

Fantasy Springs Pinspotter Training

24 Lanes, Indio, CA

Day 1 – Monday, November 7, 2016 – We started early (6 AM) due to a full house of leagues later in the morning and afternoon, and began with Distributors. This center has replaced several X-Frame Yokes lately. We investigated the possible causes of this unusual situation, where X-Frames are breaking. Generally, this is caused by either poor Shuttling and/or poor Pin Feeding by Distributors. We checked all of the Shuttle Rods and ALMOST ALL rods are coming unscrewed. The Shuttle Rods are comprised of TWO rods that are screwed into each other. ALL are coming unscrewed, and losing the tension of the shuttle rod spring that is returning the shuttle during the shuttling process, to prohibit a second pin from being allowed through the shuttle. Also, we found that the Distributors were ALL way out of adjustment. We focused on the Distributors today. We went through all distributor adjustments on 6 lanes. I showed the students how to do it and what to look for on lane 24, and then they did 5 more lanes and I checked their work. 1. Squeezing Orienter Pans to 5 ½" opening (all are too wide), 2. adjusting distributor height over Bins (most are either too high or too low), 3. raising the support under the distributor belt at the O-Pan (all were too low), 4. Leveling the O-Pan, 5. dismantling the entire clutch assembly completely, and cleaning, lubing, and reassembling (all were dirty), 6. adjusting the Nylon Rollers to make the Carriage Tube parallel with the trip rod.



We found that ALMOST ALL the nylon rollers were out of adjustment. 7. We squeezed all of the Indexing Fingers together to 3", since all were too wide.



8. We then adjusted the pans to $\frac{1}{4}$ " away from the Elevators, 9. Centered the Distributors with the Safety Link, 10. adjusted the Pin Seating Rod, and 11. adjusted the Kidney (pin guide) both up/down and 12. clockwise/counter-clockwise, for perfect orientation. Again, almost all of these 12 adjustments were not adjusted properly on all lanes we checked. It is no wonder that the center is having Pin Jams and pins-in-table issues, that are breaking table components. The students did the last three distributors that got adjusted today COMPLETELY ON THEIR OWN, and I checked behind them. They did GREAT! I am confident that they can adjust the rest of the Distributors in this center by themselves after I leave, so tomorrow we will move on to Sweeps and Tables.

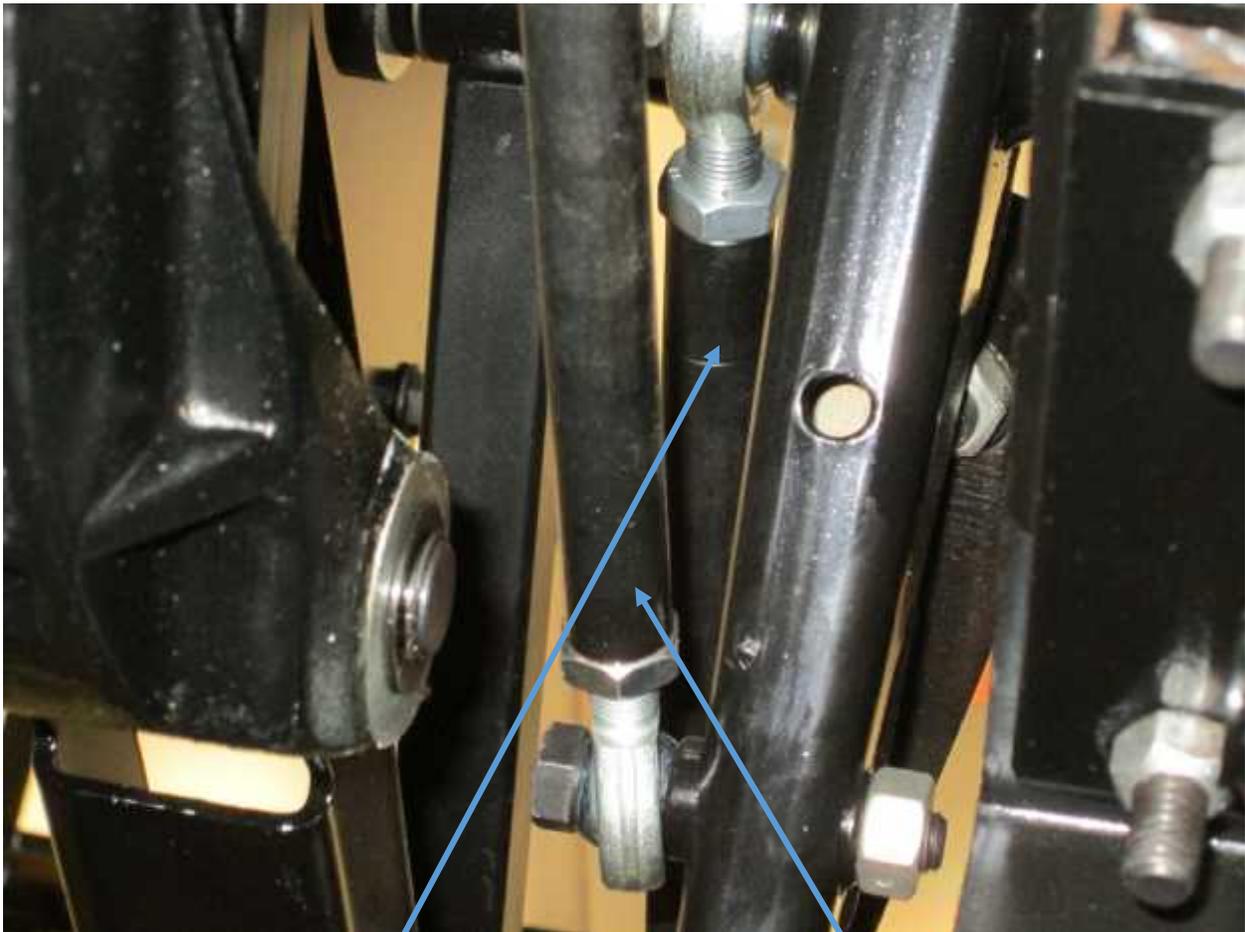
Day 2 – Tuesday, November 8, 2016 – Today we trained on Sweeps. I sent the printed copy of the exact procedure for Sweeps, Tables, Distributors, and Light Ball Sensors to all the students that I have email addresses for.

Pinspotter Training

Sweeps

Step 1 – Loosen the 6 jam nuts (2 each) on each of the 3 sweep rods.

View from pindeck – looking up:

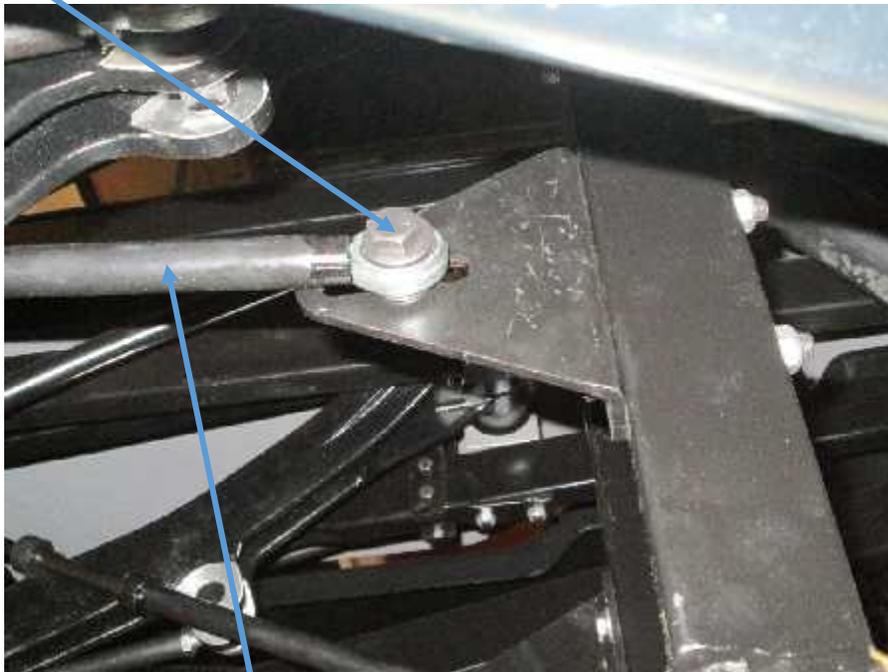


2 Jam nuts on the short travel rod and 2 each on the two long rods (7 pin side long rod not shown)

Step 2 – Crank the sweep motor Counter-Clockwise to perfect GUARD position (all the way DOWN and all the way OUT). Set the larger ends of the sweep gauge blocks under the sweep near outer edges of the lane.



