

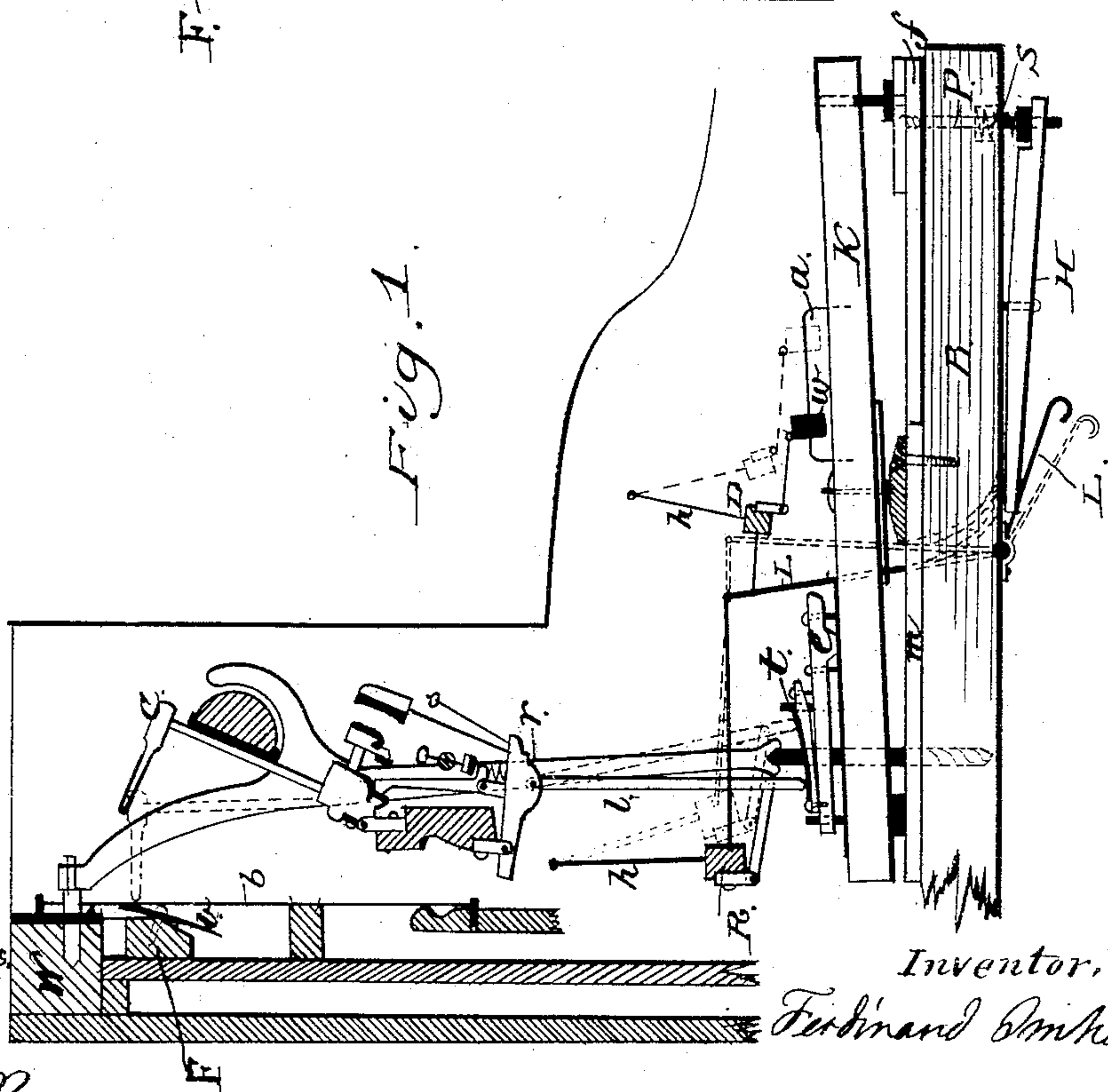
