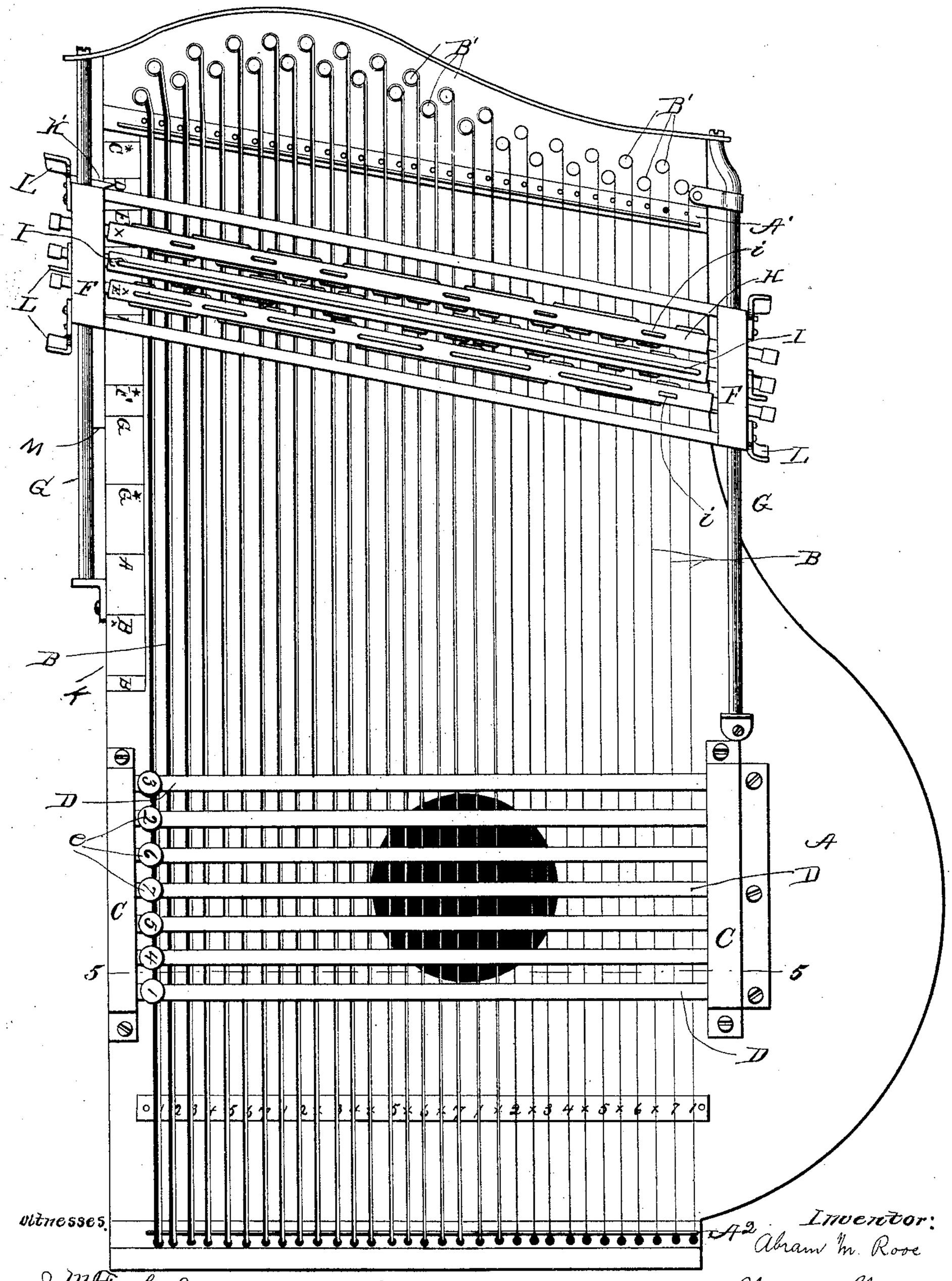
(No Model.) 2 Sheets—Sheet 1.

A. M. ROOS.

AUTOLYRE.

No. 534,175. Patented Feb. 12, 1895.



Witnesses.
J. M. Fowler Jr.
Alex. Stuart

Fig. 1.

Inventor:
Abram M. Roos
By Church & Church
his Attorneys.

(No Model.)

