Part 9.

A Gauge 0 Steam Loco for Beginners.

Coupling Rods.

By "1121."

We can't put the wheels on yet, as for two reasons we must first make the coupling rods—firstly we are going to use the axle-bushes in each frame as a jig to drill the eye-holes in the coupling-rods, and we can't do that with the axles in, and secondly we need the rods to assist in getting the wheels on correctly. Most of the jobs are being described in a carefully-thought-out order!

To save a lot of donkey-work, the rods are made from 1/16 in. mild steel strip ¼ in. wide if you have it, otherwise slices of 1/16 in plate, and the bosses thickened up separately. Cut your strips a little over the required length, to allow for cleaning up later, and number them one and two, so that you will know which is which. Clamp No. 1 rod to No. 1 mainframe, on the outside, right across the heads of the axle-bushes, with the same amount of spare projecting at either end. You needn't take the frames apart to do this, if you've got them assembled, although they will have to be dismantled shortly to put in the wheels and axles. You will need, however, to insert a bit of packing in the middle, between the frame and the rod, the thickness of the heads of the axle-bushes. (Fig. 45). Now put the No. 12 drill right through the two bushes and spot one end of the rod (Fig. 46). Do the same for the other end of the rod, and dismantle and repeat the process the other way up for the other side rod.

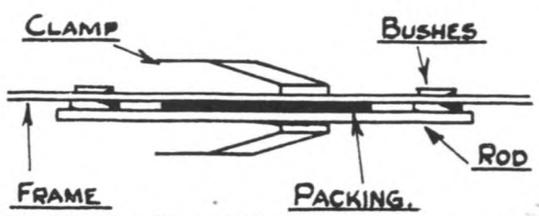


Fig. 45. Coupling-rod blank clamped to frame for spotting through.

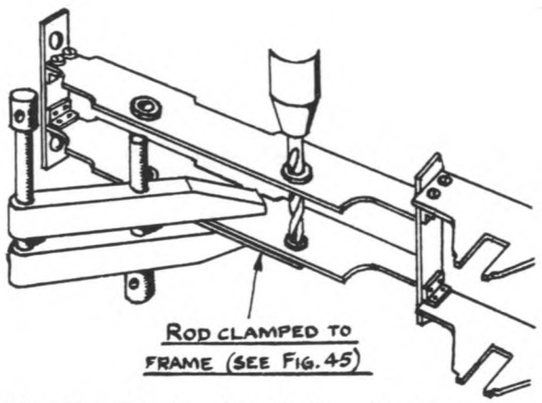


Fig. 46. Spotting through into the coupling rod blank through axle bushes.

Now in the positions marked drill the rods No. 30, or if you have no drill in this size they can be drilled 1/8 in. and eased out with a small round file. Put the file into the hole and twist round in an *anti*-clockwise direction, as if you were trying to screw it *out*, otherwise if you screw it in it will jam up, refuse to rotate any more, and you may break it without achieving enlargement of the hole. The rods should slip quite easily over the crankpins—there is no point in trying to make them a wonderful fit in this small size.

We now need a couple of 6BA steel washers for each rod, which are sweated on the front to thicken up the bosses at the ends. They must be well stuck on, otherwise subsequent operations may knock them off, so we refer you to previous remarks re soldering steel. Attach them with the hole as nearly central with the hole in the rod as you can judge, and then put the No. 30 drill through from the rod side. The rods can now be filed to shape. We suggest first sawing down on either side of the lubricator, and then sawing in to meet these cuts, finally filing away the centre part of the rod, and rounding off where necessary (Fig. 47). It is worth taking a little care to get the shape of the rods right, as they

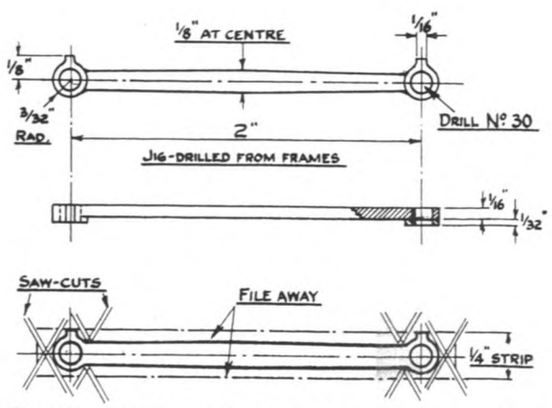


Fig. 47. Coupling rod, showing suggested method of cutting to shape. (Actual size 7 mm. scale.)

are conspicuous on any engine and can ruin its appearance if clumsily executed.

