

United States Patent Office.

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IMPROVEMENT IN PIANO ACTIONS.

The Schedule referred to in these Letters Patent and making part of the same.

I, CHARLES F. OLIVER, of Lynn, in the county of Essex and State of Massachusetts, have invented certain new and useful Improvements in Pianos, of which the following, taken in connection with the accompanying drawing, is a specification.

Nature and Objects of the Invention.

It is a fact well known to those who are familiar with pianos and their "actions," that their purity of tone is very injuriously affected by the combination of certain foreign sounds with the tone produced by the vibrations of the string and sounding-board, said foreign sounds generally being produced by the vibrations of the various parts which make up the "action" of a piano.

Another objection to the present mode of constructing "piano actions" is, that in order to insure the entering of the "jack" under the hammer, so as to lift it when the key is touched at all times, the "jacks" have to be made so short that, when the key is shrunk to its smallest size, there will be considerable play between the end of the "jack" and the "under hammer" or the "butt" upon which it is to act, which causes the "jack" to strike a blow upon the "under hammer" or "butt," which introduces another element of discord.

To obviate these objections, and to purify the tone by removing as far as possible all foreign sounds from the tone produced by the vibrations of the strings, and the sounding-board, is the object of my invention.

My invention relates, in the first place, to the means employed to reduce to a minimum the vibrations of the various moving parts of the "action," occasioned by the blows which they receive when in operation, and thereby prevent, in a great measure, the mingling of foreign sounds with the pure tone produced by the vibrations of the strings and the sounding-board; and

It consists, first, in splitting the rear end of the key and inserting therein a piece of cloth, felt, rubber, or other suitable material, and gluing the parts firmly together again, which has the effect to destroy or diminish the sound which would otherwise be produced by the vibration of the long arm of the key when it falls upon the rear stop-rail.

It also consists in introducing a spring between the rear end of the key and the cushion upon the rear stop-rail, which serves to reduce the sound produced by the vibration of the key, and also to insure the entering of the "jack" under the "under hammer" or "butt," by the yielding of said spring, so that when the key has assumed its normal position by the reaction of said spring, the "jack" shall be in contact with the "under hammer" or "butt," ready to act promptly when the key is touched, without giving a sudden

blow or impact to said "hammer" or "butt," which would produce a sound injurious to the tone of the instrument.

It also consists in the use of a spring stop, to limit or control the position of the "jack" under the "under hammer" or "butt," as a substitute for the fixed stop now used for that purpose.

My invention relates, in the second place to the construction of the "stem;" and

It consists in reducing the thickness of the "stem" near the point of attachment of the hammer, so as to make it thinner in the direction in which the blow is given, and also in splitting said "stem," when made of wood, and inserting between the two parts cloth, rubber, or other suitable material, to reduce the vibration of said stem.

Description of the Drawing.

Figure 1 is a transverse section through the key and flange rails, showing the "action" complete, in elevation, as constructed with improvements applied.

Figure 2 is a plan, and

Figure 3 is a front elevation of the same.

Figures 4 and 5 are respectively a plan and elevation of a single "hammer," "stem," and "butt," showing my improvements in the "stem."

Figures 6 and 7 are respectively a section and elevation, showing a modification of the let-off.

Figure 8 illustrates the manner of securing the hammer-cushion to the rail.

General Description.

A is the pivot-rail, in which the pins are set on which the keys are pivoted.

B is the front stop-rail, and

C the rear stop-rail.

D is the key, pivoted in the usual manner, but having a portion of its rear end cut away from its under side, and the spring *a* secured thereto, the rear end of which rests upon the cushion *b*, attached to the rear stop-rail C.

The object of this spring is to allow the rear end of the key to fall below its normal position, and thus insure the entering of the "jack" under the "hammer" or "butt," and also to assist in breaking up or destroying the sound occasioned by the vibration of the key.

