figure 8

NOTE: Do not pry or use excessive force when lifting the transmission frame, as transmission damage may occur.

NOTE: If gear shift lever is not aligned with the Power Shift slot in control panel (see Figure 9 inset), shift rod length must be adjusted as follows:

a. Disconnect the ball joint from bellcrank and move the jam nut up shift rod. See Figure 9.

b. Rotate the ball joint up or down until the gear shift lever is aligned with the Power Shift slot.

c. Reinstall the ball joint to the bellcrank and tighten the jam nut.

5. Recheck the chain deflection and lower the snowthrower to its normal position.

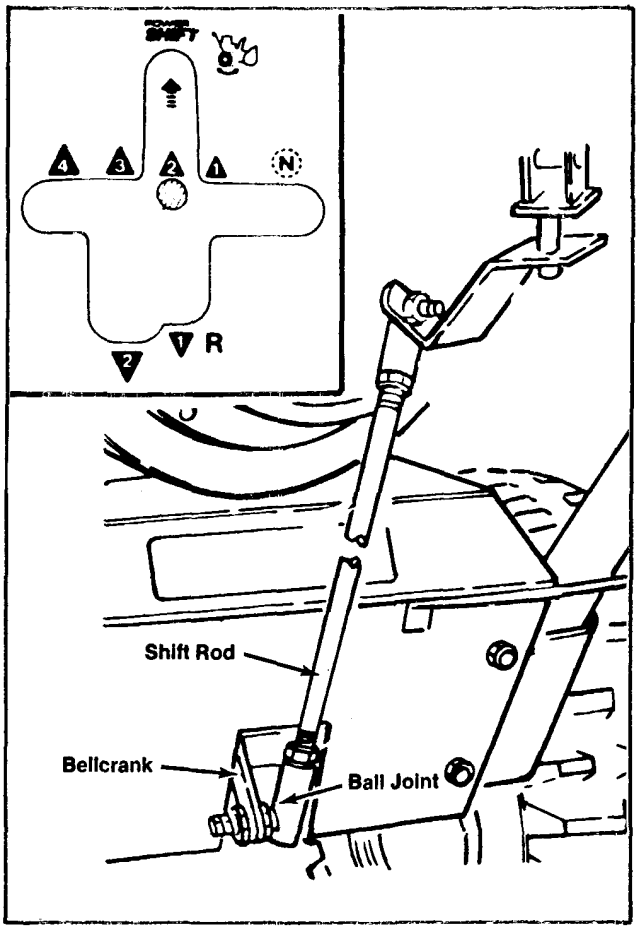

Figure 9

Maintenance - Spark Plug Service

Check the Specifications Section for the proper spark plug and gap. Since the air gap between the center and side electrodes of the spark plug increases gradually during normal engine operation, install a new plug after 25 hours of engine operation.

1. Clean the area around the spark plug so foreign matter cannot fall into cylinder when plug is removed.

2. Pull the wire off the spark plug and remove the plug from cylinder head.

   NOTE: A cracked, fouled, or dirty spark plug must be replaced. Do not sand blast, scrape or clean the electrodes because grit may eventually release from the plug and fall into the cylinder. The result will likely be engine damage.

3. Set air gap between electrodes of new spark plug. See Figure 10. Next, install the spark plug in the cylinder head. Torque plug to 15 ft-lb. If torque wrench is not used, tighten plug firmly.

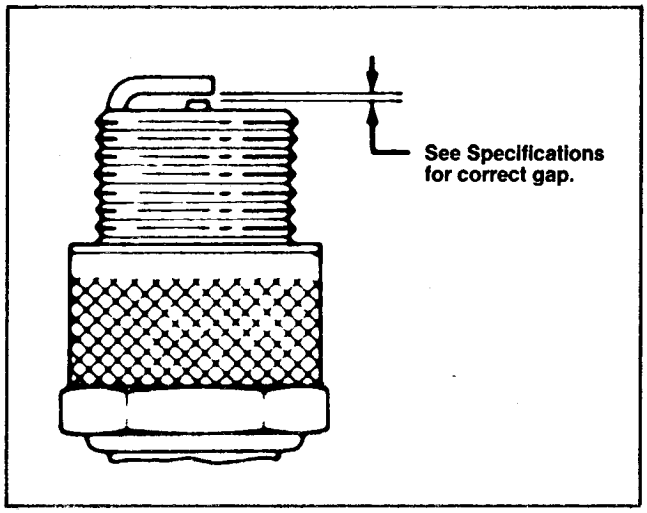

Figure 10

4. Push the wire onto the spark plug.

Preparing Snowthrower For Storage

1. Siphon or remove the gasoline from the fuel tank, referring to **Maintenance - Draining Gasoline,** page 36. Wipe up any gasoline that may have spilled.
2. Start the engine and let it run until it stops because there is no gasoline in the fuel system.
3. Remove the spark plug from the cylinder head. Next, pour two teaspoons of engine oil into spark plug hole in cylinder head. Install the spark plug in the cylinder head, but do not install the wire on the plug. Then pull recoil starter slowly to distribute the oil on the inside of the cylinder.
4. Lubricate the snowthrower: refer to **Maintenance - Chain Lubrication**, page 36. Change crankcase oil: see Operator's Manual.
5. Clean the snowthrower. Touch up chipped surfaces with paint. Sand the affected areas before painting. Use a rust preventative to prevent metal parts from rusting.
6. Tighten all screws and nuts. If any parts are damaged, repair or replace them.
7. Store the snowthrower in a clean, dry place and cover it to give protection.
8. The snowthrower may be stored tipped up on the auger housing. Make sure to drain gas before tipping snowthrower.

SECTION 1 POWER SHIFT CONTROLS

CAUTION: Servicing the Power Shift Snowthrower will require working with some of the moving parts. To prevent accidental starting of the engine while performing service, take the following precautions:

- Rotate the ignition key to off and remove.
- Pull the wire off the spark plug.
- Make sure the wire does not accidentally touch the spark plug.

CAUTION: The Power Shift Snowthrower has the feature of being able to be stood on the front housing for service and storage. Always drain the fuel from the tank prior to such service taking the following precautions:

- Drain it outdoors and make sure the engine is cool.
- Wipe up any gasoline that may have spilled.
- Do not drain the gasoline near any open flame or spark.
- Do not smoke when handling gasoline.

CONTROL BOX OPERATION

Control Box Operation - Gear Selector Control

See Figure 11.

Figure 11

The gear selector control on the Power Shift Snowthrower is used to vary the gear ratios.

Gear ratio selection is achieved by moving the shift lever left or right. The shift lever is connected through a yoke, to the shift bracket located under the control panel. As the shift lever is moved left and right, the shift bracket rotates in a near vertical motion. The shift rod transfers this motion down to a bellcrank that moves the linkage on top of the transmission.

Operation - Latch Release Mechanism

A latch mechanism holds the pivot arms in either a forward or rear position. See Figure 12.

