

(No Model.)

2 Sheets—Sheet 1.

W. H. IVERS.

TOUCH REGULATING DEVICE FOR MUSICAL INSTRUMENTS.

No. 406,913.

Patented July 16, 1889.

Fig. 1.

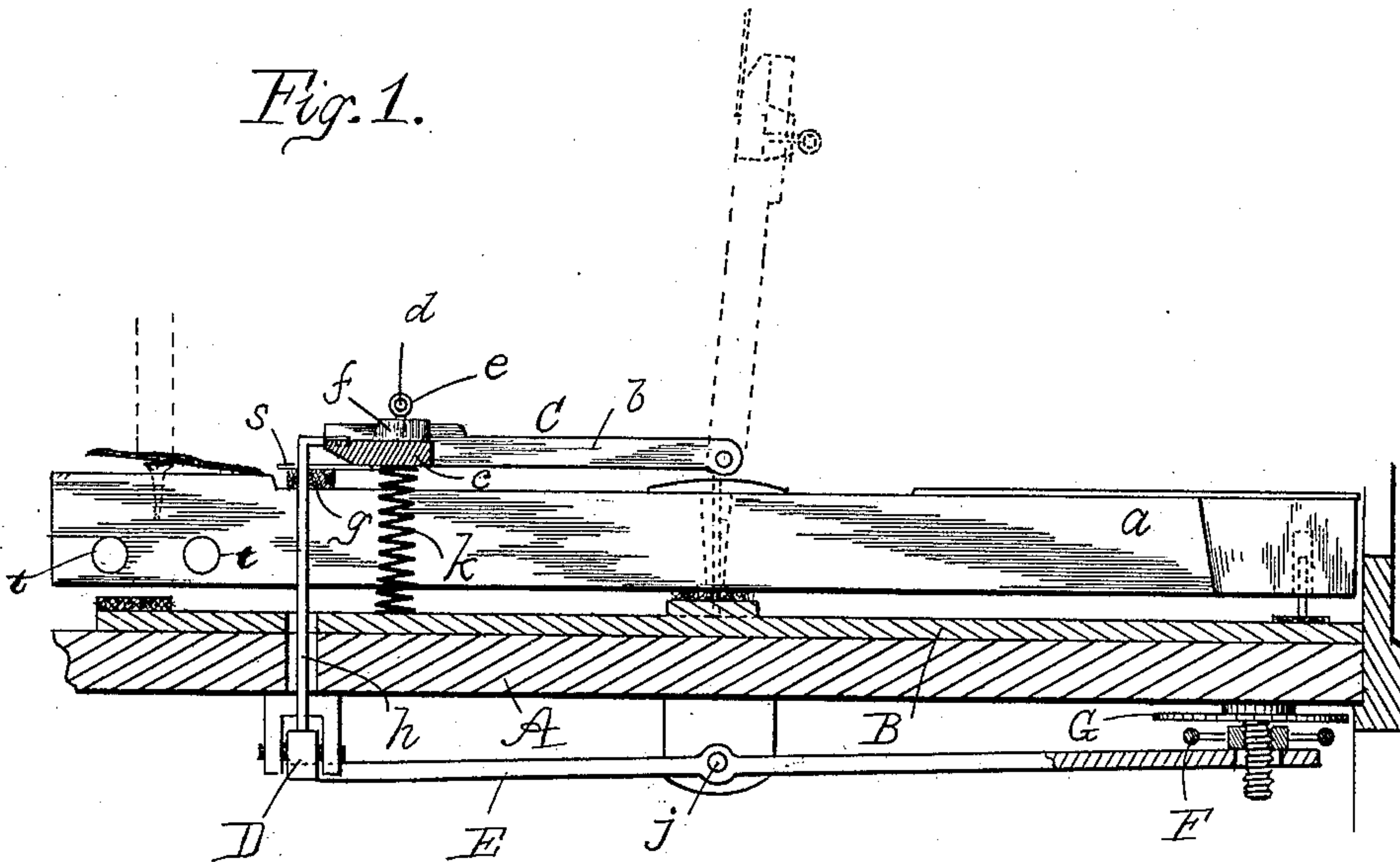


Fig. 2.

