

A GAUGE 0 STEAM LOCO FOR BEGINNERS

Part 19.

By "H2I."

The first process in setting the valve is to see that it is in the right position with relation to the cylinder-block and ports, so that whatever it may be doing, it is at least doing the same thing at either end of its travel, even if it is temporarily doing so all at the wrong times. When the eccentric is at one end or the other of its "throw," the edge of the valve at the other end should have opened the port just to its fullest extent—no more and no less. When the eccentric is turned over to the opposite centre, the opposite port should just be fully opened. If, for the sake of argument, the valve is observed to open the front port and still travel further beyond its inner edge when the eccentric is at its back position, and doesn't open the back port fully with the eccentric towards the front, then obviously the valve is too far back, and should be drawn further forward by unscrewing the spindle a little way out of its forked-end—or vice-versa. (Fig. 93.)

Having got this right, we must now check the setting of the eccentric. Theoretically, and if everything has been made exactly, it should be possible to say that when the stop-collar is in this position with its screw in line with the crank, the valve is bound to be correctly set, with no need to say more. We have a rooted dislike, however,

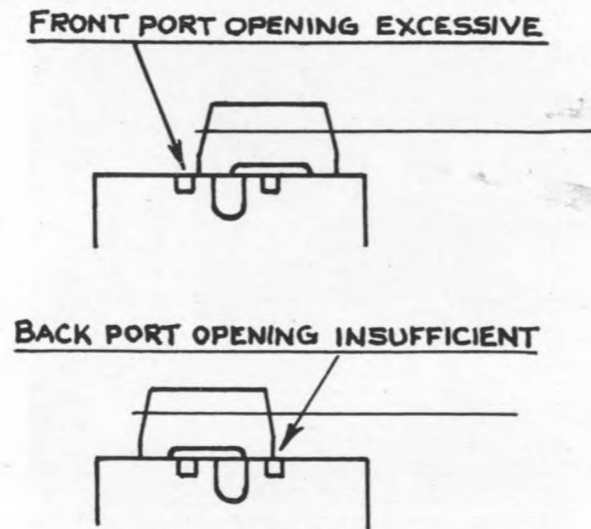


Fig. 93.

Adjusting the position of the valve. It is shown above at the back end of its travel and below at the front end. The position shown is giving an unequal port opening, and the valve requires setting further forward by unscrewing the spindle a little way out of its forked-end.

for the "follow-the-instructions-on-the-label-and-it-is-bound-to-work" type of article, and we are therefore quite happily risking the wrath of the experts who, despite all we have said, are still niggling at us for treating the whole thing in such detail, by giving some information here as to why the valve works and what it is supposed to be doing anyway (and, more important, what is wrong if it doesn't do it). We never cease to wonder just why it is that these clever folk, who get so annoyed at our detailed instructions for doing every job, should not be able to go right ahead and design and build the engine themselves, instead of having to wait for us to get through the job in our own time. We will repeat once more that we are endeavouring to provide fairly complete information in this series to cover most of the work involved in loco-building to this size generally, so that just that much ground-work will be already done and can be referred back to in any future project.

How the Valve Works.

The first job our valve has to do in its "cycle of events" is to open the port at one end—say the back end—of the cylinder, so that the steam may enter it from the steam-chest. This steam, taken directly from the boiler, is known technically as "live steam," as distinct from "exhaust steam," which is steam which has finished its work in the cylinder, and please note that this is what we mean when we refer at any time to "live steam." The term "a live steam engine" is often loosely, incorrectly and misleadingly applied to some engine, by which we are expected to understand it as being possessed of wonderful virtues missing from any others.

Our "live steam," then, has to be admitted to the cylinder when the piston is at such a position in the bore that it will derive the greatest benefit from it. In most cases, and at any rate in the case of "Aladdin," this means that when the crank is on either "dead-centre," and the piston thus at one end of its stroke, the port at that end should be actually open by a very small amount, so that the steam may by then have begun to find its way through the passage-way and be already building up its pressure against the piston. This amount of port-opening at dead-centres is called "lead," and we said a bit about it in our old "Finding Fault" series (May, 1950). The amount, at any time, is quite tiny, and in our present small model it only works out to about eight one-thousandths of an inch, or a half a 1/64 in.

