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(Under International Convention.)

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COMPLETE SPECIFICATION.

Improvements in Musical Instruments.

I, ROBERT FRANCIS FLEMMINGS, of 112, Grove Street, Melrose, Massachusetts, U.S.A., Inventor, do hereby declare the nature of this invention and in what manner the same is to be performed to be particularly described and ascertained in and by the following statement:

5 My invention relates to musical instruments and especially to that class of stringed instruments in which the strings are vibrated by the fingers, and is an improvement upon that class of stringed instrument in which two sets of strings are employed, the one set to be manipulated in the usual manner, and the other set tuned to the same pitch and to resonate sympathetically and in harmony
10 with the first mentioned set.

My present invention has for its object general improvements comprising means whereby the instrument is strengthened and stayed more efficiently to bear the greater strain entailed by the use of two sets of strings: a better method of attaching the neck to the body, and the arrangement of the finger-board
15 thereon; strengthening plates for attachment of the auxiliary set of strings: the arrangement of said strings, and bridges therefor; improvements in the means of tuning the auxiliary strings; and an improved tuning peg for the auxiliary set of strings.

20 An instrument of the class referred to is fully described hereinafter and shewn in the drawings herewith, my improvements being also described and clearly defined in the claims.

Referring to the drawings:

Figure 1 is a plan of a musical instrument embodying my invention. Fig. 2
is a sectional plan of the same, the cutting plane being on line A—A on Fig. 5.
25 Fig. 3 is a transverse section on the line B—B on Fig. 2 looking in the direction indicated by the arrow *a* on said Fig. 2. Fig. 4 is a transverse section on line C—C on Fig. 2, looking in the direction indicated by the arrow *b*. Fig. 5 is a longitudinal section on line D—D on Fig. 1. Fig. 6 is a partial section on line D—D, drawn to a larger scale. Fig. 7 is a partial section on
30 line A—A on Fig. 5. Fig. 8 is a plan view of the top bearing plate of the neck. Figs. 9 and 10 are respectively an elevation and a transverse section of the lower inside bridge with the string picking device mounted thereon. Figs. 11 and 12 are respectively a plan and a sectional elevation of the tuning-key for

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the inside strings. Fig. 13 represents a plan and edge view of the upper washer of said key, and Fig. 14 represents a plan and edge view of the other two washers of said key. Fig. 15 is an elevation of the inside head block, to which the neck is secured, as hereinafter described. Figs. 6, 7, 8, 9, 10, 11, 12, 13 and 14 are drawn to an enlarged scale. Fig. 16 is an elevation of the inside foot block, to which the foot tuning-key holder is secured; and Fig. 17 is an inverted plan of the outer bridge. 5

In the drawings, 1 represents the back, 2 the front, and 3 the side walls, of the body of the instrument, said parts being secured together by glue and the corner stay strips 4 in a well known manner. 10

The head block 5 is provided with four arms 6, which are curved to fit the curve of the inside of the head of the body of the instrument, said arms being glued to the back, front and side of said body, as shown. A similar block 7, provided with four arms 8, is in like manner secured to the back, front and side walls of the instrument at its foot or lower end. 15

The blocks 5 and 7 are cut from wood, with the grain extending lengthwise of the arms 6 and 8, and add very materially to the strength of the instrument.

The usual transverse stay bars or stiffeners 9 9 are secured to the inside surfaces of the back 1 and front 2.

The neck 10 is of the usual construction, except as will be hereinafter described, and is provided with the tuning keys 11, which may be of any well known construction and with the finger board 12, of usual construction. 20

The neck 10 is secured to the body of the instrument by the circular hub 13, which fits closely into a correspondingly shaped opening through the block 5, and the screw 14, which passes through the heel of said neck and screws into said block 5, as shewn in Fig. 6. 25

The under portion of that part of the finger board which projects over the front part of the body of the instrument is firmly secured to the neck 10 for about one and three-fourths of an inch of the length thereof, but at a distance of about three-fourths of an inch outside of the extreme upper end of the body of the instrument, the surface to which it is secured being raised above the level of the top end portion of the front of the body of the instrument, while that portion of the neck between said point of attachment and the top end of said body is on a level with the outer surface of the front 2 and has firmly secured thereto by screws the metal plate 15, which extends over and presses firmly upon the upper portion of the front 2, with a clear space between its outer surface and the inner surface of the finger board. 30 35

The outer bridge 16 has formed in its under surface beneath the bearings of the strings 17 a longitudinal recess 18, so that said bridge has two parallel bearings on the front of the instrument extending transversely thereof, which greatly improves the tone of the instrument. 40

The strings 17 are arranged and mounted substantially as in other instruments of the kind.

