

## IMPROVING THE DESIGN FEATURES OF THE BASS GUITAR (1950S – TO THE PRESENT DAY)

### PERFEȚIONAREA CONSTRUCȚIEI CHITAREI-BAS (ÎNCEPÂND CU ANII 1950 ȘI PÂNĂ ÎN PREZENT)

### СОВЕРШЕНСТВОВАНИЕ КОНСТРУКТИВНЫХ ОСОБЕННОСТЕЙ БАС-ГИТАРЫ (1950-Е – ПО СЕГОДНЯШНИЙ ДЕНЬ)

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CZU 780.653.1:780.614.131.015.2.02

*The article is devoted to the formation of the basic constructive models of bass guitar, starting with the second half of the 20<sup>th</sup> century. Special attention is paid to the design of the neck and body of bass guitar, as well as the interaction of tree species in the production of bass instruments.*

**Keywords:** electrification, Precision Bass, Fender Jazz Bass, stick, bolt-on, set-neck, neck-through body, guitar with construction

*Articolul este dedicat stabilirii modelelor de bază ale chitarei-bas, începând cu cea de-a doua jumătate a secolului XX. O atenție deosebită a fost acordată construcției tastierei și a corpului chitarei-bas, cât și interacțiunii speciilor de lemn în producția acestor instrumente.*

**Cuvinte-cheie:** electrificare, Precision Bass, Fender Jazz Bass, Höfner 500/1, stick, bolt-on, set-neck, neck-through body, construcția de chitare

*Статья посвящена формированию основных конструктивных моделей бас-гитары, начиная со второй половины XX века. Особое внимание уделено конструкции грифа и корпуса бас-гитары, а также взаимодействию древесных пород в производстве басовых инструментов.*

**Ключевые слова:** электрификация, Precision Bass, Fender Jazz Bass, Höfner 500/1, стик, болчѐный гриф, клеенный гриф, сквозной гриф, гитаростроительство

**Introduction.** Thanks to technological progress and the possibilities of electrification, the inventors tried to construct an electronic analogue of almost all acoustic musical instruments, experimenting not only with string, keyboard and percussion instruments, but also with various wind instruments. Naturally, not all electrical prototypes obtained were successful: for example, experiments on trombone electrification were only unsuccessful attempts.

As for the design of the classical guitar, which was practically unchanged from the beginning of the 17<sup>th</sup> century, later, with the registration of a patent at the beginning of the 20<sup>th</sup> century, it made a rapid leap in its evolution. In a relatively short historical period, many of its varieties appeared.

Simultaneously with the electrification of the guitar, the inventors conducted experiments to create such an improvement with bass range instruments. The design features of the electric-amplified bass guitar reflect the history of many technological, economic, and musical factors. In this regard, E. Nazaikinsky emphasizes: „The history of instruments is essentially a gradual emancipation of music, its separation from life for the benefit of life itself” [1, p.82].

#### 1. Bass guitar constructions in the 1950s-1960s.

The *Fender Precision Bass*, which was first introduced by American engineer and entrepreneur Leo Fender in 1951, became the first mass-produced bass guitar and was developed by him based on his *Fender*

*Telecaster/Broadcaster* electric guitar. He called his new invention *Precision Bass* (accurate bass), because in the new design of the instrument neck, fret partitions appeared, which were not on the contrabass neck.

*Precision Bass* in its new standardized form combines all the basic features of a *Fender Telecaster* electric guitar. Their kinship was so obvious that the first bass players spoke of the *Precision Bass* as the bass version of the *Fender Telecaster*. L. Fender used previously tested materials in the manufacture: maple neck, ash body, Kluson peg gear. The scale (neck length) was larger than on an electric guitar and had a value of 34 inches (864 mm). The string holder consisted of two metal segments, intended, in turn, for each of the two pairs of strings that passed through the body. For the first time, a highly sensitive single-coil electromagnetic pickup “Single-coil” and a black plastic pad with a chrome-plated control panel, on which two metal volume and tone controls were located, were installed on the bass guitar. As Klaus Blaskuiz notes in his book *The Fender Bass*, „the neck is attached in a slot of the body specially made for this type of mounting with 4 screws and a rectangular chromed ”neck” plate” [2, p.8].

From that moment, the bass guitar began to look like a full-body guitar, much more convenient to use than a bulky contrabass. By and large, the *Precision Bass* was an electrical appliance in which most of the parts used could be replaced. This design revealed not only the universal qualities of the bass guitar, but also the cost-effectiveness of the instrument. It should be noted that now the neck is cut out from a single piece of wood, which allowed to significantly improve productivity and limit production costs.

