

(No Model.)

3 Sheets—Sheet 1.

A. BATTES.

PIANO ACTION.

No. 374,389.

Patented Dec. 6, 1887.

Fig. 1.

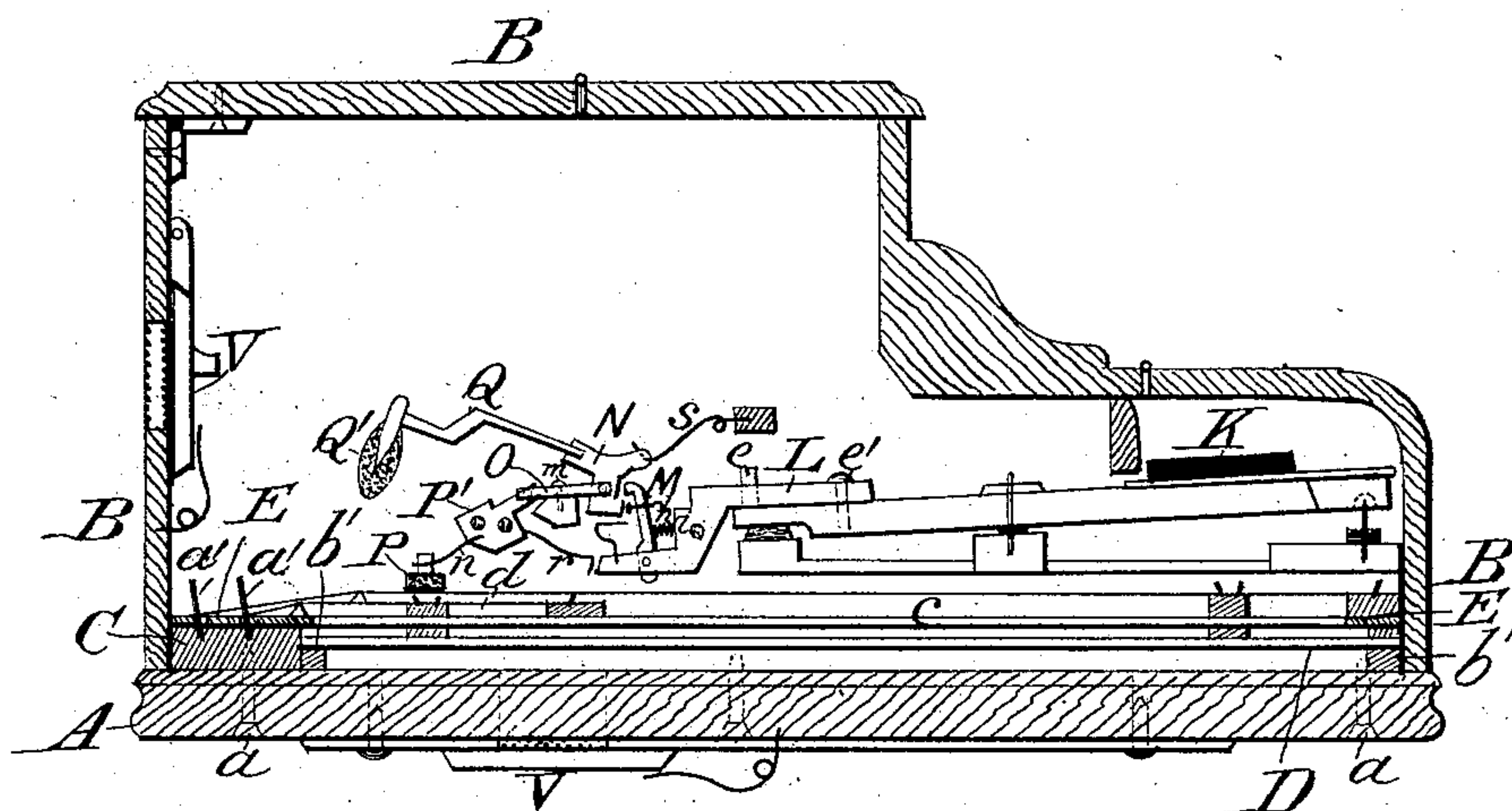


Fig. 2.

