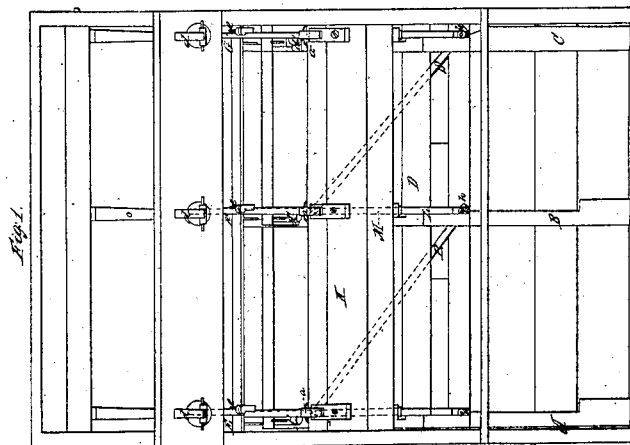
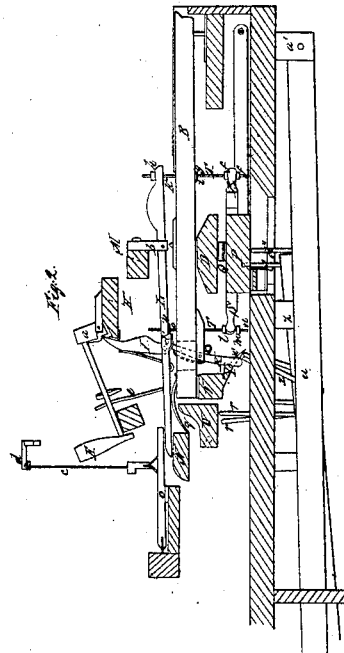


PIANO.

Patented July 10, 1845.



UNITED STATES PATENT OFFICE.

SAMUEL R. WARREN, OF MONTREAL, CANADA EAST.

PIANOFORTE.

Specification of Letters Patent No. 4,109, dated July 10, 1845.

To all whom it may concern:

Be it known that I, SAMUEL R. WARREN, a citizen of the United States of America, but residing at Montreal, in the Province of Canada East, have invented a certain new and useful Improvement in Pianofortes; and I do hereby declare that the nature of my invention and the manner in which the same operates and is constructed are fully set forth and explained in the following description and accompanying drawings, and letters, figures, and references thereof.

My invention is a peculiar modification of or addition to the common piano forte action by means of which a performer can at pleasure by a simple stroke upon any one of the keys within certain limits play or make vibrate alone by itself or in connection with the key so struck either the string of an octave key above or that of an octave key below.

Figure 1, of the drawings represents a top view of three keys of a piano forte together with their actions and the arrangement of the said keys at octave distances apart from each other as they are generally disposed in ordinary instruments. Fig. 2 is a vertical section taken midway between two of the keys, or between the central key and that on the left of it, in order to exhibit a side view of the action and appendages of the middle key. Fig. 3, is a view of a portion of the under side of the piano case exhibiting the levers which are operated by the pedestals the same to be hereinafter described. Fig. 4, denotes a vertical transverse section taken through the keys and at a very short distance in rear of the name board.

A, B, C, (Fig. 1) represent the three keys of the piano, the two outer ones being supposed to be each an octave in distance from the other or third one or at such distance from it as may be desired, for I do not intend to confine my invention strictly to the playing of the octaves, as it will be evident to piano forte mechanisms that any string may be coupled with another string by a similar arrangement of mechanism adapted to their respective actions. The three keys are supported and play in the usual manner upon a fixed bar D extending transversely underneath them. The hammers E, F, G, are denoted as having their center blocks *a, a, a*, hinged or jointed to the fixed transverse rail H. Each of the hammers is elevated or thrown up by the key acting

through two flies or hoppers I, K, the first one (viz K) being jointed to the rear end of the key while the other is jointed to and extends upward from the upper side of a long lever L, arranged over the key and playing or turning (near its front end) vertically upon a fulcrum at *b*, extending from a fixed transverse rail M. The rear end of the lever L, rests upon a bar N, and when thrown up raises the front end of a lever O which is disposed over it and with respect to it as seen in Fig. 2, and has the damper wire *c*, carrying the damper *d*, applied to or extending upward from its upper side as seen in the drawing.

