Aug. 30, 1966 E. R. GRIFFITH 3,270,119

ELECTRIC MUSICAL INSTRUMENT FOR PRODUCING PERCUSSION TYPE SOUND EFFECTS

Filed March 4, 1964 5 Sheets-Sheet 1

FIG. 1.

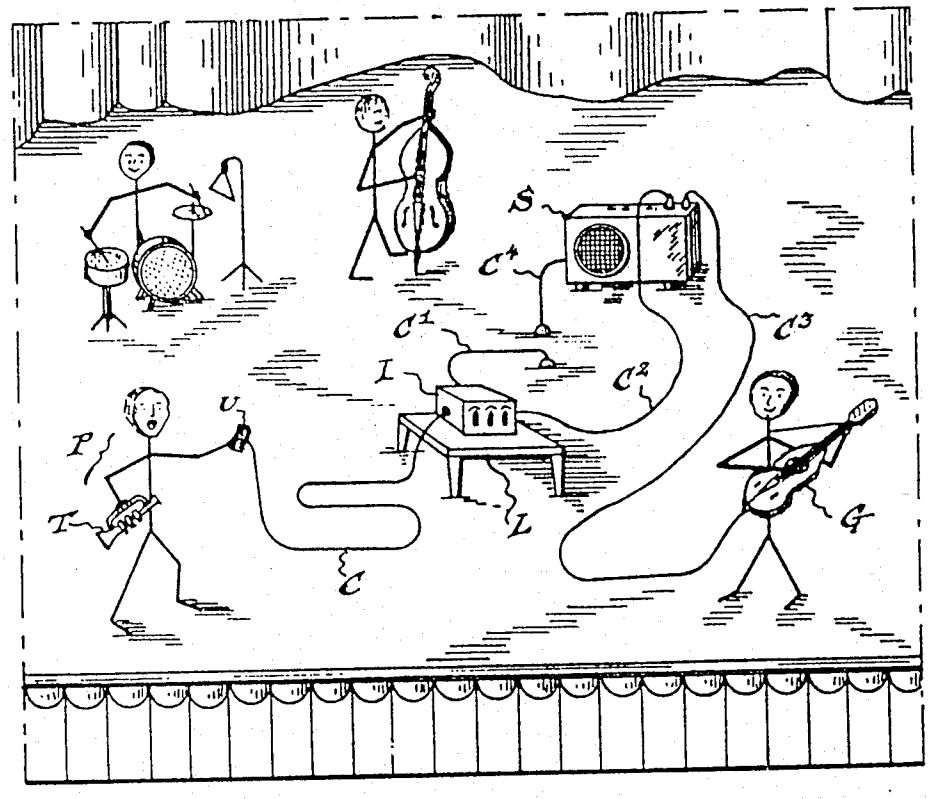
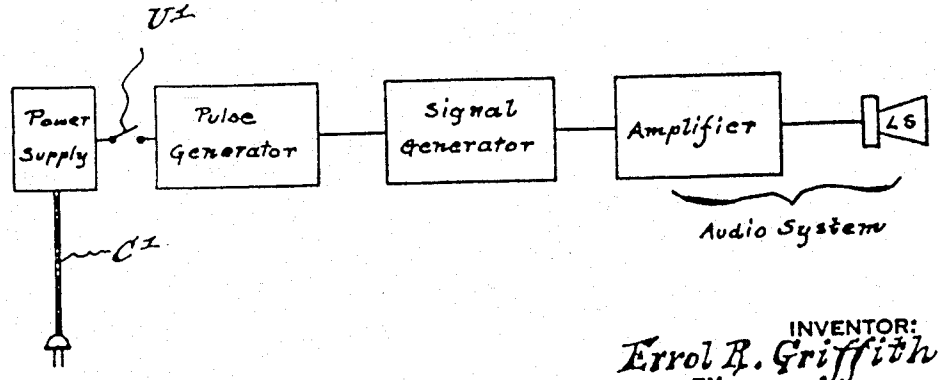


FIG. 2.



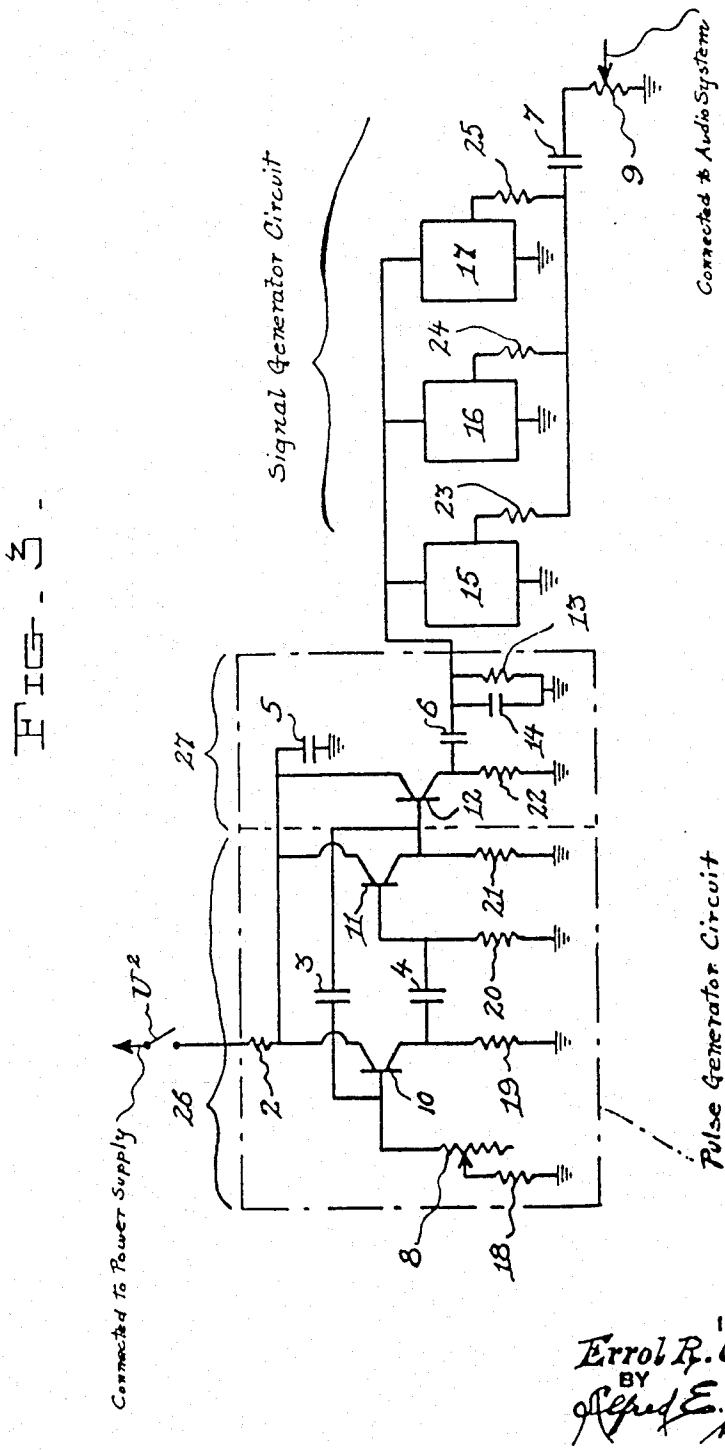
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ELECTRIC MUSICAL INSTRUMENT FOR PRODUCING PERCUSSION TYPE SOUND EFFECTS

