No. 874,299. PATENTED DEC. 17, 1907.

G. CADDICK.

PIANOFORTE.

APPLICATION FILED MAY 26, 1906.

2 SHEETS—SHEET 1.

Fig.1.

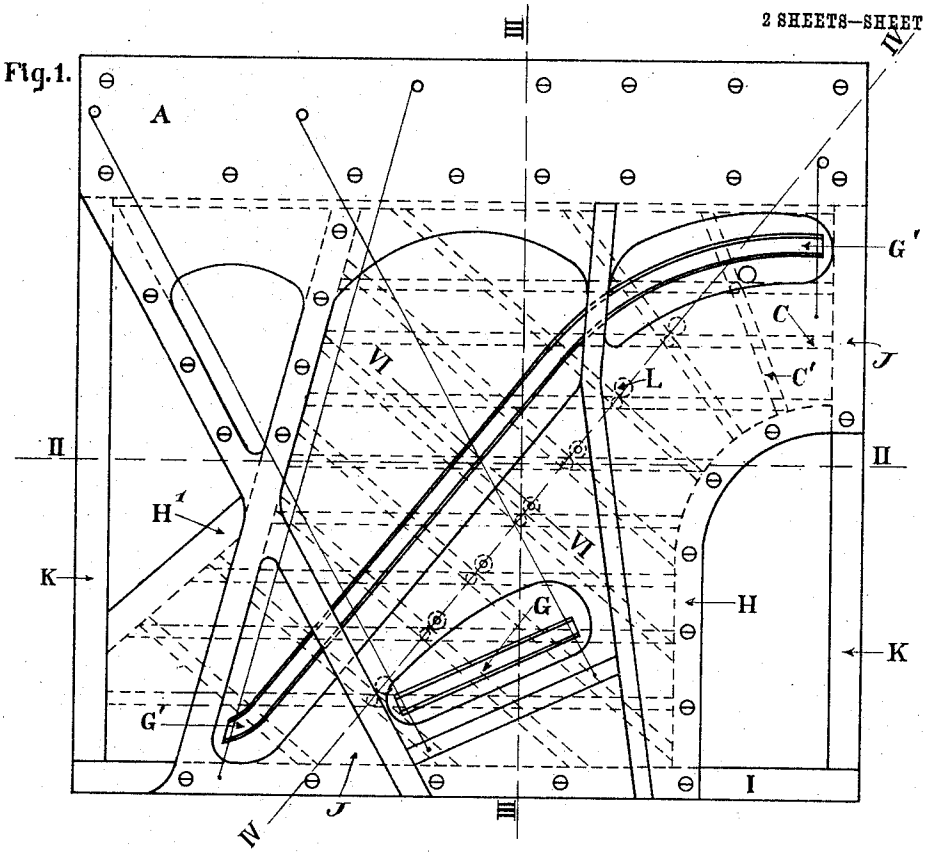


Fig.2.

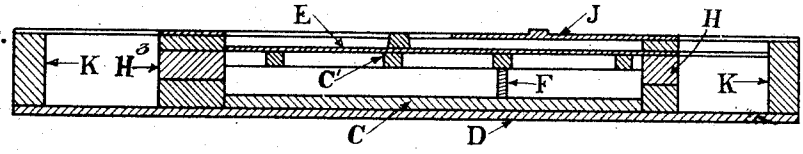


Fig.3.

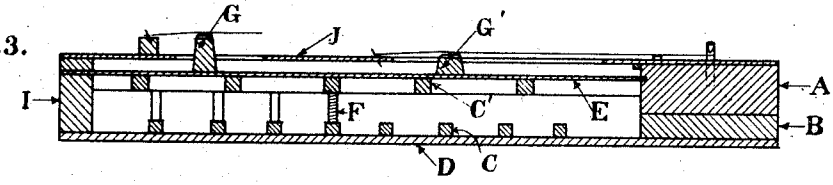
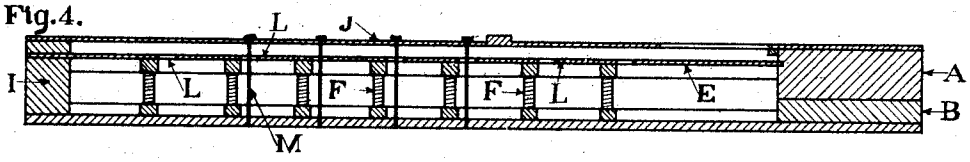


Fig.4.



