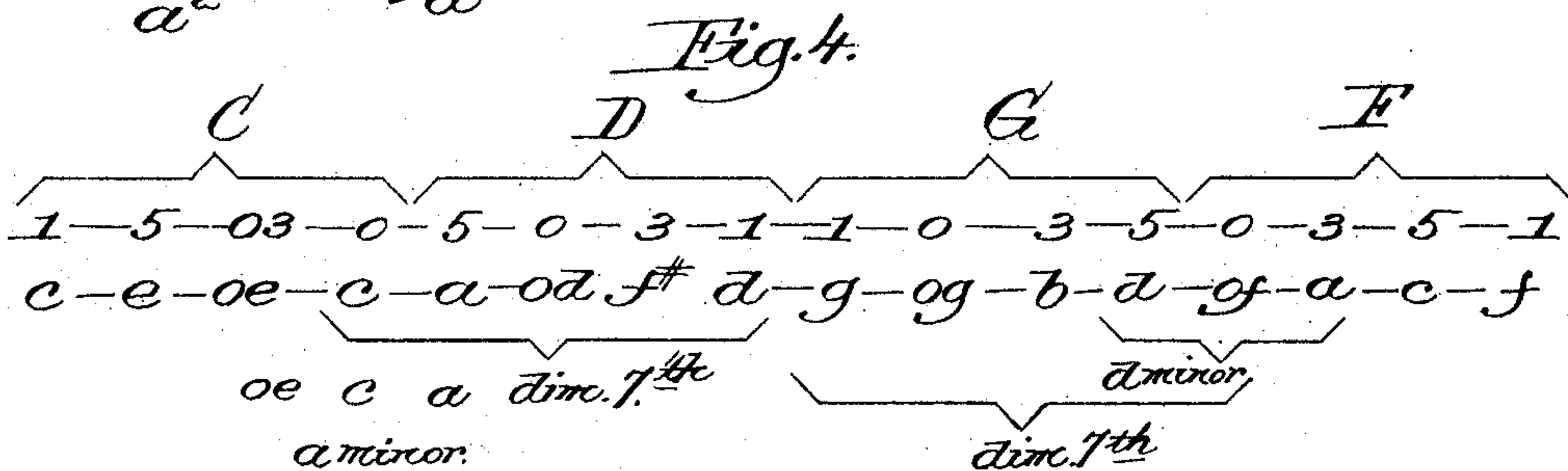
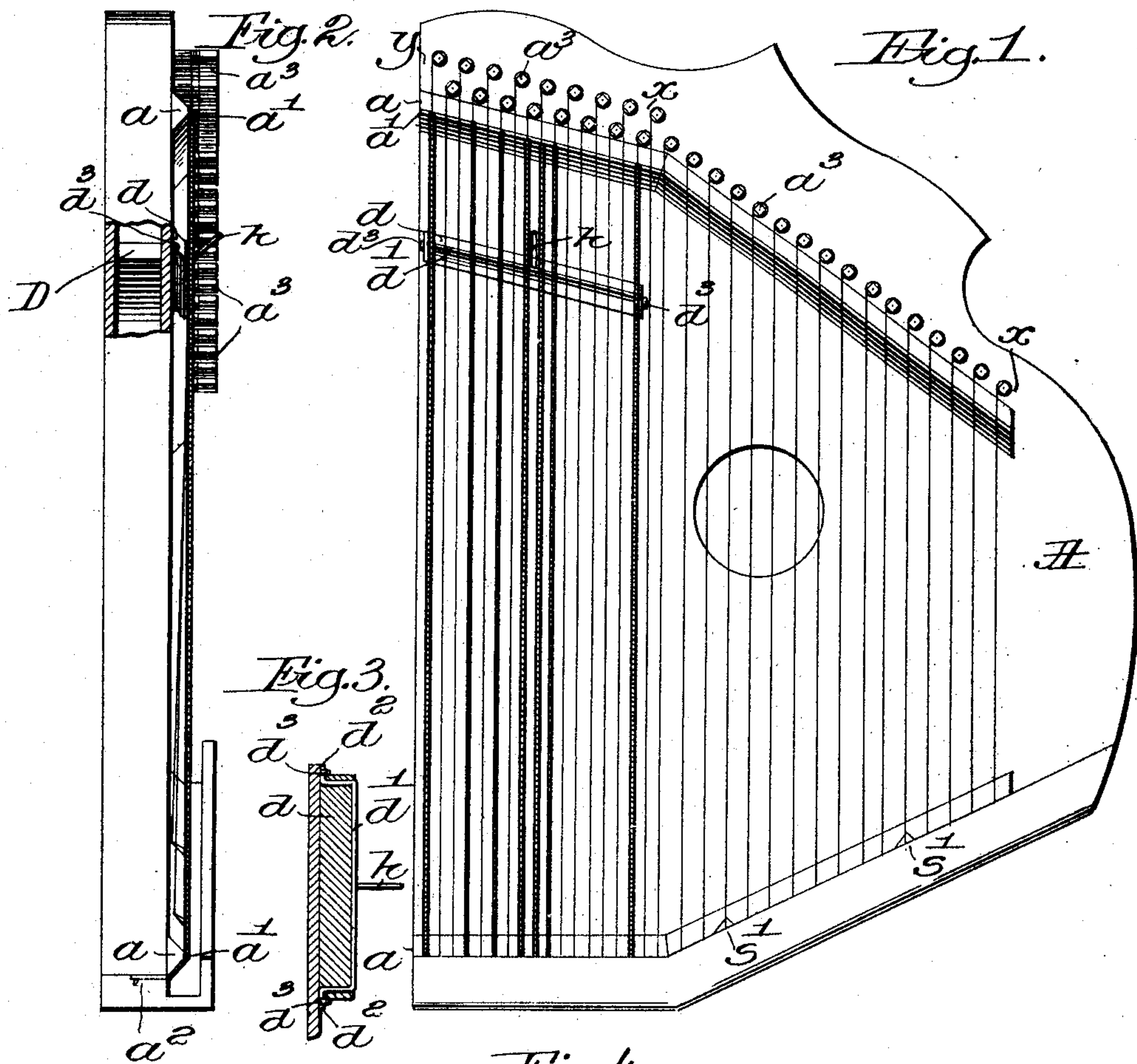


