peripheral crank velocity being, like the supposed velocity of the fly wheel, uniform, the respective times of the first and second halves *f m*, *f g*, of the whole stroke, will be as the arc *c k c* to the arc *c g c*; and with a less length, *f c*, of connecting rod, the corresponding velocities will be as *c k c* to *c g c*. *Q. E. D.*

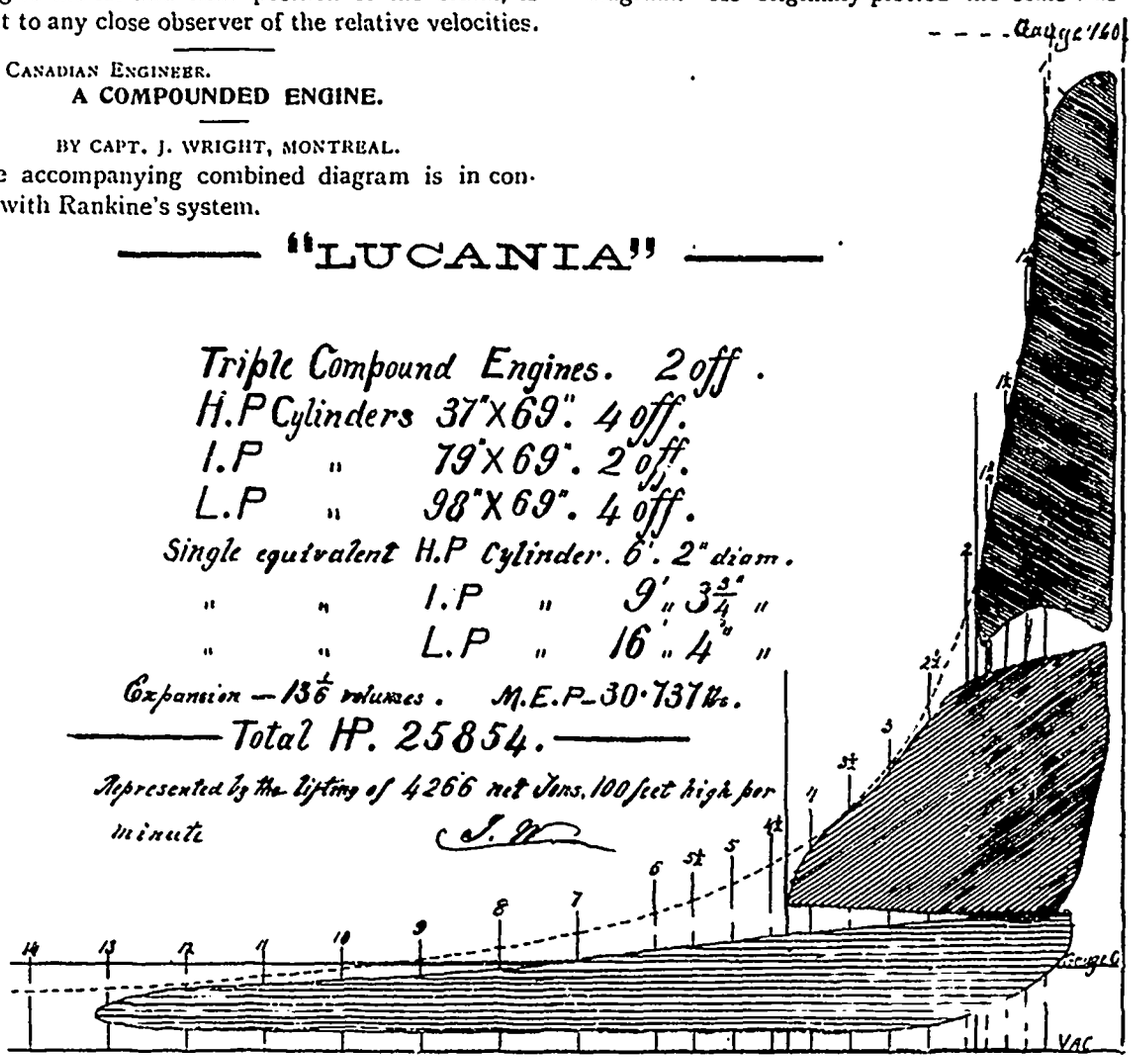
P. S.—I would add that this difference in speed between the far and near half of the stroke, or corresponding to the far and near position of the crank, is apparent to any close observer of the relative velocities.

For THE CANADIAN ENGINEER.

A COMPOUNDED ENGINE.

BY CAPT. J. WRIGHT, MONTREAL.

The accompanying combined diagram is in conformity with Rankine's system.



The lengths of the diagrams are in the ratio of the volume swept per stroke of their respective pistons, and the pressures on the original diagrams are plotted to a uniform scale.

In engine with duplicate cylinders, the high-pressure cylinders are treated as one cylinder, with an equivalent area of piston. The same is done with the intermediate and low-pressure cylinders. In this case it is immaterial whether each engine is treated by itself, or the two as one engine. For simplicity, the last method is adopted.

A further simplification is effected by combining or Rankinizing to a uniform scale of pressure and volume a set of the original diagrams, the intention being to produce a diagram that would have been obtained had the steam performed the same work by going through the same changes of pressure and volume in one cylinder. And in compound engines of any description this must be the low pressure cylinder, or their equivalent, which in this case would be 16' 4" diameter.

As previously stated, in Rankinizing diagrams from compound engines, the lengths are as the piston displacement of the respective cylinders. In this engine the ratios are, beginning with and relative to the H. P. cylinder, 1—2.279 and 7.015. After selecting a convenient length for the H. P. diagram, the others are found by using the ratio as a multiplier.

Clearance must not be neglected, or the results would be erroneous. In the absence of any reliable information about the amount, 5 per cent. is adopted, or its equivalent $\frac{1}{20}$th of the length of each diagram.

The scale of the original L. P. diagram is generally, but not necessarily, the scale of the Rankinized diagram. As originally plotted the scale was 16, and the H. P. diagram 1½" long. This per ratio makes the I. P. diagram 3.42", and the L. P. 10.52" long.

On a vacuum line as a base erect a perpendicular to bound the clearance. Three other lines are drawn parallel to the above, and at distances equal to the ratio length of the respective diagrams, plus the percentage of clearance. These lines define the end of the stroke of the H. P. and I. P. cylinders, on the scale of the L.P. cylinders, and the beginning of the stroke is the ratio length of the diagram (not including clearance) measured from their respective terminal on a perpendicular towards the clearance.

The points bounding the position and length of the diagrams having been found, the length of each is divided by equidistant ordinates into at least 10 divisions. The same is done with the originals, and, the pressure measured on their ordinates by the original scale from either the vacuum or atmospheric line, are plotted on the corresponding ordinate on the Rankinized diagram, and to the uniform scale adopted. When completed the diagram is formed by tracing a line through the pressure points on the ordinates in following order on the steam and exhaust line.

In this manner diagrams from compound engines are reduced to one equivalent. In power results the