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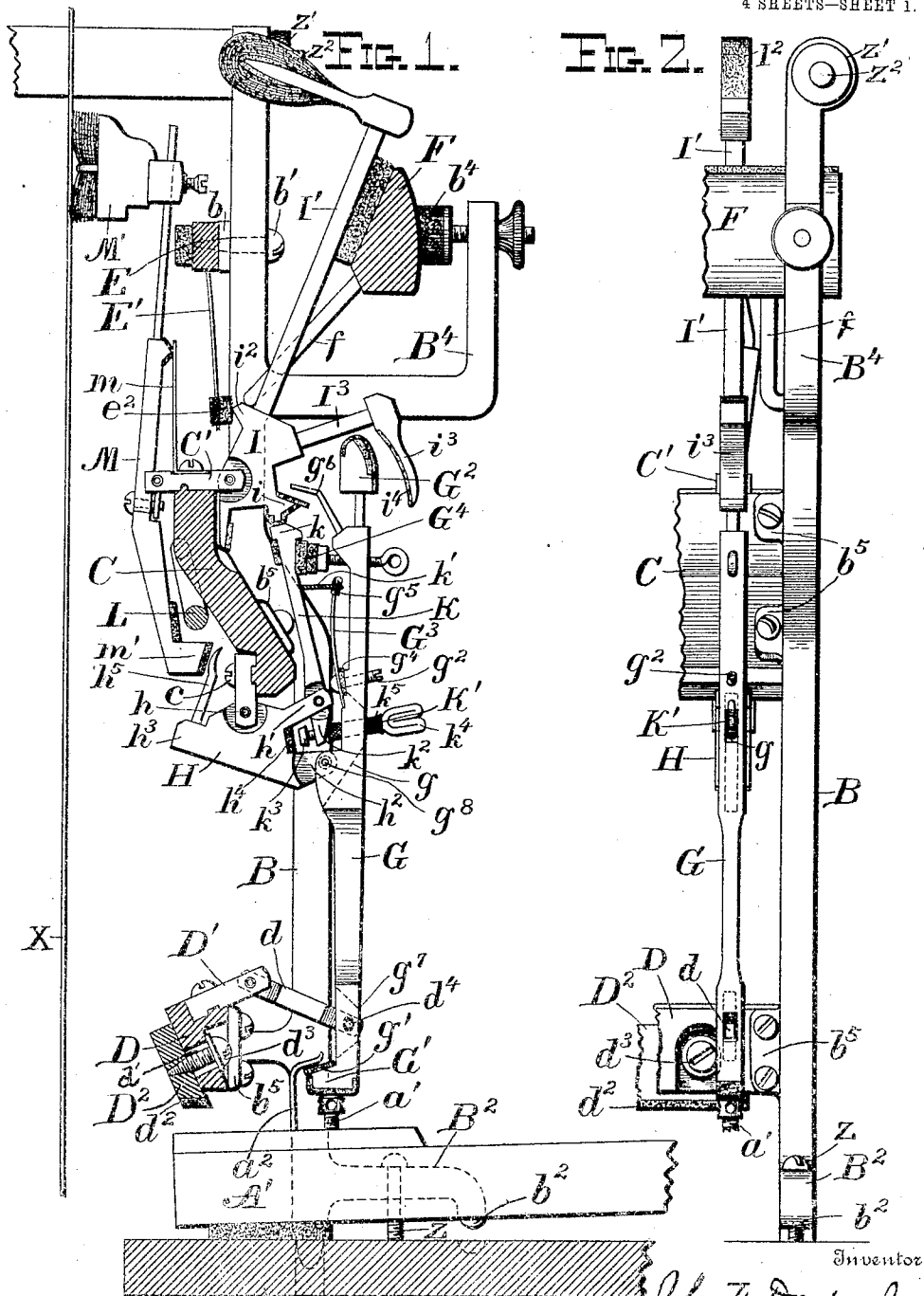
PATENTED JAN. 30, 1906.

J. W. DARLEY, JR.

PIANO ACTION.

APPLICATION FILED NOV. 27, 1901.

