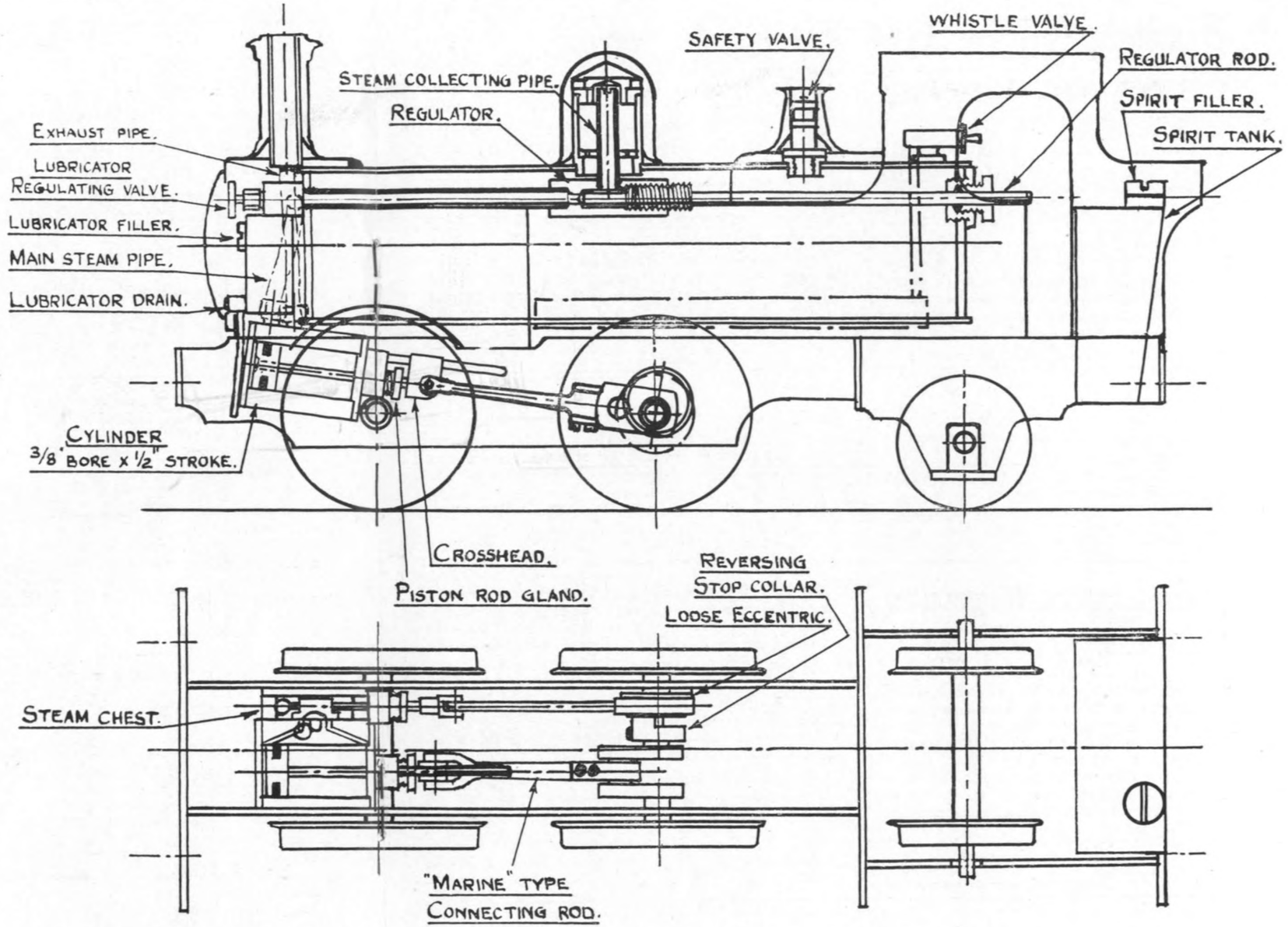
A GAUGE O STEAM LOCO FOR BEGINNERS

Part 20. **By "1121."**



General arrangement of Gauge O steam loco—not to scale.

