United States Patent

Raphael

[15] **3,693,490**

[45] **Sept. 26, 1972**

[54] **STRINGED INSTRUMENTS WITH ADJUSTABLE FRICTIONAL GRIPPING MEANS FOR THE STRING SUPPORTING PINS**

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[22] Filed: **May 21, 1969**

[21] Appl. No.: **826,345**

[52] **U.S. Cl.** **84/202,** 84/186, 84/305

[51] **Int. Cl.** **G10c 3/10**

[58] **Field of Search**.....84/184–188, 200–205, 84/297, 304–305, 312

[56] **References Cited**

UNITED STATES PATENTS

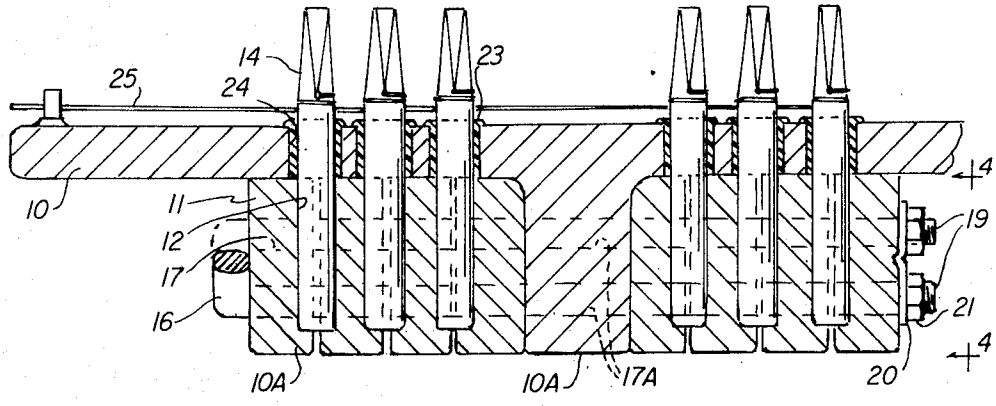
1,618,521	2/1927	Gilert	84/186
1,990,574	2/1935	Story	84/186
3,240,097	3/1966	Jaquith	84/304
3,478,636	11/1969	Juzek	84/305

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Assistant Examiner—Lawrence R. Franklin
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[57] **ABSTRACT**

A stringed instrument with tuning pins to retain the strings, in which said tuning pins are mounted in a split wrest block with the pins positioned between the abutting block section and a bolt mounted to retain said block sections in a compressed relationship and to further provide a tight frictional setting for said tuning pins when they have been tuned.

6 Claims, 7 Drawing Figures



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SHEET 1 OF 2

Fig. 1.

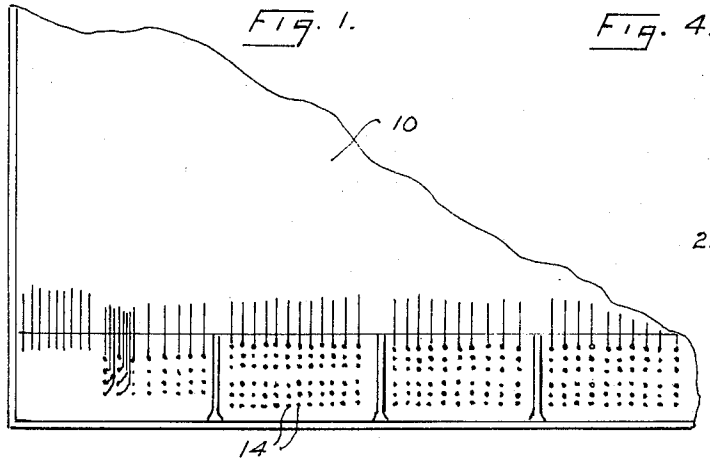


Fig. 4.

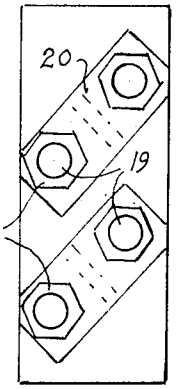


Fig. 2.

