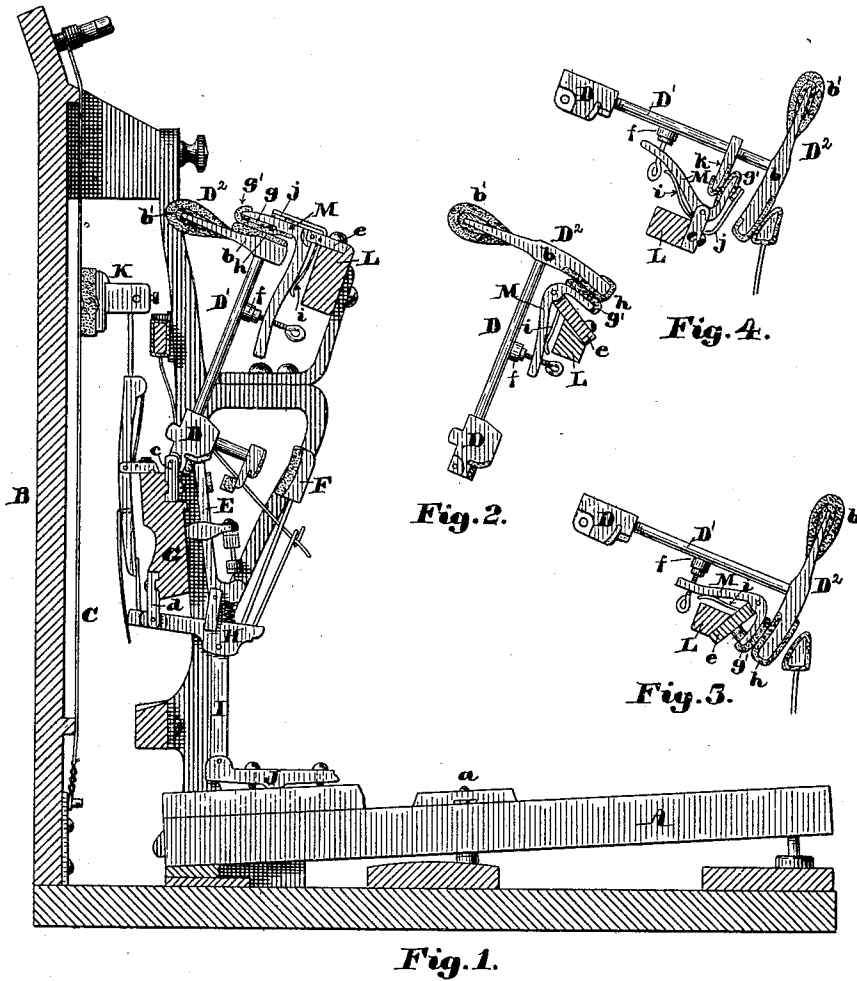


(No Model.)

A. H. STUART & E. WILLARD.
PIANO ACTION.

No. 415,426.

Patented Nov. 19, 1889.



Witnesses:
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UNITED STATES PATENT OFFICE.

ALBERT H. STUART AND EPHRAIM WILLARD, OF BOSTON, MASSACHUSETTS.

PIANO-ACTION.

SPECIFICATION forming part of Letters Patent No. 415,426, dated November 19, 1889.

Application filed March 25, 1889. Serial No. 304,704. (No model.)

To all whom it may concern:

Be it known that we, ALBERT H. STUART and EPHRAIM WILLARD, both of Boston, in the county of Suffolk and State of Massachusetts, have invented jointly a new and useful Improvement in Piano-Actions, of which the following, taken in connection with the accompanying drawings, is a specification.

Our invention relates to piano-actions, and is applicable to square, grand, and upright pianos; and it consists in certain novel features of construction, arrangement, and combination of parts, which will be readily understood by reference to the description of the drawings and to the claims to be hereinafter given, and in which our invention is particularly pointed out.

Figure 1 of the drawings is a transverse vertical section through the key-board, sounding-board, and the action-supporting rails of an upright piano, and showing one key and its action in elevation with our invention applied thereto. Fig. 2 is a side elevation of a slightly-different arrangement of our improvement adapted to upright pianos. Fig. 3 is a side elevation of the same form of our improvement adapted to square and grand pianos, and Fig. 4 is a somewhat different arrangement of our invention adapted to square and grand pianos.

In the drawings, A is the key, fulcrumed at *a*. B is the sounding-board; C, the string; D, the hammer-butt; D', the hammer-stem; D², the hammer, composed of the wooden stock *b* and the felt and leather cushion *b'*. E is the jack; F, the ordinary back-check; G, the hammer-rail; H, the jack and back-check carrying lever, connected to the key A by means of the jack-rod I and the adjustable fulcrum-arm J. K is the damper, *c* is the hammer-flange, and *d* is the flange, to which is pivoted the jack-carrying lever H, all of which may be constructed and arranged in any well-known manner and adapted to either upright, square, or grand pianos.