WITNESSES

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2 SHEETS—SHEET 2.

Fig. 5.

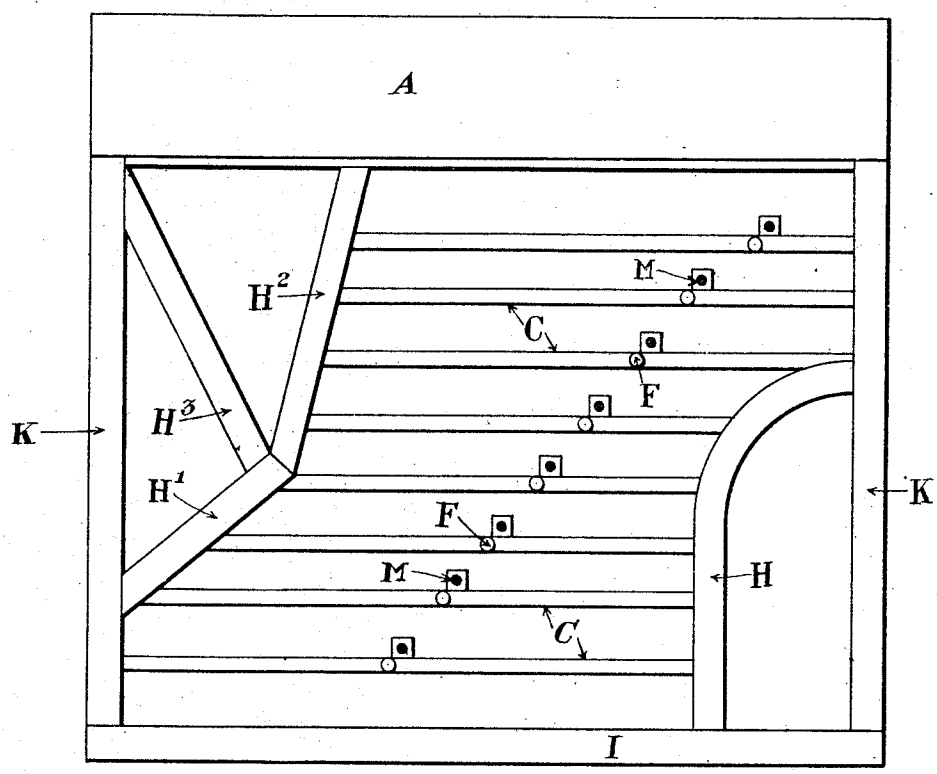
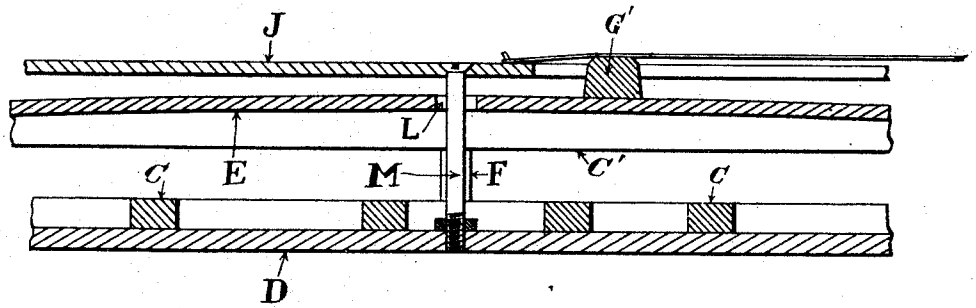


Fig. 6.



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UNITED STATES PATENT OFFICE.

GEORGE CADDICK, OF ALLEGHENY, PENNSYLVANIA.

PIANOFORTE.

No. 874,299. Specification of Letters Patent. Patented Dec. 17, 1907.

Application filed May 26, 1906. Serial No. 318,968.

