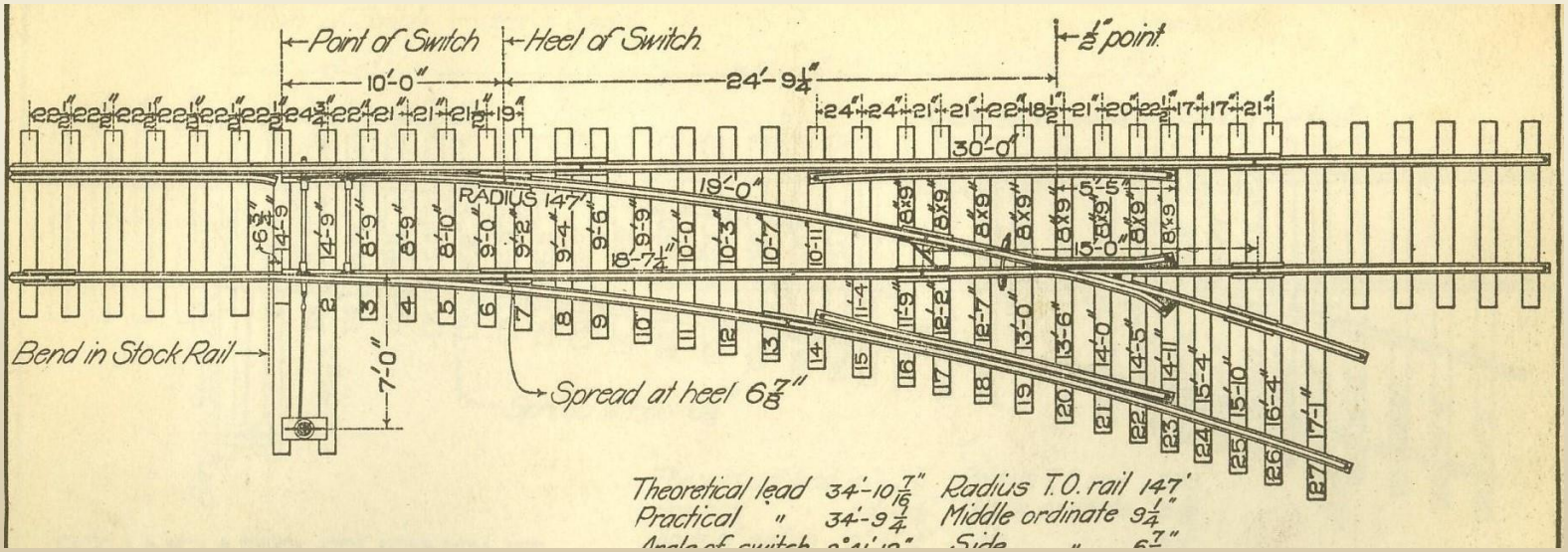
Switches

One Way to Hand Lay Them



Different methods

- Construction
  - Free hand
  - Templates – commercial, homemade
  - Jigs - commercial, homemade
- Location
  - On workbench – parts, whole
  - In place
- Components
  - Points – hinges, bending
  - Frogs – fabricated, commercial, insulated

Surprise!

- They all work!!!

- Trade offs
  - Time/learning curve vs. Money (jigs)
  - Skill sets
  - “Flowing” appearance vs.“Standard” pattern

What I will demonstate

- In place
- Paper template
- Insulated, fabricated frog
- Bending points
- Rigid throwbar
- Techniques adaptable to any frog number, curved or straight

