

in the form of split potential and stud contact have also been well featured.

No review of the year, however brief, would be complete without a reference to the attractive cartoons which have graced our pages each month—indeed we know many households where the lady makes a priority claim on the Magazine to see the latest problem of our typical railway wife.

To our contributors whose efforts have done so much to maintain the variety and interest in our pages we would express our sincere thanks and shall look forward to receiving further material from them.

Binding Volume 19.

Sets of parts for binding may now be sent to 104a, West Street, Farnham, Surrey. We should like to receive these not later than 31st January, 1953 as odd sets received after that date are subject to delay in that we have to assemble a minimum quantity for binding in order to keep prices as low as possible. The arrival of large numbers of binding orders places a heavy seasonal burden on our limited staff and readers will help us considerably if they will note the following:—



"What a husband—the only curves that interest you are those with a six-foot radius."

1. The price is 10/6 per volume post free and this remittance should be included with the order.
2. If acknowledgement of receipt is required, include a stamped addressed postcard.
3. Remember to include with your parts the 1952 index which is supplied with this issue.
4. If you wish to retain the cover pictures detach these before sending your parts.
5. The January and February, 1952 issues each contain a single extra page not printed on art paper. Remember to include these. The remaining ten issues each contain an extra four pages in addition to the art section. Generally it is preferable for us to have the complete magazines to avoid risk of error, but the removal of the outside orange cover if desired will not cause any complications.
6. We have only one standard of binding i.e. the 242 numbered pages which comprise the volume. We regret that we are unable to include advertising pages, covers or any other extraneous matter.
7. Volumes previous to Volume 19 can be bound at the same price. The appropriate index should be included in all cases.
8. Before requesting us to supply missing issues to complete any volumes sent for binding, please check the list of back numbers to make sure that these issues are available. We have only those numbers in stock which we detail in the advertisement.

2 Rails and 3 Wires.

By R. W. GRIFFIN.

Mr. Sumner's article in the November issue is most clear and convincing, and I for one, am almost convinced that he is right. I say "almost" because there remains only a small difficulty, which, however can be overcome.

He refers to my previous small contribution, stating that he had progressed beyond my "simple scheme," but in self defence I must state that I long ago adopted the wiring system he illustrates in his Fig. 3. John Ahern describes the general principles very clearly in his little "Handbook on Two Rail;" the main thing to remember is that any layout can be broken up into a number of groups of diverging lines, each fanning out from an initial turnout, on the facing side of which the current is fed in.

The disadvantage alluded to above is that each controller must consist of a rheostat and a D.P.D.T. switch, requiring two operations instead of one for reversing. By the use of two separate and equal sections of resistance and a reversing switch incorporated into the operating knob and spindle, as with the Hornby-Dublo controller, the whole thing closely resembles the split potential system in operation. The great advantage in this arrangement is that the knob is always turned in the direction in which the loco is required to move and the further one turns it the faster the loco travels.

Some of the difficulties referred to in my previous contribution are entirely overcome by using a change-over switch, but there is still the problem of synchronising controller settings in a large layout to be solved.

Part 7.

A Gauge 0 Steam Loco for Beginners.

By "1121."

Crankpins and Axles.

Crankpins.

These, as shown in Figs. 32 and 33, are a straightforward turning and screwing job, from $\frac{1}{8}$ " diameter mild steel, or if you have it use silver-steel, which will be better for wearing. Saw or part the crankpins off to length, clean up the back ends, making sure there are no burrs left, and press them into the wheels in the vice, making sure they go in squarely. A nut temporarily screwed on to the end is a fitter's dodge to protect the threads from damage during such operations as this. (Fig. 34.)

We should give a warning that little wheel castings will not stand unlimited abuse in the matter of pressing axles and crankpins into them, without splitting. The pressing-in should be only tight enough to ensure that the axle or crankpin is firmly held. If it seems to be taking a lot of pressure to get it in it is safest to tap it out again from the other side, with a punch or bit of rod, with the boss of the wheel supported squarely on the end of a piece of tube, with the axle or crankpin hanging down inside it. On no account try to drive it out with the wheel supported only by the rim, or you will snap off the spokes. It is extremely difficult to state in words just how tight such fits should be—the exact knowledge can only come with experience, but it is a fairly safe guide to say that if it is just possible to move the wheels round by gripping one at either end of an axle with the hands and

