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ENGINEER'S HANDY-BOOK.

CONTAINING

A FULL EXPLANATION OF THE STEAM-ENGINE
INDICATOR, AND ITS USE AND ADVANTAGES
TO ENGINEERS AND STEAM USERS.

WITH FORMULÆ

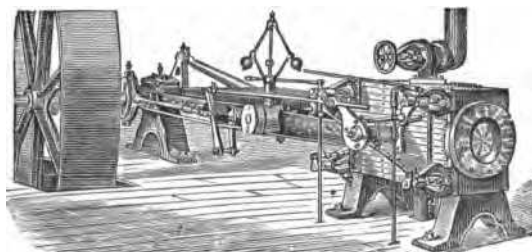
FOR ESTIMATING THE POWER OF ALL CLASSES OF STEAM-ENGINES;
ALSO, FACTS, FIGURES, QUESTIONS, AND TABLES FOR ENGINEERS
WHO WISH TO QUALIFY THEMSELVES FOR THE UNITED
STATES NAVY, THE REVENUE SERVICE, THE MER-
CANTILE MARINE, OR TO TAKE CHARGE OF
THE BETTER CLASS OF STATIONARY
STEAM-ENGINES.

With Illustrations.

BY
STEPHEN ROPER, ENGINEER,

Author of
"Roper's Catechism of High-Pressure or Non-Condensing Steam-Engines,"
"Roper's Hand-Book of the Locomotive," "Roper's Hand-Book of
Land and Marine Engines," "Roper's Hand-Book of Modern
Steam-Fire Engines," "Improvements in Steam-Engines,"
"Use and Abuse of the Steam-Boiler," "Questions and
Answers for Engineers," etc., etc.

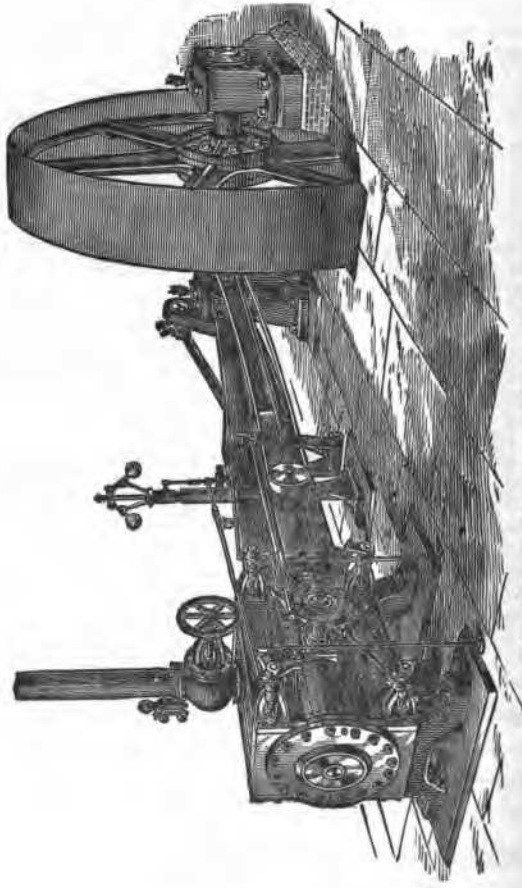
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E. CLAXTON & COMPANY,
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The Wetherill Corliss Steam-Engine.

The Wetherill Corliss Steam-Engine.

The cut on opposite page gives an outline of the general appearance of the Corliss Engine as built by Robert Wetherill & Co., Chester.

The Main Bed is shaped in the strongest form and in direct centre line connecting up cylinder and pedestals. The main pedestal bearings are made in four parts, adjustable. All bearings and wearing surfaces are arranged to take up lost motion occasioned by wear. The proportions, weights, and strength of material are ample. Cylinders are made of hard, strong, charcoal iron, and have all large proportioned port openings, which gives the full boiler pressure against the piston. The cross-head is of an improved pattern, which takes a direct bearing between centre of shoes, and the shoes are gibbed in such a manner that they can be easily removed or any lost motion taken up. Shafts, connecting-rods, and all forgings are made of double-worked hammered iron. Piston-rods, crank-pins, and all other small pins and valve-motion forgings, are of steel. Valve-stems, crank-pin boxes, and valve-gear brasses are all of bronze metal.

The Governor is of the regular Corliss pattern with improvements, but does not require the oil or molasses pot generally used. It acts free under varying loads and pressures, and regulates closely from one horse-power up to the full capacity of engine.

Piston is self-packing, and does not require any attention from the engineer. It keeps the cylinder in good order, requires very little lubrication, and has a reputation of running eight years night and day without any attention, keeping in good order and steam-tight.

Vacuum Dash-Pots for closing valves are generally used. On slow running engines, weights closed with air-cushion are preferred.

Graduating Oil-Cups on all wearing surfaces, and self-feeding oil-cups for cylinders.

Emergencies.

If a **follower-plate** should break at sea, it might be repaired with boiler-plate and tap-bolts, providing these materials were on board; if not, the propeller-shaft should be detached, and the ship proceed to the nearest port, under sail.

If the **air-pump rod** should break, and no extra rod be on board the vessel, remove the air-pump bucket and foot-valve, rig a temporary exhaust-pipe with lumber, and proceed to the nearest port.

If a **cylinder-head** should be fractured or split, it might be repaired temporarily by wrought-iron bars, canvas, or other packing, and tap-bolts.

If the **cut-off valve** should break at one end, remove it from the other end, and use steam at whole stroke.

If the **condenser** should become so much out of order as to render it useless, detach the exhaust-pipe from it, and rig a temporary exhaust with such materials as can be found on board.

If the **crank-pin** or truss-block should heat excessively, allow a stream of water to run on them continually.

If the **foot-valve** should be rendered useless, the air-pump will work, providing the discharge is in good order. Foot-valves are generally made of vulcanized India-rubber.

If the **delivery-pipe** should break, burst, or split, it may be repaired temporarily with India-rubber or canvas, lumber, and ropes.

If a **crank-pin** should break, the broken part may be removed and replaced by a new one, providing there is an extra pin on hand; if not, detach the propeller and proceed under sail.

If the **propeller-shaft** should twist off, disconnect the engines from it and proceed under sail; but if one or more of the blades should break off, proceed the best way you can, as, while any portion of it remains, it is better than none at all.