The design of the *Fender Precision Bass* marked the beginning of a new era in the evolution of bass instruments, laying the foundation for guitar building for the next generation of craftsmen around the world. It is no coincidence that the chief manager of *Fender Musical Instruments Corporation* Donald D. Randall, introducing a new model of bass guitar and equipment, said: „That the rapid increase in popularity of the *Precision Bass* and *Fender Bassman* amplifier has resulted in their being included in the instrumentation of many of the nation's top musical organizations” [3, p.14].

The next revolutionary step in the evolution of the design features of the bass guitar was the release in 1960 of the new *Fender Jazz Bass* model, dictated by the realities of modern music, which implied a transition to a brighter sound of the instrument in the general mix and, consequently, the transition of contrabass players to playing electric bass the guitar. The fundamental difference between *Jazz Bass* and *Precision Bass* was the reproduction of the sound of a bass guitar in a wider acoustic spectrum.

The new *Jazz Bass* design was distinguished by clearer, asymmetric body features that looked like a *Jazzmaster electric guitar*. The maple neck has become thinner, gradually tapering towards the head of the neck. Bridge, pegs and scale length remained unchanged. Fender himself believed that a narrower neck should attract more jazz musicians to play the bass. The presence of two single-coil pickups, the first of which was located in a special hole in the plastic lining near the neck, and the second – not far from the bridge, made it possible to get a radically new sound. This arrangement of pickups significantly enhanced the specific features of the sound of the bass guitar. So, for the bridge sensor, due to the characteristic tension of the string in this place, the sound was sharp and “readable”, with a predominance of medium and high frequencies, and for a neck sensor, the sound was deeper and thicker, with a predominance of medium and low frequencies. The control panel, which controls the volume level for each pickup and the general tone control, has traditionally been located below.

Thanks to the advent of *Fender Jazz Bass*, the sound of the bass guitar became more recognizable, and the performers, like sidemen<sup>1</sup> [4, p.327], as well as virtuoso soloists — they got a new unified instrument that can bring bright colors to the tonal-sound palette of such genre and style phenomena as funk, disco, jazz, blues, fusion, etc. The *Fender Jazz Bass* model has become a kind of bass trend, which continues to be hugely popular among bass players, being one of the best-selling bass guitars in the world. Among the virtuoso bass

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<sup>1</sup> *Sideman* is a member of a jazz orchestra performing only accompaniment parts.

players who used the *Fender Jazz Bass* model, we can distinguish such artists as Jaco Pastorius, Marcus Miller, Geddy Lee, Michael Belzari (Flea), John Paul Jones, Steve Harris, Sting and others.

Initially, it was *Fender Musical Instruments Corporation* that took the leading position in the production and sale of bass guitars. The explosion of popularity was so powerful that competing companies did not immediately realize the prospect of obtaining financial profit from the production of all-body models of bass guitars. Despite this, Gibson, Rickenbacker, and others also introduced original bass prototypes based on their electric guitar models. In 1955, the German company *Höfner* released the *Höfner 500/1* electro-acoustic bass guitar, which was reminiscent of a violin in design. After this instrument caught the attention of young Paul McCartney, the model from *The Beatles* was a resounding success.

In the early 1960s, with the popularity of rock music, the field of application of the bass guitar is growing rapidly. The production of various modifications of the instrument begins: „Frets and fretless, full-body, acoustic and semi-acoustic, with more or less strings are produced to date. The creation of various modifications of the bass guitar was made possible thanks to the bold experiments of the performers in close collaboration with manufacturers. Along with the external design, the sound conversion system has evolved. The traditional “single-coil” pickups were replaced by humbuckers, various “hybrid” sensors, active and passive electronics, piezo, optical and, finally, midi pickups” [5, p.235]. As I. Gorbunova notes, “over the centuries, new methods have been invented for extracting musical sound and, accordingly, the technology for manufacturing new musical instruments that meet the intentions of composers, listening to the sound of the world around them. With the advent and development of electronic musical instruments, a new page in the history of the development of musical art turned upside down” [6, p.235].

Among the most famous manufacturers specializing in the production of bass guitars, it is worth highlighting such companies as *Fender, Sadowsky, Fodera, Yamaha, Ken Smith, Music Man, Ibanez, Warwick, Rickenbacker*, etc.

## **2. Constructive innovations of above mentioned period of bass guitar evolution.**

The basic prototype of the instrument is a four-string bass guitar, consisting of a solid body, neck, two pickups and a timbre block. This bass guitar model is a transposing instrument tuned to pure E1, A1, D, G quarts. A musical part is written in notes in a bass key and an octave higher than the actual sound. To expand the performing range, a 5-string bass guitar with an additional bottom B2 and a 6-string bass with an additional bottom B2 and the top C are used. More multi-stringed models are also being produced, which are also widely used due to their versatility. These are seven, eight or more string bass guitars, the range of which can freely reach 5 or more octaves. There are bass guitars with double and even built-up strings, which duplicating each other, bring more overtones to the sound of the instrument and thereby enrich the musical part with a more saturated accompaniment.

