Part 5.

A Gauge 0 Steam Loco for Beginners.

By "1121."

Buffers.

If you are content with commercial solid buffers, all you will have to do is to cut off whatever shank they may have, in the case, at any rate, of the rear buffers, and solder them directly to the beam, while the front ones can be put through the holes and secured with nuts behind in the orthodox way. If you want to *make* solid buffers, turn them out of 5/16" square bar to the outline of the finished article as shown in Fig. 22. We are not proposing to devote further space to this process, as we consider it a pretty safe bet that the majority of "Aladdin" builders will prefer spring buffers. As no existing commercial spring buffer that we know of, at time of writing, fulfills the necessary condition of no projection behind the buffer-beam, we have had to scheme one out specially, and much cogitation has been entailed in evolving a design sufficiently robust to withstand the abuse inseparable from a buffer's duties. We cannot deny that they are tricky little items to make, but still within the capabilities even of a beginner, given only care and accuracy. Our "Official Suppliers" will be marketing the buffers complete by the time these notes appear in case anybody should prefer to purchase them.

To make the body, or housing, hold a piece of 5/16" square brass or steel bar in the four-jaw chuck, adjust the jaws until it runs true, and face the end off flat exactly as detailed for the axle bushes. The successive stages of forming the shape of the body are shown in the little diagrams (Fig. 23) and you can please yourself whether you do the reduced part in the middle with hand tools, or from the slide-rest. Our pet dodge is to do a job of this kind entirely with what amounts to a parting-tool with the end ground to a radius instead of being square, but naturally it is essential to take great care that such an un-robust tool doesn't get wrecked in the process. All you have to do to shape the reduced part of the buffer is to traverse the tool backwards and forwards between the base and the ridge on the outer end, gradually increasing the depth of cut until you arrive at the right diameter. Then a touch with a file will do all the "rounding-off" necessary to finish the shape.

Without disturbing the job in the chuck, centre the end and drill 5/32" diameter, or No. 22 Morse, which is near enough the same size, by about 7/16" deep.

Replace the tool in the slide-rest by an ordinary square-ended parting tool, and part off. Be careful how you feed the parting-tool in, with those square corners coming round. Finish all the buffer housings to this stage.

The only other lathe operation on this part of the buffer is to counterbore the hole from the back end. With the 5/32" drill still in the tailstock chuck, thread the buffer body over it, the other way round. Wind the tailstock barrel out until the square part of the job enters the

(Continued on page 206).

