

S. B. Driggs,

Patented Dec. 18, 1855.

N^o 13,942.

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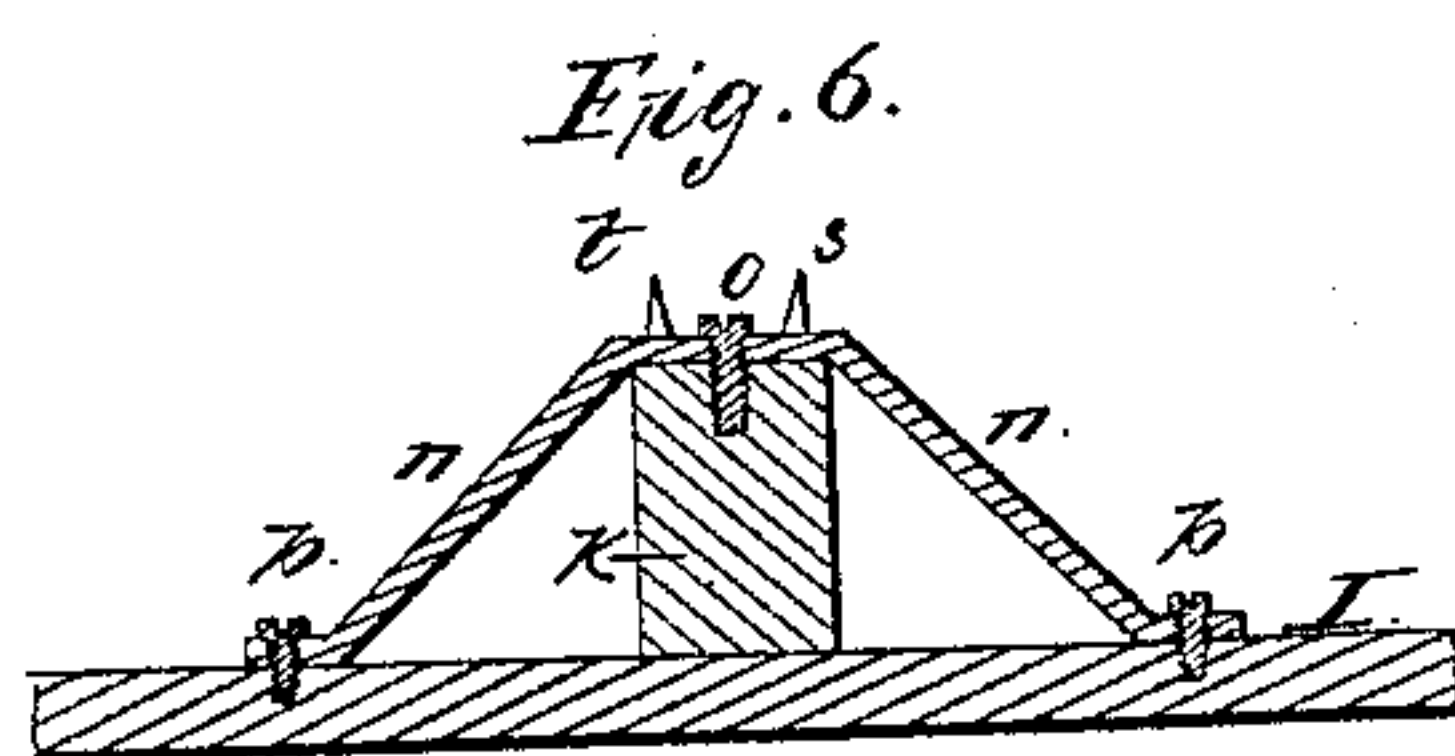
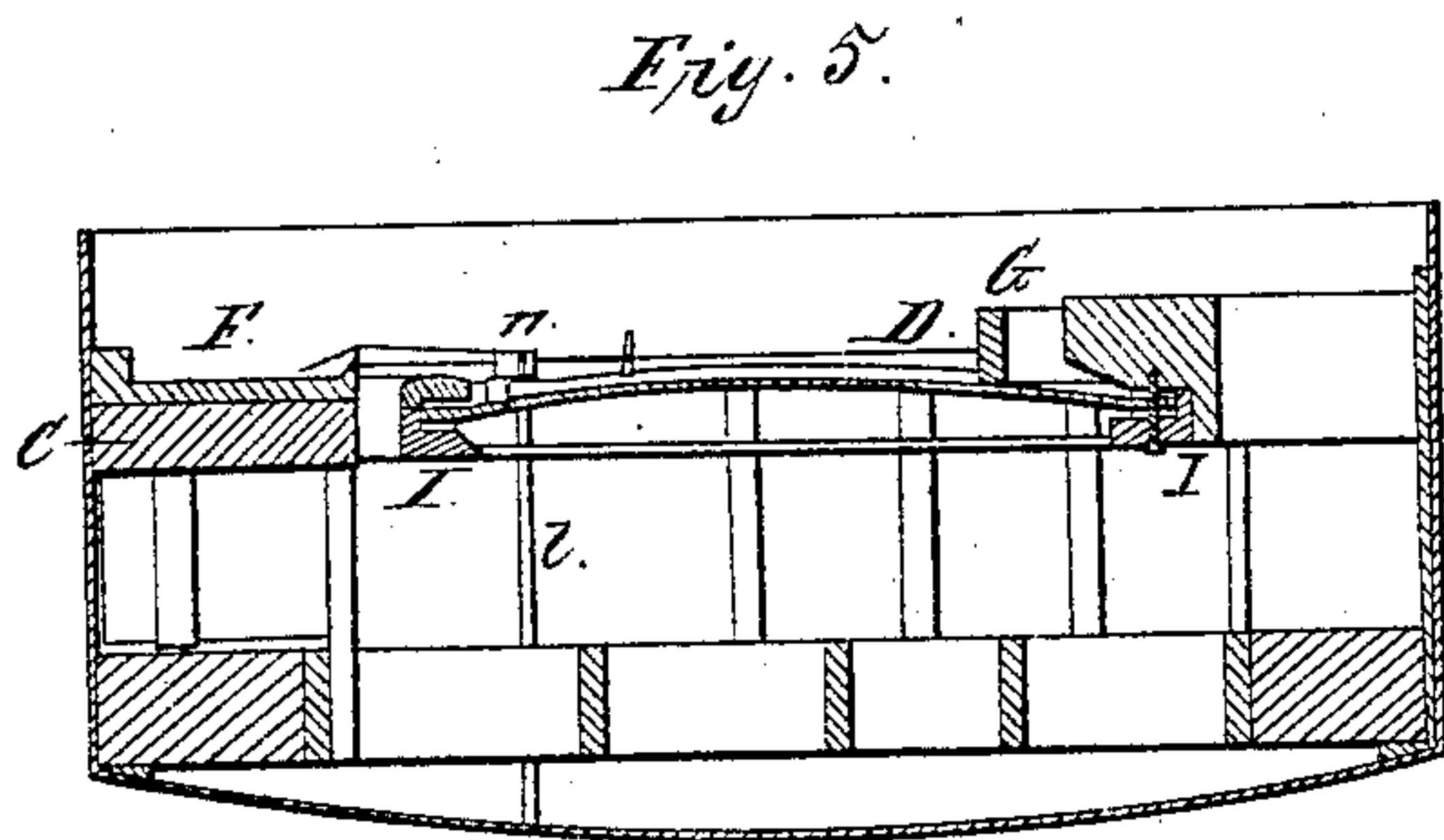
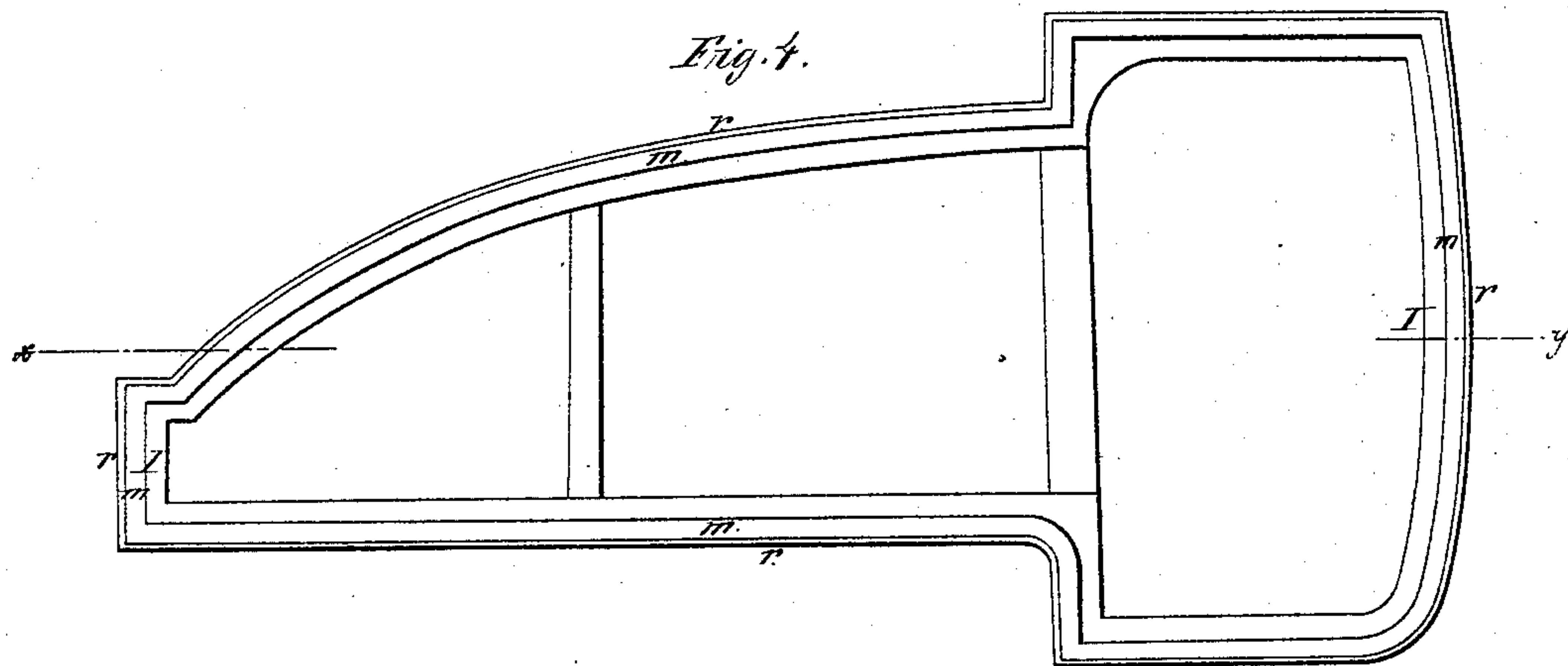
S. B. Driggs

