Nov. 3, 1964 R. BLOHM 3,154,994

CHORD FORMING DEVICE FOR STRING INSTRUMENTS

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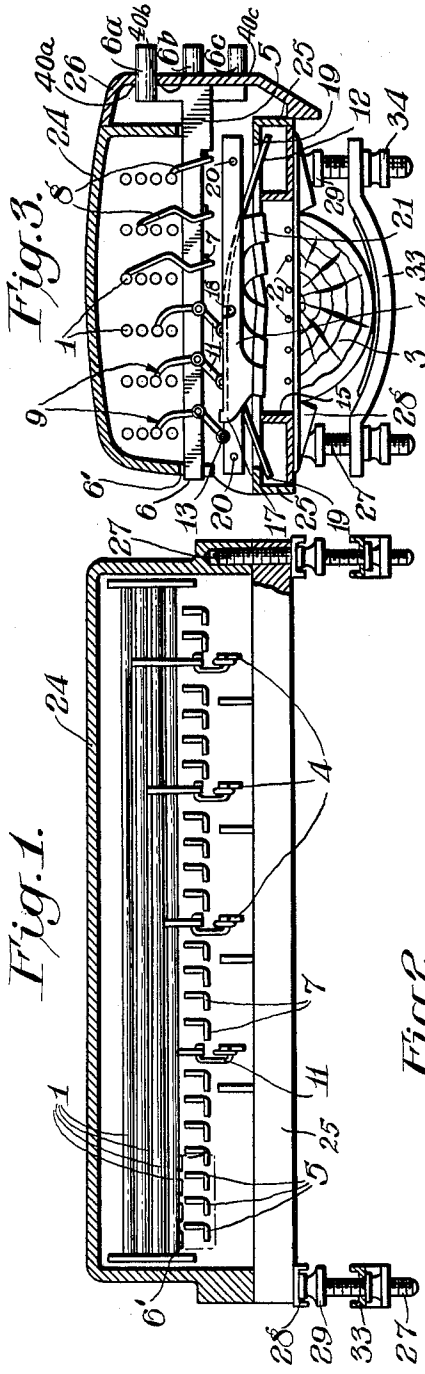


Fig. 3.

Fig. 1.

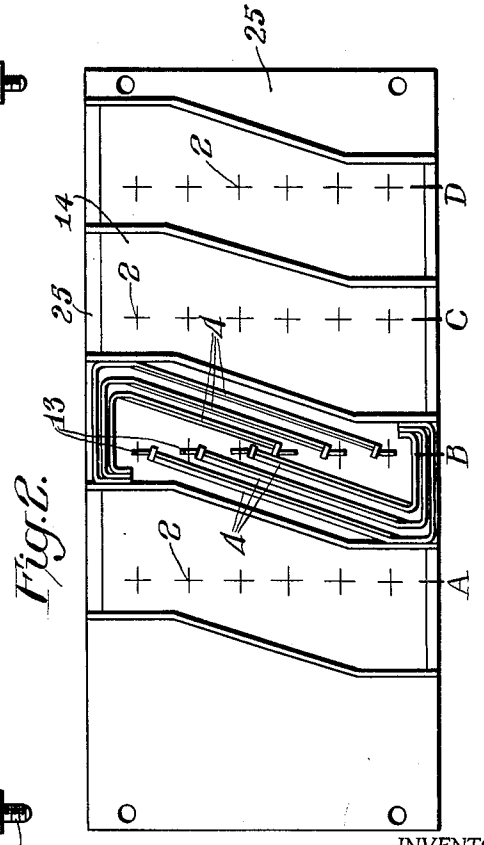


Fig. 2.

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Fig. 7.

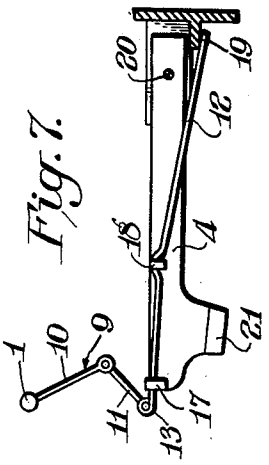


Fig. 8.

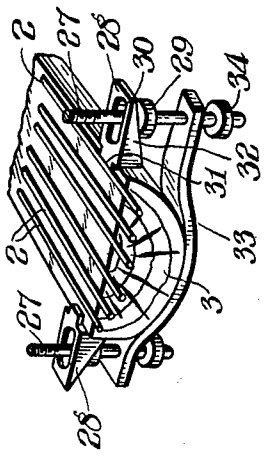


Fig. 4.

