

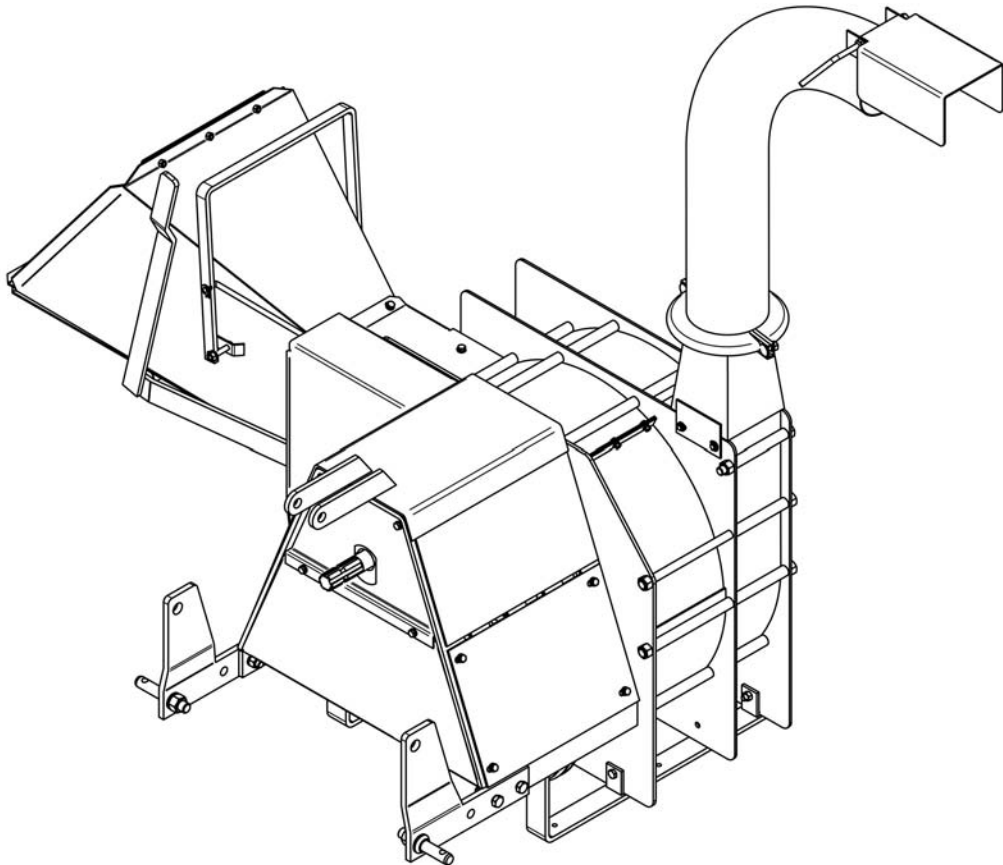
# **BEFCO**<sup>®</sup>

## **Operator's Manual**

### **BUSHMASTER**

**Chipper**

**BM6-800**



The operator's manual is a technical service guide and must always accompany the machine.

**Manual 971-168B**

**August 2010**

# SAFETY

Take note! This safety alert symbol found throughout this manual is used to call your attention to instructions involving your personal safety and the safety of others. Failure to follow these instructions can result in injury or death.



*This symbol means:  
ATTENTION!  
BECOME ALERT!  
YOUR SAFETY IS INVOLVED!*

## Signal Words

Note the use of the signal words DANGER, WARNING and CAUTION with the safety messages. The appropriate signal words for each have been selected using the following guidelines:



**DANGER:** Indicates an imminently hazardous situation that, if not avoided, will result in death or serious injury.



**WARNING:** Indicates a potentially hazardous situation that, if not avoided, could result in death or serious injury, and includes hazards that are exposed when guards are removed. It may also be used to alert against unsafe practices.



**CAUTION:** Indicates a potentially hazardous situation that, if not avoided, may result in minor or moderate injury.

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# 1 - GENERAL INFORMATION

Thank you and congratulations on having chosen our implement. Your new chipper is a technologically advanced machine constructed of high quality, sturdy components that will fulfill your working expectations. Read this manual carefully. It will instruct you on how to operate and service your chipper safely and correctly. Failure to do so could result in personal injury and/or in equipment damage.

## 1.01 - General

The implement described in this manual is to be used with tractors with PTO at 540 rpm and clockwise rotation.



**CAUTION:** Always ensure that the coupling of the implement with the tractor is done at the same PTO speed and direction of rotation. Do not operate this implement at a PTO speed or direction of rotation other than that shown on the implement. Serious damage can occur to the machine and/or the operator.



**CAUTION:** Right hand and left hand sides of the implement are determined by facing in the direction the implement will travel when going forward (see fig. 3).

Carefully read the Warranty section<sup>1</sup>, detailing coverage and limitations of this warranty. **Warranty** is provided for customers who operate and maintain their equipment as described in this manual. Warranty registration is accomplished by the dealer by completing and forwarding the **Warranty Registration** form to the Company, along with a copy of the dealer's invoice. It is in your best interest to insure that this has been done.

Warranty does not cover the following:

1. Cleaning, transporting, mailing and service call charges.
2. Normal wear items such as belts, knives, bearings, drivelines, shear pins, slip clutches, etc.
3. Depreciation or damage caused by normal wear, accidents, improper maintenance, improper protection or improper use.
4. The use of non-original spare parts and accessories.

Your Authorized Company Dealer has genuine parts in stock. Only these approved replacement parts should be used.

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<sup>1</sup> See Chapter 8 - Warranty.

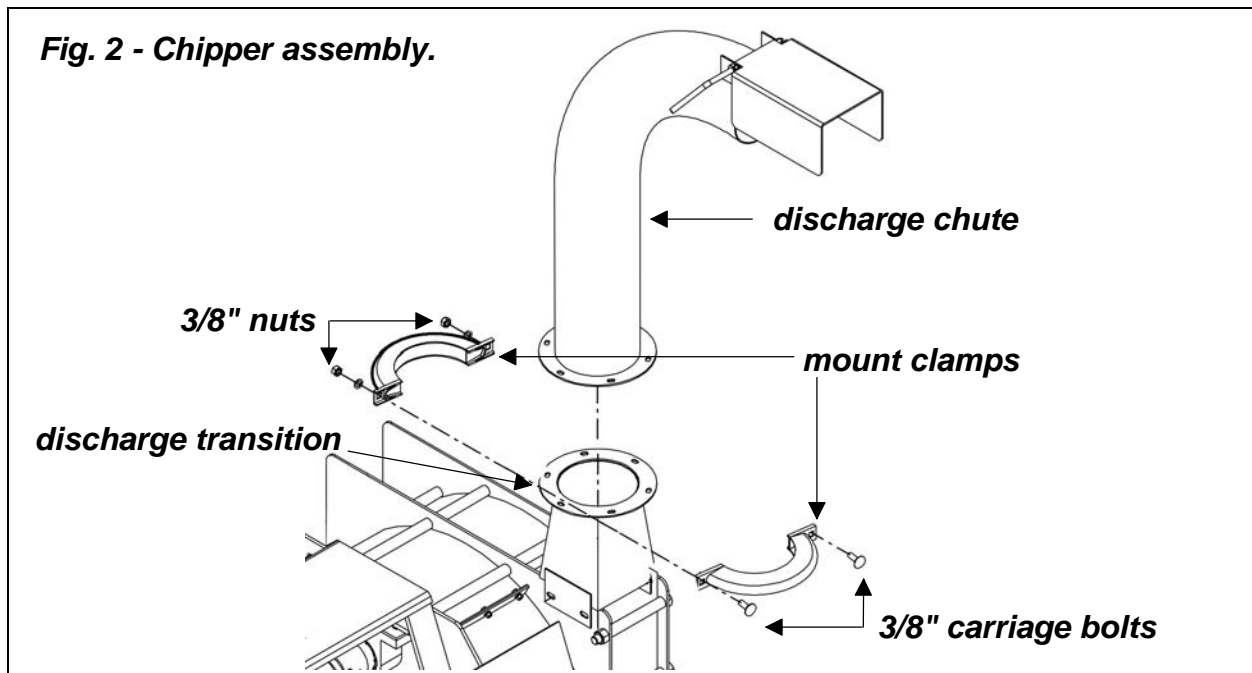
This limited warranty covers defective material and workmanship. The cost of normal maintenance or repairs for accidents or improper use and related labor will be borne by the owner.

### 1.02 - Model and Serial Number ID

Attached to the frame is an ID plate showing the model and the serial number. Record your implement model and serial number in the space provided below. Your dealer needs this information to give you prompt, efficient service when you order parts.

<b>BEFCO</b>	1781 S. Wesleyan Blvd. – P.O. Box 6036 Rocky Mount, N.C. 27802 – U.S.A. Tel: 1.252.977.9920 Fax: 1.252.977.9718
<b>MODEL:</b>	
<b>SERIAL:</b>	
<b>VERSION:</b>	

### 1.03 - Assembly Instructions





**CAUTION: Stand clear of bands when cutting as they could be under sufficient tension to cause them to fly loose. Take care in removing bands and wire. They often have extremely sharp edges and cut very easily.**

To assemble the chipper proceed as follows:

1. Position discharge chute on top of the discharge transition on chipper (**see fig. 2**).
2. Use the provided mount clamps, 3/8" carriage bolts, lock washers and nuts to tighten the discharge chute and discharge transition together.
3. Turn the discharge chute so that opening on top is pointed towards the desired direction of discharge.
4. Tighten 3/8" nuts on mount clamps.

## 2 - SAFETY PRECAUTIONS

Safety is the primary concern in the design and manufacture of our products. Unfortunately our efforts to provide safe equipment can be wiped out by a single careless act of an operator.

In addition to the design and configuration of equipment, hazard control and accident prevention are dependent upon the awareness, concern, prudence and proper training of personnel involved in the operation, transport, maintenance and storage of equipment. It is the operator's responsibility to read and understand all safety and operating instructions in the manual and to follow these.

Allow only properly trained personnel to operate the chipper. Working with unfamiliar equipment can lead to careless injuries. Read this manual, and the manual for your tractor, before assembly or operation, to acquaint yourself with the machines. It is the chipper owner's responsibility, if this machine is used by any person other than yourself, is loaned or rented, to make certain that the operator, prior to operating, reads and understands the operator's manuals and is instructed in safe and proper use.

### 2.01 - Preparation



1. Before operating equipment read and understand the operator's manual and the safety signs (**see fig. 3**).
2. Thoroughly inspect the implement before initial operation to assure that all packaging materials, i.e. wires, bands, and tape have been removed.
3. Personal protection equipment including hard hat, safety goggles, safety shoes, heavy gloves and a respirator or filter mask are recommended during assembly, installation, operation, adjustment, maintaining and/or repairing the implement.
4. Wear hearing protection on a full-time basis if noise in the operator's position exceeds 80 dB. Excessive exposure to noise over 85 dB can cause severe hearing loss.
5. Do not wear loose clothing or jewelry that may become entangled in moving parts.
6. Ensure that all safety shielding and safety signs are properly installed and in good condition.
7. In order to provide a better view, certain illustrations in this manual may show an assembly with safety shields removed. Equipment must however **never** be used in this condition. If a shield is removed for maintenance, replace shield prior to use.
8. Ensure chipper is properly mounted, adjusted and in good operating condition.
9. Operate only with a tractor equipped with an approved Roll-Over-Protective-System (ROPS). Always wear your seat belt while driving the tractor. Serious injury or even death could result from falling off the tractor.
10. Keep working area free of debris to prevent slipping or tripping.
11. Operate only on a level surface.
12. Operate only in daylight or good artificial light.

## 2.02 - Starting and Stopping



1. Be sure all bystanders are at least 100 feet away prior to engaging or while the machine is working to prevent injury from thrown objects.
2. Be sure the tractor transmission is in "Neutral" before starting engine.
3. Chipper operating power is supplied from tractor PTO. Refer to your tractor manual for PTO engagement and disengagement instructions. Always operate PTO at 540 rpm. Know how to stop the tractor and chipper quickly in case of an emergency.
4. When engaging PTO, the engine rpm should always be low. Once engaged and ready to start working, raise PTO speed to 540 rpm and maintain throughout operation. Start feeding wood only after the PTO speed of 540 rpm is reached.
5. Check the tractor master shield over the PTO stub shaft. Make sure it is in good condition and fastened securely to the tractor. Purchase a new shield if old shield is damaged or missing.
6. Stay clear of rotating drivelines. Entanglement in rotating driveline can cause serious injury or death. Wear close fitting clothing. Stop the engine and be sure PTO driveline is stopped before getting near it.
7. Never engage the PTO unless the chipper is resting on the ground. Never raise the chipper until knives have come to a complete stop.
8. Always have at least 2 operators at the job site running the chipper. One to load the hopper and the other to disengage the feed handle (**see fig. 7**) in case of an accident. Every effort should be made to maintain visual contact between the operators.
9. Always verify correct function of the feed roller engage handle before beginning to work.
10. Keep away from discharge area during operation.
11. Do not place hands, feet or any body part into feed hopper during operation.
12. Use care when feeding material into chipper. Do not send metal, rocks, glass or other foreign material into wood chipper. If foreign material enters chipper, stop the machine, turn engine off, remove ignition key and wait for all movement to stop before removing material. Inspect machine for damaged or loose parts before returning to work.
13. Feed material only from side of hopper so that debris doesn't fly back at you. Feed base of limb first. Use a wood object to push short material into feed hopper.
14. Do not block discharge of processed material, this may clog the chipper and result in unit failure.
15. To park the vehicle safely, stop vehicle on a level surface (not on a slope), engage the parking brake, stop the engine, remove the key, and wait for engine to stop before leaving the tractor's seat.



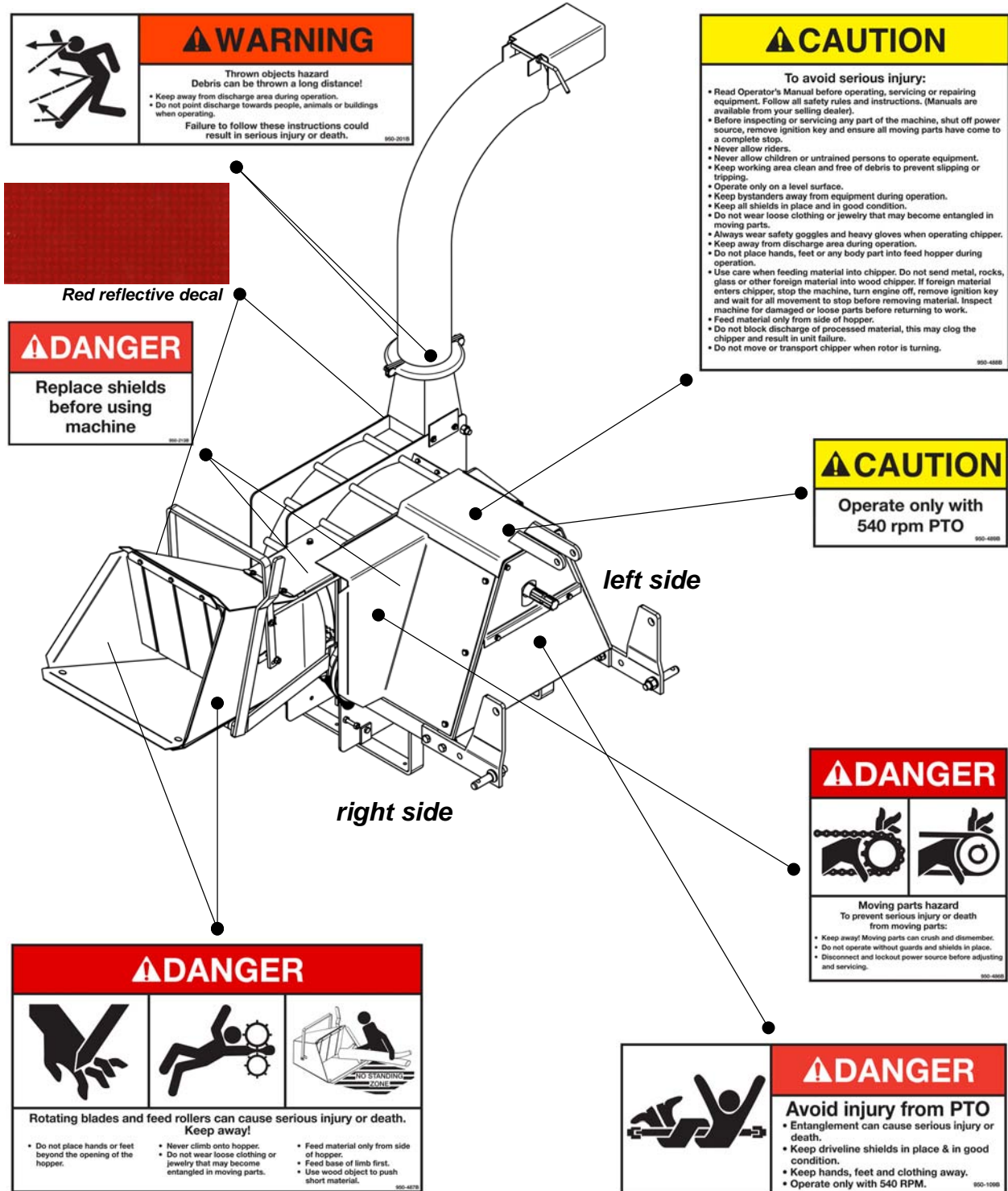
## 2.03 - Messages and Signs



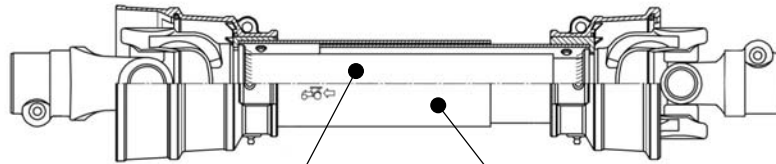
1. Read and adhere to all safety and operating decals on this machine (**see fig. 3**).
2. Before dismounting tractor: Allow moving parts to stop, stop engine, set brake and remove the key of unattended equipment.
3. Keep away from rotating driveline and from discharge area.
4. Keep guards and shields in place and in good condition.
5. Do not use chipper with bystanders in area.
6. Allow no riders on tractor or chipper.
7. Allow moving parts to stop before repair.
8. Securely support equipment before working underneath.