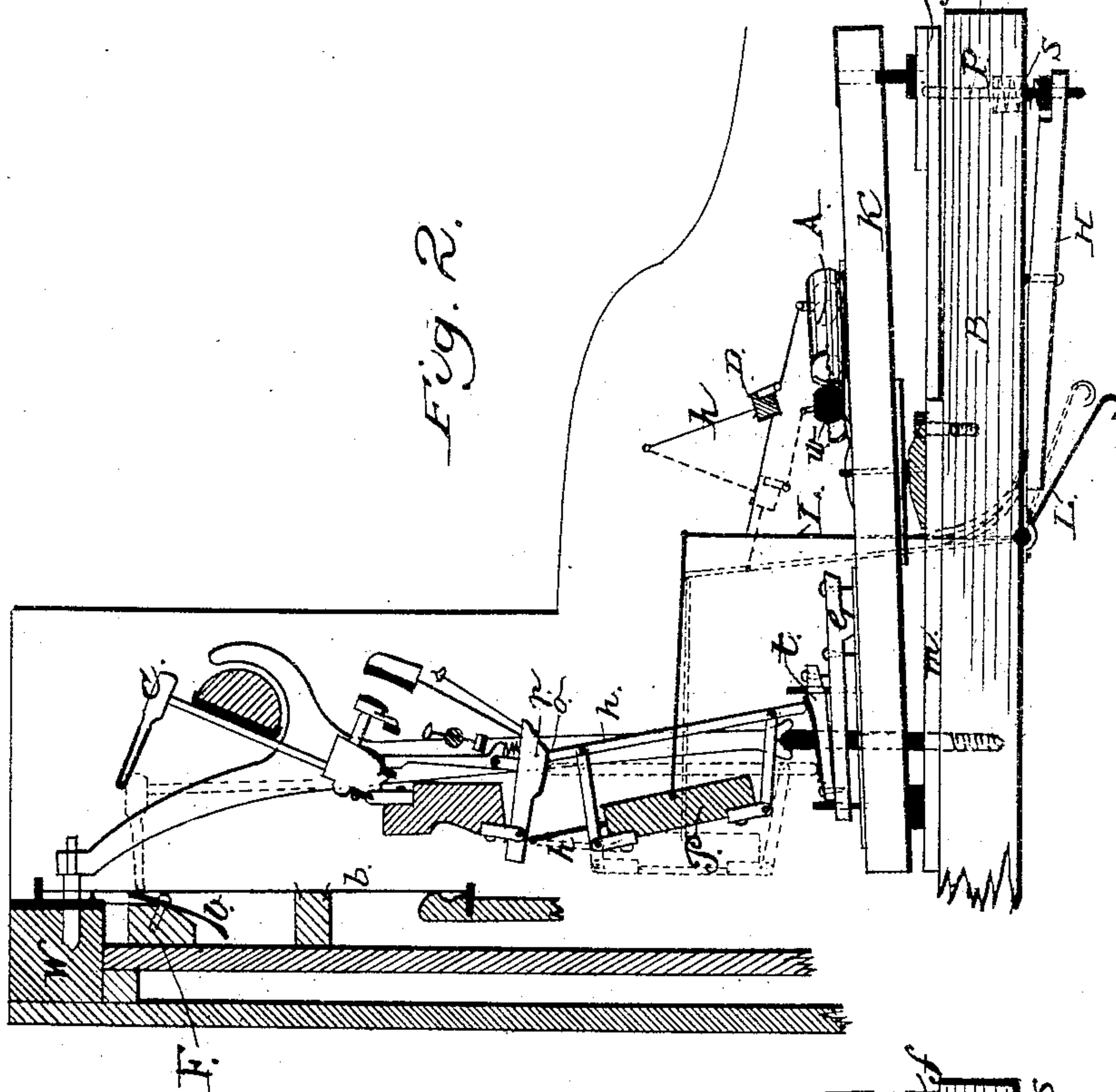
(No Model.)

