

Successful track and wheel relationships are determined by five basic factors. These are :-

1. The correct matching of the rail head and wheel and tyre contours.
2. The wheel back-to-back setting - BB - must be held to the nominal value.
3. The track gauge - TG - must not be less than the nominal value.
4. The check gauge - CG - must not be less than the nominal value.
5. The crossing flangeway - CF - must be held to the nominal value.

The first of these factors is controlled during manufacture by the shape of the rail dies and the wheel form tools. However, only Protofour wheels and Protofour rail will guarantee the modeller conformity to the Protofour standards, as they are under constant control by the MRSNG.

The remaining factors are controlled by the modeller through the use of precision Gauges designed by the MRSNG. Of these four Gauges, BB and TG are used in all circumstances, while CG and CF apply only to check rails and crossings respectively.

It must be emphasised that use of the four Gauges will not guarantee good running if other than Protofour wheels and rail are used.

BB — BACK-TO-BACK GAUGE

It is essential that the distance between the backs of a pair of wheels mounted on an axle is maintained within close limits, as on the prototype, to ensure satisfactory operation.

If the BB dimension is increased, the sum of the dimensions BB + one EF (effective flange thickness) may exceed the check gauge and thus cause derailment at crossings. Although EF is difficult to measure, the method of production of Protofour wheels prevents the maximum EF value from being exceeded and so it is necessary only to control the BB setting to ensure that both are within limits.

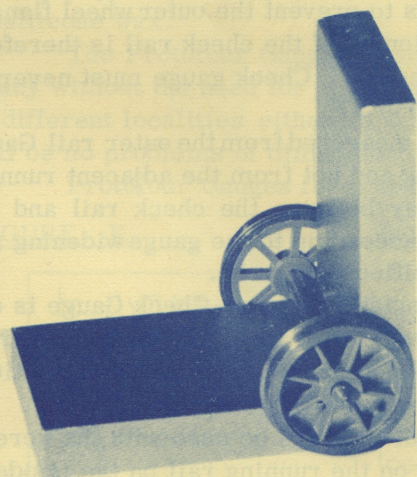
If the BB dimension is decreased, it may become less than the 'between checks' dimension and again lead to derailment at crossings. Figure A illustrates these interdependent dimensions.

The Protofour Back-to-Back Gauge is a precision-ground Gauge with parallel surfaces and is simple and adaptable in use.

Correct BB gauge is obtained when the Gauge just slides between the wheel backs without sideplay. No force should be used when gauging, as this indicates an under-gauge condition and, either the wheels will spring together again when the Gauge is removed, or the wheels will be distorted and will no longer run true.

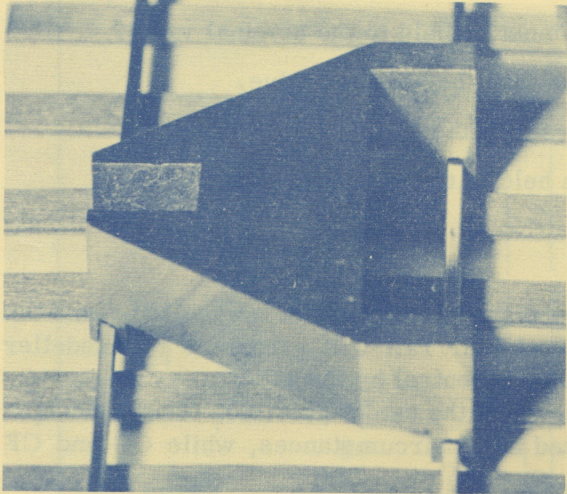
BB gauge should be checked at several points around the wheels (Fig: B), as the setting of deformed wheels may well be correct at one point but not at others (Fig: C). The type of wheel deformity shown in Fig: D is difficult to detect with use of the Gauge but may be seen when the wheel pair is spun in bearings.

Rolling stock and locomotive wheels may be checked while in place on the vehicles using one leg of the Gauge. The BB Gauge may be used to set locomotive wheels on axles as described in Instruction Leaflet No. 4.1.13.



