

A Representative North Devon Grist Mill

Late Eighteenth to Early Nineteenth Century Reconstruction

Note: Not a reconstruction of any single documented mill. A typical internal arrangement.

COMBE MARTIN GRIST MILL

Late 18th – Early 19th Century Reconstruction

The watermills of Combe Martin were substantial two-storey structures built of local rubble stone with slate roofs. They harnessed the steep gradient of the River Umber to power the milling of wheat, barley and oats into flour and meal for local use under manorial control.

1 MILL RACE (LEAT)
Water is diverted from the River Umber through a man-made leat to the mill.

2 MILL LAUNDER
A timber channel carrying water to the top of the overshot wheel.

3 OVERSHOT WATERWHEEL
(14–18 ft diameter)
Water falls over the top of the wheel, turning it in a clockwise direction.

4 TAIL RACE
Water exits beneath the wheel and returns to the River Umber.

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6 WALLOWER (Upright Shaft) – Transmits power vertically to the millstones.

7 GREAT SPUR WHEEL (Pit Wheel) – Driven by the axle; engages the wallower.

8 SHOE & DAMSEL – Regulates the flow of grain onto the stones.

9 UPRIGHT SHAFT (SPINDLE) – Drives the runner stone.

10 GRAIN HOPPER (BIN) – Holds grain before milling.

11 SACK HOIST – Raises filled sacks of grain to the upper floor.

12 MILLSTONES – Runner (upper) and Bed (lower) grind grain into flour.

Water power, skilled craftsmanship and local resources combined to make Combe Martin's mills the economic heart of the valley for centuries.

Technical Notes & Refinements

1. Pit Wheel & Great Spur Wheel

Shown as one component here; historically these were separate gears within the power train.

2. Stone Nut (Not Depicted)

A small gear normally linking the spur wheel to each millstone spindle.

3. Overshot Wheel Efficiency

Overshot wheels were the most effective design for the steep gradient of the River Umber.

4. Sack Hoist Drive

Typically powered from the upright shaft, distributing water-wheel energy throughout the mill.

5. Grain Feed Control

The shoe and damsel regulate grain flow onto the stones — a key feature of controlled milling.

6. Three-Level Workflow

Storage → milling → flour collection: a defining vertical arrangement in British watermills.

7. Optional Flour Dressing

Some mills included a bolter (flour dresser) on the upper floor; absence here is acceptable.

8. Two Pairs of Stones

Reflects the typical capacity of larger Combe Martin mills.

9. Wheel Pit Function

Houses the pit wheel and wallower — the core of the mill's power-transfer system.

10. Local Historical Context

Accurately reflects Combe Martin's medieval origins and 18th–19th-century rebuilds.

Overview

This reconstruction from [CMVHP](#) is a **generalised depiction** of a **North Devon water-powered grist mill**, as it might have appeared following rebuilding and improvement during the late eighteenth to early nineteenth centuries. This document is based on regional archaeological evidence, surviving historic buildings, documentary sources, and established British watermill technology.

The illustration, created with the assistance of AI, represents a typical example of this later phase rather than a reconstruction of any single documented mill. The textual content was researched and written by humans. Many mills in North Devon occupied sites first developed during the medieval period. They were substantially rebuilt, enlarged, or modernised during the Georgian and early Victorian eras (we estimate between 1780 and the 1850s).

How the Mill Worked

River water was diverted by a leat to the top of the wheel (overshot entry). The falling water turned the large overshot wheel; power passed along the axle into the mill's gearing and up an upright shaft. That shaft carried a **great spur wheel** which drove small **stone nuts** for each pair of millstones. Grain fed through a hopper was ground between the rotating **runner stone** and the stationary **bedstone**, then dropped through chutes for collection, dressing, or bagging.

Building Layout

Upper Floor

- Grain received and stored in bins or sacks
- Hoppers supplied grain to the millstones
- Sack hoist access for lifting grain to upper levels

Milling Floor

- Two pairs of millstones driven independently
- Grain fed from hoppers through shoe and damsel mechanism
- Adjustable stone spacing controlled flour fineness

Ground Floor

- Upright shaft and principal gearing
- Meal collection area
- Access to waterwheel and machinery for inspection and maintenance

Principal Components

1. Overshot Waterwheel
2. Waterwheel Shaft
3. Pit Wheel
4. Upright Shaft (Wallower Mounted Above)
5. Great Spur Wheel

6. Stone Nuts (One per Millstone – omitted from illustration for clarity)
7. Millstones
8. Hoppers and Feed Mechanisms
9. Sack Hoist
10. Meal Chutes
11. Tailrace