Additional warning and operating decals are available at no extra charge. Please specify model and serial number when ordering.

Fig. 3 - Safety decals - implement; replace immediately if damaged.



**Safety decals - driveline; replace immediately if damaged.**



*placed on outer tube*



*placed on outer shield*

## 3 - OPERATION

You have purchased a category 1 three point hitch mounted PTO driven Bushmaster chipper specifically designed to chip natural wood of up to 6" diameter. The PTO driven chipper saves time and labor by reducing wood to a valuable mulch, making it ideal for nurseries, contractors, large homeowners, municipalities and Christmas tree farms. The Bushmaster features a variable belt driven feed roller that can be adjusted to rotate at either 70 or 45 fpm thus allowing the operator to speed up or slow down the feed roller according to the size of the wood being chipped. The fully welded and electronically balanced 7½" wide chipper drum gives smooth, sure handed feeding for continuous chipping of large diameter material. The fan is built completely separate from the drum providing a powerful airflow inside the fan shroud that discharges the chipped wood out of the chute. A 15" additional discharge chute extension is available as an option.

### 3.01 - Operational Safety



**CAUTION:** Our chippers are designed considering safety as the most important aspect and are the safest available in today's market. Unfortunately, human carelessness can override the safety features built into our machines. Injury prevention and work safety, aside from the features on our chippers, are very much due to the responsible use of the equipment. It must always be operated prudently following with great care, the safety instructions laid out in this manual.



1. The use of this equipment is subject to certain hazards which cannot be prevented by mechanical means or product design. All operators of this equipment must read and understand this entire manual, paying particular attention to safety and operating instructions, prior to using.
2. Do not operate the tractor and chipper when you are tired, sick or when using medication.
3. Never allow children or untrained persons to operate equipment.
4. Always wear personal protection equipment including hard hat, safety glasses, safety shoes and gloves. A respirator or filter mask is recommended during operation.
5. Wear hearing protection on a full-time basis if noise in the operator's position exceeds 80 dB. Excessive exposure to noise over 85 dB can cause severe hearing loss.
6. Keep working area free of debris to prevent slipping or tripping.
7. Ensure the cutting chamber is free of foreign objects or other debris such as accumulated wood. Wood and foreign objects can be thrown from the chipper at high rates of speed.

8. Operate only on a level surface.
9. Never engage the PTO unless the chipper is resting on the ground. Never raise the chipper until knives have come to a complete stop.
10. Always have at least 2 operators at the job site running the chipper. One to load the hopper and the other to disengage the feed handle (**see fig. 7**) in case of an accident. Every effort should be made to maintain visual contact between the operators.
11. Always verify correct function of the feed roller engage handle before beginning to work.
12. Keep away from discharge area during operation.
13. Do not place hands, feet or any body part into feed hopper during operation.
14. Use care when feeding material into the chipper. Do not send metal, rocks, glass or other foreign material into wood chipper. If foreign material enters chipper, stop the machine, turn engine off, remove ignition key and wait for all movement to stop before removing material. Inspect machine for damaged or loose parts before returning to work.
15. Feed the material into the feed hopper standing from the side of the feed hopper. This reduces the risk of being caught and dragged into the machine and of being hit by debris flying back at you. Feed base of limb first. Use a wood object to push short material into feed hopper.
16. Do not over reach. Keep proper balance and footing at all times. Keep hands, feet, hair and clothing away from moving parts.
17. Do not block discharge of processed material, this may clog the chipper and result in unit failure.
18. Never point chipper chute at people, animals or buildings. Chipper can expel objects fast enough to cause severe injury or death.
19. The majority of accidents involve entanglements on the driveline and the feed roller as well as injury of bystanders by objects thrown out the chipper chute. Accidents are most likely to occur with machines that are loaned or rented to someone who has not read the operator's manual and is not familiar with a chipper.
20. Do not allow riders on the chipper or tractor at any time. There is no safe place for riders.
21. Do not operate unless all bystanders, livestock and pets are at least 100 feet away to prevent injury by thrown objects.
22. Install and secure all guards and shields before starting or operating.
23. This chipper is designed for use only on tractors with 540 rpm power take off.
24. Check chipper knives every 8 to 10 hours of use. Keep knives sharp, free of nicks and cracks and securely fastened. Replace knives immediately if they appear to be cracked or distorted. Always replace both knives to keep the drum in balance.
25. Stop chipper immediately upon striking an obstruction. Turn engine off, remove key, inspect and repair any damage before resuming operation.
26. Inspect the entire machine periodically<sup>2</sup>. Look for loose fasteners, worn or broken parts, and leaky or loose fittings.
27. Use only the driveline supplied with the chipper. Do not use it if it is missing any shield or safety protection.

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<sup>2</sup> See Chapter 4 - Maintenance.

28. When using a unit, a minimum 20% of tractor and equipment weight must be on tractor front wheels. Without this weight, tractor could tip over, causing personal injury or death. The weight may be attained with a front end loader, front wheel weights, ballast in tires or front tractor weights. When attaining a minimum 20% of tractor and equipment weight on the front wheels, you must not exceed the ROPS weight certification. Weigh the tractor and equipment. Do not guess or estimate!
29. Use extreme care and maintain minimum ground speed when transporting on hillside, over rough ground and when operating close to ditches or fences. Be careful when turning sharp corners.
30. Pass diagonally through sharp dips and avoid sharp drops to prevent "hanging up" tractor and chipper.
31. Avoid sudden starts and stops while traveling up or downhill.
32. Reduce speed on slopes and sharp turns to minimize tipping or loss of control. Be careful when changing directions on slopes. Do not start or stop suddenly on slopes. Always cut down slopes; never across the face. Slow down on sharp turns and slopes to prevent tipping and/or loss of control.
33. To park the vehicle safely, stop vehicle on a level surface (not on a slope), engage the parking brake, stop the engine, remove the key, and wait for engine to stop before leaving the tractor's seat. Never leave equipment unattended with the tractor running.

### 3.02 - Set Up

**Notice to dealer:** Pre-delivery setup and service including lubrication is the responsibility of the authorized dealer. It is up to him to assure that the machine is in perfect condition and ready to be used. It is his responsibility to ensure that the customer is aware of all safety aspects and operational procedures for the chipper. He must also fill out the Pre-Delivery Checklist<sup>3</sup> prior to delivering the chipper.



**CAUTION:** Stand clear of bands when cutting as they could be under sufficient tension to cause them to fly loose. Take care in removing bands and wire, they often have extremely sharp edges and cut very easily.

### 3.03 - Pre-Operational Check



**DANGER:** Stay clear of rotating driveline. Entanglement in rotating driveline can cause serious injury. Disengage PTO, engage parking brake or place transmission in "Park", shut off the tractor and remove the key before working

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<sup>3</sup> See Chapter 7 - Pre-Delivery Checklist.

around hitch, attaching or detaching driveline, making adjustments, servicing or cleaning the machine.

**IMPORTANT:** Check each of the following, carefully, prior to engaging the equipment:

1. The bearings have been greased and turn freely (**see fig. 9**). Replace any bearing that runs rough or is seized.
2. The driveline cross and bearings have been greased.
3. The belts for proper tension<sup>4</sup>.
4. Turn the large six throat pulley by hand and make sure there are no obstructions in the chipper.
5. The knives and anvil are properly installed and the knife and anvil retaining bolts properly torqued to 124 ft. lb.
6. No wrappings, foreign objects or other debris such as accumulated wood, are in the cutting chamber, around knives, belts or driveline.
7. The tractor, to ensure correct direction of PTO and rpm speed.
8. All safety shields and guards are in place and tightly attached.
9. No people or animals are in the work area.
10. Discharge chute is pointed away from all people, animals, and all obscured view points.
11. All hardware is tight<sup>5</sup>.

### 3.04 - Attaching to the Tractor

Chipper may be used on tractors with 30 to 50 horsepower, a category 1 three point hitch or quick-hitch and a PTO speed of 540 rpm<sup>6</sup>.



**CAUTION:** Check the tractor PTO rpm to ensure it is set at 540 and turns clockwise.



**CAUTION:** Before starting work, clear the area of any obstacles or foreign objects.



**CAUTION:** For emergency reasons, learn how to stop the tractor and implement quickly.

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<sup>4</sup> See Section 4.04 - Belt Tension, for proper adjustment procedures.

<sup>5</sup> See Table 1, page 35.

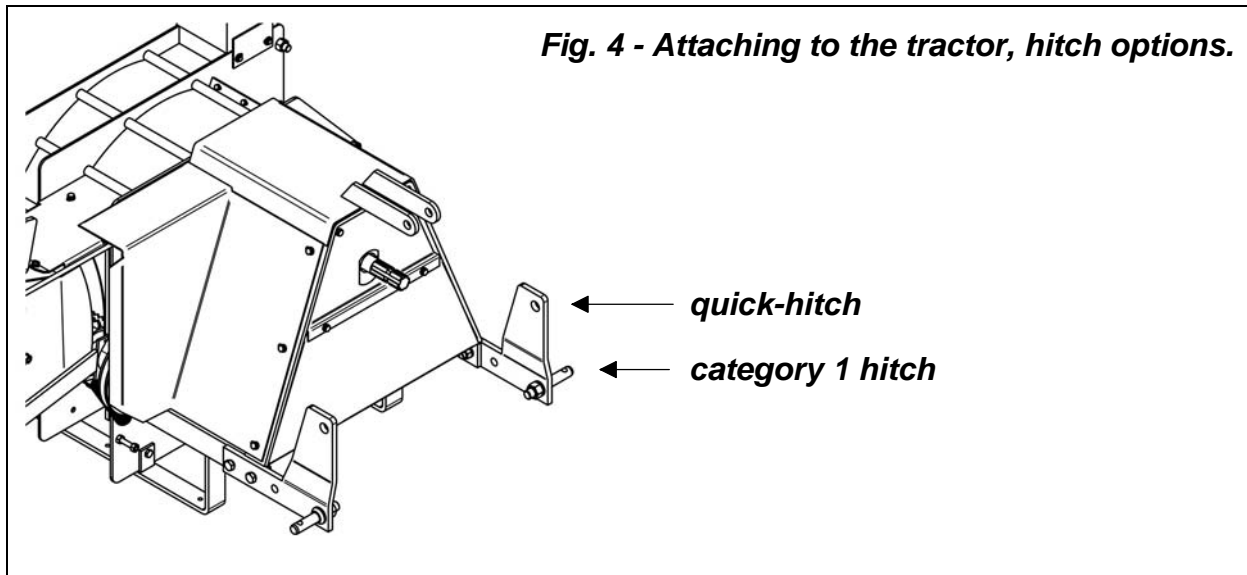
<sup>6</sup> See Table 2, page 35.



**DANGER:** Never attempt to attach the chipper to the tractor or make any adjustments to it without first turning the tractor off.



**DANGER:** Failure to ensure a secure coupling of the implement to the tractor can cause injury and damage to the implement or tractor.



To attach the chipper to the tractor do the following:

1. Back the tractor up to the chipper in order to slip the tractor hitch arms over the hitch pins on to the chipper. **Turn off the tractor engine.** Once the hitch arms are positioned on the hitch pins, secure them in place with the lynch pins. The lower hitch position is for a category 1 lift arm while the upper hitch position is for a category 1 quick hitch coupler (**see fig. 4**).
2. Adjust the tractor sway blocks or chains to remove all side movement.
3. Attach the top link. Adjust tractor top link to allow the chipper to sit level on the ground.
4. Install the shielded driveline to the tractor by first lining up the splines and depressing the snap pin. Push the yoke onto the PTO shaft as far as it will go. Release the pin and pull back slowly until the pin clicks in place. Repeat this operation on the implement end. Refer to **Section 4.07<sup>7</sup>** of this manual, if it is determined that the driveline is too long and needs to be shortened. Contact your local dealer if it is determined that the driveline is too short for your tractor.
5. Attach the driveline chains to the tractor and to the chipper to keep the driveline protection from turning. The chains should not be too tight.

<sup>7</sup> See Section 4.07 - Driveline, for instructions on how to determine correct driveline length and procedures for shortening the driveline.



### 3.05 - Start Up



**DANGER:** The chipper must always be lowered to the ground before starting tractor engine or engaging PTO lever.



**CAUTION:** Do not operate this chipper at a PTO speed or direction of rotation other than that shown on the chipper. Serious damage can occur to the machine and/or the operator.



**CAUTION:** Our chipper is designed to chip natural wood only. Any other type of processed wood may contain chemicals or other products that could potentially damage the machine. Warranty is void if the chipper is used to chip any other product other than natural wood.

Before starting to work, never forget that the **operator is responsible** for the following:

1. Safe and correct operation of the tractor and chipper.
2. To learn precise safe operating procedures for both the tractor and the chipper.
3. To ensure all maintenance and lubrication has been performed on the chipper.
4. To have read and understood all safety aspects for the chipper in the operator's manual.
5. To have read and understood all safety decals on the chipper.
6. Checking the condition of the knives and anvil. Worn or damaged knives and anvil should be changed before starting<sup>8</sup>.
7. Checking to ensure that the cutting edge is the leading edge of the knife.
8. Checking that there is no wire, weed, grass or other material wrapped around moving objects on chipper.
9. Checking to see if front weights need to be added to the tractor in order to maintain balance.
10. Checking the tractor tires for the proper pressure in accordance with the tractor operator's manual.
- 11. Checking that the PTO shield, belt shields and all other shielding are on the machine and securely in place.**
12. Making sure the proper attire is worn. Avoiding loose fitting clothing which can become entangled. Wearing sturdy, tough-soled work shoes and protective equipment for eyes, hands, ears and head. Never operate tractor or implements in bare feet, sandals or sneakers.
13. Checking for stones, wires, nails and other debris that might be hooked, snagged or thrown.
14. Ensuring proper lighting is available, sunlight or good artificial lighting.

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<sup>8</sup> See Section 4.03 - Knife Maintenance.

15. Ensuring that feed roller engage handle is installed and operating correctly.
16. Ensuring that discharge chute is not pointed towards feed hopper, people, animals or buildings.
17. Ensuring the correct function of the feed roller engage handle (**see fig. 7**).

To start the chipper proceed as follows:

Lower chipper to the ground with the tractor rock shaft control lever. Shift tractor transmission into park. Set parking brake. With the engine idling, slowly engage the PTO. Pull the chipper feed roller engage handle back to the engaged position (**see fig. 7**) and move the throttle lever until the PTO speed of 540 rpm is obtained. Once the required PTO speed is achieved operator may start feeding material into the feed hopper<sup>9</sup>.



**CAUTION:** Always have at least 2 operators at the job site running the chipper. One to load the hopper and the other to disengage the feed handle (**see fig. 7**) in case of an accident. Every effort should be made to maintain visual contact between the operators.

### 3.06 - Working Speed

Operate this chipper with a PTO speed of 540 rpm only. The feed roller can be set at two working speeds. The 70 fpm speed (factory setting) is suitable for smaller diameter softer wood while the 45 fpm speed is suitable large diameter seasoned hardwood<sup>10</sup>.

### 3.07 - Feeding Wood into the Chipper

Material should be fed into the chipper safely, to avoid contact with the equipment's moving parts.



**DANGER:** Do not place hands or any body parts into feed hopper during operation. Do not over reach. Never climb onto hopper. Keep proper balance and footing at all times. Keep working area clean and free of debris to prevent slipping or tripping. Entanglement in feed roller may cause severe injury or death.



**DANGER:** Never wear loose clothing or jewelry while operating chipper. Keep hands, feet, hair and clothing away from moving parts as they may become entangled.

