United States Patent [19]

Iorio

[11] **3,833,750**

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[54] **REED ACCORDION WITH PROGRAMMABLE ELECTRONIC ORGAN SOUND**

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[52] **U.S. Cl.** **84/1.01,** 84/1.03, 84/1.17

[51] **Int. Cl.** **G10h 1/00**

[58] **Field of Search** ..... 84/1.01, 1.03, 1.17, 376, 84/343, 345, 1.19, DIG. 15, DIG. 7

[56] **References Cited**

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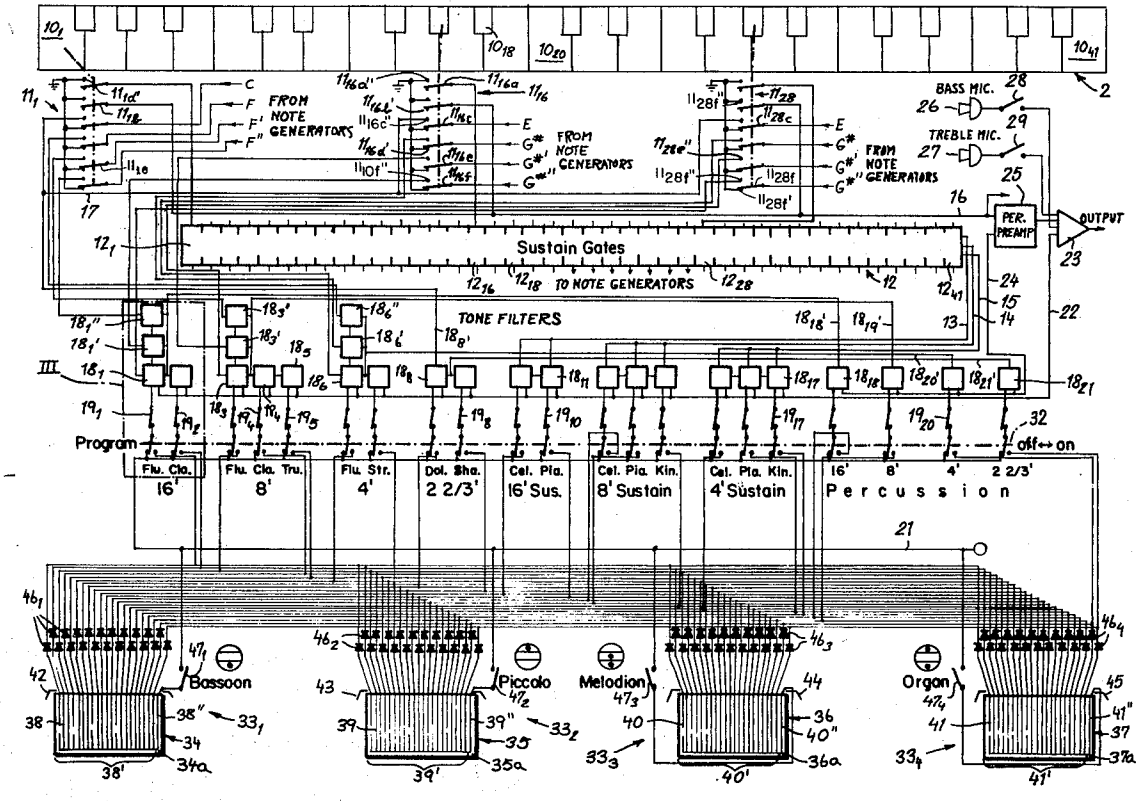
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Assistant Examiner—U. Weldon
Attorney, Agent, or Firm—Karl F. Ross; Herbert Dubno

[57] **ABSTRACT**

A reed accordion has a set of note generators each coupled to a respective key and is connected through a plurality of tone filters to an output. Each filter corresponds to a respective organ voice and is controlled by a respective tab which disconnects its filter from a bus (otherwise common to all filters) when actuated and thereby renders it operative. A plurality of registration program cards removably received in multicontact sockets on the instrument each carry a registration program network which is connectable through a respective registration switch to selected filters such that actuation of this switch will automatically cut in selected filters by disconnecting them from the bus. Each card bears two registrations in the form of conductors printed on its two faces so that simple scratching-through of a conductor programs that network for the respective organ voice, allowing the user to establish his own organ-voicing programs. A further switch, in one position, permits the accordion treble shifts to operate without preprogrammed organ-voicing and, in another position, provides programmed organ voicing for each treble shift.

