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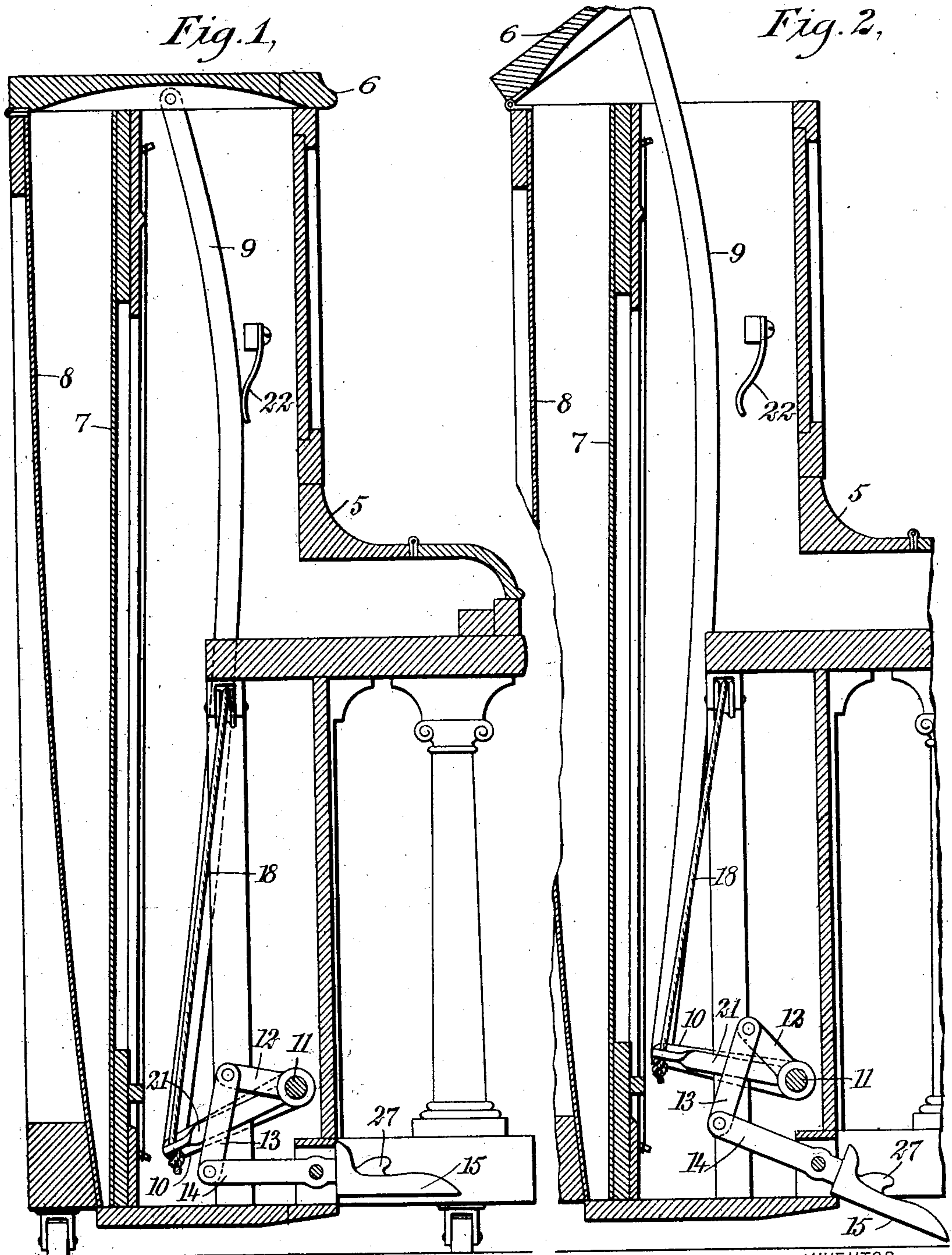
PATENTED MAY 19, 1908.

S. W. CLARK.

BALANCED SWELL FOR MUSICAL INSTRUMENTS.

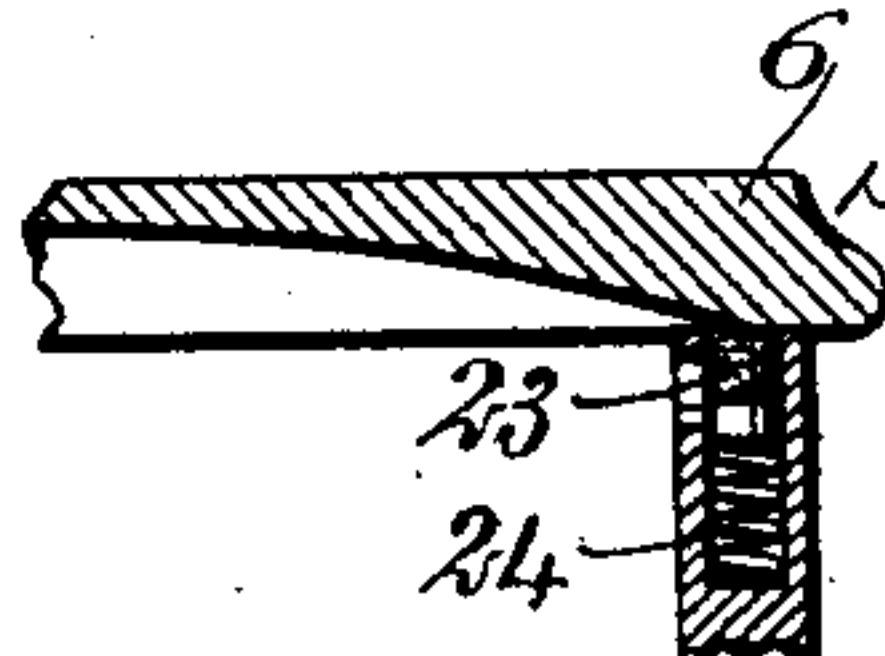
APPLICATION FILED JAN. 19, 1907.

