



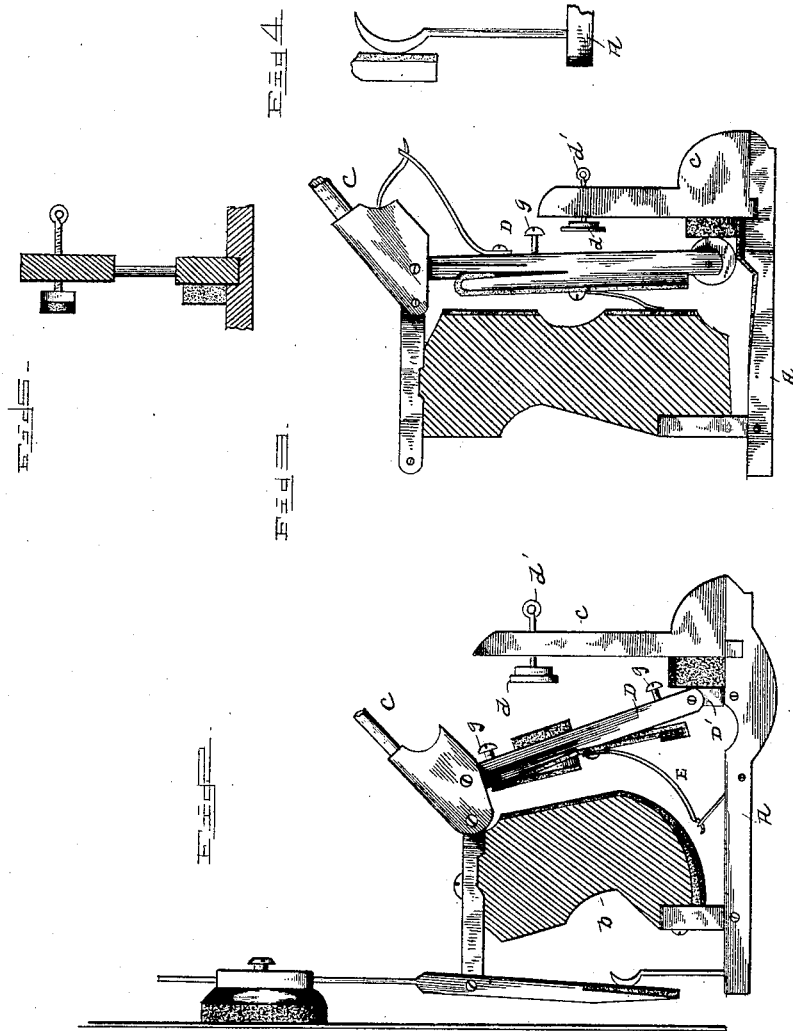
(No Model.)

2 Sheets—Sheet 2.

S. R. PERRY.  
PIANO FORTE ACTION.

No. 453,938.

Patented June 9, 1891.



Witnesses  
Paul W. Fleming.  
Roscoe Scarle.

Inventor  
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# UNITED STATES PATENT OFFICE.

SAMUEL R. PERRY, OF SCRANTON, PENNSYLVANIA.

## PIANO-FORTE ACTION.

SPECIFICATION forming part of Letters Patent No. 453,938, dated June 9, 1891.

Application filed October 14, 1889. Serial No. 327,008. (No model.)

*To all whom it may concern:*

Be it known that I, SAMUEL R. PERRY, a citizen of the United States of America, residing at Scranton, in the county of Lackawanna and State of Pennsylvania, have invented certain new and useful Improvements in Piano-Forte Actions, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to certain improvements in piano-forte actions which are applicable, with slight modifications, to grand or upright pianos.

This invention has for its object to materially cheapen the construction by dispensing with several parts necessary in piano-forte actions as heretofore made; to render the action more readily responsive to the touch of the player and promote the repetition of stroke; to make each stroke a mechanical certainty, however rapid in execution; to render the action more durable, and to require a minimum adjustment from wear.

