

(No Model.)

3 Sheets—Sheet 1.

G. B. SHEARER & E. S. ANDERSON.

HARP.

No. 550,538.

Patented Nov. 26, 1895.

Fig. 1.

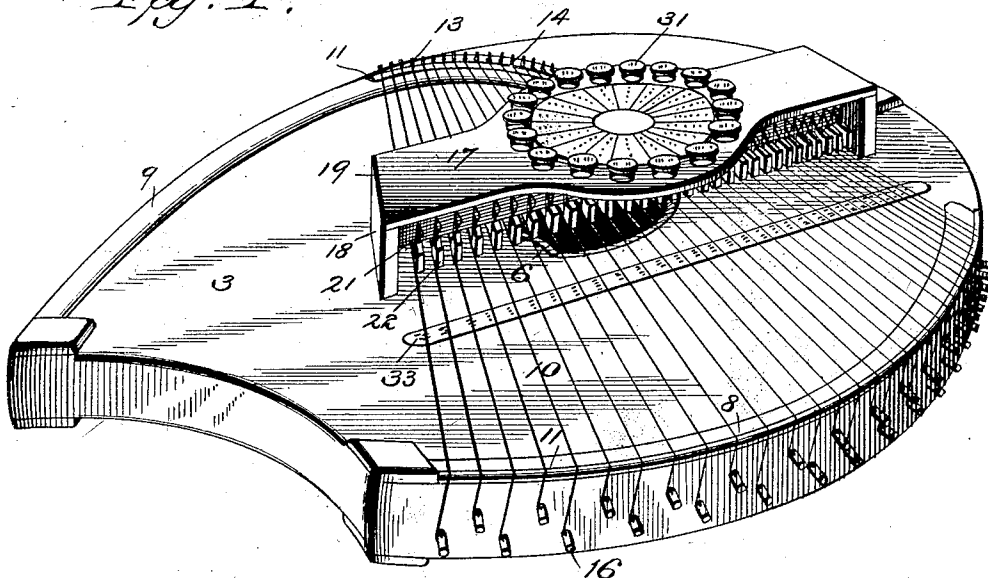
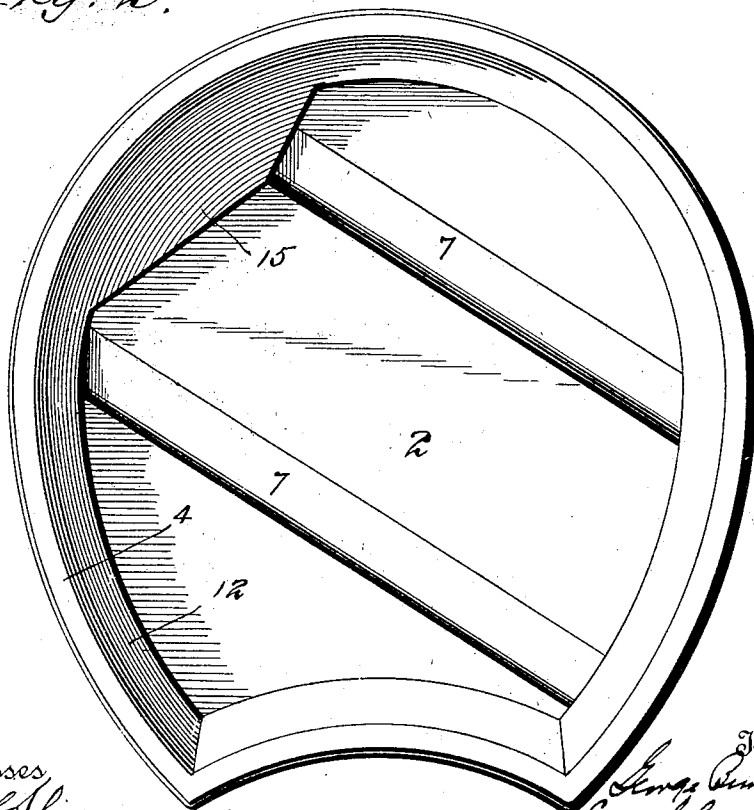


Fig. 2.



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Fig. 3.

