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Section 8: Servicing

Manually Raising or Lowering Setting Table

1. Turn off the main power switch on the Nexgen Controller and disconnect the incoming 3 phase power.

2. Remove all pins from the pin deck.

CAUTION: Never remove the V-belt with table in highest position <u>or</u> in a partially lowered position. The setting table uses the motor brake and V-belt for position holding. Table will fall to lowest position if belt is removed.

3. *Firmly grip* the top of the large table V-belt pulley. Refer to *Figure 8-1*.

(1) V-BELT
(2) LIFT MOTOR BEFORE ROTATING PULLEY

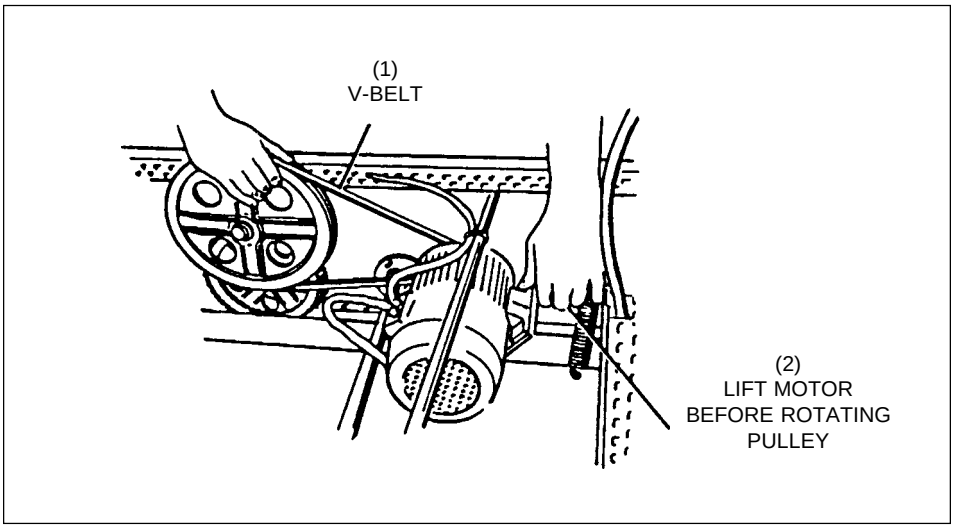

Figure 8-1. Manually Raising or Lowering the Setting Table.

4. Before rotating the pulley, use your other hand to lift the motor while carefully rotating the pulley. Watch the V-belt in the motor pulley. The belt must stay seated in both pulleys. DO NOT RELEASE PULLEY GRIP.

5. *Lower the motor* so it brakes the table drive shaft *before* releasing the pulley grip.

6. Repeat this procedure until the desired height is obtained.

Changing Setting Table V-Belt

1. Turn the stop/run switch on the Nexgen Controller to the stop position.

2. Manually lower the setting table to the new pin setting position. See previous page.

NOTE: *As an alternative, lower the table onto a jack-stand.*

3. Change the V-belt.

Setting Table Assembly Removal

1. Place three 914 mm (3') long 1 x 4 spacers on the pin deck positioned so the deck will be supported front and back. Refer to *Figure 8-2*.

(1) 914 MM LONG SPACER
(2) SETTING TABLE

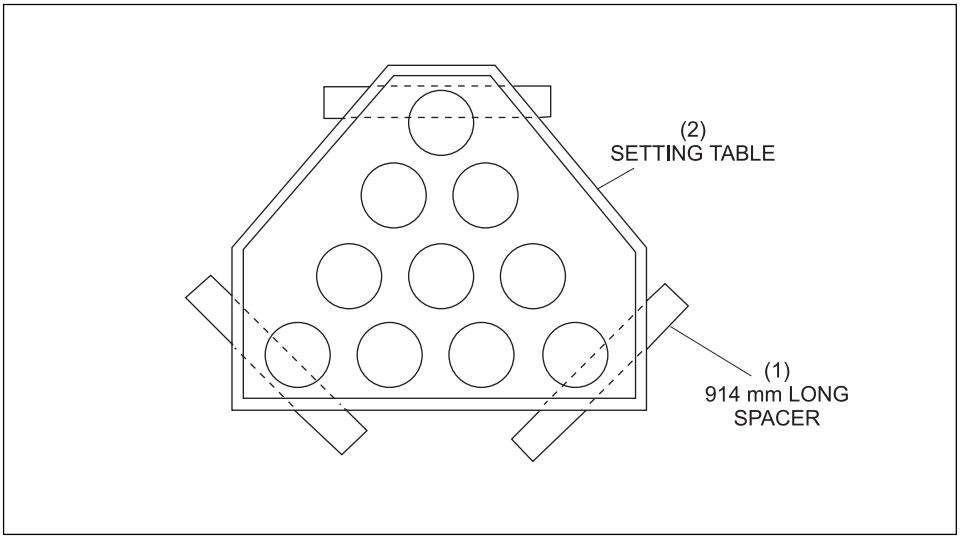

Figure 8-2. Placing Spacers.

