(No Model.)

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PIANO ACTION.

No. 386,079. Patented July 10, 1888.

Fig. 1.

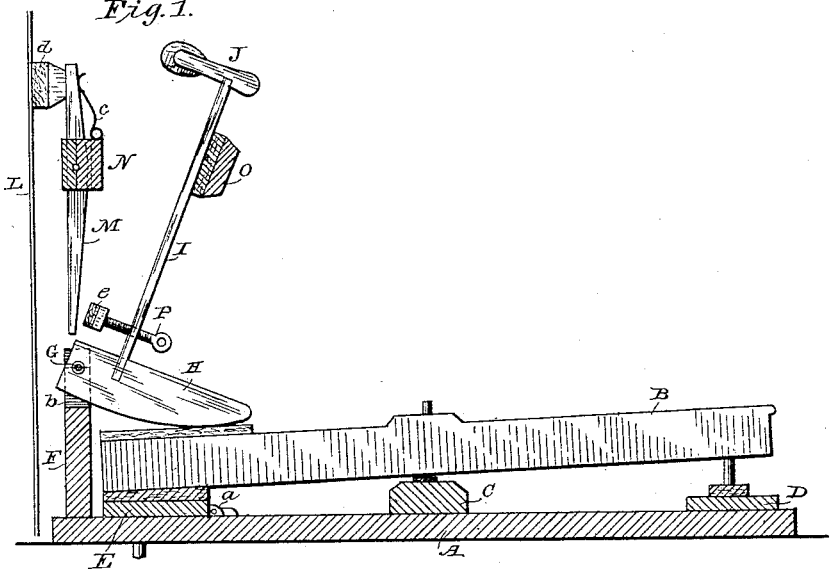


Fig. 2.

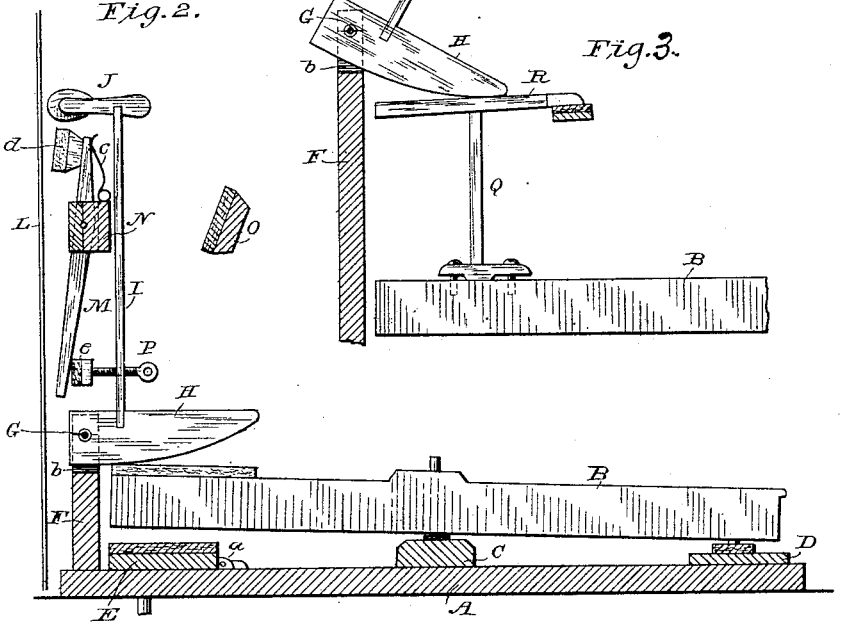
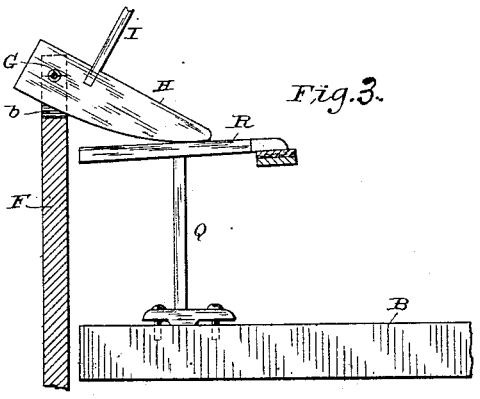


Fig. 3.



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UNITED STATES PATENT OFFICE.

JAMES McDONALD, OF BROOKLYN, NEW YORK; MARY H. McDONALD (ADMINISTRATRIX OF SAID JAMES McDONALD, DECEASED) ASSIGNOR TO BUNCE & BENEDICT, OF SAME PLACE.

PIANO-ACTION.

SPECIFICATION forming part of Letters Patent No. 386,079, dated July 10, 1888.

Application filed February 4, 1887. Serial No. 226,602. (No model.)

To all whom it may concern:

Be it known that I, JAMES McDONALD, of Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Piano-Forte Actions, of which the following is a specification.

This invention relates to certain improvements in the construction of piano-forte actions, whereby it is rendered possible to repeat the blow of the hammer against the string at any position that the key may be in. To this end a peculiar construction of hammer is adopted having a hammer-butt which is made substantially circular or arc-like in outline, said circular portion resting directly upon the transmitter, which is itself rigidly fixed with relation to the part to which it is attached, and which is, as contemplated by this invention, either the rear portion of the key itself or a part fixed thereto.