4 SHEETS—SHEET 1.



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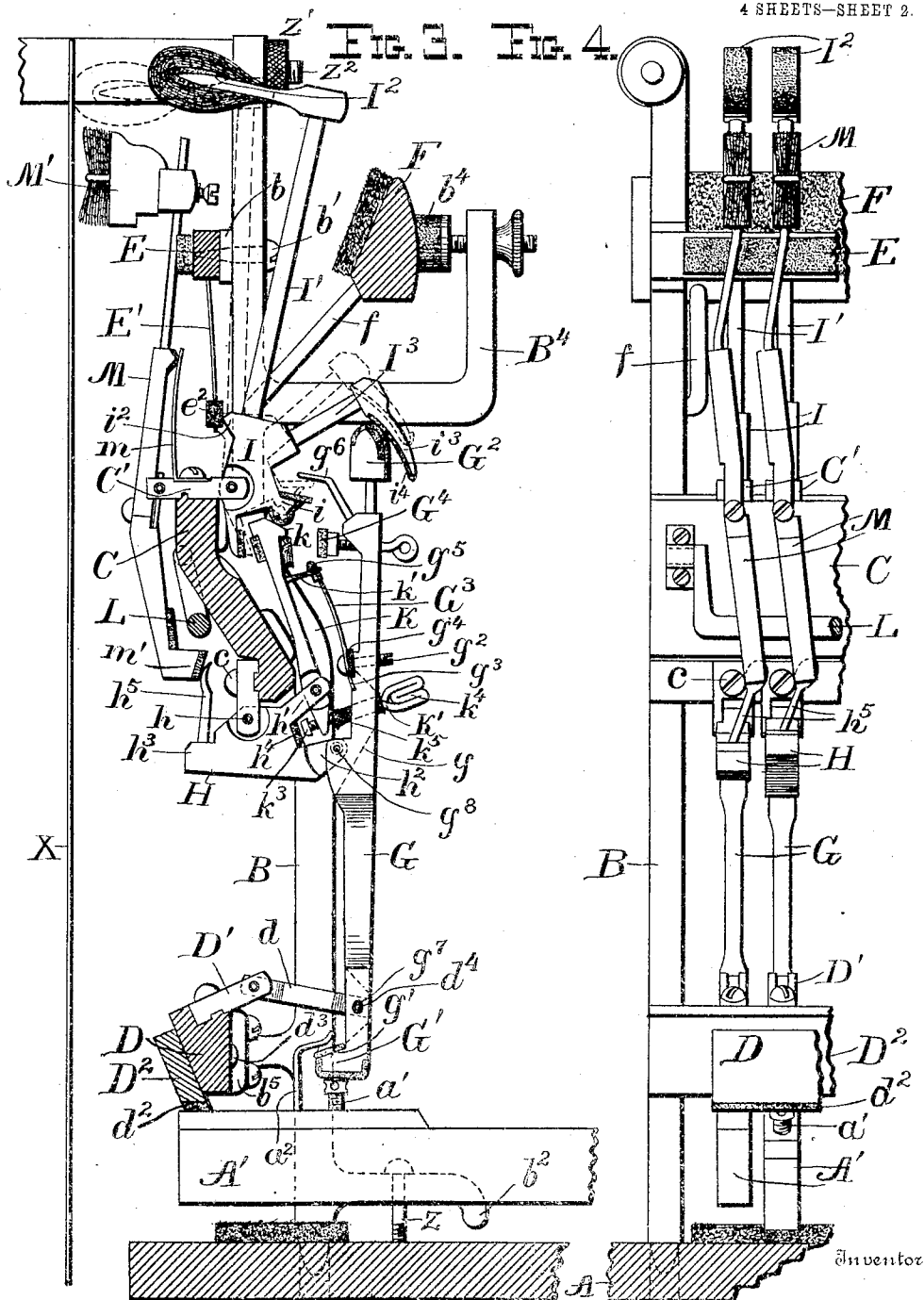
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APPLICATION FILED NOV. 27, 1901

