2.6 Making Pointwork Components

The range of tools for making pointwork components is fairly basic. The minimum requirements are:

- Files of best quality, in good condition, including a large coarse-cut flat file for the heavy cutting, (9in or even 12in), a similar size fine-cut flat file for finer work and Swiss files, half-round and knife-edge.

Note: *For use on brass and nickel silver files should be new with the teeth chalked - brass needs very sharp files to avoid the need for excessive pressure. Mark the handles to keep them separate from the others. As they wear they can be downgraded for use on steel.*

- Wet and Dry paper, for fine finishing. Sanding sticks can be made by wrapping strips around small timber section and securing with glue. Other useful finishing items include brown scouring pads and Garriflex blocks.
- Piercing saw with a selection of new blades. Razor saw with a fine metal cutting blade.
- Pliers - new, good quality with clean unbruised jaws that close parallel. Stone a few thou off the edges to avoid leaving sharp dints in the material being gripped. Polish the faces with sanding sticks and store clean and dry, free of flux and lightly oiled.
- Rules, 12in calibrated in millimetres and inches and a scale rule when replicating prototype dimensions..
- Felt-tipped pen.
- Soldering iron, small or medium-sized (say 40 watt minimum but 50 watt temperature controlled is better) and having a modern, iron plated tip. Keep a damp sponge to clean off 'cooked' solder and flux between breaks in use. For copper tips, an old file, kept especially for the job, can be used for cleaning and shaping corroded, eaten or damaged tips to produce new working edges. When clean and bright, re-tin. Keep an old pair of pliers to change hot tips for spares when they become past their best.
- Scraper to remove surplus solder. Can be made from an old wood chisel or a screwdriver blade ground to a clean sharp edge.
- Vice with 3in (or longer) jaws. One with heavily serrated jaws can be made suitable by using pieces of angle as liners in the jaws to grip without damage to the surfaces of the rail. These can be aluminium, copper, lead, fibre or any material that will grip without marking the workpiece. Lengths of steel angle in the jaws can also be used to enlarge an undersized vice. The liners can be held in place with double sided tape when setting up. Special jaw liners can be made with grooves, notches or holes to protect finished items.

Note: *At the risk of stating the obvious, when cutting lengths of rail to form components always make them a few millimetres too long to allow mistakes to be corrected. A component that is too long can be shortened but a component that is too short is scrap.*

2.6.1 Blades and stock rails

The geometry of pointwork based on the prototype is dealt with in greater detail in data sheet D2.2.1.1. For the majority of model applications point blades will either be straight switches pivoted at the heel or semi-curved switches where the blade is sprung. 9ft to 15ft straight switches and A and B semi-curved switches cover most model requirements. However, 6ft straight switches and A and B fully curved switches have been included in Table 2 for those who wish to use them. The model straight and semi-curved switches are simple to produce since the planing for both types is straight but the planing of fully curved switches is more difficult. The amount to be filed off to produce the model blade will depend on the type of blade being made.

In the case of switches where the blade is sprung, for convenience the blade and closure rail can be combined into a single unit. Some more advanced workers make the switch, closure and wing rails as one piece but this is not recommended for the less experienced modeller.

If this method is used, then when filing the blade, make the planed portion slightly over length to allow for final adjustments once the wing rail clearance is set. A combined unit removes the need to align the three sections of the turnout curve; the joints between each section being simulated with a fine saw cut in the rail head and cosmetic fishplates attached to the web. The location of the insulating gap for two-rail electrification can then be made at any convenient point in the closure/wing rail to suit the configuration.

Tables 1a and 1b (page 2-2-23) link model turnout radius to crossing angle while data sheet D2.2.1.1 shows the range of blade types recommended for the various crossing angles. Table 2 shows the length to be filed from code 124 bullhead rail or code 143 flat-bottomed rail to represent the planed length (S-C = Semi curved, F-C = Fully curved). The last column shows the planing for code 200 bullhead or code 220 flat-bottomed rail for coarse standard track.

Compiled by R. Chown, H. Finch, M. Holland, K. Sheale, K & J Thomas.
Drawings by M. Holland, T. Shaw, K. Sheale

Table 2

<table>
<tr><th rowspan="2">Prototype blade type</th><th rowspan="2">Switch rail length - mm</th><th colspan="4">Scale length of planed portion of blade - mm</th></tr>
<tr><th>Scale Seven *</th><th>0 fine *</th><th>0 coarse *</th><th>0 coarse **</th></tr>
<tr><td>6ft</td><td>42</td><td>25.7</td><td>20.2 ‡</td><td></td><td></td></tr>
<tr><td>9ft</td><td>63</td><td>38.5</td><td>30.4</td><td>26.5 ‡</td><td></td></tr>
<tr><td>12ft</td><td>84</td><td>51.3</td><td>40.5</td><td>35.4</td><td>43.3‡</td></tr>
<tr><td>15ft</td><td>105</td><td>64.2</td><td>50.6</td><td>44.2</td><td>54.2</td></tr>
<tr><td colspan="6"></td></tr>
<tr><td>(BH) A S-C</td><td>140</td><td colspan="3">38.9</td><td>55.9</td></tr>
<tr><td>(BH) B S-C</td><td>157.5</td><td colspan="3">51.5</td><td>73.7</td></tr>
<tr><td>(BH) GWR B F-C</td><td>157.5</td><td colspan="3">59.0</td><td>71.5</td></tr>
<tr><td colspan="6"></td></tr>
<tr><td>(FB) B S-C</td><td>199.5</td><td colspan="3">51.4</td><td>73.5</td></tr>
<tr><td>(FB) A F-C</td><td>199.5</td><td colspan="3">49.6</td><td>60.1</td></tr>
<tr><td>(FB) B F-C</td><td>217.3</td><td colspan="3">69.2</td><td>83.9</td></tr>
</table>

* Assuming either code 124 bullhead rail or code 143 flat bottomed rail, having a rail head width (h_r) of 1.6mm.

** Assuming either code 200 bullhead rail or code 220 flat bottomed rail, having a rail head width (h_r) of 2.35mm.

‡ These switches have a significant angle of deflection at the toe and should only be used where limited space prevents the use of longer turnouts. (See D2.2.1.1, Compromises)

2.6.1.1 Making the blades

From the above tables first decide which type of blade is required for the turnout under construction. Prototype blades can be machined to a range of profiles including straight cut, undercut and chamfered types. Of these the straight cut switch is the easiest for modellers to make and it is recommended that this type be chosen. (Figure 2-40).

For a sprung blade, it is recommended that the blade and closure rails be made as a single unit. A saw-cut in the railhead of the finished unit and the addition of cosmetic fishplates can be used to simulate the joint between them.

- Mark out the scale length of planing on the head. On the running face, file the head down to the web at the toe end, tapering to leave the full head width at the end of the planing. Do not file the rail foot (BH rail) or bottom flange (FB rail). (Figure 2-41).
- Bend the filed length to align the taper and give a straight running face to the switch. With FB rail it is necessary to either file a notch or cut a shallow vee with a piercing saw and grip firmly as the bottom flange being wider may try to twist the rail. See also Figure 2-42.
- File the opposite face from full railhead width at the end of planing to the final thickness at the toe.
- The prototype toe thickness of 3/8in equates to 0.22mm in 7mm scale but a range of 0.25mm to 0.35mm will meet the needs of most modellers. The end should be slightly chamfered and rounded to give an easy passage to wheelsets. (Figure 2-43)
- Repeat the procedure for the second blade remembering to make it the opposite hand.
- The initial steps described above are identical for both straight and semi-curved switches. For semi-curved switches the rail beyond the end of the planing is carefully curved to match the switch curve.

Fully curved switches follow a slightly different procedure. A simple jig is required. (Figure 2-44). A piece of hardwood is shaped to the curvature of the switch or, alternatively, a version of the homemade jig (Figure 2-45) could be made using a tile cut to the required curve.