The invention consists of the novel combination of parts and their construction, as will be understood from the accompanying illustrations and following description.

Figure 1 is a view in side elevation and partly in section of my invention as arranged for grand-piano-forte actions. Fig. 2 is a similar view of parts as applied to upright-piano-forte actions, and Fig. 3 is a modification of Fig. 2. Figs. 4 and 5 are modifications.

In carrying out my invention I employ a lever A, which is hinged or pivoted near its rear end upon a flange *a*, pendent from the rail *b* of the action. Beneath the lever A extends the rear end of the key B, and upon the latter rests said end of the lever, which end of the key is packed or cushioned where it comes in contact with the lever. The lever A carries at its extreme forward end a post *c*, which in turn carries an adjusting-screw *d*, which has at its rear or inner end a block or disk *d'*, the purpose of which will appear farther on.

C is the hammer, which is adapted to act or strike from below upward against the strings, and has its forward end articulated by a flange to a bar *e* of the action-frame. The hammer-arm is connected near its ex-

treme forward end by a long link D and a short link D' to the lever A, the lower end of the long link being connected to said short link D', thus forming a toggle-like joint connection between the said links and lever A for the purpose of holding the long link and its regulating-tongue against the action-rail *b*. The long link carries upon its rear or inner edge a strip or bar *f*, bolted about at its center to the long link D and having at its upper end a cushioned tongue *f'*, which is formed to enter a corresponding notch *f''* in the action-rail *b*. A spring E is fastened at its upper end to the tongue *f'* and has its lower end bearing against the rail *b*, which has the effect to hold the hammer-supporting link D in its more nearly vertical position. *g g* are regulating-screws working in the long link D and engaging the tongue *f'* to effect the adjustment of the upper and lower ends of the latter with relation to the link. The hammer normally rests upon a bar *h*, which is pivotally connected to the rail *b* by means of an arm *h'*, projecting from said bar *h* and pivoted to a short vertical flange *h''*, fastened to the rail *b*.

F is a rod or pitman having at its upper end an arm or projection *f''*, which runs beneath and supports the bar *h*, the lower end of said rod or pitman resting in an opening *f'''* in the key-frame G, a cushioned button or pin *g'* being applied to said rod or pitman so as to rest upon the said key-frame and sustain it (the said rod or pitman) in position. With the lower end of the rod or pitman F engages in practice a second rod or pitman (not shown) actuated by the pedal from below, by which means the hammers may be relatively adjusted to the strings to vary the length of their stroke for light playing, or to allow the hammers to rest at any position to suit the strength of tone required.

H is an intermediate lever, free at both ends, which is pivoted near its forward end upon a flange *i*, secured to a bar or rail *j*, which bar extends the whole length of the action-frame, and to which bar all the intermediate levers are thus attached. This bar is held in place by screws fastening it to the key-frame G. The shorter arm of the lever H rests under the rear end of the hammer-

actuating lever A, whereby it is operated as the key B is acted upon.

I is the damper, which rests normally upon the upper surface of the string or strings, and has a pendent actuating-rod I' passing through slots or guides of brackets *k k'*, suitably secured to the piano-frame. The lower end of the rod I' is curved upward to prevent the intermediate levers from disarranging themselves when removed from the case and when replacing the same. The shortening or lengthening the rod I' to suit the dampers is also effected by increasing or lessening the bend or curvature thereof by the application of the required force or pressure thereto by the use of pliers, which curve or bend may be bent up or down, as may be necessary. Pendent from the damper I is a short guide-rod I<sup>2</sup>, passing down through an eye on the bracket *k*. The damper rod or wire I is held in position in the guide-slots by its weight, and may be readily removed from the slots upward or next the upper side of the strings.

