7.3.2 String tree

The strings of a guitar rest on two small ridges: the nut and the bridge. In order to obtain a force-fit without slack, the string needs to experience a change in direction. The corresponding bend angle is specific to the guitar and varies between 5° and 15°. For achieving the bend at the upper string end, the classical method has the headstock angled back relatively strongly towards the rear. In a Martin D-45, for example, the resulting bend angle is 15°. Gibson's electrics reach this value, too – or even exceed it. With Fender, the situation is different. Always frugal with the available materials, Leo Fender does not waste any wood and refrains from angling the headstock backwards. The result is a very small bend angle of the strings (**Fig. 7.9**), and string buzz occurs when playing open strings. Remedy is found in the form of hook-like string guides that deflect in particular the B-and E_4-strings, pulling them towards the headstock

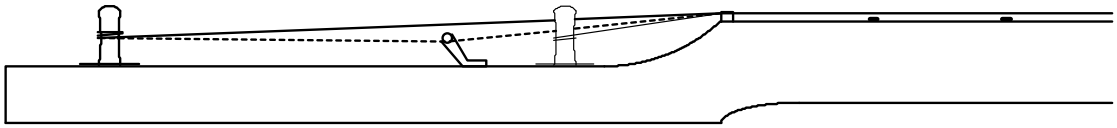

Fig.7.9: Side view of the headstock of a Stratocaster. Without string tree, the bend angle of the E_4-string amounts to only 2°; with string tree, it increases to 6° (dashed). For the E_2-string (thin line), the bend angle is sufficient without string tree.

String trees are offered in different shapes: as "butterfly" vintage original (a stamped strip of sheet metal), as roller bearing (roller string tree), as washer, or a thin oblique pin. They do increase the bend angle at the nut – but also generate an additional frictional force in terms of any longitudinal movement of the strings. This friction is considered undesirable. The wrap-around angle at the string tree of a Fender guitar can amount to as much as 7° – generating a frictional force that is even higher than that occurring at the nut. On the other hand, a Gibson-typical bend angle of the strings is, at e.g. 15°, more than twice that on the Fender-ish competition – and yet in guitaristic circles, Gibsons are not actually known to be unplayable. That does not mean that friction would generally be no problem at all: there are sharp-edged string trees of the butterfly-type that wound strings more or less clamp themselves to. Let's not enter an expert discussion here why, in the first place, a wound string would have any business interacting with a string tree on one of Leo's guitars … anyway: corrective action is easily possible via a delicate file or a practically invisible strip of Teflon. That aids the mechanics and does not hurt the look. Oil, Vaseline or machine grease would be suitable to reduce friction, as well.

Does a string tree change the sound? No, here we do not mean the targeted improvement via the increase of the bearing force of the string at the nut – but would there be any additional, possibly undesirable effects? Very theoretically, the Eigen-frequencies of the headstock could retune themselves due to the additional mass of the string tree, but that has no practical relevance. The same holds for the Eigen-frequencies of the strings running across the headstock: plucking an open string and damping these remaining string sections with the other hand will not cause any changes in the "electrical sound"… N.B.: the *acoustical* sound of an electrical guitar is insignificant, anyway (Chapter 8).