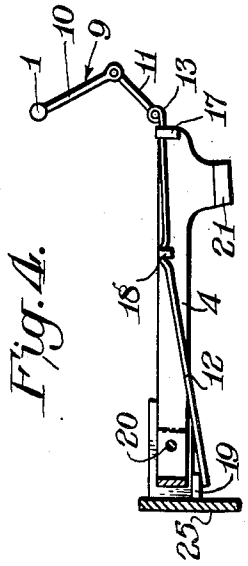


Fig. 5.

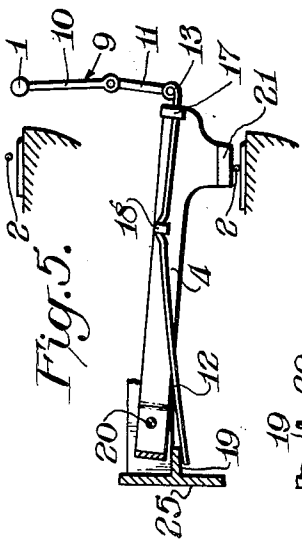
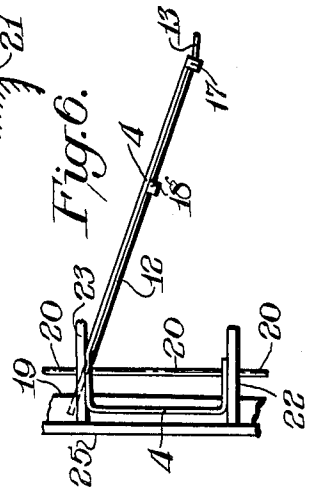


Fig. 6.



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CHORD FORMING DEVICE FOR STRING INSTRUMENTS

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Claims priority, application Germany, July 8, 1961, K 44,194
4 Claims. (Cl. 84—317)

With guitars or other types of string instruments, attachment devices are known which are used to form chords by manually depressing or sliding a key of the instrument and thus facilitating playing the instrument. Thus, by moving a coupling slide certain shafts of a group of shafts are selectively rotated around their longitudinal axis, each shaft having the function to adjust the response of a specific sound. This system has been applied, for instance, for the bass mechanism of accordions. Also, German Patent No. 366,878 teaches the application of this system with guitars. German Patent No. 1,070,480 describes the application of this system with guitars with each of the respective shafts transmitting the rotary movement to a respective parallelogram slide having a contact piece which presses a string of the instrument onto one of the frets of the finger board. The application of the parallelogram slide requires a rather broad and elongated structure which is cumbersome to handle. The scope of the finger board in which the frets for forming the chords are positioned does not allow the simultaneous location of the coupling slides and, therefore, the shafts have to be longer and stronger.

The present invention renders possible a reduction in the dimensions of such devices, particularly the width thereof and also the length. A reduction in the number of movable parts results in an improvement of the efficiency of the device. According to the invention, shafts are arranged which are about parallel to the strings, each shaft acting upon a pressure lever being set at an angle together with a cooperating leaf spring. The rotating points of half of the six pressure levers pertaining to one fret of the finger board which are positioned substantially but not quite in a right angle to the strings have a common axis on one side of the finger board, and the rotating points of the other half of the six pressure levers have a common axis on the opposite side of the finger board. The axes of the pressure levers which are parallel to the shafts maintain the pressure levers set at an angle in such a way that the bearing points thereof are situated for the motion locking connection with the shafts in a common plane outside the group of shafts and above the strings, thus enabling all of the pressure levers which transmit the rotary movement of the shafts to be passed between two coupling slides situated side-by-side which also have to be positioned at a right angle to the shafts.

A further development of the present invention is represented by a leaf spring. A detailed explanation of the function thereof as well as a description of a suitable embodiment of the combination which is necessary to enable a stable and unmovable fixing of the device on the finger board of a guitar are given below with reference to the drawings.

The attached drawings show one embodiment of a device according to the present invention, i.e., in combination with a six-string guitar wherein four frets are positioned within the range of the lever assembly.

