

Oct. 13, 1931.

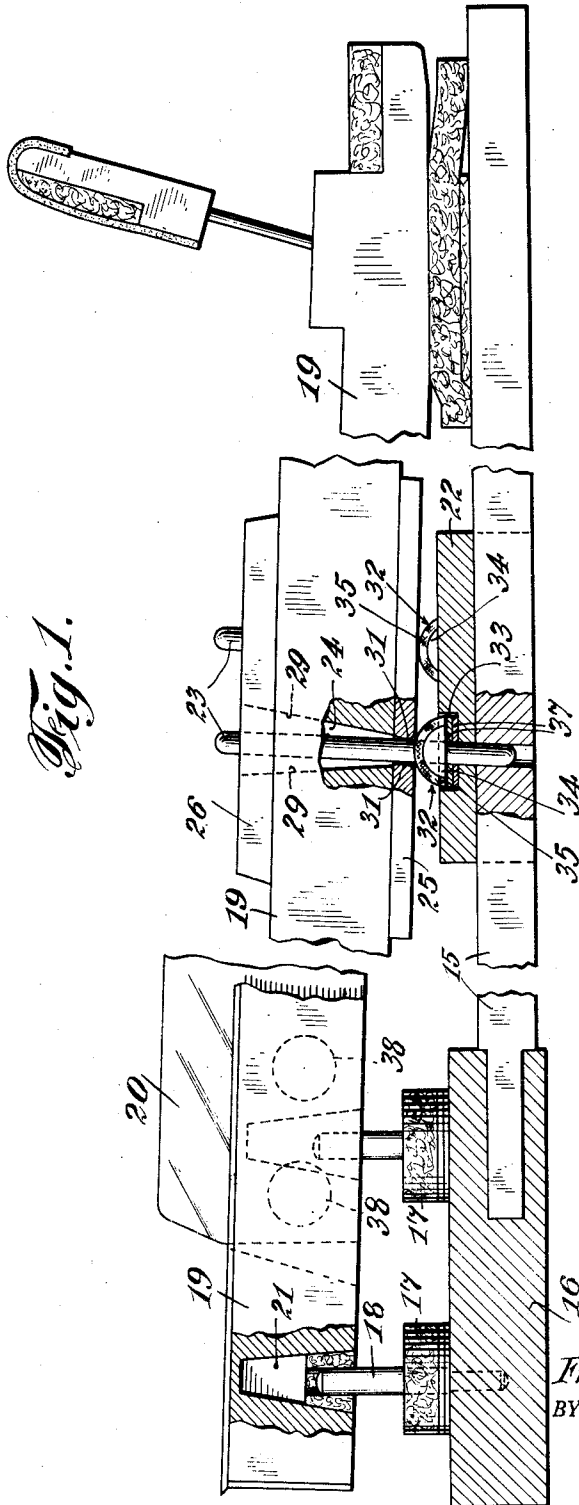
F. A. VIETOR

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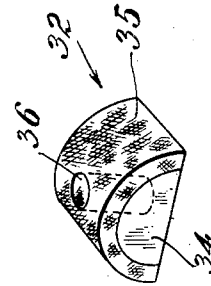
PIANO KEY MOUNTING

Filed Feb. 18, 1931

3 Sheets-Sheet 1



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Fig. 4.

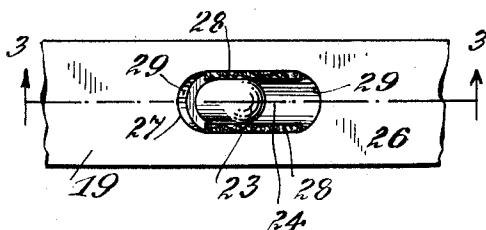


Fig. 3.

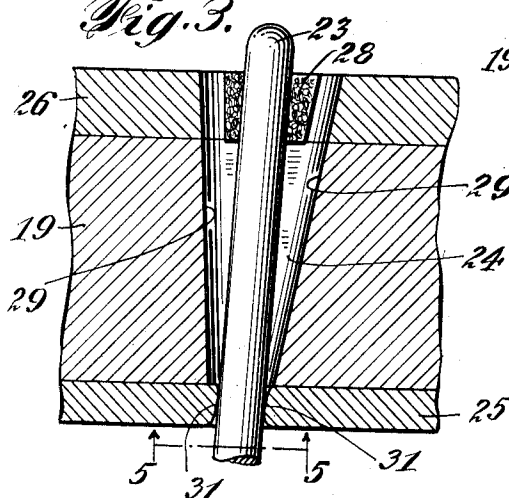


Fig. 5.