8 Claims, 4 Drawing Figures



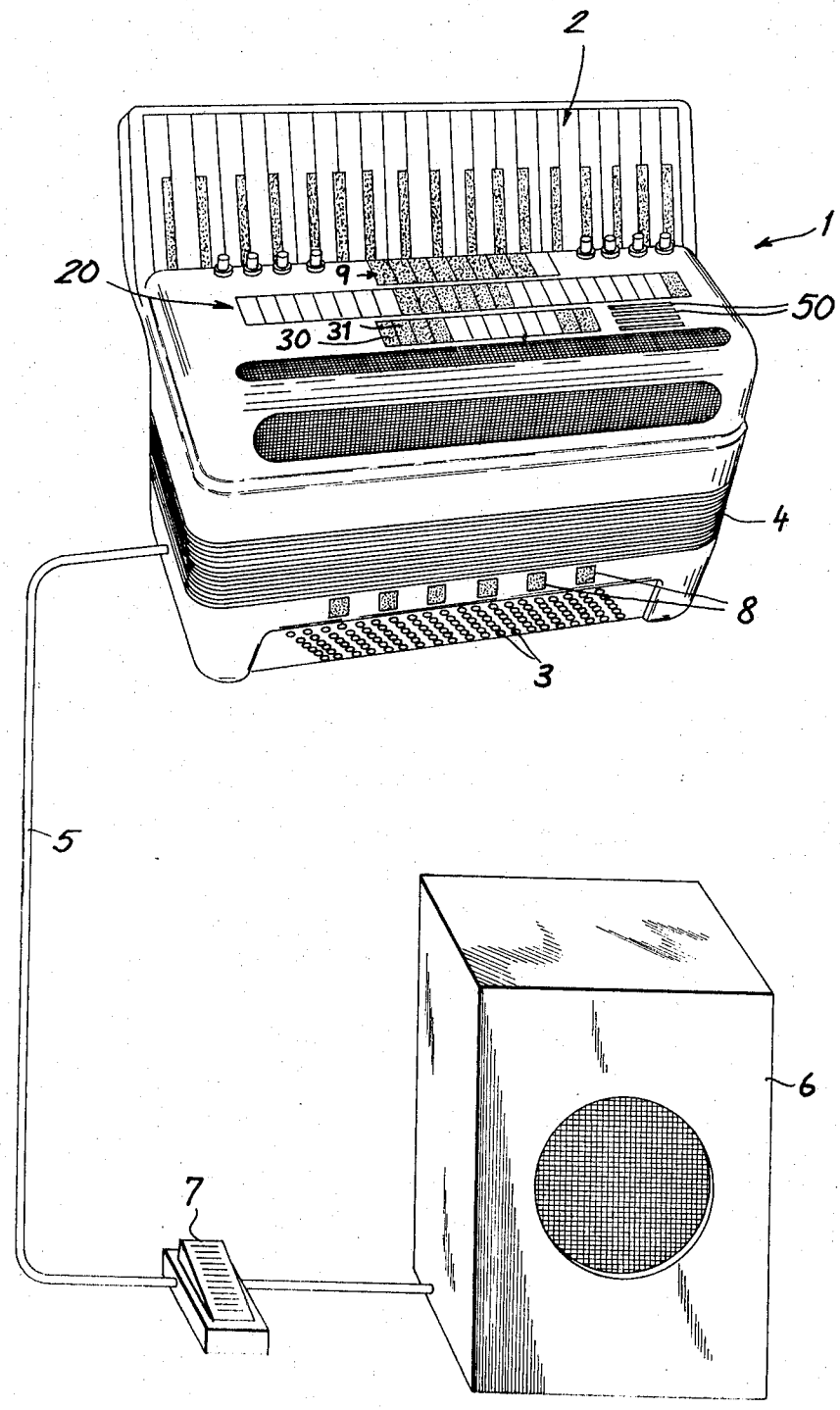


FIG. 1

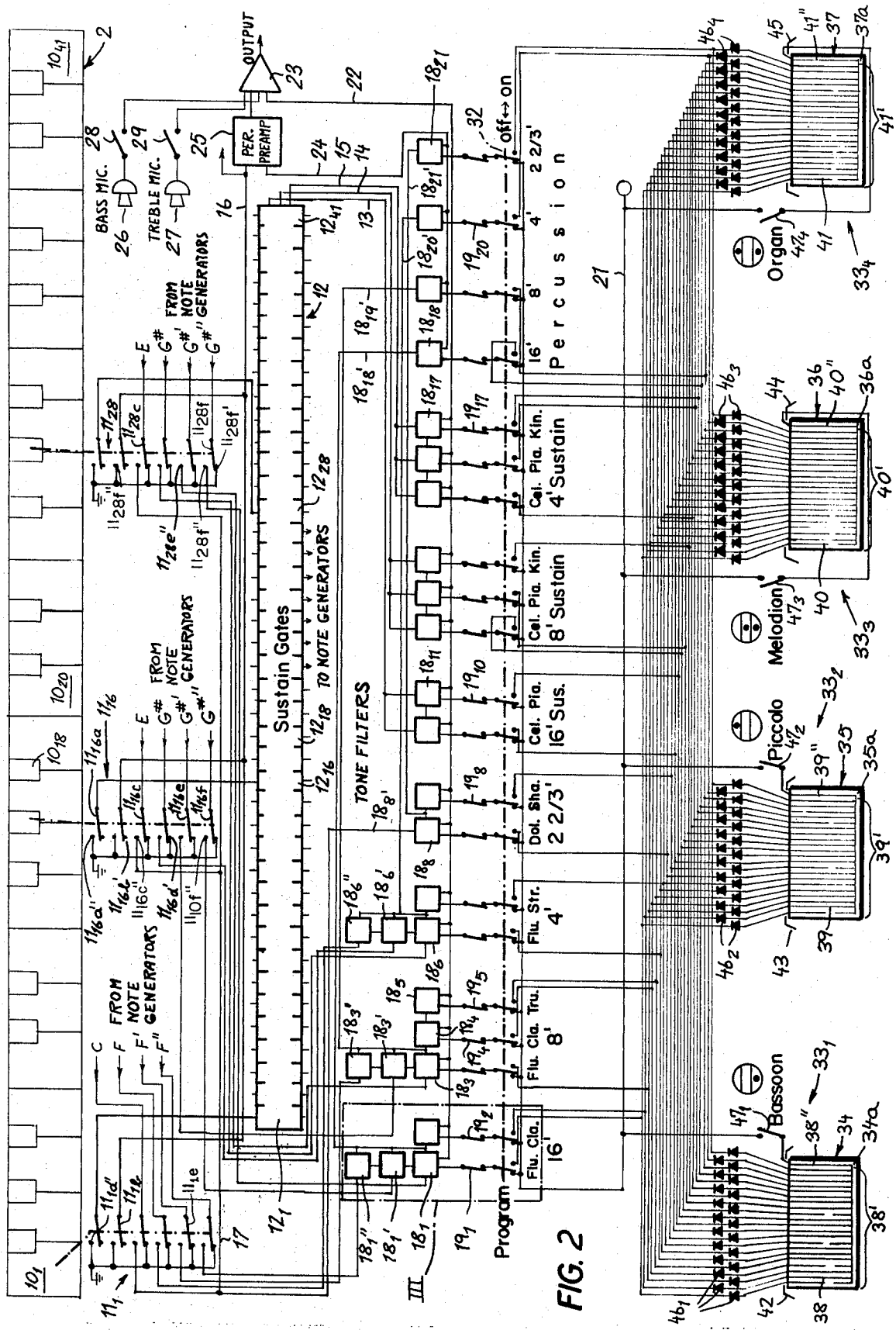

Sustain Gates
TONE FILTERS
TO NOTE GENERATORS
FROM NOTE GENERATORS
Program
Flu. Cla. 16'
Flu. Cla. Tru. 8'
Flu. Str. 4'
Dol. Sha. 2 2/3'
Cel. Pia. 16' Sus.
Cel. Pia. Kin. 8' Sustain
Cel. Pia. Kin. 4' Sustain
Percussion
Organ
Melodion
Piccolo
Bassoon
BASS MIC.
TREBLE MIC.
PER. PREAMP
OUTPUT
off↔on