As a separate species, it is natural to identify a multi-stringed version of a *stick* bass intended for playing polyphonic music using two-handed tapping. According to its design features, the stick looks like an elongated neck with a width and size that has a number of strings from 8 to 12. Due to the similar structure of the neck, the gaming functions of the stick can be conditionally compared with the piano part. Such proximity of various musical instruments is explained by reasons of a general cultural order, about which E. Hornbostel and K. Sachs write the following: „Things that sometimes seem to have little in common with each other often turn out to be close and discover new genetic and cultural-historical relationships” [7, c..230].

The most avant-garde modification to date is the design of the bass guitar without metal pegs and headstock. The string fastening here is fixed with a string holder and a nut, on which a special mechanism for clamping strings is mounted. Due to their non-standard form, these instruments have received the nickname “stump” and, due to their unattractiveness, are practically not used in performing practice.

Returning to the design features of the bass guitar, we should separately dwell on three main types of fastening of the neck to the instrument body. Along with the bolt-on neck already mentioned in *Precision Bass*, there are two more varieties: a set-neck and a neck-through body.

A *bolt-on* or bolted neck is attached to the body of the bass with four or more metal bolts. A special hole for insertion with the bar is cut out in the case. More often than not, a closing steel plate is mounted on the screwed portion. This method is easy to maintain, ensuring reliable operation and repair of the tool.

A *set-neck* assumes that the body and neck will be secured by gluing the two parts together. It is necessary that the gluing is done as efficiently as possible with the use of specialized glue and expensive wood species. There is another gluing method — dovetail joint, in which a special “pocket” is cut into the body of the bass guitar, where the glued part of the neck is then inserted.

A *neck-through body* provides for the passage of the whole neck through the body of the bass guitar, while the rest of the body (upper and lower) is glued on the sides. This method is considered the most preferred because of the best acoustic properties of the instrument, however, it is very time-consuming and expensive to manufacture, and therefore it is available only to high-class instruments. As Richard Mark French emphasizes, “neck through designs typically require complex machining and are not common among mass produced instruments” [8, p.129–130].

A characteristic feature of the design of the neck of the bass guitar is its length — the scale. Unlike an electric guitar, where the standard signature of the neck is 25,5 inches (647,7 mm), it is significantly larger on the bass and is 34 inches (864 mm). Naturally, the signature of the neck can vary significantly, starting from 28 and reaching 36 inches. These quantitative indicators of length are directly related to the distance between the frets of the bass guitar, and also affect the size and weight of the neck design. In addition, various parameters of the scale directly affect the sound of the instrument. The greater the scale signature, the deeper and richer the low notes sound, however, the larger sizes of the bass guitar neck scale create significant performance difficulties.

The design of the bass provides for a thin wooden fingerboard, which is made from a single piece of wood and glued to the front. To control the deflection of the neck inward, a special anchor rod is installed, which rotates with the hex wrench. For safe operation in more massive, multi-stringed guitars, up to two or more anchor rods are installed.

On the fretboard of the bass are fret partitions that temper the bass guitar in the midtones of a chromatic scale. The number of partitions is usually from 18 to 26, in some experimental prototypes there are up to 30 or more frets.

The body of a modern bass guitar is distinguished by a variety of shapes and designs and is traditionally made of wood. The most reasonable production option is a case consisting of a solid piece of wood. This form is considered the most economical and affordable to use. There are also modifications in which two or more tree species are used, up to their mixing. Another option involves gluing a thin layer of wood of another breed — “top” onto the bass guitar body.

This interaction brings changes both in the appearance of the bass guitar and in the acoustic features of the instrument. To obtain a more diverse sound, manufacturers sometimes use multilayer structures glued from three, five or more layers. I. Gorbunova and G. Belov rightly emphasize: „The desire to search and find more and more colors of sounds, new timbre combinations of musical instruments, the conditions and techniques of expressive playing them — apparently, an indispensable factor in the development of human culture” [9, p.8].

**Conclusions.** Considering the design features of modern bass in the context of the emergence of new experimental prototypes, with the aim of modifying the appearance and expanding the performance range, we can state the fact that we are witnessing the formation of a new type of electric instruments. Moreover, it is in the process of further evolution that it will be possible to observe the further popularization of the bass guitar as an independent bass range instrument.

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