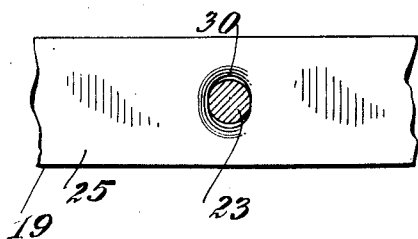


Fig. 6.

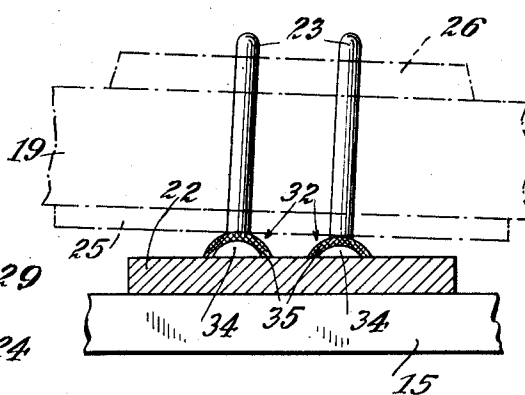
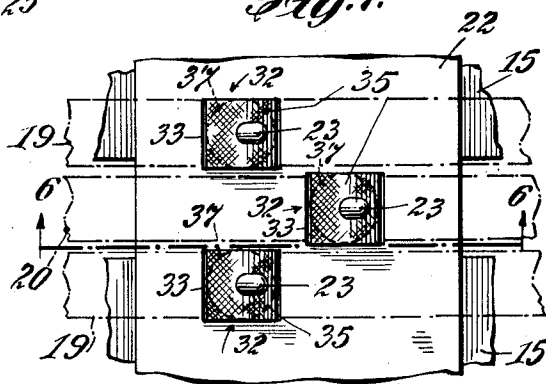


Fig. 7.



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Fig. 8.

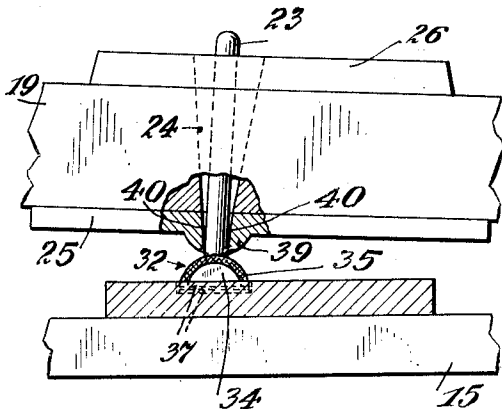


Fig. 10.

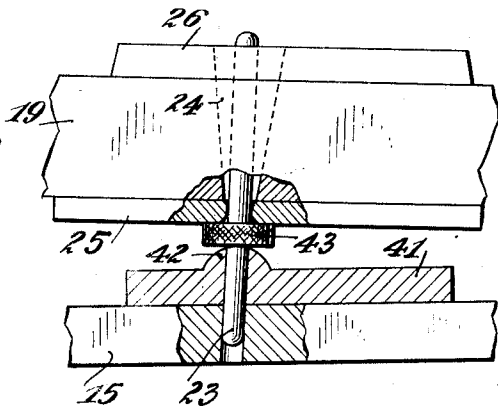


Fig. 9.