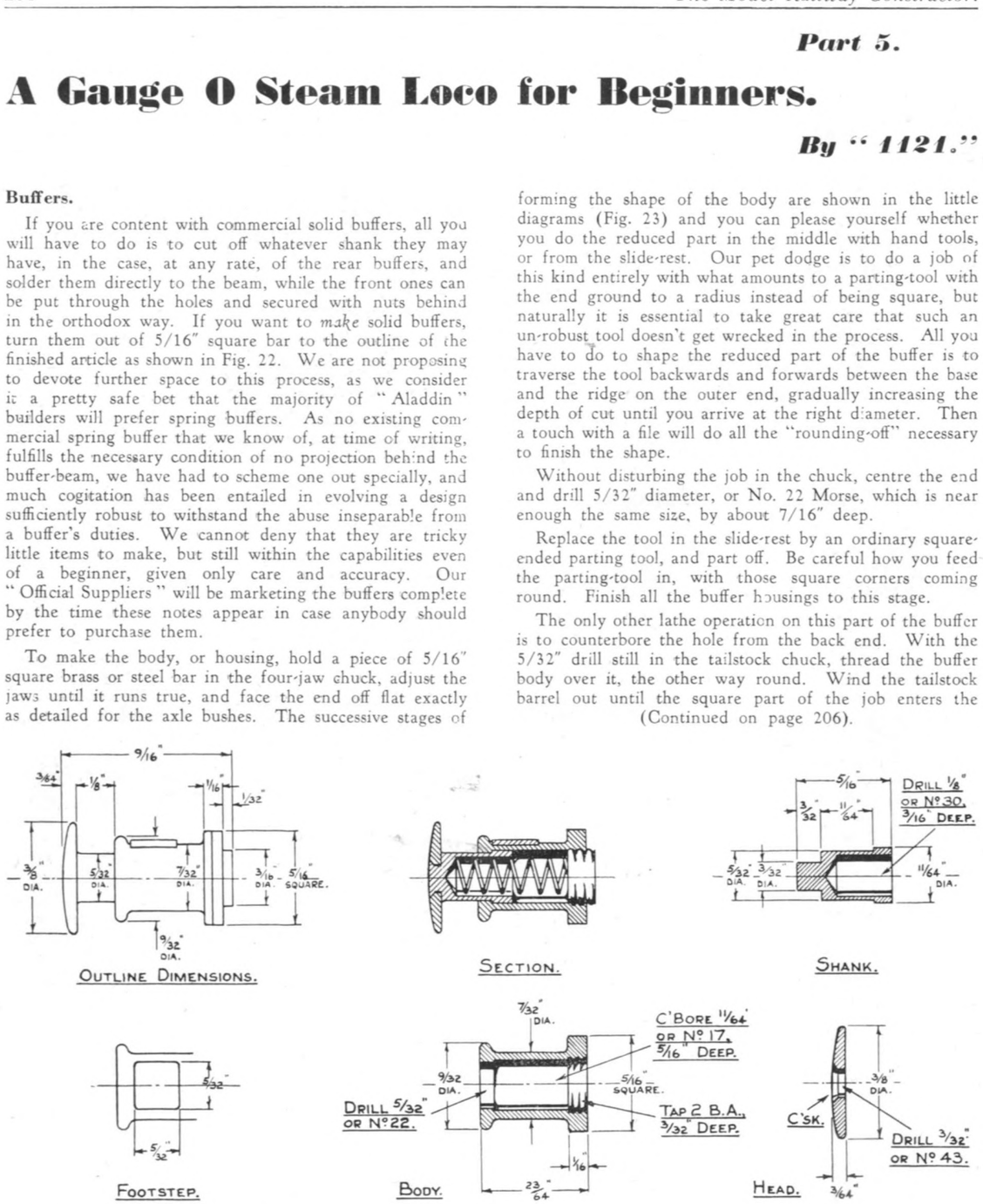


Fig. 22. Buffer details. Outline dimensions for solid buffer, sectional view of complete spring buffer and dimensions of components.