Loosen the bolt through the SLOT in the Triangular plate.



Hold the bolt and Telescoping Rod forward and tighten to set guard sweep height at the size of the gauge.

Step 3 – Crank to 4-5-6 row and move the triangle plate UP or Down... (plate down = Sweep up, plate up = Sweep down)



to achieve the gap represented by the SMALL side of Sweep Gauges as shown below.



Step 4 – Adjust the sweep left or right to CENTER over pindeck. Gaps from pindeck to sweep should be near equal on both sides.



Step 5 – Crank sweep to rearmost point and adjust the evenness of the travel by adjusting one of the Long rods.

Step 6 – Adjust the OVERALL travel with the SHORT sweep rod so that the sweep covers about 15% of the rear of the 7-8-9-10 spots when looking from Pindeck.



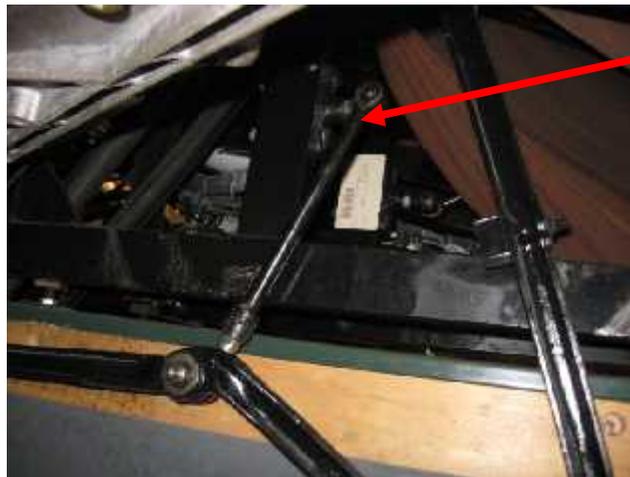
Step 7 – Crank/Run sweep back to HOME and tighten the 6 jam nuts loosened in Step 1. Run the sweep under power and adjust overall travel so the sweep travels rearward PAST the reference lines behind the 7 and 10 spots, BUT SHORT of the end of the Pindeck. Set all Guard positions for 1st and 2nd Guard and record positions in your manual.

Sweep (82-70 Style)

1. Loosen 4 long sweep rod jam nuts (2 on rod here and 2 on rod on the other side)



and the 2 short sweep rod jam nuts, (getting about 12-14 threads showing (total)- combining the threads showing on both sides of the long rods beyond the snug jam nuts, for equal "hang" position at zero degrees across the center) make sure that female half of telescoping tube is screwed-in tight against the



rod end or jam nut.



2. Adjust first guard height over lane with threaded link (to about 1.25" off lane),

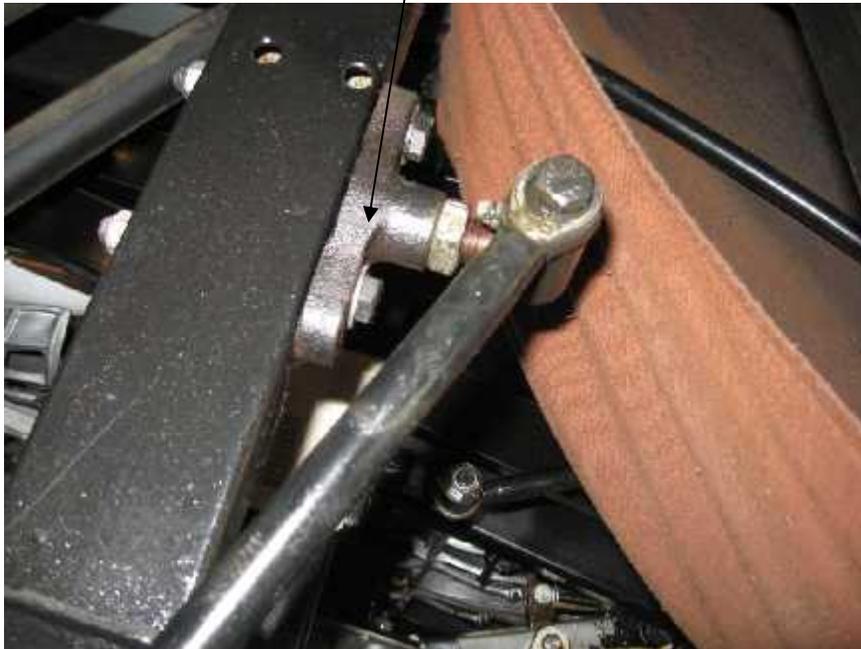


Turn the Threaded Link LONGER to raise the height at Guard Position, or make the Threaded Link SHORTER to LOWER the sweep height at Guard Position. Make sure that the Threaded Link is parallel to the lane after retightening.



3. Adjust 4-5-6 row height to

1/4" or so, with threaded link bracket up or down,





4. At rearmost position, adjust travel squareness with long sweep rods and overall travel with short sweep rod,
5. Check/readjust travel under power, 6. Tighten 6 jam nuts.

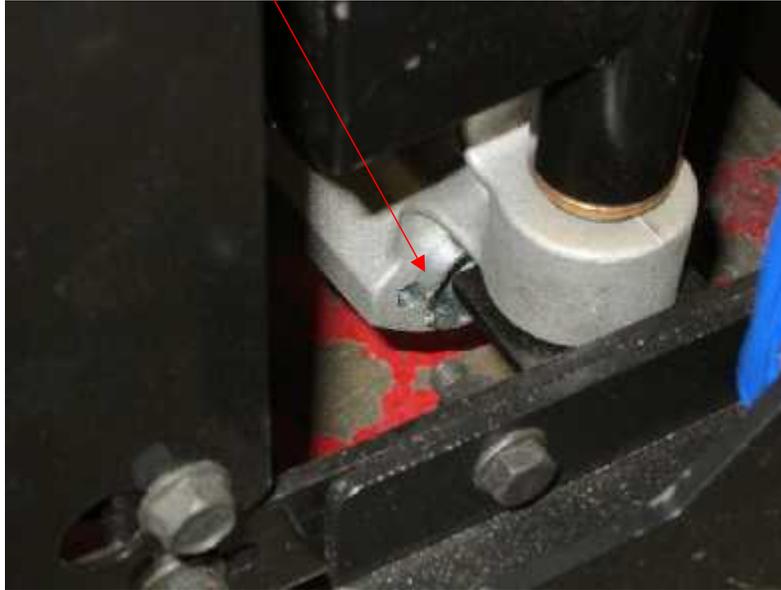
Light Ball Sensors

Step 1 – Install Light Ball Sensor unit CENTERED between the Kickbacks.

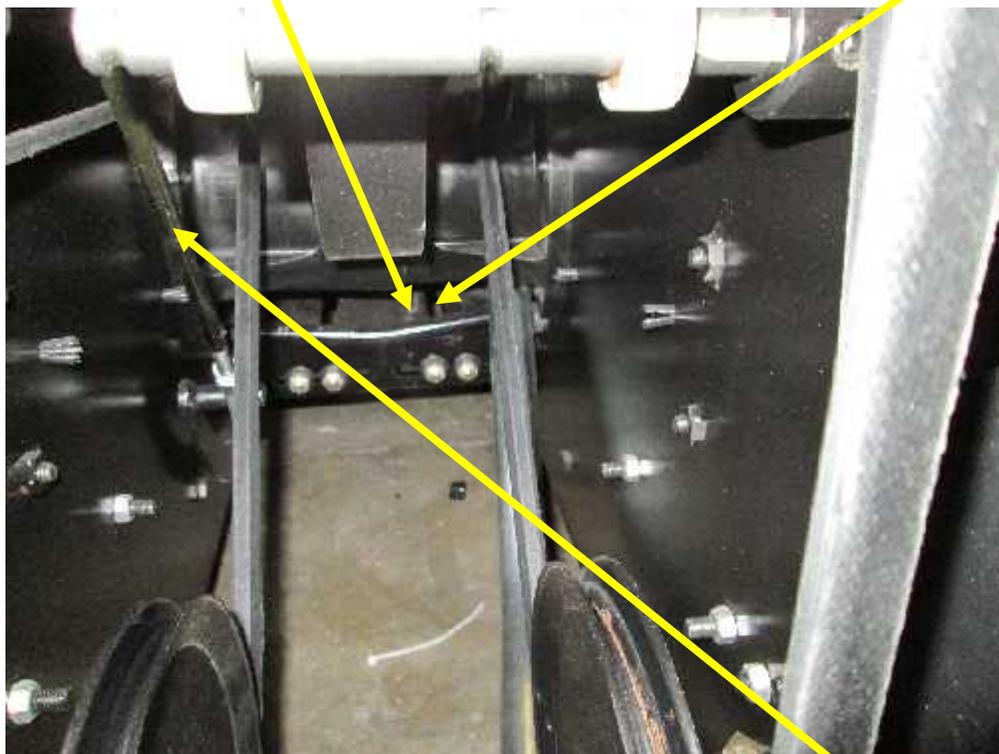


Be sure that the RUDDER ARM bisects the Rudder arm stop-bumper (Up and Down adjustment) Shim the Light Ball Sensor FRAME at the TOP two attaching bolts to RAISE the rudder arm or at the BOTTOM two frame attaching bolts to LOWER the rudder arm, so that the rudder arm BISECTS the rudder arm stop bumpers on a 45 degree angle.