2 Sheets—Sheet 1.

F. IMHORST.  
PIANO ACTION.

No. 332,716.

Patented Dec. 22, 1885.



*Witnesses*

M. Egerich

6 Cohn

*Inventor,*

Ferdinand Amhorst.

(No Model.)

2 Sheets—Sheet 2.

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*Fig. 3.*

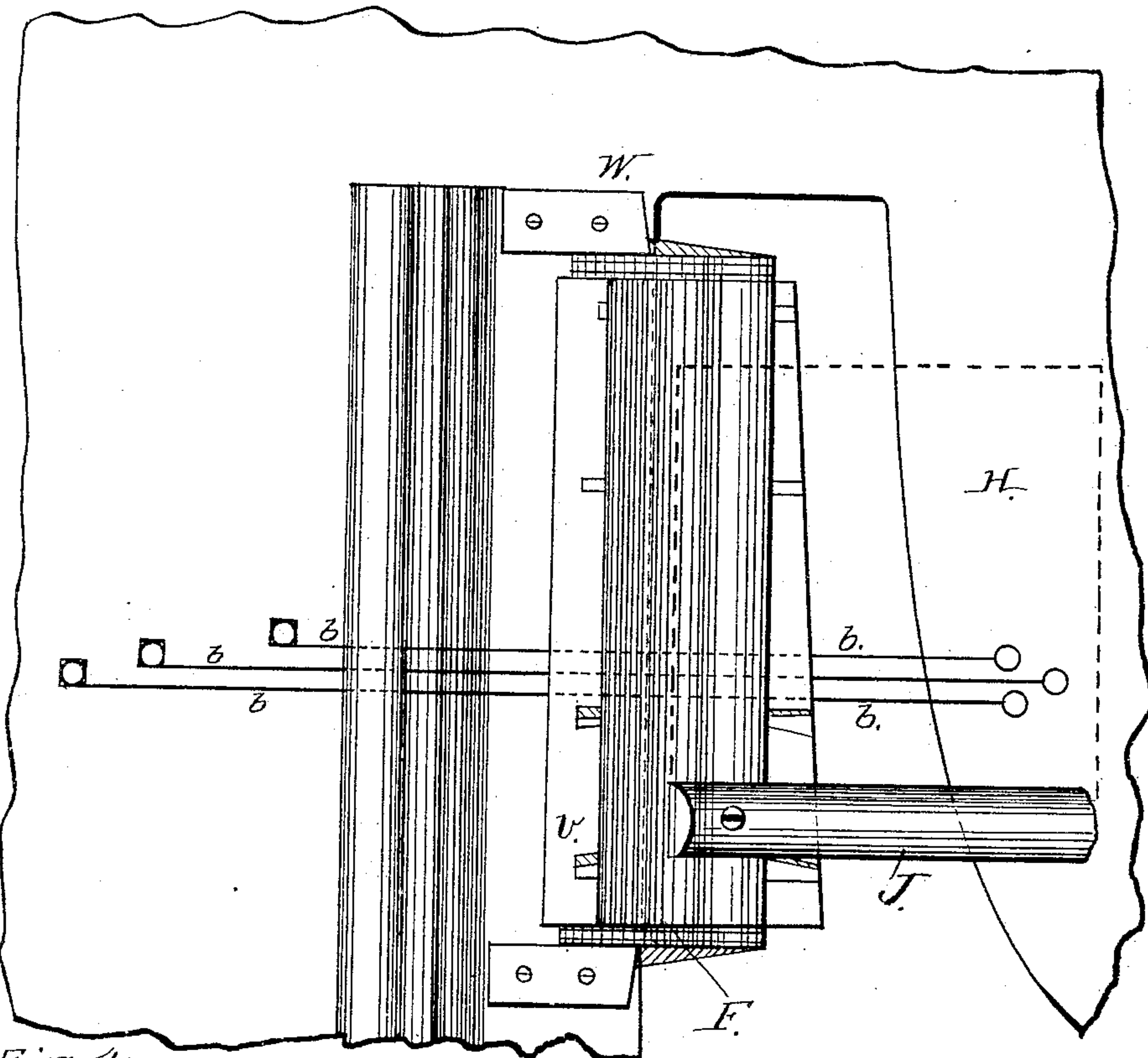


Fig. 4.

