July 2, 1940. R. W. E. SPERRY 2,206,650

TONE AMPLIFIER FOR PIANOS

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FIG. 1

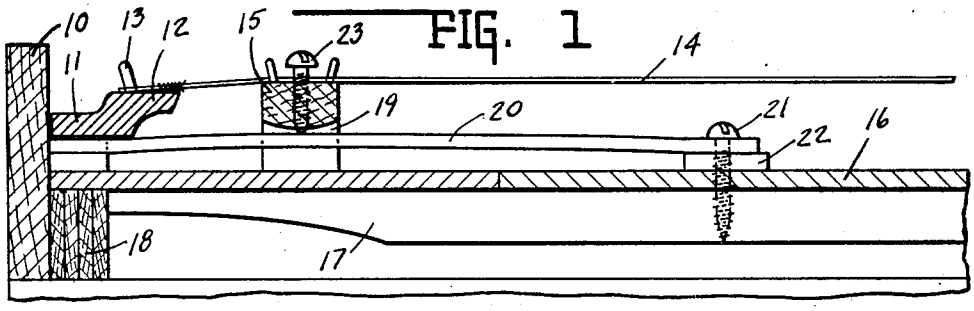


FIG. 3

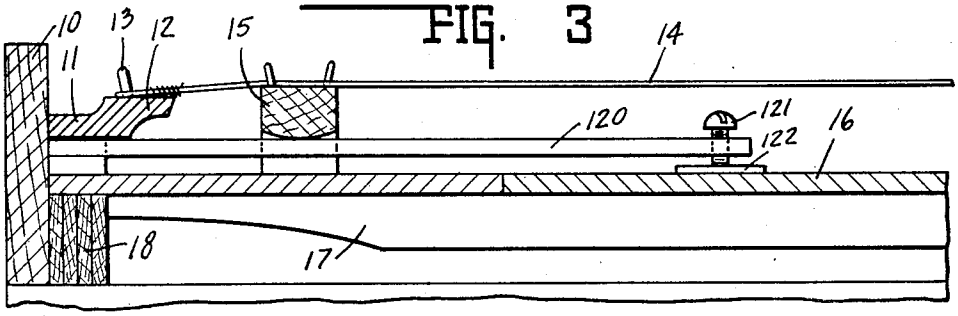


FIG. 4

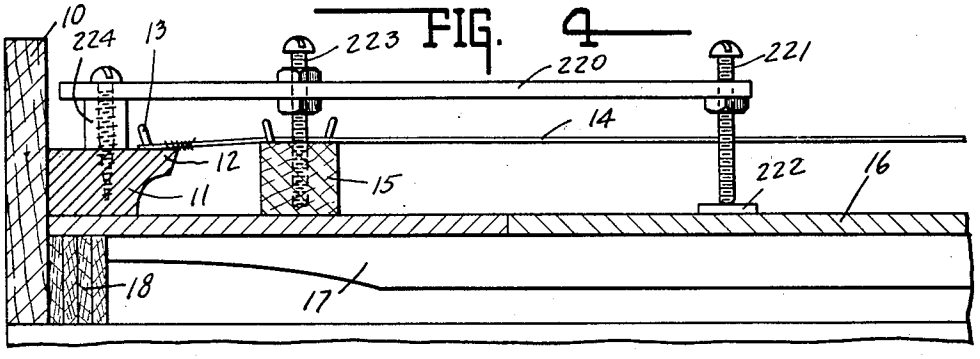
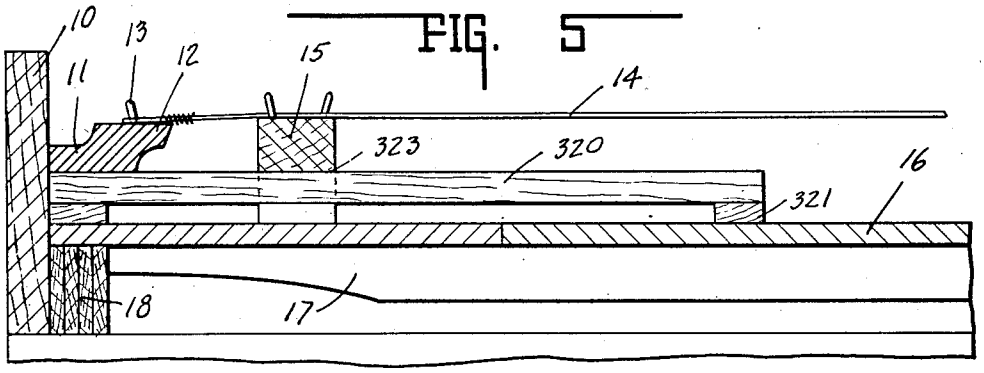


FIG. 5



INVENTOR.
RALPH W.E. SPERRY.