Adjust the rudder arm IN OR OUT of it's housing to achieve a CENTERED PADDLE within the ball door opening.

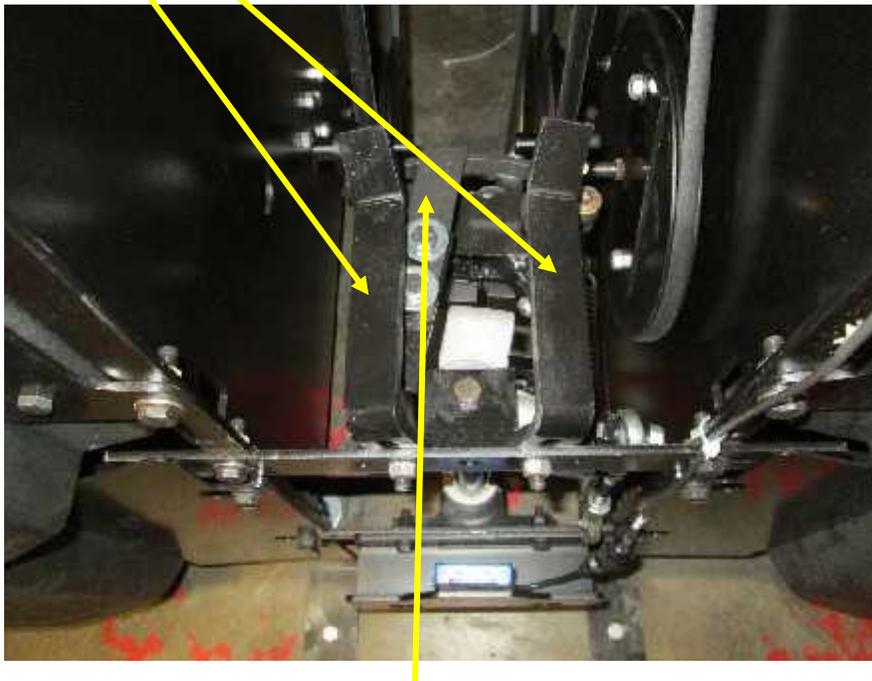


Be sure that the LIFTER height is about 1/8" above the ball door weldment:

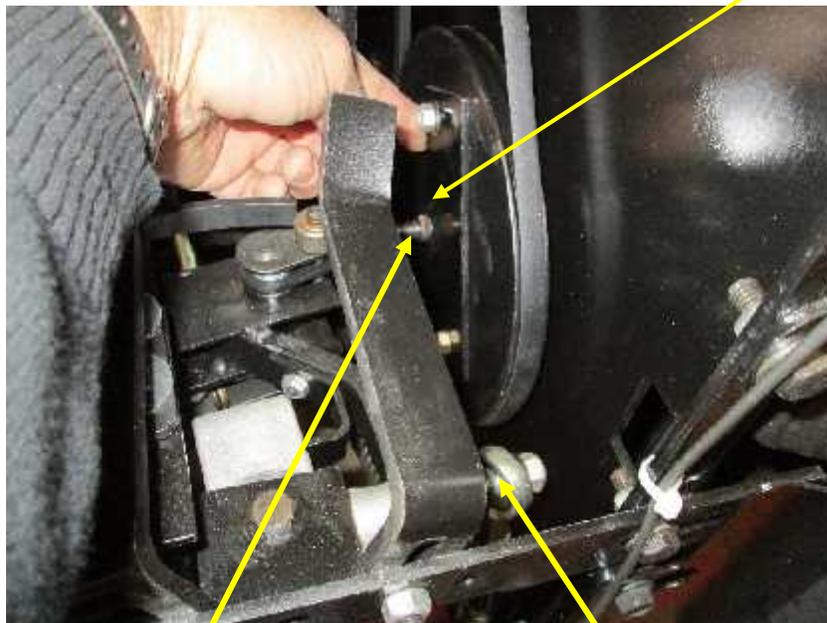


Adjust the LIFTER height by shortening or lengthening the LIFTER ROD.

Step 2 – Snug the RESET CAMS up and out of your way



Snug the POWER STROKE INDUCING ARC CAM forward and centered out of your way, and then make the RUDDER TRAVEL WIDENING/NARROWING ECCENTRIC PLATE as least eccentric as possible (shaft as far as possible toward the center of the rudder drive pulley).

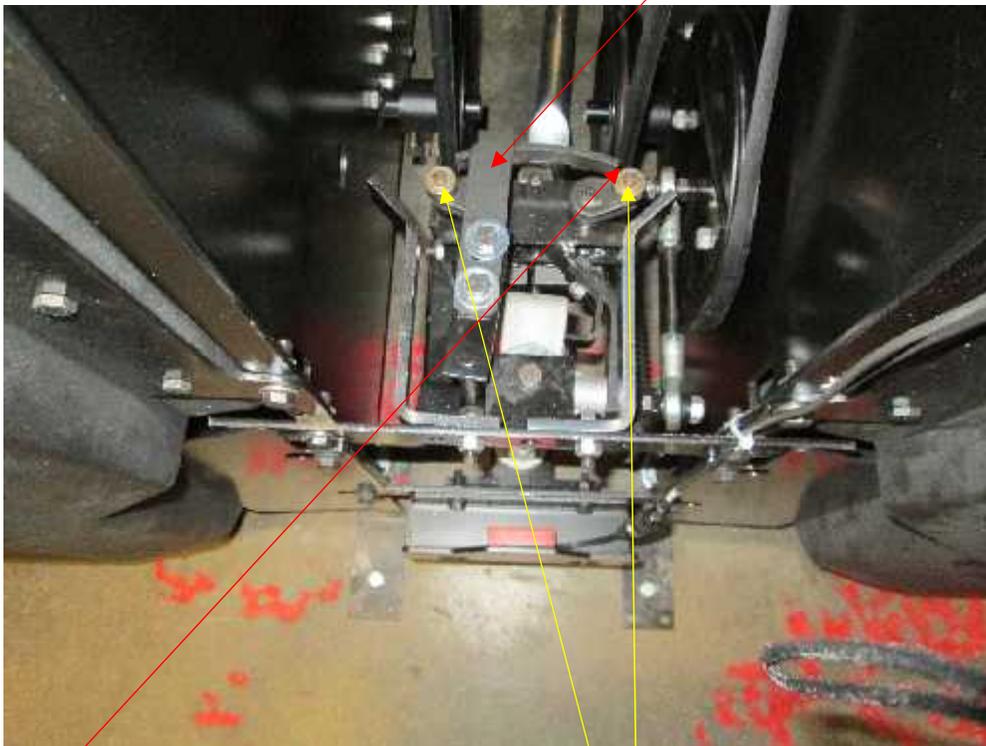


Step 3 – Adjust the length of the RUDDER TRAVEL CENTERING ROD to fit onto the Rudder Drive pulley stud, evenly changing the length from both ends of the rod. Run

under power and observe the travel of the Rudder Arm relative to the Stop Bumpers. Adjust the length of the RUDDER TRAVEL CENTERING ROD to CENTER the travel of the Rudder Arm as well as possible and tighten jam nuts. Adjust the RUDDER TRAVEL WIDENING/NARROWING ECCENTRIC PLATE to achieve 1/16" of OVERTRAVEL of the POWER STROKE INDUCING ARC CAM as the rudder arm dwells momentarily on each rudder stop bumper, and tighten both plate securing nuts.

