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ORGAN CHIME CONTROL

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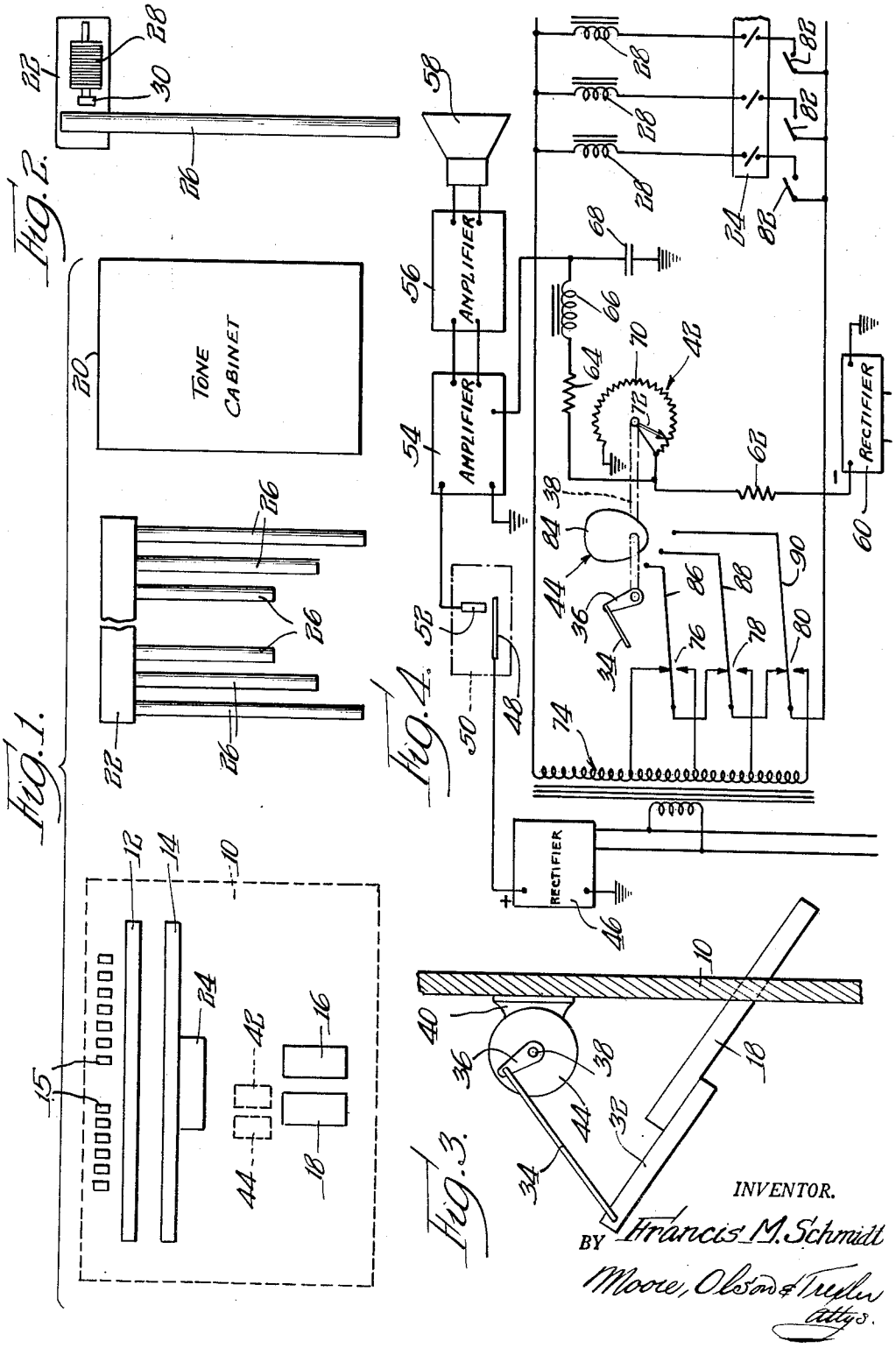


Fig. 1.

Fig. 2.

Fig. 4.

Fig. 3.

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ORGAN CHIME CONTROL

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This invention relates to electric organs and particularly to means for controlling the intensity of the chimes in such organs.

An object of the invention is to provide an improved chime intensity control adapted to be operated by a pedal of an electric organ rather than by manually adjustable means as has been done heretofore.

A further object is to provide a chime intensity control adapted to be operated concomitantly with the usual swell or intensity control of the organ.

A still further object is to provide novel means for controlling the degree of energization of the chime striker magnets in accordance with the angular position of the swell pedal, thereby to relate the chime intensity to the volume of the other tones produced by the organ.