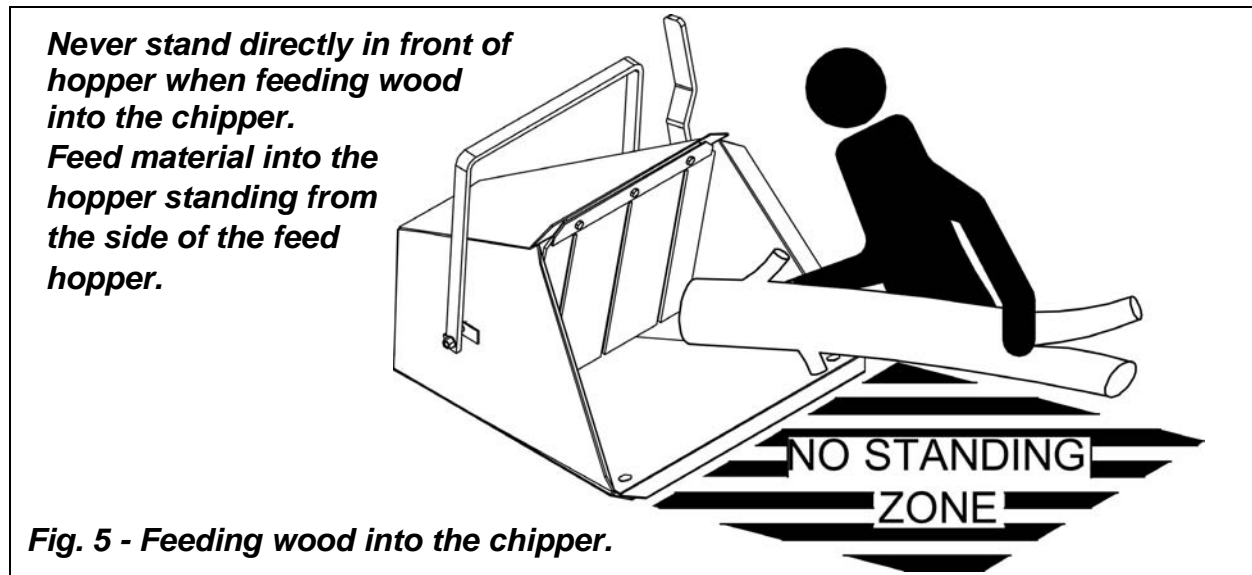
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<sup>9</sup> See Section 3.07 - Feeding Wood into the Chipper.

<sup>10</sup> See Section 4.06 - Feed Roller Belt Adjustment.



**DANGER:** Never stand directly in front of the feed hopper (see fig. 5) when feeding material into the chipper. Feed the material into the feed hopper standing from the side of the feed hopper. This reduces the risk of being caught and dragged into the machine and of being hit by debris flying back at you.



**CAUTION:** Use care when feeding material into the chipper. Do not feed metal, bottles, cans, rocks, glass or other foreign material into the chipper. If foreign material enters chipper, stop the machine, turn engine off, remove ignition key and wait for all movement to stop before removing material. Inspect machine for damaged or loose parts before returning to work.



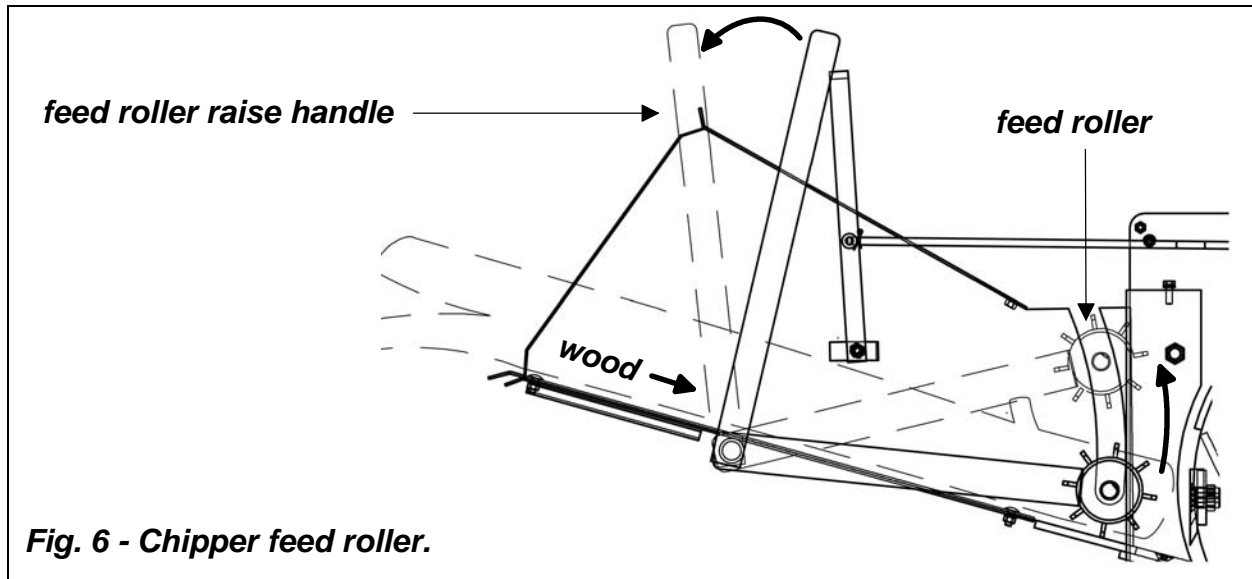
**CAUTION:** Always wear safety goggles and heavy gloves when operating chipper.



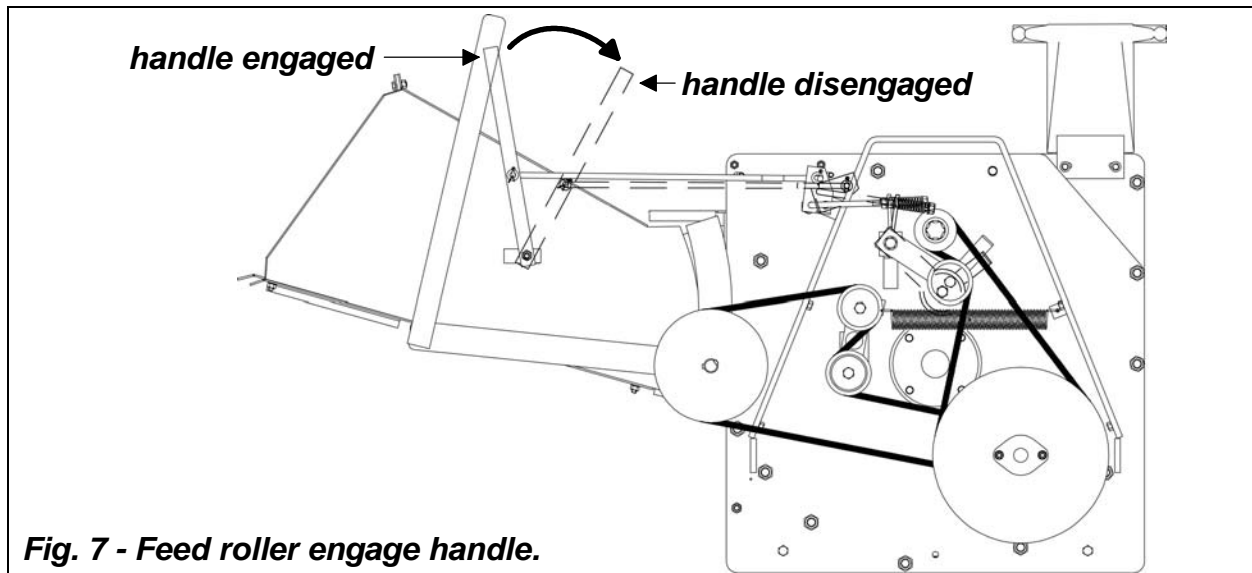
**CAUTION:** Wear hearing protection on a full-time basis if noise in the operator's position exceeds 80 dB. Excessive exposure to noise over 85 dB can cause severe hearing loss.

When feeding wood into the chipper, the feed roller will grab the material and pull it towards the chipping drum automatically. In case of wood with diameters approaching the 6" limit, operator may need to use the feed roller raise handle on the right side of the feed hopper to help raise the feed roller over the limb. Raise the feed roller by pulling

the handle back (see fig. 6). Once the roller is on top of the limb the operator can release the lever and the roller will feed the material into the chipper drum. If necessary, use a stick or branch to help push and direct short material towards the chipper drum. The chipper is equipped with a rubber curtain inside the feed hopper. The curtain is designed to prevent chips and debris from being thrown out of the feed hopper while unit is in operation. Never use your hands or legs to feed material beyond the rubber curtain in the feed hopper.



Bushmaster chippers are also equipped with a feed roller engage handle. This is the handle located over the hopper (see fig. 7). Pushing the handle forward causes the transmission belt to slip and the feed roller to stop rotating. When feeding large limbs into the chipper, the feed roller handle can also be used to allow the tractor's engine to regain rpm's. Once the tractor PTO is running again at 540 rpm, engage the feed roller handle to resume work (see fig. 7).





**WARNING:** Always verify correct function of the feed roller engage handle before beginning to work.

### 3.08 - Operating Techniques

For better chipping results always remember to feed the blunt end of the branch first. The mouth of the feed hopper is 7¼" wide, therefore if the branch you are trying to chip has limbs that spread out wider than this, trim them before inserting the branch into the feed hopper.

Never stand directly in front of the feed hopper when feeding material into the chipper. Feed the material into the feed hopper standing from the side of the feed hopper. This reduces the risk of being caught and dragged into the machine and of being hit by debris flying back at you (**see fig. 5**).

The chipper knives wear out faster when chipping dry material, therefore always try to mix green limbs when chipping dry limbs. The moisture from the green limbs will help keep the knives from heating up excessively and keep them lubricated.

At times while feeding chipper, a limb may suddenly turn or move sideways and may strike you. To reduce risk of being struck, release the limb immediately after it begins feeding and then turn away.

When working along a road always feed material from curb side.

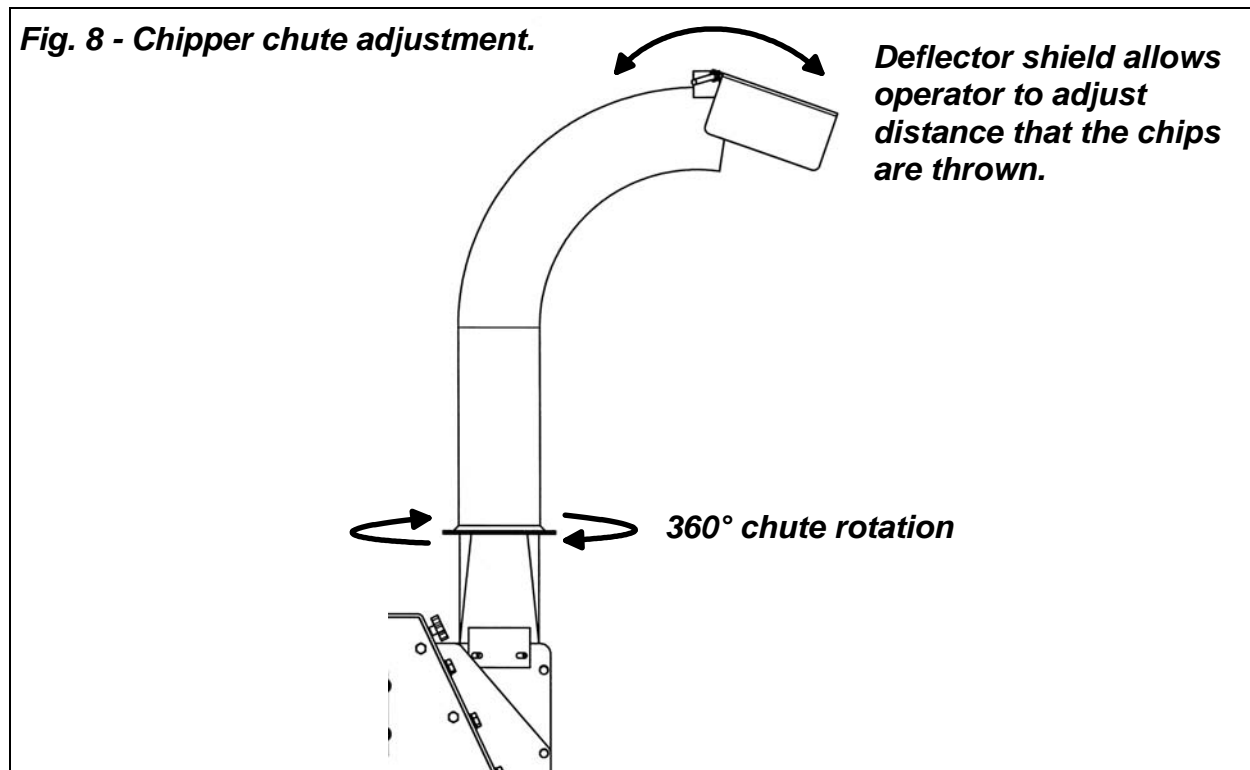
### 3.09 - Discharge Chute Adjustment



**DANGER:** Never point chipper chute at people, animals or buildings. Chipper can expel objects fast enough to cause severe injury or death.

To position the chipper chute loosen up the 3/8" nuts on the mount clamps holding the discharge chute. Adjust the discharge chute so that the opening on top is facing the direction you want the material to be thrown (**see fig. 8**). Once you have done this, tighten down the nuts on the clamp to prevent discharge chute from moving.

To adjust the deflector shield mounted on top of the discharge chute, loosen the deflector screw handle on the side of the shield and adjust the shield up or down to the desired angle. Once you have done this, tighten down the deflector screw handle to prevent deflector shield from moving. Adjusting the deflector shield up or down will allow operator to regulate the distance that the chips are thrown. With the shield angled down the material will be blown closer to the chipper. While with the shield angled up the material will be blown further away from the chipper.



### 3.10 - Removing Chipper from the Tractor

To remove the chipper from the tractor proceed as follows:

1. Push the feed roller handle all the way forward to disengage the feed roller (**see fig. 7**).
2. Disengage the tractor's PTO and make sure all parts have come to a complete stop.
3. Park chipper on level and solid ground.
4. Set parking brake and place transmission in "Park".
5. Stop engine and remove key from ignition.
6. Disconnect chipper driveline from tractor PTO shaft.
7. Disconnect three point linkage and carefully drive tractor away from chipper.



**CAUTION:** To park the vehicle safely, stop vehicle on a level surface (not on a slope), engage the parking brake, stop the engine, remove the key, and wait for engine to stop before leaving the tractor's seat.

### 3.11 - Transport

Before raising the chipper for transport, the tractor top link must be adjusted so when lifted, the rear of the machine is higher than the front. To do this, shorten the tractor top

link. This will keep the chipper locked in position and minimize the shaking and bouncing during transport which can damage the hitch or frame.



**CAUTION: Do not move or transport chipper when rotor is turning. Make sure PTO is disengaged and knives have stopped turning before raising chipper to full transport position. Do not tow tractor and chipper behind other vehicles. Use a properly equipped trailer with heavy tie-downs for towing operations.**

Before transporting:

1. Always disengage PTO before raising the implement to transport position.
2. When raising the chipper be sure the PTO driveline does not hit either the chipper or the tractor.
3. Always select a safe ground speed that is appropriate for the terrain.
4. Beware of traffic on public roads. Install a SMV (Slow Moving Vehicle) sign when traveling on roads or streets. Comply with all federal, state and local laws.
5. Reduce ground speed when turning and take care that the implement does not strike obstacles such as trees, fences or buildings.
6. During transport the chipper should not be lifted over 14"-16" from the ground.

## 4 - MAINTENANCE



**DANGER:** Stop engine, wait for all moving parts to stop, lock parking brake and remove key before performing any service or maintenance.

Never rely on the tractor lift system. Install blocks or stands under the chipper to prevent it from falling.

Always use personal protection devices, such as glasses or gloves when performing maintenance.

Keep fingers out of slots to prevent injury.

### 4.01 - Maintenance Safety



1. Good maintenance is your responsibility.
2. Keep service area clean and dry. Be sure electrical outlets and tools are properly grounded. Use adequate light for the job at hand.
3. Make sure there is plenty of ventilation. Never operate the engine of the towing vehicle in a closed building. The exhaust fumes may cause asphyxiation.
4. Make no repair or adjustments with the tractor engine running. Before working on the machine, disengage the PTO, shut off the engine, set the brakes, and remove the ignition key.
5. Be certain all moving parts on attachment have come to a complete stop before attempting to perform maintenance.
6. Never work under equipment unless it is blocked securely.
7. Always use personal protection devices such as eye, hand and hearing protectors, when performing any service or maintenance.
8. Frequently check knives and anvil. They should be sharp, free of nicks and cracks and securely fastened.
9. Periodically tighten all bolts, nuts and screws and check that all cotter pins are properly installed to ensure unit is in a safe operating condition.
10. When completing a maintenance or service function, make sure all safety shields and devices are installed before placing unit in service.
11. Do not attempt to mount a tire unless you have the proper equipment and experience to do the job.
12. Inflating or servicing tires can be dangerous. Whenever possible, trained personnel should be called to service and/or mount tires.
13. After servicing, be sure all tools, parts and service equipment are removed.