2. Manually lower the setting table assembly so it is supported by the spacers. Refer to *Figures 8-1* and *8-2.*

3. Turn the main power switch at the Nexgen Controller and remove the input power cable from the box.

4. Disconnect the setting table electrical cable.

5. Disconnect the square shaft assemblies from the setting table. Refer to *Figure 8-3*.

6. Remove the four upper 24 mm nuts that secure the table to the deck rack tubes. Refer to *Figure 8-3*.

(1) 24 MM NUTS
(2) DECK RACK TUBE
(3) SETTING TABLE STUDS

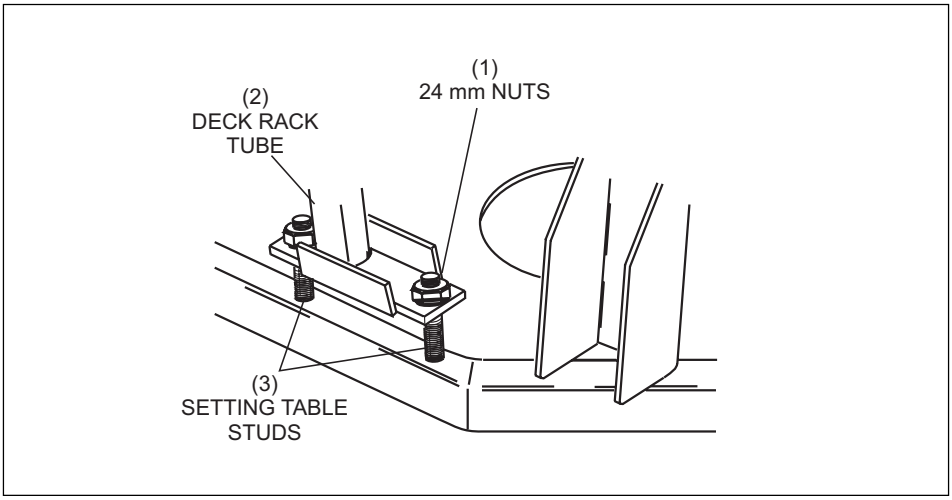

Figure 8-3. Removing Table from Deck Rack Tubes.

NOTE: *If the lower nuts are not moved, it makes leveling the reinstalled deck easier.*

7. Manually rotate the setting table motor pulley to raise the deck rack tubes. Manually lift the sweep to the up position. Refer to *Figure 8-1*.

8. Remove the setting table assembly from the pin deck area.

9. Perform the necessary maintenance or repair.

10. To reinstall, reverse the removal procedure.

Clearing Pins Jammed in Distributor

1. Turn the stop/run switch on the Nexgen Controller box to the stop position. Also, turn off the rear mechanic's on/off switch. If possible, turn off the main power switch on the Nexgen Controller box and remove the incoming 3 phase power.

2. Check for pins jammed at track ejector points. Check for pins jammed at belt turning points. Remove the jammed pins and place them on the outside return belt track.

3. Check the pin ejector assemblies for proper positions.

4. Continuous jams require checking the pin station assemblies for broken parts. Check pin release levers.

5. Apply power to the pinsetter.

6. Check pinsetter operation.

Stopping Machine in Mid-Cycle

A machine may be stopped in mid-cycle by turning the stop/run switch on top of the Nexgen Controller box to the stop position. If internal service work is to be performed, turn off the main power switch and disconnect the incoming 3 phase power.

NOTE: *Removing the incoming 3 phase power will disable both pinsetters. Upon completion of work, reconnect the 3 phase power, turn the High Voltage main power switch on, and turn the stop/run switch to the run position. The machine will return to the "ready to bowl" position.*

Round Belt Repair and Replacement

The GS Certified Pre-Owned pinsetter uses green polycord belts of various lengths to move pins through the transport band, elevator and distributor. These belts can stretch, become loose and slip on their pulleys. They can also crack and break as a result of a normal aging process.

If the belt stretches and becomes loose, a section of the belt may be cut out and it can be rewelded to the proper length. The belt is 12 mm in diameter when new. Once the belt has stretched, cut, and rewelded several times, its diameter will be reduced. This will decrease its gripping power and effectiveness in handling pins. Belts with a diameter under 10 mm or showing cracks should be replaced to keep this area reliably handling pins.

Welding Round Belts

1. *Figure 8-9* gives nominal lengths of all distributor belts. The dotted lines represent belts that are not factory installed.

