

THE
ENGINEER'S SKETCH-BOOK
OF
**MECHANICAL MOVEMENTS,
DEVICES, APPLIANCES, CONTRIVANCES
AND DETAILS**

**EMPLOYED IN THE DESIGN AND CONSTRUCTION OF
MACHINERY FOR EVERY PURPOSE**

**CLASSIFIED & ARRANGED FOR REFERENCE FOR THE USE OF ENGINEERS, MECHANICAL
DRAUGHTSMEN, MANAGERS, MECHANICS, INVENTORS, PATENT AGENTS,
AND ALL ENGAGED IN THE MECHANICAL ARTS**

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**THIRD EDITION, CONSIDERABLY ENLARGED,
With 2603 Illustrations, Descriptive Notes and Memoranda**



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PREFACE.

EVERY successful engineer is a born inventor; indeed the daily work of an engineer in practice largely consists in scheming and devising from previous experience new and improved processes, methods, and details for accomplishing them, and for simplifying or cheapening old forms of machinery and the work they produce, to enable him to successfully compete with others, who are perhaps as ingenious and enterprising as himself.

In the work of designing machinery the draughtsman has to rely mainly on his memory for inspiration; and, for lack of an idea, has frequently to wade through numerous volumes to find a detail or movement to effect a particular purpose. Hence, as a rule, every man's work runs in a groove, his productions generally having the stamp of his particular experience and training clearly marked upon them.

In the course of twenty-five years of such experience, I have found the want of such a volume as the present, and endeavoured to supply the deficiency in my own practice by private notes and sketches, gathered promiscuously, until the difficulty of selection and arrangement became so apparent that I began to classify them, as they exist in the following pages. A few weeks of unusual leisure have enabled me to complete this work and amplify it by numerous additions, and it is now presented in the hope that it will be found of equal service to others engaged in the head-splitting, exhausting work of scheming and devising machinery, than which I can conceive of no head-work more wearing and anxious. Several valuable works have already

found numerous users, and there is no lack of admirable collections of memoranda, rules, and data for designing and proportioning the various constructive details of machinery; but, as far as I am aware, there is no work in existence which aims at the same purpose as is attempted in the following pages, viz. to provide side by side suggestive sketches of the various methods in use for accomplishing any particular mechanical movement or work, in a form easily referred to, and devoid of needless detail and elaboration. A sketch, properly executed, is—to a practical man—worth a folio of description; and it is to such that these pages are addressed. For the same reason it has been deemed undesirable to add to the various sketches any rules or tables relating to strengths or dimensions, which may be found in numerous well-known volumes.

Any suggestions or additions will be entertained and gratefully acknowledged.

THOMAS WALTER BARBER.

Section 35.—ELASTIC WHEELS.

Wheels with rubber tyres are the common form. Wheels with a loose flat tyre outside a fixed tyre and with various forms of springs inserted between the tyres. (See Springs, Section 80.)

