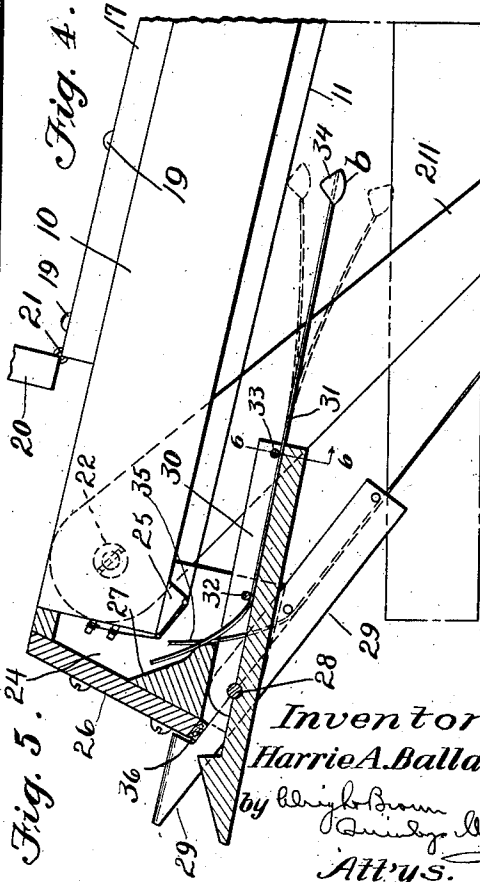
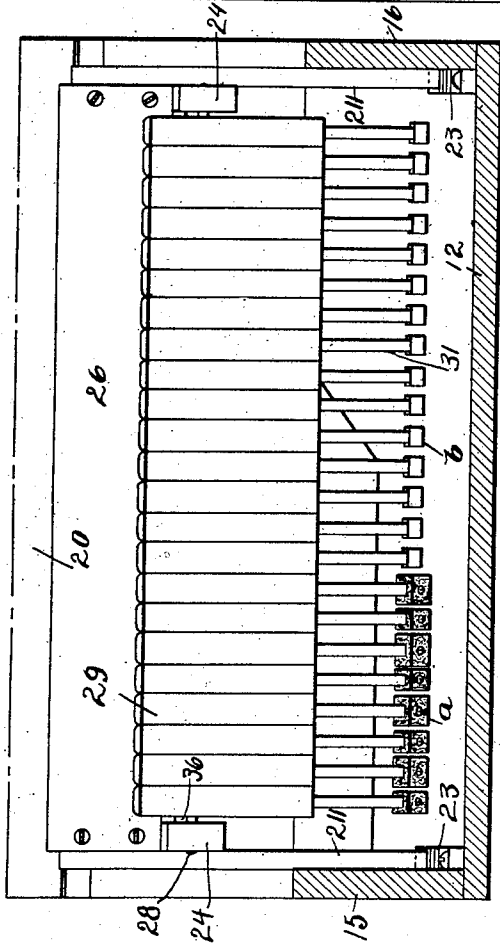
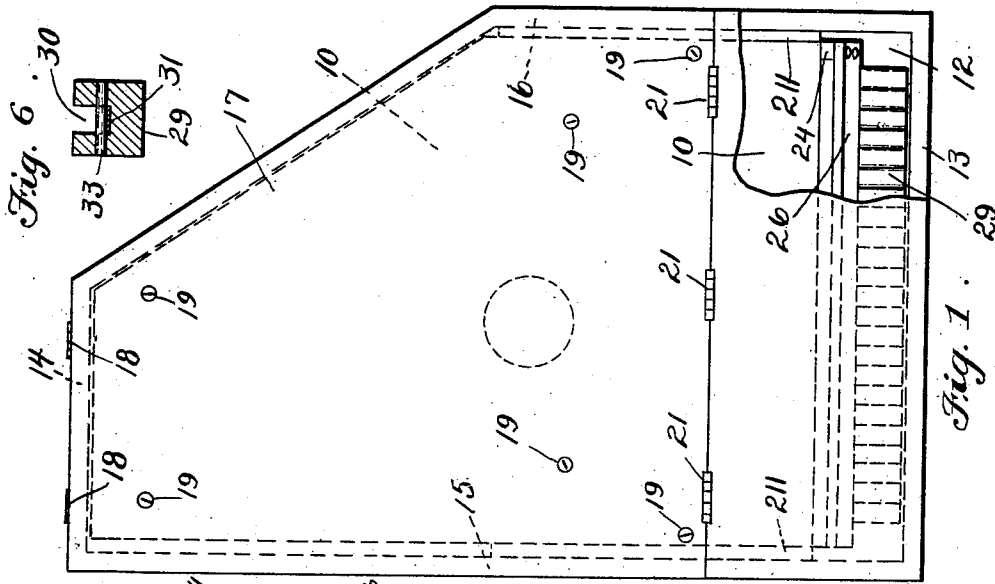


1,376,738.

