

Dec. 2, 1969

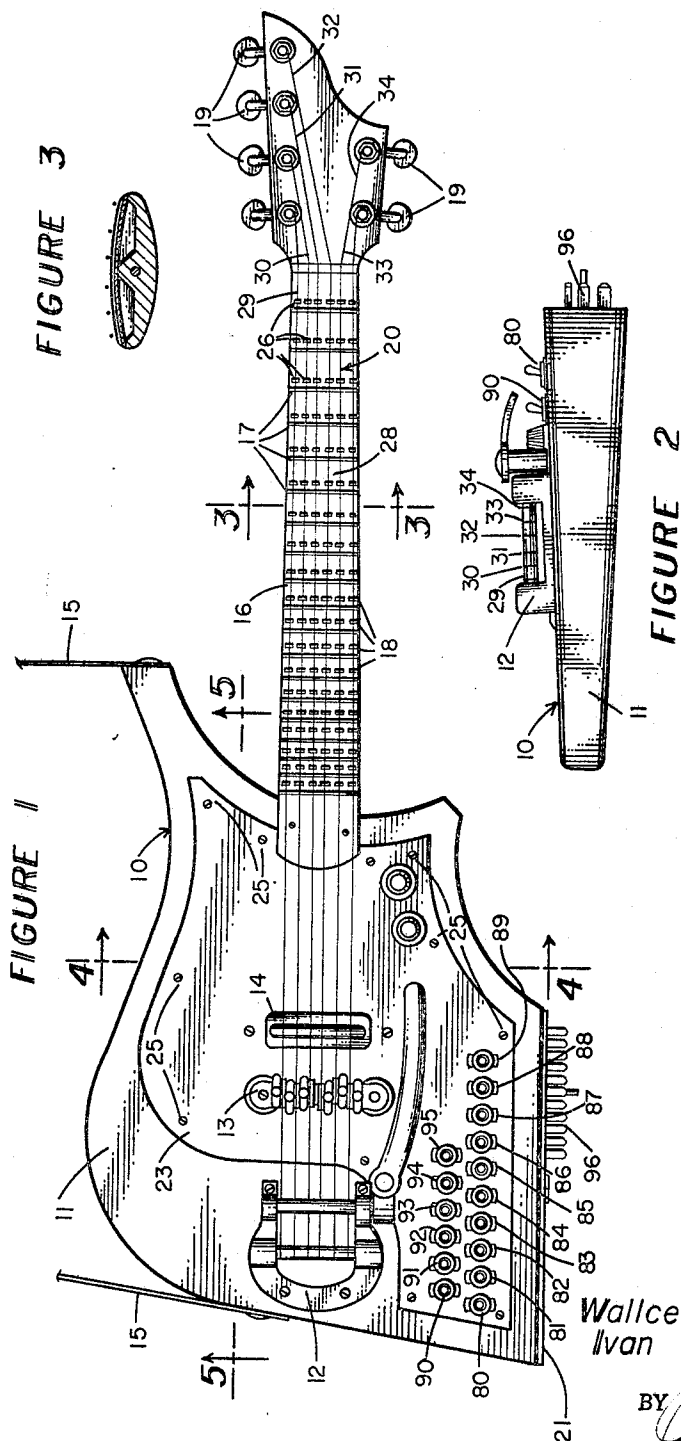
I. F. COX ET AL

3,482,028

GUITAR TYPE KEYING SYSTEM FOR OTHER INSTRUMENTS

Filed Aug. 15, 1966

3 Sheets-Sheet 1



Wallace R. Albert and
Ivan F. Cox, INVENTORS.

BY

Wallace R. Albert and Ivan F. Cox
ATTORNEY.

