Molinos Nuevos (Museo Hidraulico) in Murcia, Spain

Background

In medieval times, all European communities, whether rural or urban, had a network of water mills. These mills served a variety of functions including flour milling, cloth making, cider pressing, rock crushing, etc. The town of Murcia, in southeastern Spain, was no exception. On the Segura River and on the town's main canal there were eight separate mills operational between the 13th and 15th centuries. Each mill had a varying number of waterwheels. At least two were of Moorish origin.

Los Molinos Nuevos

The mill known as Molinos Nuevos (New Mill) is located on the right bank of the Segura River, near the Puente Mayor bridge. Its origin goes back to the 14th century, with the first written record dated 1363, when it was a fulling mill. It was latter converted to a flour mill. This early mill had 2 vertical water wheels or "acenas." During the latter Middle Ages, it was known as the "Molinos de Allende" or mills on the far side of the river.

Until the 16th century, the "Molinos de Allende," like many others, was run by wealthy families in return for payment of an annual tax to the town council. This gave the operator the exclusive rights to use the installation. By all indications, the mill turned a healthy profit for the concession-holding families.

Water mills in Mediterranean countries have always been at risk from being damaged by floods. The "Molinos de Allende" was no exception. For example, in 1743, the wooden structure was completely destroyed by a flash flood. The replacement, a structure built perpendicular to the river, had 6 water wheels. At this time, it became known as the "Molinos Nuevos". After a succession of flooding disasters (the severest in 1784), it was again rebuilt. This time it was constructed parallel to the river and had 21 water wheels (later expanded to 24). The new structure, because it did not project out into the river, created less of an obstacle to the free flow of water.

In the 19thcentury, modernization, which was occurring all across Europe, brought about the demise of the mill. Water mills could not compete financially with more "modern" milling operations which used different energy sources and could mill higher-quality flour at a lower cost. "Molinos Nuevos," for a short time at the end of its functional life, was used for milling coarse cattle-feed. But this enterprise was short-lived.

Parts of the Mill

Water for "Molinos Nuevos" was diverted from a weir on the Segura River into a channel. The differential head between the channel and the river was used to turn horizontal waterwheels, called "rodeznos" (see illustration 1 and photograph 1). Each wheel turned a shaft which transmitted the energy from the turning waterwheel to the grinding of the millstone (see illustration 2).

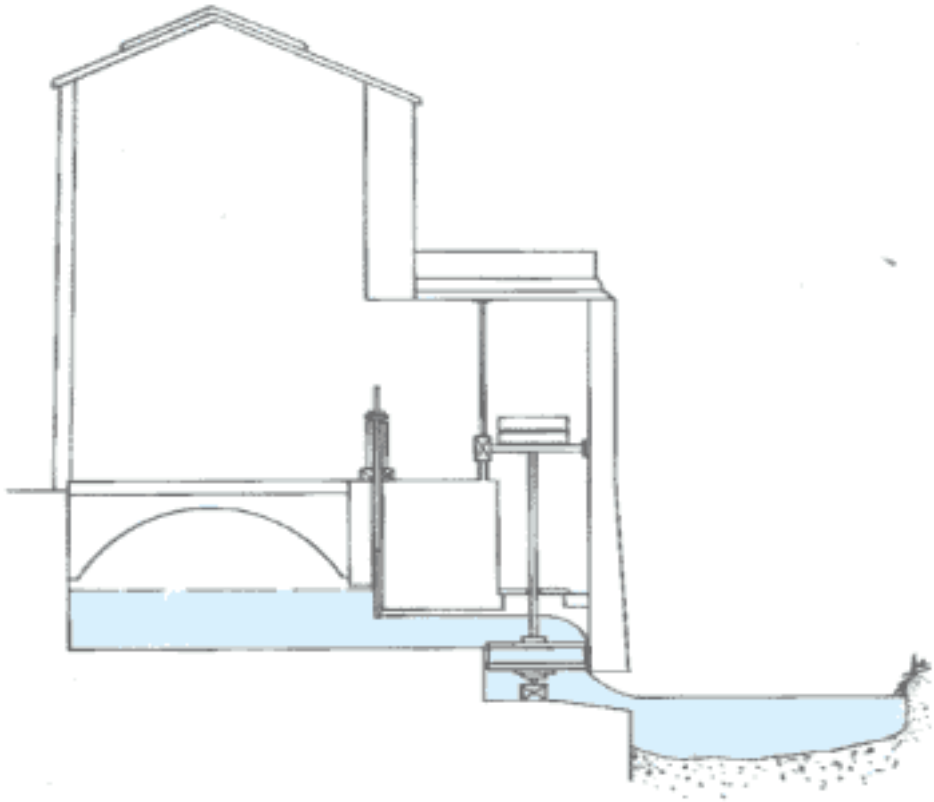

Illustration 1. Cross-section of "Molinos Nuevos" showing water falling from the channel to the river and turning the water wheel.

