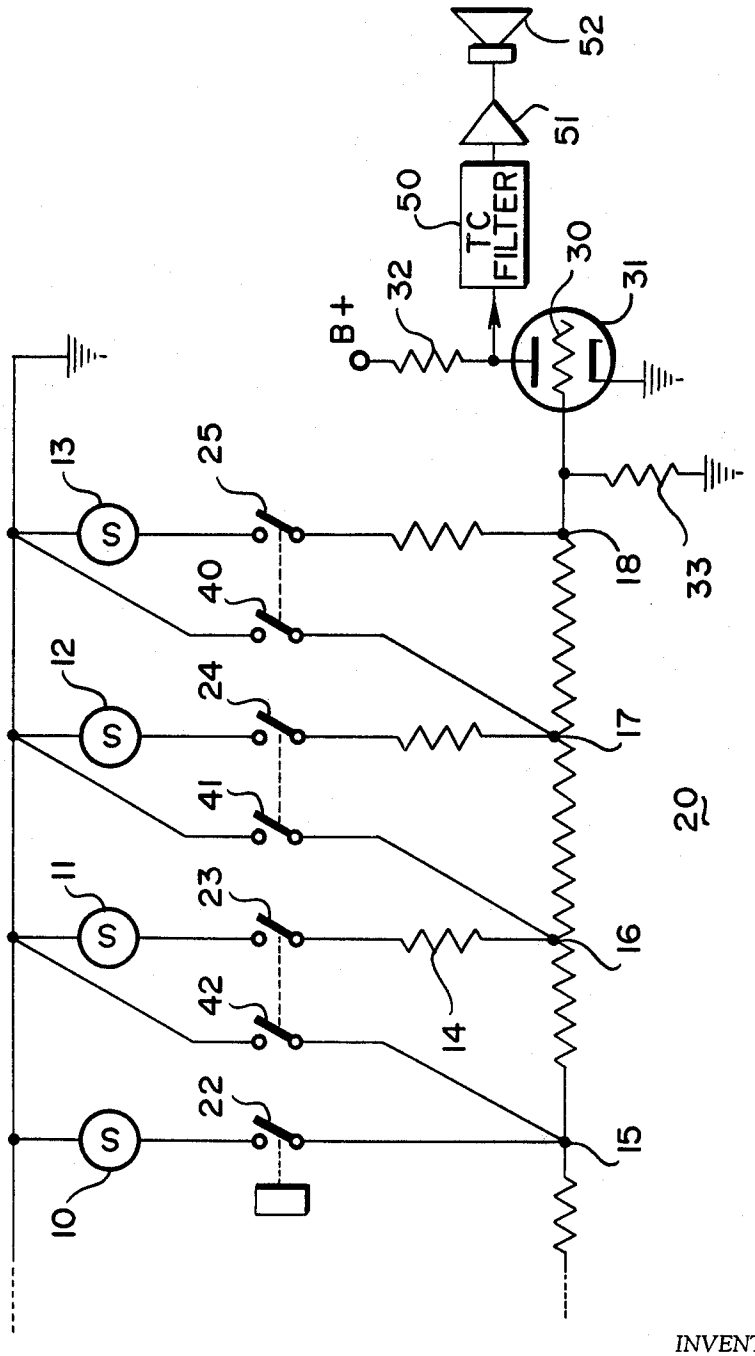
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PREFERENCE CIRCUIT

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PREFERENCE CIRCUIT

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The present invention relates generally to preference circuits, and more particularly to circuits for selectively connecting sources to a load, wherein selection of any one source prevents transfer of signal from non-preferred other sources to the load.

According to the invention, a plurality of high impedance sources may be connected at will to spaced points along a relatively high resistance, so that the sources are ordered along the resistance, one terminal of each source being grounded and the other being unconnected with the high resistance, so that the sources are all normally out of circuit. A separate switch is provided for at will connecting each source in circuit, i.e., to one of the points, thus completing a circuit between the connected source and load, which may be an amplifier with a high impedance input circuit. Each selecting switch, when closed, causes completion of a grounding circuit from a point of the high resistance which is upstream from the connected source, as seen from the load. Thereby, if two or more of the sources are connected simultaneously, the upstream source will provide no signal to the load, since its output is bypassed to ground, while the downstream source will provide signal to the load, since its output is not so grounded.

In a known prior art system of the type under consideration, the sources themselves were of low impedance and hence each source provided a ground circuit for sources upstream of itself. However, the sources are then required to be theoretically of zero impedance, which are difficult to design, and to the extent the low impedances are not zero, cross-talk ensues, i.e., signal from plural sources appear at the load. The present invention permits use of high impedance oscillators, yet eliminates cross-talk entirely, by providing low impedance paths externally of the sources themselves.

Where sources are mentioned, any source of oscillations is implied, including oscillators, frequency dividers, and the like, the invention being independent of the character of the sources.

The present invention finds obvious application to root tone organ systems, wherein a tone is conveyed to an output system corresponding only to the lowest note of a chord being played on an accompaniment manual.

It is an object of the invention to provide a novel preference circuit, the design of which is flexible, so that the signals sources can be of low or high impedance, as desired, but in which cross-talk is entirely eliminated.

The above and still further objects, features and advantages of the present invention will become apparent upon consideration of the following detailed description of one specific embodiment thereof, especially when taken in conjunction with the accompanying drawings, wherein:

The single figure of the drawing is a schematic circuit diagram of a preference circuit according to the invention.