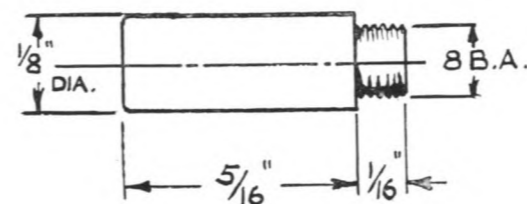


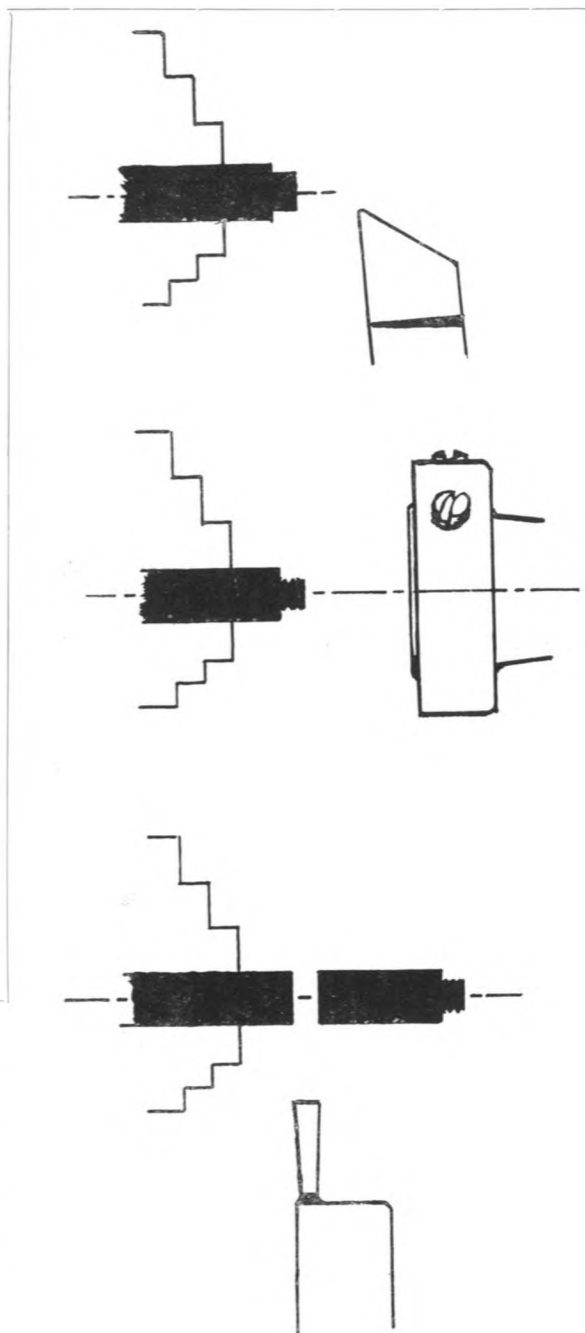
Fig. 32. Wheel crankpins.

Fig. 33. Sequence of operations for turning crankpins.

Top: Hold in 3-jaw chuck, turn .087" dia. (Can be checked with calipers from No. 43 drill).

Centre: Thread 8B.A. (The side of a die with the markings on it has a "lead" or taper for starting the thread, the other side finishing square. The die can thus be reversed for a second cut to continue the thread right up to a shoulder.)

Bottom: Part off.



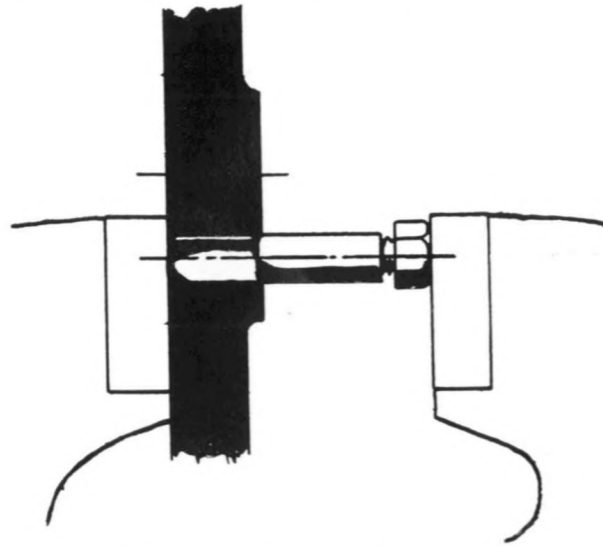


Fig. 34. Pressing crankpin into wheel.

screwing really hard, they will do, but would be better a teeny bit tighter (in this size, at any rate.) That may not be much help, but it's the best we can think of, and should give you some idea.

