

March 14, 1950

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2,500,172

HAWAIIAN ELECTRIC GUITAR WITH HARMONIC FACILITIES

Filed June 2, 1948

2 Sheets-Sheet 1

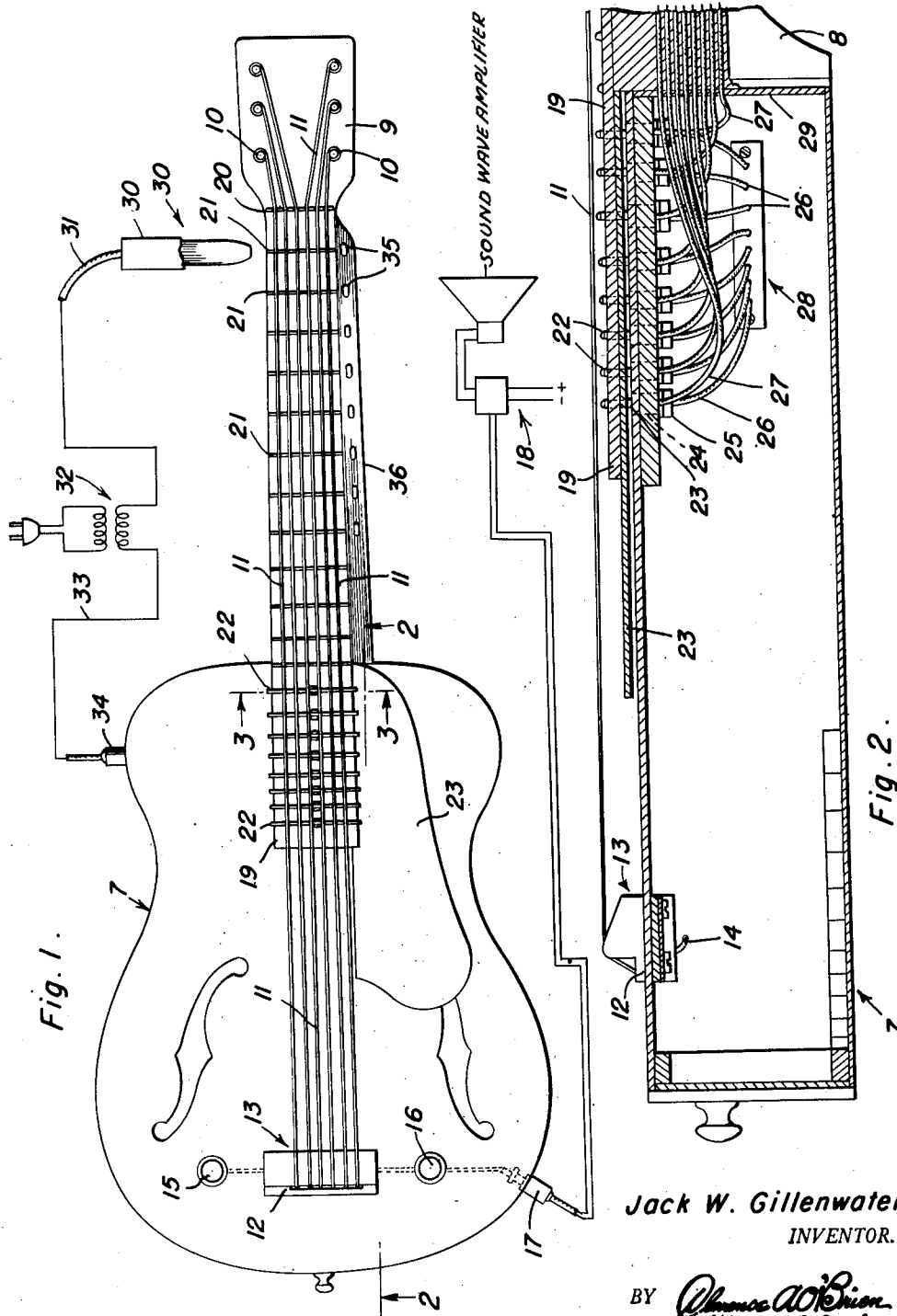


Fig. 1.

Fig. 2.

