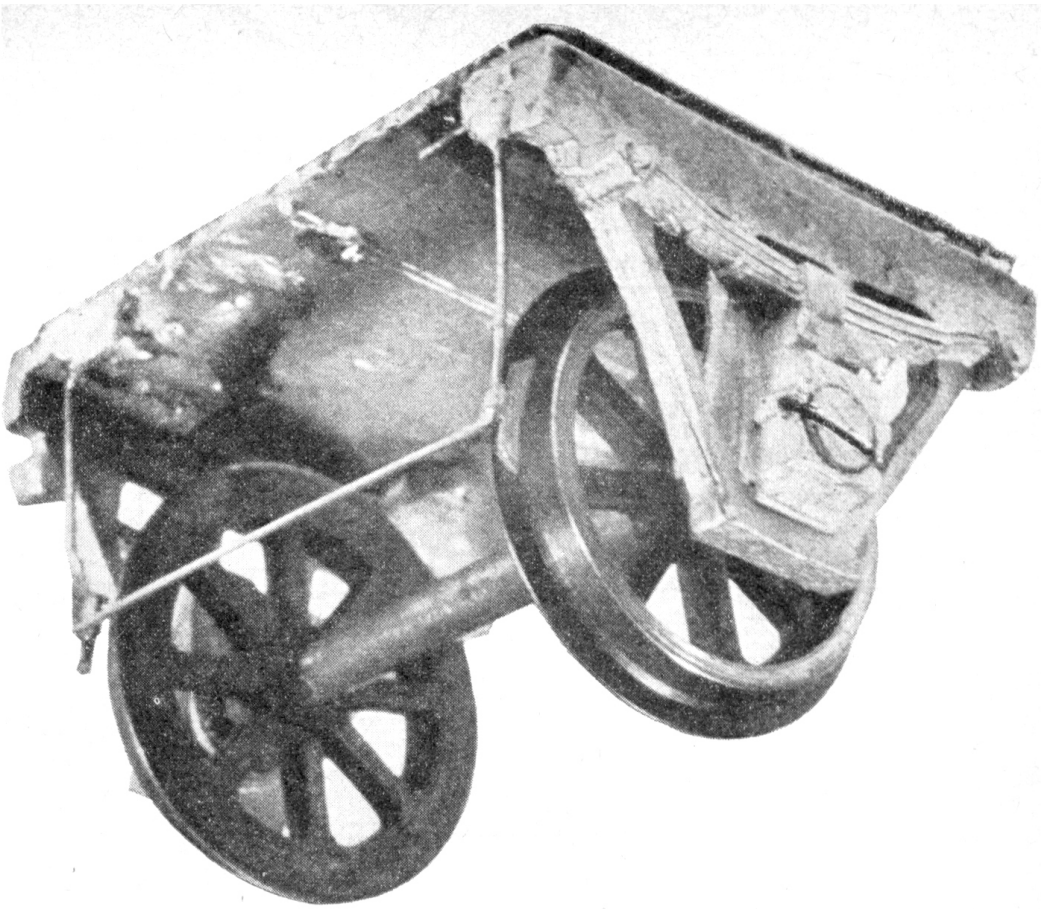


ADJUSTABLE PIN-POINT BEARINGS

By NORMAN DALE

OVER the past few years I have been dabbling and experimenting with pin point bearings for all my rolling stock. I was first introduced to the pin point idea by fellow members of the Manchester M.R.S. The first vehicles I converted were some Trackmaster stock. The idea of the Manchester "boys" was to drill and plug tap 7 B.A. the axle hole. A small plug or bush of screwed 7 B.A., already countersunk, was then screwed in. Sounds all right on paper, but it took me weeks to get 12 wagons converted to "E.M." pin pointed and running.

The main snags were: trying to tap the axleboxes with a 7 B.A. plug tap (difficulty in holding the tap square up, and the tap always seemed to want to remove all the threads—this was, of course, due to the very soft metal); the difficulty in maintaining the correct width between the bush faces. This is really vital for free running. Of course, all the foregoing was in order to maintain the original axlebox and lid intact. I did in fact only just complete the 12 vehicles in time for the 1959 Manchester exhibition, to run on my unfinished "Endale" layout.

