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The PAT-TRAP®

NEVER STAND IN FRONT OF A TRAP MACHINE. THE TRAP MACHINE MUST BE TURNED OFF AND THE SPRING RELEASED BEFORE ENTERING THE TRAP HOUSE. NEVER ATTEMPT TO MAKE ANY ADJUSTMENT WHILE THE THROW ARM IS COCKED.

DO NOT TOUCH! -- ASK FOR HELP

NEVER ATTEMPT TO LOAD THE TRAP WHEN IT IS COCKED. ALWAYS RELEASE THE TARGET FROM THE TRAP MACHINE.

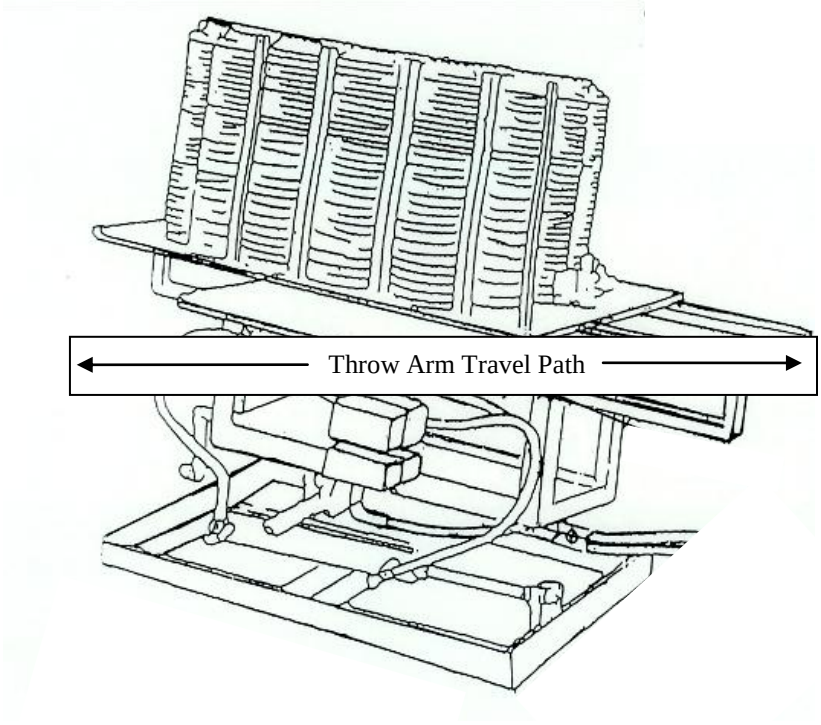
NEVER ADVANCE THE THROW ARM BY HAND WHEN THE ON/OFF/RELEASE SWITCH IS IN THE ON POSITION. THIS MAY DAMAGE THE MACHINE.

The target throw arm extends 4" beyond the throw plate. Keep away from moving parts. Never stand in front of the trap machine.

When the machine is turned ON the throw arm will travel forward to the cocked position through the danger zone.

When the throw arm is fired, the arm will travel through the indicated danger area zone.

The throw arm can be fired by pushing the pullcord button. It can also be fired by hand; by pushing the arm forward off the brake when the machine is either On or Off.



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Top-Down Suggested Plan View of Trap House

1. Water proof all sides below grade.
2. Open front trap houses are preferred if grade allows it.
3. All Walls and Roof are shown as 4” thickness.
4. Reinforce concrete per local building codes.
5. Install drainage as required.
6. Trap House Door should be weather proof and can be locked.
7. Trap House length in not less than 7’6” or more than 9’6” per ATA.
8. Trap House width is not less than 7’6” or more than 9’6” per ATA.

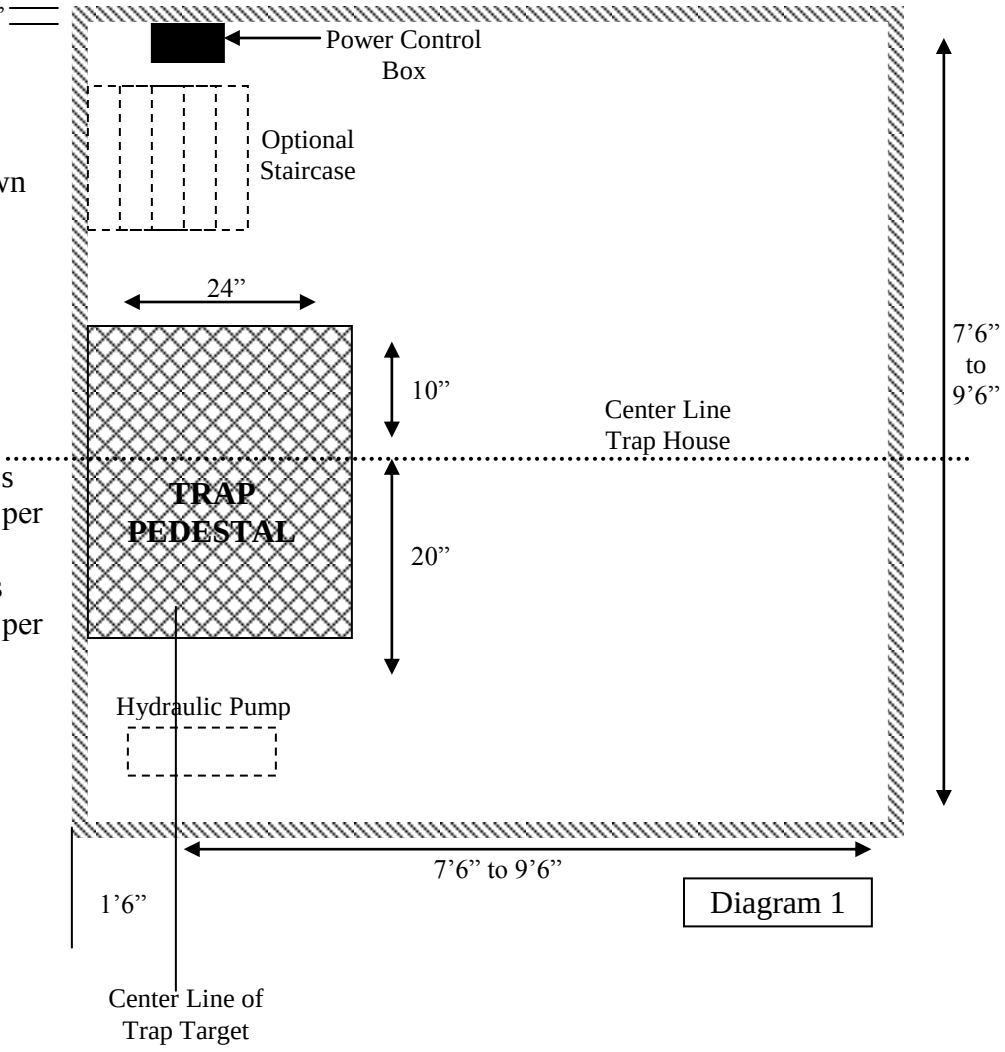

Diagram 1

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Side View (Cross Section) of Trap House

1. Paint Roof and Rear Wall Green.
2. Water Proof All Sides Below Grade.
3. Open Front Trap Houses are preferred if grade permits. Trap house opening is a minimum of 26” to a maximum of 43”. Wall minimum of 0” from top of pedestal to a maximum of 16” from top of pedestal.
4. All Walls and Roof are shown as 4” Thick.
5. Reinforce Concrete Per Local Building Codes.
6. Install Drainage as Required.
7. Trap House Door Should be Weather Proof and Capable of Being Locked.
8. Trap House Length is Not Less Than 7’6”or More Than 9’6”
9. Trap House Height is 2’2” Minimum and 3”0” Maximum from Shooting Station #3.

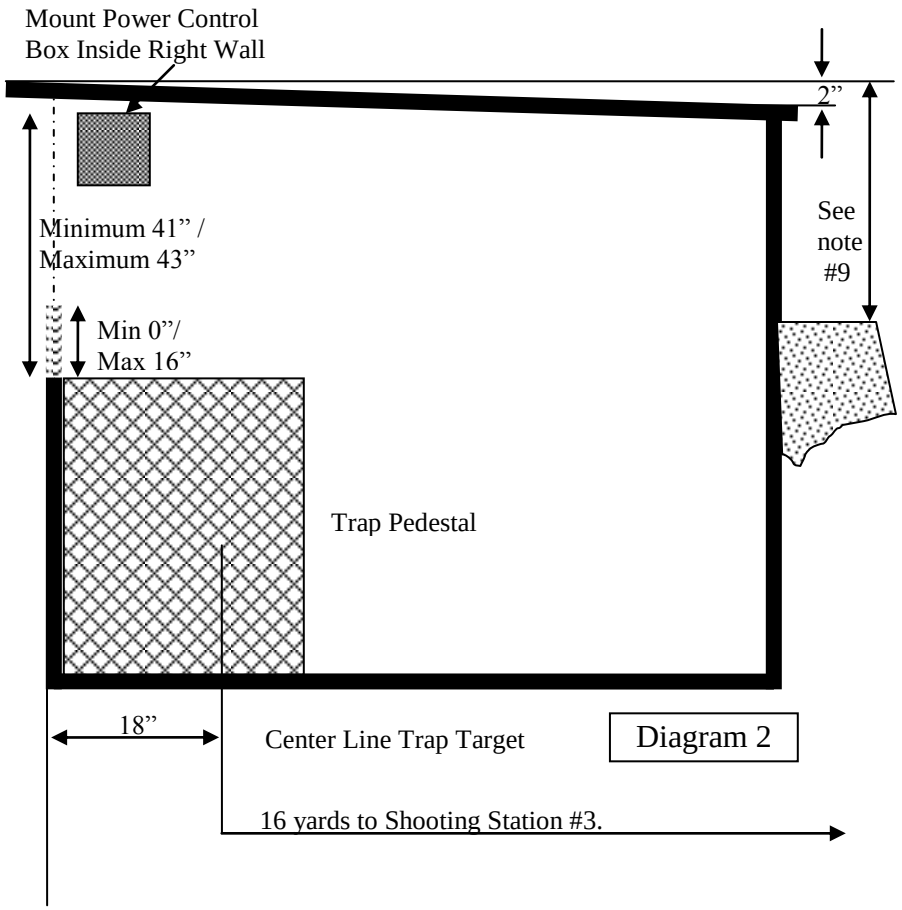

Diagram 2

For Complete Rules: See Amateur Trapshooting Association Official Rules Section XIII Standards for Trap Houses, Targets, Target Settings, Guns and Ammunition.

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Installation of the Trap Machine and Hydraulic Pump

1. Place the trap machine in the trap house with the front of the machine as close as possible to the front wall. The platform which the trap sits on *must be level*. See Diagram 2. If necessary, the turret may be removed from the machine to place the trap into the house. Please refer to page 6 for instructions.

2. The trap is to be set *off center* of the trap house. See Diagram 1.

   Measure and mark the center of the trap house. The front of the base is marked with a notch at 10" in from the left – facing the front of the machine. Set the machine so that this notch is now at the center of the trap house. The base of the trap machine should be set at 41" minimum from the ceiling; however, a setting of approximately 43" is best for loading targets.

3. Holes are provided in the corners of the base to screw down/secure your machine.

4. Place the pump on a raised platform (ie: a cinder block and you may place a foam or rubber pad underneath to reduce vibration is desired) on the left side of the trap house. See Diagram 1. If flooding is a problem in your area then mount the pump on a platform that is above the water line. The pump reservoir is filled at the factory with **5W-20** oil. (0W-20 can be used for colder temperatures.)

Hydraulic Pump System

Diagram 3

5. If not already connected, connect the quick release fittings from the pump hydraulic hoses to the hoses at the rear of the trap machine; slide back the outer sleeve of the female fitting while pushing on to the male fitting. Allow the female sleeve to slide forward to lock. Gently tug on the connections to check that they are securely fastened.

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PAT-TRAP® SERIAL NUMBER LOCATION

A fully crated Pat-Trap is 420 #.
Machine and pump weighs 350 #.
Turret weigh 50 #.
Pump weight 50 #.
Pat-Trap machine w/o pump and turret weight 250 #.

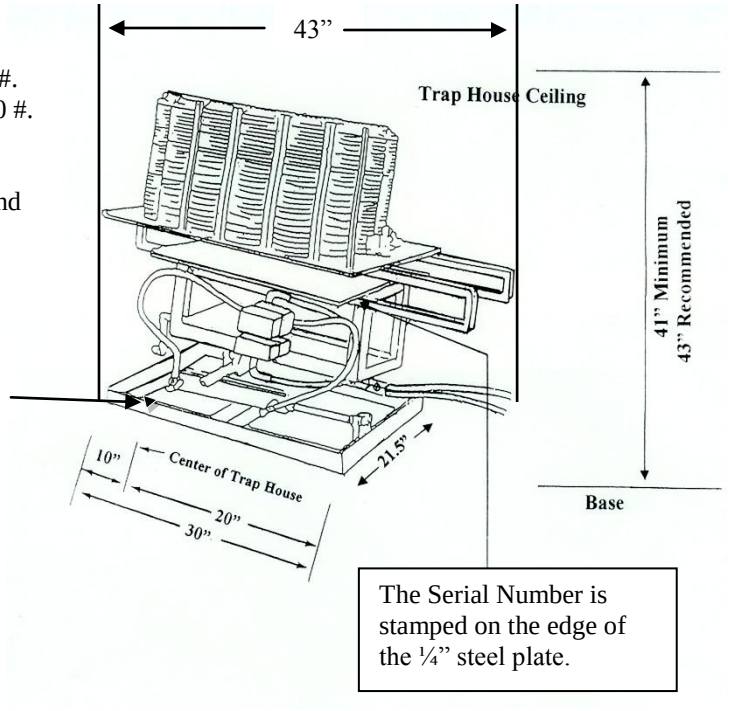

Diagram 4

Measurements of the Pat-Trap machine

From the bottom of the base to the top of the King Pin 24"

From the bottom of the base to the top of the turret 34 ¾ "

Trap cog top max – 39 ½ "
Trap cog bottom min – 37"

Wobble base to throw plate (up/down angles) min 17 ¾"

Wobble base to throw plate (up/down angles) max 24 ½ "

Wobble max – 39 ½ "
Wobble Min – 34 ¾ "

Base Dimensions of PAT-TRAP®

Serial Number is stamped here. Example: "G4190" Also located on pump.

Diagram 5

PAT-TRAP® Serial Number Location

Serial Number Location: The Serial Number is stamped on the front left edge (shooting stand 1 Side) of the ¼" thick steel "Throw Plate".

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REMOVAL/REPLACEMENT OF THE TURRET

WARNING: To prevent damage to your machine the turret must be replaced the same way as it was removed.

1. Observe how the cogs are meshed with the cam followers: i.e., the pair of cam followers has to mesh within the cogs located beneath the turret.

2. To remove the turret, have two people, one on each side of the trap machine, lift straight up (no tools are required). Both people must lift up evenly to prevent the turret from binding on the kingpin. Replace the turret in the same way that it was removed.

MOUNTING THE POWER CONTROL BOX

1. Mount the power control box just inside the trap house on the right wall near the ceiling of the trap house (See Diagrams 1). This should be the side of the trap where personnel enter/exit the trap house. The power control box should be easily accessible so that it can be operated by placing your hand around the corner of the wall and not exposing your body to the front of the trap machine. The power control box will also be accessible to trap personnel when setting the machine for Doubles. Proper location of the control box is important to insure safety.

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Diagram 6

Close Up of Pat-Trap® Power Control Box (PT SP80)

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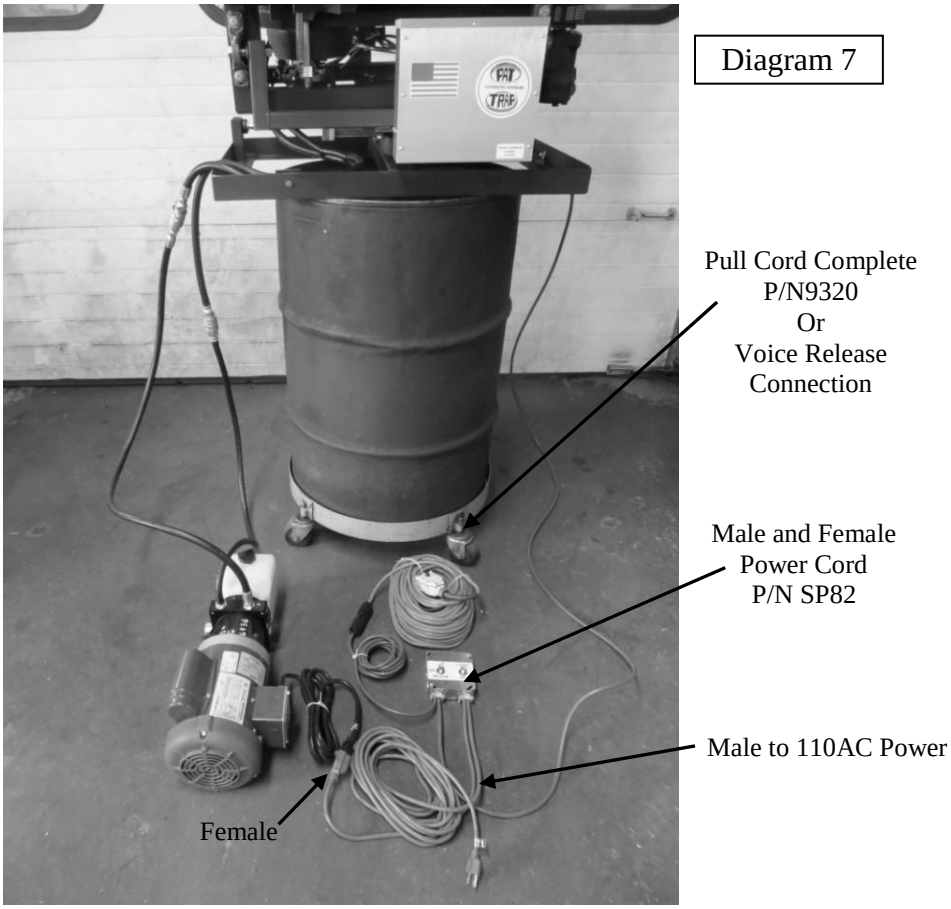
CONNECTING THE TRAP TO THE POWER SOURCE

1. Check the power control box to confirm that the *motor* and the *on/off/release* switches are in the **OFF** position. When both toggle switches are snapped downward they are in the OFF position (Diagram 6).

2. Connect the pump to the power control box by plugging the pump motor outlet coming from the power control box.

3. The trap machine uses 110 volt AC power. Connect the trap machine to the power source using the male plug from the power control box.

4. Connect the pullcord to the female connector from the power control box. The pullcord must have a male twist lock connector (Winchester type pullcord).



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HOW THE PAT-TRAP® AUTOMATIC DOUBLES MACHINE WORKS

Turn the switch marked "Pump Motor" to the On Position, and let the pump warm up.

Turn the switch marked "On/Off/Release" to the On Position to energize the PAT-TRAP®. The elevator rises to receive a target while the throw arm and turret advance. When a target is loaded, the elevator goes down and the throw arm advances the target until the Activator comes to the #2 and #3 switch bracket (See Diagram 9). The throw arm is now at the brake (in the cocked position - Diagram 8) and the target is set.