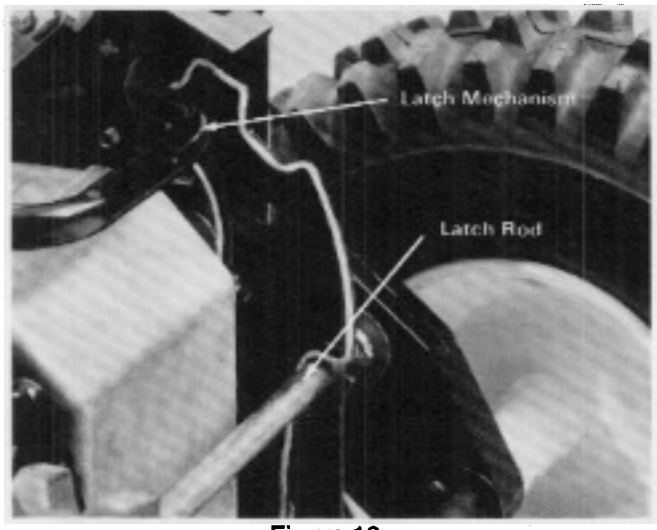

Figure 12

In order to Power Shift, i.e. pivot the wheels forward or backward, the latch plate must be released. Release of the latch plate is controlled by the latch release mechanism in the Power Shift box. See Figure 13.

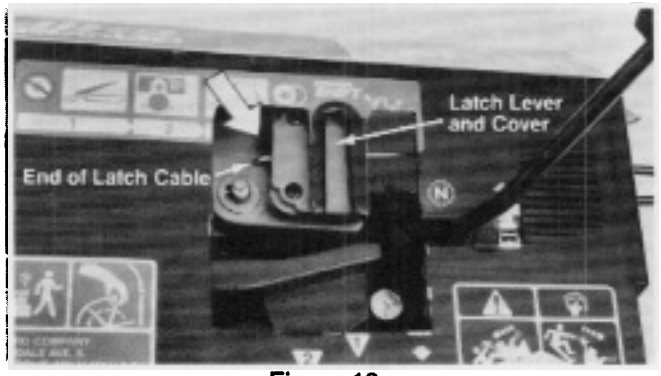

Figure 13

The latch release mechanism is very simple. When the operator Power Shifts, the shift lever is moved forward into the Power Shift slot. This in turn rotates the latch lever and pulls on the latch cable. See Figure 14.

Control Box Operation - Reverse Control

There are two conditions under which the wheels will move in the reverse direction. The first is when the operator wishes to back up and puts the gearshift lever

Control Box Operation - Reverse Control (cont'd)

in reverse. The other is when the wheels are Power Shifted from the forward to the rear position.

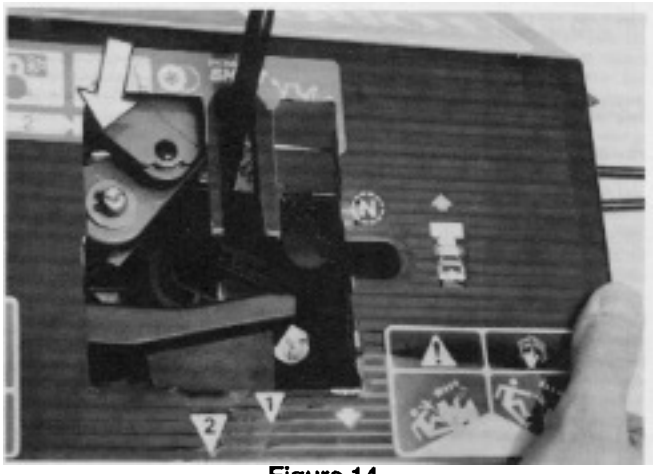

Figure 14

Before trying to understand the Power Shift control box, first take a moment to understand what is happening on top of the gearbox. The transmission is spring loaded into the forward gears. In order to reverse the transmission, the reverse cable must be pulled about 2.0 cm (3/4") to move the sliding jaw from the foward bevel gear to the reverse bevel gear. See Figure 15.

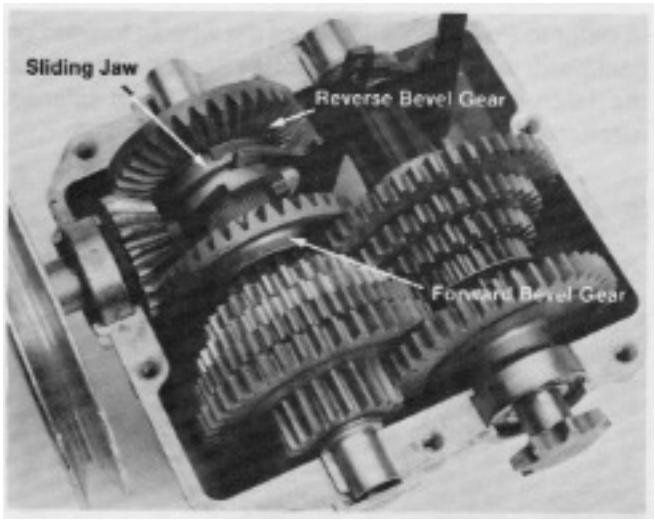

Figure 15

The upper end of the reverse cable is connected to the reverse bellcrank. The reverse bellcrank will rotate and tension the cable when the operator shifts into reverse or when he or she Power Shifts the wheels to the rear position. See Figure 16.

When the gearshift lever is pulled into one of the reverse slots, the reverse lever (visible through the reverse slots in the control panel) is pushed toward the back of the snowthrower. The reverse lever is connected to the reverse bellcrank so that as it pivots, it rotates the reverse bellcrank and tensions the cable. See Figure 17.

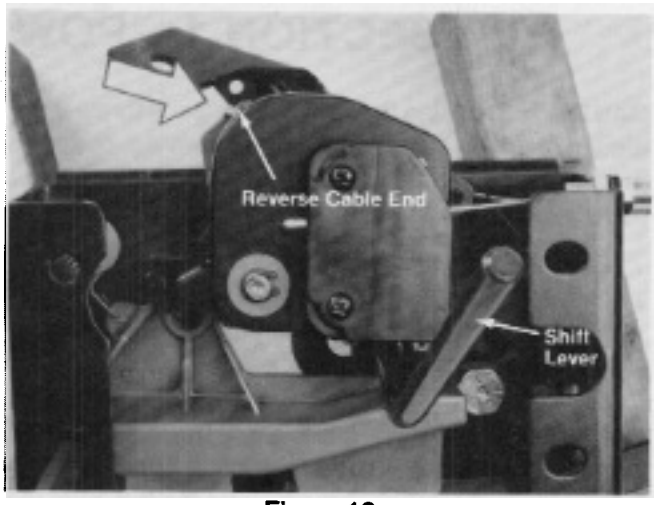

Figure 16

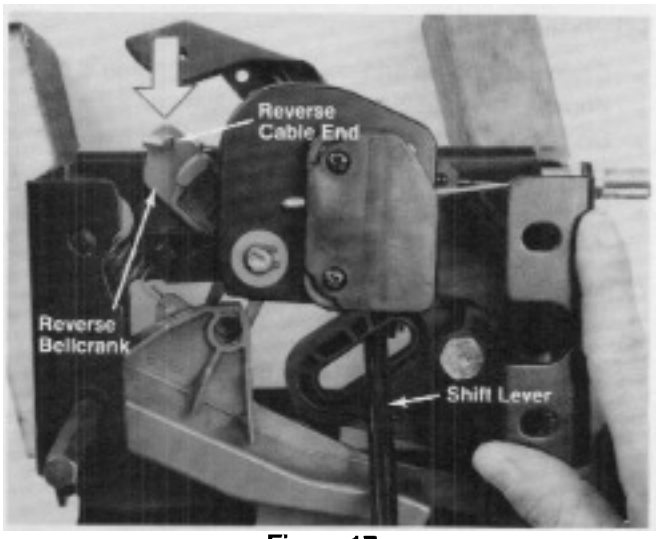

Figure 17

When the shift lever is pushed into the Power Shift slot, a tab on the index wheel contacts a tab on the reverse bellcrank every other time the Power Shift is cycled. See Figure 18.