A small rounded projection *d'* is made upon the side of the lever L, for the upper end of the lower hopper to abut and operate against so that when the front end of the key lever is depressed, the said hopper (when its upper end is directly under the projection *d'*) will raise or force upward the lever L, and thus elevate the hammer or cause it to strike a blow upon its string. On the return of the hammer it (the hammer) falls upon a back catch (*e*) (similar to such as are ordinarily used) which extends upward from the lever L, as seen in Fig. 2.

Beneath the fixed rest bar D, and at about one half an inch distant from it a movable bar P, is arranged as seen in Figs. 2 and 4. The said bar P, is to be supported in any proper manner so as to permit of its elevation or depression in vertical directions by means of the pedal levers to be hereinafter described. Between it and the fixed bar immediately over it is a spring Q, which is so connected to the two bars that whenever any force by which the lower bar P is elevated or depressed from its stationary position is relieved or withdrawn from the bar, it (the spring) will draw back the bar into its stationary position. The said movable bar P, is intended to carry and support a series of diagonal levers R, S, each of which vibrates in vertical directions upon the bar at or near its middle part on a suitable fulcrum or support attached to the bar. The front end of the lever R is placed so as to be under or in a vertical line with that of the lever L, of the middle key B. Its other or rear end extends underneath the rear end of the key A. So with the other lever S it is similarly disposed with respect to the keys C and B. At each end of each of the levers R, S, one

of a series of metallic wires T, T, &c., extends upward and is properly jointed to the end of the lever or sustained therein by being passed through a hole bored vertically through the end of the lever and by two regulating buttons or nuts *f, f*, which work upon a screw cut upon the end of the wire and are disposed as seen in the drawings.

The wire at the front end of each lever R, S, rises upward through the key which is over the end of the lever or passes through a vertical notch or groove cut vertically in the side of the key and passes and moves through the front end of the lever L which is over the said key and has two more regulating buttons or nuts *g, h*, working upon screws *i k*, cut upon it, the one of the said buttons or nuts (*viz.*, *g*) being under the key and the other (or *h*) over or upon the front end of the lever L, as seen in the drawings.

Each of the wires T, T, extending upward from the rear ends of the levers R, S is applied or jointed to its lever in a similar manner to the wires of the front ends of the said levers, that is to say, it has two screw nuts or regulating buttons *l, m*, applied to it and working upon a screw *n*, as seen in the drawings. The said wire extends upward and plays vertically or moves freely through the key lever immediately over the end of the lever R or S, from which said wire projects and the said wire also passes and moves freely through the lever L of the last mentioned key lever.

A screw *o* is cut upon the wire between the key lever and the lever L, above it and a regulating nut or button *p*, is arranged upon and adapted to the said screw as seen in the drawing. The front end of the key lever is thrown upward after each blow of the finger upon it by means of a bent wire spring *q*, which extends from the fixed bar upon which the rear end of the lever L rests and presses upon the upper side of the rear end of the key lever. The said spring, and in fact all of such, there being one to each key are thrown out of action upon the key levers when necessary by means of a transverse movable lever bar U, (shaped in cross section as seen in Fig. 2,) which is hung so as to move upon a fulcrum or fulcra at its rear part and is lifted or carried up by one of two simple sheds or rods *r, r*, extending upward from one of the two pedal levers *t* or *u*. When the rear end of either of the said pedal levers is elevated the stud *r* applied to the lever rises with it and acts upon the bar U. Another movable transverse lever bar V, supports upon its upper edge the rear ends of the key levers. The fulcra of the said bar should be arranged at the upper parts of its two ends and so as to permit the lower end of the bar to be swung forward or in a direction toward the