14. Never replace hex bolts with less than grade five bolts unless otherwise specified, i.e. shear bolts<sup>11</sup>.
15. Where replacement parts are necessary for periodic maintenance and servicing, genuine replacement parts must be used to restore your equipment to original specifications. The company will not claim responsibility for use of unapproved parts and/or accessories and other damages as a result of their use.
16. Unauthorized modifications to the machine may impair the function and/or safety of the machine and reduce its life. If equipment has been altered in any way from original design, the manufacturer does not accept any liability for injury or warranty.

## 4.02 - Service

The frequency of lubrication given is based on normal operating conditions. Severe or unusual conditions may require more frequent lubrication.

Use a good quality SAE multipurpose type grease for all grease fittings. Be sure to clean fittings thoroughly before using grease gun. Immediately replace any broken or missing fitting.

### Whenever an obstacle is hit:

1. Check machine condition, particularly the knives and anvil.
2. Replace any damaged or worn knives or anvil<sup>12</sup>.

### Daily:

1. Grease universal joints on driveline.
2. Check belts for tightness, excessive wear, cracks, or other signs of deterioration.
3. Check condition of rubber curtain. Replace curtain if torn, damaged or missing.
4. Check for proper operation of feed roller engage handle. Push handle forward to make sure feed roller rotation disengages properly.

### Every 8 hours:

1. Inspect chipper knives and anvil. Replace any damaged or worn part.
2. Check all hardware especially the nuts and bolts that secure the knives and anvil.
3. Grease all fittings (**see fig. 9**). The BM6-800 has a total of nine grease points, two are located on the pillow block bearings holding the drive shaft, three are located on the pillow block and flange bearings holding the drum shaft, two are located on the flange bearings holding the feed roller transmission shaft and two are located on the flange bearings of the feed roller.

### Every 25 hours:

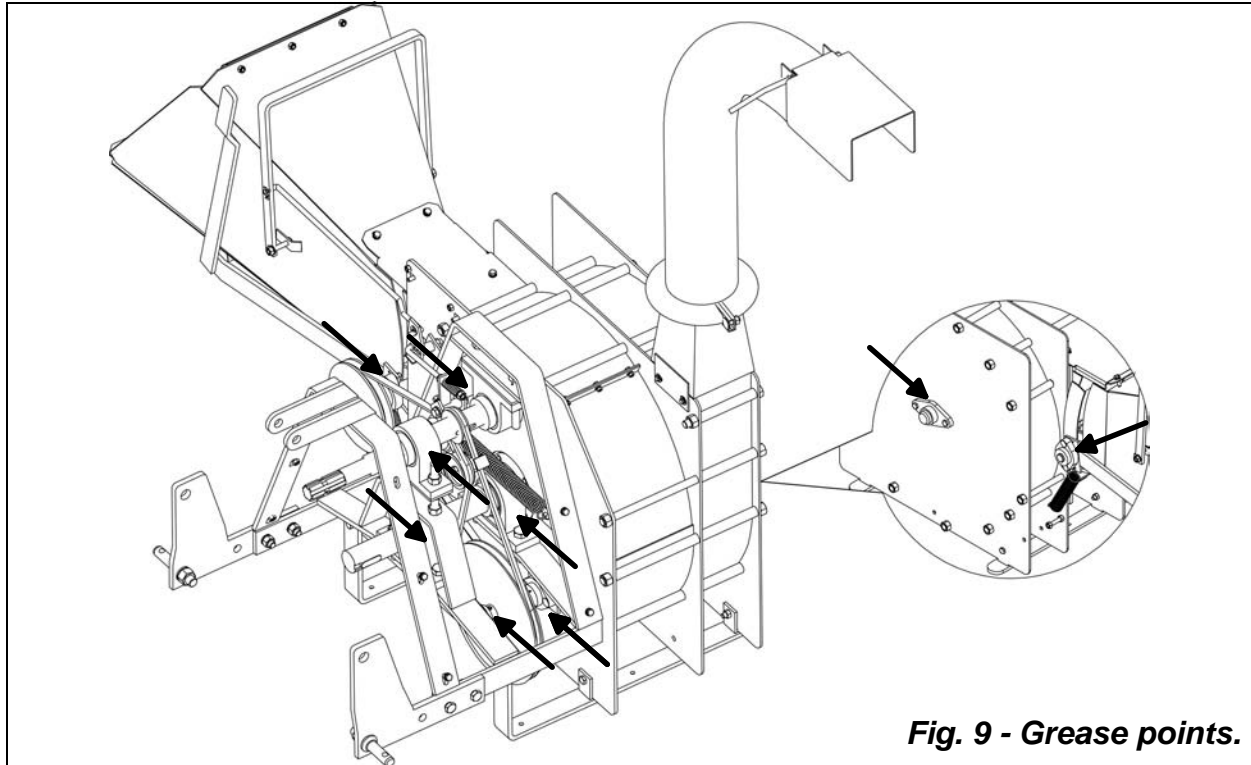
Hardware tightness; vibration can loosen bolts. Check tightness of the hardware periodically<sup>13</sup>.

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<sup>11</sup> Refer to Table 1 - Torque Specifications, page 35.

<sup>12</sup> See Section 4.03 - Knife Maintenance, for instructions on how to replace worn knives.

<sup>13</sup> Refer to Table 1 - Torque Specifications, page 35.



**Fig. 9 - Grease points.**

### 4.03 - Knife Maintenance



**WARNING:** To avoid possible injury always wear proper eye and hand protection when servicing chipper knives.



**DANGER:** Unbalanced, distorted or cracked knives can cause damage to the chipper and/or personal injury. Replace damaged knives before operating the chipper. Always replace knives as sets.

In order for the chipper to work properly and to always obtain a constant chipping quality with lower HP requirements thus keeping cost down, proper knife maintenance is important.

Knives must be kept sharp and blade angle must be maintained. A knife must be replaced if, due to wear or damage, its original shape has been distorted.

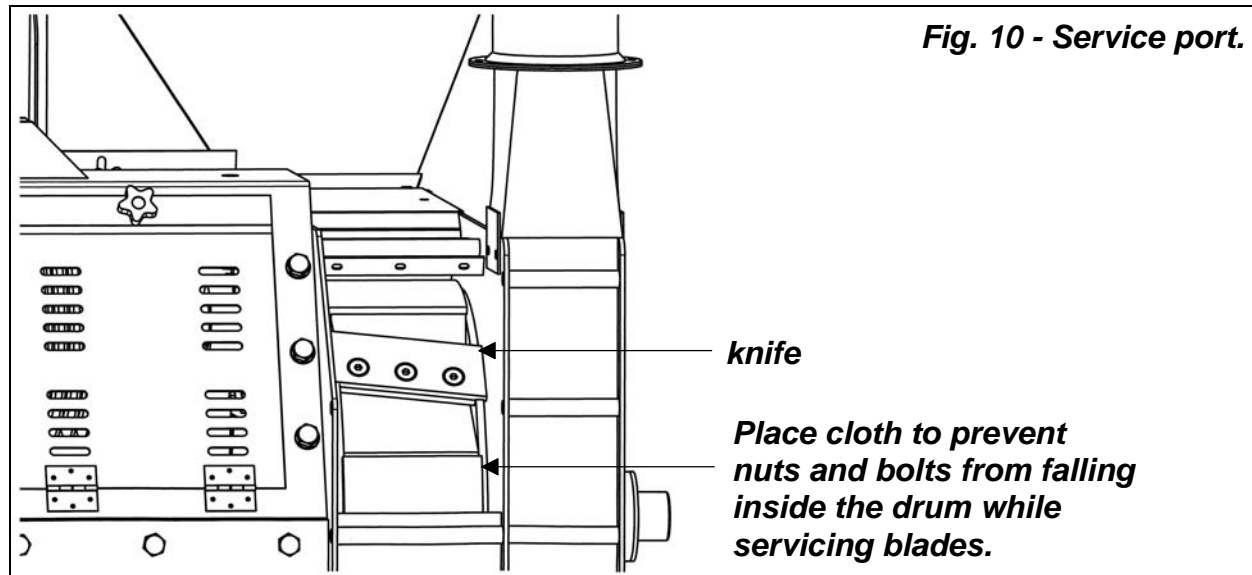
#### Knife removal

The service port is located on the left side of the chipper (**see fig. 10**). To remove the service port, unscrew the three ¼" bolts located on the top of the service port and the 5/8" threaded stud located on the bottom of the port. Remove the cover and rotate drum

to a position where the knife is in view. Lock the drive system down to prevent the drum from turning.

When removing the knives it is advisable to place a cloth in the space between the drum and the shroud to prevent dropping a bolt, nut, or washer into the bottom of the drum shroud.

The knives are secured to the drum with three  $\frac{1}{2}$ "-13x1.75" grade 8 alloy steel socket head bolts and three  $\frac{1}{2}$ " elastic stop nuts. To remove the knives you will need a  $\frac{5}{16}$ " Allen wrench and a  $\frac{3}{4}$ " wrench. Once the first knife has been replaced rotate the drum to gain access to the second knife and repeat the operation.



**DANGER:** Proper torque must be used when tightening the knife and anvil retaining bolts. Knife and anvil retaining bolts should be torqued to 124 ft. lbs. If these safety precautions are not followed, the knife and/or anvil could fail or come loose during operation and cause serious injury or death.



**DANGER:** Always remember the rotor must remain well balanced at all times to avoid dangerous vibrations which can damage the overall structure of the chipper and cause serious injury or death to nearby persons. Always remove and replace knives as sets. Chipper balance can be affected if matched knives are not kept together. It is important to keep knives sharpened and properly adjusted. If abnormal vibrations are noticed after replacing the knives, the chipper should be taken to an Authorized Service Dealership to determine if it is necessary to rebalance the rotor.



**DANGER:** The beginning of abnormal vibrations from the rotor may mean it is out of balance. A broken or missing knife is enough to cause this. An unbalanced rotor, due to its high rotation speed, can dislodge itself from the side bearing supports thus destroying the chipper and can cause serious injury or death to persons nearby. Always find the source of the vibration. Bring the rotor back in balance by replacing knives, removing wrappings, etc. If this does not remove the vibrations, the rotor may have to be rebalanced at an Authorized Service Dealership.

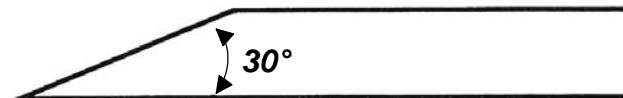


**WARNING:** Do not substitute knives or any bolt for the knife retaining bolts. Company knives and knife retaining bolts are specially made for this application. Using non-original parts can affect the chipping quality and may also cause damage to the chipper.

### Knife Sharpening

Sharpening is recommended every 8 to 10 hours of work. The need for sharpening will vary depending on hours of use, type of fiber, whether wood is wet, dry, or frozen and the amount of debris (sand in bark and other types of abrasive material) chipped. A dull knife will be subject to the effects of overheating, which will potentially destroy the knife and overload the knife cutting edge and the machine in general.

**Fig. 11 - Knife sharpening.**

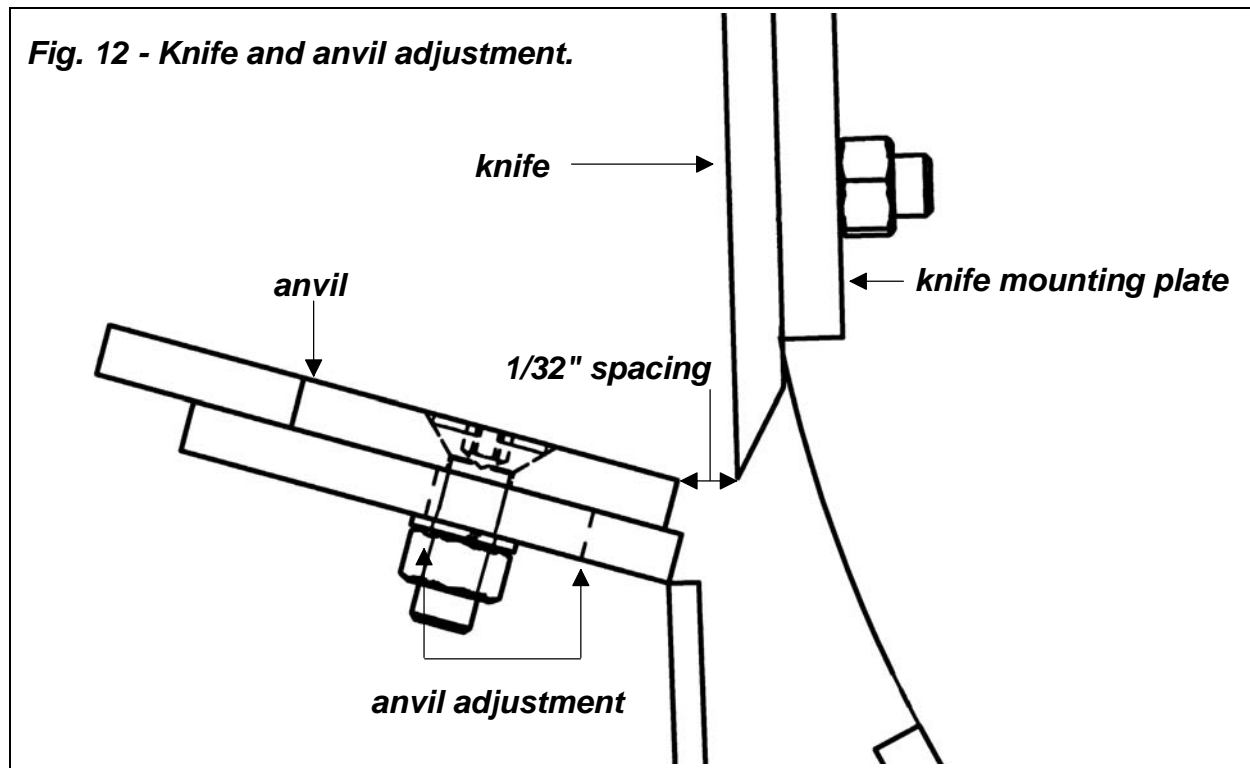


Sharpen knives at a 30° angle (**see fig. 11**). Do not grind knife back to the point where the edge is beyond the mounting plate (**see fig. 12**). To sharpen knives use a surface grinder with a “F” grade grinding disc with 36 to 46 grit.

Use short grinding times and always use coolant while sharpening knives. Any discoloration during sharpening indicates too much heat has been generated and the feed rate or coolant need to be adjusted. Overheating will remove the heat treated properties of the knife. Discard any knife that shows discoloration.

### Knife and Anvil Adjustment

If it becomes necessary to realign the knives to the anvil you will need to remove the two springs that provide down pressure for the feed roller. Raise and block the feed roller up and out of the way. The anvil is reversible and is secured by two ½”-13x1.75” grade 8 alloy steel socket head bolts, two flat washers and two ½” elastic stop nuts. There is a slotted hole for the anvil bolts to slide in (**see fig. 12**).



Move the anvil back and rotate the drum to a position where the knife is exposed. Lock the drum in place to prevent its rotation. Form an "L" shaped spacer gauge out of 1/32" thick sheet steel 5" wide. Place the "L" shaped spacer gauge you have created between the anvil and the knife. Slide the anvil forward, jamming the spacer between the anvil and the knife. Tighten the anvil down and remove the spacer. Slowly rotate the drum by hand in a forward direction to be sure that both knives do not hit the anvil. Recheck the space between both knives and anvil using the spacer gauge you have created. Close tolerances are desired for proper operation of the machine. Knife and anvil retaining bolts should be torqued to 124 ft. lbs.



**WARNING: Overtightened bolts can cause knife distortion. Distorted knives can crack and fail resulting in serious injury or death. Use a straight edge and check all knives for distortion. Discard any distorted knife.**

### Knife Installation

After you have sharpened the knives, you are ready to remount the knives to the chipper drum. Before you proceed, be sure the knife mounting plate on the drum and the surface of the knife are clean of all materials. The tolerances between the knife and the anvil located behind the feed roller are very tight and any material between the two will prevent a proper fit and cause an alignment problem. When installing the knives you may notice that one may turn closer to the anvil than the other. When adjusting the spacing between knives and anvil use the closer of the two knives and adjust the anvil

so that there is 1/32" distance between the closer of the two knives and the anvil (**see fig. 12**).

When attaching the knife **do not reuse the 1/2" elastic stop nuts that were on the bolts when the knives were removed. Use new elastic stop nuts to prevent the knife from becoming loose during operation and causing damage to your machine.** Torque the 1/2"-13x1.75" grade 8 alloy steel socket head bolts to 124 ft. lbs. Do not overtighten bolts as this could cause knife distortion. After both knives have been secured, slowly rotate the drum by hand in the forward direction and check that knives are not hitting the anvil. If the knife and anvil hit, remove the knife that is hitting and check for material between the drum knife mounting plate and the knife.

Secure each knife with three 1/2"-13x1.75" alloy steel socket head bolts and three 1/2" elastic stop nuts. Remove the cloth that was previously placed inside the opening of the service port. Replace the knife service port and secure with previously removed bolts and threaded stud.