To all whom it may concern:

Be it known that I, GEORGE CADDICK, of the city of Allegheny, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Pianofortes, of which the following is a full, clear, and exact description.

My invention relates to improvements in piano fortes, and it has for its objects to stiffen the construction of the frame and to provide an improved sound board construction having the features of advantage hereinafter described, together with other detailed improvements, as shall be more fully set forth.

Referring to the drawings, Figure 1. is a view in front elevation of the body portion of an upright piano. Fig. 2. is a cross section thereof on the line II. II. of Fig. 1. Fig. 3. is a vertical sectional view on the line III. III. of Fig. 1. Fig. 4. is a diagonal sectional view on the line IV. IV. of Fig. 1. Fig. 5. is a face view of the interior of the frame, showing the ribs, sound posts and bracings, the belly sound board and metal plate having been removed. Fig. 6. is an enlarged sectional detail view indicated by the line VI. VI. of Fig. 1 showing the supporting post, securing bolt and the bridge construction, also the curved line of bellying of belly sound board.

The main supporting members of the framework consist of a base member or plank piece I, end posts K, K, vertically arranged at each end of the plank piece, and an upper strengthening wrest plank A which, with a back piece B placed upon the wrest plank and with the posts K, K, at each end, complete the rectangular frame.

The entire back of the structure is covered by the back sound board D, which is preferably made of maple wood of a suitable thickness, say one-half inch or more for stiffening purposes, the grain of the wood running up and down or at right angles to the grain of the wrest plank A.

At one side of the frame I insert a vertical brace H extending upwardly from the plank piece I, curving outwardly as shown in Fig. 1, and joined to the inner side of the post K at the same side, the general shape of said brace H conforming to the outline of the outer or belly sound board E and of the metal plate J. At the other side are similar bracing members H^1, H^2 and H^3, the brace H^1 extending upwardly and inwardly from the opposite side post K; the brace H^2 extending downwardly and outwardly from the wrest plank A and being joined with brace H'; while the intervening brace H^3 extends downwardly and inwardly from the upper left hand corner of the frame at the juncture of post K and the wrest plank A and its companion plank B; all of said braces H^1 H^2 and H^3 being joined together at their meeting point, as clearly shown in Figs. 1 and 5.

It will be understood that the back sound board is solidly glued to all of the afore-described main members of the frame and braces, and as thus constructed it constitutes a very stiff, unyielding structure, counteracting any of the usual torsions or strains to which the instrument is ordinarily subjected and providing a very strong unyielding construction. This latter feature *i. e.* the mounting of the back sound board is one of considerable importance and advantage in that it provides the desired stiffness entirely independent of the ordinarily used numerous vertical posts of a back frame which are commonly employed in pianos of this type. It also provides convenient means for attaching the belly sound board and metal plate in the manner hereinafter described.

C represents a series of transversely laid ribs, of the back sound board, extending entirely across between the vertical posts K, K, and the inside braces H, H^1, and H^2, as clearly shown in Fig. 5, upon which are set the sound posts F, either directly upon said ribs before the belly sound board is adjusted and located, or afterwards through the openings therein in the manner hereinafter described.

m represents a series of reinforcing abutments for receiving the securing bolts, which abutments are preferably of wood and glued directly upon the inner face of the maple back sound board D, and against the edges of the ribs C.

E is a belly sound board, made of regular sound board wood as white or spruce pine, which is provided on its under surface with a series of diagonally laid ribs C^1, shown in dotted lines in Fig. 1 and in cross section in the various sectional views Figs. 2, 3 and 4, which ribs are securely glued upon the back of the belly sound board and which as shown cross the back sound board at an acute angle

thereto. On the cross juncture of said ribs I insert the sound posts F, through the openings L which perform the double function of acting as sound holes, and also permit of the insertion of the posts F into position after the belly sound board is located in place. It will be observed that the sound holes L are considerably larger than the diameter of the sound posts F whereby they may be readily inserted therethrough.

It will be understood that the belly sound board is arched or bowed outwardly in the usual way, as shown in Fig. 6 of the drawings, which construction will be readily understood by the skilled piano builder.