4 SHEETS—SHEET 1.



WITNESSES  
*Edward Thorpe*  
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*Fig. 3,*



INVENTOR  
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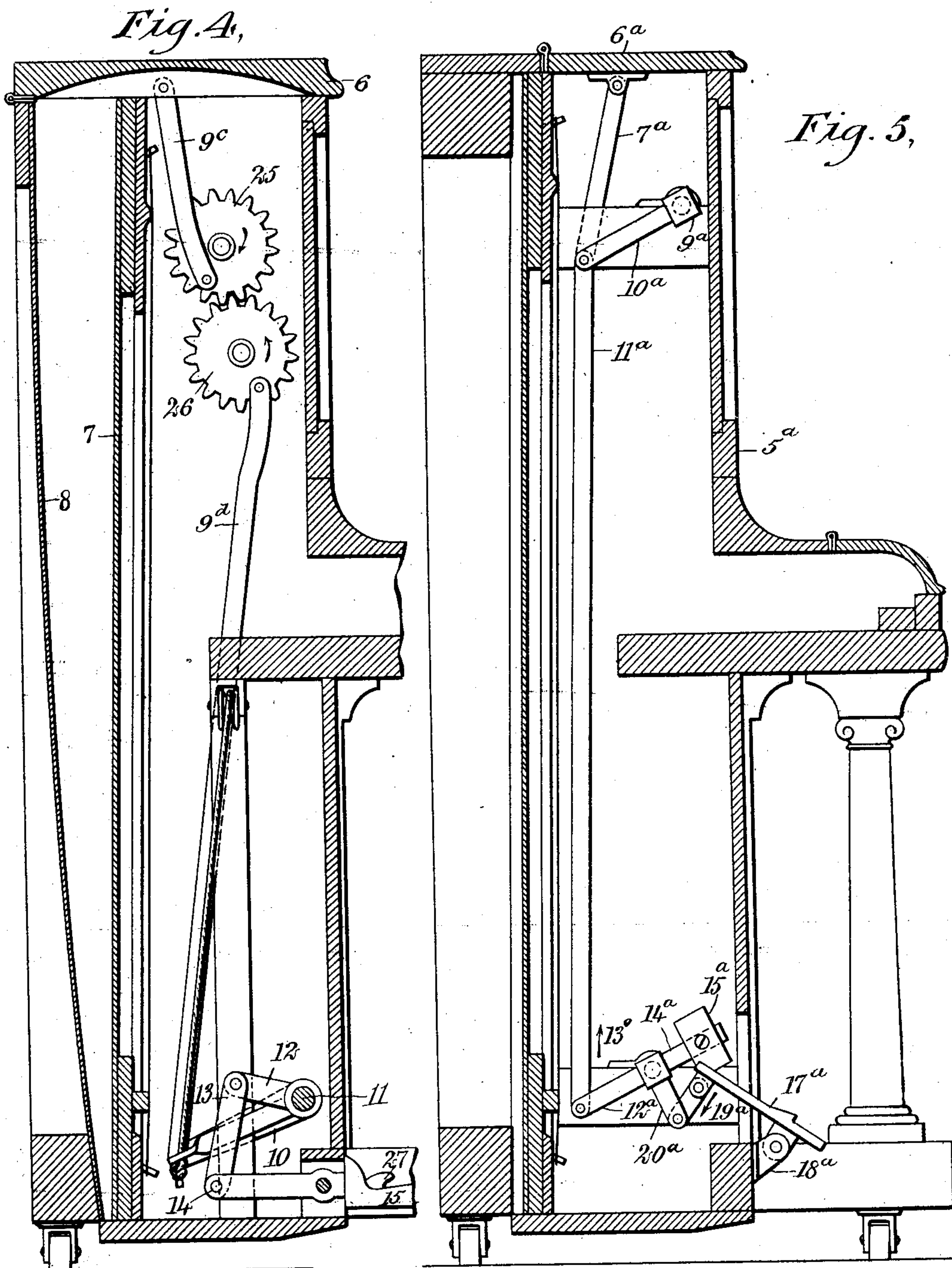
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4 SHEETS—SHEET 2.