## 4.04 - Belt Tension



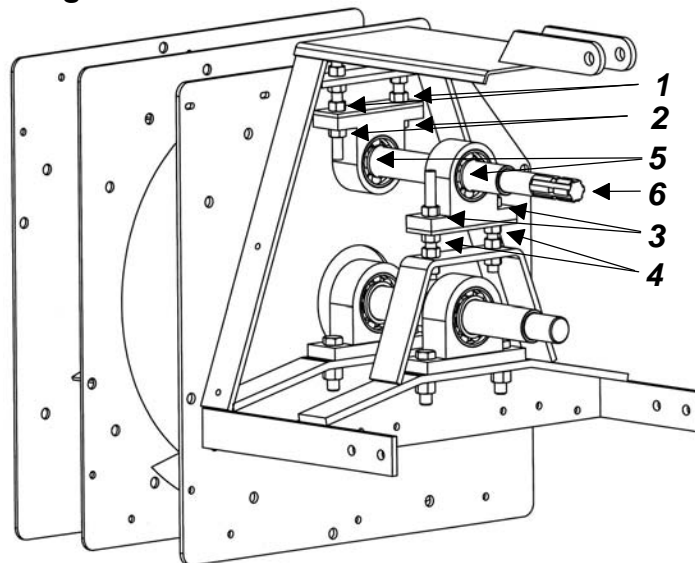
**DANGER:** When servicing or replacing drive belts it is important to keep the drive shaft straight. Improper belt tension adjustment may cause chipper to fail.

**Loosen lock nuts #1 & 3 equally.**

**Tighten belts by turning lock nuts #2 & 4 counter-clockwise by 1/2 turn intervals.**

**Make sure drive shaft #6 is straight.**

**Tighten lock nuts #1 & 3.**



**Fig. 13 - Main drive belts adjustment.**

### Main Drive Belts Adjustments

Check the belt tension by applying a force of 12-15 lb. while pushing against the belt halfway between the pulleys. The belt deflection should be between  $\frac{5}{16}$ "- $\frac{3}{8}$ ".

To tighten main drive belts, open the access cover on the left side of the chipper. Loosen the lock nuts holding the pillow block bearings on the main drive shaft by several turns (**see #1 & 3, fig. 13**). Turn each of the four nuts (**see #2 & 4, fig. 13**) by  $\frac{1}{2}$  turn intervals, then check the belt tension. Keep tightening by  $\frac{1}{2}$  turns each nut until belts are sufficiently tight. When tightening the drive belts it is important to keep the drive shaft straight (**see #6, fig. 13**). After belts are sufficiently tightened use a spirit level to make sure the drive shaft is straight. Once belts are tight enough, re-tighten the lock nuts (**see #1 & 3, fig. 13**) and access cover.

### Transmission Belt Adjustment

The transmission belt can be tightened by following the same procedure for tightening the main drive belts. Tightening the main drive belts will automatically tighten the transmission belt. If the main drive belts are tightened properly but the transmission belt is still slipping, it may be time to replace the transmission belt<sup>14</sup>.

### Feed Roller Belt Adjustment

The feed roller belt has an automatic spring loaded belt tensioner. This means that the spring will constantly keep the belt in tension. Replace belt when it is worn or begins slipping<sup>15</sup>.

## 4.05 - Belt Replacement

If one or more of the belts have been stretched or damaged to the point where the proper tension cannot be obtained they must be changed. The six main drive belts are a matched set, therefore you should replace them all at the same time.

### To replace the main drive belts do the following:

1. With tractor engine off and driveline disconnected, push the feed roller engage handle all the way forward (**see fig. 7**) to disengage the feed roller.
2. Remove the front guards held in place by the M8x30 bolts.
3. Remove the right guard held in place by the M8x30 bolts.
4. Loosen the  $\frac{5}{8}$ " lock nuts (**see #4, fig. 13**) positioned behind the main pulley. This will lower the pulley and release tension from the belts.
5. Remove old belts and replace with new belts.
6. Reassemble in reverse order.
7. Follow instructions for proper belt tension adjustment<sup>16</sup>.

### To replace the transmission belt do the following:

1. Follow points 1 to 4 from instructions above.
2. Remove set screws from lock collars on the pillow block bearings (**see #5, fig. 13**) of the drive shaft (**see #6, fig. 13**).

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<sup>14</sup> See Section 4.05 - Belt Replacement.

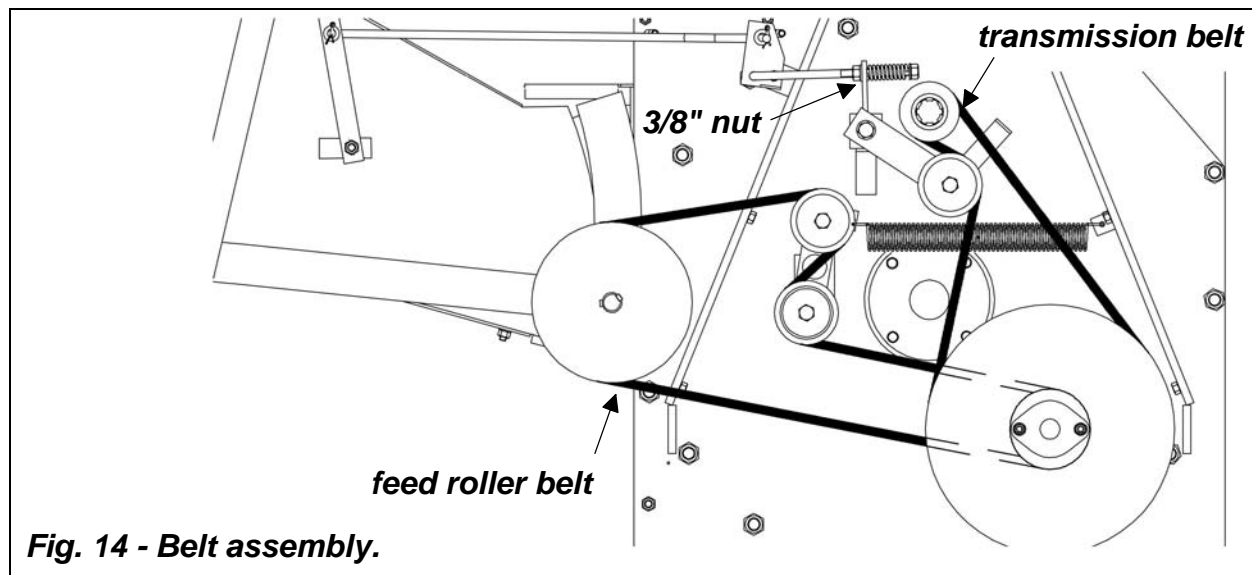
<sup>15</sup> See Section 4.05 - Belt Replacement.

<sup>16</sup> See Section 4.04 - Belt Tension.

3. Loosen lock collars by turning them clockwise.
4. Slide the drive shaft forward until the shaft is out of the back pillow block bearing and there is enough clearance for the belt to fit through.
5. Remove old belt and replace with new belt.
6. Reassemble in reverse order.
7. Follow instructions for proper belt tension adjustment<sup>17</sup>.
8. If necessary, tighten the 3/8" elastic stop nut to adjust the feed roller engage handle (see fig. 14). This operation may be necessary if the transmission belt does not fully disengage when feed roller handle is pushed forward.

**To replace the feed roller belt do the following:**

1. With tractor engine off and driveline disconnected, push the feed roller engage handle all the way forward (see fig. 7) to disengage the feed roller.
2. Remove the four 5/8" carriage bolts holding the flange bearings in place on the feed roller transmission shaft.
3. The feed roller transmission shaft can now be disassembled from the bottom.
4. Remove old belt and replace with new belt.
5. Reassemble in reverse order.



**Fig. 14 - Belt assembly.**

## 4.06 - Feed Roller Belt Speed Adjustment

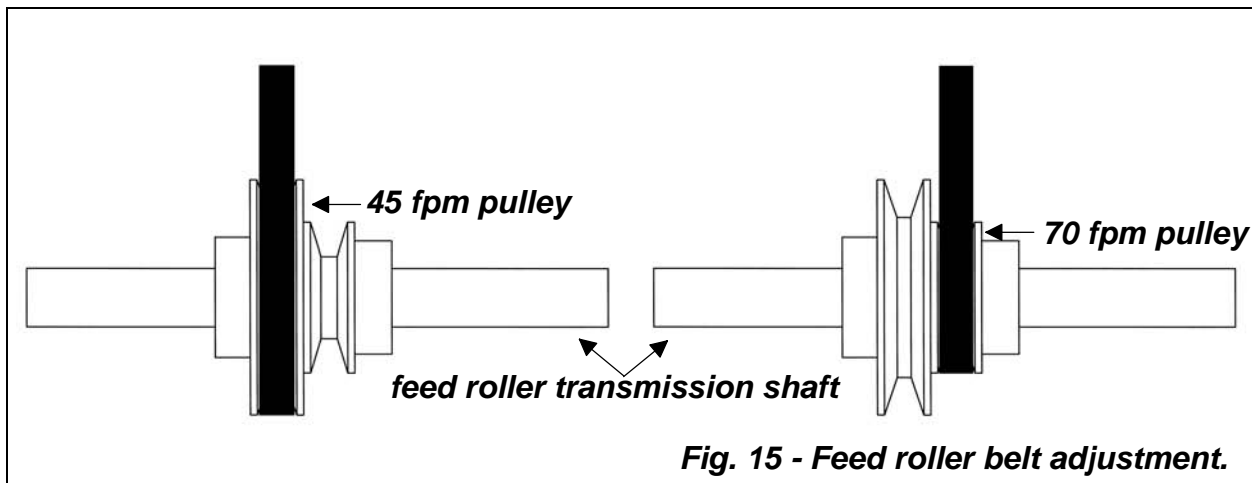
The BM6-800 chipper is equipped with a variable speed feed roller transmission. Your unit is assembled from the factory on the 70 fpm pulley. There is 45 fpm pulley mounted alongside the other one (see fig. 15). If you want smaller chips or you are working with large diameter seasoned hardwood, change the feed rate to 45 fpm.

<sup>17</sup> See Section 4.04 - Belt Tension.



To adjust the feed roller belt do the following:

1. With tractor engine off and driveline disconnected, push the feed roller engage handle all the way forward (**see fig. 7**) to disengage the feed roller.
2. Open the belt access cover on the left side of the chipper.
3. Remove the feed roller belt from the 70 fpm pulley and position it in the 45 fpm pulley.
4. Close belt cover and pull the feed roller engage handle all the way back.



## 4.07 - Driveline



**DANGER:** Only use the original driveline supplied with this chipper and always with the safety shielding. Carefully read and file away the driveline operator's manual supplied by the manufacturer. The following does not substitute the information found in the driveline manual.

**IMPORTANT:** Always check driveline length during initial setup and when connecting to a different tractor.

In the collapsed position the driveline should be approximately 2" from bottoming out to prevent possible damage to the tractor or implement. When the PTO is in the maximum extended position, the ideal minimum overlap of the two halves should be approximately 6" (**see fig. 16**).

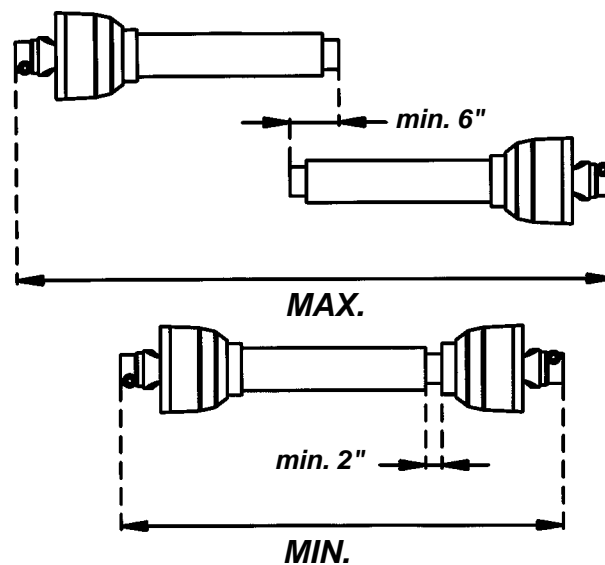
If determined that the driveline is too long, follow these procedures to adjust the length:

1. Separate the two driveline halves. Connect one half to the tractor PTO and the other half to the chipper.
2. Raise and lower the chipper with the 3 point hitch to find the position where the driveline is shortest. Hold the half shafts side by side and mark the desired length on the outer female tube guard leaving a 1½" gap between the end of the guard tube and bell guard.
3. Cut off both guard tubes the same amount as marked in step 2.

4. Shorten both drive tubes the same amount as guard tubes.
5. De-burr and clean filings from drive tubes and apply grease to outside of inner telescoping tube.
6. Reassemble the driveline halves and connect to tractor and chipper. Raise and lower chipper again to be sure driveline does not bottom out in its shortest position and has a minimum overlap of 6" in the longest position.
7. Install both driveline safety chains. One should be hooked in a hole on the outer driveline yoke shield and to the tractor to restrict outer shield rotation. The second one should be hooked in a hole on the inner driveline yoke shield and to the implement to restrict inner shield rotation.







If determined that the driveline is too short for your tractor, contact your local dealer.

**Fig. 16**



**CAUTION:** Always work with the driveline as straight as possible. This will prolong its life and that of its components. It is advised not to work at an angle greater than 15 degrees.

**TABLE 1 - TORQUE SPECIFICATIONS**

Metric (ISO) treaded bolts head marking							Inch (SAE) treaded bolts head marking								
	Class 5.8		Class 8.8		Class 10.9			Grade 2		Grade 5		Grade 8			
Bolt size mm	Thread mm	N.m	ft-lb	N.m	ft-lb	N.m	ft-lb	Bolt size inch	Thread inch tpi	N.m	ft-lb	N.m	ft-lb	N.m	ft-lb
M5	0.8	4	3	6	4	9	7	1/4"	20	7	5	11	8	16	12
M6	1	6	4	10	7	15	11	1/4"	28	8	6	13	10	19	14
M8	1.25	16	12	25	18	36	27	5/16"	18	15	11	24	17	33	25
M8	1	17	13	26	19	38	28	5/16"	24	17	13	26	19	37	27
M10	1.5	31	23	48	35	71	52	3/8"	16	27	20	42	31	59	44
M10	1.25	33	24	51	38	75	55	3/8"	24	31	23	47	35	67	49
M10	1	35	26	53	39	78	58	7/16"	14	43	32	67	49	95	70
M12	1.75	54	40	84	62	123	91	7/16"	20	48	36	75	55	106	78
M12	1.5	56	41	87	64	128	94	1/2"	13	66	48	102	75	144	106
M12	1.25	59	44	90	66	133	98	1/2"	20	75	55	115	85	163	120
M14	2	84	62	133	98	195	144	9/16"	12	95	70	147	109	208	154
M14	1.5	94	69	142	105	209	154	9/16"	18	106	79	164	121	232	171
M16	2	131	97	206	152	302	223	5/8"	11	132	97	203	150	287	212
M16	1.5	141	104	218	161	320	236	5/8"	18	149	110	230	170	325	240
M18	2.5	181	133	295	218	421	310	3/4"	10	233	172	361	266	509	376
M18	2	196	145	311	229	443	327	3/4"	16	261	192	403	297	569	420
M18	1.5	203	150	327	241	465	343	7/8"	9	226	167	582	430	822	606
M20	2.5	256	189	415	306	592	437	7/8"	14	249	184	642	473	906	668
M20	1.5	288	212	454	335	646	476	1"	8	339	250	873	644	1232	909
M22	2.5	344	254	567	418	807	595	1"	12	371	273	955	704	1348	995
M22	1.5	381	281	613	452	873	644	1-1/8"	7	480	354	1077	794	1746	1288
M24	3	444	327	714	526	1017	750	1-1/8"	12	539	397	1208	891	1958	1445
M24	2	488	360	769	567	1095	808	1-1/4"	7	677	500	1519	1120	2463	1817
M27	3	656	484	1050	774	1496	1103	1-1/4"	12	750	553	1682	1241	2728	2012
M27	2	719	530	1119	825	1594	1176	1-3/8"	6	888	655	1992	1469	3230	2382
M30	3.5	906	668	1420	1047	2033	1499	1-3/8"	12	1011	746	2268	1673	3677	2712
M30	2	1000	738	1600	1180	2250	1659	1-1/2"	6	1179	869	2643	1949	4286	3161
M36	4	1534	1131	2482	1830	3535	2607	1-1/2"	12	1326	978	2974	2194	4823	3557

When using lock washers with nuts, increase torque values by 5%.

**TABLE 2 - BUSHMASTER CHIPPER - TECHNICAL FEATURES**

Series Bushmaster Chipper, for tractors up to 50 HP, PTO 540 rpm, 3 point hitch cat. 1									
Model	Overall length	Overall width	Weight lbs	Rotor rpm/min	Knives tip speed ft/min	# Knives	# Belts & type	Cutting diameter	Driveline 1 3/8"
BM6-800	38"	60"	900	1512	9252	2	6 - BX 42 1 - BX 67 1 - A 57	6"	ASAE 4 <sup>th</sup> cat

## 5 - REPAIR PROCEDURES



**CAUTION:** All repair procedures must be done by Authorized Dealerships. It is not recommended that untrained individuals perform any repair work. Repair operations should be performed by qualified personnel only.