BY Lockwood, Goldsmith & Galt,
ATTORNEYS.

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FIG. 2

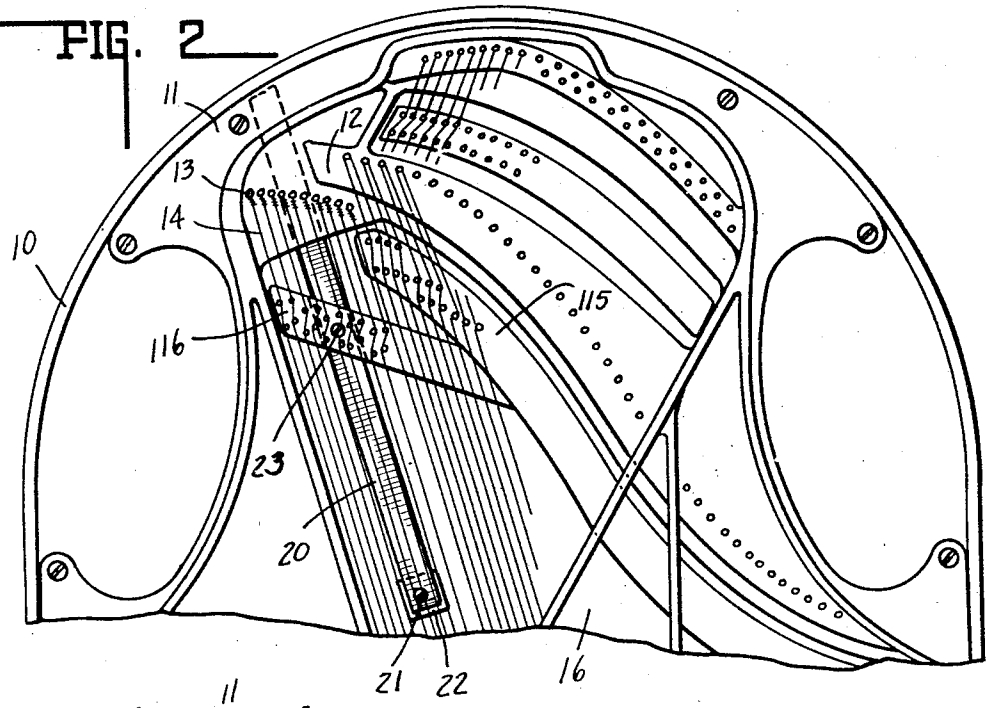
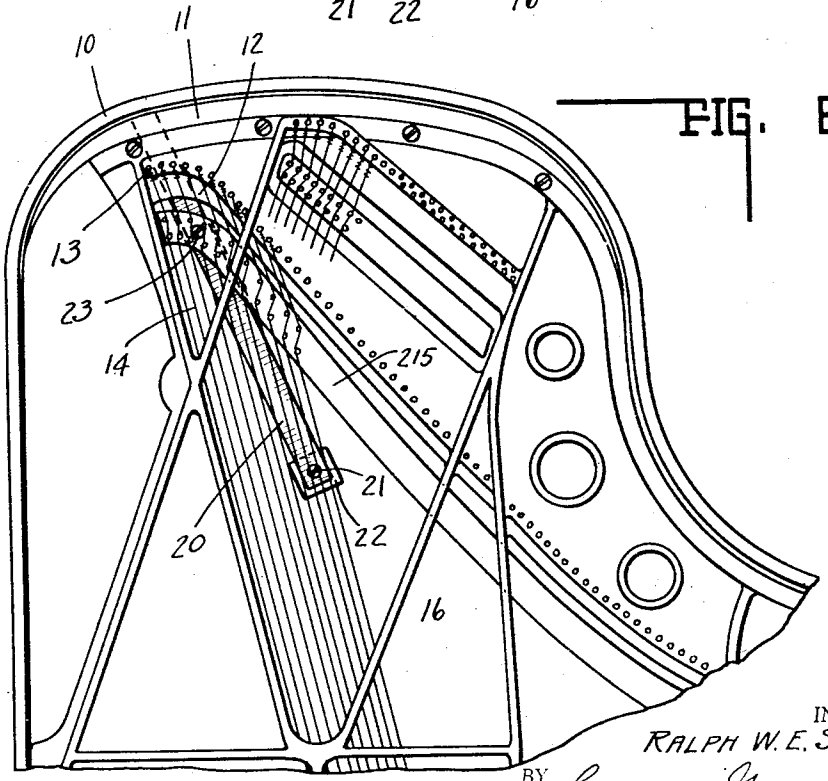


FIG. 6



INVENTOR.
RALPH W. E. SPERRY.
BY Lockwood Goldsmith & Galt.
ATTORNEYS.