Dec. 2, 1969

I. F. COX ET AL

3,482,028

GUITAR TYPE KEYING SYSTEM FOR OTHER INSTRUMENTS

Filed Aug. 15, 1966

3 Sheets-Sheet 2

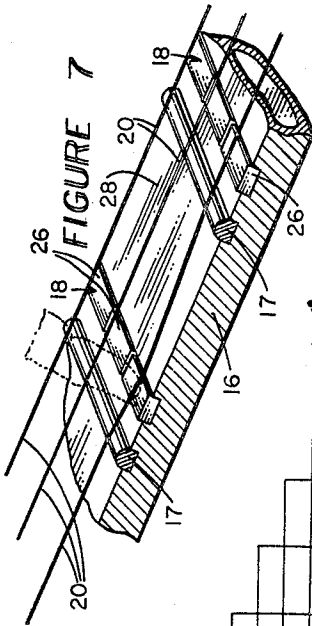
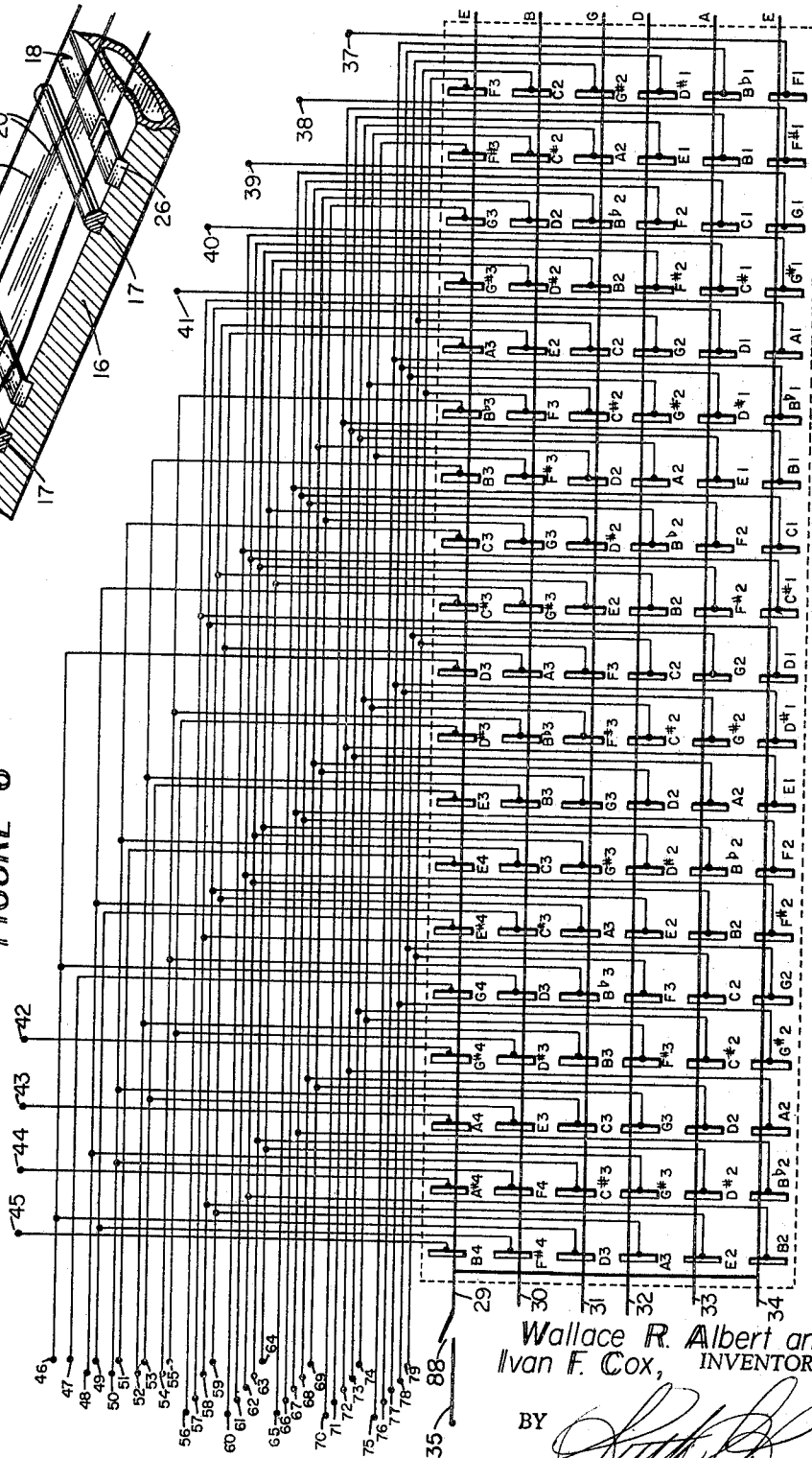