Filed March 4, 1964 5 Sheets-Sheet 2

FIG. 2



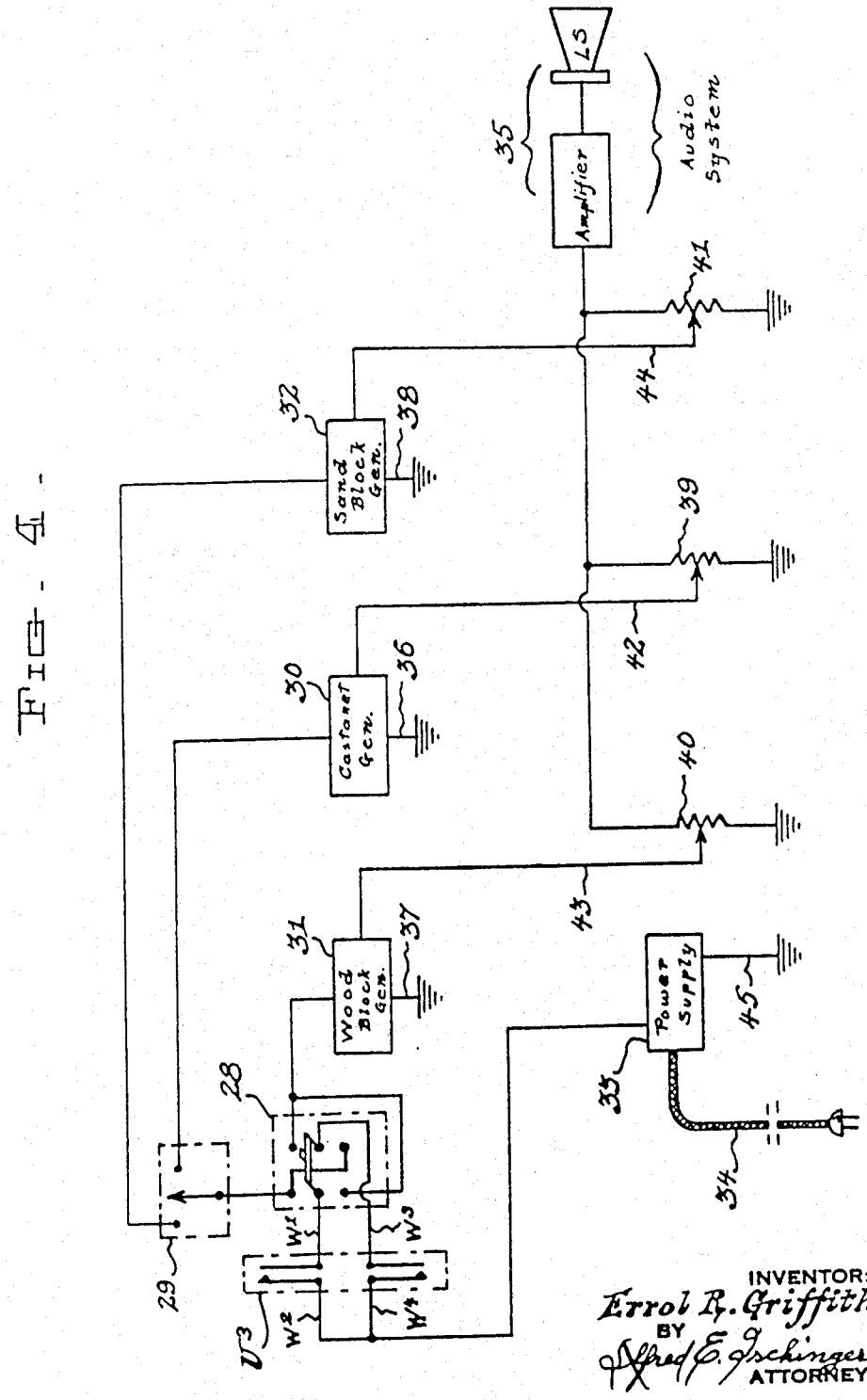
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ELECTRIC MUSICAL INSTRUMENT FOR PRODUCING PERCUSSION TYPE SOUND EFFECTS

Filed March 4, 1964 5 Sheets-Sheet 3

FIG. 4.



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ELECTRIC MUSICAL INSTRUMENT FOR PRODUCING PERCUSSION TYPE SOUND EFFECTS

Filed March 4, 1964 5 Sheets-Sheet 4

FIG. 5.

