Feb. 12, 1935. E. F. STORY 1,990,574

PIANO

Filed July 10, 1933 4 Sheets-Sheet 1

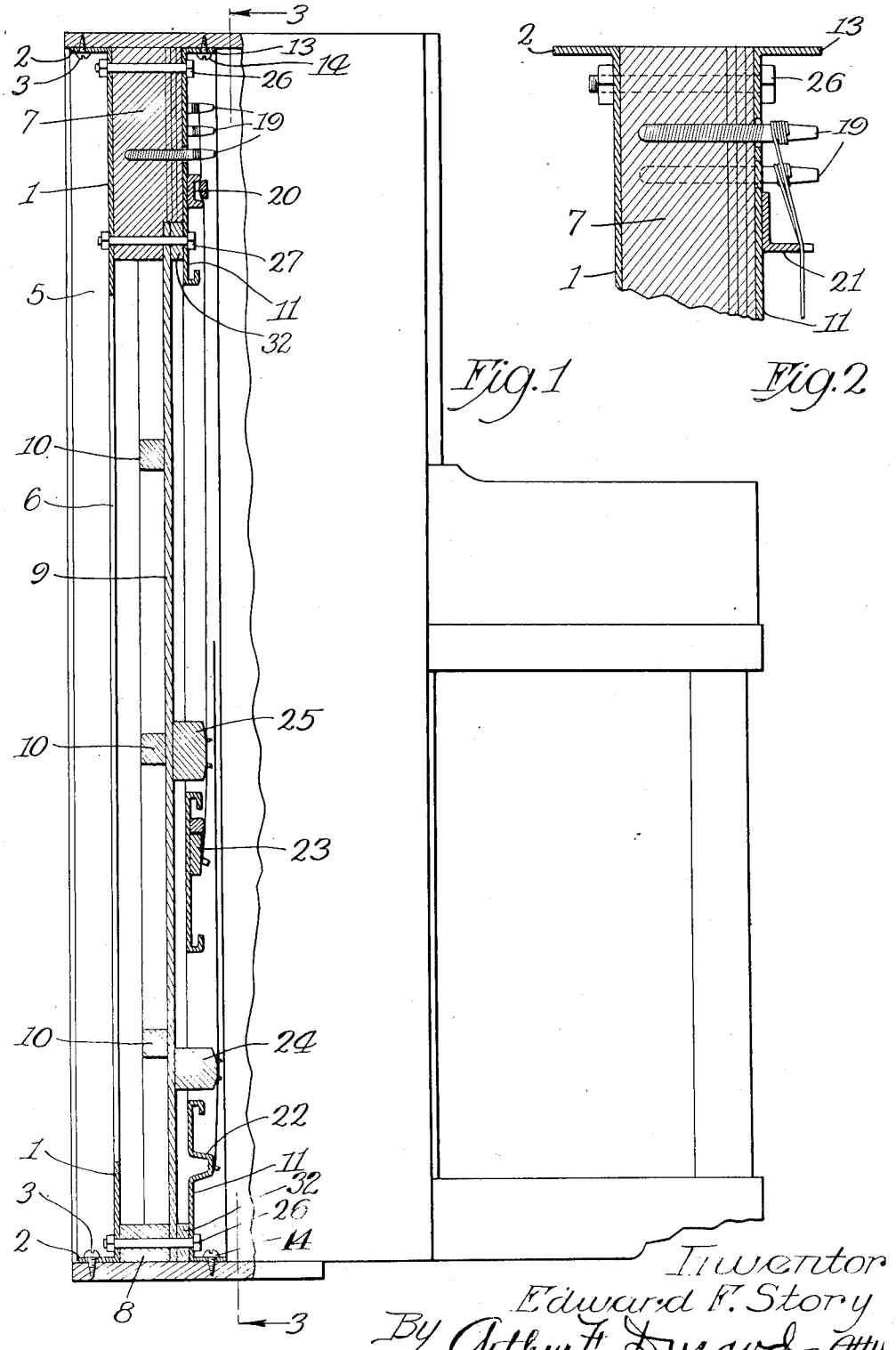


Fig. 1

Fig. 2

Inventor
Edward F. Story
By Arthur H. Durand Atty

