

(No Model.)

2 Sheets—Sheet 1.

B. B. BRADBURY.

PIANO.

No. 328,566.

Patented Oct. 20, 1885.

Fig 1

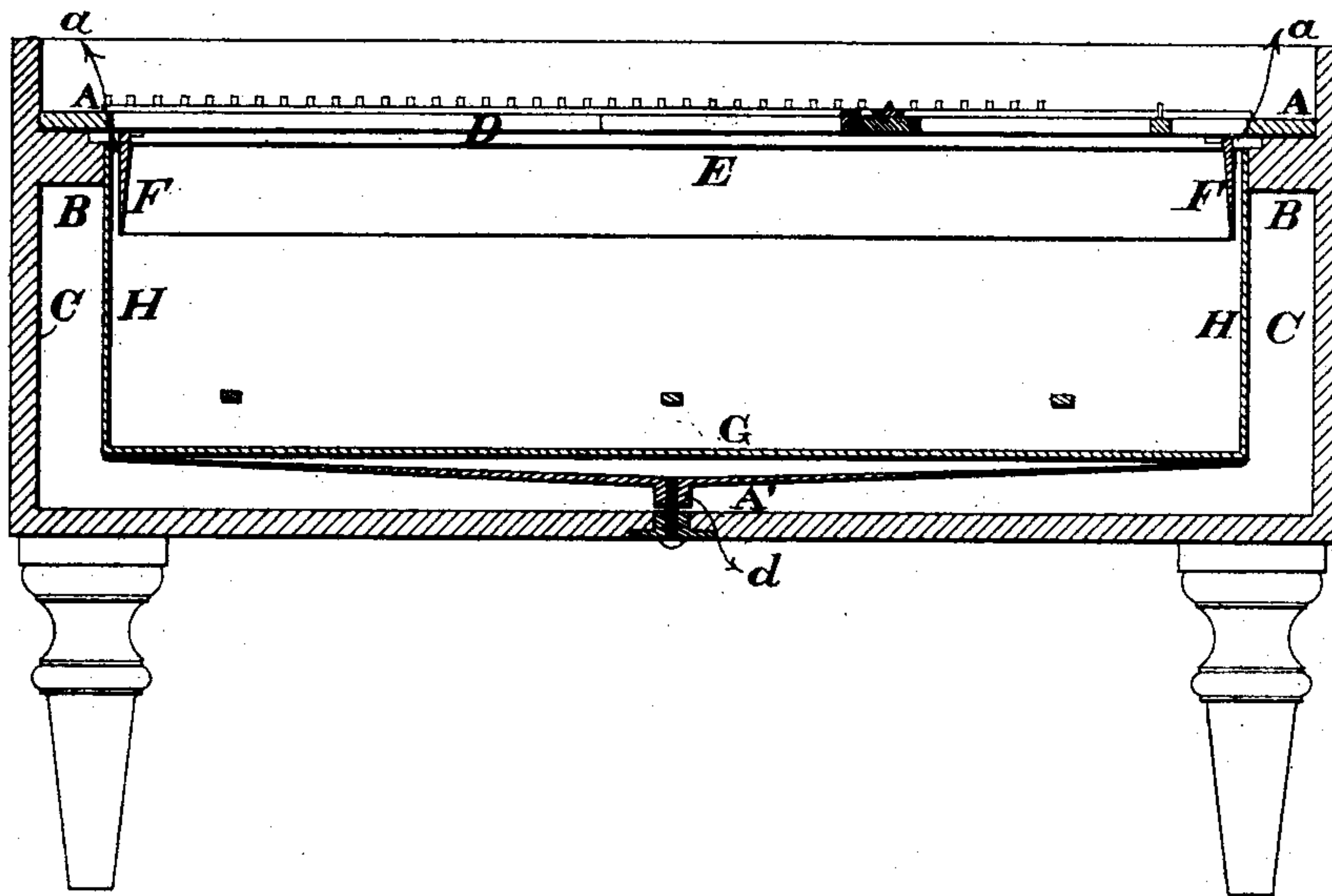
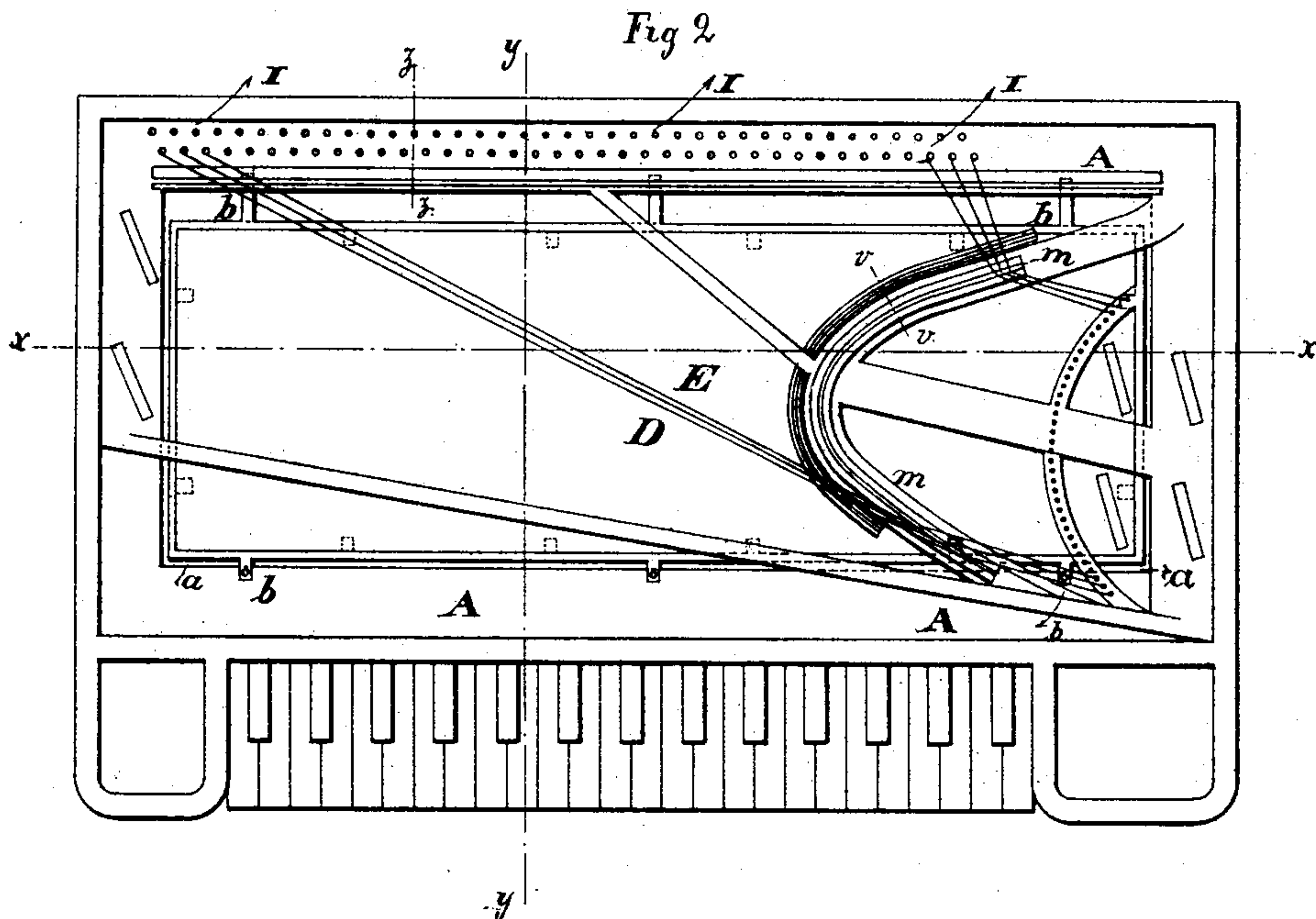


Fig 2



WITNESSES:

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SPECIFICATION forming part of Letters Patent No. 328,566, dated October 20, 1385.