Soon after this exhibition I was visiting a colleague, Sydney Stubbs of Manchester, and I asked him about the pin-points. He told me that he had abandoned the bush fitted on the inside of the axlebox to a bush screwed in after drilling straight through the axlebox, letting the bush make its own thread. This, in turn, was fixed with a blob of solder, filed off—and who could tell?

Good idea, I thought, but on returning home I also thought perhaps it would be better if the boxes were tapped after drilling. The same troubles occurred; tap stripping the threads in most cases.

Well, enough of what was done and is now past, here are my methods to get easily adjusted pin points, so free that the wheels can be blown round.

The wagon axleguards I use are an excellent reproduction made by a well-known firm of metal kit casters. They are of the separate type having no solebar cast to them. I can only find one fault with these guards; the centre of the axlebox hole is about ½ mm. out of centre with the axlebox front. Now this does not sound much but when two pairs of these guards are fitted to a wagon at correct wheel base centres, using the centre of the guards or axleboxes as the wheel base size, the axles and wheels are about 1 mm. out of line, Fig. 1. I believe this is caused through the top and bottom plates not registering up correctly during casting.

This is easily rectified by dropping a blob of molten solder into the axle holes and levelling off with a file. Also file away the boss on the inside of the box at the same time if you are working in "E.M." gauge. The guard is now placed face up on a jig, Fig. 2, and the front filed flat. The idea here is to offer to the drill a flat face, also to maintain a similar thickness of axlebox for the drilling jig. What we have to do next is to drill a No 43 hole through the centre of the box at the correct height. Rather than mark each one out separately, I thought this called for a further jig (Fig. 3). Did I hear you say "Too much time wasted making all these jigs"? Recently I did 24 sets (96 axleguards) in three hours, complete with all the foregoing as well as tapping and screwing in the brass bushes (and what a help this jig making will be to other members of my club). The bushes had been made previously on my lathe at the rate of 60 to 80 per hour (no, it is not an automatic lathe just a plain E.W.), but I will deal later with my methods for the making of the bushes.

We have now got the holes drilled right through the axleboxes and ready for tapping 7 B.A. Yes, I know a No 43 drill is not tapping size for 7 B.A.—you wait a minute, *my* tap will cut a nice thread in a No 43 hole. Do not buy a 7 B.A. tap, make one out of the 7 B.A. screwed brass rod, Fig. 4. Maybe screwed steel rod would be better for the tap, but I do not see any signs of wear on my brass tap after tapping about 400 holes! A little trace of turps into which to dip your tap is a great help when tapping these soft metals. The tap should go through the box front; this is in order to cut a full thread on the front of the box and let the taper of the tap be on the inside to make the bush be a good fit for the last couple of threads. The full threads on the front of the box enable us to easily screw in the bush. One job to do before the bush will easily screw in is due to the methods of making them on the

