

## Leonardo Da Vinci E Il Tamburo Meccanico (Leonardo Da Vinci's Defined Mechanical Drum)\*

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The AMMI presents the reconstruction project of the musical mechanism of Leonardo Da Vinci's (Figure 1) defined mechanical drum. This project was spearheaded by Franco Severi, President of the AMMI, and Ernestino Marchetti. They created a team of workers as well as a workshop where all involved could contribute. This article details some of the work involved as well as the final outcome.

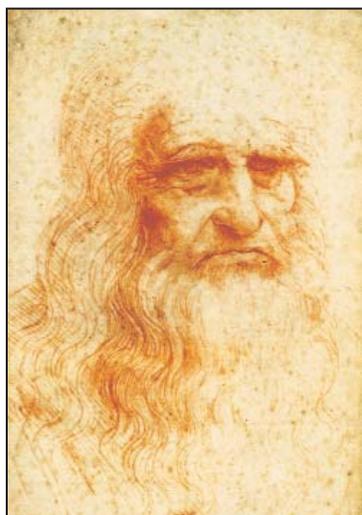


Figure 1. Leonardo's self-portrait.

We have come to know Leonardo's character through his notebooks which express the unlimited curiosity of a man whose interests ranged from comparative anatomy to painting, and from musical instruments to hydraulic engineering and all kinds of machines. He was a scientist, artist and inventor who did not perceive contradictions between the various aspects of knowledge. His explorations, encompassing every type of knowledge, were achieved through

research into new methods and new contents derived from experimentation. He thought that research should be done using mathematical demonstrations and he emphasized

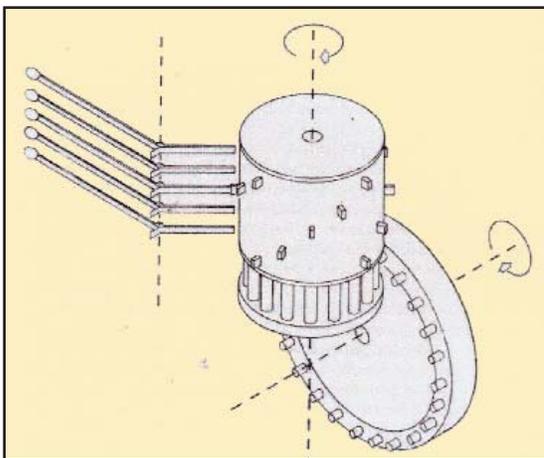


Figure 2. Leonardo's design of a drive cylinder.

the importance of experience. For him, abstract concepts could not be considered real unless they were proven by experimentation.

In his manuscripts, Leonardo writes about the concept of musical mechanisms as applications of mechanical parts of instruments which were not originally mechanical. He first designed rotating cylinders with teeth between 1490 and 1495. The mechanical drum joined this category through the use of the nailed cylinder used in moving the drumsticks (Figure 2). This mechanism's evolution led to the development of complete families of instruments.

Approximately five hundred years ago Leonardo recorded his design of machinery and his thoughts on how to facilitate man's work and activities. This way of thinking was new, just as were some specific objects he studied as part of mechanics. Many of his ideas were too advanced for his era and were only constructed many years later. The roots of this current project date back to that time in the late fifteenth century when Leonardo thought of how to avoid that hundreds of drummers (who accompanied the army with the rhythmic sound of drums) died during the battles. So why not make a mechanical device that, pulled by a horse or two men, replaced at least a dozen of traditional drums? Leonardo imagined a system that would make it possible to produce the rhythmic sound with the movement of the wheels by using a crank positioned on the axis of the wheels.