The invention is illustrated in the accompanying drawings, in which—

Figure 1 is a vertical section of an upright-piano-forte action, showing the same at rest. Fig. 2 is a similar section showing the hammer raised to the string. Fig. 3 is a detailed sectional view showing a modification of the transmitter between the key and hammer-butt.

In the drawings, A is the bottom rail of the key-frame. B is one of the keys. C is the usual center rail, to which the keys are pivotally connected. D is the front rail of the key-frame, and E is the back rail, which is hinged at *a* to the bottom rail. All of these parts are of ordinary and well-known construction, and require no further description.

F is the hammer-butt rail, to which the hammer-butts are pivoted, and which is secured to the bottom rail immediately behind the keys. This rail is made of a single piece of wood, which serves as the bearing-rail for all of the hammer-butts used in the piano, as long as the piano does not contain more than four or five octaves. The rail is provided with a series of notches, *b b*, which are formed on its upper side throughout its entire length, the notches being of the proper width and depth to receive the hammer-butts. The hammer-butts, which are provided with suitably-bushed apertures, are pivoted in said notches by means of a wire, G, which is inserted through holes in the rail and through the bushed apertures of the hammer-butts.

H is one of the hammer-butts, which has secured thereto an upwardly-extending shank, I, which carries on its upper end the hammer-head J, which is adapted to strike one of the strings L. The hammer-butt has its lower edge or surface formed in a curved line which is substantially circular or arc-like. In the preferred construction of the action this circular edge of the hammer-butt rests directly upon the rear end of the key, which constitutes itself the transmitter between the key and hammer-butt. It will be observed that with this construction the transmitter or rear end of the key will always be in contact with some portion of the circular edge of the hammer-butt in whatever position the key may be held, so that at all times by further depression of the key the hammer may be thrown back to strike the string.

M is one of the damper-levers, which is pivoted in a damper-rail, N, between the hammers and the strings. The damper-levers carry on their upper ends the damper-cushions *d*, which are normally held in contact with the strings by means of small springs *c*, mounted upon the damper-rail. A single damper-rail is used for all of the damper-levers, and the damper-levers are pivoted therein in the same manner that the hammer-butts are pivoted in the hammer-butt rail.

The hammer-shanks are supported in their position of rest by a hammer-shank rail, O, which is suitably mounted in the piano-frame. Each hammer-shank carries a regulating-screw, P, having a padded end, *e*, which, when the hammer is thrown back to strike the string, comes in contact with the lower end of the damper-lever, thus swinging the damper-pad away from the spring and permitting the free vibration of the latter. When the hammer falls back to its position of rest, the damper-lever is released and the damper-pad is again

pressed against the string by means of its spring *c*.

When the improvements are used with pianos embracing more than four or five octaves, wherein a larger number of strings are employed, it is necessary to place some of the hammer-butts at such a distance above the keys that the keys cannot act directly upon the circular edge of the hammer-butts. In such a case an additional transmitting device must be interposed between the key and hammer-butt, as is shown in Fig. 4. This transmitter, which is rigidly attached to the rear end of the key, consists of a vertical tracker, Q, which has rigidly secured to its upper end a horizontal lever, R, which comes directly in contact with the curved edge of the hammer-butt and takes the place of the transmitting rear end of the key in the construction shown in Figs. 1 and 2.

In whichever construction that is employed it will be observed that there is no independently-moving part interposed between the key and the hammer-butt, but that the transmitter is in any case rigidly fixed with relation to the part to which it is attached.

In constructing the hammer-butts, hammer-shanks, and hammer-heads these parts are made from separate sheets each wide enough to contain one or more full sets for a piano. The hammer-butts and hammer-heads are grooved to admit the hammer shanks. The hammer-heads are covered with felt or leather while still in the sheet. The hammer-shanks are then glued to the hammer-heads and hammer-butts, thereby making one or more complete sets of hammers while still in the sheet, and then the sheets are sawed apart to form the individual hammers. The damper-levers and damper-heads are made in the same manner.

I claim as my invention—

1. In a piano-forte action, the combination of a key, a simple transmitter rigidly fixed with relation to the part to which it is attached, and a pivoted hammer having a hammer-butt made substantially circular or arc-like in outline.

2. In a piano-forte action, the combination of a key, a pivoted hammer having a hammer-butt made substantially circular or arc-like in outline, and a transmitter upon which the circular edge of said hammer-butt rests, substantially as set forth.

3. A pivoted hammer having a hammer-butt made substantially circular or arc-like on one edge, in combination with a piano-key, the rear or transmitting end of which is directly in contact with the circular edge of said hammer-butt, substantially as set forth.

4. In an upright-piano-forte action, a pivoted hammer having a hammer-butt with its lower edge substantially circular in outline, in combination with a key having a transmitting part in substantially a horizontal plane on its rear end, the curved edge of the hammer-butt resting directly upon said transmitting part in whichever position the key may be held at rest, substantially as set forth.

5. In a piano-forte action, the strings, the damper-rail, the damper-levers pivoted in said damper-rail, and having damper-pads adapted to said strings, in combination with the keys of the piano, the hammer-butt rail behind the rear ends of the keys, the hammers pivoted in said hammer rail, having hammer-butts and hammer-heads, and being also provided with regulating-screws, carrying pads, which co operate with said damper-levers, and said hammer-butts having one edge substantially circular in outline, said curved edge being acted upon by a plane transmitting-surface rigidly attached to the key, substantially as set forth.

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