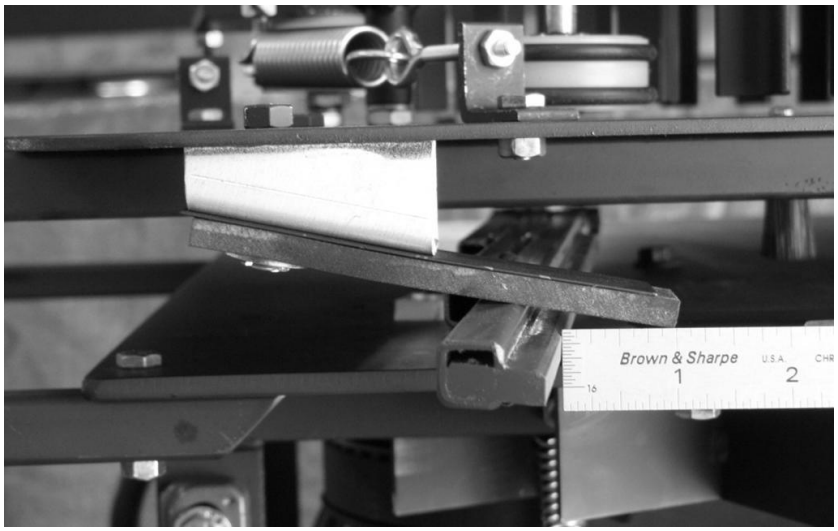

Diagram 8

Throw Arm on Throw Arm Brake

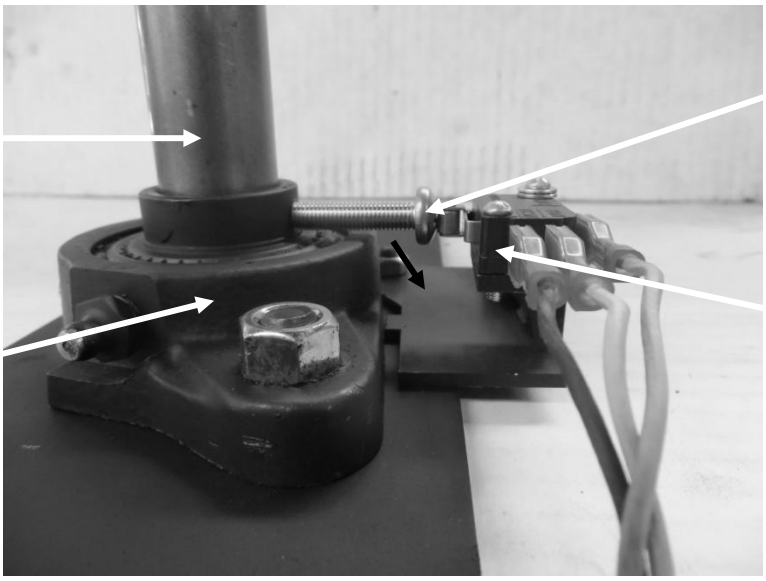

Diagram 9

Pat-Trap® #2 Switch Bracket in "Cocked Position"

When the trap release switch is activated, Switch #1 overrides Switch #2 which then advances the throw arm off the throw arm brake causing the machine to fire. (See Diagram 11)

When the activator leaves Switch #2, the #2 switch closes and begins a new cycle of loading a target and at the same time starts a new cycle of the oscillation interrupter.

** The machine oscillates to the left until Switch #12 (Left Angle Limit Reed Switch - N.O.) comes to the magnet, activating the SS circuit, causing the machine to change direction to the right (Diagram 10).

Switch #11 holds the Curcuit engaged until Switch #11 (Right Angle Limit Reed Switch - N.O.) comes to the magnet, breaking the circuit which then switches the curcuit causing the machine to oscillate back to the left. (Diagram 79)

Pat-Trap® #12 & #11 Limit Reed Switches on Oscillation Cylinder Diagram 10

The switching sequence is the same for the wobble machine.

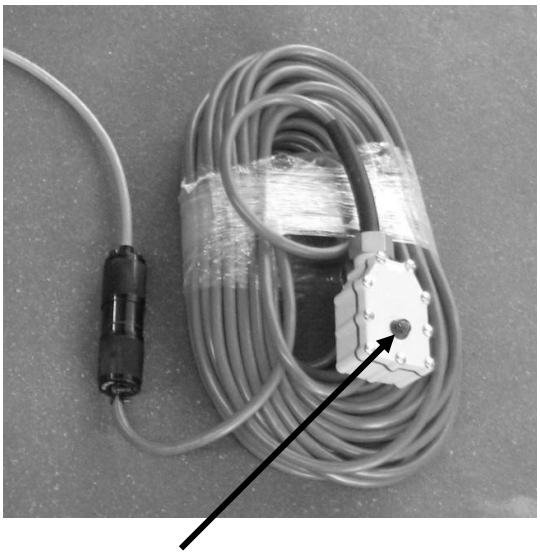

Diagram 11

#1 Switch Trap Release Switch

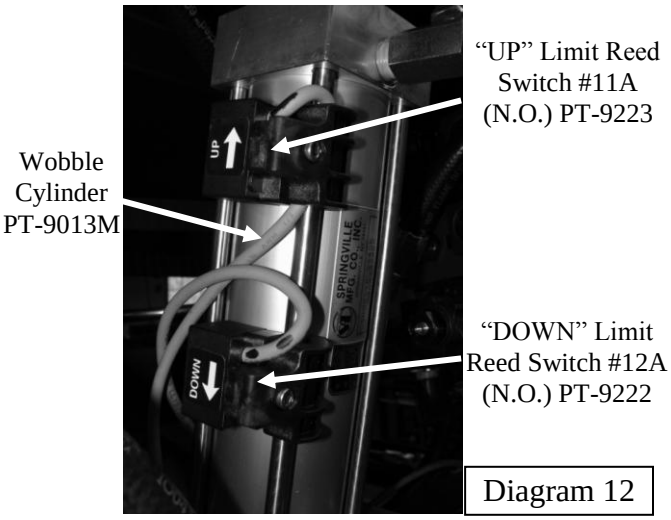

Diagram 12

#11A & #12A Limit Reed Switches on Wobble Cylinder

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PAT-TRAP® SWITCH IDENTIFICATION.

Switch #A	PAT-TRAP® Pump Motor Switch (See Diagram 6)
Switch #B	PAT-TRAP® On/Off/Release Switch (See Diagram 6)
Switch #1	PAT-TRAP® Trap Release Switch (See Diagram 11)
Switch #2	Throw Arm Limit Switch. (See Diagram 9)
Switch #11	N/O Right-angle Limit Reed Switch. (See Diagram 10)
Switch #12	N/O Left-angle Limit Reed Switch. (See Diagram 10)
Switch #11A	High-angle "UP" N/O Limit Reed Switch (Wobble). (See Diagram 12)
Switch #12A	Low-angle "DOWN" N/O Limit Reed Switch (Wobble). (See Diagram 12)

TURNING THE PAT-TRAP® MACHINE "ON"

1. Push the Pump Motor toggle switch UP to the "ON" position. (Diagram 6)

2. IMPORTANT: Turn the pump motor switch on first so that the hydraulic system is pressurized to prevent any air from entering the system. Allow the pump to warm up the hydraulic oil before operating the machine. In warm weather this will not matter. **Cold temperatures may cause the throw arm to cycle repeatedly if the hydraulic oil is not warm.** Please refer to the section: Cold Weather Adjustment Temperature/Release Time and stopping the Throw Arm on the brake.

3. Push the On/Off/Release toggle switch UP to the "ON" position. (Diagram 6)

TURNING THE PAT-TRAP®MACHINE OFF

1. Standing outside, and to the side of the trap house, push the On/Off/Release toggle switch all the way DOWN to release and let go. The trap will throw the target and not cock the spring.

2. Push the Pump Motor toggle switch DOWN to the Off position.

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LOADING THE PAT-TRAP® MACHINE

The Pat-Trap® machine holds four (4) full cases of clay targets. (540 Targets)

NEVER attempt to load the clay targets without first releasing the trap machine.

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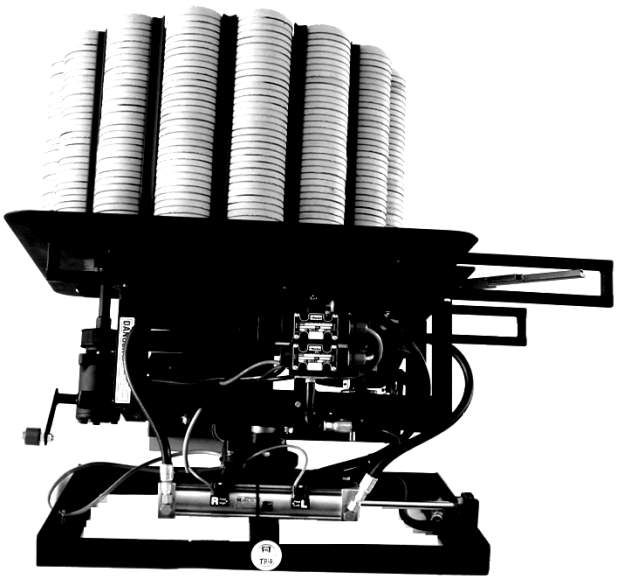
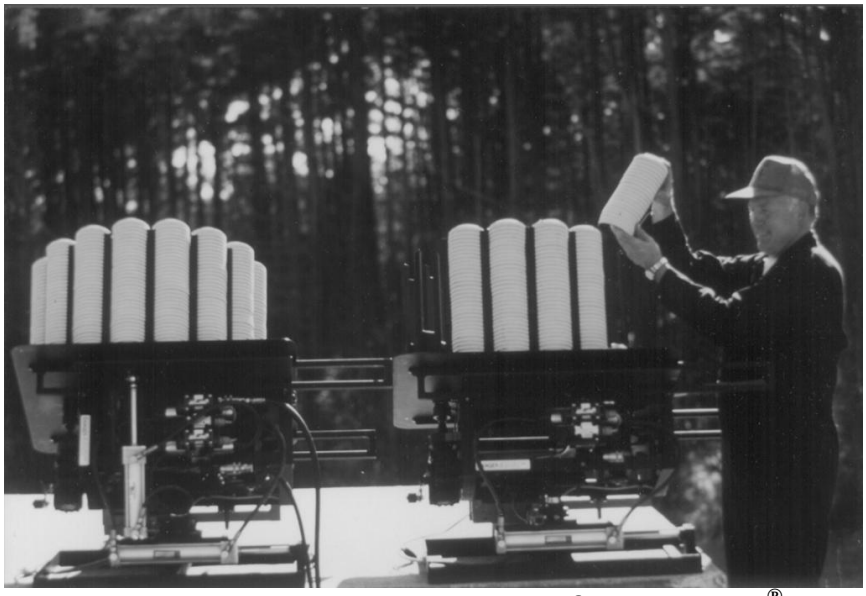


Diagram 14

Fully Loaded Pat-Trap® Machine



Stuart W. Patenaude, the Inventor of the Pat-Trap®, loading an early Pat-Trap® Machine.

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AUTOMATIC PAT-TRAP® SINGLES

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1. Standing clear of the trap machine, release the target. Push the On/Off/Release toggle switch all the way down to the release position and then let go of it.

2. Pull back on the roller plate and move the set pin to the lower notch. (See Diagram 15)

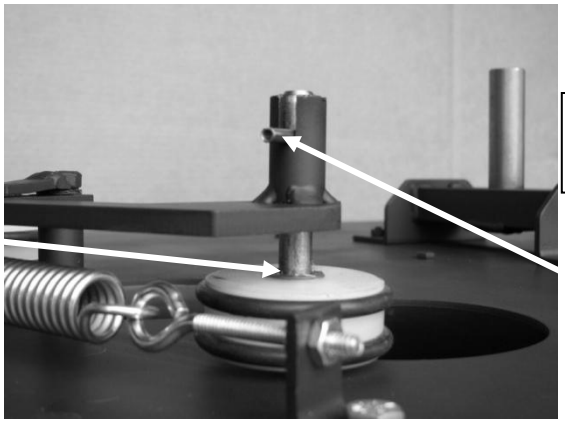


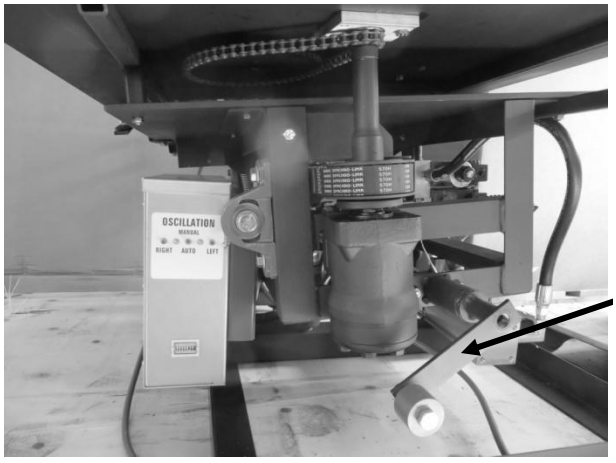
Diagram 15
(PT 9116)

Singles/Doubles Roller Plate in "Singles" Position

3. Set the Elevator Cog to the appropriate notch for singles. (Diagram 19)

4. The main spring tension can be adjusted by rotating the main spring crank clockwise to increase tension and counter-clockwise to reduce the tension. When changing from Doubles to Singles, rotate the main spring crank counter-clockwise the same number of turns that were used to increase the tension for Doubles --- approximately 10 rotations. (Diagram 16)

Diagram 16



Main Spring Crank Handle

5. On the trap machine electrical box, the toggle switch must be pushed down to the Auto position. This will return the machine to automatic horizontal oscillation. (See Diagram 17)

Diagram 17

Electrical Enclosure ("Auto" Position)

6. Before exiting the trap house, staying clear of the trap, reach over to the power control box and release the target to prevent target releasing. (Diagram 6)

7. Standing outside of the trap house and to the side, push the On/Off/Release toggle switch up to the ON position. (Diagram 6)

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AUTOMATIC PAT-TRAP® DOUBLES

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1. Standing clear of the trap machine, release the target. Push the On/Off/Release toggle switch all the way down to the release position and then let go of it..

2. Pull back on the Roller Plate and move the set pin to the upper notch. (Diagram 18)

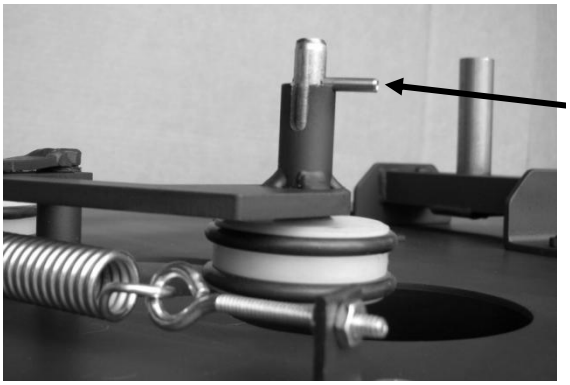


Diagram 18

Singles/Doubles Roller Plate in Doubles Position

3. Raise the elevation of the trap by placing the bottom portion of the trap machine into the elevation cog approximately 3-4 notches above the notch used to establish the Singles height. For example if the 10th notch was used in Singles then the Doubles setting should be approximately the 13th or 14th notch on the Elevation Cog nearest the frame. (Diagram 19) to achieve the 23º angle.

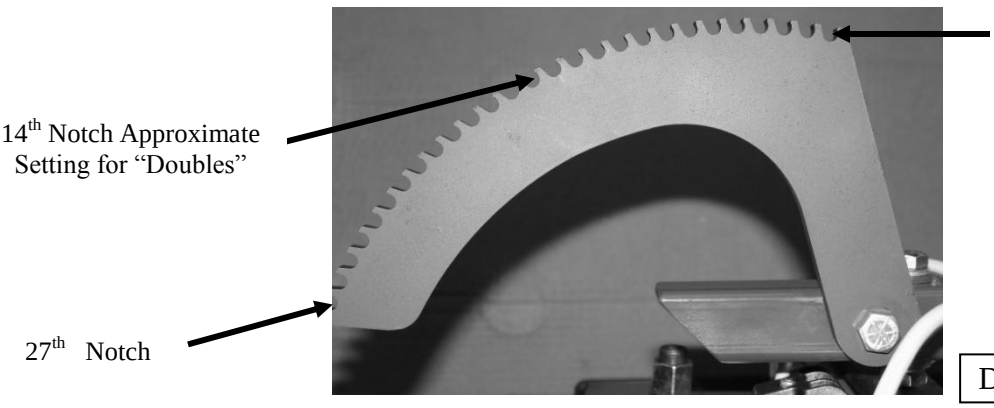


Diagram 19

Elevation Cog

4. The spring tension must be *increased* to throw Doubles. Rotate the spring crank *clockwise* approximately 10 rotations from the Singles setting. (Diagram 16).

5. On the trap machine electrical box, the toggle switch must be pushed up to the Manual position (Diagram 17). This will stop the automatic horizontal oscillation and will activate the Right and Left pushbuttons. The trap machine must be ON to operate the Right and Left pushbuttons. When the trap is On the throw arm is ready to fire. The throw arm can be fired by pushing the pullcord button. It can also be fired by hand: by pushing the arm forward off the brake when the machine is either On or Off. Staying clear of the trap machine, reach over to the power control box and turn the On/Off/Release switch to the ON position.

6. Use the Right or Left button to move the trap machine to the center of the trap field.

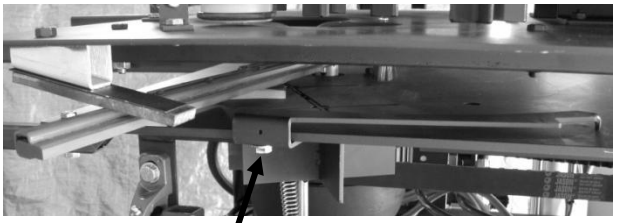
7. Before exiting the trap house, staying clear of the trap, reach over to the power control box and release the target.

8. Standing outside of the trap house and to the side, push the On/Off/Release toggle switch up to the ON position.

ADJUSTMENT FOR PAT-TRAP® DOUBLES

The adjustment for Doubles should only need to be done the very first time the machine is used. Using a 7/16" wrench, loosen the bolt, move the Double Finger in 1/8" increments. Pull the Doubles Finger back towards self to lower the height of the right target. Push it forward to raise the height of the right target. Tighten the bolt. See Diagram 20. Refer to the section for correct positioning of the Doubles Finger (Page 37). (Although the bolt is snug, it is possible to move the Doubles Finger without loosening the bolt.)

Diagram 20



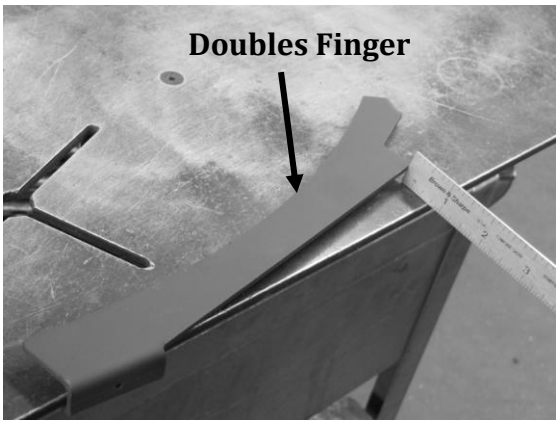


Diagram 21

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AUTOMATIC PAT-TRAP® WOBBLE SETTINGS

The PAT-TRAP® with Wobble can be used in any of the following modes:

STATIONARY		OSCILLATING HORIZONTAL	
X	Singles	X	Singles
X	Doubles	X	Doubles

OSCILLATING VERTICAL		OSCILLATING HORIZONTAL/VERTICAL	
X	Singles	X	Singles
X	Doubles	X	Doubles

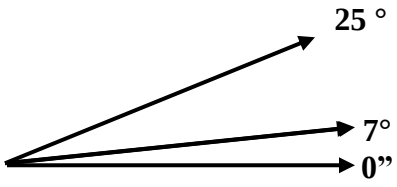
The PAT-TRAP® with Wobble has an interrupter for the horizontal and vertical modes.

NOTE: If the machine is located inside a trap house, oscillating doubles targets may hit the trap house walls.

WOBBLE ANGLES

Left/Right Angle = 8" => 50°
Down Angle = 7° Min

Left/Right Angle = 10" = 60°
Up Angle = 25 ½ ° Max



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CHANGE OVER TO WOBBLE

Standing clear of the trap machine, release the target. Use all safety procedures as stated in the previous Singles and Doubles section of this Manual.

The Oscillation Switch and the Wobbles Switch must be pushed down to the AUTO position on the trap machine electrical enclosure. This engages the machine to the automatic horizontal/vertical oscillation mode.