### 5.01 - Chipper Drum, Fan and Shaft Replacement

If it becomes necessary to replace the chipper drum, fan or main shaft it is important to have the assembly (drum, fan and main shaft) properly rebalanced before using the machine.



**DANGER:** An unbalanced rotor, due to its high rotation speed, can dislodge itself from the side bearing supports thus destroying the chipper and can cause serious injury or death to persons nearby.

### 5.02 - Suggested Spare Parts

It is suggested that the following spare parts be kept on hand for the chipper at all times to prevent a minor problem from delaying work.

Description	Quantity
Anvil	1
Knives	2
Knife mounting nuts	6

### 5.03 - Storage

After seasonal use it is important to perform the following for prolonged storage:

1. Wash the chipper carefully.
2. Inspect the chipper and replace worn or damaged parts.
3. Tighten all hardware<sup>18</sup>.
4. Grease all areas indicated under Maintenance<sup>19</sup>.
5. Cover the chipper from the elements in order to have it in perfect condition for the start of the next season.
6. Do not permit children to play on or around the stored unit.

<sup>18</sup> Refer to Table 1 - Torque Specifications, page 35.

<sup>19</sup> See Chapter 4 - Maintenance.

7. Do not park or store equipment where it will be exposed to livestock for long periods of time. Damage and livestock injury could result.
8. Make sure all parked machines are on a hard, level surface, and engage all safety devices.

## 6 - TROUBLESHOOTING



**WARNING:** Be sure tractor engine is off, parking brake is locked, and key is removed before making any adjustments.

PROBLEM	POSSIBLE CAUSE	SOLUTION
Chipper and tractor rpm slow down.	Chipper is receiving material faster than it can handle.	Disengage feed roller and allow rpm to pick up. Use 45 fpm pulley. (See section 4.06).
Chipper rpm slows down and tractor rpm does not.	Main drive belts are slipping.	Tighten drive belts. (See section 4.04).
Excessive vibration while chipping.	Chipper knives are dull. PTO shaft not aligned. PTO shaft universal joints failing.	Remove and sharpen knives. (See section 4.03). Align PTO shaft. Check universal joints on PTO shaft.
Feed roller not feeding at a steady rate.	Feed roller belt slipping. Chipper rpm too slow. Feed roller springs lost tension. Feed table dry and/or dirty. Slick flat material.	Replace feed roller belt. (See section 4.05). Increase tractor PTO speed to 540 rpm. Replace springs. Clean and lubricate. Feed roller bottoms out at 3/4" above feed table and the roller tension is low. Stand materials on taller end if possible.
Feed roller does not disengage.	Alignment linkage is out.	Tighten 3/8" elastic stop nut ( <b>see fig. 14</b> ).
Feed roller belt jumps off drive pulley.	May occur if belt is moved from 70 fpm speed pulley to 45 fpm pulley.	Align pulley being used to the top pulley.
Not chipping clean.	Dull chipper knives. Drum rpm too slow. Knives to anvil spacing off specifications.	Remove and replace knives. Increase tractor PTO speed to 540 rpm. Adjust spacing ( <b>see fig. 12</b> ).

## 7 - PRE-DELIVERY CHECKLIST

**To the dealer: Inspect the machine thoroughly after assembly to assure it is functioning properly before delivering it to the customer. The following checklist is a reminder of points to cover. Check off each item as it is found satisfactory or after proper adjustment is made.**

- Guards and shield properly fastened.
- Lubrication of grease fittings.
- Check drive belts for proper tension.
- All hardware properly tightened.
- All decals properly located and readable (**see fig. 3**).
- Knives properly installed, bolts and nuts tightened.
- Overall condition (touch up scratches, clean and polish).
- Test run, check for excessive vibration or overheating of bearings.
- Check control levers for proper operation.
- Check machine for shortage or damage in transit.
- Operator's Manual.

**Review the Operator's Manual with the customer. Explain the following:**

- Warranty.
- Safe operation and service.
- Correct machine installation and operation.
- Daily and periodic lubrication, maintenance and inspections.
- Troubleshooting.
- Operational procedures and storage.
- Parts and service.
- Fill out the Pre-Delivery Checklist and Warranty Registration form.
- Give customer the Operator's Manual and encourage the customer to read the manual carefully.

**IMPORTANT: Warranty is not valid unless Pre-Delivery Checklist and Warranty Registration form in Operator's Manual is completed in detail and mailed to the Company.**

Model Number: \_\_\_\_\_

Serial Number: \_\_\_\_\_

Delivery Date: \_\_\_\_\_

Dealer's Signature: \_\_\_\_\_

## 8 - WARRANTY

BEFCO's responsibility will be limited to substitution of the acknowledged defective merchandise to the same place of delivery as the previous one was supplied.

### 1. LIMITED WARRANTY

BEFCO, Inc. herein referred to as the Company, warrants its machines and related accessories, hereafter referred to as the Machine, to be free from defects in material and workmanship, for a period of twelve (12) months from the date of invoice to the first registered owner; this limited warranty does not apply to common wear items and excludes belts, shear pins, oil, grease, tires, tubes, hydraulic hoses, knives and PTO shafts.

Labor will be reimbursed at \$40.00 per hour based on BEFCO's time schedule.

Cost of transport to the servicing dealer is the responsibility of the customer.

Warranty coverage shall not be transferable from the first owner to any subsequent owner.

### 2. DISCLAIMER OF ALL OTHER WARRANTIES AND REMEDIES

Neither the Company nor any company affiliated with the Company makes any warranties, representations or promises, expressed or implied, as to the quality, performance or application of its products other than those set forth herein and does not make any implied warranty of merchantability or fitness.

The only remedies the purchaser has in connection with the breach, or performance of any warranty on the Company's Machine are those set forth herein. In no event will the dealer, the Company, or any company affiliated with the Company, be liable for:

- a. Injuries or damages of any kind or nature, direct, consequential or contingent to person or property.
- b. Any expenses incurred by the owner to repair, replace or rework any allegedly defective item.
- c. Any loss, cost, forfeiture or damages (including loss of profits; loss of crops; loss because of delay in field operations; any expenses or loss incurred for labor, supplies, substitute machine rental; liabilities of the owner to its customers or third persons; and all other consequential damages, losses, liabilities or damages for any other reasons) whether direct or indirect, and whether or not resulting from or contributed to by the default or negligence of the Company, its agents, employees and subcontractors which might be claimed as a result of the use or failure of the equipment delivered.

The Company's liability based on this limited warranty or any other applicable laws shall be limited to replacement or refund of the purchase price of the product.

The limited warranty extended herein gives you specific rights and you may also have other rights which vary from state to state. Neither the dealer nor the Company personnel has the authority to make any representation or to modify the terms and limitations of this warranty in any way.



**Other than the limited warranty extended hereby there is no other expressed warranty in connection with the design, safety or use of any of the Company's products except as to title. All implied warranties are expressly disclaimed pursuant to the terms of this warranty.**

### **3. CUSTOM WORK**

If the Machine is used for commercial purposes such as custom work, the period warranted for the Machine is limited to six (6) months from the date of delivery to the first registered owner and does not cover any labor charges incurred.

### **4. RENTAL**

If the Machine is used for rental purposes the period warranted for the Machine is limited to thirty (30) days from the date of delivery to the first registered owner and does not cover any labor charges incurred.

### **5. REGISTRATION**

In order to qualify for coverage on this limited warranty, the product and name of the original purchaser must be registered with the Company by a completed Machine Pre-Delivery Checklist and Warranty Registration along with a copy of the dealer's invoice to the first registered owner to the Company within fourteen (14) days after the date of delivery to the original purchaser.

### **6. WARRANTY SERVICE**

Warranty Service must be performed by a dealer authorized by BEFCO. If the warranty service requested is approved, the owner shall pay only for labor beyond the rate allowed, for overtime labor, and for any mileage charge for transporting the equipment to and from the dealer's shop. It is assumed that the dealer has the appropriate general and special tools to service the Machine. Time required for replacement of knives, oil, grease and to remove excessive dirt from the Machine is not subject to reimbursement by the Company. The owner is required to clean the Machine before presenting it to the dealer for service work. The Machine must be delivered within thirty (30) days after failure date by the owner to the dealer to be eligible for warranty consideration.

### **7. UNAPPROVED SERVICE OR MODIFICATION**

All obligations of the Company under this limited warranty shall be terminated if:

- a. Proper service and operation instructions as outlined in the Operator's Manual and on the instruction sticker on the Machine, are not followed.
- b. The Machine is modified or altered in any way not approved by the Company.
- c. The Company does not receive a copy of the dealer's invoice to the first registered owner within fourteen (14) days from the date of delivery.
- d. The Company has not been paid in full, by the dealer, for the Machine.

### **8. ACCIDENTS AND NORMAL MAINTENANCE**

This limited warranty covers defective material and workmanship. It does not cover depreciation or damage caused by normal wear, accidents, improper maintenance, improper protection or improper use. The costs of normal maintenance or repairs for accidents or improper use, and related labor will be borne by the owner.

### **9. REPLACEMENT PARTS**

BEFCO, Inc. warrants replacement parts to be free from defect in material and workmanship for a period of thirty (30) days from the date of delivery to the original purchaser.



# WARRANTY REGISTRATION

**BEFCO, Inc.**  
**P.O. Box 6036**  
**Rocky Mount, NC 27802-6036**

**Tel: (252) 977.9920 - Fax: (252) 977.9718**

Dealer	Acct. #	Retail Customer
Street	Country	Street
Town	State    Zip	Town                      State    Zip
Date of delivery	Invoice #	Phone
Model #	Serial #	
Pre-Delivery Checklist: <input type="checkbox"/> Oil in gearbox. <input type="checkbox"/> Greased fittings. <input type="checkbox"/> Safety guards in place. <input type="checkbox"/> All hardware tight. <input type="checkbox"/> Bolts torqued correctly. <input type="checkbox"/> Attached unit to tractor. Yes/No. <input type="checkbox"/> Field adjusted.                      Yes/No. <input type="checkbox"/> Test run.                                      Dry/Infield. <input type="checkbox"/> Safety decals. <input type="checkbox"/> Operator's Manual.		Tractor make: _____ Model: _____; HP _____ Type of operation: Private homeowner, Landscaping, Commercial maintenance, Golf Course, Municipality, Turf Farm, others: _____  Approximate number of acres machine will be used on annually: _____  I hereby acknowledge that: I have received and accepted delivery of the machine described. The equipment was checked thoroughly for loose or missing parts and has been adjusted in accordance with the Pre-Delivery Checklist. I have read and understand the nature and extent of the warranty and understand clearly that there were and are no other representations of warranties either expressed or implied, made by anyone. I have been advised on proper operation, maintenance and lubrication procedure of this equipment. I have been instructed on and do understand the application, limitation and capacities this equipment was designed and recommended for, all as described in the Operator's Manual and literature published by the Company.
The machine described above, had been prepared for delivery according to the Pre-Delivery Checklist and the Customer has been instructed in its care and operation and the condition of warranty.		
Inspected by: _____		
Date: _____		Date: _____
Dealer's Signature: _____		Customer's Signature: _____