FIGURE 6



Wallace R. Albert and
Ivan F. Cox, INVENTORS.

BY

[Signature]
ATTORNEY.

Dec. 2, 1969

I. F. COX ET AL

3,482,028

GUITAR TYPE KEYING SYSTEM FOR OTHER INSTRUMENTS

Filed Aug. 15, 1966

3 Sheets-Sheet 3

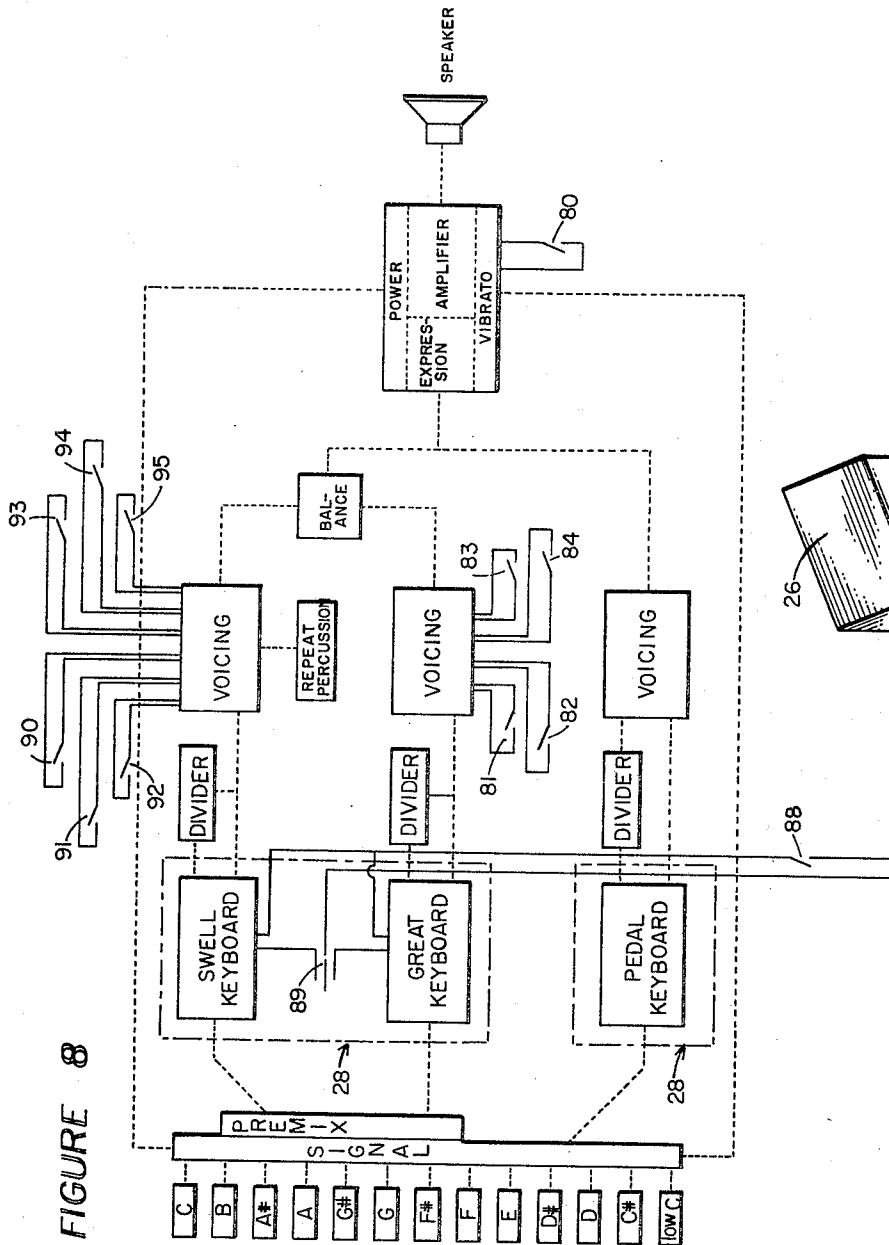


FIGURE 8

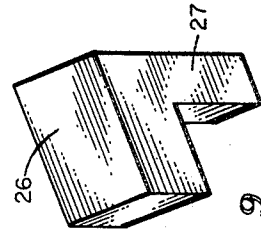


FIGURE 9

Ivan F. Cox and
Wallace R. Albert, INVENTORS
BY *[Signature]*
ATTORNEY.

1

3,482,028

GUITAR TYPE KEYING SYSTEM FOR OTHER INSTRUMENTS

Ivan F. Cox, E. 817 Baldwin Ave. 99207, and Wallace
R. Albert, 15208 E. 4th Ave. 99216, both of Spokane,
Wash.

Filed Aug. 15, 1966, Ser. No. 572,459

Int. Cl. G10h 3/00, 3/06

U.S. Cl. 84—1.16

10 Claims

ABSTRACT OF THE DISCLOSURE

An electrical switching system embodied in a fretted stringed instrument to play another instrument, such as an electric organ, simultaneously or singly. The circuitry provides all strings of the playing instrument with common potential and interconnects all notes of the same tone. The circuitry may be embodied in a guitar without disturbing its normal playing function or radically changing its design for manufacture.

This invention relates generally to the operation of one musical instrument electrically intercommunicating with another instrument by manipulation of the second instrument, and more particularly to the operation of an electric organ through the operation of the finger board of a guitar by electrical means communicating therebetween.

It has been deemed desirable, and has heretofore become known, to play one musical instrument through the operation of another, either simultaneously or individually. In the first instance, this has the advantage of allowing one musician to simultaneously produce harmonious music from two or more instruments and, in the second instance, the advantage of providing a different physical means of activating an instrument than that habitually known so as to give rise to the potential production of sounds differing from those produced by normal physical operation of such instrument. It is particularly desirable to use a fretted stringed instrument such as a guitar to play an electric organ and heretofore methods for so doing have become known.