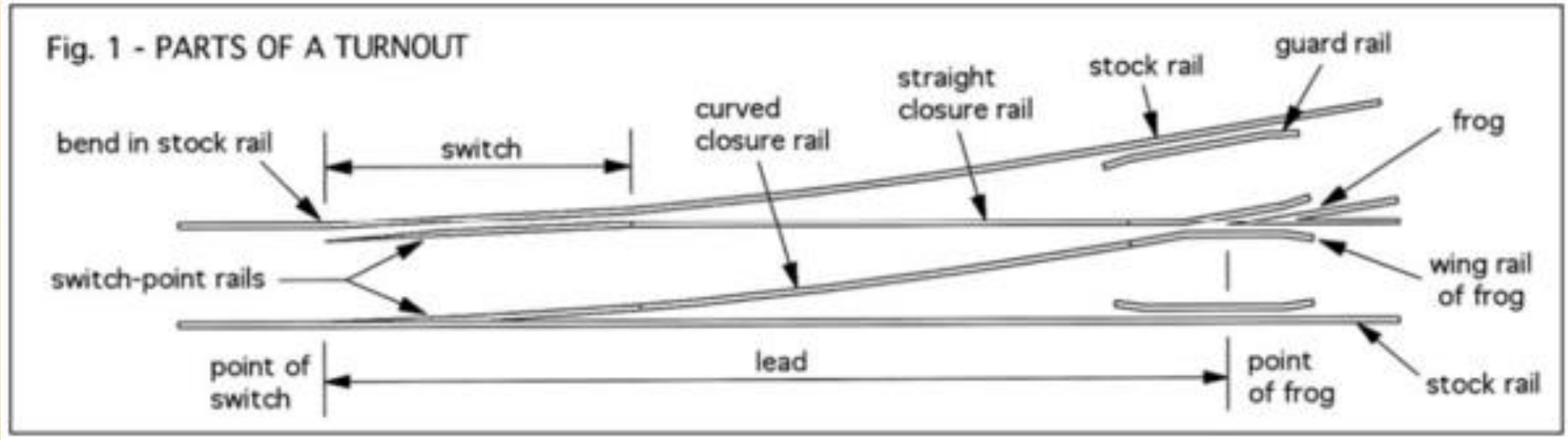
Material and Tools

- Material
  - Rail (Micro Engineering)
  - Ties (Kappler)
  - Spikes (Micro Engineering small or micro)
  - PC throwbar (Clover House)
  - Ballast (Arizona Rock and Mineral)
  - Template (Prototype reduction)
  - Solder (Radio Shack)
  - Flux (paste, had it so long can’t recall where I got it)

Material and Tools

- Tools
  - Pliers/Spike pliers
  - Rail nippers/Flush cutting pliers
  - Files, filing block
  - Hacksaw blade
  - NMRA gauge
  - Soldering iron (25 and 100 watt)
  - Motor tool with cut off disk and brass wire brush
  - Belt/disc sander

Parts of a switch



Locate the switch

- Locate the switch
- Paste the template
- Drill mechanism hole/slot
- Ties
  - Glue
  - Trim, sand
  - Stain
- Ballast (optional)

Stock rails

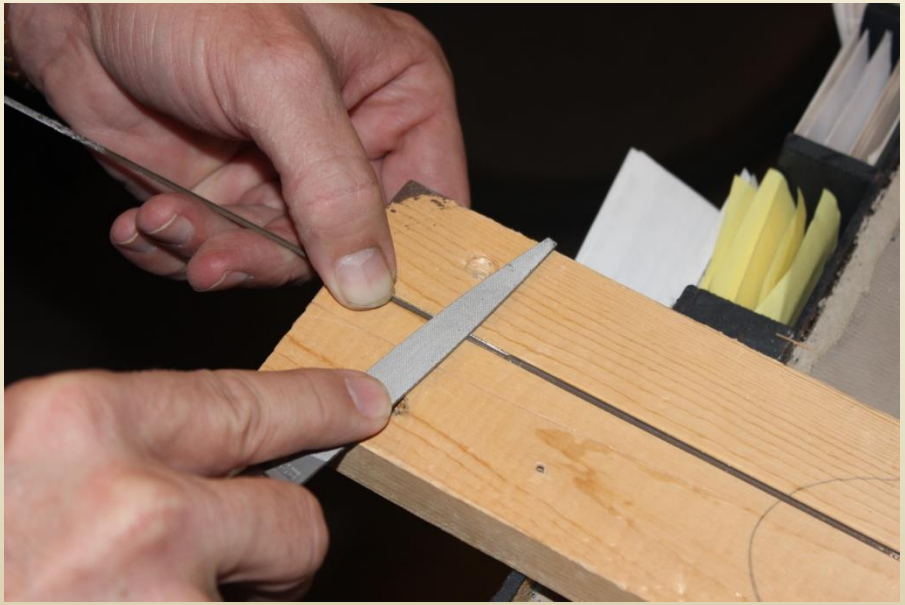
- Make stock rails
  - Notch base stock rail (not head)
  - Remove weathering around guard rail
- Spike straight stock rail in place
- Spike diverging stock rail (curved) in place
  - Locate position from template and ties