**This registration along with a copy of the invoice must be sent to BEFCO, Inc. within 14 days of date of purchase.**

*Sender:*

*Fold here*

---

*Place stamp  
here*

**BEFCO, Inc.**

Warranty Department

P.O. Box 6036

Rocky Mount, NC 27802-6036

*Cut along this line*



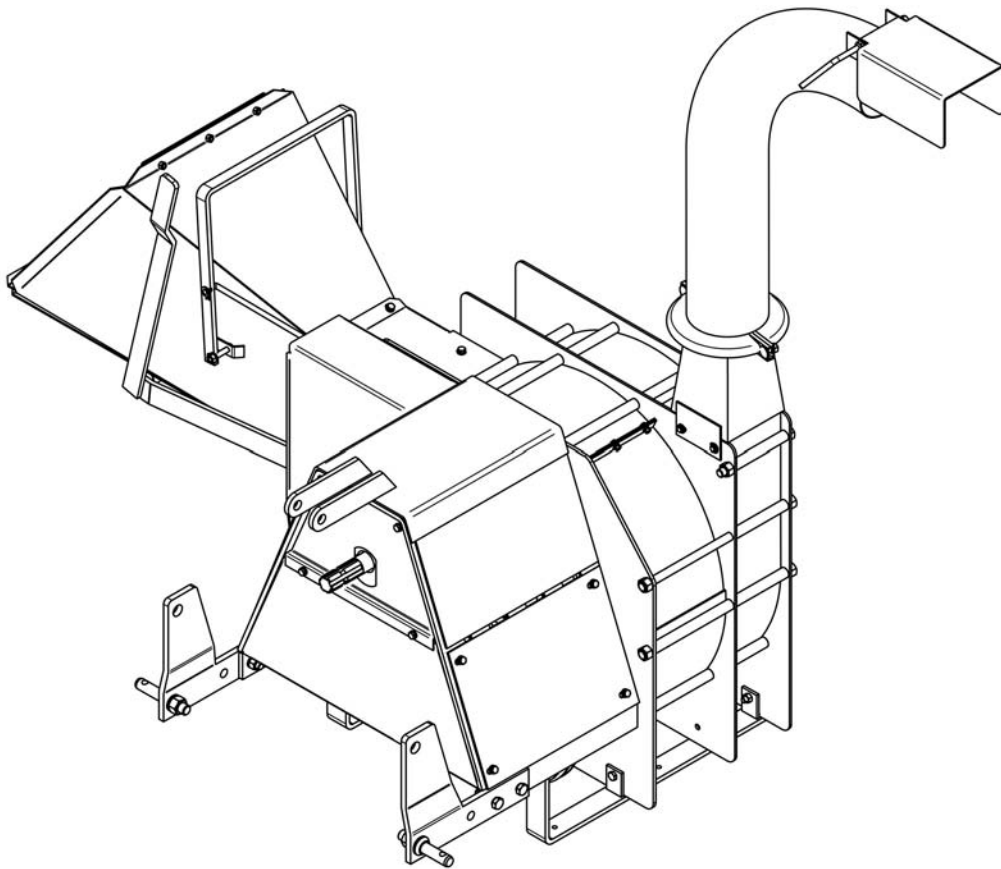
# **BEFCO**<sup>®</sup>

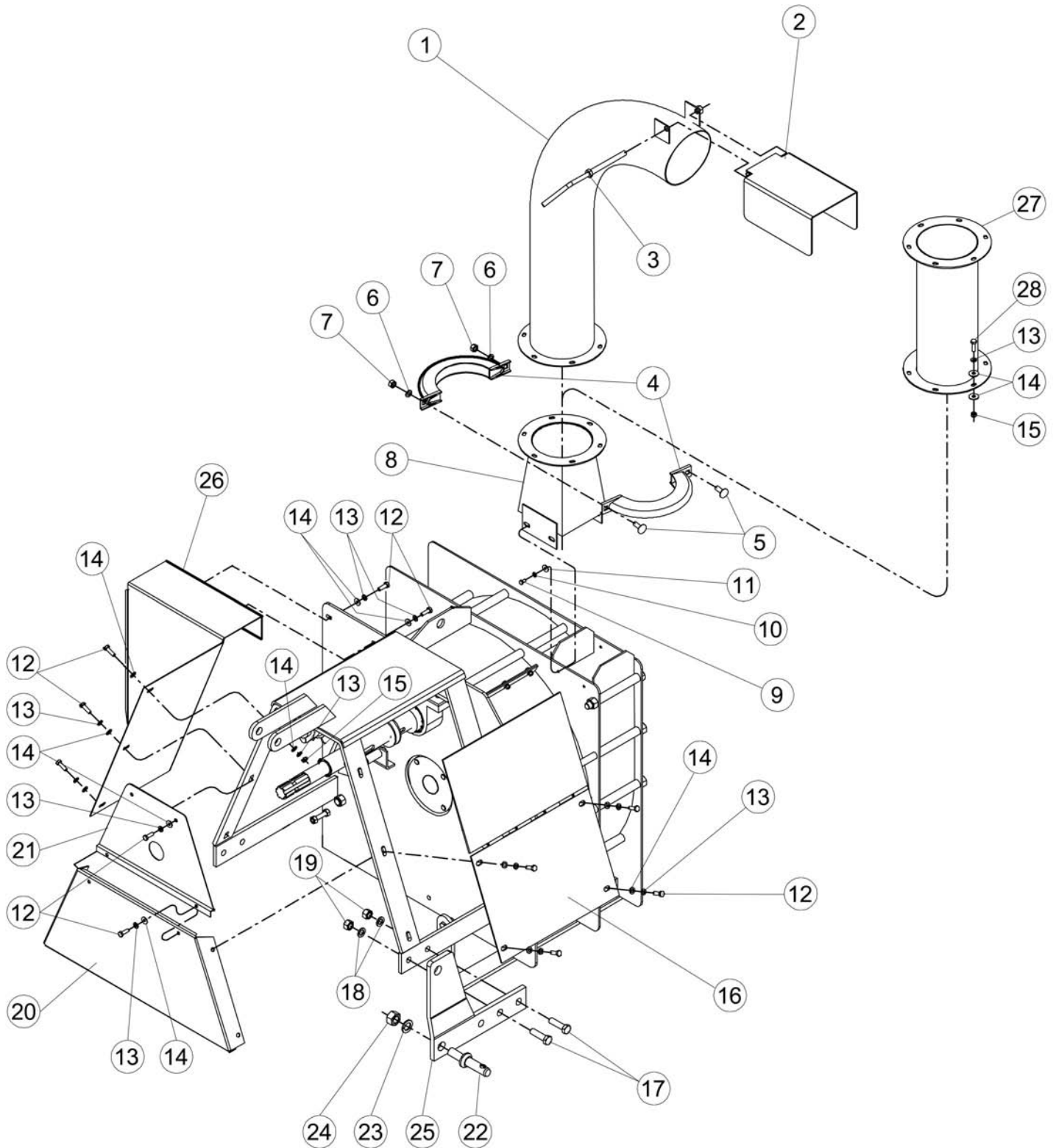
## **Parts Manual**

# **BUSHMASTER**

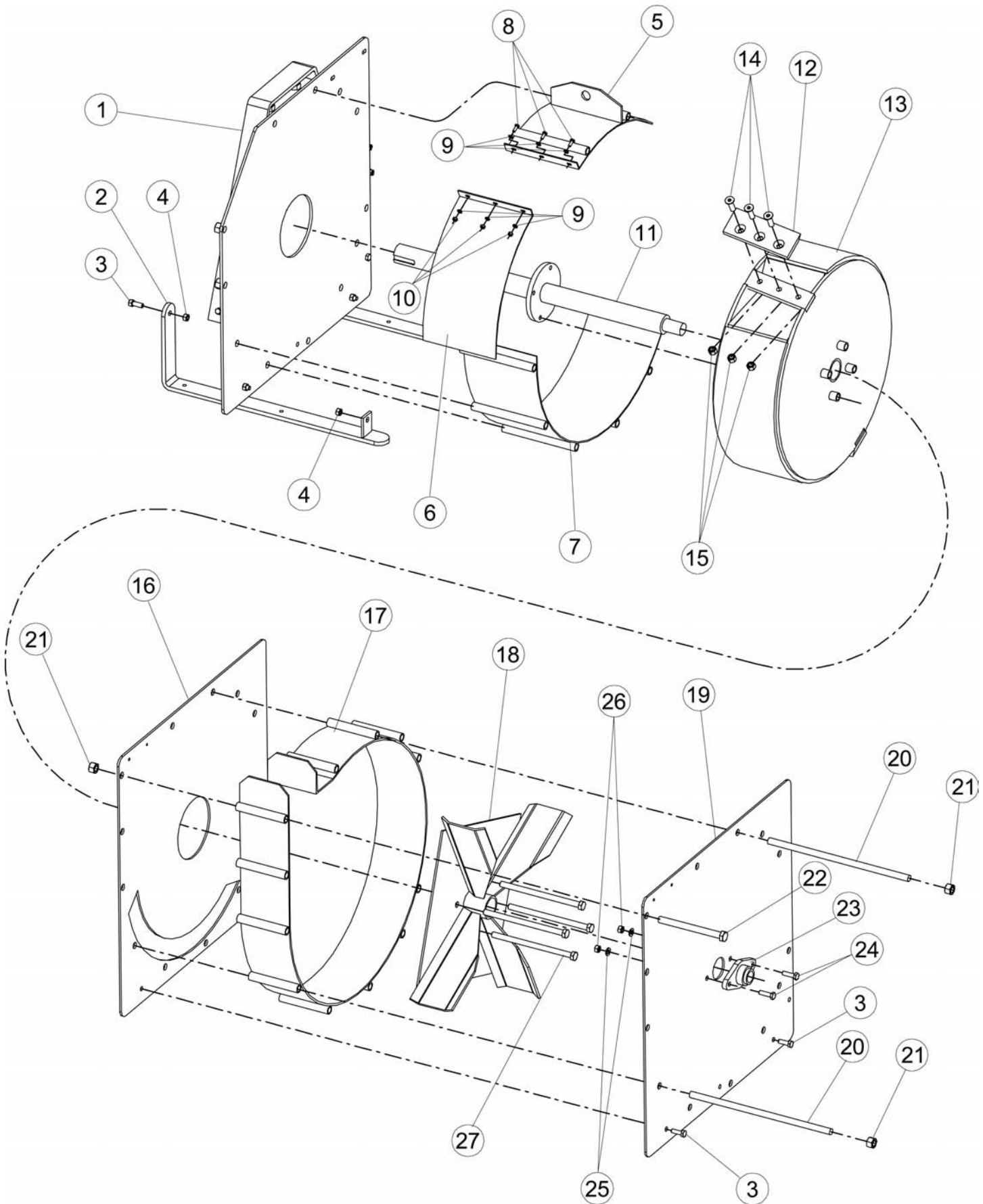
**Chipper**

**BM6-800**





Ref.	Part #	Description	Qty.
1	502-841B	Discharge chute	1
2	502-843B	Deflector	1
3	502-842B	Deflector screw handle	1
4	502-840B	Mount clamp	1
5	504-010B	Bolt CR 3/8"-16x2.5" G2 Z	2
6	006-9629	Washer lock 3/8" Z	2
7	006-9620	Nut HH 3/8"-16 G2 Z	2
8	502-839B	Discharge transition	1
9	502-869B	Bolt HH 1/4"-20x0.75" G5 Z F	4
10	502-871B	Washer lock 1/4" Z	4
11	502-872B	Washer flat 1/4" USS	4
12	004-6543	Bolt HH M8-1.25x30 C8.8 Z F	13
13	000-3144	Washer lock Ø8	13
14	001-4514	Washer flat Ø8	14
15	009-1384	Nut ES M08-1.25 Z TK	1
16	502-823B	Left side guard	1
17	006-9609	Bolt HH 5/8"-11x2" G5 Z	4
18	502-865B	Nut HH 5/8"-11 G2 Z	4
19	502-866B	Washer lock 5/8" Z	4
20	502-824B	Front guard, lower	1
21	7900502	Front guard, upper; #276114 & above	1
22	502-858B	Hitch pin	2
23	502-859B	Washer lock 7/8"	2
24	502-860B	Nut HH 7/8"-14 G2 Z	2
25	503-233B	Hitch blocks, straight bar	2
	7900503	Hitch block, right (quick-hitch compatible)	1
	7900504	Hitch block, left (quick-hitch compatible)	1
26	502-825B	Right side guard	1
27	7900500	Blower extension 15" (option)	-
28	009-1446	Bolt HH M08-1.25x25 C8.8 Z F	-



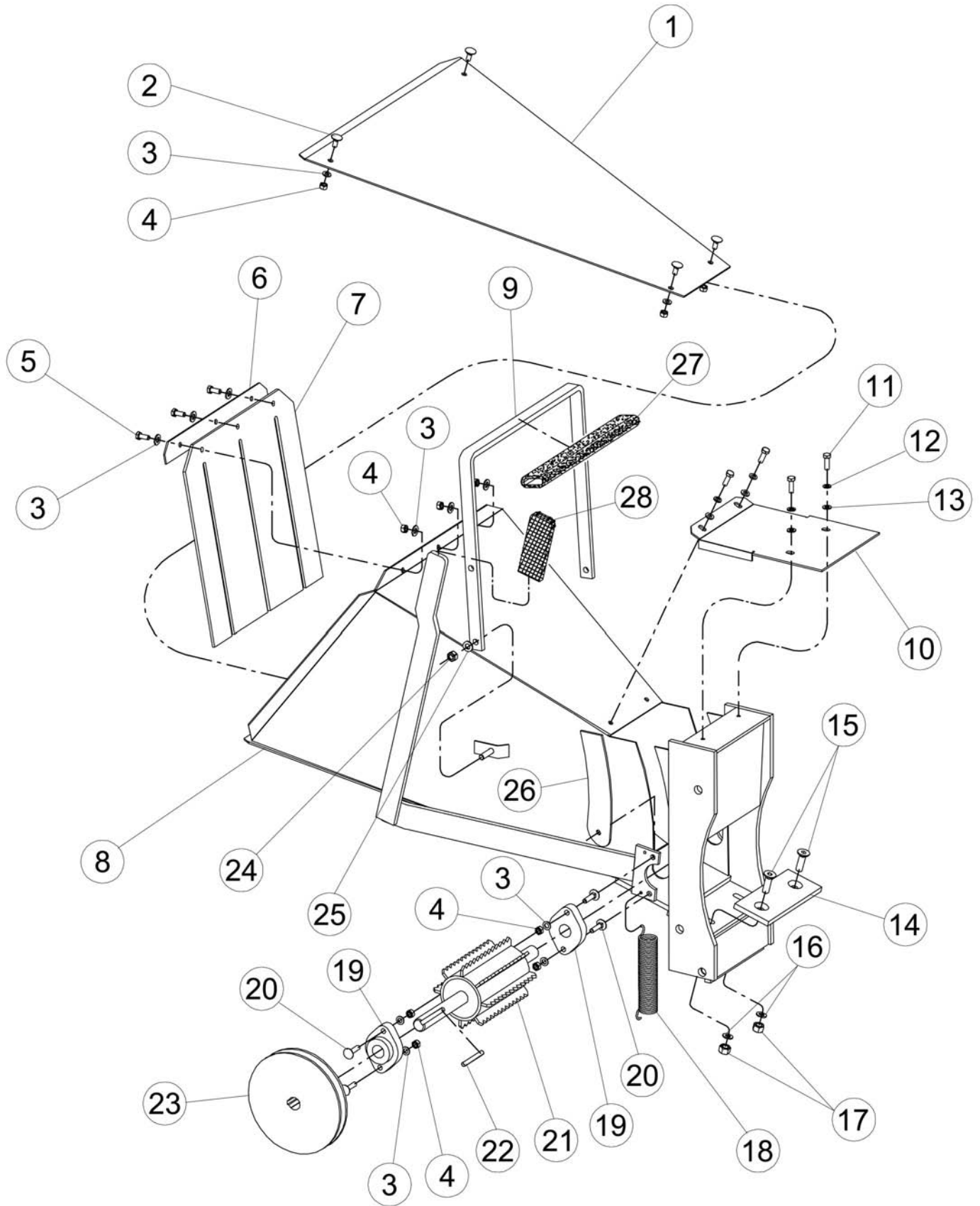


Ref.	Part #	Description	Qty.
1	502-822B	Main frame	1
2	190-1140	Skid	2
3	009-1281	Bolt HH M10-1.50x35 C8.8 Z F	6
4	001-4106	Nut ES M10-1.50 Z TK	6
5	502-833B	Drum shroud top section	1
6	502-834B	Drum shroud mid section	1
7	502-835B	Drum shroud bottom section	1
8	502-869B	Bolt HH 1/4"-20x0.75" G5 Z F	3
9	502-872B	Washer flat 1/4" USS	6
10	502-873B	Nut ES 1/4"-20 G2 Z	3
11	502-780B	Shaft 1 15/16"x46" <sup>20</sup>	1
12	502-768B	Knife, chipper	2
13	502-826B	Drum, chipper <sup>21</sup>	1
14	504-011B	Bolt CS 1/2"-13x1.75" G8 N	6
15	502-813B	Nut ES 1/2"-13 Z	6
16	502-836B	Divider plate	1
17	502-838B	Fan shroud	1
18	502-837B	Fan, chipper <sup>22</sup>	1
19	190-1127	Rear panel	1
20	502-855B	Stud 5/8"-11x16.5"	11
21	502-865B	Nut HH 5/8"-11 G2 Z	11
22	190-1228	Bolt HH 5/8"-11x7" G5 Z P	1
23	502-854B	Flanged bearing 1.25"	1
24	504-012B	Bolt HH 1/2"-13x1.5" G5 Z P	2
25	502-863B	Washer flat 1/2" USS	2
26	502-813B	Nut ES 1/2"-13 Z	2
27	502-810B	Bolt HH 1/2"-20x9" G8 Z P	4
28	502-856B	Nut PT 5/8"-11 G2 Z	12
29	502-866B	Washer lock 5/8" Z	11

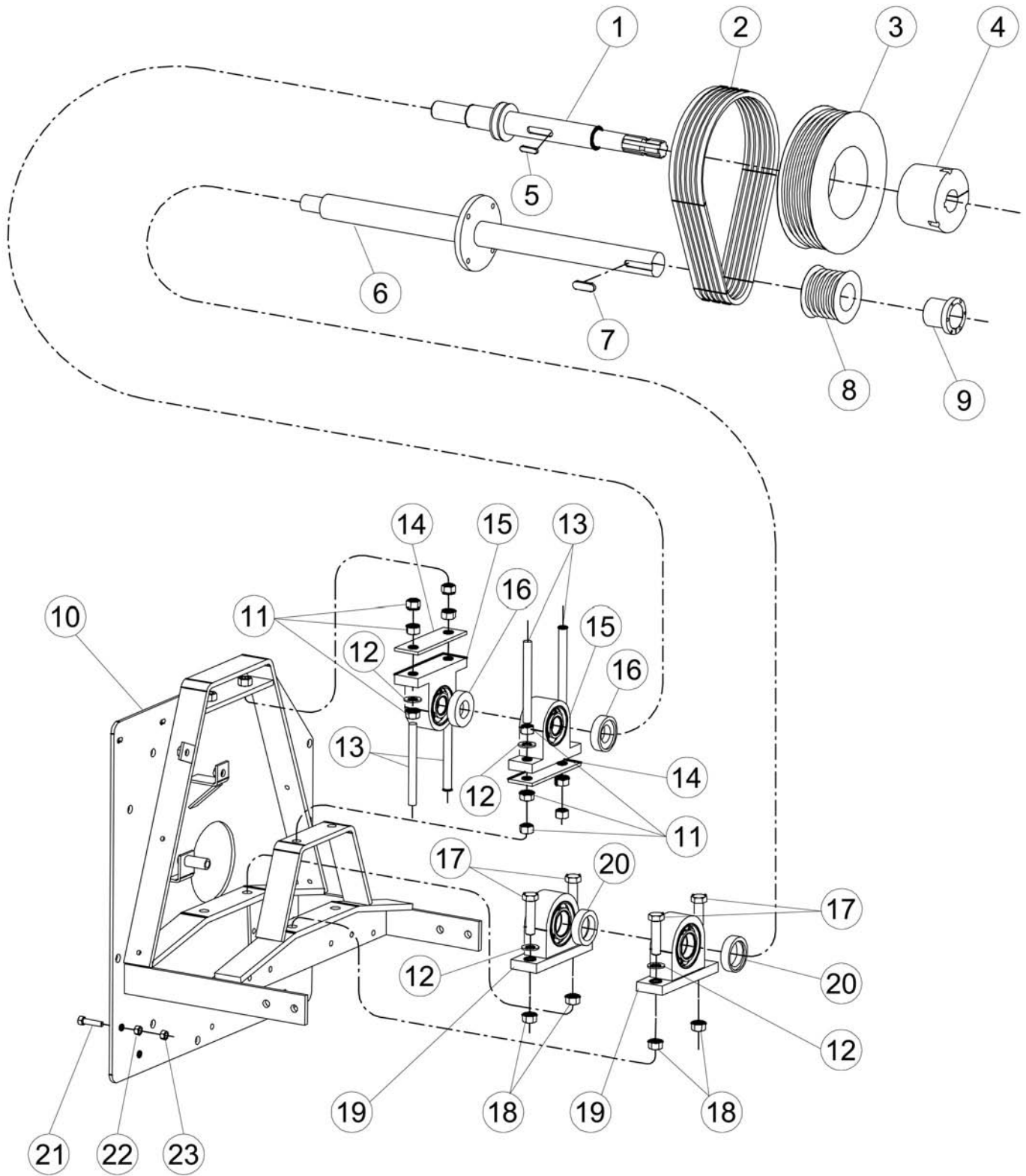
<sup>20</sup> After replacing the chipper Shaft (part #502-780B); it is important to have the assembly "shaft, drum and fan" properly rebalanced before using the chipper.

<sup>21</sup> After replacing the chipper Drum (part #502-826B); it is important to have the assembly "shaft, drum and fan" properly rebalanced before using the chipper.

