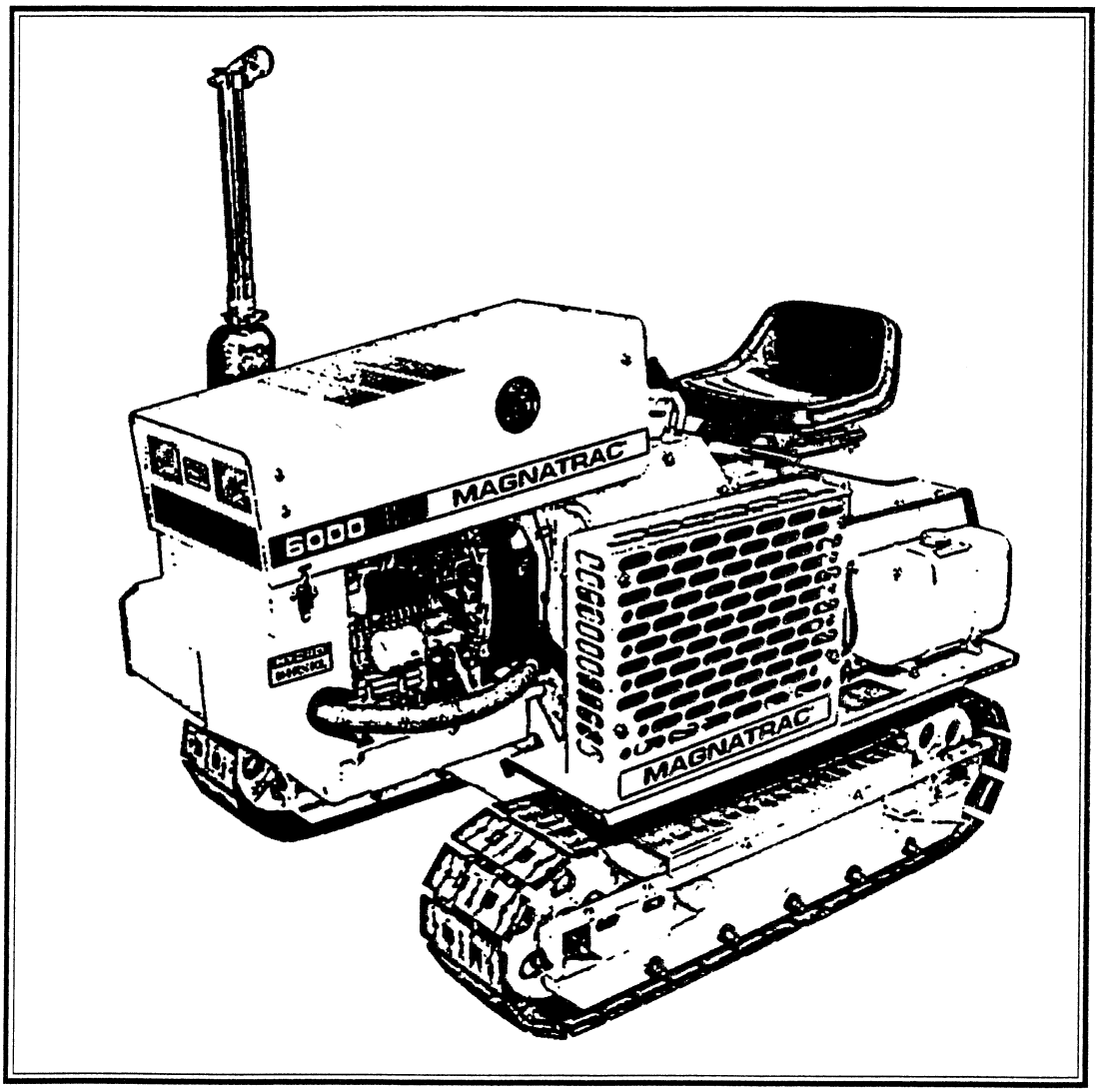
MAGNATRAC®

HYDRO 6000



Operator / Technical Manual

C.F. Struck Corporation - Cedarburg, WI 53012

********* SERVICE BULLETIN *********

C. F. STRUCK CORPORATION
Cedarburg, Wisconsin 53012

Dear Magnatrac Owner:

Working with thousands of customers over the last 35 years, I've gained some tips that I would like to share with you to make your Magnatrac experience as safe and rewarding as possible.

When a customer first receives his new Magnatrac he grabs the keys, fires-up the engine and dives into his first big job. This is human nature and quite understandable, but experience has shown that such action is DANGEROUS to the operator and can lead to unnecessary and costly damage to the Magnatrac.

As a Magnatrac Operator/Mechanic, you are expected to understand your crawler's operation & safety, basic mechanical construction, and proper maintenance. All the information you need is in the following Operator Manual! Take time NOW, before you start to operate your Magnatrac, to go over the complete Manual. Read in detail the operating, and safety instructions. Read for "backround" other sections such as lubrication, service, etc...you can go back later for more detailed reading when you actually have to perform those operations.

In conclusion, I want to bring three critical topics to your attention: Track System Lubrication, Periodic Maintenance & Tractor Operation. Experience shows that many operators let these areas go, creating either dangerous situations for themselves or needless damage and subsequently expensive repairs.

By taking the following three points seriously, you can make your Magnatrac experience satisfying, profitable, but above all...SAFE!

Sincerely yours,

#1 - TRACK SYSTEM LUBRICATION:

With tens-of-thousands of customer hours of field experience, the following "amendment" to the lubrication instructions for your Track Sprockets and Track Idlers (as described in the Service section of your Operator's Manual) is suggested:

For normal operation, the 50 hour frequency of "oiling" your Track Sprockets and Idlers is still recommend. But, if you plan on using your tractor extensively in extremely fine and abrasive materials such as sand, crushed stone, decomposed granite, etc. it is recommend that "grease" be substituted for "oil" for lubrication.

After a 20 hour initial break-in period, using a good grade of Multi-Purpose grease in a grease gun, grease should be "injected" into zerks on the ends of each #213 Idler Axle and each #214 Rear Axle. The #215 Front Axles are lubricated through the zerk located on the #209A Tube which with the #212 Sprockets rides on each Front Axle. Grease is recommended for more abrasive conditions because the grease (being injected inside the bearings) forces out contaminants and provides the mating shim washers with lubricant.

NOTE: Once you begin greasing your Track Sprockets and Idlers it should be done on a **daily** basis and you should **not** return to the "oiling" method of lubrication.

#2 - PERIODIC MAINTENANCE:

Though periodic maintenance is well covered in the Operator's Manual, it seems that some operators have let some points "slide" and have suffered expensive repairs. In the hopes of saving you from premature failure in the future, due to forgotten maintenance, the following points are brought to your attention!

1) The #526 Bushings (steel) which restrains the #525 Torque Arms mounted to the #524 Track Drive Motors must be replaced before they wear through and damage their mating #202C Pin. [Check Drawing #116 in your Operator Manual].

2) The #536 & 537 Chains should be checked for proper tensioning. See "DRIVE CHAIN TENSIONING" in Service section of your Operator Manual for complete instructions.

2) #275R & #275L Right & Left Guards, must be periodically removed and cleaned. [Check Drawing #117 in your Operator Manual].

   Due to the varied materials your tractor operates in, there is no specific maintenance schedule for these #275 Guards. Rather it is up to the operator to gain experience with the use of the Guards and create his own maintenance schedule...the Guards may require daily removal and cleaning if the tracks are run all day submerged in mud, or it may be monthly or quarterly maintenance because your tractor is working in a relatively clean environment like grass.

#3 - CRAWLER OPERATION...Uphill and Downhill:

It can not be repeated too often that you must operate your Track Control handles **slowly** and **smoothly**...they control a hydraulic drive system that can produce literally "tons of physical force".

But in addition, the Track Controls can also produce an opposite force or "resistance to movement" when going up and down hills with heavy loads...in other words, they can provide a dynamic braking action!

EXAMPLE

Potentially, if you are going downhill with a load that exceeds factory recommendations, you may find that your "overload" is actually pushing you downhill faster than the crawler's

drive system is propelling you down the hill. Under these circumstances you have basically two steps for safe control of your crawler:

First, slowly release the Track Controls so that they may go to neutral and provide a dynamic braking action. Again, it must be emphasized that you must operate your Track Controls slowly. Remember, you are controlling tons of force, and though significant overload strength has been built into the Controls, you still can do serious damage to your tractor's hydraulic drive by "snapping" the Controls into the neutral position. The act of snapping the Controls to neutral is equivalent to driving your car down the highway at 65 miles per hour and then instantly shifting into reverse!

The **second** step in controlling your crawler is to apply your Parking/Emergency Brake. This is an over-ride braking action used to augment the hydraulic system's dynamic braking effect. Again, to protect your drive system from harmful shock loads, the brakes, like the Track Controls, must be applied with controlled force...never in a snapping action.

SUMMARY

Your crawler should always be operated with forethought, rather than in a series of sudden, and potentially damaging, starts and stops. Always plan your crawler movements so as to eliminate the need for any potentially damaging sudden Track Control or Brake operation. * **NEVER carry or move loads in excess of factory recommendations!** *

******* As always, you are encouraged to contact the factory if you have any questions regarding the above instructions, or for more information regarding other maintenance and operational procedures! *******

OPERATOR MANUAL

SERIAL NUMBER:_____ MODEL NUMBER:_____

TABLE OF CONTENTS

IMPORTANT: *Though the MAGNATRAC HYDRO is offered completely assembled, it's still the customer's responsibility to provide competent service ability! The servicing can be provided either by the mechanically-inclined customer, or by a local mechanic. We provide manuals & drawings for complete service and repair so that anyone with reasonable mechanical skill can perform all required service work.*

1- TO THE OPERATOR

RECOGNIZE SAFETY INFORMATION

This is the safety-alert symbol. When you see this symbol on your Crawler or in this manual, be alert to the potential for personal injury.

UNDERSTAND SIGNAL WORDS

A signal word—DANGER, WARNING, or CAUTION—is used with the safety-alert symbol. DANGER identifies the most serious hazards.

Safety signs with the signal word DANGER or WARNING are typically near specific hazards.

General precautions are listed on CAUTION safety signs. CAUTION also calls attention to safety messages in this manual.

FOLLOW SAFETY INSTRUCTIONS

Carefully read all safety messages in this manual and on your Crawler and Attachment safety signs. Follow recommended precautions and safe operating practices.

Keep safety signs in good condition. Replace missing or damaged safety signs.

To keep your Crawler running efficiently, read the instructions in this Operator's Manual.

Left side, right side, front, and rear are viewed by facing in the direction of the Crawler's forward travel.

Record your Crawler serial & model numbers in the spaces provided on previous page. You need this information when you order parts.

(Version 01.01.01)
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2- SAFETY RULES

Reports on accidents show that careless use of machinery causes a high percentage of accidents. You can avoid many accidents by following the safety rules on these pages. Study these rules carefully and enforce them on the job.

SAFETY BEFORE STARTING OR OPERATING

The Crawler should be operated only by persons approved to do so.

Clothing worn by the operator should be fairly tight and belted.

Fasten a first aid kit to the Crawler.

Fasten a fire extinguisher to the Crawler. Keep the extinguisher fully charged. Learn to use it correctly.

If the Crawler has an unsafe condition, do not operate. Put a tag on the Track Drive Controls.

Do not start or operate the Crawler unless you are in the operator's seat.

Before you start the Engine, be sure there is plenty of ventilation.

Keep hands, feet, and clothing away from power-driven parts.

Fasten a slow-moving vehicle sign to the rear of the Crawler.

Do not change Backhoe or Loader relief valve setting without consulting factory.

Before you operate Backhoe, be sure stabilizers are in correct position.

Guards, shields, and other protective devices must be in place and in good condition.

Before you start or operate the Crawler, clear the area of all persons and obstacles.

OPERATION SAFETY

When you operate the Crawler, do not allow anyone to ride on the Crawler or its equipment.

Drive at safe speeds at all times, especially on rough ground and hillsides.

Carry the Bucket or Blade as low as possible at all times, especially when you work on a hillside or back up a steep hill.

Do not lower a loaded Bucket or Fork with the control lever in float position.

Do not drive too close to the edge of a ditch or excavation.

Watch for overhead wires. Do not touch wires with any part of the Crawler or its Attachments.

Do not leave your Crawler unattended with the Engine running.

Keep work areas as level as possible.

Do not operate the Crawler Loader without the minimum recommended counterweights.

Do not dig under stabilizers of Crawler with the Backhoe.

When loading logs with the Log Forks, make sure the logs are balanced.

Before you transport the Backhoe, attach the safety chains provided.

When you drive out of a ditch or excavation, or up a steep hillside, or when Crawler is hitched to a heavy load, engage Track Drive Controls slowly. If the front of the Crawler comes off the ground, release Track Controls immediately.

When you operate the Backhoe on a hillside, avoid swinging Bucket downhill. If possible, dump Bucket on the uphill side.

Before you lower any hydraulic equipment, be sure all persons are away from the Crawler.

Do not use the Crawler as a battering ram.

Do not guide cable onto Winch Drum with your hands.

When you drive the Crawler on a road, use the correct lights to warn operators of other vehicles.

Before you move any equipment, be sure all persons are away from the Crawler.

When the Crawler is operating, **only** the operator should be on it.

If it is necessary to make checks with the Engine running, **always use two people**...the operator at the controls, should be able to see the person doing the checking.

KEEP HANDS AWAY FROM MOVING PARTS.

DANGER: Never use "quick-disconnect" type couplings on this Crawler or any of its mating Attachments unless specified...to do so results in the potential of rupturing hydraulic fittings or even "blowing-up" your Hydraulic Pumps!

BEFORE YOU DISMOUNT:

1) **Move Track Drive Controls to neutral.**

2) **Push down Parking Brake and Lock.**

3) **Lower all equipment to the ground.**

4) **Stop Engine and remove the key.**

SERVICE SAFETY

Be sure you understand a service procedure before you work on the Crawler.

Unauthorized modifications to the Crawler may impair the function and/or safety and affect Crawler life.

Do not work under raised equipment unless it is correctly supported..

Before you work on the Engine or electrical system, disconnect the battery's "ground" (-) terminal first! When work is finished, connect battery's "ground" terminal (-) last.

When driving connecting pins, wear goggles or safety glasses.

Do not run Engine while working on the Crawler.

Be careful when handling any type of fuel. Do not smoke while filling the fuel tank or working on the fuel system.

Check for faulty wiring or loose connections.

Do not lubricate or work on the Crawler while it is moving.

Release hydraulic pressure before working on hydraulic system. Move **every** hydraulic control lever back & forth until equipment does not move.

Before using the hydraulic system, be sure that all connections are tight and that lines are in good condition.

When you work near the Track Springs, **use extreme care**. Do not disassemble parts unless you know the correct procedure and have correct tools.

FIRE PREVENTION MAINTENANCE

Be prepared if an accident or fire should occur. Know where the first aid kit and the fire extinguishers are located—know how to use them. Check fire extinguisher for correct charge.

Do not smoke while refueling or handling highly flammable material.

Shut off the Engine when refueling.

Use care in refueling if the Engine is hot.

Do not use open pans of gasoline or diesel fuel for cleaning parts. Use good commercial, nonflammable solvents.

Provide adequate ventilation when charging battery.

Do not check battery charge by placing metal objects across the posts.

Do not allow sparks or an open flame near battery. Do not smoke near battery.

Never check fuel, battery electrolyte, or coolant levels with an open flame.

Never use an open flame to look for leaks anywhere on the equipment.

Never use an open flame as light anywhere on or around the equipment.

When preparing Engine for storage, remember that inhibitor is volatile and therefore dangerous. Seal and tape openings after adding the inhibitor. Keep container tightly closed when not in use.

Inspect electrical wiring for worn or frayed insulation. Install new wiring if wires are damaged.

Temperature in Engine and cooling compartments may go up immediately after you stop the Engine. **Be on guard for fires.**

Before you clean trash from the Engine compartment, wait until the Engine has cooled. Open Side Panels to cool the Engine faster. While the Engine cools, clean trash from other areas.

Check for leaking fuel lines, hydraulic lines, hoses, or fittings with a piece of cardboard or wood. Do not use your hands. Tighten loose fittings. If lines are bent or hoses kinked, install new parts.

PROTECT AGAINST NOISE

Prolonged exposure to loud noise can cause impairment or loss of hearing. Wear a suitable hearing protective device such as earmuffs or earplugs to protect against objectionable or uncomfortable loud noise.

AVOID HIGH-PRESSURE FLUIDS

Escaping fluid under pressure can penetrate the skin causing serious injury. Relieve pressure before disconnecting hydraulic or other lines. Tighten all connections before applying pressure. Keep hands and body away from pinholes and nozzles which eject fluids under high pressure. Use a piece of cardboard or paper to search for leaks. Do not use your hand.

If ANY fluid is injected into the skin, it must be surgically removed within a few hours by a doctor familiar with this type of injury or gangrene may result.

INSTALL AND MAINTAIN ROPS PROPERLY

If Roll-Over Protective Equipment is loosened or removed for any reason, make certain all parts are reinstalled correctly. Tighten mounting bolts to proper torque. The protection offered by ROPS will be impaired if the ROPS is subject to structural damage, has been involved in an overturn incident or is in anyway altered. Damaged ROPS should be replaced, not reused.

DO use your Seat Belt if your Crawler has a Roll-Over Protective Structure (ROPS).

DO NOT use a Seat Belt if your Crawler does not have a ROPS.

ROLL-OVER PROTECTIVE STRUCTURE (ROPS)

To prevent serious injury in the event of tractor tipover:

- **Wear Seat Belt.**
- **Do not jump if tractor tips.**
- **Avoid crushing of operator.**
- **Keep this Roll-over Protective Structure in place.**
- **Replace damaged Protective Structure...don't repair!**

Any alterations to this Protective Structure must be approved by the factory!

START ENGINE ONLY FROM THE OPERATOR'S SEAT!

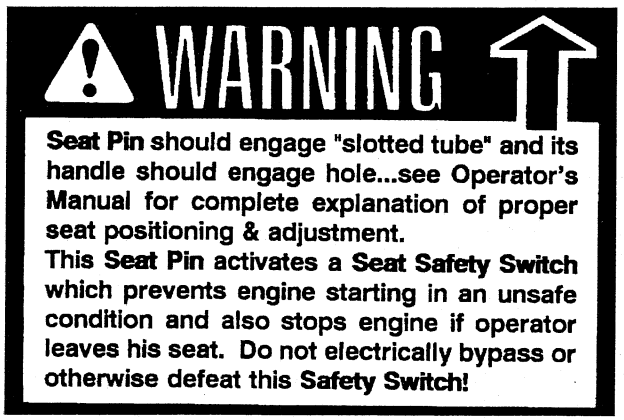
Avoid possible injury or death from Crawler runaway.

Do not start Engine by shorting across starter solenoid terminals. Crawler may start and move if normal circuitry is bypassed.

Never start Engine while standing on ground. Start Engine only from operator's seat, with Parking Brake engaged.

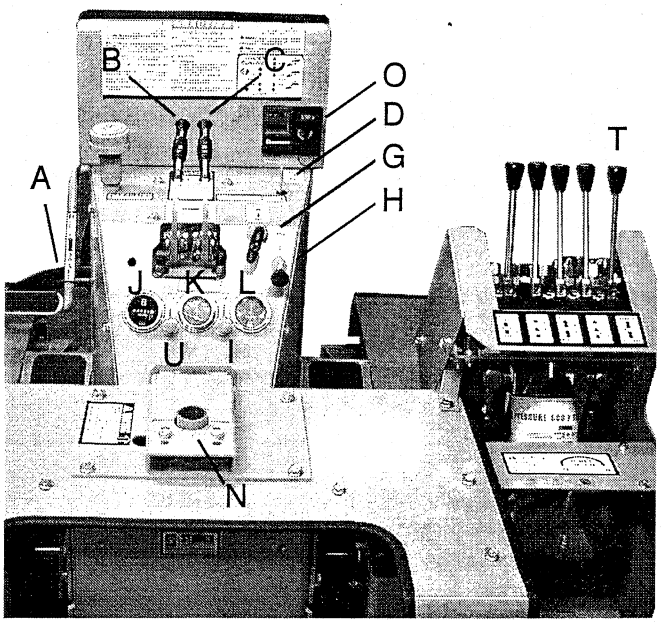
Inspect your Crawler carefully each day before you start it. See "Pre-Start Inspection".

Clean your Crawler regularly.



3- CONTROLS AND INSTRUMENTS

Learn the location and purpose of all controls, instruments, and warning labels.



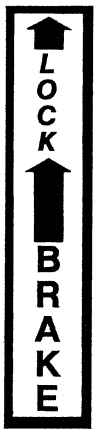
CONTROLS

- (A) PARKING/EMERGENCY BRAKE
- (B) LEFT TRACK CONTROL
- (C) RIGHT TRACK CONTROL
- (D) BRAKE LOCK/RELEASE HANDLE
- (G) THROTTLE CONTROL
- (H) ENGINE SHUTOFF
- (I) LIGHT SWITCH
- (N) MOUNT
- (O) IGNITION SWITCH
- (T) OVERDRIVE/ACCESSORY CONTROL
- (U) FAN SWITCH

INSTRUMENTS

- (J) HOUR METER
- (K) HYDRAULIC OIL TEMPERATURE
- (L) AMMETER

(A) PARKING/EMERGENCY BRAKE

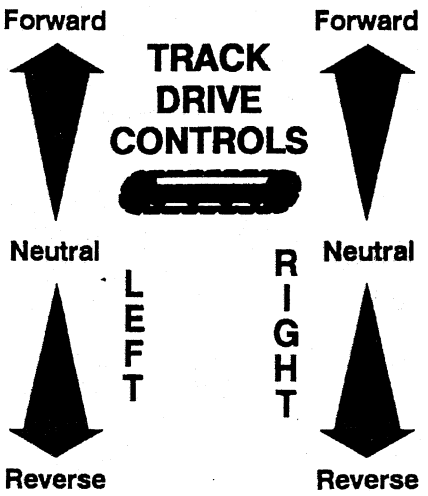


Apply Brake by pushing forward on its pedal with left foot.

To lock brake lift up on Brake Lock/Release handle while Peadl (A) is fully depressed.

To release Parkign brake push forward on Pedal (A) until Brake lock/Release handle drops

(B) LEFT and (C) RIGHT TRACK CONTROLS



1) **To move straight ahead**, push both Left and Right Track Controls forward.

2) **To move straight rearward**, pull both Left and Right Track Controls rearward.

3) **To turn right**, push forward on Left Track Control.

4) **To turn left**, push forward on Right Track Control.

5) **To counter-rotate Tracks** (shortest turn possible), push one Track Control forward while simultaneously pulling rearward on the other Track Control.

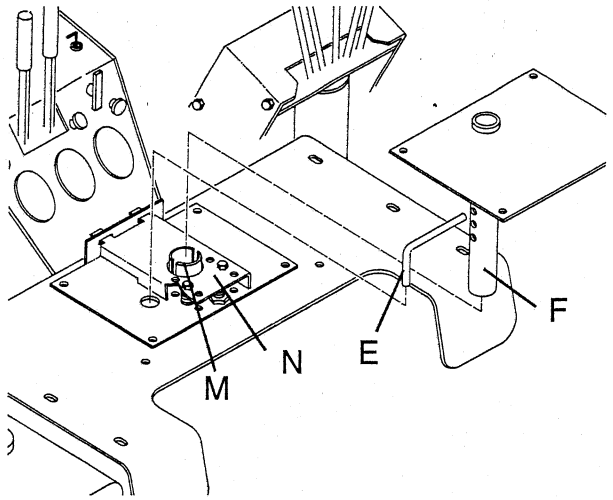
NOTE: When either Track Control lever is released, it will automatically return to neutral.

(D) BRAKE LOCK HANDLE

Press Brake Pedal and raise BRAKE LOCK HANDLE to "lock" Parking Brake. Maintain Brake adjustment...see Operator's Manual.	BRAKE LOCK HANDLE ↓

To release Brake, apply foot pressure to Brake Pedal (A) and lower Brake Lock Handle (D); slowly release foot pressure and allow Brake Pedal to come rearward to its natural unbraked position.

(E) SEAT PIN, (F) SEAT POST, (M) SEAT TUBE and (N) MOUNT

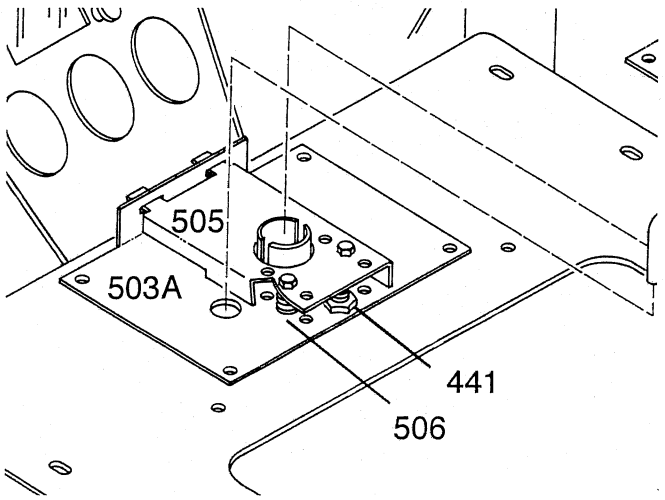


1) Adjust seat height by inserting the Seat Pin (E) into the appropriate hole of Seat Post (F). Lower Seat Post into Seat Tube (M) and engage Seat Pin in slots of Seat Tube.