TG — TRACK GAUGE

Protofour track must not be gauged at less than the nominal value of 18.83mm and should incorporate gauge widening on curves as in the prototype. The Protofour Track Gauge is a precision tool which ensures that the required values are obtained automatically.

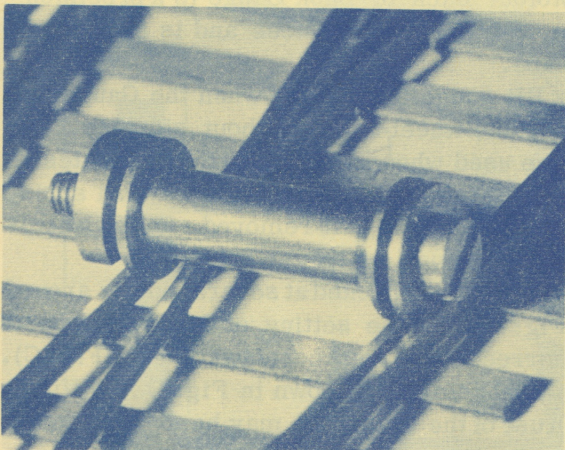


The inner faces of the Gauge claws constitute the gauging faces and rails held in the claws automatically assume the correct spacing. When soldering rail to the rivets, (see Instruction Leaflet No. 4.1.6.), only minimum lateral pressure from the soldering iron should be applied. This is to prevent bending of the rail and consequent distortion of the gauge setting. The WIDER edge of the Gauge should be held over the OUTER rail on curved track as this automatically produces the required gauge widening. To ensure that rail is held upright, check that the Gauge slots are fully down to the rail head, and hold the Gauge firmly down to obtain proper contact between the rail and the rivet heads.

When soldering long runs of track the Gauge may become too hot for comfortable handling. This may be avoided by fitting an insulating knob or a tufnol strip.

CG — CHECK GAUGE

On sharp curves check rails are necessary to counteract the tendency of the outer wheels to climb up and over the outer running rail. They are provided at all crossings to prevent the outer wheel flanges from striking the nose of the vee or the wing rail knuckle. The positioning of the check rail is therefore most important, as the check gauge and the BB gauge are interdependent. Check gauge must never be less than the $BB + one\ EF$.



Note that CG is measured from the outer rail Gauge face or the vee nose and not from the adjacent running rail. The flangeway between the check rail and the running rail varies according to the gauge widening and its value is not specified. (Fig: E).

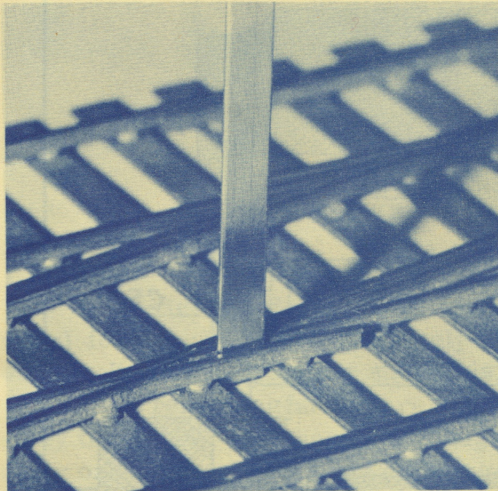
The precision-made Protofour Check Gauge is designed to hold the check rail at the correct setting during assembly, or subsequently to check the rail position, without the need for measurements.

The Gauge should always be used with the screw-slotted head resting on the running rail on the inside of the curve adjacent to the check rail. The opposite end of the Gauge has a flat segment which is designed to clear the nose of the crossing with the adjacent flange resting in the crossing flangeway.

The Gauge must be held down firmly during soldering to ensure level rail tops, and held, to minimise rail deflection, as closely as possible to the point of soldering. Recheck every check rail assembly after soldering.