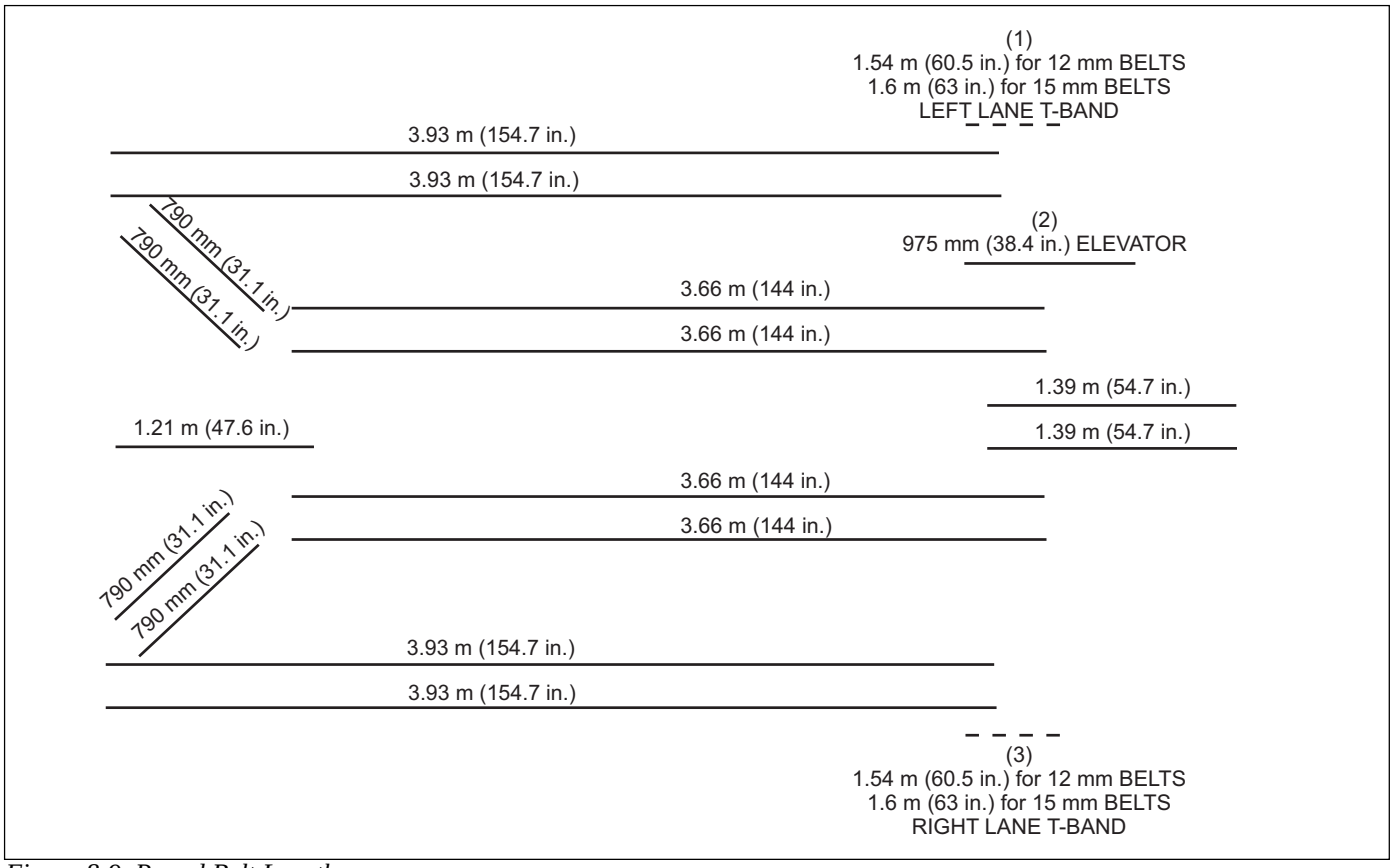

Figure 8-9. Round Belt Lengths.

(1) 1.54 M (60.5 IN.) FOR 12 MM BELTS
1.6 M (63 IN.) FOR 15 MM BELTS
LEFT LANE TRANSPORT BAND

(2) 975 MM (38.4 IN.) ELEVATOR

(3) 1.54 M (60.5 IN.) FOR 12 MM BELTS
1.6 M (63 IN.) FOR 15 MM BELTS
RIGHT LANE TRANSPORT BAND

2. Cut off both ends of the belt neatly and vertical to the belt axis with the belt cutter found in your belt welding kit.

3. Pull the belt around the shaft the pulleys are mounted on.

4. Place each belt end in the belt holder so they are *slightly* pressed together. Refer to *Figure 8-10*.

5. Push the soldering iron blade between them and heat the belt.

NOTE: *Both ends of the belt must be on the same axis on both sides of the blade.*

6. As soon as the belt begins to melt, tighten the knurling screws of the holder slightly.

7. When a pad of melted polycord has formed, withdraw the soldering iron. Refer to *Figure 8-10*.

8. Tighten the knurling screws.

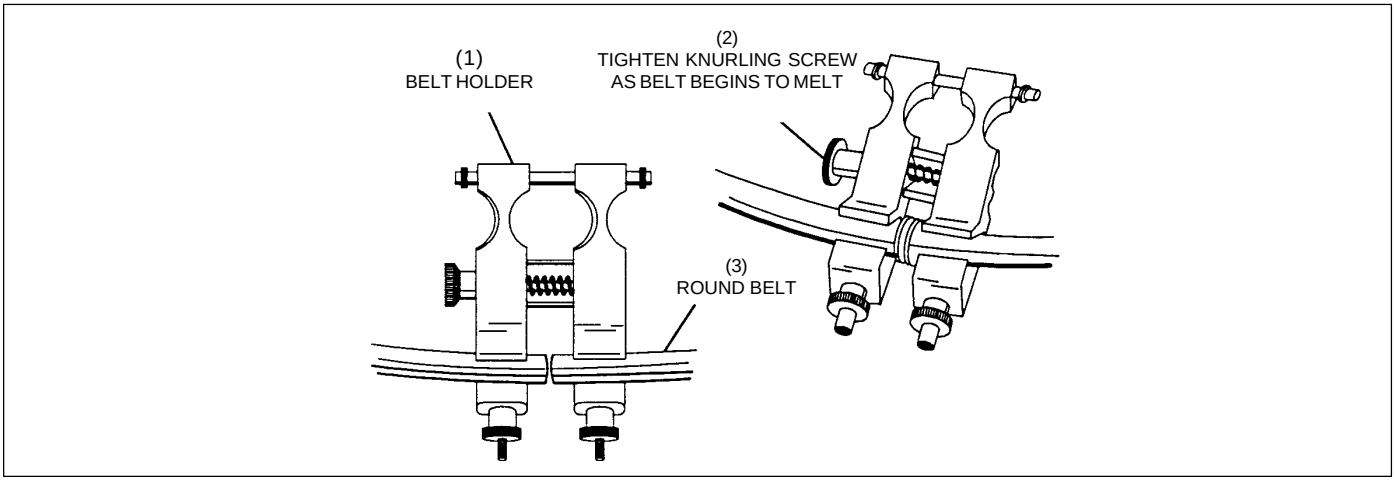

Figure 8-10. Welding Round Belts.

(1) BELT HOLDER

(2) TIGHTEN KNURLING SCREW AS BELT BEGINS TO MELT

(3) ROUND BELT

NOTE: *DO NOT OVERTIGHTEN. The melted polycord will be pushed out and the cold polycord left in the center will not form a weld.*

9. Allow to cool for approximately two minutes.

10. Trim the bead from around the belt with a sharp knife or single edge razor blade.

11. Wait another 5-10 minutes.

12. Install the belt onto the pulleys.

Changing Spotting Tongs

If a spotting tong becomes damaged and needs to be removed for repair, use the following instructions.

1. Turn the stop/run switch on the pinsetter electrical box and the mechanic's rear control box to the stop position to prevent anyone else from starting the pinsetter while you are servicing the machine. (Disconnect main power to the pinsetter if you will be leaving the machine unattended.)

2. Turn on the Pin Light using the bypass switch or Nexgen Controller Keypad to provide light if needed.

3. Manually lower the setting table onto a jack stand or other suitable support.

NOTE: *If suspending the setting table on the stroke limiter plate, it must still be supported by a jack stand or some means of support to prevent the table from dropping if the stroke limiter is bumped or slips.*

4. Turn the spotting tong square shaft until the spotting tongs are completely closed . The "ST" switch should be open and the closed stop should be against the stop block. Refer to *Figure 8-11*.