   NOTE: As you lower the Seat Post into the Seat Tube, make sure the handle of the Seat Pin passes into the 1" diameter hole in the Mount (N).

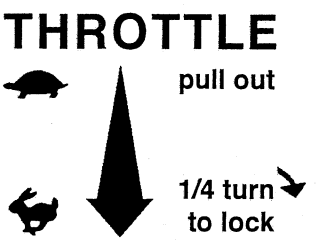
2) To set seat height for backhoeing, remove Seat Pin, rotate seat 180 degrees, reinsert Seat Pin into lowest hole in Seat Post, lower Seat Post into Seat Tube and pass handle of Seat Pin into the 1" diameter hole in the Mount.

3) To slide seat forward or back to the most comfortable position, push lever (under the right lower corner of the seat) to the left to release Seat Lock. Release lever to **lock** seat into new position.



4) In order to keep young children from operating the Crawler, it is possible to adjust the seat weight necessary to activate the #441 Seat Safety Switch. See the SERVICE section of this manual for a complete explanation of varying the seat weight adjustment by moving the #506 Springs.

(G) THROTTLE CONTROL



Pull control handle toward operator to increase Engine speed...turn handle 1/4 turn clockwise to lock throttle setting (Do not over-tighten!)

(I) LIGHT SWITCH

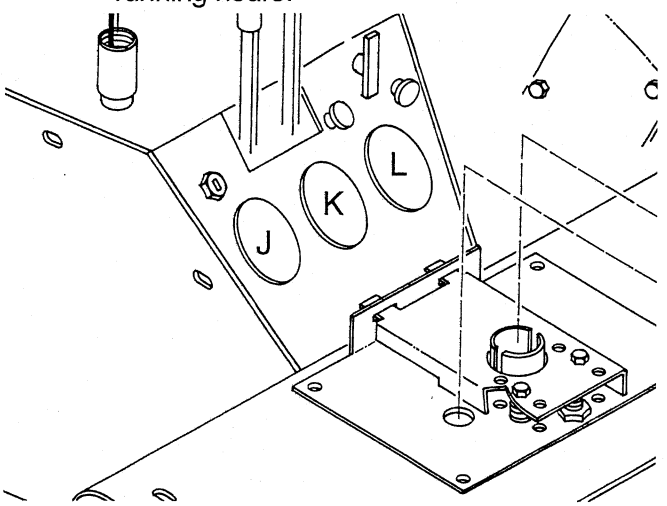
LIGHTS
PULL OUT

Pull control handle toward operator to turn lights on. Push fully back to turn lights off.

(J) HOUR METER

Meter will begin recording time the moment the Ignition Switch (O) is switched to Run.

NOTE: The Engine does not have to be running for the Meter to record time...the Ignition Switch just has to be in the **Run** position. Always turn Ignition Switch **Off** and remove key when leaving Crawler. This will assure you that your Meter is recording only actual running hours!



(K) TEMPERATURE GAUGE

This gauge records the hydraulic oil temperature just as it enters the Traction Drive Pump. Monitor this temperature so that it **does not exceed 180 degrees** Fahrenheit.

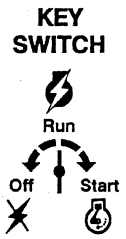
WARNING - Do NOT allow oil temperature to exceed 180°F...damage may result.

If the oil temperature exceeds 180 degrees, stop operating the Crawler, but allow the Engine to operate at medium speed to circulate the oil through the radiator and lower its temperature.

(L) AMMETER

Measures electrical charge or discharge to battery. If Ammeter shows a discharge, shut down electrical system by turning Ignition Switch to **Off** and determine the problem.

(O) IGNITION SWITCH

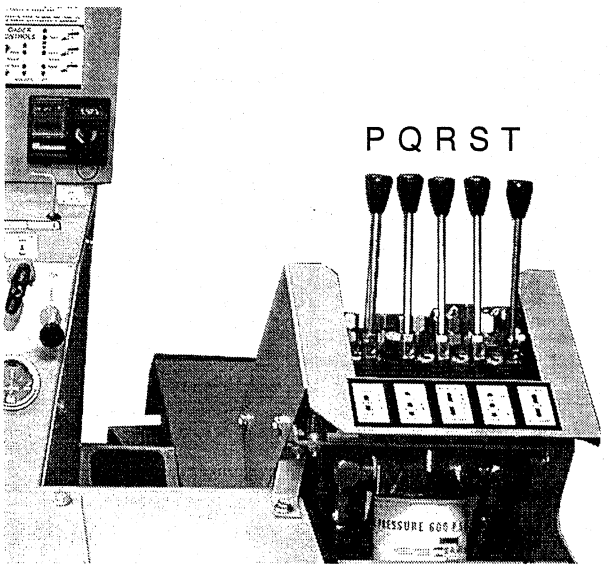


Switch is activated by rotating key clockwise. Turning it fully clockwise will engage Engine starter ... release key and it will return to the **Run** position. Turn fully counter-clockwise to **Off** position to stop Engine. Remove key.

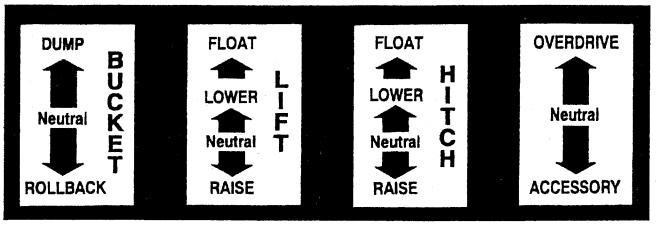
AUXILIARY HYDRAULIC CONTROLS

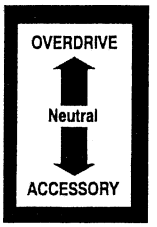
An auxiliary bank of Control Valves is located to the operator's right. These Controls are labeled P, Q, R, S, and T in the picture below.

These valves are used to control all attachments on your tractor. Your particular tractor will contain from one to five of these valves based on the attachments you have. Below is a label from a typical four bank Control Valve assembly.



(T) OVERDRIVE/ACCESSORY CONTROL





This Overdrive/Accessory Control Valve has two functions.

1) When pushed fully forward and "locked" into the Overdrive position, this valve directs the oil flow of the attachment pump into the track drive system. When Track Drive Controls are activated, this feature allows your tractor to gain extra speed to get out of excavations or move quickly to dump locations.

In addition, you can travel in "overdrive" for lighter, higher speed operations. Your tractor will automatically shift down to regular drive speed whenever you change an attachment setting (raise loader, tilt bucket, etc.) then shift back to overdrive when you are through.

2) When pulled fully rearward and "locked" into the Accessory position, it directs the oil flow to optional attachments like our Backhoe, log splitter, etc. Contact our Service Dept. for more information on specific hydraulic flow rates, pressures and various uses for this Accessory setting.

CAUTION: With Control in "accessory position" (and its mating Valve Port plugged), all power to the tracks is lost! **Do not** leave control in this position for any period of time!

(U) FAN SWITCH

Your Magnatrac Hydro 6000 comes equipped with an automotive type fan attached to its external radiator. Turn fan on by pulling switch to help reduce hydraulic oil temperature in hot conditions. Turn off fan during extensive use of headlights to prevent excessive battery drain.*

4- OPERATION

PRE-STARTING INSPECTION

Before you start your Crawler for the first time each day, perform the following checks:

ENGINE COMPARTMENT
Check oil level.
Check air intake system.
Check fuel filter.
Remove trash and oil-dirt deposits.

GRILL AND SIDE PANELS
Remove trash.
Clean radiator.

TRACKS, ATTACHMENTS, SHEET METAL
Check for bent, broken, or missing parts.
Check Track Springs.

HARDWARE
Check for loose or missing parts.

ELECTRICAL SYSTEM
Check for worn or frayed wires or loose connections.

LUBRICATION
Check lubrication points shown in Periodic Service section of this manual.

GUARDS AND SHIELDS
Check for tightness and condition.

BATTERY COMPARTMENT
Remove trash.
Check cables for tightness and corrosion.

FUEL TANK
Check fuel level.

HYDRAULIC SYSTEM
Check for leaking lines and connections.
Check for bent or kinked lines.
Check for lines rubbing against each other or against other parts.
Check oil level.

OPERATOR'S STATION
Check levers for free movement.
Check ROPS and Seat Belt.
Clean floor and instrument panel.
Adjust Seat to comfortable height for operator.

CAUTION - Before you start the engine:

1) Check the condition of the Crawler. (Pre-start inspection).

2) Be sure there is enough ventilation.

3) Be sure to know the correct starting and stopping procedure.

4) Sit in the operator's seat.

5) Clear the work area of people and obstacles.

IMPORTANT: Do not tow or push your Crawler to start it. You may damage the hydraulic drive system.

PREPARE FOR ENGINE STARTING

1) Fasten Seat Belt (only if you have ROPS installed).

2) Allow Left (**B**) and Right (**C**) Track Controls to assume their natural spring loaded center neutral positions.

3) Push forward on Parking/Emergency Brake (**A**) and lift up Lock/Release Handle (**D**) until brake locks into position.

4) Check that Loader or front-mounted Bulldozer Blade is in the fully lowered position, and that the Backhoe is in the **chained** safe traveling position.

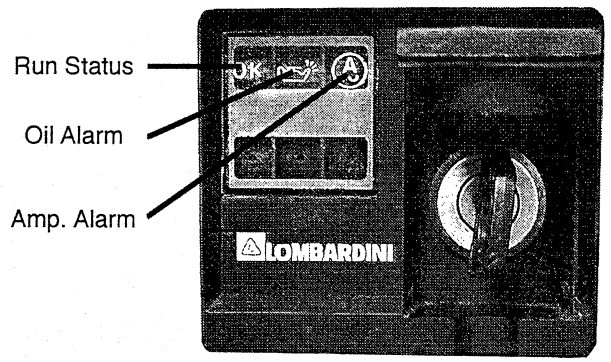
5) Check that all other hydraulic controls are in their centered neutral position.

   NOTE: The hydraulic Accessory Control (T) does not have a **spring loaded** neutral centering device; therefore, you must move it back and forth to determine its **center-neutral** position.

6) Make sure you are properly seated so Seat Safety Switch will engage.

STARTING THE ENGINE

1) Place the Throttle Control (G) midway between the Slow and Fast positions. (If GP12 Glow Plug Kit is installed depress actuator switch for approximately 15-30 seconds, and release)
2) Activate the Ignition Switch (O) by rotating it clockwise until starter engages. Release the switch as soon as the Engine starts...Switch will return to the Run position.
3) Oil Alarm light and Amp alarm light should extinguish, and Run Status light should illuminate after engine is running. Should either alarm light fail to extinguish, shut off the engine and consult the Engine manual for troubleshooting.



CAUTION: Do not crank the Engine continuously for more than 10 seconds at a time. If the Engine does not start, allow a 60-second cool-down period between starting attempts. Failure to follow these guidelines can burn out the starter motor.

CAUTION: If the Engine develops sufficient speed to disengage the starter but does not keep running (a "false start"), the Engine rotation must be allowed to come to a complete stop before attempting to restart the Engine.

If the starter is engaged while the flywheel is rotating, the starter pinion and flywheel ring gear may clash, resulting in damage to the starter.

If the starter does not turn the Engine over, shut off starter immediately. Do not make further attempts to start the Engine until the condition is corrected.

If the battery charge is not sufficient to turn over the engine, recharge the battery.

CAUTION: Do not attempt to jump start the engine with another battery. Starting with batteries larger than those recommended can burn out the starter motor.

*WARM-UP PERIOD

1. Run Engine at half speed for 5 minutes.
2. Do not run Engine at fast, or slow idle.
3. Operate Crawler at less-than-normal loads and speeds for the first 15 minutes.

WARNING: Lethal Exhaust Gases

Engine exhaust gases contain poisonous carbon monoxide. Avoid inhaling fumes, and never run the Engine in a closed building or confined area.

NOTE: Assembled Crawlers are "run in" under no load at the factory for 15 minutes to properly break-in their drive train and track drive motors.

USE SEAT BELT

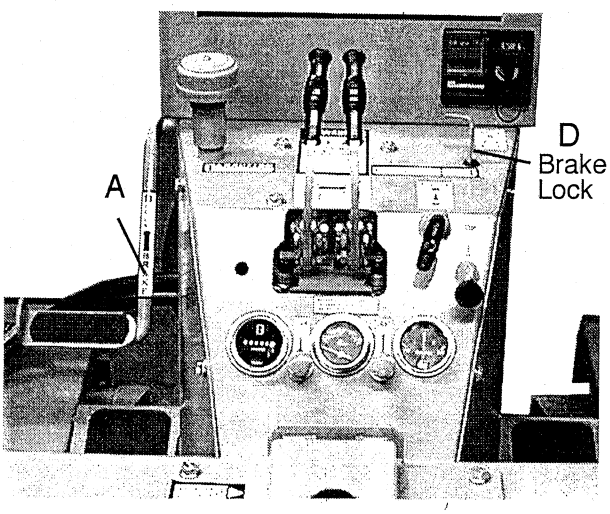
CAUTION: Use a Seat Belt when you operate with a Roll-Over Protective Structure (ROPS) to minimize chance of injury from an accident such as an overturn.

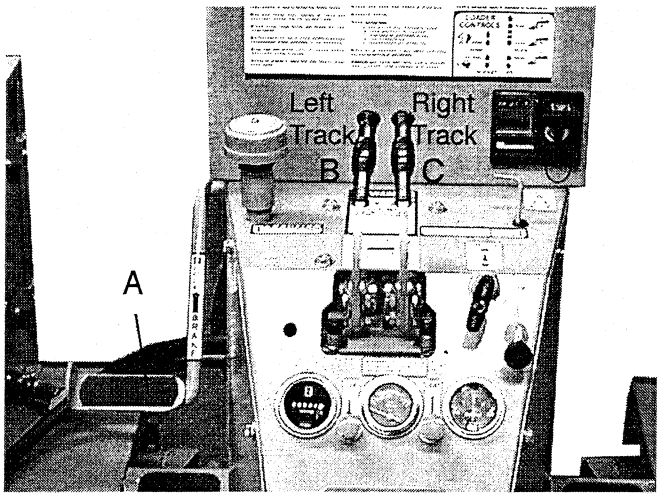
Do not use a Seat Belt if operating without a ROPS.

TRAVELING

Push foward on Parking Brake (A) and lower Brake Lock (D); slowly release pressure on Parking Brake and allow it to come back to its natural "rearward" position...remove foot from Brake!

Raise all attachments to their recommended traveling heights.





A) **To move straight ahead**, simultaneously push Right Track Control (C) and Left Track Control (B) forward.

B) **To move straight to the rear**, simultaneously pull both Right and Left Track Controls rearward.

C) **To turn to the right**, push Left Track Control forward.

D) **To turn to the left**, push Right Track Control forward.

E) **To counter-rotate Tracks**, (shortest turn possible), push one Track Control forward while simultaneously pulling rearward on the other Track Control.

NOTE: The Right and Left Track Controls are of the self-centering (neutral) "deadman" type. This allows you to simply let go of both Track Controls to disconnect active power to the Tracks.

F) **Parking/Emergency Brake** (**A**) will stop or hold Crawler in the neutral drive position.

PARKING THE CRAWLER

1) Lower all equipment to the ground.

2) Allow Right and Left Track Controls to go to neutral.

3) Push forward on Brake and lift lock handle to engage parking brake.

4) Run Engine at half speed 2 minutes without load.

5) Move Throttle Control to slow idle.

6) Turn Ignition Switch to Off.

7) Release hydraulic pressure by "rocking" all hydraulic controls back and forth.

IMPORTANT: If Engine stops under load, remove load. Start Engine immediately. Run 30 seconds at half speed before adding load.

NOTE: If engine stops, you must turn key **Off** before you can start the engine.

IMPORTANT: In freezing weather, park on a hard surface to avoid freezing the Tracks to the ground. If Tracks are frozen to the ground, be careful to avoid damage to the Tracks and drive train when you try to move the Crawler.

CAUTION: When you park your Crawler on a slope, put blocks against tracks. **Do not** park Crawler with tracks pointed downhill.

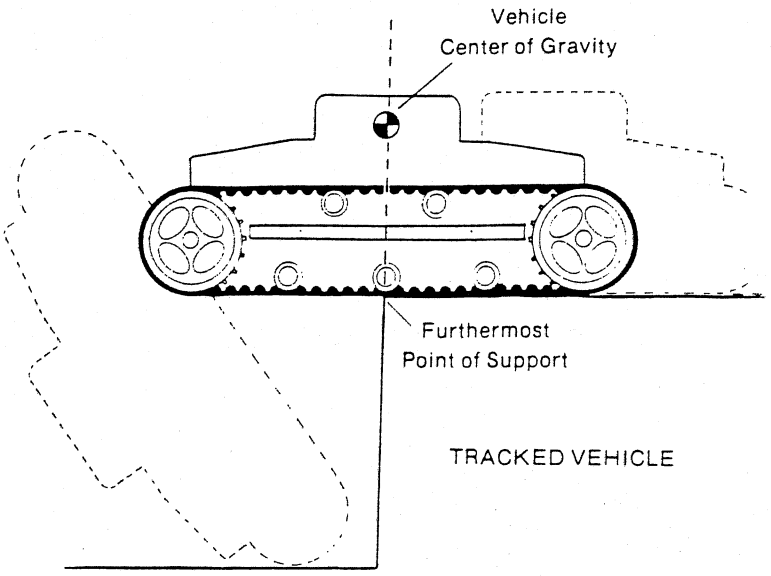
TRACKED VEHICLE — Operation & Procedure

A Tracked Vehicle, by its very nature, requires the use of operating techniques and procedures that are unfamilar to most people used to driving wheeled vehicles.

This means that a person intending to operate a Tracked Vehicle must allow himself ample opportunity to familiarize himself with the controls and characteristics of the machine.

It is the purpose of this booklet to inform and instruct prospective Tracked Vehicle operators in an effort to help them use it safely.

SAFETY WARNING: NO PERSON SHOULD ATTEMPT TO OPERATE A TRACKED VEHICLE BEFORE READING THIS BOOKLET THOROUGHLY. IF ANY PORTION OF THIS BOOKLET IS NOT CLEARLY UNDERSTOOD, WRITE TO US AT THE ADDRESS ON THE FRONT COVER.

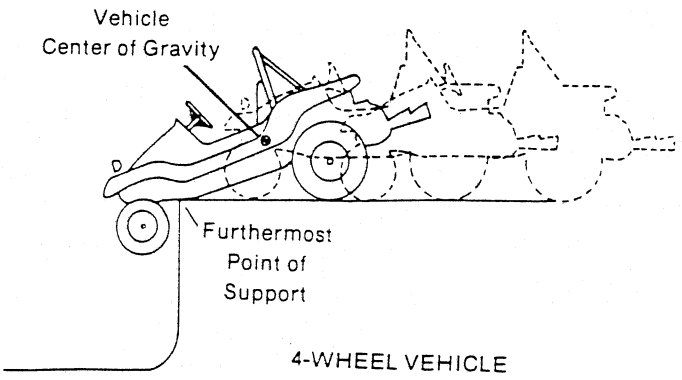


TRACKED VEHICLE

SAFETY WARNING: ANYTIME A PORTION OF THE TRACK IS NOT IN CONTACT WITH THE GROUND, STABILITY IS REDUCED. NEVER ATTEMPT TO 'JUMP' A TRACKED VEHICLE OVER DROP-OFFS, HILL CRESTS, OR OTHER OBSTACLES. THIS CAN BE EXTREMELY HAZARDOUS.

TRACKED VEHICLE CHARACTERISTICS

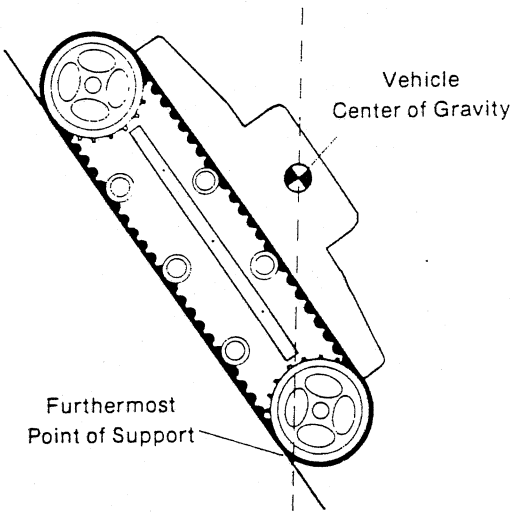
Tracked vehicles possess certain inherent features not found on standard four-wheel vehicles. For instance, a standard vehicle will hit bottom when the wheels on either end are driven over a drop-off. In most cases this will stop vehicle motion and give immediate warning.



4-WHEEL VEHICLE

A Tracked Vehicle, however will continue on without any warning until its center of gravity passes across an imaginary line drawn straight up from the furthermost point of support with the ground. It will drop SUDDENLY. (See illustration upper right). THIS WILL HAPPEN EVEN AT THE VERY SLOWEST SPEEDS.

A Tracked Vehicle can climb or descend steep slopes, so steep in fact that the vehicle can tip over forward or backward, before it loses traction.



Tipover occurs when the Vehicle's center of gravity passes across an imaginary line drawn straight up from the furthermost point of support with the ground.

When the Vehicle's center of gravity passes this point, the vehicle will tip over SUDDENLY.

TRACKED VEHICLE OPERATION

A Tracked Vehicle, by its very nature, is a vehicle requiring a great degree of care and judgment during operation. It should be kept in mind that while your Tracked Vehicle is designed to operate in rough terrain, this same fact allows for the possibility of a hazardous condition developing at any time. Safe operation of your Tracked Vehicle must be based on the understanding of the vehicle's limitations, thorough knowledge of the controls and their functions, and the operator's good judgment and experience.

SAFETY WARNING: WHERE THE OPERATOR IS NOT CERTAIN OF THE VEHICLE'S ABILITY TO TRAVERSE AN OBSTACLE OR TERRAIN SITUATION, OR, IS NOT CERTAIN OF HIS OWN ABILITY TO SAFELY OPERATE THE VEHICLE, AN ALTERNATE ROUTE MUST BE TAKEN.

OPERATION ON SLOPES

Tracked Vehicle operation on slopes presents an obvious opportunity for the vehicle to tip over. This type of operation demands constant attention to changes in terrain and the ability to anticipate and avoid possible hazards.

This ability can only be developed through careful study of the points noted in this section and a slow, planned effort on the operator's part to become proficient.

The most effective guard against hazards while operating on slopes, especially during downhill operation is to keep vehicle speed very slow.

SAFETY WARNING: WHEN OPERATING ON SLOPES VEHICLE SPEED SHOULD BE KEPT VERY SLOW AND THE OPERATOR SHOULD BE EXTREMELY ALERT FOR CHANGES IN TERRAIN.

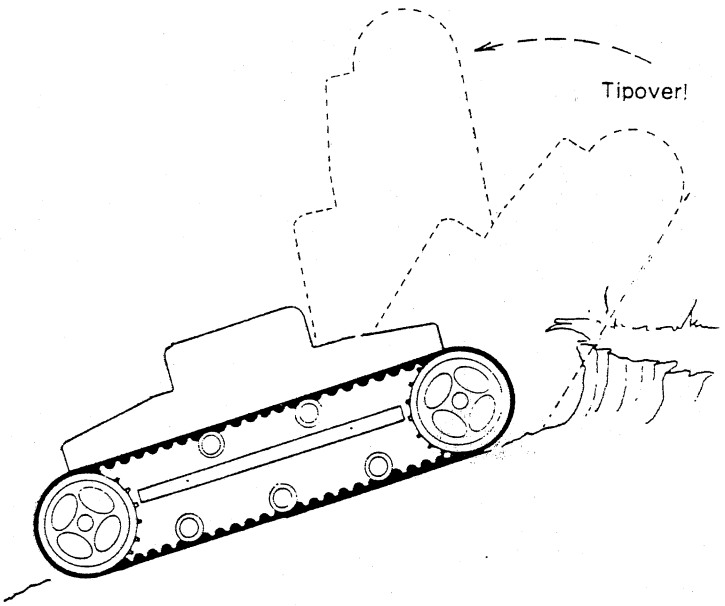
Vehicle stability on a hill, for example, is determined not only by the general slope of the hill but also by terrain conditions (rocks, ditches, logs, drop-offs, etc.)-and by the nature of the hill surface (gravel, sand, grass, snow, rock, etc.), the payload which the vehicle is carrying, the manner in which the payload is distributed within the vehicle, attachments and accessories which have been added to the vehicle, and so forth.

Similarly, driving technique and its effect on vehicle stability enters into any determination of what constitutes a safe slope. Excessive speed, sudden braking, choice of path - all can be critical.