4 SHEETS—SHEET 2.



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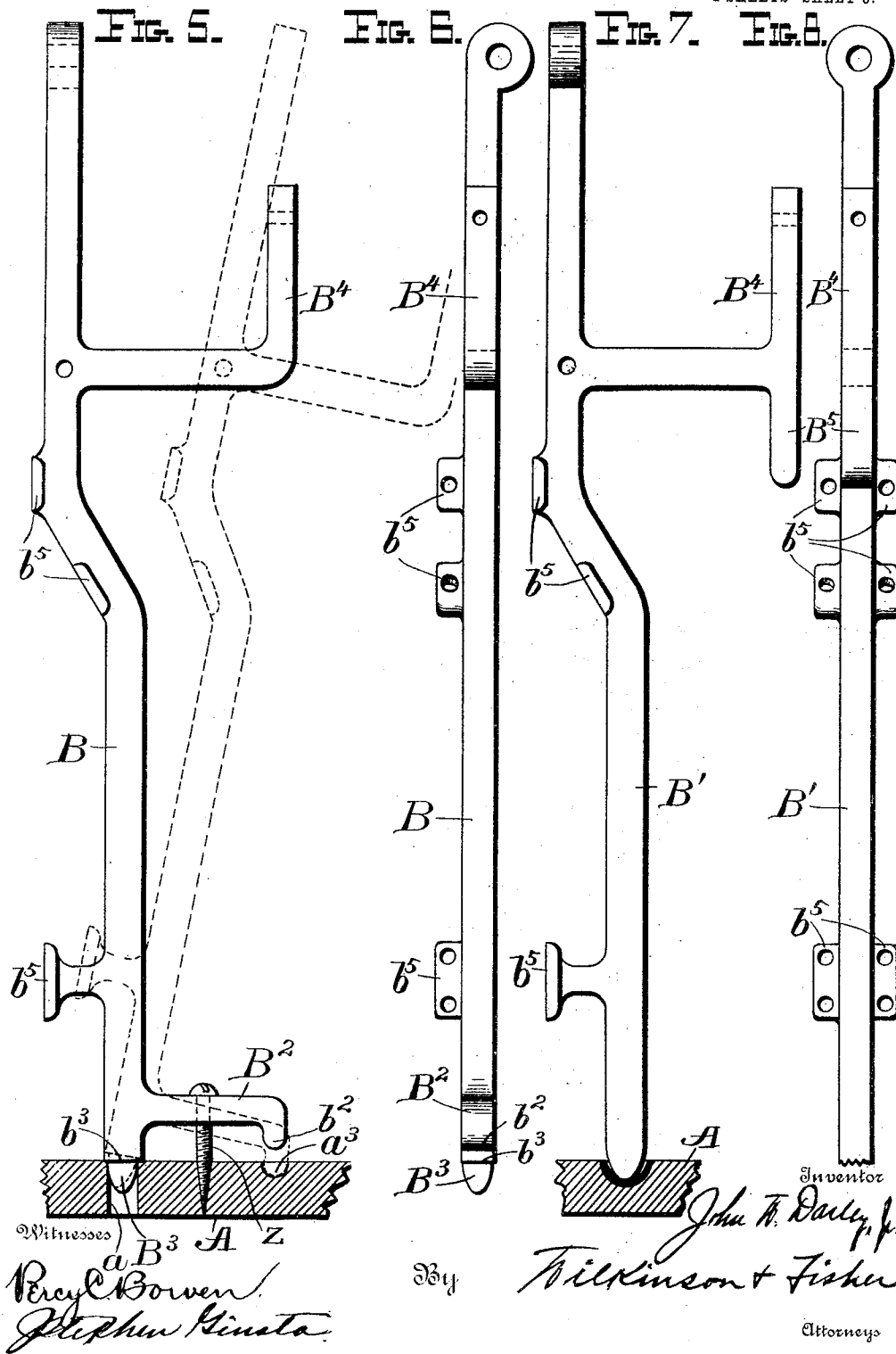
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4 SHEETS—SHEET 3.



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4 SHEETS—SHEET 4

FIG. 10.

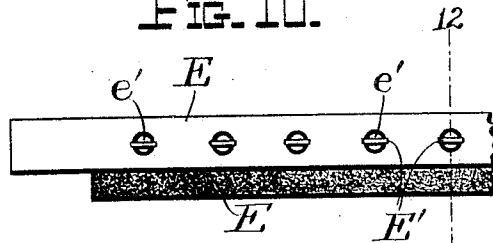


FIG. 11.

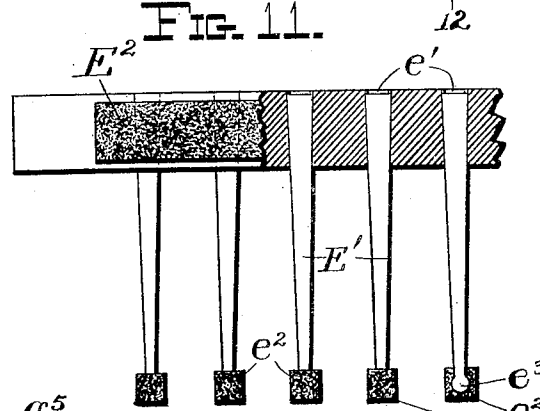


FIG. 9.