**WITNESSES**

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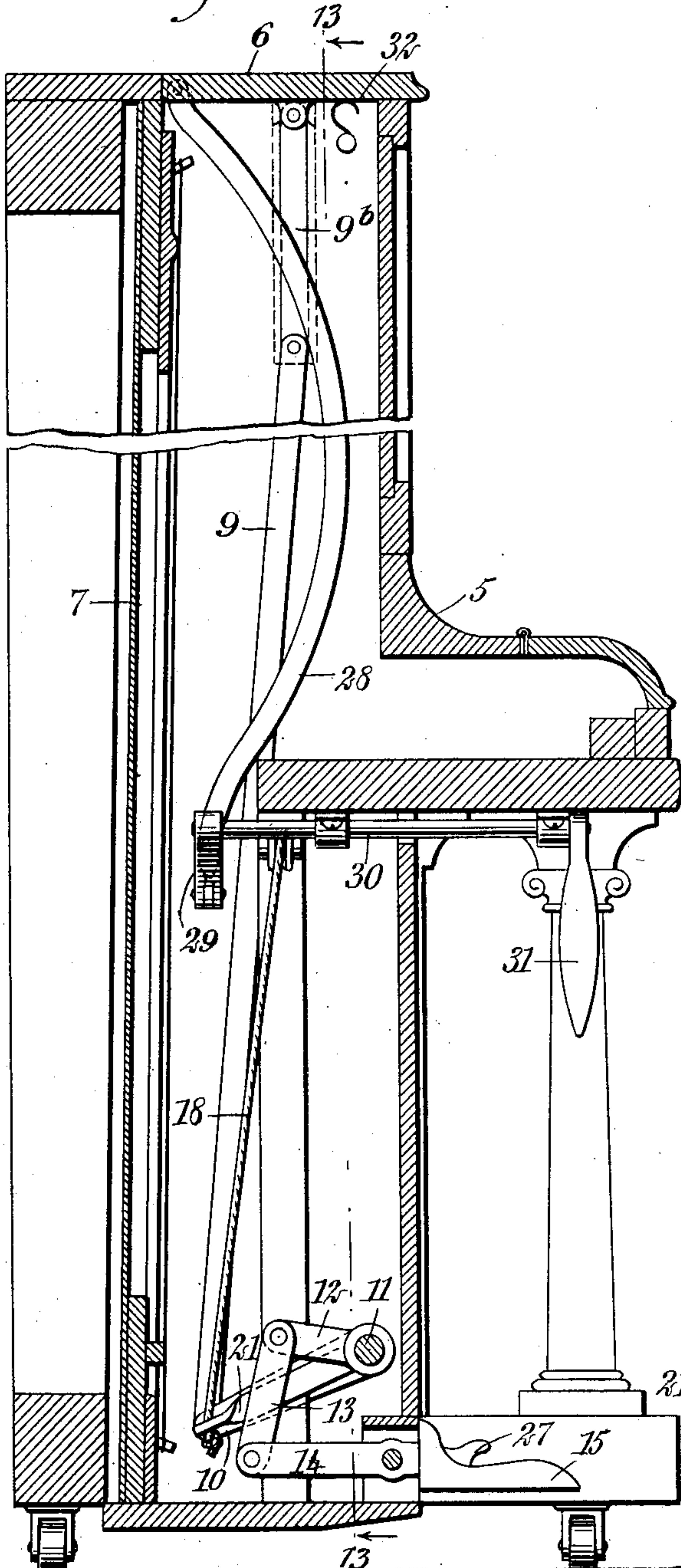
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4 SHEETS—SHEET 3.

Fig. 6,



WITNESSES

Edward Thorpe,

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Fig. 7.