UPHILL OPERATION

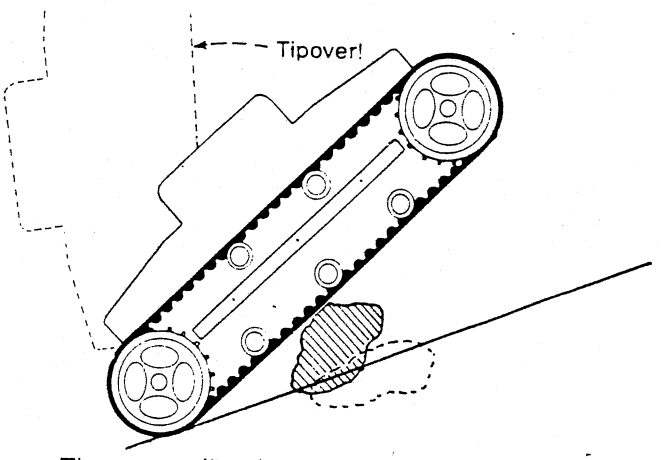
The following illustrations depict some situations in which a Tracked Vehicle can be expected to tip over. Variations in speed, loading, terrain and vehicle condition must all be analyzed to determine whether or not a specific obstacle can be traversed. If in doubt, do not attempt.

SAFETY WARNING: ON STEEPER SLOPES SMALLER OBSTACLES WILL CAUSE A TRACKED VEHICLE TO TIP OVER.



It is common to see a situation where natural erosion has caused the very top of a bank or hill to rise sharply. Always check for this condition before attempting to climb any such type of terrain. A Tracked Vehicle could climb up to a point at which it falls over backward.

It is also very important to check for this terrain condition before going down over the edge of a bank or dropoff.

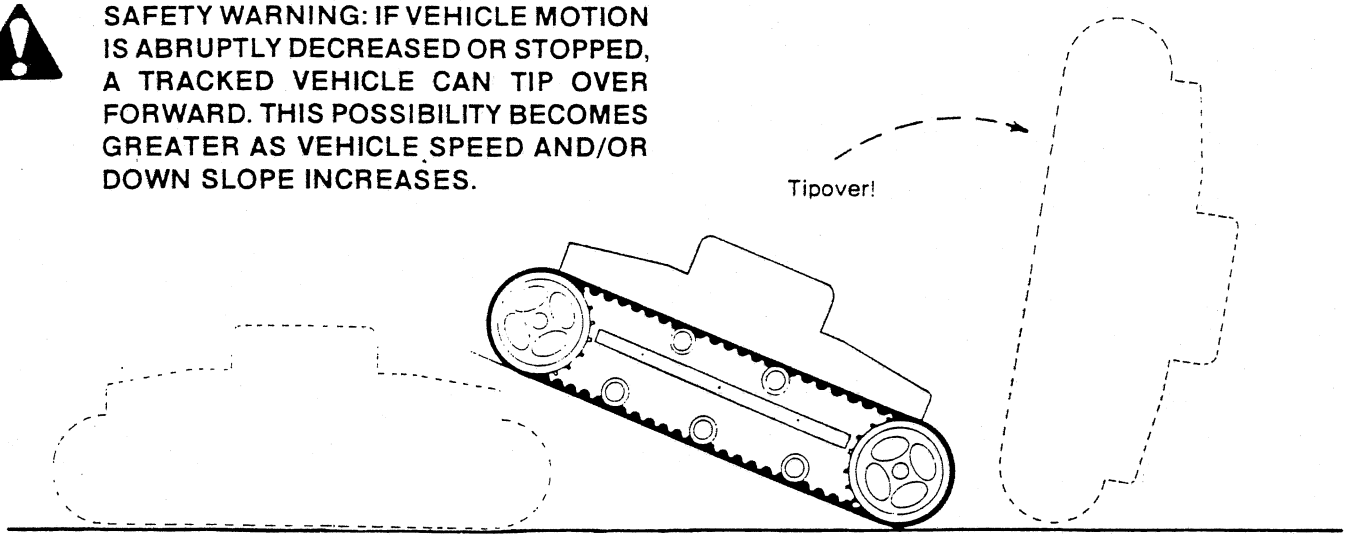


The same situation can occur where an imbedded object is pulled from the ground. The vehicle track may 'grab' a rock or log. As the object emerges from the ground, rolling under the track, the vehicle could climb to the point at which it falls over backward.

SUDDEN STOPS

If a Tracked Vehicle is driven down a slope and the tracks are stopped suddenly, the vehicle's exceptional traction may cause it to tip over forward.

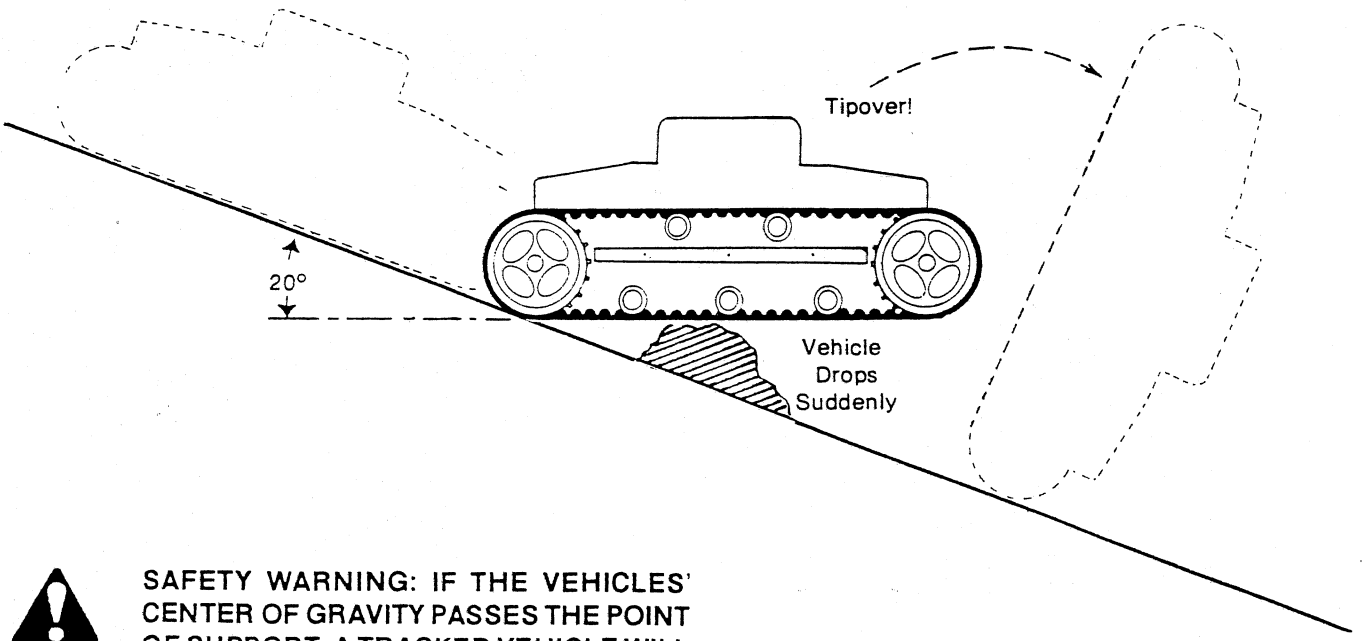
SAFETY WARNING: IF VEHICLE MOTION IS ABRUPTLY DECREASED OR STOPPED, A TRACKED VEHICLE CAN TIP OVER FORWARD. THIS POSSIBILITY BECOMES GREATER AS VEHICLE SPEED AND/OR DOWN SLOPE INCREASES.



CROSSING OVER AN OBJECT

This illustration is drawn to depict an obstacle situation in which a Tracked Vehicle can be expected to tip over. Variations likely to occur in natural terrain, the approach to the obstacle, operator skill and loading of a Tracked Vehicle may reduce the size of obstacle or steepness of the slope required, which could cause tipover.

SAFETY WARNING: ON STEEPER SLOPES, SMALLER OBSTACLES WILL CAUSE A TRACKED VEHICLE TO TIP OVER.

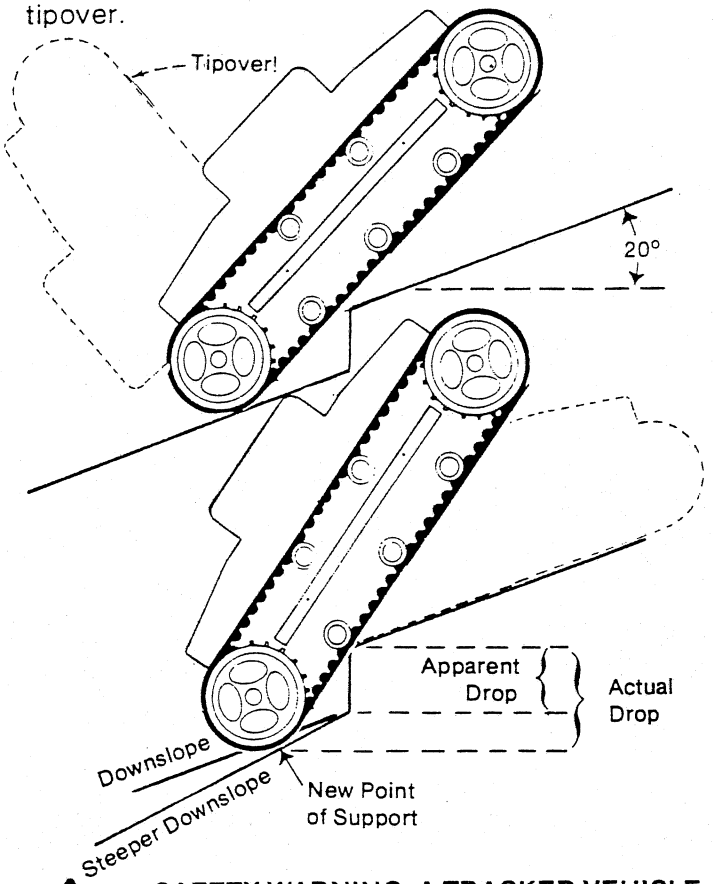


SAFETY WARNING: IF THE VEHICLES' CENTER OF GRAVITY PASSES THE POINT OF SUPPORT, A TRACKED VEHICLE WILL BEGIN TO TIP. UNLESS THE TERRAIN ON THE DOWNSIDE OF THE OBJECT PROVIDES A NEW POINT OF SUPPORT, FAR ENOUGH AHEAD OF THE VEHICLE CENTER OF GRAVITY TO NEGATE THE EFFECT OF INERTIA, A TRACKED VEHICLE WILL TIP OVER FORWARD.

SAFETY WARNING: OBSTACLES, SOME OF WHICH MIGHT BE DRIVEN OVER SAFELY WHILE ON LEVEL TERRAIN, CAN CAUSE A HAZARD WHILE OPERATING ON SLOPES.

DROPOFFS

This illustration is drawn to depict a dropoff situation in which a Tracked Vehicle can be expected to flip. Variations occuring in natural terrain, the approach to the obstacle, operator skill, and loading of a Tracked Vehicle may reduce the size of the dropoff or the steepness of the slope, which could cause tipover.



SAFETY WARNING: A TRACKED VEHICLE MUST BE OPERATED WITH GREAT CARE AT ALL TIMES AND ON ANY SLOPE. SLOPES STEEPER THAN 20° SHOULD BE REGARDED AS ULTRA-HAZARDOUS AND APPROACHED WITH EXTREME CAUTION. EVEN ON SLOPES OF LESS THAN 20°, A TRACKED VEHICLE CAN BE TIPPED OVER BY A SUDDEN STOP, EXCESSIVE SPEED, UNEVEN TERRAIN, OR OTHER SPECIAL CONDITIONS OR COMBINATIONS OF SUCH CONDITIONS.

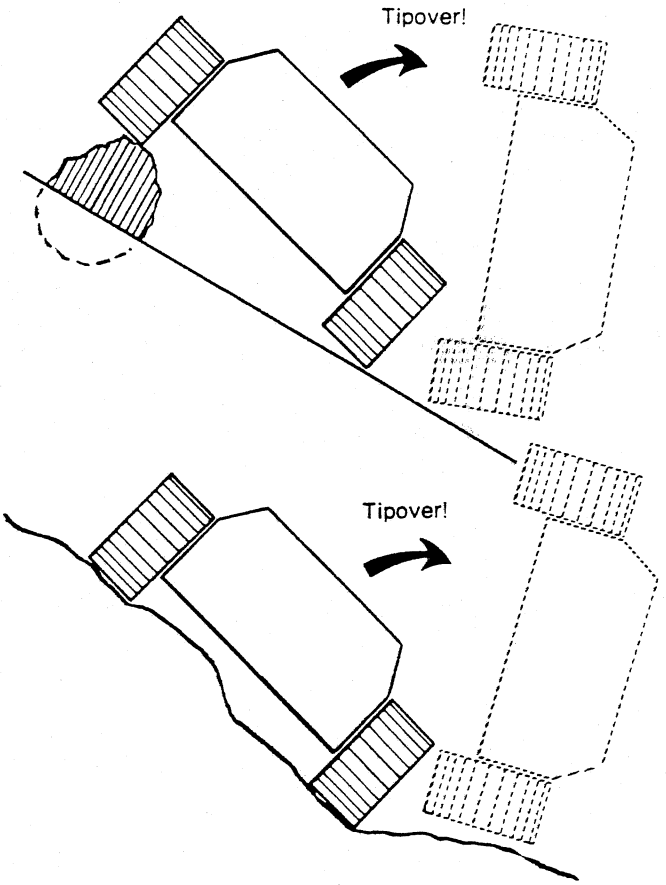
An important variable in determining if a given obstacle will cause a Tracked Vehicle to tip over is the vertical distance between the last point of contact and the new point of support. Note that the new point of support can be on level ground, a downhill slope, or a steeper downhill slope. The apparent size of the obstacle or dropoff is not the same as the drop it causes. Among the many other variables are the steepness of the slopes, size of the obstacle causing the drop, the shape of the last point of support, the load on the Tracked Vehicle, initial speed, tightness of the track, traction, symmetry of the obstacle to the Tracked Vehicle and operator skill and judgment.

SIDEHILL OPERATION

The illustrations show how driving over an obstacle with the uphill track or into a hole with the downhill track will cause the vehicle to tip over sideways.

A slippery surface, like snow, ice, frozen sand, and loose gravel can also be dangerous. It is possible to slide into a tree or rock or to slide off the edge of a cliff.

SAFETY WARNING: REGARD ALL OPERATIONS ON SLOPING TERRAIN AS HAZARDOUS.



PARKING THE VEHICLE

When a Tracked Vehicle is parked on a sufficient slope, failure to engage the parking brake-or failure of the parking brake to function properly-can result in the vehicle rolling down the slope, out of control.

OPERATING SAFETY PRECAUTIONS

1. Keep hands and feet inside vehicle.
2. Never attempt to operate the vehicle from anywhere other than the driver's seat.
3. Avoid unnecessary quick stops.
4. Avoid quick turns.
5. Shut off engine and engage parking brake when leaving vehicle.
6. Park sideways on slopes.

5- FUELS and LUBRICANTS

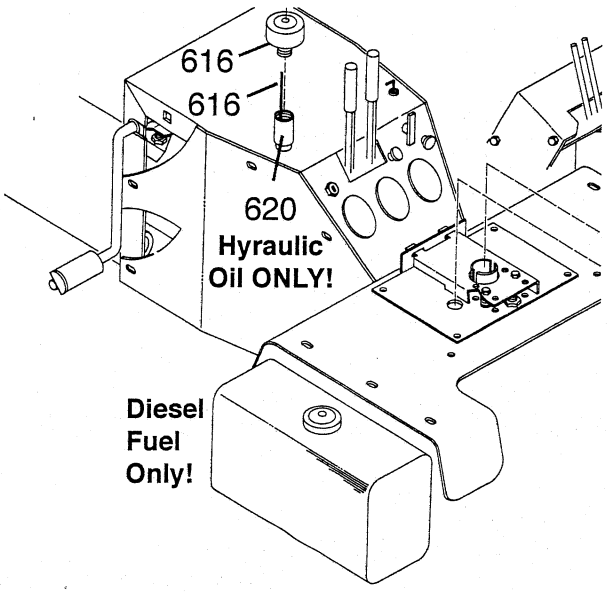
FUELS

FUEL SPECIFICATIONS

Check enclosed Engine Owner's Manual and closely follow their recommendations.

FILLING FUEL TANK (DIESEL FUEL ONLY!)

The #435 Fuel Tank is located to the left of the operator's seat.



CAUTION: Do not confuse the #435 Fuel Tank (DIESEL FUEL) with the Hydraulic Oil Tank which is filled through #620 Coupling on top of the Crawler's dash...remove #616 Breather for filling!

Fill Fuel tank at end of each day's operation. Fuel tank capacity is 4.5 U.S. gallons.

CAUTION: Handle fuel carefully. Do not fill fuel tank when the Engine is running. Do not smoke while you fill fuel tank or work on fuel system.

STORING FUELS

Keep fuel in a container in a protected area. Water and sediment must be removed before fuel gets to the Engine. Do not depend on fuel filters to remove water.

If possible, install a water separator at the storage tank outlet.

Store fuel drums on their sides with plugs up.

IMPORTANT: Keep all dirt, scale, water, or other foreign matter out of fuel.

LUBRICANTS

ENGINE OIL

Check enclosed Engine Owner's Manual and closely follow their recommendations.

HYDRAULIC OIL

Use a premium quality hydraulic oil with maximum anti-wear properties, rust and oxidation treatment like Mobil-DTE Series 10 (ISO of 32). An ISO of 32 is good for "oil" temperature conditions of +5F to +170F which are considered standard.

Fill hydraulic reservoir through #620 Coupling on top left of dash, check level with #248 Dipstick...remove #616 Breather during filling!

TRACK SPROCKETS AND IDLERS OIL

Use a non-additive, non-detergent variety of oil...SAE 30 in summer; SAE 10 in winter.

GREASE

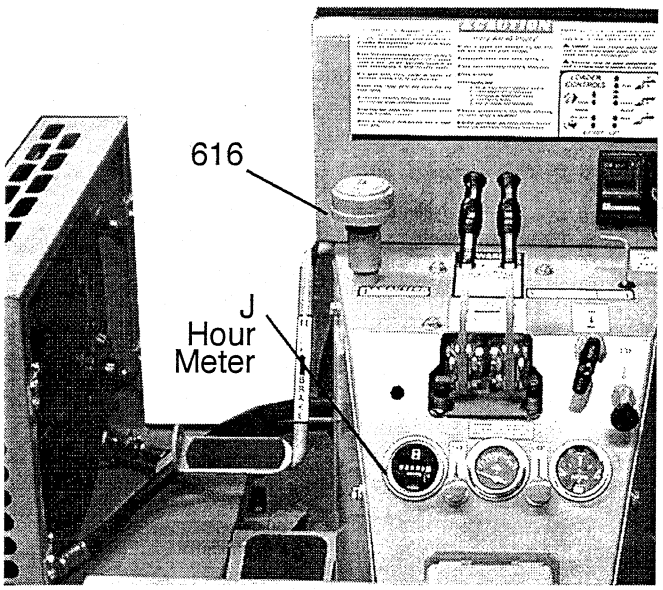
Use premium quality SAE Multi-Purpose Grease.

STORE LUBRICANTS in clean containers in area protected from dust, moisture, & contamination.

6- LUBRICATION and PERIODIC SERVICE

HOUR METER

Use the Hour Meter (**J**) to determine when periodic services are required.



LUBRICATION AND SERVICE INTERVALS

IMPORTANT: Recommended service intervals are for normal conditions. Service more often if Crawler is operated under difficult conditions.

IMPORTANT: Use only quality lubricants at intervals specified in this manual.

PERIODIC SERVICE CHART

DAILY OR EVERY TEN HOURS

Air Cleaner - Service per instructions in Engine Owner's Manual.

Engine Oil - Service per instructions in Engine Owner's Manual. **NOTE**: First oil change for new Engine is at 5 hours, every 100 hours thereafter.

Hydraulic Oil - Check level; with equipment on the ground (all cylinders should be retracted), level should be between marks on #248 Dipstick (Dipstick can be found when you unscrew and remove #616 Breather).

Grease Zerks - Lubricate all zerks per location instructions in manual of each attachment you have mounted on your Crawler.

Radiator - Remove #488 Left and #489 Right Side Panels. With low pressure air, blow clean the "fins" of #470 Radiator (oil cooler).

Track Tension - Maintain 4-1/2" overall length of #233 Yellow and #234 Black Springs on each Track. In addition, check that 7/16" Washer against front face of each #215 Front Axle is not loose enough to be rotated with fingers. Check Service section of this manual for complete explanation and Track tensioning procedures.

Drive Chain Tension - Maintain chain tension in drive train. Check Service section of this manual for complete Drive Chain Tensioning procedures.

Fittings & Hoses - Check hydraulic fittings and hydraulic hoses for cracks, breaks, and leaks.

General Once-Over - Check for loose nuts and bolts and any signs of premature wear. Correct any problems immediately. **NOTE**: Check "NOTE" in Service Section of this manual for information on Track Idler wear!

EVERY FIFTY HOURS

Engine Oil - Drain and refill per recommendations in Engine Owner's Manual.

NOTE: Change Engine oil every 25 hours if you're working under constant heavy loads or extremely dirty conditions.

Battery - Check electrolyte level and fill with distilled water to the bottom of the filler neck.

Filters -

A) Replace Engine Filter with filter recommended in Engine Owner's Manual.

B) Replace Hydraulic Oil Filter with a new #455B Filter Canister.

C) Check #535 Fuel Filter for dirt; if showing sediment, replace with new.

Tracks, Track Sprockets, and Idlers - Remove and pressure wash Track. Pressure wash Track Sprockets and Idlers. Lubricate bearings in Track Sprockets and Track Idlers following the procedure in the Service section of this manual.

EVERY 200 HOURS

Hydraulic Fluid - Completely drain system by removing plug in left rear corner on underside of Crawler's Upper Frame. NOTE: Drain when fluid is warm; block up the right front corner of Crawler a few inches to get oil to flow completely to drain opening.

Fuel Filter - Replace with new #535 Fuel Filter at this time.

Fuel Tank - Remove and drain tank of any water or sediment.

7- SERVICE

ENGINE

Your Crawler comes with a complete Engine Service Manual. It provides troubleshooting tips along with complete rebuilding procedures. If further help is needed, contact your local Engine dealer. Consult the engine service guide provided with your tractor to locate the service center nearest you.

STARTER

IMPORTANT: Do not hold down starter button longer than 10 seconds at a time. If the Engine does not start within 10 seconds, wait 60 seconds before pushing starter button again. After a false start, **do not** push starter button until Engine has stopped turning.

If the starter will not operate or operates sluggishly, check for the following:

1) Run down battery.
2) Dirty, loose, or corroded cables and wires.
3) Engine oil viscosity too heavy.

BATTERY

Your Crawler has a 12 volt, negative-grounded system with one battery.

BATTERY PRECAUTIONS

CAUTION: Sulfuric acid in batteries is a poison and could cause severe burns. Avoid contact with skin, eyes, and clothes. When you work around batteries, protect eyes and face from battery fluid and explosion.

Antidotes for Sulfuric Acid:

EXTERNAL

1. Flush skin well with water.
2. Flush eyes for 15 minutes.
3. Get medical attention immediately.

INTERNAL

1. Drink a large amount of water or milk.
2. Then drink milk of magnesia, beaten eggs, or vegetable oil.
3. Get medical attention immediately.

CAUTION: Keep flames and sparks away from batteries.

Do not use booster cables or adjust post connections unless you know the correct procedure.

When you charge a battery or use a battery in a closed space, be sure there is enough ventilation.

Keep batteries where children cannot reach them.

Keep vent caps tight and level.

COLD WEATHER BATTERY SERVICE

During cold weather, keep electrolyte in battery at correct level. Keep battery fully charged.

BATTERY STORAGE

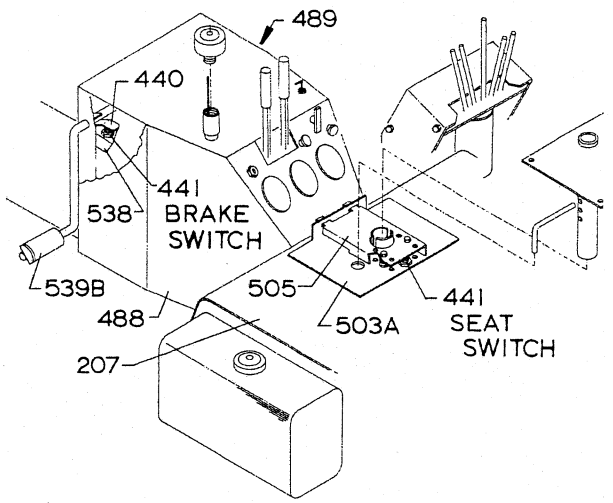
If Crawler will be stored for more than 30 days, remove battery. Keep it fully charged.

BATTERY MAINTENANCE

1) Remove corrosion from terminals with a stiff brush.
2) Clean battery with a baking soda solution (1/4 pound in a quart of water).
3) Flush battery and compartment with clear water.
4) Check electrolyte level. Fill each cell to bottom of filler neck with distilled water or clean, soft water (not hard water).
5) Put petroleum jelly on terminals. Maintain Protective Cover on "positive" (+) terminal of battery.