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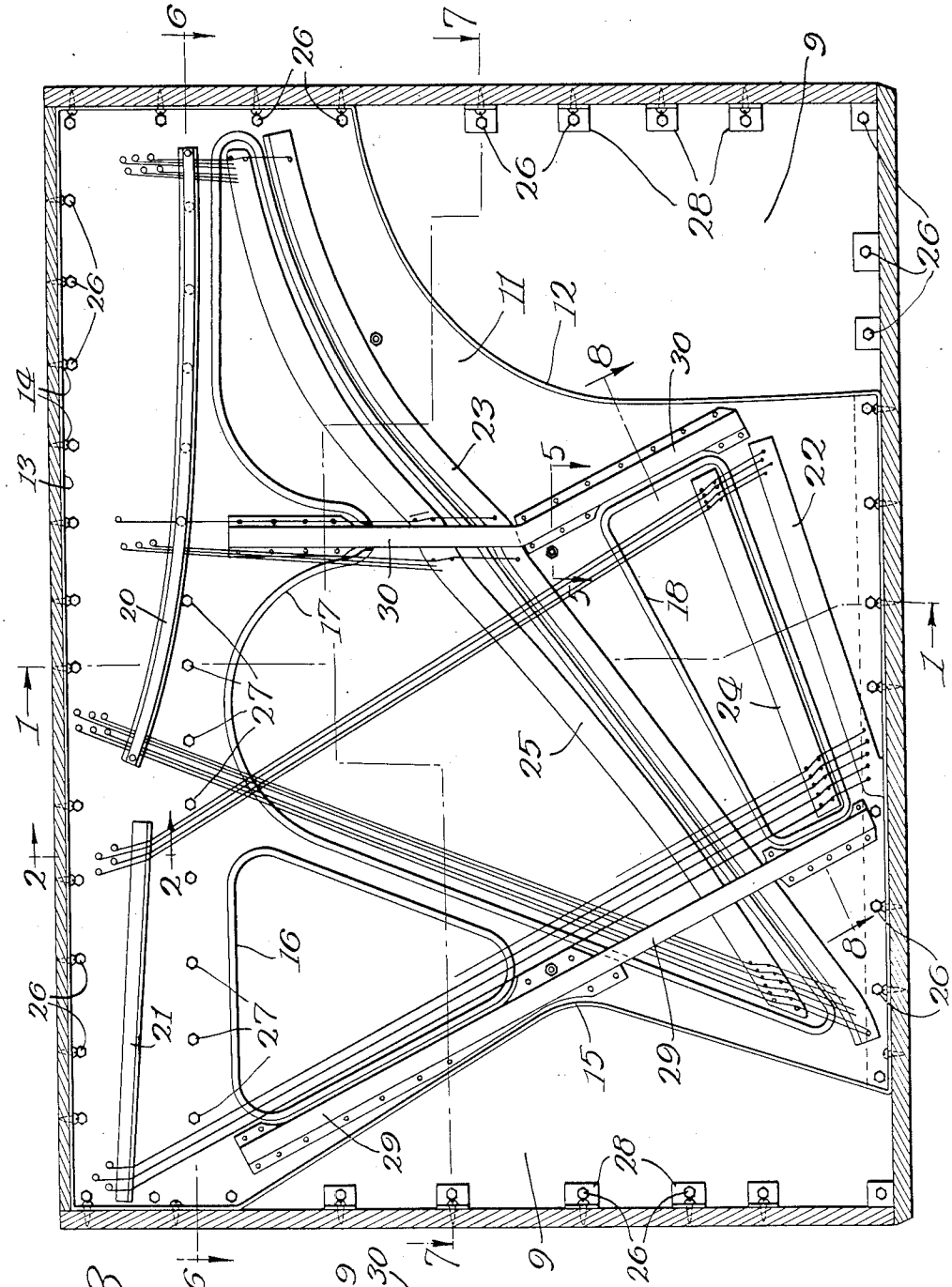


Fig. 3

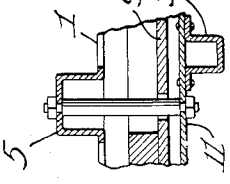


Fig. 5

Inventor:
Edward F. Story
By Arthur H. Durand
Atty.