Hint : Shaping the rails

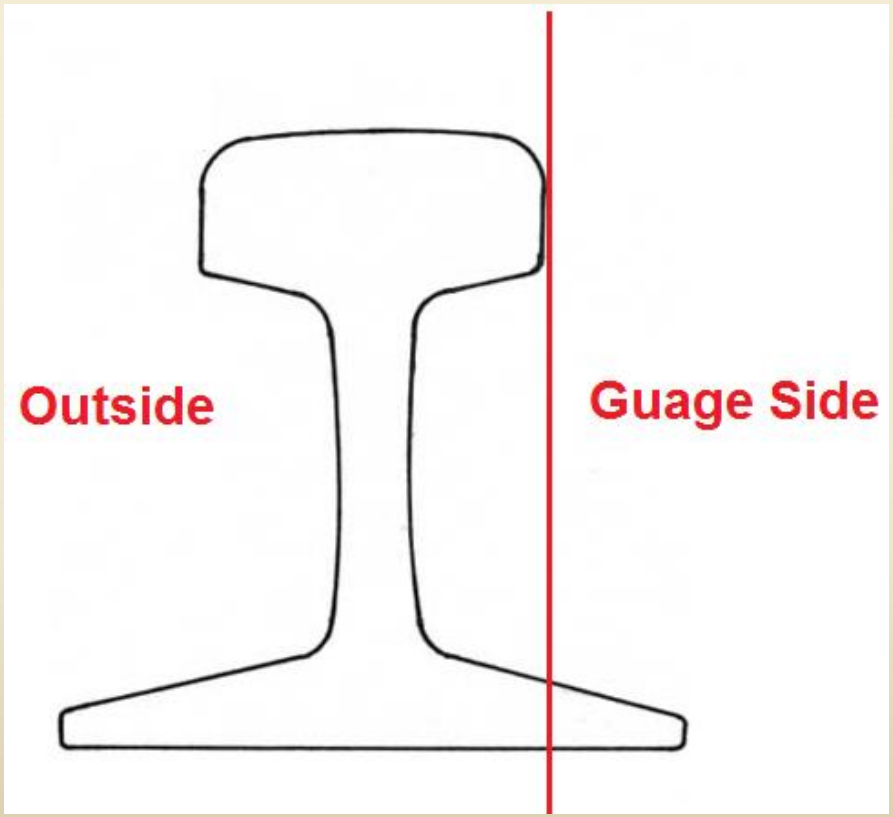
1” Belt sander

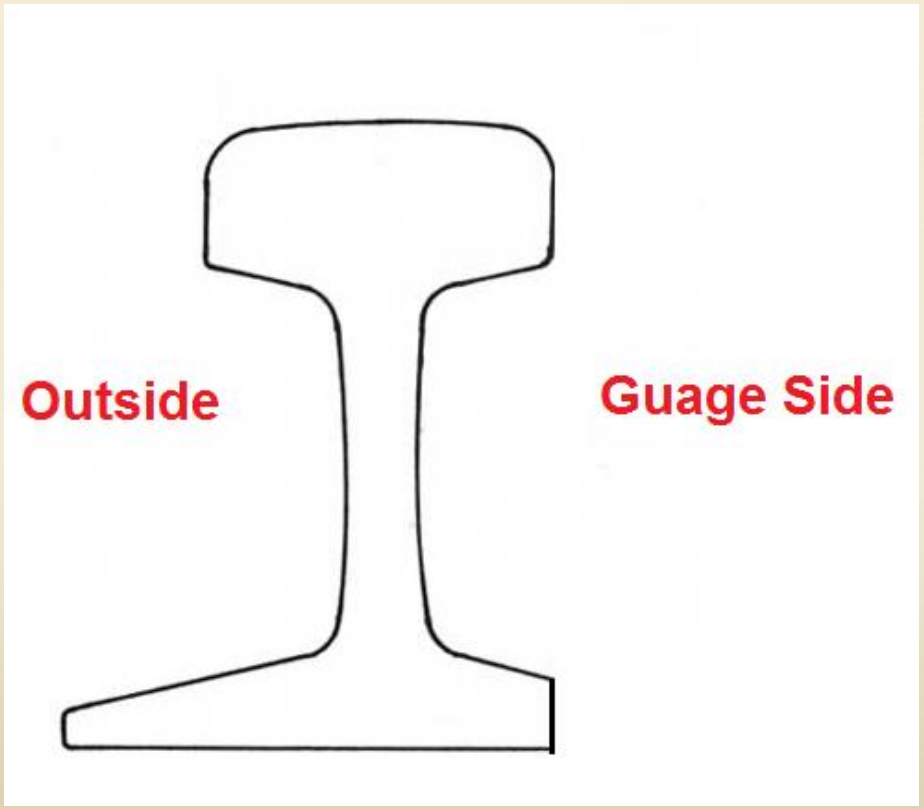
Filing Block

Cut slot with razor saw, put base of rail into slot and file the rail



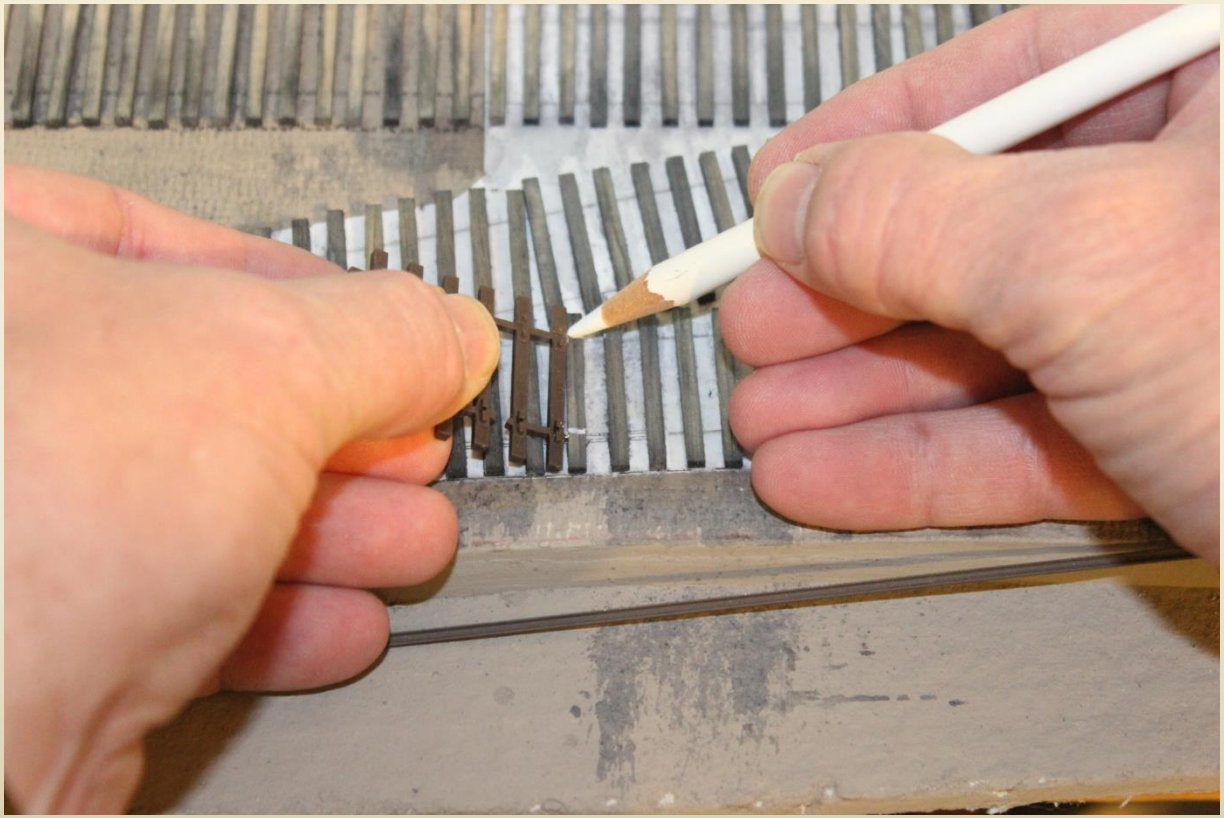
Stock rails





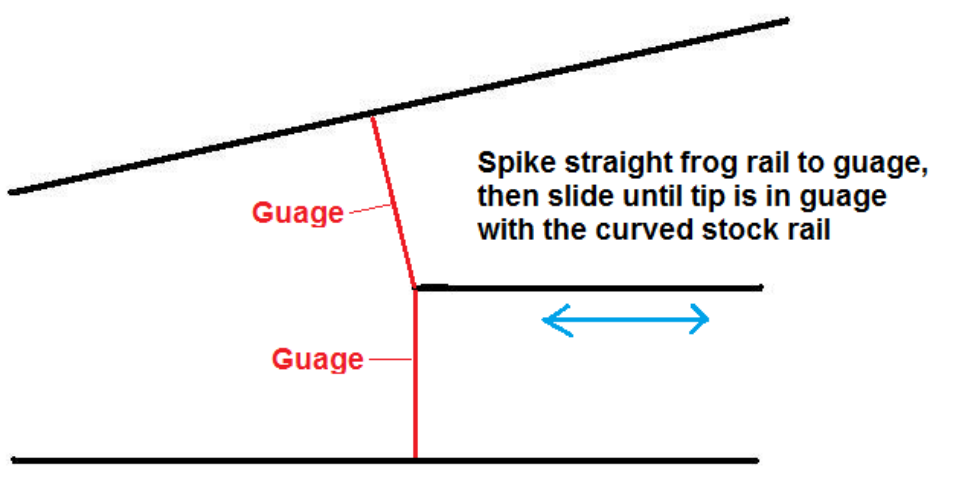