The upper end of the body of the instrument has secured thereto two reinforcing plates 19 19, one on each side of the heel of the neck, in each of which are set a series of headed studs 20, the shanks of which have formed in their inner ends eyes or perforations, in which the upper ends of the inner series of strings 21 are secured, said studs extending through the reinforcing plates 19 and wall 3 of the body of the instrument, as shewn in Fig. 7. 45

Two bridges 22 22, over which the strings 21 are strained near their connections to the studs 20, may be of any well known construction. 50

The strings 21 extend from the bridges 22 22 to and over the bridge 23, thence through the block 7 and the lower portion of the wall 3 of the body of the instrument and are wound upon the lower ends of the tuning keys 24 set in the arm 25, which is secured to and projects from the lower end of the body of the instrument, as in similar instruments of the kind heretofore made. 55

The keys 24 are of novel construction, and each consists of a main stem pro-

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vided a short distance above its lower end with the annular flange 26 and having immediately above said flange a cylindrical section 27, expanding at its upper end into a short squared section 28, above said squared section a threaded section 29, and above this a squared section 30 to receive a wrench to turn said stem to wind the string upon the portion thereof which projects below the flange 26 and is round in cross section and provided with the eye or perforation 31^a, by means of which the string is made fast thereto. The section of said stem above the flange 26 and the squared portion 28 have fitted thereon three washers 31 and 32, and the threaded portion has fitted thereto the barrel like nut 33, the lower end of which is chambered out to permit it to enclose a portion of the squared section 28 of the stem, as shewn in Fig. 12. The upper end of the nut 33 is provided with a slightly projecting milled head 34. The washer 31 has a square perforation, as shewn in Fig. 13, of a size to fit the intermediate squared portion 28 of said stem, and the washers 32 are each provided with a circular opening of sufficient diameter to permit said washer to pass over said squared portion 28. The key stem with one of the washers 32 placed thereon and resting upon the flange 26, is passed through a hole in the arm 25. The other washer 32 is then placed over said stem, resting upon the arm 25. Then the washer 31 is placed in position on the washer 32 and surrounding the squared section 28 of said stem, and then the nut 33 is screwed down upon said washer with sufficient force to clamp the washers 32 to the arm 25 to prevent their revolving when the stem is turned to strain the string, the flange 26 and the washer 31 having sufficient friction upon the washers 32 to prevent the string slackening when turned, but not sufficient to prevent the stem being turned to strain said string when a force greater than the strain on the string is applied to the squared upper end of said stem.

The bridge 23 is secured in a fixed position to one of the stay bars 9 and has formed on one side thereof toward the upper end of the instrument two ears 34 34, in bearings in which is mounted the rod 35, having mounted thereon the picker arm 36, one end of which rod projects through the side wall of the body of the instrument and is provided with a knob or other suitable means of rotating said rod and moving it endwise in its bearings.

The bridge 23 has a notch 37 cut in its side toward the rod 35 and contiguous to the right hand ear 34, into which notch or recess the arm 36 is turned when not required in tuning the strings 21, thereby locking the same against accidental interference with said strings. In this instance the picker arm consists of a short slightly bent lever, which, by partly turning and withdrawing the rod longitudinally to release it from its notch 37, can be brought beneath each string successively, and by rotating the rod, the bent part of the arm will impinge on the strings and cause them to vibrate. By this means, and the tuning pegs 24, the strings 21 are tuned to the same pitch as the strings 17. This tuning rod and its picker arm are of substantially the same construction as in other instruments of the kind, except that the picker arm 36 is of a slightly different shape, necessitated by placing the rod 35 beneath instead of above the strings.

Four longitudinal stay bars 38 connect the arms 6 of the block 5 with the arms 8 of the block 7, each of which is secured intermediate of its ends to blocks 39, which in turn are glued to the side wall 3 of the body of the instrument at its narrowest part, as shewn in Fig. 2.

A central stay rod 40 has one end securely attached to the boss 13 of the heel of the neck 10, and its other end is fitted to a hole in the block 7 and is firmly secured therein by a screw 41.