Application filed February 20, 1884. Serial No. 121,457. (No model.)

To all whom it may concern:

Be it known that I, BENJAMIN B. BRADBURY, of the city, county, and State of New York, have invented an Improvement in Pianos, of which the following is a specification.

The object of this invention is to increase the volume of sound and fullness and richness of tone in pianos, and also to facilitate the delicate and accurate tuning of pianos and instruments of like character, and also to more fully insure the permanence of the strings of such instruments at the requisite tension when tuned. The said invention comprises certain novel combinations of parts whereby these objects are fully accomplished.

Figure 1 is a longitudinal vertical sectional view of a piano made according to my invention, said view being taken in the line *x x* of Fig. 2, said Fig. 2 being a plan view of said piano with the top removed. Fig. 3 is a vertical transverse sectional view of the same taken in the line *y y* of Fig. 2. Fig. 4 is a detail sectional view on a larger scale, taken in the line *z z* of Fig. 2, illustrating one feature of my said invention; and Fig. 5 is a similar view illustrating a modification of said feature. Fig. 6 is a sectional detail view, also on a larger scale, taken in the line *v v* of Fig. 2, and illustrating another feature of my said invention.

A is the frame, and B the wrest plank, of a piano, supported in the usual or any suitable manner within the usual casing or box, C. The strips D are arranged upon the frame A, and, except in the matters hereinafter particularized, in the usual relation and position thereon.

E is a sounding-board, which is placed below the strings at the usual or any suitable distance therefrom; but this sounding-board differs from the common sounding-board in being circumferentially isolated from the surrounding parts of the piano by a space or interval, as shown at *a* in Figs. 1, 2, and 3, the said sounding-board being held in this position by fixed studs or brackets *b*, which extend from the surrounding portions of the frame or wrest-plank, as the case may be, across the space or interval *a*. Projecting downward from the circumference of this sounding-board is a rim, F, which is preferably made of metal. G is a

secondary sounding-board, which is placed below the sounding-board E, as shown in Figs. 1 and 3. This secondary sounding-board G is attached to the lower edge of a circumferential shell, H, the upper edge of which is fixed, as, for example, to the wrest-plank B, as shown in Figs. 1 and 3, in immediate neighborhood to the sounding-board E, but outside of the rim F, and with a space, *c*, between itself and said rim.

Below the secondary sounding-board G is what I term a "resonator," A', and which consists of a sheet of metal thinned from its center to its edges and curved in its cross-section, as shown in Fig. 3, and in its longitudinal section, as shown in Fig. 1, the thickness of the metal at the center of said resonator being, say, one-fourth of an inch, (more or less,) the thickness diminishing toward the circumference, until at the latter it may approach a knife-edge. This resonator is supported in position by any suitable means at its center—as, for example, a screw in the bottom of the case C working into a boss, *d*, at the center of the resonator.

I are the straining-pins, by means of which the requisite tension is given to the strings in tuning the same. These straining-pins, instead of being passed through the frame A and screwed into the wrest-plank B, are screwed into the frame A direct. By this means the whole of the strain of the strings is borne by the frame, thereby relieving the wrest-plank from strain and permitting the said plank, together with the casing or box C, to be made much lighter than has heretofore been considered feasible. In order to prevent the yielding or backward turning of the straining-pins from the tension of the strings, said tension-pins are so constructed and provided with such accessories as to hold them in position as against such tension of the strings. Said pins may be solid, as shown in Fig. 4, and provided with a jam-nut, *f*, as shown in Fig. 4, so that by turning said nut hard upon the surface of the frame the pin will be held from turning; or the pins may be tubular, as shown in Fig. 5, with a broad-headed screw, *g*, passed downward through the tubular pin into the wrest-plank below with the broad head of the screw *g* jammed snug upon the top of the

pin, to act in the same manner as a jam-nut, to prevent the backward turning of the pin.

