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CIRCUIT FOR ELECTRONIC ORGAN FOR PRODUCING MUTED
VOICES BY THE USE OF PHOTOSENSITIVE CELLS
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FIG. 2

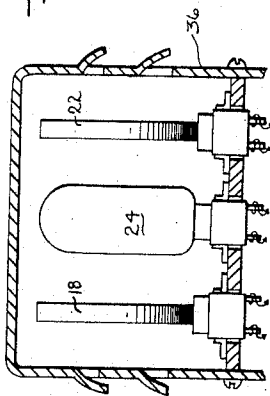
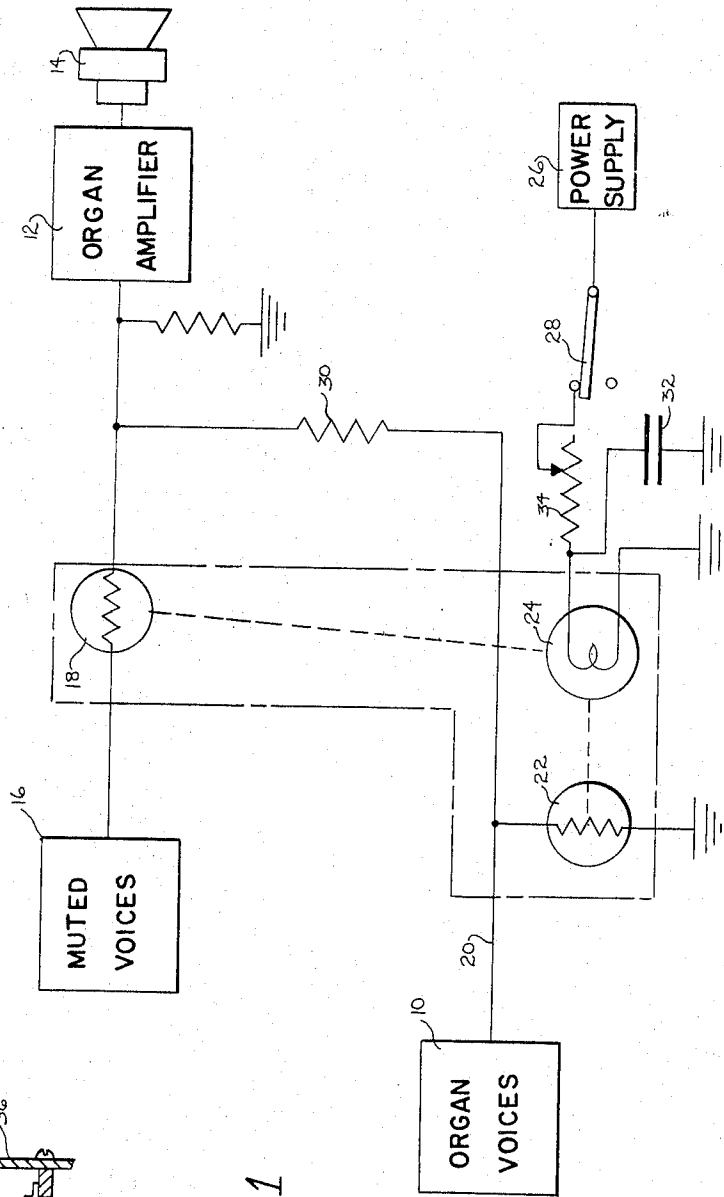


FIG. 1



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1

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CIRCUIT FOR ELECTRONIC ORGAN FOR PRODUCING MUTED VOICES BY THE USE OF PHOTOSENSITIVE CELLS

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ABSTRACT OF THE DISCLOSURE

Two sources are selectively switched to a common input by placing a photocell in series with one source and another photocell in shunt across the second source. Both photocells are illuminated simultaneously by the same controllable light source.

This invention relates to musical instruments and is particularly concerned with electric or electronically operated musical instruments, and more particularly still is concerned with a novel arrangement for changing from a normal voice to a muted voice.

Muted tones, simulating the sound produced, for example, by a trumpet or trombone when a mute or damper is placed in the bell thereof, is a desirable effect to obtain in connection with electric musical instruments such as electric organs. It is furthermore desirable to be able to change, in an organ, from a normal organ voice to a muted voice substantially at will. The present invention is particularly concerned with a novel simple circuit arrangement for obtaining the effect referred to above.

