No. 721,706. PATENTED MAR. 3, 1903.

A. A. HUSEBY.

PIANO.

APPLICATION FILED OCT. 19, 1901.

NO MODEL. 2 SHEETS—SHEET 1.

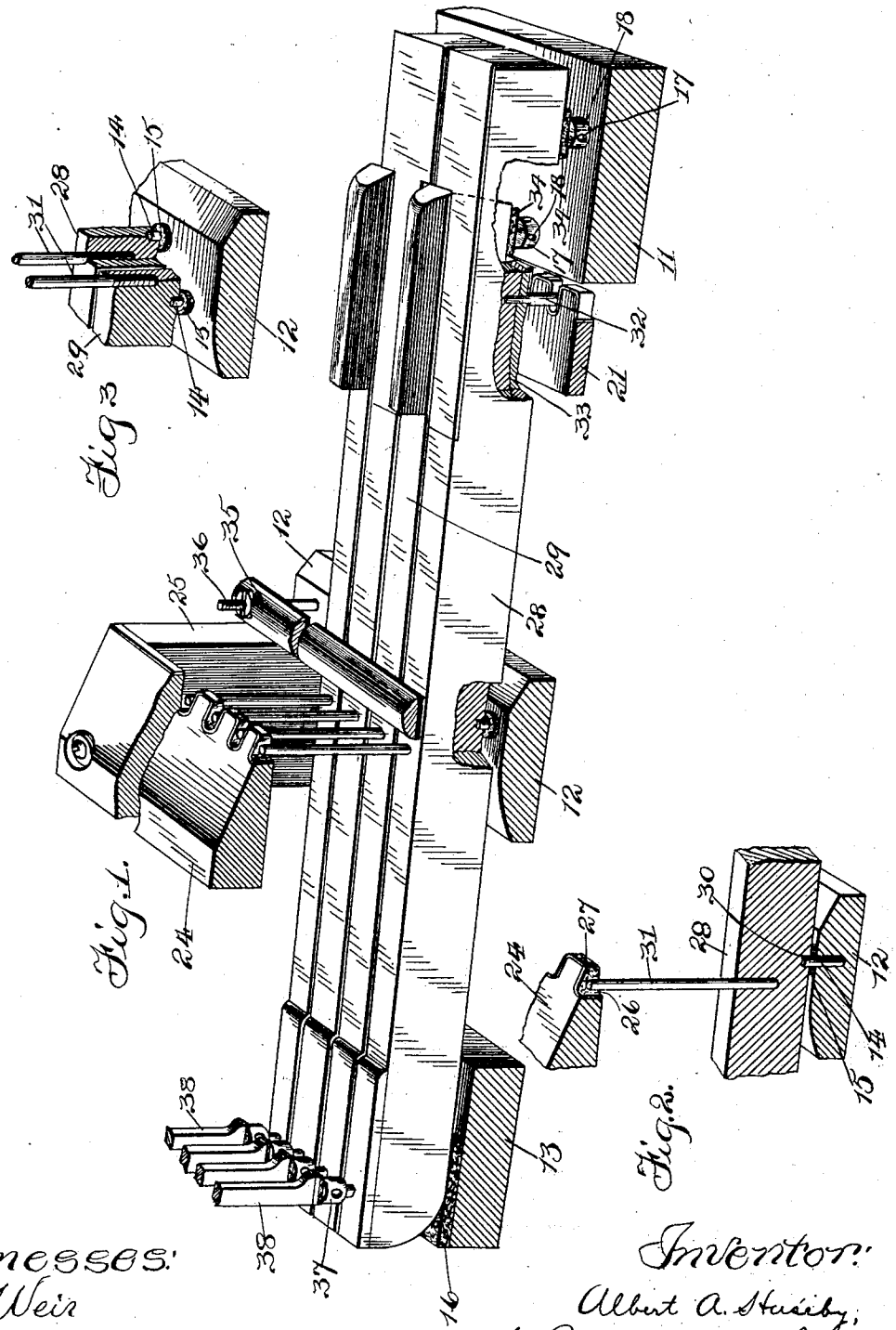


Fig. 3

Fig. 1.

Fig. 2.

Witnesses:
J. B. Weir
Ira D. Perry

Inventor:
Albert A. Huseby,
by Bond & Adams & Pickard & Jackson,
his Attys

No. 721,706. PATENTED MAR. 3, 1903.

A. A. HUSEBY.

PIANO.

APPLICATION FILED OCT. 19, 1901.