Now we can get the driving axle assembled into the frames, ready for fitting up the motion, but the front coupled wheels should *not* yet be assembled to the axle. These come over the cylinder-fixing screws, so must not be put on until the cylinder is made, installed and tested. Put the *short* end of the driving axle through the rear bush in No. 1 (the left hand) frame, and press a driving-wheel on to this end of it, making sure it is one of the right wheels, if the castings you are using are different for the driving and coupled wheels. (The front coupled wheels will have the balance weight diametrically opposite to the crankpin, if this is the case, while the driving wheels will have it adjacent to the crankpin, as can be seen in the photographs previously published.)

We recommend pressing on the wheels in the drilling-machine or lathe, to ensure that they go on square. Hold the other end of the axle firmly in the drilling-machine or lathe chuck, and spin the machine for a few turns to make sure it is true. Find a bit of plate, not less than 3/16 in. thick, and put a hole through it not less than ¼ in. diameter, on which the wheel can be rested with the crankpin down the hole. Get the wheel in position under the end of the axle, and bring the axle down until the end goes into the wheel. In the lathe, of course, you will have the bit of plate held back against the end of the tailstock mandrel. It is necessary to jam a bit of packing of the right thickness into the gap between the crankwebs while you do this, to avoid bending the axle. (Fig 48.)

In the following order, thread on to the long end of the axle the stop-collar, with the step side outwards, away from the crank web, the eccentric sheaf, with the strap over it, and with the driving pin next the stop-collar and the flange outwards, and No. 2 frame. Assemble the frame back on to the front buffer-beam and cross-stay brackets. Push the other driving wheel on to the other end of the axle hand-tight only, so that you can twist it about. Turn it round until its crank-pin is pointing towards the back of the engine when the left-hand crankpin is pointing approximately downwards, which will give you the correct "right-hand leading" relative positions of the two wheels.

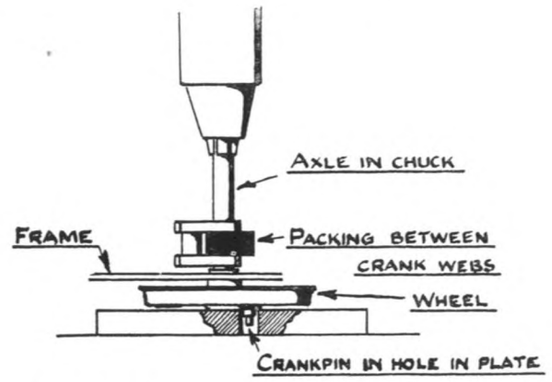


Fig. 48. Pressing the left-hand wheel on to the short end of the driving axle in the drilling machine.

With the wheels in this position, turn the frames upside-down on a couple of bits of packing of the same thickness, on your surface-plate, so that the wheels are clear. Stand your square with the butt on the surface-plate and the blade alongside the left-hand wheel, with its edge against the rear side of the crankpin. Set your inside-calipers to the height from the surface-plate to the lower side of the end of the axle, where it shows through the wheel. Now adjust the right-hand wheel on the axle until, with the square still up against the crankpin of the left-hand wheel. it just passes level with the front of the axle on that side, when the calipers are touching the underside of the crankpin on the right-hand side. There will be an error, of course, owing to the fact that the crankpins are smaller than the axles, but the error will cancel itself out if the checking is done in the positions we have stipulated, and the crank-pins will be at right-angles to each other, or the wheels will be "quartered," as we say, as near as makes no odds. All this sounds a bit complicated in words, but we have produced the sketch Fig. 49 to make things quite clear.

In actual fact, of course, the accuracy of the quartering is not really vital in an engine of this type—if we were

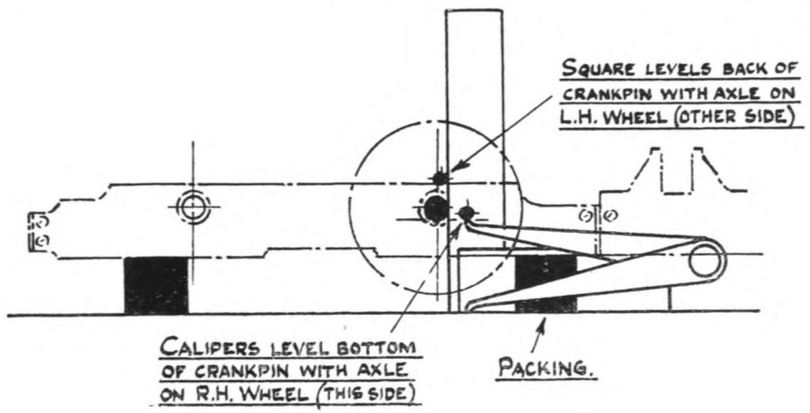


Fig. 49. How the square and calipers are used to "quarter" the driving wheels.

dealing with an engine with outside cylinders, driving direct on to the wheel crankpins, rather special care should be advisable, otherwise the engine would have uneven exhaust-beats.

