

**INDICATOR PRACTICE
AND STEAM-ENGINE
ECONOMY**

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Indicator Practice and Steam-Engine Economy by Frank F. Hemenway

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FRANK F. HEMENWAY

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INDICATOR PRACTICE

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STEAM-ENGINE ECONOMY.

WITH PLAIN DIRECTIONS FOR ATTACHING THE INDICATOR, TAKING DIAGRAMS, COMPUTING THE HORSE-POWER, DRAWING THE THEORETICAL CURVE, CALCULATING STEAM CONSUMPTION, DETERMINING ECONOMY, LOCATING DERANGEMENT OF VALVES, AND MAKING ALL DESIRED DEDUCTIONS; ALSO TABLES REQUIRED IN MAKING THE NECESSARY COMPUTATIONS, AND AN OUTLINE OF CURRENT PRACTICE IN TESTING STEAM-ENGINES AND BOILERS,

BY

FRANK F. HEMENWAY,

*Associate Editor "American Machinist," Member American Society
Mechanical Engineers, etc.*

Fully Illustrated.

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PREFACE.

DURING the past two years I have written several short articles for the *American Machinist* on the subject of the indicator-diagram. In these there was not much attempt at connection, or intention to cover more than a few points as they came up from time to time. As an outcome of the appearance of these articles I have received many letters of inquiry, especially from engineers in charge of steam engines and boilers of various classes. These letters, very frequently leading to considerable correspondence, have largely guided me in the preparation of this work: it seemed a fair presumption that they indicated what would be acceptable to others similarly situated.

It has been my aim to present the subject comprehensively enough to enable any engineer to apply the indicator to his engine, take the diagram, and make all necessary calculations from it. The endeavor has been to use no terms except such as are generally understood or fully explained, and no mathematical demonstrations are given or are required that involve the use of anything but simple arithmetical calculations.

As one of the most important ends the indicator can serve is to point out how to bring about economy of steam-consumption, its use has been considered in

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connection with steam-engine economy: there seems to be no rational way of dividing these subjects even if it were desirable.

A separate chapter has been devoted to locomotive-engines, because while the general matter applies to these in common with other steam-engines, there are some features peculiar to locomotive-indicating.

All the engravings, both of diagrams and methods of obtaining drum-motion, were made expressly for this work. What was suitable of the matter referred to as written for the *American Machinist* has been revised and used; the rest, comprising the larger portion of the whole, is now published for the first time.

Fully believing that in the near future no engineer will be considered competent unless he has knowledge of the use of the indicator, I shall be satisfied if my efforts make the subject plainer to a few; or if in any degree they assist those who recognize that the indicator-diagram has become so thoroughly incorporated with the current literature of steam-engineering, that, aside from the intention or ability to use the indicator, every one interested in the steam-engine should learn to read the diagram.

F. F. HEMENWAY.

NEW YORK CITY, Sept. 1, 1885.

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