The rear end of the key is also split, and a piece of cloth, felt, rubber, or other suitable material, *c*, inserted therein, and the parts firmly glued together again, which serves to reduce the vibrations of the key, and also to diminish the liability of the keys warping and springing.

E is the stationary portion of an ordinary "English jack," secured to the key in the usual manner; and

F is the hinged or movable portion, having the pin or arm G added thereto, and projecting toward the front of the piano, which, when the key is depressed by the finger, strikes against the button *d*, placed just above it, and causes the "jack" to be tripped from under the hammer at the proper time.

The button *d* is secured to the end of the screw *e*, inserted in the rail H, made of metal, or it may be attached to a bent wire, *f*, and screwed into the key-frame, or a rail, provided for the purpose and placed between the pivot-rail and the rear stop-rail under the keys, as shown in figs. 6 and 7, dispensing with the rail H, which I think the better plan, for the reason that it admits of withdrawing the keys for adjustment and repairs.

i is a spring-stop, against which the button *g* strikes, to limit the backward movement of the "jack," as it is forced under the hammer by the spring *j*.

The button *g* is secured to the hinged portion of the "jack" by the screw *h*, in the usual manner.

The object of using this spring stop instead of the fixed stop now in use is, to retain the "jack" under the hammer a longer time, by virtue of the yielding property of the stop, and the friction of the jack upon the "under hammer" or the "butt," and at the proper time removing it by the "let-off," by which arrangement I am enabled to strike a smarter blow upon the string than I could if the jack commenced to recede from under the hammer as soon as the finger touched the key, as is the case with the "English action" as now used.

I is the flange-rail, and

J, the flange, secured thereto by screws in the usual manner, constructed wholly of metal, for the reasons previously stated.

K is the "flange butt," secured to the flange J in the usual manner.

L is the stem, to which the hammer M and the flange butt K are secured in the usual manner.

The stem L is cut away near the hammer, so as to make it thinner in the direction in which the blow is given, as shown, so that the stem will be more elastic and give a smarter blow, and it is also split, and a piece of cloth, rubber, or other suitable material inserted between the two parts, and the whole glued firmly together again, the object of which is to check the transmission of sound by the vibrations of the stem, but not to prevent the spring of the stem when the blow is given.

N is the under hammer, constructed in the usual manner, secured to the rail O, as shown, and resting on the cushion of felt P.

Q is a cushion of felt, secured to the back side of the girt or rail O, by the plate *p* and the screws *r*, upon which the stem L falls when the finger is removed from the key.

The felt Q is slotted for the screws *r* to pass through, so that it may be readily adjusted by slackening the screws *r*, and raising or depressing the felt, and again tightening the screws.

Another advantage of this arrangement is, that the cushion is placed nearer to the hammer, which leaves less length of stem overhanging the cushion, to vibrate, and also the cushion through which the blow of the falling stem is transmitted to the rail O, is much deeper than it is possible to have it when applied in the usual manner, and it is not hardened by the use of gum or glue used to secure it in place.

R is a cushion of felt, secured to the rail O, against which the back end of the key strikes when the front end is depressed by the finger.

S represents one of the strings, and

T, the back catch, upon which the hammer rests after striking the string, until the finger is removed from the key.

The operation of my improved "action" may be clearly understood from the foregoing summary and description, without further explanation.

Having thus fully described my invention,

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

1. The spring stop *i*, constructed and applied substantially as described, for the purpose specified.
2. The hammer-stem L, when cut away near the hammer, substantially as described.
3. The insertion of cloth, felt, rubber, or other suitable material in the rear end of the key D, and in the hammer-stem L, substantially as described.
4. The spring *a*, attached to the rear end of the key in such a manner that it may be readily adjusted, substantially as described, for the purpose specified.

Executed at Boston this 15th day of February, 1870.

CHARLES F. OLIVER.

Witnesses:

D. B. HANSON,
G. E. WHITNEY.