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978-1-107-61563-2 - The Steam-Engine and Other Heat-Engines: Fourth Edition

Revised and Enlarged

Sir J. Alfred Ewing

Frontmatter

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BY

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PREFACE

TO THE FOURTH EDITION

THE purpose of this book is to present the subject of heat-engines, in their mechanical as well as their thermodynamical aspects, with sufficient fulness for the ordinary needs of University students of engineering.

Since 1910, when a Third and enlarged edition was published, there have been reprints involving little alteration.

In this—the Fourth—edition the book has been revised throughout and there are many additions. Recent developments have made it desirable to re-write large parts of the chapters on steam turbines, steam boilers, and internal-combustion engines. Not only is much of the descriptive matter new, but the treatment of theory has undergone some change. In chapters relating to the properties of steam advantage has been taken of the data supplied by Callendar in his *Steam Tables*, first published in 1915. A selection of these is included as an appendix, along with a short account of the formulas on which the Tables are based. The discussion of thermodynamic principles in their application to engines has been brought more closely into correspondence with the methods adopted in my *Thermodynamics for Engineers*, published in 1920. The conception of heat-drop, now familiar through its engineering uses, especially in relation to turbine design, has been given a prominent place.

Particulars of modern practice, with materials for illustration, have been kindly furnished by various firms whose names are noted below. I would also thank several friends for helpful information or suggestions, notably Sir Charles Parsons, Sir Dugald Clerk, Sir Henry Fowler, Professors Callendar, Dalby, Inglis, Jenkin, and Sir Thomas Hudson Beare. To Mr Stanley S. Cook I am specially grateful, not only for much information, but for reading in proof the sections which treat of steam turbines.

For particulars of turbines thanks are due to Messrs C. A. Parsons and Co., the Parsons Marine Steam Turbine Co., the English Electric Co., the Metropolitan-Vickers Co., the Brush Co., the British Thomson-Houston Co., Messrs Brown Boveri, Messrs Escher Wyss and Co., and the International General Electric Co. of New York.

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For information about boilers and furnaces, to Messrs Galloways, Messrs William Beardmore and Co., Messrs Babcock and Wilcox, the Stirling Boiler Co., Messrs Yarrow and Co., Messrs John I. Thornycroft and Co., Messrs J. Samuel White and Co., Messrs Cochran and Co., John Thompson (Wolverhampton), the British Niclausse Co., the Howden-Ljungström Co., and International Combustion Ltd.

For information about gas and oil-engines, to the National Co., Crossley Brothers, the Premier Co., Messrs Ruston and Hornsby, Messrs Galloways, Messrs Petters, Messrs Mirrlees Bickerton and Day, Messrs Harland and Wolff, Messrs William Doxford and Sons, and Messrs Worthington-Simpson. Particulars of engines of special types and of various measuring appliances have been given by Messrs Hathorn Davey and Co., Sulzer Brothers, Messrs Belliss and Morcom, Messrs Browett Lindley and Co., the Baldwin Locomotive Works, Siemens Brothers, Messrs Dobbie McInnes and Clyde, the Crosby Steam Valve Co., and the Cambridge Instrument Co.

The Institutions of Naval Architects, of Civil Engineers, and of Mechanical Engineers have kindly allowed illustrations to be reproduced.

J. A. EWING

The University, Edinburgh

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FOLDING PLATES

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Fig. 83. Impulse turbine for 15,000 kw. at 1500 r.p.m. (English Electric Company)

Fig. 88. Parsons Reaction Turbine. Two-cylinder tandem type, with double-ended low-pressure cylinder

Fig. 92. Tandem turbine with high-pressure impulse cylinder and low-pressure reaction cylinder. (English Electric Company)

Figs. 237, 237 a. Locomotive Boiler