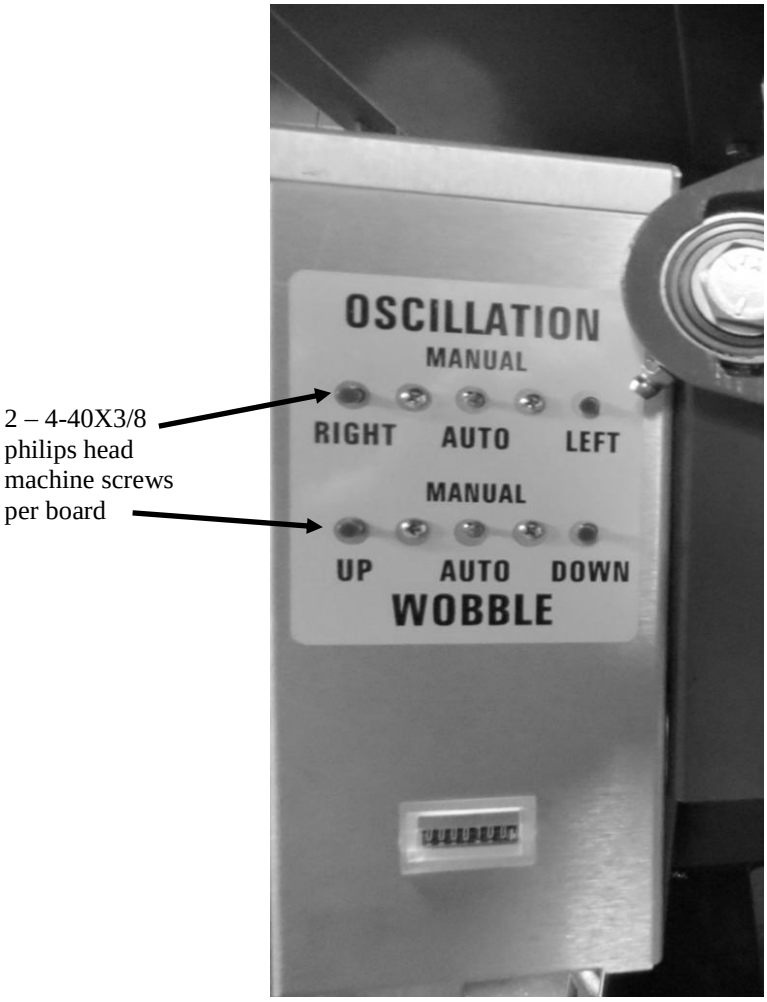

Diagram 22

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HEIGHT ADJUSTMENT FOR SINGLES/DOUBLES ON A WOBBLE MACHINE

On the trap machine electrical box, the horizontal switch must be moved to the MANUAL position. For desired height, push UP switch to go up; push DOWN switch to go down.

INCREASING/DECREASING TARGET DISTANCE/SPEED

Clockwise rotation of the main spring crank handle increases the spring tension thus increasing the speed of the target and the distance it travels.

Counter clockwise rotation of the main spring crank handle decreases the spring tension. Continued counter-clockwise rotation will remove the tension from the crank and the spring tension lock-nut will hold. The elastic lock-nut holds the spring at the set minimum tension.

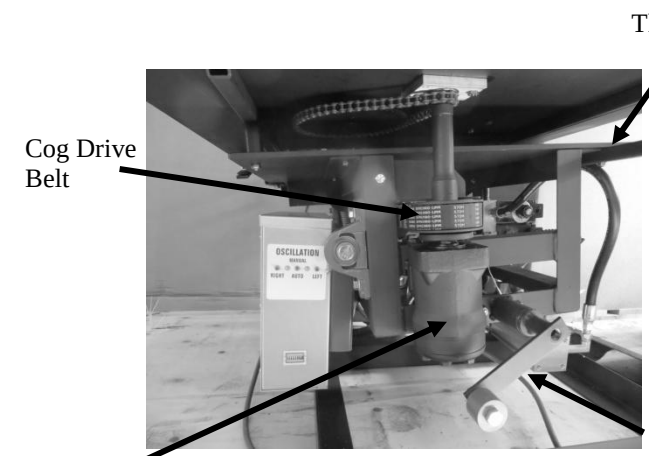

Diagram 23

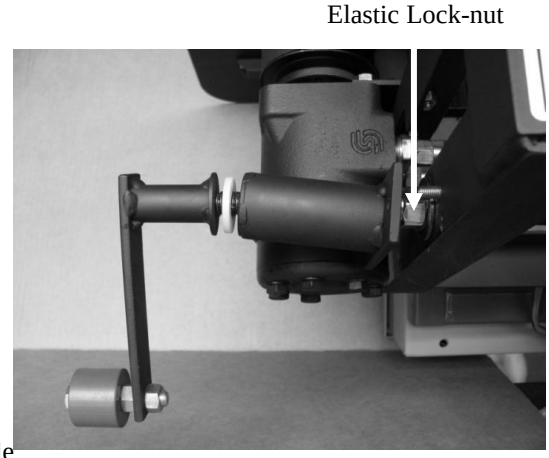

Diagram 24

PAT-TRAP® Main Spring Crank Handle

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SETTING MINIMUM TARGET DISTANCE

The procedure to establish the minimum distance for a "Singles" target is as follows: (the standard trap speed is 67 to 70 FPS to throw a target 49 to 51 yards with the machine angled at 20 degrees (9 ft high and 30 ft out) (For a 45 yard Doubles target set a Single target at 76 FPS

1. Remove the main spring crank handle by rotating it counter-clockwise (Diagram 25).

2 Remove the nylon washer that is sandwiched between the crank handle and the stand-off collar sleeve (Diagram 25).

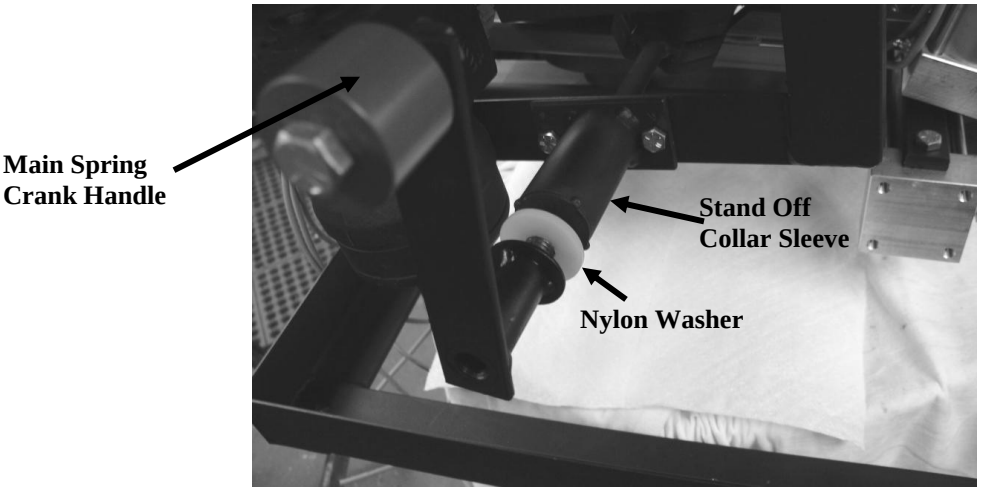

Diagram 25

Backing off the tension on PAT-TRAP® Main Spring Crank Handle

3. Remove the two (2) ¼" bolts from the stand-off collar sleeve (Diagram 26)

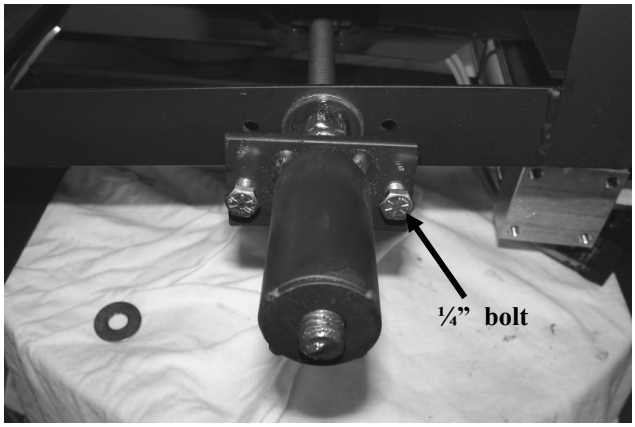

Diagram 26

Removing Main Spring Standoff Collar Sleeve

4. Remove the stand-off collar sleeve (Diagram 26).

5. Locate the elastic lock-nut. Use a ¾" wrench on this nut to adjust the distance/speed (Diagram 27)

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½-13
Elastic
Lock Nut

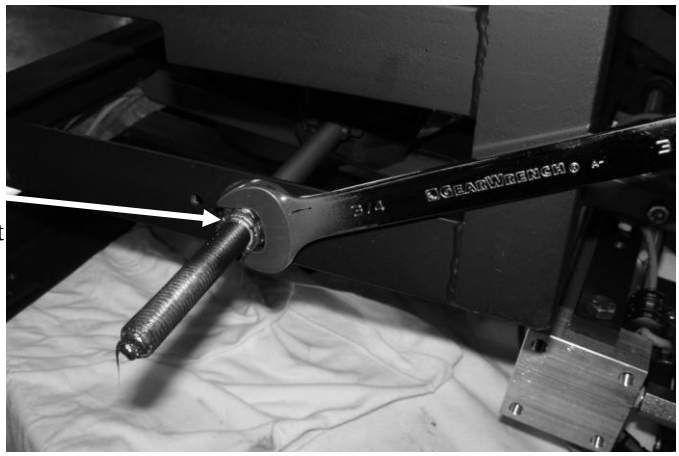

Diagram 27

Adjusting Elastic Lock Nut with ¾" Wrench

6. At this point one can throw a target or two to establish how far the PAT-TRAP® is currently throwing a straight away "Singles" target. Please observe the proper safety precautions.

7. When proper/desired distance/speed is achieved, back off the elastic lock-nut three (3) turns.

8. Re-assemble the parts.

9. When the main spring crank handle becomes snug, continue to turn three (3) more times for the proper setting.

10. Note: Whenever a "Singles" distance is to be set, back off the crank to neutral, crank back to snug; then give another three (3) turns for proper setting.

NEVER STAND IN FRONT OF A TRAP MACHINE. THE TRAP MACHINE MUST BE TURNED OFF AND THE SPRING RELEASED BEFORE ENTERING THE TRAP HOUSE. NEVER ATTEMPT TO MAKE ANY ADJUSTMENT WHILE THE THROW ARM IS COCKED.

NOTE: "SINGLES" are always set first, and then follow the procedures for "Doubles" as outlined.

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ADJUSTMENT HEIGHT OF TARGETS

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Tilt the table by pushing up on the front of the machine. The elevation cog can be positioned up or down.

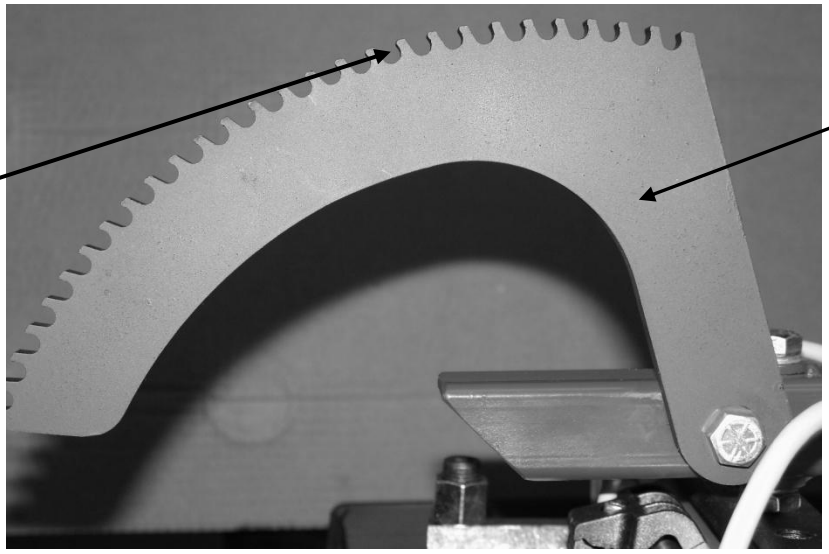

Diagram 28

Elevation Cog on Front of PAT-TRAP®

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ANGLE ANDJUSTMENTS

STRAIGHT-AWAY TARGETS

Set the toggle switch to the manual position, Use the right and left buttons to achieve Straight-Away Targets.

Diagram 29

2 – HOLE TARGETS

The 4 ¼" spacer bar between the Left and Right Angel Reed Switches allows for a $5^{7}/_{8}$" of total cylinder rod travel, which equals a **Two-Hole (34°)** Target.

A 5 ¼" spread between the switches allows for a $6^{7}/_{8}$" of total cylinder rod travel, which equals a **Three-Hole (40°)** Target.

#12 Left Angle
Limit Switch (N.O.)
PT-9222

Diagram 30

#11 Right Angle
Limit Switch (N.C.)
PT-9223

SHIFTING THE TARGET FIELD

The 9/64" hex head set screws on the limit switches are already pre-set.

DO NOT OVERTIGHTEN AS THE PLASTIC BRACKET WILL BREAK!

An aluminum spacer bar that is 4 ¼" long is provided for setting a "2-Hole" target field width (See Diagram 30). The field can be adjusted by sliding the limit switches together with the spacer bar in the direction you want to move the field;
TO MOVE THE ENTIRE FIELD TO THE RIGHT, SLIDE THE SWITCHES TO THE RIGHT AS YOUR ARE FACING THE MACHINE. Keep the switches against the spacer bar to maintain the proper field width. The set screws are lightly set so that you can slide the limit switches without adjusting the set screws.

To be able to go back to the original setting use a magic marker to draw a line on the cylinder beside the switch to mark where the switches should go back to.

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POSITION OF THE ROLLER PLATES

The roller plate must be positioned as shown. The measurement to both of the roller plates is taken from the face of the kingpin shaft to the inside edge of the roller wheel bolt. See Diagram

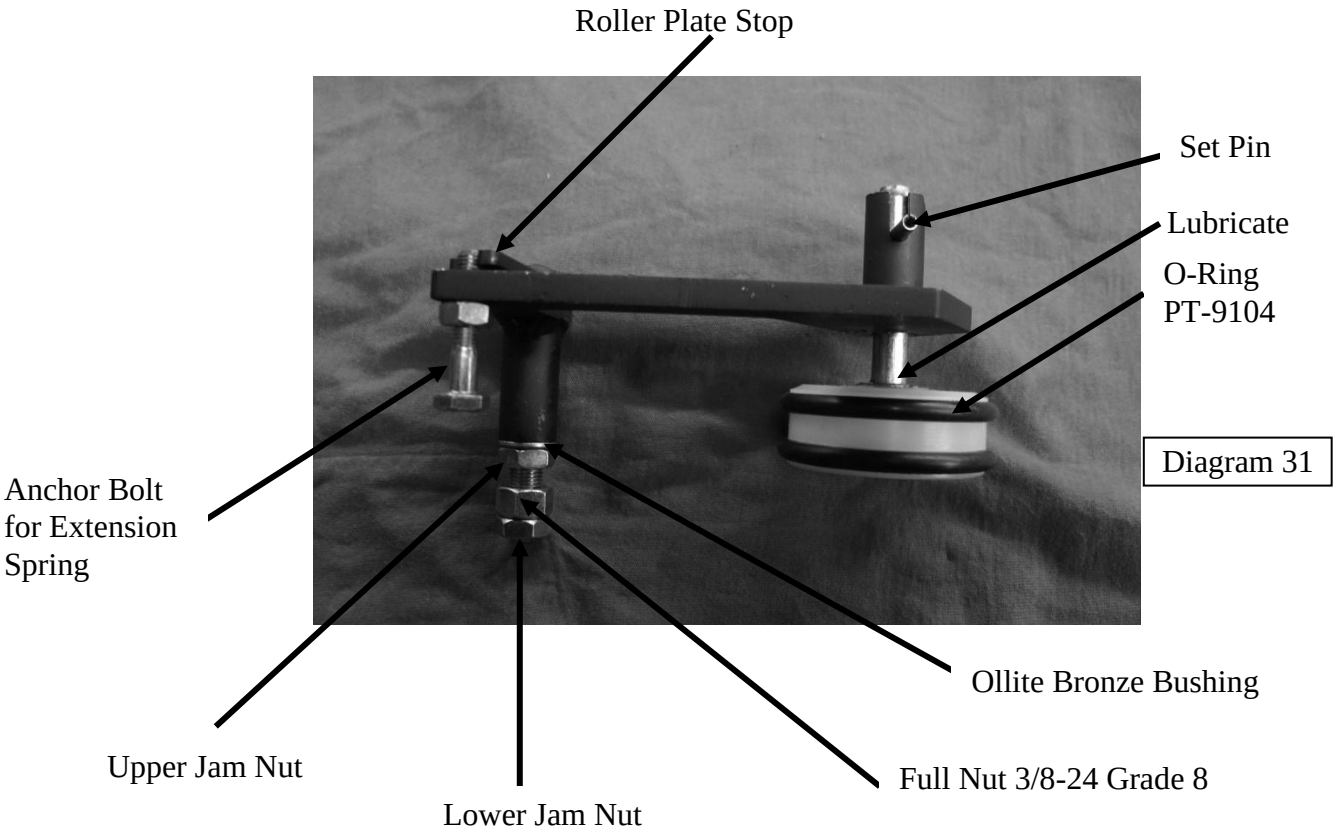

Diagram 31

If an adjustment is necessary, then the roller plate stop will have to be turned until the roller plate stops at the given measurement.

To set the position of the roller plate stop:

1. Remove the extension spring
2. Adjust upper jam nut so that when the nut is tightened the roller plate will pivot freely: with no more than 1/32" of up/down play between the roller plate shaft and jam nut.
3. Use an adjustable wrench to turn the roller plate stop to the correct position,
4. Hold back on the roller plate stop with the adjustable wrench while tightening the Full nut. Torque nut to 35/40 ft/lbs.
5. Tighten jam nut against full nut while holding back against the roller plate stop with the adjustable wrench. Torque jam nut to approximately 15 ft/lbs.
6. Check for free pivot of the roller plate after tightening.
7. Reconnect the extension spring.
8. Check the measurement to each roller plate from the king pin.

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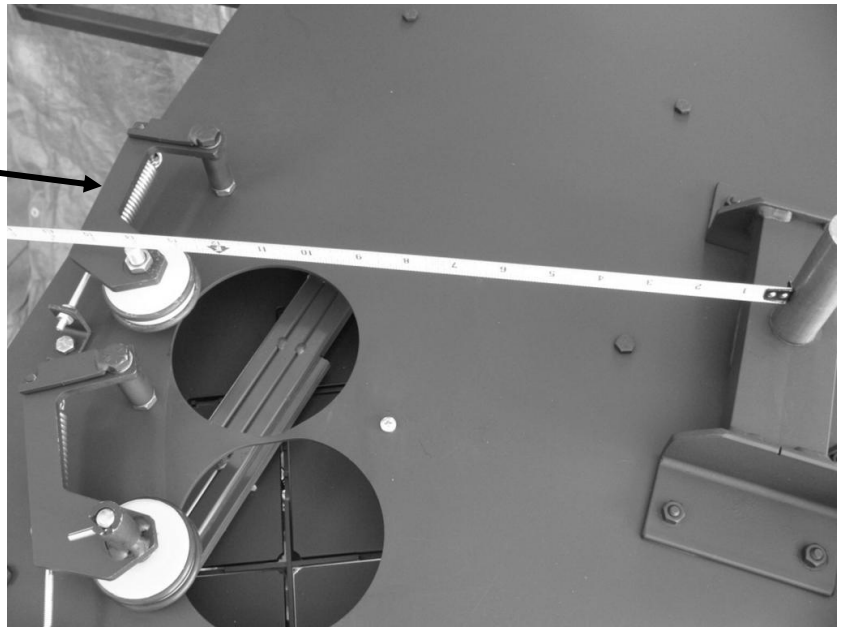

Diagram 32

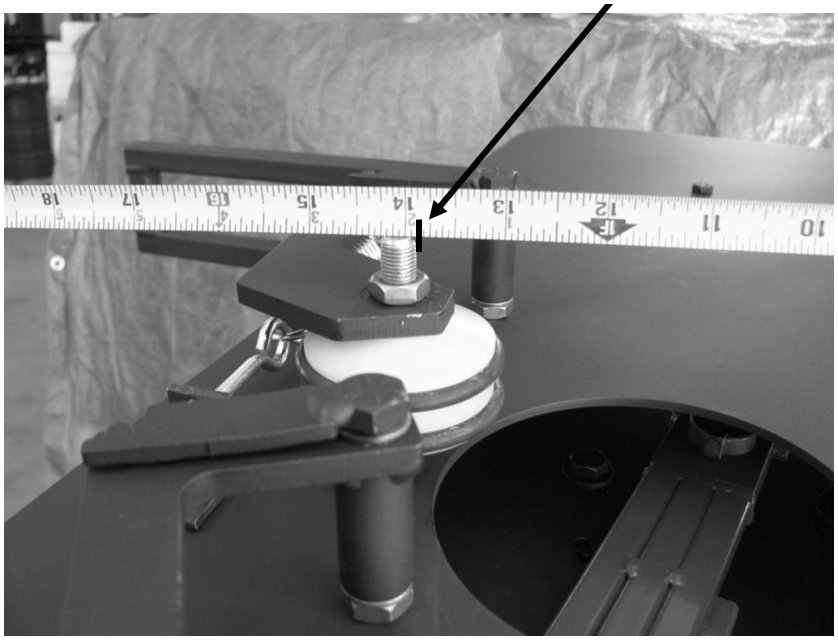

Diagram 33

Singles Roller Plate measurement is 13 7/8” from face of Kingpin Shaft to inside face of the Single Roller Wheel bolt.