No. 621,900.

Patented Mar. 28, 1899.

S. G. COOK.
MUSICAL INSTRUMENT.
(Application filed June 11, 1898.)

(No Model.)



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UNITED STATES PATENT OFFICE.

SAMUEL G. COOK, OF SOMERVILLE, MASSACHUSETTS.

MUSICAL INSTRUMENT.

SPECIFICATION forming part of Letters Patent No. 621,900, dated March 28, 1899.

Application filed June 11, 1898. Serial No. 683,158. (No model.)

To all whom it may concern:

Be it known that I, SAMUEL G. COOK, of Somerville, county of Middlesex, State of Massachusetts, have invented an Improvement in Musical Instruments, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

10 This invention relates to musical instruments of the harp class, and more particularly of the class commonly known as "citherns." Instruments of this class commonly comprise a suitable sounding-board, upon which are
15 arranged a series of strings constituting what may be called an "open" scale, upon which the air of the tune may be played, and usually at the left of this open scale of strings other series of strings are arranged in the order of the several tones of different chords,
20 provision usually being made for at least four chords—as, for example, the chords of C, G, F, A, minor. By the usual arrangement of the chord-strings the number of chords possible
25 upon an instrument of convenient size has been not exceeding four, and my invention comprehends a novel arrangement of chord-strings whereby the same number of strings, which as heretofore arranged provided for
30 but four chords, may by my novel arrangement provide for six or more different chords, thus enlarging the scope or range of the instrument without increasing its size or cost. In instruments of this type as heretofore generally constructed it has been common to
35 introduce into the open-scale strings, upon which the air is played, one or more sharp-strings, commonly an F-sharp, and as usually arranged the sharp string or strings lie in the
40 same horizontal plane as the other open-scale strings. As a large majority of the tunes played upon instruments of this type require no sharp-string in the air, it becomes a matter of considerable difficulty, particularly to
45 the amateur, to avoid accidental engagement of the sharp-string when passing over it in playing upon the other strings of the open scale, such accidental sounding of the sharp-string being extremely unpleasant to the ear.
50 To obviate this difficulty, my invention comprehends the depression of the sharp string