#441 INTERLOCK SWITCHES

Two #441 Switches are used in the Crawler's electrical system as safety devices to detect if the operator is properly seated and that the Parking Brake is engaged **before** the Crawler can start. The **plunger** in each #441 Switch has to be depressed for the Switch to **close** and activate the electrical circuits; the **plunger** has to be released for the switch to **open** and safely deactivate the circuit.



To check either the #441 Seat Switch or the #441 Brake Switch, you must remove the electrical plug attached to each switch's two terminals and connect a continuity tester to its terminals (a simple flashlight type would be fine).

#441 SEAT SWITCH TEST:

NOTE: To make this Test and subsequent adjustments, remove the 5/16" Cap Screws that hold the #207 Pan in place. Raise the Pan a few inches and reach underneath to remove the electrical plug attached to the #441 Seat Switch's terminals. With Plug removed, the Pan can be fully raised and removed for the following tests and adjustments.

A. With the #505 Treadle resting **flat** on #503A Mount, the #441 Seat Switch should be **closed**. A continuity tester, attached to the terminals of the Switch, should have its light on at this time!

B. With the #505 Treadle released and allowed to rise to the height permitted by the two **restraining** Cap Screws, the Switch should be **open**; the light should be **off**!

If **both** of the above conditions are not met, you must adjust the height of the #441 Seat Switch. The Switch is secured top and bottom of the #503A Mount with large hex nuts. Raise or lower the Switch's height to meet requirements (**A**) and (**B**) in Seat Switch Test (above) by relocating these hex nuts.

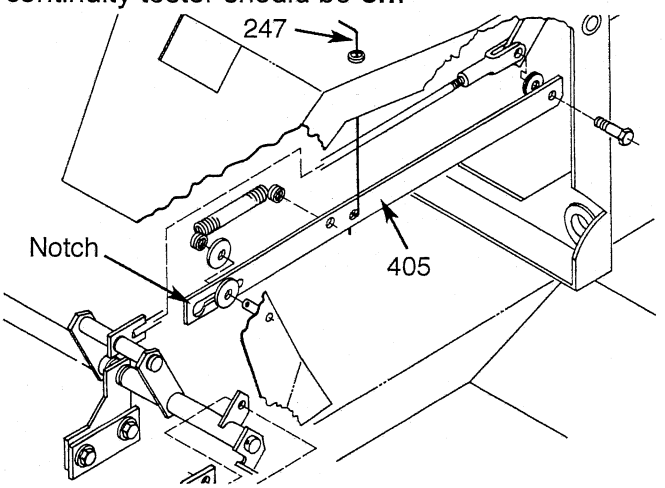
When adjustment is completed, tighten both hex nuts. Terminals of Switch should point directly to the left. Remove continuity tester and return #207 Pan back into position. Replace electrical plug on terminals of Switch and secure Pan with original Cap Screws.

At this time, following recommended safe starting procedures, start the Engine and check Switch's setting... readjust if necessary.

#441 BRAKE SWITCH TEST:

NOTE: For this Test remove the Cap Screws holding the #488 Left and #489 Right Side Panels. Remove the electrical plug from the #441 Brake Switch and connect a continuity tester to its two terminals.

A. Push #539B Brake Pedal forward, lift on the #247 Pull Rod until the #401M Pin drops into the **notch** in the end of the #405 Bar, the #441 Brake Switch should be **closed** (from contact with the rotated #440 Leaf Spring); the light of the continuity tester should be **on**!



B. Push the Brake Pedal forward to **unlock** and allow it to travel rearward until stopped by the #401M Pin reaching the forward end of slot in #405 Bar, the #441 Brake Switch should be **open** (the #440 Leaf Spring would have rotated up and away); the light of the continuity tester should now be **off**!

If **both** of the above conditions are not met, you must adjust the height of the #441 Switch.

The Switch is secured top and bottom of the #538 Bracket with large hex nuts. Raise or lower the Switch's height to meet requirements (**A**) and (**B**) in Brake Switch Test (above) by relocating these hex nuts. When adjustment is completed, tighten both hex nuts...terminals of Switch should point directly to the right. Remove continuity tester and replace electrical plug on terminals of Switch. Replace Left and Right Side Panels.

At this time, following recommended safe starting procedures, start the Engine and check Switch's setting...readjust if necessary.

SAFETY CIRCUIT TEST

The Safety Circuit is an electronic method to sense **safe starting** and **safe operating** conditions. The Circuit performs its **safe start** function by sensing the condition of the Seat Switch and the Brake Switch. Both Switches must be **closed** before the Engine will crank over.

The **safe stop** function is accomplished by sensing the condition of the Seat Switch. Once the Engine is started, the operator must remain seated thereby keeping the Seat Switch **closed** or the Engine will shut down.

An added safety feature is its **closed to operate** function which ensures that the Crawler will not function if the switch leads are broken or become disconnected.

TESTING SAFETY CIRCUIT

Conduct the following tests to check proper functioning of Safety Circuit & related switches:

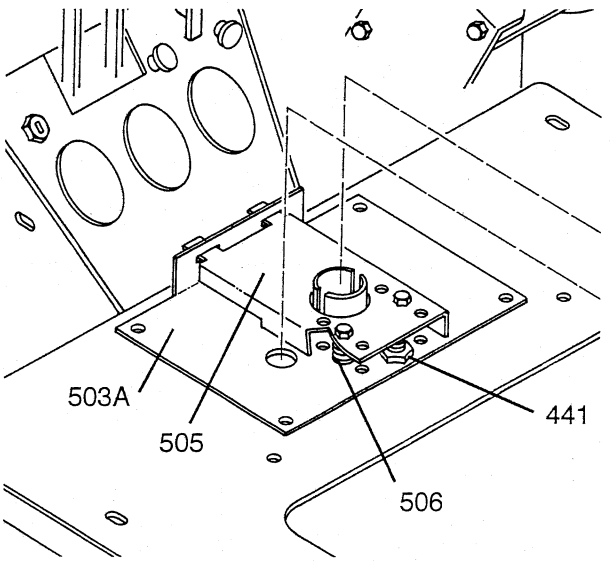
A. Following recommended safe starting procedures, and with operator seated but Parking Brake not applied, attempt to start Engine. The Engine should not start. If it does, readjust #441 Switch on #538 Bracket; Switch is mounted too high in its Bracket and is closing too soon. If readjustment doesn't solve the problem, test #441 Switch and replace if necessary.

B. Following recommended safe starting procedures, and with Parking Brake **locked** but with operator standing in the operator's compartment (not seated), attempt to start the Engine. The Engine should not start. If it does, readjust #441 Switch on #503A Mount; it's mounted too **high** in its Mount and is **closing** too soon. If readjustment doesn't solve the problem, test #441 Switch and replace if necessary. Check "expanded" height of #506 Springs (see below).

C. Following recommended safe starting procedures, and with Parking Brake **locked** and operator properly seated, attempt to start Engine. The Engine should start. If it doesn't, recheck settings of #441 Switches in Tests (**A**) and (**B**) above. Replace Module if necessary.

SEAT WEIGHT ADJUSTMENT

The weight of the operator required to activate the #441 Seat Switch can be adjusted by moving the pair of #506 Springs back and forth in the three sets of mating 3/8" holes located between #503A Mount and #505 Treadle.

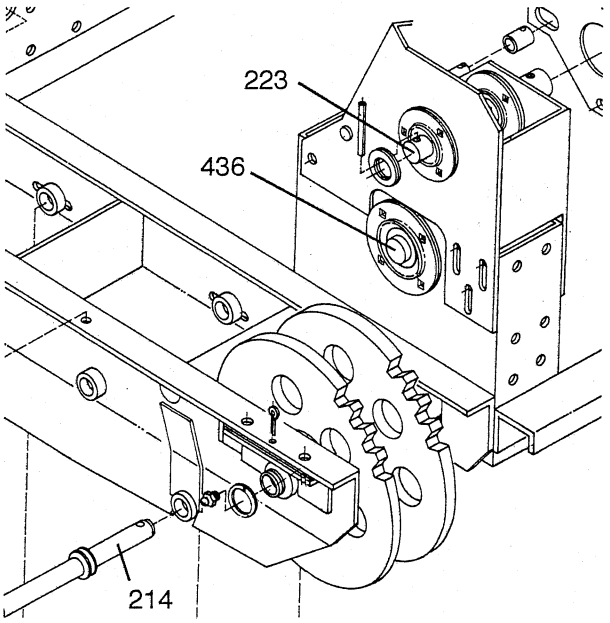


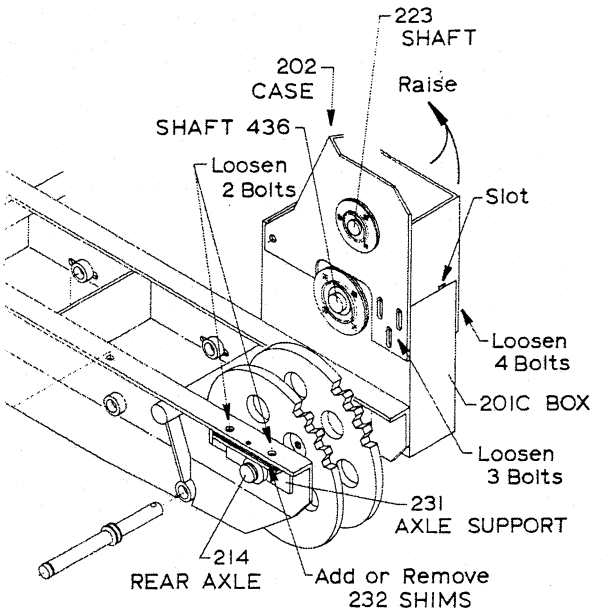
The drawing above shows them installed in the "mid-weight" range. Use the set of holes forward for the lighter operator; use the set of holes rearward for the heavier operator.

NOTE: When reassembling the #506 Springs to a new position, tighten each 3/8" Cap Screw such that it will allow each Spring to expand to only 1" high (measure Spring length only).

DRIVE CHAIN TENSIONING*

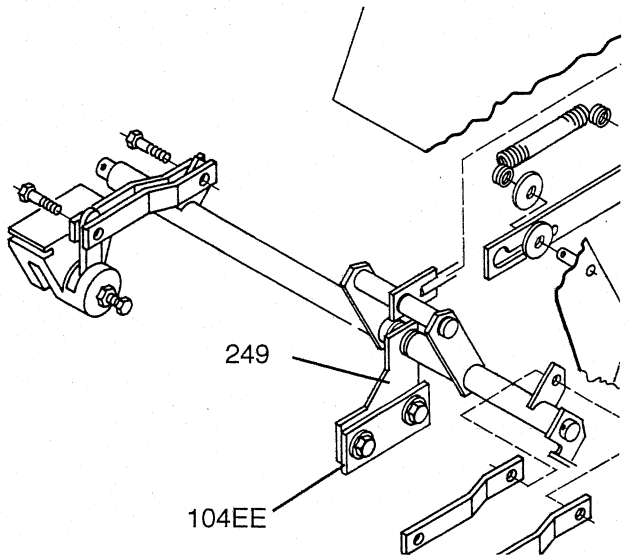
(#536 & 537 Chains)





Tighten #536 Drive Chain (#50 roller chain) by increasing the center distance between the **movable** #223 shaft and the **fixed** #436 shaft... make this adjustment to both sides of Crawler!

To tighten chain, first remove #207 Pan (remember to remove electrical plug from #441 Seat Switch). Next, loosen the two 3/8" Cap Screws holding the #249 Support to the #401EE Strip...fully loosen, but do not remove Cap Screws.



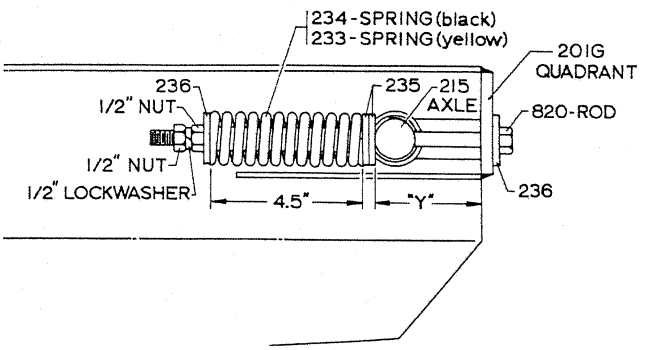
Then loosen the seven Bolts (three on the **outside** and four on the **inside**) on the #202 Case and rotate it upward (away from the #201C Box) until the **slack** has been removed from the Chain.

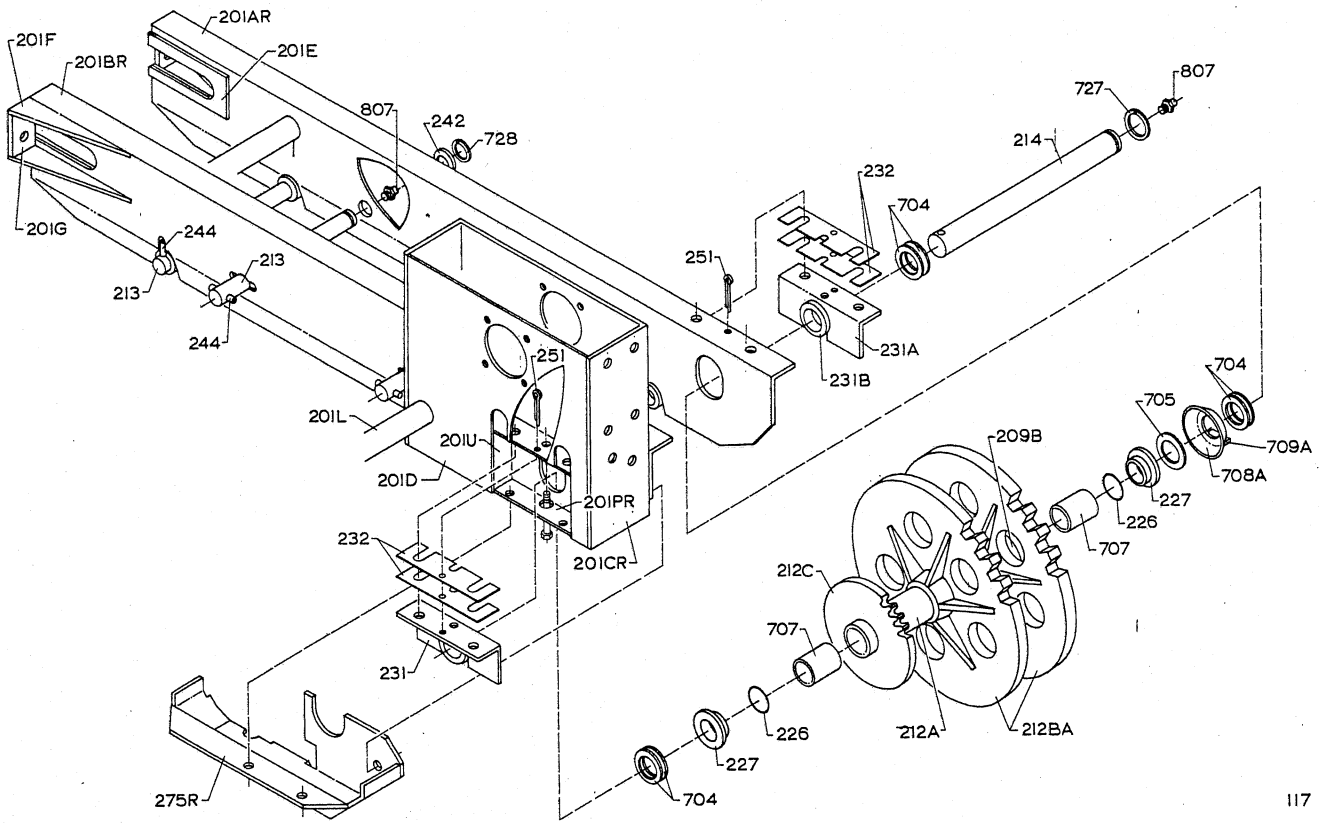
Do not make it "bow-string" tight. Secure in position by retightening the seven Bolts loosened above. Make this #536 Drive Chain adjustment on **both** sides of Crawler! Now, retighten the two 3/8" Cap Screws holding the #249 Support to the #401EE Strip.

Replace #207 Pan, electrical plug on Seat Switch and then start and operate Crawler. Check Drive Chain adjustment and readjust if necessary.

Tighten #537 Drive Chain (#80 roller chain) by increasing the center distance between the **movable** #214 Rear Axle and the **fixed** #436 Shaft...do this to both sides of Crawler.

Block Crawler from beneath so that Tracks are a few inches above the ground. Loosen and remove the two 1/2" Nuts on the ends of each #820 Rod. Remove the #233 & 234 Springs and allow the #215 Front Axle to slide back to the end of its slot in the Track Frame.





Remove the five Cap Screws holding the #275R & #275L Right & Left Guards mounted to the underside of the #201PR & #201PL Right & Left Channels...save bolts for later reassembly!

Thoroughly clean the #275R & #275L Guards and the interior compartments and roller chains they cover!

Loosen the two 1/2" Cap Screws and fully remove the #251 Cotter Pin holding each #231 Axle Support...fully loosen Cap Screws so that the #214 Rear Axle will drop down evenly (horizontally), but do not remove Nuts from 1/2" Cap Screws.

Add additional #232 Shims to the existing **pack** of #232 Shims mounted above each #231 Axle Support on each end of #214 Rear Axle. Add Shims until the #537 Drive Chain is tight...you may lightly **tap in** the last shims but do not **drive** them in (that would indicate you are overtensioning the Chain).

NOTE: Add the same number of Shims on each end of #214 Rear Axle to make sure the Rear Axle will stay horizontal. Replace Cotter pins removed above and secure them. Tighten both 1/2" Cap Screws that secure each #231 Axle Support. This tightening step will draw the Shim **packs** tight and create the proper slack in the #537 Drive Chain.

REMEMBER to make this #537 Drive Chain Adjustment to both sides of Crawler!

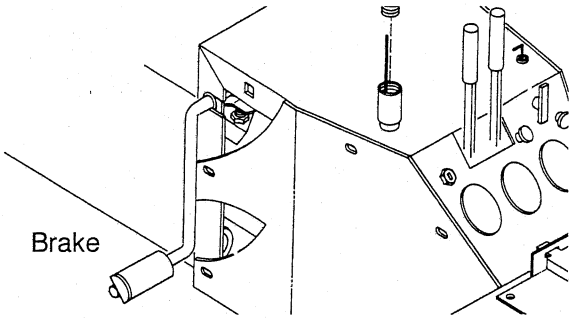
Using original bolts, replace the #275R & #275L Guards and tighten.

Follow Track Tensioning procedure in this manual and retension both Tracks. Remove Crawler from blocks and test run. Check Drive Chain adjustment and readjust if necessary.

PARKING/EMERGENCY BRAKE

The Parking/Emergency Brake provides a force approximately equal to the strength of the Crawler's drive system and is used in a number of ways. One way, is as a Parking Brake. In this capacity, it holds the Crawler in position when the Engine and drive system is shut off.

In addition, it provides a **safe start mode**, as the Brake must be engaged before starting the Engine. If the operator inadvertently touches the Track Drive Controls during Engine starting, the Brake will severely load the drive system and potentially kill the Engine (unless the Track Drive Controls are released immediately).

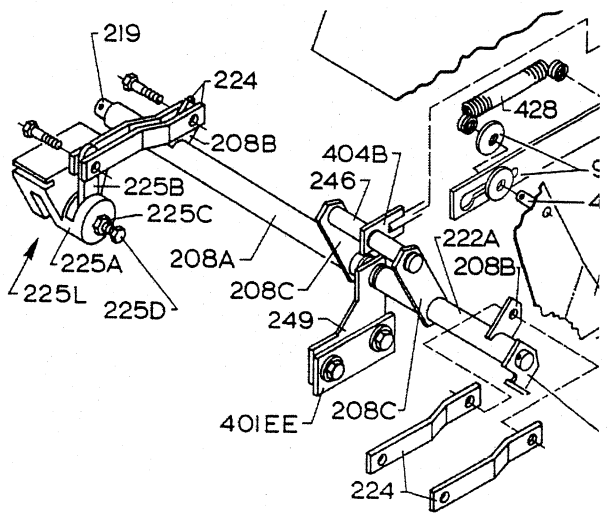


The Brake's other use is that of an Emergency Brake. If you should ever lose Engine or drive system power, the Brake can be activated instantly to hold the Crawler safely in position.

DISK BRAKE ADJUSTMENT

CAUTION: Read the following Disk Brake and Disk Puck instructions in their entirety before attempting any Disk Brake adjustments!

Release Parking Brake. Unscrew a few turns the #225C Jam Nut on #225R & #225L Right & Left Disk Brakes to release each Jam Nut's respective #225D Threaded Adjuster Pin.



Rotate the Adjuster Pin on each Disk Brake **in** (clockwise when viewing **face** of Brake) until it stops...don't overtighten, just tighten to the point where it stops and the **pucks** (brake linings) are tight on the Brake Disk.

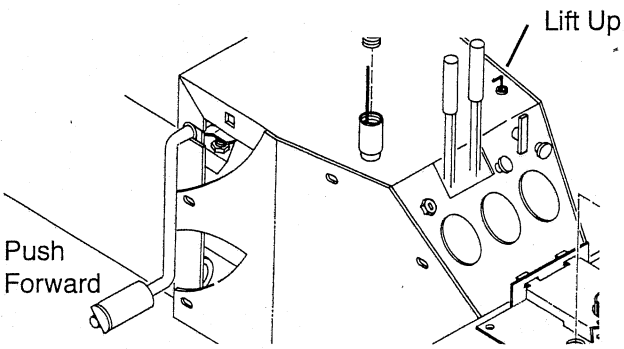
Now counter-rotate (counter-clockwise) the Adjuster Pin of each Disk Brake exactly 180 degrees. The pucks should have lost their grip on their respective Disks and both Brake assemblies should be free to move.

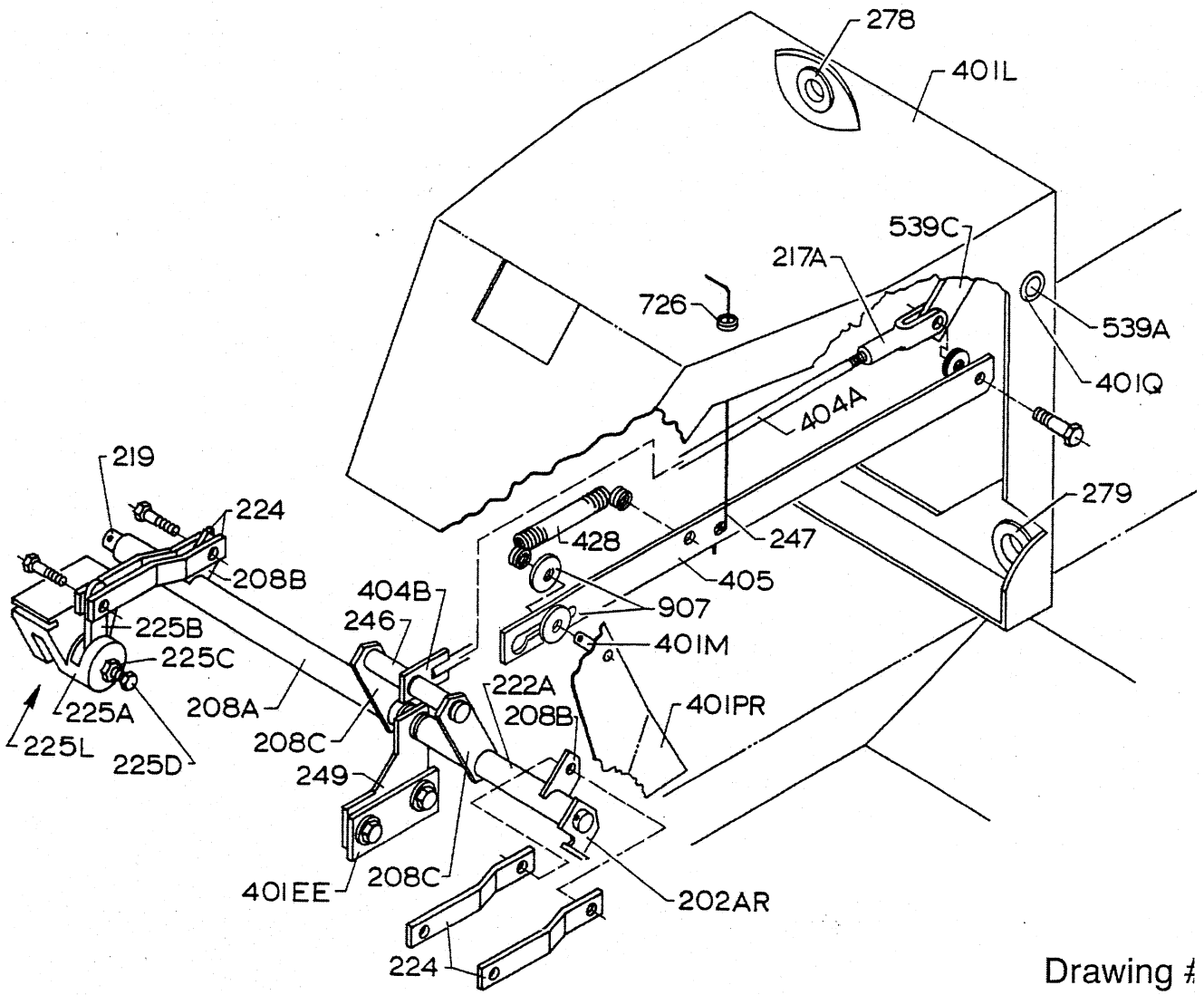
Push forward on the Parking Brake and watch as each Disk Brakes' #225B Lever begins to rotate forward, and tighten the pucks of each Brake on their respective Disk. The #246 Evener Rod is the **central pull device** that connects the two Disk Brakes together, and it **must be kept parallel** to the #219 Pivot Rod.

