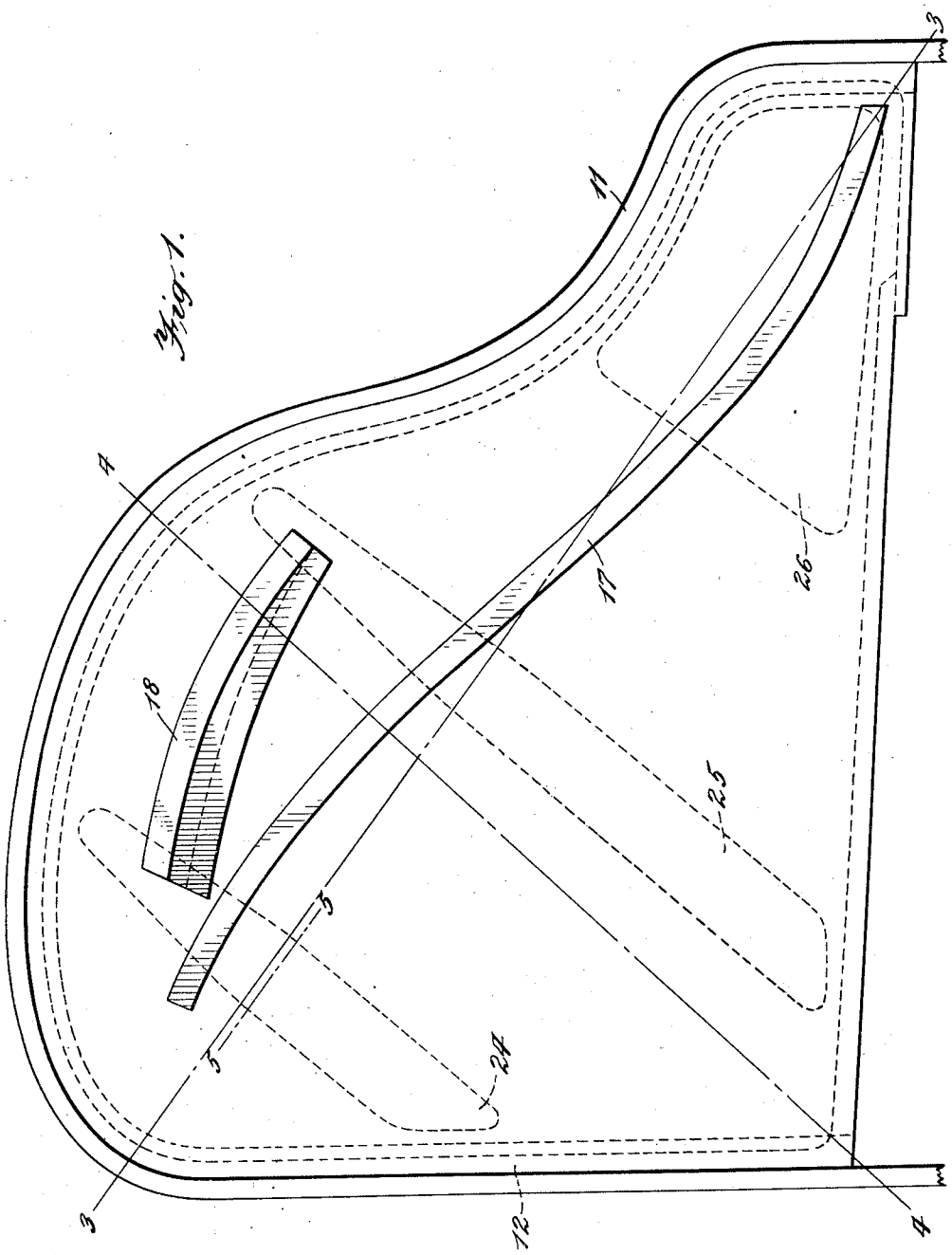
May 10, 1949. J. SAUERLAND 2,469,522

PIANO SOUND BOARD

Filed Feb. 7, 1945 3 Sheets-Sheet 1