or strings in a plane below the plane of the remaining strings of the open scale, whereby in the ordinary playing upon the strings no liability is present of accidentally engaging
55 a sharp-string; but when the air requires a sharp-string the musician having it in mind may by proper manipulation of the finger or fingers reach the depressed sharp string or strings, and thereby bring its musical tone
60 into prominence where desired.

Another feature of my invention which enlarges or broadens the range of the instrument without increasing its size is a movable piece, which I have called a "movable bridge,"
65 arranged upon the sounding-board below and traversing the lines of several of the chord-strings and normally out of engagement with such chord-strings, but which when moved from normal into abnormal position engages
70 the desired chord-strings at desired distance from the ends thereof, and by shortening the effective or vibratory length of such strings raises the tones of all to a predetermined extent, whereby the same strings with the bridge
75 raised become tuned for a higher chord than with the bridge depressed, thereby making it possible to obtain two distinct chords from the same strings without adjusting the pegs
80 to which the strings are attached and by which they are ordinarily tuned.

In the drawings, Figure 1 is a top or plan view of an instrument containing one embodiment of my invention; Fig. 2, a left-hand edge view or elevation of the instrument
85 shown in Fig. 1, partially broken away to expose parts to be described; Fig. 3, a sectional detail to be referred to, it showing the movable bridge in longitudinal section; Fig. 4, a diagram illustrating the arrangement of the
90 chord-strings, and Fig. 5 a diagram illustrating the former method of arranging the chord-strings.

Referring to the drawings and the embodiment of my invention there shown, A indicates a suitable or usual sounding board or
95 base upon which the several wires or strings are arranged. Along opposite edges of this sounding-board are arranged the suitably and usually irregularly-shaped ledges or ribs *a*,
100 over which the several strings are drawn and which serve to limit the normal vibratory

lengths of the several strings. For the best results the crowns of these ledges or ribs are provided with metallic surfaces a' , herein shown as in the form of wires set into the ribs or ledges.

The wires or strings are shown as secured to the instrument at the outer side of one of the ledges a , as best indicated at a^2 , Fig. 2, and are drawn thence over the top of the adjacent ledge a to and over the top of the opposite ledge a , and are wound, respectively, about the usual pegs or pins a^3 , suitably shaped, as by squaring their upper ends, to enable them to be turned to vary the tension upon their respective strings or wires for the proper tuning of the latter.

In the constructional features thus far described my improved instrument does not and need not differ materially from instruments of the same type now in use.

One feature of my invention, hereinbefore referred to, lies in the novel arrangement of the strings or wires whereby the capacity of the instrument is increased, and this arrangement of strings I will now describe.

