

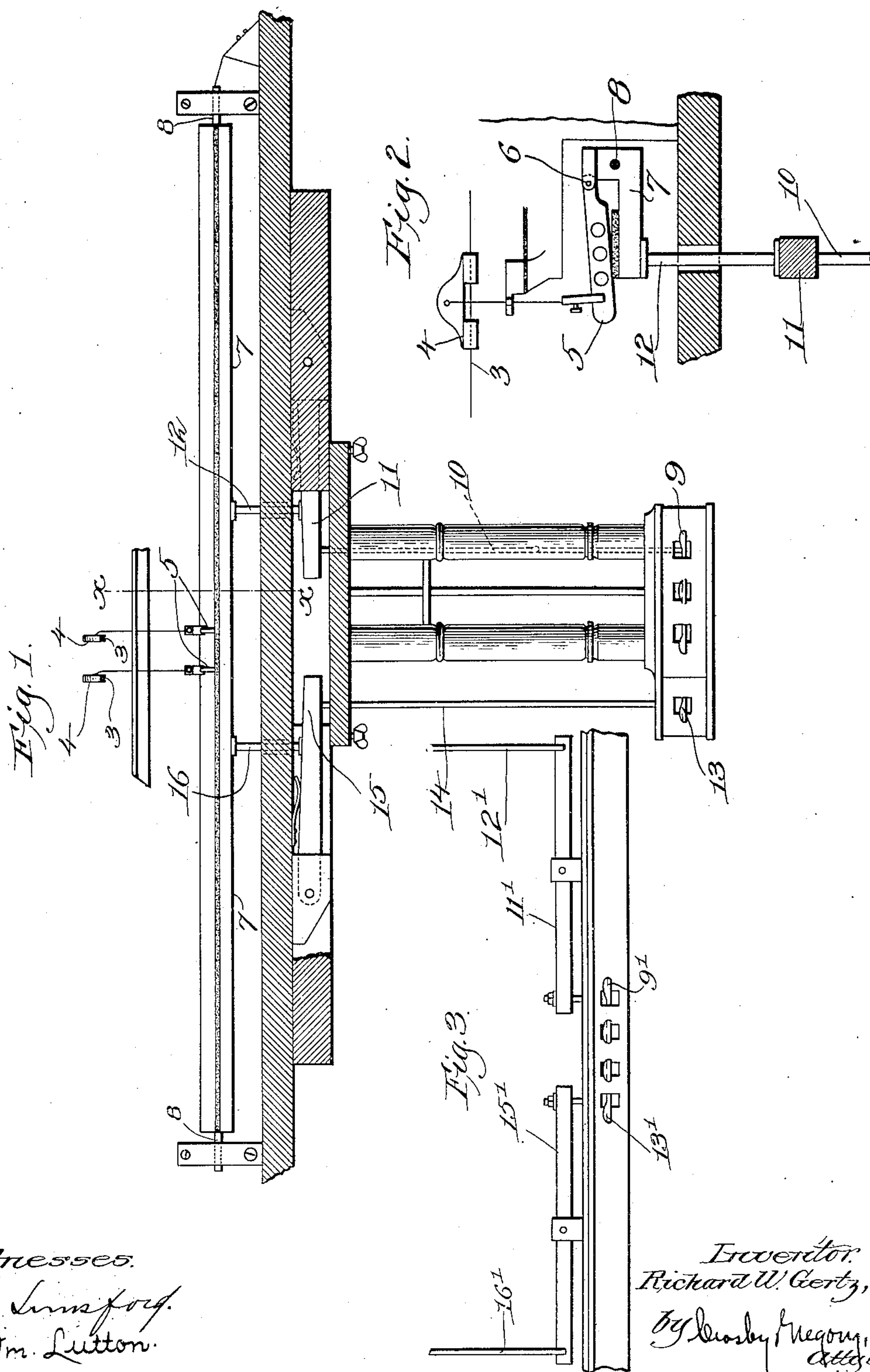
No. 751,726.

PATENTED FEB. 9, 1904.

R. W. GERTZ.  
PIANO.

APPLICATION FILED FEB. 27, 1903.

NO MODEL.





# UNITED STATES PATENT OFFICE.

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## PIANO.

SPECIFICATION forming part of Letters Patent No. 751,726, dated February 9, 1904.

Application filed February 27, 1903. Serial No. 145,353. (No model.)