NO MODEL. 2 SHEETS—SHEET 2.

Fig. 4.

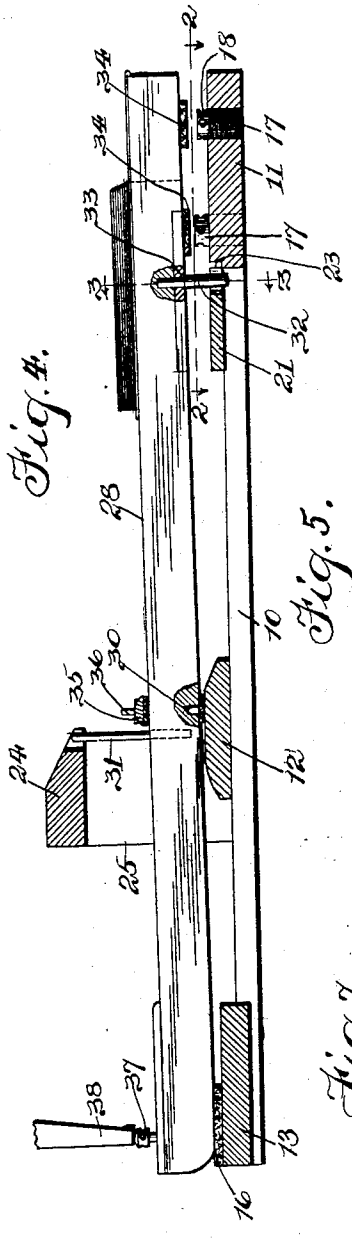


Fig. 5.

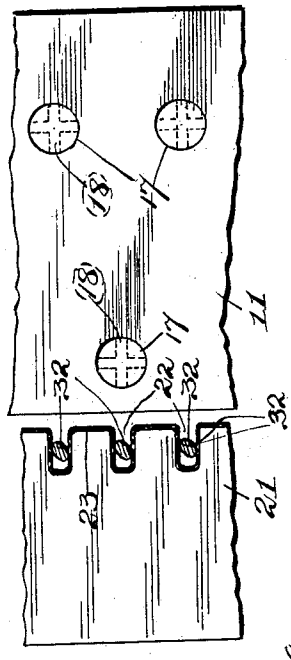


Fig. 7.

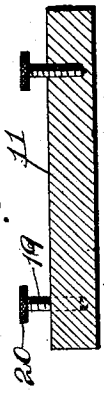
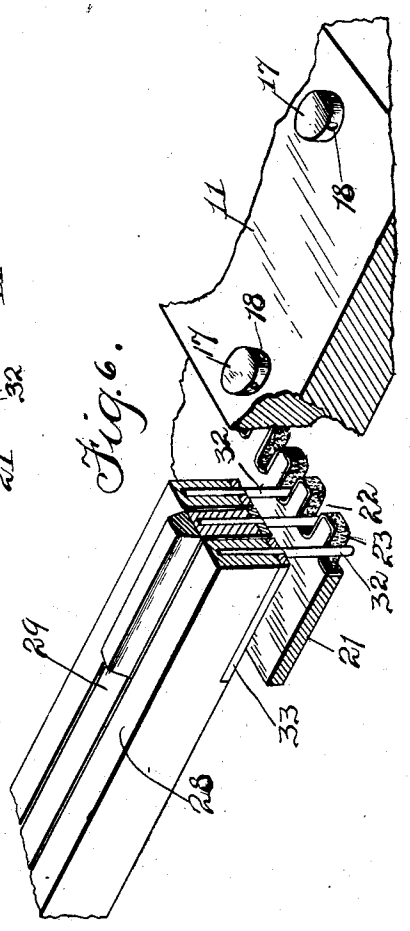


Fig. 6.



Witnesses:
J. B. Weir
Ira D. Bury

Inventor:
Albert A. Huseby,
by Bond Adams Pierce & Graham.
his Attorneys.

UNITED STATES PATENT OFFICE.

ALBERT A. HUSEBY, OF CHICAGO, ILLINOIS.

PIANO.

SPECIFICATION forming part of Letters Patent No. 721,706, dated March 3, 1903.

Application filed October 19, 1901. Serial No. 79,265. (No model.)

To all whom it may concern:

Be it known that I, ALBERT A. HUSEBY, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Pianos, of which the following is a specification, reference being had to the accompanying drawings.