The other "Valve Events."

In passing, learners might like to be told something of the remainder of the valve's functions, which do not by any means stop at getting the steam into the cylinder, and this is very easy with the chassis actually in front of you.

We have seen that when the crank is on the back dead-centre the valve has opened the back port to "live steam." As the piston moves forwards along the cylinder the port opens wider until the valve gets to the front end of its travel, and is closed as the valve moves back again. When the valve moves back far enough to cover the port again, obviously no more steam can get into the back end of the cylinder, and this is called the "cut-off" point. This point is measured as the distance the piston has moved along its stroke when it occurs, expressed as a percentage of the total stroke. In our case, if you care to do some measuring, you will find that when the valve reaches "cut-off" the piston will have travelled inwards for $\frac{3}{8}$ in., which is three-quarters of the full stroke of $\frac{1}{2}$ in. so we can say that the engine works at 75% cut-off.

The valve is greater in length than the distance over the outer edges of the ports. This means that its front end is still overlapping the front port by a considerable amount, and that it has not yet moved back to its mid-travel position. That is why the eccentric is not set at a right-angle in advance of the crank, but further in advance of it than this, the extra angle being termed the "angle of advance," and shown in Fig. 88. If our valve were to be made exactly the same length as the distance over the ports, the eccentric would be set exactly at right-angles in advance of the crank, with no "angle of advance," and the steam would not be cut off until the piston had reached the front end of its stroke, or in other words the engine would be working at 100% cut-off—a wasteful proceeding as explained in the "Finding Fault" article. This way, too, the valve travel would have to be less—only as much as would be required merely to open each port. Thus, it will be seen that the more the valve is increased in length the earlier in the piston's stroke will be the point of cut-off, and the greater must be the valve-travel to take up this extra length. The amount of this extra length, over and above the distance over the ports, added to each end of the valve, is called "steam lap," and we can say that the total valve-travel equals twice the port-length plus twice the "lap."

The exhaust events of the valve are not so easily seen and followed, but with the engine in front of us, and bearing in mind that, the valve exhaust cavity being near enough the same length as the distance *between* the steam-ports, we can see that the cavity will just be starting to open either port to exhaust according to which way the valve is moving, when it is in its mid-travel position, and we can observe where the piston is in the cylinder when the valve is in this position, with the eccentric on top or bottom centre. If our valve cavity is too short, this exhaust-opening will be later in the piston's stroke, and the closing again will be earlier in the return stroke. If the exhaust closes too soon, excessive compression may be caused in the end of the cylinder as the piston finishes its stroke. Our dimensions for the valve-cavity (1/64 in. longer than the distance between the ports), ensures that this does not occur, the exhaust actually closing at about 95% of the stroke.

Air-test.

We hope that this has given you some idea of what is happening in the steam-chest, and we are quite sure that by now you will be wanting to see some wheels going round under their own power, if not under their own steam. This can very easily be arranged with any source

of compressed air, from a bicycle-pump upwards, it being only necessary to make up an adaptor, one end of which will be screwed 3/16 in. by 40 T.P.I. to go into the entry-hole in the top of the steam-chest. The thread should only be about $\frac{1}{8}$ in. long, or the end may project into the steam-chest and foul the valve. The other end of the adaptor is made to suit whatever source of air you are using—a bicycle-tyre valve with the inner end cut off could be soldered into it to provide a connection for your pump. Naturally, the cylinder-block must first be removed from the frames, and fitted up complete with its steam-chest cover, and all paper joints, piston and gland packings, etc., installed.

These paper joints go in everywhere where there would otherwise be a metal-to-metal joint, namely, under both the front and back cylinder covers, between the steam-chest and cylinder-block, and under the steam-chest cover. They are made from brown paper, a stiff and hard rather than a soft and woolly variety, a small piece first being cut and smeared over with oil on both sides. Lay the piece over the end of the cylinder-block, in the case of the cylinder cover joints, and push the point of your scriber through the paper into the screw-holes in the block. This will produce a kind of paper burr which will anchor the paper on to the block while the subsequent operation is performed.