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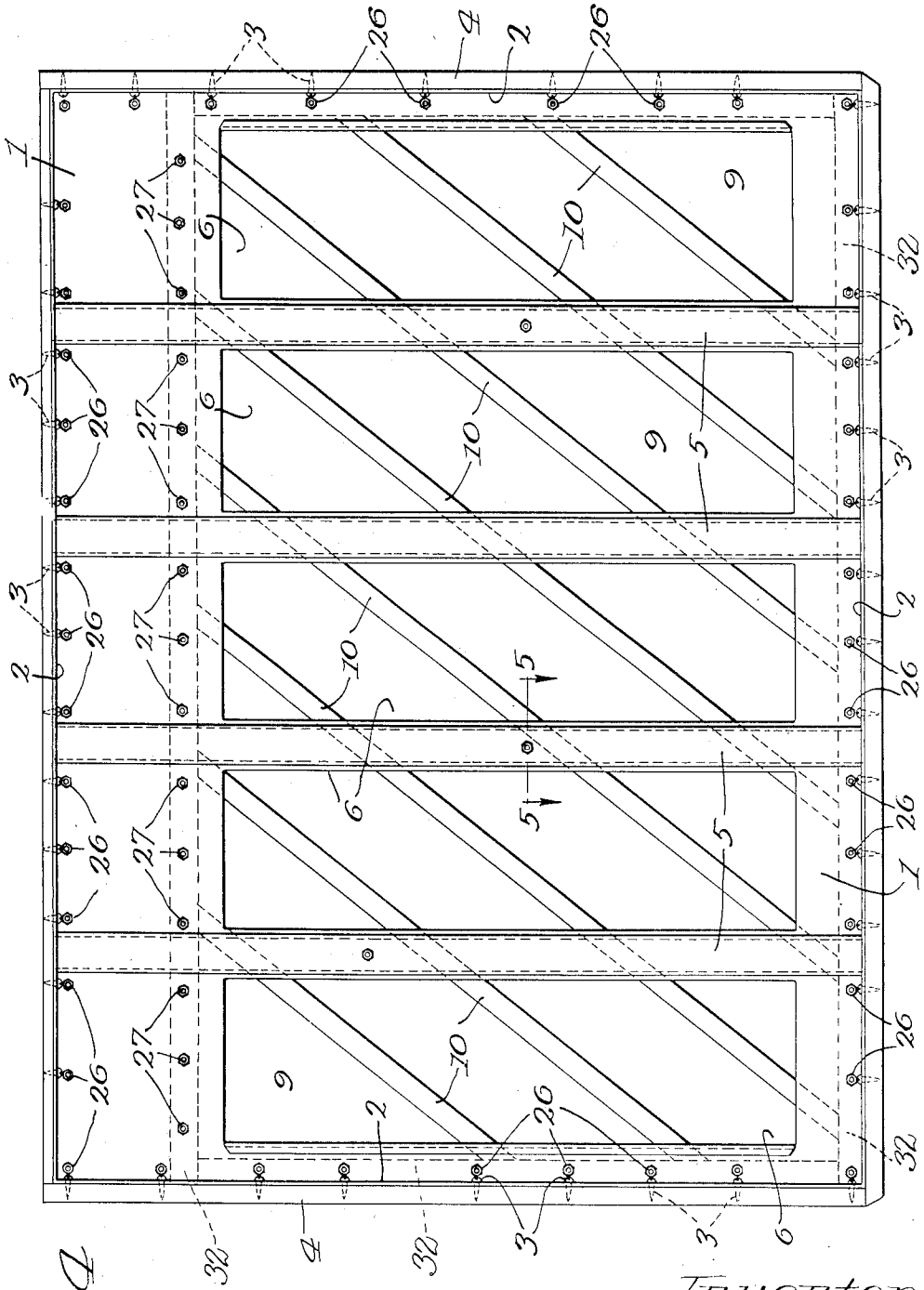


Fig. 4

Inventor
Edward F. Story
By Arthur F. Durard Atty.

