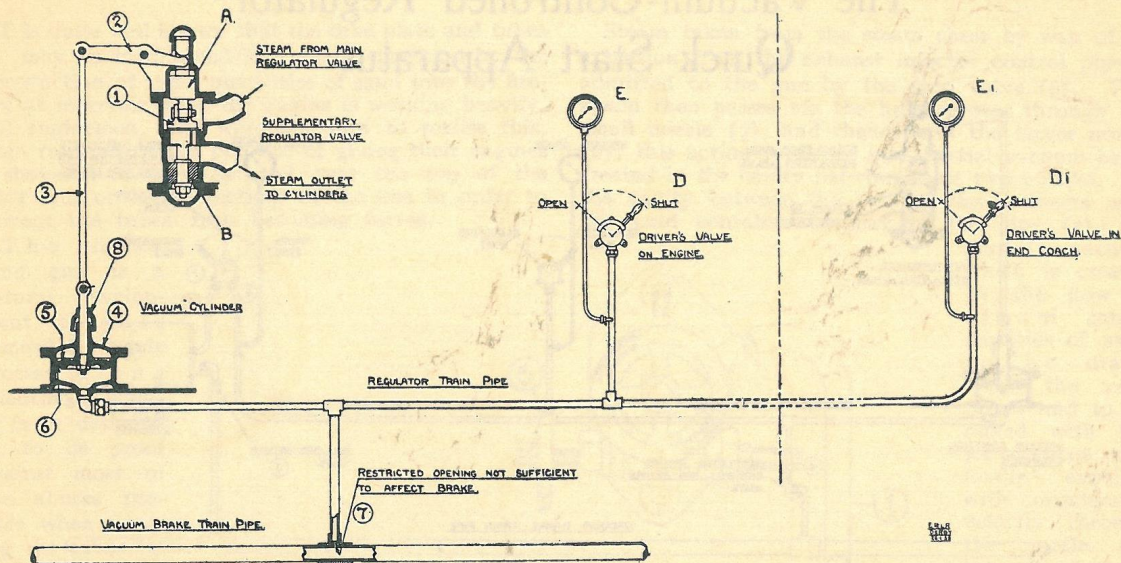


ENGINEMEN'S M.I.C. MOVEMENT

DIAGRAM OF VACUUM CONTROLLED REGULATOR



THIS apparatus consists of a vacuum cylinder (4), mounted on the engine platform (near the side of the smokebox), which is coupled to an intermediate steam regulator valve inserted in the main steam pipe between the main regulator and the steam chest. This vacuum cylinder is connected to control valves on the engine footplate and the driving compartment of the coach by a regulator train pipe. In order to open the intermediate regulator valve a vacuum must be created in the regulator train pipe, and consequently in the lower half of the vacuum cylinder with which it is connected when the control piston (5) will be depressed by atmospheric pressure acting upon its upper surface. The intermediate regulator steam valve (1) will then be lifted from its seating through the medium of the connecting-rod (3), and lever (2).

The working vacuum for the regulator control is obtained from the vacuum brake train pipe by way of a connection which contains a choke (7) of suitable diameter, designed to prevent excessive fluctuation of the brake pipe vacuum.

It will be seen that the intermediate regulator valve consists of a wing valve (1) directly coupled to two pistons, A and B, which are of different diameters. When the main regulator is fully open the smaller piston A and the wing valve (1) are subject to boiler pressure, and as the area of the valve is greater than the piston A, the tendency is for the valve to close.

Immediately the vacuum cylinder is brought into operation, thereby lifting the valve (1) off its seating, the pressure in the steam chest acts on piston B, which is greater in diameter than piston A, so that, as the steam pressure increases, the bottom piston exerts a greater tendency to close the valve, which can only be resisted by an increased vacuum in the vacuum cylinder. It follows, therefore, that the degree of vacuum in the regulator train pipe controls the pressure in the steam chest, so that the pressure in the latter is in proportion to the vacuum employed.

The vacuum cylinder (4) is of simple construction. The piston carries a leather ring (6), which is kept in pliable condition with castor oil, applied at regular intervals by the shed staff. Mineral oil is unsuitable for this purpose because it tends to harden leather. A small cowl (8) is fitted to the piston rod to prevent water being drawn down the rod into the cylinder, as might occur in wet weather if slight leakage of air was taking place past the leather ring on the piston. Atmospheric pressure in the top of the cylinder is arranged by the provision of a number of small holes.

The control valves are very similar in appearance to the standard type of steam and vacuum brake application valves, but they are painted red, and do not contain any steam fittings, since the only purpose they serve is to regulate the admission of air to the regulator control pipe. The quadrant plates of these valves are marked with the words "Open" and "Shut" to indicate the corresponding positions of the intermediate regulator on the engine. It should be appreciated, however, that the air ports in the control valves will themselves be closed when the handles occupy the position marked "Open," and vice versa. Each control valve is fitted with a pin and chain so that the handle may be secured in the "Open" position, as laid down in the instructions for when the driver is changing ends, and when control is being maintained from one valve the handle of the other must be chained in the "Open" position.

Vacuum gauges are fixed adjacent to each control valve to give the driver a direct indication of the amount of vacuum present in the regulator control system. The control pipes and connections between the vehicles are painted red to distinguish them from the vacuum brake pipes, but to prevent any possibility of the regulator control pipe line being coupled to the vacuum brake pipe in error, the connecting clips and horns on the regulator control hoses are left-handed, and will not engage with those on the brake pipes.