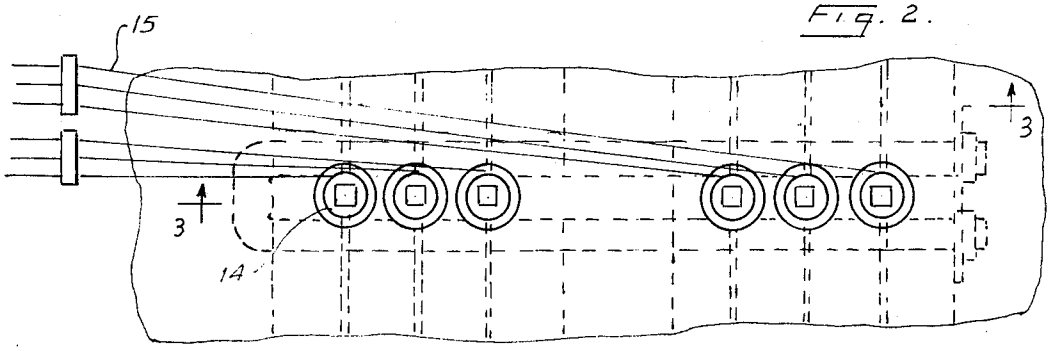
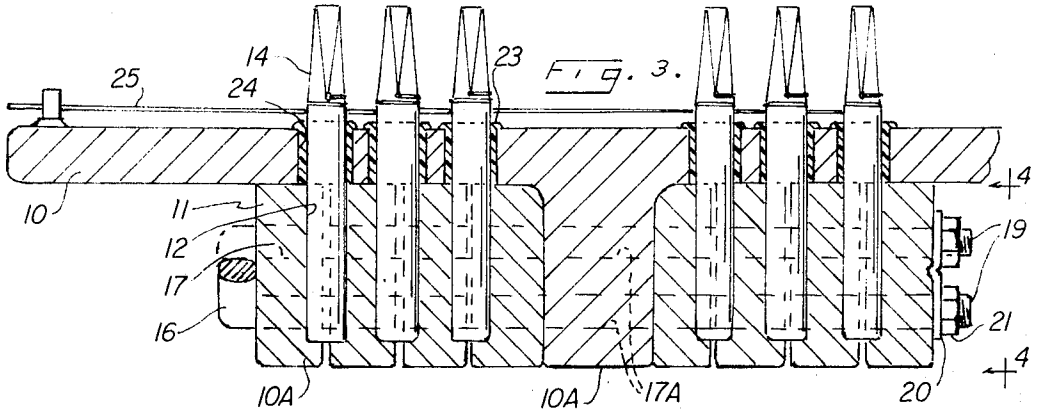


Fig. 3.



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Fig. 6.

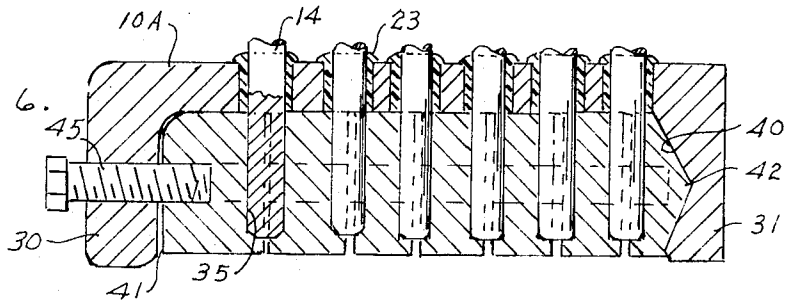


Fig. 5.