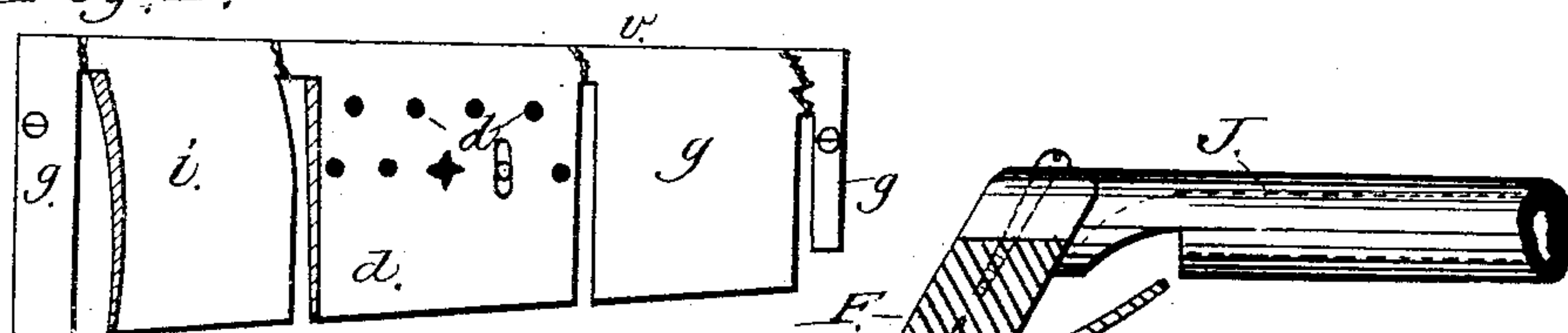
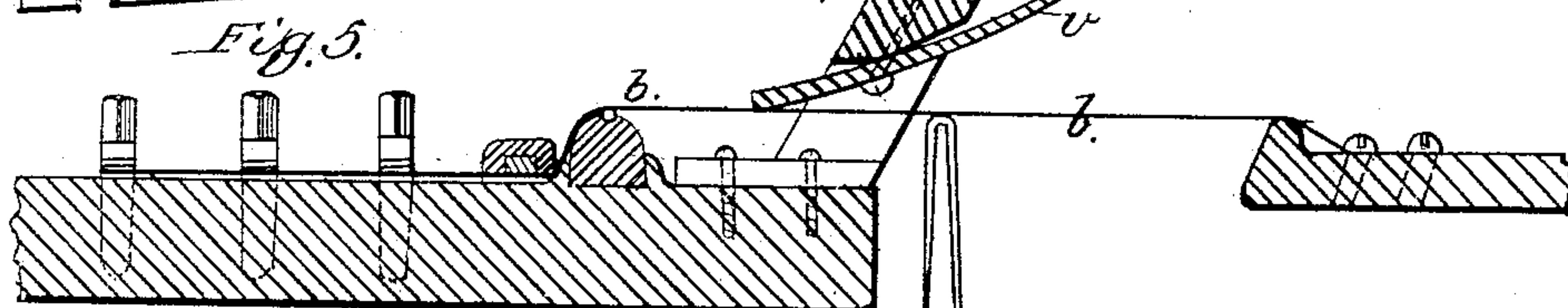


Fig. 5.



Witnesses.

M. Egger  
C. Cohn

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# UNITED STATES PATENT OFFICE.

FERDINAND IMHORST, OF SAN FRANCISCO, CALIFORNIA.

## PIANO-ACTION.

SPECIFICATION forming part of Letters Patent No. 332,716, dated December 22, 1885.

Application filed July 12, 1884. Serial No. 137,517. (No model.)

*To all whom it may concern:*

Be it known that I, FERDINAND IMHORST, a citizen of the United States, residing at the city of San Francisco, State of California, have  
5 invented new and useful Improvements in the Construction of Piano-Fortes, of which the following is a specification.

My invention relates to pianos; and it consists in the construction and combination of  
10 devices hereinafter described, and pointed out in the claims.

In the accompanying drawings, which form part of this specification, Figures 1 and 2 represent vertical sections of an upright piano-  
15 action. Fig. 3 represents a partial plan view showing the vibrator and resonator. Fig. 4 is a plan view of the vibrator detached. Fig. 5 is a cross-sectional view showing the frame, the strings, the vibrator, its frame, and the  
20 resonator.

Similar letters refer to similar parts throughout the several views.

In Fig. 1 is shown a general view of the working-section of an upright-piano action  
25 and key.

*l* represents a prolong, the lower section of which is movable forward and backward on the top surface of circular segment *t*, while the upper section of the prolong *l* is almost  
30 stationary, being pivoted to the horizontal lever *r*.

To secure a uniform backward and forward motion to a number of prolongs, their mechanism is secured to a movable cross-rail, *R*,  
35 which is held suspended by hanger *h*.

The lever *L* and its mechanism are intended for moving backward and forward the lower cross-rail, *R*. A lower section of this lever *L* is also pressing upon lever *H*, which, being  
40 pivoted, will push upward the pin *p*, and with the same movement also the front rail, *f*, of the key-frame *m*. By means of this mechanism a larger or smaller distance is obtained between the bottom of the key *K* and the top of the  
45 front section, *f*, of the key-frame *m*.

The vibrator *v* is to be made of steel, bell metal, or other suitable material, a sectional view showing the vibrator *v* and its position to the strings *b*, (see Figs. 1, 2,) and, as shown  
50 in Figs. 3, 5, are useful for grand and square as well as for upright pianos. The frame *F* is

shown as screwed to piano-plate or wrest-plank *W*, Figs. 3 and 5, and to this frame is secured the vibrator *v*, and held in its relative position to piano-strings *b* by means of screws  
55 or other devices. The vibrator is also connected with vibrating box, pipe, or cavity *J*.

In Figs. 3 and 5 the vibrator is shown as resting partly upon piano-strings *b*. The strings are vibrated by hammer *C*, causing the  
60 vibrator to respond to same harmonically. The vibrations of the vibrator will cause the air in the resonating pipe, chamber, box, or cavity *J* to respond, thereby increasing the volume of the sound, the tone being similar  
65 to that of an organ-pipe when its tongue is vibrated.