Patented May 3, 1921.

2 SHEETS—SHEET 1.



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1,376,738.

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2 SHEETS—SHEET 2.

Fig. 2.

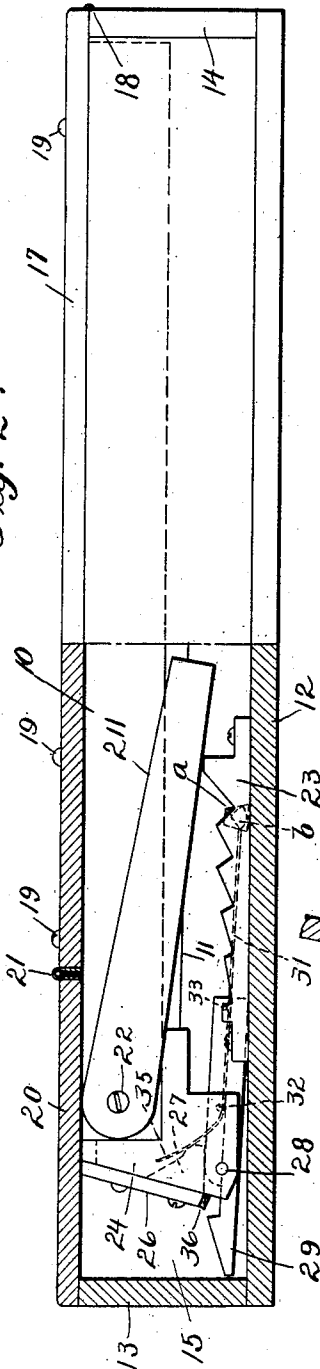
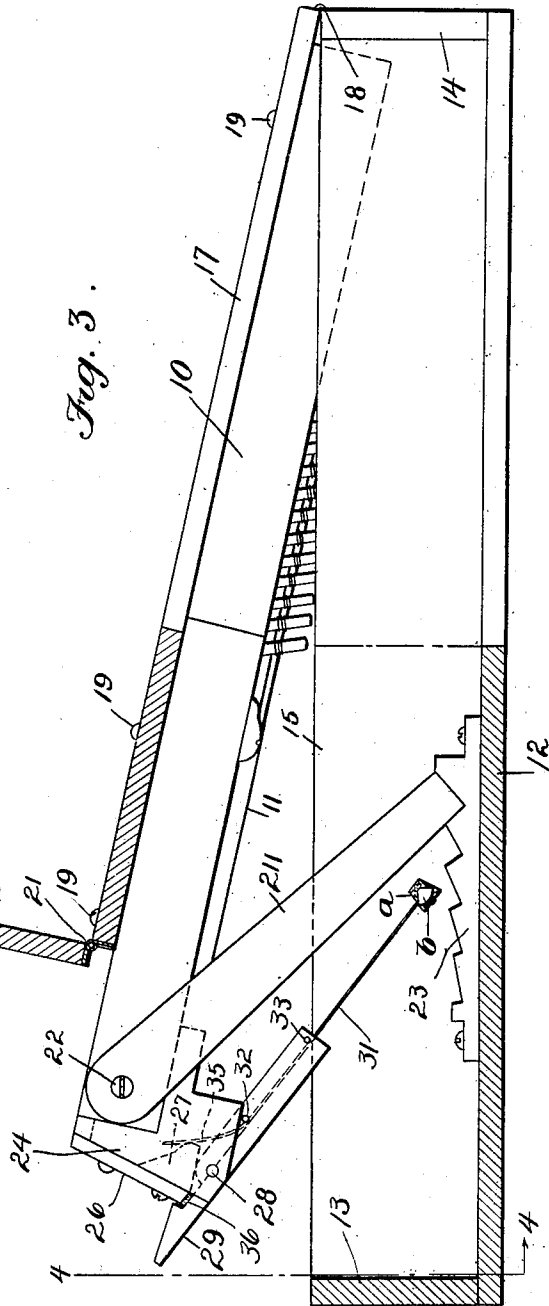


Fig. 3.



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UNITED STATES PATENT OFFICE.

HARRIE A. BALLARD, OF BOSTON, MASSACHUSETTS, ASSIGNOR TO THE PHONOHARP COMPANY, OF EAST BOSTON, MASSACHUSETTS, A CORPORATION OF MAINE.