Still another object is to provide an improved chime intensity control characterized by the foregoing and other features and advantages as will be pointed out in the following description taken in connection with the accompanying drawing, wherein:

Fig. 1 is a block diagram of an electric organ and accessories embodying the principles of the invention;

Fig. 2 is a partial view in elevation of a chime structure associated with the organ;

Fig. 3 is a partial sectional view through the portion of the organ in which the swell pedal and chime intensity control are disposed; and

Fig. 4 is a schematic circuit diagram of the organ insofar as it pertains to the present invention.

In Fig. 1 there is shown diagrammatically an organ housed in a console 10 and including two manual keyboards 12 and 14, a series of stop tablets 15, a crescendo pedal 16, and a swell pedal 18. A pedal clavier (not shown) may also be included in the organ. While an organ with two manual keyboards has been chosen for illustrative purposes, it will be apparent that the invention is equally applicable where the organ has only a single manual keyboard. Suitable tone-producing instrumentalities housed by the console 10 are controlled by the keys of the organ. Such instrumentalities in electric organs may consist of vibrating reeds which form the movable elements of condenser microphones, although I contemplate adapting the invention for use in other types of electric organs as well. The signals produced by these tone generators are amplified and reproduced in a suitable manner. Generally, the loudspeakers are located in a detached unit known as a tone cabinet, indicated at 20.

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The chimes are constructed as a separate unit 22, Fig. 1, and are controlled electrically by certain keys of a keyboard such as 14. A connection box 24 located in proximity to these keys enables circuits to be established by the keys to the striker magnets of the chimes whereby the keys may operate the chimes either alone or concurrently with the other tone-producing instrumentalities of the organ as desired. In accordance with conventional practice the circuits in the connection box 24 are closed or opened by means of a switching device operated by one of the stop tablets 15.

In Fig. 2 there is shown the general arrangement of a chime bar 26 and its striker magnet 28, there being an individual magnet for each chime bar. Each striker magnet 28 is essentially a solenoid having a core or plunger 30 adapted to strike and rebound from the associated chime bar 26 when the magnet 28 is energized. The force with which the plunger 30 strikes the bar 26 (and consequently the volume of the sound produced) is determined by the magnitude of the current flowing in the coil of the magnet 28. The purpose of the present invention is to cause this current to vary depending upon the extent to which the swell pedal 18 is depressed.

In Fig. 3 there is shown an illustrative arrangement of the swell pedal 18 and the intensity controls actuated thereby, which can be varied to suit the individual design of the organ. The pedal 18 is pivotally supported by the console 10 of the organ and is adapted to be actuated by the foot of the organist. An extension 32 on the pedal or lever 18 is connected by a link 34 to an arm 36 on a rock shaft 38 which is journaled in bearings 40 mounted inside the console 10. As the pedal 18 is moved, the arm 36 and shaft 38 are rocked to occupy corresponding positions. The movable elements of a volume control 42 and a chime intensity control 44, Figs. 1 and 4, are secured to the rock shaft 38 for movement therewith.

The circuit diagram, Fig. 4, indicates the general layout of a vibrating-reed type of electric organ constructed in accordance with the principles of the invention. Alternating-current power is supplied to a rectifier 46 which furnishes a direct-current polarizing voltage to the vibrating reed elements as 48 of the various tone generators as 50, which in the present instance comprise individual condenser microphones. Electrical signals corresponding to the tones produced by the reeds 48 are picked up by the tone screws

52 and are fed to an amplifier 54 which may be one of a series of amplifiers. In the present instance it will be assumed that there is an additional amplifier 56 which amplifies the output of the amplifier 54 and which in turn feeds its output to one or more loudspeakers as 58. The amplifier 54 is supplied with direct-current grid bias of negative polarity furnished by a rectifier 60, the output of this rectifier being fed through two series resistors 62 and 64 and a series choke 66 to the amplifier 54. A shunt capacitor 68 is connected in parallel with the input circuit of the amplifier 54 for a purpose which will be explained presently.

The organ volume control 42 essentially consists of a potentiometer or rheostat 70 having a movable contact 72 which is connected electrically to a point intermediate the resistors 62 and 64 and also to one end of the resistance element, the other end of the resistance element being grounded as shown. The amplifier 54 is of the type wherein the gain is dependent upon the amount of bias supplied thereto. As the swell pedal 18, Fig. 3, is depressed, the resistance of the element 70, Fig. 4, is gradually cut out of circuit, thereby reducing the bias and increasing the gain of the amplifier 54. Conversely, as the pedal 18 is allowed to return to its upward position, the gain of the amplifier 54 is progressively reduced. The aforesaid capacitor 68 limits the rate of volume change to prevent abrupt changes of volume such as might otherwise occur due, for example, to imperfect contact between the fixed and movable parts of the rheostat 70.