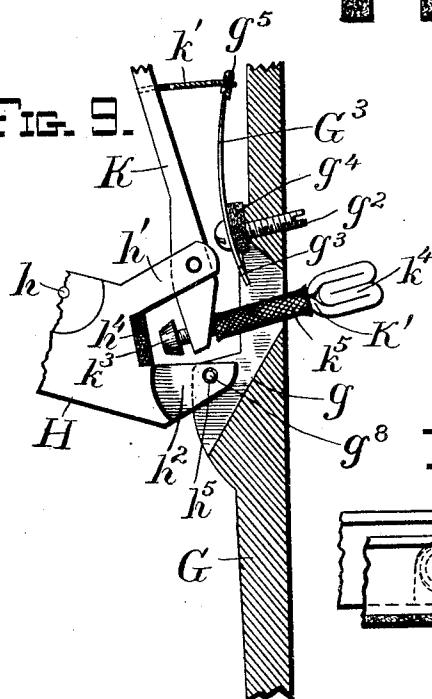


FIG. 12.

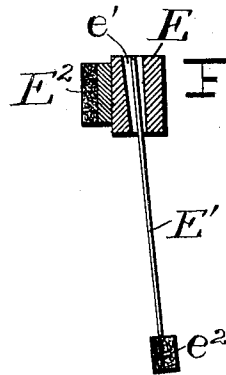
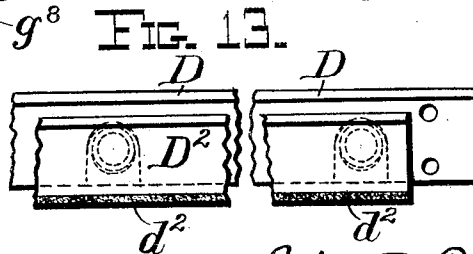


FIG. 13.



Witnesses

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UNITED STATES PATENT OFFICE.

JOHN W. DARLEY, JR., OF BALTIMORE, MARYLAND, ASSIGNOR OF ONE-HALF TO MICHAEL HOLZMAN, PHILIP HAMBURGER, AND LEON HAMBURGER, OF BALTIMORE, MARYLAND.

PIANO-ACTION.

No. 810,920.

Specification of Letters Patent.

Patented Jan. 30, 1906.

Application filed November 27, 1901. Serial No. 83,912.

To all whom it may concern:

Be it known that I, JOHN WESLEY DARLEY, Jr., a citizen of the United States of America, residing at Baltimore, in the State of Maryland, have invented certain new and useful Improvements in Piano - Actions; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to 10 which it appertains to make and use the same.

My invention relates to improvements in piano-actions, and especially in those actions known as "repetition-actions," which are designed to enable the operator to sound the same note repeatedly in rapid succession and at the same time preserve that quality known as the "touch," which is very essential to the satisfaction of the performer. Musicians who have played on an upright piano provided with my improved action have found that they could produce the required modulations in a satisfactory manner, as the keys, although light to the fingers and playing freely, do not drop away from the fingers of the player as with actions of the construction now most commonly in use on upright pianos. I attribute this improved effect to the fact that the hammers are subject to an approximately equal retraction corresponding in this regard to the hammers of the grand piano. At the same time I so arrange and proportion the parts that greater simplicity and a lighter and more sympathetic touch are obtained, coupled with greater ease of regulation and the presentation of a more handsome appearance at the front.

The present invention is especially intended to cover certain improvements upon the device described in my application concurrently pending, Serial No. 5,748, filed February 19, 1900.

Reference is had to the accompanying drawings, wherein the same parts are indicated by the same letters of reference throughout the several views.