Having now particularly described and ascertained the nature of my said invention, and in what manner the same is to be performed, I declare that what I claim is:—

1. In a stringed musical instrument the combination of the body thereof com-

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posed of wooden front, back, and sides, of head and foot blocks, each provided with four laterally projecting arms firmly secured in the interior of the body of the instrument, and re-inforcing the attachment of said front and back to the side walls thereof.

2. In a stringed musical instrument the combination with the hollow body thereof, of the neck firmly secured to the smaller end of said body; a finger board attached to said neck at a point above the junction of said neck and body; and a plate firmly secured to said neck between the lower end of the union of the finger board with said neck and the junction of said neck and body, and extending over and bearing hard upon the upper portion of the body front, with its outer face entirely separated from contact with the finger board.

3. In a stringed musical instrument the combination with the hollow body thereof, of head and foot blocks each provided with four laterally projecting arms, firmly secured in the interior of said body in positions to re-inforce the connections between the front back and side walls of the body of the instrument; and four longitudinal stay bars connecting the ends of the laterally projecting arms of said head and foot blocks and secured to the side walls at the narrowest part of said body.

4. In a stringed musical instrument the combination of a hollow body composed of front, back and side walls, a pair of re-inforcing plates secured to the upper end of said body one on each side of the heel of the neck; two series of headed studs set in and projecting through said plates and the wall of the body, and each provided with an eye or perforation in its inner end, two series of strings connected at one end to said perforated and headed studs and extending longitudinally through the length of said body; two bridges resting upon the inner surface of the back of the instrument and supporting said strings near the head of said body; another bridge supporting said strings near the lower end of said body; and means for straining said strings arranged outside of said body.

5. In a stringed musical instrument the combination of a series of strings located within the hollow body thereof, a bridge for supporting said strings near the lower end of said body resting upon and secured to the back of said body, and provided with a pair of ears projecting laterally therefrom, and with the notch 37 contiguous to one of said ears; the rod 35 mounted in suitable bearings in said ears and extending through one side of said body, and the picking arm 36 mounted upon said rod and arranged to operate as set forth.

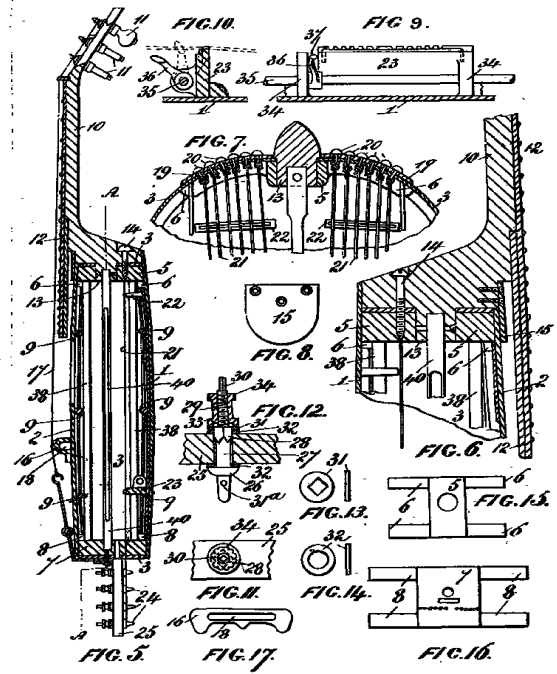
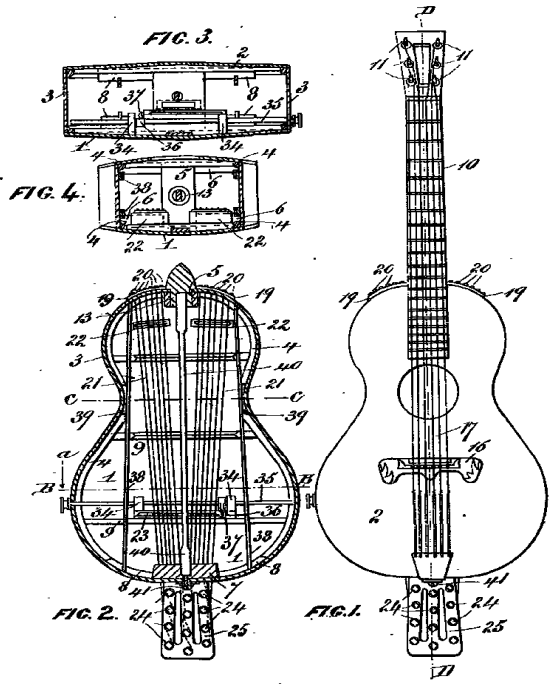
6. In a stringed musical instrument having a series of strings located within the hollow body thereof, the combination with said hollow body, and internal strings, of the arm 25 projecting from the lower end of said body, and a series of tuning keys set in said arm and composed of the following elements, *viz.*; a central stem provided with the fixed annular flange 26; the cylindrical section 27; the squared sections 28 and 30; the threaded section 29; and the perforation 31^a; the two washers 32 having a circular perforation; the washer having a square perforation; and barrel like nut 33 provided with a chamber in its lower end as set forth.