If it is not parallel, determine which of the two #208C Levers (connecting the #246 Evener) is further rearward. Release the Brake. Rotate just a few degrees counter-clockwise, the Adjuster Pin of the Disk Brake that is closest to the most rearward #208C Lever. Push forward on Brake and recheck for parallelism of #246 Evener & #219 Pivot...readjust if necessary. When satisfied, hold each #225D Adjuster with wrench and tighten its respective #225C Jam Nut.

DANGER: The proper adjustment and maintenance of your Disk Brakes can not be overemphasized! Double check your work for safety. Always call our Service Department with any doubts or questions you may have!

Push Brake fully forward and lift on #247 Brake lock handle to lock brake into Parking Brake Position.





Drawing #

At this point, the notch in slot in top rear of #405 Bar should lift over mating #401M Pin.

If it doesn't, then disconnect 5/16" Cap Screw holding #217A Clevis on forward end of #404 Pull Rod and screw Clevis further off Rod. Remount Clevis and check. If notch lifts over Pin before spring scale reaches 90 pounds, screw Clevis further on Rod and then reassemble and check.

When satisfied, secure 5/16" Cap Screw holding #217A Clevis and #405 Bar with 5/16" Lock Nut. Don't overtighten; Cap Screw must be able to rotate.

Release your Parking Brake by pushing fully forward until #247 handle drops (it may be necessary to push down on #247 to release brake). and check your final adjustment. It is **mandatory** that when the Brake Pedal is released, that each Disk Brake's **puck** is fully released and the Disk Brake assemblies are free to move without any appreciable **drag** on their respective Disks.

DISK PUCK WEAR

As the Brake System is your highest priority safety device, it is **mandatory** that you compensate for any Puck (brake lining) wear by repeating the DISK BRAKE ADJUSTMENT steps detailed above.

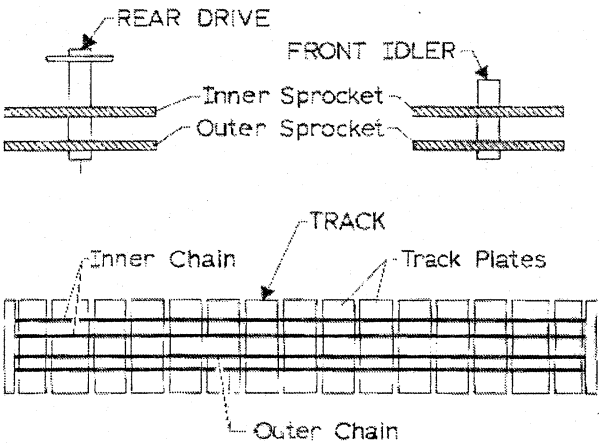
Check with factory Service Department with any questions you may have regarding when and how to replace Brake Pucks (brake linings) or other brake related parts.

TRACK MAINTENANCE

Before attempting to complete any of the three parts of this Track Maintenance section, it is recommended that you read all three parts completely to provide backround on how the total Track System is adjusted and maintained.

Below are a series of drawings to aid you in parts identification as you follow the procedures described below. To aid clarity, only the parts described in the instructions are included in most of the drawings. In some cases, to lessen confusion, certain parts (such as Track Rods), do not appear in all drawings.

NOTE: When working with the Tracks, you will be dealing with some significant weights and will be required to hold some specific alignments. Though the Tracks can be successfully put on (and off) by a single person, it's strongly advised to have an able-bodied "helper" available both for assistance and safety reasons!

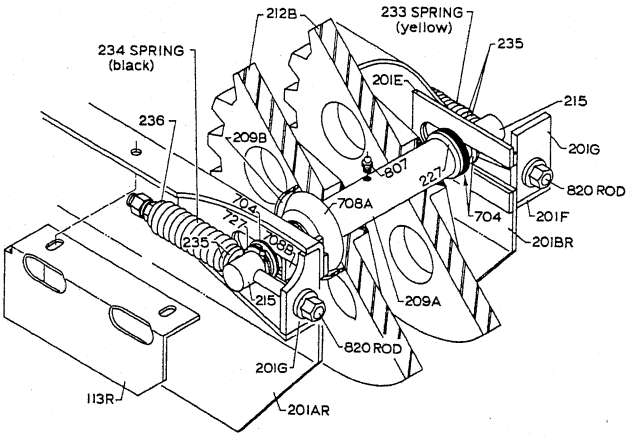


TRACK REMOVAL

Drive your Crawler onto a firm, level surface. Shut off engine and dismount. From below, block Crawler so that Tracks clear the ground by 2". Use solid blocking and place it under the Crawler so that it will give the Tractor the greatest support left to right and front to rear. When placing your blocking, analyze the total weight and balance of the Crawler as it will change as the Track is added and removed! CAUTION: When blocking Crawler, be careful you are not putting any blocks under the #212C Sprocket of either #212 Rear Drive!!

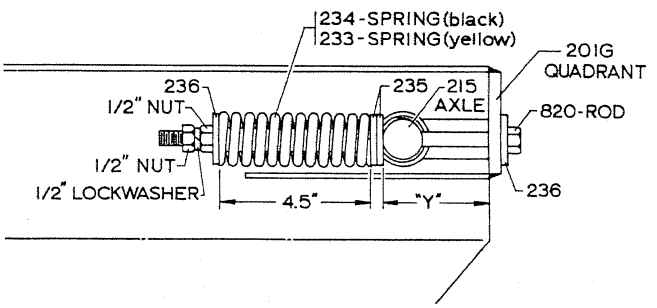
NOTE: As you work with the Tracks, realize that the more you can support the "lower strand" of each Track and keep it flat and close to the #211 Idler Wheels (4" diameter), the more slack you will have in the "upper strand" of the Track to work with!

Remove the #113 Spring Guard that covers the #234 Spring (black) on the Track you are preparing to remove...save Cap Screws and Nuts for later reassembly.

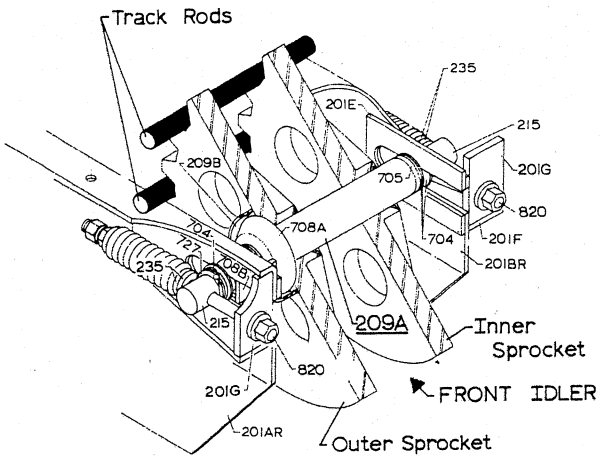


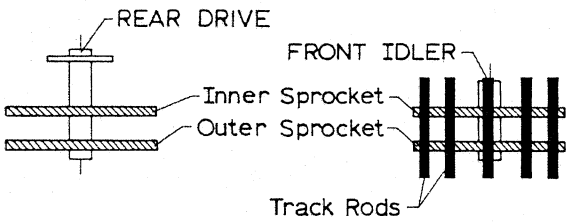
Loosen and remove the 1/2" Nut and 1/2" Lock Washer from the extreme end of each #820 Rod that is tensioning the Track you wish to remove.

By rotating each #820 Rod counter-clockwise, Loosen and remove each remaining 1/2" Nut and #236 Washer and its respective #233 or #234 Spring. Slide #215 Front Axle fully rearward.

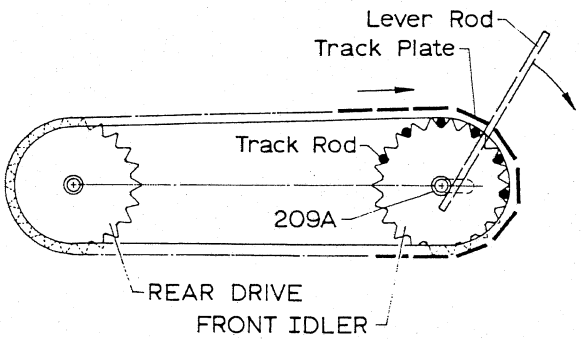


With gloved hands begin to rotate the Track **forward**. Remember to periodically "rock" the Track's Control Handles forward & back to relieve any internal pressure on the Track's Motor. As the Track is rotated **forward**, insert Track Rods between alternate mating teeth of the Front Idler's Inner & Outer Sprockets...keep Rods centered over their respective Inner & Outer Sprockets.





To ease Track rotation insert a 5/8" diameter x 24" long Lever Rod between two Track Plates and fully engage the Rod's end on the **bottom** of the #209A Tube of the Front Idler.

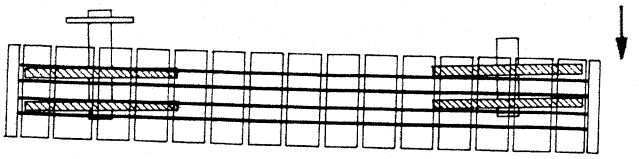


NOTE: Insert the Rod between Track Plates located at about the 1:00 o'clock position and rotate Lever Rod downward.

CAUTION: Be careful where you locate the end of the Lever Rod on the #209A Tube of Front Idler...you do not want to damage #807 Oil Fitting. Remember to periodically "rock" the Track's Control Handle forward & back to relieve any internal pressure on the Track's Motor.

Depending on the amount of debris in your Track system, you should be able to insert 5 to 6 Track Rods between the alternate mating teeth of the Front Idler's Inner & Outer Sprockets...keep Track Rods centered over their respective Inner & Outer Sprockets!

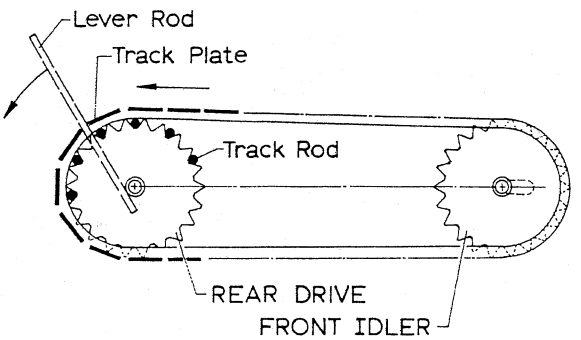
When the last Track Rod you installed has rotated to the 12:00 o'clock position, remove the Lever Rod and force the **forward end** of the Track outward by sliding on the Track Rods.



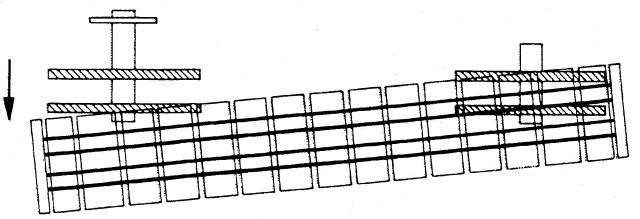
Stop sliding when the Track's Inner Chain is centered **between** the Inner & Outer Sprockets of the Front Idler...see drawing above. **NOTE**: For the sake of clarity the Track Rods are not shown in the drawing above.

Now in a similar manner, using the Lever Rod on the Rear Drive, rotate the Track **rearward** and remove all the previously installed Track Rods making sure that the Track's Inner Chain remains between the Inner & Outer Sprockets on the Front Idler.

With all the Track Rods removed from the Front Idler, continue rotating the Track **rearward** and in a similar manner as above, install the Track Rods between alternate mating teeth of the Rear Drive's Inner & Outer Sprockets...keep Rods evenly centered over their respective Inner & Outer Sprockets.



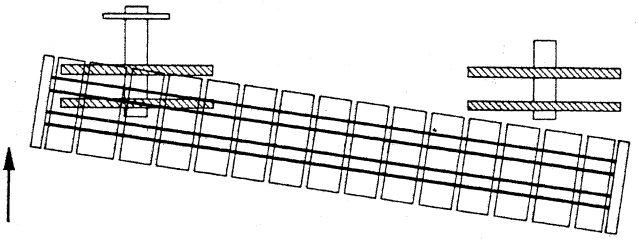
When the last Track Rod you have installed has rotated to the 12:00 o'clock position, you can force the rearward end of the Track outward and totally off the Inner & Outer Sprockets of the Rear Drive.



Pulling forward on the Track will allow you to loop the Track off the remaining Sprocket on the Front Idler allowing complete Track removal.

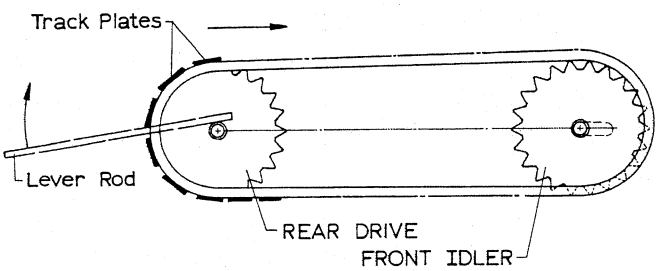
TRACK REPLACEMENT

Slip the **rearward end** of the Track around the Inner & Outer Sprockets of the Rear Drive engaging the Track's Inner Chain between the Inner & Outer Sprockets of the Rear Drive.



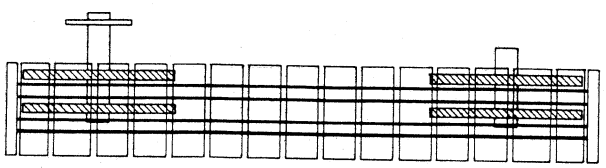
Loop the **forward end** of the Track around Inner & Outer Sprockets of Front Idler...push Track's Inner Chain against Front Idler's Outer Sprocket.

Using a Lever Rod on the Rear Drive, rotate the Track **forward** while "working" the Track's Inner Chain **up & over** the Front Idler's Outer Sprocket.

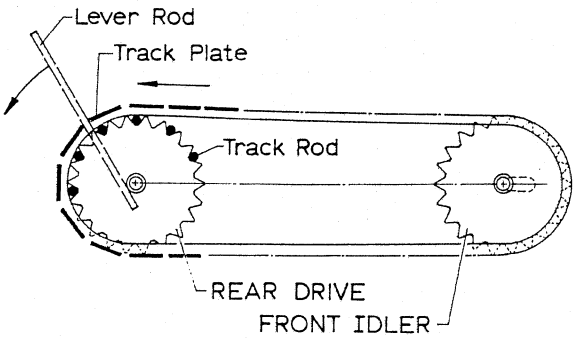


NOTE: The above step is probably the most difficult because the end of the Track you are working with is extremely heavy and except for your own lifting efforts is totally unsupported. Here is where your "helper" can be of assistance by using the Lever Rod or suitable crowbar to work the Track's Inner Chain over the teeth of the Outer Sprocket as you support it from above. Again, supporting the "lower strand" of the Track will give you additional slack to work with!

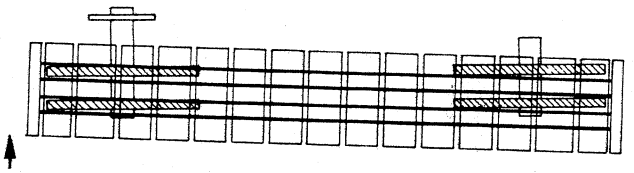
Stop when the Track's Inner Chain is located **between** the Inner & Outer Sprockets of the Front Idler and Rear Drive.



Relocate the Lever Rod and begin rotating the Track rearward. As the Track rotates rearward, insert Track Rods between the alternate mating teeth of the Rear Drive's Inner & Outer Sprockets...keep Rods centered over their respective Inner & Outer Sprockets.

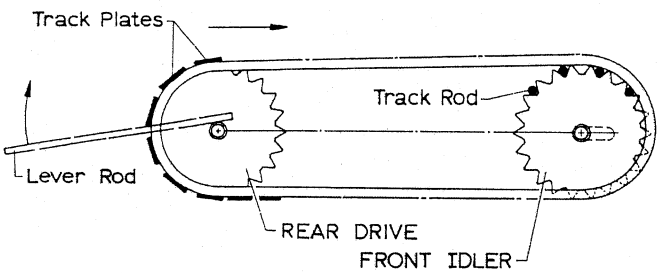


When the last Track Rod you inserted rotates to the 12:00 o'clock position, remove the Lever Rod and force the Track **inward** until the Track's Inner & Outer Chains align with their mating Inner & Outer Sprockets on the Rear Drive.

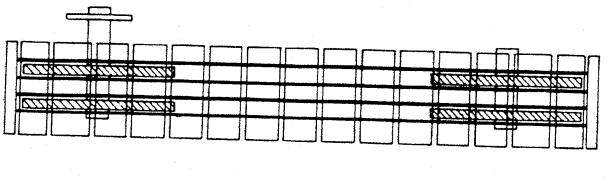


Reinsert Lever Rod and rotate the Track **forward**. Hold the above alignment and allow the Sprocket's teeth to enter their respective Track's Inner & Outer Chain. While rotating Track, remove all Track Rods as they drop free.

Continue rotating Track **forward** while inserting Track Rods into the alternate mating teeth of the Front Idler's Inner & Outer Sprockets...keep Rods centered over their respective Inner & Outer Sprockets.

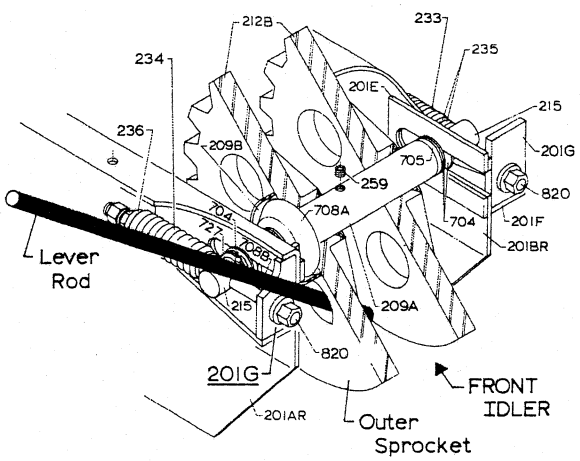


When the last Track Rod inserted rotates to the 12:00 o'clock position, remove the Lever Rod and force the Track **inward** until the Track's Inner & Outer Chains align with their mating Inner & Outer Sprockets on the Front Idler.



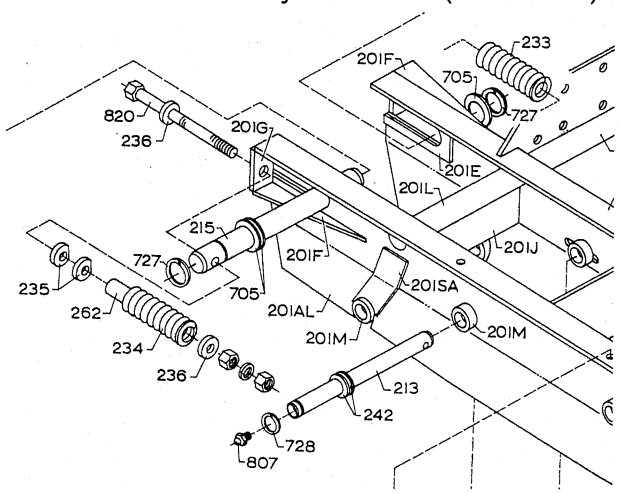
Rotate the Track **rearward** while holding the above alignment and allow the Sprocket's teeth to engage their respective Inner & Outer Track Chains. Remove all the Track Rods as they drop free; save them for next time.

Insert the Lever Rod a few inches into the **most forward** hole in the Outer Sprocket of the Front Idler. Rest the Rod firmly against the #201G Quadrant and pull back on the Lever Rod thereby drawing the Front Idler forward, tightening the Track.



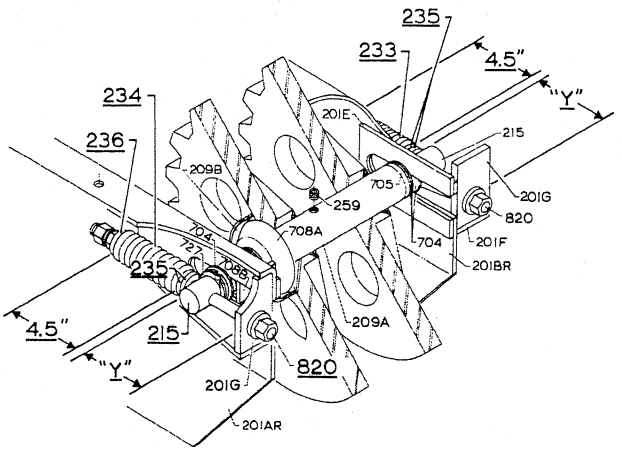
You may have to do this Track tightening procedure a few times to work the Front Idler as far forward as you can.

Replace the #234 Spring (black) by slipping it over the end of its respective #820 Rod (on outside of Track) and over its #262 Tube, which should still be in place on #820 Rod. Secure Spring with a #236 Washer followed by a 1/2" Nut (fine thread).



In a similar manner replace the #233 Spring (yellow) over its respective #820 Rod & #262 Tube (on inside of Track)...secure with #236 Washer followed by 1/2" Nut (fine thread).

By rotating each #820 Rod **clockwise**, draw the 1/2" Nut & #236 Washer (on each Rod's end) against its respective #233 or #234 Spring such that each Spring is compressed to a total length of 4.5".



NOTE: Tighten the pair of #233 & #234 Springs 1/4" at a time. Tighten the #234 Spring (black) 1/4", then stop and go to the #233 Spring (yellow) and tighten it 1/4". Work back and forth from #234 Spring to #233 Spring 1/4" at a time until **both** Springs are 4.5" in total length. Measure Spring length only...do not include the #235 & #236 Washers in your measurement).

At this time, slowly and safely remove all "support" blocking from underneath your Crawler so that the Crawler rests firmly on only its Tracks. Go on to the next section for instructions on Track Tensioning.

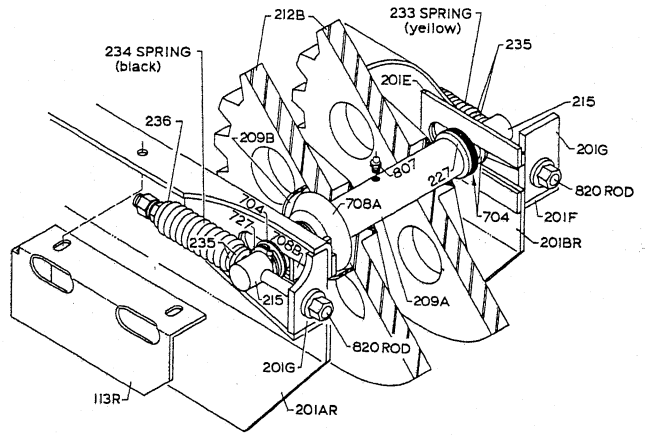
TRACK TENSIONING

Before starting your tensioning procedure, make sure your Track System is relatively clean and free of debris...a high-pressure wash job is an excellent idea.

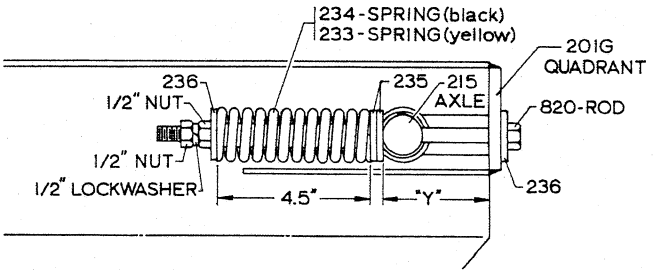
Drive your Crawler through a "clean" area to work out debris that may have lodged between Track Sprocket teeth or in the Track's Chain Links. Park your Crawler on a firm level surface, shut off engine and dismount.

On the side of the Track you are going to

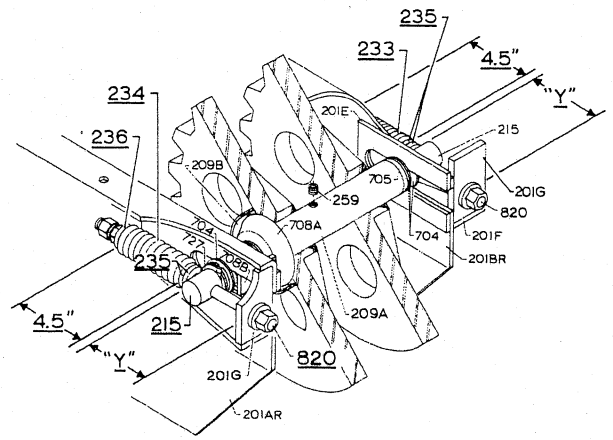
tension, remove its respective #113 Spring Guard...save Cap Screws & Nuts for reassembly.



Remove the 1/2" Nut and 1/2" Lock Washer at the extreme end of each #820 Rod.