Such combinations as have become known may be divided into a first class embodying stringed instruments having a mechanical switching device, and a second class embodying instruments with strings that are electrical conductors per se and constitute one side of some type of electrical switching system. The first class of instruments has not gained great popularity, apparently because the physical operation of the switching system differs from that the musician is habitually familiar with and the switches themselves have inherent operative problems traditionally associated with such mechanical devices having moving parts. Instruments of the second class have gained greater popularity but those members known have still presented various problems. Such instruments as known do not use all strings of the guitar as a common source of potential and therefore must have the strings insulated from each other, requiring an abnormal construction of the various instrument parts to accomplish this end. Another problem that has arisen is the separate wiring of each note playable by the stringed instrument so that the same tonic note playable on different strings potentially may play separate notes on the organ to the great potential confusion of the operator. Another problem has been associated with the frets and electrical switching means requiring the known devices to play only one note on a particular string at one time, to accordingly limit the musical product of either instrument.

2

With these thoughts and this background in mind, the instant invention was conceived. In so doing, it is:

A principal object of our invention to provide a fretted stringed musical instrument with an electrical switching playing board adapted to activate and play another musical instrument.

A further object of our invention is to provide a device of the nature aforesaid wherein all strings of the instrument constitute a common potential source and need not be electrically insulated from each other for operation.