2 Sheets—Sheet 2.

A. M. ROOS.

AUTOLYRE.

No. 534,175. Patented Feb. 12, 1895.

Fig. 2.

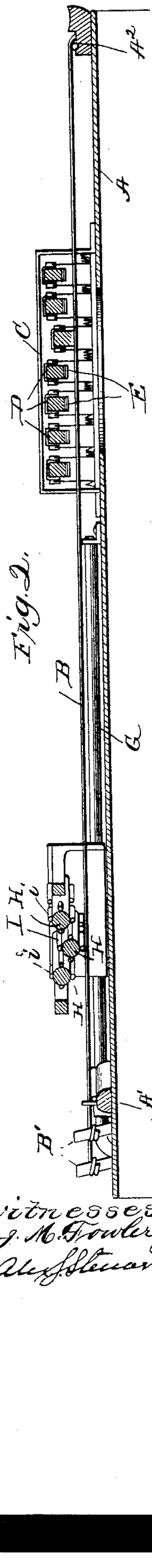


Fig. 3.

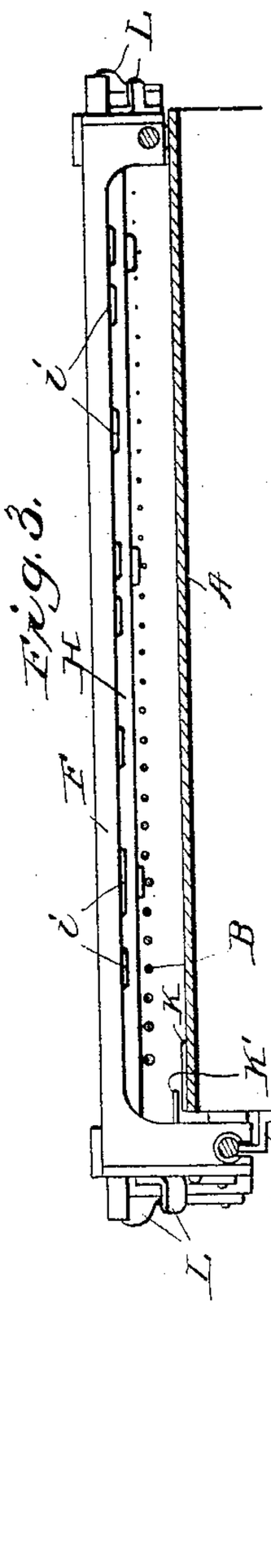


Fig. 5.

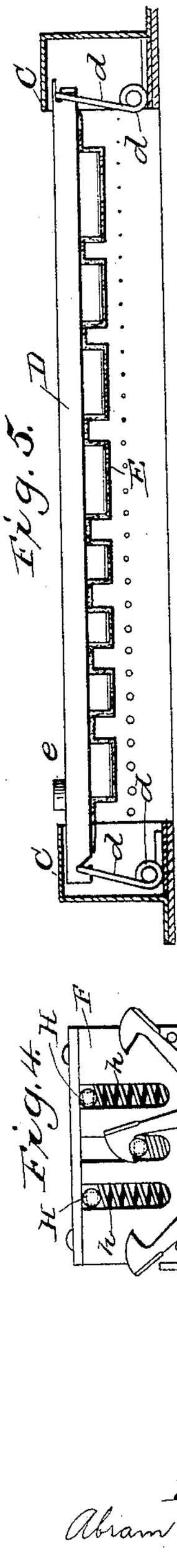


Fig. 4.

Witnesses:
J. M. Fowler Jr.
Alex. J. Stewart.

Inventor
Abram W. Roos.

By Church & Church
his Attorneys

UNITED STATES PATENT OFFICE.

ABRAM M. ROOS, OF KINGSTON, NEW YORK.

AUTOLYRE.

SPECIFICATION forming part of Letters Patent No. 534,175, dated February 12, 1895.

Application filed June 2, 1894. Serial No. 513,297. (No model.)

To all whom it may concern:

Be it known that I, ABRAM M. ROOS, of the city of Kingston, in the county of Ulster and State of New York, have invented certain new and useful Improvements in Musical Instruments or Autolyres; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming a part of this specification, and to the letters of reference marked thereon.

This invention relates particularly, though not exclusively, to that class of musical instruments designed for producing harmonious chords, usually by manipulating with one hand keys determining the strings which shall be sounded, while the other hand causes the said strings to vibrate in the desired order by picking, sweeping the hand or an instrument carried thereby, across them or in any other suitable manner.