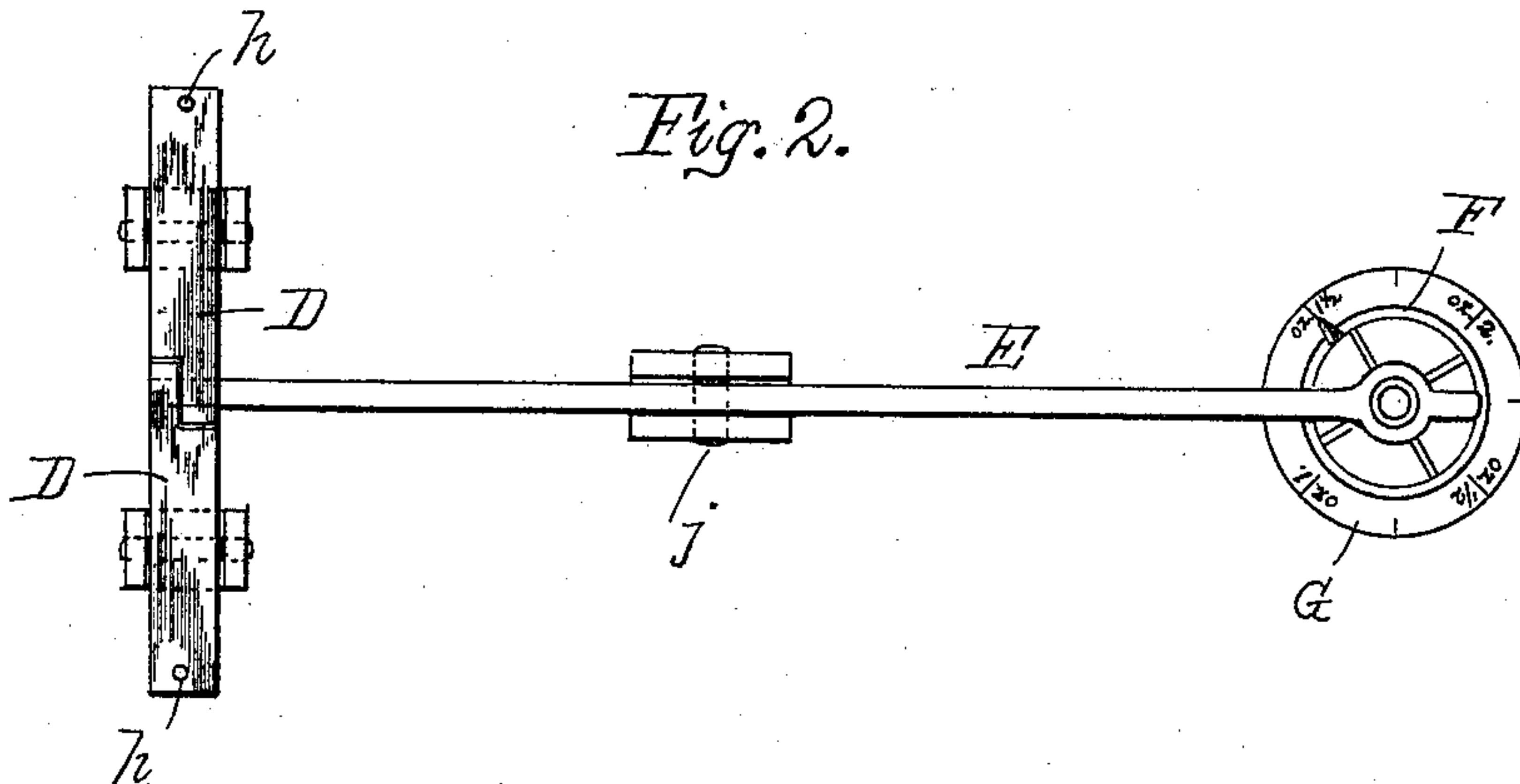
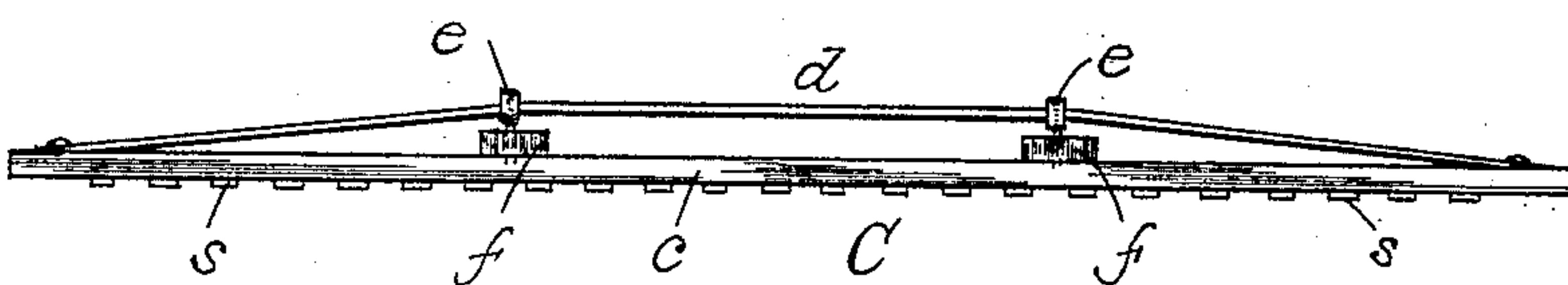