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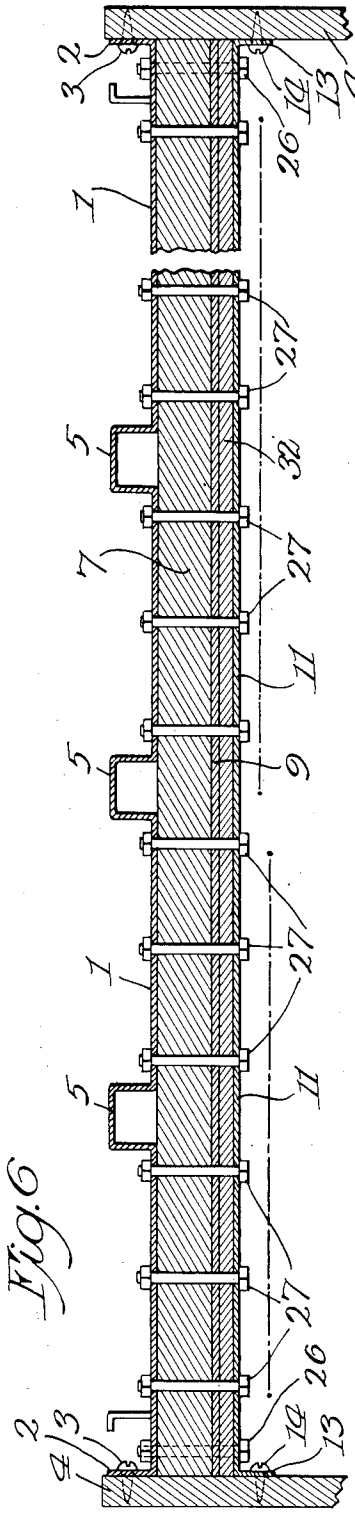


