## 2 EXPERIMENTS TO DETERMINE THE INFLUENCE OF COMPRESSION.

necessary to run the engine about 50 revolutions per minute below its normal speed; so that, because of this reduced speed, the low boiler pressure, and the small load, the consumption of steam per indicated horse-power per hour was considerably above what might have been expected from an engine of this class under more favorable conditions. These unfavorable conditions, however, did not present any obstacles to the investigation that was sought regarding the relative economy of varying amounts of compression.

The experiments prove that for either equal amounts of work produced, or for equal points of cut off, the cushion steam in an engine should not be compressed as high as the initial pressure but to some lower pressure in order to obtain the best economy, thus verifying conclusions arrived at by theory in the paper referred to.

The results obtained are as follows :

With a special valve in the engine, so arranged as to compress the cushion steam to the initial pressure, and cut-off a<sup>t</sup> onequarter stroke, the steam consumption was 37.9 lbs. per hour per horse-power.

For the same work as with the special valve, and compression to two-thirds the initial pressure, the steam consumption was 36.8 lbs. per hour horse-power.

For the same cut-off as the special valve, and compression to about five-eights the initial pressure, the steam consumption was 31.8 lbs. per hour per horse-power.

The cylinder dimensions were: bore, 10 inches; stroke, 11 inches. The stear pressure averaged about 72 lbs. above the atmosphere, and the revolutions 250 per minute.

The average indicator cards for the three sets of conditions are given in Figs. 1, 2, and 3.

The special valve released the steam at a later point in the stroke than the regular valve, so that small corrections have been made in the above figures to eliminate variations from this cause, by extending the expansion line in each case to the end of the card, as represented in Figs. 1, 2, and 3. A Barrus calorimeter was employed to determine the amount of moisture present in the steam, and the moisture was deducted to obtain the steam used. In making the tests, the work developed by the engine was absorbed by means of a Prony brake. The exhaust steam was condensed in a surface condenser, and