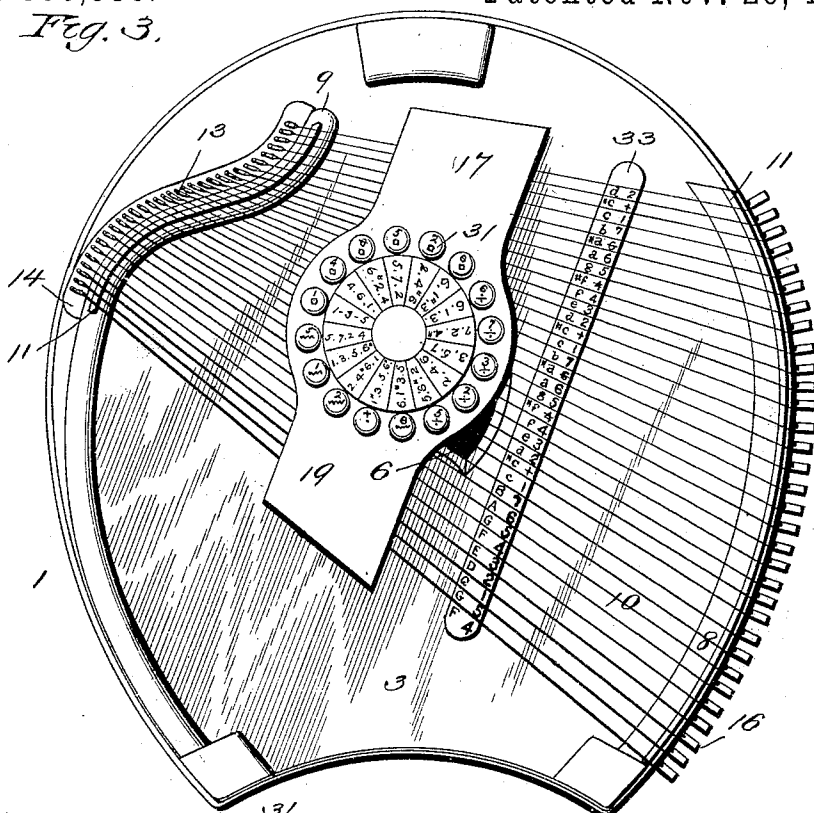


Fig. 4.

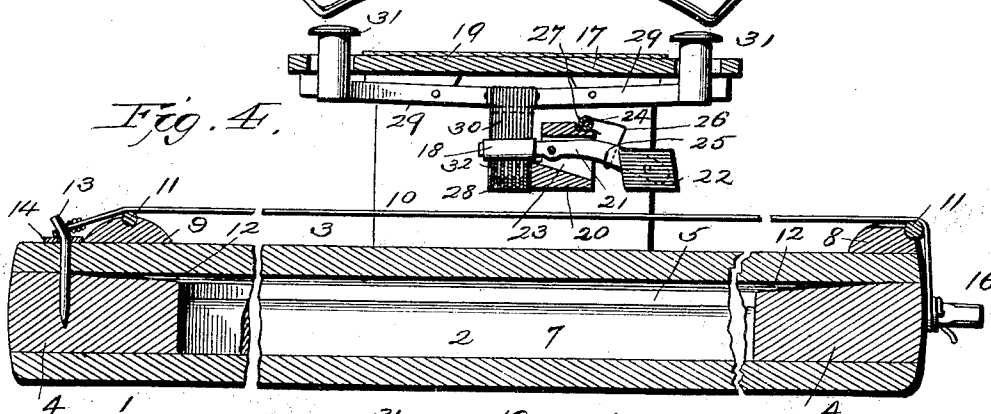
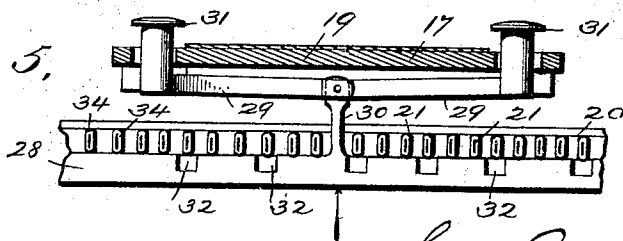


Fig. 5.



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(No Model.)

3 Sheets—Sheet 3.

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Fig. 6.