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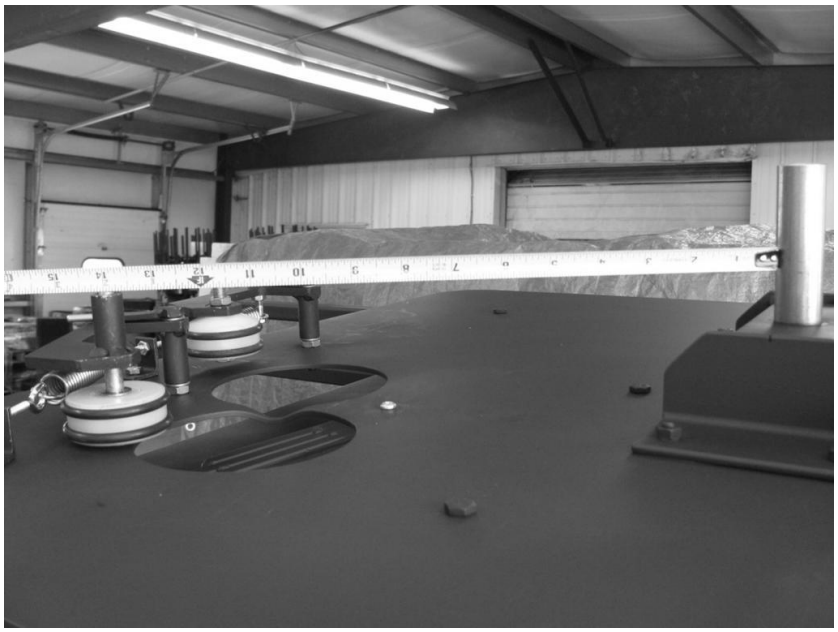

Diagram 34

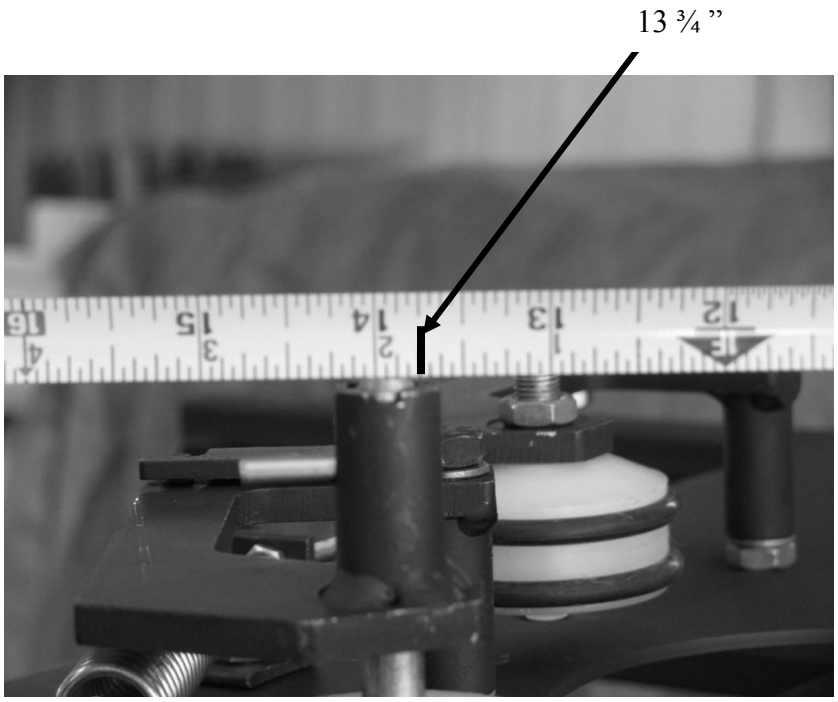

Diagram 35

Doubles Roller Plate measurement is 13 ¾” from the face of the Kingpin Shaft to the inside face of the Doubles Roller Wheel bolt.

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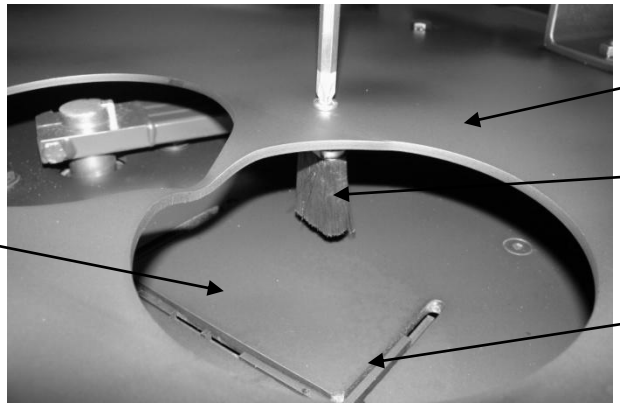
TARGET BRUSH MAINTENANCE

When Targets start to break or Targets are being thrown further to the right, it may be time to change the target brush. When the target brush becomes worn out, the target can be bumped ahead and/or "slide down" the throw plate. This can cause either the target to break or be thrown further to the right.

The purpose of the target brush is to hold the target against the throw arm when the throw arm advances to the cocked position.

When the brush begins to "flair out", loosen the screw and turn the brush 180 degrees. The brush needs to be aligned with the narrow side of the brush running from front to back of the Pat-Trap® Machine as shown in Diagram 36 below. Replace the Target Brush when needed.

Diagram 36



Installation of New Target Brush

The turret does not have to be removed to replace the target brush. Just remove the targets and use a phillips screw driver to remove the brush.

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COLD WEATHER ADJUSTMENT TEMPERATURE/RELEASE TIME STOPPING THE THROW ARM ON THE BRAKE

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In very cold weather, the pump motor should be turned on 30 to 60 minutes before operating time to warm up the hydraulic oil. If the On/Off/Release switch is turned on too soon, the machine will keep cycling (throwing targets).

Extreme temperature changes may affect the stopping position of the throw arm. Very cold temperature may cause the machine to keep cycling by itself. Very warm weather may cause the throw arm to stop too soon and cause slow pulls.

Refer to the Diagram 37 which shows the throw arm brake assembly and the proper stopping position of the throw arm. Note: The Throw Arm is approximately 1" back from the right edge of the Throw Arm Brake Rubber Pad.

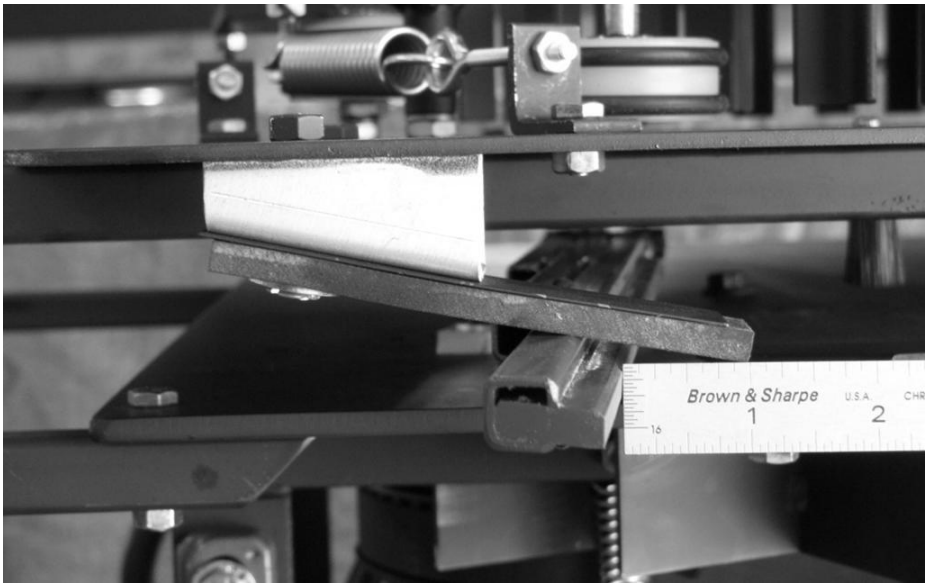

Diagram 37

Correct Position for Stopping the Throw Arm on the Throw Arm Brake

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ADJUSTING RELEASE TIME - CORRECTION OF CYCLING PROBLEM

To Adjust the Release Time, Correct a Cycling Problem, or Compensate for Extremely Cold Weather.

1. NEVER STAND IN FRONT OF A TRAP MACHINE. THE TRAP MACHINE MUST BE TURNED OFF AND THE SPRING RELEASED BEFORE ENTERING THE TRAP HOUSE. NEVER ATTEMPT TO MAKE ANY ADJUSTMENT WHILE THE THROW ARM IS COCKED.

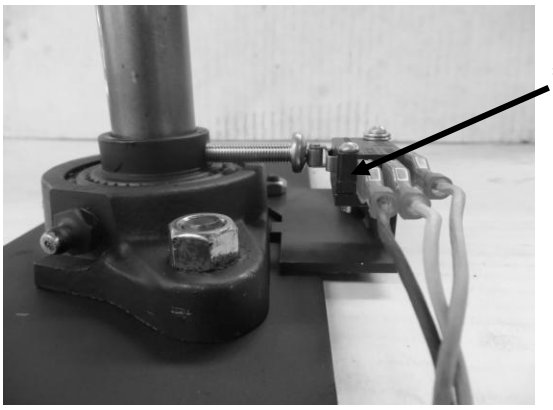
2. Locate the two switch (#2 Micro Roller Switches) on the bottom left side of the trap machine which are mounted on an adjustable bracket. Diagram 38.

3. Loosen the thumb screw to allow the switch bracket to move forwards or backwards. Diagram 39.

4. Move the upper portion of the switch bracket (diagram 39) by increments of 1/16" to the left (forward towards the front of the trap house) to stop cycling --- or lengthen the throw time --- causing the arm to stop further back on the throw arm brake.

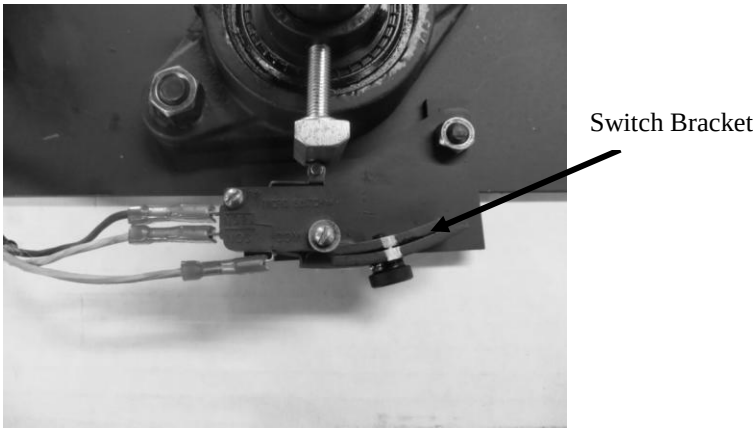
5. To shorten the throw time (release time), move the switch bracket to the right --- toward the back of the trap house --- causing the throw arm to stop further forward on the brake.

6. For proper stopping position of the throw arm on the brake see Diagram 37.



Side View of #2 Switch Bracket

Diagram 38



Top View of #2 Switch Bracket

Diagram 39

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ASSEMBLY AND MAINTENANCE OF THE THROW ARM BRAKE

A worn out brake rubber or broken brake flat spring will allow the throw arm to fire through (i.e., cycle) thereby throwing uncalled for targets.

Keep surfaces dry where the throw arm contacts the brake rubber.
Replace the throw arm brake rubber when it begins to wear out. See Diagram 4.4.

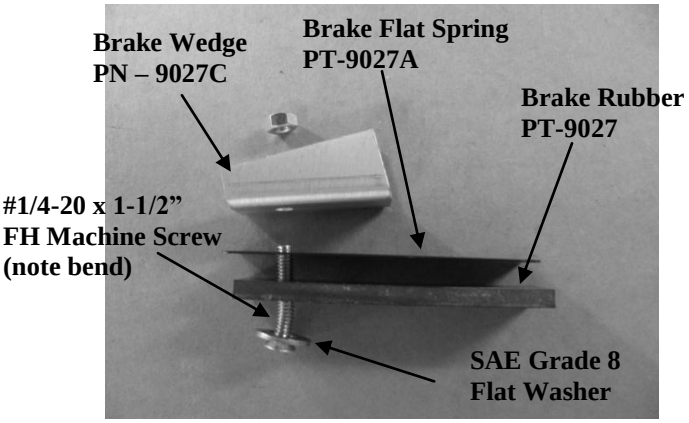

Diagram 40

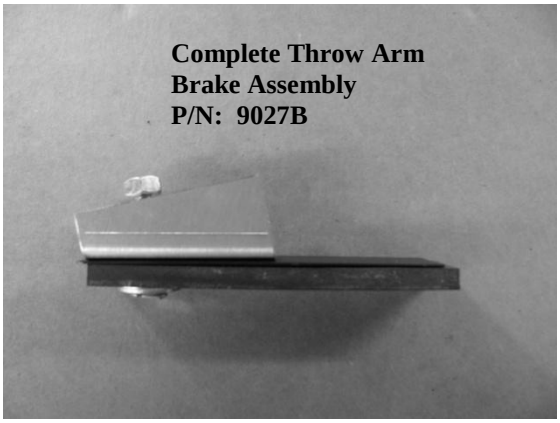

Diagram 41

Components of Throw Arm Brake Assembly

NOTE: The proper stopping position for the throw arm on the throw arm brake is shown in Diagram 42, which is approximately one inch from the right hand side of the brake rubber.

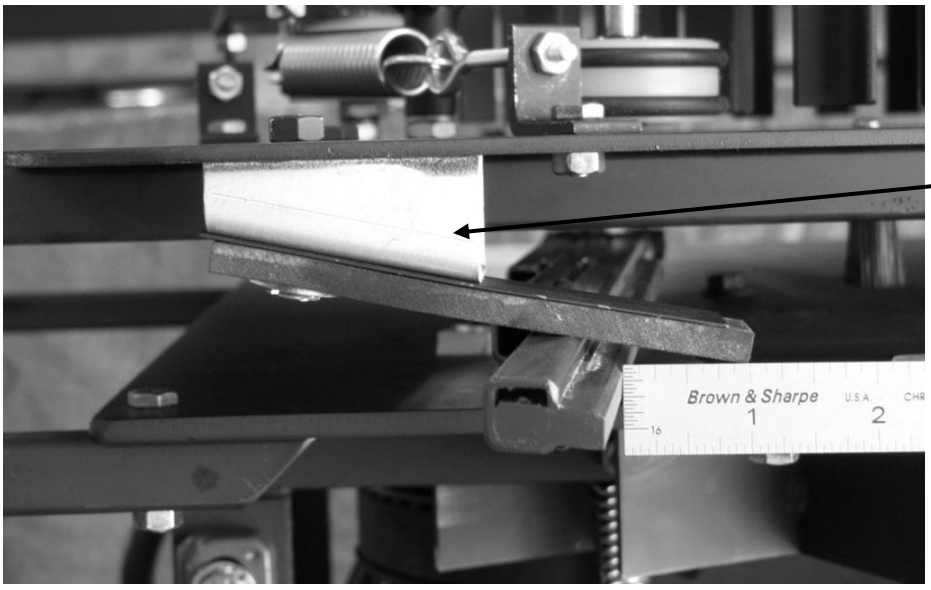

Diagram 42

Throw Arm in "Cocked Position" on Throw Arm Brake Assembly

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REMOVAL OF THROW ARM

NEVER STAND IN FRONT OF A TRAP MACHINE. THE TRAP MACHINE MUST BE TURNED OFF AND THE SPRING RELEASED BEFORE ENTERING THE TRAP HOUSE. NEVER ATTEMPT TO MAKE ANY ADJUSTMENT WHILE THE THROW ARM IS COCKED.

1. Remove and/or disconnect the main spring. Refer to the **Disconnecting The Uni-Band** section in this manual (Page 34).

2. Rotate the throw arm to a place where you can reach the nut. Use a 7/16th socket wrench with a long extension to loosen the ¼-28 nut on the throw arm (See Diagram 43).

3. Move the arm to the area between the braces. Use a pry bar or a long screwdriver. Place it under the throw arm next to the throw arm shaft and pry up on the throw arm to remove.

4. NOTE: The arm might come off more easily if you wiggle the throw arm, slightly, up and down while prying up.

5. Pry downwards against the underside of the top plate to install the new throw arm.

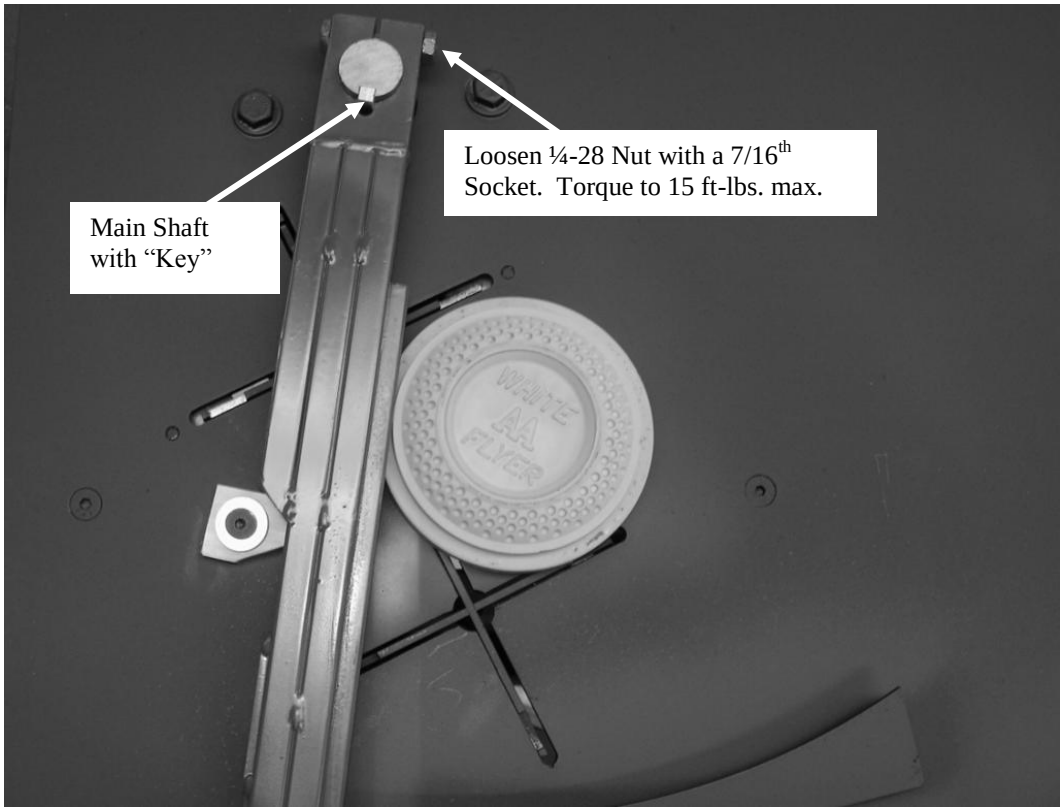

Diagram 43

Removal/Installation of Throw Arm (PT-9026)

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DISCONNECTING THE UNIBAND FROM THE CLUTCH

1. Let off the crank handle tension.
2. Turn the machine on to cock the throw arm.
3. When the throw arm stops at the throw arm brake, turn the machine off without releasing the throw arm.
4. WHEN THE THROW ARM IS COCKED, BE SURE TO STAND BEHIND THE TRAP AND STAY CLEAR OF THE THROW ARM. To completely release the tension on the throw arm carefully, manually, release the throw arm by first looping a rope or cord around the end of the throw arm. Then, holding back on the rope at 90 degrees to the throw arm, slowly move the throw arm past the brake and guide it around to the front of the machine.
5. Move the throw arm so that it is 6 7/8" from the right hand corner of the throw plate. See Diagram 53.
6. Use a 5/32" allen wrench to loosed the clutch rod-end bolt. Pull down on the rod end to remove. See Diagram 52.

INSTALLATION OF THE THROW ARM

1. Release the throw arm. Never attempt to work on your machine while it is in the cocked position.
2. Turn off the machine and "drop" the machine to the lowest elevation for an easier working position.
3. Disconnect the main spring before working with the throw arm. Refer to the Disconnecting the Uni-Band section in this manual.
4. Place the throw arm on the main shaft in the same place that it was. Hold the throw arm level while tightening the ¼-28 nut.
5. The height of the bottom of the throw arm rubber needs to be ½-inch above the surface of the throw plate. (This measurement allows for 1/32" between the lip of the target and the throw arm rubber.) See Diagram 44 & 45.

Note: Bottom of Throw Arm Rubber is ½" Above Throw Plate Surface in the area <u>where the target leaves the throw plate</u>.

