

Part 8.

# A Gauge 0 Steam Loco for Beginners.

## The Eccentric and Stop Collar.

By "1121."

We are now beginning to get some idea of the reactions of readers to "Aladdin" and the articles dealing with the engine. It is possible to say now that she is proving extremely popular, and a large number of engines are being built. One criticism which has reached us from certain quarters is that the articles are progressing too slowly for some people, who have the necessary knowledge and experience to get moving on the engine without the help of all sorts of incidental instructions about sharpening drills and things like that. One gentleman even went so far as to say that if a man didn't know how to sharpen a drill he had no right to be building an engine at all! We feel that there should be an answer to this somewhere,

and we think it must be that if a man can sharpen a drill, then he has no right to be building "Aladdin!" We are tickled to death at the idea that some of the "experts" want to build our little engine, but we beg to remind them that she is first and foremost a simple little job for beginners, as has been made quite clear right from the start. She is, in fact, intended largely as a convenient means to put over just the very information to which the more experienced people are objecting. This means that in the earlier stages of the series progress is necessarily rather slow, but as this elementary information is got through things will automatically speed up as the work can be described without frequent diversions.

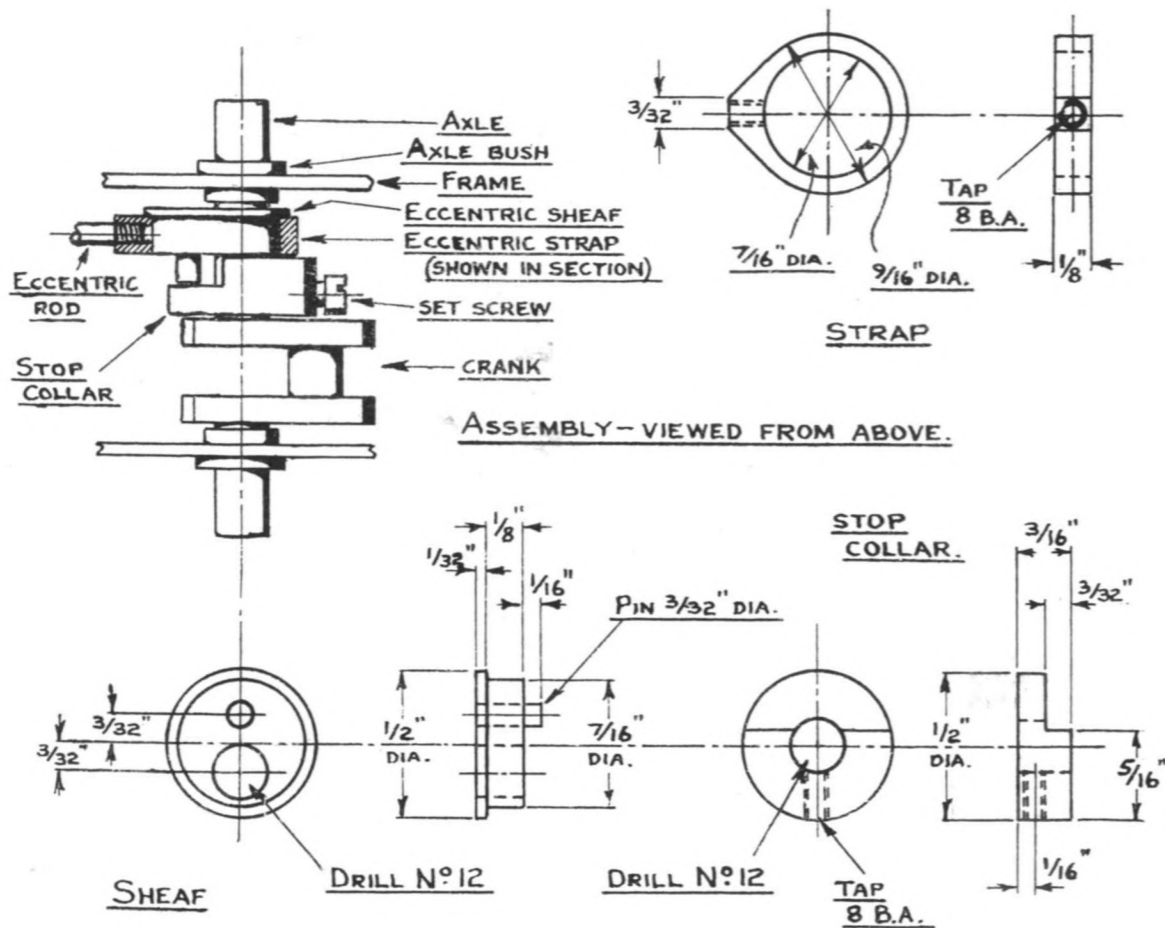
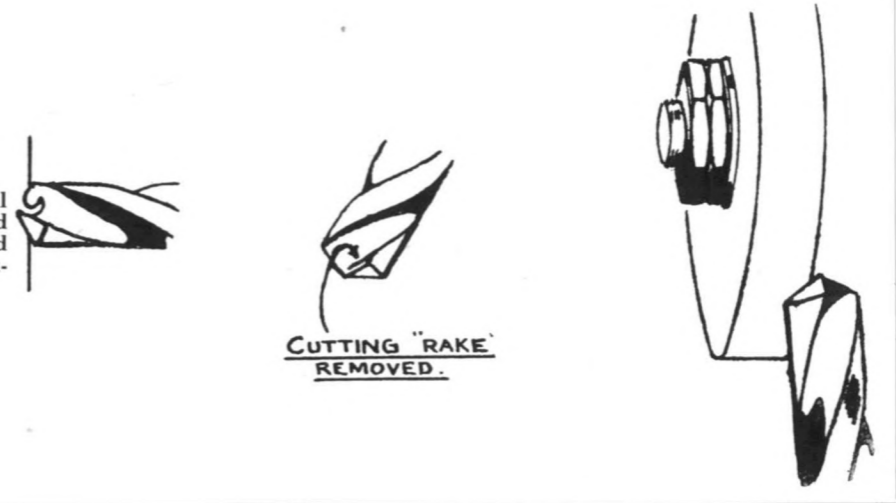