Dated this 24th day of July 1903.

P. R. J. WILLIS,
Agent for Applicant.

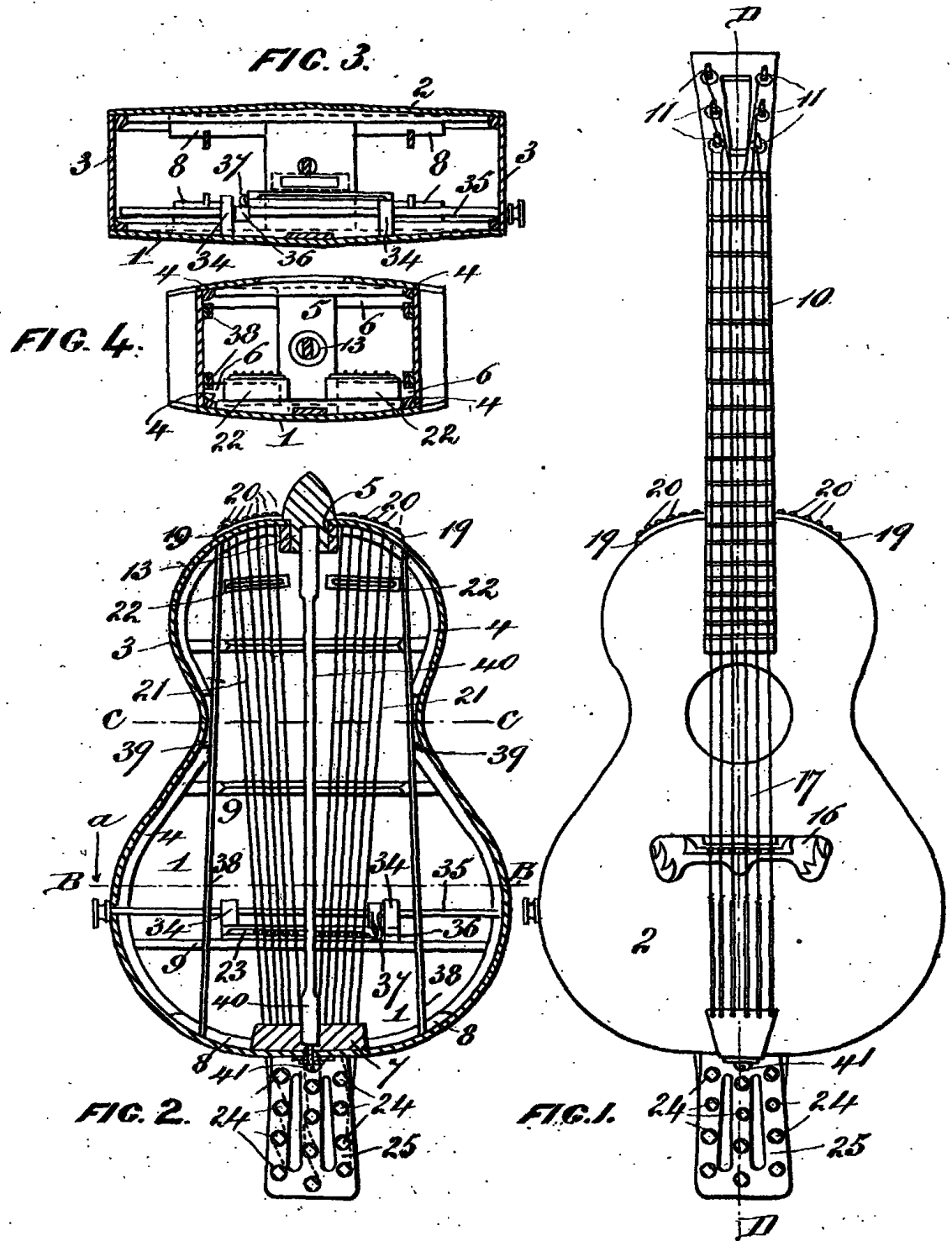