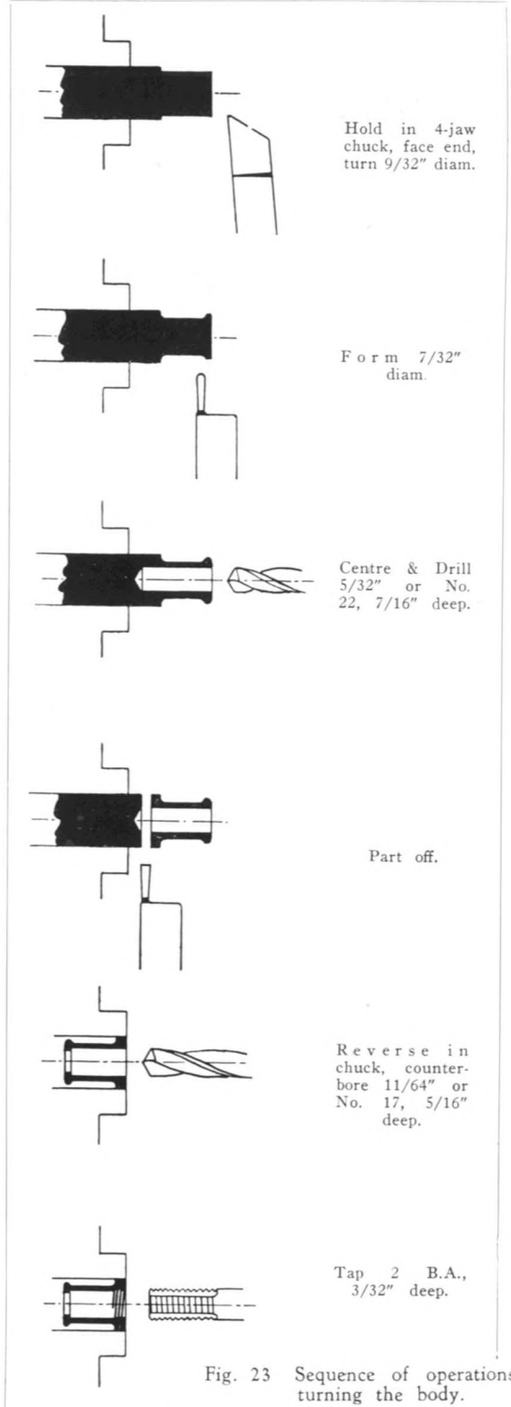
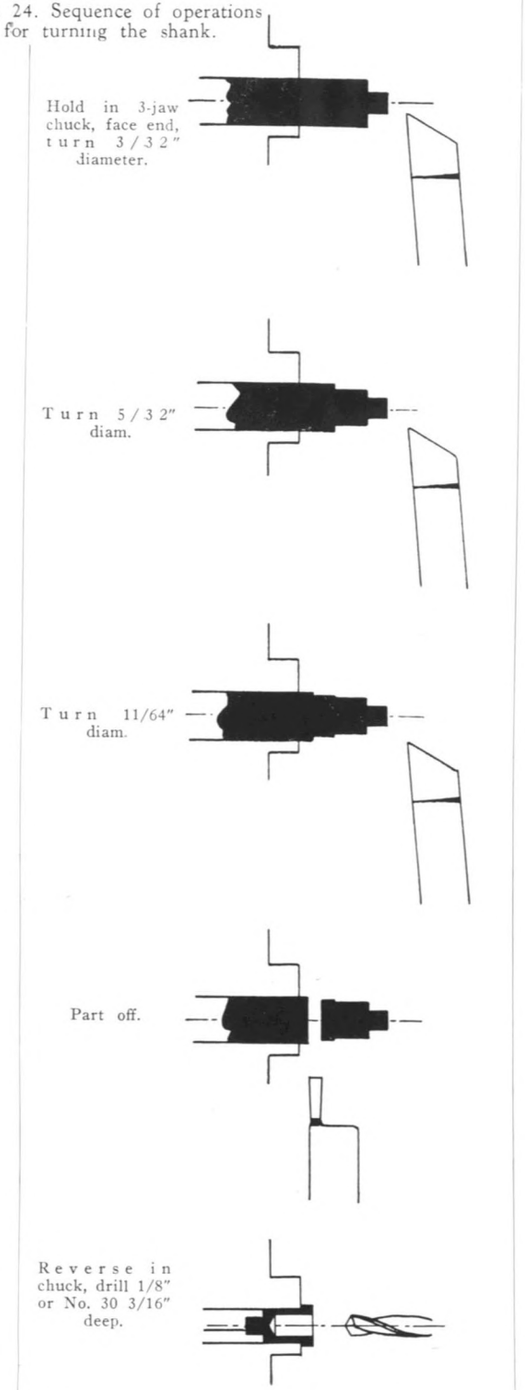


Fig. 23 Sequence of operations for turning the body.

Fig. 24. Sequence of operations for turning the shank.