Begin your tensioning procedure by checking the overall length of the #234 Spring (black) and #233 Spring (yellow). Both Springs should be compressed to an overall length of 4.5". The length measured is only the Spring; do not include the #235 & #236 Washers in your measurement!

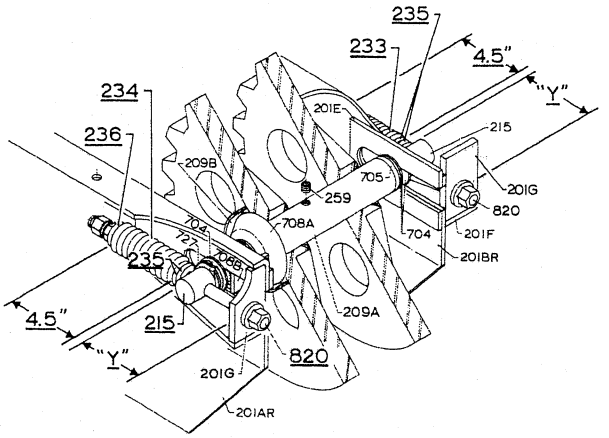


If your Springs have lost this 4.5" dimension, or you have replaced a broken #820 Rod, follow this procedure:

With a wrench, rotate each #820 Rod so that its respective #236 Washer is drawn **forward** (or released **rearward**) thereby adjusting its respective #234 Spring (black) or #233 Spring (yellow) to a final length of 4.5". Work back and forth tightening each Spring 1/4" at a time until you have achieved a 4.5" overall length for both Springs. Measure Spring length only; don't include #235 and #236 Washers in your measurement.

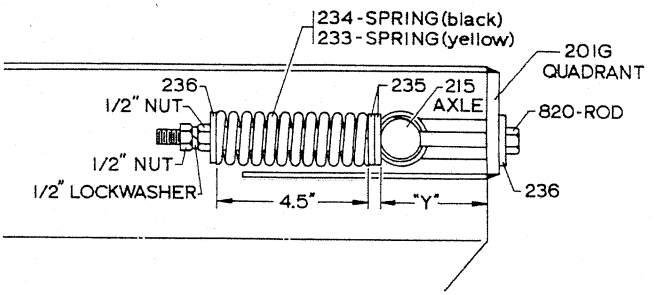
At this time remount and safely restart your Crawler. Drive it approximately 25 feet forward and then go in reverse back to your starting point. Shut off the engine and dismount. Check the overall length of your #233 & #234 Springs for any changes in length. Readjust to proper 4.5" overall length if necessary. When satisfied, secure each 1/2" Nut (on end of each #820 Rod) with a 1/2" Washer and 1/2" Nut...fully tighten.

NOTE: To achieve ideal Track alignment, the "Y" distance (the distance from the rear face of the #215 Front Axle forward to the **rear face** of the #201G Quadrant) should be reasonably equal on each end of the #215 Axle you are adjusting.

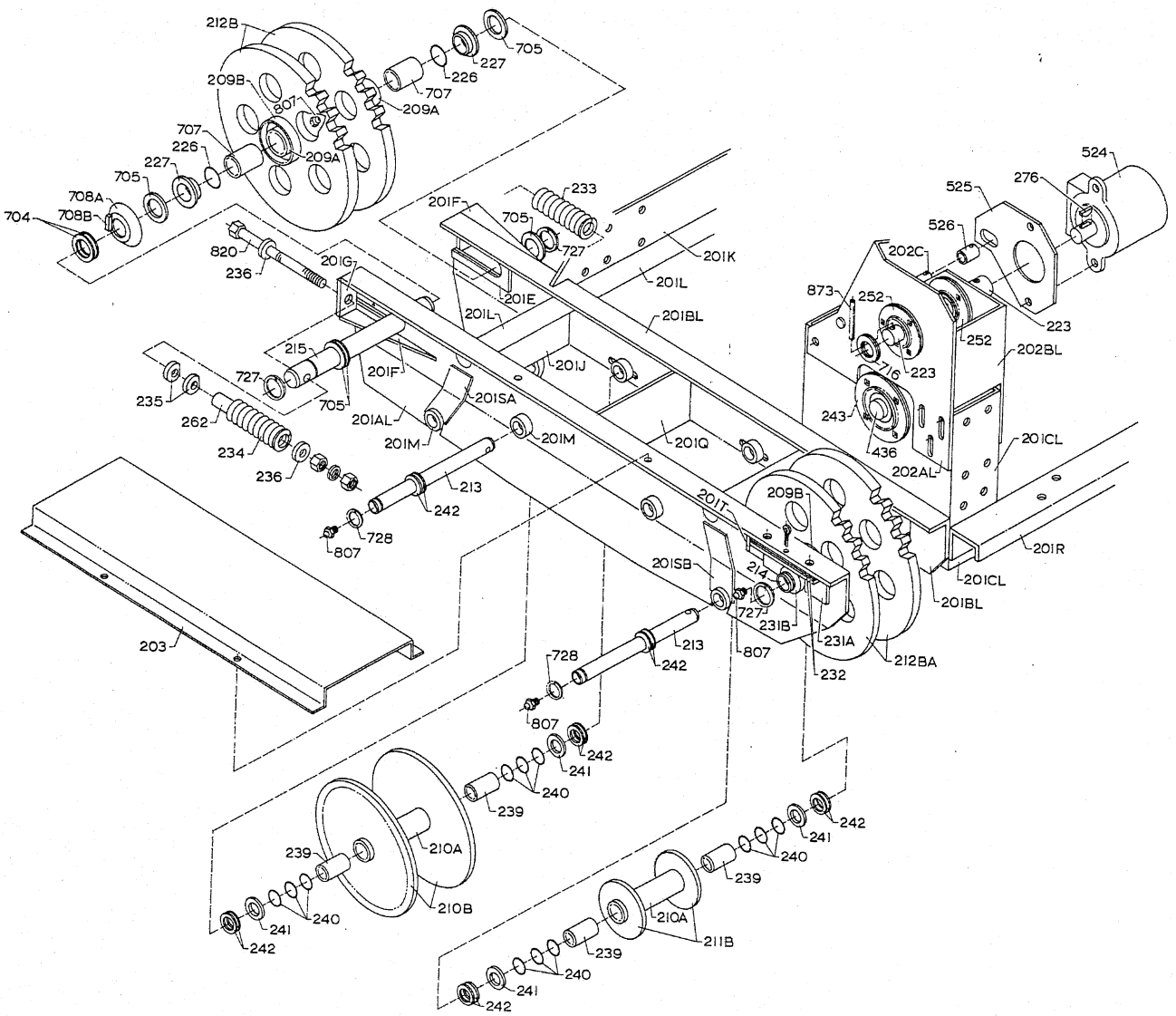


To accomplish this, loosen the 1/2" Nut and 1/2" Lock Washer on the end of the #820 Rod holding the #233 Spring (yellow) and "fine tune" the overall length of the #233 Spring using the procedure described above. Don't change the previous 4.5" setting of the #234 Spring (black).

When equal "Y" distances have been achieved, replace and tighten the 1/2" Lock Washer and 1/2" Nut on extreme end of #820 Rod holding the #233 Spring (yellow).



Using original Cap Screws and Nuts, replace the #113 Spring Guard removed above...tighten. *Lubricate system.*



Track Sprocket & Track Idler Lubrication

Lubrication of the #211 Idlers is accomplished by high pressure oiling through #807 Zerk Fittings. The Zerk Fittings are "submerged mounted" in the outside ends of all eight of the #213 Idler Axles and the two #214 Rear Axles and are lubricated from the sides of the Crawler (See drawing above)

The Front Idler Sprocket assemblies have #807 Zerks mounted in their #209A Tubes and are lubricated from the front of the track through the 1/2" track shoe gap (See drawing above).

It is a good idea to clean out the track system of debris each time you lubricate to spot problems before they become expensive maintenance items.

NOTE: In addition, #807 Zerk Fittings allow use of grease in place of oil lubrication for more severe track operating conditions. Check Lubrication and Periodic Service section of this manual for further information.

TRACK IDLER MAINTENANCE

NOTE: The #211 Track Idlers are made of a slightly softer steel than the Track Chain. This has been done to allow the inevitable wear to be concentrated on the less expensive Idlers thereby protecting and greatly extending the life of the much more expensive Track Chain.

The Track Idlers, after a few hours of running time, will have their inside walls **hard-peened** into a configuration that will precisely mate with the contour of the Track Chain they are guiding. This **peening** process creates not only a mating inside surface on each Idler, but also rolls a wider

extended edge around each Idler's circumference. In addition, the Idler surfaces are "work hardened" by being **peened** against the harder Track Chain.

TRACK SHOES

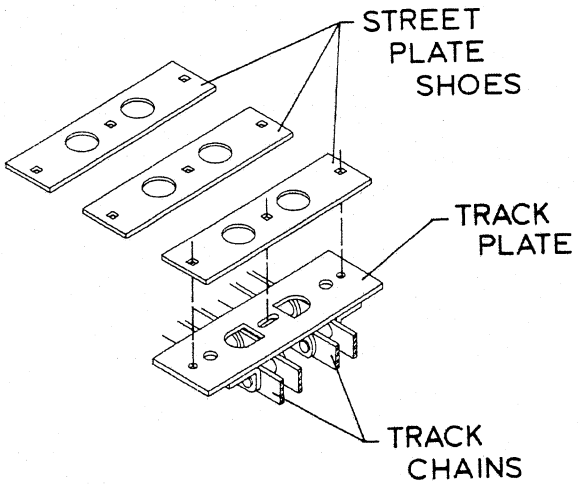
Your Crawler comes from the factory without any Track Shoes being installed. You can safely run your Crawler without Track Shoes, but under average soil conditions you will be able to attain only about 80% of your Crawler's tractive ability.

To gain more traction, you can add the TSO43 TRACK SHOE KIT. It's available in either Street Plate Shoes or Grouser Shoes. Under average soil conditions, the addition of Street Plate Shoes to your Track will increase traction to approximately 90% of your Crawler's tractive ability. Adding Grouser Shoes will give you the greatest tractive ability your Crawler can deliver.

STREET PLATE SHOE INSTALLATION

A single Street Plate Shoe is applied to the top outside face of each Track Plate and held in position with three 3/8x1" Carriage Bolts and three 3/8" Flange Lock Nuts.

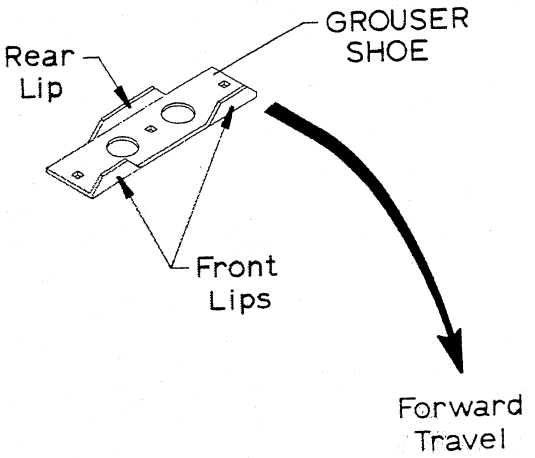
NOTE: The Carriage Bolts are inserted into the 3/8" **square** holes in **top outside face** of each Street Plate Shoe and the 3/8" Flange Lock Nut is applied to the protruding end of each Carriage Bolt on **lower inside face** of each mating Track Plate.



The Street Plate Shoes will provide a significant increase in Track traction, but will create a modest increase in Track vibration when traveling over hard, unyielding surfaces such as concrete, asphalt, etc.

GROUSER SHOE INSTALLATION

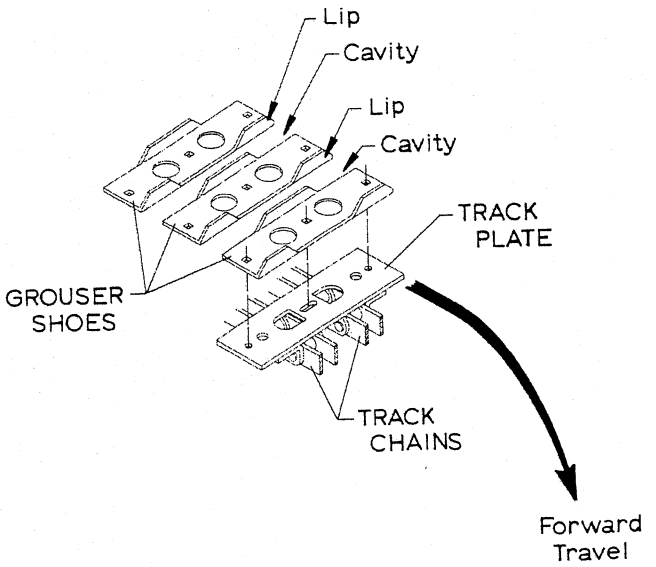
Grouser Shoes **must** be installed properly to avoid damage to the Crawler and potential operator injury! Each Grouser Shoe has two **Front Lips** and one **Rear Lip**. Grouser Shoes must be installed so that the two **Front Lips** of each Shoe touch the ground **first** during **forward** travel!



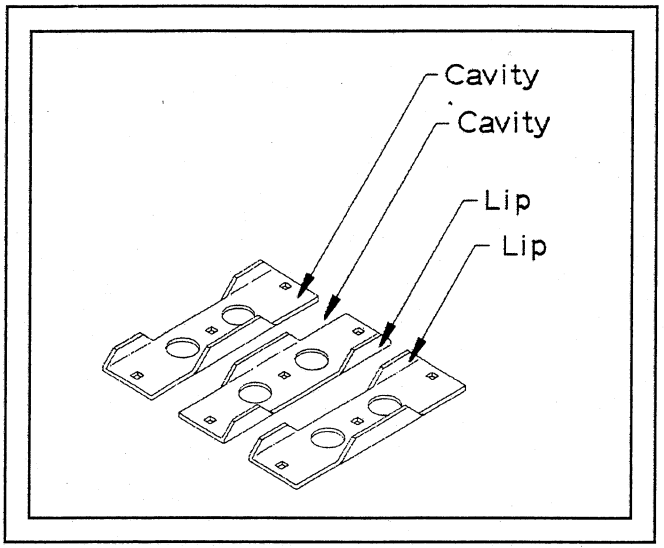
Grouser Shoes are applied to the top outside face of each Track Plate and held in position with 3/8x1" Carriage Bolts and 3/8" Flange Lock Nuts.

NOTE: The Carriage Bolts are inserted into the 3/8" square holes in top outside face of each Grouser Shoe and the 3/8" Flange Lock Nut is applied to the protruding end of each Carriage Bolt on lower inside face of each mating Track Plate.

The Lip of one Shoe should always be followed by the Cavity of the next Shoe in line. Carefully study the drawing below.



CAUTION: Incorrect assembly of the Grouser Shoes is shown in the following drawing. The **Lip** of one Grouser Shoe **should never** be followed by the **Lip** of the next Grouser Shoe in line. The **Cavity** of one Grouser Shoe **should never** be followed by the **Cavity** of the next Grouser Shoe in line.



INCORRECT ASSEMBLY !

If the Grouser Shoes are installed incorrectly, mud, stones, etc. can build up between the **Lips** of two adjacent Grouser Shoes causing the Track Chain to loose its ability to flex. This results in the Track rising up and striking and potentially causing damage to the Crawler's Fenders and related parts and possible operator injury.

9- DRAWINGS

SMALL DRAWINGS (8-1/2" x 11")

#110D - Parking/Emergency Brake

#111D - Front Idler Sprocket (Right Side)

#112 - Chain Case Assembly

#119 - Disk Brake Exploded View

#154 - Hydraulic Circuit

#155 - Electrical Diagram

LARGE DRAWINGS (11" x 17")

#116D - Track Frame Exploded View (Left Side)

#117D - Track Frame Exploded View (Right Side)

#118 - Chain Case Exploded View (Left Side)

8- PARTS LIST

MAGNATRAC HYDRO-6000

MH6000 - Version 01.01.01

The following Parts List includes all parts used to produce a Magnatrac Hydro 6000 crawler tractor. Standard hardware store fastenings (cap screws, washers, nuts, etc.) are not included although special "non-standard" washers, pins, etc. are all included. Some parts from our most common attachments and accessories are also included to aid the Magnatrac owner when he must add to or maintain these items on his Tractor.

Each part, has its own identification number or letter series. A whole number like 201 refers to a complete part; a part that can't normally be disassembled. In this case a 201 is the complete "welded" Lower Track Frame Assembly. A number with a letter after it, like 201A means that it is one specific part (which can't normally be disassembled) of the whole assembly. In this case the 201A Wall, outside. A further variation is possible if this part appears as left or right versions in the completed assembly. In this case the 201AR means that it is the right version of the 201A Wall, outside, which is a component of the 201 Lower Track Assembly. A number in parentheses ( ), indicates how many of this particular part is used in the completed assembly.

After each part number (or letter), and its single word name, is more information useful in identifying a specific part. In addition, in brackets [ ], is a brief description of what the part is used for or the number of another part close to it. This description is helpful in quickly locating specific parts and understanding their use.

22	**Cap** [closes #791 Fitting when #799 Hose is disconnected!] 830-FS-08 (2)
30	**Clip**, hose (1) [secures #812, #800 & #784 Hoses]
47	**Handgrip**, 5/8" ID (2) [#902 Handle]
52	**Edging** [#471 Hose through #401PL Left Footwell]
59	**Valve**, two section, series construction [track drive motors]
69	**Clip, large coated**
70	**Fitting**, tube tee, [connects #800 & 513 Hoses] 844-FS-10
82	**Fitting**, swivel 90 degrees
83	**Fitting**, "T"

113R	**Spring Guard**, right [#234 Spring, right]
113L	**Spring Guard**, left [#234 Spring, left]
114	**Brace**, left
115	**Brace**, right
202L	**Motor Box Assembly, left**
202AL	Plate, left
202BL	Channel, left
202C	Pin
403B	Nut (3)
202R	**Motor Box Assembly, right**
202AR	Plate, right
202BR	Channel, right
202C	Pin
403B	Nut (3)
203	**Cover, idler wheels (2)**
203A	Cover
203B	Clip (2)
204L	**Fender, left assembly**
204AL	Left Fender
204B	Pin
204C	Strip
204R	**Fender, right assembly**
204AR	Right Fender
204B	Pin
204C	Strip
205L	**Support, left fender**
205A	Rod
205B	Plate
205R	**Support, right fender**
205A	Rod
205B	Plate
207	**Pan**
208	**Rocker Assembly, left**
208A	Tube
208B	Arm
208C	Lever
209	**Front Idler Sprocket Assembly** (2)
212B	Sprocket, ductile iron, 22 tooth, 550 chain (2)

209A	Tube
209B	Ring [dust shield on outside #212B Sprocket]
211	**Idler Wheel Assembly**, 4" diameter (10)
210A	Tube
211B	Disk, 4" diameter (2)
213	**Axle**, idler wheel (10)
214	**Axle**, rear drive assembly (2)
215	**Axle**, front idler sprocket assembly(2)
217A	**Clevis**
219	**Pivot Rod**
222	**Rocker Assembly**, right
208B	Arm
208C	Lever
222A	Tube
223	**Shaft** (2) [#724 Primary Drive]
223A	Hub, 1" ID
223B	Shaft
223C	Set Screw, 5/16-18 x 1/4"
224	**Pull**, brake, disk (4)
225L	**Disk Brake Assembly**, left
225A	Body
225B	Lever
225C	Jam Nut
225D	Adjuster Pin, threaded
225R	**Disk Brake Assembly**, right
225A	Body
225B	Lever
225C	Jam Nut
225D	Adjuster Pin, threaded
226	**Seal**, double lip, 1-3/16" ID (8)
227	**Cap**, knurled, 1-3/16" ID (8)
229L	**Cover**, left
229R	**Cover**, right
231	**Support**, Axle (2)
231A	Angle
231B	Collar
232	**Shims**

233	**Spring**, front axle, inside, yellow (2)
234	**Spring**, front axle, outside, black (2)
235	**Washer**, spring, notched, 1-9/16" OD x 7/16" ID (16)
239	**Bearing**, oilite, 1-1/8" OD x 7/8" ID (20)
240	**O-Ring**, 1-1/8" OD x 7/8" ID (48)
241	**Washer**, steel, 1-1/2" OD x 7/8" ID x 1/16"
242	**Washer**, steel, 1-1/2" OD x 7/8" ID x 18 gauge, hardened
243	**Bearing Assembly** (4)
243A	Shell (2)
243B	Bearing, 1-1/4" ID
243C	Set Screw
244	**Pin**, spring, 1/4 dia. x 1-1/2" (10)
246	**Evener Rod**
247	**Pull Rod** [#405 Bar]
248	**Dipstick**, hydraulic oil [#620 Coupling]
249	**Support** [#219 Rod]
251	**Cotter Pin**, 3/16 dia. x 1-3/4" (4)
252	**Bearing Assembly** (4)
252A	Shell (2)
252B	Bearing, 1" ID
252C	Set Screw
261	**Links** (2) [#59 Valve]
262	**Tube**, spring stop (4) [inside #233 & 234 Springs]
263	**Side Wall**, left
264	**Side Wall**, right
268	**Petcock** [between #427 & #431 Hoses]
270	**Edging** [#471 Hose through #401PL Left Footwell]
274	**Edging** [#264 Side Wall, right]
275R	**Guard**, right [underside of #201PR Right Channel]

275L	**Guard**, left [underside of #201PL Left Channel]
276	**Key**, woodruff (2) [#524 Motor]
278	**Grommet**, 1" ID [top left front face #401L Dash Assembly]
279	**Grommet**, 1-1/2" ID [lower right front face #401L Dash Assembly]
281	**Edging** [lower left front face of #401L Dash Assembly]
282	**Plug**, oil tank
285	**Fuse**, 30 amp
311	**Hose**, engine drain
404	**Pull Assembly** [#246 Evener]
404A	Rod
404B	Plate
405	**Bar** [#539C Arm]
408	**Shield**, valve
410	**Support**, valve cover
412	**Hose** [right #524 Motor]
415	**Frame**, headlight
427	**Hose**, gas, long (2)
428	**Spring** [#405 Bar]
429	**Throttle Cable Assembly** [mounts in #401F Nut]
430	**Choke Cable Assembly** [mounts in #401G Nut]
432	**Cover**, terminal [#420 Wire on #442 Battery]
433	**Clip**, coated (6)
434	**Clamp** [#427, #431 Hoses]
436	**Shaft**, 1-1/4" diameter (2) [#243 Bearings]
439	**Hose** (2) [right #524 Motor; left #524 Motor]
440	**Spring**, leaf [#539A Crank]
441	**Switch**, sensing (2) [#503A Mount; #538A Bracket]

445	**Meter**, amps
445A	Body
445B	Retainer
447	**Switch**, headlights, fan (2)
448	**Arm**, torque [#783 Pump]
450	**Fitting**, 90 degree elbow [#435 Tank]
455	**Filter Assembly**
455A	Head
455B	Canister
456	**Headlight Assembly**
456A	Retainer
456B	Bulb, halogen
456C	Gasket
468	**Hose**, 3/8" ID [#621 Tube to #621 Tube, rear]
469	**Hose**, 3/8" ID [#621 Tube to #621 Tube, front]
474	**Reducer T** [#475 Sensor, #473 Barb & #401JJ Tube] 1-1/4 x 1/2 x 1-1/4"
475	**Sensor**, heat [#474 Reducer T]
486	**Meter**, hour
486A	Body
486B	Retainer
487	**Gauge**, hydraulic oil temperature
487A	Body
487B	Retainer
488	**Panel**, left
489	**Panel**, right
491	**Hose** [left #542 Motor]
495	**Latch Assembly** (2)
502	**Seat Mount**
502A	Plate
502B	Post
503	**Post Mount**
503A	Mount
503B	Tube
504	**Seat Pin**

505	**Treadle**
506	**Spring** (2)
509	**Elbow**, 90 degree [#508 Nipple to #615 Fitting] 3/8"
513	**Hose** [inlet #59 Valve]
515	**Hose** [#401GG to #401Y]
520	**Hose** [#522 Barb to #622 Barb, left #524 Motor]
521	**Hose** [#523 Barb to #622 Barb, right #524 Motor]
522	**Fitting**, barb, o-ring, 90 degree elbow [#520 Hose] BRN4601-04x04
523	**Fitting**, barb, o-ring, straight [#521 Hose] BRN4604-04x04
524	**Motor** (2)
525	**Torque Arm** (2) [#524 Motor]
526	**Sleeve** (2) [#525 Torque Arm of #524 Motor]
527	**Fitting**, straight (8) [#524 Motor; #59 Valve] 848-FSO-10x10
528	**Fitting**, 45 degree swivel elbow (2) [right #524 Motor] 889-FS-10
530	**Fitting**, straight [#59 Valve] 720-FSO-12x12
531	**Fitting**, barb, straight [#855 Hose]
532	**Fitting**, straight [#59 Valve]
533	**Elbow**, 3/4" BIP [#401KK Tube]
536	**Chain**, drive, #50 (2) [links #715B Sprocket to #724B Sprocket]
536A	Chain, 55 pitches
536B	Link, master connector
537	**Chain**, drive, #80 (2) [links #724A Sprocket to #212C Sprocket]
537A	Chain, 29 pitches
537B	Link, master connector
539	**Pedal Assembly**
538	Bracket Assembly [mounted on #539A Crank]
538A	Bracket
538B	Tube, bearing [short]
539A	Crank
539B	Pedal
539C	Arm