Component	Technical Description & Function
Overshot Waterwheel	A 14–18 ft (4–5.5 m) diameter wheel in which water is delivered over the top of the rim (the crown) into a series of buckets. As the water fills and descends within these buckets, its weight provides the primary driving force, producing high torque at low rotational speed. This design is especially efficient in the steep North Devon UMBER Valley, where a good head of water can be obtained.
Waterwheel Shaft (Main Axle)	The horizontal iron or timber shaft on which the waterwheel is mounted. As the wheel turns, this shaft carries the wheel's rotation into the mill, driving the pit wheel fixed to it and initiating the entire internal power train.
Pit Wheel	A large vertical gear mounted securely on the main waterwheel shaft inside the wheel pit. It initiates the power train inside the building.
Wallower	A smaller gear driven directly by the vertical teeth of the pit wheel. It converts the horizontal rotation of the main axle into vertical rotation.
Upright Shaft	The primary vertical timber or iron mast driven by the wallower, distributing energy vertically through the multi-level mill structure.
Great Spur Wheel	The principal horizontal gear mounted further up the upright shaft. It acts as the primary power distributor to the milling machinery.
Stone Nuts	Small gears mounted on individual spindles that engage with the Great Spur Wheel. These allow each pair of millstones to be engaged or disengaged independently.

Key Facts

Period Represented: Late eighteenth to early nineteenth century

Historical Context: Representative reconstruction of a North Devon mill, rebuilt and modernised on the site of an earlier medieval mill.

Power Source: Water diverted from a local stream via a managed leat.

Wheel Type: Overshot waterwheel (approximately 14–18 ft / 4–5.5 m diameter)

Primary Function: the mill served the community by turning locally grown cereals into flour and meal, a vital part of everyday life in rural North Devon

Interpretation

The illustration is intended as an evidence-based interpretative reconstruction. It should not be regarded as a reconstruction of any single surviving or documented mill.

This reconstruction illustrates the mature form of the traditional North Devon watermill at the height of its technological development. Textual content was provided by humans.

Individual mills differed in size, machinery, and internal arrangement. The principal components shown in this document—power transmission, and methods of operation—represent well-established regional practices, during the late Georgian and early Victorian periods.

A Historical and Archaeological Précis

A Representative North Devon Grist Mill

This précis attempts to distinguish documented evidence from informed interpretation.

1. Abstract

The reconstruction represents a typical late eighteenth- to nineteenth-century North Devon watermill rather than a specific historic structure. It draws on regional archaeology, documentary evidence and established scholarship on British watermill engineering.

2. Historical Overview

Water-powered milling formed an important part of Combe Martin's economy from the medieval period onwards. Documentary evidence demonstrates the importance of manorial milling, while later centuries saw adaptation alongside agriculture and other industries.

3. The Typical North Devon Watermill

Typical mills were built of local rubble stone with slate roofs. Overshot waterwheels were favoured where steep gradients provided sufficient head. Internally, grain storage above the milling floor was common but not universal.

4. Combe Martin Context

The River UMBER and its tributaries powered mills serving local agricultural communities. Surviving archaeological remains, historic mapping and documentary sources help reconstruct the landscape of milling without allowing every structural detail to be known.

5. Not an Exact Depiction

Documented evidence has been distinguished from regional comparison and engineering inference. The illustration in this document should therefore be regarded as an interpretative reconstruction rather than an exact depiction of any single mill.

Glossary

Overshot wheel — A waterwheel driven by water entering above the axle, using the weight of falling water for maximum efficiency in steep valleys.

Leat — A man-made watercourse that diverts water from a river or stream to supply a mill.

Wallower — A small gear mounted at the top of the pit wheel; it converts horizontal rotation from the waterwheel axle into vertical rotation for the upright shaft.

Pit wheel — The large gear fixed to the waterwheel axle; it initiates the mill's internal power train by driving the wallower.

Upright shaft — The main vertical shaft that carries power upward through the mill, driving the great spur wheel and associated machinery.

Great spur wheel — The principal horizontal gear mounted on the upright shaft; it distributes power to the stone nuts and millstones.

Stone nut — A small gear that engages with the great spur wheel, allowing each pair of millstones to be driven or disengaged independently.

Runner stone — The upper, rotating millstone that grinds grain against the stationary bedstone.

Bedstone — The lower, fixed millstone forming the grinding surface beneath the runner stone.

Hopper — A funnel-shaped container that holds grain and feeds it steadily into the millstones.

Shoe — A sloping wooden channel that guides grain from the hopper to the eye of the runner stone.

Damsel — A vibrating spindle that shakes the shoe, ensuring a consistent flow of grain into the millstones.

Tailrace — The channel that carries water away from the waterwheel after it has provided power.

Sack hoist — A simple lifting mechanism powered by the mill's gearing, used to raise sacks of grain to upper floors.

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