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PEDAL CONTROL FOR PIPE ORGANS

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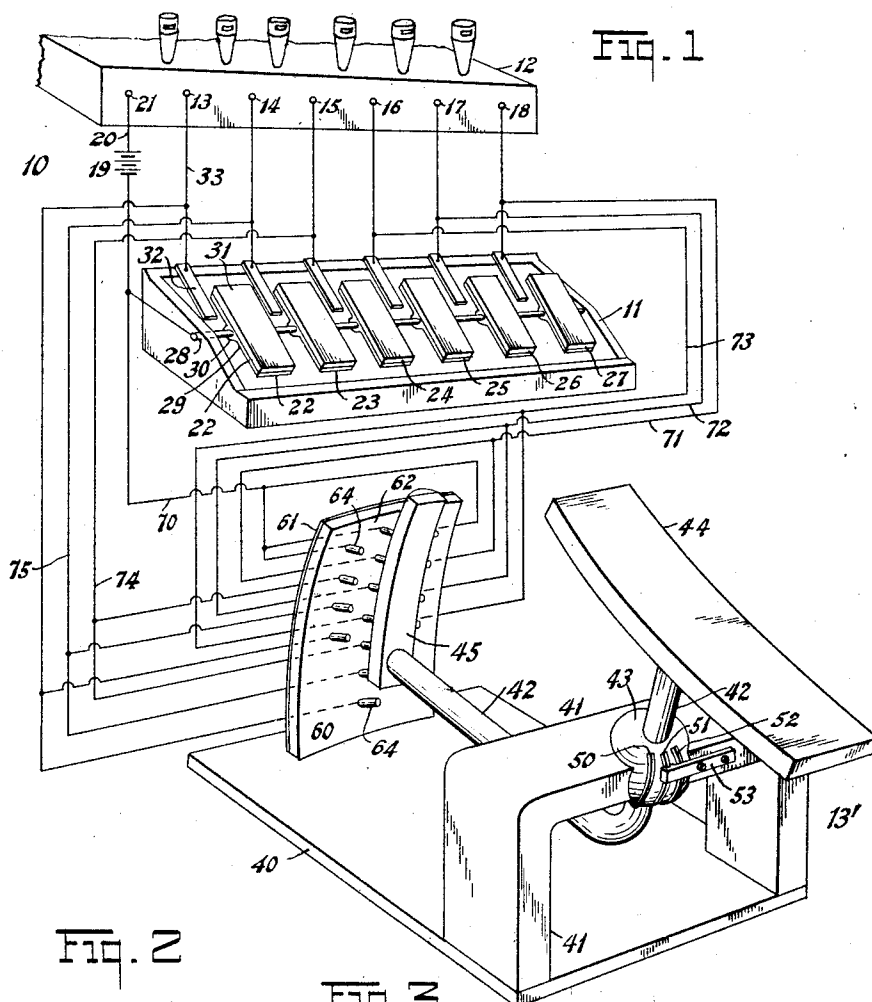


FIG. 2

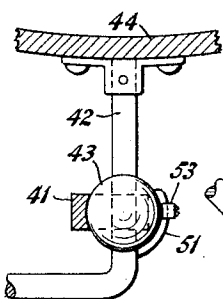


FIG. 3

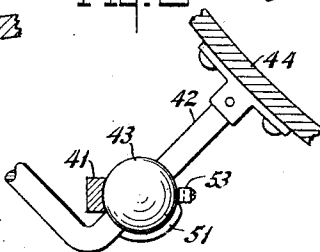
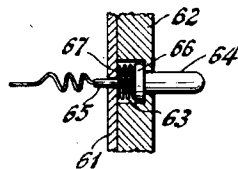


FIG. 4



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## UNITED STATES PATENT OFFICE.

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## PEDAL CONTROL FOR PIPE ORGANS.