For the curved blade:

- Mark out the scale length of planing on the head. On the running face, file the head down to

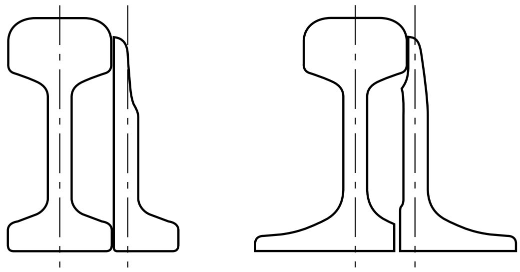


Figure 2-40 End views of straight-cut Bull head and flat bottomed switches.

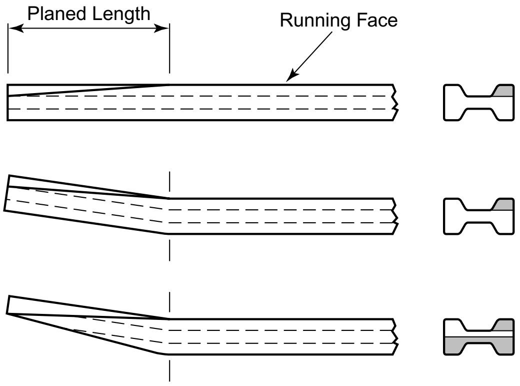


Figure 2-41 The steps in filing a switch blade.

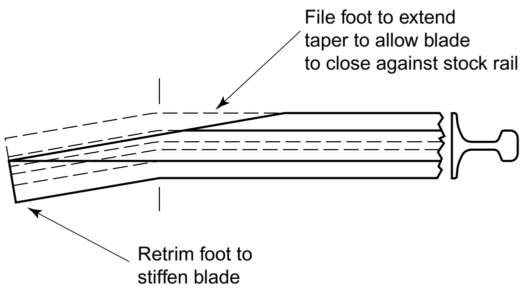


Figure 2-42 FB rail variation

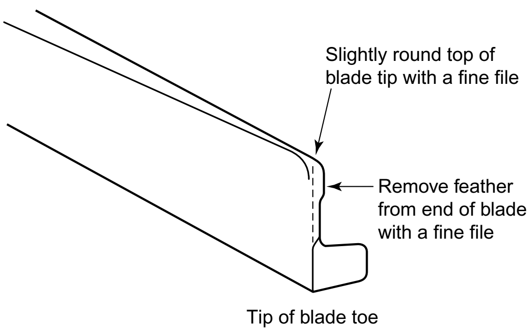


Figure 2-43 Finishing off the tip of the blade.

the web at the toe end, tapering to leave the full head width at the end of the planing. Do not file the rail foot (BH rail) or bottom flange (FB rail).

- Bend the running face of the whole blade, including the tapered portion, to the required radius and clamp to the hardwood jig.
- With a flat file, file the opposite face the full depth from the end of planing to the toe.

For the straight blade:

- Mark out the scale length of planing on the head and file the full depth from the end of planing to the toe.
- Bend the planed portion of the rail to the required radius and clamp to the hardwood jig leaving the remainder of the rail straight.

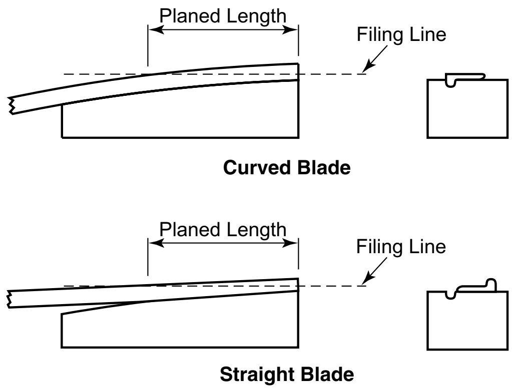


Figure 2-44 Simple jig of hardwood to assist in filing fully curved turnout blades to give the correct 'hollow' effect.

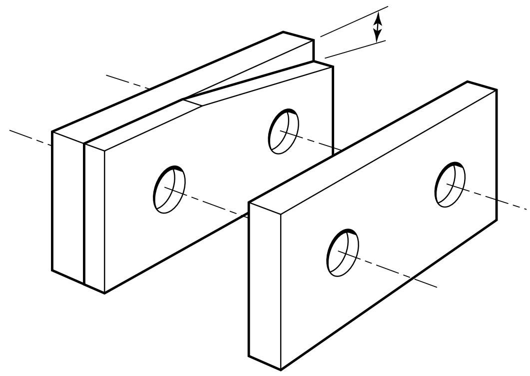
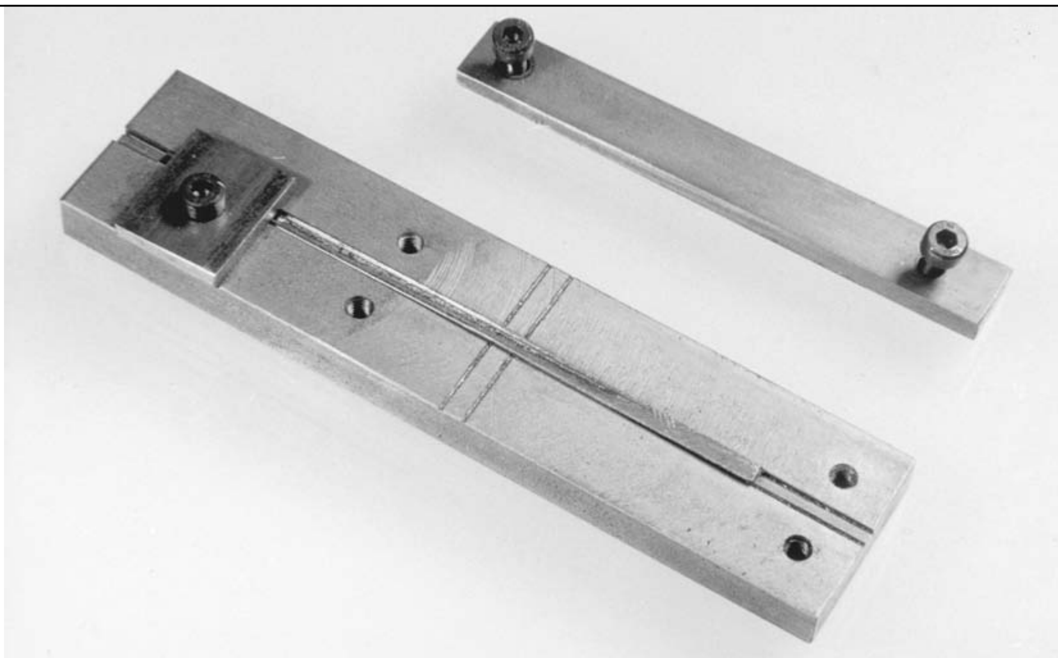


Figure 2-45. Simple filing jig made from two pieces of scrap plywood and a piece of 1/8in cork tile held together by a couple of bolts. The tile is cut to the planing angle. Code 124 rail (1/8in high) lies on the cork and is gripped by the plywood when the bolts are tightened compressing the cork. Several units can be made to suit different blade and crossing angles.



(D. Farnsworth)

Photo 2.29 Blade filing jig from the Scale 7 Group. The blade is having its mating face prepared. The guide bar is used to prevent the rail foot from being filed when preparing the running face. The two locations provide for the left and right handed blades.

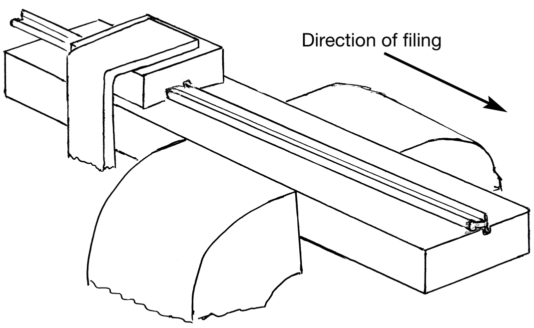


Figure 2-46 Supporting the rail in a vice. The grooves in the batten and in the block hold flat bottom rail square for filing.