This consists of cutting out the hole in the middle, the best and easiest way of doing this being to tap all round the end of the cylinder-bore with the ball-pane hammer, which will cut out the circle far more neatly than it could be done any other way. Note that this circle must also be cut out of the front cylinder cover joint, even though there is nothing to project through the hole. If any paper is left exposed it will break up as soon as the steam gets at it, and you will have awful trouble through little bits getting stuck in the passage-ways. Trim the outside edges with a razor-blade after screwing down the cover.

Exactly the same process is used to make the two steam-chest joints, the rectangular opening being cut out of each by tapping round the edge of the opening in the steam-chest. Once again we repeat—make sure there are no burrs anywhere on these components, or your joints will blow straight out!

The piston's groove is packed as full as possible with graphited asbestos string. Beware of some varieties we have discovered, which have a very fine brass wire running through the string. This would be all right for some purposes, but it isn't very clever to find an end of wire, which you can't get rid of, all ready to get jammed in between the piston and the cylinder bore! The same stuff is used for the two glands. Cut off a little bit—enough to go about twice round the piston rod or valve spindle, whichever you are doing, and stuff it into the gland. Screw the gland-screw in fairly tightly, take it out again, and if it seems to need it, put a little more in and press it down again with the screw. Finally, release the screw, and leave it only a little more than finger-tight—just tight enough so that it won't unscrew itself, without being so tight as to cause excessive friction.

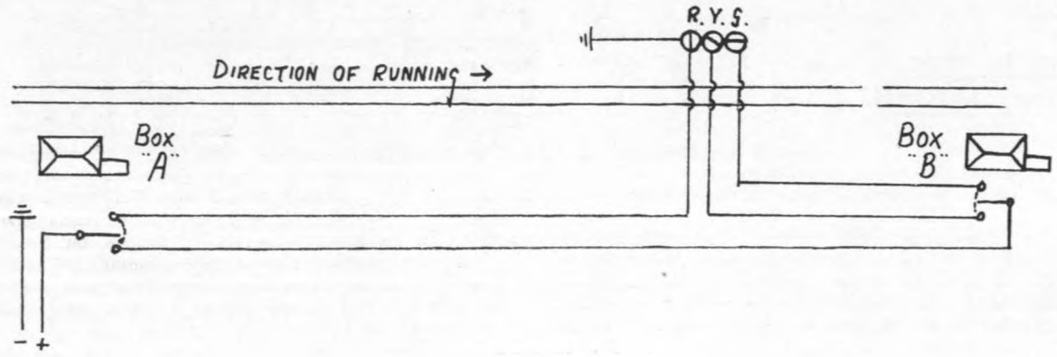
Colour Light Signals

By C. T. GOODE.

Single colour light signals add a business-like atmosphere as well as a touch of variety to a mechanically signalled layout, and the one shown in the diagram can be quite easily installed. The unit is here serving as a starting signal for Box "A," as well as a distant signal for Box "B," and the circuit diagram should make it clear how the three aspects may come to be shown. In the normal position at "A" the current would pass through one pole of the two-way switch and light up the "danger" indication. On reversing this switch the current would then flow through to the next Box "B," where it would take whatever path was made for it, i.e. whether the switch at "B" was normal (yellow), or reverse (green).

Simple though the circuit may seem, the results obtained by its incorporation are pleasing, and it is most realistic to see the red turn to yellow, then to green as the operator ahead 'sets up the road,' finally to return to red again when the 'starter' lever (or switch) is replaced.