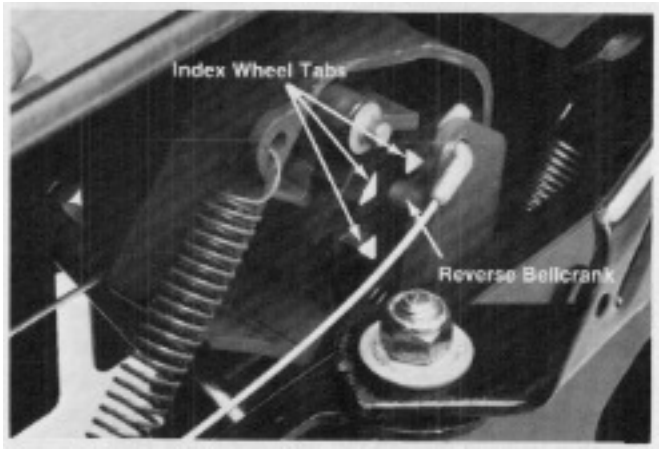

Figure 18

The contact between the two tabs forces the reverse bellcrank to rotate.

Control Box Operation - Reverse Control (cont'd)

The index wheel is necessary because the wheels must alternate between forward and backward movement when Power Shifting.

Control Box Operation - Shift Lockout

Transmission damage could result if the operator were to shift the transmission into reverse while the unit were moving forward and vice versa. To prevent this, a shift lockout is used. This lockout physically prevents the operator from switching directions without first stopping the unit.

The lockout base pivots on a shoulder bolt and rotates whenever the shift lever is moved to either the Power Shift or reverse slots. See Figure 19. Note however, that the lockout base does not rotate when the gearshift lever is moved from side to side.

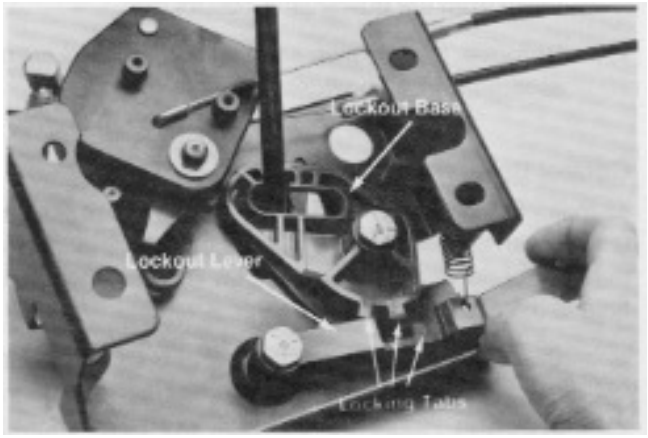

Figure 19

When the traction lever on the left handle is not engaged, the lockout base is free to move in either direction. However, once the traction lever is engaged, the two tabs on the lockout lever engage the lockout base. This prevents the shift lever from being moved forward or backward.

An added benefit of the shift lockout is that it allows the operator to lock the gearshift lever in either the Power Shift or reverse slots by depressing the traction lever. This allows the operator one hand operation of Power Shift or reverse leaving the other hand free to rotate the chute.

Control Box Operation - Indexing Mechanism

An indexing mechanism is used to control the direction of wheel movement while Power Shifting. This is necessary because the wheels need to alternate between forward and reverse when the Power Shift is cycled.

When Power Shifting the wheels forward, the indexing mechanism does nothing but index. The tabs on the bottom of the index wheel miss the tab on the reverse bellcrank and the wheels power forward when the traction lever is engaged. See Figure 20.

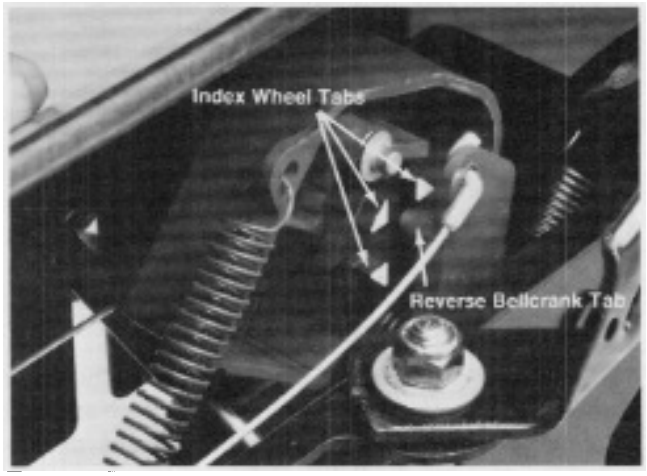

Figure 20

When the wheels are to be moved to the rear position, a tab on the bottom of the index wheel contacts a corresponding tab on the reverse bellcrank and the wheels power backward when the traction lever is engaged. See Figure 21.

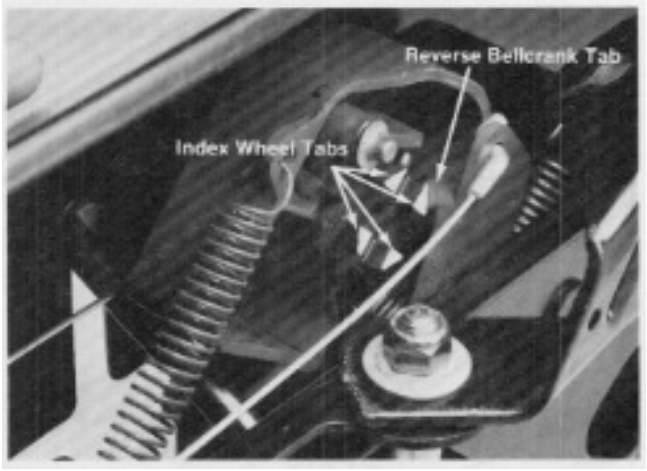

Figure 21

The index tang and a flat spring control the rotation of the index wheel. When the shift lever is pushed into the Power Shift slot, the index tang rotates the index wheel 1/8 revolution and then prevents the wheel from rotating backwards when the tabs on the index wheel and reverse bellcrank make contact. See Figure 22.

As the shift lever returns to its "at rest" position, the index wheel has a natural tendency to turn backwards due to the pressure from the index tang. The flat spring prevents backward rotation by engaging the index wheel at one of the teeth.

Control Box Operation - Indexing Mech. (cont'd)

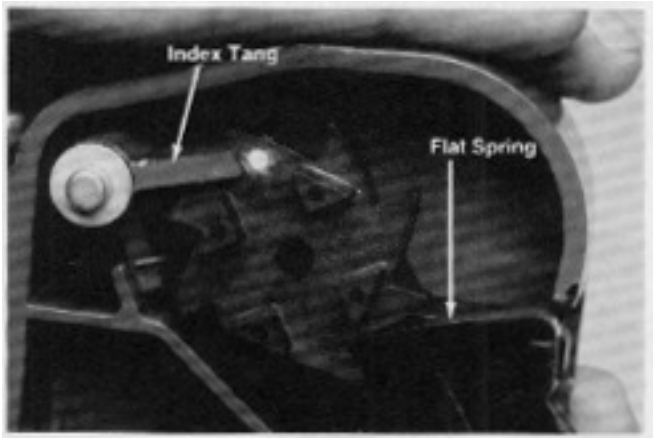

Figure 22

The index wheel is mounted on a piece called the index wheel lever. This piece fits inside the lever latch and can rotate slightly. It provides the small amount of rotation necessary to index the index wheel.