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PIANO SOUND BOARD

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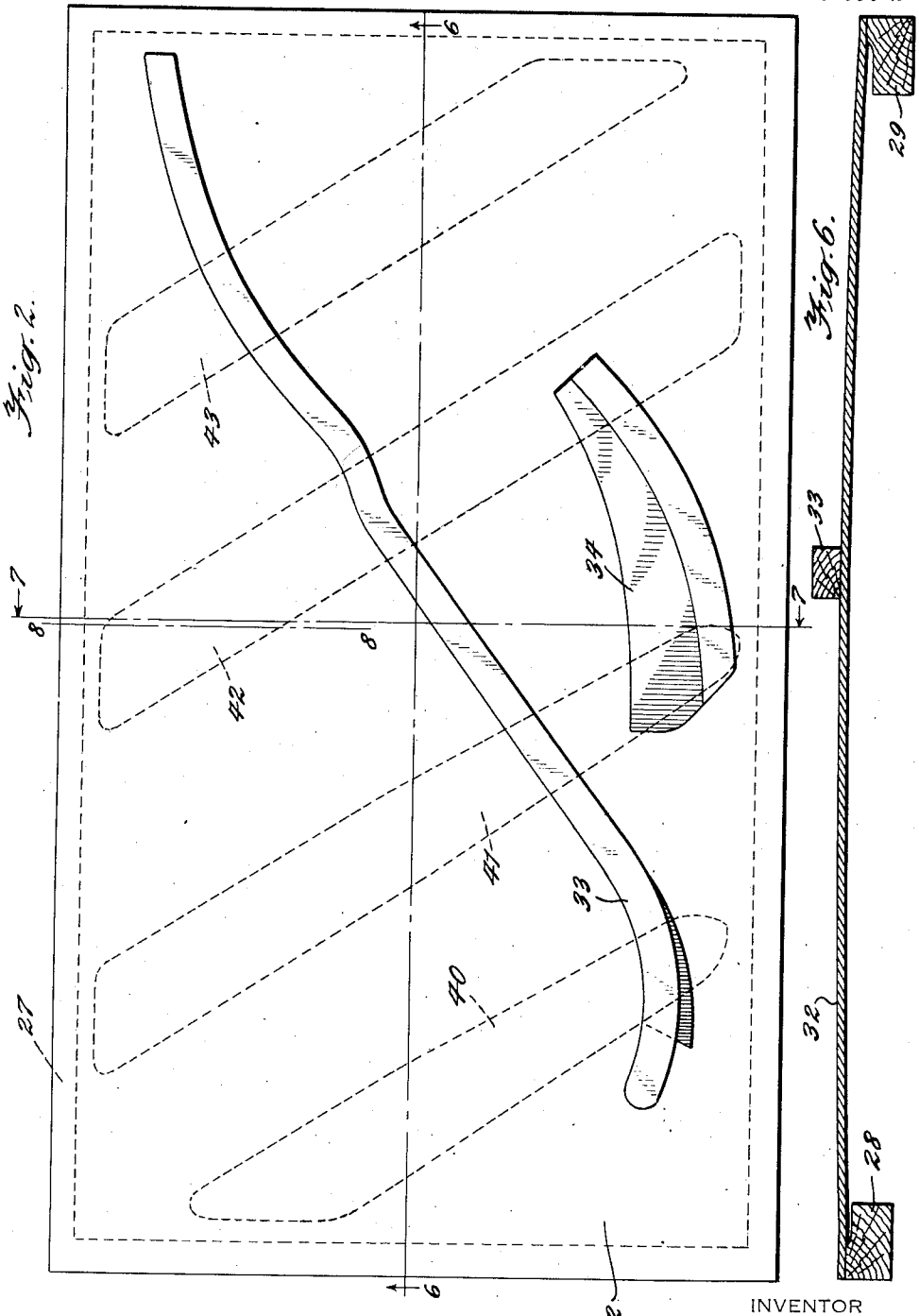


Fig. 2.