Fig. 4.



Witnesses.

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Inventor.

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by N. C. Lodge Atty.

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Fig. 3.

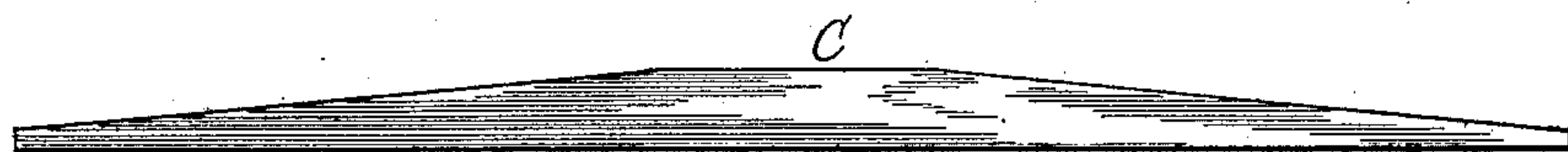
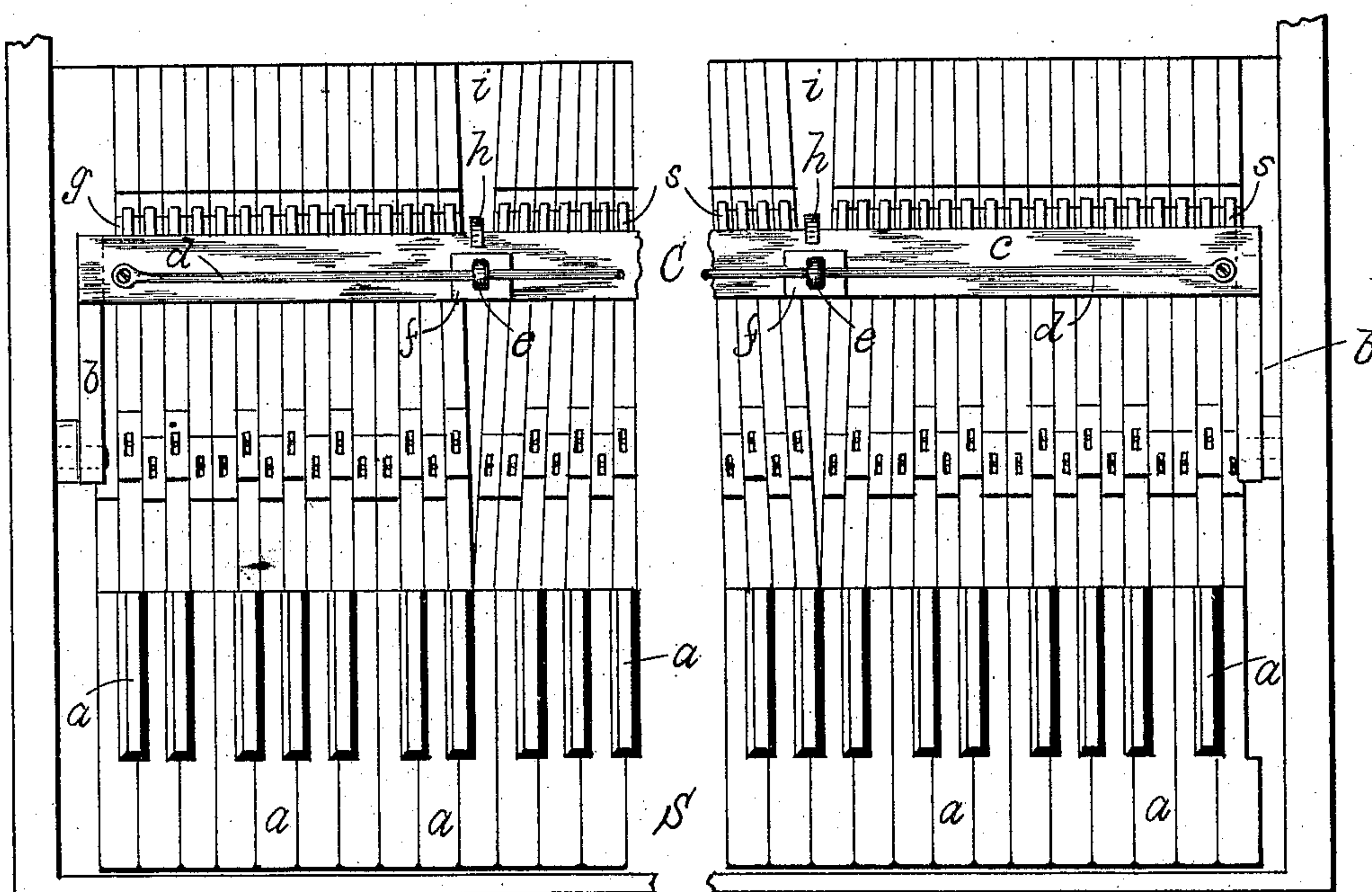