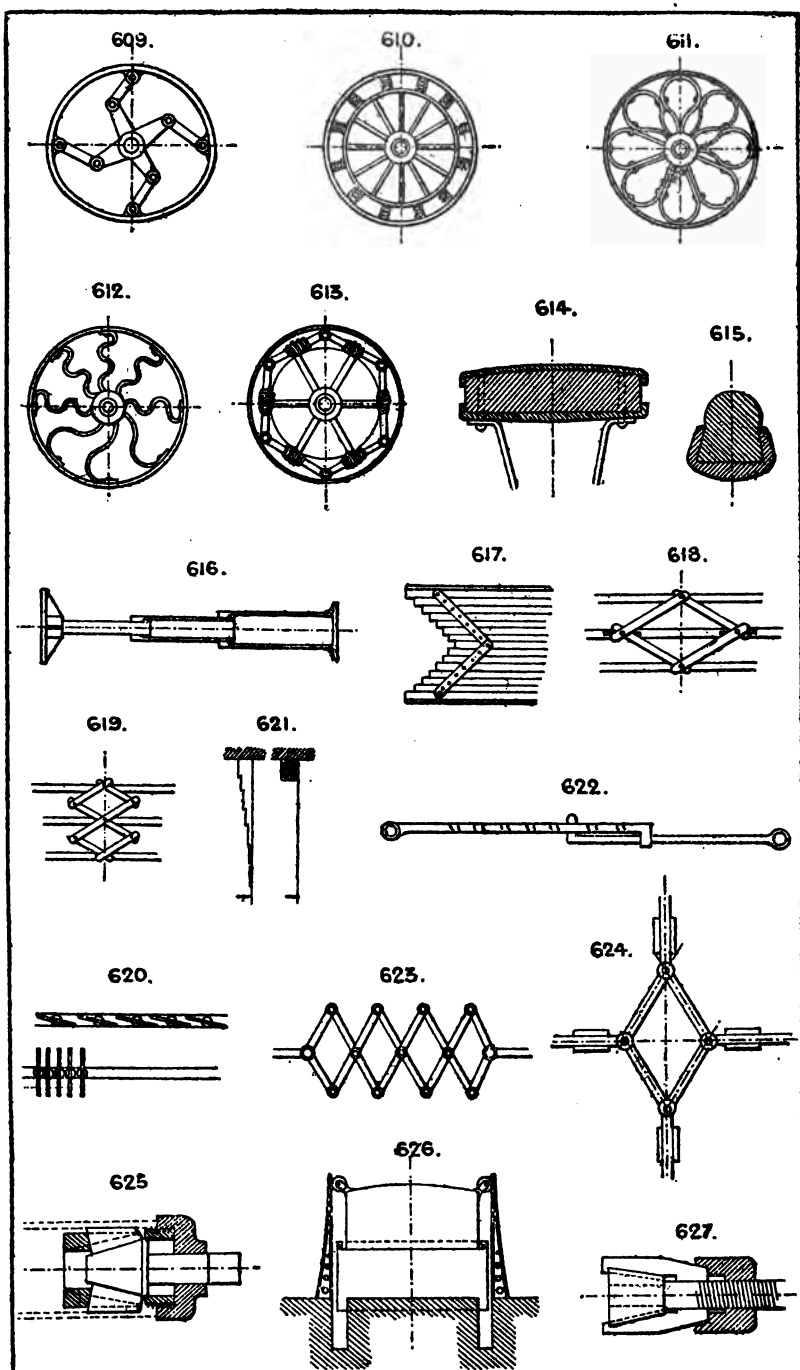
- 609. Huxley's wheel, with spring tyre and jointed spokes.
- 610. Wheel with double tyres and intermediate springs.
- 611. Two plans of bent spoke, spring formation.
- 612. Two plans of bent spoke, spring formation.
- 613. Has an outer elastic tyre and an inner rigid ring, to which the tension or compression springs are fixed.
- 614 & 615. Sections of rubber tyres.

Wheels are also made with rubber rings applied between the boss and shaft so as to allow a limited amount of elasticity between the wheel and axle.

Section 36.—EXPANDING AND CONTRACTING DEVICES.

Common expedients for these purposes are—jointed folding rods, as a carpenter's rule; the telescope tube; net work; diagonally crossed and jointed bars; lattice work; springs (see Section 80); lazy tongs (No. 623).

- 616. Telescopic ram hydraulic lift. (See also No. 1217.) Consisting of two or more rams sliding within each other.
- 617. Parallel bar expanding grille, or gate.
- 618. Parallel bar expanding grille, with lazy tongs motion, each alternate bar has slotted holes as shown.
- 619. Modification of 618. The number of horizontal bars can be multiplied indefinitely.
- 620. Venetian blind; this method is used also for movable doors or partitions, sliding horizontally.
- 621. Venetian blind, but without revolving motion to the laths or slats.
- 622. Perforated bar and hooked rod suspender.
- 623. Lazy tongs expanding connecting rod.
- 624. Four-guide expanding link device, for varying motion.
- 625. Thorburn's tube expander, operated by a central cone and ring of conical rollers.
- 626. Gasometer.
- 627. Timms' expanding boring tool. Operated by a central cone and three or more diagonal feathers, sliding in dovetail grooves in the central cone.
 - Expanding Mandrel, No. 507.
 - Expanding Chucks, Nos. 489, 491, & 506.



899. Common latch.

900. Cam locking bolt; locks the bolt when either in or out, so that it can only be moved by the cam spindle.

901. Crank movement locking bolt, similar to the last.

902. Bolt of common lock.

903. Disc and pin.

904. Side pawl.

905. Locking pawl.

For Pawl and Ratchet Gear see Section 62.

906. Spring catch, with round end which slips past the socket if sufficient force is applied, used for swing doors, &c.

907. Another form, bevilled on one side.

908. Hook latch.

909 & 910. Hasp and staple.

911. Crossbar and hooks.

912. Hand set screw.

913. Drop catch for turntable, &c.