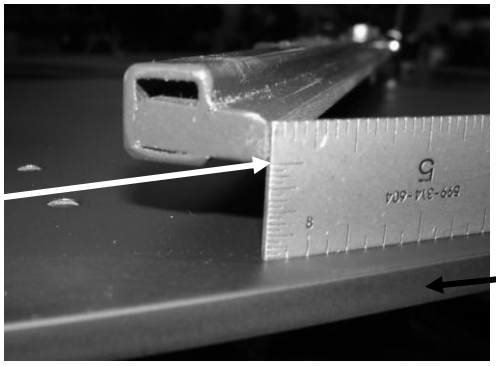

Diagram 44

<u>Setting Correct Height of Throw Arm with a Ruler</u>

6. With the main spring disconnected, check to be sure that there is 1/32", but no more than 1/16", of clearance between the target and the throw arm through the area that the target travels --- especially the area where the target leaves the throw plate surface. Please refer to Diagram 45.

Diagram 45

Setting Correct Target Clearance for Throw Arm with a Target

7. Check to see that the notch on the front rake on the PAT-TRAP® throw arm clears the Doubles Finger. See Diagram 46. To verify the clearance, move the throw arm manually past the brake and through the area of the Doubles Finger to check clearance.

8. If necessary, the Doubles finger can be bent down using a pair of channel-lock pliers. A screwdriver can be used between the "doubles" finger and the throw plate to pry it up if necessary.

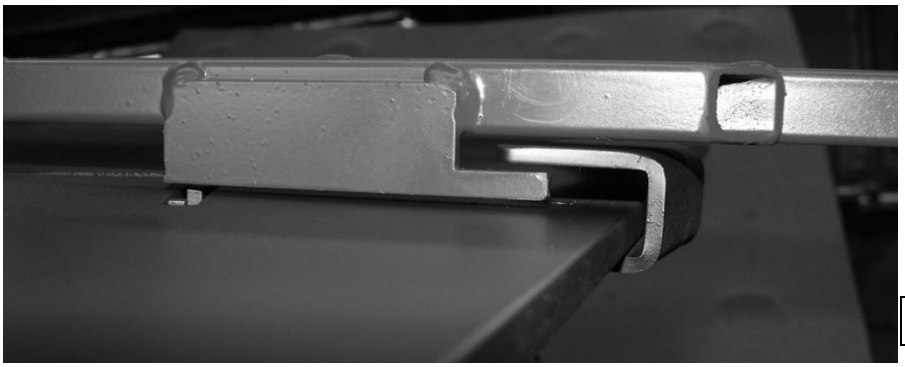

Diagram 46

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MAINTENANCE OF THROW ARM COCKING PIN

The PAT-TRAP® machine must be released and turned off before performing any work.

Rotate the bumper 45 degrees (1/8th turn) after approximately 100,000 throws (see counter located in the Electrical Control Box) to see if a flat spot is visible. The bumper should be easy to rotate by hand without having to loosen the bolt. Replace the bumper if worn or cracked. Slide the new bumper onto the bolt as pictured in Diagram 47.

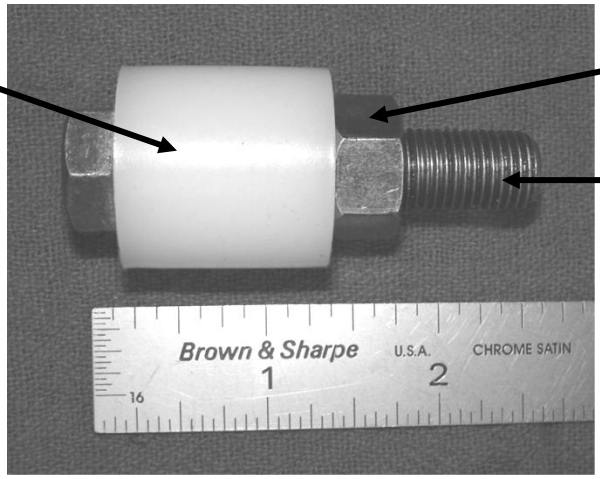

Diagram 47

Cocking Bolt Assembly (PT-9035)

Turn the nut on by hand until it is against the bumper.
Screw the Cocking Pin Assembly into the bottom of the main cog belt pulley wheel until the nut contacts the wheel. See Diagram 48.
Now, tighten the nut against the main timing wheel very tight. (Torque to 35-40 ft-lbs.). See Diagram 48 below.

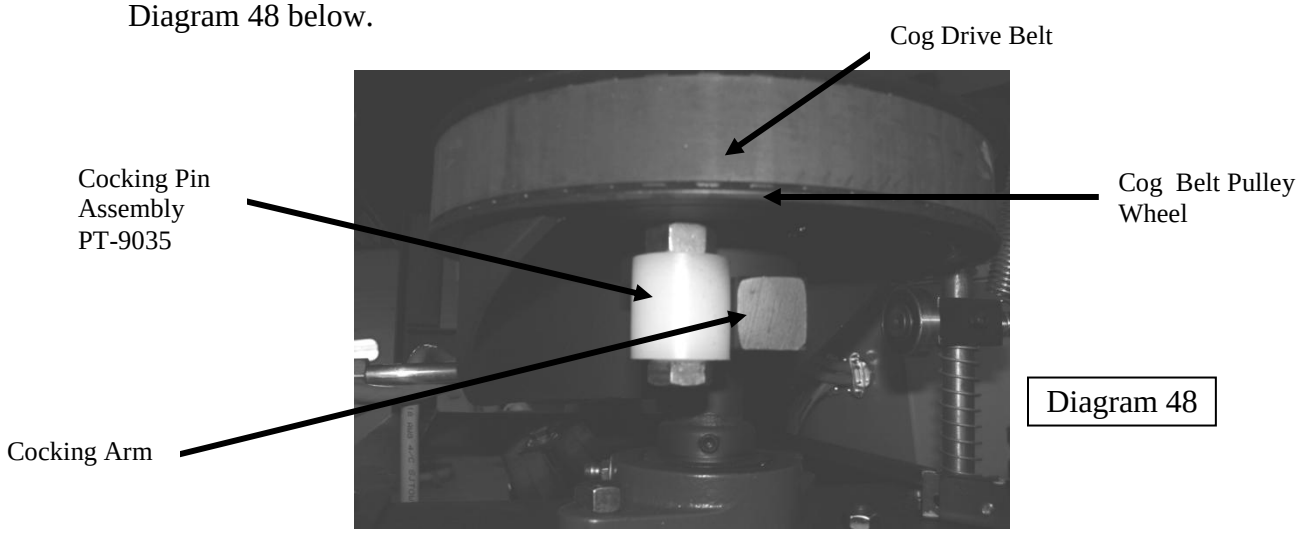

Diagram 48

Cocking Bolt Assembly (PT-9035) Attached to Timing Pulley

IMPORTANT: Do not tighten the bolt against the nut because it will compress the bumper.

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INSTALLATION OF THE "XXX" DOUBLES FINGER & SINGLES FINGER

1. Release the throw arm and turn off the machine.
2. Set the "XXX" Doubles Finger so that the corner of the first step measures approximately 3/4" inside the edge of the Throw Plate. Tighten the bolt. This is the approximate position of the "XXX" Doubles Finger for level double targets. See attached diagram 49.

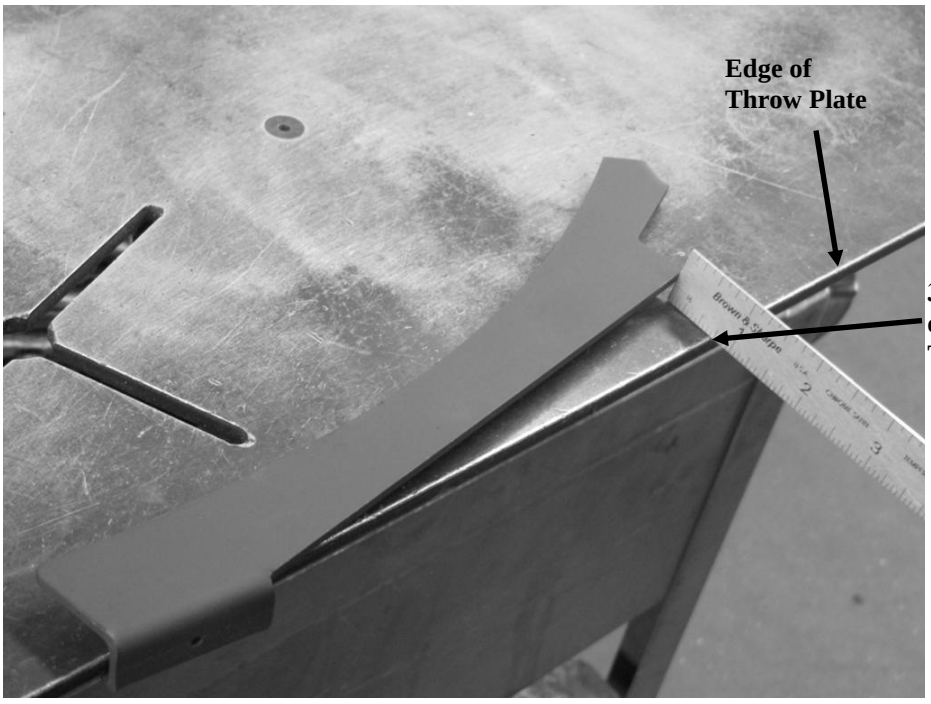

Diagram 49

3. Check to make sure that the Singles Finger measures 4 3/8" from the left-hand end of the "XXX" Doubles Finger. When tightening the nut, hold back on the Singles Finger so that it does not rotate upwards. Diagram 50.

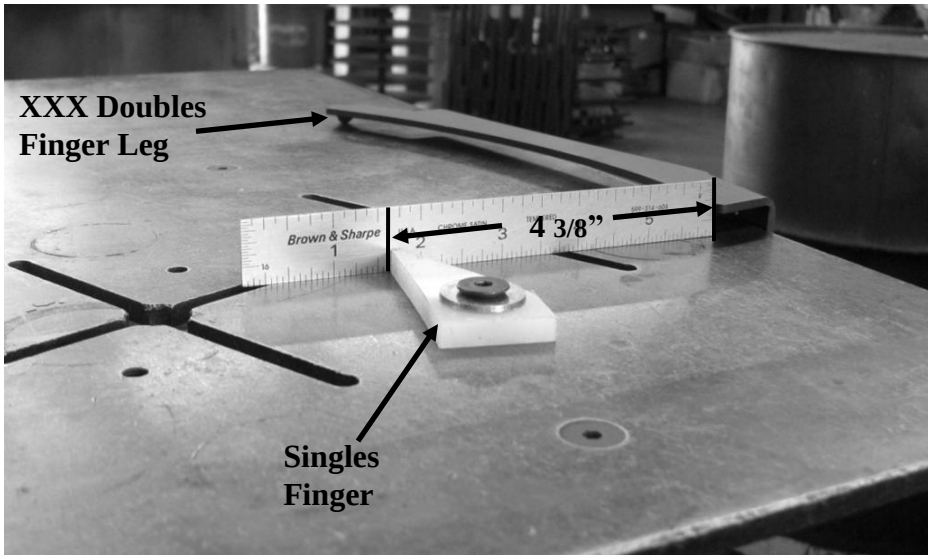

Diagram 50

4. Check to see that the Throw Arm clears the "XXX" Doubles Finger.
    a. Reduce the main spring tension – unwind the crank handle
    b. Disconnect the main spring – refer to this section in your Machine Manual (page 34).
    c. Move the Throw Arm manually past the Brake and through the area of the "XXX" Doubles Finger to check the clearance. Water-pump pliers can be used if the "XXX" Doubles Finger needs to be pried downwards. A long screwdriver can be used if the "XXX" Double Finger needs to be pried upwards.

       Presuming the machine is sitting on a level platform, with no wind; these directions should yield a level pair of Doubles.

When installing the XXX Doubles Finger check to make sure that the leg is contacting the Throw Plate surface. If it is not, then remove the finger from the machine and bend down slightly at the opposite end of the finger. (Diagram 50).

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REPLACEMENT/REMOVAL OF MAIN SHAFT CLUTCH ASSEMBLY (PT-9034)

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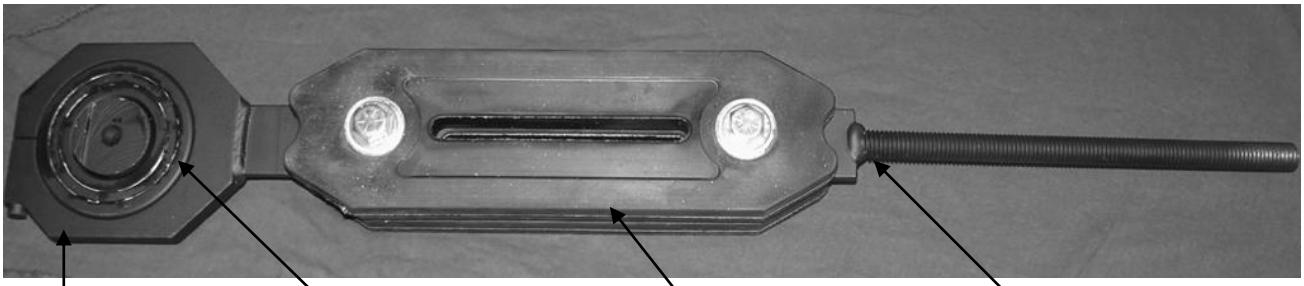

Diagram 51

Main Shaft Clutch Assembly (PT-9034)

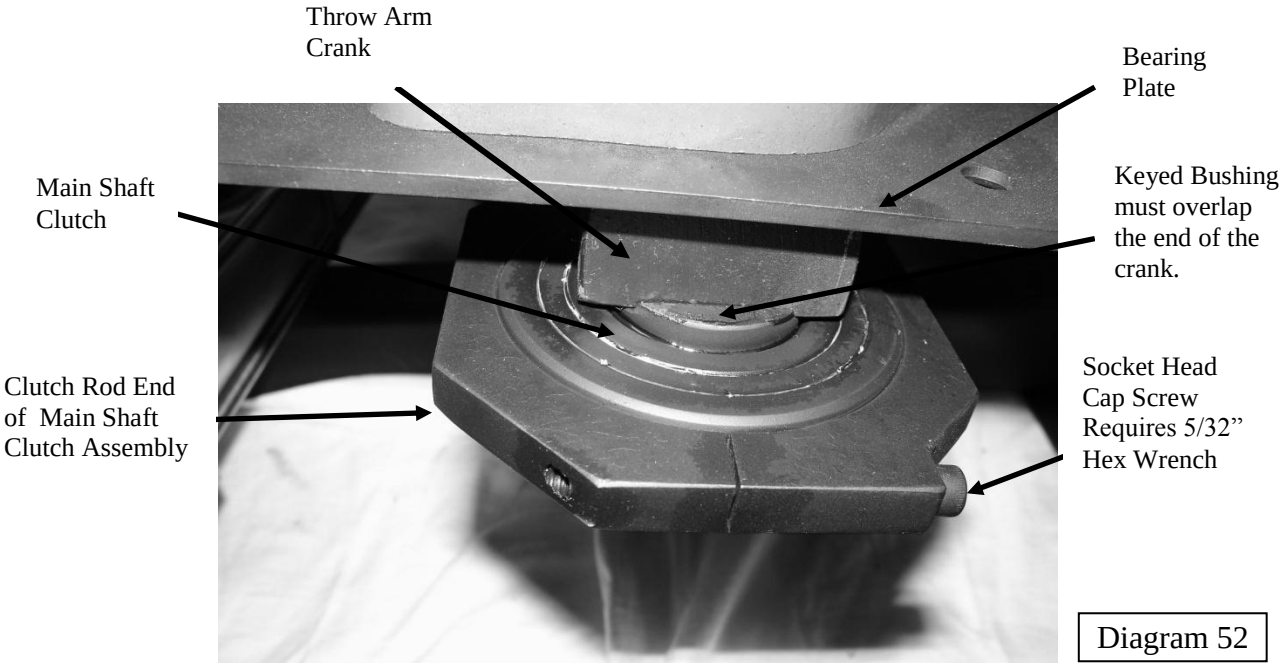

Diagram 52

Clutch Rod End of Main Shaft Clutch Assembly

1. Back off the tension on the Main Spring crank handle by rotating it counter clockwise.
2. Turn the machine on to cock the throw arm.
3. When the throw arm stops at the throw arm brake, turn the machine off without releasing the throw arm.
4. WHEN THE THROW ARM IS COCKED, BE SURE TO STAND BEHIND THE PAT-TRAP® AND STAY CLEAR OF THE THROW ARM. To completely release the main spring tension on the throw arm carefully, manually, release the throw arm by first looping a rope or cord around the end of the throw arm. Then, holding back on the rope at 90 degrees to the throw arm, slowly move the throw arm past the brake and guide it around to the front of the machine.
5. Move the throw arm so that it is 6 7/8" from the right hand corner of the throw plate. (Diagram 53.)

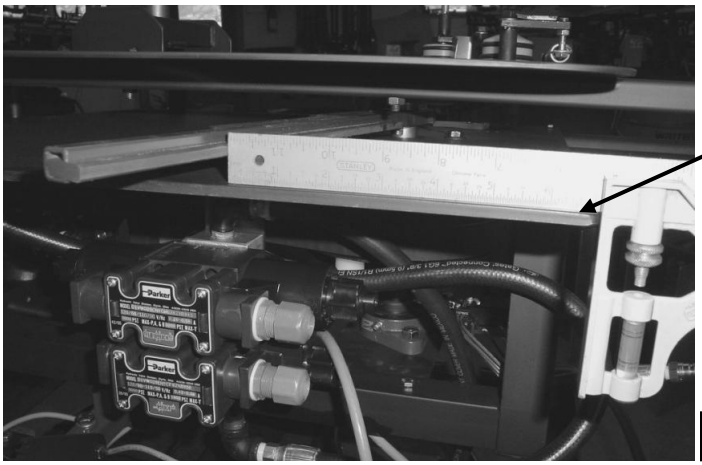

Diagram 53

Positioning Throw Arm When Installing Main Shaft Clutch Assembly

6. Clamp a vise-grip onto the throw plate with the throw arm at 6 7/8" to prevent the throw arm from moving forward. See Diagram 54.