INVERTED KEYED ZITHER.

1,376,738.

Specification of Letters Patent.

Patented May 3, 1921.

Application filed February 24, 1917. Serial No. 150,686.

To all whom it may concern:

Be it known that I, HARRIE A. BALLARD, a citizen of the United States, residing at Boston, in the county of Suffolk and State of Massachusetts, have invented new and useful Improvements in Inverted Keyed Zithers, of which the following is a specification.

This invention has relation to musical instruments of the harp or zither type, in which a key action is employed for striking the strings.

In accordance with the present invention, I may make use of a zither of ordinary construction, but I provide means for sustaining the instrument in an inverted position, that is with the strings below the sounding board. In this way, I am able to employ a simple key action consisting of a series of hammers pivoted at points between their ends, so that one end of each hammer constitutes a key which may be depressed, very much as the key of a piano is depressed. These keys are mounted on a pivot member arranged transversely of and below the strings, so that the movement of the hammer head into string-impinging position is upward. In connection with the body of the instrument and the key action I may employ a casing therefore, in which said parts are incased when not in use, but which may be opened to expose the keys for operation.

On the accompanying drawing,—

Figure 1 shows in plan view a musical instrument embodying the invention, the front section of the cover being broken away to show the keys.

Fig. 2 illustrates the instrument in side elevation and partially in section, as it appears when the case is closed.

Fig. 3 is a similar view, but with the case open, and the instrument ready to be operated.

Fig. 4 represents a longitudinal section through the key action on the line 4—4 of Fig. 3, and shows the zither in side elevation.

Fig. 5 illustrates a front elevation of the instrument, with the case in section, and shows the parts in the positions illustrated in Fig. 4.

Fig. 6 represents in section, on the line 6—6 Fig. 5, one of the hammer keys.

As I have already stated, I may in an embodiment of the invention employ a zither

or analogous instrument of any suitable or desirable size or shape without change, and such a zither is indicated as a whole at 10, being shown in dotted lines in Fig. 1 and in side elevation in Fig. 3. I have not regarded it as necessary to illustrate the instrument in detail, but it will be understood that the one shown is of the flat box type having an apertured sounding board, a parallel base board, and suitable end and side walls between said boards, and is of the well known construction. This instrument is arranged upside down, or inverted, with the sounding board below the base board, and with the usual strings 11 beneath the sounding board. Any suitable supporting means may be utilized for supporting the zither in the described position, although, as will be subsequently seen, I prefer to employ special means for this purpose. That is, I prefer to employ a case in which the instrument is concealed, but which may be opened to place the instrument in operative position. The case may be of any suitable construction. As shown, it consists of a flat box, approximating the shape of but somewhat larger in length, width and thickness than the inclosed instrument. It has the bottom wall 12, the front and rear end walls 13, 14, and the side walls 15, 16, and a cover 17, which is hinged as at 18 to the rear end wall 14. The base board of the zither is secured at suitable points by screws or other fastenings as at 19 to the under side or face of the cover and the zither is thus supported by said cover normally within the casing above the bottom thereof as shown in Fig. 2. The cover is formed with a hinged section 20 (the hinges for the same being indicated at 21), which when closed completes the cover and closes the top of the case. The entire cover may be swung upwardly to an inclined position carrying the zither with it, and it may be sustained at any one of several angular positions by struts or legs 211 which are pivoted at 22 to the sides of the zither near the front end thereof, and the ends of which may be engaged with the teeth of racks 23 secured on the bottom wall of the case at the side margin thereof. When the case is closed, these legs are folded as shown in Fig. 2, but, when the cover is raised, they may be unfolded or swung to operative position to engage the racks 23.