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- This invention relates to improvements in control for musical instruments. A principal object of the present invention is to provide improved means for control by an operator of a complex musical instrument having a plurality of working parts whereby the operator may render effective a desired plurality of such parts in a selected manner.
- A feature of the invention relates to the provision of an improved pedal having movement in more than one direction to control selectively desired parts of the instrument.
- Another feature of the invention relates to improved guiding means for the pedal mechanism.
- Another feature of the invention relates to the provision of an improved terminal bank for the contacts controlled by a pedal.
- Other objects will appear from the following description taken in connection with the accompanying drawings in which
- Figure 1 is an isometric view of my improved pedal control and so much of the organ as is necessary to an understanding of the invention;
- Figure 2 is a detailed view partly in section of the pedal mounting with the pedal guide engaged;
- Figure 3 is a detailed view partly in section of the pedal mounting with the guide disengaged and
- Figure 4 is an enlarged sectional view of a pedal contact.
- Referring to Figure 1 there is shown diagrammatically an organ 10 including a tablet rail 11 conveniently mounted upon the usual manual and organ chest 12 and a pedal structure 13' conveniently mounted near the foot of the operator. The organ chest 12 comprises a plurality of stops having usual electro-pneumatic control mechanisms each diagrammatically represented by its respective electric terminal such as 13, 14, 15, 16, 17, 18, etc. A battery 19 or other suitable source of energy is connected by a conductor 20 to a terminal 21 common to all of the electro-pneumatic controls 13 to 18 inclusive.
- For operating the stops 13 to 18 inclusive in a manner heretofore known there is provided a corresponding plurality of tablets 22, 23, 24, 25, 26 and 27. The tablets 22 to 27 are pivotally mounted on a conducting rod 28 extending longitudinally of the tablet rail 11. The tablets 22 to 27 are of similar construction and a description of one will suffice for all. For instance, the tablet 22 comprises a base portion 29 formed of material which is a conductor of electricity and having at an intermediate portion thereof a suitable flange 30 provided with a drill hole or notch whereby the tablet may be mounted for rotation upon the rod 28. The base portion 29 of the tablet 22 has secured thereto a surface portion 31 formed of ivory or other desired material upon which there may be engraved the name of the respective stop which the tablet is intended to control. Mounted upon the frame of the tablet rail 11 opposite the respective tablet is a conducting leaf-spring 32 having its free end in proximity to but normally spaced apart from the free ends of the tablet 22. The arrangement of the tablet is such that it is held apart from the leaf-spring 32 but by touching the upper end of the tablet the tablet may be caused to establish electrical contact between this conducting portion 29 and the free end of the respective leaf-spring 32, and when so displaced the tablet will remain in displaced position until the manual is restored by the operator. The conducting leaf-springs 32 of the group of tablets are each connected to a corresponding stop mechanism by means of a conductor such as 33. Thus it will be seen that when the tablet 22 is displaced the circuit is closed from battery 19, conducting rod 28, base portion 29 of the tablet 22, leaf-spring 32 of the respective tablet conductor 33, electro-pneumatic stop mechanism 13, terminal 21, conductor 20 to the opposite pole of the battery 19. A similar circuit is closed by the operation of any of the other tablets 23 to 27 for operating any of the other stop mechanisms 14 to 18 inclusive. By the means thus provided the operator may manually render effective one or more of the stop mechanisms but it is necessary for him in order to change the stops selected to take his hand away from the keys and he thus is likely to interfere with the proper rendition of the music.
- The stop mechanisms 13 to 18 inclusive may be controlled in desired combinations without removing the hands of the operator from the keyboard by the pedal 13 which as

shown includes the base portion 40 having mounted thereon a frame 41. The frame 41 is preferably formed in inverted U-shape and there is pivotally positioned in the horizontal cross member thereof a bent arm 42. The mounting of the arm 42 in the frame 41 is preferably of the ball-socket type 43, as shown. One end of the arm 42 which for the purpose of the present description may be described as the outer end is provided with a step member 44 upon which the operator may rest his feet for the purposes of control. The other end of the arm 42 which will be referred to as an inner arm is provided with a conducting shoe 45 for a purpose which will be subsequently set forth.

For guiding the arm 42 so that the shoe 45 may be moved in predetermined paths there is provided a guiding mechanism comprising a plurality of curved rails such as 50, 51, 52 positioned in spaced relation on the surface of a ball of the ball and socket joint 43. A bifurcated spring member 53 is secured to the fixed frame 41 and its free end is adapted to engage any one of the rails 50, 51, 52. The rails are of limited length so that when the arm 42 is rotated by moving the set portion 44 in a clockwise direction, as seen in Figure 1, and into the position shown diagrammatically in Figure 3, the member 53 does not engage any of the rails and thus the arm 42 is free to rotate so that the shoe 45 may be moved in a horizontal plane. When the arm 42 is again rotated so that the step 44 moves in a clockwise direction, as seen in Figure 1, the member 53 engages one of the rails such as 51 (see Figure 2). The construction is such that while it is preferable to change from one rail to the next by moving the step member 44 into the position shown, it is also possible to change to another rail by a rotation at right angles to the plane of the rails; this being possible due to the spring action of the member 53.

A terminal bank mounting 60 is secured to the base 40 adjacent the inner end of the arm 42. The terminal bank mounting 60 is spaced apart from the shoe 45, and its surface forms a portion of a sphere having such radius that the amount of separation remains constant.

The mounting 60 is formed of insulating material and is preferably formed in two portions, a back portion 61, as clearly shown in Figure 4, and a front portion 62. The back portion 61 is perforated in rows and there is provided in the front portion 62 a recess 63 opposite each perforation in the contact portion 61. Positioned in each recess there is provided a movable contact pin 64 slidably mounted on a conducting stud 65, the stud being fixedly positioned in the contact portion 61 and extending through a respective aperture therein. The contact pin 64 is provided with a shoulder 66

positioned within the recess 63 and there is provided a retractile spring 67 between the surface of the shoulder 66 and the contact portion 61 of the mounting. The main portion of the pin 64 is of restricted diameter with respect to the shoulder 66 thereof and extends through an aperture sufficiently large in diameter in the front portion 62 to permit slidable movement of the pin 64, but the aperture has a smaller diameter than that of the shoulder 66 so that movement of the pin 64 is thus limited. The outer end of the pin 64 is rounded off and preferably polished.