Fig. 39. The valve gear and its components.

Fig. 40. How a big drill "snatches" in brass and how this can be avoided by grinding off the cutting "rake."



To sum up, we beg more experienced readers to remember that they, at one time, were beginners, and were glad of opportunities to learn, and unless we receive instructions to the contrary from the Editorial Powers that Be, we refuse to be rushed, believing that it is better to provide beginners with a sound foundation of knowledge as to why we are instructing them to do this, that and the other, rather than merely telling them to "follow the instructions," without giving them a clue as to the technical why's and wherefore's.

### Eccentric and Stop Collar.

The valve gear assembled on the axle, and its separate components, are shown in Fig. 39. Make the "strap" first—it is easier to turn the sheaf to fit it rather than trying to bore out the strap to fit the sheaf, and they must be a good running fit, as slackness here will communicate itself to the valve.

Cut a piece of 1/8 in. phosphor bronze or hard brass plate about 5/8 in. square. Hold this in the 4-jaw chuck and get it set with the surface running as true as you can (without side-wobble) and the centre of the square running reasonably in the middle. Centre with the slocomb from the tail-stock and start drilling successively larger holes up to the nearest you have under 7/16 in. Now, a drill ground in the ordinary way is liable to "snatch" in brass, which doesn't matter a lot in small sizes, but a big drill suddenly screwing itself into a comparatively small thin bit of brass is likely to carve things up a bit. For this reason it is advisable to remove the "rake" from the cutting lips, and the collection of little sketches (Fig 40), show this, and how it is done. A lathe tool similarly, cuts hard brass better if it has a flat top with no rake, and there is no difference between a lathe tool and the edge of a drill, except that one is cutting vertically and the other horizontally.

Finish the hole with a 7/16 in. reamer if you have one, reaming out from a 27/64 in. drilled hole. If you haven't, finish the hole with your boring tool, checking the diameter with inside calipers set to the rule. Remove