A particular object of the present invention therefore is the provision of a circuit arrangement in which one or another circuit can selectively be made effective at will.

Still another object of this invention is the provision of a simple inexpensive circuit arrangement especially adapted for use with electric organs and the like permitting the changeover from one voice to another at any time.

A still further object of this invention is the provision of a circuit arrangement of the nature referred to in which simple elements are employed which have long life and which are not readily subject to becoming inoperative whereby the circuit arrangement is substantially free of service problems.

These and other objects and advantages of this invention will become more apparent upon reference to the following specification taken in connection with the accompanying drawings, in which:

FIGURE 1 is a schematic representation of a circuit arrangement according to the present invention, and

FIGURE 2 shows one manner in which certain components of the circuit could be arranged within a protective housing.

In FIGURE 1 there is shown a source 10 of substantially conventional organ voices or other signals to be converted into sound. Source 10 is connected to an amplifier 12 which, in turn, is connected to speaker 14.

Another source of signals at 16 identified as muted voices is also connected to amplifier 12 but by way of a photo-conductive cell 18.

One and the same set of tone generators under the control of playing keys can be provided for supplying signals to units 10 and 16, the said units including conventional organ stops for making effective the various voices to be reproduced. The tone generators and playing keys and other conventional circuitry in connection with a musical instrument, preferably, but not necessarily an organ, have not been illustrated.

2

The line 20 connecting unit 10 with amplifier 12 is connected to ground by way of a second photo-conductive cell 22. These photo-conductive cells, may, for example, be of the cadmium sulfide or cadmium selenide type and when not illuminated have a relatively high resistance, on the order of ten megohms, for example, and when illuminated have a relatively low resistance.

The resistance of the photo-conductive cells 18 and 22 is under the control of a lamp 24 positioned to illuminate both photo-conductive cells at the same time. This lamp is supplied with illuminating energy from a power source 26 by way of a selector switch 28 which, when closed, will cause illumination of the lamp, and when opened will cause the lamp to go dark.

When the lamp is dark photo-conductive cell 22 has an extremely high resistance as does photo-conductive cell 18 so that the effective signal to amplifier 12 will be derived solely from unit 10. Upon energization of lamp 24, however, cells 18 and 22 will become illuminated and the resistance thereof will become low so that the signal from unit 10 will be effectively by-passed to ground, whereas the signal from unit 16 will pass through cell 18 to amplifier 12. In order to prevent the signal passing through cell 18 from also passing to ground via cell 22, line 20 may have included therein a resistor 30. A resistor 30 of such value that is approximately 10 times the resistance of cell 22 when said cell is illuminated.

The rate of illumination of cell 24 and the rate of decay of the illumination thereof can be employed for creating a sliding effect as the sound changes from normal voicing to muted voicing and vice versa. Substantially conventional modification of the circuit to lamp 24 will be effective for producing this result, such as the inclusion in the circuit of a condenser 32 which will vary the time characteristics of the energizing circuit for lamp 24. Furthermore, the illuminating circuit preferably includes a resistor 34 which may be adjustable for controlling the illumination of lamp 24 and may furthermore be adjusted simultaneously with the opening and closing of switch 28 to vary the rate at which lamp 24 lights up and turns dark.

FIGURE 2 shows how a housing arrangement could be employed for receiving therein the bulb 24 in the cells 18 and 22. The bulb 24 is placed between the cells and thereby illuminates the cells substantially equal while the housing provides an enclosure about the lamp and cells that will protect the cells from extraneous light.

The circuit arrangement of the present invention has the advantage of simplicity and low cost and can be incorporated in new manufacture or in existing structures. Mechanical switching noises are eliminated and switching transients many times developed by the use of mechanical switches are avoided.

The system has been illustrated as effecting switching between normal organ voices and muted voices, but it will be understood that it could be readily employed in effecting other switching functions as well as the particular one illustrated.

Switch 28 could be in the form of a tab switch for operation by hand, or it could be a knee- or foot-operated switch biased, for example, in one direction so that it would be selectively operated between open and closed positions during operation of the instrument.

The circuit has been particularly described for use in connection with an electric organ, but will be evident that it will be useful in connection with substantially any electric instrument for switching purposes from one voice or effect to another, such as from a normal voice to a muted voice.

