July 23, 1929. N. A. PEDERSEN 1,721,710

MUSICAL INSTRUMENT

Original Filed Dec. 26, 1925

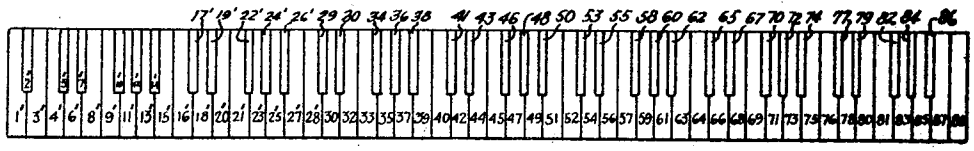


Fig. 3.

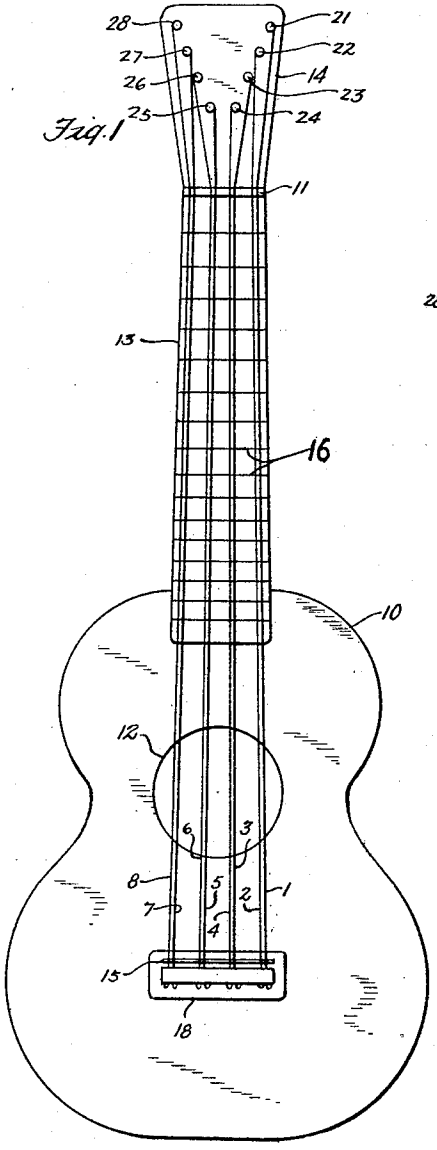
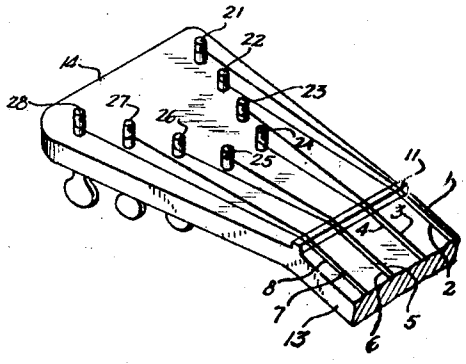


Fig. 1

Fig. 2.



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MUSICAL INSTRUMENT.

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The present invention relates to musical instruments, and more particularly to an improved form of ukulele.

The forms of ukulele heretofore produced are comparatively crude instruments, and do not give a volume or quality of tone which is comparable with that of other musical instruments, such as the violin or the cello, for example. The forms of ukulele now in use do not appeal in general, therefore, to the more refined musical taste, although the cost of such instruments is very low in comparison with most musical instruments.

It is the purpose of the present invention to provide an improved form of ukulele which has a greater volume and beauty of tone than that obtained from instruments of this type heretofore produced.

Another object of the invention is to provide a ukulele in which the drum sound, or the "dead" sound of the instrument will be eliminated and which will produce a tone which is more resonant than that obtainable from other instruments of the guitar class.

With these and other objects in view the invention comprises the various features hereinafter described and more particularly defined in the claims.

The preferred form of the invention is illustrated in the accompanying drawings, in which—

Figure 1 is a plan view of a ukulele embodying my invention;

Figure 2 is a detailed view in perspective of a portion of the instrument, showing the head and the pegs therein to which the strings of the instrument are attached at one end; and

Figure 3 is a view showing a piano keyboard with the numbers indicated thereon, to which reference will hereinafter be made in connection with the tuning of the ukulele.