Step 4 – Stop the LBS when Rudder travel is on one of the travel-stop bumpers. Adjust the POWER STROKE RESET CAM for that side to be within 1/32" of the POWER STROKE CAM FOLLOWER. Repeat for the other side. Then tweak the POWER STROKE RESET CAMS with a pry bar, to obtain BOTH a FULL RESET of the Power Stroke Cam Follower, AND YET allow the rudder arm to fully reach it's rudder stop bumper. THERE IS ONLY ONE PLACE that the Reset Cams can be positioned that will achieve BOTH a FULL RESET of the Power Stroke Cam Follower AND a complete Rudder Travel ALL THE WAY to the Rudder stop bumper.

Step 5 – Position the POWER STROKE INDUCING ARC CAM

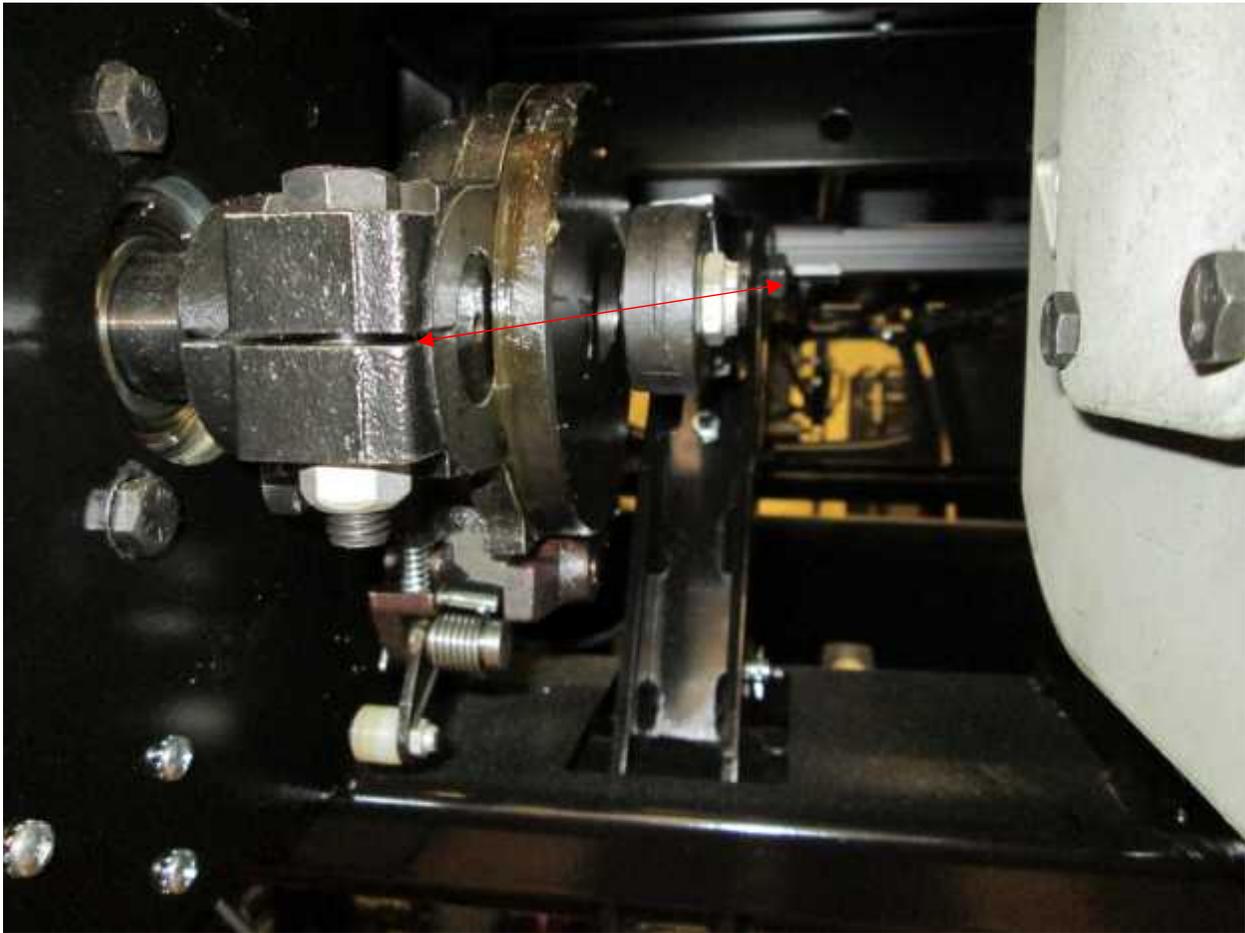


To within 1/8" and centered between the two POWER STROKE CAM FOLLOWERS. BE CERTAIN THAT THE ARC CAM DOES NOT TOUCH EITHER POWER STROKE CAM FOLLOWERS DURING ROUTINE MOTION. Run under power and inhibit the rudder arm listening for a strong "CLICK" sound as the power stroke is induced. A change in the angle of the Arc Cam may be needed to induce a solid "click" for BOTH odd and even sides.

YOU ARE NOT FINISHED until: 1. Overtravel of Arc Cam is 1/16" and fairly even on both odd and even sides, 2. POWER STROKE RESET CAMS reset the power stroke cam followers COMPLETELY – AND the rudder arm reaches and dwells on BOTH rudder arm stop bumpers. 3. Arc Cam is VERY close to, but NOT touching either Power Stroke Cam Follower during routine motion. 4. There is a solid "CLICK" as the power stroke is induced on BOTH SIDES.

Tables

Step 1 – Crank the Table to the spotting position holding down the spot latch, so that pins are delivered to cups and table goes all the way to the pindeck. The table is at it's lowest point when these three points are in a straight line.



Step 2 – Make the table PARALLEL to the pindeck by adjusting the Table Tie-Rods, so that when measuring under the 1, 8, and 10 Pin button-head respot cell pivot bolts, all three corner are THE SAME distance from the pindeck – PARALLEL to the pindeck.



Adjust the CLEVIS length, so that the table is $5/16$ " from the pindeck. We call this PARALLEL- $5/16$ ". The Table should be PARALLEL TO the pindeck AND $5/16$ " from the pindeck. A bit higher than $5/16$ " OK. Lower than $5/16$ " not OK.

Step 3 – "Flag" the table by inserting table flags into the table at the 1, 7, and 10 pin respot cell locations as shown below, and move the table as needed (one side at a time), by loosening the 3 bolts on each side of the table, that connect the steel table to the table weldments. Locate the table so that the table flags point to the center of the 1, 7, and 10 spots.



Check and adjust respot cells and cell-opening cam follower at this point if necessary. All cells should be fully open with a bit of "slop" in the rear fingers, as we discussed.

Step 4 – When the table is "Parallel 5/16" and flagged, crank the table BACKWARDS (clockwise) until the PIN BOTTOMS are 5/16" from the pindeck. At this point, you should have about a 1/16" gap between the square-head stop bolt and the stop.



(First be certain that about 4 threads are showing between square head and housing). Check for any low or high hanging pins and adjust cups accordingly. Adjust the length of the SPOT ROD to achieve the 1/16" gap, between Square Head Stop Bolt and the Stop.