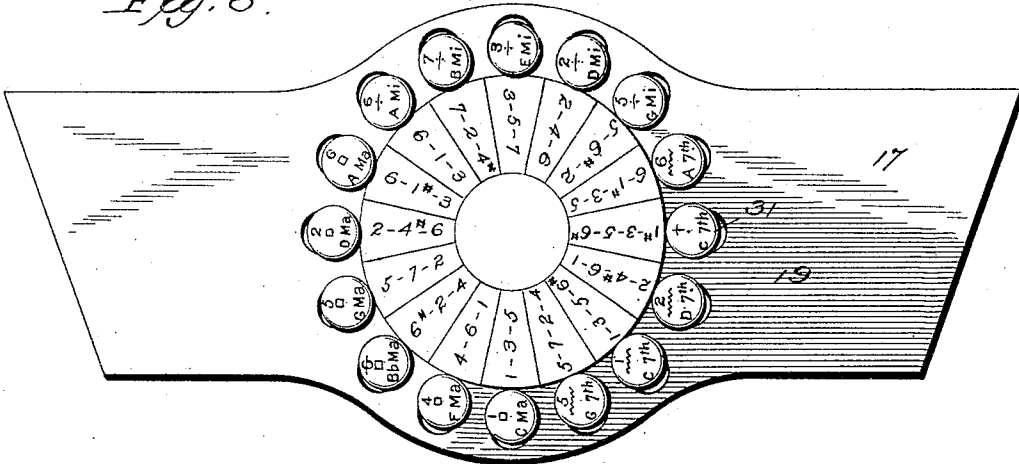


Fig. 7.

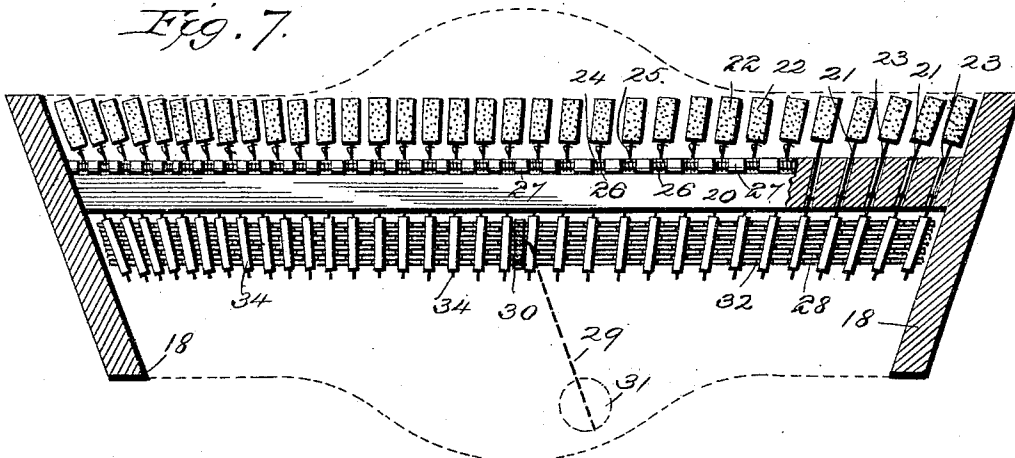
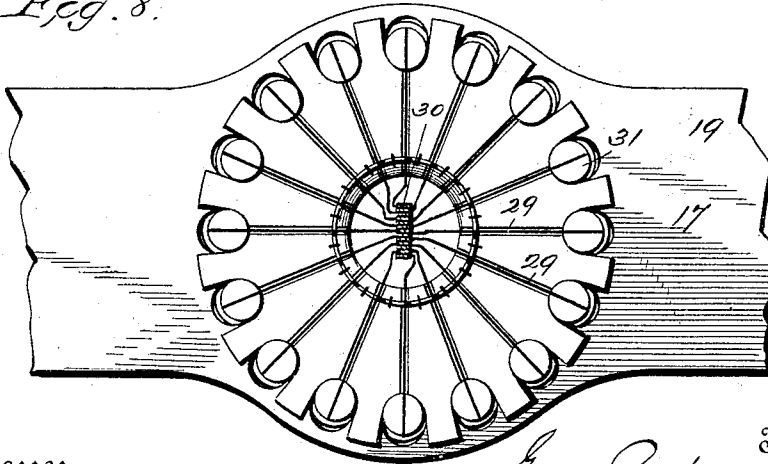


Fig. 8.