Referring more particularly to the drawings, the numeral 10 designates the body or sounding box of the ukulele, which is preferably made of mahogany, and of a size preferably intermediate between that of the ordinary ukulele and the full size guitar. The body portion of the instrument is preferably about twelve and one-half inches long and about nine inches wide at the lower widest portion, the upper body portion being preferably about seven inches wide. In one side of the body portion, which constitutes the upper side of the body in the finished ukulele, is a sound hole 12 which is preferably positioned slightly above the center line of the body and midway between the sides of the body, as is indicated in the drawing. The sound hole may be of any suitable size, although with the dimensions of the sounding box referred to above, a hole of about two and three-eighths inches is found to be preferable. The lower face of the body or sounding box of the ukulele is obviously of the same size as the upper face but, of course, does not have the sounding hole, since its purpose is to act as a sounding board, which with the other parts of the body portion, causes a reinforcing of the string tones. Between the top and the bottom faces of the sounding box is a member 10^a passing around the periphery or edge of the faces and serves to form the side walls of the sounding box. This wall is preferably about two and three-quarters inches in width, although this width may obviously be varied as may be desired. Attached to the body portion or sounding box of the ukulele is a neck piece or finger board 13, which is connected in the usual manner to the body portion and has attached to it at its outer end a head piece 14 in which the tuning pegs of the instrument are mounted and to which the strings are attached at one end.

Instead of using four strings on the instrument as is ordinarily employed, I preferably use eight strings which are so mounted on the instrument that the strings are in pairs and adapted to be played in pairs, the strings of each pair being tuned an octave apart.

While I prefer to use four sets of double strings, the strings of each set being tuned an octave apart, I may use three sets of strings, the strings of each set being an octave apart, and in addition a single string instead of a pair or set to furnish the remaining tone range, where tone balance may be produced between the single and the double strings. I may, for example, employ a single string in place of the pair of strings producing the highest tones, although as above stated, the complete double string arrangement is preferred.

The various strings of the instrument are attached in the usual manner, being connected at one end to a bridge member 18, which is preferably of oblong shape, and having an extended base, allowing it to bear

great tension. The bridge 18 is preferably provided with eight drilled holes through which the strings are passed and knotted on the outer end so as to prevent the strings from slipping through the holes when put under tension. The bridge may also be provided or backed by a plate of brass, or other suitable metal, having holes drilled therein so as to register with the holes in the bridge above described, thereby serving to prevent wear on the bridge and furthermore to distribute the stress caused by the tension of the strings to the entire bridge member. In the front portion of the bridge, or mounted upon the base of the bridge member, is a tone bar 15, which may be made of bone or other suitable material, and which forms a bed or supporting unit for one end of the strings, and which serves also for limiting the oscillating length of the strings at one side of the instrument. At the top portion of the neck piece or finger board 13 is a nut 11 serving substantially the same purpose as the tone bar 15, serving to support the strings at the upper end and to limit the oscillating length of the strings at the upper end of the instrument. It is obvious that when the strings are played only the portions of the strings between the tone bar 15 and the nut 11 or the frets on which the strings are pressed are permitted to oscillate to produce the tones of the instrument. The nut 11 is preferably provided with slots so as to hold the strings in place or to maintain the various strings in their desired relative positions.

In order to obtain the desired tone intervals on the instrument, a series of frets or raised bars 16, of metal or other suitable material, are mounted upon the finger board at the proper intervals whereby, when the strings are pressed onto the frets, the portions of the strings between the frets onto which the strings are pressed and the tone bar will vibrate when the strings are struck or stroked in the usual manner.

The strings of the instrument numbered 1 to 8 are attached to their corresponding pegs 21 to 28, as is indicated in Figures 1 and 2 of the drawings. The pegs may be made of any suitable material and may be mounted in any desired way, although the preferred form of mounting comprising the use of cog wheels, as is ordinarily employed in connection with the mandolin, for example, whereby a substantially constant tension on the strings is maintained and whereby the strings may be readily brought to the desired pitch. For the purpose of illustration, however, a more simplified form of connection is shown in the drawings.

The strings of the preferred form of my ukulele are preferably tuned as follows, reference being had to the diagram of Figure 3, showing the ordinary piano keyboard. The highest string of the instrument, string #1, is preferably tuned to correspond with the pitch of piano key #51 or, in other words "B" above "middle C". String #2 is tuned to correspond in pitch with piano key #39 or "B" below "middle C". Strings #3 is tuned to correspond to piano key #46 or, in other words "F sharp" (F#) above "middle C", and string #4 is tuned to correspond to piano key #34 or "F sharp" below "middle C". String #5 is tuned to correspond with the piano key #42 or "D" above "middle C" and string #6 is tuned to correspond with piano key #30 or "D" below "middle C". String #7 of the last pair of strings is tuned to correspond with piano key #49 or "A" above "middle C" and string #8 is tuned to correspond with piano key #37 of Figure 3 or, in other words "A" below "middle C" on the piano keyboard. It is to be understood that the pitch of the various keys may be raised or lowered if desired, and also that the particular combinations of string tones which has been described represents merely the preferred combination and may obviously be varied to suit the individual player.