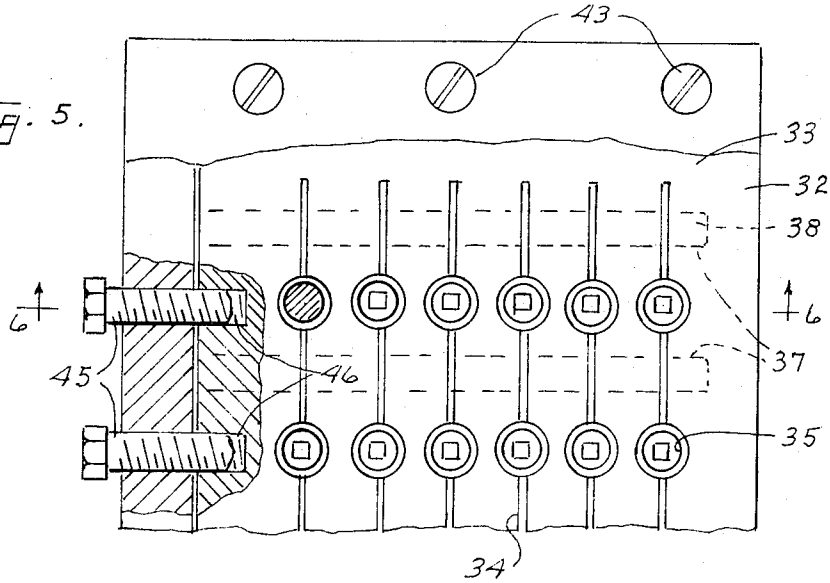
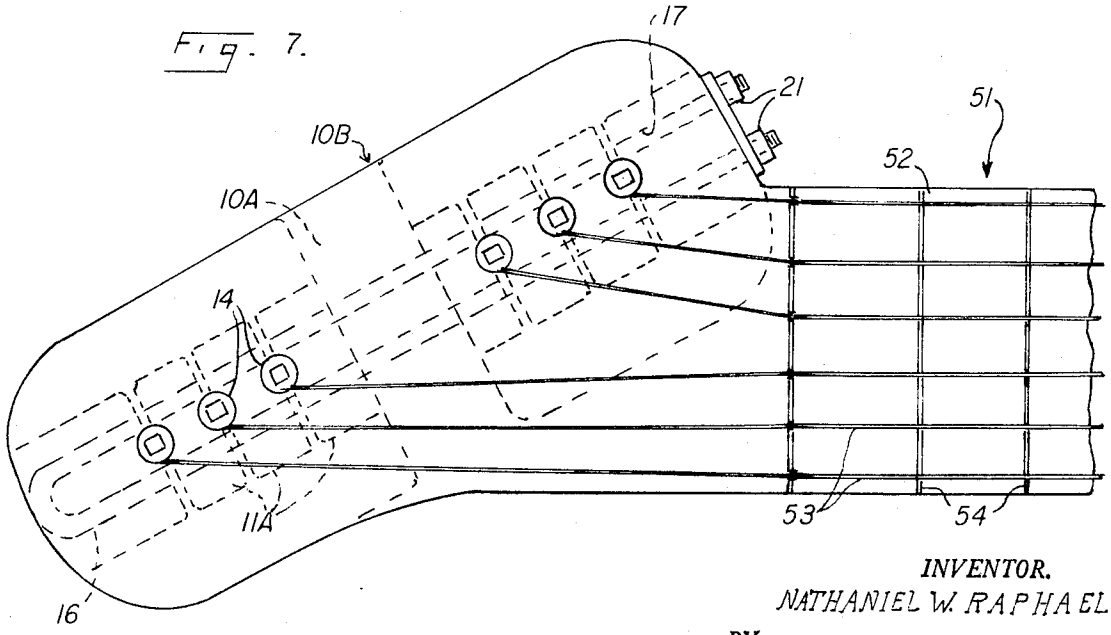


Fig. 7.



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STRINGED INSTRUMENTS WITH ADJUSTABLE FRICTIONAL GRIPPING MEANS FOR THE STRING SUPPORTING PINS

This invention relates to stringed instruments such as a piano, and more particularly to the construction and method of retaining the string tuning pins in the wrest block.

Normally the piano strings are mounted on tuning pins and the tuning pins, generally of metal, are frictionally set in a wooden wrest block. The wrest block being mounted to the supporting piano frame. The frame is a metal frame. The pins are solid and driven into an aperture in the wrest block to provide a frictional grip. In tuning, the pin must be released, turned until tuned to the correct pitch, and reset in the wrest block. In a piano the tensional stress is enormous, reaching approximately 40,000 lbs. for the 230 strings. Each tuning pin is stressed to a particular tension to maintain a desired pitch. If the pin does not hold its exact tension, the pitch or tone drops and the piano must be retuned. With changing conditions of atmosphere and temperature, there is a tendency for the frictional grip between the wrest block and the pin to vary especially over a long period and the retuning does not always produce a tuning that holds. This is due to the dependence upon the frictional grip between the wrest block and the tuning pin.

It is an object of this invention to provide a wrest block for a string instrument such as a piano in which the block is split into a number of separated segments and the pin apertures are positioned between segments so that there is a clamping of all segments to produce a compressional stress on all split blocks with tuning pins mounted in the pin apertures to provide a frictional grip on the pins and the frictional grip is decreased for tuning or turning the pins and increased for retaining the pins when tuned. In any event the degree of holding or frictional grip upon the tuning pin is independent of the tensional stress upon the string and pin.

It is an object of this invention to provide a wrest block for a string instrument such as a piano in which the block is split into a number of separated segments and the pin apertures are positioned between segments (and dampening inserts of a softer material than the wrest block positioned in each pin aperture) so that there is a clamping of all segments to produce a compressional stress on all split blocks with dampening insert and tuning pins mounted in the pin apertures to provide a frictional grip on the pins and the frictional grip decreased for tuning or turning the pins and increased for retaining the pins when tuned. In any event, the degree of holding or frictional grip upon the tuning pin is independent of the tensional stress upon the string and pin.