Photograph 1. Horizontal water wheel or "rodeznos" at the Murcia museum.

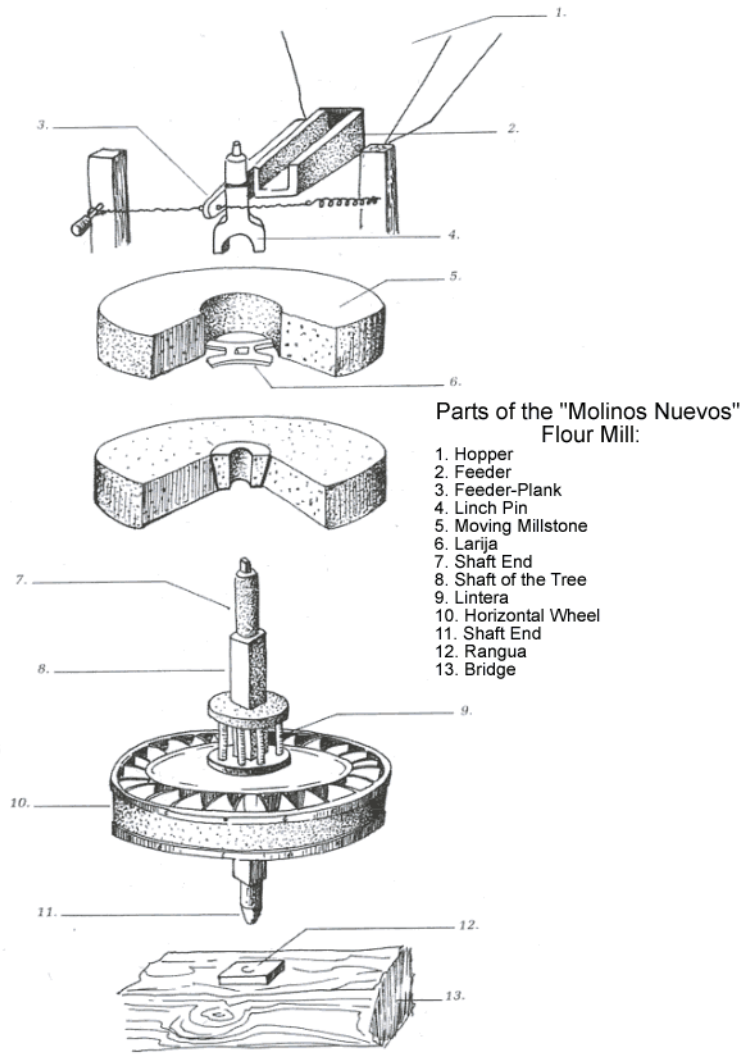

Illustration 2.

The upper millstone was concave and lower one was convex. To function properly, the millstone was not supposed to turn faster than 60 revolutions per minute. The flour overheated at higher speeds.

Because it was important to know when there was no grain left between the millstones, a small bell was tied to the hopper. When the bell ran, the miller knew that the hopper was empty. No grain meant that sparks could be struck between the two millstones, and this situation was a fire hazard.

A bridge mechanism was used to increase or decrease the distance between the two millstones (see illustration 3). This distance, which was kept constant by a lever or wheel, determined whether the flour would be fine or coarse.