- With a flat file, file the head down to produce a straight running face with the rest of the blade. Do not file the rail foot (BH rail) or bottom flange (FB rail).

2.6.1.2 Notes on filing blades

Blade filing jigs made of casehardened steel and suitable for straight planed switches are available. They are well worth considering, particularly where a large number of blades are to be manufactured as they make the process quick and

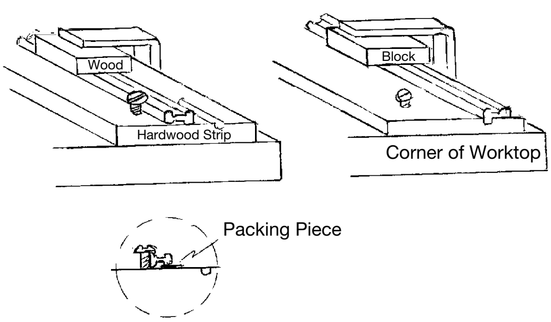


Figure 2-47 Clamping the rail to the edge of the workbench. The screw acts as a guide when filing the running face of the railhead. Flat bottom rail has its head supported on a packing piece to hold it square for filing.

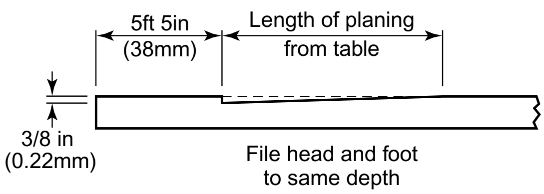


Figure 2-48 Filing a rebate into the straight stock rail.

accurate. Photo 2.29 shows an example. If only a few blades are required a simple home made jig is an alternative. An example is shown in Figure 2-45.

One offs can be filed up in a vice but this can be difficult due to the small angles and length of planing involved. A batten can be gripped in the vice and the rail clamped to it. This will provide support while filing. A shallow groove in the surface is particularly useful when filing the heavier code 143 flat bottom rail. (Figure 2-46). When filing the running face of the blade, the filing direction needs to be along the length of the blade. This can be awkward as the orientation of the average bench vice is for its vice jaws to be at right angles to the normal direction of filing. The normal direction is easier in the later stage when the full depth of the rail has to be filed. For modellers who possess swivelling-jaw bench vices this poses no problem but for those without, the following alternatives should be considered. Portable vices that clamp on to the worktop can be mounted on the side of the bench to present the workpiece end-on. Mount the workpiece on a batten that, in turn, can then be clamped to the side of the workbench. (Figure 2-47).

Warning. *When using the jigs, file towards the end of the rail. If, for some reason, the direction of filing the railhead needs to be towards the blade, filing should be done with care. Should the file slip the reason for referring to them as blades will become apparent.*

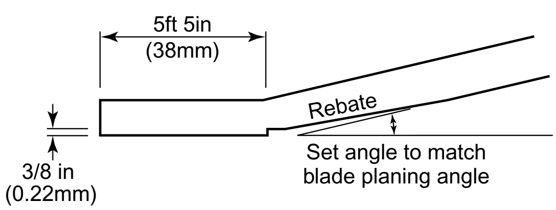


Figure 2-49 Rebate in curved stock rail.

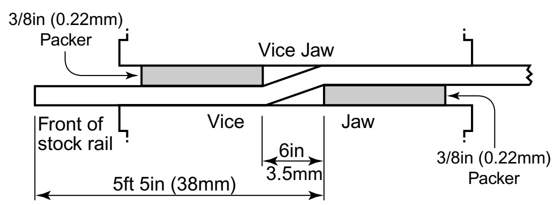
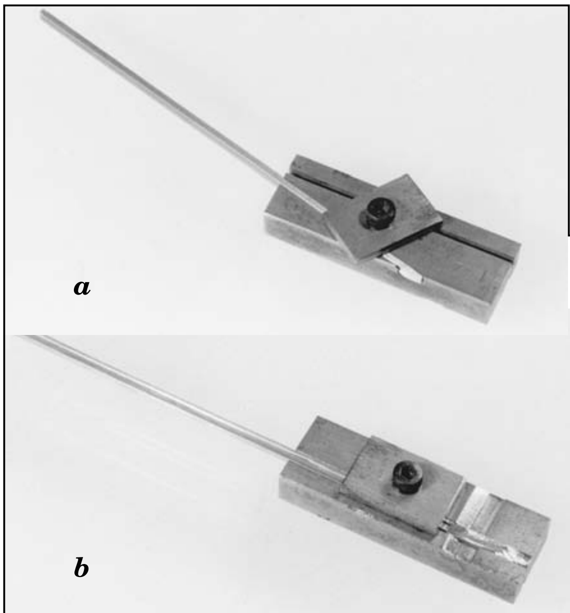


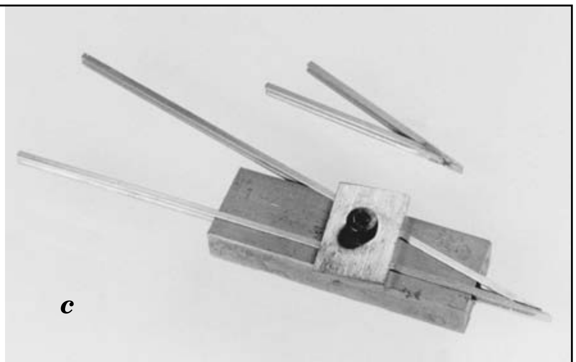
Figure 2-50 Pressing a joggle into a stock rail in the vice.

2.6.2 Stock rails.

To allow a smooth passage for wheels at straight-cut blades, the stock rails of facing turnouts were sometimes joggled to protect the tip of the blade. They were not normally used on trailing turnouts. The joggle was 6in (3.5mm) long had a depth of 3/8in (0.22mm), to match the blade thickness at the tip. In model form joggling is not necessary as wheelset clearances are greater and switch blade tips do not get the same amount of hammer blow as the prototype and can be safely filed to a sharp point.

If, however, it is decided to use them, the easiest method is to file a rebate in the rail to the same depth. This is also the recommended method for flat-bottomed rail where it is necessary to rebate the bottom flange to house the blade. The rebates in straight and curved stock rails are shown in Figures 2-48 and 2-49. Reproducing a





(D. Farnsworth)

Photo 2.30 Crossing filing and soldering jig by the Scale 7 Group. ***a****, the blade is filed to the crossing angle* ***b****, the point rail is mounted on the reverse of the jig and the splice filed and,* ***c****, the two halves are held in position for soldering. A finished crossing is shown at the side.*

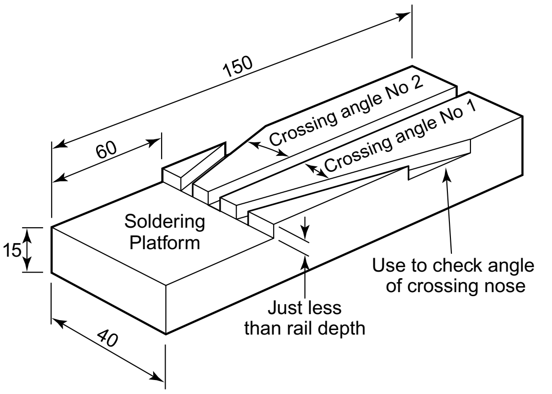


Figure 2-51 Crossing filing and soldering jig for two set angles. Made from hardwood.

joggle in bullhead rail is possible by annealing it to soften it and pressing it in a vice, but it requires some care. (Figure 2-50)

2.6.3 Common crossings

The components that form a common or acute crossing are illustrated in Figure 2-7 on page 2-2-6. In the finished assembly the point rail forms part of the main running line and the splice rail part of the diverging line, except for the GWR, which reversed the procedure. Case hardened steel filing and soldering jigs are available in a range of crossing angles and are worth considering if a large number of turnouts are being built. Photo 2.30 shows a commercial unit and Figure 2-51 a home-made version. Where there is only an occasional need the angle can be filed in the vice using jigs similar to that made for the blades and a rough clamp made to set the rails up for soldering (Photo 2.31).