Working, then, on our back dead-centre position, rotate the eccentric-sheaf in a backwards direction until its projecting pin comes up against the "step" in the stop-collar (this being the forward-running position) and see where the valve is. It should show a black line of port-opening (the back port of course) which looks about like the half-of-one-sixtyfourth which is our "lead." If it

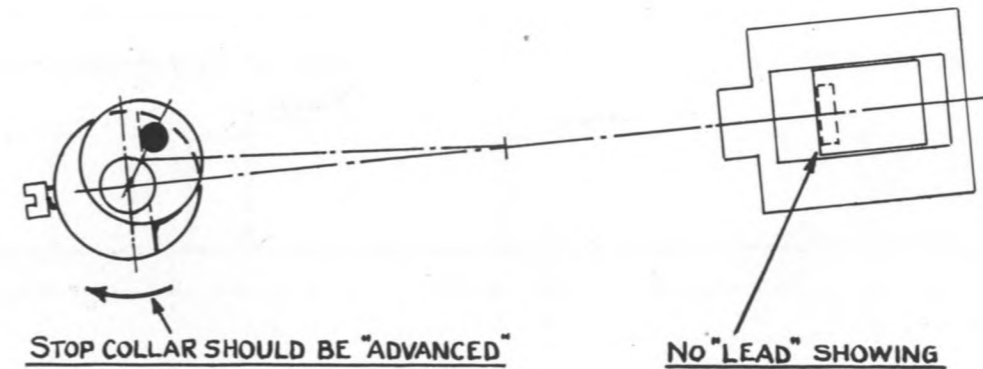


Fig. 94.

Adjusting the angular position of the stop-collar to give the correct amount of "lead." The crank is not shown, but is assumed to be in the back dead centre position, and the engine is running forwards.

shows less, our valve is working "late" in the cycle of events, and should be "advanced" a little by slight forward rotation of the stop-collar. If it is "early," of course, the stop-collar should be "retarded." (Fig. 94.) Now observe the valve with the crank on front dead-centre, seeing how much lead shows on the front port, with the eccentric still back so that it is in the position of being rotated forwards by the stop-collar. If your valve-spindle is correctly set, the amount of lead showing will be the same. If it is more, the valve is still too far back, and if less, the valve is too far forward, and the spindle should be adjusted in the fork-end accordingly.

When you are satisfied that the lead is about the right amount, and (more important), is the same at both ends, repeat the whole performance for backwards running. With the crank still on front dead-centre, turn the eccentric forwards until it is in position against the other "step" of the stop-collar, as it would be when being driven backwards by it, and see what sort of lead you've now got at the front end. If it looks less than in forward-gear, you may have been a bit generous with the amount of lead before. In any case, correct it by rotating the stop-collar backwards a little, thus pushing the eccentric round and "advancing" it a little more for back-gear running. If, on the other hand, you seem to have too much lead in backwards gear, your eccentric may be over-advanced for backwards running, and the stop-collar should be turned forwards a little. You cannot tell how much lead your gear has until you have in this way ensured that it is the same for both directions of running. Increasing it for one reduces it for the other. Now that this is done you can make up your mind whether the amount of lead is right—or too much or too little. If it is too much the eccentric is being driven too far advanced for both directions of running—the "step" in the stop-collar is too high. It is not easy to reduce it now that the motion is assembled, but the pin in the eccentric can have a small flat filed on it where it comes round against the collar. The lead is not likely to be insufficient—such a small amount is all that is necessary that the merest "crack" of port is enough, and if you have inadvertently

made the ends of your valve, or the edges of your ports, without absolutely dead-sharp corners this will act as a sort of "false lead," and so this checking should be looked upon as making sure that the lead is not excessive, and if it is not, leaving well alone. Excessive lead would be likely to cause undue jerkiness of the engine at low speeds, and with a single cylinder that is the last thing we want to encourage.

The above remarks assume that everything else has been made correctly to dimensions—the valve length, the size and spacing of the ports, and the "throw" of the eccentric, and we should not be tempted to start making alterations to any part before making quite certain that the fault does not lie elsewhere. There are so many things happening at once when the valve is working, and they are so tied up together that two "wrongs" definitely will not make a "right"—they are more likely to produce a third or fourth "wrong!"

If you are quite satisfied that you have got everything exactly right, then there is no more we can tell you, and if the engine doesn't run properly the fault is not here. This is unlikely to happen, however; in nine out of ten cases of an unsatisfactory engine of a type as simple as this the cause will be in the steam-chest, or steam "blowing past" a badly-fitting piston or valve, or out through a leaky cover joint.

Our Cover Picture

Is provided this month by Mr. E. D. Bruton and shows a Bangor-Llandudno Junction stopping train emerging from under the Conway Tubular Bridge. It is an impressive setting for the train and may suggest some scenic possibilities to modellers. Reproduction of the bridge would be a major undertaking and demanding upon space, but a short tunnel mouth of this type might be worked in a corner of the layout with advantage especially as the demand on space would mainly be vertical rather than lateral.