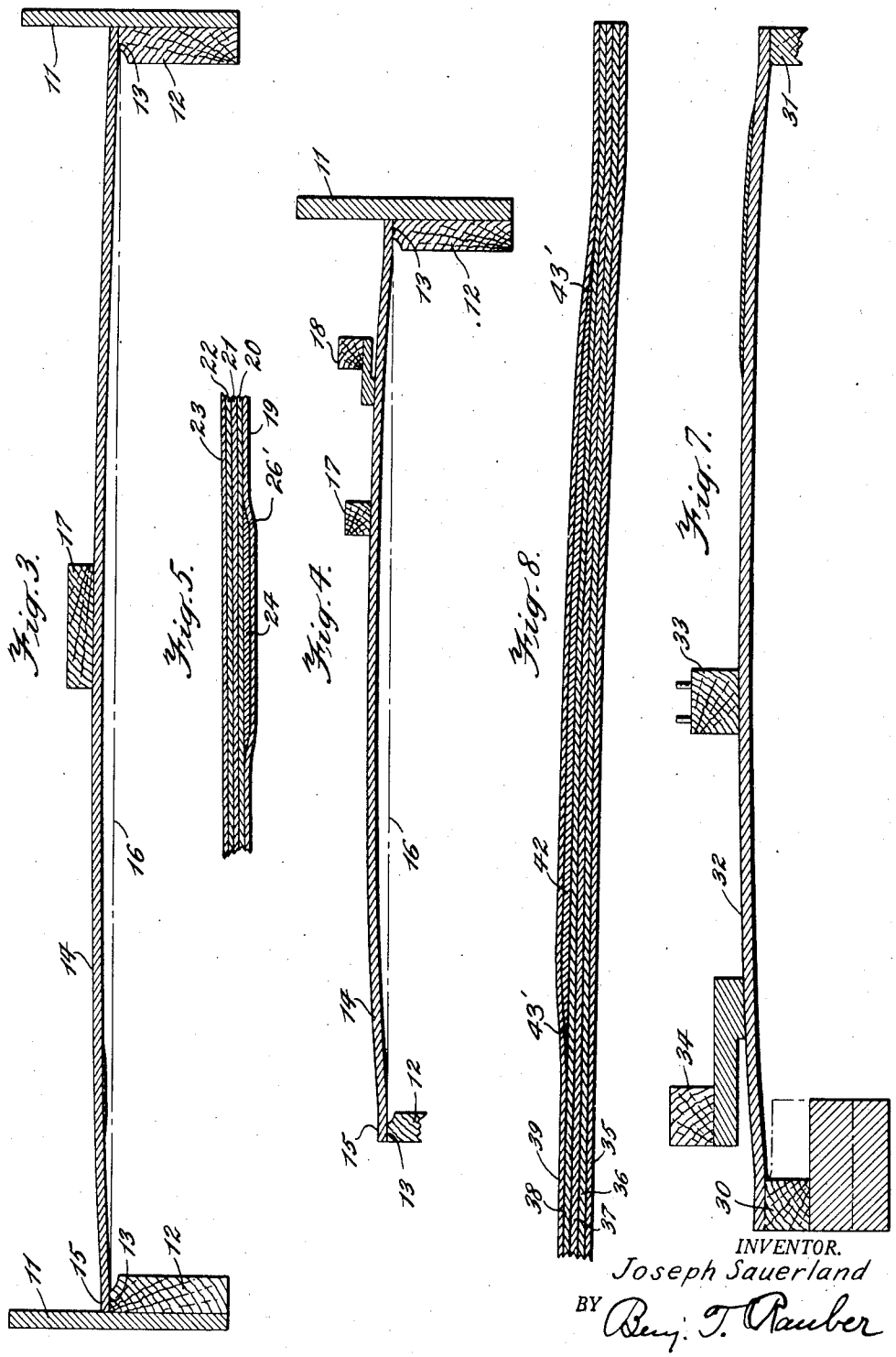
Fig. 6.

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PIANO SOUNDBOARD

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Application February 7, 1945, Serial No. 576,518

9 Claims. (Cl. 84—192)

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My invention relates to improvements in sound board constructions for pianos.

Heretofore the sound board of pianos has been made of a number of strips of wood glued side by side and also secured by gluing onto transverse ribs. These sound boards were slightly crowned convexly toward the strings and were mounted on a suitably beveled supporting liner or frame. This construction resulted in heavy and bulky sound boards which added considerably to the bulk of the piano, also imposing limitations on the responsiveness of the board to the vibrations of the strings.

My present invention provides a relatively lighter, thinner sound board of adequate strength, which may be made more responsive to vibrations imparted to it by the strings and bridge. It may also be mounted on posts or liners which need not be beveled to correspond to the crown of the board, and it is also less affected by changes in moisture or humidity.