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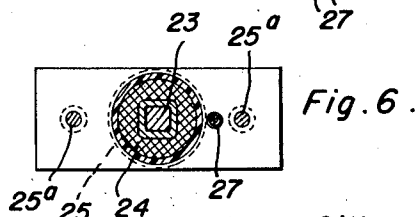
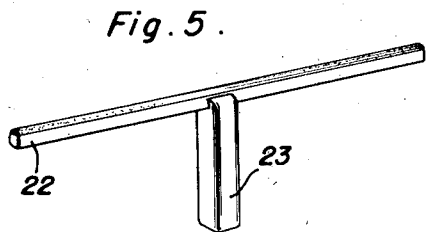
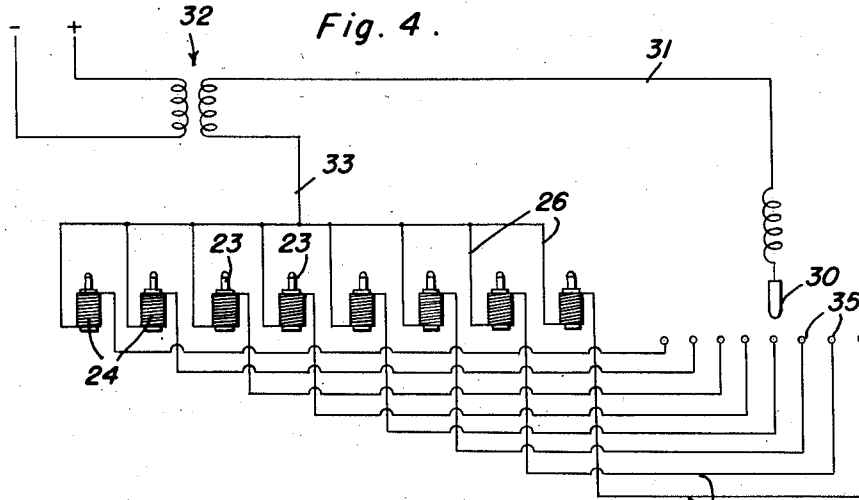
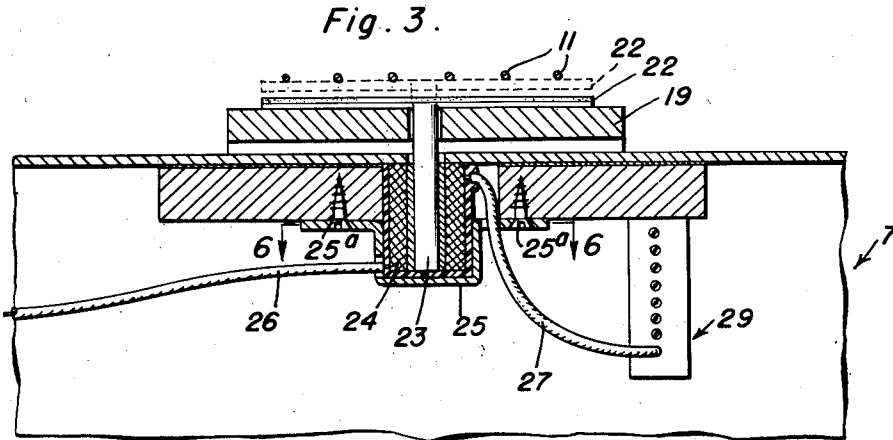
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UNITED STATES PATENT OFFICE

2,500,172

HAWAIIAN ELECTRIC GUITAR WITH HARMONIC FACILITIES

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Application June 2, 1948, Serial No. 30,612

6 Claims. (Cl. 84—1.01)

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This invention relates to stringed musical instruments of the fretted family and has reference, more particularly, to certain new and useful improvements in an electrically amplified Hawaiian guitar, the strings of which are fretted, as generally well known, with a slidable steel bar, operated by the left hand of the guitarist, and which are picked and set into vibration by the fingers of the right hand.

The primary object of my invention is to incorporate, in a standard type Hawaiian guitar, preferably one having so-called electrical pick-up and sound amplification facilities, novel means which enables the guitarist to produce, at leisure, chime and bell-like tones called harmonics.