Other objects and advantages of the present invention will become apparent from a study of the following description and drawings wherein:

FIGURE 1 is a longitudinal section of the device mounted in a housing above the neck of the guitar as seen from that side away from the person playing;

FIGURE 2 is a view from below of the lever assembly removed from the neck;

FIGURE 3 is a cross-section through the device positioned on the neck of the guitar;

FIGURES 4 and 5 show the lever assembly in various states of actuation;

FIGURE 6 is a top view of the units shown in FIGURES 4 and 5;

FIGURE 7 is a view showing the opposite side of the unit of FIGURE 4; and

FIGURE 8 is a perspective of the device showing how it is fastened to the guitar neck.

Shafts 1 are arranged parallel to one another and substantially parallel to the strings being spaced from and above the strings 2. The number of groups of shafts 1 positioned in spaced relationship across the neck 3 is identical with the number of strings shown by the instrument. The number of shafts positioned one above another in each group of shafts is identical with the number of frets required in the finger board to form chords. As seen in the drawings, a vertical bank of four shafts are in each group, corresponding to the four frets A–D (FIGURE 2). The top shaft stratum is in connection with the pressure levers 4 of the first fret, each of the shaft strata positioned below being connected with pressure levers 4 of the following frets (FIGURE 1). The coupling slides 5 are positioned parallel to each other, and slide back and forth below the groups of shafts and at right angles to them.

By the extension cams 7 of these coupling slides 5, all of which are placed at the same level, said particular shafts are selectively rotated around their longitudinal axis via driver levers 8 which are firmly connected with the shafts 1, the cams 7 contacting the driver levers at their lower ends. According to the invention, this rotary movement is transferred in such a way to the respective pressure lever 4, i.e. from the starting position (FIGURE 4) to the final position (FIGURE 5), via a crank gear assembly 9 known per se (positively connected by the rod assembly connection from the shafts 1 to the pressure levers 4, consisting of lever 10 and connecting rod 11); that lever assembly 9 represents a motion locking connection to the shafts and in its final position assumes an almost straight line, thus effecting an increasing power transmission onto the respective beam spring 12 to press down this spring.

Spring 12 is interposed, one end therof showing a lug 13 which is engaged by connecting rod 11. This spring which is prestressed leads from a guiding hook 17 at the free end of the pressure levers 4, via each fastener 18 thereof, along the pressure levers to below fixed points 19 which are positioned behind a pivot pin connection a rotation axis 20, accordingly, on the counter lever side. By the tension of beam spring 12, thus each pressure lever 4 is urged away from the final position (FIGURE 5) upwardly into the starting position (FIGURE 4).

On the other hand, it is the object of leaf spring 12 in the final position (FIGURE 5) when pressure contact piece 21 at the lower side of pressure levers 4 has pressed the string 2 to the finger board to spring back in guiding hook 17. The prestress of the spring is to be such that it will not respring or return until the pressure applied on the string has become sufficiently strong to produce a satisfactory sound.

Pressure levers 4 are arranged at equally large angles and are maintained and guided on the same axis 20 by two bearings 22 and 23 (FIGURE 6). FIGURE 2 gives a detailed representation of the positions of all the pressure levers 4 of the third fret. On one of the sides of the finger board, one group of three pressure levers 4, and on the opposite side another group of levers 4 are

connected with each other, the arms thereof showing staggered lengths being combined on pivot pins **20** so as to act opposingly whereby lugs **13** of the leaf springs move up and down in a common level which is situated at a right angle to the shafts, all the pressure levers being positioned in the same direction in identically spaced relationship to each other. On each side three combined pressure levers are movably connected corresponding to their lengths with the shafts which are positioned farthest away from its axis. By their contact pieces **21**, they also act on the three strings which are positioned farthest away. These contact pieces are preferably made of rubber or of any other sufficiently resilient material while the remaining parts of the lever arrangement are made of metal or of a sufficiently rigid plastic material. When one of the pressure keys **6***a*–**6***c* is depressed, the three pressure levers in one fret pivoted at one side of the key board are depressed to make pressure contact with three of the strings. The other three levers in the fret are depressed by another pressure key.

This arrangement and the motion locking connection with the shafts is effective in such a way that each crank drive either moves in the direction towards rotation axis **20** of pressure levers **4** (FIGURE 4) or away from them (FIGURE 7). In both cases identical effects are obtained.