Fig. 6

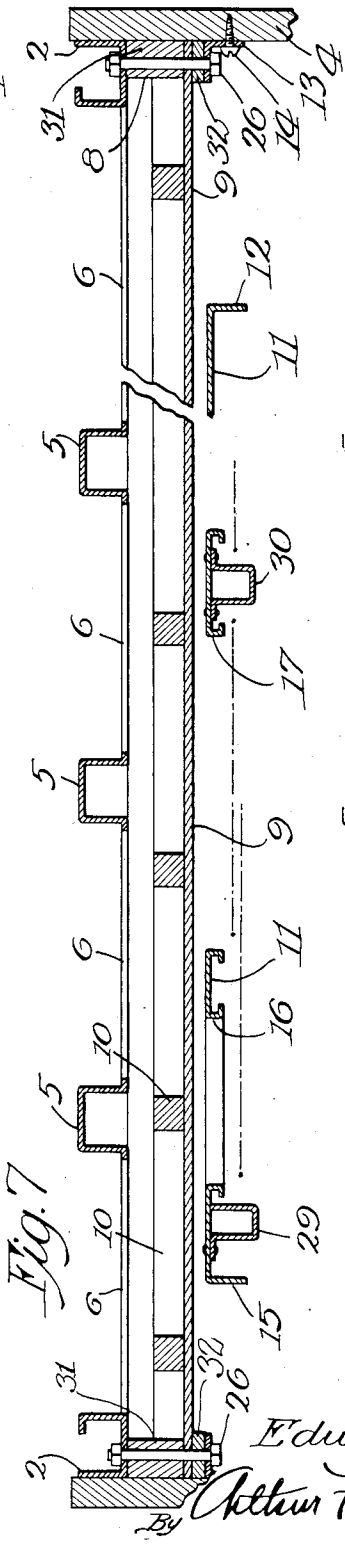


Fig. 7

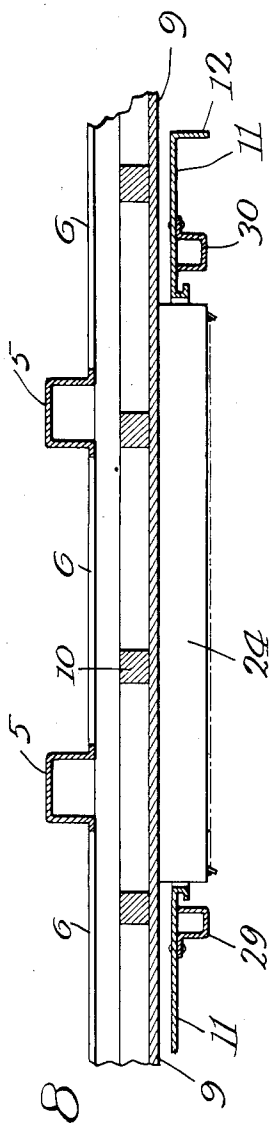


Fig. 8

Inventor
Edward F. Story
By Arthur F. Durand Atty.

Patented Feb. 12, 1935 1,990,574

UNITED STATES PATENT OFFICE

1,990,574

PIANO

Edward F. Story, Chicago, Ill., assignor to Story & Clark Piano Company, Chicago, Ill., a corporation of Delaware

Application July 10, 1933, Serial No. 679,727

8 Claims. (Cl. 84—186)

This invention relates to pianos, and more particularly to upright pianos, although some of the features of the invention may be used in grand pianos.

Generally stated, the object of the invention is to provide a novel and improved construction whereby the use of wood and cast-iron for certain things is obviated, more or less, and whereby it is made practical to employ pressed sheet steel in place thereof, thereby to reduce the weight and cost of production of pianos, and at the same time to insure good tone and appearance.

It is also an object to provide certain novel features of construction and combinations tending to increase the general efficiency and desirability of pressed sheet steel pianos of this character.

To the foregoing and other useful ends, the invention consists in matters hereinafter set forth and claimed and shown in the accompanying drawings, in which—

Fig. 1 is an end elevation of an upright piano embodying the principles of the invention, with the rear portion shown in vertical section.

Fig. 2 is an enlarged detail or fragmentary section on line 2—2 in Fig. 3 of the drawings.

Fig. 3 is a front elevation of the string-plate and sounding board of said piano, on a smaller scale, being a vertical section on line 3—3 in Fig. 1 of the drawings.

Fig. 4 is a rear elevation of the piano on the same scale as Fig. 3 of the drawings.

Fig. 5 is an enlarged detail section on line 5—5 in Fig. 3.

Fig. 6 is an enlarged horizontal section on line 6—6 in Fig. 3 with portions broken away for convenience of illustration.

Fig. 7 is a similar section on line 7—7 in Fig. 3.

Fig. 8 is an enlarged section on line 8—8 in Fig. 3 of the drawings.

As thus illustrated, the invention comprises a pressed sheet metal steel back 1, rectangular in outline, and formed with rear or outside flanges 2 along its four edges, through which screws 3 are inserted into the casing 4 of the piano. Said steel back is preferably formed with vertical hollow ribs 5 that stiffen the back 1. Rectangular openings 6 are provided between said ribs.

Against the back 1 are placed the upper pin plank 7 and the lower or base plank 8, and against the planks is placed the sounding board 9 having the oblique ribs 10 on the rear side thereof, the plank 8 being preferably first glued to the sounding board.

The steel string plate 11 is rectangular except for the curved edge 12, and is formed with edge flanges 13 that are fastened by screws 14 to the casing 4 of the piano. Also, the annular edge 15 detracts from the rectangular form of the steel string-plate, and the latter is also formed with flanged openings 16 and 17 and 18, as shown. The tuning pins 19 are inserted through the plate 11 and the sounding board 9 into the pin plank 7, and the strings extend over the angle irons 20 and 21 to the anchor or hitch plates 22 and 23 on the steel plate 1, while bridges 24 and 25 for said strings are secured as shown to the face of the sounding board.

