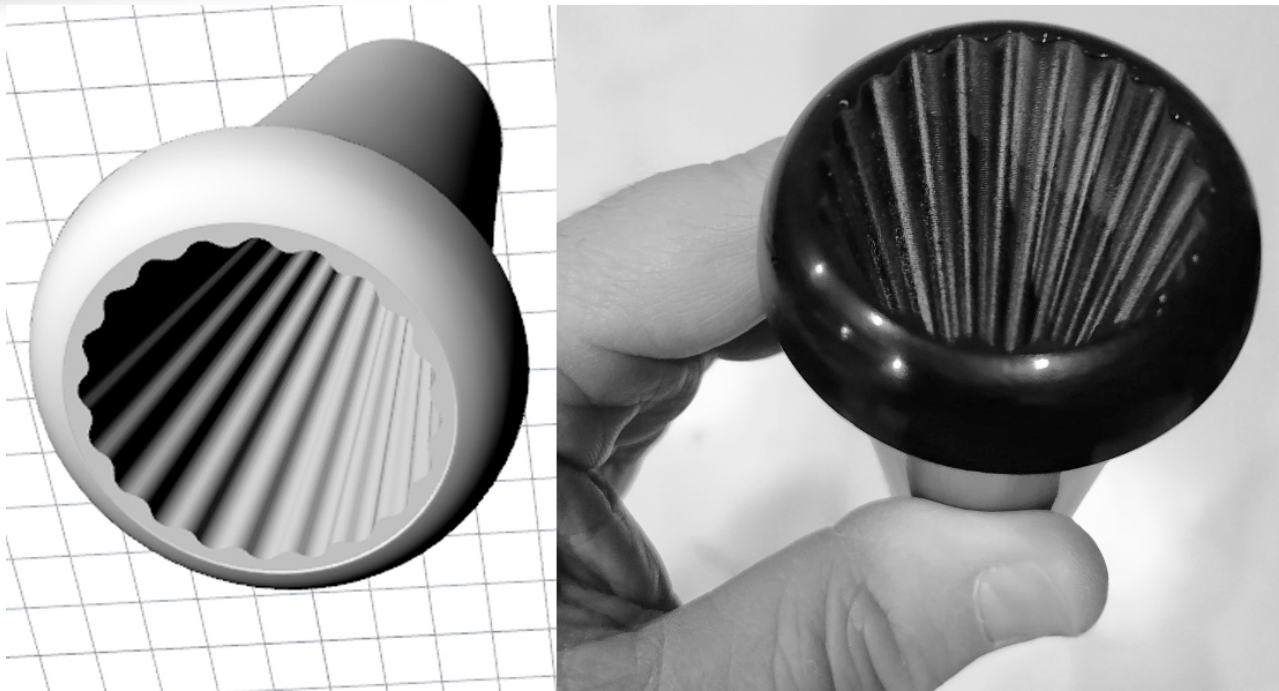


# BELL FOR WIND MUSICAL INSTRUMENT



In wind musical instruments, the bell is the part of the instrument primarily responsible for impedance coupling with the external environment. The material and geometry of the bell determine the instrument timbre. Consequently, the bell, if appropriately designed, allows matching the impedance of the instrument body to the external environment and selecting the harmonic content of the sound emission. The aim of this invention is to provide a methodology for the realization of bells with modified internal surface to improve both the impedance matching and the harmonic content of the sound, making it more pleasant for the listener.



**PRIORITY NUMBER**

102022000022893



**KEYWORDS:**

3D printing, Bell, Patterning, Reverse engineering, stampa 3D, wind instruments.



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# BELL FOR WIND MUSICAL INSTRUMENT

## DESCRIPTION

At present, the production of bells for wind instruments follows mainly empirical procedures. The materials used and the shapes are limited in number. The aim of the invention is to provide an approach for bell realization which goes beyond the handicraft process, but which is replicable and standardizable. The method proposed allows producing extremely complex shaped bells enabling to achieve a wide selection of possible sound emissions. The process for bell realization consists of the digitization and reverse engineering of an existing bell, the regeneration of its inner surface using CAD, its physical realization through 3D printing, and the verification of the sound quality related to the specific internal design used. The adoption of 3D printing also allows the use of a wide range of materials. The level of technological maturity is at TRL 4 for the validation of the adopted technology and TRL 7 for the demonstration of a finished prototype in an operational environment

## APPLICATIONS

- Suitable to any wind instrument with a bell that can be separated from the body of the instrument;
- The digitizing and printing process can be standardized in well-defined cases and used to make specific bells at request;
- The method can be offered to medium-sized and large industry.

## ADVANTAGES

- Better coupling between instrument emission and environment (increased feeling of sound smoothness);
- Selection of the sound harmonic content, thanks to a virtually unlimited library of patterns for the internal surface of the bell;
- Wide range of construction materials;
- No particular visual impact.