Figure 1 represents a side elevation of one of my improved piano-actions as it is mounted in the piano, the bars or rails which support the several parts of the action being shown in section. In this view the parts are shown in their normal position when the key

is at rest. Fig. 2 represents a front elevation of the parts of the action shown in Fig. 1. Fig. 3 is a similar view to Fig. 1, but showing the parts in the position they assume after the key has been struck and while still held down. The position of the hammer in striking the wire is shown in dotted lines. Fig. 4 represents a rear elevation of one end of the frame and bars, showing two of the piano-actions, one with the parts in the position shown in Fig. 1 and the other with the parts in the position shown in Fig. 3. Fig. 5 represents a side elevation of one of the end frames for supporting the bars or rails on which the action is hung. Fig. 6 represents a front elevation of the same. Fig. 7 represents a side elevation of one of the intermediate frames. Fig. 8 represents a front elevation of the same. Fig. 9 represents an enlarged vertical section through a part of one of the abstracts, showing certain parts of the action connected therewith. Fig. 10 represents an enlarged plan view of the rail carrying the hammer-springs. Fig. 11 represents a rear elevation, partly in longitudinal section, of the same. Fig. 12 is a section of the same, taken on the line 12-12 of Fig. 10. Fig. 13 represents a rear elevation of the lower rail, to which the abstracts are hung.

A designates the base-board, upon which the several parts of the action are mounted, and B and B' designate the supporting-frames to which the rails C, D, E, and F are suitably secured.

A' designates the end of one of the keys, which are fulcrumed on the base-piece A in the usual well-known manner.

The various rails and other parts of the piano-action are faced with felt or other suitable material wherever they are likely to be struck by any of the moving parts, and all centers are bouched with cloth in the usual well-known way, the effect of the whole being to prevent rattling and to deaden all sounds except of the strings which have been struck.

The abstract G is hung to the supporting-rail C by a three-arm lever H and to the lower rail D by a straight link *d*, which is pivoted to one of a series of pivot-blocks D', secured to the said rail D, and the said abstract is provided at its lower end with a foot G', which is

suitably padded and rests upon the head of the screw a' in the end of the key A' . The rear side of the foot G' is extended and padded on its upper side, as at g' , to make contact
 5 with a wire a^2 , which extends upward from the key and over the said end of the foot to prevent the abstract from separating from the screw a' . The wire a^2 has its upper portion bent substantially at right angles to its
 10 shank, so that the hole for the same in the key will be parallel with the hole for the capstan-screw a' , thus enabling both holes to be drilled with one setting of the drill-table.

The rail D^2 is adjustably secured to the
 15 rail D by screws d^3 , passing through slots d' in the said rail D , and is padded along its lower side, as at d^2 , the padded edge being arranged just above the ends of the keys A' to prevent the latter from being thrown too
 20 high.

The hammer-butts I are pivoted in the front ends of the cross-pieces C' , which are secured to the upper side of the rail C , and the said hammer-butts have the stems I' extending upwardly therefrom, carrying the
 25 hammers I^2 at their upper ends. When in the normal position, these stems I' rest upon the soft-pedal rail F , which is padded to receive them. The soft-pedal rail F is supported upon arms f , pivoted to the frames B and B' and connected with the soft pedal in any suitable manner.

The jack-lever H is pivoted to the rail C , as at h , and has the arms h' and h^2 extending forwardly therefrom and the arm h^3 extending rearwardly therefrom. The abstract G is pivoted to the arm h^2 , and the jack is pivoted to the arm h' and extends upwardly at an angle to the abstract, its upper end or
 40 head k normally resting beneath the knuckle i on the hammer-butt I , as shown in Fig. 1. The pin g^2 , which passes through the abstract and the jack-lever, is rigidly secured in the abstract without bushing, but is bushed,
 45 as at h^5 , (see Fig. 9,) in the jack-lever, thus permitting of a slight flexibility of the abstract with reference to the jack-lever at this point. The link d , which guides the lower part of the abstract, is pivoted in the latter
 50 by means of a pin d^4 , rigidly secured in the said link and extending into slightly-elongated holes in the abstract. These elongated holes are lined with a suitable bushing g^7 , which by reason of the shape of the holes
 55 is thicker above and below the pin than at the sides thereof, thus allowing the said abstract to have a slight lateral play at the top without binding upon the pin d^4 , while at the same time preventing a twisting movement
 60 of the abstract with reference to the link d . This is advantageous in the event that if the pivots of the link d and the jack-lever H should be slightly loose or out of proper alignment in the vertical plane there would be no
 65 binding on the pins d^4 and g^3 .

A repetition-spring G^3 is mounted in the abstract G and is connected with the jack K by a flexible connection k' , the tension of the said spring being adjustable by means of the screw g^2 , which passes through the spring
 70 and the abstract, as shown in Fig. 9, and is slotted at its small end for the insertion of a screw-driver. The lower end of the spring G^3 has a tailpiece g^3 , which fits loosely in a slot g in the abstract. A pad g^4 is placed around
 75 the screw g^2 between the spring G^3 and the abstract, and the said screw tends to draw the spring down upon this pad, thus increasing the tension of the spring and at the same time precluding the possibility of rattling.
 80 The upper end of the spring G^3 is padded, as at g^5 , to prevent the flexible connection k' from slipping.