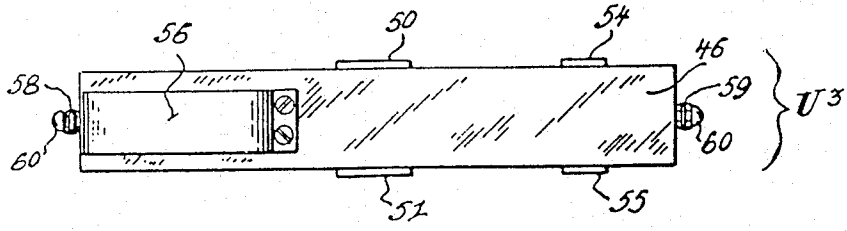


FIG. 6.

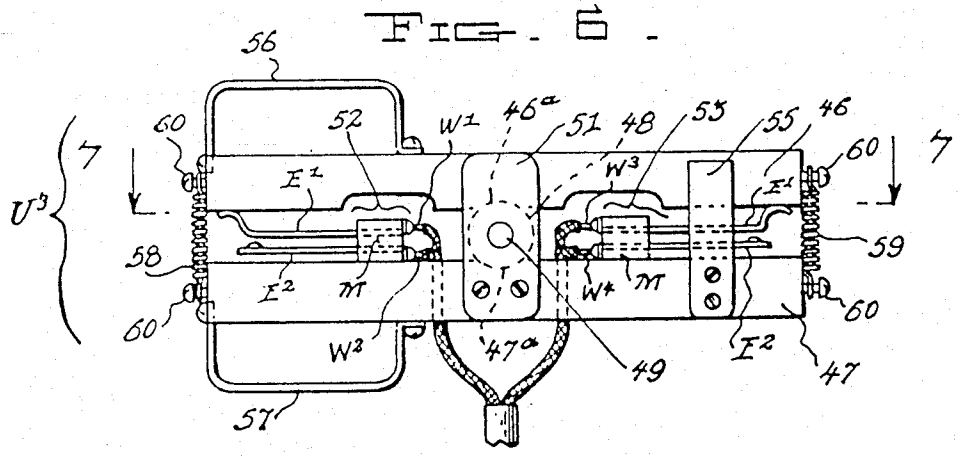


FIG. 7.

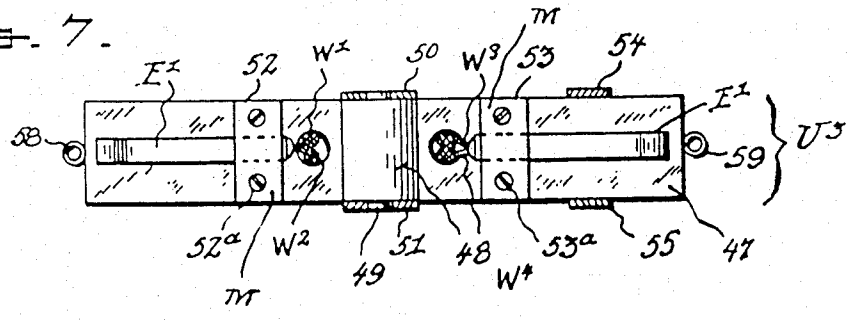
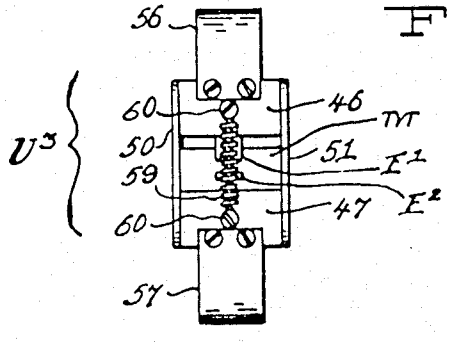


FIG. 8.



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ELECTRIC MUSICAL INSTRUMENT FOR PRODUCING PERCUSSION TYPE SOUND EFFECTS

Filed March 4, 1964 5 Sheets-Sheet 5

FIG. 9.

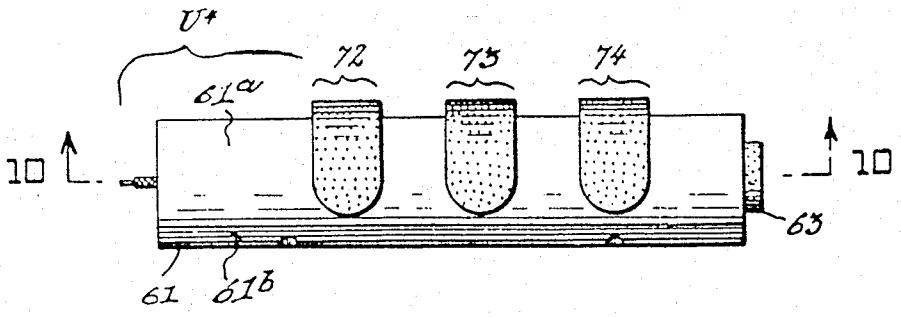


FIG. 10.

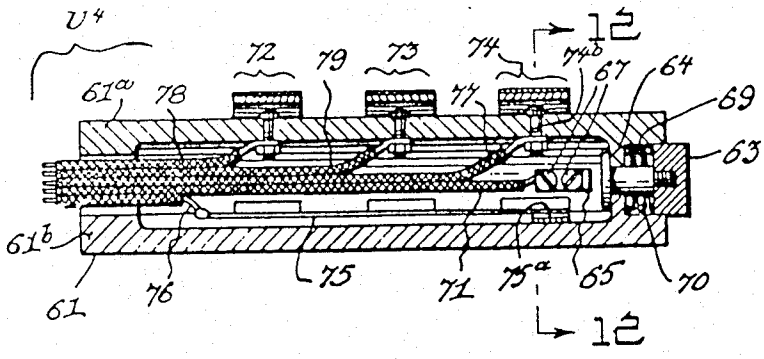


FIG. 11.