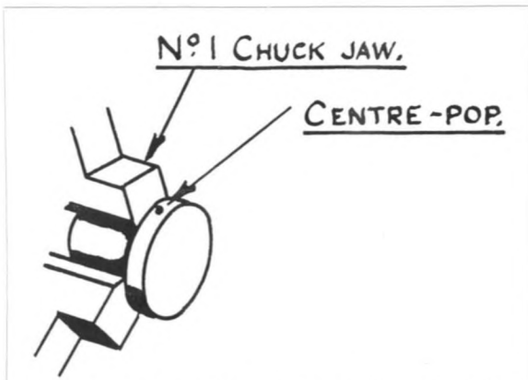


Fig. 25. Making split bush for holding the buffer shank for drilling—marking the bush before drilling to ensure subsequent correct location in chuck.

chuck jaws, and gently tighten them up. This is an easy way to re-insert a job in the chuck when there is no other means of ensuring that it is reasonably true—kindly note for the future. With the job thus held, replace the drill by a 11/64" or No. 17, and open out the hole with it to a depth of 5/16", and tap 2B.A., 3/32" deep. This will be far from a complete thread, owing to the comparatively large diameter of the hole, but its only purpose is to hold the screw which keeps in the spring while the buffer is being fitted to the beam.

Tapping in the Lathe.

This thread in the back of the buffer housing will present no difficulty whatever, for the reason given above, but as it constitutes our first bit of tapping in the lathe we will take the opportunity to deal with the subject in full now for future reference.

As the average "Aladdin" builder is not likely to possess all sorts of elaborate friction-drive tap-holders, we will describe our own method of using an ordinary tailstock drill-chuck. In the case of a big tap, you just wind it into the hole in the job and heave the lathe round by hand at the same time, occasionally reversing the process to clear the chips, but taps in the smaller sizes need handling a little more gingerly if we are to avoid an appalling rate of mortality among them. Wind the tailstock barrel out until the end of the tap is almost entering the hole. Now grab hold of the body of the tailstock chuck and give it a twist to release it from the tapered socket in the tailstock. Push the tap into the hole, and pull the lathe round. Although the stem of the chuck is now loose in the tailstock mandrel, it is still guided by it sufficiently to keep it true enough for all practical purposes, and the drill chuck is held in the hand only sufficiently tightly to make the tap cut, but not tightly enough to break it should it get stiff or encounter some obstruction, such as the bottom of a blind hole. In such an event the chuck slips round in the hand and no harm comes to the tap. As soon as this happens, pull the lathe backwards again to withdraw the tap, and have another go. Start with a taper tap and finish with a plug—you

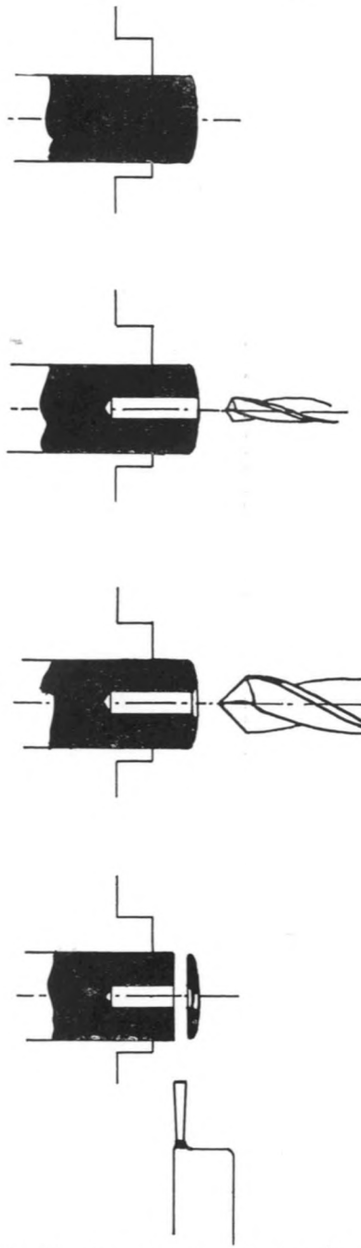


Fig. 27. Sequence of operations for turning the buffer head.
1. Hold in 3-jaw chuck, round off with file.
2. Centre & Drill 3/32" or No. 43 deep enough for 4 heads.
3. Countersink.
4. Part off to finished thickness.

should have no difficulty in brass, while in steel some species of lubricant will be found beneficial, as advised in the instructions on hand tapping.