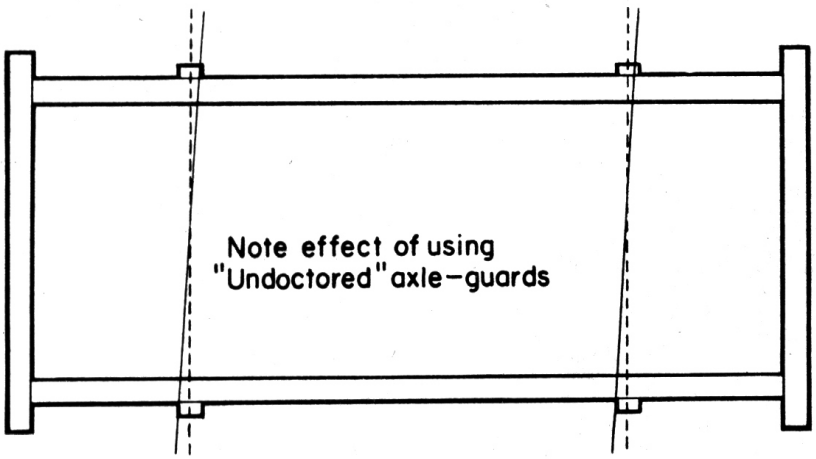


FIG. 1

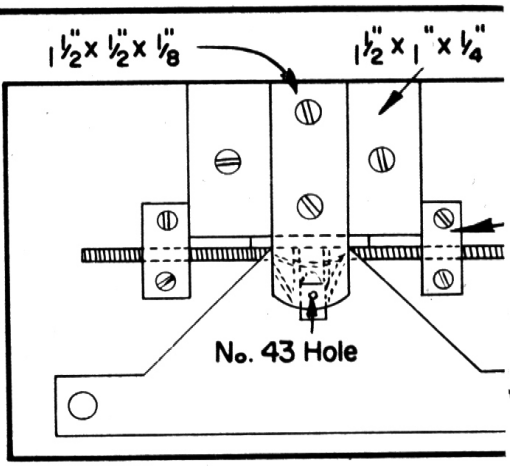


FIG. 3

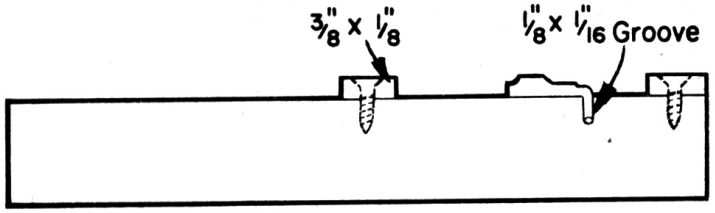


FIG. 2

Jig for filing box front

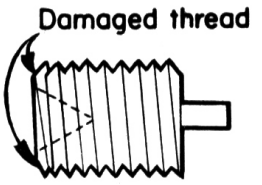


FIG. 5A

lathe; the first thread is forced over a little and this wants a gentle easing back or breaking off—a small watchmaker's screwdriver is the tool for this job, Fig. 5A (watchmaker's eyeglass on a stand is very handy here). A small pair of pliers to grip the spigot of the bush will help you to screw it not quite home.

This parting off spigot on the bush can now be nipped off and filed flat. A slot is now cut across the face of the bush, using a fine toothed hacksaw (Eclipse No 45—60 teeth/in.), Fig. 5B.

Now for the wheels. I have made quite a lot of my own, the three-holed type, but requiring a good number of the spoked type, I have been buying Jacksons spoked wheels, " E.M." of course (16.5 mm. can have the same treatment). These wheels are 0.100 in. wide when bought and to conform with my fine scale standards are required to be reduced to 0.080 in. wide. The pin-pointing of axles and the reduction of the wheel width is done at the same set-up on the lathe. The wheel assembly is gripped in the three-jaw chuck very lightly over the flanges (the jaws of my chuck will take both wheel flanges at the same time). The pressure required to grip the flanges is so small that no damage is done to the flanges. Oh yes, I know about ring chucks, but I have only had one set come adrift out of seven dozen sets of wheels. The top slide is thrown round to 60 deg. and a parting off tool used. Here is the drill:

1. Start lathe and advance tool to lightly touch edge of tread.
2. Bring tool towards self, advance 0.020 in. and reduce tread.
3. Remove domed end of axle with tool.
4. Lightly form a 60 deg. taper on axle end.
5. Lightly polish with fine emery *stuck* on ply.
6. Stop lathe, reverse wheel and start again as No 1.

Sounds quite a job. Don't believe it, my time for this operation (the last time I did it) was 10 sets in 80 min., or one wagon in 8 min.