(1) CLOSED STOP
(2) OPEN STOP
(3) GEAR RACK
(4) OPEN ST SWITCH
(5) RIGHT-HAND SQUARE SHAFT
(6) STOP BLOCK

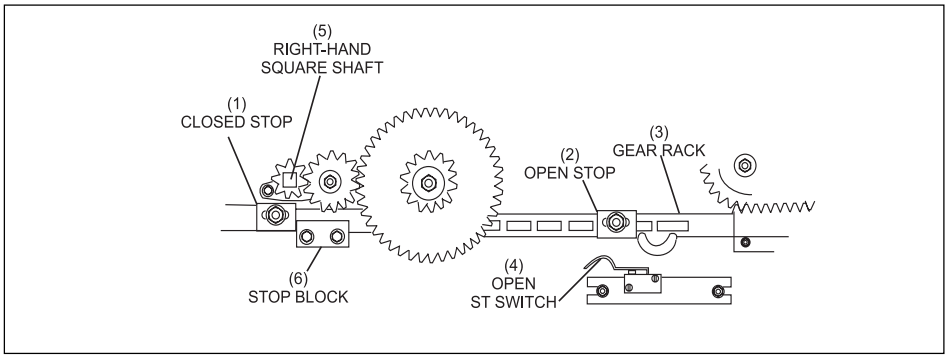

Figure 8-11. Spotting Tongs Open.

5. Remove the hardware holding the spotting tongs to the setting table. Retain the hardware for use during reassembly.

NOTE: *To keep the tongs timed properly, it is advisable to only remove one set of tongs at a time.*

6. Select the correct type depending on the position of the tongs in the table. Refer to *Figure 8-12*.

(1) SPOTTING TONGS PIN STATIONS 1, 4, 5, AND 6
(2) SPOTTING TONGS PIN STATIONS 2, 3, 7, 8, 9, AND 10

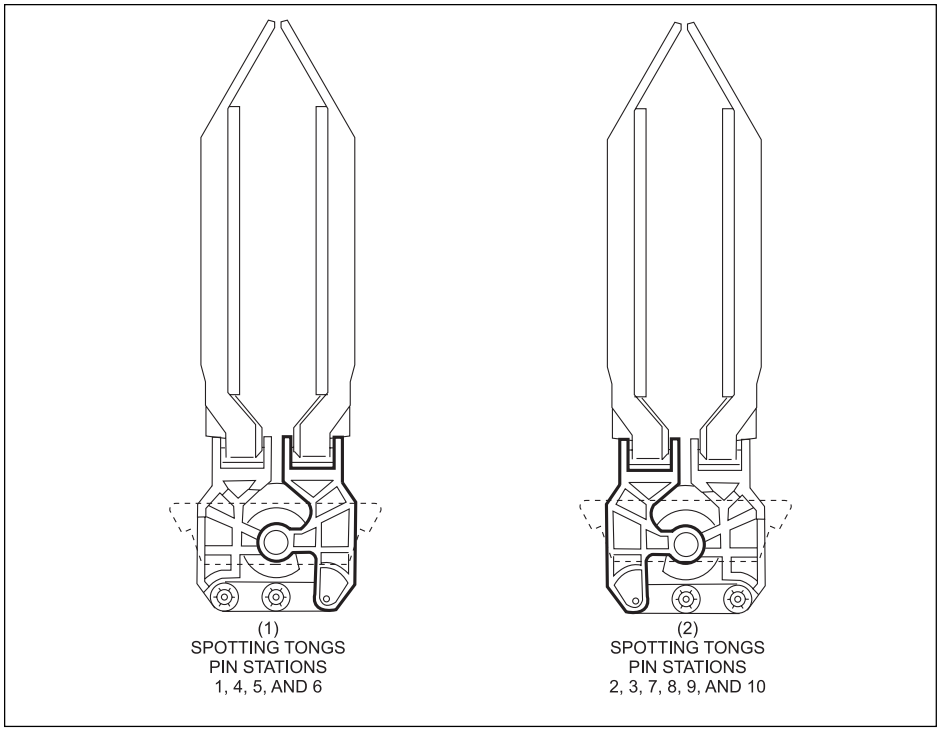

Figure 8-12. Spotting Tongs.

7. Turn the gear on the bottom of the spotting tong assembly until the tongs are completely closed. Refer to *Figure 8-13*.

(1) TURN GEAR TO CLOSE TONGS

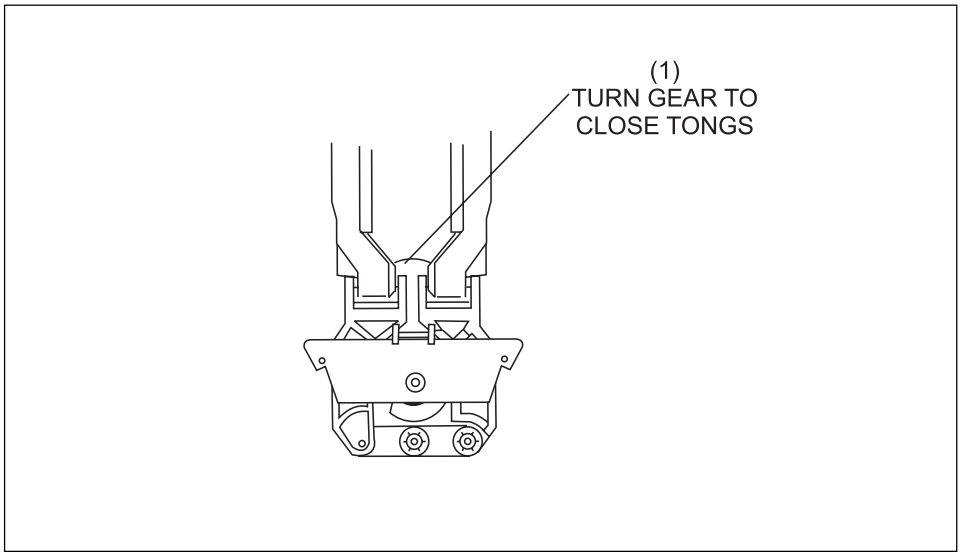

Figure 8-13. Spotting Tongs Completely Closed.

8. Place the closed spotting tongs on the setting table so the gears mesh. Reinstall the mounting hardware through the cover plate and the mounting holes.

