

UNITED STATES PATENT OFFICE.

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IMPROVEMENT IN PIANO-FORTE ACTIONS.

Specification forming part of Letters Patent No. **165,304**, dated June 6, 1875; application filed May 6, 1875.

To all whom it may concern:

Be it known that I, THADDEUS P. CARR, of Yellow Springs, Greene county, Ohio, have invented a new and useful Piano-Forte Action, of which the following is a specification:

This invention relates to that class of devices commonly known as "double-repeating" piano-actions; and my improvement consists in a novel arrangement of back-catch for sustaining the hammer in its elevated position the instant the latter comes in contact with the wire, the peculiar construction of said back-catch, together with its mode of operation, being hereinafter fully described.

In the accompanying drawing, Figure 1 is a partially-sectionized elevation of my improved double-repeating action, the hammer being shown in its normal or depressed position. Fig. 2 is another sectionized elevation of the action, showing the hammer raised and in contact with the wire of the instrument. Fig. 3 represents a modified form of the back-catch.

A represents a portion of the bed of a piano-action, said bed having the customary cushion *a*, and a bearing, B, to which latter the key C is pivoted in the usual manner. D and E represent, respectively, two rails, which extend longitudinally of the action, the former being provided with a cushion, *d*, while the latter has attached to it the knuckle-jointed bearing *e* of the shaft G, that is secured to shank or stem H of hammer I. J is the jaw of this hammer. K is the jack, hinged at *k* to an adjustable bearing, L, secured to the upper side of key C. M is a set-screw, which regulates the action of the jack. All of the above-enumerated devices may be of the represented or any other approved construction, as they constitute no part of my invention.

My improvement begins with the back-catch N, which device, instead of being rigidly united to a stem projecting upwardly from the key C in the usual manner, is pivoted at O to a bent lever or bell-crank, P, the latter being hinged at *p* to a bearing, R. This bearing is secured to, and adjusted upon, the key C by means of screws *r*. The back-catch has a heel, *n*, to which is secured one end of a suitable spring, S, the other end of said spring being

attached to the lever P at any convenient point. The stress of this spring tends to throw the free end of back-catch N outwardly, or away from its supporting-lever P, which outward movement is restricted by an adjustable stop, *t*, that engages with a screw-threaded rod, T. This rod projects inwardly from the back-catch of the action, and traverses a slot, Q, in lever P, as seen in Fig. 1. The bent lever or bell-crank P has a toe, U, which, as soon as the outer end of key C is depressed by the performer's finger, is brought in contact with a cushioned tripper, V, said tripper being adjusted to the under side of cushion-rail D by screws *v*. W is the appropriate wire for hammer I to act against.

The operation of my action is as follows: In the normal position of the various parts the hammer-shaft G rests upon the cushion *d*, and the operating end of jack K is engaged under the jaw of the hammer, while the lever P, that supports the back-catch N, turns upon the pivot *p*, and falls rearwardly as far as the bearing R will permit, as seen in Fig. 1. By referring to this illustration it will be noticed that the hammer-shank H is not in contact with any member of the movement, and, consequently, it is free to act the moment the player strikes the key of the instrument, thus insuring prompt action in response to a light touch of the key. The instant the key C is struck the different members of the action assume the position shown in Fig. 2, the hammer being at once elevated and struck against the appropriate wire W. This movement of the key brings the toe U in contact with the tripper V, thereby swinging lever P forward, and causing the cushioned back-catch N to engage under the chamfered edge of hammer-shank H at the moment of striking the wire, as seen in Fig. 2.

It is evident that the back-catch will sustain the hammer in this elevated position as long as the key is under pressure of the player's finger; but the moment the operator relaxes the pressure in the least degree, and allows the operating end of the key to descend to any appreciable extent, that moment the jack K re-engages with the jaw J of the hammer, as indicated by dotted lines in Fig. 2.

This re-engagement of the jack with the hammer's jaw enables the performer to quickly repeat the note without releasing the key.

This quick re-engagement of the jack K with the jaw J is accomplished by the spring S forcing the catch N outwardly with sufficient pressure to enable said back-catch to sustain the hammer in its elevated position. As the hammer is thus prevented from dropping, it is evident that a very slight movement of the key will suffice to enable the engagement of the jack with the jaw.

In applying my action to the piano, the stop T *t* and tripper V *v* must first be properly adjusted, so as to allow the hammer I to fall a slight distance from the wire before the back-catch N engages with its shank. This slight recoil of the hammer is necessary, as it is evident that its prolonged contact with the wire would prevent the proper vibration of the latter and thereby detract from the musical qualities of the instrument.

Chief among the advantages of this action are its delicacy, promptness, and ease of operation, its simplicity and durability. The action can be put into a piano for a small fraction of the cost of other double-repeating actions now in use, and quite equal or excel them in effectiveness. As to durability, the parts are so few and so simple in construction—there being only two bearings and two pivots—it can be made equally as durable as the parts without this attachment; such, for example, as the "French" grand action now used in all square pianos.

In perfectness of operation my action is believed to be superior to any double-repeating action now used. In every variety of touch that a player may use, my action operates as completely as any double-repeating action that is made, and in one respect more completely. In my action, however hard the key may be struck, the hammer will not rebound so far from the string but what the jack will get back to its place under the jaw of the hammer before the key under the finger of the player rises any appreciable distance. In all other double-repeating actions known to me, when the key is struck with considerable force the hammer rebounds and catches on the stationary back-catch, and then the key will have to rise under the finger to a level with the others before the jack can return to its starting-place, so that these actions are practically of no account except in very light delicate playing.

My invention is more especially designed as an effective double-repeating action for square pianos. When put into grand pianos the parts will have to be shaped differently, though occupying the same relative positions. As the grand-piano action is some two or three inches higher, the jack will have to be longer, and then the other parts will have to be changed accordingly. Thus the lever P would have a slightly different shape with its pivot or fulcrum *p* nearer the end of the key and the bearing nearer the end of the hammer, thus making the lever P almost straight. These and other changes in proportions and dimensions will be made without difficulty by any competent action-maker.

My action has another important advantage in being easy to regulate; any tuner can regulate it without trouble. It has another great advantage also in the tuner being able to take out the key easily. In other double-repeating actions the tuner has to tear the action almost to pieces before the key can be taken out.

It will be seen that the bearing of the heel of the lever against the cushion V operates to make the back-catch touch the hammer at the moment of striking the wire. If it touched the hammer before that moment, the touch would be effected and the object be not perfectly attained.

As my peculiarly-constructed swinging or pivoted back-catch is the leading feature of my invention, I have shown in Fig. 3 another way of applying said device to the instrument. In this arrangement the bent lever P' is pivoted to a bearing, X, which latter is secured to a rail, Y. The toe U' of said lever is acted upon by a tripper, V', attached to the key and not to the cushion-rail, as in the previous illustrations.

Other modifications of the hinged back-catch may be arranged so as to be adapted to various constructions of pianos.

I claim as new and of my invention—

In combination with a piano-key, C, hammer G H I J, and jack K *k*, the pivoted adjustable back-catch N *n* O S, and lever P U, which latter is pivoted either to the block R or bearing X, and operated by the tripper V or V', substantially as herein described and set forth.

In testimony of which invention I hereunto set my hand.

Attest: THADDEUS P. CARR.
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