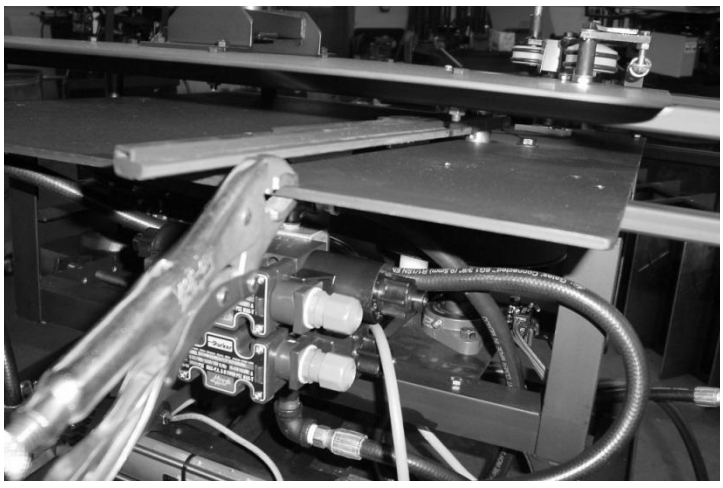

Diagram 54

Securing the Position of the Throw Arm at 6-7/8"

7. Remove the main spring crank handle from the threaded rod by rotating it counter clockwise.

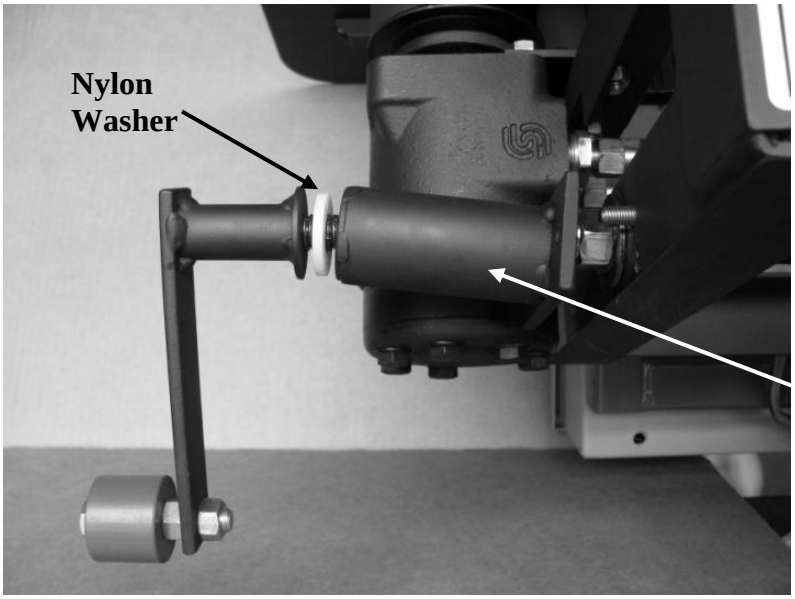

Diagram 55

Backing off the tension on PAT-TRAP® Main Spring Crank Handle

8. Remove the nylon washer that is sandwiched between the crank handle and the stand off collar sleeve (See Diagram 55).

9. Remove the two (2) ¼" bolts from the stand off collar sleeve (See Diagram 56)

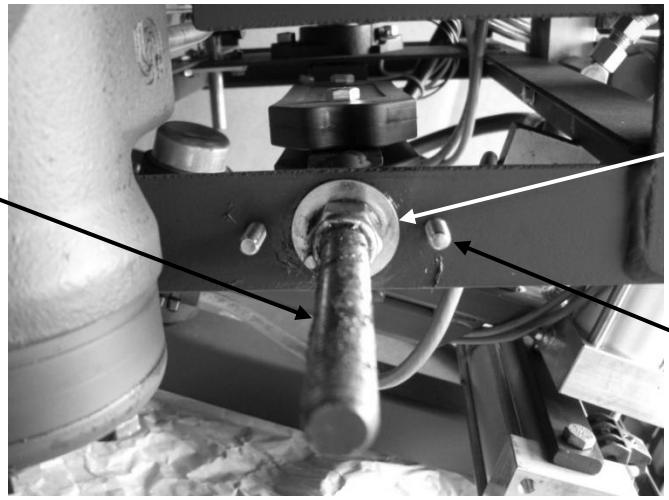

Diagram 56

Removing Main Spring Standoff Collar Sleeve

10. Remove the stand off collar sleeve (See Diagram 55).

11. Locate the elastic lock-nut. Use a ¾" wrench to remove this nut (See Diagram 57).

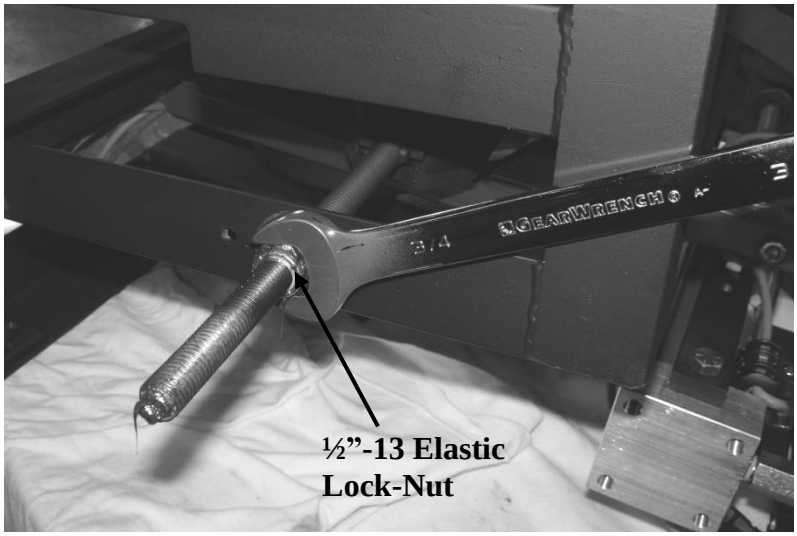

Diagram 57

Adjusting Elastic Lock Nut with ¾" Wrench

12. One can now loosen the set screw (5/32" Hex Wrench) on the clutch rod-end of the Uni-Band. Pull back and down on the rod end to remove it from the clutch. (See Diagram 59).

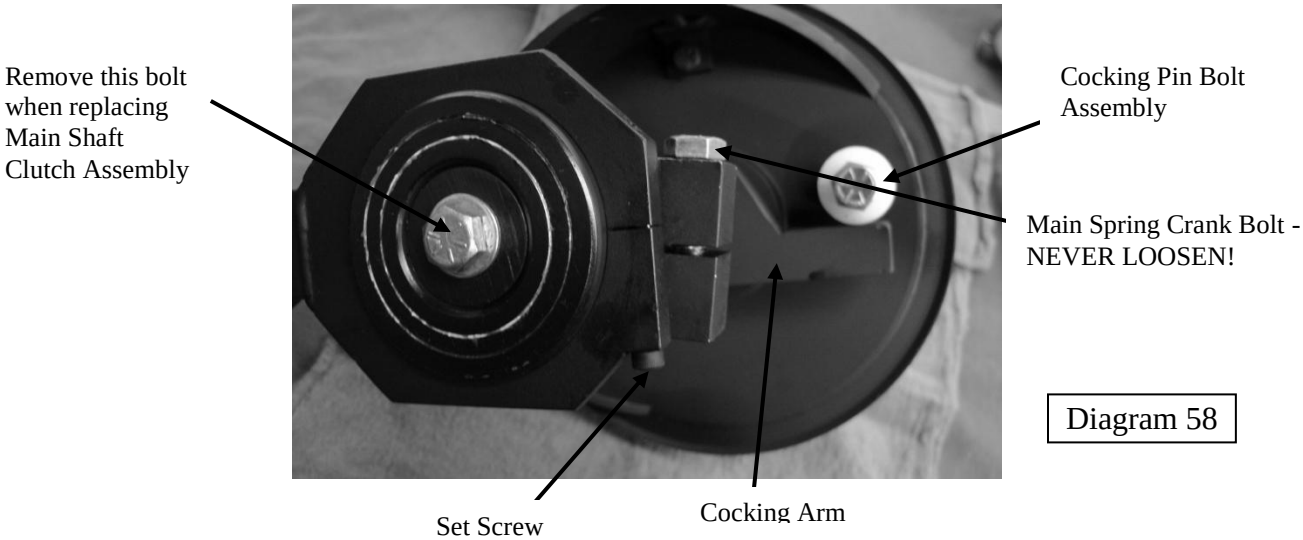

Diagram 58

Main Shaft Clutch Assembly Connection to Throw Arm Crank

13. Remove the old main shaft clutch assembly from the machine.

14. To reassemble put the threaded rod-end through the hole in the frame, and then pull the rod-end onto the clutch. Refer to Diagram 61 for proper positioning of the clutch within the rod-end (note 1/16" gap). Tighten up the rod-end to the clutch using a 5/32" hex head wrench, while keeping the rod-end level to the clutch.

15. Put the 7/16" washer onto threaded rod-end. Then screw on the elastic lock-nut. Refer to "Setting Distance and Speed" page 19. Regarding spring tension and adjustment of the elastic lock-nut.

16. Remove Vise Grip for the Throw Plate.

17. Once the proper distance and speed have been set, re-attach the crank handle, stand-off collar and the crank handle.

18. Inspect the hydraulic hoses to make sure that the rod-end does not rub against them.

WARNING: Do not work on the hoses when the throw arm is cocked. The throw arm must be released and the machine turned off when performing any work on the Pat-Trap®.

CHANGING A PAIR OF UNI-BANDS ON A MAIN SHAFT CLUTCH SYSTEM

1. Let off the crank handle tension.

2. Turn the machine on to cock the throw arm.

3. When the throw arm stops at the throw arm brake, turn the machine off without releasing the throw arm.

4. WHEN THE THROW ARM IS COCKED, BE SURE TO STAND BEHIND THE TRAP AND STAY CLEAR OF THE THROW ARM. To completely release the tension on the throw arm carefully, manually, release the throw arm by first looping a rope or cord around the end of the throw arm. Then, holding back on the rope at 90 degrees to the throw arm, slowly move the throw arm past the brake and guide it around to the front of the machine.

5. Move the throw arm so that it is 6 7/8" from the right hand corner of the throw plate. See Diagram 53.

6. Clamp a vise-grip onto the throw plate with the throw arm at 6 7/8" to prevent the throw arm from moving forward. See Diagram 54.

7. Do not loosen the throw arm crank bolt. Diagram 43.

8. Changing the Uni-Bands can be done without removing the threaded rod-end from the machine.

9. Loosen the Uni-Band connecting bolts. Disconnect the rod-end from the clutch by loosening the rod-end bolt using a 5/32" hex head wrench; pull down on the rod-end to remove it. Remove the connecting bolts. See Diagrams 60, 61 and 62

10. When re-assembling with the new pair of Uni-Bands, leave the 3/8 –24 x2 ¼" Grade 8 bolts slightly loose at first. Then, pull the rod-end onto the clutch. Refer to Diagram 61 for proper positioning of the clutch within the rod-end (note 1/16" gap). Tighten the rod-end bolt using a 5/32" hex head wrench. Keep the rod-end level on the clutch. Refer to Diagram 60 for right side up.

    Align the Uni-Bands as follows: See diagrams 60, 61 and 62

    A. Keep the clamp in front of the throw arm at 6 7/8" (Step 2)

    B. With the rod-ends and Uni-Bands in alignment to one another, torque the bolts to 10 ft/lbs.

    C. Tension the Uni-Bands with ten turns of the crank handle.

    D. Use two 9/16" wrenches. Hold back on the bolt head (on top) while tightening the nut (on bottom)

    E. Put equal pressure on both of the wrenches and torque the bolts to 25 ft/lbs minimum – 40 ft/lbs maximum. If using the sprocket toothed washers torque to 25 lbs. "Sprocket toothed washer must be used if the area around the holes is not indented."

11. Remove the vise grip from the throw plate.

12. Refer to the section on *Setting Distance and Speed (page 19)*, regarding minimum spring tension and adjustment of the elastic lock-nut.

13. Begin normal operation of the machine.

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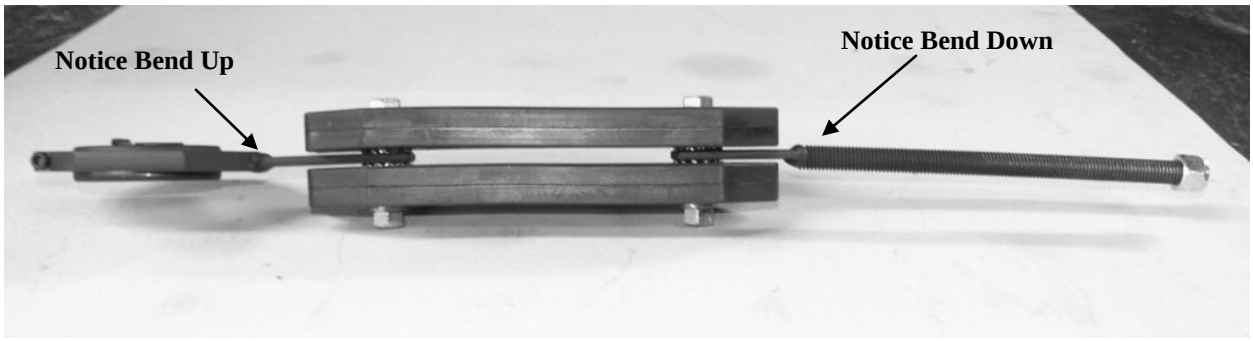
ASSEMBLY/INSTALLATION OF THE UNI-BAND (Main Spring) to the MAIN SHAFT CLUTCH



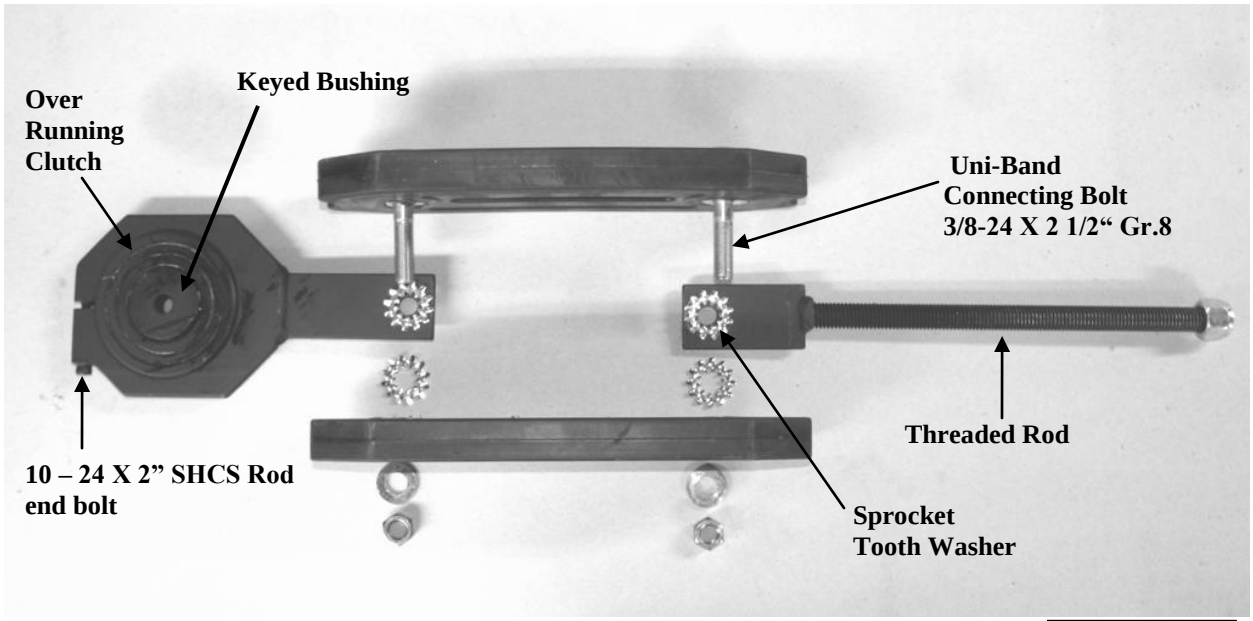


Diagram 60

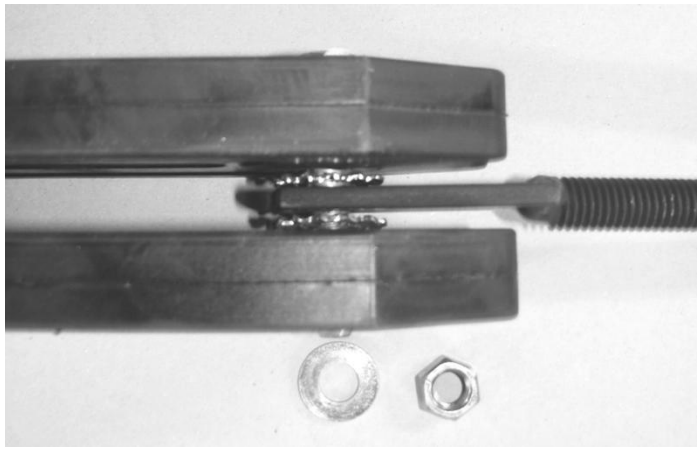


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Diagram 61

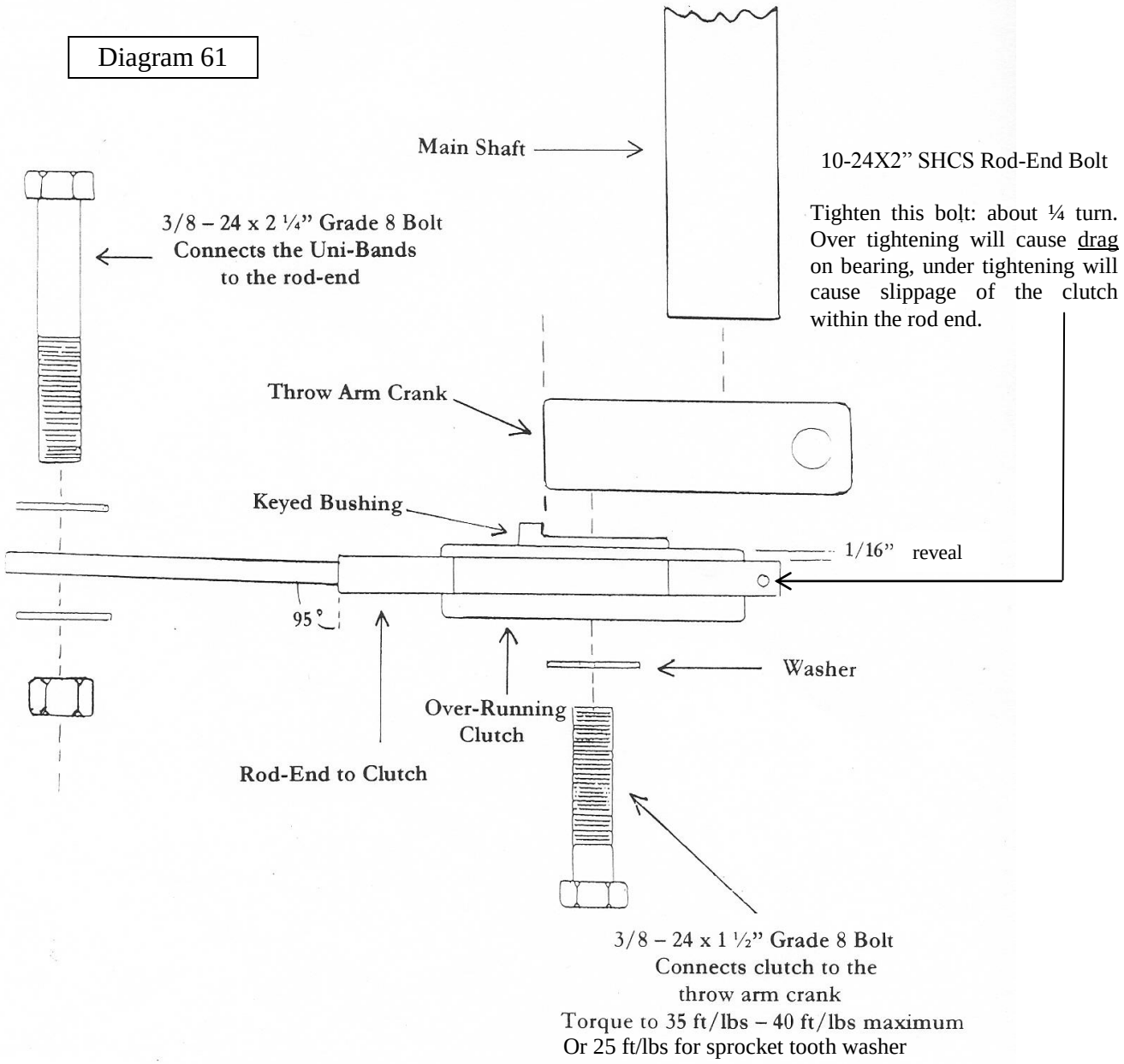

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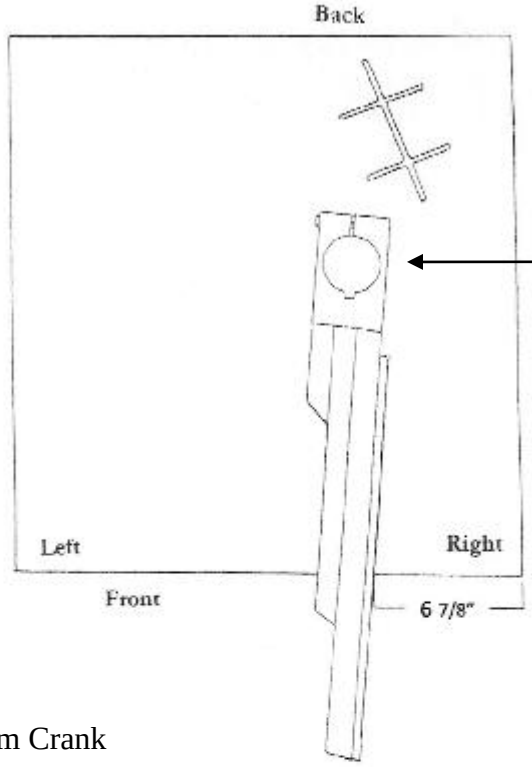
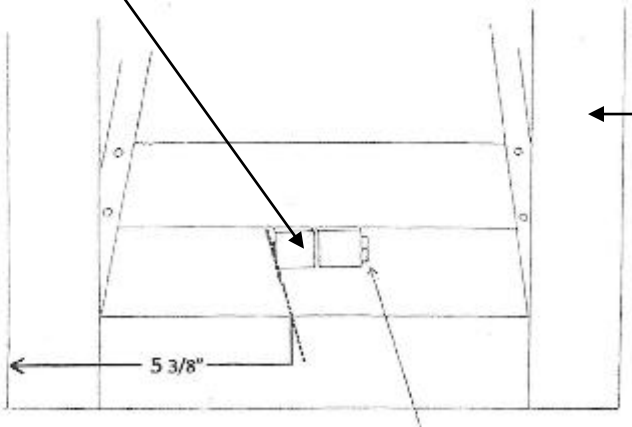
Diagram 62



Throw Arm Crank location at the bottom of the throw arm shaft.