It is an object of this invention to provide a wrest block for a string instrument such as a piano in which the block is slotted to form a number of separated segments and the pin apertures are positional between segments so that there is a clamping of all segments to produce a compressional stress on all slotted portions of the block with tuning pins mounted in the pin apertures to provide a frictional grip on the pins and the frictional grip decreased for tuning or turning the pins and increased for retaining the pins when tuned. In any event, the degree of holding or frictional grip upon the tuning pin is independent of the tensional stress upon the string and pin.

It is a further object of this invention to provide a wrest block for a stringed instrument such as a piano in which the block is comprised of a plurality of abutting segments formed from a plastic such as Nylon or a metal or metal alloy and in which the segments are clamped together to compress the abutting relationship and in which apertures are formed between abutting blocks to receive tuning pins and said tuning pins are provided with a fine thread to permit turning said pins for tuning an associated or attached string while said blocks are compressed to retain a frictional grip upon said pins.

Further objects of this invention shall be apparent by reference to the accompanying detailed description and the drawings in which:

FIG. **1** is a plan view of a portion of the piano frame supporting the wrest blocks and tuning pins and strings,

FIG. **2** is a partial plan view of the wrest block of the piano showing one row of tuning pins and strings attached thereto,

FIG. **3** is a cross sectional view taken on line **3—3** of FIG. **2**,

FIG. **4** is an end view taken on line **4—4** of FIG. **3**,

FIG. **5** is a further embodiment illustrating a slotted wrest block shown in plan view,

FIG. **6** is a cross sectional view taken on line **6—6** of FIG. **5**, and

FIG. **7** is a plan view of the neck of a stringed instrument illustrating a further embodiment.

Referring to the drawings and particularly FIGS. **1–4** there is illustrated a portion of a piano, namely, the piano frame **10**; mounted to the frame **10** is a wrest block **11**, inserted through the frame and into apertures **12** are tuning pins **14**. The tuning pins are mounted in rows of six pins as illustrated in FIGS. **2** and **3**. Strings **15** are stretched across the piano frame and are held at one end by wrapping around the tuning pins **14**, thus turning of the tuning pins **14** in one direction will increase the tension on the string **15** for tuning the string; when the string has been tuned, it must be frictionally held in that position by the wrest block **11**. In this device as illustrated, the wrest block **11** is comprised of a plurality of abutting segments supported below the frame **10**. The frame **10** is provided with a protruding portion **10A** to permit mounting four segments of the wrest block on each side of the portion **10A**. To retain the four segments on each side of portion **10A**, there is provided a U-bolt **16**. The U-bolt passing through a plurality of aligned apertures **17** through the block segments **11A**. There is also provided a pair of apertures **17A** in the protruding portion **10A** that align with the apertures in the wrest block segments to permit mounting the U-bolt as illustrated in FIGS. **2** and **3**. With the U-bolt **16** in this position, both ends **19** of the U-bolt are threaded and a washer **20** abuts with the face of the end segment **11A** and nuts **21** are secured on the ends **19**, thus by tightening the nuts **21**, the U bolt **16** draws up segments **11A** into a tight abutting relationship, however before drawing up the segments **11A** the tuning pins **14** are mounted in the apertures **12** so that when the U-bolt is tightened, the wrest block segments **11A** will be compressed to provide a tight frictional grip upon the tuning pins **14**. To provide a good bearing

and retaining surface for the tuning pins in mounting and in tuning, there is provided a plurality of nylon inserts **23**. The inserts **23** being mounted in apertures **24** in the frame **10**.

It is to be noted that by releasing the tension on the U-bolt **16**, the frictional grip on the tuning pins may be released sufficiently to permit turning the pins **14** for tuning. When the desired pitch for each string is attained, the tension on the U-bolt may be increased more than the normal degree for holding the pin to insure retaining the tuned string in the perfect pitch or set for the tuned piano.

