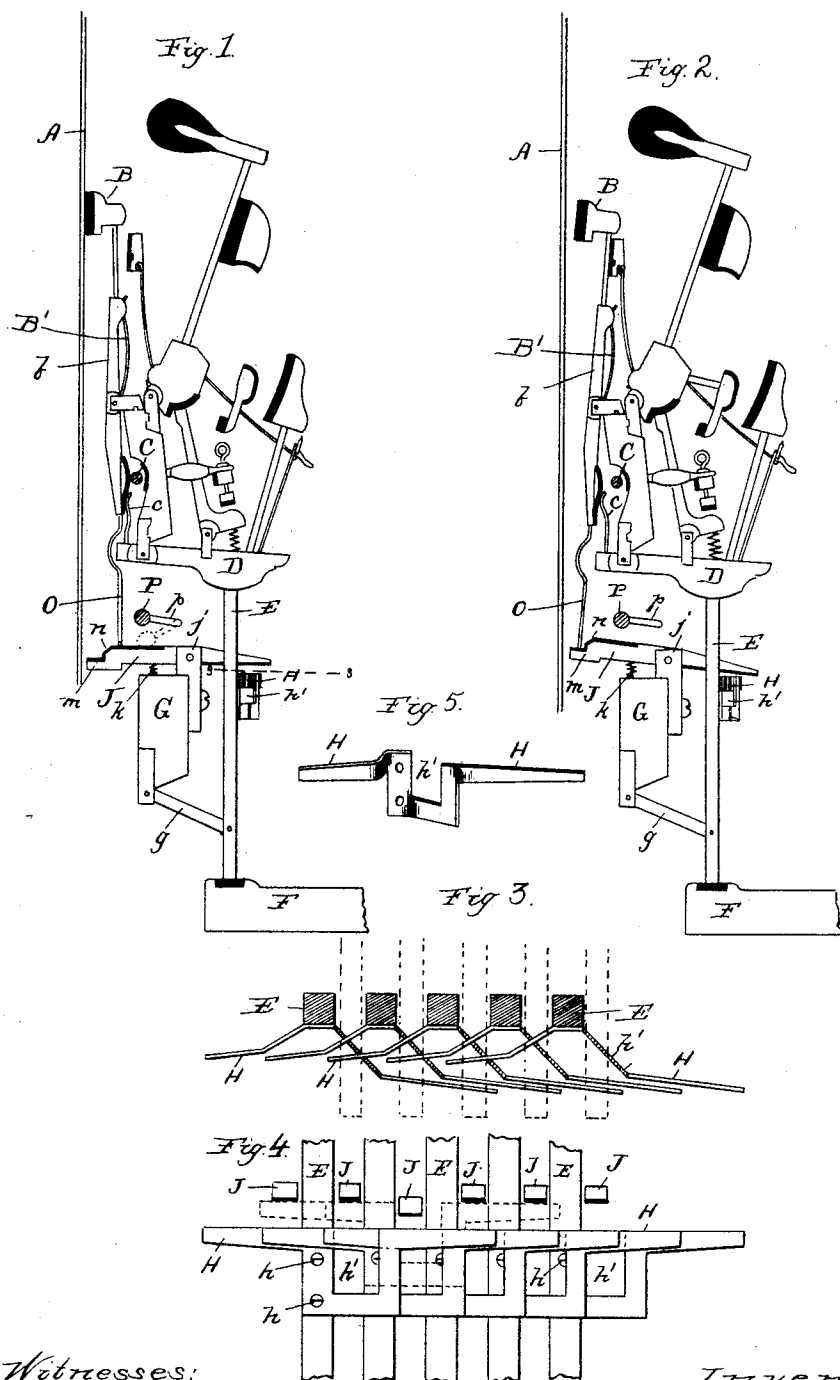


(No Model.)

J. H. PHELPS.
PIANO FORTE ACTION.

No. 465,494.

Patented Dec. 22, 1891.



Witnesses:
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UNITED STATES PATENT OFFICE.

JAMES H. PHELPS, OF SHARON, WISCONSIN.

PIANO-FORTE ACTION.

SPECIFICATION forming part of Letters Patent No. 465,494, dated December 22, 1891.

Application filed June 27, 1891. Serial No. 397,730. (No model.)

To all whom it may concern:

Be it known that I, JAMES H. PHELPS, a citizen of the United States, residing at Sharon, in the county of Walworth and State of Wisconsin, have invented a new and useful Improvement in Piano-Forte Actions, of which the following is a specification.