FIG. 2

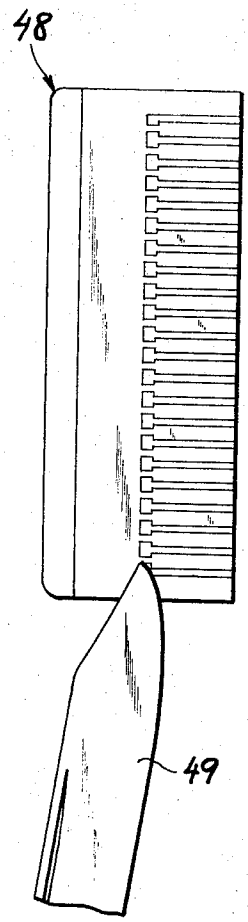

48
49

FIG. 4

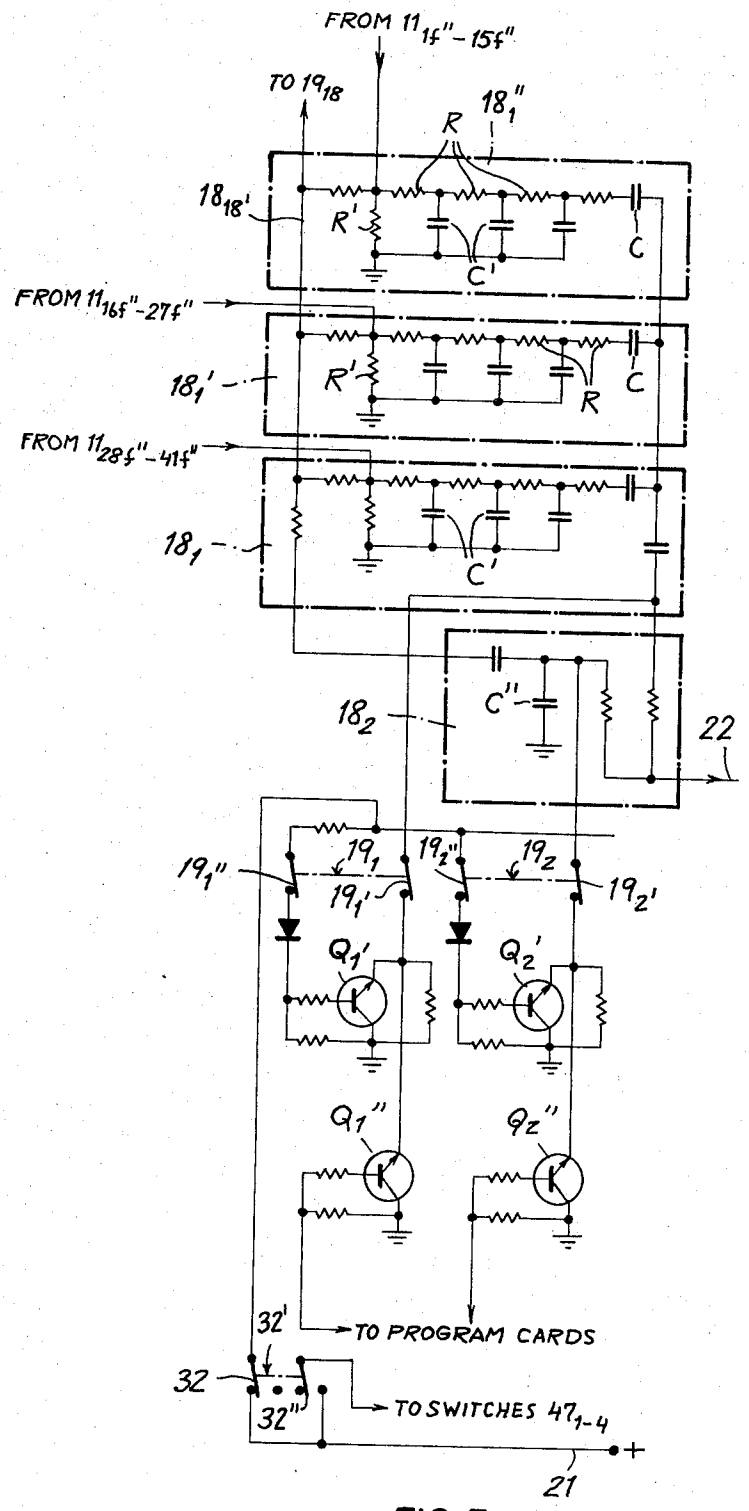

FROM 11 1f"-15f"
TO 19 18
18 1"
R
18 18'
R'
C'
C
FROM 11 16f"-27f"
18 1'
R'
R
C
FROM 11 28f"-41f"
18 1
C'
C''
18 2
22
19 1"
19 1
19 2"
19 2
19 2'
19 1'
Q 1'
Q 2'
Q 1"
Q 2"
32'
TO PROGRAM CARDS
32
32"
TO SWITCHES 47 1-4
21
+

FIG. 3

REED ACCORDION WITH PROGRAMMABLE ELECTRONIC ORGAN SOUND

FIELD OF THE INVENTION

The present invention relates to an accordion-organ combination. More specifically, this invention concerns an accordion provided with stops and electronic circuitry so that it can produce music from electronically generated notes and tones in addition to reed-generated music.

BACKGROUND OF THE INVENTION

In my earlier U.S. Pat. Nos. 3,052,147 and 3,084,584, issued on Sept. 4, 1962 and Apr. 9, 1963, respectively, I described an accordion incorporating electronic tone generators and stop-controlled filters which allowed it to be used also as an electronic organ (i.e. an accordion-organ combination). The reeds of the accordion could be used in conjunction with the electronic circuitry or alone, or the electronically generated tones alone could be used by shutting off the reeds.

Such an instrument has high versatility in that it allows an accordion player to produce various types of music which has not been possible heretofore, since certain types of music do not generally lend themselves to the standard reed-accordian sound. Now the artist may complement this sound with numerous effects with sustains, repeats and percussive effects available so that he can play virtually any of the many different types of music currently in vogue on a single instrument. In addition, should it be desired, the accordion sound can be cut out altogether and accordion techniques — right-hand treble and left-hand bass — can be used to play the instrument like an electronic organ.

When an instrument so equipped is used, it is often a considerable bother to set up a new registration or reprogram it for each different song. Since 20 or more stops and another dozen variable controls may be desirable for a very large number of registrations, the difficulties in programming the device for the registration desired in the next number are considerable. This complexity has made it altogether impossible to change registrations to any useful extend in the middle of a piece or even in a single performance program. For example, a reed accordion having eight treble shifts and a prior-art set of organ stops required a number of these organ stops to be set for any selected treble shift when combination sound was desired. This was not only inconvenient but it was also insufficient if special effects were desired.

OBJECTS OF THE INVENTION