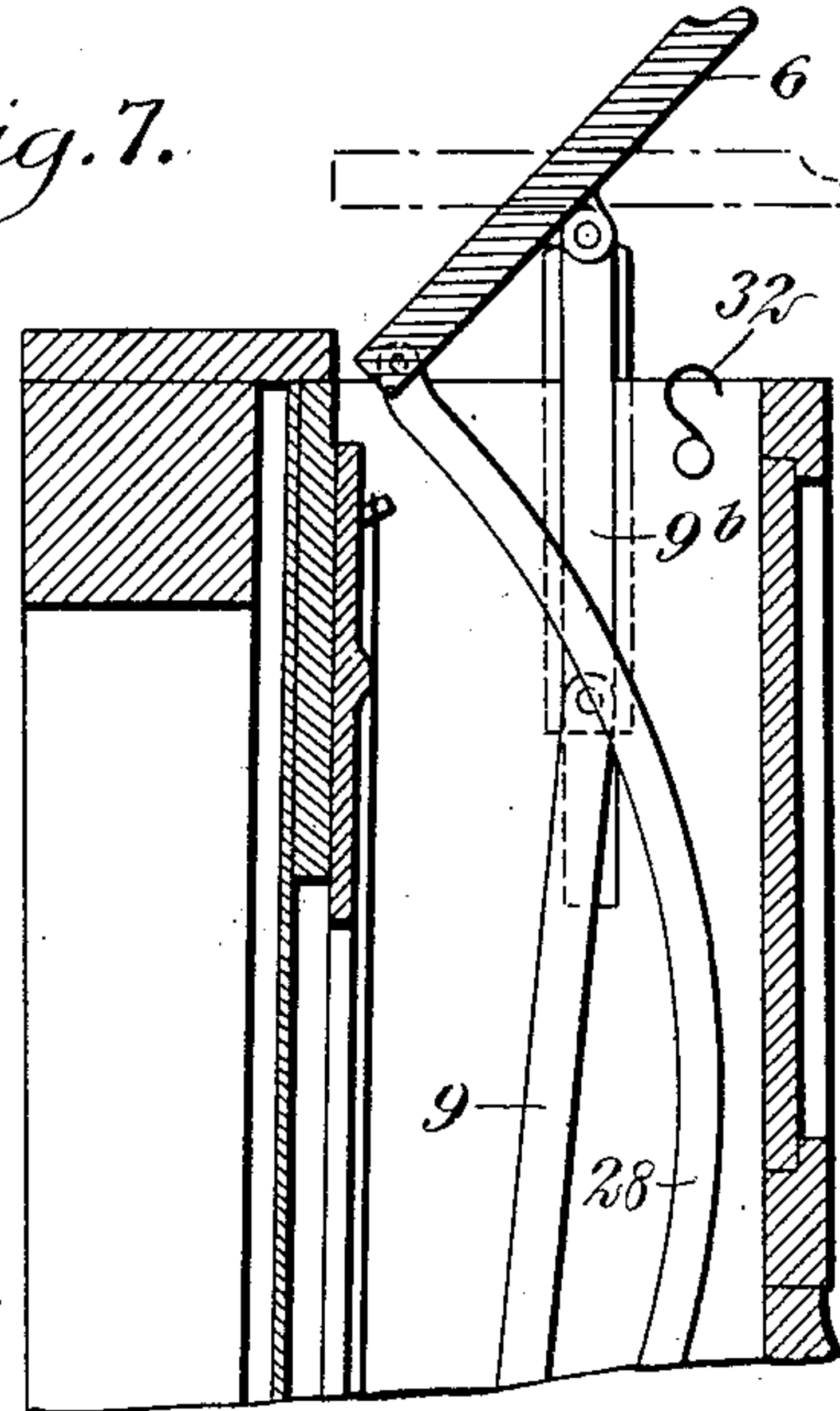


Fig. 8,