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UNITED STATES PATENT OFFICE.

GEORGE BENTON SHEARER, OF ONEONTA, AND ELWIN SOLOMON ANDERSON,
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HARP.

SPECIFICATION forming part of Letters Patent No. 550,538, dated November 26, 1895.

Application filed June 15, 1895. Serial No. 552,933. (No model.)

To all whom it may concern:

Be it known that we, GEORGE BENTON SHEARER, residing at Oneonta, in the county of Otsego, and ELWIN SOLOMON ANDERSON, residing at Sidney, in the county of Delaware, State of New York, citizens of the United States, have invented certain new and useful Improvements in Harps; and we do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the figures of reference marked thereon, which form a part of this specification.

Our invention relates to that class of musical instruments operating on the principle of harps; and it has for its object to provide for an improved construction of the sounding board or body of the instrument and of the arrangement of the strings and bridges, whereby a greater volume of sound and better tone is effected, and also to provide for an improved construction of the muting mechanism, and, further, to generally improve the construction in features which will be made to more clearly appear hereinafter.

To the accomplishment of the foregoing and such other objects as may be made to appear the invention consists in the construction and also in the arrangement of parts, all as hereinafter more particularly described, and then sought to be specifically defined by the claims, reference being had to the accompanying drawings, forming a part hereof, and in which—

Figure 1 is a perspective of the harp; Fig. 2, a plan of the bottom board and rim, the sounding-board and muting mechanism removed; Fig. 3, a plan view of the harp; Fig. 4, a vertical section through the harp on an enlarged scale; Fig. 5, an enlarged detail view of certain parts, some of which are broken away; Fig. 6, an enlarged plan of the muting-bridge and keys; Fig. 7, a plan of muting mechanism with top bridge removed; Fig. 8, a bottom plan of muting mechanism bridge, showing the key-levers.

In the drawings, the numeral 1 designates the body or base of the instrument, which preferably, although not necessarily, has the

form or outline of a horseshoe and is composed of a base-board 2 and a sounding-board proper 3, the two boards being separated by a rim 4, so as to leave an air space or chamber 5 between the two, the sounding-board being formed with the usual sound hole or opening 6.

The numerals 7 designate two wooden bars or rods extending, preferably, diagonally across the space between the sounding-board and base-board and bearing at opposite ends against the inside of the rim 4, and are primarily for the purpose of bracing the instrument between the points where the strings are secured to the instrument, said bars or rods being out of contact with the sounding-board, so as not to interfere with the vibration of the board.

To the sounding-board at opposite sides of the instrument are secured the bridges 8 and 9 for the strings 10, and each bridge at the point where the strings pass over the same has a wire or light metal rod 11 embedded in or secured in any suitable manner to its face so as to form a durable bearing-surface for the strings. The bridge 8 lies over the rim 4, so that the latter will form a firm and strong bearing for the bridge, and the bridge extends inwardly and in contact with the sounding-board for a distance, more or less, to bring it inwardly from the point of contact between the sounding-board and rim, so that the vibrations of the strings will be transmitted through the bridge on which the strings have quite an extended bearing to the sounding-board, where it is free from contact with the rim, thus giving greater vibration and volume of sound. The bridge 9 likewise lies over the rim and at the portions where the strings pass over the same is bent or curved inwardly, as illustrated, so as to bring it over the sounding-board at a distance from the outer edge of the board for the purpose of the better transmission of the vibrations to the sounding-board, and thus obtaining greater volume of sound, the inwardly bent or curved portion of the bridge lying upon the sounding-board where the same is out of contact with the rim. In order that these advantages may be obtained and the rim still have sufficient thickness to afford the requisite strength for hold-

ing the tuning-pins and hitch-pins, the rim is partially cut away or beveled from a point distant from its outer edge, as indicated by the numeral 12, thus affording a portion for the bridges to lie over and at the same time enabling the bridges to bear upon the sounding-board at a point where the board is not in contact with the rim, the beveled portion of the rim leaving a space between the rim and sounding-board at that point and above which a portion of the bridges lies.