2 Sheets - Sheet 2.

Piano.

N^o 13,942.

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UNITED STATES PATENT OFFICE.

SPENCER B. DRIGGS, OF DETROIT, MICHIGAN.

IMPROVEMENT IN PIANO-FORTES.

Specification forming part of Letters Patent No. 13,942, dated December 18, 1855.

To all whom it may concern:

Be it known that I, SPENCER B. DRIGGS, of the city of Detroit, in the county of Wayne and State of Michigan, have invented certain new and useful Improvements in Piano-Fortes; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a longitudinal vertical section of a square piano-forte in the line *xy* of Figs. 2, 3, and 4, the striking action being omitted. Fig. 2 is a plan of the interior of the case below the stringed part, which, as well as the action, is all supposed to be removed. Fig. 3 is a top view of my improved piano after the lid of the casing has been removed. Fig. 4 is a plan of what I call the "sounding-board frame," detached from the instrument. Fig. 5 is a transverse section of my improved piano. Fig. 6 is a full-sized section of one of the metallic saddles *n*, which are placed astride the sounding-board bridge *k* for the reception of the strings.

Similar letters of reference indicate corresponding parts in the several figures.

In the first place my invention consists in securing the sounding-board *H* within an independent metallic frame *I*, from which result the following advantages, viz: The sounding-board can be secured in said frame in such a manner that nearly its entire area will vibrate freely, a much thinner sounding-board can be used, and the requisite stiffness and vibratory power be given to it by making the board larger than the frame that receives it, and springing said board into its frame in such a manner as to cause it to swell upward before the strings are strained over it, by which the said board is rendered more sensitive to the vibration of the strings, and the possibility of its ever sagging is prevented; and, finally and most important, in consequence of securing the sounding-board within an inclosing metallic frame, I am enabled to construct a piano without using any wooden blocks or other wooden supports by combining the said sounding-board and its inclosing frame with an open metallic base-frame *B*, having upwardly-projecting ribs and uprights, and with the ordinary wrest-

plank and upper metallic frame or hitch-plate *D F* and a suitable outer casing.