616 **Breather/Filter** [#620 Coupling]

620 **Coupling**, 3/4" BIP [#401GG Pipe]

621 **Tube**, nipple (4) [floor of #401 Upper Frame Assembly] 1/8 x 1-1/2"

622 **Fitting**, barb (2) [#520 Hose; #521 Hose] KF04x02

678 **Fitting**, 90 degree elbow [#455 Filter] 849-FS-08x12 (2)

686 **Fitting**, 45 degree elbow, o-ring/nut [outlet # 783 Pump] 854-FSO-08x10

687 **Fitting**, barb, 90 degree elbow, o-ring/nut [#684 Pump] 854-FSO-20x20

688 **Fitting**, barb, 90 degree elbow [inlet #683 Pump] 4501-12x08

704 **Washer**, steel, 1-3/16" ID x 1-7/8" OD x 18 gauge, hardened

705 **Washer**, steel, 1-3/16" ID x 2-1/8" OD x 1/16", hardened

707 **Bearing**, oilite, 1-3/16" ID x 1-7/16" OD x 2" (8)

708 **Cup**, dust, front (2)
- 708A Cup
- 708B Tab [short]

709 **Cup**, dust, rear (2)
- 708A Cup
- 709A Tab [long]

714 **Key**, 1/4" square x 1-3/4" (2) [#715 Disk Drive Assembly]

715 **Disk Drive Assembly** (2)
- 715A Disk, 8-1/2" dia. x 1/8"
- 715B Sprocket, 12 tooth, #50 chain [aligns with #724B Sprocket]

716 **Washer**, steel, 1" ID x 1-1/2" OD

722 **Guard** (2) [#243 Bearing]

723 **Washer**, steel, 1-1/4" ID x 1-7/8" OD x 18 gauge

724 **Primary Drive** (2) [#436 Shaft]
- 724A Sprocket, hub type, 11 tooth, #80 chain [aligns with #212C Sprocket]
- 724B Sprocket, plate type, 48 tooth, #50 chain [aligns with #715B Sprocket]
- 724C Set Screw, 3/8-16 x 1/2"

727 **Snap Ring**, 1-3/16" ID (6)

728 **Snap Ring**, 7/8" ID (10)

789 **Fitting** [#449 Valve] (2)

795 **Fitting**, straight [#449 Valve]

796 **Hose**, return [#449 Valve]

800 **Hose**, pressure to overdrive

819A **Paint**, "Cat Yellow"

849 **Power Beyond Plug** K-20-10-Y
- 849A Plug
- 849B O-Ring, large
- 849C Washer, small, plastic
- 849D O-Ring, small

872 **Pin**, roll, 1/4 x 2, double roll [#436 Shaft] (4)

873 **Pin**, roll, 3/16 x 2, double roll [#223 Shaft] (2)

874 **Key** [#436 Shaft]

902 **Handle** (2) [#59 Valve]

903 **Pad**, pedal [#539B]

904 **Pad**, foot (4) [#204R & 204L Right & Left Fenders; #401PR & 401PL Right & Left Footwells]

907 **Washer**, bar, 3/8 ID x 1-1/2" OD (2)

913 **Cap**, #311 oil drain hose

925 **Track Assembly** (2)
- 925A Track Section (4)
  - 925AA Link, inner, roller
  - 925AB Link, outer, connector
  - 925AC Plate
- 925C Connector Section (4)
  - 925AB Link, outer (2)
  - 925AC Plate

925D Pin, connector (16)

925E Pin, cotter (16)

930 **Clamp**, adjustable, 3/8" ID hose (2)

932	**Clamp**, adjustable, 1" ID hose (8)
933	**Seat Assembly**
933A	Seat
933B	Glide, with handle
933C	Glide, without handle
1000	**Lower Track Frame Assembly**
201AL	Wall, outside, left
201AR	Wall, outside, right
201BL	Wall, inside, left
201BR	Wall, inside, right
201CL	Box, left
201CR	Box, right
201D	Plate (2)
201E	Reinforcement (4)
201F	Angle (6)
201G	Quadrant (4)
201J	Gusset (4)
201K	Crossplate
201L	Bar (2)
201M	Collar, 1-3/8 OD x 7/8 ID x 5/8" (20)
201N	Brace (4) [inside #201BR & #201BL Right & Left Walls]
201PL	Channel, left
201PR	Channel, right
201Q	Plate (2)
201R	Joiner
201SA	Brace, outside (2) [left front, right rear]
201SB	Brace, outside (2) [right front, left rear]
201T	Stop (2)
201U	Insert (4) [inside #201PR & 201PL Channels]
1001	**Axle Support**, rear drive (2)
1003	**Upper Frame Assembly**
401A	Channel
401B	Hitch
401C	Plate [secures #812, #800 & #784 Hoses]
401D	Front Plate
401E	Coupling [hydraulic oil drain]
401EE	Strip [#249 Support]
401F	Nut, 9/16-18 [#401L Dash]
401G	Nut, 3/8-24 [#401L Dash]
401GG	Pipe [#616 Breather]
401H	Bracket [bottom #470 Radiator]
401HH	Tube [#855 Hose]
401II	Tube [#516 Hose]
401JJ	Tube, threaded [#474 Reducer "T"]
401K	Gusset [mates with #201K Crossplate]
401KK	Tube, threaded [#533 Elbow]
401L	Dash Assembly
401M	Pin [#405 Bar]

401N	Ear (2)
401PL	Left Footwell
401PR	Right Footwell
401Q	Tube [#539A Crank]
401V	Tube (4) [#401PR & 401PL Right & Left Footwells]
401W	Baffle [welded inside tank]
401X	Bottom
401Y	Tube [#515 Hose]

1004 **Bushing**,spacer and alignment ring

1006 **Hub**, track/attchment pump

1007 **Torque arm**, track pump

1008 **Mount**, fuel filter

1009 **Rear Drive Assembly** (2)

209B	Ring [dust shield on outside #212BA Sprocket]
212A	Tube
212BA	Sprocket, ductile iron, 22 tooth, 550 chain, machined fillet (2)
212C	Sprocket, steel, 18 tooth, 80 chain [aligns with #724 Sprocket]

1010 **Hood**

1011 **Grill**

1012 **Support**, track pump mount

1013 **Dash**, hood support

1014 **Floor,** battery

1015 **Strip**, battery hold-down

1016 **Bracket**, key switch mounting

1017 **Mount**, attachment valve

1018 **Valve Cover**

1019 **Bracket**, radiator mount

1020 **Tube**, attachment pump torque arm stop

1021 **Plate**, muffler mounting

1022 **Guide**, throttle/engine cutoff cables

1023 **Guard**, radiator

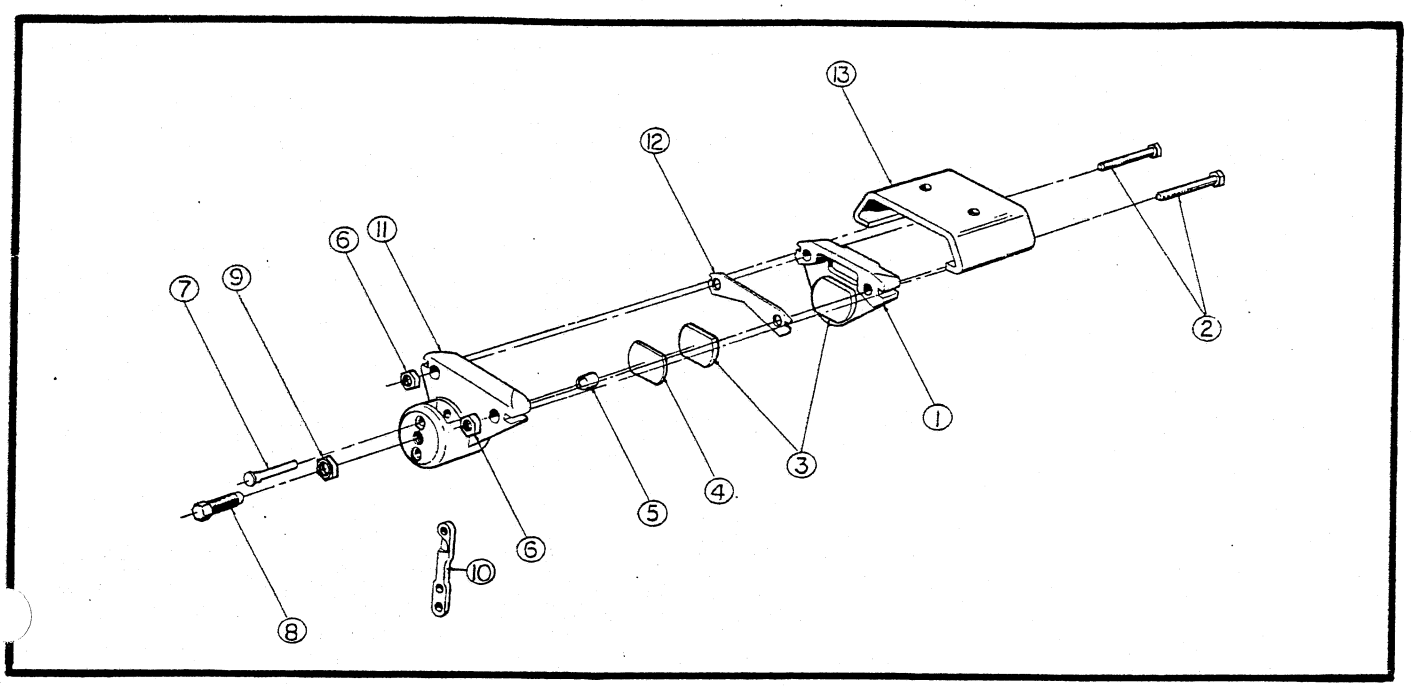
1024	**Bracket**, backup alarm switch mounts
1025	**Link with tabs for Backup alarm**, #59 valve (2)
1026	**Pipe**, muffler extension
1027	**Cap**, muffler rain cap
1028	**Tube**, track pump mounting steel bushings
1029	**Tank**, Fuel, 4.5 gallons
1030	**Rod,** track expander rod (4)
1031	**Hose**, Track Pump presssure line
1032	**Hose**, Filter to tank
1033	**Hose**, Power beyond to radiator
1034	**Hose**, Radiator to tank
1035	**#59 valve to tank**
1036	**Hose**, Track pump suction line
1037	**Hose**, attachment pump suction line
1039	**Fitting**, Metric reducer, engine oil drain line
1040	**Battery**
1041	**Valve**, attachment
1042	**Radiator**
1043	**Barb Fitting**, 3/4" x 1"
1044	**Pump**, 0.84 cu. in. track pump CW #2PE13.8D-R8552
1045	**Pump**, 0.84 cu. in. attachment pump #2PE13.8S-R8552 CCW
1046	**Fitting**, 45° with barb, track pump suction line
1047	**Key**, track/attachment pump
1048	**Fitting**, threaded barb (connects 1037 to 553)
1049	**Filter**, engine fuel
1050	**Filter**, engine oil

1051	**Fitting**, swivel, mates #688 to attachment pump
1052	**Handle assembly**, 1041 attachment valve
1053	**Engine**
1056	**Clamp**, muffler extension clamp

WIRE ASSEMBLIES

1059	**Wire**	35" 6 ga, black	(3/8 stud - 1/2 stud)	
1060	**Wire**	28" 6 ga, black	(1/2 stud - 5/16 stud)	
1061	**Wire**	5" 14 ga, brown	(#295)	(2)
1062	**Wire**	12" 14 ga, brown	(#293 - #105)	
1063	**Wire**	61" 14 ga, brown	(284 {w/ 30 amp} - #291)	
1064	**Wire**	34" 14 ga, black	(#293 - #294)	
1065	**Wire**	17" 14 ga, black	(butt - #291)	
1066	**Wire**	21" 14 ga, black	(#289 - #291)	
1067	**Wire**	46" 14 ga, black	(#301 - #295)	
1068	**Wire**	10" 14 ga, blue	(#301 - #293)	
1069	**Wire**	5" 14 ga, blue	(#294 - #295)	
1070	**Wire**	6" 14 ga, blue	(#301 - #293)	
1071	**Wire**	6" 14 ga, blue	(#301 - #294)	
1072	**Wire**	80" 14 ga, yellow	(#301)	(2)
1073	**Wire**	5" 14 ga, purple	(#295)	
1074	**Wire**	40" 14 ga, purple	(#295 - #293)	
1075	**Wire**	76" 14 ga, red	(#241 - #295)	
1076	**Wire**	10" 14 ga, green	(#295 - #296)	
1077	**Wire**	13" 14 ga, green	(#295 - #296)	
1078	**Wire**	8" 14 ga, green	(#293 - #294)	
1079	**Wire**	8" 14 ga, green	(#294 - #295)	
1080	**Wire**	33" 14 ga, green	(#293 - #293)	

Drawing #119



Item	Part No.	Description	12 O'Clock CW 3000-0001	12 O'Clock CCW 3000-0002	12 O'Clock CW Spaced 3000-0034	12 O'Clock CCW Spaced 3000-0035	12 O'Clock CW Bracket 3000-0009	12 O'Clock CCW Bracket 3000-0010	3 O'Clock CW 3000-0003	3 O'Clock CCW 3000-0004	3 O'Clock CW Spaced 3000-0036	3 O'Clock CCW Spaced 3000-0037	3 O'Clock CW Bracket 3000-0011	3 O'Clock CCW Bracket 3000-0012	6 O'Clock CW 3000-0005	6 O'Clock CCW 3000-0006	6 O'Clock CW Spaced 3000-0038	6 O'Clock CCW Spaced 3000-0039	6 O'Clock CW Bracket 3000-0013	6 O'Clock CCW Bracket 3000-0014	9 O'Clock CW 3000-0007	9 O'Clock CCW 3000-0008	9 O'Clock CW Spaced 3000-0040	9 O'Clock CCW Spaced 3000-0041	9 O'Clock CW Bracket 3000-0015	9 O'Clock CCW Bracket 3000-0016
			QUANTITY																							
1.	3000-1005	MB-1 Anvil	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
2.	3000-1011	Hex Head Screw	2	2	2	2	1	1	2	2	2	2	1	1	2	2	2	2	1	1	2	2	2	2	1	1
3.*	3000-1006	Brake Lining	2	2	2	2	1	1	2	2	2	2	1	1	2	2	2	2	1	1	2	2	2	2	1	1
4.*	3000-1007	Backing Plate	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
5.	3000-1012	Actuator Pin	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
6.	3000-1008	Self-Loc Nut	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1	2	2	2	2	2	2	2
7.†	3000-1010	Groove Pin	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
8.	3000-1013	Adjuster Pin	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
9.	3000-1009	Jam Nut	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
10.†	3000-1004	Lever	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
11.†	3000-1001	Brake Housing	1	1	1	1	1	1				1	1	1	1	1	1	1	1	1					1	1
	3000-1003	Brake Housing					1	1	1	1	1	1	1						1	1	1	1	1	1	1	1
12.	3000-1030	1/4" Spacer			1	1	1	1			1	1	1				1	1	1	1			1	1	1	1
13.	3000-1052	Floating Bracket					1	1			1	1													1	1

* Items #3 and #4 are included in Lining Repair Kit 3000-9001

† Items #7, #10 and #11 are included in MB-1 Service Kits listed on the back of this sheet.

INSTALLATION INSTRUCTIONS

1. Place brake caliper on mount, connect the brake linkage.
2. Adjust the Adjuster Pin (#8) by turning it until it is snug and then backing off 1/2 turn. Then tighten the Jam Nut (#9).

LINING REPLACEMENT

1. Back off the Adjusting Pin (#8), disconnect brake linkage and remove the brake caliper from its mount.
2. Remove the two Hex Head Screws (#2) and separate the caliper halves.
3. Remove the actuator side Lining (#3) and Backing Plate (#4) and discard.
4. Remove the Actuator Pin (#5) (behind the Backing Plate) and inspect the pin and lever for galling or cracks. If defective, these parts must be replaced.
5. Grease the spherical end of the Actuator Pin (#5), adjusting the screw and ramp areas with a good TEFLON®-additive grease and replace the pin into the caliper housing spherical end first.
6. Place new Backing Plate into housing then place new Lining (#3) on top of the plate in the housing cavity.
7. Remove the Anvil Lining (#3) and scrape all adhesive and lining material from the Anvil (#1) pocket surface. This is done to insure that the new linings will seat properly.
8. Put a small spot (about the size of a dime) of weatherstrip adhesive on the anvil and place the lining into the recess. Squeeze the tube by hand or press the lining to properly distribute the adhesive.
9. Be sure the Adjuster Pin (#8) is backed off completely. Reassemble the caliper and torque the Hex Head Screws (#2) to 24 foot-pounds (288 inch-pounds).
10. Replace the caliper onto the mount and reconnect the linkage. When doing this, turn the Adjuster Pin (#8) until it is snug, then back off 1/2 turn. Then tighten the Jam Nut (#9). Make certain that the clearance between the disc and the friction linings is .010 to .031 inch per side.

LEVER AND HOUSING REPLACEMENT

Dissassembly Instructions

1. Disconnect linkage and remove caliper from the vehicle.
2. Loosen and remove the two Hex Head Screws (#2) that hold the caliper halves together.
3. Remove the Lining (#3), the Backing Plate (#4) and the Actuator Pin (#5) from the caliper half (#11).
4. Loosen the Jam Nut (#9) and remove the Adjuster Pin (#8) from the housing.

Assembly Instructions

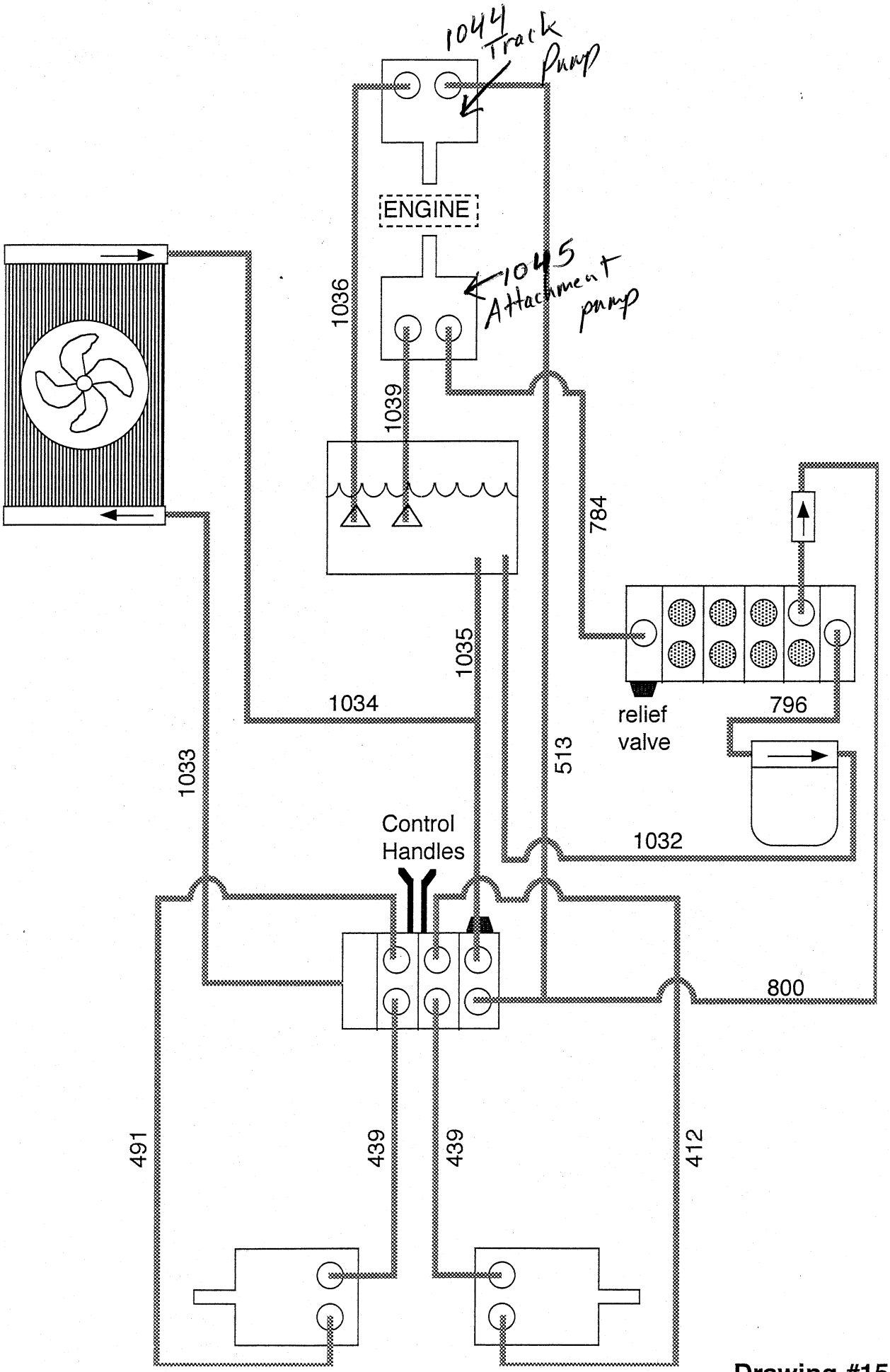
1. Apply a good high temperature grease such as a TEFLON®-additive grease to the spherical ends of Adjuster Pin (#8) and Actuator Pin (#5).
2. Thread Adjuster Pin (#8) into the Housing (#11) until the spherical end protrudes into the lever opening.
3. Install Actuator Pin (#5) into Housing (#11) (spherical end first) through the lining cavity.
4. Then, place the Backing Plate (#4) into the lining cavity.
5. Assemble the caliper halves together reusing the Hex Head Screws (#2) and Nuts (#6), torquing them to 22 to 24 foot-pounds (264 to 288 inch-pounds).
6. Replace the caliper in the vehicle and adjust by turning the Adjuster Pin (#8) until it is snug. **THEN** back the Adjuster Pin off 1/2-turn.
7. Tighten the Jam Nut (#9 and attach the linkage to the Lever (#10).
8. Prior to use, test the caliper to verify that it is working.

SERVICE KITS

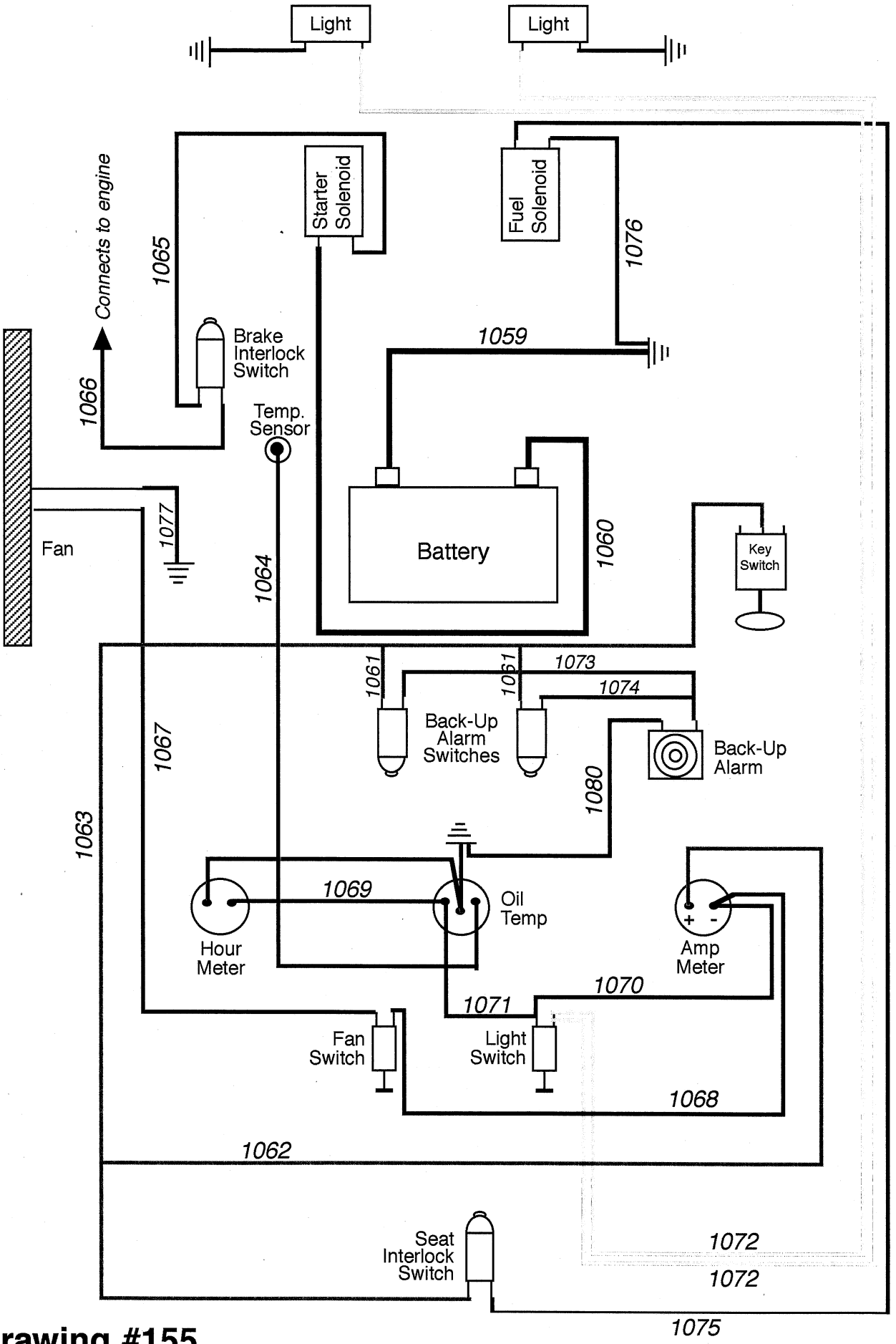
MB-1 Service Kits include: Actuator Side Housing and Lever.

