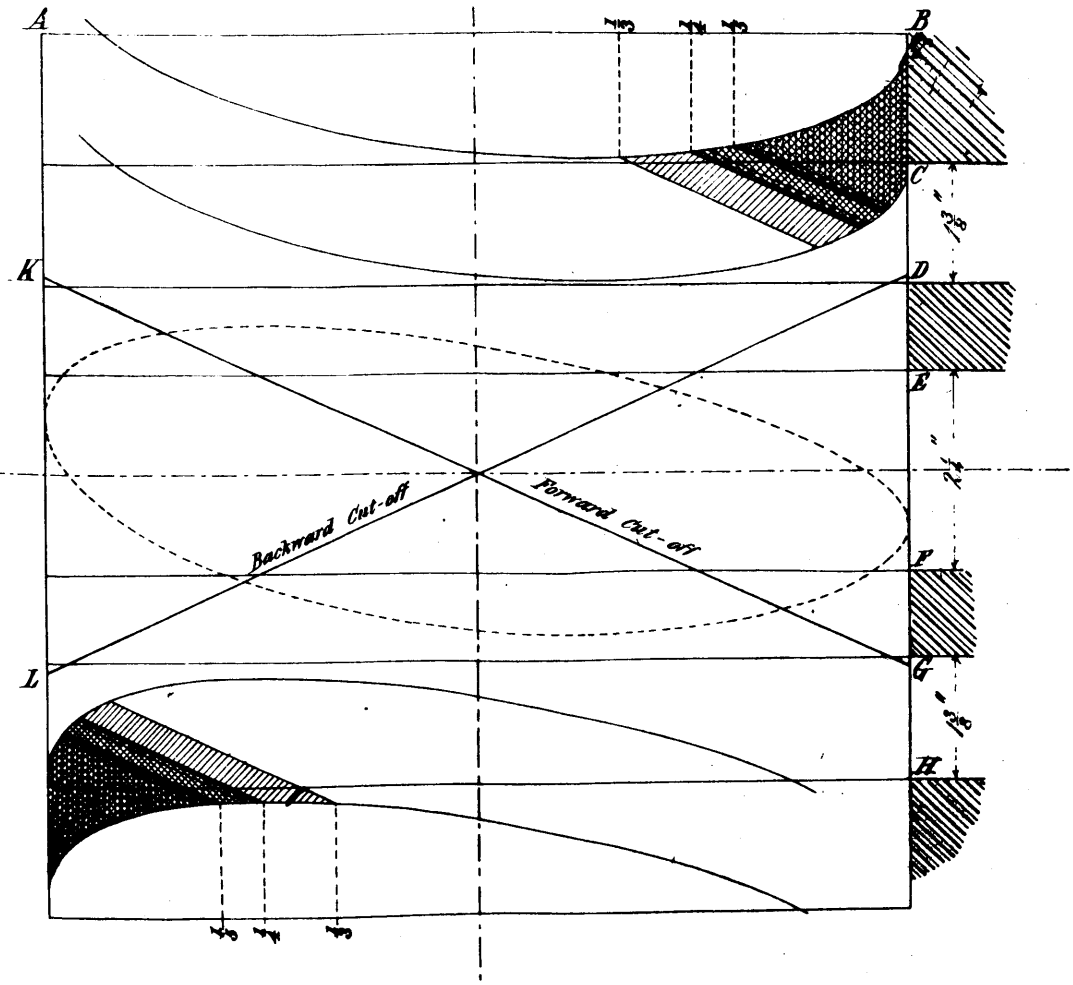
MOTION CURVES OF CUT-OFF VALVES.



As before stated, the piston positions O R S T, Fig. 1. are projected by straight ordinates from the divisional points of the crank circle. The positions thus obtained, however, would only be correct were the connecting-rod of infinite length. The effect of the obliquity of the connecting-rod is always to draw the piston nearer to the crank-shaft than it would be if the connecting-rod were infinitely long. In order, therefore, to apply a correction to this effect, we join the divisional points of the crank circle by circular arcs, the radius of which is equal to the length of the connecting-rod. The ordinates of the motion curve are then laid off tangent to these arcs, the result being that the port openings measured at any point on this curve correspond to the fractional parts of the stroke at which they were taken. As before mentioned, the usual position of the cut-off eccentric on the shaft is diametrically opposite the crank pin, in which case, if it be a reversible engine, and the two eccentrics of the link-motion have an equal angular advance, the admission will be equal both for forward and backward motions. Under some conditions, however, it may be desirable to give a greater admission during backward motion than during forward, in which case the position of the cut-off eccentric may be shifted toward the backward eccentric, giving it a later movement, and thus prolonging the admission, while for the forward movement its angular distance in advance of the forward eccentric is increased, thus producing an earlier movement and a greater relative travel. Its movement in this case, instead of being a straight line, K G (the valve going and returning upon that line), would be an open curve, similar to, but flatter than, those of the main valve, according to the position of the eccentric.

The movement of the cut-off valves (curve or straight line, as the case may be) may be plotted direct from the eccentric circle, as shown in Fig. 1. The eccentric circle is divided to correspond with the crank-pin circle, and the points of division of the former are projected horizontally and those of the latter perpendicularly, as before; the intersection of like numbered lines are then points in the curve (or straight lines) K G and L D.

It will be borne in mind that while the absolute travel of the cut-off valves is constant, we change the relative travel, for a given position of the link, by shifting the position of the cut-off eccentric in the manner before described, for it is manifest that the relative travel of the two valves would be zero if the position of the eccentrics imparting motion to them coincided (or equal to the difference of their throw, if any), and greatest when diametrically opposite. In these illustrations the diagram has been divided into three parts, for the sake of clearness, and many lines have been introduced which would be dispensed with in practice. The desired results may be easily obtained by sliding a tracing of the central curves over the diagram of steam ports.

It is not supposed that this form of diagram will displace or supersede the ordinary methods of designs in vogue in the drawing office, but it is thought that the method employed, of