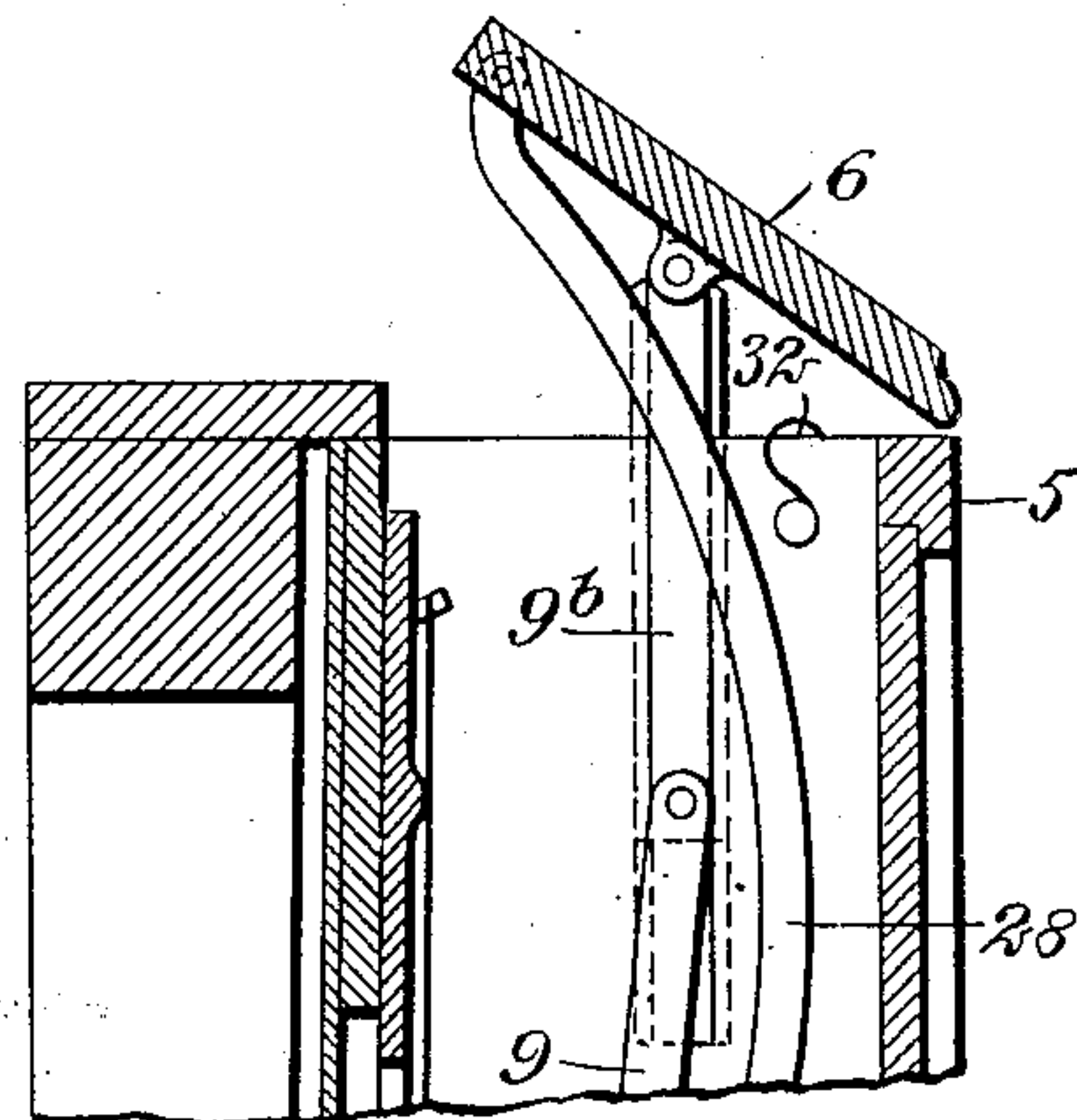
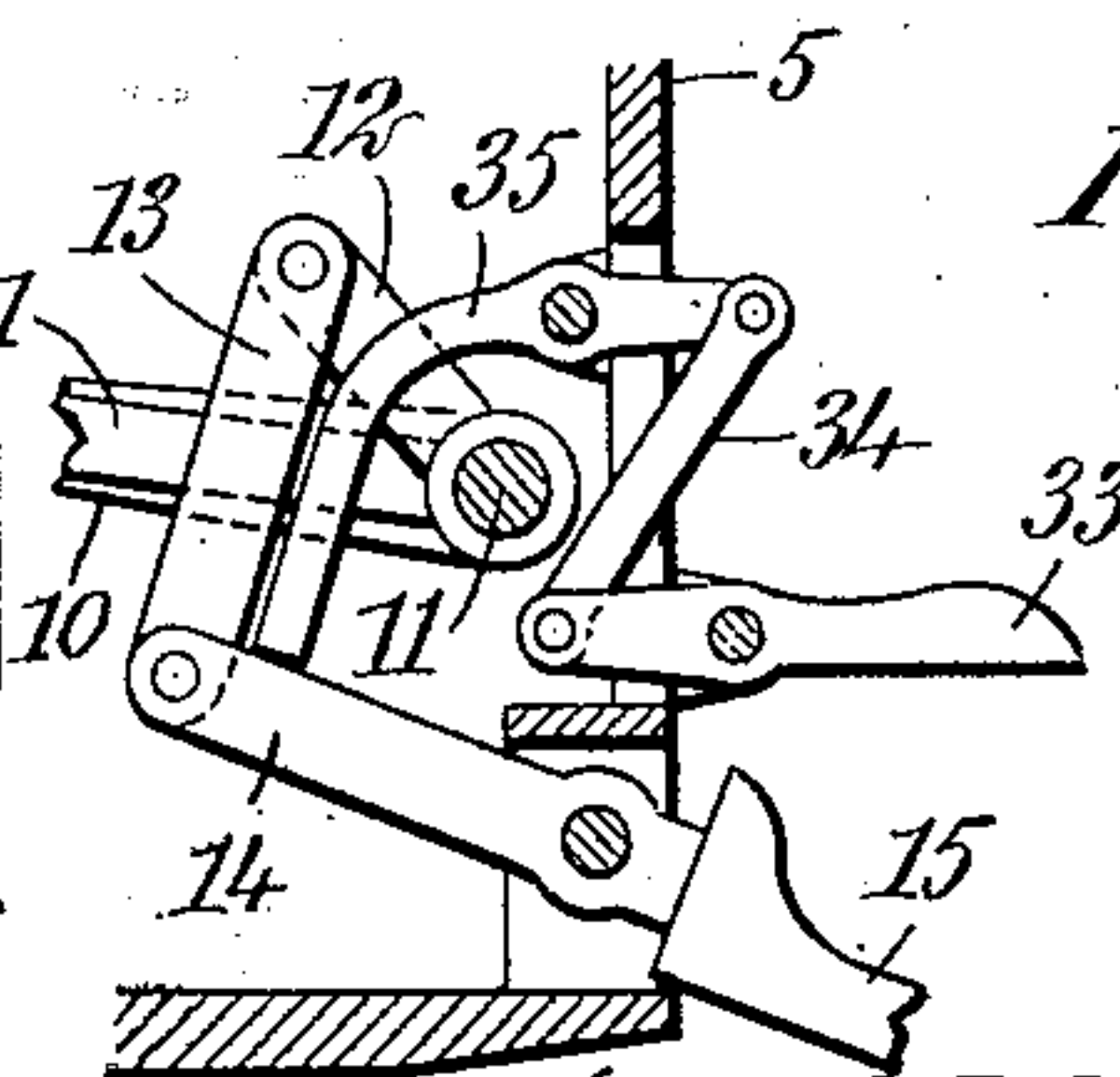