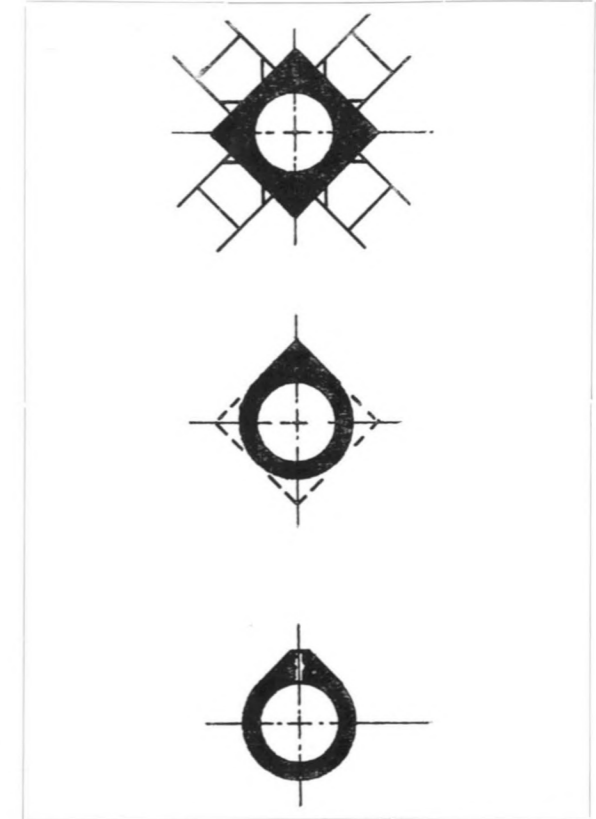


Fig. 41. Sequence of operations for making eccentric strap. Drawn full size. From top to bottom :  
 (a) Hold in four-jaw chuck, drill and ream 7/16 in.  
 (b) File off three corners.  
 (c) Flatten corner, drill and tap.

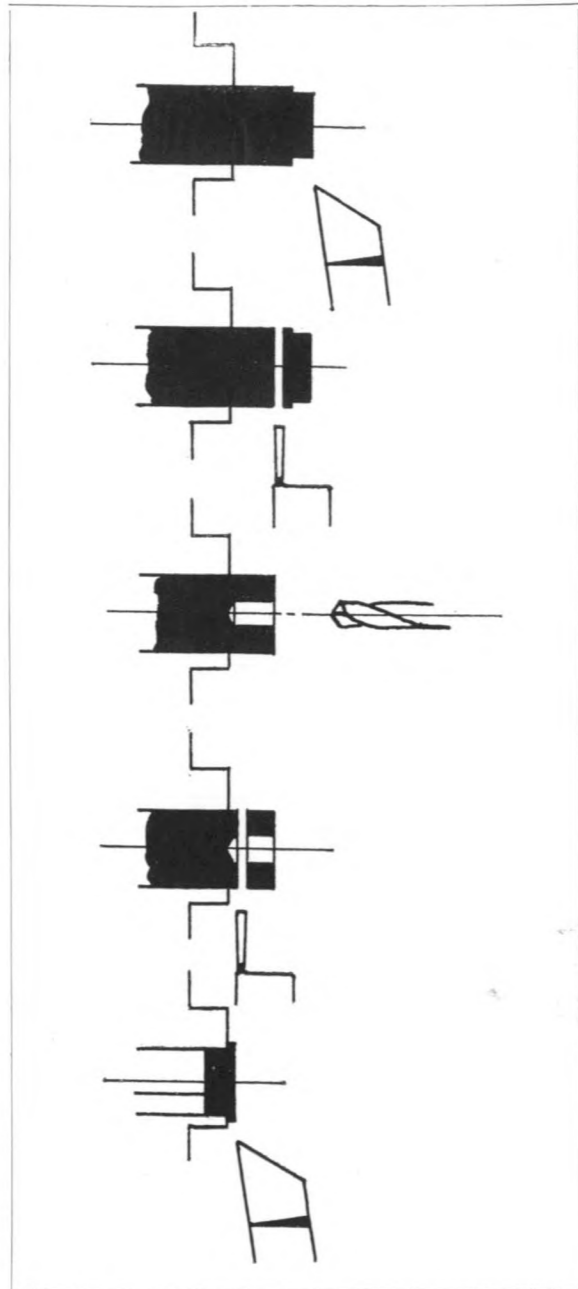


Fig. 42. Sequence of operations for turning eccentric sheaf and stop collar. From top to bottom :

- (a) Face end, turn 7/16 in. diam.
- (b) Part off sheaf.
- (c) Centre drill No. 12.
- (d) Part off collar.
- (e) Hold sheaf on 7/16 in. diam. face back.