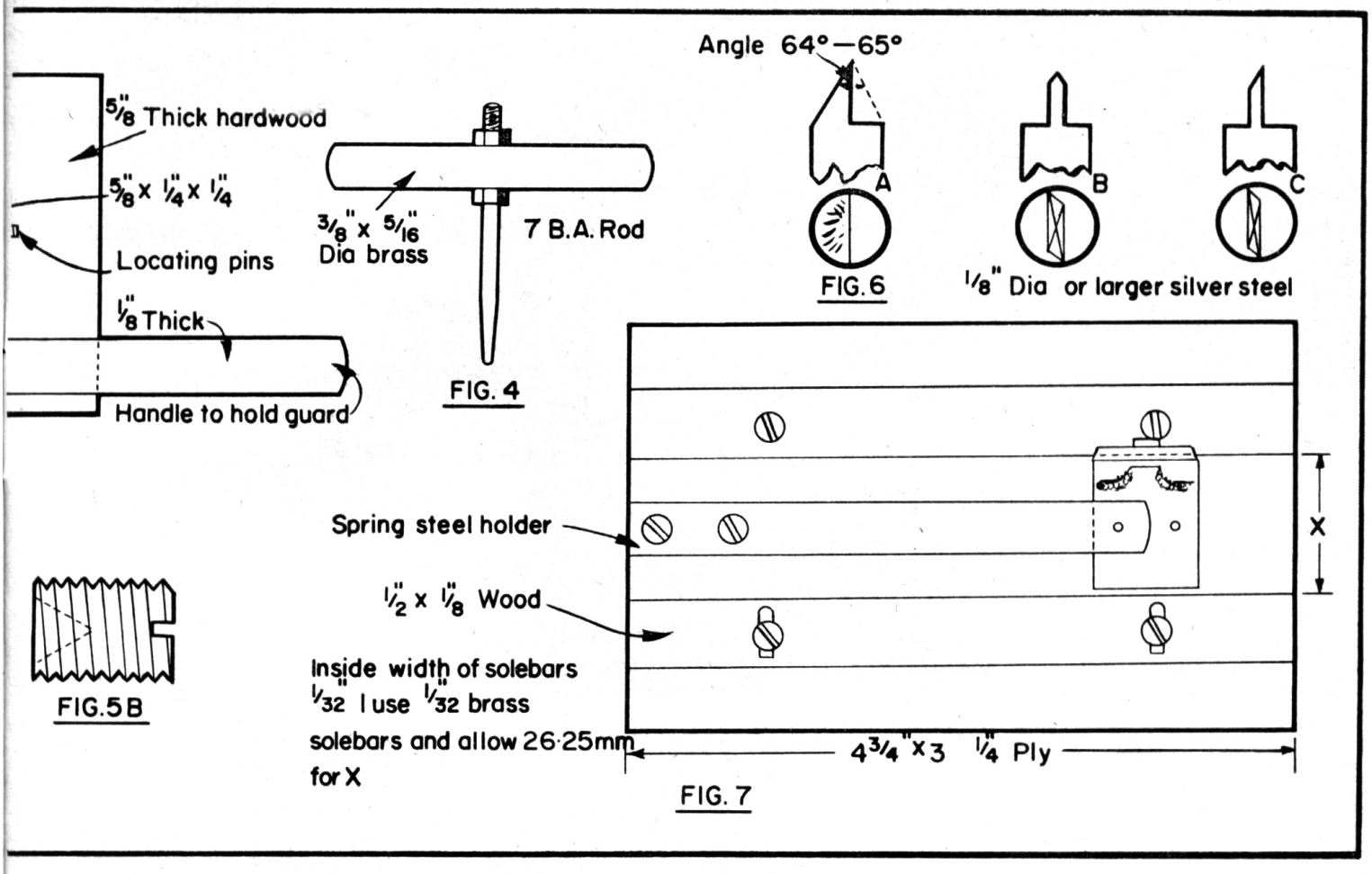
Now we have the axleboxes ready for the wheels, but before proceeding any further I must say, as I promised, more about those bushes.

They are made in the lathe from 7 B.A. screwed brass rod (Whistons, New Mills). Before moving the top slide back to 90 deg. after completing the wheels, move it a little further round, say a couple of degrees. We are now going to make the countersunk tool which will, in turn, countersink the brass bushes.

A short piece of $\frac{1}{8}$ in. dia. silver steel is then pin pointed or tapered. Whilst I had the set-up for this operation on my lathe I made three double-ended countersinks (should last me all my life). I experimented a little here in filing three different types of cutting edges on the ends, Fig. 6. These were hardened and tempered over the gas stove and kitchen sink, then stoned to a good cutting edge. I found that types B and C cut the best, perhaps B is the better of these two. I made these countersinks when I did my first batch of wheels. The idea behind the throwing further over of the top slide is so that the pin point will only bear on its extreme point.