The key and hammer action may consti-

tute a removable attachment applied to the zither and it may be formed in a number of different ways, so far as other features of the invention are concerned, although, as illustrated, it *per se* embodies certain improvements as defined in the claims hereunto annexed. The illustrated attachment comprises two similar end blocks or supports 24 secured to the front end of the zither, and which partially underlie the sounding board thereof beyond the ends of the front bridge 25. These blocks are connected by a front bar 26 and a cross bar 27, which, if desired, may be integral therewith. These parts may be all made of either wood or metal, as may be cheapest and most convenient. Supported in the depending portions of the blocks is a cross bar or pivot member 28 which is located in a plane below the plane of the strings, and which is transverse to the strings. Upon this cross bar are pivoted the keys 29 which extend longitudinally of the strings and which carry the hammers for impinging upon the several strings. Each key has a longitudinal groove 30 in its upper face to receive the flat spring shank 31 of the associated hammer, the shank being held in place frictionally by cross pins 32, 33. Each key is pivoted between its ends and its front end which projects beyond the end bar 26 may be beveled or otherwise formed to be engaged by the finger of the operator. On the rear free end of each hammer spring there is a head 34 of suitable material, and the front end 35 of the spring bears against the cross bar 27, so as to cause the front ends of the keys to bear yieldingly against the lower edge of the end bar 26 which is provided with a strip of felt as at 36 as shown in Fig. 3. When the zither is in position to be played, as in said last-mentioned figure, the hammer heads are above the bottom of the case, and the keys and hammers are in a plane at an angle to the plane of the strings with the heads relatively remote from the strings. It will be observed that, when the front end of a key is depressed, its rear portion (near the pivot bar 28) is engaged with the cross bar 27 which serves as a stop or rest to limit the movement of the keys, and that the momentum acquired by the head will cause it to strike the corresponding or associated string. Thereafter the vibration of the spring will cause the head to strike the string rapidly to produce a trill or succession of notes, unless the key is released and permitted to return to inactive position. In some cases, I omit the rear ends 35 of the hammer springs, and rely on the heavier rear portions of the keys and hammers to return the keys and hammers to normal inactive position.

In Fig. 5, I have shown the hammers as being provided with two different forms of heads. Those on the left, *a*, which are in-

dicated as being made of felt, are for playing the chord strings (not shown), and those on the right, *b*, which are indicated as being made of wood or metal, are for playing the melody strings.

In closing the case, the legs are folded and the cover is lowered. The heads of the hammers engage and slide along the upper face of the case bottom, and are automatically swung about the pivot bar so as to lie finally approximately parallel with the sounding board of the zither. When the case is open, the hinged section 20 of the cover is folded back.

From the foregoing description, it will be apparent that many advantages are secured, among which I may call attention to several, to wit:—that the instrument or zither is incased and thereby rendered less liable to injury than heretofore; and that a very simple form of action is employed, with keys, which are not dissimilar from piano keys in their accessibility. Obviously, when the strings of the zither are strung in a chromatic scale, certain of the keys may be arranged like the piano black keys. Naturally, the length of the projecting front ends of the keys may be varied, and the keys may be spaced as required, to afford the greatest facility for playing.

Having thus explained the nature of my said invention and described a way of making and using the same, although without attempting to set forth all of the forms in which it may be made or all of the modes of its use, what I claim is:

1. The combination of a zither having the strings below the body thereof; and an attachment therefor, comprising end blocks secured to the front end of the zither, a pivot bar supported in said end blocks below and crosswise of the strings, a plurality of keys pivoted on said pivot bar between their ends and having their front ends projecting forwardly from the front end of the zither, and spring hammers carried by the rear ends of said keys, said hammers normally projecting downwardly at an inclination to said strings.

2. The combination of a zither having the strings below the body thereof; and an attachment therefor, comprising end blocks secured to the front end of the zither, a pivot bar supported in said end blocks below and crosswise of the strings, a plurality of keys pivoted on said pivot bar between their ends and having their front ends projecting forwardly from the front end of the zither, spring hammers carried by the rear ends of said keys, said hammers normally projecting downwardly at an inclination to said strings, the front ends of said keys being beveled, and stops for arresting the movement of said keys about said pivot bar.

3. The combination of a zither having the

strings below the body thereof; and an attachment therefor, comprising end blocks secured to the front end of the zither, a pivot bar supported in said end blocks below and crosswise of the strings, a plurality of keys pivoted on said pivot bar between their ends and having their front ends projecting forwardly from the front end of the zither, spring hammers carried by the rear ends of said keys, said hammers normally projecting downwardly at an inclination to said strings; a case for inclosing said zither and said attachment and comprising a box having a hinged cover provided with a hinged front section, and means for attaching the zither to the under side of said cover.

4. The combination of a zither having the strings below the body thereof; and an attachment therefor, comprising end blocks secured to the front end of the zither, a

pivot bar supported in said end blocks below and crosswise of the strings, a plurality of keys pivoted on said pivot bar between their ends and having their front ends projecting forwardly from the front end of the zither, spring hammers carried by the rear ends of said keys, said hammers normally projecting downwardly at an inclination to said strings; a case for inclosing said zither and said attachment and comprising a box having a hinged cover, means attaching the zither to the under side of said cover, and struts for supporting the cover and zither in a raised position with said hammers projecting downwardly as described, said hammers when said cover is closed being held by the bottom of the case in approximate parallelism with the strings.

In testimony whereof I have affixed my signature.

HARRIE A. BALLARD.