The object of my invention is to provide piano-actions with means which may be controlled by a suitable hand-lever, knee-stop, or foot-pedal, preferably the latter, whereby the performer may at will sustain any tone or chord or succession of tones or chords by holding back from the strings the dampers of the keys struck and no others so long as said tones harmonize with each other, or until any or all of such dampers shall be automatically released and closed by the concurrent or subsequent movement of other keys whose tones do not harmonize therewith, thus enabling the performer, without the necessity of closing the pedal to prevent discords, to bind over the harmonizing tones of one chord or measure into those of another chord or measure, and thus obtain greater power, purity of tone, and legato effect than can be obtained by the use of the loud pedal now commonly employed, which, when thrown into action, holds all the dampers back from the strings, allowing any or all of them to vibrate together, whether the tones harmonize with each other or not, and which acts to close all of the dampers whenever it is desired to close any of them. I attain this object by the following devices: The action of each key is provided with laterally-projecting arms, preferably secured to the stickers, which, when the key is struck, will come in contact with pivoted levers provided for each of the keys and raise the levers of each pair of keys to the right and left of the key struck and close the dampers of those keys in case they shall be open. The key at each side of the key struck embraces the tones most prominently discordant with the tone of the key struck, and hence by closing the dampers of those keys I shut off nearly all the discordant tones. While this result is accomplished, I do not damp the string of the key struck, so that said string is allowed to continue in vibration as long as desired. If one of the keys previously damped

be now struck, it will operate to throw open its own damper and close that of the key previously struck, so that in this case, also, there is no discordance in the continuing sounds given forth by the strings. I further provide a device whereby all these damper-operating devices can be held out of action whenever that result is desired.

The nature of the invention and the construction of the parts employed therein are fully shown in the accompanying drawings, in which—

Figure 1 is a side elevation of the action of one of the keys with my improvement added. Fig. 2 shows the same parts in a different position. Fig. 3 is a horizontal section on the line 3 3 of Fig. 1. Fig. 4 is a partial front elevation of the stickers. Fig. 5 is a detail of the laterally-extending arms applied to the stickers.

In the drawings, A may represent one of the strings of the piano; B, the damper; *b*, the damper-bar; C, the loud-pedal bar for throwing all the dampers out, and *c* the usual arm of wire for operating the damper when the key is struck.

D is the pivoted lever supporting the jack. E is the sticker, and F is the key.

At G is a stationary supporting-bar having in some constructions a connecting-link *g* for holding the sticker.

The means I prefer to adopt for carrying into effect my improvement are the following: H H are laterally-extending horizontal arms, preferably made in one piece and secured to the stickers by screws *h*, as shown. They are bent so as to avoid interference with each other, and are also formed with a recess *h'*, for purposes presently to be described. They are preferably secured to the front of the stickers and are long enough to engage the lever, also described below, of the adjacent key upon each side. Adjacent to each key is a lever J, pivotally supported in a block *j*, secured to the bar G. This lever extends forward and over the arms H and passes between its own sticker and the sticker of the next adjacent key. In the rear of the pivotal support *j* a light spring *k* is inserted between the lever and the bar G, the tension of which spring is upward. At its rear end the lever J has an

offset *m* and a beveled portion *n*. In its normal position the lever is horizontal, as in Fig. 1, and in this position an extension of the damper-bar *b* rests upon its upper surface.

5 This extension may be conveniently made of wire, as indicated at O, as the wire is easily bent to avoid contact with the lever D. The lower end of the extension O should be bent to the horizontal to prevent its catching in
10 the leather covering of lever J.

Over the entire series of levers J, I extend a rod P, which is suspended at its ends, and also at intermediate points, upon cranks *p*, pivotally supported upon the action-frame.
15 The normal position of this rod P is indicated by broken lines at Fig. 1, and in that position it holds the levers J against action. It is, however, intended to be lifted to the position shown in full lines at will, and this is done
20 by connecting it to a hand-lever, or draw-stop, or knee-swell, or foot-pedal, preferably the latter. As the construction of these operating devices is well understood by those skilled in the manufacture of pianos, I do not
25 illustrate them.