It is therefore an object of the present invention to provide an improved accordion-organ combination instrument of the above-described general type while avoiding the disadvantages of earlier systems.

Another object is the provision of an improved electronic musical instrument having a simplified system for programming it with different registration.

SUMMARY OF THE INVENTION

These objects are attained according to the present invention in an electronic accordion or musical instrument having a plurality of accordion-key-operated note generators each serving to generate a particular musical note and a plurality of tone filters connected to these generators for imparting various tonal qualities to the generated notes known as voicing the notes. Each such filter is normally rendered inoperative by connection to a bus, and for each voice a stop is provided which operates a normally closed switch to disconnect the desired filter from the bus and thereby enable it or make it operative. In addition, according to my present invention, a program network is provided which is connectable between some of the filters and the bus to render only certain filters inoperative, thereby effecting a particular registration.

According to another feature of this invention, a program switch is provided on the accordion keyboard and is connected between the first-mentioned normally closed switch of each filter and the program network to disconnect this normally closed switch from the bus and connect it to the program network. This program switch is thrown to convert the accordion from conventional use, whereby the desired stops are individually actuated, to programmed use whereby the desired registration is effected by cutting in selected filters automatically. When a plurality of such program networks are provided, each is in turn associated with a respective program stop actuatable to cut in a respective organ registration, and a general PROGRAM ON-OFF switch is provided. The player then may switch in any desired registration by first depressing the PROGRAM-ON TAB, preferably located in the row of treble accordion tabs, and then depressing the tab for the desired program.

With such an arrangement it is possible for the most used registrations of the various organ stops to be stored in the unit and switched in at will. For instance, a common BASSOON registration is 16′ FLUTE, 8′ CLARINET, 2 ⅔′ DOLCE and 2 ⅔′ PERCUSSION along with one reed. This combination therefore requires the actuation of four different stops which is a good deal less than many registrations which can require eight or more different individual voices. According to this invention, a number, eight for instance, of such programs can be held in the instrument, each associated with an accordion treble tab which operates the appropriate conventional shifters for the accordion reeds.