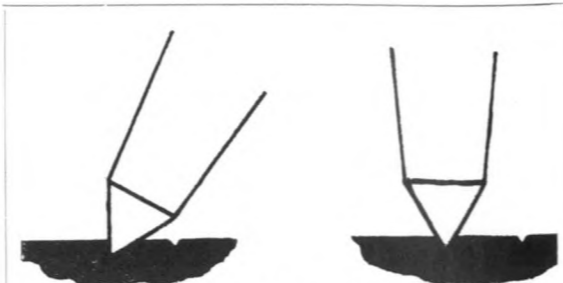


Fig. 43. How to shift a centre-pop mark.

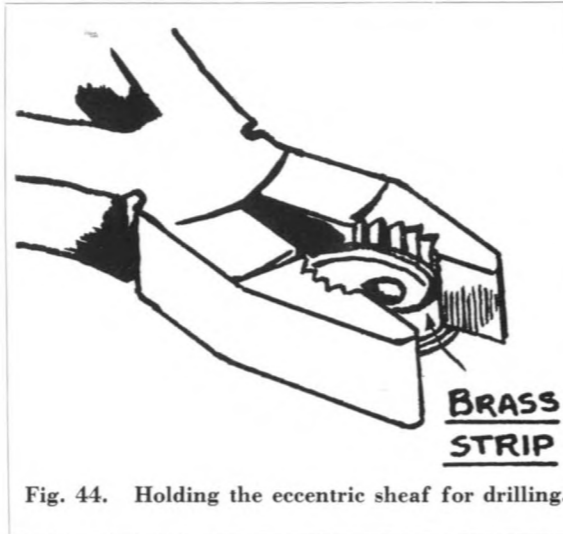


Fig. 44. Holding the eccentric sheaf for drilling.

from the chuck, saw off *three* of the corners, and file to shape. (See "sequence of operations," Fig. 41.) File off the remaining corner just enough to centre-pop, drill No. 51 and tap 8 BA. for the eccentric-rod to be screwed in later. Remove all burrs and clean up generally.

The eccentric sheaf, and the stop collar which drives it, are turned at the same time from  $\frac{1}{2}$  in. dia. mild steel bar. Chuck a short length, face the end, and turn the 7/16 in. dia. until it will just slip into your eccentric-strap without shake. Get a good finish on this diameter to avoid the surface causing excessive wear in the strap. Part off the sheaf, and face the end of the bar again, and centre and drill No. 12 about  $\frac{1}{4}$  in. deep, and part off the collar. (Fig. 42.) Hold the eccentric sheaf in the 3-jaw chuck again, the other way round, with the flange pressed up against the fronts of the jaws. Don't hold it too tightly, or you will make marks on the turned diameter. Face across the back of the sheaf, taking light cuts so as not to hook it out of the chuck. Do the same with the collar, re-inserting it in the chuck by the dodge of threading it over the No. 12 drill, as described in the article on making buffers.

The travel of our valve is to be  $\frac{3}{16}$  in., which means that the throw of the eccentric must be  $\frac{3}{32}$  in., and this must be pretty accurate if the valve is to do its job properly. The facing-marks on the smaller side of

the sheaf will show you the true centre of the 7/16 in. diameter, and the position of the axle-hole must be carefully marked off from this side. A light centre-pop in the middle will help in measuring off the other centre, which is then also centre-popped. Have a good look to make sure that the centre mark is really in the middle, and that the axle-centre really is  $\frac{3}{32}$  in. from it. If you find you are slightly out, a centre-pop mark can be shifted by attacking it carefully with the punch leant over at an angle, the corrected position then being established by a blow with the punch held vertically. (Fig. 43.)

Put a small pilot-hole through, making sure the part is held truly flat under the drill. You will not be able to open out the axle-hole with the sheaf held down with the fingers, and we suggest holding it tightly in a pair of pliers, with a little strip of soft brass, copper or aluminium to protect the job. If it went round on the drill while being gripped in the pliers, it would get horribly chewed up, but will come to no harm with the soft metal there. Open out to No. 13, and ream 3/16 in. (Fig. 44.)

The only other job on the eccentric sheaf is to put in the pin by which it is driven by the stop-collar. The position of this is shown in the drawing, and although it might appear at first sight that this is not very important, in actual fact it is, as if it is placed on a larger radius out from the centre of the axle its angular amount of rotation from one side to the other of the stop-collar during reversing of the engine will be affected. The pin is merely a bit of  $\frac{3}{32}$  in. mild steel or silver-steel rod, pressed in to a No. 43 hole.