Now to make these bushes; with the lathe back to normal and the screwed brass rod held in a collet in the mandrel nose, the home-made countersink in the tailstock drill chuck, a thin parting off tool fixed to the top slide at about $\frac{1}{8}$ in. from the countersink point.

1. Start lathe, advance countersink to give about $\frac{1}{16}$ in. deep countersink, noting how far the tailstock wheel has been turned.
2. Bring tailstock wheel back to original position; it acts as a length stop for the next bush.
3. Advance parting off tool to part off a bush, bring back tool.
4. Stop lathe, unscrew collet, push rod up to the countersink tool and restart again as No 1.



With a little practice you should average one bush per min.

After that little diversion we will now get back to the final job of fitting the axleguards and wheels to the vehicles. All that remains now is to solder the guards to a strip of tinplate $\frac{15}{16}$ in. by $\frac{3}{4}$ in. by 20 s.w.g., two guards to one plate. Any tinsmith will be only too pleased to get rid of some of his cuttings and for a few coppers he will gladly sell you a few lengths of $\frac{3}{4}$ in. by 20 s.w.g. tinplate. A mention of what you are using it for will help; most of these chaps are mechanically minded enough to be interested. The soldering of the guards is done in a simple jig, Fig. 7. Two strips of wood $\frac{1}{2}$ in. by $\frac{1}{8}$ in. are screwed to a piece of ply at the required solebar width. One of these strips can have elongated holes to accommodate different solebar widths. A strip of spring steel will hold down the tinplate leaving both hands free to hold soldering iron and a match stick holding the guard being soldered.

After the guards are soldered twist a sharp pointed pencil in the brass countersunk bush to give the axle a little dry lubricant. Insert the wheels and adjust by screwing the bushes in or out.

When fixing the assemblies to the vehicles I used No 1 by $\frac{3}{8}$ in. round headed brass screws where a block was being used to imitate a load of coal etc., or as a strengthener in a van. In the case of empty wagons 10 B.A. countersunk brass screws and nuts were used. The assemblies are fixed with the screws slack so that each wheel is allowed to fall into any low spot on the track. I have kept my eyes and ears open for the past 10 years for ideas about the springing of vehicles and to me this is the best yet. We have to thank my good friend John Langan, also of the Manchester Society, for this method of suspension. The final fixing of the guard bushes is left until the vehicle is ready for finishing. This fixing is done with the aid of the soldering iron plus a small strip of tinplate bent U shape. This tinplate trough is clipped on the iron and forms an easy way to run a little controlled flow of molten wax candle on to the top of the brass bush. When set hard the wax can be filed and cut to shape to bring back the axlebox lid into being. Personally I feel this is going a little too far, because I find after filing the wax flat and maybe a stroke of the file to form the lid on grease filled boxes, a dab of black paint is all that is required.

The use of the wax enables one to re-adjust any assembly that gets knocked or damaged. Just a dig in the wax with a small watchmaker's screwdriver and the re-adjustment is completed in a minute or so, a drop of molten wax, file and paint, and away the wagon will roll again. Coaching stock has been converted by similar methods.

There is just one snag to such easy running vehicles, that is your track must be level where a vehicle is being left on its own. Sidings are best with a slight fall towards the buffer stops.

Your Editor, Roy Dock, has a set of my wheels which I took to the Manchester M.R. Society's dinner in 1961 and a friend of mine, Eric Blakey of Bradford, finger flicked the wheels and timed them with his watch. Yes, they took 45 sec. to stop. I myself can blow 12 wagons along the track, up and down.

Well, that about completes this article. You might say, all very nice but I have no lathe, but perhaps a friend has. The best way is to take the advice given to me by another member of the Manchester M.R.S.: "If you have a TV and no lathe, sell the TV." The further one gets away from the TV and kits, and starts to help himself, the greater is the enjoyment of our hobby. I shall be only too pleased to enlarge on any point if you get in touch with me.