

## Guitar

(Fr. guitare; Ger. Gitarre; It. chitarra; Sp. guitarra; Port.violo; Brazilian Port. violão).

A string instrument of the lute family, plucked or strummed, and normally with frets along the fingerboard. It is difficult to define precisely what features distinguish guitars from other members of the lute family, because the name 'guitar' has been applied to instruments exhibiting a wide variation in morphology and performing practice. The modern classical guitar has six strings, a wooden resonating chamber with incurved sidewalls and a flat back. Although its earlier history includes periods of neglect as far as art music is concerned, it has always been an instrument of popular appeal, and has become an internationally established concert instrument endowed with an increasing repertory. In the Hornbostel and Sachs classification system the guitar is a 'composite chordophone' of the lute type

### Structure of the modern guitar.

Fig.1 shows the parts of the modern classical guitar. In instruments of the highest quality these have traditionally been made of carefully selected woods: the back and sidewalls of Brazilian rosewood, the neck cedar and the fingerboard ebony; the face or table, acoustically the most important part of the instrument, is of spruce, selected for its resilience, resonance and grain (closeness of grain is considered important, and a good table will have a grain count about 5 or 6 per cm). The table and back are each composed of two symmetrical sections, as is the total circumference of the sidewalls. The table is supported by struts of Sitka spruce, which contribute greatly to the quality of sound. Over-extraction of many of these woods led to a global shortage at the end of the 20th century, and luthiers, having exhausted their old stocks, turned to alternative materials. Indian rosewood and maple were often used instead of Brazilian rosewood (trade of which was banned throughout the world), the table was sometimes made from Canadian or western red cedar (acid rain and war in the Balkans having affected supplied of European spruce), mahogany from Honduras and Brazil was occasionally used for the neck, and African blackwood was being considered as a substitute for ebony.

The traditional arrangement has the struts radiating from below the soundhole under the lower part of the table; hence the term 'fan-strutting'. Various other patterns have resulted from experiments by different makers: some makers use a much thinner soundboard and a grid pattern of fine longitudinal struts with a smaller number of larger lateral struts, creating a membrane supported by a delicate but strong grid; others prefer a diagonal grid of struts (which include carbon fibre for extra strength). As high sound quality has been achieved by several of these makers, it is clear that one cannot speak of a standard strutting pattern; whatever the pattern, the table must be allowed to vibrate adequately. Vibrations of the strings are transmitted to the table by a rosewood bridge, which also acts as lower string fastener. The lower vibrating length of each string is determined by an ivory or bone saddle in the bridge and by a nut, also ivory or bone, at the upper end. The frets (usually 19), giving a total range of three and a half octaves, are

of nickel silver. The three upper strings are made of nylon, the three lower of nylon strands overspun with fine metal. Tuning is effected by rear pegs activating a geared mechanism that turns the bone or nylon rollers. The standard tuning is E–A–d–g–b–e'. Guitar music is notated an octave higher than it sounds.

There are two methods of joining the neck to the body – the ‘Spanish method’ and the ‘dovetail method’ (fig.1). In the former the neck is projected into the body, and the sidewalls are slotted into the heel of the neck, while in the latter the body is completed first and the neck fitted into the top block. The Spanish method is more difficult to achieve but results in a stronger joint between neck and body and is hence preferable as this is an area of great tension. Modern guitar decoration is limited to a wooden mosaic inlay surrounding the soundhole; the inlay may be repeated in the bridge but the bridge more often has ivory, wood or synthetic purfling, which is also functional as it protects the wood from the pressure of the strings. Typical measurements for a guitar are: overall length 98 cm; string length 65 or 66 cm; width at the lower bout 37 cm, at the waist 24 cm, and at the upper bout 28 cm; body length 48·5 cm; nut to body 30 cm; depth at the lower bout 10 cm, at the upper bout 9·5 cm.