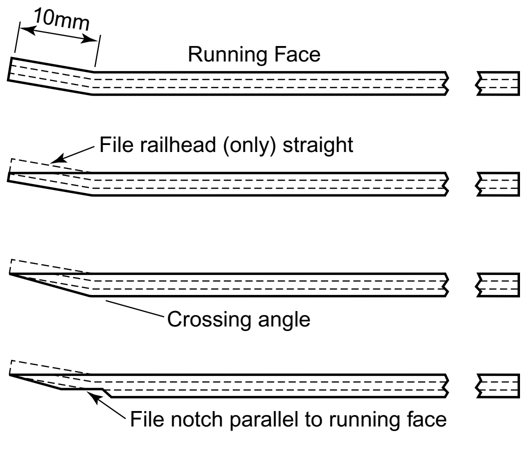


Figure 2-52 Filing the point rail.

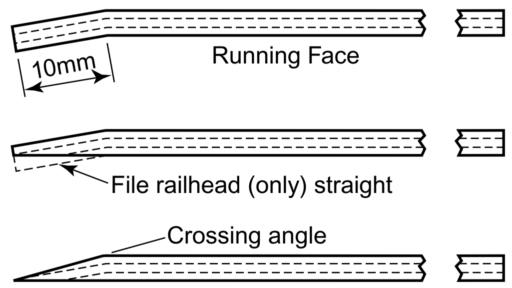


Figure 2-53 Filing the splice rail.

2.6.3.1 Point and splice rails

The procedure for making the point and splice rails is similar to that for making blades.

Again, the length of rail selected should be as long as possible to provide a smooth transition, the joint between the crossing and running rails being simulated by a saw cut and cosmetic fishplates.

Point rail (Figure 2-52)

- The first 10mm of the point rail is bent outwards on the running face to about half the desired crossing angle.
- The head is then filed flush with the face so that the nose presents a solid appearance.
- The end is then filed to match the crossing angle.

A notch is filed in the end with its long face parallel to the running face and deep enough to expose the web. *(Unless a filing jig is available this step can prove difficult and could be left out. In the case of flat bottomed rail, the foot will need to be eased to allow the splice rail to butt firmly up against it when soldering).*

Splice rail (Figure 2-53)

- Repeat the first two steps with a second piece of rail remembering to make it to the opposite hand.
- File the end of the splice rail to match the notch in the point rail. (Or to butt against the side of the point rail).
- The two rails can now be soldered together to form the Vee of a common crossing. (Figure 2-54) A jig like that in Photo 2.31 can be quickly made up with a cork vee cut to the required crossing angle.

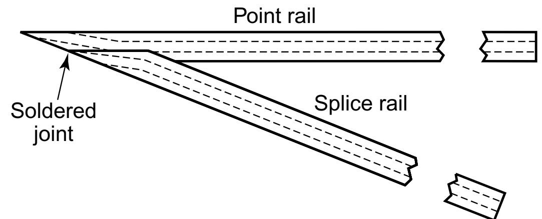


Figure 2-54 Finished crossing.

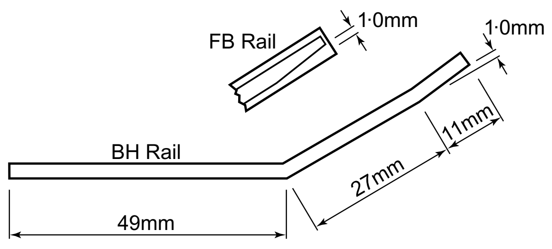


Figure 2-55 Wing rail. The overall prototype length is 12ft 3in (85.75mm) but the running and check rail proportions vary slightly depending on the crossing angle.

2.6.3.2. Wing and check rails

Figure 2-55 shows the general formation of wing rails. These can be bent to shape with pliers on a trial and error basis. In the case of flat bottomed rail, to assist bending mark off the position of the knuckle and notch the inner face with a knife-edge file or saw at this point, close up and solder. Don't make the notch too deep; the running face of the finished knuckle should be slightly curved (3ft 6in in the prototype) not bent at a sharp angle. The final assembly of the crossing vee and wing rails can be done in situ as the turnout is produced but an assembly jig makes construction much easier. A commercially produced jig is illustrated in Photo 2.25 (page 2-2-25) and a home made version in Figure 2-56.

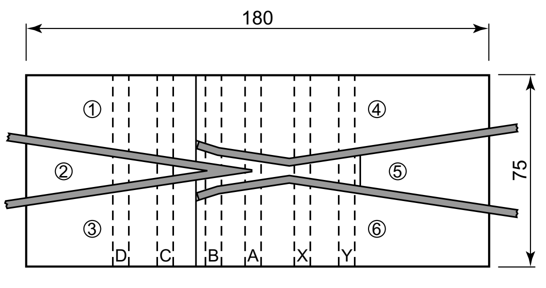
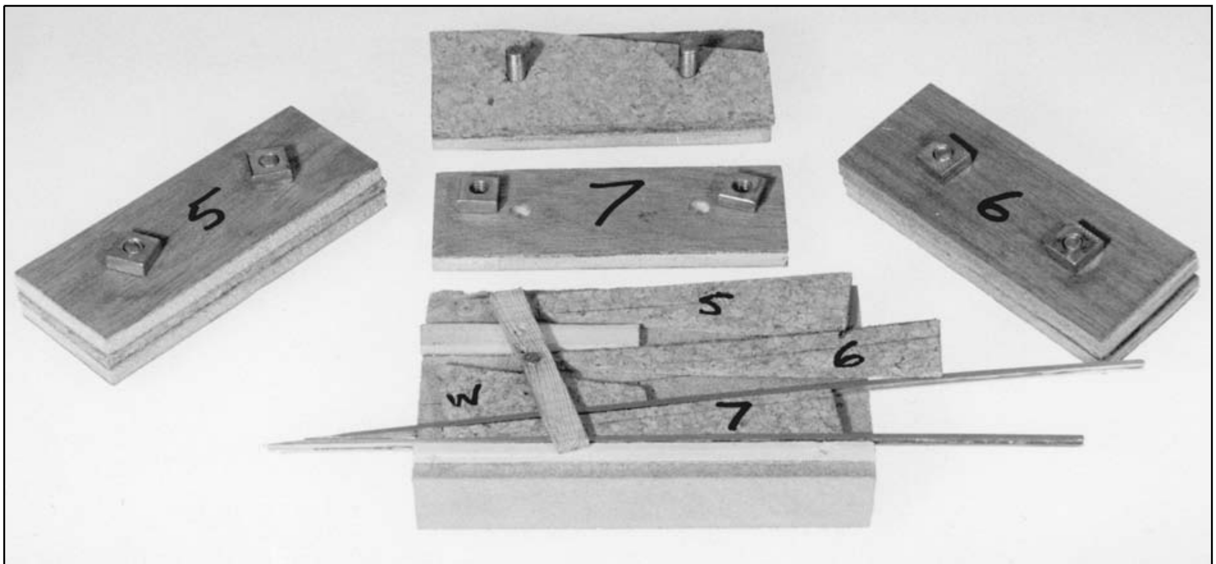


Figure 2-56 Crossing assembly jig made from six separate pieces of thin ply cut to shape and screwed to a flat base. The markings show the location of the timbers carrying the special chairs or base plates at the crossing. The A timber supports the crossing nose, B,C and D are away from the toe of the turnout and X and Y are towards the toe. The ply should be thinner than the rail height to ensure that the rail lies flat on the base.



(D. Farnsworth)

Photo 2.31 Home made versions of crossing filing and soldering jigs using materials from the scrap box. The three filing jigs are made from scrap ply and cork tiles in the form of a 'cork sandwich' as illustrated in Figure 2-45. The crossing angles are 1 in 5, 1 in 6 and 1 in 7 but any angle required can be fabricated in a few minutes. They can produce quite a large number of crossings before requiring replacement.