Bolts 26 secure the steel back 1 and the sounding board 9 and the front plate 11 together. Also, the horizontal row of bolts 27 extends through the steel back and front plate, through the sounding board, and through the pin plank 7, whereby these elements are all solidly bolted together.

Thus the sounding board structure has a pressed steel front plate and a pressed steel back, and the edges of said steel plates are fastened to the piano casing in the manner shown, the sounding board having brackets 28 where the front plate is not secured to the casing. Preferably, box-like stiffening ribs 29 and 30 are provided on the front of the steel front plate 11, and with this construction the rectangular sounding board structure, with its strings and two steel plates, is very strong and stiff and highly resilient and resonant. Moreover, the parts thereof are removably or separably bolted together, instead of being glued or otherwise permanently united, and the board and plate and plank can be easily taken apart for the purpose of repair or substitution. For example, if the sounding board should become cracked or warped, it can easily be taken out and a new one can be put in its place. By removing the screws 3 and 14 the entire structure can be taken out as a unit.

The whole unit is strong, but comparatively light, and in addition the cost of production is comparatively low, as the steel front and back plates are susceptible of standardization and do not need any machine or hand work to finish them. And, as no gluing is employed to hold the back and planks and sounding board together, the structure is less susceptible to moisture.

From the foregoing it will be seen that the sheet metal back 1 is formed of a single piece of sheet metal, preferably sheet steel, and that it is all in one integral piece. The sheet steel string plate 11 is formed with the recesses 12 and 15 at the opposite sides of the plate, so that the sounding board is not unduly covered or muffled, and

the openings shown in the string plate serve further to release the sound vibrations so that the full and proper quality of the sounding board is obtained. Both steel plates are preferably flanged at their upper and lower and side edges, as shown, for the purpose shown and described. It is obvious, moreover, that the portion 21 may be an integral portion of the string plate 11 simply punched and turned outwardly, instead of the separate angle iron shown and described. This is also true of the portion 22, as here again the hitch pins for the strings may be fixed to an integral portion of the string plate 11, punched and bent outwardly, forming an integral flange instead of the hollow rib 22 shown and described. It is also obvious that the sheet steel back 1 may be formed with suitable openings of any suitable shape, instead of the opening 6, and that this steel back may be strengthened or stiffened against buckling by any suitable or desired formation, corrugations, ribs or embossing, instead of the vertical ribs 5 shown and described. The steel back 1, being made of one integral piece of metal, may have any suitable or desired stiffening formation that will lend itself to the standardization and economical manufacture of steel backs of this kind, and the construction shown and described is illustrative of one form of the invention.

Looking at Fig. 3 of the drawings, it will be seen that the two sets of strings are arranged as usual, crosswise of each other, in the manner shown and described. Ordinarily, in running the scale on a piano having strings thus arranged, there is a break in the quality of the tone, in running the scale from one set of strings to the other set of strings. However, with the new construction shown and described, involving the one-piece sheet steel back, and the steel string plate shown and described, with the sounding board bolted between the two steel plates, it is found that practically no break in the quality of tone occurs in running the scale from one set of strings to the other set of strings. With the ordinary piano, with the strings arranged in this conventional manner, the two sets of strings are in quality of tone somewhat like two different pianos, for while they correctly represent the notes of the chromatic scale, the quality of tone in one set of strings is recognizable as being different from the quality of tone of the other set of strings. But with the novel construction shown and described, involving the two steel plates and the sounding board clamped between them, this inequality of tone is eliminated, or at least greatly reduced, and the piano is found to have practically the same quality of tone from the top to the bottom of the keyboard.