CONTROL BOX SERVICE

Control Box Service - Removal

1. Tip the snowthrower up onto the auger housing.
2. Pull the shift selector knob off of the shift selector lever.
3. Disconnect the shift rod from the power shift control box. See Figure 23.

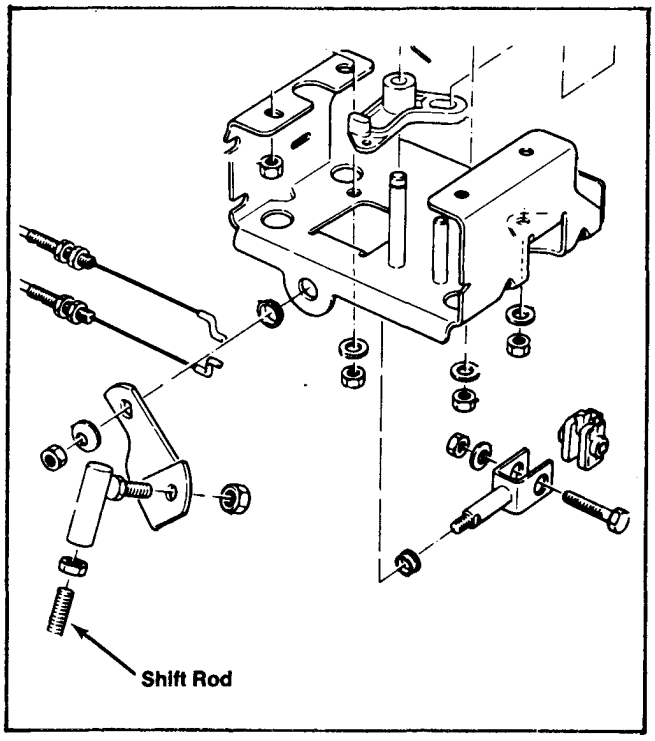

Figure 23

4. Using a 1/2" deep well socket, remove the four nylon locknuts securing the power shift control box to the control panel. See Figure 24.

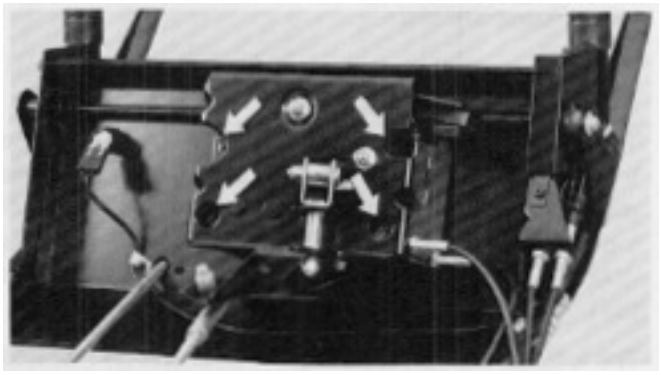

Figure 24

5. Remove the latch cover from the latch lever.
6. Disconnect the latch control cable and the reverse cable from the power shift control box.
7. Remove the power shift control box as an assembly, from the control panel.

Control Box Service - Testing

All major functions of the power shift control box can be tested, with the Power Shift control box removed from the control panel. To do so, insert a 7/16" bolt into the hole at the end of the reverse lever. .

1. Check for proper operation of the shift lockout mechanism. With the lock out lever in the position shown in Figure 25, the lock out base should prevent the shift lever from forward and backward movement.

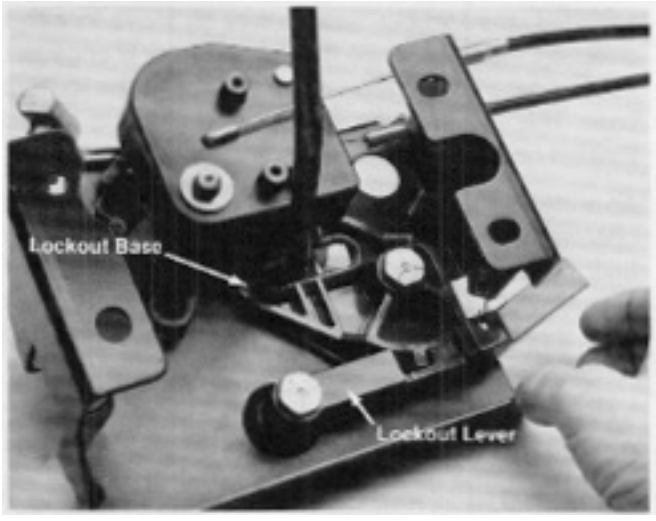

Figure 25

2. When the lockout lever is pulled back to the position shown in Figure 26, the shift lever should be free to move forward and backward.

Control Box Service - Testing (cont'd)

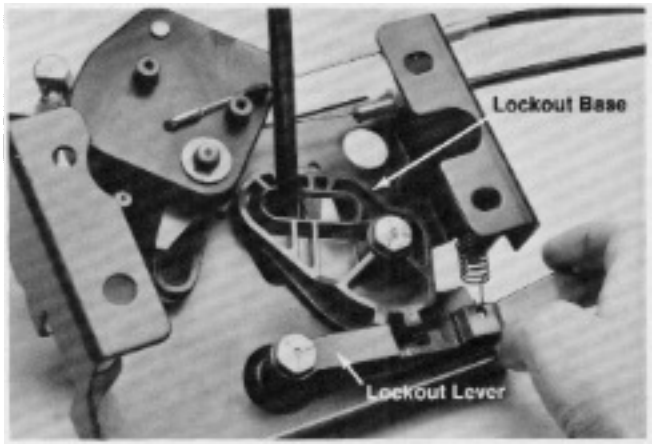

Figure 26

3. The reverse lever is spring loaded forward by the reverse lever return spring.

   Check for proper operation of the reverse lever by pulling backward. Reverse bellcrank movement as shown in Figure 27 should be noticed.

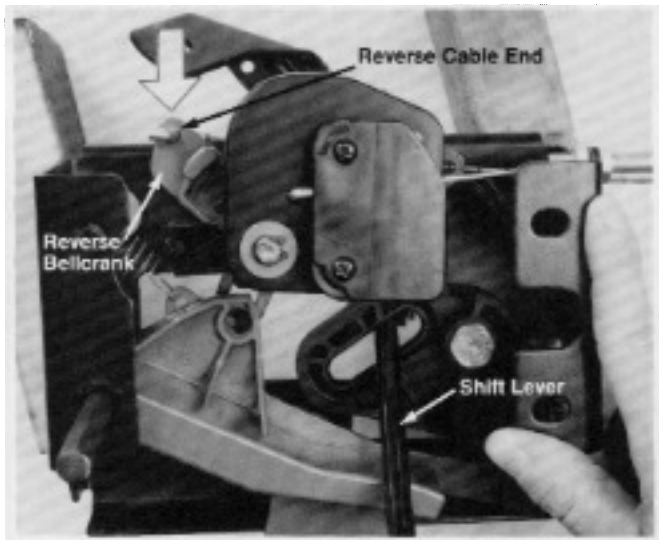

Figure 27

4. The latch lever is spring loaded clockwise by the latch lever return spring.

   Check for proper operation of the latch lever and the indexing mechanism by repeatedly rotating the latch lever about 60 degrees counter clockwise and then releasing gently (if allowed to spring back quickly, the "stop" on the bottom of the latch lever may break.) Every other time the latch lever is cycled, the reverse lever should move toward the back of the Power Shift control box as it did in Figure 27.

5. If a problem is noticed in step 4 of testing, the indexing mechanism may not be functioning properly. To check the indexing mechanism, observe the indexing wheel underneath the latch lever. See Figure 28.