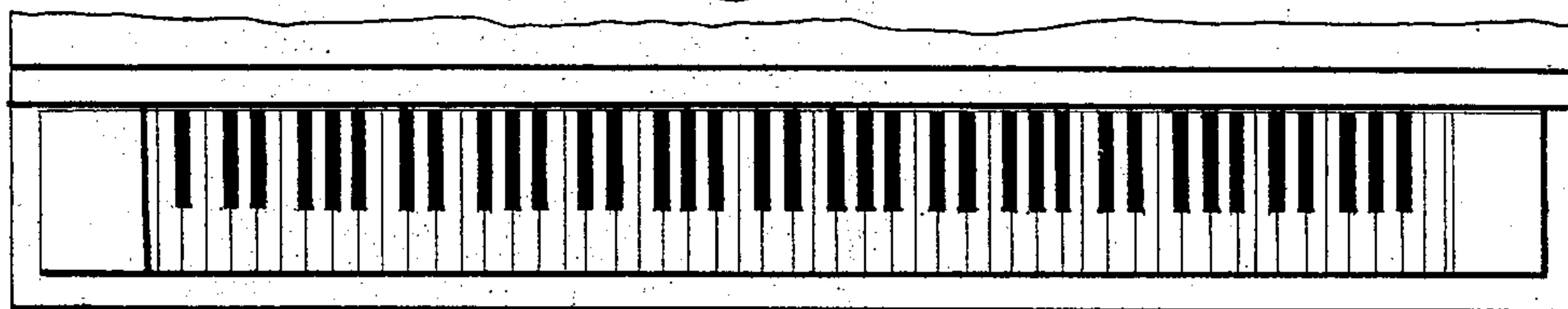


Fig. 3. ON XX.



Witnesses

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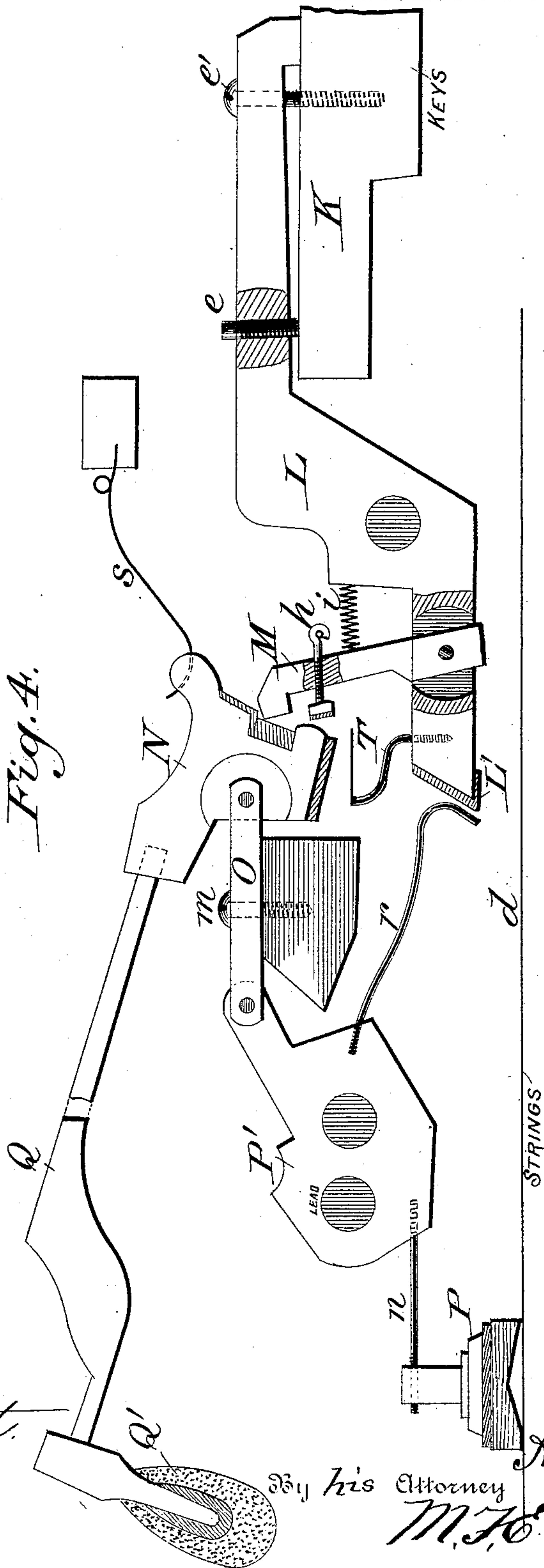
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3 Sheets—Sheet 2.

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UNITED STATES PATENT OFFICE.

ADAM BATTES, OF MANKATO, MINNESOTA.

PIANO-ACTION.

SPECIFICATION forming part of Letters Patent No. 374,389, dated December 6, 1887.