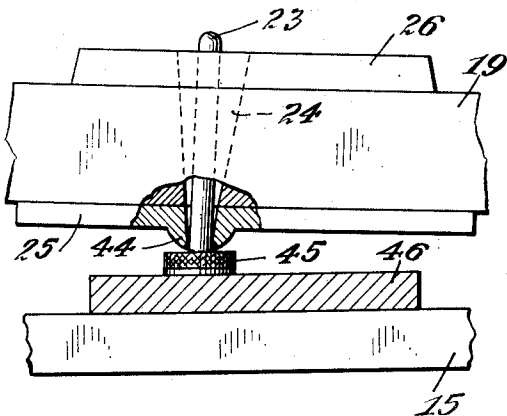
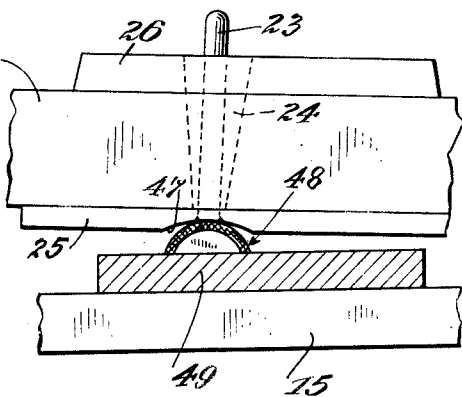


Fig. 11.



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UNITED STATES PATENT OFFICE

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PIANO KEY MOUNTING

Application filed February 18, 1931. Serial No. 516,547.

This invention relates to piano actions, more particularly to the keys thereof; and the invention has for its object the provision of improved means whereby to mount the keys upon the balance rail.

5 An object of the invention is to furnish the keys with an easy and simple rocking action which will facilitate depression under the "touch" of the fingers and which will insure rapid and forceful elevation to the original level.

10 One of the objects of the invention is the provision of a mounting in which, so far as the mounting itself is concerned, resistance to the rocking action of the key is reduced to a minimum, and a further object of the invention in this connection is to attain these results while maintaining a true leveling of the key at its elevated position.

15 More particularly, the invention is characterized by the provision of a balance rail bearing and a balance rail pin positioned centrally therein, with the former cut away or rounded in such manner that it offers no material obstruction to the free and easy rocking movement of the key from and to its elevated or leveling position. In connection with the balance rail bearing paper shims are employed as a means of securing the desired fine adjustment and leveling of the key, and the balance rail bearing at its point of bearing contact is covered with woven cloth which of itself is more or less resilient, contributing thereby to the easy rocking action of the key.

20 For its rocking action, the key is held in place by the balance rail pin, but in such manner that there is no appreciable or substantial frictional resistance offered to the rocking action of the key except at the front and rear of the pin at points adjacent the balance rail bearing where intimate close contact is necessary in order to prevent lengthwise bodily movement of the key.

25 Another object of the invention is to provide an improved mounting which may be used for the upper or "black" keys as well as for the lower or "white" keys, the mountings being of such character and of such form and so positioned that the mountings for the lower or "white" keys will in nowise

interfere with the rocking actions of the upper or "black" keys upon their respective mountings.

Other objects of the invention will appear hereinafter.

The invention further consists in the new and novel features of construction and the new and original arrangement and combination of parts hereinafter described and more particularly set forth in the subjoined claims.

Several simple and practical examples of the invention are disclosed in the accompanying drawings, in which:—

Figure 1 is a side view and section, showing a key frame and keys, together with a mounting construction in accordance with my invention, the keys being illustrated in normal or elevated position;

Figure 2 represents a detail view in perspective of a balance rail bearing;

Figure 3 is a sectional detail on an enlarged scale, showing the key and balance rail pin;

Figure 4 is a fragmentary plan view of the parts shown in Fig. 3, and illustrating in particular the character of the pin opening at the top of the key;

Figure 5 is a section on the line 5—5 of Fig. 3, showing the form of the key opening at the underface of the key;

Figure 6 is a fragmentary side view and section showing the relation of the balance rail bearings for the "white" and "black" keys;

Figure 7 is a fragmentary top plan view showing the relation of the balance rail bearings, with the keys illustrated in dash-dot lines;

Figure 8 is a fragmentary side view and section showing an alternative form of the mounting;

Figure 9 is a view similar to Fig. 8, showing another form of the mounting;

Figure 10, also similar to Fig. 8, shows a further form of the mounting construction; and

Figure 11, also similar to Fig. 8, shows a still further form of the mounting construction.

