A 7 mm. HIGHLAND RAILWAY—*continued.*

H.R. No. 126 "Loch Tummel" on down mail train. Fencing not yet completed.

Photo: James R. Smith, Kirkcaldy.

H.R. No. 95 "Strathcarron" and train of old rib-sided stock on Altnaslanach bridge. Photo taken before scenery painted.

Please!

When sending orders for prints, back numbers or any other items do please check that your address is on the letters and that your signature is legible. It may sound elementary but once or twice a week we receive orders without any indication of the writer's address with the result that after a delaying period we get a further communication often alleging all manner of inefficiency on our part. We like to give a prompt service but these occasions just leave us up in the air until we hear further from the sender. With regard to the illegible and flowing signatures so beloved by some people, we do our best to decipher them and as a last resort will address the communication to "The Occupier," but we do prefer to have the name correct if possible.

A Gauge O Steam Loco for Beginners.

Part 2. **By "1121."**

Main frames.

Right at the start we run into a slight complication—the driving and coupled wheels come *outside* the frames, in the orthodox manner, but behind the driving axle the frames widen out, and come outside the trailing wheels. There is no need to panic, however; we will describe a very simple way to construct them, and the arrangement has one great advantage in providing a good big space at the rear end of the engine for our spirit tank.

Cut two pieces of 18 s.w.g. mild steel plate to the overall dimensions (or hard brass would do if you've got it), and on one of them scribe the outline and mark out all the hole centres, with the exception of those for the cylinder fixing screws. (Fig. 1.) Carefully centre-pop each hole position. Hold the two pieces of plate together by means of a toolmaker's clamp. Make sure the edges of the two plates coincide truly all round, and tighten the clamp up well so that they can't move. Drill *one* of the screw-holes at each end, right through both plates. Put an 8 B.A. screw through each of these holes, screw nuts on and do them up tightly. You can now remove the clamp. Drill the remaining No. 43 holes, and also the axle-bush holes with the same drill. These will be opened out to ¼in. diameter later; the small hole put through at this stage will act as a "pilot" hole, as the ¼in. drill would be liable to "wander" off position if you tried to put it straight through without a "pilot" hole to guide it, and would probably produce a hole that was oversize, and any shape but round.

All drilling of this kind should be done in a drilling-machine, if you have one, to ensure the holes going through truly at right-angles to the surface of the job. If you haven't, do it in the lathe, with the drill in the chuck and the work held back flat against a drilling-pad in the tailstock. This applies to all drilling in the future. Never rely on hand drilling unless it is definitely specified for some particular reason.

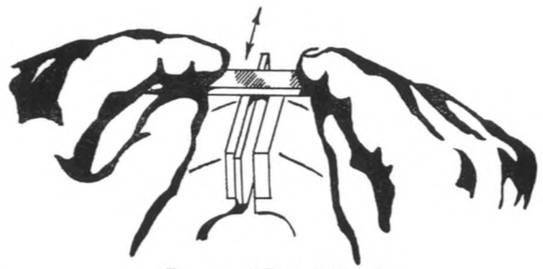

Fig. 2. "Draw-Filing."

Saw and file the frames to outline and make sure the top edges coincide, and the ends, as these are the datum points for all our dimensions. Any discrepancy will throw the frames out of truth when they are assembled. If one frame sticks out a tiny bit beyond the other, judicious filing will correct matters.

To avoid marking work with the vice-jaws, make up a pair of "clams" out of sheet copper or aluminium. These merely hang down between the jaws, being bent over them at the top.

Now number the frames, so that you know which is which, and which are the outside and inside surfaces, so that they finally go together in the same relative positions.