Fig. 9.



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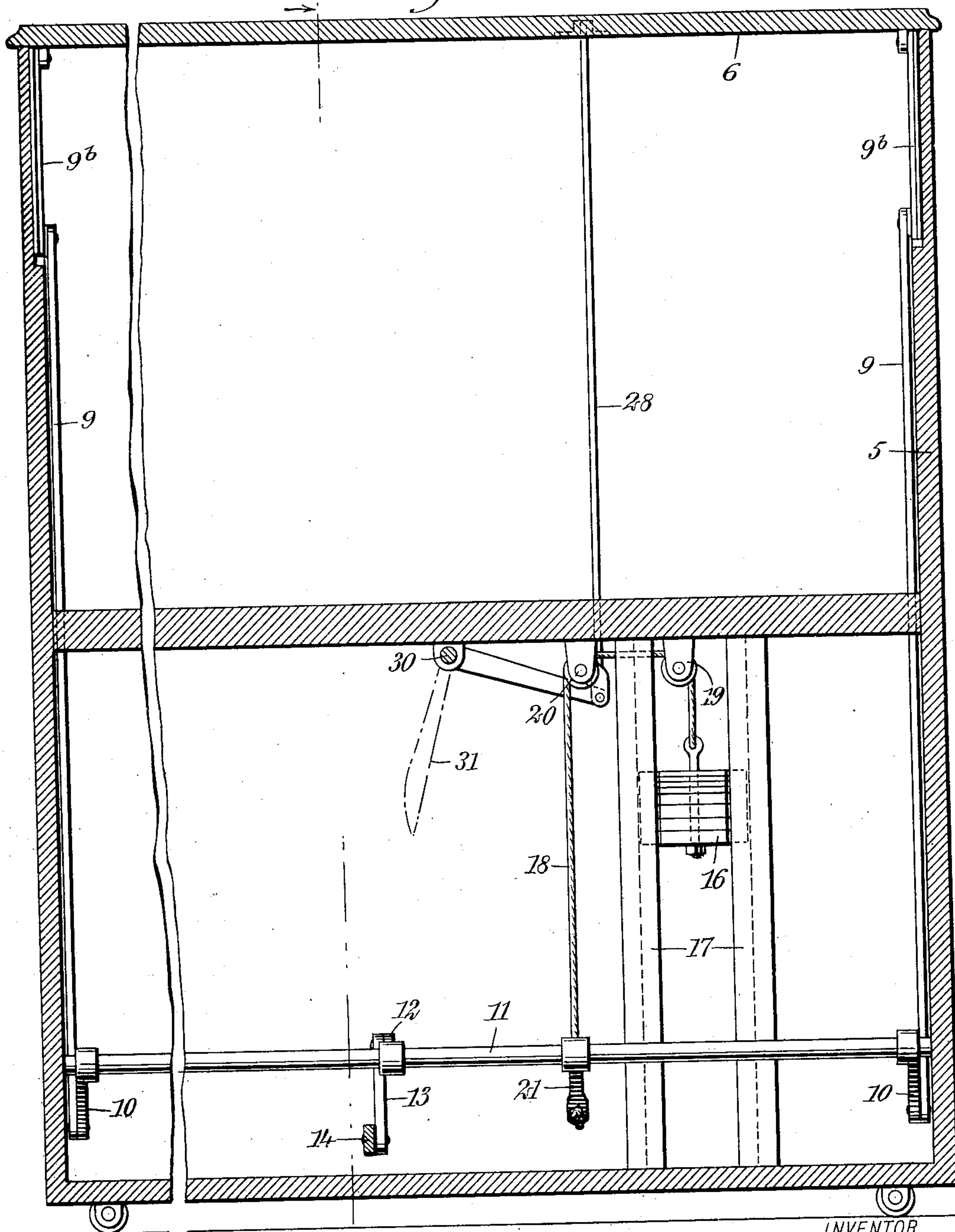
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4 SHEETS—SHEET 4.

Fig. 10.



**WITNESSES**

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# UNITED STATES PATENT OFFICE.

SARAH WOOD CLARK, OF NEW YORK, N. Y.

## BALANCED SWELL FOR MUSICAL INSTRUMENTS.

No. 888,307.

Specification of Letters Patent.

Patented May 19, 1908.

Application filed January 19, 1907. Serial No. 353,070.

*To all whom it may concern:*

Be it known that I, SARAH WOOD CLARK, a citizen of the United States, and a resident of the city of New York, borough of Manhattan, in the county and State of New York, have invented a new and Improved Balanced Swell for Musical Instruments, of which the following is a full, clear, and exact description.

10 This invention relates to improvements in musical instruments, and relates more particularly to means for varying the volume of the tone of a piano or similar instrument; the object being to provide a simple means  
15 whereby a performer on the instrument may by foot pressure vary the position of a movable part of the casing, as, for instance, a lid, to open or close the same, or vary the position of a sound deflecting board whereby the  
20 sound may be muffled or permitted to freely escape toward or away from the audience.

A further object of my invention is to provide mechanism for raising or lowering the lid and tilting it in either direction, so that  
25 the sound waves will be deflected in the desired direction by the lid.

The invention consists in certain features of construction and combination of parts, all of which will be fully set forth hereinafter  
30 and particularly pointed out in the claims.

Reference is to be had to the accompanying drawings forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the figures, in which  
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Figure 1 is a sectional elevation of a piano casing provided with my improved mechanism; Fig. 2 is a similar section but showing the lid in its raised position; Fig. 3 is a sectional detail showing one form of mechanism for cushioning the lid upon its descent; Fig. 4 is a section similar to Fig. 1, but showing a modified form of lid manipulator; Fig. 5 is a section similar to Fig. 1, but showing a  
40 further modified form; Fig. 6 is a transverse section illustrating one form of lid-tilting mechanism, said section being taken on the line 9—9 of Fig. 10; Figs. 7 and 8 are fragmentary sections similar to Fig. 6, but showing the lid in different positions; Fig. 9 shows the foot-actuated mechanism illustrated in Figs. 1, 2, 5 and 6, provided with means for lifting the pedal after the latter has been depressed; and Fig. 10 is a longitudinal section taken on the line 13—13 of Fig. 6.  
55