Hint : Locating rails

Use flex track tie strip and colored pencil to mark where the rails go



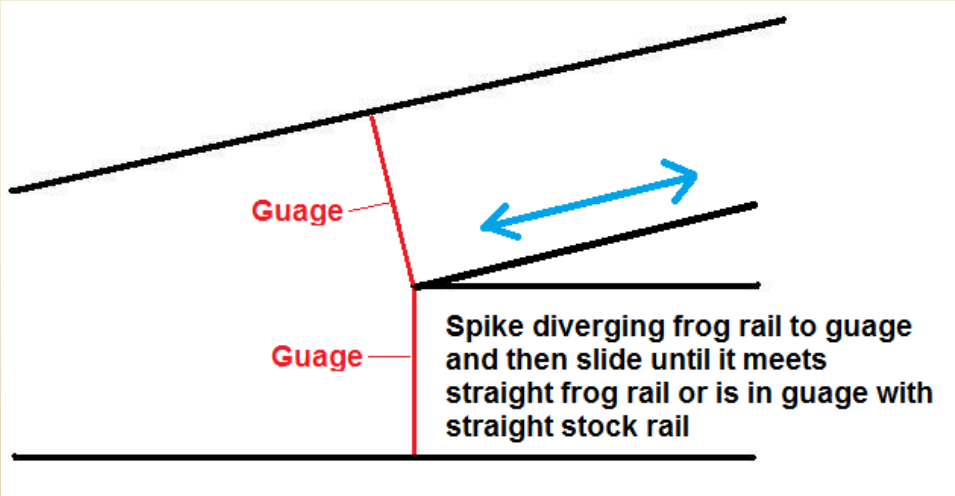
Frog

- Straight frog rail
  - File/sand frog rail
  - Spike to gage straight stock rail
  - Slide to gauge diverging stock rail