My invention relates to pianos, and has particularly to do with the keys and the method in which they are mounted. In the manufacture of keys for pianos it is customary in many instances to saw a greater or less number of the keys out of a single board, the result being that the grain of the wood in many of the keys does not run straight throughout their length, giving a cross-grain at one or more intermediate points. While this would not be objectionable if the full strength of the wood were preserved, it has heretofore been customary in mounting the keys to fit them more or less centrally upon balance-pins which rise from a suitable support and extend through enlarged passages formed in the keys by cutting out the wood. The consequence is that the keys are greatly weakened where they are cut away, and if such weakened portion happens to coincide with the cross-grained portion of the key it is apt to break. Furthermore, in mounting keys as above described the balance-pins on which they are mounted at the center have heretofore been circular in cross-section and have extended up through the keys, there being a close annular bearing at the bottom, formed by making a circular perforation at the bottom of the key and a lateral bearing at the top, formed by making a narrow slot in the top of the key, usually in a piece of wood glued to the top of the key. The upper bearing or part of the bearing has had to be in the form of a slot to permit the necessary rocking of the key. With the construction described the key has been held in proper position only by a guide-pin at the forward end thereof rising from a suitable support and projecting into a slot in the under side of the key near its forward end. The construction above described is objectionable for several reasons. In the first place, the elongated balance-pin passing through the key for the bearing at the center almost invariably binds at its lower bearing in the key when the key is being removed or placed in position, and as the keys usually have to be placed in position and removed about thirty times in manufacturing a piano the wear caused by such binding is considerable and is apt to loosen the key sufficiently to injure it. This is true to so great an extent as to make it necessary to employ a hard-wood strip to receive the wear of the pivot-pin, thereby increasing the expense of manufacture. A further objection to the construction heretofore employed is that it has been necessary to cut into the forward portion of the key to provide a slot for the reception of the guide-pin rising from the front rail, which slot has had to be lined with felt. This not only increases the expense of manufacture, but the guide-pin is almost sure to bind when the key is removed or replaced, increasing the wear at that point. Furthermore, swelling of the key is apt to partially close the slot, since the grain of the key runs lengthwise thereof, thereby increasing the tendency to bind.

The objects of my invention are to avoid the objections above noted and to provide a key and a mounting therefor by which the key will be properly pivotally supported in such manner that it will operate freely without undue wear and may be readily removed and replaced in position without friction or strain on the key or its mounting, to reduce the cost of manufacture, and particularly to preserve the full strength of the key. To the end stated my invention consists in the novel features herein described, and set forth in the appended clauses of the claim.

I shall now describe the form of my invention illustrated in the accompanying drawings; but I wish it to be understood that my invention is not restricted to the specific construction illustrated and described, except in so far as said devices are specifically claimed.

Referring to the drawings, Figure 1 is a perspective view of three keys of a keyboard, with one of the keys partly broken away to show the construction and arrangement of the parts. Fig. 2 is a partial longitudinal section of the central portion of one of the keys, the balance guide-rail and intermediate rail being in cross-section. Fig. 3 is a detail illustrating the position of the balance guide-

pins and balance-pins. Fig. 4 is a side elevation of one of the keys and the mounting devices thereof, certain parts being in section. Fig. 5 is a partial plan view of the front guide-rail and the front rail, the front guide-pins being in section. Fig. 6 is perspective view, certain parts being in section, illustrating the front guide-pins, the front guide-rail, and the front rail; and Fig. 7 is a cross-section of the front rail, showing a modified form of stop-pin.

In the drawings, 10 indicates that portion of the frame which carries the parts upon which the keys are mounted.

11 indicates the front rail, 12 the intermediate rail, and 13 the back rail. Said rails are mounted parallel with each other on the frame 10, the rail 12 being preferably about midway between the other two.

14 indicates the balance-pins, which are carried by the intermediate rail 12. As best shown in Figs. 1, 2, and 4, the balance-pins 14 are comparatively short, projecting only a short distance above the upper surface of the intermediate rail. Around each pin is a cushion of felt or other suitable material, on which the key rests when in position. As shown in Fig. 3, the different balance-pins 14 are staggered to accommodate the white and black keys, respectively.

16 indicates a strip of felt or other suitable material which is secured to the back rail 13, extending longitudinally thereof, said strip serving as a cushion for the rear ends of the keys.

17 indicates stops mounted on the front rail 11 in position to lie under the front portions of the white and black keys, respectively. Said stops serve to limit the downward movement of the keys and are adjustable, as best shown in Fig. 4, being screwed into the front rail 11.