Fig. 5.

Witnesses:
Francis C. Stanwood
Geo. F. Wood

Inventor:
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UNITED STATES PATENT OFFICE.

WILLIAM H. IVERS, OF DEDHAM, ASSIGNOR TO THE IVERS & POND PIANO CO., OF BOSTON, MASSACHUSETTS.

TOUCH-REGULATING DEVICE FOR MUSICAL INSTRUMENTS.

SPECIFICATION forming part of Letters Patent No. 406,913, dated July 16, 1889.

Application filed January 25, 1889. Serial No. 297,501. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM H. IVERS, a citizen of the United States, residing at Dedham, in the county of Norfolk and State of Massachusetts, have invented certain new and useful Improvements in Touch-Regulating Devices for Musical Instruments; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters or figures of reference marked thereon, which form a part of this specification.

This invention relates to musical instruments provided with a "key-board," so called, and a cross-bar and springs for regulating the touch of the keys.

It consists in certain improvements of construction and combination hereinafter set forth and claimed.

The drawings accompanying this specification represent, in Figure 1, a vertical section transversely of a portion of a piano or in a plane parallel with the keys lengthwise of the latter, and showing a touch-regulating rail embodying my invention. Fig. 2 is a plan of the lever system for operating the regulating-rail, viewed from beneath the instrument. Fig. 3 is a plan of a piano key-board with the touch-regulating rail in position, and Fig. 4 is a side elevation of the rail in detail. Fig. 5 is a modified form of the same.

In said drawings are shown a portion of a piano, in which A represents the key-bottom, B the key-frame, and *a a* the individual keys, which, taken collectively, compose the "key-board" S, so called. The general structural arrangement of these various component parts and their positions relatively to each other are as usual in instruments of this class, and no further description will be necessary.

The object of my invention is, primarily, to regulate the touch of the keys—that is, assuming that the keys are balanced, as is usually the practice. If this attachment is caused to bear upon the rear end portion of the keys, it is evident that more pressure or a harder touch must be required in order to produce a tone. To accomplish this result

easily and expeditiously to any desired extent, I have disposed transversely across and above the key-board a touch-regulating rail C, which is supported upon short arms *b b*, pivoted to the instrument-case near the ends of the key-board. This rail may be of any material and of any desired shape in cross-section. Owing to the peculiar function of this rail and its position, since it is supported only at the ends by the pivotal arms before mentioned, I prefer to construct said rail of a wooden bar *c*, and then form a truss by means of a rod *d*, securely fastened at each end of said bar and adjustable by aid of two screw-eyebolts *e*, engaging in blocks *f*. In this way the rail is made rigid its entire length, and by adjusting the eyebolts the stiffness of said rail may be increased to any extent, making it practically unyielding. Beneath said bar and projecting, preferably, rearwardly from the rail (see Fig. 3) are secured a number of spring mediums *s s*—in the present instance plate-springs. The free ends of the latter rest upon felts *g g*, glued to the rear end portion of the keys *a a*. Furthermore, these spring mediums are regularly spaced and made to co-operate one with each key. From this construction it is evident that if the touch-regulating rail is caused to approach the keys until the spring mediums rest upon the rear ends of the key the touch of the keys is increased. In other words, the pressure required to depress the front part of the key to produce a tone upon the instrument is proportionate to the pressure of the rail and its spring mediums upon the rear end of said keys. To actuate said rail C, I have affixed thereto two upright connecting-rods *h h*, which pass up through the key-board—in upright pianos through the spaces *i i'* usually found in the rear part of the key-board. Said rods are secured at one end of a pair of rocker-arms D D, centrally pivoted in a bracket depending from the key-bottom. The opposite ends of said rocker-arms are jointly united to a lever-rod E, pivoted at *j* and operated by a hand-wheel F upon a screw. This latter, for convenience, is located near the front of the instrument, but somewhat to one side (preferably to the right) of the center, for facility in operating it, and