The buffer shank is made from 3/16" diameter mild steel. Follow the series of operations shown in Fig. 24, allowing only just enough to project from the chuck to do the whole piece at one go. Saw or part off, and repeat for the other three. Now turn the pieces round, holding them on the 5/32" diameter, face the ends off to length, centre, and drill ⅛" or No. 30 3/16" deep.

Now, if your chuck jaws have seen better days, the process of holding this little piece to revolve sufficiently truly to get the hole dead in the middle may present something of a problem. There is a method, however, by which such a job can be done in *any* chuck, and as we shall certainly be bringing it into use later on to do really important jobs, we might as well get the information across here and now in case you would like to use it to make sure of this one.

Hold a piece of 5/16" diameter steel rod in the chuck, and turn it down to about ¼" dia., for ¼" long. Saw or part it off, and turn it round and hold it in the chuck on the diameter just turned, with the shoulder well up against the face of the chuck jaws. Make a centre-pop mark on the "head" somewhere where you can replace the thing in the chuck in exactly the same position any number of times. The usual place is just in the middle of No. 1 chuck-jaw (Fig 25). Carefully face across the head, and centre and drill the size to hold the job, in this case 5/32" or No. 22. The little bush should now be held in the vice and split for its whole length with the baby hacksaw, in a position diametrically opposite to the centre-pop mark. (This is to ensure that the split comes between two of the chuck jaws.) See Fig. 26. Remove the burr from inside the hole, along the saw-cut, with a small round file, and now you can pop it in the chuck, in the right position, and when one of your buffer-shanks, or whatever the job

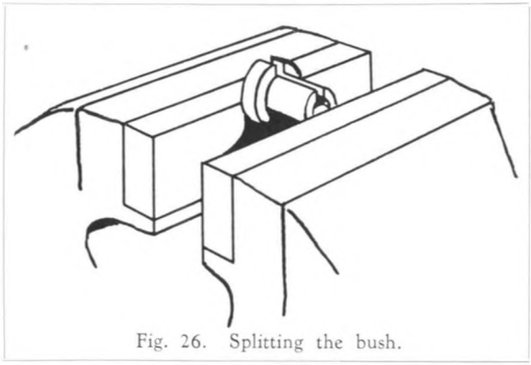


Fig. 26. Splitting the bush.

is, is put in and the whole lot tightened up together, the job should run as truly as if it were in a proper collet.

The buffer-heads are made from ⅜" round mild steel. Face the end of the bar, round off to shape with a file, centre, drill 3/32" or No. 43, and countersink slightly, and part off to finished thickness. (Fig. 27). (These *must* be *parted* off, not sawn, as you'll never be able to hold a thin disc like this to face the back.) Before parting right through to the hole, round off the back edge with the file. The initial drilling can be done deep enough for all four heads.

Silver-soldering—Lesson One.

Before assembling the parts of the buffers we must organise the little footsteps—these are tiny squares of thin sheet brass, and they will need to be silver-soldered on. If they were only soft-soldered they would fall off when soldering the buffers to the beams. They will form a useful "first lesson" in silver-soldering in preparation for more important work to come. We recommend a certain amount of silver-soldering to any modellers who go in for

A 7¼" gauge G. W. R. 0-4-2 tank built by James S. Beeson. Photo: A. S. Taylor.

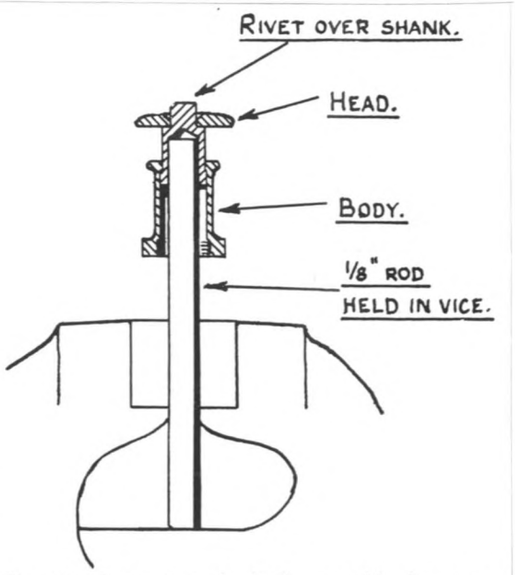


Fig. 28. Supporting the buffer assembly for riveting on the head.