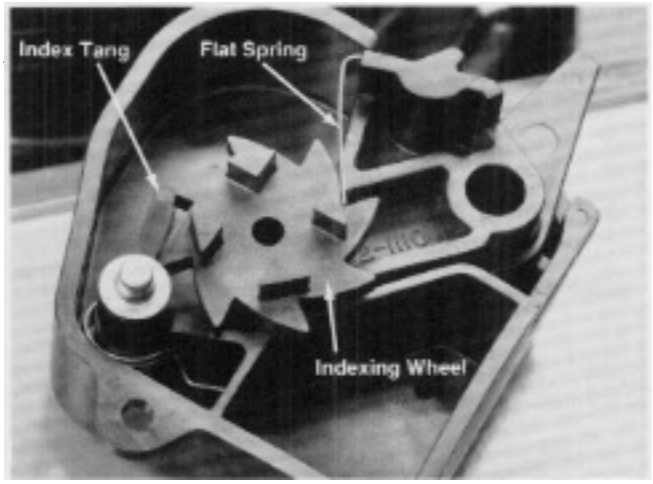

Figure 28

Check to insure that the indexing wheel is free to rotate clockwise when viewed from the bottom of the power shift control box. Also check to insure that both the flat spring and the index tang are spring loaded toward the index wheel.

Now observe the index wheel as you again cycle the latch lever. The tabs on the bottom of the index wheel and on the reverse bellcrank should alternate between meeting and missing on each subsequent cycle. See Figure 29.

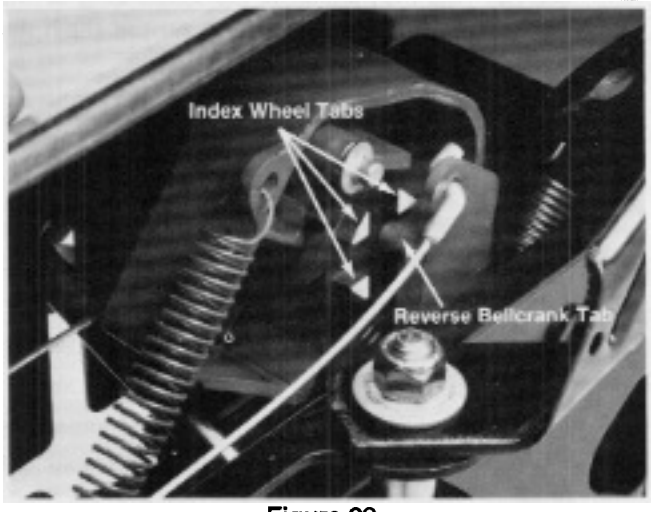

Figure 29

Control Box Service - Disassembly

See Figure 30.

1. With the Power Shift control box removed from the control panel, begin disassembly by disconnecting the reverse lever return spring from the Power Shift control box and removing the reverse lever.

Control Box Service - Disassembly (cont'd)

2. Disconnect the latch lever return spring from the latch lever mechanism. Remove the snap ring from the latch lever stud and pull off the latch lever.

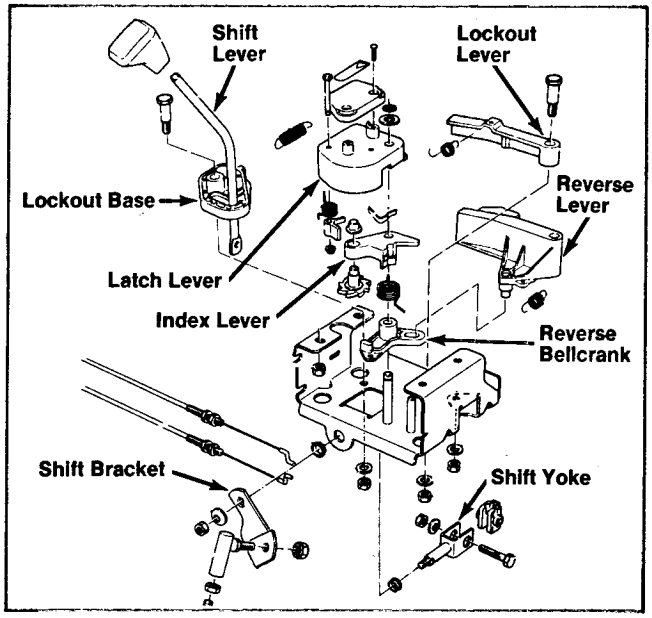

Figure 30

3. If necessary, pry off the push nut holding the index tang and remove the index tang, index tang spring, and the stud from the latch lever.

   NOTE: This may damage the index tang or the latch lever. Flattening the tabs on the push nut prior to removal may prevent damage.

4. Next, remove the index lever and, if desired, pry the push nut from the end of the index wheel. Remove the flat spring from the index lever.

   NOTE: This may damage the latch lever. Flattening the tabs on the push nut prior to removal may prevent damage.

5. Remove the reverse bellcrank from the stud along with the torsion spring.

6. Remove the bolt securing the lock out base to the Power Shift control frame and remove the lock out base.

7. Remove the special nylon locknut securing the shift lever to the Power Shift control frame and remove the shift bracket.

8. Remove the shoulder bolt securing the shift lever to the shift yoke and remove the shift lever. Next, pull the shift yoke from the power shift control box frame and finally, remove the small nylon bushings from the control box frame.

Control Box Service - Reassembly

1. If necessary, reassemble the index wheel lever assembly as shown in Figure 31.

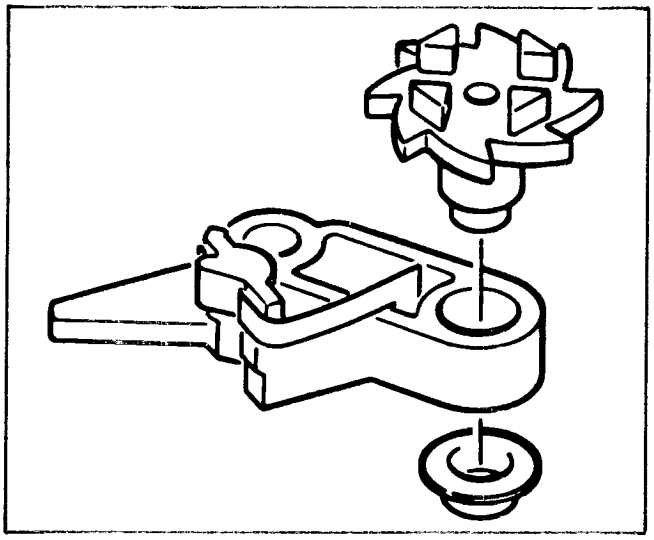

Figure 31

2. Install the index tang into the latch lever with the pin, making sure that the torsion spring is in the position shown in Figure 32.