When a blow is struck upon the string by the hammer, the hammer rebounds therefrom with considerable force, and if the operator retains the finger upon the key the hammer would strike the string a second time were it not arrested by the back-check F, which ef-

fectually prevents the return of the hammer to the string until the key is again depressed.

In all pianos now in use, so far as we are informed, no provision is made for overcoming the tendency of the hammer to rebound when its rod strikes the stop which limits its backward movement after having struck the string and the finger is removed from the key, which rebound is at times a great source of annoyance, for the reason that in cases where the same key has to be struck several times in rapid succession the hammer often rebounds to such an extent that it does not return to its normal position before the key is struck the second time, and as a consequence the hammer fails to respond to the second blow so far as to give any useful sound.

To obviate this objection and prevent any injurious rebound of the hammer after its return to its normal position is the object of our invention, and to attain this desirable end we substitute for the ordinary hammer-stop rail the rail L, to which are secured a series of flanges *e*, corresponding in number to the number of hammers used, and pivot to each of said flanges an elbow-lever M, the longer arm of which lies between said rail L and the hammer-stem D', and has adjustably attached thereto a stop-button *f*, against which the hammer-stem D' strikes when the finger is removed from the key after the hammer has struck the string. The shorter arm of the elbow-lever M extends from the fulcrum of said lever toward the strings, as shown in Figs. 1 and 4, or in the opposite direction, as shown in Figs. 2 and 3, and is so arranged relative to the hammer-stock *b* that when the hammer-stem D' strikes the button *f* and the lever M is moved slightly about its fulcrum the adjacent face of said shorter arm, which is covered with felt or leather *g g'*, or both, comes in contact with the adjacent face of the hammer-stock *b*, which is also covered at *h* with felt or leather, or both, and thus effectually prevents any injurious rebound of the hammer; but at the same time said lever does not press upon the hammer-stock so as to affect injuriously the ease with which the action may be operated.

In applying our improvement to upright pianos we prefer to arrange the stop-lever as

shown in Fig. 1, though it may be arranged as shown in Fig. 2 without departing from the principle of our invention, which is utilizing the momentum of the rebound of the hammer
 5 from the string to operate the check-lever to prevent a rebound in the opposite direction. A light spring *i* serves to relieve the pressure of said short arm upon the hammer-stock as soon as the force of the blow of the hammer-rod on the button *f* is spent and maintains
 10 said lever in a position to permit the free movement of the hammer, and a stop-pad *j* limits the movement of the elbow-lever *M* about its axis in one direction.

15 In square and grand pianos, in which the back-check for catching the hammer on its rebound from the string and holding it at rest while the key remains depressed is arranged to act directly upon the hammer-stock instead
 20 of upon the hammer-butt, the elbow-lever must necessarily act upon the inner side of the hammer-stock, as shown in Fig. 3, or upon an independent arm *k*, secured upon the hammer-rod *D'*, as shown in Fig. 4; but in each of
 25 these cases, as well as those shown in Figs. 1 and 2, the same principle of operation applies and the same result is produced in substantially the same manner.

The operation of our invention will be readily understood from the foregoing without
 30 further explanation here.

What we claim as new, and desire to secure by Letters Patent of the United States, is—

1. In a piano-action, the combination, with
 35 the hammer, of an elbow-lever, an adjustable stop-button mounted on one arm of said lever and arranged in a position to be acted upon

by said hammer to move said lever about its axis at the end of its rearward movement after having struck the string, and a pad or cushion
 40 on the other arm of said lever constructed, arranged, and adapted to engage said hammer when said lever is struck by the hammer in its rearward movement and thus prevent a
 45 rebound of said hammer toward the string.

2. In combination with the hammer of a piano-action, an elbow-lever provided with an adjustable stop-button on one arm and a felted
 50 cushion on its other arm so constructed and arranged relative to the hammer and hammer-rod that when said hammer rebounds from
 55 the string when the key returns to its normal position after being struck said stop-button will be struck by the hammer-rod, and the felted arm of said elbow-lever will thereby be
 60 made to engage the hammer-stock and prevent a rebound toward the string.

3. In combination with the hammer of a piano-action, the elbow-lever *M*, the adjustable stop-button *f* carried thereby, the felted
 65 cushion on the other arm of said lever, the stop *j*, and the spring *i*, all constructed, arranged, and operating substantially as and for the purposes described.

In testimony whereof we have signed our
 65 names to this specification, in the presence of two subscribing witnesses, on this 15th day of March, A. D. 1889.

ALBERT H. STUART.
 EPHRAIM WILLARD.

Witnesses:

NATHAN C. LOMBARD,
 WALTER E. LOMBARD.