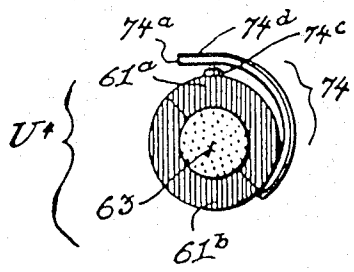
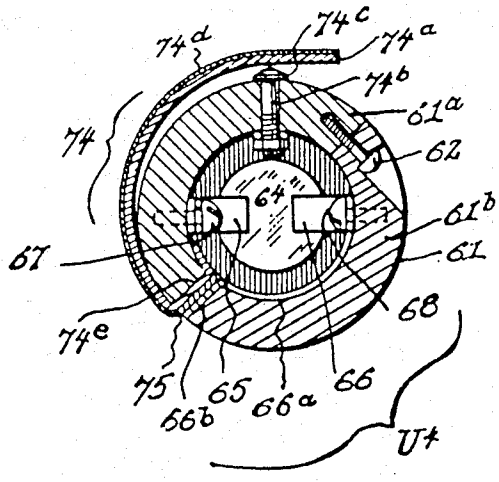


FIG. 12.



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United States Patent Office 3,270,119
Patented August 30, 1966

3,270,119

ELECTRIC MUSICAL INSTRUMENT FOR PRODUCING PERCUSSION TYPE SOUND EFFECTS

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Filed Mar. 4, 1964, Ser. No. 349,317
4 Claims. (Cl. 84—1.01)

This invention relates to electrical musical instruments, and more particularly concerns a unique instrument of this type which has special sound, noise, or tone producing capabilities and includes a novel control unit adapted to be grasped by one hand of the instrument player for actuation in a certain manner that enables a new order of instrument playing.

Electrical musical instruments are presently available which produce a great variety of musical tones and sound effects. However, to my knowledge, no instrument of this type has heretofore been devised for producing, or simulating, the special tone, noise, or sound effects of certain percussion type devices used by jazz orchestras, or otherwise. For example, the special sound effects that are producible with castanets, or such sound effects in combination with others of the type ordinarily produced by a musician with a wood block, a sand block, etc. The provision of an electrical musical instrument having the indicated sound capabilities, and one which can be operated in a simple practical and rhythmic manner, involves various problems which, to my knowledge, have not heretofore been successfully solved.

One object of my invention is to provide a novel electrical musical instrument of the type indicated and one which successfully solves the indicated problems.

Another object is to provide a special, self-contained control unit for an electrical musical instrument of the type indicated, and one which has a new mode of operation.

Another object is to provide such an instrument having cooperatively combined therewith a novel remote control unit which can be conveniently grasped with and actuated by one hand of the instrument player to effect operation of the instrument in rhythmic manner, and which unit also facilitates free hand and body movement of the instrument player in showmanship-like manner, or otherwise, as well as makes it possible for the player to carry out other activities in connection with the playing of the instrument.

A further object is to provide such an instrument that has certain special percussion type sound effect producing capabilities. For example, the capability of producing sound effects similar to those normally produced with castanets, and which instrument is also capable of combining with such sound effects, others of the type ordinarily produced by musicians with a wood block, a sand block, etc.

An additional object is to provide such an instrument in the form of a relatively small compact box-like device that can be conveniently located, or positioned, within the confines of an orchestra arrangement and which device has a lengthy flexible electric conductor element, or cord, extending therefrom, the free end of which is provided with an instrument control unit adapted to be grasped for actuation by one hand of the instrument player and manipulated in such manner as to permit the latter to simultaneously carry out various other activities in connection with the playing of the instrument.

It is also an object to provide a novel control unit for such an instrument which can be conveniently grasped for

actuation by one hand of the instrument player and can be produced in various structural and functional forms. For example, in one form for selective actuation by a hand induced rocking action and in another form for selective actuation by finger action.

Other objects are, to provide such an instrument that comprises, in cooperative combination, such items as, electrical means for producing, or simulating, the sound effects producible with castanets, with or without supplementation of other percussion type sound effects; a control unit for said electrical means that enables rhythmic rendition of said sound effects; such a control unit that can be located in remote relation with the instrument and comprises two elongated switch operating elements that are arranged in adjacent parallelism with each other and can be combinedly grasped for actuation by one hand of the instrument player for relative and selective rocking actuation; and such a one hand held control unit that embodies a plurality of finger operated electrical switches that are selectively operable to enable determined rendition of the instrument sound effects.

With these and other objects in view, which will become more apparent from the following detailed description of the practical and illustrative embodiments of my improvements shown in the accompanying drawings, my invention comprises the novel electrical musical instrument, the special control unit therefor, and the elements, features of construction and arrangement of parts in cooperative relationship, as more particularly indicated and defined by the hereto appended claims.

In the accompanying drawings:

FIGURE 1 is a schematic illustration of a jazz orchestra arrangement and indicates how an individual can operate the electrical musical instrument of my invention while simultaneously carrying out showmanship-like movements and/or other activities.

FIG. 2 is a block diagram of the complete electrical system of one form of electrical musical instrument in accordance with my invention.

FIG. 3 is a schematic illustration of the circuitry of the Pulse Generator and Signal Generator of the electrical system shown in FIG. 2.

FIG. 4 is a schematic illustration of a complete electrical musical instrument system in accordance with my invention, which is capable of simulating the sound effects of castanets, a wood block and a sand block, and which includes a special switch control unit, or device, that forms part of my invention.

FIG. 5 is a top plan view of a novel one hand operable switch control unit, or device, in accordance with my invention.

FIG. 6 is a side elevational view of the unit shown in FIG. 5.

FIG. 7 is a horizontal sectional view, taken substantially as indicated by the arrows 7—7 on FIG. 6.

FIG. 8 is an end elevational view, as seen by looking at the left end of FIG. 7.

FIG. 9 is a top plan view of a second, or modified form of one hand operable switch unit, or device, in accordance with my invention.