Referring with more particularity to the accompanying drawings, and first to the illustrations presented in Figs. 1 to 7, inclusive,

15 designates a key frame, 16 the front rail which is provided with the usual felts 17 and upwardly projecting pins 18, while 19 and 20 denote respectively the usual "white" and "black" keys which are mounted upon the key frame so as to have a rocking movement thereon in order to actuate the actions of the piano in the usual way. It will, of course, be understood that the piano actions (not herein shown) normally rest upon the rear portions of the keys so that the front portions of the keys are normally in elevated or leveling position. In accordance with the usual practice, each key at its forward portion is provided with an aperture 21 which extends up into the body of the key from the underface thereof for the reception of a guide pin as 18.

22 denotes a balance rail which is mounted upon and extends across the key frame for the support thereon of the upper and lower rows ("white" and "black") of keys for rocking movement from and to their elevated or normal position; while the numerals 23 denote the balance rail pins which project upwardly from the key frame 15 and the balance rail 22 thereon. Each of the keys is provided with an opening 24 for the passage of its individual balance rail pin 23; and this opening extends for the passage of the key through the key buttons 25 and 26 secured respectively to the underface and top face of the key. In the upper key button 26, this opening is of elongated form extending lengthwise of the key, as best illustrated in Fig. 4, and it has rounded ends 27, while the longitudinal side walls defining this opening are furnished with felt pads 28. The top portion of this opening is of such size and proportion that ample clearances for the rocking action of the key are provided at the front and rear sides of the rail pin, while the felt pads are in gentle contact with the pin. When the key is in its normal or elevated position, the pin is not in the center of the elongated opening, but as shown in Figs. 3 and 4, occupies a position a little forward of the center. From the surface of the upper key body 26 the front and rear walls 29 of the opening converge until in the lower key button 25 they come in contact with the rail pin, the extent of the contact with the rail pin, however, being for a relatively short distance, that is to say, from one-eighth to three-sixteenths of an inch. The felt pads 28 are relatively narrow in width so as to reduce the extent of the contact with the sides of the pin to a minimum. Below the felt pads and extending to the underface of the lower key button 25, there are clearance spaces 30 between the pin and the side walls of the opening, as best illustrated in Fig. 5, from an inspection of which it will be seen that at the underface of the lower key button 25 the opening is of an oblong form in a direction transversely of the

key. Under this arrangement, the key contacts with the rail pin only along the front and rear sides thereof as at 31 (Figs. 1 and 3), while the felt pads have gentle contact with the sides of the pin (Fig. 4). Owing to this arrangement, frictional resistance is reduced to a minimum during the rocking action of the key.

According to an important feature of my invention, the balance rail bearing consists of a bearing body 32 which is positioned in a recess 33 provided for the purpose in the balance rail 22; and in order to permit free and unobstructed rocking movement of the key upon the bearing body, the latter is cut away both at the front and the rear so as to have in general the form of a half-round body. The bearing body 32 consists of a core portion 34 and a woven cloth covering 35 which is secured upon its rounded face, which covering is more or less resilient to provide for the easy rocking action of the key. The bearing body is provided with a suitable aperture 36 for the rail pin 23. The recess 33 in which the bearing body is seated is made of angular form so as to prevent any displacement of the half-round bearing body and positioned within the recess 33 under the flat underface of the bearing body are one or more paper shims 37 which surround the rail pin 23, being made in the form of washers for such purpose. The bearing body can be removed from its recess in order to provide for the application and removal of the paper shims as may be necessary in order to provide for the proper leveling of the keys. Owing to the provision of the half-round bearing body, and to the fact that the key comes in contact with the pin only along the front and rear lines 31, the key may be said to be pivotally mounted upon the bearing body and so as to have free and unobstructed rocking movement thereon with a minimum of resistance offered to such rocking movement. With this form of novel mounting, the key can be depressed with great ease and its re-positioning movement, owing to the absence of frictional resistance, is effected rapidly and with considerable force. One of the important advantages which flows from this novel mounting, is that a less number of weights as 38 may be incorporated in the forward portion of the key.

As illustrated in Figs. 6 and 7, an individual mounting is provided for each of the keys 19 and 20 which make up the usual lower and upper rows of the piano keyboard; and it is to be observed in this connection that the mountings for the upper rows 20 which are located in a line back of though parallel to the line of mountings for the lower row of keys 19, so sustain the upper row of keys for rocking action that there will be no conflict

with the mountings for the lower row of keys.