The lower end of the jack K extends somewhat below its pivotal point in the arm h' of
 85 the lever H and is provided with a screw K' , which passes through a threaded opening in the jack and is provided with a head k^3 , adapted to be struck by a cushion h^4 , secured to the jack-lever between the two arms h'
 90 and h^2 thereof. When the head k^3 is struck by the cushion h^4 , the jack is forced from under the hammer-knuckle i , when the hammer rebounding from the string forces it into the position shown in Fig. 3. The other end
 95 of the screw K' extends through the slot g in the abstract and is bent upon itself to form a flat convoluted head k^4 , by means of which it may be turned from the front of the instrument. The weight of the front end and head
 100 of the screw K' is so proportioned that the jack K will be dynamically balanced about its pivot. A sleeve k^5 , of soft fabric, is placed around the screw K' where it passes through the slot g to prevent rattling.
 105

The upper end of the abstract G is provided with an adjustable cushion-stop G^4 , against which the jack stops and rests when in its normal position, and just above the said
 110 stop a wire g^6 is secured to the abstract and extends rearwardly, terminating just above the knuckle i on the hammer-butt, the object of the said wire being to assist the hammer in its return when the key is being struck very
 115 rapidly.

Near the upper part of the frames B and B' is secured a rail E , carrying the hammer-springs E' , which rail is held in place by screws b' , passing through holes in the said
 120 frames. A wooden block b is placed between the rail and frames, the thickness of which determines the play allowed for the damper-lever M and the angle of which determines the tension of the springs. The rails E are perforated with holes e' , which are larger at
 125 the top than at the bottom, and through these holes are passed the hammer-springs E' , which are smaller at their lower ends than at their upper ends and are forced into the tapering holes e' until they are firmly seated, as
 130

shown in Figs. 10, 11, and 12. The rear side of the rail E is padded, as at E^2 , for the damper-stems to strike against when in their forward position. After the hammer-springs E' are placed in the rail E their lower ends are padded, as at e^2 , where they bear upon the nose i^2 of the hammer-butt, which nose i^2 is polished and left without padding. The rear side of the padding at e^2 is leather and the front or part which works against the nose i^2 is felt, and the springs E' are glued between the same. The padding e^2 is placed on the spring in preference to the hammer-nose, as the weight of the pad will make the period of vibration of the springs so slow that it can take up none of the vibration from the piano, and thus a very large metal end on the spring is avoided, the ends of the springs being provided with circular knobs e^3 to prevent the pads e^2 from pulling off. The tension of the hammer-springs E' may be changed by loosening the screws b' and filing off the top or bottom of the side of the wood block b next to the frames B and B' , thus changing the inclination of the said rail, and consequently the tension of the springs E' .

A stem I^3 extends upwardly and forwardly from the hammer-butt I and has at its outer end a counter-check i^3 , which is covered with a shoe of cork i^4 , adapted to engage a back-check G^2 , also padded on the upper end of the abstract G when the hammer rebounds from the string while the key is pressed down, and thus hold the hammer from further movement.

The damper-levers M are pivoted to the rear ends of the pieces C' and carry at their upper ends the dampers M' , which are normally pressed against the strings X by the damper-springs m . The lower ends of the damper-levers are bent forwardly below the rail C, as at m' , and spoons h^5 , which extend upward from the arms h^3 of the jack-levers H, are adapted to strike these lower ends of the damper-levers when the abstract G moves upwardly, and thus move the dampers M' away from the strings X. The damper-levers and the spoons h^5 are set at an angle, as shown in Fig. 4, in order to allow a screw-driver to be inserted between them to turn the screws c , should this be necessary after the dampers are in place.

The rod L is connected with the loud pedal and serves to throw all of the dampers away from the strings when the loud-pedal is depressed.