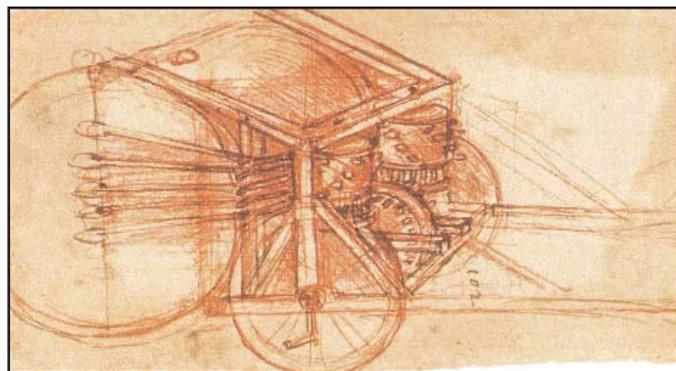


Figure 3. The Atlantic original design Code f.837 r. Close inspection reveals the wheeled unit with drum beaters activated by pinned cylinders.

Mauro Carpiceci, scientific director of the AMMI and a student of Leonardo da Vinci, developed the plan used to reconstruct the mechanical drum from the original

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design that is on the Atlantic Code (Atlantic Codex—the largest collection of drawings and writings of Leonardo da Vinci. It includes 1,119 sheets collected in 12 volumes and is currently housed in Milan, Italy). Codice Atlantico f 837 r represents a sort of wooden cart carrying a big drum; the beaters are five for each membrane (two are positioned on both sides of the drum) and are connected to the wheels, and activated through a complex mechanism of action (Figure 3).



Figure 4. Completing the towing pinion.

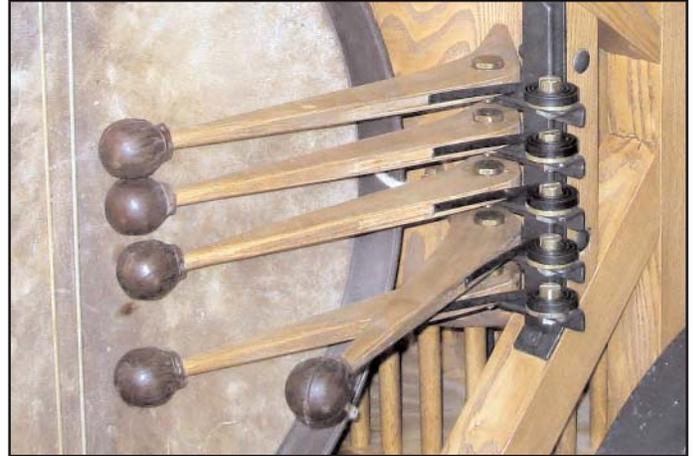


Figure 7. The completed drum and beater assembly.



Figure 5. Mounting the barrels to the chassis.



Figure 8. President Franco Severi test-driving the mechanical drum.

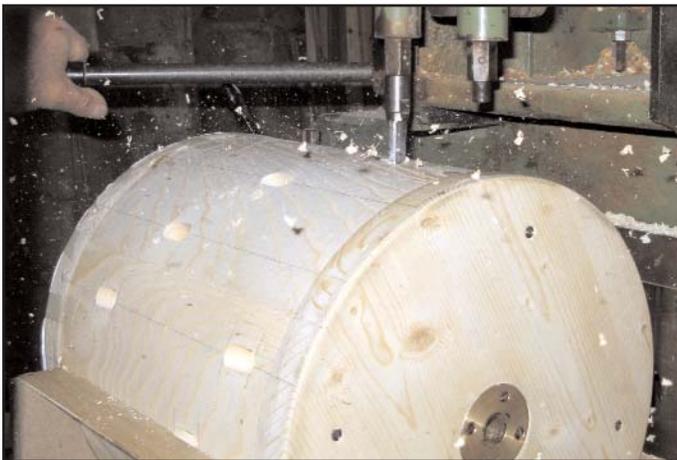
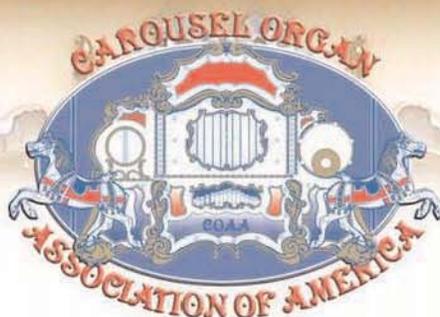


Figure 6. Drilling the cylinder.



Figure 9. The completed drum in the museum of Villa Silvia.

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