Step 5 – Crank the table a bit lower, with pins hovering over the spots (about 1/8" - 3/16" from spots), and adjust each individual spotting cup to CENTER the pin bottom over the spot BOTH Left-To-Right



AND Front-To-Back



Loosen BOTH TOP spotting cup bolts until cup is hanging freely. Tap the cup and block evenly - right or left until centered. Choose ONE U-BOLT and tighten top nut of that U-BOLT until the pin bottom is centered over the spot from front-to-back, then tighten lower and upper nuts of that U-Bolt EQUALLY in small increments, to maintain the cups centered-from-front-to-back location until the cup is secured in place by that one U-Bolt. Then tighten the loose U-Bolt's nuts in such a way as to MATCH THE NUMBER OF THREADS showing beyond the TIGHTENED U-BOLT'S upper and lower nuts for even pressure on the spotting cup. Repeat for all cups. Test under power and adjust individual cups if one or a few cups are off spot. If ALL cups are good from front-

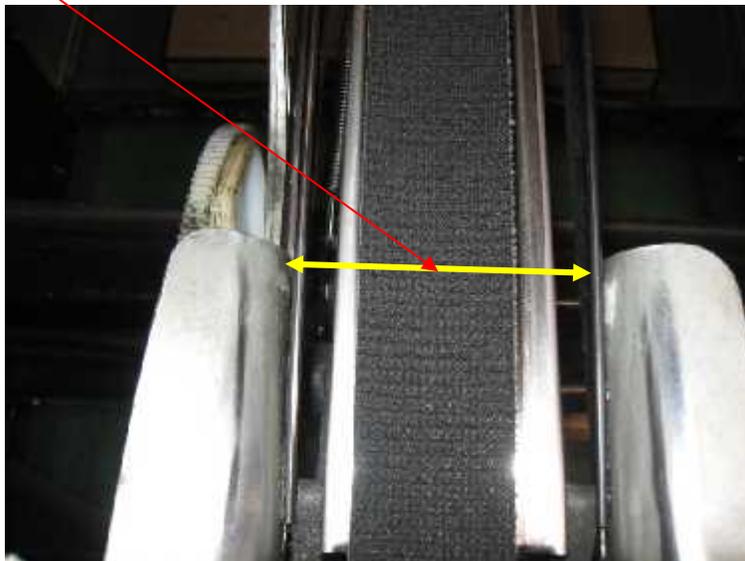
to back but ALL are a bit in front of or behind spots (by about the same amount – commonly possible due to cranking vs. running under power) – then tweak SPOT ROD to adjust ALL cups a bit forward or back. Check respot rod adjustment for a gap between the pawl and the center of the W-Shaped respot cell shifter of about 5/16" - 3/8". Test respotting action under power looking for a smooth opening and closing/locking of cells on the pins. If cells don't close all the way and lock soundly – decrease Pawl gap. If the cells slap the pins too hard and struggle to unlock when trying to open – increase pawl gap. Stop table at zero with pins in all cells and check the "hang" of the pins in the grippers. Pins should be held near TOP of the top red stripe. Adjust individual cells as needed.

Distributors (Non-Edge)

First- check for proper post shimming to provide about 3/16" clearance between front underside belt guide and Bin Frame/Durabin at 8-9 position and check for proper "balance" by removing the two rear springs and checking that distributor doesn't swing toward 7 or 10 side. Distributor should be balanced and Orientor pan should be level.



Squeeze to obtain a 5 1/2" pan opening...



and adjust for ¼" or so clearance from level O-pan to pin wheel. **THEN:**

1. Center distributor via safety link.
2. Make sure big spring front hanger bracket is straight and not bent rearward and that the jam nut trapping this spring hanger bracket is tight.



3. Make sure that pin seating rods are inward to within 1/8" of passing pinwheel cleats (7).



4. Adjust REAR kidney up-down adjustment. Lower/raise **lower rear** adjusting nut to be adjusted so that a head-first pin is flush with kidney while a butt-first pin is a bit loose when contacting kidney, and **upper rear** kidney adjusting nut is adjusted for a 3/4"-7/8" PIN DROP from kidney to Orientor Pan. 5. Adjust INNER kidney nuts so that the belly of a BUTT-FIRST strikes O-Pan just PAST center of pan, and belly of a HEAD-FIRST pin strikes O-Pan just SHORT OF the center of the O-Pan. 6. Check clutch spring for proper tension. "Feel" clutch tension by rotating inner clutch facing rearward. 3/4 to 7/8 of a turn on the clutch spring should yield proper clutch tension, but feel this tension, as contamination may require more than the recommended tension until such time that the clutch can be cleaned. 7. Index distributor to 7-pin corner. Test butt-first orientation the head-first orientation on ALL 7 CLEATS of the pin wheel. Look for NO HEASITATION as a pin proceeds down distributor belt. Repeat for 10-pin corner. If pins hesitate, pry upward slightly on the support under the distributor belt just beyond the O-Pan, as it may be too concave to allow distributor belt to "grab" the pin and convey it forward. 8. Be sure that the stop bracket lines-up exactly with the tab on the inner (gold) clutch plate at ALL pin positions. If not, adjust Nylon Rollers so that the Trip Rod and the Carriage Tube are PARALLEL. Make sure the nylon rollers are not too tightly holding the Carriage Tube. 9. Put machine on continuous cycle and observe/double-check for smooth orientation and progression from position-to-position.

The boys did great. We fixed lanes 9 and 10 that have been down for weeks for various reasons. We completed about 1/3 of all sweeps. The boys did the final 4 all alone and I checked behind them, after we did the first few together. They adjusted them perfectly. An afternoon league started and we then did PM on all lanes – out of sight from the Bowlers. We cleaned all Durabins and Pinspotter Shrouds with Armor-All, and cleaned all Metal Bins with rags lightly coated with WD-40. They look like new.

Day 3 – Wednesday, November 9, 2016 – We trained on Tables today. We got the worst ones. I showed the boys on the first two (13 & 14), and they did 15, 16, 1 and 2 on their own and I checked behind them. They did great. They used what I showed them on the first two, and the Outline (above) for tables, and they understand the process completely.

Day 4 – Thursday, November 10, 2016 – We trained on Light Ball Sensors, PBL's, Lifters, Upsweep Rails and all related Ball return equipment in the backend. I showed the students how to do the first one, I coached them on the next one, and they did two more on their own and I checked behind them. As usual, they did great. We checked out the issue with all ball lifts up front being on "axillary" mode (running 24/7). We checked 1 and 2, and it works perfectly on "normal" mode (turns on and off with Pinspotter). The control box was wired exactly right and it worked right, so I have no idea why it was on "axillary." We will check more tomorrow. We centered all Lifters on the pairs that we adjusted LBS/PBL system. We adjusted lifter height, centered PBL on Lifter at the bottom and on Upsweep Rails on the top. We adjusted the PBL Top Pulleys to be dead square. We adjusted PBL Height to be 5/16" above a ball on the Lifter. We centered the LBS between the Frames, and the Rudder Arm within the Slot to center the Paddle in the Ball Exit. We then TOTALLY adjusted the LBS according to the outline above. We did 4 pairs completely and started on a fifth pair. Lanes 9 and 10 (both former problem children) BOTH ran perfectly during the entire league session today. We had only a couple spot calls during the entire full league session. While league as bowling, we did 2 more Distributors completely. We began the PM schedule with things that could be done while lanes are in use. We solved all issues that the Center Management outlined for us to address at the outset of our training week.

Day 5 – Friday, November 11, 2016 – We performed ENTIRE daily, weekly, and monthly PM and Lubrication Schedule. We totally adjusted one more rear ball return system - PBL, Lifter, Upsweep Rails, aligning belts, Rudder Bumpers, and entire Light Ball Sensor. We made a plan for Frames-per-Stop record-keeping, and PM /Lube schedule. We went over Critical Measurements again and I sent a copy by email. We printed and reviewed the Student's Training Manual. We trained on Q-Vision Cameras and Ball Lifts up front. I gave the final examination to all four students: Mario Salazar, Adan Sanchez, Alonso A. Rodriguez Lopez, and David A. Robles. They all got an "A" on the exam – with David A. Robles getting a 98% Grade = A++.

Here is the Pinspotter Test that they all passed with flying colors:

