

May 10, 1949.

E. STRONG

2,469,582

MUSICAL STRINGED INSTRUMENT

Filed Aug. 31, 1945

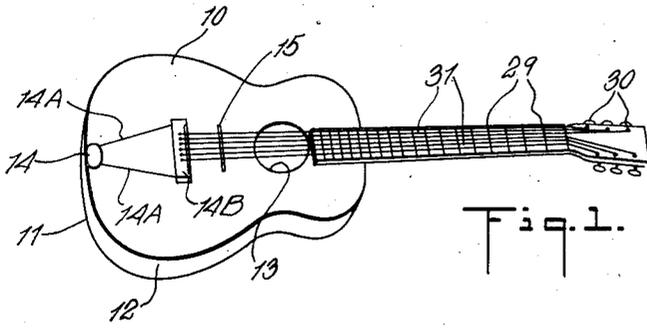


Fig. 1.

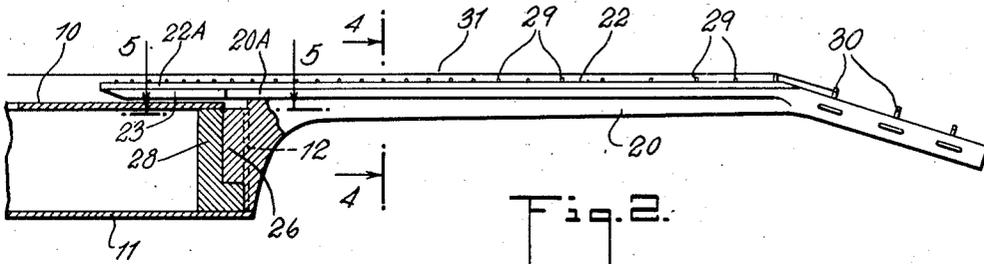


Fig. 2.

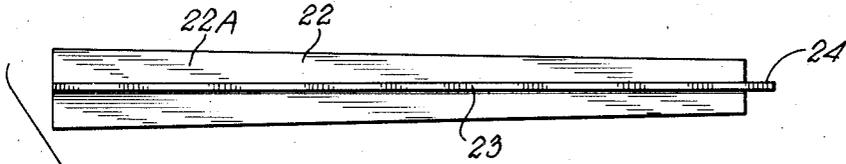


Fig. 3.

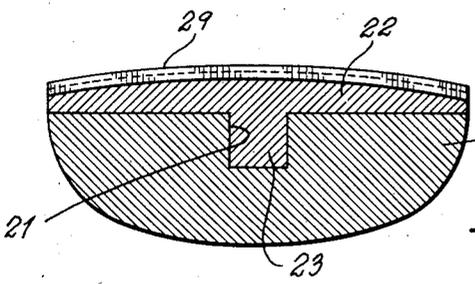
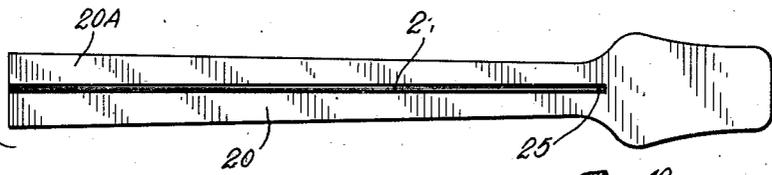


Fig. 4.

Fig. 5.

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# UNITED STATES PATENT OFFICE

2,469,582

## MUSICAL STRINGED INSTRUMENT

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Application August 31, 1945, Serial No. 613,908

4 Claims. (Cl. 84—293)

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My invention relates to improvements in musical stringed instruments and refers particularly to means for increasing the rigidity of the necks of such instruments against strains and stresses as well as against warping of the neck due to atmospheric and other agencies.

As the neck of musical instruments such as violins, cellos, mandolins, guitars, ukeleles, balalaikas and banjos, are of considerable length with comparatively small cross-sections to adapt itself to the proper fingering of the strings, or wires, and as the strings, or wires, are anchored in taut condition between the free end portion of the neck and the body, and as this tautness is increased as the strings or wires are pressed downwardly during the playing of the instrument, the neck is subjected to a series of spasmodic stressing, tending to warp it from its desired horizontal plane.

As the neck of such an instrument is warped upwardly from its original position, the tautness of the strings or wires, is decreased and the strings, or wires, are positioned higher above the neck than they were in their original position, all of which interferes with the playing of the instrument and prevents the production of the desired tones.

In addition to the warping of the neck of a musical stringed instrument due to the straining or stressing of the strings, it is subjected to the warping conditions incident to varying degrees of humidity and temperature of the atmosphere, which have a tendency to warp it toward the point of least resistance or rigidity.

It is evident, therefore, that it is important that the neck of such a musical instrument should be of such composition and construction that it will not warp from its original position during its normal periods of playing and when it is stored away and not in use.