The soldering jig below has a fixed strip and a series of cork wedges to hold the rails at the correct angle. The piece marked W jams the splice rail against the wedge and the wooden strip clamps the assembly while the joint is soldered.

The ends of bullhead wing rails and check rails are curved outwards to give a smooth entry into the flangeway. Flat-bottomed wing and check rails are not curved but have the ends machined (filed in the model form) to a similar profile.

2.6.4 Obtuse crossings

An obtuse crossing, sometimes called a K-crossing, is illustrated in Figure 2-14 (page 2-2-12). As in the prototype, crossing angles flatter than 1 in 8 require a switched diamond to prevent a wheelset from taking the wrong path.

Manufacturing the crossing components uses similar methods to those employed in making common crossings and, in fact, is slightly easier. Bending the knuckle or elbow rail is similar to making a wing rail. Nicking or filing a vee in the rail at the elbow assists in obtaining a crisp bend, particularly when the crossing approaches a right angle. The point rails are made in exactly the same way as the splice rails for a common crossing, i.e. they are not required to be notched. (Figure 2-53). The wing rails have the lead-in section bent or filed at both ends. The crossing assembly jig (Figure 2-56) can, with care, be used to assemble an obtuse crossing.

2.6.5 Moving the blades

The blades of a model turnout move a greater distance than the prototype equivalent. The increase is small in Scale Seven but is substantial in O Fine and O Coarse Standards. The additional movement, particularly in the case of sprung blades, throws a strain on the joint between the blade and the stretcher. Most problems that occur seem to be caused either by the point blades being soldered directly to the stretcher or to rivets that are a tight fit in the stretcher. With frequent point movement the soldered joint gradually suffers a fatigue failure. To allow for this increased movement, it is recommended that the stretcher bar should be connected to the point blades by some form of pivot that allows relative rotation about a vertical axis.

2.6.5.1 Stretcher-bars

Trackwork manufacturers have a range of point stretcher bars. For those who prefer to make their own, the simplest form of mechanism for operating point blades is the 'moving sleeper' type. This is illustrated in figure 2-57. To disguise it as much as possible it should be located at the toe of the blades where the first slide chairs would normally be positioned. It can be made even less obtrusive if the 'moving sleeper' is made only slightly longer than the distance between the switch toes and cosmetic part sleepers are added from the stock rails outwards.

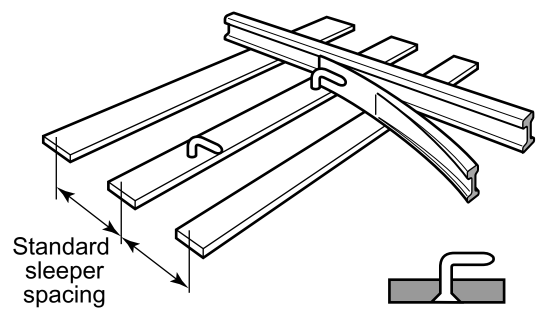


Figure 2-57 Dummy sleeper form of drive bar for blades. Set equidistant between actual sleepers. The pins are soldered to the point blades but free to rotate in the dummy sleeper.

Painted to match and with the fixed sleepers either side spaced to suit, it can be almost invisible. The moving sleeper consists of a simple PCB or perspex bar, drilled and lightly countersunk to accept Lill or dressmaker's pins. The spacing for the drive pins will depend partly on the standard being used and partly on the design of the turnout.

Where the blades are pivoted at the heel and move without bending, the spacing would be track gauge minus blade throw and minus the thickness of the blades themselves. For example, a fine standard turnout with blades 1mm thick at the foot would require a spacing of - 32mm - 3mm (throw) - 2mm (two blades) to give 27mm centres.

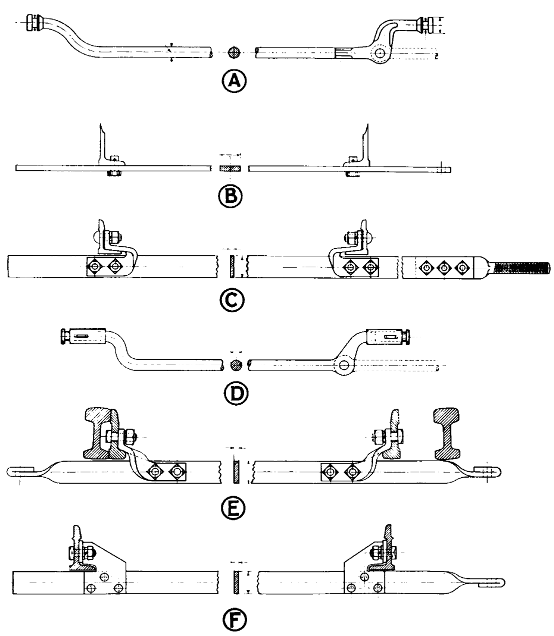


Figure 2-58 A range of stretcher bars for bull head and flat bottom rail that were in general use up to the late 1960s.

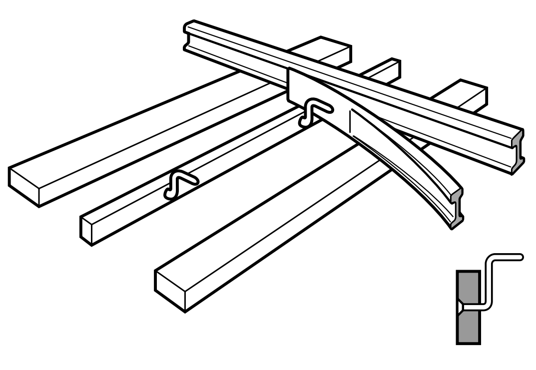


Figure 2-59 Strip of PCB set on edge to simulate a flat stretcher. Attached to the blades by dressmaker's pins.

In the case of a sprung turnout, where the blade and closure rail form a unit, the blade bends between the toe and the nominal heel position. This can cause the flangeway to be restricted part way along the blade. To overcome this a flangeway gauge should be inserted at the tightest spot and the blades set using that. The throw then gives the closest possible approach to prototype irrespective of track standard.

If the blade is particularly stiff this clearance could require the throw to be grossly exaggerated. A preferable solution is to secure the rail one or two sleepers further back from the correct heel position. This would allow the rail greater flexibility, the intermediate locations being disguised by dummy chairs.

Figure 2-58 shows a range of stretchers that were in general use up the late 60s and can still be found in sidings and secondary lines. Modern designs are very similar.

A number of modellers have provided information on a range of home made versions of stretcher bars that attempt to give a closer to prototype appearance. One of the simplest is shown in Figure 2-59 where the operating bar is a strip of PCB set on edge. The dressmaker's pins have an extra bend to give a reasonable length to solder to the blade. When painted black the depth is almost unnoticeable. As the pivot is not truly vertical the pins might eventually suffer from fatigue but they will last far longer than where the blades are soldered directly to the stretcher.