Axles.

These are shown in Fig. 35, and it will be seen that the coupled (front) axle is a plain piece of $\frac{3}{16}$ " diameter mild steel rod, $1\frac{1}{2}$ " long for fine-scale or $1\frac{9}{16}$ " for coarse. The driving axle, however, is a very different kettle of fish, as we shall now expound.

To make it, start off with a plain axle, exactly identical with the front one. For the crank webs, mark the end of a bit of mild steel strip $\frac{3}{32}$ " by $\frac{3}{8}$ " (cut from $\frac{3}{32}$ " plate if you have no strip) as shown in the "sequence of operations" diagrams Fig. 36. Centre-pop the hole centres, and from each mark, with the dividers, scribe the arc of the other end of the web. The $\frac{1}{4}$ " centres of these holes must be accurate. Pilot-drill the two holes first, and then open out No. 13. Cut the piece off roughly to length, and clamp it to the end of the strip. Transfer one hole through with the No. 13 drill, and then ream the two together right through $\frac{3}{16}$ ", without removing the clamp. Cut a little bit of the $\frac{3}{16}$ " axle-steel, slightly under $\frac{3}{8}$ " long, and pop it into the hole in the two pieces, as a "dowel" to hold them together. You can now remove the clamp, and shift it to a new position covering this hole,



Like this.



Not like this!

Fig. 37. How the crank axle should look when assembled.

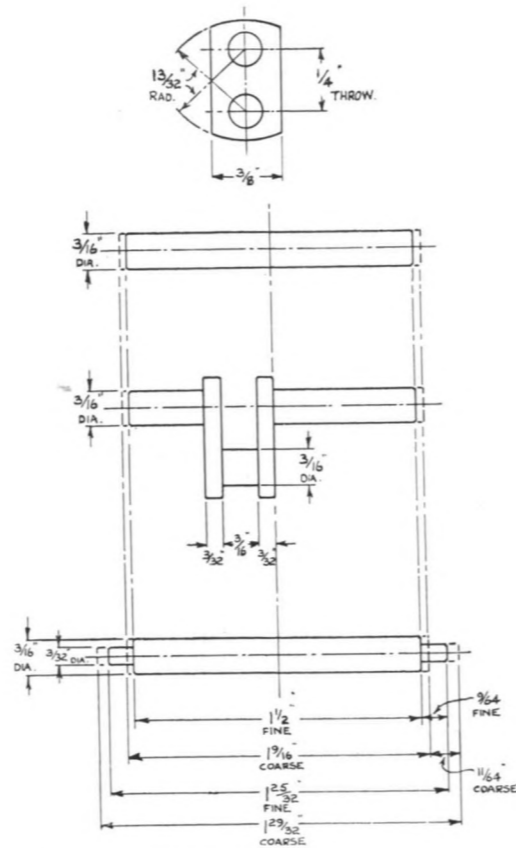


Fig. 35. The axles. Fine scale shown full, coarse scale shown dotted. (Actual size.)

which will leave the other hole exposed for drilling through and reaming exactly the same.

Saw off again, and hold the two pieces, still doweled together, in the vice (copper clamps, please), and file the ends to shape, and clean up generally. Slightly counter-sink both sides of the holes.

Slip the two webs over the axle, anointing with borax-paste as you do so, and cut another bit of the axle-steel $\frac{3}{8}$ " long, for the crankpin. Slip this into position, again making sure the borax gets right through the joints—where the borax goes, the silver-solder will follow.