The instruments of my invention are constructed to overcome this danger of warping, bending and twisting, as will be evident upon a consideration of the accompanying drawings in which similar parts are designated by similar numbers.

Fig. 1 is a perspective view of one form of a device of my invention.

Fig. 2 is an enlarged side view, partly in section, of the neck of the device of Fig. 1.

Fig. 3 is an enlarged exploded view of the bottom of the fingerboard and the top of the base member of the device of Fig. 1.

Fig. 4 is an enlarged section through the line 4—4 of Fig. 2.

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Fig. 5 is an enlarged horizontal section on the line 5—5 of Fig. 2.

The body of the particular guitar shown in the accompanying drawings comprises a top member 10 and a bottom member 11 connected together with a side member 12. The top member 10 acts as a sounding board and has an aperture 13, a tailpiece 14 connected by strings or cords, 14A—14A to the string anchor 14B, and a bridge 15.

As no claim is made to any particular body formation, the illustrated body is given simply as a means for clearly describing my invention as applied to a particular musical stringed instrument.

My invention refers particularly to the construction and formation of the neck portion of stringed musical instruments of the character mentioned, and the particular construction and form of the device of my invention as shown in the accompanying drawings comprises the elongated base neck member 20, having an elongated recess, or groove, 21, extending downwardly from the upper face of the base member 20 and abutting thereon is a fingerboard 22 having an elongated extended tongue 23, said extended tongue 23 being insertable into, and preferably cemented within, the groove recess 21 of the base member 20, said extended tongue being extended beyond the end of the fingerboard 22 as at 24, adapted to fit within the extended portion of the groove 21 of the base member 20, the lower face of the member 24 being inclined upwardly and the lower face of the groove 21 being inclined upwardly at 25 in order that the upper face of the member 24 may be flush with the upper face of the base member 20 when the tongue 23 is inserted within the groove 21.

The rear portion of the base member 20 is extended downwardly and has the male dovetail member 26 which extends downwardly from the top member 10 through the recess 27 of the side member 12 of the body, and is fixedly attached to the member 28, which latter member is fixedly attached to the inner face of the side member 12 of the body, the top member 10 of the body and the bottom member 11 of the body.

The lower end portion 20A of the base member 20 and the lower end portion 22A of the fingerboard 22 extends over the upper face 10 of the body and are spaced therefrom as shown in Fig. 2.

In the usually constructed device of this character, where the fingerboard member extends over the body of the instrument, the fingerboard and the lower neck member rest upon the top mem-

ber of the body, or are supported by a member which rests upon the top member of the body, this construction being necessary because the neck of the instrument is not constructed to prevent warping, and hence this attachment between the neck elements and the body is adopted to assist the neck member from warping. This attachment between these members, however, interferes with the proper tone vibrations of the top member of the body.

I overcome this interference of tone vibrations, by spacing the neck members from the top of the body, thus allowing full vibration, the construction of my neck members, as shown and described, making this previously employed attachment of neck member and body unnecessary.

The fingerboard 22 carries a plurality of spaced parallel frets 29, 29 of the desired spacing and number, the base member carries the desired number of string keys 30, 30, as anchorages for the strings, or wires, 31, 31, the other end portions of which are carried over the bridge 15 and are attached to the string anchor 14B.

In the particular form of my device the fingerboard 22 carries the frets, but it is evident that if desired, the frets may be carried by a separate member fixedly attached to the upper face of the fingerboard 22.

One of the features of my device is the particular construction of the finger member 22 of the neck and that of the base member 20 of the neck and the means of attaching the neck member to the body of the instrument, all of which are designed to prevent the bending and warping of the neck member and to maintain the position of the neck with respect to the body in the desired position.

A consideration of my device shows the following rigid construction:

The fingerboard 22 is positioned above the base member 20 of the neck, the lower faces of the fingerboard 22 and the upper faces of the base member 20 having been coated with a proper cementing material, and the fingerboard 22 is then forced downwardly, the tongue 23 of the fingerboard 22 entering the groove 21 of the base member 20, and is preferably cemented thereon. It will be noted that by this construction the tongue 23 and the groove 21 prevents a sideway warping of the neck and assists the other portions in preventing a vertical warping of the neck.

In the usually constructed devices of this character, a separate metal tongue, such as 23, is inserted into a slot, such as 21 of the base member 20, the top of the tongue being flush with the upper face of the base member. A fingerboard, such as 22 without the shown integral tongue 23 is then cemented to the upper face of the bottom member 20. The result of this construction is unsatisfactory as there is no stiffening member connecting the fingerboard and the base member, the wood and metal do not bond and the variant characteristics of the two materials with respect to heat, humidity, etc., prevent them from acting as integral to each other.