Throw Arm Crank



Box Frame

FRONT

BACK

Diagram 63

DO NOT LOOSEN or REMOVE unless repairing or replacing. Contact Pat-Trap for instructions.

Throw Arm Shaft, Bearing and Cog Belt Pulley Wheel not shown.

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REPLACEMENT OF THE ELEVATOR EXTENSION SPRING

***IMPORTANT: Do not loosen or remove either the lock screw that the bottom of the spring hooks onto or the set screw. The screw is holding the bearing block in position so that the bearing is in alignment with the cam – See Diagram 64.

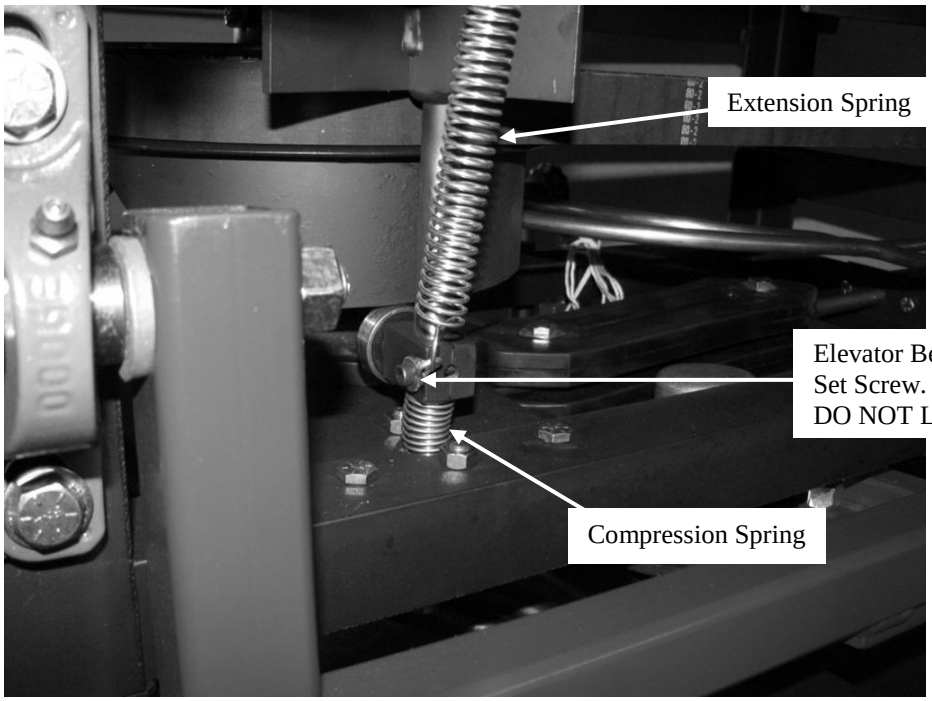

Diagram 64

Elevator Bearing Block Detailing Bearing on Cam

1. Turn the machine on.
2. Fire the throw arm and then turn the machine off as soon as the elevator goes up: When the cam leaves the cam bearing.
3. If disconnecting the spring, remove the top end first.
4. If connecting the spring, connect the bottom end first.

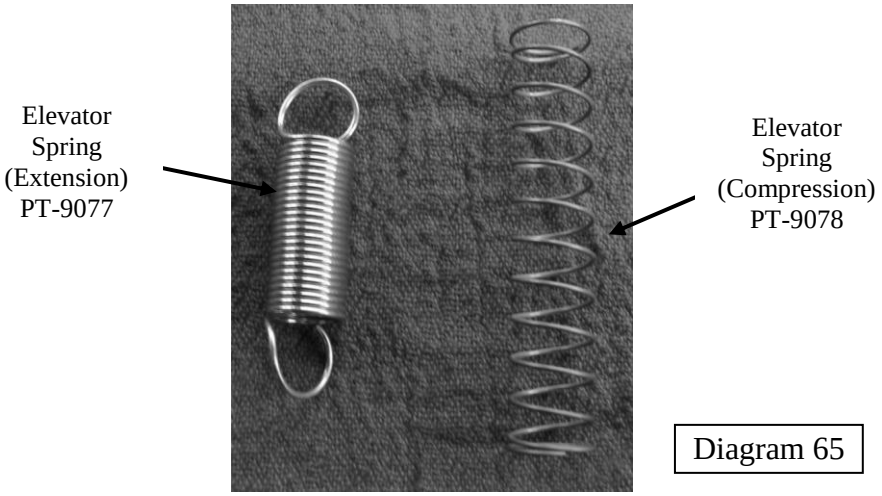

Diagram 65

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REPLACEMENT OF THE ELEVATOR COMPRESSION SPRING

1. Turn the machine on. As soon as the elevator goes up, turn the machine off.
2. Remove the two elevator rod guide bolts (7/16" wrench). See Diagram 66.

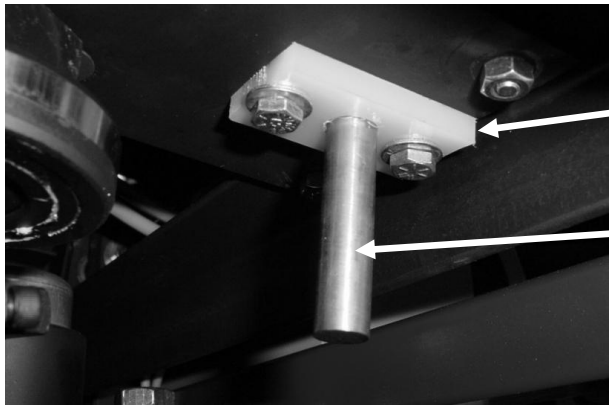

Diagram 66

Elevator Rod Guide

3. Remove the ELEVATOR ROD GUIDE. The plastic elevator rods guide must be replaced the same way as it was found (i.e., do not flip over).

4. Put the compression spring on over the elevator rod.

5. Replace the Elevator Rod Guide.

6. Fasten the two bolts only slightly snug; over tightening will deform the material and possibly cause the guide to tighten against the elevator rod.

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THROW ARM SHAFT BEARING MAINTENANCE

Grease both the Upper and Lower Flange Bearings that Support the Main Shaft (throw arm) and Main Gear Belt Pulley Wheel once a year with a **PREMIUM** grade lubricating grease such as Lithium or Mobil EP1. Heavier-weight grease will "gum-up" and not allow the throw arm shaft to rotate freely. Diagram 67.

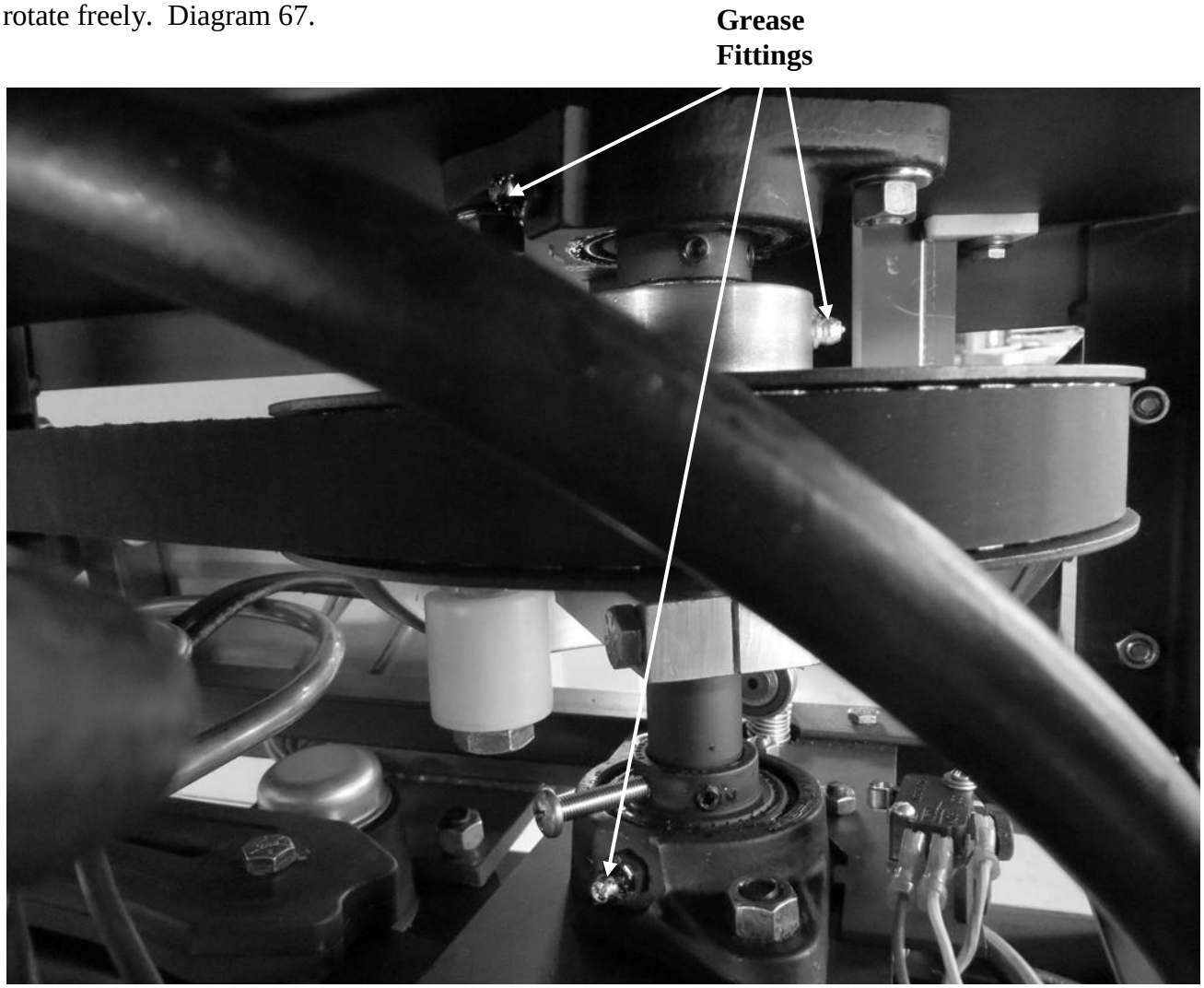

Diagram 67

Throw Arm Drive Shaft Assembly

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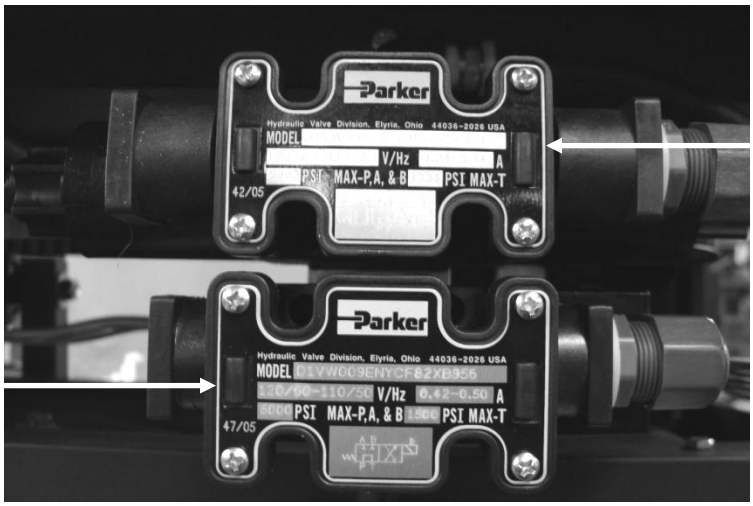
HYDRAULIC VALVE IDENTIFICATION – STANDARD PAT-TRAP®

The top valve on a standard PAT-TRAP® machine is a "soft shift" valve, and it controls the oscillation hydraulic cylinder. Diagram 68.

The lower valve on a standard PAT-TRAP® machine is a "single solenoid" hard shift valve, and it controls the hydraulic motor which cocks the throw arm and advances the turret. It is not a "soft shift" valve.



Soft Shift Valve
PT-9061
(Oscillation)

Single Solenoid
Valve
PT-9060
(Throw Arm)

Diagram 68

Hydraulic Valves on Standard PAT-TRAP®

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HYDRAULIC VALVE IDENTIFICATION – WOBBLE PAT-TRAP®

The top valve on a PAT-TRAP® Wobble machine is a "soft shift" valve, and it controls the horizontal oscillation hydraulic cylinder. Diagram 69

The middle valve on a PAT-TRAP® Wobble machine is a "single solenoid" hard shift valve, and it controls the hydraulic motor which cocks the throw arm and advances the turret. It is not a "soft shift" valve.

The bottom valve on a PAT-TRAP® Wobble machine is a "soft shift" valve, and it controls the vertical "wobble" hydraulic cylinder. Diagram 69.

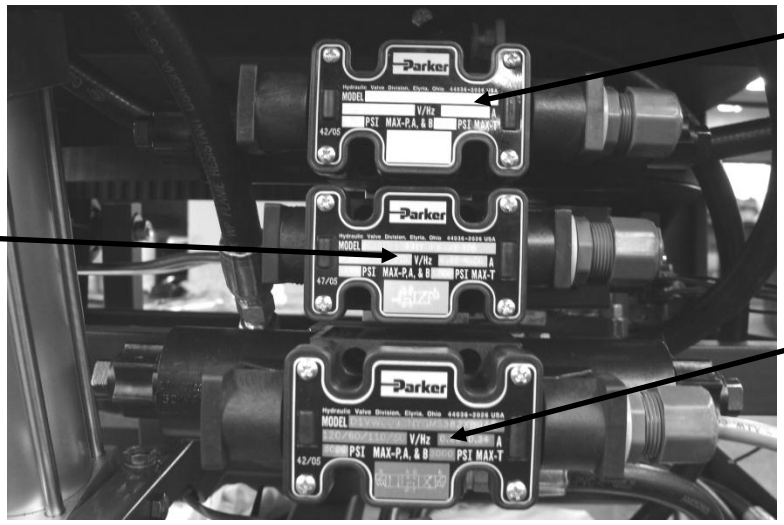

Diagram 69

Hydraulic Valves on PAT-TRAP® Wobble

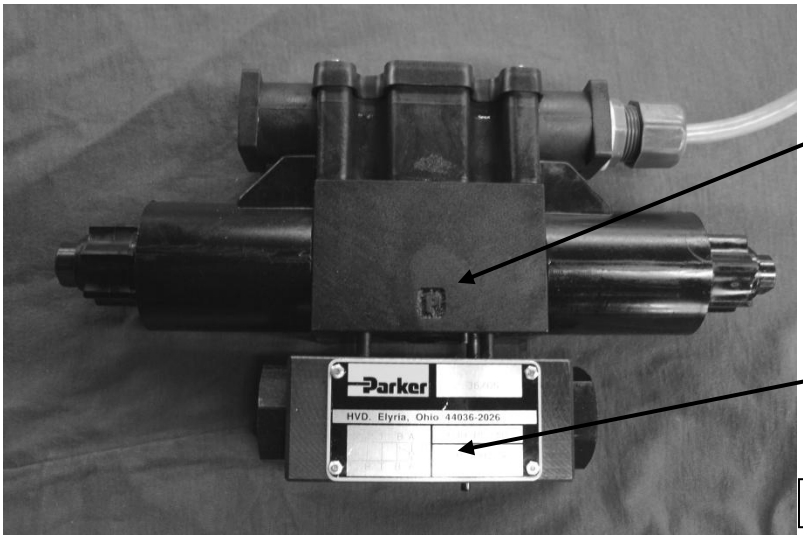

Diagram 70

Wobble Soft Shift Valve shown with Check Valve

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SOFT SHIFT VALVE WIRING GUIDE (OSCILLATION/WOBBLE VALVES)

NEVER STAND IN FRONT OF A TRAP MACHINE. THE TRAP MACHINE MUST BE TURNED OFF AND THE SPRING RELEASED BEFORE ENTERING THE TRAP HOUSE. NEVER ATTEMPT TO MAKE ANY ADJUSTMENT WHILE THE THROW ARM IS COCKED.

The wiring guide for the Soft Shift Valve on a PAT-TRAP® is as pictured in Diagram 71 below:

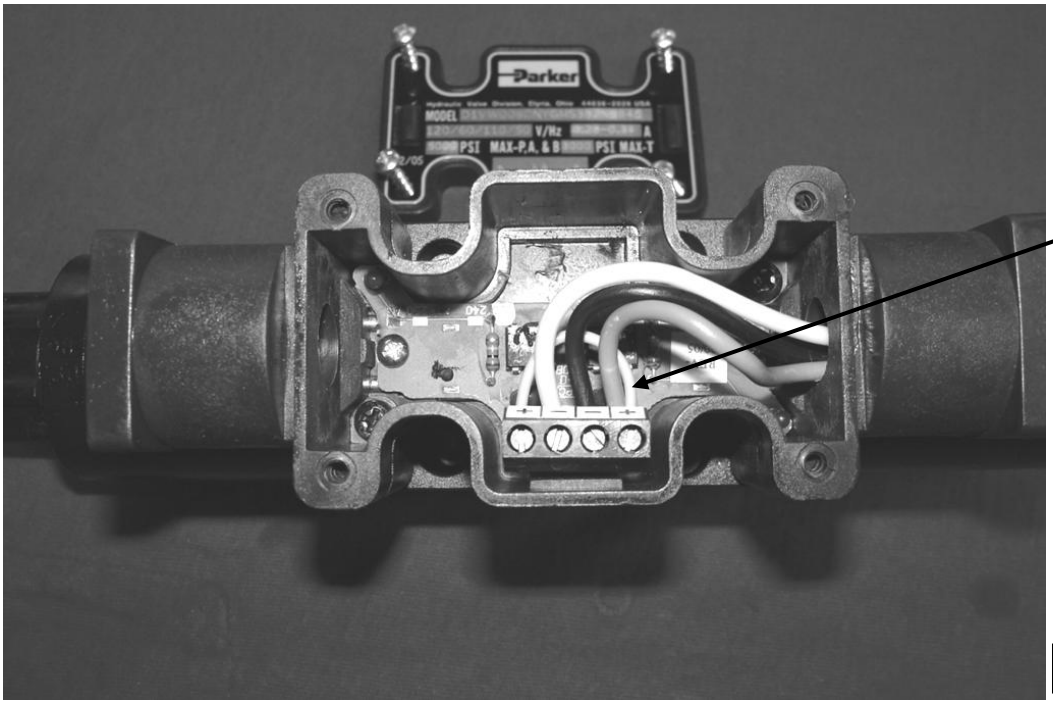

Diagram 71

Wiring of Soft Shift Valve

Wiring Terminals from Left to Right:

Jumper Wire (+)
White Wire (-)
Black Wire (-)
Green Wire and Jumper Wire (+)

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SINGLE SOLENOID VALVE (THROW ARM/TURRET) WIRING GUIDE

NEVER STAND IN FRONT OF A TRAP MACHINE. THE TRAP MACHINE MUST BE TURNED OFF AND THE SPRING RELEASED BEFORE ENTERING THE TRAP HOUSE. NEVER ATTEMPT TO MAKE ANY ADJUSTMENT WHILE THE THROW ARM IS COCKED.

The wiring guide for wiring the Single Solenoid Valve on a PAT-TRAP® is as pictured in Diagram 72 below:

Diagram 72

Wiring of Single Solenoid Valve

Connect one of the valve's black coil wires to each of the black and white wires entering the strain relief fitting along with a leg from the Varistor as shown above.

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REPLACEMENT OF A HYDRAULIC VALVE

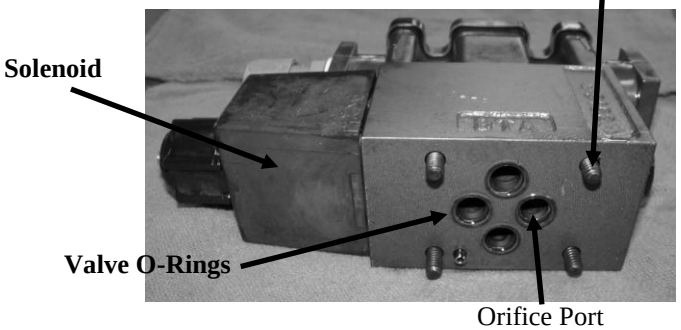
1. NEVER STAND IN FRONT OF A TRAP MACHINE. THE TRAP MACHINE MUST BE TURNED OFF AND THE SPRING RELEASED BEFORE ENTERING THE TRAP HOUSE. NEVER ATTEMPT TO MAKE ANY ADJUSTMENT WHILE THE THROW ARM IS COCKED.