A further object of our invention is to provide a device of the nature aforesaid wherein all notes of the same tone value are wired so that any one and all will activate the corresponding note on an organ play thereby.

A further object of our invention is to provide a device of the nature aforesaid that may be installed upon an ordinary commercial electric guitar without changing the major operational or structural characteristics thereof or its normal and habitual operation as an independent instrument.

A still further object of our invention is to provide a device of the nature aforesaid that may play a plurality of organ notes on one or more instrument strings at one time.

A still further object of our invention is to provide a device of the nature aforesaid that requires no electrical isolation of strings on bridge members or tuning pegs, but uses the normal construction therefor.

A still further object of our invention is to provide such a musical instrument combination that is of new and novel design, of simple and economic manufacture, of rugged and durable nature, and otherwise well adapted to the uses and purposes for which it is intended.

These and other objects of our invention will become apparent from consideration of the following specification and the accompanying drawings which form a part of this application.

In carrying out the objects of our invention, however, it is to be understood that its essential features are susceptible of change of design and structural arrangement, with only one preferred and practical embodiment being illustrated in the accompanying drawings, as required.

In the drawings, wherein like numbers of reference refer to similar parts throughout:

FIGURE 1 is an orthographic top or plan view of a form of electric stringed instrument with our invention embodied therein, showing its various parts, their configuration and arrangement.

FIGURE 2 is a vertical, orthographic end view of the instrument of FIGURE 1 showing its elements from this aspect.

FIGURE 3 is a vertical cross-sectional view through the playing-board neck of the instrument of FIGURE 1, taken on the line 3—3 thereon, in the direction indicated by the arrows.

FIGURE 4 is a vertical cross-sectional view of the body of the instrument of FIGURE 1, taken transversely on the line 4—4 thereon, in the direction indicated by the arrows.

FIGURE 5 is a vertical cross-sectional view of the instrument of FIGURE 1, taken lengthwise through the body, on the line 5—5 thereon, in the direction indicated by the arrows.

FIGURE 6 is a diagrammatic representation, in normal symbology, of the electrical circuitry of the playing-board switching system adapted to activate another electrically responsive instrument.

FIGURE 7 is a partially cutaway, enlarged, isometric view of a section of the playing board of the instrument illustrated in FIGURE 1, showing the operation of the electrical switching system when a particular string be depressed into active electrical switching.

FIGURE 8 is a combined block-type, electrical diagram showing the positioning of our invention in the normal electric organ circuitry and the means of switching the various organ voices.

FIGURE 9 is an enlarged isometric view of an individual switching contact illustrating the detailed configuration thereof.

Referring now to the drawings in more detail and particularly to that of FIGURE 1, there will be seen an electric guitar, of a particular body design, embodying the electrical switching means of our invention, adapted particularly to play an electric organ. Reference to the instrument as a guitar is a matter of convenience only and not of limitation; it should be understood that the term also includes any other type of fretted stringed instrument of appropriate nature. The guitar 10 comprises body 11, carrying string-holding mechanism 12, adjustable bridge 13, magnetic pickup 14, and neck strap 15; structurally communicating neck 16, carrying frets 17, banks of switching contacts 18 and tuning pegs 19; and metallic strings 20, capable of conducting electric current communicating from anchor mechanism 12 to appropriate tuning pegs 19, all as in a normal guitar.

This basic structure is well known in the art and found in instruments of commerce, except for the body shape and switching construction which are of our invention. The body is formed with essentially planar external surfaces, angled with respect to each other to form the wedge-like structure required by the cross-sectional views of FIGURES 4 and 5. This structure and shape provides a most convenient instrument wherein the body face may be viewed for the player during normal operation and provides a downward-most edge 21 adapted to receive the various electrical connectors necessary for use with the invention.

Since a sounding board has no particular usefulness in the ordinary electric guitar, we prefer a solid construction of both body 11 and neck 16 for structural rigidity. It is necessary, however, to provide appropriate channels 22 for electrical wiring within both the guitar neck and body, and we find it convenient to cover at least a part of this channel in the body member 14 with a sheet-like plastic 23, releasably held in mortice 24 in the upper body surface of screws 25. This arrangement permits easy access to the electrical circuitry within the guitar body 11 when necessary and additionally provides aesthetic appeal.