The entire device is located in a trough-shaped casing **24** the base of which is open and firmly connected with a base frame **25** surrounding the aperture **14** over neck **3** of the guitar. The interior edges of this frame are covered by bars **15**. On the side turned away from the person playing, a pressure key wall **26** is fixed which contains slots **40***a*–*c* arranged in several superposed series (in the present case 3), allowing pressure keys **6***a*–**6***c* to slide back and forth therein; by the actuation of these keys the coupling slides **5** are pressed into the housing thus actuating the pertaining levers **4**. On the opposite side these coupling slides end in terminal members **6** which project through a slot **6'** being provided on that side of the housing which shows to the person playing. These terminal members are visible if the corresponding pressure keys **6***a*–**6***c* are actuated. Suitably in this place of the housing wall, the tone which is sounded by the actuation of the respective pressure keys might be indicated.

For securing the device to the neck of the guitar, pairs of fastening screws **27** opposing each other are fixed to the two longitudinal ends of the casing (FIGURES 1, 3 and 8). On each fastening screw a U-shaped facing member **28** is placed which is pressed towards the device by a knurled nut **29**. The facing member **28** is slideable by its oblong slot **30** on the fastening screw and bears a lug **31** drawn forwardly which forms an angle with the U-shaped angled lateral cheeks **32** of the facing member and which rests on the edge of the finger board or of neck **3** of the guitar.

This contrivance renders the entire device slideable in its position on the finger board and, besides, by the adjustability of the facing members, it yields the possibility to adapt the fixture of the device to any possibly occurring change of width of the finger board.

Each of the pairs of fastening screws **27** positioned opposite to each other at the upper and the lower of the fixture are bridged on the counter-side by a respective traverse **33** which is maintained at both ends by the fastening screws in the holes and is pressed against neck **3** of the guitar by knurled nuts **34**. The traverses are suitably formed so as to be curved and are padded in order to protect the instruments. Alternatively the traverses may be made of a suitably resilient plastic ribbon.

Obviously many modifications and variations of the present invention are possible in the light of the above

teachings. It is, therefore, to be understood that within the scope of the appended claims the invention may be practiced otherwise than as specifically described.

What is claimed is:

1. A device for forming varying chords on string instruments comprising a housing for attachment to the instrument neck, depressible coupling slides extending through one side wall of said housing and across said housing interior transversely of said instrument neck, the ends of the coupling slides opposite the ends extending through the housing wall being loosely supported in slots formed in the housing wall whereby the coupling slides can move back and forth across said housing interior when depressed, a bundle of rotatable shafts supported within housing above said coupling slides and extending parallel to said instrument neck, driver levers connected to the shafts, means on said coupling slides which contact said driver levers whereby when the slides are depressed the shafts are rotated, pressure levers extending across the housing interior below said coupling slides to lie transversely of said instrument neck, said pressure levers being pivotably supported at one end within the housing whereby the free ends can move vertically therein, motion locking means connected with said shafts and said pressure levers whereby when said shafts are rotated by the driver levers the motion locking means depresses the pressure levers to a locked position, string contacting members affixed to the free ends of said pressure levers which apply pressure to the strings when the pressure levers are depressed by said motion locking members, and spring means connected with said pressure levers for urging the pressure levers upwardly.

2. The device of claim 1 wherein the spring means is a beam spring and is connected with a pressure lever in parallel relation thereto, the end of the spring adjacent its pivotal support being urged downwardly and positioned under a fixed ledge of the housing to urge the free end of the pressure lever upwardly, and the opposite end of the spring freely fitting under a retaining hook of the lever and extending beyond the free end of said pressure lever to connect with said motion locking means.

3. The device of claim 1 wherein half of the pressure levers required for one fret on the instrument neck are staggered in length to correspond with the string positions and is supported by a common pivot pin at one side of said housing while the other half of the pressure levers is supported on a second pivot pin at the opposite side of said housing in such a way to act antagonistically so that the free ends of said pressure levers move with the driver levers and locking means for the shafts.

4. The device of claim 1 wherein the housing is secured to the neck by a fixture comprising a pair of bolts embedded in said housing and mounted opposite each other and along both sides of the finger board, facing members supported on said bolts being arranged so as to be adjustably slideable in oblong slots in said facing members toward and away from a finger board on said neck, means for urging the facing members against the housing, lugs on said facing member which tightly adhere to the edges of the finger board when the facing members are adjusted, and traverses by which the bolts are bridged and which are held below said neck against the neck of the instrument.

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