9. Manually rotate the square shaft to open and reclose the tongs to check for proper movement.

Spotting Tong Clutch And Shaft Removal Procedure

NOTE: *Disconnect incoming power to the Nexgen Controller box before proceeding with the removal of the spotting tong clutch and shaft.*

1. When removing the spotting tong clutch and shaft, loosen the 3 mm allen head set screw which secures the clutch shaft gear to the shaft and slide it toward the spotting tong clutch. *Figure 8-14*.

2. Remove the Torx screws which hold the flange to the switch cluster assembly.

(1) CLUTCH SHAFT GEAR
(2) SPINDLE FLANGE
(3) TORX SCREWS
(4) SWITCH CLUSTER ASSEMBLY
(5) SET SCREWS

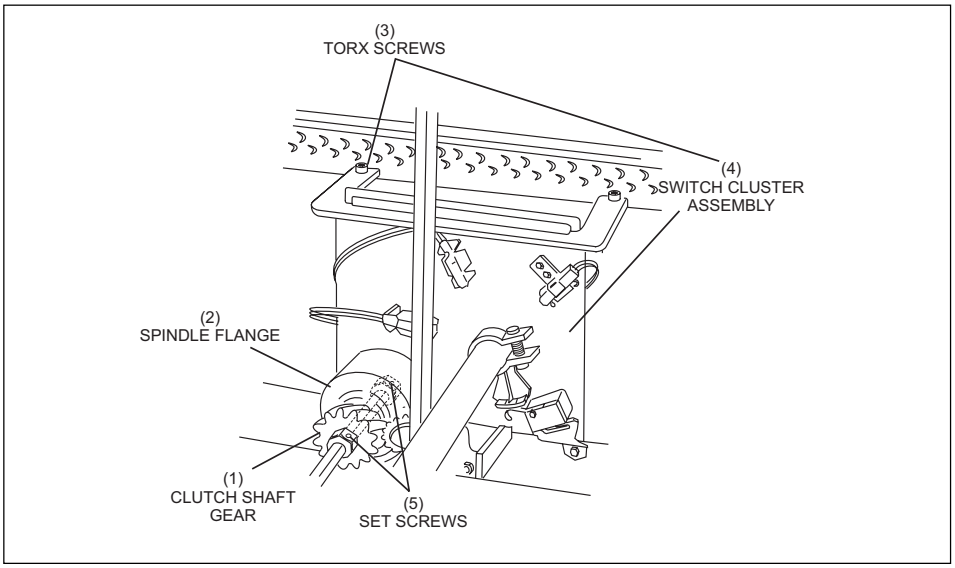

Figure 8-14. Remove Hardware.

3. Slide the shaft out of the spotting tong solenoid and remove it from the pinsetter.

4. Disassemble the clutch assembly by compressing the clutch spring with the spring tightener and rotating the spring tightener to the open slot. By doing so, the clutch assembly can then be disassembled.

5. Clean all the components with a water based cleaner and a dry towel. When reassembling the clutch, position the shiny sides of the two clutch discs to contact the clutch gear. *Figure 8-15*.

6. Compress the clutch spring to the original notch position.

(1) SPINDLE SHAFT
(2) CLUTCH DISCS
(3) 3 NOTCHES USED FOR ADJUSTING
(4) SAFETY CLUTCH
(5) CLUTCH GEAR

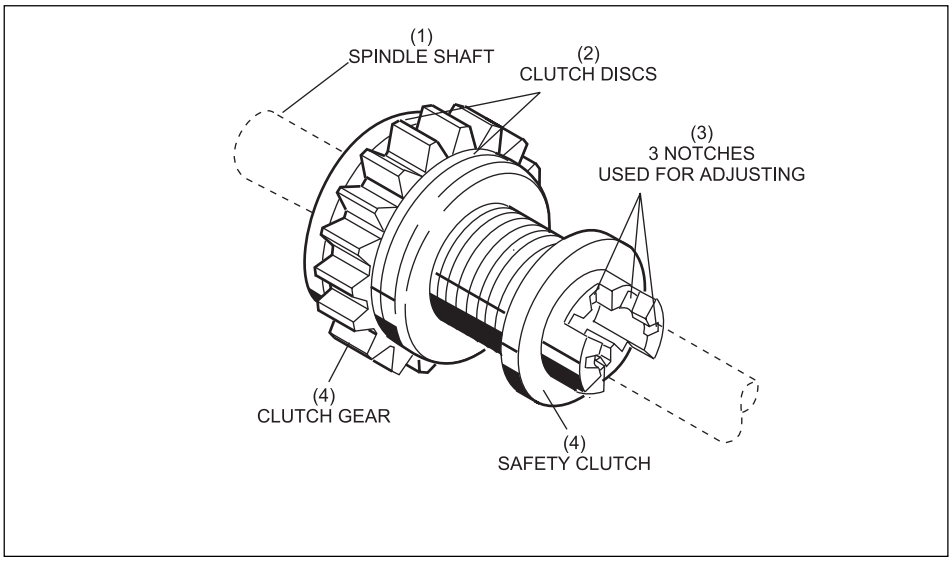

Figure 8-15. Reassembling Clutch.

Spotting Tong Clutch and Shaft Reinstallation

1. Reinstall the spotting tong clutch and shaft, reversing the removal procedure. One millimeter (1 mm) of side play in the shaft should exist when it is reinstalled to prevent binding in the assembly.

2. To increase the side play, hold the clutch shaft gear and move the shaft toward the switch cluster. To decrease the side play, move the shaft toward the spotting tong clutch. Lock the set screw and verify 1 mm of side play exists.

3. Make the second half of Adjustment 26.

4. Operate the pinsetter to verify the spotting tong clutch is operating correctly.

Changing Motors

The GS Certified Pre-Owned Pinsetter uses three different motors. If a motor has to be changed, use the following guidelines.

Motor Removal

1. Turn the stop/run switch on the Nexgen box to the stop position. Turn off the main power switch and disconnect the incoming 3 phase power.

2. Unplug the motor from the Nexgen box.

3. Table Motor - if the motor being changed is the table motor, manually lower the table onto a jack stand or all the way down to the new pin setting height. The table chain and crank arm should be in a straight line. Do not lower the table onto the stroke limiter plate; bumping or vibrating the pinsetter may cause it to slip and damage the pinsetter or cause serious injury to the person working on the machine.