In accordance with another feature of this invention the program networks are constituted by conductors printed on cards (printed-circuit boards) which can be plugged into appropriate sockets of the accordion. Such cards, according to the present invention, can be provided on both faces with networks of conductor paths which, when plugged into a socket that is connected through the PROGRAM ON-OFF switch to the respective filters, completes the necessary circuits to give the desired registration. A feature of the system of the present invention is the simplicity of the program card which need not carry any circuit elements other than an array of parallel, selectively interruptable conductors.

Another feature of this invention is a method of programming the various voice combinations on the program cards. This method consists of breaking the conductor paths which correspond to the individual voices that are to be effective for the desired registration. In the case of a printed circuit card, the conductors are broken by merely scratching through the conductor with a penknife or the like.

This provision of such programmable cards allows the user himself to make up cards for whatever registrations he uses most often so as to save him the bother of depressing all of the necessary tabs each time such a registration is called for. In addition, he can change from one of his own, personally programmed, registrations to another with the mere flip of a tab. Should he ever feel like changing one of his programmed registrations to include an extra voice, he need merely pull out the appropriate card and scratch through the appropriate conductor on the face of the card for the voice he wished to add. Removing a voice from a program requires a new card to be prepared but, since such cards are small and very inexpensive, this is no hardship. An experienced performer can, in addition, carry a plurality of extra cards in his shirt pocket, when on the job, to allow him to change from one set of programs to another between numbers, and, as a matter of fact, he can rapidly change in the middle of a number from one program to another, something that was never possible with prior-art devices.

According to another feature of the invention each tone filter is rendered inoperative by connection to a bus through a normally closed switch connected to the stop for the particular voice produced by that filter, and through the PROGRAM ON-OFF switch mentioned above. In this manner, even when the accordion is used with a program, a stop can be depressed to add yet another voice to this program, the series connection of the switches allowing this.

The individual program tabs, according to the invention, simultaneously function at least as the treble shifts of the reed accordion. As is conventional, each treble shift may operate a mechanical slider for controlling air passages of the accordion and, as I have described in an earlier patent mentioned above, the row of treble shifts may include a tab which operates a shutter for the treble part of the accordion. In addition, the programming tab, connected only to the electronic organ circuitry, may be operated to enable the electrical circuitry of the treble tabs/program tabs. Thus, in one position of the switch operated by the programmingmode tab, the treble tabs are effective only to operate as shifters for the mechanical sliders of the reed organ, the switches controlled by the treble tabs being ineffective. In the other position, the treble tab switches are rendered effective to provide the proper organ registration or tonal effects coinciding with the accordion treble tab depressed. All of the filter, tone generator and electronic switch circuitry and all other circuit elements (apart from the final output amplifier and the manually controlled switches on the accordion keyboards) may be provided on a single removable and readily accessible circuit board mounted behind the accordion console carrying the individual organ stops and the accordion treble shifter tabs.

DESCRIPTION OF THE DRAWING

The above and other objects, features and advantages will become apparent from the following description, reference being made to the accompanying drawing in which:

FIG. **1** is a perspective view of an accordion according to the present invention;

FIG. **2** is a schematic diagram, partially in block form, of the electronic circuit of the accordion according to my present invention;

FIG. **3** is a schematic diagram of the circuit elements shown in the dot-dash box indicated at III in FIG. **2**; and

FIG. **4** is a perspective view of a program card showing how the program is established.

SPECIFIC DESCRIPTION

FIG. **1** shows a reed accordion **1** having a treble keyboard **2,** a set of bass buttons **3,** and a bellows **4,** much as described in my U.S. Pat. No. 3,084,584. This unit is connected via output cable **5** to a swell pedal **7** in turn connected to an amplifier-speaker **6.**

As described in my above-mentioned patents, the reed organ has for the treble and base keyboards **2** and **3** sets of reeds for each note, three reeds for each treble key and five for each bass button. The bass keyboard **3** has a set of **6** tabs or shifts **8** which open and close the various sets of reeds in a manner well known in the art. Similarly, the treble side is provided with a set of tabs **9** which open and close the sets of shifters or shutters for the reeds of the treble part of the instrument. These tabs or stops **8** and **9** are provided with circles subdivided into regions corresponding to the various sets of reed. A dot is provided in those regions where the shutters for the reeds are open. The linkages and structures connecting the tabs **8** and **9** with the various sets of reeds are described at length in my above-mentioned patents.

The treble stops or shifter tabs, commonly including BASSOON, CLARINET, PICCOLO, MASTER, MELODION, OBOE, ORGAN and CLOSE, are preferably mounted on a single support which, in turn, can be fastened to the accordion treble console above the treble keyboard. The tabs lie in a row terminating in a PROGRAM ON tab, as described below, which controls the program mode (organ program or absence of organ program). The latter tab controls no shifters and in either of its positions is capable of affecting the treble shifters or stops of the accordion when it is operated exclusively as a reed instrument. The treble-tab assembly, each treble tab of which is provided with switches for the organ registration in addition to the shifters for the reed quality of the accordion, is provided with a plug-and jack connection to a matrix board having at least one diode matrix, as will be apparent hereinafter.