With this construction of the parts the operation is substantially as follows: When the performer desires to obtain the singing effect of the concordant tones only, he by means of
30 the pedal or other device raises the rod P from the levers J. Supposing the key F be now struck, the sticker is forced upward and the lever D and its damper-operating wire *c* are made to force the lower end of the damper-bar backward, thus freeing the damper from the string.
35 This movement of the damper-bar carries the extension O over to the position indicated at Fig. 2, and allows the spring *k* to lift the rear end of the lever J to the position also given in said figure, and in which position the extension O finds lodgment upon the offset *m*. This results, as will be observed, in detaining the damper from returning to the string after the key is released, and it will remain in this position
40 until some one of the neighboring keys is struck or the rod P is again lowered. In the upward movement of the sticker at the time the key is struck the forward end of the lever J enters within the recess *h'* of the arm H,
45 and is unaffected by the upward movement of the arm; but in the case of each key at the right and left of the key which has been struck said arms H engage with the levers J of those keys, if they happen to be in the position given at Fig. 2, and lift them to the horizontal position, thus disengaging the extension O from the offset and allowing the damper to return to the string in obedience to its spring B'. The lifting action of the arms
50 H will be clearly understood from Figs. 3 and 4, where the lever J of the key struck is shown in its inclined position, while those of the adjacent keys are shown as raised, and the operating position of the arms H is indicated in the broken lines. The performer can at any
55 time by lowering the rod P return all the le-

vers J to their normal positions, and while this rod P remains lowered can use the instrument in the same manner as without my improvements, using either the soft or loud pedal
70 where it is desired. The recess *h'* in the lateral arm H not only prevents the lifting of the lever J belonging to the same key as does the arm H, but it also gives room for the arms of the adjacent stickers, as will be understood
75 from Figs. 3, 4, and 5. The bevel *n* serves not only to facilitate the return of the extension O to the upper surface of the lever, but it also allows this end of the lever to begin its upward movement before the extension O
80 has been swung back the full distance allotted it, so that the lever gets well under way and sufficiently near the end of its rise to prevent the extension recoiling without engaging with the lever J.
85

While I have shown the best form of construction of my invention now known to me, it will be understood that the construction may be widely varied without departing from the spirit of my invention, and hence I do not
90 wish in my claims to be limited to the construction shown, except in the case of such claims as are laid specially to the construction. It will also be understood that the invention is applicable to square and grand pi-
95 anos as well as to uprights, although I have shown it in the drawings as applied to an upright.

I claim—

1. The combination, with a piano-forte key 100 and the damper of another key not harmonizing therewith, of devices set in operation by the striking of said key and adapted to close said damper, substantially as set forth.

2. The combination, with a piano-forte key 105 and the damper of an adjacent key not harmonizing therewith, of devices set in operation by the striking of said key and adapted to close said damper, substantially as set forth.

3. The combination, with a piano-forte key 110 and the dampers of the adjacent keys, one at either side, of devices set in operation by the striking of said key and adapted to close all said dampers, substantially as set forth.

4. The combination, with a piano-forte action, 115 of devices set in operation by the striking of a key and adapted to close the dampers of other and discordant keys, substantially as set forth.

5. The piano-forte action, the keys and 120 dampers whereof are combined with means for holding the dampers open, and means set in operation by striking the keys for releasing the dampers, substantially as set forth.

6. The combination, with the series of keys 125 and dampers of a piano-forte action, of a series of devices for holding the dampers open, and a series of devices set in operation by the striking of the keys and serving to release the holding devices, substantially as set forth. 130

7. In a piano-forte action, a key adapted when struck to open its own damper, in com-

combination with means for closing the dampers of one or more discordant keys, substantially as set forth.

8. The combination, with the keys and dampers of a piano-forte action, of levers J, damper-bar extensions O, and arms H, attached to the stickers, substantially as set forth.

9. The combination, with the keys and dampers of a piano-forte action, of a series of pivoted levers J, a series of damper-bar extensions O in contact with the rear ends of said levers, and a series of arms H, borne by the stickers and engaging the other ends of said levers, substantially as set forth.

10. The combination, with the series of levers J for holding the dampers open, of the rod P for depressing all the levers and releasing the dampers, substantially as set forth.

11. The lever J, having the offset end m , in

combination with the damper-bar engaging with said end, and the spring k , substantially as set forth.

12. The lever J, having the offset m and bevel n , in combination with the damper-bar and spring k , substantially as set forth.

13. The combination, with the pivoted levers J, of arms H, having recesses h' , and actuating-supports for said arms, substantially as set forth.

14. The combination, with the stickers, of arms H, borne thereon and constructed and arranged as shown, substantially as set forth.

15. The combination, with levers J, of the stickers and the arms H, constructed and arranged as shown and borne upon the stickers, substantially as set forth.

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Witnesses:

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