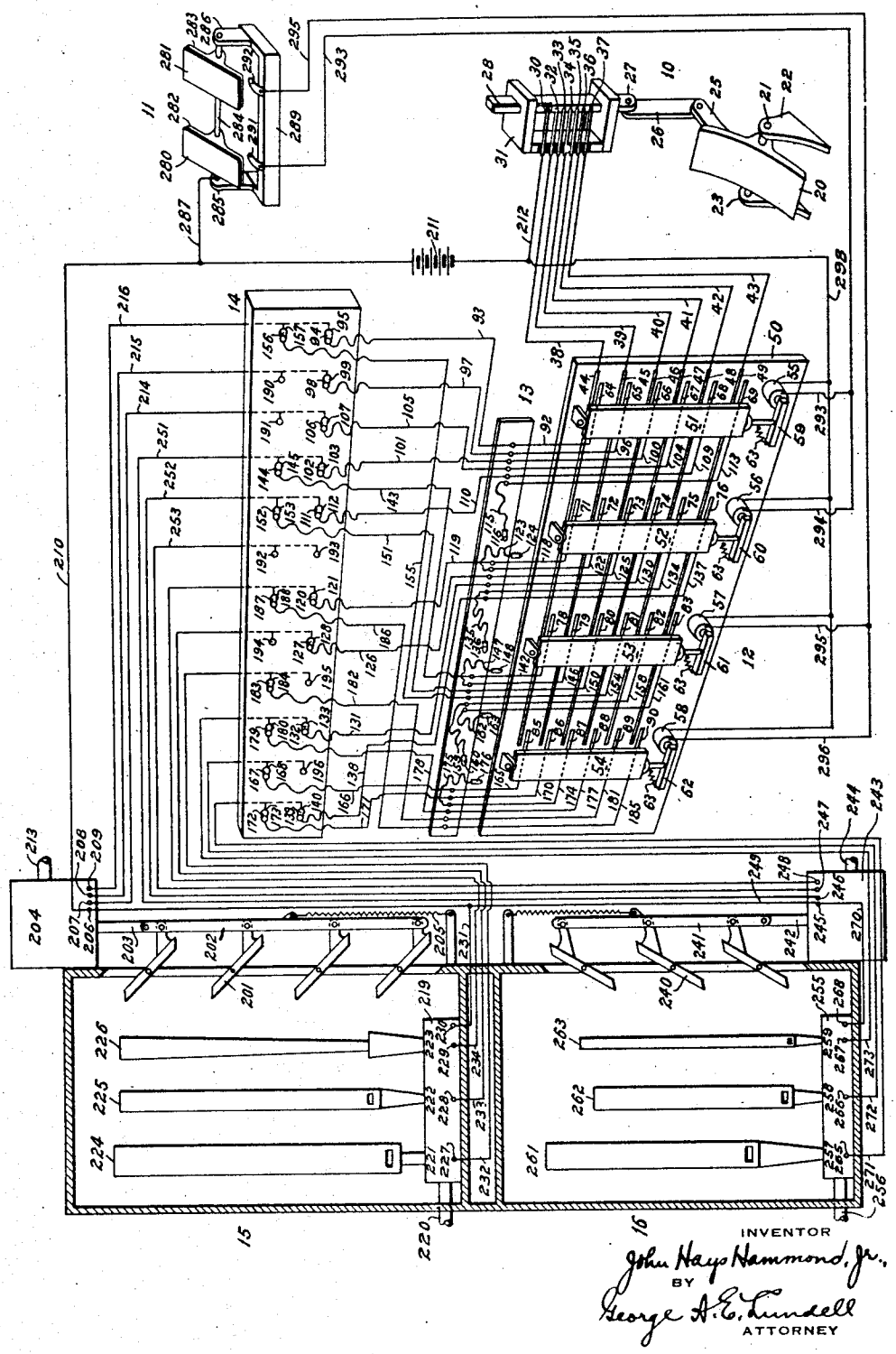
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ORGAN CONTROL

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UNITED STATES PATENT OFFICE.

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ORGAN CONTROL.