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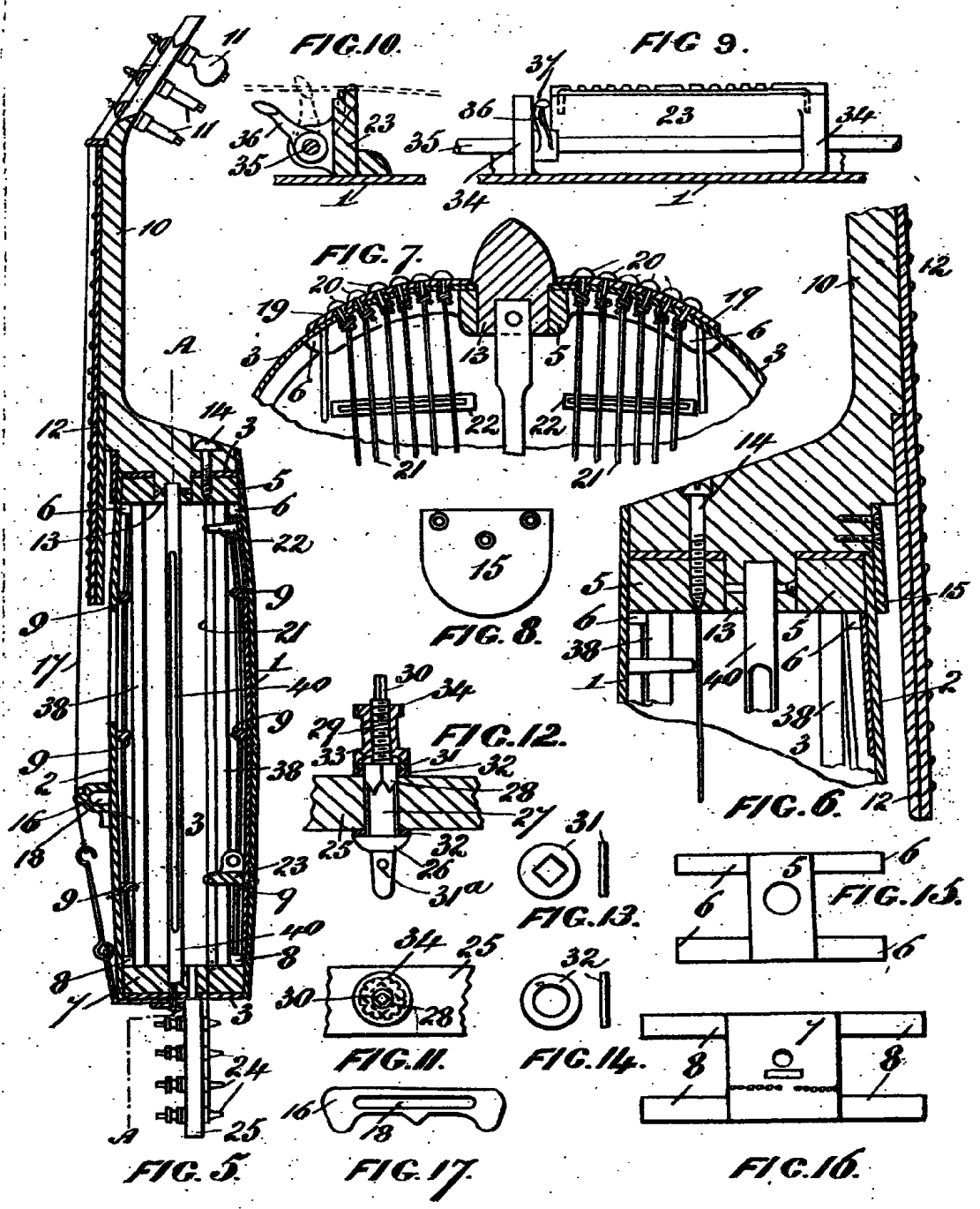
SHEET 2



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