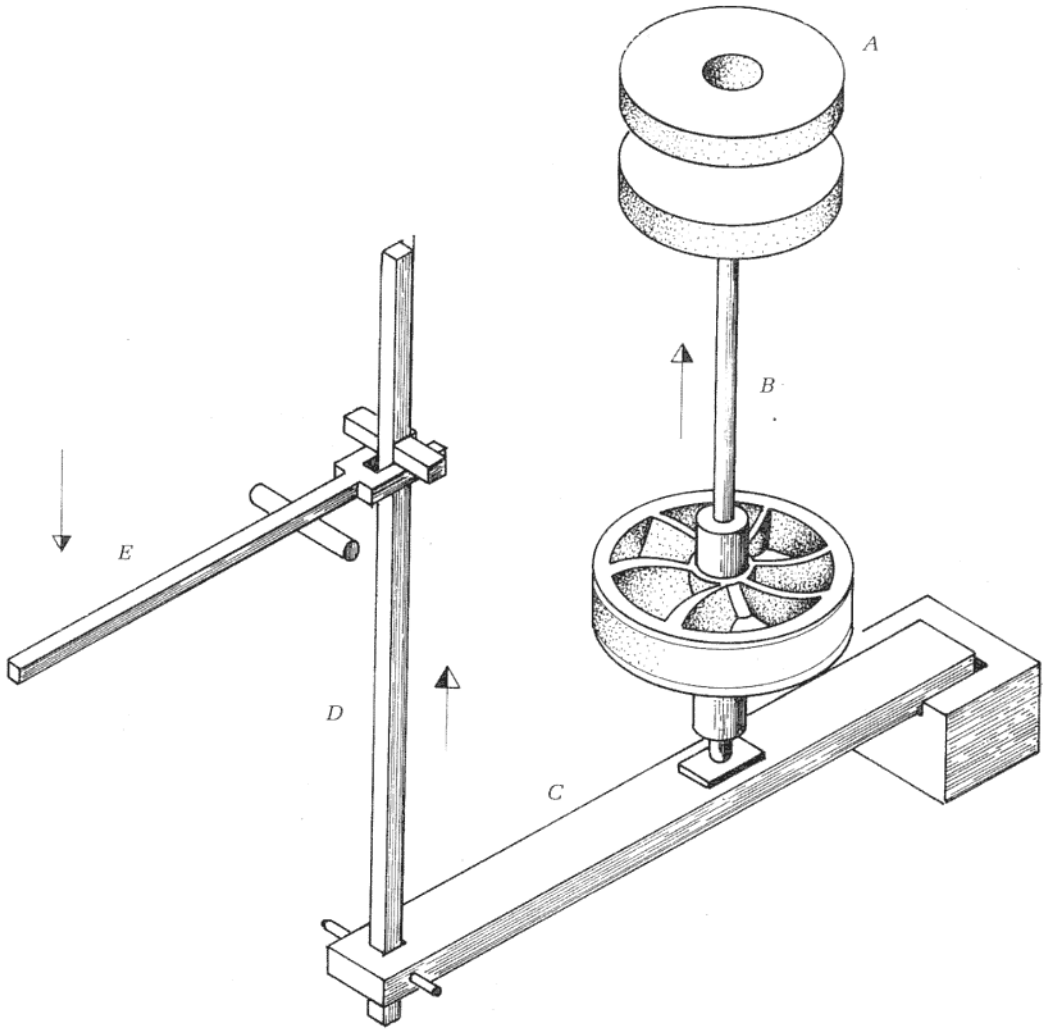

Illustration 3. Diagram showing how the bridge works. The lever (E) which regulates the distance between the millstones moves the guiding rod (D), which is joined at one end of the bridge (C). The other end of the bridge rests on a masonry block. This allows the shaft (B) and the moving wheel (A) to be raised.

Hydraulic Museum

The historic remnants of "Molinos Nuevos" were reborn as an impressive museum and cultural center (see photograph 2). The architect's concept was to restore much of the original look of the mill. The building/museum was reopened in 1989 and was a top-ten project of the 80s in Spain.

Photograph 2. The Hydraulic Museum sits parallel to the Segura River in Murcia, Spain.

The permanent exhibit titled "How a mill works" includes various facets of the history and technology of mills in the Murcia area. It has excellent displays, many fully functional and interactive, which shed considerable light on water-wheel/mill technologies (see photograph 3). All the exhibits are in Spanish, but the museum has an excellent brochure which has been translated into other languages (including English).

Photograph 3. A working model of a flour mill at the Hydraulic Museum.

The author was at the museum on a Saturday in late April, 2002. Other than myself, I saw only one visitor (I got the impression the museum is set up principally for school children). The museum staff consisted of one man, and he was not particularly helpful, though language was a problem.

Note: This write up is heavily dependent on the museum's English brochure.