The arrangement of frets 17 and electrical switching contacts 18 is shown best in the illustration of FIGURE 7. Fret 17 is the normal fret habitually used in guitars and similar instruments, generally of metallic material for durability. Switching contact 18 is a relatively flat, preferably metallic, electrical conducting surface 26, having lateral, downwardly projecting tenons 27, as shown in FIGURE 9, to position the member in the structure of guitar neck 16 and provide convenient electrical connectors. Each fret and switching contact is held in position by frictional engagement with the walls of an appropriate channel in the fingering board, as well known in the art. Each switching contact 18 is laterally spaced from its neighbor or otherwise electrically isolated therefrom. It is to be noted that the upper surface 26 of each contact is lower than the upward projection of fret 17, so that when a string is depressed to make electrical contact with a particular contact 18 it cannot by such depression make contact with any other switching contact. This upper surface 26 of the contacts may be slightly rounded for playing convenience, if desired. The configuration of an individual switching contact is best illustrated in FIGURE 9.

The electrical circuitry of our invention is set forth in the diagram of FIGURE 6, where it is shown in normal symbology. Playing board 28 carried by neck 16 of the guitar is shown in dotted outline, at least as to electrical contacts carried thereby. The particular playing board illustrated is a nineteen fret board, though obviously the

principle involved could be expanded or contracted to a playing board of any number of frets and any number of strings. For convenience of reference and simplicity of understanding, the various notes played by the strings in the various fret positions are shown in ordinary musical connotation.

Each fret-string combination is provided with a switching contact 18 spaced slightly rearwardly of the associated fret, and it is this contact that is labeled with the musical note of the associated fret-string combination. The several switching contacts 18 are each provided with electrical communication to tonal activators of an electrically activated instrument to be played preferably an organ as illustrated in FIGURE 8. All instrument strings 29, 30, 31, 32, 33, 34 must be conductors and intercommunicate electrically in parallel with each other and in series with lead 35 to provide a common source of current from this lead.

On a nineteen fret, six-string guitar illustrated, there are forty-three separate and distinct notes in the musical scale and each of these separate notes communicates electrically with one of the output leads 37 through 79, inclusively, to activate an organ note normally of the same pitch. All notes of a particular pitch are shunted in to the same lead so that the same note on any string provides current in that lead. With this arrangement then, as an example, it is seen that the *f*-3 note on string 29 communicates to output lead 79 and further that the *f*-3 note on string 30, the *f*-3 note on string 31, and the *f*-3 note on string 32, are all shunted to the intercommunicating electrical lead to provide current through output lead 79 upon activation of any of these notes of the same pitch. This arrangement, as seen in the drawing of FIGURE 6, is carried out throughout the wiring of the entire playing board. This wiring preferably is accomplished with coaxial cable with grounded shields to eliminate various undesirable electrical transients, and is preferably carried within the body and neck of guitar 10.

It is generally also desired to activate from the guitar various other features of an organ that deal with the tone or nature of the sounds produced thereby, but not the pitch characteristics as activated by the normal organ keys. A plurality of switches 89 through 95 are provided in the guitar body to serve as activators for these organ elements, and electrical communication from the normal organ activating means is provided as shown in FIGURE 8.

The organ swell keyboard voicings are operated by the outer row of switches: switch 80 for the vibrato, switch 81 the saxophone, switch 82 the horn, switch 83 the oboe, switch 84 the diapason, switch 85 is a spare, switch 86 is a spare, switch 87 turns the guitar off or on, switch 88 turns the organ off or on, and switch 89 switches the guitar playing board alternately to either the organ swell keyboard or great keyboard. The organ great keyboard voicings are operated by the inner row of switches: switch 90 for the saxophone voicing, switch 91 the oboe, switch 92 the flute, switch 93 the cornet switch 94 the reed, and switch 95 the violin.

