material inserted into a length-wise slot in the bridge, which is where the strings make contact with the guitar. On an electric guitar, a "hard-tail" bridge assembly, usually consisting of a metal frame with individually adjustable bridge saddle is rigidly attached (via screws) to the body of the guitar, which often is a solid block of wood, such as alder, ash, mahogany, korina, poplar, *etc*. There also exist other kinds of bridge assemblies for electric guitars, *e.g*. vibrato bridges of various types, the design of which usually consists of a spring-loaded mechanical system that enables the guitar player to raise and/or lower the pitch (*i.e*. frequency) of the strings by pulling on a lever mechanism (or mechanisms). At the neck end of the guitar, the nut supporting the strings is again often made of bone, ivory or a synthetic material; sometimes even musical brass (also known as bell brass) is used for making the nut on a guitar. Some guitars, such as vintage (50's and 60's era) Gretsch guitars even used a "zeroth" fret as the nut of the guitar.

When a string undergoes transverse vibrations, there are time-dependent forces that act on the end supports of the string, in addition to the static tension, *T* of the string.
If the end supports are perfectly rigid, then these forces are in fact of no consequence. However, on a real guitar, the end supports are *not* perfectly rigid. The bridge attached to the soundboard of an acoustic guitar can vibrate (differently) in three dimensions - because the wood of the soundboard, with its accompanying bracing is not perfectly rigid. Indeed, vibration of the soundboard of an acoustic guitar is *required* in order for it to produce its sound - via the acoustical cavity inside the body of the guitar!

Because of the grain structure of the spruce wood - usually aligned parallel to the strings of the acoustic guitar, the structural rigidity of the bridge-top plate assembly of an acoustic guitar is not the same when vibrating in three possible mutually-perpendicular directions. By conscious design, the bridge of an acoustic guitar vibrates most easily perpendicular to the plane of the soundboard of the guitar (= plane of the strings of the guitar), and to a lesser extent, along the string direction, and/or perpendicular to the strings, in the plane of the strings, enabling the efficient transfer of energy from the strings of an acoustic guitar to the (resonant) body cavity of the guitar, thereby enabling the sound of the strings to be amplified in a natural manner.

For an electric solid-body guitar, because of the fact that the wooden guitar body is so much thicker and thus much more massive than the soundboard of an acoustical guitar, the vibrations associated with the bridge of an electric guitar are considerably less than that associated with an acoustic guitar.

An electric guitar of necessity must use magnetically-permeable metal strings. As a consequence of this, the string tension, T associated with an electric guitar is ~ twice that of an acoustic guitar strung *e.g*. with nylon strings. The neck of an electric guitar is also usually considerably thinner, and therefore less rigid than the neck of an acoustic guitar. So much so, that almost without exception an adjustable truss rod (internal to the neck of an electric guitar) is used to counter the tensile forces of the strings in order to keep the neck from warping over a period of time. Thus, the neck of either an electric or acoustic guitar behaves as an *axially-loaded, cantilevered beam*. Therefore, the nut attached near the top of the neck of any guitar will not be perfectly rigid as the strings of the electric guitar vibrate. The nut on an electric guitar will in fact vibrate more than that of an acoustic guitar because of the thinner neck, and also because of the increased tension, due to the use of magnetically-permeable metal strings - we will shortly see that the forces acting on the end supports are proportional to the string tension.