Referring to FIGS. **5** and **6** there is illustrated a further embodiment of this invention in which the frame **10A** is formed differently than the prior embodiment. In this embodiment the frame **10A** is formed with a right angular downward protruding portion **30** at one end and a right angular downward protruding portion **40** at the opposite end. The wrest block **32** is a single block being solid at its upper end **33** but being slotted toward the opposite or lower end. In this embodiment there are illustrated six slots **34** dividing the wrest block **32** into seven segments and apertures **35** are formed in aligned relationship for each abutting segment. Thus referring to FIG. **6**, tuning pins **14** may be inserted in each of the apertures **35** similar to the prior embodiment and nylon inserts **23** may also be used by mounting on the frame **10A** and passing the tuning pins **14** through the insert into the apertures **35**. In this embodiment, the slotted wrest block **32** is provided with bores **37** into which the pins **38** are inserted to provide the necessary string retention on the slotted block at all times. The block **32** at one end on its exterior has a wide V shape **40** formed as illustrated in FIG. **6**. The opposite end of the slotted wrest block **32** is provided with a face **41** so that the block **32** may be easily mounted to the frame **10A** by inserting the end **42** to abut with the V face **40** and then moving the block so that face **41** abuts with the face of the downward protruding portion **30**. To retain the wrest block **32** in this position, a plurality of screws or bolts **45** is provided, the bolts passing through the frame **10A** and into the block **32**. To provide a clamping action upon the slotted block **32**, there are provided a plurality of threaded bolts **45**. Bolts **45** are threaded into the portion **30** as illustrated in FIG. **6** and the end of bolt **45** which may abut with the face **41** of the wrest block, or the face **41** may be provided with a slight bore to receive the end of the bolt **45** when turned in one direction it will abut with the wrest block and compress the slotted portions to the degree desired to produce a tight compression and therefore a strong frictional grip upon each pin when the tuning pin is mounted in the aperture **35**. When it is desired to tune the piano by turning the tuning pins **14**, the compression of the wrest block **32** may be released by turning bolts **45** in the opposite direction to the degree desired and when the tuning pins have been tuned, bolts **45** may be turned in a direction to compress the slotted block **32**, thus insuring the retaining of the tuning pins as tuned.

Referring to FIG. **7** there is illustrated a still further embodiment of this invention in which frame **10B** is formed differently than the previous embodiments. In this embodiment frame **10B** is the key or tuning pin supporting wrest block for a stringed instrument such as a guitar. The neck **52** of the guitar **51** is formed with a split wrest block **11A** similar to that illustrated in FIGS. **2** and **3**. The frame **10B** is formed to lie in an angular position out of alignment with the neck **52** so that the tuning pins **14** will be held in spaced relationship and thus hold the strings **53** in their proper spaced relationship over the frets **54** of the guitar. The pins **14** are retained between blocks **11A** as in FIG. **3** and the blocks are retained in nested relationship, that is, four blocks are supported either side of portion **10A** by a U-bolt **16**. The U-bolt, passing through aligned apertures **17**, as in FIG. **3**, thus by tightening the nuts **21** the U-bolt compresses the segments and holds the tuning pins in a tight frictional grip. The tuning pins **14** may have a square head for a key to fit as shown or the tuning pins may have a thumb grip or a gearing connection to a key (not shown) but standard on most guitars.

If there is sufficient compression when the pins are threaded into the aperture, this permits easy turning of the tuning pin with very little release of tension by the U-bolt, thus tending to hold the pin when it has been tuned and when the U-bolt is tightened to increase the frictional grip to provide an exceptionally strong retention of the tuning pins.

Although we have described the means of retaining tuning pins in a stringed instrument by means of a split or slotted wrest block which is provided with means to increase or decrease the frictional grip upon the pins, this invention is not limited to a piano but may be utilized for the retention of tuning pins for any stringed instrument. As long as the embodiments described are utilized, this invention shall not be limited to a particular material, that is, although the older wrest blocks have been made of wood such as rock maple which is a hard wood, the wrest block may be comprised of wood or plastic such as Nylon, or aluminum or any non-ferrous metal or of a material that will provide the frictional gripping force under compression without deforming the material and without departing from the spirit of this invention.

What is claimed is:

1. A stringed instrument which includes a frame, wrest block and tuning pins, said wrest block provided with a plurality of divided segments, mounted apertures for tuning pins located between segments, said tuning pins mounted in said apertures, an adjustable clamping means to produce a compressional stress on all divided segments to draw them together and increase the frictional grip of said wrest block on each tuning pin.

2. In a device according to claim **1** in which said wrest block is comprised of a plurality of abutting individual sections that are retained by said frame as a single wrest block with divided segments.

3. In a device according to claim **1** in which said wrest block is comprised of a single slotted block to form divided segments.

4. In a device according to claim **1** in which said wrest block is comprised of a material that will distort under compression and in which said slotted block allows a greater degree of distortion under compression and a greater degree of frictional grip on each tuning pin than the conventional unitary wrest block.

5. In a device according to claim **1** in which said adjustable clamping means is a U-bolt supported by the instrument frame.

6. In a device according to claim 1 in which said adjustable clamping means is a plurality of threaded bolts, each bolt threadably mounted in a separate threaded aperture in said frame and the end of each bolt bearing upon one face of said wrest block, said bolts threadably movable to increase the compressional force on said slotted wrest block to in turn increase the frictional grip upon each tuning pin.

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