likewise that it may not interfere with the performer when the latter is seated at the instrument. This actuating-wheel is provided with a graduated dial in order that the pressure exerted by the touch-regulating rail may be determined at a glance; but this is not essential, since the touch can be adjusted positively by taking an ounce weight (provided one-ounce pressure is required) placing said weight upon the front end of a key, and then causing the rail to bear upon the rear end of said keys until the weighted key rises. When the latter has assumed its normal position with the weight still upon it, then the pressure of the touch-regulating rail is one ounce, and similarly for any desired weight.

Springs *k k*, located beneath the regulating-rail, serve to lift the latter and prevent the spring mediums attached thereto from touching the keys when the instrument is to be employed without this attachment. As shown in Fig. 1 by the dotted lines, this touch-regulating rail can very readily be thrown up in the event of repairs or when removal of the keys is required at any time.

The operation of this attachment is very simple, as here explained. By turning the wheel *F* upon its screw, and thereby lowering the front end of the lever *E*, the rear end is elevated, at the same time lifting the adjacent ends of the rock-levers *D D* and causing the connecting-rods to drop or move vertically downward. As a consequence the entire touch-regulating rail, with its spring mediums *s s*, is caused to bear more or less hard upon the keys.

As before premised, the rail is to be practically rigid its entire length. This effect is produced either by trussing it, as shown, or by making it of some suitable material of greatest cross-section in the middle, as illustrated in Fig. 5, to prevent any tendency to spring. By thus making the rail rigid, or practically so, equal and uniform pressure is brought to bear upon each and every key, and the rail with its spring mediums will produce the same result upon the central keys as it does upon those at either extremity of the key-board. This is an important and necessary feature; otherwise the touch would vary at different points, and the result sought to be accomplished would fail of its purpose.

I find by experiment that this touch-regulating mechanism will serve a secondary purpose, but one equally useful—that is, it may be employed as a substitute for the balance-

weights *t t*, now universally used to balance the keys *a a*. In this instance, however, the springs *k k* will be omitted, while the rail and its spring mediums are constantly in contact with the key-board with sufficient pressure to maintain every key when at rest in the same position with the degree of heaviness or lightness of touch as now accomplished by the means of weights. This mechanism, when in operation for either of the purposes hereinbefore designated, serves to render each key very lively—an important feature in very rapid execution.

What I desire to claim is—

1. In combination with a set of keys constituting the key-board of a musical instrument, a rigid transverse rail *C*, arranged above said keys, arms *b b*, whereby said rail is pivoted to the frame of the instrument, springs attached to said rail and bearing individually on the rear parts of said keys, and adjusting devices for regulating the pressure of said rail and springs on said keys, substantially as set forth.

2. The transverse rail *C*, consisting of a bar *c* and a truss-rod *d*, held therefrom in the middle by eyes *e*, in combination with springs on the said rail, keys against which said springs bear, and which constitute the key-board of a musical instrument, and adjusting devices for regulating the pressure of said rail and springs on said keys, substantially as set forth.

3. In combination with the keys of a key-board, a transverse rail provided with springs bearing thereon, springs *k* between the said rail and the key-frame, an adjusting-lever *E*, rocker-arms *D*, jointly united to said lever, and rods *h*, connecting the outer ends of said rocker-arms to the outer ends of the transverse rail, substantially as set forth.

4. The combination, with the key-board *G* of a musical instrument, the swinging touch-regulating rail *C*, trussed as described, mounted above the keys, and one or more springs *k k* beneath the rail, of a series of spring mediums affixed to said rail, the connecting-rods *h h*, rocker-arms *D*, lever *E*, and hand-wheel *F*, substantially as set forth.

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

WILLIAM H. IVERS.

Witnesses:

H. E. LODGE,

FRANCIS C. STANWOOD.