The form of stop shown in the principal figures of the drawings consists of a cylinder screw-threaded throughout its greater portion and having holes 18 near its upper end to receive a pin, bar, or other tool for adjusting it. As a substitute for this stop I have shown in Fig. 7 a stop 19, which is in the form of a screw having an enlarged head 20. Either of these two forms of stop or any other suitable stop may be employed.

21 indicates a guide-rail which is mounted on the frame 10, extending parallel with the front rail 11 and adjacent thereto. Said guide-rail 21 is provided with a number of slots 22 in its forward edge to receive guide-pins carried by the keys, as will be hereinafter described. The slots are lined with strips of felt 23, as shown in Fig. 6.

24 indicates an upper guide-rail, which may be termed the "balance" guide-rail, since it receives the balance-pins carried by the keys, as will be hereinafter described. The balance guide-rail 24 is mounted upon suitable supports 25, rising from the frame 10 or other suitable base and extends over the keys and a short distance from them. The balance guide-rail is provided in its front edge with a series of slots 26, which register with and are adapted to receive the balance guide-pins, as hereinafter described, said slots being lined with a strip of felt 27, similar to the lining 23. The grain of the strips comprising the front guide-rail 21 and balance guide-rail 24 runs longitudinally thereof, and as the slots 22 and 26 of said guide-rails, respectively, extend perpendicularly to the grain of the wood they are not appreciably affected by swelling of the wood, and consequently there is no appreciable variation in the width of the slots on that account. Consequently there is no tendency to bind the guide-pins.

28 indicates the white keys, and 29 the black. Said keys are, however, the same in construction so far as my invention is concerned, and consequently the parts thereof are indicated by the same reference-numerals.

30 indicates a recess formed in the under side of each key to receive the balance-pin 14, as shown in Fig. 4. As illustrated, the recess 30 need not be deep, it being necessary only that it be sufficiently deep to accommodate the balance-pin 14 and retain it so securely as to prevent the key from accidentally slipping off the balance-pin when the parts are all assembled. Inasmuch as the keys are held down by a binder when all the parts are assembled it is evident that the recess 30 need not be of great depth, and as to cut away the key reduces its strength I prefer to make the recess 30 as shallow as practicable. In practice the recess 30 is made very slightly larger in diameter than the balance-pin, so that the balance-pin may fit loosely therein.

31 indicates a balance guide-pin with one of which each key is provided. The balance guide-pin 31 is secured in the key near the central portion thereof and projects upward therefrom, its upper end resting in one of the slots 26 in the balance guide-rail 24, as shown in Figs. 1 and 4. The upper end of the balance guide-pin always lies in its slot 26 while the key is in position, the slot being of sufficient depth to permit the pin 31 to rock without moving out of the slot.

32 indicates the front guide-pins, with one of which each key is provided. The guide-pin 32 is secured in the key and projects downward therefrom near the forward end thereof, the lower end of each pin 32 entering one of the slots 22 in the guide-rail 21, as shown in Figs. 4 and 6. The guide-pins 32 are not circular in cross-section, but are elliptical, as shown in Fig. 5, the object being to provide for adjusting the pins 32 to cause them to frictionally engage the sides of the slots 22 to a greater or less extent. It sometimes happens that the keys become somewhat loose in their mounting, and consequently are apt to rattle. By partially rotating the pins 32 they are caused to bear slightly against the sides of the slots 22, thereby compensating for any looseness in the mounting of the keys and pre-

venting rattling. The pins 32 are consequently adapted to be rotated, and on this account hard-wood strips 33 are provided in the under surface of the keys, through which strips the pins 32 pass and by which they are more firmly held than they would be in the soft wood of which the keys are principally composed.

34 indicates cushions or punchings provided on the under sides of the keys near their front ends, said punchings being placed so as to overlie the stops 17. As already described, the stops 17 are vertically adjustable, so that the touch of the keyboard can be adjusted by simply running the screw-stops 17 up or down. By this means the use of paper punchings to adjust the touch is avoided, and consequently the touch of the key once laid accurately will always retain the same evenness.

35 indicates a key-binder of the usual form, which extends over the keys near the central portion thereof and holds them properly down upon the balance-pins 14. The binder 35 is held in place by bolts 36 at its ends, said bolts being secured to the intermediate rail 12.

37 indicates adjustable stops at the rear ends of the keys upon which rest the lower ends of the action-bars 38.