It is a matter of common knowledge that long experience and dexterity of skill is a prerequisite to production of clearly audible harmonics and, because of difficulty of satisfactory accomplishment, many performers avoid the use of fascinating and inspiring harmonic effects and consequently lose the achievement of wanted results. It follows, therefore, that with a guitar constructed in accordance with my inventive ideas the user will thus be afforded the means needed to obtain the ends wanted, superior performance.

In carrying out the principles of my invention, I resort to the use of a conventionally fretted fingerboard wherein the first eight frets of the first octave or group are fixed and the frets of the next succeeding group are momentarily movable from normal positions to elevated positions in a manner to contact and bridge the undersides of all six strings, whereby when the steel stops, for example, a given string at the first fret, the movable fret at fret position thirteen is automatically projected and contacts the same string, permitting a tone, one octave above said first fret, to be sounded with the stated harmonic effect.

Another objective is to provide selectively operable electro-magnets or solenoids as plungers to lift and lower the movable frets and to wire said electro-magnets to contact buttons which are fixedly mounted in registry with the fixed frets and to electrically wire the insulated slide or steel to said electro-magnets, whereby to enable the steel to engage the buttons, where wanted, and to thus have the additional function of a circuit make and break device, in an obvious manner.

A further object of the invention is to provide a plurality of individually operable electro-magnetic controls for the raisable and lowerable plunger-type movable frets which latter are optionally usable so that the guitarist may have same at his disposal, if and when desired, but may

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perform, without the aid of the movable frets, if preferred. Thus, the steel or slide with its wiring and plugs may be "plugged in" in readiness for use; or may be wholly detached and laid aside and a conventional steel, without electrical equipment may be utilized.

A further object is to provide a fret arrangement of the form shown and described which is such that it may be installed and used on Hawaiian guitars not equipped with the usual electric pick-up and amplification facilities.

Other objects and advantages of the invention will become more readily apparent from the following description and the accompanying illustrative drawings.

In the drawings:

Figure 1 is a top plan view of a conventional type Hawaiian guitar having the usual electric pick-up amplification means and further constructed to include my invention, the electrically-operated harmonic producing movable frets;

Figure 2 is an enlarged fragmentary sectional and elevational view on the line 2—2 of Figure 1, looking in the direction of the arrows;

Figure 3 is a fragmentary cross section on the line 3—3 of Figure 1, looking in the direction of the arrows;

Figure 4 is the wiring diagram;

Figure 5 is a perspective view of one of the movable frets; and

Figure 6 is a section on the line 6—6 of Figure 3, looking in the direction of the arrows.

Referring now to the drawings by distinguishing reference numerals and accompanying lead lines, the hollow body of the Hawaiian guitar is denoted by the numeral 7, and this is provided with the usual neck 8 having a customary head 9 with tuning pegs or keys 10 for the conventional six strings 11. The strings 11 are anchored at the left-hand end in Figure 1 on customary tail means 12 and are here shown trained over bridge means 13 which includes an electric pick-up device (not detailed) with wire means 14 (see Figure 2). Incidentally, the numeral 15 designates an electric tone control and 16 an electric volume control, and these form parts of the electric pick-up which has connected thereto a plug 17 with wiring means leading to a well known type of sound wave amplifier 18. Mounted on the neck is a conventional fingerboard 19 having a nut at the point 20 over which the strings pass before they are connected to the tuning pegs. The numeral 21 designates longitudinally spaced transversely disposed fixed frets on the fingerboard, and these are conventional. However, in the fret assembly

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I provide, in addition to the fixed frets, a plurality of liftable and lowerable, or so-called movable frets 22. In the drawings I show twenty frets in all, the first twelve being fixed and the remaining eight movable. Except when in use, the eight movable frets 22 occupy regular positions on the fingerboard and the guitar may be employed and played as though my invention were not present. So far as the description has gone the same has had to do with so-called old parts, including the customarily employed hand rest 23. Or, stated otherwise, the only factor so far introduced, in which I claim novelty, is a fingerboard having a complete compass or range of frets, the frets of the first or main octave being fixed and the remaining frets, above said octave, being movable toward and from the strings and adapted to bridge and contact the undersides of the strings.

Whereas the movable frets might be mechanically rigged up and operated, I have found it expedient and practicable to employ electrical devices to attain, with precision and accuracy, the wanted ends.