CF — CROSSING FLANGEWAY GAUGE

The crossing flangeway, unlike check rail flangeways, is always a fixed value as it is closely related to wheel width and effective flange dimensions. The width of the flangeway is controlled in the prototype by bolting the rails together with spacing blocks. In Protofour it is determined by means of a strip Gauge CF.



When the crossing vee has been soldered into position and excess solder removed, the CF Gauge is placed against it and the wing rail pressed against the Gauge while it is soldered in its turn. When rechecking, the Gauge should enter the flangeway easily but should have no sideplay.

The crossing flangeway and the check rail flangeway are not of the same value. The CF Gauge should NOT be used for check rail flangeways, which are determined by the check gauge setting, and similarly, the Check Gauge should NOT be used to set crossing flangeways.

SWITCH BLADE GAUGES

The Protofour Switch Blade Gauges are not mandatory items of trackmaking equipment but their use considerably assists the setting of switch blades, and the installation of Protofour Turnout Operating Units. Their function and operation are described in Instruction Leaflet No: 4.1.7.

CARE AND MAINTENANCE OF GAUGES

Protofour Gauges are precision tools and should be handled and stored accordingly. Great care should be taken to prevent damage to the Gauge surfaces.

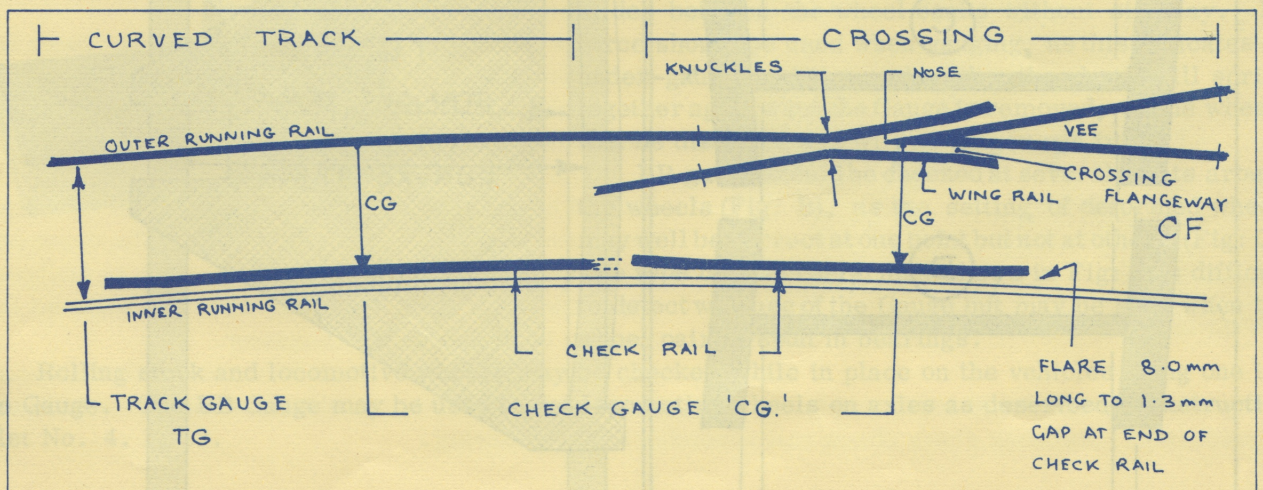
Following soldering operations the Gauges should be cleaned thoroughly with spirit or other means to remove the flux which may have been deposited on them. They should be given a coat of silicone wax or machine oil and stored in a closed container such as a tobacco or pastille tin, together with a piece of vapour phase inhibiting (VPI) paper.

A piece of VPI paper is enclosed with the Gauges when despatched and they have an initial coating of silicone wax.

The Protofour Gauges enable the modeller to construct trackwork to a constant standard of accuracy without the need for ruler measurements. Furthermore, they enable modellers building layouts in different localities either to exchange stock or to combine the layouts with the knowledge that there will be no problems of dimensions or gauge variation.

Protofour Gauges for track to other than standard gauge are used exactly as described above.

FIGURE E



(E) FUNCTION OF CHECK RAILS

PROTOFOUR

FIGURES A — D