Because of the limited number of notes on the ordinary guitar playing board and the musical difference of the organ pedal keyboard from its other boards, this organ keyboard is preferably played by a second guitar (not shown) of a rhythm or solo type, electrically styled and communicating with the organ pedal keyboard in the same fashion as that immediately before described. Obviously one guitar could be expanded to enough electrical contacts to play this keyboard if desired. Also, if desired, various organ features may be separately played by foot pedal or other auxiliary structure.

As shown in FIGURE 1, self-aligning blade-type connectors 96 are provided in surface 21 of guitar body 11 to provide releasable electrical communication for cable communicating with an electric organ. Such con-

nectors are a standard item of commerce and well known in the art.

As shown particularly in FIGURE 6, the various leads from our guitar switching system are wired to an electric organ to activate the individual notes of the various keyboards as desired by means well known in the art. Generally, the organs are activated by a relay or switch and if so, its two leads are connected between string lead 35 and the appropriate note lead 37 through 79 inclusive, so that when the note lead is presented with current the switch will be activated to play the electric organ. This system plays the various electric organs of commerce but the transistorized organ is particularly suited for use with our invention, as it is small and the various electrical components may conveniently be placed in a relatively small container, without keyboard or pedalboard, as the normal organ keyboard and pedalboard are not necessary to the operation of the invention.

It is possible that the various elements could even be carried within appropriate chambers within the guitar body itself.

From the foregoing description of the apparatus of our invention, its operation is relatively obvious. Various notes, in the case illustrated forty-three, of an organ may be played by making appropriate contact between the strings 20 of guitar 10 and switching contacts 18. This may be done without playing the guitar, contemporaneously with it, or the guitar may be played separately from the organ merely by removing current from the switching system by throwing switch 88.

The switching contacts are activated by bringing the associated string into physical contact with the upper surface of the appropriate switching contact in the same fashion as habitually familiar to the guitar player in his normal playing.

From the foregoing it is to be noted that the playing of an organ is accomplished by physical means and motions different from those ordinarily employed with use of the keys, and by reason of this, varying results may be obtained which might not be obtained, or at least not so readily obtained, with the normal keyboard of an organ. These results may be accomplished in playing the organ alone or in playing it in combination with the guitar.

It is further to be noted that with this circuitry described a plurality of organ notes may be played simultaneously or in any order on one string or on several of the strings or on any intermediate combination, as desired. It is further to be noted that a particular string note may be played and one or more organ notes played on the same string at or below the string note played.

It is further to be noted that in using the frets on the playing board by depressing the instrument strings, not more than one organ note will be played by the depressing of a string at one point, since the string is supported on both sides of the switching contact by normal instrument frets rising vertically higher than switching contacts. In other electrical switching devices depression of the string might play more than one note and generally some means of playing only the highest of a plurality of notes was developed in use with these other devices.

The foregoing description of our invention is necessarily of a detailed nature so that a specific embodiment of it might be set forth, as required, but it is to be understood that various modifications of detail, rearrangement and multiplication of parts may be resorted to without departing from its spirit, essence or scope.

Having thusly described our invention, what we desire to protect by Letters Patent, and what we claim is:

1. In a string instrument having electrically conducting strings, a switching means of the nature aforesaid, carried in the playing board of such instrument adapted to play other musical instruments, comprising, in combination:

a plurality of switching contacts electrically isolated

from each other, one said switching contact being associated with each fret-string combination of said stringed instrument, each said switching contact being immediately adjacent its associated fret on the neck side thereof;

electrical circuitry communicating with said switching contacts providing a separate lead for each switching contact associated with a fret producing a string instrument note of different pitch, all switching contacts associated with a fret producing notes of like pitch communicating electrically with a common lead so that current may pass between said switching contacts and associated strings when said string be depressed into physical communication with said contact;

electrical circuitry communicating in parallel with the strings of said stringed instrument to provide a constant source of potential therein; and means of supplying electric energy to said circuitry.

