

Storage Batteries

By

RALPH W. RITTER

ELECTRICAL ENGINEER

SECTION ON NICKEL-IRON-ALKALINE CELL

By

E. W. ALLEN

ELECTRICAL ENGINEER



STORAGE BATTERIES

Parts 1-2

552

Published by

INTERNATIONAL TEXTBOOK COMPANY

SCRANTON, PA.

Storage Batteries, Parts 1 and 2: Copyright, 1929, by INTERNATIONAL TEXTBOOK
COMPANY.

Copyright in Great Britain

All rights reserved

Printed in U. S. A.



INTERNATIONAL TEXTBOOK COMPANY
Scranton, Pa.

CONTENTS

NOTE.—This book is made up of separate parts, or sections, as indicated by their titles, and the page numbers of each usually begin with 1. In this list of contents the titles of the parts are given in the order in which they appear in the book, and under each title is a full synopsis of the subjects treated.

STORAGE BATTERIES, PART 1

	<i>Pages</i>
Introduction	1- 2
Lead Cells	3-32
General Design and Construction.....	4-22
Component parts; Fundamental types of plates; Commercial types of lead plates; Manchester positives; Iron-clad positives; Box, and formed negatives; General relation of design to service; Plate thickness; Grouping and connecting; Plate supports; Insulating supports.	
Characteristics	23-30
Capacity; Voltage; Open-circuit voltage; Charging, and discharging voltage; Internal resistance; Specific gravity of electrolyte; Temperature; Efficiency.	
Testing Instruments and Apparatus.....	31-32
The hydrometer; Automatic pilot-cell filler; Voltmeters; Ampere-hour meters.	
Nickel-Iron-Alkaline Cell	33-46
Theory	33-35
History; Elementary theory; Advantages in using iron and nickel oxide; Chemical actions and equations.	
Construction.....	36-41
Positive plates; Negative plate; Group assembly; Element assembly; The container; Filling aperture; Electro-chemical formation; Battery assembly; Connecting cells; Types and sizes.	
Characteristics	42-46
Internal resistance; Temperature; Ampere-hour and watthour efficiency; Weight efficiency and life of cell; Accidental conditions; Application.	

STORAGE BATTERIES, PART 2

Pages

Installation and Operation of Lead Batteries.....	1-31
Installing Batteries	1- 3
Compartment requirements; Connectors, terminals, and corrosion; Assembling.	
Operation and Maintenance.....	3-31
Charges and Discharges.....	3- 9
Initial charge; Proper charging rate; Periodic equalizing charge; Indication of completed charge; Floating and trickling; Discharging; Battery-room ventilation.	
Hydrometer Readings and Specific-Gravity Regulations	9-12
Idle Batteries and Batteries in Storage.....	13-15
Battery Repair and New Parts.....	16-20
Reassembling Battery	21-24
Plates, covers, separators; Checking polarity; Testing and treating jars; Installing elements in jars; Sealing cover to jars; Adding electrolyte; Water treatment.	
Lead Burning	25-31
Fastening plates to group straps; Burning connectors on pillar straps; Removing connectors; Gases to use; Precautions when using oxygen; Use of hydrogen gas; Electric carbon-burning outfit.	
Nickel-Iron-Alkaline Storage Batteries.....	32-38
Connections; Battery compartments; Stationary batteries; Constant-current method; Boost charging; Loss of capacity; Cleaning; Cautions.	
Controlling Charge and Discharge of Batteries.....	39-53
Control of Charge.....	39-47
Using a variable-resistance rheostat; Using a fixed resistance; Varying number of lamp groups in parallel; Divided battery with fixed resistance; Charging by raising generator voltage; Charging through booster.	
Control of Discharge.....	48-53
Principle of end-cell control; Hand-operated, and motor-driven end-cell switches; Grouping, and charging end cells.	