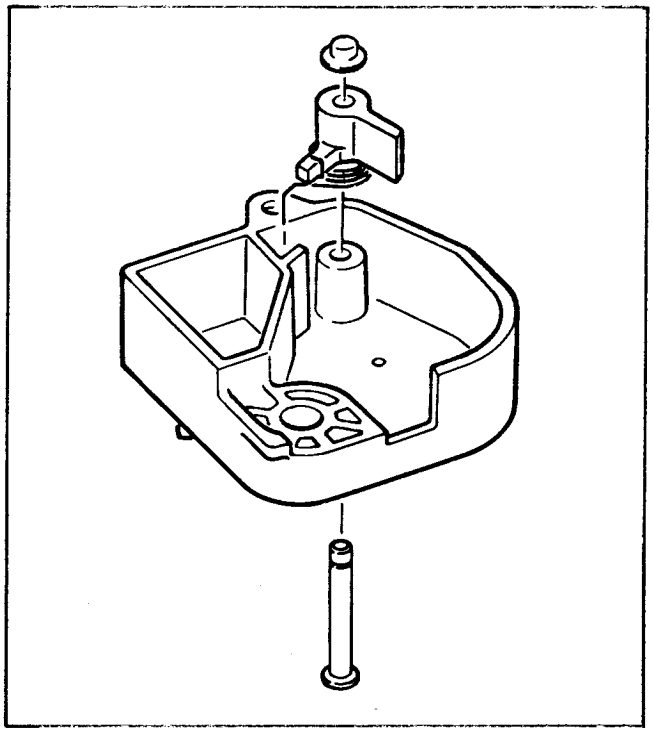

Figure 32

3. Push the two small shift yoke bushings into the control box frame. Note that the wider flange should be toward the outside in both cases. Assemble the shift yoke and shift bracket with the Belleville washer and nylon locknut. Make sure

that the flats on the yoke align with the shift bracket. See Figure 33.

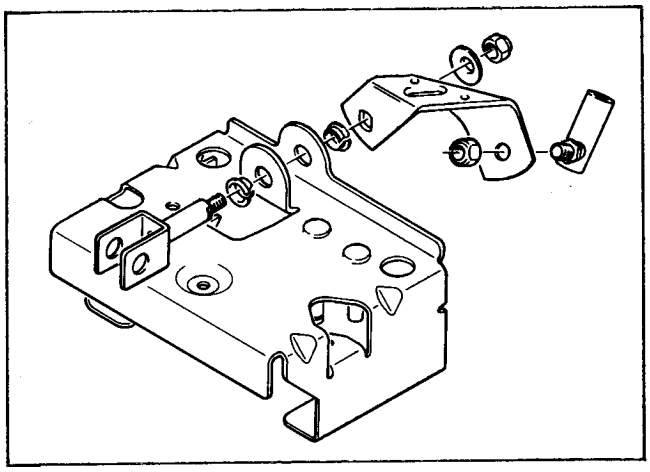

Figure 33

4. On 1989 and newer units, insert the yoke bushing into the yoke. Insert the shift lever into the shift lever yoke, making sure that the shift lever bends forward. Secure with the flat washer and nylon locknut. Make sure the shift lever fits into the recesses in the yoke bushings and that the connectors between the yoke bushings face the rear of the machine. (If installed with the connectors forward, binding will result when the shift lever is moved forward and backward.) See Figure 34.

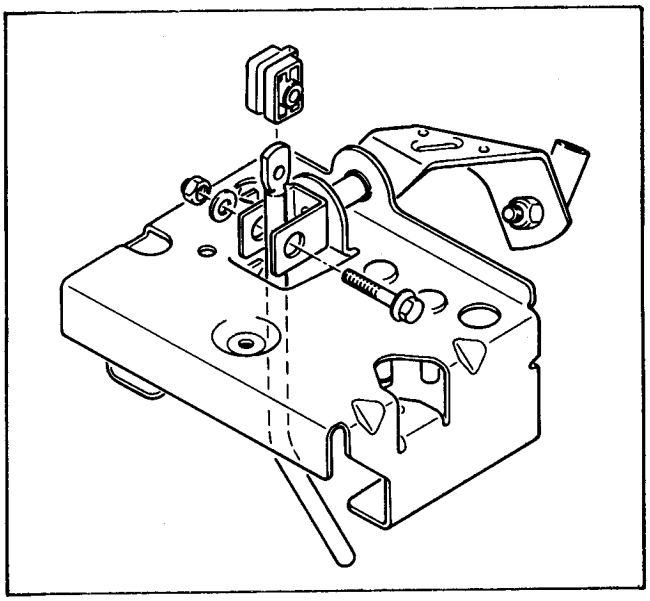

Figure 34

5. Slip the lock out base over the shift lever and secure with the shoulder bolt, flat washer and the nylon locknut. Make sure that the lockout base moves freely after installation. See Figure 35.

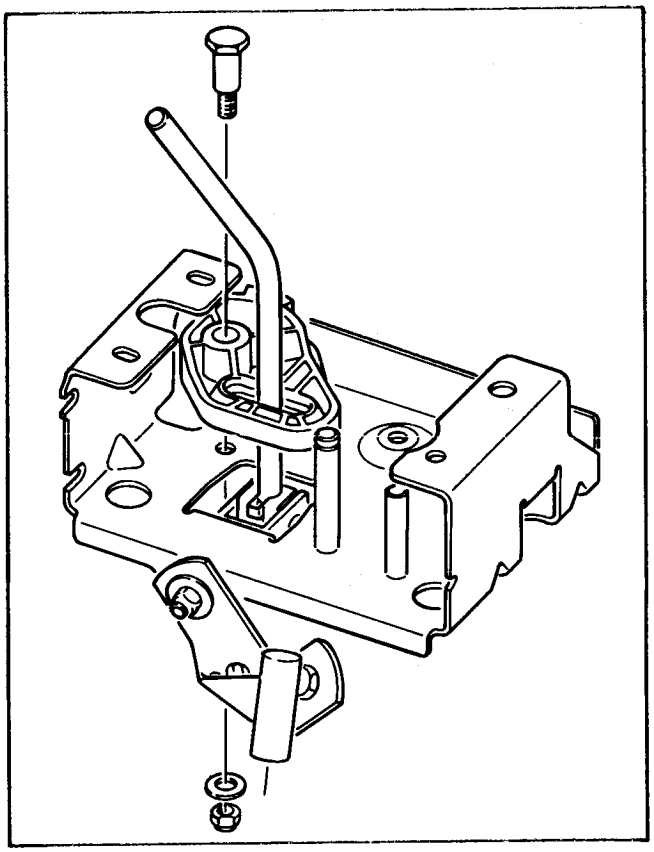

Figure 35

6. Mount the shift lockout lever to the power shift control box using the shoulder bolt, flat washer and nylon locknut. See Figure 36.

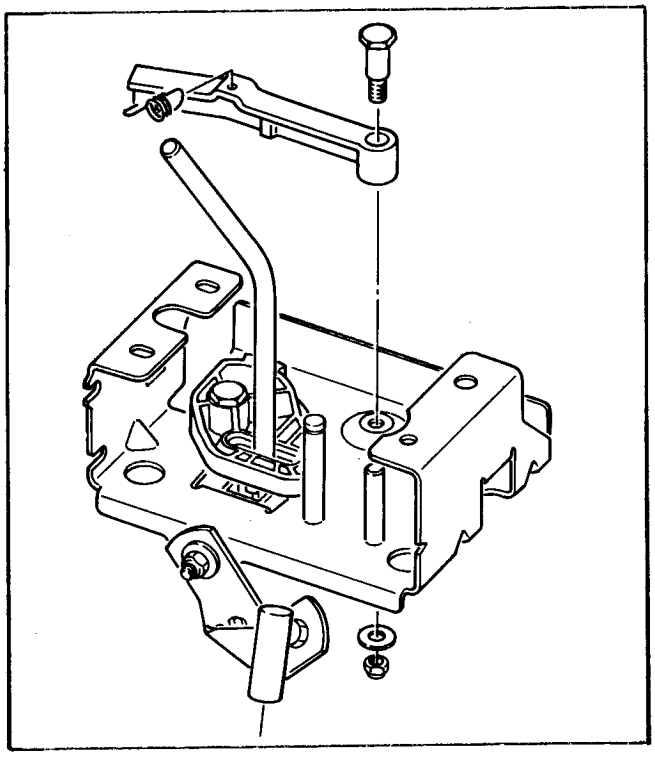

Figure 36

Control Box Service - Reassembly (cont'd)

NOTE: Coat the shoulder bolt with an anti-seize compound (Toro part number 505-109) to prevent corrosion and subsequent binding.

