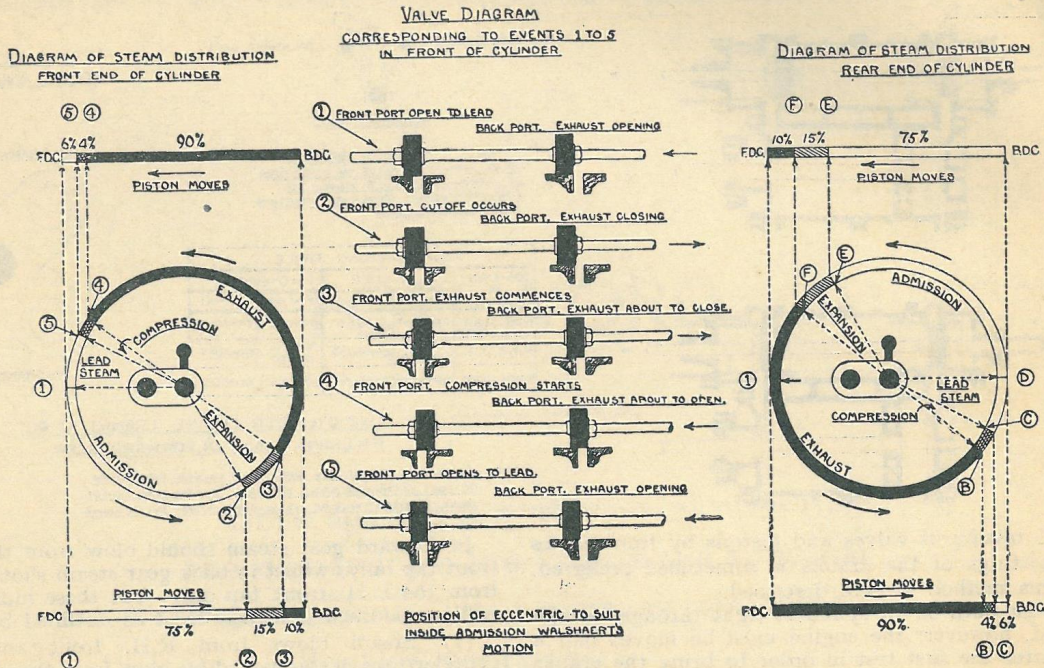


ENGINEMEN'S M.I.C. MOVEMENT



WHEN considering the steam cycle within the cylinder, the position of both piston and crank must be taken into account, because the duration of the various "periods" in the working cycle are measured in terms of the piston stroke or angular movement of the crank, whilst the complete cycle embraces one revolution of the crank or two strokes of the piston.

This relationship is set out quite clearly in the diagram reproduced above, which shows the working cycle in each end of the cylinder during one crank revolution, and also gives the valve positions corresponding to the events of the front port.

Referring to the L.H. diagram, we commence from F.D.C. and assume full forwards gear. The crank is shown in this position and the corresponding point on the crank cycle is marked with the figure (1), the subsequent events following in order.

The working cycle consists of four principal periods, namely: "admission," "expansion," "exhaust" and "compression," but sometimes it is convenient to consider the admission period split up into two distinct parts, i.e. that portion which takes place between the end of the compression period and the arrival of piston and crank at F.D.C., and the admission proper, lasting from F.D.C. to the point of cut-off. If the sub-division is made, the first part of the admission period is called "pre-admission" which corresponds, of course, to the entry of lead steam to the cylinder.

If the valve events are known by the percentage of piston stroke at which they occur, it is possible to set them out on a diagram similar to that shown above. For instance, if cut-off occurs at 75 per cent.

we should mark off this fraction on the lower line from F.D.C., and the point on the crank circle immediately above the point so obtained will give the approximate crank angle where cut-off occurs. The expansion period will occupy about a further 15 per cent. of the stroke, so this distance should be marked off starting from the point of cut-off in order to find the point where the port begins to open to exhaust, the corresponding crank position then being obtained from this point as before.

The exhaust period is the longest of the four and generally occupies about the same proportion of the return stroke of the piston as the admission and expansion periods do of the backwards stroke, so to locate point 4, or the commencement of compression, measure off 90 per cent. of the upper time from B.D.C. and mark off the corresponding point on the crank circle below.

With long travel valves the compression period in full gear is very short, and is only likely to occupy about 4 per cent. of the stroke, which leaves an amount of 6 per cent. for the lead in order to complete the cycle and bring us back to the starting point at F.D.C. once more.

It should be understood that the form of diagram makes no allowance for angularity of the connecting rod so that the crank positions as obtained will be slightly in rear of the actual position. In the case of long connecting rods, however, the amount of error is slight, amounting only to 2 per cent. or 6 per cent. near rear mid-stroke, so that unless complete accuracy is essential, such as for valve setting, etc., it is convenient to disregard the effects of angularity.