In the drawings I have illustrated various modified forms of mechanism for raising the lid by foot pressure, each of said forms being illustrated in connection with an upright piano, but it is to be understood that my invention may be applied equally as well to a square or grand piano. In the form illustrated in Figs. 1 to 3, inclusive, a casing 5 of any suitable character is employed, said casing having a movable lid 6 closing the upper end thereof and hinged at the rear side of the instrument. This lid is preferably flat upon its upper surface and curved longitudinally and laterally upon the lower surface, as indicated in Figs. 1 and 3. This form of lid is preferably employed in connection with a piano having the ordinary sounding board 7 and also the curved sounding board 8 disclosed and claimed in my prior patent No. 763,157, granted June 21, 1904. The lid at each end thereof is provided with long curved bars 9 pivotally connected thereto and extending to points adjacent the lower end of the piano. The lower end of each of these bars is pivotally connected to corresponding arms 80 10 carried by a rock shaft 11 extending the full length of the instrument and connected to mechanism for rocking the shaft. The particular embodiment of mechanism illustrated in this form, as well as in the form illustrated in Fig. 5, comprises an arm 12 extending rearwardly therefrom and connected by means of a link 13 to the inner extended end 14 of a pedal 15. By pressing downward upon the pedal, the inner end 14 thereof is raised and the rock shaft 11 rotated. This movement of the shaft causes the arms 10 to rise and causes the bars 9 to move longitudinally to raise the lid upon its hinges. For facilitating this movement of the lid, I provide a counterbalancing weight 16 mounted between guides 17 and connected by a cord 18 extending over pulleys 19 and 20 to the end of an arm 21 carried by the rock shaft. The weight 16 is of such a size that the lid 6 is substantially counterbalanced and only a very slight pressure upon the pedal 15 is required in order to raise the lid, while upon relieving the pressure of the foot, the lid will automatically but slowly descend to the position indicated in Fig. 1.  
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To prevent the lid from coming too violently in contact with the upper edge of the casing, I may provide any suitable mechanism for cushioning it, as, for instance, springs  
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22 secured to the inner sides of the end walls of the casing, so as to contact with the sides of the bars 9 when the latter have moved nearly to their limiting position. In Fig. 3, a modified form of cushioning device is illustrated, which comprises a buffer 23 carried in a recess in the upper edge of the front side of the casing and movable therein. A spring 24 normally presses this buffer up out of the recess, and as the lid descends it contacts first with the buffer and must compress the spring 24 before it can contact with the front of the casing. It is evident that various other means than those illustrated may be employed for cushioning the descent of the lid.

Instead of connecting the arms 10 directly to the lid 6 by bars 9, as illustrated in Figs. 1 and 2, I may, if desired, connect the lid and arms to separate bars and connect these bars to intermeshing gear wheels, as illustrated in Fig. 4. In this embodiment of my invention, I provide short bars 9<sup>c</sup> connected to the lid and bars 9<sup>d</sup> connected to the arms 10. The first mentioned arms are pivotally connected to gear wheels 25 mounted on the inner side of the end wall of the casing and intermeshing with gear wheels 26 mounted adjacent thereto and pivotally connected to the bars 9<sup>d</sup>. Upon pressing downward on the pedal 15 the arms 9<sup>d</sup> are raised to cause a rotation of the gear wheel 26, and the motion thus imparted to the gear wheel 25 causes the lid to rise. The relative size of the two gear wheels may be varied at will, so as to open the lid by a minimum or maximum movement of the pedal. The connections of the bars 9<sup>c</sup> and 9<sup>d</sup> to these gear wheels may be such that when the lid reaches its limited open position, the end of either the rod 9<sup>c</sup> or 9<sup>d</sup> will be upon a dead center and the lid held against accidental return movement. Should the lid fail to freely return when the pressure is relieved from the pedal, I may, if desired, provide the pedals with small projections or clips 27, whereby the performer may catch the tip of the sole of his shoe beneath the projection and slightly raise the pedal to start the lid on its downward movement.

It is evident that my improved lid manipulator may be employed in connection with the lid of any ordinary piano instead of in connection with the curved lid illustrated in the forms above described. In Fig. 5, I have illustrated a modified form of lid manipulator and one employed in connection with a piano of ordinary or simple construction. In this form I have indicated a casing 5<sup>a</sup> having a swinging lid 6<sup>a</sup> pivotally connected at its ends to links 7<sup>a</sup> extending downwardly to pivotal connections with arms 8<sup>a</sup> on a rock shaft 9<sup>a</sup> arranged in the upper portion of the casing. Also extending

from the said rock shaft is an arm 10<sup>a</sup> having connection 11<sup>a</sup> with an arm 12<sup>a</sup> projecting from a second rock shaft 13<sup>a</sup> arranged in the lower portion of the casing. Extending forward from the last mentioned rock shaft is an arm 14<sup>a</sup> having a weight 15<sup>a</sup> secured thereto and adjustable longitudinally thereof. This weight operates in the same manner as the weight in the forms above described, and operates to counterbalance the lid and permit of easier movement of said lid. A foot pedal 17<sup>a</sup> extends through an opening in the front of the casing at the bottom and is mounted to swing on a stud 18<sup>a</sup> attached to the lower rail of the casing. The inner end of the pedal has a link connection 19<sup>a</sup> with an arm 20<sup>a</sup> extending from the rock shaft 13<sup>a</sup> substantially at right angles to the arm 12<sup>a</sup>. The operation of this form is substantially the same as in the form first described, namely, upon pressing the pedal the rock shaft 13<sup>a</sup> is caused to rotate and raise the bar 11<sup>a</sup>, which in turn rotates the rock shaft 9<sup>a</sup> and raises the arms 7<sup>a</sup>.

In connection with the various forms of lid-raising mechanism hereinbefore described, I preferably employ means for so supporting the lid that it may be inclined in any desired direction, and provide mechanism for readily controlling this means. In Figs. 6 to 10, inclusive, I have illustrated a foot-operated mechanism similar to that illustrated in Figs. 1 to 4, inclusive, but instead of connecting the bars 9 directly to the lid 6, I connect them to the lower ends of the vertically movable supporting bars 9<sup>b</sup> held within guides of any suitable character in the ends of the casing 5. The vertically movable supporting bars 9<sup>b</sup> are pivotally connected to the lid 6 at the opposite ends thereof and intermediate the opposite sides, and the lid illustrated in Figs. 6 to 10, inclusive, is entirely free from and unattached to the casing of the piano, save at these two supporting bars. Upon depressing the pedal 15, the lid may be moved in a parallel position to a plane above the piano, as illustrated in dotted lines in Fig. 7.