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Some of the objects of this invention are to provide improved means for controlling the swell shutters and stops of a pipe organ by means of a foot pedal; for causing the swell shutters and stops to be operated simultaneously or alternately by the pedal; for causing the swell shutters and the stops to be operated in a predetermined succession; for having a plurality of predetermined arrangements that can be selected by means of tablets; and for changing the succession of operations in each individual arrangement by hand.

In the accompanying drawing there is shown a diagrammatical view, partly in section, of a system constructed in accordance with this invention.

Referring to the accompanying drawing, one embodiment of this invention comprises a pedal mechanism 10, a selector mechanism 11, a switching means 12, a terminal board 13, a plugging-in board 14, a primary organ 15, and a secondary organ 16.

The pedal mechanism 10, consists of a pedal 20, rotatably mounted upon a shaft 21, journalled in a pair of brackets 22, 23. Secured to the upper end of the pedal 20, is an arm 25, to which is pivoted one end of a link 26, the other end of which is pivotally connected to a rod 27, constructed of suitable electrically insulating material, such as hard rubber or the like. Secured to the front upper face of the rod 27 is a strip 28 formed of conducting material, which normally engages a contact 30, carried by but insulated from frame 31. Normally engaging the insulated portion of the rod 27 and carried by the frame 31, are six contacts 32, 33, 34, 35, 36, 37, insulated from each other and from the frame. These contacts are connected by conductors 38, 39, 40, 41, 42, 43 respectively, to six plates of conducting material 44, 45, 46, 47, 48, 49, mounted upon and insulated from a base 50. Upon the base 50 are mounted four switches 51, 52, 53, 54, which can be rotated about their longitudinal axes by means of four electro-magnets 55, 56, 57, 58 which have associated therewith for actuation thereby the armatures 59, 60, 61, 62 respectively. These armatures are each keyed to the respective shaft of the switches 51, 52, 53, 54. The armatures are held in normal position as shown in the drawing by retractile springs such as 63.

The switch 51 comprises six contacts 64, 65, 66, 67, 68, 69 which, when the switch 51 is rotated, engage the plates 44, 45, 46, 47, 48, 49, respectively. Similarly, the switch 52 comprises six contacts 71, 72, 73, 74, 75, 76. The switch 53 comprises six contacts, 78, 79, 80, 81, 82, 83. The switch 54 comprises six contacts 85, 86, 87, 88, 89, 90.

The contact 64 is connected by a conductor 92, to the terminal board 13, and thence by a flexible conductor 93 to a plug 94, which may be inserted in a receptacle 95 in the plugging-in board 14, as shown. The contact 65 is connected by a conductor 96 to the terminal board 13, and thence to a flexible conductor 97 to a plug 98, which may be inserted in a receptacle 99. The contact 66 is connected by a conductor 100 to the terminal board 13, and thence by a flexible conductor 101 to a plug 102 which may be inserted in a receptacle 103. The contact 67 is connected by a conductor 104 to the terminal board 13, and thence by a flexible conductor 105 to a plug 106 which may be inserted in a receptacle 107. The contact 68 is connected by a conductor 109 to the terminal board 13, and thence by a flexible conductor 110 to a plug 111 which may be inserted in a receptacle 112. The contact 69 is connected by a conductor 113 to the terminal board 13, from which it is connected by a flexible conductor 115 to a plug 116. The contact 71 is connected by a conductor 118 to the terminal board 13 and thence by a flexible conductor 119 to a plug 120 which may be inserted in a receptacle 121. The contact 72 is connected by a conductor 122 to the terminal board 13, and thence by a flexible conductor 123 to a plug 124. The contact 73 is connected by a conductor 125 to the terminal board 13, and thence by the conductor 126 to a plug 127 which may be inserted in a receptacle 128. The contact 74 is connected by a conductor 130 to the terminal board 13, and thence by a flexible conductor 131 to a plug 132 which may be inserted in a receptacle 133. The contact 75 is connected by a conductor 134 to the terminal board 13, and thence by a flexible conductor 135 to a plug 136. The contact 76 is connected by a conductor 137 to a terminal board 13, and thence by a flexible conductor 138 to a plug 139 which may be inserted in a receptacle 140. The contact 78 is connected by a conductor 142 to the terminal board 13, and thence by a flexible conductor 143 to a plug 144 which may be inserted in a receptacle 145. The contact 79 is connected by a