As has been explained above and as illustrated in the drawings, there are preferably four pairs of strings, the strings of each pair being tuned an octave apart, whereby an improved tone is produced which has a greater volume than is obtainable by the use of single strings, and moreover, is sweeter and more resonant than that produced from the ordinary ukulele having single strings. The reason for the amplification of the tone and increased sweetness of tone over that of the ordinary instrument is not entirely known, although it is believed that the difference is due to the reinforcement of the over tones of the lower string by the upper string of each pair. When the strings numbered 1 and 2, are played, for example, the string #2 produces the fundamental tone and also its harmonizing over tones comprising mainly thirds and fifths and the octaves of the fundamental tone. The upper string or string #1, which is simultaneously played, produces its main or fundamental tone an octave over that of the fundamental tone of string #2 but produces also its over tones comprising thirds and fifths, which serve to reinforce the over tones of the string #2. In the playing of the strings 1 and 2 there is produced more or less noise due to the vibrations of the strings out of their natural period, which occurs more or less when the strings are first struck or stroked; accidental or undesired over tones are thus produced which, in the ordinary instrument, greatly reduce the sweetness of tone and is the cause of the inharmonious sounds of the instrument. Obviously, the harmonious tones or over tones of strings 1 and 2 supplement

each other through sympathetic vibration and therefore augment the desired over tones which increase the richness or sweetness of the tones produced on the strings. The accidental or forced vibrations of the strings produce tones out of the natural periods of vibrations and this vibration of one string in any pair is not supplemented by that of the other string through sympathetic vibration. It appears in fact, when one of the strings is caused to vibrate out of its natural period of vibration, the other string tends to "kill" or prevent the forced vibration, resulting substantially in the elimination of inharmonious sounds, or effects a reduction in the undesired vibrations to such an extent as to render such vibrations inaudible. It is apparent therefore that by the use of pairs of strings, the strings of each pair being an octave apart in pitch, the desired harmonious tones will be increased and the undesired sounds will be diminished or eliminated, whereby the volume of tone is greatly reinforced, and a richer and sweeter tone than is obtainable from other instruments of this type is produced.

Any suitable type of strings may be employed on the instrument, but I have found that the best results are produced by the use of the following types of strings, with reference to the strings of the instrument as indicated in the drawings by numerals 1 to 8.

String #1—Banjo first, steel.
String #2—Guitar third, compound, or on silk.
String #3—Guitar first, steel.
String #4—Guitar fourth, compound, or on silk.
String #5—Guitar second, steel.
String #6—Guitar fourth, compound, or on silk.
String #7—Banjo first, steel.
String #8—Guitar third, compound, or on silk.

It is to be understood that while I prefer the above particular form of strings, this combination of strings has been given for purposes of illustration only, and that I may employ any other form of strings which may be found suitable for the purposes, or I may use them in any desired combination. It is also to be understood that various modifications or changes may be made in the various details of the instrument as will be apparent to those skilled in the art without departing from the spirit or scope of the invention as defined in the claims.

Having thus described the invention what is claimed as new is—

1. A ukulele having a series of pairs of strings, the strings of each pair being of different character so as to enable one of each pair to be tuned an octave above or below the other, whereby when so tuned and the strings of a pair are simultaneously struck, a balanced tone is produced.

2. A ukulele having a series of pairs of strings, the strings of each pair being of different character so as to enable one of each pair to be tuned an octave above or below the other and arranged so as to enable them to be simultaneously struck, the corresponding or similarly placed strings of each pair being of similar material, whereby when the strings are so tuned and the instrument is played a balanced tone is produced.

3. A ukulele having four pairs of strings, the strings of each pair being of a different character so as to enable one of each pair to be tuned an octave above or lower the other, the corresponding strings of the pairs being of similar material, and the strings of each pair being so arranged as to enable them to be substantially simultaneously played, whereby when the pairs of strings are so tuned an octave apart in the sequence corresponding substantially to A, D, F sharp, B and the instrument is played, a homogeneous balanced tone is produced throughout the range of the instrument.

In testimony whereof I affix my signature.

NICHOL A. PEDERSEN.