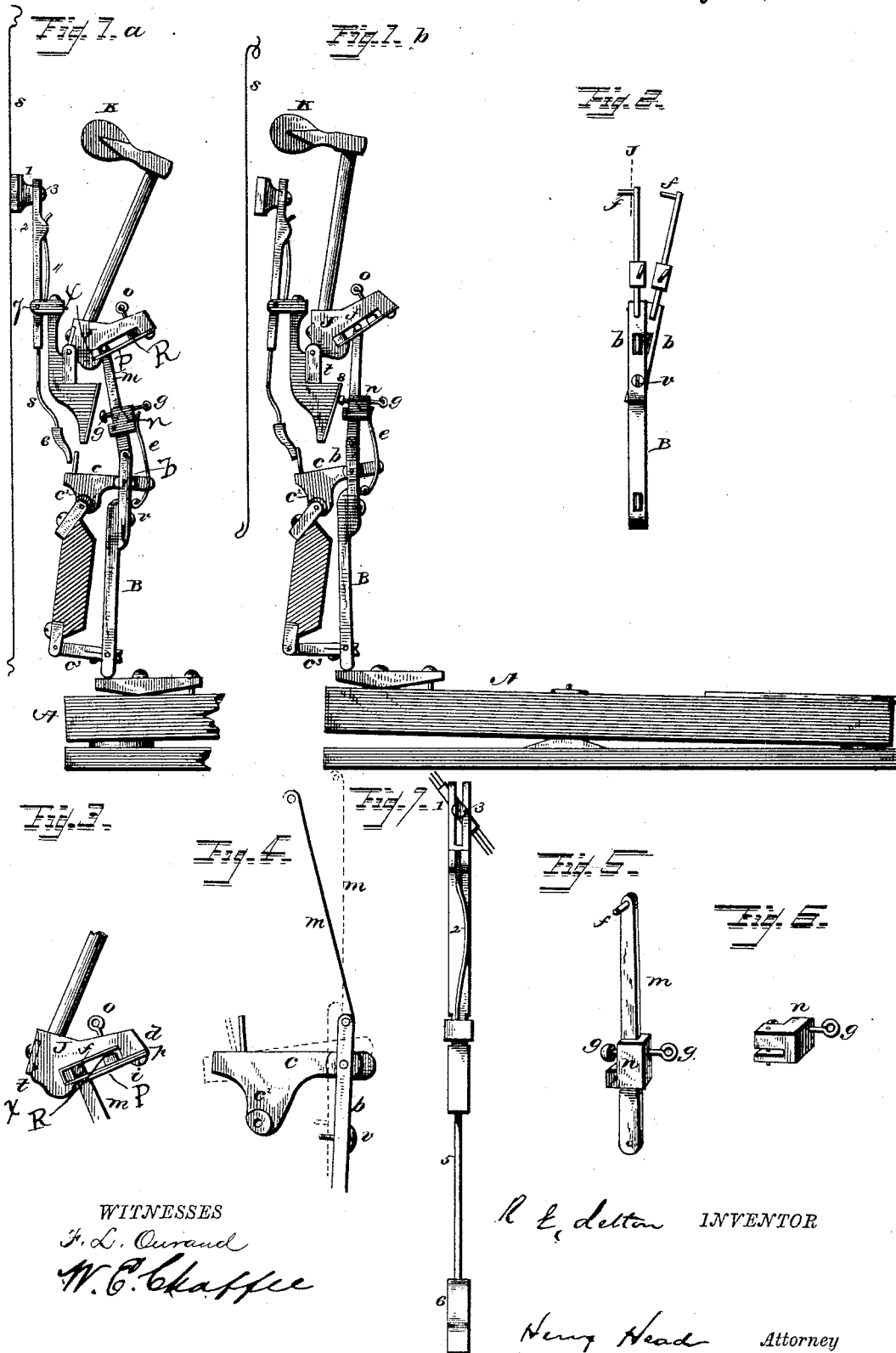


R. E. LETTON.
UPRIGHT PIANO ACTION.

Patented July 20, 1886.



UNITED STATES PATENT OFFICE.

RAPHAEL E. LETTON, OF QUINCY, ILLINOIS.

UPRIGHT-PIANO ACTION.

SPECIFICATION forming part of Letters Patent No. 345,706, dated July 20, 1886

Application filed January 6, 1885. Serial No. 152,171. (No model.)

To all whom it may concern:

Be it known that I, RAPHAEL E. LETTON, of the city of Quincy, of the county of Adams and State of Illinois, have invented a new and useful Improvement in the Action of the Upright Piano, of which the following is a full and exact specification, reference being had to the accompanying drawings.

Figure 1^a is a vertical elevation of the action of an upright piano, having the component parts composed as follows: A is the key which moves the vertical lifting-post B, having the post adjustable by means of adjusting-screw *v*. *c* is the horizontal arm hinged in a mortised post at *b*, and pivoted at *c'*. *c''* is the horizontal arm hinged in post B and hinged in pivot-block 3. When moved by lifting-post B, the parts assume the positions as shown in dotted lines in Fig. 4. The pin in upper side of *c*, Fig. 1^a, by pressing against lug 6, controls the action of damper, indicated by numbers 1, 2, 3, 4, 5, 6, and 7 in Fig. 1^a. By means of adjusting-screw *v* in lifting-post B, the jack *m* can be moved to right or left, as shown in Fig. 2, to a proper working relation to the hammer-butt J. The pin *f*, in upper end of jack *m*, moves in a slot in hammer-butt J. Below the center of the jack is secured the lug-block *n*, with regulating-screw *g*, as shown in Figs. 5 and 6. *e* is a spring fastened to pivot-block *b*, and pressing the lug-block at *n*. *m* is the jack pivoted in post *b*.