Frog

- Diverging frog rail
  - File/sand frog rail
  - Spike to gage diverging stock rail
  - Slide to gauge straights tock rail and straight frog rail

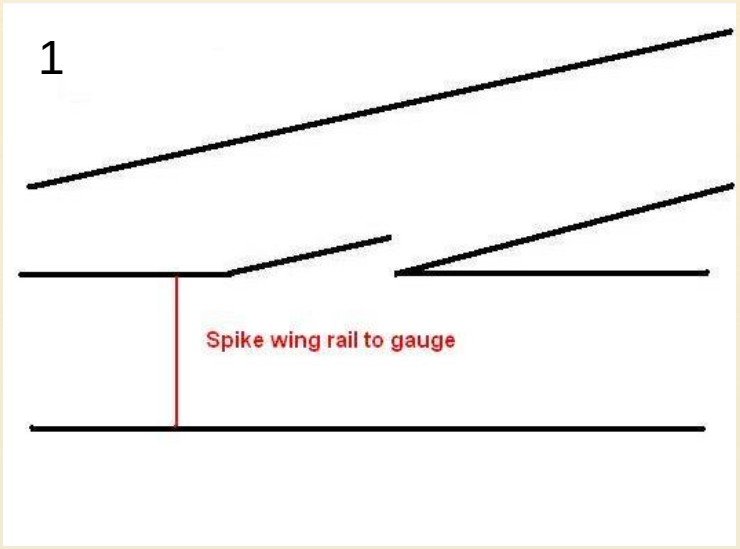


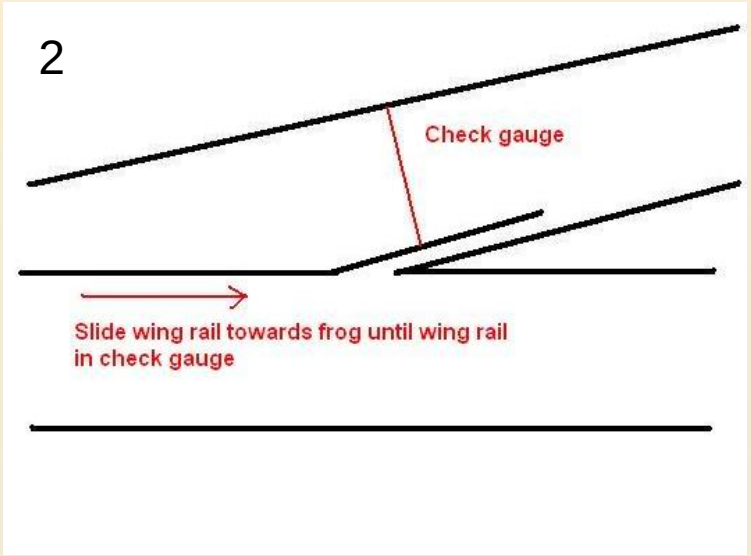
- Tack solder frog rails

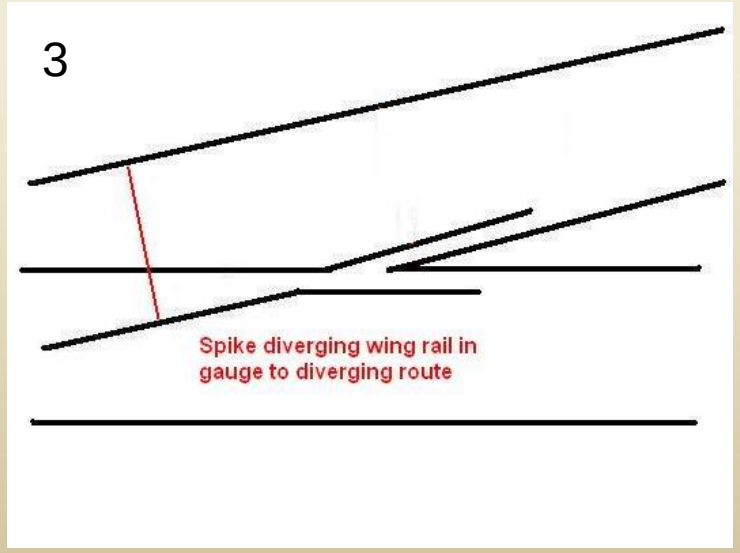
Wing Rails

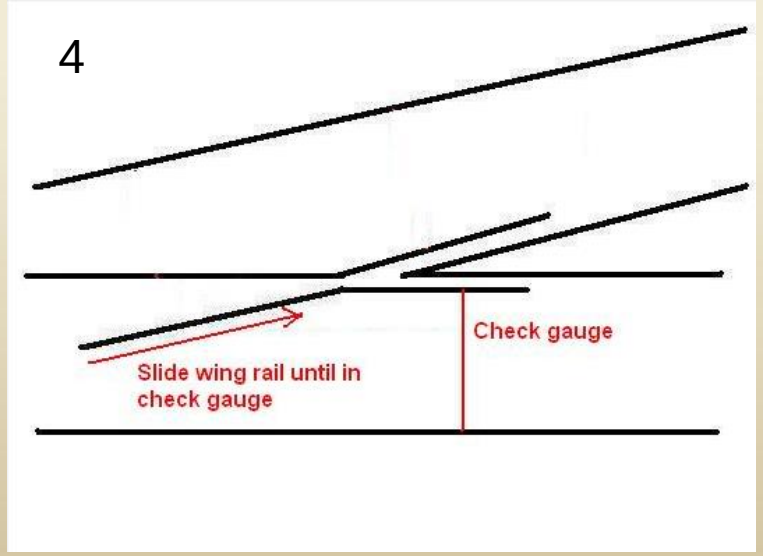
- Make wing rails
  - Cut and bend wing rails
- Install straight wing rail
  - Spike to gage straight stock rail
  - Slide to check gauge diverging stock rail
- Install diverging wing rail