As also described in my U.S. Pat. No. 3,084,584, the instrument comprises a set of 12 basic oscilators which are each coupled with five or six frequency dividers to emit, overall, 75 different notes which are combined and voiced to provide all of the various organ effects.

The treble keyboard **2** comprises **41** keys $\mathbf{10}_{1\text{-}41}$ which each are connected with that element of each set of the three reed sets corresponding to a particular note, as also described in my patent cited immediately above. In addition, each key $\mathbf{10}_{1\text{-}41}$ operates a respective six-pole double throw (GPDT) switch $\mathbf{11}_{1\text{-}41}$, three of which are shown in the drawing. The notes are subdivided into three groups corresponding to keys $\mathbf{10}_{1\text{-}15}$ for low range, $\mathbf{10}_{16\text{-}27}$ for mid range, and $\mathbf{10}_{28\text{-}41}$ for high range.

The switches $\mathbf{11}_{1\text{-}41}$ are all identical. Switch $\mathbf{11}_{16}$ has six poles $\mathbf{11}_{16a\text{-}f}$ which normally lie against contacts $\mathbf{11}_{16a'\ \text{-}f'}$ and which, when actuated by key $\mathbf{10}_{16}$ engage contacts $\mathbf{11}_{16a''\ \text{-}f''}$. The contacts $\mathbf{11}_{1a''\ \text{-}41a''}$, $\mathbf{11}_{1b''\ \text{-}41b''}$, $\mathbf{11}_{1c'\ \text{-}41c'}$, $\mathbf{11}_{1d'\ \text{-}41d'}$,

$11_{1e'-41e'}$, and $11_{1f'-41f'}$ are connected to ground.

Each pole 11_{1a-41a} is connected to a respective sustain gate 12_{1-41} of a bank **12** of such gates. These gates are also connected to the note generators discussed above. The bank **12** of sustain gates has three outputs **13, 14** and **15,** corresponding to 16', 8', and 4' voices. Each gate is also connected to a respective part of a note generator.

The poles 11_{1b-41b} are all connected together to a common bus **16** which is connected in turn to various circuit elements of the organ part of the instrument. Since the contacts $11_{1b'-41b'}$ are all connected to ground, actuation of any of the keys 10_{1-41} will connect the various circuit elements to ground and thereby allow them to function, whereas no key is actuated much of the organ circuitry is disconnected from ground to disable it and thereby reduce power consumption when no key is actuated.

The other four poles of each switch are connected to the various oscillators and frequency dividers as shown. It is understood that the production of organ tones requires the combination of various different notes with different tonal qualities, along with simultaneous suppression or generation of harmonics, depending on the tone desired. The contacts $11_{1c''-41c''}$ are all connected together to a bus **17** to feed to this bus a signal representing note which is offset from the note associated with the respective key 10_{10-41} as shown. The remaining contacts $11_{1d''-41f''}$ are connected, according to range, to a plurality of tone filters 18_{1-21}.

The filters 18_1, 18_3, and 18_6 are connected to the contacts $11_{29f''-41f''}$, $11_{28e''-41e''}$, and $11_{28d''-41d''}$, respectively, as well as to respective prefilters $18_{1'}$, $18_{3'}$, and $18_{6'}$ in turn connected to respective prefilters $18_{1''}$, $18_{3''}$, and $18_{6''}$. These prefilters are connected to the switches of the other two ranges in the same manner as the filters 18_1, 18_3, and 18_6. Filters 18_8 and 18_9 are connected via line $18_{8'}$, to contacts $11_{1c''-41c''}$, and filters 18_{18-21} are connected via respective lines $18_{18'-21'}$ to the filters 18_{1-2}, 18_{3-5}, 18_{6-7}, and 18_{8-9}, respectively.

Connected to each filter 18_{1-21} is a respective voice switch 19_{1-21} controlled by a respective one of tabs **20** shown in FIG. **1.** Actually some **36** tabs are shown in FIG. **1,** as well as eight rotary controls, in addition to the nine tabs **9** controlling the reeds and the programs as will be described below. These fifteen extra tabs control various repeat, vibrato, and similar effects having little to do with the present invention.

Each switch 19_{1-21} is normally closed so that it connects the respective filter 18_{1-21} to a bus **21.** This connection disables the respective filter so that if, for instance, a 8' Trumpet voice is desired, the switch 19_4 is actuated to uncouple the filter 18_4 from the bus **21** and render it operative. When operative, each filter feeds the appropriately voiced note through a line **22** to an output amplifier **23.** The percussion filters 18_{18-21} are, however connected via their own line **24** to a percussion preamplifier **25** and thence to the amplifier **23.** This preamplifier **25** is connected to the enabling bus **16** so that it is only operative when a key is depressed.

A bass microphone **26** and a treble microphone **27** are provided adjacent the respective sets of bass and treble reeds of the instrument and are connectable through respective switches **28** and **29** operated by tabs **30** and **31,** on the accordion key board or console, to the amplifier **23** so as to allow electronic amplification of the normal reed-accordion sound itself.