2. Disconnect the PAT-TRAP® from its power source.
3. Remove the cover plate on the valve's terminal box as shown in Diagram's 71 & 72.
4. Disconnect the electrical wires that are located within the valve's terminal box and remove from the strain relief fitting located on the side of the valve.
5. Place a paper towel or rag below the valve to be removed.
6. Remove the old hydraulic valve from the hydraulic sub-plate manifold by removing the four bolts that hold it in place. A 5/32" T-Handled Hex Wrench works best as shown in Diagram 73. Make sure that the holes are cleaned out before using the wrench.

Diagram 73

Loosening/Tightening Valve Mounting Screws

Diagram 74



Rear View of Single Solenoid Valve

7. Replace the old valve with the proper replacement valve, and secure to the hydraulic sub-plate manifold with the four bolts that hold it in place. A 5/32" T-Handled Hex Wrench works best as shown in Diagram 73.
8. Note: Use caution that the four O-Rings located around the valve's orifice ports are securely in place or else a leak will occur. See Diagram 74.
9. Re-attach the wires that are located within the valve's terminal box after feeding them through the strain relief fitting located on the side of the valve. Refer to Diagram 71 or 72 for the proper valve wiring guide.
10. Re-attach the cover plate on the Valve's Terminal Box as shown in Diagram's 71 or 72.
11. Connect the PAT-TRAP® back to its power source and resume operation.

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To replace a FIELD ANGLE LIMIT SWITCH use the following directions:

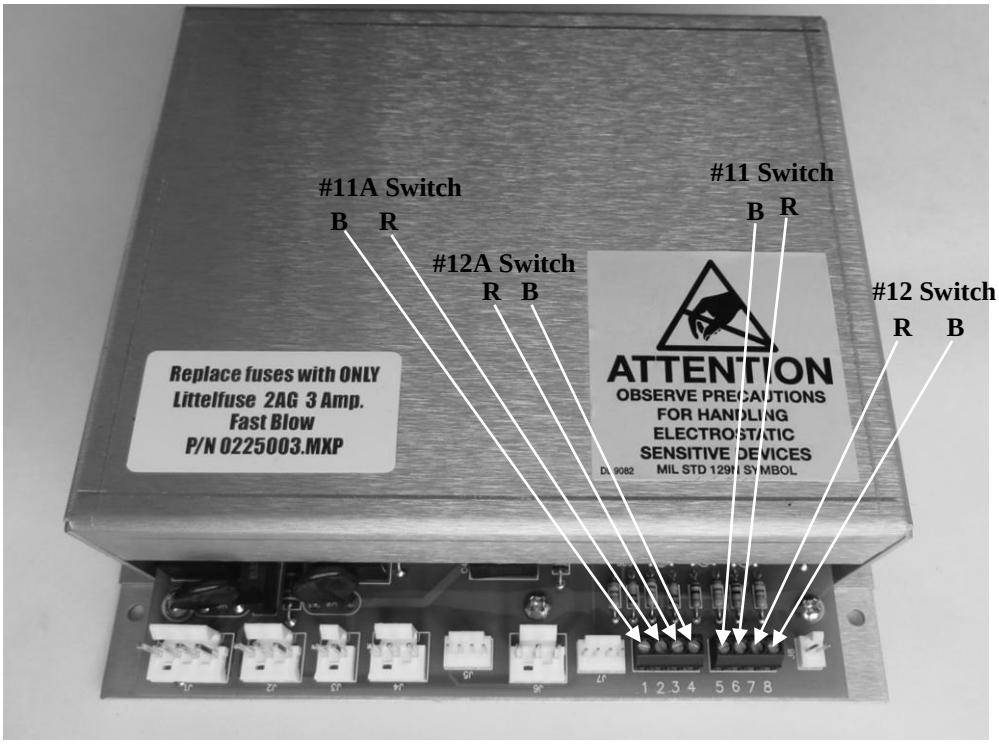
1. NEVER STAND IN FRONT OF A TRAP MACHINE. THE TRAP MACHINE MUST BE TURNED OFF AND THE SPRING RELEASED BEFORE ENTERING THE TRAP HOUSE. NEVER ATTEMPT TO MAKE ANY ADJUSTMENT WHILE THE THROW ARM IS COCKED.

2. Disconnect the PAT-TRAP® from its power source.

3. Open the cover of the Electrical Enclosure located on the back of the PAT-TRAP® with a medium Philips screwdriver .

4. Loosen the screws on the Romex Connector located on the rear exterior of the electrical enclosure. Remove the switch wires from their terminal. Tie a string to the switch wire ends and pull out of the box. Fish the new switch wire back into the box.

5. The connections for the field limit switches to their terminal shown in Diagram 76 are as follows:



Inside the Electrical Enclosure of the PAT-TRAP®

Diagram 76

6. After replacing the appropriate field limit switch, close and secure the cover of the electrical enclosure with 6 - 32 X1/4 Philips head screws. Connect the PAT-TRAP® back to its power source and resume operation.

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WIRING GUIDE FOR FIELD ANGLE LIMIT SWITCHES (#11,#12,#11A, & #12A)

Diagram 75

PAT-TRAP® Oscillation Cylinder with Field Angle Switches and 2-Hole Spacer Bar

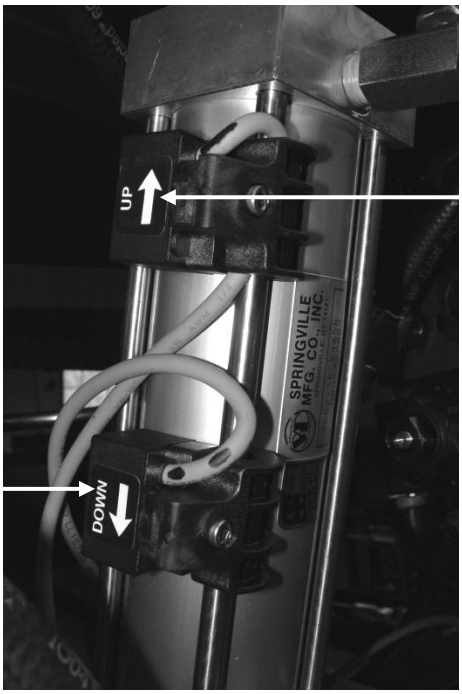

Diagram 77

Limit Switches on the PAT-TRAP® Wobble Hydraulic Cylinder

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REPLACEMENT OF OSCILLATION CYLINDER

To replace a horizontal hydraulic oscillation cylinder use the following directions:

NEVER STAND IN FRONT OF A TRAP MACHINE. THE TRAP MACHINE MUST BE TURNED OFF AND THE SPRING RELEASED BEFORE ENTERING THE TRAP HOUSE. NEVER ATTEMPT TO MAKE ANY ADJUSTMENT WHILE THE THROW ARM IS COCKED.

1. Disconnect the PAT-TRAP® from its power source.

2. Tools required: 9/16" wrench (ratchet or speedy wrench will help), 9/64" hex wrench, ½" wrench, 5/8" and 11/16" wrenches (or adjustable wrench).

3. Remove field angle limit switches from the cylinder tie rods with a 9/64" hex wrench.

4. Loosen the two cylinder bar bolts, but do not remove yet, with a 9/16" wrench. The Cylinder Bar remains on the machine.

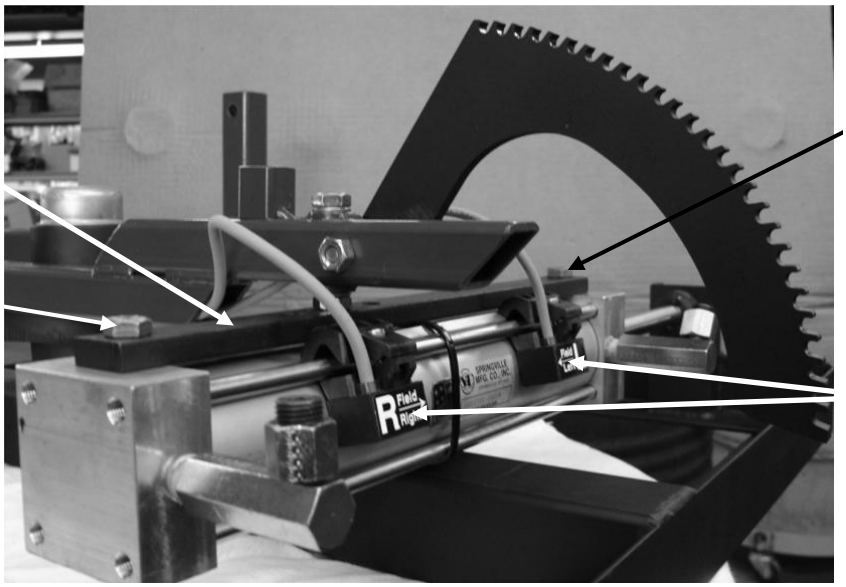

Diagram 79

Removing Cylinder Bar Bolts

5. Remove the cylinder rod-end bolt using a ½" open-end wrench on the milled Wrench flat at the end of the cylinder rod and a 9/16" wrench on the rod-end bolt. (Do not lose the bushings or bushing caps.) See Diagram 80.

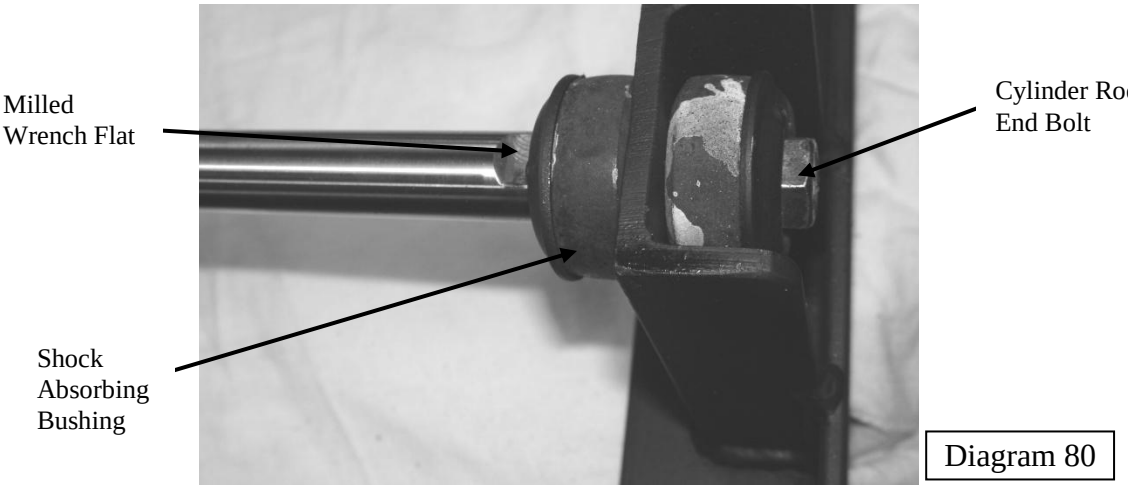

Diagram 80

Removing Shaft Rod- End Bolt From Frame

6. Remove the cylinder bar bolts.

7. Now that the cylinder is free, remove the hydraulic hoses that connect to the long adapters. Use the 5/8" and 11/16" open-end wrenches to perform this task.

8. When putting on the new oscillation cylinder, first secure the cylinder to the cylinder bar with the two bolts.

9. Tighten the rod-end bolt to the cylinder rod, making sure that the bushings and bushing caps are in place.

10. Make sure that the cylinder bar bolts are tight.

11. Replace the field angle limit switch to the cylinder tie rods with the 9/64" hex wrench. Do not over tighten the plastic switch bracket clamp because it WILL break.

12. Connect the hoses. When tightening, make sure that the hoses are turned slightly away from the frame of the machine. This is done so that the hoses won't rub against the machine when at the extreme left and right angle limits.

13. After installing the new cylinder, turn on the machine.

14. Put the Auto/Manual switch into the manual position. Push the left button and run the cylinder to the end.

15. Push the right button and run the cylinder to the end. Now the air is out of the cylinder.

16. Check the oil level within the hydraulic pump reservoir and add **5W-20 oil** as required.

17. Move the cylinder back to center and begin normal operation.

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REPLACEMENT OF WOBBLE CYLINDER

To replace a vertical hydraulic Wobble cylinder use the following directions:

1. Tools required: 1" thick block of wood, 9/16" wrench (ratchet or speedy wrench will help), 9/64" hex wrench, ½" wrench, 5/8" and 11/16" wrenches (or adjustable wrench).

2. Set the 1" thick block of wood on the frame post. See Diagram 81.

3. Carefully lower the machine onto the block of wood without crushing it.

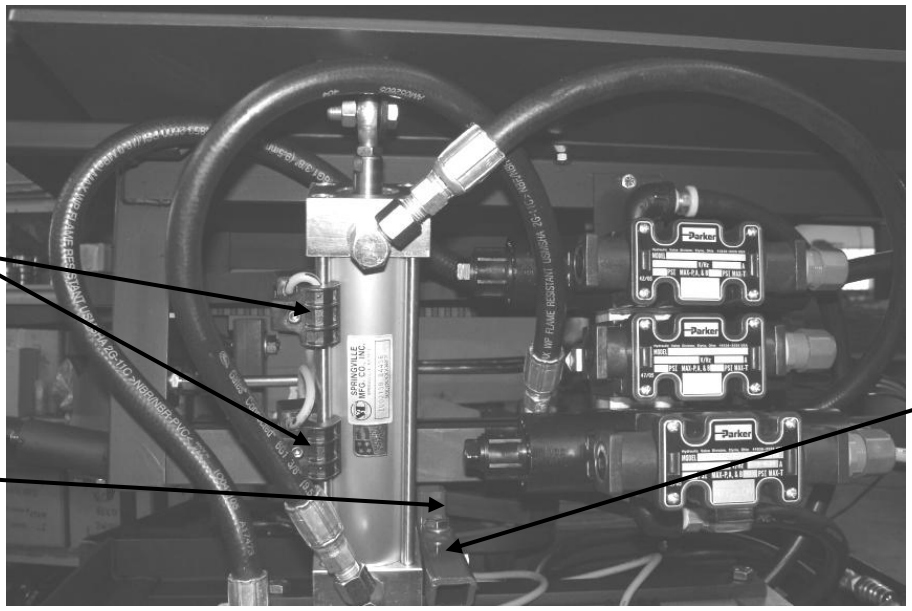


Diagram 81

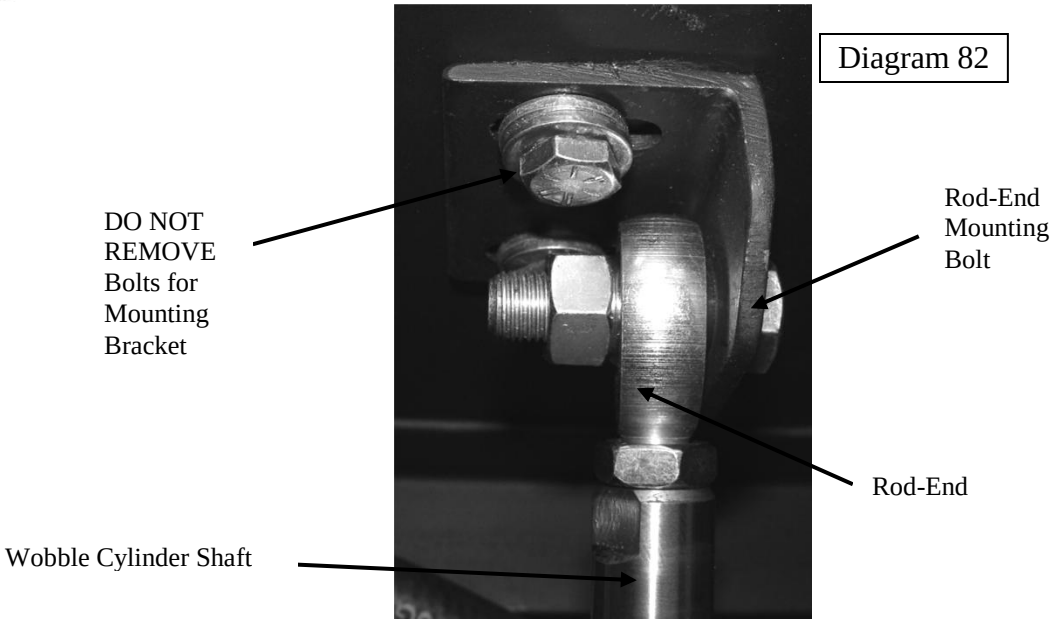
Wobble Cylinder

4. STAND BEHIND THE PAT-TRAP® MACHINE RELEASE THE THROW ARM AND TURN OFF THE MACHINE. THE TRAP MACHINE MUST BE TURNED OFF AND THE SPRING RELEASED BEFORE ENTERING THE TRAP HOUSE. NEVER ATTEMPT TO MAKE ANY ADJUSTMENT WHEN THE THROW ARM IS COCKED.

5. Disconnect the PAT-TRAP® from its power source.

6. Remove Wobble Up and Down limit switches from the cylinder tie rods with a 9/64" hex wrench. See Diagram 81.

7. Remove the cylinder rod-end mounting bolt using two 9/16"open-end wrenches. See Diagram 82.

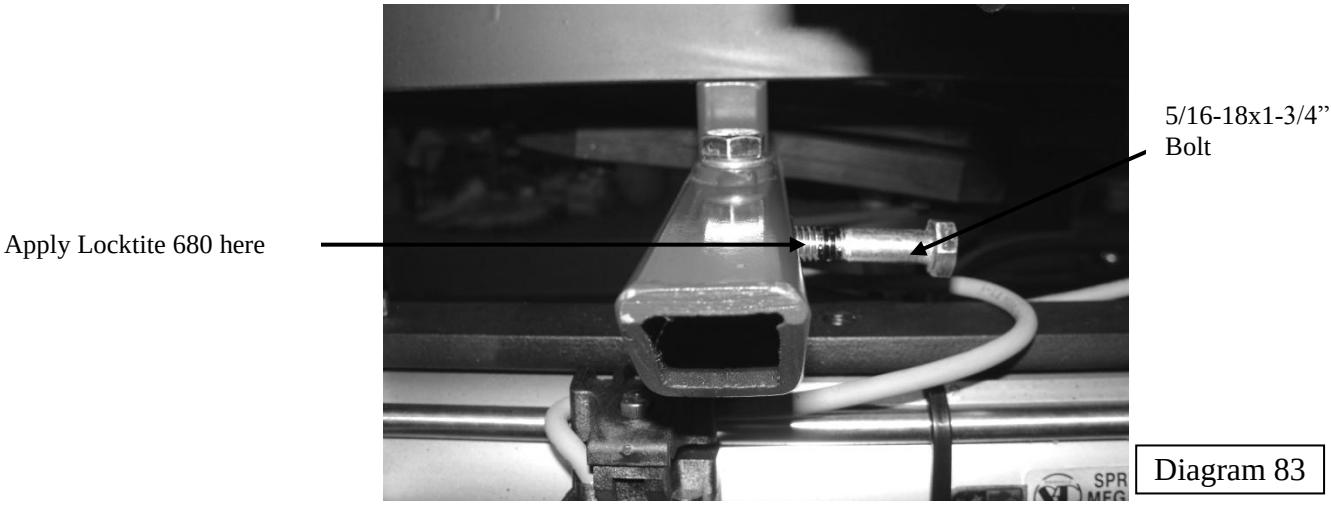


Rod End to Mount Wobble Cylinder to PAT-TRAP®

8. Remove the hydraulic hoses that connect to the short adapters. Use the 5/8" and 11/16" open-end wrenches to perform this task.

9. Remove the bottom mounting bolt located on the bottom of the Wobble Cylinder using a ½" wrench. See Diagram 81.

10. When putting on the new Wobble cylinder, first apply a small quantity of Locktite 680 to the last threads of the #5/16-18 x 1-3/4" bottom mounting bolt as shown in Diagram 82.



Bolt for to Mount Wobble Cylinder

11. Replace the cylinder rod-end mounting bolt using two 9/16" open-end wrenches. Diagram 82.

12. Remove 1" thick block of wood from frame post.

13. Make sure that the cylinder rod-end mounting bolt is tight (torque to 25-30 ft-lbs).

14. Replace the field angle limit switch to the Wobble cylinder tie rods with the 9/64" hex wrench. Do not over-tighten the plastic switch bracket clamp because it WILL break.

15. Connect the hoses. When tightening, make sure that the hoses are positioned as shown in Diagram 81. This is done so that the hoses won't rub against the machine when at the extreme up, down, left, and right angle limits.

16. After installing the new Wobble cylinder, turn on the machine.

17. Put the Auto/Manual switch into the manual position. Push the UP button and run the cylinder rod to the end. Remove the wooden block.

18. Push the DOWN button and run the cylinder rod to the end. Now the air is out of the cylinder.

19. Check the oil level within the hydraulic pump reservoir and add 5W-20 oil as required.

20. Move the Wobble cylinder back to center (between limit switches) and begin normal operation.