fine detail. The higher melting-point enables a part to be fabricated and then fixed in position as a whole, or further added to by means of soft-solder without falling to pieces. The process itself is no more difficult, merely requiring greater heat. Arm yourself with some low melting-point silver-solder (as distinct from the very hard stuff you do come across sometimes). We always use "Easiflo," and the special flux to go with it, although ordinary borax from a chemist can be used as flux for an easy job like brass. You will also require some soft iron binding-wire, to hold the parts together. A small blowlamp, or gas blowpipe of the "self-blowing" bunsen kind will provide all the heat necessary for any silver-soldering encountered on an engine this size.

File a little flat on the buffer body, in the correct place, into which the step will fit, making sure that it will come parallel to one of the sides of the square base. Mix up a little borax to a stiff paste with water, and put a dab on this flat part. If you are able to file the flat to just such a width that the step will jam into it, it will hold itself in place, but if it is loose it will need to be secured with a bit of the iron wire twisted round the body. Now heat up the whole thing to red, the best way to hold it being to thread it over a length of stiff steel wire. Warm up the end of your strip of silver-solder, so that it doesn't chill this tiny job as soon as it touches it, but at the same time not heating it sufficiently to cause it to melt and blob all over the job before you are ready, and then carefully apply it in the joint between step and body. You will be able to find a place in the end of the flame which is just hot enough to keep the job at the right heat while you operate, without the danger of its over-heating and melting, which brass has been known to do. The silver-solder will run into the joint just like soft-solder, but the merest touch is sufficient—if you put in more than necessary it will run all over the job, waste the solder, which is expensive stuff, and all have to be laboriously cleaned off by hand afterwards.

Put the job on one side to cool, while you do the others in the same way, afterwards cleaning them all up with emery-cloth or steel wool.

Assembling the Buffers.

Put a short length of $\frac{1}{8}$" diameter rod in the vice, standing vertically. Insert the buffer-shank into the body (from the back, of course), and then place the whole thing over the bit of rod. (Fig. 28.) Put a buffer-head over the end of the shank, and rivet the latter over carefully into the countersink. Clean up the rivetted end with file and emery, until there's nothing to show how it was done. For the sum of one penny you can procure at the local tobacconist's a long spring as used in cigarette lighters to hold the flint against the wheel. One of these, cut into $\frac{3}{8}$" lengths with wire-cutters, will provide all four buffer-springs. They will work more freely if their ends are squared off by touching them on the grinding wheel. Pop one of your springs into the back end of the first buffer, and screw in behind it a 2B.A.screw (any old 2B.A. screw), and try the buffer for pressure. You can adjust the length of the spring by stretching it longer, or grinding it shorter. When you are satisfied, saw off the screw and trim it down with the file until it projects 1/32" from the buffer housing—just enough to form a location in the hole in the buffer beam. Repeat for the other three.

We need hardly tell you, when you come to solder the buffers into the beams, to avoid running solder all over the buffer-beams and buffers. If the iron is hot enough, *and clean enough*, it can be applied at the back of the beam only, and the heat will go through to the front.

A SMALL GREAT WESTERN SIGNAL BOX

by B. H. HARPER.

Drawings actual size 4 mm. scale.

I found that there are very few signal box drawings available, so when I built "Lansdowne," a small G.W. branch terminus, I was not surprised to find that I had to design my own.

The signal box was designed to take about twelve levers, and can well be built of card. The steps and hand-rails, however, are best made of wood owing to their slender proportions. The lower portion of the signal box was finished in brick while the upper half is wood weather-board which was painted buff. The main timbers, barge boards, gutters, stove and fall pipes are painted brown. The roof is grey slate.