The striker magnets 28 are adapted to be energized by a suitable voltage source such as the secondary of a transformer 74, the primary of this transformer being energized by the alternating-current source which supplies power to the rectifier 46. The secondary of the transformer 74 is tapped, and the amount of voltage furnished thereby is determined by the settings of tap-changing switches as 76, 78 and 80, of which any desired number may be employed. Circuits for energizing the striker magnets 28 are established individually through switches 82 arranged to be operated respectively by keys on the keyboard 14, and gang-operated switches in the connection box 24 which are closed and opened under control of a special stop tablet on the organ as noted hereinabove.

A number of arrangements may be utilized for varying the settings of the tap-changing switches 76, 78 and 80 in accordance with the setting of the volume control 42. I have shown, for example, a cam 84 fast on the rock shaft 36 for successively engaging the switch-operating arms 86, 88 and 90 as the cam 84 is rotated. When the setting of the volume control 42 is such that the gain of the amplifier 54 is at a minimum, the cam 84 then is out of engagement with all of the switch-operating arms 86, 88 and 90. Under these conditions the voltage available to operate the chime striker magnets 28 is likewise at a minimum. As the gain of the ampliger 54 is increased to produce greater sound intensity at the loudspeaker 58, however, the voltage available for energizing the striker magnets 28 is increased in discrete steps, so that the chime intensity is commensurate with the volume of the music. Obviously the chime intensity control may be modified to operate on direct current instead of alternating current if required.

It is apparent from the foregoing that I have provided a simple and effective organ chime control which fulfills the above stated objects of the invention. The invention makes it possible to control the chime intensity concomitantly with variations in the organ tone volume and much more conveniently than could be done in prior arrangements which required that the organist manually and independently adjust the chime intensity while playing the organ. Thus greater freedom is afforded the organist when operating the chimes, and more pleasing tonal effects are secured.

Various changes may be made in the specific embodiment set forth for purposes of illustration without departing from the spirit of the invention, and it is intended that such modifications as may readily occur to persons skilled in the art shall be included in the scope of the following claims.

The invention is hereby claimed as follows:

1. In an organ having a pedal-operated volume control and auxiliary chimes, a separate chime intensity control, and means mechanically connecting said chime intensity control to the organ volume control for synchronous operation therewith.

2. In an electric organ including a pedal-operated volume control rheostat and auxiliary chimes each having an individual striker magnet, a chime intensity control including a variable voltage source for supplying a variable voltage to each striker magnet, and means mechanically connecting said chime intensity control to the volume control rheostat whereby the voltage impressed on the striker magnets is related to the rheostat setting.

3. In an electric organ having a volume control and auxiliary chimes, a separate chime intensity control, and common foot-actuated means for operating said chime intensity control and the organ volume control, said chime intensity control including a variable voltage supply means for energizing the chimes.

4. In an electric organ having a volume control means and auxiliary chimes, a chime intensity control, and foot-actuated means for operating said chime-intensity control and the volume control means concomitantly, said chime intensity control including a tapped transformer and a tap-changing switch.

5. In an organ having electric tone generators and means for amplifying and reproducing the signals furnished by the tone generators, the combination of a swell pedal, auxiliary chimes, an individual striker magnet for each of said chimes, variable voltage supply means for said striker magnets, and means actuated by said swell pedal for varying the voltage furnished by said voltage supply means to said auxiliary chimes.

6. In an organ having electric tone generator and means for amplifying and reproducing the signals furnished by the tone generators, the combination of a swell pedal, auxiliary chimes, an individual striker magnet for each of said chimes, variable voltage supply means for said striker magnets, and means actuated by said swell pedal for varying the voltage furnished by said voltage supply means to said auxiliary chimes, said voltage supply means comprising a transformer and a plurality of tap switches operable to vary the transformer output in discrete steps.

7. In an organ having electron tone generators and means for amplifying and reproducing the signals furnished by the tone generators, the com-

bination of a swell pedal for controlling the gain of the amplifying means, auxiliary chimes, an individual striker magnet for each of said chimes, keys for selectively closing the circuits to said striker magnets, variable voltage supply means for said striker magnets, and means actuated by said swell pedal for varying the voltage furnished by said voltage supply means in accordance with the volume of the reproduced organ tones.

8. In an electric organ having a volume control means and auxiliary chimes, a chime-intensity control, and foot-actuated means for operating said chime-intensity control and the volume control means concomitantly, said volume control means comprising a variable bleeder resistor, and

said chime-intensity control comprising a tapped voltage supply and a plurality of cam actuated tap-changing switches.

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