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conductor 146 to the terminal board 13, and thence by a flexible conductor 147 to a plug 148. The contact 80 is connected by a conductor 150 to the terminal board 13, and thence by a conductor 151 to a plug 152, which may be inserted in a receptacle 153. The contact 81 is connected by a conductor 154 to the terminal board 13 and thence by a conductor 155 to a plug 156, which may be inserted in a receptacle 157. The contact 82 is connected by a conductor 158 to the terminal board 13, and thence by flexible conductor 159 to a plug 160. The contact 83 is connected by a conductor 161 to the terminal board 13, and thence by a flexible conductor 162 to a plug 163. The contact 85 is connected by a conductor 165 to the terminal board 13, and thence by a flexible conductor 166 to a plug 167, which may be inserted in a receptacle 168. The contact 86 is connected by a conductor 170 to the terminal board 13, and thence by a flexible conductor 171 to a plug 172 which may be inserted in a receptacle 173. The contact 87 is connected by a conductor 174 to the terminal board 13, and thence by a flexible conductor 175 to a plug 176. The contact 88 is connected by a conductor 177 to the terminal board 13, and thence by a conductor 178 to a plug 179 which may be inserted in a receptacle 180. The contact 89 is connected by a conductor 181 to the terminal board 13, and thence by a flexible conductor 182 to a plug 183 which may be inserted in a receptacle 184. The contact 90 is connected by a conductor 185 to the terminal board 13, and thence by a flexible conductor 186 to a plug 187 which may be inserted in a receptacle 188, as shown.

The plugging-in board 14 is also provided with receptacles 190, 191, 192, 193, 194, 195, 196.

The primary organ chamber 15, is provided with a plurality of swell shutters 201, which are operated by a rod 202, the upper end of which is connected to a link 203, which in turn is connected to the mechanism in a swell motor 204 of any standard construction. The swell shutters 201 are normally held in the closed position by means of a spring 205. The swell motor 204 is provided with four terminals 206, 207, 208, 209, which are connected on the inside to the mechanism operating the swell motor. The terminal 206 is connected by a conductor 210 to one side of a battery 211, the other side of which is connected by a conductor 212 to the contact 30 of the pedal mechanism 10. The swell motor 204 is connected by a pipe 213 to a suitable supply air pressure. The terminal 207 is connected by a conductor 214 to the receptacles 191, 107. The terminal 208 is connected by a conductor 215 to the receptacles 190, and 99, and the terminal 209 is connected by a conductor 216 to the receptacles 157, and 95.

Inside the primary organ chamber 15, there is mounted an organ chest 219, which is connected by a pipe 220 to a source of air under pressure, and is provided with three stops 221, 222, 223, each consisting of a series of pipes 224, 225, 226 respectively. The stops 221, 222, 223 are controlled from three terminals 227, 228, 229. The return from these three circuits is connected to a terminal 230. The terminal 230 is connected by a conductor 231 to the terminal 206. The terminal 227 is connected by a conductor 232 to the receptacles 184 and 195. The terminal 228 is connected by a conductor 233 to the receptacles 194 and 128, and the terminal 229 is connected by a conductor 234 to the receptacles 188 and 121.

The secondary organ chamber 16, is provided with a plurality of swell shutters 240, which are operated by a rod 241, the lower end of which is connected to a link 242, which in turn is operated from a swell motor 243 of standard construction. The swell motor 243 is connected by a pipe 244 to a suitable source of air under pressure, and is provided with four terminals 245, 246, 247, 248. The terminal 245 is connected by a conductor 249 to the conductor 231. The terminal 246 is connected by a conductor 251 to the receptacles 145 and 103. The terminal 247 is connected by a conductor 252 to the receptacles 153 and 112, and the terminal 248 is connected by a conductor 253 to the receptacles 192 and 193. In the secondary organ chamber 16 is mounted an organ chest 255, which is connected by a pipe 256 to a source of air under pressure. The chest 255 is provided with three stops 257, 258, 259, which consist of sets of pipes 261, 262, 263. The stops 257, 258, 259 are controlled from three terminals 265, 266, 267. The return from these three circuits is connected to a terminal 268. The terminal 268 is connected by a conductor 270 to the terminal 245. The terminal 265 is connected by a conductor 271 to the receptacles 173 and 140. The terminal 266 is connected by a conductor 272 to the receptacles 168 and 196, and the terminal 267 is connected by a conductor 273 to the receptacles 180 and 133.

