

(No Model.)

A. R. LERRO.  
STRINGED MUSICAL INSTRUMENT.

No. 600,586.

Patented Mar. 15, 1898.

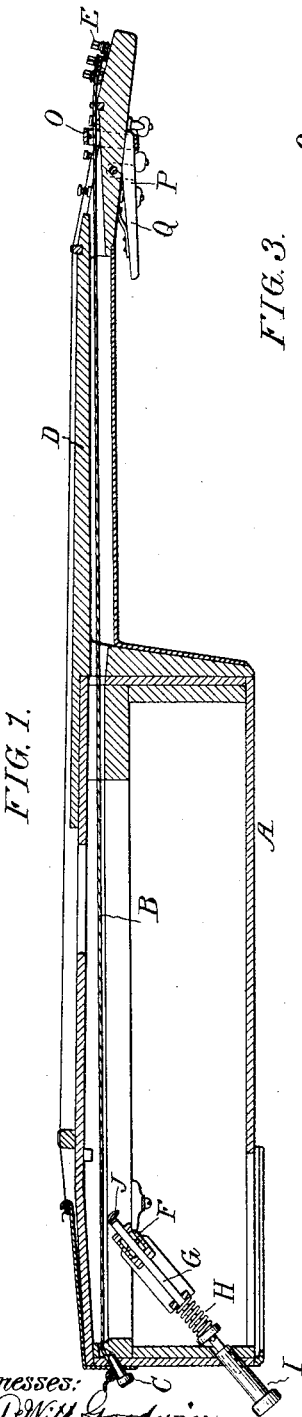


FIG. 1.

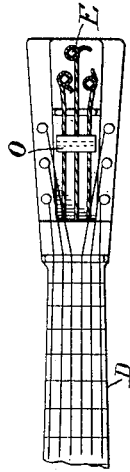


FIG. 3.

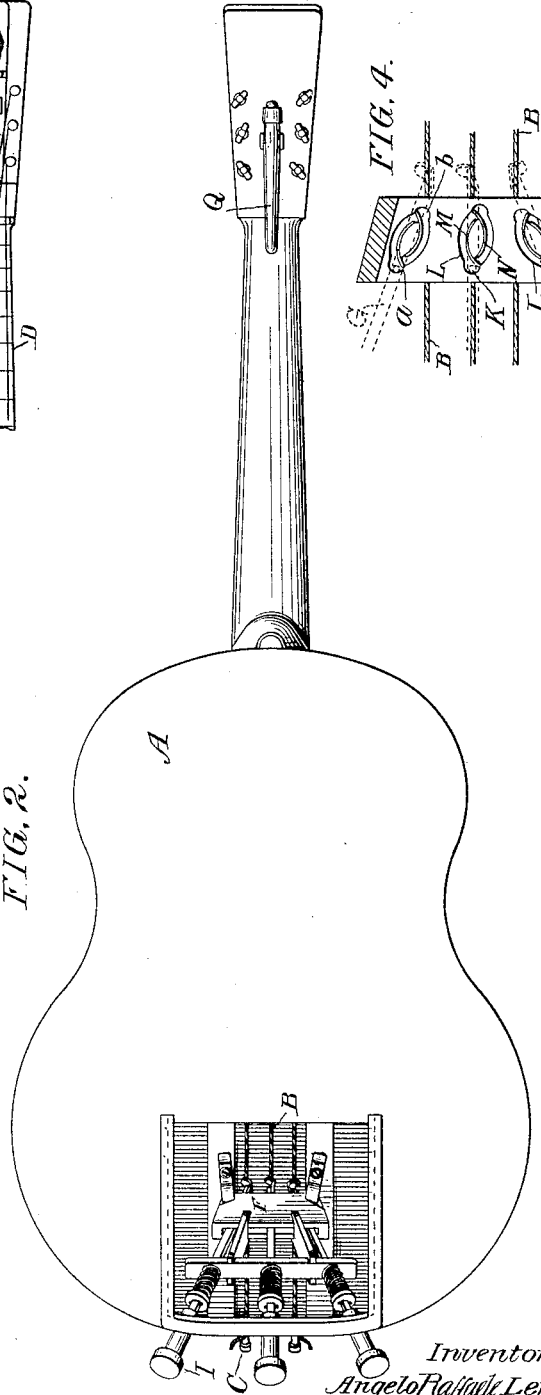


FIG. 2.

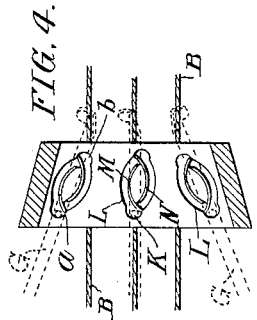


FIG. 4.

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# UNITED STATES PATENT OFFICE.

ANGELO RAFFAELE LERRO, OF PHILADELPHIA, PENNSYLVANIA.

## STRINGED MUSICAL INSTRUMENT.

SPECIFICATION forming part of Letters Patent No. 600,586, dated March 15, 1898.

Application filed September 30, 1897. Serial No. 653,659. (No model.)

*To all whom it may concern:*

Be it known that I, ANGELO RAFFAELE LERRO, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented a certain new and useful Improvement in Stringed Musical Instruments, of which the following is a specification.