Application filed August 30, 1887. Serial No. 248,276. (No model.)

To all whom it may concern:

Be it known that I, ADAM BATTES, a citizen of the United States, residing at Mankato, in the county of Blue Earth and State of Minnesota, have invented certain new and useful Improvements in Pianos; and I do 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 the letters and figures of reference marked thereon, which form a part of this specification.

This invention relates to improvements in pianos, the object being to produce a piano of seven and one-fourth octaves (and three unisons) on the smallest possible scale; second, to produce a piano having the least possible weight, for the purpose of easy and cheap transportation; third, a piano of a neat pleasing shape, so low as to enable the player during lectures and concerts in schools and singing societies to sit freely at his instrument instead of being withdrawn from the gaze of the audience by a high piano, or, as it not unfrequently happens, having his back turned to his audience. This is chiefly the case with the present pianos, and a circumstance which artists ever pointed out as a great deficiency.

Owing to studies during a period of many years, and by the expenditure of considerable sums of money, I have finally succeeded in producing a piano that embraces in its construction the above-named improvement.

The sound-waves are propagated by all stringed instruments in a contrary direction from that in which they are produced, as, in the case of an upright piano, the stroke of the hammers is exactly in the same plane as the ear of the player. When the string is struck by the hammer, the sound-wave travels in the same line toward the ear of the player, which, by dint of long practice, exercises a pernicious influence upon the organ of hearing, and in no few instances produces headache; but it is not alone this. During the accompaniment of a song it suppresses the voice of the singer. With grand piano-fortes or square piano-fortes this happens less frequently, because the hammers in these instruments strike upward, and the sound-waves are produced in a downward

direction and are not as hurtful to the ear as in the above-mentioned waves (in the same line with the ear of the player.) Still this circumstance has its disadvantages also. For instance, if a room is carpeted and the sound-wave is produced in a downward direction, it must be stifled on the carpet, because, as is well known, soft substances like carpets are no conductors of sound. These drawbacks are also removed in my piano. Besides this, in my piano the inner parts producing the tones are closed very tightly by the outer case—an advantage which no other piano possesses. Several lids are constructed in the back and at the bottom of the instrument, which can be opened at pleasure by means of pedals to allow the sound-waves a free passage to spread in different directions. Moreover, care has been taken to diminish the weight of the piano, which weighs at most three hundred and fifty pounds. Besides, the exterior case can be removed by loosening a few screws, so that each part separately weighs one hundred and seventy-five pounds, thus rendering it easily transported.

In the accompanying drawings, in which similar letters of reference indicate like parts in the different figures, Figure 1 represents a vertical cross-section through the case and musical apparatus of the piano. Fig. 2 is a plan of the key-board. Fig. 3 is a transverse section through the bridge and a portion of the sounding-board on line *xx* of Fig. 6. Fig. 4 is an enlarged side view of a key and its connections, showing the parts their full size. Fig. 5 is a plan view showing a part of the case and foundation-frame of the piano. Fig. 6 shows a plan of the metallic plate carrying the strings.

In the figures, A represents the foundation or base-frame, which supports all the musical mechanism as well as the case or cover B, which is attached to the base-frame by screws *a a*, passing through the marginal projection of the base-frame surrounding the iron plate which carries the strings. This foundation A consists of a rectangular frame of wood, the sides of which are retained in position by a series of braces, *b b*, preferably seven in number, and are arranged, as shown in Fig. 5 of the drawings, diagonally, so that they may be

in the line of the greatest strain. Secured to this base-frame A at the rear is the tuning-block C, and within this block, resting against it and upon the braces *b*, is the sounding-board support *b'*, upon which rests the sounding-board D. Over the sounding-board, and resting upon the tuning-block at the rear and suitable supports at the front, is the metallic plate E. This plate is of skeleton form, fully covering the tuning-block C at the rear, and pierced to allow the tuning-pins *a' a'* to pass through it into said tuning-block, and further provided with the agraffe-block F at one end, between which and the tuning-block are the series of braces *c c*, made integral with the rest of the plate. In order to support the bridge H in its proper position above the plate E, it is made in two pieces, (see Fig. 3,) the lower one of which is glued to the sounding-board and has spaces cut out of it for the passage of the braces *c* of said metallic plate E. The upper part of the bridge is then provided with the bridge-pins *f* and firmly secured to the lower part by the screws, thus causing the bridge to inclose the braces of the metallic plate.