The selector mechanism 11 consists of two tablets 280 and 281 which are mounted upon bases 282, 283, of conducting material, which are rotatably mounted upon a rod 284, formed of conducting material, and journalled in a pair of brackets 285, 286. The rod 284 is connected by a conductor 287, to the common return conductor 210, and to one pole of the battery 211. Mounted upon a board 289 are two contacts 291, 292, which are engaged by the bases 282, 283, of the tablets 280, 281, when these tablets are depressed. The contact 291 is connected by a conductor 293 to one terminal of the magnet 55, and by a branch conductor 294 to a terminal of the coil of the magnet 56. The contact 292 is connected by a conductor 295 to a terminal of the coil of the

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magnet 57 and by a branch conductor 296 to a terminal of the coil of the magnet 58. The return circuit from the other terminals of the coils of the magnets 55, 56, 57, and 58 to the battery 211 includes the common return conductor 298.

In the operation of the form of the invention shown the operator depresses one of the selector tablets, say for example, tablet 280, which closes a circuit from the battery 211 through conductors 210 and 287 to the rod 284, thence through strip 282, contact 291, conductor 293, to the magnet 55, and by conductor 294 to the magnet 56, the current from these two magnets returning along the conductor 298 back to the battery 211, thus energizing the two magnets 55 and 56. This will cause the switches 51 and 52 to be rotated about their axes, thus causing the contacts 64, 65, 66, 67, 68, 69, and the contacts 71, 72, 73, 74, 75, 76, to engage the plates 44, 45, 46, 47, 48, 49, respectively.

When the operator rotates the pedal 20 in a clockwise direction about the shaft 21, the rod 27 will be moved downwardly, thus bringing the strip 28 of conducting material into successive engagement with the contacts 32, 33, 34, 35, 36, 37. When the strip 28 engages the contact 32, a circuit will be closed from the battery 211 through conductor 212, contact 30, strip 28, contact 32, conductor 38, plate 44, contact 64, conductors 92, 93, plug 94, assumed to be inserted in the receptacle 95, conductor 216, to the terminal 209 on the swell motor 204, thence through the primary mechanism of this motor, to the return terminal 206, common return conductor 210 to the battery 211, thus causing the swell motor to operate one step, and open the swell shutters 201 a small amount. At the same time a circuit will be closed from the plate 44 through contact 71, conductors 118, 119, plug 120, conductor 234, to the terminal 229, thence through the stop action 223 to the return terminal 230, conductor 231 to the terminal 206, common return conductor 210 to the battery 211. This operates the stop action 223, thus throwing on this stop, represented by the series of pipes 226, any one or more of which may be sounded from the usual keyboard of the instrument, which is not shown.

When the strip 28 engages the contact 33, a circuit is closed from battery 211, conductor 212, contact 30, conducting strip 28, contact 33, conductor 39, plate 45, contact 65, conductors 96, 97, plug 98, receptacle 99, conductor 215, to the terminal 208 of the swell motor 204, common terminal 206 of the swell shutter motor 204, common conductor 210 to the opposite pole of the battery 211, thus causing the swell motor 204 to open swell shutters 201, an additional amount, whereby to increase the volume of sound emitted from the primary organ 15. It will be noted that the circuit through contact 72 and conductor 122 is opened as the plug 124 is not inserted in the receptacle in the plugging-in board 14.

Continued actuation of the pedal 20 and downward movement of the strip 28 causes the following circuit to be closed. Battery 211, conductor 212, contact 30, conducting strip 28, contact 34, conductor 40, plate 46, contact 66, conductors 100, 101, plug 102, receptacle 103, conductor 251, terminal 246 of the swell shutter motor 243, common terminal 245, swell shutter motor 243, common return conductors 249, 210, to the opposite pole of the battery 211. The swell shutter motor 243 is thus energized to open the swell shutters 240 of the secondary organ 16 to a limited extent. The following circuit is closed. Battery 211, conductor 212, contact 30, conducting strip 28, contact 34, conductor 40, plate 46, contact 73, conductors 125, 126, plug 127, receptacle 128, conductor 233, terminal 228 of the stop 222, common terminal 230 of the chest 219, common return conductors 231, 210 to the opposite pole of the battery 211. Thus the stop 222 is operated to render the pipe 225 effective for producing in the primary organ 15 a different musical effect from that previously obtained.

