

# **A TREATISE ON CRANES**

Published @ 2017 Trieste Publishing Pty Ltd

ISBN 9780649141074

A treatise on cranes by Henry R. Towne

Except for use in any review, the reproduction or utilisation of this work in whole or in part in any form by any electronic, mechanical or other means, now known or hereafter invented, including xerography, photocopying and recording, or in any information storage or retrieval system, is forbidden without the permission of the publisher, Trieste Publishing Pty Ltd, PO Box 1576 Collingwood, Victoria 3066 Australia.

All rights reserved.

Edited by Trieste Publishing Pty Ltd.  
Cover @ 2017

This book is sold subject to the condition that it shall not, by way of trade or otherwise, be lent, re-sold, hired out, or otherwise circulated without the publisher's prior consent in any form or binding or cover other than that in which it is published and without a similar condition including this condition being imposed on the subsequent purchaser.

[www.triestepublishing.com](http://www.triestepublishing.com)

**HENRY R. TOWNE**

**A TREATISE  
ON CRANES**



A TREATISE ON CRANES.

A TREATISE  
ON  
CRANES.

---

DESCRIPTIVE PARTICULARLY OF THOSE DESIGNED AND BUILT BY  
THE YALE & TOWNE MANUFACTURING CO.,  
OWNING AND OPERATING  
THE WESTON CRANE CO.  
INCLUDING ALSO A DESCRIPTION OF LIGHT HOISTING MACHINERY  
AS BUILT BY THE SAME MAKERS.

BY  
HENRY R. TOWNE,  
MECHANICAL ENGINEER.

---

STAMFORD, CONN.,  
1883.

## PREFACE.

---

The subject of Cranes has had but little consideration from technical writers, and has never yet received from them the attention which its importance in the mechanic arts will justify. It is perhaps partly due to this cause that the value and economy of Cranes, as labor-saving machines, is as yet so little appreciated in this country.

The only English books descriptive of Cranes are that of Glynn, written more than thirty years ago, and the catalogues published by various English firms to advertise their products, none of which fully represent what is best in English practice, or affords any information as to the important details of construction embodied in the machines they illustrate.

The present treatise, although intended primarily to place before users of Cranes a description of those built by THE YALE & TOWNE MANUFACTURING COMPANY, includes a careful study of the subject from an independent point of view, and will, it is believed, be found of interest to engineers generally by reason of its comprehensiveness, both as relates to the various types of Cranes and to the details of their construction, and because it carries the art it describes down to a more recent date than

any previous publication. In its description of details and of actual construction, it embodies the results of the combined work of several skilled inventors and mechanical engineers, continued uninterruptedly, under the author's direction, during a number of years and applied, together with the resources of a large establishment, to the study and development of the art of Crane building as a distinct specialty.

It is the first publication descriptive of American, as distinct from European practice, in the specialty of which it treats. The class of machines which it describes has long been recognized in Europe as one of wide importance and interest. It is the purpose of this treatise to indicate to American readers the great variety of uses to which Cranes can be applied with economy and convenience, and to describe the latest and best results of American practice in this field of engineering work.

H. R. T.

*September, 1883.*



## CONTENTS.

## PART I.

	PAGE.
Introduction.....	I
Types of Cranes.....	3
Details of Cranes:	
Hoisting Gear.....	6
Traverse Gear.....	9
Chains <i>versus</i> Ropes, and Chain Wheels <i>versus</i> Drums.....	11
Trolleys and Trucks.....	15
Frames and Girders.....	16

## PART II.

Introduction.....	21
Crane Details.....	22
Chains.....	23
Chain Wheels.....	25
Spur Gearing.....	28
Worm Gearing.....	30
Frictional Safety Ratchet.....	33
Clutches.....	41
Weston-Capen Clutch.....	47
Squaring Device for Movable Crane Bridges.....	54
Bridge Moving Device for Traveling Cranes.....	58
Squaring and Bridge and Trolley Moving Device for Traveling Cranes.....	61
Trolley Traveling Mechanism.....	65
Gearing of Jib Cranes for operation by Hand.....	69
Gearing and Clutches of Power Traveling Cranes.....	73
Bridge Trucks.....	78
Frames and Girders.....	81
Bridges and Trestles of Traveling Cranes.....	85
Power Transmission.....	88
Take-ups.....	90
Hooks.....	91
Blocks and Bushings.....	94
Pillar Crane Foundations.....	97
Notice as to Rights Secured by Patent.....	99
List of Patents.....	103



INDEX TO ILLUSTRATIONS.

	PAGE.
Fig. 1. Chain Wheel, Guide and Stripper.....	26
" 2. Teeth of Spur Wheels.....	28
" 3. Worm Wheel and Worm.....	32
" 4. "Double Lift" Safety Ratchet.....	34
" 5. Spur Pinion with Safety Ratchet.....	36
" 6. Safety Spur Pinion.....	38
" 7. Safety Worm Pinion.....	40
" 8. Model of Alternate Friction Plates.....	41
" 9. Experimental Friction Brake.....	43
" 10. Frictional Shaft Coupling, longitudinal section.....	44
" 11 & 12. " " " transverse section.....	45
" 13. Friction Pulleys with Capen Toggles.....	47
" 14. Simple Form of Weston Clutch.....	49
" 15. Weston Clutch with Capen Toggles.....	50
" 16 & 17. Capen Toggles.....	51
" 18, 19 & 20. " " ".....	52
" 21. Device for Squaring Movable Bridges.....	54
" 22. Device for Squaring and Propelling Bridges.....	58
" 23. Device for Squaring and for Propelling Bridges and Trolleys.....	62
" 24. Mechanism for Moving Trolleys.....	66
" 25. Gearing of Jib Cranes.....	69
" 26. Detail View of Chain Wheel in Jib Cranes.....	70
" 27. Gearing of Jib Crane.....	71
" 28. Top View of Reversing Mechanism.....	74
" 29. Side Elevation of Reversing Mechanism.....	74
" 30. End View of the Three Shafts of the Reversing Mechanism and their Connecting Gears.....	75
" 31. Truck for I-Beam Bridge.....	78
" 32. Truck for Plate Girder Bridge.....	79
" 33. Jib Crane Frame.....	82
" 34. Transverse Section of I-Beam Bridge.....	83
" 35. " " " Plate Girder Bridge.....	83
" 35. Bridge of Hand Traveling Crane.....	85
" 37. " " " Power " ".....	86
" 38. Rim of Wheel for Wire Rope.....	88
" 39. " " " " Cotton Rope.....	88
" 40. Transmission of Power.....	89
" 41. Take-ups.....	90