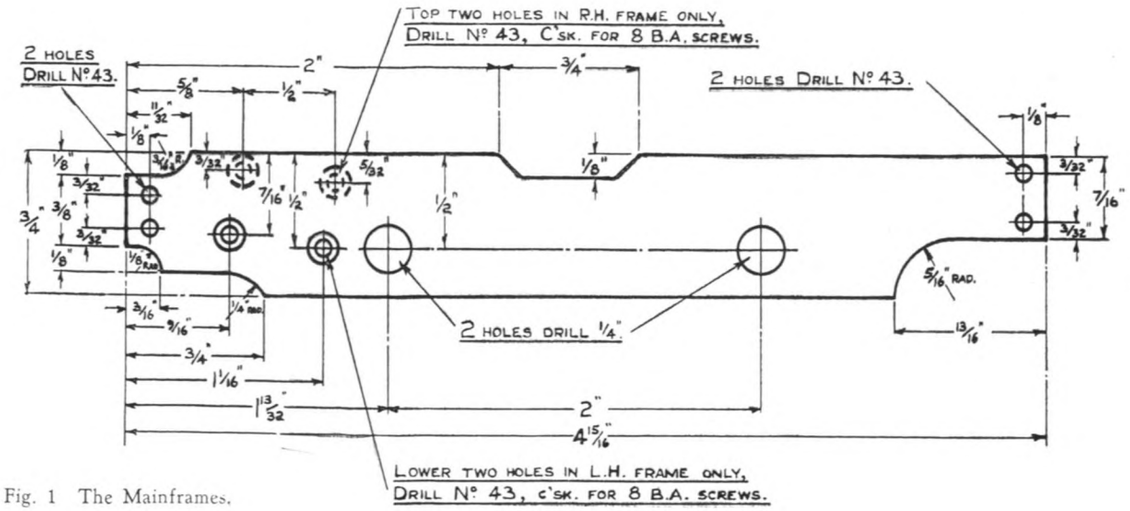

Fig. 1 The Mainframes.

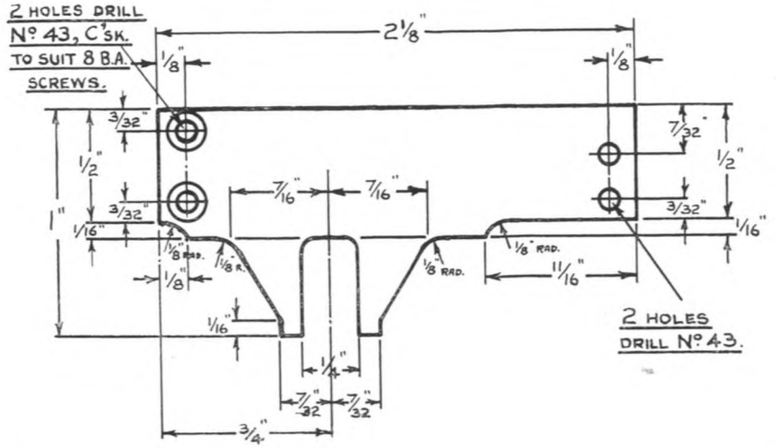

Fig. 3. Rear Frames.

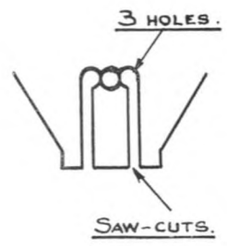

Fig. 4. Cutting Axlebox Slots.

If you haven't any small number-stamps, put one centre-pop mark on the left-hand frame, on the outside, and two together on the right-hand frame, somewhere where they won't spoil the beauty of the engine—say at the front end between the two screw-holes.

Take the frames apart, and remove all burrs. To remove burrs from holes use a larger drill, and to clean up the edges of the plates use a smooth flat file laid flat on the plate, *not* scraped across the corner. Never be afraid of removing burrs in between operations, even though you know you are going to knock up some more immediately. It makes the job much nicer to handle, and in some cases the presence of a burr is enough to throw a job out of truth when it is held down on a drilling-machine table, for example, resulting in mysterious errors cropping up in a subsequent operation.

Open out the axle holes to ¼in. diameter, running the drill slowly. Hold the plate down on a flat piece of wood as firmly as you can, or the big drill will dig in and twist it out of your fingers. If you aren't used to such jobs, and are at all apprehensive about it, use a big piece of wood that you can hold easily, and clamp the plate down to it with wood-screws round the edge. File off the burrs from both sides, not forgetting that this process will push another burr into the hole all round. Remove this with a round file, otherwise this internal burr may deceive you into thinking that the hole is smaller than it really is, when it comes to fitting the axle bushes later on.

Go round the edges of the plates removing file-marks by the process known as "draw-filing," which is illustrated in Fig. 2. The plate is held in the vice, and a dead-smooth file is laid straight across the edge. Standing at one end of the job, hold one end of the file in each hand and move it towards and away from you in a perfectly parallel motion with no longitudinal movement of the file itself. An alternative is a piece of fine emery-cloth wrapped round a bit of wood, but this takes longer.

You can now mark the positions of the two cylinder fixing screw-holes in each frame, noting that they are lower in No. 1 frame than in No. 2. These holes must be carefully positioned, as there isn't a lot of room in the cylinder-block for the screws. The holes are shown as being countersunk on the drawing, but don't countersink them at this stage—that will be done after we have finished using the holes as guides for drilling the cylinder-block, as will be explained when the time comes.

Rear frames.

Repeat the whole process exactly to make the rear frames (Fig. 3). Note the method of cutting out the slot for the axlebox, as shown in Fig. 4. Drill the three little holes, say about $\frac{1}{16}$in., and saw down to the outer two. Put the pair of frames, still bolted together, in the vice, lower edge upwards, with these holes showing just above the jaws. Separate the two little tongues by pushing a screwdriver between them, and then a bit of waggling with a pair of pliers will break them off. Clean up the slot by filing, trying carefully for width and parallelism with a piece of ¼in. square bar, or ¼in. plate. Number the frame plates, separately and clean up as before. Don't countersink the front two holes yet.