Lever Position	Direction of Pull	Airheart No.
3 O'Clock	Counter Clockwise Lever Pull	3000-9005
6 O'Clock	Clockwise Lever Pull	3000-9006
12 O'Clock	Counter Clockwise Lever Pull	3000-9003
12 O'Clock	Clockwise Lever Pull	3000-9002
6 O'Clock	Counter Clockwise Lever Pull	3000-9007
3 O'Clock	Clockwise Lever Pull	3000-9004
9 O'Clock	Clockwise Lever Pull	3000-9008

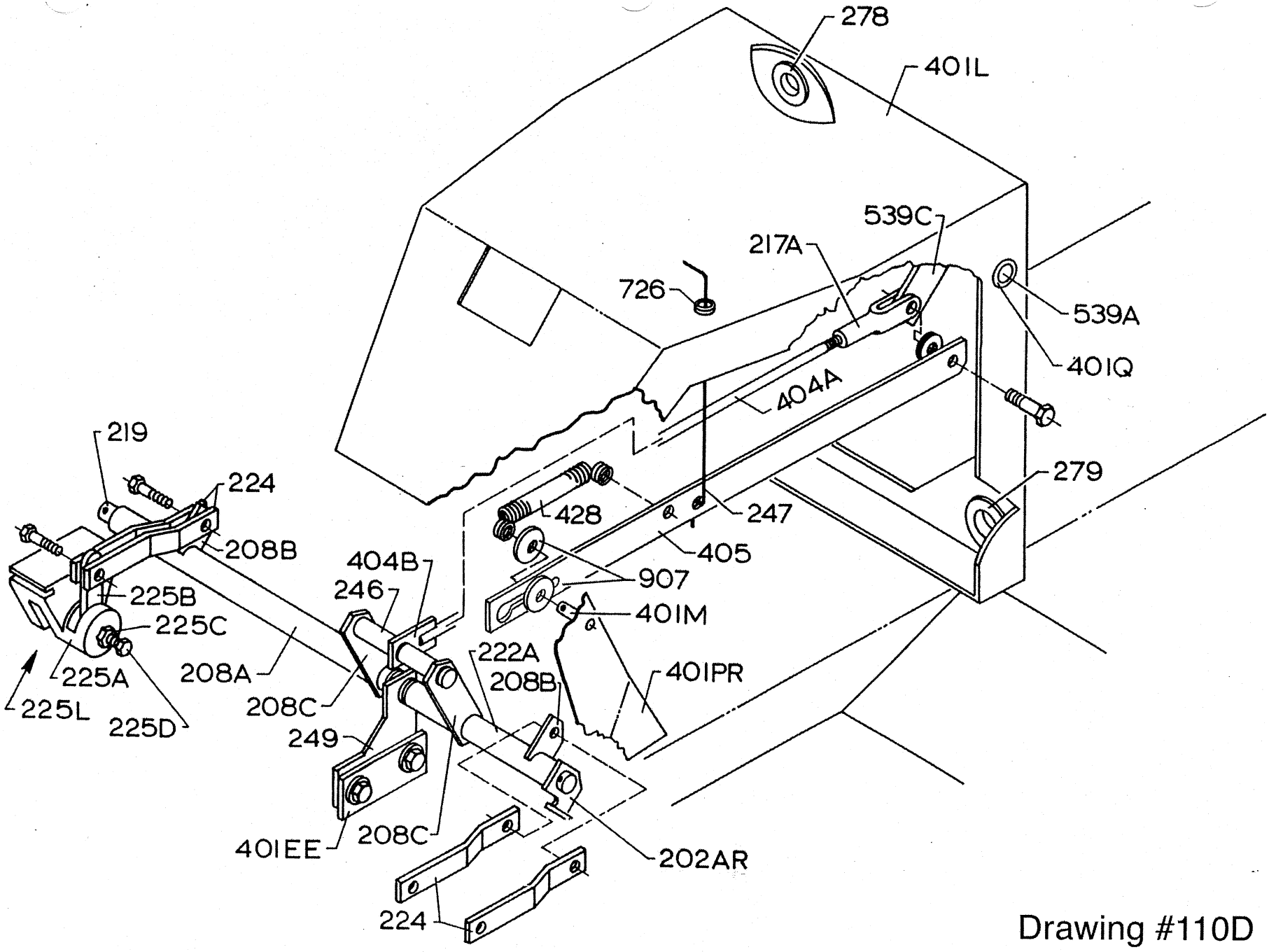
MB-1 Lining Kit - 3000-9001 (Kit includes Friction Linings and Backing Plates)


1044 Track Pump
ENGINE
1045 Attachment pump
1036
1039
784
1035
1034
1033
513
relief valve
796
Control Handles
1032
800
491
439
439
412

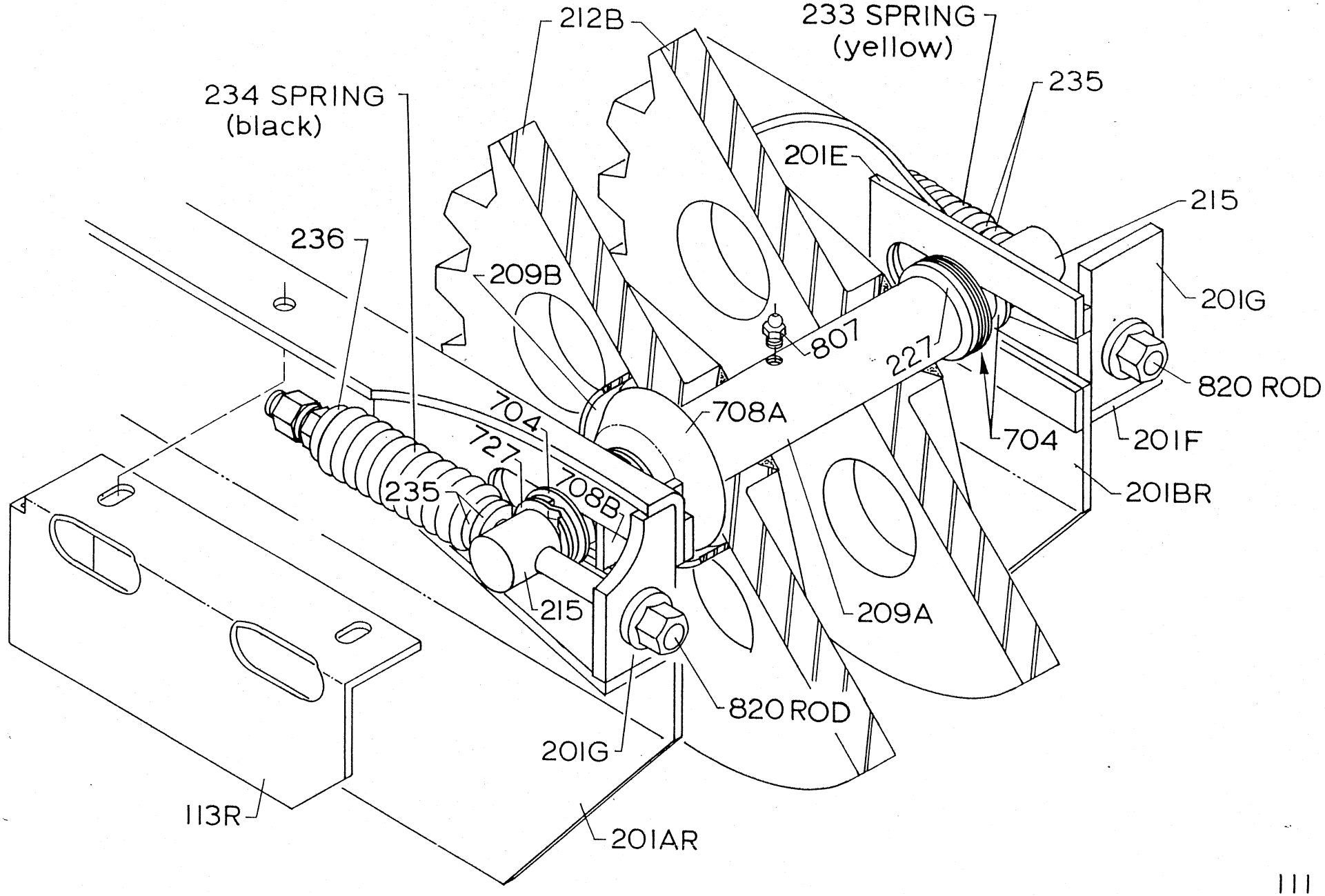
Drawing #154


Light
Light
Connects to engine
1065
Starter Solenoid
Fuel Solenoid
1076
1059
Brake Interlock Switch
1066
Temp. Sensor
Fan
1077
1064
Battery
1060
Key Switch
1061
1061
1073
1074
Back-Up Alarm Switches
Back-Up Alarm
1080
1067
1063
1069
Oil Temp
Hour Meter
Amp Meter
1070
1071
Fan Switch
Light Switch
1068
1062
Seat Interlock Switch
1072
1072
1075

Drawing #155

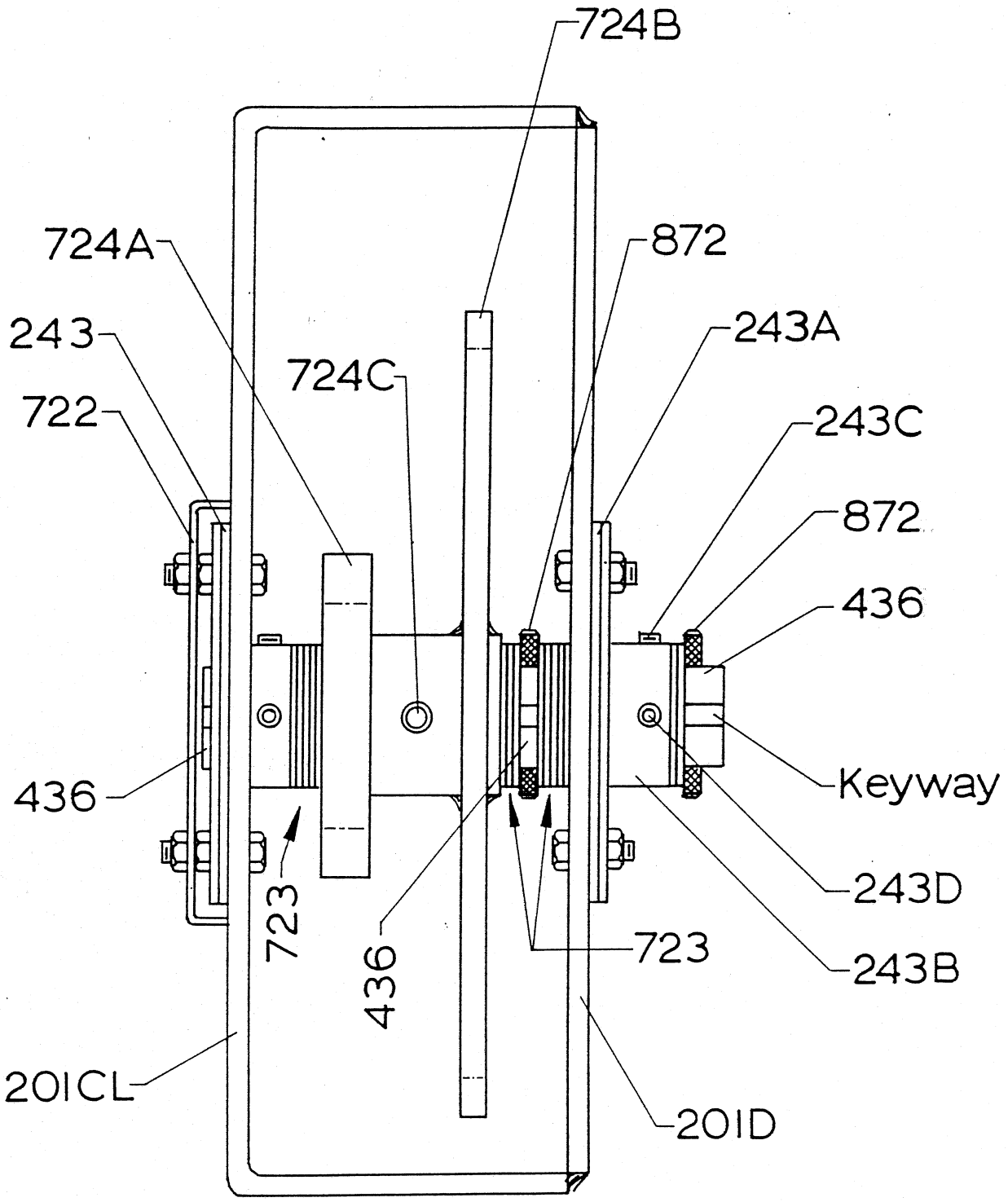


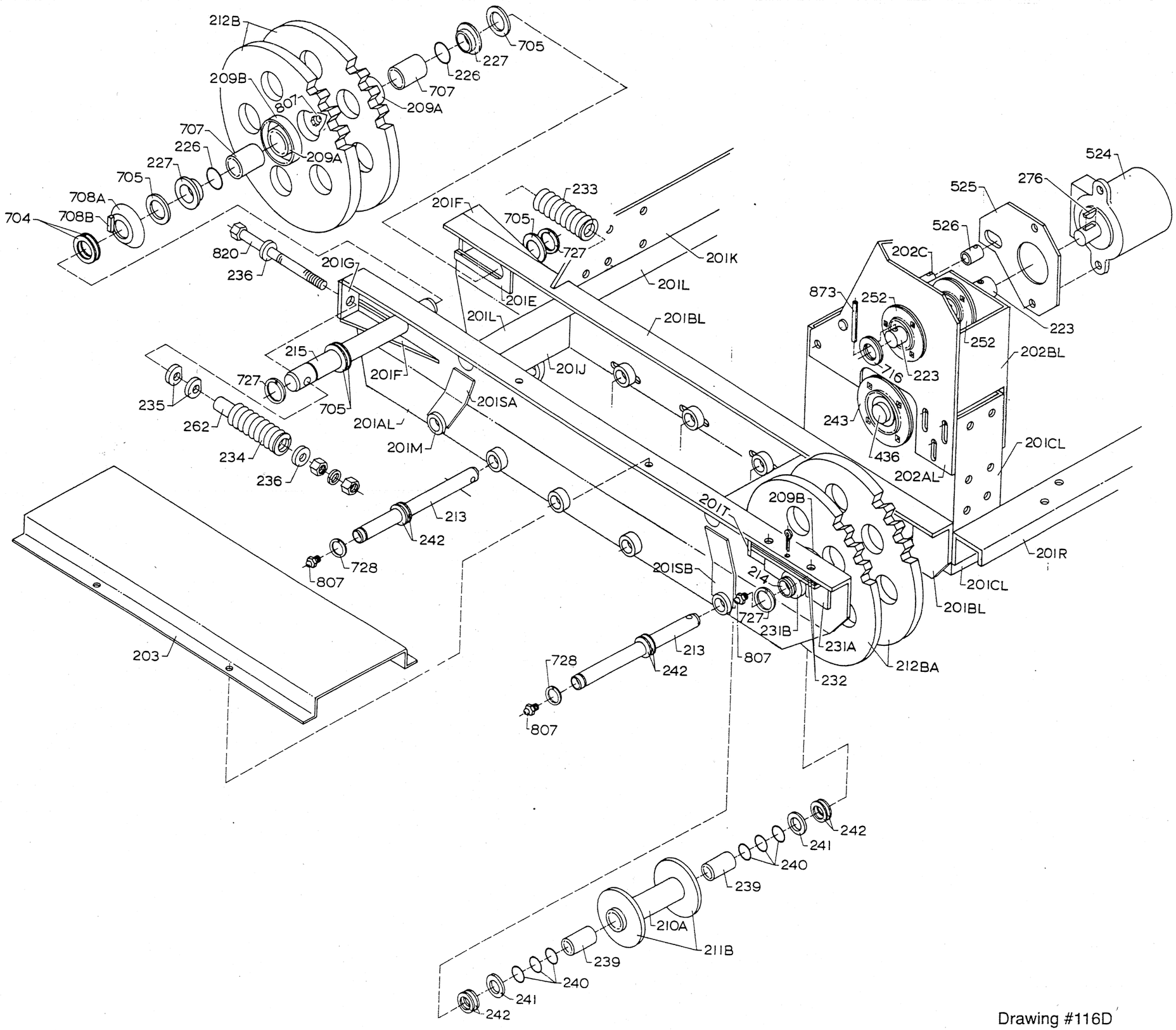
Drawing #110D


212B
233 SPRING
(yellow)
235
234 SPRING
(black)
201E
215
236
209B
201G
807
227
820 ROD
708A
704
727
704
201F
235
708B
201BR
215
209A
820 ROD
201G
113R
201AR

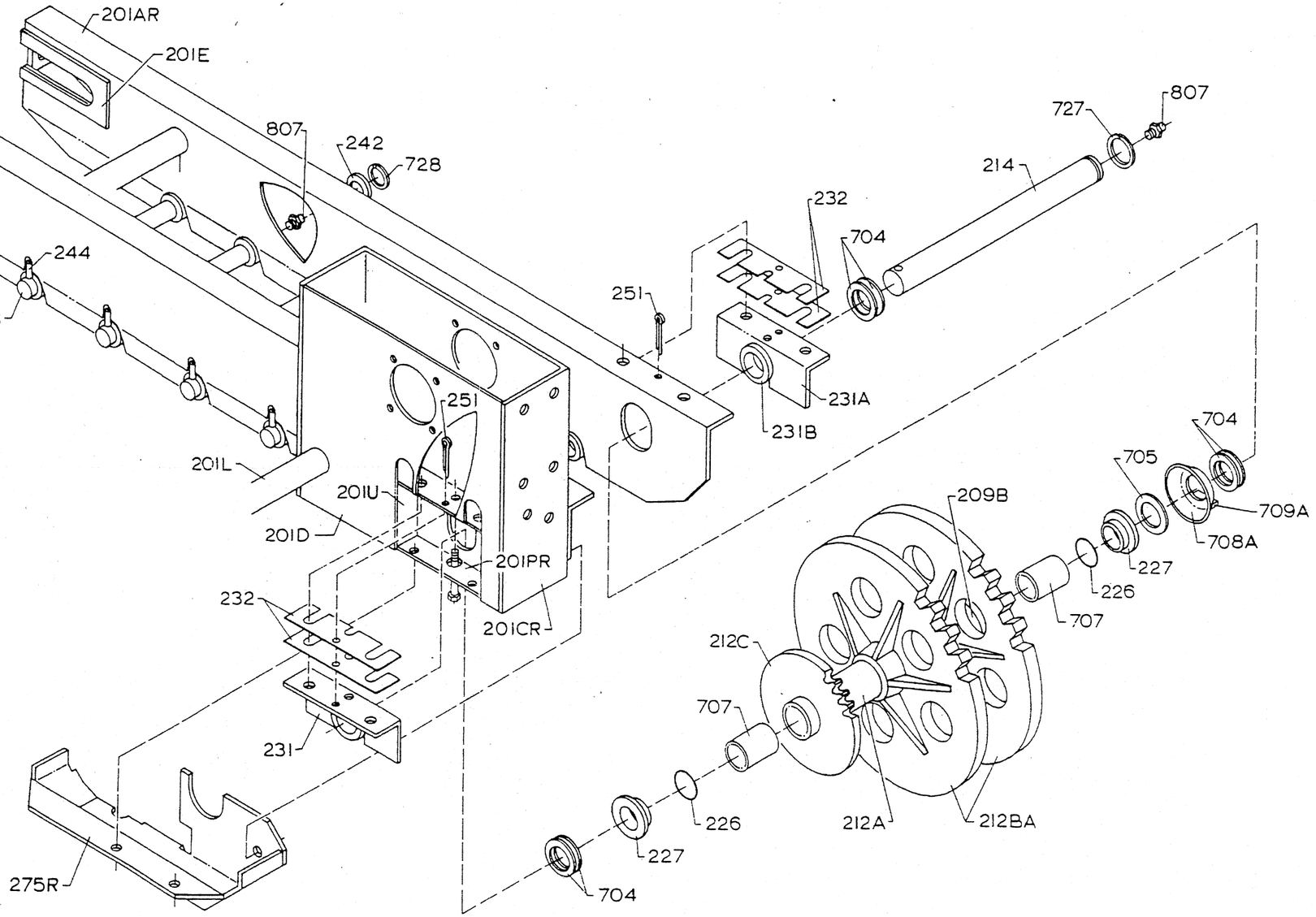
Drawing #111

Drawing #112

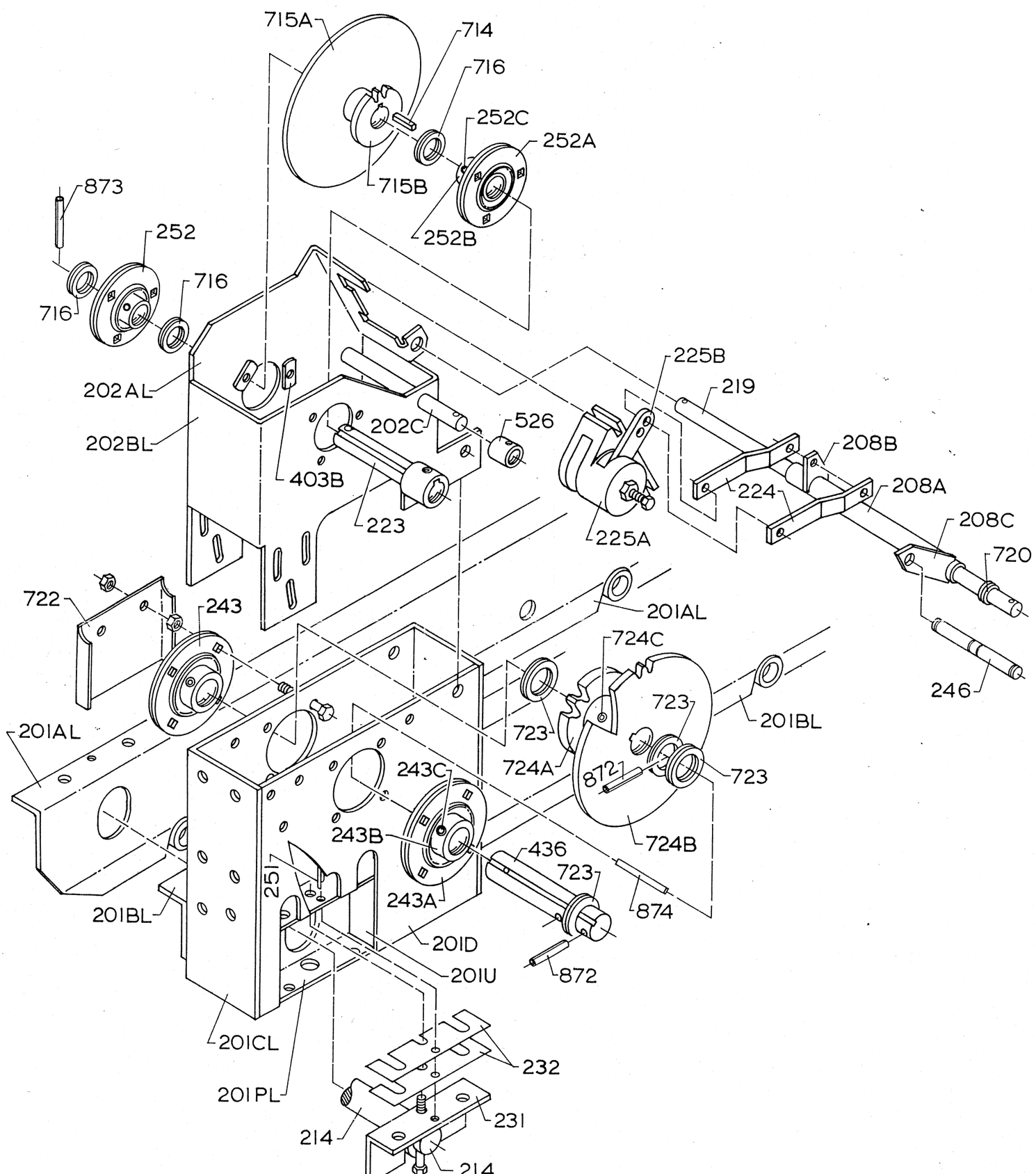

724B
724A
872
243
243A
724C
722
243C
872
436
Keyway
436
723
243D
723
436
243B
201CL
201D



Drawing #116D



Drawing #117D



118

Drawing #118