STEAM ENGINE INDICATORS AND VALVE GEARS: A PRACTICAL PRESENTATION OF MODERN TESTING APPLIANCES AND METHODS USED TO PRODUCE MAXIMUM EFFICIENCY AS APPLIED TO THE STEAM ENGINE

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INTRODUCTION

JAMES WATT was responsible for many important developments in connection with the steam engine and one of these was the "Indicator Diagram". By means of this ingenious graph of the engine's action a trained engineer can determine its ailments as surely as a skilled physician can detect the weaknesses of a patient's heart action by the aid of a stethoscope. Every deviation of the curve from the standard form means to this expert a fault either of design or of adjustment. Poor lubrication, late admission of the steam, excessive back pressure, too early cut-off, etc., each makes its impression on the curve, and each trouble in turn can be corrected and proof given that this has been done by noting the improvement in the curve on a new indicator card.

¶ In addition to this information, a measurement of the area of the diagram, together with known constants of the engine and indicator, enable one to determine the exact number of horsepower produced by the engine.

¶ Another important adjunct of the modern engine is the "Valve Gear", by which the admission of the steam to the cylinder, the cut-off, the expansion, compression, and exhaust are controlled. The proper operation of the valves of an engine is of the highest economic importance and not only must the expert engineer understand the working theory of this control device and understand the differences between a Stephenson, Walschaert, or Reynolds-Corliss, for example, but he must be able to determine whether the valve actions are as perfect as they can be made by proper adjustment. By use of a graphical method called a "Zeuner Diagram", it is possible to determine the proper lap, lead, angle of advance, cut-off, and release, and to correct any errors of adjustment that may exist.

¶ All of these important matters in connection with the steam engine are carefully and authoritatively treated in this book in an exceedingly practical way. A number of examples taken from actual operation experiences are carefully worked out as a guide to the proper method of applying both the indicator and Zeuner diagrams.

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