Similarly, when the conducting strip 28 engages contact 35, a circuit will be closed through plate 47, contact 67, conductors 104, 105, plug 106, receptacle 107, conductor 214, terminal 207 of the swell shutter motor 204, common terminal 206 of the swell shutter motor, common return conductor 210 to battery 211 to cause the swell shutter motor 204 to open the swell shutters 201, to the primary organ 15 to the full amount. A circuit will then be closed through contact 74, conductors 130, 131, plug 132, receptacle 133, conductor 273, terminal 267 of the stop action 259, main terminal 268 of the chest 255, common return conductors 270, 249, 210 to the battery 211. The stop action 259 will thus be operated to render the pipe 263 effective.

Similarly, when the conducting strip 28 engages the contact 36 a circuit will be closed from battery 211, common conductor 212, contact 30, conducting strip 28, contact 36, conductor 42, plate 48, contact 68, conductors 109, 110, plug 111, receptacle 112, conductor 252, terminal 247 of the swell motor 243, common terminal 245 of the swell shutter motor 243, common return conductors 249, 210 to the opposite pole of the battery 211. The swell shutter motor 243 will thereupon be energized to its fullest extent.

When the strip 28 engages the contact 57 a circuit will be closed including the plate 49, contact 76, conductors 137, 138, plug 139, receptacle 140, conductor 271, terminal 265 of the stop action 257, common terminal 268 of the chest 255, common return conductors 270, 249, 210 to the battery 211. Thus the stop action 257 is operated for rendering effective the pipe 261.

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It will thus be seen that the complex combination of the circuits for rendering effective a plurality of swell shutters, each of a different degree, will render effective a desired number of stop actions in desired combinations. While the complexity of these combinations is so great that the performer cannot select them during a performance of music, the switching mechanism herein featured provides means for predetermining the desired operations and simplifies the control thereof so that the performer may readily obtain an agreeable and novel combination of sounds.

The invention upon which this application is based is broader than the specific embodiments shown and described for the purpose of illustrating some of the ways in which it may be employed. The scope of the invention is therefore understood not to be limited by the present specific description. I intend no limitations other than those imposed by the appended claims.

What I claim is:—

1. In a musical instrument, the combination with a sound producing mechanism and means for controlling the sound produced thereby, of a manually operable control device, switching mechanism operated by said device, other switching mechanism interconnecting said first named switching mechanism and said sound control device, and a sequentially operable controller for initially rendering certain portions of the sound producing mechanism effective and for subsequently rendering other portions of the sound producing mechanism effective according to the predetermined adjustment of the manually operable control device.

2. In a musical instrument, the combination with a sound producing mechanism and means for controlling the sound produced thereby, of an adjustable control device, transition mechanism operated by said device, selector mechanism operatively interconnecting said transition mechanism and said sound control device, and a sequentially operable controller for initially rendering certain portions of the sound producing mechanism effective and for subsequently rendering additional portions of the sound producing mechanism effective according to a predetermined adjustment of said control device.

3. In a musical instrument, the combination with a sound producing mechanism and means for controlling the sound produced thereby, a device movable at the will of an operator, electro-magnetic means for actuating the sound controlling means, switching mechanism including stationary and movable contacts, the stationary contacts being operatively connected to said electro-magnetic actuating means, and switching mechanism interposed between said movable contacts and said control device, and circuit closing devices for selectively controlling said switching mechanism.

4. In a musical instrument, the combination with a sound producing mechanism and means for controlling the sound produced thereby, of a manually operable control device, switching mechanism operated by said device, other switching mechanism arranged to be adjusted into desired position, and a sequentially operable controller for rendering effective desired portions of the sound producing mechanism in accordance with the conjoint action of the manually operable control device and the second named switching mechanism.

5. In a musical instrument the combination with a sound producing mechanism and means for controlling the sound produced thereby, of a manually operable control device, switching mechanism operated by said device, a second manually operable control device interconnecting said switching mechanism and the said control device, and a sequentially operable controller for controlling the sound producing mechanism selectively according to the conjoint action of said manually operable devices.

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