The pins 64 are arranged in vertical rows on the mounting 60, there being as many pins in each row as may be desired. For instance, there are shown in the drawings four pins in the first row from the left hand side of Figure 1, seven pins in the second vertical row and four pins in the third vertical row, but it is understood that this showing is only by way of example and that any desired number of pins may be employed. The upper pin of each row is connected by means of a conductor 70 to the battery 19, the connection to the pin being made as indicated in Figure 4. Similarly, each of the other contact pins is connected to one of the stop actions 13 to 18, and thus there is provided a path in shunt with each respective tablet contact for closing the circuit of each such action.

In operation the step 44 is shifted by the foot of the operator by rotation horizontally while the rails 51 are in the position shown in Figure 3. Assuming that the second rail 51 and the second row of terminals have been selected by the operator, he then rotates the step 44 in a vertical plane thus bringing the bifurcated member 53 into engagement with a selected rail to maintain movement of the shoe 45 in register with the selected row of contacts. The operator may vary the musical effect by controlling the movement of the step 44 in the selected vertical plane, as the amount of movement determines the extent of movement of the shoe 45 and thus determines the number of contact pins which are to be connected into the circuit. As illustrated in the drawing, the mechanism is in the position shown so that six pins in the second row are electrically connected together. The following circuits are closed:

(1) Battery 19, conductor 70, upper contact pin in the second row, second contact pin in the second row, conductor 71, stop action 18, terminal 21, conductor 20, and the opposite pole of the battery 19.

(2) Battery 19, conductor 70, upper contact pin in the second row, third contact pin in the second row, conductor 72, stop action 17, terminal 21, conductor 20, to the opposite pole of the battery 19.

(3) Battery 19, conductor 70, upper contact pin in the second row, fourth contact pin in the second row, conductor 73, stop action 16, terminal 21, conductor 20 to the  
5 opposite pole of the battery 19.

(4) Battery 19, conductor 70, upper contact pin in the second row, fifth contact pin in the second row, conductor 74, stop action 15, terminal 21, conductor 20 to the opposite pole of the battery 19.  
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(5) Battery 19, conductor 70, upper contact pin in the second row, conductor 75, stop action 14, terminal 21, conductor 20 to the opposite pole of the battery 19.

15 If desired the operator may shift from one group of stops to another by rotating the step 44 horizontally and without returning it to the position shown in Figure 3 as the spring member 53 can be caused to  
20 jump from one rail to another as desired.

Thus it will be seen that the operator may conveniently control the stop actions of the instrument in varying combinations and thus produce quickly and expeditiously music  
25 having desired characteristics. The operator may instantly change the characteristics of the music without interfering with the manual key board operation and thus a variety of musical expression may be accordingly increased.  
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The invention upon which the application is based is broader than the specific embodiments shown and described, for example, the structure selected for purposes of illustration is that of an organ but it is understood  
35 that the invention may be readily applied to any other form of musical instrument as may be desired.

What I claim is:

40 1. A control for musical instruments comprising contact pins arranged in rows, a shoe for establishing electrical contact with desired ones of said pins, a guiding rail corresponding to each of said rows of pins, and  
45 a member for engaging a selected one of said rails.

2. A control for musical instruments having a plurality of stop actions, manual means for controlling said stop actions, a  
50 pedal means for controlling said actions in groups independently of said manual means,

and means for guiding said pedal to operate with respect to a selected group.

3. A control mechanism for musical instruments comprising a terminal bank forming a portion of a sphere, contact ends positioned on said terminal bank and a correspondingly curved shoe movable in two directions across said terminal bank to establish electrical connections with said pins.  
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4. A control mechanism for musical instruments comprising a terminal bank having stationary contacts arranged in rows, a movable contact for selectively engaging certain of said contacts, means for moving said movable contact into alignment with a desired row of stationary contacts, and a guide in predetermined relation with each row of stationary contacts for guiding the movable contact to operate only with respect to the selected row.  
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5. A control mechanism for musical instruments comprising a terminal bank having fixed contacts arranged in rows, a movable contact, a pedal for actuating said movable contact in one direction to select a desired row and in a different direction to select desired fixed contacts in the selected row.  
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6. A control mechanism for musical instruments comprising a terminal bank having fixed contacts arranged in rows, a movable contact, a pedal for actuating said movable contact in one direction to select a desired row and in a direction at an angle to the first named direction to select desired fixed contacts in the selected row.  
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7. A control mechanism for musical instruments comprising an arm, a ball and socket joint for said arm, a support for said ball and socket joint, a pedal at one end of said arm for actuating said arm, a movable contacting element at the other end of said arm, a plurality of rows of stationary contacts engaged by said element, and guides controlling said ball and socket joint for guiding the movable contacting element to operate with respect to a selected group of contacts.  
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Signed at Gloucester, in the county of Essex and State of Massachusetts, this 14th day of August, A. D. 1924.  
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JOHN HAYS HAMMOND, JR.