In order to raise all the dampers from the strings simultaneously, as is necessary in the loudest playing, I apply to the key-frame G, immediately under the intermediate levers H, a bar J, which is hinged at one edge to the rear of the key-frame G, and is provided with a dowel or rod *l*, reaching down through an aperture in the key-frame. This dowel or stud *l* is adapted to be engaged by a pitman or rod and lever (not shown) carried by the pedal, and when acted upon will raise all the intermediate damper-levers at one time and allow rendering the full tone of the piano. The weight of the hammer is counterbalanced by a spring K, which is upwardly inclined and connected at its lower end to the rail *e* and at its other end to a flexible loop K', the opposite end of which is connected to the long link D. This arrangement is for the purpose of lightening the stroke of the action by removing a portion of the weight of the hammer.

From the foregoing construction and arrangement it will be seen that I am able to remove all the parts except the rails of my action from the piano-case at the same time, as they are all secured to the key-frame G. It will be seen that when the key is actuated it will in turn act upon the lever A, containing the post *c*, having the buffer *d'*, which lever will act upon the intermediate lever and raise the damper from the string, while the link D' and long link D will actuate or throw the hammer against the string. Following this movement of parts and at the proper time the long link D, with the tongue-connection *f f'*, will be thrown forward by the post *c* and buffer *d'*, effecting the engagement of the tongue of the long link D with the notch *f<sup>2</sup>* of the rail *b*. This action of parts at the same time flexes or throws the link D forward, while by the entrance of the tongue *f'* into the notch *f<sup>2</sup>* it will be caused to hug

the rail and form a brace, check, or toggle on that side of the long link, thus acting to hold the long link against the rail as the hammer rebounds from the strings. The spring E, which has now been compressed or put under tension, will act to restore and return the short link D' and long D to their normal position, ready for the next stroke of the hammer, when the key is free to react. The form of the tongue, which is packed or cushioned, may be of any other suitable shape to suit the fancy of the maker in order to subserve the purpose of my invention.

In Fig. 2 the spring E conforms to the beveled rail *b*, and is secured to a loop fastened to the lever A, which spring acts to return the links D and D' to their normal positions, as before stated, or it may press against the rail *b* to effect the same.

In Fig. 3 the long link D is showing the face of the tongue to be nearly straight, while the long link is provided with a roller at its lower end instead of link D'. This roller is allowed to rest upon cushions in the lever A and post C. In all cases the lower end of the long link D rests against cushions to prevent noise or rattle and in order to determine the proper stroke, which may be regulated by means of a block and screw, if desired.

In lieu of the post C and its regulating-block the same may be modified, as shown by Fig. 4, wherein a spoon-shaped wire is fastened to the lever A, and may be bent forward by means of pliers, in order to regulate the exact position of the same with relation to the long link D to effect the link D' in making the stroke and for use in making the cheaper kind of actions; or the post may be a wire driven into the lever A and a block of wood screwed to the end of the wire, through which the regulating-screw is placed, as shown in Fig. 5.

In Figs. 1 and 2 the short link D', connecting the lever A and long link D, is substantially the same as the short link J, connecting the long link K and the lever G, embraced in a patent issued to me July 2, 1889, No. 406,405; but it is here used in a different relation to the action-rail and with some improvements, as shown by the padded tongue *f'*, spring E, and the adjusting-screw *g*; also by cushioning the rail *b*.

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

1. In a piano-forte action, the combination of the rail *b*, the lever A, pivoted thereto, and the links D D', link D having on its rear face the strip attached thereto and its adjusting-screw running therethrough, substantially as shown and described.

2. In a piano-forte action, the combination of the rail *b*, the lever A, pivoted thereto, and the links D and D', said link D having on its rear face the strip and the spring E, attached thereto, and the adjusting-screw running

therethrough for adjusting said strip, substantially as shown and described.

3. In a piano-forte action, the lever A, pivoted to rail *b*, engaging at one end the intermediate lever and having connection with the hammer-supporting link by means of a short link, substantially as described.