4. Lift up against the belt tension spring and remove the "V" belt from the pulley.

5. Remove motor support bracket from the left drive frame and lift the motor out of the pinsetter.

6. Remove the motor wire cover plate and disconnect the four wires attached to the terminal block and ground screw.

Motor Pulley

The sweep motor pulleys is the same for 50 and 60 cycle. Using the wrong side can result in pin handling problems in the distributor and lowering the table too fast and causing pinfall errors and excessive wear on the stroke limiter assembly and setting table.

(1) 60 CYCLE SIDE
(2) 50 CYCLE SIDE

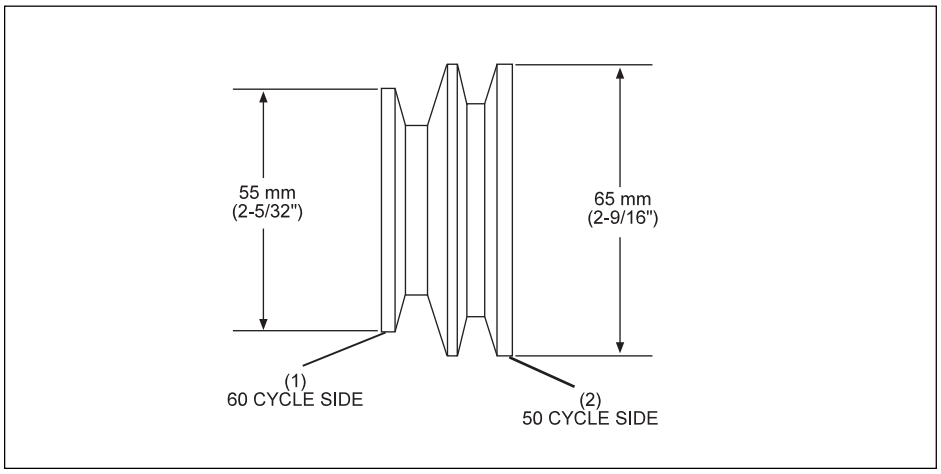

Figure 8-16. Dual Pulley.

7. Loosen the pulley's set screw with a 3 mm Allen wrench (hex key).

8. Use a gear puller to slide the pulley off the shaft. Save the key for use during installation.

Motor Pulley and Motor Installation

1. Make certain the key is properly seated in the motor shaft.

2. Tap the pulley onto the shaft with a soft faced hammer.

NOTE: *Some distributor and table motors have a dual pulley. The smaller side (55 mm) is for use when the pinsetter is powered by a 60 cycle (60 hz) supply. The larger size (65 mm) is used when the power supplied is 50 cycles (50 hz). Refer to* Figure 8-16.

3. Align the pulley so that the “V” belt will ride in the center of the motor pulley and the large drive pulley.

4. Tighten the set screw to prevent the pulley from moving out of position.

5. Remove the motor wire cover plate of the new motor.

6. Wire the motor for proper voltage input, IE 208, 230, 380.

7. Install the motor onto the pinsetter and wire it for proper voltage. Verify that the wiring straps and Brake PCB (if applicable) are properly attached. Refer to Figures 8-17 and 8-18.

(1) TABLE AND SWEEP MOTOR WIRING FOR 208 TO 230 VOLTS
(2) MOTOR CABLE FROM NEXGEN BOX
(3) GROUND
(4) BRAKE PCB
(5) BRAKE
(6) WIRING STRAPS
(7) MOTOR WIRING BLOCK
(8) GROUND CONNECTION
(9) DISTRIBUTOR MOTOR WIRING FOR 208 TO 230 VOLTS
(10) TABLE AND SWEEP MOTOR WIRING FOR 380 VOLTS
(11) DISTRIBUTOR MOTOR WIRING FOR 380 VOLTS

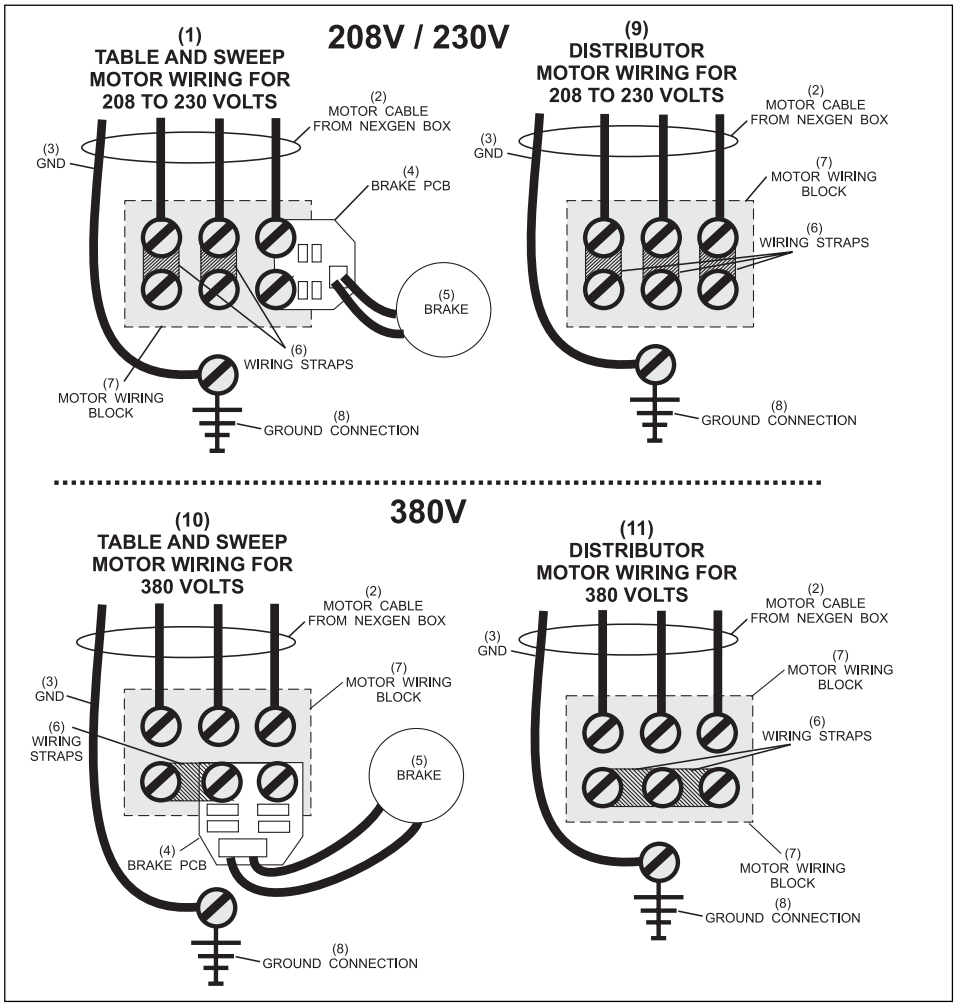

Figure 8-17. Table, Sweep and Distributor Motor Wiring.