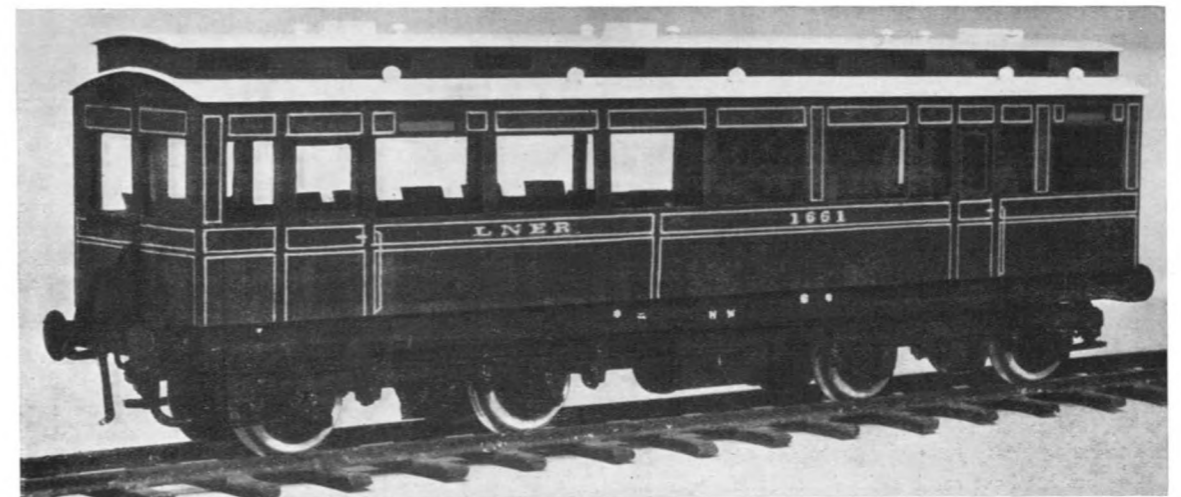
The stop-collar has a step filed across it as shown. The position of this step relative to the centre of the axle is also important. To finish the collar, drill the thick side No. 51 and tap 8 BA., and fit a little set-screw to secure it to the axle.

### Second Thoughts.

"We wish to refer back to a couple of points concerning parts of "Aladdin."

The first of these concerns the axle bushes, described in the October, 1952 issue, in which a rather extraordinary mistake occurred in the drawing. Fig. 19, gave the thickness of the head as  $\frac{3}{32}$  in., and the length of the  $\frac{1}{4}$  in. diameter which presses into the frames as  $\frac{3}{64}$  in. These dimensions should, in fact be reversed, the length of the bush under the head being  $\frac{3}{32}$  in., and the thickness of the head  $\frac{3}{64}$  in. We are very sorry about this, and just cannot imagine how the mistake got through our checking system, as the drawing was incorrect; it wasn't just a mistake in dimensioning. Luckily, the effects of the error are not very serious—anybody who has made the bushes only need press them out of the frames, hold then gently on the  $\frac{1}{4}$  in. diameter in the 3-jaw chuck, with the underside of the head pressed squarely against the fronts of the jaws, and carefully face the head down to the right thickness. The fact that this will leave the total length of the bushes less than was intended does not matter a lot—the main thing is that the dimension over the bushes and frames should be reduced to clear the back-to-back distance between the wheels. Apologies, once more, and we will try not to do it again!

The other point we would like to mention is that we gave no figure for the amount the crankpins should project from the wheels, in the last (Jan., 1953) article. frames, hold the gently on the  $\frac{1}{4}$  in. diameter in the from the face of the boss. The coupling rods being  $\frac{3}{32}$  in. thick at the ends, this gives  $\frac{1}{32}$  in. clearance when the nuts are screwed on tightly. These nuts can be standard 8 B.A. hexagons, or, to look better, the special ones which will be described later on when we are ready to fit the rods for keeps.



A gauge OO model of the original N.E.R. Chief Mechanical Engineers vehicle which came out in the 70's and is still used on the L.N.E.R. at York for various purposes. The model is depicted in its present style and finish which has not altered much from the original, the major addition being the letter "L" in front of the N.E.R. The crest of the N.E.R. was carried until the 30's. The model was built to special order by Messrs. Edward Exley for Mr. J. Jackson of Chelford, Cheshire. Photo: H. L. Overend.