At this stage the right-hand wheel should be left tight enough to avoid its being moved accidently, and it can now be pressed right home with the lathe tailstock or drilling-machine, not forgetting the packing in between the crank-webs.

The lengths given for the axles will ensure that the wheels are to correct gauge when the ends of the axles come flush with the outsides of the bosses. The back-to-back dimension should be checked, however, as this dimension is more important that the gauge. The gauge of a pair of wheels can hardly be measured, anyway, being taken from indefinite point on the radius at the root of the flange. If the back-to-back is correct, however,—1 - 3/32 in. coarse and 1 - 9/64 in. fine, and the wheels have been turned reasonably near the right contour, the gauge will look after itself.

Second Thoughts.

A builder of "Aladdin" draws attention to a small discrepency between the drawings and the text in last month's article on the eccentrics—the sheaf is shown as drilled No. 12 in the drawing, while the text says ream 3/16 in. This was undoubtedly a change of mind while doing the drawings, thinking that the clearing hole would be quite good enough but forgetting to alter the text, and while we can only agree that such human lapses should not be allowed to occur, we feel that this is a very minor case, and it is only necessary to ensure that the sheaf is free on the axle.

The same correspondent points out that, "it is normal practice to use a snap to support the snap-head rivets, not rest the heads on the vice-jaws as in the August issue." Well! no doubt it is, and it is also "normal practice" to go and buy a milling machine rather than to perform some of the contortions which we shall be describing to do certain milling jobs in the lathe. The point is that we are recommending the purchase of only a minimum number of special tools for this job. Our own original "Aladdin" was riveted up in precisely the manner shown, with quite satisfactory results, and we are only concerned with ensuring to the best of our ability that anyone else can do the same as we have done.

For all this criticism, however, our friend says that he is enjoying building the loco, which, after all is the main thing.

Second second Thoughts.

By one of those little bits of cussedness that occasionally crop up in the best regulated circles, the information we endeavoured to give last month concerning the projection of the crankpins from the wheels somehow got tangled up in the printing department with the result that just the very line containing the required figure was missing. The sentence should have read " There should be $\frac{1}{8}$ in. of plain $\frac{1}{8}$ in. diameter projecting from the face of the boss."

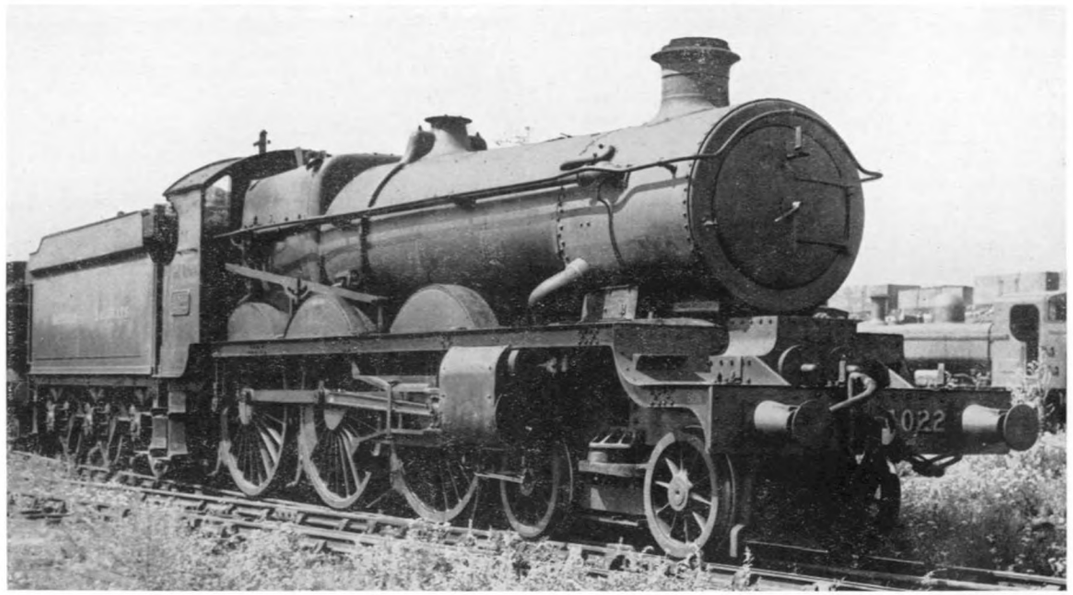


Photo: Maurice Earley.

Western Region "Star" Class 4-6-0 loco No. 4022. Originally named "King William" and subsequently "Belgian Monarch" on the introduction of the 6000 Class " Kings."