It will be noted also, that this construction presents a much greater area of cemented surfaces than is possible in the ordinary method of cementing a flat surface of a fingerboard to a flat surface of a base member, thus increasing both the rigidity and prevention of warping and bending of the neck as a whole.

The rigid neck thus produced is fixedly attached to the body by means of the extended base member 26 which is cemented to the member 28 car-

ried by the interior members of the body of the device. By these means the extended face 32 of the base portion 20 abutting upon the outside face of the side member 12 prevents any horizontal, or vertical, movement of the neck with respect to the body, this abutting portion being fixedly assisted by truncated pyramidal, or dovetail member 26 positioned within the truncated pyramidal, or dovetail, recess 33 of the fixedly attached member 28, as clearly shown in Figure 5.

While the neck member of my invention can be made in the usual manner by cementing a separate fingerboard to the upper face of the base member, I prefer to employ the form shown in the accompanying drawings in which the fingerboard is a part of the base member, thus avoiding the possibility of a separation of the fingerboard from the rest of the neck.

In this preferred form, the fingerboard is composed of a material composed of a plurality of thin wood laminations, pressure impregnated with a phenol formaldehyde resin, heated and then superpressed in heated steel dies to produce the desired shape. The material thus formed has high tensile strength, high compressive strength, high modulus of rupture and bending and exceedingly low moisture absorption and is light in weight, all of which properties are desirable in the neck portions of musical stringed instruments. This material has the additional valuable properties in that it can be molded or machined into the desired shape, its surface can be highly polished so that it needs no further treatment, and it has practically the same expansion and construction ratios as the body of the device, and it is capable of much more permanent attachment to the base portion of the neck than the metal parts usually employed.

Materials thus formed and having the described characteristics are commercially obtainable and are known as "Compregwood," "Compreg," "Pregwood" and by other commercial designations, and by the word "Compregwood" in my specification I mean materials having the construction and properties described above.

With reference to the term "Pregwood," this material, as indicated hereinbefore, is a laminated plastic material. It is composed of maple veneers impregnated with thermosetting resin, which under heat and pressure is converted to a compact solid. The long unbroken wood fibers provide unusual high tensile strength values. The resin bonds the fibers to give high shear resistance and provides moisture protection. The maximum physical properties are in the direction of the wood grain. The properties of Pregwood of importance by comparison with other laminates are its stiffness and its impact and tensile strength, and also its ability to be firmly bonded to other wooden structures.

In addition to high physical strength properties, Pregwood has an inherent beauty due to the thorough penetration of resin into the wood cells, thus bringing out the full depth of the grain. This material is refinishable throughout its thickness.

While I have thus described my devices as being constructed with a fingerboard made from the material known as "Compregwood" and a base member of wood, "Compregwood" may be employed for both the fingerboard and the base member of a neck.

I do not limit myself to the particular size, shape, number, arrangement or material of parts as specifically mentioned and described as these

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are given solely for the purpose of clearly describing the devices of my invention.

What I claim is:

1. In a musical stringed instrument comprising a neck member having an elongated base portion one end portion of which is extended downwardly carrying a rearwardly extended portion, said rearwardly extended portion being adapted to extend through an aperture in the side body member of a said musical stringed instrument and of being fitted within a recess of a member within the said body of said instrument fixedly attached to the inner face of the body of said instrument, said neck base member having a longitudinal groove therein and a plurality of stringed keys carried by the other end portion of said base member; and an elongated fretted fingerboard having an integral, elongated tongue, said fingerboard being fixedly attached to the upper face of said base member with said tongue inserted within said groove of said base member, the lower end portions of said fingerboard and said base member being adapted to extend over the upper face of said body portion and being spaced therefrom.

2. In a musical stringed instrument comprising a neck member having an elongated base portion one end portion of which is extended downwardly carrying a rearwardly extended portion, said rearwardly extended portion being adapted to extend through an aperture in the side body member of a said musical stringed instrument and of being fitted within a recess of a member within the said body of said instrument fixedly attached to the inner face of the body of said instrument, said neck base member

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having a longitudinal groove therein and a plurality of stringed keys carried by the other end portion of said base member; and an elongated fretted fingerboard having an integral, elongated tongue, said fingerboard being fixedly attached to the upper face of said base member with said tongue inserted within said groove of said base member, the lower end portion of said fingerboard and an end portion of said base member being adapted to extend over the upper face of said body portion and being spaced therefrom.

3. A neck for a musical instrument comprising an elongated base element having a centrally disposed longitudinal groove, a fingerboard of substantially T configuration adapted for union with said base element, and a longitudinal tongue on said finger board constituting the vertical part of said T configuration arranged and constructed for sealed disposition in said groove.

4. A neck according to claim 3, and means including a dovetail tongue which is adapted for mesh engagement with a dovetail recess in a body portion of the musical instrument.

EMERSON STRONG.

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