2. The invention of claim 1 wherein each said electrical switching contact comprises:

a relatively flat planar member presenting an upper contact surface slightly above the neck of the instrument but lower than the upper surface of adjacent frets, said switching contact having a downwardly extending lateral tenon adapted to frictionally engage within a cooperating mortice in the instrument neck to releasably hold said switching contact structurally therein and provide means of electrical communication therewith.

3. The invention of claim 1 electrically communicating with at least one of the keyboards of an organ to play various notes potentially activated by said keyboard in response to electrical current presented to said organ keyboard upon activation of switching contacts of said stringed instrument.

4. The invention of claim 1 electrically communicating with at least one of the keyboards of an organ to play various notes potentially activated by said keyboard in response to electrical current presented to said organ keyboard upon activation of switching contacts of said stringed instrument,

said invention being further characterized by a plurality of switches carried on said stringed instrument to activate the several voicings of said organ.

5. A stringed musical instrument of the nature aforesaid having a fretted playing board and electrically conductive strings, adapted to play another musical instrument by electrical activation thereof, comprising, in combination:

a body carrying switching circuitry and having connecting means adapted to aid in electrical communication with a second electrically activated instrument;

a neck structurally communicating with said body and carrying a playing board having a plurality of spaced frets adapted to regulate the vibrations of instrument strings to recognized notes, said playing board having a plurality of electrical switching contacts associated with said frets, only one said switching contact being associated with any individual combination of fret and string of said instrument;

output leads communicating between said switching contacts and said other instrument to electrically activate said other instrument upon presentment of electric current in said output leads, each output lead communicating in series with all switching contacts associated with all fret-string combinations producing string instrument notes of the same pitch;

electrical communication of all of said instrument strings in parallel; and

means of supplying electric energy to said instrument to create an electric potential in said instrument strings transferable to one of said plural output leads upon depression of a guitar string into physical con-

7

tact with the electrical switching contact communicating with said output lead.

6. The invention of claim 5 further characterized by the body of said musical instrument being formed with substantially planar face and back members angled relative each other so that the upper portion of the said body when in playing position is thinner than the lower portion thereof.

7. The invention of claim 5 further characterized by said body carrying plural switches electrically communicating with an organ played by said stringed instrument, said plural switches adapted to activate, upon manipulation, the various voicing feature of said organ.

8. The invention of claim 5 further characterized by said electrical switching contacts comprising relatively flat rectangular members having a lateral downwardly projecting tenon to aid in maintaining said member in said playing board and provide electrical communication therewith, said switching contacts being positioned on the neck side of various frets adjacent thereto, with the upper surface thereof below the uppermost surface of said frets, one said switching contact being associated with each string-fret combination of said instrument.

9. The invention of claim 5 operatively communicating with an electrically activated organ.

10. In a stringed instrument of the nature aforesaid having a fretted playing board and electrically conductive strings, adapted to play another musical instrument by

8

electrical activation thereof, electrical switching contacts, comprising, in combination:

relatively flat rectangular members having a downwardly projecting tenon to aid in maintaining said member in operative position in said instrument playing board, said electrical switching contacts being electrically isolated from each other and positioned on the neck side of an associated fret-string combination, with the upper projection of said electrical switching contacts being below the uppermost surface of said frets so that when a string be depressed into contact with one switching contact it may not thereby contact another switching contact positioned along the same string.

References Cited

UNITED STATES PATENTS

2,792,738	5/1957	Donahue	84—1.16
3,116,357	12/1963	Krebs	84—1.01
3,196,729	7/1965	Burns	84—1.01
3,217,079	11/1965	Murrell	84—1.16
3,388,206	6/1968	Sines	84—1.01

HERMAN KARL SAALBACH, Primary Examiner

25 F. P. BUTLER, Assistant Examiner

U.S. Cl. X.R.

84—1.17