7 mm. Fine Scale G.N.R. Ivatt Locomotives.

Part 2.

By E. J. Henshaw.

The 0-6-0 J6 goods locomotive was Mr. Ivatt's last design for the G.N.R. and it has always appealed to me as a handsome representative of the 0-6-0 type, though the later style of the chimney has detracted somewhat from its appearance. Before the war in the Nottingham area they were used on fast goods trains and on excursions to the Lincolnshire coast. I remember well the characteristic "smack" of the snifting valve when the regulator was opened, and the hectic career of a fast goods train at night down the 1 in 100 gradient towards Basford station near Nottingham.

The typical G.N.R. footplate was made in my usual way, viz., by first cutting from plywood a strip with the reverse curves and fitting both plate and valance to it before soldering up. Frames on top are dummy and at scale distance apart. The front splashers presented a problem, as they merge into the sandboxes, and the top of the splasher continues forward to form the rear side of the sandbox. This top projects slightly from the sand box, yet remains flush with the beading of the splasher.

The splasher-cum-sandbox sides were cut out and shaped together and the curve of the beading was clearly marked. The splasher top was prepared as shown, with the reduction in width beginning at a point A on the splasher just behind the maximum height, and soldered to the side. The projection was then carefully filed so as to make an exact fit with the beading (1/32 in. wide brass strip) which was bent to shape and sweated on. The front side was added, then the top at C,

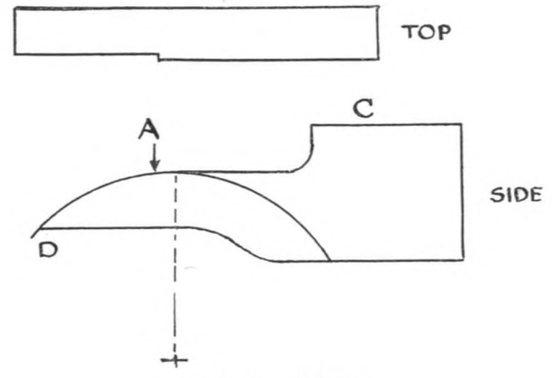
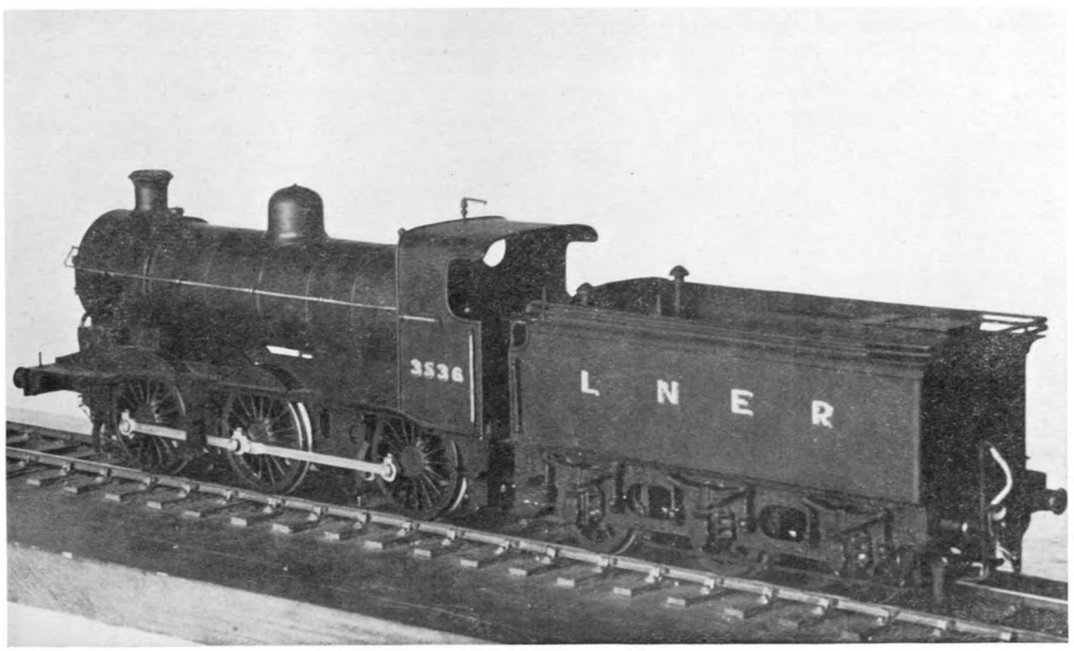


Fig. 1. Splasher.



L.N.E.R. (ex-G.N.R.) Class J6 0-6-0 Locomotive No. 3536. **Photos: A. Henshaw.**