(1) MOTOR CABLE FROM NEXGEN BOX
(2) ACCELERATOR MOTOR
(3) TO AUTOMATIC SCORER CABLE
(4) WIRING STRAPS
(5) GROUND
(6) JUNCTION BOX

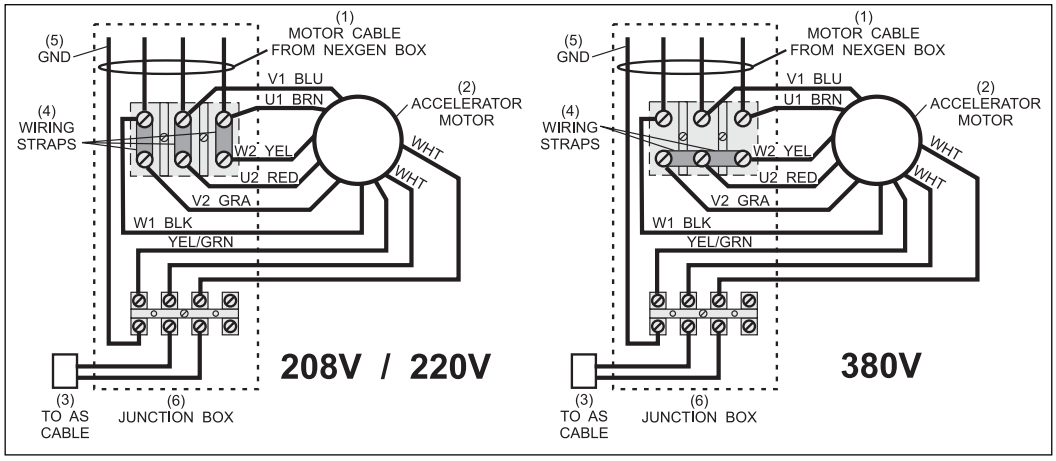

Figure 8-18. Accelerator Motor Wiring.

8. Turn the pinsetter on briefly and watch the rotation of the motor for proper direction as noted*.

* Table Motor - Watch the table cam. It should leave the “A” switch and go to the “B” switch when making a detection stroke.

* Sweep Motor - Watch the cam on the crank arm on the right side of the pinsetter. It must leave the “SM” switch in the “3 o’clock” position and go toward the “12 o’clock” position (counter clockwise).

* Distributor Motor - Watch the green pin handling belts. Make sure they move the pins through the distributor in the proper direction. Running in a reverse direction can cause a shovel jam in the elevator.

* Accelerator Motor - Check that the large belt will propel the ball forward.

If a motor is running backward, swap any two of the three supply wires from the Nexgen box at the motor terminal block. . This will reverse the direction of the motor shaft.

WARNING: Never swap the ground (earth) wire with one of the supply wires.

Motor Brake Replacement

The electric motor brake has a coil which disengages the brake when power is applied to the motor and the brake. When the power is turned off, the brake grips the motor shaft. This prevents coasting and stops the motor and holds what it operates (the table or sweep) in that position until power is applied again.

If the brake fails to release the motor shaft or allows coasting, it may be necessary to change the break as follows:

1. Turn off the pinsetter at the Nexgen Control box.
2. Unplug the motor from the Nexgen Control box.
3. Remove the motor from the pinsetter. Refer to the Motor Replacement section of this manual.
4. Remove the brake wiring terminal cover and disconnect the two wires for the brake coil. Refer to *Figure 8-20*.