The particular object of the invention is to provide a means whereby musical compositions written in different keys may be played, thereby vastly increasing the number of chords which may be struck, or in other words, vastly increasing the range of the instrument and adapting it for playing accompaniments with musical instruments of other kinds, having a normal range of several octaves, the piano for instance, and in any desired key.

A further object of the invention is to adapt it for being readily brought into harmony with different instruments, the pitch of which may be slightly different, and further, to improve the mechanical structure of the keys whereof they may be operated by a pressure of the finger at any point in their length.

Primarily, the invention consists in providing an instrument such as described, with a bar having supplemental properly spaced bridges which may be moved into and out of contact with the strings at an intermediate point to give them a tension which will produce the proper tones.

Further the invention consists in providing a movable supplemental bridge for all the strings to give the proper tension to all the strings, in combination with movable supplemental sectional or interrupted bridges which engage certain individual strings to give the proper half tones for the desired key.

The invention further consists in certain novel details of construction and combinations and arrangements of parts all as will be now described and pointed out particularly in the appended claims.

Refering to the accompanying drawings, Figure 1 is a top plan view of an instrument embodying my present improvements. Fig. 2 is a longitudinal section through the same. Fig. 3 is a section at right angles to Fig. 2 showing the movable bridges. Fig. 4 is a detail side elevation of one end of the movable bridge carriage. Fig. 5 is a section on the line 5—5 Fig. 1, through the damper bars to show the manner of mounting the same.

Like letters of reference in the several figures indicate the same parts.

The body of the instrument, lettered A, in the accompanying drawings, may be of any ordinary or preferred construction, preferably, however, as shown, resembling in shape and internal arrangement an ordinary zither, being provided at each end with bridges A′ A^2, over which the strings B are strung from the usual keys or posts B′ at one end, to suitable pins or retaining devices at the other end. I prefer to tune the base strings in an ordinary diatonic scale for the first octave and the balance of the strings in a chromatic scale, as will be readily understood from reference to Fig. 1, wherein the strings are properly numbered and the sharped strings indicated by a cross mark.

Across the strings and having their ends arranged within suitable housings C is a series, usually seven, of silencing bars D. These bars are as shown in Fig. 5, pivotally supported upon upwardly projecting pivoted links *d* so as to swing down while maintaining their parallelism to the body of the instrument, said links being preferably formed by upwardly extending arms or loops of small coiled springs *d′* fixed to the housings or body of the instrument as desired, and on the under side of the bars a series of silencing or damping pads E is secured. These silencing pads are so arranged that when the bars carrying the same are depressed, they will come in contact with and prevent the sounding or deaden the vibration of those strings which do not form a part of the chord, which it is desired to sound. Hence it will be seen

that by arranging seven of these bars above the strings, seven chords may be struck by simply depressing the bars in the order desired and sweeping the hand across the whole series of strings this movement being of course, susceptible of various modifications to sound a portion or portions of the chord, as desired. By arranging the bars on parallel links an important advantage is secured, namely, the bars are depressed evenly, irrespective of the point at which the finger is applied thereto. Thus, while I have shown at one end a series of finger pieces *e*, it is perfectly evident that the fingers may be applied to the bars at any point in their length and they will be evenly depressed throughout.

As thus far described, it is possible with the instrument to strike seven chords in the key in which the instrument is tuned, this usually being the key of C, but in order to play accompaniments to pieces written in other keys, it has heretofore been necessary to retune the entire instrument, a very laborious and unsatisfactory method, as it is practically impossible to retune the instrument in the desired key without the consumption of considerable time and with no certainty of securing the desired result without the person is a skilled tuner. These defects have practically precluded the possibility of playing accompaniments in pieces other than such as are written in the one key, and inasmuch as this style of instrument is designed more especially for popular playing, it will be seen that its effectiveness is much impaired.