  - Spike to gage diverging stock rail
  - Slide to check gauge straight stock rail

Wing Rails

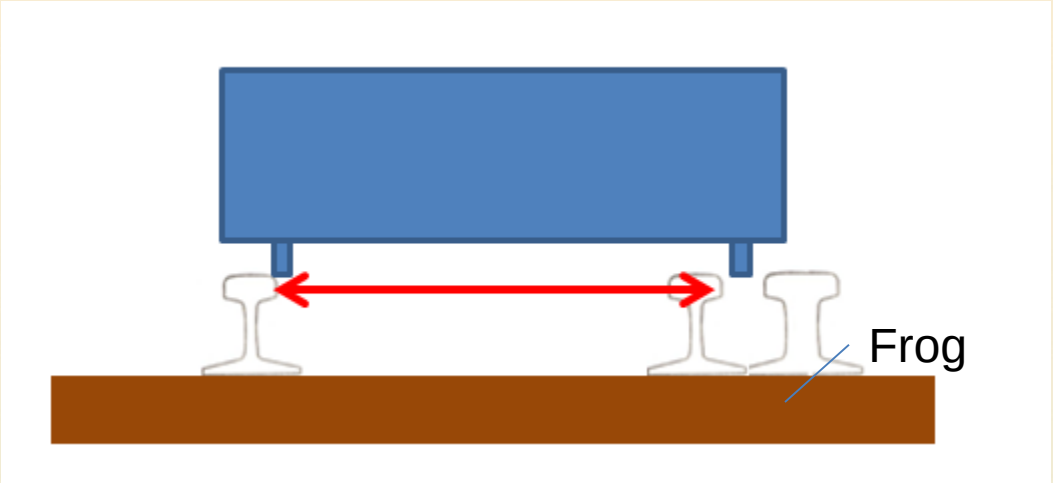

1
Spike wing rail to gauge


2
Check gauge
Slide wing rail towards frog until wing rail in check gauge


3
Spike diverging wing rail in gauge to diverging route


4
Check gauge
Slide wing rail until in check gauge

“Check” gauge



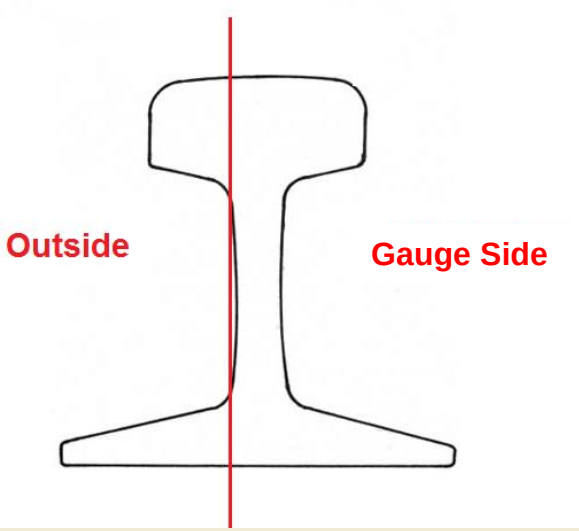
Finish the frog

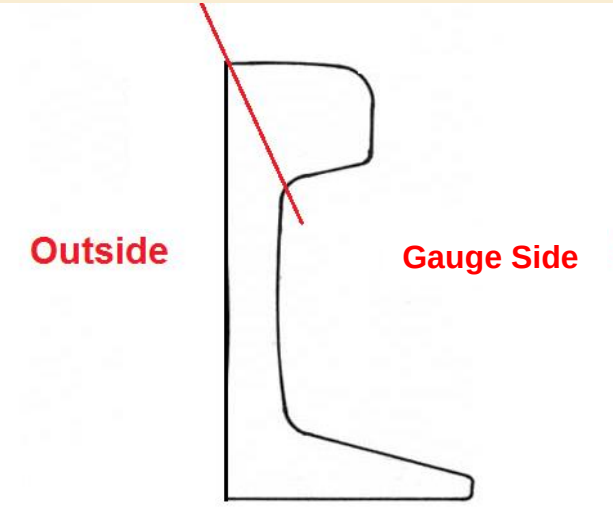
- Fill frog with solder
- Use hacksaw blades to clear flangeways
- Check flangeways and check gauge