The several rails upon which the action is hung are supported by the end frames B and the intermediate frames B' . The end frames are provided at their lower ends with feet B^2 , having toes b^2 and rounded heels B^3 , with shoulders b^3 at the base of the said heels. When the frames are in the instrument, the rounded heels B^3 sit in holes a in the base-board A, the shoulders b^3 resting upon the

base-board at the edges of the holes and supporting the weight of the frames and the parts carried thereby. When the frames are in their normal position, the toes b^2 are raised above the base-board A, as shown in Figs. 5, and the frames are held in this position by the screws z , which pass through the feet B^2 and enter the base-board A, the upper ends of the frames being held in position by the nuts z' on the screws z^2 . The intermediate frames B' are only rounded at their lower ends to sit in buckskin-lined depressions in the base-board A and are secured in the upright position by the nuts z' at the top. Forwardly-extending brackets B^4 are formed on the said frames, in the upper ends of which brackets are mounted adjustable cushioned stops b^4 for the soft-pedal rail F to rest against, and the brackets B^4 on the intermediate frames have downwardly-extending pieces B^5 , which serve as handles when moving the action. These frames have side flanges b^5 at suitable places to hold the rails C and D, which are secured thereto by screws. The end frames B have the flanges b^5 on one side only, and the intermediate frames B' have the flanges b^5 on both sides, as will be seen in Figs. 6 and 8. When the action is to be removed from the piano, the screws z and nuts z' are removed and the frames are tilted forward, as shown by dotted lines in Fig. 5, the toes b^2 falling in the depressions a^3 in the base-board A. When the frames are in this position, the action has moved forward far enough to bring the feet G' of the abstracts G from under the wire a^2 , and the action can then be removed by lifting the frames, and with them the action, clear of the piano. The feet B^2 are so proportioned that when the action is out of the piano the frame and action will stand upright upon these feet.

The operation of the invention will be clearly understood without further description.

Having thus described my invention, what I claim, and desire to secure by Letters Patent of the United States, is—

1. In a piano-action, the combination with a series of frames supporting the several parts of the piano-action, and having feet with rounded heels, and shoulders at the base of said heels, and toes on the said feet; of a base-board having holes to receive the rounded portion of the said heels, and depressions to receive the toes, and means for securing said frames in an upright position, substantially as described.

2. In a piano-action, the combination with a series of frames supporting the several parts of the piano-action, and having feet with rounded heels, and shoulders at the base of said heels, and toes on the said feet; of a base-board having holes to receive the rounded portion of the said heels, and depressions to receive the toes, the relation of

- the said heels and toes and holes and depressions being such that when the frames are in an upright position the frames will rest upon the shoulders at the base of the heels with the toes slightly above their corresponding depressions, allowing the frames to be tilted forwardly, and means for securing the frames in an upright position, substantially as described.
3. In a piano-action, the combination with the supporting-frames, of a rail D secured to said frames directly above the rear ends of the keys, a key-rail D² adjustably secured to the said rail D, and projecting below the latter, padding along the lower edge of said key-rail adapted to act as an abutment for the ends of the keys, and screws countersunk in the rail D and entering the rail D², substantially as described.
4. In a piano-action, the combination with a jack-lever, and a link having a pin rigidly secured therein; of an abstract guided by said jack-lever and link and having an elongated slot to receive said pin, and bushing in said slot, whereby said abstract may have slight lateral play without twisting movement, substantially as described.
5. In a piano-action, the combination with a jack-lever, and a link having a pin rigidly secured therein; of an abstract guided by said jack-lever and link and having a pin rigidly secured in said abstract and passing through a hole containing a bushing in said jack-lever, said abstract having an elongated slot to receive the pin in said link and bushing in said slot whereby said abstract may have slight lateral play without twisting movement, substantially as described.
6. In a piano-action, the combination with the supporting-frames, and the keyboard; of a rail secured to said supporting-frames above the rear end of the keys and provided with vertically-disposed slots, a key-rail, a strip of padding along the lower edge of the key-rail, and screws passing through said slots into said key-rail for adjustably securing the same in position above the rear ends of the keys.
7. In a piano-action, the combination with the frames supporting the piano-actions, and the keyboard; of a rail or bar supported by said frames near their lower ends, a pivot-block secured upon the top of said rail, an abstract having its lower end in proximity to said block, a link connecting said block and abstract, a key-rail, padding upon the under side of said key-rail, and screws passing through vertically-disposed slots in said rail and entering said key-rail to adjustably secure the same above the rear ends of the keys.
- In testimony whereof I affix my signature in presence of two witnesses.
- J. W. DARLEY, Jr.
- Witnesses:
 GRAFTON L. MCGILL,
 J. STEPHEN GIUSTA.