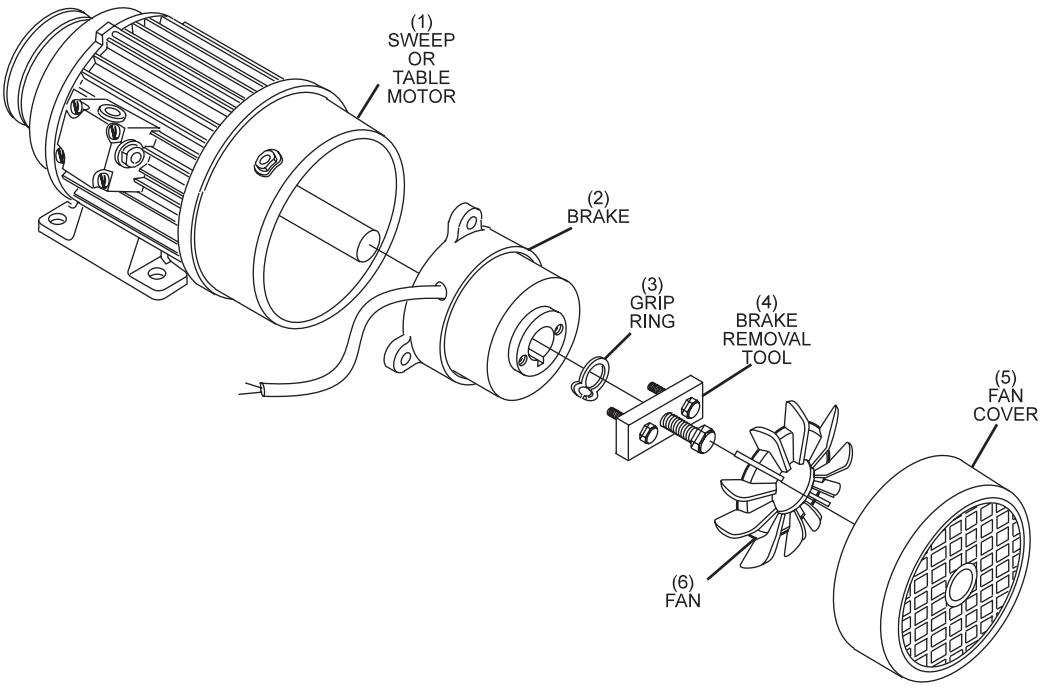

Figure 8-20. Motor Brake Replacement

(1) SWEEP OR TABLE MOTOR
(2) BRAKE
(3) GRIP RING
(4) BRAKE REMOVAL TOOL
(5) FAN COVER
(6) FAN

5. Remove the three fan cover screws and the fan cover.

6. Gently pry off the plastic fan. (Use two medium size screw drivers to apply even pressure to both sides.)

7. Remove the three mounting screws that hold the brake housing onto the motor.

8. Remove the large grip ring on the shaft with a strong pair of snap ring pliers. Caution, wear safety glasses for this operation.

9. Attach the brake removal tool which can be purchased from Brunswick. Consult the Drive Frame section of your Service Parts Catalog. Refer to *Figure 8-20*.

10. Tighten the large center bolt of the brake removal tool to pull the brake off the motor shaft.

11. Install the new brake using a soft face (plastic) hammer to avoid damaging the brake and motor shaft.

12. Start with step “8” and work back to “1” to complete the installation of the new brake.

Chain Repair or Replacement

The elevator, table lift, sweep lift and motor shaft chains may need repair or replacement. Brunswick offers a repair kit to assist you in the repair of your chain. Consult the Elevator section of your Brunswick Service Parts catalog for ordering this kit.

The elevator chains are different than the other chains. These chains have longer pins that fit into the end of the pit shovel shaft. When repairing or replacing these chains, it is necessary to keep the pins on both chains running evenly to allow the shovels to lift the pin shovel horizontally.

Chain Repair

1. Remove the chain from the pinsetter.

2. Install the chain repair tool in a vise as illustrated in *Figure 8-21*.

3. Place the pin of the link you wish to place over the bottom hole in the repair tool. Tighten the repair tool to push out through the bottom hole.

(1) CHAIN REPAIR TOOL
(2) BENCH VISE

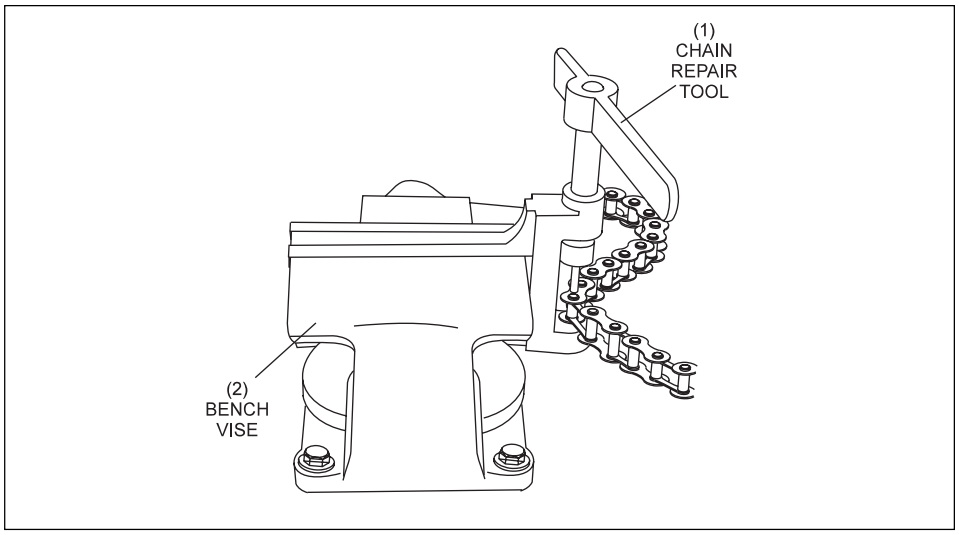

Figure 8-21. Chain Repair Using Vice.

4. Repeat this procedure on the other end of the links to be replaced.

5. Install a master link between the new and old section of chains.

6. Place the cap on both pins of the master link. Refer to *Figure 8-22*.

7. Slide the clip-on spring over the cap and into the notches until both pins are securely locked.

(1) CLIP-ON SPRING
(2) CAP
(3) MASTER LINK

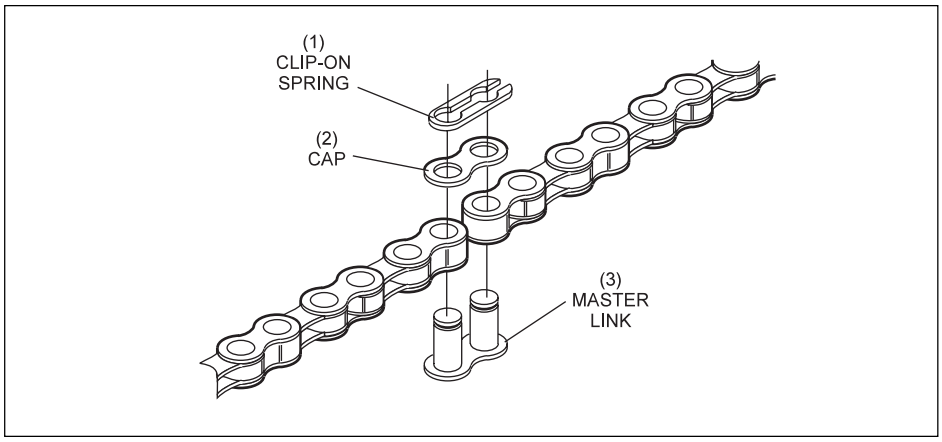

Figure 8-22. Chain Repair.

Chain Replacement

If you are installing a new chain, use a master link to connect both ends of the chain. Use steps 5, 6 and 7 of the Chain Repair procedure.

Adjust the chain for the proper tension or adjustment using the adjustment section of this manual.