Patented July 2, 1940

2,206,650

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TONE AMPLIFIER FOR PIANOS

Ralph W. E. Sperry, De Kalb, Ill., assignor to The Rudolph Wurlitzer Company, Cincinnati, Ohio, a corporation

Application November 19, 1938, Serial No. 241,297

7 Claims. (Cl. 84—212)

This invention relates to a structure for amplifying the tone of a piano, and particularly for carrying the string vibrations toward the middle portion of the sounding board, being particularly applicable to the smaller piano structures necessitating the bridge being located too near to the fixed edge of the sounding board.

It has been found that in the smaller pianos, and particularly such as are commonly known as the "baby grand" or the "butterfly grand," there is not sufficient room within the casing to permit locating the string bridge sufficiently distant from the fixed edge of the sounding board to give the desired deep mellow tone. Thus, wherein the longer strings, such as the higher treble and bass strings, extend substantially the full width of the piano casing, this problem particularly arises and results in a deadening of the sound because of insufficient freedom of vibration of the sounding board where the bridge operates too closely to the casing.

To improve these conditions, and as particularly applied to the longer strings, it has been found that the deeper more mellow tone may be obtained by providing means to transmit the string vibration not only directly through the bridge to the sounding board, but in addition through the bridge to a lever extending toward the middle portion of the sounding board so as to transmit vibrations thereto. This arrangement may take several forms of structure.

That herein more specifically disclosed pertains primarily to the higher treble strings, a different type of lever arrangement being required for the bass strings. However, the same invention as herein disclosed applies equally to both. More specifically, a lever in the form of a metal or wooden strip is provided having one end firmly anchored to the frame and extending therefrom toward the middle portion of the sounding board where its inner end bears thereon. Said strip extends across the bridge in contact therewith so that vibrations set up by the strings through the bridge will be transmitted through the arm to the sounding board.

In another form, the lever arm has its inwardly extending free end merely in fixed or adjustable contact with the middle portion of the sounding board. It is sufficient for the purpose of this invention that provision be made to transmit the vibrations set up in the bridge by the strings inwardly of the sounding board.

The full nature of the invention will be understood from the accompanying drawings and the following description and claims:

Fig. 1 is a sectional view through the bridge and sounding board of a piano with one form of lever construction mounted thereon. Fig. 2 is a plan view illustrating one type of bridge and the position of the lever with respect thereto and the treble strings. Fig. 3 is the same as Fig. 1, showing a modified form of lever construction. Fig. 4 is the same as Figs. 1 and 3, showing a further modified form. Fig. 5 is the same as Fig. 1 showing still another modification. Fig. 6 is the same as Fig. 2 illustrating the invention as applied to the usual bridge construction.

In the drawings there is shown a portion of a piano having a casing 10 and metal plate 11 to which is secured a pin block 12 having the string pins 13 thereon. Anchored to the pins 13 are the usual treble strings 14 which extend over and bear upon the bridge 15. The bridge is mounted in the usual manner upon the sounding board 16 supported by the ribs 17, the peripheral edge of the sounding board being secured to the framework 18 in the usual manner.

Adjacent the end of the bridge 15 near the higher treble strings, the bridge is notched on its underside to provide an opening indicated at 19 through which a vibration transmitting lever arm 20 extends.

The lever arm 20 is arranged to extend crosswise of the bridge from the frame 18 toward the middle portion of the sounding board. One end of the lever arm is rigidly secured and anchored between the frame structure and the plate 11 or pin block. As shown in Fig. 1, the other end of the arm is rigidly secured by a suitable screw 21 at or near the middle portion thereof, but preferably spaced therefrom by a block 22. An adjusting screw 23, extending through the bridge 15 and having its end bearing upon the lever arm 20, may be employed to adjust the tension of the lever arm with respect to the bridge and sounding board.

There may be one or more such lever arms employed at spaced intervals along the bridge, either in respect to the treble strings or the bass strings, or both. As shown herein, it is sufficient, so far as the treble strings are concerned, that a single lever arm be located adjacent that end of the bridge on which the higher treble strings bear.

The result of this arrangement is that that group of strings bearing upon the portion of the bridge lying closest to the frame not only permits vibration directly through the bridge to the sounding board, but through the bridge to the lever arm 20 which in turn transmits the vibrations to the middle portion of the sounding board. Thus, the vibrations normally transmitted to the sounding board at that portion along which the bridge bears is amplified by the further transmission of vibrations to the middle portion of the board.

In the modified form shown in Fig. 3, the lever arm 120 is provided with an adjustable screw 121 which bears upon a metal plate 122 which in turn bears upon the sounding board. Thus,

as distinguished from the structure shown in Fig. 1, the inner end of the lever arm is not secured to the sounding board, but bears thereon, and instead of there being adjustment at the bridge, the adjustment is secured at the end of the arm.