It is with the object in view of enabling the player to adjust the instrument for playing in any key that I have designed what I shall herein term a continuous supplemental movable bridge for adjusting the tension of the entire series of strings and a supplemental interrupted bridge for giving the desired tension to individual strings to produce the necessary half tones or sharps and flats for the particular key desired, a series of such arrangements being provided for adjusting to different keys. In the accompanying drawings, I have shown what I consider one of the simplest embodiments of this idea consisting essentially of a carriage F, sliding on ways G in lines substantially parallel with the strings and provided with a series of movable bridge bars H, preferably mounted upon coiled springs *h* at each end and guided in vertical slots in the carriage, as shown. Upon each of these bars, except the first one, or the one nearest the bottom of the instrument there is a continuous bridge I, which when turned down and the bar depressed will contact with the whole series of strings and by adjusting the carriage to the proper point, it is obvious that the tension of the strings may be so adjusted as to produce tones in harmony with the tones of a piano and to give the half tones of the key, the bars are provided with interrupted bridges *i*, one for each key and when the bar next below the one having the continuous bridge thereon and having the proper bridge down is depressed, the said bridge will engage the proper strings to sharp the same for that key.

It is obvious that strings may be flatted, as is necessary in certain of the keys, by sharping all save those which it is desired shall be flat, and in this way upon three bridge bars, I have found that a sufficient number of interrupted bridges may be arranged for playing in any key which may in practice be found necessary.

The bars are so spaced with relation to each other that the bridges on one bar will change the pitch exactly a half a tone from that given by the next adjacent bridges. Thus if the middle bar is depressed the pitch of the strings in contact with its bridge will be half a tone higher than they would be if the last or end bar were depressed.

In my arrangement, upon the last or end bar there is arranged a continuous bridge adapted for use in connection with the interrupted bridges of the middle bar, and in addition, there are arranged three interrupted bridges for use in connection with the permanent bridge on the instrument, certain of the keys, to wit, C sharp, D and B, being formed by simply sharping the strings by bringing the interrupted bridges into contact therewith at the proper point without the employment of a supplemental continuous bridge. For instance, the key of D, shown in Fig. 1, on the last bar is arranged to sharp the F and C strings only throughout the whole instrument, and it is apparent without further description that these interrupted bridges may be so placed as to sharp any of the strings desired for playing in any key, and by adjusting the carriage along to the proper point any desired pitch may be given the strings.

To assist in the proper adjustment of the carriage along the strings, a scale K is mounted along one edge of the body of the instrument, and a pointer K′ secured on one edge of the carriage registers with graduations on said scale to indicate when the carriage is at the proper point for the bridges to be brought in contact with the strings to secure the proper intonation.

Various means may be employed for depressing the bridge bars and holding them in proper position, and as a simple means for accomplishing this result, I have shown the ends of said bars reduced for the engagement of hooks L secured on the ends of the carriage and adapted when said bars are depressed, by the fingers to be swung up over the squared ends to hold them depressed. The squared ends, it will be noted, insure the centering of the bridges on the under side which is essential to secure purity in the tone.

The ways upon which the carriage slides should be of considerable strength in order to prevent any upward yielding when the bridges are brought in contact with the

strings, and I have secured this result by providing said ways with a central brace M secured to the body of the instrument, and the bearings for the carriage are provided with a slot at the bottom through which the brace may pass as the carriage is moved along in one direction or the other.

While I have described the ways for the carriage as running substantially parallel with the strings, it will be observed from Fig. 1, that they are not absolutely parallel, but are slightly oblique thereto and the carriage is not exactly parallel with the fixed bridge, this arrangement being desirable to secure greater accuracy in the adjustment of the supplemental movable bridges upon the strings in accordance with well known principles governing the rates of vibration necessary to secure the proper tones in the scales, it being a well known fact that it is necessary to shorten the strings giving the higher tones rather more in proportion than those making a less number of vibrations.

From the foregoing description, the adjustment necessary to play in any particular key will be readily understood. For instance, we will assume that it is desired to play in the key of F♯. The carriage is first adjusted along the ways until the pointer is at the F indication. Then, it being ascertained from the marks on the bridge bars that F is on the first bar, the middle bar is turned until its continuous bridge is down. Then the bar is depressed and fastened in place with the continuous supplemental bridge in contact with all the strings. Then the first bar is turned until the interrupted bridges for sharping the six strings necessary in this key are at the bottom. Then this bar is depressed and fastened in place, when the instrument will be found to be tuned in the key of F♯. This procedure is followed out for adjusting the instrument in each of the other keys and when adjusted, it is played in the usual manner, the damper bars operating to give the proper chords in every key as will be readily understood by all musicians.