82-70/90XL Training School

Distributor Examination Circle correct answers

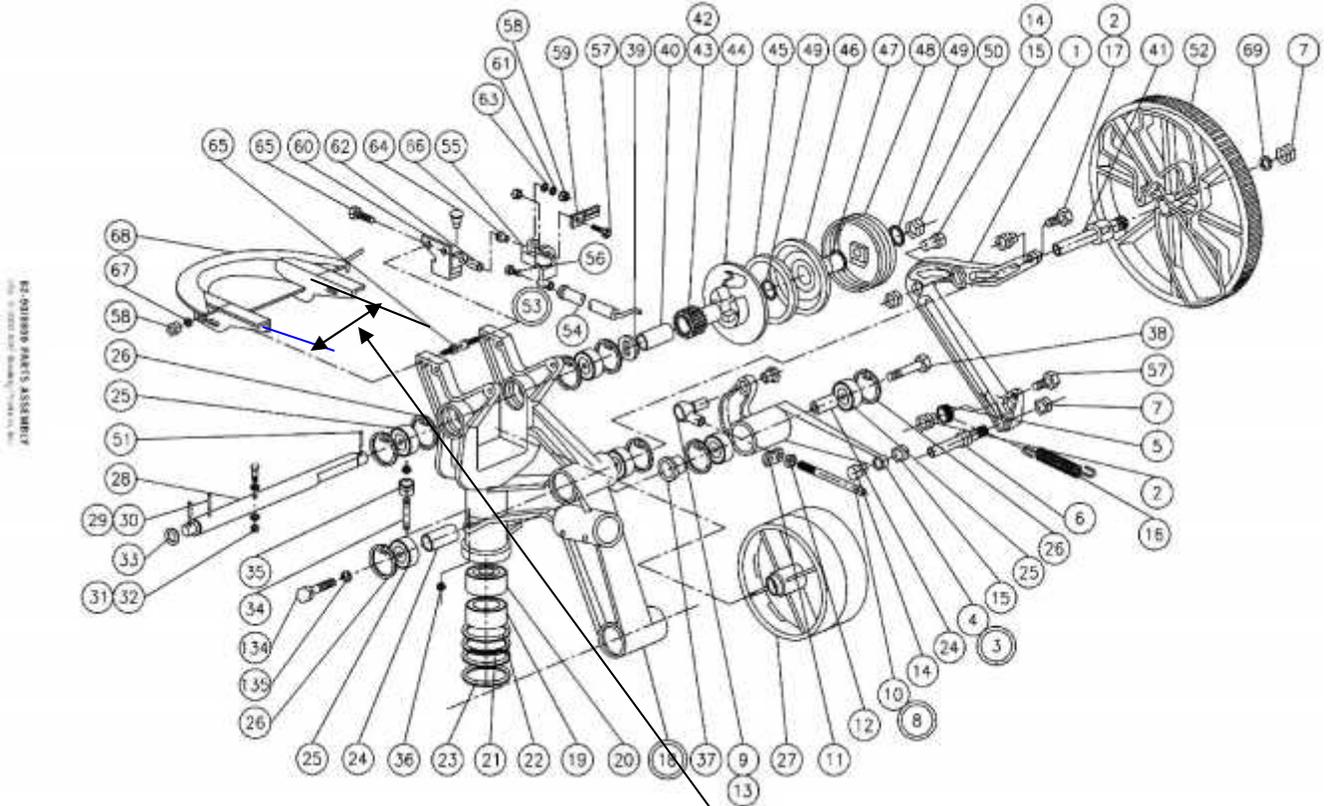


Figure 1

1. Item 68 is called what?
 - A. Orientor pan
 - B. Drip pan
 - C. Oil pan
2. On item 68, the critical opening measurement is what?
3.
 - A. 5"
 - B. 5 1/2"
 - C. 6"
 - D. 6 1/2"
4. Items 44,45, and 46 should be:
 - A. Oiled regularly
 - B. Kept clean

4. The proper starting point for tension on spring (item 48) is:
 - A. $\frac{1}{2}$ of a turn
 - B. $\frac{7}{8}$ of a turn
 - C. 1 turn
 - D. $1 \frac{1}{2}$ turns

5. The timing mark on the large white nylon gear (item 52) and the Timing mark on the pinion gear (item 43) should be aligned with each other when the distributor is at which bin location?
 - A. #1 pin position
 - B. #5 pin position
 - C. #9 pin position

6. The male half of the safety link is shown as item 10. Along with the female half, this link adjusts what?
 - A. distributor's distance from pin elevator
 - B. distributor's position from right-to-left
 - C. distributor's height over Durabins

7. Items 39 through 50 combine to make what assembly?
 - A. distributor drive
 - B. distributor post
 - C. distributor clutch

8. The stop blade (item 59) engages the stop on item 44. These engaged metal surfaces should be:
 - A. clean and dry
 - B. greased regularly

9. Item 43 is called what?
 - A. friction disk
 - B. pinion
 - C. worm

10. Item 45 is called what?
 - A. friction disk
 - B. pinion
 - C. worm

11. Item 47 is called what?
 - A. friction disk
 - B. pinion
 - C. worm

12. Which pin is the first pin to be fed into the bins by the distributor?
 - A. head pin
 - B. #5 pin
 - C. #9 pin

13. Which pin is the last to be fed into the bins by the distributor?
 - A. head pin
 - B. #5 pin
 - C. #9 pin

14. Which pin is fed next after the #6 pin?
 - A. #7 pin
 - B. #9 pin
 - C. #10 pin

15. The bin switch which tells the chassis that the bins are full is at which bin location?
 - A. head pin
 - B. #5 pin
 - C. #9 pin

16. A double-fed 6 or 10 pin is often an indication of what?
 - A. too much clutch spring tension
 - B. not enough clutch spring tension

17. Distributor jams can be caused by:
 - A. poor clutch tension
 - B. bad pin orientation
 - C. dirt
 - D. poor centering
 - E. All of the above

18. The proper drop-off of a pin from the “kidney” shaped pin guide onto the Orientor Pan is:
- A. about 1/8”
 - B. about 1/2”
 - C. about 7/8”
19. When a head-first pin coming up the elevator, engages the bottom of the “kidney” shaped pin guide, the pin belly should be:
- A. Flush with the Kidney
 - B. 1/8” above the Kidney and drop onto it shortly after
 - C. 1/2” above the Kidney and drop onto it shortly after
20. When a butt-first pin coming up the elevator, engages the bottom of the “kidney” shaped pin guide, the pin belly should be:
- A. Flush with the Kidney
 - B. 1/8” above the Kidney and drop onto it shortly after
 - C. 1/2” above the Kidney and drop onto it shortly after
21. The proper clearance between the front distributor belt guide (under the indexing trip arms) and the Durabin or Bin Assembly when the distributor is in the 8-9 area is:
- A. 1/4”
 - B. 1/2”
 - C. 1”

82-70 Training School

Table and Front End Circle correct answers

1. Table “flags” are used to do what?
 - A. Set table height
 - B. Spot pins
 - C. Center table over pindeck

2. At it’s lowest spotting position, table should be parallel to pindeck and how far above the pindeck?
 - A. 1”
 - B. 5/16”
 - C. 1/8”

3. The solenoid fires right before the table is about to:
 - A. pick up standing pins
 - B. set a new rack of pins.

4. When the solenoid fires, it does three things. Which below is NOT one of those three things:
 - A. Unblock the shuttle
 - B. Induce a long table stroke
 - C. Cause cups to turn downward
 - D. Open respot cells

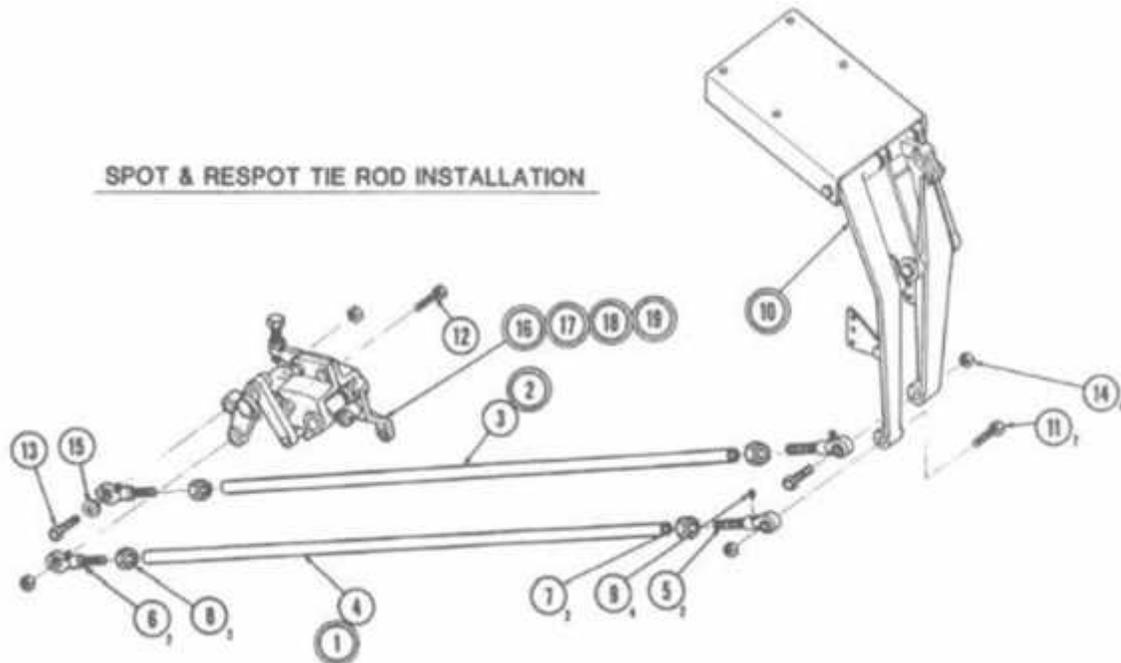


Figure 2

5. In figure #2, item 1/4 is the respot rod. What is it's function?
- A. Used to raise or lower table
 - B. Used to open and close respot cells
 - C. Used to level table
6. In figure #2, item 2/3 is called what?
- A. Table leveling tie rod
 - B. Sweep travel rod
 - C. Spot rod