In connection with the combination of the sounding-board and its inclosing frame with an open metallic base-frame, and with a rest-plank and upper metallic frame or hitch-plate, the second feature of my invention consists in combining the said open metallic base-frame with a shallow inclosing base-frame of wood and a thin bottom board confined only at its edges, substantially as represented in the accompanying drawings.

In connection with the inclosure of the thin sounding-board within a metallic frame, and the combination of said frame with the upper metallic frame, the wrest-plank, and the open metallic base-frame, the third feature of my invention consists in the combination of the said sounding-board with the thin bottom board of the instrument by means of a sounding-post, for the purpose of adding additional stiffness and vibratory power to both of said boards.

The fourth feature of my invention consists in supporting the strings upon metallic saddles which stride the sounding-board bridge and rest upon the said bridge and the sounding-board, by which I am enabled to make the said bridge narrower than usual and cause the vibrations of the strings to be more directly conducted to the sounding-board.

To enable those skilled in the art to make and use my invention, I will proceed to describe its construction and operation.

A A is a frame-work of scantling of about two to two and a half inches in depth and from four to six inches in width, occupying and filling the lower part of the case and serving to sustain the sides *aa* and bottom *b* thereof, which are secured to it by gluing or otherwise. The sides *aa* of the case are made of wood of about half ($\frac{1}{2}$) an inch in thickness with the grain running up and down. The bottom *b* is made of wood of about three-eighths ($\frac{3}{8}$) of an inch in thickness and should be put on so as to be slightly concave internally, said concavity being preserved by putting bars or ribs across it. It does not bear against the whole surface of the frame *A*, but against narrow strips *cc*, (see Fig. 1,) put between it and the said frame for the purpose

of allowing the bottom the greatest possible amount of vibrating surface. Between this vibrating bottom of the case and the sounding-board H, in a position directly under the sounding-board bridge *k*, I place a sounding-post *l*, of wood, for the purpose of enabling the vibrating bottom to aid the sounding-board to catch or meet the vibrations of the strings where they are short and so very rapid that the sounding-board can hardly feel them without such aid, as the vibrations of the strings cease before the sounding-board can give them much aid to produce tone and leave but a sort of husky echo instead of a prompt and purely musical sound.

To the frame A A is secured a cast-iron frame B B, which supports the wrest-plank C, the metallic hitch-plate D, and all the stringed part of the instrument. The iron frame B B, which fits snugly within the frame A A, is cast with transverse braces *d d*, running from back to front, and with oblique braces *e e*, running in the same directions as the strings. The part of the iron frame B fitting within the wooden frame A is made only of the same depth as the wooden frame, in order to allow room for the key-board and striking action above it; but under the wrest-plank it has raised arms *f f*, which form a continuation of the braces *e e*, and stand high enough to support and serve as a bed for the wrest plank and have room for the striking action above the framing A A B B, the said arms extending over the frame A A, so as almost to reach the left-hand end and back of the case. At the right-hand end of the case some of the braces *e e* extend over the frame A A, as shown at *f' f'*, and rise high enough to support the hitch-plate D. This cast-iron frame is secured to the frame A A by bolts *g g*, passing horizontally through the two.

The wrest-plank C is of the usual form and is covered by a top plate F, like the wrest-plank of many piano-fortes heretofore made, the said plate forming a continuation of the hitch-plate and being strengthened in front by a brace G, such as is commonly employed to resist the tension of the strings. The wrest-plank and top plate D F, the cast-iron frame B B, and the wooden frame A A are bolted together by bolts *h h*, passing through the whole.

By the above frame-work A A B B, I am enabled to sustain the tension of the strings without the solid heavy wooden bottom of the case and without the blocking which is usually employed, every portion of which absorbs some of the vibrations or tones evolved by the strings.