Fig. 1^b is a vertical elevation of the action, showing the positions after the recoil of the hammer has taken place while the key is still pressed by the fingers.

Fig. 2 is a front view of the jack *m* and lifting-post B and *b*, having the part *b* joined to the part B by the regulating-screw *v*. By this device the top of the jack *m* can be placed either to the right or left, as the situation of the jack to the stays may require. A mortise is cut from front to rear in block *b*, also in post B, to receive the arms *c* and *c'*.

Fig. 3 is a profile of the hammer-butt J, having slot R, extended toward the pivot-pin *t*, forming a pocket arranged to hold in place the elastic packing X, providing a cushion to receive the recoil of the axis *f*. The metallic spring-stay P is secured to the butt J by screw *i*, arranged to press the elastic stay *d*.

o is a regulating-screw piercing the butt J from top to interior of the slot R, having at the point a button. If the screw be turned to press the stays *d* and P, the slot R will be enlarged. When reversed, the slot will be diminished.

Fig. 4 is a view of the guide-arm *c* and part of the lifting-post *b* B, the strong lines indicating the arm at a condition of rest and the lighter lines at the greatest elevation. The top of the post *b*, in passing from point to point, will describe the segment of a circle, both vertical and lateral, from right to left. The foregoing results would not be determined to the same extent if the arm *c* were hinged at the same level with the upper surface of the said arm, providing the lifting-post should be continuous from the key A to the jack *m*. In the old-style actions the post either ends at or the top is pivoted into the arm.

Fig. 5 is a perspective sketch of the jack *m*, made of plate metal. Near the apex and at right angles to the jack is riveted the wire axis *f*. Below the center of the jack is secured the lug-block *n*, with regulating-screw *g*.

Fig. 6 is a perspective sketch of the lug-block, having a longitudinal slit cut to receive the metal jack *m*, and fastened therein by a rivet piercing the lug transversely against the edge of jack *m*, also a regulating-screw piercing the lug from front to rear.

Fig. 7 is a front elevation of the damper-lever 2, having a slot cut longitudinally from front to rear. The regulating-screw 3 is inserted into the slot piercing the damper-block 1. By this mechanism the damper-block 1 can be secured in a longitudinal direction to the established line of the string. Into the lower end of lever 2 is inserted the wire stem 5. At the lower point of the stem is attached a cushioned bumper-block, 6, which is actuated by arm *c*. The damper is hinged in pivot-block 7, having the greater length and leverage below the pivot-point. By this arrangement the strong reacting force of the damper-spring against the ascending action is in part overcome, requiring a much lighter blow to overcome the pressure of the spring.

The operations and appliances of the foregoing mechanical devices herein named may

be described as follows: When the key A is struck, giving the post B *b* and jack *m* an upward impetus, urging the hammer R against the spring *s*, a recoil of the hammer should follow the blow to prevent a rebound of the hammer against the string, also to secure a quick return of the hammer. It is my object to construct an action that will not be dependent on sluggish recoil or fall of a vertical hammer, but upon mechanical appliances that are positive and unerring on the lightest blow against the key. J is the hammer-butt, having at the margin the lined slot R, the cavity covered by two stays *d* and P. The innermost stay is made of leather, the outer made of spring metal. O is the regulating screw and button, arranged to press the stays from within, thereby adjusting the slot *r*, that will permit therein a free lateral passage of the axis *f*. The lower surface of the arm *c* is extended so as to form a crank, pivoted at the lower pole, *c*². Upon this pivot the arm *c* oscillates, yielding to the post *b* and jack *m* and *n* a motion from front to rear, where by the regulating-button is brought in a sudden contact with the beveled block *a*. The apex of the jack *m n* is thrown to the front, bringing the axes *f* in contact with and pressing the stays *d* and P. By this positive actuation the hammer is drawn from the string and a rebound prevented. So long as the key is pressed by the fingers the hammer is both impelled and impeded by a single stroke of the key A. The axis *f* of the jack *m* being conjoined to hammer-butt, the mo-

ment the key is released the hammer will be drawn to a position of rest by the combined power of the jack-spring and the gravitating tendency of the action.

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

1. In the upright-piano action, the arm *c*, having the lower surface extended in form of a bell-crank and pivoted at the lowest pole into a flange at *c*², all substantially as described.

2. The arm *c*, having the crank-block *c*², arranged in combination to the conjoined parts *m n* and B *b*, all substantially as described.

3. A piano-action having the adjustable lifting-post composed of the pivot-block *b* and post B, with regulating-screw *v*, constructed and arranged to be adjustable to stays *d* and P on the hammer-butt, all substantially as described.

4. In a piano-action, the hammer-butt J, having the slot R, with stays *d* and P, also regulating screw and button *o*, arranged in combination with the jack having the axis *f*, all substantially as described.

In testimony that I claim the foregoing improvement in the action of the upright piano, as above described, I have hereunto set my hand this the 11th day of December, A. D. 1884.

RAPHAEL E. LETTON.

Witnesses:

E. S. JANES,
GEO. M. JANES.