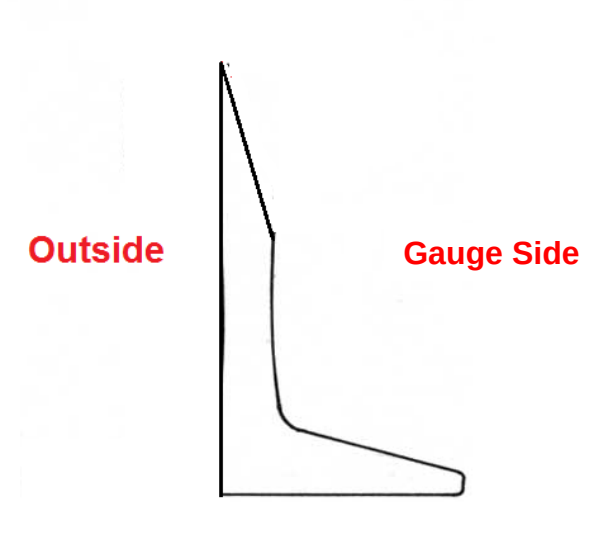
Points

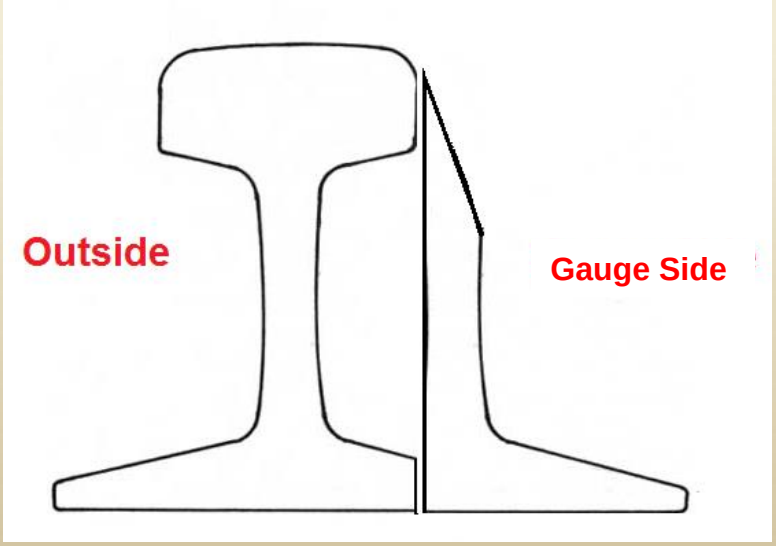
- Cut points to approximate length
- File outside taper
  - Remove base and ball, but not web and inside base
- File inside taper
  - Remove ball only, minimal web and no base
  - Optional bend

Points


Outside
Gauge Side


Outside
Gauge Side


Outside
Gauge Side


Outside
Gauge Side

Points

- Position the straight point
  - Cut to length, allow .010 to .020 gap to wing rail
  - Spike to gauge for straight stock rail
- Position the diverging point point
  - Optional bend to match diverging stock rail
  - Cut to length, allow .010 to .020 gap to wing rail
  - Spike to gauge for diverging stock rail

Throwbar

- Cut throwbar material
  - Cannot be conductive/must be able to insulate
- Position the throwbar
  - Use thin profile tie, matchstick or cardboard to space point from the stock rail
  - Put a dab of flux at joint between throwbar and point
  - Cut small piece of solder and put at joint
  - Solder point to throwbar quickly

Throwbar

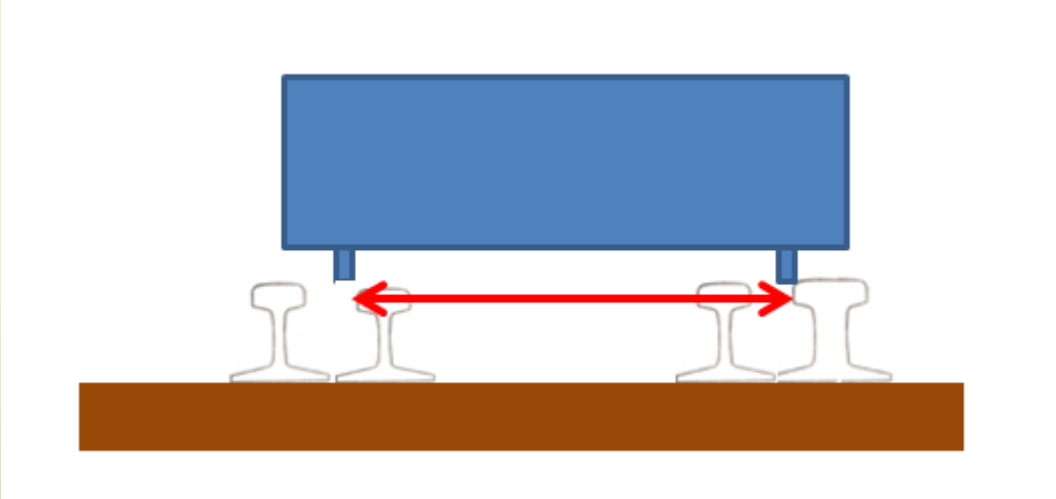
- Position the first point against its stock rail
- Position the second point
  - Use a tie, matchstick or cardboard to space point from the stock rail
  - Put a dab of flux at joint between throwbar and point
  - Cut small piece of solder and put at joint
  - Solder point to throwbar quickly