It will be observed that the portion of the beveled part of the rim over which extends the bent or curved portion of the bridge 9 extends farther inward than the other portions of the rim, so as to afford a bearing for the hitch-pins 13. These hitch-pins pass through a metallic plate 14, which lies back of and against the bent or curved portion of the bridge 9, and the pins which pass through the plate have their bearing in the extended portion 15 of the rim 4, thereby affording a strong bearing for the hitch-pins and yet at the same time allowing the portion of the bridge over which the strings pass to rest upon the sounding-board at a point where the board is out of contact with the rim, and thus affording a greater volume of sound, as before stated. The tuning-pins 16 are secured in the side of the rim 4 next to the bridge 8 and hold the strings in contact with the top face of the bridge, so that their vibrations will be transmitted to the sounding-board and also hold the strings against the metal rod or wire 11, so that said wire or rod will be caused to take the strain of the strings in tuning. By the arrangement of the bridges and the rim, as described, the vibrations imparted to the sounding-board will also to a greater or less extent be transmitted to the base-board of the instrument, thus utilizing the base-board to some extent for adding to the volume of sound.

It will also be observed that the strings are arranged fan shape—that is, they are caused to diverge from the curved bearing portion of the bridge 9 to the opposite bridge 8, thereby extending the strings over a greater surface of the sounding-board, and thus securing practically greater sounding-board surface for the vibration and magnifying of tone.

Across the strings 10 extends a bridge 17, which sustains the muting mechanism, said bridge preferably being formed of the two uprights 18, suitably secured to the sounding-board, preferably by being glued thereto, and a board 19, which spans the strings and is secured by screws or otherwise to the uprights 18. This bridge sustains a bar 20, extending across the strings beneath the board 19. To this bar are fulcrumed a number of levers 21, one for each string of the instrument whatever the number be, and each provided with a damper 22, formed of felt or other suitable material, and adapted when thrown into contact with the strings to mute the strings. These levers are preferably fulcrumed to the bar 20 by fitting each in a separate slot 23,

formed in the bar and then passing a rod longitudinally through the bar and through each lever, so that the levers will be free to turn, each independently of the other. The damper carried by each lever is normally held out of contact with its string by means of a spring, which holds up the damper end of the lever. The spring is preferably made of wire, coiled any desired number of times around a shaft or rod 24, and having a loop 25, formed at one end in which the lever will lie, so that as the lever is depressed and raised the spring will slip or slide on the lever, and thus permit a free movement of the lever without the spring unduly binding the lever or exerting such an undue tension thereon as to interfere with the free, easy, and prompt movement of the lever and its damper. These springs are designated by the numeral 26, and are preferably separated one from the other by means of spacing-blocks 27, made of rubber or other suitable material, and encircling the shaft or rod 24. Provision is made for simultaneously actuating the proper and necessary number of these levers to produce the desired chord by throwing the proper dampers against the strings which are to be temporarily muted, so that by running the thumb-pick over the strings which are not muted, such strings will be vibrated and the desired chord produced. For this purpose we provide a series of plates or bars 28, extended transversely across the series of levers, so as to be brought into contact with the levers to press the same against the influence of the springs 26, so as to throw the proper dampers against the strings to produce the desired chord, the springs 26 restoring the dampers to their normal position as soon as the particular bar or plate has its pressure taken from the levers.

The bars or plates 28 preferably lie beneath the levers 21, and are brought into contact with those levers by means of key-levers 29, there being one of said key-levers for each of the bars or plates 28, each key-lever being suitably fulcrumed to an appropriate support—for instance, to the under side of the bridge-board 19—and having one end connected with its plate or bar—for instance, by a projection 30 from its plate or bar—the other end of the key-lever being provided with a key 31, which will project through the bridge-board 19, so as to receive the pressure of the finger in actuating the muting-dampers.