The strings included within the field indicated by the letters $x x$ are what have in the art been termed the "open-scale" strings, they being arranged in the regular order of the C-scale, for example, C, D, E, F, &c., with the addition of the two sharp-strings, herein indicated as $F\sharp$ -strings and lettered in the drawings $s' s'$. The strings embraced within the field $x y$ are what may be called the "chord-strings," upon which the accompaniment may be played for an air played upon the open-scale strings. Heretofore in instruments of this kind these chord-strings have been arranged or grouped to form so many distinct chords with the strings representing the fundamental tone or lowest tone of the chord always at one—for example, the left—end of the group or series. This will be best understood by reference to the diagram Fig. 5. For example, then, referring to said figure, it will be seen that the chord of C is arranged with a fundamental tone, marked 1, at the left, followed in succession to the right by the strings representing the fifth, the octave, and the third. Then continuing to the right is the fundamental 1 of the chord G, in turn to the right of which are arranged in succession the strings representing the octave, the third, and the diminished seventh of the chord G, then of the chord F, the fundamental 1, the third, fifth, and octave, then the chord of A minor, in which first is the fundamental 1, then the octave, the third, and the fifth. By reference to this diagram it will be perfectly clear that the capacity of the instrument is limited to the number of chords thus arranged upon the sounding-board and that no tone going to make up a part of one chord is available for use in connection with one or more tones of another chord to produce a new chord, because the fundamental tone of one chord always intervenes between

the other and what may be termed the "harmonical" tones of the two chords which it might be desired to associate in the formation of a new chord. Referring, however, to Figs. 1 and 4, my present invention comprehends an arrangement of the strings which as there embodied consists in first arranging at the left end of the instrument the strings going to make up the chord C, which may be first the fundamental 1, followed in the direction of the right by the fifth, the third of the octave, and the octave. Now instead of proceeding with the fundamental of the next chord, which has there been selected as the chord D, my present invention comprehends commencing the series of the chord D with one of the harmonical tones—for example, the fifth—followed by the octave, the third, and, lastly, the fundamental. Then follows the chord G, commencing in the present instance with the fundamental 1, then the octave, the third, and fifth, then of the chord F, the octave, third, fifth, and fundamental. Immediately below the numerical series of the diagram Fig. 4 I have arranged the corresponding staff-letters for convenience on the part of those more familiar with the arrangement of chords by letters on the staff.

While my invention is not necessarily limited to the particular chords herein selected—viz., C, D, G, and F—or to any particular arrangement of the strings of the different chords, so long as the fundamental of one chord does not always appear at the beginning of the chord series and separating the harmonical tones of the two adjacent series, yet the advantages resulting from my invention are apparent from the arrangement of the strings shown in the drawings. For example, the string representing the octave of the chord C may be combined with the tones of the chord D to produce the diminished seventh chord of D and the strings of the chord G may be combined with the octave of the chord F and produce the diminished seventh of the chord G; also, the octave third and the octave of the chord C may be combined with the fifth of the chord D to produce the chord of A minor and the fifth of the chord G may be combined with the octave and third of the chord F to produce the chord of D minor. Thus by my novel arrangement of strings, whereby the harmonical tone-strings of adjacent chords are brought together with the fundamentals of the two chords on the extreme outer ends of the series it is possible to combine one or more of the tone-strings of one chord with one or more of an adjacent chord in the production of a new chord without the intervention of a fundamental, which would occur in the prevailing methods of stringing and which would prevent any such combination of tones of different chords. Thus while the number of strings in the arrangement shown in Figs. 1 and 4 is no greater than the number illustrated in the diagram Fig. 5, which represents the earlier practice, yet instead of obtaining but four