To provide for the more accurate tuning of the strings and the more permanent retention of the strings at the requisite tension, there is provided between the straining-pins and the sounding-board immediately below the strings an upwardly-projecting rib, in which are horizontal holes corresponding in number with the strings, and through which the strings are passed with their upper sides bearing against the upper sides of said holes, said rib thus placed and constructed for use being designated, for convenience of reference herein, as the "clamp" *m*. At the inner side of this clamp *m*, at a slight distance therefrom, and of corresponding or parallel curvature or shape, is a horizontal steel rod, cylindrical in its cross-section, and which I designate as the "bridge" *n*. This bridge *n* may be placed in a semicircular groove provided for its reception, as shown in Figs. 4, 5, 6. When desired, the clamp *m* and bridge *n* may be provided on the frame, as shown in Figs. 4 and 5; or, as is preferred, for the practical advantage of adjustability, the clamp may be made in a separate piece with lateral flanges *a'*, through which screws *r* are passed to attach it to the frame in such manner that it can be raised or lowered to adjust its straining effect upon the strings in their relation with the bridge *n*, the latter being in this case placed upon the sounding-board.

In the operation of a piano constructed with the several features of my said invention the sounding-board *E*, being isolated and suspended apart from the adjacent portions of the apparatus, vibrates without interference, and transmits its vibrations to the adjacent atmosphere without diminution. The rim *F* transmits the said vibrations in a downward direction, and measurably concentrates them upon the secondary sounding-board *G*, which adds the effect of its own vibrations to that of the upper sounding-board. The shell *H* not only serves to suspend the secondary sounding-board *G* in position, but also prevents the scattering of the vibrations below the rim *F*. The resonator *A'*, receiving vibrations transmitted from the secondary sounding-board above, adds the volume of sound from its own vibration or metallic resonance to that of the sounding-boards above. Said sounding-boards are designed to be made of wood of the kinds usually employed for sounding-boards in musical instruments. Suitable openings should be made in the sides of the casing or box *C* of the piano, in order to ad-

mit the requisite quantity of air to the sounding-board, resonator, &c.

The key-board, mechanism for actuating the strings, &c., in playing the instrument being of any ordinary or suitable kind or construction, need not be detailed here, their application and arrangement requiring only good mechanical judgment and such knowledge as is common in the art to which my said invention relates.

What I claim as my invention is—

1. In combination with the case or frame, the wrest-plank and the strings of a piano, the suspended and isolated sounding-board *E*, circumferential downwardly-depending rim *F*, and means for suspending said sounding-board below the strings, substantially as and for the purpose herein set forth.

2. In combination with the strings, the sounding-board, and inclosing case or frame of a piano, the independent secondary sounding-board *G*, circumferentially isolated from the upper sounding-board, substantially as and for the purpose herein set forth.

3. In combination with the strings, the sounding-board, and inclosing case or frame of a piano, the shell *H*, and secondary sounding-board *G*, said shell and secondary sounding-board being circumferentially isolated from the upper sounding-board, substantially as and for the purpose herein set forth.

4. The combination, with the strings, the sounding-board, and inclosing case or frame of a piano, of the suspended and isolated sounding-board *E*, having the circumferential depending rim *F*, the secondary sounding-board *G*, and the shell *H*, said secondary sounding-board and the shell being circumferentially isolated from the upper sounding-board, and the whole constructed and arranged for joint use and operation, substantially as and for the purpose herein set forth.

5. The combination, with the strings and sounding-board of a piano, of the secondary sounding-board *G*, the shell *H*, and metallic resonator placed below the secondary sounding-board, substantially as and for the purpose herein set forth.

6. The combination, with the strings and frame of a piano, of the tubular straining-pins *I*, and tightening-screws for preventing the turning of said straining-pins from the tension of the strings, substantially as and for the purpose herein set forth.

BENJAMIN B. BRADBURY.

Witnesses:

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