G is the bridge for the bass strings, glued directly upon the belly sound board, while G^1 is the bridge for the treble strings, likewise glued upon the belly sound board, both of said bridges being located as shown in Fig. 1 in the manner usually adopted in piano fortes for suitable arrangement of the strings.

J is the outer metal plate which is bolted or screwed down firmly upon the wrest plank A at the top, the plank I at the bottom, the end posts K, K, and to the inner braces H, H^2 and H^3, as clearly shown in Fig. 1. Such bolting of the iron plate to the frame and braces solidly connects all of the main parts of the structure together, giving great strength and stiffness to the structure inclosing the sound chamber.

M are a series of bolts passing down through the metal plate J, through the sound holes L, and screwed into the back sound board D as clearly shown in Figs. 4 and 6, whereby the structure is further solidly connected and the metal plate rigidly held in position. It will be noted that the bolts M being located closely adjacent to the series of treble hitch pins stiffen and support the iron plate against any tendency to up-lift by the strings which pass over the bridge at an elevation above the plane of the iron plate and the bolts being screwed into the back sound board hold up the bridge and the belly sound board through the posts against the downward pressure of the strings and prevents any deflection of the back sound board.

As thus made and connected the entire structure is very stiff and unyielding, providing for the necessary vibration of the sound boards inclosing the sound chamber; imparting great strength to the parts requiring stiffness and rigidity, while greatly increasing the acoustic qualities of the piano. The mass of air contained in the sound chamber is positively put into vibration with the strings of the instrument; the strings are put in vibration by the blow of the hammers and carry the tone to the bridges, to the belly sound board, and through the sound posts to the back sound board, and to the mass of air within the sound chamber.

The various connecting bolts M, by their mounting in the metal plate J, prevent the back sound board from sinking, they counterbalance the outward lift of the strings on the metal plate, they oppose the backward pressure of the sound posts under the belly sound board, and maintain the outwardly bowing tendency thereof, thereby augmenting the tone. The location of the sound posts, putting the two sound boards into communication immediately back of the hitch pins, tends to steady the tone and bring the sound boards to a state of rest along the line of connection with the sound posts.

A particular advantage of making the back sound board of maple wood and having the various braces glued upon it, is that it prevents the piano from pulling out of square, while the back sound board being thicker than the spruce pine of the belly sound board, has a higher normal tone. By such judicious employment of different woods and the thickness thereof, I attain that blending of tone color which is so desirable in a piano forte.

The advantages of my invention will be readily appreciated by all those familiar with the piano building art and the features of the invention may be employed in pianos of different construction or design, as a grand piano, while the invention may be greatly changed or varied by the skilled mechanic to suit different conditions of use, but all such advantages are to be considered as within the scope of the following claims.

What I claim is:

1. In a piano forte, the combination of a main rectangular frame, inner bracing members located at diagonally opposite portions of the frame extending from the back to the front thereof and partially defining the outline of the intervening sound chamber, and a back board and a front board secured on opposite sides respectively of said frame, substantially as set forth.

2. In a piano forte, the combination with an upright main rectangular frame, a back board and a front board secured thereon and inclosing an intervening sound space, of an inner bracing member extending through the sound space and partially defining the edge thereof, projecting upwardly from the base and then outwardly to the side post of the main frame and joined to said base and side post, substantially as set forth.

3. In a piano forte, the combination with a main rectangular frame provided with an upper wrest plank, side-posts and a base with back and front boards secured thereon; of an inner bracing member extending through the sound space and partially defining the edge thereof, projecting downwardly from the wrest plank and outwardly to the side post,

with an intervening diagonal brace, said bracing members being joined to the main frame, substantially as set forth.

4. In a piano forte, the combination with the back and belly sound board, the outer side pieces, the wrest plank, the inner diagonally arranged braces extending across one corner, the inner vertically arranged outwardly curved brace at the diagonally opposite corner, and the base piece; of the outer metal plate bolted to the wrest plank and to the base piece and to said inner braces, substantially as set forth.