Each fret construction is the same, and a description of one will suffice for all. Reference being had, therefore, to Figure 3, it will be seen that the movable felt faced fret 22 is attached to and forms part of a so-called T-shaped plunger 23 which is primarily the movable core in the electro-magnet. The coil is denoted by the numeral 24, and this is mounted in a cup forming part of suitable hanger or bracket means 25 fastened, by screws 25a, to the interior of the guitar. The fingerboard is slotted or otherwise apertured to permit passage of the plunger and to permit the fret to be raised from the normal position atop the fingerboard to the elevated dotted line position here shown in which position it underlies and bridges all six strings. Wires 26 and 27 are connected to the respective electro-magnets or solenoids, and these are mounted in adaptor plates 28 and 29 also suitably mounted in the body of the guitar.

The slidable steel or bar is denoted by the numeral 30 and is of conventional shape but is here provided with a suitably insulated grip 30a and a current conducting wire 31 connected with an appropriate plug equipped transformer 32. An additional wire 33 is connected with said transformer and is provided with an appropriate plug 34 which taps into a suitable receptacle (not detailed) with which the wires 26 all connect as shown in Figure 2. The remaining wires 27, which connect with the adaptor 29, are mounted in the neck and are distributed and properly and electrically connected to fixed contact buttons 35 mounted in a suitable plate or strip 36 which is attached to and runs alongside of the fingerboard. The contact buttons 35 are each lined up with the respective fixed frets 21 as shown. I have shown eight contact buttons which correspond with the eight movable frets 22 and, of course, all of the respective circuits are properly and individually wired so that whichever circuit is desired may be brought into play, depending on the tone to be produced.

With the guitar wired up to include my invention and the complementary details of same, it is obvious that any one of the magnets may be selectively energized and then de-energized to obtain the wanted ends. The principle of operation of each fret and its electric control means is the same. Therefore, it will be understood that, assuming that the steel or slide 30 is

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pressed down in front of the first fixed fret 21, by shoving the top of the slide over into engagement with the first contact button 35, which is opposite said fret, the first circuit will be closed, that is, the circuit which controls the first or thirteenth fret. It follows that the electro-magnet at this point will be energized and the complementary fret will be lifted and raised to a position to underlie, contact and bridge all six strings. With the left-hand of the performer holding the steel bar at the first fret and while the fret 22 at the thirteenth position is bridging the string, the performer takes his right hand and picks the string. Instead of getting the tone that would ordinarily be produced by the steel against said first fret 21, the next nearest related tone is produced, this being an octave higher, as is obvious. The tone produced is the same as if the performer had placed the slide at the thirteenth fret and had picked the strings, except that the harmonic effect would be lost by finger pressure on said string, that is, pressing the string down against the thirteenth fret. Also, as soon as the circuit is broken, the movable fret drops down to its normal out-of-the-way position on the fingerboard. It is to be remembered that the instrument is so wired that when the steel bar makes contact with one of the contact points 35 that that fret which is thirteen steps up from the one the steel is on will come up against the string, thus dividing the length of the particular string in half and therefore producing the desired harmonic effect.

It is further clear that the cross bar portions of the T-shaped plungers, the movable frets, lightly touch the undersides of the strings to produce the stated harmonic effect. The fret does not create sounds or act as a mechanical finger, or a substitute for the human finger. The primary purpose of the movable fret is to divide the length of the selected string to produce the "octave higher" harmonic effect as above described.

I have shown a suitable wiring diagram in Figure 4 and have utilized reference characters for the parts which correspond to the duplicate parts already described in the operatively constructed instrument.

Although the invention might work satisfactorily in connection with other stringed musical instruments, and with or without tone amplification facilities, it has been designed for the purposes shown and described and, to the best of my knowledge and belief, is essentially restricted for use with the Hawaiian guitar and preferably one having appropriate amplification facilities sufficient to bring out the harmonic tones with the chime-like quality and volume wanted.

A careful consideration of the foregoing description in conjunction with the invention as illustrated in the drawings will enable the reader to obtain a clear understanding and impression of the alleged features of merit and novelty sufficient to clarify the construction of the invention as hereinafter claimed.

Minor changes in shape, size, materials and rearrangement of parts may be resorted to in actual practice so long as no departure is made from the invention as claimed.