Buffer-beams.

These can be made from the same material as the frames, and call for no special comment, except the warning about pilto-drilling for the $\frac{3}{16}$in. holes. The drawbar slots are shown in the drawing (Fig. 5), as required for the hooks which will be described in due course. If you are proposing to use commercial hooks, or some special pet couplings of your own, you will, of course, make provision to suit. The same goes for the buffer-holes, but note that the buffers on the rear beam come just in the way of the frames, so we cannot use buffers which involve any fixing behind the beam.

The marking-off of your centre-line, and so on, should be done on what is to be the back of the beam, so that you can at the same time mark two lines to indicate the positions of the outer faces of the angle-brackets. These are of $\frac{3}{16}$in. or ¼in. angle, whichever you can get, and are rivetted to the beams with $\frac{1}{16}$in. snaphead rivets, put through from the back. Now, you can fiddle about holding these little brackets on the beam with a toolmaker's clamp while you drill the rivet-holes, but our pet method for this sort of job is to solder them on, although we would certainly never rely on solder alone. Steel can be soldered quite easily—clean it up nice and bright, and use an acid flux, such as Baker's soldering fluid. The solder probably won't "take" at first, but put some more Baker's on the steel *while it's hot*, so that it sizzles and bubbles, and you will have no further trouble. Tin the back of your bracket, and sweat it on, using plenty of heat, so that the solder flows well, and hold the bracket down firm until it sets. Check that your two brackets are the right distance apart

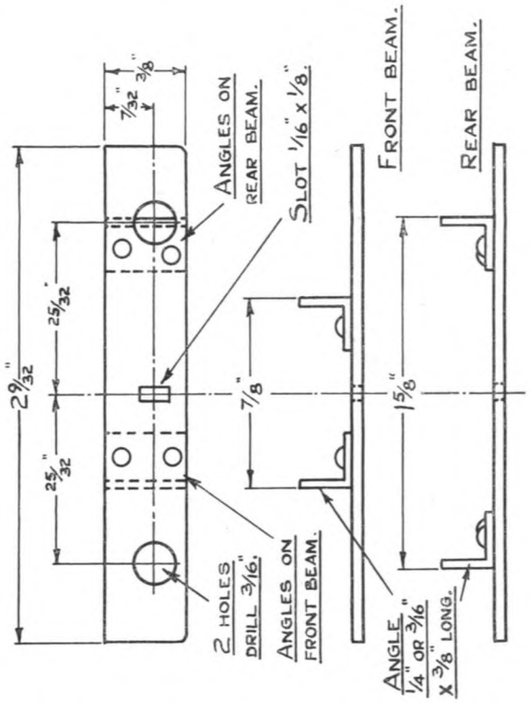

Fig. 5. Buffer Beams. Below: Photo—M. W. Earley.

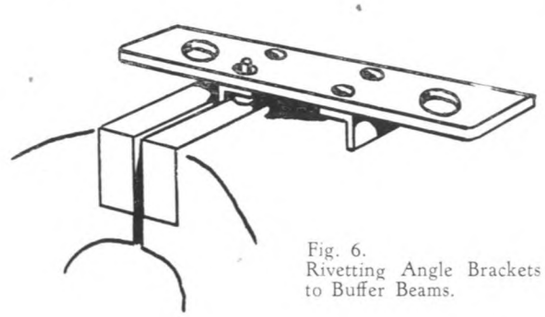

Fig. 6.
Rivetting Angle Brackets to Buffer Beams.

—there's no room for inaccuracy here—and are equidistant from the centre-line, also that they will hold the frames truly vertical. When you are satisfied, pop the $\frac{1}{16}$in. drill through from a couple of centre-pop marks on the bracket. The exact positions of these holes are not important—they should be as far apart as practicable without breaking out of the edge anywhere. Note, however, that the lower hole in each bracket on the rear buffer-beam will have to be positioned fairly carefully, as the buffer-hole doesn't leave you very much room.

Remove the burrs on the angle side of the holes with a bigger drill twiddled in the fingers, and a trifle more so on the face of the buffer-beam, to form a shallow countersink. Put a $\frac{1}{16}$in. rivet through from the back, and hold the projecting leg of the bracket gently in the vice, with the head of the rivet resting on top of the jaw. (Fig. 6.) If you have to use over-length rivets, cut the end off with wire-cutters or side-cutting pliers to project about $\frac{1}{16}$in. above the surface of the buffer-beam. Now carefully rivet down into the countersink, using for preference the "ball" end of a ball-pane hammer, avoiding, however, the production of dents all over the surface of the buffer-beam. Every smack should be on the rivet! When the rivet is down tight, file off any excess flush with the surface. Do all the rivets the same, and when the beams are painted nobody will be any the wiser, and you will have the strongest possible job.