chords, as in the Fig. 5 arrangement, I obtain six major chords and two minor chords, and other arrangements and combinations might be made whereby with the same number of strings even a greater or perhaps a less aggregate number of chords might be obtained. The capacity of an instrument of this type is further increased in accordance with my invention by providing a movable bridge-piece *d*, Figs. 1, 2, and 3, preferably flattened in cross-section, whereby when in one position it does not engage the strings above it, though traversing the lines of such strings, yet when moved into a different position it does contact with such strings and serves as a bridge between the strings and the sounding-board. In the construction herein shown this movable bridge-piece is provided along one side with a metallic, preferably wire, crown *d'*, which near the ends of the bridge and beyond the outside strings of the group or groups embraced within its length has its ends turned downwardly into or through the material of the bridge-piece, thence again outwardly to form trunnions or hinges *d''*, which may be stapled, as at *d'''*, to the sounding-board. By this construction the bridge-piece is easily turned from inoperative to operative position, a handle *h* being provided for this purpose, the handle protruding from between two adjacent strings. The bridge-piece is reinforced or supported from below the top of the sounding-board by a usual or suitable reinforcing block or member *D*. The arrangement of this bridge-piece on the sounding-board is such that when turned from inoperative to operative position it shortens the effective lengths of the strings across which it lies by a distance corresponding to the distance between the crown of the bridge-piece when in operative position and the crown of the ledge *a*, over which the strings are drawn, such distance being exactly what it should be to shorten the vibratory lengths of the strings engaged by the bridge enough to raise the pitch of the strings either one half or one whole tone, thus further enlarging the capacity or range of the instrument by providing means whereby identically the same strings, without change in their arrangement or order, may be made to produce the tones in a new pitch-chord, which would otherwise be provided for only by supplying the same number of new strings, which of course would enlarge the size of the instrument.

Referring now particularly to Fig. 1, two notches are cut into the bridge for the two sharp-strings *s'*, or the said instrument may be otherwise suitably constructed to cause one or, if desired, both ends of the sharp-strings to be depressed into a plane below the plane of the other strings of the open scale. Thus while playing upon the ordinary C scale or arrangement of wires for producing the tones of the ordinary scale there is no danger of the operator accidentally engaging a sharp-string, which would cause a discord,

for the fingers in engaging the regular strings pass above the sharp-strings. In such special instances, however, as make it necessary to employ the sharp-strings the operator may very easily manipulate his finger or fingers to reach the depressed sharp-strings, and thus bring them into play at the desired times and without serious inconvenience, the slight inconvenience or difficulty in reaching the depressed strings being more than offset, as I believe, by the absolute impossibility of the operator accidentally engaging the sharp-strings at the wrong times.

My invention obviously is not limited to the particular embodiment herein shown, for it may be varied widely within the spirit and scope of my invention as herein disclosed.

Obviously the depressed strings *s'* might be flat instead of sharp strings or might be any other sharp than F-sharp strings; but of course their location would be varied according to the particular string sharpened or flatted.

Having described my invention and without limiting myself as to specific arrangements and details, what I claim as my invention, and desire to secure by Letters Patent, is—

1. In a stringed instrument, the combination with a sounding-board, of a plurality of groups or series of strings arranged thereupon, each series or group constituting the strings of a distinct chord, a plurality of adjacent groups being arranged with one or more of their higher or harmonical tone-strings immediately adjacent, and with the fundamental strings of such chords or groups separated by said adjacent harmonical tone-strings, whereby harmonical tone-strings of one chord may be combined with harmonical tone-strings of the adjacent chord group in the formation of a new chord not necessarily including the fundamental string of either chord, substantially as described.

2. In an instrument of the class described, the combination with a sounding-board, and a series of strings arranged thereupon, of a movable bridge member arranged on said sounding-board and between the latter and the strings to be engaged thereby, and an operating-handle on the said bridge member and reaching upwardly between and above the strings, whereby the said bridge member may be conveniently moved by the fingers when over the strings, from one to another position to vary the vibratory lengths of the strings engaged thereby, to vary correspondingly the pitch of the strings engaged, substantially as described.

3. In an instrument of the class described, the combination with a sounding-board, and a series of strings arranged thereupon, of a movable bridge member pivoted upon the sounding-board and between the latter and the strings to be engaged thereby, and an operating-handle on said bridge member and reaching upwardly between and above the said strings, and furnishing convenient means

whereby the said bridge member may be swung from one to another position by the fingers when above the strings, to vary the vibratory lengths of the strings engaged thereby, to vary correspondingly the pitch of the strings engaged, substantially as described.

5

In testimony whereof I have signed my

name to this specification in the presence of two subscribing witnesses.

SAMUEL G. COOK.

Witnesses:

FREDERICK L. EMERY,
AUGUSTA E. DEAN.