FIG. 10 is a vertical sectional view, taken substantially as indicated by the arrows 10—10 on FIG. 9.

FIG. 11 is an end elevational view, as seen by looking at the right end of FIG. 10, and

FIG. 12 is an enlarged vertical sectional view, taken substantially as indicated by the arrows 12—12 on FIG. 10.

It will facilitate an understanding of my invention to first briefly consider some of the more important aspects and phases thereof so that these may be kept in mind when subsequently reading the detailed description of the illustrative and practical embodiments thereof shown in the accompanying drawings.

Accordingly, it is noted that my invention comprises a unique electrical musical instrument having novel means for simulating, or producing, the sound effects producible with well known castanets, in conjunction with, or without, other percussion type sound effects, such as the sound effects producible with a conventional sand block, a conventional wood block, etc.

My said musical instrument is preferably, but not necessarily, arranged to be operated by a remote control unit. When arranged for remote control operation, a special remote control unit is cooperatively combined with the instrument circuitry in the manner of my invention. The said special control unit is adapted to be held and operated by one hand of the instrument player, so as to enable freedom of hand and body movement of the latter for various activities, as hereinafter more particularly pointed out in connection with the description of FIG. 1.

The said special control unit of my invention can be provided in various forms, as exemplified by the two practical embodiments thereof shown more particularly in FIGS. 5–12 of the drawings.

From the herein disclosed embodiments of my invention it will be readily apparent to those skilled in this art how the novel features thereof can be applied to advantage, in the same or in a similar manner, to the general field of electrical musical instruments, so as to substantially attain the same novel and beneficial results. It is to be understood, therefore, that my invention is not limited in its scope to the precise disclosure herein made, but rather, that it comprehends any adaptations, variations and modifications thereof which are apparent from its disclosure, or indicated, or defined, by the hereto appended claims.

An immediate general understanding may be had of certain new use and operational phases of my invention, by referring first to FIG. 1 of the drawings. As there schematically or diagrammatically indicated, the electric musical instrument of my invention generally comprises, a box-like unit I which contains the special sound effect producing circuitry of my musical instrument, a remote control unit U which is adapted to be held and operated by one hand of an individual or instrument player identified by the letter P, a lengthy flexible conductor cord C arranged to connect the units I and U, a conductor cord C^1 arranged to connect the unit I to a floor or other socket that establishes the proper power supply for the unit I, and a conductor cord C^2 arranged to connect the unit I with a conventional audio system unit S.

The unit I can be conveniently supported on a table L, or the like, that is located within the confines of the orchestra arrangement.

The audio system unit S can be of the general type adapted for use with a conventional prior art electrical musical instrument, such as an electric guitar G which, as shown, is connected by a conductor cord C^3 with the unit S. As usual, the unit S may be energized by connecting it, by means of a conductor cord C^4, to a floor socket or the like of a suitable power line.

From FIG. 1, it will be apparent that my electrical musical instrument may be played by the individual P in either one of two different ways. In accordance with the preferred new operational way shown in FIG. 1, the individual P may occupy a conspicuous spot or location in the orchestral arrangement and his playing of my electrical musical instrument may be simultaneously supplemented by a more or less conspicuous exhibition of one or more of his particular acting talents, specialties, or capabilities, such as singing, playing a trumpet T, dancing, or carrying out certain hand and body movements in showmanship like manner. In accordance with the second way, the individual P may occupy a relatively inconspicuous location in the orchestral arrangement and play my electrical musical instrument solely for the purpose of combining with the orchestral renditions the special sound effects producible with the instrument and in a manner whereby his playing activities remain inconspicuous.

The playing of my electrical musical instrument in accordance with the indicated first and preferred way, is believed to achieve an electrical musical instrument playing innovation that is predicated upon the use of the novel one hand held and operated control unit U, which forms part of my invention and is hereinafter more particularly described. When my electrical musical instrument is played in accordance with the indicated second way, the control unit U may also be used, but if desired, some other conventional type control unit may be substituted, as will become apparent later.

Referring now to the simple block diagram of the circuitry of my electrical musical instrument, as disclosed by FIG. 2 of the drawings, it is pointed out that in FIG. 2, the parts marked Power Supply, Pulse Generator and Signal Generator, are the parts embodied in the unit I of FIG. 1. The Audio System of FIG. 2, which consists of a conventional electric amplifier and loud speaker arrangement, is embodied in the unit S of FIG. 1. The switch unit U^1 indicated in FIG. 2, represents the special control unit U of FIG. 1 and the conductor cord C^1 of FIG. 2 represents the conductor cord also designated C^1 in FIG. 1.

Referring next to the schematic or diagrammatic illustration of FIG. 3, it is noted that the circuitry there shown represents the circuitry of my electrical musical instrument indicated by the two blocks marked Pulse Generator and Signal Generator in FIG. 2. This circuitry produces, or simulates, the sound effects of conventional castanets.

It is well known that the sound effect produced in the usual manner by one or more castanets, involves a repetitive clicking sound. A single "click" sound results when the time duration, or the pulse duration of a sound, is in the order of about 10 milliseconds or less.

Such castanet-like clicking sounds are produced with my electrical musical instrument by the cooperative action of the two basic circuits disclosed in FIG. 3, one of which is enclosed within a dot-and-dash line rectangle marked "Pulse Generator Circuit" and the other one of which is generally indicated by a bracket marked "Signal Generator Circuit."