By the described arrangement instead of the limited number of chords which can be ordinarily struck with such instruments, the full range of chords in every key may be struck and the capacity of the instrument is vastly increased, thereby enabling it to be used in playing music of ordinary character and adapting it for accompanying other musical instruments whether permanently strung as in the piano or not, for it is obvious that by slightly varying the position of the carriage from the indications, the tone may be made to harmonize with any other instrument.

Having thus described my invention, what I claim as new is—

1. In a musical instrument, such as described, the combination with the body of the instrument, the fixed bridge and strings strained over the same, of a supplemental continuous bridge movable into and out of contact with the strings, and a supplemental interrupted bridge movable into and out of contact with the strings for adjusting the instrument to play in different keys, substantially as described.

2. In a musical instrument, such as described, the combination with the body of the instrument, the fixed bridge and strings strained over the same of the bar having an interrupted bridge thereon moved into and out of contact with the strings in front of the fixed bridge and a series of damper bars arranged transversely across the strings; substantially as described.

3. In a musical instrument, such as described, the combination with the body, the fixed bridge and the strings strained over the same, of the rotary bar having a series of interrupted bridges thereon located in front of the fixed bridge, said interrupted bridges being brought into contact with the strings to vary the tones of the same; substantially as described.

4. In a musical instrument, such as described, the combination with the body, the fixed bridge, the strings strained over the same and the series of damper pads arranged transversely across the strings, of the rotary bar having a series of interrupted bridges thereon, located in front of the fixed bridge and movable toward and away from the strings, whereby different bridges may be brought into contact with the strings to vary the tones of the same; substantially as described.

5. In a musical instrument, such as described, the combination with the body, the fixed bridge and strings strained over the same, of a supplemental interrupted bridge movable longitudinally of the strings and movable into and out of contact with the strings; substantially as described.

6. In a musical instrument, such as described, the combination with the body, the fixed bridge and strings strained over the same, of a supplemental continuous bridge and a supplemental interrupted bridge, connected for simultaneous movement longitudinally of the strings and movable into and out of contact with the strings; substantially as described.

7. In a musical instrument, such as described, the combination with the body, the fixed bridge and strings strained over the same, of a supplemental bridge carriage mounted in ways on the body to move longitudinally of the strings and the bridge bars mounted in the carriage and the bridges on said bars movable into and out of contact with the strings; substantially as described.

8. In a musical instrument, such as described, the combination with the body, the fixed bridge and strings strained over the same, of a supplemental bridge carriage mounted in ways on the body to move longitudinally of the strings and the series of vertically movable bars carrying supplemental

bridges mounted in the carriage; substantially as described.

9. In a musical instrument, such as described, the combination with the body, the fixed bridge and strings strained over the same, of a supplemental bridge carriage mounted in ways on the body to move longitudinally of the strings, the series of vertically movable bars carrying supplemental bridges mounted in the carriage and locks for holding said bars in depressed position with the bridges in contact with the strings; substantially as described.

10. In a musical instrument, such as described, the combination with the body, the fixed bridge and strings strained over the same, of a supplemental bridge carriage mounted in ways on the body to move longitudinally of the strings, rotary bars mounted in said carriage and a series of supplemental bridges on said bars; substantially as described.

11. In a musical instrument, such as described, the combination with the body, the fixed bridge and strings strained over the same, of a supplemental bridge carriage mounted in ways on the body to move longitudinally of the strings, a series of rotary vertically movable bars mounted in the carriage and a series of supplemental bridges on each of said bars with means for holding the bridges in contact with the strings; substantially as described.

12. In a musical instrument, such as described, the combination with the body, the fixed bridge and strings strained over the same, of a supplemental bridge carriage movable longitudinally of the strings, a series of parallel bars mounted in vertical slot bearings in the carriage and having the squared ends, hooks on the carriage cooperating with said squared ends to hold the bars in position and supplemental bridges on the bars; substantially as described.

13. In a musical instrument, the combination with the body, the fixed bridge and strings strained over the same, of the series of supplemental bridge bars carrying supplemental bridges and so spaced with relation to each other that the bridges on any one bar will when in contact with the strings raise their pitch half a tone above the tone given by the strings when the adjacent bridge nearer the ends of the strings is in contact therewith; substantially as described.

ABRAM M. ROOS.

Witnesses:
JACOB D. MORTS,
J. H. HAGENAH.