Having described the invention, what is claimed as new is:

1. A stringed musical instrument of the class shown and described comprising a hollow body having a neck, a fingerboard mounted atop said

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neck, a plurality of transverse, longitudinally spaced frets mounted for use, as usual, on said fingerboard, and conventional strings anchored at opposite ends on said body and neck, respectively, and strung over said fingerboard and frets, certain of said frets being fixed to the fingerboard, as customary, and the remaining frets being bodily liftable and lowerable and movable toward and from said fingerboard and functioning, when elevated, to underlie and contact all of said strings, and remote-controlled electrical means for automatically actuating the movable frets.

2. A stringed musical instrument of the class shown and described comprising a hollow body having a neck, a fingerboard mounted atop said neck, a plurality of transverse, longitudinally spaced frets mounted for use, as usual, on said fingerboard, and conventional strings anchored at opposite ends on said body and neck, respectively, and strung over said fingerboard and frets, certain of said frets being fixed to the fingerboard, as customary, and the remaining frets being bodily liftable and lowerable and movable toward and from said fingerboard and functioning, when elevated, to underlie and contact all of said strings, and remote-controlled electrical means for automatically actuating the movable frets, said means including a plurality of individually operable electro-magnets including reciprocable members, the movable frets being individually secured to and movable with said movable members whereby said movable members constitute actuating plungers for the frets.

3. A stringed musical instrument of the class shown and described comprising a hollow body having a neck, a fingerboard mounted atop said neck, a plurality of transverse, longitudinally spaced frets mounted for use, as usual, on said fingerboard, and conventional strings anchored at opposite ends on said body and neck, respectively, and strung over said fingerboard and frets, certain of said frets being fixed to the fingerboard, as customary, and the remaining frets being bodily liftable and lowerable and movable toward and from said fingerboard and functioning, when elevated, to underlie and contact all of said strings, and remote-controlled electrical means for automatically actuating the movable frets, said means including a plurality of individually operable electro-magnets including reciprocable members, the movable frets being individually secured to and movable with said movable members whereby said movable members constitute actuating plungers for the frets, a conventional type slidable steel bar operable along the fingerboard and frets by the left-hand of the user, said steel bar being wired to said electro-magnets, a plurality of contact buttons mounted on the neck in registry with the fixed frets, said contact buttons being wired to said electro-magnets, whereby said steel bar and contact buttons may be used as circuit closers for a plurality of circuits individually controlling the electro-magnets and consequently the movable frets.

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4. A stringed musical instrument of the class described comprising a hollow body having a neck, a fingerboard mounted atop said neck, a plurality of transverse longitudinally spaced frets mounted for customary use on said fingerboard, conventional strings anchored at opposite ends on the body and neck, respectively, and strung over said fingerboard and frets in the customary manner, an electro-magnet mounted in said guitar body, one of said movable frets being connected to and operable by said electro-magnet, a contact button fixedly mounted on the neck opposite one of the fixed frets, a wire connection between said contact button and said electro-magnet, a hand-actuated slidable steel bar, and a wire in connection between said steel bar and electro-magnet, whereby when the steel bar is brought into engagement with the contact button a circuit is closed to energize the magnet and operate the movable fret.

5. A Hawaiian electric-type guitar including a body, a neck on said body, a fingerboard on said neck, a plurality of transverse longitudinally spaced frets on said fingerboard, electric amplifying means embodied in said body, at least one of said frets being fixed, at least one of said frets, an octave distance from the fixed fret, being movable, an electro-magnet mounted in said body, said movable fret being connected to the movable core of the magnet, said movable fret underlying the strings and being adapted to contact said strings when the fret is moved and occupies a predetermined elevated position.

6. A Hawaiian electric-type guitar including a body, a neck on said body, a fingerboard on said neck, a plurality of transverse longitudinally spaced frets on said finger board, electric amplifying means embodied in said body, at least one of said frets being fixed, at least one of said frets, an octave distance from the fixed fret, being movable, an electro-magnet mounted in said body, said movable fret being connected to the movable core of the magnet, said movable fret underlying the strings and being adapted to contact said strings when the fret is moved and occupies a predetermined elevated position, a contact button mounted on the neck opposite said fixed fret, said contact button being wired to said electro-magnet, and a slidable steel movable along the strings and cooperable with the frets, said steel being engageable with said button and having wired connection with said electro-magnet.

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