The component circuitry parts of FIG. 3 generally comprise, the switch control unit U^2, which may be the same as the special control unit U of FIG. 1; a resistor **2**; capacitors **3**, **4**, **5**, **6** and **7**; variable resistors **8** and **9**; conventional type transistors **10**, **11** and **12**; a combination resistor **13** and capacitor **14**; sine wave oscillators **15**, **16** and **17**; and fixed value resistors **18**, **19**, **20**, **21**, **22**, **23**, **24** and **25**. The said circuitry parts are connected with each other by usual conductors, and grounded, as clearly shown, and the values or type of certain of these parts are as follows:

Circuitry part:	Value or type
Resistor **2** ohms	100
Capacitor **3** mfd	0.56
Capacitor **4** mfd	0.56
Capacitor **5** mfd	20.0
Capacitor **6** mfd	0.4
Capacitor **7** mfd	0.01
Variable resistor **8** ohms	100,000
Variable resistor **9** do	250,000
Transistor **10**	Type 2N591
Transistor **11**	Type 2N591
Transistor **12**	Type 2N1605A

Circuitry part:	Value or type
Resistor 13 (combined) ohms	220
Capacitor 14 mfd	5.0
Sine wave oscillator 15 c.p.s	2217.6
Sine wave oscillator 16 c.p.s	2349.3
Sine wave oscillator 17 c.p.s	2489.0
Fixed value resistor 18 ohms	15,000
Fixed value resistor 19 do	2,200
Fixed value resistor 20 do	68,000
Fixed value resistor 21 do	2,200
Fixed value resisotr 22 do	1,500
Fixed value resistor 23 do	10,000
Fixed value resistor 24 do	10,000
Fixed value resistor 25 do	10,000

Mfd.=mfero farads, c.p.s.=cycles per second.

The said indicated values are to be considered as exemplary and approximate values of an order that will produce a castanet-like click sound effect of approximately 22 cycles per second and a pulse duration of approximately 4 milliseconds, when the three audio oscillators 15, 16 and 17 are simultaneously pulsed.

In FIG. 3, the component circuitry parts 2, 3, 4, 8, 10, 11, 18, 19, 20 and 21 establish a conventional multivibrator which is generally indicated by the Pulse Generator Circuit section 26, which multivibrator triggers a switching stage and pulse forming network that is generally indicated by the Pulse Generator Circuit section 27 in series connection with the input to the paralleled oscillators 15, 16 and 17.

The Pulse Generator Circuit of FIG. 3 performs the function of establishing the proper pulse duration and repetitive rate of the castanet sound effect established by the circuitry of FIG. 3. The tone quality or so-called "timbre," of the said sound effect is established by mixing the outputs of the three oscillators 15, 16 and 17, each of which is of a different frequency.

The frequency values of the three oscillators 15, 16 and 17 are not critical and frequency values of approximately 2200 to 2500 cycles per second, with frequency differences of about a musical semitone (usually designated $2^{\frac{1}{12}}$, or $\sqrt{2}$, or two to the ½ power) have been found in practice to produce a desirable castanet quality of sound.

The multivibrator 26 is adjusted by the resistor 8 to produce a pulse repetition rate of 22 cycles per second. This multivibrator signal triggers the switching transistor 12 which controls the input current to the oscillators 15, 16 and 17. The pulse duration is determined by the value of the capacitor 6 and the net load consisting of the resistor 13 and the oscillators 15, 16 and 17. The combination of resistor 13 and capacitor 14 adjusts the wave front of the pulse so as to obtain a desirable type of click.

The entire circuitry of FIG. 3 is powered by a direct current source of 14 volts.

Closing of the switch control unit U^2 will result in repeated clicks as long as the switch is closed.

The schematic or diagrammatic illustration of FIG. 4 shows the component parts and circuitry of a complete electrical system of a modified musical instrument in accordance with my invention, which includes not only the castanet sound effect producing means of FIG. 3, but also the parts and circuitry of two additional conventional electrical sound effect producing generators, namely, a conventional wood block sound producing generator and a sand block sound producing generator.

The parts of the electrical system shown in FIG. 4 generally comprise, a switch control unit or actuator U^3, which is of the special type in accordance with my invention hereinafter described, a double-pole double-throw switch 28, a single-pole double-throw switch 29, an electrical castanet sound effect producing generator 30 such as disclosed by FIG. 3 and heretofore described, a conventional electrical wood block sound effect producing generator 31, a conventional electrical sand block sound effect producing generator 32, a direct current power supply unit 33, and an electrical audio system 35 consisting of a conventional amplifier unit and a loudspeaker, as indicated.

The power supply unit 33 is connectable by a conductor cord 34 to a commercial power supply and is adapted to convert the latter to the proper direct current power required to operate the entire musical instrument circuitry system of FIG. 4.

The various parts of the electrical system of FIG. 4 are connected with each other by usual conductors as clearly shown. Certain parts of the generators 30, 31 and 32 are directly grounded, as usual, by conductors 36, 37 and 38, and certain other parts of said generators are indirectly grounded, as usual, through variable resistors 39, 40 and 41, by conductors 42, 43 and 44. The power supply 33 is grounded by a conductor 45. In this manner individual level controls are provided for establishing the proper output level relationship between the individual sound effects produced by the system of FIG. 4.

The special control unit or actuator U^3 enables the musical instrument operator, or player, to alternately operate the wood block generator with either the castanet generator or the said block generator, by properly setting the switches 28 and 29. In other words, by means of the single pole double throw switch 29, connection can be selectively established between either the special control unit U^3 and the castanet generator 30, or between the said unit U^3 and the said block generator 32.

The double pole double throw switch 28 enables reversal of the connections of the castanet generator 30 and the sand block generator 32 with the control unit U^3.

The musical instrument circuitry of my invention, as shown in FIGS. 2 and 3, may, if desired, be operated by means of a conventional type actuator switch unit and such a unit has consequently been symbolically indicated in said figures. It is to be understood, therefore, that the reference characters U^1 and U^2 in FIGS. 2 and 3 indicate either a conventional switch control unit, or the special switch control unit of my invention hereinafter described. The closing of the electrical circuit of FIG. 3, in which such a switch unit is connected, will result in producing the castanet sound effects as long as the switch unit is closed.

When my musical instrument includes a plurality of sound effect producing circuits, as shown in FIG. 4, the special switch control unit there indicated by the reference character U^3 is cooperatively combined with such plurality of circuits so as to enable selective operation of the latter. The special switch control unit of my invention may be provided in various structural and functional forms, as exemplified by the two practical forms thereof shown in FIGS. 5–12, which will next be described.