In my present invention a sound board is constructed of a number of plies, as for example five or more, superposed and glued together with the grain of the successive plies alternating or crossing. The outer or marginal edge of the board is supported on the surface of a supporting liner or frame which may be in a flat plane. The marginal edge of the asembly of plies is correspondingly flat where it rests on the supporting frame or liner and arches convexly toward the strings in the area within the supporting margin. Additional stiffening or strengthening plies may be interposed in the plywood structure at limited areas, determined by the tonal requirements of the board. The treble and base bridges are mounted on the crowned surface of the board in their usual positions. With this construction the grain of the plies runs in both directions, that is at substantially right angles and imparts sufficient strength and rigidity in all directions, thus eliminating the use of strengthening ribs. Also the cross graining of the wood renders the sound board more resistant to changes in temperature and humidity conditions and to splitting.

The various features of the invention are illustrated, by way of example, in the acompanying drawings in which

Fig. 1 is a plan view of a grand piano case and sound board embodying a preferred form of the invention, the key-board, strings and hammer mechanism being omitted for the sake of clearness in illustration;

Fig. 2 is a front elevation of an upright piano embodying the invention, the strings and key-board mechanism being omitted;

Figs. 3 and 4 are sections taken on lines 3—3 and 4—4 of Fig. 1;

Fig. 5 is a section on a larger scale taken on line 5—5 of Fig. 1;

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Figs. 6 and 7 are sections taken on lines 6—6 and 7—7 of Fig. 2;

Fig. 8 is a section on a larger scale taken on line 8—8 of Fig. 2.

Referring more particularly to Figs. 1, 3, 4 and 5 of the drawings, the sound board of my invention is illustrated as mounted in a grand piano case 11 and supported on a liner or supporting frame 12 which conforms to the shape of the case and encloses the area of the sound board.

The upper surface of the liner 12 is on a flat horizontal plane as indicated at 13. The sound board 14 of my invention has a flat peripheral margin 15 in one plane to be mounted directly on the upper flat surface of the liner 12 and is crowned convexly upwardly from the plane as indicated at 16, Figs. 3 and 4. A treble bridge 17 and a base bridge 18 are mounted on the upper surface of the sound board.

The sound board is made of a number of plies, five plies, 19, 20, 21, 22 and 23, being shown by way of example. The grain of the outer plies 19 and 23 and of the middle ply 21 runs transversely or at a right angle to the general length of the treble bridge 19, and the grain of the plies 20 and 22 is at a right angle to that of the plies 19, 21, 23. Thus the board is strengthened in both directions.

It will be understood that any number of plies may be employed, but that in general an uneven number will be employed with the grain of the two outer plies transverse to the general length of the treble bridge.

The board may be arched to any desired extent at any area of the sound board to give a selected rigidity and tonal quality. Also additional plies may be interposed in the plywood construction at selected intervals as indicated at 24, 25 and 26 and as shown in Fig. 5 to increase the strength, rigidity or stiffness at selected areas of the sound board. The edges of the interposed strips 24, 25 and 26 may be beveled or feathered as shown 26' in Fig. 5 to enable them to be smoothly built into the structure between the outer and intermediate plies.

The flexibility of the plies during their assembly and until they have been glued together enables any desired convexity to be given at any selected area or areas.

In the form of the invention shown in Figs. 2, and 6 to 8, in which the invention is adapted to an upright piano, the sound board may be made of a rectangular shape with a flat peripheral margin 27 which may be glued or otherwise secured to the upright posts 28 and 29, Fig. 6, and to the horizontal beams 30 and 31 of the piano case.

The area within the border margin is bowed convexly forwardly or toward the strings as indicated at 32 in Figs. 6 and 7. A treble bridge 33 and a base bridge 34 are mounted on the convex side

of the sound board. The grain of the two outer plies is preferably transverse or at a right angle to the general length of the bridges **33** and **34** and may run approximately vertical.

The sound board is built up of a number of superposed plies **35**, **36**, **37**, **38** and **39** with the grain of the plies running alternately in positions at right angles to adjacent plies. A number of plies **40**, **41**, **42** and **43** may be interposed between the plies of the sound board as shown in Figs. 2 and 3. The edges of these inserts are beveled or feathered as at **43'** as in the case of the grand piano sound board to give a substantially smooth outer surface.