It will be understood that this invention is susceptible

to modification in order to adapt it to different usages and conditions; and accordingly, it is desired to comprehend such modifications within this invention as may fall within the scope of the appended claims.

What is claimed is:

1. In combination; first and second sources of electrical signals adapted to be converted into sound, an amplifier for receiving said signals and speaker means supplied by said amplifier, means directly connecting said first source of signals to the input of said amplifier, a first photo-conductive cell connecting said second source of signals to the input of said amplifier, a second photo-conductive cell connecting said first source of signals to ground, a lamp operable when energized to illuminate both of said photo-conductive cells simultaneously to make said sources selectively effective for supplying said amplifier, and an energizing circuit for said lamp.

2. In combination; first and second sources of electrical signals adapted to be converted into sound, an amplifier for receiving said signals and speaker means supplied by said amplifier, means directly connecting said first source of signals to the input of said amplifier, a first photo-conductive cell connecting said second source of signals to the input of said amplifier, a second photo-conductive cell connecting said first source of signals to ground, a lamp operable when energized to illuminate both of said photo-conductive cells simultaneously to make said sources selectively effective for supplying said amplifier, and an energizing circuit for said lamp including a selectively operable switch and resistor means in said circuit to control the energization of said lamp and thereby to control the illumination of said cells.

3. In combination; first and second sources of electrical signals adapted to be converted into sound, an amplifier for receiving said signals and speaker means supplied by said amplifier, means directly connecting said first source of signals to the input of said amplifier, a first photo-conductive cell connecting said second source of signals to the input of said amplifier, a second photo-conductive cell connecting said first source of signals to ground, a lamp operable when energized to illuminate both of said photo-conductive cells simultaneously to make said sources selectively effective for supplying said amplifier, and an energizing circuit for said lamp including a selectively operable switch and resistor means in said circuit to control the energization of said lamp and thereby to control the illumination of said cells, said circuit also comprising means for controlling the rate at which said lamp comes up to full brilliance.

4. In combination; first and second sources of electrical signals adapted to be converted into sound, an amplifier for receiving said signals and speaker means supplied by said amplifier, means directly connecting said first source of signals to the input of said amplifier, a first photo-conductive cell connecting said second source of signals to the input of said amplifier, a second photo-conductive cell connecting said first source of signals to ground, a lamp operable when energized to illuminate both of said photo-conductive cells simultaneously to make said sources selectively effective for supplying said amplifier,

and an energizing circuit for said lamp including a selectively operable switch and resistor means in said circuit to control the energization of said lamp and thereby to control the illumination of said cells, said circuit including means for controlling the rate at which said lamp comes up to full brilliance upon closing of said switch and thereafter becomes completely dark upon opening of said switch.

5. In combination; first and second sources of electrical signals adapted to be converted into sound, an amplifier for receiving said signals and speaker means supplied by said amplifier, means directly connecting said first source of signals to the input of said amplifier, a first photo-conductive cell connecting said second source of signals to the input of said amplifier, a second photo-conductive cell connecting said first source of signals to ground, a lamp operable when energized to illuminate both of said photo-conductive cells simultaneously to make said sources selectively effective for supplying said amplifier, an energizing circuit for said lamp including a selectively operable switch and resistor means in said circuit to control the energization of said lamp and thereby to control the illumination of said cells, and a housing in which said lamp and cells are mounted, said lamp being positioned relative to said cells to illuminate both thereof, said housing shielding at least said cells from light other than that generated by said lamp.

6. In combination; first and second sources of electrical signals adapted to be converted into sound, an amplifier for receiving said signals and speaker means supplied by said amplifier, means directly connecting said first source of signals to the input of said amplifier, a first photo-conductive cell connecting said second source of signals to the input of said amplifier, a second photo-conductive cell connecting said first source of signals to ground, a lamp operable when energized to illuminate both of said photo-conductive cells simultaneously to make said sources selectively effective for supplying said amplifier, and an energizing circuit for said lamp including a selectively operable switch and resistor means in said circuit to control the energization of said lamp and thereby to control the illumination of said cells, said lamp being positioned relative to said cells to illuminate both thereof substantially equally, said housing shielding at least said cells from light other than that generated by said lamp.

7. The combination of claim 2 which includes a resistor in the line connecting said first source of signals to the input of said amplifier.

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