7. Slip the reverse bellcrank and torsion spring onto the stud as shown in Figure 37. Slide the index wheel lever assembly onto the stud. Make sure that the ends of the torsion spring are in the positions shown in Figure 38.

   NOTE: Coat the reverse bellcrank with an anti-seize compound (Toro part number 505-109) to prevent corrosion and subsequent binding.

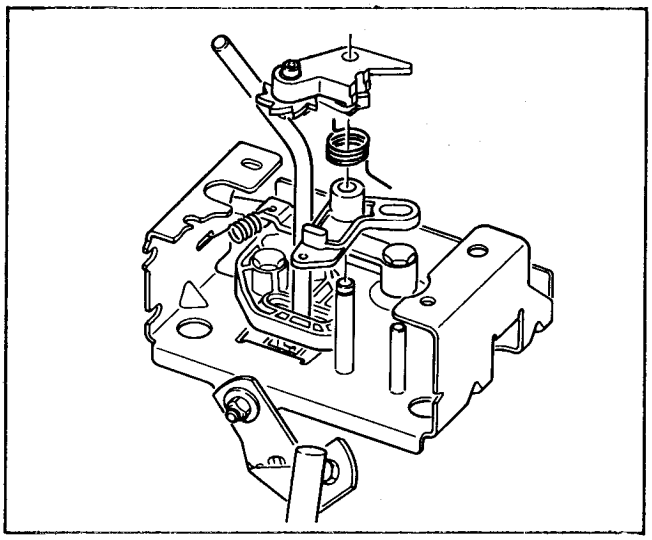

Figure 37

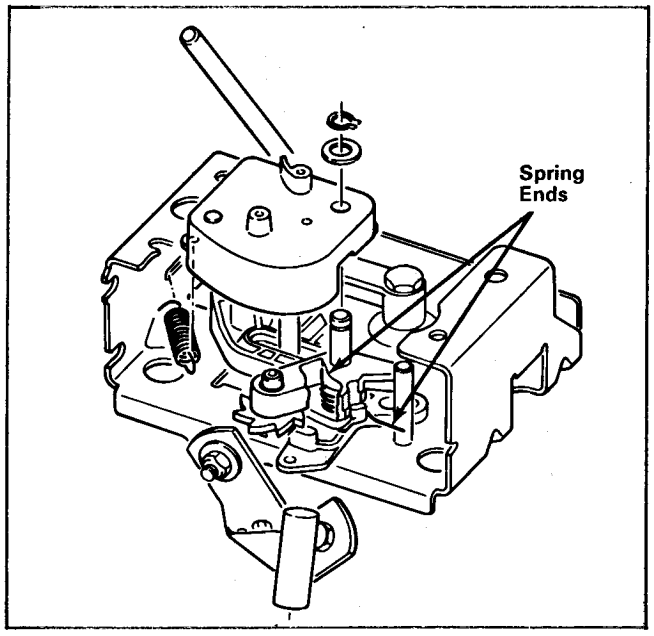

Figure 38

8. Install the latch lever and spring into the position shown in Figure 38. Once installed, rotate the latch lever back and forth to insure that the index wheel is rotating properly. Secure with the flat washer and snap ring. See Figure 38.

   NOTE: Coat the latch lever with an anti-seize compound (Toro part number 505-109) to prevent corrosion and subsequent binding.

9. Next, install the reverse lever and reverse lever return spring as shown in Figure 39. Make sure that the boss at the bottom of the reverse lever engages the reverse bellcrank.

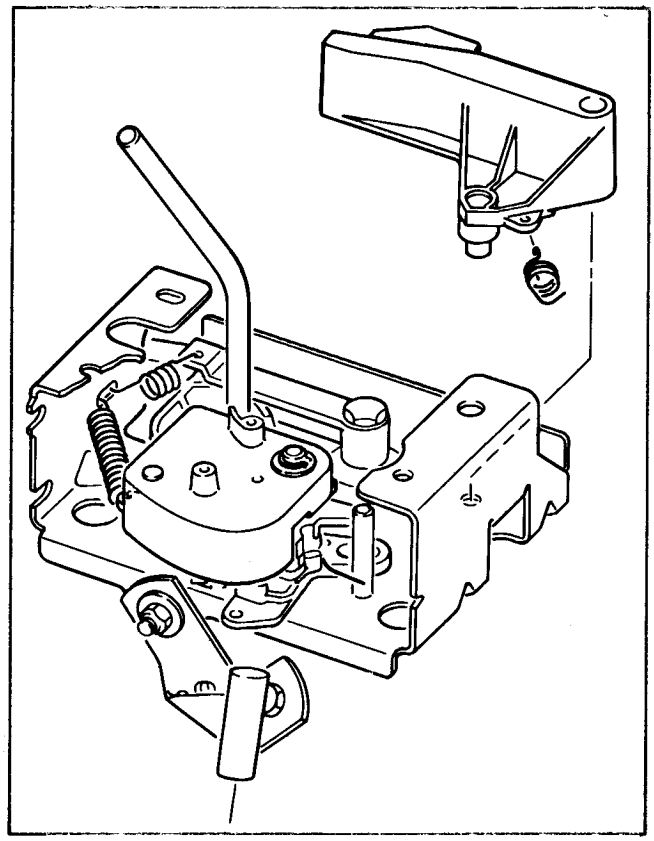

Figure 39

10. Make sure that all three control box springs are in the position shown in Figure 40.

Control Box Service - Installation

1. Install the end of the reverse cable into the reverse bellcrank from the bottom of the reverse bellcrank. Secure with the two jam nuts at the end of the cable sheath. Adjust as described in **Control Box Service - Adjustments**, page 49.

2. Insert the end of the latch release cable into the small hole in the top of the latch lever. Adjust as described in **Control Box Service - Adjustments,** page 49.

3. Install the latch lever cover with 2 Phillips screws. Do not overtighten. Adjust the latch cable as described in Control Box - Adjustments, page 49.

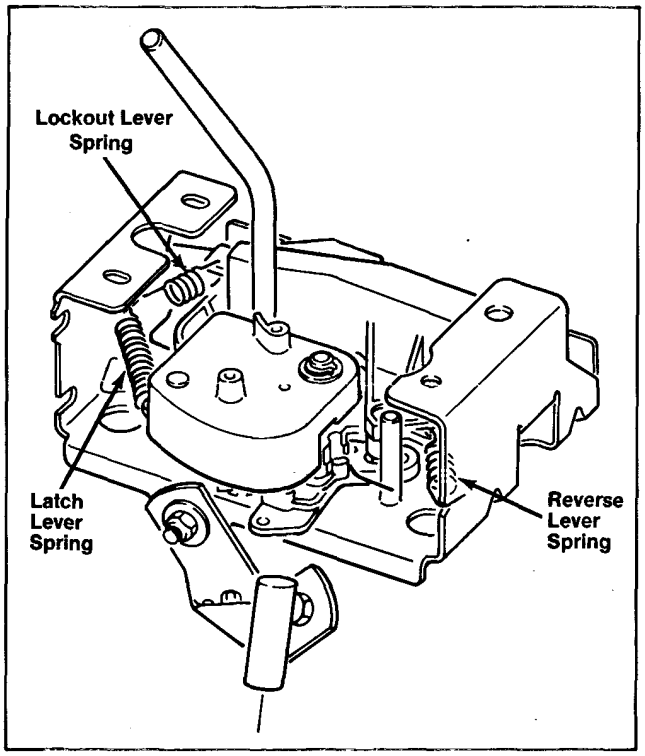

Figure 40

4. Install the Power Shift control box on the control panel, making sure that the reverse lever is properly mounted on the upper left stud. Secure with 4 nylon locknuts. Before proceeding, be sure all levers are working smoothly.