The special switch control unit, indicated by the reference character U^3 in FIG. 4, is disclosed substantially to full size, or scale, by FIGS. 5–8 of the drawings. This unit generally comprises, two similar elongated members 46 and 47 that are formed of a suitable dielectric material such as wood, a plastic material, etc., and are arranged in relatively spaced parallelism with each other, a cylindrical spacing element 48 having a shaft 49 extending centrally therethrough, two bearing plates 50 and 51, in which the outer ends of the shaft 49 are mounted, two similar switch devices 52 and 53 that are secured, in relatively opposed relation on the member 47, by screws 52^a and 53^a, two similar guide plates 54 and 55, two strap-like members 56 and 57, and two similar tension springs 58 and 59.

The lower surface of the member 46 and the upper surface of the member 47, are centrally provided with aligned arcuate notches or depressions 46^a and 47^a, in correspondence with the outer curvature of the cylindrical spacing element 48, as indicated in FIG. 6, and the said depressions 46^a and 47^a serve as a seating arrangement for the members 46 and 47 in relation to the element 8.

The lower ends of the two bearing plates 50 and 51, and the lower ends of the two guide plates 54 and 55, are each secured to the member 47 by two screws, as indicated in FIG. 6. This arrangement enables free, but guided, rocking movement of the member 46 relative to the member 47, about the pivot established by the spacing element 48.

The two strap-like members 56 and 57 are shaped substantially as shown in FIG. 6 and have their outer ends secured to the members 46 and 47 by screws, as clearly shown.

The springs 58 and 59 have their ends anchored by screws 60 to the members 46 and 47, and are arranged to extend along the outer ends of the members 46 and 47 in such manner as to normally maintain the latter in a positionally balanced relation with each other, as illustrated by FIG. 6. This arrangement also maintains the members 46 and 47 in the assembled relation shown and enables rocking movement of the outer ends of the members 46 and 47 toward and from each other about the pivot forming spacing element 48. Furthermore, when rockingly displaced, it effects automatic return of the members 46 and 47 by the springs 58 and 59, to their initial or normal uniformly spaced position illustrated by FIG. 6.

The switch devices 52 and 53 are alike and, in each instance, comprise a base or mounting member M, that is formed of a suitable dielectric material, and two elongated, flat, resilient, metallic conductor elements E^1 and E^2, that are shaped as shown in FIGS. 6 and 7 and spacedly secured in suitable slots of the base member M as indicated. The rear ends of the conductor elements E^1 and E^2 have fixedly connected thereto by soldering or otherwise, insulated wires or conductors W^1, W^2, W^3 and W^4 that may be connected in the circuitry of my electrical musical instrument as indicated in FIG. 4.

It will be noted that the just described special switch control unit of my invention is of such shape and size that it can be readily grasped, or held, in one hand of the operator, or player, of my novel electrical musical instrument, in the general manner indicated by FIG. 1, in which the switch control unit, there indicated by the reference character U, is held by the left hand of the instrument player.

To make the operating action of the control unit U^3 clear, let it be assumed that the unit, as shown in FIG. 6, is to be grasped by the right hand of the instrument operator. To do so, the thumb of the right hand may be extended through the loop formed by the strap-like element 56, and the first two fingers of the right hand may be extended through the loop formed by the strap-like element 57, with the palm of the hand and the other fingers arranged more or less loosely about the unit portion to the rear of said strap-like elements.

By then exerting a slight hand compressing action, at one end or the other of the control unit U^3, so as to relatively rock the members 46 and 47 about the spacing element 48, one or the other of the switch devices 52 or 53 can be selectively closed by bringing the conductor elements E^1 and E^2 thereof into contact with each other, so as to close the particular circuit of my electrical musical instrument in which the selectively closed switch elements are connected. In this manner, my special switch control unit, indicated by the reference character U in FIG. 1 and the reference character U^3 in FIGS. 4–8, may be used, in conjunction with the switch units 28 and 29, to operate the circuitry of the particular electrical musical instrument illustrated by FIG. 4.

A modified form of my special switch control unit is illustrated substantially to full size or scale, by FIGS. 9–12 of the drawings and generally identified by the reference character U^4. This unit is also adapted to be grasped by one hand of the operator, or player of a musical instrument of the type herein disclosed, and mainly differs from the first form of my special switch control unit U or U^3, in that it embodies four, instead of two, selectively operable switch devices, and in that the said four switch devices are operated by a certain finger action, instead of by the hand compressing or rocking motion previously described.

More particularly, the special switch control unit U^4 comprises a cylindrical casing or housing 61, that is composed of two substantially similar half sections 61^a and 61^b, each of which is formed of a suitable dielectric material. The sections 61^a and 61^b are secured together by suitable means, such as by a plurality of screws 62 (see FIG. 12) appropriately spaced along the length of the sections 61^a and 61^b, so as to firmly unite the latter without contacting any metallic parts.

The switch unit U^4 is provided at one end thereof with a switch device that comprises a circular push button 63 that is formed of a dielectric material, and has secured thereto the reduced screw threaded end of a circular metallic switch element 64, that cooperates with two right-angularly shaped metallic switch terminal forming pieces 65 and 66 which are secured in relatively aligned order to the casing sections 61^a and 61^b by screws 67 and 68. The push button 63 is arranged for free sliding motion in a cylindrical cavity 69 formed in the end portions of the casing sections 61^a and 61^b, as shown in FIG. 10, and a compression spring 70 normally maintains the push button 63 in its outer or switch device inactive position as shown.

The end of an insulated conductor 71 is secured to the switch terminal piece 65 by one of the screws 67, as shown in FIG. 10.