Figure 2-60 shows a scheme originally published in the Gazette. Small strips of metal about 0.25mm (0.010in) thick and 3mm (0.125in) wide are soldered to the end of the point blades. These are made long enough to pass under the stock rails. This has the additional benefit of preventing the switches riding up above the stock rails and causing a derailment. One end is

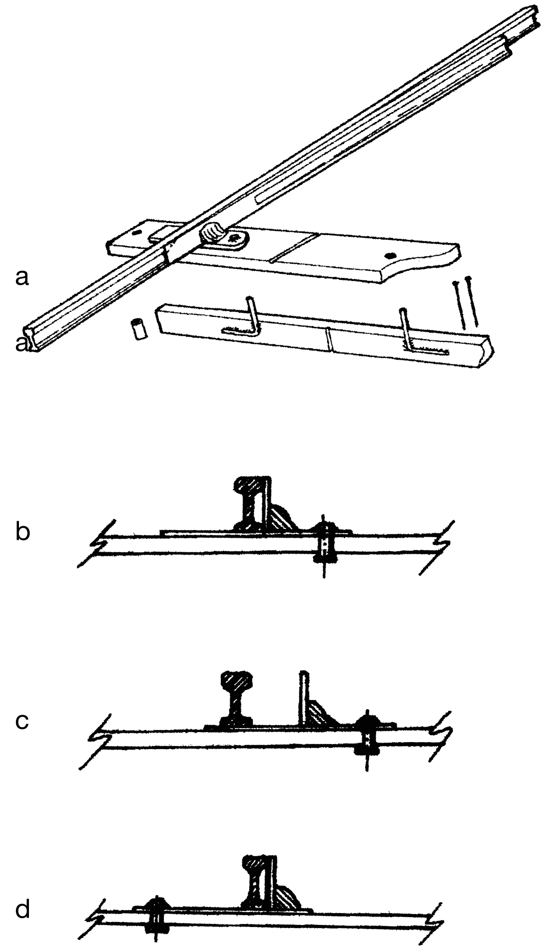


Figure 2-60 Operating scheme originally described in the Gazette.

rounded and drilled about 1mm (0.040in) to suit the pivot wire. Sketches b and c show the closed and open positions. The pivot can also be located outside the running rails as shown in d. If the space is confined this could be used in combination with a pivot inside the running rails, a useful feature when dealing, for example, with slip points.

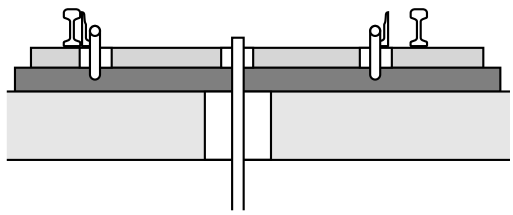


Figure 2-61 Alternative scheme. The tube shown in the centre of the stretcher is to provide a connection for the operating wire of a drive mechanism, in this case a Tortoise point motor, located below the base board.

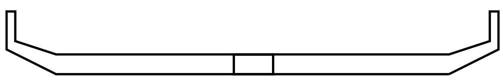


Figure 2-62 Stretcher made from thin wall tube with a plastic rod insert and the ends flattened to fit into the web of the point blade.

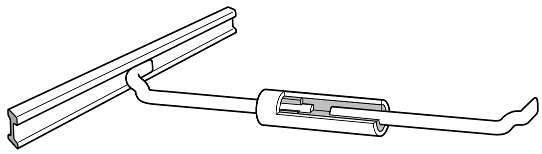


Figure 2-63 Rod stretched made from wire and tube on the 'split axle' system.

Referring to Figure 2-60, sketch a, this shows a normal flat bar for use with pointwork constructed with PCB (copper clad) sleepering. To keep the width as narrow as possible use 00 or TT sleeper strip mounted copper side down. The strip is drilled and pivot wires, a little over length, are soldered to the copper side. The pivot wires are led through the blade strips, trimmed to project about 3mm (1/8in) and turned over. For two rail working the copper side should be gapped for insulation in the centre and near the operating rod connection.

Where the track is constructed with proprietary components that include deeper sleepering, the lower version in sketch a with the strip on edge is preferable. Small 'L' shaped pieces of wire are soldered to the strip to form the pivots. Again they are left a little over length and trimmed once they are fitted. They can be kept upright by small guide pins driven into the baseboard either side of the bar. The operating rods can usually be soldered direct to the copper clad strip, unless there is an angle crank immediately adjacent, in which case a short length of 1.5mm (1/16in) o.d. pivot tube can be soldered to the copper. An alternative scheme is shown in Figure 2-61. It comprises a vertical strip of PCB with short lengths of pivot tube soldered to it. These can be positioned for soldering using a simple jig. Pivot wire is soldered to the blades and is long enough to protrude below the bottom of the pivot tubes. The end can be turned over or secured with a washer soldered into position to hold the stretcher in position and prevent the blades from lifting. An alternative is a fine screw soldered to the blade in place of the wire and held in place by a nut and washer.

Rod stretchers are more difficult to model satisfactorily due to their small diameter. The prototype rods shown in Figure 2-58 are 1 1/4in diameter or 0.73mm in 7mm scale. Brass rod is available with a diameter of 0.8mm (1/32in), which is very close to scale. A stretcher can be shaped from this and, if the turnout is for three rail or the wiring system has the blades, closure rail and crossing all at the same polarity (see Figure 3-1b on page 8-3-1 of Part 8, Electrical), then it can be soldered to both blades. Alternatively, one end can be soldered to one blade and the other attached to the other blade using an epoxy resin with a thin insulator between to avoid short circuits.

For those who prefer not to rely on a face joint using epoxy, an alternative is to produce a stretcher with an insulated break in the middle. 1.5mm o.d. thin wall brass tube with an i.d of 1.05mm is available. Use the tube as a stretcher and join two sections with a length of plastic rod held in place with epoxy. The epoxy can also fill the gap between the two pieces of tube and, when set, it can be cleaned up and the joint will be invisible. (Figure 2-62). Alternatively, the tube can be used as the outer sleeve over 0.8mm rod to form a type of 'split axle' joint, all held together with epoxy resin. Figure 2-63 shows an example. When attaching wire or rods to blades, flatten the end to give a larger contact area.

2.6.5.2 Under baseboard drive unit

A system using a particular variety of Swish curtain rail was described by a number of members. It first appeared in the model press some years ago but as the particular design of curtain rail is still available it has been included here. (Figure 2-64).

Pivot wires, long enough to reach below the baseboard, are soldered to the blades. They can either be straight as shown or bent to sit out of sight under the stock rails. Holes about 6mm (1/4in) diameter are drilled through the baseboard to provide room for the pivot wires to move. A square drive bar, sized to slide easily in one slot of the curtain rail, is fitted with two pivot tubes. The unit is positioned below the baseboard under the toe of the turnout and the pivot wires are fed into the drive bar tubes. It is held in place with a couple of screws through the unused side into the baseboard.

2.6.5.3 Pivoting straight switches

Straight switches of the 'tongue' and 'heel' type are pivoted at the heel joint by a fishplate or a specially designed chair respectively. Although they are not straight switches, Peco's commercial turnouts use the former type of heel. To prevent 'creep' of the blades, a wire 'anchor' should be used