In the single figure of the drawings, **10**, **11**, **12**, **13** are exemplary signal sources, such as oscillators. The sources **10–13** are assumed to be of high impedance and are shown connected each in a series with a resistance, as **14**. The resistances **14** may be equal. The resistances **14** are considered source output impedances. Single-pole single-throw switches **22**, **23**, **24**, **25** are provided to selectively connect the ungrounded terminals of sources **10–13**, inclusive, to separate points **15–18**, respectively, of resistance chain **20**.

Point **18** of resistance chain **20** is connected to the grid **30** of an amplifier tube **31**, having an anode load **32** and a high grid leak resistance **33**, say .5 megohm.

In operation, if only one switch is closed, voltage from only the one associated source will be present at grid **30**. But if two of switches **22–25** are closed, only one of the two associated sources will provide such voltage. If, for example, switch **25** and any other switch is closed, the source **13** associated with switch **25** will provide signal to grid **30** but concurrently a zero impedance path from point **17** to ground will be completed, and therefore the source connected by the other switch will not affect the amplifier. As many switches as desired can be closed simultaneously and only that associated oscillator which is closest to grid **30** will provide signal thereto. All others are fully bypassed to ground, but the preferred oscillator is isolated from ground by one or more sections of resistance **20**.

Short circuit paths are provided from point **17** to ground via switch **40**, closed when switch **25** is closed; via switch **41**, closed when switch **24** is closed; and via switch **42**, closed when switch **22** is closed. It follows that each downstream source, i.e., source most nearly adjacent to tube **31**, when connected in circuit, provides a zero impedance grounding path for all upstream sources. The grounding path is a dead short circuit, so that cross-talk is totally avoided, and the grounding path is exclusive of the source itself, so that source impedance is not a crucial factor in the operation of the present system.

Values of ladder network impedances and generator output impedances may be such that:

(1) they are equal or approximately so,
(2) the network impedances exceed the generator output impedances, or
(3) are less than the generator output impedances, but not negligible in comparison.

The signal present at the anode of tube **31** is applied via a conventional tone color filter **50**, and amplifier **51**, to a loudspeaker, or other electroacoustic transducer **52**. The switch pairs, as **25**, **40** or **24**, **41** or **22**, **42** are actuated by the keys of a pedal clavier of an electronic organ, when the system of the invention is utilized in a pedal tone preference circuit, or by keys of an accompaniment manual, when utilized in a root tone system. A root tone system is a preference circuit, in principle, since only the lowest frequency of a plurality of tones is audibly called forth when plural keys are actuated.

While I have described and illustrated one specific embodiment of my invention, it will be clear that variations of the details of construction which are specifically illustrated and described may be resorted to without departing from the true spirit and scope of the invention as defined in the appended claims.

What I claim is:

1. A preference circuit, including
a plurality of resistances connected in series,
a series of two terminal signal sources connectible each at one terminal to a different junction of said resistances, the other terminals of said signal sources being normally grounded,
separate switches for at will connecting each of said one terminal to a separate one of said junctions,
a load circuit connected to one end of said plurality of resistances, and
means responsive to closure of each of said switches for grounding a point of said series of resistances lying outside the path connecting the selected signal source to said load.

2. The construction according to claim **1** wherein said signal sources are high impedance signal sources.

3. A preference circuit comprising

a series of signal sources arranged in ordered array with respect to a load,

means for at will connecting any one or more of said signal sources to said load, and

means responsive to operation of said means for at will connecting for providing a substantially zero impedance path to ground around all but one of said signal sources, whereby actuation of plural ones of said means for at will connecting provides signal from only one of said signal sources at said load.

4. In an electronic musical instrument having a plurality of tone generators to generate electrical signals representative of musical tones, and a tone signal response circuit to modify a characteristic of at least one of the tones corresponding to one of said signals,

the combination with said tone generators and said signal response circuit of a preference network of the character described,

said preference network having a ladder configuration and including an impedance element in each of the series arms of the ladder,

the impedance of the elements being of the same order of magnitude as the output impedances of said tone generators,

switch means to connect the individual tone generators in the individual shunt arms of the ladder when the corresponding tones are selected to be played, and

a subsidiary circuit of negligible impedance for bypassing to ground all but one of plural signals selected by said switch means.

5. In an electronic musical instrument having a plurality of tone generators to generate electrical signals representative of musical tones, and a tone signal response circuit to modify a characteristic of at least one of the tones corresponding to one of said signals,

the combination with said tone generators and said signal response circuit of a preference network of the character described,

said preference network comprising:

a plurality of impedance elements connected in series with one another,

each of said impedance elements having an impedance of the same order of magnitude as the output impedances of said tone generators,

switch means to connect the individual tone generators between the individual junctions of said impedance elements and a common point or ground when the corresponding tones are selected to be played, and

a subsidiary circuit of negligible impedance for bypassing to ground all but one of plural signals selected by said switch means.

6. In an electronic musical instrument having a plurality of tone generators to generate electrical signals representative of musical tones, and a tone signal response circuit to modify a characteristic of at least one of the tones corresponding to one of said signals,

the combination with said tone generators and said signal response circuit of a preference network of the character described,

said preference network comprising:

a plurality of resistors connected in series with one another, the value of said resistors being of the same order of magnitude as the values of the output impedances of said tone generators,

a plurality of single-pole single-throw switches, one for each of said tone generators, to connect the latter individually between the individual junctions of said resistors and a common point or ground when the corresponding tones are selected to be played, and

a subsidiary circuit of negligible impedance for bypassing to ground all but one of plural signals selected by said switch means.

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