Arranged in relatively spaced order along the length of the unit U^4, are three similar finger operated switch devices that are generally indicated by the numerals 72, 73 and 74. Since these three switch devices are generally alike in their construction and operation, only one of them, namely, the switch device 74, will be described in detail. In this connection, it is to be understood that the switch devices 72 and 73 are structurally and functionally substantially the same as the switch device 74.

The switch device 74 generally comprises, a resilient metallic switch element 74^a, that is formed of spring brass or the like and is shaped substantially as shown in cross-section in FIG. 12, and a metallic bolt-like switch element 74^b, having a lower threaded shank portion and an enlargement 74^c at its upper end which is suitably shaped so as to serve as a contact member.

If desired, the outer surface of the switch element 74^a may be covered, or coated, with a suitable dielectric material as indicated at 74^d.

By referring to FIG. 12, it will be noted that the lower end portion of the metallic switch element part 74^a is of substantially U-shaped configuration, as indicated at 74^e, and this portion is arranged in tightly fitting relation in a gap or slot formed between the casing sections 61^a and 61^b, along with an elongated metallic conductor strip 75. Extending downwardly from the switch terminal piece 66 is a flat arcuately-shaped integral extension 66^a which curves downwardly and has an offset terminus portion 66^b contactingly positioned against the conductor strip 75. At its other end, the conductor strip 75 has connected thereto, by soldering or otherwise, an insulated wire or conductor 76.

An insulated wire or conductor 77 is connected to the switch element 74^b, by a nut, as indicated. Similarly, insulated wires or conductors 78 and 79 are connected to the bolt-like switch elements of the switch devices 72 and 73, and the arcuately-shaped elements of the latter, which correspond with the element 74^a of the device 74, have their lower U-shaped portions arranged in contacting relation with the conductor strip 75. Accordingly, the wire or conductor 76 is in common connection with the conductor strip 75, the switch piece 66, the switch element 74^a of the switch device 74 and those switch elements of

the switch devices 72 and 73 that correspond with the element 74a of the switch device 74.

By depressing the resilient switch element 74a of the switch device 74, until it contacts the enlargement 74c of the bolt-like switch element 74b, a circuit in which the conductors 76 and 77 of the switch device 74 are connected, will be closed. In similar manner, a circuit in which the conductors 76 and 78 are connected, can be closed and opened by operation of the switch device 72, and a circuit in which the conductors 76 and 79 are connected, can be closed and opened by operation of the switch device 73.

By moving the push button 63 to the left, as seen in FIG. 10, against the action of compression spring 70 and until the metallic switch element 64 contactingly bridges the two switch terminal forming pieces 65 and 66, a circuit in which the conductors 71 and 76 are connected will be closed.

To selectively operate the four switch devices of the control unit U4, the latter may be held with the right hand in such manner that the thumb lightly rests on the push button 63, the first finger lightly rests on the resilient switch element 74a of the switch device 74, and the second and third fingers are similarly positioned relative to the switch devices 72 and 73. By then selectively depressing the thumb and the first three fingers of the right hand, so as to close the respective switch devices, the four circuits in which said switch devices are connected can be selectively operated.

From the foregoing description of the control unit U4, it is believed to be apparent that this unit may be used, for example, to selectively operate four separate and distinct circuits of an electrical musical instrument circuitry system of the general type of my invention herein disclosed, or the like, in substantially the same manner as the control unit U of FIG. 1, or otherwise.

As previously indicated, when the electrical musical instrument of my invention is provided to produce only the castanet sound effects, and for this purpose comprises the circuitry of FIG. 3, then the control unit U2 indicated in said figure may be in the form of a simple conventional one contact switch, such as those ordinarily operated by a push button, the key of an electrical musical instrument keyboard, etc.

Of course, my novel electrical musical instrument and the special control unit therefor, can be changed and modified in various ways without departing from the invention herein disclosed, the scope of which is more particularly indicated and defined by the hereto appended claims.

I claim:

1. An electrical musical instrument comprising, a power supply, a continuously repeating subsonic pulse generator, means for selectively connecting said power supply to said pulse generator, a noise type tone signal generator, means for energizing said tone signal generator from said pulse generator, and an audio system connected to the output of said tone signal generator.

2. An electrical musical instrument in accordance with claim 1, wherein the means for selectively connecting the power supply to said pulse generator includes an elongated switch control unit that is adapted to be held in lengthwise extending order along the palm of one hand of the musical instrument player and is provided with a plurality of individually operable switches that are selectively actuatable by the exertion thereon of different hand member movements.

3. An electrical musical instrument of the character described comprising, an electric circuitry which includes a source of electric energy, a plurality of circuits for producing different sound effects similar to those normally producible with percussion type instruments which circuits are connected to and energized by said source of electric energy, an electric audio system connected to said circuits, and an elongated switch control unit that is adapted to be held in lengthwise extending order along the palm of one hand of the musical instrument player and includes a plurality of individually operable switches that are arranged to control said plurality of circuits and are selectively actuatable by the exertion thereon of different hand member movements.

4. An electrical musical instrument of the character described comprising, an electric circuitry which includes a source of electric energy, a plurality of circuits for producing different sound effects including one which is similar to that normally producible with castanets which circuits are connected to and energized by said source of electric energy, an electric audio system connected to said circuits, and an elongated switch control unit that is adapted to be held in lengthwise extending order along the palm of one hand of the musical instrument player and includes a plurality of individually operable switches that are arranged to control said plurality of circuits and are selectively actuatable by the exertion thereon of different hand member movements.

References Cited by the Examiner

UNITED STATES PATENTS

2,348,107	5/1944	Brongersma	200—5
2,684,411	7/1954	Verkuil	200—5
2,988,945	6/1961	Osborne et al.	84—1.01
3,006,228	10/1961	White	84—1.01
3,037,413	6/1962	Markowitz	84—1.01 X
3,038,364	6/1962	Bergman	84—1.03 X
3,141,919	7/1964	Mabuchi	84—1.01 X
3,146,290	8/1964	Park	84—1.03
3,196,729	7/1965	Burns et al.	

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