Each of the bars or plates 28 is adapted to actuate only so many of the levers 21 as will mute certain strings to produce the chord desired, each plate or bar being formed with the requisite number of notches or recesses 32 as will pass around or receive the ends of the levers corresponding to the strings which are not to be muted by the actuation of the particular bar or plate, and thus insuring the actuation of only those levers which will throw the particular dampers against the strings necessary to be muted in order to pro-

duce the chord desired. It is obvious, therefore, that each of the bars or plates 28 will be so notched or recessed that it will actuate only the levers and dampers to produce a certain chord. There may be produced as many chords as there are bars or plates 28, and as these bars are thin and each occupies a comparatively small space in cross-section the instrument is capable of producing an unusually large number of chords for an instrument of this type.

It is preferred to arrange the keys 31 in circular form, as illustrated, but we are not confined to that arrangement in applying our invention.

On the bridge-board 19, opposite to each key 31, will be placed numerals indicating the different strings, which will be free to vibrate upon depressing the key opposite to which said numerals appear. These numerals will have one or more corresponding numerals in a diagram or scale 33, placed upon the sounding-board 3 beneath the strings 10. The numerals in this scale, which correspond with the numerals appearing opposite any particular key, lie directly under and indicate the particular strings which will be free to vibrate upon the depression of such particular key, the other strings being muted by depression of that key. This diagram or scale will also designate at a glance the particular string to be picked to produce a given note or tone, as may be designated by a sheet of music containing the figures or numerals corresponding with the figures or numerals on the scale.

It will be observed that an instrument of the size illustrated in the drawings and containing thirty-two strings is divided into octaves of seven tones each, with sharps and flats added. The octaves run from 1 to 7 or from C to B, inclusive—thus 1, 2, 3, 4, 5, 6, 7—or if sharps occur—thus 1, 2, 3, 4, $\sharp$ 5, 6, $\sharp$ 7. As a basis of establishing a relative difference in the octaves, there is employed a different size and shape of figure for each octave. For instance, it will be observed that the heaviest or largest figures are employed for the bass tones; smaller figures and preferably of a different shape are employed to denote the middle octave, beginning with middle c; a still smaller or different set of figures and preferably of a different shape are employed to denote the second octave in the treble or the first octave above the middle c, and a still smaller figure and of different size employed to denote the high or upper octave, of which there are only three strings on an instrument of the size represented by the drawings.

The sharps are indicated by a numeral with a dash across the same. Thus, for instance, 6 sharp will be represented thus, δ . There may be also employed in this scale letters placed opposite to the numerals and of which the numerals are the equivalent, as illustrated in the drawings. These letters will be of different

sizes or have different faces, as illustrated, to distinguish the different octaves, and wherever a sharp is indicated by any of the letters, the letter indicating the sharp will be characterized, for instance, by a character such as $\sharp$, so that small c sharp would be represented thus, $\sharp$ c.

The instrument illustrated represents one having sixteen keys, producing sixteen different chords. The chords produced are respectively C major, G major, F major, B $\flat$ major, D major, A major, G minor, A minor, D minor, E minor, B minor, C seventh, G seventh, D seventh, A seventh, C diminished seventh. Each key has a marking or signature denoting what it is, which marking or signature may be applied in any suitable way for the purpose. It is preferred to apply the marking or signature to the key itself, as illustrated, although it may be otherwise applied. The preferred signature used is a numeral to designate the particular letter ordinarily employed and a character placed under the numeral to represent the particular chord. For instance, the majors C, G, F, D, A will be represented, respectively, by the numerals 1, 5, 4, 2, 6, and a character thus $\square$ will be placed under the numeral to indicate that it is major. For instance, C major will be represented thus, 1. The chord B $\flat$ would be

represented thus, δ , the figure 6 with the $\square$

diagonal line across it representing B $\flat$, and the character indicating that it is major.

In the minor chords the usual letters G, A, B, E, D will be represented, respectively, by numerals 5, 6, 2, 3, 7, and beneath each numeral will be placed the character $\div$, indicating that it is minor, thus the signature of G minor would be 5.

The signature of C, G, D, and A seventh would be represented, respectively, by numerals 1, 5, 2, 6, with the character $\sim$ beneath each numeral. Thus C seventh would be 1, the numeral indicating the letter and the character $\sim$ indicating that it is seventh.

The signature of C diminished seventh is $\div$, the $\div$ representing C and the $\cdot$ beneath it indicating that it is seventh.