lower ends of the several lower hoppers K. The said movable bar should have a short arm *w*, extending from its lower side about at right angles to the bar, as seen in Fig. 2. The front end of the said arm is to be raised by a projection or shed or wire *x*, extending upward from the pedal lever *v*, so that when the said lever *v* raises the stud the front end of the arm will be thrown up and will thereby cause a projection *y* from the front side of the movable bar V to come into contact with the lower ends of the several lower hoppers K, and throw them forward and of course their upper ends backward or away from their positions under the projection *d'* and *c* of the lever L, against which they act to raise the lever. Consequently when this takes place and the key is depressed or struck by the performer, it will not elevate the lever L and its hammer. The object of this will hereafter be explained. The several pedal levers *s, t, u, v*, are disposed beneath the instrument as seen in Figs. 2 and 3. The two former (*s, t*) are shorter than the two latter (*u, v*). The fulcra of the two former are between their ends or at *z z*, while those of the two latter are at their ends which are immediately beneath the keys or at *a' a'*.

Each of two levers *s, t*, acts when its rear end is elevated so as to depress the movable bar P, and this is effected by the front end of each of the levers resting and bearing upon a button or head *b'* of a wire *c'* which projects downward from the bar P. The said bar P is raised upward by the levers *u v*, when they are elevated, each of the said levers having a stud or wire *d''* inserted in it and rising upward from it and terminating at a short distance below the bar P.

Having thus described the several operative parts of my improvement I shall now proceed to explain the manner in which they act in combination with each other, first premising that when the pedal levers are not acted upon by their pedals the instrument may be played upon like any ordinary piano forte, that is to say, each key may be struck without affecting or moving any other than its own hammer. By raising the rear end of pedal lever *t* the movable bar P, will be depressed so as to carry down the regulating button of the wire of the rear end of the diagonal lever S, and to such distance as when the key B is struck to cause the rear end of its lever to come in contact with the said button and raise the same and the rear end of the lever S, thereby depressing its front end, as well as that of the front end of the lever L of the key C and at the same time throwing up the hammer of the key C. Thus the octave above or to the right is struck by the key B.

The elevation of the rear end of the lever

S depresses the movable bar P, and at the same time elevates the arm of the movable bar V and thereby throws the lower end of the lower hopper K forward as before described. Consequently when such is the position of things and the key B, is struck no motion of its hammer takes place but it will operate on the hammer of the key C.

By elevating the rear end of the pedal lever *u* the movable bar P will be raised so as to cause the regulating button or nut *g* of the wire inserted in the front end of the lever R to be met or forced down by the key B, when struck by the performer. Thus the front end of the lever R is depressed and in consequence thereof the hammer of the key A thrown up. The sound of the string of said hammer is therefore obtained at the same time with that of the hammer of the key B. The elevation of the rear end of the pedal lever *v* produces a movement of the lower hopper K of the action of the key B, the same as was effected by raising the pedal lever *s*. Consequently while the said pedal lever *v* is raised and the key B is struck by the performer it only acts upon the hammer of the key A.

What I claim in the above as my invention is—

1. The combination of a coupling lever which together with its support is capable of being moved up or down or not as the case may require, and its wires T, T, and regulating buttons or nuts (*p*, *h*, of keys B and C, or *g*, *p*, of keys B and A) and a lever

L and auxiliary hopper or fly I (or other substitutes of like character) applied to any two keys or key levers of a piano forte for the purpose of sounding the strings of both keys by striking upon one of the keys as above described.

2. And I also claim the combination with the hopper (K) which is applied to the key levers for the purpose of elevating the parts above, and the hammer, of the vibrating bar V, or apparatus by which said hopper is thrown out of action upon the parts above it, the same being for the object or purpose as hereinbefore specified.

3. And I also claim the mechanism or combination by which I am enabled at pleasure to effect the action of a key above or below the key struck by the performer, the said mechanism consisting in the movable board P, made capable of being raised or lowered by pedal levers, the respective regulating buttons or nuts *p*, *h* of the keys B and C and *g*, *p* of the keys B and A, the said nuts being arranged upon their wires and the whole of the said mechanism being operated and applied to the other parts of the action substantially as described.

In testimony whereof, I have hereto set my signature this eighth day of April A. D. 1845.

SAMUEL R. WARREN.

Witnesses:

R. H. EDDY,
THOS. D. WARREN.