In the modified form, as shown in Fig. 4, the lever arm extends over instead of under the bridge. Thus, there is shown an arm **220** having in its inner end an adjustable screw **221** extending therethrough and bearing upon a washer **222** which in turn bears upon the sounding board. In this structure, there is also an adjustable screw **223** extending into the top of the bridge and adjustably spacing the lever arm thereabove. For anchoring the opposite end of the lever arm to the frame, a block **224** is provided to which it is secured, the block in turn being secured to the pin block or plate.

In the modified form, as shown in Fig. 5, the lever arm **320** is glued securely to the bridge under which it extends, as indicated at **323**. The inner end of the lever arm is likewise glued to the block **321**, which is in turn glued to the upper surface of the sounding board.

In the illustrative plan view shown in Fig. 2, the bridge **115** is terminated short of the higher treble strings, being supplemented by an expansion bridge **116** which extends across the sounding board in chord-like fashion so as not to be too closely located with respect to the piano frame. In this construction, the lever arm, herein shown as that of Fig. 1, extends under the chord-like extension **116** toward the middle portion of the sounding board.

In the illustrative plan view shown in Fig. 6, the bridge **215** extends to all the treble strings. In this construction, the lever arm, likewise shown as that of Fig. 1, extends under the bridge **215** near its end and toward the middle portion of the sounding board upon which it bears.

The invention claimed is:

1. In a piano structure the combination with a supporting frame, a sounding board secured thereto, and a string plate having a pin block thereon to which the respective strings are secured, of a bridge supported by the sounding board having a portion thereof approaching the frame over which the strings bear for transmitting vibration to the sounding board, and a lever arm extending substantially transversely to and in contact with said bridge, one end being secured to said frame and the other end extending inwardly toward the middle portion of the sounding board and bearing thereon for transmitting vibrations from the bridge to the sounding board.

2. In a piano structure the combination with a supporting frame, a sounding board secured thereto, and a string plate having a pin block thereon to which the respective strings are secured, of a bridge supported by the sounding board having a portion thereof approaching the frame over which the strings bear for transmitting vibration to the sounding board, a lever arm extending substantially transversely to and in contact with said bridge, one end being secured to said frame and the other end extending inwardly toward the middle portion of the sounding board and bearing thereon for transmitting vibrations from the bridge to the sounding board, and adjustable means associated with said lever arm for varying the bearing pressure thereof on the bridge and sounding board.

3. In a piano structure the combination with a supporting frame, a sounding board secured thereto, and a string plate having a pin block thereon to which the respective strings are secured, of a bridge supported by the sounding board terminating short of the higher treble strings, and a chord-like bridge extension having one end secured to the first-mentioned bridge and extending transversely of the higher treble strings, said extension lying a substantial distance inwardly from the pin block and bearing the higher treble strings for transmitting their vibrations to the sounding board at a greater distance inwardly from the pin block than the first-mentioned bridge.

4. In a piano structure the combination with a supporting frame, a sounding board secured thereto, and a string plate having a pin block thereon to which the respective strings are secured, of a bridge supported by the sounding board terminating short of the higher treble strings, a chord-like bridge extension having one end secured to the first-mentioned bridge and extending transversely of the higher treble strings, said extension lying a substantial distance inwardly from the pin block and bearing the higher treble strings for transmitting their vibrations to the sounding board at a greater distance inwardly from the pin block than the first-mentioned bridge, and a lever arm having one end secured to the frame and extending inwardly substantially transversely of said bridge extension toward the middle portion of the sounding board and bearing under tension against said bridge and sounding board for transmitting vibrations therebetween.

5. In a piano structure, the combination with a string plate frame, a sounding board secured thereto, and a series of piano strings connected with said frame and extending over said board, of a vibration transmitting lever arm having one end secured to said frame and extending inwardly therefrom toward the middle portion of the sounding board and bearing on said sounding board for transmitting the vibrations set up in said strings inwardly from the frame to the sounding board near the middle portion thereof.

6. In a piano structure, the combination with a supporting frame, a sounding board secured thereto, and a string plate having a pin block thereon to which the respective piano strings are secured, of a bridge supported by the sounding board adjacent said frame over which the strings bear for transmitting vibrations to said board, and auxiliary means bearing against said bridge and board extending inwardly from the bridge over the upper surface of the board toward the middle portion thereof for transmitting a portion of said vibrations directly from the bridge to the middle portion of the board.

7. In a piano structure, the combination with a supporting frame, a sounding board secured thereto, and a string plate having a pin block thereon to which the respective strings are secured, of a bridge supported by the sounding board over which the strings bear for transmitting vibrations thereto, and a lever arm bearing against said bridge and extending substantially transversely thereof over the upper surface of the sounding board toward the middle portion thereof with the extended end of said arm bearing upon said sounding board for transmitting vibrations thereto.

RALPH W. E. SPERRY.