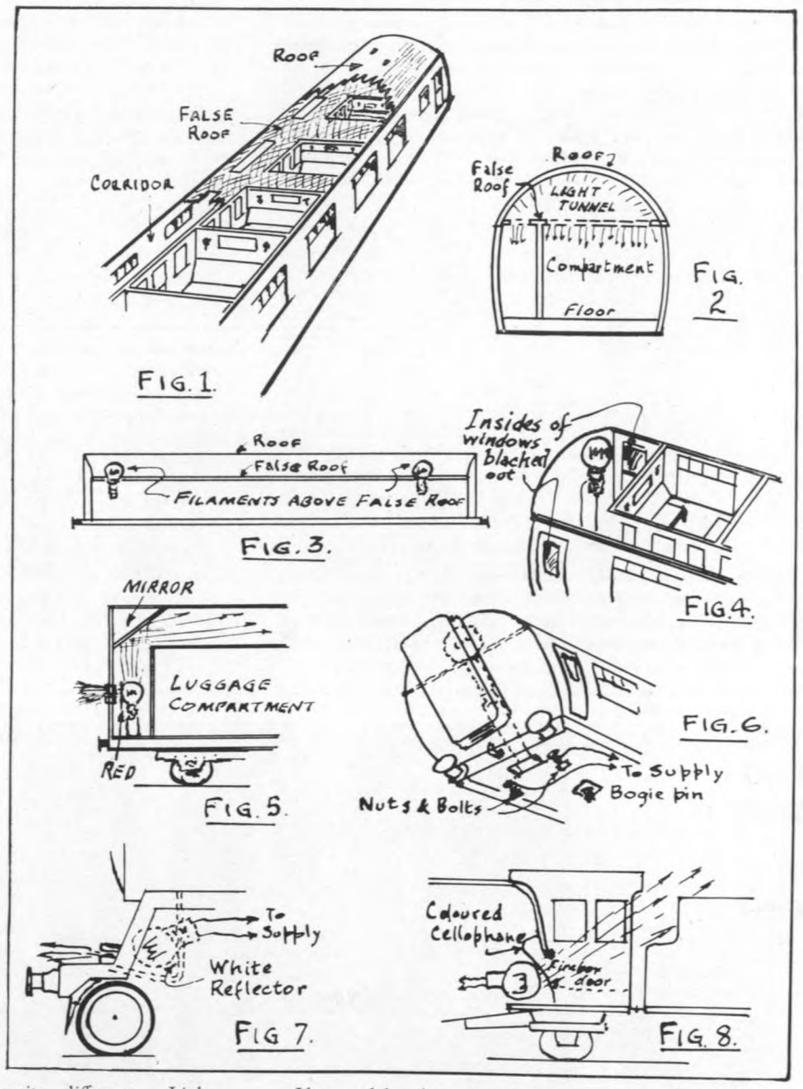
The idea lends itself, too, as a solution at locations where it is difficult to operate a distant semaphore, due to distance from the frame, curves or an intervening tunnel.



"Night Travel on the 4 mm"

By A. H. J. BARNETT

Modelling to 4 mm. scale has produced some really lovely examples of craftsmanship, yet I think I am right in saying that, in the main, the fixing of lights, whether to coach interiors, engines or brake vans, has to a great extent been ignored. In the commercial field we have seen attempts at placing lights in the form of a bulb in the middle of the smoke-box door of tinplate O gauge locos, which gave the impression of a 24 in. search-light on a local train from Kings Cross to Hertford! I recently saw a gauge 1 model (or toy?) carrying a red tail light that was dazzling in almost broad daylight. More recent 4 mm. commercial productions appear to be going in for coach, loco, brake van, station and signal lighting, and very good they appear to be—as far as commercial productions go—though in my opinion they are far too bright (they probably have to be, in order that the public can see what they are buying, for usually these things are on sale in a brightly lighted store!)



Many modellers go to great lengths to obtain accurate information measuring, photographing and drawing a particular item of their choice, and have at their command, documentary proof as they build their pet piece of equipment. When it comes to details of *light* as opposed to the lamp or material object, the problem is quite different. Light changes its density according to distance, and as many people have pet ideas about scale speeds yet never seem to agree, I trust that this will not act as a starting gun for "scale light" argument. As I see it, the answer can only be based on a sound observation of prototype railway lighting, followed by trial and error with a model, the trials being made in absolute darkness.

If a model railway is going to be equipped with lighting it should be operated in the dark. I have tried limited experiments on these lines, and it is amazing how a source of light, which is almost invisible on a layout when a 100 watt electric "sun" is shining merrily overhead appears just right when the "sun" is switched out and the entire track darkened. This point can be proved in prototype practice. Unless you look up at the ceiling of a compartment in which you are travelling