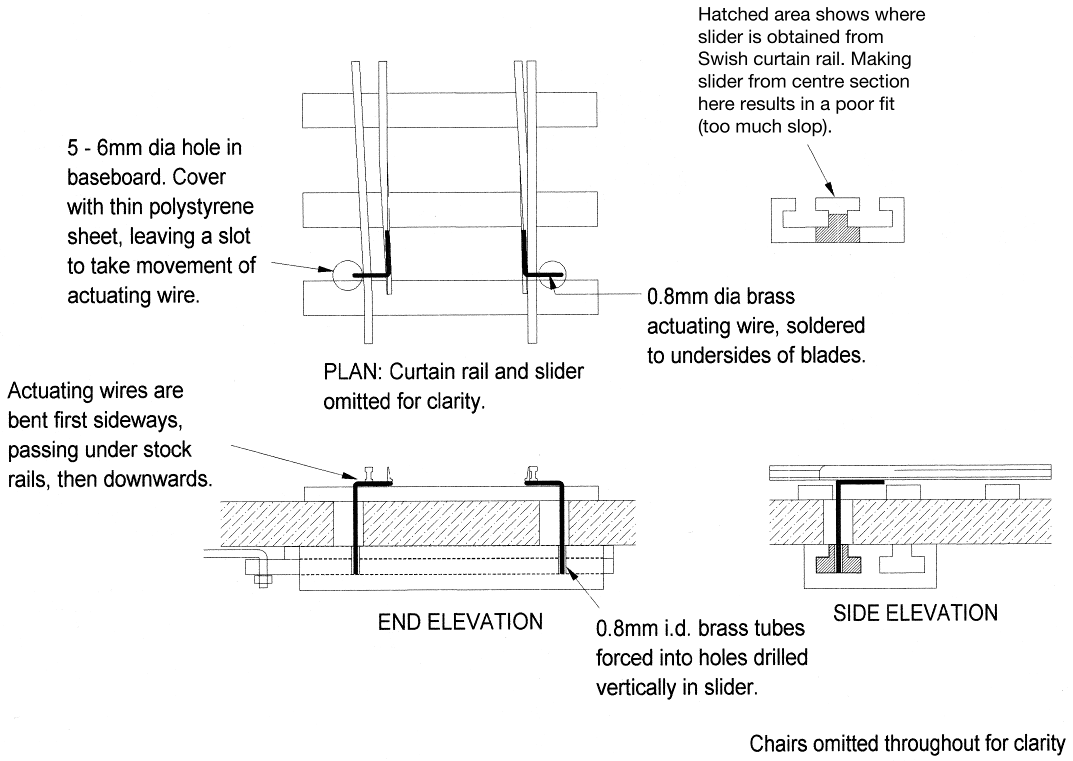
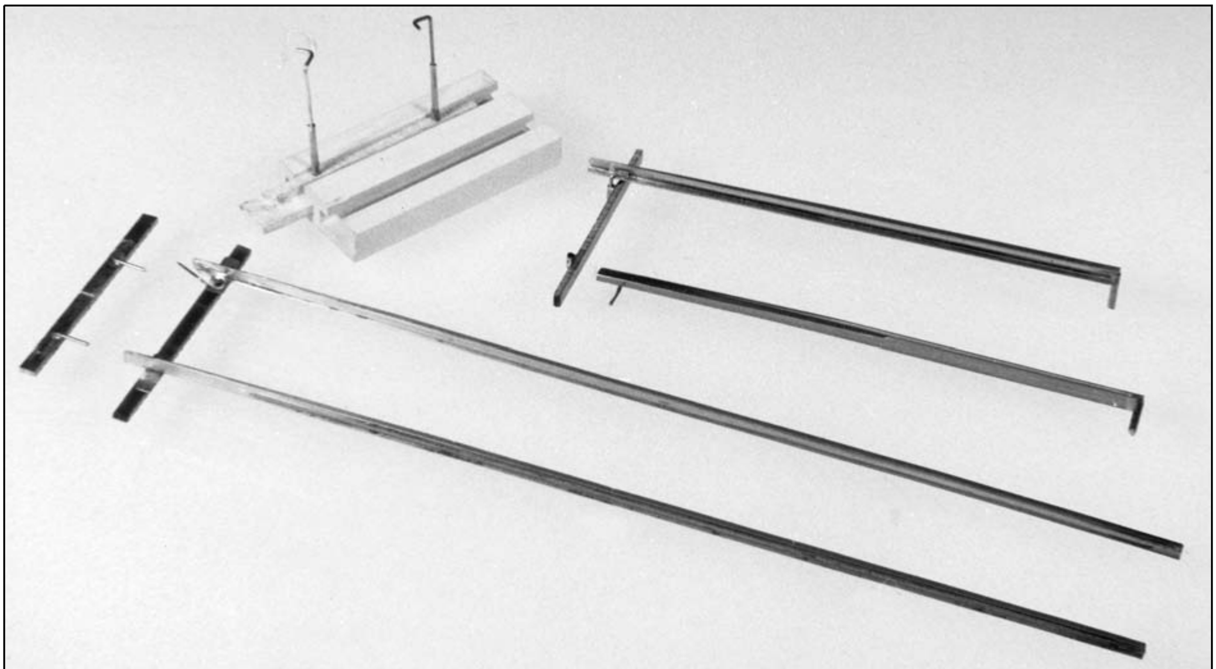
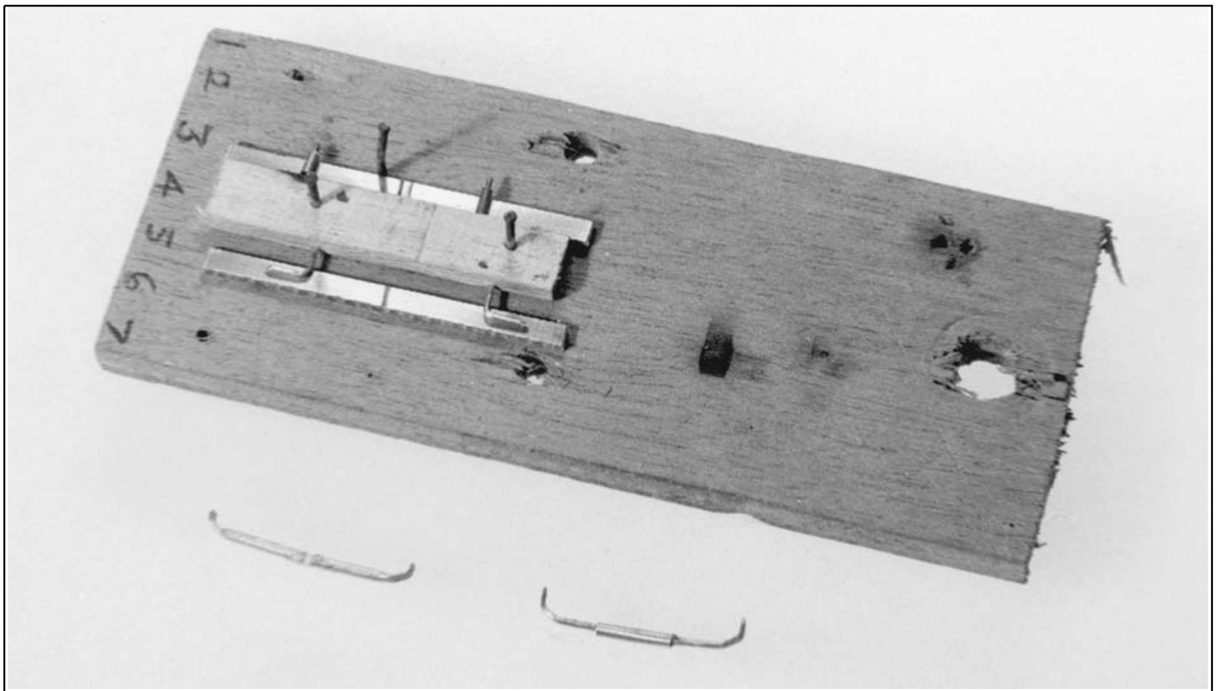


Figure 2-64 Under baseboard driving bar based on Swish curtain rail.



(D. Farnsworth)

Photo 2.32 A selection of blades and stretchers. At the top left is an under baseboard unit using Swish curtain rail (see Figure 2-64). The pivoting blades to the right have droppers of fine wire that are moved by a vertical stretcher (see Figure 2-61). The pivot is a simple screw and will be secured by a nut (see Figure 2-65). The spring blades featured below are attached to a PCB stretcher with dressmaker's pins (see Figure 2-60). The alternative version using a vertical stretcher with pivot wires is shown alongside.



(D. Farnsworth)

Photo 2.33 Stretcher jig made from the scrap box . On the near side, the wooden strip has a pair of holes to position the pivot wires while they are soldered to the stretcher. On the far side there are two wires fixed into the strip to locate the pivot tubes while they are soldered into position.

The stretcher, below left, is made from 1.5mm dia. tube (see Figure 2-62). The other is 0.8mm brass wire with an insulating sleeve in the middle (see Figure 2-63).

to join the switch and closure rails, the fishplate being only attached to the closure rail to support the switch but not to impede its movement. The fishplate can be either a commercial product or a home made version as preferred by the modeller. In the latter case, thin strips of flat brass are available which can fit into the web of the rail. Short strips can be soldered to each side of the closure rail and project forward to grip the switch and simulate the fishplate normally located there.

For the 'heel' type of switch an alternative is to provide an actual pivot at the heel. At the heel of the switch rail, the lower web is partly filed away to accept the head of an 8 or 10 BA screw. (Figure 2-65). This is soldered to the rail and inserted into a clearance hole in the sleeper supporting the heel. It is held in place by a nut below the sleeper, which is secured with a touch of Loctite. The switch is clipped in the closed position and the closure rail aligned with the end of it.