According to my present invention, each voice switch 19_{1-21} can be connected by means of a PROGRAM ON-OFF switch **32** comprising respective SPDT switches either directly to the bus **21** or thereto through the intermediary of various program networks 33_{1-4}. In the PROGRAM ON position of switch **32** these networks 33_{1-4} are connected between the switches 19_{1-21} and the bus **21,** whereas in the PROGRAM OFF position they are connected directly to the bus **21.**

Each program or register network comprises a respective two-faced nonconductive card **34–37** whose one faces **34***a*–**37***a* are shown. These cards are printed on both faces with respective arrays of conductors; four such cards are shown at **38–41.** Each array consists of 22 parallel conductors connected together at one end of the respective board and all terminating at the other edge of the board which is adapted to be received in one of several multicontact sockets shown schematically at **42–45.** The first **21** contacts in each socket, corresponding to conductors **38'–41'** are connected to respective isolating diode matrices 46_{1-4} which are in turn connected to respective filters 18_{1-21} when switch **32** is thrown to the right, as seen in FIG. **2.** The twenty-second conductors **38''–41''** of each card are connected through a respective normally open program switch 47_{1-4} to the bus **21.** Thus, assuming all of the conductors on each card to be intact, if the program switch **32** is thrown into the PROGRAM ON position the filters **18** will all be disconnected from the bus **21** and, when any of the switches 47_{1-4} is closed, all of the filters 18_{1-21} will be connected through the respective one of the arrays **38–41** to the bus **21.**

The device is programmed, however, by interrupting one or more of the conductors of each array so that only selected ones of the filters are connected to the bus when one of the switches 47_{1-4} is closed. The network 33_1 is shown set up for a Bassoon regulation with the first only of the three sets of treble reeds and whereby the conductors are cut corresponding to the following filters: 16' Flute, 8' Clarinet, 2⅔' Dolce, and 2⅔' Percussion, thereby forming one predetermined registration program. On a device having four cards with a registration program on each face, the following seven other programs can be provided:

TREBLE TAB NOTATION	PROGRAM (REGISTRATION)	REED CONDITION (SHIFTER POSITION)
CLARINET	16'– CLARINET 8'– TRUMPET 4'– SUSTAIN PIANO	second reed open
PICCOLO	16'– FLUTE 2⅔– SHARP 8'– SUSTAIN PIANO	third reed open
MASTER	16'– SUSTAIN CELESTA 8'– SUSTAIN CELESTA 4'– SUSTAIN CELESTA 4'– PERCUSSION 2⅔– PERCUSSION	all reeds open
MELODION	16'– FLUTE 8'– FLUTE 4'– FLUTE	first and second reeds open
OBOE	16'– FLUTE 4'– FLUTE 4'– PERCUSSION	second and third

-Continued

TREBLE TAB NOTATION	PROGRAM (REGISTRATION)	REED CONDITION (SHIFTER POSITION)
	16'– SUSTAIN PIANO 4'– SUSTAIN KINURA	reeds open
ORGAN	16'– FLUTE 8'– FLUTE 4' – FLUTE 2'⅔– SHARP 8'– SUSTAIN PIANO	first and third reeds open
CLOSED	16'– FLUTE 8'– FLUTE 2'⅔– PERCUSSION	no reeds open

Of course if the accordion bellows are not actuated none of the reeds will sound with any of the above programs.

These preprepared programs and registration can be supplemented by the accordion user by any possible combination of voices. Thus the buyer can take a virgin card, as shown at **48** in FIG. **4** and by means of a simple instrument, such as the penknife **49**, can scrape away the conductors corresponding to the voices he wishes to use in a particular custom program registration.

Since these cards are quite inexpensive, merely being phenolic cards with a simple copper circuit printed on each face in an entirely conventional fashion, the user can set up as many different programs as he desires. The cards then, programmed on each face, are fitted into four slots **50** (FIG. **1**) in the instrument so that the user can readily switch from one program to another. He can jump back and forth between eight different programs for the next one, with program switching achieved by merely depressing the respective program table.

Of course the program cards described above can be eliminated in a less sophisticated version of the accordion-organ instrument according to the invention. In this case, the diodes 46_1, 46_2, 46_3 etc. can be mounted on a printed circuit board having sockets or terminals for receiving all of the diodes, one side of each socket or set of terminals being connected to a common bus and switch 47_1, 47_2, 47_3, etc. as already described. The diode matrix on its board may be readily replaceable in the instrument and can be connected with the remaining circuitry by plug-and-jack means of the multicontact type. The program or registration in this instance is obtained by simply snipping selected diodes from the matrix (in the same pattern as the selected conductors were interrupted in the manner already described.) Just as the program cards adapted to be plugged into the slots of the treble console are supplied with the entire array of conductors intact for personal registration programming or with predetermined programs, the diode-matrix boards may be supplied with all diodes intact for personal programming or with selected diodes removed for predetermined registrations.

FIG. **3** shows by way of example the filters 18_1, $18_1'$, $18_1''$, and 18_2 along with the details of the various switches illustrated schematically in FIG. **2.**

Each of the filters 18_1, $18_1'$, and $18_1''$ shown in FIG. **3** comprises a plurality of resistors R connected in series with the input line and a capacitor C connected to the output line. In addition secondary resistors R' and capacitors C' are connected from the junctions between the resistors R and ground. The filter 18_2 comprises a capacitor C'' connected to ground and to another resistor connected to the output lead **22.** The various resistors and capacitors of these filters have values determined according to principles well known in the art so as to impart the proper tone timbre or overtone quality to the notes fed to them.