The sounding-board H is fitted to a light metal frame I, (shown in Figs. 1 and 4,) which is of proper form at the right-hand end to fit the interior of the case; but toward the left hand it narrows off to allow room for the hammers to rise between it and the wrest-plank to strike the strings. The form of this frame is best shown in Fig. 4; but its position

is shown in dotted outline in Fig. 3. It is supported at the right-hand end on a ledge *i*, (see Figs. 1 and 2,) secured to the side *a* of the casing and partly on the wrest-plank, and at the left-hand end it is supported by the wrest-plank. This frame I, which I call the "sounding-board frame," has a narrow raised rim *r*, within which the sounding-board is received, as shown in the section Fig. 1, and by which it is held with its upper side in a slightly convex condition when placed within the said rim. This convexity is not sufficient to be visible in a drawing unless drawn on a very large scale. By fitting the sounding-board to a frame in this manner to hold it in an arched form I am enabled to give any desired amount of stiffness without making it too thick or barring it to such an extent as is usual in piano-fortes heretofore constructed, which detracts from the brilliancy or deadens the tone of the instrument. The edges of the sounding-board are clamped by screws between this frame I and the top plate; but narrow strips of wood *m m* are placed round the edges of the sounding-board between it and both the top plate and sounding-board frame.

Another very important advantage resulting from the securing of the sounding-board within the metallic frame is that it enables the whole board to vibrate freely, with the exception of about the width of one inch from its extreme edge, whereas it is well known that sounding-boards secured in the ordinary manner by being glued to the blocks and to the front bar have their vibrating area reduced to the extent of one-fourth or one-fifth of the entire surface.

In order to connect the vibrations of the strings with those of the sounding-board more directly than it is possible to do by any of the plans now in use, I employ for the strings of each note a metallic saddle *n*, which strides over the sounding-board bridge K, and is secured both to said bridge and to the sounding-board by screws *o p* on both sides of the bridge in all except the extreme treble notes, where it is attached to the sounding-board only behind the bridge. This saddle has two transverse projecting ribs *s t* on its upper side, the strings passing from the hitch-pins through holes in the right-hand or back rib *s* and resting on and vibrating from the front or left-hand rib *t*. By the employment of these saddles all "side bearing" for the strings, which is indispensable to prevent rattling and jar with the ordinary mode of connecting the strings and sounding-board, is dispensed with. This side bearing I consider to be objectionable, as it acts as a spring whose power is applied at right angles to the power of the hammer, and thereby causes the string to have a circular motion when put in vibration, which greatly detracts from its power to act upon the sounding-board, as the vibrations to be fully effective should be in a direction perpendicular to the sounding-board. With the employment of the above

saddles I make the sounding-board bridge thinner and lighter than usual, particularly toward the base end.

By means of the thin shell-like case having no surplus wood to absorb the tones, the metallic frame for the bottom to aid in sustaining the tension of the strings and avoid the necessity of a quantity of wood blocking, the metallic frame for the sounding-board to prevent any wasting of the tones, the sounding-post to aid the vibrations of the sounding-board to meet those of the strings in the treble part, and the metallic saddles on the sounding-board bridge to connect the vibrations of the strings with those of the sounding-board more intimately, I am enabled to produce a continued vibration in the treble part of my piano-forte sufficiently prolonged to play a more perfect degree of harmony than has ever before been reached in any piano-forte. These several improvements all tend to one and the same object—viz., to produce more free, prompt, brilliant, and prolonged tones in all parts, particularly the treble of the instrument. These improvements are equally applicable to grand or upright piano-fortes, only varying the arrangement of the parts from that shown in the drawings as far as is rendered necessary by the difference in form between those and the square piano-forte.

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

1. Securing the sounding-board within a metallic frame or its equivalent, substantially in the manner and for the purpose herein set forth.

2. Combining the sounding-board and its

inclosing-frame with upward projections from an open metallic base-frame and with a wrest-plank and an upper metallic frame or hitch-plate, by which I am enabled to make a piano-forte without using wooden blocks or other wooden supports for the wrest-plank, sounding-board, and upper metallic frame, substantially as herein set forth.

3. In connection with the combination of the upward projections from the open metallic base-frame with the metallic sounding-board frame, the wrest-plank, and the upper metallic frame, combining a thin bottom board with a shallow wooden frame which incloses the said open metallic base-frame, substantially as herein set forth.

4. In connection with the inclosure of the thin sounding-board within a metallic frame and the combination of said frame with the upper metallic frame, the wrest-plank, and the open metallic base-frame, the combination of the said inclosed sounding-board with the thin bottom board of the instrument by means of a sounding-post, for the purpose of adding additional stiffness and vibratory power to both of said boards, substantially as herein set forth.

5. Supporting the strings upon metallic saddles which stride the sounding-board bridge and are combined with said bridge and with the sounding-board, substantially in the manner and for the purpose herein set forth.

SPENCER B. DRIGGS.

Witnesses:

S. H. WALES,
I. G. MASON.