5. In a piano forte, the combination of a main frame, a back sound board secured upon the frame and provided with a series of inner ribs, a belly sound board provided with a series of inner ribs disposed angularly across the back sound board ribs, and sound posts secured to said ribs at their crossings, substantially as set forth.

6. In a piano forte, the combination of a main frame, a back sound board secured upon the frame and provided with a series of inner ribs, a belly sound board provided with a series of sound holes and a series of inner ribs disposed angularly across the back sound board ribs, and sound posts secured to said ribs at their crossings, substantially as set forth.

7. In a piano forte, the combination of a main frame, a back sound board secured upon the frame and provided with a series of inner ribs, a belly sound board provided with a series of sound holes and a series of inner ribs disposed angularly across the back sound board ribs, the outer metal plate sound posts secured to said ribs at their crossings, and a corresponding series of stiffening bolts engaging the metal plate passing through the sound holes adjacent to the posts and secured to the back sound board, substantially as set forth.

8. In a piano forte, the combination with the back sound board provided with inner ribs and the belly sound board provided with inner ribs arranged crosswise of said ribs, and having an outer string bridge; of a series of sound posts located between the back sound board ribs and belly sound board ribs and conforming to the direction of said bridge, substantially as set forth.

9. In a pianoforte, the combination of an outer metal plate, a back sound board provided with inner ribs, and a belly sound board provided with inner ribs arranged crosswise of said ribs and provided with a string bridge, a series of sound posts located between the back sound board ribs and belly sound board ribs, and a series of holding bolts located adjacent to the sound posts, said holding bolts having heads at one end engaging the outer side of the metal plate; passing through said belly sound board and screwed into the back sound board by threads upon their opposite ends, substantially as set forth.

10. In a piano forte, the combination of the back sound board and belly sound board provided with sound holes, and the metal plate located outwardly beyond the belly sound board; of sound posts located between the back and belly sound boards, and holding bolts adjacent thereto passing through and engaging the outer side of the metal plate, and passing through said sound holes, and secured in the back sound board, substantially as set forth.

11. In a piano forte, the combination of the outer side frame, the inner braces, the back sound board secured to said frame and braces, the belly sound board secured at the opposite side of said frame and braces and forming therewith and with the back sound board an inclosed sound chamber, the sound posts, the holding bolts and the metal plate, substantially as set forth.

12. In a piano forte, the combination of the outer side frame, the inner braces, the belly sound board the back sound board secured at the opposite side of said frame and braces and forming therewith and with the belly sound board an inclosed sound chamber, sound posts between the back and belly sound boards, and the metal plate, substantially as set forth.

13. In a piano forte, the combination of the outer side frame, the inner braces, the back sound board secured to said frame and braces, the belly sound board secured at the opposite side of said frame and braces and forming therewith and with the back sound board an inclosed sound chamber, sound posts, the metal plate, and securing bolts engaging the metal plate and passing through the belly sound board and secured in the back sound board, substantially as set forth.

14. In a piano forte, the combination of the outer side frame, the inner braces, the back sound board secured to said frame and braces, the belly sound board secured at the opposite side of said frame and braces and provided with sound holes, said belly sound board forming with the back sound board an inclosed sound chamber, sound posts between the back sound board and the belly sound board, the metal plate, and securing bolts passing through holes in the metal plate and the holes in the belly sound board said bolts having heads engaging the metal plate and having terminals secured in the back sound board, substantially as set forth.

15. In a piano forte, the combination of the outer side frame, the inner braces, the back sound board secured to said frame and braces and provided with inner strengthening ribs, the belly sound board secured at the opposite side of said frame and braces and

provided with inner ribs, string bridges, and sound holes, said belly sound board forming with the back sound board an inclosed sound chamber; sound posts between the back and belly sound boards and engaging the ribs thereof, the metal plate, and securing bolts passing through holes in the metal plate and the holes in the belly sound board, said bolts having heads engaging the metal plate and having terminals secured in the back sound board, substantially as set forth.

In testimony whereof I have hereunto set my hand this 17th day of May, 1906, at Allegheny, Pa.

GEORGE CADDICK.

Witnesses:
C. J. WEITERSHAUSEN,
J. J. WEITERSHAUSEN.