A second alternative is to replace the screw with a length of rod. The rod passes through a hole in the sleeper and is secured by soldering a thin washer to it below the sleeper. In both cases the below sleeper projection provides a useful point of connection for the power supply to the blades. With bullhead rail a cosmetic chair can hide the screw head or rod but this more difficult if flat bottom rail is being used. In that case the pivot rod is the better proposition. An example of an industrial flat bottomed rail heel switch appears in Photo 2.23 and Photo 2.34 shows a close up of the single stretcher.

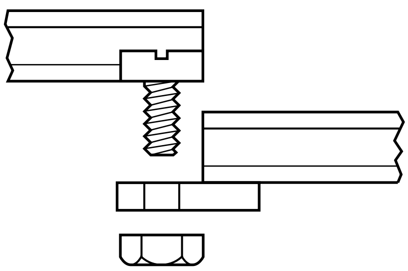


Figure 2-65 A BA screw used as a pivot for the heel of a switch.

Photo 2.34 *(G. Davidson)*

2.6.6 Other details

Point locks are required for all turnouts that are used in a facing direction by passenger trains. These (working or cosmetic), can be included as the modeller wishes. Point locks were generally of two basic types. The most widely used consisted of two notches in an additional front stretcher bar bolted between the toes of the switches, one of which lined up with a longitudinal bar, depending on which way the points were set. (Photo 2.35) A separate lever in the signal box advanced the longitudinal bar into the appropriate notch, thus locking the points. Another example for flat bottom Rail is shown in Photo 2.36.

(K. Thomas)

Photo 2.35 GWR style front stretcher with facing point lock. Under the cover the centre has a flat section notched to receive the locking bolt. The second stretcher, just visible beyond the sleeper, is a flat bar. (Bewdely, SVR)

The other type, known as the 'economical lock', had a number of variants. A common type consisted of a plate containing a diagonal slot with a longitudinal 'land' at each end. The transverse displacement of the slot is equal to the throw of the switch blades.

Attached to the stretcher bar is a block which fits into the slot and which normally rests in one of the 'lands', thus locking the points. Movement of a single lever in the signal box causes the slotted plate to move longitudinally, firstly unlocking the points, then causing the block to move sideways and finally entering the other 'land', thus relocking the points in the other position.

Photo 2.36 *(Pandrol Rail Fastenings)*

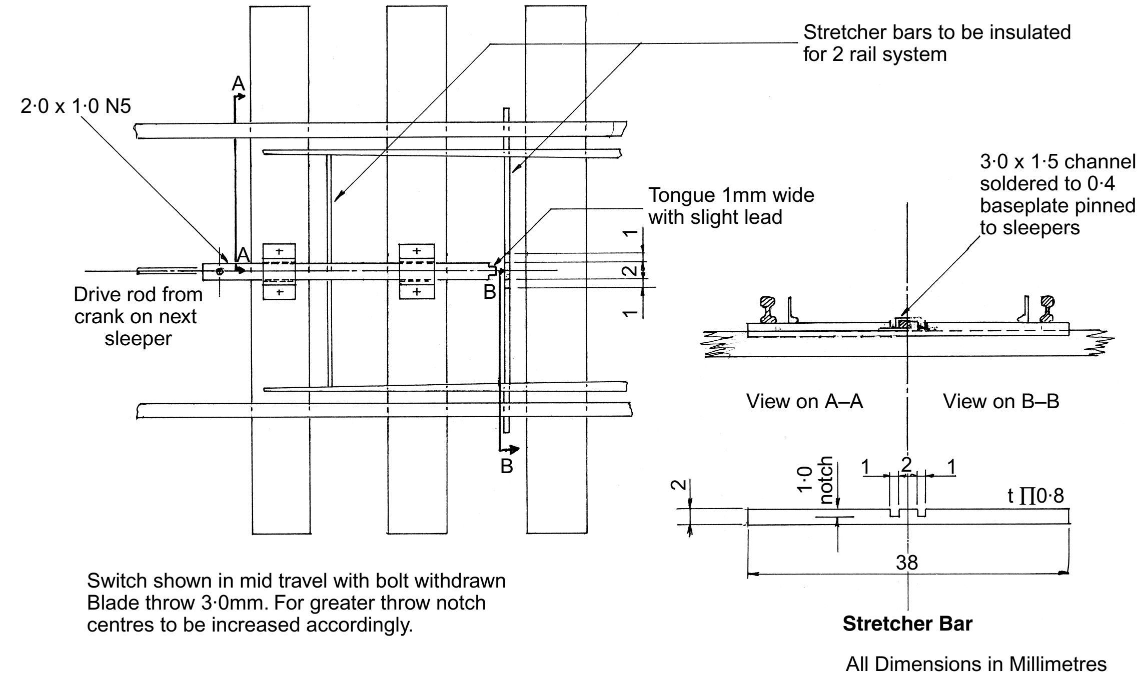


Figure 2-66 "Bolt" type Facing Point Lock

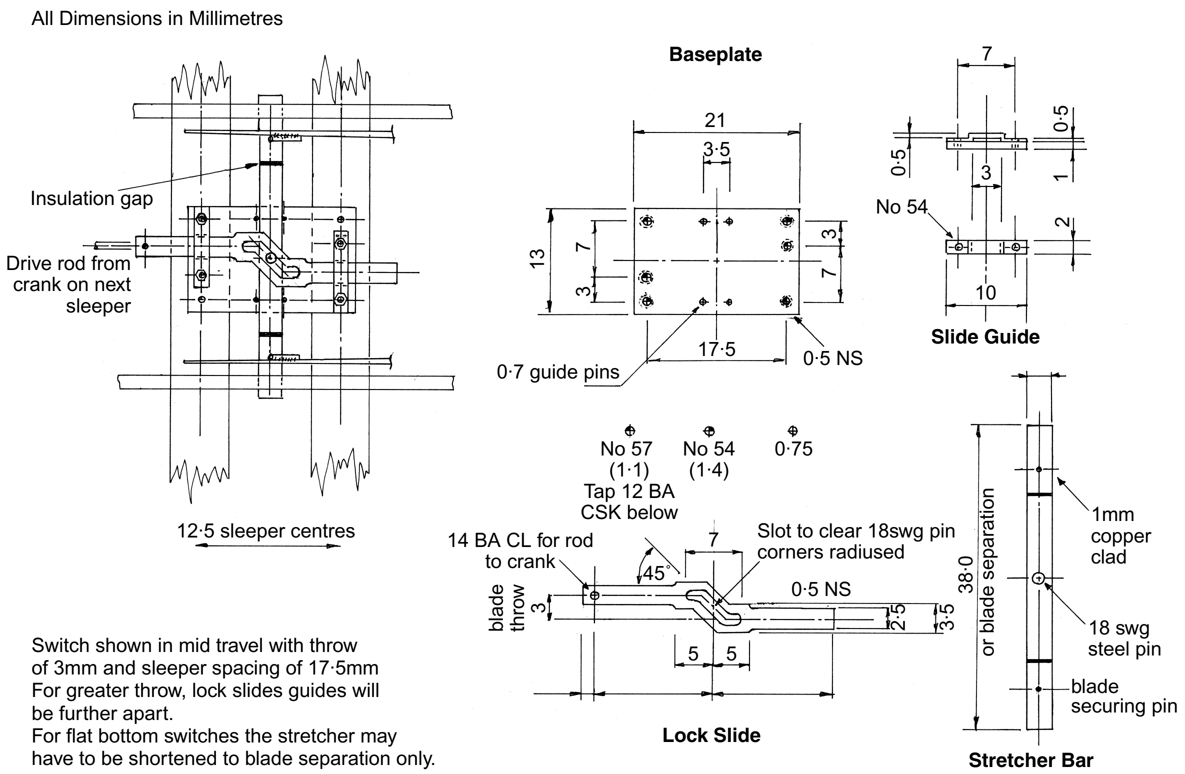


Figure 2-67 "Economical" Facing Point Lock