It will be observed that by reason of the construction above described to remove a key it is necessary only to remove the binder, when by raising the front end of the key sufficiently to clear the balance-pin it may be removed by drawing it forward and that during the removal there is no place where binding can occur. When a key is placed in position, it takes its place automatically, since the guide-pins 31 and 32 move into their respective slots, carrying the socket 30 into position over said balance-pin. The guide-pin 32 serves principally to hold the key against swinging about a vertical axis, while the balance guide-pin 31 serves also to prevent rocking of the key about its longitudinal axis.

By the construction described I provide a strong and certain pivotal and guide connection for the keys, the length of the guide-pins being sufficient to give easy control, and I also avoid cutting away of the keys and the necessity of using reinforcing-strips, as has heretofore been practiced. Besides, I obtain a much steadier and better action with a much stronger construction than has heretofore been attainable. By locating the balance-pin sockets forward or backward of the lines of the guide-pins 31, as illustrated in Figs. 1, 2, and 3, the boring of a continuous passage or hole through the keys from top to bottom is avoided. The guide-pins may either be screwed into the keys or they may be driven in, as desired.

It will be understood, as already suggested, that so far as its broader features are concerned my invention is not restricted to the details of construction shown and described, but includes the use of equivalents. It will also be understood that while my improvements are especially designed for piano-keys they may also be applied to keys for other instruments so far as may be practicable.

That which I claim as my invention, and desire to secure by Letters Patent, is—

1. An improved key for pianos having a shallow recess in its under surface near the longitudinal center of the key, adapted to receive a balance-pin, and a balance guide-pin which projects vertically from its upper surface at a point near said recess, substantially as described.

2. An improved key for pianos having a shallow recess in its under surface adapted to receive a balance-pin, a balance guide-pin which projects vertically from its upper surface near the longitudinal center thereof, and a guide-pin carried by the key near the front end thereof, substantially as described.

3. An improved key for pianos having a shallow recess in its under surface adapted to receive a balance-pin, a balance guide-pin which projects vertically from its upper surface near the longitudinal center thereof, and a downwardly-projecting guide-pin carried by the key near the front end thereof, substantially as described.

4. The combination with a pivotally-mounted piano-key, of a vertically-adjustable stop over which the front end of the key projects, said stop acting to limit the downward movement of the key, a guide-pin carried by the key, a guide-rail for said guide-pin, and a cushion between the under surface of the key and the top of said stop, substantially as described.

5. An improved key-mounting for pianos, consisting of a suitable support, an upwardly-projecting balance-pin carried thereby and having its upper end substantially circular in cross-section, the key having a recess which receives the upper end of said balance-pin, said recess lying between the side edges of the key, and means near the pivotal center of the key for guiding said key as it rocks on said balance-pin, substantially as described.

6. The combination of a suitable support, a short pivot-pin rising therefrom, a key having a socket adapted to receive said pin, and a guide extending upward from said key, substantially as described.

7. An improved key-mounting for pianos, consisting of a suitable support, an upwardly-projecting balance-pin carried thereby, the projecting portion of said pin being shorter than the vertical thickness of the key, a key having a socket which receives said balance-pin, an upwardly-projecting guide-pin carried by the key near the pivotal center thereof, and a guide-rail having a slot which receives said guide-pin, substantially as described.

8. An improved key-mounting for pianos, consisting of a suitable support, an upwardly-projecting balance-pin carried thereby and having its upper end substantially circular

in cross-section, a key having a shallow recess which receives said balance-pin, a downwardly-projecting guide-pin carried by the key near its front end, and a guide-rail having a slot, open at the front, which receives said guide-pin, substantially as described.

9. An improved key-mounting for pianos, consisting of a suitable support, an upwardly-projecting balance-pin carried thereby and having its upper end substantially circular in cross-section, the key having a shallow recess which receives said balance-pin, means near the pivotal center of the key for guiding the key as it rocks on said balance-pin, and guiding means near the front end of the key, substantially as described.

10. An improved key-mounting for pianos, consisting of a suitable support, an upwardly-projecting balance-pin carried thereby and having its upper end substantially circular in cross-section, the key having a shallow recess which receives said balance-pin, means near the pivotal center of the key for guiding the key as it rocks on said balance-pin, a downwardly-projecting guide-pin carried by the key near its front end, and a guide-rail having a slot open at the front which receives said guide-pin, substantially as described.

11. An improved key-mounting for pianos, consisting of a suitable support, an upwardly-projecting balance-pin carried thereby, the projecting portion of said pin being shorter than the vertical thickness of the key, a key having a socket which receives said balance-pin, an upwardly-projecting guide-pin carried by the key near the pivotal center thereof, a guide-rail having a slot which receives said guide-pin, and guiding means near the front end of said key, substantially as described.