Thus it will be seen that the sheet metal back 1, preferably made of sheet steel, is a one-piece affair, that it has the attaching flanges on the back or outer side thereof, and that it has vertical stiffening means extending practically to the top or upper edge of the back, preventing buckling of the upper portion of the back. The steel back and the steel string-plate and the sounding board with the string-plate provided with circumscribed openings, and also with lateral notches or recesses exposing the sounding board in the desired manner, are bolted together to form a unit which is attached by the rear flanges 2 and the front flanges 13 to the casing of the piano. Thus the piano can be shipped knocked-down, so to speak, and can be easily assembled when received. Again, the steel construction thus provided is practically moisture-proof, and there is less danger of warping of the sounding board unit from that cause.

It will be seen that the nuts on the bolts 26 and 27 engage the wall of the back 1 of the piano, and that these nuts, as well as the screws 3, are accessible from the rear of the piano, so that the back can be removed separately, should occasion so require. The horizontal elements 7 and 8, shown in Fig. 1, together with the similar elements 31 shown engaging the bolts 26 in Fig. 7 of the drawings, between the back 1 and the sounding board 9, form a frame-like structure, between the steel back and the steel string plate, with the sounding board clamped between this frame-like structure and the string plate, the latter being spaced from the sounding board by the spacer strips 32 extending along the four edges of the sounding board, in the manner shown and described.

What I claim as my invention is:

1. In a piano having an outer casing, an organized unit therefor comprising an upright frame-like structure having a tuning pin plank forming the upper portion thereof, a sounding board of less height than said structure and disposed on the front side thereof, a one-piece sheet steel back engaging the rear side of said structure and formed with rearwardly extending flanges at the upper and lower and side edges thereof, means accessible from the rear of the piano for attaching said flanges to said casing, a sheet steel string plate engaging the front of said pin plank and formed with forwardly extending flanges at the upper and lower and side edges thereof, means accessible from the front of the piano for fastening these last-mentioned flanges to said casing, and bolts extending through and clamping said back and structure and sounding board and string plate tightly together, whereby the elements thus organized and bolted together and thus characterizing the piano may be inserted in and removed from the casing as a unit.

2. A structure as specified in claim 1, said back comprising a single sheet of steel pressed into the desired form, having openings alternating with vertically disposed stiffening formations to prevent the back from buckling under the string tension.

3. A structure as specified in claim 1, said string plate having its top flange continuous and unbroken for the full length thereof, and having its side edges formed with flanged recesses to expose the sounding board, so that the flange for the lower edge of the string plate is of less length than the upper flange thereof.

4. A structure as specified in claim 1, some of said bolts being disposed in horizontal rows adjacent the top and bottom flanges of the back, and other bolts being disposed in a horizontal row adjacent the upper edge of the sounding board, and adjacent the lower edge of said pin plank, and some of said bolt being disposed in vertical rows adjacent the vertical side flanges of said back.

5. A structure as specified in claim 1, said bolts having nuts that engage the wall of the back, so that by removing these nuts, and by removing the fastening means from the flanges of the back, the latter may be removed separately from the back of the piano.

6. In a piano having a casing, a one-piece sheet steel back therefor of rectangular form having rearwardly extending top and bottom and side flanges, and means accessible from the rear of

the piano for securing said flanges to the top and bottom and side walls of the piano casing, whereby said one-piece sheet of steel thus fastened in place forms the entire back of the piano and is separately removable from the rear of the casing.

7. In a piano having a casing, a unitary back and tuning pin plank and sounding board and string plate unit, insertable in and removable from the piano as a unitary structure, said string plate being of sheet steel and having top and bottom and side flanges on the front thereof detachably secured to the upper and lower and side walls of the casing, serving to hold the unit in place, and said string plate thus formed having its side edges formed with flanged recesses to expose the sounding board, so that the bottom flange of the plate does not extend the full width of the latter, as does the upper flange of the plate, whereby the side flanges of the plate that are attached to the casing extend downwardly a distance from the upper edge of the plate and terminate above said recesses, but are integral with the flanges of the latter.

8. A structure as specified in claim 6, said back having vertically disposed channel portions alternating with vertically disposed openings between them, whereby the back is stiffened from top to bottom to resist the buckling strain imposed by the tension of the piano strings.

EDWARD F. STORY.