*To all whom it may concern:*

Be it known that I, RICHARD W. GERTZ, a citizen of the United States, residing at Cambridge, in the county of Middlesex and State of Massachusetts, have invented an Improvement in Pianos, of which the following description, in connection with the accompanying drawings, is a specification, like numerals on the drawings representing like parts.

This invention relates to pianos, and has for its object to provide means whereby the sympathetic strings may be caused to vibrate when any note or chord is struck and then damped before the next note or chord is struck, whereby each chord or tone will stand by itself and at the same time the benefit of all overtones may be obtained.

In pianos as now commonly constructed each string is provided with a damper connected to and operated by a damper-lever and all the damper-levers are pivoted to a damper-lever frame, which in turn is operated by the so-called "loud" pedal. Each damper-lever is capable of movement independent of the damper-lever frame, and suitable mechanism is provided whereby when any key is struck the corresponding damper-lever is raised, thus lifting the dampers from the strings and allowing them to vibrate when struck by the hammer. As soon as the key is released the damper comes in contact with the string and damps it. When the so-called "loud" pedal is operated, the damper-lever frame is raised, thus raising all the dampers simultaneously, with the result that when any chord or tone is struck not only the strings corresponding to the keys operated will sound, but also the sympathetic strings will be caused to vibrate, thus producing harmonics or overtones.

The effect desired in rendering some passages of music can only be obtained by bringing out all the harmonics or overtones for each note or chord struck in such a way that there will be no blending of one tone or chord into the other, but each tone, with its overtones, will stand by itself. This can only be accomplished by providing means whereby all the dampers are raised from the strings immediately after any note or chord is struck and brought back or dropped onto the strings

again just prior to the instant that the next succeeding note or chord is struck. If the above operation is performed, the striking of an individual note causes said note to sound, and the instant the string corresponding to said note begins to vibrate the dampers are raised from the other strings, so that the sympathetic strings are permitted to vibrate, thus producing the harmonics or overtones. The damping of all the strings just prior to the sounding of the next note causes all the strings to cease their vibrations, with the result that each note, and its harmonics or overtones, stands by itself.

It is the purpose of my present invention to provide a mechanism for accomplishing this object.

In the drawings, Figure 1 is a sectional view of a portion of a grand piano, showing my invention applied thereto. Fig. 2 is a section on the line *x x*, Fig. 1; and Fig. 3 shows how my invention may be applied to an upright piano.

Referring to Figs. 1 and 2, 3 designates the usual piano-strings, and 4 the dampers for the said strings. These dampers are operated as usual—that is, each damper is connected to a damper-lever 5, which is pivoted, as at 6, to a damper-lever frame 7, said damper-lever frame being in turn pivoted to turn about an axis 8. 9 indicates the ordinary so-called "loud" pedal, which is connected by a member 10 to the operating-lever 11, which in turn operates the damper-lever frame 7 through the strut or member 12.

The parts thus far described are constructed as usual in grand or square pianos.

In order that the dampers may properly perform their function, it is essential that when the pedal is released said dampers should rest upon the strings, and to permit this the connections between the pedals and the dampers usually have some loose play, such loose play generally coming between the member 10 and the operating-lever and also between the strut 12 and the damper-lever frame, said strut not being connected directly to the damper-lever frame, but merely constructed to engage said frame when the strut is lifted, and thus lift the frame. When, therefore, the pedal 9 is



depressed, a considerable part of the movement of the pedal is employed in taking up the lost motion in the parts between the pedal and the damper-lever frame, which parts are  
 5 familiarly known by the name of "trapwork," and similarly a considerable part of the movement of the pedal when the foot is raised therefrom corresponds to the lost motion in the trapwork.