In the drawings, each key has imprinted upon it the particular chord which it produces expressed in the ordinary way, and also has imprinted upon it the particular indicating-signature which has been just described, the particular indicating-signature corresponding with that used in the music, which will be furnished for use with the instrument. The purpose of employing with the particular indicating-signature upon the keys the usual marking to indicate particular chords is to guide and aid the beginner until familiarity can be acquired in the use of the new designating-signatures.

Another feature of the invention consists

in providing each of the levers 21 with an elastic cushion 34 of suitable material, which may be soft rubber, so as to afford a certain elasticity to the levers and thus cause the same to yield with the vibrations of the strings when the dampers are in contact with the strings, and thus not impair the vibrations to an extent that would detract from the tones sought to be produced by the vibrations of the strings. These cushions also serve to deaden any sound that the contact of the notched or recessed bars with the levers might have a tendency to cause.

We have described with particularity the preferred details of construction and arrangement of the several parts; but it is obvious that changes can be made therein without departing from the essential features of the invention.

It is desired to direct special attention to the fact that the tuning-pins are placed in the side of the instrument below the bridge for the strings instead of into the top of the instrument, as heretofore, and that the hitch-pins are placed back of the other bridge and through the metal plate which lies against the outside edge of that bridge. The advantage of this is that the tuning-pins draw the strings down upon the bridge next to the tuning-pins, so that there will be no jarring of the strings, and, furthermore, puts the tension on the strings over the edge of the instrument at such an angle next to the tuning-pins that the pins are relieved of the direct strain or pull, which in the ordinary location of the pins has a tendency to turn the pins so as to loosen the strings and put them out of tune. It also avoids the necessity of employing additional pins adjacent to the tuning-pins as ordinarily practiced to receive the pull on the strings as the tuning-pins are turned in tuning.

Having described our invention and set forth its merits, what we claim is—

1. In a stringed instrument of the type described, the combination with the sounding board, the baseboard, and the separating rim between the two boards, of the bridges for the strings located at opposite sides of the instrument and lying partially over the rim separating the two boards and extending or lapping upon the sounding board beyond the point of contact between the sounding board and said rim, substantially as and for the purposes described.

2. In a stringed instrument of the type described, the combination with the sounding board, the baseboard, and the separating rim between the two boards, of the bridges for the strings located at opposite sides of the instrument, a portion of said rim beneath the sounding board and said bridges being cut away or beveled so as to separate the sounding board and rim at such portion, substantially as and for the purposes described.

3. In a stringed instrument of the type described, the combination with the sounding

board, the baseboard, and the separating rim between the two boards, of the bridges for the strings located at opposite sides of the instrument, one of said bridges being bent or curved inwardly from the edge of the instrument, the separating rim between the two boards having a portion extended beneath the inwardly bent or curved bridge and separated from the sounding board at such point and adapted to receive the pins which bind the strings to said bridge, substantially as and for the purposes described.

4. In a stringed instrument of the type described, the combination with the sounding board, the baseboard, and the separating rim between the two boards, of the bars or rods extending across the space or chamber between the two boards with their ends bearing at opposite points against said rim, said rods or bars being out of contact with the sounding board, substantially as and for the purposes described.

5. In a stringed instrument of the type described, the combination with the sounding board, the baseboard, and the separating rim between the two boards, of the bridges for the strings located at opposite sides of the instrument, one of said bridges being bent or curved inwardly from the edge of the instrument, and the strings passing over both bridges and diverging from the inwardly turned or curved portion of one bridge toward the opposite bridge so that the strings will cover a gradually increasing area of sounding board surface from the inwardly bent or curved bridge to the opposite bridge and thus produce a magnifying of tone, substantially as and for the purposes described.

6. In a stringed instrument of the type described, the combination with the strings, of a series of independently fulcrumed levers, one for each string, provided with dampers normally out of contact with the strings, a series of bars or plates extended transversely across said levers, each bar or plate being adapted to move certain of the levers so as to throw their dampers into contact with certain strings to mute the same and formed with notches or recesses adapted to receive certain other levers so that said levers may remain in position to hold their dampers out of contact with their respective strings to permit the strings to vibrate, and means for actuating said bars or plates, substantially as and for the purposes described.