In order that the sound produced within the instrument may be deflected either from the front or the rear, I connect to the lid means for varying the inclination thereof. This means may be of various different forms, but in the drawings I have illustrated one embodiment, comprising a bar 28 pivotally connected to the lid at the rear edge thereof and so connected at its lower end, that the performer may raise or lower the rear edge of the lid to vary its inclination. As shown, the lower end of the bar 28 is connected to an arm 29 secured to a short oscillating shaft 30, which latter extends out from the front of the piano below the keyboard and carries a lever 31 in a position to be operated by the



knee of the performer. A side movement of the lever 31 rotates the shaft 30 and raises or lowers the end of the arm 29 and bar 28. By raising the entire lid to the position shown in dotted lines in Fig. 7 and then moving the lever 31 to depress the rear of the lid, the volume of sound may be thrown forward over the head of the performer; while by moving the arm 31 to lift the rear of the lid, the latter may be inclined to the position shown in Fig. 8 and the sound deflected in the opposite direction. Any suitable means may be employed for cushioning the descent of the lid, the form shown comprising a small spring 32 extending a short distance above the top of the casing when the lid is raised.

Instead of employing the projection or clip 27 for raising the pedal after the same has been depressed, I may, if desired, employ the mechanism illustrated in Fig. 9, in which an auxiliary pedal 33 is mounted directly above the pedal 15 and connected by a link 34 to a bell crank lever 35, the inner end of which may be brought into engagement with the inner extended end 14 of the pedal 15, to depress the latter and cause the lid to return to its original position.

The operation of my improved device is quite obvious; that is, a performer on the instrument by placing his foot on the pedal and applying suitable pressure thereto may raise the lid of the instrument to any desired degree to deflect the sound waves from the instrument, and upon relieving the foot pressure the lid will close by gravity, but all jarring or noise will be obviated by the cushioning device employed.

It is desirable that the weight should very nearly counterbalance the lid, so that only a slight pressure is required to raise the latter, but this results in a very slow return movement of the lid after it is released. If the performer desires to close the lid more rapidly or in case the lid does not descend upon the removal of the foot from the pedal, pressure is applied to the auxiliary pedal, whereupon the lid may be instantly closed.

Having thus described my invention, I claim as new and desire to secure by Letters Patent:

1. A musical instrument, comprising, in combination, a casing having a movable lid; and foot actuated mechanism for moving said lid, said mechanism including a pedal adapted to be depressed to raise the lid, and means adapted to be engaged by the foot of a performer to start the lid in the reverse direction.

2. A musical instrument, comprising, in combination, a casing having a movable sound deflecting board, and foot actuated mechanism for moving said board, said mechanism including a pedal adapted to be depressed to move the board in one direction and means adapted to be engaged by the

foot of a performer to start the board in the reverse direction.

3. A musical instrument, comprising, in combination, a casing having a movable lid constituting a sound deflecting board, and foot actuated mechanism for moving said lid, said mechanism including a pedal adapted to be depressed to move the lid in one direction, and means adapted to be engaged by the foot of a performer to start the lid in the reverse direction.

4. A musical instrument, comprising, in combination, a casing having a movable lid, and mechanism for moving either one of two opposite edges of said lid out of engagement with the casing.

5. A musical instrument, comprising, in combination, a casing having a movable lid, means for moving said lid in respect to said casing, and independent means for varying the inclination of said lid.

6. A musical instrument, comprising a casing having a movable lid, foot actuated mechanism for raising said lid, and separate means for varying the inclination of said lid.

7. A musical instrument, comprising a casing having a movable sound deflecting board, a counterbalancing weight therefor, foot actuated mechanism for moving said board in one direction, and independent means for varying the inclination of said board.

8. A musical instrument, comprising a casing having a movable lid, means for counterbalancing the weight thereof, foot actuated mechanism for operating the same, and independently operated means for varying the inclination of the lid to bring either one of two opposite edges of said lid out of engagement with said casing.

9. A musical instrument, comprising a casing having a movable lid, a rock shaft extending longitudinally of the casing substantially the entire length thereof, means connecting the opposite ends of said rock shaft to the opposite ends of said lid, foot-actuated mechanism for operating the rock shaft, and a weight operatively connected to said rock shaft and counterbalancing the lid.

10. A musical instrument, comprising a casing having a movable lid, a rock shaft extending longitudinally of the casing substantially the entire length thereof, means connecting the opposite ends of said rock shaft to the opposite ends of said lid, foot-actuated mechanism for operating the rock shaft, a weight operatively connected to said rock shaft and counterbalancing the lid, and a spring for cushioning the lid at the end of the closing movement.

11. A musical instrument, comprising a casing having a movable lid, a rock shaft extending longitudinally of the casing substantially the entire length thereof, means connecting the opposite ends of said rock shaft to the opposite ends of said lid, foot-actuated

mechanism for operating the rock shaft, a  
weight operatively connected to said rock  
shaft and counterbalancing the lid, and  
mechanism for moving either one of the two  
5 opposite edges of said lid out of engagement  
with the casing.

In testimony whereof I have signed my

name to this specification in the presence of  
two subscribing witnesses.

SARAH WOOD CLARK.

Witnesses:

J. MITCHELL CLARK,  
WILLIAM MERGARAT.