4. In a piano-forte action, the pivoted lever A, engaging the intermediate lever at one end and carrying a post having a screw and buffer, substantially as described.

5. In a piano-forte action, the key B, lever A, engaging the intermediate lever H, having connection with a bar J, and a pitman *l*, extending vertically through the key-frame and connected to the pedal, substantially as described.

6. In a piano-forte action, the hammer-supporting long link connected to the lever A by means of a short link and having secured to its inner face the tongues *f* and *f'*, and the spring E and tongue *f'*, designed to engage a corresponding recess in the rail *b*, substantially as described.

7. In a piano-forte action, the lever A, carrying on one end a post having a screw carrying a buffer passing therethrough near its upper end, and the lever A in continuation engaging the intermediate lever, said intermediate lever pivoted near one end and supporting the damper on its outer rear end, substantially as described.

8. In a piano-forte action, the damper bearing against the upper side of the strings, having a guide-rod connected to the rear end thereof projected through an orifice in the bracket, and the supporting-rod projected through brackets connected to the frame and bearing against one end of the intermediate lever, substantially as described.

9. In a piano-forte action, the combination of the rail or bar J, the pitman *l*, the rail *j*, intermediate lever H, and key-frame *a*, removable from the case therewith, substantially as described.

10. In a piano-forte action, the combination of the rail or bar J, the pitman *l*, the rail *j*, the intermediate lever H, and the hammer-supporting mechanism connected to the key-frame G and removable therewith, substantially as described.

11. In a piano-forte action, the damper hav-

ing a rod secured thereto at its upper end and having its lower end curved or hooked to adjust its length, as shown and described.

12. In a piano-forte action, the link D, having upon its inner surface the strips *f* and *f'* and spring E, with the adjusting-screws *g* and *g'*, adapted to engage the rail *b*, as shown and described.

13. In a piano-forte action, the combination of the key B, lever A, and rail *b*, flange *h*<sup>2</sup>, arm *h'*, rail *h*, arm *f*<sup>3</sup>, pitman F, button *g'*, key-frame G, and foot-pedal, substantially as shown and described.

14. In a piano-forte action, the intermediate lever H and rail *j*, connected to the key-frame to allow their removal from the case, substantially as described.

15. In a piano-forte action, the lever A, pivoted to the rail B, the intermediate lever H, pivoted at one end to the rail *j* and supporting upon its inner end the damper-rod I and resting upon the lifting-rail J, substantially as described.

16. In a piano-forte action, the links D and D', the lever A, attached to the intermediate lever H, and damper I, in combination with the spring K and rail *e*, in the manner and for the purpose specified.

17. In a piano-forte action, the links D and D', connecting the hammer-butt and actuating-lever, and the said links resting against the lower end of post *c* and its cushion, in the manner and for the purpose specified.

18. In a piano-forte action, the post *c*, having a screw passing therethrough carrying a buffer and attached to lever A, in combination with the links D and D', in the manner and for the purpose specified.

19. In a piano-forte action, the damper I, bearing against the upper side of the piano-string and having a guide-rod I<sup>2</sup> connected to its rear end and projected through an orifice in the bracket, and the supporting-rod I', projected through the brackets connected to the piano-frame, in the manner and for the purpose specified.

In testimony whereof I affix my signature in presence of two witnesses.

SAMUEL R. PERRY.

Witnesses:

I. W. ECKENRODE,

W. A. O'NEILL.

It is hereby certified that in Letters Patent No. 453,938, granted June 9, 1891, upon the application of Samuel R. Perry, of Scranton, Pennsylvania, for an improvement in Piano-Forte Actions," an error appears in the printed specification requiring the following correction: In line 48, page 2, the words "except the rails" should be stricken out; and that the Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed, countersigned, and sealed this 11th day of August, A. D. 1891.

CYRUS BUSSEY,  
*Assistant Secretary of the Interior.*

Countersigned:

W. E. SIMONDS,  
*Commissioner of Patents.*