In the sound board of my invention strength and uniformity are provided together with lightness and thinness and it is possible to control the arching or convexity of the board with great exactness. The cross graining of the several plies provides equal strength in all directions making it unnecessary to employ any supporting ribs as in the usual sound board. Also by using the inserts the sound board may be strengthened or stiffened in any desired areas to provide whatever tone effects may be required in accordance with the lengths of the strings and the frequency of vibration.

By having the marginal edge of the plywood in a flat plane it may be mounted directly on the structure of the casing, eliminating the necessity for liners and permitting the thickness of the piano to be correspondingly reduced, a feature that is of value particularly for upright pianos.

What I claim is:

1. A piano sound board of superposed plies of wood of substantially uniform thickness arched convexly upwardly from a marginal border and a string supporting bridge on the convex upper surface of the board, the concave undersurface of said board being free and unobstructed.

2. A piano sound board of superposed plies of wood of substantially uniform thickness glued to an integral structure with the grain of one ply transverse to the grain of adjacent plies, said board being arched convexly upwardly from a marginal border, strengthening plies interposed at selected areas of said board and a string supporting bridge on the convex upper surface of said board, the undersurface of said board being free.

3. A piano sound board of superposed plies of wood of substantially uniform thickness glued in an integral structure, the grain of one ply being transverse to that of adjacent plies, said sound board being arched convexly upwardly, the marginal border being flat and in a single plane, the undersurface of said board being free.

4. A piano sound board of superposed plies of wood of substantially uniform thickness glued in an integral structure, the grain of one ply being transverse to that of adjacent plies, said board having a substantially flat border margin and being arched convexly upwardly in the area within said border margin.

5. A piano sound board of superposed plies of wood of substantially uniform thickness glued in an integral structure with the grain of one ply transverse to the grain of adjacent plies and having ply inserts at limited areas, said board being arched convexly upwardly and having a flat border margin and a string supporting bridge on the upper surface of said board and transverse to the grain of the uppermost ply.

6. An upright piano having vertical and horizontal beams the front faces having a flat surface, a sound board having a flat margin secured to said flat surface of said beams and arched convexly away from said beams, said sound board superposed plies of wood of substantially uniform thickness glued in an integral structure with the outermost plies running approximately vertically and intermediate plies alternately horizontally and vertically, and a string supporting bridge on the convex surface of said sound board the concave surface of said board being free.

7. An upright piano having vertical and horizontal beams the front faces having a flat surface, a sound board having a flat margin secured to said flat surface of said beams and arched convexly away from said beams, said sound board comprising superposed plies of wood of substantially uniform thicknes glued in an integral structure with the outermost plies running approximately vertically and intermediate plies alternately horizontally and vertically, a string supporting bridge on the convex surface of said sound board the concave surface of said board being free, said sound board having reinforcing inserts interposed between said plies at selected parts of said convex area.

8. A grand piano having a case, a supporting liner secured to said case and having a flat upper surface in one plane, a sound board having a flat border margin mounted on the upper surface of said liner and arching upwardly therefrom, said sound board comprising superposed plies glued in an integral structure with the grain of one ply being transverse to that of adjacent plies, the under concave surface of said sound board being free and unobstructed.

9. A grand piano having a case, a supporting liner secured to said case and having a flat upper surface in one plane, a sound board having a flat border margin mounted on the upper surface of said liner and arching upwardly therefrom, said sound board comprising superposed plies glued in an integral structure with the grain of one ply being transverse to that of adjacent plies, the under concave surface of said sound board being free and unobstructed and reinforcing plies of limited area interposed in said plywood to strengthen said sound board at limited parts of said concave area.

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Certificate of Correction

Patent No. 2,469,522. May 10, 1949.

JOSEPH SAUERLAND

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows:

Column 4, line 7, claim 6, after the word "board" insert *comprising*;

and that the said Letters Patent should be read with this correction therein that the same conform to the record of the case in the Patent Office.

Signed and sealed this 4th day of October, A. D. 1949.

[SEAL]

THOMAS F. MURPHY,
Assistant Commissioner of Patents.

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