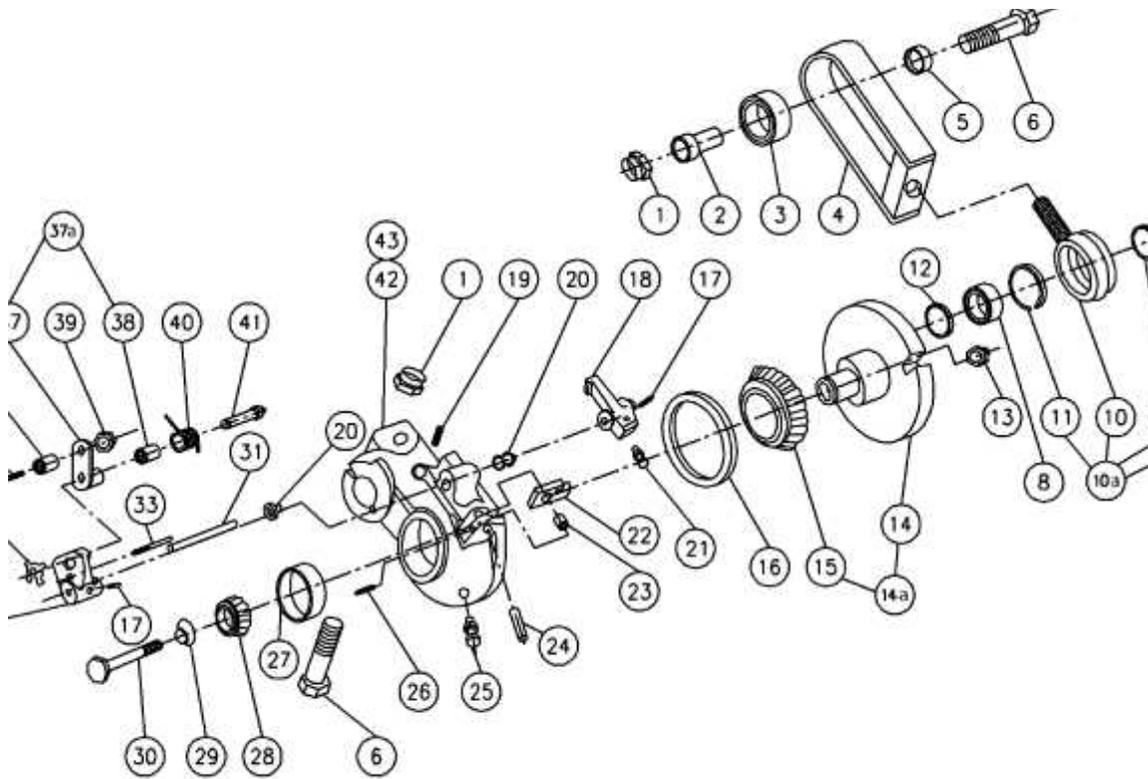


Figure 3

7. Figure 3 is of what component?
 - A. Table drive assembly
 - B. Table motor assembly
 - C. Table torque tube assembly

8. In Figure #3, item 4 is called the clevis. What is it's function.
 - A. Used to raise or lower table
 - B. Used to open and close respot cells
 - C. Used to level table

9. Table adjustments can be done in any order.
 - A. True
 - B. False

10. When spotting, the pin bottoms should strike the pindeck:
 - A. Slightly toe-first
 - B. Flat
 - C. Slightly heel-first

11. The length of which rod determines when the spotting cups shift rearward, releasing pins in the spotting motion:
- A. Spot rod
 - B. Respot rod
 - C. Table tie-rod
12. The length of which rod determines when the respot cells open and close:
- A. Spot rod
 - B. Respot rod
 - C. Table tie-rod
13. The length of which rods determines the levelness of the table:
- A. Spot rod
 - B. Respot rod
 - C. Table tie-rod
14. The spotting cups are all individually adjustable.
- A. True
 - B. False
15. When changing a spotting cup, the table should be positioned:
- A. As high as it will go
 - B. As low as it will go
 - C. Pin bottoms hovered over spots
16. How many respot cells are on a pinspotter?
- A. 2
 - B. 6
 - C. 10
17. How many respot cells on a pinspotter have carburetor links attached to them?
- A. 2
 - B. 6
 - C. 9

18. Respot cells should hold a pin just above the top red stripe on the pin.

- A. True
- B. False

19. During which cycle are respot cells called upon to operate?

- A. Strike cycle
- B. 1st ball cycle
- C. Foul cycle

82-70 Training School

Sweep, Back End, and PBL/LBS Circle correct answers

1. The sweeps lowest point in the sweeping motion is:
 - A. At guard position
 - B. Over the 4-5-6 row of pin spots
 - C. All the way at the back of the pindeck

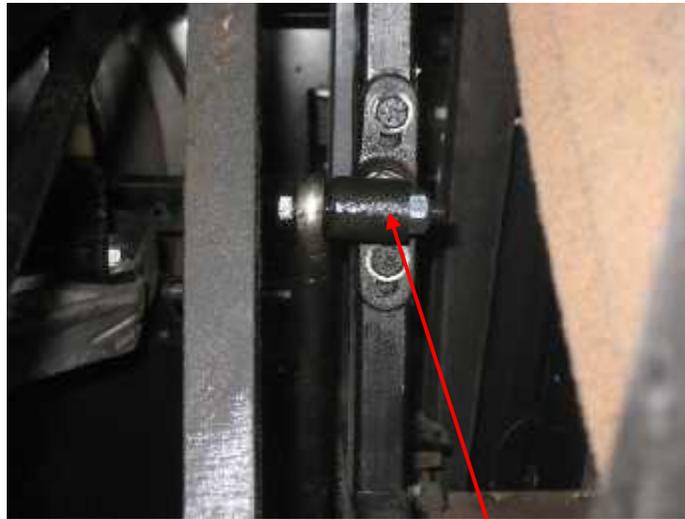


Figure 4

2. In Figure 4, the position (inward or outward) of Threaded Link determines the sweep's height where?
 - A. At guard position
 - B. Over the 4-5-6 row of pin spots
 - C. All the way at the back of the pindeck



Figure 5

3. In figure 5. The bracket shown is bolted to the side-frame and it adjusts up or down to change the sweep height during the sweeping motion. Where do you position the sweep to make this adjustment?

- A. At guard position
- B. Over the 4-5-6 row of pin spots
- C. All the way at the back of the pindeck