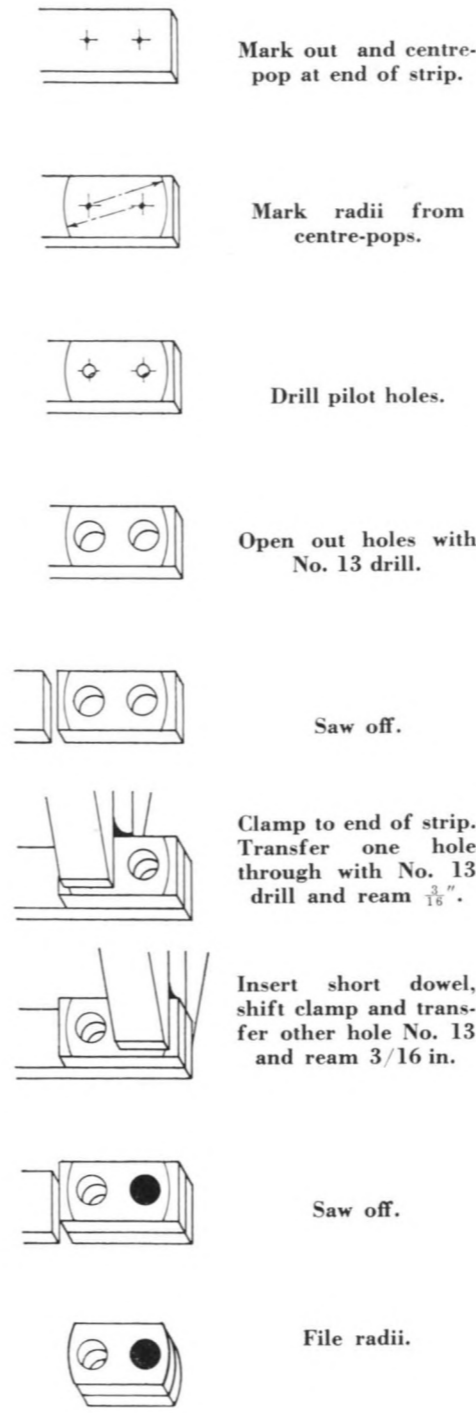


Fig. 36. Sequence of operations for making crank webs.

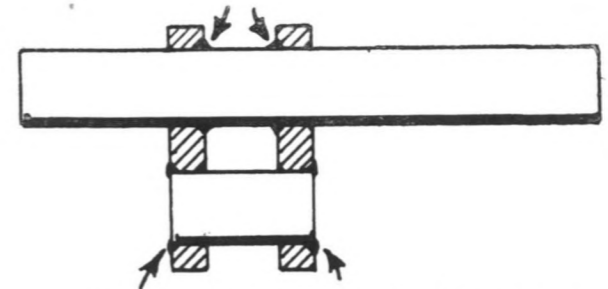


Fig. 38. Where to apply the silver solder.

Lay the whole thing on an asbestos mat, and have a good look to make sure the crankpin is laying truly parallel with the axle (Fig. 37), and check up that the webs are in the right position along the axle. (This is with the outside of one web coinciding with the centre-point of the axle—measure the centre and make a mark with the corner of a file here before you start.)

Now get busy with the heat, and get the whole thing to a nice bright red, before applying the silver-solder. When you apply it, do this in the places shown in Fig 38, which will prevent getting loads of silver-solder all over the crankpin and the ends of the axle. The counter-sinks in the webs will help to start the silver-solder flowing, but have a bit of bike-spoke or similar thin stiff steel wire handy, sharpened to a point, and stick it in the borax and scratch around the joint if the silver-solder is at all obstinate. The secret with steel is to get the job hot as quickly as you can, so that you can get the silver-solder running into the joint before the job has time to get dirty. Keep cooking the job after you have applied the silver-solder, to give it a chance to get right through the joints.

Last operation—saw out the unwanted bit of axle, and clean up with files and emery-cloth.

The trailing axle is cut to the overall length, and then turned at each end, in a split bush if your chuck is not true, as described in the article on buffers. Always put these away in a little box as you make them, and you will thus gradually build up a stock which will, in time cover any job for which their use is desirable. They will not last for ever, however. For one thing, as your chuck wears more they will no longer compensate for its inaccuracy, and will need to be replaced.

Do not press any wheels on to axles yet.

L.N.W.R. DRAWINGS.

We have had requests for details of issues remaining in print which contain L.N.W.R. drawings and would mention that the following are still available at 1/2 each post free.

- June 1947. 50 ft. Luggage Van.
- Sept., 1949. "Experiment" 4-6-0 Loco. (Part 1.)
- Oct., 1949. "Experiment" Loco. (Part 2.)
- May, 1950. L.N.W.R. Loco Shed.
- Feb., 1951. L.N.W.R. Signal Box.
- June, 1951. 19 in. Goods Loco.

Our Cover Picture.

Shows a view on the outdoor Gauge 1 layout operated by Mr. E. C. Griffith of Farnham.