Guardrails

- Install guardrails
  - Cut the guardrails
  - Make appropriate flare
  - Spike in place , using check gauge to wing and frog rails
  - If desired solder guardrails to the stock rails
  - Use hacksaw blades to ream out flangeways

Guardrails

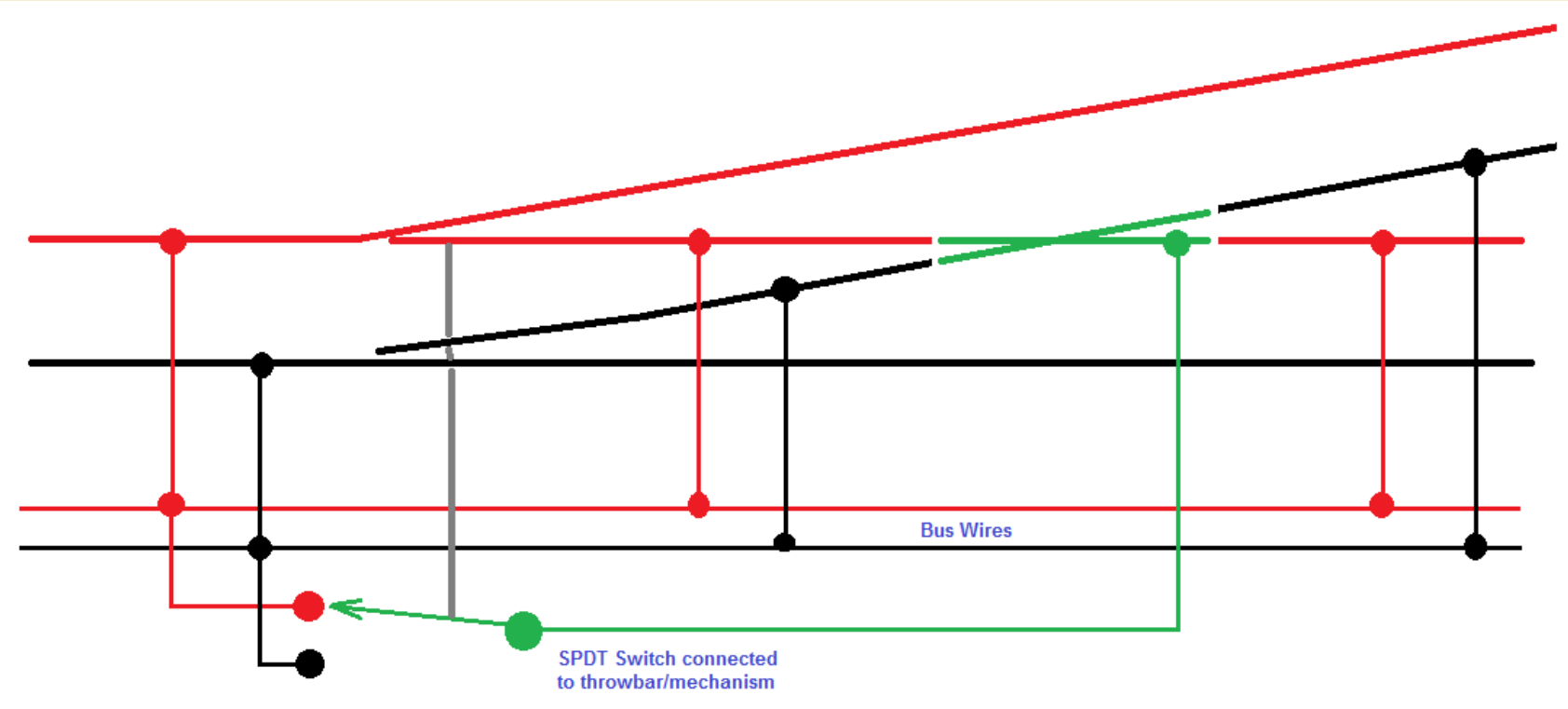
Measure gauge between guardrail face and frog face



Electrical

- Install feeders
  - Point rails and frog required feeders
  - Stock rails optional
  - Install insulating spacers in gaps around frogs
    - CA or epoxy .010 - .020 styrene
    - Trim to match rail profile
- Install switch mechanism
  - Hole in throwbar
  - Wire up frog polarity control

Wiring



Run Trains!!!

Resources

- UP Industrial development : Prototype info
  - http://www.up.com/customers/ind-dev/operations/specs/track/index.htm
- NMRA Standards : dimensions
  - http://www.nmra.org/index-nmra-standards-and-recommended-practices
- Proto87
  - http://www.proto87.com/
- Kappler Mill and Lumber Co : Ties, scale lumber
  - http://www.kapplerusa.com/y2k/kp-main.htm
- Clover House
  - http://cloverhouse.com/Store/
- Hand Laid Track
  - http://www.handlaidtrack.com/