12. An improved key-mounting for pianos, consisting of a suitable support, an upwardly-projecting balance-pin carried thereby, the projecting portion of said pin being shorter than the vertical thickness of the key, a key having a socket which receives said balance-pin, an upwardly-projecting guide-pin carried by the key near the pivotal center thereof, a guide-rail having a slot which receives said guide-pin, a downwardly-projecting guide-pin carried by the key near its front end, and a second guide-rail having a slot which receives said last-mentioned guide-pin, substantially as described.

13. An improved key-mounting for pianos, consisting of a suitable support, an upwardly-projecting balance-pin carried thereby and having its upper end substantially circular in cross-section, the key having a shallow recess which receives said balance-pin, means near the pivotal center of the key for guiding said key as it rocks on said balance-pin, a downwardly-projecting guide-pin carried by the key near its front end, and a guide-rail near the front end of the key, said guide-rail having a slot open at the front which receives said guide-pin, substantially as described.

14. An improved key-mounting for pianos consisting of a suitable support, an upwardly-projecting balance-pin carried thereby, the projecting portion of said pin being shorter than the vertical thickness of the key, a key having a socket which receives said balance-pin, an upwardly-projecting guide-pin carried by the key near the pivotal center thereof, a guide-rail having a slot in the front edge thereof which receives said guide-pin, and guiding means near the front end of said key, substantially as described.

15. An improved key-mounting for pianos, consisting of a suitable support, an upwardly-projecting balance-pin carried thereby, the projecting portion of said pin being shorter than the vertical thickness of the key, a key having a socket which receives said balance-pin, an upwardly-projecting guide-pin carried by the key near the pivotal center thereof, a guide-rail having a slot in the front edge thereof which receives said guide-pin, a downwardly-projecting guide-pin carried by the key near its front end, and a guide-rail having a slot in the front edge thereof which receives said last-mentioned guide-pin, substantially as described.

16. A piano-key having a recess in its under surface adapted to receive a pivot-pin, and having a vertical balance guide-pin on its upper surface between its ends, substantially as described.

17. The combination of a key, an upper and independent guide-rail above the key and having a slot in its forward edge, and a guide-pin carried by the key and adapted to move in the slot in said guide-rail, whereby rocking of the key about its longitudinal axis is prevented, substantially as described.

18. An improved key-mounting for pianos, consisting of a balance-pin, a key pivotally mounted upon the upper end of said balance-pin, said key having a shallow socket which receives said balance-pin, a downwardly-projecting guide-pin carried by said key near its front end, and a guide-rail having a slot open at its front edge, which receives said guide-pin, substantially as described.

19. An improved key-mounting for pianos, consisting of a balance-pin, a key mounted upon the upper end of said balance-pin and adapted to rock thereupon, a downwardly-projecting guide-pin carried by said key near its front end, and a guide-rail having a slot open at its front edge which receives said guide-pin, substantially as described.

20. An improved key-mounting for pianos, consisting of a suitable support, an upwardly-projecting balance-pin carried thereby, the projecting portion of said pin being shorter than the vertical thickness of the key, the key having a socket which receives said balance-pin, an upwardly-projecting guide-pin carried by the key near the pivotal center thereof, a guide-rail having a slot which re-

ceives said guide-pin, a downwardly-projecting guide-pin carried by said key near its front end, and a guide-rail having a slot which receives said downwardly-projecting guide-pin, the slots in said guide-rails being arranged substantially at right angles to the grain of the wood of which said guide-rails are made, substantially as described.

21. An improved key-mounting for pianos consisting of a suitable support, an upwardly-projecting balance-pin carried thereby, the projecting portion of said pin being shorter than the vertical thickness of the key, a key having a socket which receives said balance-pin, an upwardly-projecting guide-pin carried by the key near the pivotal center thereof, and a guide-rail having a slot which receives said guide-pin, said slot being arranged at right angles to the grain of the wood of which the guide-rail is made, substantially as described.

22. The combination with a piano-key having a guide-pin, of a guide-rail having a slot open at the front adapted to receive said guide-pin, substantially as described.

23. An improved key-mounting for pianos, consisting of a suitable support, a key pivotally mounted on said support, an upwardly-projecting balance guide-pin carried by said key, a guide-rail having a slot in which said balance guide-pin moves, and a guide near one end of said key, substantially as described.

ALBERT A. HUSEBY.

Witnesses:
JOHN L. JACKSON,
ALBERT H. ADAMS.