In Fig. 4 the vibrator is shown in sections, and in such forms as may be required to meet the demands of a musical scale, letter *g* showing the straight sections, letter *i* a curved section, and letter *d* a perforated section.  
70

The perforations in the vibrator are for the purpose of securing better and more easy vibration of the metal. It also enables me to  
75 tune the vibrator in such manner that when the piano-strings are a little out of tune it will not add to the discord. The vibrator is not tuned to respond sharp to one or several notes, but responds harmonically.  
80

To the lever *L* is attached the mechanism and cross-rail *D*, Fig. 1, which, when moved backward and forward, (shown as suspended by hanger *h* above the piano-key,) will propel the weight *w*, which is held suspended upon  
85 rod or rail *a*. In the manner shown the touch to the piano-key *K* can be regulated to be either light or heavy.

On top of the piano-key, Figs. 1, 2, and below the prolongs, (shown by letters *l* and *y*,) is  
90 secured the rocker *e*, and on top of this rocker is arranged a circular segment, *t*, suitably provided with screws and set-screws, and in such a manner that it may be regulated and held in such a position that the top face of the circular segment *t* will always meet the bottom of  
95 the prolong *l*, Fig. 1, and also prolong *y*, Fig. 2, in its various motions.

The pin *p* is provided with a suitable spring, *s*, assisting the downward motion of the front  
100 rail, *f*, of the key-frame *m*, pressing same upon key-bottom *B*.



My improvements in Fig. 2 consist in providing a completely-moving prolong, *y*, and its operative mechanism, its top section moving along the convex bottom surface, *O*, of the horizontal lever *r*, the lower section of this  
 5 prolong resting upon the top face of the circular segment *t*. In this manner I secure a uniform and easy movement for the piano mechanism, and by means of this mechanism the  
 10 touch can be regulated to suit the player.

For the purpose of securing a uniform motion to a number of prolongs, I have secured their mechanism to a movable cross-rail, *P*, which is held suspended by hanger *h*, the same  
 15 permitting all necessary movements. Cross-rail *P* and its mechanism are moved forward or backward by lever *L*, which is also working the touch-regulating weight *w*, Fig. 2, and mechanism. Lever *L* is also working the  
 20 cross-rail *D*, hanger *h'*, and mechanism, to which are secured the touch-regulating weight *w*. (Shown at Fig. 2 as moving within a channel, groove, pipe, or gutter, *A*.)

I am aware a lever or rod connecting the  
 25 key and jack lever arranged to be moved back and forth is not new, and such construction I therefore do not broadly claim as my invention.

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

30 1. In a piano, a perforated and curved sheet-metal vibrator secured to the frame *F*, in combination with the strings *b* and a key and intermediate mechanism for operating the  
 35 hammer, substantially as described.

2. In a piano or other musical instrument, the combination, with a resonating chamber, box, pipe, or cavity, of a perforated sheet-metal vibrator and the strings of the instru-  
 40 ment, substantially as herein described.

3. In a piano, the key *K* and rocker *e*, in combination with a curved segment upon said rocker, and a cross-rail, *R*, lever *L*, and its connections for causing a prolong to move back and forth upon the segment, substantially  
 45 as described.

4. In a piano, the key-frame *m*, key-bottom *B*, pivoted lever *H*, a pin, *p*, and spring *s*, in combination with the movable front section, *f*, of the key-frame, substantially as described.  
 50

5. In a piano, a key-frame having a movable front section, *f*, in combination with a pin, *p*, attached to a pivoted lever, *H*, to adjust the distance between the bottom of the key and the movable front section, *f*, substantially as  
 55 described, and for the purpose herein set forth.

6. In a piano, the key *K* and rail *a*, in combination with a weight, *w*, pivotally-secured cross-rails *R* and *D*, a lever, *L*, and suitable connections for causing said weight to move  
 60 back and forth on the rail *a*, substantially as and for the purpose described.

7. In a piano, the combination, with a key, of a touch-regulating weight, a cross-rail connected to the weight, a lever for moving said  
 65 weight, and a pipe, groove, or gutter within which the weight moves, substantially as and for the purpose set forth.

8. In a piano, the angular lever *L*, the pivotally-secured cross-rails, the lever *H*, with its  
 70 pin, and suitable connections secured to the cross-rails for moving the lower ends of one or more pivoted prolongs upon a curved segment, *t*, and for moving a weight to regulate the touch, substantially as herein described.

FERDINAND IMHORST.

Witnesses:

W. EGGERT,  
 C. COHN.