My invention relates to a new and useful improvement in stringed musical instruments, and has for its object to add to the present strings of an ordinary guitar or the like other strings arranged within the body of the instrument and capable of being put in action by the plunger-keys, adapted to be controlled by some other portion of the body than the fingers—as, for instance, by the knees.

A further object of my invention is to provide an exceedingly simple mechanism for bringing about the mechanical “picking” of the secondary strings in substantially the same manner as strings are usually acted upon by the fingers.

With these ends in view this invention consists in the details of construction and combination of elements hereinafter set forth, and then specifically designated by the claims.

In order that those skilled in the art to which this invention appertains may understand how to make and use the same, the construction and operation will now be described in detail, referring to the accompanying drawings, forming a part of this specification, in which—

Figure 1 is a longitudinal section of a guitar having my improvement applied thereto; Fig. 2, a bottom plan view thereof; Fig. 3, a detail of the head, showing the arrangement for tuning the primary and secondary strings; and Fig. 4, an enlarged detail of run-around cam-grooves for bringing about the proper motion of the plunger-keys, said keys being shown in dotted lines.

In carrying out my invention as here embodied, A represents a stringed instrument, which may be of any suitable type or design, and within the body thereof are strung the secondary strings B, these strings being secured at C and extending forward through an opening in the arm D to the tuning-keys E, to which they are attached and by means of which their tone may be varied, as is well

understood. Beneath the inner portion of the secondary strings is located a housing F, and through this housing the plunger-keys G pass and are adapted to slide to and fro therein, coil-springs H serving to hold these keys in their normally-lowered position, the outer ends thereof having heads I, whereby they may be easily manipulated. From this it will be seen that when one of the plunger-keys is forced inward against the action of its spring the inner end thereof will come in contact with one of the secondary strings B and, if properly manipulated, will give to said string the vibrations necessary to bring about musical sound. Now the manipulation of the inner end of the key, which is provided with an offset J, is accomplished by a pin K, carried by each of the plunger-keys projecting within the oval-shaped groove L, and this groove has located therein the springs M and N, each of said springs having one of its ends projecting across the slot, as indicated at *a*, so that when the pin is forced forward it will ride upon its spring until coming to the opposite portion of the slot and in contact with the projecting end of the opposite spring, when it will force the last-named spring backward and pass into the pocket or recess *b*. In this movement of the pin within the slot, which, as shown in Fig. 4, is curved, the inner end of the plunger is caused to describe a circular path, and in so doing first comes in contact with the string to be sounded and then, after depressing said string to a certain extent, will pass out of line therewith, permitting the string to spring backward and give forth vibratory sounds. After the plunger-key has accomplished this result the release thereof will permit the spring H to return to its normal position. During this last-named motion it, having previously gained access to the opposite side of the spring N, will be carried by the pin K through the curved path in the reverse direction from that which it traveled upon its inward movement, thus preventing its end from coming in contact with the string upon this reverse movement. By this arrangement it will be seen that each of the plunger-keys may be made to sound its respective string, and as this can be brought about without the use of the hand it will be seen that in the playing of the instrument in the usual man-

ner a considerable volume of sound may be added thereto by the proper manipulation of the plunger-keys G, since by such manipulation the secondary strings will give forth their sounds, and these being upon the inside of the body will be mellowed, although of considerable volume, and these vibrations when blending with the vibrations of the primary strings have been found to produce superior results.

The secondary strings may be varied in tone by suitable treading, and I have here shown a treadle-bridge O, connected with the lever P, which latter is actuated in one direction by the spring Q, so that when it is desired this lever may be operated to the vibrating length of the secondary strings therein, thus increasing the rapidity of said vibrations which, as is obvious, will alter the tone of the sounds emanating therefrom.

As before stated, the pitch and tone of the secondary strings may be varied to suit the particular requirements or fancy of the user of the instrument by the tuning-keys E, thus permitting the harmonious tuning of both the secondary and primary strings from which most unique and attractive results may be produced.

Of course I do not wish to limit myself to the exact construction here shown or the application of my improvement to any particular style of instrument, as these might be varied to a considerable extent without departing from the spirit of my invention.

Having thus fully described my invention, what I claim as new and useful is—

1. In combination with the primary strings of a musical instrument, secondary strings arranged substantially parallel therewith and beneath said primary strings, plunger-keys for operating the secondary strings, and means for tuning the same, as specified.

2. In combination with the primary strings of a musical instrument, secondary strings arranged therebeneath, keys for tuning said secondary strings, means for treading these strings, and plunger-keys for operating the same, substantially as specified.

3. In combination with a stringed musical instrument, a treadle-bridge arranged above the strings of said instrument, the ends of said bridge projecting through the neck, a lever pivoted to the under side of the neck and connected at one end to the ends of the bridge, to draw the same down against the strings, and a spring arranged between the opposite end of said lever and the neck whereby said bridge is normally held away from the strings, as and for the purpose described.

In testimony whereof I have hereunto affixed my signature in the presence of two subscribing witnesses.

ANGELO RAFFAELE LERRO.

Witnesses:

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S. S. WILLIAMSON.