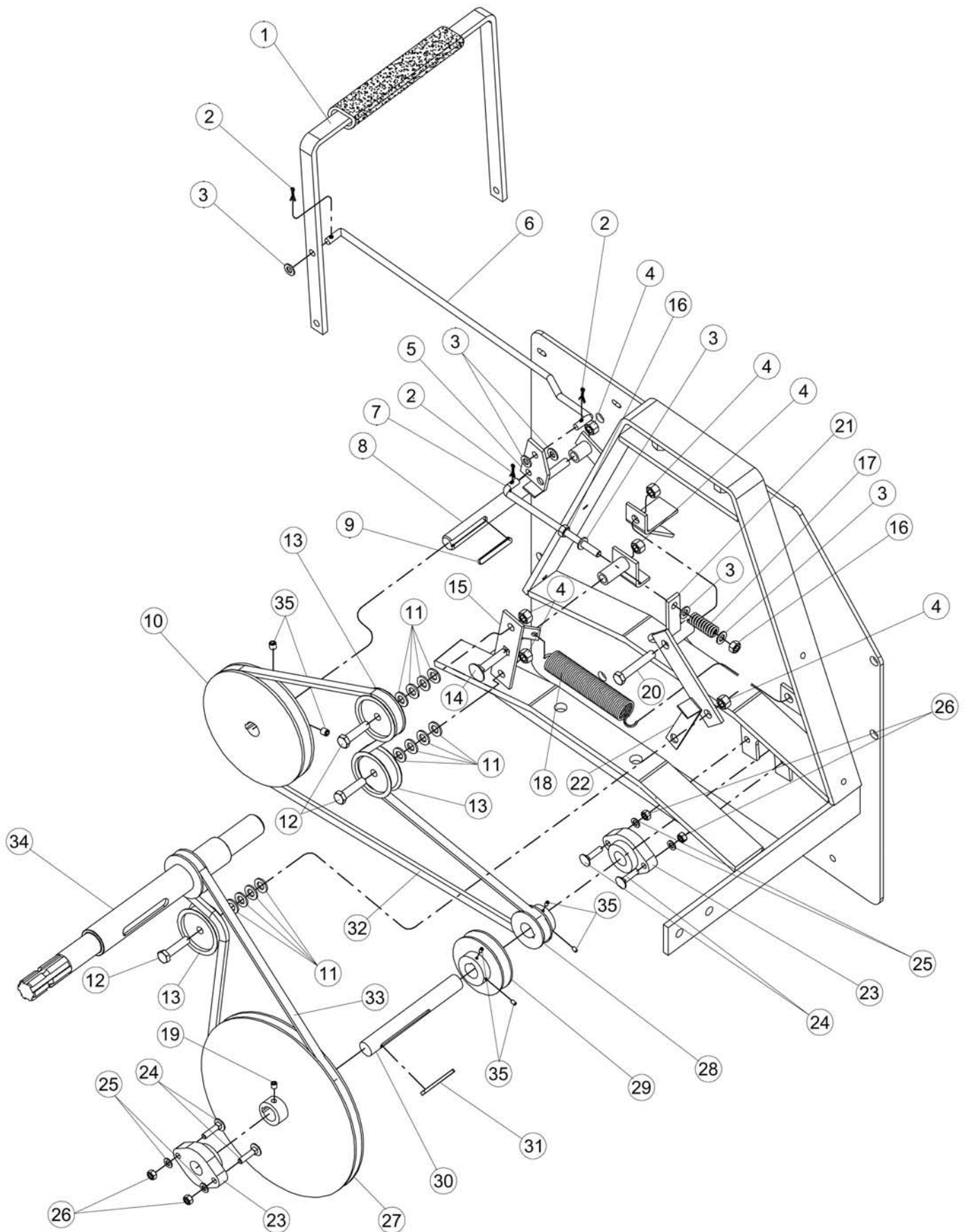
<sup>22</sup> After replacing the chipper Fan (part #502-837B); it is important to have the assembly "shaft, drum and fan" properly rebalanced before using the chipper.



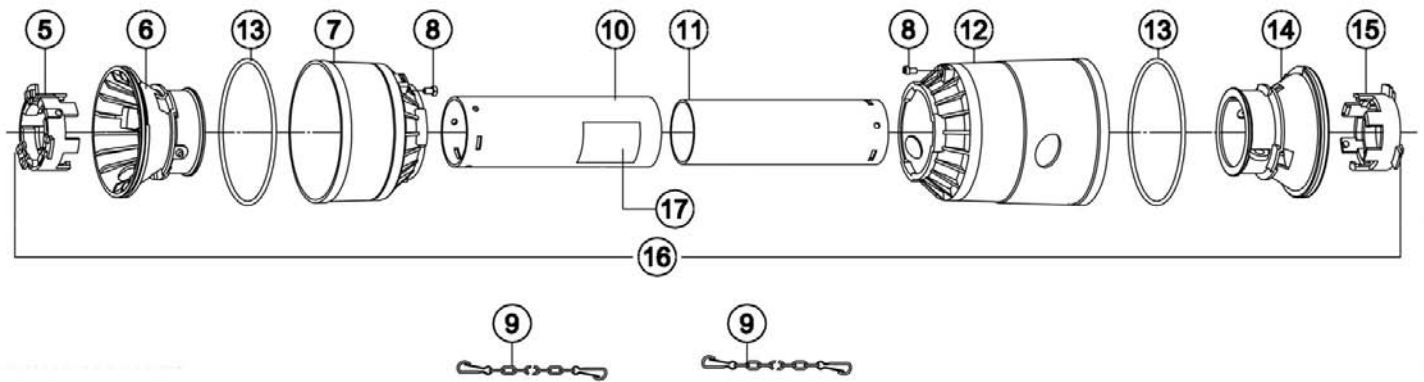
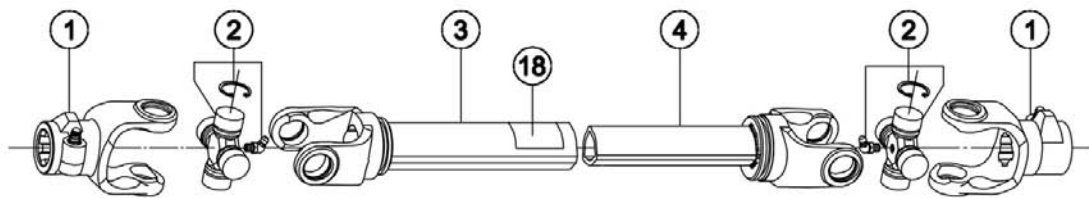
Ref.	Part #	Description	Qty.
1	190-2044	Chute wear pad	1
2	008-4289	Bolt CR M8-1.25x20 C4.6 Z	4
3	001-5230	Washer flat Ø8	14
4	009-1384	Nut ES M8-1.25 Z TK	11
5	009-1446	Bolt HH M8-1.25x25 C8.8 Z F	3
6	190-2043	Skirt mount box	1
7	190-2042	Chipper skirt	1
8	190-2041	Chipper chute	1
9	502-831B	Feed roller engage handle	1
10	502-832B	Chipper chute top cover	1
11	001-5012	Bolt HH M8-1.25x20 C8.8 Z F	4
12	000-3144	Washer lock Ø8	4
13	001-4514	Washer flat Ø8	4
14	502-769B	Anvil, chipper	1
15	504-011B	Bolt CS 1/2"-13x1.75" G8 N	2
16	502-863B	Washer flat 1/2" USS	2
17	502-813B	Nut ES 1/2"-13 Z	2
18	502-801B	Spring feed roller	2
19	502-794B	Flanged bearing 1"	2
20	005-7384	Bolt CR M8-1.25x30 C4.6 Z	4
21	502-781B	Feed roller x 1 c.r.r.b. shaft	1
22	502-784B	Key 1/4"x3"	1
23	502-775B	Pulley B 8.25" OD	1
24	001-4106	Nut ES M10-1.50 Z TK	2
25	000-2034	Washer flat Ø10	2
26	7900501	Guard; #276114 & above	2
27	190-2087	Foam grip 32" long	1
28	190-2086	Handle grip	1



Ref.	Part #	Description	Qty.
1	502-779B	Drive shaft 1 3/8"x19"	1
2	502-786B	Main drive belt BX 42	6
3	502-770B	Pulley B110 SF	1
4	502-776B	Bushing 1 3/8"	1
5	502-782B	Key 5/16"x3"	1
6	502-780B	Drum shaft 1 15/16"x46"	1
7	502-783B	Key 1/2"x5/16"x1.75"	1
8	502-771B	Pulley B 4.5"	1
9	502-777B	Bushing 1 15/16"	1
10	502-822B	Main frame	1
11	502-865B	Nut HH 5/8"-11 G2 Z	12
12	503-877B	Washer flat 5/8" SAE Z	8
13	502-806B	Stud 5/8"-11x6"	4
14	502-805B	Mount plate	2
15	502-795B	Pillow block bearing 1 3/8"	2
16	502-797B	Lock collar	2
17	502-809B	Bolt HH 5/8"-18x2.5" G8 Z P	4
18	503-878B	Nut ES 5/8"-18 Z	4
19	502-796B	Pillow block bearing 1 15/16"	2
20	502-798B	Lock collar	2
21	002-6329	Bolt HH M10-1.50x45 C8.8 Z F	2
22	000-1279	Nut HH M10-1.50 C6 Z TK	2
23	001-4106	Nut ES M10-1.50 Z TK	2

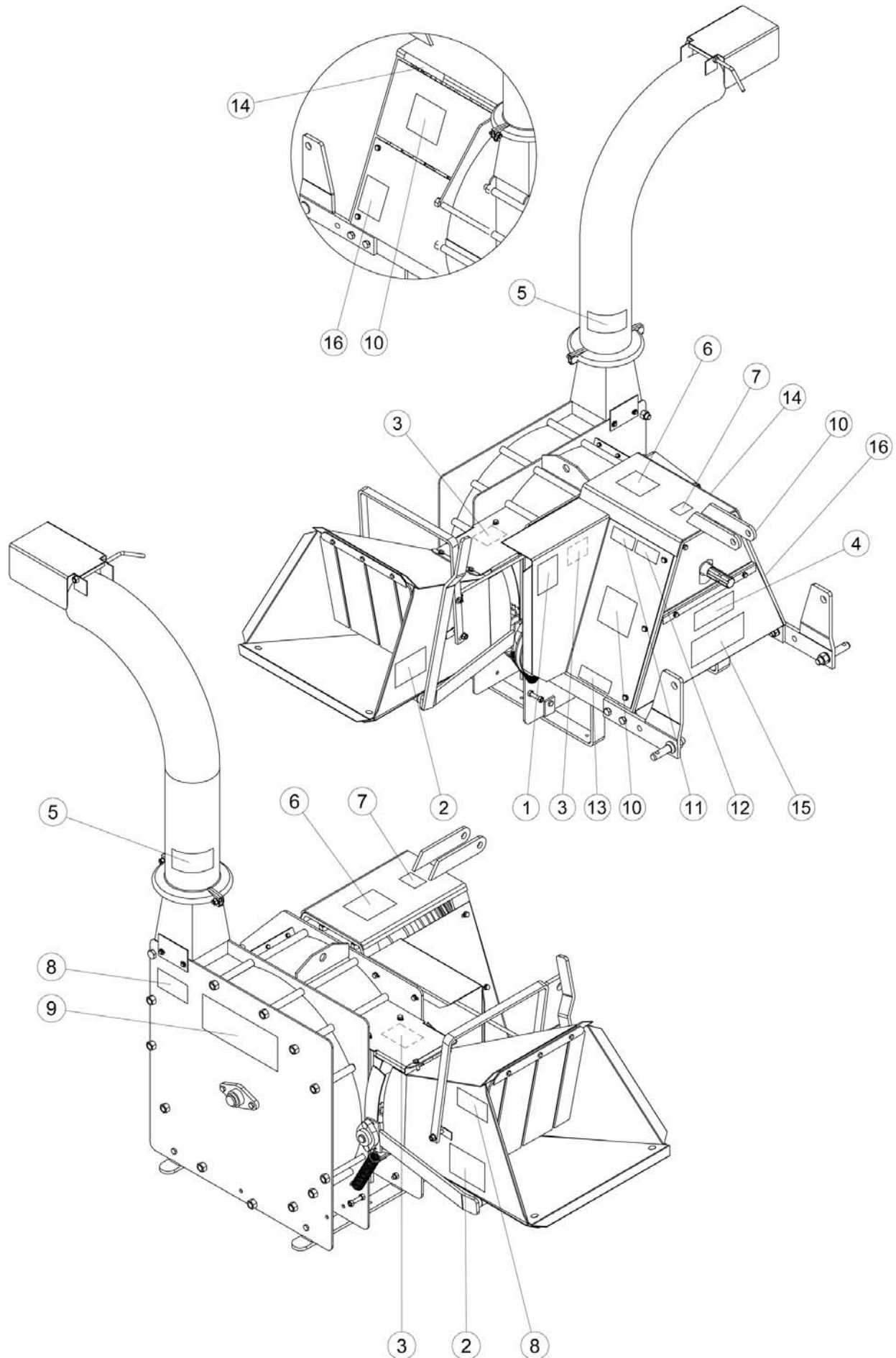


Ref.	Part #	Description	Qty.
1	502-831B	Feed roller engage handle	1
2	502-802B	Cotter pin 5/32"x2"	3
3	000-2034	Washer flat Ø10 W	6
4	502-813B	Nut ES 1/2"-13 Z	6
5	502-791B	Pivot bracket	1
6	502-789B	Linkage, long	1
7	502-790B	Linkage, short	1
8	502-781B	Feed roller x 1 c.r.r.b. shaft	1
9	502-784B	Key 1/4"x3"	1
10	502-775B	Pulley B 8.25"x1	1
11	009-1435	Washer flat Ø14 W	12
12	502-400B	Bolt HH 1/2"-13x2.00" G5 Z P	3
13	502-788B	Pulley take up	3
14	502-814B	Bolt CR 1/2"-13x3" Z	1
15	502-804B	Dual idler bracket	1
16	502-815B	Nut ES 3/8"-16 Z	2
17	502-799B	Spring, small take up	1
18	502-801B	Spring feed roller	1
19	504-008B	Set screw 5/16"-24x5/16"	1
20	190-1146	Bolt HH 1/2"-13x3.5" G5 Z P	1
21	502-792B	Take up bracket	1
22	502-793B	Belt bracket	1
23	502-794B	Flanged bearing 1"	2
24	005-7384	Bolt CR M8-1.25x30 C4.6 Z	4
25	001-5230	Washer flat Ø8	4
26	009-1384	Nut ES M8-1.25 Z TK	4
27	502-772B	Pulley 12" OD	1
28	502-773B	Pulley 2.5" OD	1
29	502-774B	Pulley 4" OD	1
30	502-778B	Feed roller transmission shaft 1"x7.5"	1
31	502-741B	Key 1/4"x4"	1
32	502-787B	Feed roller belt BX67	1
33	190-2098	Transmission belt A57	1
34	502-779B	Shaft 1 3/8"x19"	1
35	504-007B	Set screw 5/16"-24x3/8"	6





Ref.	Part #	Description	Qty.
1	1024010C	Yoke	2
2	1004020C	Cross & bearing	2
3	1944025NC	Outer tube	1
4	1954027NC	Inner tube	1
5	1784210C	Locking ring, outer tube	1
6	1784201C	Rigid cone, outer tube	1
7	1784203C	Standard cone (tractor end)	1
8	1784212C	Pin	2
9	1006065C	Chain, anti-rotation	2
10	1773023C	Shield, outer tube	1
11	1872023C	Shield, inner tube	1
12	1784205C	Long cone (implement end)	1
13	1213233C	Stiffening ring	2
14	1784202C	Rigid cone, inner tube	1
15	1784211C	Locking ring, inner tube	1
16	90SL4023C	Shield, complete	1
17	950-463B	Decal "DANGER - Rotating driveline, keep away" outer shield	1
18	950-464B	Decal "DANGER - Guard missing, do not operate" outer tube	1
	050-0453	Driveline, complete	-



Ref.	Part #	Description	Qty.
1	950-486B	Decal "DANGER - Moving parts hazard"	1
2	950-487B	Decal "DANGER - Rotating blades and feed rollers"	2
3	950-213B	Decal "DANGER - Replace shields"	2
4	950-109B	Decal "DANGER - Rotating driveline"	1
5	950-201B	Decal "WARNING - Thrown objects hazard"	2
6	950-488B	Decal "CAUTION - To avoid serious injury"	1
7	950-489B	Decal "CAUTION - Operate only with 540 rpm PTO"	1
8	950-366B	Decal, red reflective	2
9	950-107B	Decal "BEFCO"	1
10	950-103B	Decal "B"	2
11	950-821B	Decal "BM6"	1
12	950-822B	Decal "800"	1
13	950-381B	Decal "BEFCO INC." address	1
14	950-358B	Decal "Made in USA"	1
15	950-200B	Decal "Bushmaster-Chipper"	1
16	950-940B	Decal "Quick-Hitch compatible"	1
	971-168B	Operator's & Parts Manual Bushmaster BM6-800	1

## Use only original spare parts

*All rights reserved. It is unlawful to copy, reprint or use any of the information or details in this manual without the expressed written permission of the Company. Technical information provided in this manual is approximate, the Company reserves the right to modify or improve the models shown for technical or commercial purposes. Pictures in this manual do not necessarily show the machine as delivered.*

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**BEFCO**<sup>®</sup>

P.O. Box 6036  
Rocky Mount, NC 27802-6036  
Tel.: 252.977.9920 - Fax: 252.977.9718  
[www.befco.com](http://www.befco.com)

