

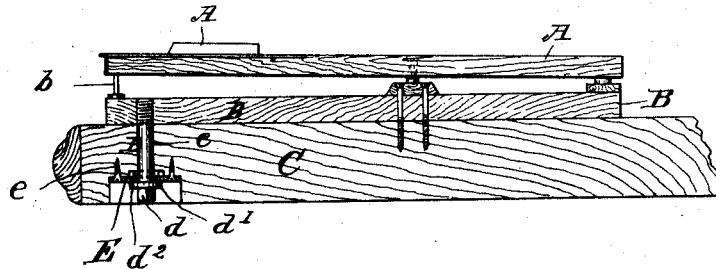
(No Model.)

F. S. WARREN.  
TOUCH REGULATOR.

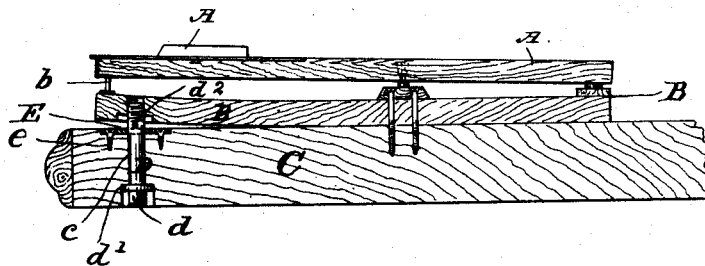
No. 421,149.

Patented Feb. 11, 1890.

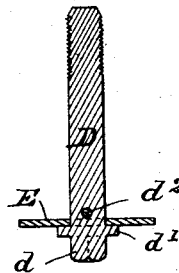
*Fig. 1*



*Fig. 2*



*Fig. 3*



Witnesses

H. M. Danforth.  
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Inventor

Frank S. Warren

By his Attorney J. B. Thurston

# UNITED STATES PATENT OFFICE.

FRANK S. WARREN, OF CONCORD, NEW HAMPSHIRE.

## TOUCH-REGULATOR.

SPECIFICATION forming part of Letters Patent No. 421,149, dated February 11, 1890.

Application filed October 5, 1889. Serial No. 326,127. (No model.)

### *To all whom it may concern:*

Be it known that I, FRANK S. WARREN, a citizen of the United States, residing at Concord, in the county of Merrimac and State of New Hampshire, have invented certain new and useful Improvements in Touch-Regulators, of which the following is a specification.

This invention relates to the key-bottom of piano-fortes.

The object of the invention is to regulate without displacement the "dip" of the keyboard, so that when for any reason the touch is desired deeper or shallower it is within one's power to readily make the required alteration.

The invention will be fully set forth in the following specification and claim, and clearly illustrated in the accompanying drawings, forming an inseparable part thereof, of which—

Figure 1 is a sectional view taken through a key, the key-bottom, and the bed-piece of a piano to which my improvement is applied.

Fig. 2 is a similar view of the same parts, showing the key-bottom as when adjusted by means of my improved attachment. Fig. 3 is an enlarged detached view of one of my regulating devices in section.

Similar reference-letters indicate like parts.

A represents an ordinary piano-key; B, the key-bottom, upon which the keys are mounted, having the guide-pins *b*, which enter the said keys near one end, and C is the bed-piece.

In order to effect my purpose, I omit securing the front of the key-bottom to the bed-piece, thus leaving it free to be elevated slightly or sprung upward forward of the fulcrum-point *a* of the keys A.

To carry my invention into effect, I perforate the bed-piece C, as at *c*, at intervals, to receive the plain cylindrical portion of a screw D, which is provided, preferably, with a square head *d*, so as to be conveniently adjusted with an ordinary tuning-hammer. The threaded end of either screw fits a threaded opening formed in the key-bottom B; and in order that said key-bottom may be adjusted up or down by the rotation of said

screw in opposite directions the plain part or body of the screw must not be permitted to move in the direction of its length or vertically within the bed-piece. Any convenient means may be employed to accomplish this result. For instance, the screw D may be provided near its square head *d* with a flange or shoulder *d'*, and a washer E, being slipped onto the screw and resting upon said flange, is secured by two or more screws *e* to the under side of the bed-piece C, the stop-pin *d''*, driven through the smooth portion of the screw close to the upper side of the washer E, preventing the removal of said screw from said bed-piece without first unfastening said washer. If preferred, however, the said washer and stop-pin may be placed as seen in Fig. 2, in which the washer is screwed to the upper side of the bed-piece. In either case the rotation of the several screws in opposite directions causes the key-bottom to rise or fall, respectively. In Fig. 1 said key-bottom is shown as in its normal position, while in Fig. 2 it is seen slightly elevated, which of course has shortened the dip of the keys A, and by the use of these screws fitted in this manner the said key-bottom is held rigidly in any desired position and can be moved in neither direction except by the adjustment of the screws.

Having described my improvements, what I claim as new, and desire to secure by Letters Patent, is—

The combination, with the key-bottom and bed-piece, of screws having a shoulder or annular flange near their head, a washer adapted to rest against said shoulder or flange having two or more perforations for receiving wood-screws by which it may be fastened to said bed-piece, and a stop-pin passing through said screw at a point to retain said washer thereon, all substantially for the purpose specified.

In testimony whereof I affix my signature in presence of two witnesses.

FRANK S. WARREN.

Witnesses:

J. B. THURSTON,

DANIEL B. DONOVAN.