10 In order to produce the effects contemplated by my invention, it is necessary for the pianist to depress the pedal 9 with his foot at the proper time so that the dampers will all be raised from the strings immediately after the  
 15 hammer corresponding to the key operated strikes its string, so that the note struck will first be sounded and instantly the dampers raised be bring out the overtones or harmonics. To obtain the above-described effect, there-  
 20 fore, requires two distinct syncopated motions—one the motion necessary to strike the note or chord and the other the motion necessary to raise the dampers from the strings. While the ordinary loud pedal is sufficient to  
 25 obtain this effect when an individual note is struck which is not followed by a succeeding note, yet it would be impossible to operate a single pedal 9 rapidly enough to raise all the dampers from the strings immediately  
 30 after a note or chord was struck and drop the dampers back onto the strings before the next note or chord was struck during the rendering of any piece of music, because the lost motion in the trapwork makes it nec-  
 35 essary to move the foot operating the pedal through such a distance that it would be impossible to make the physical effort necessary to operate the pedal with sufficient rapidity. In this form of my invention I provide for in-  
 40 creasing the rapidity with which the damper-lever frame may be operated by providing a second pedal, which is similar to but independent from the pedal 9 and which may be used in addition to the pedal 9 for operating  
 45 the damper-lever frame. In the form of the invention shown in Fig. 1 this supplemental or extra pedal is designated by 13, and it has connected thereto a member 14, which operates a lever 15, similar in all respects to lever  
 50 11. A suitable strut or connecting member 16 is interposed between the lever 15 and the damper-lever frame 7. With this construction when either of the levers 9 or 13 is depressed the damper-lever frame will be oper-  
 55 ated, and by operating said levers alternately the damper-lever frame may be operated with sufficient rapidity so that the dampers may be raised from the strings immediately after any note or chord is struck and dropped back  
 60 onto the strings again before the next succeeding note is struck, no matter how rapidly the notes or chords follow each other.

In using a piano with my double-pedal improvements applied thereto the player strikes  
 65 one note or chord and at the same time de-

presses one pedal, so as to raise the dampers from the strings immediately after the hammer strikes the strings, and holds said pedal depressed until just previous to the striking of the next succeeding note or chord, which in  
 70 case the notes follow each other in quick succession might be only the fraction of a second. Just previous to striking the second note or chord the foot is released from the pedal and the dampers allowed to come back onto  
 75 the strings, and while a second note or chord is being struck the second pedal is operated, so that the dampers will again be raised from the strings immediately after such second note is sounded. Owing to the lost motion in the  
 80 trapwork the second pedal is being depressed to take up the lost motion before the first pedal has completely resumed its normal position.

After a person has become skilful in the  
 85 use of a piano having my improvements it will be possible to so operate the two pedals that the instant the dampers strike the strings after the first pedal is released the note or chord will be struck and the dampers instantly  
 90 raised by the second pedal. In other words, the second pedal will have been depressed to take up lost motion while the first pedal is resuming its normal position, so that the strut 16 catches the damper-lever frame just as the  
 95 strut 12 moves away from said frame. By this operation all the overtones are brought out in a way that has been impossible to obtain in legato passages and the singing power of the individual tones is very greatly in-  
 100 creased.

In the piano as now constructed to attempt to operate the single pedal 9 rapidly and deftly enough to partially obtain the above-men-  
 105 tioned effects even in very slow passages is accompanied by a loud and disagreeable noise and a physical effort on the part of the player which detracts very much from the enjoyment of the performance both for the player and for  
 110 the listener. With my improvements, however, it is possible even in the most rapid passages to make each chord or tone stand alone by itself and at the same time obtain the benefit of the overtones.

In practice I prefer to place the pedal 13 a  
 115 slight distance to the left of the group of the other pedals and such a distance away from them that by swinging the left foot on the heel the operator may readily reach and operate said pedal when he desires to produce  
 120 the effects above mentioned.

In Fig. 3 I have illustrated my invention as applied to an upright piano. In said figure, 9' is the ordinary loud pedal, which is connected to the damper-lever frame (not shown)  
 125 by a lever 11' and connection 12'. 13' designates the additional pedal, which is connected to the damper-lever frame by means of the lever 15' and connection 16'.

In order to produce the effects above de-  
 130



scribed, it is essential that the dampers should be raised from the strings the same distance each time, and to accomplish this it is necessary that the two trapworks be identical in construction, so that one will operate to raise the damper-lever frame exactly the same distance that the other will.

While I have herein illustrated two ways of embodying my invention, I do not wish to be limited to the construction here shown, as I believe I am the first to provide means whereby the strings may be damped and the dampers raised from the strings between each two successive notes even though the notes follow each other rapidly.

Having described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a piano, a damper-lever frame, dampers operated thereby, and two independently-operated pedals separately connected to the

damper-lever frame, whereby the said frame may be operated by the pedals alternately.

2. In a piano, a damper-lever frame, dampers operated thereby, and two independent trapworks for separately operating said damper-lever frame.

3. In a piano, a damper-lever frame, dampers operated thereby, two independently-operated pedals, and similar connections interposed between each pedal and the damper-lever frame whereby said frame may be independently operated and to the same extent by each pedal.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

RICHARD W. GERTZ.

Witnesses:

LOUIS C. SMITH,

EDITH M. STODDARD.