In Fig. 8, I show an alternative form of the key mounting construction. In this instance, the lower key button 25 is provided around the opening 24 for the rail pin 23 with a depending extension or rim 39 which surrounds the rail pin and has contact therewith only along the front and rear lines 40. The underface of the rim 39 rests upon the balance rail bearing 32.

In the form of construction shown in Fig. 10, the balance rail 41 is itself made with a balance rail bearing 42 which is half-round in form; and as here illustrated, suitable woven cloth washers 43 are disposed around the rail pin 23 in a position between the rail bearing 42 and the lower key button 25.

In Fig. 9 another form of the mounting is illustrated; and in this instance it will be noted that the balance rail bearing 44 is provided on the lower key button 25, while woven cloth washers 45, which surround the rail pin 23, are interposed between the rail bearing 44 and the balance rail 46.

In the form of construction illustrated in Fig. 11, the lower key button 25 is provided in its underside with a concaved recess 47 and the half-round rail bearing 48 upon the balance rail 49 contacts tangentially with the concaved surface of the recess 47, it being observed that in order to provide for this tangential contact and for the proper rocking action of the key, the concaved cavity of the recess 47 is made considerably larger than the half-round side of the rail bearing.

All of these forms of construction reduce to a minimum the frictional resistance offered to the rocking action of the keys, and consequently they make provisions for easy depression of the keys with a corresponding rapid and forceful re-positioning thereof.

In the embodiments shown, the pivotal action of the key upon the pin and upon the bearing becomes coincident or unitary.

It will be obvious that the forms of construction herein disclosed are capable of embodiment in many different environments. It has been sought herein to illustrate such embodiments as will suffice to exhibit the character of the invention.

The terms and expressions employed are used as terms of description and not of limitation, and I have no intention, in the use of such terms and expressions, of excluding any mechanical equivalents of the features shown and described, or portions thereof, but recognize that various structural modifications are possible within the scope of the invention as claimed.

I claim:—

1. In a piano action, consisting of a key, balance rail and balance rail pin, with an opening in the key for the passage of the pin, the walls of said opening converging

and contacting at their lower portions with the front and rear sides of the pin to provide for rocking action of the key on the pin as a retaining pivot and the walls of said opening being otherwise spaced from the pin to provide clearance spaces for the rocking action of the key and to avoid frictional resistance to the rocking action thereof, and an elongated semi-cylindrical section bearing body for the key encompassing the pin and occupying a position between the rail and the portions of the walls which contact with the pin, the portions of the bearing body being cut away to allow upon the bearing body unobstructed rocking movement of the key from and to its normal position while supporting the key to its retaining pivot, whereby the pivotal action upon the pin and upon the bearing body become coincident.

2. A piano action having, in combination, a balance rail, a balance rail pin, a key with an underneath button, said key and button having an opening therein for the passage of the pin, the walls of said opening contacting with the front and rear sides of the pin within the button and being otherwise spaced from the pin, an intermediate bearing body surrounding the pin and supporting the key and button upon the rail, said bearing body being rounded front and rear to allow unobstructed rocking of the key and button for the purpose of the piano action, and shims on the pin interposed between the bearing body and rail.

3. In a piano action, having a balance rail, a pin on the rail, a key on the pin retained thereby against longitudinal movement and so as to permit oscillating movement upward and downward of the key, a bearing body surrounding the pin and interposed between the rail and key, the bearing body being cut away from the pin to provide an unobstructed path for the oscillating movement upward and downward of the key, the pivotal action of the key upon the pin and the key upon the bearing action being unitary.

4. In a piano action having a balance rail, a balance rail pin and a key with an opening therein for the passage of the pin; a bearing for the key, cutaway to form a pivot point located between the key and the balance rail, there being a free space at the front and rear of said pivot point to allow free rocking on the point and free unobstructed swinging of the key in said space at the front and rear of the point whereby to facilitate quick and unobstructed movement of the key to allow for easy rocking thereof when depressed or freed from depression.

In testimony that I claim the foregoing as my invention, I have signed my name hereto.

FREDERICK A. VIETOR.