5. Attach the lower shift rod to the shift bracket with the nylon locknut as shown in Figure 41. Make certain that the ball joint is in the position shown or the shift mechanism will not work properly.

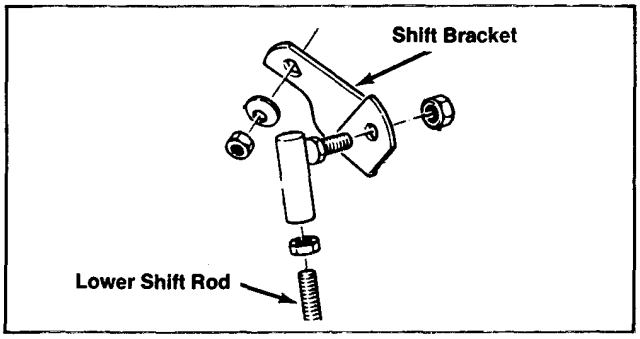

Figure 41

6. Push the rubber shift knob onto the shift lever until it is fully seated. Note that it is a press fit only. Once installed the knob should point forward.

1. **Latch Cable Adjustment:** Adjust the latch control cable by removing slack between the end of the sheath and the end of the cable. Do not tighten beyond the point of removing slack. See Figure 42.

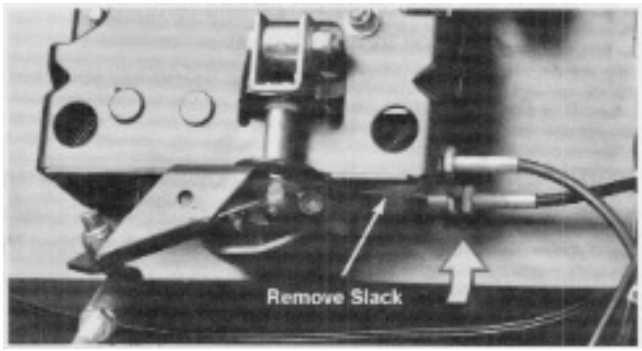

Figure 42

2. **Reverse Cable Adjustment:** Adjust the reverse cable so that there is 1.5 mm (1/16") side play in the reverse bellcrank as shown in Figure 43. If the cable is too loose, loss of reverse will result. If the cable is too tight, loss of the forward gears will occur.

Figure 43

3. **Shift Lever Adjustment:** The shift lever is properly adjusted when the transmission is in second gear and the lever slides right down the center of the power shift slot. If adjustment is necessary, remove the lower shift rod from the bellcrank near the transmission and manually place the bellcrank in second (ie. second notch from the top). Loosen the jam nut at the ball joint and move the ball joint up or down until the shift lever rides in the center of the power shift slide. Secure by attaching the ball joint to the bellcrank with a nylon locknut and tightening the jam nut.

SECTION 2 TRACTION AND IMPELLER CONTROLS

CAUTION: Servicing the Power Shift Snowthrower will require working with some of the moving parts. To prevent accidental starting of the engine while performing service, take the following precautions:

- Rotate the ignition key to off and remove.
- Pull the wire off the spark plug.
- Make sure the wire does not accidentally touch the spark plug.

CAUTION: The Power Shift Snowthrower has the feature of being able to be stood on the front housing for service and storage. Always drain the fuel from the tank prior to such service taking the following precautions:

- Drain it outdoors and make sure the engine is cool.
- Wipe up any gasoline that may have spilled.
- Do not drain the gasoline near any open flame or spark.
- Do not smoke when handling gasoline.

OPERATION

Operation - Traction Control

Traction is controlled by means of the lever on top of the left handle. See Figure 44. The lever is spring loaded in the disengaged position. The transmission can be engaged by pushing down on the lever.

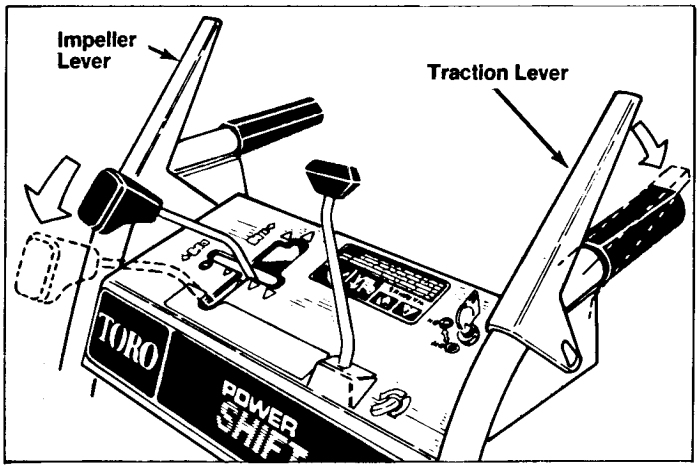

Figure 44

The traction lever is rigidly fastened to the cross rod that passes underneath the control panel. See Figure 45. Also attached to the cross rod is a trip lever (that actuates the shift lockout mechanism) and a cam release (that controls the impeller locking mechanism). Both are keyed to the traction lever rod.

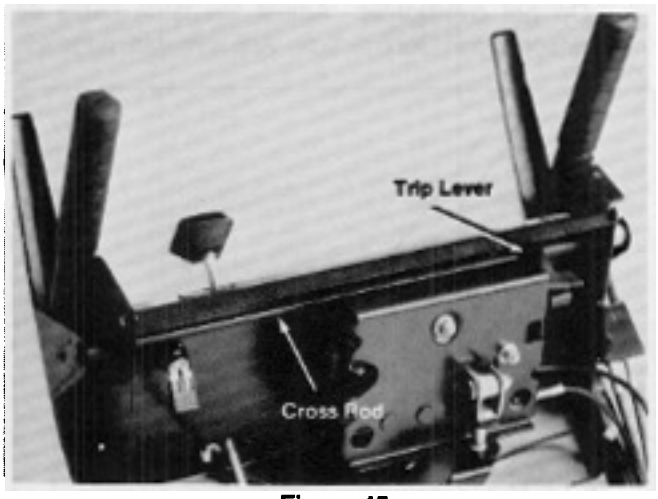

Figure 45

Control inputs are transferred down to the idler assembly through the cable attached to the release cam. The top end of the traction cable is protected by a rubber boot to help prevent corrosion and icing.

Operation - Impeller Control

The impeller control is the lever located on top of the right handle. See Figure 44 above. It is spring loaded in the disengaged position. The auger is engaged by depressing the lever.

Control input is transferred to the idler assembly at the auger pulley by means of a cable. There is a boot at the top end of the auger cable to help prevent corrosion and icing.

Operation - Impeller Locking Mechanism

As a convenience feature, there is an impeller locking mechanism that holds the impeller control in the engaged position if the traction lever is also engaged. This feature lets the operator throw snow and propel the unit with one hand, leaving the other free to position the chute.

The impeller locking mechanism is comprised of only four pieces. They are:

- locking tang
- release cam
- locking latch
- torsion spring

The mechanism is disabled whenever the traction lever is in the disengaged position. See Figure 46.