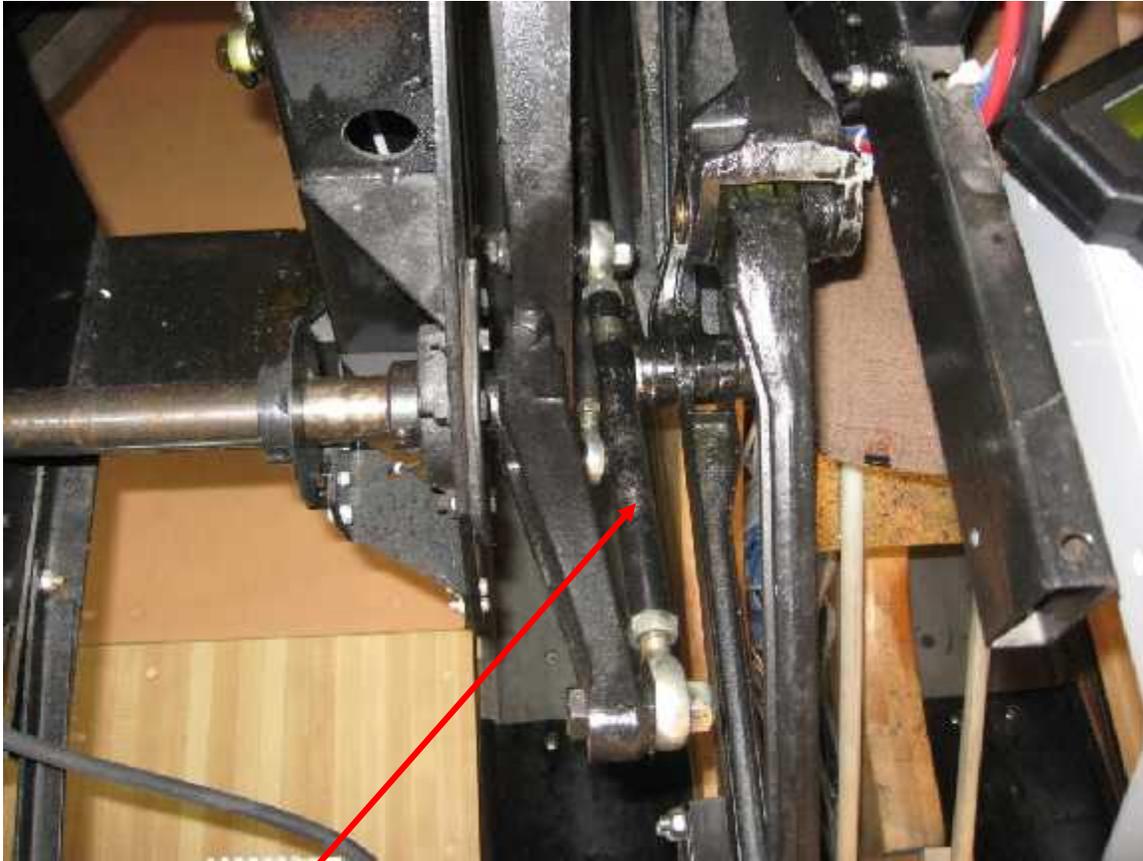


Figure 6

4. In figure 6, this is the sweep overall travel rod. This rod's length determines how far the sweep travels rearward. Where do you position the sweep to make this adjustment?

- A. At guard position
- B. Over the 4-5-6 row of pin spots
- C. All the way at the back of the pindeck

5. When the sweep is at guard position, it should be:

- A. $1 \frac{1}{8}'' - 1 \frac{3}{16}''$ above the lane surface
- B. About $\frac{3}{16}''$ above the pindeck
- C. Just beyond the rear tailplank reference marks

6. When the sweep is over the 4-5-6 row of pin spots, it should be:

- A. $1 \frac{1}{8}'' - 1 \frac{3}{16}''$ above the lane surface
- B. About $\frac{3}{16}''$ above the pindeck
- C. Just beyond the rear tailplank reference marks

7. When the sweep is running under power, it's rear-most position should be:
- A. 1 1/8" – 1 3/16" above the lane surface
 - B. About 3/16" above the pindeck
 - C. Just beyond the rear tailplank reference marks
8. It is possible to adjust the travel of the 7-pin side of the sweep and the 10-pin side of the sweep independently.
- A. True
 - B. False
9. If a sweep-table interlock occurs because a pin gets trapped between the sweep and the flat-gutter, this usually is an indication of what?
- A. Sweep is traveling too far rearward
 - B. Sweep is not traveling far enough rearward
10. The assembly that stops the ball as the ball leaves the pindeck is called:
- A. The carpet
 - B. The bounce plate
 - C. The cushion
11. The item which conveys the pins back to the pin elevator is called:
- A. The carpet
 - B. The bounce plate
 - C. The cushion
12. The "hidden" assembly which funnels the ball toward the ball exit is called:
- A. The carpet
 - B. The bounce plate
 - C. The cushion
13. The back end motor drives three pinspotter components. They are the PBL system, the pin elevator, and what?
- A. The sweep
 - B. The table
 - C. The distributor

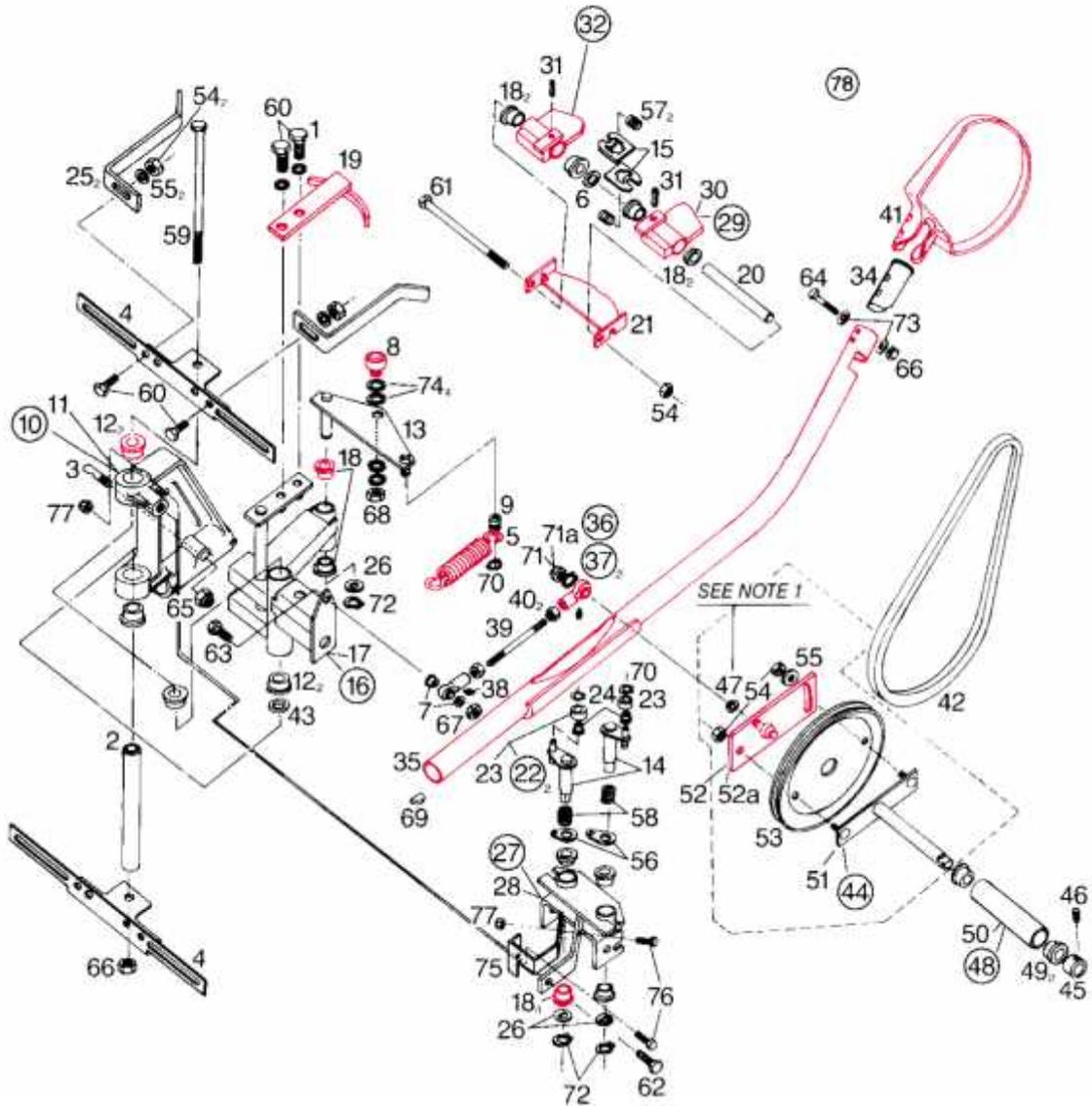


Figure 7

Figure 7 is the light ball sensor assembly. Locate items 19, 25, 39, and 52. Each item does one of the four choices below.

15. Item 19 does what?

- A. Centers the rudder/paddle travel
- B. Induces a “power stroke”
- C. Resets the power stroke cam follower to “normal stroke”
- D. Narrows or widens the rudder/paddle travel

16. Item 25 does what?

- A. Centers the rudder/paddle travel
- B. Induces a “power stroke”
- C. Resets the power stroke cam follower to “normal stroke”
- D. Narrows or widens the rudder/paddle travel

17. Item 39 does what?

- A. Centers the rudder/paddle travel
- B. Induces a “power stroke”
- C. Resets the power stroke cam follower to “normal stroke”
- D. Narrows or widens the rudder/paddle travel

18. Item 52 does what?

- A. Centers the rudder/paddle travel
- B. Induces a “power stroke”
- C. Resets the power stroke cam follower to “normal stroke”
- D. Narrows or widens the rudder/paddle travel

19. The same belt which drives the carpet, drives the PBL system.

- A. True
- B. False