7. In a stringed instrument of the type described, the combination with the strings, of a series of independently fulcrumed levers, one for each string, provided with dampers normally out of contact with the strings, a bar provided with slots in which said levers are fulcrumed, a series of bars or plates extended transversely across said levers, each bar or plate being adapted to move certain of the levers so as to throw their dampers into contact with certain strings to mute the same and formed with notches or recesses adapted

to receive certain other levers so that said levers may remain in position to hold their dampers out of contact with their respective strings to permit the strings to vibrate, and means for actuating said bars or plates, substantially as and for the purposes described.

8. In a stringed instrument of the type described, the combination with the strings, of a series of independently fulcrumed levers, one for each string, provided with dampers normally out of contact with the strings, a series of bars or plates extended transversely across said levers, each bar or plate being adapted to move certain levers so as to throw their dampers into contact with certain strings to mute the same and formed with notches or recesses adapted to receive certain other levers so that said levers may remain in position to hold their dampers out of contact with their respective strings, to permit their strings to vibrate, and a series of fulcrumed key-levers connected with said notched or recessed bars or plates, one with each, for moving said bars or plates, substantially as and for the purposes described.

9. In a stringed instrument of the type described, the combination with the strings, of a series of independently fulcrumed levers, one for each string, provided with dampers normally out of contact with the strings, a series of bars or plates extended transversely across said levers, each bar or plate being adapted to move certain of the levers so as to throw their dampers into contact with certain strings to mute the same and formed with notches or recesses adapted to receive certain other levers so that said levers may remain in position to hold their dampers out of contact with their respective strings, to permit the strings to vibrate, and a series of fulcrumed key-levers arranged in a circle and connected with said notched or recessed bars or plates, one for each, for moving said bars or plates, substantially as and for the purposes described.

10. In a stringed instrument of the type described, the combination with the strings, of a series of dampers adapted to mute certain strings and to leave other strings free to vibrate, a scale provided with markings or characters to denote the tone of the different strings, keys arranged in a circle and from which motion is transmitted to said dampers to actuate the same, signatures for the various keys indicating the chord produced by actuation of each key, and markings or characters arranged inside the circle described by the keys, said markings or characters being opposite to the various keys and corresponding with certain of the markings or characters on said scale to indicate the particular strings influenced by the actuation of any

particular key, substantially as and for the purposes described.

11. In a stringed instrument of the type described, the combination with the strings, of a series of independently fulcrumed levers, one for each string, provided with dampers for muting certain strings while other strings are free to vibrate, and the springs for restoring said levers to their normal position after they have been moved therefrom, said springs being loosely looped around their respective levers to form a sliding connection therewith in the movement of the levers, substantially as and for the purposes described.

12. In a stringed instrument of the type described, the combination with the strings, of a series of levers provided with dampers for muting certain strings while other strings are free to vibrate, and an elastic or resilient cushion for said levers so as to facilitate the levers yielding to the vibrations of the strings when the dampers are in contact with the strings, substantially as and for the purposes described.

13. In a stringed instrument of the type described, the combination with the strings, of the bridges, one of which is curved inwardly over the sounding board, a metal plate located to bear against the outer side of said bridge, hitch pins passed through said plate, and the tuning pins located in the opposite side of the instrument below the bridge at that side so as to put the tension on the tuning pin ends of the strings over the edge of the instrument at such an angle as will tend to prevent the pins being loosened by the pull of the strings thereon, substantially as and for the purposes described.

14. In a stringed instrument of the type described, the combination with the strings, the sounding board, the base board and the separating rim between the two boards, of the bridges one of which is located over the separating rim in line with the outer edge of the instrument and provided with a metallic outer edge, the tuning pins located in the side of the instrument below the bridge so as to put the tension on the tuning pin ends of the strings upon the bridge over the separating rim and over the edge of the instrument to prevent jarring of the strings and at such an angle as will tend to prevent the pins being loosened by the pull of the strings thereon, substantially as and for the purposes described.

In testimony whereof we affix our signatures in presence of two witnesses.

GEORGE BENTON SHEARER.
ELWIN SOLOMON ANDERSON.

Witnesses:

WILLIAM FRANCIS WENGER,
CHARLES HENRY SEELEY.