An additional brace, *c'*, crosses from the tuning to the agraffe block in the line of the first strings, being at a different angle from the braces *c c* and above them, affording additional stiffness to the plate in the line of these strings, which strings, as shown in Fig. 6, pass over the bridge from the tuning-pins *a'* in the tuning-block to the holding-pins *a''* in the agraffe-block.

The construction and operation of the mechanism by which the keys cause the hammer to strike the strings is different from that now in use, as will be apparent from the following detailed description of its construction, referring to Fig. 4 of the drawings, in which the parts are shown of full size.

d represents the strings; K, the keys; L, the jack-lever; *e*, the regulating-screw, and *e'* the fastening-screw by which it is secured to the keys. The jack-lever is cambered and hangs down the length of the thrust-lever M behind the key, in order to bring the pivot of the hammer-base closer to the strings and to shorten the head of the hammer, whereby a firm stroke will be obtained.

M is the thrust-lever; *h*, the adjusting or set screw to cause escapement of the thrust or jack-lever from the hammer-base N.

i is a spiral spring which brings the thrust-lever, when out of gear, back to its working-point. The escapement of the lever or jack is effected by the block on the end of the screw *h* coming in contact with the hammer-base.

O is the hammer-flange, to which the mechanism is connected by the screw *m*, and by the screw *e'* to the keys.

P is a damper connected to the weighted piece P' by the wire stem *n*. The block P' is hinged to the hammer-bearer O, and both it

and the damper are weighted with lead, in order to cause the falling of the keys and to work the damper.

Q is the shank of the hammer, secured at one end to the hammer-base N, and cambered in a manner to shorten the head of the hammer and bring it in close proximity to the strings *d*.

r is a curved wire screwed fast in the block P', and lifts the damper by means of the projecting end L' of the jack-lever when the key is struck.

s is a spring which returns the hammer to its normal position of rest after every stroke.

T is the catcher, which holds the hammer at every stroke until the finger is lifted from the key.

The catcher T is made of wire and screwed into the jack-lever L, and the upper part is filed flat and forms a spring, so that as soon as the finger is lifted a little from the key the hammer-base N is slightly lifted, in order to bring it back easier to the thrust-lever *b*, and in this manner the repetition of the stroke upon the key will be rendered easier.

In order to allow the volume of sound to pass out from the piano, I make one or more openings in the back of the case B, and close said openings by spring-actuated doors or valves V, which may be connected with suitable mechanism, allowing them to be opened or closed by the knee of the operator. I also place a similar valve on the bottom of the case, which I prefer to operate by a pedal. This valve is generally left open; but all of them are fully under the control of the operator, and by them he is able to regulate the volume of sound that issues from the instrument.

The case is provided with a hinged front, falling down in the ordinary manner to cover and protect the keys. It will, however, be observed that by the removal of the screws *a* the whole case can be lifted off, exposing all the mechanism to view and allowing repairs to be made without the difficulty experienced in obtaining access to the same in the pianos as now constructed.

The whole mechanism is believed to present a novel arrangement of parts, giving many advantages over the pianos in common use, especially in the matter of transportation and cost of construction, while its durability and purity of tone cannot be exceeded.

In the drawings illustrating my invention I have shown no legs to support the instrument. My reason for this is that they form no part of its musical mechanism, and I may sometimes prefer to mount the instrument upon a box-like pedestal instead of legs.

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

1. As an improvement in pianos, the base-frame, the sounding-board support, and the braced metallic plate, in combination with the

bridge resting upon the sounding-board and encircling the braces of the same, substantially as and for the purpose specified.

2. As an improvement in pianos, the keys, the adjustable jack-lever attached thereto, and the thrust-lever having an adjusting-screw, *h*, in combination with the hammer attached by a cambered shank to the base *N*, said screw adapted to regulate the action of the hammers, as specified.

3. As an improvement in pianos, the combination of the hammer attached by a cambered shank to the hammer-base, the spring *s*, the thrust-lever, and its operating mechanism, substantially as and for the purpose set forth.

4. As an improvement in pianos, the swinging block *P'*, the damper attached to said block, the arm or wire *r*, projecting from the

block, and the beveled extension *L'* of the jack-lever, adapted to raise the damper when the key is touched, as specified.

5. As an improvement in pianos, the jack-lever provided with the catcher *T* and thrust-lever *M*, in combination with the hammer and hammer-base *N*, said catcher being arranged in such a manner as to stop the base and prevent jumping of the hammer under the action of its elevating-spring when released by the thrust-lever, substantially as specified.

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

ADAM BATTES.

Witnesses:

Q. LEONARD,
HENRY LEONARD.