The output of the filters 18_1 and 18_2 are connected through respective poles $19_1'$ and $19_2'$ to the emitters of a respective NPN transistor Q_1' and Q_2'. These transistors are connected in the so-called inverted mode so that they offer either a very high impedance between their collecter and emitter or a very low impedance. This latter state is achieved by connecting the base of the transistor through a respective switch pole $19_1''$ or $19_2''$ to the bus **21** which is positive. Rendering the bases of the transistors Q_1' and Q_2' positive virtually causes a perfect short circuit from their emitters to ground, which renders the filters 19_1 and 19_2 connected thereto completely inoperative by grounding their outputs. Thus these filters are made operative by ungrounding them, which is achieved in normal operation simply by disconnecting the base of the respective switch transistor from the positive bus with pole $19_1''$ or $19_2''$ or by disconnecting the filter from the transistor's emitter, both functions being carried out by the two-pole switches 19_1 and 19_2. Of course each filter $18_{1\text{-}21}$ has a respective voice-switching transistor connected like transistors Q_1' and Q_2'.

Although shown for the sake of illustration in FIG. **2** as comprising a plurality of SPDT switches, the PROGRAM OFF-ON or mode switch **32** actually is a number of ganged DPDT switches combined with 21 switching transistors connected in parallel to the switching transistors discussed above, only the first two, Q_1'' and Q_2'' being shown here. The base of the transistor Q_1'' is connected to the first one of the conductors **38'–41'** through the respective isolating diode **46** and the base of the second transistor Q_2'' is connected to the second conductor **38'–41'**, and so on for all 21 transistors and conductors. The switch **32** in the PROGRAM OFF position has one pole **32'** connecting the poles corresponding to pole $19_1''$ of all of the switches $19_{1\text{-}21}$ to the bus **21** and another pole **32''** which does nothing. On switching to the PROGRAM ON position the pole **32''** cuts the supply of current to the bases of the voice-switching transistors corresponding to transistors Q_1' and Q_2', and the pole **32''** connects all of the switches $47_{1\text{-}4}$ to the bus **21.**

In this PROGRAM ON position of the DPDT switch **32** closing of any of the switches $47_{1\text{-}4}$ will connect one of the respective conductors **38''–41''** to this bus **21** and will thereby connect all of the bases of all of the transistors corresponding to transistors Q_1'' and Q_2'' to the bus **21,** except where conductors on the cards are broken. Thus is the Bassoon switch 47_1 is thrown, the transistor Q_1'' will not be connected to the bus **21** so that the filter 18_1 will be rendered operative, while the transistor Q_2'' will be connected through the card **34** to the bus **21** and will short out and render inoperative its filter 18_2, with filters 18_4, 18_8, and 18_{13} being similarly rendered operative.

Obviously if none of the switches $47_{1\text{-}4}$ is closed while switch **32** is in the PROGRAM ON position (to the right in FIGS. **2** and **3**) actuation of any of the keys $10_{1\text{-}41}$ will give a full organ sound, with all voices. Actuation of any of the keys with switch **32** in the PROGRAM OFF position and none of the voice tabs actu-

ated will give only the noted reed accordion effect on the treble keyboard.

If a program is being used it is also possible to add a voice or more to the program by actuation of one of the switches $19_{1\text{-}21}$. This switch will have to be reversed to eliminate its voice from the accordion sound, however, when the program is cut out.

I claim:

1. In a reed accordion having a plurality of electronic note generators and a plurality of electronic tone filters connected thereto for imparting respective voices to notes from said generators, each filter being connectable through a respective voice switch to a bus such that operation of a switch enables the respective individual filter, the improvement comprising:

a program network including a diode matrix having one side connected to said filters;

a program switch connected in circuit between said filters and said network and operable for simultaneously rendering a selected plurality of said filters operative; and

a multicontact socket connected between said matrix and said bus and a card carrying an array of selectively interruptable conductors receivable in said socket.

2. The improvement defined in claim **1** wherein said card is a printed-circuit board.

3. The improvement defined in claim **2** wherein said accordion is provided with a plurality of said networks, matrices, and program switches.

4. The improvement defined in claim **3** wherein said printed-circuit board has two faces each provided with a respective array of parallel conductors.

5. An electronic musical instrument comprising:

a plurality of note generators each having a respective key operable to generate a respective musical note;

an output circuit connected to said generators;

a plurality of filter means between said generators and said output circuit for imparting different respective tonal qualities to the generated notes;

a bus connected to one side of a power source and selectively connectable to said filter means to render same inoperative, the filter means being operative when disconnected from said bus;

respective control means each including a normally closed switch between a respective filter means and said bus for rendering the respective filter means inoperative by connection to said bus and for enabling the respective filter means by disconnection from said bus;

at least one program network including a diode matrix between selected filter means and said bus; and

a multicontact socket connected between said diode matrix and said bus and a card carrying an array of selectively interruptible conductors receivable in said socket.

6. The instrument defined in claim **5** wherein said diode matrix in said network has one side connected to the filters of said filter means and another side connected to said multi contact socket, said means in circuit with said network including a switch connected between said multi contact socket and said bus.

7. The instrument defined in claim **6** wherein said instrument comprises a plurality of such matrices, program networks, and means in circuit with said program networks, each network being connected to a different group of selected filters.

8. The instrument defined in claim **6,** further comprising a reed-type accordion having a treble console and keyboard, a row of treble tabs on said console actuatable for establishing respective reed-accordion voices and provided with respective electrical contacts in circuit with said control means for producing organ tones corresponding to respective registrations, said means in circuit with said program network including a switch tab on said console along said row.

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